APPENDIX-A
(Sheet 2 of 2)

B. INTERNATIONAL STANDARDS ON HSE

Safety Glasses	:	ANSI Z 87.1, ANSI ZZ 87.1, AS 1337, BS 2092, BS 1542, BS 679, DIN 4646/ 58311
Safety Shoes	:	ANSI Z 41.1, AS 2210, EN 345
Hand Gloves	:	BS 1651
Ear Muffs	:	BS 6344, ANSI S 31.9
Hard Hat	:	ANSI Z 89.1/89.2, AS 1808, BS 5240, DIN 4840
Goggles	:	ANSI Z 87.1
Face Shield	:	ANSI Z 89.1
Breathing Apparatus	:	BS 4667, NIOSH
Welding & Cutting	:	ANSI Z49.1
Safe handling of compressed:	P-1	(Compressed Gas Association Gases in cylinders 1235 Jefferson Davis Highway, Arlington VA 22202 - USA)
Full body harness	:	EN-361
Lanyard	:	EN-354
Karabiner	:	EN-362 and EN-12275

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APPENDIX-B

DETAILS OF FIRST AID BOX

SL. NO.	DESCRIPTION		QUANTITY
1.	Small size Roller Bandages, 1 Inch Wide	(Finger Dressing small)	6 Pcs.
2.	Medium size Roller Bandages, 2 Inches Wide	(Hand & Foot Dressing)	6 Pcs.
3.	Large size Roller Bandages, 4 Inches Wide	(Body Dressing Large)	6 Pcs.
4.	Large size Burn Dressing	(Burn Dressing Large)	4 Pkts.
5.	Cotton Wool	(20 gms packing)	4 Pkts.
6.	Antiseptic Solution Dettol (100 ml.) or Savlon		1 Bottle
7.	Mercurochrome Solution (100 ml.) 2% in water		1 Bottle
8.	Ammonia Solution (20 ml.)		1 Bottle
9.	A Pair of Scissors		1 Piece
10.	Adhesive Plaster (1.25 cm X 5 m)		1 Spool
11.	Eye pads in Separate Sealed Pkt.		4 pcs.
12.	Tourniqut		1 No.
13.	Safety Pins		1 Dozen
14.	Tinc. Iodine/ Betadine (100 ml.)		1 Bottle
15.	Polythene Wash cup for washing eyes		1 No.
16.	Potassium Permanganate (20 gms.)		1 Pkt.
17.	Tinc. Benzoine (100 ml.)		1 Bottle
18.	Triangular Bandages		2 Nos.
19.	Band Aid Dressing		5 Pcs.
20.	Iodex/Moov(25 gms.)		1 Bottle
21.	Tongue Depressor		1 No.
22.	Boric Acid Powder (20 gms.)		2 Pkt.
23.	Sodium Bicarbonate (20 gms.)		1 Pkt.
24.	Dressing Powder (Nebasulf) (10 gms.)		1 Bottle
25.	Medicinal Glass		1 No.
26.	Duster		1 No.
27.	Booklet (English& Local Language)		1 No. each
28.	Soap		1 No.
29.	Toothache Solution		1 No.
30.	Vicks (22 gms.)		1 Bottle
31.	Forceps		1 No.
32.	Snake –Bite Lancet		1No.
33.	Note Book		1 No.
34.	Splints		4 Nos.
35.	Lock		1 Piece
36.	Life Saving/Emergency/Over-the counter Drugs		As decided at site

Box size: Suitable size first aid box to be used for first aid items

Note : The medicines prescribed above are only indicative. Equivalent medicines can also be used. A prescription, in this regard, shall be required from a qualified Physician.

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APPENDIX-C

TYPE OF FIRES VIS-À-VIS FIRE EXTINGUISHERS

Fire Extinguisher → / Fire ↓	Water	Foam	CO_2	Dry Powder	Multi purpose (ABC)
Originated from paper, clothes, wood	✔	✔	can control minor surface fires	can control minor surface fires	✔
Inflammable liquids like alcohol, diesel, petrol, edible oils, bitumen	×	✔	✔	✔	✔
Originated from gases like LPG, CNG, H_2	×	×	✔	✔	✔
Electrical fires	×	×	✔	✔	✔

LEGEND : ✔ : CAN BE USED

× : NOT TO BE USED

Note: Fire extinguishing equipment must be checked atleast once a year and after every use by an authorized person. The equipment must have an inspection label on which the next inspection date is given. Type of extinguisher shall clearly be marked on it.

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APPENDIX-D

List of Statutory Acts & Rules Relating to HSE

- The Indian Explosives Act and Rules
- The Motor Vehicle Act and Central Motor Vehicle Rules
- The Factories Act and concerned Factory Rules
- The Petroleum Act and Petroleum Rules
- The Workmen Compensation Act
- The Gas Cylinder Rules and the Static & Mobile Pressure Vessels Rules
- The Indian Electricity Act and Rules
- The Indian Boiler Act and Regulations
- The Water (Prevention & Control & Pollution) Act
- The Water (Prevention & Control of Pollution) Cess Act
- The Mines & Minerals (Regulation & Development) Act
- The Air (Prevention & Control of Pollution) Act
- The Atomic Energy Act
- The Radiation Protection Rules
- The Indian Fisheries Act
- The Indian Forest Act
- The Wild Life (Protection) Act
- The Environment (Protection) Act and Rules
- The Hazardous Wastes (Management & Handling) Rules
- The Manufacturing, Storage & import of Hazardous Chemicals Rules
- The Public Liability Act
- The Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act
- Other statutory acts Like EPF, ESIS, Minimum Wages Act.

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APPENDIX-E(Sheet 1 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(A) EXCAVATION Pit Excavation upto 3.0m	Falling into pit	Personal injury	Provide guard rails/ barricade with warning signal Provide atleast two entries/ exits. Provide escape ladders.
	Earth Collapse	Suffocation/ Breathlessness Buried	Provide suitable size of shoring and strutting, if required. Keep soil heaps away from the edge equivalent to 1.5m or depth of pit whichever is more. Don't allow vehicles to operate too close to excavated areas. Maintain atleast 2m distance from edge of cut. Maintain sufficient angle of repose. Provide slope not less than 1:1 and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock. Battering/benching the sides.
	Contact with buried electric cables Gas/ Oil Pipelines	Electrocution Explosion	Obtain permission from competent authorities, prior to excavation, if required. Locate the position of buried utilities by referring to plant drawings. Start digging manually to locate the exact position of buried utilities and thereafter use mechanical means.
Pit Excavation beyond 3.0m	Same as above plus Flooding due to excessive rain/ underground water	Can cause drowning situation	Prevent ingress of water Provide ring buoys Identify and provide suitable size dewatering pump or well point system
	Digging in the vicinity of existing Building/ Structure	Building/Structure may collapse Loss of health & wealth	Obtain prior approval of excavation method from local authorities. Use under-pining method Construct retaining wall side by side.
	Movement of vehicles/ Equipments close to the edge of cut.	May cause cave-in or slides. Persons may get buried.	Barricade the excavated area with proper lighting arrangements Maintain at least 2m distance from edge of cut and use stop blocks to prevent over-run Strengthen shoring and strutting

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APPENDIX-E: (Sheet 2 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
Narrow deep excavations for pipelines, etc.	Same as above plus Frequent cave-in or slides	May cause severe injuries or prove fatal	Battering/benching of sides Provide escape ladders
	Flooding due to Hydro- static testing	May arise drowning situation	Same as above plus Bail out accumulated water Maintain adequate ventilation.
Rock by excavation blasting	Improper handling of explosives	May prove fatal	Ensure proper storage, handling & carrying of explosives by trained personnel. Comply with the applicable explosive acts & rules.
	Uncontrolled explosion	May cause severe injuries or prove fatal	Allow only authorized persons to perform blasting operations. Smoking and open flames are to be strictly prohibited
	Scattering of stone pieces in atmosphere	Can hurt people	Use PPE like goggles, face mask, helmets etc.
Rock excavation by blasting (Contd)	Entrapping of persons/ animals.	May cause severe injuries or prove fatal	Barricade the area with red flags and blow siren before blasting.
	Misfire	May explode suddenly	Do not return to site for atleast 20 minutes or unless announced safe by designated person.
Piling Work	Failure of pile-driving equipment	Can hurt people	Inspect Piling rigs and pulley blocks before the beginning of each shift.
	Noise pollution	Can cause deafness and psychological imbalance.	Use personal protective equipment's like ear plugs, muffs, etc.
	Extruding rods/casing	Can hurt people	Barricade the area and install sign boards Provide first-aid
	Working in the vicinity of 'Live-Electricity'	Can cause electrocution/ Asphyxiation	Keep sufficient distance from Live-Electricity as per IS code. Shut off the supply, if possible Provide artificial/rescue breathing to the injured
(B) CONCRETING	Air pollution by cement	May affect Respiratory System	Wear respirators or cover mouth and nose with wet cloth.
	Handling of ingredients	Hands may get injured	Use gloves & other PPE.
	Protruding reinforcement rods.	Feet may get injured	Provide platform above reinforcement for movement of workers or provide end caps for protection on reinforcement bars.

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APPENDIX-E :(Sheet 3 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Earthing of electrical mixers, vibrators, etc. not done.	Can cause electrocution/ asphyxiation	Ensure earthing of equipments and proper functioning of electrical circuit before commencement of work.
	Falling of materials from height	Persons may get injured	Use hard hats Remove surplus material immediately from work place. Ensure lighting arrangements during night hours
	Continuous pouring by same gang	Cause tiredness of workers and may lead to accident.	Insist on shift pattern Provide adequate rest to workers between subsequent pours.
	Revolving of concrete mixer/ vibrators	Parts of body or clothes may get entrapped.	Allow only mixers with hopper Provide safety cages around moving motors Ensure proper mechanical locking of vibrator.
Super-structure	Same as above plus Deflection in props or shuttering material	Shuttering/props may collapse and prove fatal	Avoid excessive stacking on shuttering material Check the design and strength of shuttering material before commencement of work Rectify immediately the deflection noted during concreting.
	Passage to work place	Improperly tied and designed props/planks may collapse	Ensure the stability and strength of passage before commencement of work. Do not overload and stand under the passage.
(C) REINFOR-CEMENT	Curtailment and binding of rods	Persons may get injured	Use PPE like gloves, shoes, helmets, etc. Avoid usage of shift tools
	Carrying of rods for short distances/at heights	Workers may get injured their hands and shoulders.	Provide suitable pads on shoulders and use safety gloves. Tie up rods in easily liftable bundles Ensure proper staging.
	Checking of clear distance/ cover with hands	Rods may cut or injure the fingers	Use measuring devices like tape, measuring rods, etc.
	Hitting projected rods and standing on cantilever rods.	Persons may get injured and fell down	Use safety shoes and avoid standing unnecessarily on cantilever rods Avoid wearing of loose clothes

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APPENDIX-E:(Sheet 4 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Falling of material from height	May prove fatal	Use helmets Provide safety nets
	Transportation of rods by trucks/ trailers	Protruded rods may hit the persons	Use red flags/lights at the ends Do not protrude the rods in front of or by the side of driver's cabin. Do not extend the rods 1/3rd of deck length or 1.5m whichever is less
(D)WELDING AND GAS CUTTING	Welding radiates invisible ultraviolet and infra-red rays	Radiation can damage eyes and skin.	Use specified shielding devices and other PPE of correct specifications. Avoid thoriated tungsten electrodes for GTAW
	Improper placement of oxygen and acetylene cylinders	Explosion may occur	Move out any leaking cylinder Keep cylinders in vertical position Use trolley for transportation of cylinders and chain them Use flashback arrestors
	Leakage/ cuts in hoses	May cause fire	Purge regulators immediately and then turn off Never use grease or oil on oxygen line connections and copper fittings on acetylene lines Inspect regularly gas carrying hoses Always use red hose for acetylene & other fuel gases and black for oxygen
	Opening-up of cylinder	Cylinder may burst	Always stand back from the regulator while opening the cylinder Turn valve slowly to avoid bursting Cover the lug terminals to prevent short circuiting
	Welding of tanks, container or pipes storing flammable liquids	Explosion may occur	Empty & purge them before welding Never attach the ground cable to tanks, container or pipe storing flammable liquids Never use LPG for gas cutting

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APPENDIX-E:(Sheet 5 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES ...(Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(E) RADIOGRAPHY	Ionizing radiation	Radiations may react with the skin and can cause cancer, skin irritation, dermatitis, etc.	Ensure Safety regulations as per BARC/AERB before commencement of job. Cordon off the area and install Radiation warning symbols Restrict the entry of unauthorized persons Wear appropriate PPE and film badges issued by BARC/AERB
	Transportation and Storage of Radiography source	Same as above	Never touch or handle radiography source with hands Store radiography source inside a pit in an exclusive isolated storage room with lock and key arrangement. The pit should be approved by BARC/AERB. Radiography source should never be carried either in passenger bus or in a passenger compartment of trains. BARC/AERB has to be informed before source movement. Permission from Director General of Civil Aviation is required for booking radio isotopes with airlines.
	Loss of Radio isotope	Same as above	Try to locate with the help of Survey Meter. Inform BARC/AERB (*)
(F) ELECTRICAL INSTALLATION ANDUSAGE	Short circuiting	Can cause Electrocution or Fire	Use rubberized hand gloves and other PPE Don't lay wires under carpets, mats or door ways. Allow only licensed electricians to perform on electrical facilities Use one socket for one appliance Ensure usage of only fully insulated wires or cables Don't place bare wire ends in a socket Ensure earthing of machineries and equipment's Do not use damaged cords and avoid temporary connections Use spark-proof/flame proof type field distribution boxes.

(*) Atomic Energy Regulatory Board (AERB),
Bhabha Atomic Research Centre (BARC)
Anushakti Nagar, Mumbai – 400 094

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APPENDIX-E:(Sheet 6 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			Do not allow open/bare connections Provide all connections through 30mAELCB Protect electrical cables/equipments from water and naked flames Check all connections before energizing
	Overloading of Electrical System	Bursting of system can occur which leads to fire	Display voltage and current ratings prominently with 'Danger' signs. Ensure approved cable size, voltage grade and type Switch off the electrical utilities when not in use Do not allow unauthorized connections. Ensure proper grid wise distribution of Power
	Improper laying of overhead and underground transmission lines/cables	Can cause electrocution and prove fatal	Do not Jay un armoured cable directly on ground, wall, roof of trees Maintain atleast 3m distance from HT cables All temporary cables should be laid atleast 750 mm below ground on 100 mm fine sand overlying by brick soling Provide proper sleeves at crossings/ inter-sections Provide cable route markers indicating the type and depth of cables at intervals not exceeding 30m and at the diversions/termination
(G) FIRE PREVENTION AND PROTECTION	Small fires can become big ones and may spread to the surrounding areas	Cause burn injuries and may prove fatal	In case a fire breaks out, press fire alarm system and shout "Fire, Fire". Keep buckets full of sand & water/ fire extinguishing equipment near hazardous locations. Confine smoking to 'Smoking Zones' only. Train people for using specific type of fire fighting equipments under different classes of fire. Keep fire doors/shutters, passages and exit doors unobstructed. Maintain good housekeeping and first-aid boxes (for details refer Appendix-B). Don't obstruct assess to Fire extinguishers. Do not use elevators for evacuation during fire. Maintain lightening arrestors for elevated structures. Stop all electrical motors with internal combustion.

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APPENDIX-E :(Sheet 7 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			Move the vehicles from dangerous locations. Remove the load hanging from the crane booms Remain out of the danger areas.
	Improper selection of Fire extinguisher	It may not extinguish the fire	Ensure usage of correct fire extinguisher meant for the specified fire (for details refer Appendix-C). Do not attempt to extinguish Oil and electric fires with water. Use foam cylinders/CO_2/sand or earth.
	Improper storage of highly inflammable substances	Same as above	Maintain safe distance of flammable substances from source of ignition. Restrict the distribution of flammable materials to only min. necessary amount. Construct specifically designed fuel storage facilities. Keep chemicals in cool and dry place away from heat. Ensure adequate ventilation. Before welding operation, remove or shield the flammable material properly. Store flammable materials in stable racks, correctly labeled preferably with catchment trays. Wipe off the spills immediately
	Short circuiting of electrical system	Same as above Can cause Electrocution	Don't lay wires under carpets, mats or door ways Use one socket for one appliance. Use only fully insulated wires or cables. Do not allow open/bare connections. Provide all connections through 30mAELCB. Ensure earthing of machineries and equipments.
(H) VEHICULAR MOVEMENT	Crossing the Speed Limits (Rash driving)	Personal injury	Obey speed limits and traffic rules strictly. Always expect the unexpected and be a defensive driver. Use seat belts/helmets. Blow horn at intersections and during overtaking operations. Maintain the vehicle in good condition. Do not overtake on curves, bridges and slopes.
	Adverse weather condition	Same as Above	Read the road ahead and ride to the left. Keep the wind screen and lights clean. Do not turn at speed. Recognize the hazard, understand the defense and act correctly in time.

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APPENDIX-E :(Sheet 8 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Consuming alcohol before and during the driving operation	Same as above	Alcohol and driving do not mix well. Either choose alcohol or driving. If you have a choice between hitting a fixed object or an on-coming vehicle, hit the fixed object Quit the steering at once and become a passenger. Otherwise take sufficient rest and then drive. Do not force the driver to drive fast and round the clock. Do not day dream while driving
	Falling objects/ Mechanical failure	May prove fatal	Ensure effective braking system, adequate visibility for the drives, reverse warning alarm. Proper maintenance of the vehicle as per manufacturer instructions
(I) PROOF TESTING (HYDROSTATIC/ PNEUMATIC TESTING)	Bursting of piping Collapse of tanks Tanks flying off	May cause injury and prove fatal	Prepare test procedure & obtain EIL/owner's approval. Provide separate gauge for pressurizing pump and piping/equipment. Check the calibration status of all pressure gauges, dead weight testers and temperature recorders. Take dial readings at suitable defined intervals and ensure most of them fall between 40-60% of the gauge scale range. Provide safety relief valve (set at pressure slightly higher than test pressure) while testing with air/ nitrogen. Ensure necessary precautions, stepwise increase in pressure, tightening of bolts/nuts, grouting, etc. before and during testing. Keep the vents open before opening any valve while draining out of water used for hydro-testing of tanks. Pneumatic testing involves the hazard of released energy stored in compressed gas. Specific care must therefore be taken to minimize the chance of brittle failure during a pneumatic leak test. Test temperature is important in this regard and must be considered when the designer chooses the material of construction.

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APPENDIX-E :(Sheet 9 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			A pressure relief device shall be provided, having a set pressure not higher than the test pressure plus the lesser of 345 KPa (50 psi) or 10% of the test pressure. The gas used as test fluid, if not air, shall be nonflammable and nontoxic.
(J) WORKING AT HEIGHTS	Person can fall down	May sustain severe injuries or prove fatal	Provide guard rails/barricade at the work place Use PPE like full body harness, life line, helmets, safety shoes, etc. Obtain a permit before starting the work at height above 2 meters Fall arrest and safety nets, etc. must be installed Provide adequate working space(min. 0.6 m) Tie/weld working platform with fixed support Use roof top walk ladder while working on a slopping roofs Avoid movement on beams
		May hit the scrap/material stacked at the ground or in between	Keep the work place neat and clean Remove the scrap immediately
	Material can fall down	May hit the workers working at lower levels and prove fatal	Same as above plus Do not throw or drop materials or equipment from height. i.e. do not *bomb* materials All tools to be carried in a tool-kit Bag or on working uniform Remove scrap from the planks Ensure wearing of helmet by the workers working at lower levels. Multiple activities at same location to be avoided. .
(K) CONFINED SPACES	Suffocation/ drowning	Unconsciousness, death	Use respiratory devices, if reqd. Avoid overcrowding inside a confined space Provide Exhaust fans for ventilation Do not wear loose clothes, neck ties, etc. Fulfill conditions of the permit

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APPENDIX-E:(Sheet 10 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			Check for presence of hydrocarbons, O_2 level Obtain work permit before entering a confined space Ensure that the connected piping of the equipment which is to be opened is pressure free, fluid has been drained, vents are open and piping is positively isolated by a blind flange
	Presence of foul smell and toxic substances	Inhalation can pose threat to life	Same as above plus Check for hydrocarbon and Aromatic compounds before entering a confined space Depute one person outside the confined space for continuous monitoring and for extending help in case of an emergency
	Ignition/ flame can cause fire	Person may sustain burn injuries or explosion may occur	Keep fire extinguishers at a hand distance Remove surplus material and scrap immediately Do not smoke inside a confined space Do not allow gas cylinders inside a confined space Use low voltage (24V) lamps for lighting Use tools with air motors or electric tools with max. voltage of 24V Remove all equipment's at the end of the day
(L) HANDLING AND LIFTING EQUIPMENTS	Failure of load lifting and moving equipment's	Can cause accident and prove fatal	Avoid standing under the lifted load and within the operating radius of cranes. Check periodically oil, brakes, gears, horns and tyre pressure of all moving machinery. Check quality, size and condition of all chain pulley blocks, slings, U-clamps, D-shackles, wire ropes, etc. Allow crane to move only on hard, firm and leveled ground. Allow lifting slings as short as possible and check gunny packings at the friction points. Do not allow crane to tilt its boom while moving Install Safe Load Indicator. Ensure certification by applicable authority.

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APPENDIX-E :(Sheet 11 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Overloading of lifting equipments	Same as above	Safe lifting capacity of derricks and winches written on them shall be got verified The max. safe working load shall be marked on all lifting equipments Check the weight of columns and other heavy items painted on them and accordingly decide about the crane capacity, boom and angle of erection Allow only trained operators and riggers during crane operation.
	Overhead electrical wires	Can cause electrocution and fire	Do not allow boom or other parts of crane to come within 3m reach of overhead HT cables Hook and load being lifted shall preferably remain in full visibility of crane operators.
(M) SCAFFOLDING, FORMWORK AND LADDERS	Person can fall down	Person May sustain severe injuries and prove fatal	Provide guard rails for working at height. Face ladder while climbing and use both hands. Ladders shall extend about 1m above landing for easy access and tying up purpose. Do not place ladders against movable objects and maintain base at 1/4 unit of the working length of the ladder. Suspended scaffolds shall not be less than 500 mm wide and tied properly with ropes. No loose planks shall be allowed. Use PPE, like helmets, safety shoes etc.
	Failure of scaffolding material	Same as above	Inspect visually all scaffolding materials for stability and anchoring with permanent structures. Design scaffolding for max. load carrying capacity. Scaffolding planks shall not be less than 50X250 mm full thickness lumber or equivalent. These shall be cleated or secured and must extend over the end supports by at least 150mm and not more than 300mm. Don't overload the scaffolds. Do not splice short ladders to make a longer one. Vertical ladders shall not exceed 6m.
	Material can fall down	Persons working at lower level gets injured	Remove excess material and scrap immediately. Carry the tools in a tool-kit bag only. Provide safety nets.

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APPENDIX-E:(Sheet 12 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS &PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(N) STRUC-TURAL WORKS	Personal negligence and danger of fall	Can cause injury or casualty	Do not take rest inside rooms built for welding machines or electrical distribution system. Avoid walking on beams at height. Wear helmet with chin strap and full body harness while working at height. Use hand gloves and goggles during grinding operations. Cover or mark the sharp and projected edges. Do not stand within the operating radius of cranes.
	Lifting/ slipping of material	Same as above	Do not stand under the lifted load. Stack properly all the materials. Avoid slippage during handling. Control longer pieces lifted up by cranes from both ends. Remove loose materials from height. Ensure tightening of all nuts & bolts.
(O)PIPELIN E WORKS	Erection/ lowering failure	Can cause injury	Do not stand under the lifted load. Do not allow any person to come within the radii of the side boom handling pipes. Check the load carrying capacity of the lifting tools & tackles. Use safe Load Indicators (SLI). Use appropriate PPEs.
	Other	Same as above	Wear gum boots in marshy areas. Allow only one person to perform signaling operations while lowering of pipes. Wedges to be provided below the pipe to prevent spool/pipe roll out. Provide night caps on pipes. Provide end covers on pipes for stoppage of pigs while testing/ cleaning operations.
(P) GRIT BLASTING	Pollution in neighboring area, hit by grit sand high pressure air	Can cause personal injury	Ensure the blasting is done in enclosed shed. Keep safe distance while blasting operations. Wear positive pressure blast hood or helmet with view-window, ear-muff/plug, gloves, overall or leather coat /apron, rubber shoes.

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APPENDIX-F

TRAINING SUBJECTS / TOPICS

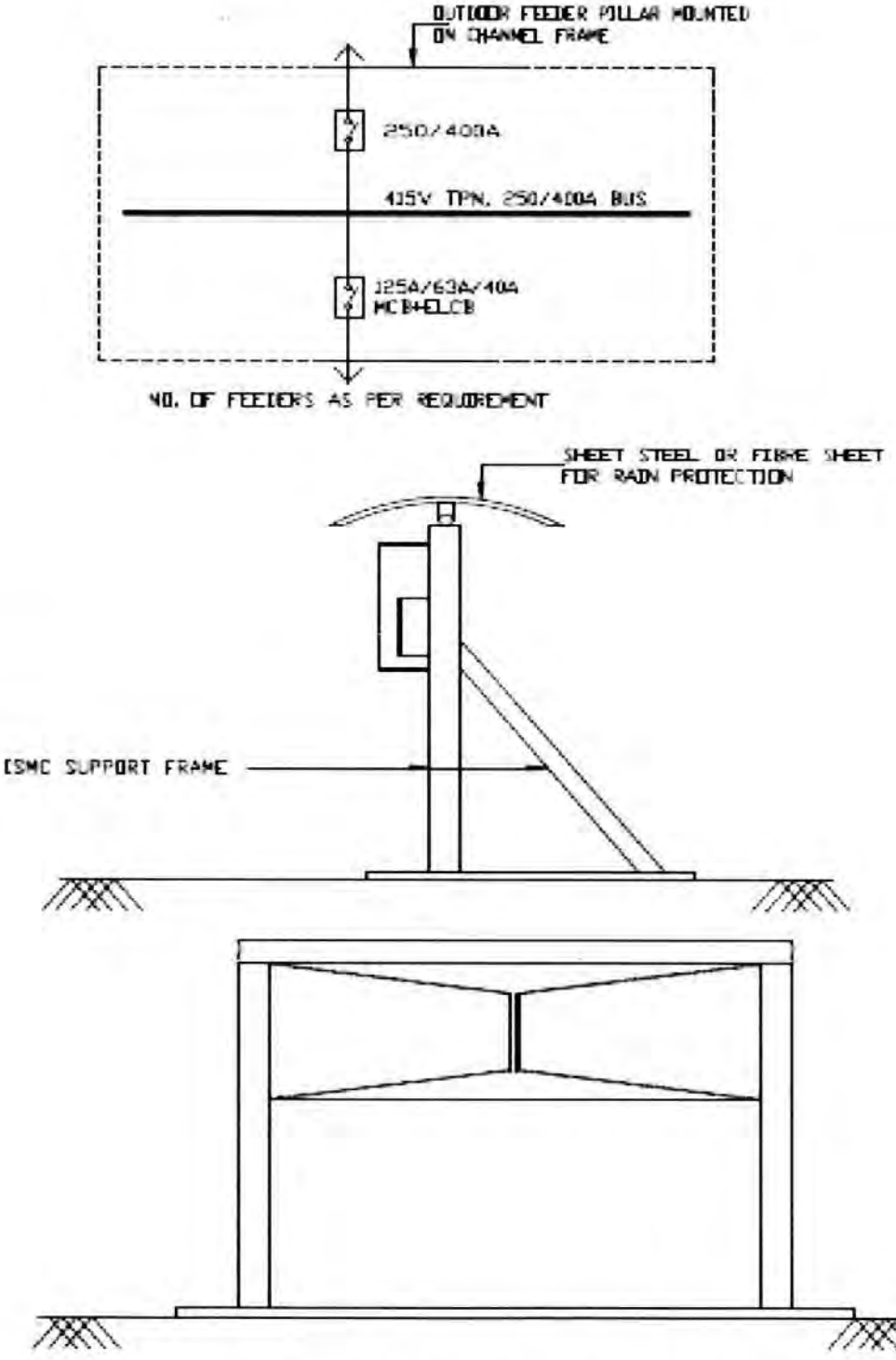
(For contractors' personnel)

1. The Law & Safety – Statutory Requirement / Applicable statutes / Duties of employer / employee.
2. Policy & Administration – Why HSE? / Duties & Responsibilities of Safety Personnel at project site / Effect of incentive on accident prevention.
3. HSE & Supervision – Duties of Supervisor / HSE integrated supervision / Who should be held responsible for site accidents?
4. Safety Budget / Cost of Accidents – Direct costs / Indirect costs.
5. Hazard Identification / Type of hazards / HIRAC.
6. Behavioral Safety & Motivation.
7. Housekeeping – Storage / Stacking / Handling of materials / Hydraulic Mobile Crane handling.
8. Occupational Health in Construction sector.
9. Personal Protective Equipment's – Respiratory & Non- respiratory.
10. Electricity & Safety – ELCB / Fuse / Powered tools / Project illumination.
11. Handling of Compressed Gas – Transportation / Storage / FBAs / Fire prevention.
12. Machine Safety – Machine guarding / Maintenance.
13. Transportation – Hazards & risks in transp. of materials / ODC consignments.
14. Cranes & Other Lifting machinery – Legal requirements vis-à-vis essential safety requirements.
15. Communication – HSE Induction / TBTs / Safety Committee / Safety meeting / Safety propaganda / Publicity.
16. Excavation – Risks & Dangers / Safety measures.
17. Working at Heights – Use of ladder / Work on roofs / Scaffolds / Double harness lanyards / Life-line / Fall arrester / Safety Nets / Floor openings.
18. Hazards in Welding & important safety precautions.
19. Gas Cutting – Hazards & safety measures.
20. Fire prevention & fire protection.

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APPENDIX - G

CONSTRUCTION POWER BOARD(typ)



NOTES:-

1. CONTRACTOR TO INSTALL TEMPORARY CONST. POWER BOARD AS SHOWN IN THE DRG. ITS LOCATION SHALL BE EASILY ACCESABALE.
2. POWER DISTRIBUTION BOARD SHALL BE EARTHED AT TWO POINTS BY MINIMUM 40X5MM GI STRIP FROM THE AVILABLE GRID OR DIRECTLY CONNECTED TO TWO DIRECTLY DRIVEN EARTH ELECTRODES.
3. DISTRIBUTION BOARD SHALL BE FABRICATED BY USING 14MM CRCA SHEET STEELWITH HINGED DOORSAND ALL COMPONENT MOUNTED IN IT.
4. ALL INCOMING AND OUTGOING CABLESSHALL HAVE BOTTOM ENTRY.

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APPENDIX-H

LIST OF PROCEDURES (MINIMUM) TO BE FORMING PART OF HSE PLAN:-

A. HSE Management Procedures:

- HSE Risk Management (including HIRA)
- HSE Legal Compliance and Other Requirements
- HSE Objectives & Performance
- HSE Training and Competence (including Induction)
- HSE Motivation &Award Scheme
- HSE Audits
- HSE Sub Contractor Management
- HSE Emergency Management
- HSE Incidents Reporting and Management
- HSE procedure for Behaviour based Safety
- First Aid & Management
- Roles, Responsibility, accountabilities and Authorities

B. Job procedures/Safe Operating procedures

- Setting Up Site &Signages
- Working at Height
- Confined Space Entry
- Permit to Work (including hot works)
- Housekeeping
- Transportation of materials including Manual Handling
- Earthmoving Operations & excavation
- Scaffolding
- Fire Prevention/Protection
- Hazardous Substance handling & Storage
- Personal Protective Equipment

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APPENDIX-I

LIFE SAVING RULES

Bypassing Safety Controls

Obtain authorisation before overriding or disabling safety controls



- I understand & use safety-critical equipment and procedure which apply to my task
- I obtain authorization before:
  - disabling or overriding safety equipment
  - deviating from procedures
  - crossing a barrier

Confined Space

Obtain authorisation before entering a confined space



- I confirm energy sources are isolated
- I confirm the atmosphere has been tested and is monitored
- I check and use my breathing apparatus when required
- I confirm there is an attendant standing by
- I confirm rescue plan is in place
- I obtain authorization to enter

Driving

Follow safe driving rules



- I always wear a seatbelt
- I do not exceed the speed limit, and reduce my speed for road conditions
- I do not use phones or operate devices while driving
- I am fit, rested and fully alert while driving
- I follow journey management requirements

Energy Isolation

Verify isolation and zero energy before work begins



- I have identified all energy sources
- I confirm that hazardous energy sources have been isolated, locked and tagged
- I have checked there is zero energy and tested for residual or stored energy

Hot Work

Controls flammables and ignition sources



- I identify and control ignition sources
- Before starting any hot work:
  - I confirm flammable material has been removed or isolated
  - I obtain authorization
- Before starting hot work in a hazardous are I confirm:
  - a gas test has been completed
  - gas will be monitored continually

Line of Fire

Keep yourself and others out of the line of fire



- I position myself to avoid:
  - moving objects
  - vehicles
  - pressure releases
  - dropped objects
- I establish and obey barriers and exclusion zones
- I take action to secure loose objects and report potentialdropped objects

Safe Mechanical Lifting

Plan lifting operations and control the area



- I confirm that the equipment and load have been inspected and are fit for purpose
- I only operate equipment that I am qualified to use
- I establish and obey barriers and exclusion zones
- I never walk under a suspended load

Work Authorization

Work with a valid permit when required



- I am authorised to perform the work
- I understand the permit
- I have confirmed that hazards are controlled and it is safe to start
- I stop and reassess if conditions change

Work at Height

Protect yourself against a fall when working at height



- I inspect my fall protection equipment before use
- I secure tools and work materials to prevent dropped objects
- I tie off 100% to approved anchor points while outside a protected area

Excavation

Follow safe excavation procedure



- Before starting any excavation:
  - I confirm availability of underground utilities
  - I obtain authorization
  - I take adequate precautions to prevent collapse of soil

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FORMAT NO. : HSE-1 REV 1

(Sheet 1 of 6)

SAFETY WALK-THROUGH REPORT

(Name & signature of walk through performer to be inserted at the bottom of each page)

Project : _____ Report no. : _____

Date : _____ Ccontractor : _____

Inspection by : _____ Owner : _____

Frequency : Monthly Job no. : _____

Note : Write 'NA' wherever the item is not applicable

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
1.	HOUSEKEEPING				
a)	Waste containers provided and used				
b)	Sanitary facilities adequate and Clean				
c)	Passageways and Walkways Clear				
d)	General neatness of working areas				
e)	Other				
2.	PERSONNEL PROTECTIVE EQUIPMENT				
a)	Goggles; Shields				
b)	Face protection				
c)	Hearing protection				
d)	Foot protection				
e)	Hand protection				
f)	Respiratory Masks etc.				
g)	Full body harness conforming to CE, EN 361				
h)	Hard hat (HDPE)				
i)	Other				
3.	EXCAVATIONS/OPENINGS				
a)	Openings properly covered or barricaded				
b)	Excavations shored				
c)	Excavations barricaded				
d)	Overnight lighting provided				
e)	Other				

Safety walk-through performer (Name & Signature).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 2 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
4.	WELDING & GAS CUTTING				
a)	Gas cylinders chained upright				
b)	Cables and hoses not obstructing				
c)	Screens or shields used				
d)	Flammable materials protected				
e)	Live electrode bits contained properly				
f)	Fire extinguisher (s) accessible				
g)	Other				
5.	SCAFFOLDING & BARRICADING				
a)	Fully decked platforms				
b)	Guard and intermediate rails in place				
c)	Toe boards in place				
d)	Adequate shoring				
e)	Adequate access				
f)	Positive barricading for critical activities				
g)	Installation of warning signs				
h)	Other				
6.	LADDERS				
a)	Extension side rails 1 m above				
b)	Top of landing				
c)	Properly secured				
d)	Angle + 70^0 from horizontal				
e)	Other				

Safety walk-through performer (Name &Signature).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 3 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
7.	HOISTS, CRANES AND DERRICKS				
a)	Condition of cables and sheaves OK				
b)	Condition of slings, chains, hooks and eyes O.K.				
c)	Inspection and maintenance log-books maintained				
d)	Outriggers used				
e)	Reverse horn installed / active / coupled with gear				
f)	Signs/barricades provided				
g)	Signals observed and understood				
h)	Qualified operators				
i)	Other				
8.	MACHINERY, TOOLS AND EQUIPMENT				
a)	Proper instruction				
b)	Safety devices				
c)	Proper cords				
d)	Inspection and maintenance				
e)	Other				
9.	VEHICLE AND TRAFFIC				
a)	Rules and regulations observed				
b)	Inspection and maintenance				
c)	Licensed drivers				
d)	Other				

Safety walk-through performer (Name &Signature).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 4 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
10.	TEMPORARY FACILITIES				
a)	Emergency instructions posted				
b)	Fire extinguishers provided				
c)	Fire-aid equipment available				
d)	Secured against storm damage				
e)	General neatness				
f)	In accordance with electrical requirements				
g)	Other				
11.	FIRE PREVENTION				
a)	Personnel trained& instructed to make use of facility				
b)	Fire extinguishers checked periodically & record maintained				
c)	No smoking in Prohibited areas.				
d)	Fire Hydrants not obstructed				
e)	Regular fire drill conducted				
12.	ELECTRICAL				
a)	Use of 3-core armored cables everywhere				
b)	Usage of 'All insulated' or 'double-insulated' electrical tools				
c)	All electrical connection are routed through ELCB				
d)	Natural Earthing at the source of power (Main DB)				
e)	Continuity and tightness of earth conductor				
f)	Effective covering of junction boxes, panels and other energized wiring places				
g)	Ground fault circuit interrupters provided				
h)	Prevention of tripping hazards maintained				
f)	DCP extinguishers arranged & licensed electrician engaged at site				

Safety walk-through performer (Name &Signature).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 5 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
13.	HANDLING AND STORAGE OF MATERIALS				
a)	Safely stored or stacked				
b)	Passageways clear / free from obstructions				
c)	Fire fighting facility in place				
14.	FLAMMABLE GASES AND LIQUIDS				
a)	Containers clearly identified / protected from fire				
b)	Safe storage & transportation arrangement made				
c)	Fire extinguishers positioned nearby				
d)	Facilities kept away from electric spark, hot spatters & ignition source.				
15.	WORKING AT HEIGHT				
a)	Approved Erection plan and work permit in place				
b)	Safe access, Safe work platform & Safety nets provided				
c)	Life lines, Fall arrester, Full body harness with double lanyards used;				
d)	Health Check record available for workers going up?				
e)	Protective handrails arranged around floor openings				
16.	CONFINED SPACE				
a)	Work Permit obtained from requisite authority				
b)	Test for toxic gas and sufficient availability of oxygen conducted & status				
c)	Supervisor present at site & at least one person outside the confined space for monitoring deputed				
d)	Availability of safe means of entry, exit and ventilation (register for entry & exit maintained)				
e)	Fire extinguisher and first-aid facility ensured				
f)	Lighting provision made by using 24V Lamp				
g)	Proper usage of PPEs ensured				
17.	RADIOGRAPHY				
a)	Proper storage and handling of source as per BARC/ AERB guidelines (authorized radiographer available)				
b)	Work permit obtained				

Safety walk-through performer (Name &Signature).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 6 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
c)	Cordoning of the area done				
d)	Use of appropriate PPE's ensured				
e)	HSE training to workers/supervisors imparted during the fortnight (indicate topic)				
f)	Minimum occupancy of workplace ensured				
18.	HEALTH CHECKS				
a)	All Workers medically examined and found be fit for working at heights (slinging, rigging, painting etc.) in confined space in excavation / trenching in shot blasting				
b)	Availability of First Aid box with contents				
c)	Proper sanitation at site, office and labour camps				
d)	Arrangement of medical facilities.				
e)	Measures for dealing with illness at site & labour camps.				
f)	Availability of Potable drinking water for workmen & staff.				
g)	Provision of crèches for children.				
h)	Stand by vehicle / ambulance available for evacuation of injured				
i)	Adherence to Govt. Guidelines/procedures during epidemic and pandemic (as applicable).				
19.	ENVIRONMENT				
a)	Chemical and Other Effluents properly disposed				
b)	Cleaning liquid of pipes disposed off properly				
c)	Seawater used for hydro-testing disposed off as per agreed procedure				
d)	Lubricant Waste/Engine oils properly disposed				
e)	Waste from Canteen, offices, sanitation etc. disposed properly				
f)	Disposal of surplus earth, stripping materials, Oily rags and combustible materials done properly				
g)	Green belt protection				

Safety walk-through performer (Name &Signature).....

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FORMAT NO. : HSE-2 REV 0

(Sheet 1 of 3)

ACCIDENT REPORT

(To be submitted by Contractor after every Accident within 24 hours to EIL/ Owner)

Report No.: _____ **Date:** _____

Project site: _____ **Name of work:** _____

Contractor's name: _____ Contractor's Job Engineer (name) _____

Non-disabling injury (Non-LTI)	Hospitalized but resumed duty before end of 48 hrsof accident	
Disabling injury (other LTI)	Hospitalized & failed to resume duty within next 48 hrs	
Fatal (LTI):	Death / Expiry	
First Aid case	Resume duty after first aid	

Name of the injured:_____ Father's name of victim: _____

Sub Contractor's Name: .....

Gate Pass No.:.....Age: _____Yrs. Victim's medical fitness exam. (Pre-empl.) date: - _____

Date & time of Accident / Incident: _____

Names of Witnesses: (1_____ (2)_____ (3) _____

Profession of victim:

Bar bender		Carpenter		Meson	
Fitter		Helper		Gas cutter	
Grinder		Welder		Electrician	
Driver		Rigger		M/c.operator	
Engineer		Manager		Other/specify	

Qualification

No formal education		Non-Matriculate		Matriculate	
Graduate		Post- grad		Other/specify	

Job Experience

NIL		Less than 2 yrs		2-5 yrs	
5-10 yrs		11-15 yrs		15 years and above	

Location where the incident happened: _____

_____

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FORMAT NO. : HSE-2 REV 0

(Sheet 2 of 3)

Activity / Works that were continuing during incident / accident: -

Excavation		Demolition		Concrete carrying	
Concrete pouring		Transportation of materials (manually)		Transportation of materials (mechanically)	
Work on or adjacent to water		Work at height (+2.0 mts)		Scaffold preparation	
Scaffold dismantling		Piling works		Welding	
Grinding		Gas-cutting		Pipe fit-ups & fabrication	
Structural fabrications		Machine works		Hydro-testing works	
Electrical works		Erection activities		Other/specify	

What exactly the victim was doing just before the incident / accident? .....

.....

.....

Nature of injury:

Bruise or Contusion		Abrasion (superficial wound)		Sprains or strains	
Cut or Laceration		Puncture or Open wound		Burn	
Inhalation of toxic or Poisonous fumes or gases		Absorption		Amputation	
Fracture		Other/specify			

Parts of body involved in incident / accident

Head		Face		Eyes	
Throat		Arm (above wrist)		Hand (including wrist)	
Fingers		Truck (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

Accident type:

Struck against		Struck by		Fall from Elevation	
Fall on same level		caught in		caught under	
caught in between		Rubbed or abraded		Contact with (Electricity)	
Contact with (Temp./ extremes)		Contact with chemicals oroils		Vehicle accident	
Other/specify					

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FORMAT NO. : HSE-2 REV 0

(Sheet 3 of 3)

Medical Aid provided:-(indicate specific aids / treatment etc.)-

.....

.....

Actions taken to prevent recurrence of similar incident / accident:.....

.....

.....

.....

.....

.....

.....

Intimation to local authorities (Dist. Collector / Local Police Station / ESI authority): Yes / No / NA.

If yes, to whom .....

Safety Officer
(Signature and Name)
Stamp of Contractor

Site Head / Resident Construction Manager
(Signature and Name)

To : Owner
: RCM/Site-in-charge EIL (3 copies)
- Nodal Officer HO through RCM (In case of major accident)
- Divisional Head (Constn) through RCM
- Project Manager, EIL, through RCM

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FORMAT NO. : HSE-3 REV 0

(Sheet 1 of 5)

SUPPLEMENTARY ACCIDENT INVESTIGATION REPORT

TICK THE APPROPRIATE ONEAS APPLICABLE (furnish within 72 hours)

Supplementary to Incident / Accident Report No: _____ (Copy enclosed)

Report No.: _____ **Date:** _____

Project site: _____ **Name of work:** _____

Contractor's name: _____ Contractor's Job Engineer (name) _____

Non-disabling injury (Non-LTI)	Hospitalized but resumed duty before end of 48 hrs of accident.	
Disabling injury (other LTI)	Hospitalized & failed to resume duty within next 48 hrs.	
Fatal (LTI)	Death / Expiry	
First Aid case	Resume duty after first aid	

Name of the injured: _____ Father's name of victim: _____

Sub Contractor's Name: .....

Gate Pass No.:..... Age: _____Yrs. Victim's medical fitness exam. (Pre-empl.) date: - _____

Date & time of Accident / Incident: _____

Names of Witnesses: (1_____ (2)_____ (3) _____

Profession of victim:

Bar bender		Carpenter		Meson	
Fitter		Helper		Gas cutter	
Grinder		Welder		Electrician	
Driver		Rigger		M/c. operator	
Engineer		Manager		Other/specify	

Qualification

No formal education		Non-Matriculate		Matriculate	
Graduate		Post- grad		Other/specify	

Job Experience

NIL		Less than 2 yrs.		2-5 yrs.	
5-10 yrs.		11-15 yrs.		15 years and above	

Location where the incident happened: _____

_____

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FORMAT NO. : HSE-3 REV 0

(Sheet 2 of 5)

Activity / Works that were continuing during incident / accident: -

Excavation		Demolition		Concrete carrying	
Concrete pouring		Transportation of materials (manually)		Transportation of materials (mechanically)	
Work on or adjacent to water		Work at height (+2.0 mts)		Scaffold preparation	
Scaffold dismantling		Piling works		Welding	
Grinding		Gas-cutting		Pipe fit-ups & fabrication	
Structural fabrications		Machine works		Hydro-testing works	
Electrical works		Erection activities		Other/specify	

What exactly the victim was doing just before the incident / accident? .....

.....

.....

Particular of tools & tackles being used and condition of the same after incident/accident:

.....

.....

Description of Incident/Accident (How the incident was caused) : .....

.....

.....

.....

Nature of injury:

Bruise or Contusion		Abrasion (superficial wound)		Sprains or strains	
Cut or Laceration		Puncture or Open wound		Burn	
Inhalation of toxic or Poisonous fumes or gases		Absorption		Amputation	
Fracture		Other/specify			

Parts of body involved in incident / accident

Head		Face		Eyes	
Throat		Arm (above wrist)		Hand (including wrist)	
Fingers		Truck (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

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FORMAT NO. : HSE-3 REV 0

(Sheet 3 of 5)

Accident type:

Struck against		Struck by		Fall from Elevation	
Fall on same level		caught in		caught under	
caught in between		Rubbed or abraded		Contact with (Electricity)	
Contact with (Temp./ extremes)		Contact with chemicals or oils		Vehicle accident	
Other/specify					

Name & Designation of person who provided First-Aid to the victim: _____

Name & Telephone number of Hospital where the victim was treated _____

Mode of transport used for transporting victim – Ambulance / Private car / Tempo / Truck / Others

How much time taken to shift the injured person to Hospital_____

In case of FATAL incident, indicate clearly the BOCW Registration No. of the victim/Company.....

...

Comments of Medical Practitioner, who treated / attended the victim/injured (attached / described here)_____

What actions are taken for investigation of the incident, please indicate clearly – (Video film / Photography / Measurements taken etc. .....)

Immediate cause (Please tick the right applicable) –

Hazardous methods or procedures inadequately guarded		Poor housekeeping		Inadequate or improper PPE	
Environmental hazards (excess noise/ space constraint/ inadequate ventilation		improper illumination/Moving on oval surface		Working on dangerous equipment	

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FORMAT NO.: HSE-3 REV 0

(Sheet 4 of 5)

Failure to secure		Horse-play		Failure to use PPE	
Inattention to surroundings		Improper use of hands & body-parts		By-passing safety devices	
Unsafe mixing or placement of tools & tackles		Bypassing standard procedures		Failure in communication	
Operating without authority		Improper use of equipment or tools & tackles		drug or alcoholic influence	
excessive haste		Others(specify)			

Basic cause

Over confidence		Impulsiveness		over-exertion	
Faulty judgement or poor understanding		Failing to keep attention constantly		Nervousness & Fear	
Fatigue		Defective vision		Ill health or sickness	
Slow reaction		Others(specify)			

Root cause

Inadequate Engg.		Improper Design		Inadequate Planning & organization	
Inadequate knowledge		Inadequate skill		Inadequate training	
Inadequate supervision		Improper work procedure		Inadequate compliance with standard	
Substandard performance		Inadequate maintenance		Improper inspection	
Others(specify)					

Loss of man days and impact on site works, (if any) –

Remarks from Contractor's Safety Officer/ Engineer –

Was the victim performing relevant tasks for which he was engaged /employed? Yes / No
Was the Supervisor present on work-site during the incident? Yes / No
Have the causes of incident rightly identified? Yes / No
Cause of Accident was _____

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FORMAT NO. : HSE-3 REV 0

(Sheet 5 of 5)

Remedial measures recommended by **Safety Officer of Contractor** for avoiding similar incident in future

: .....

.....

.....

.....

.....

.....

.....

Intimation to local authorities (Dist. Collector / Local Police Station / ESI authority): Yes / No / NA.

If yes, to whom .....

Safety Officer
(Signature and Name)

Site Head / Resident Construction Manager
(Signature and Name)
Stamp of Contractor

To : Owner
: RCM/ Site-in-charge of EIL (3 copies)
Nodal Officer HO through RCM (In case of major accident)
Divisional Head (Constn.) through RCM
Project Manager EIL, through RCM

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FORMAT NO. : HSE-4 REV 0

NEAR MISS INCIDENT/ DANGEROUS OCCURRENCE REPORTPROFORMA

(to be submitted within 24 hours)

Report No.: _____

Name of Site: _____ Date: _____

Name of work: _____ Contractor: _____

Incident reported by :

Date & Time of Incident :

Location :

Brief description of incident

Probable cause of incident

Suggested corrective action

Steps taken to avoid recurrence Yes ☐ No ☐

Safety Officer — Site Head / Resident Construction Manager

(Signature and Name) — (Signature and Name)

Stamp of Contractor

Note:

- **Near Miss:** Human injury escaped & no damage to property, equipmentor interruption to work.
- **Dangerous Occurrence**: Occurrences as mentioned below shall be considered as "Dangerous occurrences"

a. collapse or failure of lifting appliances or hoist or conveyors or other similar equipment for handling building or construction material or breakage or failure of rope, chain or loose gears; overturning of cranes used in building or other construction work; falling of objects from height;
b. collapse or subsidence of soil, any wall, floor, gallery, roof or any other part of any structure, platform, staging, scaffolding or any means of access including formwork;
c. collapse of transmission tower;
d. fire and explosion causing damage to property at Construction site.
e. spillage or leakage of hazardous substances and damage to their container;
f. Collapse, capsizing, toppling or collision of transport equipment;
g. Leakage or release of harmful toxic gases at the construction site.

To :Owner
:RCM/Site-in-charge EIL (3 copies)

Divisional Head (Const.) through RCM
Project Manager EIL, through RCM
} (Applicable for Dangerous Occurrence only)

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FORMAT NO. : HSE-5 REV 0

MONTHLY HEALTH, SAFETY &ENVIRONMENTAL (HSE) REPORT

(To be submitted by each Contractor)

Actual work start Date: _____ For the Month of: _____

Project: _____ Report No: _____

Name of the Contractor: _____ Status as on: _____

Name of Work: _____ Job No : _____

(Contractor in consultation with EIL shall generate the reports through web basedpackage (www3.eil.co.in/eilhse)only.

ITEM		UPTO PREVIOUS MONTH	THIS MONTH	CUMULATIVE
1) Average number of Staff & Workmen (average daily headcount. not man days)				
2)Total Man-hours worked				
3) Number of site personnel undergone HSE Induction				
4) Number of HSE meetings organized at site				
5) Number of HSE awareness programmes conducted at site				
6) Number of Tool Box Talks conducted				
7) Number of Loss Time Injuries (LTI)	Fatalities			
	Other LTI			
8) Number of Non disabling injury (Non-LTI)				
9) Number of First Aid Cases				
10) Number of Near Miss Incidents				
11) Number of Dangerous Occurrences				
12) No. of unsafe acts/ practices detected				
13) No. of disciplinary actions taken against staff/ workmen				
14) Man-days lost due to injury				
15) LTI Free man-hours i.e. LTI free man-hours counted from the Last LTI (enter date: .....)				
16) Frequency Rate (No. of reportable LTI per 10lacs man-hours worked)				
17) Severity Rate (No. of man days lost due to LTI per 10lacs man-hours worked)				
18) No. of activities for which HIRAC Completed				
19) No. of incentives/ awards given				
20) No. of occasions on which penalty imposed by EIL/ Owner				
21) No. of Audits conducted				
22) No. of pending NCs in above Audits				
23) Compensation cases raised with Insurance				
24) Compensation cases resolved and paid to workmen				
25) No of Vehicular Accident cases				
26) No of fire/Explosion cases				

27) Whether workmen compensation policy taken			Yes		No
28) Whether workmen compensation policy is valid			Yes		No
29) Whether workmen registered under ESI Act, as applicable			Yes		No
30) Whether HIRAC Register prepared and updated			Yes		No
31)Whether Environment Aspect Impact Register prepared and updated			Yes		No
32) Whether Legal Register prepared and updated			Yes		No

Remarks, if any

Date:

Prepared by Safety Officer Approved by Site Head / Resident Construction Manager

(Signature and Name)(Signature and Name)

To: -

- RCM EIL

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FORMAT NO. : HSE-6 REV 1

PERMIT FOR WORKING AT HEIGHTS (ABOVE 2.0 METER)

(In duplicate to be issued daily for site and for office)

Permit No..... Name of Main Contractor.....
Name of work executing agency / sub agency / vendor:.....
Date..... Exact Location of work.....
Nature of work .....Duration of work (from) ..... (to) .....
Number of workers covered within this permit.....
(*List enclosed with name & gate pass numbers.*)

Sl. No.	Items / Subjects	Status of compliance (Yes / No)	
1	Work areas / Equipment's inspected		
2	Work area cordoned off		
3	Adequate lighting is provided		
4	Precautions against public traffic taken		
5	Concerned persons in & around have been alerted & cautioned		
6	Hazards / risks involved in routine / non-routine task assessed and control measures have been implemented at specific task		
7	ELCB provided for electrical connection & found working		
8	Ladder safely attached / fixed		
9	Scaffoldings are checked and TAGs are found used correctly		
10	Working platforms are provided and are found sound /safe for use		
11	Safe access & egress arrangements (e.g. ladders, fall arresters, life-lines etc.) are satisfactorily incorporated		
12	a. Openings on platform / floors are effectively cordoned / covered		
	b. Safety Nets are provided wherever required		
13	Use of following safety gadgets by people working at area under this permit, is checked and found satisfactory - Safety helmet Safety harness (full body) with double lanyard Safety Shoes Safety gloves Safety goggles		
14	Housekeeping of work area found satisfactorily tidy / clean & clear		
15	Adequate measures have been taken for works being continued at the ground level, when simultaneous works are permitted overhead at that very location.		
16	Materials are not thrown from heights on to ground		
17	Medical examination of workers are made & found satisfactory		
18	Responsible job engineer / supervisor found physically present at work spot for overall administration of work as well as safety of people.		

Above items have been checked & compliance has been found in place. Hence work is permitted to start / continue at the above-mentioned location. Work shall not start till identified lapses are rectified.

Additional Precautions, if any .....
.....

Work Permit Receiver — Verification By — Work Permit issuer
Contractor Job Supervisor — Contractor Safety Officer — Contractor Engineer/RCM

AT THE END OF THE DAY/WORK:
All works at height are completed & workmen have returned safely from work location at (time)..... (date).....

(Sig. Contractor Engineer)

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FORMAT NO. : HSE-7 REV 1

CONFINED SPACE ENTRY PERMIT

Project site _____ Sr. No. _____
Name of the work _____ Date _____
Name of Contractor _____ Nature of work _____
Exact location of work _____

Safety Requirements POSITIVE ISOLATION OF THE VESSEL IS MANDATORY

(A) Has the equipment been ?

Y	NR		Y	NR		Y	NR	
☐	☐	Isolated from power/steam/air	☐	☐	water flushed &/or steamed	☐	☐	radiation sources removed
☐	☐	isolated from liquid or gases	☐	☐	Man ways open & ventilated	☐	☐	proper lighting provided
☐	☐	depressurized &/or drained	☐	☐	cont. inert gas flow arranged	☐	☐	
☐	☐	blanked/ blinded/ disconnected	☐	☐	adequately cooled	☐	☐	

(B) Expected Residual Hazards

☐	☐	lack of O_2	☐	☐	combustible gas/ liquid	☐	☐	H_2S / toxic gases
☐	☐	corrosive chemicals	☐	☐	pyrophoric iron / scales	☐	☐	electricity / static
☐	☐	heat/ steam / frost	☐	☐	high humidity	☐	☐	ionizing radiation
☐	☐		☐	☐		☐	☐	

(C) Protection Measures

☐	☐	gloves	☐	☐	ear plug / muff	☐	☐	goggles / face shield
☐	☐	protective clothing	☐	☐	dust / gas / air line mask	☐	☐	personal gas alarm
☐	☐	grounded air duct/blower /AC	☐	☐	attendant with SCBA/air mask	☐	☐	rescue equipment/team
☐	☐	Fire fighting arrangements	☐	☐	safety harness & lifeline	☐	☐	communication equipment
☐	☐		☐	☐		☐	☐	

Authorization / Renewal (It is safe to enter the confined space)

	No. of persons allowed	Name of persons allowed	Signature			Time		Signature
			Work Permit Receiver(Contractor Supervisor)	Verification by Contractor Safety officer	Work permit issuer Contractor Engineer/RCM	From	To	Workman

Permit Closure :

(A) Entry ☐ was closed ☐ stopped ☐ will continue on ...

(B) ☐ Site left in a safe condition ☐ Housekeeping done

(C) Multi lock ☐ removed ☐ key transferred

☐ Ensured all men have come out ☐ Man-ways barricaded

Remarks, if any:

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FORMAT NO. : HSE-8 REV 0

RADIATION WORK PERMIT

Project :
Name of the work :
Name of site contractor :

Sr. No. :
Date :
Job No. :

Location of work :

Source strength :

Cordoned distance (m) :

Name of Radiography agency :

Approved by Owner/EIL ☐

No. of workers engaged :
(List enclosed with name & gate pass numbers.)

The following items have been checked &compliance shall be ensured during currency of the permit:

S. No.	Item description	Done
	Safety regulations as per BARC/AERB ensured while source in use/in transit & during storage	☐
	Area cordoned off / safe working platform provided	☐
	Lighting arrangements for working during nights ensured	☐
	Warning signs/ flash lights installed	☐
	Cold work permit taken (if applicable)	☐
	PPEs like film badges, dosimeters used	☐

Additional precautions, if any _____

(Radiography Agency's BARC/AERB authorized Supervisor)

Permission is granted.

Permit is valid from _____ AM/PM _____ Date to _____ AM/PM _____ Date

(Signature of permit issuing authority-RCM of contractor)
Name : Designation: Date:

Permit renewal:

Permit extended up to		Additional precautions required, if any	Sign of issuing authority with date (of site contractor)	
Date	Time			

Work completed/ stopped/ area cleared at _____ Hrs of Date _____
(Sign. of permit issuing authority)
Name& Signature of site contractor:

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FORMAT NO. : HSE-9 REV 1

DEMOLISHING/DISMANTLING WORK PERMIT

Project :
Name of the work :
Name of contractor :

Sr.No. :
Date :
Job No. :

Name of sub-contractor :

No. of workers to be engaged:
(List enclosed with name & gate pass numbers.)

Line No./ Equipment No./ Structure to be dismantled :

Location details of dismantling/ demolition with sketch : (clearly indicate the area)

The following items have been checked &compliance shall be ensured during currency of the permit:

S. No.	Item description	Done	Not Applicable
	Services like power, gas supply, water, etc. disconnected	☐	☐
	Dismantling/ Demolishing method reviewed & approved	☐	☐
	Usage of appropriate PPEs ensured	☐	☐
	Precautions taken for neighboring structures	☐	☐
	First-Aid arrangements made	☐	☐
	Fire fighting arrangements ensured	☐	☐
	Precautions taken for blasting	☐	☐

Work Permit Receiver
(Contractor's Supervisor/Engineer)

Verification by Contractor
(Contractor's Safety Officer)

Permission is granted.

(Work Permit issuer-Client)

Name :
Date :

Completion report:

Dismantling/ Demolishing is completed on _____ Date at _____ Hrs.

Materials/ debris transported to identified location ☐ Tagging completed (as applicable) ☐

Services like power, gas supply, water, etc. restored ☐

(Permit issuing authority-Client)

CONTRACTOR's NAME

FORMAT NO. : HSE-10 REV 0

DAILY SAFETY CHECKLIST

(To make use of before start of day's work)

Project :
Name of the work :
Name of contractor :

Sr.No. :
Date :
Job No. :

Description of Job decided to perform : -

- **Use of PPE / Safety Gadgets**

Sl. No	PPEs	Compliance (Yes / No)	Sl. No	PPEs	Compliance (Yes / No)
1	Safety Helmets		6	Face Shield	
2	Safety Shoes		7	Full body harness	
3	Hand Gloves		8	Fall Arrest System	
4	Dust Musk		9	Safety net	
5	Safety Goggles		10	Horizontal life-line made of steel wire, (dia not less than 8.0 mm.)	

(Serial No. 1 & 2 are compulsory for everyone. Specify & ensure use of other safety gadgets as required for the job)

- **Identify following important unsafe conditions: -**

Sl. No	Conditions	Yes / No
1	Access to work site / emergency escape clear	
2	Soil / Loose earth kept away from excavated pit / slope / ladder provided	
3	Electrical wire / welding lead lying entangled on ground / welding m/c. booth accessible	
4	Elevated work platform / open ends are protected	
5	Ground area cordoned off before lifting works or erection at height / ground area checked & cordoned-off before start of height works	
6	Structural members / erected pipes / wooden boards/pieces etc. are safely anchored at heights and are not likely to fall down on people when working beneath	
7	Ladders tied-up on tall steel structures, long before are removed to get rid of their use	
8	Any Other	

- **Indicate actions taken, if status of any of the above items is found "No"**
  .....
  .....
- **Specific Safety guidelines / precautions, if any** (communicated thro' TBT)
  .....
  .....
- **Above conditions and PPE compliances are checked by undersigned and correct status are indicated after verification**

Prepared by
Contractor Site Engineer

Verification By
Contractor Safety Officer

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FORMAT NO. : HSE-11 REV 0

(Sheet 1 of 2)

HOUSEKEEPING ASSESSMENT& COMPLIANCE

Project :
Name of the work :
Name of contractor :
Name of contractor : Fortnightly

Sr.No. :
Date :
Job No. :

Sl. No.	Subjects of Review	Satisfactory/ Yes	Non satisfactory/No	Remarks	Action
1.	Cleanliness at the Main entry / access of site				
2.	Ground condition / floor areas free from water-logging / oil spillage				
3.	Ground & elevated floors free from rubbish / wastes / accumulated debris / scraps.				
4.	Manholes / openings are covered / fenced				
5.	Trenches are barricaded / walkways are in place				
6.	Drains are cleaned / not choked / not occupied by dumped materials				
7.	Sufficient CAUTION boards / instructions displayed				
8.	Construction machinery are maintained & parked in orderly manner.				
9.	Movement of site people are not obstructed because of dumping / storing of construction materials				
10.	Access / egress to Electrical Distribution Boards / Panels clear from wires / cables / earth-strips etc.				
11.	Electrical panel rooms / sheds / MCC / Control rooms / Substations etc. are clean & tidy and not used for storing dress / clothes, tiffin-box or bicycles.				
12.	Passage behind Elec. panels are free for access				
13.	Fire extinguishers / fire-buckets are accessible without any difficulty.				
14.	Stair-steps, platforms & landings are clear & tidy				
15.	Sheds / rooms & work areas have got sufficient illumination as well as ventilation				
16.	Cables / Wires / welding leads are routed / hanged appropriately & are not creating unsafe condition.				
17.	Stacking / storing of insulation materials or their packing.				
18.	Removal or cleanliness of left-over sand, concrete, brick-bats, insulation-materials, excess earth, wastes etc.				
19.	Storing / stacking of sand, metal chips, re-bars, steel pipes, valves, fittings etc.				
20.	One escape route at ground & minimum two escape routes at elevation available,				

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FORMAT NO. : HSE-11 REV 0

(Sheet 2 of 2)

Sl. No.	Subjects of Review	Satisfactory/ Yes	Non satisfactory/No	Remarks	Action
21.	Captions / Posters / Slogans on various safety instructions are displayed legibly in local language				
22.	Cable trenches are water-free or regular arrangement for taking out accumulated water exists.				
23.	Windows of rooms / offices are regularly cleaned				
24.	Facilities for cycle sheds, drinking water, washing, rest-rooms etc. are maintained in tidy manner.				
25.	Toilet, Urinals, Canteen / kitchen / pantry etc. are maintained & free from obnoxious smell.				
26.	Construction tools / tackles are stored systematically - the items are tagged / tested / certified by competent third party.				
27.	Sufficient numbers of Dust-bins / Waste-bins found at site and are regularly emptied.				

Additional remarks, if any -

.....

.....

.....

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

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FORMAT NO. : HSE-12 REV 0

INSPECTION OF TEMPORARY ELECTRICAL BOOTH / INSTALLATION

Project :
Name of the work :
Name of contractor :
Sub Station No:/Booth No

Sr.No. :
Date :
Job No. :
Location:

SL NO	SUBJECTS	OBSERVATION (YES /NO)	ACTION TAKEN
1	Switchboards installed properly are in order and protected from rain & water-logging.		
2	Adequate illumination provided for switchboard operation during night hours & the lamps are protected from direct human contact.		
3	Voltage ratings, DANGER signs, Shock-Treatment-Chart displayed in the installation / booth		
4	Fire extinguisher (DCP or CO_2) & Sand Bucket kept in close vicinity of Switchboards		
5	Valid License & Competent Electrician / Wireman available & name/ license no. displayed at booth / installation.		
6	General housekeeping in & around booth / installation found in order.		
7	Cable-route-markers for U/G cables provided.		
8	Monthly inspection report of Electrical hand tools available in booth / installation.		
9	Electrical Panel door to be in closed condition and Insulated Mat to be provided in front of panel.		
10	Rubber hand gloves available/ used by Electricians		
11	Availability of CAUTION boards for shutdown & / or repairing works.		
12	All incoming & outgoing feeders have proper MCCB / HRC fuses / Switches.		
13	Switchboards "earthed" at two distinctly isolated locations.		
14	Switchboards have adequate operating space at the front face & at the rear face too.		
15	All connections provided through 30mA ELCB.		
16	Testing records of all ELCBs available at site		
17	Only industrial type plugs & sockets are used.		
18	Temporary connections are 3-core double insulated & free from cuts & joints and 3rd core is earthed at both ends		
19	Socket boards are properly mounted on stand & protected from water ingress.		
20	Electrical equipments operating above 250V have two earthing / double earthing.		
21	All incoming / outgoing cables are properly glanded& terminated with "lugs".		
22	Switch-boards are of industrial variety / type.		
23	Sketch for installation / connection (SLD) made & pasted& other safety labels/display boards		
24	Labeling of incoming / outgoing feeders made.		
25	All hand lamps are protected from direct contact.		
26	All electrical cable / joints are in safe condition		

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

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FORMAT NO. : HSE-13 REV 0

(Sheet 1 of 2)

INSPECTION FOR SCAFFOLDING

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :

Sl. No	Description	Yes	No	N.A.	Actions taken
1	Whether work permit is obtained to take up work at height above 1.5 Mts?				
2	Whether atmospheric condition is "stormy" or "raining" and works at heights have been permitted?				
3	Whether steel pipes scaffoldings are used for units /off-site areas?				
4	Whether scaffolding has been erected on rigid/firm/leveled surfaces / ground? Whether "foot-seals" or "base-plates" are used beneath the up-rights (vertical steel pipes)				
5	Whether scaffold construction is as per IS specification with toe-board and hand-rails (top-rail as well as mid-rail)?				
6	Whether distance between two successive up-rights are less than 2.5 Mts (height of scaffold & load carrying capacity governs the distance between two uprights)				
7	Whether all uprights are extended at least 900 mm above the top most working platform (to enable fitting of handrails)?				
8	Whether vertical distance of two successive ledgers is satisfactory? (*varying between 1.3 Mts. To 2.1 Mts)*				
9	Whether the peripheral areas of working at height are cordoned-off? (for avoiding accident to people arising out of dropped / deflected materials)				
10	Whether platform is provided? Is it safely approachable?				
11	Whether end of scaffold platform / board are extended beyond transoms? (125mm to 150 mm)				
12	Whether CE / IS approved quality and worthy conditioned full-body safety harness (with double lanyard & karabiners) are used while working at heights?				
13	Whether life-line of safety harness is anchored to an independent secured support capable of withstanding load of a falling person?				
14	Whether the area around the scaffold is cordoned off to prohibit the entry of unauthorized person / vehicle?				
15	Whether clamps used are of good condition, of adequate strength and free from defects?				
16	Whether ladder is placed at secured and leveled surface?				
17	Whether water-pass and oil-spills are avoided around the scaffold structure?				
18	Whether ladder is extended 1.5mts. above the landing point at height?				
19	Whether more than one access/egress provided to the scaffold?				
20	Whether ladder used are of adequate length and overlapping of short ladders avoided?				
21	Whether metallic ladders are placed much away from near-by electrical transmission line?				
22	Whether rungs of ladder are inspected and found in good order?				
23	Whether fall-arresters provided on both the access/egress routes?				
24	Whether diagonal (cross) bracings are provided at regular interval on the scaffold?				
25	Whether working platform on the scaffold has been made free from "jolt" or "gap"?				
26	Whether tools or materials are removed after completion of the day's job at heights?				
27	Whether a valid Permit for Work (PFW) is obtained before taking up work over asbestos or fragile roof?				
28	Whether sufficient precaution is taken while working on fragile roof?				

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FORMAT NO. : HSE-13 REV 0

(Sheet 2 of 2)

Sl. No	Description	Yes	No	N. A	Actions taken
29	Whether provision is made to arrange duck ladder, crawling board for working on fragile roof?				
30	Whether scaffold has been inspected by qualified civil engineers prior to their use?				
31	Whether the scaffolding has been designed for the load to be borne by the same?				
32	Whether the erection and dismantling of the scaffolding is being done by trained persons and under adequate supervision?				
33	Whether safety net with proper working arrangement and life-line has been provided?				
34	Whether TAGS (Green for acceptable and Red for incomplete/unsafe scaffolds) are used on scaffolds?				
35	Whether sufficient illumination is provided in and around the scaffold and access?				
36	Whether emergency rescue / response arrangements are made in place				

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

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FORMAT NO. : HSE-14 REV 1

(sheet 1 of 2)

PERMIT FOR ERECTION / MODIFICATION & DISMANTLING OFSCAFFOLDING

Project :
Name of the work :
Name of contractor :
Nature of activities :

Sr.No. :
Date :
Job No. :
Duration: From.....To.....

SL. No.	SUBJECTS / ITEMS	DONE	NOT DONE	REMARKS
1	Specific task of Erection / Modification / Dismantling of scaffolds, identified & TAGGED accordingly (before as well as after carrying-out jobs).			
2	People engaged in doing the job are identified & are certified by Job Engineer of Main Contractor as experienced / trained.			Names to be noted
3	Concerned persons are alerted by the Job Engineer of Main Contractor in connection with possible hazards & what the workmen MUST do / MUST not do.			
4	Verification by Job Engineer of Main Contractor made for confirming that all persons permitted to carry-out the jobs are making use of Helmet, Safety Shoes, Goggles, Gloves & Double lanyard safety harness and other relevant PPEs.			
5	Area of work is effectively cordoned-off / barricaded / illuminated.			
6	For taking-up / lowering down Scaffolding members / clamps / couplings etc. appropriate ropes / pulleys/ chains etc. have been arranged for use (not to throw any item) & the same have been verified as "fit for purpose".			
7	Items / members of scaffold, being lowered are removed from the area & stacked correctly.			
8	Ropes, chains, pulley blocks etc. being used for lifting or lowering scaffold items, are inspected by the Job Engineer & their certifications as well as physical conditions have been found O.K. before signing this PERMIT.			
9	Safety Net / Life-line / Fall Arresters etc. are arranged in position and Job Engineer has found working conditions favorable for activities to start.			
10	Scaffold erection or dismantling tasks are being supervised by Experienced Engineer / Competent person.			
11	Only competent & experienced people have been selected / engaged in Scaffolding erection, modification or dismantling tasks.			
12	Adequate & effective actions for traffic and movement of people around the cordoned-off area taken to avoid inadvertent incident			
13	Working platforms are protected with handrails & toe-boards.			
14	Access & Exit (for reach & escape) are safe for use by people.			
15	Tools, tackles to be used for above jobs are verified by job Engineers of Main contractor as genuinely good and tied-up at height (to prevent their fall).			
16	Site important Telephone Nos. are made known to everyone			
17	SOP (Safe Operating Procedure) for the specific task is made & followed too.			
18	Emergency vehicle has been arranged at work locations.			

- This permit for work shall be available at specific work location all the time.
- After completion of work, permit shall be returned to safety cell of main contractor, without fail.
- This Permit shall be issued maximum upto (Monday to Sunday).
- Additional Precautions, if any

  .....
- **ACCORD OF PERMISSION** (to be ticked) - **YES** ( )/ NO ( )

  Work Permit Receiver Verification By Work Permit issuer Contractor Job Supervisor
  Contractor Safety Officer Contractor Engineer/RCM

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FORMAT NO. : HSE-14 REV 1

(sheet 2of 2)

Everyday Site working conditions & performance of workmen shall be assessed / checked by Contractor Site Engr. and Safety Officer shall verify the same.

	Name / Sign.	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Site Engr.								
Safety Off.								

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FORMAT NO. : HSE-15 REV 1

PERMIT FOR HEAVY LIFT/CRITICAL ERECTION

Project :
Name of the work :
Name of contractor :
Nature of activities :
Location of work :
Equipment/Structure to be erected:

Sr. No. :
Date :
Job No. :
Duration: From.....To.....
Name /Type of crane :
Wt. of equipment/ structure to be erected

SL. NO.	Description of Item	COMPLIANCE STATUS			Remarks
		Yes	No	Not applicable	
1)	Is the crane type suitable for lift or as per erection procedure?				
2)	Is the crane have the correct number of counterweights fitted?				
3)	Availability of Load Certification of crane from authorized agency.				
4)	Is the load chart of crane available in carne cabin/or with Crane operator?				
5)	Is the device to check the Wind speed in crane is working? Is the safety features in crane are working?				
6)	Availability of Load certification of slings and other accessories from authorized agency				
7)	Availability of Licensee/certificate for crane operator from authorized agency.				
8)	Availability of approved HIRAC for the subject activities.				
9)	Availability of approved erection/rigging procedures.				
10)	Availability of temporary gratings/ platforms for critical lifting(as applicable)				
11)	Tool Box conducted before erection?				
12)	Has the area been cordoned off?				
13)	Are the authorized persons during erection are identified?				
14)	Does each person identified for erection understand their roles and responsibilities?				
15)	Is the ground on which crane will rest or outrigger support are correct?				
16)	Is hard stand requirement (if any) complied?				
17)	Is the communication system (viz walkie-talkies, etc. are working properly?				
18)	If more than one crane is lifting the load, is an Intermediate rigger will supervise the lift?				
19)	If there is other obstruction within the operating radius of the crane, have correct precautions been taken to prevent collision?				
20)	All the persons are wearing the requisite PPE?				

Work Permit Receiver Verification By Work Permit issuer Contractor Job Supervisor
Contractor Safety Officer Contractor Engineer/RCM

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FORMAT NO. : HSE-16 REV 1

PERMIT FOR ENERGY ISOLATION & DE-ISOLATION

Project :
Name of the work :
Name of contractor :

Sr.No. :
Date :
Job No. :

ENERGY ISOLATION PERMIT

- Clearance required from:.....Hrs .....Date To .....Hrs ....Date
- Name of equipment/ energy source etc. .....
- Nature of job to be done: .....
- Area.....Location:.....

PERMIT VALIDATION	PERFORMING AUTHORITY
I hereby authorize the .....personnel(performer) to isolate the above equipment/energy source from all sources of power and handover the equipment/energy source for maintenance/repair. Issuing authority Client/Contractor RCM (as applicable) Signature: Date: Name:	The work and precautions will be carried out under my overall responsibility.(Testing/execution engineer) Signature: Date: Name:

SAFETY PRECAUTIONS FOR CLEARANCE	NORMALISING AFTER CLEARANCE
1. Notify workers of intent to de- energize ☐ 2. Obtain lock, tag or locking/tagging devices ☐ 3. Shut down, de-energize, dissipate any residual energies. ☐ 4. Apply lock ,tag and locking and/or tagging devices ☐ 5. *Any other job specific precautions ☐ 6. Verify effectiveness of lockout by attempting to restart. ☐ 7. Proper PPE is ensured ☐ I certify that the energy source mentioned above is isolated from all sources and is safe to start the work. Tag No:..... Lock No:..... Issuing authority Client/Contractor RCM (as applicable) Signature: Date: Name: **(*to be included by contractor in consultation with issuing authority)**	1. Notify workers of intent to re- energize ☐ 2. Conduct visual inspection to confirm that the danger zone is clear of workers ☐ 3. Conduct visual inspection to confirm that tools ,equipment's danger zone is clear of workers ☐ 4. Reposition the safety devices(interlocks, valves, guards, covers ,sensors, as applicable, etc.) ☐ 5. *Any other job specific normalizing details ☐ 6. Remove lock, tag and locking and/or tagging devices. ☐ 7. Re-energize. ☐ 8. Confirm system is operating properly& safely I certify that the energy source mentioned above is isolated from all sources and is safe to start the work. Tag No:..... Lock No:..... Issuing authority Client/Contractor RCM (as applicable) Signature: Date: Name: **(*to be included by contractor in consultation with issuing authority)**

ENERGY DE-ISOLATION PERMIT

PERMIT VALIDATION	PERFORMING AUTHORITY
I hereby authorize the .....personnel(performer) to de- isolate the above equipment/energy source from all sources of power and handover the equipment/energy source for normal operation.. Issuing authority Client/Contractor RCM (as applicable) Signature: Date: Name:	I hereby certify that the equipment/energy source mentioned above has been de-isolated and is ready for normal operation.(Testing/execution engineer) Signature: Date: Name: Countersigned by Issuing authority

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FORMAT NO. : HSE-17 REV 1

PERMIT FOR EXCAVATION (depth 2m and above)

(Sheet 1of 2)

Project :
Name of the work :
Name of contractor :
Job Description :
Size of excavation :

Sr.No. :
Date :
Job No. :
Location:

SL. NO.	Description of Item	COMPLIANCE STATUS			Remarks
		Yes	No	Not applicable	
1)	Suitable and sufficient risk assessments and method statements has been carried to ensure that the work shall be undertaken in accordance with specification and standard.				
2)	Are plans/details of underground services available and the same has been reviewed?				
3)	Has survey done to locate the services/obstacles etc.				
4)	Has the live services (electrical, water line, air line, telephone line, etc)has been disabled for carrying out the job.				
5)	Is adequate barriers/fences to protect the excavation are in place?				
6)	Is Adequate warning signs are in place?				
7)	Is Assessment of ground conditions done and remedial action(if any) taken?				
8)	Safe access / egress (e.g. ramp / steps / ladders etc.) provided for site workmen & supervisors.				
9)	Is the excavation work being undertaken in proximity of structure, etc. ?If Yes, it's effect is considered?				
10)	Availability of competent person for supervising the excavation work?				
11)	Adequate safe arrangement to prevent collapse of edges (e.g. shoring / strutting / benching / sloping etc.) made at site.				
12)	Hard barricades (at least 1.0M away from edge & for excavation near site access roads) with warning signs/caution boards are provided				
13)	Accumulation / passage-ways of water at periphery of excavation / trench stopped/ restricted.				
14)	Is the equipment being used for excavation has been checked for adequacy and is in good working condition having all the safety features?				
15)	Age & fitness of workmen ensured by medical test before engagement in job ?				
16)	Arrangement of Monitoring of possible oxygen deficiency or obnoxious gases done & action taken?				

PERMIT GRANTED - Yes / No

(List enclosed with name & gate pass numbers.)

Name & Signature of Site Engr. Name & Signature of Area – In charge/RCM of Contractor (Receiver) Contractor (Issuer)

Verification by Contractor Safety Officer

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FORMAT NO. : HSE-17 REV 1

PERMIT FOR EXCAVATION

(Sheet 2of 2)

NOTES: -

1. Slopes or benches for excavation beyond 2.0M depth shall be designed & approved by Contractor's site head.
2. Excavated earth to be kept at least 1.5M away from edges
3. Safety helmets, Safety shoes or gum-boots, gloves, goggles, Face shield, Safety Harness shall be essential PPEs.
4. Permit shall be made in **duplicate** and original shall be available at site of work.
5. Permit shall be issued for maximum **one week** only (Monday to Sunday)
6. After completion of works, permit shall be closed & preserved for record purpose

GRANT OF PERMIT AND EXTENSIONS

Sl. No.	Validity period From ____To ____	Working Time From _____To _____	Receiver (site Engr. of Main Contractor)	Issuer(Area In charge/RCM of Main Contractor)	Review by EIL / Owner (Remarks with date
1.					
2.					
3.					
4.					
5.					
6.					
7.					

Additional safety instructions if any: -

1.

2.

3.

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FORMAT NO. : HSE-18 REV 0 **(Sheet 1of 2)**

IDENTIFICATION OF ENVIRONMENTAL ASPECTS, IMPACT ASSESSMENT AND CONTROL MEASURES

S.No	Activity	Environmental Aspect	N/A/E	Environment Impact	Control Measures	Consequences						Risk Level	Significant	Gaps/ Recommendations
						A	B	C	D	E	F	G	Yes/No	

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(Sheet 2 of 2)

INITIAL ENVIRONMENT REVIEW TECHNIQUE

Environmental Impacts	AP = Air Pollution	WP = Water Pollution	LC = Land Contamination	DNR = Depletion of Natural Resources	NP = Noise Pollution

Scale	Quantity (A)	Occurrence (B)	Severity of Impact (C)	Detection (D)	Control (E)	Legal and other requirements (F)
1	Negligible	Very Rare	Negligible visual impact	Immediately	Available & effective at place	In compliance or not applicable
2	Low	Once a month or less	Causes Discomfort or Nuisance	Within 1 hour	Has in-built Secondary control	
3	Moderate	Once a day	Resource Depletion	Within 8 hours	Needs human Intervention	
4	High	Several times a Day	Affects Aquatic Life, flora, fauna or global issue	Within 24 hours	Mechanism in place but not reliable	
5	Excessive	Continuous	Human health effect	More than 24 hours	Absent or no effective control	Not in compliance

Risk Level - G : A x B x C x D x Ex F

Aspects with score of **100 and above** are considered as significant.
Also, Irrespective of the score, all legal noncompliance's to be considered as significant

Condition	
N	NORMAL
A	ABNORMAL
E	EMERGENCY

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Risk Identification						Desired Controls & Existing Gaps, If Any		Risk Assessment				Recommended Control Actions To Reduce The Risk Level	Action By	Remarks
SN	Activity	Activity Type (R/NR)	Hazards	Condition(N/AN/E)	Associated Risk	Desired Control Measures	Gaps If Any	Probability(P)	Impact (I)	Risk R= P*I	Risk Classification			

Likelihood – Possibility of occurrence of risks based on present gaps (technological / operational / competence / measurement and monitoring);

UL: Unlikely, **L:** Likely, **VL:** Very Likely, **FR:** Frequent, **C**: Continuous

Impact –

SI: Slight Injury, **MI:** Minor Injury, **MJ:** Major Injury, **SF:** Single Fatality, **MF:** Multiple Fatalities

Level of consequence – Refer Guidance criteria for this i.e. possible degree of damage;

Condition- N: Normal, **AN**: Abnormal, **E**-Emergency

Activity Type: R- Routine, NR- Non Routine

RISK –

L: Low Risk, **M:** Moderate Risk, **H:** High Risk

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FORMAT NO.: **HSE-20 REV 0**

Inspection of Tower Crane

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Serial number plate &SWL marking		
2	Valid TPI Certificate		
3	Valid Insurance		
4	Safe access and egress are provided to the crane operator.		
5	Front glass of Operator cabin		
6	Operator crane cabin is provided with a locking mechanism so as to prevent unauthorised entry.		
7	A safety bar is fitted across the operator's cabin window where there is likelihood of the operator falling through it.		
8	Manufacturer Operating Manual and Maintenance Manual are made available.		
9	An updated Operation and Maintenance log book is available in the operator cabin.		
10	All mounting bolts are in good condition.		
11	Load chart provided		
12	SLI available		
13	Crane hooks have got smooth surface and no dent		
14	Hook-latch / Dog-clamp in hook is effective		
15	Over hoist limit switch		
16	Double body earthing of Tower Crane		
17	Jib angle indicator is provided (For Luffing Jib Tower Crane).		
18	Emergency stop button, which will terminate the operation of the crane engine, is installed in the operator cabin and correctly identified.		
19	Effective braking mechanisms for Hoisting, Derricking, Slewing, Trolley Travelling maintained:		
20	Trolley Travelling limiter to prevent over-travelling of trolley is functional.		
21	Limit switches to prevent over-derricking and over-lowering of jib (For Luffing Jib Tower Crane) is functional.		
22	Slewing limiter to restrict slewing of crane is functional.		
23	Over load Limiter to prevent overloading of crane is functional.		
24	Load Moment Limiter to prevent over-turning moment is functional.		
25	Anti-collision devices are tested to stop the tower crane's operation such that the crane-to-crane interference must be maintained at not less than 3 m.		
26	Condition of boom		
27	Counter weight placement and pins		
28	Winches, pulleys and wire ropes are in good working condition.		
29	Colour coding		
30	Leakage in hydraulic cylinder		

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31	Fire Extinguisher		
32	Tower crane is adequately grounded or protected against lightning.		
33	Wind anemometer is installed and is in good working condition.		
34	Aviation lamp is functional (Reqd. for 30mt and above)		
35	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
36	Safety Induction for Operator		
37	Others		

Signature & Name of Operator:

Signature and name of Job Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-21 REV 0

Crane Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Crane hooks have got smooth surface and no dent		
2	Hook-latch / Dog-clamp in hook is effective		
3	Over hoist limit switch		
4	Over Load Indicator		
5	Over Boom limit switch		
6	Boom angle indicator		
7	Colour coding		
8	Condition of boom		
9	Condition of wire rope		
10	Rope drum / sheaves are in good working condition		
11	Swing break & lock		
12	Swing Alarm		
13	Over hoist break & lock		
14	Boom break & lock (For Telescopic Boom)		
15	Leakage in hydraulic cylinder		
16	Condition of Outrigger (For Tyre Mounted Crane)		
17	Outrigger fully extended Marking (For Tyre Mounted Crane)		
18	Condition of Tyre (For Tyre Mounted Crane)		
19	Wheel chokes are present and are used whenever required (For Tyre mounted)		
20	Battery & lamps		
21	Moving & rotating parts guarded		
22	Load chart provided		
23	Reverse horn (For Tyre Mounted Crane)		
24	Body Condition of crane		
25	Front glass of Operator cabin		
26	Both side Mirror		
27	Number Plate (For Tyre Mounted Crane)		
28	Fire Extinguisher		
29	Horn		
30	Windshield and wipers		
31	Working of light & Indicator		
32	SLI		
33	Spark Arrestor(For Running Refinery/ Petrochemical/Chemical Plant)		

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34	Foot-steps and hand-holds are in good working condition for exit /enter in to cabin		
35	TPI Certificate		
36	RC Document (For Tyre Mounted Crane)		
37	Fitness Certificate of Vehicle by authority		
38	Insurance		
39	PUC		
40	HMV License for Operator		
41	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
42	Safety Induction for Operator		
43	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-22 REV 0

Hydraulic Mobile Crane- Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Identification number of Hydraulic Mobile crane boldly scribed in front and rear end of machine		
2	Operator has got adequate document in support of his competency (i.e. HMV driving license, knowledge & training)		
3	Marking of SWL on hook position is clearly visible		
4	Test & examination of Hydraulic Mobile crane by statutory / competent authority is carried out & document is valid		
5	Colour Coding		
6	RC Document		
7	Fitness Certificate of Vehicle by authority		
8	Valid Insurance		
9	Valid PUC		
10	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
11	Safety Induction for Operator		
12	Crane hooks have got smooth surface and no dent		
13	Hook-latch / Dog-clamp in hook is effective		
14	Over hoist limit switch		
15	Over Load Indicator		
16	SLI		
17	Condition of boom		
18	Condition of wire rope		
19	Rope drum / sheaves are in good working condition		
20	Leakage in hydraulic cylinder		
21	Tyre condition		

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22	Battery		
23	Moving & rotating parts guarded		
24	Break		
25	Parking Break		
26	Front horn		
27	Reverse horn		
28	Hydraulic Mobile Crane cabin body and frame of machine is in good order		
29	Both side Mirror		
30	Fire Extinguisher		
31	Front glass pane of the Hydraulic Mobile operator's cabin is clean & clear (i.e. not cracked / damaged / broken)		
32	Windshield and wipers condition		
33	Working of front & back lights, turn Indicators, parking lights & fog lamps		
34	Spark Arrestor(For Running Refinery/ Petrochemical/Chemical Plant)		
35	Wheel chokes are present and are used whenever required		
36	Foot-steps and hand-holds are in good working condition for exit /enter in to cabin		
37	Others		

Signature & Name of Operator

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-23 REV 0

Hydraulic Rig Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Control panel is clean & all buttons/switches are clearly visible (no paint over spray, etc.)		
2	All switch & mechanical guards are in good condition and properly installed		
3	All Safety Indicator lights work		
4	Drive controls function properly & accurately labelled (up, down, right, left, forward, back)		
5	Motion alarms are functional		
6	Safety decals are in place and readable		
7	Any defects such as cracked welds, fuel leaks, hydraulic leaks, damaged control cables or wire harness, etc.		
8	Braking devices are operating properly		
9	Winches, pulleys and wire ropes are in good working condition.		
10	Function of interlocks and limit switch		
11	The manufacturer's operations manual (in all languages of the operators)		
12	Oil level, Hydraulic Oil Level, Fuel Level, Coolant Level		
13	Battery Charge		
14	Outriggers in place or functioning. Associated alarms working		
15	Moving & rotating parts guarded		

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16	Load chart provided		
17	Fire Extinguisher		
18	Spark Arrestor, if operated by using fuel(For Running Refinery/ Petrochemical/Chemical Plant)		
19	Serial number plate		
20	SLI		
21	TPI Certificate		
22	Colour Coding		
23	Insurance		
24	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
25	Safety Induction for Operator		
26	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-24 REV 0

Boom Lift Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Operating and emergency controls are in proper working condition, EMO button or Emergency Stop Device		
2	Functional upper drive control interlock (i.e. foot pedal, spring lock, or two hand controls)		
3	Emergency Lowering function operates properly		
4	Lower operating controls successfully override the upper controls		
5	Both upper and lower controls are adequately protected from inadvertent operation.		
6	Control panel is clean & all buttons/switches are clearly visible (no paint over spray, etc.)		
7	All switch & mechanical guards are in good condition and properly installed		
8	All Safety Indicator lights work		
9	Drive controls function properly & accurately labelled (up, down, right, left, forward, back)		
10	Motion alarms are functional		
11	Safety decals are in place and readable		
12	Guardrails and anchor points are in place, and in good condition		
13	Work platform & extension slides are clean, dry, & clear of debris		
14	Work platform extension slides in and out freely with safety locking pins in place to lock setting on models with extension platforms.		
15	Any defects such as cracked welds, fuel leaks, hydraulic leaks, damaged control cables or wire harness, etc.		
16	Braking devices are operating properly		
17	The manufacturer's operations manual is stored on AWP (in all languages of the operators)		
18	Oil level, Hydraulic Oil Level, Fuel Level, Coolant Level		

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19	Battery Charge		
20	Outriggers in place or functioning. Associated alarms working		
21	Tyres and wheels are in good condition, with adequate air pressure if pneumatic		
22	Wheel chokes are present and are used whenever required		
23	Moving & rotating parts guarded		
24	Load chart provided		
25	Fire Extinguisher		
26	Spark Arrestor, if operated by using fuel(For Running Refinery/ Petrochemical/Chemical Plant)		
27	Serial number plate with Load capacity		
28	TPI Certificate		
29	Colour Coding		
30	Insurance		
31	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
32	Safety Induction for Operator		
33	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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OISD - GDN - 192
July, 2000

FOR RESTRICTED CIRCULATION

SAFETY PRACTICES DURING CONSTRUCTION

OISD-GDN-192

Oil Industry Safety Directorate

Government of India
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OISD - GDN - 192
July, 2000

FOR RESTRICTED CIRCULATION

SAFETY PRACTICES DURING CONSTRUCTION

Prepared by

COMMITTEE ON
SAFETY PRACTICES DURING CONSTRUCTION

Oil Industry Safety Directorate

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Preamble

Indian petroleum industry is the energy lifeline of the nation and its continuous performance is essential for sovereignty and prosperity of the country. As the industry essentially deals with inherently inflammable substances throughout its value chain – upstream, midstream and downstream – Safety is of paramount importance to this industry as only safe performance at all times can ensure optimum ROI of these national assets and resources including sustainability.

While statutory organizations were in place all along to oversee safety aspects of Indian petroleum industry, Oil Industry Safety Directorate (OISD) was set up in 1986 Ministry of Petroleum and Natural Gas, Government of India as a knowledge centre for formulation of constantly updated world-scale standards for design, layout and operation of various equipment, facility and activities involved in this industry. Moreover, OISD was also given responsibility of monitoring implementation status of these standards through safety audits.

In more than 25 years of its existence, OISD has developed a rigorous, multi-layer, iterative and participative process of development of standards – starting with research by in-house experts and iterating through seeking & validating inputs from all stake-holders – operators, designers, national level knowledge authorities and public at large – with a feedback loop of constant updation based on ground level experience obtained through audits, incident analysis and environment scanning.

The participative process followed in standard formulation has resulted in excellent level of compliance by the industry culminating in a safer environment in the industry. OISD – except in the Upstream Petroleum Sector – is still a regulatory (and not a statutory) body but that has not affected implementation of the OISD standards. It also goes to prove the old adage that self-regulation is the best regulation. The quality and relevance of OISD standards had been further endorsed by their adoption in various statutory rules of the land.

Petroleum industry in India is significantly globalized at present in terms of technology content requiring its operation to keep pace with the relevant world scale standards & practices. This matches the OISD philosophy of continuous improvement keeping pace with the global developments in its target environment. To this end, OISD keeps track of changes through participation as member in large number of International and national level Knowledge Organizations – both in the field of standard development and implementation & monitoring in addition to updation of internal knowledge base through continuous research and application surveillance, thereby ensuring that this OISD Standard, along with all other extant ones, remains relevant, updated and effective on a real time basis in the applicable areas.

Together we strive to achieve NIL incidents in the entire Hydrocarbon Value Chain. This, besides other issues, calls for total engagement from all levels of the stake holder organizations, which we, at OISD, fervently look forward to.

Jai Hind!!!

Executive Director
Oil Industry Safety Directorate

FOREWORD

The Oil Industry in India is nearly 100 years old. Due to various collaboration agreements a variety of international codes, standards and practices are in vogue. Standardisation in design philosophies, operating and maintenance practices at a national level was hardly in existence. This lack of uniformity coupled with feedback from some serious accidents that occurred in the recent past in India and abroad, emphasised the need for the industry to review the existing state of art in designing, operating and maintaining oil and gas installations.

With this in view, the Ministry of Petroleum and Natural Gas in 1986 constituted a Safety Council assisted by the Oil Industry Safety Directorate (OISD) staffed from within the industry in formulating and implementing a series of self-regulatory measures aimed at removing obsolescence, standardising and upgrading the existing standards to ensure safer operations. Accordingly OISD constituted a number of functional committees comprising of experts nominated from the industry to draw up standards and guidelines on various subjects.

The present document on “Safety Practices during Construction” was prepared by the Functional Committee on “Safety Practices during Construction”. This document is based on the accumulated knowledge and experience of industry members and the various national and international codes and practices.

It is hoped that provisions of this document if implemented objectively, may go a long way to improve the safety to reduce accidents in Oil and Gas Industry. Users are cautioned that no document can be substitute for the judgment of responsible and experienced engineer.

Suggestions are invited from the users after it is put into practice to improve the document further. Suggestions for amendments, if any, to this standard should be addressed to:

The Co-ordinator
Committee on “Safety Practices during Construction”

Oil Industry Safety Directorate

Government of India
Ministry of Petroleum & Natural Gas
8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)

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This document in no way supersedes the statutory regulations of Chief Controller of Explosives (CCE), Factory Inspectorate or any other statutory body, which must be followed as applicable.

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Though every effort has been made to assure the accuracy and reliability of the data contained in these documents. OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from their use.

These documents are intended to supplement rather than replace the prevailing statutory requirements.

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SAFETY PRACTICES DURING CONSTRUCTION

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SAFETY PRACTICES DURING CONSTRUCTION

1.0 INTRODUCTION

Safety in Construction Management deserves utmost attention especially in the hydrocarbon industry, such as Exploration, Refineries, Pipelines and Marketing installations, Gas Processing units etc. Construction is widely recognised as one of the accident prone activities. Most of the accidents are caused by inadequate planning, failure during the construction process and/or because of design deficiencies. Besides property loss, accidents also result in injuries and fatalities to the personnel; same needs to be prevented.

The reasons for accidents during construction activities are related to unique nature of the industry, human behaviour, difficult work-site conditions, extended odd duty hours, lack of training & awareness and inadequate safety management. Unsafe working methods, equipment failure and improper housekeeping also tend to increase the accident rate in construction.

Ensuring good quality of materials, equipment and competent supervision along with compliance of standard engineering practices shall go a long way to in built safety into the system.

The objective of this standard is to provide practical guidance on technical and educational framework for safety and health in construction with a view to:

(a) prevent accidents and harmful effects on the health of workers arising from employment in construction;
(b) ensure appropriate safety during implementation of construction;
(c) provide safety practice guidelines for appropriate measures of planning, control and enforcement.

2.0 SCOPE

This document specifies broad guidelines on safe practices to be adhered to during construction activities in oil industry. However, before commencing any job, specific hazards and its effects should be assessed and necessary corrective/preventive actions should be taken by all concerned. The document is intended only to supplement and not to replace or supersede the prevailing statutory requirements, which shall also be followed as applicable. For Personal Protective Equipment, OISD-STD-155 (Part I&II) shall be referred to. The scope of this document does not include the design aspects and quality checks during construction.

3.0 DEFINITIONS

Definitions of various terminology are given below:

- *Adequate, appropriate or suitable* are used to describe qualitatively or quantitatively the means or method used to protect the worker.
- *Brace:* A structural member that holds one point in a fixed position with respect to another point; bracing is a system of structural members designed to prevent distortion of a structure.
- *By hand:* The work is done without the help of a mechanised tool.
- *Competent Authority:* A stautory agency having the power to issue regulations, orders or other instructions having the force of law.
- *Competent person:* A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill for the safe performance of the specific work. The competent authorities may define appropriate criteria for the designation of such persons and may determine the duties to be assigned to them.

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- *Execution agency:*

  Any physical or legal person, having contractual obligation with the owner, and who employs one or more workers on a construction site

- *Owner:*

  Any physical or legal person for whom construction job is carried out.

  It shall also include owner's designated representative/consultant/nominee/agent, authorised from time to time to act for and on its behalf, for supervising/ coordinating the activities of the execution agency.

- *Hazard:* Danger or potential danger.

- *Guard-rail:* An adequately secured rail erected along an exposed edge to prevent persons from falling.

- *Hoist:* A machine, which lifts materials or persons by means of a platform, which runs on guides.

- *Lifting gear:* Any gear or tackle by means of which a load can be attached to a lifting appliance but which does not form an integral part of the appliance or load.

- *Lifting appliance:* Any stationary or mobile appliance used for raising or lowering persons or loads.

- *Means of access or egress:* Passageways, corridors, stairs, platforms, ladders and any other means for entering or leaving the workplace or for escaping in case of danger.

- *Scaffold:* Any fixed, suspended or mobile temporary structure supporting workers and material or to gain access to any such structure and which is not a lifting appliance as defined above.

- *Toe-board:* A barrier placed along the edge of a scaffold platform, runway, etc., and secured there to guard against the slipping of persons or the falling of material.

- *Worker:* Any person engaged in construction activity.

- *Workplace:* All places where workers need to be or to go by reason of their work.

4.0 GENERAL DUTIES

4.1 GENERAL DUTIES OF EXECUTION AGENCIES

4.1.1 Execution agency should:

i) provide means and organisation to comply with the safety and health measures required at the workplace.

ii) provide and maintain workplaces, plant, equipment, tools and machinery and organise construction work so that, there is no risk of accident or injury to health of workers. In particular, construction work should be planned, prepared and undertaken so that:

(a) dangers, liable to arise at the workplace, are prevented;
(b) excessively or unnecessarily strenuous work positions and movements are avoided;
(c) organisation of work takes into account the safety and health of workers;
(d) materials and products used are suitable from a safety and health point of view;
(e) working methods are adopted to safeguard workers against the harmful effects of chemical, physical and biological agents.

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iii) establish committees with representatives of workers and management or make other arrangement for the participation of workers in ensuring safe working conditions.

iv) arrange for periodic safety inspections by competent persons of all buildings, plant, equipment, tools, machinery, workplaces and review of systems of work, regulations, standards or codes of practice. The competent person should examine and ascertain the safety of construction machinery and equipment.

v) provide such supervision to ensure that workers perform their work with due regard to safety and health of theirs as well as that of others.

vi) Employ only those workers who are qualified, trained and suited by their age, physique, state of health and skill.

vii) satisfy themselves that all workers are informed and instructed in the hazards connected with their work and environment and trained in the precautions necessary to avoid accidents and injury to health.

viii) Ensure that buildings, plant, equipment, tools, machinery or workplaces in which a dangerous defect has been found should not be used until the defect has been rectified.

ix) Organise for and remain always prepared to take immediate steps to stop the operation and evacuate workers as appropriate, where there is an imminent danger to the safety of workers.

x) establish a checking system by which it can be ascertained that all the members of a shift, including operators of mobile equipment, have returned to the camp or base at the close of work on dispersed sites and where small groups of workers operate in isolation.

xi) provide appropriate first aid, training and welfare facilities to workers as per various statutes like the Factories Act, 1948 etc. and, whenever collective measures are not feasible or are insufficient, provide and maintain personal protective equipment and clothing in line with the requirement as per OISD-STD-155 (Vol. I& II) on Personnel Protective Equipment. They should also provide access to workers to occupational health services.

xii) Educate workers about their right and the duty at any workplace to participate in ensuring safe working conditions to the extent of their control over the equipment and methods of work and to express views on working procedures adopted as may affect safety and health.

xiii) Ensure that except in an emergency, workers, unless duly authorised, should not interfere with, remove, alter or displace any safety device or other appliance furnished for their protection or the protection of others, or interfere with any method or process adopted with a view to avoiding accidents and injury to health.

xiv) Ensure that workers do not operate or interfere with plant and equipment that they have not been duly authorised to operate, maintain or use.

xv) Ensure that workers do not sleep, rest or cook etc in dangerous places such as scaffolds, railway tracks, garages, confined spaces or in the vicinity of fires, dangerous or toxic substances, running machines or vehicles and heavy equipment etc.

xvii) Obtain the necessary clearance/permits as required and specified by owner

xviii) As per the Govt. circular as amended from time to time all contractors who employ more than 50 workers or where the contract value exceeds Rs. 50 crores, the following facilities are to be provided by contractor at site :

- Arrangement for drinking water
- Toilet facilities
- A creche where 10 or more women workers are having children below the age of 6 years
- Transport arrangement for attending to emergencies

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xix) should deploy a safety officer at site

4.2 GENERAL DUTIES OF OWNERS

4.2.1 Owners should:

i) co-ordinate or nominate a competent person to co-ordinate all activities relating to safety and health on their construction projects;
ii) inform all contractors on the project of special risks to health and safety;
iii) Ensure that executing agency is aware of the owner's requirements and the executing agency's responsibilities with respect to safetry practices before starting the job.

5.0 SAFETY PRACTICES AT WORK PLACES

5.1. GENERAL PROVISIONS

5.1.1 All openings and other areas likely to pose danger to workers should be clearly indicated.

5.1.2 Workers & Supervisors should use the safety helmet and other requisite Personal Protective Equipment according to job & site requirement. They should be trained to use personal protective equipment.

5.1.3 Never use solvents, alkalis and other oils to clean the skin.

5.1.4 Lift the load with back straight and knees bent as far as possible. Seek the help in case of heavy load.

5.1.5 Ensure the usage of correct and tested tools and tackles. Don't allow the make shift tools and tackles.

5.1.6 No loose clothing should be allowed while working near rotating equipment or working at heights.

5.2 MEANS OF ACCESS AND EGRESS

Adequate and safe means of access (atleast two, differently located) to and egress from all workplaces should be provided. Same should be displayed and maintained.

5.3 HOUSEKEEPING

5.3.1 Ensure:

i) proper storage of materials and equipment;
ii) removal of scrap, inflammable material, waste and debris at appropriate intervals.

5.3.2 Removal of loose materials, which are not required for use, to be ensured. Accumulation of these at the site can obstruct means of access to and egress from workplaces and passageways.

5.3.3 Workplaces and passageways, that are slippery owing to oil, grease or other causes, should be cleaned up or strewn with sand, sawdust, ash etc.

5.4 PRECAUTIONS AGAINST THE FALL OF MATERIALS & PERSONS AND COLLAPSE OF STRUCTURES

5.4.1 Precautions should be taken such as the provision of fencing, look-out men or barriers to protect any person against injury by the fall of materials, or tools or equipment being raised or lowered.

5.4.2 Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or parts of structures that are being erected, maintained, repaired, dismantled or demolished.

5.4.3 All openings through which workers are liable to fall should be kept effectively covered or fenced and displayed prominently.

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5.4.4 As far as practicable, guardrails and toe-boards should be provided to protect workers from falling from elevated workplaces.

5.5 PREVENTION OF UNAUTHORISED ENTRY

5.5.1 Construction sites located in built-up areas and alongside vehicular and pedestrian traffic routes should be fenced to prevent the entry of unauthorised persons.

5.5.2 Visitors should not be allowed access to construction sites unless accompanied by or authorised by a competent person and provided with the appropriate protective equipment.

5.6 FIRE PREVENTION AND FIRE FIGHTING

5.6.1 All necessary measures should be taken by the executing agency and owner to:

i) avoid the risk of fire;
ii) control quickly and efficiently any outbreak of fire;
iii) bring out a quick and safe evacuation of persons.
iv) Inform unit/fire station control room, where construction work is carried out within existing operating area.

5.6.2 Combustible materials such us packing materials, sawdust, greasy/oily waste and scrap wood or plastics should not be allowed to accumulate in workplaces but should be kept in closed metal containers in a safe place.

5.6.3 Places where workers are employed should, if necessary to prevent the danger of fire, be provided with:

i) suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible;
ii) an adequate water supply at sufficient pressure meeting the requirements of various OISD standards.

5.6.4 To guard against danger at places having combustible material, workers should be trained in the action to be taken in the event of fire, including the use of means of escape.

5.6.5 At sites having combustible material, suitable visual signs should be provided to indicate clearly the direction of escape in case of fire.

5.6.6 Means of escape should be kept clear at all times. Escape routes should be frequently inspected particularly in high structures and where access is restricted.

5.7 LIGHTING

5.7.1 Where natural lighting is not adequate, working light fittings or portable hand-lamps should be provided at workplace on the construction site where a worker will do a job.

5.7.2 Emergency lighting should be provided for personnel safety during night time to facilitate standby lighting source, if normal system fails.

5.7.2 Artificial lighting should not produce glare or disturbing shadows.

5.7.3 Lamps should be protected by guards against accidental breakage.

5.7.4 The cables of portable electrical lighting equipment should be of adequate size & characteristics for the power requirements and of adequate mechanical strength to withstand severe conditions in construction operations.

5.8 PLANT, MACHINERY, EQUIPMENT AND HAND TOOLS

5.8.1 General Provisions

i) Plant, machinery and equipment including hand tools, both manual and power driven, should:

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a) be of proper design and construction, taking into account health, Safety and ergonomic principles.
b) be maintained in good working order;
c) be used only for work for which they have been designed.
d) be operated only by workers who have been authorised and given appropriate training.
e) be provided with protective guards, shields or other devices as required.

ii) Adequate instructions for safe use should be provided.

iii) Safe operating procedures should be established and used for all plant, machinery and equipment.

iv) Operators of plant, machinery and equipment should not be distracted while work is in progress.

v) Plant, machinery and equipment should be switched off when not in use and isolated before any adjustment, clearing or maintenance is done.

vi) Where trailing cables or hose pipes are used they should be kept as short as practicable and not allowed to create a hazard.

vii) All moving parts of machinery and equipment should be enclosed or adequately guarded.

viii) Every power-driven machine and equipment should be provided with adequate means, immediately accessible and readily identifiable to the operator, of stopping it quickly and preventing it from being started again inadvertently.

ix) Operators of plant, machinery, equipment and tools should be provided with PPEs, including where necessary, suitable ear protection.

5.8.2 Hand tools

i) Hand tools should be repaired by competent persons.

ii) Heads of hammers and other shock tools should be dressed or ground to a suitable radius on the edge as soon as they begin to mushroom or crack.

iii) When not in use and while being carried or transported sharp tools should be kept in sheaths, shields, chests or other suitable containers.

iv) Only insulated or nonconducting tools should be used on or near live electrical installations.

v) Only non-sparking tools should be used near or in the presence of flammable or explosive dusts or vapours.

5.8.3 Pneumatic Tools

i) Operating triggers on portable pneumatic tools should be:
a) so placed as to minimise the risk of accidental starting of the machine.
b) so arranged as to close the air inlet valve automatically when the pressure of the operator's hand is removed.

ii) Hose and hose connections for compressed air supply to portable pneumatic tools should be:

a) designed and tested for the pressure and service for which they are intended;
b) fastened securely on the pipe outlet and equipped with the safety chain, as appropriate.

iii) Pneumatic shock tools should be equipped with safety clips or retainers to prevent dies and tools from being accidentally expelled from the barrel.

iv) Pneumatic tools should be disconnected from power and the pressure in hose lines released before any adjustment or repair is made.

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5.8.4 Electrical Tools

i) Low voltage portable electrical tools should generally be used.

ii) All electrical tools should be earthed, unless they are "all insulated" or "double insulated" tools which do not require earthing.

iii) All electrical tools should get inspected and maintained on a regular basis by a competent electrician and complete records kept.

5.8.5 Engines

i) Engines should:

a) be installed so that they can be started safely and the maximum safe speed cannot be exceeded.
b) have controls for limiting speed.
c) have devices to stop them from a safe place in an emergency.

ii) IC engines should not be run in confined spaces unless adequate exhaust ventilation is provided.

iii) When IC engines are being fuelled:

a) the engine should be shut off.
b) care should be taken to avoid spilling fuel;
c) no person should smoke or have an naked light in the vicinity.
d) a fire extinguisher should be kept readily available.

iv) Secondary fuel reservoir should be placed outside the engine room.

6.0 CONSTRUCTION ACTIVITIES

The various common activities in construction are as under:

- Excavation
- Scaffolding, Platforms & Ladders
- Structural Work, Laying of Reinforcement & Concreting
- Road Work (Laying of roads)
- Cutting /Welding
- Working in Confined Space
- Proof/Pressure Testing
- Working at Heights
- Handling & Lifting Equipments
- Vehicle Movement
- Electrical
- Offshore
- Demolition
- Radiography
- Sand/shot blasting/ spray painting
- Work above water

The safe practices to be followed during the implementation of above construction activities are given below:

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6.1 EXCAVATION

6.1.1 All excavation work should be planned and the method of excavation and the type of support work required should be decided considering the following:

i) the stability of the ground;
ii) the excavation will not affect adjoining buildings, structures or roadways;
iii) to prevent hazard, the gas, water, electrical and other public utilities should be shut off or disconnected, if necessary;
iv) presence of underground pipes, cable conductors, etc.,
v) the position of culvert/bridges, temporary roads and spoil heaps should be determined;

6.1.2 Before digging begins on site, all excavation work should be planned and the method of excavation and the type of support work required decided.

6.1.3 All excavation work should be supervised.

6.1.4 Sites of excavations should be thoroughly inspected:

i) daily, prior to each shift and after interruption in work of more than one day;
ii) after every blasting operation;
iii) after an unexpected fall of ground;
iv) after substantial damage to supports;
v) after a heavy rain, frost or snow;
vi) when boulder formations are encountered.

6.1.5 Safe angle of repose while excavating trenches exceeding 1.5m depth upto 3.0m should be maintained. Based on site conditions, provide proper slope, usually 45^0,and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock or provide proper shoring and strutting to prevent cave-in or slides.

6.1.6 As far as possible, excavated earth should not be placed within one meter of the edge of the trench or depth of trench whichever is greater.

6.1.7 Don't allow vehicles to operate too close to excavated area. Maintain atleast 2m distance from edge of excavation. No load, plant or equipment should be placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endanger any person unless precautions such as the provision of shoring or piling are taken to prevent the sides from collapsing.

6.1.8 Adequately anchored stop blocks and barriers should be provided to prevent vehicles being driven into the excavation. Heavy vehicles should not be allowed near the excavation unless the support work has been specially designed to permit it.

6.1.9 If an excavation is likely to affect the security of a structure on which persons are working, precautions should be taken to protect the structure from collapse.

6.1.10 Barricade at 1m height (with red & white band/self glowing caution board) should be provided for excavations beyond 1.5m depth. Provide two entries/exits for such excavation.

6.1.11 Necessary precautions should be taken for underground utility lines like cables, sewers etc. and necessary approvals/clearances from the concerned authorities shall be obtained before commencement of the excavation job.

6.1.12 Water shall be pumped/bailed out, if any accumulates in the trench. Necessary precautions should be taken to prevent entry of surface water in trenches.

6.1.13 During rains, the soil becomes loose. Take additional precaution against collapse of side wall.

6.1.14 In hazardous areas, air should be tested to ascertain its quality. No one should be allowed entry till it is suitable for breathing.

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6.1.15 In case of mechanised excavation, precaution shall be taken to not to allow anybody to come within one meter of extreme reach of the mechanical shovel. The mechanised excavator shall be operated by a well-trained experienced operator. When not in operation, the machine shall be kept on firm leveled ground with mechanical shovel resting on ground. Wheel or belt shall be suitably jammed to prevent any accidental movement of the machine. Suitable precautions as per manufacturer guidelines should be taken for dozers, graders and other heavy machines.

6.1.16 In case of blasting, follow strictly IS:4081-1986 & Indian Explosive Act and rules for storage, handling and carrying of explosive materials and execution of blasting operation.

6.2 SCAFFOLDING, PLATFORMS & LADDERS

6.2.1 Metal as material of construction

i) A scaffold should be provided and maintained or other equally safe and suitable provision should be made where work cannot safely be done on or from the ground or from part of a building or other permanent structure.

ii) Scaffolds should be provided with safe means of access, such as stairs, ladders or ramps. Ladders should be secured against inadvertent movement.

iii) Every scaffold should be constructed, erected and maintained so as to prevent collapse or accidental displacement when in use.

iv) Every scaffold and part thereof should be constructed :

(a) in such a way so as not to cause hazards for workers during erection and dismantling;
(b) in such a way so as guard rails and other protective devices, platforms, ladders, stairs or ramps can be easily put together;
(c) with sound material and of requisite size and strength for the purpose for which it is to be used and maintained in a proper condition.

v) Boards and planks used for scaffolds should be protected against splitting.

vi) Materials used in the construction of scaffolds should be stored under good conditions and apart from any material unsuitable for scaffolds.

vii) Couplers should not cause deformation in tubes. Couplers should be made of drop forged steel or equivalent material.

viii) Tubes should be free from cracks, splits and excessive corrosion and be straight to the eye, and tube ends cut cleanly square with the tube axis.

ix) Scaffolds should be designed for their maximum load as per relevant code.

x) Scaffolds should be adequately braced.

xi) Scaffolds which are not designed to be independent should be rigidly connected to the building at designated vertical and horizontal places.

xii) A scaffold should never extend above the highest anchorage to an extent which might endanger its stability and strength.

xiii) Loose bricks, drainpipes, chimney-pots or other unsuitable material should not be used for the construction or support of any part of a scaffold.

xiv) Scaffolds should be inspected and certified:

(a) before being taken into use;
(b) at periodic intervals thereafter as prescribed for different types of scaffolds;
(c) after any alteration, interruption in use, exposure to weather or seismic conditions or any other occurrence likely to have affected their strength or stability.

xv) Inspection should more particularly ascertain that:

(a) the scaffold is of suitable type and adequate for the job;

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(b) materials used in its construction are sound and of sufficient strength;
(c) it is of sound construction and stable;
(d) that the required safeguards are in position.

xvi) A scaffold should not be erected, substantially altered or dismantled except by or under the supervision.

xvii) Every scaffold should be maintained in good and proper condition, and every part should be kept fixed or secured so that no part can be displaced in consequence of normal use.

xviii) If out-rigger scaffolding is to be used, it should be specifically designed and inspected before putting in use.

6.2.2 Lifting appliances on scaffolds

i) When a lifting appliance is to be used on a scaffold:

(a) the parts of the scaffold should be carefully inspected to determine the additional strengthening and other safety measures required;
(b) any movement of the scaffold members should be prevented;
(c) if practicable, the uprights should be rigidly connected to a solid part of the building at the place where the lifting appliance is erected.

6.2.3 Prefabricated scaffolds

i) In the case of prefabricated scaffold systems, the instructions provided by the manufacturers or suppliers should be strictly adhered to. Prefabricated scaffolds should have adequate arrangements for fixing bracing.

ii) Frames of different types should not be intermingled in a single scaffold.

iii) Scaffolding shall be erected on firm and level ground.

iv) All members of metal scaffolding shall be checked periodically to screen out defective / rusted members. All joints should be properly lubricated for easy tightening.

v) Entry to scaffolding should be restricted.

vi) Erection, alteration and removal shall be done under supervision of experienced personnel.

vii) Use of barrels, boxes, loose bricks etc., for supporting platform shall not be permitted.

viii) Each supporting member of platform shall be securely fastened and braced

ix) Where planks are butt-joined, two parallel putlogs shall be used, not more than 100mm apart, to give support to each plank.

x) Platform plank shall not project beyond its end support to a distance exceeding 4 times the thickness of plank, unless it is effectively secured to prevent tipping. Cantilever planks should be avoided.

xi) The platform edges shall be provided with 150mm high toe board to eliminate hazards of tools or other objects falling from platform.

xii) Erect ladders in the “four up-one out position”

xiii) Lash ladder securely with the structure.

xiv) Using non-slip devices, such as, rubber shoes or pointed steel ferules at the ladder foot, rubber wheels at ladder top, fixing wooden battens, cleats etc.

xv) When ladder is used for climbing over a platform, the ladder must be of sufficient length, to extend at least one meter above the platform, when erected against the platform in “four up-one out position.”

xvi) Portable ladders shall be used for heights not more than 4mt. Above 4mt flights, fixed ladders shall be provided with at least 600 mm landings at every 6mt or less.

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xvii) The width of ladder shall not be less than 300mm and rungs shall be spaced not more than 300mm.

xviii) Every platform and means of access shall be kept free from obstruction.

xix) If grease, mud, gravel, mortar etc., fall on platform or scaffolds, these shall be removed immediately to avoid slippage.

xx) Workers shall not be allowed to work on scaffolds during storms or high wind. After heavy rain or storms, scaffolds shall be inspected before reuse.

xxi) Don't overload the scaffolding. Remove excess material and scrap immediately.

xxii) Dismantling of scaffolds shall be done in a pre-planned sequential manner.

6.2.4 Suspended scaffolds/boatwain's chair

i) In addition to the requirements for scaffolds in general as regards soundness, stability and protection against the risk of falls, suspended scaffolds should meet the following specific requirements.

(a) platforms should be designed and built with dimensions that are compatible with the stability of the structure as a whole, especially the length;
(b) the number or anchorage should be compatible with the dimensions of the platform;
(c) the safety of workers should be safeguarded by an extra rope having a point of attachment independent of the anchorage arrangements of the scaffold;
(d) the anchorage and other elements of support of the scaffold should be designed and built in such a way as to ensure sufficient strength;
(e) the ropes, winches, pulleys or pulley blocks should be designed, assembled, used and maintained according to the requirements established for lifting gear adapted to the lifting of persons according to national laws and regulations;
(f) Before use, the whole structure should be checked by a competent person.

6.2.5 Bamboo Scaffolding

i) In general, it should be avoided as far as possible. It should not be used in the unit/off-site areas and where hot work is to be done.

ii) For construction and maintenance of residential and office buildings, situated outside explosive licensed area, bamboo scaffold, if used, should conform to provisions given in IS-3696 (Part 1)-1987.

6.3 STRUCTURAL WORK, LAYING OF REINFORCEMENT & CONCRETING

6.3.1 General provisions

i) The erection or dismantling of buildings, structures, civil engineering works, formwork, falsework and shoring should be carried out by trained workers only under the supervision of a competent person.

ii) Precautions should be taken to guard against danger to workers arising from any temporary state of weakness or instability of a structure.

iii) Formwork, falsework and shoring should be so designed, constructed and maintained that it will safely support all loads that may be imposed on it.

iv) Formwork should be so designed and erected that working platforms, means of access, bracing and means of handling and stabilising are easily fixed to the formwork structure.

6.3.2. Erection and dismantling of steel and prefabricated structures

i) The safety of workers employed on the erection and dismantling of steel and prefabricated structures should be ensured by appropriate means, such as provision and use of:

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(a) ladders, gangways or fixed platforms;
(b) platforms, buckets, boatswain's chairs or other appropriate means suspended from lifting appliances;
(c) safety harnesses and lifelines, catch nets or catch platforms;
(d) Power-operated mobile working platforms.

ii) Steel and prefabricated structures should be so designed and made that they can be safely transported and erected.

iii) In addition to the need for the stability of the part when erected, the design should explicitly take following into account:

(a) the conditions and methods of attachment in the operations of transport, storing and temporary support during erection or dismantling as applicable;
(b) Methods for the provision of safeguards such as railings and working platforms, and, when necessary, for mounting them easily on the structural steel or prefabricated parts.

iv) The hooks and other devices built in or provided on the structural steel or prefabricated parts that are required for lifting and transporting them should be so shaped, dimensioned and positioned as:

(a) to withstand with a sufficient margin the stresses to which they are subjected;
(b) Not to set up stresses in the part that could cause failures, or stresses in the structure itself not provided for in the plans, and be designed to permit easy release from the lifting appliance. Lifting points for floor and staircase units should be located (recessed if necessary) so that they do not protrude above the surface;
(c) To avoid imbalance or distortion of the lifted load.

v) Storeplaces should be so constructed that:

(a) there is no risk of structural steel or prefabricated parts falling or overturning;
(b) storage conditions generally ensure stability and avoid damage having regard to the method of storage and atmospheric conditions;
(c) racks are set on firm ground and designed so that units cannot move accidentally.

vi) While they are being stored, transported, raised or set down, structural steel or prefabricated parts should not be subjected to stresses prejudicial to their stability.

vii) Every lifting appliance should:

(a) be suitable for the operations and not be capable of accidental disconnection;
(b) be approved or tested as per statutory requirement.

viii) Lifting hooks should be of the self-closing type or of a safety type and should have the maximum permissible load marked on them.

ix) Tongs, clamps and other appliances for lifting structural steel and prefabricated parts should:

(a) be of such shape and dimensions as to ensure a secure grip without damaging the part;
(b) be marked with the maximum permissible load in the most unfavourable lifting conditions.

x) Structural steel or prefabricated parts should be lifted by methods or appliances that prevent them from spinning accidentally.

xi) When necessary to prevent danger, before they are raised from the ground, structural steel or prefabricated parts should be provided with safety devices such as railings and working platforms to prevent falls of persons.

xii) While structural steel or prefabricated parts are being erected, the workers should be provided with appliances for guiding them as they are being lifted and set down, so as to avoid crushing of hands and to facilitate the operations. Use of such appliances should be ensured.

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xiii) A raised structural steel or prefabricated part should be so secured and wall units so propped that their stability cannot be imperiled, even by external agencies such as wind and passing loads before its release from the lifting appliance.

xiv) At work places, instruction should be given to the workers on the methods, arrangements and means required for the storage, transport, lifting and erection of structural steel or prefabricated parts, and, before erection starts, a meeting of all those responsible should be held to discuss and confirm the requirements for safe erection.

xv) During transportation within the construction area, attachments such as slings and stirrups mounted on structural steel or prefabricated parts should be securely fastened to the parts.

xvi) Structural steel or prefabricated parts should be so transported that the conditions do not affect the stability of the parts or the means of transport result in jolting, vibration or stresses due to blows, or loads of material or persons.

xvii) When the method of erection does not permit the provision of other means of protection against fall of persons, the workplaces should be protected by guardrails, and if appropriate by toe-boards.

xviii) When adverse weather conditions such as snow, ice and wind or reduced visibility entail risks of accidents, the work should be carried on with particular care, or, if necessary, interrupted.

xix) Structures should not be worked on during violent storms or high winds, or when they are covered with ice or snow, or are slippery from other causes.

xx) If necessary, to prevent danger, structural steel parts should be equipped with attachments for suspended scaffolds, lifelines or safety harnesses and other means of protection.

xxi) The risks of falling, to which workers moving on high or sloping girders are exposed, should be limited by all means of adequate collective protection or, where this is impossible, by the use of a safety harness that is well secured to a strong support.

xxii) Structural steel parts that are to be erected at a great height should as far as practicable be assembled on the ground.

xxiii) When structural steel or prefabricated parts are being erected, a sufficiently extended area underneath the workplace should be barricaded or guarded

xxiv) Steel trusses that are being erected should be adequately shored, braced or guyed until they are permanently secured in position.

xxv) Load-bearing structural member should not be dangerously weakened by cutting, holing or other means.

xxvi) Structural members should not be forced into place by the hoisting machine while any worker is in such a position that he could be injured by the operation.

xxvii) Open-web steel joists that are hoisted singly should be directly placed in position and secured against dislodgment.

6.3.3 Reinforcement

i) Ensure that workers use Personnel Protective equipment like safety helmet, safety shoes, gloves etc.

ii) Don't place the hand below the rods for checking clear distance. Use measuring devices.

iii) Don't wear loose clothes while checking the rods.

iv) Don't stand unnecessarily on cantilever rods.

v) To carry out welding/cutting of rods, safety procedures/precautions as mentioned in Item No. 6.5 to be followed.

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vi) For supplying of rods at heights, proper staging and/or bundling to be provided.

vii) Ensure barricading and staging for supplying and fixing of rods at height.

viii) For short distance carrying of materials on shoulders, suitable pads to be provided.

ix) While transporting material by trucks/trailers, the rods shall not protrude in front of or by the sides of driver's cabin. In case such protrusion cannot be avoided behind the deck, then it should not extend 1/3rd of deck length or 1.5M which ever is less and tied with red flags/lights.

6.3.4 Concreting

i) Ensure stability of shuttering work before allowing concreting.

ii) Barricade the concreting area while pouring at height/depths.

iii) Keep vibrator hoses, pumping concrete accessories in healthy conditions and mechanically locked.

iv) Pipelines in concrete pumping system shall not be attached to temporary structures such as scaffolds and formwork support as the forces and movements may effect their integrity.

v) Check safety cages & guards around moving motors/parts etc. provided in concreting mixers.

vi) Use Personal Protective Equipment like gloves, safety shoes etc. while dealing with concrete and wear respirators for dealing with cement.

vii) Earthing of electrical mixers, vibrators, etc. should be done and verified.

viii) Cleaning of rotating drums of concrete mixers shall be done from outside. Lockout devices shall be provided where workers need to enter.

ix) Where concrete mixers are driven by internal combustion engine, exhaust points shall be located away from the worker's workstation so as to eliminate their exposure to obnoxious fumes.

x) Don't allow unauthorised person to stand under the concreting area.

xi) Ensure adequate lighting arrangements for carrying out concrete work during night.

xii) Don't allow the same workers to pour concrete round the clock. Insist on shift pattern.

xiii) During pouring, shuttering and its supports should be continuously watched for defects.

6.4 ROAD WORK

6.4.1 Site shall be barricaded and provided with warning signs, including night warning lamps at appropriate locations for traffic diversion.

6.4.2 Filled and empty bitumen drums shall be stacked separately at designated places.

6.4.3 Mixing aggregate with bitumen shall preferably be done with the help of bitumen batch mixing plant, unless operationally non-feasible.

6.4.4 Road rollers, Bitumen sprayers, Pavement finishers shall be driven by experienced drivers with valid driving license.

6.4.5 Workers handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen with aggregate, shall be provided with PVC hand gloves and rubber shoes with legging up to knee joints.

6.4.6 At the end of day's work, surplus hot bitumen in tar boiler shall be properly covered by a metal sheet, to prevent anything falling in it,

6.4.7 If bitumen accidentally falls on ground, it shall be immediately covered by sprinkling sand, to prevent anybody stepping on it. Then it shall be removed with the help of spade.

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6.4.8 For cement concrete roads, besides site barricading and installation of warning signs for traffic diversion, safe practices mentioned in the chapter on "Concreting", shall also be applicable.

6.5 CUTTING/WELDING

6.5.1 Common hazards involved in welding/cutting are sparks, molten metal, flying particles, harmful light rays, electric shocks etc. Following precautions should be taken: -

i) A dry chemical type fire extinguisher shall be made available in the work area.

ii) Adequate ventilation shall be ensured by opening manholes and fixing a shield or forced circulation of air etc, while doing a job in confined space.

iii) Ensure that only approved and well-maintained apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used.

iv) All covers and panels shall be kept in place, when operating an electric Arc welding machine.

v) The work piece should be connected directly to Power supply, and not indirectly through pipelines/structures/equipments etc.

vi) The welding receptacles shall be rated for 63 A suitable for 415V, 3-Phase system with a scraping earth. Receptacles shall have necessary mechanical interlocks and earthing facilities.

vii) All cables, including welding and ground cables, shall be checked for any worn out or cracked insulation before starting the job. Ground cable should be separate without any loose joints.

viii) Cable coiling shall be maintained at minimum level, if not avoidable.

ix) An energised electrode shall not be left unattended.

x) The power source shall be turned off at the end of job.

xi) All gas cylinders shall be properly secured in upright position.

xii) Acetylene cylinder shall be turned and kept in such a way that the valve outlet points away from oxygen cylinder.

xiii) Acetylene cylinder key for opening valve shall be kept on valve stem, while cylinder is in use, so that the acetylene cylinder could be quickly turned off in case of emergency. Use flash back arrestors to prevent back-fire in acetylene/oxygen cylinder.

xiv) When not in use, valves of all cylinders shall be kept closed.

xv) All types of cylinders, whether full or empty, shall be stored at cool, dry place under shed.

xvi) Forced opening of any cylinder valve should not be attempted.

xvii) Lighted gas torch shall never be left unattended.

xviii) Store acetylene and oxygen cylinders separately.

xix) Store full and empty cylinders separately.

xx) Avoid cylinders coming into contact with heat.

xxi) Cylinders that are heavy or difficult to carry by hand may be rolled on their bottom edge but never dragged.

xxii) If cylinders have to be moved, be sure that the cylinder valves are shut off.

xxiii) Before changing torches, shut off the gas at the pressure reducing regulators and not by crimping the hose.

xxiv) Do not use matches to light torches, use a friction lighter.

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xxv) Move out any leaking cylinder immediately.

xxvi) Use trolleys for oxygen & acetylene cylinder and chain them.

xxvii) Always use Red hose for acetylene and other fuel gases and Black for oxygen, and ensure that both are in equal length.

xxviii) Ensure that hoses are free from burns, cuts and cracks and properly clamped.

xxix) Avoid dragging hoses over sharp edges and objects

xxx) Do not wrap hoses around cylinders when in use or stored.

xxxi) Protect hoses from flying sparks, hot slag, and other hot objects.

xxxii) Lubricants shall not be used on Ox-fuel gas equipment.

xxxiii) During cutting/welding, use proper type goggles/face shields.

6.6 WORKING IN CONFINED SPACES

6.6.1 Following safety practices for working in confined space like towers, columns, tanks and other vessels should be followed in addition to the safety guidelines for specific jobs like scaffolding, cutting/welding etc.

i) Shut down, isolate, depressurise and purge the vessel as per laid down procedures.

ii) Entry inside the vessel and to carry out any job should be done after issuance of valid permit only in line with the requirement of OISD-STD-105.

iii) Ensure proper and accessible means of exit before entry inside a confined space.

iv) The number of persons allowed inside the vessel should be limited to avoid overcrowding.

v) When the work is going on in the confined space, there should always be one man standby at the nearby manway.

vi) Before entering inside the vessels underground or located at lower elevation, probability of dense vapours accumulating nearby should also be considered in addition to inside the vessel.

vii) Ensure requisite O_2 level before entry in the confined space and monitor level periodically or other wise use respiratory devices.

viii) Check for no Hydrocarbon or toxic substances before entry and monitor level periodically or use requisite Personal Protective Equipment.

ix) Ensure adequate ventilation or use respiratory devices.

x) Depending upon need, necessary respirator system, gas masks and suit shall be worn by everyone entering confined space. In case of sewer, OWS or in the confined area where there is a possibility of toxic or inert gas, gas masks shall be used by everyone while entering.

xi) Barricade the confined spaces during hoisting, radiography, blasting, pressure testing etc.

xii) Use 24V flameproof lamp fittings only for illumination.

xiii) Use tools with air motors or electric tools with maximum voltage of 24V.

xiv) House keeping shall be well maintained.

xv) Safety helmet, safety shoes and safety belt shall be worn by everyone entering the confined space.

xvi) Don't wear loose clothing while working in a confined space.

xvii) In case of the vessels which are likely to contain pyropheric substances (like Iron Sulphide), special care need to be taken before opening the vessel. Attempt should be

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made to remove the pyropheric substances. Otherwise, these should be always kept wet by suitable means.

xviii) The cutting torches should also be kept outside the vessel immediately after the cutting.

xix) The gas cylinders used for cutting/welding shall be kept outside.

xx) All cables, hoses, welding equipment etc., shall be removed from confined space at end of each work day, even if the work is to be resumed in the same space the next day.

xxi) To the extent possible sludge shall be cleared and removed from outside before entering.

xxii) No naked light or flame or hot work such as welding, cutting and soldering should be permitted inside a confined space or area unless it has been made completely free of the flammable atmosphere, tested and found safe by a competent person. Only non-sparking tools and flameproof hand lamps protected with guard and safety torches should be used inside such confined space or area for initial inspection, cleaning or other work required to be done for making the area safe.

xxiii) Communication should be always maintained between the worker and the attendant.

6.7 PROOF/PRESSURE TESTING

6.7.1 Review test procedure before allowing testing with water or air or any other fluid.

6.7.2 Provide relief valves of adequate size while testing with air or other gases.

6.7.3 Ensure compliance of necessary precautions, step wise loading, tightening of fasteners, grouting etc. before and during testing.

6.7.4 Inform all concerned in advance of the testing.

6.7.5 Keep the vents open before opening any valve for filling/draining of liquid used for hydrotesting. The filling/draining should not exceed the designed rate for pressure testing.

6.7.6 Provide separate gauges of suitable range for pressurising pump and the equipment to be tested.

6.7.7 Provide gauges at designated locations for monitoring of pressures.

6.7.8 Check the calibration of all pressurising equipment and accessories and maintain records.

6.7.9 Take readings at pre-defined intervals.

6.8 WORKING AT HEIGHTS

6.8.1 General Provision

i) While working at a height of more than 3 meters, ISI approved safety belt shall be used.

ii) While working at a height of more than 3 meters, permit should be issued by competent person before commencement of the job.

iii) Worker should be well trained on usage of safety belt including its proper usage at the time of ascending/descending.

iv) All tools should be carried in tool kits to avoid their falling.

v) If the job is on fragile/sloping roof, roof walk ladders shall be used.

vi) Provide lifeline wherever required.

vii) Additional safety measures like providing Fall Arrestor type Safety belt, safety net should be provided depending upon site conditions, job requirements.

viii) Keep working area neat and clean. Remove scrap material immediately.

ix) Don't throw or drop material/equipment from height.

x) Avoid jumping from one member to another. Use proper passageway.

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xi) Keep both hands free while climbing. Don't try to bypass the steps of the ladder.

xii) Try to maintain calm at height. Avoid over exertion.

xiii) Avoid movements on beam.

xiv) Elevated workplaces including roofs should be provided with safe means of access and egress such as stairs, ramps or ladders.

6.8.2 Roof Work

i) All roof-work operations should be pre-planned and properly supervised.

ii) Roof work should only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.

iii) Work on roofs shouldn't be carried on in weather conditions that threaten the safety of workers.

iv) Crawling boards, walkways and roof ladders should be securely fastened to a firm structure.

v) Roofing brackets should fit the slope of the roof and be securely supported.

vi) Where it is necessary for a person to kneel or crouch near the edge of the roof, necessary precautions should be taken.

vii) On a large roof where work have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided.

viii) All covers for openings in roofs should be of substantial construction and be secured in position.

ix) Roofs with a pitch of more than 10 should be treated as sloping.

x) When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders should be provided and firmly secured in position.

xi) During extensive work on the roof, strong barriers or guardrails and toe-boards should be provided to stop a person from falling off the roof.

xii) Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they should be provided with suitable roof ladders or crawling boards strong enough and when spanning across the supports for the roof covering to support those workers.

xiii) A minimum of two boards should be provided so that it is not necessary for a person to stand on a fragile roof to move a board or a ladder, or for any other reason.

6.8.3 Work on tall chimneys

i) For the erection and repair of tall chimneys, scaffolding should be provided. A safety net should be maintained at a suitable distance below the scaffold.

ii) The scaffold floor should always be at least 65 cm below the top of the chimney.

iii) Under the working floor of the scaffolding the next lower floor should be left in position as a catch platform.

iv) The distance between the inside edge of the scaffold and the wall of the chimney should not exceed 20 cm at any point.

v) Catch platforms should be erected over:

(a) the entrance to the chimney;
(b) Passageways and working places where workers could be endangered by falling objects.

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vi) For climbing tall chimneys, access should be provided by:

(a) stairs or ladders;
(b) a column of iron rungs securely embedded in the chimney wall;
(c) Other appropriate means.

vii) When workers use the outside rungs to climb the chimney, a securely fastened steel core rope looped at the free end and hanging down at least 3 m should be provided at the top to help the workers to climb on to the chimney.

viii) While work is being done on independent chimneys the area surrounding the chimney should be enclosed by fencing at a safe distance.

ix) Workers employed on the construction, alteration, maintenance or repair of tall chimneys should not:

a) work on the outside without a safety harness attached by a lifeline to a rung, ring or other secure anchorage;
b) put tools between the safety harness and the body or in pockets not intended for the purpose;
c) haul heavy materials or equipment up and down by hand to or from the workplace on the chimney;
d) fasten pulleys or scaffolding to reinforcing rings without first verifying their stability;
e) work alone;
f) climb a chimney that is not provided with securely anchored ladders or rungs;
g) Work on chimneys in use unless the necessary precautions to avoid danger from smoke and gases have been taken.

x) Work on independent chimneys should not be carried on in high winds, icy conditions, fog or during electrical storms.

6.9 HANDLING AND LIFTING EQUIPMENT:

6.9.1 General Provisions

Following are the general guidelines to be followed with regard to all types of handling and lifting equipment in addition to the guidelines for specific type of equipments dealt later on.

i) There should be a well-planned safety programme to ensure that all the lifting appliances and lifting gear are selected, installed, examined, tested, maintained, operated and dismantled with a view to preventing the occurrence of any accident;

ii) All lifting appliances shall be examined by competent persons at frequencies as specified in "The Factories act".

iii) Check thoroughly quality, size and condition of all lifting tools like chain pulley blocks, slings, U-clamps, D-shackles etc. before putting them in use.

iv) Safe lifting capacity of all lifting & handling equipment, tools and shackles should be got verified and certificates obtained from competent authorities before its use. The safe working load shall be marked on them.

v) Check periodically the oil, brakes, gears, horns and tyre pressure of all moving equipments like cranes, forklifts, trailers etc as per manufacturer's recommendations.

vi) Check the weights to be lifted and accordingly decide about the crane capacity, boom length and angle of erection.

vii) Allow lifting slings as short as possible and check packing at the friction points.

viii) While lifting/placing of the load, no unauthorised person shall remain within the radius of the boom and underneath the load.

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ix) While loading, unloading and stacking of pipes, proper wedges shall be placed to prevent rolling down of the pipes.

x) Control longer jobs being lifted up from both ends.

xi) Only trained operators and riggers should carry out the job. While the crane is moving or lifting the load, the trained rigger should be there for keeping a vigil against hitting any other object.

xii) During high wind conditions and nights, lifting of heavy equipments should be avoided. If unavoidable to do erection in night, operator and rigger should be fully trained for night signaling. Also proper illumination should be there.

xiii) Allow crane to move on hard, firm and leveled ground.

xiv) When crane is in idle condition for long periods or unattended, crane boom should either be lowered or locked as per manufacturer's guidelines.

xv) Hook and load being lifted shall remain in full visibility of crane operators, while lifting, to the extent possible.

xvi) Don't allow booms or other parts of crane to come within 3 meters reach of overhead electrical cables.

xvii) No structural alterations or repairs should be made to any part of a lifting appliance, which may affect the safety of the appliance without the permission and supervision of the competent person.

6.9.2 Hoists

i) Hoist shafts should be enclosed with rigid panels or other adequate fencing at:

(a) ground level on all sides;
(b) all other levels at all points at which access is provided;
(c) all points at which persons are liable to be struck by any moving part.

ii) The enclosure of hoist shafts, except at approaches should extend where practicable at least 2mt above the floor, platform or other place to which access is provided except where a lesser height is sufficient to prevent any person falling down the hoistway and there is no risk of any person coming into contact with any moving part of the hoist, but in no case should the enclosure be less than 1mt in height.

iii) The guides of hoist platforms should offer sufficient resistance to bending and, in the case of jamming by a safety catch, to buckling.

iv) Where necessary to prevent danger, adequate covering should be provided above the top of hoist shafts to prevent material falling down them.

v) Outdoor hoist towers should be erected on firm foundations, and securely braced, guyed and anchored.

vi) A ladderway should extend from the bottom to the top of outdoor hoist towers, if no other ladderway exists within easy reach.

vii) Hoisting engines should be of ample capacity to control the heaviest load that they will have to move.

viii) Hoists should be provided with devices that stop the hoisting engine as soon as the platform reaches its highest stopping place.

ix) Winches should be so constructed that the brake is applied when the control handle is not held in the operating position.

x) It should not be possible to set in motion from the platform a hoist, which is not designed for the conveyance of persons.

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xi) Winches should not be fitted with pawl and ratchet gears on which the pawl must be disengaged before the platform is lowered.

xii) Hoist platforms should be capable of supporting the maximum load that they will have to carry with a safety factor.

xiii) Hoist platforms should be equipped with safety gear that will hold the platform with the maximum load if the hoisting rope breaks.

xiv) If workers have to enter the cage or go on the platform at landings there should be a locking arrangement preventing the cage or platform from moving while any worker is in or on it.

xv) On sides not used for loading and unloading, hoist platforms should be provided with toe-boards and enclosures of wire mesh or other suitable material to prevent the fall of parts of loads.

xvi) Where necessary to prevent danger from falling objects, hoist platforms should be provided with adequate covering.

xvii) Counterweights consisting of an assemblage of several parts should be made of specially constructed parts rigidly connected together.

xviii) Counterweights should run in guides.

xix) Platforms should be provided at all landings used by workers.

xx) Following notices should be posted up conspicuously and in very legible characters:

(a) on all hoists:

- on the platform: the carrying capacity in kilograms or other appropriate standard unit of weight;
- on the hoisting engine: the lifting capacity in kilograms or other appropriate standard unit of weight;

(b) on hoists authorised or certified for the conveyance of persons:

- on the platform or cage: the maximum number of persons to be carried at one time;

(c) *on* hoists for goods only:

- on every approach to the hoist and on the platform: prohibition of use by persons.

xxi) Hoists intended for the carriage of persons should be provided with a cage so constructed as to prevent any person from falling out or being trapped between the cage and any fixed part of the structure when the cage gate is shut, or from being struck by the counterbalance weight or by articles or materials tailing down the hoistway.

xxii) On each side in which access is provided, the cage should have a gate fitted with devices which ensure that the gate cannot be opened except when the cage is at a landing and that the gate must be closed before the cage can move away from the landing.

xxiii) Every gate in the enclosure of the hoist shaft which gives access from a landing place to the cage should be fitted with devices to ensure that the gate cannot be opened except when the cage is at that landing place, and that the cage cannot be moved away from that landing place until the gate is closed.

6.9.3 Derricks

Stiff-leg derricks

i) Derricks should be erected on a firm base capable of taking the combined weight of the crane structure and maximum rated load.

ii) Devices should be used to prevent masts from lifting out of their seating.

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iii) Electrically operated derricks should be effectively earthed from the sole plate or framework.

iv) Counterweights should be so arranged that they do not subject the backstays, sleepers or pivots to excessive strain.

v) When derricks are mounted on wheels:

a) a rigid member should be used to maintain the correct distance between the wheels;
b) they should be equipped with struts to prevent them from dropping if a wheel breaks or the derrick is derailed.

vi) The length of a derrick jib should not be altered without consulting the manufacturer.

vii) The jib of a scotch derrick crane should not be erected within the backstays of the crane.

Guy derricks

i) The restraint of the guy ropes should be ensured by fitting stirrups or anchor plates in concrete foundations.

ii) The mast of guy derricks should be supported by six top guys spaced approximately equally.

iii) The spread of the guys of a guy derrick crane from the mast should not be more than 45^0 from the horizontal.

iv) Guy ropes of derricks should be equipped with a stretching screw or turnbuckle or other device to regulate the tension.

v) Gudgeon pins, sheave pins and fool bearings should be lubricated frequently.

vi) When a derrick is not in use, the boom should be anchored to prevent it from swinging.

6.9.4 Gin poles

i) Gin poles should:

(a) be straight;
(b) consist of steel or other suitable metal;
(c) be adequately guyed and anchored;
(d) be vertical or raked slightly towards the load;
(e) be of adequate strength for the loads that they will be required to lift/move.

ii) Gin poles should not be spliced and if a gin pole is composed of different elements, they should be assembled in conformity with their intrinsic material strength.

iii) Gin poles should be fastened at their feet to prevent displacement in operation.

iv) Gin poles, which are moved from place to place and re-erected, should not be taken into use again before the pole, lifting ropes, guys, blocks and other parts have been inspected, and the whole appliance has been tested under load.

v) When platforms or skips are hoisted by gin poles, precautions should be taken to prevent them from spinning and to provide for proper landing.

6.9.5 Tower cranes

i) Where tower cranes have cabs at high level, persons, capable and trained to work at heights, should only be employed as crane operators.

ii) The characteristics of the various machines available should be considered against the operating requirements and the surroundings in which the crane will operate before a particular type of crane is selected.

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iii) Care should be taken in the assessment of wind loads both during operations and out of service. Account should also be taken of the effects of high structures on wind forces in the vicinity of the crane.

iv) The ground on which the tower crane stands should have the requisite bearing capacity. Account should be taken of seasonal variations in ground conditions.

v) Bases for tower cranes and tracks for rail-mounted tower cranes should be firm and level. Tower cranes should only operate on gradients within limits specified by the manufacturer. Tower cranes should only be erected at a safe distance from excavations and ditches.

vi) Tower cranes should be sited where there is clear space available for erection, operation and dismantling. As far as possible, cranes should be sited so that loads do not have to be handled over occupied premises, over public thoroughfares, other construction works and railways or near power cables.

vii) Where two or more tower cranes are sited in positions where their jibs could touch any part of the other crane, there should be direct means of communication between them and a distinct warning system operated from the cab so that one driver may alert the other of impending danger.

viii) The manufacturers' instructions on the methods and sequence of erection and dismantling should be followed. The crane should be tested before being taken into use.

ix) The climbing operation of climbing tower cranes should be carried out in accordance with manufacturers' instructions. The free-standing height of the tower crane should not extend beyond what is safe and permissible in the manufacturers' instructions.

x) When the tower crane is left unattended, loads should be removed from the hook, the hook raised, the power switched off and the boom brought to the horizontal. For longer periods or at times when adverse weather conditions are expected, out of service procedures should be followed. The main jib should be slewed to the side of the tower away from the wind, put into free slew and the crane immobilised.

xi) A windspeed measuring device should be provided at an elevated position on the tower crane with the indicator fitted in the drivers' cab.

xii) Devices should be provided to prevent loads being moved to a point where the corresponding safe working load of the crane would be exceeded. Name boards or other items liable to catch the wind should not be mounted on a tower crane other than in accordance with the manufacturers' instructions.

xiii) Tower cranes should not be used for magnet, or demolition ball service, piling operations or other duties, which could impose excessive loading on the crane structure.

6.9.6 Lifting ropes

i) Only ropes with a known safe working capacity should be used as lifting ropes.

ii) Lifting ropes should be installed, maintained and inspected in accordance with manufacturers' instructions.

iii) Repaired steel ropes should not be used on hoists.

iv) Where multiple independent ropes are used, for the purpose of stability, to lift a work platform, each rope should be capable of carrying the load independently.

6.10 VEHICLE MOVEMENT

6.10.1 Park vehicles only at designated places. Don't block roads to create hindrance for other vehicles.

6.10.2 Don't overload the vehicle.

6.10.3 Obey speed limits and traffic rules.

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6.10.4 Always expect the unexpected and be a defensive driver.

6.10.5 Drive carefully during adverse weather and road conditions.

6.10.6 Read the road ahead and ride to the left.

6.10.7 Be extra cautious at nights. Keep wind screens clean and lights in working condition.

6.10.8 All vehicles used for carrying workers and construction materials must undergo predictive/preventive maintenance and daily checks

6.10.9 Driver with proper valid driving license shall only be allowed to drive the vehicle

6.10.10 Routes shall be leveled, marked and planned in such a way so as to avoid potential hazards such as overhead power lines and sloping ground etc.

6.10.11 While reversing the vehicles, help of another worker should be ensured at all times

6.10.12 An unattended vehicle should have the engine switched off

6.10.13 Wherever possible one-way system shall be followed

6.10.14 Barriers/fixed stops should be provided for excavation/openings to prevent fall of vehicle

6.10.15 Load should be properly secured

6.10.16 The body of the tipper lorry should always be lowered before driving the vehicle off.

6.10.17 Signs/signals/caution boards etc. should be provided on routes .

6.11 ELECTRICAL

6.11.1 General Provisions

i) Only persons having valid licenses should be allowed to work on electrical facilities.

ii) No person should be allowed to work on live circuit. The same, if unavoidable, special care and authorisation need to be taken.

iii) Treat all circuits as "LIVE" unless ensured otherwise.

iv) Electrical "Tag Out" procedure "MUST" be followed for carrying out maintenance jobs.

v) Display voltage ratings prominently with "Danger" signs.

vi) Put caution/notice signs before starting the repair works.

vii) All electrical equipment operating above 250V shall have separate and distinct connections to earth grid.

viii) Proper grounding to be ensured for all switch boards and equipment including Portable ones prior to taking into service.

ix) Make sure that electrical switch boards, portable tools, equipments (like grinding machine etc.) don't get wet during their usage. If it happens, stop the main supply, make the tools dry and then only use them. Check proper earthing.

All temporary switch boards/ KIOSKS put up at work site should be suitably protected from rain and the level of same should be high enough to avoid contact with water due to water logging.

x) Don't work wet on electrical system.

xi) Don't overload the electrical system.

xii) Use only proper rated HRC fuses.

xiii) Industrial type extension boards and Plug sockets are only to be used.

xiv) ELCB for all temporary connections must be provided. Use insulated 3-pin plug tops.

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xv) All power supply cables should be laid properly and neatly so that they don't cause hindrance to persons working and no physical damage also takes place to the cables during various construction activities.

xvi) All Power cables to be properly terminated using glands and lugs of proper size and adequately crimped.

xvii) Use spark-proof/flame proof type electrical fittings in Fire Hazard zones as per area classification under OISD-STD-113.

xviii) Check installations of steel plates/pipes to protect underground cables at crossings.

xix) Don't lay unarmored cable directly on ground, wall, roof or trees. All temporary cables should be laid at least 750 mm below ground and cable markers should be provided. Proper sleeves should be provided at road crossings. In case temporary cables are to be laid on wooden poles/steel poles, the minimum cable heights should be 4.5 M.

xx) Maintain safe overhead distance of HT cables as per Indian Electricity Rules and relevant acts.

xxi) Don't connect any earthing wire to the pipelines/structures.

xxii) Don't make any unsafe temporary connections, naked joints/wiring etc.

xxiii) Ensure that temporary cables are free from cuts, damaged insulation, kinks or improper insulated joints.

xxiv) Check at periodic intervals that pins of sockets and joints are not loose.

xxv) Protect electrical wires/equipments from water and naked flames.

xxvi) Illuminate suitably all the work areas.

xxvii) All switchboards should be of MS structure only and incoming source should be marked.

xxviii) Hand lamps should not be of more than 24V rating.

xxix) Fire extinguishers (DCP/CO_2/Sand buckets) should be kept near temporary switch boards being used for construction purposes. Don't use water for fighting electrical fires.

xxx) Insulating mats shall be provided in the front and back end of switch boards.

xxxi) All parts of electrical installations should be so constructed, installed and maintained as to prevent danger of electric shock, fire and external explosion.

Periodic checking/certification of electrical safety appliances such as gloves, insulating mats, hoods etc. to be done/witnessed along with maintaining a register at site signed by competent authority.

xxxii) A notice displaying following, should be kept exhibited at suitable places:

a) prohibiting unauthorised persons from entering electrical equipment rooms or from handling or interfering with electrical apparatus;
b) containing directions as to procedures in case of fire, rescue of persons in contact with live conductors and the restoration of persons suffering from electric shock;
c) specifying the person to be notified in case of electrical accident or dangerous occurrence, and indicating how to communicate with him.

xxxiii) No other cables/pipes to be laid in trench used for electrical cables.

xxxiv) Utmost care should be taken while excavating Earth from cable trench to avoid damage or any accident.

xxxv) Sub-station floor cut-outs meant for switch board installations to be covered wherever installation is incomplete.

NOTE: A Residual Current Operated Circuit Breaker (RCCB) or Earth Leakage Circuit Breaker (ELCB), when installed, protects a human being to the widest extent. RCCB or ELCB should be provided as per Indian Electricity Rules.

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6.11.2 Inspection and maintenance

i) All electrical equipment should be inspected before taking into use to ensure suitability for its proposed use.

ii) At the beginning of every shift, the person using the electrical equipment should make a careful external examination of the equipment and conductors, especially the flexible cables.

iii) Apart from some exceptional cases, work on or near live parts of electrical equipment should be forbidden.

iv) Before any work is begun on conductors or equipment that do not have to remain live:

a) the current should be switched off by a responsible authorised person;
b) precautions should be taken to prevent the current from being switched on again;
c) the conductors or the equipment should be tested to ascertain that they are dead;
d) the conductors and equipment should be earthed and short-circuited;
e) neighbouring live parts should be adequately protected against accidental contact.

v) After work has been done on conductors and equipment, the current should only be switched on again on the orders of a competent person after the earthing and short-circuiting have been removed and the workplace reported safe.

vi) Electricians should be provided with approved and tested tools, and personal protective equipment such as rubber gloves, mats etc.

vii) All conductors and equipment should be considered to be live unless there is a proof of the contrary.

viii) When work has to be done in dangerous proximity to live parts the current should be cut off. If for operational reasons this is not possible, the live parts should be fenced off or enclosed by qualified staff from the sub-station concerned.

6.11.3. Testing

i) Electrical installations should be inspected and tested and the results recorded.

ii) Periodic testing of the efficiency of the earth leakage protective devices should be carried out.

iii) Particular attention should be paid to the earthing of apparatus, the continuity of protective conductors, polarity and insulation resistance, protection against mechanical damage and condition of connections at points of entry.

6.12 OFFSHORE

6.12.1 General

The isolated nature of offshore installations are hazardous. They call for greater need for safety and survival at offshore. Safety at offshore is safety of installations and safety of personnel. Safety problems and accidents at offshore have high risks due to limited space, helicopter operation, sea transport etc. Following are the general safety guidelines to be followed in addition to the safety guidelines stipulated for specific jobs dealt later on:

i) Workers should be well trained to do their job independently with high degree of self-control and self-discipline.

ii) On arrival at offshore, everyone should be briefed about the safety rules to be followed at offshore, evacuation system etc. All personnel should wear overall (dangri), helmet and shoes for personnel protection.

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iii) In case of emergency, workers should follow instruction of Field Production Superintendent (F.P.S.) In certain cases instructions may be given to abandon the offshore installation and evacuate the persons to safe location.

iv) To overcome above problems, offshore personnel must receive training for using life saving appliances and other personal survival techniques.

v) Any person working at offshore should have one person as standby for any eventuality.

6.12.2 Drilling Rigs

i) Location of jack up rigs should not be less than 5 Kms from shipping route. Orientation of the rig, wind direction etc are required for safe landing of helicopter. Information w.r.t. sea currents, wind speed, Hi-lo tide etc are required for mooring of supply vessels.

ii) Sea bed condition at every location should be ensured for safety of rig.

iii) Radio and other communication facilities should be such to maintain contact with base all times.

iv) During toeing of rig, the rig deck should be clear of load, toeing lines should be in good condition and tensions in various toeing lines should be constantly monitored.

v) Few steps during toeing are:

a) crane booms should be secured to their vesta,
b) all hatches and water tight doors should be closed,
c) number of personnel on board should be restricted,
d) evacuate in case of emergency and operation should be completed preferably in day light.

6.12.3 Drilling

i) In view of CO_2 and H_2S gas cut from well, effective ventilation should be provided where drilling is in progress.

ii) Safety alarm shall be checked in advance in view of failure of ventilation system.

iii) Suitable sensors for H_2S and Methane should be function tested time to time and suitable colour code should be given.

iv) Working areas of the crane should be illuminated during night to avoid accident.

v) Clear space should be available for despatch and receipt of load and, in particular, basket transfer of passengers. Persons engaged in loading/unloading of materials should be protected from falling into the sea.

vi) Signal light should be fitted at the top of the jib.

vii) Crane hook should be fitted with safety latches.

viii) Experienced person should be engaged in operation of specific equipment like winches, cranes etc.

ix) At least three cable turns shall always be there on the winch drum.

x) Adequate communication like walkie talkie, round robin phone should be available between the crane operator, supervisor and helper.

xi) Crane operation should be completely stopped during helicopter landing/taking off.

xii) Except for helicopter landing deck, all decks, platforms, bridges, ladders should have rigid and fixed guard rails atleast one meter high and should have one intermediate rail midway between the handrail and 100 mm toe board.

xiii) Wooden ladders shall not be used at offshore.

xiv) Flow sensor in the flow line should be ensured for safe working and to avoid blow out.

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xv) Hydrogen sulphuide gas In offshore is of great risk and at 10 ppm (0.001%) concentration in air, a person should not be exposed for more than 8 hours, If concentration is more, then breathing apparatus should be used. Corrosion of equipment is also caused by H_2S.

xvi) Portable H_2S gas detector should be continously used.

6.12.4 Production Platforms

i) In case hydrocarbon Is released due to overpressure, leak, overflow, gas blow etc., shut down process to stop flow *of* hydrocarbon. Prevent ignition of released hydrocarbon and in case of fire shut in the process complex and follow emergency contigency plan.

ii) Sub surface safetv valve (SSSV)) below the well head should be actuated during uncontrolled well -flow and they should be regularly checked.

iii) Surface safety valve or SDV should be checked for no gas leakage from bleed port / flange etc., in the well head area. It should not be in "mechanical override" or bypassed from panel.

iv) High pressure gas lift lines - blowdown system should be O.K.

v) Auto actuation of SDVs in the inlet of pressure vessels should be O.K. and in "normal position" from shutdown panels. A record of status of switches normal/bypassed in auto-con* panels (PSH, PSL, LSL, ILSL) should be maintained.

* Shut Down Panels

vi) Welders rectifier set and electrical connections to it should be checked and approved by electrical-in- charge for proper electrical safely.

vii) “SCADA" telementry system if available should be operational for remote opening and closing of wells at unmanned platforms (through RPMC).

viii) Local ESD/FSD (near the work site) should be provided for jobs of very critical nature, so that the persons working can access it immediately in emergency for safety. Safety officer should judge the requirement & inform FPS for the same.

ix) Railings and Gratings etc. in and around work area should be O.K. and inspected to avoid slippage of man into sea.

x) Emergency shut down (ESD) system is initiated when an abnormal condition is detected. ESD should be checked once in six months.

xi) Platform should be manned round the clock.

xii) Welding and cutting work should be regulated by hot work permit.

xiii) All detectors should be calibrated as per recommendation of the manufacturer.

xiv) No system should be by-passed which affects the system of platform.

xv) In H_2S field platforms, due care shall be taken as per recommendations.

xvi) Follow the instructions of F.P.S. during stay at platform

6.12.5 Fire Prevention And Control

i) Provision be made for safe handling and storage of dirty rags, trash, and waste oil. Flammable liquids and chemicals applied on platform should be immediately cleaned.

ii) Paint containers and hydrocarbon samples, gas cylinders for welding and cutting should be stored properly. Cylinders should be transported in hand-cart.

iii) Smoking should be restricted and no smoking area should be identified.

iv) Special attention should be given to crude oil pump seals, diesel and gas engines which are potential source of ignition in the event of failure.

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v) Fire and smoke detectors i.e. ultraviolet heat, thermal and smoke detector should be function tested once in three months.

vi) Fire is controlled in offshore by water spraying, Halon, CO_2 flooding, DCP and sprinkler system.

vii) Foaming agent is applied for controlling fire in liquid hydrocarbon. The system is not effective in gas fire.

viii) Light weight breathing system should be used.

ix) The fire control plan at offshore should reveal control station, fire alarms and fire detectors, deluge valves and sprinkler, fire extinguishing appliances, fireman outfit and ventilation system.

x) Fire fighting equipment should be maintained in ready to use condition.

6.12.6 Life Saving Appliances

i) Life boats with a speed of 6 knots and carrying capacity upto 50 persons are used in offshore.

ii) No. of life boats on one installation should have a capacity to accommodate twice the number of persons onboard installation.

iii) Launching appliances and life boat equipment should be checked every week.

iv) Boat landing areas should be adequately illuminated.

v) Life raft has no power and they rely on drift.

vi) Life jacket lifts the wearer after entering water.

vii) Life buoys are used to rescue persons if any person accidentally falls in the sea.

viii) All life saving appliances should be inspected by the MMD surveyor /sr. officials once a year.

ix) Every life boat shall be inspected once a week.

x) Every life boat and life raft should be serviced once a year by a competent authority,

6.12.7 Safety Precautions during Helicopter Transportation

i) Passenger briefing regarding safety rules while travelling in helicopter should be carried out before boarding the helicopter.

ii) Emergency procedure should be briefed to all the passenger In case helicopter is to ditch into the sea.

iii) Heli-pad should have a non-skid surface. Nylon rope net should be stretched on the deck.

iv) Proper drainage should be available on helideck.

v) There should be no obstruction on the helideck itself and within 3 meters of its parameter. Closest super structure above the helideck should have red obstruction light.

vi) While landing fire crew of two persons should be standby adjacent to helideck.

vii) Heli-deck should be properly illuminated for night landing.

viii) During switching off helicopter, persons should not be allowed to go out/ towards helicopter

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6.13 DEMOLITION

6.13.1. General provisions

i) When the demolition of any building or structure might present danger to workers or to the public:

(a) necessary precautions, methods and procedures should be adopted, including those for the disposal of waste or residues;
(b) the work should be planned and undertaken only under the supervision of a competent person.

ii) Before demolition operations begin:

(a) structural details and builders' drawings should be obtained wherever possible;
(b) details of the previous use should be obtained to identify any possible contamination and hazards from chemicals, flammables, etc.;
(c) an initial survey should be carried out to identify any structural problems and risks associated with flammable substances and substances hazardous to health. The survey should note the type of ground on which the structure is erected, the condition of the roof trusses, the type of framing used in framed structures and the load-bearing walls;
(d) a method of demolition should be formulated after the survey and recorded in a method statement having taken all the various considerations into account and identifying the problems and their solutions;

iii) All electric, gas, water and steam service lines should be shut off and, as necessary, capped or otherwise controlled at or outside the construction site before work commences.

iv) If it is necessary to maintain any electric power, water or other services during demolition operations, they should be adequately protected against damage.

v) As far as practicable, the danger zone round the building should be adequately fenced off and sign posted. To protect the public a fence 2m high should be erected enclosing the demolition operations and the access gates should be secured outside working hours.

vi) The fabric of buildings contaminated with substances hazardous to health should be decontaminated. Protective clothing and respiratory devices should be provided and worn.

vii) Where plant has contained flammable materials, special precautions should be taken to avoid fire and explosion.

viii) The plant to be demolished should be isolated from all other plant that may contain flammable materials. Any residual flammable material in the plant should be rendered safe by cleaning, purging or the application of an inert atmosphere as appropriate.

ix) Care should be taken not to demolish any parts, which would destroy the stability of other parts.

x) Demolition activities should not be continued under adverse climatic conditions such as high winds, which could cause the collapse of already weakened structures.

xi) To prevent hazards parts of structures should be adequately shored, braced or otherwise supported.

xii) Structures should not be left in a condition in which they could be brought down by wind pressure or vibration.

xiii) Where a deliberate controlled collapse technique is to be used, expert engineering advice should be obtained, and:

(a) it should only be used where the whole structure is to come down because it relies on the removal of key structural members to effect a total collapse;

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(b) it should only be used on sites that are fairly level and where there is enough surrounding space for all operatives and equipment to be withdrawn to a safe distance.

xiv) When equipment such as power shovels and bulldozers are used for demolition, due consideration should be given to the nature of the building or structure, its dimensions, as well as to the power of the equipment being used.

xv) If a swinging weight is used for demolition, a safety zone having a width of at least one-and-a-half times the height of the building or structure should be maintained around the points of impact.

6.13.2. Demolition of structural steelwork

i) All precautions should be taken to prevent danger from any sudden twist, spring or collapse of steelwork, ironwork or reinforced concrete when it is cut or released.

ii) Steel construction should be demolished tier by tier.

iii) Structural steel parts should be lowered and not dropped from a height.

6.14 RADIOGRAPHY

6.14.1 All radiography jobs shall be carried out as per BARC Safety Regulations

6.14.2 During field radiography, nearby area around the radiation source should be cordoned off.

6.14.3 If the field radiography is to be done at the same location repeatedly, it is advisable to provide either a wire fencing around or a temporary brick enclosure.

6.14.4 Special permission/permit should be taken for radiography from area-in-charge.

6.14.5 As far as possible, field radiography should be done only during night time when there is little or no occupancy there.

6.14.6 Radiation warning signals should be pasted all along the cordoned off area.

6.14.7 Entry into the restricted area by unauthorised persons should be strictly prohibited during exposure.

6.14.8 The radiation level alongwith the cordon should be monitored by a suitable and well-calibrated radiation survey meter.

6.14.9 All personnel working with radiography sources should wear appropriate protective equipment and film badges issued by BARC.

6.14.10 Protection facilities such as manipulator rod, remote handling tongs, lead pots, radiation hazard placards and means of cordon off shall be available at each site.

6.14.11 The radiography source shall never be touched or handled directly with hands.

6.14.12 The package containing radiography cameras and sources should never be carried by public transport like bus, train etc.

6.14.13 Radiography sources and cameras, when not in use, should be stored inside a source pit with lock and key arrangement as approved by BARC. The storage room should preferably be located in an isolated area of minimum occupancy and radiation level outside the storage room should not exceed 0.25 mR/hr as per BARC Regulations.

6.14.14 In case of an accident (due to loss or of damage to radiography source), action should be taken in line with BARC Safety Rules/Guidelines.

6.15 SAND/SHOT BLASTING/ SPRAY PAINTING

6.15.1 Sand blasting should be used only after approval from competent person.

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6.15.2 Air Compressor used for sand/shot blasting/painting should have guard and positioned away from the work place.

6.15.3 Exhaust of the prime mover, if IC engine is used, should be directed away from the work place.

6.15.4 In case of motor driven compressor, the body of the motor as well as the compressor to be properly earthed.

6.15.5 The hoses used for compressed air should be of proper quality, and health of the same to be ensured through regular check/ test.

6.15.6 The operator of sand/shot blasting/painting should wear suitable PPE's including mask.

6.15.7 Adequate measures to be taken to suppress dust/spray particle.

6.15.8 Sand used for sand blasting should be suitably covered & protected from to rain/moisture.

6.15.9 When these activities are done in confined places, adequate measure to be taken for proper ventilation.

6.16 WORK ABOVE WATER

6.16.1 General Provisions

i) Where work is done over or in close proximity to water & where possibility of drowning exists, provision should be made for:
   a) Preventing workers from falling into water;
   b) The rescue of workers in danger of drowning;
   c) Safe and sufficient transport.

ii) Provisions for the safe performance of work over or in close proximity to water should include, where appropriate, the provision and use of suitable and adequate:

   a) fencing, safety nets and safety harnesses;
   b) lifebuoys, life jackets and manned boats;
   c) protection against such hazards as reptiles and other animals.

iii) Gangways, pontoons, bridges, footbridges and other walkways or work places over water should:
   a) possess adequate strength and stability;
   b) be sufficiently wide to allow safe movement of workers;
   c) have level surfaces free from tripping hazards;
   d) be adequately lit when natural light is insufficient;
   e) where practicable and necessary, to prevent danger, be provided with toe-boards, guard rails, hand ropes etc.
   f) be secured to prevent dislodgment by rising water or high winds;
   g) if necessary, be equipped with ladders which should be sound, of sufficient strength and length and be securely lashed to prevent slipping.

iv) All deck openings including those for buckets should be fenced.

6.16.2 Rescue & Emergency procedures

i) Persons who work over water should be provided with some form of buoyancy aid. Life jackets should provided sufficient freedom of movement, have sufficient buoyancy to bring persons to the surface and keep them afloat face upwards, be easily secured to the body, be readily visible by way of self luminous paint/strip.

ii) Nobody should work alone on or above water.

iii) Each worker should be trained in the procedure to be followed in the event of an emergency.

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7.0 ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS

In addition to general safety precautions as outlined above for the activities in Clause 6.0, following additional safety precautions need to be taken for the sites within the operating area or nearby, where presence of Hydrocarbons cannot be ruled out.

i) No job shall be carried out without a valid permit. Permit should be in line with OISD-STD-105 "Work Permit System".

ii) Smoking should be prohibited in all places containing readily combustible or flammable materials and "No Smoking" notices be prominently displayed.

iii) In confined spaces and other places where flammable gases, vapours or dusts can cause danger, following measures should be taken:

(a) only approved type electrical installations and equipment, including portable lamps, should be used;
(b) there should be no naked flames or source of ignition;
(c) oily rags, waste and clothes or other substances liable to spontaneous ignition should be removed without delay to a safe place;
(d) ventilation should be provided.

iv) Regular inspections should be made of places where there are fire risks. These include the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations.

v) Welding, flame cutting and other hot work should only be done after issuance of work permit in line with the requirement of OISD-STD-105 after appropriate precautions, as required, are taken to reduce the risk of fire. For carrying out other jobs also, OISD-STD-105 should be followed strictly.

vi) Fire-extinguishing equipment should be well maintained and inspected at suitable intervals by a competent person. Access to fire-extinguishing equipment such as hydrants, portable extinguishers and connections for hoses should be kept clear at all times.

vii) All supervisors and a sufficient number of workers should be trained in the use of fire-extinguishing equipment, so that adequate trained personnel are readily available during all working periods.

viii) Audio means to give warning in case of fire should be provided where this is necessary to prevent danger. Such warning should be clearly audible in all parts of the site where persons are liable to work. There should be an effective evacuation plan so that all persons are evacuated speedily without panic and accounted for and all plant and processes shut down.

ix) Notices should be posted at conspicuous places indicating:

(a) the nearest fire alarm;
(b) the telephone number and address of the nearest emergency services.

x) The work site shall be cleared of all combustible materials, as Sparks and molten metal coming from the welding job can easily ignite combustible materials near or below the welding site. If the combustible materials cannot be removed from the area, the same shall be properly shielded.

xi) A dry chemical type fire extinguisher shall be made available in the work area. Also fire protection facilities like running hoses etc. as per permit should be complied with.

xii) Wherever required, welding screens shall be put up to protect other equipment in adjoining areas against flying sparks. Material used should be metal/asbestos/water curtain.

xiii) Welding or cutting of vessels/ equipments used in Hydrocarbon/ hazardous chemicals shall be done after proper gas freeing and verifying the same with the explosive-meter.

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xiv) The confined space/equipment shall be gas freed and cleaned.

xv) Absence of any toxic gas and any flammable gas above explosion limit shall be ensured with the help of gas detection instrument and explosive meter respectively.

xvi) Used and hot electrode stubs shall be discarded in a metal bucket.

xvii) Use approved and certified flame arrestors for vehicles.

xviii) Work permit to be obtained, if construction work is carried out within existing operating area.

8.0 FIRST AID

First aid facilities should be provided in line with various statutory regulations like factory act etc. However following care should be taken:

i) First aid, including the provision of trained personnel should be ensured at work sites. Arrangement should be made for ensuring the medical attention of the injured workers. First aid box should be as per the Factory rules.

ii) Suitable rescue equipment, like stretchers should be kept readily available at the construction site.

iii) First-aid kits or boxes, as appropriate and as per statutory requirements, should be provided at workplaces and be protected against contamination by dust, moisture etc.

iv) First-aid kit or boxes should not keep anything besides material for first aid in emergencies.

v) First-aid kits and boxes should contain simple and clear instructions to be followed, be kept under the charge of a responsible person qualified to render the first aid and be regularly inspected and stocked.

vi) Where the work involves risk of drowning, asphyxiation or electric shock, first-aid personnel should be proficient in the use of resuscitation and other life saving techniques and in rescue procedures.

vii) Emergency telephone numbers of nearby Hospitals, Police, Fire Station and Administration should be prominently displayed.

9.0 DOCUMENTATION

The intention of keeping documentation of all types of accident(s) is to prevent recurrence of similar accident(s). All accidents should be reported as per OISD Guidelines (OISD-GDN-107) and Factories act, 1948.

All accidents (major, minor or near miss) should be investigated, analysed and recommendations should be documented along with implementation status.

All related data should be well-documented and further analysis highlighting the major cause(s) of accidents be done. This will help in identifying thrust areas and training needs for prevention of accidents.

10.0 SAFETY AWARENESS & TRAINING

Safety awareness to all section of personnel ranging from site-in-charge to workmen helps not only preventing the risk but also build up the confidence. Time and expenditures also get saved as a result.

Safety awareness basically seeks to persuade/inform people on safety besides supplementing skill also. Awareness programme may include followings:

i) **Poster:** Posters with safety slogan in humorous, gruesome demonstrating manner may be used to discourage bad habits attributable to accidents by appealing to the workers'

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pride, self-love, affection curiosity or human aspects. These should be displayed in prominent location(s).

ii) **Safety Sign Boards**: Different type of message of cautioning, attention, notice etc. should be displayed at the appropriate places for learning/ awareness of the workmen while working at site.

iii) **Films & Slides:** Film(s) narrating the accident including the causes and possible remedial ways of preventing the recurrence of a similar accident should be displayed at regular intervals. Slides consisting main points of the film show may also be shown to workers.

iv) **Talks, lectures & conferences:** The success of these events would depend much on audience's understandings of the speaker (s). The speakers are to be knowledgeable and good presenter. Speakers should know to hold the attention and to influence the audiences.

v) **Competitions:** Organise competition(s) between the different deptts/categories of workers. The sense of reward/recognition also will improve safety awareness and result in enhancing safety levels.

vi) **Exhibitions:** Exhibitions also make the workers acquainted with hazards and means of preventive measures.

vii) **Safety Publication:** Safety publications including pocket books dealing with ways of investigation and prevention in the field of safety and so on, may be distributed to workers to promote the safety awareness.

viii) **Safety Drives:** From time to time, an intensive safety drive by organising a safety day or a safety week etc. should be launched.

ix) **Training:** Training for covering the hazards for different trade should be imparted. Training should also include the specific hazards related to a job in addition to the general safety training as has been dealt in various chapters and should include all workers. Reference may be drawn from OISD-STD-154.

11.0 REFERRENCES

i) *Factory Act, 1948*

ii) *Indian Electricity Rules*

iii) *Safety & Health in Construction by ILO*

iv) *The Building & Other Construction Workers (Regulation, Employment and Conditions of Service) Act 1996*

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ANNEXURE I

LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF INDIAN STANDARDS

Sr.no	Code No.	Title
01.	IS : 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
02.	IS : 875	Code of practice for Structural safety of buildings: Masonry walls
03.	IS : 933	Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
04.	IS : 1179	Specification for Equipment for Eye and Face Protection during Welding – First Revision.
05.	IS : 1904	Code of practice for Structural safety of buildings: Shallow foundations
06.	IS : 1905	Code of practice for Structural safety of buildings: Masonry walls
07.	IS : 2171	Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision.
08.	IS : 2361	Specification for Building Grips – First Revision.
09.	IS : 2750	Specification for Steel Scaffoldings.
10.	IS : 2925	Specification for Industrial Safety Helmets – First Revision.
11.	IS : 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision.
12.	IS : 3521	Industrial safety belts and harnesses
13.	IS : 3696 – Part I	Safety Code for Scaffolds and Ladders : Part I – Scaffolds.
14.	IS : 3696 – Part II	Safety Code for Scaffolds and Ladders : Part II – Ladders.
15.	IS : 3764	Safety Code for Excavation Work.
16.	IS : 4014 -Part I & II	Code of practice for Steel tubular scaffolding
17.	IS : 4081	Safety Code for Blasting and Related Drilling Operations.
18.	IS : 4082	Recommendations on staking and storage of construction materials at site
19.	IS : 4130	Safety Code for Demolition of Buildings – First Revision.
20.	IS : 4138	Safety Code Working in Compressed Air-First Revision
21.	IS : 4756	Safety code for Tunneling works
22.	IS : 4912	Safety requirements for Floor and Wall Openings, Railings and toe Boards –First Revision.
23.	IS : 5121	Safety Code for Piling and other Deep Foundations.
24.	IS : 5916	Safety Code for Construction involving use of Hot Bituminous Materials.
25.	IS : 5983	Specification for Eye Protectors – First Revision.
26.	IS : 6922	Structures subject to underground blasts, criteria for safety and design of

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27.	IS : 7155	Code of recommended practices for conveyor safety
28.	IS : 7205	Safety Code for Erection on Structural Steel Works.

Sr.no	Code No.	Title
29.	IS : 7069	Safety Code for Handling and Storage of Building Materials.
30.	IS : 7293	Safety Code for Working with Construction Machinery.
31.	IS : 7323	Guidelines for operation of Reservoirs
32.	IS : 7969	Safety code for handling and storage of building material
33.	IS : 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals.
34.	IS : 8989	Safety Code for Erection of Concrete Framed Structures.
35.	IS : 9706	Code of Practices for construction of Arial ropeways for transportation of material
36.	IS : 9759	Guidelines for de-watering during construction
37.	IS : 9944	Recommendations on safe working load for natural and man-made fibre roap slings
38.	IS : 10291	Safety code for dress divers in civil engineering works
39.	IS :10386 – Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects.
40.	IS :10386 – Part II	Safety Code for Construction, Operation and Maintenance of River Valley Projects.
41.	IS : 11057	Code of practice for Industrial safety nets
42.	IS : 13415	Code of Practice on safety for Protective barriers in and around building
43.	IS : 13416	Recommendations for preventive measures against hazards at working places

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OISD – GDN – 207

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OCTOBER 2002

CONTRACTOR SAFETY

OISD – GUIDELINES – 207

Oil Industry Safety Directorate
Government of India
Ministry of Petroleum & Natural Gas

CONTRACTOR SAFETY

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CONTRACTOR SAFETY

1.0 INTRODUCTION

Oil and Gas operations like Drilling, Production, Refining, Transportation and Distribution are inherently hazardous. A large number of contractor workforce is deployed to carry out construction, maintenance and other jobs. The analysis of the incidents in the Petroleum Sector indicates that a large number of incidents involved contractor workforce and have resulted in either casualty or injury besides leading to property damage and operational interruptions and environmental degradation.

In order to improve the safety levels of oil installations, the contractor safety is of utmost importance and there is a need to institute a good contractor safety system.

2.0 SCOPE

This standard covers broadly the guidelines on the management system for enhancing the safety levels of the contractor workforce deployed in construction, maintenance and operation activities in the hydrocarbon industry.

The safety precautions to be taken while carrying out different activities during construction / maintenance have separately been covered in OISD-GDN-192 on "Safety Practices during Construction".

3.0 DEFINITIONS

Work station/Work site

A place/unit where the job is carried out by contractor/executing agency in specified manner with safety, during construction phase or in operation phase.

Owner

Any physical or legal person/entity for whom prescribed job is carried out.

It shall also include owner's designated representative / consultant /nominee / agent, authorised from time to time to act for and on its behalf, for supervising / co-ordinating the activities of the contractor/execution agency.

Contractor / Executing Agency

A physical or legal person/entity having contractual obligation with the owner, and who deploys one or more worker on the site.

Contractor Worker

It covers all workmen who are either self-employed or employed through contractor, the casual workers and includes contractor's supervisor, working at a location / site employed directly by Owner or through their contractor.

Incident

An incident is an unplanned, uncontrolled, unintended or unforeseen event, caused by unsafe acts and / or unsafe conditions, resulting in or having the potential to result in personal injury and/or property damage.

Consultant

Consultant is a physical or legal person/entity engaged by owner to provide the consultancy services to owner for management of the contract on their behalf or as specified.

Designer

Designer is a physical or legal person / entity engaged by owner to provide design services of a work site.

Owner's Representative / Engineer In Charge

The Owner's representative/Engineer-in-charge is the one, who has been designated by the owner to manage the contract.

Owner's Safety Officer

A properly trained person designated by owner who ensures safety at work site.

4.0 DUTIES/ RESPONSIBILITIES

4.1 OWNER

4.1.1 Owner's Management

The commitment to safety has to be emphasised by the owner by practice by its own management and employees at all levels. The duties and responsibilities of owner should include:

i) To institute a mechanism for identification and compliance of all applicable statutory rules & regulations (Refer Annexure I for a list of few important Bureau of Indian Standards & statutory regulations).

ii) To provide specific information to contractors and make workers aware on the hazards associated with job assigned.

iii) To provide information about Risk Mitigation measures available at the place of work.

iv) To provide the contractor with information on Owners Safety Plan & Regulations, Emergency Management Plan, lockout/ tag out procedure, confined space entry, work permit system, excavation/trench permit system etc.

v) To specify rules (e.g. for security including access arrangements) and safety rules such as fire protection, first aid arrangements, Work Permit systems etc.

vi) To provide comprehensive list of statutory regulations / standards and specification, to be complied with during execution of contract, in the tender document itself.

vii) To ensure training of the contractor workforce, medical examination, and proper usage of safety equipment.

viii) To specify the requirements of Health, Safety and Environment (HSE) (commensurate with the nature of job) in Pre- Qualification criteria.

ix) To designate Engineer-in-charge and safety officer.

x) To arrange for a multi-disciplinary safety audit team to conduct surprise / regular safety audits and monitor the implementation of the recommendations.

xi) To introduce suitable schemes for motivation of the contractor worker to adhere to safety guidelines.

xii) To review safety practices & their implementation through periodic surprise visit of the work sites and monthly review meeting.

xiii) To develop the HSE plans and incorporate the same in the tender document.

xiv) To liaise with external agencies like press, public etc and with law enforcement, regulatory, statutory agencies etc.

xv) To report to statutory agencies on safety compliance and accidents, if any.

4.1.2 Owner's Representative/Engineer-in-charge

The duties & responsibilities of engineer-in-charge should include:

i) To ensure that all Contract requirements including Health, Safety, Environment & Security are complied with.

ii) To ensure that contractor workforce deployed is adequately qualified, trained and in state of health to commensurate with the requirements of the job.

iii) To ensure that the Tools / Tackles and Machinery being used are properly

tested and are in sound working conditions and necessary resources proposed for providing safe place of work and necessary PPE are being used.

iv) To take the required necessary corrective action immediately upon noticing or receipt of a report on noncompliance or any such condition which poses a threat to health, safety or environment. If during the course of execution of the contract, any situation of non-compliance with the contractor's safety and health plan are noticed / reported, the same will be taken up with the contractor for correction. In the event of repeated non compliance, suitable action to be initiated as per the contract.

v) To ensure that the incidents are reported to all concerned within stipulated timeframe.

vi) To ensure submission of a plan for safe working (Method Statement) from contractor and approval of the same by competent person / department.

vii) To ensure that Work Permit System in line with OISD-STD-105 is adhered to.

viii) To ensure availability of all the documentation needed for the execution of contract.

ix) To ensure that the quality controls have been maintained during fabrication/erection and all jobs required for safe commissioning have been carried out.

x) To ensure safe dismantling of all temporary facilities/connections put up by the contractor, after completion of work.

xi) To compile a report on the safety performance (at the conclusion of each contract or periodically such as annually for renewable and long-term contracts), which is to be considered in future when selecting contractors.

xii) To ensure that the Consultant, contractor and sub-contractor employ / designate qualified & trained Safety Engineer / Officer commensurate with requirement of the job.

4.1.3 Owner's Safety Officer

The duties & responsibilities of the Owner's Safety Officer should include:

i) To assess the hazards associated with jobs in consultation with all concerned and establish safe working procedure including identification of the escape routes.

ii) To establish a written record of factors which can cause injuries and illnesses.

iii) To undertake routine/surprise inspections of all work sites and identify unsafe conditions & practices, if any. Check for compliance of the safety practices being followed with approved HSE Plan.

iv) To investigate promptly the incidents (including near-miss) in order to advise corrective and/or preventive action.

v) To maintain statistical information for use in analyzing all phases of incidents and events involving contract personnel.

vi) To provide the means for complying with the reporting requirements for occupational injuries and illnesses.

vii) To check whether the proposed working arrangements are safe and satisfactory, particularly at the interface between the contractor's planned work and owner’s existing facilities.

viii) To communicate to the Contractor the imposed restrictions which may affect the work/personnel such as the temporary closure of a corridor or electrical isolation of equipment.

ix) To review and monitor the contractor's adherence to approved HSE plan and all applicable environmental, health, and safety requirements.

x) To ensure that Consultant, Contractor's Managers, Supervisors and workmen at all levels (who will plan, monitor, oversee and carry out the work) undergo Health, Safety and Environmental training in their respective responsibilities with respect to conducting work safely and with due regard for the protection of the environment.

xi) To identify areas of operations where specialized training is required to deal with potential dangers.

xii) To document and to bring to the attention of the Owner's Supervisor and Contractor any non-compliance/violation of the safety norms against approved safety and health plan or safety and health requirements and also raise these issues in the Safety Committee Meetings.

xiii) To take part in Tool Box Meetings at random and to ensure maintenance of records.

4.2 CONTRACTOR

4.2.1 Contractor's Management

Duties & responsibilities of the contractor should include the following:

i) To implement safe methods and practices, deploy appropriate machinery, tools & tackles, experienced supervisory personnel and skilled work force etc. required for execution.

ii) To prepare a comprehensive and documented plan for implementation, monitoring and reporting of Health, Safety and Environment (HSE) and implement the same after its approval.

iii) To nominate qualified & trained Safety Engineers / Officers reporting to the Site in charge, for supervision, co-ordination and, liaison for the implementation of the safety plan.

Similar HSE Plan should be implemented at the sub- contractor's or supplier's site /office. However the compliance with the HSE Plan is to be the sole responsibility of the Contractor.

iv) To arrange suitable facilities in liaison with the owner for drinking water, toilets, lighting, canteen, crèche etc as applicable as per Laws/ Legislation at site and also arrange for workmen compensation insurance, third party liability insurance, registration under ESI / PF act etc as applicable.

v) To arrange for fire protection equipment as per the advice of owner.

vi) To ensure that its employees have completed appropriate health and safety training as required by the statute / regulation and also as per requirements of the Owner / Consultant. The documentation of such training imparted to all its employees should be maintained and produced for verification as required.

vii) To comply with all the security arrangements of owner.

viii) To ensure that the plant and equipment used on-site by him / his employees is correctly registered, controlled and maintained in sound working condition.

ix) To ensure availability of First Aid boxes and First Aid trained attendant.

x) To ensure that all incidents including near misses are reported to all concerned immediately.

In construction projects where sub-contractors are engaged, the contractor should set out the responsibilities, duties and safety measures that are expected of

the sub-contractor's workforce. These measures should include the provision and use of specific safety equipment, methods of carrying out specific tasks on safety and the inspection and appropriate use of tools.

The responsibilities indicated separately under contractor's Supervisor, Safety Officer and contract worker are contractually that of the Contractor and legally binding on the Contractor only. However the specific detailing as above has been given separately for guidance and operational convenience.

The selection of sub contractors, if employed, should be approved by the owner. Sub-contractor should comply fully with all safety rules and conditions applicable to the main contractor.

4.2.2 Contractor's Supervisor / Safety Officer

Duties & responsibilities of the Contractor's supervisor/Safety Officer should include the following:

i) To ensure strict compliance with work permit system by carrying out work only with appropriate work permits and after ensuring that all safety precautions / conditions in the permit are complied with and closing the same after job completion.

ii) To ensure that required guards and protective equipment are provided, used, and properly maintained.

iii) To ensure that tools and equipment are properly maintained and tested.

iv) To plan the workload and assign workers to jobs in commensuration with their qualification, experience and state of health.

v) To ensure that the workers understand the work to be done, the hazards that may be encountered, and the proper precautions/procedure for carrying out the work safely.

vi) To take immediate action to correct any violation of safety rules observed or reported.

vii) To ensure that the workers likely to be exposed to hazardous chemicals/materials have access to appropriate Material Safety Data Sheets (MSDS), wherever applicable, and provide necessary mitigation measures.

viii) To ensure inspection and certification of all tools (hand operated as well as mechanically operated) being used. Defective tools shall be immediately removed.

ix) To ensure that appropriate warning signboards or tags are displayed.

x) To ensure that workers have proper training for their job assignments, including use of appropriate PPE and first aid fire fighting equipment.

xi) To comply with all applicable safety and health standards, rules, regulations and orders issued by competent authority pertaining to the assigned activities.

xii) To ensure that sick and/or injured workers receive appropriate first aid and/or medical attention.

xiii) To report each incident and/or injury in accordance with established procedures and assist in investigation.

xiv) To take necessary action for correction of any unsafe act / condition at the workplace. However, in case the same is outside the limits of authority, it should be reported to Owner's Engineer-in-charge immediately.

xv) To conduct daily inspections to ensure compliance with safety standards, codes, regulations, rules and orders applicable to the work concerned.

xvi) To ensure that workers under their supervision are aware of their responsibilities.

xvii) To arrange daily tool box meeting and regular site safety meetings and maintain records in the required formats. (Refer Clause 5.9.1)

xviii) To arrange stand-by supervisor/ worker where situations so demand.

xix) To develop methods and display banners/posters to inculcate safety consciousness.

xx) To attend training and ensure participation of his workers for training as per schedule arranged by the Owner / Consultant and keeps himself updated.

xxi) To keep records of number of persons working at the site.

xxii) To keep a constant liaison with Engg-in-charge / owners' representative on safety issues.

xxiii) To maintain accident & nearmiss record in a register.

xxiv) To ensure that only PPE of the approved type by owner is used at site.

A separate Safety Officer should be assigned, where more than 100 workers are employed at site. For smaller jobs, the supervisor should assume the role of the safety officer also.

4.2.3 Contract workers

The duties & responsibilities of the contractor worker should include the following:

i) To perform work safely as per the job requirement and instructions.

ii) To inform all concerned regarding unsafe conditions/acts.

iii) To wear PPE as stipulated and necessary for the job.

iv) To inform promptly to their supervisor regarding all work related incidents resulting in personal injury, illness and/or property damage.

v) To take all necessary and appropriate safety precautions to protect themselves, other personnel and the environment.

4.3 CONSULTANT

The activities and responsibilities covered under the scope of the Owner may be delegated to the consultant in those cases as applicable, based on the respective contract conditions. The primary responsibility of Consultant is to ensure compliance with agreed HSE plan for the contract by the Contractor. However those responsibilities conferred on Owner as Principal employer cannot be delegated to consultant.

Where the consultant‘s scope involves Engineering and Design, those factors under **Designer** should also be applicable.

In all cases, the Consultant's scope should include submission of latest HSE plans for work under his and Contractor's purview and implementing the same till job completion. It should conform to owner's overall HSE plan. This should include Guidelines and Implementation and Reporting Methodology to be followed with required report formats.

Adequate number of Safety Officers shall be provided by the Consultant with necessary skills required for the work to be performed.

The Consultant shall review the documents submitted by the contractor and advise owner on acceptance as well as advise suitability and number of Contractor's safety officers / supervisors.

4.4 DESIGNER

The Process Designer should identify all hazards and risks likely to be encountered during fabrication, erection including

dismantling, Pre-commissioning, commissioning and Performance run to meet the Guarantees and advise the risk mitigation measures.

All the hazards and safety measures to be adopted while handling Dangerous chemicals and Catalysts should be detailed by the Process Licensor and the same should be again included in the scope of the suppliers. Specific write ups/MSDS should be obtained from Patented single source suppliers also.

Designs should recognize, include and apply safe practice during preparation, construction and subsequent operational use and maintenance after completion of the Project.

All documents including drawings and calculations are to be originated, checked and approved in accordance with latest international codes, standards, specifications and design basis philosophy.

Preferred use of low risk materials, policy on hazardous substances, preferred use of low noise and dust-suppressed equipment etc. should be encouraged.

5.0 SAFETY MANAGEMENT

5.1 JOB SAFETY ANALYSIS (JSA)

Job safety analysis (JSA) provides a mechanism by which the contractor, safety officer or supervisor take a detailed look at how an individual task is performed and its inherent hazards and preventive measures. This procedure helps in integrating accepted safety and health principles and practices into a particular operation. In a JSA, each step of the job is examined to identify potential hazards and to determine the safest way to do the job.

A job safety analysis includes five steps as below:

- Select a job
- Break the job down into a sequence of steps
- Identify the hazards against each of these steps (based on knowledge of accident, causes of injuries and personal experience) and determine the preventive measures to overcome these hazards
- Apply the controls to the hazards
- Evaluate the controls

5.2 CRITERIA OF SELECTION OF A CONTRACTOR

“Contractor Safety” can be ensured to a large extent if competent agency for execution of assignment or job, based on HSE system agreed upon by owner, is selected. It is necessary to assess his capabilities and competencies to perform work safely.

A databank should be developed for all the contractors for their past performance on HSE aspects. An attempt should also be made to get similar data from other similar industries.

The data required will depend upon complexity involved in the job and type / size of resources required. Format needs to be suitably developed depending upon size, nature of the job & hazard associated therein. The format designed should also take care of the skill required to carry out the job.

Performance review is essential for all type of contractors. It helps in recording actual performance/experience with contractors while the contract is in progress. It is essential that resources agreed as per the contract are reviewed at mobilization stage for ensuring compliance from the day one and thorough effective supervision / monitoring system are at place.

This activity also helps in taking timely action in case of unsatisfactory performance to correct the situation and ensure safe work during execution period and deciding about suitability of the contractor for future jobs.

The periodicity of such performance review will depend upon size/type/complexity of contract. However, the performance should be reviewed at least at mobilisation stage and at the end of the contract.

5.3 SITE PLANNING AND LAYOUT

Before starting the construction/maintenance job at existing workplace in operation or green field locations, following should be ensured: -

i) Details regarding location of workshop/ fabrication yard, site office, stores, laboratory, electrical installations, placement of construction machinery, medical and welfare facilities, lighting underground and above ground piping route, cable route etc. should be decided prior to commencement of the work in consultation with owner / Consultants and implementation should be ensured. Layout should be displayed at strategic locations.

ii) The resources required to meet any emergency situations like fire fighting, first aid etc. should be planned and mobilized as per the job requirement.

iii) The sequence or order in which work to be done and any hazardous operations or processes should be identified.

iv) Free access to site shall be provided with clear roads, passage, gangways, staircases etc. Access to construction site should be leveled, open and free from any obstructions like construction material or scrap/waste, exposure to hazards such as falling materials, material handling equipment and vehicles. Any pit or ditch shall be covered or barricaded.

v) Arrangements should be made to maintain good housekeeping at site. Scrap and debris generated out of construction work should be removed/disposed off at a regular interval as directed. Emergency exit should be provided in case of blockade of primary exit.

vi) Suitable warning notices and also the routes to and from welfare facilities should be displayed prominently.

vii) Pedestrian pathways and routes for vehicular traffic (light/heavy vehicles including material handling equipment) should be earmarked.

viii) Artificial lighting to be provided at places where work continues or workers pass by after sunset or in case natural light is insufficient like confined spaces.

ix) Keep all equipment /machines under cover to prevent them from dust, rain/flood water, heat etc. and follow storage instructions as applicable for each of them.

5.4 GATE ENTRY PROCEDURE

Gate entry at any site / workplace / unit is to be restricted to ensure entry of only authorised persons / vehicles.

5.4.1 Entry procedure for all contractor worker should be as follows:

A. Issuance of Pass

i) The passes are to be issued after the owner's representative/engineer-in-charge forwards the application of the contractor providing complete details of the workers being engaged. The contractor may be asked to submit Character & Antecedents (C&A) verification of individual worker from concerned authorities.

ii) With regard to issuance of passes for all vehicles including material handling equipment, owner's representative / engineer-in-charge should forward the application only after ensuring that all documents pertaining to the fitness of the vehicle/equipment and valid driving license of the driver etc. are available.

iii) The passes should be serially numbered with address, contractor name, identification mark, signature of the worker etc.

iv) Special colour code for passes should be used for persons entering different

areas like Administrative Block, Unit area, Project Area (wherever applicable).

v) Contractor workers engaged on routine basis for long periods should be provided with monthly photo pass.

vi) Special permit is required separately for working beyond normal working hours and holidays.

B. Gate Entry

i) Entry of the contractor's employees should be permitted with valid gate passes only.

ii) Entry of contractor's workers should be allowed in presence of authorized representative of contractor.

iii) Records of persons at the time of entry/exit should be maintained.

iv) At the entry gate of the location, a physical checking for non-carrying of lighter, matchboxes, explosives etc. should be carried out.

v) Gate passes/Identity Cards should be displayed on persons at all the times.

vi) For Mega-projects at existing / operating installations, it is preferable to have a separate gate for entry of contractor workers and also the project areas should be segregated fencing from operational area by fencing / other physical means.

vii) No vehicle should be allowed to enter in an operational area without proper flame arrestor.

viii) Awareness on Safety through training / posters etc. highlighting Do's and Don'ts should be spread within entire contractor workforce. Video/Audio tapes on Safety Topics should be played preferably.

ix) For occasionally engaged labourers such as for material handling etc., spot photograph may be preferably taken with two copies (one for preparing the pass and other for attachment with gate register). Specific advice and recommendation of User Department may be given due cognizance. Relevant details are to be written. The pass should be collected back at the gate after day's work.

5.4.2 Tank Truck Loading (TTL) Operation :

At the loading / unloading location, a large no. of Tank Trucks of petroleum products enter the installation. Crew members are generally not regular entrants. The procedure should be as follows:

i) The gate pass should be issued to the individual crew members on written request of the transporter mentioning TT registration nos., License and certificate of training as per MV rule 9.

ii) Character & Antecedent (C & A) verification of the TTL crew through local police is to be done preferably and record maintained.

iii) For loading/unloading purpose, register entry at security gate is made before allowing entry into the premises with recording of names of crew members, time of entry, pass Sr. No., TT no. etc.

iv) For loading/unloading, crew is allowed entry alongwith TT only, after checking of TT from explosive/security point of view.

v) Out time, invoice no., Destination etc., are recorded while TTs go out of the security gate.

5.5 TRAINING

Training is to educate contractor workforce on various hazards associated with the job/workplace and on the respective preventive / mitigation measures to avoid untoward incidents.

i) Workers should be adequately and suitably:

(a) informed of potential safety and health hazards to which they may be exposed to at their workplace;

(b) instructed and trained in the measures available for the prevention, control and protection against those hazards.

ii) No person should be employed in any work at a workplace unless that person has received the necessary information, instruction and training so as to be able to do the work competently and safely. The competent authority should, in collaboration with employers, promote training programs to enable all the workers to read and understand the information / instructions related to safety and health matters.

iii) The information, instruction and training should be given in a language understood by the worker and written, Oral, visual and participative approaches should be used to ensure that the worker has assimilated the information.

iv) Every worker should receive instruction and training regarding the general safety and health measures common to the workplace. This should include:

(a) general rights and duties of workers at the workplace;

(b) means of access and egress both during normal working and in an emergency;

(c) measures for good housekeeping;

(d) location and proper use of welfare amenities and first aid facilities provided;

(e) proper use and care of the items of personnel protective equipment and protective clothing provided to the worker;

(f) general measures for personal hygiene and health protection;

(g) fire precautions to be taken;

(h) action to be taken in case of an emergency;

(i) requirements of relevant safety and health rules and regulations.

Copies of the relevant safety and health rules, regulations and procedures should be available to workers upon the commencement of and upon any change of employment.

5.5.1 Training Techniques

a) Lectures

This technique should be applied when it is required to transfer information in local language to a large contractor workforce with controlled content and time.

b) Case Study

This is an effective technique based on the presentation of case of real events by Trainer to highlight probable causes like Human Error, ignorance about the job etc.

c) Videos

Videos, an effective technique of communication, should be used to display the right techniques of performing a task in a safe manner and hazards associated with a job.

d) Demonstration at site

Right way to do a job should invariably be demonstrated to workers at the site itself. The right way is also a safe way. Hazards due to wrong procedures, short cuts and their adverse effects etc. should also be highlighted.

5.5.2 Training/Awareness Module and Frequency

A. General Safety Training to all categories of contractor employees should be imparted before induction and annually thereafter. No person should be allowed to enter the installation without undergoing this training. This training program may cover:

i) Mandatory uses of PPE like Cotton clothes, Helmet, Safety Shoes, Safety Belts etc.

ii) Probable Hazards

iii) Important Telephone No / Escape route

iv) First Aid

v) Use of Fire extinguisher

The contractor workers, if engaged in operation of the plants/facilities, should be trained in line with Clause No. 4.6 of OISD-GDN-206 on “Safety Management System”. For other categories of contractor workers, training modules for different category employees are as follows:

B. Contractor Supervisor

Contractor Supervisor should be trained in accordance with the provision of clause no. 5.1.1.2, 5.2.7, 5.3.10, 5.6.12 and 5.7.8 of OISD-STD-154 on 'Safety Aspects in Functional Training'

C. Contractor Worker

Yearly training programme should be carried out for contractor worker and the records should be maintained. The training programme should cover at least the following:

i) Worker responsibility for safety of himself and work area.

ii) Associated hazards with the job and job area including electrical shock hazards.

iii) Importance of First Aid fire fighting equipment, their use & operations

iv) Communication system at the installation

v) Fire / Accident Reporting procedure

vi) General Safety rules

vii) Safety Measures during execution of job such as:

- Welding / Cutting / Grinding
- Working at height
- Confined space entry
- X ray / radiation
- Erection / Dismantling of scaffolding
- Tank construction and repairs
- Handling of chemicals etc.

viii) Importance & use of PPE

ix) Emergency Routes

x) Assembly Points

xi) Job Specific Training

D. Consultant / Contractor

Awareness program should be carried out for Consultant / Contractor at the time of induction. This program should cover at least the following:

i) Responsibility of contractor for safety of their personnel and work area

ii) Hazardous property of Petroleum products and chemical used

iii) Communication system

iv) Fire / Accident Reporting procedure

v) Medical facility available

vi) Statutory requirements

vii) Importance of First Aid equipment and required at the site

viii) Work Permit system

ix) Direct/ Indirect losses due to accident

x) Safety Measures while executing the jobs such as:

- Welding / Cutting / Grinding
- Working at height
- Confined space entry
- X ray / radiation
- Erection / Dismantling of scaffolding
- Tank construction and repairs
- Handling of chemicals etc.
- electrical jobs

xi) Safety training needs of their supervisors and workers

xii) Importance & Use of PPE at the site

xiii) General Safety rules at the installation

E Security Personnel

Training program should be carried out for Security personnel at the time of induction and annually thereafter and the records should be maintained. The training program should cover at least the following:

i) Layout of Plant and Facilities
ii) Vulnerable locations
iii) Safety regulations (Statutory and in company)
iv) Fire Protection Facilities and Locations
v) Role in case of Fire / Disaster
vi) Emergency Procedure and Drills
vii) Industrial First Aid
viii) Use of Personnel Protective Equipment
ix) Disaster Management Plan

5.6 INSPECTION / AUDIT

Inspection / Audit is a tool to evaluate compliance of all safety requirements. Most of the information could be gathered through site inspection using ready-made check lists to ensure that contractors / agencies abide by the safety rules and norms while working at operating / construction sites.

A checklist, while carrying out different type of jobs, should be developed based on hazards associated with the job being performed and requirements as per OISD-GDN-192 on "Safety Practices during Construction". Typical format is enclosed at Annexure II, which should be modified to suit the requirement of the site / job to be done.

Before starting the work and at regular intervals thereafter, Contractor's Supervisor/safety Officer and Owner's representative / Engineer-in charge/safety Officer should inspect as per the checklist so prepared to ensure that contractor has prepared to start the work with all safety precaution required for safe execution of job.

5.7 PENALTIES FOR NON-COMPLIANCE

Financial or other type of penalties like seizure of gate passes, stoppage of work for a limited period etc. may be levied on the contractors or their workers for non-compliance of safety rules. A provision of suitable accident severity based penalty clause for contractor may be incorporated to ensure adherence of systems and procedures. A few of the usual non-compliance are as follows:

-- Non-usage of PPEs like Safety helmet / Safety shoes / Safety goggles / Respiratory protection etc. by the contractor personnel

-- Non-usage of the safety belt and life line by the workers while working at height

-- Non-provision of basic safety requirement such as 24 V lamp for working in confined space, uncertified / non standard lifting tools, earth leakage protection & earthing connections for electrical appliances as per Indian Electricity Rules, emergency isolation switches etc.

-- Violation of Safety Permit conditions like Fire fighting equipment

-- Non-barricading of area while rigging, digging etc.

-- Working without valid work permit

-- Unauthorised road closure/blockage

5.8 INCIDENT REPORTING AND INVESTIGATION SYSTEM

All the incidents including near-miss should be reported immediately by contractor's Supervisor to Contractor and owner's Supervisor/Engineer-in-charge, who should inform to Owner's Safety Officer and owner's Management. Owner's Safety Department will be required for onward reporting as per OISD, Statutory requirements.

All accidents regardless of the extent of injury or damage should be investigated in order to find probable causes, lessons learnt thereof and remedial measures required to prevent its recurrence.

The incident investigation should be done as per provision of clause no. 4.12 of OISD-GDN-206 on 'Safety Management System' . All the recommendations of investigation / Enquiry Report need to be monitored closely for its implementation. A proper record needs to be maintained to ensure implementation of all the recommendations and same should be reviewed from time to time.

5.9 SAFETY COMMITTEE MEETINGS

Following three type of safety committee meetings should be held aiming at raising the level of safety consciousness at the site:

5.9.1 Toolbox meeting

To maintain awareness, update training and convey important safety and health information, contractor supervisors should conduct tool box meetings at least weekly and also prior to start of any work. All the contractor workers should attend this meeting. The owner's supervisor/Engineer-in-charge and safety officers should also attend these meetings on random basis. Tool box meeting should be conducted more frequently depending upon circumstances. Record of the same can be maintained in the following typical format.

TOOLBOX MEETING FORM

SUBJECT :
PRESENTER :
DATE :
TIME : From….. To…..
CONTENT IN BRIEF :

Participant's Name	Signature
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5.9.2 Site Safety Committee Meeting

Primary purpose of this safety committee is to enable owner, contractor and workers to work together to monitor the site safety and health plan so as to prevent accidents and improve working condition on site. Its size and membership will depend on the size and nature of job.

The safety committee should include representatives of owner, consultant, contractor identified as safety officer/supervisor. It should be headed by Engineer-in-charge.

The safety committee should have regular and frequent meetings, atleast fortnightly, to discuss the safety and health program on site and to make suggestions for improvement. The meetings should be documented with a time bound action plan. The functions carried out by safety committee should include:

i) Review compliance of pending items of last Safety meetings.

ii) Consideration of the reports of safety personnel.

iii) Discussion of accident/near-miss and illness reports in order to make appropriate recommendation for prevention.

iv) Examination/evaluation of suggestions made by workers.

v) Dissemination of acquired knowledge through training programs and information sharing sessions.

vi) Discussion & review of Fire Prevention & Disaster Management Plan.

vii) To send recommendation to Apex Body for consideration/approvals.

5.9.3 Safety Review Meeting by Location Head

This meeting should be headed by the Location head and attended by Owner's Supervisor/Engineer-in-charge, owner's safety Officer and all concerned department heads. Prime purpose of this review is to ensure that all the recommendations of various committees are being complied with and to take decisions on critical points raised. This meeting should take place at least once in every quarter. All the investigation reports/ audit findings with status of implementation of recommendations should be discussed.

5.10 SAFETY EQUIPMENT / PERSONNEL PROTECTIVE EQUIPMENT

The type of safety equipment to be used is decided based on the job requirement. Selection should be made based on OISD-GDN-192, OISD-STD-155 (Part I & II) and the job requirement. Safety equipment / Personnel Protective Equipment (PPE) shall be of approved make. Contractor shall provide necessary training to each employee regarding proper usage and upkeep of PPE including its limitation.

A register showing stock and issue of PPE should be maintained by the contractor at site and must be available for inspection.

6.0 REFERENCES

1) OISD-GDN-206 on "Safety Management System"

2) OISD-GDN-192 on "Safety During Construction"

3) OISD-STD-155 Part(I&II) on "Personnel Protective Equipment"

4) Building & Other Construction workers (Regulation of Employment & Condition of Service) Act 1996

ANNEXURE I

LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF INDIAN STANDARDS

Sl.no.	Code No.	Title
1	IS: 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
2	IS: 875	Code of practice for Structural safety of buildings: Masonry walls
3	IS: 933	Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
4	IS: 1179	Specification for Equipment for Eye and Face Protection during Welding – First Revision
5	IS: 1904	Code of practice for Structural safety of buildings: Shallow foundations
6	IS: 1905	Code of practice for Structural safety of buildings: Masonry walls
7	IS: 1989 – Part II	Leather Safety Boots and shoes for heavy metal industry
8	IS: 2171	Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision
9	IS: 2361	Specification of Building Grips – First Revision
10	IS: 2750	Specification for Steel Scaffoldings
11	IS: 2925	Specification for Industrial Safety Helmets – First Revision
12	IS: 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision
13	IS: 3521	Industrial Safety Belts and harnesses
14	IS: 3696 – Part I	Safety Code for Scaffolds and Ladders: Part I – Scaffolds
15	IS: 3696 – Part II	Safety Code for Scaffolds and Ladders: Part II – Ladders
16	IS: 3764	Safety Code for Excavation Work
17	IS: 4014 – Part I & II	Code of Practice for Steel Tubular Scaffolding
18	IS: 4081	Safety Code for Blasting and Related Drilling Operations
19	IS: 4082	Recommendations on stacking and storage of construction materials at site
20	IS: 4130	Safety Code for Demolition of Buildings – First Revision
21	IS: 4138	Safety Code for working in compressed air – First Revision

22	IS: 4756	Safety Code for Tunneling works
23	IS: 4912	Safety requirements for Floor and Wall openings, Railings and toe boards – First Revision
24	IS: 5216 – Part I & II	Recommendations on safety procedures and practices in electrical work
25	IS: 5121	Safety code for piling and other deep foundations
26	IS: 5916	Safety Code for Construction involving use of Hot Bituminous materials
27	IS: 6994 – Part I	Specifications for safety gloves: Part I – Leather and Cotton gloves
28	IS: 5983	Specification for Eye Protectors – First Revision
29	IS: 6922	Criteria for safety and design of structures subject to underground blasts
30	IS: 7155	Code of recommended practices for conveyor safety
31	IS: 7205	Safety Code for Erection on Structural Steel Works
32	IS: 7069	Safety Code for Handling and Storage of Building Materials
33	IS: 7293	Safety Code for Working with Construction Machinery
34	IS: 7323	Guidelines for operation of Reservoirs
35	IS: 7969	Safety Code for handling and storage of building materials
36	IS: 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals
37	IS: 8989	Safety Code for Erection of Concrete Framed Structures
38	IS: 9706	Code of Practices for construction of Arial ropeways for transportation of material
39	IS: 9759	Guidelines for de-watering during construction
40	IS: 9944	Recommendations on safe working load for natural and manmade fibre rope slings
41	IS: 10667	Guide for selection of industrial safety equipment for protection foot and leg
42	IS: 10291	Safety Code for dress divers in civil engineering works
43	IS: 10386 – Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects
44	IS: 10386 – Part II	Safety Code for Construction, Operation and Maintenance for

		River Valley Projects
45	IS: 11057	Code of Practice for Industrial Safety Nets
46	IS: 13415	Code of Practice on safety for Protective barriers in and around building
47	IS: 13416	Recommendations for preventive measures against hazards at working places

Statutory Regulations

Latest Statutory Acts and Rules, as given below, may be referred:-

1. The Petroleum Acts 1934 and Petroleum Rules 2002
2. The Factory Act, 1948 (As amended by Factory Amendment Act 1987) and concerned Factory Rules
3. The Water (Prevention and Control of Pollution) Act 1974 & Rules 1975
4. The Environment (Protection) Act 1986
5. The Manufacturing, Storage and Import of Hazardous Rules 1989
6. The Hazardous Wastes Management (Management & Handling) Rules 1989
7. The Indian Electricity Act 1901 and Rules 1956
8. The Indian Explosive Acts, 1884 & The Indian Explosive Rules 1983
9. The Gas Cylinder Rules 1981and the static & Mobile Pressure Vessels (Unfired) Rules 1981
10. The Indian Boiler Act 1923 and Regulations 1950
11. The Public Liability Act 1991 as amended in 1992
12. The Motor Vehicle act 1988 and Central Motor Vehicle rules 1989
13. Building & Other Construction workers (Regulation of Employment & Condition of Service) Act 1996

In addition to above, various other statutory acts like EPF, ESIS, Minimum wage act and other local statutory requirements shall also be complied with.

ANNEXURE II

CHECK LIST FOR SAFETY INSPECTION / AUDIT

Job _____ Location _____ Date of Audit_____Frequency _____

Inspected by _____ Contractor (s) _____

Sl.no.	ITEM	YES	NO	NA	REMARKS / ACTION
1.0	**PERSONNEL PROTECTIVE EQUIPMENT (PPE):** Are following PPEs being used as per the job requirements?				
1.1	Safety Helmets				
1.2	Safety Shoes				
1.3	Gum Boots				
1.4	Safety Belts with life line				
1.5	Gloves				
1.6	Ear Plug				
1.7	Goggles				
1.8	Shield Glass				
1.9	Face Protection				
1.10	Breathing Apparatus				
1.11	Canister Mask				
1.12	Hand wash / Eye wash/ Respirating filter / cloth				
1.13	Boiler Suit				
1.14	Others				
2.0	**HOUSE KEEPING**				
2.1	Whether Waste Bins are provided / used				
2.2	Are Passageways / Walkways clear?				
2.3	Is General neatness O.K.?				
2.4	Is the Ground free from oil, grease etc. and is not found to be slippery?				
2.5	Others				

3.0	**EXCAVATION**				
3.1	Whether soil stability is checked?				
3.2	Whether proper shoring for the excavation is provided to prevent cave-in for side of slope >45 Degree?				
3.3	Whether proper precautions have been taken if the excavation is adjoining to heavy structure like building, street and roadways?				
3.4	While excavating whether proper slope usually 45^0 & suitable benches of 0.5 m width at each 1.5 m depth are provided?				
3.5	Whether barricading of 1m height with glowing caution board is provided for excavation beyond 1.5m depth?				
3.6	Whether excavating earth is placed beyond 1m of the edge of the trench?				
3.7	Whether heavy vehicle movement is restricted to come too close to the excavating area?				
3.8	Whether necessary precaution is taken for underground pipes, sewers, cables by contractors?				
3.9	Whether excavation hot work permit is taken?				
3.10	Whether extra precaution is taken for bailing out water properly while excavating?				
3.11	During rains whether the excavation is done with extra precaution to prevent caving in?				
3.12	Whether two separate entry/ exit points with necessary ladders / steps, as per requirement, have been provided?				
3.13	Whether one person is available at all the time to communicate any hazards noticed with workers working in deep trenches or excavation?				
3.14	Whether necessary precautions like				

	regular gas testing are being taken in areas having hydrocarbons and LPG so that no gas accumulation takes place in the trenches.				
3.15	Whether IS: 4081-1986 & Indian Explosive act & rules for storage, handling & carrying of explosive material and execution of blasting operation is followed?				
3.16	Whether in case of mechanised excavation, caution board is provided for do's and don'ts like 'Nobody to enter' within one meter of the extreme reach?				
3.17	Whether the following are inspected during excavation work :- a) Boulder formation encountered b) Collapsing / development of cracks of sides c) Marked damage to support d) Unexpected fall of ground e) Inspection of site after each blast.				
3.18	Others				
4.0	**PERMITS**				
4.1	Whether valid work permit is issued to start any work?				
4.2	Whether all conditions of the permit are fulfilled before starting the job?				
4.3	As noted in the permit, whether compliance of all the recommendations are ensured?				
4.4	Whether permits are available at work site all the times?				
4.5	Whether hot work permit registered in fire station?				
4.6	Whether permits are being closed after the completion of job?				
4.7	Others				
5.0	**SAFETY IN CUTTING / WELDING/GRINDING**				
5.1	Whether LPG / Oxygen / Acetylene/ Gas				

	cylinders are kept outside only while working in confined space?				
5.2	Are Acetylene /LPG cylinders kept in upright position and secured at designated places under shed – wet gunny bags wrapped around it if the same is under sun at designated place?				
5.3	Check cylinder and cylinder valves for any kind of damage?				
5.4	Whether protective valves are kept on cylinder while not in use?				
5.5	Whether proper means and method for transportation of cylinders to avoid dropping and rolling are being adopted / followed?				
5.6	Whether gas cylinders, regulators are kept away/free from oil and grease?				
5.7	Whether all hoses were found to be free of any damage or crack?				
5.8	Whether oxygen and acetylene cylinders are stored separately?				
5.9	Whether color coding is being used for easy identification of different type of cylinders and hoses?				
5.10	Whether cylinder keys are available near the cylinder?				
5.11	Whether gas torches with NRV with flash back arrestor of approved make are only being used?				
5.12	Whether pressure gauges are in working condition and checked from time to time?				
5.13	Whether welding shields are used while welding?				
5.14	Whether proper earthing for welding machines are provided?				
5.15	Whether power is taken from approved sources (welding receptacles)?				
5.16	Whether welding receptacles are properly grounded?				

5.17	Whether welding cables are maintained in good condition and without any joints/ cuts?				
5.18	Whether to avoid short circuit, welding machines are protected against rain?				
5.19	Whether earth connectors are securely connected to the job and not to the adjoining pipeline or structure?				
5.20	Whether flame arrestor of DG set is of approved make and quality?				
5.21	Others				
6.0	**SAND / SHOT BLASTING**				
6.1	Whether sand blasting is used only after getting approval from competent authority?				
6.2	Whether air compressor used for sand / shot blasting are positioned away from work place?				
6.3	Whether exhaust of the prime mover is directed away from the work place?				
6.4	Whether in case of motor driven compressor, the body of the motor as well as the compressor is properly earthed?				
6.5	Whether line operator of sand/shot blasting wear suitable PPEs including mask?				
6.6	Whether adequate measures are adopted to confine dust/spray particles?				
6.7	Whether adequate measures are taken for proper ventilation while the work is done in confined space?				
6.8	Others				
7.0	**SAFETY WHILE WORKING AT HEIGHTS / SCAFFOLDING / LADDERS**				
7.1	Whether work permit is obtained to take up work at height above 3 mts?				
7.2	Whether steel pipes scaffoldings are used in unit/off site areas?				

7.3	Whether provision for suitable platform with all scaffoldings are made? Whether its construction is as per specification with toe board and railing?				
7.4	Whether the area below working at height is cordoned?				
7.5	Whether suitable platform is provided?				
7.6	Whether ISI approved quality and good condition safety belts are used while working at heights?				
7.7	Whether life line of safety belt is Anchored to an independent secured support capable of withstanding load of a falling person?				
7.8	Whether the area around the scaffold is cordoned off to prohibit the entry of unauthorized person?				
7.9	Whether ropes used are of good condition and adequate strength free of defects?				
7.10	Whether ladder is placed at secured and leveled surface?				
7.11	Whether it is extended 1.5 Mts. Above the landing point?				
7.12	Whether ladder used are of adequate length and tying short ladder is avoided?				
7.13	Whether metallic ladders are placed away from electrical system?				
7.14	Whether tools or materials are removed after completion of the day's job at heights?				
7.15	Whether a valid permit is obtained before taking up work on asbestos or fragile roof?				
7.16	Whether sufficient precaution is taken while working on fragile roof?				
7.17	Whether provision is made to arrange duck ladder, crawling board for working at fragile roof?				
7.18	Whether scaffolding has been erected on rigid / firm / levelled surfaces only?				

7.19	Whether scaffold has been inspected by competent person prior to being put in use?				
7.20	Whether the scaffolding has been designed for the load to be borne?				
7.21	Whether the erection and dismantling of the scaffolding is being done only by trained persons and under supervision?				
7.22	Whether safety net with proper working arrangement and life line has been provided?				
7.23	Others				
8.0	**SAFETY IN CONFINED SPACE**				
8.1	Whether a permit is obtained to enter a confined space?				
8.2	Whether gas test for hydrocarbon, toxic gas, oxygen level is obtained before entering any confined space?				
8.3	Whether adequate oxygen level is ensured in confined space before entering? If not, whether all precaution like using of Breathing Apparatus set is ensured?				
8.4	Whether, in case of chance of ingress of hydrocarbon gases / toxic gases, Personnel Monitoring System (PMS) is used or not?				
8.5	Whether only in presence of a supervisor, worker enters in confined space?				
8.6	Whether provision of sufficient means of entry and exit is available?				
8.7	Whether provision of ventilation to remove welding fumes, dust, exhaust gases are made?				
8.8	Whether provision of 24V (Hand lamps with cage as per OISD-STD-155) light for working inside space is made?				

8.9	Is it strictly ensured that a stand-by trained person is standing outside before a person enters a confined space and communication is being maintained all the time with workers working inside?				
8.10	Whether life belt with one end under control of stand-by person outside is kept while working in confined space?				
8.11	Whether Personnel protective Equipment are in good condition as specified in the permit?				
8.12	Whether absence of Hydrogen Sulfide, CO or other toxic gas is ensured before entering into a confined space? If yes, whether proper required PPE like BA, Gas Mask are used.				
8.13	Whether boxing up is being done only as per the approved procedures and by competent persons?				
8.14	Whether all the safety precautions listed in OISD-GDN-192 are taken while working in sewers, OWS etc.?				
8.15	Whether proper house keeping is being maintained inside the confined space?				
8.16	Whether training has been provided to workers working in the confined space and the workers only of sound health are being asked to work in the confined space?				
8.17	Others				
9.0	**SAFETY IN MATERIAL HANDLING**				
9.1	Whether all lifting tools, tackles, machines, chains, ropes etc. are of sound construction, made of sound material and maintained in good condition?				
9.2	Whether safe working load, date of testing visibly marked/painted on the equipment?				
9.3	Whether lifting tools, tackles are of adequate strength for the load to be handled?				
9.4	Whether all parts including the working gears fixed or movable of every lifting machine, chain, rope, tackles specify the				

	following condition: a) Thoroughly examined by competent person at least once a year or such interval as required by statutory authority. b) Document of such examination are maintained and produced to owner supervisor before use of particular equipment?				
9.5	Whether chain blocks and cables are inspected before each use to assure their sound condition?				
9.6	Whether hoist and lift if used are: a) Properly maintained and thoroughly examined by competent authority at least once in every year. b) A register to be maintained to record particulars of such examination in prescribed forms and shall be produced to the owner supervisor before use.				
9.7	Whether area below the movement of boom of crane is cleared to avoid injury from falling objects?				
9.8	Whether it is ensured that crew of truck leave the truck in crane handling area before starting loading / unloading, if not involved in rigging operation?				
9.9	Whether transporting material from one place to another is done by suitable means?				
9.10	Whether carrier with sufficient capacity without projecting parts is used for transporting materials?				
9.11	Whether riggers engaged are well trained and conversant with signaling procedures including night signalling if required?				
9.12	Whether permission of authorized person is obtained before working on or near an overhead crane?				
9.13	Whether trained riggers are available all the time along with crane?				

9.14	Whether barricading has been done to ensure no unauthorised person enters in the working area of the crane?				
9.15	Whether lifting plan has been prepared and approved before start of the work?				
9.16	Whether route of crane movement has been planned before the crane moves out of the garage?				
9.17	Whether it has been ensured that no electrical cable come within 3 metres or safe distance from the boom of the crane?				
9.18	Whether boom is being kept in the horizontal position or locked while idling?				
9.19	Whether material is being stacked / destacked in trucks with the help of wedges to ensure no slippage while loading / unloading takes place?				
9.20	Whether the forklift / crane is being operated only by trained person?				
9.21	Others				
10.0	**ELECTRICAL SAFETY**				
10.1	Has the Electrical Line Clearance procedure been followed involving electrical and other concerned Dept. and filling of formats?				
10.2	Have Danger Signs with Voltage rating/ Men at work signboards been displayed at both Sub Station as well as the work site?				
10.3	Has the contractor worker understood the electrical circuit on which he is going to work with probable electrical hazards and mitigation measures to be adopted?				
10.4	Whether contractor has engaged electrician (s) having valid electrical licence in line with provisions in Indian Electricity Rules?				

10.5	Have all checks prior to switching operation been carried out and authorisation of owner/ user section obtained subsequently?				
10.6	Have all earthing links on electrical conductors removed before charging the line/ apparatus?				
10.7	Have PPE as prescribed under Indian Electricity Rules been in place, kept healthy and used?				
10.8	Are earthing and bonding arrangement of non-current carrying metallic parts in line with provisions of Indian Electricity Rules – 1956 amended time to time as IS: 3043?				
10.9	Have electrical part of OISD-GDN-192 and Clause No. 9.0 for Temporary installations in OISD-173 been understood and followed wherever applicable?				
10.10	Are flexible wires having voltage of 240 volts above earth potential taken through PVC conduits?				
10.11	Whether portable hand lamps with a voltage rating of not more than 24 volts used with flameproof enclosures in confined spaces within columns, vessels etc?				
10.12	Have the Switches, MCBs, fuses etc. been inspected for proper ratings?				
10.13	Has Earth Leakage Circuit Breaker (ELCB) been used on the incoming side to protect against leakage of current? Is the device tested every time the work is started?				
10.14	Whether all portable appliances are provided with insulated Three pin Plugs and socket arrangement?				
10.15	Whether industrial type extension boards and plug sockets are used?				
10.16	Has the electrical equipment brought to site by contractor been inspected by owner's supervisor/ safety officer for damage/cuts/abrasion etc? Is record of				

	Insulation Resistance, wherever required , being kept?				
10.17	Have standard practices for termination of conductors/ cables been followed (e.g. use of proper lugs, crimping tool, cable glands etc)? Is cable armour in continuity from feeding point to load?				
10.18	Are the Contractor supervisor and workmen well acquainted with first aid for electrical shock?				
10.19	Are the wires/ cables identifiable along their route towards the load by using colour coding and/or markers?				
10.20	Others				
11.0	**ROAD WORK**				
11.1	Whether site is barricaded and provided with warning signs including night warning lamps/ self glowing markers at appropriate location for diversion of traffic?				
11.2	Whether mixing aggregates with bitumen is done with the help of batch mixing plants? If no, whether adequate precautions have been taken?				
11.3	Whether road rollers, bitumen sprayers, pavement finishers are driven by experienced drivers with valid driving licenses?				
11.4	Whether the worker handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen with aggregate are provided with PVC hand gloves rubber shoes with pegging upto knee joints?				
11.5	Others				
12.0	**FORM WORK, REINFORCEMENT**				
12.1	Whether form work, shuttering, shoring etc. are adequately designed and provided to erect the structure and to support the expected load?				

12.2	Whether staging (support) for shuttering is designed for loads like worker movement, impact load and other incidental loads during construction?				
12.3	Whether workers use PPEs at work site?				
12.4	Whether all safety procedures are adopted while cutting rod?				
12.5	Whether proper staging and bundling is provided for supplying rods at height?				
12.6	Whether sufficient cross bracings are provided for high staging works at vulnerable points?				
12.7	Others				
13.0	**CONCRETING**				
13.1	Whether the concreting area is barricaded?				
13.2	Whether vibrator hoses, pumping concrete accessories are in healthy condition and mechanically strong?				
13.3	Whether it is ensured that no pipe line in concrete pumping system is attached to any temporary strut such as scaffolds etc.?				
13.4	Whether it is checked that safety guards around moving parts are provided in concrete mixer/ machines?				
13.5	Whether earthing of electrical mixers, vibrator etc. are checked?				
13.6	Whether entry of unauthorised person in the concreting area is restricted?				
13.7	Whether adequate lighting arrangement is made in the concreting area if working during night?				
13.8	Whether PPEs like gum boots, gloves and dust masks etc. are being used?				
13.9	For overhead or underground work, whether form work and shuttering have been checked so that the same do not collapse during concreting?				

13.10	Others				
14.0	**DEMOLISHING (DEMOLISHING BY BLAST NOT CONSIDERED)**				
14.1	Has the stability of structure been examined by competent person and found OK?				
14.2	Are non-sparking tools being used, if required?				
14.3	Is intermittent clearing operation being done to keep the area reasonably tidy and clean?				
14.4	Whether effective barricading has been provided?				
14.5	Whether Electrical and other facilities like water, oil, gas pipelines have been isolated/protected?				
14.6	Whether the plan of demolition (including sequence of activities) has been prepared and approved prior to start of the work?				
14.7	Others				
15.0	**RADIOGRAPHY**				
15.1	Are safety precautions for handling of source as per guidelines of BARC being followed?				
15.2	Is the potency of the source being used within acceptable limits as per the BARC regulations?				
15.3	Is the area being cordoned with proper signs during radiography?				
15.4	Does proper place exist as per BARC regulations for storage of source / Personnel safety equipment?				
15.5	Does the radiographer has valid certificate of radiography from competent authority (BARC)?				
15.6	Is radiographer using Exposure Meter / Dosi Meter?				
15.7	Whether minimum occupancy of the				

	premises / workplace is being ensured while radiography is in progress?				
15.8	Is permit system being followed?				
15.9	Others				
16.0	**ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS**				
16.1	Are jobs being carried out with a valid work permit only as per OISD-STD-105 "Work Permit System".				
16.2	Is smoking prohibited in all places containing combustible or flammable materials and "No Smoking" notices prominently displayed.				
16.3	Are only approved type electrical installations and equipment, including portable lamps, being used?				
16.4	Are oily rags, waste, wooden materials and clothes or other substances liable to spontaneous ignition being removed?				
16.5	Are the combustible materials properly shielded in case same cannot be removed from the area?				
16.6	Has welding screens (like metal/asbestos/ water curtain) been put up to protect other equipment / facilities/ OWS/ drains in adjoining areas against flying sparks, as may be required?				
16.7	Is Gas-testing being done with the means of a calibrated Gas detection Meter prior to start of Hot work and being done subsequently at regular intervals as per the requirement?				
16.8	Are regular inspections being done of places where there are fire risks like in the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations?				
16.9	Are fire-extinguishing equipment being placed at strategic locations and are kept well maintained and inspected at suitable intervals by a competent person.				
16.10	Are access to fire-extinguishing equipment such as hydrants, portable				

	extinguishers and connections for hoses kept clear at all times?				
16.11	Are all supervisors and a sufficient number of workers trained in the use of fire-extinguishing equipment?				
16.12	Are audio means, to give warning in case of fire provided, audible in all parts of the site where persons are liable to work?				
16.13	Is there an effective evacuation plan in place so that all persons are evacuated speedily without panic?				
16.14	Others				
17.0	**EMERGENCY PROCEDURES**				
17.1	Is signaling / siren system effective?				
17.2	Is arrangement for rescuing affected person adequate?				
17.3	Are signs showing emergency exit route installed?				
17.4	Is emergency exit route clear of obstacles?				
17.5	Is communication system adequate?				
17.6	Whether emergency vehicle with driver has been provided to meet any emergency situation?				
17.7	Does any tie-up with hospitals or local doctors exist?				
17.8	Has the assembly point for workers in case of emergency been identified and earmarked?				
17.9	Has training been provided to a few workers for First Aid?				
17.10	Others				
18.0	**WELFARE FACILITIES**				
18.1	Is hygienic conditions prevailing at labour camps?				
18.2	Are First Aid facilities available?				

18.3	Does proper sanitation exist at site office and labour camps?				
18.4	Does any arrangement of medical facilities like tie ups with nearby hospital exist?				
18.5	Is proper drinking water facility available for workmen & staff?				
18.6	Are crèches provided for children (if applicable)?				
18.7	Is any proper place/canteen/restroom provided for eating food and taking rest?				
18.8	Is any place earmarked for storing / keeping clothing?				
18.9	Is Adequate washing facility available?				
18.10	Does proper ventilation at working place exist?				
18.11	Others				
19.0	**GENERAL**				
19.1	Are illumination levels at workplace and passages adequate?				
19.2	Is communication system adequate?				
19.3	Are display and caution boards provided at strategic locations?				
19.4	Are road barriers being used for blocking any roads/passage?				
19.5	Has the structure been adequately secured against storm/high winds during construction/ erection?				
19.6	Are the equipment properly earthed?				
19.7	Are vehicles being checked like brakes, oil, lights etc. on regular basis?				
19.8	Is compressed air being used only for its intended purpose and not for any other purpose?				
19.9	Are only proper clothes and not loose clothes being used while working around				

	machinery?				
19.10	Are nails or other sharp objects being removed or bent?				
19.11	Are machine guards over moving parts of machinery such as coupling, pulley, wheel etc. installed?				
19.12	Whether after maintenance of machinery the guards are securely fitted before putting into operation?				
19.13	Are working platforms / gangways provided with hand rails & toe guards?				
19.14	Are swing platforms provided with chains & secured adequately when not in use?				
19.15	Are the approaches to work sites being maintained & kept clear of obstacles?				
19.16	Whether engines of equipment entering into the operating area have exhaust and muffler system with approved spark arrestor?				
19.17	Whether vehicles/engine driven equipment, electrical equipment and tools used are certified?				
19.18	Whether contractors inform his workers about hazards and safe procedures?				
19.19	Whether sufficient care is taken so that spark do not go outside working enclosure & falls below?				
19.20	Whether contractor's qualified / trained supervisor is present?				
19.21	Whether all exhausts of engines are provided with approved type of flame arrestors and exhaust is not facing toward the place where the workers are working?				
19.22	Others				

Signature of the Auditor

CONSTRUCTION SAFETY AUDIT CHECK-LIST FOR REFINERIES & PETROCHEMICAL PLANTS

Oil Industry Safety Directorate

Government of India

Ministry of Petroleum & Natural Gas

8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)

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Prepared By	Checked by	Approved by	Issue date	Rev.
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Section 1: Introduction

The safety Checklist is a tool to help identify the tasks, hazards, and controls, based upon contractor's scope of work, and to properly align them with Oil Industry Safety Directorate's applicable standard, guidelines, and recommended practises.

The safety checklist is intended to be filled out by internal auditors of owner and later verified by OISD auditor. Filling out the Safety Checklist helps determine if owner, main contractor, and its subcontractor(s) is considering expected hazards and controls based upon the scope of work.

This checklist will be applicable to auditing the construction areas of petroleum refineries, petrochemical plants, and oil /gas processing plants.

1.1 Audit Facility details

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
1.1.1.	Name of the Project:	
1.1.2.	Plant Location:	
1.1.3.	Name of PMC/EPCM/LSTK Contractor (Unit wise):	
1.1.4.	Licensed/Design Capacity: unitwise (Annual & Hourly):	
1.1.5.	Type of Feed/ feed mix	
1.1.6.	Provide brief description of the unit/facility	
1.1.7.	Land area- L x B (In meters):	
1.1.8.	Max. No. of Persons deployed on any particular day	
1.1.9.	Present overall progress of work completion in percentage	

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1.2 Contractors Competent & Qualified Person(s):

Provide the name(s) of those persons onsite who by possession of a recognized degree, certification, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems relating to the subject matter, the work, or the project. The contractor shall confirm that each qualified and competent person listed has been trained in the following areas as applicable:

1.2.1	Overall site In-charge of contractor for the facility	
1.2.2	Site supervisor of contractor	
1.2.3	Crane Competent Person of Contractor:	
1.2.4	Confined Space Entry Supervisor of Contractor:	
1.2.5	Electrical Qualified Person(s) of Contractor:	
1.2.6	Excavation & Trenching Competent Person of Contractor:	
1.2.7	Scaffold Competent Person of Contractor:	

Section 2: Leadership and Commitment by Owners for contractor safety

As we embark on this critical evaluation of contractor safety practices, we begin by focusing on the pivotal role that owners play in fostering a safe work environment. In this section, we examine the leadership and commitment demonstrated by owners towards the safety of all personnel involved in their projects. The extent to which owners embrace safety as a core value and actively support contractors in their pursuit of a hazard-free workplace is fundamental to the success of any safety program. This section will audit into the actions, policies, and culture established by owners to confirm that safety is paramount in every aspect of their operations.

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Sl. No.	Description	Observations by the team
2.1	In the HSE policy, what are the components relevant to construction sites?	
2.2	Are HSE related issues reviewed by company management, during project reviews? Provide MoM of last project review meeting.	
2.3	What is the system for safety aud t of construction sites in line with OISD-GDN-192 and checklist of OISD-GDN-207? Who reviews the construction safety audit report? When was the last audit conducted?	
2.4	Is there a company nominated HSE executive for each construction site? To whom does the HSE executive report? Are the role, responsibility, accountability and authority of the HSE executive defined and communicated?	
2.5	What is the qualification & experience of contractor HSE officer? How many contractor HSE officers are there in the site and what is basis for this number?	
2.6	Are HSE personnel deployed by contractor in ratio as specified in contract condition?	
2.7	What is the system for review & approval of CVs of HSE personnel of PMC & executing agencies before their deployment at site?	
2.8	Are the HSE officer aware of related OISD standards like OISD-STD-105, OISD-STD-155, OISD-GDN-206, OISD-GDN-192, OISD-GDN-207 etc.	
2.9	What is the system for giving induction safety training to all workmen? What is the periodicity of training imparted to workmen? Who reviews and approves the contents & matter of induction safety training?	
2.10	What is the system for rewarding the workmen performing excellently in the field of HSE?	
2.11	What system is there to confirm competency of contract workmen (specialized job like welder, electrical technician, instrument technician, scaffolders, crane operator etc)?	

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2.12	Who imparts toolbox talk to contract workmen, before start of job? Is record available for same? Are applicable recommendations of OISD safety alerts/case studies being discussed during TBT?	
2.13	What is the system and frequency for regular health check-up of working personnel?	
2.14	Is Doctor or Paramedic available at site?	
2.15	Does "Basic Life Support Ambulance" is available at site?	
2.16	Does the system exist for tie-up with nearby hospital for attending to emergency cases on round the clock basis?	
2.17	Does the system exist to Confirm that children & unhealthy adults are not engaged for the job.	
2.18	Has Asset Integrity Management (AIM) been considered during design stage i.e. inherent safety, built in reliability.	
2.19	Is there any procedure to Confirm safety aspects such as safe access, approach, escape etc., operability and maintenance aspects such as ergonomics etc. w.r.t. equipment?	
2.20	What is the procedure to Confirm Calibration/ standardization of equipment and instrumentation used for construction/ fabrication/ erection/ inspection etc?	
2.21	What system is followed to Confirm proper inspection of materials at various stage of procurement at vendor shop? What is the role of owner in this inspection process?	
2.22	Is the installation procedure available for all type of equipment?	
2.23	What system exist to confirm use of appropriate gaskets, packing, bolts, valves, lubricants and welding rods etc? Is it documented?	
2.24	(a) What is the frequency of safety review meeting by contractor/ PMC/ Owner? (b) Produce the agenda, MOM and compliance status of these meetings for verification.	

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Section 3: Pre-Project Safety Planning and Statutory Approval

Pre-project safety planning and obtaining statutory approvals are critical aspects of ensuring safety and compliance, especially in construction and hazardous operations. Here's a combined checklist that addresses both pre-project safety planning and the necessary statutory approvals:

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
3.1	Are the conditions stipulated in the PESO (CCOE) approval for construction of facilities complied? Provide Ref no and Date of approval of PESO approval along with plot plan. equipment layout and Hazardous area classification.	
3.2	OISD standard	
3.3	Is storage license for hydrocarbon and gas cylinder available?	
3.4	Are the conditions stipulated in the MOEF Clearance (EC) is compiled?	
3.5	Is the Change of Land Use (CLU) approval being applicable and available?	
3.6	Are the conditions stipulated in the consent to establish from State Pollution control Board complied? Issue date? List pending issues if any.	
3.7	Are the Consent to Establish under Factories Act taken.	
3.8	Are Registration of establishment from Central / State Govt. Labour Commissioner under Contract Labour (Regulation and Abolition) Act 1970 available?	
3.9	Whether water supply/ Electricity supply agreement is available?	
3.10	Whether construction approval for IBR equipment and piping is available from IBR authority?	
3.11	Whether PNGRB consent/ approval for pipe line is applicable and taken?	
3.12	Whether fire NOC is available?	

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3.13	Confirm the existence of a comprehensive project-specific safety plan. Confirm that the safety plan addresses potential hazards and risks associated with the project.	
3.14	Whether Risk Analysis (QRA/ RRA) has been carried out and recommendations implemented?	
3.15	Provide the list of risk reduction measures implemented.	
3.16	Whether Environment impact assessment has been carried out and recommendations implemented?	
3.17	Whether consent under hazardous waste/ construction waste or plastic waste management taken?	
3.18	Whether HAZOP study has been carried out and its recommendations addresses and updated in as-built P&ID? Specify total recommendations.	
3.19	Any other approval like ground water, forest clearance CRZ etc.	

Section 4: Site Assessment and Preparation

Meticulous evaluation and readiness Confirm the safety and effectiveness of contractor safety in the oil and gas industry. This section focuses on key considerations for identifying hazards, implementing safeguards, and setting the foundation for a secure project site.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
4.1	Confirm that the site is properly cleared of any debris, vegetation, or potential obstructions.	
4.2	Confirm the establishment of safe access routes and pathways for personnel and equipment.	
4.3	Confirm that safety barriers are installed to prevent unauthorized access to hazardous areas, construction area evacuated area.	

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4.4	Check for the presence of safety barriers, warning signage, and access control. Confirm that warning signs are clearly visible and appropriately placed to alert personnel to potential dangers.	
4.5	Confirm that fully equippec first-aid stations are strategically located throughout the site. Confirm that personnel are aware of the location of first-aid facilities and how to access them in case of emergencies.	
4.6	Confirm that essential safety equipment, such as fire extinguishers and safety showers are readily accessible and well-maintained. Confirm that personnel are trained in the proper use of safety equipment.	
4.7	Confirm that access points, walkways, stairs, and platforms are in good condition and free from tripping hazards.	
4.8	Confirm that adequate lighting is available for safe movement, especially in areas with 24/7 operations.	

Section 5: Incident Reporting and Investigation

This Section focuses on ensuring that inc dents are promptly reported, thoroughly investigated, and corrective actions are implemented:

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
5.1	Existence of a clear and documented incident reporting process at the construction site. Confirm that all personnel including contractors, are aware of the reporting process.	
5.2	Confirm that incidents are reported promptly, including unsafe act, unsafe condition, near misses and minor injuries.	
5.3	Confirm that incident reports contain essential information, including date, time, location, individuals involved, and a detailed description of the incident.	
5.4	Confirm that all incidents, regardless of severity, are reported and documented, and that there are no instances of unreported incidents.	
5.5	Whether consumption of first a d items are being evaluated to analysed the type of incident.	

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Section 6: Safety Equipment and PPE

This comprehensive evaluation Confirms that personnel, including contractors, are adequately equipped to mitigate refinery-specific hazards and adhere to safety protocols, ultimately fostering a secure working environment. The checklist encompasses various aspects, including PPE selection, proper usage, maintenance, and compliance with industry safety standards.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
6.1	What is the PPE policy and the system to confirm the use of mandatory PPEs at all the construction sites? What are the mandatory PPEs used?	
6.2	What is the system for selecting and ensuring the quality of PPEs & safety gadgets? Please give details of system.	
6.3	Confirm that personnel, including contractors and sub-contractors are trained on the proper use, care, and maintenance of PPE.	
6.4	Evaluate the availability and condition of essential PPE items, including: - • Hard he met • Safety glasses or face shields • Hearing protection (e.g., earplugs or earmuffs) • Gloves (variety of types for different tasks • Safety footwear with slip-resistant soles • High-visibility vests or clothing (if required)	
6.5	Confirm the availability and functionality of emergency safety equipment, including: - • Eyewash stations and safety showers • Fire extinguishers • Emergency escape respirators (if needed) • First-aid kits and medical supplies	

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Section 7: Emergency Response and Evacuation

Audit checklist is a vital tool to assess the contractor's preparedness and capability to respond swiftly and effectively to various potential emergencies, including fires, chemical spills, and other critical incidents. This comprehensive evaluation Confirms that emergency plans, equipment, personnel training, and evacuation procedures are meticulously reviewed, promoting the safety of all individuals.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
7.1	Existence of a comprehensive emergency response plan specific to project site.	
7.2	Confirm that the plan is well-documented, up-to-date, and accessible to all personnel, including sub-contractors	
7.3	Confirm that the emergency response plan addresses a wide range of potential construction incidents, including fire, Slip, Trip, and Fall, Electrical Accident, Trench and Excavation Hazard, Caught-in or Caught-between Accidents, Confined space Incidents, explosions, releases of hazardous materials, natural calamity and handling heavy equipment.	
7.4	Confirm the clarity and specificity of roles and responsibilities assigned to personnel, including emergency response teams and sub-contractors.	
7.5	Confirm that emergency contact information is prominently displayed throughout the project site, including: Phone numbers for local emergency services (fire, medical, police). Contacts for management and designated emergency responders.	
7.6	Confirm the availability and functionality of emergency response equipment, including: • Fire extinguishers, hoses, and suppression systems • Gas detectors and alarms. • Spill control kits and containment materials.	
7.7	Confirm that all personnel, including contractors, receive emergency response training: • Confirm that training includes procedures for evacuations, fire response, spill containment, and first aid. • Confirm that personnel are trained in the proper use of emergency equipment.	

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7.7.1	Review training records to confirm compliance with training requirements.	
7.8	Is arrangement for rescuing affected person adequate?	
7.9	Are signs showing emergency exit route installed?	
7.10	Is emergency exit route clear of obstacles?	
7.11	Is communication system adequate?	
7.12	Whether emergency vehicle with driver has been provided to meet any emergency situation?	
7.13	Does any tie-up with hospitals or local doctors exist?	
7.14	Has the assembly point for workers in case of emergency been identified and earmarked?	
7.15	Has training been provided to a few workers for First Aid?	
7.16	Emergency procedure and telephone numbers are known to all and same are prominently displayed at site? (Sample compliance check)	
7.17	Whether emergency mock drills are being regularly done?	
7.18	Specify frequency, coverage and effectiveness of mock drill	

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Section 8: Safety while working at Height/ Scaffolding /ladders.

Safety while working at height, particularly on scaffolding and ladders, is paramount in preventing falls and injuries. It involves thorough risk assessments, proper training, and the use of fall protection equipment to Confirm workers' safety. Adherence to safety protocols and equipment maintenance is vital to minimize risks in elevated work environments.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
8.1	Confirm for issuance of "Height Work Permit" before start of for any work at height (> 1.8 Mtrs).	
8.2	Confirm that a comprehensive Job safety assessment has been conducted for all tasks involving working at height at project site taking into account specific work areas, types of tasks, and potential hazards associated with working at height. Confirm that control measures are in place to mitigate identified hazards.	
	Scaffolding	
8.3	Confirm that scaffolding is erected, inspected, and maintained by competent personnel.	
8.4	Confirm that scaffold structures are designed to support the intended loads and are stable and secure.	
8.5	Confirm that guardrails, toe boards, and access points are installed correctly.	
8.6	Check that scaffolding platforms are fully planked and free from defects.	
8.7	Confirm that only authorized personnel are allowed to erect, modify, or dismantle scaffolding.	
	Fall Protection	
8.8	Confirm that fall protection measures are in place when working at height:	
8.9	Confirm the use of personal fall protection equipment (harnesses, lanyards, lifelines, fall arrestor) where necessary.	

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8.10	Confirm the presence of anchorage points or anchor systems for connecting fall protection equipment.	
8.11	Confirm that workers are trained in the proper use of fall protection equipment.	
	Training and Competency	
8.12	Confirm the training and competency of contractors and sub-contractors involved in working at height tasks:	
8.13	Confirm that personnel are trained in identifying fall hazards and using fall protection equipment.	
8.14	Confirm that workers are competent in scaffold erection, ladder use, and fall prevention measures.	
8.15	Whether vertigo test is mandatory for the workers working at height.	
8.16	Review training records to Confirm compliance with training requirements.	
	Inspection	
8.17	Confirm the system exist for certification of scaffolds (and green tagging), by competent person. What is the frequency of inspection/ recertification	
8.18	Does the system exist for periodic visit to all height locations by a competent person, and identification of dangerous openings, for necessary corrective actions. Are the records available. Furnish list of deviations observed.	
	Supervision and Monitoring	
8.19	Confirm that competent supervisors oversee activities	
8.20	Confirm that regular inspections and audits are conducted to monitor compliance with safety measures.	
8.21	Confirm that hazard communication includes proper signage and barricades to warn of working at height activities.	

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Section 9: Safety while excavation and trenching

Excavation and trenching activities are paramount for various maintenance, construction, and projects. These processes involve digging into the earth's surface to create cavities or trenches for purposes such as installing pipelines, repairing underground structures, or conducting maintenance on critical infrastructure. Safety is of utmost concern in these operations due to the risk of trench collapses, utility strikes, and exposure to hazardous gases. Stringent safety protocols, including comprehensive excavation plans, proper protective systems, and continuous training, are imperative to mitigate risks and Confirm the well-being of workers, the integrity of the refinery's infrastructure, and the prevention of environmental incidents.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
9.1	Confirm that a comprehensive excavation and trenching plan is in place and approved by competent authority.	
9.2	Verify that a thorough site inspection of excavation and trenching activities as per clause 6.1.4 of OISD-GDN-192 is followed.	
	Protective Systems:	
9.3	Inspect the use of appropriate protective systems such as trench boxes, shoring, or sloping based on soil conditions and depth	
9.4	Is it Confirmed that excavated earth is not dumped by the side of excavated pit.	
9.5	Are the escape stairs/ ladders available in every excavated pit (of more than 1.2 mts depth)	
9.6	Whether barricading of 1 Mtr. Height with glowing caution boards provided for excavations beyond 1.5 mtr. Depth.	
9.7	Whether one person is available outside at all times to communicate any hazards noticed with workers working in deep trenched or excavations.	

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Section 10: Safety while reinforcement/ shuttering & concreting

A comprehensive safety checklist for these activities includes Confirming the structural integrity of formwork and shuttering, ensuring proper bracing and support systems are in place to prevent collapses, and confirming the correct placement of reinforcement materials. Additionally, rigorous checks for the availability and use of personal protective equipment, fall protection measures, and adequate ventilation are essential to safeguard workers from potential hazards associated with concrete work in this high-risk environment.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
	Pre-Work Planning:	
10.1	Confirm the presence of detailed reinforcement and concreting plans and designs. Confirm that plans are reviewed and approved by qualified structural engineers and complied with national building codes.	
	Structural Stability	
10.2	Inspect formwork, shuttering, and bracing systems to Confirm they are structurally sound and properly installed.	
10.3	Confirm that adequate supports are in place to prevent collapses during concreting.	
	Safety:	
10.4	The safety of workers on erection and dismantling of steel and prefab structure should be Confirmed by provision mentioned in OISD-GDN-192 clause no 6.3.2	
10.5	All lifting appliances should be suitable for the operations and approved and tested as per statutory requirement.	
10.6	Inspect the proper storage and handling of reinforcement bars, concrete, and related materials to prevent accidents and material degradation.	

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Section 11: safety while working in confined space area.

Safety is paramount when working in confined spaces. These spaces can pose numerous hazards, including toxic atmospheres, limited entry and exit points, and the potential for engulfment or entrapment. To Confirm worker safety, strict adherence to confined space entry procedures, including proper ventilation, continuous atmospheric monitoring, and the use of appropriate personal protective equipment, is essential. Comprehensive training, frequent drills, and clear communication among the team are vital elements in mitigating risks and responding effectively to emergencies within confined spaces, ultimately safeguarding the lives of refinery personnel.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
	General	
11.1	Whether entry inside the vessel to carry out any job shall be done after issuance of valid permit only in line with the requirement of OISD-STD-105?	
11.2	Shut down, pos tively isolate, depressurise and purge the confined area as per laid down procedures.	
	Entry Procedures	
11.3	Confirm proper and accessible means of exit before entry inside a confined space.	
11.4	Whether systems exist for registering the number of workmen entering & leaving the confined space.	
11.5	What type of ladder/ safety harness are in use for working in confined space?	
	Atmospheric Testing	
11.6	Whether system exists for gas test of confined spaces in order to Confirm adequate oxygen level & absence of Hydrocarbon, H2S, CO or other toxic gases before entry of workmen into the confined spaces.	
11.7	Confirm that gas detectors are calibrated and functioning correctly.	
	Communication	

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11.8	When the work is going on in the confined space, there should always be two men standby at the nearby manway / manhole equipped with communication arrangement to contact seniors and to evacuate the worker inside confined space in case of emergency.	
	Lighting and Equipment	
11.9	Use 24V flameproof lamp fittings only for illumination.	
11.10	Use tools with air motors or electric tools with maximum voltage of 24V.	
11.11	The cutting torches should also be kept outside the vessel immediately after the cutting and the gas cylinders used for cutting/welding shall be kept outside.	
	Emergency Response	
11.12	Confirm the availability and condition of rescue equipment, such as hoists, tripods, and self-contained breathing apparatus (SCBA).Also Confirm that a well-documented rescue plan s in place, and rescue personnel are trained and ready to respond.	

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Section 12: Safety during material handling and lifting equipment safety.

Ensuring safety while handling and lifting equipment is of paramount importance in the industrial setting of an oil refinery. It involves meticulous equipment inspection, rigorous operator training, and strict adherence to safety procedures to prevent accidents, protect personnel, and safeguard critical infrastructure.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
12.1	Does the system exist for load testing & certification of all lifting tools and tackles like wire ropes slings, chain blocks etc. at regular intervals as per the provisions of factories act. Is register maintained to record particulars of such tests. Please mention the periodicity of such tests. Furnish list of deviations/ failures of such tests.	
12.2	Does the systems exist for load test & certification of equipment (Cranes, Hoists, Hydra etc.) by competent persons before deployment at site and thereafter at regular intervals.	
12.3	Whether all parts including the working gears fixed or movable of every lifting machine, chain, rope, tackles specify the following condition: a) Thoroughly examined by competent person at least once a year or such interval as required by statutory authority. b) Document of such examination are maintained and produced to owner supervisor before use of particular equipment? c) Whether safe working load, date of testing & next test due date visibly marked/ painted on all equipment.	
12.4	Whether chain blocks and cables are inspected before each use to assure their sound condition?	
12.5	Whether area below the movement of boom of crane is cleared to avoid injury from falling objects?	
12.6	In crane handling area whether it is confirmed that crew of truck, leave the truck before starting loading / unloading?	
12.7	Whether transporting material from one place to another is done by suitable means?	
12.8	Whether carrier with sufficient capacity without projecting parts is used for transporting materials?	

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12.9	Whether riggers engaged are well trained and conversant with signalling procedures including night signalling if required?	
12.10	Whether permission of authorized person is obtained before working on or near an overhead crane?	
12.11	Whether trained riggers are available all the time along with crane?	
12.12	Whether barricading has been done to confirm no unauthorised person enters in the working area of the crane?	
12.13	Whether lifting (rigging) plan has been prepared and approved before start of the work?	
12.14	Whether route of crane movement has been planned before the crane moves out of the garage?	
12.15	Whether it has been confirmed that no electrical cable comes within 3 meters or safe distance from the boom of the crane?	
12.16	Whether boom is be ng kept in the horizontal position or locked while idling?	
12.17	Whether material is being stacked / de-stacked in trucks with the help of wedges to Confirm no slippage whi e loading / unloading takes place?	
12.18	Whether the for<lift / crane is being operated only by trained / authorized person?	
12.19	Whether permissior of authorized person is obtained before working on or near an overhead crane?	
12.20	Whether trainec riggers are available all the time along with crane?	
12.21	Whether barricading has been done to Confirm no unauthorised person enters in the working area of the crane?	
12.22	Whether lifting (rigging) plan has been prepared and approved before start of the work?	
12.23	What system is available to Confirm that all Heavy equipment operators are experienced for operating the relevant equipment.	
12.24	Does the system exist for general check-up of cranes, hydra etc. like tyre pressure, reverse horn etc. on daily basis.	
12.25	Does the system exist for approval of erection scheme of heavy lifts & critical lifts. Who is the approving authority?	
12.26	Does the system exist for keeping record of equipment, tools & tackles and manpower involved in heavy lifts & critical lifts.	

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12.27	Does the system exist to restrict the boom loaded hydras for movement/ transshipment of loads?	
12.28	Does the system exist to Confirm adequate hard stand before deployment of crane?	

Section 13: Safety while gas cutting, grinding & welding.

Safety during gas cutting, grinding, and welding is paramount in industrial operations, particularly in environments like an oil refinery. These processes involve high temperatures, flammable materials, and potentially hazardous fumes, making strict adherence to safety protocols, proper training, and the use of appropriate personal protective equipment critical to prevent accidents, fires, and exposure to harmful substances.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
13.1	Whether LPG / Oxygen / Acetylene/ Gas cylinders are kept outside only while working in confined space	
13.2	Are Acetylene/ O2 / LPG cylinders kept in upright position with required valve cap and secured at designated places under shed – wet fire retardant clothes gunny bags wrapped around it if the same is under sun at designated place?	
13.3	Check cylinder and cylinder valves for approved quality & any kind of damage?	
13.4	Whether protective valves caps are kept on cylinders while not in use?	
13.5	Whether proper means and method for transportation of cylinders to avoid dropping and rolling are being adopted / followed?	
13.6	Whether gas cylinders, regulators are kept away from combustible materials and / free from oil and grease?	
13.7	Check cylinder and cylinder valves for approved quality & any kind of damage?	
13.8	Are the electric connection cables & welding cables, cutting hoses laid in non-haphazard manner.	
13.9	Whether all hoses are of approved quality and found to be free of any damage or crack?	
13.10	Whether oxygen and acetylene cylinders are stored separately at a distance of at least 5 feet from each other and kept under shade as per Gas Cylinder rules 2016?	
13.11	Whether gas cylinders are kept at safe location particularly in case job is being done at different elevations while in use?	

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13.12	Whether color coding is being used for easy identification of different type of cylinders and hoses?	
13.13	Whether cylinder keys are available near the cylinder?	
13.14	Whether gas torches with flash back arrestors of approved make are only being used?	
13.15	Whether pressure gauges are in working condition and checked from time to time?	
13.16	Whether welding shields are used while welding?	
13.17	Whether proper earthing for welding machines are provided?	
13.18	Whether power is taken from approved sources (welding receptacles)?	
13.19	Whether welding receptacles are properly grounded?	
13.20	Whether welding cables are maintained in good condition and without any joints/ cuts?	
13.21	Whether to avoid short circuit, welding machines are protected against rain?	
13.22	Whether earth connectors are securely connected to the job and not to the adjoining pipeline or structure?	

Section 14: Safety in electrical jobs.

Safety during gas cutting, grinding, and welding is paramount in industrial operations, particularly in environments like an oil refinery. These processes involve high temperatures, flammable materials, and potentially hazardous fumes, making strict adherence to safety protocols, proper training, and the use of appropriate personal protective equipment critical to prevent accidents, fires, and exposure to harmful substances.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
14.1	Whether the provisions for temporary installations as per clause 09 of OISD-STD-173, fully complied.	
14.2	Does the contractor engage electrician(s) having valid electrical license in line with provisions of Central Electricity Authority (CEA).	
14.3	Has the Electrical Line C earance procedure been followed involving electrical and other concerned Dept. and filling of formats?	
14.4	Have Danger Signs with Voltage rating/ Men at work signboards been displayed at both Sub Station as well as the work site?	

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14.5	Does the system exist for inspection & approval of electrical equipment (DG sets, Panels etc.) by the competent person/ authority before being put to use.	
14.6	Whether the cables from switchgear panels to portable equipment/ lighting transformers/ field distribution board are running in orderly manner with no insulation damage/ no joints.	
14.7	Are the cables/ wires identifiable along their route towards the load by using colour coding and or markers.	
14.8	Is the standard practice for termination of cables (i.e. proper lugs, crimping, cable glands etc.) being followed. Is cable armour in continuity from feeding point to load point.	
14.9	Are the ELCB used on the incoming side to protect against the current leakage. Is the device tested every time before start of work.	
14.10	Are all the portable appliances provided with insulated three pin plug & socket arrangement.	
14.11	Whether only industrial type extension boards & plug sockets used at all sites.	
14.12	Whether electrical PPEs (hand gloves, insulating mats, fuse pullers etc.) are available and maintained in good condition.	
14.13	Whether CO2 fire extinguishers to control electrical fires are available and periodically tested?	
14.14	Visual inspection of electrical equipment for damaged cables, loose connections, improper earthing and exposed live parts.	
14.15	Whether all portable lights and tools are flame proof or intrinsically safe when working in a confined space where there is a potential flammable or explosive atmosphere.	

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Section 15: Safety in abrasive blasting and painting jobs.

Ensuring safety during abrasive blasting and painting jobs in an oil refinery is essential to protect workers, prevent environmental damage, and maintain the integrity of equipment and structures. These tasks involve various hazards, including exposure to hazardous materials, respiratory risks, confined space work, and the potential for falls. This contractor safety audit checklist is designed to help refinery operators and contractors systematically assess and enhance safety measures during abrasive blasting and painting activities, promoting a secure work environment and regulatory compliance.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
15.1	**General**	
15.1.1	Confirm that abrasive blasting is used only after getting approval from competent authority / work permit?	
15.1.2	Confirm that air compressor used for abrasive blasting are positioned away from workplace.	
15.2	**Respiratory Protection**	
15.2.1	Confirm that workers are provided with the correct type of respirators for the tasks, and they are fit-tested and trained in their use.	
15.2.2	Check that respirators are maintained, cleaned, and stored properly.	
15.3	**Ventilation and Dust Control**	
15.3.1	Inspect the availability and effectiveness of local exhaust ventilation systems to control dust and fumes.	
15.3.2	Confirm that dust collection systems are properly maintained and functioning.	
15.4	**Equipment Inspection**	
15.4.1	Check that abrasive blasting equipment, including blast pots, hoses, nozzles, and paint spraying equipment, is in good working condition.	
15.4.2	Confirm regular equipment inspections, maintenance, and safety checks are documented.	
15.5	**Paints and Coatings**	
15.5.1	Confirm that workers are trained in the safe handling and disposal of paints, coatings, and solvents.	

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15.5.2	Confirm that hazardous materials are stored and labeled properly.	

Section 16: Safety in Radiography.

Safety in radiography within an oil refinery is crucial to protect personnel from radiation hazards and Confirm compliance with regulatory requirements. This specialized safety audit checklist focuses on Confirming the qualifications of radiography technicians, inspecting radiation equipment, ensuring proper shielding, monitoring individual exposure levels, and confirming adherence to safety protocols. Additionally, it assesses emergency response plans and the availability of radiation detection equipment. By conducting regular safety audits using this checklist, oil refineries can maintain a secure environment during radiography activities, mitigating the risk of radiation exposure and ensuring regulatory compliance.

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
16.1	**General**	
16.1.1	Are safety precautions for handling of source as per guidelines of AERB being followed?	
16.1.2	Is the potency of the source being used within acceptable limits as per the AERB regulations?	
16.1.3	Whether Radiation Safety Officer is available at site?	
16.2	**Qualified Personnel**	
16.2.1	Does the radiographer have valid certificate of radiography from competent authority (AERB)?	
16.3	**Equipment Inspection**	
16.3.1	Is the area being cordoned with proper signs during radiography as per guidelines of AERB?	
16.3.2	Confirm that radiographic equipment, including X-ray machines or gamma-ray sources, is in good working condition and has up-to-date inspection and calibration records.	
16.4	**Radiation Safety and Exposure Control**	
16.4.1	Is radiographer using Exposure Meter / Dosi Meter?	
16.4.2	Whether minimum occupancy of the premises / workplace is being monitored?	

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Section17-21: Safety check list in various jobs as tabulated:

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
17.0	**SAFETY WHILE WORKING NEAR OR ABOVE THE WATER BODIES**	
17.1	Are the provisions as per clause 6.16 of OISD-GDN-192, being complied with.	
17.2	Are the sufficient provisions like safety nets, life buoys, life jackets, boats etc. available?	
17.3	Are rescue & emergency procedure in place for any eventuality?	
18.0	**NOISE POLLUTION RELATED SAFETY**	
18.1	Are there construction sites where continuous noise level exceeds 85 Decibels	
18.2	Is the noise level monitored? Explain the mitigation measures for high noise level equipment/ areas.	
18.3	Are the high noise areas, (i.e., the areas where verbal communication is difficult), been identified.	
18.4	Are approved hearing protection devices used by workers/ employees working in high noise areas (>85Db).	
18.5	Are the employees exposed to continuous noise level above 85 Db, tested periodically for audiometric test.	
19.0	**TRANSPORTATION, LOADING AND UNLOADING**	
19.1	Is any written down procedure available for material movement inside the premises? How to Confirm implementation of procedure?	
19.2	Is any written down procedure available for material loading unloading?	
20.0	**STORAGE AND PRESERVATION**	

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20.1	Whether material like pipes, tubes, fittings etc. are stored with proper manner (stacking, tagging, capping)?	
21.0	**Safety in Road work**	
21.1	Whether site is barricaded and provided with warning signs including night warning lamps/ self glowing markers at appropriate location for diversion of traffic?	
21.2	Whether mixing aggregates with bitumen is done with the help of batch mixing plants? If no, whether adequate precautions have been taken?	
21.3	Whether road rollers, bitumen sprayers, pavement finishers are driven by experienced drivers with valid driving licenses?	
21.4	Whether the worker handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen with aggregate are provided with PVC hood, hand gloves rubber shoes (gum boot) with pegging upto knee joints?	

Section22: Documentation and Quality assurance plan

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
22.1	Whether procedure is available for handover of as built/ final drawing, documents, datasheets, 3D model, Isometrics etc. to owner for future reference.	
22.2	Whether guidelines for quality control and assurance procedures and specifications for asset are available and implemented to Confirm that material, construction, and procedure (fabrication and inspection) during the fabrication stage are in accordance with the design specifications?	
22.3	What is the procedure of positive material identification (PMI) to identify metallurgy mismatch? What are the stages of PMI?	

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Section23: Welfare facility

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
23.1	Are the welfare related facilities as per factories act provided, not limited to following: -Canteen (Neat & Hygienic) -Drinking water facilities - Shelters for rest room - Toilet facilities(ladies/gents) -First Aid Boxes	
23.2	Does the system exist for review of basic amenities on the labour camps viz.: -Drinking -Washing facilities -Adequate carpet area for family members. -Protection from mosquitoes menace. -Clean to lets	
23.3	Are the first aid & rescue facilities available at each site like: -First aid boxes -Qualified first aider -Ambulance (s) -Visiting doctor	

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Section24: General

SR. NO.	DESCRIPTION	OBSERVATIONS BY AUDIT TEAM
24.1	Does the system exist to encourage reporting of near miss, unsafe act & unsafe condition.	
24.2	Does the system exist for encouraging the house keeping at site?	
24.3	Whether any system is available for construction waste management?	
24.4	Are there adequate safety promotion displays at the site (i.e. posters, Banners, Signages, Slogans etc.)?	
24.5	Whether waste bins are provided at each site for collection & regular disposal of wastes.	
24.6	Is communication system adequate?	
24.7	Are road barriers being used for blocking any roads/passage?	
24.8	Has the structure been adequately secured against storm/high winds during construction/ erection?	
24.9	Are only proper clothes and not loose clothes being used while working around machinery?	
24.10	Is the speed limit for vehicles inside the plant duly notified & followed. Please mention speed limit.	
24.11	Does the system exist for checking of vehicles before their deployment at site and regular checking thereafter.	
24.12	Does the system exist for penalty in case of violation of safety norms.	
24.13	Whether all moving parts of equipment provided with safety guards	
24.14	Are the floor openings, service pits etc. always covered or protected by guard rails or equivalent system.	
24.15	Whether adequate covered area is provided at each site to Confirm smooth & safe working during unfavourable weather conditions. Please mention the ratio of total area Vs covered area.	

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24.16	Whether separate area is earmarked for warehousing the combustible materials (i.e., diesel, lube oils etc.), with adequate fire extinguishing equipment. Are the statutory provisions complied?	
24.17	Whether Boundary wall / Barrication constructed surrounding the project area?	
24.18	Is access system available for contract workmen and employees?	
24.19	Whether motorable access road is available for all the sites?	
24.20	Whether fire and rescue tender is available?	
24.21	What type of security system available i.e., CCTV, security guards, Drone vigilance?	

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WRITE A BRIEF ABOUT HSE PRACTICES OF YOUR SITE

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Bharat Petroleum

energising lives

BPCL CORPORATE SAFETY MANAGEMENT SYSTEM

Technical Standard on Project Safety Management

(BPCL /CSMS/TS/05)



Approved By	**ED,Corporate -HSSE**
Issued By	**GM, Corporate -HSSE**
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1.0 Purpose

BPCL has developed Corporate Safety Management System (CSMS) which defines specific requirements for managing OHS risks across its operations in accordance to its HSE policy and stakeholders expectations. The **Element 5 of Corporate Safety Management System : Planning, Standards and Procedures** requires that BUs establish project safety management plans and procedures to ensure safety during construction and commissioning of new installations or modernization/ expansion projects.

This Technical Standard outlines project safety management requirements,which should be integrated in all new (i.e. green field projects) as well as modernization or expansion projects (i.e. projects within or adjacent to existing locations/plants).

2.0 Applicability

This Techniacl Standard applies to Project Functions of respective Business Units and their project locations. **The scope of Tehnical Standard covers both i.e. new projects at greenfield locations and modernization/expansion projects within or adjacent to existing BPCL plant/location .** The project contracts includes here combination of all activities such as Construction, Erection, Modifications, Expansions, Maintenance, Demolishing, etc to be done within specific budget and time frame. These are typically managed by project function and can be a very large projects at times. The TS shall apply to all contractors/sub-contractors hat provide services solely to the Project.

The plan is to be implemented by the Contractors/ project management consultant, if applicable and its application will be monitored/ audited by BPCL.

3.0 References

BPCL HSE Policy
BPCL Corporate Safety Management System
BPCL Technical standard on Risk Assessment and Management
BPCL Technical standard on Contractors Safety Management (TS/01)
The Building and Other Construction Workers (Regulations of Employment and Conditions of Services) Act and State Rules as applicable to BPCL Project Site

4.0 Responsibilities

Corporate HSSE shall be responsible for training , communicating and monitoring of this technical standard in BU and their project locations.

BU- HSSE/ Location- HSSE shall be responsible for implementation of this technical standard at their project locations.

BPCL Project Leader responsibility shall include(but not limited to)

- Ensuring legal compliances related to project activities;
- Ensuring that tenders/bids for contracts contain sufficient information to enable an evaluation of the safety risk and control measures associated with the work activity;
- Ensuring a contractor pre-prequalification process is applied that evaluates the safety systems, capability and performance of companies prior to work commencing;
- Provide information relating to the hazards associated with project activities and the risk control measures designed to prevent injury and/or loss;
- Review , monitoring and enforcement of a documented project safety plan of EPC contractor;
- Establish a system for daily job safety planning, risk assessments, training, performance monitoring, auditing and inspection of contractor activities at the project location;

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- Ensuring that workers get adequate instruction, information, training and supervision;
- Sharing good practices to promote continuous improvement in contractor and BPCL safety performance;
- Effective motivation and disciplinary policy.

Project Leader shall define the project management organizational structure , roles, responsibilities and accountabilities for all personnel who play a role implementing the Project Safety Management , including:

- Project Management Consultant, if applicable
- Area In-charges;
- BPCL HSSE Professionals;
- Human Resource
- Any other department under project
- Supervisors;
- Safety staffing of contractors

Refer **Appendix 1** for Guidance on Responsibilities.

5.0 Existing Applicable Laws

BU/ Locations shall ensure that their operations comply with all relevant Indian Environmental, Health and Safety laws and regulations and obtain statutory permissions/approvals prior to start of the work.

6.0 Project Safety Management

a. Contractors' safety Management is vital to prevent any accidents and incidents that have harmful impact on employees, the community, assets and the environment. This can be achieved by:

- Clear communication of BPCL's safety management system(SMS) requirements to Contractor(s)
- Verifying the gap(s) between the Contractor's SMS and BPCL's Requirements and
- Establishing and implementing Mechanism for monitoring and ensuring compliance of BPCL SMS requirements

b. Key areas for project safety management include but not limited to:

- Project team leadership and commitment
- Prequalification and selection of competent project contractor
- Communication of project specific safety requirements in contract documents
- Comprehensive project safety plan preparation by contractor or project management consultant and approval by BPCL project owner / owner's representative
- Pre-job meetings / Tool box talks
- Induction and specialized training
- Daily job plan
- supervisory safety responsibility
- Monitoring/supervision of critical tasks
- Daily equipment and work area inspections
- Active project safety committee
- Joint safety walks
- Method statement
- Safe equipment and tools
- Effective control and monitoring on alcohol and drug abuse policy
- Execution of the work &performance Monitoring
- Post contract evaluation
- Effective motivation and disciplinary policy

6.1. Management Commitment & Accountability

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BPCL project team at all levels, is dedicated to assuring that its employees and others are provided a safe and healthy place to work on each of its projects and ensuring that the Zero Harm philosophy is executed. The management should take the lead and demonstrate commitment throughout the project by:

Treating safety management as a core value of the project and demonstrating leadership throughout the project.

Developing shared objectives and promoting team building between BPCL Project Management Team and Contractors organization's / Project Management Consultant.

- Providing adequate resources and competent safety professionals
- Visibly promoting safety in regular meetings and by doing regular safety walks /**Location** visits with their counterparts.
- Setting safety objectives and targets and by measuring and reviewing performance.

6.2. Pre-Qualifications & Selection of Project Contractors

a. BU/ Locations shall develop and maintain a process for pre-qualification and selection of project contractors relevant to their needs and demonstrate continual improvement of the same.

b. While selecting / pre-qualifying the contractors, consideration shall at least be given to:

A. Contractor's Past Safety Performance

a. Worker's Compensation Payout (last 3 years)
b. Number of Fatal Incidents (last 3 years)
c. Reportable Lost Time Injury Frequency Rates (last 3 years)
d. Pending court cases, if any

B. Safety Capabilities Assessment

a. Contractor's Company Safety Policy
b. Contractor's Company Safety Organization
c. Safety Management System Manual of the contractor
d. Hazard Identification & Risk Management Program
e. Accreditation (ISO 9001/ ISO 14001/ OHSAS 18001) / Performance Awards
f. 3rd Party / Client Audits Report of similar previous jobs undertaken by them

c. Contractors safety pre-qualification evaluations shall be performed by a team of designated officials from Contract Owners / Owners Representative; Procurement, HSSE, Finance etc. considering the other risks such as commercial etc.
d. Procurement / Owner department shall ensure the completion of any requirement, further highlighted by HSSE Staff before qualifying the contractor.
e. Once the contractor is qualified, his name shall be maintained in contract department's database of competent project contractors and their safety pre-qualifications information.

6.3. Communicating Project Specific Safety Requirements in Contract Documents

a. Locations shall determine project specific work specific safety requirements. These Project Specific Safety Requirements shall be communicated to all pre-qualified contractors in bid documents by contracting department.

The project specific work specific safety requirements, which may be included are (but not limited to):

- Valid Registration Letter issued by BPCL
- Contractor's Safety Organization specific to project

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- Hazard Identification and Risk Management Procedures
- Applicable Risk Assessment Studies like HAZOP, HAZID etc.
- Project Safety Management Plan
- Method Statement(s)/(safe work procedure) for all hazardous or potentially jobs as defined by owner department.
- Any additional document/procedure/study as identified by BU/location.

Contracting department shall ensure that contractor submit all the applicable safety requirements as listed above. HSSE department shall be consulted if needed.

6.4. Project Safety Management Plan

Contractor shall submit a detailed Project Safety Management Plan in BU prescribed template. This shall be a comprehensive document defining safety management system for the project and shall be reviwed/approved by BPCL project owner/ representative, prior to start of the work (Refer **Appendix 2** for a sample Template for a Project Safety Management Plan) .

Note : BU/Location may not require a detailed Project Safety Management Plan as per Appendix 2 for a small or short term project. However, a shorter version of plan shall always be necessary to show that that the hazards are recognized and understood is likely to be adequate.

6.5. Project Safety Organization

The project safety organization shall vary according to size and complexity of projects. A typical project, however should include :

A. Chief Project HSSE Manager- HQ

B. Senior Project HSSE Managers- Region

C. Project Engineers

D Fire and Electrical Officer (as may be applicable)

E. Contractor's Safety Officers

F. Contractor's Safety Supervisors

6.6. Contractor's Safety Organization

Contractors must provide a nominated manager, supervisor or foreman with authority to give and receive safety instructions at project location as mentioned below.

- If a contractor is employing less than 30 employees, he shall designate one dedicated supervisors as a safey steward.
- For every 30 persons or more contractor shall appoint one qualified safety steward (diploma in industrial safety from recognized government institute). For more than one safety steward, one of them shall be appointed as Chief safety steward.
- In addition to above contractor shall also appoint one safety officer, if he employs more than 100 workers. Safety officer shall have Diploma in Industrial Safety or any equivalent qualification from Government Recognized Institute and minimum 2 years of experience. For more than one safety officer, one of them shall be appointed as Chief safety steward.

NOTE: BPCL shall reserve the right to prescribe the number and qualification of contractor's safety personnel.

Appendix 3 provides description of Contractor's Roles and Responsibilities. **Appendix 4** provides list of facilities /equipment for the contractor's safety function.

6.7. Inadequate Safety Personnel

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In case if the contractor fails to provide the minimum required manpower or fail to fill up vacancies created within 30 days, the same shall be provided by BPCL at contractor's cost. Any administrative expenses involved providing the same like paper advertisement or manpower consultant charges, etc shall also be at the cost of contractor.

6.8. Approval of Safety Personnel from BPCL

The name of the nominated person(s) must be given to the BPCL Representative before work commences along with their educational qualification and training certificates. The Contractor shall be fully responsible for supervision of Contractor personnel to ensure that they strictly adhere to all applicable safety requirements. The Contractor shall provide, and fix in place, all caution and hazard notices required for the project location in accordance with the applicable laws in force and industry practice.

6.9. Subcontractors Control

The Contractor shall provide the BPCL Representative with the names of the Sub-Contractors and obtain approval to this Code of Practice prior to their engagement. Contractor shall ensure that the sub contractors shall also be governed by the requirements as applicable to them. The contractor shall ensure that the Sub-Contractors receive safety induction briefings. The Contractor shall regularly check the Sub-Contractors' compliance with safety requirements and be held accountable for their safety performance including requirement to use Personal Protective Equipment (PPE).

6.10. Kickoff Meeting

The contractor shall facilitate a formal safety kickoff meeting prior to commencement of Location works along with subcontractors and BPCL representative. The contractor shall inform the BPCL a minimum of seven (07) days in advance of these formal kickoff meetings and the BPCL.

6.11. Project Safety Committee

A project safety management committee shall be constituted with representation from senior management representation from the contractors, subcontractors (if permitted in contract).The meeting shall be held at least once per month and record maintained. The meeting shall be chaired by BPCL project manager and convened by Location HSSE Manager.

The large contractors/ sub-contractors may also be asked to constitute their own safety committees. will provide the BPCL the minutes of the same.

The outcome of pre job meeting shall be documented and record maintained.

6.12. Hazard Identification and Risk Assessment

The contractor shall ensure that a specific hazards are identified, which have the potential to cause harm in terms of human injury, ill health, damage to property or the environment, or a combination of these and risk is properly assessed, control measures are identified prior to start of work. The record shall be maintained at Location office.

6.13. Safety Instruction & Training

Project Leader shall establish safety training plan & procedures (example given below).

Training Profile Discipline: Scaffolder	Initial Training
Safety Orientation & BPCL HSE Policy, Life Saving Rules, Roles & Responsibilities, Incident Reporting, Emergency management, Project description, hazards & risks, Project Safety Management Plan etc.	Prior to starting work- All BPCL and Contractors Employee

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Scaffolder Practical Assessment	Prior to starting work
New Start Orientation	Prior to starting work
Correct use of PPE	Prior to starting work
Safe use of Safety Harness and 100% Tie-Off	Prior to starting work
Working at Height & Dropped Object Controls	Prior to starting work
Toolbox Talk	Prior to starting work
Hazard Identification and Safety Intervention	Prior to starting work
JSP and Work Permit System	Prior to starting work
First Aid	As required
Worker Welfare Program	Prior to starting work
Environmental Awareness Program	Prior to starting work
Transport Safety Awareness	Prior to starting work
Safe Commissioning and Start up to concerned personnel	Prior to Commissioning and Start up

The contractor shall ensure that all personnel attend the Safety Induction Training / Instruction, Tool Box talks before they start to work on the project. The contractor's workman shall attend Refresher Training Periodically and shall take advantage of the various Safety training courses provided by BPCL.

A record of the Safety training undertaken by staff shall be maintained and available to Employers Representative on demand.

6.14. Daily Job Safety Plan

The Contractor Job Representative shall prepare daily job safety plan to identify specific tasks, their hazards and risks and control measures. This is a joint formal review of all tasks and to be documented. This shall be reviewed and approved by owner or his authorized representatives.

6.15. Safety Communication

The Table 1 below outline the indicative methods and schedule for Contractor Specific Health and Safety communication for processes identified for all employees.

Table 1 : Indicative Communication Workplace Schedule:

Communication Process	Schedule	Participants	Facilitator
Toolbox Meeting	Daily	Contractors and its subcontractors	Respective Contractors Supervisors in charge of work activities
Safety Meetings	As scheduled	Contractors	BPCL HSSE Manager
Project kick Off Meeting	Prior to project commencement or first day on-Location	BPCL Construction Team, Contractors and its subcontractors	BPCL HSSE Manager/ Contractors Safety Officers/ Stewards

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Mass Tool Box Meeting	Weekly	BPCL Construction Team, Contractors and its subcontractors	BPCL Project Manager Contractor Front Line Supervision and Contractor safety stewards
Safety "Stand Down"	As and when required	Specific task group	Contractor project Manager / Contractor Construction Manager
Emergency drill exercise	Monthly	As per emergency response plan	Contractor Project Manager / Contractor Construction Manager

6.16. Toolbox Meetings and Mass Tool Box Meeting

Daily toolbox meetings shall be conducted prior to commencement of operations to raise the safety awareness of all project personnel- Meetings shall be carried out at the workface. Toolbox meetings shall comprise information of discussions concerning any inherent hazards associated with planned works as well as precautions that will be initiated. Topics for toolbox meetings shall include risk assessments conducted for work activities. Toolbox meetings shall be conducted at the common resting shed and designated Contractor personnel will provide assistance to Contractor Supervisors in the preparation and delivery of safety talks and other relevant matters. Refer **Appendix 5** for Guidance on Tool Box Talk.

Mass Tool Box Meetings will be conducted by BPCL Project Manager /Contractors to address workforce common issues, communicate corporative messages, and discuss Lesson Learns and / or safety programs new initiatives.

6.17. Monthly Location Walk Through

Contractors shall conduct Monthly Location Walk Troughs comprising Contractors Location Management and Safety Coordinators. BPCL project management and HSSE role holders will join these inspections on regular basis.

6.18. Safety Audits

Internal Project Safety Audits will be undertaken in accordance with the Project Safety Management Plan. Regional Project Head shall decide about the external safety audit from Indepdent third party agencies or BPCL auditors (other than Project) as may be required on case to case basis.

6.19. Safety Statistics

Contractors' safety statistics shall be gathered on a monthly basis and reported to the BPCL HSSE Manager. Contractors and its subcontractors shall provide details regarding their monthly statistics to BPCL for collation by the 5 th calendar day of every month. Monthly Statistics shall be communicated at a prominent place. Refer Appendix 6 for indicative safety statistics to be maintained at each BPCL project Location as minimum.

6.20. Project Safety Management Basic Rules

Refer **Appendix 7** for Project Safety Basic Rules.

6.21. Equipment and Machinery Safety

All plant and equipment intended to be used at the project contractors and its subcontractors shall conform to the manufacturer's specifications shall have a proof of adequate maintenance regime. In

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addition to these requirements, Contractor shall comply with all regulatory authority standards for machinery guarding and warning devices shall be adhered to prior to the operation of the plant and or equipment on the project.

Contractor shall keep records of all inspections; third party certifications (when applicable) and maintenance activities inclusive of breakdowns shall be recorded using the logbook provided for the relevant item of plant.

All plant items shall be provided with a logbook that contains:

- Current copy of registration/certificate or licence, where applicable,
- Records of service,
- Operation manual,
- Daily pre-start inspection checklists (as applicable),Maintenance records for prior history and provision for future entries, and
- Mobilization inspection checklist completed by en appropriately qualified or competent person.
- Authorized operators record

Vehicle and Plant maintenance will be carried out to manufacturer's specifications and maintenance schedule.

Colour-coding and frequency of maintenance are to be indicated clearly in the maintenance regime of all equipment and machinery.

Unless all the required licenses required to operate any equipment are held by the operating employee and have obtained the necessary work permit approval, then that equipment will not be operated.

BPCL and Third parties will audit the inspection protocols and inspection records.

6.22. Pre-Start Inspections

Supervisors and operators shall ensure equipment and vehicles are inspected prior to operation each shift. The operator shall enter details of the inspection into the logbook or daily checklist of the person delegated to complete the inspection. All safety devices shall be operative and at all times used. All required certificates should be available, current and valid

6.23. Equipment and Machinery Inspection Register

Contractor construction team shall maintain a Plant and Equipment Register to systematically record each item of plant brought to the project location, which will determine inspection levels, registration details and logbook requirements. All safety devices shall be operative and at all times used as well as all required certificates, all required certificates should be available current and valid

BPCL Team and Third parties will audit the inspection protocols and inspection records

6.24. Lifting Machines (Cranes, Rigging, Lifting and Mobile platform)

The use of lifting machines in the project location shall abide by the following conditions:

- Current applicable regulation shall be complied with at all times.
- Lifting machines (i.e. cranes, piling machines) shall possess a valid Inspection Certificate and such certificate must be displayed on the machines.
- Contractor Project engineer and lifting supervisor shall inspect the lifting machines upon arrival at project location before being permitted to be used.
- A statutory competent person shall examine the lifting machines at least once in every 12 months. All required certificates should be available, current and valid.
- The Load Capacity Chart (manufacturer or certified by Authorized Examiner) shall be displayed on the lifting machines and understood by the operators.

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- Lifting machines shall be marked with its safe working load (maximum and minimum radius)
- Lifting machines shall be used in accordance with manufacturer's operating instruction and/or the Authorized Examiner's instructions
- Lifting machines shall be provided with.

  -An adequate braking mechanism
  -A swing lock or swing brake capable of prevention of rotation;
  -A brake or other device adequate to bring the crane to a stop from any travel for which it is designed, together with a means of locking the crane so as to hold its stationary
  - a load and/or radius indicator with warning alarm
  -a load/radius table to be available in the crane cab of every variable radius jib crane
  -an automatic safe load indicator (Load Moment Indicator)
  -anti two blocking devices
  -crane hook with a safety catch to prevent displacement of the sling or load from the hook
  -an anemometer or a wind speed meter (for new cranes) for measuring wind force and velocity
- Lifting machines shall be examined by an Authorized Examiner after any major repair or any repair done on the hoisting or operating mechanism, boom jib and after over loading incident
- Excavators shall not be used for lifting operations.
- No lifting machine shall be operated unless all measures are taken to prevent toppling or overturning or contact with overhead obstruction (such as structure, power lines)
- When moving lifting machines, the boom shall be lowered and traffic controller/guide shall be required to guide the lifting machine operator.
- When lifting machines are reversing, an additional person shall be required to ensure that the path of travel is clear.
- Lifting machines cabin shall be locked when it is not attended by the operator. Unauthorized person(s) shall not be permitted to enter in the cabin or operate the crane.
- Fire extinguisher shall be provided in the lifting machines. Operator shall be trained to use fire extinguishers.
- Good housekeeping of the lifting machine shall be exercised and maintained.
- Safe access (with proper foot and hand holds/supports) to the cabin and deck of the lifting machines shall be provided and identified.
- Lifting machines shall be maintained to ensure that all components of the lifting and operating mechanism are in good, safe and sound functioning condition.
- A maintenance program shall be required and implemented effectively for the lifting machines and the maintenance records shall be kept in the cabin.
- The operator shall carry out daily inspection of the crane and testing of the safety devices In accordance to manufacturer's recommendations.
- The maintenance section of respective supplier shall inspect the lifting machines at least once every month.

6.25. Lifting Operations

- BPCL requires that all lifting to be executed as a minimum, under compliance with applicable regulations and approved code of practices.
- Contractors shall appoint trained and competent Lifting Supervisors Riggers, Signalman and Crane Operators In accordance to statutory requirements.
- Contractors shall also appoint a Responsible Person to coordinate lifting activities.
- Method statements, risk assessments and Work Permit System shall be implemented for all lifting operations.
- A Lifting Plan shall be established and implemented for all routine and non-routine operations.

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- The Lifting Plan shall be submitted together with the Lifting Checklist prior to commencing lifting operations. Designated lifting points and the lifting path shall be drawn in the Lifting Plan .o The Lifting Plan shall also indicate the followings:
  - Location of lifting operation;
  - Description of lifting operation;
  - Weight of load;
  - Description of lifting equipment to be used;
  - Personnel involved in the lifting operation
- Appointed lifting supervisor shall also check and ensure that all safety provision are in place before the lifting operation is commenced with checklist(s) provided.
- The lifting operation area and other areas with potential hazard / danger must be cordoned off to prevent access for all unauthorized personnel. Only authorized persons and personnel involved in the lifting are allowed in the lifting operation area.
- The load shall be controlled by means of tag lines to prevent the load from turning, swaying or swinging.
- The crane operator/lifting machine operator shall be medically and physically fit for the job and possess the following qualifications.
  - valid crane operator license issued by Government department; and
  - certificate of competency for the type class/capacity of the crane.
- Contractors shall submit the respective documents and certificates on the above for verification to BPCL

6.26. Safe Work Procedures

The contractor shall develop and implement a safe system of work and procedure/ method statement at each Location. A copy of procedures shall be submitted to BPCL Representative prior to commencement of the work.

This shall include but not be limited to:

- BPCL 12 Life Saving Rules
- Safety Signage
- Hazard Identification and Risk Assessment Procedure
- General Safe System of Work
- Lay out, Housekeeping and Traffic
- Working at heights, ladders, Scaffold and Working Platform
- Use of electrical plant and hand tools
- Material Handling
- Heavy earth moving equipment
- Digging and Excavation
- Hot work
- Dust & Fumes
- Control of hazardous Substances
- Electrical hazards, especially in the connection of equipment supplied by BPCL, or their Subcontractors, to power sources provided by others
- Confined spaces (as applicable)
- Noise, Lighting, Heat Stress, Extreme whether
- Store & waste management
- Portable tools & equipment
- Induction Checklist Drugs and Alcohol
- Safe Lifting & Rigging Procedures
- Material Handling Equipment Operations Ladder Safety

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- Portable Hand Tool / Power Tools Safety
- Personal Protective Equipment (Selection, Use & Maintenance)
- Waste Storage, segregation & disposal procedures
- Competency Criteria for High Risk Activities (Qualification / Experience / Training / Skills)

6.27. Scaffolding and Work Platforms

Erection, alteration and dismantling of any scaffold shall be carried out by a person holding the appropriate certificate of competency and under the direct supervision of a qualified scaffold supervisor. The use of scaffolds shall be governed by the IS codes.

6.28. Personal Protective Equipment (PPE)

PPE that shall be required for all personnel including visitors whilst they enter project Location. Areas where personal protective equipment is required to be worn shall be prominently displayed with signs. Instruction on the correct use and maintenance of personal protective equipment shall form part of the nominated training and toolbox sessions and reiterated through the pre-start meeting process. Contractors shall establish and implement a PPE maintenance programme.

The Contractor shall remove from the location any worker who consistently refuses to wear the appropriate personal protective equipment. The PPEs and safety appliances provided by the contractor shall be of the standard as prescribed by Bureau of Indian Standards (BIS) or equivalent standard.

All construction workers should be provided with high visibility Jackets with reflective tapes confirming to the requirement specified under BS EN 471: 1994. The contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and maintain proper record. The standard PPE may include:

- High visibility Vests
- Fire Retardant Clothing (particular activities and designated areas)
- Portable gas detector (particular activities and designated areas)
- Toe Protection and steel capped safety footwear with ankle support
- Hearing protection (particular activities and designated areas)
- Respiratory protection (particular activities and designated areas)
- Hand Protection (particular activities and designated areas)
- Safety helmet with chinstrap
- Safety Goggles.
- Eye protection for grinding, welding and cutting, compressed air use and chemical interaction
- Full body harnesses attached to a shock absorbing device and with double lanyard ("Y" type)
- Life Jackets (designated area)

Safety Induction shall be used as a forum to advice on the general personal protective equipment.

6.29. Location Familiarization

Location familiarization is an essential part of the Location Safety arrangements. The contractor shall provide its employees a familiarization tour to their work area for their personnel prior to commencement of the work. This shall include:

- Boundary of work location.
- Authorized safe access / egress routes.
- Authorized walking Routes.
- Storage areas for various materials in particular where dangerous materials or substances are concerned.

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- Location of key Personnel, e.g. BPCL Project Manager, HSSE office etc.
- Arrangements for sanitary conveniences and washing facilities.
- Location security arrangements.
- Identification of physical hazards associated with BPCL operational or other work activities.
- Assembly points during emergency.

6.30. Certificates of Competency

BPCL requires the Contractors to maintain a register with all statutory certificates of competence as their qualified personnel. These records shall be kept on Location for auditing purposes.

Where BPCL requires personnel to have certificates of competency to perform designated tasks, a record of the certificates will be taken at the time of employment or induction prior to employees being able to perform those tasks. The records shall be maintained in a register for Auditing purposes

Competency certificates shall be maintained for:

- Issuing work permits
- Conducting Electrical Work
- Scaffold work
- Lifting Operations / Safe Slinging & Rigging
- Crane / forklift operators
- Fire Fighting

6.31. Location Access Control and Traffic Management

Contractors shall manage the security at BPCL project premises. Security guards, traffic patrols, traffic wardens, heavy equipment escorting, vehicle access, warehouses, access and exit gates will be managed by Contractors under procedures and regulations agreed with BPCL Project Team Management.

Only authorized employees with a current and valid driver's license will be allowed to operate vehicles on the project. Contractors shall train all their drivers in defensive driving principles.

6.32. No Smoking Policy

BPCL follows No Smoking Policy at the work Location and same shall be practised at all its project locations. The cigarettes / bidis, lighters, match boxes etc. shall not be permitted to the project Location.

6.33. Drugs and Alcohol

The use, possession, distribution or sale of illegal drugs and controlled substances by any BPCL employee, visitors, contractors or sub-contractors and their employees while on BPCL premises or while performing services on the BPCL project Location is strictly prohibited. Breath analyzer test shall be conducted at the Location regularly.

6.34. Notices and Signs

Contractors shall display prominently relevant safety notices and signs in such a manner as to ensure personnel in the vicinity are made obviously aware of the potential hazard. Posters shall be utilized within amenities as a general reminder and changed on a regular basis to reduce familiarity. Signs shall be generated following Indian regulations.

6.35. Barricading and Shuttering

Barricades are designed to restrict access into work areas where hazardous conditions are prevalent. Shutters and roof supports are designed to protect access to trenches, tunnels, drains, sewers etc.

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Contractors shall identify and adequately highlight potentially hazardous areas or processes and particular risky activities by displaying appropriate tag, warning sign and where deemed necessary, bunted off with fixed rail barricades. Contractor shall erect fixed temporary guardrails at entry points to areas requiring the removal of permanent guard railing or other means of fall protection, Other situations include:

Overhead Work.

- Confined Space Entry;
- Scaffold erection and protection;
- Chemical and product spills;
- Traffic and pedestrian control;
- Blasting and charging situations;
- Excavation
- Hot work
- Painting
- Electrical equipment

6.36. Working at Heights

Working at heights may cause serious injuries or fatalities. It is therefore essential to ensure the following measures are taken by Contractors prior to commencing any work at height:

- Permit to work system shall be implemented for working at height
- Where work is performed/or lifted to heights greater than 2 metres above the ground, the potential drop zones must be cordoned off
- Pipe work and structures that could deflect falling objects will be considered when assessing the potential drop zone
- All work areas, walkways, platforms etc. elevated 2 meter or more, must be encompassed by an approved guard rail or rope
- All barriers such as guardrails, opening covers are adequately provided with warning signage must be to protect all workers and public from injury
- Tools and materials will be raised and lowered in secured containers
- When work is carried out at elevated levels, the area below must be cordoned off and warning signs must be posted up
- All openings in floors must be covered temporarily or securely fenced.
- Appropriate Personal Protective Equipment (PPEs) for fall arrest such as full body harnesses attached to a shock absorbing device and with double lanyard ("Y" type) shall be used for work at heights. It is to be used at height of 2 meters and above.

6.37. Housekeeping

Housekeeping shall be considered an extension of every activity on the project. Contractors shall ensure maintaining a high standard of housekeeping in the Project at all times. Contractors' supervisors shall be responsible for ensuring housekeeping inspections are conducted on a daily basis and corrective actions are taken accordingly. The areas within their control are to be maintained

in a tidy, safe condition, materials and equipment not in use are neatly stacked away from the work areas and clear of access ways and emergency exits.

Housekeeping shall be constantly monitored to ensure a safe and productive work environment. The following shall be complied at all times:

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- Emergency exits, stairway, roadways, walkways and fire points must be identified and kept free of obstruction
- Place of work shall be kept free from any obstruction and from any substance likely to cause a person to slip, trip or fall
- Equipment for use or installation placed on Location and work area shall not cause any obstruction unless otherwise approved
- Wires, cables, and gas hoses shall not be laid across floors, steps, stairs, passages, gangways and means of access.
- Construction materials shall be stored or placed at demarcated areas, and stacked in a safe, stable and orderly manner
- Cleaning of offices canteens, and sanitary facilities shall be carried out daily on e routine basis
- All waste shall be categorized and disposed to designated containers, bins, or designated places only.
- Construction and engineering waste and scraps shall be collected and place into designated bins at the end of the work day
- Surplus waste civil material such as soil, stone etc. must be dumped at the designated dumping areas or remove from Location
- Mass housekeeping exercise shall be carried out once every week, and as and when
- Contractors Project Managers or HSSE personnel deemed necessary
- Chemicals shall be stored in a designated area and locked to prevent unauthorized usage

6.38. Hazardous Substances

Any material or substances that are or may be considered hazardous to Personnel or the environment shall be handled, stored, transported, used or applied according to:

- Manufacturer's Recommendations
- Statutory Requirements
- Contractor shall keep a register of all chemicals used in the Project. Contractor HSE Manager shall approve all chemicals to be used in the Project before they brought into Project premises. It is advisable for the Contractor to generate an Internal Chemical Approval and Control Procedure

6.39. Portable Electrical Power Tools and Equipment

- Earth Leakage Circuit Breakers (ELCB) ere standard devices to be used on project locations. Contractors shall use ELCBs when using portable tools and/or equipment. This ensures the maximum safety and protection for all personnel.
- All their tools shall be tagged and tested.
- Double adaptors and piggy-back plugs shall not be used.
- Electrical extension leads and cables shall be, where practical, kept off the floors or ground and be secured at a height by insulated hangers that does not interfere with or hinder the work area.
- Electrical cords, as much as possible, shall not be coiled when in use, they shall be inspected daily before they are used
- Electrical extension leads across pedestrian access ways / floors shall be adequately protected from damage and to reduce trip hazards.
- All equipment shall be visually inspected by the operator prior to use and by a licensed electrician on a three-monthly basis with details of the inspection being recorded in the "Electrical Inspection Register" and on the appropriate colour coded tag for the period.

Common types of power tools used are:

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- Drills Rivet
- Grinders
- Guns
- Circular saws

6.40. Electrical work

- For all works that require the identification and control of electrical energy, an approved Log Out - Tag Out (LOTO) Procedure shall be utilized. Contractor shall ensure to generate and utilize a LOTO procedure to manage the intervention on electrical equipment. As minimum, this procedure shall include:
  - Selection and appointment of competent personnel
  - Roles and responsibilities
  - Training requirements
  - Approved tools
  - Safety devices and mechanisms
  - Communication protocols
  - Authorization protocols
  - Administration and physical controls
  - Precautionary measures
  - Maintenance and testing protocols
  - Consideration on simultaneous operations
- All pertinent personnel shall be trained, If energized equipment, installation, or electrical system must be intervened it shall be de energized and/or isolated prior to commencement of work on them by using the Log out Tag Out Procedure
- All practicable measures shall be taken to protect any person against the risk of electric shock arising from or in connection with the use of any electrical installation or equipment.
- Underground or concealed electrical power lines must be identified and marked prior to any work to be carried out onto the ground or wall.
- In work areas where the exact location of underground electric power lines is unknown, person using hand tools which may contact a line must be provided with insulated protective gloves and insulated protective footwear.
- All dangerous occurrences and electrical incidents shall be reported to the Contractors Project Manager and HSSE personnel immediately and followed by submission with an appropriate written report.
- Electrical installation and equipment shall be of good construction, sound material and free from defect.
- Electrical installation shall be performed, tested and checked by a Licensed Electrical person.
- Testing, inspection and maintenance on electrical installations shall be done by a licensed electrician.
- All temporary electrical in building and work location shall be provided with earth leakage circuit breakers (ELCB).
- All wiring shall be made of weatherproof types, properly insulated and provided with adequate mechanical protection.
- No bare wires or other unprotected conductors shall be located within 4 meters of any surface where employees may work or pass, unless completely guarded by a fence or other barrier.
- No person shall work in such proximity to any part of an electric power circuit that he may be in contact with in the course of his work unless he is protected against electric shock.
- Person shall be advised of the location of such lines, the hazards involved and the protective measures to be taken. No extension to the electrical wiring system shall be made without the Contractor Project Manager and HSE Manager approval.

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- Underground and/or concealed cables shall be identified on Location layout drawings and other related drawings, and shall also be Identified with markers on location.
- All electrical , testing or alterations to any electrical equipment shall only be undertaken by a suitably licensed electrician.
- All electrical equipment including cables, leads or extension cords are to be examined and tested at regular intervals. The findings of these inspections are to be recorded and action taken for the repair, replacement or destruction of the damaged equipment after suitable approval has been granted.
- Switchboards shall be kept locked at all times. The key shall be secured in a safe place to prevent unauthorized access.
- Mobile portable lighting shall be inspected daily for broken switches, exposed or damaged wiring, blown bulbs and damage to trailer and trailer frame. Portable items which are damaged are to be tagged and the details of the damage recorded and then action taken for the repair, replacement or destruction of the damaged equipment after suitable approval has been granted.
- Conductors, switchgear and electrical apparatus is always regarded as being alive until it is proved to be dead by means of approved test lamps, suitable indication devices or voltmeters.
- All electrical equipment and tools are to be inspected by a Licensed Electrician on a monthly basis.

6.41. Working on or near Exposed Live Circuits and Equipment

When working on exposed Live Low Voltage Mains and Apparatus adequate precautions must be taken, otherwise may result in injury or death,

- Insulating mats and hose are to be used by Construction staff when working on or adjacent to exposed Live Low Voltage Mains and Apparatus. When insulating mats and hose are used to cover conductors or earthed metal, the mats and/or hose must be securely fixed to prevent displacement. Conductors and apparatus taken out of service must be proven" dead h by testing
- Precautions must be taken to ensure that the supply remains de-energized by Locking Out the main control switch and any other control points which are capable of restoring supply.
- "Danger" Notices are to be securely attached to the operating lever or push buttons so there is no risk of them becoming dislodged, or of an operator being able to restore power or operate the equipment whilst being unaware of the danger by doing so

6.42. Isolations

Electrical Isolations shall be co-ordinated via Local Electrical Authority, appointed Responsible Competent Person, HSSE appointed personnel and respective Supervisor.

Contractors will adopt its internal Isolation and Lockout procedure.

6.43. Lock-out & Tag-out of Equipment

A lock-out and tag-out procedure shall be in place for machinery or equipment at the Location for the purpose of inspection, maintenance, routine servicing, or repair. During this period, if the machinery or equipment is inadvertently activated or energized leading to a start-up, it is liable to cause bodily injury to any person who may be working on the machinery, by the sudden release of energy.

The lock-out & tag-out procedure is a set of procedures established for the following purposes:

- To ensure that all energy sources to the relevant part of the machinery / equipment, shall be isolated or disconnected.
- To prevent any interconnected part of the machinery / equipment from being inadvertently activated or energized.
- To implement for the inspection, cleaning, repair or maintenance of any plant, machinery or equipment

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Note: The Contractor Log Out and Tag Out Procedure shall integrate all pertinent piping, mechanical, pre-commissioning, commissioning activities as well as communication and joint activities at battery limit form multiple contractors/service providers

6.44. Work Permit System

The intention of the permit to system is to control construction activities having the potential to result in personnel injury, property damage or environment impact.

Locations shall implement a Work Permit System to be applied during construction stage and communicate to contractors. The work permit system shall cover;

- Entry into confined spaces
- Work at Height
- Excavation
- Use of explosive devices
- Hot work
- Electrical work
- Radiography
- Piling work
- Demolition
- Lifting operations involving lifting machines and appliances
- Tunneling work
- Working at height where a person could fall more than 2 meters
- Any other high risk activities, as identified by risk assessment shall also be included It may extend into cold commissioning activities, which may require a Clearance Certificate.

6.45. Hot Work

"Hot Work" is any work activity which requires or involves open flames or any other sources of heat that could ignite flammable or com**bu**stible materials in the work area. Such work shall include but not be limited to, welding, burning, grinding, soldering etc. The following requirements shall be in place prior to commencing any hot work activity.

- A work permit system shell be implemented for hot work activities o An adequate number of dry powder fire extinguishers shall be located within close proximity to hot work areas
- A trained fire watchman shall be assigned to be positioned at the area where hot work is being carried out
- All Slags and sparks shall be contained within the work area. Fire blankets shall be used to contain the sparks, if required.

No hot work close to operating plant and in commissioning areas shall be done by Contractors without BPCL permission.

6.46. Welding

- Welding works shall comply with Indian Standard requirements. Only competent and authorized workers use welding and cutting equipment. Welders and fire watchers shall be competent in the operation of fire extinguishers, fire hoses and any other fighting equipment.
- No Welding and gas cutting close to operating plant and in commissioning areas shall be done by contractors without BPCL permission.
- Fumes and gases evolved shall be identified and exposure controlled. Welders and other persons in the vicinity shall be protected against exposure to ultra violet light and infra-red radiation emitted from the welding operation.
- Welding sets shall be in good condition, properly maintained and earthed.

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- Terminals and live components shall be adequately protected.
- Cables shall be inspected to ensure the insulation is intact.
- Damaged cables or electrical holders shall be properly repaired or replaced
- Welders shall wear face mask, appropriate face shields and welder gauntlets during welding activities
- Only competent and authorized workers shall use welding equipment.
- Precautions shall be taken against exposure for welder and other personnel to ultraviolet radiation, fire, explosion, asphyxiation, or exposure to toxic gases, fumes or dust during welding activity.
- Adequate ventilation shall be furnished when working with welding equipment.
- Fire extinguisher/charged hoses/firefighting equipment must be provided at the welding work locations.
- Welders and fire watch personnel shall be competent in using the fire extinguisher/fire hoses/fire fighting equipment.
- Welding shields must be used to protect the eyes of nearby workers and visitors from ultraviolet exposure.
- Welders shall not wear metal rings, bracelets or necklaces during work as these might be heated by induced currents from the welding equipment.
- The welding equipment shall be checked for defects by the welder prior to usage:
- Damaged insulation on welding leads electrode holders and connections;
  - Faulty earth clamps and earth leads,
  - Torn insulation mats/cradles;
  - Worn or damaged hoses;
- Welding equipment shall be installed in such a manner that it can be continuously seen by the welder during welding activities.
- The welding equipment shall be placed at ground level only. The welding equipment shall not be placed in the path of falling sparks or in elevated structures.
- Diesel welding machines, generators and transformers must be protected by suitable covers for general protection.
- Such equipment must be turned off when not in use.
- Welding machines shall be inspected by a licensed electrician on a monthly basis
- Metal frames and casings of mains powered welding rectifiers, transformers and voltage regulators shall be earthed.
- Welding leads and return leads shall be well protected against mechanical damage.
- The earthing cable shall be attached to the work area as close as possible.
- The earthing cable shall not be attached to an existing installation or apparatus.
- Welding of the earthing cable is prohibited. No concrete reinforcing steel bar shall be used as earth point.
- The work piece shall be positively earthed, using a well-protected earthing wire connected at both ends by bolted lugs or secured by screwed clamps.
- Grounding to plant equipment pieces is prohibited.

6.47. Gas cutting

- Gas cutting shall comply with Indian Standard requirements.
- Gas cylinders shall be in good condition and free from corrosion
- Gas cylinders shall be properly colour-coded and individually identified
- Hoses shall be properly colour-coded to the internationally recognized standard for the gas being used, in good condition and fitted with hose connectors attached with permanent clips. Jubilee clips shall not be used

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- A suitable non-return valve or any other similar device which prevents the backflow of gas shall be fitted in accordance with the manufacturer's instructions between each gas torch inlet and gas hose of every oxygen-fuel gas equipment.
- A flashback arrestor which stops flashbacks shall be fitted in accordance with the manufacturer's instructions at the pressure regulator outlet of each gas cylinder
- Gas cutting equipment must be inspected on a daily basis for leaks, damaged hoses, regulators and pressure gauges, etc, Defects must be reported.
- Suspected leaks may be confirmed with a soap solution. Equipment must be replaced if leak cannot be repaired
- There shall be a designated area for proper storage of cylinders. Cylinders shall not be left lying around, They must not be stored or used in a horizontal position, but must be secured in an upright position, Cylinders must not be taken into confined spaces for use or storage, and shall not be placed on scaffolds
- Cylinder storage area shall be well ventilated and away from heat source or direct sunlight, "No Naked Flame", II NO Smoking" and "Flammable" sign boards shall be displayed
- Cylinders must be handled with care and must not be misused. They must be properly shut off when not in use and safety cap must be fitted when being moved
- Cylinders must be placed in a cylinder cage or frame prior to lifting by crane. Manual lifting of cylinder should be minimized. Cylinders shall not be subjected to drop, knocks, and roll during handling
- Cylinders must be placed in trolleys. A bottle key shall be kept with cylinders in use. Cylinders not in use shall be fitted with a safety cap.
- Oxygen and fuel gas cylinders shall be kept separate with a minimum distance of 5m. Empty cylinders must be separated with full cylinders, and shall be marked "Empty" or 'Full"
- Gas cutting equipment, including hoses shall not cause obstruction. Hoses not in use must be coiled up and put in a safe place. Hoses should be supported off the ground
- Gas cutting equipment, including hoses must be removed from confined spaces and excavations during any break or at the end of the day

6.48. Hazardous Areas

- Hot work shall not be carried out in a hazardous area unless a hot work permit is issued.
- Before hot work in a hazardous area is performed, the Contractor and person(s) performing the hot work shall:
    - Provide suitable locations for equipment including emergency fire fighting equipment.
    - Consider any possible changes in circumstances during the hot work, which may render the area unsafe..
    - Ensure fire watchman and fire fighting equipment are available.
    - If required, fire blankets will be used to protect areas that could com**bu**st due to sparks
    - Issue hot work permit.
    - Ensure that when hot work is performed, welders will not work alone and shall be provided with assistance as considered necessary. One of the duties performed by the assistance shall be of trained fire watcher.
    - Ensure that on completion of the hot work, the permit has been signed off by the issuing officer.

6.49. Confined Spaces

All conditions, precautions, etc. as outlined in the Regulations and relevant code of practice shall be adhered to. In addition, the requirements as defined in Additional requirements are as follows:

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- A competent Confined Space Assessor shall be engaged to closely monitor and supervise the safe work operations in the confined space. He shall be the assessor of the confined space where works are intended to be carried out
- The Confined Space Assessor shall test the atmosphere of a confined space prior to entry by any person into the confined space. The results, indicating the levels of oxygen content, flammable and toxic gases shall be recorded and attached to the work permit system.
- A copy of the approved work permit system shall be displayed at the entrance of the confined space.
- Atmospheric testing of the confined space shall be carried out prior to start of confined space works and subsequently at 6-hourly intervals if the work is continuous. The work permit system will be revoked if independent testing shows the confined space to be an unsafe hazardous environment Re-entry into the confined space shall only be allowed with the issuance of a new PTW
- Confined Space workers (entrants) shall have passed the BPCL approved Safety Orientation
- Confined space attendant(s) who have to communicate regularly with the entrants shall be trained in the same areas as the entrants He shall also be trained in rescue efforts so that he can coordinate rescue efforts in times of emergency. The attendant shall not leave his position at the outside entrance of the confined space at any time.
- Forced ventilation shall be provided at all times to a confined space when work activity is being carried out. The ventilation system would consist of a blower connected to flexible ducting. Only explosion proof blower shall be used for combustible atmospheres. The requirement and determination of equipment to be used and its set up while obey a Contractor Confined Space Assessor ventilation plan.
- Appropriate respiratory, breathing apparatus and proper PPE shall be provided to protect the entrants from inhaling contaminants in the confined space
- A retrieval system consisting of a retrieval line, body harness and a lifting device, or other suitable means shall be used by entrants who are authorized to enter into a confined space and tended at all times by the attendant.
- Illumination of not less than 50 lux shall be provided for access and passage into the confined space.
- All portable hand-held lightings provided in confined space shall be operated at an AC voltage not exceeding 55 volts between the conductor and earth or DC voltage not exceeding 1 10 volts
- Warning signs shall be displayed at or near every access point to warn persons of the existence of a confined space.
- A confined space entrant shall always wear a safety harness with a retractable lifeline, abrasion resistant gloves, protective non-slip footwear and safety helmets.
- A tripod or crane should be used to lower workers where possible.
- Breathable air cylinders to be used shall be properly certified and tested before each use
- If Air compressor will be used to supply breathable air, the compressor shall be for that purpose only and it should be provided with CO, moisture, temperature and oil in line monitor and deficiency alarms.

6.50. Excavation

Contractor shall authorize all excavation work by means of an excavation permit; it includes on-shore pile driving and soil testing. Proper checks, e.g. by hand excavated test holes, shell be made for the presence of underground cables or services before machine excavation work is authorized. Drawing checks are insufficient. On project locations within or adjacent to operating plants , all machine excavation shall be done with a dedicated and properly trained banksmen observing the actual soil cutting and removal. The following conditions shall be in place for excavation works:

- Excavations shall be barricaded with signs and shall have warning lights at night

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- Excavations with a depth of more than 1.5 meters must be shored, sheet piled or sloped. Excavation more than 1.5 meters depth must have a barrier constructed from the edge of the excavation
- Materials shall be placed more than 1.5 meters away to prevent collapse. Vehicles shall not be parked near excavation areas • Exposed cables or services shall be supported
- Exits points shall be provided
- Excavations shall be inspected by the supervisor daily before work start. Any shoring for excavation depth exceeding 4 metres shall be designed by a professional engineer
- Excavations and trenches more than 1.2 meters depth shall be considered as a confined space and subject to work permit control, both on existing operating and green field project locations
- A designated person who has completed adequate training in safety and health shall supervise the excavation works. He shall also carry out daily inspection of the excavated area before commencement of work, and after every rainstorm or other hazard occurrence
- Access ladders must be provided for excavation depth exceeding 1.2 meters and at least every 25 meters around the perimeter of all excavations
- Ground water must be pumped and kept out from the bottom of all excavations
- Gas cylinders must not permitted in any excavation
- Edge line of excavation, ropes, chains and other tripping hazards must be marked in order to be clearly visible during day or night
- Starter bars or other protruding objects must be covered or removed
- Personnel removing shoring after completion of work must not be at the bottom of the excavation
- Only a trained and competent excavator operator is allowed to operate the excavator. The excavator operator shall have completed a training course on the operation of excavators
- Excavation machinery must be positioned and operated in a manner that will not endanger any person involved in the excavation works
- No person shall be permitted to work or to be at vicinity where he may be struck or endangered by excavation machinery or by material dislodged by it or falling from it. A safe distance must be maintained between the excavator machine and any person(s) working near to that machine. Person(s) must be prevented from entering the safe operational envelope of the machine; if no-one is there than no-one can get injured.
- visible barrier shall be erected around the excavator to prevent person(s) from walking close to its operating envelope
- Excavations must be gas checked before any personnel enter if evidence of gaseous elements is suspected
- Excavators shall not be used for lifting purposes at any time
- Excavation machinery shall be subjected to daily inspection and regular maintenance

6.51. Security

Contractor shall include the provision of full-time security personnel to manage Security measures at the Location. These personnel form part of the Emergency Response Team (ERT) and assist in emergency evacuation of personnel. The security department shall take the following measures daily.

- Attendance record for all Location personnel including sub-contractors and visitors
- Issuing of visitor pass as per location procedure
- Vehicle movement record for all vehicles entering and leaving the Location
- Records for all incoming and outgoing machineries such as cranes, excavators, piling rigs, etc,
- Stop and conduct checks on all persons, their identities, and any items in their possessions, custody or control
- Declaration form by persons carrying personal phones, pagers, walkie-talkies
- Control and management of unauthorized parking at Location premises

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- Location patrol
- Support the Contractor Drug & Alcohol Monitoring and testing Procedure
- Support Contractor Management in handling cases of workers involved in misconduct /violations at the project location.

6.52. Location traffic & Transport of Material

Contractors shall ensure the following conditions are in place for transportation of materials:

- All vehicles must be roadworthy and conform to local legal requirements.
- Inspection and maintenance of all vehicles and construction equipment before mobilization on Location. Periodic maintenance to be conducted after mobilization on-Location. All vehicles must be wellmaintained, and exhaust emissions must be clean, with no visible black smoke. All safety features/devices shall be fully operative at all times.
- Risk assessment on the 'transport of materials to include as a minimum: loading, securing, unloading of materials, escorting heavy loads, escorting loads in complicated/congested routes, use of banksmen and spotters as needed, peak hour mobilizations, pre-checks of heavy loads routes and areas impacted by inclement weather.
- Training and authorization of drivers of all classes of vehicles and construction equipment. Contractors must ensure that only licensed and authorised personnel are allowed to drive
- Designating Location personnel to act as traffic controllers. Traffic controllers to be briefed on roles and responsibilities.
- Demarcation of areas on-Location where traffic is allowed to be made known to all Location personnel and visitors. Contractors must erect barricades and install signs to separate pedestrians from vehicles. Particular attention must be paid at entrances to the Location.
- Reverse sensors to be fitted on all vehicles where practicable. In the event where fitting of the sensors are impractical, traffic controllers should be deployed.
- Seat belts are compulsory for the drivers and passengers of all classes of vehicles.
- Vehicles must be parked at a designated car park and shall not block access or emergency points
- Traffic management will be coordinated through the BPCL project manager.
- Only authorised routes must be used to and from the Location- Mobilization route drawings must be communicated and update accordingly.

6.53. Piling

Contractor shall carry out Piling operations shall be carried out, as a minimum, in accordance with the following requirements:

- Method statements risk assessments and emergency procedure for piling works
- Structure adequately supported by sheet piling or other means of shoring in accordance with the design of a professional engineer (PE)
- Contractors shall assign an area for pile preparation at a safe distance away from the piling zone
- To determine the piling machine's safe working area/access on Location during operation/movement based on type of machine operated and the ground load bearing capacity e Provision of suitable PPE to protect rig operators and workers from falling objects, noise, etc, Inspection of the piling machine daily prior to start work. Ensure all safety mechanism/devices are well known by involved personnel and are in good working condition
- Submit the Work Permit for piling prior to work commencement and proceed work subject to approval from the Project Manager
- Suitable footing such as steel plate and hard core to be provided if piling rig is to be driven on soft ground
- Only trained and competent persons to operate piling machines With valid LM certificates
- Bored holes to be properly barricaded and/or effectively covered.

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- The piling machine shall be subjected to regular inspection and maintenance regime programme. It shall have updated and valid certification.

6.54. Demolition

Contractor shall perform demolition work in accordance with the following requirements:

- Method statements and risk assessments for demolition work shall include exposure to hazardous chemicals such as dust and toxic chemicals
- De-energize all electrical supply prior to commencement of demolition works
- Protection of adjacent structures against premature collapse
- Disposal of all types of waste in accordance to local authority requirements
- Demarcation for no-entry zones to prevent unauthorized entry into the structure being demolished.
- Appropriate PPE requirements such as safety harnesses, anchoring points, respirators, etc.

6.55. Commissioning

It is vital to mobilize commissioning managers and other key persons early, and to maintain continuity of people, planning and work processes from construction through cold commissioning to hot commissioning to start-up. Cold commissioning involves cleaning and functional testing of utility and process systems without the introduction of nitrogen and hydrocarbons. Hot commissioning involves introduction of hydrocarbons or other process materials for testing purposes and the functional testing of all remaining utility and process systems. During commissioning, BPCL work permit system will be used.

6.56. Environmental Management

BPCL Project team should audit the implementation of adequate environmental protection plan, procedures, protocols and actions.

Environmental management shall include the following.

- Waste management
- Chemicals management
    - Fugitive dust controls
- Noise and vibration controls
- Traffic management ensuring "clean wheel policy"
- Reinstatement of land after temporary works
- Vector controls (e.g. by dewatering, water treatment, use of water-based spraying of mosquitoes instead of thermal fogging, others)
- Rodent and pest controls
  Hygiene controls of office f and warehouse facilities and canteens
- Waste and spoil management to include hazardous waste (e.g. keeping a list of hazardous substances used and SDS, keeping a list and utilizing approved waste collectors, implementing programs to minimize waste by programme for recycling, reusing and recovering, others)Reporting of environmental incidents
- Training on environmental principles end procedures
- Effluent discharge controls
- Pollution prevention training
- Complying with all Pollution Control Board requirements
- Taking timely and adequate actions to resolve any potential audit observation

6.57. Waste Management

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All Contractors shall take provision for proper disposal of general and industrial waste at the Location. Collection of garbage and industrial waste should be conducted on a regular basis. Waste should be segregated based on the different types such as metal, wood, food, hazardous and general waste. General guidelines on disposal of waste should include the following.

Hazardous waste to be disposed in separate containers and clearly labelled. Contractors should engage a licensed industrial waste collector to dispose all hazardous waste. Hazardous waste includes waste generated from clinics such as

- Signs are to be placed at designated areas for the storage of waste bins or containers
- Batteries should be segregated and subsequently disposed in a safe and controlled manner
- Only approved contractors should be engaged for the recycling of scrap metal.
- Chemical containers and drums should be reused if still in good condition
- Disposal of garbage shall meet local legislative requirements and public health standards. Solid waste management shall be managed by the collection of refuse by licensed general waste collectors
- There shall not be any overloading or spillage of construction wastes from skips
- Refuse bins shall be properly covered
- Organic food wastes and construction wastes must not be stored together and shall be removed daily
- Waste/used oil shall be properly collected and sent to a pollution control board licensed collector/agency.
- dressings, swabs, used syringes, needles, cartridges, medicines, tablet and other chemical waste used in OHS centre.

6.58. Air Pollution Control by Contractors

- Lorries and vehicles carrying construction materials must be properly and adequately covered
- There shall not be any emission of dark smoke from construction equipment and machinery
- Open burning of construction waste is strictly prohibited.
- Dust preventive measures such as water sprinklers/spray, shielding, netting, covers/hoarding for aggregate/sand stores shall be provided and maintained.

6.59. Noise Pollution Control by Contractors

- DG sets at Location shall be with acoustic enclosure.
- Regular maintenance shall be carried out for all equipment and machinery to prevent excessive noise emission
- Noise monitoring activities may be needed/required on particular cases.

6.60. Toilet & Washing facilities by Contractors

Sufficient toilet and washing facilities at the Location office shall include the following facilities:

- Wash basins and showers shall be provided with hot and cold water, with soap and paper towels, continuous roller type towels or hand dryers
- Continuous supply of water should be provided at all times
- Toilet and washing facilities shall be kept clean and in working order
- Floors, walls, ceilings and fittings in the facilities should be of a finish that can be cleaned easily
- Waste water should be connected to a disposal drain and discharged to a drain

6.61. Canteen& Food Hygiene

Contractors shall maintain a high level of food hygiene at the Location. The necessary steps are to be taken to prevent food contamination that may lead to case(s) of food poisoning:

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- Provision of a designated area for consumption of food away from the Location.
- All Location personnel are to be briefed on good hygiene habits prior to consumption of food.
- Consumption of food at any other area other than the designated area should be strictly prohibited.
- Only food catering operators that are licensed are allowed to deliver food to the Location.
- Food handlers shall wear gloves or use tongs or other suitable implements when handling ready-to-eat or cooked food

6.62. Drinking Water

Contractors shall ensure the availability of sufficient potable drinking water for all personnel at the Location. Drinking water standards should meet WHO quality standards. Provision of potable drinking water and water stations shall also meet the following requirements:

- The stations for the drinking water and potable water tanks are to be labeled "Drinking Water" to differentiate from water used for industrial purposes
- Drinking water stations are to be indicated on the general Location layout plan to inform all personnel.

6.63. Lighting

Contractors shall provide sufficient and suitable lighting at every part of the Location as well as in the office. The requirements shall conform to the requirements stated in National building Code/OISD codes.

- General lighting requirements shall be as follows:
- Minimum 50 lux — for passageways, corridors and stairways
- Minimum 100 lux — for store rooms, toilets and wash rooms
- Minimum 200 lux -- moderate discrimination of detail required (eg. rough bench and machine work)
- Minimum 300 lux - close discrimination of detail required (eg. medium bench and machine work)
- Emergency lighting shall also be provided in the event of a power failure affecting the general lighting.

6.64. Health Monitoring

Health surveillance will be provided for staff where there is a legislative requirement or for staff who have been identified as having exposure to hazardous substances and the exposure to the hazardous substance is such that it is likely that an adverse effect on the staff's health may occur under the particular conditions of the work.

6.65. Procedures, Records Storage

BPCL HSSE procedures will be used as reference for Contractors compliance during the Construction Stage. Stringent of the two shall be complied with. Contractors Procedures will be aligned with BPCL Procedures. BPCL HSSE procedures will be fully in use during the commissioning stage,

Contractors shall ensure that the following records are obtained and kept on file:

- Insurance details for each contractor including Workers Compensation and Public Liability;
- Licenses and Permits
- Drivers license (motor vehicle and plant);
- Electrical contractors license;
- Crane drivers, signalmen, riggers, etc;

Contractors shall ensure that as a minimum the following documentation is maintained on the project:

- Details of HSSE training (external & In-house) and induction records, attendance records;
- Hot Work Permits and Confined Space permits; •Records of all accidents and near misses;

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- Details of all inspections, hazard/risk assessments;
- Copies of all Health & Safety reports

6.66. Emergency Response Plan (ERP)

Location shall develop and implement a comprehensive Emergency Response Plan to be used during the construction and commissioning phase. Communication with external authorities and Emergency Response Organizations shall be clearly defined.

A copy of the up-to-date Emergency Preparedness and Response Plan for each Area shall be made available as guide of the Emergency Response Team (ERT).

Specific high risk activities that require potentially complex rescues e.g. Confined Space within confined space or confined space requiring ventilation entry into a vessel loaded with trays or activities conduct from particularly high structures, such as flares, will be requires to have "Stand By" rescue personnel.

Locations shall ensure that contractors properly communicate the Emergency Respond Plan to their all personnel. Contractors will be responsible to ensure safety of all their supplier and short term service personnel and escort them at all time on Location.

All visitors and personnel entering the work Location shall be provided with instructions in what action to take in the event of a potential emergency situation. Key subject areas will be.

- Locations of medical facilities
- Overview of emergency plan and procedures
- Potential emergency threats on project
- Action to take in the event of an emergency
- Emergency notification alarms and their location
- Location of " Assembly Area"
- Action to be taken at a " Assembly Area"
- Medical Emergency response requirements
- First aid requirements
- Emergency Telephone numbers

6.67. Emergency Alarm System

Locations shall evaluate the need to install alarm systems. This could consist of the following.

- Gas Detection Alarm Systems
- Office Building Alarm System

6.68. Medical Facilities

Location shall maintain an OHS centre, equipped ambulance and first aid boxes at project Location as per the Building and Construction Workers Rules as applicable . Any project location more than 500 workers shall have one fully equipped ambulance van.

6.69. Incidents and Near Misses Reporting and Investigation

All accidents and dangerous occurrences shall be reported/ recorded as per BPCL IRIS system, regardless of whether or not personnel injury occurs.

- Fatal accident
- Lost Time Injury accident
- Dangerous occurrence
- Any incident involving a member of the public
- Near Misses

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BPCL shall conduct in-depth investigations into all fatal accidents, Lost Time injury, accidents, incidents involving a member of the public, dangerous occurrences. Copies of these investigations shall be forwarded to the contractor Representative.

6.70. Dangerous occurrence Reporting

- Bursting of a revolving vessel, wheel, and grindstone or grinding wheel moved by mechanical power.
- Collapse or failure of a crane, derrick, winch or other appliance used in raising or lowering persons or goods or any part thereof (except the breakage of chain or rope slings), or the overturning of the crane;
- Explosion or fire causing damage to the structure of any room or place in which persons are employed, or to any machine or plant, resulting in the complete suspension of ordinary work.
- Electrical short circuit or failure of electrical machinery, plant or apparatus, attended by explosion or fire, causing structural damage involving its stoppage or disuse.
- Explosion of a receiver or container used for the storage at a pressure greater than atmospheric pressure of any gas or gases (including air) or any liquid or solid resulting from the compression of gas.
- Collapse in whole or part from any cause whatsoever of any roof, wall, floor, structure or foundation forming part of the construction Location in which persons are employed.
- Total or partial collapse of any overburden, face tip or embankment on the construction Location.
- The overturning of, or collision with any object by any bulldozer, dumper, excavator, grader, lorry or shovel loader, or any mobile machine used for the handling of any substance on the construction Location.

6.71. Reporting of Fires to BPCL

The contractor shall report to the BPCL Representative all fires which occur on Location including any fires that have been extinguished by the contractor, and the Employers Representative may send staff to investigate such fires. The following information shall be provided:

- Time of fire;
- Location of fire;
- Means of extinguishing fire;
- Injury to any person / damage to any property; and
- The probable cause of fire.

6.72. Monthly Safety Submittal to the BPCL

The contractor shall submit following monthly reports to BPCL (but not limited to)

- Monthly report of total number of workmen.
- Total Man hours worked
- Number of LTI incidents
- Minutes of Location safety committee Meeting.
- Safety Inspection report
- Electrical Inspection Report
- Scaffold Inspection Report
- Crane Inspection Report
- Any potential concern

6.73. Safety Record to be maintained by contractor

The contractor shall submit following monthly reports to BPCL (but not limited to)

- Accident / Incident / Dangerous Occurrence report form.

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- Accident Statistic – Monthly report form.
- Contractors Monthly Safety report.
- Work permit records
- Risk Assessment worksheet.
- Safety Training Attendance record.
- Weekly Fire Fighting Equipment checklist.
- Electrical Inspection Report
- Scaffold Inspection Report
- Crane Inspection Report

6.74. Safety Inspections

Contractor shall establish following schedule of inspections as a minimum at each project Location and submit inspection checklist

Inspection Category	Inspection Type	Periodicity
Planned General Inspection	Contractor and subcontractor Location safety committee	Monthly
	Daily safety inspection by contractor Location safety Team	Daily
Routine Inspection	Inspection of equipment	Daily
Special inspection	As per equipment manufacturer's manual (scaffold, crane, HEMM, Electrical etc.)	----

6.75. Safety Recognition

Locations shall develop and implement recognition scheme to recognize outstanding safety performance of workers, supervisors and subcontractors. This recognition shall l be given out on a monthly basis.

BU/ Locations may award contractors who have performed well in best safety practices and achieved "Zero harm to People and Assets Incident" target.

7.0 Review

Corporate HSSE shall review this technical standard once in 2 years and need based in consultation with BU HSSE Role Holders.

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8.0 Definitions

Project	A project, by definition, is a temporary activity with a starting date, scope, specific goals and conditions, defined responsibilities, a budget, a planning, fixed end date, parties involved. It means here a EPC project related to construction and commissioning of a new installation at a new Location or expansion / modernization of existing installation at the existing Location. The project work activities may include but not limited to activities related to Construction, Erection, Modifications, Expansions, Maintenance, Demolishing, etc.
Project Safety Management Plan	A comprehensive document defining entire safety management system for the proposed activities. This shall be submitted by contractors in BU prescribed template and shall be approved by project owner/his representative prior to start of the work.
Project Locations	It includes A. New projects such as greenfield Locations as well as B. Projects within or adjacent to existing installation/plant (but separated by a fence with an independent access control. In case of project work , within or adjacent to existing installation/plan , prior work permit shall be required.

9.0 Abbreviations

API	American Petroleum Institute
ANSI	American National Standard Institute
ALARP	As Low As Reasonably Practicable
BPCL	Bharat Petroleum Corporation Limited
BU	Business Unit
EPC	Eraction, Procurement and Commissioning
FEED	Front-End Engineering Design
HSSE	Health, Safety, Security , Environment
HAZOP	Hazard and Operability Analysis
HIRA	Hazard Identification and Risk Assessment
IRIS	Incident Reporting and Investigation System
ISO	International Organization for Standardization
IS	Indian Standards
JSP	Job Safety Plan
OISD	Oil Industry Safety Directorate

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RLTIFR	Reportable Lost Time Injury Frequency Rate
OHSA	Occupational Health and Safety
P & ID	Piping & Instrument Diagram
PSP	Project Safety Plan
QRA	Quantitative Risk Assessment
SWP	Safe Work Procedure / Standard Operation Procedure
TS	Technical Standard
WPS	Work permit system

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Appendix 1 : Project Personnel Responsibilities

BPCL Project Leader : Specific Responsibilities may include:

- Ensure Project Safety Management Plan is developed and implemented for the project and actively promote safety via personal example and supervision.
- Ensure the allocation of adequate resources for implementation of the Project Safety Management Plan
- Promote the reporting of all incidents (including non-injury) by all employees
- Ensure an audit plan is in place to monitor the compliance and effectiveness of the Project Safety Management Plan
- Endorsement of the BPCL HSSE Policy

BPCL Project Engineers

Specific Responsibilities may include.

- Ensure the effective communication of the Project Safety Management Plan to all employees, Contractors and its subcontractors
- Ensure the Project Safety Management plan as documented is implemented and to actively promote via personal example and supervision
- Familiarization and compliance of legislation as applied to the project
- To ensure safety training and induction programme are formulated and exercised to all employees, Contractors and its subcontractors
- Promote a recognition Scheme for personnel and Contractors with outstanding safety performance
- Promote a safety accountability scheme to deal with personnel with under expectation safety performance
- Promote the reporting of all incidents (including non-injury) by all employees.
- Ensure that the Contractors and their subcontractors have undertaken their Health and Safety obligations
- Undergo necessary safety training and induction of each construction Location

BPCL Project HSSE Role Holders

- Daily job planning with contractors job representatives
- Audit / inspection the implementation of the BPCL Location Project Safety Management Plan as defined herein.
- Liaison with Contractors' safety personnel and line managers.
- Audit Contractor Line Management implementation of the Project Safety Management Plan
- Participate inspections of the work areas with Contractors Management
- Advise supervisory staff and employees in the implementation of strategies to identify and control potential hazards.
- Liaise with Contractor's Safety Role Holders to request to the Contractors action plans for safety performance improvement as needed
- Audit Contractors equipment and machinery inspection process
- Audit Contractors' Hazardous Materials storage and controls
- Conduct internal safety training

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- Participate in safety meetings, including the Project Safety Committee Meetings
- Incident recordings and investigations
- Safety discipline

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Appendix 2: Sample Template for Project Safety Management Plan

Project Details:

CLIENT/COMPANY	
PROJECT	

Prepared by:

Reviwed by:

Approved by:

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Sr. No	Particulars	Page No
	Name of contractor organization submitting Safety Management Plan	
	Authorized Person Submitting safety Plan & Contact details	
0.	Purpose of the Plan	
1.	Project Highlights • Title • Principal Employer • Project Brief • Period • Lay out plan • Contact No. of Principal Employer	
2.	Scope of the Contract against which this safety Plan is submitted	
3.	Reference Documents	
4.	Abbreviations /Definitions	
5.	General Duties of project managers	
6.	General Duties of workmen	
7	Safety Leadership, Policy & Objectives	
7.1	Safety Policy & involvement of leadership in Safety Implementation	
7.2	Contractor's Alcohol & Drug Policy	
7.3	Safety Objectives & Targets	
8	Contractor's safety Organization • Safety Committee • Project Director • Location Manager • Supervisor	

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	• Location Safety Head • Location SAFETY Managers • Location SAFETY Representatives • SAFETY Stewarts • Labor Welfare officer • Medical Officer & staff • Sub-contractors • Fire / Safety Watch • Quality Assurance Staff	
9	Hazard Identification , Risk assessment & Risk mitigation Procedure	
10	Facility & Equipment provided to safety personnel	
12	Selection , Control & evaluation of Sub contractor	
13	Issuing I Card & Maintaining Register of workman	
14	Health Surveillance & Facilities (Occupational Health center , Ambulance & First aid facilities)	
15	Contractor's Safety committee meetings	
16	Safety Department & Contractors Safety stewards meetings	
17	Pre start up meeting	
18	List of Safe Work Procedure to be maintained at Location	
19	Hazard Reporting & Rectification Procedure	
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21	Lockout & Tag out followed, if yes details	
22	Details of Persons Having "Certificate of Competency" on high risk activities including: • Work permit issuer • Electrical work • Operators- Crane, Hydra / Derrick • Drivers • Slinging & Rigging • Scaffold • Any other Note : Provide copies of certificates of competent persons	
23	a. Contractor's Safety Training , Promotion & Recognition b. Induction Training to project managers / officers/ supervisors (Prior to start the work) c. Induction Training to contractors (Prior to start the work) d. Training plan and agenda e. Competency assessment training f. Safety Internal auditor training g. Mandatory Safety Training to selected employees/	

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	workmen (Firefighting / First aid / Emergency drill) h. Safety Intranet i. Quarterly Safety Campaign j. Safety Signage k. List of Days to be celebrated l. Safety Rewards	
24	**Contractor's Safety Inspection System** a. Management Walk b. Daily Safety inspection by SAFETY Representative c. Daily Safety Inspection by contractor Safety Officer d. Scaffolding & Platform inspection (weekly) e. Lifting machines / tools inspection by Competent Authority –Annually f. Lifting appliances (Quarterly) – Inspection & color coding g. Electrical safety inspection – Monthly h. Heavy Earth moving machineries	
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32	List of standard IS approved PPEs provided at location	
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Appendix 3: Contractors Roles & Responsibilities

Contractor's Project Manager

The contractor's Manager has overall responsibility for the development and implementation of appropriate Location Managing and Health and Safety Standards of BPCL. He shall also keep all team members of their responsibilities, current, new and amended statutory requirements.

The contractor's representative shall inform the name of Location Manager to BPCL at least 3 weeks prior to commencement of work. He shall work closely with BPCL Project manager and BPCL Location Safety officer.

Contractor's Managers/ Supervisors

All managers / supervisors employed by the contractor shall conform to the following requirements:

i. The understanding and acceptance of their responsibilities under the BPCL health and Safety Policies and current Indian Health and Safety Legislation.

ii. Make themselves fully conversant with the contents of this document copy and operate within all legal and BPCL requirements applicable to the project location. This requires the continual and regular checking of these requirements in actual practice and taking any necessary corrective action.

iii. Ensuring that all newly engaged or transferred personnel under their control are made fully aware of any known hazards or processes within the project location and the preventative measures to be taken or provided to reduce the risk to personnel.

iv. Ensuring that all employees, including Supervisors, are properly trained for the specific tasks allotted to them. That all newly engaged and transferred employees receive the Health and Safety induction training prior to commencing work at the project location, and that they receive on the job training in health and Safety matters.

v. Ensuring that all personnel under their control are made fully aware of the emergency and evacuation procedures and that the locations of firefighting equipment, alarms, emergency doors and exit routes and assembly areas are pointed out to them.

vi. Making sure that all plant, tools and equipment at the location are maintained in a condition that is safe to use, that all the necessary Safety equipment is readily available, issued, used and maintained and that there is a safe means of access and egress to and from the work location at all times.

vii. Ensuring that the entire relevant safe operating procedures and systems of work instructions are generated, made known to all respective personnel and strictly adhered to. This includes the continual review of these procedures and instructions in practice and discussions with the employees concerned to ensure that they are workable and understood.

viii. Ensuring that all personnel under their control are adequately trained and capable of carrying out their duties correctly and safely, and that no newly engaged or transferred employees are required to undertake any task without the appropriate training, instruction and supervision.

ix. Knowing and thoroughly implementing the accident and incident reporting investigation procedure and taking prompt remedial action to prevent recurrences.

x. Assisting BPCL on investigations, complying with instructions given by him, and co-operating on areas recommended for improvement.

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xi. Demonstrating a personal interest in the health, Safety and welfare of personnel, applying a good standard of housekeeping within the work location and encouraging a positive response from other personnel by showing a high standard of self-discipline in respect of health and Safety.

xii. Maintaining a high standard of health and Safety at project location by the day to day Safety training, no matter how small the requirement, by individual instructions, as necessary.

xiii. Assisting the BPCL Representative on work location inspections and taking action any recommendations made, provided they are able to do so. Ensuring that in the event that any matter raised be unresolved, even with the facilities available to them, they refer the issue to the location Incharge/ Head.

xiv. Where new plant, equipment, process or changes are to be implemented within the work area, they are to make BPCL Representative(s) aware of the details and the potential effect such plant / equipment / practices are likely to have on the health and Safety of personnel in the work area.

xv. Seek the advice of the Location Incharge on matters of health and Safety, protective equipment, clothing, systems of work and procedures wherever any doubt exists.

xvi. Determine the requirements for protective equipment or clothing for operations and processes and requisition the same from stores and issue same to those requiring use of such equipment.

xvii. Notify their immediate superior of any defective, damaged or missing guards on machinery or plant and request that the matter be dealt with immediately prior to permitting the use of any such plant or machinery, etc.

xviii. Notifying the Location Incharge of all personnel whom they intend to employ on operations involving contact with hazardous process.

xix. The contractor's managers/ supervisors have an overall responsibility to ensure that all machinery, plant and equipment under their direct control are safe and without risk to employees.

xx. In the event of the contractor's managers/ supervisors not being able to resolve a health and Safety problem, especially ones reported to him by employees, he shall refer the matter to the BPCL project manager.

xxi. The contractor shall maintain Portable First Aid Boxes in fully equipped state at various places. The contractor shall ensure that at least one employee on every working shift, is a trained First Aider, capable of administering First Aid competently until the arrival of professional help, in an accident situation.

Contractor's Safety Officer

The contractor's Safety officer is primarily responsible for writing and the upkeep of his Safety Plan, and any other identified required procedures as the project progresses. Other responsibilities include, but are not limited to, advising the SM and any members of the project team on Safety matters, assuring compliance with BPCL Safety Manual and any other relevant Safety related documents, ensuring audits and inspections are conducted on a regular basis as required, ensure that personnel, at all levels within their scope receive appropriate Safety training through organized induction and refresher courses and activity toolbox talks , provide assistance to assure they fully comply with their responsibilities for Safety, chairing Safety committee meetings and constant liaison with the BPCL Safety Engineer. PSE shall be appointed and notified to the Employer in due course.

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Appendix 4 : Facilities /Equipment for the Contractor's Safety Function

The following minimum facilities shall be provided:

S.No	Safety monitoring and Audio-Visual equipment details	Quantity
1	Portable hand held Digital Sound Level Meter (SLM)	
2	Portable hand held Digital Lux Meter	
3	Laptop computer with standard configuration including multimedia facilities.	
4	Colour Printer	
5	Computer Projector with Screen	
6	Overhead Projector	
7	35mm Camera	
8	Digital Camera with flash (4 Mega pixel minimum) with video facility	
9	Digital still Camera with flash (4 Mega pixel minimum)	
10	Portable loud speaker (for tool box talk and emergency purpose)	
11	Communication facilities like mobile phones and Walky talky	
12	Accident Investigation kit	

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Appendix 5: Indicative Contractor Toolbox Meeting Structure

TOOLBOX MEETING STRUCTURE	
Coordinator	Contractor Supervisor
Attendees	Entire Work Crew for the workplace / work activity (Assemble workforce in groups of manageable size so the talk is effective)
Agenda	Supervisors shall consider the following when formulating the daily agenda: Work Permit Conditions PPE Requirements Area and Task risk analysis Emergency protocol, numbers and Assembly Areas Emergency Exit Routes (for new personnel) Equipment Condition and inspection Emergency Exit Routes (for new personnel) Dissemination of Safety Bulletins Significant Incidents / Near Misses / Preventive actions / Incident reports, safety trends & findings of incident investigations
Frequency	Daily/Weekly
Minutes	Toolbox meetings shall be considered a formal communication process and the recording of minutes with the standard Project Toolbox meeting record form shall be used

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Appendix 6: Indicative Project Safety Statistics

Name of Project :

A : General

Indicator	Total
Man-hours Current Reporting Period	
Accumulated Man-hours (Since start of project)	
Days without any Lost Time Injury	

B. Lead Safety Indicators

	Target	Actual
Total Number of hazards/ unsafe conditions/ unsafe act Reported	Numbers	
Near misses and findings closed on time	100 %	
Safety audit and inspection findings closed on time	100 %	
Number of Monthly Safety Walks (against plan)	Numbers	
Number of Monthly Safety Committee Meetings	Numbers	
Number of Monthly Mass Communication Meetings	Numbers	

C. Lag Safety Indicators

	Target	Actual
Fatality	Zero	
Lost Time Injury	Zero	
First Aid Case	Zero	
Dangerous Occurrences/ Near Misses	Zero	
Spills	Zero	
Fires	Zero	
Asset damage Incident	Zero	
Traffic Incidents	Zero	
Security Incident	Zero	
Penalty Notices / Discipline Action Taken	Zero	

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Total Lost Time Incident Rate (per 1,000,000 man-hours worked)	Zero	
Total Compensation Paid	Zero	

Appendix 7 : Project Safety Basic Safety Rules

1. Contractor shall appoint adequate number of qualified and experienced safety staff at the BPCL Project Location.
2. All equipment, tools, crane, vehicle etc. brought by the contractor shall be inspected to ensure compliance with the applicable Safety requirements. Only those equipment, tools, crane, vehicle etc that meets the requirements and are approved by the BPCL shall be permitted for use.
3. Such inspections shall be carried out independently as well as jointly by contractor and BPCL HSSE staff. Inspections checklists shall be used for these inspections.
4. Contractor employees shall comply with the BPCL HSSE procedures & policies as applicable at the concerned project location.
5. Contractor shall follow project safety management plan duly reviewed and approved by BPCL.
6. Contractor employees shall follow Safety precautions and procedures concerning specific operations and jobs. Work or task shall be performed according to established procedures and with the designated tools & equipment.
7. Contractor employees shall not start work until authorized by the area owner or work supervisor from BPCL or his authorized agency.
8. Contractor employees shall only carryout the assigned task under a work permit issued by the BPCL or his authorized agency.
9. Contractor employees shall not bring Radios, Mobile phones, lighters, matches, or any other form of ignition sources within project locations.
10. Firearms, ammunitions, knifes etc. shall be strictly prohibited at project locations and workers camps within Industrial Sector.
11. Contractor employees shall not carryout photography or use video camera within the project locations without written approval of BPCL concerned department.
12. No Smoking Policy shall be strictly followed for all projects.
13. All temporary buildings of contractors within project locations shall be located in an area approved by the BPCL area owner and HSSE Department.
14. All temporary offices, office wiring including accessories installed therein shall be subjected to inspection & approval of BPCL. Any changes to approved wiring or installation of new electrical accessories shall be submitted to BPCL for review and approval prior to implementation.
15. Contractor shall ensure that construction areas, fabrication shop, corridors, offices material storage area, workshops etc. have adequate natural or artificial lighting.
16. Contractor shall furnish adequate clean supply of potable water, containers disposable cups to their employees for drinking water.
17. Contractor shall furnish adequate portable toilet facilities for his employees. All portable toilets shall be kept clean and located in an easily accessible area. If they are to be used at night, the area shall have adequate illumination.
18. Contractor shall properly secure, transport, and use compressed gas cylinders. Cylinders not in use shall be capped and marked.
19. BPCL fire and emergency response equipment and systems shall not be used without authorization and/or for any non-emergency activity. Such equipment shall not be impaired (restricted access) by contractor work activity.
20. Contractor shall comply with applicable rules and regulations for disposal of debris, waste material including hazardous, toxic chemicals.
21. Contractor shall provide required safety signs, posters, warning lights, night lights, barricades and other devices/equipment necessary for all situations or for temporary hazards created by the contractors work activity.
22. All excavations made by the contractor shall be adequately protected to prevent sloughing of earth, by shoring or sloping and shall be protected against personnel slipping or falling into the excavation.
23. Contractor shall guard or place appropriate barricades around temporary openings in floor, temporary impairments to handrails, stairways, or walkways. Existing machinery or equipment guards shall not be modified or altered.
24. Work on live electrical systems shall be conducted in accordance with tag-out, lockout, and permit procedures.

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25. Contractor shall follow State Pollution Control Board regulations for safe handling, storage & disposal of materials from the work .
26. When it is necessary for a contractor to operate cranes or lifting operations within 4 meters of the vicinity of energized electrical lines, the contractor shall review the hazards and precautions with the Tenant concerned area supervisor / end user to determine whether the lines can be de-energized. If the lines are to remain energized, the contractor is responsible to install suitable guards to prevent an electrical arc or accidental circuit condition. For such situations contractor shall submit a method statement along with a checklist for verifying all requirements.
27. Contractor shall ensure identification of underground services /pipelines etc in consultation with end user / facility owner prior to execution of job.
28. Contractor shall ensure compliance to compatibility requirements for hazardous material and cylinders storage.
29. Contractor supervisory personnel shall develop method/system and implement it to ensure that all safety procedures are understood and followed. Contractor supervisory personnel shall, at all times, set a good safety example.
30. Contractors shall be accountable for their employees' compliance with the Tenant safety rules.
31. Where it is apparent that contractor employees are not following prescribed Tenant safety regulations, policies, or procedures, the person observing such situations should notify the Tenant Supervising Department, who will take the necessary action to ensure that safe work conditions are maintained.
32. Horseplay, fighting, gambling, possessions of firearms or explosives, use of regulated drugs or alcohol, being under the influence of drugs or alcohol, theft, vandalism, sabotage, and distribution of unauthorized literature shall not be permitted. Those involved in such activities shall be removed from the project location and shall be liable for punishment by applicable law.
33. **For Project Locations, within existing installations/plants,** Contractor shall not perform any of the following jobs without the specific permission of the area supervisor / end user:

    a. Make repairs or changes to existing equipment
    b. Operate any valve, switch, or instrument control device.
    c. Operate any utility services such as electricity, water, air, nitrogen, etc.
    d. Connect into existing pipelines
    e. Connect into existing sewers
    f. Connect into existing electrical system or electrically operated equipment
    g. Operate electrical equipment or electrical switches
    h. Enter any closed vessel, tank, container, pit, excavations, or other confined space
    i. Perform work involving radiography (X-ray etc.)
    j. Use entity's pipelines, electrical conduits, handrails, or structures as supports for loads, ladders, or scaffolds
    k. Use entity's structure, pipe or other equipment for attaching blocks, lines, or other services which apply loads on the equipment
    l. Install guy lines across electrical lines
    m. Operate cranes or derricks near electrical lines
    n. Work on any machinery while it is in operation
    o. Dispose any material in unauthorized areas
    p. Make excavations without adequate protection to prevent sloughing and without fencing to prevent personnel from failing into them
    q. Operate electrical equipment without grounding or ground fault circuit interruption (GFCI) protection
    r. Move suspended loads without securing load to prevent swinging
    s. Operate any metal-wheeled equipment without adequate protection for the street paving.

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ANNEXURE-XV TO SPECIAL CONDITIONS OF CONTRACT

1) OISD-192
2) OISD-207

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SAFETY PRACTICES DURING CONSTRUCTION

Engineers India Ltd

OISD-GDN-192
Second Edition, April, 2016
First Edition, July, 2000



Oil Industry Safety Directorate

Government of India
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SAFETY PRACTICES DURING CONSTRUCTION

Prepared by

COMMITTEE ON
SAFETY PRACTICES DURING CONSTRUCTION

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Preamble

Indian petroleum industry is the energy lifeline of the nation and its continuous performance is essential for sovereignty and prosperity of the country. As the industry essentially deals with inherently inflammable substances throughout its value chain – upstream, midstream and downstream – Safety is of paramount importance to this industry as only safe performance at all times can ensure optimum ROI of these national assets and resources including sustainability.

While statutory organizations were in place all along to oversee safety aspects of Indian petroleum industry, Oil Industry Safety Directorate (OISD) was set up in 1986 Ministry of Petroleum and Natural Gas, Government of India as a knowledge centre for formulation of constantly updated world-scale standards for design, layout and operation of various equipment, facility and activities involved in this industry. Moreover, OISD was also given responsibility of monitoring implementation status of these standards through safety audits.

In more than 25 years of its existence, OISD has developed a rigorous, multi-layer, iterative and participative process of development of standards – starting with research by in-house experts and iterating through seeking & validating inputs from all stake-holders – operators, designers, national level knowledge authorities and public at large – with a feedback loop of constant updation based on ground level experience obtained through audits, incident analysis and environment scanning.

The participative process followed in standard formulation has resulted in excellent level of compliance by the industry culminating in a safer environment in the industry. OISD – except in the Upstream Petroleum Sector – is still a regulatory (and not a statutory) body but that has not affected implementation of the OISD standards. It also goes to prove the old adage that self-regulation is the best regulation. The quality and relevance of OISD standards had been further endorsed by their adoption in various statutory rules of the land.

Petroleum industry in India is significantly globalized at present in terms of technology content requiring its operation to keep pace with the relevant world scale standards & practices. This matches the OISD philosophy of continuous improvement keeping pace with the global developments in its target environment. To this end, OISD keeps track of changes through participation as member in large number of International and national level Knowledge Organizations – both in the field of standard development and implementation & monitoring in addition to updation of internal knowledge base through continuous research and application surveillance, thereby ensuring that this OISD Standard, along with all other extant ones, remains relevant, updated and effective on a real time basis in the applicable areas.

Together we strive to achieve NIL incidents in the entire Hydrocarbon Value Chain. This, besides other issues, calls for total engagement from all levels of the stake holder organizations, which we, at OISD, fervently look forward to.

Jai Hind!!!

Executive Director
Oil Industry Safety Directorate

Engineers India Ltd.

FOREWORD

At the time of development of this document, 113 OISD standards, recommended practices and guidelines are applicable to the Oil and Gas installations of Public sector Oil Companies in India. 11 of these standards have been adopted by Petroleum and Explosives Safety Organisation (PESO) in various rules administered by them and thus the provisions of these standards are mandatory for entire Oil & Gas sector to that extent.

A few serious accidents have occurred in the recent past in India and abroad including vapour cloud explosion and fire at Oil terminal near Jaipur emphasised the need for the industry to review the existing provisions of various guidelines and statutory requirements.

With the above in view the Government of India directed the Oil Industry Safety directorate to develop a comprehensive document covering all the facets of Safety in Design, Operation and Maintenance, of depots and terminals being run by marketing divisions of Oil companies with an objective to strengthen the existing system.

The present guideline on "Safety Practices During Construction" has been prepared by the functional committee based on, existing standards, guidelines & recommended practices of OISD, the recommendations arising out of recent major accidents and their analysis, the accumulated knowledge and experience of industry members in India and updation of National and International codes and practices.

The provisions of this document, if implemented objectively, may go a long way in enhancing overall safety standard and reduce accidents in Oil Installations.

Users are cautioned that no standard can be substitute to the "judgment and experience of Engineers"

This document will be reviewed periodically for improvements based on the new experiences and better understanding. Suggestions are also invited from the users after it is put into practice to improve the document further. Suggestions may be addressed to:

The Co-ordinator
Committee on "Safety Practices during Construction"

Oil Industry Safety Directorate

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This document in no way supersedes the statutory regulations of Chief Controller of Explosives (CCE), Factory Inspectorate or any other statutory body, which must be followed as applicable.

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These documents are intended to supplement rather than replace the prevailing statutory requirements.

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In addition to the above, several other experts from Industry contributed in the preparation, review and finalisation of this Guideline.

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SAFETY PRACTICES DURING CONSTRUCTION

1.0 INTRODUCTION

Safety in Construction Management deserves utmost attention especially in the hydrocarbon industry, such as Exploration, Refineries, Pipelines and Marketing installations, Gas Processing units etc. Construction is widely recognised as one of the accident prone activities. Most of the accidents are caused by inadequate planning, failure during the construction process and/or because of design deficiencies. Besides property loss, accidents also result in injuries and fatalities to the personnel, damage to environment which needs to be prevented.

The reasons for accidents during construction activities are related to unique nature of the industry, human behaviour, difficult work-site conditions, extended odd duty hours, lack of training & awareness and inadequate safety management. Unsafe working methods, lack of proper JSA (Job Safety Analysis) and use of improper / inadequate PPEs, equipment failure and improper housekeeping also tend to increase the accident rate in construction.

Ensuring good quality of materials, equipment and competent supervision along with compliance of standard engineering practices shall go a long way to in built safety into the system.

The objective of this document is to provide practical guidance on technical and educational framework for health, safety and environment in construction with a view to:

(a) prevent accidents and harmful effects on the health of workers arising from employment in construction;
(b) ensure appropriate safety during implementation of construction;
(c) provide safety practice guidelines for appropriate measures of planning, control and enforcement.
(d) protect environment.

2.0 SCOPE

This document specifies broad guidelines on HEALTH, SAFETY AND ENVIRONMENT practices to be adhered to during construction activities including green field projects in oil industry. However, before commencing any job, specific hazards and its effects should be assessed and necessary corrective/preventive actions should be taken by all concerned. The document is intended only to supplement and not to replace or supersede the prevailing statutory requirements, which shall also be followed as applicable. For Personal Protective Equipment, OISD-STD-155 (Part I&II) shall be referred to. The scope of this document does not include the design aspects and quality checks during construction.

3.0 DEFINITIONS

Definitions of various terminology are given below:

- **Adequate, appropriate or suitable** are used to describe qualitatively or quantitatively the means or method used to protect the men, machinery, material, property and enviroment.

- **By hand:** The work is done without the help of a mechanised tool.

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- **Competent Authority:** A stautory agency having the power to issue regulations, orders or other instructions having the force of law.

- **Competent person:** A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill for the safe performance of the specific work. The competent authorities may define appropriate criteria for the designation of such persons and may determine the duties to be assigned to them.

- **Construction site:**

  A worksite involving new construction, modification or maintenance of existing facility, shutdown related activity, demolition, housekeeping etc.

- **Environment:**

  Environment includes water, air and land and the interrelationship which exists among and between water, air and land and human beings, other living creatures, plants, microorganisms and property.

- **Execution agency:**

  Any entity / person, having contractual obligation with the owner and who employs one or more workers on a construction site.

- **Hazard:** A condition or a set of conditions which has potential of causing injury to person, damage to property or environment.
- **Health:** Soundness of body covering Physical, Emotional, Psychological and Intellectual conditions of a worker which assists the attainment of the objectives.
- **Means of access or egress:** Passageways, corridors, stairs, platforms, ladders and any other means for entering or leaving the workplace or for escaping in case of danger.

- **Owner:** Any entity **/** person for whom construction job is carried out.

  It shall also include owner's designated representative/ consultant/ nominee/ agent, authorised from time to time to act for and on its behalf for supervising/ coordinating the activities of the execution agency.

- **Scaffold:** Any fixed, suspended or mobile temporary structure supporting workers and material or to gain access to any such structure and which is not a lifting appliance.
- **Safety :** Prevention & protection from exposure to Hazard.

- **Worker:** Any person engaged in construction activity.

- **Workplace:** Owner's designated premises where workers need to be present by virtue of their involvement in the construction activity**.**

4.0 GENERAL DUTIES

4.1 GENERAL DUTIES OF EXECUTION AGENCIES

4.1.1 Execution agency should:

i) provide means and organisation to comply with the Health, safety and environment protection measures required at the workplace.

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ii) provide and maintain workplaces, plant, equipment, tools and machinery and organise construction work so that, there is no risk of accident or injury to health of workers. In particular, construction work should be planned, prepared and undertaken so that:

(a) dangers liable to arise at the workplace, are prevented;
(b) excessively or unnecessarily strenuous work positions and movements are avoided;

- organisation of work takes into account the safety and health of workers and also environment protection;
- materials and products used are suitable from Health safety and environment protection point of view;

(c) working methods are adopted to safeguard workers against the harmful effects of chemical, physical and biological agents.

iii) establish committees with representatives of workers and management or make other arrangement for the participation of workers in ensuring safe working conditions.

iv) arrange for periodic safety inspections by competent persons of all buildings, plant, equipment, tools, machinery, workplaces and review of systems of work, regulations, standards or codes of practice. The competent person should examine and ascertain the safety of construction machinery and equipment.

v) provide such supervision to ensure that workers perform their work with due regard to safety and health of theirs as well as that of others.

vi) employ only those workers who are qualified, trained and suited by their age, physique, state of health and skill.

vii) satisfy themselves that all workers are informed and instructed in the hazards connected with their work and environment and trained in the precautions necessary to avoid accidents and injury to health.

viii) ensure that buildings, plant, equipment, tools, machinery or workplaces in which a dangerous defect has been found should not be used until the defect has been rectified.

ix) organise for and remain always prepared to take immediate steps to stop the operation and evacuate workers as appropriate, where there is an imminent danger to the safety of workers.

x) establish a checking system by which it can be ascertained that all the members of a shift, including operators of mobile equipment, have returned to the camp or base at the close of work on dispersed sites and where small groups of workers operate in isolation.

- provide appropriate first aid, training and welfare facilities to workers as per various statutes like the Factories Act 1948, Building & Construction Workers Regulation (BOCWR), etc. and, whenever collective measures are not feasible or are insufficient, provide and maintain personal protective equipment and clothing in line with the requirement as per OISD-STD-155 (Part I & II) on Personnel Protective

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Equipment. They should also provide access to workers to occupational health services.

- educate workers about their right and the duty at any workplace to participate in ensuring safe working conditions to the extent of their control over the equipment and methods of work and to express views on working procedures adopted as may affect health, safety and environment.

xi) ensure that except in an emergency, workers unless duly authorised, should not interfere with, remove, alter or displace any safety device or other appliance furnished for their protection or the protection of others, or interfere with any method or process adopted with a view to avoiding accidents and injury to health.

xii) ensure that workers do not operate or interfere with plant and equipment that they have not been duly authorised to operate, maintain or use.

xiii) ensure that workers do not sleep, rest or cook etc in dangerous places such as scaffolds, railway tracks, garages, confined spaces or in the vicinity of fires, dangerous or toxic substances, machines or vehicles and heavy equipment etc.

xiv) obtain the necessary clearance/permits as required and specified by owner.

Arrangement for drinking water, toilet facilities, a creche and transport arrangement etc. to be provided as per statutory requirement.

xv) deploy a safety officer at site as per the requirement of Factory Act 1948/ Building & Construction Workers Regulation (BOCWR)/ Criticality of the job.

xvi) ensure that all employees/workmen undergo medical examination as required under the law or under the contract provision and keep a record of the same.

xvii) obtain the police verification of the workers/ supervisors arranged by him and the same is to be submitted to the owner.

xviii) not permit any employee/workmen/visitor to enter the work area under the influence of alcohol or any drugs.

4.2 GENERAL DUTIES OF OWNERS

4.2.1 Owners should:

i) co-ordinate or nominate a competent person to co-ordinate all activities relating to HEALTH, SAFETY AND ENVIRONMENT on their construction projects;

ii) inform all contractors on the work site / project of special risks to HEALTH, SAFETY AND ENVIRONMENT;

iii) ensure that executing agency is aware of the owner's requirements and the executing agency's responsibilities with respect to HEALTH, SAFETY AND ENVIRONMENT practices before starting the job.

5.0 SAFETY PRACTICES AT WORK PLACES

5.1. GENERAL PROVISIONS

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5.1.1 All openings and other areas likely to pose danger to workers should be clearly indicated and accident prevention measures taken as required. The working area should be clearly de-marketed to keep the workers in that area only.

5.1.2 Workers & Supervisors should use the safety helmet and other requisite Personal Protective Equipment according to job & site requirement as per OISD-STD-155 (Part I & II). They should be trained to use personal protective equipment including their limitations.

5.1.3 Never use solvents, alkalis and other oils to clean the skin.

5.1.4 Lift the load with back straight and knees bent. The contractor shall ensure at his construction site, no worker lifts by hand or carries overhead or over his back or shoulders any material, article, tool or pipelines exceeding in weight as per The Factory Act 1948 / Rule 38 of Building & Construction Workers Regulation (BOCWR), unless aided by another worker or device.

5.1.5 Ensure the usage of correct and tested tools and tackles. Don't allow the make shift tools and tackles. Also the tools should be suitable for a particular job and rated accordingly.

5.1.6 No loose clothing should be allowed while at construction site.

5.1.7 Start work only after proper authorization viz Work permit etc.

5.1.8 Job safety analysis to be done for all critical works.

5.1.9 Hydra should not be used for transportation of hook loaded materials.

5.1.10 Rope ladders should not be used at construction sites.

5.2 MEANS OF ACCESS AND EGRESS

Adequate and safe means of access (atleast two, differently located) to and egress from all workplaces should be provided. Same should be displayed and maintained. Escape routes should be marked prominently in workers friendly language. The escape routes should not be blocked at any point of time and same to be made understand to the workers.

5.3 HOUSEKEEPING

5.3.1 General Housekeeping shall be carried out by the contractor and he will ensure;

i) proper storage of materials and equipment;

ii) removal of scrap, inflammable material, waste and debris at appropriate intervals including slippery materials. (construction sand on road, oil/ lubricants, resins, etc.).

iii) to provide containers for segregation of disposal of debris at required places and regular cleaning of the same.

5.3.2 Removal of loose materials, which are not required for use, to be ensured. Accumulation of these at the site can obstruct means of access to and egress from workplaces and passageways.

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5.3.3 Workplaces and passageways, that are slippery owing to oil, grease or other causes, should be cleaned up or strewn with sand, sawdust, ash etc.

5.3.4 All surplus earth and debris are removed/disposed off from the working areas to officially designated dumpsites. The debris like plastics, packing material, rubber items should not be allowed to burn. Trucks carrying sand, earth and any pulverized materials etc. in order to avoid dust or odour impact, shall be covered while moving.

5.4 PRECAUTIONS AGAINST THE FALL OF MATERIALS & PERSONS AND COLLAPSE OF STRUCTURES

5.4.1 Precautions should be taken such as the provision of fencing, look-out men or barriers to protect any person against injury by the fall of materials, or tools or equipment being raised or lowered.

5.4.2 Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or parts of structures that are being erected, maintained, repaired, dismantled or demolished.

5.4.3 All openings through which workers are liable to fall should be kept effectively covered or fenced and displayed prominently.

5.4.4 SOP of crane operation should be adhered to. The crane jacks/legs should be parked on compacted surface to avoid tilting.

5.5 PREVENTION OF UNAUTHORISED ENTRY

5.5.1 Construction sites located in built-up areas and alongside vehicular and pedestrian traffic routes should be fenced to prevent the entry of unauthorised persons.

5.5.2 Visitors should not be allowed access to site(s) unless accompanied by or authorised by a competent person. All authorized visitors should report at the site office. Contractor shall provide visitor's helmet (helmet with visitor sticker) and other PPEs like Safety Shoe, reflective jacket, respiratory protection etc. as per requirement of the site. All the workers to have photo IDs including the staff of vehicles used in the job.

5.6 FIRE PREVENTION AND FIRE FIGHTING

5.6.1 All necessary measures should be taken by the executing agency and owner to:

i) avoid the risk of fire;
ii) control quickly and efficiently any outbreak of fire;
iii) bring out a quick and safe evacuation of persons.
iv) Inform unit/fire station control room, where construction work is carried out within existing operating area.
v) DMP should be in place for the same.

5.6.2 Combustible materials such as packing materials, sawdust, greasy/oily waste and scrap wood or plastics should not be allowed to accumulate in workplaces but should be kept in closed metal containers in a safe place. To be disposed periodically away from site at designated place and assigned manner.

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5.6.3 Places where workers are employed on works prone to danger of fire should be provided with:

i) suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible;
ii) an adequate water supply at sufficient pressure meeting the requirements of various OISD standards.
iii) required PPEs.

5.6.4 To guard against danger at places having combustible material, workers should be trained in the action to be taken in the event of fire, including the use of means of escape.

5.6.5 At sites having combustible material, suitable visual sign boards should be provided to indicate clearly the direction of escape in case of fire.

5.6.6 Means of escape should be kept clear at all times. Escape routes should be frequently inspected and if possible marked in fluorescent colours particularly in high structures and where access is restricted.

5.7 LIGHTING

5.7.1 Where natural lighting is not adequate, working light fittings or portable hand-lamps should be provided at workplace on the construction site where a worker will do a job.

5.7.2 Emergency lighting should be provided for personnel safety during night time to facilitate standby lighting source, if normal system fails.

5.7.2 Artificial lighting should not produce glare or disturbing shadows.

5.7.3 Lamps should be protected by guards against accidental breakage.

5.7.4 The cables of portable electrical lighting equipment should be of adequate size & characteristics for the power requirements and of adequate mechanical strength to withstand severe conditions in construction operations.

5.7.5 For temporary lighting connection, mostly neutral and phases are connected and insulation tapes are provided. It is better to stagger the neutral and phase connection so that even if the tape gets removed from the joints, there will be no short circuit/ spark between neutral and phase due to staggering of neutral and phase.

5.7.6 All the temporary lighting/ machine connections are to be provided from a three core cable for better safety.

5.8 PLANT, MACHINERY, EQUIPMENT AND HAND TOOLS

5.8.1 General Provisions

i) Plant, machinery and equipment including hand tools, both manual and power driven, should:
   a) be of proper design and construction, taking into account health, Safety and ergonomic principles.
   b) be maintained in good working order;
   c) be used only for work for which they have been designed.
   d) be operated only by workers who have been authorised and given appropriate training.

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e) be provided with protective guards, shields or other devices as required.

ii) Adequate instructions for safe use should be provided.

iii) Standard operating procedures should be established and used for all plant, machinery and equipment.

iv) Operators of plant, machinery and equipment should not be distracted while work is in progress.

v) Plant, machinery and equipment should be switched off when not in use and isolated before any adjustment, clearing or maintenance is done.

vi) Where trailing cables or hose pipes are used they should be kept as short as practicable and not allowed to create a hazard.

vii) All moving parts of machinery and equipment should be enclosed or adequately guarded.

viii) Every power-driven machine and equipment should be provided with adequate means, immediately accessible and readily identifiable to the operator, of stopping it quickly and preventing it from being started again inadvertently.

ix) Operators of plant, machinery, equipment and tools should be provided with PPEs, including where necessary, suitable ear protection.

5.8.2 Hand tools

i) Hand tools should be repaired by competent persons.

ii) Heads of hammers and other shock tools should be dressed or ground to a suitable radius on the edge as soon as they begin to mushroom or crack.

iii) When not in use and while being carried or transported, sharp tools should be kept in sheaths, shields, chests or other suitable containers.

iv) Only insulated or non-conducting tools should be used on or near live electrical installations.

v) Only non-sparking tools should be used near or in the presence of flammable or explosive dusts or vapours.

5.8.3 Pneumatic Tools

i) Operating triggers on portable pneumatic tools should be:
   a) so placed as to minimise the risk of accidental starting of the machine.
   b) so arranged as to close the air inlet valve automatically when the pressure of the operator's hand is removed.

ii) Hose and hose connections for compressed air supply to portable pneumatic tools should be:

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a) designed and tested for the pressure and service for which they are intended;
b) fastened securely on the pipe outlet and equipped with the safety chain, as appropriate.

iii) Pneumatic shock tools should be equipped with safety clips or retainers to prevent dies and tools from being accidentally expelled from the barrel.

iv) Pneumatic tools should be disconnected from power and the pressure in hose lines released before any adjustment or repair is made.

5.8.4 Electrical Tools

i) Low voltage portable electrical tools should generally be used.

ii) All electrical tools should be earthed, unless they are "all insulated" or "double insulated" tools which do not require earthing.

iii) All electrical tools should get inspected and maintained on a regular basis by a competent electrician and complete records kept.

iv) No temporary connected appliance shoud be left connected in the socket. Its plug should be immediately removed after use.

5.8.5 Engines

i) Engines should:

a) be installed so that they can be started safely and the maximum safe speed cannot be exceeded.
b) have controls for limiting speed.
c) have devices to stop them from a safe place in an emergency.
d) have their batteries top covered with insulating material.
e) have radiator fan covers in place.

ii) IC engines should not be run in confined spaces unless adequate exhaust ventilation is provided or the exhaust should be installed outside the confined place at suitable height.

iii) When IC engines are being fuelled:

a) the engine should be shut off.
b) care should be taken to avoid spilling fuel.
c) no person should smoke or have an naked light in the vicinity.
d) a fire extinguisher should be kept readily available.

iv) Secondary fuel reservoir should be placed outside the engine room.

6.0 CONSTRUCTION ACTIVITIES

The various common activities in construction are as under:

- Excavation
- Scaffolding, Platforms & Ladders
- Structural Work, Laying of Reinforcement & Concreting
- Road Work (Laying of roads)
- Cutting /Welding
- Working in Confined Space

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- Proof/Pressure Testing
- Working at Heights
- Handling & Lifting Equipment
- Vehicle Movement
- Electrical
- Offshore
- Demolition
- Radiography
- Shot blasting/ spray painting
- Work above water

Work permit system as per requirement of OISD-STD-105 shall be followed for various construction activities. As regards the activities at work places including grass root project sites if not covered under OISD-STD-105, owner shall develop a suitable methodology for execution of various construction activities under work permit system for safe execution of the works.

The safe practices to be followed during the implementation of above construction activities are given below:

6.1 EXCAVATION

6.1.1 All excavation work should be planned and the method of excavation and the type of support work required should be decided considering the following:

i) the stability of the ground including the chances of seepage of water;
ii) the excavation will not affect adjoining buildings, structures or roadways;
iii) to prevent hazard, the Hydrocarbon lines, water, electrical and other above ground & underground public utilities should be shut off, re-routed or disconnected, if necessary; If such a presence is envisaged, clearance to be taken from respective competent authority/ person.
iv) the position of culvert/bridges, temporary roads and spoil heaps should be determined;
v) a signed rough sketch of the excavation site to be prepared and made the workers understand

6.1.2 Before digging begins on site, all excavation work should be planned and the method of excavation and the type of support work required should be decided based on good engineering practices and recorded.

6.1.3 All excavation work should be supervised by a competent person.

6.1.4 Sites of excavations should be thoroughly inspected:

i) daily, prior to each shift and after interruption in work of more than one day;
ii) after every blasting operation;
iii) after an unexpected fall of ground;
iv) after substantial damage to supports;
v) after a heavy rain, frost or snow;
vi) when boulder formations are encountered.
vii) for cracks in the nearby buildings or area as the excavation progresses and the same to be reviewed.

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6.1.5 Safe angle of repose while excavating trenches exceeding 1.5m depth upto 3.0m should be maintained. Based on site conditions, provide proper slope, usually 45^0,and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock or provide proper shoring and strutting to prevent cave-in or slides.

6.1.6 As far as possible, excavated earth should not be placed within one meter of the edge of the trench or depth of trench whichever is greater.

6.1.7 Don't allow vehicles to operate too close to excavated area. Maintain atleast 2m distance from edge of excavation or depth of trench whichever is greater. No load, plant or equipment should be placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endanger any person unless precautions such as the provision of shoring or piling are taken to prevent the sides from collapsing.

6.1.8 Adequately anchored stop blocks and barriers should be provided to prevent vehicles being driven into the excavation. Heavy vehicles should not be allowed near the excavation unless the support work has been specially designed to permit it.

6.1.9 If an excavation is likely to affect the stability of a structure on which persons are working, precautions should be taken to protect the structure from collapse.

6.1.10 Barricade at 1m height (with red & white band/self glowing caution board) should be provided for excavations beyond 1.0 m depth. Provide two entries/exits for such excavation through proper means. Lighting arrangements to be made to avoid any accidental fall in the excavated portion even when work is not in progress.

6.1.11 Necessary precautions should be taken for underground utility lines like cables, sewers etc. and necessary approvals/clearances from the concerned authorities shall be obtained before commencement of the excavation job.

6.1.12 Water shall be pumped/ bailed out, if any accumulates in the trench. Necessary precautions should be taken to prevent entry of surface water in trenches.

6.1.13 During / after rains, the soil becomes loose. Take additional precaution against collapse of side wall. During rains excavation should be avoided.

6.1.14 In hazardous areas, air should be tested to ascertain its quality. No one should be allowed entry till it is suitable for breathing.

6.1.15 In case of mechanised excavation, precaution shall be taken to not to allow anybody to come within one meter of extreme reach of the mechanical shovel. This area of reach of mechanical shovel should be marked / barricaded suitably. The mechanised excavator shall be operated by a well-trained experienced operator. When not in operation, the machine shall be kept on firm leveled ground with mechanical shovel resting on ground. Wheel or belt shall be suitably jammed to prevent any accidental movement of the machine. Suitable precautions as per manufacturer guidelines should be taken for dozers, graders and other heavy machines.

6.1.16 In case of blasting, follow strictly IS:4081-1986 & Indian Explosive Act and rules for storage, handling and carrying of explosive materials and execution of blasting operation.

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6.2 SCAFFOLDING, PLATFORMS & LADDERS

System of tagging shall be followed to indicate status of `Fit-for-Purpose' certification by a competent person for the scaffoldings. Green Tag shall indicate `Fit-for-Purpose' whereas Red Tag shall indicate `Unfit-for-purpose'. Accordingly only Red Tag shall be displayed during Erection & Dismantling.

All personnel engaged in erecting, using, dismantling scaffolds shall use full body safety harness with double lanyard with shock absorber connected with personal fall arrestor which should be secured to a properly designed anchor.

6.2.1 Scaffold related guidelines

General Requirements

Categories and Classification

Most scaffolds fall into one of the four primary categories:

- Tube and coupler scaffold
- System scaffolds e.g. Cup lock, Ring lock, H frame scaffold
- Suspension(or Suspended) scaffold
- Mobile scaffold
- Special scaffold

Scaffolds are classified according to their intended use as:

- Light duty
- Medium duty (General Purpose)
- Heavy duty

Type of Scaffolding	Load duty	Light		Medium	Heavy/Special		
	Maximum Safe load in Kg/m^2	75	150	225	300	450	600
Tubular with clamps	Max. bay length (distance between two verticals) in Meter	2.7	2.2	1.8	1.4	1.0	0.8
Cup / Ring lock		2.5	2.0	1.5	1.25	1.0	NA

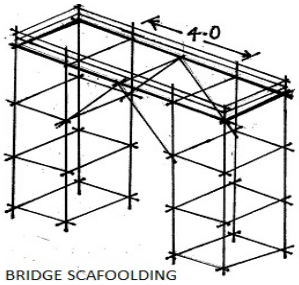
Conditions where special scaffolding procedure is required:

1. Height of the scaffolding is more than 30 meters.

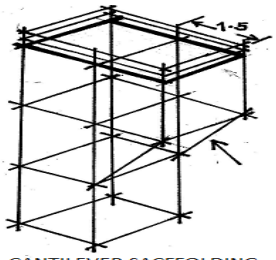
2. Scaffolding is special in nature/ type: cantilever more than 1 .5 meters, bridge more than 4 meters, scaffolding for machine/ equipment maintenance requiring frequent modifications, offshore scaffold, hanging scaffold; wooden scaffold (for specific use e.g. cooling tower), etc.

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BRIDGE SCAFOOLDING



CANTILEVER SACFFOLDING

For all such cases, but not limited to, in addition to checklist, a plant specific procedure cum checklist based on additional risk is to be prepared & validated by a competent person (example: procedure for erection/ dismantling shall be prepared and followed. If need felt, help from Engineering Cell/Third Party may be taken for checking proposed scaffold in respect of design and load carrying capacity etc.).

Specifications of Scaffolds

Applicable to all Scaffolds

1. All elevated structures/ working platform areas should be guarded on all sides.

2. Railings and toe boards should be provided on the platform.

3. Scaffolds shall be designed to support at least 4 times the anticipated weight of Men, material and wind force.

4. Make certain that all scaffolds are in plumb and level at all times.

5. Scaffolds shall be secured from tipping when the scaffold height exceeds four times its minimum base dimension.

6. Scaffolds must be constructed at least **3** planks wide unless location makes this physically impossible.

7. Landing platform should be provided at every 9 meter of height or less.

8. The members of scaffolds should extend at least 6" on either ends but not more than 12". They should be fastened on both ends and laid tight by clamps.

9. All scaffoldings having height to base ratio more than 4 shall be secured firmly with permanent structure in X and Y direction at least every 6 meters.

10. Scaffold which spread to 20 meter or more should have two accesses preferably opposite side.

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11. Plastic Checklist holder with red marked to be used as a “Not Fit-for-Purpose” warning signboard and Green colour combined checklist to be used as “Fit-for-Purpose” signboard.

12. Keep distance of at least 150mm between high temp Pipelines or equipment and scaffolding.

13. Safe distance from overhead electrical lines to be maintained as per Site electrical safety procedures.

Applicable to Tube-and-coupler scaffold

1. Tube and coupler scaffolds over 30 meter in height must be Designed by a competent professional engineer (who by extensive knowledge, training, and experience have successfully demonstrated his ability to carry out scaffold design and load calculations).
2. Maximum height of first horizontal member (Ledger) of scaffolds from the Ground shall be 2.2 meters. Lower lift can be considered for heavy loads depending upon the scaffold design. When scaffold is more than 6 meter height for carrying heavy load, kicker lift should be provided at a height of 150mm from ground.

3. The top rail shall be at height of 900-1200 mm and Mid rails must be installed approximately halfway between the top rail and the platform surface. Toe boards (150mm) should be securely attached to the working platform. Toe boards are generally applicable to working platform and not for landing platforms.

4. The bay length & width depends on the height and the load to be carried by the scaffold.

5. Bracings shall be fitted up to full height of scaffold.

6. Standards should be joined having overlap of min 600 mm using three equally spaced swivel clamps or end to end using sleeve/pin type coupler.

7. Ledgers should be joined having overlap of min 600 mm using three equally spaced swivel clamps or end to end using sleeve coupler.

8. Base plate 150 x 150 x 6mm shall be used to support all vertical pipes of Scaffolds.

9. Sole plate shall be used at all unpaved area to support base late.

10. Scaffolding platform Grating shall be tied with clamp at both ends, and scaffolding platform Grating shall not overhang more than 150 mm and shall be at least 150 mm away from hot surface.

11. Every scaffold shall be provided with certified ladder and extending its free end shall be above platform by 1000 mm/ four rungs.

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Applicable to Mobile scaffolds

1. Attach castors with plain stems to the panel or adjustment screw by pins or other suitable means.

2. Apply castor brakes/lock at all times when scaffolding is not being moved.

3. Do not ride rolling scaffoldings.

4. Remove all material and equipment from platform before moving scaffolding.

5. Do not try to move rolling scaffolding without sufficient help. Watch out for holes protrusions in the floor and for overhead obstructions.

6. Do not use brackets on rolling scaffoldings without first considering the overturning effect.

Design Criteria

- All types of scaffolds shall be strong enough of carrying and transmitting all types of loads to the ground. All scaffolds shall be adequately secured, stiffened, both longitudinally and transversely.

- Scaffolding determines as per the requirement and use of scaffold such as:

    - Purpose of scaffolding
    - Loading on scaffold platform
    - Required height
    - Sufficient work place
    - Surrounding environment

Storage and inspection of materials

- All scaffolding material shall be stored at designated location to protect them from adverse environment conditions such as corrosion, weather.

- Storage racks/ Locations/ areas shall be clearly identified.

- Storage facility of scaffold material shall be properly constructed for its stability and load bearing capability.

- Steel pipes and scaffolding platform Grating shall be stacked horizontally according to length. Fittings, Couplers shall be stored in separate bins.

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- Defective material shall be removed from site.
- Scaffolding material such as tubular, planks, clamps etc. shall be inspected annually for contractor owned material by contractor. The visual inspection shall cover 100% scaffold materials.

Transportation and handling of scaffolding material

- Make sure that scaffold pipe shifting done in vehicle of appropriate length.
- Special safety care to be taken while shifting or lifting pipes manually.
- Rope and pulley should be used to lift pipe from height.

Safety requirements

A risk assessment to access scaffold hazards through inspection and work method statement for relevant work activities shall be made before erecting, dismantling, moving, or modifying scaffold. Examples of hazards to be considered include the following:

- Working at/from heights.
- The presence of nearby electrical lines or process equipment (e.g. hot line, vents, drains, etc.). Necessary safety distances shall be maintained as specified in site level electrical safety procedure.
- Possible emergency scenario, escape routes and responses.
- The condition and loading of working surfaces /platform /scaffold pipes and other components or loose material such as clamps/ bolts on the working platforms.
- The presence and activity of other people and equipment in the vicinity of the work.
- The weather (Heavy rain, high wind velocity-more than 20 knots, etc).
- Erection during dark hours.
- Scaffold collapse.
- Manual task (Manual Material Handling).
- Access and egress during normal and emergency condition.
- The effect of heavy equipment movement in close vicinity such as within 4 meters to be considered for direct hit and sagging of land in case of unpaved area.

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This assessment is a part of the work permit process but should also be extended to the specific job planning of the crew performing the work. Appropriate actions shall be taken to mitigate the hazards identified during the assessment.

Fall protection when erecting, dismantling, and modifying scaffolds shall be under the direction of a competent person (Scaffold Supervisor). Scaffold erectors (Scaffolder) shall use personal fall-protection systems that provide continuous fall protection while erecting, dismantling or modifying scaffolds unless the determination is made by a competent person that fall protection is not feasible or it creates a greater hazard. Fall protection can be accomplished through the use of adequate anchorages that are independent of the scaffold or by using scaffold systems and components that are approved by the manufacturer as adequate anchorages. Employees/workmen shall use appropriate fall-arrest equipment.

The footing for supported scaffolds shall be sound, rigid, and capable of supporting the maximum intended load, including the weight of the scaffold.

Scaffold platform grating shall be fastened on both ends and laid tight by scaffold clamps/couplers.

Manufacturer's guidelines for proprietary scaffolds (e.g. Cup lock, ring lock, H frame, Insulating modular scaffolds) shall be followed unless a competent person approves the variance and provided the variance complies with applicable regulations and generally accepted scaffold engineering practices.

Proprietary/special scaffold manufacturer's guidelines for erection and inspection should be available with users, and with plant maintenance engineer for reference.

The following safe practices with respect to scaffolds shall be followed:

- There shall be firm foundation for all scaffoldings. All scaffolding shall be made of sound material. Scaffolding material shall be inspected and used, only if found in good condition. Avoid using equipment whose strength is not known.

- Provide adequate Base for scaffolding posts. Metal base plate is used under all upright or standard scaffoldings. Correct type of couplers shall be used for all connections. Use right angle couplers for joining vertical to horizontal members and swivel type couplers for joining bracing with ledgers. For joining vertical load bearing members (standards), "joint pin" type couplers can also be used. The couplers shall be of a structural metal, such as drop-forged steel, malleable iron, or structural grade aluminum (use of gray cast iron is prohibited).

- Plumb and level scaffoldings as erection proceeds, so that braces will fit without forcing. Fasten all braces securely.

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- Where scaffoldings are erected above walkways or work areas, the space between toe board and railing should be screened (e.g. Safety net, Metal sheets).

- Whenever work is being done over men who are working on scaffolding, overhead protection should be provided on the scaffolding.

- Restrain free-standing scaffolding towers from tipping by guying or other means.

- A safe and convenient means of access shall be provided to the platform level. Means of access may be a portable ladder, fixed ladder, ramp or runway or stairway. The ladder shall be so installed that there supporting member (pipe) is just below ladder rung. This is to avoid tripping hazard, especially while using the ladder.

- During erection, the ladder shall be installed as early as practicable, but not later than first two horizontal members (Ledgers). This is to facilitate Scaffolder while erecting the scaffold.

- During erection/ dismantling, scaffolder shall use 'T' steps to minimize risk of accidental fall/ slip.

- Ladder should be provided with tie rods/studs at top and bottom rungs and secured to scaffolding with ladder clamps, at least 2 locations for a ladder of length up to 4 m & at 3 locations for more than 4 m long ladder.

- The horizontal member/ ledger on which ladder is to be fixed, must be clamped to two subsequent standard using fixed clamps.

- Do not cantilever or extend putlogs / trusses as side brackets, without thoroughly considering the loads to be applied.

- Do not climb scaffold using cross braces.

- Do not use ladders or makeshift devices on top of scaffoldings to increase the height.

- Have at least 12" overlap and 6" extension beyond centerline of support or cleat at both ends to prevent sliding.

- Do not allow unsupported ends of planking to extend an unsafe distance beyond supports.

- Planks shall be non-greasy and free from defects.

- Access to working platform shall be suitably protected against inadvertent fall by providing swing members/ swing gate or chains.

- When scaffolding is no longer required, request for dismantling of scaffold shall be sent to scaffolding supervisor through work permit.

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- Scaffold shall be removed from top bracings. Ties, rackers etc. should not be removed from section lower than the one which is being dismantled.
- Do not throw or allow falling to ground any scaffold member, board or fittings.
- Dismantled scaffold material shall be neatly stacked, away from the site until whole of scaffold has been dismantled.

6.2.2 Metal as material of construction

i) A scaffold should be provided and maintained or other equally safe and suitable provision should be made where work cannot safely be done on or from the ground or from part of a building or other permanent structure.

ii) Scaffolds should be provided with safe means of access, such as stairs, ladders or ramps. Ladders should be secured against inadvertent movement.

iii) Every scaffold should be constructed, erected, properly secured/ tied and maintained so as to prevent collapse or accidental displacement during erection, while in use, in idle state or dismantling.

iv) Every scaffold and part thereof should be constructed :

(a) in such a way so as not to cause hazards for workers during erection and dismantling;
(b) in such a way so as guard rails and other protective devices, platforms, ladders, stairs or ramps can be easily put together;
(c) with sound material and of requisite size and strength for the purpose for which it is to be used and maintained in a proper condition.

v) Boards and planks used for scaffolds should be protected against splitting.

vi) Materials used in the construction of scaffolds should be stored under good conditions and apart from any material unsuitable for scaffolds.

vii) Couplers should not cause deformation in tubes. Couplers should be made of drop forged steel or equivalent material.

viii) Tubes should be free from cracks, splits and excessive corrosion and be straight to the eye, and tube ends cut cleanly square with the tube axis.

ix) Scaffolds should be designed for their maximum load as per relevant codes.

x) Scaffolds should be adequately braced.

xi) Scaffolds which are not designed to be independent should be rigidly connected to the building at designated vertical and horizontal places.

xii) A scaffold should never extend above the highest anchorage to an extent which might endanger its stability and strength.

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xiii) Loose bricks, drainpipes, chimney-pots or other unsuitable material should not be used for the construction or support of any part of a scaffold.

xiv) Scaffolds should be inspected and certified:

(a) before being taken into use;
(b) at periodic intervals thereafter as prescribed for different types of scaffolds;
(c) after any alteration, interruption in use, exposure to weather or seismic conditions or any other occurrence likely to have affected their strength or stability.

xv) Inspection should more particularly ascertain that:

(a) the scaffold is of suitable type and adequate for the job;
(b) materials used in its construction are sound and of sufficient strength;
(c) it is of sound construction and stable;
(d) that the required safeguards are in position.

xvi) A scaffold should not be erected, substantially altered or dismantled except by or under the supervision.

xvii) If out-rigger scaffolding is to be used, it should be specifically designed and inspected before putting in use.

6.2.3 Lifting appliances on scaffolds (CHAIN PULLEY BLOCKS, PULLERS)

i) When a lifting appliance is to be used on a scaffold:

(a) the parts of the scaffold should be carefully inspected to determine the additional strengthening and other safety measures required;
(b) any movement of the scaffold members should be prevented;
(c) if practicable, the uprights should be rigidly connected to a solid part of the building at the place where the lifting appliance is erected.

6.2.4 Prefabricated scaffolds

i) In the case of prefabricated scaffold systems, the instructions provided by the manufacturers or suppliers should be strictly adhered to. Prefabricated scaffolds should have adequate arrangements for fixing bracing.

ii) Frames of different types should not be intermingled in a single scaffold.

iii) Scaffolding shall be erected on firm and level ground. In case of loose or uneven terrain, care should be taken to see that the scaffolding is on firm footing by leveling / compacting or other means.

iv) All members of metal scaffolding shall be checked periodically to screen out defective / rusted members. All joints should be properly lubricated for easy tightening.

v) Entry to scaffolding should be restricted.

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vi) Erection, alteration and removal shall be done under supervision of experienced personnel.

vii) Use of barrels, boxes, loose bricks etc., for supporting scaffolds shall not be permitted.

viii) Each supporting member of platform shall be securely fastened and braced.

ix) Where planks are butt-joined, two parallel putlogs shall be used, not more than 100mm apart, to give support to each plank.

x) Platform plank shall not project beyond its end support to a distance exceeding 4 times the thickness of plank, unless it is effectively secured to prevent tipping. Cantilever planks should be avoided. If it is unavoidable overhang should be effectively secured to prevent tipping.

xi) The platform edges shall be provided with 150mm high toe board to eliminate hazards of tools or other objects falling from platform.

xii) Erect ladders in the “four up-one out position”

xiii) Ladder shall be properly secured with the structure.

xiv) Use non-slip devices, such as, rubber shoes or pointed steel ferules at the ladder foot, rubber wheels at ladder top, fixing wooden battens, cleats etc.

xv) When ladder is used for climbing over a platform, the ladder must be of sufficient length, to extend at least one meter above the platform, when erected against the platform in “four up-one out position.”

xvi) Portable ladders shall be used for heights not more than 4mt. Above 4mt flights, fixed ladders shall be provided with at least 600 mm landings at every 6mt or less.

xvii) The width of ladder shall not be less than 300mm and rungs shall be spaced not more than 300mm.

xviii) Every platform and means of access shall be kept free from obstruction.

xix) If grease, mud, gravel, mortar etc., fall on platform or scaffolds, these shall be removed immediately to avoid slippage.

xx) Workers shall not be allowed to work on scaffolds during storms or high wind. After heavy rain or storms, scaffolds shall be inspected before reuse.

xxi) Don't overload the scaffolding. Remove excess material and scrap immediately.

xxii) Dismantling of scaffolds shall be done in a pre-planned sequential manner.

6.2.5 Suspended scaffolds/ boatwain's chair

In addition to the requirements for scaffolds in general as regards soundness, stability and protection against the risk of falls, suspended scaffolds should meet the following specific requirements.

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(a) platforms should be designed and built with dimensions that are compatible with the stability of the structure as a whole, especially the length;
(b) the number or anchorage should be compatible with the dimensions of the platform;
(c) the safety of workers should be safeguarded by an extra rope having a point of attachment independent of the anchorage arrangements of the scaffold;
(d) the anchorage and other elements of support of the scaffold should be designed and built in such a way as to ensure sufficient strength;
(e) the ropes, winches, pulleys or pulley blocks should be designed, assembled, used and maintained according to the requirements established for lifting gear adapted to the lifting of persons according to national laws and regulations;
(f) before use, the whole structure should be checked by a competent person.

6.2.6 Bamboo Scaffolding

i) It should not be used in oil & gas installations and in the areas where hot work is to be done.

ii) For construction and maintenance of low rise residential and office buildings, situated outside explosive licensed area, bamboo scaffold, if unavoidable, should conform to provisions given in IS-3696 (Part 1)-1987.

6.3 STRUCTURAL WORK, LAYING OF REINFORCEMENT & CONCRETING

6.3.1 General provisions

i) The erection or dismantling of buildings, structures, civil engineering works, formwork, falsework and shoring should be carried out by trained workers only under the supervision of a competent person.

ii) Precautions should be taken to guard against danger to workers arising from any temporary state of weakness or instability of a structure.

iii) Formwork, falsework and shoring should be so designed, constructed and maintained that it will safely support all loads that may be imposed on it. Conformity with design during job execution shall be certified by the competent person and the relevant records shall be maintained.

iv) Formwork should be so designed and erected that working platforms, means of access, bracing and means of handling and stabilising are easily fixed to the formwork structure.

v) Proper methodology based on the design of the building / structure to be developed and approved by competent person before resorting to dismantling / modifications.

vi) All works / facilities should be certified for structural stabilities by a competent person and on statutory requirement completed before putting to use.

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6.3.2 Erection and dismantling of steel and prefabricated structures

i) The safety of workers employed on the erection and dismantling of steel and prefabricated structures should be ensured by appropriate means, such as provision and use of:

(a) ladders, gangways or fixed platforms;
(b) platforms, buckets, boatswain's chairs or other appropriate means suspended from lifting appliances;
(c) safety harnesses and lifelines supported on properly designed anchor, catch nets or catch platforms;
(d) Mechanical / Power-operated mobile working platforms;
(e) Proper Personal Protective Equipment.

ii) Steel and prefabricated structures should be so designed and made that they can be safely transported and erected. Route survey to be carried out from works to construction site route considering the load bearing capacity of the bridges, height of the bridges en-route and maximum width and length permissible without causing any hazard to public, the route and the equipment.

iii) In addition to the need for the stability of the part when erected, the design should explicitly take following into account:

(a) the conditions and methods of attachment in the operations of transport, storing and temporary support during erection or dismantling as applicable;
(b) Methods for the provision of safeguards such as railings and working platforms, and, when necessary, for mounting them easily on the structural steel or prefabricated parts.

iv) The hooks and other devices built in or provided on the structural steel or prefabricated parts that are required for lifting and transporting them should be so shaped, dimensioned and positioned as:

(a) to withstand with a sufficient margin the stresses to which they are subjected;
(b) Not to set up stresses in the part that could cause failures, or stresses in the structure itself not provided for in the plans, and be designed to permit easy release from the lifting appli-ance. Lifting points for floor and staircase units should be located (recessed if necessary) so that they do not protrude above the surface;
(c) To avoid imbalance or distortion of the lifted load.

v) Storeplaces should be so constructed that:

(a) there is no risk of structural steel or prefabricated parts falling or overturning;
(b) storage conditions generally ensure stability and avoid damage having regard to the method of storage and atmo-spheric conditions;
(c) racks are designed and secured on firm ground so that units cannot move accidentally.

vi) While they are being stored, transported, raised or set down, structural steel or prefabricated parts should not be subjected to stresses prejudicial to their stability.

vii) Every lifting appliance should:

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(a) be suitable for the operations and not be capable of accidental disconnection;
(b) be approved or tested as per statutory requirement.

viii) Lifting hooks should have safety latch (self closing type).

ix) Lifting hooks, Tongs, clamps and other appliances for lifting structural steel and prefabricated parts should:

(a) be of such shape and dimensions as to ensure a secure grip without damaging the part;
(b) be marked with the maximum permissible load in the most unfavourable lifting conditions.
(c) be periodically inspected and certified to ensure further usage as per requirement of factory act / Building & Construction Workers Regulation (BOCWR).

x) Structural steel or prefabricated parts should be lifted only after rigging plan approved by competent person to prevent them from spinning, slipping or dropping accidentally.

xi) When necessary to prevent danger, before they are raised from the ground, structural steel or prefabricated parts should be provided with safety devices such as railings and working platforms to prevent falls of persons.

xii) While structural steel or prefabricated parts are being erected, the workers should be provided with appliances such as guiding ropes for guiding them as they are being lifted and set down, so as to avoid crushing of hands and to facilitate the operations. Use of such appliances should be ensured.

xiii) A raised structural steel or prefabricated part should be so secured and wall units so propped that their stability cannot be affected, even by external factors such as wind and passing loads before its release from the lifting appliance.

xiv) At work places, instruction should be given to the workers on the methods, arrangements and means required for the storage, transport, lifting and erection of structural steel or prefabricated parts, and, before erection starts, a meeting of all those responsible should be held to discuss and confirm the requirements for safe erection.

xv) During transportation within the construction area, attachments such as slings and straps mounted on structural steel or prefabricated parts should be securely fastened to the parts. Vehicle loading should be such that the vehicle and the load remain stable at all positions during transportation and unloading.

xvi) Structural steel or prefabricated parts should be so transported that the conditions do not affect the stability of the parts or the means of transport result in jolting, vibration or stresses due to blows, or loads of material or persons.

xvii) When the method of erection does not permit the provision of other means of protection against fall of persons, the workplaces should be protected by guardrails, and if appropriate by toe-boards.

xviii) When adverse weather conditions such as snow, hailstorm, rain and wind or reduced visibility, etc. entail risks of accidents, the rigging work should be interrupted after taking necessary safety precautions.

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xix) If necessary, to prevent danger, structural steel parts should be equipped with attachments for suspended scaffolds, lifelines or safety harnesses and other means of protection.

xx) The risks of falling, to which workers moving on high or sloping girders are exposed, should be limited by all means of adequate collective protection or, where this is impossible, by the use of a safety harness that is well secured to a properly designed support.

xxi) Structural steel parts that are to be erected at a height should as far as practicable be assembled on the ground.

xxii) When structural steel or prefabricated parts are being erected, a sufficiently extended area underneath the workplace should be barricaded or guarded

xxiii) Steel trusses that are being erected should be adequately shored, braced or guyed until they are permanently secured in position.

xxiv) Load-bearing structural member should not be dangerously weakened by cutting, holing or other means.

xxv) Structural members should not be forced into place by the hoisting machine while any worker is in such a position that he could be injured by the operation.

xxvi) Open-web steel joists that are hoisted singly should be directly placed in position and secured against dislodgment.

xxvii) All structures should be designed for either permanent anchors or provision for erection of anchors as and when required to support life line during any Maintenance work etc. during life of the structure. The point of provision of anchor should be indicated through suitable signage for ease of use as and when required.

6.3.3 Reinforcement

i) Ensure that workers use Personnel Protective equipment like safety helmet with chin straps, safety shoes, gloves, full body safety harness, safety goggles, etc.

ii) Don't place the hand below the rods for checking clear distance. Use measuring devices.

iii) Don't wear loose clothes while checking the rods.

iv) Don't stand unnecessarily on cantilever rods.

v) To carry out welding/cutting of rods, safety procedures/precautions as mentioned in Item No. 6.5 to be followed.

vi) For supplying of rods at heights, proper staging and/or bundling to be provided.

vii) Ensure barricading and staging for supplying and fixing of rods at height.

viii) For short distance carrying of materials on shoulders, suitable pads to be provided.

ix) While transporting material by trucks/trailers, the rods shall not protrude in front of or by the sides of driver's cabin. In case such protrusion cannot be avoided behind the deck, then it should not

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extend 1/3rd of deck length or 1.5 Meters whichever is less and tied with red flags/lights.

x) Reinforcement rods, cut pieces etc. should be properly stored at identified locations and the scrap should be disposed off promptly on regular basis.

6.3.4 Concreting

i) Ensure stability of shuttering work before allowing concreting.

ii) Barricade the concreting area while pouring at height/depths.

iii) Keep vibrator hoses, pumping concrete accessories in healthy conditions and mechanically locked.

iv) Pipelines in concrete pumping system shall not be attached to temporary structures such as scaffolds and formwork support as the forces and movements may affect their integrity.

v) Check safety cages & guards around moving motors/parts etc. provided in concreting mixers.

vi) Use Personal Protective Equipment like gloves, safety shoes, full body safety harness, safety goggles, etc. while dealing with concrete and wear respirators for dealing with cement.

vii) Earthing of electrical mixers, vibrators, etc. should be done and verified.

viii) Cleaning of rotating drums of concrete mixers shall be done from outside. Lockout devices shall be provided where workers need to enter the drum for cleaning / inspection.

ix) Where concrete mixers are driven by internal combustion engine, exhaust points shall be located away from the worker's workstation so as to eliminate their exposure to obnoxious fumes.

x) Don't allow unauthorised person to stand under the concreting area.

xi) Ensure adequate lighting arrangements for carrying out concrete work during night.

xii) Don't allow the same workers to pour concrete round the clock. Insist on shift pattern.

xiii) During pouring, shuttering and its supports should be continuously watched for defects.

xiv) Never look into the drum mounted on truck (such as in case of Ready Mix Concrete).

6.4 ROAD WORK

6.4.1 Site shall be barricaded and provided with warning signs, including night warning lamps at appropriate locations for traffic diversion. This should be done sufficiently advance as a warning to the approaching drivers for the impending dander ahead.

6.4.2 Filled and empty bitumen drums shall be stacked separately at designated places.

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6.4.3 Mixing aggregate with bitumen shall preferably be done with the help of bitumen batch mixing plant, unless operationally non-feasible.

6.4.4 Road rollers, Bitumen sprayers, Pavement finishers shall be driven by experienced drivers with valid driving license.

6.4.5 Workers handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen with aggregate shall be provided with PVC hand gloves and rubber shoes with legging up to knee joints.

6.4.6 At the end of day's work, surplus hot bitumen in tar boiler shall be properly covered by a metal sheet, to prevent anything falling in it,

6.4.7 If bitumen accidentally falls on ground, it shall be immediately covered by sprinkling sand, to prevent anybody stepping on it. Then it shall be removed with the help of spade.

6.4.8 For cement concrete roads, besides site barricading and installation of warning signs for traffic diversion, safe practices mentioned in the chapter on "Concreting", shall also be applicable.

6.4.9 Any excavation for road work should be done only after surveying underground utilities and after taking suitable precautions. The underground utilities to be rerouted as required after approval of competent person / authority.

6.4.10 All the raw material for road construction/ maintenance to be stored on designated place which should be away from the running road. The running road should not be used for storing the sand, hot bitumen, etc..

6.4.11 Precaution should be taken that no construction material/ slab/ pre-fabricated object can come on the running road accidently or due to slipping. In such case, an erection plan should be designed and got approved from the competent authority.

6.5 CUTTING / WELDING

6.5.1 Common hazards involved in welding/cutting are sparks, molten metal, flying particles, harmful light rays, electric shocks , depletion in O_2 concentration due to generation of toxic gases, etc. Following precautions should be taken: -

i) A dry chemical powder (DCP) type fire extinguisher shall be made available in the work area.

ii) Adequate ventilation shall be ensured by opening manholes and fixing a shield or forced circulation of air etc, while doing a job in confined space.

iii) Ensure that only approved and well-maintained apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used. Also their regular calibration where ever necessary.

iv) All panels and covers shall be kept in place, when operating an electric Arc welding machine. 30mA rating ELCB shall be ensured in the power receptacle of the welding machine.

v) The work piece should be connected directly to Power supply, and not indirectly through pipelines/ structures/ equipment etc.

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vi) The welding receptacles shall be rated for 63 A suitable for 415V, 3-Phase system with a scraping earth. Receptacles shall have necessary mechanical interlocks and earthing facilities.

vii) All cables, including welding and ground cables shall be checked for any worn out or cracked insulation before starting the job and such cables shall not be used. Ground cable should be separate without any loose joints.

viii) Cable coiling shall be maintained at minimum level, if not avoidable. Criss-crossing of welding/electrical power supply cables & gas cutting hoses shall be avoided. Care to be taken against damage of gas cutting hoses.

ix) An energised electrode shall not be left unattended.

x) The power source shall be turned off at the end of job.

xi) All gas cylinders shall be properly secured in upright position.

xii) Acetylene cylinder shall be turned and kept in such a way that the valve outlet points away from oxygen cylinder.

xiii) Acetylene cylinder key for opening valve shall be kept on valve stem, while cylinder is in use, so that the acetylene cylinder could be quickly turned off in case of emergency. Use flash back arrestors to prevent back-fire in acetylene/oxygen cylinder.

xiv) When not in use, valves of all cylinders shall be kept closed.

xv) All types of cylinders, whether full or empty, shall be stored at cool, dry place under shed.

xvi) Forced opening of any cylinder valve should not be attempted.

xvii) Lighted gas torch shall never be left unattended.

xviii) Store acetylene and oxygen cylinders separately.

xix) Store full and empty cylinders separately.

xx) Avoid cylinders coming into contact with heat.

xxi) Cylinders that are heavy or difficult to carry by hand may be rolled on their bottom edge but never dragged.

xxii) If cylinders have to be moved, be sure that the cylinder valves are shut off.

xxiii) Before changing torches, shut off the gas at the pressure reducing regulators and not by crimping the hose.

xxiv) Do not use matches to light torches, use a friction lighter. Gas torch should be ignited with the lighter only. It should not be ignited by touching other hot surfaces.

xxv) Move out any leaking cylinder immediately and cap it. No hot work should be permitted in the vicinity of such leaked cylinders.

xxvi) Use trolleys for oxygen & acetylene cylinder and chain them.

xxvii) Always use Red hose for acetylene and other fuel gases and Black for oxygen, and ensure that both are in equal length.

xxviii) Ensure that hoses are free from burns, cuts and cracks and properly clamped.

xxix) Avoid dragging hoses over sharp edges and objects

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xxx) Do not wrap hoses around cylinders when in use or stored.

xxxi) Protect hoses from flying sparks, hot slag, and other hot objects. Protect cylinders by covering welding blanket while hot work in the vicinity.

xxxii) Lubricants shall not be used on Ox-fuel gas equipment.

xxxiii) During cutting/welding, use required PPEs like hand gloves, full body clothing of fire retardant / suitable material, safety shoes, full body safety harness, mask, goggles / face shields, welding screen of required DIN glass as per approved Weld Preparation Scheme.

xxxiv) Hot work permit to be taken if working in hazardous area.

6.6 WORKING IN CONFINED SPACES

6.6.1 Following safety practices for working in confined space like towers, columns, tanks and other vessels should be followed in addition to the safety guidelines for specific jobs like scaffolding, cutting/welding etc.

i) Shut down, positively isolate, depressurise and purge the vessel as per laid down procedures.

ii) Entry inside the vessel to carry out any job shall be done after issuance of valid permit only in line with the requirement of OISD-STD-105.

iii) Ensure proper and accessible means of exit before entry inside a confined space.

iv) The number of persons allowed inside the vessel should be limited to avoid overcrowding. Record of entering person shall be maintained with in and out time.

v) When the work is going on in the confined space, there should always be two men standby at the nearby manway / manhole equipped with communication arrangement to contact seniors and to evacuate the worker inside confined space in case of emergency.

vi) Before entering inside the vessels underground or located at lower elevation, probability of dense vapours accumulating nearby should also be considered in addition to inside the vessel and corrective action should be ensured.

vii) Ensure requisite O_2 level before entry in the confined space and monitor level periodically or other wise use required respiratory devices.

viii) Check for no Hydrocarbon or toxic substances before entry and monitor level periodically or use requisite Personal Protective Equipment.

ix) Ensure adequate ventilation or use respiratory devices.

x) Depending upon need, necessary respirator system, gas masks and suit shall be worn by everyone entering confined space. In case of sewer, OWS or in the confined area where there is a possibility of toxic or inert gas, required respiratory device, shall be used by everyone while entering.

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xi) Barricade the confined spaces during hoisting, radiography, blasting, pressure testing etc.

xii) Use 24V flameproof lamp fittings only for illumination.

xiii) Use tools with air motors or electric tools with maximum voltage of 24V.

xiv) House keeping shall be well maintained.

xv) Required PPEs like Safety helmet, safety shoes and full body harness shall be worn by everyone entering the confined space.

xvi) Don't wear loose clothing while working in a confined space.

xvii) In case of the vessels which are likely to contain pyropheric substances (like Iron Sulphide), special care need to be taken before opening the vessel. Attempt should be made to remove the pyropheric substances. Otherwise, these should be always kept wet by suitable means.

xviii) The cutting torches should also be kept outside the vessel immediately after the cutting.

xix) The gas cylinders used for cutting/welding shall be kept outside. Care to be taken for the integrity of gas hoses and welding cables while work is in progress.

xx) All cables, hoses, welding equipment etc., shall be removed from confined space at end of each work day, even if the work is to be resumed in the same space the next day.

xxi) To the extent possible sludge shall be cleared and removed from outside before entering.

xxii) No naked light or flame or hot work such as welding, cutting and soldering should be permitted inside a confined space or area unless it has been made completely free of the flammable atmosphere, tested and found safe by a competent person. Only non-sparking tools and flameproof hand lamps protected with guard and safety torches should be used inside such confined space or area for initial inspection, cleaning or other work required to be done for making the area safe.

xxiii) Communication should be always maintained between the worker and the attendant.

xxiv) Inside the confined space spray painting should be avoided. If absolutely essential it should be done after ensuring adequate precautions including exhaust of paint vapours and continuous monitoring of concentration of oxygen and toxic gases.

xxv) Before issuing the vessel entry permit, it should be ensured that all the incoming and outgoing lines to and from the vessel are positively isolated. Where this is not applicable like dampers in HRSG system, Sufficient time is to be allowed to observe the leakage of hot gases from the dampers/ passing valves before taking any decision on vessel entry permit.

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6.7 PROOF/PRESSURE TESTING

6.7.1 Review test procedure before allowing testing with water or air or any other fluid. Testing should be done only after proper Job Safety Analysis (JSA) and its approval.

6.7.2 Provide relief valves of adequate size while testing with air or other gases.

6.7.3 Ensure compliance of necessary precautions, step wise loading, tightening of fasteners, grouting etc. before and during testing.

6.7.4 Inform all concerned in advance of the testing.

6.7.5 Keep the vents open before opening any valve for filling/draining of liquid used for hydrotesting. The filling/draining should not exceed the designed rate for pressure testing.

6.7.6 Provide separate gauges of suitable range for pressurising pump and the equipment to be tested.

6.7.7 Provide gauges at designated locations for monitoring of pressures.

6.7.8 Check the calibration of all pressurising equipment and accessories and maintain records.

6.7.9 Take readings at pre-defined intervals.

6.7.10 Arrangement to be made to ensure that the pressurizing system i.e. motor-pump set is out of circuit so that the system under hydro testing is not re-pressurized by the contractor due to pressure drop before a pre-defined time.

6.8 WORKING AT HEIGHTS

6.8.1 General Provision

i) While working at a height of more than 2.2 meters, ISI approved full body harness shall be used.

ii) While working at a height of more than 2.2 meters, permit should be issued by competent person before commencement of the job.

iii) Worker should be well trained on usage of full body harness including its proper usage at the time of ascending/descending.

iv) All tools should be carried in tool bag/belt to avoid their falling.

v) If the job is on fragile/sloping roof, roof walk ladders shall be used.

vi) Provide lifeline properly designed, secured and anchored, wherever required. Mock Drill of use of lifeline at regular intervals to be carried out.

vii) Additional safety measures like providing Fall Arrestor type full body harness, safety net should be provided depending upon site conditions, job requirements.

viii) Keep working area neat and clean. Remove scrap material immediately.

ix) Don't throw or drop material/equipment from height.

x) Avoid jumping from one member to another. Use proper passageway.

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xi) Keep both hands free while climbing. Don't try to bypass the steps of the ladder. Same to be followed while climbing down. Further on climbing down, front of the body to be towards the ladder.

xii) Try to maintain calm at height. Avoid over exertion.

xiii) Avoid movements on any structural member without fall protection.

xiv) Elevated workplaces including roofs should be provided with safe means of access and egress such as stairs, ramps or ladders.

xv) Fall protection hierarchy to be followed as below:

(a) Elimination: Explore possibility whether job can be done avoiding work at height.

(b) Prevention: Prevent fall of a worker by providing appropriate fall prevention system.

(c) Fall arrest system: Arrest the fall using suitable fall arrest system. Ensure to have a strong suitably designed anchor point.

(d) Warning Lines: Use a warning line using a rope or wire barrier around roof to warn workers that they are getting close to the roof edge.

(e) Safety Monitoring: Use a safety monitor to warn the workers.

(f) Administration: Prepare a written administrative procedure to ensure workers are doing the best that they can.

6.8.2 Roof Work

i) All roof-work operations should be pre-planned and properly supervised.

ii) Roof work should only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.

iii) Work on roofs shouldn't be carried on in weather conditions that threaten the safety of workers.

iv) Crawling boards, walkways and roof ladders should be securely fastened to a firm structure.

v) Roofing brackets should fit the slope of the roof and be securely supported.

vi) Where it is necessary for a person to kneel or crouch near the edge of the roof, necessary precautions should be taken.

vii) On a large roof where work have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided.

viii) All covers for openings in roofs should be of substantial construction and be secured in position.

ix) Roofs with a pitch of more than 10 should be treated as sloping.

x) When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders should be provided and firmly secured in position.

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xi) During extensive work on the roof, strong barriers or guardrails and toe-boards should be provided to stop a person from falling off the roof.

xii) Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they should be provided with suitable roof ladders or crawling boards strong enough and when spanning across the supports for the roof covering to support those workers.

xiii) A minimum of two boards should be provided so that it is not necessary for a person to stand on a fragile roof to move a board or a ladder, or for any other reason.

6.8.3 Work on tall chimneys

i) For the erection and repair of tall chimneys, scaffolding should be provided. A safety net should be maintained at a suitable distance below the scaffold.

ii) The scaffold floor should always be at least 65 cm below the top of the chimney.

iii) Under the working floor of the scaffolding the next lower floor should be left in position as a catch platform.

iv) The distance between the inside edge of the scaffold and the wall of the chimney should not exceed 20 cm at any point.

v) Catch platforms should be erected over:

(a) the entrance to the chimney;
(b) Passageways and working places where workers could be endangered by falling objects.

vi) For climbing tall chimneys, access should be provided by:

(a) stairs or ladders;
(b) a column of iron rungs securely embedded in the chimney wall;
(c) Other appropriate means.

vii) When workers use the outside rungs to climb the chimney, a securely fastened steel core rope looped at the free end and hanging down at least 3 m should be provided at the top to help the workers to climb on to the chimney.

viii) While work is being done on independent chimneys the area surrounding the chimney should be enclosed by fencing at a safe distance.

ix) Workers employed on the construction, alteration, maintenance or repair of tall chimneys should not:

a) work on the outside without a safety harness attached by a lifeline to a rung, ring or other secure anchorage;
b) put tools between the safety harness and the body or in pockets not intended for the purpose;
c) haul heavy materials or equipment up and down by hand to or from the workplace on the chimney;
d) fasten pulleys or scaffolding to reinforcing rings without first verifying their stability;
e) work alone;

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f) climb a chimney that is not provided with securely anchored ladders or rungs;
g) Work on chimneys in use unless the necessary precautions to avoid danger from smoke and gases have been taken. Ensure that the outside surface temperature of the chimney is at
h) room temperature before taking up any job after shut down of the (system) chimney.

x) Work on independent chimneys should not be carried on in high winds, icy conditions, fog or during electrical storms.

6.9 HANDLING AND LIFTING EQUIPMENT:

6.9.1 General Provisions

Following are the general guidelines to be followed with regard to all types of handling and lifting equipment in addition to the guidelines for specific type of equipments dealt later on.

i) There should be a well-planned safety programme to ensure that all the lifting appliances and lifting gear are selected, installed, examined, tested, maintained, operated and dismantled with a view to preventing the occurrence of any accident;

ii) All lifting appliances shall be examined by competent persons at frequencies as specified in "The Factories act".

iii) Check thoroughly quality, size and condition of all lifting tools like chain pulley blocks, slings, U-clamps, D-shackles etc. before putting them in use.

iv) Safe lifting capacity of all lifting & handling equipment, tools and shackles should be got verified and certificates obtained from competent authorities before its use. The safe working load shall be marked on them.

v) Check periodically the oil, brakes, gears, horns and tyre pressure, lighting fixtures of all moving equipments like cranes, forklifts, trailers, etc. as per manufacturer's recommendations.

vi) Check the weights to be lifted and accordingly decide about the crane capacity, boom length and angle of erection.

vii) Allow lifting slings as short as possible and check packing at the friction points.

viii) While lifting/placing of the load, no unauthorised person shall remain within the radius of the boom and underneath the load.

ix) While loading, unloading and stacking of pipes, proper wedges shall be placed to prevent rolling down of the pipes.

x) Control longer jobs being lifted up from both ends.

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xi) Only trained operators and riggers should carry out the job. While the crane is moving or lifting the load, the trained rigger should be there for keeping a vigil against hitting any other object.

xii) During high wind conditions and nights, lifting of heavy equipments should be avoided. If unavoidable to do erection in night, operator and rigger should be fully trained for night signaling. Also proper illumination should be there.

xiii) Allow crane to move on hard, firm and leveled ground. Ensure that all the crane pedestals/ hydraulic jacks taking weight of the crane and load are on a firm compacted surface.

xiv) When crane is in idle condition for long periods or unattended, crane boom should either be lowered or locked as per manufacturer's guidelines.

xv) Hook and load being lifted shall remain in full visibility of crane operators, while lifting, to the extent possible.

xvi) Don't allow booms or other parts of crane to come within 3 meters reach of overhead electrical cables.

xvii) No structural alterations or repairs should be made to any part of a lifting appliance, which may affect the safety of the appliance without the permission and supervision of the competent person.

6.9.2 Hoists

i) Hoist shafts should be enclosed with rigid panels or other adequate fencing at:

(a) ground level on all sides;
(b) all other levels at all points at which access is provided;
(c) all points at which persons are liable to be struck by any moving part.

ii) The enclosure of hoist shafts, except at approaches should extend where practicable at least 2 meters above the floor, platform or other place to which access is provided except where a lesser height is sufficient to prevent any person falling down the hoistway and there is no risk of any person coming into contact with any moving part of the hoist, but in no case should the enclosure be less than 1 meter in height.

iii) The guides of hoist platforms should offer sufficient resistance to bending and, in the case of jamming by a safety catch, to buckling.

iv) Where necessary to prevent danger, adequate covering should be provided above the top of hoist shafts to prevent material falling down them.

v) Outdoor hoist towers should be erected on firm foundations, and securely braced, guyed and anchored.

vi) A ladderway should extend from the bottom to the top of outdoor hoist towers, if no other ladderway exists within easy reach.

vii) Hoisting engines should be of ample capacity to control the heaviest load that they will have to move.

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viii) Hoists should be provided with devices that stop the hoisting engine as soon as the platform reaches its highest stopping place.

ix) Winches should be so constructed that the brake is applied when the control handle is not held in the operating position.

x) It should not be possible to set in motion from the platform a hoist, which is not designed for the conveyance of persons.

xi) Winches should not be fitted with pawl and ratchet gears on which the pawl must be disengaged before the platform is lowered.

xii) Hoist platforms should be capable of supporting the maximum load that they will have to carry with a safety factor.

xiii) Hoist platforms should be equipped with safety gear that will hold the platform with the maximum load if the hoisting rope breaks.

xiv) If workers have to enter the cage or go on the platform at landings there should be a locking arrangement preventing the cage or platform from moving while any worker is in or on it.

xv) On sides not used for loading and unloading, hoist platforms should be provided with toe-boards and enclosures of wire mesh or other suitable material to prevent the fall of parts of loads.

xvi) Where necessary to prevent danger from falling objects, hoist platforms should be provided with adequate covering.

xvii) Counterweights consisting of an assemblage of several parts should be made of specially constructed parts rigidly connected together.

xviii) Counterweights should run in guides.

xix) Platforms should be provided at all landings used by workers.

xx) Following notices should be posted up conspicuously and in very legible characters:

(a) on all hoists:

- on the platform: the carrying capacity in kilograms or other appropriate standard unit of weight;
- on the hoisting engine: the lifting capacity in kilograms or other appropriate standard unit of weight;

(b) on hoists authorised or certified for the conveyance of persons:

- on the platform or cage: the maximum number of persons to be carried at one time;

(c) on hoists for goods only:

- on every approach to the hoist and on the platform: prohibition of use by persons.

xxi) Hoists intended for the carriage of persons should be provided with a cage so constructed as to prevent any person from falling out or being trapped between the cage and any fixed part of the structure when the cage gate is shut, or from being struck by the counterbalance weight or by articles or materials tailing down the hoistway.

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xxii) On each side in which access is provided, the cage should have a gate fitted with devices which ensure that the gate cannot be opened except when the cage is at a landing and that the gate must be closed before the cage can move away from the landing.

xxiii) Every gate in the enclosure of the hoist shaft which gives access from a landing place to the cage should be fitted with devices to ensure that the gate cannot be opened except when the cage is at that landing place, and that the cage cannot be moved away from that landing place until the gate is closed.

6.9.3 Derricks

Stiff-leg derricks

i) Derricks should be erected on a firm base capable of taking the combined weight of the crane structure and maximum rated load.

ii) Devices should be used to prevent masts from lifting out of their seating.

iii) Electrically operated derricks should be effectively earthed from the sole plate or framework.

iv) Counterweights should be so arranged that they do not subject the backstays, sleepers or pivots to excessive strain.

v) When derricks are mounted on wheels:

a) a rigid member should be used to maintain the correct distance between the wheels;
b) they should be equipped with struts to prevent them from dropping if a wheel breaks or the derrick is derailed.

vi) The length of a derrick jib should not be altered without consulting the manufacturer.

vii) The jib of a scotch derrick crane should not be erected within the backstays of the crane.

Guy derricks

i) The restraint of the guy ropes should be ensured by fitting stirrups or anchor plates in concrete foundations.

ii) The mast of guy derricks should be supported by six top guys spaced approximately equally.

iii) The spread of the guys of a guy derrick crane from the mast should not be more than 45^0 from the horizontal.

iv) Guy ropes of derricks should be equipped with a stretching screw or turnbuckle or other device to regulate the tension.

v) Gudgeon pins, sheave pins and fool bearings should be lubricated frequently.

vi) When a derrick is not in use, the boom should be anchored to prevent it from swinging.

6.9.4 Gin poles

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i) Gin poles should:

(a) be straight;
(b) consist of steel or other suitable metal;
(c) be adequately guyed and anchored;
(d) be vertical or raked slightly towards the load;
(e) be of adequate strength for the loads that they will be required to lift/move.

ii) Gin poles should not be spliced and if a gin pole is composed of different elements, they should be assembled in conformity with their intrinsic material strength.

iii) Gin poles should be fastened at their feet to prevent displacement in operation.

iv) Gin poles, which are moved from place to place and re-erected, should not be taken into use again before the pole, lifting ropes, guys, blocks and other parts have been inspected, and the whole appliance has been tested under load.

v) When platforms or skips are hoisted by gin poles, precautions should be taken to prevent them from spinning and to provide for proper landing.

6.9.5 Tower cranes

i) Where tower cranes have cabs at high level, persons, capable and trained to work at heights, should only be employed as crane operators.

ii) The characteristics of the various machines available should be considered against the operating requirements and the surroundings in which the crane will operate before a particular type of crane is selected.

iii) Care should be taken in the assessment of wind loads both during operations and out of service. Account should also be taken of the effects of high structures on wind forces in the vicinity of the crane.

iv) The ground on which the tower crane stands should have the requisite bearing capacity. Account should be taken of seasonal variations in ground conditions.

v) Bases for tower cranes and tracks for rail-mounted tower cranes should be firm and level. Tower cranes should only operate on gradients within limits specified by the manufacturer. Tower cranes should only be erected at a safe distance from excavations and ditches.

vi) Tower cranes should be sited where there is clear space available for erection, operation and dismantling. As far as possible, cranes should be sited so that loads do not have to be handled over occupied premises, over public thoroughfares, other construction works and railways or near power cables.

vii) Where two or more tower cranes are sited in positions where their jibs could touch any part of the other crane, there should be direct means of communication between them and a distinct warning system operated from the cab so that one driver may alert the other of impending danger.

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viii) The manufacturers' instructions on the methods and sequence of erection and dismantling should be followed. The crane should be tested before being taken into use.

ix) The climbing operation of climbing tower cranes should be carried out in accordance with manufacturers' instructions. The free-standing height of the tower crane should not extend beyond what is safe and permissible in the manufacturers' instructions.

x) When the tower crane is left unattended, loads should be removed from the hook, the hook raised, the power switched off and the boom brought to the horizontal. For longer periods or at times when adverse weather conditions are expected, out of service procedures should be followed. The main jib should be slewed to the side of the tower away from the wind, put into free slew and the crane immobilised.

xi) A windspeed measuring device should be provided at an elevated position on the tower crane with the indicator fitted in the drivers' cab.

xii) Devices should be provided to prevent loads being moved to a point where the corresponding safe working load of the crane would be exceeded. Name boards or other items liable to catch the wind should not be mounted on a tower crane other than in accordance with the manufacturers' instructions.

xiii) Tower cranes should not be used for magnet, or demolition ball service, piling operations or other duties, which could impose excessive loading on the crane structure.

6.9.6 Lifting ropes

i) Only ropes with a known safe working capacity should be used as lifting ropes.

ii) Lifting ropes should be installed, maintained and inspected in accordance with manufacturers' instructions.

iii) Repaired steel ropes should not be used on hoists.

iv) Where multiple independent ropes are used, for the purpose of stability, to lift a work platform, each rope should be capable of carrying the load independently.

6.10 VEHICLE MOVEMENT

6.10.1 Park vehicles only at designated places. Don't block roads to create hindrance for other vehicles.

6.10.2 Don't overload the vehicle.

6.10.3 Obey speed limits and traffic rules.

6.10.4 Always expect the unexpected and be a defensive driver.

6.10.5 Drive carefully during adverse weather and road conditions.

6.10.6 Read the road ahead and ride to the left.

6.10.7 Be extra cautious at nights. Keep wind screens clean and lights in working condition.

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6.10.8 All vehicles used for carrying workers and construction materials must undergo predictive/preventive maintenance and daily checks

6.10.9 Driver with proper valid driving license shall only be allowed to drive the vehicle

6.10.10 Routes shall be leveled marked and planned in such a way so as to avoid potential hazards such as overhead power lines and sloping ground etc.

6.10.11 While reversing the vehicles, help of another worker should be ensured at all times

6.10.12 An unattended vehicle should have the engine switched off

6.10.13 Wherever possible one-way system shall be followed

6.10.14 Barriers/fixed stops should be provided for excavation/openings to prevent fall of vehicle

6.10.15 Load should be properly secured

6.10.16 The body of the tipper lorry should always be lowered before driving the vehicle off.

6.10.17 Signs/signals/caution boards etc. should be provided on routes.

6.10.18 All vehicles in a running process plants to use spark arrester on the exhaust.

6.10.19 No material should be protruding outside the vehicle for the safety of the public. If necessary, same to be marked as per RTO regulations.

6.10.20 Proper caution tag should be available on the vehicle for hazardous material like oil,.LPG, explosives, nuclear material, toxic fluids etc and the vehicle staff should be well informed about the potential danger of the material being transported by them.

6.10.21 An earth chain for the discharge of static electricity generated during transportation of specific material with the vehicle to be provided.

6.10.22 Drunken driving should be prohibited.

6.11 ELECTRICAL

6.11.1 General Provisions

i) Only persons having valid licenses shall be allowed to work on electrical facilities as per prevailing IE Act and rules thereunder including CEA rules/regulations.

ii) No person should be allowed to work on live circuit. The same, if unavoidable, special care and written authorisation need to be taken.

iii) Treat all circuits as "LIVE" unless ensured otherwise.

iv) Electrical " Lock Out - Tag Out (LOTO)" procedure "MUST" be followed for work on electrical system.

v) Display voltage ratings prominently with "Danger" signs in local language also.

vi) Put caution/notice signs before starting the repair works.

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vii) All electrical equipment operating above 250V shall have two separate and distinct connections to earth grid.

viii) Proper grounding to be ensured for all switch boards and equipment including Portable ones prior to taking into service.

ix) Make sure that electrical switch boards, portable tools, equipment (like grinding machine etc.) don't get wet during their usage. If it happens, stop the main supply, make the tools dry, check for specified insulation value and then only use them. Check proper earthing.

All temporary switch boards/ KIOSKS put up at work site should be suitably protected from rain and the level of same should be high enough to avoid contact with water due to water logging.

x) Don't work wet on electrical system.

xi) Don't overload the electrical system.

xii) Use only proper rated HRC fuses / ELCB / MCB.

xiii) Only ISI marked or equivalent industrial type extension boards and Plug sockets are to be used.

xiv) ELCB for all temporary connections must be provided using 3 pin plug.

xv) All power supply cables should be laid properly and neatly so that they don't cause hindrance to persons working and no physical damage also takes place to the cables during various construction activities.

xvi) All Power cables to be properly terminated using glands and lugs of proper size, type and crimped.

xvii) Use electrical fittings in Hazard zones as per area classification under OISD-STD-113.

xviii) Ensure pipe sleeve / conduit to protect underground cables at crossings.

xix) Don't lay unarmored cable directly on ground, wall, roof or trees. All temporary cables should be laid at least 750 mm below ground and cable markers should be provided. Proper sleeves should be provided at road crossings. In case temporary cables are to be laid on wooden poles/steel poles, the minimum cable heights should be 4.5 M.

xx) Maintain safe overhead distance of HT transmission lines as per latest CEA Safety Regulation.

xxi) Don't use pipelines/structures for earthing.

xxii) Don't make any unsafe temporary connections, e.g. naked joints etc.

xxiii) Ensure that temporary cables are free from cuts, damaged insulation, kinks or improper insulated joints.

xxiv) Check at periodic intervals that pins of sockets and joints are not loose.

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xxv) Protect electrical wires/equipment from water and naked flames.

xxvi) Illuminate level in all the work areas should be in line with OISD-RP-149.

xxvii) All switchboards should be of MS structure only and incoming/outgoing feeders should be marked.

xxviii) Hand lamps/ Torch should not be of more than 24V rating, and E'x' type should be in line with hazardous area classification.

xxix) Fire extinguishers (DCP/CO_2/Sand buckets) should be kept near temporary switch boards being used for construction purposes. Don't use water for fighting electrical fires.

xxx) ISI marked Insulating mats shall be provided in the front and back end of switch boards.

xxxi) All parts of electrical installations should be so constructed, installed and maintained as to prevent danger of electric shock, fire and explosion.

Periodic checking of electrical safety appliances such as gloves, insulating mats, hoods etc. to be done/witnessed in line with OISD-STD-137, and records to be maintained duly endorsed by the concerned.

xxxii) A notice displaying following, should be kept exhibited at suitable places in local language also:

a) prohibiting unauthorized persons from entering electrical equipment rooms or from handling or interfering with electrical apparatus;
b) containing directions as to procedures in case of fire, rescue of persons in contact with live conductors and the restoration of persons suffering from electric shock;
c) specifying the person to be notified in case of electrical accident or dangerous occurrence, and indicating how to communicate with him.

xxxiii) No other cables/pipes to be laid in trench used for electrical cables.

xxxiv) Utmost care should be taken while excavating Earth from cable trench to avoid damage or any accident.

xxxv) Sub-station floor cut-outs meant for switch board installations to be covered wherever installation is incomplete.

xxxvi) Flameproofness integrity of all flameproof equipment / fittings/fixtures to be ensured at all times.

NOTE: A Residual Current Operated Circuit Breaker (RCCB) or Earth Leakage Circuit Breaker (ELCB), when installed, protects a human being to the widest extent. RCCB or ELCB should be provided as per latest CEA Safety Regulation.

6.11.2 Inspection and maintenance

i) All electrical equipment should be inspected before taking into use to ensure suitability for its proposed use.

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ii) At the beginning of every shift, the person using the electrical equipment should make a careful external examination of the equipment and conductors, especially the flexible cables.

iii) Apart from some exceptional cases subject to work permits, work on or near live parts of electrical equipment should be forbidden.

Before starting any work on conductors and/or equipment, it is to be ensured that: power supply should be isolated by an authorized person following the concept of LOTO;

iv) After work has been done on conductors and/or equipment, the power supply should only be switched on again after work permit is returned back, lock/tag on isolated feeder are removed and the workplace is reported safe.

v) Electricians should be provided with approved and tested tools and personal protective equipment such as rubber gloves, arc flash suit etc.

vi) All conductors and equipment should be considered to be live unless there is a proof of the contrary.

vii) When work has to be done in dangerous proximity to live parts the power supply should be cut off. If for operational reasons this is not possible, the live parts should be fenced off or enclosed by qualified staff from the sub-station concerned.

6.11.3. Testing

i) Electrical installations should be inspected and tested as per approved plan and the results recorded.

ii) Periodic testing for proper functioning of the earth leakage protective devices should be carried out.

iii) Particular attention should be paid to the earthing of apparatus, the continuity of protective conductors, polarity and insulation resistance, protection against mechanical damage and condition of connections at points of entry.

6.12 OFFSHORE

6.12.1 General

The isolated nature of offshore installations are hazardous. They call for greater need for health safety and survival at offshore. Safety at offshore is safety of installations and safety of personnel. Safety problems and accidents at offshore have high risks due to limited space, helicopter operation, sea transport etc. Following are the general health and safety guidelines to be followed in addition to the safety guidelines stipulated for specific jobs dealt later on:

i) Workers should be well trained to do their job independently with high degree of self-control and self-discipline.

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ii) On arrival at offshore, everyone should be briefed about the safety rules to be followed at offshore, evacuation system etc. All personnel should wear overall (dangri), helmet and shoes for personnel protection.

iii) In case of emergency, workers should follow instruction of Field Production Superintendent (F.P.S.). In certain cases instructions may be given to abandon the offshore installation and evacuate the persons to safe location.

iv) To overcome above problems, offshore personnel must receive training for using life saving appliances and other personal survival techniques.

v) Any person working at offshore should have one person as standby for any eventuality.

vi) Periodical health check-up of all personal on platforms shall be ensured and remedial measures shall be taken as per statutory and other requirements.

6.12.2 Drilling Rigs

i) Location of jack up rigs should not be less than 5 Kms from shipping route. Orientation of the rig, wind direction, etc. are required for safe landing of helicopter. Information w.r.t. sea currents, wind speed, Hi- Low tide, etc. are required for mooring of supply vessels.

ii) Sea bed condition at every location should be ensured for safety of rig.

iii) Radio and other communication facilities should be such to maintain contact with base all times.

iv) During toeing of rig, the rig deck should be clear of load, toeing lines should be in good condition and tensions in various toeing lines should be constantly monitored.

v) Few steps during toeing are:

a) crane booms should be secured to their vesta,
b) all hatches and water tight doors should be closed,
c) number of personnel on board should be restricted,
d) evacuate in case of emergency and operation should be completed preferably in day light.

6.12.3 Drilling

i) In view of CO_2 and H_2S gas cut from well, effective ventilation should be provided where drilling is in progress.

ii) Safety alarm shall be checked in advance in view of failure of ventilation system.

iii) Suitable sensors for H_2S and Methane should be function tested time to time and suitable colour code should be given.

iv) Working areas of the crane should be illuminated during night to avoid accident.

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v) Clear space should be available for despatch and receipt of load and, in particular, basket transfer of passengers. Persons engaged in loading/unloading of materials should be protected from falling into the sea.

vi) Signal light should be fitted at the top of the jib.

vii) Crane hook should be fitted with safety latches.

viii) Experienced person should be engaged in operation of specific equipment like winches, cranes etc.

ix) At least three cable turns shall always be there on the winch drum.

x) Adequate communication like walkie talkie, round robin phone should be available between the crane operator, supervisor and helper.

xi) Crane operation should be completely stopped during helicopter landing/ taking off.

xii) Except for helicopter landing deck, all decks, platforms, bridges, ladders should have rigid and fixed guard rails atleast one meter high and should have one intermediate rail midway between the handrail and 100 mm toe board.

xiii) Wooden ladders shall not be used at offshore.

xiv) Flow sensor in the flow line should be ensured for safe working and to avoid blow out.

xv) Hydrogen sulphuide gas In offshore is of great risk and at 10 ppm (0.001%) concentration in air, a person should not be exposed for more than 8 hours, If concentration is more, then breathing apparatus should be used. Corrosion of equipment is also caused by H_2S.

xvi) Portable H_2S gas detector should be continously used.

6.12.4 Production Platforms

i) In case hydrocarbon Is released due to overpressure, leak, overflow, gas blow etc., shut down process to stop flow *of* hydrocarbon. Prevent ignition of released hydrocarbon and in case of fire shut in the process complex and follow emergency contigency plan.

ii) Sub surface safetv valve (SSSV)) below the well head should be actuated during uncontrolled well -flow and they should be regularly checked.

iii) Surface safety valve or SDV should be checked for no gas leakage from bleed port / flange etc., in the well head area. It should not be in "mechanical override" or bypassed from panel.

iv) High pressure gas lift lines - blowdown system should be O.K.

* Auto actuation of SDVs in the inlet of pressure vessels should be O.K. and in "normal position" from shutdown panels. A record of status of switches normal/bypassed

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in auto-con* panels (PSH, PSL, LSL, ILSL) should be maintained.

*Shut Down Panels

v) Welders rectifier set and electrical connections to it should be checked and approved by electrical-in- charge for proper electrical safely.

vi) "SCADA" telementry system if available should be operational for remote opening and closing of wells at unmanned platforms (through RPMC).

vii) Local ESD/FSD (near the work site) should be provided for jobs of very critical nature, so that the persons working can access it immediately in emergency for safety. Safety officer should judge the requirement & inform FPS for the same.

viii) Railings and Gratings etc. in and around work area should be O.K. and inspected to avoid slippage of man into sea.

ix) Emergency Shut Down (ESD) system is initiated when an abnormal condition is detected. ESD should be checked once in six months.

x) Platform should be manned round the clock.

xi) Welding and cutting work should be regulated by hot work permit.

xii) All detectors should be calibrated as per recommendation of the manufacturer.

xiii) No system should be by-passed which affects the system of platform.

xiv) In H_2S field platforms, due care shall be taken as per recommendations.

xv) Follow the instructions of F.P.S. during stay at platform

6.12.5 Fire Prevention And Control

i) Provision be made for safe handling and storage of dirty rags, trash, and waste oil. Flammable liquids and chemicals applied on platform should be immediately cleaned.

ii) Paint containers and hydrocarbon samples, gas cylinders for welding and cutting should be stored properly. Cylinders should be transported in hand-cart.

iii) Smoking should be restricted and no smoking area should be identified.

iv) Special attention should be given to crude oil pump seals; diesel and gas engines which are potential source of ignition in the event of failure.

v) Fire and smoke detectors i.e. ultraviolet heat, thermal and smoke detector should be function tested once in three months.

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vi) Fire is controlled in offshore by water spraying, Halon, CO_2 flooding, DCP and sprinkler system.

vii) Foaming agent is applied for controlling fire in liquid hydrocarbon. The system is not effective in gas fire.

viii) Light weight breathing system should be used.

ix) The fire control plan at offshore should reveal control station, fire alarms and fire detectors, deluge valves and sprinkler, fire extinguishing appliances, fireman outfit and ventilation system.

x) Fire fighting equipment should be maintained in ready to use condition.

6.12.6 Life Saving Appliances

i) Life boats with a speed of 6 knots and carrying capacity upto 50 persons are used in offshore.

ii) No. of life boats on one installation should have a capacity to accommodate twice the number of persons onboard installation.

iii) Launching appliances and life boat equipment should be checked every week.

iv) Boat landing areas should be adequately illuminated.

v) Life raft has no power and they rely on drift.

vi) Life jacket lifts the wearer after entering water.

vii) Life buoys are used to rescue persons if any person accidentally falls in the sea.

viii) All life saving appliances should be inspected by the MMD surveyor /sr. officials once a year.

ix) Every life boat shall be inspected once a week.

x) Every life boat and life raft should be serviced once a year by a competent authority.

6.12.7 Safety Precautions during Helicopter Transportation

i) Passenger briefing regarding safety rules while travelling in helicopter should be carried out before boarding the helicopter.

ii) Emergency procedure should be briefed to all the passengers in case helicopter is to ditch into the sea.

iii) Heli-pad should have a non-skid surface. Nylon rope net should be stretched on the deck.

iv) Proper drainage should be available on helideck.

v) There should be no obstruction on the helideck itself and within 3 meters of its perimeter. Closest super structure above the helideck should have red obstruction light.

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vi) While landing on helicopter, fire crew of two persons should be standby adjacent to helideck.

vii) Heli-deck should be properly illuminated for night landing.

viii) During switching off helicopter, persons should not be allowed to go out/ towards helicopter

6.13 DEMOLITION

6.13.1. General provisions

i) When the demolition of any building or structure might present danger to workers or to the public:

(a) necessary precautions, methods and procedures should be adopted, including those for the disposal of waste or residues;
(b) the work should be planned and undertaken only under the supervision of a competent person.

ii) Before demolition operations begin:

(a) structural details and builders' drawings should be obtained wherever possible;
(b) details of the previous use should be obtained to identify any possible contamination and hazards from chemicals, flammables, etc.;
(c) an initial survey should be carried out to identify any structural problems and risks associated with flammable substances and substances hazardous to health. The survey should note the type of ground on which the structure is erected, the condition of the roof trusses, the type of framing used in framed structures and the load-bearing walls;
(d) a method of demolition should be formulated after the survey and recorded in a method statement having taken all the various considerations into account and identifying the problems and their solutions;

iii) All electric, gas, water and steam service lines should be shut off and, as necessary, capped or otherwise controlled at or outside the construction site before work commences.

iv) If it is necessary to maintain any electric power, water or other services during demolition operations, they should be adequately protected against damage.

v) As far as practicable, the danger zone round the building should be adequately fenced off and sign posted. To protect the public a fence 2m high should be erected enclosing the demolition operations and the access gates should be secured outside working hours.

vi) The fabric of buildings contaminated with substances hazardous to health should be decontaminated. Protective clothing and respiratory devices should be provided and worn.

vii) Where plant has contained flammable materials, special precautions should be taken to avoid fire and explosion.

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viii) The plant to be demolished should be isolated from all other plant that may contain flammable materials. Any residual flammable material in the plant should be rendered safe by cleaning, purging or the application of an inert atmosphere as appropriate.

ix) Care should be taken not to demolish any parts, which would destroy the stability of other parts.

x) Demolition activities should not be continued under adverse climatic conditions such as high winds, which could cause the collapse of already weakened structures.

xi) To prevent hazards parts of structures should be adequately shored, braced or otherwise supported.

xii) Structures should not be left in a condition in which they could be brought down by wind pressure or vibration.

xiii) Where a deliberate controlled collapse technique is to be used, expert engineering advice should be obtained, and:

(a) it should only be used where the whole structure is to come down because it relies on the removal of key structural members to effect a total collapse;
(b) it should only be used on sites that are fairly level and where there is enough surrounding space for all operatives and equipment to be withdrawn to a safe distance.

xiv) When equipment such as power shovels and bulldozers are used for demolition, due consideration should be given to the nature of the building or structure, its dimensions, as well as to the power of the equipment being used.

xv) If a swinging weight is used for demolition, a safety zone having a width of at least one-and-a-half times the height of the building or structure should be maintained around the points of impact.

6.13.2. Demolition of structural steelwork

i) All precautions should be taken to prevent danger from any sudden twist, spring or collapse of steelwork, ironwork or reinforced concrete when it is cut or released.

ii) Steel construction should be demolished tier by tier.

iii) Structural steel parts should be lowered and not dropped from a height.

6.14 RADIOGRAPHY

6.14.1 All radiography jobs shall be carried out as per BARC Safety Regulations

6.14.2 During field radiography, nearby area around the radiation source should be cordoned off.

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6.14.3 If the field radiography is to be done at the same location repeatedly, it is advisable to provide either a wire fencing around or a temporary brick enclosure.

6.14.4 Special permission/permit should be taken for radiography from area-in-charge.

6.14.5 As far as possible, field radiography should be done only during night time when there is little or no occupancy there.

6.14.6 Radiation warning signals should be pasted all along the cordoned off area.

6.14.7 Entry into the restricted area by unauthorised persons should be strictly prohibited during exposure.

6.14.8 The radiation level alongwith the cordon should be monitored by a suitable and well-calibrated radiation survey meter.

6.14.9 All personnel working with radiography sources should wear appropriate protective equipment and film badges issued by BARC.

6.14.10 Protection facilities such as manipulator rod, remote handling tongs, lead pots, radiation hazard placards and means of cordon off shall be available at each site.

6.14.11 The radiography source shall never be touched or handled directly with hands.

6.14.12 The package containing radiography cameras and sources should never be carried by public transport like bus, train etc.

6.14.13 Radiography sources and cameras, when not in use, should be stored inside a source pit with lock and key arrangement as approved by BARC. The storage room should preferably be located in an isolated area of minimum occupancy and radiation level outside the storage room should not exceed 0.25 mR/hr as per BARC Regulations.

6.14.14 In case of an accident (due to loss or of damage to radiography source), action should be taken in line with BARC Safety Rules/Guidelines.

6.14.15 Technologically advance methods should be preferred for reduced radiation effect wherever safety so warrants.

6.15 GRIT SHOT/ SLAG BLASTING/ SPRAY PAINTING

6.15.1 Blasting for surface preparation should be used only after approval from competent person.

6.15.2 Air Compressor used for grit/shot/slag blasting/painting should have guard and positioned away from the work place.

6.15.3 Exhaust of the prime mover, if IC engine is used, should be fitted with PESO approved spark arrester (in case of work in hazardous area) and directed away from the work place.

6.15.4 In case of motor driven compressor, the body of the motor as well as the compressor to be properly earthed.

6.15.5 The hoses used for compressed air should be of proper quality, and health of the same to be ensured through regular check/ test.

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6.15.6 The operator of grit/shot/slag blasting/painting should wear suitable PPE's including mask and the area should be cordoned off.

6.15.7 Adequate measures to be taken to suppress dust/spray particle.

6.15.8 When these activities are done in confined places, adequate measure to be taken including monitoring Oxygen level and ensuring proper ventilation.

6.15.9 Proper fire fighting arrangements are to be made where spray painting is in progress.

6.15.10 Some paints and their supplements are toxic also and emit offensive smell. PPE to workers should be suitable to address this issue.

6.15.11 "No Smoking Zone" boards should be displayed prominantly in paints shop/ spray paint area.

6.16 WORK ABOVE WATER

6.16.1 General Provisions

i) Where work is done over or in close proximity to water & where possibility of drowning exists, provision should be made for:
   a) preventing workers from falling into water;
   b) the rescue of workers in danger of drowning;
   c) safe and sufficient transport.
   d) deputation of lifeguards/divers.
   e) preventing of persons suffering from hydrophobia on deputation to work above water.

ii) Provisions for the safe performance of work over or in close proximity to water should include, where appropriate, the provision and use of suitable and adequate:
   a) fencing, safety nets and safety harnesses;
   b) lifebuoys, life jackets and manned boats;
   c) protection against such hazards as reptiles bushes/ polluted water and other animals.
   d) deputation of lifeguards/divers.

iii) Gangways, pontoons, bridges, footbridges and other walkways or work places over water should:
   a) possess adequate strength and stability;
   b) be sufficiently wide to allow safe movement of workers;
   c) have level surfaces free from tripping hazards;
   d) be adequately lit when natural light is insufficient;
   e) where practicable and necessary, to prevent danger, be provided with toe-boards, guard rails, hand ropes etc.
   f) be secured to prevent dislodgment by rising water or high winds;
   g) if necessary, be equipped with ladders which should be sound, of sufficient strength and length and be securely lashed to prevent slipping.

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iv) All deck openings including those for buckets should be fenced.

v) All the employees (owner, contractor and contractor workers) working above and under the water should comply with the requirements of Standards of Training, Certification and Watchkeeping 95 (STCW 95).

6.16.2 Rescue & Emergency procedures

i) Persons who work over water should be provided with some form of buoyancy aid. Life jackets should be provided for sufficient freedom of movement, have sufficient buoyancy to bring persons to the surface and keep them afloat face upwards, be easily secured to the body, be readily visible by way of self luminous paint/strip.

ii) Nobody should work alone on or above water.

iii) Each worker should be trained in the procedure to be followed in the event of an emergency.

iv) Necessary rescue arrangements like divers, rescue boats etc to be in place.

v) Persons to be trained for CPR/ Artificial resuscitation as an first aid to the rescued person.

vi) Also for off shore operations. Speed of water current and water temperature to be considered.

7.0 ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS

In addition to general safety precautions as outlined above for the activities in Clause 6.0, following additional safety precautions need to be taken for the sites within the operating area or nearby, where presence of Hydrocarbons cannot be ruled out.

i) No job shall be carried out without a valid permit. Permit should be in line with OISD-STD-105 "Work Permit System".

ii) Smoking should be prohibited in all places containing readily combustible or flammable materials and "No Smoking" notices be prominently displayed.

iii) In confined spaces and other places where flammable gases, vapours or dusts can cause danger, following measures should be taken:

(a) only approved type electrical installations and equipment, including portable lamps, should be used;
(b) there should be no naked flames or source of ignition;
(c) oily rags, waste and clothes or other substances liable to spontaneous ignition should be removed without delay to a safe place;
(d) Air operated ventilation system should be provided.

iv) Regular inspections should be made of places where there are fire risks. These include the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations.

v) Welding, flame/gas cutting and other hot work should only be done after issuance of work permit in line with the requirement of OISD-STD-105

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after appropriate precautions, as required, are taken to reduce the risk of fire. For carrying out other jobs also, OISD-STD-105 should be followed strictly.

vi) Fire-extinguishing equipment should be well maintained and inspected at suitable intervals by a competent person. Access to fire-extinguishing equipment such as hydrants, portable extinguishers and connections for hoses should be kept clear at all times.

vii) All supervisors and workers should be trained in the use of fire-extinguishing equipment, so that adequate trained personnel are readily available during all working periods.

viii) Audio means to give warning in case of fire should be provided where this is necessary to prevent danger. Such warning should be clearly audible in all parts of the site where persons are liable to work. There should be an effective evacuation plan so that all persons are evacuated.

ix) Notices should be posted at conspicuous places indicating:

(a) the nearest fire alarm;
(b) the telephone number and address of the nearest emergency services.

x) The work site shall be cleared of all combustible materials, as Sparks and molten metal coming from the welding job can easily ignite combustible materials near or below the welding site. If the combustible materials cannot be removed from the area, the same shall be properly shielded.

xi) A dry chemical type fire extinguisher (DCP) shall be made available in the work area. Also fire protection facilities like running hoses etc. as per permit should be complied with.

xii) Wherever required, welding screens shall be put up to protect other equipment in adjoining areas against flying sparks. Material used should be metal/ fire proof blanket/water curtain.

xiii) Welding or cutting of vessels/ equipments used in Hydrocarbon/ hazardous flammable chemicals shall be done after ensuring hydrocarbon free area and verifying the same with the suitable hydrocarbon detector.

xiv) The confined space/equipment shall be made gas free (hydrocarbon and toxic) and cleaned and shall be ensured, with the help of suitable gas detectors.

xv) Used and hot electrode stubs shall be discarded in a metal bucket.

xvi) Use PESO approved and certified spark arrestors for vehicles, wherever applicable.

xvii) Relevant work permit (hot work, cold work, vessel entry etc. as the case maybe) to be obtained, if construction work is carried out within existing operating area.

xviii) Precaution against pyrophoric material shall be ensured.

8.0 Environment Protection

8.1 Waste

The contractor is required to develop, institute and maintain a Waste Management Programme (WMP) during the construction of the project for his works and obtain approval of the owner. WMP may include: -

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i) Identification of disposal sites.
ii) Identification of waste/surplus quantities to be disposed off.
iii) Identification of amounts intended to be stored temporarily on site location of such storage.
iv) Use of proper PPEs.
v) Identification of intended transport means and route.
vi) Obtaining permission, where required, for disposal.

Such a mechanism is intended to ensure that the designation of areas for the segregation and temporary storage of reusable and recyclable materials are incorporate into the WMP. The WMP should be prepared and submitted to the Engineer for approval.

The Contractor shall handle waste in a manner that ensures they are held securely without loss or leakage thus minimizing potential for pollution and fire. The Contractor shall maintain and clean waste storage areas regularly.

The Contractor shall make arrangement to stack the metal scrap at designated location and maintain the site free from obstruction. The scrap to be disposed as per owner instruction at regular interval.

8.2 Hazardous Waste Management

If encountered or generated as a result of Contractor's activity, then waste classified as hazardous under the "Hazardous Wastes (Management & Handling) Rules, 1989, and amendments thereunder time to time" shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.

Chemicals classified as hazardous chemicals under "Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 of Environment (Protection) Act, 1986 (latest) shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.

8.3 Air Quality

The Contractor shall take all necessary precautions to minimise fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste. He shall not allow emissions of fugitive dust from any transport, handling, construction or storage activity to remain visible in atmosphere beyond the property line of emission source for any prolonged period of time without notification to the Employer.

The Contractor shall use construction equipment designed and equipped to minimise or control air pollution. He shall maintain evidence of such design and equipment and make these available for inspection by Employer.

If after commencement of construction activity, Employer believes that the contractor's equipment or methods of working are causing unacceptable air pollution impacts then these shall be inspected and remedial proposals shall be drawn up by the Contractor, submitted for review to the Employer and implemented.

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The Contractor shall maintain the MSDS of the chemicals used / stacked at site and same shall be handled as per the standard prescribed procedure. The quantity shall be stored strictly as per the norms and emergency handling procedure shall be known and displayed prominently.

8.4 Noise

The Contractor shall consider noise as an environmental constraint in his design, planning and execution of the Works and provide demonstrable evidence of the same. The Contractor shall, take all appropriate measures to ensure that work carried out by the Contractor, whether on or off the Site, will not cause any unnecessary or excessive noise.

8.5 Occupational Noise

i) Protection against the effects of occupational noise exposure should be provided when the sound levels exceed the threshold values as prescribed.
ii) When employees are subjected to expose the sound levels beyond the prescribed limit, feasible administrative or engineering controls should be ensured.
iii) If such controls fail to reduce sound levels within the levels, personal protective equipment shall be provided and used to reduce sound levels within the prescribed limit.

9.0 OCCUPATIONAL HEALTH

9.1 Medical Examination

The contractor shall arrange a medical examination of all his employees before employing, after illness or injury, if it appears that the illness or injury might have affected his fitness and, thereafter, at periodicity stipulated under Factories Act / Building & Construction Workers Regulation (BOCWR).

The Contractor shall maintain the confidential records of medical examination by the physician authorized by the Employer.

9.2 Occupational Health Centre

The contractor shall ensure at a construction site an occupational health centre, mobile or static is provided and maintained in good order. Services and facilities as per the scale lay down under Factories Act / Building & Construction Workers Regulation (BOCWR). A construction medical officer appointed in an occupational health centre possess the qualification as laid down under Factories Act / Building & Construction Workers Regulation (BOCWR).

9.3 First Aid

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First aid facilities should be provided in line with various statutory regulations like The Factory Act etc. However following care should be taken:

i) First aid, including the provision of trained personnel should be ensured at work sites. Arrangement should be made for ensuring the medical attention of the injured workers.

ii) Suitable rescue equipment, like stretchers should be kept readily available at the construction site.

iii) First-aid kits or boxes, as appropriate and as per statutory requirements, should be provided at workplaces and be protected against contamination by dust, moisture etc.

iv) First-aid kit or boxes should not contain anything besides material for first aid in emergencies.

v) First-aid kits and boxes should contain simple and clear instructions to be followed, be kept under the charge of a responsible person qualified to render the first aid and be regularly inspected and replenished.

vi) Where the work involves risk of drowning, asphyxiation or electric shock, first-aid personnel should be proficient in the use of resuscitation and other life saving techniques as specified in rescue procedures.

vii) Emergency telephone numbers of nearby Hospitals, Police, Fire Station and Administration should be prominently displayed.

10.0 DOCUMENTATION

The intention of keeping documentation of all types of accident(s) is to prevent recurrence of similar accident(s). All accidents should be reported as per OISD Guidelines and The Factories Act, 1948/ BOCWR.

All accidents (major, minor or near miss) should be investigated, analysed and recommendations should be documented along with implementation status.

All related data should be well-documented and further analysis highlighting the major cause(s) of accidents be done. This will help in identifying thrust areas and training needs for prevention of accidents.

11.0 SAFETY AWARENESS & TRAINING

Safety awareness to all section of personnel ranging from site-in-charge to workmen helps not only preventing the risk but also build up the confidence. Time and expenditures also get saved as a result.

Safety awareness basically seeks to persuade/inform people on safety besides supplementing skill also. Awareness programme may include followings:

i) **Poster:** Posters with safety slogan in humorous, gruesome demonstrating manner may be used to discourage bad habits attributable to accidents by appealing to the workers' pride, self-love, affection curiosity or human aspects. These should be displayed in prominent location(s).

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ii) **Safety Sign Boards**: Different type of message of cautioning, attention, notice etc. should be displayed at the appropriate places for learning/ awareness of the workmen while working at site.

iii) **Films & Slides:** Film(s) narrating the accident case study including the causes and possible remedial ways of preventing the recurrence of a similar accident should be displayed at regular intervals. Slides consisting main points of the film show may also be shown to workers.

iv) **Talks, lectures & conferences:** The success of these events would depend much on audience's understandings of the speaker (s). The speakers are to be knowledgeable and good presenter. Speakers should know to hold the attention and to influence the audiences.

v) **Competitions:** Organise competition(s) between the different deptts/categories of workers. The sense of reward/recognition also will improve safety awareness and result in enhancing safety levels.

vi) **Exhibitions:** Exhibitions also make the workers acquainted with hazards and means of preventive measures.

vii) **Safety Publication:** Safety publications including pocket books dealing with ways of investigation and prevention in the field of safety and so on, may be distributed to workers to promote the safety awareness.

viii) **Safety Drives:** From time to time, an intensive safety drive by organising a safety day or a safety week etc. should be launched.

ix) **Training:** Training for covering the hazards for different trade should be imparted. Training should also include the specific hazards related to a job in addition to the general safety training as has been dealt in various chapters and should include all workers. Reference may be drawn from OISD-STD-154.

12.0 REFERRENCES

i) *Factory Act, 1948*

ii) *Indian Electricity Rules*

iii) *Safety & Health in Construction by ILO*

iv) *The Building & Other Construction Workers (Regulation, Employment and Conditions of Service) Act 1996 and Central Rules 1998*

v) CSB guidelines

vi) *IS 1161: 2006 or latest edition - Steel tubes for structural purposes — specification*

vii) *IS 2750: 1964 or latest edition - Specification for steel scaffolding.*

viii) *IS : 3696 (Part 1) – 1987 (Scaffolds) Safety code of scaffolds and ladders*

ix) *IS : 3696 (Part 2) – 1987 (Ladders)Safety code of scaffolds and ladders*

x) *IS 4014 Part I: 2006 or latest edition - Code of practice for steel tubular scaffolding - definitions and materials.*

xi) *IS 4014 Part II: 2005 or latest edition - Code of practice for Steel tubular scaffolding - Safety regulations for scaffolding.*

xii) *Building & Other Construction Workers(Regulation on employment &conditions of service) central rules, 1998 (Provision related to Scaffold).*

xiii) *OHSA Standard on Scaffold (CFR 1926.452)*

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ANNEXURE I

LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF INDIAN STANDARDS

Sr.no	Code No.	Title
01.	IS : 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
02.	IS : 875	Code of practice for Structural safety of buildings: Masonry walls
03.	IS : 933	Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
04.	IS : 1179	Specification for Equipment for Eye and Face Protection during Welding – First Revision.
05.	IS : 1904	Code of practice for Structural safety of buildings: Shallow foundations
06.	IS : 1905	Code of practice for Structural safety of buildings: Masonry walls
07.	IS : 2171	Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision.
08.	IS : 2361	Specification for Building Grips – First Revision.
09.	IS : 2750	Specification for Steel Scaffoldings.
10.	IS : 2925	Specification for Industrial Safety Helmets – First Revision.
11.	IS : 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision.
12.	IS : 3521	Industrial safety belts and harnesses
13.	IS : 3696 – Part I	Safety Code for Scaffolds and Ladders : Part I – Scaffolds.
14.	IS : 3696 – Part II	Safety Code for Scaffolds and Ladders : Part II – Ladders.
15.	IS : 3764	Safety Code for Excavation Work.
16.	IS : 4014 -Part I & II	Code of practice for Steel tubular scaffolding
17.	IS : 4081	Safety Code for Blasting and Related Drilling Operations.
18.	IS : 4082	Recommendations on staking and storage of construction materials at site
19.	IS : 4130	Safety Code for Demolition of Buildings – First Revision.
20.	IS : 4138	Safety Code Working in Compressed Air-First Revision
21.	IS : 4756	Safety code for Tunneling works
22.	IS : 4912	Safety requirements for Floor and Wall Openings, Railings and toe Boards –First Revision.
23.	IS : 5121	Safety Code for Piling and other Deep Foundations.
24.	IS : 5916	Safety Code for Construction involving use of Hot Bituminous Materials.
25.	IS : 5983	Specification for Eye Protectors – First Revision.
26.	IS : 6922	Structures subject to underground blasts, criteria for safety and design of
27.	IS : 7155	Code of recommended practices for conveyor safety
28.	IS : 7205	Safety Code for Erection on Structural Steel Works.

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Sr.no	Code No.	Title
29.	IS : 7069	Safety Code for Handling and Storage of Building Materials.
30.	IS : 7293	Safety Code for Working with Construction Machinery.
31.	IS : 7323	Guidelines for operation of Reservoirs
32.	IS : 7969	Safety code for handling and storage of building material
33.	IS : 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals.
34.	IS : 8989	Safety Code for Erection of Concrete Framed Structures.
35.	IS : 9706	Code of Practices for construction of Arial ropeways for transportation of material
36.	IS : 9759	Guidelines for de-watering during construction
37.	IS : 9944	Recommendations on safe working load for natural and man-made fibre rope slings
38.	IS : 10291	Safety code for dress divers in civil engineering works
39.	IS :10386 – Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects.
40.	IS :10386 – Part II	Safety Code for Construction, Operation and Maintenance of River Valley Projects.
41.	IS : 11057	Code of practice for Industrial safety nets
42.	IS : 13415	Code of Practice on safety for Protective barriers in and around building
43.	IS : 13416	Recommendations for preventive measures against hazards at working places

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OISD – GDN – 207

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CONTRACTOR SAFETY

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CONTRACTOR SAFETY

Prepared by

FUNCTIONAL COMMITTEE ON CONTRACTOR SAFETY

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Preamble

Indian petroleum industry is the energy lifeline of the nation and its continuous performance is essential for sovereignty and prosperity of the country. As the industry essentially deals with inherently inflammable substances throughout its value chain – upstream, midstream and downstream – Safety is of paramount importance to this industry as only safe performance at all times can ensure optimum ROI of these national assets and resources including sustainability.

While statutory organizations were in place all along to oversee safety aspects of Indian petroleum industry, Oil Industry Safety Directorate (OISD) was set up in 1986 Ministry of Petroleum and Natural Gas, Government of India as a knowledge centre for formulation of constantly updated world-scale standards for design, layout and operation of various equipment, facility and activities involved in this industry. Moreover, OISD was also given responsibility of monitoring implementation status of these standards through safety audits.

In more than 25 years of its existence, OISD has developed a rigorous, multi-layer, iterative and participative process of development of standards – starting with research by in-house experts and iterating through seeking & validating inputs from all stake-holders – operators, designers, national level knowledge authorities and public at large – with a feedback loop of constant updation based on ground level experience obtained through audits, incident analysis and environment scanning.

The participative process followed in standard formulation has resulted in excellent level of compliance by the industry culminating in a safer environment in the industry. OISD – except in the Upstream Petroleum Sector – is still a regulatory (and not a statutory) body but that has not affected implementation of the OISD standards. It also goes to prove the old adage that self-regulation is the best regulation. The quality and relevance of OISD standards had been further endorsed by their adoption in various statutory rules of the land.

Petroleum industry in India is significantly globalized at present in terms of technology content requiring its operation to keep pace with the relevant world scale standards & practices. This matches the OISD philosophy of continuous improvement keeping pace with the global developments in its target environment. To this end, OISD keeps track of changes through participation as member in large number of International and national level Knowledge Organizations – both in the field of standard development and implementation & monitoring in addition to updation of internal knowledge base through continuous research and application surveillance, thereby ensuring that this OISD Standard, along with all other extant ones, remains relevant, updated and effective on a real time basis in the applicable areas.

Together we strive to achieve NIL incidents in the entire Hydrocarbon Value Chain. This, besides other issues, calls for total engagement from all levels of the stake holder organizations, which we, at OISD, fervently look forward to.

Jai Hind!!!

Executive Director
Oil Industry Safety Directorate

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FOREWORD

At the time of development of this document, 113 OISD standards, recommended practices and guidelines are applicable to the Oil and Gas installations of Public sector Oil Companies in India. 11 of these standards have been adopted by Petroleum and Explosives Safety Organisation (PESO) in various rules administered by them and thus the provisions of these standards are mandatory for entire Oil & Gas sector to that extent.

A few serious accidents have occurred in the recent past in India and abroad including vapour cloud explosion and fire at Oil terminal near Jaipur emphasised the need for the industry to review the existing provisions of various guidelines and statutory requirements.

With the above in view the Government of India directed the Oil Industry Safety directorate to develop a comprehensive document covering all the facets of Safety in Design, Operation and Maintenance, of depots and terminals being run by marketing divisions of Oil companies with an objective to strengthen the existing system.

The present guideline on "Contractor Safety" has been prepared by the functional committee based on, existing standards, guidelines & recommended practices of OISD, the recommendations arising out of recent major accidents and their analysis, the accumulated knowledge and experience of industry members in India and updation of National and International codes and practices.

The provisions of this document, if implemented objectively, may go a long way in enhancing overall safety standard and reduce accidents in Oil Installations.

Users are cautioned that no standard can be substitute to the "judgement and experience of Engineers"

This document will be reviewed periodically for improvements based on the new experiences and better understanding. Suggestions are also invited from the users after it is put into practice to improve the document further. Suggestions may be addressed to:

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This guideline in no way supercedes the statutory regulations of Chief Controller of Explosives (CCE), Factory Inspectorate or any other statutory body, which shall be followed as applicable.

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NOTE

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Though every effort has been made to assure the accuracy and reliability of the data contained in these documents, OISD hereby expressedly disclaims any liability or responsibility for loss or damage resulting from their use.

These documents are intended to supplement rather than replace the prevailing statutory requirements.

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SECOND FUNCTIONAL COMMITTEE ON CONTRACTOR SAFETY

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In addition to the above, several other experts from Industry contributed in the preparation, review and finalisation of this Guideline.

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In addition to the above, several other experts from Industry contributed in the preparation, review and finalisation of this Guideline.

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CONTRACTOR SAFETY

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CONTRACTOR SAFETY

1.0 INTRODUCTION

Oil and Gas operations like Drilling, Production, Refining, Storage**,** Transportation and Distribution, etc. are inherently hazardous. A large number of contractor workforce is deployed to carry out construction, maintenance and other jobs. The analysis of the incidents in the Petroleum Sector indicates that a large number of incidents involved contractor workforce and have resulted in either casualty or injury besides leading to property damage and operational interruptions and environmental degradation.

In order to improve the safety levels of hydrocarbon installations, the contractor safety is of utmost importance and there is a need to institute a good contractor safety system.

2.0 SCOPE

This document covers broadly the guidelines on the HSE management system for enhancing the safety levels of the contractor workforce deployed in construction, maintenance and operation activities in the hydrocarbon industry.

The safety precautions to be taken while carrying out different activities during construction / maintenance have separately been covered in OISD-GDN-192 on "Safety Practices during Construction".

3.0 DEFINITIONS

Work station / Work site

A place / unit where the job is carried out by contractor/executing agency in specified manner with safety, during construction phase or in operation phase.

Owner
Any physical or legal person/entity for whom prescribed job is carried out.

It shall also include owner's designated representative / consultant /nominee / agent, authorised from time to time to act for and on its behalf, for supervising / co-ordinating the activities of the contractor/execution agency.

Contractor / Executing Agency

A physical or legal person/entity having contractual obligation with the owner, and who deploys one or more worker on the site.

Contractor Worker

It covers all workmen who are either self-employed or employed through contractor, the casual workers and includes contractor's supervisor, working at a location / site employed directly by Owner or through their contractor.

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Incident

An incident is an unplanned, uncontrolled, unintended or unforeseen event, caused by unsafe acts and / or unsafe conditions, resulting in or having the potential to result in personal injury and/or property damage.

Consultant

Consultant is a physical or legal person/entity engaged by owner to provide the consultancy services to owner for management of the contract on their behalf or as specified.

Designer

Designer is a physical or legal person / entity engaged by owner to provide design services of a work site.

Owner's Representative / Engineer In Charge

The Owner's representative/Engineer-in-charge is the one, who has been designated by the owner to manage the contract.

Owner's Safety Officer

A properly trained person designated by owner who ensures safety at work site.

4.0 DUTIES/ RESPONSIBILITIES

4.1 OWNER

4.1.1 Owner's Management

The commitment to safety has to be emphasized by the owner by practice by its own management and employees at all levels. The duties and responsibilities of owner should include:

i) To institute a mechanism for identification and compliance of all applicable statutory rules & regulations (Refer Annexure I for a list of few important Bureau of Indian Standards & statutory regulations).

ii) To provide specific information to contractors and make workers aware on the hazards associated with job assigned.

iii) To provide information about Risk Mitigation measures available at the place of work.

iv) To provide the contractor with information on Owners Safety Plan & Regulations, Emergency Management Plan, lockout / tag out procedure, confined space entry, work permit system, excavation / trench permit system etc.

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v) To specify rules (e.g. for security including access arrangements) and safety rules such as fire protection, first aid arrangements, Work Permit systems etc.

vi) To provide comprehensive list of statutory regulations / standards and specification, to be complied with during execution of contract, in the tender document itself.

vii) To ensure training of the contractor workforce, medical examination, and proper usage of safety equipment.

viii) To specify the requirements of Health, Safety and Environment (HSE) (commensurate with the nature of job) in Pre- Qualification criteria.

ix) To designate Engineer-in-charge and safety officer.

x) To arrange for a multi-disciplinary safety audit team to conduct surprise / regular safety audits and monitor the implementation of the recommendations.

xi) To introduce suitable schemes for motivation of the contractor worker to adhere to safety guidelines.

xii) To review safety practices & their implementation through periodic surprise visit of the work sites and monthly review meeting.

xiii) To develop the HSE plans and incorporate the same in the tender document.

xiv) To liaise with external agencies like press, public etc and with law enforcement, regulatory, statutory agencies etc.

xv) To report to statutory agencies on safety compliance and accidents, if any.

4.1.2 Owner's Representative/Engineer-in-charge

The duties & responsibilities of engineer-in-charge should include:

i) To ensure that all Contract requirements including Health, Safety, Environment & Security are complied with.

ii) To ensure that contractor workforce deployed is adequately qualified, trained and in state of health to commensurate with the requirements of the job.

iii) To ensure that the Tools / Tackles and Machinery being used are properly tested and are in sound working conditions and necessary resources proposed for providing safe place of work and necessary PPE are being used.

iv) To take the required necessary corrective action immediately upon noticing or receipt of a report on noncompliance or any such condition which poses a threat to health, safety or environment. If during the course of execution of the contract, any situation of non-compliance with the contractor's safety and health plan are noticed / reported, the same will be taken up with the contractor for correction. In the event of repeated non compliance, suitable action to be initiated as per the contract.

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v) To ensure that the incidents are reported to all concerned within stipulated time frame.

vi) To ensure submission of a plan for safe working (Method Statement) from contractor and approval of the same by competent person / department.

vii) To ensure that Work Permit System in line with OISD-STD-105 is adhered to.

viii) To ensure availability of all the documentation needed for the execution of contract.

ix) To ensure that the quality controls have been maintained during fabrication/erection and all jobs required for safe commissioning have been carried out.

x) To ensure safe dismantling of all temporary facilities/connections put up by the contractor, after completion of work.

xi) To compile a report on the safety performance (at the conclusion of each contract or periodically such as annually for renewable and long-term contracts), which is to be considered in future when selecting contractors.

xii) To ensure that the Consultant, contractor and sub-contractor employ / designate qualified & trained Safety Engineer / Officer commensurate with requirement of the job.

xiii) To comply with all applicable safety and health standards, rules, regulations and orders issued by competent authority pertaining to the assigned activities.

4.1.3 Owner's Safety Officer

The duties & responsibilities of the Owner's Safety Officer should include:

i) To assess the hazards associated with jobs in consultation with all concerned and establish safe working procedure including identification of the escape routes.

ii) To establish a written record of factors which can cause injuries and illnesses and maintain statistical information for use in analysing all types of incidents and events involving contract personnel.

iii) To undertake routine/surprise inspections of all work sites and identify unsafe conditions & practices, if any. Check for compliance of the safety practices being followed with approved HSE Plan.

iv) To investigate promptly the incidents (including near-miss) in order to advise corrective and/or preventive action and assist management for its compliance.

v) To ensure periodic internal audits, review meetings, monitor and analyse HSE performance, nonconformities and suggest its corrective & preventive action.

vi) To encourage contractor and contract workers for reporting requirements ~~for~~ of occupational injuries and illnesses.

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vii) To advise whether the proposed working arrangements are safe and satisfactory, particularly at the interface between the contractor's planned work and owner's existing facilities.

viii) To communicate to the Contractor the imposed restrictions which may affect the work/personnel such as the temporary closure of a corridor or electrical isolation of equipment.

ix) To review and monitor the contractor's adherence to approved HSE plan and compliance thereof.

x) To design and conduct either independently or in collaboration with the training department, suitable HSE training programme for the prevention of personal injuries to Consultant, Contractor's Managers, Supervisors and workmen at all levels

xi) To identify areas of operations where specialized training is required to deal with potential dangers.

xii) To document and to bring to the attention of the Owner's Supervisor and Contractor any non-compliance/violation of the safety norms against approved safety and health plan or safety and health requirements and also raise these issues in the Safety Committee Meetings.

xiii) To take part in Tool Box Meetings at random and to ensure maintenance of records.

I. Establish, implement, maintain and review HSE objectives and programs including responsibility, authority, means & time frame at all relevant functions and levels.
II. Apprise the management about HSE status & help formulate appropriate policies for continual improvement.
III. Standardize PPE & Safety Devices, identify and develop approved vendors wherever required.

To organise campaigns, competitions, contests and other activities in association with the concerned departments, which will develop and maintain the interest of the contractor and contractor workers in establishing and maintaining safe conditions of work and procedures;

4.2 CONTRACTOR

4.2.1 Contractor's Management

Duties & responsibilities of the contractor should include the following:

i) To implement safe methods and practices, deploy appropriate machinery, tools & tackles, experienced supervisory personnel and skilled work force etc. required for execution.

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ii) To prepare a comprehensive and documented plan for implementation, monitoring and reporting of Health, Safety and Environment (HSE) and implement the same after its approval.

iii) To nominate qualified & trained Safety Engineers / Officers reporting to the Site in charge, for supervision, co-ordination and, liaison for the implementation of the safety plan.

Similar HSE Plan should be implemented at the sub- contractor's or supplier's site /office. However the compliance with the HSE Plan is to be the sole responsibility of the Contractor.

iv) To arrange facilities at suitable location in liaison with the owner for drinking water, toilets, lighting, canteen, lunch shelter, crèche etc. as applicable as per Laws/ Legislation at site and also arrange for workmen compensation insurance, third party liability insurance, registration under ESI / PF act etc as applicable.

v) To arrange for fire protection equipment as per the advice of owner.

vi) To ensure that its employees have completed appropriate health and safety training as required by the statute / regulation and also as per requirements of the Owner / Consultant. The documentation of such training imparted to all its employees should be maintained and produced for verification as required.

vii) To comply with all the security arrangements of owner.

viii) To ensure that the plant and equipment used on-site by contractor / employees is correctly registered, controlled and maintained in sound working condition.

ix) To ensure availability of First Aid boxes and First Aid trained attendant and other facilities as per requirement of factory Act / Building & Construction Workers Regulation (BOCWR).

x) To ensure that all incidents including near misses are reported immediately. Investigated with corrective and preventive action and learning are shared with all workers and all concerned at the earliest.

xi) To have HSE policy

xii) Maintain HSE performance data on yearly basis and submit to owner for evaluation

In construction projects where sub-contractors are engaged, the contractor should set out the responsibilities, duties and safety measures that are expected of the sub-contractor's workforce. These measures should include the provision and use of specific safety equipment, methods of carrying out specific tasks on safety and the inspection and appropriate use of tools.

The responsibilities indicated separately under contractor's Supervisor, Safety Officer and contract worker are contractually that of the Contractor and legally binding on the

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Contractor only. However the specific detailing as above has been given separately for guidance and operational convenience.

The selection of sub contractors, if employed, should be approved by the owner. Sub-contractor should comply fully with all safety rules and conditions applicable to the main contractor.

4.2.2 Contractor's Supervisor / Safety Officer

Duties & responsibilities of the Contractor's supervisor/Safety Officer should include the following:

i) To ensure strict compliance with work permit system by carrying out work only with appropriate work permits and after ensuring that all safety precautions / conditions in the permit are complied with and closing the same after job completion.

ii) To ensure that required guards and standard personal protective equipment are provided, used, and properly maintained including contingency requirement.

iii) To ensure inspection, tested, certification and maintenance of all tools and ensure removal of defective tools.

iv) To plan the workload and assign workers to jobs in commensuration with their qualification, experience and state of health.

v) To ensure that all the preventive measures for identified hazards (e.g. Job Safety Analysis, Job Hazard Analysis, HIRA, etc.) are in place and communicated to workers

vi) To take immediate corrective action against the violation of safety rules observed or reported.

vii) To ensure that the workers likely to be exposed to hazardous chemicals/materials have access to appropriate Material Safety Data Sheets (MSDS), and provide necessary mitigation measures.

viii) To ensure that appropriate warning signboards or tags are displayed.

ix) To ensure that all workers have proper training for their job assignments, including use of appropriate PPE, first aid and fire fighting equipment.

x) To ensure that only medically fit person shall be engaged in work and also ensure that sick / or injured workers during course of work should receive timely and appropriate first aid and/or medical attention.

xiii) To report each incident and/or injury in accordance with established procedures and assist in investigation.

I. Maintain Daily HSE observation log book at site
II. Conduct Tool Box talks along with Site Engineers/ supervisors.

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Maintain the published HSE literature, HSE regulations, codes and other communications. Advise management of compliance and conditions requiring attention.

A fulltime / dedicated Safety Officer should be assigned, where more than 100 workers are employed at site. For smaller jobs, the supervisor should assume the role of the safety officer also.

4.2.3 Contract workers

The duties & responsibilities of the contractor worker should include the following:

i) To perform work safely as per the job requirement and instructions.

ii) To inform all concerned regarding unsafe conditions / and unsafe acts.

iii) To wear PPE as stipulated and necessary for the job.

iv) To inform promptly to their supervisor regarding all work related incidents resulting in personal injury, illness and/or property damage.

v) To take all necessary and appropriate safety precautions to protect themselves, other personnel and the environment.

4.3 CONSULTANT

The activities and responsibilities covered under the scope of the Owner may be delegated to the consultant in those cases as applicable, based on the respective contract conditions. The primary responsibility of Consultant is to ensure compliance with agreed HSE plan for the contract by the Contractor. However those responsibilities conferred on Owner as Principal employer cannot be delegated to consultant.

Where the consultant's scope involves Engineering and Design, those factors under Designer (Para 4.4) should also be applicable.

In all cases, the Consultant's scope should include submission of latest HSE plans for work under his and Contractor's purview and implementing the same till job completion. It should conform to owner's overall HSE plan. This should include Guidelines and Implementation and Reporting Methodology to be followed with required report formats.

Adequate number of Safety Officers shall be provided by the Consultant with necessary skills required for the work to be performed.

The Consultant shall review the documents submitted by the contractor and advise owner on acceptance as well as advise suitability and number of Contractor's safety officers / supervisors.

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4.4 DESIGNER

The Process Designer should identify all hazards and risks likely to be encountered during fabrication, erection including dismantling, Pre-commissioning, commissioning and Performance run to meet the Guarantees and advise the risk mitigation measures.

All the hazards and safety measures to be adopted while handling Dangerous chemicals and Catalysts should be detailed by the Process Licensor and the same should be again included in the scope of the suppliers. Specific write ups/MSDS should be obtained from Patented single source suppliers also.

Designs should recognize, include and apply safe practice during preparation, construction and subsequent operational use and maintenance after completion of the Project.

All documents including drawings and calculations are to be originated, checked and approved in accordance with latest international codes, standards, specifications and design basis philosophy.

Use of low risk materials, non hazardous substances, use of low noise and dust-suppressed equipment etc. should be encouraged.

5.0 SAFETY MANAGEMENT

5.1 JOB SAFETY ANALYSIS (JSA)

Job safety analysis (JSA) provides a mechanism by which the contractor / owner, safety officer(s) and job supervisor(s) take a detailed look at how an individual task is performed , and its inherent hazards and preventive measures. This procedure helps in integrating accepted safety and health principles and practices into a particular operation. In a JSA, each step of the job is examined to identify potential hazards and to determine the safest way to do the job.

A job safety analysis includes five steps as below:

- Select a job
- Break the job down into a sequence of steps
- Identify the hazards against each of these steps (based on knowledge of accident, causes of injuries and personal experience) and determine the preventive measures to overcome these hazards
- Apply the controls to the hazards
- Evaluate the controls measures and revisit JSA if necessary

5.2 CRITERIA OF SELECTION OF A CONTRACTOR & SAFETY PERFORMANCE REVIEW

“Contractor Safety” can be ensured to a large extent if competent agency for execution of assignment or job, based on HSE system agreed upon by owner, is selected. It is necessary to assess his capabilities and competencies to perform work safely.

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A databank should be developed for all the contractors for their past performance on HSE aspects. An attempt should also be made to get similar data from other similar industries.

The data required will depend upon complexity involved in the job and type / size of resources required. Format needs to be suitably developed depending upon size, nature of the job & hazard associated therein. The format designed should also take care of the skill required to carry out the job.

Performance review is essential for all type of contractors. It helps in recording actual performance/experience with contractors while the contract is in progress. It is essential that resources agreed as per the contract are reviewed at mobilization stage for ensuring compliance from the day one and thorough effective supervision / monitoring system are at place.

This activity also helps in taking timely action in case of unsatisfactory performance to correct the situation and ensure safe work during execution period and deciding about suitability of the contractor for future jobs.

The periodicity of such performance review will depend upon size/type/complexity of contract. However, the performance should be reviewed periodically from mobilisation stage till the demobilization stage. Appropriate corrective action should be ensured.

5.3 SITE PLANNING AND LAYOUT

Before starting the construction/maintenance job at existing workplace in operation or green field locations, following should be ensured: -

i) Details regarding location of workshop/ fabrication yard, site office, stores, laboratory, electrical installations, placement of construction machinery, medical and welfare facilities, lighting underground and above ground piping route, cable route etc. should be decided prior to commencement of the work in consultation with owner / Consultants and implementation should be ensured. Layout should be displayed at strategic locations.

ii) The resources required to meet any emergency situations like fire fighting, first aid etc. should be planned and mobilized as per the job requirement.

iii) The sequence or order in which work to be done and any hazardous operations or processes should be identified.

iv) Free access to site shall be provided with clear roads, passage, gangways, staircases etc. Access to construction site should be leveled, open and free from any obstructions like construction material or scrap/waste, exposure to hazards such as falling materials, material handling equipment and vehicles. Any pit or ditch shall be covered or barricaded.

v) Arrangements should be made to maintain good housekeeping at site. Scrap and debris generated out of construction work should be removed/disposed off at a regular interval as directed. Emergency exit should be provided in case of blockade of primary exit.

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vi) Suitable warning notices and also the routes to and from welfare facilities should be displayed prominently.

vii) Pedestrian pathways and routes for vehicular traffic (light/heavy vehicles including material handling equipment) should be earmarked.

viii) Artificial lighting to be provided at places where work continues or workers pass by after sunset or in case natural light is insufficient like confined spaces.

ix) Keep all equipment /machines under cover to prevent them from dust, rain/flood water, heat etc. and follow storage instructions as applicable for each of them.

5.4 GATE ENTRY PROCEDURE

Gate entry at any site / workplace / unit is to be restricted to ensure entry of only authorised persons / vehicles.

5.4.1 Entry procedure for all contractor workers should be as follows:

A. Issuance of Pass

i) The passes are to be issued after the owner's representative/engineer-in-charge forwards the application of the contractor providing complete details of the workers being engaged. The contractor should be asked to submit Character & Antecedents (C&A) verification of individual worker from concerned authorities.

ii) The actual deployment of the workers at the construction site should be done after imparting the necessary safety induction training.

iii) With regard to issuance of passes for all vehicles including material handling equipment, owner's representative / engineer-in-charge should forward the application only after ensuring that all documents pertaining to the fitness of the vehicle/equipment and valid driving license of the driver**,** PUC of the vehicle, insurance of vehicle, etc. are available.

iv) The passes should be serially numbered with address, contractor name, identification mark, signature of the worker etc.

v) Special colour code for passes should be used for persons entering different areas like Administrative Block, Unit area, Project Area (wherever applicable).

vi) Contractor workers engaged on routine basis for long periods should be provided with monthly photo pass.

vii) Special permit is required separately for working beyond normal working hours and holidays.

B. Gate Entry

i) Entry of the contractor's employees should be permitted with valid gate passes only.

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ii) Entry of contractor's workers should be allowed in presence of authorized representative of contractor.

iii) Records of persons at the time of entry/exit should be maintained.

iv) At the entry gate of the location, a physical checking for non-carrying of lighter, matchboxes, explosives etc. should be carried out.

v) Gate passes/Identity Cards should be displayed on persons at all the times.

vi) For Mega-projects at existing / operating installations, it is preferable to have a separate gate for entry of contractor workers and also the project areas should be segregated fencing from operational area by fencing / other physical means.

vii) No vehicle should be allowed to enter in an operational area without proper flame arrestor.

viii) Awareness on Safety through training / posters etc. highlighting Do's and Don'ts should be spread within entire contractor workforce. Video/Audio tapes on Safety Topics should be played preferably.

ix) For occasionally engaged workers such as for material handling etc., spot photograph should preferably take with two copies (one for preparing the pass and other for attachment with gate register). Specific advice and recommendation of User Department should be given due cognizance. Relevant details are to be written. The pass should be collected back at the gate after day's work.

5.4.2 Tank Truck Loading (TTL) Operation :

At the loading / unloading location, a large no. of Tank Trucks of petroleum products enter the installation. Crew members are generally not regular entrants. The procedure should be as follows:

i) The gate pass should be issued to the individual crew members on written request of the transporter mentioning TT registration nos., License and certificate of training as per MV rule 9.

ii) Character & Antecedent (C & A) verification of the TTL crew through local police is to be done preferably and record maintained.

iii) For loading/unloading purpose, register entry at security gate is made before allowing entry into the premises with recording of names of crew members, time of entry, pass Sr. No., TT no. etc.

iv) For loading/unloading, crew is allowed entry alongwith TT only, after checking of TT from explosive/security point of view.

v) Out time, invoice no., Destination etc., are recorded while TTs go out of the security gate.

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5.5 TRAINING

Training is to educate contractor workforce on various hazards associated with the job/workplace and on the respective preventive / mitigation measures to avoid untoward incidents.

i) Workers should be adequately and suitably:

(a) informed of potential safety and health hazards to which they may be exposed to at their workplace;

(b) instructed and trained in the measures available for the prevention, control and protection against those hazards.

ii) No person should be employed in any work at a workplace unless that person has received the necessary information, instruction and training so as to be able to do the work competently and safely. The competent authority should, in collaboration with employers, promote training programs to enable all the workers to read and understand the information / instructions related to safety and health matters.

iii) The information, instruction and training should be given in a language understood by the worker and written, Oral, visual and participative approaches should be used to ensure that the worker has assimilated the information.

iv) Every worker should receive instruction and training regarding the general safety and health measures common to the workplace. This should include:

(a) general rights and duties of workers at the workplace;

(b) means of access and egress both during normal working and in an emergency;

(c) measures for good housekeeping;

(d) location and proper use of welfare amenities and first aid facilities provided;

(e) proper use and care of the items of personnel protective equipment and protective clothing provided to the worker;

(f) general measures for personal hygiene and health protection;

(g) fire precautions to be taken;

(h) action to be taken in case of an emergency;

(i) requirements of relevant safety and health rules and regulations.

(j) training on hazards and mitigation measures for specific area where worker is assigned to work shall be given as part of entry procedure

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(k) Job specific training / refresher course shall also be given at regular intervals.

(l) It is also expected that behaviour based safety culture shall be encouraged and all the workers will be involved.

Copies of the relevant safety and health rules, regulations and procedures should be available to workers upon the commencement of and upon any change of employment.

5.5.1 Training Techniques

a) Lectures

This technique should be applied when it is required to transfer information in local language to a large contractor workforce with controlled content and time.

b) Case Study

This is an effective technique based on the presentation of case of real events by Trainer to highlight probable causes like Human Error, ignorance about the job etc.

c) Videos

Videos, an effective technique of communication, should be used to display the right techniques of performing a task in a safe manner and hazards associated with a job.

d) Demonstration at site

Right way to do a job should invariably be demonstrated to workers at the site itself. The right way is also a safe way. Hazards due to wrong procedures, short cuts and their adverse effects etc. should also be highlighted.

5.5.2 Training/Awareness Module and Frequency

A. General Safety Training to all categories of contractor employees should be imparted before induction and annually thereafter. No person should be allowed to enter the installation without undergoing this training. This training program should cover:

i) Mandatory uses of PPE like Cotton clothes, Helmet, Safety Shoes, Full Body Safety harness, dust masks, safety goggles, etc.

ii) Probable Hazards related to industry

iii) Job specific hazards

iv) Important Telephone No / Escape route

v) First Aid

vi) Use of Fire extinguisher

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vii) Location of assembly points

viii) Procedure of calling fire crew in case of any emergency

ix) Wind direction

The contractor workers, if engaged in operation of the plants/facilities, should be trained in line with Clause No. 4.6 of OISD-GDN-206 on "Safety Management System". For other categories of contractor workers, training modules for different category employees are as follows:

B. Contractor Supervisor

Contractor Supervisor should be trained in accordance with the provision of clause no. 5.1.1.2, 5.2.7, 5.3.10, 5.6.12 and 5.7.8 of OISD-STD-154 on 'Safety Aspects in Functional Training'

C. Contractor Worker

Yearly training programme should be carried out for contractor worker and the records should be maintained. The training programme should cover at least the following:

i) Worker responsibility for safety of himself and work area.

ii) Associated hazards with the job and job area including electrical shock hazards.

iii) Importance of First Aid fire fighting equipment, their use & operations

iv) Communication system at the installation

v) Fire / Accident Reporting procedure

vi) General Safety rules

vii) Safety Measures during execution of job such as:

- Welding / Cutting / Grinding
- Working at height
- Confined space entry
- X ray / radiation
- Erection / Dismantling of scaffolding
- Tank construction and repairs
- Handling of chemicals etc.
- Hydrojetting
- Leak testing of pipelines and equipment (hydro and pneumatic testing)
- Grit / other methods of blasting for surface preparation blasting etc.
- Chemical cleaning & pickling
- Catalyst loading & storage
- ELCB

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viii) Importance & use of PPE

ix) Emergency Routes

x) Assembly Points

xi) Job Specific Training

D. Consultant / Contractor

Awareness program should be carried out for demarketed Consultant / Contractor at the time of induction. This program should cover at least the following:

i) Responsibility of contractor for safety of their personnel and work area

ii) Hazardous property of Petroleum products and chemical used

iii) Communication system

iv) Fire / Accident Reporting procedure

v) Medical facility available

vi) Statutory requirements

vii) Importance of First Aid equipment and required at the site

viii) Work Permit system

ix) Direct/ Indirect losses due to accident

x) Safety Measures while executing the jobs such as:

- Welding / Cutting / Grinding
- Working at height
- Confined space entry
- X ray / radiation
- Erection / Dismantling of scaffolding
- Tank construction and repairs
- Handling of chemicals etc.
- electrical jobs
- Hydrojetting
- Leak testing of pipelines and equipment (hydro and pneumatic testing)
- Grit / other methods of blasting for surface preparation blasting etc.
- Chemical cleaning & pickling
- Catalyst loading & storage
- ELCB

xi) Safety training needs of their supervisors and workers

xii) Importance & Use of PPE at the site

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xiii) General Safety rules at the installation –

General points:

Workers should not be allowed to take meals or take rest inside the construction / plant area.

E Security Personnel

Training program should be carried out for Security personnel at the time of induction and annually thereafter and the records should be maintained. The training program should cover at least the following:

i) Layout of Plant and Facilities
ii) Vulnerable locations
iii) Safety regulations (Statutory and in company)
iv) Fire Protection Facilities and Locations
v) Role in case of Fire / Disaster
vi) Emergency Procedure and Drills
vii) Industrial First Aid
viii) Use of Personnel Protective Equipment
ix) Disaster Management Plan

5.6 INSPECTION / AUDIT

Inspection / Audit is a tool to evaluate compliance of all safety requirements. Most of the information could be gathered through site inspection using ready-made check lists to ensure that contractors / agencies abide by the safety rules and norms while working at operating / construction sites.

A checklist, while carrying out different type of jobs, should be developed based on hazards associated with the job being performed and requirements as per OISD-GDN-192 on "Safety Practices during Construction". Typical format is enclosed at Annexure II, which should be modified to suit the requirement of the site / job to be done.

Before starting the work and at regular intervals thereafter, Contractor's Supervisor/safety Officer and Owner's representative / Engineer-in charge/safety Officer should inspect as per the checklist so prepared to ensure that contractor has prepared to start the work with all safety precaution required for safe execution of job.

5.7 FINANCIAL DETERRENTS FOR NON-COMPLIANCE OF SAFETY RULES/ PROCEDURES

Financial or other type of penalties like seizure of gate passes, stoppage of work for a limited period etc. should be levied on the contractors or their workers for non-compliance of safety rules. A provision of suitable accident severity based penalty clause for contractor should be incorporated to ensure adherence of systems and procedures.

The financial deterrent clauses shall be included in the general terms and conditions of the contract. The violators of the clauses shall be suitably punished. Following list shall be taken as a guide while preparing the financial deterrent clauses but need not be limited to these conditions only.

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A few of the usual non-compliance are as follows:

I. Working without valid work permit/ Violation of any of the conditions specified in the permit.

II. Throwing up/down any material from height or not making proper provision to bring down material safely from height

III. Non standard/unsafe platform/ladder, Non standard/unsafe Scaffolding

IV. Non-usage of PPEs like Safety helmet / Safety shoes / Safety goggles / Welding Shield / Respiratory protection etc. by the contractor personnel

V. Non use of ELCB , using poor joints of cable, using naked wire without top plug into the socket, laying wire/cables on the roads without sleeve.

VI. Carrying out electrical jobs by un-authorised person

VII. Non deployment of the licensed electricians for electrical job.

VIII. Unsatisfactory fencing / barricading of excavated areas, Not providing proper shoring /strutting /proper slope and Not keeping the excavated earth at least one meter away from excavated area

IX. Over speeding of vehicles, rash driving, wrong side parking & parking in front of any fire-fighting equipment.

X. Riding on material handling vehicles or trolleys or hydra.

XI. Non-deployment of safety supervisor / supervisor responsible for safety at work site

XII. Failure to maintain safety register and record by Contractor Safety Supervisor or Supervisor responsible for safety.

XIII. Acting in contravention to any of the provision mentioned in Factories Act 1948 and/or the rules framed there under including all amendments thereto.

XIV. Failure to furnish a first information report (FIR) as per prescribed Pro-Forma within 4 hours of the incident.

XV. Keep and maintain proper records of all incidents occurred at work site.

XVI. Working beyond statutory limits by contractor's workers.

XVII. Deployment of child or adolescent labour.

XVIII. Use of untested and uncertified pressure vessel. Use of untested and uncertified lifting tools/tackle.

XIX. Unsafe handling of compressed gas cylinders No trolley or jubilee clips or double gauge regulator or flash back arrestor on both gas lines & both ends or improper storage / handling or cylinders without caps when not in

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use/damaged hoses). Keeping compressed gas cylinders in horizontal position.

XX. Transporting metallic items below overhead lines, without isolation.

XXI. Damage to fire equipment like hydrant & monitors, fire extinguishers including non return of fire equipment

XXII. Horseplay at work site.

XXIII. Non-provision of basic safety requirement such as 24 V lamp for working in confined space, uncertified / non standard lifting tools, earth leakage protection & earthing connections for electrical appliances as per Indian Electricity Rules, emergency isolation switches etc.

XXIV. Keeping gas cylinders inside the confined spaces.

XXV. Non-usage of the full body safety harness and fall back arrester with life line properly anchored by the workers while working at height

XXVI. Violation of Safety Permit conditions like Firefighting equipment.

XXVII. Non-barricading of area while rigging, digging etc.

XXVIII. Working without valid work permit.

XXIX. Un-authorised road closure/blockage.

XXX. Not clearing the work site on regular basis.

XXXI. Leaving contractor owned leftover material at site at the time of demobilization.

5.7.1 REWARDS AND RECOGNITIONS

The contract employees should be suitably rewarded as per a scheme, with monetary benefits/ prizes for timely reporting of the Near miss incidents/ Unsafe conditions/ Unsafe Acts based on the accident potential if it could have occurred.

The compliance to safety procedures by the contractors shall be evaluated annually as per the scheme based on different leading and lagging indicators and shall be awarded during the safety week celebrations.

The best safety conscious worker as recommended by the safety officers of different contractors during short term jobs such as the turnaround maintenance activities shall be suitably rewarded for motivating the workers to comply with safety requirements.

The best safety officer/supervisors of the contractor shall be recognized and shall be suitably rewarded during the safety week celebrations.

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5.8 INCIDENT REPORTING AND INVESTIGATION SYSTEM

All the incidents including near-miss should be reported immediately by contractor's Supervisor to Contractor and owner's Supervisor / Engineer-in-charge, who should inform to Owner's Safety Officer and owner's Management. Owner's Safety Department will be required for onward reporting as per OISD, Statutory requirements.

All accidents regardless of the extent of injury or damage should be investigated in order to find probable causes, lessons learnt thereof and remedial measures required to prevent its recurrence.

The incident investigation should be done as per provision of clause no. 4.12 of OISD-GDN-206 on 'Safety Management System'.

All the recommendations of investigation / Enquiry Report need to be monitored closely for its implementation. A proper record should be maintained to ensure implementation of all the recommendations and same should be reviewed from time to time.

5.9 SAFETY COMMITTEE MEETINGS

Following three type of safety committee meetings should be held aiming at raising the level of safety consciousness at the site:

5.9.1 Toolbox meeting

To maintain awareness, update training and convey important safety and health information, contractor supervisors should conduct tool box meetings at least weekly and also prior to start of any work. All the contractor workers should attend this meeting. The owner's supervisor/Engineer-in-charge and safety officers should also attend these meetings on random basis. Tool box meeting should be conducted more frequently depending upon circumstances. Record of the same can be maintained in the following typical format.

TOOL BOX MEETING FORM

A Toolbox Talk is a safety meeting allowing open environment for discussion with the work force. It focuses on safety topics related to the specific job, such as workplace hazards and safe work practices. It is aimed to refresh workers' knowledge, cover last minute safety checks, to raise workers' awareness of specific problems on site. Toolbox Talks are also intended to facilitate health and safety discussions on the job site and promote safety culture. It also helps to remind workers that health and safety are an important part of the working day.

Toolbox talk should be short in duration and conducted at the job site prior to the commencement of a new job or work shift. Toolbox Talks can be used for post-accident communications / accident case study, re-enforcement of safe work practice and pre-task planning etc.

Contractor supervisors should conduct tool box meetings at least weekly and also prior to start of any work. All the contractor workers should attend this meeting. The owner's supervisor/Engineer-in-charge and safety officers should also attend these meetings on

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random basis. Tool box meeting should be conducted more frequently depending upon circumstances.

A toolbox talk should cover following topics;

- Review of the hazards related to job being done. What safety equipment and PPEs should be used? What procedures should be followed?
- Review and analyse recent safety violations— What was the violation? What hazard did it create? What injury could have occurred?
- Review and analyse recent injuries— What happened? Why did it happen? What should have been done?
- Ergonomics and behaviour related tips.
- Importance of PPEs and proper tool for specific jobs.
- Housekeeping

Records of such talks should be maintained. Following information should be included when completing a Toolbox Talk Form:

- Names and signatures of all persons present,
- Topics discussed,

Any job specific training or instructions that have been given in the meeting and who raised the issue or added to the discussion, to show that there has been active consultation with all persons attending the meeting and that all parties have had a chance to raise issues.

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TOOL BOX TALK RECORD

DATE_____ **TIME:**_____ **LOCATION:**_____
DELIVERED BY:_____**WITNESSED B Y:** _____
JOB DISCRIPTION:_____
NAME OF THE CONTRACTOR:_____

Toolbox Talk – Topics / Issues discussed
Other points or issues raised by attendees

NAME	SIGNATURE	NAME	SIGNATURE

5.9.2 Site Safety Committee Meeting

Primary purpose of this safety committee is to enable owner, contractor and workers to work together to monitor the site safety and health plan so as to prevent accidents and improve working condition on site. Its size and membership will depend on the size and nature of job.

The safety committee should include representatives of owner, consultant, contractor identified as safety officer / supervisor. It should be headed by Engineer-in-charge.

The safety committee should have regular and frequent meetings, atleast fortnightly, to discuss the safety and health program on site and to make suggestions for improvement. The meetings should be documented with a time bound action plan. The functions carried out by safety committee should include:

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i) Review compliance of pending items of last Safety meetings. All critical items should be identified and their compliance ensured.

ii) Consideration of the reports of safety personnel.

iii) Discussion of accident/near-miss and illness reports in order to make appropriate recommendation for prevention.

iv) Examination/evaluation of suggestions made by workers.

v) Dissemination of acquired knowledge through training programs and information sharing sessions.

vi) Discussion & review of Fire Prevention & Disaster Management Plan.

vii) To send recommendation to Apex Body for consideration / approvals.

5.9.3 Safety Review Meeting by Location Head

This meeting should be headed by the Location head and attended by Owner's Supervisor / Engineer-in-charge, owner's safety Officer and all concerned department heads. Prime purpose of this review is to ensure that all the recommendations of various committees are being complied with and to take decisions on critical points raised. This meeting should take place at least once in every quarter. All the investigation reports / audit findings with status of implementation of recommendations should be discussed.

5.10 SAFETY EQUIPMENT / PERSONNEL PROTECTIVE EQUIPMENT

The type of safety equipment to be used is decided based on the job requirement. Selection should be made based on OISD-GDN-192, OISD-STD-155 (Part I & II) and the job requirement. Safety equipment / Personnel Protective Equipment (PPE) shall be of approved make. Contractor shall provide necessary training to each employee regarding proper usage and upkeep of PPE including its limitation.

A register showing stock and issue of PPE should be maintained by the contractor at site and must be available for inspection. 10 to 20 % of PPE in excess of actual requirement to meet contingency requirement should be maintained at site.

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REFERENCES

1) OISD-GDN-206 on “Safety Management System”

2) OISD-GDN-192 on “Safety During Construction”

3) OISD-STD-155 Part (I & II) on “Personnel Protective Equipment”

4) Building & Other Construction workers (Regulation of Employment & Condition of Service) Act 1996 & Rules thereof

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ANNEXURE I

LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF INDIAN STANDARDS

Sl.no.	Code No.	Title
1	IS: 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
2	IS: 875	Code of practice for Structural safety of buildings: Masonry walls
3	IS: 933	Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
4	IS: 1179	Specification for Equipment for Eye and Face Protection during Welding – First Revision
5	IS: 1904	Code of practice for Structural safety of buildings: Shallow foundations
6	IS: 1905	Code of practice for Structural safety of buildings: Masonry walls
7	IS: 1989 – Part II	Leather Safety Boots and shoes for heavy metal industry
8	IS: 2171	Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision
9	IS: 2361	Specification of Building Grips – First Revision
10	IS: 2750	Specification for Steel Scaffoldings
11	IS: 2925	Specification for Industrial Safety Helmets – First Revision
12	IS: 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision
13	IS: 3521	Industrial Safety Belts and harnesses
14	IS: 3696 – Part I	Safety Code for Scaffolds and Ladders: Part I – Scaffolds
15	IS: 3696 – Part II	Safety Code for Scaffolds and Ladders: Part II – Ladders
16	IS: 3764	Safety Code for Excavation Work
17	IS: 4014 – Part I & II	Code of Practice for Steel Tubular Scaffolding
18	IS: 4081	Safety Code for Blasting and Related Drilling Operations
19	IS: 4082	Recommendations on stacking and storage of construction materials at site

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20	IS: 4130	Safety Code for Demolition of Buildings – First Revision
21	IS: 4138	Safety Code for working in compressed air – First Revision
22	IS: 4756	Safety Code for Tunneling works
23	IS: 4912	Safety requirements for Floor and Wall openings, Railings and toe boards – First Revision
24	IS: 5216 – Part I & II	Recommendations on safety procedures and practices in electrical work
25	IS: 5121	Safety code for piling and other deep foundations
26	IS: 5916	Safety Code for Construction involving use of Hot Bituminous materials
27	IS: 6994 – Part I	Specifications for safety gloves: Part I – Leather and Cotton gloves
28	IS: 5983	Specification for Eye Protectors – First Revision
29	IS: 6922	Criteria for safety and design of structures subject to underground blasts
30	IS: 7155	Code of recommended practices for conveyor safety
31	IS: 7205	Safety Code for Erection on Structural Steel Works
32	IS: 7069	Safety Code for Handling and Storage of Building Materials
33	IS: 7293	Safety Code for Working with Construction Machinery
34	IS: 7323	Guidelines for operation of Reservoirs
35	IS: 7969	Safety Code for handling and storage of building materials
36	IS: 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals
37	IS: 8989	Safety Code for Erection of Concrete Framed Structures
38	IS: 9706	Code of Practices for construction of Arial ropeways for transportation of material
39	IS: 9759	Guidelines for de-watering during construction
40	IS: 9944	Recommendations on safe working load for natural and manmade fibre rope slings
41	IS: 10667	Guide for selection of industrial safety equipment for protection foot and leg

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42	IS: 10291	Safety Code for dress divers in civil engineering works
43	IS: 10386 – Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects
44	IS: 10386 – Part II	Safety Code for Construction, Operation and Maintenance for River Valley Projects
45	IS: 11057	Code of Practice for Industrial Safety Nets
46	IS: 13415	Code of Practice on safety for Protective barriers in and around building
47	IS: 13416	Recommendations for preventive measures against hazards at working places

Statutory Regulations

Latest Statutory Acts and Rules, as given below, should be referred:-

1. The Petroleum Acts 1934 and Petroleum Rules 2002
2. The Factory Act, 1948 (As amended by Factory Amendment Act 1987) and concerned Factory Rules
3. The Water (Prevention and Control of Pollution) Act 1974 & Rules 1975
4. The Environment (Protection) Act 1986 and rules thereunder
5. The Manufacturing, Storage and Import of Hazardous Rules 1989
6. The Hazardous Wastes Management (Management & Handling) Rules 1989
7. The Indian Electricity Act 1901 and Rules 1956
8. The Indian Explosive Acts, 1884 & The Indian Explosive Rules 1983
9. The Gas Cylinder Rules 1981and the static & Mobile Pressure Vessels (Unfired) Rules 1981
10. The Indian Boiler Act 1923 and Regulations 1950
11. The Public Liability Act 1991 as amended in 1992
12. The Motor Vehicle act 1988 and Central Motor Vehicle rules 1989
13. Building & Other Construction workers (Regulation of Employment & Condition of Service) Act 1996

In addition to above, various other statutory acts like EPF, ESIS, Minimum wage act and other local statutory requirements shall also be complied with.

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ANNEXURE II

CHECK LIST FOR SAFETY INSPECTION / AUDIT

Job _____ Location _____ Date of Audit_____Frequency _____

Inspected by _____ Contractor (s) _____

Sl.no.	ITEM	YES	NO	NA	REMARKS / ACTION
1.0	**PERSONNEL PROTECTIVE EQUIPMENT (PPE):** Are following PPEs being used as per the job requirements?				
A.	**Minimum mandatory PPEs**				
A1	Safety Helmets (with chin strap)				
A2	Safety Shoes				
A3	Safety Goggles				
A4	Safety hand gloves				
B.	**Job specific PPEs**				
	Whether need of specialised safety PPE identified and documented?				
B1	Full body safety harness with double lanyard				
B2	Fall arrester				
B3	Ear Plug / Ear Muff				
B4	Gum Boots				
B5	Face shield				
B6	Shot/Grit/Slag blasting hood				
B7	Breathing Apparatus				
B8	Gas Filter Mask / Dust Mask				
B9	Hand Gloves (Chemical/ Welding/ Electrical/ anti-vibration/ High temperature/ cold burn etc.)				
B10	Boiler Suit / Fire-retardant suit / Electrical flash fire retardant suit /High pressure water cleaning (Hydrojetting-Turtle) suit /				

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	Chemical suit / Low temperature suit etc.				
B11	Others				
C.	Whether workers are trained / briefed to use the PPEs?				
D.	Whether system of checking the quality / quantity of PPEs provided by contractor exists and in practice?				
E.	Whether as per contract the contractor is obliged to arrange the required PPEs to its workmen and the same is being complied with ?				
2.0	**HOUSE KEEPING**				
2.1	Whether Standards of housekeeping are defined in contract and housekeeping is being maintained accordingly?				
2.2	Whether areas are identified and marked for stacking of material like scrap, pipes, plates, cement, sand, loose excavated material etc.?				
2.3	Whether surplus excavated material, debris and scrap material is being removed and disposed on regular basis as per contract?				
2.4	Whether path ways, roads, stairs etc. in the vicinity of work place are maintained free from obstructions?				
2.5	Whether appropriate actions are taken to avoid the slippery area due to water logging / oil spillage?				
2.6	Whether system for collecting and disposal of small size scraps like welding buds, small size metal pieces, insulation material in place.				
2.7	Whether area is maintained free from vegetation, garbage etc. and the work place is kept clean and free of any hazard?				
2.8	Others				
3.0	**EXCAVATION**				
3.1	Whether detailed plan of excavation including soil stability is made and approved by competent authority?				
3.2	Whether excavation hot work permit is taken?				

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3.3	Whether the workplace is thoroughly inspected before issuance of work permit, as stipulated in OISD-STD-105?				
3.4	Whether special conditions mentioned in the permit are clearly explained to the supervisor and in turn to the contractor workers and documented?				
3.5	Whether proper shoring for the excavation is provided to prevent cave-in for side of slope more than the safe angle of repose (generally around 45 degrees) of the soil being excavated?				
3.6	Whether proper precautions have been taken if the excavation is adjoining to heavy structure like building, street and roadways?				
3.7	While excavating whether proper slope usually 45^0 & suitable benches of 0.5 m width at each 1.5 m depth are provided?				
3.8	Whether barricading of 1m height with glowing caution board is provided for excavation beyond 1.5m depth?				
3.9	Whether excavating earth is placed beyond 1m or depth of the excavation whichever is more, from the edge of the trench?				
3.10	Whether heavy vehicle movement is restricted to come too close (minimum 2 M from the edge of excavation) to the excavating area?				
3.11	Whether adequately anchored stop blocks and barriers are provided to prevent vehicles being driven into the excavation? Heavy vehicles should not be allowed near the excavation unless the support work has been specially designed to permit it.				
3.12	Whether necessary precaution is taken for underground pipes, sewers, cables by contractors?				
3.13	Whether extra precaution is taken for bailing out water properly while excavating?				
3.14	During rains whether the excavation is				

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	done with extra precaution to prevent caving in?				
3.15	Whether two separate entry/ exit points with necessary ladders / steps, as per requirement, have been provided?				
3.16	Whether required no. of persons are available (as per OISD-STD-105) at all the time to communicate any hazards noticed with workers working in deep trenches or excavation?				
3.17	Whether necessary precautions like regular gas testing are being taken in areas having hydrocarbons and toxic gases so that no gas accumulation takes place in the trenches.				
3.18	Whether IS: 4081-1986 & Indian Explosive act & rules for storage, handling & carrying of explosive material and execution of blasting operation is followed?				
3.19	Whether in case of mechanised excavation, caution board is provided for do's and don'ts like 'Nobody to enter' within one meter of the extreme reach?				
3.20	Whether the following observations are being documented during excavation work and corrective actions taken :- a) Boulder formation encountered b) Collapsing / development of cracks of sides c) Marked damage to support d) Unexpected fall of ground e) Inspection of site after each blast. f) Water logging g) Unexpected utility/cabling				
3.21	Others				
4.0	**PERMITS**				
4.1	Whether valid work permit is issued in compliance to OISD-STD-105 to start any work?				
4.2	Whether before issuing the permit, JSA carried out and mitigation measures made				

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	part of work permit?				
4.3	Whether personnel working at site were given tool box talk about the hazards and emergency procedure with important do's and don'ts and record maintained?				
4.4	Whether all conditions of the permit are fulfilled before starting the job?				
4.5	As noted in the permit, whether compliance of all the recommendations are ensured during entire duration of the job?				
4.6	Whether permits are available at work site all the times?				
4.7	Whether hot work permit registered in fire station / designated safety officer?				
4.8	Whether permits are being closed after the completion of job?				
4.9	Others				
5.0	**SAFETY IN CUTTING / WELDING/GRINDING**				
5.1	Whether LPG / Oxygen / Acetylene/ Gas cylinders are kept outside only while working in confined space?				
5.2	Are Acetylene/ O_2 / LPG cylinders kept in upright position with required valve cap and secured at designated places under shed – wet fire retardant clothes ~~gunny bags~~ wrapped around it if the same is under sun at designated place?				
5.3	Check cylinder and cylinder valves for approved quality & any kind of damage?				
5.4	Whether protective valve ~~s~~ caps are kept on cylinders while not in use?				
5.5	Whether proper means and method for transportation of cylinders to avoid dropping and rolling are being adopted / followed?				
5.6	Whether gas cylinders, regulators are				

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	kept away from combustible materials and ~~/~~free from oil and grease?				
5.7	Whether all hoses are of approved quality and found to be free of any damage or crack?				
5.8	Whether oxygen and acetylene cylinders are stored separately at a distance of at least 5 feet from each other and kept under shade as per Gas Cylinder rules 2002?				
5.9	Whether gas cylinders are kept at safe location particularly in case job is being done at different elevations while in use?				
5.10	Whether color coding is being used for easy identification of different type of cylinders and hoses?				
5.11	Whether cylinder keys are available near the cylinder?				
5.12	Whether gas torches with flash back arrestors of approved make are only being used?				
5.13	Whether pressure gauges are in working condition and checked from time to time?				
5.14	Whether welding shields are used while welding?				
5.15	Whether proper earthing for welding machines are provided?				
5.16	Whether power is taken from approved sources (welding receptacles)?				
5.17	Whether welding receptacles are properly grounded?				
5.18	Whether welding cables are maintained in good condition and without any joints/ cuts?				
5.19	Whether to avoid short circuit, welding machines are protected against rain?				
5.20	Whether earth connectors are securely connected to the job and not to the				

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	adjoining pipeline or structure?				
5.21	Whether flame arrestor of DG set is of approved make and quality?				
5.22	Whether 30mA rating ELCB is provided on power supply.				
5.23	Whether separate power supply arrangement is provided for portable oven?				
5.24	Others				
6.0	**ABRASIVE (SHOT/GRIT/SLAG) BLASTING**				
6.1	Whether abrasive blasting is used only after getting approval from competent authority / work permit?				
6.2	Whether air compressor used for abrasive blasting are positioned away from work place?				
6.3	Whether exhaust of the prime mover is directed away from the work place?				
6.4	Whether in case of motor driven compressor, the body of the motor as well as the compressor is properly earthed?				
6.5	Whether line operator of abrasive blasting wear suitable PPEs including mask?				
6.6	Whether adequate measures are adopted to confine dust / flying particles?				
6.7	Whether adequate measures are taken for proper ventilation while the work is done in confined space?				
6.8	Whether the Air receiver vessel of the compressor is pressure tested.				
6.9	Others				
7.0	**SAFETY WHILE WORKING AT HEIGHTS / SCAFFOLDING / LADDERS**				
7.1	Whether work permit is obtained to take up work at height above 2.2 meters?				
7.2	Whether steel pipes scaffoldings are used in unit/off site areas?				

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7.3	Whether provision for suitable platform with all scaffoldings are made? Whether its construction is as per specification with toe board and railing?				
7.4	Whether the area below working at height is cordoned?				
7.5	Whether ISI approved quality and good condition full body safety harness with shock absorber are used while working at heights?				
7.6	Whether life line of full body safety harness with shock absorber is anchored to an independent secured support capable of withstanding load of a falling person?				
7.7	Whether the area around the scaffold is cordoned off to prohibit the entry of unauthorized person?				
7.8	Whether lifeline ropes used are of good condition and adequate strength free of defects?				
7.9	Whether ladder is placed at secured and leveled surface?				
7.10	Whether it is extended 1.0 Meters above the landing point?				
7.11	Whether ladder used are of adequate length and tying short ladder is avoided?				
7.12	Whether metallic ladders are placed away from electrical system?				
7.13	Whether tools or materials are removed after completion of the day's job at heights?				
7.14	Whether a valid permit is obtained before taking up work on asbestos or fragile roof?				
7.15	Whether sufficient precaution like roof ladders, nets, lifeline, full body harness, etc. is taken while working on fragile roof?				

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7.16	Whether provision is made to arrange duck ladder, crawling board for working at fragile roof?				
7.17	Whether scaffolding has been erected on rigid / firm / leveled surfaces only?				
7.18	Whether scaffold has been inspected by competent person & tagged accordingly prior to being put in use?				
7.19	Whether the scaffolding has been designed for the load to be borne?				
7.20	Whether the erection and dismantling of the scaffolding is being done only by trained persons and under competent supervision?				
7.21	Whether safety net with proper working arrangement and life line has been provided?				
7.22	Others				
8.0	**SAFETY IN CONFINED SPACE**				
8.1	Whether positive isolation is done as per approved blind list and crossed checked by competent person?				
8.2	Whether a permit is obtained to enter a confined space?				
8.3	Whether gas test for hydrocarbon, toxic gas, oxygen level is checked for acceptable limits before entering any confined space and recorded? If levels are beyond permissible limit, whether required PPE like BA, Gas Mask are used.				
8.4	Whether adequate oxygen level is ensured in confined space before entering? If not, whether all precaution like using of Breathing Apparatus set is ensured?				
8.5	In case of chance of ingress of hydrocarbon gases / toxic gases, whether Personnel Monitoring System (PMS) is used ?				

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8.6	Whether only in presence of a supervisor, worker enters in confined space?				
8.7	Whether provision of sufficient means of entry and exit is available?				
8.8	Whether provision of ventilation to remove welding fumes, dust, exhaust gases are made?				
8.9	Whether provision of 24V (Hand lamps with cage as per OISD-STD-155) light for working inside space is made?				
8.10	Is it strictly ensured that stand-by trained persons (2 nos.) are standing outside before a person enters a confined space and communication is being maintained all the time with workers working inside?				
8.11	Whether life belt with one end under control of stand-by person outside is kept while working in confined space?				
8.12	Whether Personnel protective Equipment as specified in the permit are in good condition?				
8.13	Whether boxing up is done only as per the approved procedures and under the supervision of competent persons?				
8.14	Whether all the safety precautions listed in OISD-GDN-192 are taken while working in sewers, OWS etc.?				
8.15	Whether proper house keeping is being maintained inside the confined space?				
8.16	Whether training has been provided to workers working in the confined space and the workers only of sound health are being asked to work in the confined space?				
8.17	Others				
9.0	**SAFETY IN MATERIAL HANDLING**				
9.1	Whether all lifting tools, tackles, machines, chains, ropes etc. are of sound construction, made of sound material and				

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	maintained in good condition?				
9.2	Whether lifting tools & tackles are tested as per norms and safe working load, date of testing visibly marked/painted on the equipment?				
9.3	Whether lifting tools, tackles are of adequate strength for the load to be handled?				
9.4	Whether all parts including the working gears fixed or movable of every lifting machine, chain, rope, tackles specify the following condition: a) Thoroughly examined by competent person at least once a year or such interval as required by statutory authority. b) Document of such examination are maintained and produced to owner supervisor before use of particular equipment?				
9.5	Whether chain blocks and cables are inspected before each use to assure their sound condition?				
9.6	Whether hoist and lift, if used are: a) Properly maintained and thoroughly examined by competent authority at least once in every year. b) A register to be maintained to record particulars of such examination in prescribed forms and shall be produced to the owner supervisor before use.				
9.7	Whether area below the movement of boom of crane is cleared to avoid injury from falling objects?				
9.8	In crane handling area whether it is ensured that crew of truck, leave the truck before starting loading / unloading?				
9.9	Whether transporting material from one place to another is done by suitable				

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	means?				
9.10	Whether carrier with sufficient capacity without projecting parts is used for transporting materials?				
9.11	Whether riggers engaged are well trained and conversant with signaling procedures including night signaling if required?				
9.12	Whether permission of authorized person is obtained before working on or near an overhead crane?				
9.13	Whether trained riggers are available all the time along with crane?				
9.14	Whether barricading has been done to ensure no unauthorised person enters in the working area of the crane?				
9.15	Whether lifting (rigging) plan has been prepared and approved before start of the work?				
9.16	Whether route of crane movement has been planned before the crane moves out of the garage?				
9.17	Whether it has been ensured that no electrical cable comes within 3 meters or safe distance from the boom of the crane?				
9.18	Whether boom is being kept in the horizontal position or locked while idling?				
9.19	Whether material is being stacked / destacked in trucks with the help of wedges to ensure no slippage while loading / unloading takes place?				
9.20	Whether the forklift / crane is being operated only by trained / authorized person?				
9.21	Others				
10.0	**ELECTRICAL SAFETY**				
10.1	Has the Electrical Line Clearance				

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	procedure been followed involving electrical and other concerned Dept. and filling of formats?				
	Whether the "LOTO" system is defined properly and all personnel are aware with the procedure?				
	Whether "LOTO" system is being used in all electrical isolation jobs, by all departments?				
10.2	Have Danger Signs with Voltage rating/ Men at work signboards been displayed at both Sub Station as well as the work site?				
10.3	Has the contractor worker understood the electrical circuit on which he is going to work with probable electrical hazards and mitigation measures to be adopted?				
10.4	Whether contractor has engaged electrician (s) having valid electrical license in line with provisions in Indian Electricity Rules?				
10.5	Have all checks prior to switching operation been carried out and authorisation of owner/ user section obtained subsequently?				
10.6	Have all earthing links on electrical conductors removed before charging the line/ apparatus?				
10.7	Are PPE as prescribed under Indian Electricity Rules available, kept healthy and being used?				
10.8	Are earthing and bonding arrangement of non-current carrying metallic parts in line with provisions of Indian Electricity Rules – 1956 amended time to time as IS: 3043?				
10.9	Have electrical part of OISD-GDN-192 and Clause No. 9.0 for Temporary installations in OISD-STD-173 been understood and followed wherever applicable?				
10.10	Are flexible wires having voltage of 240 volts above earth potential taken through				

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	PVC conduits?				
10.11	Whether portable hand lamps with a voltage rating of not more than 24 volts used with flameproof enclosures in confined spaces within columns, vessels etc?				
10.12	Have the Switches, MCBs, fuses etc. been inspected for proper ratings?				
10.13	Has Earth Leakage Circuit Breaker (ELCB) been used on the incoming side to protect against leakage of current? Is the device tested every time the work is started?				
10.14	Whether all portable appliances are provided with insulated Three pin plugs and socket arrangement?				
10.15	Whether industrial type extension boards and plug sockets are used?				
10.16	Has the electrical equipment brought to site by contractor been inspected by owner's supervisor/ safety officer for damage/cuts/abrasion etc? Is record of Insulation Resistance, wherever required being kept?				
10.17	Have standard practices for termination of conductors/ cables been followed (e.g. use of proper lugs, crimping tool, cable glands etc)? Is cable armour in continuity from feeding point to load?				
10.18	Are the Contractor supervisor and workmen well acquainted with first aid for electrical shock?				
10.19	Are the wires/ cables identifiable along their route towards the load by using colour coding and/or markers?				
10.20	Others				
11.0	**ROAD WORK**				
11.1	Whether site is barricaded and provided with warning signs including night warning lamps/ self glowing markers at appropriate location for diversion of traffic?				

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11.2	Whether mixing aggregates with bitumen is done with the help of batch mixing plants? If no, whether adequate precautions have been taken?				
11.3	Whether road rollers, bitumen sprayers, pavement finishers are driven by experienced drivers with valid driving licenses?				
11.4	Whether the worker handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen with aggregate are provided with PVC hood, hand gloves rubber shoes (gum boot) with pegging upto knee joints?				
11.5	Others				
12.0	**FORM WORK, REINFORCEMENT**				
12.1	Whether form work, shuttering, shoring etc. are adequately designed and provided to erect the structure and to support the expected load?				
12.2	Whether staging (support) for shuttering is designed for loads like worker movement, impact load and other incidental loads during construction?				
12.3	Whether workers use PPEs at work site like safety shoes, gloves, helmet with chin strap, goggles and dust masks etc.?				
12.4	Whether all safety procedures are adopted while cutting rod?				
12.5	Whether proper staging and bundling is provided for supplying rods at height?				
12.6	Whether sufficient cross bracings are provided for high staging works as per design requirement?				
12.7	Others				
13.0	**CONCRETING**				
13.1	Whether the concreting area is barricaded?				

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13.2	Whether vibrator hoses, pumping concrete accessories are in healthy condition and mechanically strong?				
13.3	Whether it is ensured that no pipe line in concrete pumping system is attached to any temporary strut such as scaffolds etc.?				
13.4	Whether it is checked that safety guards around moving parts are provided in concrete mixer/ machines?				
13.5	Whether earthing of electrical mixers, vibrator etc. are provided?				
13.6	Whether entry of unauthorised person in the concreting area is restricted?				
13.7	Whether adequate lighting arrangement is made in the concreting area if working during night?				
13.8	Whether PPEs like gum boots, gloves, helmet with chin strap, goggles and dust masks etc. are being used?				
13.9	For overhead or underground work, whether form work and shuttering have been checked with respect to design?				
13.10	Whether boom placers are properly secured?				
13.11	Others				
14.0	**DEMOLISHING (DEMOLISHING BY BLAST NOT CONSIDERED)**				
14.1	Whether an initial survey carried out to identify any structural problems and risks associated with flammable substances and substances hazardous to health?				
14.2	Whether sequence of demolition is formulated and approved by competent person after the survey and recorded in a method statement having taken all the various considerations into account and identifying the problems and their solutions?				
14.3	Are non-sparking tools being used, if required?				

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14.4	Is intermittent clearing operation being done to keep the area reasonably tidy and clean?				
14.5	Whether effective barricading has been provided?				
14.6	Whether Electrical and other facilities like water, oil, gas pipelines, etc. have been isolated / protected?				
14.7	Whether required PPEs like helmet with chin strap, goggles, ear plug/muff, hand gloves, safety shoes, dust mask, etc. used?				
14.8	Others				
15.0	**RADIOGRAPHY**				
15.1	Are safety precautions for handling of source as per guidelines of BARC being followed?				
15.2	Is the potency of the source being used within acceptable limits as per the BARC regulations?				
15.3	Is the area being cordoned with proper signs during radiography as per guidelines of BARC?				
15.4	Does proper place exist as per BARC regulations for storage of source / Personnel safety equipment?				
15.5	Does the radiographer have valid certificate of radiography from competent authority (BARC)?				
15.6	Is radiographer using Exposure Meter / Dosi Meter?				
15.7	Whether minimum occupancy of the premises / workplace is being ensured while radiography is in progress?				
15.8	Is permit system being followed?				
15.9	Whether Radiation Safety Officer is				

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	available at site?				
15.10	Others				
16.0	**ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS**				
16.1	Are jobs being carried out with a valid work permit only as per OISD-STD-105 "Work Permit System".				
16.2	Is smoking prohibited in all places containing combustible or flammable materials and "No Smoking" notices prominently displayed?				
16.3	Are only approved type electrical installations and equipment, including portable lamps, being used?				
16.4	Are oily rags, waste, wooden materials and clothes or other substances liable to spontaneous ignition being removed?				
16.5	Are the combustible materials properly shielded in case same cannot be removed from the area?				
16.6	Has welding screens (like metal/ fire retardant cloth/ water curtain) been put up to protect other equipment / facilities/ OWS cement ceiling/ drains in adjoining areas against flying sparks, as may be required?				
16.7	Is Gas-testing being done with the means of a calibrated Gas detection Meter prior to start of Hot work and being done subsequently at regular intervals as per the requirement and recorded?				
16.8	Are regular inspections being done of places where there are fire risks like in the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations?				
16.9	Are fire-extinguishing equipment being placed at strategic locations and are kept well maintained and inspected at suitable intervals by a competent person?				

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16.10	Are accesses to fire - extinguishing equipment such as hydrants, portable extinguishers and connections for hoses kept clear at all times?				
16.11	Are all supervisors and a sufficient number of workers trained in the use of fire-extinguishing equipment?				
16.12	Are audio means, to give warning in case of fire provided, audible in all parts of the site where persons are liable to work?				
16.13	Is there an effective evacuation plan in place so that all persons are evacuated speedily without panic?				
16.14	Others				
17.0	**EMERGENCY PROCEDURES**				
17.1	Is signaling / siren system effective?				
17.2	Is arrangement for rescuing affected person adequate?				
17.3	Are signs showing emergency exit route installed?				
17.4	Is emergency exit route clear of obstacles?				
17.5	Is communication system adequate?				
17.6	Whether emergency vehicle with driver has been provided to meet any emergency situation?				
17.7	Does any tie-up with hospitals or local doctors exist?				
17.8	Has the assembly point for workers in case of emergency been identified and earmarked?				
17.9	Has training been provided to a few workers for First Aid?				
17.10	Emergency procedure and telephone numbers are known to all and same are prominently displayed at site? (Sample				

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	compliance check)				
17.11	Whether emergency mock drills are being regularly done?				
17.12	Others				
18.0	**WELFARE FACILITIES**				
18.1	Are hygienic conditions prevailing at labour camps?				
18.2	Are First Aid facilities available?				
18.3	Does proper sanitation exist at site office and labour camps?				
18.4	Does any arrangement of medical facilities like tie ups with nearby hospital exist?				
18.5	Is proper drinking water facility available for workmen & staff?				
18.6	Are crèches provided for children (if applicable)?				
18.7	Is any proper place/canteen/restroom provided for eating food and taking rest?				
18.8	Is any place earmarked for storing / keeping clothing?				
18.9	Is adequate washing facility available?				
18.10	Does proper ventilation at working place exist?				
18.11	Others				
19.0	**GENERAL**				
19.1	Are illumination levels at workplace and passages adequate?				
19.2	Is communication system adequate?				
19.3	Are display and caution boards provided at strategic locations?				
19.4	Are road barriers being used for blocking any roads/passage?				

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19.5	Has the structure been adequately secured against storm/high winds during construction/ erection?				
19.6	Are the equipment properly earthed?				
19.7	Are vehicles being checked like brakes, oil, lights etc. on regular basis?				
19.8	Is compressed air being used only for its intended purpose and not for any other purpose?				
19.9	Are only proper clothes and not loose clothes being used while working around machinery?				
19.10	Are nails or other sharp objects being removed or bent?				
19.11	Are machine guards over moving parts of machinery such as coupling, pulley, wheel etc. installed?				
19.12	Whether after maintenance of machinery the guards are securely fitted before putting into operation?				
19.13	Are working platforms / gangways provided with hand rails & toe guards?				
19.14	Are swing platforms provided with chains & secured adequately when not in use?				
19.15	Are the approaches to work sites being maintained & kept clear of obstacles?				
19.16	Whether engines of equipment entering into the operating area have exhaust and muffler system with approved spark arrestor?				
19.17	Whether vehicles/engine driven equipment, electrical equipment and tools used are certified?				
19.18	Whether contractors inform his workers about hazards and safe procedures?				

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19.19	Whether sufficient care is taken so that spark do not go outside working enclosure & falls below?				
19.20	Whether contractor's qualified / trained supervisor is present?				
19.21	Whether all exhausts of engines are provided with approved type of flame arrestors and exhaust is not facing toward the place where the workers are working?				
19.22	Others				

Signature of the Auditor

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Annexure-XVI to SCC

Bank Guarantee Clause

As per BPCL Standard policy on acceptance of Bank Guarantee (BG) , BG's as per following criteria will be accepted:

Criteria for Acceptance of BG

BG Value	Stipulation
Upto INR 1 Crores	Bank Guarantees from any Scheduled bank (including nationalised banks, other scheduled commercial banks, scheduled cooperative banks and scheduled regional rural banks) as appearing in the second schedule to the RBI Act 193 Shall be acceptable.
Greater than INR 1 Crores	Bank Guarantee which are issued by banks having long term issuer rating of "A2" from Moody's or equivalent from Fitch and S&P in case of the foreign bank and long-term issuer rating of at least "AA" from CRISIL or equivalent from CARE, ICRA and Indian rating in case on Indian Bank, shall be acceptable. In case rating for a bank is available from more than one rating agency, the lowest such rating shall be considered. Illustrative list of banks meeting the stipulated criteria as on 02.06.2025 are attached as annexure 1.

Annexure I

List of banks meeting the stipulated criteria as on 02.06.2025

Sr No.	Name of Bank	Category of Banks
1	AU Small Finance Bank Ltd	Indian Bank
2	Axis Bank Ltd	Indian Bank
3	Bank of Baroda	Indian Bank
4	Bank of India	Indian Bank
5	Bank of Maharashtra	Indian Bank
6	Canara Bank	Indian Bank
7	Federal Bank Ltd	Indian Bank
8	HDFC Bank Ltd	Indian Bank
9	ICICI Bank Ltd	Indian Bank
10	IDBI Bank Ltd	Indian Bank
11	IDFC First Bank Ltd	Indian Bank
12	Indian Bank	Indian Bank
13	Indian Overseas Bank	Indian Bank
14	IndusInd Bank Ltd	Indian Bank
15	Karur Vysya Bank Ltd	Indian Bank
16	Kotak Mahindra Bank Ltd	Indian Bank
17	Punjab National Bank	Indian Bank
18	State Bank of India	Indian Bank
19	UCO Bank	Indian Bank
20	Union Bank of India Ltd	Indian Bank
21	Abu Dhabi Commercial Bank PJSC	Foreign Bank
22	Bank of America NA	Foreign Bank
23	Bank of Nova Scotia	Foreign Bank
24	MUFG Bank Ltd	Foreign Bank
25	BNP Paribas SA	Foreign Bank
26	Shinhan Financial Group Co Ltd	Foreign Bank
27	Citibank NA	Foreign Bank
28	DBS Group Holdings Ltd	Foreign Bank
29	Hongkong & Shanghai Banking Co	Foreign Bank
30	JPMorgan Chase & Co	Foreign Bank
31	Mizuho Bank Ltd	Foreign Bank
32	Westpac Banking Corp	Foreign Bank
33	Industrial & Commercial Bank of China	Foreign Bank
34	Credit Agricole SA	Foreign Bank
35	Cooperative Rabobank UA	Foreign Bank
36	Doha Bank QPSC	Foreign Bank
37	Qatar National Bank QPSC	Foreign Bank
38	United Overseas Bank Ltd	Foreign Bank
39	KEB Hana Bank	Foreign Bank
40	Industrial Bank of Korea	Foreign Bank
41	First Abu Dhabi Bank PJSC	Foreign Bank
42	Emirates NBD Bank PJSC	Foreign Bank
43	NatWest Markets PLC	Foreign Bank
44	Bank of China Ltd	Foreign Bank
45	CTBC Bank Co Ltd	Foreign Bank

Note:

1. The above list of banks is based on the credit rating as on date (Source: Bloomberg)
2. In case of any discrepancy/subsequent upgrade in credit rating, user department can contact Treasury for clarification.

ANNEXURE-XVII TO SPECIAL CONDITIONS OF CONTRACT

ENERGY POLICY

Energy Policy

We at Bharat Petroleum Corporation Limited, Bina Refinery (BPCL-BR) are committed to continual improvement in Energy performance and Energy Management System, which shall be demonstrated by:

- **Proactively** anticipate & assess risks and opportunities, address them through short and long-term objectives and implement mitigation plans.
- **Ensuring** effective Management of Energy, Information and Resources to achieve Objectives & Targets and Complying with all applicable legislation and other requirements.
- **Strengthening** purchase of energy efficient products & services by utilizing latest technology to improve our energy performance.
- **Monitoring** & Controlling energy consumption through well-structured reviews.
- **Attaining** participative culture of energy conservation by creating awareness through training.

Date : 1st July 2023

Place : Bina

Chacko M Jose

Executive Director - BR

ANNEXURE-XVIII TO SPECIAL CONDITIONS OF CONTRACT

DISCONTINUATION OF HYDRA CRANES WITHIN BINA REFINERY

Annexure XVIII

DISCONTINUATION OF HYDRA CRANES WITHIN BINA REFINERY PREMISES

The present Hydra Cranes can be substituted with suitable/equivalent hydraulically operated cranes that are equipped with rear mounted boom and out rigger supports. Some of the models having these features are mentioned below for your easy reference:

Sr. no.	Manufacturer	Models
1	Escort Construction Eqp. Ltd(ECEL)	TRX Series :K10,F15,TRX 1651,TRX 2319, MAC 1214
2	Action Construction Eqp. Ltd. (ACE)	FX 120,FX 150, 15XWE ,15 XWF, Rhino 110 FC

All the contractors are requested to take cognizance of the above, and arrange for alternate equipment, to carry out various jobs inside Bina Refinery.

Please ensure strict compliance failing which suitable action shall be taken as deemed fit.

ANNEXURE – XIX
TO
SPECIAL CONDITIONS OF CONTRACT

[LABOUR COMPLIANCE & SPECIFICATIONS/GUIDELINES FOR LABOUR WELFARE FACILITIES AT CAMP AND AT PROJECT SITE]

LABOUR COMPLIANCE

1. On the award of a contract, the contractor shall contact BPCL HR department to understand the requirements for onward process/ procedure for BPCL HR related activities and submit details/ contact number(s)/ email id(s) of their point of contact and authorization letter (for signing any BPCL HR related compliance document) of the person named so.

2. The scope of obligations of the contractors underlined also includes those of its subcontractor(s) and the contractor shall have the sole ownership and accountability for the same.

3. **Adherence to Statutes, Regulations, Schemes, Rules, BPCL's rules and procedures**: The contractor shall undertake to ensure due and complete compliance with respect to all Statutes, Regulations, Schemes, Rules, BPCL's rules and procedures etc. (which may be amended from time to time) whether of Central Govt. or State Govt. or any other competent authority applicable to the contractor and or employees employed or whose services are otherwise availed of by contractor or sub-contractor appointed by such contractor. Such laws shall also include Minimum Wages Act, 1948, Contract Labour (Regulation and Abolition) Act,1970, Employees State Insurance Act, 1948. Employees' Compensation Act, 1923, Payment of Gratuity Act, 1972, Provident Fund & Miscellaneous Provisions Act, 1952, Payment of Bonus Act, 1965, Apprentices Act,1961 and all other applicable Act, laws, rules, regulations and orders as may be in force from time to time. The Contractor must ensure strict compliance with respect to all applicable Acts.

4. The Gate Passes for contractors' employees are processed through Contract Man Management System (CMMS) online portal. The contractor shall fill in details pertinent to the LOI/ LOA/ PO, Labour license (if applicable), accidental insurance (Employees State Insurance Act, 1948/ Employees Compensation Act, 1923 policy details) and personal details of contractors' employees in CMMS through its login credential. The contractor shall contact BPCL HR department to understand the requirements and process.

5. Documents related to the contractor's employees to be submitted to BPCL and or uploaded in CMMS:
   5.1. Character certificate (Police verification)
   5.2. Medical fitness certificate
   5.3. Insurance policy (Pehchan Card under ESIC/EC policy/Group Personal Accident (GPA) as applicable)
   5.4. Photo Id (preferably Aadhar)
   5.5. Education/ Experience certificate (as required)
   5.6. Bank account, mobile number and UAN details; if not available, after the first month of the running of the contract
   5.7. Any additional requirement will be communicated and shall be required to be complied

6. For Bina location, medical examination of the employees is to be done mandatorily at BPCL (VK BR) hospital, located in BPCL Township, Bina as per the applicable charges. The gate pass is issued only those who are declared medically fit. Medical fitness of employees

involved in the high-risk jobs like confined space entry, inert space entry, work at height etc. is reassessed for specific requirements (on form-32) at Occupational Health Centre.

7. BPCL has the sole proprietorship of the Gate Passes issued to the contractors' employees and the contractor is obligated to return all the gate passes issued to the contractor. In case of non-submission of the Gate passes / lost Gate passes / damaged Gate passes suitable amount per gate pass will be deducted by BPCL. Also, the case of non-submission of the Gate passes / lost Gate passes shall require the contractor to lodge complaint at the local Police Thana and submit a copy of the same to BPCL Security.

8. **Confirmation to BPCL HR department of Compliance under various Act applicable:** It shall be the responsibility of the Contractor to confirm to BPCL HR of conformance to statutory compliances under various Acts applicable and submit the required documents to BPCL HR in CMMS through its log in credentials, on monthly basis. The contractor is required to contact BPCL HR department to understand the requirements and process.

   8.1. Contractor shall ensure timely payment to employees, remittance of PF & Pension & ESIC contributions and maintain statutory documents & registers under various applicable Acts.
   8.2. The checklist of the documents and formats etc. to be maintained and submitted to BPCL can be obtained from the BPCL HR department after the award of contract.
   8.3. On submission of the aforementioned documents, BPCL HR will inspect and issue 'HR Clearance Certificate'. Clearance of invoices shall be subject to completion of all labour compliances and getting HR Clearance Certificate from BPCL HR.

9. **Inspections/ Audits:** The contractor shall maintain and keep a copy of statutory documents at site and shall present itself at the designated time and venue with the required documents as when demanded by the BPCL and or any statutory authorities.

Specifications for Labour Camp

1 Purpose

To establish a minimum standard for the provision and maintenance of living conditions for the wellbeing and welfare of the workforce in construction projects of BPREP. The document aim to cover the norms apart from the existing provisions incorporated in relevant tenders.

2 Scope

This standard covers minimum basic requirements of design, construction, installation, and maintenance of temporary workers' housing quarters (Labor Camp) on construction site.

The contractor shall provide, free of cost temporary accommodation as the regulatory requirement to all workers engaged in the Project.

This document aims to provide the Project Teams and Contractors with guidance on the planning, design, construction, operation and decommissioning of Construction Camps in a sustainable way:

- Create adequate, respectable living conditions for the Project construction workforce.
- Maximize value over the entire lifecycle of the construction camp (maintenance, cleaning, waste management, energy and water usage management) and minimize footprint.
- Consider ethnic, religious and cultural differences and managing those.
- Create a secure, safe, and hygienic environment, including the logistics.
- Minimize impact on the local communities.
- Lower disease incidence and/or food poisoning outbreaks.
- Promote Health & Wellness and create a facility and community that exudes care for people.
- Maximize opportunities for beneficial use of the site, infrastructure, or parts thereof after project execution.
- It is assumed in this document that the facilities will be intended for single or bachelor status occupancy only unless specified differently.

This document does not cover permanent residential areas, neither temporary nor permanent office units nor buildings located inside project area.

3 Responsibilities

Following are the responsibilities of contractor:

- Providing Labour camp as per the norms listed in the tender document.
- Deploying manpower/ stewards/ managers and training workers as per contract norms for inspection & ensuring compliance

Maintaining records of labor complaints and submitting owner for record of compliance.

4 General guidelines for location of labor camp:

(To be read in Conjunction with labor camp layout, Appendix I)

- CONTRACTOR shall arrange land for construction of labour camp outside the Refinery. CONTRACTOR shall ensure that all workers stay in the labour camp. The workers having permanent address within 10 kms radius of the refinery location can be exempted from camp accommodation. For subject exemption, CONTRACTOR shall maintain record of all the workers with their name, age, local address, and permanent address along with copy of Aadhar card.
- CONTRACTOR shall develop and maintain all necessary facilities in labour camp like power, water, hutments, sanitation facilities, medical facilities, drainage, transportation facilities, etc. as per the norms mentioned in the tender document.
- Land for labour camp will be arranged by contractor following all local authorities rules and regulations. Camp must be located on elevated ground which is less prone to floods.
- Ensure that the land is not marshy in nature. Locality of the camp should be so selected that that there is no rift between the habitats of the camp and nearby community. Land under dispute shall not be selected for labor camp. If possible, commuting for shopping or to work shall be minimized.
- If there is danger of intrusion of snakes, carbolic acid must be spread around the labor camp and an area up to five meters from the buildings shall be cleared of any kind of shrubs, holes etc. that can house snakes and insects and it shall be maintained by periodic removal of vegetation.
- Availability of underground public utility services like electricity cables, water pipelines, gas pipelines and telephone / other lines shall be assessed and proper approval shall be taken from the authorities before excavating the land.
- If passing of overhead high-tension electric line over the labor camp cannot be avoided then a safe distance (minimum 3-5 meters) from the wires shall be ensured.
- Structures in the labor camp should be designed, constructed accordingly and their structural stability certificate shall be obtained.
- Water shall not be allowed to stagnate, and water generated shall be collected, treated and recycled.
- A small grocery shop shall be developed inside the labor camp.

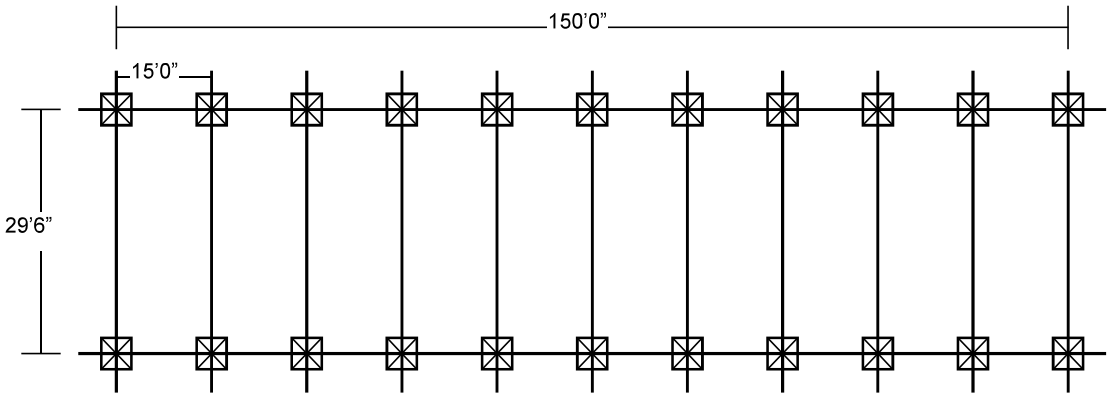
5 Norms for labor camp

5.1 Housing and Accommodation

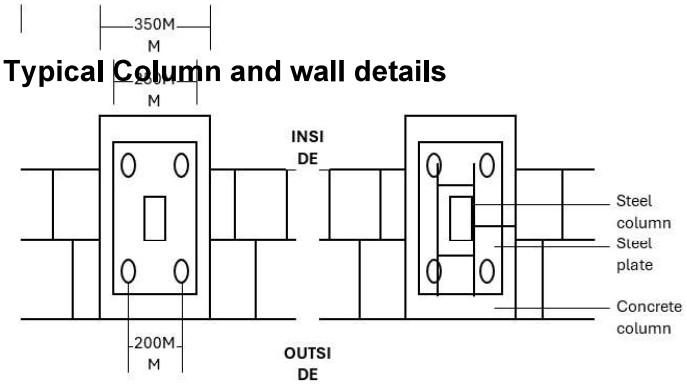
- The housing shall be in the form of weather protected, prefabricated houses or constructed with hollow blocks. Row type sheds constructed with Structural Steel structure and Prefabricated Aerocon Panels & GI sheet roofing with columns, trusses and purlins and thermocol false ceiling.

- The contractor shall be responsible for demolishing the camp, clear the area and hand over the land to the landowner post project completion.
- Contractor shall allocate everyone a minimum of 25 square feet of accommodation space.
- Accommodations should be structured to house four persons per unit, utilizing bunk beds to maximize the use of vertical space.
- Each room with bunk bed setup should be equipped with a fan and a window to ensure proper ventilation, and lockers should be provided for personal storage. There shall be provision of a meshed window, 3 feet x 2 feet in size, located 6-9" below the ceiling on the common wall for ventilation.
- The height of ceiling shall be a minimum of 10 feet. If bunker beds are provided, the ceiling shall be a minimum of 4 feet above the top bunker bed. In case of bunker beds, no ceiling fans are allowed, only wall mounted fans shall be permitted.
- Provision of hooks in rooms @ 5ft height from the floor for tying the mosquito nets shall be ensured.
- Additionally, each bed should be furnished with a suitable mattress to ensure comfort and support for the occupants.
- Contractor shall provide for family rooms of approximately 12*10 square feet area in the ratio of 20:80 bachelor accommodation. The family accommodation shall be provided in the same camp area, separated by a barricading.
- Maximum 3-4 camps with 5000-8000 workers per camp may be considered for better management of facilities.
- Proper signages shall be installed at all turns and junctures to facilitate easy movement of habitants.
- Safe electric fitting with sufficient switches and plugs shall be provided. Every room shall have one tube light or LED, one fan and minimum 3 plug points. If bunker beds are used, number of light, fan and charging points shall be increased accordingly. ELCB of proper rating shall be provided for Electrical safety.
- The rooms and ceiling should be painted in light (preferably white) color for better illumination.
- The flooring should be made of Plain Cement Concrete.
- Every room shall have a window with grill and door with lock and key.
- Accommodation for bachelors and families shall be separate.
- Plinth of the rooms shall be approximately 300mm above the ground surface.

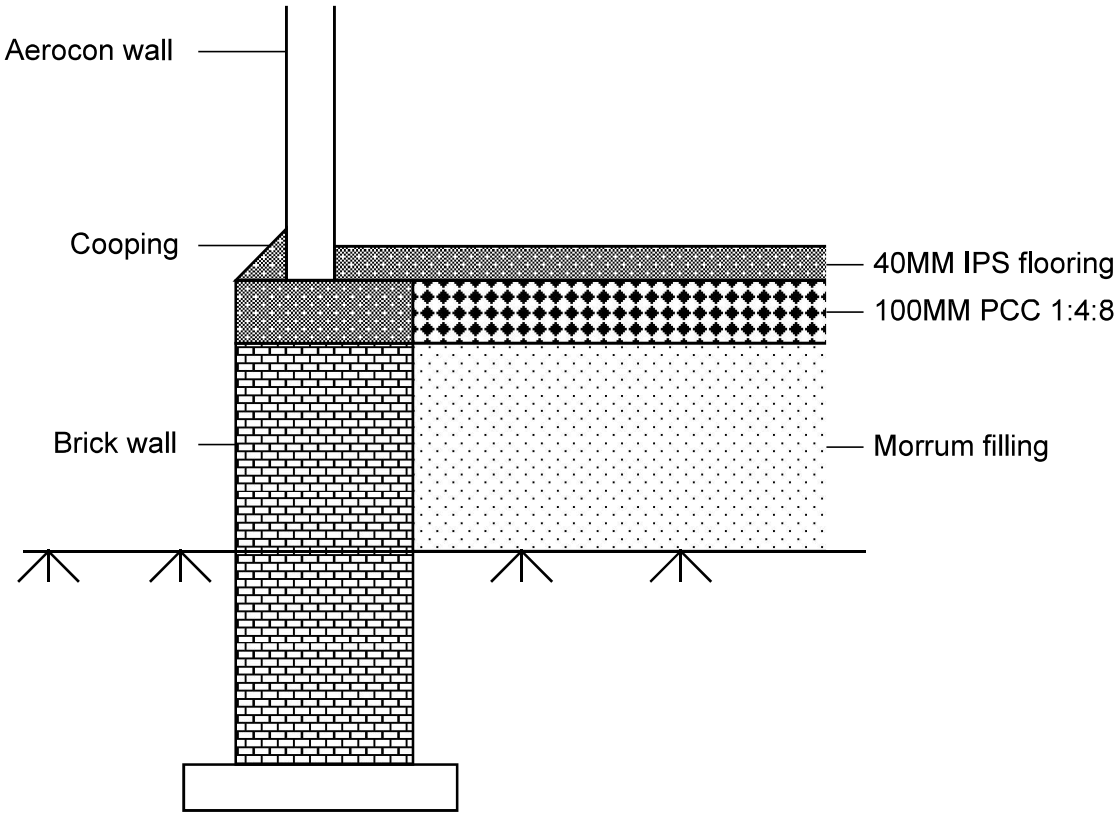
Labor quarters footing drawing



Typical Column and wall details



Typical Flooring details



Note: Details provided are typical in nature and for depiction only. Contractor shall design the structures as per standards and stability certification shall be provided.

5.2 Hygiene and Sanitation

Washrooms:

- Contractor shall ensure segregated water closets for men and women, adhering to below ratio: .
    - 1 for up to 20 persons
    - 2 for 21 to 45 persons
    - 3 for 46 to 70 persons
    - 4 for 71 to 100 persons
    - From 101 to 200 persons, add at the rate of 3 %. For over 200 persons, add at the rate of 2.5 %.
- Additionally, urinals shall also be installed following a ratio of 1:40.
- Washrooms with brick wall, tile flooring and standard sanitary fittings shall be provided for labour camps.
- Toilets are to be located within 100m of home location at camp
- Essential to maintaining cleanliness and hygiene, disposable bags and adequately covered dustbins must be provided in all toilet facilities.
- Furthermore, ensuring that every washroom is stocked with handwash, and soap will promote hygiene and prevent the spread of disease. These improvements are essential for providing a safe and dignified environment for all workers at the site.
- To further enhance the sanitation management, the installation of small-scale Sewage Treatment Plants (STPs) in all camps is required. There should not be any untreated discharge to the storm water.
- Proper levelling/ pavement of roads is to be ensured to avoid water logging.

Washing/Bathing Area:

- Contractor shall ensure segregated bathrooms/ washrooms for men and women, adhering to below ratio:
    - 1 for up to 20 persons
    - 2 for 21 to 45 persons
    - 3 for 46 to 70 persons
    - 4 for 71 to 100 persons
    - From 101 to 200 persons, add at the rate of 3 %. For over 200 persons, add at the rate of 2.5 %.
- The bathing area shall be constructed on P.C.C floor of area 24 feet x 24 feet with 5-bathroom block on each side and 2 feet gap on each side.
- The water shall be pumped to the portable tank lying on the structurally stable structure above the ground.
- The capacity of tank shall be suitable for 50 liters/person/day.
- The bathroom shall be completely covered with brick wall on 3 faces and gate on the 4th face.
- Size of each bathroom shall be 4ft x 4ft x 8 ft (height) fixed with a door.

- Labors shall be educated not to throw the shampoo pouches/soap cover in the bathrooms & proper screen shall be fixed to prevent all these solid wastes going into grey water treatment plant.

5.3 Water Supply

- To address drinking water issues, it is imperative to ensure a supply of 20-30 liters of water per person per day, specifically allocated for drinking and cooking purposes.
- Contractor shall ensure a daily water provision of 8-10 liters per person through water stations.
- Additionally, water coolers fitted with Reverse Osmosis (RO) systems shall be installed at all water stations to provide clean, safe drinking water at camp and site. The water used for cooking and drinking purpose shall be tested and potable as per IS 10500. Water tapes shall be push button type (as used in railways) in the drinking water area
- Recommended water supply for purposes other than drinking and cooking to be provided to ensure a minimum of 100 liters per person per day and a wastewater treatment plant of suitable capacity and design shall be established at each camp.

5.4 Grey Water and Sewage Treatment Plant

- Bathing and washing wastewater is termed as grey water and it is encouraged to treat the same in the grey water treatment plant, the treated water shall be reused for bathing and washing (by maintaining pH value), dust suppression/ green belt watering at the site.
- Grey water shall be treated in Grey water treatmentunit and sewage shall be treated in sewage treatment plant before any discharge. Grey water and sewage treatment plant shall be provided by contractor for his labor camps. Both the units shall be designed and implemented as per labor camp capacity following all environmental and statutory guidelines after taking necessary approval from BPCL/ EIL.

5.5 Fresh Water Tank

Sintex (3 layered) water tanks of required capacity shall be provided to store the fresh water, considering 2 days' storage. They should be located close to the main gate. An electric pump and necessary plumbing to pump the water to other areas shall be provided.

- A designated common kitchen shall be provided in every camp, ensuring that food preparation facilities are accessible to all residents. Cooking area with a minimum area of 600 sqft shall be setup and be separated from other facilities
- Openings for exhaust and cross ventilation shall be provided.
- The food preparation area shall be equipped with fire extinguisher for safety.
- Adequate storage with lock and key shall be provided to all the gangs for storage of grocery and vegetable.
- Pest control with anti-rodent arrangements shall be conducted regularly in the cooking area.

- If LPG is used as fuel, periodic checking of supply pipe/ regulator shall be done for leakage detection
- Fuel storage: The fuel storage area shall be close to the cooking area which should be equipped with fire extinguishers and necessary safety arrangements. People shall be trained to use fire-extinguishers. Minimum area of fuel storage shall be 100 sqft.
- No kitchen shall be allowed at Project site, food packets to be delivered to the workers by respective contractors. The food distribution by respective contractors needs to be pre-planned for additional delivery during early start and late finish months.
- Provision shall be made inside camps for workers to cook food as per choice. Cooking inside the accommodation rooms shall be strictly banned.
- Kitchen shall be provided in family rooms by using space of verandah.
- Dining area shall be near to the cooking area and shall be minimum 20X40 feet for 100 workers. Dining area capacity shall be 25% of the total wokers deployed by contractor.
- The dining area
- Fixed tables and sitting arrangements should be made preferably made of kadappa stone tables and benches.
- The area shall be sufficient for 80 to 100 labors at a time.
- Hand-wash area with drainage shall be provided.

  Covered Food-waste bins shall be kept near the dining area & waste shall be disposed on daily basis to avoid breeding of flies/mosquitoes.

5.6 Utensil Washing Area

- Utensil washing area shall be near to the cooking area and shall be minimum 20X20 feet.
- Utensil washing area shall be provided with 10 taps to wash the utensils.
- The wastewater stream from utensil washing area shall flow to gray water treatment plant after screening solids from the kitchen water.
- The screened solids shall be diverted to the waste disposal area, where food waste is disposed. Contractor should make proper arrangement for disposal of food waste/ other solid waste meeting all statutory and environmental compliance.

5.7 Weather conditions at camps

- Fans and proper ventilation shall be ensured in all camp accommodation by the respective contractors.
- Uninterrupted supply of cold water by sufficient industrial water coolers (stations) shall be ensured during the peak summer months.
- Provision of heaters/ blowers needs to be ensured at camp to cater to extreme cold.

5.8 Worker Transportation

- Comfortable seats in good condition shall be always maintained in the buses.
- Regular audits may be carried out by designated representative to ensure no overcrowding of buses.

- Site management shall ensure that parking at site is planned sufficiently to ensure no traffic because of buses at any time.
- Workflow shall be set-up by the respective contractors to ensure proper queuing of workers for getting in and getting out of the buses.

- **Provision of Transportation Services**

  The Contractor shall provide adequate transport facilities for all workmen employed at the construction site. Contractor shall provide proper mode of transport in form of passenger Bus service for transporting workmen from Labour camp to entry gate and from entry gate to worksite. The facilities shall ensure timely onboarding, transportation to the site, and return to the designated pick-up points within the stipulated timeframes. This is to ensure the timely, efficient, and safe transportation of workmen to and from the work site, thereby minimizing downtime, improving productivity, and maintaining steady job progress.

- **Capacity and Frequency of Transport**

  a. The transportation facilities shall be organized to ensure that each bus caters to minimum 50 workers per trip.
  b. The number of buses and trips required shall be determined by the total number of workmen and their work schedules to avoid overcrowding or delays.

- **Prohibition of Overcrowding**

  The Contractor shall ensure that all transport vehicles comply with applicable safety regulations and are not overcrowded. Adequate seating and standing arrangements shall be made, ensuring the comfort and safety of the workmen.

- **Compliance with Time Management**

  a. The transport schedule shall align with the work site's operational hours to guarantee that all workmen reach the site punctually.
  b. The downtime due to transportation delays shall be minimized, and any repeated failure to meet this standard may result in penalties or deductions, as specified in the contract.

- **Monitoring and Reporting**

  The Contractor shall maintain a log of transport schedules, vehicle capacity, and the number of workers transported. This record shall be subject to periodic inspection by the Owner or their representative.

- **Health and Safety Standards**

The Contractor shall ensure all transport vehicles are in good working condition and comply with health and safety regulations. Drivers shall be licensed and trained to handle workmen transportation professionally.

- **Non-Compliance:**
  Improper mode of transport (deploying small vehicles , pick up vans , construction material carrier etc) will be considered as unsafe act and suitable penalty for unsafe act will be imposed.

5.9 Cultural Amalgamation and Recreation

- Absence of recreational facilities on site can affect the morale and overall well-being of workers. Site management shall incorporate an open space measuring 100 X 150 meters in each camp specifically designated for sports and recreational activities.
- The decision regarding the specific facilities to be included in this space should be made by the contractor, based on the preferences and interests of the workforce.
- A recreation room of minimum 20*20 ft shall be provided for entertainment of labors
- The contractor needs to organize theme-based skits with professional agencies related to safety, unity, rights and duties, de-addiction, etc. once every two months.
- It shall be ensured that all the festivals are organized at camp and site to encourage bonding between workers.
- Training and awareness through slogans in different languages shall be ensured throughout the camp and site area.
- The camp management team shall comprise of representatives from different regions to ensure open communication with workers from different areas of the country.
- A TV (minimum 40 inch) with data cable connection shall be provided & be used for entertainment and showing informative videos on HSE/ general topics.
- Camp Head shall take care of the discipline in TV room and food, bidi, gutka shall not be allowed inside the TV room, also labors shall not be allowed to sleep inside the TV room
- Appropriate no of big floor mats of minimum 10ft*10ft shall be provided for watching the TV.

5.10 Medical Facilities

- Medical check-up report needs to be mandatorily submitted by the contractor for all the workers before issuance of ID card.
- Site management shall ensure primary medical facilities to all workers through OHCU.
- An ambulance through tie up with nearby hospitals should be available on site at a ratio of one per 2000 workers. If the workers are less than 2000, minimum one ambulance to be maintained. A first aid center with adequate paramedics should be present next to the camp administrator's office and the area of this room shall be minimum 100 sqft. In case of female workers, female first aiders shall be made available.

- Contractors shall equip each dining area (within HSSE hub) with a first aid box, maintaining a ratio of one box per 150 workers, to ensure first aid supplies in case of emergencies.
- Furthermore, organizing medical camps every two months and conducting an annual health check-up for all workers will help in early detection and management of potential health issues.
- Mandatory Emergency First Response training shall be imparted to supervisors once every year.
- De-addiction drives shall be organized every two months to provide education, support, and resources to help workers overcome their addictions.

5.11 Safety and security

- Security measures must include installation of a minimum of six closed-circuit television cameras in each camp, with capabilities to record continuously for 30 days to enhance safety and monitoring.
- Every labor camp shall have security cabin at the main gate to guard and to ensure safe passage of people, goods and belongings. The security cabin should typically be 6 feet x 6 feet.
- A security guard shall be deployed (24x7) at the main gate.

5.12 Waste Disposal Area

- The waste disposal area shall be cleaned daily, and authorized vendor shall be engaged to dispose the collected waste.
- Bio-gas plant and food-waste composting shall be encouraged for energy conservation and for food waste management in large labor camps (more than 1500 labors). For specific details on size please touch base with Corporate HSE department.

5.13 Emergency Assembly Area

- Emergency assembly area shall be clearly marked and should be easily accessible to everyone in the labor colony.
- Area: should be able to accommodate the full occupant load of the premises / area (as a thumb rule, not less than 2.25 square feet per person @ 1.5x1.5 feet)
- A notice board displaying the emergency contact numbers shall be provided in this area.
- Each occupant shall be briefed on the location of Emergency Assembly Area, first-aid room and their actions in case of an emergency

5.14 Grocery Shop

- Provision for a grocery shop of 10*10 Sq ft shall be made inside the labor camp, the shopkeeper must keep daily use items for labors like soap, washing powder, toothpaste,

Hair Oil, comb, shampoo etc. Kitchen items like cooking oil, rice, dal, wheat flour, spices etc shall be available with the shop.

- Shopkeeper may keep a provision for preparation of tea and ready to eat snacks, biscuits etc based on the requirement, but cooking shall not be permitted inside the grocery shop.

5.15 Creche

- In case of 50 or more female workers, a creche facility of minimum 20*10 Sqft shall be provided inside the labor camp.
- Children below 6 years shall be accommodated in creche and a trained caretaker shall be appointed to take care of children. Proper nutrition, healthcare, hygiene and primary education shall be ensured for the children by the caretaker.

5.16 Electric Room

- Preferably, labor camp electrification shall have solar energy as the source of electric energy and a small DG set as back-up for emergencies.
- Electric room shall preferably be of adequate size to accommodate the DG and panels etc. In general, it may be of 200 sqft size with brick work, concrete flooring and plaster. Earthing pits shall be a part of it. If required, cable trays shall be provided to align the cables.
- The roof, floor and walls shall be leak-proof to avoid any leakage / dampness.
- It shall be equipped with firefighting equipment and with lock & key.
- Earth resistance shall be checked on weekly basis and no. of earth pit shall be done
- In case of solar powered labor camp, room to store batteries of energy bank shall be provided.

5.17 Camp Head Room

- An office room for the camp administrator shall be provided near the entrance gate.
- This office room shall be minimum 100 sqft.
- Provision of electrical fittings & fixtures (lights & fan) as well as a table, 4 chairs and cupboard shall be provided.
- A notice board in lock & key shall be provided outside the camp boss room but displaying notices, information etc.

6 Guidelines on compliance of norms

6.1.1 Audit

- **Inspection Protocol:** A third-party audit appointed by EIL/BPCL will be conducted monthly. Any deficiencies identified must be corrected and reassessed as per Attached annexure-I for penalty matrix

- **Audits and Feedback:** Surprise visits will be conducted by the owner's human resources, legal, IR, or safety teams, or by the PMC, to gather feedback on labor accommodation.

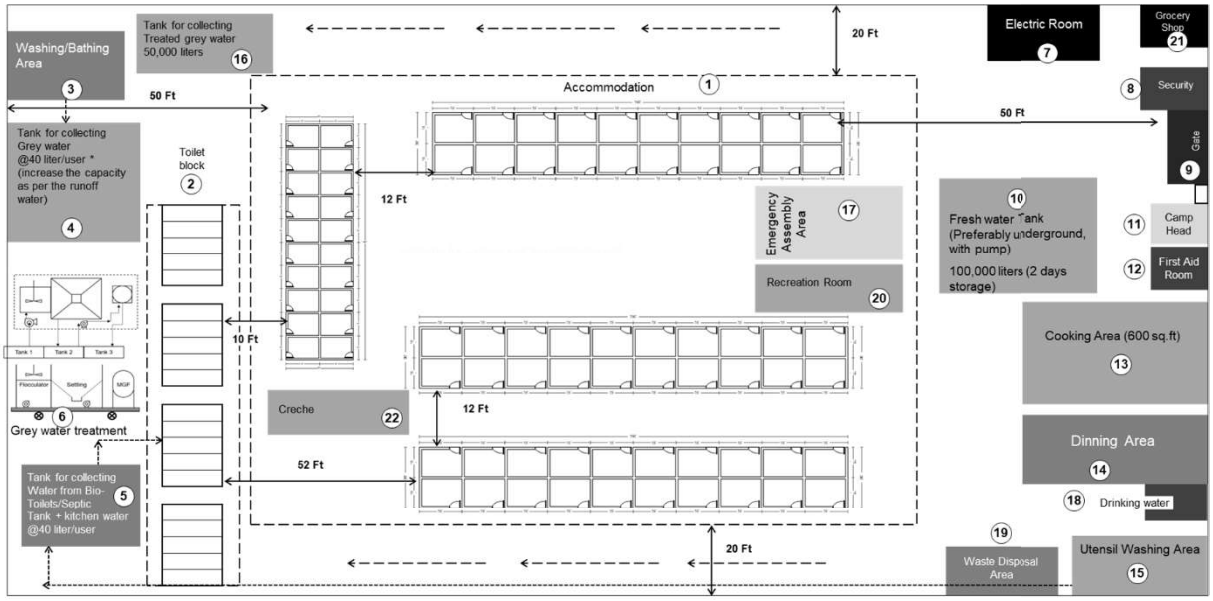
6.1.2 Reporting

- **Complaint Mechanism:** Each contractor's office must have a provision for laborers to submit complaints. The contractor is responsible for maintaining records of these complaints and resolving complaints in a timely manner.
- **Incident Reporting:** The PMC is tasked with verifying documents and informing the owner of any incidents. Human resources from the owner will report these incidents to the factory inspector, DISH, and PESO.

6.1.3 Pain - Gain

- **Non-Compliance Penalties:** The concerned authority from the owner/ PMC will impose penalties for each non-compliance issue, as per attached Annexure-I.
- **Appreciation and Rewards:** Appreciation letters will be awarded to the best contractor.
- **Recognitions** such as Safety/Quality person of the month, quarter, and year would be awarded to the contractors based on their performance in these domains.
- **Exclusive high tea sessions** with the leadership may be organized to motivate the manpower
- **Wall of fame** for outstanding laborers will be maintained and the names chosen by the auditing team.

Depiction for Scheme for Labor camp establishment


Washing/Bathing Area
3
Tank for collecting Treated grey water 50,000 liters
16
50 Ft
Tank for collecting Grey water @40 liter/user * (increase the capacity as per the runoff water)
4
Toilet block
2
Accommodation
1
20 Ft
Electric Room
7
Grocery Shop
21
Security
8
50 Ft
Gate
9
12 Ft
Emergency Assembly Area
17
Fresh water Tank (Preferably underground, with pump)
100,000 liters (2 days storage)
10
Camp Head
11
First Aid Room
12
Recreation Room
20
Cooking Area (600 sq.ft)
13
10 Ft
Creche
22
12 Ft
Dinning Area
14
Drinking water
18
6
Grey water treatment
52 Ft
Tank for collecting Water from Bio-Toilets/Septic Tank + kitchen water @40 liter/user
5
19
Waste Disposal Area
20 Ft
Utensil Washing Area
15

Welfare facilities for Labour at Site

1. Toilet/ Urinal:

- Contractor shall ensure segregated water closets for men and women, adhering to a ratio of 1:20. Additionally, urinals shall also be installed following a ratio of 1:40.
- Washrooms with brick wall, tile flooring and standard sanitary fittings shall be provided in Process units (in ECU, PP/BU, etc. areas for longevity) , whereas portable washrooms may be provided in other areas at site (as mentioned in the plot plan shared in tender)
- Toilets are to be located within 200m of work zone at site (<5 mins walk).
- Essential to maintaining cleanliness and hygiene, disposable bags and adequately covered dustbins must be provided in all toilet facilities.
- Furthermore, ensuring that every washroom is stocked with handwash, and soap will promote hygiene and prevent the spread of disease. These improvements are essential for providing a safe and dignified environment for all workers at the site.
- To further enhance the sanitation management, the installation of small-scale Sewage Treatment Plants (STPs) in all camps or, alternatively, the use of septic tanks is recommended. There should not be any untreated discharge to the storm water.
- Proper levelling/ pavement of roads is to be ensured to avoid water logging.

2. Drinking Water:

- Contractor shall ensure a daily water provision of 8-10 liters per person through water stations.
- Additionally, water coolers fitted with Reverse Osmosis (RO) systems shall be installed at all water stations to provide clean, safe drinking water at camp and site. The water used for drinking purpose shall be tested and potable as per IS 10500. Water tapes shall be push button type (as used in railways) in the drinking water area

3. Food Shelters:

- Contractor shall establish dining halls (multiple small dining halls if needed) with capacity to accommodate 25% of total workforce at that hall.
- Everyone shall be allotted a space of 20 square feet to ensure comfort while dining.
- Additionally, the area shall be equipped with coolers and fans to maintain pleasant temperature, as well as fly killers to enhance sanitary conditions, ensure dignified and hygienic environment.
- The area including the dining hall may be designated as HSSE hub and shall include drinking water, hand wash facility, rest area, toilets and first aid facility.

- Covered Food-waste bins shall be kept near the dining area & waste shall be disposed on daily basis (at designated locations) to avoid breeding of flies/mosquitoes. Food waste shall be utilized for bio-gas generation and manure production

4. Weather conditions

- Adjustment of work schedule to include a 3–4-hour lunch break during the peak summer months, with an option for adjusting the same through an extended early start or finish, will help minimize exposure to peak temperature hours.
- It is recommended to provide a minimum of 20 square feet of shaded space per person, ideally located adjacent to the dining area. This can be achieved through the installation of tents made of fire retardant materials, which offer effective protection against the sun.
- Additionally, equipping these areas with fans that utilize atomized water or mist sprays will further help in reducing the temperature and providing comfort to the workers.
- Site management shall ensure properly laid out drawing in the tender documents, clearly showing the locations of shaded areas, water coolers, and washrooms.
- Provision of hydration supplements (ORS, Glucose) to mitigate dehydration during hot weather shall be ensured.
- Uninterrupted supply of cold water by sufficient industrial water coolers (stations) shall be ensured during the peak summer months.
- Towels need to be provided to workers on site to protect from harsh sun during summers.
- Provision of heaters/ blowers needs to be ensured at site to cater to extreme cold. Bonfires in site area shall be strictly prohibited to ensure safety and prevent hazard.

Note: Please refer Annexure-I for non-compliance Penalty

Non- compliance penalties against Labour facilities

Areas	Provisions/ sub areas (as per specifications in tender norms)	Timeline for compliance post inspection (days)	Penalty for each instance of non-compliance post timeline given at inspection (in INR)	Penalty applicability at Camp & Project Site	Maximum penalty per unit (Col E) per year for the specified area (in INR)
A	B	C	D	E	F
General	Upkeep of camp area- clearing bushes, etc.	7	1,000	Per 100 person camp/ Site	12,000
	Approach Roads	15	2,000	Per 100 person camp / Site	24,000
Housing/ accommodation	Accommodation space per person	15	200	Per room	2,400
	Fan	7	200	Per room	2,400
	Window	7	200	Per room	2,400
	Ceiling height	15	200	Per room	2,400
	Mattress	7	100	Per unit	1,200
	Signages	15	200	Per 100 person camp	2,400
	Provision of lighting/ socket in room	7	200	Per room	2,400
	Plinth height	15	1,000	Per 100 person camp	12,000
Washrooms	Area and specifications	15	500	Per washroom	6,000
	Nos of WC	15	500	Per washroom	6,000
	Dustbins and disposable bags	7	100	Per washroom	1,200
	Handwash and soap	7	100	Per washroom	1,200
	Daily cleaning as per specification	7	100	Per washroom	1,200
	Ventillation as per specification	7	100	Per washroom	1,200
Bathrooms	Area and specifications	15	500	Per bathroom	6,000
	No of bathrooms	15	500	Per bathroom	6,000
Drinking water	Capacity for drinking and cooking (fresh water tanks)	7	1,000	Per 100 person camp/ Site	12,000
	No of water stations/ coolers (all with RO)	7	1,000	Per 100 person camp/ Site	12,000
Water for washing and cleaning	Capacity (as per specifications)	7	1,000	Per 100 person camp/ Site	12,000
Water treatement	availability of grey water treatment unit	15	1,000	Per 100 person camp/ Site	12,000
	availability of Sewage treatment plant	15	2,000	Per 100 person camp/ Site	24,000
Dining hall	Capacity of dining hall	15	2,000	Per 100 person camp/ Site	24,000
	Seating capacity (tables/ chairs)	7	200	Per unit	2,400
	Air coolers	7	1,000	Per hall	12,000
	Fans	7	1,500	Per hall	18,000
	Insectecutor	7	500	Per hall	6,000
	Drinking water coolers	7	1,000	Per hall	12,000
	Hand wash basin	15	500	Per hall	6,000
	Hand wash/ soap	7	200	Per hall	2,400
	Covered food- waste bins	7	200	Per hall	2,400
Kitchen/ canteen	Area of cooking space	15	2,000	Per 100 person camp	24,000
	Exhaust fan	7	200	Per 100 person camp	2,400

Areas	Provisions/ sub areas (as per specifications in tender norms)	Timeline for compliance post inspection (days)	Penalty for each instance of non-compliance post timeline given at inspection (in INR)	Penalty applicability at Camp & Project Site	Maximum penalty per unit (Col E) per year for the specified area (in INR)
	Fire extinguisher	1	200	Per 100 person camp	2,400
	Storage with lock and key	7	100	Per 100 person camp	1,200
	Utensil washing area with hot water supply	15	500	Per 100 person camp	6,000
Steps for weather conditions	Minimum shaded space per person	15	2,000	Per 100 person	24,000
	Fans	15	200	Per 100 person	2,400
	Hydration supplements	7	50	Per person	600
	Heaters/ Blowers	7	200	Per 100 person	2,400
Transportation	No of buses/ trips	15	500	Per 100 person camp/ Site	6,000
Recreation facilities	Open space as per specification	15	2,000	Per 100 person camp	24,000
	Recreation room	30	500	Per 100 person camp	6,000
	TV	7	500	Per 100 person camp	6,000
	Floor mats/ chairs in TV room	7	200	Per 100 person camp	2,400
Medical facilities	Annual check up	15	100	Per person	1,200
	Ambulance	15	200	Per 100 person camp/ Site	2,400
	First aid (for each location)	7	100	Per 100 person camp/ Site	1,200
Waste disposal	Daily cleaning	7	500	Per 100 person camp/ Site	6,000
Emergency assembly area	Space as per specification	15	500	Per 100 person camp/ Site	6,000
	Notice board	7	200	Per 100 person camp/ Site	2,400
Creche	Provision as per specification	15	2,000	Per 100 person camp	24,000
Electric room	As per specification	15	2,000	Per 100 person camp	24,000
	DG set	7	1,000	Per 100 person camp	12,000

Note: In case of non- adhernace of the compliances mentioned in the contract or otherwise as applicable by the labour law, the principal employer will supply/ provide the facility and recover the cost of the same with penalty from respective contractors' running bill.

The maximum overall penalty per year for non compliance of norms for labour facilities as per the tender document would be capped at 1% of the overall contract value

SOCIAL MEDIA POLICY FOR BUSINESS PARTNER

[ANNEXURE - XX TO SPECIAL CONDITIONS OF CONTRACT]

BHARAT PETROLEUM CORPORATION LIMITED
SOCIAL MEDIA POLICY FOR BUSINESS PARTNERS

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TERMS AND CONDITIONS FOR ACCEPTABLE USE OF SOCIAL MEDIA BY BUSINESS PARTNERS

1. OBJECTIVE

Social media has become part of everyday life and a means of communication and sharing information with others. Every organization recognises the benefits that social media tools can provide, and also reckons the challenges it brings.

These terms and conditions ("**Social Media T&Cs**") seek to provide clear guidance on acceptable standards of conduct and practices to be followed by the Business Partners (*as defined below*) of Bharat Petroleum Corporation Limited ("**Corporation**"), in the usage of social media tools during and post their association with the Corporation. These terms and conditions are intended to protect and safeguard *inter alia* the interests and reputation of the Corporation, in the access, use of or participation on Social Media (*as defined below*) platforms by such constituents.

It is important to maintain the highest degree of professional standard that is associated with the Corporation's name, brand and reputation. Constituents must constantly be aware of the risk of damaging the Corporation's name or reputation in public forums. These terms and conditions should be adhered to by each constituent at all times and should be read harmoniously and in conjunction with the terms of their engagement with the Corporation, as well as other applicable policies and directions issued by Corporation, from time to time, including the Relevant Documents (*as defined below*).

1.1. Social Media

Social Media includes any web or mobile based platform that enables an individual or agency to communicate interactively and enables exchange of user generated content. The term "**Social Media**" describes internet-based technologies and practices that people use to share opinions, insights, experiences and perspectives. It may be internal (housed within the Constituent's technology infrastructure and open for use only by the Constituents) or public (widely available to the population of internet users).

These terms and conditions are applicable equally to a wide range of websites and mobile phone / tablet applications, including the following:

(a) Social Networking sites, for example - Facebook, Twitter, and LinkedIn.
(b) Media Sharing sites, for example - Instagram, Snapchat, YouTube
(c) Discussion forums, for example - Reddit, Quora, Digg, Glassdoor
(d) Content Curation network, for example - Pinterest, Flipboard

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(e) Blogging and Publishing sites, for example - WordPress, Tumblr, Medium including blogs
(f) Interest-based network, for example - Goodreads, Houzz
(g) Information sharing sites, such as Wikipedia
(h) Opinion sites (e.g. Yahoo! Answers)
(i) Any other social media platform/s

1.2. Scope and Applicability

These Social Media T&Cs are applicable to all Business Partners (*as defined below*), including any prospective partners of the Corporation (the "**Constituents**").

The Social Media T&Cs provides a framework for the usage of Social Media by the Constituents and non-conformance with these Social Media T&Cs or any other applicable policy or directions issued by the Corporation as may be relevant to the Constituents, may result in penalties ranging from financial to legal liabilities, as set out under the respective contractual understanding between each Business Partner and the Corporation.

1.3. Relevant Documents

These Social Media T&Cs have been formulated in line with the Framework & Guidelines for Use of Social Media for Government Organizations, issued by the Department of Electronics and Information Technology, Ministry of Communications & Information Technology, Government of India.

In addition, these Social Media T&Cs must be read in conjunction with the underlying contract documents including the following documents (collectively, the "**Relevant Documents**"), as may be applicable to each Constituent:

(a) General Conditions of Contract for vendors (relevant clauses are placed at Annexure I);

(b) Transportation Contract Agreement Bulk LPG Transportation Contract By Road (relevant clauses are placed at Annexure II);

(c) PCVO, Retail and Lubes Transport guidelines.

2. CONTENT GUIDELINES

This section seeks to set out the guidelines for content management as well as administration rights of all official Business Partner Social Media accounts and ensure accountability of the authorised representatives of such Business Partner.

The following guidelines on content sharing ("**Content Guidelines**") must be followed, in relation to all content created, posted or shared on Social Media:

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(a) All post and other content shared via Social Media shall abide by applicable laws, including the Information Technology Act, 2000 and rules made thereunder, as amended.

(b) The content posted or shared though official Social Media accounts, shall be relevant, engaging and in line with the Corporation's brand and communication strategy, whether in the form of text, images, gifs, videos, etc.

(c) The Constituents shall be mindful of content and the tone associated with it. A negative tonality, sarcasm, dry humour, pun, memes, etc. should be avoided to steer clear from any controversy.

(d) The Constituents shall be careful and ensure that any content posted or shared through the official Social Media accounts does not bring disrepute to the Corporation. Opinion or comments on political observations, religious beliefs, gender biases, etc. must be avoided while operating official Social Media accounts. In the use of official Social Media accounts, the Constituents shall refrain from forwarding or sharing any videos or images or messages, which are considered inappropriate or any content that is considered offensive, obscene or derogatory in nature.

(e) The Constituents shall be cognizant of concerns regarding confidentiality and disclosure requirements, and must at all times, adhere to the Relevant Documents as well as these terms and conditions, to understand what shall be disclosed on a public platform. For instance any communication marked as "privileged" or "restricted" or "confidential" or "not for circulation" should not be shared on Social Media. The Constituents are absolutely prohibited from disclosing commercially sensitive, anticompetitive, private or confidential information. If unsure whether the information that is proposed to be shared falls within one of these categories, authorised representatives of the Constituent may discuss with the concerned official as designated by the Corporation.

(f) The Constituents shall ensure that any references to the Corporation or its employees, or other customers, partners and vendors do not contravene any non-disclosure agreements. The Constituents shall avoid disclosure of any information pertaining to any employee / vendor / customer or individual associated with the Corporation, without their prior consent.

(g) The Constituents shall be vigilant about tagging, mentions and conversations around the Corporation. If it notices any customer complaint, dealer/ distributor/ vendor grievances, media story etc., the same may be flagged to the official channels of the Corporation and will be responded to by authorized personnel within the Corporation.

(h) In the operation of official Social Media accounts, the Constituents shall be cognizant of maintaining professional etiquette for all interactions and shall not initiate or engage in discussions which may be characterised as showcasing a personal opinion such as political or religious beliefs. In

addition, official Social Media accounts should not share any content or comment that may be viewed as colouring the relations between the Corporation and the Government of India or any Ministry / Department of the Central or State Governments.

(i) The Constituents, particularly in the use of official Social Media accounts, shall only post original content, which is free of any copyright infringement or plagiarism. To ensure the reputation and principles of the Corporation are safeguarded, all Constituents must avoid posting content that violates the law, infringes the intellectual property rights of the Corporation and its group companies or of any individual or organization. Any inadvertent posts, which violates these principles, must be removed / deleted immediately upon becoming aware of the implications as set out in these guidelines.

As responsible business partners of the Corporation, the following points must be strictly observed and followed by the Constituents:

(i) Text, photos, images, musical work in any form, video clips, movie clips, or any other content for which the Constituent does not own copyright, must not be used in any form, and in particular for official purposes to promote any activities related to the Corporation, without obtaining consent from the copyright owner. If the copyright owner for such work cannot be identified or if the consent for use of such work is not provided by the copyright owner, the work must not be used by the Constituent.

(ii) Capturing photographs and/or videos of the Corporation's offices, facilities, and other establishments (within or outside) or customer sites is strictly prohibited. Any such illegal images and/or videos of the Corporation's establishments, offices, facilities and factories or other sites and whether directly emailing or otherwise circulating such content via Social Media posts on the Internet, shall attract legal consequences. Official visual materials may be availed from the Corporation and can be requested through email, to the relevant State / Territory team.

(iii) Creation, sharing and/or distribution of videos which make use of unlicensed music is strictly prohibited.

(iv) Unauthorized videos of any events hosted by the Corporation, whether within or outside the Corporation's premises that may be captured by Constituents shall not be shared/distributed on Social Media.

(v) All Constituents must take due care to protect the Corporation's copyright and intellectual property within and outside the organization.

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(j) The authorised personnel operating official Social Media accounts of respective Business Partner shall not post unverified news, or news from dubious 'sources', that may project the Corporation in a negative light.

(k) The admins operating official Social Media accounts shall clearly state the source and give due disclaimers while quoting any third-party content through such Social Media accounts.

(l) Additionally, content on official Business Partner Social Media Accounts shall be limited to the coverage of activities related to the business only. However, these accounts can re-share / retweet the posts of Corporation's official Social Media accounts, subject to the veracity of such accounts.

3. ACCEPTABLE USAGE OF SOCIAL MEDIA BY BUSINESS PARTNERS

The following guidelines are applicable to vendors, suppliers and other contractors of the Corporation ("**Business Partners**"), and these are intended to supplement, and do not to replace the terms and conditions or any other agreement or guidelines (including the applicable provisions set out under Annexure I or II of these Social Media T&Cs), which are currently in place to regulate the conduct of such Business Partners:

(a) Business Partners have the discretion to decide whether their Social Media accounts will be used for personal or professional purposes. However, in any event, whether such Social Media accounts are used for official purposes or personal purposes, to the extent that they declare their affiliation with the Corporation in any way, it is deemed that they will abide by these terms and conditions read with the applicable contractual provisions and the Framework & Guidelines for Use of Social Media for Government Organizations, issued by the Department of Electronics and Information Technology, Ministry of Communications & Information Technology, Government of India.

(b) Only official Business Partners accounts are eligible to declare their association with the Corporation or using any content owned by or belonging to the Corporation, including logo, product specifications, product pictures, product catalogues, etc. Such accounts may only post content that are official in nature and reasonably expected to promote the activities specific to its business. Such official Business Partner Social Media account shall be akin to a professional page to promote business interactions and shall not post any content which may showcase the account as expressing opinion on ancillary matters which are not in furtherance of the objective set out under the Relevant Documents, such as posts related to entertainment industry, or political views etc. However, such affiliation or use of Corporation's content, such as logo, product pictures etc. is only limited to use by official Social Media accounts of such Business Partner, and will not, at any time, be used by any authorised or other personnel of such Business Partner, in the operation of a personal Social Media account.

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(c) Every Business Partner's official or personal (individual) Social Media account is prohibited from posting / circulating any official communication / document or disclosing any business-related or other confidential information, pertaining to the Corporation, in accordance with the Relevant Documents.

(d) Each Business Partner Social Media account, particularly those accounts which have been permitted to acknowledge their association with the Corporation, has an obligation to exercise caution in the posting or sharing of content on Social Media, and shall undertake adequate diligence prior to posting any content. In particular, such accounts shall be fully cognizant of posting or providing traction to any 'fake news' and shall refrain from posting or sharing unlawful, controversial or unverified news, or news from dubious 'sources', particularly in relation to the Corporation and the Central / State Governments.

(e) The Business Partner Social Media account which are maintained for official purposes, shall refrain from engaging in unlawful or inappropriate posts or sharing any content that may be defamatory or may have the effect of downplaying the Corporation's business or competitors. In addition, such account should also not post or share content using derogatory language or is likely to demean sentiments of anyone with whom they engage in any public communication using Social Media.

(f) Business Partners using Social Media for official purposes and especially those accounts that have been approved by the Corporation, shall maintain professional and proper etiquette in online interaction via Social Media and shall not engage in inappropriate behaviour. Such inappropriate behaviour includes but may not be limited to posting, sharing or endorsing in any form, any content which may be considered as:

(i) Divisive, unethical or unlawful at the workplace;

(ii) False, or derogatory, or amounting to bullying, trolling, intimidating, or harassing including using offensive, defamatory, threatening, discriminating, obscene or insulting language;

(iii) A misrepresentation of the Corporation, such as creating any unofficial groups or networks (whether intentional or unintentional) using the Corporation's name, logo, or email address;

(iv) Compromising the confidentiality (of the Constituents and/or the Corporation's information), or creating a conflict of interest;

(v) Disclosing commercially sensitive, anticompetitive, or information which is marked as restricted for internal circulation within the Corporation;

(vi) Misleading and misrepresentative, such as creating or endorsing any video channel / account representing the Corporation or any specific Business Unit, or otherwise posting or sharing any content owned by the

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Corporation, unless such content has been posted on verifiable official Social Media accounts of the Corporation;

(vii) Amounting to pornographic material (that is, writing, pictures, films and video clips of a sexually explicit nature) or content that could be considered as offensive, obscene or criminal; or

(viii) Creating or likely to create any liability (whether criminal or civil, for the Corporation).

Where evidence of misuse or inappropriate behaviour is brought to the notice of the Corporation, the Corporation may undertake a more detailed investigation in accordance with its procedures, which may involve the examination and disclosure of records by those nominated to undertake the investigation and any witnesses involved in the investigation. If necessary, action may be taken against such Business Partner under the respective contractual agreement and in case required, such information may be handed to authorities in connection with the investigation.

(g) Any violation of these Social Media T&Cs shall be treated as violation of General Conditions of Contract of the Corporation and may invite action by the Corporation as deemed fit, based on the sole discretion of the Corporation.

(h) The Corporation has a zero-tolerance policy for any complaints that may be brought to its notice via Business Partner Social Media accounts. In the event the Business Partner or its associates *etc.* are dissatisfied with the Corporation, or have any unresolved query or grievance against the Corporation or any individual who is in the employment or association of the Corporation, the Business Partner or such person associated with it must reach out to the designated official and follow the hierarchy established within the Corporation. All such communication must follow the formal processes that are available as per contractual agreement with the Corporation. In the event the Business Partner, whether by itself or its employee or associate publishes any such information on Social Media or discloses details of any complaint or dispute with the Corporation on a public forum through Social Media, it will be in breach of the terms of these T&Cs and its agreement with the Corporation, and the Corporation will have the right to pursue such legal remedies as may be appropriate and available under law.

(i) Upon termination or expiry of the Relevant Document / underlying contractual agreement between the Corporation and the Business Partner, the Business Partner shall ensure that all references and posts which disclose any affiliation with the Corporation has been scrubbed from the Business Partner's Social Media account and a formal written declaration to this effect must be provided to the Corporation, within 7 days of such termination or expiry.

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4. ENFORCEABILITY AND COMPLIANCE

4.1. These Social Media T&Cs are construed to be a part of the Relevant Documents and form an integral part of the contractual understanding between the Corporation and the Business Partner.

4.2. Any violation of the Social Media T&Cs shall be treated as violation of respective contractual understanding between the Corporation and the Business Partner, and may invite appropriate action by the Corporation as deemed fit.

4.3. The Business Partner agrees and understands that all activities of the Business Partner's official Social Media Account is subject to monitoring and periodic audits by the Corporation, if required.

4.4. The Business Partner will provide its written acknowledgement to these Social Media T&Cs, in the form set out in Annexure III, failing which the Corporation may take such action as may be necessary to ensure compliance with these terms and conditions.

4.5. The concerned official of the Corporation shall be responsible for reviewing the compliance of these Social Media T&Cs as may be required to ensure that it meets legal requirements and reflects best practice.

ANNEXURE I

GENERAL CONDITIONS OF CONTRACT FOR VENDORS

Clause 34: Contractor's Subordinate Staff and Their Conducts:

34.2 If and whenever any of the Contractor's or sub-contractor's agents, sub-agents, assistants supervisor or other employees shall in the opinion of Engineer-in-Charge be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties or that in the opinion of the owner or Engineer-in-Charge, it is undesirable for administrative or any other reason for such person or persons to be employed in the works, the contractor, if so directed by the Engineer-in- Charge, shall at once remove such person or persons from employment thereon. Any person or persons so removed from the works shall not again be employed in connection with the works without the written permission of the Engineer-in-Charge. Any person so removed from the works shall be immediately replaced at the expense of the contractor by a qualified and competent substitute. Should the contractor be requested to repatriate any person removed from the works he shall do so and shall bear all costs in connection herewith.

34.3 The contractor shall be responsible for the proper behaviour of all the staff, supervisor, workmen and others and shall exercise a proper degree of control over them and in particular, and without prejudice to the said generality, the contractor shall be bound to prohibit and prevent any employees from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neighbourhood and in the event of such employee so trespassing, the contractor shall be responsible therefore and relieve the Owner of all consequent claims or actions for damages or injury or any other grounds whatsoever. The decision of the Engineer-in-Charge upon any matter arising under this clause shall be final. Contractor shall ensure that none of their employees are ever engaged in any anti-national activities.

Clause 44: Liens

44.2 Contractor will not disclose details of the work to any person or persons except those engaged in its performance, and only to the extent required for the particular portion of the work being done. Contractor will not give any items concerning details of the work to the press or a news disseminating agency without prior written approval from Engineer-in-Charge. Contractor shall not take any pictures on site without written approval of Engineer-in-Charge.

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ANNEXURE II

TRANSPORTATION CONTRACT AGREEMENT FOR BULK LPG TRANSPORTATION CONTRACT BY ROAD

Clause 28:

(a) The Transporter shall remain at all times liable to the Corporation for any loss or damage caused to any building, plant machinery or the property of the Corporation due to careless, negligent, inexperienced act or default of the Transporter, their agents, representative or employees. The Corporation shall be entitled to deduct from the amounts payable to the Transporter under this Agreement or otherwise the loss or damages so suffered.

(b) The Transporter will be liable for any loss and/or injury to Corporation's employee due to careless, negligent, wrongful act or default of the Transporter, his/their representatives or employees in carrying out the job under this contract.

Clause 38:

All terms & conditions stipulated in the Guidelines for Bidders, Tender Terms & Conditions, Declarations, Agreement, Industry Bulk LPG Transport Discipline Guidelines and other documents furnished with the Tender and related correspondence shall form part of the contract. The Corporations are entitled to frame and implement the Policy(ies) applicable to Transporters, and to modify and amend the same from time to time, and that the Policy(ies) as framed, amended and modified would be binding on the Transporters, immediately upon being communicated to them.

Clauses from Transportation Agreement of Retail and MAK Lubricants

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ANNEUXRE III

FORMAT OF ACKNOWLEDGEMENT

To,
[*insert details to whom such acknowledgement may be addressed***]**

[*in the case of an individual or sole proprietorship*] I am _____ , an inhabitant of _____ and carrying on business of _____

OR

We are [*insert names of all partners of firm*] carrying on business at _____ in partnership under the firm name and style of M/s. _____

OR

[*insert name of Limited Company or a Co-operative Society / Trust Co-operative*] incorporated under the laws of India and having its Registered Office at _____
_____

I / We have entered into a [insert name of agreement] dated [*insert date*] ("**Agreement**") for the [*insert purpose*], with Bharat Petroleum Corporation Limited ("**BPCL**").

In furtherance thereof, we have been provided with a copy of the Terms and Conditions for Acceptable Use of Social Media by Business Partners, issued by the Corporation.

I / We have read and understood BPCL's Terms and Conditions for Acceptable Use of Social Media by Business Partners and agree to abide by it.

I / We understand that any violation of the above conditions may result in disciplinary action, or termination or revocation of the Agreement.

In acknowledgement thereof, please see below our acceptance of the Terms and Conditions for Acceptable Use of Social Media by Business Partners, issued by the Corporation, duly signed and acknowledged by [*insert name*], in the capacity of our authorised representative.

A copy of such authorisation is also attached for your record.

_____
(Signature & seal)

Name:
Designation: Date:

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Advisory on Environmental Criteria

[ANNEXURE - XXI TO SPECIAL CONDITIONS OF CONTRACT]

BPCL Supplier / Vendor Advisory on Environmental Criteria

Dear Suppliers / Vendors,
As you aware that environment is one of the most precious gifts given to us by Mother Nature. We must be conscious of our actions and act responsibly to preserve and conserve the environment. BPCL has always endeavoured to be a responsible & conscious corporate citizen. We would also want to engage you - our suppliers - in the efforts to reduce our impact on the environment.

Below are the advisory guidelines on environmental criteria, which we want our suppliers to follow:

1. Emission / Pollution Control (Air, Water, Soil, Noise etc.)

a. The organization and its all operations should follow all laws related to emission / pollution norms.
b. The organization should get all necessary approvals & certifications for emission / pollution control from relevant authorities for plants, equipment, vehicles etc.
c. Monitoring mechanism should be put in place for all emissions / pollution emitted from organization owned assets e.g. Equipment, vehicles etc.
d. Organization should conduct training and awareness programs for the staff on emission / pollution impacts & prevention.

2. Energy

a. Monitoring energy consumption by the organization from all sources should be done.
b. Organization should strive to reduce energy consumption by employing energy efficiency & conservation measures.
c. Use of alternate fuel sources & renewable energy should be promoted by the organization.

3. Water

a. Water consumption from all the sources should be monitored by the organization.
b. Reduction in water consumption should be aimed by treating waste water & alternative use of waste water.
c. Waste water should be treated to remove harmful elements before releasing it to the eco-system.

4. Reducing Resource Intensity

a. Optimization / re-use / recycle techniques should be used to reduce the use of resources.
b. Minimizing use of resources having major environmental impact should be done and substitutes should be found.
c. Proper handling should be done for hazardous resources (chemicals etc.) having impact on humans & eco system.

5. Waste Management

a. Waste segregation based on type of waste (solid, liquid, hazardous, etc.) generated by the organization should be done.
b. Opportunities for recycling & re-use of waste should be identified & promoted by the organization.
c. Hazardous waste should be handled by trained personnel & disposed to authorized agencies only.

6. Risk Mitigation

a. Environmental Risk Assessment should be carried out for all the organization's operations.
b. The severity / extent of damage due to the environmental risk should be estimated.
c. Staff / personnel involved in operations related to environmental risk should be trained and regular awareness programs should be conducted.

The guidelines are indicative of the direction that the suppliers should take to be more environmentally supportive. Suppliers should join hands with BPCL in making a value chain that is environmentally aware and responsible.

Procedure for Vendor Invoice Processing

[ANNEXURE - XXII TO SPECIAL CONDITIONS OF CONTRACT]

Business Process Excellence Centre

To Our Esteemed Suppliers/ Contractors,

BPCL has setup a Business Process Excellence Centre (BPEC) for Vendor Invoice processing.

BPEC will function as a payments factory to receive, digitize and process vendor invoices in a timely and accurate manner. In addition, the centre will receive and account for Bank Guarantees (BGs) & other allied activities like release of retention money/ security deposit etc.

➢ Bill Payments

Effective 1st May 2017, the following original documents will need to be sent to BPEC for release of payments:

i) Original Commercial / Tax invoice
ii) Any Supporting documents for payments e.g. Octroi certificate, freight bills, IRN, test certificate
iii) Copy of the Works Contract Tax (WCT) Exemption Certificate for lower/Nil deduction of WCT (Original must be submitted to Kochi Refinery procurement team for their records)

Please send these documents to the following address for payment processing*:

BUSINESS PROCESS EXCELLENCE CENTRE (BPEC)
4th FLOOR, BPCL OFFICE COMPLEX
PLOT NO. 6 SECTOR – 2
BEHIND CIDCO GARDEN, KHARGHAR
NAVI MUMBAI-410210

**Please note that this does not change the BPCL address that needs to be put on the invoice.*

The following documents should not be sent to BPEC:

- Excise invoice (Duplicate invoice For Transporter- DFT)
- User reference manuals
- Test booklets
- BG against Earnest Money Deposit (EMD) etc.

**These documents should be sent to the procurement location i.e Kochi Refinery*

How to Track Status of Bills sent to Business Process Excellence Centre (BPEC)?

1) For every valid bill received at BPEC, the vendor will be communicated with a unique DPID no. on their registered email ID & mobile no. as per BPCL records
2) Vendors can contact Toll Free No. 1800 224 221 during working days between 9.00 AM to 5.00 PM for any payment/ bill related queries
3) Vendors can write to z_vendorhelpdesk@bharatpetroleum.in for any queries
4) The payment status of your invoices can also be check in Vendor Portal (*https://efp.bpcl.in/*)
5) The payment status of your invoices can also be check in Mobile Application (https://ebiz.bpc.co.in/EbizPortal/)
6) For status of specific invoices, vendor can also use SMS application by sending SMS **"STAT (Space) <DPID>"** to 9223112222 from their registered mobile no.

General Guidelines for Invoices

All invoices should be legible and accompanied with supporting documents required for invoice processing as per the PO. Invoices should be compliant with government requirements on tax invoices and should have the following information:

- PO number, clearly mentioned (45XXXXXXXX)
- Vendor code (Available with your BPCL contract)
- Vendor name
- Vendor address, telephone number, email address and point of contact
- Tax registration number (VAT, Service Tax, Excise etc. as applicable)
- The invoice should be in name of Bharat Petroleum Corporation Limited (BPCL)
- Invoice number
- Invoice date
- Specification of goods and services delivered
- Total gross amount and breakup
- Taxes applicable, with individual tax rates matching with the purchase order
- BPCL Location name and address
- Kindly ensure multiple invoices are not bunched together (stapled) whilst sending the same to BPEC for processing.

**Please note that the above information should be present on the invoice, to ensure that the invoice is processed in a timely manner*.

➢ Release of Security Deposit/ Retention Money

Standard Template for Release of Retention Money & Security Deposit is duly attached herewith which should be used by all vendors/contractors while submitting their release of Retention/Security deposit requests to BPEC.

With respect to the said template vendors are required to note the following point:

1) Only single Purchase Order (45XXXXXXXX) / Contract (46XXXXXXXX) can be provided per request letter (separate requests letters for each Purchase Order/ Contract)
2) **Photo copies of old invoices/bills** to which the retention money pertains **should not be attached** with the request letter
3) Request letter must be duly signed by the vendor or their authorized representative
4) There is no requirement for BPCL officers to sign on the said request letter
5) Request letter must be sent to BPEC only after completion of job (for security deposit) or completion of defect liability period (for retention money)
6) Vendors can also send scan copy of the said letter duly signed to z_vendorhelpdesk@bharatpetroleum.in
7) Vendors will also be receiving emails for tracking of these requests on their registered email ID's

➢ Guidelines for Bank Guarantees and Performance Bank Guarantees

All PBGs and BGs should be accompanied with a cover letter stating one of the following (available with your BPCL contract)

- PO/ Contract number
- RFQ number

In addition, please clearly state the following:

- Vendor number
- Vendor Name, address, email address and phone number
- Vendor point of contact
- BPCL location and address

Further, currently on receipt of these BG's, letters are being sent to issuing Bank for BG Confirmation. On many occasions there are delays or no response from Banks with regards to confirmation of BG's which ultimately leads to delay in release of vendor payments.

Considering the above pain points, BPCL has tied up with SBI for implementation of SFMS (Structured Financial Messaging Service) Bank Guarantee Process and the salient features are as given below:

1) Vendors/ Contractors shall provide BPCL's Bank Account No. & IFSC Code (Details given below) to their existing Bank at the time of application for Bank Guarantee in favor of BPCL
2) Your Bank shall issue the Bank Guarantee & send SFMS message to BPCL Bank confirming the Bank Guarantee as genuine
3) **BPCL's Bank (SBI) shall in turn send the said SFMS message to BPCL's dedicated email ID basis which BPEC shall consider the said Bank Guarantee as verified by Bank**
4) Once the above process is completed, BPEC Team shall proceed with the release of payment to vendors which is due against the said Bank Guarantee.

Name of Bank: State Bank of India
Branch: CAG Branch, Mumbai
Account No: 11083980831
IFSC Code: SBIN0009995

REQUEST FOR RELEASE OF SECURITY DEPOSIT

Date: DD/MM/YYYY

To,

The Allied Process Team
BUSINESS PROCESS EXCELLENCE CENTRE
4th FLOOR, BPCL OFFICE COMPLEX
PLOT NO. 6 SECTOR – 2
BEHIND CIDCO GARDEN, KHARGHAR
NEW MUMBAI-410210

Dear Sir,

Sub: - **Request for Release of Security Deposit**

Request you to kindly release the Security Deposit money held by Bharat Petroleum Corp Ltd as per the details given below:

Purchase Order	**(45XXXXXXXX)**
Contract No (if applicable)	**(46XXXXXXXX)**
Vendor Code	
Vendor Name	
Description of Services / Job Carried	
Security Deposit Amount	

(Only one PO/Contract # per Request letter will be accepted)

Thanking you,

Yours faithfully
For M/s…….

_____

REQUEST FOR RELEASE OF RETENTION MONEY

Date: DD/MM/YYYY

To,

The Allied Process Team
BUSINESS PROCESS EXCELLENCE CENTRE
4th FLOOR, BPCL OFFICE COMPLEX
PLOT NO. 6 SECTOR – 2
BEHIND CIDCO GARDEN, KHARGHAR
NEW MUMBAI-410210

Dear Sir,

Sub: - **Request for Release of Retention Money**

Request you to kindly release the retention money held by Bharat Petroleum Corp Ltd as per details given below

The request to release is based on (Please tick whichever applicable)

- ☐ Retention money is due since defect liability period is complete
- ☐ Performance Bank Guarantee submitted against PO/Contract

Purchase Order	**(45XXXXXXXX)**
Contract No (if applicable)	**(46XXXXXXXX)**
Vendor Code	
Vendor Name	
Description of Services / Job Carried	

(Only one PO/Contract # per Request letter will be accepted)

S. No	Invoice Ref. No.	Invoice Date	Invoice Amount	Performance Bank Guarantee No. (if retention release against submission of PBG)	Retention Amount
1					
2					

Thanking you,

Yours faithfully
For M/s……

ANNEXURE – XXIII
TO
SPECIAL CONDITIONS OF CONTRACT
PROFORMA OF ABG

[PROFORMA OF ADVANCE BANK GUARANTEE]

PROFORMA OF BANK GUARANTEE - FOR ADVANCE
(On non-judicial paper of appropriate value)

To,

Bharat Petroleum Corporation Limited,
BPCL Office Complex
Business Process Excellence Centre (BPEC)
Plot No. – 6, Sector – 2, Behind CIDCO Garden
Kharghar, Navi Mumbai – 410 210

Dear Sir,

In consideration of the Bharat Petroleum Corporation Limited (hereinafter called 'the Company' which expression shall include its successors and assigns) having awarded to M/s. (Name)…..……. (Constitution)…….. (Address)…..……. (hereinafter referred to as "The Vendor" which expression shall wherever the subject or context so permits include its successors, administrators, representatives and assigns) the contract in terms inter alia for …….. (description of supply), on terms and conditions set out, inter alia, in the Company's Contract No…….dated……. as well as the General and Special Conditions of Contract of the Company and valued at <Currency> (in figures)…….. <Currency> (in words)…… only) and the Company having agreed to make an advance payment of ……% (….. percent) of the said value of the Contract to the Contractor against Bank Guarantee to be furnished by the Contractor in terms of clause …….. of the Contract , the said advance to be adjusted against the price of materials supplied in the manner provided for in clause ……. of the Contract .

We, (Name)…….. (Constitution) ……(hereinafter called "the Bank" which expression shall include its successors and assigns) hereby jointly and severally undertake and guarantee to pay to the Company in ……(Currency) forthwith on demand in writing and without protest or demur of any and all moneys any wise payable by the Vendor to the Company to the extent of <Currency> (in figures)…… <Currency> (in words)…….. only) till the said advance is adjusted as aforesaid at any time up to ……

The amount stated by the Company in any demand, claim or notice, as liable to be paid to the Company by the Contractor, with reference to the above mentioned advance payment under the said Contract , shall, as between the Bank and the Company, for the purpose of these presents, be conclusive of the amount payable by the Bank to the Company hereunder, notwithstanding any dispute or disputes has been raised by the Contractor and are pending before any arbitration, Tribunal or Court.

The Bank agrees that the guarantee herein contained shall continue to be enforceable till the sum due to the Company on account of the said advance is adjusted as aforesaid or till the expiry of this guarantee, whichever is earlier.

The Bank further undertakes not to revoke this guarantee during its currency without the previous consent of the Company.

The Bank also agrees that the Company shall be entitled to enforce this guarantee, notwithstanding any other security or guarantee that it may have in relation to the supplier's liability for the said advance.

Notwithstanding anything said above, our liability under this guarantee is restricted to <Currency> …..... (<Currency> …… only). Our guarantee shall remain in force until …… Unless a claim or demand in writing is made against us under this guarantee before the expiry of …… months from the aforesaid date, i.e. before _____ be relieved and discharged from all liabilities thereunder.

This Guarantee shall be treated as an unconditional guarantee and the Contractor shall have no right to object or obstruct in any way the enforcement of this Guarantee.

This guarantee shall be governed and construed in accordance with Indian laws and subject to the exclusive jurisdiction of courts in India.

Dated this …… day of ……..

Yours faithfully,

(Signature)
NAME & DESIGNATION
NAME OF THE BANK
NOTES:

ANNEXURE – XXIV
TO
SPECIAL CONDITIONS OF CONTRACT

[SPECIAL INSTRUCTIONS TO CONTRACTORS]

SPECIAL INSTRUCTIONS TO BIDDERS/CONTRACTORS

APART FROM SCOPE MENTIONED IN THE TENDER DOCUMENT, FOLLOWING ARE ADDITIONAL INSTRUCTIONS TO BIDDER:

"The following requirements are within the Contractor's scope without any additional cost implication. No separate payment shall be made for these items, and the cost shall be considered included in the prices quoted in the Schedule of Rates (SOR) attached with the Tender."

GENERAL:

This tender i.e. Mechanical works of ECU, Tender no. B957-300-16-43-MR-T-**3001** shall comprise Mechanical (Piping & Equipment erection), Insulation, Painting & miscellaneous Civil/ Structural works. ECU plot area is physically divided into two part viz Part A and Part B. Please note as below:

1. Bidders will ***visit site to assess the site conditions*** and familiarize themselves of ***site specific requirements***. During the visit bidder will also familiarize themselves of ***locally available resources*** that may be required for carrying out site works.
2. Bidder will set up ***well equipped, gated, covered and secured pre-fabrication facilities*** and site offices near the vicinity of site works. Watch and ward of these facilities will **be** bidder's responsibility during the entire duration of the works under the scope of this package
3. ***Approx. 5 acres area will be allocated to the*** contractor for setting up of the prefabrication yard and site office. The location of the fabrication yard is within the BPCL Refinery boundary wall . Fabrication yard will be handover to Contractor in "as it is" condition. Contractor to visit site to assess the location before submitting the bid. Further any grading and other ground preparation as well as shed erection for monsoon preparation as required per SOW to be done by Contractor." Contractor's fabrication yard shall be maintained in good condition. Materials shall be stored off ground, protected from waterlogging and environmental damage, with proper care of handed over material. The area required to be developed by the Contractor by their own and regular housekeeping to be maintained. In case contractor fails to do so the necessary housekeeping will be arranged by deploying other agencies at risk and cost of the contractor as well as vacating the area. Non-availability of space inside refinery from BPCL should not be a case for extra claim or time extension. Therefore, the CONTRACTOR shall, within the quoted price, make alternate arrangement to cope with such eventuality.

MONSOON COMBAT /EXTREME WEATHER CONDITION

4. During the Monsoon season, the bidder shall be ***responsible for making their own arrangements to combat monsoon*** to ensure uninterrupted site works. Bidder will make all necessary ***arrangements for keeping the prefabrication yard, working area free of water logging*** and make necessary approach to work site as required.

5. The execution of the work shall entail working in all seasons including extreme winter/summer and monsoon. In so far as necessary, the bidder shall maintain at job site at all times such material, labor, pumps, equipment and machinery as may be required for the performance of the work during all weather condition including monsoon or other rains and shall plan well in advance for the collection of material and equipment and the erection of such tarpaulins, sheds, wind breakers and/or other protection as shall or may be necessary for the work during all weather condition including monsoon or other rains so that the rains or monsoon ***shall not hamper working***. Bidder shall also arrange and bring to job site such special equipment and machinery as may be necessary to enable work during the monsoon, and shall, at his own cost and initiative, arrange at all times for dewatering the job sites so as to keep the construction site and areas to be worked upon, free of water. Bidder shall ensure cool air circulation, humidity control for any work or equipment works
6. Bidder shall familiarize itself with the weather conditions of Bina site across the year. As a precautionary, Bidder to note that ***at least 2 monsoon stretches*** of rainfall are envisaged in the construction duration allocated for the works. ***Detailed plan*** for monsoon combat for ***uninterrupted construction activities during the monsoon period is to be provided.*** Bidder shall Consider atleast 2 peak summer season- cool drinking water supply, sheds with proper ventilation, distribution of ORS for workers and overall sanitation facilities. Bidder to consider mobilization of additional resources suitably considering site weather conditions. No extra time/cost implications shall be entertained in this regard.
7. Bidders shall provide scheme for suitable ***coverage of the work area*** in addition to other covered pre-fabrication yards proposed by them for continuity of works during extreme summer, winters and monsoon and shall implement the schemes for effective mitigation of effects of monsoons including but not limited to preparation of approach roads for vehicular/crane movements, adequate dewatering systems/facilities at no extra cost to the Owner. Monsoon Mitigation Plan for Storage & Execution for insulation works (cover-shed) shall also be provided.

PRE-FABRICATION & TESTING OF MATERIALS

8. Bidder shall have to note the following information to identify the type of prefabrication, sequence of erection.

    a. Site facilities viz. overhead bridges, Movement constraints and restrictions, turning radius, existing Fire water lines etc. in view of any modular construction and its transportation.

    b. Approach roads/routes.

    c. Area for crane placement

    d. Space for storage and site work

9. Adequate covered fabrication, blasting (automatic blasting facilities), painting and storage facilities(hazardous waste disposal of painting materials) shall be

developed by the contractor in allotted fabrication yard for facilitating uninterrupted piping fabrication works. For this purpose, as a minimum, covered sheds as defined elsewhere in the bid, shall be developed by the contractor as mentioned in this document.

10. Testing of material (e.g. consumables) procured by bidder may be required in authorized laboratories(NABL accredited lab) during the course of execution of works and this will be bidder's responsibility without any time and cost implication to the owner.
11. Bidder shall ensure Comprehensive Piping Spools management for AG system / program during the entire execution of site work. Bidder shall use system/program for material and inventory management, weld mapping, revision management, activity level stage wise control with documentation at all level of fabrication and erection and related commercial billing. Advance technique like RFID for spooling & Bar code system must be used for identification of materials to ensure automation as per specification and access to the systems shall be available to BPCL / EIL on real time basis Necessary MIS/reports related to above shall be periodically uploaded in Digital platforms of owner (DigiBPREP platform).

12. The bidder shall ensure deployment of their personnel at Spool's manufacturer(s) works as per tender's conditions to have better coordination with them to facilitate receipt of right Spools in accordance with site readiness.

STATUTORY APPROVALS

13. Bidder will ensure ***all local approvals*** for smooth and uninterrupted execution of site work. Bidder shall also ensure proper coordination, liasoning, complying and obtaining approvals as required from statutory/government bodies like GBI/IBR, factory inspector (DISH), labour law compliance authorities, CEA etc and any other required to complete works as per scope in all manner.

SITE COORDINATION & MANAGEMENT

14. The QA plans for execution shall be developed by the Contractor and submitted for Owner/PMC's approval well before start of the work.
15. ***Multiple agencies*** are expected to work concurrently at site; bidder will ensure ***necessary coordination*** with these agencies and ensure smooth construction/ site activities. Interface management plan shall be submitted to the owner / EIL. It is the responsibility of the bidder to plan execution in coordination with the other agencies working on the plot. No time/cost implication shall be applicable in this regard.
16. ***Competent sub-agencies may be engaged by the bidder*** with prior approval of owner for carrying out site works. Augmentation of manpower as required will be bidder's responsibility.
17. Bidder to note that ***construction management*** shall be done directly by him and shall not be subcontracted to any other agency.
18. ***Skilled manpower required for carrying out site activities*** will be identified by the bidder and month-wise Resource ***deployment plan(Manpower-***

tradewise/Equipment/Machineries/Tools etc.)will be submitted to the owner post award. Bidder will ensure that the skilled manpower meets all qualification criteria required for performing site works. Bidders shall furnish the trade validation check lists, internal procedure & on-site trade validation plan to owner / EIL for review. All required qualifications tests etc. will be at bidder's cost. Overall Execution plan, crane mobilization plan, manpower deployment plan and zonewise construction management plan shall be submitted at bidding stage and detailed plan during execution stage. Further:

a. Bidder to familiarize himself with BPCL material movement and manpower entry/exit procedures including online software platforms. Bidder is requested to consider approximate time taken to prepare gate passes for manpower is 5 days from the date of submission of all required documents. (Safety training, Medical checkup, ESIC/PF etc). Bidder to mobilize resources considering above suitably.
b. Qualified maintenance team shall also be deployed during Pre-commissioning/Commissioning for any maintenance activity on rotating equipment, if required.
c. Contractor shall execute mechanical works on a 24×7 basis. Resource planning and deployment shall be managed by contractor to meet this requirement.
d. Contractor shall prepare and submit a zone-wise weekly execution schedule covering all activities for review and approval.
e. Build Clean concept to be implemented for all equipment.
f. Paramedic staff to be maintained by Contractor for welfare of manpower deployed.

19. ***Latest construction techniques*** will be ***utilized in performing site activities*** with an ***overall objective to maximize production in minimum time*** without compromising on quality. This shall be bidder's exclusive responsibility without any time and cost implication to the owner.

PROGRESS REVIEWS

20. ***Weekly / monthly review meeting*** will be held with successful bidders and in case any ***Contractor lag behind in progress of work,*** Owner reserves the right to engage other agencies to augment site manpower for ensuring smooth and uninterrupted site work at bidders risk and cost. Bidder will ***ensure strong and competent planning and scheduling personnel*** as part of his site management team. All progress review meetings shall be conducted in coordination with DigiBPREP platform. Bidder to ensure timely submission of data/inputs on the platform as per the procedure.

ERECTION OF HEAVY LIFT / TALL EQUIPMENTS/ PIPING/MISC. STRUCTURE

21. Mobilization of required capacity Crane for handling / installation of skid, Structural steel, module, etc. including supply of Operator, Rigging Gang, skilled manpower, tools and tackles and thus make the cranes ready for use is in the Bidder's scope. Erection shall be performed by the bidder in coordination with the BPCL/EIL. ***Bidder to provide mast climbers & tower cranes in strategic locations & has to mark it on plot plan for BPCL review & approval.*** Construction/temporary lifts to be provided at multiple locations wherever high volume of work at height job is involved.

22. The prime responsibility with respect to erection scheme & arrangements and complete erection lies with the bidder who would have substantial presence at site and shall be in a position to manage all aspects of the erection. For critical lifts above 50 MT, contractor shall prepare lift animations with binder and provide detailed briefings to BPCL/EIL and workmen.

    All equipments (Columns/Vessels/Dryers/Reactors etc) shall be erected in fully dressed up condition to minimize/avoid working at height. Bidder to consider this time taken to dress up the equipment in their erection methodology and plan accordingly.

23. Bidder shall be responsible for preparation of Erection Scheme for modules incorporating the site, schedule and situation specific requirements & shall furnish the same to Owner/Consultant along with offer and same shall be subject toreview/approval by owner/ Consultant.
24. Bidder shall be responsible for ***sequencing the erection*** activities with respect to modular structures/ skid/piping and other works, cordoning-off the areas under riskprior to erection.
25. Bidder shall also be responsible for Making the foundation/Structure for erection including chipping/ hacking concrete surfaces of foundation, arranging shims, packing plates, etc., arranging all tools & tackles for aligning the equipment including Auto levels, Theodolites, laser plumbs, hydraulic jacks, stools etc.,arranging manual/ power wrenches, torque tensioners etc. as required.
26. Bidder shall be responsible for arranging and erecting scaffolding, ladders, walkways, planks/boards for working platforms, safety nets, hand railing etc. as required for ensuring smooth and safe equipment erection operation. Hanging scaffolding with A/G and U/G segregator shall be provided at the pipe racks(Full deck) wherever work in UG/Grade are in progress and also above grade activities are in progress. A special design for scaffolding required above 9 Mtr. Jallies not permitted .Contractor to use steel boards.

    Prior to commencement of work, successful bidder has to submit the proposed agencies list for owner/consultant review & approval. Approved scaffolding agency should have adequate experience and approval for the same should be by engineering –in-charge prior to engagement. Bidder to ensure availability of one scaffolding supervisor in every 3 gangs & one scaffolding inspector in every 6 gangs, scaffolding supervisors & inspectors must have certification from approved training institutes & submitted to owner/consultant for validation. Financial Penalty per day shall be imposed in case of non availability/deployment of scaffolding inspectors and use of non certified scaffoldings.

    a. Bidder shall provide lifting beams, spreader beams for equipment erection within the quoted rates.

    b. Test loads for load testing of cranes shall be arranged by the bidder.

    c. Vendor supervision if extended for the reason solely attributed to bidder then the charges towards such overstay shall be recovered from the bidder.

d. Bidder shall also be responsible for removal and reinstallation of all temporary scaffolding, ladders, walkways, planks/boards for working platforms, safety nets, hand railing, Hanging scaffolding etc. installed for facilitating any erection.

27. Bidder shall be responsible for, installing circular platforms, ladders, landing etc., installation of sliding plates/base plates etc. both in horizontal & vertical condition. Bidder to note that Caps/End Blinds for all line sizes for hydro test purpose to bearranged. Sizes shall be as per piping SOR for hydro testing of lines.
28. Bidder shall be responsible for following activities during erection:

- Providing skilled & un-skilled manpower.
- Bolting/tightening and securing the equipment / skid during and upon placement on the foundation including inserting extra shims/pack-plates/jacks etc. if required.
- Bringing the structure/Tack structure to correct alignment with respect to all three axes including blue-matching if required.
- Grouting the equipment base with foundation.
- Preparation of relevant reports and obtaining endorsements as required by Owner/Consultant.
- Bidder to note that specialized agencies with suitable PTR be deployed for bolt tensioning, rotomol cleaning, hydrojetting, chemical cleaning, alkali boil out.

29. Initial Constructability study shall be conducted by the successful bidders within 30 days of awarding the contract & should cover the following minimum mentioned topics:

- Traffic Management.
- Identification of erection holds.
- Identification of dismantling of structure for erection.
- Identification of critical lifts (equipment's, pipingand packages including tandem lifts, skidding).
- Temporary facilities plan (Lay down, office layout, ware house, labor accommodation & transportation).
- Heavy crane movement plan including preparation of roads, approach or hardstands
- Subcontracting plan.
- Construction power & construction water.
- Storage & preservation.
- Statutory approval.
- Waste management plan.
- Dress-up plans.
- Item description should cover protection of U/G facilities, making good the damages as per approved repair procedure, design calculation for stools, arrangement of adequate no. of wooden sleepers, steel mats.
- Bidder to study/assess the equipment layout and indicate resource mobilization according to the requirements to carry out work as per various elevations across the plot.

  Final Constructibility study shall be presented, within 3 months of award of contract.

30. Insulation material for columns/vessels/reactors/dryers etc to be erected in dressed up condition shall have to be arranged prior to availability of equipments. Structural platform & ladder/piping shall be erected along with equipment.
31. Piping down comers along with support shall have to be fabricated and keep ready within prior to availability of equipments coming for this work.
32. Tray/ duct coming on already erected structure be procured immediately & made available at site within three month of award of job.
33. Bidder to note all fabrication of piping spool and support shall be done outside the premises of the plant to minimize site erections work such that the modular / bolted erections can be achieved. Except local welding where ever required. Proper traceability during Spooling and fabrication of piping to be maintained by RFID/BAR Code.

Extent of Pipe spooling shall be finalized considering following guide line

a) Rack Piping: Straight Pipe Pieces to be pre-assembled to length of about 25 M and then stringing shall be done at Site along the Rack, to minimize welding at heights.
b) All Expansion Loops to be Spooled, keeping in view erection feasibility of the expansion loops.
c) Pipe spooling shall be ensured to the extent of 70% (of Total Weld) in case of Piping in Restricted Place/Tech Structure.

34. Movable/Biodegraded toilets adequate number (01 number of toilet for 25 Nos. workers) shall have to install at site. All the toilets have to be periodically maintained and shall be mobilized on site as per man power plan.
35. Bidder has to mobilize adequate no of supervisors/Engineers. Penalty shall be imposed for non-mobilization of the supervisors/Engineer and other personnel as per document no. 7-82-0003 rev 2.
36. Bidder to provide CV of head of each function with an alternate CV. All key personnel (Construction manager, HSE Manager, Quality Manager, Project control manager, heavy lift superintendent, rotary equipment superintendent& material controller) nominees along with one alternate resume to be provided immediately on and when asked or during KOM. PMC may interview the key personnel during & accepted personnel shall be deployed. Detailed organization chart should be submitted by the bidder in his technical bid.
37. L2 schedule shall be provided with the bid. L3 Schedule to be provided post award within a month. Kick off Meeting at site be conducted within two weeks of award of LOA/PO.
38. Contractor to have suitable procedure for waste insulation material disposal as per Central/State Pollution Control board Norms. Bidder to dispose of debris generated out of execution as per norms of local municipality/panchayat outside premises at his own cost.
39. Bidder to note that adequate covered area is to be prepared. Minimum covered area required is as follows.

- Painting covered area offsite 10 MTR x 20 MTR within a month of mobilization – 02 nos. minimum.
- For piping work covered and other works of size 100 MTR X24 MTR within 3 months award of jobs- 02 nos. minimum.
- Gantry crane yard with capacity of 20 MT with a span of 15 MTR. for open yard.

40. Bidder to note that color coding & material traceability for spools to be finalized with consultation with RCM at site. Bidder to share the schema which shall be followed along with the BID
41. Bidder to note that bar and color coding for piping material to be followed.
42. Bidder to establish Warehouse in complex for storage of material after receipt from warehouse.
43. Bidder to arrange necessary arrangement for automatic blasting.
44. For sprinkler system, caps/plugs to be supplied for testing purpose.
45. Minimum two subcontractors to be mobilized for Insulation, Painting for each to safeguard against risk of relying on just one party
46. Bidder to note that Mechanical completion definition has been specified in the contract. Also Bidder to note that SOR items for Mechanical completion and pre commissioning/ commissioning has been specified in scope of work.
47. Bidder to arrange Boroscope for inspection for Stretch of inlet piping of critical equipments. Especially Exchangers, Compressor, Compressor suction piping/critical piping and other High Energy Intensive Rotating Equipment).
48. Bidder to arrange Automatic & semi automatic machines for Cutting/Beveling& welding.
49. As Mobile Phones are restricted inside the Premises, Contractor to have provision for Walkies or similar communication systems.
50. Bidder to arrange Double Decker Site offices (due to space constraints).
51. Bidder to arrange adequate diesel dewatering pumps for hydro-test Draining and Monsoon Mitigation.
52. Bidder to arrange Rotomol cleaning/Hydro jetting for critical pipe flushing.
53. Specialized agency for Torquing & Tensioning and Catalyst loading shall be mobilized. Formatted Record shall be generated against box-up of each Flanged Joint included in the Composite Contract
54. Bidder to arrange AUT(Automated Ultrasonic testing) for pipe welding inspection.
55. CPM / PERT – Bidder to submit a detailed schedule in network form, identifying critical path.
56. Mechanized Spooling Work up to 32”NB: Contractor shall carry out Mechanized Spooling Work for pipe size up to 32”NB at its, or its Sub-Contractor’s, Workshop.

    Semi-Mechanized Spooling Work above 32”NB: Contractor shall carry out Semi-Mechanized Spooling Work for pipe size above 32”NB at its Fabrication Shop/Yard put up at Site.

Piping spools shall be erected at Site only after all reports are reviewed and verified as mentioned in contract. All piping spools are to be erected after checking internal cleaning. Build Clean concept to be implemented for all equipment/piping/spools.

57. Pipe Spooling in Mechanized Set-Up:

    This category of Pipe Spooling shall mean manufacturing of pipe spools in controlled environment, by employing mechanized spool-fabrication assembly line(s) (automated tools & machines for forming, cutting, squaring, edge-preparing, welding, etc.) and synchronized material handling facilities, in order to deliver fabricated pipe spools with highest productivity and with least quality concerns.

58. Bidder to ensure that at any point of work execution if individual SOR quantity is exceeding ,the same is to be intimated to EIL&BPCL within 10 days of receipt of drawings and prior Approval is obtained before undertaking any such work. Moreover, excess- saving statement to be prepared every quarterly after six months of award of job. Payment will be made by the OWNER against Running Account (RA) Bills certified by the EIC/Site-in-Charge within 30 days from the date of receipt of complete and correct R.A. Bill with supporting documents from the Contractor by Engineer-in-Charge.
59. Flare header & other lines requiring pneumatic testing of size 24" NB & above, flushing shall be carried out prior to pneumatic testing and clearance shall be taken from operation group and then contractor shall proceed for pneumatic testing and box up. After pneumatic testing and box up, it shall be preserved so that no further cleaning is required at a later date.
60. Pre commissioning & commissioning activity shall be commenced even prior to the Mechanical clearance of entire unit. All activities related to this must get completed within time period.
61. During Pre -commissioning/Commissioning number of activities like fabrication, erection, testing, tubing, loop checking, valve dismantling, re-election, structural modification, equipment dismantling/re-erection etc. which were not part of mechanical clearance and reasons are nor attributable to contractor may have to be carried out but the rates for the same is available in SOR, The same shall be utilize for carrying out the activity during Pre-commissioning/Commissioning.
62. After respective mechanical completion & Pre commissioning/commissioning contractor has to demobilize the resources, temporary structure etc.and clear the work site within 15 days. In case the same is not demobilized in specified timeframe, same shall be done and shall be back charged to the contractor.
63. Safety related SOR has been included in the Tender. Contractor to specifically note the same.
64. Bidder to provide facilities for critical valve testing. Contractor shall provide small facility for valve testing and repair.
65. Bidder to Use pre insulated tubes as mentioned in scope of work.
66. Bidder to construct sufficient no of underground pits for storing radiography source/camera systems as per guidelines issued by BARC in his allocated area.
67. **Penalty:**

    The Contractor shall adhere consistently to all provisions of HSE requirements as per specification no. **6-82-0001 Rev.2**. In case of non compliances and also for repeated failure in implementation of any of the HSE provisions,
    EIL/Owner may impose stoppage of work without any cost & time implication to the Owner and/or impose a suitable penalty as per above specification.

68. Contractor to identify /study the system to be cleaned for rotomol/manual cleaning or hydro jetting and advise on any extra opening or drains of appropriate size after study in consultation with EIC and their sub agencies within three month of award of job.
69. Residual Insulation, Painting, Scaffolding Removal, etc., which are usually kept/allowed in Pre-Commissioning Period, should all be completed prior to declaring Mechanical Completion.

70. Bidder shall work on priority areas identified by EIL / Owner on regular basis.

71. Facilities to be setup by Contractor

a) Bidder to establish warehouse in allocated area for storage of materials after receipt from EIL/BPCL warehouse.
b) Warehouse to have physically segregated Zones corresponding to Units zones, especially for piping items
c) Material receipt and material issue vouchers to have specific zone mentioned
d) Contractor shall provide and operate a small mechanical workshop with minimum one lathe, one drilling machine and necessary lapping arrangement for seal faces, PSV discs and nozzles throughout contract duration.

Prefabrication & Testing of material

a) Piping spool management software - Contractor shall provide one license each to EIL & BPCL of the software / program.

72. Site coordination and management-

Piping - Bidder / Contractor to provide piping area wise following with schedule

- Work quantum of piping (ID)
- Associated NDT
- Material requirement / availability
- Free issue items
- Drawing issuance plan
- Work front release plan.

Contractor will have to prepare area wise work packages including following on a daily basis (DPR):

- Resources deployment plan – Supervisors, skilled man-power like welder, fitter, grinder, rigger etc.
- Work front availability matrix (Drawings Vis-a Vis material)
- Area wise responsible Safety supervisor / Job Safety Analysis

Contractor to provide equipment wise work load (specially welding ID, structural erection MT) and construction plan. Contractor to provide resource deployment plan for erection and associated works after award of work.

Contractor to provide warehouse management data dumps to EIL / BPCL on receipt &utilization of materials on weekly basis, to enable control/ tracking of material post issuance to contractor up to erection/ installation.

Contractor / Bidder to provide quality assurance plan with assessed quantum.

73. All contractor supplied material shall be inspected by BPCL approved TPI.
74. No LET - OUT of cranes under the scope of a particular contract is allowed at site. However, in the interest of job, if let- out from one agency to other agency is need of the time, it shall be only after due permission from BPCL and EIL. However, commercial benefits in this regard be passed on to BPCL by contractor/ agency.
75. PPE quality should be of good quality.

76. Successful Bidder to furnish detailed manpower mobilization (direct and indirect) and detailed equipments and machinery deployment (month wise) after award of job.
77. Machinery, welding machines, Crane, EOT, etc which are required shall be fit to use and shall be assessed and verified prior to usage.
78. Contractor to setup workshop or tie up with external agency for repairs of machines, motors etc and also ensure minimum surplus (quantity to be mentioned in bid) of certain items for maintaining productivity. Contractor shall prepare daily log book for the availability of resource and back-up plan for its mitigation.
79. Soft Ware:-

- Composite Contractor to use Software for Material Management till System handover.
- Composite Contractor to have own;
  - Data Centre Facility
  - Server Application
  - Connectivity-Client Software to access Data Centre.
  - Own Lease Line for resource connectivity from Contractor Data Centre to client & Specific URL to be provided (Global Public URL) to provide client access as & when required.

80. Work Permit

Issue of work permit will be as below:

a) Within the construction area segregated from operational area where work is to be executed for project completion, contractors & Consultant shall follow approved permit system finalized & agreed with BPCL. Consultant shall directly issue the work permits to contractors.

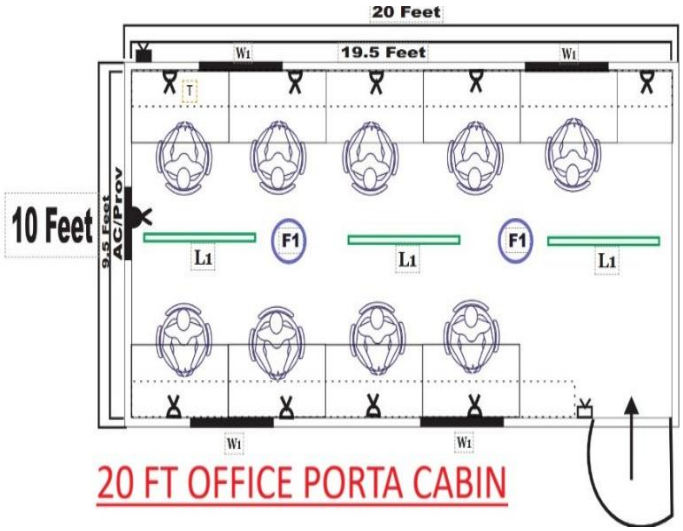
b) Work permit system for all hook up / tie up jobs and within operational area shall be as per enforced work permit system of BPCL Bina Refinery. Within operational area work permits shall be issued by Bina Refinery to respective contractors which have to be signed by consultant also.

The EIL site team, in coordination with BPCL, shall prepare and finalize the modality of the Work Permit System for the non-operational area. Same to be followed by contractor during execution.

81. REQUIREMENTS TO BE ADHERED BY CONTRACTOR AT SITE FOR EXECUTION OF WORKS

1. 4 nos of 20 feet Porta Cabin with Amenities (Table/Chairs/Acs) to be provided at site for EIL/Client use (Standard layout attached for reference). Refer sketch below for porta cabin.
2. Provision and execution of temporary lifts required for mechanical works will be kept.
3. Contractor shall fabricate/procure hoses for all pre-commissioning, commissioning, and LO flushing activities as instructed by EIC.
4. Certified scaffolding inspectors (min 4 numbers) shall be deployed. Scaffolding materials shall be certified and zone-wise scaffolding teams segregated for better control.

5. For material issued to contractor: Contractor's scope shall include pickup of issued materials from BPCL/EIL stores within plant premises as instructed by EIC, without any cost or time implications.
6. DigiBPREP platform shall be mandated for all project reporting, submittals, inspections, NCRs, punch lists, progress updates and documentation as required by BPCL.
7. All contractor personnel shall possess VKBR medical certification in accordance with prevailing BPCL guidelines and maintain validity throughout execution.



Symbol	Qountity.	Size	Description.
D1	1	3'x6.5'	Main Entry Door
W1	4	3'x3'	Sliding Glass Window
L1	3	4'	LED Lights
F1	2	-	Wall mounted Fans
	1	6 Modular Plate	Main board for Tube Lite, Fan & Blockhead Switches
	9	6 Modular plate	2Nos. 5Amp Switch and Socket
	1	2 Way box	32 Amp MCB
	2	3 Modular Plate	2 Nos. 15 Amp Switch & Socket

BIDDING DOCUMENT

FOR

MECHANICAL WORKS FOR ETHYLENE CRACKER UNIT(ECU)

(BIDDING DOCUMENT NO.: JP/B957-300-MR-T-3001/1030)

PROJECT: BINA PETCHEM AND REFINERY EXPANSION PROJECT(BPREP) OF M/S BHARAT PETROLEUM CORPORATION LIMITED (BPCL)

PART-II OF III : PRICED PART

इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

ENGINEERS INDIA LIMITED
(A Govt. of India Undertaking)

Name of Work : MECHANICAL WORKS FOR ETHYLENE CRACKER UNIT(ECU)

Bidding Document No.: JP/B957-300-MR-T-3001/1030

SCHEDULE OF RATES

Name of Work : MECHANICAL WORKS FOR ETHYLENE CRACKER UNIT(ECU)

Bidding Document No.: JP/B957-300-MR-T-3001/1030

PREAMBLE TO SCHEDULE OF RATES

1.0 The Schedule of Rates shall be read in conjunction with all other sections of this Bidding Document.

2.0 The Contractor is deemed to have studied the drawings, specifications and details of works to be done within the Time Schedule and should have acquainted himself of the conditions prevailing at site.

3.0 The quantities shown against the various items are only approximate and may vary to any extent individually subject to conditions given in General Terms & Conditions of Contract/Special Conditions of Contract.

4.0 No claim shall be entertained during currency of this Contract towards any items due to the above including where the CONTRACTOR has quoted low/ high rates.

5.0 EIL/OWNER reserves the right to interpolate or extrapolate the rates for any new item of work not covered in Schedule of Rates from the similar items already available in schedule of rates. In case any activity though specifically not covered in schedule of rates descriptions but the same is covered under scope of work/ scope of supply/ specification/ drawings etc. no extra claim on this account shall be entertained, since Schedule of Rates is to be read in conjunction with all other documents forming part of the Contract.

6.0 All items of work mentioned in the Schedule of Rates shall be carried out as per the specifications, drawings and instructions of EIL/ OWNER and the rates are deemed to be inclusive of material, consumable, labour, supervision, tools & tackles and detailing of construction/fabrication drawings, isometric wherever required as called for in the detail specification and conditions of the Contract.

7.0 Bidder shall furnish this Form duly filled in all respects along with his price part.

8.0 The quoted prices/rates shall be deemed to be inclusive of all taxes and duties except “Goods and Services Tax” (GST) as per Provisions of taxes & duties specified in SCC.

9.0 Any errors of interpretation of applicability of taxes/duties by bidders shall be to their account.

10.0 Employer/Consultant reserves the right to cancel/ delete/ curtail any item or group of work if necessary. Such a step shall not be construed as reason for changing the rates.

11.0 Bidders shall quote their prices as percentage (increase(+)i.e. Above/decrease(-) i.e. Below/ Par) variation in Price Schedule format **Form SP-0** on Total estimated value in **BoQ1** Sheet of Price Schedule respectively for **Part-A and/or Part-B**. This percentage variation as quoted by the bidder will apply uniformly to all items of SOR during execution for the respective parts.

12.0 Bidder shall indicate only the Increase/Decrease/Par on Total estimated(**in Col.7**) value in terms of percentage (**in Col.9**) upto 2 decimal places in the “SUMMARY OF PRICES [SP-0]" i.e., Sheet BoQ1. Bidder shall not change the Pre-filled rate/ amount indicated in ‘Schedule of Rates’ [Refer FORM-SP-1].

Name of authorized person submitting the tender on behalf of the Bidder (s):	
Designation of authorized person:	
Name of firm / Contractor:	
Address of firm / Contractor:	
Date:	

(SIGNATURE & STAMP OF BIDDER)

Name of Work : MECHANICAL WORKS FOR ETHYLENE CRACKER UNIT(ECU)

Bidding Document No.: JP/B957-300-MR-T-3001/1030

FORM SP-0

Validate Print Help

Item Wise BoQ (Form Based)

Tender Inviting Authority: EIL on Behalf of BPCL

Name of Work: MECHANICAL WORKS FOR ETHYLENE CRACKER UNIT(ECU) OF BINA PETCHEM AND REFINERY EXPANSION PROJECT(BPREP) OF M/S BHARAT PETROLEUM CORPORATION LIMITED (BPCL)

Contract No: JP/B957-300-MR-T-3001/1030

Name of the Bidder/ Bidding Firm / Company :	

SUMMARY OF PRICE [FORM SP-0] FOR PART-A & PART-B

Note :

1. This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only.
2. If percentage is not quoted in Col. 9 of Form SP-0, it shall be considered "NIL" for price evaluation/award.
3. Bidder to select appropriate percentage option from "Percentage Option [Excess (+), Less (-)]"
4. Bidder's quoted prices in this FORM SP-0 shall be loaded with GST@18% during evaluation.

NUMBER #	TEXT #	TEXT #	NUMBER	TEXT #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Units	Estimated Rate in INR.	Percentage Option (Above/ Below/ At Par) (to be selected by Bidder)	Percentage Rate to be entered by the Bidder in (P %)	TOTAL AMOUNT inclusive of all taxes and duties excluding GST in INR.	TOTAL AMOUNT In Words
1	2	5	6	7	9	11	13
1	**MECHANICAL WORKS FOR ETHYLENE CRACKER UNIT(ECU)**						
1.01	**ECU Part-A :** (For Details Refer Form SP-1)	Total Estimated Value	**5894395044.00**	Select		**0.00**	INR Zero Only
1.02	**ECU Part-B :** (For Details Refer Form SP-1)	Total Estimated Value	**4660594779.00**	Select		**0.00**	INR Zero Only

Name of Work: **MECHANICAL WORKS FOR ETHYLENE CRACKER UNIT(ECU)**
Bidding Document No.: **JP/B957-300-MR-T-3001/1030**

FORM SP-1
PRE-FILLED SCHEDULE OF RATES

[All rates / Amount in Indian Rupees (INR)]

SCHEDULE OF RATES

JOB NO	B957
TENDER TITLE	Mechanical Worksfor ECU
CLIENT	BPCL
PROJECT	Overall Project Management as MPMC and PMC/EPCM Services for Ethylene Cracker Unit and U&O for BPREP

While quoting and filling the rate in this Schedule of Rates, Bidder shall take into consideration complete scope of work for the relevant item, provided in the Bidding Document. The rate quoted in Schedule of Rates shall be deemed to include all activities of work mentioned in item description of Schedule of Rates .
Bidders are requested to fill in the RATE column only

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1	A	B957-300-06-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01CT	CATHODIC PROTECTION				
2	A	B957-300-06-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01CT.MI2	Cathodic Protection System for Plant:				
3	A	B957-300-06-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01CT.MI2.1	Survey, Design, Detail Engineering, Supply, installation, testing, commissioning, etc of the cathodic protection system for the buried vessels and exchangers. All work shall be carried out conforming to the scope of work, design basis, data sheets, specifications, standards, drawings, etc as per the provisions of GCC, SCC and specification no: B957-300-06-45-CPS-3001, Rev. 0.	1	Lumpsum	82 15 920	82 15 920
4	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10000000000	PIPING-UNITS				
5	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10100000000	FABRICATION OF PIPING SPECIALS FROM PIPES (SUPPLIED BY OWNER) :- Fabrication of the following specials from pipes of all types & thicknesses including transportation of materials from Owner's storage points to work site/workshop, cutting, fitup, edge preparing, welding, bending, testing (Including DP/MP) & inspection as per specs etc. supply of all necessary equipment, consumables, labour, supervision etc. The work shall be carried out as per the specificatons, drawings and instructions of Engineer-in-Charge.Note: Sizes mentioned under the heading of Reducers (Conc. / Ecc.) are for large end.				
6	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10101000000	C.S MITRE BENDS-90; THK. <= 10MM				
7	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10101001600	NB 8.000 INCHES	1	Nos	12 340	12 340
8	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10101001700	NB 10.000 INCHES	1	Nos	15 420	15 420
9	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10101001800	NB 12.000 INCHES	1	Nos	18 510	18 510
10	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10101002000	NB 16.000 INCHES	1	Nos	24 680	24 680
11	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10101002200	NB 20.000 INCHES	1	Nos	34 060	34 060
12	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10101002400	NB 24.000 INCHES	1	Nos	40 880	40 880
13	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10102000000	C.S MITRE BENDS-90; THK. > 10MM AND <= 20MM				
14	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10102002500	NB 26.000 INCHES	1	Nos	52 920	52 920

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
15	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10102002700	NB 30.000 INCHES	1	Nos	61 060	61 060
16	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10102003000	NB 36.000 INCHES	1	Nos	73 270	73 270
17	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10102003200	NB 40.000 INCHES	1	Nos	81 410	81 410
18	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10102003400	NB 44.000 INCHES	1	Nos	98 980	98 980
19	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10102003600	NB 48.000 INCHES	1	Nos	1 07 970	1 07 970
20	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10102003900	NB 54.000 INCHES	1	Nos	1 21 470	1 21 470
21	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10102004200	NB 60.000 INCHES	1	Nos	1 34 970	1 34 970
22	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104000000	C.S MITRE BENDS-45; THK. <= 10MM				
23	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104001600	NB 8.000 INCHES	1	Nos	8 650	8 650
24	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104001700	NB 10.000 INCHES	1	Nos	10 820	10 820
25	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104001800	NB 12.000 INCHES	1	Nos	12 980	12 980
26	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104002000	NB 16.000 INCHES	1	Nos	17 320	17 320
27	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104002200	NB 20.000 INCHES	1	Nos	23 780	23 780
28	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104002400	NB 24.000 INCHES	1	Nos	28 540	28 540
29	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104002700	NB 30.000 INCHES	1	Nos	35 670	35 670
30	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104002800	NB 32.000 INCHES	1	Nos	38 050	38 050
31	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104003000	NB 36.000 INCHES	1	Nos	42 810	42 810
32	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104003200	NB 40.000 INCHES	1	Nos	47 560	47 560
33	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104003400	NB 44.000 INCHES	1	Nos	52 320	52 320
34	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10104003600	NB 48.000 INCHES	1	Nos	57 080	57 080
35	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10105000000	C.S MITRE BENDS-45; THK. > 10MM AND <= 20MM				
36	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10105003900	NB 54.000 INCHES	1	Nos	84 460	84 460
37	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10105004200	NB 60.000 INCHES	1	Nos	93 840	93 840
38	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10107000000	C.S CONC. REDUCERS; THK. <= 10MM				
39	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10107001500	NB 6.000 INCHES	1	Nos	10 160	10 160
40	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10107001600	NB 8.000 INCHES	1	Nos	13 540	13 540
41	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10107001700	NB 10.000 INCHES	1	Nos	16 920	16 920
42	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10107001800	NB 12.000 INCHES	1	Nos	20 310	20 310
43	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10107001900	NB 14.000 INCHES	1	Nos	23 690	23 690
44	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10107002000	NB 16.000 INCHES	1	Nos	27 080	27 080

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
45	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10110000000	C.S ECC. REDUCERS; THK. <= 10MM				
46	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10110001500	NB 6.000 INCHES	1	Nos	10 990	10 990
47	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10110001600	NB 8.000 INCHES	1	Nos	14 650	14 650
48	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10110001700	NB 10.000 INCHES	1	Nos	18 310	18 310
49	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10110001800	NB 12.000 INCHES	1	Nos	21 990	21 990
50	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10110001900	NB 14.000 INCHES	1	Nos	25 650	25 650
51	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10110002000	NB 16.000 INCHES	1	Nos	29 310	29 310
52	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10110002100	NB 18.000 INCHES	1	Nos	32 970	32 970
53	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10110002200	NB 20.000 INCHES	1	Nos	40 280	40 280
54	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10111000000	C.S ECC. REDUCERS; THK. > 10MM AND <= 20MM				
55	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10111002400	NB 24.000 INCHES	1	Nos	58 100	58 100
56	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10111002800	NB 32.000 INCHES	1	Nos	77 470	77 470
57	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10111003000	NB 36.000 INCHES	1	Nos	87 150	87 150
58	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10111003300	NB 42.000 INCHES	1	Nos	1 12 030	1 12 030
59	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10111003400	NB 44.000 INCHES	1	Nos	1 17 360	1 17 360
60	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10111003600	NB 48.000 INCHES	1	Nos	1 28 030	1 28 030
61	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10111003900	NB 54.000 INCHES	1	Nos	1 44 030	1 44 030
62	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10111004200	NB 60.000 INCHES	1	Nos	1 60 040	1 60 040

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
63	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10900000000	PIPING (ABOVE GROUND) :-Transportation of all piping items from Owners storage point to work site/work shop; fabrication including cutting, edge preparation, (inclusive of grinding the edges of pipe, pipe spools, fittings, flanges etc. to match with the mating edges of uneven/different thickness wherever required); fit-up, bending, preheating wherever required, welding, threading, and laying of pipes and pipe spools(spools along with supports) of all types and thickness including full and partial jacketing according to attached Specification for Jacketed Piping over sleepers, overhead on racks and at all elevations, hook-ups with existing piping, connecting with equipment nozzles, strainers, steam traps, static mixers, sight flow indicators, thermal sleeve, orifice assemblies, spray nozzles, rotameters, tappings for pressure gauges, thermowells, sample connections, sample coolers, closed sample system cabinets etc. and fixing of gaskets, bolts, nuts including application of torque wherever required and all other inline instruments and fittings, like elbows, reducers, tees, flanges, spectacle blinds and spacer and blinds, piping specials such as mitres and fabricated fittings, vents, drains(but excluding reinforcing pads),SW valves upto 1.5 NB Steam Supply/Condensate Recovery stations(Cast/Fabricated),Supply and welding of Strip as per EIL Std 7-51-0112 to all pipes before hydro-testing at exit points of Units for earthing purpose, Steam Tracing as per 6-44-0007; alignment, cleaning and flushing by water/compressed air, hydrostatic, pneumatic, vacuum, spark testing and any other type of testing as specified draining, drying by compressed air, performing Positive Material Identification (PMI) using alloy analysers, completing all such works in all respects (including preparation of isometrics as mentioned in the Scope of Work for the job) as per the specifications, drawings and instructions of Engineer-in-Charge. PMI shall be performed by third party as defined in PMI spec. Rates for tubing (if any) shall include rates for valves, fittings, all in line instruments and testing etc. Carbon steel piping includes LTCS piping also. Erection of all inline instruments like flow				
64	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901000000	CARBON STEEL PIPING (NON IBR); THK. <= 10MM				
65	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901010000	FABRICATION (BUTT WELD- MANUAL)				
66	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901019100	NB UPTO 1.5 INCH	8400	Inch Dia	800	67 20 000
67	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901019200	NB 2 INCH - 6 INCH	103570	Inch Dia	800	8 28 56 000
68	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901019300	NB 8 INCH - 14 INCH	30040	Inch Dia	800	2 40 32 000
69	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901019400	NB 16 INCH - 24 INCH	13855	Inch Dia	800	1 10 84 000
70	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901019500	NB 26 INCH - 36 INCH	5385	Inch Dia	800	43 08 000
71	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901020000	FABRICATION (FILLET WELD)				
72	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901029100	NB UPTO 1.5 INCH	35000	Inch Dia	680	2 38 00 000
73	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901029200	NB 2 INCH - 6 INCH	1965	Inch Dia	680	13 36 200
74	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901029300	NB 8 INCH - 14 INCH	735	Inch Dia	680	4 99 800
75	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901029400	NB 16 INCH - 24 INCH	485	Inch Dia	680	3 29 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
76	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901029500	NB 26 INCH - 36 INCH	300	Inch Dia	680	2 04 000
77	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901029600	NB 38 INCH - 48 INCH	220	Inch Dia	680	1 49 600
78	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
79	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901039300	NB 8 INCH - 14 INCH	12875	Inch Dia	1 010	1 30 03 750
80	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901039400	NB 16 INCH - 24 INCH	5940	Inch Dia	1 010	59 99 400
81	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901039500	NB 26 INCH - 36 INCH	2310	Inch Dia	1 010	23 33 100
82	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901040000	ERECTION (OTHER THAN SPOOL)				
83	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901049100	NB UPTO 1.5 INCH	28000	Inch M	290	81 20 000
84	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901049200	NB 2 INCH - 6 INCH	215740	Inch M	290	6 25 64 600
85	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901049300	NB 8 INCH - 14 INCH	60720	Inch M	290	1 76 08 800
86	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901049400	NB 16 INCH - 24 INCH	5020	Inch M	290	14 55 800
87	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901049500	NB 26 INCH - 36 INCH	10825	Inch M	300	32 47 500
88	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901049600	NB 38 INCH - 48 INCH	190	Inch M	300	57 000
89	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901049800	ABOVE 60 INCH	30	Inch M	300	9 000
90	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901050000	ERECTION (SPOOL)				
91	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901059100	NB UPTO 1.5 INCH	840	Inch M	290	2 43 600
92	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901059200	NB 2 INCH - 6 INCH	13035	Inch M	290	37 80 150
93	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901059300	NB 8 INCH - 14 INCH	160375	Inch M	290	4 65 08 750
94	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901059400	NB 16 INCH - 24 INCH	155670	Inch M	290	4 51 44 300
95	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10901059500	NB 26 INCH - 36 INCH	67195	Inch M	300	2 01 58 500
96	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902000000	CARBON STEEL PIPING (NON IBR); THK. > 10MM AND <= 20MM				
97	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902010000	FABRICATION (BUTT WELD- MANUAL)				
98	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902019200	NB 2 INCH - 6 INCH	5110	Inch Dia	950	48 54 500
99	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902019300	NB 8 INCH - 14 INCH	9425	Inch Dia	950	89 53 750
100	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902019400	NB 16 INCH - 24 INCH	17900	Inch Dia	950	1 70 05 000
101	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902019500	NB 26 INCH - 36 INCH	32360	Inch Dia	950	3 07 42 000
102	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902019600	NB 38 INCH - 48 INCH	6770	Inch Dia	950	64 31 500
103	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902019700	NB 50 INCH - 60 INCH	1700	Inch Dia	950	16 15 000
104	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902019800	ABOVE 60 INCH	2310	Inch Dia	950	21 94 500
105	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
106	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902039300	NB 8 INCH - 14 INCH	4040	Inch Dia	1 180	47 67 200
107	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902039400	NB 16 INCH - 24 INCH	7675	Inch Dia	1 180	90 56 500
108	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902039500	NB 26 INCH - 36 INCH	13870	Inch Dia	1 180	1 63 66 600
109	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902039600	NB 38 INCH - 48 INCH	2900	Inch Dia	1 180	34 22 000
110	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902039700	NB 50 INCH - 60 INCH	730	Inch Dia	1 180	8 61 400
111	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902039800	ABOVE 60 INCH	990	Inch Dia	1 180	11 68 200
112	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902040000	ERECTION (OTHER THAN SPOOL)				
113	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902049200	NB 2 INCH - 6 INCH	7925	Inch M	300	23 77 500
114	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902049300	NB 8 INCH - 14 INCH	12015	Inch M	300	36 04 500
115	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902049400	NB 16 INCH - 24 INCH	14530	Inch M	300	43 59 000
116	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902049500	NB 26 INCH - 36 INCH	110160	Inch M	300	3 30 48 000
117	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902049600	NB 38 INCH - 48 INCH	90865	Inch M	330	2 99 85 450
118	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902049700	NB 50 INCH - 60 INCH	18255	Inch M	330	60 24 150
119	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902049800	ABOVE 60 INCH	28895	Inch M	330	95 35 350
120	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902050000	ERECTION (SPOOL)				
121	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902059200	NB 2 INCH - 6 INCH	11015	Inch M	300	33 04 500
122	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902059300	NB 8 INCH - 14 INCH	59195	Inch M	300	1 77 58 500
123	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902059400	NB 16 INCH - 24 INCH	105605	Inch M	300	3 16 81 500
124	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10902059500	NB 26 INCH - 36 INCH	32485	Inch M	300	97 45 500
125	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903000000	CARBON STEEL PIPING (NON IBR); THK. > 20MM AND <= 40MM				
126	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903010000	FABRICATION (BUTT WELD- MANUAL)				
127	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903019400	NB 16 INCH - 24 INCH	125	Inch Dia	1 210	1 51 250
128	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903019500	NB 26 INCH - 36 INCH	1320	Inch Dia	1 210	15 97 200
129	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903019600	NB 38 INCH - 48 INCH	28295	Inch Dia	1 210	3 42 36 950
130	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
131	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903039400	NB 16 INCH - 24 INCH	55	Inch Dia	1 520	83 600
132	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903039500	NB 26 INCH - 36 INCH	570	Inch Dia	1 520	8 66 400
133	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903039600	NB 38 INCH - 48 INCH	12130	Inch Dia	1 520	1 84 37 600
134	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903040000	ERECTION (OTHER THAN SPOOL)				
135	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903049400	NB 16 INCH - 24 INCH	45	Inch M	330	14 850

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
136	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903049500	NB 26 INCH - 36 INCH	2025	Inch M	330	6 68 250
137	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903049600	NB 38 INCH - 48 INCH	146170	Inch M	330	4 82 36 100
138	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903050000	ERECTION (SPOOL)				
139	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903059400	NB 16 INCH - 24 INCH	20	Inch M	330	6 600
140	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10903059500	NB 26 INCH - 36 INCH	855	Inch M	330	2 82 150
141	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906000000	CARBON STEEL PIPING (IBR); THK. <= TO 10MM				
142	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906010000	FABRICATION (BUTT WELD- MANUAL)				
143	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906019100	NB UPTO 1.5 INCH	1120	Inch Dia	870	9 74 400
144	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906019200	NB 2 INCH - 6 INCH	11340	Inch Dia	870	98 65 800
145	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906019300	NB 8 INCH - 14 INCH	6235	Inch Dia	870	54 24 450
146	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906019400	NB 16 INCH - 24 INCH	1415	Inch Dia	870	12 31 050
147	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906019500	NB 26 INCH - 36 INCH	2105	Inch Dia	870	18 31 350
148	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906020000	FABRICATION (FILLET WELD)				
149	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906029100	NB UPTO 1.5 INCH	21000	Inch Dia	770	1 61 70 000
150	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
151	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906039300	NB 8 INCH - 14 INCH	2675	Inch Dia	1 080	28 89 000
152	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906039400	NB 16 INCH - 24 INCH	605	Inch Dia	1 080	6 53 400
153	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906039500	NB 26 INCH - 36 INCH	905	Inch Dia	1 080	9 77 400
154	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906040000	ERECTION (OTHER THAN SPOOL)				
155	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906049100	NB UPTO 1.5 INCH	14000	Inch M	290	40 60 000
156	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906049200	NB 2 INCH - 6 INCH	13030	Inch M	290	37 78 700
157	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906049300	NB 8 INCH - 14 INCH	2775	Inch M	290	8 04 750
158	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906049400	NB 16 INCH - 24 INCH	20	Inch M	290	5 800
159	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906049500	NB 26 INCH - 36 INCH	15325	Inch M	300	45 97 500
160	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906050000	ERECTION (SPOOL)				
161	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906059100	NB UPTO 1.5 INCH	4200	Inch M	290	12 18 000
162	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906059200	NB 2 INCH - 6 INCH	11160	Inch M	290	32 36 400
163	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906059300	NB 8 INCH - 14 INCH	45620	Inch M	290	1 32 29 800
164	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906059400	NB 16 INCH - 24 INCH	28210	Inch M	290	81 80 900
165	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10906059500	NB 26 INCH - 36 INCH	11075	Inch M	300	33 22 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
166	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907000000	CARBON STEEL PIPING (IBR); THK. > 10MM AND <= 20MM				
167	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907010000	FABRICATION (BUTT WELD- MANUAL)				
168	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907019200	NB 2 INCH - 6 INCH	1305	Inch Dia	1 020	13 31 100
169	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907019300	NB 8 INCH - 14 INCH	2000	Inch Dia	1 020	20 40 000
170	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907019400	NB 16 INCH - 24 INCH	6735	Inch Dia	1 020	68 69 700
171	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907019500	NB 26 INCH - 36 INCH	7285	Inch Dia	1 020	74 30 700
172	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907019600	NB 38 INCH - 48 INCH	5830	Inch Dia	1 020	59 46 600
173	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
174	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907039300	NB 8 INCH - 14 INCH	860	Inch Dia	1 270	10 92 200
175	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907039400	NB 16 INCH - 24 INCH	2890	Inch Dia	1 270	36 70 300
176	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907039500	NB 26 INCH - 36 INCH	3125	Inch Dia	1 270	39 68 750
177	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907039600	NB 38 INCH - 48 INCH	2500	Inch Dia	1 270	31 75 000
178	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907040000	ERECTION (OTHER THAN SPOOL)				
179	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907049200	NB 2 INCH - 6 INCH	6265	Inch M	300	18 79 500
180	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907049300	NB 8 INCH - 14 INCH	575	Inch M	300	1 72 500
181	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907049400	NB 16 INCH - 24 INCH	1725	Inch M	300	5 17 500
182	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907049500	NB 26 INCH - 36 INCH	25740	Inch M	300	77 22 000
183	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907049600	NB 38 INCH - 48 INCH	41355	Inch M	300	1 24 06 500
184	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907050000	ERECTION (SPOOL)				
185	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907059300	NB 8 INCH - 14 INCH	9965	Inch M	300	29 89 500
186	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907059400	NB 16 INCH - 24 INCH	60505	Inch M	300	1 81 51 500
187	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10907059500	NB 26 INCH - 36 INCH	17270	Inch M	300	51 81 000
188	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10908000000	CARBON STEEL PIPING (IBR); THK. > 20MM AND <= 40MM				
189	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10908010000	FABRICATION (BUTT WELD- MANUAL)				
190	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10908019700	NB 50 INCH - 60 INCH	630	Inch Dia	1 210	7 62 300
191	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10908019800	ABOVE 60 INCH	615	Inch Dia	1 210	7 44 150
192	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10908030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
193	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10908039700	NB 50 INCH - 60 INCH	270	Inch Dia	1 520	4 10 400
194	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10908039800	ABOVE 60 INCH	265	Inch Dia	1 520	4 02 800
195	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10908040000	ERECTION (OTHER THAN SPOOL)				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
196	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10908049700	NB 50 INCH - 60 INCH	1805	Inch M	330	5 95 650
197	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10908049800	ABOVE 60 INCH	12775	Inch M	330	42 15 750
198	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911000000	STAINLESS STEEL PIPING (NON-IBR); THK. <= 10MM				
199	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911010000	FABRICATION (BUTT WELD- MANUAL)				
200	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911019100	NB UPTO 1.5 INCH	420	Inch Dia	1 580	6 63 600
201	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911019200	NB 2 INCH - 6 INCH	2445	Inch Dia	1 580	38 63 100
202	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911019300	NB 8 INCH - 14 INCH	3105	Inch Dia	1 580	49 05 900
203	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911019400	NB 16 INCH - 24 INCH	3370	Inch Dia	1 580	53 24 600
204	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911019500	NB 26 INCH - 36 INCH	2130	Inch Dia	1 580	33 65 400
205	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911020000	FABRICATION (FILLET WELD)				
206	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911029100	NB UPTO 1.5 INCH	2100	Inch Dia	1 280	26 88 000
207	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
208	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911039300	NB 8 INCH - 14 INCH	1330	Inch Dia	1 970	26 20 100
209	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911039400	NB 16 INCH - 24 INCH	1445	Inch Dia	1 970	28 46 650
210	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911039500	NB 26 INCH - 36 INCH	915	Inch Dia	1 970	18 02 550
211	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911040000	ERECTION (OTHER THAN SPOOL)				
212	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911049100	NB UPTO 1.5 INCH	7000	Inch M	370	25 90 000
213	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911049200	NB 2 INCH - 6 INCH	15	Inch M	370	5 550
214	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911049300	NB 8 INCH - 14 INCH	15	Inch M	370	5 550
215	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911049400	NB 16 INCH - 24 INCH	180	Inch M	370	66 600
216	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911049500	NB 26 INCH - 36 INCH	8530	Inch M	370	31 56 100
217	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911049600	NB 38 INCH - 48 INCH	25	Inch M	370	9 250
218	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911050000	ERECTION (SPOOL)				
219	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911059100	NB UPTO 1.5 INCH	665	Inch M	370	2 46 050
220	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911059200	NB 2 INCH - 6 INCH	17635	Inch M	370	65 24 950
221	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911059300	NB 8 INCH - 14 INCH	28915	Inch M	370	1 06 98 550
222	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911059400	NB 16 INCH - 24 INCH	30065	Inch M	370	1 11 24 050
223	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10911059500	NB 26 INCH - 36 INCH	4630	Inch M	370	17 13 100
224	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912000000	STAINLESS STEEL PIPING (NON-IBR); THK. > 10MM AND <= 20MM				
225	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912010000	FABRICATION (BUTT WELD- MANUAL)				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
226	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912019200	NB 2 INCH - 6 INCH	10	Inch Dia	1 990	19 900
227	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912019300	NB 8 INCH - 14 INCH	255	Inch Dia	1 990	5 07 450
228	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912019400	NB 16 INCH - 24 INCH	1195	Inch Dia	1 990	23 78 050
229	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912019500	NB 26 INCH - 36 INCH	735	Inch Dia	1 990	14 62 650
230	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912019600	NB 38 INCH - 48 INCH	1665	Inch Dia	1 990	33 13 350
231	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912019700	NB 50 INCH - 60 INCH	1330	Inch Dia	1 990	26 46 700
232	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
233	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912039300	NB 8 INCH - 14 INCH	110	Inch Dia	2 480	2 72 800
234	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912039400	NB 16 INCH - 24 INCH	510	Inch Dia	2 480	12 64 800
235	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912039500	NB 26 INCH - 36 INCH	315	Inch Dia	2 480	7 81 200
236	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912039600	NB 38 INCH - 48 INCH	715	Inch Dia	2 480	17 73 200
237	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912039700	NB 50 INCH - 60 INCH	570	Inch Dia	2 480	14 13 600
238	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912040000	ERECTION (OTHER THAN SPOOL)				
239	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912049400	NB 16 INCH - 24 INCH	355	Inch M	430	1 52 650
240	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912049600	NB 38 INCH - 48 INCH	21060	Inch M	430	90 55 800
241	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912049700	NB 50 INCH - 60 INCH	15715	Inch M	430	67 57 450
242	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912050000	ERECTION (SPOOL)				
243	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912059300	NB 8 INCH - 14 INCH	2975	Inch M	430	12 79 250
244	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912059400	NB 16 INCH - 24 INCH	8315	Inch M	430	35 75 450
245	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10912059500	NB 26 INCH - 36 INCH	5500	Inch M	430	23 65 000
246	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918000000	STAINLESS STEEL PIPING (IBR); THK. <= 10MM				
247	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918010000	FABRICATION (BUTT WELD- MANUAL)				
248	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918019100	NB UPTO 1.5 INCH	1400	Inch Dia	1 700	23 80 000
249	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918019200	NB 2 INCH - 6 INCH	1330	Inch Dia	1 700	22 61 000
250	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918019300	NB 8 INCH - 14 INCH	2105	Inch Dia	1 700	35 78 500
251	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918019400	NB 16 INCH - 24 INCH	2450	Inch Dia	1 700	41 65 000
252	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918020000	FABRICATION (FILLET WELD)				
253	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918029100	NB UPTO 1.5 INCH	1680	Inch Dia	1 540	25 87 200
254	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
255	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918039300	NB 8 INCH - 14 INCH	900	Inch Dia	2 120	19 08 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
256	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918039400	NB 16 INCH - 24 INCH	1050	Inch Dia	2 120	22 26 000
257	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918040000	ERECTION (OTHER THAN SPOOL)				
258	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918049100	NB UPTO 1.5 INCH	910	Inch M	370	3 36 700
259	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918049200	NB 2 INCH - 6 INCH	5	Inch M	370	1 850
260	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918049300	NB 8 INCH - 14 INCH	5	Inch M	370	1 850
261	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918049400	NB 16 INCH - 24 INCH	935	Inch M	370	3 45 950
262	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918049500	NB 26 INCH - 36 INCH	15	Inch M	370	5 550
263	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918050000	ERECTION (SPOOL)				
264	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918059100	NB UPTO 1.5 INCH	560	Inch M	370	2 07 200
265	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918059200	NB 2 INCH - 6 INCH	3765	Inch M	370	13 93 050
266	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918059300	NB 8 INCH - 14 INCH	15225	Inch M	370	56 33 250
267	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10918059400	NB 16 INCH - 24 INCH	16970	Inch M	370	62 78 900
268	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919000000	STAINLESS STEEL PIPING (IBR); THK. > 10MM AND <=20MM				
269	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919010000	FABRICATION (BUTT WELD- MANUAL)				
270	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919019400	NB 16 INCH - 24 INCH	1590	Inch Dia	2 130	33 86 700
271	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919019500	NB 26 INCH - 36 INCH	8690	Inch Dia	2 130	1 85 09 700
272	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
273	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919039400	NB 16 INCH - 24 INCH	680	Inch Dia	2 660	18 08 800
274	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919039500	NB 26 INCH - 36 INCH	3725	Inch Dia	2 660	99 08 500
275	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919040000	ERECTION (OTHER THAN SPOOL)				
276	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919049400	NB 16 INCH - 24 INCH	805	Inch M	430	3 46 150
277	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919049500	NB 26 INCH - 36 INCH	31065	Inch M	430	1 33 57 950
278	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919050000	ERECTION (SPOOL)				
279	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919059400	NB 16 INCH - 24 INCH	6555	Inch M	430	28 18 650
280	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10919059500	NB 26 INCH - 36 INCH	4660	Inch M	430	20 03 800
281	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10925000000	ALLOY STEEL (OTHER THAN P91) PIPING (NON-IBR); THK. <= 10MM				
282	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10925020000	FABRICATION (FILLET WELD)				
283	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10925029100	NB UPTO 1.5 INCH	1400	Inch Dia	1 210	16 94 000
284	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10925040000	ERECTION (OTHER THAN SPOOL)				
285	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10925049300	NB 8 INCH - 14 INCH	5	Inch M	330	1 650

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
286	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10925050000	ERECTION (SPOOL)				
287	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10925059100	NB UPTO 1.5 INCH	700	Inch M	330	2 31 000
288	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10926000000	ALLOY STEEL (OTHER THAN P91) PIPING (NON-IBR); THK. > 10MM AND <= 20MM				
289	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10926010000	FABRICATION (BUTT WELD- MANUAL)				
290	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10926019300	NB 8 INCH - 14 INCH	60	Inch Dia	1 760	1 05 600
291	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10926019500	NB 26 INCH - 36 INCH	1015	Inch Dia	1 760	17 86 400
292	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10926030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
293	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10926039300	NB 8 INCH - 14 INCH	25	Inch Dia	2 190	54 750
294	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10926039500	NB 26 INCH - 36 INCH	435	Inch Dia	2 190	9 52 650
295	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10926050000	ERECTION (SPOOL)				
296	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10926059300	NB 8 INCH - 14 INCH	1115	Inch M	370	4 12 550
297	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10926059500	NB 26 INCH - 36 INCH	18375	Inch M	370	67 98 750
298	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10931000000	ALLOY STEEL (OTHER THAN P91) PIPING (IBR); THK. <= 10MM				
299	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10931010000	FABRICATION (BUTT WELD- MANUAL)				
300	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10931019200	NB 2 INCH - 6 INCH	195	Inch Dia	1 630	3 17 850
301	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10931020000	FABRICATION (FILLET WELD)				
302	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10931029100	NB UPTO 1.5 INCH	210	Inch Dia	1 310	2 75 100
303	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10931030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
304	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10931050000	ERECTION (SPOOL)				
305	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10931059100	NB UPTO 1.5 INCH	95	Inch M	330	31 350
306	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10931059200	NB 2 INCH - 6 INCH	25	Inch M	330	8 250
307	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932000000	ALLOY STEEL (OTHER THAN P91) PIPING (IBR); THK. > 10MM AND <= 20MM				
308	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932010000	FABRICATION (BUTT WELD- MANUAL)				
309	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932019200	NB 2 INCH - 6 INCH	5	Inch Dia	1 990	9 950
310	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932019300	NB 8 INCH - 14 INCH	60	Inch Dia	1 990	1 19 400
311	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932019400	NB 16 INCH - 24 INCH	490	Inch Dia	1 990	9 75 100
312	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932019500	NB 26 INCH - 36 INCH	20	Inch Dia	1 990	39 800
313	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
314	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932039300	NB 8 INCH - 14 INCH	25	Inch Dia	2 480	62 000
315	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932039400	NB 16 INCH - 24 INCH	210	Inch Dia	2 480	5 20 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
316	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932039500	NB 26 INCH - 36 INCH	10	Inch Dia	2 480	24 800
317	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932050000	ERECTION (SPOOL)				
318	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932059300	NB 8 INCH - 14 INCH	150	Inch M	370	55 500
319	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932059400	NB 16 INCH - 24 INCH	8090	Inch M	370	29 93 300
320	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10932059500	NB 26 INCH - 36 INCH	55	Inch M	370	20 350
321	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10944000000	STEAM TRACERS CARBON STEEL				
322	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10944000400	NB 0.500 INCHES	1340	Metres	950	12 73 000
323	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10944000500	NB 0.750 INCHES	800	Metres	950	7 60 000
324	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10945000000	STEAM TRACERS STAINLESS STEEL				
325	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10945000400	NB 0.500 INCHES	15	Metres	1 830	27 450
326	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M10945000500	NB 0.750 INCHES	140	Metres	1 830	2 56 200
327	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11600000000	VALVES :- Transportation of all types of valves (Including special valves and motor operated valves) from Owners storage points to contractors stores/worksite and installation of valves for all rating including assembly of valves accessories like air bottles etc, if any, fixing of gaskets bolts/nuts wherever required and performing Positive Material Identification(PMI) using alloy analysers as per specification, drawings and directions of Engineer-in-Charge. Note : For PRDS, PSVs, TSVs, Control valves, On-Off/Shutdown valves and Self actuating valves all details and rates shall be as per Instrumentation SOR.				
328	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601000000	FLANGED/WAFER VALVES INCLUDING MOV (UPTO 600#)				
329	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601000400	NB 0.500 INCHES	3	Nos	630	1 890
330	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601000500	NB 0.750 INCHES	7	Nos	630	4 410
331	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601000600	NB 1.000 INCHES	135	Nos	630	85 050
332	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601000900	NB 2.000 INCHES	2503	Nos	990	24 77 970
333	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601001100	NB 3.000 INCHES	737	Nos	1 480	10 90 760
334	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601001300	NB 4.000 INCHES	529	Nos	1 980	10 47 420
335	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601001500	NB 6.000 INCHES	757	Nos	2 950	22 33 150
336	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601001600	NB 8.000 INCHES	511	Nos	3 940	20 13 340
337	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601001700	NB 10.000 INCHES	359	Nos	4 930	17 69 870
338	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601001800	NB 12.000 INCHES	144	Nos	5 920	8 52 480
339	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601001900	NB 14.000 INCHES	191	Nos	6 900	13 17 900

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
340	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601002000	NB 16.000 INCHES	173	Nos	7 880	13 63 240
341	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601002100	NB 18.000 INCHES	120	Nos	8 870	10 64 400
342	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601002200	NB 20.000 INCHES	105	Nos	9 860	10 35 300
343	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601002400	NB 24.000 INCHES	137	Nos	11 820	16 19 340
344	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601002500	NB 26.000 INCHES	10	Nos	12 810	1 28 100
345	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601002600	NB 28.000 INCHES	14	Nos	13 800	1 93 200
346	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601002700	NB 30.000 INCHES	75	Nos	18 960	14 22 000
347	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601003000	NB 36.000 INCHES	53	Nos	22 760	12 06 280
348	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601003200	NB 40.000 INCHES	62	Nos	25 280	15 67 360
349	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11601003300	NB 42.000 INCHES	16	Nos	26 540	4 24 640
350	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11606000000	CARBON STEEL/LTCS BW VALVES INCLUDING MOV (IBR)				
351	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11606000400	NB 0.500 INCHES	3	Nos	1 250	3 750
352	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11606000500	NB 0.750 INCHES	5	Nos	1 250	6 250
353	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11606000900	NB 2.000 INCHES	1	Nos	2 020	2 020
354	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11606001500	NB 6.000 INCHES	4	Nos	6 040	24 160
355	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11900000000	SPRING SUPPORT ASSEMBLIES :- Transportation of all types of spring support assemblies from Owner's storage points to contractor's stores/worksite and installation of spring support assemblies for all rating including assembly, if any, fixing of gaskets bolts/nuts, welding attachments wherever required and performing Positive Material Identification(PMI) using alloy analysers as per specification, drawings and directions of Engineer-in-Charge. Contractor to ensure that travel stops are removed and spring is locked in cold load position for Hydrotest. It shall be ensured that locking devices are removed and springs are properly set at hot load position during commissioning.				
356	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M11901000000		59	MT	83 650	49 35 350
357	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12000000000	BOLT TENSIONING :- Carrying out tensioning of bolted joints on all types of piping as called for in EIL Specification No.6-76-0002 on already erected system including supply of all materials, recording devices, instruments etc; Providing all normal and special equipment and gadgets, skilled / un skilled labour, specialist, supervisory staff and completing the work in all respects as per specifications and instructions of engineer-in-charge. some joints may require bolt tensioning more than once, but, payment for one joint shall be made only once.				
358	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001000000	150# JOINTS				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
359	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001001900	NB 14.000 INCHES	213	Nos	4 800	10 22 400
360	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001002000	NB 16.000 INCHES	339	Nos	5 480	18 57 720
361	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001002100	NB 18.000 INCHES	83	Nos	6 170	5 12 110
362	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001002200	NB 20.000 INCHES	250	Nos	6 850	17 12 500
363	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001002400	NB 24.000 INCHES	272	Nos	8 230	22 38 560
364	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001002500	NB 26.000 INCHES	7	Nos	8 910	62 370
365	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001002600	NB 28.000 INCHES	14	Nos	9 600	1 34 400
366	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001002700	NB 30.000 INCHES	143	Nos	10 290	14 71 470
367	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001002800	NB 32.000 INCHES	7	Nos	15 770	1 10 390
368	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001003000	NB 36.000 INCHES	87	Nos	17 740	15 43 380
369	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001003200	NB 40.000 INCHES	7	Nos	19 710	1 37 970
370	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001003300	NB 42.000 INCHES	22	Nos	20 700	4 55 400
371	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001003600	NB 48.000 INCHES	3	Nos	23 650	70 950
372	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12001004200	NB 60.000 INCHES	1	Nos	29 570	29 570
373	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002000000	300# JOINTS				
374	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002001700	NB 10.000 INCHES	174	Nos	4 930	8 57 820
375	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002001800	NB 12.000 INCHES	265	Nos	5 920	15 68 800
376	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002001900	NB 14.000 INCHES	122	Nos	6 900	8 41 800
377	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002002000	NB 16.000 INCHES	99	Nos	7 880	7 80 120
378	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002002100	NB 18.000 INCHES	189	Nos	8 870	16 76 430
379	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002002200	NB 20.000 INCHES	148	Nos	9 860	14 59 280
380	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002002400	NB 24.000 INCHES	341	Nos	11 820	40 30 620
381	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002002500	NB 26.000 INCHES	10	Nos	12 810	1 28 100
382	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002002600	NB 28.000 INCHES	68	Nos	13 800	9 38 400
383	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002002700	NB 30.000 INCHES	283	Nos	14 780	41 82 740
384	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002002800	NB 32.000 INCHES	26	Nos	20 230	5 25 980
385	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002002900	NB 34.000 INCHES	5	Nos	21 490	1 07 450
386	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002003000	NB 36.000 INCHES	170	Nos	22 760	38 69 200
387	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002003200	NB 40.000 INCHES	653	Nos	25 280	1 65 07 840
388	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12002003300	NB 42.000 INCHES	44	Nos	26 540	11 67 760

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
389	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004000000	600# JOINTS				
390	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004001500	NB 6.000 INCHES	130	Nos	3 800	4 94 000
391	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004001600	NB 8.000 INCHES	165	Nos	5 050	8 33 250
392	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004001700	NB 10.000 INCHES	109	Nos	6 320	6 88 880
393	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004001800	NB 12.000 INCHES	8	Nos	7 580	60 640
394	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004001900	NB 14.000 INCHES	31	Nos	8 850	2 74 350
395	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004002000	NB 16.000 INCHES	104	Nos	10 110	10 51 440
396	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004002100	NB 18.000 INCHES	34	Nos	11 380	3 86 920
397	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004002200	NB 20.000 INCHES	117	Nos	12 640	14 78 880
398	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004002400	NB 24.000 INCHES	73	Nos	15 170	11 07 410
399	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004002600	NB 28.000 INCHES	23	Nos	17 700	4 07 100
400	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004002700	NB 30.000 INCHES	101	Nos	18 960	19 14 960
401	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004003000	NB 36.000 INCHES	8	Nos	28 920	2 31 360
402	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12004003300	NB 42.000 INCHES	40	Nos	33 750	13 50 000
403	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12007000000	2500# JOINTS				
404	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12007001500	NB 6.000 INCHES	3	Nos	6 490	19 470
405	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12007001700	NB 10.000 INCHES	3	Nos	10 820	32 460
406	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12100000000	REINFORCING PADS FOR PIPES :- Fabrication of reinforcing pads for pipe connection wherever required (from pipes only supplied by the Owner) and erection, fitup, welding & testing (including DP/MP) if required of the same and performing Positive Material Identification(PMI) using alloy analysers as per the specifications, drawings and instructions of the Engineer-in-Charge. Note: Sizes mentioned for Reinforcing Pads are for branch pipe				
407	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101000000	C.S REINFORCING PADS				
408	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101000900	NB 2.000 INCHES	312	Nos	2 740	8 54 880
409	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101001100	NB 3.000 INCHES	108	Nos	4 110	4 43 880
410	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101001300	NB 4.000 INCHES	211	Nos	5 480	11 56 280
411	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101001500	NB 6.000 INCHES	148	Nos	8 230	12 18 040
412	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101001600	NB 8.000 INCHES	127	Nos	10 970	13 93 190
413	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101001700	NB 10.000 INCHES	77	Nos	13 710	10 55 670
414	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101001800	NB 12.000 INCHES	47	Nos	16 450	7 73 150

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
415	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101001900	NB 14.000 INCHES	49	Nos	19 200	9 40 800
416	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101002000	NB 16.000 INCHES	62	Nos	21 940	13 60 280
417	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101002100	NB 18.000 INCHES	30	Nos	24 680	7 40 400
418	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101002200	NB 20.000 INCHES	30	Nos	27 420	8 22 600
419	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101002400	NB 24.000 INCHES	48	Nos	37 020	17 76 960
420	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101002500	NB 26.000 INCHES	3	Nos	40 110	1 20 330
421	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101002600	NB 28.000 INCHES	13	Nos	43 190	5 61 470
422	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101002700	NB 30.000 INCHES	5	Nos	46 280	2 31 400
423	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101002800	NB 32.000 INCHES	3	Nos	49 360	1 48 080
424	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101003200	NB 40.000 INCHES	1	Nos	91 270	91 270
425	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12101003300	NB 42.000 INCHES	13	Nos	95 830	12 45 790
426	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12102000000	A.S REINFORCING PADS				
427	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12102000900	NB 2.000 INCHES	1	Nos	4 560	4 560
428	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12102001900	NB 14.000 INCHES	3	Nos	31 940	95 820
429	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12102002000	NB 16.000 INCHES	1	Nos	36 510	36 510
430	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12102002200	NB 20.000 INCHES	1	Nos	45 630	45 630
431	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103000000	S.S REINFORCING PADS				
432	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103000900	NB 2.000 INCHES	36	Nos	4 860	1 74 960
433	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103001500	NB 6.000 INCHES	18	Nos	14 590	2 62 620
434	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103001600	NB 8.000 INCHES	14	Nos	19 450	2 72 300
435	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103001700	NB 10.000 INCHES	3	Nos	24 320	72 960
436	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103001800	NB 12.000 INCHES	1	Nos	29 180	29 180
437	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103001900	NB 14.000 INCHES	3	Nos	34 040	1 02 120
438	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103002000	NB 16.000 INCHES	4	Nos	38 910	1 55 640
439	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103002200	NB 20.000 INCHES	1	Nos	48 630	48 630
440	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103002400	NB 24.000 INCHES	4	Nos	65 300	2 61 200
441	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12103002700	NB 30.000 INCHES	1	Nos	81 630	81 630
442	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12300000000	DYE PENETRATION/MAGNETIC PARTICLE TEST :- Performance of magnetic particle/ dye penetrant test including supply of all necessary materials, equipment and labour for carrying out the work as per specification and directions of Engineer-in-Charge.				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
443	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12301000000	DYE PENETRANT TEST	32741	Inches	80	26 19 280
444	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12400000000	PIPE SUPPORTS (FROM MATERIALS SUPPLIED BY OWNER) :- Fabrication, erection(at all elevations) of pipe supports like shoes, cradles, hangers, clamps(of all sizes/thicknesses manufactured by forming method using die), turn buckles, saddles, guides, special supports, pads(including corrosion pads & protection shields), providing and welding of stiffeners as per drawings, T post etc. of all types including supply and application one coat of primer, all necessary equipments, consumables, labour, returning surplus materials and scrap etc to owner's storage points and completing work as per drawings, specifications and instructions of Engineer-in-charge. Modifications/rectifications, if required; and adjustment/ alignment during precommisioning, commisioning as per the instructions of Engineer-in-charge. Fabrication of extension of spindle for valves, provision of locking arrangement, etc. shall also be considered under this item.				
445	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12404000000	DUMMY PIPE SUPPORTS FOR C.S (OWNER SUPPLIED)	179	MT	73 350	1 31 29 650
446	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12405000000	DUMMY PIPE SUPPORTS FOR S.S (OWNER SUPPLIED)	10	MT	1 46 690	14 66 900
447	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12406000000	DUMMY PIPE SUPPORTS FOR A.S (OWNER SUPPLIED)	1	MT	1 10 020	1 10 020
448	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12500000000	PIPE SUPPORTS (FROM MATERIALS SUPPLIED BY CONTRACTOR) :- Fabrication, erection(at all elevations) of pipe supports like shoes, cradles, hangers, clamps(of all sizes/thicknesses manufactured by forming method using die), turn buckles, saddles, guides, special supports, pads(including corrosion pads & protection shields), providing and welding of stiffeners as per drawings, T post etc. of all types including supply and application one coat of primer, all necessary equipments, consumables, labour, and completing work as per drawings, specifications and instructions of Engineer-in-charge. Modifications/rectifications, if required; and adjustment/ alignment during precommisioning, commisioning as per the instructions of Engineer-in-charge. Fabrication of extension of spindle for valves, provision of locking arrangement, etc. shall also be considered under this item.				
449	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12501000000	C.S STRUCTURAL STEEL (CONTRACTOR SUPPLIED)	910	MT	1 36 830	12 45 15 300
450	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12502000000	S.S STRUCTURAL STEEL (CONTRACTOR SUPPLIED)	5	MT	4 10 510	20 52 550
451	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12503000000	A.S STRUCTURAL STEEL (CONTRACTOR SUPPLIED)	1	MT	3 61 240	3 61 240

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
452	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12600000000	HARDNESS TEST :- Carrying out hardness testing of weld joints on all types of piping as called for on shop / site fabricated already erected system including supply of all materials, instrument set., providing all normal and special equipment and gadgets, skilled / unskilled labour, specialist, supervisory staff and completing the work in all respects as per specifications and instructions of engineer-in-charge. The joints under this head do not include Stress Relieved joints. Joints which do not meet the hardness requirement as per spec shall be stress relieved and re tested on contractors cost. No seperate payment shall be made for this. . NOTE : Unit for hardness testing quantity is Nos. of Test Spots.				
453	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12601000000	NUMBER OF TEST SPOTS	15272	Nos	320	48 87 040
454	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700000000	STRESS RELIEVING :- Carrying out stress relieving of weld joints, including all types of attachment welds (corrosion pads, protection shields, supports, etc.), as applicable, on all types of piping as called for on shop/site fabricated already erected system including supply of all materials, consumables recording devices, insulation materials, instruments etc., providing all normal and special equipment and gadgets, skilled/unskilled labour, specialist, supervisory staff and completing the work in all respects as per specifications and instructions of Engineer-in-Charge. Repeat performance due to defective stress relieving or any other account shall be on Contractors cost. Payment shall be done only after submission and approval of charts. Stress relieving shall be followed by measurement of hardness and no separate payment shall be made for this. Note: Unit for stress relieving quantity is Nos of circumferential weld joints				
455	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700000400	NB 0.500 INCHES	66	Nos	220	14 520
456	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700000500	NB 0.750 INCHES	3362	Nos	300	10 08 600
457	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700000600	NB 1.000 INCHES	910	Nos	430	3 91 300
458	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700000800	NB 1.500 INCHES	111	Nos	520	57 720
459	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700000900	NB 2.000 INCHES	4958	Nos	490	24 29 420
460	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700001100	NB 3.000 INCHES	2369	Nos	740	17 53 060
461	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700001300	NB 4.000 INCHES	2176	Nos	990	21 54 240
462	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700001500	NB 6.000 INCHES	3899	Nos	1 480	57 70 520
463	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700001600	NB 8.000 INCHES	3307	Nos	1 980	65 47 860
464	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700001700	NB 10.000 INCHES	2964	Nos	2 460	72 91 440
465	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700001800	NB 12.000 INCHES	1264	Nos	2 950	37 28 800
466	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700001900	NB 14.000 INCHES	1678	Nos	3 450	57 89 100

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
467	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700002000	NB 16.000 INCHES	1509	Nos	3 940	59 45 460
468	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700002100	NB 18.000 INCHES	1359	Nos	4 440	60 33 960
469	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700002200	NB 20.000 INCHES	1400	Nos	4 930	69 02 000
470	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700002300	NB 22.000 INCHES	5	Nos	5 420	27 100
471	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700002400	NB 24.000 INCHES	1002	Nos	5 920	59 31 840
472	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700002500	NB 26.000 INCHES	139	Nos	6 410	8 90 990
473	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700002600	NB 28.000 INCHES	293	Nos	6 900	20 21 700
474	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700002700	NB 30.000 INCHES	1023	Nos	7 390	75 59 970
475	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700002800	NB 32.000 INCHES	59	Nos	7 880	4 64 920
476	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700003000	NB 36.000 INCHES	848	Nos	8 870	75 21 760
477	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700003200	NB 40.000 INCHES	233	Nos	9 860	22 97 380
478	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700003300	NB 42.000 INCHES	216	Nos	10 350	22 35 600
479	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700003600	NB 48.000 INCHES	49	Nos	11 820	5 79 180
480	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700004200	NB 60.000 INCHES	26	Nos	14 780	3 84 280
481	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12700004600	NB 68.000 INCHES	60	Nos	16 750	10 05 000
482	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12800000000	WOODEN/HIGH DENSITY PUF SUPPORTS FOR COLD LINES :- Supply, shaping, positioning and fixing of cold line supports as per EIL pipe support standard having the following specifications: Wood specification: Hard wood, chemically treated with creosote under pressure. Quality of wood to conform class-I durability as per IS-3629 & Grade-I timber of Group-A with permissible compression strength of 70 Kg/cm2 perpendicular to grains as per IS-883. PUF specifications: Density for lines upto 6" NB : 240 kg/cm3 Density for lines above 6" NB : 320 kg/cm3				
483	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12801000000	WOODEN BLOCKS	33	Cu. M	1 08 090	35 66 970
484	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12802000000	HIGH DENSITY (240 Kg/Cu.M) PUF BLOCKS	46	Cu. M	81 730	37 59 580
485	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12803000000	HIGH DENSITY (320 Kg/Cu.M) PUF BLOCKS	130	Cu. M	1 34 430	1 74 75 900

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
486	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12900000000	Ultrasonic Testing (UT) :- Performance of UT inspection on piping of all types and thicknesses including providing or hiring of all necessary equipment and whatever else even though not expressly mentioned but required to perform the work as per specifications and instructions of Engineer-in-Charge. UT shall be submitted to the Engineer-in-charge. (Repeat UT due to defective UT on repaired joints due to Contractors fault and for additional UT necessitated due to poor performance of contractors welders shall be done at contractors cost) Note: Unit for UT quantity is Nos of circumferencial weld joints.				
487	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12901000000	FOR JOINTS THK. <= 8MM (FOR CS OTHER THAN CLASS IV OF JOB NDE SPECIFICATION)				
488	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12901000400	NB 0.500 INCHES	1	Nos	480	480
489	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12901000500	NB 0.750 INCHES	20	Nos	480	9 600
490	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12901000600	NB 1.000 INCHES	5	Nos	480	2 400
491	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12901000800	NB 1.500 INCHES	3	Nos	730	2 190
492	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12901000900	NB 2.000 INCHES	394	Nos	970	3 82 180
493	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12901001100	NB 3.000 INCHES	185	Nos	1 450	2 68 250
494	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12901001300	NB 4.000 INCHES	124	Nos	1 920	2 38 080
495	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12901001500	NB 6.000 INCHES	268	Nos	2 890	7 74 520
496	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902000000	FOR JOINTS THK. <= 8MM (FOR CS AS PER CLASS IV OF JOB NDE SPECIFICATION/AS/SS)				
497	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902000400	NB 0.500 INCHES	1	Nos	560	560
498	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902000500	NB 0.750 INCHES	25	Nos	560	14 000
499	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902000600	NB 1.000 INCHES	4	Nos	560	2 240
500	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902000800	NB 1.500 INCHES	3	Nos	830	2 490
501	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902000900	NB 2.000 INCHES	241	Nos	1 110	2 67 510
502	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902001100	NB 3.000 INCHES	109	Nos	1 670	1 82 030
503	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902001300	NB 4.000 INCHES	114	Nos	2 230	2 54 220
504	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902001500	NB 6.000 INCHES	202	Nos	3 340	6 74 680
505	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902001600	NB 8.000 INCHES	144	Nos	4 460	6 42 240
506	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902001700	NB 10.000 INCHES	108	Nos	5 570	6 01 560
507	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902001800	NB 12.000 INCHES	27	Nos	6 690	1 80 630
508	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902001900	NB 14.000 INCHES	55	Nos	7 800	4 29 000
509	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902002000	NB 16.000 INCHES	68	Nos	8 910	6 05 880

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
510	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902002100	NB 18.000 INCHES	31	Nos	10 030	3 10 930
511	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902002200	NB 20.000 INCHES	103	Nos	11 140	11 47 420
512	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902002400	NB 24.000 INCHES	35	Nos	13 370	4 67 950
513	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902002600	NB 28.000 INCHES	13	Nos	15 600	2 02 800
514	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12902002700	NB 30.000 INCHES	12	Nos	16 710	2 00 520
515	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903000000	FOR JOINTS ABOVE THK. 8MM				
516	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903000400	NB 0.500 INCHES	1	Nos	620	620
517	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903000500	NB 0.750 INCHES	10	Nos	620	6 200
518	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903000900	NB 2.000 INCHES	14	Nos	1 250	17 500
519	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903001300	NB 4.000 INCHES	9	Nos	2 490	22 410
520	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903001500	NB 6.000 INCHES	39	Nos	3 730	1 45 470
521	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903001600	NB 8.000 INCHES	173	Nos	4 970	8 59 810
522	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903001700	NB 10.000 INCHES	192	Nos	6 210	11 92 320
523	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903001800	NB 12.000 INCHES	96	Nos	7 460	7 16 160
524	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903001900	NB 14.000 INCHES	36	Nos	8 690	3 12 840
525	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903002000	NB 16.000 INCHES	142	Nos	9 940	14 11 480
526	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903002100	NB 18.000 INCHES	65	Nos	11 180	7 26 700
527	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903002200	NB 20.000 INCHES	31	Nos	12 430	3 85 330
528	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903002300	NB 22.000 INCHES	1	Nos	13 670	13 670
529	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903002400	NB 24.000 INCHES	111	Nos	14 910	16 55 010
530	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903002500	NB 26.000 INCHES	10	Nos	16 150	1 61 500
531	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903002600	NB 28.000 INCHES	21	Nos	17 400	3 65 400
532	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903002700	NB 30.000 INCHES	48	Nos	18 640	8 94 720
533	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903002800	NB 32.000 INCHES	4	Nos	19 880	79 520
534	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903002900	NB 34.000 INCHES	1	Nos	21 120	21 120
535	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903003000	NB 36.000 INCHES	90	Nos	22 370	20 13 300
536	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903003200	NB 40.000 INCHES	21	Nos	24 860	5 22 060
537	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903003300	NB 42.000 INCHES	8	Nos	26 090	2 08 720
538	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903003400	NB 44.000 INCHES	1	Nos	27 340	27 340
539	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903003600	NB 48.000 INCHES	10	Nos	29 830	2 98 300

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
540	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903003900	NB 54.000 INCHES	13	Nos	33 550	4 36 150
541	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903004200	NB 60.000 INCHES	1	Nos	37 270	37 270
542	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903004600	NB 68.000 INCHES	1	Nos	42 240	42 240
543	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903004800	NB 72.000 INCHES	1	Nos	44 730	44 730
544	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M12903005200	NB 80.000 INCHES	1	Nos	49 700	49 700
545	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13000000000	CHEMICAL CLEANING/PICKLING/DEGREASING/PASSIVATION :- Cleaning and pickling of equipment/pipeline includng preparation of circulation loop, supply of temporary piping, pumps, heater coils, gaskets, thermometer, hydrometer, valve, test coupon, spares, laboratory facilities, with all accessories for conducting test, chemicals, safety accessories and also providing or hiring all necessary equipment and whatever else even though not expressly mentioned herein and in specificaions but required to perform the work as per job specifications and instructions of Engineer-in-Charge.				
546	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001000000	CHEMICAL CLEANING AND PASSIVATION FOR CS PIPING OF COMPRESSOR CIRCUIT				
547	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001000400	NB 0.500 INCHES	160	Metres	290	46 400
548	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001000600	NB 1.000 INCHES	130	Metres	290	37 700
549	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001000800	NB 1.500 INCHES	520	Metres	440	2 28 800
550	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001000900	NB 2.000 INCHES	380	Metres	580	2 20 400
551	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001001100	NB 3.000 INCHES	5	Metres	870	4 350
552	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001001300	NB 4.000 INCHES	130	Metres	1 150	1 49 500
553	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001001500	NB 6.000 INCHES	170	Metres	1 740	2 95 800
554	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001001600	NB 8.000 INCHES	100	Metres	2 320	2 32 000
555	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001001700	NB 10.000 INCHES	455	Metres	2 890	13 14 950
556	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001001800	NB 12.000 INCHES	270	Metres	3 470	9 36 900
557	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001001900	NB 14.000 INCHES	30	Metres	4 050	1 21 500
558	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001002000	NB 16.000 INCHES	145	Metres	4 630	6 71 350
559	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001002100	NB 18.000 INCHES	135	Metres	5 210	7 03 350
560	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001002200	NB 20.000 INCHES	775	Metres	5 780	44 79 500
561	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001002400	NB 24.000 INCHES	365	Metres	6 950	25 36 750
562	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001002500	NB 26.000 INCHES	140	Metres	7 520	10 52 800
563	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001002600	NB 28.000 INCHES	125	Metres	8 100	10 12 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
564	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001002700	NB 30.000 INCHES	330	Metres	8 670	28 61 100
565	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001002800	NB 32.000 INCHES	90	Metres	9 260	8 33 400
566	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001003000	NB 36.000 INCHES	340	Metres	10 410	35 39 400
567	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001003300	NB 42.000 INCHES	100	Metres	12 150	12 15 000
568	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13001003600	NB 48.000 INCHES	10	Metres	13 880	1 38 800
569	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003000000	PASSIVATION OF COOLING WATER LINES				
570	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003000400	NB 0.500 INCHES	10	Metres	270	2 700
571	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003000500	NB 0.750 INCHES	30	Metres	270	8 100
572	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003000600	NB 1.000 INCHES	260	Metres	270	70 200
573	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003000800	NB 1.500 INCHES	15	Metres	410	6 150
574	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003000900	NB 2.000 INCHES	115	Metres	540	62 100
575	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003001100	NB 3.000 INCHES	300	Metres	800	2 40 000
576	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003001300	NB 4.000 INCHES	445	Metres	1 070	4 76 150
577	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003001500	NB 6.000 INCHES	515	Metres	1 610	8 29 150
578	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003001600	NB 8.000 INCHES	235	Metres	2 140	5 02 900
579	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003001700	NB 10.000 INCHES	795	Metres	2 680	21 30 600
580	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003001800	NB 12.000 INCHES	150	Metres	3 210	4 81 500
581	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003001900	NB 14.000 INCHES	880	Metres	3 750	33 00 000
582	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003002000	NB 16.000 INCHES	445	Metres	4 280	19 04 600
583	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003002100	NB 18.000 INCHES	1330	Metres	4 830	64 23 900
584	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003002200	NB 20.000 INCHES	295	Metres	5 360	15 81 200
585	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003002400	NB 24.000 INCHES	420	Metres	6 430	27 00 600
586	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003002500	NB 26.000 INCHES	120	Metres	6 970	8 36 400
587	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003002600	NB 28.000 INCHES	60	Metres	7 500	4 50 000
588	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003002700	NB 30.000 INCHES	75	Metres	8 040	6 03 000
589	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003002800	NB 32.000 INCHES	160	Metres	8 570	13 71 200
590	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003002900	NB 34.000 INCHES	160	Metres	9 110	14 57 600
591	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003003300	NB 42.000 INCHES	1990	Metres	11 250	2 23 87 500
592	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003003600	NB 48.000 INCHES	85	Metres	12 850	10 92 250
593	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003004300	NB 62.000 INCHES	275	Metres	16 610	45 67 750

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
594	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003004500	NB 66.000 INCHES	380	Metres	17 680	67 18 400
595	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003004800	NB 72.000 INCHES	65	Metres	19 280	12 53 200
596	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13003006000	NB 96.000 INCHES	30	Metres	25 710	7 71 300
597	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13400000000	SUPPLY OF STUDS ALONG WITH NUTS: Supply as per Technical Notes for Fasteners (6-44-0057) from Vendor enlisted in Project Master Supplier List of Studs along with two nuts for diameter < 1" and 3 nuts for diamemter >= 1"of nuts, as per the direction of Engineer in-charge. All Alloy steel fasteners used in SS Piping shall be Hot Dip Galvanized.				
598	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13401000000	AS FASTENERS (ASTM A193 GR.B7/B7M/A194 GR.2H/2HM)	0.13	Tonnes	2 41 000	31 330
599	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13402000000	AS FASTENERS (ASTM A193 GR.B16/A194 GR.7)	0.07	Tonnes	2 41 000	16 870
600	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13403000000	AS (IMPACT TESTED) FASTENERS (ASTM A320 GR.L7/A194 GR.7)	0.07	Tonnes	2 62 400	18 368
601	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13404000000	SS FASTENERS (ASTM A193 GR.B8/B8M/A194 GR.8/B8M)	0.07	Tonnes	4 82 000	33 740
602	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13405000000	SS (IMPACT TESTED) FASTENERS (ASTM A320 GR.B8CL.2/A194 GR.8)	0.07	Tonnes	4 82 000	33 740
603	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13406000000	SS (STRESS RUPTURE TESTED) FASTENERS (ASTM A453GR.660)	0.07	Tonnes	5 08 800	35 616
604	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13700000000	MODIFICATION/EXTRA WORKS (IF ANY) :- Cutting, bevelling, fitup, welding of different sizes of CS/AS/SS/Higher Alloy piping of all types and thicknessess in shop, in position, on ground/overhead on rack and at all elevations; transportation of pipes, fittings, flanges etc from owners storage point to work site/ work shop, making necessary scaffoldings, consumables, machinery, tools, tackles, labour and supervision including attending repairs for completing the work as per the instruction of Engineer-in-charge.				
605	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13701000000	FLAME CUTTING C.S PIPING IBR/NON IBR	5965	Inch Dia	250	14 91 250
606	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13702000000	HACKSAW CUTTING C.S PIPING IBR/NON IBR	1990	Inch Dia	270	5 37 300
607	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13703000000	BEVELLING C.S PIPING IBR/NON IBR	7955	Inch Dia	290	23 06 950
608	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13704000000	FITUP & WELDING C.S PIPING IBR/NON IBR	7955	Inch Dia	700	55 68 500
609	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13705000000	FLAME CUTTING S.S PIPING IBR/NON IBR	690	Inch Dia	340	2 34 600
610	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13706000000	HACKSAW CUTTING S.S PIPING IBR/NON IBR	230	Inch Dia	430	98 900
611	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13707000000	BEVELLING S.S PIPING IBR/NON IBR	920	Inch Dia	440	4 04 800
612	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13708000000	FITUP & WELDING S.S PIPING IBR/NON IBR	920	Inch Dia	1 250	11 50 000
613	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13709000000	FLAME CUTTING A.S PIPING IBR/NON IBR	35	Inch Dia	310	10 850
614	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13710000000	HACKSAW CUTTING A.S PIPING IBR/NON IBR	15	Inch Dia	360	5 400
615	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13711000000	BEVELLING A.S PIPING IBR/NON IBR	50	Inch Dia	410	20 500
616	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13712000000	FITUP & WELDING A.S PIPING IBR/NON IBR	50	Inch Dia	1 080	54 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
617	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13713000000	FLAME CUTTING NICKEL/MONEL/INCOLOY PIPING	5	Inch Dia	490	2 450
618	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13714000000	HACKSAW CUTTING NICKEL/MONEL/INCOLOY PIPING	5	Inch Dia	640	3 200
619	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13715000000	BEVELLING NICKEL/MONEL/INCOLOY PIPING	5	Inch Dia	670	3 350
620	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13716000000	FITUP & WELDING NICKEL/MONEL/INCOLOY PIPING	5	Inch Dia	4 770	23 850
621	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13717000000	FLAME CUTTING OF DUPLEX SS PIPING	5	Inch Dia	520	2 600
622	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13718000000	HACKSAW CUTTING OF DUPLEX SS PIPING	5	Inch Dia	640	3 200
623	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13719000000	BEVELLING OF DUPLEX SS PIPING	5	Inch Dia	660	3 300
624	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13720000000	FITUP & WELDING OF DUPLEX SS PIPING	5	Inch Dia	1 860	9 300
625	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13800000000	REMOVAL ERECTED PIPING(ABOVE GROUND) :- Removal of piping existing/ erected including SW valves for modification as required as per Drawings/P and IDs/instructions of Engineer-in-charge at all elevations, including providing assistance to owner for draining, cleaning and purging of the lines to be removed , unbolting of flanged joints /cutting of pipe lines wherever required, installation of flanges and blind flanges, removal of insulation from insulated lines, removing supports, steam tracers, all fittings and flanges, instruments etc, cutting of pipes in appropriate length for transporting purposes, cleaning, flushing, drying and transporting all materials to storage point(within the complex battery limits) designated by Owner/EIL including stacking of material and disposing of waste etc as instructed by Engineer-in-charge.				
626	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13801000000	C.S/A.S PIPING	17040	Inch M	380	64 75 200
627	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13802000000	S.S PIPING	1580	Inch M	580	9 16 400
628	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13803000000	NICKEL/MONEL/INCOLOY PIPING	5	Inch M	1 260	6 300
629	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13804000000	DUPLEX SS PIPING	5	Inch M	740	3 700
630	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13900000000	REMOVAL OF ERECTED VALVES (ABOVE GROUND) :- Removal of all types and ratings of valves by unbolting, cutting etc. as required, cleaning by flushing with water/air etc. as required and transportation of the same to Owner's storage point (within thecomplex battery limits) and stacking as per instructions of Engineer-in-Charge.				
631	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901000000	VALVES OTHER THAN CONTROL VALVES				
632	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901000400	NB 0.500 INCHES	1	Nos	510	510
633	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901000800	NB 1.500 INCHES	1	Nos	640	640
634	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901000900	NB 2.000 INCHES	1	Nos	850	850
635	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901001100	NB 3.000 INCHES	1	Nos	1 290	1 290
636	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901001300	NB 4.000 INCHES	1	Nos	1 720	1 720

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
637	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901001500	NB 6.000 INCHES	1	Nos	2 570	2 570
638	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901001600	NB 8.000 INCHES	1	Nos	3 430	3 430
639	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901001700	NB 10.000 INCHES	1	Nos	4 280	4 280
640	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901001800	NB 12.000 INCHES	1	Nos	5 140	5 140
641	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901001900	NB 14.000 INCHES	1	Nos	6 000	6 000
642	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901002000	NB 16.000 INCHES	1	Nos	6 850	6 850
643	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901002100	NB 18.000 INCHES	1	Nos	7 720	7 720
644	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901002200	NB 20.000 INCHES	1	Nos	8 570	8 570
645	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901002400	NB 24.000 INCHES	1	Nos	10 290	10 290
646	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901002700	NB 30.000 INCHES	1	Nos	12 850	12 850
647	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901003000	NB 36.000 INCHES	1	Nos	15 420	15 420
648	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13901003300	NB 42.000 INCHES	1	Nos	17 990	17 990
649	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13902000000	CONTROL VALVES				
650	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13902000400	NB 0.500 INCHES	1	Nos	620	620
651	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13902000900	NB 2.000 INCHES	1	Nos	1 240	1 240
652	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13902001100	NB 3.000 INCHES	1	Nos	1 860	1 860
653	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13902001300	NB 4.000 INCHES	1	Nos	2 490	2 490
654	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13902001500	NB 6.000 INCHES	1	Nos	3 730	3 730
655	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13902001600	NB 8.000 INCHES	1	Nos	4 970	4 970
656	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13902001700	NB 10.000 INCHES	1	Nos	6 210	6 210
657	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M13902001800	NB 12.000 INCHES	1	Nos	6 560	6 560
658	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M14100000000	LOW FRICTION PADS: Supply, fabrication and fixing of low friction pads with suitable bonding materials / fasteners, as specified in Drawings / Isometrics / Special support sketches.				
659	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M14101000000	TEFLON PAD WITH COMPRESSIVE STRENGTH (0.25 OFFSET) :1870 PSI	3	Cu. M	26 35 190	79 05 570
660	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M14102000000	GRAPHITE PAD WITH COMPRESSIVE STRENGTH : 2877 PSI	5	Cu. M	23 71 680	1 18 58 400
661	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M15200000000	PIPE DAVITS : Supply, fabrication & erection of pipe davits as per EIL std. 7-12-023 for lowering of aircooler motors/safety valves from structural platforms, fixing the same to platforms, inspection as per specs., supply of all necessary materials, equipment, consumables, labour, supervision etc. The work shall be carried out as per the specifications, drawings & instruction of engineerincharge.				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
662	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M15201000000		9	MT	2 63 550	23 71 950
663	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19901000000	Roto-mol cleaning method for pipes:- Cleaning shall be followed up with boroscopy for checking the cleanliness inside the pipe. Contractor has to offer boroscopy of the lines to BPCL/EIL representatives ensuring satisfactory internal cleaning of lines. All spading, de-spading, erection/dismantling of scaffolding, all tools and tackles, Farhana, Roto-mol Machine, boroscopy machine, Cables from nearest 440V socket, panel and all other accessories Including hose connection jobs required for successful completion of job shall be in the scope of contractor. Contractor to quote on per inch meter basis. For example, if contractor has carried out rotomol cleaning and boroscopy of 10" header for a length of 3 metres, the quantity shall be 10X3=30 inch metre.	26000	Inch M	370	96 20 000
664	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19901100000	Supply and Installation of Pre-insulated SS Tubing for Steam Tracing : Supply, fabrication, erection, supporting, testing etc., of Pre insulated SS Tubing from the Steam supply distribution manifold outlet upto the traced pipe & from the traced pipe to the Condensate Recovery manifold including supply of all materials i.e. pre insulated tube, tube connectors (including adaptor for joining tube with CS pipe), tube fittings, clamps, supports etc.; including tube bending, cutting, end preparation, making connections, supporting etc. as per specification (B018-6-44-0022), manufacturer specification, standard & guidelines etc. with all other tools and tackles including bending/crimping tools, sealing kits etc., skilled manpower including adequate prevention from dust contamination etc. to complete the work in all respect at all elevations as per the directions of the Engineer In charge. -				
665	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19901110000	PREINSULATED SS TUBING -				
666	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19901120000	NB 0.500 INCHES -	38870	Metres	1 920	7 46 30 400
667	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902000000	RADIOGRAPHY :- Performance of radiographic inspection on piping of all types and thicknesses including providing or hiring of all necessary equipment and whatever else even though not expressly mentioned but required to perform the work as per specifications and instructions of Engineer-in-Charge. Radiographs shall be submitted to the Engineer-in-charge. (Repeat Radiography due to defective radiograph on repaired joints due to Contractors fault and for additional radiography necessitated due to poor performance of contractors welders shall be done at contractors cost) Note: Unit for radiography quantity is Nos of circumferencial weld joints.				
668	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902010000	Digital Radiography (40%)				
669	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902010100	FOR JOINTS THK. <= 8MM (FOR CS OTHER THAN CLASS IV OF JOB NDE SPECIFICATION)				
670	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902010200	NB 0.50 INCHES	1	NOs	1 050	1 050

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
671	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902010300	NB 0.750 INCHES	70	NOs	1 050	73 500
672	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902010400	NB 1.000 INCHES	17	NOs	1 050	17 850
673	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902010500	NB 1.500 INCHES	9	NOs	1 580	14 220
674	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902010600	NB 2.000 INCHES	1381	NOs	2 100	29 00 100
675	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902010700	NB 3.000 INCHES	645	NOs	2 220	14 31 900
676	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902010800	NB 4.000 INCHES	372	NOs	2 950	10 97 400
677	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902010900	NB 6.000 INCHES	805	NOs	4 440	35 74 200
678	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902011000	FOR JOINTS THK. <= 8MM (FOR CS AS PER CLASS IV OF JOB NDE SPECIFICATION/AS/SS)				
679	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902011100	NB 0.500 INCHES	1	Nos	1 050	1 050
680	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902011200	NB 0.750 INCHES	87	NOs	1 050	91 350
681	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902011300	NB 1.000 INCHES	14	NOs	1 050	14 700
682	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902011400	NB 1.500 INCHES	10	NOs	1 580	15 800
683	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902011500	NB 2.000 INCHES	840	NOs	2 100	17 64 000
684	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902011600	NB 3.000 INCHES	382	NOs	2 320	8 86 240
685	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902011700	NB 4.000 INCHES	342	Nos	3 090	10 56 780
686	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902011800	NB 6.000 INCHES	605	Nos	4 630	28 01 150
687	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902011900	NB 8.000 INCHES	433	Nos	6 170	26 71 610
688	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902012000	NB 10.000 INCHES	324	Nos	7 720	25 01 280
689	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902012100	NB 12.000 INCHES	83	Nos	9 260	7 68 580
690	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902012200	NB 14.000 INCHES	164	Nos	10 800	17 71 200
691	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902012300	NB 16.000 INCHES	204	Nos	12 340	25 17 360
692	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902012400	NB 18.000 INCHES	95	Nos	13 880	13 18 600
693	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902012500	NB 20.000 INCHES	307	Nos	15 420	47 33 940
694	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902012600	NB 24.000 INCHES	107	Nos	18 510	19 80 570
695	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902012700	NB 28.000 INCHES	39	Nos	21 600	8 42 400
696	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902012800	NB 30.000 INCHES	34	Nos	23 140	7 86 760
697	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902012900	FOR JOINTS ABOVE THK. 8MM				
698	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902013000	NB 0.750 INCHES	26	Nos	850	22 100
699	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902013100	NB 2.000 INCHES	35	Nos	1 720	60 200
700	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902013200	NB 4.000 INCHES	18	Nos	3 430	61 740

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
701	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902013300	NB 6.000 INCHES	79	Nos	5 140	4 06 060
702	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902013400	NB 8.000 INCHES	346	Nos	6 850	23 70 100
703	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902013500	NB 10.000 INCHES	386	Nos	8 570	33 08 020
704	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902013600	NB 12.000 INCHES	192	Nos	10 290	19 75 680
705	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902013700	NB 14.000 INCHES	74	Nos	12 000	8 88 000
706	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902013800	NB 16.000 INCHES	285	Nos	13 710	39 07 350
707	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902013900	NB 18.000 INCHES	130	Nos	15 420	20 04 600
708	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902014000	NB 20.000 INCHES	62	Nos	15 420	9 56 040
709	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902014100	NB 22.000 INCHES	1	Nos	16 970	16 970
710	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902014200	NB 24.000 INCHES	221	Nos	18 510	40 90 710
711	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902014300	NB 26.000 INCHES	22	Nos	20 050	4 41 100
712	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902014400	NB 28.000 INCHES	43	Nos	21 600	9 28 800
713	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902014500	NB 30.000 INCHES	98	Nos	23 140	22 67 720
714	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902014600	NB 32.000 INCHES	8	Nos	24 680	1 97 440
715	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902014700	NB 34.000 INCHES	1	Nos	26 230	26 230
716	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902014800	NB 36.000 INCHES	179	Nos	27 770	49 70 830
717	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902014900	NB 40.000 INCHES	42	Nos	30 850	12 95 700
718	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902015000	NB 42.000 INCHES	17	Nos	32 400	5 50 800
719	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902015100	NB 44.000 INCHES	1	Nos	33 940	33 940
720	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902015200	NB 48.000 INCHES	21	Nos	37 020	7 77 420
721	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902015300	NB 54.000 INCHES	26	Nos	41 650	10 82 900
722	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902015400	NB 60.000 INCHES	3	Nos	46 280	1 38 840
723	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902015500	NB 68.000 INCHES	1	Nos	52 450	52 450
724	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902015600	NB 72.000 INCHES	1	Nos	55 540	55 540
725	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902015700	NB 80.000 INCHES	1	Nos	61 700	61 700
726	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902020000	Conventional radiography (30 %)				
727	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902020100	FOR JOINTS THK. <= 8MM (FOR CS OTHER THAN CLASS IV OF JOB NDE SPECIFICATION)				
728	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902020200	NB 0.500 INCHES	1	Nos	490	490
729	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902020300	NB 0.750 INCHES	30	Nos	490	14 700
730	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902020400	NB 1.000 INCHES	8	Nos	490	3 920

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
731	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902020500	NB 1.500 INCHES	4	Nos	520	2 080
732	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902020600	NB 2.000 INCHES	592	Nos	690	4 08 480
733	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902020700	NB 3.000 INCHES	277	Nos	1 030	2 85 310
734	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902020800	NB 4.000 INCHES	186	Nos	1 370	2 54 820
735	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902020900	NB 6.000 INCHES	402	Nos	2 060	8 28 120
736	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902021000	FOR JOINTS THK. <= 8MM (FOR CS AS PER CLASS IV OF JOB NDE SPECIFICATION/AS/SS)			2 740	
737	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902021100	NB 0.500 INCHES	1	Nos	490	490
738	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902021200	NB 0.750 INCHES	38	Nos	490	18 620
739	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902021300	NB 1.000 INCHES	7	Nos	490	3 430
740	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902021400	NB 1.500 INCHES	4	Nos	520	2 080
741	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902021500	NB 2.000 INCHES	360	Nos	690	2 48 400
742	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902021600	NB 3.000 INCHES	164	Nos	1 030	1 68 920
743	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902021700	NB 4.000 INCHES	170	Nos	1 370	2 32 900
744	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902021800	NB 6.000 INCHES	303	Nos	2 060	6 24 180
745	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902021900	NB 8.000 INCHES	217	Nos	2 750	5 96 750
746	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902022000	NB 10.000 INCHES	163	Nos	3 430	5 59 090
747	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902022100	NB 12.000 INCHES	42	Nos	4 120	1 73 040
748	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902022200	NB 14.000 INCHES	82	Nos	4 800	3 93 600
749	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902022300	NB 16.000 INCHES	101	Nos	5 480	5 53 480
750	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902022400	NB 18.000 INCHES	47	Nos	6 170	2 89 990
751	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902022500	NB 20.000 INCHES	153	Nos	6 850	10 48 050
752	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902022600	NB 24.000 INCHES	53	Nos	8 230	4 36 190
753	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902022700	NB 28.000 INCHES	20	Nos	9 600	1 92 000
754	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902022800	NB 30.000 INCHES	17	Nos	10 290	1 74 930
755	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902022900	FOR JOINTS ABOVE THK. 8MM			4 110	
756	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902023000	NB 0.750 INCHES	16	Nos	370	5 920
757	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902023100	NB 2.000 INCHES	21	Nos	690	14 490
758	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902023200	NB 4.000 INCHES	14	Nos	1 370	19 180
759	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902023300	NB 6.000 INCHES	59	Nos	2 060	1 21 540
760	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902023400	NB 8.000 INCHES	259	Nos	2 750	7 12 250

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
761	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902023500	NB 10.000 INCHES	289	Nos	3 430	9 91 270
762	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902023600	NB 12.000 INCHES	144	Nos	4 120	5 93 280
763	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902023700	NB 14.000 INCHES	55	Nos	4 800	2 64 000
764	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902023800	NB 16.000 INCHES	213	Nos	5 480	11 67 240
765	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902023900	NB 18.000 INCHES	98	Nos	6 170	6 04 660
766	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902024000	NB 20.000 INCHES	47	Nos	6 850	3 21 950
767	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902024100	NB 22.000 INCHES	1	Nos	7 540	7 540
768	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902024200	NB 24.000 INCHES	166	Nos	8 230	13 66 180
769	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902024300	NB 26.000 INCHES	17	Nos	8 910	1 51 470
770	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902024400	NB 28.000 INCHES	31	Nos	9 600	2 97 600
771	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902024500	NB 30.000 INCHES	73	Nos	10 290	7 51 170
772	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902024600	NB 32.000 INCHES	5	Nos	10 970	54 850
773	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902024700	NB 34.000 INCHES	1	Nos	11 660	11 660
774	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902024800	NB 36.000 INCHES	134	Nos	12 340	16 53 560
775	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902024900	NB 40.000 INCHES	31	Nos	13 710	4 25 010
776	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902025000	NB 42.000 INCHES	13	Nos	14 390	1 87 070
777	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902025200	NB 48.000 INCHES	16	Nos	16 450	2 63 200
778	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902025300	NB 54.000 INCHES	20	Nos	18 510	3 70 200
779	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902025400	NB 60.000 INCHES	1	Nos	20 570	20 570
780	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902025500	NB 72.000 INCHES	1	Nos	24 680	24 680
781	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902030000	Close proximity Radiography (10%)				
782	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902030100	FOR JOINTS THK. <= 8MM (FOR CS OTHER THAN CLASS IV OF JOB NDE SPECIFICATION)				
783	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902030300	NB 0.75 INCHES	1	NOs	620	620
784	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902030400	NB 1.00 INCHES	1	NOs	620	620
785	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902030500	NB 1.50 INCHES	1	NOs	940	940
786	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902030600	NB 2.000 INCHES	1	NOs	1 250	1 250
787	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902030700	NB 3.000 INCHES	1	Nos	1 860	1 860
788	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902030800	NB 4.000 INCHES	62	Nos	2 490	1 54 380
789	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902030900	NB 6.000 INCHES	134	Nos	2 890	3 87 260
790	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902031000	FOR JOINTS THK. <= 8MM (FOR CS AS PER CLASS IV OF JOB NDE SPECIFICATION/AS/SS)			9 640	

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
791	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902031100	NB 0.500 INCHES	1	Nos	620	620
792	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902031200	NB 0.750 INCHES	1	Nos	620	620
793	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902031300	NB 1.000 INCHES	1	Nos	620	620
794	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902031400	NB 1.500 INCHES	1	Nos	940	940
795	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902031500	NB 2.000 INCHES	1	Nos	1 250	1 250
796	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902031600	NB 3.000 INCHES	1	Nos	1 860	1 860
797	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902031700	NB 4.000 INCHES	57	Nos	2 490	1 41 930
798	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902031800	NB 6.000 INCHES	101	Nos	2 890	2 91 890
799	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902031900	NB 8.000 INCHES	73	Nos	3 860	2 81 780
800	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902032000	NB 10.000 INCHES	55	Nos	4 830	2 65 650
801	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902032100	NB 12.000 INCHES	14	Nos	5 780	80 920
802	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902032200	NB 14.000 INCHES	27	Nos	6 750	1 82 250
803	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902032300	NB 16.000 INCHES	34	Nos	7 720	2 62 480
804	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902032400	NB 18.000 INCHES	16	Nos	8 670	1 38 720
805	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902032500	NB 20.000 INCHES	51	Nos	9 640	4 91 640
806	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902032600	NB 24.000 INCHES	18	Nos	11 560	2 08 080
807	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902032700	NB 28.000 INCHES	7	Nos	13 500	94 500
808	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902032800	NB 30.000 INCHES	5	Nos	14 470	72 350
809	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902032900	FOR JOINTS ABOVE THK. 8MM			4 820	
810	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902033000	NB 0.750 INCHES	1	Nos	620	620
811	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902033100	NB 2.000 INCHES	1	Nos	1 250	1 250
812	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902033200	NB 4.000 INCHES	5	Nos	2 490	12 450
813	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902033300	NB 6.000 INCHES	20	Nos	2 890	57 800
814	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902033400	NB 8.000 INCHES	86	Nos	3 860	3 31 960
815	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902033500	NB 10.000 INCHES	96	Nos	4 830	4 63 680
816	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902033600	NB 12.000 INCHES	48	Nos	5 780	2 77 440
817	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902033700	NB 14.000 INCHES	18	Nos	6 750	1 21 500
818	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902033800	NB 16.000 INCHES	72	Nos	7 720	5 55 840
819	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902033900	NB 18.000 INCHES	33	Nos	8 670	2 86 110
820	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902034000	NB 20.000 INCHES	16	Nos	9 640	1 54 240

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
821	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902034100	NB 22.000 INCHES	1	Nos	10 610	10 610
822	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902034200	NB 24.000 INCHES	56	Nos	11 560	6 47 360
823	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902034300	NB 26.000 INCHES	5	Nos	12 530	62 650
824	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902034400	NB 28.000 INCHES	10	Nos	13 500	1 35 000
825	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902034500	NB 30.000 INCHES	25	Nos	14 470	3 61 750
826	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902034600	NB 32.000 INCHES	1	Nos	15 420	15 420
827	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902034800	NB 36.000 INCHES	44	Nos	17 360	7 63 840
828	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902034900	NB 40.000 INCHES	10	Nos	19 280	1 92 800
829	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902035000	NB 42.000 INCHES	4	Nos	20 250	81 000
830	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902035200	NB 48.000 INCHES	5	Nos	23 140	1 15 700
831	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19902035400	NB 54.000 INCHES	7	Nos	26 030	1 82 210
832	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903000000	In-situ flange serration for flanges				
833	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903010000	NB 2 INCH - 6 INCH	52	NOs	8 160	4 24 320
834	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903020000	NB 8 INCH - 14 INCH	65	NOs	22 440	14 58 600
835	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903030000	NB 16 INCH - 24 INCH	65	NOs	40 810	26 52 650
836	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903040000	NB 26 INCH - 36 INCH	33	NOs	63 250	20 87 250
837	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903050000	NB 38 INCH - 48 INCH	26	NOs	87 730	22 80 980
838	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903060000	NB > 48 INCH	13	NOs	1 22 430	15 91 590
839	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903100000	Valve servicing and gland packing replacement/hydrotest				
840	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903110000	UPTO 1.5 INCH	130	NOs	1 210	1 57 300
841	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903120000	NB 2 INCH - 6 INCH	130	NOs	3 210	4 17 300
842	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903130000	NB 8 INCH - 14 INCH	130	NOs	8 820	11 46 600
843	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903140000	NB 16 INCH - 24 INCH	65	NOs	16 050	10 43 250
844	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903150000	NB 26 INCH - 36 INCH	33	NOs	24 870	8 20 710
845	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903160000	NB 38 INCH - 48 INCH	33	NOs	34 500	11 38 500
846	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19903170000	NB > 48 INCH	7	NOs	48 130	3 36 910

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
847	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944000000	ABOVE GROUND GALVANIZED CARBON STEEL PIPING: Supplying and laying of above ground galvanized carbon steel piping for services like Fire water, Drinking water etc. Piping covers supply, fabrication, erection, bending, hydrotesting etc. of pipes, flanges, fittings, valves, gaskets & bolts etc. conforming to piping material specification class J2A/J95A including supply of Teflon tapes, white lead etc., cutting the pipes to required lengths, making threads, including laying of pipes on pipe rack, sleepers, T-supports, erection of piping on equipments, pumps etc. including joining of pipes and fittings with threaded/ flanged connections, hydrostatic testing of the piping. The work shall be completed in totality as per specifications, P&IDs, drawings and instructions of Engineer in-charge. -				
848	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944010000	PIPING (INCLUDES PIPES, FLANGES, FITTINGS, GASKETS, FASTENERS ETC. EXCEPT VALVES): -				
849	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944010400	NB 0.500 INCHES	1125	Metres	750	8 43 750
850	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944010600	NB 1.000 INCHES	4350	Metres	1 200	52 20 000
851	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944010800	NB 1.500 INCHES	1950	Metres	1 860	36 27 000
852	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944010900	NB 2.000 INCHES	4395	Metres	2 410	1 05 91 950
853	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944011100	NB 3.000 INCHES	1905	Metres	3 560	67 81 800
854	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944011300	NB 4.000 INCHES	970	Metres	4 900	47 53 000
855	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944011500	NB 6.000 INCHES	1095	Metres	8 250	90 33 750
856	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944011600	NB 8.000 INCHES	2620	Metres	11 750	3 07 85 000
857	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944011700	NB 10.000 INCHES	130	Metres	15 970	20 76 100
858	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944011800	NB 12.000 INCHES	3670	Metres	19 400	7 11 98 000
859	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944020000	VALVES				
860	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944020500	NB 0.750 INCHES	1	Nos	3 280	3 280
861	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944020800	NB 1.500 INCHES	1	Nos	8 320	8 320
862	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M19944020900	NB 2.000 INCHES	65	Nos	13 010	8 45 650

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
863	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M30000000000	PAINTING (UNITS) :- Supply of paints and primers, preparation of surfaces and application of primer and finish paints, identification (Line numbering), lettering, colour bands, colour coding etc. as specified including rubdown and touch up of shop primer wherever required, providing scaffolding for all heights, labour, material, tools and tackles, consumables supervision etc. to complete the work in all respects as per Job Specification, drawings and direction of Engineer-in-Charge for all types of uninsulated piping and insulated piping as specified including all pipes, fittings, flanges, supports, valves etc. Surface preparation by blast cleaning and application of first coat of primer (inorganic zinc silicate, F9) shall be done in fabrication yard prior to erection. For insulated piping wherever blast cleaning with no primer application is specified, in such cases finish paints shall also be applied in the fabrication yard. The identification marks of the piping and joints shall be noted before blasting and the same shall be transferred on primed surface with Polyurethane paint (F2) or as per the instructions of Engineer-in-Charge. Notes: 1. All joints (fabrication as well as erection joints) shall be left unpainted till hydrotesting. 2. No extra payment shall be made for identification (line numbering etc.) of insulated and uninsulated lines.				
864	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39100000000	PAINTING OF UNINSULATED PIPING FOR 'CORROSIVE' ENVIRONMENT AS PER TABLE 6 OF JOB SPEC B957-000-6-42-PLS-01 REV 2 FOR CS/LTCS/AS.				
865	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102000000	DESIGN TEMP GROUP: -14 TO 80(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1coat of F-9 @ 65-75mu DFT/ coat + 1 coat of P-6 @ 40 mu DFT/ coat, Intermediate coat: 2 coats of F-6B @ 100 mu DFT / coat, Final coat: 1 coat of F-2 @ 40 mu DFT/coat, Total DFT: 345-355 mu.				
866	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102010000	PIPES				
867	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102010400	NB: .5 Inches	590	Metres	70	41 300
868	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102010500	NB: .75 Inches	115	Metres	90	10 350
869	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102010600	NB: 1 Inches	4805	Metres	110	5 28 550
870	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102010800	NB: 1.5 Inches	1820	Metres	150	2 73 000
871	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102010900	NB: 2 Inches	6280	Metres	190	11 93 200
872	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102011100	NB: 3 Inches	5610	Metres	280	15 70 800
873	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102011300	NB: 4 Inches	4055	Metres	360	14 59 800
874	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102011500	NB: 6 Inches	5645	Metres	530	29 91 850
875	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102011600	NB: 8 Inches	2570	Metres	700	17 99 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
876	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102011700	NB: 10 Inches	5	Metres	870	4 350
877	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102011800	NB: 12 Inches	5	Metres	1 030	5 150
878	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102012400	NB: 24 Inches	10	Metres	1 930	19 300
879	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102012600	NB: 28 Inches	5	Metres	2 250	11 250
880	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102012700	NB: 30 Inches	15	Metres	2 420	36 300
881	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102012900	NB: 34 Inches	140	Metres	2 740	3 83 600
882	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102013000	NB: 36 Inches	400	Metres	2 900	11 60 000
883	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102013200	NB: 40 Inches	415	Metres	3 220	13 36 300
884	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102013300	NB: 42 Inches	1960	Metres	3 380	66 24 800
885	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102013400	NB: 44 Inches	5	Metres	3 540	17 700
886	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102020000	VALVES				
887	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102020900	NB: 2 Inches	1355	Nos.	290	3 92 950
888	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102021100	NB: 3 Inches	189	Nos.	420	79 380
889	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102021300	NB: 4 Inches	120	Nos.	540	64 800
890	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102021500	NB: 6 Inches	172	Nos.	800	1 37 600
891	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102021600	NB: 8 Inches	125	Nos.	1 040	1 30 000
892	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102021700	NB: 10 Inches	73	Nos.	1 300	94 900
893	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102021800	NB: 12 Inches	16	Nos.	1 540	24 640
894	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102021900	NB: 14 Inches	35	Nos.	1 690	59 150
895	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102022000	NB: 16 Inches	23	Nos.	1 930	44 390
896	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102022100	NB: 18 Inches	12	Nos.	2 170	26 040
897	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102022200	NB: 20 Inches	12	Nos.	2 420	29 040
898	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102022400	NB: 24 Inches	30	Nos.	2 900	87 000
899	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102022500	NB: 26 Inches	3	Nos.	3 140	9 420
900	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102023000	NB: 36 Inches	5	Nos.	4 350	21 750
901	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102023200	NB: 40 Inches	8	Nos.	4 830	38 640
902	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39102023300	NB: 42 Inches	4	Nos.	5 070	20 280
903	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103000000	DESIGN TEMP GROUP: 81 TO 250(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1coat of F-9 @ 65-75mu DFT/coat + 1 coats of F-11 @ 20mu DFT/coat, Intermediate coat: None, Final coat: 1 coat of F-11 @ 20mu DFT/coat, Total DFT: 105-115				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
904	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103010000	PIPES				
905	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103010400	NB: .5 Inches	510	Metres	50	25 500
906	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103010500	NB: .75 Inches	125	Metres	60	7 500
907	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103010600	NB: 1 Inches	350	Metres	70	24 500
908	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103010800	NB: 1.5 Inches	855	Metres	100	85 500
909	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103010900	NB: 2 Inches	9060	Metres	130	11 77 800
910	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103011100	NB: 3 Inches	6460	Metres	190	12 27 400
911	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103011300	NB: 4 Inches	5050	Metres	240	12 12 000
912	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103011500	NB: 6 Inches	6525	Metres	350	22 83 750
913	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103011600	NB: 8 Inches	6550	Metres	460	30 13 000
914	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103011700	NB: 10 Inches	1235	Metres	570	7 03 950
915	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103011800	NB: 12 Inches	160	Metres	680	1 08 800
916	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103012000	NB: 16 Inches	40	Metres	850	34 000
917	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103012100	NB: 18 Inches	40	Metres	950	38 000
918	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103012200	NB: 20 Inches	160	Metres	1 060	1 69 600
919	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103012400	NB: 24 Inches	115	Metres	1 270	1 46 050
920	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103012600	NB: 28 Inches	15	Metres	1 480	22 200
921	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103012700	NB: 30 Inches	220	Metres	1 590	3 49 800
922	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103012800	NB: 32 Inches	270	Metres	1 690	4 56 300
923	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103012900	NB: 34 Inches	25	Metres	1 800	45 000
924	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103013000	NB: 36 Inches	395	Metres	1 910	7 54 450
925	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103013200	NB: 40 Inches	1115	Metres	2 120	23 63 800
926	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103013300	NB: 42 Inches	505	Metres	2 220	11 21 100
927	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103013400	NB: 44 Inches	85	Metres	2 330	1 98 050
928	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103013600	NB: 48 Inches	40	Metres	2 650	1 06 000
929	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103014200	NB: 60 Inches	315	Metres	3 180	10 01 700
930	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103014800	NB: 72 Inches	260	Metres	3 810	9 90 600
931	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103015200	NB: 80 Inches	140	Metres	4 240	5 93 600
932	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103020000	VALVES				
933	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103020900	NB: 2 Inches	317	Nos.	190	60 230

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
934	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103021100	NB: 3 Inches	205	Nos.	280	57 400
935	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103021300	NB: 4 Inches	173	Nos.	360	62 280
936	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103021500	NB: 6 Inches	186	Nos.	530	98 580
937	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103021600	NB: 8 Inches	105	Nos.	690	72 450
938	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103021700	NB: 10 Inches	78	Nos.	850	66 300
939	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103021800	NB: 12 Inches	22	Nos.	1 010	22 220
940	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103021900	NB: 14 Inches	30	Nos.	1 110	33 300
941	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103022000	NB: 16 Inches	40	Nos.	1 270	50 800
942	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103022100	NB: 18 Inches	8	Nos.	1 430	11 440
943	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103022200	NB: 20 Inches	20	Nos.	1 590	31 800
944	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103022400	NB: 24 Inches	18	Nos.	1 910	34 380
945	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103022700	NB: 30 Inches	4	Nos.	2 380	9 520
946	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39103023200	NB: 40 Inches	7	Nos.	3 180	22 260
947	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104000000	DESIGN TEMP GROUP: 251 TO 400(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1coat of F-9 @ 65-75mu DFT/ coat + 1 coats of F- 12 @ 20mu DFT/coat, Intermediate coat: None, Final coat: 1 coat of F-12 @ 20mu DFT/coat, Total DFT: 105-115 mu				
948	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104010000	PIPES				
949	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104010400	NB: .5 Inches	5	Metres	60	300
950	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104010500	NB: .75 Inches	15	Metres	70	1 050
951	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104010600	NB: 1 Inches	5	Metres	90	450
952	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104010800	NB: 1.5 Inches	5	Metres	120	600
953	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104010900	NB: 2 Inches	645	Metres	160	1 03 200
954	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104011100	NB: 3 Inches	505	Metres	230	1 16 150
955	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104011300	NB: 4 Inches	370	Metres	290	1 07 300
956	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104011500	NB: 6 Inches	140	Metres	430	60 200
957	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104011600	NB: 8 Inches	275	Metres	560	1 54 000
958	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104012400	NB: 24 Inches	115	Metres	1 560	1 79 400
959	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104013000	NB: 36 Inches	30	Metres	2 350	70 500
960	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104013200	NB: 40 Inches	300	Metres	2 610	7 83 000
961	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104013300	NB: 42 Inches	70	Metres	2 740	1 91 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
962	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104020000	VALVES				
963	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104020900	NB: 2 Inches	9	Nos.	230	2 070
964	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104021300	NB: 4 Inches	1	Nos.	440	440
965	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39104021500	NB: 6 Inches	9	Nos.	650	5 850
966	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39105000000	DESIGN TEMP GROUP: 401 TO 650(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1 coat of F-16 @ 125 mu, Intermediate coat: None, Final coat: 1 coat of F-16 @ 125mu, Total DFT: 250-300 mu				
967	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39105010000	PIPES				
968	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39105010600	NB: 1 Inches	5	Metres	130	650
969	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39105011100	NB: 3 Inches	140	Metres	350	49 000
970	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39105020000	VALVES				
971	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39105020900	NB: 2 Inches	3	Nos.	350	1 050
972	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39200000000	PAINTING OF INSULATED PIPING OF CS & AS FOR 'CORROSIVE' ENVIRONMENT AS PER TABLE 11 OF JOB SPEC B957-000-6-42-PLS-01 REV 2 FOR CS/LTCS/AS.				
973	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201000000	DESIGN TEMP GROUP: -45 TO 125(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1coat of F-15 @ 100mu DFT/coat, Primer: None, Finish paint: 2 coats of F-15 @ 100mu DFT/coat, Total DFT 300 mu				
974	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201010000	PIPES				
975	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201010500	NB: .75 Inches	25	Metres	80	2 000
976	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201010600	NB: 1 Inches	150	Metres	100	15 000
977	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201010800	NB: 1.5 Inches	10	Metres	140	1 400
978	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201010900	NB: 2 Inches	800	Metres	170	1 36 000
979	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201011100	NB: 3 Inches	400	Metres	250	1 00 000
980	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201011300	NB: 4 Inches	1240	Metres	320	3 96 800
981	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201011500	NB: 6 Inches	1485	Metres	480	7 12 800
982	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201011600	NB: 8 Inches	830	Metres	620	5 14 600
983	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201011700	NB: 10 Inches	5	Metres	770	3 850
984	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201011800	NB: 12 Inches	5	Metres	920	4 600
985	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201011900	NB: 14 Inches	10	Metres	1 010	10 100
986	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201012000	NB: 16 Inches	295	Metres	1 150	3 39 250
987	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201012100	NB: 18 Inches	35	Metres	1 290	45 150

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
988	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201012200	NB: 20 Inches	40	Metres	1 440	57 600
989	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201012400	NB: 24 Inches	130	Metres	1 720	2 23 600
990	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201012500	NB: 26 Inches	55	Metres	1 870	1 02 850
991	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201012600	NB: 28 Inches	65	Metres	2 010	1 30 650
992	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201012700	NB: 30 Inches	1190	Metres	2 150	25 58 500
993	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201012800	NB: 32 Inches	95	Metres	2 300	2 18 500
994	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201013000	NB: 36 Inches	915	Metres	2 580	23 60 700
995	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201013200	NB: 40 Inches	350	Metres	2 870	10 04 500
996	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201013300	NB: 42 Inches	905	Metres	3 010	27 24 050
997	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201013600	NB: 48 Inches	155	Metres	3 440	5 33 200
998	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201014200	NB: 60 Inches	35	Metres	4 310	1 50 850
999	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201014600	NB: 68 Inches	190	Metres	4 880	9 27 200
1000	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201020000	VALVES				
1001	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201020900	NB: 2 Inches	64	Nos.	260	16 640
1002	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201021100	NB: 3 Inches	38	Nos.	380	14 440
1003	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201021300	NB: 4 Inches	51	Nos.	490	24 990
1004	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201021500	NB: 6 Inches	70	Nos.	710	49 700
1005	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201021600	NB: 8 Inches	59	Nos.	930	54 870
1006	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201021700	NB: 10 Inches	38	Nos.	1 160	44 080
1007	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201021800	NB: 12 Inches	22	Nos.	1 370	30 140
1008	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201021900	NB: 14 Inches	34	Nos.	1 510	51 340
1009	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201022000	NB: 16 Inches	23	Nos.	1 720	39 560
1010	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201022100	NB: 18 Inches	40	Nos.	1 940	77 600
1011	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201022200	NB: 20 Inches	9	Nos.	2 150	19 350
1012	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201022400	NB: 24 Inches	22	Nos.	2 580	56 760
1013	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201022500	NB: 26 Inches	3	Nos.	2 800	8 400
1014	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201022700	NB: 30 Inches	25	Nos.	3 230	80 750
1015	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201023000	NB: 36 Inches	4	Nos.	3 880	15 520
1016	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39201023300	NB: 42 Inches	10	Nos.	4 520	45 200

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1017	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202000000	DESIGN TEMP GROUP: 126 TO 560(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1 coat of F-16 @ 125mu DFT/coat, Primer: None, Finish paint: 1 coat F-16 @ 125mu DFT/coat, Total DFT: 250mu				
1018	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202010000	PIPES				
1019	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202010400	NB: .5 Inches	25	Metres	80	2 000
1020	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202010500	NB: .75 Inches	215	Metres	110	23 650
1021	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202010600	NB: 1 Inches	280	Metres	130	36 400
1022	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202010800	NB: 1.5 Inches	700	Metres	190	1 33 000
1023	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202010900	NB: 2 Inches	3770	Metres	240	9 04 800
1024	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202011100	NB: 3 Inches	3235	Metres	350	11 32 250
1025	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202011300	NB: 4 Inches	2680	Metres	450	12 06 000
1026	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202011500	NB: 6 Inches	5785	Metres	660	38 18 100
1027	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202011600	NB: 8 Inches	2590	Metres	860	22 27 400
1028	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202011700	NB: 10 Inches	5	Metres	1 070	5 350
1029	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202011800	NB: 12 Inches	5	Metres	1 270	6 350
1030	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202011900	NB: 14 Inches	5	Metres	1 390	6 950
1031	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202012200	NB: 20 Inches	10	Metres	1 990	19 900
1032	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202012400	NB: 24 Inches	100	Metres	2 380	2 38 000
1033	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202012600	NB: 28 Inches	10	Metres	2 780	27 800
1034	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202012700	NB: 30 Inches	235	Metres	2 980	7 00 300
1035	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202012800	NB: 32 Inches	20	Metres	3 180	63 600
1036	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202013000	NB: 36 Inches	1035	Metres	3 580	37 05 300
1037	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202013200	NB: 40 Inches	720	Metres	3 970	28 58 400
1038	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202013300	NB: 42 Inches	105	Metres	4 170	4 37 850
1039	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202013600	NB: 48 Inches	10	Metres	4 770	47 700
1040	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202013900	NB: 54 Inches	5	Metres	5 360	26 800
1041	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202020000	VALVES				
1042	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202020900	NB: 2 Inches	456	Nos.	350	1 59 600
1043	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202021100	NB: 3 Inches	204	Nos.	520	1 06 080
1044	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202021300	NB: 4 Inches	109	Nos.	670	73 030

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1045	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202021500	NB: 6 Inches	216	Nos.	990	2 13 840
1046	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202021600	NB: 8 Inches	101	Nos.	1 290	1 30 290
1047	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202021700	NB: 10 Inches	75	Nos.	1 600	1 20 000
1048	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202021800	NB: 12 Inches	49	Nos.	1 900	93 100
1049	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202021900	NB: 14 Inches	62	Nos.	2 090	1 29 580
1050	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202022000	NB: 16 Inches	44	Nos.	2 380	1 04 720
1051	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202022100	NB: 18 Inches	13	Nos.	2 680	34 840
1052	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202022200	NB: 20 Inches	35	Nos.	2 980	1 04 300
1053	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202022400	NB: 24 Inches	27	Nos.	3 580	96 660
1054	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202022500	NB: 26 Inches	3	Nos.	3 870	11 610
1055	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202022600	NB: 28 Inches	1	Nos.	4 170	4 170
1056	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202022700	NB: 30 Inches	35	Nos.	4 470	1 56 450
1057	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202023000	NB: 36 Inches	20	Nos.	5 360	1 07 200
1058	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39202023200	NB: 40 Inches	48	Nos.	5 960	2 86 080
1059	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39300000000	PAINTING OF INSULATED PIPING OF SS & MS FOR 'CORROSIVE' ENVIRONMENT AS PER TABLE 11 OF JOB SPEC B957-000-6-42-PLS-01 REV 2 FOR SS/MS.				
1060	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301000000	DESIGN TEMP GROUP: -45 TO 125(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-16; (15-25mu surface profile) 1 coat of F-15 @100mu DFT/coat, Primer: None, Finish paint: 2 coats of F-15 @ 100mu DFT/coat, Total DFT: 300mu				
1061	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301010000	PIPES				
1062	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301010500	NB: .75 Inches	5	Metres	80	400
1063	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301010600	NB: 1 Inches	5	Metres	110	550
1064	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301010800	NB: 1.5 Inches	5	Metres	150	750
1065	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301012200	NB: 20 Inches	15	Metres	1 600	24 000
1066	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301012400	NB: 24 Inches	35	Metres	1 920	67 200
1067	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301012500	NB: 26 Inches	10	Metres	2 080	20 800
1068	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301012600	NB: 28 Inches	50	Metres	2 230	1 11 500
1069	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301012700	NB: 30 Inches	30	Metres	2 390	71 700
1070	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301012800	NB: 32 Inches	5	Metres	2 550	12 750
1071	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301013000	NB: 36 Inches	765	Metres	2 870	21 95 550

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1072	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301020000	VALVES				
1073	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301020900	NB: 2 Inches	95	Nos.	290	27 550
1074	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301021100	NB: 3 Inches	49	Nos.	420	20 580
1075	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301021300	NB: 4 Inches	34	Nos.	540	18 360
1076	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301021500	NB: 6 Inches	57	Nos.	790	45 030
1077	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301021600	NB: 8 Inches	39	Nos.	1 030	40 170
1078	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301021700	NB: 10 Inches	57	Nos.	1 290	73 530
1079	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301021800	NB: 12 Inches	22	Nos.	1 530	33 660
1080	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301021900	NB: 14 Inches	14	Nos.	1 680	23 520
1081	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301022000	NB: 16 Inches	20	Nos.	1 920	38 400
1082	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301022100	NB: 18 Inches	20	Nos.	2 160	43 200
1083	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301022200	NB: 20 Inches	17	Nos.	2 390	40 630
1084	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301022400	NB: 24 Inches	10	Nos.	2 870	28 700
1085	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301022500	NB: 26 Inches	3	Nos.	3 110	9 330
1086	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301022600	NB: 28 Inches	7	Nos.	3 350	23 450
1087	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301022700	NB: 30 Inches	4	Nos.	3 590	14 360
1088	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39301023000	NB: 36 Inches	13	Nos.	4 310	56 030
1089	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39302000000	DESIGN TEMP GROUP: 126 TO 650(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-16; (15-25mu surface profile) 1 coat of F-16 @125mu DFT/coat, Primer: None, Finish paint: 1 coat of F-16 @ 125mu DFT/coat, Total DFT: 250mu				
1090	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39302020000	VALVES				
1091	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39302020900	NB: 2 Inches	5	Nos.	380	1 900
1092	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39302021300	NB: 4 Inches	5	Nos.	730	3 650
1093	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39302021600	NB: 8 Inches	1	Nos.	1 390	1 390
1094	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39302021700	NB: 10 Inches	3	Nos.	1 730	5 190
1095	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39302022000	NB: 16 Inches	12	Nos.	2 580	30 960
1096	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M39302022700	NB: 30 Inches	8	Nos.	4 830	38 640

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1097	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M5**********	********** LEGENDS / NOTES FOR INSULATION WORKS ********** ** Types of Insulation : IH = Insulation for Heat Conservation IT = Insulation for Steam Traced Lines IS = Insulation for Personal Safety IC = Cold Insulation for Anti-condensation IE = Insulation for Electrically Traced Lines IJ = Insulation for Jacketed Lines IK = Insulation for Dual Insulated Lines ** Basic Line Surface Materials : CS = Carbon Steel (Including LT Carbon Steel) AS = Alloy Steel SS = Stainless Steel ** Notes : 1. For insulation type IT,tracer size and tracer numbers shall be as per specification. 2. Insulation thickness for IC where insulation material is Poly Urethane foam (PUF) / Poly Isocyanurate (PIC) + Cellular Glass includes outer layer of 50mm of Cellular Glass and Inner layer of balance thickness of PUF/PIC 3. Insulation for IE consists of inner layer of Rockwool and outer layer of PUF / PIC. The thicknesses have been specified as THK(I) and THK(O) for inner and outer layers respectively. **********				
1098	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50000000000	HOT INSULATION (UNITS) ; Providing thermal insulation including supply of all insulating and ancillary materials, vapour barrier, weather protective coverings, consumables and other necessary materials , testing of materials as required, including transportation of materials to work site, duly inspected by 3rd party inspector(Llyods/BV/DNV or any other Client approved party) at manufacturer's shop & sample check/inspection at site by EIL Construction inspector, applying insulation on surfaces as specified including all preparatory work there on, binding, tying, lacing, stitching and/or otherwise securing , finishing with sheet cladding as per spec. , providing bolts, rivets, and self tapping screws wherever specified , providing inspection windows, end seals for flanges etc., colour coding and identification. Providing steel scaffolding, all tools , tackles , equipments etc. , labour, supervision and completing the work in all respect, at all heights as per drawings , specifications and instructions of Engineer-in-charge. (Refer Legend for applicable EIL specification)				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1099	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50100000000	INSULATION MATERIAL : ROCKWOOL				
1100	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101000000	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : ROCKWOOL				
1101	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010000	PIPES				
1102	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010405	NB 00.50 INCHES; THICKNESS 25 MM	10	Metres	1 430	14 300
1103	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010408	NB 00.50 INCHES; THICKNESS 40 MM	10	Metres	2 080	20 800
1104	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010505	NB 00.75 INCHES; THICKNESS 25 MM	60	Metres	1 540	92 400
1105	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010508	NB 00.75 INCHES; THICKNESS 40 MM	125	Metres	2 190	2 73 750
1106	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010605	NB 01.00 INCHES; THICKNESS 25 MM	65	Metres	1 670	1 08 550
1107	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010608	NB 01.00 INCHES; THICKNESS 40 MM	115	Metres	2 340	2 69 100
1108	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010805	NB 01.50 INCHES; THICKNESS 25 MM	30	Metres	1 990	59 700
1109	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010808	NB 01.50 INCHES; THICKNESS 40 MM	640	Metres	2 660	17 02 400
1110	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010905	NB 02.00 INCHES; THICKNESS 25 MM	900	Metres	2 230	20 07 000
1111	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101010908	NB 02.00 INCHES; THICKNESS 40 MM	715	Metres	2 930	20 94 950
1112	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011105	NB 03.00 INCHES; THICKNESS 25 MM	355	Metres	2 830	10 04 650
1113	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011108	NB 03.00 INCHES; THICKNESS 40 MM	705	Metres	3 540	24 95 700
1114	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011305	NB 04.00 INCHES; THICKNESS 25 MM	290	Metres	3 350	9 71 500
1115	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011308	NB 04.00 INCHES; THICKNESS 40 MM	775	Metres	4 090	31 69 750
1116	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011505	NB 06.00 INCHES; THICKNESS 25 MM	3635	Metres	4 470	1 62 48 450
1117	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011508	NB 06.00 INCHES; THICKNESS 40 MM	1510	Metres	5 270	79 57 700
1118	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011605	NB 08.00 INCHES; THICKNESS 25 MM	830	Metres	5 520	45 81 600
1119	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011608	NB 08.00 INCHES; THICKNESS 40 MM	625	Metres	6 370	39 81 250
1120	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011705	NB 10.00 INCHES; THICKNESS 25 MM	1360	Metres	6 640	90 30 400
1121	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011708	NB 10.00 INCHES; THICKNESS 40 MM	775	Metres	7 550	58 51 250
1122	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011805	NB 12.00 INCHES; THICKNESS 25 MM	1545	Metres	7 690	1 18 81 050
1123	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011808	NB 12.00 INCHES; THICKNESS 40 MM	290	Metres	8 650	25 08 500
1124	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011905	NB 14.00 INCHES; THICKNESS 25 MM	730	Metres	8 350	60 95 500
1125	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101011908	NB 14.00 INCHES; THICKNESS 40 MM	105	Metres	9 340	9 80 700
1126	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012005	NB 16.00 INCHES; THICKNESS 25 MM	325	Metres	9 390	30 51 750
1127	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012008	NB 16.00 INCHES; THICKNESS 40 MM	665	Metres	10 440	69 42 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1128	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012105	NB 18.00 INCHES; THICKNESS 25 MM	315	Metres	10 450	32 91 750
1129	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012108	NB 18.00 INCHES; THICKNESS 40 MM	205	Metres	11 540	23 65 700
1130	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012205	NB 20.00 INCHES; THICKNESS 25 MM	170	Metres	11 500	19 55 000
1131	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012208	NB 20.00 INCHES; THICKNESS 40 MM	35	Metres	12 640	4 42 400
1132	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012210	NB 20.00 INCHES; THICKNESS 50 MM	65	Metres	13 430	8 72 950
1133	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012405	NB 24.00 INCHES; THICKNESS 25 MM	515	Metres	13 600	70 04 000
1134	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012410	NB 24.00 INCHES; THICKNESS 50 MM	810	Metres	15 700	1 27 17 000
1135	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012505	NB 26.00 INCHES; THICKNESS 25 MM	60	Metres	14 660	8 79 600
1136	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012608	NB 28.00 INCHES; THICKNESS 40 MM	10	Metres	17 060	1 70 600
1137	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012705	NB 30.00 INCHES; THICKNESS 25 MM	985	Metres	16 760	1 65 08 600
1138	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012708	NB 30.00 INCHES; THICKNESS 40 MM	15	Metres	18 160	2 72 400
1139	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012710	NB 30.00 INCHES; THICKNESS 50 MM	450	Metres	19 110	85 99 500
1140	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101012805	NB 32.00 INCHES; THICKNESS 25 MM	15	Metres	20 250	3 03 750
1141	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101013005	NB 36.00 INCHES; THICKNESS 25 MM	295	Metres	19 910	58 73 450
1142	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101013010	NB 36.00 INCHES; THICKNESS 50 MM	475	Metres	22 530	1 07 01 750
1143	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101013205	NB 40.00 INCHES; THICKNESS 25 MM	125	Metres	22 020	27 52 500
1144	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101013305	NB 42.00 INCHES; THICKNESS 25 MM	420	Metres	23 070	96 89 400
1145	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101013308	NB 42.00 INCHES; THICKNESS 40 MM	15	Metres	66 190	9 92 850
1146	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101020000	FLANGE ASSEMBLIES				
1147	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101020805	NB 01.50 INCHES; THICKNESS 25 MM	1	NOs	1 990	1 990
1148	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101020808	NB 01.50 INCHES; THICKNESS 40 MM	5	NOs	2 660	13 300
1149	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101020905	NB 02.00 INCHES; THICKNESS 25 MM	3	NOs	2 230	6 690
1150	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101020908	NB 02.00 INCHES; THICKNESS 40 MM	8	NOs	2 930	23 440
1151	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101021108	NB 03.00 INCHES; THICKNESS 40 MM	1	NOs	3 540	3 540
1152	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101021308	NB 04.00 INCHES; THICKNESS 40 MM	5	NOs	4 090	20 450
1153	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101021508	NB 06.00 INCHES; THICKNESS 40 MM	4	NOs	5 270	21 080
1154	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101030000	BLIND FLANGE ASSEMBLIES				
1155	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101030505	NB 00.75 INCHES; THICKNESS 25 MM	5	NOs	1 540	7 700
1156	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101030508	NB 00.75 INCHES; THICKNESS 40 MM	49	NOs	2 190	1 07 310
1157	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101030608	NB 01.00 INCHES; THICKNESS 40 MM	1	NOs	2 340	2 340

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1158	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101030808	NB 01.50 INCHES; THICKNESS 40 MM	1	NOs	2 660	2 660
1159	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101030908	NB 02.00 INCHES; THICKNESS 40 MM	1	NOs	2 930	2 930
1160	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101040000	VALVE ASSEMBLIES				
1161	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101040505	NB 00.75 INCHES; THICKNESS 25 MM	4	NOs	3 070	12 280
1162	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101040508	NB 00.75 INCHES; THICKNESS 40 MM	72	NOs	4 380	3 15 360
1163	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101040608	NB 01.00 INCHES; THICKNESS 40 MM	14	NOs	4 680	65 520
1164	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101040808	NB 01.50 INCHES; THICKNESS 40 MM	3	NOs	5 320	15 960
1165	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101040905	NB 02.00 INCHES; THICKNESS 25 MM	3	NOs	4 460	13 380
1166	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101040908	NB 02.00 INCHES; THICKNESS 40 MM	22	NOs	5 850	1 28 700
1167	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101041105	NB 03.00 INCHES; THICKNESS 25 MM	1	NOs	5 660	5 660
1168	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101041108	NB 03.00 INCHES; THICKNESS 40 MM	4	NOs	7 090	28 360
1169	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101041308	NB 04.00 INCHES; THICKNESS 40 MM	3	NOs	8 180	24 540
1170	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101041508	NB 06.00 INCHES; THICKNESS 40 MM	3	NOs	10 530	31 590
1171	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101041608	NB 08.00 INCHES; THICKNESS 40 MM	18	NOs	12 740	2 29 320
1172	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50101041708	NB 10.00 INCHES; THICKNESS 40 MM	3	NOs	15 090	45 270
1173	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102000000	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 176 (DEG C) TO 350 (DEG C); INSULATION MATERIAL : ROCKWOOL				
1174	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010000	PIPES				
1175	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010508	NB 00.75 INCHES; THICKNESS 40 MM	55	Metres	1 680	92 400
1176	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010510	NB 00.75 INCHES; THICKNESS 50 MM	15	Metres	2 040	30 600
1177	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010608	NB 01.00 INCHES; THICKNESS 40 MM	30	Metres	1 790	53 700
1178	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010610	NB 01.00 INCHES; THICKNESS 50 MM	120	Metres	2 160	2 59 200
1179	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010808	NB 01.50 INCHES; THICKNESS 40 MM	30	Metres	2 050	61 500
1180	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010810	NB 01.50 INCHES; THICKNESS 50 MM	10	Metres	2 420	24 200
1181	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010908	NB 02.00 INCHES; THICKNESS 40 MM	115	Metres	2 250	2 58 750
1182	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010910	NB 02.00 INCHES; THICKNESS 50 MM	550	Metres	2 630	14 46 500
1183	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010913	NB 02.00 INCHES; THICKNESS 65 MM	355	Metres	3 230	11 46 650
1184	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102010916	NB 02.00 INCHES; THICKNESS 80 MM	30	Metres	3 860	1 15 800
1185	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011108	NB 03.00 INCHES; THICKNESS 40 MM	430	Metres	2 740	11 78 200
1186	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011110	NB 03.00 INCHES; THICKNESS 50 MM	560	Metres	3 130	17 52 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1187	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011113	NB 03.00 INCHES; THICKNESS 65 MM	60	Metres	3 760	2 25 600
1188	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011308	NB 04.00 INCHES; THICKNESS 40 MM	15	Metres	3 170	47 550
1189	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011313	NB 04.00 INCHES; THICKNESS 65 MM	205	Metres	4 240	8 69 200
1190	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011315	NB 04.00 INCHES; THICKNESS 75 MM	255	Metres	4 690	11 95 950
1191	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011510	NB 06.00 INCHES; THICKNESS 50 MM	215	Metres	4 530	9 73 950
1192	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011513	NB 06.00 INCHES; THICKNESS 65 MM	555	Metres	5 250	29 13 750
1193	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011516	NB 06.00 INCHES; THICKNESS 80 MM	245	Metres	5 980	14 65 100
1194	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011610	NB 08.00 INCHES; THICKNESS 50 MM	50	Metres	5 430	2 71 500
1195	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011613	NB 08.00 INCHES; THICKNESS 65 MM	440	Metres	6 190	27 23 600
1196	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011616	NB 08.00 INCHES; THICKNESS 80 MM	20	Metres	6 980	1 39 600
1197	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011710	NB 10.00 INCHES; THICKNESS 50 MM	120	Metres	6 380	7 65 600
1198	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011713	NB 10.00 INCHES; THICKNESS 65 MM	365	Metres	7 190	26 24 350
1199	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011716	NB 10.00 INCHES; THICKNESS 80 MM	325	Metres	8 030	26 09 750
1200	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011810	NB 12.00 INCHES; THICKNESS 50 MM	215	Metres	7 280	15 65 200
1201	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011813	NB 12.00 INCHES; THICKNESS 65 MM	30	Metres	8 140	2 44 200
1202	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011816	NB 12.00 INCHES; THICKNESS 80 MM	215	Metres	9 030	19 41 450
1203	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011910	NB 14.00 INCHES; THICKNESS 50 MM	20	Metres	7 840	1 56 800
1204	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011913	NB 14.00 INCHES; THICKNESS 65 MM	275	Metres	8 730	24 00 750
1205	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102011916	NB 14.00 INCHES; THICKNESS 80 MM	50	Metres	9 660	4 83 000
1206	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102012010	NB 16.00 INCHES; THICKNESS 50 MM	450	Metres	8 730	39 28 500
1207	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102012013	NB 16.00 INCHES; THICKNESS 65 MM	130	Metres	9 680	12 58 400
1208	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102012110	NB 18.00 INCHES; THICKNESS 50 MM	20	Metres	9 630	1 92 600
1209	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102012113	NB 18.00 INCHES; THICKNESS 65 MM	20	Metres	10 630	2 12 600
1210	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102012213	NB 20.00 INCHES; THICKNESS 65 MM	60	Metres	11 580	6 94 800
1211	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102012216	NB 20.00 INCHES; THICKNESS 80 MM	40	Metres	12 650	5 06 000
1212	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102012413	NB 24.00 INCHES; THICKNESS 65 MM	95	Metres	13 470	12 79 650
1213	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102012416	NB 24.00 INCHES; THICKNESS 80 MM	115	Metres	14 650	16 84 750
1214	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102012716	NB 30.00 INCHES; THICKNESS 80 MM	1230	Metres	17 640	2 16 97 200
1215	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102020000	FLANGE ASSEMBLIES				
1216	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102020810	NB 01.50 INCHES; THICKNESS 50 MM	8	NOs	2 160	17 280

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1217	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102020908	NB 02.00 INCHES; THICKNESS 40 MM	1	NOs	2 250	2 250
1218	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102020910	NB 02.00 INCHES; THICKNESS 50 MM	9	NOs	2 630	23 670
1219	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102020913	NB 02.00 INCHES; THICKNESS 65 MM	4	NOs	3 230	12 920
1220	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102021110	NB 03.00 INCHES; THICKNESS 50 MM	9	NOs	3 130	28 170
1221	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102021308	NB 04.00 INCHES; THICKNESS 40 MM	1	NOs	3 170	3 170
1222	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102021313	NB 04.00 INCHES; THICKNESS 65 MM	16	NOs	4 240	67 840
1223	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102021315	NB 04.00 INCHES; THICKNESS 75 MM	4	NOs	4 690	18 760
1224	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102021510	NB 06.00 INCHES; THICKNESS 50 MM	3	NOs	4 530	13 590
1225	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102021513	NB 06.00 INCHES; THICKNESS 65 MM	26	NOs	5 250	1 36 500
1226	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102030000	BLIND FLANGE ASSEMBLIES				
1227	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102030508	NB 00.75 INCHES; THICKNESS 40 MM	90	NOs	1 680	1 51 200
1228	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102030510	NB 00.75 INCHES; THICKNESS 50 MM	30	NOs	2 040	61 200
1229	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102030910	NB 02.00 INCHES; THICKNESS 50 MM	8	NOs	2 630	21 040
1230	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102030913	NB 02.00 INCHES; THICKNESS 65 MM	1	NOs	3 230	3 230
1231	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102040000	VALVE ASSEMBLIES				
1232	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102040508	NB 00.75 INCHES; THICKNESS 40 MM	117	NOs	3 370	3 94 290
1233	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102040510	NB 00.75 INCHES; THICKNESS 50 MM	43	NOs	4 070	1 75 010
1234	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102040610	NB 01.00 INCHES; THICKNESS 50 MM	23	NOs	4 330	99 590
1235	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102040908	NB 02.00 INCHES; THICKNESS 40 MM	1	NOs	4 500	4 500
1236	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102040910	NB 02.00 INCHES; THICKNESS 50 MM	34	NOs	5 270	1 79 180
1237	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102040913	NB 02.00 INCHES; THICKNESS 65 MM	9	NOs	6 460	58 140
1238	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102041110	NB 03.00 INCHES; THICKNESS 50 MM	21	NOs	6 260	1 31 460
1239	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102041308	NB 04.00 INCHES; THICKNESS 40 MM	1	NOs	6 340	6 340
1240	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102041313	NB 04.00 INCHES; THICKNESS 65 MM	16	NOs	8 470	1 35 520
1241	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102041510	NB 06.00 INCHES; THICKNESS 50 MM	1	NOs	9 060	9 060
1242	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102041513	NB 06.00 INCHES; THICKNESS 65 MM	33	NOs	10 490	3 46 170
1243	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102041610	NB 08.00 INCHES; THICKNESS 50 MM	1	NOs	10 860	10 860
1244	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50102041613	NB 08.00 INCHES; THICKNESS 65 MM	13	NOs	12 370	1 60 810
1245	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103000000	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 351 (DEG C) TO 500 (DEG C); INSULATION MATERIAL : ROCKWOOL				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1246	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103010000	PIPES				
1247	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103010515	NB 00.75 INCHES; THICKNESS 75 MM	10	Metres	3 000	30 000
1248	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103010518	NB 00.75 INCHES; THICKNESS 90 MM	10	Metres	3 610	36 100
1249	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103010520	NB 00.75 INCHES; THICKNESS 100 MM	10	Metres	4 030	40 300
1250	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103010816	NB 01.50 INCHES; THICKNESS 80 MM	10	Metres	3 620	36 200
1251	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103010823	NB 01.50 INCHES; THICKNESS 115 MM	10	Metres	5 180	51 800
1252	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103010918	NB 02.00 INCHES; THICKNESS 90 MM	65	Metres	4 290	2 78 850
1253	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103011930	NB 14.00 INCHES; THICKNESS 150 MM	320	Metres	14 380	46 01 600
1254	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103011935	NB 14.00 INCHES; THICKNESS 175 MM	275	Metres	16 230	44 63 250
1255	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103012735	NB 30.00 INCHES; THICKNESS 175 MM	745	Metres	26 830	1 99 88 350
1256	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103020000	FLANGE ASSEMBLIES				
1257	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103020616	NB 01.00 INCHES; THICKNESS 80 MM	1	NOs	3 330	3 330
1258	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103020816	NB 01.50 INCHES; THICKNESS 80 MM	1	NOs	3 620	3 620
1259	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103030000	BLIND FLANGE ASSEMBLIES				
1260	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103030515	NB 00.75 INCHES; THICKNESS 75 MM	8	NOs	3 000	24 000
1261	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103040000	VALVE ASSEMBLIES				
1262	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103040515	NB 00.75 INCHES; THICKNESS 75 MM	10	NOs	5 990	59 900
1263	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50103040918	NB 02.00 INCHES; THICKNESS 90 MM	4	NOs	8 570	34 280
1264	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50104000000	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 501 (DEG C) TO 550 (DEG C); INSULATION MATERIAL : ROCKWOOL				
1265	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50104010000	PIPES				
1266	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50104010523	NB 00.75 INCHES; THICKNESS 115 MM	10	Metres	4 700	47 000
1267	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50104010625	NB 01.00 INCHES; THICKNESS 125 MM	10	Metres	5 310	53 100
1268	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50104010828	NB 01.50 INCHES; THICKNESS 140 MM	10	Metres	6 380	63 800
1269	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50104010930	NB 02.00 INCHES; THICKNESS 150 MM	30	Metres	7 180	2 15 400
1270	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50104012743	NB 30.00 INCHES; THICKNESS 215 MM	10	Metres	31 070	3 10 700
1271	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117000000	INSULATION TYPE : IT; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : ROCKWOOL				
1272	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117010000	PIPES				
1273	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117010505	NB 00.75 INCHES; THICKNESS 25 MM	10	Metres	2 170	21 700
1274	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117010805	NB 01.50 INCHES; THICKNESS 25 MM	10	Metres	2 620	26 200

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1275	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117011105	NB 03.00 INCHES; THICKNESS 25 MM	20	Metres	3 460	69 200
1276	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117011305	NB 04.00 INCHES; THICKNESS 25 MM	405	Metres	3 990	16 15 950
1277	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117020000	FLANGE ASSEMBLIES				
1278	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117020805	NB 01.50 INCHES; THICKNESS 25 MM	1	NOs	2 620	2 620
1279	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117021105	NB 03.00 INCHES; THICKNESS 25 MM	1	NOs	3 460	3 460
1280	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117021305	NB 04.00 INCHES; THICKNESS 25 MM	3	NOs	3 990	11 970
1281	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117030000	BLIND FLANGE ASSEMBLIES				
1282	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117030505	NB 00.75 INCHES; THICKNESS 25 MM	4	NOs	2 170	8 680
1283	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117040000	VALVE ASSEMBLIES				
1284	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117040505	NB 00.75 INCHES; THICKNESS 25 MM	5	NOs	4 350	21 750
1285	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50117041305	NB 04.00 INCHES; THICKNESS 25 MM	4	NOs	7 990	31 960
1286	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134000000	INSULATION TYPE : IS; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 176 (DEG C) TO 350 (DEG C); INSULATION MATERIAL : ROCKWOOL				
1287	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134010000	PIPES				
1288	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134010508	NB 00.75 INCHES; THICKNESS 40 MM	10	Metres	1 680	16 800
1289	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134010608	NB 01.00 INCHES; THICKNESS 40 MM	10	Metres	1 790	17 900
1290	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134010808	NB 01.50 INCHES; THICKNESS 40 MM	30	Metres	2 050	61 500
1291	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134010908	NB 02.00 INCHES; THICKNESS 40 MM	15	Metres	2 250	33 750
1292	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134011110	NB 03.00 INCHES; THICKNESS 50 MM	15	Metres	3 130	46 950
1293	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134011113	NB 03.00 INCHES; THICKNESS 65 MM	20	Metres	3 760	75 200
1294	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134011310	NB 04.00 INCHES; THICKNESS 50 MM	30	Metres	3 580	1 07 400
1295	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134011810	NB 12.00 INCHES; THICKNESS 50 MM	10	Metres	7 280	72 800
1296	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50134013213	NB 40.00 INCHES; THICKNESS 65 MM	60	Metres	21 040	12 62 400
1297	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50135000000	INSULATION TYPE : IS; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 351 (DEG C) TO 500 (DEG C); INSULATION MATERIAL : ROCKWOOL				
1298	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50135010000	PIPES				
1299	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M50135012030	NB 16.00 INCHES; THICKNESS 150 MM	10	Metres	15 630	1 56 300
1300	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55100000000	INSULATION MATERIAL : INHIBITED ROCKWOOL				
1301	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55109000000	INSULATION TYPE : IH; SURFACE MATERIAL : SS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : INHIBITED ROCKWOOL				
1302	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55109010000	PIPES				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1303	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55109010505	NB 00.75 INCHES; THICKNESS 25 MM	10	Metres	1 540	15 400
1304	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55109010905	NB 02.00 INCHES; THICKNESS 25 MM	10	Metres	2 240	22 400
1305	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55109011105	NB 03.00 INCHES; THICKNESS 25 MM	10	Metres	2 840	28 400
1306	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55109011305	NB 04.00 INCHES; THICKNESS 25 MM	10	Metres	3 370	33 700
1307	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55109011505	NB 06.00 INCHES; THICKNESS 25 MM	10	Metres	4 480	44 800
1308	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55109011905	NB 14.00 INCHES; THICKNESS 25 MM	10	Metres	8 380	83 800
1309	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55109012005	NB 16.00 INCHES; THICKNESS 25 MM	30	Metres	9 430	2 82 900
1310	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110000000	INSULATION TYPE : IH; SURFACE MATERIAL : SS; OPERATING TEMP. RANGE : 176 (DEG C) TO 350 (DEG C); INSULATION MATERIAL : INHIBITED ROCKWOOL				
1311	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110010000	PIPES				
1312	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110010410	NB 00.50 INCHES; THICKNESS 50 MM	10	Metres	1 960	19 600
1313	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110010508	NB 00.75 INCHES; THICKNESS 40 MM	10	Metres	1 690	16 900
1314	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110010510	NB 00.75 INCHES; THICKNESS 50 MM	10	Metres	2 060	20 600
1315	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110010810	NB 01.50 INCHES; THICKNESS 50 MM	10	Metres	2 440	24 400
1316	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110010913	NB 02.00 INCHES; THICKNESS 65 MM	10	Metres	3 260	32 600
1317	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110011315	NB 04.00 INCHES; THICKNESS 75 MM	60	Metres	4 740	2 84 400
1318	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110011616	NB 08.00 INCHES; THICKNESS 80 MM	10	Metres	7 070	70 700
1319	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110011716	NB 10.00 INCHES; THICKNESS 80 MM	60	Metres	8 130	4 87 800
1320	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110012013	NB 16.00 INCHES; THICKNESS 65 MM	125	Metres	9 790	12 23 750
1321	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110012016	NB 16.00 INCHES; THICKNESS 80 MM	190	Metres	10 790	20 50 100
1322	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110012716	NB 30.00 INCHES; THICKNESS 80 MM	10	Metres	17 890	1 78 900
1323	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M55110012718	NB 30.00 INCHES; THICKNESS 90 MM	60	Metres	18 830	11 29 800
1324	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58200000000	INSULATION MATERIAL : METAL CAGE				
1325	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233000000	INSULATION TYPE : IS; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : METAL CAGE				
1326	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233010000	PIPES				
1327	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233010581	NB 00.75 INCHES; THICKNESS 3 MM	10	Metres	770	7 700
1328	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233010681	NB 01.00 INCHES; THICKNESS 3 MM	10	Metres	860	8 600
1329	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233010881	NB 01.50 INCHES; THICKNESS 3 MM	10	Metres	1 050	10 500
1330	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233010981	NB 02.00 INCHES; THICKNESS 3 MM	130	Metres	1 200	1 56 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1331	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233011181	NB 03.00 INCHES; THICKNESS 3 MM	35	Metres	1 580	55 300
1332	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233011381	NB 04.00 INCHES; THICKNESS 3 MM	80	Metres	1 910	1 52 800
1333	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233011581	NB 06.00 INCHES; THICKNESS 3 MM	130	Metres	2 610	3 39 300
1334	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233011681	NB 08.00 INCHES; THICKNESS 3 MM	160	Metres	3 450	5 52 000
1335	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233011781	NB 10.00 INCHES; THICKNESS 3 MM	50	Metres	3 450	1 72 500
1336	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233011881	NB 12.00 INCHES; THICKNESS 3 MM	15	Metres	4 330	64 950
1337	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233011981	NB 14.00 INCHES; THICKNESS 3 MM	55	Metres	4 990	2 74 450
1338	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233012081	NB 16.00 INCHES; THICKNESS 3 MM	125	Metres	5 400	6 75 000
1339	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233012181	NB 18.00 INCHES; THICKNESS 3 MM	60	Metres	6 060	3 63 600
1340	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233012281	NB 20.00 INCHES; THICKNESS 3 MM	35	Metres	6 720	2 35 200
1341	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233012481	NB 24.00 INCHES; THICKNESS 3 MM	75	Metres	7 380	5 53 500
1342	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233012681	NB 28.00 INCHES; THICKNESS 3 MM	10	Metres	8 040	80 400
1343	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233012781	NB 30.00 INCHES; THICKNESS 3 MM	80	Metres	8 700	6 96 000
1344	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233012881	NB 32.00 INCHES; THICKNESS 3 MM	20	Metres	9 370	1 87 400
1345	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233013081	NB 36.00 INCHES; THICKNESS 3 MM	30	Metres	10 020	3 00 600
1346	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233013281	NB 40.00 INCHES; THICKNESS 3 MM	115	Metres	10 690	12 29 350
1347	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233013381	NB 42.00 INCHES; THICKNESS 3 MM	95	Metres	11 340	10 77 300
1348	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58233013681	NB 48.00 INCHES; THICKNESS 3 MM	15	Metres	12 010	1 80 150
1349	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241000000	INSULATION TYPE : IS; SURFACE MATERIAL : SS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : METAL CAGE				
1350	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241010000	PIPES				
1351	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241010581	NB 00.75 INCHES; THICKNESS 3 MM	10	Metres	770	7 700
1352	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241010681	NB 01.00 INCHES; THICKNESS 3 MM	10	Metres	860	8 600
1353	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241010881	NB 01.50 INCHES; THICKNESS 3 MM	10	Metres	1 050	10 500
1354	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241010981	NB 02.00 INCHES; THICKNESS 3 MM	20	Metres	1 200	24 000
1355	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241011181	NB 03.00 INCHES; THICKNESS 3 MM	10	Metres	1 580	15 800
1356	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241011381	NB 04.00 INCHES; THICKNESS 3 MM	10	Metres	1 910	19 100
1357	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241011581	NB 06.00 INCHES; THICKNESS 3 MM	50	Metres	2 610	1 30 500
1358	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241012081	NB 16.00 INCHES; THICKNESS 3 MM	15	Metres	6 060	90 900
1359	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M58241012281	NB 20.00 INCHES; THICKNESS 3 MM	10	Metres	7 380	73 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1360	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000000	SPECIAL INSULATION MATERIALS CONSIDERED :- 90MM ROCKWOOL +20MM AEROGEL +75MM PIR (FOR LP & MP STEAM), 125MM ROCKWOOL +20MM AEROGEL +75 PIR (FOR HP STEAM), 290 MM CALICUM SILICATE INNER LAYER & 75 MM IN SITU PUF (OUTER LAYER) WITH 50 MICRON MYLAR FOIL BETWEEN OUTER & INNER LAYERS OF INSULATION. (FOR VHP STEAM)				
1361	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000001	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : ROCKWOOL				
1362	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000002	PIPES				
1363	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000003	NB 03.00 INCHES; THICKNESS 185 MM	140	Metres	23 900	33 46 000
1364	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000004	NB 03.00 INCHES; THICKNESS 185 MM	465	Metres	23 900	1 11 13 500
1365	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000005	NB 04.00 INCHES; THICKNESS 185 MM	10	Metres	26 290	2 62 900
1366	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000006	NB 06.00 INCHES; THICKNESS 185 MM	10	Metres	31 370	3 13 700
1367	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000007	NB 08.00 INCHES; THICKNESS 185 MM	510	Metres	36 140	1 84 31 400
1368	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000008	NB 10.00 INCHES; THICKNESS 185 MM	130	Metres	41 220	53 58 600
1369	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000009	NB 12.00 INCHES; THICKNESS 185 MM	30	Metres	46 000	13 80 000
1370	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000010	NB 14.00 INCHES; THICKNESS 185 MM	95	Metres	48 990	46 54 050
1371	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000011	NB 16.00 INCHES; THICKNESS 185 MM	125	Metres	53 770	67 21 250
1372	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000012	NB 18.00 INCHES; THICKNESS 185 MM	205	Metres	58 550	1 20 02 750
1373	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000013	NB 20.00 INCHES; THICKNESS 185 MM	10	Metres	63 320	6 33 200
1374	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000014	NB 20.00 INCHES; THICKNESS 185 MM	55	Metres	63 320	34 82 600
1375	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000015	NB 24.00 INCHES; THICKNESS 185 MM	515	Metres	72 880	3 75 33 200
1376	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000016	NB 30.00 INCHES; THICKNESS 185 MM	440	Metres	87 220	3 83 76 800
1377	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000017	NB 36.00 INCHES; THICKNESS 185 MM	440	Metres	1 01 550	4 46 82 000
1378	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000027	FLANGE ASSEMBLIES			1 01 550	
1379	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000028	NB 03.00 INCHES; THICKNESS 185 MM	1	NOs	23 900	23 900
1380	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000029	NB 04.00 INCHES; THICKNESS 185 MM	3	NOs	26 290	78 870
1381	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000030	NB 06.00 INCHES; THICKNESS 185 MM	1	NOs	31 370	31 370
1382	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000031	NB 08.00 INCHES; THICKNESS 185 MM	1	NOs	36 140	36 140
1383	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000032	NB 10.00 INCHES; THICKNESS 185 MM	1	NOs	41 220	41 220
1384	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000033	NB 12.00 INCHES; THICKNESS 185 MM	7	NOs	46 000	3 22 000
1385	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000034	NB 14.00 INCHES; THICKNESS 185 MM	10	NOs	48 990	4 89 900

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1386	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000035	NB 16.00 INCHES; THICKNESS 185 MM	8	NOs	53 770	4 30 160
1387	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000036	NB 18.00 INCHES; THICKNESS 185 MM	5	NOs	58 550	2 92 750
1388	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000037	NB 20.00 INCHES; THICKNESS 185 MM	1	NOs	63 320	63 320
1389	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000038	NB 20.00 INCHES; THICKNESS 185 MM	4	NOs	63 320	2 53 280
1390	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000039	NB 24.00 INCHES; THICKNESS 185 MM	1	NOs	72 880	72 880
1391	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000040	NB 30.00 INCHES; THICKNESS 185 MM	4	NOs	87 220	3 48 880
1392	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000044	BLIND FLANGE ASSEMBLIES			58 550	
1393	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000045	NB 03.00 INCHES; THICKNESS 185 MM	8	NOs	23 900	1 91 200
1394	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000046	NB 04.00 INCHES; THICKNESS 185 MM	1	NOs	26 290	26 290
1395	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000047	NB 08.00 INCHES; THICKNESS 185 MM	4	NOs	36 140	1 44 560
1396	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000048	NB 10.00 INCHES; THICKNESS 185 MM	7	NOs	41 220	2 88 540
1397	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000049	NB 12.00 INCHES; THICKNESS 185 MM	10	NOs	46 000	4 60 000
1398	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000050	NB 36.00 INCHES; THICKNESS 185 MM	1	NOs	1 01 550	1 01 550
1399	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000054	VALVE ASSEMBLIES			31 370	
1400	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000055	NB 03.00 INCHES; THICKNESS 185 MM	1	NOs	47 800	47 800
1401	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000056	NB 03.00 INCHES; THICKNESS 185 MM	3	NOs	47 800	1 43 400
1402	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000057	NB 04.00 INCHES; THICKNESS 185 MM	1	NOs	52 580	52 580
1403	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000058	NB 08.00 INCHES; THICKNESS 185 MM	18	NOs	72 290	13 01 220
1404	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000059	NB 10.00 INCHES; THICKNESS 185 MM	1	NOs	82 450	82 450
1405	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000060	NB 12.00 INCHES; THICKNESS 185 MM	3	NOs	92 000	2 76 000
1406	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000061	NB 14.00 INCHES; THICKNESS 185 MM	9	NOs	97 980	8 81 820
1407	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000062	NB 16.00 INCHES; THICKNESS 185 MM	7	NOs	1 07 530	7 52 710
1408	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000063	NB 18.00 INCHES; THICKNESS 185 MM	4	NOs	1 17 100	4 68 400
1409	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000064	NB 20.00 INCHES; THICKNESS 185 MM	1	NOs	1 26 650	1 26 650
1410	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000065	NB 20.00 INCHES; THICKNESS 185 MM	3	NOs	1 26 650	3 79 950
1411	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000066	NB 24.00 INCHES; THICKNESS 185 MM	3	NOs	1 45 760	4 37 280
1412	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000067	NB 30.00 INCHES; THICKNESS 185 MM	5	NOs	1 74 440	8 72 200
1413	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000074	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 176 (DEG C) TO 350 (DEG C); INSULATION MATERIAL : ROCKWOOL			46 000	
1414	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000075	PIPES			48 990	

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1415	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000076	NB 03.00 INCHES; THICKNESS 185 MM	355	Metres	21 820	77 46 100
1416	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000077	NB 03.00 INCHES; THICKNESS 185 MM	60	Metres	21 820	13 09 200
1417	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000078	NB 04.00 INCHES; THICKNESS 185 MM	95	Metres	24 100	22 89 500
1418	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000079	NB 04.00 INCHES; THICKNESS 185 MM	130	Metres	24 100	31 33 000
1419	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000080	NB 06.00 INCHES; THICKNESS 185 MM	245	Metres	28 930	70 87 850
1420	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000081	NB 06.00 INCHES; THICKNESS 185 MM	245	Metres	28 930	70 87 850
1421	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000082	NB 08.00 INCHES; THICKNESS 185 MM	95	Metres	33 480	31 80 600
1422	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000083	NB 08.00 INCHES; THICKNESS 185 MM	20	Metres	33 480	6 69 600
1423	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000084	NB 10.00 INCHES; THICKNESS 185 MM	345	Metres	38 310	1 32 16 950
1424	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000085	NB 10.00 INCHES; THICKNESS 185 MM	325	Metres	38 310	1 24 50 750
1425	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000086	NB 12.00 INCHES; THICKNESS 185 MM	180	Metres	42 870	77 16 600
1426	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000087	NB 14.00 INCHES; THICKNESS 185 MM	235	Metres	45 710	1 07 41 850
1427	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000088	NB 14.00 INCHES; THICKNESS 185 MM	50	Metres	45 710	22 85 500
1428	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000089	NB 16.00 INCHES; THICKNESS 185 MM	15	Metres	50 250	7 53 750
1429	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000090	NB 16.00 INCHES; THICKNESS 185 MM	50	Metres	50 250	25 12 500
1430	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000091	NB 20.00 INCHES; THICKNESS 185 MM	340	Metres	59 360	2 01 82 400
1431	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000092	NB 40.00 INCHES; THICKNESS 185 MM	470	Metres	1 04 840	4 92 74 800
1432	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000102	FLANGE ASSEMBLIES			68 450	
1433	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000103	NB 03.00 INCHES; THICKNESS 185 MM	4	NOs	21 820	87 280
1434	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000104	NB 03.00 INCHES; THICKNESS 185 MM	1	NOs	21 820	21 820
1435	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000105	NB 04.00 INCHES; THICKNESS 185 MM	7	NOs	24 100	1 68 700
1436	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000106	NB 04.00 INCHES; THICKNESS 185 MM	4	NOs	24 100	96 400
1437	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000107	NB 06.00 INCHES; THICKNESS 185 MM	17	NOs	28 930	4 91 810
1438	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000108	NB 08.00 INCHES; THICKNESS 185 MM	9	NOs	33 480	3 01 320
1439	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000109	NB 08.00 INCHES; THICKNESS 185 MM	5	NOs	33 480	1 67 400
1440	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000110	NB 10.00 INCHES; THICKNESS 185 MM	10	NOs	38 310	3 83 100
1441	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000111	NB 10.00 INCHES; THICKNESS 185 MM	4	NOs	38 310	1 53 240
1442	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000112	NB 12.00 INCHES; THICKNESS 185 MM	8	NOs	42 870	3 42 960
1443	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000113	NB 14.00 INCHES; THICKNESS 185 MM	1	NOs	45 710	45 710
1444	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000114	NB 14.00 INCHES; THICKNESS 185 MM	1	NOs	45 710	45 710

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1445	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000115	NB 16.00 INCHES; THICKNESS 185 MM	1	NOs	50 250	50 250
1446	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000116	NB 16.00 INCHES; THICKNESS 185 MM	1	NOs	50 250	50 250
1447	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000117	NB 20.00 INCHES; THICKNESS 185 MM	1	NOs	59 360	59 360
1448	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000122	BLIND FLANGE ASSEMBLIES			54 800	
1449	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000123	NB 03.00 INCHES; THICKNESS 185 MM	1	NOs	21 820	21 820
1450	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000124	NB 04.00 INCHES; THICKNESS 185 MM	7	NOs	24 100	1 68 700
1451	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000125	NB 06.00 INCHES; THICKNESS 185 MM	7	NOs	28 930	2 02 510
1452	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000126	NB 06.00 INCHES; THICKNESS 185 MM	4	NOs	28 930	1 15 720
1453	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000127	NB 08.00 INCHES; THICKNESS 185 MM	1	NOs	33 480	33 480
1454	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000128	NB 10.00 INCHES; THICKNESS 185 MM	1	NOs	38 310	38 310
1455	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000129	NB 10.00 INCHES; THICKNESS 185 MM	1	NOs	38 310	38 310
1456	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000130	NB 12.00 INCHES; THICKNESS 185 MM	4	NOs	42 870	1 71 480
1457	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000131	NB 14.00 INCHES; THICKNESS 185 MM	1	NOs	45 710	45 710
1458	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000132	NB 20.00 INCHES; THICKNESS 185 MM	3	NOs	59 360	1 78 080
1459	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000135	VALVE ASSEMBLIES			95 750	
1460	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000136	NB 03.00 INCHES; THICKNESS 185 MM	14	NOs	43 640	6 10 960
1461	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000137	NB 03.00 INCHES; THICKNESS 185 MM	1	NOs	43 640	43 640
1462	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000138	NB 04.00 INCHES; THICKNESS 185 MM	8	NOs	48 200	3 85 600
1463	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000139	NB 04.00 INCHES; THICKNESS 185 MM	4	NOs	48 200	1 92 800
1464	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000140	NB 06.00 INCHES; THICKNESS 185 MM	20	NOs	57 860	11 57 200
1465	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000141	NB 06.00 INCHES; THICKNESS 185 MM	3	NOs	57 860	1 73 580
1466	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000142	NB 08.00 INCHES; THICKNESS 185 MM	9	NOs	66 970	6 02 730
1467	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000143	NB 08.00 INCHES; THICKNESS 185 MM	3	NOs	66 970	2 00 910
1468	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000144	NB 10.00 INCHES; THICKNESS 185 MM	17	NOs	76 630	13 02 710
1469	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000145	NB 10.00 INCHES; THICKNESS 185 MM	7	NOs	76 630	5 36 410
1470	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000146	NB 12.00 INCHES; THICKNESS 185 MM	10	NOs	85 730	8 57 300
1471	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000147	NB 14.00 INCHES; THICKNESS 185 MM	5	NOs	91 420	4 57 100
1472	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000148	NB 14.00 INCHES; THICKNESS 185 MM	3	NOs	91 420	2 74 260
1473	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000149	NB 16.00 INCHES; THICKNESS 185 MM	1	NOs	1 00 510	1 00 510
1474	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000150	NB 20.00 INCHES; THICKNESS 185 MM	3	NOs	1 18 710	3 56 130

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1475	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000156	INSULATION TYPE : IH; SURFACE MAT ERIAL : CS & AS; OPERATING TEMP. RANGE : 351 (DEG C) TO 500 (DEG C); INSULATION MATERIAL : ROCKWOOL			1 91 500	
1476	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000157	PIPES				
1477	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000158	NB 04.00 INCHES; THICKNESS 365 MM	10	Metres	36 440	3 64 400
1478	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000159	NB 06.00 INCHES; THICKNESS 365 MM	150	Metres	40 490	60 73 500
1479	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000160	NB 10.00 INCHES; THICKNESS 365 MM	10	Metres	48 350	4 83 500
1480	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000161	NB 10.00 INCHES; THICKNESS 365 MM	170	Metres	48 350	82 19 500
1481	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000162	NB 16.00 INCHES; THICKNESS 365 MM	65	Metres	58 360	37 93 400
1482	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000163	NB 18.00 INCHES; THICKNESS 365 MM	640	Metres	62 170	3 97 88 800
1483	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000168	FLANGE ASSEMBLIES			52 160	
1484	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000169	NB 18.00 INCHES; THICKNESS 365 MM	1	NOs	62 170	62 170
1485	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000173	BLIND FLANGE ASSEMBLIES				
1486	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000174	NB 04.00 INCHES; THICKNESS 365 MM	1	NOs	36 440	36 440
1487	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000175	NB 10.00 INCHES; THICKNESS 365 MM	7	NOs	48 350	3 38 450
1488	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000176	VALVE ASSEMBLIES			40 490	
1489	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000177	NB 18.00 INCHES; THICKNESS 365 MM	3	NOs	1 24 330	3 72 990
1490	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000181	INSULATION TYPE : IH; SURFACE MAT ERIAL : CS & AS; OPERATING TEMP. RANGE : 501 (DEG C) TO 550 (DEG C); INSULATION MATERIAL : ROCKWOOL				
1491	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000182	PIPES				
1492	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000183	NB 10.00 INCHES; THICKNESS 365 MM	50	Metres	48 350	24 17 500
1493	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000184	NB 12.00 INCHES; THICKNESS 365 MM	10	Metres	52 160	5 21 600
1494	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000185	NB 16.00 INCHES; THICKNESS 365 MM	75	Metres	58 360	43 77 000
1495	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000186	NB 20.00 INCHES; THICKNESS 365 MM	310	Metres	65 980	2 04 53 800
1496	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000187	NB 24.00 INCHES; THICKNESS 365 MM	550	Metres	73 600	4 04 80 000
1497	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M59900000188	NB 30.00 INCHES; THICKNESS 365 MM	10	Metres	91 730	9 17 300

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1498	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M70000000000	INSULATION OF ELETRICAL TRACED LINES (UNITS): Providing thermal insulation including supply of all insulating and ancillary materials, vapour barrier, weather protective coverings, consumable and other necessary materials ,testing of materials as required, including transportation of materials to work site, duly inspected by 3rd party inspector(Llyods/BV/DNV or any other Client approved party) at manufacturer's shop & sample check/inspection at site by EIL Construction inspector, applying insulation on surfaces as specified including all preparatory work there on, all binding, tying, lacing, stitching and/or otherwise securing , finishing with cladding as per spec., providing bolts, rivets, and self tapping screws wherever specified , providing inspection windows, end seals for flanges etc., colour coding and identification. Providing steel scaffolding, all tools , tackles , equipments etc. , labour, supervision and completing the work in all respect, at all heights as per drawings , specifications and instructions of Engineer- in-charge. (Refer Legend for applicable EIL specification)				
1499	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M72200000000	INSULATION MATERIAL : ROCKWOOL+PIC				
1500	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M72257000000	INSULATION TYPE : IE; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : ROCKWOOL+PIC				
1501	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M72257010000	PIPES				
1502	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570104AA	NB 00.50 INCHES; THK(I) 25 MM; THK(O) 25 MM	30	Metres	2 590	77 700
1503	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570105AA	NB 00.75 INCHES; THK(I) 25 MM; THK(O) 25 MM	20	Metres	2 730	54 600
1504	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570105DA	NB 00.75 INCHES; THK(I) 40 MM; THK(O) 25 MM	15	Metres	3 440	51 600
1505	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570106AA	NB 01.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	30	Metres	2 890	86 700
1506	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570108AA	NB 01.50 INCHES; THK(I) 25 MM; THK(O) 25 MM	10	Metres	3 240	32 400
1507	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570108DA	NB 01.50 INCHES; THK(I) 40 MM; THK(O) 25 MM	10	Metres	3 970	39 700
1508	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570109AA	NB 02.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	165	Metres	3 530	5 82 450
1509	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570109DA	NB 02.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	140	Metres	4 270	5 97 800
1510	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570109FA	NB 02.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	20	Metres	4 790	95 800
1511	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570109JA	NB 02.00 INCHES; THK(I) 65 MM; THK(O) 25 MM	15	Metres	5 570	83 550
1512	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570111AA	NB 03.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	100	Metres	4 220	4 22 000
1513	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570111DA	NB 03.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	10	Metres	4 980	49 800
1514	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570111JA	NB 03.00 INCHES; THK(I) 65 MM; THK(O) 25 MM	55	Metres	6 330	3 48 150
1515	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570113AA	NB 04.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	595	Metres	4 830	28 73 850
1516	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570113DA	NB 04.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	80	Metres	5 620	4 49 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1517	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570113FA	NB 04.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	115	Metres	6 170	7 09 550
1518	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570113LA	NB 04.00 INCHES; THK(I) 75 MM; THK(O) 25 MM	30	Metres	7 590	2 27 700
1519	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570115AA	NB 06.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	1385	Metres	6 120	84 76 200
1520	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570115FA	NB 06.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	15	Metres	7 560	1 13 400
1521	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570115LA	NB 06.00 INCHES; THK(I) 75 MM; THK(O) 25 MM	125	Metres	9 070	11 33 750
1522	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570116AA	NB 08.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	40	Metres	7 340	2 93 600
1523	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570116FA	NB 08.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	475	Metres	8 860	42 08 500
1524	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570116LA	NB 08.00 INCHES; THK(I) 75 MM; THK(O) 25 MM	15	Metres	10 460	1 56 900
1525	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570116PA	NB 08.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	15	Metres	11 460	1 71 900
1526	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570117AA	NB 10.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	10	Metres	8 630	86 300
1527	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570118PA	NB 12.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	35	Metres	14 430	5 05 050
1528	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570119PA	NB 14.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	10	Metres	15 330	1 53 300
1529	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570120PA	NB 16.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	15	Metres	16 770	2 51 550
1530	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570122PA	NB 20.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	10	Metres	19 660	1 96 600
1531	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M72257020000	FLANGE ASSEMBLIES				
1532	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570208AA	NB 01.50 INCHES; THK(I) 25 MM; THK(O) 25 MM	3	NOs	3 240	9 720
1533	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570208DA	NB 01.50 INCHES; THK(I) 40 MM; THK(O) 25 MM	1	NOs	3 970	3 970
1534	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570209AA	NB 02.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	14	NOs	3 530	49 420
1535	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570209DA	NB 02.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	1	NOs	4 270	4 270
1536	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570209FA	NB 02.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	3	NOs	4 790	14 370
1537	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570213AA	NB 04.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	9	NOs	4 830	43 470
1538	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570213DA	NB 04.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	1	NOs	5 620	5 620
1539	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570213FA	NB 04.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	3	NOs	6 170	18 510
1540	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570213LA	NB 04.00 INCHES; THK(I) 75 MM; THK(O) 25 MM	3	NOs	7 590	22 770
1541	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570215AA	NB 06.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	9	NOs	6 120	55 080
1542	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570215FA	NB 06.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	1	NOs	7 560	7 560
1543	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570215LA	NB 06.00 INCHES; THK(I) 75 MM; THK(O) 25 MM	1	NOs	9 070	9 070
1544	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570215PA	NB 06.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	1	NOs	10 020	10 020
1545	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570216AA	NB 08.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	3	NOs	7 340	22 020
1546	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570216FA	NB 08.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	1	NOs	8 860	8 860

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1547	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570216LA	NB 08.00 INCHES; THK(I) 75 MM; THK(O) 25 MM	4	NOs	10 460	41 840
1548	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570216PA	NB 08.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	1	NOs	11 460	11 460
1549	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570218PA	NB 12.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	1	NOs	14 430	14 430
1550	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570219PA	NB 14.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	1	NOs	15 330	15 330
1551	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570220PA	NB 16.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	1	NOs	16 770	16 770
1552	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M72257030000	BLIND FLANGE ASSEMBLIES				
1553	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570305AA	NB 00.75 INCHES; THK(I) 25 MM; THK(O) 25 MM	51	NOs	2 730	1 39 230
1554	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570305DA	NB 00.75 INCHES; THK(I) 40 MM; THK(O) 25 MM	7	NOs	3 440	24 080
1555	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570308AA	NB 01.50 INCHES; THK(I) 25 MM; THK(O) 25 MM	1	NOs	3 240	3 240
1556	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570311AA	NB 03.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	3	NOs	4 220	12 660
1557	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M72257040000	VALVE ASSEMBLIES				
1558	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570404AA	NB 00.50 INCHES; THK(I) 25 MM; THK(O) 25 MM	8	NOs	5 190	41 520
1559	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570405AA	NB 00.75 INCHES; THK(I) 25 MM; THK(O) 25 MM	85	NOs	5 460	4 64 100
1560	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570405DA	NB 00.75 INCHES; THK(I) 40 MM; THK(O) 25 MM	10	NOs	6 870	68 700
1561	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570406AA	NB 01.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	17	NOs	5 770	98 090
1562	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570408AA	NB 01.50 INCHES; THK(I) 25 MM; THK(O) 25 MM	1	NOs	6 480	6 480
1563	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570409AA	NB 02.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	91	NOs	7 070	6 43 370
1564	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570409DA	NB 02.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	10	NOs	8 530	85 300
1565	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570409FA	NB 02.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	12	NOs	9 570	1 14 840
1566	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570409JA	NB 02.00 INCHES; THK(I) 65 MM; THK(O) 25 MM	8	NOs	11 140	89 120
1567	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570411AA	NB 03.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	40	NOs	8 440	3 37 600
1568	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570411DA	NB 03.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	3	NOs	9 960	29 880
1569	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570411JA	NB 03.00 INCHES; THK(I) 65 MM; THK(O) 25 MM	20	NOs	12 660	2 53 200
1570	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570413AA	NB 04.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	43	NOs	9 650	4 14 950
1571	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570413DA	NB 04.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	3	NOs	11 230	33 690
1572	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570413FA	NB 04.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	3	NOs	12 330	36 990
1573	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570413LA	NB 04.00 INCHES; THK(I) 75 MM; THK(O) 25 MM	1	NOs	15 190	15 190
1574	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570415AA	NB 06.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	65	NOs	12 230	7 94 950
1575	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570415FA	NB 06.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	3	NOs	15 110	45 330
1576	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570415LA	NB 06.00 INCHES; THK(I) 75 MM; THK(O) 25 MM	3	NOs	18 140	54 420

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1577	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570416AA	NB 08.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	10	NOs	14 680	1 46 800
1578	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570416FA	NB 08.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	10	NOs	17 710	1 77 100
1579	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570416LA	NB 08.00 INCHES; THK(I) 75 MM; THK(O) 25 MM	1	NOs	20 920	20 920
1580	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570416PA	NB 08.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	1	NOs	22 920	22 920
1581	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570417AA	NB 10.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	1	NOs	17 260	17 260
1582	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570418PA	NB 12.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	5	NOs	28 870	1 44 350
1583	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570420PA	NB 16.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	1	NOs	33 540	33 540
1584	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	M722570422PA	NB 20.00 INCHES; THK(I) 90 MM; THK(O) 25 MM	1	NOs	39 320	39 320
1585	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0000000000	COLD INSULATION (UNITS): Providing thermal insulation including supply of all insulating and ancillary materials, Aluminium foil for SS surfaces, vapour barrier, weather protective coverings, consumables and other necessary materials , testing of materials as required , including transportation of materials to work site, duly inspected by 3rd party inspector(Llyods/BV/DNV or any other Client approved party) at manufacturer's shop & sample check/inspection at site by EIL Construction inspector, applying insulation on surfaces as specified including all preparatory works there on, binding, tying, lacing, stitching and/or otherwise securing , finishing with cladding as per spec., providing bolts, rivets, and self tapping screws wherever specified ,providing inspection windows, end seals for flanges etc., colour coding and identification. Providing steel scaffolding, all tools , tackles , equipments etc. , labour, supervision and completing the work in all respect, at all heights as per drawings , specifications and instructions of Engineer-in-charge. (Refer Legend for applicable EIL specification)				
1586	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0400000000	INSULATION MATERIAL : POLY ISOCYANURATE(PIC)				
1587	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465000000	INSULATION TYPE : IC; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO -45 (DEG C); INSULATION MATERIAL : POLY ISOCYANURATE(PIC)				
1588	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010000	PIPES				
1589	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010410	NB 00.50 INCHES; THICKNESS 50 MM	10	Metres	2 900	29 000
1590	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010505	NB 00.75 INCHES; THICKNESS 25 MM	15	Metres	1 710	25 650
1591	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010508	NB 00.75 INCHES; THICKNESS 40 MM	10	Metres	2 490	24 900
1592	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010510	NB 00.75 INCHES; THICKNESS 50 MM	20	Metres	3 040	60 800
1593	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010512	NB 00.75 INCHES; THICKNESS 60 MM	20	Metres	3 620	72 400
1594	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010605	NB 01.00 INCHES; THICKNESS 25 MM	60	Metres	1 870	1 12 200

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1595	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010610	NB 01.00 INCHES; THICKNESS 50 MM	20	Metres	3 220	64 400
1596	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010612	NB 01.00 INCHES; THICKNESS 60 MM	15	Metres	3 810	57 150
1597	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010805	NB 01.50 INCHES; THICKNESS 25 MM	15	Metres	2 220	33 300
1598	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010808	NB 01.50 INCHES; THICKNESS 40 MM	10	Metres	3 040	30 400
1599	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010810	NB 01.50 INCHES; THICKNESS 50 MM	10	Metres	3 620	36 200
1600	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010812	NB 01.50 INCHES; THICKNESS 60 MM	10	Metres	4 220	42 200
1601	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010814	NB 01.50 INCHES; THICKNESS 70 MM	10	Metres	4 850	48 500
1602	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010905	NB 02.00 INCHES; THICKNESS 25 MM	445	Metres	2 510	11 16 950
1603	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010908	NB 02.00 INCHES; THICKNESS 40 MM	55	Metres	3 350	1 84 250
1604	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010910	NB 02.00 INCHES; THICKNESS 50 MM	15	Metres	3 930	58 950
1605	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010912	NB 02.00 INCHES; THICKNESS 60 MM	85	Metres	4 560	3 87 600
1606	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465010914	NB 02.00 INCHES; THICKNESS 70 MM	40	Metres	5 210	2 08 400
1607	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011112	NB 03.00 INCHES; THICKNESS 60 MM	10	Metres	5 360	53 600
1608	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011114	NB 03.00 INCHES; THICKNESS 70 MM	60	Metres	6 040	3 62 400
1609	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011116	NB 03.00 INCHES; THICKNESS 80 MM	255	Metres	6 750	17 21 250
1610	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011305	NB 04.00 INCHES; THICKNESS 25 MM	780	Metres	3 770	29 40 600
1611	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011310	NB 04.00 INCHES; THICKNESS 50 MM	10	Metres	5 380	53 800
1612	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011312	NB 04.00 INCHES; THICKNESS 60 MM	50	Metres	6 070	3 03 500
1613	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011314	NB 04.00 INCHES; THICKNESS 70 MM	60	Metres	6 780	4 06 800
1614	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011316	NB 04.00 INCHES; THICKNESS 80 MM	140	Metres	7 530	10 54 200
1615	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011505	NB 06.00 INCHES; THICKNESS 25 MM	10	Metres	5 040	50 400
1616	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011510	NB 06.00 INCHES; THICKNESS 50 MM	165	Metres	6 820	11 25 300
1617	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011512	NB 06.00 INCHES; THICKNESS 60 MM	35	Metres	7 580	2 65 300
1618	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011514	NB 06.00 INCHES; THICKNESS 70 MM	290	Metres	8 370	24 27 300
1619	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011516	NB 06.00 INCHES; THICKNESS 80 MM	1015	Metres	9 180	93 17 700
1620	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011605	NB 08.00 INCHES; THICKNESS 25 MM	670	Metres	6 230	41 74 100
1621	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011610	NB 08.00 INCHES; THICKNESS 50 MM	60	Metres	8 180	4 90 800
1622	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011612	NB 08.00 INCHES; THICKNESS 60 MM	65	Metres	9 000	5 85 000
1623	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011614	NB 08.00 INCHES; THICKNESS 70 MM	245	Metres	9 850	24 13 250
1624	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011616	NB 08.00 INCHES; THICKNESS 80 MM	405	Metres	10 730	43 45 650

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1625	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011708	NB 10.00 INCHES; THICKNESS 40 MM	50	Metres	8 760	4 38 000
1626	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011710	NB 10.00 INCHES; THICKNESS 50 MM	40	Metres	9 620	3 84 800
1627	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011712	NB 10.00 INCHES; THICKNESS 60 MM	145	Metres	10 520	15 25 400
1628	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011714	NB 10.00 INCHES; THICKNESS 70 MM	410	Metres	11 440	46 90 400
1629	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011716	NB 10.00 INCHES; THICKNESS 80 MM	375	Metres	12 380	46 42 500
1630	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011808	NB 12.00 INCHES; THICKNESS 40 MM	230	Metres	10 050	23 11 500
1631	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011813	NB 12.00 INCHES; THICKNESS 65 MM	20	Metres	12 430	2 48 600
1632	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011814	NB 12.00 INCHES; THICKNESS 70 MM	270	Metres	12 930	34 91 100
1633	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011816	NB 12.00 INCHES; THICKNESS 80 MM	290	Metres	13 930	40 39 700
1634	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011818	NB 12.00 INCHES; THICKNESS 90 MM	75	Metres	14 970	11 22 750
1635	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011908	NB 14.00 INCHES; THICKNESS 40 MM	100	Metres	10 850	10 85 000
1636	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011913	NB 14.00 INCHES; THICKNESS 65 MM	50	Metres	13 340	6 67 000
1637	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011914	NB 14.00 INCHES; THICKNESS 70 MM	55	Metres	13 860	7 62 300
1638	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011916	NB 14.00 INCHES; THICKNESS 80 MM	65	Metres	14 900	9 68 500
1639	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465011918	NB 14.00 INCHES; THICKNESS 90 MM	150	Metres	15 980	23 97 000
1640	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012008	NB 16.00 INCHES; THICKNESS 40 MM	335	Metres	12 140	40 66 900
1641	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012013	NB 16.00 INCHES; THICKNESS 65 MM	275	Metres	14 800	40 70 000
1642	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012014	NB 16.00 INCHES; THICKNESS 70 MM	85	Metres	15 340	13 03 900
1643	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012016	NB 16.00 INCHES; THICKNESS 80 MM	115	Metres	16 460	18 92 900
1644	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012018	NB 16.00 INCHES; THICKNESS 90 MM	65	Metres	17 600	11 44 000
1645	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012108	NB 18.00 INCHES; THICKNESS 40 MM	250	Metres	13 440	33 60 000
1646	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012113	NB 18.00 INCHES; THICKNESS 65 MM	105	Metres	16 250	17 06 250
1647	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012114	NB 18.00 INCHES; THICKNESS 70 MM	20	Metres	16 830	3 36 600
1648	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012116	NB 18.00 INCHES; THICKNESS 80 MM	55	Metres	18 020	9 91 100
1649	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012118	NB 18.00 INCHES; THICKNESS 90 MM	880	Metres	19 220	1 69 13 600
1650	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012208	NB 20.00 INCHES; THICKNESS 40 MM	30	Metres	14 730	4 41 900
1651	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012213	NB 20.00 INCHES; THICKNESS 65 MM	15	Metres	17 700	2 65 500
1652	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012214	NB 20.00 INCHES; THICKNESS 70 MM	55	Metres	18 320	10 07 600
1653	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012216	NB 20.00 INCHES; THICKNESS 80 MM	385	Metres	19 560	75 30 600
1654	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012220	NB 20.00 INCHES; THICKNESS 100 MM	95	Metres	22 130	21 02 350

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1655	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012408	NB 24.00 INCHES; THICKNESS 40 MM	50	Metres	17 320	8 66 000
1656	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012413	NB 24.00 INCHES; THICKNESS 65 MM	10	Metres	20 620	2 06 200
1657	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012414	NB 24.00 INCHES; THICKNESS 70 MM	75	Metres	21 290	15 96 750
1658	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012416	NB 24.00 INCHES; THICKNESS 80 MM	165	Metres	22 670	37 40 550
1659	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012420	NB 24.00 INCHES; THICKNESS 100 MM	130	Metres	25 510	33 16 300
1660	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012513	NB 26.00 INCHES; THICKNESS 65 MM	15	Metres	22 080	3 31 200
1661	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012520	NB 26.00 INCHES; THICKNESS 100 MM	80	Metres	27 190	21 75 200
1662	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012608	NB 28.00 INCHES; THICKNESS 40 MM	65	Metres	19 900	12 93 500
1663	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012616	NB 28.00 INCHES; THICKNESS 80 MM	210	Metres	25 780	54 13 800
1664	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012620	NB 28.00 INCHES; THICKNESS 100 MM	35	Metres	28 880	10 10 800
1665	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012708	NB 30.00 INCHES; THICKNESS 40 MM	335	Metres	21 200	71 02 000
1666	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012713	NB 30.00 INCHES; THICKNESS 65 MM	495	Metres	24 980	1 23 65 100
1667	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012714	NB 30.00 INCHES; THICKNESS 70 MM	290	Metres	25 760	74 70 400
1668	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012716	NB 30.00 INCHES; THICKNESS 80 MM	260	Metres	27 330	71 05 800
1669	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012720	NB 30.00 INCHES; THICKNESS 100 MM	50	Metres	30 560	15 28 000
1670	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465012816	NB 32.00 INCHES; THICKNESS 80 MM	85	Metres	28 890	24 55 650
1671	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465013008	NB 36.00 INCHES; THICKNESS 40 MM	605	Metres	25 070	1 51 67 350
1672	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465013013	NB 36.00 INCHES; THICKNESS 65 MM	195	Metres	29 350	57 23 250
1673	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465013014	NB 36.00 INCHES; THICKNESS 70 MM	40	Metres	30 230	12 09 200
1674	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465013016	NB 36.00 INCHES; THICKNESS 80 MM	65	Metres	32 000	20 80 000
1675	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465013020	NB 36.00 INCHES; THICKNESS 100 MM	205	Metres	35 610	73 00 050
1676	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465013208	NB 40.00 INCHES; THICKNESS 40 MM	105	Metres	27 650	29 03 250
1677	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465013214	NB 40.00 INCHES; THICKNESS 70 MM	120	Metres	33 200	39 84 000
1678	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465013216	NB 40.00 INCHES; THICKNESS 80 MM	55	Metres	35 100	19 30 500
1679	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465013320	NB 42.00 INCHES; THICKNESS 100 MM	105	Metres	40 670	42 70 350
1680	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465013620	NB 48.00 INCHES; THICKNESS 100 MM	160	Metres	45 720	73 15 200
1681	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465014220	NB 60.00 INCHES; THICKNESS 100 MM	40	Metres	55 820	22 32 800
1682	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465014620	NB 68.00 INCHES; THICKNESS 100 MM	190	Metres	62 570	1 18 88 300
1683	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465020000	FLANGE ASSEMBLIES				
1684	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465020810	NB 01.50 INCHES; THICKNESS 50 MM	7	NOs	3 620	25 340

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1685	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465020812	NB 01.50 INCHES; THICKNESS 60 MM	8	NOs	4 220	33 760
1686	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465020814	NB 01.50 INCHES; THICKNESS 70 MM	9	NOs	4 850	43 650
1687	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465020905	NB 02.00 INCHES; THICKNESS 25 MM	17	NOs	2 510	42 670
1688	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465020908	NB 02.00 INCHES; THICKNESS 40 MM	3	NOs	3 350	10 050
1689	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465020910	NB 02.00 INCHES; THICKNESS 50 MM	1	NOs	3 930	3 930
1690	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465020912	NB 02.00 INCHES; THICKNESS 60 MM	7	NOs	4 560	31 920
1691	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465020914	NB 02.00 INCHES; THICKNESS 70 MM	5	NOs	5 210	26 050
1692	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021114	NB 03.00 INCHES; THICKNESS 70 MM	5	NOs	6 040	30 200
1693	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021116	NB 03.00 INCHES; THICKNESS 80 MM	4	NOs	6 750	27 000
1694	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021305	NB 04.00 INCHES; THICKNESS 25 MM	4	NOs	3 770	15 080
1695	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021310	NB 04.00 INCHES; THICKNESS 50 MM	3	NOs	5 380	16 140
1696	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021312	NB 04.00 INCHES; THICKNESS 60 MM	1	NOs	6 070	6 070
1697	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021314	NB 04.00 INCHES; THICKNESS 70 MM	9	NOs	6 780	61 020
1698	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021316	NB 04.00 INCHES; THICKNESS 80 MM	3	NOs	7 530	22 590
1699	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021510	NB 06.00 INCHES; THICKNESS 50 MM	7	NOs	6 820	47 740
1700	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021512	NB 06.00 INCHES; THICKNESS 60 MM	8	NOs	7 580	60 640
1701	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021514	NB 06.00 INCHES; THICKNESS 70 MM	12	NOs	8 370	1 00 440
1702	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021516	NB 06.00 INCHES; THICKNESS 80 MM	4	NOs	9 180	36 720
1703	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021605	NB 08.00 INCHES; THICKNESS 25 MM	13	NOs	6 230	80 990
1704	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021612	NB 08.00 INCHES; THICKNESS 60 MM	1	NOs	9 000	9 000
1705	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021614	NB 08.00 INCHES; THICKNESS 70 MM	8	NOs	9 850	78 800
1706	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021616	NB 08.00 INCHES; THICKNESS 80 MM	8	NOs	10 730	85 840
1707	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021708	NB 10.00 INCHES; THICKNESS 40 MM	1	NOs	8 760	8 760
1708	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021710	NB 10.00 INCHES; THICKNESS 50 MM	3	NOs	9 620	28 860
1709	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021712	NB 10.00 INCHES; THICKNESS 60 MM	3	NOs	10 520	31 560
1710	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021714	NB 10.00 INCHES; THICKNESS 70 MM	12	NOs	11 440	1 37 280
1711	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021716	NB 10.00 INCHES; THICKNESS 80 MM	9	NOs	12 380	1 11 420
1712	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021808	NB 12.00 INCHES; THICKNESS 40 MM	4	NOs	10 050	40 200
1713	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021813	NB 12.00 INCHES; THICKNESS 65 MM	1	NOs	12 430	12 430
1714	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021814	NB 12.00 INCHES; THICKNESS 70 MM	5	NOs	12 930	64 650

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1715	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021816	NB 12.00 INCHES; THICKNESS 80 MM	13	NOs	13 930	1 81 090
1716	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021818	NB 12.00 INCHES; THICKNESS 90 MM	7	NOs	14 970	1 04 790
1717	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021908	NB 14.00 INCHES; THICKNESS 40 MM	1	NOs	10 850	10 850
1718	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021913	NB 14.00 INCHES; THICKNESS 65 MM	3	NOs	13 340	40 020
1719	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021914	NB 14.00 INCHES; THICKNESS 70 MM	1	NOs	13 860	13 860
1720	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021916	NB 14.00 INCHES; THICKNESS 80 MM	3	NOs	14 900	44 700
1721	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465021918	NB 14.00 INCHES; THICKNESS 90 MM	4	NOs	15 980	63 920
1722	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022014	NB 16.00 INCHES; THICKNESS 70 MM	1	NOs	15 340	15 340
1723	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022016	NB 16.00 INCHES; THICKNESS 80 MM	7	NOs	16 460	1 15 220
1724	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022018	NB 16.00 INCHES; THICKNESS 90 MM	1	NOs	17 600	17 600
1725	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022108	NB 18.00 INCHES; THICKNESS 40 MM	1	NOs	13 440	13 440
1726	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022113	NB 18.00 INCHES; THICKNESS 65 MM	3	NOs	16 250	48 750
1727	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022114	NB 18.00 INCHES; THICKNESS 70 MM	1	NOs	16 830	16 830
1728	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022116	NB 18.00 INCHES; THICKNESS 80 MM	4	NOs	18 020	72 080
1729	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022118	NB 18.00 INCHES; THICKNESS 90 MM	10	NOs	19 220	1 92 200
1730	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022208	NB 20.00 INCHES; THICKNESS 40 MM	4	NOs	14 730	58 920
1731	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022213	NB 20.00 INCHES; THICKNESS 65 MM	3	NOs	17 700	53 100
1732	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022214	NB 20.00 INCHES; THICKNESS 70 MM	5	NOs	18 320	91 600
1733	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022216	NB 20.00 INCHES; THICKNESS 80 MM	4	NOs	19 560	78 240
1734	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022220	NB 20.00 INCHES; THICKNESS 100 MM	5	NOs	22 130	1 10 650
1735	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022408	NB 24.00 INCHES; THICKNESS 40 MM	12	NOs	17 320	2 07 840
1736	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022413	NB 24.00 INCHES; THICKNESS 65 MM	3	NOs	20 620	61 860
1737	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022414	NB 24.00 INCHES; THICKNESS 70 MM	5	NOs	21 290	1 06 450
1738	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022416	NB 24.00 INCHES; THICKNESS 80 MM	1	NOs	22 670	22 670
1739	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022420	NB 24.00 INCHES; THICKNESS 100 MM	5	NOs	25 510	1 27 550
1740	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022513	NB 26.00 INCHES; THICKNESS 65 MM	1	NOs	22 080	22 080
1741	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022620	NB 28.00 INCHES; THICKNESS 100 MM	1	NOs	28 880	28 880
1742	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022708	NB 30.00 INCHES; THICKNESS 40 MM	4	NOs	21 200	84 800
1743	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022714	NB 30.00 INCHES; THICKNESS 70 MM	4	NOs	25 760	1 03 040
1744	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022716	NB 30.00 INCHES; THICKNESS 80 MM	7	NOs	27 330	1 91 310

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1745	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465022720	NB 30.00 INCHES; THICKNESS 100 MM	5	NOs	30 560	1 52 800
1746	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465023008	NB 36.00 INCHES; THICKNESS 40 MM	5	NOs	25 070	1 25 350
1747	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465023014	NB 36.00 INCHES; THICKNESS 70 MM	1	NOs	30 230	30 230
1748	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465023016	NB 36.00 INCHES; THICKNESS 80 MM	1	NOs	32 000	32 000
1749	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465023020	NB 36.00 INCHES; THICKNESS 100 MM	1	NOs	35 610	35 610
1750	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465023214	NB 40.00 INCHES; THICKNESS 70 MM	1	NOs	33 200	33 200
1751	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465023316	NB 42.00 INCHES; THICKNESS 80 MM	1	NOs	36 660	36 660
1752	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465030000	BLIND FLANGE ASSEMBLIES				
1753	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465030410	NB 00.50 INCHES; THICKNESS 50 MM	5	NOs	2 900	14 500
1754	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465030505	NB 00.75 INCHES; THICKNESS 25 MM	52	NOs	1 710	88 920
1755	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465030508	NB 00.75 INCHES; THICKNESS 40 MM	14	NOs	2 490	34 860
1756	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465030510	NB 00.75 INCHES; THICKNESS 50 MM	53	NOs	3 040	1 61 120
1757	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465030512	NB 00.75 INCHES; THICKNESS 60 MM	51	NOs	3 620	1 84 620
1758	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465030605	NB 01.00 INCHES; THICKNESS 25 MM	1	NOs	1 870	1 870
1759	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465030610	NB 01.00 INCHES; THICKNESS 50 MM	3	NOs	3 220	9 660
1760	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465030905	NB 02.00 INCHES; THICKNESS 25 MM	1	NOs	2 510	2 510
1761	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465031114	NB 03.00 INCHES; THICKNESS 70 MM	3	NOs	6 040	18 120
1762	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465031305	NB 04.00 INCHES; THICKNESS 25 MM	1	NOs	3 770	3 770
1763	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465031310	NB 04.00 INCHES; THICKNESS 50 MM	1	NOs	5 380	5 380
1764	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465031314	NB 04.00 INCHES; THICKNESS 70 MM	1	NOs	6 780	6 780
1765	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465031505	NB 06.00 INCHES; THICKNESS 25 MM	1	NOs	5 040	5 040
1766	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465031605	NB 08.00 INCHES; THICKNESS 25 MM	1	NOs	6 230	6 230
1767	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465031716	NB 10.00 INCHES; THICKNESS 80 MM	1	NOs	12 380	12 380
1768	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465032008	NB 16.00 INCHES; THICKNESS 40 MM	1	NOs	12 140	12 140
1769	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465032220	NB 20.00 INCHES; THICKNESS 100 MM	1	NOs	22 130	22 130
1770	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465032816	NB 32.00 INCHES; THICKNESS 80 MM	1	NOs	28 890	28 890
1771	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465033008	NB 36.00 INCHES; THICKNESS 40 MM	1	NOs	25 070	25 070
1772	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040000	VALVE ASSEMBLIES				
1773	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040410	NB 00.50 INCHES; THICKNESS 50 MM	5	NOs	5 790	28 950
1774	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040505	NB 00.75 INCHES; THICKNESS 25 MM	55	NOs	3 430	1 88 650

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1775	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040508	NB 00.75 INCHES; THICKNESS 40 MM	17	NOs	4 970	84 490
1776	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040510	NB 00.75 INCHES; THICKNESS 50 MM	77	NOs	6 090	4 68 930
1777	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040512	NB 00.75 INCHES; THICKNESS 60 MM	73	NOs	7 240	5 28 520
1778	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040605	NB 01.00 INCHES; THICKNESS 25 MM	3	NOs	3 740	11 220
1779	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040610	NB 01.00 INCHES; THICKNESS 50 MM	16	NOs	6 440	1 03 040
1780	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040612	NB 01.00 INCHES; THICKNESS 60 MM	10	NOs	7 610	76 100
1781	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040805	NB 01.50 INCHES; THICKNESS 25 MM	4	NOs	4 440	17 760
1782	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040905	NB 02.00 INCHES; THICKNESS 25 MM	4	NOs	5 010	20 040
1783	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040908	NB 02.00 INCHES; THICKNESS 40 MM	4	NOs	6 690	26 760
1784	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040910	NB 02.00 INCHES; THICKNESS 50 MM	1	NOs	7 870	7 870
1785	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040912	NB 02.00 INCHES; THICKNESS 60 MM	10	NOs	9 120	91 200
1786	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465040914	NB 02.00 INCHES; THICKNESS 70 MM	3	NOs	10 410	31 230
1787	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041112	NB 03.00 INCHES; THICKNESS 60 MM	4	NOs	10 730	42 920
1788	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041114	NB 03.00 INCHES; THICKNESS 70 MM	4	NOs	12 080	48 320
1789	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041116	NB 03.00 INCHES; THICKNESS 80 MM	9	NOs	13 500	1 21 500
1790	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041305	NB 04.00 INCHES; THICKNESS 25 MM	4	NOs	7 540	30 160
1791	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041310	NB 04.00 INCHES; THICKNESS 50 MM	1	NOs	10 760	10 760
1792	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041312	NB 04.00 INCHES; THICKNESS 60 MM	1	NOs	12 130	12 130
1793	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041314	NB 04.00 INCHES; THICKNESS 70 MM	10	NOs	13 560	1 35 600
1794	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041316	NB 04.00 INCHES; THICKNESS 80 MM	9	NOs	15 050	1 35 450
1795	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041505	NB 06.00 INCHES; THICKNESS 25 MM	1	NOs	10 080	10 080
1796	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041510	NB 06.00 INCHES; THICKNESS 50 MM	4	NOs	13 640	54 560
1797	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041512	NB 06.00 INCHES; THICKNESS 60 MM	5	NOs	15 170	75 850
1798	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041514	NB 06.00 INCHES; THICKNESS 70 MM	16	NOs	16 730	2 67 680
1799	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041516	NB 06.00 INCHES; THICKNESS 80 MM	16	NOs	18 360	2 93 760
1800	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041605	NB 08.00 INCHES; THICKNESS 25 MM	13	NOs	12 470	1 62 110
1801	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041610	NB 08.00 INCHES; THICKNESS 50 MM	5	NOs	16 360	81 800
1802	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041612	NB 08.00 INCHES; THICKNESS 60 MM	1	NOs	18 010	18 010
1803	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041614	NB 08.00 INCHES; THICKNESS 70 MM	20	NOs	19 710	3 94 200
1804	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041616	NB 08.00 INCHES; THICKNESS 80 MM	5	NOs	21 450	1 07 250

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1805	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041710	NB 10.00 INCHES; THICKNESS 50 MM	4	NOs	19 240	76 960
1806	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041714	NB 10.00 INCHES; THICKNESS 70 MM	17	NOs	22 880	3 88 960
1807	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041716	NB 10.00 INCHES; THICKNESS 80 MM	13	NOs	24 760	3 21 880
1808	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041813	NB 12.00 INCHES; THICKNESS 65 MM	5	NOs	24 850	1 24 250
1809	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041814	NB 12.00 INCHES; THICKNESS 70 MM	4	NOs	25 850	1 03 400
1810	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041816	NB 12.00 INCHES; THICKNESS 80 MM	3	NOs	27 870	83 610
1811	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041818	NB 12.00 INCHES; THICKNESS 90 MM	1	NOs	29 940	29 940
1812	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041908	NB 14.00 INCHES; THICKNESS 40 MM	4	NOs	21 700	86 800
1813	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041913	NB 14.00 INCHES; THICKNESS 65 MM	5	NOs	26 670	1 33 350
1814	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041914	NB 14.00 INCHES; THICKNESS 70 MM	8	NOs	27 710	2 21 680
1815	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041916	NB 14.00 INCHES; THICKNESS 80 MM	8	NOs	29 810	2 38 480
1816	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465041918	NB 14.00 INCHES; THICKNESS 90 MM	10	NOs	31 960	3 19 600
1817	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042008	NB 16.00 INCHES; THICKNESS 40 MM	1	NOs	24 290	24 290
1818	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042013	NB 16.00 INCHES; THICKNESS 65 MM	1	NOs	29 590	29 590
1819	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042014	NB 16.00 INCHES; THICKNESS 70 MM	1	NOs	30 690	30 690
1820	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042016	NB 16.00 INCHES; THICKNESS 80 MM	3	NOs	32 920	98 760
1821	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042018	NB 16.00 INCHES; THICKNESS 90 MM	3	NOs	35 210	1 05 630
1822	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042108	NB 18.00 INCHES; THICKNESS 40 MM	4	NOs	26 870	1 07 480
1823	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042114	NB 18.00 INCHES; THICKNESS 70 MM	3	NOs	33 660	1 00 980
1824	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042116	NB 18.00 INCHES; THICKNESS 80 MM	3	NOs	36 030	1 08 090
1825	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042118	NB 18.00 INCHES; THICKNESS 90 MM	20	NOs	38 440	7 68 800
1826	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042213	NB 20.00 INCHES; THICKNESS 65 MM	1	NOs	35 400	35 400
1827	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042216	NB 20.00 INCHES; THICKNESS 80 MM	3	NOs	39 120	1 17 360
1828	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042220	NB 20.00 INCHES; THICKNESS 100 MM	3	NOs	44 270	1 32 810
1829	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042414	NB 24.00 INCHES; THICKNESS 70 MM	1	NOs	42 590	42 590
1830	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042420	NB 24.00 INCHES; THICKNESS 100 MM	3	NOs	51 020	1 53 060
1831	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042513	NB 26.00 INCHES; THICKNESS 65 MM	3	NOs	44 150	1 32 450
1832	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042708	NB 30.00 INCHES; THICKNESS 40 MM	5	NOs	42 390	2 11 950
1833	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042713	NB 30.00 INCHES; THICKNESS 65 MM	1	NOs	49 960	49 960
1834	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465042716	NB 30.00 INCHES; THICKNESS 80 MM	3	NOs	54 660	1 63 980

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1835	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465043008	NB 36.00 INCHES; THICKNESS 40 MM	5	NOs	50 140	2 50 700
1836	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0465043014	NB 36.00 INCHES; THICKNESS 70 MM	1	NOs	60 450	60 450
1837	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0466000000	INSULATION TYPE : IC; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : BELOW -45 (DEG C); INSULATION MATERIAL : POLY ISOCYANURATE(PIC)				
1838	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0466010000	PIPES				
1839	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0466010924	NB 02.00 INCHES; THICKNESS 120 MM	30	Metres	9 060	2 71 800
1840	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0466011326	NB 04.00 INCHES; THICKNESS 130 MM	10	Metres	11 920	1 19 200
1841	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0466011528	NB 06.00 INCHES; THICKNESS 140 MM	50	Metres	14 940	7 47 000
1842	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0466011720	NB 10.00 INCHES; THICKNESS 100 MM	55	Metres	14 730	8 10 150
1843	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0466020000	FLANGE ASSEMBLIES				
1844	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0466020924	NB 02.00 INCHES; THICKNESS 120 MM	1	NOs	9 060	9 060
1845	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0466021326	NB 04.00 INCHES; THICKNESS 130 MM	3	NOs	11 920	35 760
1846	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0466021528	NB 06.00 INCHES; THICKNESS 140 MM	1	NOs	14 940	14 940
1847	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468000000	INSULATION TYPE : IC; SURFACE MATERIAL : SS; OPERATING TEMP. RANGE : UPTO -45 (DEG C); INSULATION MATERIAL : POLY ISOCYANURATE(PIC)				
1848	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010000	PIPES				
1849	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010505	NB 00.75 INCHES; THICKNESS 25 MM	10	Metres	1 760	17 600
1850	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010510	NB 00.75 INCHES; THICKNESS 50 MM	10	Metres	3 110	31 100
1851	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010512	NB 00.75 INCHES; THICKNESS 60 MM	20	Metres	3 710	74 200
1852	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010605	NB 01.00 INCHES; THICKNESS 25 MM	10	Metres	1 920	19 200
1853	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010612	NB 01.00 INCHES; THICKNESS 60 MM	10	Metres	3 900	39 000
1854	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010814	NB 01.50 INCHES; THICKNESS 70 MM	10	Metres	4 960	49 600
1855	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010905	NB 02.00 INCHES; THICKNESS 25 MM	10	Metres	2 570	25 700
1856	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010908	NB 02.00 INCHES; THICKNESS 40 MM	10	Metres	3 430	34 300
1857	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010912	NB 02.00 INCHES; THICKNESS 60 MM	10	Metres	4 670	46 700
1858	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468010914	NB 02.00 INCHES; THICKNESS 70 MM	10	Metres	5 320	53 200
1859	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011105	NB 03.00 INCHES; THICKNESS 25 MM	15	Metres	3 260	48 900
1860	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011114	NB 03.00 INCHES; THICKNESS 70 MM	10	Metres	6 180	61 800
1861	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011116	NB 03.00 INCHES; THICKNESS 80 MM	190	Metres	6 900	13 11 000
1862	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011305	NB 04.00 INCHES; THICKNESS 25 MM	75	Metres	3 880	2 91 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1863	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011316	NB 04.00 INCHES; THICKNESS 80 MM	10	Metres	7 690	76 900
1864	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011516	NB 06.00 INCHES; THICKNESS 80 MM	270	Metres	9 380	25 32 600
1865	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011612	NB 08.00 INCHES; THICKNESS 60 MM	85	Metres	9 210	7 82 850
1866	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011616	NB 08.00 INCHES; THICKNESS 80 MM	170	Metres	10 960	18 63 200
1867	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011716	NB 10.00 INCHES; THICKNESS 80 MM	235	Metres	12 640	29 70 400
1868	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011814	NB 12.00 INCHES; THICKNESS 70 MM	10	Metres	13 200	1 32 000
1869	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011816	NB 12.00 INCHES; THICKNESS 80 MM	10	Metres	14 230	1 42 300
1870	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011818	NB 12.00 INCHES; THICKNESS 90 MM	180	Metres	15 280	27 50 400
1871	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011916	NB 14.00 INCHES; THICKNESS 80 MM	10	Metres	15 220	1 52 200
1872	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468011918	NB 14.00 INCHES; THICKNESS 90 MM	205	Metres	16 300	33 41 500
1873	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012008	NB 16.00 INCHES; THICKNESS 40 MM	80	Metres	12 440	9 95 200
1874	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012116	NB 18.00 INCHES; THICKNESS 80 MM	30	Metres	18 390	5 51 700
1875	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012118	NB 18.00 INCHES; THICKNESS 90 MM	10	Metres	19 600	1 96 000
1876	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012208	NB 20.00 INCHES; THICKNESS 40 MM	20	Metres	15 090	3 01 800
1877	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012220	NB 20.00 INCHES; THICKNESS 100 MM	170	Metres	22 570	38 36 900
1878	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012416	NB 24.00 INCHES; THICKNESS 80 MM	20	Metres	23 130	4 62 600
1879	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012420	NB 24.00 INCHES; THICKNESS 100 MM	50	Metres	25 990	12 99 500
1880	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012508	NB 26.00 INCHES; THICKNESS 40 MM	15	Metres	19 050	2 85 750
1881	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012513	NB 26.00 INCHES; THICKNESS 65 MM	50	Metres	22 550	11 27 500
1882	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012620	NB 28.00 INCHES; THICKNESS 100 MM	125	Metres	29 420	36 77 500
1883	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012708	NB 30.00 INCHES; THICKNESS 40 MM	30	Metres	21 690	6 50 700
1884	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012720	NB 30.00 INCHES; THICKNESS 100 MM	75	Metres	31 140	23 35 500
1885	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468012820	NB 32.00 INCHES; THICKNESS 100 MM	10	Metres	32 850	3 28 500
1886	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468013020	NB 36.00 INCHES; THICKNESS 100 MM	105	Metres	36 280	38 09 400
1887	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468020000	FLANGE ASSEMBLIES				
1888	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468020814	NB 01.50 INCHES; THICKNESS 70 MM	3	NOs	4 960	14 880
1889	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021116	NB 03.00 INCHES; THICKNESS 80 MM	9	NOs	6 900	62 100
1890	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021305	NB 04.00 INCHES; THICKNESS 25 MM	1	NOs	3 880	3 880
1891	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021310	NB 04.00 INCHES; THICKNESS 50 MM	1	NOs	5 510	5 510
1892	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021316	NB 04.00 INCHES; THICKNESS 80 MM	3	NOs	7 690	23 070

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1893	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021516	NB 06.00 INCHES; THICKNESS 80 MM	12	NOs	9 380	1 12 560
1894	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021616	NB 08.00 INCHES; THICKNESS 80 MM	8	NOs	10 960	87 680
1895	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021716	NB 10.00 INCHES; THICKNESS 80 MM	3	NOs	12 640	37 920
1896	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021814	NB 12.00 INCHES; THICKNESS 70 MM	3	NOs	13 200	39 600
1897	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021816	NB 12.00 INCHES; THICKNESS 80 MM	1	NOs	14 230	14 230
1898	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021818	NB 12.00 INCHES; THICKNESS 90 MM	1	NOs	15 280	15 280
1899	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021908	NB 14.00 INCHES; THICKNESS 40 MM	1	NOs	11 120	11 120
1900	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468021916	NB 14.00 INCHES; THICKNESS 80 MM	1	NOs	15 220	15 220
1901	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022008	NB 16.00 INCHES; THICKNESS 40 MM	4	NOs	12 440	49 760
1902	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022116	NB 18.00 INCHES; THICKNESS 80 MM	1	NOs	18 390	18 390
1903	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022118	NB 18.00 INCHES; THICKNESS 90 MM	1	NOs	19 600	19 600
1904	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022216	NB 20.00 INCHES; THICKNESS 80 MM	3	NOs	19 970	59 910
1905	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022220	NB 20.00 INCHES; THICKNESS 100 MM	4	NOs	22 570	90 280
1906	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022420	NB 24.00 INCHES; THICKNESS 100 MM	7	NOs	25 990	1 81 930
1907	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022508	NB 26.00 INCHES; THICKNESS 40 MM	3	NOs	19 050	57 150
1908	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022513	NB 26.00 INCHES; THICKNESS 65 MM	1	NOs	22 550	22 550
1909	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022620	NB 28.00 INCHES; THICKNESS 100 MM	3	NOs	29 420	88 260
1910	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022720	NB 30.00 INCHES; THICKNESS 100 MM	1	NOs	31 140	31 140
1911	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468022820	NB 32.00 INCHES; THICKNESS 100 MM	3	NOs	32 850	98 550
1912	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468023020	NB 36.00 INCHES; THICKNESS 100 MM	1	NOs	36 280	36 280
1913	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468030000	BLIND FLANGE ASSEMBLIES				
1914	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468030505	NB 00.75 INCHES; THICKNESS 25 MM	9	NOs	1 760	15 840
1915	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468030510	NB 00.75 INCHES; THICKNESS 50 MM	16	NOs	3 110	49 760
1916	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468030512	NB 00.75 INCHES; THICKNESS 60 MM	51	NOs	3 710	1 89 210
1917	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468030612	NB 01.00 INCHES; THICKNESS 60 MM	3	NOs	3 900	11 700
1918	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468031516	NB 06.00 INCHES; THICKNESS 80 MM	1	NOs	9 380	9 380
1919	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468032620	NB 28.00 INCHES; THICKNESS 100 MM	1	NOs	29 420	29 420
1920	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468040000	VALVE ASSEMBLIES				
1921	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468040505	NB 00.75 INCHES; THICKNESS 25 MM	9	NOs	3 520	31 680
1922	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468040510	NB 00.75 INCHES; THICKNESS 50 MM	16	NOs	6 220	99 520

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1923	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468040512	NB 00.75 INCHES; THICKNESS 60 MM	52	NOs	7 420	3 85 840
1924	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468040612	NB 01.00 INCHES; THICKNESS 60 MM	4	NOs	7 790	31 160
1925	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468040905	NB 02.00 INCHES; THICKNESS 25 MM	3	NOs	5 150	15 450
1926	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468040908	NB 02.00 INCHES; THICKNESS 40 MM	3	NOs	6 850	20 550
1927	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468040912	NB 02.00 INCHES; THICKNESS 60 MM	9	NOs	9 340	84 060
1928	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468040914	NB 02.00 INCHES; THICKNESS 70 MM	5	NOs	10 650	53 250
1929	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468041105	NB 03.00 INCHES; THICKNESS 25 MM	1	NOs	6 520	6 520
1930	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468041114	NB 03.00 INCHES; THICKNESS 70 MM	5	NOs	12 350	61 750
1931	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468041116	NB 03.00 INCHES; THICKNESS 80 MM	10	NOs	13 800	1 38 000
1932	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468041305	NB 04.00 INCHES; THICKNESS 25 MM	4	NOs	7 750	31 000
1933	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468041516	NB 06.00 INCHES; THICKNESS 80 MM	17	NOs	18 750	3 18 750
1934	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468041616	NB 08.00 INCHES; THICKNESS 80 MM	9	NOs	21 920	1 97 280
1935	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468041716	NB 10.00 INCHES; THICKNESS 80 MM	23	NOs	25 290	5 81 670
1936	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468041818	NB 12.00 INCHES; THICKNESS 90 MM	1	NOs	30 550	30 550
1937	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468041916	NB 14.00 INCHES; THICKNESS 80 MM	1	NOs	30 430	30 430
1938	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468041918	NB 14.00 INCHES; THICKNESS 90 MM	7	NOs	32 600	2 28 200
1939	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468042116	NB 18.00 INCHES; THICKNESS 80 MM	3	NOs	36 770	1 10 310
1940	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468042118	NB 18.00 INCHES; THICKNESS 90 MM	3	NOs	39 200	1 17 600
1941	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468042416	NB 24.00 INCHES; THICKNESS 80 MM	5	NOs	46 260	2 31 300
1942	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468042513	NB 26.00 INCHES; THICKNESS 65 MM	3	NOs	45 090	1 35 270
1943	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468042620	NB 28.00 INCHES; THICKNESS 100 MM	7	NOs	58 850	4 11 950
1944	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468042708	NB 30.00 INCHES; THICKNESS 40 MM	3	NOs	43 390	1 30 170
1945	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468042720	NB 30.00 INCHES; THICKNESS 100 MM	1	NOs	62 270	62 270
1946	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0468043020	NB 36.00 INCHES; THICKNESS 100 MM	7	NOs	72 570	5 07 990
1947	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469000000	INSULATION TYPE : IC; SURFACE MATERIAL : SS; OPERATING TEMP. RANGE : BELOW -45 (DEG C); INSULATION MATERIAL : POLY ISOCYANURATE(PIC)				
1948	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010000	PIPES				
1949	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010414	NB 00.50 INCHES; THICKNESS 70 MM	10	Metres	4 290	42 900
1950	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010512	NB 00.75 INCHES; THICKNESS 60 MM	15	Metres	3 830	57 450
1951	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010514	NB 00.75 INCHES; THICKNESS 70 MM	10	Metres	4 450	44 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1952	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010516	NB 00.75 INCHES; THICKNESS 80 MM	15	Metres	5 110	76 650
1953	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010518	NB 00.75 INCHES; THICKNESS 90 MM	20	Metres	5 790	1 15 800
1954	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010520	NB 00.75 INCHES; THICKNESS 100 MM	20	Metres	6 500	1 30 000
1955	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010614	NB 01.00 INCHES; THICKNESS 70 MM	10	Metres	4 660	46 600
1956	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010618	NB 01.00 INCHES; THICKNESS 90 MM	10	Metres	6 020	60 200
1957	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010620	NB 01.00 INCHES; THICKNESS 100 MM	15	Metres	6 730	1 00 950
1958	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010622	NB 01.00 INCHES; THICKNESS 110 MM	10	Metres	7 480	74 800
1959	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010814	NB 01.50 INCHES; THICKNESS 70 MM	10	Metres	5 120	51 200
1960	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010816	NB 01.50 INCHES; THICKNESS 80 MM	10	Metres	5 800	58 000
1961	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010818	NB 01.50 INCHES; THICKNESS 90 MM	10	Metres	6 510	65 100
1962	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010820	NB 01.50 INCHES; THICKNESS 100 MM	10	Metres	7 240	72 400
1963	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010822	NB 01.50 INCHES; THICKNESS 110 MM	10	Metres	8 010	80 100
1964	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010824	NB 01.50 INCHES; THICKNESS 120 MM	10	Metres	8 790	87 900
1965	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010914	NB 02.00 INCHES; THICKNESS 70 MM	55	Metres	5 490	3 01 950
1966	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010916	NB 02.00 INCHES; THICKNESS 80 MM	30	Metres	6 190	1 85 700
1967	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010922	NB 02.00 INCHES; THICKNESS 110 MM	10	Metres	8 440	84 400
1968	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010924	NB 02.00 INCHES; THICKNESS 120 MM	335	Metres	9 240	30 95 400
1969	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469010926	NB 02.00 INCHES; THICKNESS 130 MM	80	Metres	10 070	8 05 600
1970	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011116	NB 03.00 INCHES; THICKNESS 80 MM	15	Metres	7 100	1 06 500
1971	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011118	NB 03.00 INCHES; THICKNESS 90 MM	10	Metres	7 860	78 600
1972	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011122	NB 03.00 INCHES; THICKNESS 110 MM	65	Metres	9 460	6 14 900
1973	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011124	NB 03.00 INCHES; THICKNESS 120 MM	10	Metres	10 300	1 03 000
1974	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011126	NB 03.00 INCHES; THICKNESS 130 MM	15	Metres	11 170	1 67 550
1975	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011128	NB 03.00 INCHES; THICKNESS 140 MM	160	Metres	12 060	19 29 600
1976	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011316	NB 04.00 INCHES; THICKNESS 80 MM	20	Metres	7 920	1 58 400
1977	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011318	NB 04.00 INCHES; THICKNESS 90 MM	15	Metres	8 710	1 30 650
1978	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011320	NB 04.00 INCHES; THICKNESS 100 MM	35	Metres	9 530	3 33 550
1979	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011322	NB 04.00 INCHES; THICKNESS 110 MM	20	Metres	10 370	2 07 400
1980	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011326	NB 04.00 INCHES; THICKNESS 130 MM	125	Metres	12 140	15 17 500
1981	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011330	NB 04.00 INCHES; THICKNESS 150 MM	30	Metres	14 010	4 20 300

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
1982	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011518	NB 06.00 INCHES; THICKNESS 90 MM	15	Metres	10 500	1 57 500
1983	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011520	NB 06.00 INCHES; THICKNESS 100 MM	80	Metres	11 390	9 11 200
1984	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011522	NB 06.00 INCHES; THICKNESS 110 MM	160	Metres	12 310	19 69 600
1985	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011524	NB 06.00 INCHES; THICKNESS 120 MM	40	Metres	13 250	5 30 000
1986	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011526	NB 06.00 INCHES; THICKNESS 130 MM	10	Metres	14 220	1 42 200
1987	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011528	NB 06.00 INCHES; THICKNESS 140 MM	150	Metres	15 210	22 81 500
1988	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011532	NB 06.00 INCHES; THICKNESS 160 MM	115	Metres	17 270	19 86 050
1989	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011618	NB 08.00 INCHES; THICKNESS 90 MM	75	Metres	12 190	9 14 250
1990	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011620	NB 08.00 INCHES; THICKNESS 100 MM	65	Metres	13 150	8 54 750
1991	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011622	NB 08.00 INCHES; THICKNESS 110 MM	15	Metres	14 130	2 11 950
1992	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011624	NB 08.00 INCHES; THICKNESS 120 MM	345	Metres	15 140	52 23 300
1993	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011626	NB 08.00 INCHES; THICKNESS 130 MM	30	Metres	16 170	4 85 100
1994	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011628	NB 08.00 INCHES; THICKNESS 140 MM	10	Metres	17 230	1 72 300
1995	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011632	NB 08.00 INCHES; THICKNESS 160 MM	20	Metres	19 420	3 88 400
1996	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011718	NB 10.00 INCHES; THICKNESS 90 MM	140	Metres	13 990	19 58 600
1997	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011720	NB 10.00 INCHES; THICKNESS 100 MM	10	Metres	15 020	1 50 200
1998	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011722	NB 10.00 INCHES; THICKNESS 110 MM	30	Metres	16 070	4 82 100
1999	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011724	NB 10.00 INCHES; THICKNESS 120 MM	85	Metres	17 140	14 56 900
2000	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011728	NB 10.00 INCHES; THICKNESS 140 MM	75	Metres	19 380	14 53 500
2001	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011732	NB 10.00 INCHES; THICKNESS 160 MM	95	Metres	21 700	20 61 500
2002	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011820	NB 12.00 INCHES; THICKNESS 100 MM	120	Metres	16 770	20 12 400
2003	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011822	NB 12.00 INCHES; THICKNESS 110 MM	10	Metres	17 890	1 78 900
2004	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011824	NB 12.00 INCHES; THICKNESS 120 MM	160	Metres	19 030	30 44 800
2005	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011826	NB 12.00 INCHES; THICKNESS 130 MM	20	Metres	20 200	4 04 000
2006	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011830	NB 12.00 INCHES; THICKNESS 150 MM	20	Metres	22 600	4 52 000
2007	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011834	NB 12.00 INCHES; THICKNESS 170 MM	30	Metres	25 120	7 53 600
2008	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011920	NB 14.00 INCHES; THICKNESS 100 MM	10	Metres	17 870	1 78 700
2009	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011922	NB 14.00 INCHES; THICKNESS 110 MM	15	Metres	19 020	2 85 300
2010	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011924	NB 14.00 INCHES; THICKNESS 120 MM	50	Metres	20 210	10 10 500
2011	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469011934	NB 14.00 INCHES; THICKNESS 170 MM	80	Metres	26 510	21 20 800

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2012	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012025	NB 16.00 INCHES; THICKNESS 125 MM	40	Metres	22 730	9 09 200
2013	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012028	NB 16.00 INCHES; THICKNESS 140 MM	30	Metres	24 670	7 40 100
2014	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012030	NB 16.00 INCHES; THICKNESS 150 MM	10	Metres	25 990	2 59 900
2015	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012035	NB 16.00 INCHES; THICKNESS 175 MM	145	Metres	29 410	42 64 450
2016	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012038	NB 16.00 INCHES; THICKNESS 190 MM	140	Metres	31 550	44 17 000
2017	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012125	NB 18.00 INCHES; THICKNESS 125 MM	130	Metres	24 650	32 04 500
2018	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012128	NB 18.00 INCHES; THICKNESS 140 MM	15	Metres	26 680	4 00 200
2019	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012135	NB 18.00 INCHES; THICKNESS 175 MM	55	Metres	31 670	17 41 850
2020	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012138	NB 18.00 INCHES; THICKNESS 190 MM	55	Metres	33 900	18 64 500
2021	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012223	NB 20.00 INCHES; THICKNESS 115 MM	40	Metres	25 180	10 07 200
2022	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012225	NB 20.00 INCHES; THICKNESS 125 MM	80	Metres	26 570	21 25 600
2023	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012228	NB 20.00 INCHES; THICKNESS 140 MM	50	Metres	28 700	14 35 000
2024	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012230	NB 20.00 INCHES; THICKNESS 150 MM	20	Metres	30 160	6 03 200
2025	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012235	NB 20.00 INCHES; THICKNESS 175 MM	250	Metres	33 920	84 80 000
2026	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012238	NB 20.00 INCHES; THICKNESS 190 MM	15	Metres	36 240	5 43 600
2027	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012425	NB 24.00 INCHES; THICKNESS 125 MM	245	Metres	30 410	74 50 450
2028	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012428	NB 24.00 INCHES; THICKNESS 140 MM	10	Metres	32 740	3 27 400
2029	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012430	NB 24.00 INCHES; THICKNESS 150 MM	10	Metres	34 330	3 43 300
2030	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012625	NB 28.00 INCHES; THICKNESS 125 MM	10	Metres	34 250	3 42 500
2031	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012630	NB 28.00 INCHES; THICKNESS 150 MM	55	Metres	38 500	21 17 500
2032	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012723	NB 30.00 INCHES; THICKNESS 115 MM	55	Metres	34 450	18 94 750
2033	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012730	NB 30.00 INCHES; THICKNESS 150 MM	35	Metres	40 580	14 20 300
2034	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469012825	NB 32.00 INCHES; THICKNESS 125 MM	10	Metres	38 080	3 80 800
2035	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469013025	NB 36.00 INCHES; THICKNESS 125 MM	275	Metres	41 930	1 15 30 750
2036	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469013028	NB 36.00 INCHES; THICKNESS 140 MM	50	Metres	44 850	22 42 500
2037	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469013030	NB 36.00 INCHES; THICKNESS 150 MM	320	Metres	46 820	1 49 82 400
2038	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469020000	FLANGE ASSEMBLIES				
2039	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469020414	NB 00.50 INCHES; THICKNESS 70 MM	1	NOs	4 290	4 290
2040	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469020814	NB 01.50 INCHES; THICKNESS 70 MM	3	NOs	5 120	15 360
2041	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469020816	NB 01.50 INCHES; THICKNESS 80 MM	5	NOs	5 800	29 000

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2042	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469020818	NB 01.50 INCHES; THICKNESS 90 MM	4	NOs	6 510	26 040
2043	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469020820	NB 01.50 INCHES; THICKNESS 100 MM	5	NOs	7 240	36 200
2044	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469020822	NB 01.50 INCHES; THICKNESS 110 MM	4	NOs	8 010	32 040
2045	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469020824	NB 01.50 INCHES; THICKNESS 120 MM	4	NOs	8 790	35 160
2046	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469020924	NB 02.00 INCHES; THICKNESS 120 MM	12	NOs	9 240	1 10 880
2047	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469020926	NB 02.00 INCHES; THICKNESS 130 MM	1	NOs	10 070	10 070
2048	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021116	NB 03.00 INCHES; THICKNESS 80 MM	1	NOs	7 100	7 100
2049	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021122	NB 03.00 INCHES; THICKNESS 110 MM	1	NOs	9 460	9 460
2050	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021124	NB 03.00 INCHES; THICKNESS 120 MM	1	NOs	10 300	10 300
2051	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021126	NB 03.00 INCHES; THICKNESS 130 MM	1	NOs	11 170	11 170
2052	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021128	NB 03.00 INCHES; THICKNESS 140 MM	3	NOs	12 060	36 180
2053	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021318	NB 04.00 INCHES; THICKNESS 90 MM	1	NOs	8 710	8 710
2054	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021320	NB 04.00 INCHES; THICKNESS 100 MM	1	NOs	9 530	9 530
2055	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021326	NB 04.00 INCHES; THICKNESS 130 MM	10	NOs	12 140	1 21 400
2056	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021330	NB 04.00 INCHES; THICKNESS 150 MM	5	NOs	14 010	70 050
2057	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021518	NB 06.00 INCHES; THICKNESS 90 MM	3	NOs	10 500	31 500
2058	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021520	NB 06.00 INCHES; THICKNESS 100 MM	4	NOs	11 390	45 560
2059	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021522	NB 06.00 INCHES; THICKNESS 110 MM	1	NOs	12 310	12 310
2060	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021524	NB 06.00 INCHES; THICKNESS 120 MM	5	NOs	13 250	66 250
2061	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021526	NB 06.00 INCHES; THICKNESS 130 MM	1	NOs	14 220	14 220
2062	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021532	NB 06.00 INCHES; THICKNESS 160 MM	1	NOs	17 270	17 270
2063	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021618	NB 08.00 INCHES; THICKNESS 90 MM	7	NOs	12 190	85 330
2064	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021620	NB 08.00 INCHES; THICKNESS 100 MM	1	NOs	13 150	13 150
2065	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021622	NB 08.00 INCHES; THICKNESS 110 MM	1	NOs	14 130	14 130
2066	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021624	NB 08.00 INCHES; THICKNESS 120 MM	9	NOs	15 140	1 36 260
2067	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021626	NB 08.00 INCHES; THICKNESS 130 MM	4	NOs	16 170	64 680
2068	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021628	NB 08.00 INCHES; THICKNESS 140 MM	3	NOs	17 230	51 690
2069	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021632	NB 08.00 INCHES; THICKNESS 160 MM	3	NOs	19 420	58 260
2070	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021718	NB 10.00 INCHES; THICKNESS 90 MM	1	NOs	13 990	13 990
2071	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021722	NB 10.00 INCHES; THICKNESS 110 MM	3	NOs	16 070	48 210

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2072	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021724	NB 10.00 INCHES; THICKNESS 120 MM	4	NOs	17 140	68 560
2073	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021726	NB 10.00 INCHES; THICKNESS 130 MM	1	NOs	18 240	18 240
2074	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021728	NB 10.00 INCHES; THICKNESS 140 MM	3	NOs	19 380	58 140
2075	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021732	NB 10.00 INCHES; THICKNESS 160 MM	3	NOs	21 700	65 100
2076	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021820	NB 12.00 INCHES; THICKNESS 100 MM	5	NOs	16 770	83 850
2077	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021822	NB 12.00 INCHES; THICKNESS 110 MM	3	NOs	17 890	53 670
2078	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021824	NB 12.00 INCHES; THICKNESS 120 MM	4	NOs	19 030	76 120
2079	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021830	NB 12.00 INCHES; THICKNESS 150 MM	3	NOs	22 600	67 800
2080	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021834	NB 12.00 INCHES; THICKNESS 170 MM	7	NOs	25 120	1 75 840
2081	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021920	NB 14.00 INCHES; THICKNESS 100 MM	3	NOs	17 870	53 610
2082	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021922	NB 14.00 INCHES; THICKNESS 110 MM	5	NOs	19 020	95 100
2083	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469021934	NB 14.00 INCHES; THICKNESS 170 MM	1	NOs	26 510	26 510
2084	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022025	NB 16.00 INCHES; THICKNESS 125 MM	1	NOs	22 730	22 730
2085	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022028	NB 16.00 INCHES; THICKNESS 140 MM	4	NOs	24 670	98 680
2086	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022035	NB 16.00 INCHES; THICKNESS 175 MM	12	NOs	29 410	3 52 920
2087	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022125	NB 18.00 INCHES; THICKNESS 125 MM	5	NOs	24 650	1 23 250
2088	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022128	NB 18.00 INCHES; THICKNESS 140 MM	1	NOs	26 680	26 680
2089	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022133	NB 18.00 INCHES; THICKNESS 165 MM	1	NOs	30 210	30 210
2090	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022135	NB 18.00 INCHES; THICKNESS 175 MM	3	NOs	31 670	95 010
2091	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022138	NB 18.00 INCHES; THICKNESS 190 MM	3	NOs	33 900	1 01 700
2092	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022223	NB 20.00 INCHES; THICKNESS 115 MM	4	NOs	25 180	1 00 720
2093	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022225	NB 20.00 INCHES; THICKNESS 125 MM	3	NOs	26 570	79 710
2094	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022228	NB 20.00 INCHES; THICKNESS 140 MM	1	NOs	28 700	28 700
2095	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022230	NB 20.00 INCHES; THICKNESS 150 MM	4	NOs	30 160	1 20 640
2096	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022235	NB 20.00 INCHES; THICKNESS 175 MM	1	NOs	33 920	33 920
2097	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022238	NB 20.00 INCHES; THICKNESS 190 MM	1	NOs	36 240	36 240
2098	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022423	NB 24.00 INCHES; THICKNESS 115 MM	1	NOs	28 890	28 890
2099	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022425	NB 24.00 INCHES; THICKNESS 125 MM	3	NOs	30 410	91 230
2100	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022428	NB 24.00 INCHES; THICKNESS 140 MM	3	NOs	32 740	98 220
2101	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022430	NB 24.00 INCHES; THICKNESS 150 MM	3	NOs	34 330	1 02 990

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2102	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022625	NB 28.00 INCHES; THICKNESS 125 MM	3	NOs	34 250	1 02 750
2103	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022723	NB 30.00 INCHES; THICKNESS 115 MM	4	NOs	34 450	1 37 800
2104	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022725	NB 30.00 INCHES; THICKNESS 125 MM	1	NOs	36 170	36 170
2105	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022730	NB 30.00 INCHES; THICKNESS 150 MM	5	NOs	40 580	2 02 900
2106	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469022825	NB 32.00 INCHES; THICKNESS 125 MM	3	NOs	38 080	1 14 240
2107	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469023025	NB 36.00 INCHES; THICKNESS 125 MM	3	NOs	41 930	1 25 790
2108	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469023028	NB 36.00 INCHES; THICKNESS 140 MM	1	NOs	44 850	44 850
2109	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469023030	NB 36.00 INCHES; THICKNESS 150 MM	3	NOs	46 820	1 40 460
2110	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469030000	BLIND FLANGE ASSEMBLIES				
2111	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469030512	NB 00.75 INCHES; THICKNESS 60 MM	29	NOs	3 830	1 11 070
2112	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469030514	NB 00.75 INCHES; THICKNESS 70 MM	12	NOs	4 450	53 400
2113	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469030516	NB 00.75 INCHES; THICKNESS 80 MM	21	NOs	5 110	1 07 310
2114	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469030518	NB 00.75 INCHES; THICKNESS 90 MM	36	NOs	5 790	2 08 440
2115	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469030520	NB 00.75 INCHES; THICKNESS 100 MM	23	NOs	6 500	1 49 500
2116	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469030618	NB 01.00 INCHES; THICKNESS 90 MM	5	NOs	6 020	30 100
2117	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469030926	NB 02.00 INCHES; THICKNESS 130 MM	1	NOs	10 070	10 070
2118	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469031126	NB 03.00 INCHES; THICKNESS 130 MM	1	NOs	11 170	11 170
2119	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469031316	NB 04.00 INCHES; THICKNESS 80 MM	4	NOs	7 920	31 680
2120	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469031320	NB 04.00 INCHES; THICKNESS 100 MM	1	NOs	9 530	9 530
2121	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469031326	NB 04.00 INCHES; THICKNESS 130 MM	4	NOs	12 140	48 560
2122	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469032425	NB 24.00 INCHES; THICKNESS 125 MM	1	NOs	30 410	30 410
2123	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469033030	NB 36.00 INCHES; THICKNESS 150 MM	1	NOs	46 820	46 820
2124	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040000	VALVE ASSEMBLIES				
2125	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040512	NB 00.75 INCHES; THICKNESS 60 MM	38	NOs	7 650	2 90 700
2126	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040514	NB 00.75 INCHES; THICKNESS 70 MM	14	NOs	8 910	1 24 740
2127	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040516	NB 00.75 INCHES; THICKNESS 80 MM	29	NOs	10 220	2 96 380
2128	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040518	NB 00.75 INCHES; THICKNESS 90 MM	52	NOs	11 590	6 02 680
2129	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040520	NB 00.75 INCHES; THICKNESS 100 MM	35	NOs	13 000	4 55 000
2130	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040614	NB 01.00 INCHES; THICKNESS 70 MM	7	NOs	9 320	65 240
2131	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040618	NB 01.00 INCHES; THICKNESS 90 MM	9	NOs	12 040	1 08 360

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2132	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040620	NB 01.00 INCHES; THICKNESS 100 MM	8	NOs	13 470	1 07 760
2133	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040622	NB 01.00 INCHES; THICKNESS 110 MM	1	NOs	14 950	14 950
2134	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040914	NB 02.00 INCHES; THICKNESS 70 MM	4	NOs	10 980	43 920
2135	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040916	NB 02.00 INCHES; THICKNESS 80 MM	7	NOs	12 370	86 590
2136	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040922	NB 02.00 INCHES; THICKNESS 110 MM	3	NOs	16 870	50 610
2137	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040924	NB 02.00 INCHES; THICKNESS 120 MM	23	NOs	18 480	4 25 040
2138	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469040926	NB 02.00 INCHES; THICKNESS 130 MM	16	NOs	20 140	3 22 240
2139	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041116	NB 03.00 INCHES; THICKNESS 80 MM	1	NOs	14 210	14 210
2140	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041118	NB 03.00 INCHES; THICKNESS 90 MM	4	NOs	15 720	62 880
2141	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041122	NB 03.00 INCHES; THICKNESS 110 MM	8	NOs	18 930	1 51 440
2142	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041124	NB 03.00 INCHES; THICKNESS 120 MM	1	NOs	20 610	20 610
2143	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041126	NB 03.00 INCHES; THICKNESS 130 MM	3	NOs	22 330	66 990
2144	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041128	NB 03.00 INCHES; THICKNESS 140 MM	1	NOs	24 110	24 110
2145	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041316	NB 04.00 INCHES; THICKNESS 80 MM	4	NOs	15 830	63 320
2146	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041318	NB 04.00 INCHES; THICKNESS 90 MM	3	NOs	17 420	52 260
2147	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041320	NB 04.00 INCHES; THICKNESS 100 MM	1	NOs	19 060	19 060
2148	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041322	NB 04.00 INCHES; THICKNESS 110 MM	5	NOs	20 750	1 03 750
2149	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041326	NB 04.00 INCHES; THICKNESS 130 MM	10	NOs	24 290	2 42 900
2150	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041330	NB 04.00 INCHES; THICKNESS 150 MM	3	NOs	28 030	84 090
2151	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041518	NB 06.00 INCHES; THICKNESS 90 MM	1	NOs	21 000	21 000
2152	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041520	NB 06.00 INCHES; THICKNESS 100 MM	3	NOs	22 780	68 340
2153	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041522	NB 06.00 INCHES; THICKNESS 110 MM	1	NOs	24 620	24 620
2154	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041524	NB 06.00 INCHES; THICKNESS 120 MM	8	NOs	26 500	2 12 000
2155	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041526	NB 06.00 INCHES; THICKNESS 130 MM	1	NOs	28 440	28 440
2156	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041528	NB 06.00 INCHES; THICKNESS 140 MM	12	NOs	30 410	3 64 920
2157	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041532	NB 06.00 INCHES; THICKNESS 160 MM	7	NOs	34 540	2 41 780
2158	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041618	NB 08.00 INCHES; THICKNESS 90 MM	10	NOs	24 390	2 43 900
2159	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041620	NB 08.00 INCHES; THICKNESS 100 MM	3	NOs	26 300	78 900
2160	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041622	NB 08.00 INCHES; THICKNESS 110 MM	1	NOs	28 260	28 260
2161	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041624	NB 08.00 INCHES; THICKNESS 120 MM	8	NOs	30 280	2 42 240

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2162	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041626	NB 08.00 INCHES; THICKNESS 130 MM	7	NOs	32 330	2 26 310
2163	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041632	NB 08.00 INCHES; THICKNESS 160 MM	1	NOs	38 850	38 850
2164	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041718	NB 10.00 INCHES; THICKNESS 90 MM	10	NOs	27 990	2 79 900
2165	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041722	NB 10.00 INCHES; THICKNESS 110 MM	1	NOs	32 130	32 130
2166	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041724	NB 10.00 INCHES; THICKNESS 120 MM	4	NOs	34 290	1 37 160
2167	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041728	NB 10.00 INCHES; THICKNESS 140 MM	9	NOs	38 750	3 48 750
2168	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041732	NB 10.00 INCHES; THICKNESS 160 MM	8	NOs	43 410	3 47 280
2169	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041820	NB 12.00 INCHES; THICKNESS 100 MM	7	NOs	33 540	2 34 780
2170	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041824	NB 12.00 INCHES; THICKNESS 120 MM	3	NOs	38 060	1 14 180
2171	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041826	NB 12.00 INCHES; THICKNESS 130 MM	7	NOs	40 390	2 82 730
2172	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041830	NB 12.00 INCHES; THICKNESS 150 MM	5	NOs	45 210	2 26 050
2173	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041922	NB 14.00 INCHES; THICKNESS 110 MM	1	NOs	38 050	38 050
2174	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469041924	NB 14.00 INCHES; THICKNESS 120 MM	3	NOs	40 410	1 21 230
2175	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042028	NB 16.00 INCHES; THICKNESS 140 MM	1	NOs	49 340	49 340
2176	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042030	NB 16.00 INCHES; THICKNESS 150 MM	1	NOs	51 980	51 980
2177	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042035	NB 16.00 INCHES; THICKNESS 175 MM	5	NOs	58 830	2 94 150
2178	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042038	NB 16.00 INCHES; THICKNESS 190 MM	12	NOs	63 090	7 57 080
2179	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042125	NB 18.00 INCHES; THICKNESS 125 MM	8	NOs	49 300	3 94 400
2180	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042128	NB 18.00 INCHES; THICKNESS 140 MM	1	NOs	53 370	53 370
2181	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042135	NB 18.00 INCHES; THICKNESS 175 MM	5	NOs	63 330	3 16 650
2182	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042223	NB 20.00 INCHES; THICKNESS 115 MM	3	NOs	50 350	1 51 050
2183	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042225	NB 20.00 INCHES; THICKNESS 125 MM	4	NOs	53 130	2 12 520
2184	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042228	NB 20.00 INCHES; THICKNESS 140 MM	5	NOs	57 400	2 87 000
2185	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042235	NB 20.00 INCHES; THICKNESS 175 MM	5	NOs	67 830	3 39 150
2186	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469042425	NB 24.00 INCHES; THICKNESS 125 MM	5	NOs	60 820	3 04 100
2187	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469043025	NB 36.00 INCHES; THICKNESS 125 MM	5	NOs	83 860	4 19 300
2188	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0469043030	NB 36.00 INCHES; THICKNESS 150 MM	1	NOs	93 640	93 640
2189	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0500000000	INSULATION MATERIAL : CELLULAR GLASS				
2190	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571000000	INSULATION TYPE : IK; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : ALL; INSULATION MATERIAL : CELLULAR GLASS				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2191	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571010000	PIPES				
2192	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571010508	NB 00.75 INCHES; THICKNESS 40 MM	15	Metres	2 860	42 900
2193	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571010810	NB 01.50 INCHES; THICKNESS 50 MM	10	Metres	4 570	45 700
2194	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571010910	NB 02.00 INCHES; THICKNESS 50 MM	15	Metres	5 050	75 750
2195	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571011112	NB 03.00 INCHES; THICKNESS 60 MM	40	Metres	7 450	2 98 000
2196	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571011312	NB 04.00 INCHES; THICKNESS 60 MM	20	Metres	8 570	1 71 400
2197	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571011514	NB 06.00 INCHES; THICKNESS 70 MM	105	Metres	12 730	13 36 650
2198	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571011614	NB 08.00 INCHES; THICKNESS 70 MM	50	Metres	15 240	7 62 000
2199	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571012118	NB 18.00 INCHES; THICKNESS 90 MM	50	Metres	33 650	16 82 500
2200	A	B957-300-16-43-MR-SOR-3001-A-2M	Mechanical Works for ECU-PART-A	MA0571012418	NB 24.00 INCHES; THICKNESS 90 MM	105	Metres	42 670	44 80 350
2201	A	B957-300-16-50-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01EE	ELECTRICAL WORKS				
2202	A	B957-300-16-50-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01EE.MB28	ELECTRIC HEAT TRACING SYSTEM				
2203	A	B957-300-16-50-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01EE.MB28.01	Design, Engineering and supply including procurement services all equipment / materials for Electrical Heat tracing system (other than those pertaining to civil & structure, insulation painting and mechanical, Instrumentation works pertaining to site installation of equipment/ material) including heater tape, tracers, junction boxes, RTDs, central monitoring system, power distribution board (PDB), Local distribution panel (LDP), etc., complete earthing system, cabling system comprising of supply of all incoming and outgoing power and control cables of PDB and LDP i.e. all power and control cables from owner's substation to PDB/ LDP, PDB to LDP, PDBs/ LDPs to tracers/RTDs, communication cable from controllers to central monitoring system, multi circuit temperature controller, junction boxes, T-connectors, heating tape, tracer, communication cables (as required), necessary connectors, all materials including supply of MS Supports, GI Earthing Strips, earthing items, sands, bricks etc. and associated GI cable trays/ RCC trenches for electrical traced lines/ equipment under BPREP Project BPCL-Bina Refinery, including commissioning spares, special tools & tackles and consumables required for completing and establishing a fully functional and operative electrical Heat Tracing System and associated facilities including all other activities incidental to procurement and supply, complete as per scope of work/ supplies detailed in various section of bidding document, drawings, specifications including EIL specification 6-51-0095, Scope of supply & work and Job Specification and other provision of bidding document and directions of Engineer-In-Charge.	1	Lumpsum	2 67 98 030	2 67 98 030

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2204	A	B957-300-16-50-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01EE.MB28.02	Construction, fabrication, installation, testing, mechanical completion, pre commissioning, commissioning required for completing and establishing a fully functional and operative electrical heat tracing system and associated facilities for electrical traced lines/ equipment including any balance field engineering under BPREP Project BPCL-Bina Refinery. Supply of all materials required for completion of the job (excluding those covered under supply portion in item no.01EE.MB28.01), inclusive of earthing works, RCC cable trenches, cable trays, all cable laying, connection & termination of all power & control cables from owner's substation to PDB/ LDP, PDB to LDP, PDB/LDP to tracers/RTDs, communication cables for fault alarms and communication cable from LDP to central monitoring system as defined in the tender, testing of multi circuit temperature controller, testing, labor, tools & tackles, consumables, transportation of materials from contractor's warehouse to work site, providing construction and all other activities, including civil works such as concrete foundations, excavation, disposal of surplus earth, levelling, grouting/ welding, bolting, riveting etc. as required complete in all respects as per bidding document, drawings, specifications, Scope of supply & work and Job Specification and direction of Engineer-In-Charge	1	Lumpsum	89 32 680	89 32 680
2205	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II	INSTRUMENTATION				
2206	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950	SITE ACTIVITIES BY MECHANICAL CONTRACTOR				
2207	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10	Transportation of all types of valves (Including Control Valves, Special Control Valves, PRDS, Control valves, On-Off/Shutdown valves, Self actuating valves) from Owner's storage points to contractor's stores/worksite and installation of valves for all rating including assembly of valves accessories like air bottles etc, if any, fixing of gaskets bolts/nuts wherever required and performing Positive Material Identification(PMI) using alloy analysers as per specification, drawings and directions of Engineer-in-Charge.				
2208	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V28	Inlet Valve size - 3/4" , Rating - 300#	2	nos	780	1 560
2209	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V81	Inlet Valve size - 3/4" , Rating - 600#	1	nos	780	780
2210	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V11	Inlet Valve size - 1" , Rating - 300#	48	nos	870	41 760
2211	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V18	Inlet Valve size - 1" , Rating - 600#	8	nos	870	6 960
2212	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V2	Inlet Valve size - 1 1/2" , Rating - 150#	1	nos	950	950
2213	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V12	Inlet Valve size - 1 1/2" , Rating - 300#	25	nos	950	23 750
2214	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V34	Inlet Valve size - 1 1/2" , Rating - 600#	7	nos	950	6 650
2215	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V14	Inlet Valve size - 2" , Rating - 300#	71	nos	1 040	73 840

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2216	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V23	Inlet Valve size - 2" , Rating - 600#	22	nos	1 040	22 880
2217	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V36	Inlet Valve size - 2" , Rating - 1500#	2	nos	1 040	2 080
2218	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V13	Inlet Valve size - 3" , Rating - 300#	40	nos	1 820	72 800
2219	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V24	Inlet Valve size - 3" , Rating - 600#	7	nos	1 820	12 740
2220	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V15	Inlet Valve size - 4" , Rating - 300#	61	nos	2 430	1 48 230
2221	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V25	Inlet Valve size - 4" , Rating - 600#	12	nos	2 430	29 160
2222	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V16	Inlet Valve size - 6" , Rating - 300#	51	nos	3 650	1 86 150
2223	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V45	Inlet Valve size - 6" , Rating - 600#	12	nos	3 650	43 800
2224	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V84	Inlet Valve size - 6" , Rating - 2500#	1	nos	3 650	3 650
2225	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V17	Inlet Valve size - 8" , Rating - 300#	40	nos	4 860	1 94 400
2226	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V32	Inlet Valve size - 8" , Rating - 600#	2	nos	4 860	9 720
2227	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V85	Inlet Valve size - 8" , Rating - 2500#	1	nos	4 860	4 860
2228	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V19	Inlet Valve size - 10" , Rating - 300#	8	nos	6 080	48 640
2229	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V21	Inlet Valve size - 10" , Rating - 600#	1	nos	6 080	6 080
2230	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V10	Inlet Valve size - 12" , Rating - 300#	25	nos	7 290	1 82 250
2231	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V44	Inlet Valve size - 12" , Rating - 600#	1	nos	7 290	7 290
2232	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V30	Inlet Valve size - 14" , Rating - 300#	13	nos	9 270	1 20 510
2233	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V75	Inlet Valve size - 14" , Rating - 600#	1	nos	9 270	9 270
2234	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V20	Inlet Valve size - 16" , Rating - 300#	9	nos	10 300	92 700
2235	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V51	Inlet Valve size - 18" , Rating - 300#	12	nos	12 110	1 45 320
2236	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V77	Inlet Valve size - 18" , Rating - 600#	1	nos	12 110	12 110
2237	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V76	Inlet Valve size - 18" , Rating - 2500#	1	nos	12 110	12 110
2238	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V41	Inlet Valve size - 20" , Rating - 300#	11	nos	13 460	1 48 060
2239	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V79	Inlet Valve size - 20" , Rating - 600#	1	nos	13 460	13 460
2240	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V78	Inlet Valve size - 20" , Rating - 2500#	1	nos	13 460	13 460
2241	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V42	Inlet Valve size - 24" , Rating - 300#	5	nos	16 760	83 800
2242	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V55	Inlet Valve size - 24" , Rating - 600#	1	nos	16 760	16 760
2243	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V80	Inlet Valve size - 24" , Rating - 2500#	1	nos	16 760	16 760
2244	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V43	Inlet Valve size - 30" , Rating - 300#	4	nos	20 600	82 400
2245	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V68	Inlet Valve size - 30" , Rating - 600#	1	nos	20 600	20 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2246	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V53	Inlet Valve size - 36" , Rating - 300#	2	nos	25 750	51 500
2247	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V82	Inlet Valve size - 40" , Rating - 300#	2	nos	30 900	61 800
2248	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V54	Inlet Valve size - 42" , Rating - 300#	1	nos	32 960	32 960
2249	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.10.1V83	Inlet Valve size - 42" , Rating - 600#	1	nos	32 960	32 960
2250	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11	Transportation of all types of Safety Valves, Pilot Operated Safety Valves, Breather valves from owner's storage point to contractor's store/worksite and installation of valves for all ratings including assembly of valves, accessories if any, at all locations and fixing of gaskets, bolts/nuts wherever required as per drawings, specifications and as per the directions of engineer-in-charge.				
2251	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V12	Inlet size - 3/4" , Rating - NPT	1	nos	610	610
2252	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V3	Inlet size - 1" , Rating - 150#	43	nos	610	26 230
2253	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V9	Inlet size - 1" , Rating - 300#	68	nos	610	41 480
2254	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V13	Inlet size - 1" , Rating - 600#	25	nos	610	15 250
2255	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V1	Inlet size - 1 1/2" , Rating - 150#	27	nos	910	24 570
2256	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V10	Inlet size - 1 1/2" , Rating - 300#	41	nos	910	37 310
2257	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V23	Inlet size - 1 1/2" , Rating - 600#	9	nos	910	8 190
2258	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V4	Inlet size - 2" , Rating - 150#	2	nos	1 220	2 440
2259	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V17	Inlet size - 2" , Rating - 300#	9	nos	1 220	10 980
2260	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V15	Inlet size - 2" , Rating - 600#	2	nos	1 220	2 440
2261	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V5	Inlet size - 3" , Rating - 150#	7	nos	1 820	12 740
2262	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V18	Inlet size - 3" , Rating - 300#	27	nos	1 820	49 140
2263	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V24	Inlet size - 3" , Rating - 600#	2	nos	1 820	3 640
2264	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V6	Inlet size - 4" , Rating - 150#	7	nos	2 430	17 010
2265	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V11	Inlet size - 4" , Rating - 300#	9	nos	2 430	21 870
2266	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V32	Inlet size - 4" , Rating - 600#	10	nos	2 430	24 300
2267	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V7	Inlet size - 6" , Rating - 150#	17	nos	3 650	62 050
2268	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V19	Inlet size - 6" , Rating - 300#	8	nos	3 650	29 200
2269	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V30	Inlet size - 6" , Rating - 600#	28	nos	3 650	1 02 200
2270	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V2	Inlet size - 8" , Rating - 150#	31	nos	4 860	1 50 660
2271	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V34	Inlet size - 10" , Rating - 150#	1	nos	6 080	6 080
2272	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.11.1V33	Inlet size - 12" , Rating - 150#	11	nos	7 290	80 190

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2273	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12	Cleaning, set pressure tests of pressure relief and thermal relief valves before installation, providing equipments, necessary test jig, instrument air, nitrogen cylinders, all consumables and loop testing including dropping/shifting of the PSV's/TSV's from the installed position(if required) to workshop for calibration/re-calibration/re-checking, etc., and reinstall back to original location including parts replacement, gasket, stud/bolts etc., re-fixing of the PSV's /TSV's including lapping (if required) but excludes flow calibration, calibration/test reports and excluding supply of valves				
2274	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V14	Inlet size - 3/4" , Rating - NPT	1	nos	1 650	1 650
2275	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V2	Inlet size - 1" , Rating - 150#	43	nos	1 730	74 390
2276	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V6	Inlet size - 1" , Rating - 300#	68	nos	1 730	1 17 640
2277	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V10	Inlet size - 1" , Rating - 600#	25	nos	1 730	43 250
2278	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V1	Inlet size - 1 1/2" , Rating - 150#	27	nos	2 160	58 320
2279	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V7	Inlet size - 1 1/2" , Rating - 300#	41	nos	2 160	88 560
2280	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V23	Inlet size - 1 1/2" , Rating - 600#	9	nos	2 160	19 440
2281	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V3	Inlet size - 2" , Rating - 150#	2	nos	2 280	4 560
2282	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V15	Inlet size - 2" , Rating - 300#	9	nos	2 280	20 520
2283	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V12	Inlet size - 2" , Rating - 600#	2	nos	2 280	4 560
2284	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V4	Inlet size - 3" , Rating - 150#	7	nos	2 370	16 590
2285	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V16	Inlet size - 3" , Rating - 300#	27	nos	2 370	63 990
2286	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V22	Inlet size - 3" , Rating - 600#	2	nos	2 370	4 740
2287	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V9	Inlet size - 4" , Rating - 150#	6	nos	2 580	15 480
2288	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V8	Inlet size - 4" , Rating - 300#	9	nos	2 580	23 220
2289	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V31	Inlet size - 4" , Rating - 600#	10	nos	2 580	25 800
2290	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V25	Inlet size - 6" , Rating - 150#	15	nos	3 460	51 900
2291	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V17	Inlet size - 6" , Rating - 300#	8	nos	3 460	27 680
2292	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V29	Inlet size - 6" , Rating - 600#	28	nos	3 460	96 880
2293	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V26	Inlet size - 8" , Rating - 150#	30	nos	5 740	1 72 200
2294	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.12.1V32	Inlet size - 12" , Rating - 150#	11	nos	7 620	83 820
2295	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.13	Impulse line painting (uninsulated) as per painting specification for project				
2296	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.13.1V1	Instrumentation impulse line of size 1/2" for temp. (-)14 to 80 degC	2470	m	40	98 800
2297	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.13.1V2	Instrumentation impulse line of size 1/2" for temp. up to 120 degC	1240	m	40	49 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2298	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.13.1V3	Instrumentation impulse line of size 1/2" for temp. 120 to 200 degC	2470	m	40	98 800
2299	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.13.1V4	Instrumentation impulse line of size 1/2" for temp. above 200 degC	2470	m	40	98 800
2300	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.13.1V7	Instrumentation impulse line of size 3/4" for temp. (-)14 to 80 degC	300	m	60	18 000
2301	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.13.1V9	Instrumentation impulse line of size 3/4" for temp. up to 120 degC	125	m	60	7 500
2302	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.13.1V10	Instrumentation impulse line of size 3/4" for temp. 120 to 200 degC	300	m	60	18 000
2303	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.13.1V11	Instrumentation impulse line of size 3/4" for temp. above 200 degC	300	m	60	18 000
2304	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17	Transportation of all line mounted flow instruments such as Coriolis Mass Flow Meter, magnetic flow meter, ultrasonic flow meter, variable area flow meter, vortex flow meter, venturi flow meter, flow nozzle, integral orifice flow meter, wedge flow meter from Owner's storage points to contractor's stores/worksite and installation of these Flow Meters for all rating, fixing of gaskets bolts/nuts wherever required as per specification, drawings and directions of Engineer-in-Charge.				
2305	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V27	Inlet Size - 3/4" , Rating - 300#	3	nos	1 170	3 510
2306	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V1	Inlet Size - 1" , Rating - 300#	2	nos	1 240	2 480
2307	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V48	Inlet Size - 1" , Rating - 600#	1	nos	1 240	1 240
2308	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V11	Inlet Size - 1.5" , Rating - 150#	1	nos	1 340	1 340
2309	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V2	Inlet Size - 1.5" , Rating - 300#	2	nos	1 340	2 680
2310	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V12	Inlet Size - 1.5" , Rating - 600#	4	nos	1 340	5 360
2311	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V19	Inlet Size - 2" , Rating - 150#	9	nos	1 480	13 320
2312	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V3	Inlet Size - 2" , Rating - 300#	11	nos	1 480	16 280
2313	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V50	Inlet Size - 2" , Rating - 600#	1	nos	1 480	1 480
2314	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V4	Inlet Size - 3" , Rating - 300#	6	nos	1 970	11 820
2315	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V53	Inlet Size - 3" , Rating - 600#	1	nos	1 970	1 970
2316	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V32	Inlet Size - 4" , Rating - 150#	1	nos	2 260	2 260
2317	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V5	Inlet Size - 4" , Rating - 300#	2	nos	2 260	4 520
2318	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V43	Inlet Size - 4" , Rating - 600#	1	nos	2 260	2 260
2319	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V36	Inlet Size - 6" , Rating - 150#	1	nos	2 510	2 510
2320	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V6	Inlet Size - 6" , Rating - 300#	6	nos	2 510	15 060
2321	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V37	Inlet Size - 6" , Rating - 600#	1	nos	2 510	2 510
2322	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V46	Inlet Size - 8" , Rating - 300#	4	nos	3 790	15 160
2323	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V63	Inlet Size - 8" , Rating - 600#	1	nos	3 790	3 790

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2324	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V39	Inlet Size - 10" , Rating - 150#	2	nos	4 740	9 480
2325	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V7	Inlet Size - 10" , Rating - 300#	3	nos	4 740	14 220
2326	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V40	Inlet Size - 12" , Rating - 150#	1	nos	5 390	5 390
2327	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V14	Inlet Size - 14" , Rating - 300#	1	nos	6 000	6 000
2328	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V41	Inlet Size - 16" , Rating - 150#	1	nos	7 050	7 050
2329	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V9	Inlet Size - 16" , Rating - 300#	1	nos	7 050	7 050
2330	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V49	Inlet Size - 18" , Rating - 300#	1	nos	8 120	8 120
2331	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V42	Inlet Size - 20" , Rating - 150#	1	nos	9 210	9 210
2332	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V21	Inlet Size - 20" , Rating - 300#	2	nos	9 210	18 420
2333	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V24	Inlet Size - 24" , Rating - 300#	1	nos	11 460	11 460
2334	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V52	Inlet Size - 24" , Rating - 600#	1	nos	11 460	11 460
2335	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V51	Inlet Size - 24" , Rating - 2500#	1	nos	11 460	11 460
2336	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V54	Inlet Size - 30" , Rating - 300#	1	nos	14 990	14 990
2337	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V55	Inlet Size - 36" , Rating - 300#	1	nos	18 650	18 650
2338	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V56	Inlet Size - 40" , Rating - 300#	1	nos	21 170	21 170
2339	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V57	Inlet Size - 42" , Rating - 300#	1	nos	22 440	22 440
2340	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V58	Inlet Size - 42" , Rating - 600#	1	nos	22 440	22 440
2341	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V59	Inlet Size - 48" , Rating - 150#	1	nos	27 930	27 930
2342	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V47	Inlet Size - 54" , Rating - 150#	1	nos	32 180	32 180
2343	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V60	Inlet Size - 56" , Rating - 300#	1	nos	33 610	33 610
2344	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V61	Inlet Size - 66" , Rating - 300#	1	nos	40 930	40 930
2345	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.17.1V62	Inlet Size - 78" , Rating - 300#	1	nos	50 020	50 020
2346	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.18	Supply & wrapping with sodium silicate inhibited ceramic fiber rope (SS-wire braided) after cleaning the impulse lines of dust, rust, grease. The wrapping of the rope around impulse line shall cover it completely without leaving any gap. Apply two layers of self-adhesive Aluminum foil tape of minimum 0.1 mm thick spirally bound over the fiber rope surface with the joints in two layers staggered with all other specifications inline with specification '6-79-0026' for Hot insulation				
2347	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.18.1V1	1/2" impulse line (with 3/8" tracer)	525	metre	520	2 73 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2348	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.19	Transportation of all types of Flame Arrestor from owner's storage point to contractor's store/worksite and installation of Flame Arrestor for all ratings including assembly, accessories if any, at all locations and fixing of gaskets, bolts/nuts wherever required as per drawings, specifications and as per the directions of engineer-in-charge.				
2349	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.19.1V4	Inlet size - 10" , Rating - 150#	1	nos	2 580	2 580
2350	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.20	Transportation of all types of Rupture Disc assemblies from owner's storage point to contractor's store/worksite and installation of Rupture Disc assembly for all ratings including assembly, accessories if any, at all locations and fixing of gaskets, bolts/nuts wherever required as per drawings, specifications and as per the directions of engineer-in-charge.				
2351	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.20.1V4	Inlet size - 2" , Rating - 300#	1	nos	370	370
2352	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.20.1V5	Inlet size - 4" , Rating - 150#	1	nos	410	410
2353	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.20.1V6	Inlet size - 6" , Rating - 300#	2	nos	550	1 100
2354	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.20.1V7	Inlet size - 8" , Rating - 150#	1	nos	670	670
2355	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.20.1V1	Inlet size - 12" , Rating - 150#	1	nos	890	890
2356	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.20.1V2	Inlet size - 14" , Rating - 150#	2	nos	990	1 980
2357	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.20.1V3	Inlet size - 16" , Rating - 150#	3	nos	1 080	3 240
2358	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.21	Transportation of all types of Emergency vents from owner's storage point to contractor's store/worksite and installation of Emergency vents for all ratings including assembly, accessories if any, at all locations and fixing of gaskets, bolts/nuts wherever required as per drawings, specifications and as per the directions of engineer-in-charge.				
2359	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.21.1V1	Inlet size - 18" , Rating - 300#	1	nos	12 110	12 110
2360	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.21.1V2	Inlet size - 20" , Rating - 150#	1	nos	13 460	13 460
2361	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.21.1V3	Inlet size - 24" , Rating - 150#	1	nos	16 760	16 760
2362	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.21.1V4	Inlet size - 24" , Rating - 300#	1	nos	16 760	16 760
2363	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.21.1V5	Inlet size - 28" , Rating - 150#	1	nos	20 190	20 190
2364	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.22	Cold Insulation of Impulse line as per specification 6-79-0027 for project. Scope of supply by Contractor includes all material, tools, tackles & labour etc. to complete the work in all respects.				
2365	A	B957-300-16-51-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01II.950.22.1V1	Impulse line size - 1/2"	20	m	1 300	26 000
2366	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ	EQUIPMENT - PACKAGE				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2367	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.MH3	INSTALLATION OF FREE ISSUE EQUIPMENT: Handling and transportation of Equipment from Owner's storage point to work site/contractor's stores. Assembly of subassemblies, placing the equipment on foundations/structures, levelling, aligning, fixing of foundation bolts, providing (including supply) packing/shim plates, chipping and dressing of foundations, grouting (incldluing supply and applications of grout material), cleaning and flushing of equipment with water, draining and drying with compressed air, erection of inter- connecting piping including some amount of cutting and welding, wherever required. Purging the line with air/gas, supply and installation of insulation in all respects wherever applicable on equipments and piping as per Vendor drawings, application of touch-up paint (if required) after erection and assembly at site, providing manpower for carrying out pre-commissioning, commissioning and testing under the supervision guidance of Manufacturer's/Owner's personnel and rectifying defects, if any and completing the work in all respects as per drawing(s), specifications, scope of work (B957-300-80-42-SOW-3001) and instructions of engineer in charge for each equipment including drives and accessories listed below :				
2368	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.MH3.1	Filter	26	MT	32 930	8 56 180
2369	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.MH3.2	Filter Separator / Coalescer	40	MT	32 930	13 17 200
2370	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7	Chain Pulley Block				
2371	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1	Supply of Geared Trolley Mounted Chain Pulley Block				
2372	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1	Procurement & delivery of Chain Pulley Block (CPB) with its trolley, lift up to 8 m and average 8 m distance from monorail to operating floor irrespective of monorail beam size. For upward revision of height of lift and (or) operating floor distance below monorail beyond the aforesaid limit, payment shall be adjusted based on respective quoted rate for per meter increase in the height of lift and operating floor distance below monorail.				
2373	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1.1V2	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 10 MT	6	nos	4 80 910	28 85 460
2374	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1.1V3	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 3 MT	5	nos	2 83 250	14 16 250
2375	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1.1V4	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 1 MT	6	nos	1 89 760	11 38 560
2376	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1.1V5	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 2 MT	12	nos	2 36 900	28 42 800
2377	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1.1V6	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 5 MT	12	nos	3 09 520	37 14 240

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2378	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1.1V7	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 7.5 MT	6	nos	3 81 400	22 88 400
2379	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1.1V9	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 15 MT	6	nos	6 07 270	36 43 620
2380	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1.1V10	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 20 MT	3	nos	8 28 120	24 84 360
2381	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1.1V11	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 30 MT	1	nos	12 40 120	12 40 120
2382	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.1.1.1V12	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 25 MT	2	nos	11 30 680	22 61 360
2383	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.2	Supply of Hook Mounted Chain Pulley Block (Without Geared Trolley)				
2384	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.2.1	Procurement & delivery of Chain Pulley Block (CPB),suitable for lift upto 8 m and average 8 m distance from suspension hook to operating floor. Also refer Scope of work /Job Specification attached with the tender. For upward revision of height of lift and (or) operating floor distance below suspension hook beyond the aforesaid limit, payment shall be adjusted based on respective quoted rate for per meter increase in height of lift and operating floor distance below monorail.				
2385	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.2.1.1V2	Spark resistant Chain Pulley Block without geared trolley suitable for hazardous area of capacity 1 MT	6	nos	46 350	2 78 100
2386	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.2.1.1V4	Spark resistant Chain Pulley Block without geared trolley suitable for hazardous area of capacity 2 MT	5	nos	93 220	4 66 100
2387	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.2.1.1V5	Spark resistant Chain Pulley Block without geared trolley suitable for hazardous area of capacity 3 MT	5	nos	1 39 820	6 99 100
2388	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.2.1.1V6	Spark resistant Chain Pulley Block without geared trolley suitable for hazardous area of capacity 5 MT	4	nos	2 33 040	9 32 160
2389	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.4	Installation of Geared Trolley Mounted Chain Pulley Block / Geared Trolley (of Chain Pulley Block)				
2390	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.4.1	Transportation of Equipment from Owner's store/Contractor's store to work site. Assembly of subassemblies, placing the equipment on monorail, levelling, aligning, fixing of bolts, providing manpower for carrying out trial and start up runs and testing under the supervision guidance of manufacturer/clients- personnel and rectifying defects of any and completing the work in all respects as per drawing, specifications and instructions of engineer in charge for each equipment including accessories. Also refer Scope of work /Job specification attached with the tender.				
2391	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.4.1.1	Chain Pulley Block Capacity- Upto 10 MT	46	nos	48 090	22 12 140
2392	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.4.1.2	Chain Pulley Block Capacity- from 15 MT to 25 MT	11	nos	1 13 070	12 43 770
2393	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.4.1.3	Chain Pulley Block Capacity- from 30 MT to 50 MT	1	nos	1 24 010	1 24 010
2394	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.5	Installation of Hook Mounted Chain Pulley Block				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2395	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.5.1	Transportation of Equipment from Owner's store/Contractor's store to work site. Assembly of subassemblies, placing the equipment on hook, providing manpower for carrying out trial and start up runs and testing under the supervision guidance of manufacturer/clients-personnel and rectifying defects of any and completing the work in all respects as per drawing, specifications and instructions of engineer in charge for each equipment including accessories. Also refer Scope of work /Job specification attached with the tender.				
2396	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.5.1.1	Chain Pulley Block Capacity- Upto 10 MT	20	nos	23 300	4 66 000
2397	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.6	For supply: Unit Rate (addition) per meter increase in height of lift(due to increase in load chain length etc.) for Chain Pulley Block as per scope of work/Job specification defined in the tender.				
2398	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.6.1	Chain Pulley block capacity upto10 MT	25	per metre length	2 290	57 250
2399	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.6.2	Chain Pulley Block capacity from 15 MT to 25 MT	5	per metre length	3 300	16 500
2400	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.7	For supply: Unit Rate (addition) per meter increase in distance from monorail/point of suspension to operating floor(due to increase in hand chain length etc.) for Chain Pulley Block as per scope of work/Job specification defined in the tender.				
2401	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.7.1	Chain Pulley Block Capacity upto 10 MT	25	per metre length	650	16 250
2402	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.7.7.2	Chain Pulley Block Capacity from 15 MT to 25 MT	5	per metre length	900	4 500
2403	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.9	INSTALLATION OF SKID MOUNTED PACKAGES(SINGLE/MULTIPLE SKIDS) INVOLVING LOADING OF ADSORBANTS/CATALYST: Handling and transportation of Package consisting single or multiple skids from Owner's storage point to work site/contractor's stores. Assembly of subassemblies, placing the equipment on foundations/structures, levelling, aligning, fixing of foundation bolts, providing (including supply) packing/shim plates, chipping and dressing of foundations, grouting (including supply and applications of grout material), cleaning and flushing of equipment with water, draining and drying with compressed air, erection of inter- connecting piping including some amount of cutting, welding, NDT, hydrotesting/pneumatic testing, wherever required. Purging the line with air/gas, loading of desiccant/adsorbant in adsorber vessel(s) as per the instruction of Package supplier, providing manpower for carrying out pre-commissioning, commissioning and testing under the supervision guidance of Manufacturer's/Owner's personnel and rectifying defects, if any and completing the work in all respects as per drawing(s), specifications, scope of work and instructions of engineer in charge for each equipment including drives and accessories listed below :				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2404	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.9.1	PSA Hydrogen				
2405	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.9.1.1	PSA Hydrogen excluding Adsorbents	1117	MT	39 730	4 43 78 410
2406	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.9.1.2	Quantity of Adsorbents	600	MT	26 780	1 60 68 000
2407	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01QQ.9.1.3	Supply of high pressure Nitrogen for leak testing	50	Nm^3	360	18 000
2408	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR	EQUIPMENT - ROTATING				
2409	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.1	Handling and transportation of Rotating Equipment & miscellaneous items of equipment package from Owner's storage points to work site / contractor's stores, assembly of sub-assemblies, field assembly (as applicable) placing the equipment on foundations, (including some amount of cutting, welding & field joints wherever required), levelling, aligning, fixation of foundation bolts, providing (including supply) packing / shim plates (as applicable), including chipping & dressing of foundations, grouting (including supply and application of grout material, equipment base frame filling as per vendor recommendation with specified grout), cleaning and flushing, draining and drying, purging of lines, and providing manpower and tools / equipment for NDT, testing, carrying out trial and start-up runs and testing under supervision of manufacture's / customer personnel, rectifying defects (if any), insulation (as applicable), precommissioning and commissioning (as applicable) and completing the work in all respects as per drawings, job specifications / scope of work and instructions of Engineer-in-charge for each equipment including drivers and accessories, as listed below. NOTE: Scope also includes erection, fabrication, insulation (as applicable), welding & field joints wherever required, installation & NDT of vendor supplied prefabricated spools / commercial length between various skids of an equipment package (payable at the rate provided against piping SOR items).				
2410	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.1.1	Pump Packages (all types) with drivers, auxiliaries and accessories.				
2411	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.1.1.1	All Types of Pumps (Electric Motor Driven) along with driver, auxiliaries and accessories (Single Skid).	660	MT	36 890	2 43 47 400
2412	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.1.2	Centrifugal Compressor (Gas / Air) Packages with drivers, auxiliaries and accessories.				
2413	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.1.2.1	Centrifugal Compressors with Electric Motor Driver, auxiliaries and accessories.	650	MT	50 440	3 27 86 000
2414	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.1.8	Chemical Dosing Packages				
2415	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.1.8.1	Skid mounted chemical dosing packages along with all auxiliaries and accessories.	200	MT	36 890	73 78 000
2416	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.1.MH01	INITIAL FILL				
2417	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.1.MH01.1	INITIAL FILL OF LUBRICANTS, SEALING FLUID & OTHER CONSUMABLES ETC. REQUIRED FOR STARTUP AND COMMISSIONING	50000	Litre	310	1 55 00 000
2418	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.3	Epoxy Grout				

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2419	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01RR.3.1	Extra Charges for supplying and applying of Epoxy Grout.	40	m³	5 62 920	2 25 16 800
2420	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV	EQUIPMENT - STATIC				
2421	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30	EQUIPMENT ERECTION				
2422	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.1	EQUIPMENT ERECTION: Transportation of reactors, columns, vessels, silencers, heat exchangers (shell and tube, plate fin, plate) and electric heater etc. from owner's storage point to work site, assembly of parts, subassemblies, erection at all elevations, aligning, verticality checking, grouting, tightening of foundation bolts, welding of washer on anchor chairs, erection of wooden pillow for cold equipments, stacking of multi-tier exchanger(which are stored in unstacked condition), arranging hooks for test ring/ test flanges in heat exchangers, installation of demister, internal gratings, distributor, pipe davit, installation of mixer/agitator, cleaning and flushing by water, draining, drying by compressed air, arranging all tools, tackles, machinery, consumables, transportation equipment, erection equipment, instruments, labour, ancillary, etc. to complete the work in all respects as per drawings, equipment detail, specifications and instructions of the Engineer-in-Charge.				
2423	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.1.1	Equipment weighing less than 500 MT but 100 MT and above	5500	MT	64 430	35 43 65 000
2424	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.1.2	Equipment weighing less than 100 MT but 50 MT and above	1800	MT	39 730	7 15 14 000
2425	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.1.3	Equipment weighing less than 50 MT but 30 MT and above	600	MT	39 730	2 38 38 000
2426	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.1.4	Equipment weighing less than 30 MT but 10 MT and above	1050	MT	39 730	4 17 16 500
2427	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.1.5	Equipment weighing less than 10 MT	260	MT	39 730	1 03 29 800
2428	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.MH1	ERECTION OF DRESSED-UP EQUIPMENT: Transportation of columns and vessels from owner's storage point to work site, assembly of parts, subassemblies, erection at all elevations, aligning, verticality checking, grouting, tightening of foundation bolts, welding of washer on anchor chairs, installation of demister, internal gratings, distributor, pipe davit etc on the Column/Vessel, cleaning and flushing by water, draining, drying by compressed air etc, arranging all tools, tackles, machinery, consumables, erection of completely dressed-up equipment & arranging all instruments, labour, ancillary, etc to complete the work in all respects as per drawings, equipment detail, specifications and instructions of the Engineer In-Charge.				
2429	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.MH1.1	Equipment(Dressed-up) weighing less than 10 MT	5	MT	45 080	2 25 400
2430	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.MH1.2	Equipment(Dressed-up) weighing less than 50 MT but 30 MT and Above	40	MT	45 080	18 03 200
2431	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.MH1.3	Equipment(Dressed-up) weighing less than 100 MT but 50 MT and Above	250	MT	45 080	1 12 70 000
2432	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.MH1.4	Equipment(Dressed-up) weighing less than 500 MT but 100 MT and Above	2000	MT	64 430	12 88 60 000

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2433	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3	HYDROTESTING OF EQUIPMENT				
2434	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2	HYDROSTATIC TESTING OF EXCHANGERS (shell and tube): Hydrostatic testing of exchangers single tier or multitier including dismantling and reassembling of piping connections wherever required, providing blinds and gaskets on nozzles, piping, arranging water hoses, gauges, valves, test pumps and all other temporary arrangements, labour and materials, drying by hot compressed air as per specifications and instructions of Engineer-in-Charge. In case, if leakage is found in gaskets and gaskets are replaced, then re-hydrotest to be done with new gasket after reassembly. (AS PER ERECTION SPECIFICATION ENCLOSED)				
2435	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.1	Hydrotesting of shell side				
2436	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.1.1	upto 20m3	71	nos	38 200	27 12 200
2437	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.1.2	above 20m3 to 50m3	14	nos	38 200	5 34 800
2438	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.1.3	above 50m3 to 100m3	5	nos	38 200	1 91 000
2439	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.2	Hydrotesting of tube side				
2440	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.2.1	upto 20m3	74	nos	38 200	28 26 800
2441	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.2.2	above 20m3 to 50m3	21	nos	38 200	8 02 200
2442	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.2.3	above 50m3 to 100m3	6	nos	38 200	2 29 200
2443	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.3	Rehydrotesting of tube side in floating heat exchangers if leakage is noticed by drop in pressure and no leakage in any of the external joints, hinting at floating head gasket leakage. Shell cover is to be opened and tube side is to be filled with water.				
2444	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.3.1	upto 20m3	1	nos	38 200	38 200
2445	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.3.2	above 20m3 to 50m3	1	nos	38 200	38 200
2446	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.4	Hydrotesting of shell side & tube side simultaneously, keeping the differential pressure between the shell side and tube side.				
2447	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.4.1	upto 20m3	1	nos	57 310	57 310
2448	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.2.4.2	above 20m3 to 50m3	1	nos	57 310	57 310
2449	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.4	HYDROSTATIC TESTING OF EXCHANGERS (ELECTRIC HEATER): Hydrostatic testing of exchangers single tire or multitier including dismantling and reassembling of piping connections wherever required, providing blinds and gaskets on nozzles, piping, arranging water hoses, gauges, valves, test pumps and all other temporary arrangements, labour and materials, drying by hot compressed air as per specifications and instructions of Engineer-in-Charge.				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2450	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.4.1	upto 20m3	3	nos	62 540	1 87 620
2451	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.5	HYDROSTATIC TESTING OF HEAT EXCHANGERS UNDER IBR SERVICE: Hydrostatic testing of Heat Exchangers single tier or multitier including dismantling and reassembling of piping connections wherever required, providing blinds and gaskets on nozzles, piping, arranging water hoses, gauges, valves, test pumps and all other temporary arrangements, labour and materials, drying by hot compressed air as per specifications and instructions of Engineer-in-Charge. In case, if leakage is found in gaskets and gaskets are replaced, then re-hydro test to be done with new gasket after reassembly. Obtaining necessary IBR approvals/ certificates on this account, as per the instructions of Engineer-In-Charge, is also be included in contractor scope within the quoted price.				
2452	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.5.1	Hydrotesting of Shell side(IBR) of Exchanger				
2453	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.5.1.1	upto 20m3	13	nos	38 200	4 96 600
2454	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.5.1.3	above 50m3 to 100m3	1	nos	38 200	38 200
2455	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.5.2	Hydrotesting of Tube side(IBR) of Exchanger				
2456	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.5.2.1	upto 20m3	7	nos	38 200	2 67 400
2457	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.5.2.2	above 20m3 to 50m3	3	nos	38 200	1 14 600
2458	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.6	HYDROSTATIC TESTING OF VESSEL UNDER IBR SERVICE: Hydrostatic testing of vessels including dismantling and reassembling of piping connections wherever required, providing blinds and gaskets on nozzles, piping, arranging water hoses, gauges, valves, test pumps and all other temporary arrangements, labour and materials, drying by hot compressed air as per specifications and instructions of Engineer-in-Charge. In case, if leakage is found in gaskets and gaskets are replaced, then re-hydro test to be done with new gasket after reassembly. Obtaining necessary IBR approvals/ certificates on this account, as per the instructions of Engineer-In-Charge, is also be included in contractor scope within the quoted price.				
2459	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.3.6.1	upto 20m3	15	nos	38 200	5 73 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2460	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.7	LETTERING AND STENCILING: Surface preparation, supply and application of primer and paint on insulated and uninsulated equipment for lettering, stenciling on vessels, columns, drums, for the purposes of identification (Equipment Name, Equipment Number & Service Description) as per applicable painting specification enclosed elsewhere in the tender document, arranging scaffolding for all heights, labour, materials, tools, tackles, supervision etc. to complete the work as per specifications and instructions of Engineer-in- Charge.	10000	Per Letter	210	21 00 000
2461	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.8	ERECTION OF AIR COOLERS (AFC) - MODULAR CONSTRUCTION: Transportation of air cooler modules (Consisting Tube bundles/ Sections/ Bays, Motors, Fans, Plenum chambers etc.as a single unit) and bottom segments of structural columns (dispatched as loose by others) and other loose items (if any) from Owner's storage points to erection site, erection / assembly of bottom segment of structural columns, assembly of parts & sub-assemblies, erection at all elevations, aligning, verticality checking, grouting, tightening of foundation/ anchor bolts, lifting the modules and placing the same on bottom columns using the lifting lugs, removing the temporary bracing and installing the permanent bracings, installation of ladder, staircase, handrails and platforms all around, matching of TOG level of platforms as mentioned in respective datasheets, laying cables, installation of junction boxes, trial run of one bay for each tag number after erection, ensuring vibration free operation, carrying out necessary modification required in case of any vibration, arranging all tools, tackles, machinery, consumables, transportation equipment, erection equipment, instruments, labour, ancillary, etc. to complete the work in all respects as per drawings, equipment detail, specifications and instructions of the Engineer-in-Charge. Note: Installation, erection, trial run and any modification work in case of vibration shall be carried out under supervision of air cooler supplier.				
2462	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.8.4	Equipment/AFC module weighing less than 30 MT but 10 MT and Above	215	MT	41 130	88 42 950
2463	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10	LOADING OF CATALYST & INERT BALLS FOR REACTORS				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2464	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.MH01	LOADING OF MOLECULAR SEIVE/ CATALYST & INERT BALLS FOR DRYERS BY SOCK LOADING METHOD: Transportation of molecular sieve/Catalyst/ Inert balls from owners storage yard to the erection site, storing the same near erection site, supply/ procurement / fabrication of all materials, equipments, tools, tackles, machinery, consumables along with arranging of required skilled / experienced personnel, erection of internal supplied loose by vessel fabricator, removal of internals (if supplied in installed condition) as required to facilitate loadings of molecular sieve/Catalyst and Inert balls by sock loading method, re-installation of the internals removed, carrying out leak tests, removal of temporary structures / platforms and completing the work in all respect as per instructions of Engineer-in-Charge. The work shall be done to the complete satisfaction of Engineer-in-Charge under supervision of representative of Owner/Catalyst and inert balls Supplier/Licensor. Refer the molecular sieve/Catalyst Specification & relevant sections of Operating manual attached elsewhere in bid package.				
2465	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.MH01.01	upto 20m3	2	nos	4 12 000	8 24 000
2466	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.MH01.02	above 20m3 to 50m3	2	nos	10 30 000	20 60 000
2467	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.MH01.03	above 100m3	3	nos	30 90 000	92 70 000
2468	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.MH01.04	PROCUREMENT & SUPPLY OF PERLITE INSULATION				
2469	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.MH01.04.01	Procurement and supply of perlite insulation as per vendors specification attached elsewhere in the tender and delivered at owner's storage point and ensuring good quality of perlite till its filling	1638	m^3	34 690	5 68 22 220
2470	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.MH01.05	SUPPLY OF WOODEN PILLOWS				
2471	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.MH01.05.01	Supply of wooden pillows for saddle support of equipment in-line with EIL job standard no. B957-000-80-42-SK-1005 to complete the work in all respect as per drawings and direction of Engineer in-Charge.	1	nos	20 600	20 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2472	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.1	LOADING OF CATALYST & INERT BALLS FOR REACTORS BY SOCK LOADING METHOD: Transportation of Catalyst/ Inert balls from owners storage yard to the erection site, storing the same near erection site, supply/ procurement / fabrication of all materials, equipments, tools, tackles, machinery, consumables along with arranging of required skilled / experienced personnel, erection of internal supplied loose by vessel fabricator, removal of internals (if supplied in installed condition) as required to facilitate loadings of Catalyst and Inert balls by sock loading method, re-installation of the internals removed, carrying out leak tests, removal of temporary structures / platforms and completing the work in all respect as per instructions of Engineer-in-Charge. The work shall be done to the complete satisfaction of Engineer-in-Charge under supervision of representative of Owner/Catalyst and inert balls Supplier/Licensor. Refer the Catalyst Specification & relevant sections of Operating manual attached elsewhere in bid package.				
2473	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.1.1	upto 20m3	2	nos	4 12 000	8 24 000
2474	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.1.2	above 20m3 to 50m3	4	nos	10 30 000	41 20 000
2475	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.1.3	above 50m3 to 100m3	4	nos	20 60 000	82 40 000
2476	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.MH02	LOADING OF CLAY FOR ITEM NO: 300-CC-00-3601A/B				
2477	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.10.MH02.01	Loading of Clay & Sand, Ceramic balls is in the scope of Mechanical Contractor, Details of the same shall be as per applicable specification / Mechanical datasheet enclosed elsewhere in the Tender. Removal & re-installation of internals i.e. collector & distributor and removal (if required) / re-installation of Screen shall also be carried out by mechanical contractor. All the tools, machinery or any other equipment required for completion of work in all respect shall be in the scope of mechanical contractor.	1	Lumpsum	20 47 640	20 47 640
2478	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.12	ERECTION OF BURIED EQUIPMENT : Transportation of vessels from Owner's storage point to worksite, repair/ touch up of finish paint, arrangement of all accessories, equipments, labour etc., placing/erection of vessel in trenches/pits including assembly of parts, subassemblies, aligning, verticality checking, grouting, tightening of foundation bolts, arranging all tools, tackles, machinery, consumables etc to complete the work in all respects as per drawings, equipment detail, specifications and instructions of the Engineer-in-Charge.				
2479	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.12.4	Equipment weighing less than 30 MT but 10 MT and Above	100	MT	32 960	32 96 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2480	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.13	WELDING & NDT OF CUT NOZZLES / SUMP / BOOT OF BURRIED VESSELS: Assembly of cut nozzles/Sump/Boot(as shown in Respective Engg. Data Sheet), vertically checking, alignment, Welding of cut nozzles , NDT such as 100% radiography ,UT , surface preparation of the weld seam portion, application of primer, painting, arranging all tools and tackles, machinery. Consumables, transportation/handling of equipment, labour etc to complete the work in all respects as per drawings & instruction of Engineer-in charge.				
2481	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.13.MH1	MOC: Carbon Steel, Nozzle size: 32"	1	nos	39 880	39 880
2482	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.13.3	MOC : Carbon Steel ,Nozzle size : 4"	6	nos	4 990	29 940
2483	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.13.4	MOC : Carbon Steel ,Nozzle size : 6"	7	nos	7 480	52 360
2484	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.13.5	MOC : Carbon Steel ,Nozzle size : 8"	2	nos	9 970	19 940
2485	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.13.10	MOC : Carbon Steel ,Nozzle size : 18"	2	nos	22 430	44 860
2486	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.13.11	MOC : Carbon Steel ,Nozzle size : 20"	2	nos	24 930	49 860
2487	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.13.12	MOC : Carbon Steel ,Nozzle size : 24"	12	nos	29 910	3 58 920
2488	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.13.13	MOC : Carbon Steel ,Nozzle size : 28"	1	nos	34 900	34 900
2489	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.13.14	MOC : Carbon Steel ,Nozzle size : 30"	1	nos	37 390	37 390
2490	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.14	CHEMICAL CLEANING OF REACTOR/COLUMN/VESSEL: Procurement of all materials, carrying out chemical cleaning / pre-cleaning / degreasing / passivation (as applicable) of equipment, arranging labour, materials, tools and tackles, consumables, supervision etc. required to complete the work in all respects as per job specification attached with the tender document and directions of Engineer-in-charge. Refer mechanical data sheet/Scope of Supply/Work attached with the tender.				
2491	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.14.1	Chemical Cleaning				
2492	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.14.1.1	upto 20m3	3	nos	4 12 000	12 36 000
2493	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.14.1.2	above 20m3 to 50m3	2	nos	10 30 000	20 60 000
2494	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.14.1.3	above 50m3 to 100m3	1	nos	20 60 000	20 60 000
2495	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.14.1.4	above 100m3	7	nos	30 90 000	2 16 30 000
2496	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.14.3	Degreasing				
2497	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.14.3.2	above 20m3 to 50m3	1	nos	7 72 500	7 72 500
2498	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.14.3.3	above 50m3 to 100m3	1	nos	15 45 000	15 45 000
2499	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.14.3.4	above 100m3	4	nos	23 17 500	92 70 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2500	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.15	CHEMICAL CLEANING OF HEAT EXCHANGER/HEATER: Procurement of all materials, carrying out chemical cleaning / pre-cleaning / degreasing / passivation (as applicable) of equipment, arranging labour, materials, tools and tackles, consumables, supervision etc. required to complete the work in all respects as per job specification attached with the tender document and directions of Engineer-in-charge. Refer mechanical data sheet/Scope of Supply/Work attached with the tender.				
2501	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.15.8	Passivation (Tube Side)				
2502	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.15.8.1	upto 20m3	21	nos	3 09 000	64 89 000
2503	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.15.8.2	above 20m3 to 50m3	9	nos	7 72 500	69 52 500
2504	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.22	ERECTION OF COLD BOX EQUIPMENT Transportation of Cold box including structural components, Piping, Piping spools etc from owner's storage point to work site, assembly of parts, subassemblies, erection at all elevations, aligning, verticality checking, grouting, tightening of foundation bolts, welding of washer on anchor chairs, arranging hooks for accessories in Equipment, installation of parts including internals gratings, distributor, pipe davit, cleaning, flushing, , draining, drying as per Cold box supplier instruction, arranging all tools, tackles, machinery, consumables, transportation equipment, erection equipment including Piping spool erection, including welding, supporting, testing instruments, labour, ancillary, etc. to complete the work in all respects as per drawings, equipment detail, specifications and instructions of the Cold-box supplier or Engineer-in- Charge.				
2505	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.22.2	Equipment weighing less than 500 MT but 100 MT and above	550	MT	54 630	3 00 46 500
2506	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.23	FILLING OF PERLITE INSULATION Transportation of Perlite Insulation from owner's storage point to work site, filling of Perlite Insulation at any elevation in the cold box casing and other component as required, arranging all the machinery, all tools, tackles, etc. to complete the work in all respects as per drawings, equipment detail, specifications and instructions of the Cold-box supplier or Engineer-in- charge				
2507	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.30.23.MH1	ITEM TAG NO 300-LZ-00-3001 VENDOR GA NO - C2532-B-GAD, C2532-C-GAD AND C2532-D-GAD REMARKS : FOR DETAILS REFER VENDOR DRAWINGS	1	Lumpsum	67 48 560	67 48 560
2508	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40	EQUIPMENT INSULATION				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2509	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1	HOT INSULATION: Providing thermal insulation including supply of all insulating and ancillary material, weather protective covering, consumables and other necessary materials, testing of the material as required including transportation of the materials to work sites, applying insulation on surfaces as specified, including all preparatory works thereon, all binding, tying, lacing, stitching and/or otherwise securing, providing vapour barrier, finishing with plain/corrugated sheet cladding or as specified, providing bolts, rivets, self tapping screws wherever specified, providing inspection windows etc., arranging necessary scaffolding, all tools and tackles, equipment, apparatus etc., labour and supervision and completing the work in all respect at all heights as per drawings, specifications and instructions of Engineer-in-Charge.				
2510	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.MH01	Shells of vertical vessels, columns, exchangers, reactors, silencers etc. Surface material: CS/AS. Insulation type: IK (Cellular Glass).				
2511	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.MH01.01	Insulation Thickness: 80 mm	720	m²	19 710	1 41 91 200
2512	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1	Shells of vertical vessels, columns, exchangers, reactors, silencers etc. Surface material: CS/AS. Insulation type : IH &IT (Rockwool).				
2513	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1.1	Insulation Thickness: 25 mm	1800	m²	7 000	1 26 00 000
2514	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1.3	Insulation Thickness: 40 mm	780	m²	7 340	57 25 200
2515	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1.5	Insulation Thickness: 50mm	1150	m²	7 560	86 94 000
2516	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1.7	Insulation Thickness: 65mm	900	m²	7 900	71 10 000
2517	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1.10	Insulation Thickness: 80mm	1600	m²	8 240	1 31 84 000
2518	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1.11	Insulation Thickness: 90mm	400	m²	8 470	33 88 000
2519	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1.12	Insulation Thickness: 100mm	360	m²	8 700	31 32 000
2520	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1.14	Insulation Thickness: 125mm	40	m²	9 260	3 70 400
2521	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1.16	Insulation Thickness: 150mm	230	m²	9 830	22 60 900
2522	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.1.18	Insulation Thickness: 175mm	930	m²	10 400	96 72 000
2523	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.MH02	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material CS/AS. Insulation type: IK (Cellular Glass).				
2524	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.MH02.01	Insulation Thickness: 80 mm	250	m²	19 710	49 27 500
2525	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material CS/AS. Insulation type: IH &IT (Rockwool).				
2526	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2.1	Insulation Thickness: 25 mm	2200	m²	7 000	1 54 00 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2527	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2.3	Insulation Thickness: 40mm	120	m²	7 340	8 80 800
2528	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2.5	Insulation Thickness: 50mm	560	m²	7 560	42 33 600
2529	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2.7	Insulation Thickness: 65mm	170	m²	7 900	13 43 000
2530	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2.10	Insulation Thickness: 80mm	170	m²	8 240	14 00 800
2531	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2.11	Insulation Thickness: 90mm	160	m²	8 470	13 55 200
2532	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2.12	Insulation Thickness: 100mm	160	m²	8 700	13 92 000
2533	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2.14	Insulation Thickness: 125mm	15	m²	9 260	1 38 900
2534	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2.16	Insulation Thickness: 150mm	70	m²	9 830	6 88 100
2535	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.2.18	Insulation Thickness: 175mm	260	m²	10 400	27 04 000
2536	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.MH03	Shells of vertical vessels, columns, exchangers, reactors, silencers etc. Surface material: CS/AS. Insulation type: IE				
2537	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.MH03.01	Insulation Thickness: 25 mm Inner Layer: Rockwool, 25 mm Outer Layer: PIR, Polyisocyanurate, ASTM C591, Grade-2, Type-II	135	m²	8 330	11 24 550
2538	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.3	Shells of vertical vessels, columns, exchangers, reactors, silencers etc. Surface material : SS. Insulation type : IH &IT (Rockwool).				
2539	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.3.5	Insulation Thickness: 50mm	320	m²	7 560	24 19 200
2540	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.3.10	Insulation Thickness: 80mm	30	m²	8 240	2 47 200
2541	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.MH04	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material CS/AS. Insulation type: IE				
2542	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.MH04.01	Insulation Thickness: 25 mm Inner Layer: Rockwool, 25 mm Outer Layer: PIR, Polyisocyanurate, ASTM C591, Grade-2, Type-II	500	m²	8 330	41 65 000
2543	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.4	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material SS. Insulation type: IH &IT (Rockwool).				
2544	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.4.5	Insulation Thickness: 50mm	40	m²	7 560	3 02 400
2545	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.4.7	Insulation Thickness: 65mm	20	m²	7 900	1 58 000
2546	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.4.10	Insulation Thickness: 80mm	25	m²	8 240	2 06 000
2547	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.1.4.11	Insulation Thickness: 90mm	20	m²	8 470	1 69 400

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2548	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2	COLD INSULATION: Providing cold insulation including supply of all insulating and anciliary material, protective covering, consumables and other necessary materials, testing of the material as required including transportation of the materials to work sites, applying insulation on surfaces as specified, including all preparatory works thereon, all binding, tying, lacing, stitching and/or otherwise securing, providing vapour barrier, finishing with plain/corrugated sheet cladding or as specified, providing bolts, rivets, providing vapour stop etc. arranging necessary scaffolding, all tools and tackles, equipment, apparatus etc. labour and supervision and completing the work in all respect at all heights as per drawings, specifications and instructions of Engineer-in-Charge.				
2549	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.3	Shells of vertical vessels, columns, exchangers, reactors, silencers etc. Surface material: SS. Insulation type : Ic (Cellular glass, ASTM C 552, Grade 6, Type-II).				
2550	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.3.2	Insulation Thickness: 50mm	218	m²	14 730	32 11 140
2551	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.4	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material SS. Insulation type: Ic (Cellular glass, ASTM C 552, Grade 6, Type-II).				
2552	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.4.2	Insulation Thickness: 50mm	195	m²	14 730	28 72 350
2553	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.9	Shells of vertical vessels, columns, exchangers, reactors, silencers etc. Surface material: CS/AS. Insulation type: Ic (Rigid Polyisocyanurate ("PIR" to ASTM C591, Grade-2, Type-II).				
2554	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.9.MH01	Insulation Thickness: 80mm	610	m²	10 690	65 20 900
2555	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.9.1	Insulation Thickness: 40mm	50	m²	8 560	4 28 000
2556	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.9.MH02	Insulation Thickness: 70 mm	350	m²	10 160	35 56 000
2557	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.9.3	Insulation Thickness: 65mm	300	m²	9 890	29 67 000
2558	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.9.6	Insulation Thickness: 100mm	40	m²	11 750	4 70 000
2559	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.10	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material CS/AS. Insulation type: Ic (Rigid Polyisocyanurate ("PIR" to ASTM C591, Grade-2, Type-II).				
2560	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.10.MH01	Insulation Thickness:80 mm	850	m²	10 690	90 86 500
2561	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.10.1	Insulation Thickness: 40mm	210	m²	8 560	17 97 600
2562	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.10.MH02	Insulation Thickness:25 mm	265	m²	7 760	20 56 400
2563	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.10.MH03	Insulation Thickness:70 mm	310	m²	10 160	31 49 600
2564	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.10.3	Insulation Thickness: 65mm	110	m²	9 890	10 87 900

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2565	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.10.6	Insulation Thickness: 100mm	850	m²	11 750	99 87 500
2566	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.11	Shells of vertical vessels, columns, exchangers, reactors, silencers etc. Surface material: SS. Insulation type: Ic (Rigid Polyisocyanurate ("PIR" to ASTM C591, Grade-2, Type-II).				
2567	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.11.4	Insulation Thickness: 75mm	90	m²	10 420	9 37 800
2568	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.11.6	Insulation Thickness: 100mm	120	m²	11 750	14 10 000
2569	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.11.8	Insulation Thickness: 125mm	260	m²	13 080	34 00 800
2570	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.11.10	Insulation Thickness: 140mm	145	m²	13 880	20 12 600
2571	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.11.13	Insulation Thickness: 175mm	660	m²	15 750	1 03 95 000
2572	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.11.15	Insulation Thickness: 190mm	70	m²	16 540	11 57 800
2573	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.12	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material: SS. Insulation type: Ic (Rigid Polyisocyanurate ("PIR" to ASTM C591, Grade-2, Type-II).				
2574	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.12.4	Insulation Thickness: 75mm	35	m²	10 420	3 64 700
2575	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.12.6	Insulation Thickness: 100mm	500	m²	11 750	58 75 000
2576	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.12.7	Insulation Thickness: 115mm	30	m²	12 550	3 76 500
2577	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.12.8	Insulation Thickness: 125mm	165	m²	13 080	21 58 200
2578	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.12.10	Insulation Thickness: 140mm	35	m²	13 880	4 85 800
2579	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.12.11	Insulation Thickness: 150mm	10	m²	14 410	1 44 100
2580	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.12.13	Insulation Thickness: 175mm	50	m²	15 750	7 87 500
2581	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.2.12.15	Insulation Thickness: 190mm	20	m²	16 540	3 30 800
2582	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.3	PERSONAL PROTECTION INSULATION (METAL CAGE/GUARD, FOR HORIZONTAL/ VERTICAL EQUIPMENT): Providing the metal cage/ guards (STAINLESS STEEL Wire netting type as per EIL specification) including supply of all material, transportation of the materials to work sites, installation of the fabricated cage on the surfaces of the equipment, Including all preparatory works thereon, all binding, tying or otherwise securing, arranging necessary scaffolding, all tools and tackles, equipment, apparatus etc., labour and supervision and completing the work in all respect at all heights as per the specifications and instructions of Engineer-in-Charge.				
2583	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.40.3.1	For the Shells and Heads of Horizontal/ Vertical Equipment	1700	m²	4 420	75 14 000
2584	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50	EQUIPMENT PAINTING				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2585	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.1	PAINTING (UNINSULATED EQUIPMENT) FOR CS / LTCS AND LOW ALLOY STEEL VESSEL				
2586	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.1.1	Supply and application of field primers and finish paint on C.S., L.T.C.S. and low alloy steel vessels, columns, reactor, silencer, exchangers, air cooler structure and other equipment, including rubdown and touch up of shop primer (primer as per applicable specification) wherever required as per attached specification, providing scaffolding for all heights, labour, material, tools and tackles, consumables, supervision etc. to complete the work in all respect as per specifications, drawings, equipment details for painting and direction of Engineer in-Charge for all type of uninsulated equipment. The surface area is as per respective temperature ranges given below as per applicable specification. Note: Surface preparation and first coat of primer application shall be provided by equipment supplier.				
2587	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.1.1.MH1	Design Temperature Range: (-)45 °C To (-) 15 °C Surface preparation and Primer : SSPC-SP-10; 1coat of F-9 @ 65-75µDFT/coat Total Final DFT in microns (min) : 65-75. Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	290	290
2588	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.1.1.MH2	Design Temperature Range: (-)14 °C To 80 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-9@ 65-75µ DFT/coat + 1 coat of P-6 @ 40µDFT/coat Intermediate coat: 2 coat of F-6B@100µ DFT/coat Finish Paint: 1 coat of F-2 @ 40µ DFT/coat Total DFT in Microns (Min): 345-355 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	40	m²	850	34 000
2589	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.1.1.MH3	Design Temperature Range: 81 °C To 250 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-9 @ 65-75µ DFT/coat + 1 coat of F-11 @ 20µ DFT/coat Finish Paint: 1 coat of F-11 @ 20µ DFT/coat Total DFT in microns min : 105-115 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	130	m²	510	66 300
2590	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.1.1.MH4	Design Temperature Range: 251 °C To 400 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-9@ 65-75µDFT/coat + 1 coat of F-12 @ 20µDFT/coat Finish Paint: 1coat of F-12 @ 20µDFT/coat Total DFT in Microns (Min): 105-115 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	660	660

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2591	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.1.1.MH5	Design Temperature Range: 401 °C To 650 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-16 @ 125µDFT/coat. Finish Paint: 1coat of F-16 @ 125µDFT/coat. Total DFT in Microns (Min): 250-300. Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	1 090	1 090
2592	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.1.1.MH6	Design Temperature Range: (-) 45 °C To 80 °C (External side of underground Vessels) Surface preparation and primer: SSPC-SP-10; 1 coat of F-9 @ 65-75µDFT/coat + 1 coat of F-7 @ 100µDFT/coat Finish Paint: 2 coats of F-7 @ 100µDFT/coat Total DFT in Microns (Min): 365-375 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	730	730
2593	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.1.1.MH7	Design Temperature Range: 81 °C To 200 °C (External side of underground Vessels) Surface preparation and primer: SSPC-SP-10; 1 coat of F-17 primer @ 400µ DFT/coat Finish Paint: 1coat of F-17 @ 400µDFT/coat. Total DFT in Microns (Min): 800 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	20	m²	730	14 600
2594	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.1.1.MH8	Design Temperature Range: 201 °C To 400 °C (External side of underground vessels) Surface preparation and primer: SSPC-SP-10; 1 coat of F-16 primer @ 125µ DFT/coat Finish Paint: 2 coats of F-16 @ 125µ DFT/coat Total DFT in Microns (Min): 375 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	10	m²	1 600	16 000
2595	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.2	PAINTING (INSULATED EQUIPMENT) FOR CS / LTCS AND LOW ALLOY STEEL VESSEL				
2596	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.2.1	Supply and application of field primers and finish paint on C.S, L.T.C.S & low alloy steel vessels, columns, reactor, silencer, exchangers and other equipment, including rubdown and touch up of shop primer (primer as per applicable specification) wherever required, as per attached specification, providing scaffolding for all heights, labour, materials, tools and tackles, consumables and supervision etc. to complete the work in all respect as per specifications, drawings, equipment details for painting and direction of Engineer in-Charge. The surface area is as per respective temperature ranges given below as per applicable specification. Note: Surface preparation and first coat of primer application shall be provided by equipment supplier.				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2597	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.2.1.MH1	Design Temperature Range: -45 °C To 125 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-15 @ 100 µ DFT/coat Finish Paint: 2 coats of F-15 @100microns DFT/coat. Total DFT in Microns (Min): 300 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	280	m²	740	2 07 200
2598	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.2.1.MH2	Design Temperature Range: 126 °C To 560 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-16 @ 125 µ DFT/coat Finish Paint: 1 coat of F-16 @125 microns DFT/coat. Total DFT in Microns (Min): 250 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	300	m²	1 090	3 27 000
2599	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.2.1.MH3	Design Temperature Range: 200 °C To 540 °C Surface preparation and primer: Temporary oil based varnish coating to be provided for transport and storage. Finish Paint: Thermally Sprayed Aluminum coating (TSAC) Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, refer applicable painting specification, (Refer Annexure-I)	1	m²	2 060	2 060
2600	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.3	PAINTING (INSULATED EQUIPMENT) FOR STAINLESS STEEL				
2601	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.3.1	Supply and application of field primers and finish paint on Stainless Steel vessels, columns, reactors, silencers, exchangers and other equipment, including rubdown and touch up of shop primer (primer as per applicable specification) wherever required, as per attached specification, providing scaffolding for all heights, labour, materials, tools and tackles, consumables and supervision etc. to complete the work in all respect as per specifications, drawings, equipment details for painting and direction of Engineer in-Charge. The surface area is as per respective temperature ranges given below as per applicable specification. Note: Surface preparation and first coat of primer application shall be provided by equipment supplier.				
2602	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.3.1.MH1	Design Temperature Range: (-) 45 °C To 125 °C Surface preparation and primer: SSPC-SP-16; (15-25µ surface profile) 1 coat of F-15 @ 100 µ DFT/coat. Finish Paint: 2 coats of F-15 @ 100 µ DFT/coat Total DFT in Microns (Min): 300 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	770	770

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2603	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.3.1.MH2	Design Temperature Range: 126 °C To 650 °C Surface preparation and primer: SSPC-SP-16; (15-25µ surface profile) 1 coat of F-16 @ 125 µ DFT/coat. Finish Paint: 1 coat of F-16 @ 125 µ DFT/coat Total DFT Microns (Min): 250 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	1 120	1 120
2604	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.3.1.MH3	Design Temperature Range: (-)45 °C To 150 °C, For cyclic services of CS, LTCS, SS, DSS, SDSS & Alloy steel Surface preparation and primer: Surface preparation and primer: SSPC-SP-10 For CS, LTCS & Alloy steel, SSPC-SP-16 for SS; (15-25µ surface profile) 1 coat of F-15 @ 100 µ DFT/coat. Finish Paint: 2 coats of F-15 @ 100 µ DFT/coat. Total DFT in Microns: 300. Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	780	780
2605	A	B957-300-80-42-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01VV.50.3.1.MH4	Design Temperature Range: (-)180 °C To 650 °C Surface preparation and primer: Surface preparation and primer: SSPC-SP-10 For CS, LTCS & Alloy steel, SSPC-SP-16 for SS; (15-25µ surface profile) 1 coat of F-16 @ 125 µ DFT/coat. Finish Paint: SSPC-SP-16; 1 coat of F-16 @ 125 µ DFT/coat Total DFT in Microns (Min): 250 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification	215	m²	1 130	2 42 950
2606	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM	EQUIPMENT - COLUMNS/TRAYS				
2607	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10	TRAYS, TOWER PACKINGS AND TOWER INTERNALS				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2608	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.1	NEW COLUMNS: Checking inside the column for levelness of support ring and location of bolting bars to ensure that they are within tolerances as per approved drawings, applicable standards/specifications and if required modification of the same, transportation of trays/tower internals from Owner's storage point to work site, Floor Mock-up of each type & size of tray and layer of structured packing, installation of all trays, tower internals and associated components under supervision of internal supplier and as per applicable Installation Procedure and GADs, Arranging of Cranes in case of Cartridge Tray Bundle installation, Arrangement of Scaffolding inside the column for parallel working (if required), filling of Tower Packings, and carrying out minor adjustments/modifications during installation, carrying out various leak tests as per requirement and completing all work as per approved drawings / specifications and instructions of Engineer-in-Charge and filling of required Installation Reporting Formats. Attending to Punch List and carrying out necessary modifications/rectifications suggested by EIL specialist/Licensor, providing infrastructure facilities & help/manpower to Engineer-in-Charge/ EIL specialist/Licensor during checking of tray installation. For details, Refer Schedule of Quantities and technical specification, attached elsewhere.				
2609	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.1.ME01	Tag Nos. 300-CC-00-2201 HP DEPROPANIZER 300-CC-00-2202 LP DEPROPANIZER 300-CC-00-3001 DEMETHANIZER 300-CC-00-4001 DETHANIZER 300-CC-00-4201 DEBUTANIZER 302-CC-00-2601 DEPENTANIZER 302-CC-00-2602 RERUN TOWER 302-CC-00-2701 H2S STRIPPER 302-CC-00-2702 BTX TOWER 303-CC-00-3502 SOLVENT RECOVERY COLUMN (SRC) 303-CC-00-3503 WATER STRIPPER 303-CC-00-3602 BENZENE COLUMN 303-CC-00-3603 TOLUENE COLUMN 303-CC-00-3604 XYLENE COLUMN				
2610	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.1.1	Installation of Trays and Tower Internals	220	MT	1 54 500	3 39 90 000
2611	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.1.2	Filling / Installation of Tower Packings (Random/Structured)	250	m^3	20 600	51 50 000
2612	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.1.ME2	Minor modification like Bending/ Cutting/ Grinding etc. for Removable Internals / Welded attachments.	1	Kg	310	310
2613	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.3	Site Welding; Fillet welding of Trays & Tower Internals inside the Column.				
2614	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.3.ME1	Seal Weld 3mm (SS to SS)	1	RM	23 240	23 240
2615	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.3.ME2	Seal Weld 3mm (CS to CS)	1	RM	9 290	9 290
2616	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.3.3	Fillet Weld of 6mm at Site per RM (SS to SS or SS to CS)	1	RM	24 530	24 530
2617	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.3.4	Fillet Weld of 6mm at Site per RM (CS to CS)	1	RM	9 810	9 810

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2618	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.10.3.5	Fillet Weld of 10mm at Site per RM (CS to CS)	1	RM	10 330	10 330
2619	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.45	Erection of standalone Ejectors / Ejector and Silencer				
2620	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.45.1	Erection of Ejectors				
2621	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.45.1.ME001	Tag No. 303-JA-00-3501 – Solvent Sump Ejector & Tag No. 303-JA-00-3502 – Aromatic Sump Ejector				
2622	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.45.1.1	Transportation of the Ejectors from Owner's storage points to work site and Erection on structure support by bolting, shims etc. including levelling, aligning including connecting nozzles with piping at various elevations and completing the work in all respects as per drawings, specifications and instructions of Engineer-in-Charge.				
2623	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.45.1.1.01	Equipment weighing less than 10 MT	0.1	MT	39 700	3 970
2624	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.91	De-humidification and Air-conditioning system for Columns				
2625	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.91.1	NEW COLUMNS: De-humidification and Air-conditioning system for Columns shall be provided during installation of column internals. System shall be designed to provide 40 air changes per hour & ensure a temperature from 32 to 35 degree Celsius or 10-12 degree Celsius less than ambient temperature whichever is lower with a Uniform humidity (RH) of 50-55% inside the column. At a time minimum 15m of column height for inside diameter of range 6000 to 9000mm and 10m of column height for inside diameter of more than 9000mm shall maintain above temperature and humidity; for other columns above shall be maintained across the full length of column. The power required for the system shall be given by Client and charges for the same shall be as per Contractual Agreement/ Requirements. This system shall be used by the Column internal installation Contractor during installation of Column Internals and various Inspection Agencies during the inspection of Internals inside the columns till the BOX-UP of the Columns. De-humidification and Air-conditioning system shall be arranged from specialized agencies who are well experienced in this line of service having proven track record (PTR). The Agency shall visit site to identify the location of all columns in advance and necessary arrangements shall be made in advance so that the De-humidification and Air-conditioning system are in place before start of internal installation work. The system shall be designed in such a manner that any kind of combination of column work may progress (e.g. One Major Column or Both Major Column or One Major Column with Small Column or Two Major Columns with Small Columns, etc.). The sequence of column internals installation along with schedule will be finalized at later stage. The machine shall be installed at the Grade Level or at the scaffolding to be decided by Mechanical contractor / Agency and shall be as per the direction of the Engineer-In-Charge. Also, all Statutory Regulations and Safety, Health and Environment Requirements shall be complied by the Mechanical Contractor / Agency. Transportation of the system from Owner's (Mechanical contractor) Storage points to work				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2626	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.91.1.ME01	300-CC-00-2201 HP DEPROPANIZER (Col. ID 5000/3800mm, TL-TL 24900) 300-CC-00-2202 LP DEPROPANIZER (Col. ID 2800/3400mm, TL-TL 39300) 300-CC-00-3001 DEMETHANIZER (Col. ID 4800/2500/3200mm, TL-TL 62100) 300-CC-00-4001 DETHANIZER (Col. ID 4500mm, TL-TL 39100) 300-CC-00-4201 DEBUTANIZER (Col. ID 3000mm, TL-TL 29200) 302-CC-00-2601 DEPENTANIZER (Col. ID 2100/3000mm, TL-TL 46000) 302-CC-00-2602 RERUN TOWER (Col. ID 5100mm, TL-TL 23900) 302-CC-00-2701 H2S STRIPPER (Col. ID 2400mm, TL-TL 18900) 302-CC-00-2702 BTX TOWER (Col. ID 4300mm, TL-TL 28400) 303-CC-00-3502 SOLVENT RECOVERY COLUMN (SRC) (Col. ID 3400/5000mm, TL-TL 33600) 303-CC-00-3602 BENZENE COLUMN (Col. ID 2800mm, TL-TL 43750) 303-CC-00-3603 TOLUENE COLUMN (Col. ID 2600mm, TL-TL 44200) 303-CC-00-3604 XYLENE COLUMN (Col. ID 1500mm, TL-TL 38200)				
2627	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.91.1.1	Column ID range 1000mm to 3000mm and TL to TL height upto 60000mm. Lumpsum price is for one column. Details as per drawings and tender specification.	1	Lumpsum	9 39 360	9 39 360
2628	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.91.1.2	Column ID range 3001mm to 5000mm and TL to TL height upto 70000mm. Lumpsum price is for one column. Details as per drawings and tender specification.	1	Lumpsum	9 39 360	9 39 360
2629	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.91.1.3	Column ID range 5001mm to 7000mm and TL to TL height upto 80000mm. Lumpsum price is for one column. Details as per drawings and tender specification.	1	Lumpsum	1 56 560	1 56 560
2630	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.92	Insulation				
2631	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.92.ME001	Tag No. 303-JA-00-3501 – Solvent Sump Ejector & Tag No. 303-JA-00-3502 – Aromatic Sump Ejector				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2632	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.92.1	HOT INSULATION: Providing thermal insulation including supply of all insulating and ancillary material, heat resistant paint/foils, weather protective covering, consumables and other necessary materials, testing of the material as required including transportation of materials to work sites, applying insulation on surfaces as specified, including all preparatory work thereon, all binding, tying, lacing, stitching and/or otherwise securing, finishing with plain/corrugated sheet cladding or as specified, providing bolts, nuts, self tapping screws wherever specified, providing inspection windows etc., providing necessary scaffolding, all tools and tackles, equipment, apparatus etc., labour & supervision and completing the work in all respects at all heights as per drawings, specifications and instructions of Engineer-in-Charge. (As per Applicable Insulation Specification attached elsewhere in tender)				
2633	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.92.1.3	Shells and heads of horizontal vessels, columns, exchangers, silencers etc. and heads of above mentioned vertical equipments. Surface material CS/AS. Insulation type: IH &IT (Rockwool).				
2634	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.92.1.3.1	Insulation Thickness: 25mm	1	m²	5 400	5 400
2635	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.92.1.3.3	Insulation Thickness: 40mm	1	m²	5 740	5 740
2636	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.93	Painting				
2637	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.93.2	PAINTING (INSULATED EQUIPMENT) FOR CS / LTCS AND LOW ALLOY STEEL VESSEL				
2638	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.93.2.ME001	Tag No. 303-JA-00-3501 – Solvent Sump Ejector & Tag No. 303-JA-00-3502 – Aromatic Sump Ejector				
2639	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.93.2.1	Supply and application of field primers and finish paint on C.S, L.T.C.S & low alloy steel vessels, columns, reactor, silencer, exchangers and other equipment, including rubdown and touch up of shop primer (primer as per applicable specification) wherever required, as per attached specification, providing scaffolding for all heights, labour, materials, tools and tackles, consumables and supervision etc. to complete the work in all respect as per specifications, drawings, equipment details for painting and direction of Engineer in-Charge. The surface area is as per respective temperature ranges given below as per applicable specification. Note: Surface preparation and first coat of primer application shall be provided by equipment supplier.				
2640	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.93.2.1.ME01	Design temperature range -45 °C to 125 °C Primer SSPC-SP-10; 1coat of F-15 @ 100µ DFT/coat, Finish Paint 2 coats of F-15 @100µ DFT/coat, Total DFT Microns (min.) 300. Remarks - Refer Table no. 11.1 Painting specification no. B957-000-06-42-PLS-01.	1	sqm	900	900
2641	A	B957-300-80-46-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01HM.93.2.1.ME02	Design temperature range 126 °C to 560 °C Primer SSPC-SP-10; 1 coat of F-16 @ 125µ DFT/coat, Finish Paint 1 coat F-16 @ 125µ DFT/coat, Total DFT Microns (min.) 250. Remarks- Refer Table no. 11.1 of Painting specification no. B957-000-06-42-PLS-01.	1	sqm	1 240	1 240
2642	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS	STRUCTURAL				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2643	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1	EARTH WORK (REFER SPECIFICATION NO. 6-68-0003)				
2644	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.1	Earthwork excavation in soil				
2645	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.1.1	Earth work in EXCAVATION below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth upto 1.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	4000	m^3	300	12 00 000
2646	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.1.2	Earth work in EXCAVATION below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth beyond 1.5m and upto and inclusive of 3.0m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	3600	m^3	350	12 60 000
2647	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.1.3	Earth work in EXCAVATION below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth beyond 3.0m and upto & inclusive of 4.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	1	m^3	410	410
2648	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.2	Earthwork excavation in soft rock				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2649	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.2.1	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth upto 1.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	300	m^3	720	2 16 000
2650	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.2.2	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth beyond 1.5m and upto & inclusive of 3.0m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	300	m^3	880	2 64 000
2651	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.2.3	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth beyond 3.0m and upto & inclusive of 4.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	1	m^3	1 030	1 030
2652	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.4	Earthwork excavation by controlled blasting (Explosive/ Non-explosive)				
2653	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.4.11	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Hard Rocks, for a depth of 1.5m including all related work for non-explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete.	1	m^3	2 290	2 290

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2654	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.4.12	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Hard Rocks, for a depth beyond 1.5m and upto & inclusive of 3.0m including all related work for non-explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete.	1	m^3	2 590	2 590
2655	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.4.13	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Hard Rocks, for a depth beyond 3.0m and upto & inclusive of 4.5m including all related work for non-explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete.	1	m^3	2 930	2 930
2656	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.4.MF1311	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Soft Rocks, for a depth of 1.5m including all related work for non explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete.	300	m^3	2 080	6 24 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2657	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.4.MF1312	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Soft Rocks, for a depth beyond 1.5m and upto & inclusive of 3.0m including all related work for non-explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete.	300	m^3	2 350	7 05 000
2658	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.4.MF1313	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Soft Rocks, for a depth beyond 3.0m and upto & inclusive of 4.5m including all related work for non-explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete	1	m^3	2 660	2 660
2659	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.5	Earthwork excavation by chiselling				
2660	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.5.1	Earth work in EXCAVATION below ground level for all kinds of works in HARD ROCKS for a depth upto 1.5m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	1	m^3	1 820	1 820

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2661	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.5.2	Earth work in EXCAVATION below ground level for all kinds of works in HARD ROCKS for a depth beyond 1.5m and upto & inclusive of 3.0m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	1	m^3	2 020	2 020
2662	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.5.3	Earth work in EXCAVATION below ground level for all kinds of works in HARD ROCKS for a depth beyond 3.0m and upto & inclusive of 4.5m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	1	m^3	2 220	2 220
2663	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.5.MF1301	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCKS for a depth upto 1.5m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	300	m^3	1 600	4 80 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2664	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.5.MF1302	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCKS for a depth beyond 1.5m and upto & inclusive of 3.0m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	300	m^3	1 770	5 31 000
2665	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.5.MF1303	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCKS for a depth beyond 3.0m and upto & inclusive of 4.5m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	1	m^3	1 950	1 950
2666	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.6	SHORING AND STRUTTING				
2667	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.6.1	Providing and installing approved type of "SHORING AND STRUTTING" by open timbering method for all depths to retain earth including dismantling and removal of the same etc. from site after completion of work etc. all complete as directed.	100	m^2	400	40 000
2668	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.6.2	Providing and installing approved type of "SHORING AND STRUTTING" by close timbering method for all depths to retain earth including dismantling and removal of the same etc. from site after completion of work etc. all complete as directed.	100	m^2	580	58 000
2669	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.7	Backfilling after execution of work				
2670	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.7.1	BACKFILLING after execution of the WORK to proper grade and level with selected materials from available excavated soil from spoil heaps within a LEAD OF 100M, including re- excavating the deposited soil excavated earlier, breaking clods, laying at all depths and heights in layers of thickness not exceeding 15 Cms. watering, rolling and ramming by manual methods/ mechanical compactors to achieve 90% laboratory maximum dry density, dressing, trimming etc. in foundations, plinths, trenches, pits etc. all complete.	5800	m^3	270	15 66 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2671	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.7.2	BACKFILLING after execution of the WORK to proper grade and level with selected materials from available excavated soil from spoil heaps beyond a LEAD OF 100M AND UPTO & INCLUSIVE OF 500M including re-excavating the deposited soil excavated earlier, breaking clods, laying at all depths and heights in layers of thickness not exceeding 15 Cms. watering, rolling and ramming by manual methods/mechanical compactors to achieve 90% laboratory maximum dry density, dressing, trimming etc. in foundations, plinths, trenches, pits etc. all complete.	1080	m^3	320	3 45 600
2672	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.7.3	BACKFILLING after execution of the WORK to proper grade and level with selected materials from available excavated soil from spoil heaps beyond a LEAD OF 500M AND UPTO & INCLUSIVE OF 1KM including re-excavating the deposited soil excavated earlier, breaking clods, laying at all depths and heights in layers of thickness not exceeding 15 Cms. watering, rolling and ramming by manual methods/mechanical compactors to achieve 90% laboratory maximum dry density, dressing, trimming etc. in foundations, plinths, trenches, pits etc. all complete.	360	m^3	340	1 22 400
2673	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.7.MF1301	BACKFILLING after execution of the WORK to proper grade and level from available crushed rock beyond a LEAD OF 3KM AND UPTO & INCLUSIVE OF 6KM laying at all depths and heights in layers of 150mm loose thickness (maximum) including watering, ramming, rolling, compacting to achieve 85% relative density dressing, trimming etc. in foundations, plinths, trenches, pits etc. all complete.	600	m^3	500	3 00 000
2674	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.9	Earthwork Filling by excavation				
2675	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.9.4	EARTHWORK IN FILLING by excavating the earth from BORROW AREAS arranged by CONTRACTOR for all leads, transporting the earth from borrow area including cleaning & stripping the earth at borrow areas, breaking clods, loading, unloading and laying at all depths and heights in layers of thickness not exceeding 15 cms., watering, rolling and ramming by manual methods/mechanical compactors to achieve 90% of the maximum laboratory dry density, dressing, trimming, levelling the top surface etc. in foundations, plinths, trenches etc. all complete.	50	m^3	600	30 000
2676	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.10	Transporting & Disposing the SURPLUS EARTH AND DEBRIS				
2677	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.10.1	Transporting and disposing the SURPLUS EARTH AND DEBRIS including shrubs and vegetations from construction area beyond the initial LEAD OF 100M AND UPTO 1KM including re-excavating the deposited soil excavated earlier, transportation, loading, unloading, laying at all depths and heights, stacking, levelling and dressing both the area (viz. from where the earth is transported and where it is deposited) to required levels and slopes complete with all lifts as directed. For carting on the basis of truck measurements (volume of truck reduced by 30% for voids).	400	m^3	220	88 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2678	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.10.2	Transporting and disposing the SURPLUS EARTH AND DEBRIS including shrubs and vegetations from construction area beyond the initial LEAD OF 1.0KM AND UPTO & INCLUSIVE OF 3.0KM including re-excavating the deposited soil excavated earlier, transportation, loading, unloading, laying at all depths and heights, stacking, levelling and dressing both the area (viz. from where the earth is transported and where it is deposited) to required levels and slopes complete with all lifts as directed. For carting on the basis of truck measurements (volume of truck reduced by 30% for voids).	50	m^3	240	12 000
2679	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.10.3	Transporting and disposing the SURPLUS EARTH AND DEBRIS including shrubs and vegetations from construction area beyond the initial LEAD OF 3.0KM AND UPTO & INCLUSIVE OF 5.0KM including re-excavating the deposited soil excavated earlier, transportation, loading, unloading, laying at all depths and heights, stacking, levelling and dressing both the area (viz. from where the earth is transported and where it is deposited) to required levels and slopes complete with all lifts as directed. For carting on the basis of truck measurements (volume of truck reduced by 30% for voids).	50	m^3	270	13 500
2680	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.10.5	"Transporting and disposing the SURPLUS EARTH AND DEBRIS including shrubs and vegetations from construction areas to areas ANYWHERE OUTSIDE THE PLANT BOUNDARY, including re-excavating the deposited soil excavated earlier, loading, transportation, unloading, laying at all depths and heights, stacking, levelling and dressing both the area (viz. from where the earth is transported and where it is deposited) to required levels and slopes complete with all lifts as directed. For carting on the basis of truck measurements (volume of truck reduced by 30% for voids). DISPOSAL AREAS OUTSIDE PLANT BOUNDARY TO BE ARRANGED BY THE CONTRACTOR. Royalty as applicable for disposal outside plant limits to be borne by the Contractor. "	50	m^3	340	17 000
2681	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.11	Transportation of ROCK material				
2682	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.11.1	Transportation of ROCK material coming out of operation of item Nos. 01CS.1.2 to 01CS.1.5 BEYOND INITIAL LEAD OF 100M AND UPTO 1KM to the area of disposal including loading, unloading, laying at all depths and heights, stacking, spreading, levelling at an area of disposal as directed. For carting on the basis of Truck Measurements (volume of truck reduced by 50% for voids).	180	m^3	320	57 600
2683	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.11.2	Transportation of ROCK material coming out of operation of item Nos. 01CS.1.2 to 01CS.1.5 beyond initial LEAD OF 1.0KM AND UPTO & INCLUSIVE OF 3.0KM to the area of disposal including loading, unloading, laying at all depths and heights, stacking, spreading, levelling at an area of disposal as directed. For carting on the basis of Truck Measurements (volume of truck reduced by 50% for voids).	180	m^3	340	61 200

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2684	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.11.3	Transportation of ROCK material coming out of operation of item Nos. 01CS.1.2 to 01CS.1.5 beyond initial LEAD OF 3.0KM AND UPTO & INCLUSIVE OF 5.0KM to the area of disposal including loading, unloading, laying at all depths and heights, stacking, spreading, levelling at an area of disposal as directed. For carting on the basis of Truck Measurements (volume of truck reduced by 50% for voids).	1440	m^3	380	5 47 200
2685	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.11.4	Transportation of ROCK material coming out of operation of item Nos. 01CS.1.2 to 01CS.1.5 beyond initial LEAD OF 5.0KM AND UPTO the area of disposal ANYWHERE WITHIN THE PLANT BOUNDARY including loading, unloading, laying at all depths and heights, stacking, spreading, levelling at an area of disposal as directed. For carting on the basis of Truck Measurements (volume of truck reduced by 50% for voids).	10	m^3	410	4 100
2686	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.14	Earthwork Manual Excavation in SOIL				
2687	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.14.1	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth upto 1.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m^3	690	6 900
2688	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.14.2	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth beyond 1.5m and upto and inclusive of 3.0m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m^3	790	7 900

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2689	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.14.3	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth beyond 3.0m and upto & inclusive of 4.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m^3	900	9 000
2690	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.15	Earthwork Manual Excavation in SOFT ROCK				
2691	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.15.1	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth upto 1.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m^3	1 630	16 300
2692	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.15.2	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth beyond 1.5m and upto & inclusive of 3.0m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m^3	1 820	18 200
2693	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.15.3	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth beyond 3.0m and upto & inclusive of 4.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m^3	2 020	20 200

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2694	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.16	TRIAL PIT in Soil				
2695	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.16.1	Excavation of TRIAL PITS by Manual Means for determining the underground facilities in all type of soils for a depth upto 1.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes (if required), disposal or stacking of excavated material within a lead of 100m, dewatering of accumulated water from any source, keeping the surface dry for subsequent works, barricading the area, preparing location & depth wise record of underground facilities and restoration of trial pits by excavated earth to original condition by compacting/ ramming the soil, etc. all complete as directed by Engineer-in-Charge including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables, etc., but excluding shoring and strutting.	25	cum	670	16 750
2696	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.16.2	Excavation of TRIAL PITS by Manual Means for determining the underground facilities in all type of soils for a depth beyond 1.5m and upto 3.0m, including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes (if required), disposal or stacking of excavated material within a lead of 100m, dewatering of accumulated water from any source, keeping the surface dry for subsequent works, barricading the area, preparing location & depth wise record of underground facilities and restoration of trial pits by excavated earth to original condition by compacting/ ramming the soil, etc. all complete as directed by Engineer-in-Charge including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables, etc., but excluding shoring and strutting.	25	cum	770	19 250
2697	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.1.16.3	Excavation of TRIAL PITS by Manual Means for determining the underground facilities in all type of soils for a depth beyond 3.0m and upto 4.5m, including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes (if required), disposal or stacking of excavated material within a lead of 100m, dewatering of accumulated water from any source, keeping the surface dry for subsequent works, barricading the area, preparing location & depth wise record of underground facilities and restoration of trial pits by excavated earth to original condition by compacting/ ramming the soil, etc. all complete as directed by Engineer-in-Charge including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables, etc., but excluding shoring and strutting.	10	cum	880	8 800
2698	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2	PLAIN & REINFORCED CEMENT CONCRETE: (REFER SPECIFICATION NO. 6-68-0004)				
2699	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.17	PCC - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2700	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.17.1	Providing and laying PLAIN CEMENT CONCRETE for all depths below and upto plinth level in foundations, drains, fillings, non-suspended floors, pavements & ramps or any other works etc. including shuttering, tamping, ramming, vibrating, curing etc. all as specified in any shape, position, thickness and finishing the top surface rough or smooth as specified and directed all complete for concrete of nominal mix 1:5:10 by mass (1 Cement: 5 Coarse Sand: 10 Crushed Stone Aggregates/Gravels) with 40mm and down size graded crushed stone aggregates/Gravels. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	140	m^3	6 750	9 45 000
2701	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.17.5	Providing and laying PLAIN CEMENT CONCRETE of nominal mix 1:3:6 by mass (1 Cement : 3 Sand : 6 Crushed Stone Aggregates) with 10mm and down size graded crushed stone aggregates below and upto plinth level as SCREED in trenches, floor slabs, sumps, channels, drains etc. for all depths including shuttering, tamping, curing etc. as specified in any shape, level, thickness, position and finishing the top surface smooth etc. all complete as directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	7 380	7 380
2702	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.17.6	Providing and laying PLAIN CEMENT CONCRETE of nominal mix 1:3:6 by mass (1 Cement : 3 Sand : 6 Crushed Stone Aggregates) with 10mm and down size graded crushed stone aggregates above plinth level as SCREED in floor slabs, roofs, chajjas, canopies, gutters etc. for all heights including shuttering, tamping, curing etc. as specified in any shape, level, thickness, position and finishing the top surface smooth etc. all complete as directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	8 400	8 400
2703	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.17.7	Providing and laying PLAIN CEMENT CONCRETE for all depths below and upto plinth level in foundations, drains, fillings, non-suspended floors, pavements & ramps or any other works etc. including shuttering, tamping, ramming, vibrating, curing, etc. all as specified in any shape, position, thickness and finishing the top surface rough or smooth as specified and directed all complete for concrete grade M15 with 20mm and down size graded crushed stone aggregates/Gravels. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	50	m^3	8 030	4 01 500
2704	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.17.8	Providing and laying PLAIN CEMENT CONCRETE for all depths below and upto plinth level in foundations, drains, fillings, non-suspended floors, pavements & ramps or any other works etc. including shuttering, tamping, ramming, vibrating, curing, etc. all as specified in any shape, position, thickness and finishing the top surface rough or smooth as specified and directed all complete for concrete grade M20 with 20mm and down size graded crushed stone aggregates/Gravels. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	30	m^3	8 860	2 65 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2705	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.18	RCC Substrutures - Non FIM Items				
2706	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.18.16	Providing and laying REINFORCED CEMENT CONCRETE OF M-25 GRADE with 20 mm and down size graded crushed stone aggregates/ gravel in SUB-STRUCTURE e.g. foundations, raft, beams, slabs, pile caps, retaining walls, dyke walls, jambs, counterforts, buttresses, pedestals, pipe sleepers, columns, suspended floors, staircases, landings, steps, brackets etc., including equipment/ machine foundations & pedestals viz. compressors, ID & FD fans, pumps, generators, crushers, mills, etc., (including single pour concreting as specified on the drawing), applying cement wash on concrete surface (wherever no other surface application is specified), providing pockets, openings, recesses, chamfering, etc., wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT, SHUTTERING & SPECIFIED ADMIXTURES) for all depths below and upto plinth level in any shape, position and thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1150	m^3	9 740	1 12 01 000
2707	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.18.17	Providing and laying REINFORCED CEMENT CONCRETE OF M-30 GRADE with 20 mm and down size graded crushed stone aggregates/ gravel in SUB-STRUCTURE e.g. foundations, raft, beams, slabs, pile caps, retaining walls, dyke walls, jambs, counterforts, buttresses, pedestals, pipe sleepers, columns, suspended floors, staircases, landings, steps, brackets etc., including equipment/ machine foundations & pedestals viz. compressors, ID & FD fans, pumps, generators, crushers, mills, etc., (including single pour concreting as specified on the drawing), applying cement wash on concrete surface (wherever no other surface application is specified), providing pockets, openings, recesses, chamfering, etc., wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT, SHUTTERING & SPECIFIED ADMIXTURES) for all depths below and upto plinth level in any shape, position and thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	160	m^3	9 970	15 95 200

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2708	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.18.21	Providing and laying REINFORCED CEMENT CONCRETE OF M-25 GRADE with 20 mm and down size graded crushed stone aggregates/ gravel in SUB-STRUCTURE e.g. trenches, culverts, manholes, pipe encasement, catchpits, drains, pits, etc., applying cement wash on concrete surface (wherever no other surface application is specified), providing pockets, openings, recesses, chamfering, etc., wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT, SHUTTERING & SPECIFIED ADMIXTURES) for all depths below and upto plinth level in any shape, position and thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m³	10 230	10 230
2709	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.19	RCC Superstructures - Non FIM Items				
2710	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.19.16	Providing and laying REINFORCED CEMENT CONCRETE OF M-25 GRADE with 20 mm and down size graded crushed stone aggregates/ gravel in SUPER STRUCTURE in suspended floors, slabs, beams, columns, walls including counterforts, staircases, landings, steps, facias, fins, mouldings, gutters, shelves, window sills, canopies, lintels, girders, ducts, brackets, chajjas with drip moulds, pedestals, posts, struts, equipment/ machine foundations, ramps etc. (including single pour concreting as specified on the drawing), providing cement wash (wherever no other surface application is specified), providing pockets, openings, recesses, chamfering wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT, SHUTTERING AND SPECIFIED ADMIXTURES) FOR ALL HEIGHTS UPTO & INCLUSIVE OF 20 m ABOVE PLINTH LEVEL in any shape, position, thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	100	m³	10 640	10 64 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2711	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.19.21	Providing and laying REINFORCED CEMENT CONCRETE OF M-25 GRADE with 20 mm and down size graded crushed stone aggregates/ gravel in SUPER STRUCTURE in suspended floors, slabs, beams, columns, walls including counterforts, staircases, landings, steps, facias, fins, mouldings, gutters, shelves, window sills, canopies, lintels, girders, ducts, brackets, chajjas with drip moulds, pedestals, posts, struts, equipment/ machine foundations, ramps etc. (including single pour concreting as specified on the drawing), providing cement wash (wherever no other surface application is specified), providing pockets, openings, recesses, chamfering wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT, SHUTTERING AND SPECIFIED ADMIXTURES) FOR ALL HEIGHTS MORE THAN 20 m ABOVE PLINTH LEVEL in any shape, position, thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	11 700	11 700
2712	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.20	RCC Flooring - Non FIM Items				
2713	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.20.2	Providing and laying REINFORCED CEMENT CONCRETE OF M-20 GRADE with 20mm and down size graded crushed stone aggregates / gravel in NON-SUSPENDED slabs / pavement slabs including pedestals, ramps etc. leaving pockets, laying in alternate panels to required slopes, all necessary form work and finishing the top surface rough or smooth, including cost of admixtures if used, providing pockets, openings, recesses, chamfering etc., wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT AND SHUTTERING) for all depths below and upto plinth level in any shape, position and thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	8 290	8 290
2714	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.22	Precast Elements - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2715	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.22.4	Manufacturing, transporting, supplying and erecting in position Reinforced Cement Concrete PRECAST ELEMENTS such as columns, beams, cover slabs, lintels, louvers, fins, shelves etc. of M-25 grade with 20mm and down size graded crushed stone aggregates/gravel, each unit upto and inclusive of 500 kg. for all leads, levels, shapes and thickness including all moulds, shuttering and centering, vibrating, tamping, curing, chamfering wherever required, finishing the top surface with cement mortar 1:3 (1 Cement : 3 Sand) to give a smooth and even surface, or non skid finish as specified, providing lifting hooks, metal inserts, making holes pockets, (ONLY M.S. INSERTS TO BE MEASURED & PAID SEPARATELY) transporting to site, erecting, levelling, aligning and fixing in position with cement mortar 1:3 (1Cement : 3 Coarse Sand), breaking bricks and/or concrete surfaces and making good the same etc. all complete (EXCLUDING THE COST OF REINFORCEMENT) and as directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	19 430	19 430
2716	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.22.5	Manufacturing, transporting, supplying and erecting in position Reinforced Cement Concrete PRECAST ELEMENTS such as columns, beams, cover slabs, lintels, louvers, fins, shelves etc. of M-25 grade with 20mm and down size graded crushed stone aggregates/gravel, each unit beyond 500 kg and upto and inclusive of 1000 kg. for all leads, levels, shapes and thickness including all moulds, shuttering and centering, vibrating, tamping, curing, chamfering wherever required, finishing the top surface with cement mortar 1:3 (1 Cement : 3 Sand) to give a smooth and even surface, or non skid finish as specified, providing lifting hooks, metal inserts, making holes pockets, (ONLY M.S. INSERTS TO BE MEASURED & PAID SEPARATELY) transporting to site, erecting, levelling, aligning and fixing in position with cement mortar 1:3 (1Cement : 3 Coarse Sand), breaking bricks and/or concrete surfaces and making good the same etc. all complete (EXCLUDING THE COST OF REINFORCEMENT) and as directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	19 480	19 480

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2717	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.22.6	Manufacturing, transporting, supplying and erecting in position Reinforced Cement Concrete PRECAST ELEMENTS such as columns, beams, cover slabs, lintels, louvers, fins, shelves etc. of M-25 grade with 20mm and down size graded crushed stone aggregates/gravel, each unit beyond 1000 kg and upto and inclusive of 2000 kg. for all leads, levels, shapes and thickness including all moulds, shuttering and centering, vibrating, tamping, curing, chamfering wherever required, finishing the top surface with cement mortar 1:3 (1 Cement : 3 Sand) to give a smooth and even surface, or non skid finish as specified, providing lifting hooks, metal inserts, making holes pockets, (ONLY M.S. INSERTS TO BE MEASURED & PAID SEPARATELY) transporting to site, erecting, levelling, aligning and fixing in position with cement mortar 1:3 (1Cement : 3 Coarse Sand), breaking bricks and/or concrete surfaces and making good the same etc. all complete (EXCLUDING THE COST OF REINFORCEMENT) and as directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	19 630	19 630
2718	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.23	HYD Bars / MS Bars - Non FIM Items				
2719	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.23.8	Supplying and placing in position HIGH YEILD-STRENGTH DEFORMED STEEL BARS REINFORCEMENT of Grade Fe500D (TMT) conforming to IS:1786, for RCC work including transporting the Steel, straightening, cleaning, decoiling, cutting, bending to required shapes and lengths as per details, binding with 18 SWG black soft annealed binding wire at every intersection, supplying and placing with proper cover blocks, supports, chairs, overlaps, welding, spacers, fanhooks etc. for all heights and depths etc. all complete as directed. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	180	MT	94 290	1 69 72 200
2720	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.24	Conc. Encasing - Non FIM Items				
2721	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.24.3	Providing and laying Reinforced Cement Concrete of grade M-25 with 20mm and down size graded stone aggregates for ENCASING OF STRUCTURAL STEEL WORK including chamfering wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (excluding the cost of Reinforcement and Shuttering) for all heights and depths in any shape, position, and thickness etc. all complete as specified and shown. Cement. All materials supplied by the contractor.	10	m^3	9 470	94 700
2722	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.25	Centering and Shuttering - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2723	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.25.1	Providing and fixing CENTERING AND SHUTTERING in foundations, footings,raft beams, slabs, pile caps, retaining walls, jambs, counter-forts, buttresses, trenches, equipment/machine foundations, pedestals, abutments, pipe sleepers, columns, plinth beams, lintels, suspended slabs, beams, staircases, landings, steps, non-circular tunnels/bunkers/ silos/ shafts/ hoppers/liquid storage structures etc. for all depths below and upto & inclusive of plinth level including shuttering for single pour concreting, strutting, bracing, propping etc., keeping the same in position during concreting and removal of the same after specified period etc. for Straight/ Inclined Shuttering, keeping necessary provision for inserts, projecting dowels, anchor bolts or any other fixture etc. all complete and as specified and directed.	4200	m²	420	17 64 000
2724	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.25.2	Providing and fixing CENTERING AND SHUTTERING in superstrctures in retaining walls, jambs, counter-forts, buttresses, equipment/ machine foundations, abutments,columns, lintels, suspended slabs, beams, staircases, landings, steps, non-circular tunnels/ bunkers/ silos/ shafts/ hoppers/ liquid storage structures etc. for all heights above plinth level including shuttering for single pour concreting, strutting, bracing, propping etc., keeping the same in position during concreting and removal of the same after specified period etc. for Straight/ Inclined Shuttering, keeping necessary provision for inserts, projecting dowels, anchor bolts or any other fixture etc. all complete and as specified and directed.	450	m²	760	3 42 000
2725	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.26	Expansion joints - Non FIM Items				
2726	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.26.1	Providing 20mm wide EXPANSION JOINTS in flooring and pavement slabs and ISOLATION JOINTS around equipment foundations/columns/pedestal/trenches etc. including cleaning the joints of all loose material, filling clean sand for the full depth of slab (upto and inclusive of 300 mm) except for 12mm depth from top and sealing the top 12mm with approved two part liquid polysulphide Sealing Compound as per IS:12118 etc. all complete as shown, specified and directed.	1	m	570	570
2727	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.26.2	Supplying and fixing in position 25mm thick BITUMEN IMPREGNATED FIBRE BOARD conforming to IS:1838 of approved quality in expansion joints at all locations and levels in concrete structures etc. all complete as shown, specified and directed.	1	m²	1 870	1 870
2728	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.26.3	Supplying and fixing in position 50 mm (2X25 mm) thick BITUMEN IMPREGNATED FIBRE BOARD conforming to IS:1838 of approved quality in expansion joints at all locations and levels in concrete structures etc. all complete as shown, specified and directed.	1	m²	2 220	2 220
2729	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.26.4	Supplying and sealing EXPANSION JOINTS 25 mm wide and 12mm deep at all locations and levels in Concrete Structures with approved two part liquid POLYSULPHIDE SEALING COMPOUND as per IS:12118 including raking of joints etc. all complete as shown, specified and directed.	1	m	500	500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2730	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.26.5	Supplying and sealing EXPANSION JOINTS 50 mm wide and 12mm deep at all locations and levels in Concrete Structures with approved two part liquid POLYSULPHIDE SEALING COMPOUND as per IS:12118 including raking of joints etc. all complete as shown, specified and directed.	1	m	630	630
2731	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.28	Mechanical Rebar Couplers - Non-FIM items				
2732	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.28.3	"Supplying and fixing MECHANICAL REBAR COUPLER of approved make for jointing high strength deformed steel reinforcement bars of Grade Fe500D (conforming to IS:1786) of dia. upto and inclusive of 25 mm at all levels & locations including testing as per manufacturer's recommendations, adjusting etc. all complete as specified and directed. "	10	each	290	2 900
2733	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.28.4	"Supplying and fixing MECHANICAL REBAR COUPLER of approved make for jointing high strength deformed steel reinforcement bars of Grade Fe500D (conforming to IS:1786) of dia. above 25 mm at all levels & locations including testing as per manufacturer's recommendations, adjusting etc. all complete as specified and directed. "	10	each	370	3 700
2734	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.29	Fixing Re-bars in already cast concrete - Non FIM Items				
2735	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.29.1	Designing, supplying and fixing rebars in already cast concrete, including drilling, cleaning hole with air blow-out & wire-brush and injecting odourless Chemical of approved make, packed in dual foil, with the help of dispenser into a hole of diameter and depth as per manufacture specification, at all levels & locations for high strength deformed steel reinforcement bars of dia. upto 12 mm of Grade Fe500D (conforming to IS:1786), DESIGNED FOR FULL TENSILE ANCHORAGE, including testing (as per manufacturer's recommendations), adjusting and making good any damage done to the structure etc. all complete as specified and directed. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE EXCLUDING REINFORCEMENT BARS.	50	each	1 060	53 000
2736	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.29.2	Designing, supplying and fixing rebars in already cast concrete, including drilling, cleaning hole with air blow-out & wire-brush and injecting odourless Chemical of approved make, packed in dual foil, with the help of dispenser into a hole of diameter and depth as per manufacture specification, at all levels & locations for high strength deformed steel reinforcement bars of dia. 16 mm & 20 mm of Grade Fe500D (conforming to IS:1786), DESIGNED FOR FULL TENSILE ANCHORAGE, including testing (as per manufacturer's recommendations), adjusting and making good any damage done to the structure etc. all complete as specified and directed. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE EXCLUDING REINFORCEMENT BARS.	100	each	1 140	1 14 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2737	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.2.29.3	Designing, supplying and fixing rebars in already cast concrete, including drilling, cleaning hole with air blow-out & wire-brush and injecting odourless Chemical of approved make, packed in dual foil, with the help of dispenser into a hole of diameter and depth as per manufacture specification, at all levels & locations for high strength deformed steel reinforcement bars of dia. 25 mm & 28 mm of Grade Fe500D (conforming to IS:1786), DESIGNED FOR FULL TENSILE ANCHORAGE, including testing (as per manufacturer's recommendations), adjusting and making good any damage done to the structure etc. all complete as specified and directed. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE EXCLUDING REINFORCEMENT BARS.	100	each	1 420	1 42 000
2738	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4	STRUCTURAL STEEL WORKS SPEC NO. 6-68-0006				
2739	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.1	General Steel Works - FIM Items				
2740	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.1.5	Transporting from storage yard (or any other location as specified by engineer-in-charge), Storing, Assembling and Erecting in position and testing/ examining, bolted and/ or welded, already Fabricated STRUCTURAL STEEL (of any Grade) at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled/ hollow sections and/or plates/ bent plates in all types of structural frameworks, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified etc., all complete. ALREADY FABRICATED STRUCTURAL STEEL SHALL (WITH CONNECTION BOLTS) BE PROVIDED TO CONTRACTOR FREE OF COST. SUPPLY OF ALL OTHER MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	17 320	17 320
2741	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.1.6	Transporting from storage yard (or any other location as specified by engineer-in-charge), Storing, Assembling and Erecting in position and testing/ examining, bolted and/ or welded, already Fabricated STRUCTURAL STEEL (of any Grade) at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled/ hollow sections and/or plates/ bent plates in all types of structural frameworks, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified etc., all complete. ALREADY FABRICATED STRUCTURAL STEEL SHALL (WITH CONNECTION BOLTS) BE PROVIDED TO CONTRACTOR FREE OF COST. SUPPLY OF ALL OTHER MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	27 600	27 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2742	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.1.9	Modification and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS ALREADY FABRICATED BY OTHERS, including all builtup/ compound sections made out of rolled/ hollow sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos,bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding etc., all complete as specified and directed. SUPPLY OF ALL OTHER MATERIAL (OTHER THAN ALREADY FABRICATED STRUCTURAL STEEL) IN CONTRACTOR'S SCOPE.	1	MT	45 110	45 110
2743	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.1.51	Unloading and proper stacking of already fabricated structural steel (including all builup sections/ compound sections made out of rolled/ hollow sections and/ or plates/ bent plates in all types of structural frameworks, horizontal and inclined hand rails and electroforged galvanised gratings etc.) supplied & transported to site/ unloading location by the supplier, at designated location(s) as specified and directed by engineer-in-charge. SUPPLY OF ALL MACHINERY, MATERIALS, TOOLS & TACKLES, MANPOWER IS IN CONTRACTOR'S SCOPE.	400	MT	3 390	13 56 000
2744	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.1.MF1307	Dismantling, modification & re-erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS ALREADY ERECTED BY OTHERS at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, repair of damaged portion of primer as per Sl No 3.1 of Table 3 of Standard Specification for Surface Preparation and Protective Coating Document No. 6-79-0020 (or as per Job Specification, wherever applicable), grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified etc., all complete. SUPPLY OF ALL OTHER MATERIAL (OTHER THAN ALREADY ERECTED STRUCTURAL STEEL) IN CONTRACTOR'S SCOPE.	1	MT	55 470	55 470

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2745	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.1.MF1308	Dismantling, modification & re-erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS ALREADY ERECTED BY OTHERS at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, repair of damaged portion of primer as per Sl No 3.1 of Table 3 of Standard Specification for Surface Preparation and Protective Coating Document No. 6-79-0020 (or as per Job Specification, wherever applicable), grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified etc., all complete. SUPPLY OF ALL OTHER MATERIAL (OTHER THAN ALREADY ERECTED STRUCTURAL STEEL) IN CONTRACTOR'S SCOPE.	1	MT	64 350	64 350
2746	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.1.MF1315	Transporting, Assembling and Erecting in position bolted and/ or welded already fabricated Structural Steel works (of any Grade) at all levels & locations, comprising of rolled/ built-up sections made of joists, channels, angles, flats rounds, plates cut and/ or bent to any shape and size, in beams, girders, trusses columns, brackets, bracings, ladders (with or without cage), safety chain brackets, staircases, handrailings and platforms of any shape and size (including chequered plates/ gratings), on vertical and/ or horizontal equipments, in miscellaneous valve operating platforms, pipe supports etc, fixing in line and level with temporary staging and removal of the same after erection, grouting below base plates with free flow non shrink/ ordinary grout as specified to bring them to required levels, all complete as shown, specified and directed. ALREADY FABRICATED STRUCTURAL STEEL SHALL (WITH CONNECTION BOLTS) BE PROVIDED TO CONTRACTOR FREE OF COST. SUPPLY OF ALL OTHER MATERIAL IN CONTRACTOR'S SCOPE.	400	MT	41 560	1 66 24 000
2747	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.3	General Steel Works - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2748	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.3.MF1303	Supplying, transporting, storing, fabricating & erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E250BR / E250B0 (confirming to IS:2062) at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer(1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 31 770	1 31 770
2749	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.3.MF1304	Supplying, transporting, storing, fabricating & erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E250BR / E250B0 (confirming to IS:2062) at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 42 100	1 42 100

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2750	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.3.MF1305	Supplying, Fabricating at CONTRACTOR's shop outside the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining , bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E250BR / E250B0 (conforming to IS:2062 at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer(1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT) , as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 29 340	1 29 340

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2751	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.3.MF1306	Supplying, Fabricating at CONTRACTOR's shop outside the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining , bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E250BR / E250B0 (conforming to IS:2062 at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT) , as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 39 820	1 39 820

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2752	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.3.MF1313	Supplying, transporting, storing, fabricating & erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E350BR / E350B0 (conforming to IS:2062) at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/ or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 30 490	1 30 490
2753	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.3.MF1314	Supplying, transporting, storing, fabricating & erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E350BR / E350B0 (conforming to IS:2062) at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 40 960	1 40 960

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2754	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.3.MF1315	Supplying, Fabricating at CONTRACTOR's shop outside the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining , bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E350BR / E350B0 (conforming to IS:2062 at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL including all builtup sections/ compound sections made out of rolled sections and/ or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc.. all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	600	MT	1 36 930	8 21 58 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2755	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.3.MF1316	Supplying, Fabricating at CONTRACTOR's shop outside the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining , bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E350BR / E350B0 (conforming to IS:2062 at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL including all builtup sections/ compound sections made out of rolled sections and/ or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc.. all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	300	MT	1 47 230	4 41 69 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2756	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.3.MF1333	Supplying, Fabricating, Transporting and Erecting in position bolted and/ or welded Structural Steel works of Grade E250BR/ E250B0 (confirming to IS:2062) at all levels & locations, comprising of rolled/ built-up sections made of joists, channels, angles, flats rounds, plates cut and/ or bent to any shape and size, in beams, girders, trusses columns, brackets, bracings, ladders (with or without cage), safety chain brackets, staircases, handrailings and platforms of any shape and size (excluding chequered plates/ gratings), on vertical and/ or horizontal equipments, in miscellaneous valve operating platforms, pipe supports etc, including preparation and submission of all fabrication and as built drawings to the Engineer-in-Charge, straightening, cutting and/ or bending the steel to required size/ shape, edge preparation, preheating, bolting, welding of joints (including sealing of joints of box sections with continuous welding wherever shown), grinding the prepared edges/ surfaces to a smooth finish, fixing in line and level with temporary staging and removal of the same after erection, grouting below base plates with free flow non shrink/ ordinary grout as specified to bring them to required levels, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT) as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication, removing from site of work all scrap/ unserviceable steel etc, all complete as shown, specified and directed.	1	MT	1 32 050	1 32 050
2757	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.4	Painting - Non FIM Items				
2758	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.4.MF1310	Supplying and applying COATING (Post-erection/ Field) of approved quality and shade as per Sl. No. 6.2 of Table 6 of EIL Specification No. 6-79-0020 (or as per Job Specifications, wherever applicable) over the coat of shop primer already applied, including storage, surface preparation, degreasing, cleaning, drying, providing necessary arrangement for access, testing etc. including touching up of shop primer coat as per Sl. No. 3.1 of Table 3 of EIL Specification No. 6-79-0020 (or as per Job Specifications, wherever applicable), for steel structures (excluding hand rails) at all location & levels, all complete as specified, in OFFISTE (COASTAL) areas as well as UNIT (INLAND & COASTAL) areas. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE. (Unit rate based on Structural steel weight).	13500	MT	17 660	23 84 10 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2759	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.4.MF1311	Supplying and applying COATING (Post-erection/ Field) of approved quality and shade as per Sl. No. 4.1 of Table 4.0 of EIL Specification No. 6-79-0020 (or as per Job Specifications, wherever applicable) for painting(including primer) over the galvanisation already applied, including storage, surface preparation, degreasing, cleaning, drying, providing necessary arrangement for access, testing etc. including touching up of galvanisation (as per notes of table 4 of EIL specification no. 6-79-0020 or as per Job Specification, wherever applicable), for HAND RAILS at all location & levels, all complete as specified. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE. (Unit rate based on weight of steel).	200	MT	14 650	29 30 000
2760	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.4.MF1313	Supplying and applying COATING (Post erection/Field) of approved quality and shade as per Sl. no. 6.2 of Table 6 of EIL Specification No. 6-79-0020 (or as per Job Specifications, wherever applicable) over the damaged area requiring repair/rectification, including storage, surface preparation as per ST.2, degreasing, cleaning, drying, providing necessary arrangement for access, testing etc., for all steel structures (excluding handrails) at all location & levels all complete as specified, in OFFISTE (COASTAL) areas as well as UNIT (INLAND & COASTAL) areas. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE. (Unit rate based on surface area in Sqm)	50	m²	630	31 500
2761	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.4.4.MF1314	Supplying and applying COATING (Post-erection/ Field) of approved quality and shade as per Sl. no. 4.1 of Table 4 of EIL Specification No. 6-79-0020 (or as per Job Specifications, wherever applicable) over the damaged area requiring repair/rectification, including storage, surface preparation as per ST.2, degreasing, cleaning, drying, providing necessary arrangement for access, testing etc. for HANDRAIL at all location & levels, all complete as specified. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE. (Unit rate based on surface area in Sqm)	25	m²	500	12 500
2762	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.5	STRUCTURAL STEEL WORKS (TUBULAR/HOLLOW SECTION) (REFER SPECIFICATION NO.6-68-0007)				
2763	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.5.9	Yst 355 IS 4923				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2764	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.5.9.MF1303	Supplying, transporting, storing, fabricating, erecting in position & testing/examining at all locations and levels, bolted and/or welded STRUCTURAL STEEL WORKS of all types using "COLD FORMED (RECTANGULAR/SQUARE) HOLLOW SECTIONS conforming to IS: 4923, Grade Yst-355 of approved make" in all type of trusses, purlins, girders, side rails, columns, runners, beams, ties, portals, framework, bracing, brackets, sag rods etc. including all handling straightening/bending if required, cutting to required size & shape, edge preparation, welding & bolting of joints, providing and fixing end caps and plugging holes, fixing in line and level with necessary temporary staging and removal of the same after erection, grouting with Ordinary/ premix free flow Non-Shrink Grout as specified, preparation and submission of detailed fabrication drawings, preparing the exposed surfaces for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) etc. all complete as specified and directed (SUPPLY OF ALL MATERIALS INCLUDING PLATES IN CONTRACTOR'S SCOPE).	800	MT	1 56 940	12 55 52 000
2765	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6	MISCELLANEOUS STEEL WORKS SPECIFICATIONS NO. 6-68-0008				
2766	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.1	Anchor Bolts - FIM Items				
2767	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.1.2	Fixing and keeping in position at all levels and locations already fabricated THREADED ANCHOR BOLTS of all diameters and nomenclature supplied by the owner as Free Issue including nuts, washers, anchor plates, pipe sleeves etc. in foundations, columns, pedestals, slabs, beams, walls etc. or any other place as directed including transporting the same from owner's store/issue points to site of work handling , straightening if required, turning from relevant size M.S. rounds to required diameter, threading, welding, providing necessary templates and auxiliary dummy structures, if any, necessary tying and welding with reinforcement, adjustment of shuttering & reinforcement/any other fixture, greasing exposed metal surfaces, covering bolts and packing the sleeves with jute cloth etc. all complete as specified and directed. (BOLTS SHALL BE SUPPLIED BY THE OWNER AS FREE ISSUE) .	0.5	MT	30 400	15 200
2768	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.15	Anchor Bolts - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2769	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.15.1	Supplying, fabricating, fixing and keeping in position at all levels and locations THREADED ANCHOR BOLTS of all diameters and nomenclature including nuts, washers, anchor plates, pipe sleeves etc. in foundations, columns, pedestals, slabs, beams, walls etc. or any other place as directed including handling & transporting, straightening if required, turning from relevant size M.S. rounds to required diameter, threading, welding, providing necessary templates and auxiliary dummy structures, if any, necessary tying and welding with reinforcement, adjustment of shuttering & reinforcement/any other fixture, greasing exposed metal surfaces, covering bolts and packing the sleeves with jute cloth etc. all complete as specified and directed.(SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	15	MT	1 37 670	20 65 050
2770	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.16	MS Metal Inserts - Non FIM Items				
2771	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.16.1	Supplying, transporting, storing, fabricating and fixing in position M.S. METAL INSERT (with lugs) of any shape made out of flats, plates, rolled sections, pipes etc. providing necessary templates, staging, cutting, straightening, if required, bolting, welding as required and embedding in position on both Plain and Reinforced Cement concrete members inclusive of adjusting shuttering & reinforcement/ any other fixture, welding where necessary, tying and holding to correct level, line and position, any auxiliary dummy structures to support the heavy inserts, painting exposed surfaces with a coat of primer as per EIL Specification No. 6-79-0020 (or as per Job Specification wherever applicable), etc. all complete for all depths and heights as specified and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	9	MT	1 44 410	12 99 690
2772	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.17	GI Pipe Sleeves - Non FIM Items				
2773	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.17.1	Supplying, fabricating and fixing in position G.I. PIPE SLEEVES of all diameters including providing necessary staging, cutting, straightening if required, bolting, welding as required and embedding in position on both Plain and Reinforced Cement concrete members inclusive of adjusting shuttering & reinforcement/any other fixture, welding where necessary, tying and holding to correct level, line and position, any auxiliary dummy structures to support heavy sleeves etc. all complete for all depths and heights as specified and directed.	0.1	MT	1 31 700	13 170
2774	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.18	MS Chequered Plates - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2775	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.18.1	Supplying, fabricating and erecting in position at all levels and locations bolted, screwed and/or welded M.S. CHEQUERED PLATES of any thickness in walkways, platforms, stair treads, any other place as directed etc. including cutting to required size, shape, making holes, notches, openings of required size, nosing, straightening if required, making the edges smooth, removing the burrs, fixing, welding, preparation and submission of fabrication drawings and preparing the surfaces for painting and applying shop primer as per EIL Specification No. 6-79-0020 (or Job Specification, wherever applicable) after fabrication etc. all complete as specified and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	0.5	MT	1 41 500	70 750
2776	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.19	MS Grating Cat. A,B - Non FIM Items				
2777	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.19.6	Supplying, fabricating and erecting in position at all levels and locations ELECTROFORGED HOT-DIP GALVANISED GRATING (purchased from approved manufacturer by the Contractor) conforming to EIL Standard No. 7-68-0697 (in walkways, platforms, stair treads etc.) including cutting to required size, shape, making holes, notches, openings of required size, nosing, straightening if required, making the edges smooth, removing the burrs, fixing with manufacturer's supplied Hot-dip galvanised clamps, preparation and submission of fabrication drawings, all complete as specified and directed. SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE.	135	MT	1 38 560	1 87 05 600
2778	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.19.7	Making openings in galvanized grating for pipes / ducts etc., at all levels and at at all locations by cutting the existing grating and providing 50x6 galvanised flat as toe protection for the openings by welding and application of galvanized paint as per EIL Standard No. 7-68-0697, all complete. Payment shall be made as per number of openings.	1000	each	1 460	14 60 000
2779	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.22	MS Rungs - Non FIM Items				
2780	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.22.1	Supplying, fabricating, fixing and keeping in position M.S. RUNGS in R.C.C. works at all depths and heights including handling, transporting the steel to site workshop and site of work, straightening, if required, cutting, bending to shape, necessary tying and welding with reinforcement, adjustment of shuttering, cleaning, surface preparation, shop primer as per EIL Spec. 6-79-0020 (or Job Specification, wherever applicable) and two coats of anticorrosive paint of approved quality on the exposed portion of rungs etc. all complete as specified and directed (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	200	kg	100	20 000
2781	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.23	Hand Railing 1000mm - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2782	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.23.2	Supplying, fabricating and fixing in position (to already erected vertical posts for Hand Railing) at all locations ONLY TOP RAIL 32mm nominal diameter medium grade M.S. Tubes conforming to IS:1239 including straightening if required, cutting, welding, bending, surface preparation, shop primer as per EIL SPEC. 6-79-0020 (or as per Job Specification, wherever applicable), preparation and submission of fabrication drawings etc. all complete as specified, shown and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	10	m	580	5 800
2783	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.23.MF1301	Supplying, fabricating and fixing in position at all locations 1000mm high INCLINED HAND RAILING (for staircases) consisting of top rail, mid rail and vertical posts (Maximum spacing 1500mm c/c) with 32mm nominal diameter medium grade M.S. Tubes conforming to IS:1239 including straightening if required, cutting, bending, welding, bolting, grouting with ordinary grout, cleaning, surface preparation, hot-dip galvanising as per Sl. No. 4.1 of Table 4 of EIL SPEC. 6-79-0020 (or as per Job Specification, wherever applicable) , preparation and submission of fabrication drawings etc. all complete as specified, shown and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE). (Complete handrail work shall be measured as length of top rail only and not length of each element fixed).	200	metre	1 920	3 84 000
2784	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.23.MF1303	Supplying, fabricating and fixing in position at all locations 1000mm high HORIZONTAL HAND RAILING (for platforms, walkways, etc. or any other location as directed) consisting of top rail, mid rail and vertical posts (Maximum spacing 1500mm c/c) with 32mm nominal diameter medium grade MS Tubes conforming to IS:1239 and 100x5 MS Toe Plate confirming to IS:2062 (Grade A/B), including straightening if required, cutting, bending, welding, bolting, grouting with ordinary grout, cleaning, surface preparation, hot-dip galvanising as per Sl. No. 4.1 of Table 4 of EIL SPEC. 6-79-0020 (or as per Job Specification, wherever applicable), preparation and submission of fabrication drawings etc. all complete as specified, shown and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE). (Complete handrail work shall be measured as length of top rail only and not length of each element fixed).	2200	metre	1 840	40 48 000
2785	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.24	Hand Railing 500mm - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2786	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.24.MF1301	Supplying, fabricating and fixing in position at all locations 500mm HIGH INCLINED HAND RAILING (for stair cases) consisting of top rail & vertical posts (maximum spacing 1500mm c/c) with 32mm nominal diameter medium grade M.S. Tubes conforming to IS:1239 including straightening if required, cutting, bending, welding, surface preparation, hot-dip galvanising as per Sl. No. 4.1 of Table 4 of EIL SPEC. 6-79-0020 (or as per Job Specification, wherever applicable), preparation and submission of fabrication drawings etc. all complete as specified, shown and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE). (Complete handrail work shall be measured as length of top rail only and not length of each element fixed).	5	metre	1 050	5 250
2787	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.24.MF1302	Supplying, fabricating and fixing in position at all locations 500mm high HORIZONTAL HAND RAILING (for platforms, walkways, etc. or any other location as directed) consisting of top rail, mid rail and vertical posts (Maximum spacing 1500mm c/c) with 32mm nominal diameter medium grade MS Tubes conforming to IS:1239 and 100x5 MS Toe Plate confirming to IS:2062 (Grade A/B), including straightening if required, cutting, bending, welding, bolting, grouting with ordinary grout, cleaning, surface preparation, hot-dip galvanising as per Sl. No. 4.1 of Table 4 of EIL SPEC. 6-79-0020 (or as per Job Specification, wherever applicable) , preparation and submission of fabrication drawings etc. all complete as specified, shown and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE). (Complete handrail work shall be measured as length of top rail only and not length of each element fixed).	5	metre	1 010	5 050
2788	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.25	Mechanical Anchor fastners - Non FIM Items				
2789	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.25.1	"Supplying, handling, transporting to site of work and fixing approved MECHANICAL ANCHOR FASTENERS M.S. bolts of Grade 5.8 or more, GALVANIZED with minimum thickness of 5 microns (approved for use in cracked concrete), of 12mm dia at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size, testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush, and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	750	each	490	3 67 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2790	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.25.2	"Supplying, handling, transporting to site of work and fixing approved MECHANICAL ANCHOR FASTENERS M.S. bolts of Grade 5.8 or more, GALVANIZED with minimum thickness of 5 microns (approved for use in cracked concrete), of 16mm dia at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size, testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush, and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	750	each	880	6 60 000
2791	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.26	Chemical Anchor Fastner				
2792	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.26.1	"Supplying, handling, transporting to site of work and fixing approved CHEMICAL ANCHOR FASTENERS consisting of M.S. threaded rod of Grade 5.8, GALVANIZED with minimum thickness of 5 microns and chemical (approved for use in cracked concrete), packed in flexible chemical foil or dual foil type, to be used with the help of dispenser, of 12mm dia. at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size, testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	250	each	1 840	4 60 000
2793	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.26.2	"Supplying, handling, transporting to site of work and fixing approved CHEMICAL ANCHOR FASTENERS consisting of M.S. threaded rod of Grade 5.8, GALVANIZED with minimum thickness of 5 microns and chemical (approved for use in cracked concrete), packed in flexible chemical foil or dual foil type, to be used with the help of dispenser, of 16mm dia. at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size., testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	500	each	2 270	11 35 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2794	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.26.3	"Supplying, handling, transporting to site of work and fixing approved CHEMICAL ANCHOR FASTENERS consisting of M.S. threaded rod of Grade 5.8, GALVANIZED with minimum thickness of 5 microns and chemical (approved for use in cracked concrete), packed in flexible chemical foil or dual foil type, to be used with the help of dispenser, of 20mm dia. at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size., testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	250	each	2 800	7 00 000
2795	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.26.4	"Supplying, handling, transporting to site of work and fixing approved CHEMICAL ANCHOR FASTENERS consisting of M.S. threaded rod of Grade 5.8, GALVANIZED with minimum thickness of 5 microns and chemical (approved for use in cracked concrete), packed in flexible chemical foil or dual foil type, to be used with the help of dispenser, of 24mm dia. at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size., testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	250	each	3 490	8 72 500
2796	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.27	Threaded bolts for equipment fixing-Non FIM				
2797	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.27.1	Supplying, fabricating, fixing and keeping in position at all levels and locations THREADED BOLTS of Grade C property class 4.8 as per IS:1363 (part 2) of all diameters and length including nuts, washers for supporting equipment on steel structure as directed including handling & transporting, straightening if required, turning from relevant size M.S. rounds to required diameter, threading etc. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	2	MT	1 43 600	2 87 200
2798	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.32	Temporary Rain Protection Structure - Non FIM Item				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2799	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.32.1	"Design, supplying, fabricating at Contractor's shop OUTSIDE the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining, bolted and/ or welded STRUCTURAL STEEL WORKS FOR RAIN PROTECTION STRUCTURES, of Grade E250A/ E250BR / E250B0 (conforming to IS:2062) and/ or CFSHS/CFRHS of Grade YSt 310 (conforming to IS:4923) and/ or CFCHS of Grade YSt 310 (conforming to IS:1161) at all locations and levels, including all builtup sections/ compound/ hollow/ tubular sections made out of rolled sections and/ or plates/ bent plates in all types of structural frameworks for protection of covered area against rain, cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, fixing columns of shed on top of existing structures, including providing and fixing pre-coated galvanised steel profile sheets as per IS: 513 (size, shape and pitch of corrugation as approved by Engineer-in-charge) 0.50 mm (+ 0.05 %) total coated thickness with zinc coating 120 gm per sqm as per IS:277 in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns, sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 meter or as desired by Engineer-in-charge. The sheet shall be fixed using self-drilling /self-tapping screws of size (5.5 x 55 mm) with EPDM seal, complete up to any pitch in horizontal/ vertical or curved surfaces and including cutting to size and shape wherever required, including complete Structural design, detailed engineering, preparation of design drawing and calculation, preparation and submission of detailed fabrication drawings, preparing the surface for painting and applying pre-erection/ shop primer as mentioned in SCOPE OF WORK after fabrication etc., AND maintaining the structure during project execution AND dismantling, removing & taking away all materials outside the plant boundary after the completion	25000	m²-mon	760	1 90 00 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2800	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.6.32.2	"Providing sheeting with side runner for covering vertical surface on existing structures. Design, supplying, fabricating at Contractor's shop OUTSIDE the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining, bolted and/ or welded STRUCTURAL STEEL WORKS at all locations and levels, of Grade E250A/ E250BR / E250B0 (conforming to IS:2062) and/ or CFSHS/CFRHS of Grade YSt 310 (conforming to IS:4923) and/ or CFCHS of Grade YSt 310 (conforming to IS:1161) at all locations and levels, including all builtup sections/ compound/ hollow/ tubular sections made out of rolled sections and/ or plates/ bent plates in all types of structural frameworks for covering vertical surface against rain, cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, fixing on existing structures, including providing and fixing pre-coated galvanised steel profile sheets as per IS: 513 (size, shape and pitch of corrugation as approved by Engineer-in-charge) 0.50 mm (+ 0.05 %), total coated thickness with zinc coating 120 gm per sqm as per IS:277 in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns, sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self-drilling /self-tapping screws of size (5.5 x 55 mm) with EPDM seal, complete up to any pitch in horizontal/ vertical or curved surfaces and including cutting to size and shape wherever required, including complete Structural design, detailed engineering, preparation of design drawing and calculation, preparation and submission of detailed fabrication drawings, preparing the surface for painting and applying pre-erection/ shop primer as mentioned in SCOPE OF WORK after fabrication etc., AND maintaining the structure during project execution AND dismantling.	100	m²-mon	630	63 000
2801	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.7	BRICK MASONRY (REFER SPECIFICATION NO.6-68-0009)				
2802	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.7.9	CLASS 5.0 at all depths -Non FIM Items				
2803	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.7.9.1	Providing and laying BRICK MASONRY WITH BRICKS OF CLASS 5.0 in cement mortar 1:6 (1 Cement : 6 Sand) in one or more brick thickness and in any shape (excluding circular/curved brick masonry) at all depths below plinth level including the cost of materials, labour, scaffolding/ staging, sampling & testing, soaking of bricks, cutting and laying of bricks, providing recesses, making openings of any shape & size, finishing the joints flush below ground level and raking out the joints above ground level, sealing the gap between masonry and soffit of beam/slab, embedding the fittings & fixtures, curing, etc. all complete as per specifications. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m³	9 960	9 960

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2804	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.7.9.2	Providing and laying BRICK MASONRY WITH BRICKS OF CLASS 5.0 in cement mortar 1:6 (1 Cement : 6 Sand) in one or more brick thickness and in any shape (excluding circular/curved brick masonry) at all heights above plinth level including the cost of materials, labour, scaffolding/ staging, sampling & testing, soaking of bricks, cutting and laying of bricks, providing recesses, making openings of any shape & size, finishing the joints flush below ground level and raking out the joints above ground level, sealing the gap between masonry and soffit of beam/slab, embedding the fittings & fixtures, curing, etc. all complete as per specifications. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	10 650	10 650
2805	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.7.11	HALF BRICK MASONARY with bricks of CLASS 5.0-Non FIM Items				
2806	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.7.11.1	Providing and laying HALF BRICK MASONRY with bricks of CLASS 5.0 in cement mortar 1:4 (1 Cement : 4 Sand)in any shape, including the cost of materials, labour, scaffolding/staging, sampling and testing, soaking of bricks, cutting and laying of bricks, providing openings of any shape & size, raking out the joints, supplying and placing 2 Nos. 6mm dia. M.S. Bars at every fourth course, sealing the gap between masonry and soffit of beam/slab, embedding the fittings and fixtures, curing etc. all complete as per specification. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY CONTRACTOR.	1	m^2	1 230	1 230
2807	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10	DEMOLISHING AND DISMANTLING (REFER SPEC NO. 6-68-0012)				
2808	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.1	Brickwork - Non FIM Items				
2809	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.1.1	Demolishing BRICKWORK (taking all necessary safety precautions) for all depths below plinth level including supply of all tools and tackles, necessary scaffolding, propping, underpinning, cleaning and stacking of serviceable material, disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed. (Excavation & backfilling shall be paid separately under relevant items).	1	m^3	1 800	1 800
2810	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.1.2	Demolishing BRICKWORK (taking all necessary safety precautions) for all heights above plinth level including supply of all tools and tackles, necessary scaffolding, propping, underpinning, cleaning and stacking of serviceable material, disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed.	1	m^3	1 960	1 960
2811	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2	RCC - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2812	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2.1	Demolishing RCC WORK (taking all necessary safety precautions) for all depths below plinth level including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc., cutting, straightening, scraping and cleaning of reinforcement bars, stacking of serviceable materials, disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed. (Excavation & backfilling shall be paid separately under relevant items).	1	m^3	2 530	2 530
2813	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2.2	Demolishing RCC WORK (taking all necessary safety precautions) for all heights above plinth level including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc., cutting, straightening, scraping and cleaning of reinforcement bars, stacking of serviceable materials, disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed.	1	m^3	2 710	2 710
2814	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2.3	Chipping of RCC WORK (taking all necessary safety precautions) by CHISELLING, upto & inclusive of 25mm thickness including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc., cutting, lapping/welding of reinforcement bars as per drawings, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete at all heights and depths, as specified and directed. (Excavation and backfilling shall be paid separately under relevant items).	1	m^2	580	580
2815	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2.4	Chipping of RCC WORK (taking all necessary safety precautions) by CHISELLING, beyond 25mm and upto & inclusive of 50mm thickness including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc., cutting, lapping/welding of reinforcement bars as per drawings, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete at all heights and depths, as specified and directed. (Excavation and backfilling shall be paid separately under relevant items).	1	m^2	730	730
2816	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2.5	Chipping of RCC WORK (taking all necessary safety precautions) by CHISELLING, beyond 50mm and upto & inclusive of 100mm thickness including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc., cutting, lapping/welding of reinforcement bars as per drawings, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete at all heights and depths, as specified and directed. (Excavation and backfilling shall be paid separately under relevant items).	1	m^2	1 130	1 130

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2817	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2.6	Chipping of RCC WORK (taking all necessary safety precaution) by CHISELLING for thickness more than 100mm for all depths below plinth level including supply of all tools & tackles, scaffolding, propping, underpinning, etc. exposing, cutting, lapping/welding the reinforcement bars as per drawings & cleaning the same by wire brushing, washing the exposed surfaces, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed. (Excavation and backfilling shall be paid separately under relevant items).	0.2	m^3	4 500	900
2818	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2.7	Chipping of RCC WORK (taking all necessary safety precaution) by CHISELLING for thickness more than 100mm for all heights above plinth level including supply of all tools & tackles, scaffolding, propping, underpinning, etc. exposing, cutting, lapping/welding the reinforcement bars as per drawings & cleaning the same by wire brushing, washing the exposed surfaces, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed.	1	m^3	4 990	4 990
2819	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2.11	Making cut-outs in RCC slab/ wall upto a thickness of 400mm (taking all necessary safety precautions) by vibration-less spark-free mechanical means like core-cutting, wet cutting by diamond wall saw system at all depths & heights including supply of all tools & tackles, necessary scaffolding etc. cutting of reinforcement bars, disposal of unserviceable material, plastering & finishing the cut surfaces, all complete as specified and directed by the Engineer-in- Charge (Measurement on Plan/ Elevation Area basis).	1	m^3	15 450	15 450
2820	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2.12	Cutting/ Dismantling RCC work in pavement, slabs, beams, columns, etc upto a depth of 450 mm by using vibration-less spark-free Diamond Saw Cutter of make HILTI (or equivalent) at all depths & heights, in hazardous areas within process units & offsite which are fire prone due to presence of hydrocarbon vapours etc. taking elaborate precautions for dismantling as per fire permit, clearance etc. and work is to be done with extreme caution. The work item includes cost of all necessary accessories, tools & tackles including diamond saw cutter, disposal of RCC Debris upto lead of 100 m & for all lifts (taking all safety precautions) including cutting reinforcement bars, embedded structural steel members, with necessary scaffolding, propping and underpinning etc. for all elevations with all labour and materials, all complete as per drawings, specifications and directions of the Engineer-in-charge. Payment will be made per sq.m.of cross-sectional cut area. Contractor to submit dismantling plan prior to start of dismantling. Dismantling shall be planned in such a way that each cut piece shall weigh not less than 1.6 MT.	1	m^2	10 380	10 380

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2821	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.2.13	Cutting/ Dismantling of RCC block foundations, raft foundations, pile caps, mass concrete, equipment foundations etc. by using vibration-less spark-free Diamond Wire Saw Cutter of make HILTI (or equivalent) at all depths & heights, in hazardous areas within process units & offsite which are fire prone due to presence of hydrocarbon vapours etc. taking elaborate precautions for dismantling as per fire permit, clearance etc. and work is to be done with extreme caution. The work item includes cost of all necessary accessories, tools & tackles including diamond saw cutter , disposal of RCC Debris upto lead of 100 m & for all lifts (taking all safety precautions) including cutting reinforcement bars, embedded structural steel members, with necessary scaffolding, propping and underpinning etc. for all elevations with all labour and materials complete as per drawings, specificationsand directions of the Engineer-in-charge. Payment will be made per sq.m.of cross-sectional cut area. Contractor to submit dismantling plan prior to start of dismantling. Dismantling shall be planned in such a way that each cut piece shall weigh not less than 1.6 MT.	1	m²	11 030	11 030
2822	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.3	Pockets - Non FIM Items				
2823	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.3.1	Making POCKETS/HOLES of sizes upto & inclusive of 200 x200x500mm in RCC/PCC works (taking all necessary safety precautions) by chiselling/drilling, including supply of all tools & tackles, necessary scaffolding etc. cutting of reinforcement bars, cleaning the pockets of all debris, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary all complete at all heights & depths as specified and directed.	50	each	520	26 000
2824	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.4	PCC _ Non FIM Items				
2825	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.4.1	Demolishing PLAIN CEMENT CONCRETE work (taking all necessary safety precautions) for all depths below plinth level including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc. disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed. (Excavation and backfilling shall be paid separately under relevant items)	1	m³	2 070	2 070
2826	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.4.2	Demolishing PLAIN CEMENT CONCRETE work (taking all necessary safety precautions) for all heights above plinth level including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc. disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed.	1	m³	2 220	2 220
2827	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.6	Steelwork - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2828	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.6.1	Dismantling bolted/rivetted/welded STRUCTURAL STEEL WORK of all descriptions (taking all necessary safety precautions), including supply of all tools and tackles, consumables, necessary scaffolding etc., providing temporary bracings as required, cutting (by flame or saw) gusset plates, bolts, nuts, weldings etc., transporting and stacking of the serviceable materials, cleaning the site of work of all unserviceable materials for disposal to spoil heaps anywhere within the plant boundary, all complete at all depths and heights, as specified and directed.	1	MT	12 630	12 630
2829	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.7	AC / GI Sheets - Non FIM Items				
2830	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.10.7.1	Dismantling GI/asbestos/translucent sheets, ridges, gutters etc. (taking all necessary safety precautions) in roofings and wall claddings, including supply of all tools & tackles, necessary scaffolding, consumables, cutting (by flame or saw) of fixing hooks, transporting and stacking the serviceable materials, cleaning the site and disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete for all levels, as specified and directed.	1	m²	150	150
2831	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.11	MISCELLANEOUS ITEMS (REFER SPECIFICATION NO. 6-68-0013)				
2832	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.11.6	Sand Filling - Non FIM Items				
2833	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.11.6.1	Supplying and filling approved SAND of specified quality under floors, in foundations, plinths, tank foundations etc. for all depths and heights including cost of sand, royalties, transportation to site for all leads and lifts, including loading, unloading, spreading in layers of loose thickness not exceeding 150 mm, watering, ramming, compacting with mechanical compactors and/or other equipment to the specified levels to achieve 85% relative density as per IS:2720 Part XIV, including preparation of subgrade to the required slope, providing testing apparatus and testing the degree of consolidation all complete as per drawings, specifications and direction of Engineer-in-charge. The rates shall be inclusive of the cost of all labour, material, equipments etc. all complete .	900	m³	3 440	30 96 000
2834	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.11.10	BI-POLAR CONCRETE PENETRATING CORROSION INHIBITING ADMIXTURE				
2835	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.11.10.1	Supplying and mixing of approved brand of BI-POLAR CONCRETE PENETRATING CORROSION INHIBITING ADMIXTURE (confirming to EIL Specification No. 6-68-0017) in concrete as per manufacturer's specification for protection of reinforcement against corrosion. Supply of admixture in Contractor's scope.	3450	kg	220	7 59 000
2836	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.14	BONDING FRESH CONCRETE TO OLD CONCRETE BY EPOXY RESIN BONDING SYSTEM (REFER SPECIFICATION NO. 6-68-0056)				
2837	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.14.1	Epoxy Resin - non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2838	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.14.1.1	Providing and applying approved EPOXY RESIN (prepared as per manufacturer's recommendation) for bonding of fresh concrete to old concrete in all types of structure at all depths and heights including cleaning of concrete surface, removing of all loose concrete pieces, making rough by chiselling, taking off the skin of concrete, application of Epoxy Resin System by spraying, necessary working platforms, props, scaffolding and other safety measures, removal of same after completion etc. all complete as specified and directed. (Excavation, backfilling, removal of surplus earth, keeping pit dry by pumping/bailing subsoil water shall be paid separately under relevant items).	50	kg	1 350	67 500
2839	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.17	FIREPROOFING OF STEEL STRUCTURES (REF SPEC NO 6-68-0033)				
2840	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.17.11	Concrete - Non FIM Items				
2841	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.17.11.1	Supply and laying of concrete of grade M30 as per Type-I of EIL Standard Specification 6-68-0033 as fire proofing material with 10 mm and down size graded coarse and fine aggregates including admixture around structural steel members (viz. beams, columns, bracings etc.) all complete; cleaning the steel surfaces, supplying, placing and fixing in position cover plates conforming to IS:2062 and stiffeners for members exceeding 600 mm depth, supply and welding of MS nuts on angle and box sections and cover blocks for other sections, supplying, placing and fixing in position galvanized expanded metal sheet with mesh size 4.5 mm x 13.5 mm conforming to IS:412 except on angle and box sections, hot dipped galvanized welded wire fabric reinforcement 2 mm dia 50 mm x 50 mm mesh conforming to IS:1566, and tying the reinforcement to the cover blocks with galvanized 16 SWG tying wire, including cutting, straightening, cleaning, bending, vibrating, tamping, curing or providing a layer of approved membrane of curing compound, rendering with cement sand mortar (1:3) wherever required to achieve a smooth and even surface, providing L50x50x6 at corners or as specified in the drawing, applying primer on MS nuts, angles and affected surfaces, supplying and laying of non-bituminous polysulfide or silicon rubber mastic sealant at terminating edges/ metal joints, painting the surfaces with sealer coat of epoxy polyamide as base and finish coats of coating system No.1 of NORSOK Standard M-501, including the cost of all labour, materials, specified tests, shuttering, staging, scaffolding, working platforms, approaches, etc. for all shapes and positions at all heights upto & including 10 m above pavement etc. all complete as per specifications and directions of Engineer-in-Charge. (ALL MATERIALS INCLUDING CEMENT TO BE SUPPLIED BY THE CONTRACTOR).	200	m²	3 290	6 58 000
2842	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.17.12	Vermiculite Concrete for Structural Steel - Non-FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2843	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.17.12.1	Supply and laying of vermiculite based lightweight cementitious concrete coating as per Type-II of EIL Standard Specification 6-68-0033 as fire proofing material of required thickness around structural steel members (viz. beams, columns, bracings etc.) for the required fire protection from reaching temperature 538 degree C; cleaning the steel surfaces and applying primer compatible to vermiculite material if required as per manufacturer specifications, supplying, placing and fixing in position cover plates conforming to IS:2062 and stiffeners for members exceeding 600 mm depth, supply and welding of MS nuts on angle and box sections and cover blocks for other sections, supplying, placing and fixing in position galvanized expanded metal sheet with mesh size 4.5 mm x 13.5 mm conforming to IS:412 except on angle and box sections, hot dipped galvanized welded wire fabric reinforcement 2 mm dia 50 mm x 50 mm mesh conforming to IS:1566, and tying the reinforcement to the cover blocks with galvanized 16 SWG tying wire, including cutting, straightening, cleaning, bending, applying primer on MS nuts and affected surfaces, curing or providing a layer of approved membrane of curing compound, patching of damaged portion wherever required to achieve a smooth and even surface, providing chamfering at corners, supplying and laying of non-bituminous polysulfide or silicon rubber mastic sealant at terminating edges/ metal joints, painting the surfaces with sealer coat of epoxy polyamide as base and finish coats of coating system No.1 of NORSOK Standard M-501, including the cost of all labour, materials, specified tests, shuttering, staging, scaffolding, working platforms, approaches, etc. for all shapes and positions at all heights upto & including 10 m above pavement etc. all complete as per specifications and directions of Engineer-in-Charge. (ALL MATERIALS SHALL BE SUPPLIED BY THE CONTRACTOR).	15000	m²	4 750	7 12 50 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2844	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.17.12.2	Supply and laying of vermiculite based lightweight cementitious concrete coating as per Type-II of EIL Standard Specification 6-68-0033 as fire proofing material of required thickness around structural steel members (viz. beams, columns, bracings etc.) for the required fire protection from reaching temperature 538 degree C; cleaning the steel surfaces and applying primer compatible to vermiculite material if required as per manufacturer specifications, supplying, placing and fixing in position cover plates conforming to IS:2062 and stiffeners for members exceeding 600 mm depth, supply and welding of MS nuts on angle and box sections and cover blocks for other sections, supplying, placing and fixing in position galvanized expanded metal sheet with mesh size 4.5 mm x 13.5 mm conforming to IS:412 except on angle and box sections, hot dipped galvanized welded wire fabric reinforcement 2 mm dia 50 mm x 50 mm mesh conforming to IS:1566, and tying the reinforcement to the cover blocks with galvanized 16 SWG tying wire, including cutting, straightening, cleaning, bending, applying primer on MS nuts and affected surfaces, curing or providing a layer of approved membrane of curing compound, patching of damaged portion wherever required to achieve a smooth and even surface, providing chamfering at corners, supplying and laying of non-bituminous polysulfide or silicon rubber mastic sealant at terminating edges/ metal joints, painting the surfaces with sealer coat of epoxy polyamide as base and finish coats of coating system No.1 of NORSOK Standard M-501, including the cost of all labour, materials, specified tests, shuttering, staging, scaffolding, working platforms, approaches, etc. for all shapes and positions at all heights more than 10 m above pavement etc. all complete as per specifications and directions of Engineer-in-Charge. (ALL MATERIALS SHALL BE SUPPLIED BY THE CONTRACTOR).	25000	m²	5 020	12 55 00 000
2845	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.17.13	Vermiculite Concrete for Equipments - Non-FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2846	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.17.13.1	Supply and laying of vermiculite based lightweight cementitious concrete coating as per Type-III of EIL Standard Specification 6-68-0033 as fire proofing material of required thickness on equipment/ vessel skirts, saddles and supports for the required fire protection from reaching temperature 427 degree C; cleaning the steel surfaces and applying primer compatible to vermiculite material if required as per manufacturer specifications, supplying, placing and fixing in position cover plates conforming to IS:2062, hot dipped galvanized welded wire fabric reinforcement of 2 mm dia 50 mm x 50 mm mesh conforming to IS:1566 and tying the reinforcement with the pre welded nuts by galvanized 16 SWG tying wire, including straightening, cutting, bending of the reinforcement, including supplying and welding of additional MS nuts if directed by the Engineer-in-charge, applying primer wherever required, curing or providing a layer of approved membrane of curing compound, patching of damaged portion wherever required to achieve a smooth and even surface, providing chamfering at corners, supplying and laying of non-bituminous polysulfide or silicon rubber mastic sealant at terminating edges/ metal joints, painting the surfaces with sealer coat of epoxy polyamide as base and finish coats of coating system No.1 of NORSOK Standard M-501, including the cost of all labour, materials, specified tests, shuttering, staging, scaffolding, working platforms, approaches, etc. for all shapes and positions. all complete as per specifications and directions of Engineer-in-Charge. (ALL MATERIALS SHALL BE SUPPLIED BY THE CONTRACTOR).	8050	m²	5 710	4 59 65 500
2847	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.17.MF15	Intumescent coating for Structural Steel				
2848	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.17.MF15.1	Design, Supply and laying of intumescent coating system as per job Specification B957-999-06-43-IF01 as fire proofing material of required thickness (not to be less than 12 mm) around structural steel members (viz. beams, columns, bracings etc.) for the required fire protection from reaching temperature 538 degree C; surface preparation for painting and applying primer as per Job Specification, including the cost of all labour, materials, specified tests, shuttering, staging, scaffolding, working platforms, approaches, etc. for all shapes and positions at all location & levels above pavement etc. all complete as per specifications and directions of Engineer-in-Charge. (ALL MATERIALS SHALL BE SUPPLIED BY THE CONTRACTOR).	6000	m²	15 450	9 27 00 000
2849	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.18	Mechanical works				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2850	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.18.5	Supplying, fabricating and erecting in position MS plates as per detailed drawings, conforming to grade A of IS:2062 on top of all RCC pedestals supporting the sliding saddles of equipments, including cutting, straightening where necessary, rounding rounding unfinished edges by grinding, machining the exposed top surface, making necessary bolt holes, providing and laying ready mixed free flow non-shrink grout below the base plate at all levels & locations, machining top surfaces etc. all complete and as shown and directed.	1	MT	1 41 520	1 41 520
2851	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.18.9	Dismantling Of steel works				
2852	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.18.9.1	Dismantling structural steel already erected by others including provision of adequate temporary supports, bracings etc. wherever required, to ensure safety of the affected structure or part thereof, and replacing back all original members into their respective positions true to line and level, removing all temporary supports/bracings, welding/bolting of the end connections, splicing or strengthening the member and their joints to regain original strengths, all complete as directed by the Engineer-in-Charge. Note: The weight of dismantled and re- erected structure shall be measured only once.(SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE)	1	MT	12 630	12 630
2853	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.23	SAFETY (REFER EIL SPECIFICATION)				
2854	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.23.1	Safety Structures - Non FIM Items				
2855	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.23.1.1	Supplying, Transporting, Storing, Fabricating & Erecting in position and testing/ examining bolted and/ or welded Structural Steel Works at all locations and levels in HANGER SCAFFOLDING below piperack, comprising of hangar channels, fabricated pen wen ladder beams, steel planks bent to shape and size and any other sections, if required, all as per sketches/ specifications and load tested for statisfactory performance, including cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, including preparation and submission of detailed fabrication drawings, preparing the surface for painting as per BIS codes after fabrication etc. all complete as specified and directed. All items shall be removed & carried back by Contractor as per instructions of Engineer-in-Charge after completion of works. (Supply of All Material In Contractor's Scope).	13700	m²	2 430	3 32 91 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2856	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.23.1.3	Providing and fixing double scaffolding system of any height made with 40 mm dia MS tube 1.5 m centre to centre, horizontal & vertical tubes joining with MS tubes, MS tube challies, MS clamps and MS staircase system in the scaffolding for working platform/ staircase etc., and maintaining it in a serviceable condition for the required duration as approved and removing it thereafter. The scaffolding system shall be stiffened with bracings, runners, connection with the building etc., wherever required for inspection of work at required locations with essential safety features for the workmen etc., all complete as per directions and approval of Engineer-in-charge. (Height shall be measured from Floor/ platform from where scaffolding is erected) including providing Aluminium ladders for safe acess of workers.	1500	m³	120	1 80 000
2857	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	01CS.23.1.4	Providing of steel scaffold stair tower system with minimum 800 mm wide flights, landings at every 1.5 to 2.0 m height, handrailing around flights and landings for safe access upto a height of 12.0 m, all complete including supply of all materials, tools & tackles, manpower etc., at the location directed by Engineer-in-Charge on monthly rental basis. Rental charges shall be payable after completion of erection of the system and acceptance by the Engineer-in-Charge. Rates shall also be inclusive of dismantling of the system and taking out all materials from the project permises as directed by the Engineer-in-Charge. Rate quoted shall be for Running Meter (Height) per month.	200	RM	5 670	11 34 000
2858	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	11CS	CIVIL, STRUCTURE AND ARCHITECTURE				
2859	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	11CS.22	WATER PROOFING				
2860	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	11CS.22.25	Providing and applying crystalline mortar by mixing in the ratio of 4.5 : 1 (4.5 parts crystalline mortar : 1 part water) for the treatment of faulty construction joints, cracks, tie rod holes and spalled & honeycombed surface of RCC underground structures like basement, water tanks, bridge deck etc. to ensure water tightness. The crystallie mortar shall conform to the EN 1504-3 having compressive strength Class R4 > 45 MPa and adhesive bond strength Class R3 > 1.5 MPa. The work shall be carried out all complete as per specification and the direction of the Engineer-In-Charge. The product performance shall carry guarantee for 10 years against any leakage.				
2861	A	B957-300-81-41-MR-SOR-3001-A-1M	Mechanical Works - I For ECU-PART-A	11CS.22.25.1	For sealing cracks and faulty construction joints, routed out/making U-shape groove size 25x25mm and then primed the area with integral crystalline slurry @0.05kg/ running metre and while the surface is tacky filled the groove upto surface with crystalline mortar @1.50kg/ running metre. Once crystalline mortar is touch dry then finally applied two coats of integral crystalline slurry @0.05kg/running metre per coat.	50	metre	460	23 000
2862	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC	GENERAL CIVIL				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2863	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7	CONCRETE PAVEMENTS				
2864	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.2	Providing and laying Reinforced Cement Concrete with 20mm and down size graded crushed stone aggregates in flooring, pavements etc. including leaving pockets, if necessary, making recess/drains, laying in alternate panels, etc. for all depths including shuttering, tamping, curing, etc. as specified in any shape, thickness, position and finishing the top surface smooth etc. all complete as per drawings, specifications and directions of Engineer-in-Charge.				
2865	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.2.2	For RCC of M-30 grade concrete (all materials including cement but excluding cost of providing & fixing reinforcement and joint sealing shall be supplied by the contractor).	200	m^3	9 870	19 74 000
2866	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.6	Supplying and laying of 150 micron thick HM HDPE (Grade-I) FILM lining conforming to IS 10889 below concrete pavements, Hard stand, at any other place etc. including royalties, taxes, handling, transportation, unloading, storage, joining etc. all complete as per drawings, manufacturer's specifications and directions of Engineer-in-charge.	1250	m^2	150	1 87 500
2867	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.7	Supply of all materials and Construction of DRY LEAN CEMENT CONCRETE SUB-BASE (7 days compressive strength of 10.0 MPa) with 26.5mm and down size aggregate including cement , water, and approved additives on a prepared sub-grade, mixed in batching plant, transported to site, for all leads & lifts, laid, compacted, finished and cured etc. complete as per IRC:SP:49 (Guidelines for the use of Dry Lean Concrete as Sub-Base), drawings, standards, specifications and directions of Engineer-in-charge.	100	m^3	4 130	4 13 000
2868	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.10	Providing 20mm wide Expansion Joints in pavement slabs as per standard/ drawing including cleaning the joints of all loose material, filling with 20mm thick impregnated fibre boards for the full depth of slab except for 25mm depth from top and sealing the top 25mm with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. all complete as per drawings, specifications and directions of Engineer-in-Charge.				
2869	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.10.1	For type-I pavement (Upto and inclusive of thickness of 200 mm). (Including providing and laying MS dowel bar, painting as required, GI pipe and cap and cotton waste).	50	m	1 880	94 000
2870	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.10.3	For type-II pavement (Upto and inclusive of thickness of 150 mm)	50	m	280	14 000
2871	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.10.4	For type-III pavement (Upto and inclusive of thickness of 100 mm).	25	m	220	5 500
2872	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.10.5	For thickened pavement (Upto and inclusive of thickness of 300 mm).	25	m	510	12 750

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2873	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.11	Providing joints in pavements and around foundations as per standard/ drawing including cleaning the joints of all loose materials and sealing with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. complete as per drawings, specifications and directions of Engineer-in-Charge for.				
2874	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.11.1	Construction joints 20mm wide x 25mm deep.	50	m	370	18 500
2875	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.11.2	Sealing joint around pedestal and column etc. 20mm wide x 200 mm deep including filling with 20mm thick impregnated fire board for the full depth of slab except for 25mm depth from top and sealing the top 25mm with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. complete as per drawings, specifications and directions of Engineer-in-Charge.	125	m	580	72 500
2876	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.11.3	Sealing joint around pedestal and column etc. 20mm wide x 150 mm deep including filling with 20mm thick impregnated fire board for the full depth of slab except for 25mm depth from top and sealing the top 25mm with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. complete as per drawings, specifications and directions of Engineer-in-Charge.	125	m	520	65 000
2877	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.11.4	Sealing joint around pedestal and column etc. 20mm wide x 100 mm deep including filling with 20mm thick impregnated fire board for the full depth of slab except for 25mm depth from top and sealing the top 25mm with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. complete as per drawings, specifications and directions of Engineer-in-Charge for.	75	m	460	34 500
2878	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.7.11.5	Sealing joint around pedestal and column etc. 20mm wide x 300 mm deep including filling with 20mm thick impregnated fire board for the full depth of slab except for 25mm depth from top and sealing the top 25mm with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. complete as per drawings, specifications and directions of Engineer-in-Charge for.	75	m	690	51 750
2879	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.26	MISCELLANEOUS ITEMS				
2880	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.26.10	Supply and installation of combined safety shower and eyewash units as per spec. no.6-66-0038, including providing and fixing of necessary foundation bolts in foundations/ pavement etc. complete. Each safety shower shall have proper sign board with florescent letters showing their location, all complete as per specification, drawings and direction of Engineer-in-charge.	20	each	47 690	9 53 800

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2881	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.26.17	Supplying and fixing in position CI sluice Gates with frames as per IS:13349 and as per specifications and drawings including transportation to site of work, supplying and fixing bolts, nuts, washers, gaskets etc. complete as per drawings, specifications and directions of Engineer-in-Charge. For following Size(mm) and Type and Class				
2882	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.26.17.1V11	Square 750 mm Class - 1	1	nos	2 31 750	2 31 750
2883	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40	Fabrication and Erection of piping (underground)				
2884	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.5	Laying and joining of pipes and specials for underground system etc. including transportation of all materials from owner's storage points to work site, earthwork in excavation in all types of soil but EXCLUDING SOFT ROCK AND HARD ROCK for trenches etc. including dewatering of rain and /or sub soil water, shoring & strutting if required, dressing of sides, levelining, grading & ramming of bottom of trench, cutting of pipes if required,fitup, edge preparation, joining by welding, providing paint as per specification suitable for temperature mentioned below, laying the pipes in trenches to required alignment and levels, welding the same after laying, installation of fittings like elbows, reducers, tees, flanges, spectacle blind and spacer blinds etc. painting of field joints , hydrostatic testing of system, cleaning and flushing by water/ compressed air, draining, supply and filling 150mm coarse sand / gravel around the pipe as per standard no. 7-65-0269, backfilling the trenches with select material from available excavated soil including re-excavating the deposited soil excavated earlier, breaking clods and laying in layers of 15cm compacted thickness, watering and compacting with mechanical means like vibro rammers etc. to 90% standard proctor density as per IS-2720 Part- VII or 85% of relative density as per IS: 2720 Part XIV as applicable, disposal of surplus earth/ unserviceable material to demarcated area anywhere within the complex limit etc. complete as per drawings, specifications and instructions of engineer-in-charge including return of all unused/scrap pipes to owner's storage points. (Pipes shall be supplied by the owner as free issue material)(Depth of excavation for pipe trench shall be upto 3.0m)				
2885	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.5.1	Carbon Steel Piping (Non IBR), Thickness <=10 mm				
2886	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.5.1.1	Fabrication, For the following nominal sizes				
2887	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.5.1.1.2	NB 2 inch - 6 inch	100	Inch Dia	770	77 000
2888	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.5.1.1.3	NB 8 inch - 14 inch	100	Inch Dia	770	77 000
2889	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.5.1.2	Erection including painting and coarse sand/gravel filling, for following Nominal Sizes and temperature for painting				
2890	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.5.1.2.6V3	NB 2 inch - 6 inch 200 °C	100	Inch Mtr	320	32 000

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2891	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.5.1.2.7V3	NB 8 inch - 14 inch 200 °C	100	Inch Mtr	320	32 000
2892	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20	Laying and joining of externally 3L PE pre-coated Carbon Steel pipes and specials underground including transportation of all material from Owner's storage point to worksite, earthwork in excavation in all types of soils excluding soft rock and hard rock, for pipe trenches, saddles, etc. including dewatering, shoring and strutting if required, dressing of sides, levelling, grading and ramming of bottoms, cutting of pipes to required lengths if required, edge preparation, laying the pipes in trenches to required alignment and levels, welding the same after laying, installation of flanges, blind flanges, tapping for pressure gauges, temperature gauges and all other online instruments, fixing of nuts, bolts, gaskets and washers, welding, carrying out repairs of coating defects not attributed to owner (i.e. defects occurring after taking over of pipes from owner), coating of all field weld joints etc. as per specification, including supply of coating material for field joints,inspection and testing for the corrosion protection coating as per specification, cutting of road wherever required and making good the same,hydrostatic testing of the system, flushing, backfilling the trenches with select material from available excavated soil including re-excavating the deposited soil excavated earlier, breaking clods and laying in layers of 15 cm compacted thickness, watering, compacting with mechanical means like vibro rammers etc. to 90% of dry density as per IS:2720 Part- VII or 85% relative density as per IS: 2720 Part XIV as applicable, making good the surface, disposal of surplus earth/ unserviceable material to demarcated area anywhere within the complex limit etc. complete as per drawings, specifications and instructions of Engineer-in-Charge including connecting the pipes to manhole, including return of all unused / scrap pipes and specials to owner's storage point (All the materials except Pre-coated Pipes and fittings shall be supplied by contractor)(Pre-coated Pipes and fittings shall be issued free of cost by Owner.) (Depth of excavation for pipe trench shall be upto 3.0m)				
2893	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1	Carbon Steel Piping (Non IBR), Thickness <=10 mm				
2894	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.1	Fabrication, For the following nominal sizes				
2895	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.1.2	NB 2 inch - 6 inch	100	Inch Dia	770	77 000
2896	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.1.3	NB 8 inch - 14 inch	100	Inch Dia	770	77 000
2897	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.1.4	NB 16 inch - 24 inch	100	Inch Dia	770	77 000
2898	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.1.5	NB 26 inch - 36 inch	100	Inch Dia	770	77 000
2899	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.2	Erection including corrosion protection coating of field joints, for Water System (Pressure Piping), For following Nominal Sizes				
2900	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.2.2	NB 2 inch - 6 inch	400	Inch Mtr	330	1 32 000
2901	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.2.3	NB 8 inch - 14 inch	400	Inch Mtr	330	1 32 000
2902	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.2.4	NB 16 inch - 24 inch	400	Inch Mtr	330	1 32 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2903	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.2.5	NB 26 inch - 36 inch	400	Inch Mtr	330	1 32 000
2904	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.3	Erection including corrosion protection coating of field joints, for Waste Water Collection System (Gravity Flow), for following Nominal Sizes				
2905	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.3.2	NB 2 inch - 6 inch	100	Inch Mtr	330	33 000
2906	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.3.3	NB 8 inch - 14 inch	100	Inch Mtr	330	33 000
2907	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.3.4	NB 16 inch - 24 inch	100	Inch Mtr	330	33 000
2908	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.20.1.3.5	NB 26 inch - 36 inch	100	Inch Mtr	330	33 000
2909	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.55	Extra Over respective underground piping erection items but for excavation in soft rock by mechanical means like hydraulic excavator/ chiseler/ rock breaker/ ripper/ rock hammer/ cutter etc. for trench, saddle etc. including chiseling and cutting to required levels, dressing and trimming of sides, levelling and grading of bottoms, removal of all rock protrusions etc. complete including stacking of material to demarcated areas anywhere within the complex limit. (The measurement and payment shall be as per specification 6-68-0003)				
2910	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.55.1	For depth of excavation for pipe trench, saddle etc. upto 3m	10	m^3	700	7 000
2911	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.55.2	For depth of excavation for pipe trench, saddle etc. beyond 3.0m and upto 4.5m	10	m^3	800	8 000
2912	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.59	Extra Over respective underground piping erection items but for transportation of approved available select earth/ approved material (like fine aggregates, sand dust etc.) excavated & deposited/ stacked earlier within complex limit including re-excavating the deposited soil excavated earlier including clearing and stripping at earlier deposited soil (if necessary), loading, unloading, transportation etc. complete within a lead of 500M. (The efforts for backfilling shall be paid under respective underground piping erection item.) (The payment shall be as per specification 6-65-0006) .	10	m^3	220	2 200
2913	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.60	Extra over Item No.01GC.40.59 above but for lead of available material beyond the initial lead of 500m.				
2914	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.60.1	upto and inclusive of 1.0 km	10	m^3	10	100
2915	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.60.2	beyond 1.0 km and upto and inclusive of 3.0 km	10	m^3	30	300
2916	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.40.60.3	beyond 3.0 km and upto and inclusive of 5.0 km	10	m^3	50	500
2917	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41	Supply, fabrication and Erection of piping(underground)				
2918	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.6	Water System Galvanised Pressure Piping (Under Ground) (Screwed)				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2919	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.6.1	Supplying and laying carbon steel galvanised pipes as per piping materials specification Class underground including supply of all necessory fittings including Tee, reducing Tee, reducing Coupling, nipple, coupling, elbows etc. supply of teflon tapes, PTFE tape, white lead, etc. cutting the pipes to required lengths, making threads, earthwork in excavation for trenches, etc. in all types of soil except soft rock & hard rock including dewatering, shoring and strutting if required, dressing of sides, levelling, grading and ramming of bottoms, including laying of pipes in trenches, jointing the pipes and fittings with threaded connections, hydrostatic testing of the piping, backfilling the trenches with selected/approved earth fill material, cutting of roads wherever required, making good the road surface after laying, disposal of surplus earth at a designated area anywhere within complex limit etc., complete as per specifications, drawings and directions of Engineer-in-Charge. For following Nominal Size and Piping Material Class.				
2920	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.6.1.1V1	Nominal Dia 1 Inch Piping class J2A	2800	m	1 090	30 52 000
2921	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.6.1.1V37	Nominal Dia 3 Inch Piping class J95A	100	m	3 530	3 53 000
2922	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.6.1.1V38	Nominal Dia 4 Inch Piping class J95A	250	m	4 890	12 22 500
2923	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.6.1.1V39	Nominal Dia 2 Inch Piping class J95A	100	m	2 360	2 36 000
2924	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.7	Water System Galvanised Pressure Piping (Under Ground) (Welded)				
2925	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.7.1	Supplying and laying carbon steel galvanised pipes as per piping materials specification Class underground including supply of all necessory fittings including Tee, reducing Tee, reducuing Coupling, nipple, coupling, elbows etc., cutting the pipes to required lengths,welding, providing cold galvanising with zinc coating compound on surfaces where galvanising has been burnt off, earthwork in excavation for trenches, etc. in all types of soil except soft rock and hard rock, including dewatering, shoring and strutting if required, dressing of sides, levelling, grading and ramming of bottoms, including laying of pipes in trenches, jointing the pipes and fittings with welded/ flanged connections, hydrostatic testing of the piping, backfilling the trenches with selected/approved earth fill material, cutting of roads wherever required, making good the road surface after laying, disposal of surplus earth at a designated area anywhere within complex limit etc., complete as per specifications, drawings and directions of Engineer-in-Charge. For following Nominal Size and Piping Material Class .				
2926	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.7.1.1V22	Nominal Dia 6 Inch Piping class J95A	800	m	8 100	64 80 000
2927	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.7.1.1V23	Nominal Dia 8 Inch Piping class J95A	850	m	11 660	99 11 000
2928	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.7.1.1V24	Nominal Dia 12 Inch Piping class J95A	90	m	19 300	17 37 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2929	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.41.7.1.1V26	Nominal Dia 10 Inch Piping class J95A	500	m	15 860	79 30 000
2930	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51	fire fighting equipment's				
2931	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.2	Supply and installation of Deluge Valve skid				
2932	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.2.1	Supply, Installation, erection, testing and commissioning of Deluge valve skid, with UL/FM listed/approved Deluge Valve (consisting of deluge valve, strainers, solenoid valve, air pressure regulator, limit switches, pressure gauge, pressure transmitters, inlet/ outlet valves, drain valve, priming valve, vent valve including alarm motor gong, fittings, local control panel including bypass connection to deluge valve along with strainer and ball valve etc. complete) actuated through air (pneumatic) detection system including installation/placing the skid at the designated location and fixing with anchor bolts, connecting the water inlet and system piping, connecting detection network piping, fittings etc. complete for deluge valve skid as per specification, drawings and directions of Engineer-in-Charge. For the following DV skid size (Inlet/ outlet/ bypass fire water line size - Deluge Valve size -)				
2933	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.2.1.1V2	Inlet/ outlet/ bypass fire water line size 4 Inch Deluge Valve size 3 Inch	1	each	6 33 450	6 33 450
2934	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.2.1.1V3	Inlet/ outlet/ bypass fire water line size 4 Inch Deluge Valve size 4 Inch	1	each	7 31 300	7 31 300
2935	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.2.1.1V4	Inlet/ outlet/ bypass fire water line size 6 Inch Deluge Valve size 4 Inch	1	each	7 39 540	7 39 540
2936	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.2.1.1V6	Inlet/ outlet/ bypass fire water line size 8 Inch Deluge Valve size 6 Inch	8	each	10 45 450	83 63 600
2937	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.2.1.1V8	Inlet/ outlet/ bypass fire water line size 6 Inch Deluge Valve size 6 Inch	9	each	9 05 370	81 48 330
2938	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.2.1.1V10	Inlet/ outlet/ bypass fire water line size 10 Inch Deluge Valve size 8 Inch	6	each	13 49 300	80 95 800
2939	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.2.1.1V11	Inlet/ outlet/ bypass fire water line size 8 Inch Deluge Valve size 8 Inch	2	each	12 07 160	24 14 320
2940	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.2.1.1V12	Inlet/ outlet/ bypass fire water line size 12 Inch Deluge Valve size 8 Inch	1	each	14 78 050	14 78 050
2941	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.3	S/I Portable/ trolley mounted Extinguishers				
2942	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.3.1	Supply and installation of portable DCP (Dry Chemical Powder Type) extinguisher including transporting to worksite, fixing in position including all accessories and all labor and material etc. complete as per drawings, specification and directions of Engineer-in-Charge.				
2943	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.3.1.1V1	Capacity 6 kg	450	nos	3 000	13 50 000
2944	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.3.1.1V2	Capacity 9 kg	300	nos	3 890	11 67 000
2945	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.3.2	Supply and installing in position, trolley mounted DCP (Dry Chemical Powder Type) extinguisher including transporting to worksite, placing in position including all accessories and all labor and material etc. complete as per drawings, specification and directions of Engineer-in-Charge.				
2946	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.3.2.1V2	Capacity 50 kg	80	nos	31 210	24 96 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
2947	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.3.5	Supply and installation of portable CO2 extinguishers including transporting to worksite, fixing in position including all accessories and all labor and material etc. complete as per drawings, specification, data sheet and directions of Engineer-in-Charge.				
2948	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.3.5.1V1	Capacity 4.5 kg	80	nos	5 090	4 07 200
2949	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5	Supply, installation, testing and commissioning of following firefighting equipment as per relevant specifications, data sheet, drawing, including transporting the equipment to worksite, fixing of nuts, bolts, washers, gaskets, welding needed for fixing the equipment with matching flange etc. all complete as per drawings, specifications, standards, data sheet and direction of Engineer-in-Charge.				
2950	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.MG1	Air Release Valve	25	nos	3 300	82 500
2951	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.MG2	Sand Bucket	20	nos	15 450	3 09 000
2952	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.3	Double headed landing valve	15	each	26 390	3 95 850
2953	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.5	First Aid hose reel wall mounted type	95	each	9 540	9 06 300
2954	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.6	First Aid hose reel floor mounted type	35	each	10 020	3 50 700
2955	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.8	Hose box cabinet Type-II (Wall mounted type) including all inside accessories, including all civil works, fixing in position with anchor bolts in foundations or wall	130	each	30 900	40 17 000
2956	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.12	Remote operated long range water/ water cum foam monitor of 1000/1500/2000 GPM (variable) capacity on technological structure/ pipe rack/independent tower etc.	25	each	41 40 600	10 35 15 000
2957	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.13	Variable flow Water cum foam monitor of 500/750/1000 GPM capacity	11	each	2 68 830	29 57 130
2958	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.14	Variable flow Water cum foam monitor of 1000/1500/2000 GPM capacity	2	each	3 96 550	7 93 100
2959	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.15	Stand Post Type Fire Hydrant with Pumper Connection	10	each	30 800	3 08 000
2960	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.5.16	Stand Post Type Fire Hydrant without Pumper Connection	100	each	23 280	23 28 000
2961	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.7	Supply and installation of medium velocity spray nozzles with 1/2" NPT fixing arrangement including transportation to worksite from Owner's storage point, testing, flushing etc. all complete as per specification, drawings, data sheet and directions of Engineer-in-Charge. For nozzle of following K factor				
2962	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.7.1V1	K factor 18	90	nos	620	55 800
2963	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.7.1V2	K factor 30	950	nos	620	5 89 000
2964	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.7.1V3	K factor 51	115	nos	620	71 300
2965	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.7.1V4	K factor 22	230	nos	620	1 42 600
2966	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.7.1V5	K factor 35	2100	nos	620	13 02 000
2967	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.7.1V6	K factor 26	235	nos	620	1 45 700

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2968	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.7.1V7	K factor 41	55	nos	620	34 100
2969	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.7.1V8	K factor 64	65	nos	620	40 300
2970	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.7.1V12	K factor 20	110	nos	620	68 200
2971	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.9	Quartzoid bulb detectors				
2972	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.9.4	Supply, installation, testing and commissioning of quartzoid bulb detectors with 1/2" NPT fixing arrangement at locations as per data sheets, drawings and directions of Engineer-in-Charge.				
2973	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.9.4.1V1	Actuation Temperature 79 °C	3600	nos	300	10 80 000
2974	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.9.4.1V2	Actuation Temperature 182 °C	150	nos	650	97 500
2975	A	B957-300-81-45-MR-SOR-3001-A-0M	Mechanical Works - I For ECU-PART-A	01GC.51.9.4.1V6	Actuation Temperature 93 °C	220	nos	370	81 400
2976	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP	PROJECTS				
2977	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999	Providing pre-commissioning/commissioning assistance to the Owner/EIL by providing Skilled /Semiskilled/unskilled workers as per the direction of Engineer in - Charge with tools tackles, PPEs, consumables and Supervision (including site supervision, safety supervision) with the single point responsibility for quality, safety and speed of execution (one Man day =8 hours shift) with 1 vehicle standby for emergency at site with the following manpower on fix basis. Contractor to provide & mobilise man power in shifts on Need Basis on the instructions of Engineer -in-chrge. Note that the manpower deployment shall be inclusive of required tools and tackles and machinery such as welding machines, grinding machines, gas cutting sets , Mechanical/Electrical tool box, etc.				
2978	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.10000	Skilled manpower				
2979	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.10000.100	Piping Welder (Arc & TIG)	1300	Mandays	1 480	19 24 000
2980	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.10000.200	Mill Wright fitter/ Rotary mechanic	1500	Mandays	1 480	22 20 000
2981	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.10000.300	Instrument Technician	500	Mandays	1 480	7 40 000
2982	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.10000.400	Electrician	500	Mandays	1 480	7 40 000
2983	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.10000.500	Valve Mechanic	900	Mandays	1 480	13 32 000
2984	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.10000.600	Rotary mechanic capable of executing maintenance work	1300	Mandays	1 480	19 24 000

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2985	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.11000	DEWATERING : Pumping out rain water from specific location towards downstream side by deploying suitable capacity / adequate numbers of mud pumps / submersible pumps from various types drains / culverts sump pits / unit areas discharge into the outlet point laying and connecting of discharge delivery pipe mentioned in the same contract as directed by Engineer-In-charge at site including supply of all pumps, power/diesel , connecting pipes / hoses, all enabling works, tools and tackles etc. completely in all respect as per the directions of the Engineer-In-charge. (Jointly accepted log book to be maintained for payment)				
2986	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.11000.100	10 HP PUMP (POWER/DIESEL operated)	80	Hour	1 320	1 05 600
2987	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.11000.200	5 HP PUMP (POWER/DIESEL operated)	80	Hour	1 010	80 800
2988	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.11000.300	2 HP PUMP (POWER/DIESEL operated)	80	Hour	610	48 800
2989	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.12000	Contractor to provide & mobilise following man power on the instructions of Engineer in- charge. However, 2 weeks' notice shall be given for mobilisation and 1 day notice Shall be given for demobilisation. Note that quoted rate of manpower deployment shall be inclusive of required PPEs and facilities required for functioning at site. (1 Man-Month should be considered as 30 man-days.				
2990	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.12000.100	Safety supervisor	9	Man month	78 120	7 03 080
2991	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.12000.200	Safety Officer/Engineer	13	Man month	97 650	12 69 450
2992	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.20000	Semi-skilled Manpower				
2993	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.20000.100	Piping/structural fitter	4000	Mandays	1 180	47 20 000
2994	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.20000.200	Structural welder	3500	Mandays	1 180	41 30 000
2995	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.20000.300	Gas cutter	4000	Mandays	1 180	47 20 000
2996	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.20000.400	Grinder/driller	4000	Mandays	1 180	47 20 000
2997	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.20000.500	Rigger	4000	Mandays	1 180	47 20 000
2998	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.20000.600	Concrete chipper	1500	Mandays	1 180	17 70 000
2999	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.30000	Unskilled manpower				
3000	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.30000.100	Helper/Assistants	12000	Mandays	870	1 04 40 000
3001	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.40000	Commissioning operator (Qualification degree with 3 yrs. of experience or diploma with 5 years' experience) --	3000	Mandays	3 200	96 00 000
3002	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.50000	Commissioning supervisor (B.E. with 5 years' experience of commissioning activities in refineries, petrochemical etc) (1 man month= 26 days @ 8 hours per day duty)	50	Man month	90 000	45 00 000
3003	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.60000	Supervisor/ Foreman	45	Mandays	1 900	85 500
3004	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.70000	Fork lift operator (1 man month= 26 days @ 8 hours per day duty)	3	Man month	44 980	1 34 940

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3005	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.70001	Supply of Flame proof torches- rechargeable (with high intensity)	5	nos	8 500	42 500
3006	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.70002	Supply of 40/80 wire-mesh SS for covering strainers/filters	250	nos	2 580	6 45 000
3007	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.70003	Supply of rubber hoses(1", 15 mtr length, pressure-500 psi)	10	nos	7 730	77 300
3008	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.70004	Supply of fire hoses with connector for fire hydrants (dia. 63 mm, length-15 mtr as per relevant international specifications)	10	nos	7 210	72 100
3009	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.80000	Providing Hydraulic mobile Crane (min. 15 Ton capacity wheel mounted) including fuel, lube and operator & helper charges, sling web belts d- shackles, guiding ropes etc for lifting/shifting/loading/ unloading material like pipes, equipment, fittings, pipe-spools, concrete blocks, drums, boxes boulders, crates, scraps etc as directed (1 day= 8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE	120	day	8 850	10 62 000
3010	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.90000	Providing trailer including fuel, lube and operator & khalasi charges for transportation of material (including pipes, structural steel, fittings, valves, gaskets, earth, wooden scrap, usable material, metallic or non-metallic scrap) from & to project/unit area, stores, warehouse, dump yard/scrap yard as directed. (1 day= 8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASED FOR COMMISSIONING	120	day	7 500	9 00 000
3011	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.98000	Providing "Telescopic/Lattice" type crane (100 Ton capacity wheel mounted/CRAWLER) including fuel, lube and operator & helper charges, sling web belts d- shackles, guiding ropes etc for lifting/shifting/loading/ unloading material like pipes, equipment, fittings, pipe-spools, concrete blocks, drums, boxes boulders, crates, scraps etc as directed (1 day= 8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE	120	day	50 000	60 00 000
3012	A	B957-300-85-41-MR-SOR-3001-A-1M	Mechanical Works For ECU-PART-A	01QP.999.99000	Providing "Telescopic" type crane (40 Ton capacity wheel mounted) including fuel, lube and operator & helper charges, sling web belts d- shackles, guiding ropes etc for lifting/shifting/loading/ unloading material like pipes, equipment, fittings, pipespools, concrete blocks, drums, boxes boulders, crates, scraps etc as directed (1 day=8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE	120	day	25 000	30 00 000
		SUB TOTAL							**589 43 95 044**
3013	B	B957-300-06-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CT	CATHODIC PROTECTION				
3014	B	B957-300-06-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CT.MI3	Cathodic Protection System for Plant:				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3015	B	B957-300-06-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CT.MI3.1	Survey, Design, Detail Engineering, Supply, installation, testing, commissioning, etc of the cathodic protection system for the buried vessels and exchangers. All work shall be carried out conforming to the scope of work, design basis, data sheets, specifications, standards, drawings, etc as per the provisions of GCC, SCC and specification no: B957-300-06-45-CPS-3001, Rev. 0.	1	Lumpsum	1 82 67 460	1 82 67 460
3016	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10000000000	PIPING-UNITS				
3017	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10100000000	FABRICATION OF PIPING SPECIALS FROM PIPES (SUPPLIED BY OWNER) :- Fabrication of the following specials from pipes of all types & thicknesses including transportation of materials from Owner's storage points to work site/workshop, cutting, fitup, edge preparing, welding, bending, testing (Including DP/MP) & inspection as per specs etc. supply of all necessary equipment, consumables, labour, supervision etc. The work shall be carried out as per the specificatons, drawings and instructions of Engineer-in-Charge.Note: Sizes mentioned under the heading of Reducers (Conc. / Ecc.) are for large end.				
3018	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10101000000	C.S MITRE BENDS-90; THK. <= 10MM				
3019	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10101001600	NB 8.000 INCHES	1	Nos	12 340	12 340
3020	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10101001700	NB 10.000 INCHES	1	Nos	15 420	15 420
3021	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10101001800	NB 12.000 INCHES	1	Nos	18 510	18 510
3022	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10101002000	NB 16.000 INCHES	1	Nos	24 680	24 680
3023	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10101002200	NB 20.000 INCHES	1	Nos	34 060	34 060
3024	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10101002400	NB 24.000 INCHES	1	Nos	40 880	40 880
3025	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102000000	C.S MITRE BENDS-90; THK. > 10MM AND <= 20MM				
3026	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102002500	NB 26.000 INCHES	1	Nos	52 920	52 920
3027	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102002600	NB 28.000 INCHES	1	Nos	56 990	56 990
3028	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102002700	NB 30.000 INCHES	1	Nos	61 060	61 060
3029	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102003000	NB 36.000 INCHES	1	Nos	73 270	73 270
3030	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102003200	NB 40.000 INCHES	1	Nos	81 410	81 410
3031	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102003400	NB 44.000 INCHES	1	Nos	98 980	98 980
3032	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102003600	NB 48.000 INCHES	1	Nos	1 07 970	1 07 970
3033	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102003900	NB 54.000 INCHES	1	Nos	1 21 470	1 21 470
3034	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102004200	NB 60.000 INCHES	1	Nos	1 34 970	1 34 970
3035	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102004400	NB 64.000 INCHES	1	Nos	1 39 780	1 39 780

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3036	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102004900	NB 74.000 INCHES	1	Nos	1 61 620	1 61 620
3037	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102005100	NB 78.000 INCHES	1	Nos	1 70 350	1 70 350
3038	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102005200	NB 80.000 INCHES	1	Nos	1 74 720	1 74 720
3039	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102005600	NB 88.000 INCHES	1	Nos	1 92 190	1 92 190
3040	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102005700	NB 90.000 INCHES	1	Nos	1 96 560	1 96 560
3041	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102005900	NB 94.000 INCHES	1	Nos	2 05 300	2 05 300
3042	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10102007200	NB124.000 INCHES	1	Nos	2 70 820	2 70 820
3043	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104000000	C.S MITRE BENDS-45; THK. <= 10MM				
3044	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104001600	NB 8.000 INCHES	1	Nos	8 650	8 650
3045	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104001700	NB 10.000 INCHES	1	Nos	10 820	10 820
3046	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104001800	NB 12.000 INCHES	1	Nos	12 980	12 980
3047	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104002000	NB 16.000 INCHES	1	Nos	17 320	17 320
3048	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104002200	NB 20.000 INCHES	1	Nos	23 780	23 780
3049	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104002400	NB 24.000 INCHES	1	Nos	28 540	28 540
3050	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104002700	NB 30.000 INCHES	1	Nos	35 670	35 670
3051	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104003000	NB 36.000 INCHES	1	Nos	42 810	42 810
3052	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104003200	NB 40.000 INCHES	1	Nos	47 560	47 560
3053	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104003400	NB 44.000 INCHES	1	Nos	52 320	52 320
3054	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10104003600	NB 48.000 INCHES	1	Nos	57 080	57 080
3055	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105000000	C.S MITRE BENDS-45; THK. > 10MM AND <= 20MM				
3056	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105003200	NB 40.000 INCHES	1	Nos	56 990	56 990
3057	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105003400	NB 44.000 INCHES	1	Nos	62 690	62 690
3058	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105003600	NB 48.000 INCHES	1	Nos	75 070	75 070
3059	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105003900	NB 54.000 INCHES	1	Nos	84 460	84 460
3060	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105004200	NB 60.000 INCHES	1	Nos	93 840	93 840
3061	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105004400	NB 64.000 INCHES	1	Nos	1 00 090	1 00 090
3062	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105004900	NB 74.000 INCHES	1	Nos	1 15 730	1 15 730
3063	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105005100	NB 78.000 INCHES	1	Nos	1 21 990	1 21 990
3064	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105005200	NB 80.000 INCHES	1	Nos	1 25 120	1 25 120
3065	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105005600	NB 88.000 INCHES	1	Nos	1 37 630	1 37 630

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3066	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105005900	NB 94.000 INCHES	1	Nos	1 47 010	1 47 010
3067	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10105007200	NB124.000 INCHES	1	Nos	1 93 930	1 93 930
3068	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10107000000	C.S CONC. REDUCERS; THK. <= 10MM				
3069	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10107001500	NB 6.000 INCHES	1	Nos	10 160	10 160
3070	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10107001600	NB 8.000 INCHES	1	Nos	13 540	13 540
3071	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10107001700	NB 10.000 INCHES	1	Nos	16 920	16 920
3072	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10107001800	NB 12.000 INCHES	1	Nos	20 310	20 310
3073	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10107001900	NB 14.000 INCHES	1	Nos	23 690	23 690
3074	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10107002000	NB 16.000 INCHES	1	Nos	27 080	27 080
3075	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10110000000	C.S ECC. REDUCERS; THK. <= 10MM				
3076	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10110001500	NB 6.000 INCHES	1	Nos	10 990	10 990
3077	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10110001600	NB 8.000 INCHES	1	Nos	14 650	14 650
3078	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10110001700	NB 10.000 INCHES	1	Nos	18 310	18 310
3079	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10110001800	NB 12.000 INCHES	1	Nos	21 990	21 990
3080	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10110001900	NB 14.000 INCHES	1	Nos	25 650	25 650
3081	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10110002000	NB 16.000 INCHES	1	Nos	29 310	29 310
3082	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10110002100	NB 18.000 INCHES	1	Nos	32 970	32 970
3083	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10110002200	NB 20.000 INCHES	1	Nos	40 280	40 280
3084	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111000000	C.S ECC. REDUCERS; THK. > 10MM AND <= 20MM				
3085	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111002400	NB 24.000 INCHES	1	Nos	58 100	58 100
3086	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111002500	NB 26.000 INCHES	1	Nos	62 940	62 940
3087	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111002600	NB 28.000 INCHES	1	Nos	67 790	67 790
3088	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111002700	NB 30.000 INCHES	1	Nos	72 630	72 630
3089	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111002800	NB 32.000 INCHES	1	Nos	77 470	77 470
3090	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111003000	NB 36.000 INCHES	1	Nos	87 150	87 150
3091	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111003200	NB 40.000 INCHES	1	Nos	96 840	96 840
3092	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111003600	NB 48.000 INCHES	1	Nos	1 28 030	1 28 030
3093	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111003900	NB 54.000 INCHES	1	Nos	1 44 030	1 44 030
3094	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111004200	NB 60.000 INCHES	1	Nos	1 60 040	1 60 040
3095	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111004500	NB 66.000 INCHES	1	Nos	1 59 780	1 59 780

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3096	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111004900	NB 74.000 INCHES	1	Nos	1 79 150	1 79 150
3097	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111005600	NB 88.000 INCHES	1	Nos	2 13 040	2 13 040
3098	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111005700	NB 90.000 INCHES	1	Nos	2 17 880	2 17 880
3099	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111005900	NB 94.000 INCHES	1	Nos	2 27 570	2 27 570
3100	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10111007200	NB124.000 INCHES	1	Nos	3 00 190	3 00 190
3101	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10900000000	PIPING (ABOVE GROUND) :-Transportation of all piping items from Owners storage point to work site/work shop; fabrication including cutting, edge preparation, (inclusive of grinding the edges of pipe, pipe spools, fittings, flanges etc. to match with the mating edges of uneven/different thickness wherever required); fit-up, bending, preheating wherever required, welding, threading, and laying of pipes and pipe spools(spools along with supports) of all types and thickness including full and partial jacketing according to attached Specification for Jacketed Piping over sleepers, overhead on racks and at all elevations, hook-ups with existing piping, connecting with equipment nozzles, strainers, steam traps, static mixers, sight flow indicators, thermal sleeve, orifice assemblies, spray nozzles, rotameters, tappings for pressure gauges, thermowells, sample connections, sample coolers, closed sample system cabinets etc. and fixing of gaskets, bolts, nuts including application of torque wherever required and all other inline instruments and fittings, like elbows, reducers, tees, flanges, spectacle blinds and spacer and blinds, piping specials such as mitres and fabricated fittings, vents, drains(but excluding reinforcing pads),SW valves upto 1.5 NB Steam Supply/Condensate Recovery stations(Cast/Fabricated),Supply and welding of Strip as per EIL Std 7-51-0112 to all pipes before hydro-testing at exit points of Units for earthing purpose, Steam Tracing as per 6-44-0007; alignment, cleaning and flushing by water/compressed air, hydrostatic, pneumatic, vacuum, spark testing and any other type of testing as specified draining, drying by compressed air, performing Positive Material Identification (PMI) using alloy analysers, completing all such works in all respects (including preparation of isometrics as mentioned in the Scope of Work for the job) as per the specifications, drawings and instructions of Engineer-in-Charge. PMI shall be performed by third party as defined in PMI spec. Rates for tubing (if any) shall include rates for valves, fittings, all in line instruments and testing etc. Carbon steel piping includes LTCS piping also. Erection of all inline instruments like flow				
3102	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901000000	CARBON STEEL PIPING (NON IBR); THK. <= 10MM				
3103	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901010000	FABRICATION (BUTT WELD- MANUAL)				
3104	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901019100	NB UPTO 1.5 INCH	8400	Inch Dia	800	67 20 000
3105	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901019200	NB 2 INCH - 6 INCH	75005	Inch Dia	800	6 00 04 000
3106	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901019300	NB 8 INCH - 14 INCH	23990	Inch Dia	800	1 91 92 000
3107	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901019400	NB 16 INCH - 24 INCH	12910	Inch Dia	800	1 03 28 000
3108	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901019500	NB 26 INCH - 36 INCH	11040	Inch Dia	800	88 32 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3109	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901020000	FABRICATION (FILLET WELD)				
3110	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901029100	NB UPTO 1.5 INCH	35000	Inch Dia	680	2 38 00 000
3111	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901029200	NB 2 INCH - 6 INCH	620	Inch Dia	680	4 21 600
3112	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901029300	NB 8 INCH - 14 INCH	370	Inch Dia	680	2 51 600
3113	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901029400	NB 16 INCH - 24 INCH	575	Inch Dia	680	3 91 000
3114	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901029500	NB 26 INCH - 36 INCH	185	Inch Dia	680	1 25 800
3115	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901029600	NB 38 INCH - 48 INCH	250	Inch Dia	680	1 70 000
3116	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3117	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901039300	NB 8 INCH - 14 INCH	10280	Inch Dia	1 010	1 03 82 800
3118	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901039400	NB 16 INCH - 24 INCH	5535	Inch Dia	1 010	55 90 350
3119	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901039500	NB 26 INCH - 36 INCH	4730	Inch Dia	1 010	47 77 300
3120	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901040000	ERECTION (OTHER THAN SPOOL)				
3121	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901049100	NB UPTO 1.5 INCH	28000	Inch M	290	81 20 000
3122	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901049200	NB 2 INCH - 6 INCH	143135	Inch M	290	4 15 09 150
3123	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901049300	NB 8 INCH - 14 INCH	47970	Inch M	290	1 39 11 300
3124	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901049400	NB 16 INCH - 24 INCH	7890	Inch M	290	22 88 100
3125	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901049500	NB 26 INCH - 36 INCH	39525	Inch M	300	1 18 57 500
3126	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901049600	NB 38 INCH - 48 INCH	155	Inch M	300	46 500
3127	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901049700	NB 50 INCH - 60 INCH	50	Inch M	300	15 000
3128	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901049800	ABOVE 60 INCH	140	Inch M	300	42 000
3129	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901050000	ERECTION (SPOOL)				
3130	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901059100	NB UPTO 1.5 INCH	840	Inch M	290	2 43 600
3131	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901059200	NB 2 INCH - 6 INCH	24820	Inch M	290	71 97 800
3132	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901059300	NB 8 INCH - 14 INCH	117090	Inch M	290	3 39 56 100
3133	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901059400	NB 16 INCH - 24 INCH	122640	Inch M	290	3 55 65 600
3134	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10901059500	NB 26 INCH - 36 INCH	57335	Inch M	300	1 72 00 500
3135	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902000000	CARBON STEEL PIPING (NON IBR); THK. > 10MM AND <= 20MM				
3136	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902010000	FABRICATION (BUTT WELD- MANUAL)				
3137	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902019200	NB 2 INCH - 6 INCH	7800	Inch Dia	950	74 10 000
3138	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902019300	NB 8 INCH - 14 INCH	3870	Inch Dia	950	36 76 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3139	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902019400	NB 16 INCH - 24 INCH	18495	Inch Dia	950	1 75 70 250
3140	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902019500	NB 26 INCH - 36 INCH	36195	Inch Dia	950	3 43 85 250
3141	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902019600	NB 38 INCH - 48 INCH	14430	Inch Dia	950	1 37 08 500
3142	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902019700	NB 50 INCH - 60 INCH	5595	Inch Dia	950	53 15 250
3143	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902019800	ABOVE 60 INCH	14905	Inch Dia	950	1 41 59 750
3144	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902020000	FABRICATION (FILLET WELD)				
3145	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902029100	NB UPTO 1.5 INCH	15	Inch Dia	800	12 000
3146	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3147	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902039300	NB 8 INCH - 14 INCH	1660	Inch Dia	1 180	19 58 800
3148	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902039400	NB 16 INCH - 24 INCH	7925	Inch Dia	1 180	93 51 500
3149	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902039500	NB 26 INCH - 36 INCH	15515	Inch Dia	1 180	1 83 07 700
3150	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902039600	NB 38 INCH - 48 INCH	6185	Inch Dia	1 180	72 98 300
3151	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902039700	NB 50 INCH - 60 INCH	2400	Inch Dia	1 180	28 32 000
3152	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902039800	ABOVE 60 INCH	6390	Inch Dia	1 180	75 40 200
3153	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902040000	ERECTION (OTHER THAN SPOOL)				
3154	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902049200	NB 2 INCH - 6 INCH	2375	Inch M	300	7 12 500
3155	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902049300	NB 8 INCH - 14 INCH	695	Inch M	300	2 08 500
3156	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902049400	NB 16 INCH - 24 INCH	19100	Inch M	300	57 30 000
3157	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902049500	NB 26 INCH - 36 INCH	113380	Inch M	300	3 40 14 000
3158	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902049600	NB 38 INCH - 48 INCH	62390	Inch M	330	2 05 88 700
3159	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902049700	NB 50 INCH - 60 INCH	27100	Inch M	330	89 43 000
3160	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902049800	ABOVE 60 INCH	162705	Inch M	330	5 36 92 650
3161	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902050000	ERECTION (SPOOL)				
3162	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902059100	NB UPTO 1.5 INCH	5	Inch M	300	1 500
3163	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902059200	NB 2 INCH - 6 INCH	1590	Inch M	300	4 77 000
3164	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902059300	NB 8 INCH - 14 INCH	34585	Inch M	300	1 03 75 500
3165	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902059400	NB 16 INCH - 24 INCH	63215	Inch M	300	1 89 64 500
3166	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10902059500	NB 26 INCH - 36 INCH	12485	Inch M	300	37 45 500
3167	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903000000	CARBON STEEL PIPING (NON IBR); THK. > 20MM AND <= 40MM				
3168	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903010000	FABRICATION (BUTT WELD- MANUAL)				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3169	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903019600	NB 38 INCH - 48 INCH	8275	Inch Dia	1 210	1 00 12 750
3170	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903019700	NB 50 INCH - 60 INCH	1320	Inch Dia	1 210	15 97 200
3171	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903019800	ABOVE 60 INCH	2235	Inch Dia	1 210	27 04 350
3172	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3173	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903039600	NB 38 INCH - 48 INCH	3550	Inch Dia	1 520	53 96 000
3174	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903039700	NB 50 INCH - 60 INCH	565	Inch Dia	1 520	8 58 800
3175	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903039800	ABOVE 60 INCH	960	Inch Dia	1 520	14 59 200
3176	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903040000	ERECTION (OTHER THAN SPOOL)				
3177	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903049600	NB 38 INCH - 48 INCH	51995	Inch M	330	1 71 58 350
3178	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903049700	NB 50 INCH - 60 INCH	7525	Inch M	330	24 83 250
3179	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10903049800	ABOVE 60 INCH	13085	Inch M	330	43 18 050
3180	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906000000	CARBON STEEL PIPING (IBR); THK. <= TO 10MM				
3181	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906010000	FABRICATION (BUTT WELD- MANUAL)				
3182	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906019100	NB UPTO 1.5 INCH	1120	Inch Dia	870	9 74 400
3183	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906019200	NB 2 INCH - 6 INCH	12210	Inch Dia	870	1 06 22 700
3184	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906019300	NB 8 INCH - 14 INCH	3790	Inch Dia	870	32 97 300
3185	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906019400	NB 16 INCH - 24 INCH	4055	Inch Dia	870	35 27 850
3186	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906019500	NB 26 INCH - 36 INCH	3615	Inch Dia	870	31 45 050
3187	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906020000	FABRICATION (FILLET WELD)				
3188	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906029100	NB UPTO 1.5 INCH	21000	Inch Dia	770	1 61 70 000
3189	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3190	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906039300	NB 8 INCH - 14 INCH	1625	Inch Dia	1 080	17 55 000
3191	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906039400	NB 16 INCH - 24 INCH	1740	Inch Dia	1 080	18 79 200
3192	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906039500	NB 26 INCH - 36 INCH	1550	Inch Dia	1 080	16 74 000
3193	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906040000	ERECTION (OTHER THAN SPOOL)				
3194	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906049100	NB UPTO 1.5 INCH	14000	Inch M	290	40 60 000
3195	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906049200	NB 2 INCH - 6 INCH	23500	Inch M	290	68 15 000
3196	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906049300	NB 8 INCH - 14 INCH	3440	Inch M	290	9 97 600
3197	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906049400	NB 16 INCH - 24 INCH	10	Inch M	290	2 900
3198	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906049500	NB 26 INCH - 36 INCH	24325	Inch M	300	72 97 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3199	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906049800	ABOVE 60 INCH	30	Inch M	300	9 000
3200	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906050000	ERECTION (SPOOL)				
3201	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906059100	NB UPTO 1.5 INCH	4200	Inch M	290	12 18 000
3202	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906059200	NB 2 INCH - 6 INCH	2700	Inch M	290	7 83 000
3203	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906059300	NB 8 INCH - 14 INCH	14240	Inch M	290	41 29 600
3204	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906059400	NB 16 INCH - 24 INCH	50755	Inch M	290	1 47 18 950
3205	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10906059500	NB 26 INCH - 36 INCH	8670	Inch M	300	26 01 000
3206	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907000000	CARBON STEEL PIPING (IBR); THK. > 10MM AND <= 20MM				
3207	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907010000	FABRICATION (BUTT WELD- MANUAL)				
3208	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907019200	NB 2 INCH - 6 INCH	1650	Inch Dia	1 020	16 83 000
3209	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907019300	NB 8 INCH - 14 INCH	895	Inch Dia	1 020	9 12 900
3210	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907019400	NB 16 INCH - 24 INCH	1995	Inch Dia	1 020	20 34 900
3211	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907019500	NB 26 INCH - 36 INCH	7160	Inch Dia	1 020	73 03 200
3212	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907019600	NB 38 INCH - 48 INCH	3345	Inch Dia	1 020	34 11 900
3213	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3214	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907039300	NB 8 INCH - 14 INCH	385	Inch Dia	1 270	4 88 950
3215	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907039400	NB 16 INCH - 24 INCH	855	Inch Dia	1 270	10 85 850
3216	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907039500	NB 26 INCH - 36 INCH	3070	Inch Dia	1 270	38 98 900
3217	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907039600	NB 38 INCH - 48 INCH	1435	Inch Dia	1 270	18 22 450
3218	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907040000	ERECTION (OTHER THAN SPOOL)				
3219	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907049200	NB 2 INCH - 6 INCH	5245	Inch M	300	15 73 500
3220	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907049300	NB 8 INCH - 14 INCH	785	Inch M	300	2 35 500
3221	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907049400	NB 16 INCH - 24 INCH	405	Inch M	300	1 21 500
3222	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907049500	NB 26 INCH - 36 INCH	33030	Inch M	300	99 09 000
3223	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907049600	NB 38 INCH - 48 INCH	22975	Inch M	300	68 92 500
3224	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907050000	ERECTION (SPOOL)				
3225	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907059200	NB 2 INCH - 6 INCH	35	Inch M	300	10 500
3226	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907059300	NB 8 INCH - 14 INCH	8645	Inch M	300	25 93 500
3227	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907059400	NB 16 INCH - 24 INCH	12375	Inch M	300	37 12 500
3228	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10907059500	NB 26 INCH - 36 INCH	4515	Inch M	300	13 54 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3229	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908000000	CARBON STEEL PIPING (IBR); THK. > 20MM AND <= 40MM				
3230	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908010000	FABRICATION (BUTT WELD- MANUAL)				
3231	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908019100	NB UPTO 1.5 INCH	15	Inch Dia	1 210	18 150
3232	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908019300	NB 8 INCH - 14 INCH	910	Inch Dia	1 210	11 01 100
3233	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908019400	NB 16 INCH - 24 INCH	1385	Inch Dia	1 210	16 75 850
3234	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908019500	NB 26 INCH - 36 INCH	130	Inch Dia	1 210	1 57 300
3235	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908019700	NB 50 INCH - 60 INCH	2040	Inch Dia	1 210	24 68 400
3236	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908019800	ABOVE 60 INCH	2775	Inch Dia	1 210	33 57 750
3237	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3238	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908039300	NB 8 INCH - 14 INCH	390	Inch Dia	1 520	5 92 800
3239	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908039400	NB 16 INCH - 24 INCH	595	Inch Dia	1 520	9 04 400
3240	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908039500	NB 26 INCH - 36 INCH	55	Inch Dia	1 520	83 600
3241	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908039700	NB 50 INCH - 60 INCH	875	Inch Dia	1 520	13 30 000
3242	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908039800	ABOVE 60 INCH	1190	Inch Dia	1 520	18 08 800
3243	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908040000	ERECTION (OTHER THAN SPOOL)				
3244	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908049300	NB 8 INCH - 14 INCH	2030	Inch M	330	6 69 900
3245	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908049400	NB 16 INCH - 24 INCH	30	Inch M	330	9 900
3246	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908049500	NB 26 INCH - 36 INCH	380	Inch M	330	1 25 400
3247	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908049700	NB 50 INCH - 60 INCH	10595	Inch M	330	34 96 350
3248	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908049800	ABOVE 60 INCH	19715	Inch M	330	65 05 950
3249	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908050000	ERECTION (SPOOL)				
3250	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908059300	NB 8 INCH - 14 INCH	870	Inch M	330	2 87 100
3251	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10908059400	NB 16 INCH - 24 INCH	21810	Inch M	330	71 97 300
3252	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10909000000	CARBON STEEL PIPING (IBR); THK. > 40MM AND <= 60MM				
3253	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10909010000	FABRICATION (BUTT WELD- MANUAL)				
3254	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10909019100	NB UPTO 1.5 INCH	15	Inch Dia	1 810	27 150
3255	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10909019300	NB 8 INCH - 14 INCH	10	Inch Dia	1 810	18 100
3256	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10909019400	NB 16 INCH - 24 INCH	105	Inch Dia	1 810	1 90 050
3257	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10909030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3258	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10909039300	NB 8 INCH - 14 INCH	5	Inch Dia	2 330	11 650

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3259	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10909039400	NB 16 INCH - 24 INCH	45	Inch Dia	2 330	1 04 850
3260	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10909050000	ERECTION (SPOOL)				
3261	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10909059400	NB 16 INCH - 24 INCH	3100	Inch M	500	15 50 000
3262	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911000000	STAINLESS STEEL PIPING (NON-IBR); THK. <= 10MM				
3263	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911010000	FABRICATION (BUTT WELD- MANUAL)				
3264	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911019100	NB UPTO 1.5 INCH	420	Inch Dia	1 580	6 63 600
3265	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911019200	NB 2 INCH - 6 INCH	1260	Inch Dia	1 580	19 90 800
3266	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911019300	NB 8 INCH - 14 INCH	1295	Inch Dia	1 580	20 46 100
3267	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911019400	NB 16 INCH - 24 INCH	435	Inch Dia	1 580	6 87 300
3268	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911020000	FABRICATION (FILLET WELD)				
3269	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911029100	NB UPTO 1.5 INCH	2100	Inch Dia	1 280	26 88 000
3270	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3271	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911039300	NB 8 INCH - 14 INCH	555	Inch Dia	1 970	10 93 350
3272	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911039400	NB 16 INCH - 24 INCH	185	Inch Dia	1 970	3 64 450
3273	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911040000	ERECTION (OTHER THAN SPOOL)				
3274	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911049100	NB UPTO 1.5 INCH	7000	Inch M	370	25 90 000
3275	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911049200	NB 2 INCH - 6 INCH	5	Inch M	370	1 850
3276	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911049300	NB 8 INCH - 14 INCH	5	Inch M	370	1 850
3277	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911050000	ERECTION (SPOOL)				
3278	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911059100	NB UPTO 1.5 INCH	665	Inch M	370	2 46 050
3279	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911059200	NB 2 INCH - 6 INCH	10130	Inch M	370	37 48 100
3280	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911059300	NB 8 INCH - 14 INCH	21245	Inch M	370	78 60 650
3281	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10911059400	NB 16 INCH - 24 INCH	7105	Inch M	370	26 28 850
3282	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912000000	STAINLESS STEEL PIPING (NON-IBR); THK. > 10MM AND <= 20MM				
3283	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912010000	FABRICATION (BUTT WELD- MANUAL)				
3284	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912019600	NB 38 INCH - 48 INCH	1965	Inch Dia	1 990	39 10 350
3285	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912019700	NB 50 INCH - 60 INCH	2460	Inch Dia	1 990	48 95 400
3286	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912019800	ABOVE 60 INCH	585	Inch Dia	1 990	11 64 150
3287	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3288	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912039600	NB 38 INCH - 48 INCH	845	Inch Dia	2 480	20 95 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3289	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912039700	NB 50 INCH - 60 INCH	1055	Inch Dia	2 480	26 16 400
3290	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912039800	ABOVE 60 INCH	250	Inch Dia	2 480	6 20 000
3291	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912040000	ERECTION (OTHER THAN SPOOL)				
3292	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912049600	NB 38 INCH - 48 INCH	18205	Inch M	430	78 28 150
3293	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912049700	NB 50 INCH - 60 INCH	25400	Inch M	430	1 09 22 000
3294	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10912049800	ABOVE 60 INCH	1060	Inch M	430	4 55 800
3295	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918000000	STAINLESS STEEL PIPING (IBR); THK. <= 10MM				
3296	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918010000	FABRICATION (BUTT WELD- MANUAL)				
3297	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918019200	NB 2 INCH - 6 INCH	65	Inch Dia	1 700	1 10 500
3298	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918019300	NB 8 INCH - 14 INCH	180	Inch Dia	1 700	3 06 000
3299	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918019400	NB 16 INCH - 24 INCH	40	Inch Dia	1 700	68 000
3300	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918020000	FABRICATION (FILLET WELD)				
3301	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918029100	NB UPTO 1.5 INCH	1680	Inch Dia	1 540	25 87 200
3302	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3303	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918039300	NB 8 INCH - 14 INCH	75	Inch Dia	2 120	1 59 000
3304	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918039400	NB 16 INCH - 24 INCH	20	Inch Dia	2 120	42 400
3305	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918040000	ERECTION (OTHER THAN SPOOL)				
3306	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918049100	NB UPTO 1.5 INCH	910	Inch M	370	3 36 700
3307	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918050000	ERECTION (SPOOL)				
3308	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918059100	NB UPTO 1.5 INCH	560	Inch M	370	2 07 200
3309	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918059200	NB 2 INCH - 6 INCH	45	Inch M	370	16 650
3310	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918059300	NB 8 INCH - 14 INCH	2370	Inch M	370	8 76 900
3311	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10918059400	NB 16 INCH - 24 INCH	80	Inch M	370	29 600
3312	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10919000000	STAINLESS STEEL PIPING (IBR); THK. > 10MM AND <=20MM				
3313	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10919010000	FABRICATION (BUTT WELD- MANUAL)				
3314	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10919019400	NB 16 INCH - 24 INCH	45	Inch Dia	2 130	95 850
3315	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10919030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3316	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10919039400	NB 16 INCH - 24 INCH	20	Inch Dia	2 660	53 200
3317	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10919050000	ERECTION (SPOOL)				
3318	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10919059400	NB 16 INCH - 24 INCH	80	Inch M	430	34 400

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3319	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925000000	ALLOY STEEL (OTHER THAN P91) PIPING (NON-IBR); THK. <= 10MM				
3320	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925010000	FABRICATION (BUTT WELD- MANUAL)				
3321	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925019200	NB 2 INCH - 6 INCH	155	Inch Dia	1 370	2 12 350
3322	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925020000	FABRICATION (FILLET WELD)				
3323	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925029100	NB UPTO 1.5 INCH	1400	Inch Dia	1 210	16 94 000
3324	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3325	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925040000	ERECTION (OTHER THAN SPOOL)				
3326	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925049500	NB 26 INCH - 36 INCH	5	Inch M	330	1 650
3327	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925050000	ERECTION (SPOOL)				
3328	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925059100	NB UPTO 1.5 INCH	700	Inch M	330	2 31 000
3329	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10925059200	NB 2 INCH - 6 INCH	325	Inch M	330	1 07 250
3330	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926000000	ALLOY STEEL (OTHER THAN P91) PIPING (NON-IBR); THK. > 10MM AND <= 20MM				
3331	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926010000	FABRICATION (BUTT WELD- MANUAL)				
3332	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926019300	NB 8 INCH - 14 INCH	50	Inch Dia	1 760	88 000
3333	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926019500	NB 26 INCH - 36 INCH	190	Inch Dia	1 760	3 34 400
3334	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926019600	NB 38 INCH - 48 INCH	35	Inch Dia	1 760	61 600
3335	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3336	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926039300	NB 8 INCH - 14 INCH	20	Inch Dia	2 190	43 800
3337	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926039500	NB 26 INCH - 36 INCH	80	Inch Dia	2 190	1 75 200
3338	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926039600	NB 38 INCH - 48 INCH	15	Inch Dia	2 190	32 850
3339	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926050000	ERECTION (SPOOL)				
3340	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926059300	NB 8 INCH - 14 INCH	530	Inch M	370	1 96 100
3341	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926059500	NB 26 INCH - 36 INCH	3475	Inch M	370	12 85 750
3342	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10926059600	NB 38 INCH - 48 INCH	1020	Inch M	370	3 77 400
3343	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10931000000	ALLOY STEEL (OTHER THAN P91) PIPING (IBR); THK. <= 10MM				
3344	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10931020000	FABRICATION (FILLET WELD)				
3345	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10931029100	NB UPTO 1.5 INCH	210	Inch Dia	1 310	2 75 100
3346	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10931050000	ERECTION (SPOOL)				
3347	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10931059100	NB UPTO 1.5 INCH	95	Inch M	330	31 350
3348	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10932000000	ALLOY STEEL (OTHER THAN P91) PIPING (IBR); THK. > 10MM AND <= 20MM				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3349	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10932010000	FABRICATION (BUTT WELD- MANUAL)				
3350	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10932019200	NB 2 INCH - 6 INCH	35	Inch Dia	1 990	69 650
3351	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10932030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3352	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10932050000	ERECTION (SPOOL)				
3353	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10932059200	NB 2 INCH - 6 INCH	375	Inch M	370	1 38 750
3354	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10944000000	STEAM TRACERS CARBON STEEL				
3355	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10944000400	NB 0.500 INCHES	10	Metres	950	9 500
3356	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10944000500	NB 0.750 INCHES	385	Metres	950	3 65 750
3357	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10945000000	STEAM TRACERS STAINLESS STEEL				
3358	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10945000400	NB 0.500 INCHES	10	Metres	1 830	18 300
3359	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10945000500	NB 0.750 INCHES	65	Metres	1 830	1 18 950
3360	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10957000000	INCOLOY PIPING; THK. <= 10MM				
3361	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10957010000	FABRICATION (BUTT WELD- MANUAL)				
3362	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10957019100	NB UPTO 1.5 INCH	5	Inch Dia	4 120	20 600
3363	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10957019200	NB 2 INCH - 6 INCH	125	Inch Dia	4 120	5 15 000
3364	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10957030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3365	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10957050000	ERECTION (SPOOL)				
3366	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10957059100	NB UPTO 1.5 INCH	5	Inch M	840	4 200
3367	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10957059200	NB 2 INCH - 6 INCH	460	Inch M	840	3 86 400
3368	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10969000000	ALLOY 20 PIPING; THK. <= 10MM				
3369	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10969010000	FABRICATION (BUTT WELD- MANUAL)				
3370	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10969019100	NB UPTO 1.5 INCH	5	Inch Dia	2 890	14 450
3371	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10969019200	NB 2 INCH - 6 INCH	180	Inch Dia	2 890	5 20 200
3372	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10969020000	FABRICATION (FILLET WELD)				
3373	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10969029100	NB UPTO 1.5 INCH	30	Inch Dia	2 370	71 100
3374	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10969030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3375	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10969050000	ERECTION (SPOOL)				
3376	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10969059100	NB UPTO 1.5 INCH	15	Inch M	600	9 000
3377	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10969059200	NB 2 INCH - 6 INCH	740	Inch M	600	4 44 000
3378	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10977000000	INCONEL PIPING; THK. <= 10MM				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3379	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10977010000	FABRICATION (BUTT WELD- MANUAL)				
3380	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10977019200	NB 2 INCH - 6 INCH	10	Inch Dia	4 120	41 200
3381	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10977020000	FABRICATION (FILLET WELD)				
3382	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10977029100	NB UPTO 1.5 INCH	5	Inch Dia	3 380	16 900
3383	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10977030000	FABRICATION (BUTT WELD-AUTOMATIC/MECHANIZED/ROBOTIC/ORBITAL)				
3384	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10977050000	ERECTION (SPOOL)				
3385	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10977059100	NB UPTO 1.5 INCH	5	Inch M	840	4 200
3386	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M10977059200	NB 2 INCH - 6 INCH	5	Inch M	840	4 200
3387	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11400000000	ERECTION OF TEFLON LINED PIPING				
3388	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11400001100	NB 3.000 INCHES	30	Metres	580	17 400
3389	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11400001800	NB 12.000 INCHES	10	Metres	580	5 800
3390	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11600000000	VALVES :- Transportation of all types of valves (Including special valves and motor operated valves) from Owners storage points to contractors stores/worksite and installation of valves for all rating including assembly of valves accessories like air bottles etc, if any, fixing of gaskets bolts/nuts wherever required and performing Positive Material Identification(PMI) using alloy analysers as per specification, drawings and directions of Engineer-in-Charge. Note : For PRDS, PSVs, TSVs, Control valves, On-Off/Shutdown valves and Self actuating valves all details and rates shall be as per Instrumentation SOR.				
3391	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601000000	FLANGED/WAFER VALVES INCLUDING MOV (UPTO 600#)				
3392	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601000400	NB 0.500 INCHES	3	Nos	630	1 890
3393	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601000500	NB 0.750 INCHES	230	Nos	630	1 44 900
3394	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601000600	NB 1.000 INCHES	44	Nos	630	27 720
3395	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601000800	NB 1.500 INCHES	52	Nos	950	49 400
3396	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601000900	NB 2.000 INCHES	1829	Nos	990	18 10 710
3397	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601001100	NB 3.000 INCHES	562	Nos	1 480	8 31 760
3398	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601001300	NB 4.000 INCHES	307	Nos	1 980	6 07 860
3399	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601001500	NB 6.000 INCHES	371	Nos	2 950	10 94 450
3400	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601001600	NB 8.000 INCHES	260	Nos	3 940	10 24 400
3401	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601001700	NB 10.000 INCHES	202	Nos	4 930	9 95 860
3402	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601001800	NB 12.000 INCHES	138	Nos	5 920	8 16 960

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3403	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601001900	NB 14.000 INCHES	48	Nos	6 900	3 31 200
3404	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601002000	NB 16.000 INCHES	49	Nos	7 880	3 86 120
3405	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601002100	NB 18.000 INCHES	74	Nos	8 870	6 56 380
3406	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601002200	NB 20.000 INCHES	105	Nos	9 860	10 35 300
3407	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601002300	NB 22.000 INCHES	3	Nos	10 840	32 520
3408	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601002400	NB 24.000 INCHES	118	Nos	11 820	13 94 760
3409	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601002600	NB 28.000 INCHES	4	Nos	13 800	55 200
3410	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601002700	NB 30.000 INCHES	20	Nos	18 960	3 79 200
3411	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601002800	NB 32.000 INCHES	4	Nos	20 220	80 880
3412	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601002900	NB 34.000 INCHES	16	Nos	21 490	3 43 840
3413	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601003000	NB 36.000 INCHES	40	Nos	22 760	9 10 400
3414	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601003300	NB 42.000 INCHES	14	Nos	26 540	3 71 560
3415	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601003600	NB 48.000 INCHES	10	Nos	30 340	3 03 400
3416	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601004000	NB 56.000 INCHES	1	Nos	35 390	35 390
3417	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601004500	NB 66.000 INCHES	1	Nos	41 710	41 710
3418	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601005100	NB 78.000 INCHES	1	Nos	49 300	49 300
3419	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11601005600	NB 88.000 INCHES	1	Nos	55 620	55 620
3420	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11606000000	CARBON STEEL/LTCS BW VALVES INCLUDING MOV (IBR)				
3421	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11606000500	NB 0.750 INCHES	35	Nos	1 250	43 750
3422	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11606000600	NB 1.000 INCHES	1	Nos	1 240	1 240
3423	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11606001100	NB 3.000 INCHES	21	Nos	3 020	63 420
3424	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11606001600	NB 8.000 INCHES	4	Nos	8 060	32 240
3425	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11606001800	NB 12.000 INCHES	8	Nos	12 080	96 640
3426	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11606002000	NB 16.000 INCHES	4	Nos	16 110	64 440
3427	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11611000000	TEFLON LINED VALVES				
3428	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11611001100	NB 3.000 INCHES	1	Nos	6 040	6 040

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3429	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11900000000	SPRING SUPPORT ASSEMBLIES :- Transportation of all types of spring support assemblies from Owner's storage points to contractor's stores/worksite and installation of spring support assemblies for all rating including assembly, if any, fixing of gaskets bolts/nuts, welding attachments wherever required and performing Positive Material Identification(PMI) using alloy analysers as per specification, drawings and directions of Engineer-in-Charge. Contractor to ensure that travel stops are removed and spring is locked in cold load position for Hydrotest. It shall be ensured that locking devices are removed and springs are properly set at hot load position during commissioning.				
3430	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M11901000000		39	MT	83 650	32 62 350
3431	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12000000000	BOLT TENSIONING :- Carrying out tensioning of bolted joints on all types of piping as called for in EIL Specification No.6-76-0002 on already erected system including supply of all materials, recording devices, instruments etc; Providing all normal and special equipment and gadgets, skilled / un skilled labour, specialist, supervisory staff and completing the work in all respects as per specifications and instructions of engineer-in-charge. some joints may require bolt tensioning more than once, but, payment for one joint shall be made only once.				
3432	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001000000	150# JOINTS				
3433	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001001900	NB 14.000 INCHES	126	Nos	4 800	6 04 800
3434	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001002000	NB 16.000 INCHES	134	Nos	5 480	7 34 320
3435	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001002100	NB 18.000 INCHES	152	Nos	6 170	9 37 840
3436	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001002200	NB 20.000 INCHES	387	Nos	6 850	26 50 950
3437	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001002400	NB 24.000 INCHES	221	Nos	8 230	18 18 830
3438	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001002600	NB 28.000 INCHES	22	Nos	9 600	2 11 200
3439	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001002700	NB 30.000 INCHES	104	Nos	10 290	10 70 160
3440	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001002800	NB 32.000 INCHES	23	Nos	15 770	3 62 710
3441	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001002900	NB 34.000 INCHES	7	Nos	16 750	1 17 250
3442	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001003000	NB 36.000 INCHES	52	Nos	17 740	9 22 480
3443	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001003200	NB 40.000 INCHES	7	Nos	19 710	1 37 970
3444	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001003300	NB 42.000 INCHES	26	Nos	20 700	5 38 200
3445	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001003600	NB 48.000 INCHES	42	Nos	23 650	9 93 300
3446	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001003800	NB 52.000 INCHES	1	Nos	25 620	25 620
3447	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001004000	NB 56.000 INCHES	3	Nos	27 590	82 770

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3448	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001004200	NB 60.000 INCHES	9	Nos	29 570	2 66 130
3449	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001004400	NB 64.000 INCHES	1	Nos	31 540	31 540
3450	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001004800	NB 72.000 INCHES	1	Nos	35 480	35 480
3451	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001005000	NB 76.000 INCHES	1	Nos	37 450	37 450
3452	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001005600	NB 88.000 INCHES	1	Nos	43 360	43 360
3453	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12001005900	NB 94.000 INCHES	8	Nos	46 320	3 70 560
3454	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002000000	300# JOINTS				
3455	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002001700	NB 10.000 INCHES	286	Nos	4 930	14 09 980
3456	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002001800	NB 12.000 INCHES	265	Nos	5 920	15 68 800
3457	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002001900	NB 14.000 INCHES	87	Nos	6 900	6 00 300
3458	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002002000	NB 16.000 INCHES	83	Nos	7 880	6 54 040
3459	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002002100	NB 18.000 INCHES	125	Nos	8 870	11 08 750
3460	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002002200	NB 20.000 INCHES	127	Nos	9 860	12 52 220
3461	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002002300	NB 22.000 INCHES	7	Nos	10 840	75 880
3462	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002002400	NB 24.000 INCHES	146	Nos	11 820	17 25 720
3463	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002002500	NB 26.000 INCHES	14	Nos	12 810	1 79 340
3464	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002002600	NB 28.000 INCHES	26	Nos	13 800	3 58 800
3465	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002002700	NB 30.000 INCHES	109	Nos	14 780	16 11 020
3466	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002002800	NB 32.000 INCHES	4	Nos	20 230	80 920
3467	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002002900	NB 34.000 INCHES	18	Nos	21 490	3 86 820
3468	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002003000	NB 36.000 INCHES	195	Nos	22 760	44 38 200
3469	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002003300	NB 42.000 INCHES	55	Nos	26 540	14 59 700
3470	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002003600	NB 48.000 INCHES	8	Nos	30 340	2 42 720
3471	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002003900	NB 54.000 INCHES	16	Nos	34 130	5 46 080
3472	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002004000	NB 56.000 INCHES	12	Nos	35 390	4 24 680
3473	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002004200	NB 60.000 INCHES	3	Nos	37 920	1 13 760
3474	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002004500	NB 66.000 INCHES	4	Nos	41 710	1 66 840
3475	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002004600	NB 68.000 INCHES	1	Nos	42 980	42 980
3476	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002004800	NB 72.000 INCHES	1	Nos	45 500	45 500
3477	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12002005100	NB 78.000 INCHES	8	Nos	49 300	3 94 400

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3478	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004000000	600# JOINTS				
3479	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004001500	NB 6.000 INCHES	103	Nos	3 800	3 91 400
3480	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004001600	NB 8.000 INCHES	38	Nos	5 050	1 91 900
3481	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004001700	NB 10.000 INCHES	21	Nos	6 320	1 32 720
3482	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004001800	NB 12.000 INCHES	40	Nos	7 580	3 03 200
3483	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004002100	NB 18.000 INCHES	38	Nos	11 380	4 32 440
3484	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004002200	NB 20.000 INCHES	4	Nos	12 640	50 560
3485	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004002400	NB 24.000 INCHES	26	Nos	15 170	3 94 420
3486	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004002700	NB 30.000 INCHES	4	Nos	18 960	75 840
3487	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004002800	NB 32.000 INCHES	3	Nos	25 710	77 130
3488	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12004003300	NB 42.000 INCHES	1	Nos	33 750	33 750
3489	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12006000000	1500# JOINTS				
3490	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12006000800	NB 1.500 INCHES	10	Nos	1 410	14 100
3491	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12006001100	NB 3.000 INCHES	7	Nos	2 830	19 810
3492	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12006001300	NB 4.000 INCHES	4	Nos	3 770	15 080
3493	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12006001500	NB 6.000 INCHES	8	Nos	5 660	45 280
3494	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12006001600	NB 8.000 INCHES	4	Nos	7 540	30 160
3495	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12006001700	NB 10.000 INCHES	4	Nos	9 430	37 720
3496	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12006002100	NB 18.000 INCHES	4	Nos	16 970	67 880
3497	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007000000	2500# JOINTS				
3498	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007000800	NB 1.500 INCHES	5	Nos	1 620	8 100
3499	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007000900	NB 2.000 INCHES	18	Nos	2 160	38 880
3500	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007001300	NB 4.000 INCHES	1	Nos	4 330	4 330
3501	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007001500	NB 6.000 INCHES	1	Nos	6 490	6 490
3502	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007001600	NB 8.000 INCHES	1	Nos	8 660	8 660
3503	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007001700	NB 10.000 INCHES	1	Nos	10 820	10 820
3504	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007001800	NB 12.000 INCHES	21	Nos	12 980	2 72 580
3505	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007001900	NB 14.000 INCHES	1	Nos	15 150	15 150
3506	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007002000	NB 16.000 INCHES	1	Nos	17 310	17 310
3507	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007002100	NB 18.000 INCHES	1	Nos	19 470	19 470

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3508	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007002400	NB 24.000 INCHES	21	Nos	25 970	5 45 370
3509	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12007002700	NB 30.000 INCHES	1	Nos	32 460	32 460
3510	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12100000000	REINFORCING PADS FOR PIPES :- Fabrication of reinforcing pads for pipe connection wherever required (from pipes only supplied by the Owner) and erection, fitup, welding & testing (including DP/MP) if required of the same and performing Positive Material Identification(PMI) using alloy analysers as per the specifications, drawings and instructions of the Engineer-in-Charge. Note: Sizes mentioned for Reinforcing Pads are for branch pipe				
3511	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101000000	C.S REINFORCING PADS				
3512	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101000900	NB 2.000 INCHES	437	Nos	2 740	11 97 380
3513	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101001100	NB 3.000 INCHES	153	Nos	4 110	6 28 830
3514	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101001300	NB 4.000 INCHES	159	Nos	5 480	8 71 320
3515	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101001500	NB 6.000 INCHES	138	Nos	8 230	11 35 740
3516	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101001600	NB 8.000 INCHES	91	Nos	10 970	9 98 270
3517	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101001700	NB 10.000 INCHES	135	Nos	13 710	18 50 850
3518	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101001800	NB 12.000 INCHES	53	Nos	16 450	8 71 850
3519	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101001900	NB 14.000 INCHES	20	Nos	19 200	3 84 000
3520	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101002000	NB 16.000 INCHES	35	Nos	21 940	7 67 900
3521	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101002100	NB 18.000 INCHES	43	Nos	24 680	10 61 240
3522	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101002200	NB 20.000 INCHES	53	Nos	27 420	14 53 260
3523	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101002400	NB 24.000 INCHES	57	Nos	37 020	21 10 140
3524	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101002500	NB 26.000 INCHES	1	Nos	40 110	40 110
3525	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101002600	NB 28.000 INCHES	17	Nos	43 190	7 34 230
3526	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101002700	NB 30.000 INCHES	5	Nos	46 280	2 31 400
3527	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101002800	NB 32.000 INCHES	3	Nos	49 360	1 48 080
3528	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101002900	NB 34.000 INCHES	10	Nos	52 450	5 24 500
3529	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101003000	NB 36.000 INCHES	30	Nos	55 530	16 65 900
3530	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101003200	NB 40.000 INCHES	22	Nos	91 270	20 07 940
3531	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101003300	NB 42.000 INCHES	47	Nos	95 830	45 04 010
3532	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101003400	NB 44.000 INCHES	7	Nos	1 00 390	7 02 730
3533	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101003600	NB 48.000 INCHES	1	Nos	1 09 520	1 09 520

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3534	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101004300	NB 62.000 INCHES	1	Nos	1 41 460	1 41 460
3535	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12101004400	NB 64.000 INCHES	3	Nos	1 46 030	4 38 090
3536	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12102000000	A.S REINFORCING PADS				
3537	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12102000900	NB 2.000 INCHES	13	Nos	4 560	59 280
3538	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12102001300	NB 4.000 INCHES	3	Nos	9 130	27 390
3539	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12102001600	NB 8.000 INCHES	3	Nos	18 250	54 750
3540	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12102001700	NB 10.000 INCHES	3	Nos	22 820	68 460
3541	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103000000	S.S REINFORCING PADS				
3542	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103000900	NB 2.000 INCHES	9	Nos	4 860	43 740
3543	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103001100	NB 3.000 INCHES	3	Nos	7 290	21 870
3544	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103001300	NB 4.000 INCHES	3	Nos	9 730	29 190
3545	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103001500	NB 6.000 INCHES	9	Nos	14 590	1 31 310
3546	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103001600	NB 8.000 INCHES	5	Nos	19 450	97 250
3547	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103001700	NB 10.000 INCHES	5	Nos	24 320	1 21 600
3548	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103001800	NB 12.000 INCHES	3	Nos	29 180	87 540
3549	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103002000	NB 16.000 INCHES	1	Nos	38 910	38 910
3550	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103002100	NB 18.000 INCHES	1	Nos	43 770	43 770
3551	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103002200	NB 20.000 INCHES	3	Nos	48 630	1 45 890
3552	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103002400	NB 24.000 INCHES	1	Nos	65 300	65 300
3553	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12103002700	NB 30.000 INCHES	1	Nos	81 630	81 630
3554	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12300000000	DYE PENETRATION/MAGNETIC PARTICLE TEST :- Performance of magnetic particle/ dye penetrant test including supply of all necessary materials, equipment and labour for carrying out the work as per specification and directions of Engineer-in-Charge.				
3555	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12301000000	DYE PENETRANT TEST	67574	Inches	80	54 05 920

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3556	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12400000000	PIPE SUPPORTS (FROM MATERIALS SUPPLIED BY OWNER) :- Fabrication, erection(at all elevations) of pipe supports like shoes, cradles, hangers, clamps(of all sizes/thicknesses manufactured by forming method using die), turn buckles, saddles, guides, special supports, pads(including corrosion pads & protection shields), providing and welding of stiffeners as per drawings, T post etc. of all types including supply and application one coat of primer, all necessary equipments, consumables, labour, returning surplus materials and scrap etc to owner's storage points and completing work as per drawings, specifications and instructions of Engineer-in-charge. Modifications/rectifications, if required; and adjustment/ alignment during precommisioning, commisioning as per the instructions of Engineer-in-charge. Fabrication of extension of spindle for valves, provision of locking arrangement, etc. shall also be considered under this item.				
3557	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12404000000	DUMMY PIPE SUPPORTS FOR C.S (OWNER SUPPLIED)	228	MT	73 350	1 67 23 800
3558	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12405000000	DUMMY PIPE SUPPORTS FOR S.S (OWNER SUPPLIED)	10	MT	1 46 690	14 66 900
3559	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12406000000	DUMMY PIPE SUPPORTS FOR A.S (OWNER SUPPLIED)	1	MT	1 10 020	1 10 020
3560	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12500000000	PIPE SUPPORTS (FROM MATERIALS SUPPLIED BY CONTRACTOR) :- Fabrication, erection(at all elevations) of pipe supports like shoes, cradles, hangers, clamps(of all sizes/thicknesses manufactured by forming method using die), turn buckles, saddles, guides, special supports, pads(including corrosion pads & protection shields), providing and welding of stiffeners as per drawings, T post etc. of all types including supply and application one coat of primer, all necessary equipments, consumables, labour, and completing work as per drawings, specifications and instructions of Engineer-in-charge. Modifications/rectifications, if required; and adjustment/ alignment during precommisioning, commisioning as per the instructions of Engineer-in-charge. Fabrication of extension of spindle for valves, provision of locking arrangement, etc. shall also be considered under this item.				
3561	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12501000000	C.S STRUCTURAL STEEL (CONTRACTOR SUPPLIED)	910	MT	1 36 830	12 45 15 300
3562	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12502000000	S.S STRUCTURAL STEEL (CONTRACTOR SUPPLIED)	5	MT	4 10 510	20 52 550
3563	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12503000000	A.S STRUCTURAL STEEL (CONTRACTOR SUPPLIED)	1	MT	3 61 240	3 61 240

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3564	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12600000000	HARDNESS TEST :- Carrying out hardness testing of weld joints on all types of piping as called for on shop / site fabricated already erected system including supply of all materials, instrument set., providing all normal and special equipment and gadgets, skilled / unskilled labour, specialist, supervisory staff and completing the work in all respects as per specifications and instructions of engineer-in-charge. The joints under this head do not include Stress Relieved joints. Joints which do not meet the hardness requirement as per spec shall be stress relieved and re tested on contractors cost. No seperate payment shall be made for this. . NOTE : Unit for hardness testing quantity is Nos. of Test Spots.				
3565	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12601000000	NUMBER OF TEST SPOTS	9443	Nos	320	30 21 760
3566	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700000000	STRESS RELIEVING :- Carrying out stress relieving of weld joints, including all types of attachment welds (corrosion pads, protection shields, supports, etc.), as applicable, on all types of piping as called for on shop/site fabricated already erected system including supply of all materials, consumables recording devices, insulation materials, instruments etc., providing all normal and special equipment and gadgets, skilled/unskilled labour, specialist, supervisory staff and completing the work in all respects as per specifications and instructions of Engineer-in-Charge. Repeat performance due to defective stress relieving or any other account shall be on Contractors cost. Payment shall be done only after submission and approval of charts. Stress relieving shall be followed by measurement of hardness and no separate payment shall be made for this. Note: Unit for stress relieving quantity is Nos of circumferential weld joints				
3567	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700000400	NB 0.500 INCHES	27	Nos	220	5 940
3568	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700000500	NB 0.750 INCHES	2387	Nos	300	7 16 100
3569	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700000600	NB 1.000 INCHES	939	Nos	430	4 03 770
3570	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700000800	NB 1.500 INCHES	855	Nos	520	4 44 600
3571	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700000900	NB 2.000 INCHES	7328	Nos	490	35 90 720
3572	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700001100	NB 3.000 INCHES	3709	Nos	740	27 44 660
3573	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700001300	NB 4.000 INCHES	1530	Nos	990	15 14 700
3574	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700001500	NB 6.000 INCHES	2330	Nos	1 480	34 48 400
3575	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700001600	NB 8.000 INCHES	1815	Nos	1 980	35 93 700
3576	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700001700	NB 10.000 INCHES	1576	Nos	2 460	38 76 960
3577	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700001800	NB 12.000 INCHES	1548	Nos	2 950	45 66 600
3578	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700001900	NB 14.000 INCHES	157	Nos	3 450	5 41 650

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3579	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700002000	NB 16.000 INCHES	299	Nos	3 940	11 78 060
3580	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700002100	NB 18.000 INCHES	117	Nos	4 440	5 19 480
3581	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700002200	NB 20.000 INCHES	274	Nos	4 930	13 50 820
3582	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700002300	NB 22.000 INCHES	34	Nos	5 420	1 84 280
3583	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700002400	NB 24.000 INCHES	1010	Nos	5 920	59 79 200
3584	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700002500	NB 26.000 INCHES	5	Nos	6 410	32 050
3585	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700002600	NB 28.000 INCHES	34	Nos	6 900	2 34 600
3586	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700002700	NB 30.000 INCHES	294	Nos	7 390	21 72 660
3587	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700002800	NB 32.000 INCHES	12	Nos	7 880	94 560
3588	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700002900	NB 34.000 INCHES	9	Nos	8 380	75 420
3589	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700003000	NB 36.000 INCHES	160	Nos	8 870	14 19 200
3590	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700003300	NB 42.000 INCHES	16	Nos	10 350	1 65 600
3591	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700003400	NB 44.000 INCHES	51	Nos	10 840	5 52 840
3592	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700003600	NB 48.000 INCHES	64	Nos	11 820	7 56 480
3593	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700003900	NB 54.000 INCHES	5	Nos	13 300	66 500
3594	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700004000	NB 56.000 INCHES	113	Nos	13 800	15 59 400
3595	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700004600	NB 68.000 INCHES	33	Nos	16 750	5 52 750
3596	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12700005100	NB 78.000 INCHES	99	Nos	19 220	19 02 780
3597	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12800000000	WOODEN/HIGH DENSITY PUF SUPPORTS FOR COLD LINES :- Supply, shaping, positioning and fixing of cold line supports as per EIL pipe support standard having the following specifications: Wood specification: Hard wood, chemically treated with creosote under pressure. Quality of wood to conform class-I durability as per IS-3629 & Grade-I timber of Group-A with permissible compression strength of 70 Kg/cm2 perpendicular to grains as per IS-883. PUF specifications: Density for lines upto 6" NB : 240 kg/cm3 Density for lines above 6" NB : 320 kg/cm3				
3598	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12801000000	WOODEN BLOCKS	20	Cu. M	1 08 090	21 61 800
3599	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12802000000	HIGH DENSITY (240 Kg/Cu.M) PUF BLOCKS	26	Cu. M	81 730	21 24 980
3600	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12803000000	HIGH DENSITY (320 Kg/Cu.M) PUF BLOCKS	91	Cu. M	1 34 430	1 22 33 130

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3601	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12900000000	Ultrasonic Testing (UT) :- Performance of UT inspection on piping of all types and thicknesses including providing or hiring of all necessary equipment and whatever else even though not expressly mentioned but required to perform the work as per specifications and instructions of Engineer-in-Charge. UT shall be submitted to the Engineer-in-charge. (Repeat UT due to defective UT on repaired joints due to Contractors fault and for additional UT necessitated due to poor performance of contractors welders shall be done at contractors cost) Note: Unit for UT quantity is Nos of circumferencial weld joints.				
3602	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901000000	FOR JOINTS THK. <= 8MM (FOR CS OTHER THAN CLASS IV OF JOB NDE SPECIFICATION)				
3603	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901000500	NB 0.750 INCHES	40	Nos	480	19 200
3604	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901000600	NB 1.000 INCHES	14	Nos	480	6 720
3605	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901000800	NB 1.500 INCHES	13	Nos	730	9 490
3606	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901000900	NB 2.000 INCHES	307	Nos	970	2 97 790
3607	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901001100	NB 3.000 INCHES	200	Nos	1 450	2 90 000
3608	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901001300	NB 4.000 INCHES	90	Nos	1 920	1 72 800
3609	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901001500	NB 6.000 INCHES	183	Nos	2 890	5 28 870
3610	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901001600	NB 8.000 INCHES	1	Nos	3 860	3 860
3611	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901001800	NB 12.000 INCHES	1	Nos	5 780	5 780
3612	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901001900	NB 14.000 INCHES	1	Nos	6 750	6 750
3613	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901002000	NB 16.000 INCHES	1	Nos	7 710	7 710
3614	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12901002400	NB 24.000 INCHES	1	Nos	11 570	11 570
3615	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902000000	FOR JOINTS THK. <= 8MM (FOR CS AS PER CLASS IV OF JOB NDE SPECIFICATION/AS/SS)				
3616	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902000500	NB 0.750 INCHES	16	Nos	560	8 960
3617	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902000600	NB 1.000 INCHES	3	Nos	560	1 680
3618	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902000800	NB 1.500 INCHES	9	Nos	830	7 470
3619	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902000900	NB 2.000 INCHES	120	Nos	1 110	1 33 200
3620	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902001100	NB 3.000 INCHES	65	Nos	1 670	1 08 550
3621	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902001300	NB 4.000 INCHES	4	Nos	2 230	8 920
3622	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902001500	NB 6.000 INCHES	9	Nos	3 340	30 060
3623	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902001600	NB 8.000 INCHES	33	Nos	4 460	1 47 180
3624	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902001700	NB 10.000 INCHES	27	Nos	5 570	1 50 390

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3625	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902001800	NB 12.000 INCHES	5	Nos	6 690	33 450
3626	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902002000	NB 16.000 INCHES	16	Nos	8 910	1 42 560
3627	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902002100	NB 18.000 INCHES	5	Nos	10 030	50 150
3628	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12902002400	NB 24.000 INCHES	4	Nos	13 370	53 480
3629	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903000000	FOR JOINTS ABOVE THK. 8MM				
3630	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903000500	NB 0.750 INCHES	31	Nos	620	19 220
3631	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903000600	NB 1.000 INCHES	1	Nos	620	620
3632	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903000900	NB 2.000 INCHES	22	Nos	1 250	27 500
3633	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903001100	NB 3.000 INCHES	34	Nos	1 860	63 240
3634	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903001300	NB 4.000 INCHES	17	Nos	2 490	42 330
3635	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903001500	NB 6.000 INCHES	22	Nos	3 730	82 060
3636	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903001600	NB 8.000 INCHES	153	Nos	4 970	7 60 410
3637	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903001700	NB 10.000 INCHES	104	Nos	6 210	6 45 840
3638	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903001800	NB 12.000 INCHES	118	Nos	7 460	8 80 280
3639	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903001900	NB 14.000 INCHES	9	Nos	8 690	78 210
3640	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903002000	NB 16.000 INCHES	34	Nos	9 940	3 37 960
3641	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903002100	NB 18.000 INCHES	31	Nos	11 180	3 46 580
3642	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903002200	NB 20.000 INCHES	42	Nos	12 430	5 22 060
3643	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903002400	NB 24.000 INCHES	65	Nos	14 910	9 69 150
3644	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903002600	NB 28.000 INCHES	3	Nos	17 400	52 200
3645	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903002700	NB 30.000 INCHES	34	Nos	18 640	6 33 760
3646	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903002800	NB 32.000 INCHES	3	Nos	19 880	59 640
3647	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903002900	NB 34.000 INCHES	1	Nos	21 120	21 120
3648	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903003000	NB 36.000 INCHES	31	Nos	22 370	6 93 470
3649	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903003200	NB 40.000 INCHES	21	Nos	24 860	5 22 060
3650	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903003300	NB 42.000 INCHES	4	Nos	26 090	1 04 360
3651	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903003600	NB 48.000 INCHES	9	Nos	29 830	2 68 470
3652	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903003900	NB 54.000 INCHES	22	Nos	33 550	7 38 100
3653	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903004000	NB 56.000 INCHES	1	Nos	34 790	34 790
3654	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903004200	NB 60.000 INCHES	1	Nos	37 270	37 270

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3655	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903004800	NB 72.000 INCHES	1	Nos	44 730	44 730
3656	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M12903005600	NB 88.000 INCHES	3	Nos	54 670	1 64 010
3657	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13000000000	CHEMICAL CLEANING/PICKLING/DEGREASING/PASSIVATION :- Cleaning and pickling of equipment/pipeline includng preparation of circulation loop, supply of temporary piping, pumps, heater coils, gaskets, thermometer, hydrometer, valve, test coupon, spares, laboratory facilities, with all accessories for conducting test, chemicals, safety accessories and also providing or hiring all necessary equipment and whatever else even though not expressly mentioned herein and in specificaions but required to perform the work as per job specifications and instructions of Engineer-in-Charge.				
3658	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001000000	CHEMICAL CLEANING AND PASSIVATION FOR CS PIPING OF COMPRESSOR CIRCUIT				
3659	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001000500	NB 0.750 INCHES	50	Metres	290	14 500
3660	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001000600	NB 1.000 INCHES	10	Metres	290	2 900
3661	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001000800	NB 1.500 INCHES	10	Metres	440	4 400
3662	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001000900	NB 2.000 INCHES	185	Metres	580	1 07 300
3663	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001001100	NB 3.000 INCHES	185	Metres	870	1 60 950
3664	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001001300	NB 4.000 INCHES	315	Metres	1 150	3 62 250
3665	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001001500	NB 6.000 INCHES	1060	Metres	1 740	18 44 400
3666	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001001600	NB 8.000 INCHES	555	Metres	2 320	12 87 600
3667	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001001700	NB 10.000 INCHES	260	Metres	2 890	7 51 400
3668	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001001800	NB 12.000 INCHES	15	Metres	3 470	52 050
3669	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001001900	NB 14.000 INCHES	120	Metres	4 050	4 86 000
3670	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001002000	NB 16.000 INCHES	1140	Metres	4 630	52 78 200
3671	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001002100	NB 18.000 INCHES	170	Metres	5 210	8 85 700
3672	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001002200	NB 20.000 INCHES	195	Metres	5 780	11 27 100
3673	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001002300	NB 22.000 INCHES	30	Metres	6 360	1 90 800
3674	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001002400	NB 24.000 INCHES	150	Metres	6 950	10 42 500
3675	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001002500	NB 26.000 INCHES	10	Metres	7 520	75 200
3676	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001002600	NB 28.000 INCHES	230	Metres	8 100	18 63 000
3677	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001002700	NB 30.000 INCHES	755	Metres	8 670	65 45 850
3678	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001002800	NB 32.000 INCHES	80	Metres	9 260	7 40 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3679	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001003000	NB 36.000 INCHES	705	Metres	10 410	73 39 050
3680	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001003300	NB 42.000 INCHES	690	Metres	12 150	83 83 500
3681	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001003400	NB 44.000 INCHES	60	Metres	12 730	7 63 800
3682	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001003600	NB 48.000 INCHES	170	Metres	13 880	23 59 600
3683	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001003800	NB 52.000 INCHES	10	Metres	15 040	1 50 400
3684	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001003900	NB 54.000 INCHES	130	Metres	15 620	20 30 600
3685	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001004000	NB 56.000 INCHES	205	Metres	16 200	33 21 000
3686	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001004200	NB 60.000 INCHES	300	Metres	17 350	52 05 000
3687	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001004300	NB 62.000 INCHES	65	Metres	17 930	11 65 450
3688	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001004400	NB 64.000 INCHES	55	Metres	18 510	10 18 050
3689	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001004600	NB 68.000 INCHES	360	Metres	19 670	70 81 200
3690	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001005100	NB 78.000 INCHES	185	Metres	22 560	41 73 600
3691	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13001005600	NB 88.000 INCHES	180	Metres	25 450	45 81 000
3692	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002000000	AMINE DEGREASING OF CS PIPING				
3693	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002000500	NB 0.750 INCHES	15	Metres	170	2 550
3694	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002000600	NB 1.000 INCHES	15	Metres	170	2 550
3695	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002000800	NB 1.500 INCHES	15	Metres	260	3 900
3696	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002000900	NB 2.000 INCHES	1190	Metres	340	4 04 600
3697	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002001100	NB 3.000 INCHES	455	Metres	510	2 32 050
3698	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002001300	NB 4.000 INCHES	105	Metres	690	72 450
3699	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002001500	NB 6.000 INCHES	225	Metres	1 030	2 31 750
3700	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002001600	NB 8.000 INCHES	55	Metres	1 370	75 350
3701	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002001700	NB 10.000 INCHES	205	Metres	1 710	3 50 550
3702	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13002001800	NB 12.000 INCHES	300	Metres	2 060	6 18 000
3703	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003000000	PASSIVATION OF COOLING WATER LINES				
3704	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003000500	NB 0.750 INCHES	35	Metres	270	9 450
3705	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003000600	NB 1.000 INCHES	235	Metres	270	63 450
3706	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003000800	NB 1.500 INCHES	15	Metres	410	6 150
3707	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003000900	NB 2.000 INCHES	150	Metres	540	81 000
3708	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003001100	NB 3.000 INCHES	205	Metres	800	1 64 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3709	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003001300	NB 4.000 INCHES	175	Metres	1 070	1 87 250
3710	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003001500	NB 6.000 INCHES	1300	Metres	1 610	20 93 000
3711	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003001600	NB 8.000 INCHES	390	Metres	2 140	8 34 600
3712	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003001700	NB 10.000 INCHES	1590	Metres	2 680	42 61 200
3713	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003001800	NB 12.000 INCHES	705	Metres	3 210	22 63 050
3714	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003001900	NB 14.000 INCHES	20	Metres	3 750	75 000
3715	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003002000	NB 16.000 INCHES	2250	Metres	4 280	96 30 000
3716	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003002100	NB 18.000 INCHES	235	Metres	4 830	11 35 050
3717	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003002200	NB 20.000 INCHES	605	Metres	5 360	32 42 800
3718	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003002400	NB 24.000 INCHES	530	Metres	6 430	34 07 900
3719	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003002500	NB 26.000 INCHES	20	Metres	6 970	1 39 400
3720	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003002600	NB 28.000 INCHES	410	Metres	7 500	30 75 000
3721	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003002700	NB 30.000 INCHES	10	Metres	8 040	80 400
3722	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003002800	NB 32.000 INCHES	85	Metres	8 570	7 28 450
3723	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003002900	NB 34.000 INCHES	195	Metres	9 110	17 76 450
3724	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003003000	NB 36.000 INCHES	840	Metres	9 640	80 97 600
3725	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003003300	NB 42.000 INCHES	225	Metres	11 250	25 31 250
3726	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003003400	NB 44.000 INCHES	120	Metres	11 780	14 13 600
3727	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003003600	NB 48.000 INCHES	30	Metres	12 850	3 85 500
3728	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003003800	NB 52.000 INCHES	40	Metres	13 930	5 57 200
3729	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003004500	NB 66.000 INCHES	690	Metres	17 680	1 21 99 200
3730	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003004800	NB 72.000 INCHES	20	Metres	19 280	3 85 600
3731	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003005100	NB 78.000 INCHES	145	Metres	20 890	30 29 050
3732	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003006000	NB 96.000 INCHES	230	Metres	25 710	59 13 300
3733	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003007300	NB 114.000 INCHES	120	Metres	30 530	36 63 600
3734	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13003007400	NB 156.000 INCHES	35	Metres	41 780	14 62 300
3735	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004000000	CHEMICAL CLEANING OF PIPING CONNECTED TO LP/MP/HP STEAM GENERATORS				
3736	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004000400	NB 0.500 INCHES	10	Metres	380	3 800
3737	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004000500	NB 0.750 INCHES	10	Metres	380	3 800
3738	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004000600	NB 1.000 INCHES	10	Metres	380	3 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3739	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004000800	NB 1.500 INCHES	10	Metres	560	5 600
3740	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004000900	NB 2.000 INCHES	10	Metres	750	7 500
3741	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004001300	NB 4.000 INCHES	10	Metres	1 500	15 000
3742	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004001500	NB 6.000 INCHES	15	Metres	2 260	33 900
3743	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004001600	NB 8.000 INCHES	65	Metres	3 010	1 95 650
3744	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004001700	NB 10.000 INCHES	250	Metres	3 760	9 40 000
3745	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004001800	NB 12.000 INCHES	75	Metres	4 510	3 38 250
3746	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13004002400	NB 24.000 INCHES	95	Metres	9 020	8 56 900
3747	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13400000000	SUPPLY OF STUDS ALONG WITH NUTS: Supply as per Technical Notes for Fasteners (6-44-0057) from Vendor enlisted in Project Master Supplier List of Studs along with two nuts for diameter < 1" and 3 nuts for diamemter >= 1"of nuts, as per the direction of Engineer in-charge. All Alloy steel fasteners used in SS Piping shall be Hot Dip Galvanized.				
3748	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13401000000	AS FASTENERS (ASTM A193 GR.B7/B7M/A194 GR.2H/2HM)	0.13	Tonnes	2 41 000	31 330
3749	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13402000000	AS FASTENERS (ASTM A193 GR.B16/A194 GR.7)	0.07	Tonnes	2 41 000	16 870
3750	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13403000000	AS (IMPACT TESTED) FASTENERS (ASTM A320 GR.L7/A194 GR.7)	0.07	Tonnes	2 62 400	18 368
3751	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13404000000	SS FASTENERS (ASTM A193 GR.B8/B8M/A194 GR.8/B8M)	0.07	Tonnes	4 82 000	33 740
3752	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13405000000	SS (IMPACT TESTED) FASTENERS (ASTM A320 GR.B8CL.2/A194 GR.8)	0.07	Tonnes	4 82 000	33 740
3753	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13406000000	SS (STRESS RUPTURE TESTED) FASTENERS (ASTM A453GR.660)	0.07	Tonnes	5 08 800	35 616
3754	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13700000000	MODIFICATION/EXTRA WORKS (IF ANY) :- Cutting, bevelling, fitup, welding of different sizes of CS/AS/SS/Higher Alloy piping of all types and thicknessess in shop, in position, on ground/overhead on rack and at all elevations; transportation of pipes, fittings, flanges etc from owners storage point to work site/ work shop, making necessary scaffoldings, consumables, machinery, tools, tackles, labour and supervision including attending repairs for completing the work as per the instruction of Engineer-in-charge.				
3755	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13701000000	FLAME CUTTING C.S PIPING IBR/NON IBR	5460	Inch Dia	250	13 65 000
3756	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13702000000	HACKSAW CUTTING C.S PIPING IBR/NON IBR	1820	Inch Dia	270	4 91 400
3757	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13703000000	BEVELLING C.S PIPING IBR/NON IBR	7280	Inch Dia	290	21 11 200
3758	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13704000000	FITUP & WELDING C.S PIPING IBR/NON IBR	7280	Inch Dia	700	50 96 000
3759	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13705000000	FLAME CUTTING S.S PIPING IBR/NON IBR	185	Inch Dia	340	62 900
3760	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13706000000	HACKSAW CUTTING S.S PIPING IBR/NON IBR	60	Inch Dia	430	25 800
3761	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13707000000	BEVELLING S.S PIPING IBR/NON IBR	245	Inch Dia	440	1 07 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3762	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13708000000	FITUP & WELDING S.S PIPING IBR/NON IBR	245	Inch Dia	1 250	3 06 250
3763	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13709000000	FLAME CUTTING A.S PIPING IBR/NON IBR	10	Inch Dia	310	3 100
3764	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13710000000	HACKSAW CUTTING A.S PIPING IBR/NON IBR	5	Inch Dia	360	1 800
3765	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13711000000	BEVELLING A.S PIPING IBR/NON IBR	15	Inch Dia	410	6 150
3766	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13712000000	FITUP & WELDING A.S PIPING IBR/NON IBR	15	Inch Dia	1 080	16 200
3767	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13713000000	FLAME CUTTING NICKEL/MONEL/INCOLOY PIPING	5	Inch Dia	490	2 450
3768	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13714000000	HACKSAW CUTTING NICKEL/MONEL/INCOLOY PIPING	5	Inch Dia	640	3 200
3769	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13715000000	BEVELLING NICKEL/MONEL/INCOLOY PIPING	10	Inch Dia	670	6 700
3770	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13716000000	FITUP & WELDING NICKEL/MONEL/INCOLOY PIPING	10	Inch Dia	4 770	47 700
3771	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13717000000	FLAME CUTTING OF DUPLEX SS PIPING	5	Inch Dia	520	2 600
3772	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13718000000	HACKSAW CUTTING OF DUPLEX SS PIPING	5	Inch Dia	640	3 200
3773	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13719000000	BEVELLING OF DUPLEX SS PIPING	5	Inch Dia	660	3 300
3774	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13720000000	FITUP & WELDING OF DUPLEX SS PIPING	5	Inch Dia	1 860	9 300
3775	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13800000000	REMOVAL ERECTED PIPING(ABOVE GROUND) :- Removal of piping existing/ erected including SW valves for modification as required as per Drawings/P and IDs/instructions of Engineer-in-charge at all elevations, including providing assistance to owner for draining, cleaning and purging of the lines to be removed , unbolting of flanged joints /cutting of pipe lines wherever required, installation of flanges and blind flanges, removal of insulation from insulated lines, removing supports, steam tracers, all fittings and flanges, instruments etc, cutting of pipes in appropriate length for transporting purposes, cleaning, flushing, drying and transporting all materials to storage point(within the complex battery limits) designated by Owner/EIL including stacking of material and disposing of waste etc as instructed by Engineer-in-charge.				
3776	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13801000000	C.S/A.S PIPING	16995	Inch M	380	64 58 100
3777	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13802000000	S.S PIPING	895	Inch M	580	5 19 100
3778	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13803000000	NICKEL/MONEL/INCOLOY PIPING	5	Inch M	1 260	6 300
3779	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13804000000	DUPLEX SS PIPING	5	Inch M	740	3 700
3780	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13900000000	REMOVAL OF ERECTED VALVES (ABOVE GROUND) :- Removal of all types and ratings of valves by unbolting, cutting etc. as required, cleaning by flushing with water/air etc. as required and transportation of the same to Owner's storage point (within thecomplex battery limits) and stacking as per instructions of Engineer-in-Charge.				
3781	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901000000	VALVES OTHER THAN CONTROL VALVES				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3782	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901000500	NB 0.750 INCHES	1	Nos	500	500
3783	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901000600	NB 1.000 INCHES	1	Nos	500	500
3784	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901000800	NB 1.500 INCHES	1	Nos	640	640
3785	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901000900	NB 2.000 INCHES	1	Nos	850	850
3786	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901001100	NB 3.000 INCHES	1	Nos	1 290	1 290
3787	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901001300	NB 4.000 INCHES	1	Nos	1 720	1 720
3788	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901001500	NB 6.000 INCHES	1	Nos	2 570	2 570
3789	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901001600	NB 8.000 INCHES	1	Nos	3 430	3 430
3790	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901001700	NB 10.000 INCHES	1	Nos	4 280	4 280
3791	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901001800	NB 12.000 INCHES	1	Nos	5 140	5 140
3792	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901002000	NB 16.000 INCHES	1	Nos	6 850	6 850
3793	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901002100	NB 18.000 INCHES	1	Nos	7 720	7 720
3794	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901002200	NB 20.000 INCHES	1	Nos	8 570	8 570
3795	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901002700	NB 30.000 INCHES	1	Nos	12 850	12 850
3796	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901003000	NB 36.000 INCHES	1	Nos	15 420	15 420
3797	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13901003200	NB 40.000 INCHES	1	Nos	17 140	17 140
3798	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13902000000	CONTROL VALVES				
3799	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13902000900	NB 2.000 INCHES	1	Nos	1 240	1 240
3800	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13902001300	NB 4.000 INCHES	1	Nos	2 490	2 490
3801	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13902001500	NB 6.000 INCHES	1	Nos	3 730	3 730
3802	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13902001700	NB 10.000 INCHES	1	Nos	6 210	6 210
3803	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13902001800	NB 12.000 INCHES	1	Nos	6 560	6 560
3804	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13902002000	NB 16.000 INCHES	1	Nos	8 740	8 740
3805	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M13902002200	NB 20.000 INCHES	1	Nos	10 930	10 930
3806	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M14100000000	LOW FRICTION PADS: Supply, fabrication and fixing of low friction pads with suitable bonding materials / fasteners, as specified in Drawings / Isometrics / Special support sketches.				
3807	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M14101000000	TEFLON PAD WITH COMPRESSIVE STRENGTH (0.25 OFFSET) :1870 PSI	3	Cu. M	26 35 190	79 05 570
3808	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M14102000000	GRAPHITE PAD WITH COMPRESSIVE STRENGTH : 2877 PSI	5	Cu. M	23 71 680	1 18 58 400

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3809	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M15200000000	PIPE DAVITS : Supply, fabrication & erection of pipe davits as per EIL std. 7-12-023 for lowering of aircooler motors/safety valves from structural platforms, fixing the same to platforms, inspection as per specs., supply of all necessary materials, equipment, consumables, labour, supervision etc. The work shall be carried out as per the specifications, drawings & instruction of engineerincharge.				
3810	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M15201000000		8	MT	2 63 550	21 08 400
3811	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19901000000	Roto-mol cleaning method for pipes:- Cleaning shall be followed up with boroscopy for checking the cleanliness inside the pipe. Contractor has to offer boroscopy of the lines to BPCL/EIL representatives ensuring satisfactory internal cleaning of lines. All spading, de-spading, erection/dismantling of scaffolding, all tools and tackles, Farhana, Roto-mol Machine, boroscopy machine, Cables from nearest 440V socket, panel and all other accessories Including hose connection jobs required for successful completion of job shall be in the scope of contractor. Contractor to quote on per inch meter basis. For example, if contractor has carried out rotomol cleaning and boroscopy of 10" header for a length of 3 metres, the quantity shall be 10X3=30 inch metre.	26000	Inch M	370	96 20 000
3812	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19901100000	Supply and Installation of Pre-insulated SS Tubing for Steam Tracing : Supply, fabrication, erection, supporting, testing etc., of Pre insulated SS Tubing from the Steam supply distribution manifold outlet upto the traced pipe & from the traced pipe to the Condensate Recovery manifold including supply of all materials i.e. pre insulated tube, tube connectors (including adaptor for joining tube with CS pipe), tube fittings, clamps, supports etc.; including tube bending, cutting, end preparation, making connections, supporting etc. as per specification (B018-6-44-0022), manufacturer specification, standard & guidelines etc. with all other tools and tackles including bending/crimping tools, sealing kits etc., skilled manpower including adequate prevention from dust contamination etc. to complete the work in all respect at all elevations as per the directions of the Engineer In charge. -				
3813	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19901110000	PREINSULATED SS TUBING -				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3814	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19901120000	NB 0.500 INCHES -	38870	Metres	1 920	7 46 30 400
3815	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902000000	RADIOGRAPHY :- Performance of radiographic inspection on piping of all types and thicknesses including providing or hiring of all necessary equipment and whatever else even though not expressly mentioned but required to perform the work as per specifications and instructions of Engineer-in-Charge. Radiographs shall be submitted to the Engineer-in-charge. (Repeat Radiography due to defective radiograph on repaired joints due to Contractors fault and for additional radiography necessitated due to poor performance of contractors welders shall be done at contractors cost) Note: Unit for radiography quantity is Nos of circumferencial weld joints.				
3816	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902000100	Digital Radiography (40%)				
3817	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902000200	FOR JOINTS THK. <= 8MM (FOR CS OTHER THAN CLASS IV OF JOB NDE SPECIFICATION)				
3818	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902000300	NB 0.500 INCHES	1	Nos	1 050	1 050
3819	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902000400	NB 0.750 INCHES	140	Nos	1 050	1 47 000
3820	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902000500	NB 1.000 INCHES	52	Nos	1 050	54 600
3821	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902000600	NB 1.500 INCHES	44	Nos	1 580	69 520
3822	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902000700	NB 2.000 INCHES	1074	Nos	2 100	22 55 400
3823	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902000800	NB 3.000 INCHES	602	Nos	2 220	13 36 440
3824	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902000900	NB 4.000 INCHES	269	Nos	2 950	7 93 550
3825	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902001000	NB 6.000 INCHES	551	Nos	4 440	24 46 440
3826	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902001100	NB 8.000 INCHES	5	Nos	5 910	29 550
3827	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902001200	NB 10.000 INCHES	1	Nos	7 390	7 390
3828	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902001300	NB 12.000 INCHES	5	Nos	8 870	44 350
3829	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902001400	NB 14.000 INCHES	4	Nos	10 350	41 400
3830	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902001500	NB 16.000 INCHES	4	Nos	11 830	47 320
3831	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902001600	NB 20.000 INCHES	1	Nos	14 780	14 780
3832	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902001700	NB 24.000 INCHES	5	Nos	17 740	88 700
3833	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902001800	NB 30.000 INCHES	1	Nos	22 170	22 170
3834	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902001900	FOR JOINTS THK. <= 8MM (FOR CS AS PER CLASS IV OF JOB NDE SPECIFICATION/AS/SS)				
3835	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902002000	NB 0.500 INCHES	1	Nos	1 050	1 050
3836	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902002100	NB 0.750 INCHES	55	Nos	1 050	57 750
3837	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902002200	NB 1.000 INCHES	10	Nos	1 050	10 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3838	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902002300	NB 1.500 INCHES	33	Nos	1 570	51 810
3839	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902002400	NB 2.000 INCHES	417	Nos	1 540	6 42 180
3840	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902002500	NB 3.000 INCHES	195	Nos	2 310	4 50 450
3841	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902002600	NB 4.000 INCHES	12	Nos	3 090	37 080
3842	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902002700	NB 6.000 INCHES	29	Nos	4 630	1 34 270
3843	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902002800	NB 8.000 INCHES	99	Nos	6 170	6 10 830
3844	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902002900	NB 10.000 INCHES	83	Nos	7 710	6 39 930
3845	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902003000	NB 12.000 INCHES	17	Nos	9 260	1 57 420
3846	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902003100	NB 14.000 INCHES	1	Nos	10 800	10 800
3847	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902003200	NB 16.000 INCHES	47	Nos	12 340	5 79 980
3848	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902003300	NB 18.000 INCHES	17	Nos	13 880	2 35 960
3849	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902003400	NB 24.000 INCHES	13	Nos	18 510	2 40 630
3850	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902003500	FOR JOINTS ABOVE THK. 8MM				
3851	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902003600	NB 0.750 INCHES	77	Nos	860	66 220
3852	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902003700	NB 1.000 INCHES	5	Nos	860	4 300
3853	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902003800	NB 1.500 INCHES	1	Nos	1 290	1 290
3854	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902003900	NB 2.000 INCHES	57	Nos	1 710	97 470
3855	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902004000	NB 3.000 INCHES	68	Nos	2 570	1 74 760
3856	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902004100	NB 4.000 INCHES	34	Nos	3 430	1 16 620
3857	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902004200	NB 6.000 INCHES	46	Nos	5 140	2 36 440
3858	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902004300	NB 8.000 INCHES	308	Nos	6 860	21 12 880
3859	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902004400	NB 10.000 INCHES	208	Nos	8 570	17 82 560
3860	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902004500	NB 12.000 INCHES	238	Nos	10 280	24 46 640
3861	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902004600	NB 14.000 INCHES	20	Nos	12 000	2 40 000
3862	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902004700	NB 16.000 INCHES	69	Nos	13 710	9 45 990
3863	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902004800	NB 18.000 INCHES	61	Nos	15 430	9 41 230
3864	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902004900	NB 20.000 INCHES	83	Nos	15 430	12 80 690
3865	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902005000	NB 22.000 INCHES	1	Nos	16 970	16 970
3866	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902005100	NB 24.000 INCHES	130	Nos	18 510	24 06 300
3867	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902005200	NB 26.000 INCHES	1	Nos	20 050	20 050

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3868	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902005300	NB 28.000 INCHES	5	Nos	21 600	1 08 000
3869	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902005400	NB 30.000 INCHES	68	Nos	23 140	15 73 520
3870	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902005500	NB 32.000 INCHES	5	Nos	24 680	1 23 400
3871	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902005600	NB 34.000 INCHES	3	Nos	26 220	78 660
3872	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902005700	NB 36.000 INCHES	62	Nos	27 770	17 21 740
3873	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902005800	NB 40.000 INCHES	43	Nos	30 850	13 26 550
3874	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902005900	NB 42.000 INCHES	9	Nos	32 390	2 91 510
3875	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902006000	NB 44.000 INCHES	1	Nos	33 940	33 940
3876	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902006100	NB 48.000 INCHES	18	Nos	37 020	6 66 360
3877	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902006200	NB 52.000 INCHES	1	Nos	40 110	40 110
3878	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902006300	NB 54.000 INCHES	46	Nos	41 650	19 15 900
3879	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902006400	NB 56.000 INCHES	1	Nos	43 190	43 190
3880	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902006500	NB 60.000 INCHES	3	Nos	46 280	1 38 840
3881	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902006600	NB 64.000 INCHES	1	Nos	49 360	49 360
3882	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902006700	NB 66.000 INCHES	1	Nos	50 900	50 900
3883	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902006800	NB 68.000 INCHES	1	Nos	52 450	52 450
3884	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902006900	NB 72.000 INCHES	4	Nos	55 530	2 22 120
3885	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902007000	NB 74.000 INCHES	1	Nos	57 070	57 070
3886	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902007100	NB 76.000 INCHES	1	Nos	58 620	58 620
3887	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902007200	NB 78.000 INCHES	1	Nos	60 160	60 160
3888	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902007300	NB 80.000 INCHES	1	Nos	61 700	61 700
3889	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902007400	NB 88.000 INCHES	4	Nos	67 870	2 71 480
3890	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902007500	NB 90.000 INCHES	1	Nos	69 410	69 410
3891	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902007600	NB 94.000 INCHES	1	Nos	72 500	72 500
3892	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902007700	NB124.000 INCHES	1	Nos	95 640	95 640
3893	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902020000	Conventional radiography (30 %)				
3894	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902020100	FOR JOINTS THK. <= 8MM (FOR CS OTHER THAN CLASS IV OF JOB NDE SPECIFICATION)				
3895	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902020200	NB 0.500 INCHES	1	Nos	490	490
3896	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902020300	NB 0.750 INCHES	60	Nos	490	29 400
3897	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902020400	NB 1.000 INCHES	22	Nos	490	10 780

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3898	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902020500	NB 1.500 INCHES	20	Nos	520	10 400
3899	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902020600	NB 2.000 INCHES	460	Nos	690	3 17 400
3900	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902020700	NB 3.000 INCHES	302	Nos	1 030	3 11 060
3901	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902020800	NB 4.000 INCHES	135	Nos	1 370	1 84 950
3902	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902020900	NB 6.000 INCHES	276	Nos	2 060	5 68 560
3903	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902021000	NB 8.000 INCHES	3	Nos	2 740	8 220
3904	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902021100	NB 10.000 INCHES	1	Nos	490	490
3905	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902021200	NB 12.000 INCHES	3	Nos	490	1 470
3906	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902021300	NB 14.000 INCHES	3	Nos	490	1 470
3907	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902021400	NB 16.000 INCHES	1	Nos	520	520
3908	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902021500	NB 20.000 INCHES	1	Nos	690	690
3909	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902021600	NB 24.000 INCHES	3	Nos	1 030	3 090
3910	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902021700	NB 30.000 INCHES	1	Nos	1 370	1 370
3911	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902021800	FOR JOINTS THK. <= 8MM (FOR CS AS PER CLASS IV OF JOB NDE SPECIFICATION/AS/SS)			2 060	
3912	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902021900	NB 0.500 INCHES	1	Nos	2 750	2 750
3913	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902022000	NB 0.750 INCHES	23	Nos	3 430	78 890
3914	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902022100	NB 1.000 INCHES	4	Nos	4 120	16 480
3915	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902022200	NB 1.500 INCHES	14	Nos	4 800	67 200
3916	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902022300	NB 2.000 INCHES	178	Nos	5 480	9 75 440
3917	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902022400	NB 3.000 INCHES	98	Nos	6 170	6 04 660
3918	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902022500	NB 4.000 INCHES	7	Nos	6 850	47 950
3919	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902022600	NB 6.000 INCHES	14	Nos	8 230	1 15 220
3920	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902022700	NB 8.000 INCHES	49	Nos	9 600	4 70 400
3921	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902022800	NB 10.000 INCHES	42	Nos	10 290	4 32 180
3922	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902022900	NB 12.000 INCHES	8	Nos	4 110	32 880
3923	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902023000	NB 14.000 INCHES	1	Nos	370	370
3924	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902023100	NB 16.000 INCHES	23	Nos	690	15 870
3925	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902023200	NB 18.000 INCHES	9	Nos	1 370	12 330
3926	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902023300	NB 24.000 INCHES	7	Nos	2 060	14 420
3927	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902023400	FOR JOINTS ABOVE THK. 8MM			2 750	

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3928	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902023500	NB 0.750 INCHES	46	Nos	3 430	1 57 780
3929	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902023600	NB 1.000 INCHES	3	Nos	4 120	12 360
3930	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902023700	NB 1.500 INCHES	1	Nos	4 800	4 800
3931	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902023800	NB 2.000 INCHES	34	Nos	5 480	1 86 320
3932	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902023900	NB 3.000 INCHES	51	Nos	6 170	3 14 670
3933	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902024000	NB 4.000 INCHES	25	Nos	6 850	1 71 250
3934	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902024100	NB 6.000 INCHES	34	Nos	7 540	2 56 360
3935	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902024200	NB 8.000 INCHES	230	Nos	8 230	18 92 900
3936	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902024300	NB 10.000 INCHES	156	Nos	8 910	13 89 960
3937	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902024400	NB 12.000 INCHES	178	Nos	9 600	17 08 800
3938	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902024500	NB 14.000 INCHES	14	Nos	10 290	1 44 060
3939	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902024600	NB 16.000 INCHES	52	Nos	10 970	5 70 440
3940	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902024700	NB 18.000 INCHES	46	Nos	11 660	5 36 360
3941	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902024800	NB 20.000 INCHES	62	Nos	12 340	7 65 080
3942	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902024900	NB 22.000 INCHES	1	Nos	13 710	13 710
3943	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902025000	NB 24.000 INCHES	98	Nos	14 390	14 10 220
3944	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902025100	NB 26.000 INCHES	1	Nos	8 910	8 910
3945	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902025200	NB 28.000 INCHES	4	Nos	16 450	65 800
3946	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902025300	NB 30.000 INCHES	51	Nos	18 510	9 44 010
3947	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902025400	NB 32.000 INCHES	4	Nos	20 570	82 280
3948	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902025500	NB 34.000 INCHES	1	Nos	24 680	24 680
3949	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902025600	NB 36.000 INCHES	47	Nos	12 340	5 79 980
3950	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902025700	NB 40.000 INCHES	33	Nos	13 710	4 52 430
3951	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902025800	NB 42.000 INCHES	7	Nos	14 400	1 00 800
3952	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902025900	NB 44.000 INCHES	1	Nos	15 080	15 080
3953	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902026000	NB 48.000 INCHES	13	Nos	16 450	2 13 850
3954	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902026100	NB 52.000 INCHES	1	Nos	17 820	17 820
3955	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902026200	NB 54.000 INCHES	34	Nos	18 510	6 29 340
3956	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902026300	NB 56.000 INCHES	1	Nos	19 200	19 200
3957	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902026400	NB 60.000 INCHES	3	Nos	20 570	61 710

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3958	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902026500	NB 64.000 INCHES	1	Nos	21 940	21 940
3959	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902026600	NB 66.000 INCHES	1	Nos	22 620	22 620
3960	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902026700	NB 68.000 INCHES	1	Nos	23 310	23 310
3961	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902026800	NB 72.000 INCHES	3	Nos	24 680	74 040
3962	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902026900	NB 74.000 INCHES	1	Nos	25 370	25 370
3963	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902027000	NB 76.000 INCHES	1	Nos	26 050	26 050
3964	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902027100	NB 78.000 INCHES	1	Nos	26 740	26 740
3965	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902027200	NB 80.000 INCHES	1	Nos	27 420	27 420
3966	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902027300	NB 88.000 INCHES	3	Nos	30 160	90 480
3967	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902027400	NB 90.000 INCHES	1	Nos	30 850	30 850
3968	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902027500	NB 94.000 INCHES	1	Nos	32 220	32 220
3969	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902027600	NB124.000 INCHES	1	Nos	42 510	42 510
3970	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902030000	Close proximity Radiography (10%)				
3971	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902030100	FOR JOINTS THK. <= 8MM (FOR CS OTHER THAN CLASS IV OF JOB NDE SPECIFICATION)				
3972	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902030200	NB 3.000 INCHES	100	Nos	1 860	1 86 000
3973	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902030300	NB 4.000 INCHES	46	Nos	620	28 520
3974	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902030400	NB 6.000 INCHES	92	Nos	620	57 040
3975	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902030500	NB 8.000 INCHES	1	Nos	940	940
3976	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902030600	NB 10.000 INCHES	1	Nos	1 250	1 250
3977	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902030700	NB 12.000 INCHES	1	Nos	1 860	1 860
3978	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902030800	NB 14.000 INCHES	1	Nos	2 490	2 490
3979	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902030900	NB 16.000 INCHES	1	Nos	2 890	2 890
3980	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902031000	NB 20.000 INCHES	1	Nos	9 640	9 640
3981	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902031100	NB 24.000 INCHES	1	Nos	620	620
3982	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902031200	NB 30.000 INCHES	1	Nos	620	620
3983	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902031300	FOR JOINTS THK. <= 8MM (FOR CS AS PER CLASS IV OF JOB NDE SPECIFICATION/AS/SS)			620	
3984	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902031400	NB 3.000 INCHES	33	Nos	940	31 020
3985	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902031500	NB 4.000 INCHES	3	Nos	1 250	3 750
3986	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902031600	NB 6.000 INCHES	5	Nos	1 860	9 300
3987	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902031700	NB 8.000 INCHES	17	Nos	2 490	42 330

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
3988	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902031800	NB 10.000 INCHES	14	Nos	2 890	40 460
3989	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902031900	NB 12.000 INCHES	3	Nos	3 860	11 580
3990	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902032000	NB 14.000 INCHES	1	Nos	4 830	4 830
3991	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902032100	NB 16.000 INCHES	8	Nos	5 780	46 240
3992	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902032200	NB 18.000 INCHES	3	Nos	6 750	20 250
3993	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902032300	NB 24.000 INCHES	3	Nos	7 720	23 160
3994	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902032400	FOR JOINTS ABOVE THK. 8MM			8 670	
3995	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902032500	NB 3.000 INCHES	17	Nos	9 640	1 63 880
3996	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902032600	NB 4.000 INCHES	8	Nos	11 560	92 480
3997	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902032700	NB 6.000 INCHES	12	Nos	13 500	1 62 000
3998	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902032800	NB 8.000 INCHES	77	Nos	14 470	11 14 190
3999	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902032900	NB 10.000 INCHES	52	Nos	4 820	2 50 640
4000	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902033000	NB 12.000 INCHES	60	Nos	620	37 200
4001	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902033100	NB 14.000 INCHES	5	Nos	1 250	6 250
4002	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902033200	NB 16.000 INCHES	17	Nos	2 490	42 330
4003	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902033300	NB 18.000 INCHES	16	Nos	2 890	46 240
4004	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902033400	NB 20.000 INCHES	21	Nos	3 860	81 060
4005	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902033500	NB 22.000 INCHES	1	Nos	4 830	4 830
4006	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902033600	NB 24.000 INCHES	33	Nos	5 780	1 90 740
4007	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902033700	NB 26.000 INCHES	1	Nos	6 750	6 750
4008	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902033800	NB 28.000 INCHES	1	Nos	7 720	7 720
4009	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902033900	NB 30.000 INCHES	17	Nos	8 670	1 47 390
4010	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902034000	NB 32.000 INCHES	1	Nos	9 640	9 640
4011	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902034100	NB 34.000 INCHES	1	Nos	10 610	10 610
4012	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902034200	NB 36.000 INCHES	16	Nos	11 560	1 84 960
4013	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902034300	NB 40.000 INCHES	10	Nos	12 530	1 25 300
4014	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902034400	NB 42.000 INCHES	3	Nos	13 500	40 500
4015	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902034500	NB 44.000 INCHES	1	Nos	14 470	14 470
4016	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902034600	NB 48.000 INCHES	4	Nos	15 420	61 680
4017	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902034700	NB 52.000 INCHES	1	Nos	25 070	25 070

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4018	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902034800	NB 54.000 INCHES	12	Nos	17 360	2 08 320
4019	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902034900	NB 56.000 INCHES	1	Nos	19 280	19 280
4020	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902035000	NB 60.000 INCHES	1	Nos	20 250	20 250
4021	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902035100	NB 64.000 INCHES	1	Nos	30 850	30 850
4022	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902035200	NB 66.000 INCHES	1	Nos	23 140	23 140
4023	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902035300	NB 68.000 INCHES	1	Nos	32 780	32 780
4024	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902035400	NB 72.000 INCHES	1	Nos	26 030	26 030
4025	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902035500	NB 74.000 INCHES	1	Nos	35 670	35 670
4026	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902035600	NB 76.000 INCHES	1	Nos	36 640	36 640
4027	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902035700	NB 78.000 INCHES	1	Nos	37 600	37 600
4028	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902035800	NB 80.000 INCHES	1	Nos	38 560	38 560
4029	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902035900	NB 88.000 INCHES	1	Nos	42 420	42 420
4030	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902036000	NB 90.000 INCHES	1	Nos	43 380	43 380
4031	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902036100	NB 94.000 INCHES	1	Nos	45 310	45 310
4032	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19902036200	NB124.000 INCHES	1	Nos	59 770	59 770
4033	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903000000	In-situ flange serration for flanges				
4034	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903010000	NB 2 INCH - 6 INCH	46	NOs	8 160	3 75 360
4035	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903020000	NB 8 INCH - 14 INCH	65	NOs	22 440	14 58 600
4036	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903030000	NB 16 INCH - 24 INCH	65	NOs	40 810	26 52 650
4037	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903040000	NB 26 INCH - 36 INCH	33	NOs	63 250	20 87 250
4038	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903050000	NB 38 INCH - 48 INCH	13	NOs	87 730	11 40 490
4039	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903060000	NB > 48 INCH	7	NOs	1 22 430	8 57 010
4040	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903100000	Valve servicing and gland packing replacement/hydrotest				
4041	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903110000	UPTO 1.5 INCH	130	NOs	1 210	1 57 300
4042	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903120000	NB 2 INCH - 6 INCH	130	NOs	3 210	4 17 300
4043	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903130000	NB 8 INCH - 14 INCH	130	NOs	8 820	11 46 600
4044	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903140000	NB 16 INCH - 24 INCH	65	NOs	16 050	10 43 250
4045	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903150000	NB 26 INCH - 36 INCH	65	NOs	24 870	16 16 550
4046	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903160000	NB 38 INCH - 48 INCH	33	NOs	34 500	11 38 500
4047	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19903170000	NB > 48 INCH	7	NOs	48 130	3 36 910

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4048	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944000000	ABOVE GROUND GALVANIZED CARBON STEEL PIPING: Supplying and laying of above ground galvanized carbon steel piping for services like Fire water, Drinking water etc. Piping covers supply, fabrication, erection, bending, hydrotesting etc. of pipes, flanges, fittings, valves, gaskets & bolts etc. conforming to piping material specification class J2A/J95A including supply of Teflon tapes, white lead etc., cutting the pipes to required lengths, making threads, including laying of pipes on pipe rack, sleepers, T-supports, erection of piping on equipments, pumps etc. including joining of pipes and fittings with threaded/ flanged connections, hydrostatic testing of the piping. The work shall be completed in totality as per specifications, P&IDs, drawings and instructions of Engineer in-charge. -				
4049	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944010000	PIPING (INCLUDES PIPES, FLANGES, FITTINGS, GASKETS, FASTENERS ETC. EXCEPT VALVES): -				
4050	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944010400	NB 0.500 INCHES	10	Metres	750	7 500
4051	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944010500	NB 0.750 INCHES	10	Metres	1 010	10 100
4052	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944010600	NB 1.000 INCHES	650	Metres	1 200	7 80 000
4053	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944010800	NB 1.500 INCHES	1950	Metres	1 860	36 27 000
4054	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944010900	NB 2.000 INCHES	1725	Metres	2 410	41 57 250
4055	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944011100	NB 3.000 INCHES	1080	Metres	3 560	38 44 800
4056	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944011300	NB 4.000 INCHES	1210	Metres	4 900	59 29 000
4057	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944011500	NB 6.000 INCHES	730	Metres	8 250	60 22 500
4058	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944011600	NB 8.000 INCHES	1635	Metres	11 750	1 92 11 250
4059	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944011700	NB 10.000 INCHES	1265	Metres	15 970	2 02 02 050
4060	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944011800	NB 12.000 INCHES	160	Metres	19 400	31 04 000
4061	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944020000	VALVES				
4062	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944020500	NB 0.750 INCHES	1	Nos	3 280	3 280
4063	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944020800	NB 1.500 INCHES	1	Nos	8 320	8 320
4064	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M19944020900	NB 2.000 INCHES	65	Nos	13 010	8 45 650

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4065	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M30000000000	PAINTING (UNITS) :- Supply of paints and primers, preparation of surfaces and application of primer and finish paints, identification (Line numbering), lettering, colour bands, colour coding etc. as specified including rubdown and touch up of shop primer wherever required, providing scaffolding for all heights, labour, material, tools and tackles, consumables supervision etc. to complete the work in all respects as per Job Specification, drawings and direction of Engineer-in-Charge for all types of uninsulated piping and insulated piping as specified including all pipes, fittings, flanges, supports, valves etc. Surface preparation by blast cleaning and application of first coat of primer (inorganic zinc silicate, F9) shall be done in fabrication yard prior to erection. For insulated piping wherever blast cleaning with no primer application is specified, in such cases finish paints shall also be applied in the fabrication yard. The identification marks of the piping and joints shall be noted before blasting and the same shall be transferred on primed surface with Polyurethane paint (F2) or as per the instructions of Engineer-in-Charge. Notes: 1. All joints (fabrication as well as erection joints) shall be left unpainted till hydrotesting. 2. No extra payment shall be made for identification (line numbering etc.) of insulated and uninsulated lines.				
4066	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39100000000	PAINTING OF UNINSULATED PIPING FOR 'CORROSIVE' ENVIRONMENT AS PER TABLE 6 OF JOB SPEC B957-000-6-42-PLS-01 REV 2 FOR CS/LTCS/AS.				
4067	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102000000	DESIGN TEMP GROUP: -14 TO 80(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1coat of F-9 @ 65-75mu DFT/ coat + 1 coat of P-6 @ 40 mu DFT/ coat, Intermediate coat: 2 coats of F-6B @ 100 mu DFT / coat, Final coat: 1 coat of F-2 @ 40 mu DFT/coat, Total DFT: 345-355 mu.				
4068	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102010000	PIPES				
4069	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102010500	NB: .75 Inches	45	Metres	90	4 050
4070	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102010600	NB: 1 Inches	830	Metres	110	91 300
4071	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102010800	NB: 1.5 Inches	615	Metres	150	92 250
4072	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102010900	NB: 2 Inches	6940	Metres	190	13 18 600
4073	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102011100	NB: 3 Inches	4170	Metres	280	11 67 600
4074	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102011300	NB: 4 Inches	2330	Metres	360	8 38 800
4075	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102011500	NB: 6 Inches	1040	Metres	530	5 51 200
4076	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102011600	NB: 8 Inches	1060	Metres	700	7 42 000
4077	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102011700	NB: 10 Inches	30	Metres	870	26 100

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4078	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102011800	NB: 12 Inches	5	Metres	1 030	5 150
4079	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102012000	NB: 16 Inches	395	Metres	1 290	5 09 550
4080	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102012200	NB: 20 Inches	65	Metres	1 610	1 04 650
4081	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102012400	NB: 24 Inches	5	Metres	1 930	9 650
4082	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102012600	NB: 28 Inches	330	Metres	2 250	7 42 500
4083	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102012700	NB: 30 Inches	5	Metres	2 420	12 100
4084	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102012900	NB: 34 Inches	155	Metres	2 740	4 24 700
4085	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102013000	NB: 36 Inches	800	Metres	2 900	23 20 000
4086	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102013300	NB: 42 Inches	50	Metres	3 380	1 69 000
4087	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102013600	NB: 48 Inches	15	Metres	3 860	57 900
4088	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102020000	VALVES				
4089	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102020900	NB: 2 Inches	832	Nos.	290	2 41 280
4090	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102021100	NB: 3 Inches	131	Nos.	420	55 020
4091	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102021300	NB: 4 Inches	22	Nos.	540	11 880
4092	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102021500	NB: 6 Inches	27	Nos.	800	21 600
4093	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102021600	NB: 8 Inches	26	Nos.	1 040	27 040
4094	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102021700	NB: 10 Inches	62	Nos.	1 300	80 600
4095	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102021800	NB: 12 Inches	5	Nos.	1 540	7 700
4096	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102021900	NB: 14 Inches	4	Nos.	1 690	6 760
4097	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102022000	NB: 16 Inches	7	Nos.	1 930	13 510
4098	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102022100	NB: 18 Inches	8	Nos.	2 170	17 360
4099	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102022200	NB: 20 Inches	12	Nos.	2 420	29 040
4100	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102022400	NB: 24 Inches	9	Nos.	2 900	26 100
4101	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102022600	NB: 28 Inches	3	Nos.	3 380	10 140
4102	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102022900	NB: 34 Inches	16	Nos.	4 100	65 600
4103	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102023000	NB: 36 Inches	10	Nos.	4 350	43 500
4104	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102023300	NB: 42 Inches	5	Nos.	5 070	25 350
4105	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39102023600	NB: 48 Inches	3	Nos.	5 790	17 370

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4106	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103000000	DESIGN TEMP GROUP: 81 TO 250(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1coat of F-9 @ 65-75mu DFT/coat + 1 coats of F-11 @ 20mu DFT/coat, Intermediate coat: None, Final coat: 1 coat of F-11 @ 20mu DFT/coat, Total DFT: 105-115				
4107	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103010000	PIPES				
4108	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103010400	NB: .5 Inches	5	Metres	50	250
4109	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103010500	NB: .75 Inches	85	Metres	60	5 100
4110	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103010600	NB: 1 Inches	955	Metres	70	66 850
4111	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103010800	NB: 1.5 Inches	485	Metres	100	48 500
4112	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103010900	NB: 2 Inches	6530	Metres	130	8 48 900
4113	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103011100	NB: 3 Inches	4785	Metres	190	9 09 150
4114	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103011300	NB: 4 Inches	4720	Metres	240	11 32 800
4115	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103011500	NB: 6 Inches	3330	Metres	350	11 65 500
4116	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103011600	NB: 8 Inches	3270	Metres	460	15 04 200
4117	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103011700	NB: 10 Inches	1140	Metres	570	6 49 800
4118	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103011800	NB: 12 Inches	145	Metres	680	98 600
4119	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103012200	NB: 20 Inches	35	Metres	1 060	37 100
4120	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103012400	NB: 24 Inches	230	Metres	1 270	2 92 100
4121	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103012600	NB: 28 Inches	5	Metres	1 480	7 400
4122	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103012700	NB: 30 Inches	265	Metres	1 590	4 21 350
4123	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103012800	NB: 32 Inches	85	Metres	1 690	1 43 650
4124	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103012900	NB: 34 Inches	5	Metres	1 800	9 000
4125	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103013000	NB: 36 Inches	520	Metres	1 910	9 93 200
4126	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103013200	NB: 40 Inches	25	Metres	2 120	53 000
4127	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103013300	NB: 42 Inches	190	Metres	2 220	4 21 800
4128	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103013400	NB: 44 Inches	5	Metres	2 330	11 650
4129	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103013600	NB: 48 Inches	455	Metres	2 650	12 05 750
4130	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103013800	NB: 52 Inches	5	Metres	2 750	13 750
4131	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103013900	NB: 54 Inches	85	Metres	2 860	2 43 100
4132	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103014000	NB: 56 Inches	25	Metres	2 960	74 000
4133	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103014200	NB: 60 Inches	295	Metres	3 180	9 38 100

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4134	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103014400	NB: 64 Inches	70	Metres	3 390	2 37 300
4135	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103014500	NB: 66 Inches	170	Metres	3 490	5 93 300
4136	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103014800	NB: 72 Inches	410	Metres	3 810	15 62 100
4137	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103014900	NB: 74 Inches	55	Metres	3 920	2 15 600
4138	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103015000	NB: 76 Inches	280	Metres	4 020	11 25 600
4139	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103015200	NB: 80 Inches	65	Metres	4 240	2 75 600
4140	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103015600	NB: 88 Inches	185	Metres	4 660	8 62 100
4141	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103015700	NB: 90 Inches	180	Metres	4 760	8 56 800
4142	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103015900	NB: 94 Inches	130	Metres	4 980	6 47 400
4143	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103020000	VALVES				
4144	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103020900	NB: 2 Inches	399	Nos.	190	75 810
4145	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103021100	NB: 3 Inches	140	Nos.	280	39 200
4146	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103021300	NB: 4 Inches	130	Nos.	360	46 800
4147	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103021500	NB: 6 Inches	108	Nos.	530	57 240
4148	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103021600	NB: 8 Inches	88	Nos.	690	60 720
4149	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103021700	NB: 10 Inches	34	Nos.	850	28 900
4150	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103021800	NB: 12 Inches	47	Nos.	1 010	47 470
4151	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103021900	NB: 14 Inches	30	Nos.	1 110	33 300
4152	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103022100	NB: 18 Inches	4	Nos.	1 430	5 720
4153	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103022200	NB: 20 Inches	23	Nos.	1 590	36 570
4154	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103022400	NB: 24 Inches	35	Nos.	1 910	66 850
4155	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103022700	NB: 30 Inches	1	Nos.	2 380	2 380
4156	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103023000	NB: 36 Inches	9	Nos.	2 860	25 740
4157	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39103023600	NB: 48 Inches	1	Nos.	3 810	3 810
4158	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104000000	DESIGN TEMP GROUP: 251 TO 400(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1coat of F-9 @ 65-75mu DFT/ coat + 1 coats of F- 12 @ 20mu DFT/coat, Intermediate coat: None, Final coat: 1 coat of F-12 @ 20mu DFT/coat, Total DFT: 105-115 mu				
4159	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104010000	PIPES				
4160	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104010400	NB: .5 Inches	5	Metres	60	300
4161	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104010500	NB: .75 Inches	5	Metres	70	350

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4162	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104010600	NB: 1 Inches	15	Metres	90	1 350
4163	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104010900	NB: 2 Inches	590	Metres	160	94 400
4164	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104011100	NB: 3 Inches	1240	Metres	230	2 85 200
4165	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104011300	NB: 4 Inches	790	Metres	290	2 29 100
4166	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104011500	NB: 6 Inches	55	Metres	430	23 650
4167	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104011600	NB: 8 Inches	190	Metres	560	1 06 400
4168	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104020000	VALVES				
4169	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104020900	NB: 2 Inches	8	Nos.	230	1 840
4170	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104021100	NB: 3 Inches	18	Nos.	340	6 120
4171	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104021300	NB: 4 Inches	5	Nos.	440	2 200
4172	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104022000	NB: 16 Inches	1	Nos.	1 560	1 560
4173	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39104022200	NB: 20 Inches	1	Nos.	1 950	1 950
4174	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39105000000	DESIGN TEMP GROUP: 401 TO 650(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1 coat of F-16 @ 125 mu, Intermediate coat: None, Final coat: 1 coat of F-16 @ 125mu, Total DFT: 250-300 mu				
4175	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39105010000	PIPES				
4176	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39105010600	NB: 1 Inches	5	Metres	130	650
4177	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39105012200	NB: 20 Inches	5	Metres	1 990	9 950
4178	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39105012700	NB: 30 Inches	5	Metres	2 980	14 900
4179	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39105013600	NB: 48 Inches	5	Metres	4 770	23 850
4180	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39200000000	PAINTING OF INSULATED PIPING OF CS & AS FOR 'CORROSIVE' ENVIRONMENT AS PER TABLE 11 OF JOB SPEC B957-000-6-42-PLS-01 REV 2 FOR CS/LTCS/AS.				
4181	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201000000	DESIGN TEMP GROUP: -45 TO 125(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1coat of F-15 @ 100mu DFT/coat, Primer: None, Finish paint: 2 coats of F-15 @ 100mu DFT/coat, Total DFT 300 mu				
4182	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201010000	PIPES				
4183	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201010500	NB: .75 Inches	40	Metres	80	3 200
4184	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201010600	NB: 1 Inches	25	Metres	100	2 500
4185	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201010800	NB: 1.5 Inches	10	Metres	140	1 400
4186	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201010900	NB: 2 Inches	795	Metres	170	1 35 150
4187	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201011100	NB: 3 Inches	1660	Metres	250	4 15 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4188	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201011300	NB: 4 Inches	255	Metres	320	81 600
4189	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201011500	NB: 6 Inches	1980	Metres	480	9 50 400
4190	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201011600	NB: 8 Inches	1475	Metres	620	9 14 500
4191	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201011700	NB: 10 Inches	5	Metres	770	3 850
4192	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201011800	NB: 12 Inches	20	Metres	920	18 400
4193	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201011900	NB: 14 Inches	35	Metres	1 010	35 350
4194	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201012000	NB: 16 Inches	215	Metres	1 150	2 47 250
4195	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201012100	NB: 18 Inches	50	Metres	1 290	64 500
4196	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201012200	NB: 20 Inches	10	Metres	1 440	14 400
4197	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201012400	NB: 24 Inches	260	Metres	1 720	4 47 200
4198	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201012600	NB: 28 Inches	135	Metres	2 010	2 71 350
4199	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201012700	NB: 30 Inches	240	Metres	2 150	5 16 000
4200	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201012800	NB: 32 Inches	165	Metres	2 300	3 79 500
4201	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201013000	NB: 36 Inches	530	Metres	2 580	13 67 400
4202	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201013200	NB: 40 Inches	5	Metres	2 870	14 350
4203	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201013300	NB: 42 Inches	510	Metres	3 010	15 35 100
4204	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201013400	NB: 44 Inches	70	Metres	3 160	2 21 200
4205	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201013600	NB: 48 Inches	625	Metres	3 440	21 50 000
4206	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201013900	NB: 54 Inches	5	Metres	3 870	19 350
4207	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201014000	NB: 56 Inches	195	Metres	4 020	7 83 900
4208	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201014500	NB: 66 Inches	45	Metres	4 740	2 13 300
4209	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201014600	NB: 68 Inches	70	Metres	4 880	3 41 600
4210	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201015100	NB: 78 Inches	205	Metres	5 600	11 48 000
4211	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201020000	VALVES				
4212	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201020900	NB: 2 Inches	109	Nos.	260	28 340
4213	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201021100	NB: 3 Inches	26	Nos.	380	9 880
4214	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201021300	NB: 4 Inches	20	Nos.	490	9 800
4215	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201021500	NB: 6 Inches	66	Nos.	710	46 860
4216	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201021600	NB: 8 Inches	48	Nos.	930	44 640
4217	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201021700	NB: 10 Inches	10	Nos.	1 160	11 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4218	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201021800	NB: 12 Inches	29	Nos.	1 370	39 730
4219	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201021900	NB: 14 Inches	7	Nos.	1 510	10 570
4220	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201022000	NB: 16 Inches	9	Nos.	1 720	15 480
4221	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201022100	NB: 18 Inches	9	Nos.	1 940	17 460
4222	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201022200	NB: 20 Inches	10	Nos.	2 150	21 500
4223	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201022300	NB: 22 Inches	3	Nos.	2 370	7 110
4224	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201022400	NB: 24 Inches	10	Nos.	2 580	25 800
4225	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201022600	NB: 28 Inches	1	Nos.	3 010	3 010
4226	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201022700	NB: 30 Inches	14	Nos.	3 230	45 220
4227	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201023000	NB: 36 Inches	5	Nos.	3 880	19 400
4228	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201023300	NB: 42 Inches	4	Nos.	4 520	18 080
4229	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201023600	NB: 48 Inches	4	Nos.	5 170	20 680
4230	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201024000	NB: 56 Inches	1	Nos.	6 030	6 030
4231	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201024500	NB: 66 Inches	1	Nos.	7 100	7 100
4232	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39201025100	NB: 78 Inches	1	Nos.	8 390	8 390
4233	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202000000	DESIGN TEMP GROUP: 126 TO 560(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-10; 1 coat of F-16 @ 125mu DFT/coat, Primer: None, Finish paint: 1 coat F-16 @ 125mu DFT/coat, Total DFT: 250mu				
4234	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202010000	PIPES				
4235	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202010400	NB: .5 Inches	5	Metres	80	400
4236	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202010500	NB: .75 Inches	80	Metres	110	8 800
4237	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202010600	NB: 1 Inches	220	Metres	130	28 600
4238	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202010800	NB: 1.5 Inches	335	Metres	190	63 650
4239	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202010900	NB: 2 Inches	3835	Metres	240	9 20 400
4240	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202011100	NB: 3 Inches	3915	Metres	350	13 70 250
4241	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202011300	NB: 4 Inches	2200	Metres	450	9 90 000
4242	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202011500	NB: 6 Inches	3920	Metres	660	25 87 200
4243	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202011600	NB: 8 Inches	2225	Metres	860	19 13 500
4244	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202011700	NB: 10 Inches	5	Metres	1 070	5 350
4245	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202011800	NB: 12 Inches	10	Metres	1 270	12 700

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4246	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202012000	NB: 16 Inches	100	Metres	1 590	1 59 000
4247	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202012200	NB: 20 Inches	35	Metres	1 990	69 650
4248	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202012400	NB: 24 Inches	55	Metres	2 380	1 30 900
4249	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202012700	NB: 30 Inches	255	Metres	2 980	7 59 900
4250	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202012800	NB: 32 Inches	140	Metres	3 180	4 45 200
4251	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202013000	NB: 36 Inches	2535	Metres	3 580	90 75 300
4252	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202013200	NB: 40 Inches	395	Metres	3 970	15 68 150
4253	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202013300	NB: 42 Inches	265	Metres	4 170	11 05 050
4254	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202013600	NB: 48 Inches	465	Metres	4 770	22 18 050
4255	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202013800	NB: 52 Inches	5	Metres	5 160	25 800
4256	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202013900	NB: 54 Inches	60	Metres	5 360	3 21 600
4257	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202014200	NB: 60 Inches	160	Metres	5 960	9 53 600
4258	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202015600	NB: 88 Inches	270	Metres	8 740	23 59 800
4259	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202016500	NB: 124 Inches	335	Metres	12 310	41 23 850
4260	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202020000	VALVES				
4261	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202020900	NB: 2 Inches	293	Nos.	350	1 02 550
4262	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202021100	NB: 3 Inches	189	Nos.	520	98 280
4263	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202021300	NB: 4 Inches	107	Nos.	670	71 690
4264	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202021500	NB: 6 Inches	134	Nos.	990	1 32 660
4265	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202021600	NB: 8 Inches	66	Nos.	1 290	85 140
4266	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202021700	NB: 10 Inches	55	Nos.	1 600	88 000
4267	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202021800	NB: 12 Inches	52	Nos.	1 900	98 800
4268	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202021900	NB: 14 Inches	4	Nos.	2 090	8 360
4269	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202022000	NB: 16 Inches	26	Nos.	2 380	61 880
4270	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202022100	NB: 18 Inches	48	Nos.	2 680	1 28 640
4271	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202022200	NB: 20 Inches	57	Nos.	2 980	1 69 860
4272	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202022400	NB: 24 Inches	51	Nos.	3 580	1 82 580
4273	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202022700	NB: 30 Inches	1	Nos.	4 470	4 470
4274	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202022800	NB: 32 Inches	3	Nos.	4 770	14 310
4275	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202023000	NB: 36 Inches	8	Nos.	5 360	42 880

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4276	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202023300	NB: 42 Inches	5	Nos.	6 260	31 300
4277	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39202023600	NB: 48 Inches	3	Nos.	7 150	21 450
4278	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39300000000	PAINTING OF INSULATED PIPING OF SS & MS FOR 'CORROSIVE' ENVIRONMENT AS PER TABLE 11 OF JOB SPEC B957-000-6-42-PLS-01 REV 2 FOR SS/MS.				
4279	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39301000000	DESIGN TEMP GROUP: -45 TO 125(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-16; (15-25mu surface profile) 1 coat of F-15 @100mu DFT/coat, Primer: None, Finish paint: 2 coats of F-15 @ 100mu DFT/coat, Total DFT: 300mu				
4280	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39301020000	VALVES				
4281	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39301020900	NB: 2 Inches	4	Nos.	290	1 160
4282	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39301021100	NB: 3 Inches	9	Nos.	420	3 780
4283	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39301021500	NB: 6 Inches	1	Nos.	790	790
4284	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39301021600	NB: 8 Inches	8	Nos.	1 030	8 240
4285	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39301022000	NB: 16 Inches	3	Nos.	1 920	5 760
4286	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39301022100	NB: 18 Inches	1	Nos.	2 160	2 160
4287	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39301022400	NB: 24 Inches	3	Nos.	2 870	8 610
4288	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39302000000	DESIGN TEMP GROUP: 126 TO 650(DEG C)Surface preparation & Pre-erection / Shop primer:SSPC-SP-16; (15-25mu surface profile) 1 coat of F-16 @125mu DFT/coat, Primer: None, Finish paint: 1 coat of F-16 @ 125mu DFT/coat, Total DFT: 250mu				
4289	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39302020000	VALVES				
4290	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39302020900	NB: 2 Inches	14	Nos.	380	5 320
4291	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39302021300	NB: 4 Inches	3	Nos.	730	2 190
4292	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39302021600	NB: 8 Inches	5	Nos.	1 390	6 950
4293	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39302021700	NB: 10 Inches	4	Nos.	1 730	6 920
4294	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39302021800	NB: 12 Inches	1	Nos.	2 050	2 050
4295	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39302022000	NB: 16 Inches	1	Nos.	2 580	2 580
4296	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M39302022400	NB: 24 Inches	5	Nos.	3 860	19 300

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4297	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M5**********	********** LEGENDS / NOTES FOR INSULATION WORKS ********** ** Types of Insulation : IH = Insulation for Heat Conservation IT = Insulation for Steam Traced Lines IS = Insulation for Personal Safety IC = Cold Insulation for Anti-condensation IE = Insulation for Electrically Traced Lines IJ = Insulation for Jacketed Lines IK = Insulation for Dual Insulated Lines ** Basic Line Surface Materials : CS = Carbon Steel (Including LT Carbon Steel) AS = Alloy Steel SS = Stainless Steel ** Notes : 1. For insulation type IT,tracer size and tracer numbers shall be as per specification. 2. Insulation thickness for IC where insulation material is Poly Urethane foam (PUF) / Poly Isocyanurate (PIC) + Cellular Glass includes outer layer of 50mm of Cellular Glass and Inner layer of balance thickness of PUF/PIC 3. Insulation for IE consists of inner layer of Rockwool and outer layer of PUF / PIC. The thicknesses have been specified as THK(I) and THK(O) for inner and outer layers respectively. **********				
4298	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50000000000	HOT INSULATION (UNITS) ; Providing thermal insulation including supply of all insulating and ancillary materials, vapour barrier, weather protective coverings, consumables and other necessary materials , testing of materials as required, including transportation of materials to work site, duly inspected by 3rd party inspector(Llyods/BV/DNV or any other Client approved party) at manufacturer's shop & sample check/inspection at site by EIL Construction inspector, applying insulation on surfaces as specified including all preparatory work there on, binding, tying, lacing, stitching and/or otherwise securing , finishing with sheet cladding as per spec. , providing bolts, rivets, and self tapping screws wherever specified , providing inspection windows, end seals for flanges etc., colour coding and identification. Providing steel scaffolding, all tools , tackles , equipments etc. , labour, supervision and completing the work in all respect, at all heights as per drawings , specifications and instructions of Engineer-in-charge. (Refer Legend for applicable EIL specification)				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4299	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50100000000	INSULATION MATERIAL : ROCKWOOL				
4300	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101000000	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : ROCKWOOL				
4301	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101010000	PIPES				
4302	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101010405	NB 00.50 INCHES; THICKNESS 25 MM	10	Metres	1 430	14 300
4303	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101010505	NB 00.75 INCHES; THICKNESS 25 MM	50	Metres	1 540	77 000
4304	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101010508	NB 00.75 INCHES; THICKNESS 40 MM	15	Metres	2 190	32 850
4305	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101010605	NB 01.00 INCHES; THICKNESS 25 MM	50	Metres	1 670	83 500
4306	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101010608	NB 01.00 INCHES; THICKNESS 40 MM	35	Metres	2 340	81 900
4307	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101010805	NB 01.50 INCHES; THICKNESS 25 MM	15	Metres	1 990	29 850
4308	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101010808	NB 01.50 INCHES; THICKNESS 40 MM	235	Metres	2 660	6 25 100
4309	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101010905	NB 02.00 INCHES; THICKNESS 25 MM	885	Metres	2 230	19 73 550
4310	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101010908	NB 02.00 INCHES; THICKNESS 40 MM	1165	Metres	2 930	34 13 450
4311	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011105	NB 03.00 INCHES; THICKNESS 25 MM	1185	Metres	2 830	33 53 550
4312	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011108	NB 03.00 INCHES; THICKNESS 40 MM	345	Metres	3 540	12 21 300
4313	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011305	NB 04.00 INCHES; THICKNESS 25 MM	275	Metres	3 350	9 21 250
4314	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011308	NB 04.00 INCHES; THICKNESS 40 MM	905	Metres	4 090	37 01 450
4315	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011505	NB 06.00 INCHES; THICKNESS 25 MM	2730	Metres	4 470	1 22 03 100
4316	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011508	NB 06.00 INCHES; THICKNESS 40 MM	1210	Metres	5 270	63 76 700
4317	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011605	NB 08.00 INCHES; THICKNESS 25 MM	905	Metres	5 520	49 95 600
4318	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011608	NB 08.00 INCHES; THICKNESS 40 MM	495	Metres	6 370	31 53 150
4319	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011705	NB 10.00 INCHES; THICKNESS 25 MM	280	Metres	6 640	18 59 200
4320	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011708	NB 10.00 INCHES; THICKNESS 40 MM	585	Metres	7 550	44 16 750
4321	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011805	NB 12.00 INCHES; THICKNESS 25 MM	1530	Metres	7 690	1 17 65 700
4322	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011808	NB 12.00 INCHES; THICKNESS 40 MM	315	Metres	8 650	27 24 750
4323	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011905	NB 14.00 INCHES; THICKNESS 25 MM	450	Metres	8 350	37 57 500
4324	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101011908	NB 14.00 INCHES; THICKNESS 40 MM	20	Metres	9 340	1 86 800
4325	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012005	NB 16.00 INCHES; THICKNESS 25 MM	325	Metres	9 390	30 51 750
4326	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012008	NB 16.00 INCHES; THICKNESS 40 MM	375	Metres	10 440	39 15 000
4327	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012105	NB 18.00 INCHES; THICKNESS 25 MM	575	Metres	10 450	60 08 750

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4328	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012108	NB 18.00 INCHES; THICKNESS 40 MM	495	Metres	11 540	57 12 300
4329	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012205	NB 20.00 INCHES; THICKNESS 25 MM	410	Metres	11 500	47 15 000
4330	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012210	NB 20.00 INCHES; THICKNESS 50 MM	140	Metres	13 430	18 80 200
4331	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012405	NB 24.00 INCHES; THICKNESS 25 MM	430	Metres	13 600	58 48 000
4332	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012408	NB 24.00 INCHES; THICKNESS 40 MM	420	Metres	14 850	62 37 000
4333	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012410	NB 24.00 INCHES; THICKNESS 50 MM	255	Metres	15 700	40 03 500
4334	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012605	NB 28.00 INCHES; THICKNESS 25 MM	80	Metres	15 700	12 56 000
4335	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012705	NB 30.00 INCHES; THICKNESS 25 MM	15	Metres	16 760	2 51 400
4336	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012710	NB 30.00 INCHES; THICKNESS 50 MM	205	Metres	19 110	39 17 550
4337	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012805	NB 32.00 INCHES; THICKNESS 25 MM	170	Metres	20 250	34 42 500
4338	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101012810	NB 32.00 INCHES; THICKNESS 50 MM	40	Metres	20 250	8 10 000
4339	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101013005	NB 36.00 INCHES; THICKNESS 25 MM	300	Metres	19 910	59 73 000
4340	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101013305	NB 42.00 INCHES; THICKNESS 25 MM	270	Metres	23 070	62 28 900
4341	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101013310	NB 42.00 INCHES; THICKNESS 50 MM	10	Metres	66 190	6 61 900
4342	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101013605	NB 48.00 INCHES; THICKNESS 25 MM	555	Metres	26 220	1 45 52 100
4343	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101013610	NB 48.00 INCHES; THICKNESS 50 MM	75	Metres	25 940	19 45 500
4344	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101015605	NB 88.00 INCHES; THICKNESS 25 MM	260	Metres	47 250	1 22 85 000
4345	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101017205	NB124.000 INCHES; THICKNESS 25 MM	95	Metres	66 190	62 88 050
4346	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101020000	FLANGE ASSEMBLIES				
4347	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101020605	NB 01.00 INCHES; THICKNESS 25 MM	5	NOs	1 670	8 350
4348	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101020805	NB 01.50 INCHES; THICKNESS 25 MM	3	NOs	1 990	5 970
4349	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101020808	NB 01.50 INCHES; THICKNESS 40 MM	9	NOs	2 660	23 940
4350	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101020905	NB 02.00 INCHES; THICKNESS 25 MM	1	NOs	2 230	2 230
4351	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101020908	NB 02.00 INCHES; THICKNESS 40 MM	4	NOs	2 930	11 720
4352	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101021308	NB 04.00 INCHES; THICKNESS 40 MM	3	NOs	4 090	12 270
4353	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101021608	NB 08.00 INCHES; THICKNESS 40 MM	7	NOs	6 370	44 590
4354	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101021808	NB 12.00 INCHES; THICKNESS 40 MM	3	NOs	8 650	25 950
4355	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101022008	NB 16.00 INCHES; THICKNESS 40 MM	1	NOs	10 440	10 440
4356	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101022410	NB 24.00 INCHES; THICKNESS 50 MM	1	NOs	15 700	15 700
4357	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101030000	BLIND FLANGE ASSEMBLIES				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4358	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101030505	NB 00.75 INCHES; THICKNESS 25 MM	1	NOs	1 540	1 540
4359	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101030508	NB 00.75 INCHES; THICKNESS 40 MM	82	NOs	2 190	1 79 580
4360	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101030608	NB 01.00 INCHES; THICKNESS 40 MM	9	NOs	2 340	21 060
4361	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101030908	NB 02.00 INCHES; THICKNESS 40 MM	1	NOs	2 930	2 930
4362	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101040000	VALVE ASSEMBLIES				
4363	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101040505	NB 00.75 INCHES; THICKNESS 25 MM	18	NOs	3 070	55 260
4364	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101040508	NB 00.75 INCHES; THICKNESS 40 MM	112	NOs	4 380	4 90 560
4365	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101040608	NB 01.00 INCHES; THICKNESS 40 MM	13	NOs	4 680	60 840
4366	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101040905	NB 02.00 INCHES; THICKNESS 25 MM	8	NOs	4 460	35 680
4367	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101040908	NB 02.00 INCHES; THICKNESS 40 MM	22	NOs	5 850	1 28 700
4368	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101041108	NB 03.00 INCHES; THICKNESS 40 MM	1	NOs	7 090	7 090
4369	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101041308	NB 04.00 INCHES; THICKNESS 40 MM	3	NOs	8 180	24 540
4370	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101041608	NB 08.00 INCHES; THICKNESS 40 MM	1	NOs	12 740	12 740
4371	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101041708	NB 10.00 INCHES; THICKNESS 40 MM	10	NOs	15 090	1 50 900
4372	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101041808	NB 12.00 INCHES; THICKNESS 40 MM	3	NOs	17 300	51 900
4373	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50101042008	NB 16.00 INCHES; THICKNESS 40 MM	5	NOs	20 880	1 04 400
4374	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102000000	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 176 (DEG C) TO 350 (DEG C); INSULATION MATERIAL : ROCKWOOL				
4375	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102010000	PIPES				
4376	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102010508	NB 00.75 INCHES; THICKNESS 40 MM	20	Metres	1 680	33 600
4377	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102010510	NB 00.75 INCHES; THICKNESS 50 MM	40	Metres	2 040	81 600
4378	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102010808	NB 01.50 INCHES; THICKNESS 40 MM	10	Metres	2 050	20 500
4379	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102010810	NB 01.50 INCHES; THICKNESS 50 MM	15	Metres	2 420	36 300
4380	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102010908	NB 02.00 INCHES; THICKNESS 40 MM	15	Metres	2 250	33 750
4381	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102010910	NB 02.00 INCHES; THICKNESS 50 MM	75	Metres	2 630	1 97 250
4382	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102010913	NB 02.00 INCHES; THICKNESS 65 MM	835	Metres	3 230	26 97 050
4383	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102011108	NB 03.00 INCHES; THICKNESS 40 MM	470	Metres	2 740	12 87 800
4384	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102011110	NB 03.00 INCHES; THICKNESS 50 MM	20	Metres	3 130	62 600
4385	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102011308	NB 04.00 INCHES; THICKNESS 40 MM	50	Metres	3 170	1 58 500
4386	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102011313	NB 04.00 INCHES; THICKNESS 65 MM	50	Metres	4 240	2 12 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4387	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102011510	NB 06.00 INCHES; THICKNESS 50 MM	35	Metres	4 530	1 58 550
4388	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102011513	NB 06.00 INCHES; THICKNESS 65 MM	15	Metres	5 250	78 750
4389	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102011610	NB 08.00 INCHES; THICKNESS 50 MM	15	Metres	5 430	81 450
4390	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102011613	NB 08.00 INCHES; THICKNESS 65 MM	385	Metres	6 190	23 83 150
4391	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102011713	NB 10.00 INCHES; THICKNESS 65 MM	15	Metres	7 190	1 07 850
4392	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102012010	NB 16.00 INCHES; THICKNESS 50 MM	60	Metres	8 730	5 23 800
4393	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102012013	NB 16.00 INCHES; THICKNESS 65 MM	20	Metres	9 680	1 93 600
4394	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102012413	NB 24.00 INCHES; THICKNESS 65 MM	10	Metres	13 470	1 34 700
4395	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102012716	NB 30.00 INCHES; THICKNESS 80 MM	605	Metres	17 640	1 06 72 200
4396	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102013318	NB 42.00 INCHES; THICKNESS 90 MM	20	Metres	24 750	4 95 000
4397	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102013613	NB 48.00 INCHES; THICKNESS 65 MM	145	Metres	24 820	35 98 900
4398	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102013618	NB 48.00 INCHES; THICKNESS 90 MM	85	Metres	27 850	23 67 250
4399	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102017213	NB124.000 INCHES; THICKNESS 65 MM	235	Metres	60 800	1 42 88 000
4400	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102020000	FLANGE ASSEMBLIES				
4401	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102020810	NB 01.50 INCHES; THICKNESS 50 MM	8	NOs	2 160	17 280
4402	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102020910	NB 02.00 INCHES; THICKNESS 50 MM	5	NOs	2 630	13 150
4403	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102020913	NB 02.00 INCHES; THICKNESS 65 MM	10	NOs	3 230	32 300
4404	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102021110	NB 03.00 INCHES; THICKNESS 50 MM	1	NOs	3 130	3 130
4405	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102030000	BLIND FLANGE ASSEMBLIES				
4406	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102030508	NB 00.75 INCHES; THICKNESS 40 MM	3	NOs	1 680	5 040
4407	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102030510	NB 00.75 INCHES; THICKNESS 50 MM	33	NOs	2 040	67 320
4408	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102040000	VALVE ASSEMBLIES				
4409	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102040508	NB 00.75 INCHES; THICKNESS 40 MM	26	NOs	3 370	87 620
4410	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102040510	NB 00.75 INCHES; THICKNESS 50 MM	51	NOs	4 070	2 07 570
4411	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102040910	NB 02.00 INCHES; THICKNESS 50 MM	5	NOs	5 270	26 350
4412	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102040913	NB 02.00 INCHES; THICKNESS 65 MM	10	NOs	6 460	64 600
4413	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50102041110	NB 03.00 INCHES; THICKNESS 50 MM	1	NOs	6 260	6 260
4414	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103000000	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 351 (DEG C) TO 500 (DEG C); INSULATION MATERIAL : ROCKWOOL				
4415	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103010000	PIPES				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4416	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103010515	NB 00.75 INCHES; THICKNESS 75 MM	20	Metres	3 000	60 000
4417	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103010520	NB 00.75 INCHES; THICKNESS 100 MM	10	Metres	4 030	40 300
4418	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103010616	NB 01.00 INCHES; THICKNESS 80 MM	15	Metres	3 330	49 950
4419	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103010816	NB 01.50 INCHES; THICKNESS 80 MM	15	Metres	3 620	54 300
4420	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103010823	NB 01.50 INCHES; THICKNESS 115 MM	10	Metres	5 180	51 800
4421	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103010918	NB 02.00 INCHES; THICKNESS 90 MM	255	Metres	4 290	10 93 950
4422	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103011733	NB 10.00 INCHES; THICKNESS 165 MM	195	Metres	13 390	26 11 050
4423	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103012735	NB 30.00 INCHES; THICKNESS 175 MM	100	Metres	26 830	26 83 000
4424	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103013025	NB 36.00 INCHES; THICKNESS 125 MM	20	Metres	25 300	5 06 000
4425	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103013325	NB 42.00 INCHES; THICKNESS 125 MM	15	Metres	28 760	4 31 400
4426	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103020000	FLANGE ASSEMBLIES				
4427	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103020816	NB 01.50 INCHES; THICKNESS 80 MM	13	NOs	3 620	47 060
4428	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103020918	NB 02.00 INCHES; THICKNESS 90 MM	1	NOs	4 290	4 290
4429	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103030000	BLIND FLANGE ASSEMBLIES				
4430	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103030515	NB 00.75 INCHES; THICKNESS 75 MM	1	NOs	3 000	3 000
4431	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103030616	NB 01.00 INCHES; THICKNESS 80 MM	3	NOs	3 330	9 990
4432	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103040000	VALVE ASSEMBLIES				
4433	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103040515	NB 00.75 INCHES; THICKNESS 75 MM	86	NOs	5 990	5 15 140
4434	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103040616	NB 01.00 INCHES; THICKNESS 80 MM	5	NOs	6 650	33 250
4435	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103040816	NB 01.50 INCHES; THICKNESS 80 MM	3	NOs	7 240	21 720
4436	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50103040918	NB 02.00 INCHES; THICKNESS 90 MM	16	NOs	8 570	1 37 120
4437	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50104000000	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 501 (DEG C) TO 550 (DEG C)				
4438	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50104010000	PIPES				
4439	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50104010523	NB 00.75 INCHES; THICKNESS 115 MM	30	Metres	4 700	1 41 000
4440	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50104010625	NB 01.00 INCHES; THICKNESS 125 MM	15	Metres	5 310	79 650
4441	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50104010828	NB 01.50 INCHES; THICKNESS 140 MM	15	Metres	6 380	95 700
4442	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50104010930	NB 02.00 INCHES; THICKNESS 150 MM	40	Metres	7 180	2 87 200
4443	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117000000	INSULATION TYPE : IT; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : ROCKWOOL				
4444	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117010000	PIPES				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4445	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117010505	NB 00.75 INCHES; THICKNESS 25 MM	10	Metres	2 170	21 700
4446	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117010605	NB 01.00 INCHES; THICKNESS 25 MM	10	Metres	2 310	23 100
4447	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117010805	NB 01.50 INCHES; THICKNESS 25 MM	10	Metres	2 620	26 200
4448	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117010905	NB 02.00 INCHES; THICKNESS 25 MM	575	Metres	2 870	16 50 250
4449	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117010908	NB 02.00 INCHES; THICKNESS 40 MM	50	Metres	3 580	1 79 000
4450	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117011105	NB 03.00 INCHES; THICKNESS 25 MM	40	Metres	3 460	1 38 400
4451	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117011305	NB 04.00 INCHES; THICKNESS 25 MM	455	Metres	3 990	18 15 450
4452	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117011505	NB 06.00 INCHES; THICKNESS 25 MM	50	Metres	5 110	2 55 500
4453	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117011508	NB 06.00 INCHES; THICKNESS 40 MM	120	Metres	5 930	7 11 600
4454	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117011605	NB 08.00 INCHES; THICKNESS 25 MM	30	Metres	6 150	1 84 500
4455	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117011708	NB 10.00 INCHES; THICKNESS 40 MM	35	Metres	8 210	2 87 350
4456	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117012410	NB 24.00 INCHES; THICKNESS 50 MM	35	Metres	16 380	5 73 300
4457	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117013010	NB 36.00 INCHES; THICKNESS 50 MM	290	Metres	23 200	67 28 000
4458	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117013910	NB 54.00 INCHES; THICKNESS 50 MM	15	Metres	33 940	5 09 100
4459	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117020000	FLANGE ASSEMBLIES				
4460	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117020805	NB 01.50 INCHES; THICKNESS 25 MM	1	NOs	2 620	2 620
4461	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117021105	NB 03.00 INCHES; THICKNESS 25 MM	1	NOs	3 460	3 460
4462	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117021305	NB 04.00 INCHES; THICKNESS 25 MM	3	NOs	3 990	11 970
4463	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117021508	NB 06.00 INCHES; THICKNESS 40 MM	4	NOs	5 930	23 720
4464	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117021605	NB 08.00 INCHES; THICKNESS 25 MM	1	NOs	6 150	6 150
4465	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117021708	NB 10.00 INCHES; THICKNESS 40 MM	1	NOs	8 210	8 210
4466	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117022210	NB 20.00 INCHES; THICKNESS 50 MM	1	NOs	14 100	14 100
4467	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117022710	NB 30.00 INCHES; THICKNESS 50 MM	1	NOs	19 800	19 800
4468	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117023010	NB 36.00 INCHES; THICKNESS 50 MM	1	NOs	23 200	23 200
4469	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117023910	NB 54.00 INCHES; THICKNESS 50 MM	1	NOs	33 940	33 940
4470	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117030000	BLIND FLANGE ASSEMBLIES				
4471	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117030505	NB 00.75 INCHES; THICKNESS 25 MM	3	NOs	2 170	6 510
4472	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117030905	NB 02.00 INCHES; THICKNESS 25 MM	13	NOs	2 870	37 310
4473	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117030908	NB 02.00 INCHES; THICKNESS 40 MM	5	NOs	3 580	17 900
4474	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117031508	NB 06.00 INCHES; THICKNESS 40 MM	1	NOs	5 930	5 930

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4475	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117033910	NB 54.00 INCHES; THICKNESS 50 MM	1	NOs	33 940	33 940
4476	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117040000	VALVE ASSEMBLIES				
4477	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117040505	NB 00.75 INCHES; THICKNESS 25 MM	18	NOs	4 350	78 300
4478	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117040605	NB 01.00 INCHES; THICKNESS 25 MM	4	NOs	4 620	18 480
4479	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117040805	NB 01.50 INCHES; THICKNESS 25 MM	1	NOs	5 240	5 240
4480	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117040905	NB 02.00 INCHES; THICKNESS 25 MM	72	NOs	5 730	4 12 560
4481	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117040908	NB 02.00 INCHES; THICKNESS 40 MM	18	NOs	7 160	1 28 880
4482	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117041105	NB 03.00 INCHES; THICKNESS 25 MM	8	NOs	6 930	55 440
4483	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117041305	NB 04.00 INCHES; THICKNESS 25 MM	1	NOs	7 990	7 990
4484	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117041505	NB 06.00 INCHES; THICKNESS 25 MM	5	NOs	10 220	51 100
4485	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117041508	NB 06.00 INCHES; THICKNESS 40 MM	4	NOs	11 860	47 440
4486	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50117042410	NB 24.00 INCHES; THICKNESS 50 MM	1	NOs	32 760	32 760
4487	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118000000	INSULATION TYPE : IT; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 176 (DEG C) TO 350 (DEG C); INSULATION MATERIAL : ROCKWOOL				
4488	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118010000	PIPES				
4489	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118010508	NB 00.75 INCHES; THICKNESS 40 MM	10	Metres	2 220	22 200
4490	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118010608	NB 01.00 INCHES; THICKNESS 40 MM	15	Metres	2 340	35 100
4491	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118010808	NB 01.50 INCHES; THICKNESS 40 MM	10	Metres	2 590	25 900
4492	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118010908	NB 02.00 INCHES; THICKNESS 40 MM	125	Metres	2 800	3 50 000
4493	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118011108	NB 03.00 INCHES; THICKNESS 40 MM	730	Metres	3 280	23 94 400
4494	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118011308	NB 04.00 INCHES; THICKNESS 40 MM	205	Metres	3 710	7 60 550
4495	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118011510	NB 06.00 INCHES; THICKNESS 50 MM	505	Metres	5 100	25 75 500
4496	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118011610	NB 08.00 INCHES; THICKNESS 50 MM	55	Metres	5 990	3 29 450
4497	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118011710	NB 10.00 INCHES; THICKNESS 50 MM	165	Metres	6 940	11 45 100
4498	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118011910	NB 14.00 INCHES; THICKNESS 50 MM	80	Metres	8 400	6 72 000
4499	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118012010	NB 16.00 INCHES; THICKNESS 50 MM	100	Metres	9 290	9 29 000
4500	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118012213	NB 20.00 INCHES; THICKNESS 65 MM	30	Metres	12 150	3 64 500
4501	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118012413	NB 24.00 INCHES; THICKNESS 65 MM	550	Metres	14 050	77 27 500
4502	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118013013	NB 36.00 INCHES; THICKNESS 65 MM	560	Metres	19 730	1 10 48 800
4503	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118013313	NB 42.00 INCHES; THICKNESS 65 MM	190	Metres	22 570	42 88 300

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4504	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118013913	NB 54.00 INCHES; THICKNESS 65 MM	50	Metres	28 670	14 33 500
4505	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118014213	NB 60.00 INCHES; THICKNESS 65 MM	125	Metres	31 090	38 86 250
4506	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118020000	FLANGE ASSEMBLIES				
4507	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118021308	NB 04.00 INCHES; THICKNESS 40 MM	5	NOs	3 710	18 550
4508	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118021510	NB 06.00 INCHES; THICKNESS 50 MM	5	NOs	5 100	25 500
4509	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118021610	NB 08.00 INCHES; THICKNESS 50 MM	5	NOs	5 990	29 950
4510	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118021710	NB 10.00 INCHES; THICKNESS 50 MM	1	NOs	6 940	6 940
4511	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118021910	NB 14.00 INCHES; THICKNESS 50 MM	1	NOs	8 400	8 400
4512	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118022010	NB 16.00 INCHES; THICKNESS 50 MM	5	NOs	9 290	46 450
4513	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118022213	NB 20.00 INCHES; THICKNESS 65 MM	14	NOs	12 150	1 70 100
4514	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118022413	NB 24.00 INCHES; THICKNESS 65 MM	1	NOs	14 050	14 050
4515	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118022713	NB 30.00 INCHES; THICKNESS 65 MM	1	NOs	16 890	16 890
4516	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118023013	NB 36.00 INCHES; THICKNESS 65 MM	26	NOs	19 730	5 12 980
4517	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118023913	NB 54.00 INCHES; THICKNESS 65 MM	1	NOs	28 670	28 670
4518	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118024213	NB 60.00 INCHES; THICKNESS 65 MM	1	NOs	31 090	31 090
4519	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118030000	BLIND FLANGE ASSEMBLIES				
4520	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118030508	NB 00.75 INCHES; THICKNESS 40 MM	1	NOs	2 220	2 220
4521	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118030908	NB 02.00 INCHES; THICKNESS 40 MM	33	NOs	2 800	92 400
4522	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118033313	NB 42.00 INCHES; THICKNESS 65 MM	5	NOs	22 570	1 12 850
4523	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118033913	NB 54.00 INCHES; THICKNESS 65 MM	1	NOs	28 670	28 670
4524	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118040000	VALVE ASSEMBLIES				
4525	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118040508	NB 00.75 INCHES; THICKNESS 40 MM	1	NOs	4 440	4 440
4526	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118040608	NB 01.00 INCHES; THICKNESS 40 MM	10	NOs	4 680	46 800
4527	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118040808	NB 01.50 INCHES; THICKNESS 40 MM	12	NOs	5 190	62 280
4528	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118040908	NB 02.00 INCHES; THICKNESS 40 MM	59	NOs	5 600	3 30 400
4529	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118041108	NB 03.00 INCHES; THICKNESS 40 MM	48	NOs	6 560	3 14 880
4530	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118041308	NB 04.00 INCHES; THICKNESS 40 MM	10	NOs	7 420	74 200
4531	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118041510	NB 06.00 INCHES; THICKNESS 50 MM	14	NOs	10 200	1 42 800
4532	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118041610	NB 08.00 INCHES; THICKNESS 50 MM	8	NOs	11 980	95 840
4533	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118041710	NB 10.00 INCHES; THICKNESS 50 MM	1	NOs	13 880	13 880

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4534	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118042213	NB 20.00 INCHES; THICKNESS 65 MM	3	NOs	24 310	72 930
4535	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118042413	NB 24.00 INCHES; THICKNESS 65 MM	27	NOs	28 100	7 58 700
4536	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50118043013	NB 36.00 INCHES; THICKNESS 65 MM	7	NOs	39 450	2 76 150
4537	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50134000000	INSULATION TYPE : IS; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 176 (DEG C) TO 350 (DEG C); INSULATION MATERIAL : ROCKWOOL				
4538	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50134010000	PIPES				
4539	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50134010510	NB 00.75 INCHES; THICKNESS 50 MM	10	Metres	2 040	20 400
4540	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50134010908	NB 02.00 INCHES; THICKNESS 40 MM	75	Metres	2 250	1 68 750
4541	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50134011313	NB 04.00 INCHES; THICKNESS 65 MM	10	Metres	4 240	42 400
4542	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M50134011715	NB 10.00 INCHES; THICKNESS 75 MM	20	Metres	7 750	1 55 000
4543	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55100000000	INSULATION MATERIAL : INHIBITED ROCKWOOL				
4544	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109000000	INSULATION TYPE : IH; SURFACE MATERIAL : SS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : INHIBITED ROCKWOOL				
4545	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109010000	PIPES				
4546	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109010505	NB 00.75 INCHES; THICKNESS 25 MM	10	Metres	1 540	15 400
4547	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109010605	NB 01.00 INCHES; THICKNESS 25 MM	10	Metres	1 680	16 800
4548	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109010805	NB 01.50 INCHES; THICKNESS 25 MM	10	Metres	1 990	19 900
4549	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109010905	NB 02.00 INCHES; THICKNESS 25 MM	60	Metres	2 240	1 34 400
4550	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109011605	NB 08.00 INCHES; THICKNESS 25 MM	15	Metres	5 540	83 100
4551	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109011705	NB 10.00 INCHES; THICKNESS 25 MM	60	Metres	6 660	3 99 600
4552	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109011805	NB 12.00 INCHES; THICKNESS 25 MM	10	Metres	7 720	77 200
4553	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109011808	NB 12.00 INCHES; THICKNESS 40 MM	15	Metres	8 700	1 30 500
4554	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M55109012005	NB 16.00 INCHES; THICKNESS 25 MM	30	Metres	9 430	2 82 900
4555	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58200000000	INSULATION MATERIAL : METAL CAGE				
4556	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233000000	INSULATION TYPE : IS; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : METAL CAGE				
4557	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233010000	PIPES				
4558	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233010481	NB 00.50 INCHES; THICKNESS 3 MM	10	Metres	700	7 000
4559	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233010581	NB 00.75 INCHES; THICKNESS 3 MM	10	Metres	770	7 700
4560	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233010681	NB 01.00 INCHES; THICKNESS 3 MM	10	Metres	860	8 600
4561	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233010881	NB 01.50 INCHES; THICKNESS 3 MM	10	Metres	1 050	10 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4562	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233010981	NB 02.00 INCHES; THICKNESS 3 MM	30	Metres	1 200	36 000
4563	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233011181	NB 03.00 INCHES; THICKNESS 3 MM	255	Metres	1 580	4 02 900
4564	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233011381	NB 04.00 INCHES; THICKNESS 3 MM	15	Metres	1 910	28 650
4565	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233011581	NB 06.00 INCHES; THICKNESS 3 MM	170	Metres	2 610	4 43 700
4566	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233011681	NB 08.00 INCHES; THICKNESS 3 MM	20	Metres	3 450	69 000
4567	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233011781	NB 10.00 INCHES; THICKNESS 3 MM	105	Metres	3 450	3 62 250
4568	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233011881	NB 12.00 INCHES; THICKNESS 3 MM	10	Metres	4 330	43 300
4569	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233012081	NB 16.00 INCHES; THICKNESS 3 MM	10	Metres	5 400	54 000
4570	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233012181	NB 18.00 INCHES; THICKNESS 3 MM	20	Metres	6 060	1 21 200
4571	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233012281	NB 20.00 INCHES; THICKNESS 3 MM	55	Metres	6 720	3 69 600
4572	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233012481	NB 24.00 INCHES; THICKNESS 3 MM	40	Metres	7 380	2 95 200
4573	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233012781	NB 30.00 INCHES; THICKNESS 3 MM	95	Metres	8 700	8 26 500
4574	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233012881	NB 32.00 INCHES; THICKNESS 3 MM	15	Metres	9 370	1 40 550
4575	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233013081	NB 36.00 INCHES; THICKNESS 3 MM	30	Metres	10 020	3 00 600
4576	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233013381	NB 42.00 INCHES; THICKNESS 3 MM	15	Metres	11 340	1 70 100
4577	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233013881	NB 52.00 INCHES; THICKNESS 3 MM	10	Metres	17 950	1 79 500
4578	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233014281	NB 60.00 INCHES; THICKNESS 3 MM	30	Metres	20 590	6 17 700
4579	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233014581	NB 66.00 INCHES; THICKNESS 3 MM	50	Metres	22 920	11 46 000
4580	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233040000	VALVE ASSEMBLIES				
4581	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58233041381	NB 04.00 INCHES; THICKNESS 3 MM	1	NOs	3 820	3 820
4582	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58241000000	INSULATION TYPE : IS; SURFACE MATERIAL : SS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : METAL CAGE				
4583	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58241010000	PIPES				
4584	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58241010581	NB 00.75 INCHES; THICKNESS 3 MM	10	Metres	770	7 700
4585	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58241010881	NB 01.50 INCHES; THICKNESS 3 MM	10	Metres	1 050	10 500
4586	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58241010981	NB 02.00 INCHES; THICKNESS 3 MM	20	Metres	1 200	24 000
4587	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58241011681	NB 08.00 INCHES; THICKNESS 3 MM	10	Metres	3 630	36 300
4588	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M58241012181	NB 18.00 INCHES; THICKNESS 3 MM	10	Metres	6 720	67 200

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4589	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000000	SPECIAL INSULATION MATERIALS CONSIDERED :- 90MM ROCKWOOL +20MM AEROGEL +75MM PIR (FOR LP & MP STEAM), 125MM ROCKWOOL +20MM AEROGEL +75 PIR (FOR HP STEAM), 290 MM CALICUM SILICATE INNER LAYER & 75 MM IN SITU PUF (OUTER LAYER) WITH 50 MICRON MYLAR FOIL BETWEEN OUTER & INNER LAYERS OF INSULATION. (FOR VHP STEAM)				
4590	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000001	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : ROCKWOOL				
4591	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000002	PIPES				
4592	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000011	NB 03.00 INCHES; THICKNESS 185 MM	65	Metres	53 770	34 95 050
4593	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000012	NB 03.00 INCHES; THICKNESS 185 MM	140	Metres	58 550	81 97 000
4594	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000013	NB 04.00 INCHES; THICKNESS 185 MM	80	Metres	63 320	50 65 600
4595	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000014	NB 06.00 INCHES; THICKNESS 185 MM	15	Metres	63 320	9 49 800
4596	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000015	NB 06.00 INCHES; THICKNESS 185 MM	320	Metres	72 880	2 33 21 600
4597	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000016	NB 08.00 INCHES; THICKNESS 185 MM	250	Metres	87 220	2 18 05 000
4598	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000017	NB 10.00 INCHES; THICKNESS 185 MM	380	Metres	1 01 550	3 85 89 000
4599	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000018	NB 12.00 INCHES; THICKNESS 185 MM	275	Metres	46 000	1 26 50 000
4600	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000019	NB 14.00 INCHES; THICKNESS 185 MM	130	Metres	48 990	63 68 700
4601	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000020	NB 16.00 INCHES; THICKNESS 185 MM	470	Metres	53 770	2 52 71 900
4602	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000021	NB 18.00 INCHES; THICKNESS 185 MM	550	Metres	58 550	3 22 02 500
4603	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000022	NB 20.00 INCHES; THICKNESS 185 MM	595	Metres	63 320	3 76 75 400
4604	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000023	NB 24.00 INCHES; THICKNESS 185 MM	35	Metres	72 880	25 50 800
4605	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000024	NB 24.00 INCHES; THICKNESS 185 MM	290	Metres	72 880	2 11 35 200
4606	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000025	NB 28.00 INCHES; THICKNESS 185 MM	180	Metres	82 440	1 48 39 200
4607	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000026	NB 30.00 INCHES; THICKNESS 185 MM	340	Metres	87 220	2 96 54 800
4608	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000027	NB 36.00 INCHES; THICKNESS 185 MM	510	Metres	1 01 550	5 17 90 500
4609	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000029	FLANGE ASSEMBLIES			26 290	
4610	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000035	NB 03.00 INCHES; THICKNESS 185 MM	1	NOs	53 770	53 770
4611	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000036	NB 04.00 INCHES; THICKNESS 185 MM	1	NOs	58 550	58 550
4612	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000037	NB 04.00 INCHES; THICKNESS 185 MM	7	NOs	63 320	4 43 240
4613	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000038	NB 06.00 INCHES; THICKNESS 185 MM	16	NOs	63 320	10 13 120
4614	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000039	NB 08.00 INCHES; THICKNESS 185 MM	9	NOs	72 880	6 55 920

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4615	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000040	NB 10.00 INCHES; THICKNESS 185 MM	1	NOs	87 220	87 220
4616	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000041	NB 12.00 INCHES; THICKNESS 185 MM	16	NOs	46 000	7 36 000
4617	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000042	NB 14.00 INCHES; THICKNESS 185 MM	4	NOs	48 990	1 95 960
4618	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000043	NB 16.00 INCHES; THICKNESS 185 MM	5	NOs	53 770	2 68 850
4619	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000044	NB 18.00 INCHES; THICKNESS 185 MM	8	NOs	58 550	4 68 400
4620	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000045	NB 20.00 INCHES; THICKNESS 185 MM	9	NOs	23 900	2 15 100
4621	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000046	NB 24.00 INCHES; THICKNESS 185 MM	4	NOs	26 290	1 05 160
4622	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000047	NB 24.00 INCHES; THICKNESS 185 MM	1	NOs	36 140	36 140
4623	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000048	NB 36.00 INCHES; THICKNESS 185 MM	1	NOs	41 220	41 220
4624	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000050	BLIND FLANGE ASSEMBLIES			1 01 550	
4625	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000054	NB 06.00 INCHES; THICKNESS 185 MM	7	NOs	31 370	2 19 590
4626	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000055	NB 08.00 INCHES; THICKNESS 185 MM	1	NOs	47 800	47 800
4627	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000056	NB 10.00 INCHES; THICKNESS 185 MM	7	NOs	47 800	3 34 600
4628	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000057	NB 12.00 INCHES; THICKNESS 185 MM	12	NOs	52 580	6 30 960
4629	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000058	NB 20.00 INCHES; THICKNESS 185 MM	1	NOs	72 290	72 290
4630	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000059	NB 30.00 INCHES; THICKNESS 185 MM	1	NOs	82 450	82 450
4631	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000061	VALVE ASSEMBLIES			97 980	
4632	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000067	NB 03.00 INCHES; THICKNESS 185 MM	3	NOs	1 74 440	5 23 320
4633	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000068	NB 03.00 INCHES; THICKNESS 185 MM	7	NOs	23 900	1 67 300
4634	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000069	NB 04.00 INCHES; THICKNESS 185 MM	8	NOs	26 290	2 10 320
4635	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000070	NB 06.00 INCHES; THICKNESS 185 MM	1	NOs	31 370	31 370
4636	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000071	NB 06.00 INCHES; THICKNESS 185 MM	20	NOs	31 370	6 27 400
4637	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000072	NB 08.00 INCHES; THICKNESS 185 MM	14	NOs	36 140	5 05 960
4638	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000073	NB 10.00 INCHES; THICKNESS 185 MM	9	NOs	41 220	3 70 980
4639	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000074	NB 12.00 INCHES; THICKNESS 185 MM	17	NOs	46 000	7 82 000
4640	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000075	NB 14.00 INCHES; THICKNESS 185 MM	1	NOs	48 990	48 990
4641	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000076	NB 16.00 INCHES; THICKNESS 185 MM	9	NOs	21 820	1 96 380
4642	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000077	NB 18.00 INCHES; THICKNESS 185 MM	14	NOs	21 820	3 05 480
4643	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000078	NB 20.00 INCHES; THICKNESS 185 MM	25	NOs	24 100	6 02 500
4644	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000079	NB 24.00 INCHES; THICKNESS 185 MM	5	NOs	24 100	1 20 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4645	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000080	NB 24.00 INCHES; THICKNESS 185 MM	4	NOs	28 930	1 15 720
4646	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000081	NB 36.00 INCHES; THICKNESS 185 MM	1	NOs	28 930	28 930
4647	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000082	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 176 (DEG C) TO 350 (DEG C); INSULATION MATERIAL : ROCKWOOL			33 480	
4648	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000083	PIPES			33 480	
4649	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000089	NB 03.00 INCHES; THICKNESS 185 MM	15	Metres	50 250	7 53 750
4650	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000090	NB 03.00 INCHES; THICKNESS 185 MM	15	Metres	50 250	7 53 750
4651	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000091	NB 04.00 INCHES; THICKNESS 185 MM	10	Metres	59 360	5 93 600
4652	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000092	NB 04.00 INCHES; THICKNESS 185 MM	10	Metres	1 04 840	10 48 400
4653	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000093	NB 04.00 INCHES; THICKNESS 185 MM	60	Metres	24 100	14 46 000
4654	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000094	NB 06.00 INCHES; THICKNESS 185 MM	100	Metres	28 930	28 93 000
4655	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000095	NB 06.00 INCHES; THICKNESS 185 MM	335	Metres	28 930	96 91 550
4656	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000096	NB 06.00 INCHES; THICKNESS 185 MM	120	Metres	28 930	34 71 600
4657	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000097	NB 08.00 INCHES; THICKNESS 185 MM	15	Metres	33 480	5 02 200
4658	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000098	NB 10.00 INCHES; THICKNESS 185 MM	105	Metres	38 310	40 22 550
4659	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000099	NB 12.00 INCHES; THICKNESS 185 MM	10	Metres	42 860	4 28 600
4660	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000100	NB 18.00 INCHES; THICKNESS 185 MM	130	Metres	54 800	71 24 000
4661	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000101	NB 20.00 INCHES; THICKNESS 185 MM	30	Metres	59 360	17 80 800
4662	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000102	NB 24.00 INCHES; THICKNESS 185 MM	20	Metres	68 450	13 69 000
4663	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000103	NB 30.00 INCHES; THICKNESS 185 MM	85	Metres	21 820	18 54 700
4664	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000104	NB 32.00 INCHES; THICKNESS 185 MM	120	Metres	21 820	26 18 400
4665	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000105	NB 36.00 INCHES; THICKNESS 185 MM	755	Metres	24 100	1 81 95 500
4666	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000106	NB 40.00 INCHES; THICKNESS 185 MM	455	Metres	24 100	1 09 65 500
4667	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000109	FLANGE ASSEMBLIES			33 480	
4668	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000113	NB 03.00 INCHES; THICKNESS 185 MM	3	NOs	45 710	1 37 130
4669	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000114	NB 03.00 INCHES; THICKNESS 185 MM	1	NOs	45 710	45 710
4670	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000115	NB 04.00 INCHES; THICKNESS 185 MM	1	NOs	50 250	50 250
4671	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000116	NB 04.00 INCHES; THICKNESS 185 MM	1	NOs	50 250	50 250
4672	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000117	NB 06.00 INCHES; THICKNESS 185 MM	1	NOs	59 360	59 360
4673	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000118	NB 06.00 INCHES; THICKNESS 185 MM	1	NOs	28 930	28 930

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4674	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000119	NB 06.00 INCHES; THICKNESS 185 MM	7	NOs	28 930	2 02 510
4675	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000120	NB 08.00 INCHES; THICKNESS 185 MM	1	NOs	33 480	33 480
4676	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000121	NB 12.00 INCHES; THICKNESS 185 MM	1	NOs	42 860	42 860
4677	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000122	NB 18.00 INCHES; THICKNESS 185 MM	4	NOs	54 800	2 19 200
4678	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000123	NB 20.00 INCHES; THICKNESS 185 MM	3	NOs	21 820	65 460
4679	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000124	NB 24.00 INCHES; THICKNESS 185 MM	1	NOs	24 100	24 100
4680	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000125	NB 30.00 INCHES; THICKNESS 185 MM	1	NOs	28 930	28 930
4681	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000126	NB 32.00 INCHES; THICKNESS 185 MM	3	NOs	28 930	86 790
4682	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000127	NB 36.00 INCHES; THICKNESS 185 MM	5	NOs	33 480	1 67 400
4683	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000129	BLIND FLANGE ASSEMBLIES			38 310	
4684	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000132	NB 04.00 INCHES; THICKNESS 185 MM	1	NOs	59 360	59 360
4685	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000133	NB 10.00 INCHES; THICKNESS 185 MM	1	NOs	38 310	38 310
4686	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000134	NB 12.00 INCHES; THICKNESS 185 MM	10	NOs	42 860	4 28 600
4687	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000135	NB 36.00 INCHES; THICKNESS 185 MM	1	NOs	95 750	95 750
4688	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000137	VALVE ASSEMBLIES			43 640	
4689	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000142	NB 03.00 INCHES; THICKNESS 185 MM	1	NOs	66 970	66 970
4690	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000143	NB 03.00 INCHES; THICKNESS 185 MM	1	NOs	66 970	66 970
4691	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000144	NB 04.00 INCHES; THICKNESS 185 MM	1	NOs	76 630	76 630
4692	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000145	NB 04.00 INCHES; THICKNESS 185 MM	5	NOs	76 630	3 83 150
4693	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000146	NB 06.00 INCHES; THICKNESS 185 MM	4	NOs	85 730	3 42 920
4694	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000147	NB 06.00 INCHES; THICKNESS 185 MM	4	NOs	91 420	3 65 680
4695	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000148	NB 06.00 INCHES; THICKNESS 185 MM	7	NOs	91 420	6 39 940
4696	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000149	NB 10.00 INCHES; THICKNESS 185 MM	10	NOs	1 00 510	10 05 100
4697	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000150	NB 12.00 INCHES; THICKNESS 185 MM	1	NOs	1 18 710	1 18 710
4698	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000151	NB 18.00 INCHES; THICKNESS 185 MM	3	NOs	1 09 610	3 28 830
4699	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000152	NB 20.00 INCHES; THICKNESS 185 MM	4	NOs	1 18 710	4 74 840
4700	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000153	NB 24.00 INCHES; THICKNESS 185 MM	4	NOs	1 36 900	5 47 600
4701	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000154	NB 30.00 INCHES; THICKNESS 185 MM	3	NOs	1 64 210	4 92 630
4702	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000155	NB 32.00 INCHES; THICKNESS 185 MM	1	NOs	1 73 290	1 73 290
4703	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000156	NB 36.00 INCHES; THICKNESS 185 MM	8	NOs	1 91 500	15 32 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4704	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000157	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 351 (DEG C) TO 500 (DEG C); INSULATION MATERIAL : ROCKWOOL				
4705	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000158	PIPES			36 440	
4706	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000163	NB 03.00 INCHES; THICKNESS 365 MM	60	Metres	62 170	37 30 200
4707	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000164	NB 04.00 INCHES; THICKNESS 365 MM	145	Metres	36 440	52 83 800
4708	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000165	NB 06.00 INCHES; THICKNESS 365 MM	195	Metres	40 490	78 95 550
4709	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000166	NB 08.00 INCHES; THICKNESS 365 MM	165	Metres	44 300	73 09 500
4710	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000167	NB 10.00 INCHES; THICKNESS 365 MM	425	Metres	48 350	2 05 48 750
4711	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000168	NB 12.00 INCHES; THICKNESS 365 MM	195	Metres	52 160	1 01 71 200
4712	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000169	NB 18.00 INCHES; THICKNESS 365 MM	165	Metres	62 170	1 02 58 050
4713	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000170	NB 24.00 INCHES; THICKNESS 365 MM	885	Metres	73 600	6 51 36 000
4714	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000171	FLANGE ASSEMBLIES				
4715	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000174	NB 03.00 INCHES; THICKNESS 365 MM	4	NOs	36 440	1 45 760
4716	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000175	NB 04.00 INCHES; THICKNESS 365 MM	7	NOs	48 350	3 38 450
4717	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000176	NB 06.00 INCHES; THICKNESS 365 MM	4	NOs	40 490	1 61 960
4718	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000177	NB 08.00 INCHES; THICKNESS 365 MM	4	NOs	1 24 330	4 97 320
4719	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000178	NB 12.00 INCHES; THICKNESS 365 MM	4	NOs	52 160	2 08 640
4720	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000179	NB 24.00 INCHES; THICKNESS 365 MM	9	NOs	73 600	6 62 400
4721	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000181	BLIND FLANGE ASSEMBLIES				
4722	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000184	NB 04.00 INCHES; THICKNESS 365 MM	4	NOs	52 160	2 08 640
4723	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000185	NB 06.00 INCHES; THICKNESS 365 MM	7	NOs	58 360	4 08 520
4724	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000186	NB 10.00 INCHES; THICKNESS 365 MM	3	NOs	65 980	1 97 940
4725	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000187	NB 12.00 INCHES; THICKNESS 365 MM	4	NOs	73 600	2 94 400
4726	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000188	VALVE ASSEMBLIES			91 730	
4727	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000193	NB 03.00 INCHES; THICKNESS 365 MM	3	NOs	69 060	2 07 180
4728	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000194	NB 04.00 INCHES; THICKNESS 365 MM	5	NOs	72 880	3 64 400
4729	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000195	NB 06.00 INCHES; THICKNESS 365 MM	3	NOs	80 980	2 42 940
4730	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000196	NB 08.00 INCHES; THICKNESS 365 MM	9	NOs	88 600	7 97 400
4731	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000197	NB 10.00 INCHES; THICKNESS 365 MM	3	NOs	96 700	2 90 100
4732	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000198	NB 18.00 INCHES; THICKNESS 365 MM	1	NOs	1 24 330	1 24 330

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4733	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000199	NB 24.00 INCHES; THICKNESS 365 MM	5	NOs	1 47 210	7 36 050
4734	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000200	INSULATION TYPE : IH; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : 501 (DEG C) TO 550 (DEG C)				
4735	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000201	PIPES				
4736	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000206	NB 03.00 INCHES; THICKNESS 365 MM	10	Metres	34 530	3 45 300
4737	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000207	NB 04.00 INCHES; THICKNESS 365 MM	10	Metres	36 440	3 64 400
4738	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000208	NB 12.00 INCHES; THICKNESS 365 MM	80	Metres	52 160	41 72 800
4739	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000209	NB 20.00 INCHES; THICKNESS 365 MM	55	Metres	65 970	36 28 350
4740	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000210	NB 24.00 INCHES; THICKNESS 365 MM	385	Metres	73 600	2 83 36 000
4741	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000211	NB 30.00 INCHES; THICKNESS 365 MM	345	Metres	85 030	2 93 35 350
4742	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M59900000212	NB 36.00 INCHES; THICKNESS 365 MM	190	Metres	96 470	1 83 29 300
4743	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M70000000000	INSULATION OF ELETRICAL TRACED LINES (UNITS): Providing thermal insulation including supply of all insulating and ancillary materials, vapour barrier, weather protective coverings, consumable and other necessary materials ,testing of materials as required, including transportation of materials to work site, duly inspected by 3rd party inspector(Llyods/BV/DNV or any other Client approved party) at manufacturer's shop & sample check/inspection at site by EIL Construction inspector, applying insulation on surfaces as specified including all preparatory work there on, all binding, tying, lacing, stitching and/or otherwise securing , finishing with cladding as per spec., providing bolts, rivets, and self tapping screws wherever specified , providing inspection windows, end seals for flanges etc., colour coding and identification. Providing steel scaffolding, all tools , tackles , equipments etc. , labour, supervision and completing the work in all respect, at all heights as per drawings , specifications and instructions of Engineer- in-charge. (Refer Legend for applicable EIL specification)				
4744	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M72200000000	INSULATION MATERIAL : ROCKWOOL+PIC				
4745	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M72257000000	INSULATION TYPE : IE; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO 175 (DEG C); INSULATION MATERIAL : ROCKWOOL+PIC				
4746	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M72257010000	PIPES				
4747	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570105AA	NB 00.75 INCHES; THK(I) 25 MM; THK(O) 25 MM	10	Metres	2 730	27 300
4748	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570106AA	NB 01.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	10	Metres	2 890	28 900
4749	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570108AA	NB 01.50 INCHES; THK(I) 25 MM; THK(O) 25 MM	10	Metres	3 240	32 400
4750	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570108DA	NB 01.50 INCHES; THK(I) 40 MM; THK(O) 25 MM	10	Metres	3 970	39 700
4751	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570109AA	NB 02.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	275	Metres	3 530	9 70 750

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4752	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570109DA	NB 02.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	30	Metres	4 270	1 28 100
4753	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570111AA	NB 03.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	140	Metres	4 220	5 90 800
4754	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570111DA	NB 03.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	680	Metres	4 980	33 86 400
4755	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570111FA	NB 03.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	340	Metres	5 520	18 76 800
4756	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570113FA	NB 04.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	10	Metres	6 170	61 700
4757	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570115FA	NB 06.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	15	Metres	7 560	1 13 400
4758	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570116FA	NB 08.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	490	Metres	8 860	43 41 400
4759	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570116JA	NB 08.00 INCHES; THK(I) 65 MM; THK(O) 25 MM	230	Metres	9 800	22 54 000
4760	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570127AA	NB 30.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	115	Metres	20 350	23 40 250
4761	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M72257020000	FLANGE ASSEMBLIES				
4762	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570209AA	NB 02.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	4	NOs	3 530	14 120
4763	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570211AA	NB 03.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	1	NOs	4 220	4 220
4764	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570211DA	NB 03.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	3	NOs	4 980	14 940
4765	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570211FA	NB 03.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	3	NOs	5 520	16 560
4766	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570215FA	NB 06.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	1	NOs	7 560	7 560
4767	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570216FA	NB 08.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	4	NOs	8 860	35 440
4768	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570216JA	NB 08.00 INCHES; THK(I) 65 MM; THK(O) 25 MM	1	NOs	9 800	9 800
4769	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570227AA	NB 30.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	3	NOs	20 350	61 050
4770	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M72257030000	BLIND FLANGE ASSEMBLIES				
4771	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570305AA	NB 00.75 INCHES; THK(I) 25 MM; THK(O) 25 MM	13	NOs	2 730	35 490
4772	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570309DA	NB 02.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	3	NOs	4 270	12 810
4773	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570313FA	NB 04.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	1	NOs	6 160	6 160
4774	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M72257040000	VALVE ASSEMBLIES				
4775	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570405AA	NB 00.75 INCHES; THK(I) 25 MM; THK(O) 25 MM	14	NOs	5 460	76 440
4776	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570408AA	NB 01.50 INCHES; THK(I) 25 MM; THK(O) 25 MM	3	NOs	6 480	19 440
4777	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570408DA	NB 01.50 INCHES; THK(I) 40 MM; THK(O) 25 MM	3	NOs	7 950	23 850
4778	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570409AA	NB 02.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	5	NOs	7 070	35 350
4779	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570409DA	NB 02.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	23	NOs	8 530	1 96 190
4780	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570411AA	NB 03.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	5	NOs	8 440	42 200
4781	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570411DA	NB 03.00 INCHES; THK(I) 40 MM; THK(O) 25 MM	3	NOs	9 960	29 880

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4782	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570411FA	NB 03.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	3	NOs	11 040	33 120
4783	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570415FA	NB 06.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	1	NOs	15 110	15 110
4784	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570416FA	NB 08.00 INCHES; THK(I) 50 MM; THK(O) 25 MM	8	NOs	17 710	1 41 680
4785	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	M722570427AA	NB 30.00 INCHES; THK(I) 25 MM; THK(O) 25 MM	3	NOs	40 710	1 22 130
4786	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0000000000	COLD INSULATION (UNITS): Providing thermal insulation including supply of all insulating and ancillary materials, Aluminium foil for SS surfaces, vapour barrier, weather protective coverings, consumables and other necessary materials , testing of materials as required , including transportation of materials to work site, duly inspected by 3rd party inspector(Llyods/BV/DNV or any other Client approved party) at manufacturer's shop & sample check/inspection at site by EIL Construction inspector, applying insulation on surfaces as specified including all preparatory works there on, binding, tying, lacing, stitching and/or otherwise securing , finishing with cladding as per spec., providing bolts, rivets, and self tapping screws wherever specified ,providing inspection windows, end seals for flanges etc., colour coding and identification. Providing steel scaffolding, all tools , tackles , equipments etc. , labour, supervision and completing the work in all respect, at all heights as per drawings , specifications and instructions of Engineer-in-charge. (Refer Legend for applicable EIL specification)				
4787	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0400000000	INSULATION MATERIAL : POLY ISOCYANURATE(PIC)				
4788	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465000000	INSULATION TYPE : IC; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : UPTO -45 (DEG C); INSULATION MATERIAL : POLY ISOCYANURATE(PIC)				
4789	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010000	PIPES				
4790	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010505	NB 00.75 INCHES; THICKNESS 25 MM	20	Metres	1 710	34 200
4791	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010510	NB 00.75 INCHES; THICKNESS 50 MM	10	Metres	3 040	30 400
4792	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010512	NB 00.75 INCHES; THICKNESS 60 MM	15	Metres	3 620	54 300
4793	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010605	NB 01.00 INCHES; THICKNESS 25 MM	15	Metres	1 870	28 050
4794	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010805	NB 01.50 INCHES; THICKNESS 25 MM	10	Metres	2 220	22 200
4795	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010812	NB 01.50 INCHES; THICKNESS 60 MM	10	Metres	4 220	42 200
4796	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010814	NB 01.50 INCHES; THICKNESS 70 MM	10	Metres	4 850	48 500
4797	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010905	NB 02.00 INCHES; THICKNESS 25 MM	125	Metres	2 510	3 13 750
4798	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010908	NB 02.00 INCHES; THICKNESS 40 MM	10	Metres	3 350	33 500
4799	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465010914	NB 02.00 INCHES; THICKNESS 70 MM	55	Metres	5 210	2 86 550

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4800	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011105	NB 03.00 INCHES; THICKNESS 25 MM	180	Metres	3 170	5 70 600
4801	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011108	NB 03.00 INCHES; THICKNESS 40 MM	20	Metres	4 070	81 400
4802	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011114	NB 03.00 INCHES; THICKNESS 70 MM	40	Metres	6 040	2 41 600
4803	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011116	NB 03.00 INCHES; THICKNESS 80 MM	15	Metres	6 750	1 01 250
4804	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011305	NB 04.00 INCHES; THICKNESS 25 MM	215	Metres	3 770	8 10 550
4805	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011316	NB 04.00 INCHES; THICKNESS 80 MM	10	Metres	7 530	75 300
4806	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011505	NB 06.00 INCHES; THICKNESS 25 MM	365	Metres	5 040	18 39 600
4807	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011510	NB 06.00 INCHES; THICKNESS 50 MM	60	Metres	6 820	4 09 200
4808	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011514	NB 06.00 INCHES; THICKNESS 70 MM	35	Metres	8 370	2 92 950
4809	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011516	NB 06.00 INCHES; THICKNESS 80 MM	345	Metres	9 180	31 67 100
4810	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011605	NB 08.00 INCHES; THICKNESS 25 MM	790	Metres	6 230	49 21 700
4811	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011614	NB 08.00 INCHES; THICKNESS 70 MM	105	Metres	9 850	10 34 250
4812	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011616	NB 08.00 INCHES; THICKNESS 80 MM	40	Metres	10 730	4 29 200
4813	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011708	NB 10.00 INCHES; THICKNESS 40 MM	10	Metres	8 760	87 600
4814	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011808	NB 12.00 INCHES; THICKNESS 40 MM	95	Metres	10 050	9 54 750
4815	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465011908	NB 14.00 INCHES; THICKNESS 40 MM	120	Metres	10 850	13 02 000
4816	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012008	NB 16.00 INCHES; THICKNESS 40 MM	245	Metres	12 140	29 74 300
4817	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012013	NB 16.00 INCHES; THICKNESS 65 MM	40	Metres	14 800	5 92 000
4818	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012016	NB 16.00 INCHES; THICKNESS 80 MM	30	Metres	16 460	4 93 800
4819	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012108	NB 18.00 INCHES; THICKNESS 40 MM	145	Metres	13 440	19 48 800
4820	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012113	NB 18.00 INCHES; THICKNESS 65 MM	10	Metres	16 250	1 62 500
4821	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012208	NB 20.00 INCHES; THICKNESS 40 MM	55	Metres	14 730	8 10 150
4822	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012320	NB 22.00 INCHES; THICKNESS 100 MM	30	Metres	23 820	7 14 600
4823	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012408	NB 24.00 INCHES; THICKNESS 40 MM	40	Metres	17 320	6 92 800
4824	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012416	NB 24.00 INCHES; THICKNESS 80 MM	10	Metres	22 670	2 26 700
4825	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012516	NB 26.00 INCHES; THICKNESS 80 MM	10	Metres	24 230	2 42 300
4826	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012616	NB 28.00 INCHES; THICKNESS 80 MM	60	Metres	25 780	15 46 800
4827	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012708	NB 30.00 INCHES; THICKNESS 40 MM	185	Metres	21 200	39 22 000
4828	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465012713	NB 30.00 INCHES; THICKNESS 65 MM	410	Metres	24 980	1 02 41 800
4829	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465013008	NB 36.00 INCHES; THICKNESS 40 MM	505	Metres	25 070	1 26 60 350

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4830	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465013013	NB 36.00 INCHES; THICKNESS 65 MM	115	Metres	29 350	33 75 250
4831	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465013308	NB 42.00 INCHES; THICKNESS 40 MM	125	Metres	28 940	36 17 500
4832	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465013416	NB 44.00 INCHES; THICKNESS 80 MM	65	Metres	38 210	24 83 650
4833	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465013608	NB 48.00 INCHES; THICKNESS 40 MM	145	Metres	32 820	47 58 900
4834	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465013620	NB 48.00 INCHES; THICKNESS 100 MM	55	Metres	45 720	25 14 600
4835	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465014016	NB 56.00 INCHES; THICKNESS 80 MM	140	Metres	47 530	66 54 200
4836	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465014620	NB 68.00 INCHES; THICKNESS 100 MM	65	Metres	62 570	40 67 050
4837	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465015120	NB 78.00 INCHES; THICKNESS 100 MM	205	Metres	72 040	1 47 68 200
4838	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465020000	FLANGE ASSEMBLIES				
4839	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465020612	NB 01.00 INCHES; THICKNESS 60 MM	1	NOs	3 810	3 810
4840	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465020805	NB 01.50 INCHES; THICKNESS 25 MM	4	NOs	2 220	8 880
4841	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465020812	NB 01.50 INCHES; THICKNESS 60 MM	3	NOs	4 220	12 660
4842	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465020814	NB 01.50 INCHES; THICKNESS 70 MM	4	NOs	4 850	19 400
4843	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465020905	NB 02.00 INCHES; THICKNESS 25 MM	7	NOs	2 510	17 570
4844	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021105	NB 03.00 INCHES; THICKNESS 25 MM	7	NOs	3 170	22 190
4845	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021108	NB 03.00 INCHES; THICKNESS 40 MM	1	NOs	4 070	4 070
4846	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021114	NB 03.00 INCHES; THICKNESS 70 MM	1	NOs	6 040	6 040
4847	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021305	NB 04.00 INCHES; THICKNESS 25 MM	4	NOs	3 770	15 080
4848	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021314	NB 04.00 INCHES; THICKNESS 70 MM	1	NOs	6 780	6 780
4849	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021316	NB 04.00 INCHES; THICKNESS 80 MM	1	NOs	7 530	7 530
4850	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021505	NB 06.00 INCHES; THICKNESS 25 MM	9	NOs	5 040	45 360
4851	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021510	NB 06.00 INCHES; THICKNESS 50 MM	1	NOs	6 820	6 820
4852	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021605	NB 08.00 INCHES; THICKNESS 25 MM	13	NOs	6 230	80 990
4853	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021614	NB 08.00 INCHES; THICKNESS 70 MM	1	NOs	9 850	9 850
4854	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021616	NB 08.00 INCHES; THICKNESS 80 MM	1	NOs	10 730	10 730
4855	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021716	NB 10.00 INCHES; THICKNESS 80 MM	1	NOs	12 380	12 380
4856	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465021908	NB 14.00 INCHES; THICKNESS 40 MM	1	NOs	10 850	10 850
4857	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465022008	NB 16.00 INCHES; THICKNESS 40 MM	1	NOs	12 140	12 140
4858	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465022016	NB 16.00 INCHES; THICKNESS 80 MM	1	NOs	16 460	16 460
4859	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465022108	NB 18.00 INCHES; THICKNESS 40 MM	4	NOs	13 440	53 760

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4860	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465022113	NB 18.00 INCHES; THICKNESS 65 MM	1	NOs	16 250	16 250
4861	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465022516	NB 26.00 INCHES; THICKNESS 80 MM	1	NOs	24 230	24 230
4862	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465022708	NB 30.00 INCHES; THICKNESS 40 MM	5	NOs	21 200	1 06 000
4863	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465022713	NB 30.00 INCHES; THICKNESS 65 MM	1	NOs	24 980	24 980
4864	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465022916	NB 34.00 INCHES; THICKNESS 80 MM	1	NOs	30 440	30 440
4865	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465023008	NB 36.00 INCHES; THICKNESS 40 MM	3	NOs	25 070	75 210
4866	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465023013	NB 36.00 INCHES; THICKNESS 65 MM	1	NOs	29 350	29 350
4867	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465023308	NB 42.00 INCHES; THICKNESS 40 MM	4	NOs	28 940	1 15 760
4868	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465023608	NB 48.00 INCHES; THICKNESS 40 MM	1	NOs	32 820	32 820
4869	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465023620	NB 48.00 INCHES; THICKNESS 100 MM	1	NOs	45 720	45 720
4870	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465024016	NB 56.00 INCHES; THICKNESS 80 MM	5	NOs	47 530	2 37 650
4871	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465024620	NB 68.00 INCHES; THICKNESS 100 MM	1	NOs	62 570	62 570
4872	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465025120	NB 78.00 INCHES; THICKNESS 100 MM	4	NOs	72 040	2 88 160
4873	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465030000	BLIND FLANGE ASSEMBLIES				
4874	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465030505	NB 00.75 INCHES; THICKNESS 25 MM	64	NOs	1 710	1 09 440
4875	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465030510	NB 00.75 INCHES; THICKNESS 50 MM	8	NOs	3 040	24 320
4876	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465030512	NB 00.75 INCHES; THICKNESS 60 MM	12	NOs	3 620	43 440
4877	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465032408	NB 24.00 INCHES; THICKNESS 40 MM	3	NOs	17 320	51 960
4878	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465032416	NB 24.00 INCHES; THICKNESS 80 MM	1	NOs	22 670	22 670
4879	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465033608	NB 48.00 INCHES; THICKNESS 40 MM	1	NOs	32 820	32 820
4880	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465035120	NB 78.00 INCHES; THICKNESS 100 MM	1	NOs	72 040	72 040
4881	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465040000	VALVE ASSEMBLIES				
4882	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465040505	NB 00.75 INCHES; THICKNESS 25 MM	88	NOs	3 430	3 01 840
4883	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465040510	NB 00.75 INCHES; THICKNESS 50 MM	16	NOs	6 090	97 440
4884	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465040512	NB 00.75 INCHES; THICKNESS 60 MM	26	NOs	7 240	1 88 240
4885	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465040605	NB 01.00 INCHES; THICKNESS 25 MM	8	NOs	3 740	29 920
4886	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465040905	NB 02.00 INCHES; THICKNESS 25 MM	22	NOs	5 010	1 10 220
4887	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465040908	NB 02.00 INCHES; THICKNESS 40 MM	1	NOs	6 690	6 690
4888	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465040914	NB 02.00 INCHES; THICKNESS 70 MM	1	NOs	10 410	10 410
4889	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041105	NB 03.00 INCHES; THICKNESS 25 MM	8	NOs	6 340	50 720

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4890	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041116	NB 03.00 INCHES; THICKNESS 80 MM	1	NOs	13 500	13 500
4891	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041305	NB 04.00 INCHES; THICKNESS 25 MM	12	NOs	7 540	90 480
4892	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041505	NB 06.00 INCHES; THICKNESS 25 MM	26	NOs	10 080	2 62 080
4893	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041514	NB 06.00 INCHES; THICKNESS 70 MM	1	NOs	16 730	16 730
4894	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041516	NB 06.00 INCHES; THICKNESS 80 MM	1	NOs	18 360	18 360
4895	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041605	NB 08.00 INCHES; THICKNESS 25 MM	17	NOs	12 470	2 11 990
4896	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041614	NB 08.00 INCHES; THICKNESS 70 MM	3	NOs	19 710	59 130
4897	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041616	NB 08.00 INCHES; THICKNESS 80 MM	3	NOs	21 450	64 350
4898	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041708	NB 10.00 INCHES; THICKNESS 40 MM	1	NOs	17 520	17 520
4899	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041808	NB 12.00 INCHES; THICKNESS 40 MM	3	NOs	20 100	60 300
4900	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465041908	NB 14.00 INCHES; THICKNESS 40 MM	3	NOs	21 700	65 100
4901	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465042208	NB 20.00 INCHES; THICKNESS 40 MM	4	NOs	29 450	1 17 800
4902	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465042320	NB 22.00 INCHES; THICKNESS 100 MM	3	NOs	47 630	1 42 890
4903	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465042713	NB 30.00 INCHES; THICKNESS 65 MM	1	NOs	49 960	49 960
4904	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465043013	NB 36.00 INCHES; THICKNESS 65 MM	1	NOs	58 690	58 690
4905	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465043308	NB 42.00 INCHES; THICKNESS 40 MM	1	NOs	57 890	57 890
4906	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465043608	NB 48.00 INCHES; THICKNESS 40 MM	1	NOs	65 640	65 640
4907	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465044016	NB 56.00 INCHES; THICKNESS 80 MM	1	NOs	95 050	95 050
4908	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0465045120	NB 78.00 INCHES; THICKNESS 100 MM	1	NOs	1 44 070	1 44 070
4909	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468000000	INSULATION TYPE : IC; SURFACE MATERIAL : SS; OPERATING TEMP. RANGE : UPTO -45 (DEG C); INSULATION MATERIAL : POLY ISOCYANURATE(PIC)				
4910	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468010000	PIPES				
4911	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468010505	NB 00.75 INCHES; THICKNESS 25 MM	10	Metres	1 760	17 600
4912	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468010510	NB 00.75 INCHES; THICKNESS 50 MM	10	Metres	3 110	31 100
4913	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468010512	NB 00.75 INCHES; THICKNESS 60 MM	10	Metres	3 710	37 100
4914	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468010610	NB 01.00 INCHES; THICKNESS 50 MM	10	Metres	3 300	33 000
4915	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468010908	NB 02.00 INCHES; THICKNESS 40 MM	10	Metres	3 430	34 300
4916	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468011108	NB 03.00 INCHES; THICKNESS 40 MM	10	Metres	4 180	41 800
4917	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468011114	NB 03.00 INCHES; THICKNESS 70 MM	10	Metres	6 180	61 800
4918	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468011116	NB 03.00 INCHES; THICKNESS 80 MM	10	Metres	6 900	69 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4919	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468011510	NB 06.00 INCHES; THICKNESS 50 MM	10	Metres	6 990	69 900
4920	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468011714	NB 10.00 INCHES; THICKNESS 70 MM	10	Metres	11 680	1 16 800
4921	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468012008	NB 16.00 INCHES; THICKNESS 40 MM	10	Metres	12 440	1 24 400
4922	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468012016	NB 16.00 INCHES; THICKNESS 80 MM	10	Metres	16 800	1 68 000
4923	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468012408	NB 24.00 INCHES; THICKNESS 40 MM	10	Metres	17 730	1 77 300
4924	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468020000	FLANGE ASSEMBLIES				
4925	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468020908	NB 02.00 INCHES; THICKNESS 40 MM	1	NOs	3 420	3 420
4926	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468021116	NB 03.00 INCHES; THICKNESS 80 MM	3	NOs	6 900	20 700
4927	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468021310	NB 04.00 INCHES; THICKNESS 50 MM	1	NOs	5 510	5 510
4928	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468021714	NB 10.00 INCHES; THICKNESS 70 MM	1	NOs	11 680	11 680
4929	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468022008	NB 16.00 INCHES; THICKNESS 40 MM	1	NOs	12 440	12 440
4930	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468030000	BLIND FLANGE ASSEMBLIES				
4931	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468030505	NB 00.75 INCHES; THICKNESS 25 MM	4	NOs	1 760	7 040
4932	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468030510	NB 00.75 INCHES; THICKNESS 50 MM	5	NOs	3 110	15 550
4933	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468030512	NB 00.75 INCHES; THICKNESS 60 MM	1	NOs	3 710	3 710
4934	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468040000	VALVE ASSEMBLIES				
4935	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468040505	NB 00.75 INCHES; THICKNESS 25 MM	5	NOs	3 520	17 600
4936	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468040510	NB 00.75 INCHES; THICKNESS 50 MM	5	NOs	6 220	31 100
4937	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468040512	NB 00.75 INCHES; THICKNESS 60 MM	1	NOs	7 420	7 420
4938	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468040610	NB 01.00 INCHES; THICKNESS 50 MM	1	NOs	6 600	6 600
4939	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468041108	NB 03.00 INCHES; THICKNESS 40 MM	3	NOs	8 360	25 080
4940	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468041114	NB 03.00 INCHES; THICKNESS 70 MM	3	NOs	12 350	37 050
4941	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468041116	NB 03.00 INCHES; THICKNESS 80 MM	1	NOs	13 800	13 800
4942	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468041510	NB 06.00 INCHES; THICKNESS 50 MM	1	NOs	13 970	13 970
4943	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468042008	NB 16.00 INCHES; THICKNESS 40 MM	1	NOs	24 870	24 870
4944	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468042016	NB 16.00 INCHES; THICKNESS 80 MM	1	NOs	33 600	33 600
4945	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468042408	NB 24.00 INCHES; THICKNESS 40 MM	1	NOs	35 460	35 460
4946	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0468042416	NB 24.00 INCHES; THICKNESS 80 MM	1	NOs	46 260	46 260
4947	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469000000	INSULATION TYPE : IC; SURFACE MATERIAL : SS; OPERATING TEMP. RANGE : BELOW -45 (DEG C); INSULATION MATERIAL : POLY ISOCYANURATE(PIC)				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4948	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469010000	PIPES				
4949	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469010516	NB 00.75 INCHES; THICKNESS 80 MM	10	Metres	5 110	51 100
4950	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469010820	NB 01.50 INCHES; THICKNESS 100 MM	10	Metres	7 240	72 400
4951	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469011624	NB 08.00 INCHES; THICKNESS 120 MM	295	Metres	15 140	44 66 300
4952	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469020000	FLANGE ASSEMBLIES				
4953	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469020820	NB 01.50 INCHES; THICKNESS 100 MM	1	NOs	7 240	7 240
4954	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469021624	NB 08.00 INCHES; THICKNESS 120 MM	1	NOs	15 140	15 140
4955	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469030000	BLIND FLANGE ASSEMBLIES				
4956	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469030516	NB 00.75 INCHES; THICKNESS 80 MM	3	NOs	5 110	15 330
4957	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469040000	VALVE ASSEMBLIES				
4958	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469040516	NB 00.75 INCHES; THICKNESS 80 MM	4	NOs	10 220	40 880
4959	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0469041624	NB 08.00 INCHES; THICKNESS 120 MM	8	NOs	30 280	2 42 240
4960	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0500000000	INSULATION MATERIAL : CELLULAR GLASS				
4961	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0571000000	INSULATION TYPE : IK; SURFACE MATERIAL : CS & AS; OPERATING TEMP. RANGE : ALL; INSULATION MATERIAL : CELLULAR GLASS				
4962	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0571010000	PIPES				
4963	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0571010508	NB 00.75 INCHES; THICKNESS 40 MM	10	Metres	2 860	28 600
4964	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0571010810	NB 01.50 INCHES; THICKNESS 50 MM	10	Metres	4 570	45 700
4965	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0571011112	NB 03.00 INCHES; THICKNESS 60 MM	10	Metres	7 450	74 500
4966	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0571011514	NB 06.00 INCHES; THICKNESS 70 MM	65	Metres	12 730	8 27 450
4967	B	B957-300-16-43-MR-SOR-3001-B-1M	Mechanical Works For ECU-PART B	MA0571011614	NB 08.00 INCHES; THICKNESS 70 MM	30	Metres	15 240	4 57 200
4968	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II	INSTRUMENTATION				
4969	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950	SITE ACTIVITIES BY MECHANICAL CONTRACTOR				
4970	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10	Transportation of all types of valves (Including Control Valves, Special Control Valves, PRDS, Control valves, On-Off/Shutdown valves, Self actuating valves) from Owner's storage points to contractor's stores/worksite and installation of valves for all rating including assembly of valves accessories like air bottles etc, if any, fixing of gaskets bolts/nuts wherever required and performing Positive Material Identification(PMI) using alloy analysers as per specification, drawings and directions of Engineer-in-Charge.				
4971	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V28	Inlet Valve size - 3/4" , Rating - 300#	2	nos	780	1 560
4972	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V81	Inlet Valve size - 3/4" , Rating - 600#	1	nos	780	780

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
4973	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V11	Inlet Valve size - 1" , Rating - 300#	48	nos	870	41 760
4974	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V18	Inlet Valve size - 1" , Rating - 600#	8	nos	870	6 960
4975	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V2	Inlet Valve size - 1 1/2" , Rating - 150#	1	nos	950	950
4976	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V12	Inlet Valve size - 1 1/2" , Rating - 300#	25	nos	950	23 750
4977	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V34	Inlet Valve size - 1 1/2" , Rating - 600#	7	nos	950	6 650
4978	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V14	Inlet Valve size - 2" , Rating - 300#	71	nos	1 040	73 840
4979	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V23	Inlet Valve size - 2" , Rating - 600#	22	nos	1 040	22 880
4980	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V36	Inlet Valve size - 2" , Rating - 1500#	2	nos	1 040	2 080
4981	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V13	Inlet Valve size - 3" , Rating - 300#	40	nos	1 820	72 800
4982	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V24	Inlet Valve size - 3" , Rating - 600#	7	nos	1 820	12 740
4983	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V15	Inlet Valve size - 4" , Rating - 300#	61	nos	2 430	1 48 230
4984	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V25	Inlet Valve size - 4" , Rating - 600#	12	nos	2 430	29 160
4985	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V16	Inlet Valve size - 6" , Rating - 300#	51	nos	3 650	1 86 150
4986	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V45	Inlet Valve size - 6" , Rating - 600#	12	nos	3 650	43 800
4987	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V84	Inlet Valve size - 6" , Rating - 2500#	1	nos	3 650	3 650
4988	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V17	Inlet Valve size - 8" , Rating - 300#	40	nos	4 860	1 94 400
4989	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V32	Inlet Valve size - 8" , Rating - 600#	2	nos	4 860	9 720
4990	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V85	Inlet Valve size - 8" , Rating - 2500#	1	nos	4 860	4 860
4991	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V19	Inlet Valve size - 10" , Rating - 300#	8	nos	6 080	48 640
4992	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V21	Inlet Valve size - 10" , Rating - 600#	1	nos	6 080	6 080
4993	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V10	Inlet Valve size - 12" , Rating - 300#	25	nos	7 290	1 82 250
4994	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V44	Inlet Valve size - 12" , Rating - 600#	1	nos	7 290	7 290
4995	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V30	Inlet Valve size - 14" , Rating - 300#	13	nos	9 270	1 20 510
4996	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V75	Inlet Valve size - 14" , Rating - 600#	1	nos	9 270	9 270
4997	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V20	Inlet Valve size - 16" , Rating - 300#	9	nos	10 300	92 700
4998	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V51	Inlet Valve size - 18" , Rating - 300#	12	nos	12 110	1 45 320
4999	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V77	Inlet Valve size - 18" , Rating - 600#	1	nos	12 110	12 110
5000	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V76	Inlet Valve size - 18" , Rating - 2500#	1	nos	12 110	12 110
5001	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V41	Inlet Valve size - 20" , Rating - 300#	11	nos	13 460	1 48 060
5002	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V79	Inlet Valve size - 20" , Rating - 600#	1	nos	13 460	13 460

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5003	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V78	Inlet Valve size - 20" , Rating - 2500#	1	nos	13 460	13 460
5004	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V42	Inlet Valve size - 24" , Rating - 300#	5	nos	16 760	83 800
5005	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V55	Inlet Valve size - 24" , Rating - 600#	1	nos	16 760	16 760
5006	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V80	Inlet Valve size - 24" , Rating - 2500#	1	nos	16 760	16 760
5007	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V43	Inlet Valve size - 30" , Rating - 300#	4	nos	20 600	82 400
5008	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V68	Inlet Valve size - 30" , Rating - 600#	1	nos	20 600	20 600
5009	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V53	Inlet Valve size - 36" , Rating - 300#	2	nos	25 750	51 500
5010	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V82	Inlet Valve size - 40" , Rating - 300#	2	nos	30 900	61 800
5011	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V54	Inlet Valve size - 42" , Rating - 300#	1	nos	32 960	32 960
5012	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.10.1V83	Inlet Valve size - 42" , Rating - 600#	1	nos	32 960	32 960
5013	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11	Transportation of all types of Safety Valves, Pilot Operated Safety Valves, Breather valves from owner's storage point to contractor's store/worksite and installation of valves for all ratings including assembly of valves, accessories if any, at all locations and fixing of gaskets, bolts/nuts wherever required as per drawings, specifications and as per the directions of engineer-in-charge.				
5014	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V12	Inlet size - 3/4" , Rating - NPT	1	nos	610	610
5015	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V3	Inlet size - 1" , Rating - 150#	43	nos	610	26 230
5016	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V9	Inlet size - 1" , Rating - 300#	68	nos	610	41 480
5017	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V13	Inlet size - 1" , Rating - 600#	25	nos	610	15 250
5018	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V1	Inlet size - 1 1/2" , Rating - 150#	27	nos	910	24 570
5019	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V10	Inlet size - 1 1/2" , Rating - 300#	41	nos	910	37 310
5020	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V23	Inlet size - 1 1/2" , Rating - 600#	9	nos	910	8 190
5021	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V4	Inlet size - 2" , Rating - 150#	2	nos	1 220	2 440
5022	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V17	Inlet size - 2" , Rating - 300#	9	nos	1 220	10 980
5023	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V15	Inlet size - 2" , Rating - 600#	2	nos	1 220	2 440
5024	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V5	Inlet size - 3" , Rating - 150#	7	nos	1 820	12 740
5025	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V18	Inlet size - 3" , Rating - 300#	27	nos	1 820	49 140
5026	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V24	Inlet size - 3" , Rating - 600#	2	nos	1 820	3 640
5027	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V6	Inlet size - 4" , Rating - 150#	7	nos	2 430	17 010
5028	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V11	Inlet size - 4" , Rating - 300#	9	nos	2 430	21 870
5029	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V32	Inlet size - 4" , Rating - 600#	10	nos	2 430	24 300

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5030	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V7	Inlet size - 6" , Rating - 150#	17	nos	3 650	62 050
5031	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V19	Inlet size - 6" , Rating - 300#	8	nos	3 650	29 200
5032	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V30	Inlet size - 6" , Rating - 600#	28	nos	3 650	1 02 200
5033	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V2	Inlet size - 8" , Rating - 150#	31	nos	4 860	1 50 660
5034	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V34	Inlet size - 10" , Rating - 150#	1	nos	6 080	6 080
5035	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.11.1V33	Inlet size - 12" , Rating - 150#	11	nos	7 290	80 190
5036	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12	Cleaning, set pressure tests of pressure relief and thermal relief valves before installation, providing equipments, necessary test jig, instrument air, nitrogen cylinders, all consumables and loop testing including dropping/shifting of the PSV's/TSV's from the installed position(if required) to workshop for calibration/re-calibration/re-checking, etc., and reinstall back to original location including parts replacement, gasket, stud/bolts etc., re-fixing of the PSV's /TSV's including lapping (if required) but excludes flow calibration, calibration/test reports and excluding supply of valves				
5037	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V14	Inlet size - 3/4" , Rating - NPT	1	nos	1 650	1 650
5038	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V2	Inlet size - 1" , Rating - 150#	43	nos	1 730	74 390
5039	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V6	Inlet size - 1" , Rating - 300#	68	nos	1 730	1 17 640
5040	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V10	Inlet size - 1" , Rating - 600#	25	nos	1 730	43 250
5041	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V1	Inlet size - 1 1/2" , Rating - 150#	27	nos	2 160	58 320
5042	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V7	Inlet size - 1 1/2" , Rating - 300#	41	nos	2 160	88 560
5043	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V23	Inlet size - 1 1/2" , Rating - 600#	9	nos	2 160	19 440
5044	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V3	Inlet size - 2" , Rating - 150#	2	nos	2 280	4 560
5045	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V15	Inlet size - 2" , Rating - 300#	9	nos	2 280	20 520
5046	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V12	Inlet size - 2" , Rating - 600#	2	nos	2 280	4 560
5047	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V4	Inlet size - 3" , Rating - 150#	7	nos	2 370	16 590
5048	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V16	Inlet size - 3" , Rating - 300#	27	nos	2 370	63 990
5049	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V22	Inlet size - 3" , Rating - 600#	2	nos	2 370	4 740
5050	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V9	Inlet size - 4" , Rating - 150#	6	nos	2 580	15 480
5051	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V8	Inlet size - 4" , Rating - 300#	9	nos	2 580	23 220
5052	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V31	Inlet size - 4" , Rating - 600#	10	nos	2 580	25 800
5053	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V25	Inlet size - 6" , Rating - 150#	15	nos	3 460	51 900
5054	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V17	Inlet size - 6" , Rating - 300#	8	nos	3 460	27 680

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5055	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V29	Inlet size - 6" , Rating - 600#	28	nos	3 460	96 880
5056	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V26	Inlet size - 8" , Rating - 150#	30	nos	5 740	1 72 200
5057	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.12.1V32	Inlet size - 12" , Rating - 150#	11	nos	7 620	83 820
5058	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.13	Impulse line painting (uninsulated) as per painting specification for project				
5059	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.13.1V1	Instrumentation impulse line of size 1/2" for temp. (-)14 to 80 degC	2470	m	40	98 800
5060	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.13.1V2	Instrumentation impulse line of size 1/2" for temp. up to 120 degC	1240	m	40	49 600
5061	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.13.1V3	Instrumentation impulse line of size 1/2" for temp. 120 to 200 degC	2470	m	40	98 800
5062	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.13.1V4	Instrumentation impulse line of size 1/2" for temp. above 200 degC	2470	m	40	98 800
5063	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.13.1V7	Instrumentation impulse line of size 3/4" for temp. (-)14 to 80 degC	300	m	60	18 000
5064	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.13.1V9	Instrumentation impulse line of size 3/4" for temp. up to 120 degC	125	m	60	7 500
5065	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.13.1V10	Instrumentation impulse line of size 3/4" for temp. 120 to 200 degC	300	m	60	18 000
5066	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.13.1V11	Instrumentation impulse line of size 3/4" for temp. above 200 degC	300	m	60	18 000
5067	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17	Transportation of all line mounted flow instruments such as Coriolis Mass Flow Meter, magnetic flow meter, ultrasonic flow meter, variable area flow meter, vortex flow meter, venturi flow meter, flow nozzle, integral orifice flow meter, wedge flow meter from Owner's storage points to contractor's stores/worksite and installation of these Flow Meters for all rating, fixing of gaskets bolts/nuts wherever required as per specification, drawings and directions of Engineer-in-Charge.				
5068	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V27	Inlet Size - 3/4" , Rating - 300#	3	nos	1 170	3 510
5069	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V1	Inlet Size - 1" , Rating - 300#	2	nos	1 240	2 480
5070	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V48	Inlet Size - 1" , Rating - 600#	1	nos	1 240	1 240
5071	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V11	Inlet Size - 1.5" , Rating - 150#	1	nos	1 340	1 340
5072	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V2	Inlet Size - 1.5" , Rating - 300#	2	nos	1 340	2 680
5073	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V12	Inlet Size - 1.5" , Rating - 600#	4	nos	1 340	5 360
5074	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V19	Inlet Size - 2" , Rating - 150#	9	nos	1 480	13 320
5075	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V3	Inlet Size - 2" , Rating - 300#	11	nos	1 480	16 280
5076	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V50	Inlet Size - 2" , Rating - 600#	1	nos	1 480	1 480
5077	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V4	Inlet Size - 3" , Rating - 300#	6	nos	1 970	11 820
5078	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V53	Inlet Size - 3" , Rating - 600#	1	nos	1 970	1 970
5079	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V32	Inlet Size - 4" , Rating - 150#	1	nos	2 260	2 260
5080	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V5	Inlet Size - 4" , Rating - 300#	2	nos	2 260	4 520

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5081	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V43	Inlet Size - 4" , Rating - 600#	1	nos	2 260	2 260
5082	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V36	Inlet Size - 6" , Rating - 150#	1	nos	2 510	2 510
5083	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V6	Inlet Size - 6" , Rating - 300#	6	nos	2 510	15 060
5084	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V37	Inlet Size - 6" , Rating - 600#	1	nos	2 510	2 510
5085	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V46	Inlet Size - 8" , Rating - 300#	4	nos	3 790	15 160
5086	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V63	Inlet Size - 8" , Rating - 600#	1	nos	3 790	3 790
5087	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V39	Inlet Size - 10" , Rating - 150#	2	nos	4 740	9 480
5088	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V7	Inlet Size - 10" , Rating - 300#	3	nos	4 740	14 220
5089	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V40	Inlet Size - 12" , Rating - 150#	1	nos	5 390	5 390
5090	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V14	Inlet Size - 14" , Rating - 300#	1	nos	6 000	6 000
5091	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V41	Inlet Size - 16" , Rating - 150#	1	nos	7 050	7 050
5092	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V9	Inlet Size - 16" , Rating - 300#	1	nos	7 050	7 050
5093	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V49	Inlet Size - 18" , Rating - 300#	1	nos	8 120	8 120
5094	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V42	Inlet Size - 20" , Rating - 150#	1	nos	9 210	9 210
5095	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V21	Inlet Size - 20" , Rating - 300#	2	nos	9 210	18 420
5096	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V24	Inlet Size - 24" , Rating - 300#	1	nos	11 460	11 460
5097	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V52	Inlet Size - 24" , Rating - 600#	1	nos	11 460	11 460
5098	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V51	Inlet Size - 24" , Rating - 2500#	1	nos	11 460	11 460
5099	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V54	Inlet Size - 30" , Rating - 300#	1	nos	14 990	14 990
5100	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V55	Inlet Size - 36" , Rating - 300#	1	nos	18 650	18 650
5101	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V56	Inlet Size - 40" , Rating - 300#	1	nos	21 170	21 170
5102	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V57	Inlet Size - 42" , Rating - 300#	1	nos	22 440	22 440
5103	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V58	Inlet Size - 42" , Rating - 600#	1	nos	22 440	22 440
5104	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V59	Inlet Size - 48" , Rating - 150#	1	nos	27 930	27 930
5105	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V47	Inlet Size - 54" , Rating - 150#	1	nos	32 180	32 180
5106	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V60	Inlet Size - 56" , Rating - 300#	1	nos	33 610	33 610
5107	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V61	Inlet Size - 66" , Rating - 300#	1	nos	40 930	40 930
5108	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.17.1V62	Inlet Size - 78" , Rating - 300#	1	nos	50 020	50 020

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5109	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.18	Supply & wrapping with sodium silicate inhibited ceramic fiber rope (SS-wire braided) after cleaning the impulse lines of dust, rust, grease. The wrapping of the rope around impulse line shall cover it completely without leaving any gap. Apply two layers of self-adhesive Aluminum foil tape of minimum 0.1 mm thick spirally bound over the fiber rope surface with the joints in two layers staggered with all other specifications inline with specification '6-79-0026' for Hot insulation				
5110	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.18.1V1	1/2" impulse line (with 3/8" tracer)	525	metre	520	2 73 000
5111	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.19	Transportation of all types of Flame Arrestor from owner's storage point to contractor's store/worksite and installation of Flame Arrestor for all ratings including assembly, accessories if any, at all locations and fixing of gaskets, bolts/nuts wherever required as per drawings, specifications and as per the directions of engineer-in-charge.				
5112	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.19.1V4	Inlet size - 10" , Rating - 150#	1	nos	2 580	2 580
5113	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.20	Transportation of all types of Rupture Disc assemblies from owner's storage point to contractor's store/worksite and installation of Rupture Disc assembly for all ratings including assembly, accessories if any, at all locations and fixing of gaskets, bolts/nuts wherever required as per drawings, specifications and as per the directions of engineer-in-charge.				
5114	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.20.1V4	Inlet size - 2" , Rating - 300#	1	nos	370	370
5115	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.20.1V5	Inlet size - 4" , Rating - 150#	1	nos	410	410
5116	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.20.1V6	Inlet size - 6" , Rating - 300#	2	nos	550	1 100
5117	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.20.1V7	Inlet size - 8" , Rating - 150#	1	nos	670	670
5118	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.20.1V1	Inlet size - 12" , Rating - 150#	1	nos	890	890
5119	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.20.1V2	Inlet size - 14" , Rating - 150#	2	nos	990	1 980
5120	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.20.1V3	Inlet size - 16" , Rating - 150#	3	nos	1 080	3 240
5121	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.21	Transportation of all types of Emergency vents from owner's storage point to contractor's store/worksite and installation of Emergency vents for all ratings including assembly, accessories if any, at all locations and fixing of gaskets, bolts/nuts wherever required as per drawings, specifications and as per the directions of engineer-in-charge.				
5122	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.21.1V1	Inlet size - 18" , Rating - 300#	1	nos	12 110	12 110
5123	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.21.1V2	Inlet size - 20" , Rating - 150#	1	nos	13 460	13 460
5124	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.21.1V3	Inlet size - 24" , Rating - 150#	1	nos	16 760	16 760
5125	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.21.1V4	Inlet size - 24" , Rating - 300#	1	nos	16 760	16 760
5126	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.21.1V5	Inlet size - 28" , Rating - 150#	1	nos	20 190	20 190

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5127	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.22	Cold Insulation of Impulse line as per specification 6-79-0027 for project. Scope of supply by Contractor includes all material, tools, tackles & labour etc. to complete the work in all respects.				
5128	B	B957-300-16-51-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01II.950.22.1V1	Impulse line size - 1/2"	20	m	1 300	26 000
5129	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ	EQUIPMENT - PACKAGE				
5130	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH1	Quench Oil Coke Removal Package (Item no. 300-LZ-00-1202) INSTALLATION OF SKID MOUNTED PACKAGES(SINGLE/MULTIPLE SKIDS): Handling and transportation of Package consisting single or multiple skids from Owner's storage point to work site/contractor's stores. Assembly of sub-assemblies, placing the equipment on foundations/structures, levelling, aligning, fixing of foundation bolts, providing (including supply) packing/shim plates, chipping and dressing of foundations, grouting (including supply and applications of grout material), cleaning and flushing of equipment with water, draining and drying with compressed air, erection of inter- connecting piping including some amount of cutting, welding, NDT, hydrotesting/pneumatic testing, wherever required. Purging the line with air/gas as per the instruction of Package supplier (wherever applicable), providing manpower for carrying out pre-commissioning, commissioning and testing under the supervision guidance of Manufacturer's/Owner's personnel and rectifying defects, if any and completing the work in all respects as per drawing(s), specifications, scope of work (B957-300-80-42-SOW-3001) and instructions of engineer in charge for each equipment including drives and accessories listed below :				
5131	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH1.1	Module-1	35	MT	44 710	15 64 850
5132	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH1.2	Module-2	35	MT	44 710	15 64 850
5133	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH1.3	Module-3	35	MT	44 710	15 64 850
5134	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH1.4	Module-4	35	MT	44 710	15 64 850
5135	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH1.5	Module-5	35	MT	44 710	15 64 850
5136	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH1.6	Module-6	15	MT	44 710	6 70 650
5137	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH1.7	Module-7	30	MT	44 710	13 41 300
5138	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH1.8	Module-8	40	MT	44 710	17 88 400

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5139	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH2	INSTALLATION OF FREE ISSUE EQUIPMENT: Handling and transportation of Equipment from Owner's storage point to work site/contractor's stores. Assembly of subassemblies, placing the equipment on foundations/structures, levelling, aligning, fixing of foundation bolts, providing (including supply) packing/shim plates, chipping and dressing of foundations, grouting (incldluing supply and applications of grout material), cleaning and flushing of equipment with water, draining and drying with compressed air, erection of inter- connecting piping including some amount of cutting and welding, wherever required. Purging the line with air/gas, supply and installation of insulation in all respects wherever applicable on equipments and piping as per Vendor drawings, application of touch-up paint (if required) after erection and assembly at site, providing manpower for carrying out pre-commissioning, commissioning and testing under the supervision guidance of Manufacturer's/Owner's personnel and rectifying defects, if any and completing the work in all respects as per drawing(s), specifications, scope of work (B957-300-80-42-SOW-3001) and instructions of engineer in charge for each equipment including drives and accessories listed below :				
5140	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH2.1	Filter	216	MT	39 730	85 81 680
5141	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH2.2	Filter Separator / Coalescer	60	MT	39 730	23 83 800
5142	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH4	Lean MEA Activated Carbon Filter (300-GN-00-2502) INSTALLATION OF SKID MOUNTED PACKAGES(SINGLE/MULTIPLE SKIDS) INVOLVING LOADING OF ACTIVATED CARBON: Handling and transportation of Package consisting single or multiple skids from Owner's storage point to work site/contractor's stores. Assembly of subassemblies, placing the equipment on foundations/structures, levelling, aligning, fixing of foundation bolts, providing (including supply) packing/shim plates, chipping and dressing of foundations, grouting (including supply and applications of grout material), cleaning and flushing of equipment with water, draining and drying with compressed air, erection of inter- connecting piping including some amount of cutting, welding, NDT, hydrotesting/pneumatic testing, wherever required. Purging the line with air/gas, loading of activated carbon in filter vessel(s) as per the instruction of Package supplier, providing manpower for carrying out pre-commissioning, commissioning and testing under the supervision guidance of Manufacturer's/Owner's personnel and rectifying defects, if any and completing the work in all respects as per drawing(s), specifications, scope of work (B957-300-80-42-SOW-3001) and instructions of engineer in charge for each equipment including drives and accessories listed below :				
5143	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH4.1	Filter Vessel	30	MT	39 730	11 91 900

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5144	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.MH4.2	Activated Carbon	15	MT	39 730	5 95 950
5145	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7	Chain Pulley Block				
5146	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1	Supply of Geared Trolley Mounted Chain Pulley Block				
5147	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1	Procurement & delivery of Chain Pulley Block (CPB) with its trolley, lift up to 8 m and average 8 m distance from monorail to operating floor irrespective of monorail beam size. For upward revision of height of lift and (or) operating floor distance below monorail beyond the aforesaid limit, payment shall be adjusted based on respective quoted rate for per meter increase in the height of lift and operating floor distance below monorail.				
5148	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1.1V2	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 10 MT	6	nos	4 80 910	28 85 460
5149	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1.1V3	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 3 MT	5	nos	2 83 250	14 16 250
5150	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1.1V4	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 1 MT	6	nos	1 89 760	11 38 560
5151	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1.1V5	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 2 MT	12	nos	2 36 900	28 42 800
5152	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1.1V6	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 5 MT	12	nos	3 09 520	37 14 240
5153	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1.1V7	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 7.5 MT	6	nos	3 81 400	22 88 400
5154	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1.1V9	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 15 MT	6	nos	6 07 270	36 43 620
5155	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1.1V10	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 20 MT	3	nos	8 28 120	24 84 360
5156	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1.1V11	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 30 MT	1	nos	12 40 120	12 40 120
5157	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.1.1.1V12	Spark resistant Chain Pulley Block with Geared Trolley suitable for Hazardous area of capacity 25 MT	2	nos	11 30 680	22 61 360
5158	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.2	Supply of Hook Mounted Chain Pulley Block (Without Geared Trolley)				
5159	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.2.1	Procurement & delivery of Chain Pulley Block (CPB),suitable for lift upto 8 m and average 8 m distance from suspension hook to operating floor. Also refer Scope of work /Job Specification attached with the tender. For upward revision of height of lift and (or) operating floor distance below suspension hook beyond the aforesaid limit, payment shall be adjusted based on respective quoted rate for per meter increase in height of lift and operating floor distance below monorail.				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5160	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.2.1.1V2	Spark resistant Chain Pulley Block without geared trolley suitable for hazardous area of capacity 1 MT	4	nos	46 350	1 85 400
5161	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.2.1.1V4	Spark resistant Chain Pulley Block without geared trolley suitable for hazardous area of capacity 2 MT	5	nos	93 220	4 66 100
5162	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.2.1.1V5	Spark resistant Chain Pulley Block without geared trolley suitable for hazardous area of capacity 3 MT	5	nos	1 39 820	6 99 100
5163	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.2.1.1V6	Spark resistant Chain Pulley Block without geared trolley suitable for hazardous area of capacity 5 MT	6	nos	2 33 040	13 98 240
5164	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.4	Installation of Geared Trolley Mounted Chain Pulley Block / Geared Trolley (of Chain Pulley Block)				
5165	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.4.1	Transportation of Equipment from Owner's store/Contractor's store to work site. Assembly of subassemblies, placing the equipment on monorail, levelling, aligning, fixing of bolts, providing manpower for carrying out trial and start up runs and testing under the supervision guidance of manufacturer/clients- personnel and rectifying defects of any and completing the work in all respects as per drawing, specifications and instructions of engineer in charge for each equipment including accessories. Also refer Scope of work /Job specification attached with the tender.				
5166	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.4.1.1	Chain Pulley Block Capacity- Upto 10 MT	47	nos	48 090	22 60 230
5167	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.4.1.2	Chain Pulley Block Capacity- from 15 MT to 25 MT	11	nos	1 13 070	12 43 770
5168	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.4.1.3	Chain Pulley Block Capacity- from 30 MT to 50 MT	1	nos	1 24 010	1 24 010
5169	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.5	Installation of Hook Mounted Chain Pulley Block				
5170	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.5.1	Transportation of Equipment from Owner's store/Contractor's store to work site. Assembly of subassemblies, placing the equipment on hook, providing manpower for carrying out trial and start up runs and testing under the supervision guidance of manufacturer/clients-personnel and rectifying defects of any and completing the work in all respects as per drawing, specifications and instructions of engineer in charge for each equipment including accessories. Also refer Scope of work /Job specification attached with the tender.				
5171	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.5.1.1	Chain Pulley Block Capacity- Upto 10 MT	20	nos	23 300	4 66 000
5172	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.6	For supply: Unit Rate (addition) per meter increase in height of lift(due to increase in load chain length etc.) for Chain Pulley Block as per scope of work/Job specification defined in the tender.				
5173	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.6.1	Chain Pulley block capacity upto10 MT	25	per metre length	2 290	57 250
5174	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.6.2	Chain Pulley Block capacity from 15 MT to 25 MT	5	per metre length	3 300	16 500
5175	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.7	For supply: Unit Rate (addition) per meter increase in distance from monorail/point of suspension to operating floor(due to increase in hand chain length etc.) for Chain Pulley Block as per scope of work/Job specification defined in the tender.				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5176	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.7.1	Chain Pulley Block Capacity upto 10 MT	25	per metre length	650	16 250
5177	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01QQ.7.7.2	Chain Pulley Block Capacity from 15 MT to 25 MT	5	per metre length	900	4 500
5178	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR	EQUIPMENT - ROTATING				
5179	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1	Handling and transportation of Rotating Equipment & miscellaneous items of equipment package from Owner's storage points to work site / contractor's stores, assembly of sub-assemblies, field assembly (as applicable) placing the equipment on foundations, (including some amount of cutting, welding & field joints wherever required), levelling, aligning, fixation of foundation bolts, providing (including supply) packing / shim plates (as applicable), including chipping & dressing of foundations, grouting (including supply and application of grout material, equipment base frame filling as per vendor recommendation with specified grout), cleaning and flushing, draining and drying, purging of lines, and providing manpower and tools / equipment for NDT, testing, carrying out trial and start-up runs and testing under supervision of manufacture's / customer personnel, rectifying defects (if any), insulation (as applicable), precommissioning and commissioning (as applicable) and completing the work in all respects as per drawings, job specifications / scope of work and instructions of Engineer-in-charge for each equipment including drivers and accessories, as listed below. NOTE: Scope also includes erection, fabrication, insulation (as applicable), welding & field joints wherever required, installation & NDT of vendor supplied prefabricated spools / commercial length between various skids of an equipment package (payable at the rate provided against piping SOR items).				
5180	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.1	Pump Packages (all types) with drivers, auxiliaries and accessories.				
5181	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.1.1	All Types of Pumps (Electric Motor Driven) along with driver, auxiliaries and accessories (Single Skid).	590	MT	36 890	2 17 65 100
5182	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.1.2	All Types of Pumps (General Purpose Steam Turbine driven) along with driver, auxiliaries and accessories (Single Skid).	150	MT	36 890	55 33 500
5183	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.2	Centrifugal Compressor (Gas / Air) Packages with drivers, auxiliaries and accessories.				
5184	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.2.1	Centrifugal Compressors with Electric Motor Driver, auxiliaries and accessories.	1950	MT	50 440	9 83 58 000
5185	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.4	Packaged Reciprocating Compressor Packages with drivers, auxiliaries and accessories.				
5186	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.4.1	Packaged Reciprocating Compressors on single skid with driver (Electric Motor), auxiliaries and accessories.	50	MT	39 730	19 86 500
5187	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.8	Chemical Dosing Packages				
5188	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.8.1	Skid mounted chemical dosing packages along with all auxiliaries and accessories.	170	MT	36 890	62 71 300
5189	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.MH10	INITIAL FILL				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5190	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.1.MH10.1	INITIAL FILL OF LUBRICANTS, SEALING FLUID & OTHER CONSUMABLES ETC. REQUIRED FOR STARTUP AND COMMISSIONING	85000	Litre	310	2 63 50 000
5191	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.3	Epoxy Grout				
5192	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01RR.3.1	Extra Charges for supplying and applying of Epoxy Grout.	40	m^3	5 62 920	2 25 16 800
5193	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV	EQUIPMENT - STATIC				
5194	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.MH1	SUPPLY OF WOODEN PILLOWS				
5195	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.MH1.1	Supply of wooden pillows for saddle support of equipment in-line with EIL job standard no. B957-000-80-42-SK-1005 to complete the work in all respect as per drawings and direction of Engineer in-Charge.	1	nos	20 600	20 600
5196	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30	EQUIPMENT ERECTION				
5197	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.MH01	ERECTION OF DRESSED-UP EQUIPMENT: Transportation of columns and vessels from owner's storage point to work site, assembly of parts, subassemblies, erection at all elevations, aligning, verticality checking, grouting, tightening of foundation bolts, welding of washer on anchor chairs, installation of demister, internal gratings, distributor, pipe davit etc on the Column/Vessel, cleaning and flushing by water, draining, drying by compressed air etc, arranging all tools, tackles, machinery, consumables, erection of completely dressed-up equipment & arranging all instruments, labour, ancillary, etc to complete the work in all respects as per drawings, equipment detail, specifications and instructions of the Engineer In-Charge.				
5198	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.MH01.01	Equipment(Dressed-up) weighing less than 100 MT but 50 MT and Above	280	MT	45 080	1 26 22 400
5199	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.1	EQUIPMENT ERECTION: Transportation of reactors, columns, vessels, silencers, heat exchangers (shell and tube, plate fin, plate) and electric heater etc. from owner's storage point to work site, assembly of parts, subassemblies, erection at all elevations, aligning, verticality checking, grouting, tightening of foundation bolts, welding of washer on anchor chairs, erection of wooden pillow for cold equipments, stacking of multi-tier exchanger(which are stored in unstacked condition), arranging hooks for test ring/ test flanges in heat exchangers, installation of demister, internal gratings, distributor, pipe davit, installation of mixer/agitator, cleaning and flushing by water, draining, drying by compressed air, arranging all tools, tackles, machinery, consumables, transportation equipment, erection equipment, instruments, labour, ancillary, etc. to complete the work in all respects as per drawings, equipment detail, specifications and instructions of the Engineer-in-Charge.				
5200	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.1.1	Equipment weighing less than 500 MT but 100 MT and above	4310	MT	64 430	27 76 93 300
5201	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.1.2	Equipment weighing less than 100 MT but 50 MT and above	1200	MT	39 730	4 76 76 000

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5202	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.1.3	Equipment weighing less than 50 MT but 30 MT and above	400	MT	39 730	1 58 92 000
5203	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.1.4	Equipment weighing less than 30 MT but 10 MT and above	360	MT	39 730	1 43 02 800
5204	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.1.5	Equipment weighing less than 10 MT	200	MT	39 730	79 46 000
5205	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3	HYDROTESTING OF EQUIPMENT				
5206	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.2	HYDROSTATIC TESTING OF EXCHANGERS (shell and tube): Hydrostatic testing of exchangers single tier or multitier including dismantling and reassembling of piping connections wherever required, providing blinds and gaskets on nozzles, piping, arranging water hoses, gauges, valves, test pumps and all other temporary arrangements, labour and materials, drying by hot compressed air as per specifications and instructions of Engineer-in-Charge. In case, if leakage is found in gaskets and gaskets are replaced, then re-hydrotest to be done with new gasket after reassembly. (AS PER ERECTION SPECIFICATION ENCLOSED)				
5207	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.2.1	Hydrotesting of shell side				
5208	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.2.1.1	upto 20m3	44	nos	38 200	16 80 800
5209	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.2.1.2	above 20m3 to 50m3	31	nos	38 200	11 84 200
5210	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.2.2	Hydrotesting of tube side				
5211	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.2.2.1	upto 20m3	43	nos	38 200	16 42 600
5212	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.2.2.2	above 20m3 to 50m3	33	nos	38 200	12 60 600
5213	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.2.3	Rehydrotesting of tube side in floating heat exchangers if leakage is noticed by drop in pressure and no leakage in any of the external joints, hinting at floating head gasket leakage. Shell cover is to be opened and tube side is to be filled with water.				
5214	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.2.3.1	upto 20m3	1	nos	38 200	38 200
5215	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.2.3.2	above 20m3 to 50m3	1	nos	38 200	38 200
5216	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.3	HYDROSTATIC TESTING OF EXCHANGERS (PLATE): Hydrostatic testing of all fluid passages including dismantling and reassembling of piping connections wherever required, providing blinds and gaskets on nozzles, piping, arranging water hoses, gauges, valves, test pumps and all other temporary arrangements, labour and materials, drying by hot compressed air as per specifications and instructions of Engineer-in-Charge.				
5217	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.3.1	upto 20m3	3	nos	38 200	1 14 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5218	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.5	HYDROSTATIC TESTING OF HEAT EXCHANGERS UNDER IBR SERVICE: Hydrostatic testing of Heat Exchangers single tier or multitier including dismantling and reassembling of piping connections wherever required, providing blinds and gaskets on nozzles, piping, arranging water hoses, gauges, valves, test pumps and all other temporary arrangements, labour and materials, drying by hot compressed air as per specifications and instructions of Engineer-in-Charge. In case, if leakage is found in gaskets and gaskets are replaced, then re-hydro test to be done with new gasket after reassembly. Obtaining necessary IBR approvals/ certificates on this account, as per the instructions of Engineer-In-Charge, is also be included in contractor scope within the quoted price.				
5219	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.5.1	Hydrotesting of Shell side(IBR) of Exchanger				
5220	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.5.1.1	upto 20m3	3	nos	38 200	1 14 600
5221	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.5.1.2	above 20m3 to 50m3	1	nos	38 200	38 200
5222	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.5.2	Hydrotesting of Tube side(IBR) of Exchanger				
5223	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.5.2.1	upto 20m3	3	nos	38 200	1 14 600
5224	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.6	HYDROSTATIC TESTING OF VESSEL UNDER IBR SERVICE: Hydrostatic testing of vessels including dismantling and reassembling of piping connections wherever required, providing blinds and gaskets on nozzles, piping, arranging water hoses, gauges, valves, test pumps and all other temporary arrangements, labour and materials, drying by hot compressed air as per specifications and instructions of Engineer-in-Charge. In case, if leakage is found in gaskets and gaskets are replaced, then re-hydro test to be done with new gasket after reassembly. Obtaining necessary IBR approvals/ certificates on this account, as per the instructions of Engineer-In-Charge, is also be included in contractor scope within the quoted price.				
5225	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.6.1	upto 20m3	3	nos	38 200	1 14 600
5226	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.3.6.4	above 100m3	1	nos	47 750	47 750

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5227	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.7	LETTERING AND STENCILING: Surface preparation, supply and application of primer and paint on insulated and uninsulated equipment for lettering, stenciling on vessels, columns, drums, for the purposes of identification (Equipment Name, Equipment Number & Service Description) as per applicable painting specification enclosed elsewhere in the tender document, arranging scaffolding for all heights, labour, materials, tools, tackles, supervision etc. to complete the work as per specifications and instructions of Engineer-in- Charge.	8000	Per Letter	210	16 80 000
5228	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.10	LOADING OF CATALYST & INERT BALLS FOR REACTORS				
5229	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.10.1	LOADING OF CATALYST & INERT BALLS FOR REACTORS BY SOCK LOADING METHOD: Transportation of Catalyst/ Inert balls from owners storage yard to the erection site, storing the same near erection site, supply/ procurement / fabrication of all materials, equipments, tools, tackles, machinery, consumables along with arranging of required skilled / experienced personnel, erection of internal supplied loose by vessel fabricator, removal of internals (if supplied in installed condition) as required to facilitate loadings of Catalyst and Inert balls by sock loading method, re-installation of the internals removed, carrying out leak tests, removal of temporary structures / platforms and completing the work in all respect as per instructions of Engineer-in-Charge. The work shall be done to the complete satisfaction of Engineer-in-Charge under supervision of representative of Owner/Catalyst and inert balls Supplier/Licensor. Refer the Catalyst Specification & relevant sections of Operating manual attached elsewhere in bid package.				
5230	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.10.1.1	upto 20m3	1	nos	4 12 000	4 12 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5231	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.10.MH1	LOADING OF CATALYST & INERT BALLS FOR DRYERS BY SOCK LOADING METHOD: Transportation of Catalyst/ Inert balls from owners storage yard to the erection site, storing the same near erection site, supply/ procurement / fabrication of all materials, equipments, tools, tackles, machinery, consumables along with arranging of required skilled / experienced personnel, erection of internal supplied loose by vessel fabricator, removal of internals (if supplied in installed condition) as required to facilitate loadings of Catalyst and Inert balls by sock loading method, re-installation of the internals removed, carrying out leak tests, removal of temporary structures / platforms and completing the work in all respect as per instructions of Engineer-in-Charge. The work shall be done to the complete satisfaction of Engineer-in-Charge under supervision of representative of Owner/Catalyst and inert balls Supplier/Licensor. Refer the Catalyst Specification & relevant sections of Operating manual attached elsewhere in bid package.				
5232	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.10.MH1.1	above 50m3 to 100m3	2	nos	20 60 000	41 20 000
5233	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.12	ERECTION OF BURIED EQUIPMENT : Transportation of vessels from Owner's storage point to worksite, repair/ touch up of finish paint, arrangement of all accessories, equipments, labour etc., placing/erection of vessel in trenches/pits including assembly of parts, subassemblies, aligning, verticality checking, grouting, tightening of foundation bolts, arranging all tools, tackles, machinery, consumables etc to complete the work in all respects as per drawings, equipment detail, specifications and instructions of the Engineer-in-Charge.				
5234	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.12.3	Equipment weighing less than 50 MT but 30 MT and Above	70	MT	32 960	23 07 200
5235	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.12.4	Equipment weighing less than 30 MT but 10 MT and Above	100	MT	32 960	32 96 000
5236	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13	WELDING & NDT OF CUT NOZZLES / SUMP / BOOT OF BURRIED VESSELS: Assembly of cut nozzles/Sump/Boot(as shown in Respective Engg. Data Sheet), vertically checking, alignment, Welding of cut nozzles , NDT such as 100% radiography ,UT , surface preparation of the weld seam portion, application of primer, painting, arranging all tools and tackles, machinery. Consumables, transportation/handling of equipment, labour etc to complete the work in all respects as per drawings & instruction of Engineer-in charge.				
5237	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.MH01	MOC: Carbon Steel, Nozzle size: 32"	1	nos	39 880	39 880
5238	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.MH02	MOC : Stainless Steel ,Nozzle size : 4"	1	nos	7 480	7 480
5239	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.MH03	MOC : Stainless Steel ,Nozzle size : 6"	3	nos	11 220	33 660

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5240	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.MH04	MOC : Stainless Steel ,Nozzle size : 8"	1	nos	14 960	14 960
5241	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.4	MOC : Carbon Steel ,Nozzle size : 6"	12	nos	7 480	89 760
5242	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.MH05	MOC : Stainless Steel ,Nozzle size : 20"	2	nos	37 390	74 780
5243	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.5	MOC : Carbon Steel ,Nozzle size : 8"	5	nos	9 970	49 850
5244	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.MH06	MOC : Stainless Steel ,Nozzle size : 24"	3	nos	44 870	1 34 610
5245	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.MH07	MOC : Stainless Steel ,Nozzle size : 28"	1	nos	52 340	52 340
5246	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.MH08	MOC: Stainless Steel, Nozzle size: 32"	1	nos	59 820	59 820
5247	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.10	MOC : Carbon Steel ,Nozzle size : 18"	5	nos	22 430	1 12 150
5248	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.11	MOC : Carbon Steel ,Nozzle size : 20"	6	nos	24 930	1 49 580
5249	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.12	MOC : Carbon Steel ,Nozzle size : 24"	20	nos	29 910	5 98 200
5250	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.13	MOC : Carbon Steel ,Nozzle size : 28"	1	nos	34 900	34 900
5251	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.13.14	MOC : Carbon Steel ,Nozzle size : 30"	1	nos	37 390	37 390
5252	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.15	CHEMICAL CLEANING OF HEAT EXCHANGER/HEATER: Procurement of all materials, carrying out chemical cleaning / pre-cleaning / degreasing / passivation (as applicable) of equipment, arranging labour, materials, tools and tackles, consumables, supervision etc. required to complete the work in all respects as per job specification attached with the tender document and directions of Engineer-in-charge. Refer mechanical data sheet/Scope of Supply/Work attached with the tender.				
5253	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.15.8	Passivation (Tube Side)				
5254	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.15.8.1	upto 20m3	12	nos	3 09 000	37 08 000
5255	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.30.15.8.2	above 20m3 to 50m3	12	nos	7 72 500	92 70 000
5256	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40	EQUIPMENT INSULATION				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5257	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1	HOT INSULATION: Providing thermal insulation including supply of all insulating and ancillary material, weather protective covering, consumables and other necessary materials, testing of the material as required including transportation of the materials to work sites, applying insulation on surfaces as specified, including all preparatory works thereon, all binding, tying, lacing, stitching and/or otherwise securing, providing vapour barrier, finishing with plain/corrugated sheet cladding or as specified, providing bolts, rivets, self tapping screws wherever specified, providing inspection windows etc., arranging necessary scaffolding, all tools and tackles, equipment, apparatus etc., labour and supervision and completing the work in all respect at all heights as per drawings, specifications and instructions of Engineer-in-Charge.				
5258	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.1	Shells of vertical vessels, columns, exchangers, reactors, silencers etc. Surface material: CS/AS. Insulation type : IH &IT (Rockwool).				
5259	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.1.1	Insulation Thickness: 25 mm	650	m²	7 000	45 50 000
5260	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.1.3	Insulation Thickness: 40 mm	700	m²	7 340	51 38 000
5261	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.1.5	Insulation Thickness: 50mm	400	m²	7 560	30 24 000
5262	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.1.7	Insulation Thickness: 65mm	70	m²	7 900	5 53 000
5263	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.1.10	Insulation Thickness: 80mm	150	m²	8 240	12 36 000
5264	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.1.11	Insulation Thickness: 90mm	300	m²	8 470	25 41 000
5265	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.1.18	Insulation Thickness: 175mm	70	m²	10 400	7 28 000
5266	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.2	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material CS/AS. Insulation type: IH &IT (Rockwool).				
5267	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.2.1	Insulation Thickness: 25 mm	750	m²	7 000	52 50 000
5268	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.2.3	Insulation Thickness: 40mm	330	m²	7 340	24 22 200
5269	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.2.5	Insulation Thickness: 50mm	1700	m²	7 560	1 28 52 000
5270	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.2.7	Insulation Thickness: 65mm	350	m²	7 900	27 65 000
5271	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.2.10	Insulation Thickness: 80mm	30	m²	8 240	2 47 200
5272	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.2.11	Insulation Thickness: 90mm	90	m²	8 470	7 62 300
5273	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.2.14	Insulation Thickness: 125mm	10	m²	9 260	92 600
5274	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.2.18	Insulation Thickness: 175mm	20	m²	10 400	2 08 000
5275	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.3	Shells of vertical vessels, columns, exchangers, reactors, silencers etc. Surface material : SS. Insulation type : IH &IT (Rockwool).				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5276	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.3.3	Insulation Thickness: 40mm	410	m²	7 340	30 09 400
5277	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.4	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material SS. Insulation type: IH &IT (Rockwool).				
5278	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.4.3	Insulation Thickness: 40mm	125	m²	7 340	9 17 500
5279	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.4.5	Insulation Thickness: 50mm	85	m²	7 560	6 42 600
5280	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.1.4.10	Insulation Thickness: 80mm	10	m²	8 240	82 400
5281	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.2	COLD INSULATION: Providing cold insulation including supply of all insulating and anciliary material, protective covering, consumables and other necessary materials, testing of the material as required including transportation of the materials to work sites, applying insulation on surfaces as specified, including all preparatory works thereon, all binding, tying, lacing, stitching and/or otherwise securing, providing vapour barrier, finishing with plain/corrugated sheet cladding or as specified, providing bolts, rivets, providing vapour stop etc. arranging necessary scaffolding, all tools and tackles, equipment, apparatus etc. labour and supervision and completing the work in all respect at all heights as per drawings, specifications and instructions of Engineer-in-Charge.				
5282	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.2.9	Shells of vertical vessels, columns, exchangers, reactors, silencers etc. Surface material: CS/AS. Insulation type: Ic (Rigid Polyisocyanurate ("PIR" to ASTM C591, Grade-2, Type-II).				
5283	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.2.9.2	Insulation Thickness: 50mm	120	m²	9 090	10 90 800
5284	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.2.9.3	Insulation Thickness: 65mm	240	m²	9 890	23 73 600
5285	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.2.10	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material CS/AS. Insulation type: Ic (Rigid Polyisocyanurate ("PIR" to ASTM C591, Grade-2, Type-II).				
5286	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.2.10.1	Insulation Thickness: 40mm	30	m²	8 560	2 56 800
5287	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.2.10.2	Insulation Thickness: 50mm	460	m²	9 090	41 81 400
5288	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.2.10.3	Insulation Thickness: 65mm	80	m²	9 890	7 91 200
5289	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.2.12	Shells and heads of horizontal vessels, columns, reactors, exchangers, silencers etc and heads of above mentioned vertical equipments. Surface material: SS. Insulation type: Ic (Rigid Polyisocyanurate ("PIR" to ASTM C591, Grade-2, Type-II).				
5290	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.2.12.6	Insulation Thickness: 100mm	30	m²	11 750	3 52 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5291	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.3	PERSONAL PROTECTION INSULATION (METAL CAGE/GUARD, FOR HORIZONTAL/ VERTICAL EQUIPMENT): Providing the metal cage/ guards (STAINLESS STEEL Wire netting type as per EIL specification) including supply of all material, transportation of the materials to work sites, installation of the fabricated cage on the surfaces of the equipment, Including all preparatory works thereon, all binding, tying or otherwise securing, arranging necessary scaffolding, all tools and tackles, equipment, apparatus etc., labour and supervision and completing the work in all respect at all heights as per the specifications and instructions of Engineer-in-Charge.				
5292	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.40.3.1	For the Shells and Heads of Horizontal/ Vertical Equipment	2300	m²	4 420	1 01 66 000
5293	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50	EQUIPMENT PAINTING				
5294	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.1	PAINTING (UNINSULATED EQUIPMENT) FOR CS / LTCS AND LOW ALLOY STEEL VESSEL				
5295	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.1.1	Supply and application of field primers and finish paint on C.S., L.T.C.S. and low alloy steel vessels, columns, reactor, silencer, exchangers, air cooler structure and other equipment, including rubdown and touch up of shop primer (primer as per applicable specification) wherever required as per attached specification, providing scaffolding for all heights, labour, material, tools and tackles, consumables, supervision etc. to complete the work in all respect as per specifications, drawings, equipment details for painting and direction of Engineer in-Charge for all type of uninsulated equipment. The surface area is as per respective temperature ranges given below as per applicable specification. Note: Surface preparation and first coat of primer application shall be provided by equipment supplier.				
5296	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.1.1.MH01	Design Temperature Range: (-)45 °C To (-) 15 °C Surface preparation and Primer : SSPC-SP-10; 1coat of F-9 @ 65-75 µ DFT/coat Total Final DFT in microns (min) : 65-75. Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	290	290
5297	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.1.1.MH02	Design Temperature Range: (-)14 °C To 80 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-9@ 65-75 µ DFT/coat + 1 coat of P-6 @ 40 µ DFT/coat Intermediate coat: 2 coats of F-6B @100 µ DFT/coat Finish Paint: 1 coat of F-2 @ 40 µ DFT/coat Total DFT in Microns (Min): 345-355 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	20	m²	850	17 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5298	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.1.1.MH03	Design Temperature Range: 81 °C To 250 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-9 @ 65-75 µ DFT/coat + 1 coat of F-11 @ 20 µ DFT/coat Finish Paint: 1 coat of F-11 @ 20 µ DFT/coat Total DFT in microns min : 105-115 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	70	m²	510	35 700
5299	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.1.1.MH04	Design Temperature Range: 251 °C To 400 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-9@ 65-75 µ DFT/coat + 1coat of F-12 @ 20 µ DFT/coat Finish Paint: 1coat of F-12 @ 20 µ DFT/coat Total DFT in Microns (Min): 105-115 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	660	660
5300	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.1.1.MH05	Design Temperature Range: 401 °C To 650 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-16 @ 125 µ DFT/coat. Finish Paint: 1coat of F-16 @ 125 µ DFT/coat. Total DFT in Microns (Min): 250-300. Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	1 090	1 090
5301	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.1.1.MH06	Design Temperature Range: (-) 45 °C To 80 °C (External side of underground Vessels) Surface preparation and primer: SSPC-SP-10; 1 coat of F-9 @ 65-75 µ DFT/coat + 1 coat of F-7 @ 100 µ DFT/coat Finish Paint: 2 coats of F-7 @ 100 µ DFT/coat Total DFT in Microns (Min): 365-375 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	730	730
5302	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.1.1.MH07	Design Temperature Range: 81 °C To 200 °C (External side of underground Vessels) Surface preparation and primer: SSPC-SP-10; 1 coat of F-17 primer @ 400 µ DFT/coat Finish Paint: 1coat of F-17 @ 400 µ DFT/coat. Total DFT in Microns (Min): 800 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	50	m²	730	36 500
5303	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.1.1.MH08	Design Temperature Range: 201 °C To 400 °C (External side of underground vessels) Surface preparation and primer: SSPC-SP-10; 1 coat of F-16 primer @ 125 µ DFT/coat. Finish Paint: 2 coats of F-16 @ 125 µ DFT/coat. Total DFT in Microns (Min): 375 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	10	m²	1 600	16 000
5304	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.2	PAINTING (INSULATED EQUIPMENT) FOR CS / LTCS AND LOW ALLOY STEEL VESSEL				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5305	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.2.1	Supply and application of field primers and finish paint on C.S, L.T.C.S & low alloy steel vessels, columns, reactor, silencer, exchangers and other equipment, including rubdown and touch up of shop primer (primer as per applicable specification) wherever required, as per attached specification, providing scaffolding for all heights, labour, materials, tools and tackles, consumables and supervision etc. to complete the work in all respect as per specifications, drawings, equipment details for painting and direction of Engineer in-Charge. The surface area is as per respective temperature ranges given below as per applicable specification. Note: Surface preparation and first coat of primer application shall be provided by equipment supplier.				
5306	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.2.1.MH01	Design Temperature Range: -45 °C To 125 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-15 @ 100 µ DFT/coat Finish Paint: 2 coats of F-15 @100microns DFT/coat. Total DFT in Microns (Min): 300 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	70	m²	740	51 800
5307	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.2.1.MH02	Design Temperature Range: 126 °C To 560 °C Surface preparation and primer: SSPC-SP-10; 1 coat of F-16 @ 125 µ DFT/coat Finish Paint: 1 coat of F-16 @125 microns DFT/coat. Total DFT in Microns (Min): 250 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	200	m²	1 090	2 18 000
5308	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.2.1.MH03	Design Temperature Range: 200 °C To 540 °C Surface preparation and primer: Temporary oil based varnish coating to be provided for transport and storage. Finish Paint: Thermally Sprayed Aluminum coating (TSAC) Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, refer applicable painting specification, (Refer Annexure-I)	1	m²	2 060	2 060
5309	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.3	PAINTING (INSULATED EQUIPMENT) FOR STAINLESS STEEL				
5310	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.3.1	Supply and application of field primers and finish paint on Stainless Steel vessels, columns, reactors, silencers, exchangers and other equipment, including rubdown and touch up of shop primer (primer as per applicable specification) wherever required, as per attached specification, providing scaffolding for all heights, labour, materials, tools and tackles, consumables and supervision etc. to complete the work in all respect as per specifications, drawings, equipment details for painting and direction of Engineer in-Charge. The surface area is as per respective temperature ranges given below as per applicable specification. Note: Surface preparation and first coat of primer application shall be provided by equipment supplier.				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5311	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.3.1.MH01	Design Temperature Range: (-) 45 °C To 125 °C Surface preparation and primer: SSPC-SP-16; (15-25 µ surface profile) 1 coat of F-15 @ 100□ µ DFT/coat. Finish Paint: 2 coats of F-15 @ 100 µ DFT/coat Total DFT in Microns (Min): 300 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	770	770
5312	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.3.1.1V1	Design Temperature Range: -45 °C To 200 Primer: None Finish Paint: 1 coat of FP-10 @ 75micr. DFT/coat. (1 X 125). Total = 250 DFT Remarks: Refer applicable painting specification.	1	m²	700	700
5313	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.3.1.MH02	Design Temperature Range: 126 °C To 650 °C Surface preparation and primer: SSPC-SP-16; (15-25 µ surface profile) 1 coat of F-16 @ 125 µ DFT/coat. Finish Paint: 1 coat of F-16 @ 125 µ DFT/coat Total DFT Microns (Min): 250 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	1 120	1 120
5314	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.3.1.MH03	Design Temperature Range: (-)45 °C To 150 °C, For cyclic services of CS, LTCS, SS, DSS, SDSS & Alloy steel Surface preparation and primer: Surface preparation and primer: SSPC-SP-10 For CS, LTCS & Alloy steel, SSPC-SP-16 for SS; (15-25 µ surface profile) 1 coat of F-15 @ 100 µ DFT/coat. Finish Paint: 2 coats of F-15 @ 100 µ DFT/coat. Total DFT in Microns: 300. Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	1	m²	780	780
5315	B	B957-300-80-42-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01VV.50.3.1.MH04	Design Temperature Range: (-)180 °C To 650 °C Surface preparation and primer: Surface preparation and primer: SSPC-SP-10 For CS, LTCS & Alloy steel, SSPC-SP-16 for SS; (15-25 µ surface profile) 1 coat of F-16 @ 125 µ DFT/coat. Finish Paint: SSPC-SP-16; 1 coat of F-16 @ 125 µ DFT/coat Total DFT in Microns (Min): 250 Remarks: ONLY TOUCH UP PAINT IS IN MECHANICAL CONTRACTOR'S SCOPE, Refer applicable painting specification.	50	m²	1 130	56 500
5316	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM	EQUIPMENT - COLUMNS/TRAYS				
5317	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10	TRAYS, TOWER PACKINGS AND TOWER INTERNALS				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5318	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.1	NEW COLUMNS: Checking inside the column for levelness of support ring and location of bolting bars to ensure that they are within tolerances as per approved drawings, applicable standards/specifications and if required modification of the same, transportation of trays/tower internals from Owner's storage point to work site, Floor Mock-up of each type & size of tray and layer of structured packing, installation of all trays, tower internals and associated components under supervision of internal supplier and as per applicable Installation Procedure and GADs, Arranging of Cranes in case of Cartridge Tray Bundle installation, Arrangement of Scaffolding inside the column for parallel working (if required), filling of Tower Packings, and carrying out minor adjustments/modifications during installation, carrying out various leak tests as per requirement and completing all work as per approved drawings / specifications and instructions of Engineer-in-Charge and filling of required Installation Reporting Formats. Attending to Punch List and carrying out necessary modifications/rectifications suggested by EIL specialist/Licensor, providing infrastructure facilities & help/manpower to Engineer-in-Charge/ EIL specialist/Licensor during checking of tray installation. For details, Refer Schedule of Quantities and technical specification, attached elsewhere.				
5319	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.1.ME001	Tag Nos. 300-CC-00-1401 PROCESS WATER STRIPPER 300-CC-00-2401 DCU OFFGAS CAUSTIC/WASH WATER TOWER 300-CC-00-2502 MEA REGENERATOR				
5320	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.1.1	Installation of Trays and Tower Internals	15	MT	1 54 500	23 17 500
5321	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.1.2	Filling / Installation of Tower Packings (Random/Structured)	220	m^3	20 600	45 32 000
5322	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.1.ME3	Minor modification like Bending/ Cutting/ Grinding etc. for Removable Internals/ Welded attachments.	1	Kg	310	310
5323	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.3	Site Welding; Fillet welding of Trays & Tower Internals inside the Column.				
5324	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.3.2	Fillet Weld of 3mm at Site per RM (SS to SS or SS to CS)	1	RM	15 490	15 490
5325	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.3.3	Fillet Weld of 6mm at Site per RM (SS to SS or SS to CS)	1	RM	24 530	24 530
5326	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.3.4	Fillet Weld of 6mm at Site per RM (CS to CS)	1	RM	9 810	9 810
5327	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.3.5	Fillet Weld of 10mm at Site per RM (CS to CS)	1	RM	10 330	10 330
5328	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.3.ME6	Seal weld 3mm (SS to SS)	1	RM	23 240	23 240
5329	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.10.3.ME7	Seal weld 3mm (CS to CS)	1	RM	9 290	9 290
5330	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.20	Deaerator Packages				
5331	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.20.ME01	Tag No. 300-LZ-00-8001				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5332	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.20.1	Erection: Transportation of Deaerator packages from Owner's storage point to work site, fixing of dome of Deaerator with main storage vessel, hydrotesting of complete Deaerator assembly , erection of vessel on the foundations, modifications in the erected vessel, including aligning, levelling and grouting , flushing, cleaning & drying of Storage and Deaerator vessel, assembly and fixing of tower internals, erection of pipe davit (if required) and completing the work in all respects for commissioning the plant as per the drawings and specifications attached elsewhere in the bid document and to the instructions / satisfaction of the Engineer-in-charge.				
5333	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.20.1.1	Equipment weighing less than 500 MT but 100 MT and above	170	MT	44 710	76 00 700
5334	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.45	Erection of standalone Ejectors / Ejector and Silencer				
5335	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.45.1	Erection of Ejectors				
5336	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.45.1.ME01	Tag No. 300-JA-00-1201				
5337	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.45.1.1	Transportation of the Ejectors from Owner's storage points to work site and Erection on structure support by bolting, shims etc. including levelling, aligning including connecting nozzles with piping at various elevations and completing the work in all respects as per drawings, specifications and instructions of Engineer-in-Charge.				
5338	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.45.1.1.01	Equipment weighing less than 10 MT	0.05	MT	39 700	1 985
5339	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.91	De-humidification and Air-conditioning system for Columns				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5340	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.91.1	NEW COLUMNS: De-humidification and Air-conditioning system for Columns shall be provided during installation of column internals. System shall be designed to provide 40 air changes per hour & ensure a temperature from 32 to 35 degree Celsius or 10-12 degree Celsius less than ambient temperature whichever is lower with a Uniform humidity (RH) of 50-55% inside the column. At a time minimum 15m of column height for inside diameter of range 6000 to 9000mm and 10m of column height for inside diameter of more than 9000mm shall maintain above temperature and humidity; for other columns above shall be maintained across the full length of column. The power required for the system shall be given by Client and charges for the same shall be as per Contractual Agreement/ Requirements. This system shall be used by the Column internal installation Contractor during installation of Column Internals and various Inspection Agencies during the inspection of Internals inside the columns till the BOX-UP of the Columns. De-humidification and Air-conditioning system shall be arranged from specialized agencies who are well experienced in this line of service having proven track record (PTR). The Agency shall visit site to identify the location of all columns in advance and necessary arrangements shall be made in advance so that the De-humidification and Air-conditioning system are in place before start of internal installation work. The system shall be designed in such a manner that any kind of combination of column work may progress (e.g. One Major Column or Both Major Column or One Major Column with Small Column or Two Major Columns with Small Columns, etc.). The sequence of column internals installation along with schedule will be finalized at later stage. The machine shall be installed at the Grade Level or at the scaffolding to be decided by Mechanical contractor / Agency and shall be as per the direction of the Engineer-In-Charge. Also, all Statutory Regulations and Safety, Health and Environment Requirements shall be complied by the Mechanical Contractor / Agency. Transportation of the system from Owner's (Mechanical contractor) Storage points to work				
5341	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.91.1.ME001	300-CC-00-1401 PROCESS WATER STRIPPER (Col. ID 3200mm, TL-TL 16300) 300-CC-00-2401 DCU OFFGAS CAUSTIC/WASH WATER TOWER (Col. ID 1300mm, TLTL 36300) 300-CC-00-2502 MEA REGENERATOR (Col. ID 3400mm, TL-TL 32200)				
5342	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.91.1.1	Column ID range 1000mm to 3000mm and TL to TL height upto 60000mm. Lumpsum price is for one column. Details as per drawings and tender specification.	1	Lumpsum	9 39 360	9 39 360
5343	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.91.1.2	Column ID range 3001mm to 5000mm and TL to TL height upto 70000mm. Lumpsum price is for one column. Details as per drawings and tender specification.	1	Lumpsum	9 39 360	9 39 360
5344	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.92	Insulation				
5345	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.92.ME01	Tag No. 300-JA-00-1201 & Tag No. 300-LZ-00-8001				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5346	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.92.1	HOT INSULATION: Providing thermal insulation including supply of all insulating and ancillary material, heat resistant paint/foils, weather protective covering, consumables and other necessary materials, testing of the material as required including transportation of materials to work sites, applying insulation on surfaces as specified, including all preparatory work thereon, all binding, tying, lacing, stitching and/or otherwise securing, finishing with plain/corrugated sheet cladding or as specified, providing bolts, nuts, self tapping screws wherever specified, providing inspection windows etc., providing necessary scaffolding, all tools and tackles, equipment, apparatus etc., labour & supervision and completing the work in all respects at all heights as per drawings, specifications and instructions of Engineer-in-Charge. (As per Applicable Insulation Specification attached elsewhere in tender)				
5347	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.92.1.3	Shells and heads of horizontal vessels, columns, exchangers, silencers etc. and heads of above mentioned vertical equipments. Surface material CS/AS. Insulation type: IH &IT (Rockwool).				
5348	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.92.1.3.ME1	Insulation Thickness: 40 mm (Tag No. 300-JA-00-1201)	1	sqm	5 740	5 740
5349	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.92.1.3.ME2	Insulation Thickness: 80mm (Tag No. 300-LZ-00-8001)	680	sqm	6 640	45 15 200
5350	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.93	Painting				
5351	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.93.2	PAINTING (INSULATED EQUIPMENT) FOR CS / LTCS AND LOW ALLOY STEEL VESSEL				
5352	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.93.2.ME01	Tag No. 300-JA-00-1201 & Tag No. 300-LZ-00-8001				
5353	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.93.2.1	Supply and application of field primers and finish paint on C.S, L.T.C.S & low alloy steel vessels, columns, reactor, silencer, exchangers and other equipment, including rubdown and touch up of shop primer (primer as per applicable specification) wherever required, as per attached specification, providing scaffolding for all heights, labour, materials, tools and tackles, consumables and supervision etc. to complete the work in all respect as per specifications, drawings, equipment details for painting and direction of Engineer in-Charge. The surface area is as per respective temperature ranges given below as per applicable specification. Note: Surface preparation and first coat of primer application shall be provided by equipment supplier.				
5354	B	B957-300-80-46-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01HM.93.2.1.ME1	Design temperature range 126 °C to 560 °C Primer SSPC-SP-10; 1 coat of F-16 @ 125µ DFT/coat, Finish Paint 1 coat F-16 @ 125µ DFT/coat, Total DFT Microns (min.) 250. Remarks: Refer Table no. 11.1 of Painting specification no. B957-000-06-42-PLS-01.	600	sqm	1 090	6 54 000
5355	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS	STRUCTURAL				
5356	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1	EARTH WORK (REFER SPECIFICATION NO. 6-68-0003)				
5357	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.1	Earthwork excavation in soil				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5358	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.1.1	Earth work in EXCAVATION below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth upto 1.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	3900	m^3	300	11 70 000
5359	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.1.2	Earth work in EXCAVATION below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth beyond 1.5m and upto and inclusive of 3.0m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	3500	m^3	350	12 25 000
5360	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.1.3	Earth work in EXCAVATION below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth beyond 3.0m and upto & inclusive of 4.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	1	m^3	410	410
5361	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.2	Earthwork excavation in soft rock				
5362	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.2.1	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth upto 1.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	500	m^3	720	3 60 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5363	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.2.2	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth beyond 1.5m and upto & inclusive of 3.0m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	500	m^3	880	4 40 000
5364	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.2.3	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth beyond 3.0m and upto & inclusive of 4.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	1	m^3	1 030	1 030
5365	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.4	Earthwork excavation by controlled blasting (Explosive/ Non-explosive)				
5366	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.4.11	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Hard Rocks, for a depth of 1.5m including all related work for non-explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete.	1	m^3	2 290	2 290

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5367	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.4.12	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Hard Rocks, for a depth beyond 1.5m and upto & inclusive of 3.0m including all related work for non-explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete.	1	m^3	2 590	2 590
5368	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.4.13	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Hard Rocks, for a depth beyond 3.0m and upto & inclusive of 4.5m including all related work for non-explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete.	1	m^3	2 930	2 930
5369	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.4.MF1411	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Soft Rocks, for a depth of 1.5m including all related work for non explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete.	500	m^3	2 080	10 40 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5370	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.4.MF1412	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Soft Rocks, for a depth beyond 1.5m and upto & inclusive of 3.0m including all related work for non-explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete.	500	m^3	2 350	11 75 000
5371	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.4.MF1413	Earthwork in EXCAVATION below ground level for all kinds of works by Non- Explosive Blasting methods in Soft Rocks, for a depth beyond 3.0m and upto & inclusive of 4.5m including all related work for non-explosive blasting such as drilling, supplying, storage, mixing & filling of drilled holes with non-explosive demolition agents/ blasting chemicals making necessary safety measures around the area, chiselling & cutting to required levels, dressing & trimming of sides, levelling & grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works & disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. as directed including providing temporary support to existing structures, service lines like water pipes, sewage pipes, electric overhead and underground cable etc. all complete	1	m^3	2 660	2 660
5372	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.5	Earthwork excavation by chiselling				
5373	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.5.1	Earth work in EXCAVATION below ground level for all kinds of works in HARD ROCKS for a depth upto 1.5m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	1	m^3	1 820	1 820

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5374	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.5.2	Earth work in EXCAVATION below ground level for all kinds of works in HARD ROCKS for a depth beyond 1.5m and upto & inclusive of 3.0m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	1	m^3	2 020	2 020
5375	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.5.3	Earth work in EXCAVATION below ground level for all kinds of works in HARD ROCKS for a depth beyond 3.0m and upto & inclusive of 4.5m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	1	m^3	2 220	2 220
5376	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.5.MF1401	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCKS for a depth upto 1.5m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	500	m^3	1 600	8 00 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5377	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.5.MF1402	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCKS for a depth beyond 1.5m and upto & inclusive of 3.0m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	500	m^3	1 770	8 85 000
5378	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.5.MF1403	Earth work in EXCAVATION below ground level for all kinds of works in SOFT ROCKS for a depth beyond 3.0m and upto & inclusive of 4.5m by CHISELLING (pneumatic or manual), wedging or any other agreed methods (where blasting is prohibited for any reason or as decided) including all related works, all equipments required for chiselling, and cutting upto required levels, dressing and trimming of sides, levelling and grading of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal of spoils to spoil heaps and stacking of usable excavated materials within a lead of 100m etc. all complete as directed including providing temporary supports to existing service lines like waterpipes, sewage pipes, electric overhead and underground cables etc. all complete.	1	m^3	1 950	1 950
5379	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.6	SHORING AND STRUTTING				
5380	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.6.1	Providing and installing approved type of "SHORING AND STRUTTING" by open timbering method for all depths to retain earth including dismantling and removal of the same etc. from site after completion of work etc. all complete as directed.	100	m^2	400	40 000
5381	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.6.2	Providing and installing approved type of "SHORING AND STRUTTING" by close timbering method for all depths to retain earth including dismantling and removal of the same etc. from site after completion of work etc. all complete as directed.	100	m^2	580	58 000
5382	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.7	Backfilling after execution of work				
5383	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.7.1	BACKFILLING after execution of the WORK to proper grade and level with selected materials from available excavated soil from spoil heaps within a LEAD OF 100M, including re- excavating the deposited soil excavated earlier, breaking clods, laying at all depths and heights in layers of thickness not exceeding 15 Cms. watering, rolling and ramming by manual methods/ mechanical compactors to achieve 90% laboratory maximum dry density, dressing, trimming etc. in foundations, plinths, trenches, pits etc. all complete.	5640	m^3	270	15 22 800

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5384	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.7.2	BACKFILLING after execution of the WORK to proper grade and level with selected materials from available excavated soil from spoil heaps beyond a LEAD OF 100M AND UPTO & INCLUSIVE OF 500M including re-excavating the deposited soil excavated earlier, breaking clods, laying at all depths and heights in layers of thickness not exceeding 15 Cms. watering, rolling and ramming by manual methods/mechanical compactors to achieve 90% laboratory maximum dry density, dressing, trimming etc. in foundations, plinths, trenches, pits etc. all complete.	1050	m^3	320	3 36 000
5385	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.7.3	BACKFILLING after execution of the WORK to proper grade and level with selected materials from available excavated soil from spoil heaps beyond a LEAD OF 500M AND UPTO & INCLUSIVE OF 1KM including re-excavating the deposited soil excavated earlier, breaking clods, laying at all depths and heights in layers of thickness not exceeding 15 Cms. watering, rolling and ramming by manual methods/mechanical compactors to achieve 90% laboratory maximum dry density, dressing, trimming etc. in foundations, plinths, trenches, pits etc. all complete.	350	m^3	340	1 19 000
5386	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.7.MF1401	BACKFILLING after execution of the WORK to proper grade and level from available crushed rock beyond a LEAD OF 3KM AND UPTO & INCLUSIVE OF 6KM laying at all depths and heights in layers of 150mm loose thickness (maximum) including watering, ramming, rolling, compacting to achieve 85% relative density dressing, trimming etc. in foundations, plinths, trenches, pits etc. all complete.	1020	m^3	500	5 10 000
5387	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.9	Earthwork Filling by excavation				
5388	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.9.4	EARTHWORK IN FILLING by excavating the earth from BORROW AREAS arranged by CONTRACTOR for all leads, transporting the earth from borrow area including cleaning & stripping the earth at borrow areas, breaking clods, loading, unloading and laying at all depths and heights in layers of thickness not exceeding 15 cms., watering, rolling and ramming by manual methods/mechanical compactors to achieve 90% of the maximum laboratory dry density, dressing, trimming, levelling the top surface etc. in foundations, plinths, trenches etc. all complete.	50	m^3	600	30 000
5389	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.10	Transporting & Disposing the SURPLUS EARTH AND DEBRIS				
5390	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.10.1	Transporting and disposing the SURPLUS EARTH AND DEBRIS including shrubs and vegetations from construction area beyond the initial LEAD OF 100M AND UPTO 1KM including re-excavating the deposited soil excavated earlier, transportation, loading, unloading, laying at all depths and heights, stacking, levelling and dressing both the area (viz. from where the earth is transported and where it is deposited) to required levels and slopes complete with all lifts as directed. For carting on the basis of truck measurements (volume of truck reduced by 30% for voids).	200	m^3	220	44 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5391	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.10.2	Transporting and disposing the SURPLUS EARTH AND DEBRIS including shrubs and vegetations from construction area beyond the initial LEAD OF 1.0KM AND UPTO & INCLUSIVE OF 3.0KM including re-excavating the deposited soil excavated earlier, transportation, loading, unloading, laying at all depths and heights, stacking, levelling and dressing both the area (viz. from where the earth is transported and where it is deposited) to required levels and slopes complete with all lifts as directed. For carting on the basis of truck measurements (volume of truck reduced by 30% for voids).	200	m^3	240	48 000
5392	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.10.3	Transporting and disposing the SURPLUS EARTH AND DEBRIS including shrubs and vegetations from construction area beyond the initial LEAD OF 3.0KM AND UPTO & INCLUSIVE OF 5.0KM including re-excavating the deposited soil excavated earlier, transportation, loading, unloading, laying at all depths and heights, stacking, levelling and dressing both the area (viz. from where the earth is transported and where it is deposited) to required levels and slopes complete with all lifts as directed. For carting on the basis of truck measurements (volume of truck reduced by 30% for voids).	50	m^3	270	13 500
5393	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.10.5	"Transporting and disposing the SURPLUS EARTH AND DEBRIS including shrubs and vegetations from construction areas to areas ANYWHERE OUTSIDE THE PLANT BOUNDARY, including re-excavating the deposited soil excavated earlier, loading, transportation, unloading, laying at all depths and heights, stacking, levelling and dressing both the area (viz. from where the earth is transported and where it is deposited) to required levels and slopes complete with all lifts as directed. For carting on the basis of truck measurements (volume of truck reduced by 30% for voids). DISPOSAL AREAS OUTSIDE PLANT BOUNDARY TO BE ARRANGED BY THE CONTRACTOR. Royalty as applicable for disposal outside plant limits to be borne by the Contractor. "	50	m^3	340	17 000
5394	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.11	Transportation of ROCK material				
5395	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.11.1	Transportation of ROCK material coming out of operation of item Nos. 01CS.1.2 to 01CS.1.5 BEYOND INITIAL LEAD OF 100M AND UPTO 1KM to the area of disposal including loading, unloading, laying at all depths and heights, stacking, spreading, levelling at an area of disposal as directed. For carting on the basis of Truck Measurements (volume of truck reduced by 50% for voids).	900	m^3	320	2 88 000
5396	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.11.2	Transportation of ROCK material coming out of operation of item Nos. 01CS.1.2 to 01CS.1.5 beyond initial LEAD OF 1.0KM AND UPTO & INCLUSIVE OF 3.0KM to the area of disposal including loading, unloading, laying at all depths and heights, stacking, spreading, levelling at an area of disposal as directed. For carting on the basis of Truck Measurements (volume of truck reduced by 50% for voids).	1500	m^3	340	5 10 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5397	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.11.3	Transportation of ROCK material coming out of operation of item Nos. 01CS.1.2 to 01CS.1.5 beyond initial LEAD OF 3.0KM AND UPTO & INCLUSIVE OF 5.0KM to the area of disposal including loading, unloading, laying at all depths and heights, stacking, spreading, levelling at an area of disposal as directed. For carting on the basis of Truck Measurements (volume of truck reduced by 50% for voids).	300	m^3	380	1 14 000
5398	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.11.4	Transportation of ROCK material coming out of operation of item Nos. 01CS.1.2 to 01CS.1.5 beyond initial LEAD OF 5.0KM AND UPTO the area of disposal ANYWHERE WITHIN THE PLANT BOUNDARY including loading, unloading, laying at all depths and heights, stacking, spreading, levelling at an area of disposal as directed. For carting on the basis of Truck Measurements (volume of truck reduced by 50% for voids).	300	m^3	410	1 23 000
5399	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.14	Earthwork Manual Excavation in SOIL				
5400	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.14.1	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth upto 1.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m^3	690	6 900
5401	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.14.2	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth beyond 1.5m and upto and inclusive of 3.0m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m^3	790	7 900

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5402	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.14.3	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in ALL TYPES OF SOILS EXCEPT SOFT ROCK AND HARD ROCK as classified in specification for a depth beyond 3.0m and upto & inclusive of 4.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m³	900	9 000
5403	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.15	Earthwork Manual Excavation in SOFT ROCK				
5404	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.15.1	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth upto 1.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m³	1 630	16 300
5405	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.15.2	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth beyond 1.5m and upto & inclusive of 3.0m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m³	1 820	18 200
5406	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.15.3	Earth work in EXCAVATION BY MANUAL MEANS below ground level for all kinds of works in SOFT ROCK as classified in specification for a depth beyond 3.0m and upto & inclusive of 4.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, levelling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, but excluding shoring and strutting.	10	m³	2 020	20 200

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5407	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.16	TRIAL PIT in Soil				
5408	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.16.1	Excavation of TRIAL PITS by Manual Means for determining the underground facilities in all type of soils for a depth upto 1.5m including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes (if required), disposal or stacking of excavated material within a lead of 100m, dewatering of accumulated water from any source, keeping the surface dry for subsequent works, barricading the area, preparing location & depth wise record of underground facilities and restoration of trial pits by excavated earth to original condition by compacting/ ramming the soil, etc. all complete as directed by Engineer-in-Charge including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables, etc., but excluding shoring and strutting.	25	cum	670	16 750
5409	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.16.2	Excavation of TRIAL PITS by Manual Means for determining the underground facilities in all type of soils for a depth beyond 1.5m and upto 3.0m, including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes (if required), disposal or stacking of excavated material within a lead of 100m, dewatering of accumulated water from any source, keeping the surface dry for subsequent works, barricading the area, preparing location & depth wise record of underground facilities and restoration of trial pits by excavated earth to original condition by compacting/ ramming the soil, etc. all complete as directed by Engineer-in-Charge including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables, etc., but excluding shoring and strutting.	25	cum	770	19 250
5410	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.1.16.3	Excavation of TRIAL PITS by Manual Means for determining the underground facilities in all type of soils for a depth beyond 3.0m and upto 4.5m, including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes (if required), disposal or stacking of excavated material within a lead of 100m, dewatering of accumulated water from any source, keeping the surface dry for subsequent works, barricading the area, preparing location & depth wise record of underground facilities and restoration of trial pits by excavated earth to original condition by compacting/ ramming the soil, etc. all complete as directed by Engineer-in-Charge including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables, etc., but excluding shoring and strutting.	10	cum	880	8 800
5411	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2	PLAIN & REINFORCED CEMENT CONCRETE: (REFER SPECIFICATION NO. 6-68-0004)				
5412	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.17	PCC - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5413	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.17.1	Providing and laying PLAIN CEMENT CONCRETE for all depths below and upto plinth level in foundations, drains, fillings, non-suspended floors, pavements & ramps or any other works etc. including shuttering, tamping, ramming, vibrating, curing etc. all as specified in any shape, position, thickness and finishing the top surface rough or smooth as specified and directed all complete for concrete of nominal mix 1:5:10 by mass (1 Cement: 5 Coarse Sand: 10 Crushed Stone Aggregates/Gravels) with 40mm and down size graded crushed stone aggregates/Gravels. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	210	m^3	6 750	14 17 500
5414	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.17.5	Providing and laying PLAIN CEMENT CONCRETE of nominal mix 1:3:6 by mass (1 Cement : 3 Sand : 6 Crushed Stone Aggregates) with 10mm and down size graded crushed stone aggregates below and upto plinth level as SCREED in trenches, floor slabs, sumps, channels, drains etc. for all depths including shuttering, tamping, curing etc. as specified in any shape, level, thickness, position and finishing the top surface smooth etc. all complete as directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	7 380	7 380
5415	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.17.6	Providing and laying PLAIN CEMENT CONCRETE of nominal mix 1:3:6 by mass (1 Cement : 3 Sand : 6 Crushed Stone Aggregates) with 10mm and down size graded crushed stone aggregates above plinth level as SCREED in floor slabs, roofs, chajjas, canopies, gutters etc. for all heights including shuttering, tamping, curing etc. as specified in any shape, level, thickness, position and finishing the top surface smooth etc. all complete as directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	8 400	8 400
5416	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.17.7	Providing and laying PLAIN CEMENT CONCRETE for all depths below and upto plinth level in foundations, drains, fillings, non-suspended floors, pavements & ramps or any other works etc. including shuttering, tamping, ramming, vibrating, curing, etc. all as specified in any shape, position, thickness and finishing the top surface rough or smooth as specified and directed all complete for concrete grade M15 with 20mm and down size graded crushed stone aggregates/Gravels. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	50	m^3	8 030	4 01 500
5417	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.17.8	Providing and laying PLAIN CEMENT CONCRETE for all depths below and upto plinth level in foundations, drains, fillings, non-suspended floors, pavements & ramps or any other works etc. including shuttering, tamping, ramming, vibrating, curing, etc. all as specified in any shape, position, thickness and finishing the top surface rough or smooth as specified and directed all complete for concrete grade M20 with 20mm and down size graded crushed stone aggregates/Gravels. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	8 860	8 860

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5418	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.18	RCC Substrutures - Non FIM Items				
5419	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.18.16	Providing and laying REINFORCED CEMENT CONCRETE OF M-25 GRADE with 20 mm and down size graded crushed stone aggregates/ gravel in SUB-STRUCTURE e.g. foundations, raft, beams, slabs, pile caps, retaining walls, dyke walls, jambs, counterforts, buttresses, pedestals, pipe sleepers, columns, suspended floors, staircases, landings, steps, brackets etc., including equipment/ machine foundations & pedestals viz. compressors, ID & FD fans, pumps, generators, crushers, mills, etc., (including single pour concreting as specified on the drawing), applying cement wash on concrete surface (wherever no other surface application is specified), providing pockets, openings, recesses, chamfering, etc., wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT, SHUTTERING & SPECIFIED ADMIXTURES) for all depths below and upto plinth level in any shape, position and thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1700	m^3	9 740	1 65 58 000
5420	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.18.17	Providing and laying REINFORCED CEMENT CONCRETE OF M-30 GRADE with 20 mm and down size graded crushed stone aggregates/ gravel in SUB-STRUCTURE e.g. foundations, raft, beams, slabs, pile caps, retaining walls, dyke walls, jambs, counterforts, buttresses, pedestals, pipe sleepers, columns, suspended floors, staircases, landings, steps, brackets etc., including equipment/ machine foundations & pedestals viz. compressors, ID & FD fans, pumps, generators, crushers, mills, etc., (including single pour concreting as specified on the drawing), applying cement wash on concrete surface (wherever no other surface application is specified), providing pockets, openings, recesses, chamfering, etc., wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT, SHUTTERING & SPECIFIED ADMIXTURES) for all depths below and upto plinth level in any shape, position and thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	160	m^3	9 970	15 95 200

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5421	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.18.21	Providing and laying REINFORCED CEMENT CONCRETE OF M-25 GRADE with 20 mm and down size graded crushed stone aggregates/ gravel in SUB-STRUCTURE e.g. trenches, culverts, manholes, pipe encasement, catchpits, drains, pits, etc., applying cement wash on concrete surface (wherever no other surface application is specified), providing pockets, openings, recesses, chamfering, etc., wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT, SHUTTERING & SPECIFIED ADMIXTURES) for all depths below and upto plinth level in any shape, position and thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m³	10 230	10 230
5422	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.19	RCC Superstructures - Non FIM Items				
5423	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.19.16	Providing and laying REINFORCED CEMENT CONCRETE OF M-25 GRADE with 20 mm and down size graded crushed stone aggregates/ gravel in SUPER STRUCTURE in suspended floors, slabs, beams, columns, walls including counterforts, staircases, landings, steps, facias, fins, mouldings, gutters, shelves, window sills, canopies, lintels, girders, ducts, brackets, chajjas with drip moulds, pedestals, posts, struts, equipment/ machine foundations, ramps etc. (including single pour concreting as specified on the drawing), providing cement wash (wherever no other surface application is specified), providing pockets, openings, recesses, chamfering wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT, SHUTTERING AND SPECIFIED ADMIXTURES) FOR ALL HEIGHTS UPTO & INCLUSIVE OF 20 m ABOVE PLINTH LEVEL in any shape, position, thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	100	m³	10 640	10 64 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5424	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.19.21	Providing and laying REINFORCED CEMENT CONCRETE OF M-25 GRADE with 20 mm and down size graded crushed stone aggregates/ gravel in SUPER STRUCTURE in suspended floors, slabs, beams, columns, walls including counterforts, staircases, landings, steps, facias, fins, mouldings, gutters, shelves, window sills, canopies, lintels, girders, ducts, brackets, chajjas with drip moulds, pedestals, posts, struts, equipment/ machine foundations, ramps etc. (including single pour concreting as specified on the drawing), providing cement wash (wherever no other surface application is specified), providing pockets, openings, recesses, chamfering wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT, SHUTTERING AND SPECIFIED ADMIXTURES) FOR ALL HEIGHTS MORE THAN 20 m ABOVE PLINTH LEVEL in any shape, position, thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	11 700	11 700
5425	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.20	RCC Flooring - Non FIM Items				
5426	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.20.2	Providing and laying REINFORCED CEMENT CONCRETE OF M-20 GRADE with 20mm and down size graded crushed stone aggregates / gravel in NON-SUSPENDED slabs / pavement slabs including pedestals, ramps etc. leaving pockets, laying in alternate panels to required slopes, all necessary form work and finishing the top surface rough or smooth, including cost of admixtures if used, providing pockets, openings, recesses, chamfering etc., wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (EXCLUDING THE COST OF REINFORCEMENT AND SHUTTERING) for all depths below and upto plinth level in any shape, position and thickness etc. all complete as specified, shown and directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	8 290	8 290
5427	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.22	Precast Elements - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5428	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.22.4	Manufacturing, transporting, supplying and erecting in position Reinforced Cement Concrete PRECAST ELEMENTS such as columns, beams, cover slabs, lintels, louvers, fins, shelves etc. of M-25 grade with 20mm and down size graded crushed stone aggregates/gravel, each unit upto and inclusive of 500 kg. for all leads, levels, shapes and thickness including all moulds, shuttering and centering, vibrating, tamping, curing, chamfering wherever required, finishing the top surface with cement mortar 1:3 (1 Cement : 3 Sand) to give a smooth and even surface, or non skid finish as specified, providing lifting hooks, metal inserts, making holes pockets, (ONLY M.S. INSERTS TO BE MEASURED & PAID SEPARATELY) transporting to site, erecting, levelling, aligning and fixing in position with cement mortar 1:3 (1Cement : 3 Coarse Sand), breaking bricks and/or concrete surfaces and making good the same etc. all complete (EXCLUDING THE COST OF REINFORCEMENT) and as directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	19 430	19 430
5429	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.22.5	Manufacturing, transporting, supplying and erecting in position Reinforced Cement Concrete PRECAST ELEMENTS such as columns, beams, cover slabs, lintels, louvers, fins, shelves etc. of M-25 grade with 20mm and down size graded crushed stone aggregates/gravel, each unit beyond 500 kg and upto and inclusive of 1000 kg. for all leads, levels, shapes and thickness including all moulds, shuttering and centering, vibrating, tamping, curing, chamfering wherever required, finishing the top surface with cement mortar 1:3 (1 Cement : 3 Sand) to give a smooth and even surface, or non skid finish as specified, providing lifting hooks, metal inserts, making holes pockets, (ONLY M.S. INSERTS TO BE MEASURED & PAID SEPARATELY) transporting to site, erecting, levelling, aligning and fixing in position with cement mortar 1:3 (1Cement : 3 Coarse Sand), breaking bricks and/or concrete surfaces and making good the same etc. all complete (EXCLUDING THE COST OF REINFORCEMENT) and as directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	19 480	19 480

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5430	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.22.6	Manufacturing, transporting, supplying and erecting in position Reinforced Cement Concrete PRECAST ELEMENTS such as columns, beams, cover slabs, lintels, louvers, fins, shelves etc. of M-25 grade with 20mm and down size graded crushed stone aggregates/gravel, each unit beyond 1000 kg and upto and inclusive of 2000 kg. for all leads, levels, shapes and thickness including all moulds, shuttering and centering, vibrating, tamping, curing, chamfering wherever required, finishing the top surface with cement mortar 1:3 (1 Cement : 3 Sand) to give a smooth and even surface, or non skid finish as specified, providing lifting hooks, metal inserts, making holes pockets, (ONLY M.S. INSERTS TO BE MEASURED & PAID SEPARATELY) transporting to site, erecting, levelling, aligning and fixing in position with cement mortar 1:3 (1Cement : 3 Coarse Sand), breaking bricks and/or concrete surfaces and making good the same etc. all complete (EXCLUDING THE COST OF REINFORCEMENT) and as directed. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	19 630	19 630
5431	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.23	HYD Bars / MS Bars - Non FIM Items				
5432	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.23.8	Supplying and placing in position HIGH YEILD-STRENGTH DEFORMED STEEL BARS REINFORCEMENT of Grade Fe500D (TMT) conforming to IS:1786, for RCC work including transporting the Steel, straightening, cleaning, decoiling, cutting, bending to required shapes and lengths as per details, binding with 18 SWG black soft annealed binding wire at every intersection, supplying and placing with proper cover blocks, supports, chairs, overlaps, welding, spacers, fanhooks etc. for all heights and depths etc. all complete as directed. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	260	MT	94 290	2 45 15 400
5433	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.24	Conc. Encasing - Non FIM Items				
5434	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.24.3	Providing and laying Reinforced Cement Concrete of grade M-25 with 20mm and down size graded stone aggregates for ENCASING OF STRUCTURAL STEEL WORK including chamfering wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (excluding the cost of Reinforcement and Shuttering) for all heights and depths in any shape, position, and thickness etc. all complete as specified and shown. Cement. All materials supplied by the contractor.	10	m^3	9 470	94 700
5435	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.25	Centering and Shuttering - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5436	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.25.1	Providing and fixing CENTERING AND SHUTTERING in foundations, footings,raft beams, slabs, pile caps, retaining walls, jambs, counter-forts, buttresses, trenches, equipment/machine foundations, pedestals, abutments, pipe sleepers, columns, plinth beams, lintels, suspended slabs, beams, staircases, landings, steps, non-circular tunnels/bunkers/ silos/ shafts/ hoppers/liquid storage structures etc. for all depths below and upto & inclusive of plinth level including shuttering for single pour concreting, strutting, bracing, propping etc., keeping the same in position during concreting and removal of the same after specified period etc. for Straight/ Inclined Shuttering, keeping necessary provision for inserts, projecting dowels, anchor bolts or any other fixture etc. all complete and as specified and directed.	5500	m²	420	23 10 000
5437	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.25.2	Providing and fixing CENTERING AND SHUTTERING in superstrctures in retaining walls, jambs, counter-forts, buttresses, equipment/ machine foundations, abutments,columns, lintels, suspended slabs, beams, staircases, landings, steps, non-circular tunnels/ bunkers/ silos/ shafts/ hoppers/ liquid storage structures etc. for all heights above plinth level including shuttering for single pour concreting, strutting, bracing, propping etc., keeping the same in position during concreting and removal of the same after specified period etc. for Straight/ Inclined Shuttering, keeping necessary provision for inserts, projecting dowels, anchor bolts or any other fixture etc. all complete and as specified and directed.	600	m²	760	4 56 000
5438	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.26	Expansion joints - Non FIM Items				
5439	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.26.1	Providing 20mm wide EXPANSION JOINTS in flooring and pavement slabs and ISOLATION JOINTS around equipment foundations/columns/pedestal/trenches etc. including cleaning the joints of all loose material, filling clean sand for the full depth of slab (upto and inclusive of 300 mm) except for 12mm depth from top and sealing the top 12mm with approved two part liquid polysulphide Sealing Compound as per IS:12118 etc. all complete as shown, specified and directed.	1	m	570	570
5440	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.26.2	Supplying and fixing in position 25mm thick BITUMEN IMPREGNATED FIBRE BOARD conforming to IS:1838 of approved quality in expansion joints at all locations and levels in concrete structures etc. all complete as shown, specified and directed.	1	m²	1 870	1 870
5441	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.26.3	Supplying and fixing in position 50 mm (2X25 mm) thick BITUMEN IMPREGNATED FIBRE BOARD conforming to IS:1838 of approved quality in expansion joints at all locations and levels in concrete structures etc. all complete as shown, specified and directed.	1	m²	2 220	2 220
5442	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.26.4	Supplying and sealing EXPANSION JOINTS 25 mm wide and 12mm deep at all locations and levels in Concrete Structures with approved two part liquid POLYSULPHIDE SEALING COMPOUND as per IS:12118 including raking of joints etc. all complete as shown, specified and directed.	1	m	500	500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5443	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.26.5	Supplying and sealing EXPANSION JOINTS 50 mm wide and 12mm deep at all locations and levels in Concrete Structures with approved two part liquid POLYSULPHIDE SEALING COMPOUND as per IS:12118 including raking of joints etc. all complete as shown, specified and directed.	1	m	630	630
5444	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.28	Mechanical Rebar Couplers - Non-FIM items				
5445	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.28.3	"Supplying and fixing MECHANICAL REBAR COUPLER of approved make for jointing high strength deformed steel reinforcement bars of Grade Fe500D (conforming to IS:1786) of dia. upto and inclusive of 25 mm at all levels & locations including testing as per manufacturer's recommendations, adjusting etc. all complete as specified and directed. "	10	each	290	2 900
5446	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.28.4	"Supplying and fixing MECHANICAL REBAR COUPLER of approved make for jointing high strength deformed steel reinforcement bars of Grade Fe500D (conforming to IS:1786) of dia. above 25 mm at all levels & locations including testing as per manufacturer's recommendations, adjusting etc. all complete as specified and directed. "	10	each	370	3 700
5447	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.29	Fixing Re-bars in already cast concrete - Non FIM Items				
5448	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.29.1	Designing, supplying and fixing rebars in already cast concrete, including drilling, cleaning hole with air blow-out & wire-brush and injecting odourless Chemical of approved make, packed in dual foil, with the help of dispenser into a hole of diameter and depth as per manufacture specification, at all levels & locations for high strength deformed steel reinforcement bars of dia. upto 12 mm of Grade Fe500D (conforming to IS:1786), DESIGNED FOR FULL TENSILE ANCHORAGE, including testing (as per manufacturer's recommendations), adjusting and making good any damage done to the structure etc. all complete as specified and directed. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE EXCLUDING REINFORCEMENT BARS.	50	each	1 060	53 000
5449	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.29.2	Designing, supplying and fixing rebars in already cast concrete, including drilling, cleaning hole with air blow-out & wire-brush and injecting odourless Chemical of approved make, packed in dual foil, with the help of dispenser into a hole of diameter and depth as per manufacture specification, at all levels & locations for high strength deformed steel reinforcement bars of dia. 16 mm & 20 mm of Grade Fe500D (conforming to IS:1786), DESIGNED FOR FULL TENSILE ANCHORAGE, including testing (as per manufacturer's recommendations), adjusting and making good any damage done to the structure etc. all complete as specified and directed. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE EXCLUDING REINFORCEMENT BARS.	100	each	1 140	1 14 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5450	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.2.29.3	Designing, supplying and fixing rebars in already cast concrete, including drilling, cleaning hole with air blow-out & wire-brush and injecting odourless Chemical of approved make, packed in dual foil, with the help of dispenser into a hole of diameter and depth as per manufacture specification, at all levels & locations for high strength deformed steel reinforcement bars of dia. 25 mm & 28 mm of Grade Fe500D (conforming to IS:1786), DESIGNED FOR FULL TENSILE ANCHORAGE, including testing (as per manufacturer's recommendations), adjusting and making good any damage done to the structure etc. all complete as specified and directed. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE EXCLUDING REINFORCEMENT BARS.	100	each	1 420	1 42 000
5451	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4	STRUCTURAL STEEL WORKS SPEC NO. 6-68-0006				
5452	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.1	General Steel Works - FIM Items				
5453	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.1.5	Transporting from storage yard (or any other location as specified by engineer-in-charge), Storing, Assembling and Erecting in position and testing/ examining, bolted and/ or welded, already Fabricated STRUCTURAL STEEL (of any Grade) at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled/ hollow sections and/or plates/ bent plates in all types of structural frameworks, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified etc., all complete. ALREADY FABRICATED STRUCTURAL STEEL SHALL (WITH CONNECTION BOLTS) BE PROVIDED TO CONTRACTOR FREE OF COST. SUPPLY OF ALL OTHER MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	17 320	17 320
5454	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.1.6	Transporting from storage yard (or any other location as specified by engineer-in-charge), Storing, Assembling and Erecting in position and testing/ examining, bolted and/ or welded, already Fabricated STRUCTURAL STEEL (of any Grade) at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled/ hollow sections and/or plates/ bent plates in all types of structural frameworks, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified etc., all complete. ALREADY FABRICATED STRUCTURAL STEEL SHALL (WITH CONNECTION BOLTS) BE PROVIDED TO CONTRACTOR FREE OF COST. SUPPLY OF ALL OTHER MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	27 600	27 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5455	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.1.9	Modification and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS ALREADY FABRICATED BY OTHERS, including all builtup/ compound sections made out of rolled/ hollow sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos,bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding etc., all complete as specified and directed. SUPPLY OF ALL OTHER MATERIAL (OTHER THAN ALREADY FABRICATED STRUCTURAL STEEL) IN CONTRACTOR'S SCOPE.	1	MT	45 110	45 110
5456	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.1.51	Unloading and proper stacking of already fabricated structural steel (including all builup sections/ compound sections made out of rolled/ hollow sections and/ or plates/ bent plates in all types of structural frameworks, horizontal and inclined hand rails and electroforged galvanised gratings etc.) supplied & transported to site/ unloading location by the supplier, at designated location(s) as specified and directed by engineer-in-charge. SUPPLY OF ALL MACHINERY, MATERIALS, TOOLS & TACKLES, MANPOWER IS IN CONTRACTOR'S SCOPE.	150	MT	3 390	5 08 500
5457	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.1.MF1407	Dismantling, modification & re-erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS ALREADY ERECTED BY OTHERS at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, repair of damaged portion of primer as per Sl No 3.1 of Table 3 of Standard Specification for Surface Preparation and Protective Coating Document No. 6-79-0020 (or as per Job Specification, wherever applicable), grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified etc., all complete. SUPPLY OF ALL OTHER MATERIAL (OTHER THAN ALREADY ERECTED STRUCTURAL STEEL) IN CONTRACTOR'S SCOPE.	1	MT	55 470	55 470

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5458	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.1.MF1408	Dismantling, modification & re-erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS ALREADY ERECTED BY OTHERS at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, repair of damaged portion of primer as per Sl No 3.1 of Table 3 of Standard Specification for Surface Preparation and Protective Coating Document No. 6-79-0020 (or as per Job Specification, wherever applicable), grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified etc., all complete. SUPPLY OF ALL OTHER MATERIAL (OTHER THAN ALREADY ERECTED STRUCTURAL STEEL) IN CONTRACTOR'S SCOPE.	1	MT	64 350	64 350
5459	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.1.MF1415	Transporting, Assembling and Erecting in position bolted and/ or welded already fabricated Structural Steel works (of any Grade) at all levels & locations, comprising of rolled/ built-up sections made of joists, channels, angles, flats rounds, plates cut and/ or bent to any shape and size, in beams, girders, trusses columns, brackets, bracings, ladders (with or without cage), safety chain brackets, staircases, handrailings and platforms of any shape and size (including chequered plates/ gratings), on vertical and/ or horizontal equipments, in miscellaneous valve operating platforms, pipe supports etc, fixing in line and level with temporary staging and removal of the same after erection, grouting below base plates with free flow non shrink/ ordinary grout as specified to bring them to required levels, all complete as shown, specified and directed. ALREADY FABRICATED STRUCTURAL STEEL SHALL (WITH CONNECTION BOLTS) BE PROVIDED TO CONTRACTOR FREE OF COST. SUPPLY OF ALL OTHER MATERIAL IN CONTRACTOR'S SCOPE.	150	MT	41 560	62 34 000
5460	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.3	General Steel Works - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5461	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.3.MF1403	Supplying, transporting, storing, fabricating & erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E250BR / E250B0 (confirming to IS:2062) at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer(1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 31 770	1 31 770
5462	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.3.MF1404	Supplying, transporting, storing, fabricating & erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E250BR / E250B0 (confirming to IS:2062) at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 42 100	1 42 100

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5463	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.3.MF1405	Supplying, Fabricating at CONTRACTOR's shop outside the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining , bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E250BR / E250B0 (conforming to IS:2062 at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer(1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT) , as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 29 340	1 29 340

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5464	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.3.MF1406	Supplying, Fabricating at CONTRACTOR's shop outside the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining , bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E250BR / E250B0 (conforming to IS:2062 at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT) , as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 39 820	1 39 820

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5465	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.3.MF1413	Supplying, transporting, storing, fabricating & erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E350BR / E350B0 (conforming to IS:2062) at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/ or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 30 490	1 30 490
5466	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.3.MF1414	Supplying, transporting, storing, fabricating & erecting in position and testing/ examining bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E350BR / E350B0 (conforming to IS:2062) at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL, including all builtup sections/ compound sections made out of rolled sections and/or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc., all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	1	MT	1 40 960	1 40 960

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5467	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.3.MF1415	Supplying, Fabricating at CONTRACTOR's shop outside the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining , bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E350BR / E350B0 (conforming to IS:2062 at all locations and levels UPTO & INCLUSIVE OF 20 m ABOVE HPP/ FGL including all builtup sections/ compound sections made out of rolled sections and/ or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc.. all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	700	MT	1 36 930	9 58 51 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5468	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.3.MF1416	Supplying, Fabricating at CONTRACTOR's shop outside the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining , bolted and/ or welded STRUCTURAL STEEL WORKS of Grade E350BR / E350B0 (conforming to IS:2062 at all locations and levels MORE THAN 20 m ABOVE HPP/ FGL including all builtup sections/ compound sections made out of rolled sections and/ or plates/ bent plates in all types of structural frameworks, floor beams, stairs, or any other structural items or accessories to support equipments, piping, conveyor galleries, towers, masts, etc., but excluding silos, bunkers, hoppers, etc., cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, grouting with Ordinary Grout or premix free flow Nonshrink Grout as specified, including preparation and submission of detailed fabrication drawings, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication etc.. all complete. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE.	300	MT	1 47 230	4 41 69 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5469	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.3.MF1433	Supplying, Fabricating, Transporting and Erecting in position bolted and/ or welded Structural Steel works of Grade E250BR/ E250B0 (confirming to IS:2062) at all levels & locations, comprising of rolled/ built-up sections made of joists, channels, angles, flats rounds, plates cut and/ or bent to any shape and size, in beams, girders, trusses columns, brackets, bracings, ladders (with or without cage), safety chain brackets, staircases, handrailings and platforms of any shape and size (excluding chequered plates/ gratings), on vertical and/ or horizontal equipments, in miscellaneous valve operating platforms, pipe supports etc, including preparation and submission of all fabrication and as built drawings to the Engineer-in-Charge, straightening, cutting and/ or bending the steel to required size/ shape, edge preparation, preheating, bolting, welding of joints (including sealing of joints of box sections with continuous welding wherever shown), grinding the prepared edges/ surfaces to a smooth finish, fixing in line and level with temporary staging and removal of the same after erection, grouting below base plates with free flow non shrink/ ordinary grout as specified to bring them to required levels, preparing the surface for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT) as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) after fabrication, removing from site of work all scrap/ unserviceable steel etc, all complete as shown, specified and directed.	1	MT	1 32 050	1 32 050
5470	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.4	Painting - Non FIM Items				
5471	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.4.MF1410	Supplying and applying COATING (Post-erection/ Field) of approved quality and shade as per Sl. No. 6.2 of Table 6 of EIL Specification No. 6-79-0020 (or as per Job Specifications, wherever applicable) over the coat of shop primer already applied, including storage, surface preparation, degreasing, cleaning, drying, providing necessary arrangement for access, testing etc. including touching up of shop primer coat as per Sl. No. 3.1 of Table 3 of EIL Specification No. 6-79-0020 (or as per Job Specifications, wherever applicable), for steel structures (excluding hand rails) at all location & levels, all complete as specified, in OFFISTE (COASTAL) areas as well as UNIT (INLAND & COASTAL) areas. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE. (Unit rate based on Structural steel weight).	10000	MT	17 660	17 66 00 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5472	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.4.MF1411	Supplying and applying COATING (Post-erection/ Field) of approved quality and shade as per Sl. No. 4.1 of Table 4.0 of EIL Specification No. 6-79-0020 (or as per Job Specifications, wherever applicable) for painting(including primer) over the galvanisation already applied, including storage, surface preparation, degreasing, cleaning, drying, providing necessary arrangement for access, testing etc. including touching up of galvanisation (as per notes of table 4 of EIL specification no. 6-79-0020 or as per Job Specification, wherever applicable), for HAND RAILS at all location & levels, all complete as specified. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE. (Unit rate based on weight of steel).	200	MT	14 650	29 30 000
5473	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.4.MF1413	Supplying and applying COATING (Post erection/Field) of approved quality and shade as per Sl. no. 6.2 of Table 6 of EIL Specification No. 6-79-0020 (or as per Job Specifications, wherever applicable) over the damaged area requiring repair/rectification, including storage, surface preparation as per ST.2, degreasing, cleaning, drying, providing necessary arrangement for access, testing etc., for all steel structures (excluding handrails) at all location & levels all complete as specified, in OFFISTE (COASTAL) areas as well as UNIT (INLAND & COASTAL) areas. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE. (Unit rate based on surface area in Sqm)	50	m²	630	31 500
5474	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.4.4.MF1414	Supplying and applying COATING (Post-erection/ Field) of approved quality and shade as per Sl. no. 4.1 of Table 4 of EIL Specification No. 6-79-0020 (or as per Job Specifications, wherever applicable) over the damaged area requiring repair/rectification, including storage, surface preparation as per ST.2, degreasing, cleaning, drying, providing necessary arrangement for access, testing etc. for HANDRAIL at all location & levels, all complete as specified. SUPPLY OF ALL MATERIAL IN CONTRACTOR'S SCOPE. (Unit rate based on surface area in Sqm)	25	m²	500	12 500
5475	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.5	STRUCTURAL STEEL WORKS (TUBULAR/HOLLOW SECTION) (REFER SPECIFICATION NO.6-68-0007)				
5476	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.5.9	Yst 355 IS 4923				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5477	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.5.9.MF1403	Supplying, transporting, storing, fabricating, erecting in position & testing/examining at all locations and levels, bolted and/or welded STRUCTURAL STEEL WORKS of all types using "COLD FORMED (RECTANGULAR/SQUARE) HOLLOW SECTIONS conforming to IS: 4923, Grade Yst-355 of approved make" in all type of trusses, purlins, girders, side rails, columns, runners, beams, ties, portals, framework, bracing, brackets, sag rods etc. including all handling straightening/bending if required, cutting to required size & shape, edge preparation, welding & bolting of joints, providing and fixing end caps and plugging holes, fixing in line and level with necessary temporary staging and removal of the same after erection, grouting with Ordinary/ premix free flow Non-Shrink Grout as specified, preparation and submission of detailed fabrication drawings, preparing the exposed surfaces for painting (SSPC-SP-10) and applying pre-erection/ shop primer (1 coat of F-9 @ 65-75 micron DFT and 1 coat of P-6 @ 40 micron DFT), as per EIL Specification No. 6-79-0020 (or as per Job Specification, wherever applicable) etc. all complete as specified and directed (SUPPLY OF ALL MATERIALS INCLUDING PLATES IN CONTRACTOR'S SCOPE).	1000	MT	1 56 940	15 69 40 000
5478	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6	MISCELLANEOUS STEEL WORKS SPECIFICATIONS NO. 6-68-0008				
5479	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.1	Anchor Bolts - FIM Items				
5480	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.1.2	Fixing and keeping in position at all levels and locations already fabricated THREADED ANCHOR BOLTS of all diameters and nomenclature supplied by the owner as Free Issue including nuts, washers, anchor plates, pipe sleeves etc. in foundations, columns, pedestals, slabs, beams, walls etc. or any other place as directed including transporting the same from owner's store/issue points to site of work handling , straightening if required, turning from relevant size M.S. rounds to required diameter, threading, welding, providing necessary templates and auxiliary dummy structures, if any, necessary tying and welding with reinforcement, adjustment of shuttering & reinforcement/any other fixture, greasing exposed metal surfaces, covering bolts and packing the sleeves with jute cloth etc. all complete as specified and directed. (BOLTS SHALL BE SUPPLIED BY THE OWNER AS FREE ISSUE) .	0.5	MT	30 400	15 200
5481	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.15	Anchor Bolts - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5482	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.15.1	Supplying, fabricating, fixing and keeping in position at all levels and locations THREADED ANCHOR BOLTS of all diameters and nomenclature including nuts, washers, anchor plates, pipe sleeves etc. in foundations, columns, pedestals, slabs, beams, walls etc. or any other place as directed including handling & transporting, straightening if required, turning from relevant size M.S. rounds to required diameter, threading, welding, providing necessary templates and auxiliary dummy structures, if any, necessary tying and welding with reinforcement, adjustment of shuttering & reinforcement/any other fixture, greasing exposed metal surfaces, covering bolts and packing the sleeves with jute cloth etc. all complete as specified and directed.(SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	18	MT	1 37 670	24 78 060
5483	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.16	MS Metal Inserts - Non FIM Items				
5484	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.16.1	Supplying, transporting, storing, fabricating and fixing in position M.S. METAL INSERT (with lugs) of any shape made out of flats, plates, rolled sections, pipes etc. providing necessary templates, staging, cutting, straightening, if required, bolting, welding as required and embedding in position on both Plain and Reinforced Cement concrete members inclusive of adjusting shuttering & reinforcement/ any other fixture, welding where necessary, tying and holding to correct level, line and position, any auxiliary dummy structures to support the heavy inserts, painting exposed surfaces with a coat of primer as per EIL Specification No. 6-79-0020 (or as per Job Specification wherever applicable), etc. all complete for all depths and heights as specified and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	9	MT	1 44 410	12 99 690
5485	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.17	GI Pipe Sleeves - Non FIM Items				
5486	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.17.1	Supplying, fabricating and fixing in position G.I. PIPE SLEEVES of all diameters including providing necessary staging, cutting, straightening if required, bolting, welding as required and embedding in position on both Plain and Reinforced Cement concrete members inclusive of adjusting shuttering & reinforcement/any other fixture, welding where necessary, tying and holding to correct level, line and position, any auxiliary dummy structures to support heavy sleeves etc. all complete for all depths and heights as specified and directed.	0.1	MT	1 31 700	13 170
5487	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.18	MS Chequered Plates - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5488	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.18.1	Supplying, fabricating and erecting in position at all levels and locations bolted, screwed and/or welded M.S. CHEQUERED PLATES of any thickness in walkways, platforms, stair treads, any other place as directed etc. including cutting to required size, shape, making holes, notches, openings of required size, nosing, straightening if required, making the edges smooth, removing the burrs, fixing, welding, preparation and submission of fabrication drawings and preparing the surfaces for painting and applying shop primer as per EIL Specification No. 6-79-0020 (or Job Specification, wherever applicable) after fabrication etc. all complete as specified and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	0.5	MT	1 41 500	70 750
5489	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.19	MS Grating Cat. A,B - Non FIM Items				
5490	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.19.6	Supplying, fabricating and erecting in position at all levels and locations ELECTROFORGED HOT-DIP GALVANISED GRATING (purchased from approved manufacturer by the Contractor) conforming to EIL Standard No. 7-68-0697 (in walkways, platforms, stair treads etc.) including cutting to required size, shape, making holes, notches, openings of required size, nosing, straightening if required, making the edges smooth, removing the burrs, fixing with manufacturer's supplied Hot-dip galvanised clamps, preparation and submission of fabrication drawings, all complete as specified and directed. SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE.	135	MT	1 38 560	1 87 05 600
5491	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.19.7	Making openings in galvanized grating for pipes / ducts etc., at all levels and at at all locations by cutting the existing grating and providing 50x6 galvanised flat as toe protection for the openings by welding and application of galvanized paint as per EIL Standard No. 7-68-0697, all complete. Payment shall be made as per number of openings.	1000	each	1 460	14 60 000
5492	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.22	MS Rungs - Non FIM Items				
5493	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.22.1	Supplying, fabricating, fixing and keeping in position M.S. RUNGS in R.C.C. works at all depths and heights including handling, transporting the steel to site workshop and site of work, straightening, if required, cutting, bending to shape, necessary tying and welding with reinforcement, adjustment of shuttering, cleaning, surface preparation, shop primer as per EIL Spec. 6-79-0020 (or Job Specification, wherever applicable) and two coats of anticorrosive paint of approved quality on the exposed portion of rungs etc. all complete as specified and directed (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	200	kg	100	20 000
5494	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.23	Hand Railing 1000mm - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5495	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.23.2	Supplying, fabricating and fixing in position (to already erected vertical posts for Hand Railing) at all locations ONLY TOP RAIL 32mm nominal diameter medium grade M.S. Tubes conforming to IS:1239 including straightening if required, cutting, welding, bending, surface preparation, shop primer as per EIL SPEC. 6-79-0020 (or as per Job Specification, wherever applicable), preparation and submission of fabrication drawings etc. all complete as specified, shown and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	10	m	580	5 800
5496	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.23.MF1401	Supplying, fabricating and fixing in position at all locations 1000mm high INCLINED HAND RAILING (for staircases) consisting of top rail, mid rail and vertical posts (Maximum spacing 1500mm c/c) with 32mm nominal diameter medium grade M.S. Tubes conforming to IS:1239 including straightening if required, cutting, bending, welding, bolting, grouting with ordinary grout, cleaning, surface preparation, hot-dip galvanising as per Sl. No. 4.1 of Table 4 of EIL SPEC. 6-79-0020 (or as per Job Specification, wherever applicable) , preparation and submission of fabrication drawings etc. all complete as specified, shown and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE). (Complete handrail work shall be measured as length of top rail only and not length of each element fixed).	200	metre	1 920	3 84 000
5497	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.23.MF1403	Supplying, fabricating and fixing in position at all locations 1000mm high HORIZONTAL HAND RAILING (for platforms, walkways, etc. or any other location as directed) consisting of top rail, mid rail and vertical posts (Maximum spacing 1500mm c/c) with 32mm nominal diameter medium grade MS Tubes conforming to IS:1239 and 100x5 MS Toe Plate confirming to IS:2062 (Grade A/B), including straightening if required, cutting, bending, welding, bolting, grouting with ordinary grout, cleaning, surface preparation, hot-dip galvanising as per Sl. No. 4.1 of Table 4 of EIL SPEC. 6-79-0020 (or as per Job Specification, wherever applicable), preparation and submission of fabrication drawings etc. all complete as specified, shown and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE). (Complete handrail work shall be measured as length of top rail only and not length of each element fixed).	2200	metre	1 840	40 48 000
5498	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.24	Hand Railing 500mm - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5499	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.24.MF1401	Supplying, fabricating and fixing in position at all locations 500mm HIGH INCLINED HAND RAILING (for stair cases) consisting of top rail & vertical posts (maximum spacing 1500mm c/c) with 32mm nominal diameter medium grade M.S. Tubes conforming to IS:1239 including straightening if required, cutting, bending, welding, surface preparation, hot-dip galvanising as per Sl. No. 4.1 of Table 4 of EIL SPEC. 6-79-0020 (or as per Job Specification, wherever applicable), preparation and submission of fabrication drawings etc. all complete as specified, shown and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE). (Complete handrail work shall be measured as length of top rail only and not length of each element fixed).	5	metre	1 050	5 250
5500	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.24.MF1402	Supplying, fabricating and fixing in position at all locations 500mm high HORIZONTAL HAND RAILING (for platforms, walkways, etc. or any other location as directed) consisting of top rail, mid rail and vertical posts (Maximum spacing 1500mm c/c) with 32mm nominal diameter medium grade MS Tubes conforming to IS:1239 and 100x5 MS Toe Plate confirming to IS:2062 (Grade A/B), including straightening if required, cutting, bending, welding, bolting, grouting with ordinary grout, cleaning, surface preparation, hot-dip galvanising as per Sl. No. 4.1 of Table 4 of EIL SPEC. 6-79-0020 (or as per Job Specification, wherever applicable) , preparation and submission of fabrication drawings etc. all complete as specified, shown and directed. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE). (Complete handrail work shall be measured as length of top rail only and not length of each element fixed).	5	m	1 010	5 050
5501	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.25	Mechanical Anchor fastners - Non FIM Items				
5502	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.25.1	"Supplying, handling, transporting to site of work and fixing approved MECHANICAL ANCHOR FASTENERS M.S. bolts of Grade 5.8 or more, GALVANIZED with minimum thickness of 5 microns (approved for use in cracked concrete), of 12mm dia at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size, testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush, and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	750	each	490	3 67 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5503	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.25.2	"Supplying, handling, transporting to site of work and fixing approved MECHANICAL ANCHOR FASTENERS M.S. bolts of Grade 5.8 or more, GALVANIZED with minimum thickness of 5 microns (approved for use in cracked concrete), of 16mm dia at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size, testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush, and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	750	each	880	6 60 000
5504	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.26	Chemical Anchor Fastner				
5505	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.26.1	"Supplying, handling, transporting to site of work and fixing approved CHEMICAL ANCHOR FASTENERS consisting of M.S. threaded rod of Grade 5.8, GALVANIZED with minimum thickness of 5 microns and chemical (approved for use in cracked concrete), packed in flexible chemical foil or dual foil type, to be used with the help of dispenser, of 12mm dia. at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size, testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	250	each	1 840	4 60 000
5506	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.26.2	"Supplying, handling, transporting to site of work and fixing approved CHEMICAL ANCHOR FASTENERS consisting of M.S. threaded rod of Grade 5.8, GALVANIZED with minimum thickness of 5 microns and chemical (approved for use in cracked concrete), packed in flexible chemical foil or dual foil type, to be used with the help of dispenser, of 16mm dia. at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size., testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	500	each	2 270	11 35 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5507	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.26.3	"Supplying, handling, transporting to site of work and fixing approved CHEMICAL ANCHOR FASTENERS consisting of M.S. threaded rod of Grade 5.8, GALVANIZED with minimum thickness of 5 microns and chemical (approved for use in cracked concrete), packed in flexible chemical foil or dual foil type, to be used with the help of dispenser, of 20mm dia. at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size., testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	250	each	2 800	7 00 000
5508	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.26.4	"Supplying, handling, transporting to site of work and fixing approved CHEMICAL ANCHOR FASTENERS consisting of M.S. threaded rod of Grade 5.8, GALVANIZED with minimum thickness of 5 microns and chemical (approved for use in cracked concrete), packed in flexible chemical foil or dual foil type, to be used with the help of dispenser, of 24mm dia. at specified positions on concrete floors, roofs, beams (sides and bottom), walls, columns etc. according to manufacturer's specifications including all accessories like nuts, washers etc. of required size., testing, necessary scaffolding, drilling of the holes in concrete surface with electric drill, cleaning of holes with air blowout & wire-brush and making good any damage done to the structure etc. all complete for all heights, depths and locations as specified and directed. "	250	each	3 490	8 72 500
5509	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.27	Threaded bolts for equipment fixing-Non FIM				
5510	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.27.1	Supplying, fabricating, fixing and keeping in position at all levels and locations THREADED BOLTS of Grade C property class 4.8 as per IS:1363 (part 2) of all diameters and length including nuts, washers for supporting equipment on steel structure as directed including handling & transporting, straightening if required, turning from relevant size M.S. rounds to required diameter, threading etc. (SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE).	2	MT	1 43 600	2 87 200
5511	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.32	Temporary Rain Protection Structure - Non FIM Item				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5512	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.32.1	"Design, supplying, fabricating at Contractor's shop OUTSIDE the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining, bolted and/ or welded STRUCTURAL STEEL WORKS FOR RAIN PROTECTION STRUCTURES, of Grade E250A/ E250BR / E250B0 (conforming to IS:2062) and/ or CFSHS/CFRHS of Grade YSt 310 (conforming to IS:4923) and/ or CFCHS of Grade YSt 310 (conforming to IS:1161) at all locations and levels, including all builtup sections/ compound/ hollow/ tubular sections made out of rolled sections and/ or plates/ bent plates in all types of structural frameworks for protection of covered area against rain, cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, fixing columns of shed on top of existing structures, including providing and fixing pre-coated galvanised steel profile sheets as per IS: 513 (size, shape and pitch of corrugation as approved by Engineer-in-charge) 0.50 mm (+ 0.05 %) total coated thickness with zinc coating 120 gm per sqm as per IS:277 in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns, sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 meter or as desired by Engineer-in-charge. The sheet shall be fixed using self-drilling /self-tapping screws of size (5.5 x 55 mm) with EPDM seal, complete up to any pitch in horizontal/ vertical or curved surfaces and including cutting to size and shape wherever required, including complete Structural design, detailed engineering, preparation of design drawing and calculation, preparation and submission of detailed fabrication drawings, preparing the surface for painting and applying pre-erection/ shop primer as mentioned in SCOPE OF WORK after fabrication etc., AND maintaining the structure during project execution AND dismantling, removing & taking away all materials outside the plant boundary after the completion	209000	m²-mon	760	15 88 40 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5513	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.6.32.2	"Providing sheeting with side runner for covering vertical surface on existing structures. Design, supplying, fabricating at Contractor's shop OUTSIDE the plant boundary, transporting fabricated items to site, unloading, storing, erecting in position and testing/ examining, bolted and/ or welded STRUCTURAL STEEL WORKS at all locations and levels, of Grade E250A/ E250BR / E250B0 (conforming to IS:2062) and/ or CFSHS/CFRHS of Grade YSt 310 (conforming to IS:4923) and/ or CFCHS of Grade YSt 310 (conforming to IS:1161) at all locations and levels, including all builtup sections/ compound/ hollow/ tubular sections made out of rolled sections and/ or plates/ bent plates in all types of structural frameworks for covering vertical surface against rain, cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints, finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, fixing on existing structures, including providing and fixing pre-coated galvanised steel profile sheets as per IS: 513 (size, shape and pitch of corrugation as approved by Engineer-in-charge) 0.50 mm (+ 0.05 %), total coated thickness with zinc coating 120 gm per sqm as per IS:277 in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns, sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self-drilling /self-tapping screws of size (5.5 x 55 mm) with EPDM seal, complete up to any pitch in horizontal/ vertical or curved surfaces and including cutting to size and shape wherever required, including complete Structural design, detailed engineering, preparation of design drawing and calculation, preparation and submission of detailed fabrication drawings, preparing the surface for painting and applying pre-erection/ shop primer as mentioned in SCOPE OF WORK after fabrication etc., AND maintaining the structure during project execution AND dismantling.	100	m²-mon	630	63 000
5514	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.7	BRICK MASONRY (REFER SPECIFICATION NO.6-68-0009)				
5515	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.7.9	CLASS 5.0 at all depths -Non FIM Items				
5516	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.7.9.1	Providing and laying BRICK MASONRY WITH BRICKS OF CLASS 5.0 in cement mortar 1:6 (1 Cement : 6 Sand) in one or more brick thickness and in any shape (excluding circular/curved brick masonry) at all depths below plinth level including the cost of materials, labour, scaffolding/ staging, sampling & testing, soaking of bricks, cutting and laying of bricks, providing recesses, making openings of any shape & size, finishing the joints flush below ground level and raking out the joints above ground level, sealing the gap between masonry and soffit of beam/slab, embedding the fittings & fixtures, curing, etc. all complete as per specifications. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m³	9 960	9 960

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5517	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.7.9.2	Providing and laying BRICK MASONRY WITH BRICKS OF CLASS 5.0 in cement mortar 1:6 (1 Cement : 6 Sand) in one or more brick thickness and in any shape (excluding circular/curved brick masonry) at all heights above plinth level including the cost of materials, labour, scaffolding/ staging, sampling & testing, soaking of bricks, cutting and laying of bricks, providing recesses, making openings of any shape & size, finishing the joints flush below ground level and raking out the joints above ground level, sealing the gap between masonry and soffit of beam/slab, embedding the fittings & fixtures, curing, etc. all complete as per specifications. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY THE CONTRACTOR.	1	m^3	10 650	10 650
5518	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.7.11	HALF BRICK MASONARY with bricks of CLASS 5.0-Non FIM Items				
5519	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.7.11.1	Providing and laying HALF BRICK MASONRY with bricks of CLASS 5.0 in cement mortar 1:4 (1 Cement : 4 Sand)in any shape, including the cost of materials, labour, scaffolding/staging, sampling and testing, soaking of bricks, cutting and laying of bricks, providing openings of any shape & size, raking out the joints, supplying and placing 2 Nos. 6mm dia. M.S. Bars at every fourth course, sealing the gap between masonry and soffit of beam/slab, embedding the fittings and fixtures, curing etc. all complete as per specification. ALL MATERIALS INCLUDING CEMENT SUPPLIED BY CONTRACTOR.	1	m^2	1 230	1 230
5520	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10	DEMOLISHING AND DISMANTLING (REFER SPEC NO. 6-68-0012)				
5521	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.1	Brickwork - Non FIM Items				
5522	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.1.1	Demolishing BRICKWORK (taking all necessary safety precautions) for all depths below plinth level including supply of all tools and tackles, necessary scaffolding, propping, underpinning, cleaning and stacking of serviceable material, disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed. (Excavation & backfilling shall be paid separately under relevant items).	1	m^3	1 800	1 800
5523	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.1.2	Demolishing BRICKWORK (taking all necessary safety precautions) for all heights above plinth level including supply of all tools and tackles, necessary scaffolding, propping, underpinning, cleaning and stacking of serviceable material, disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed.	1	m^3	1 960	1 960
5524	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2	RCC - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5525	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2.1	Demolishing RCC WORK (taking all necessary safety precautions) for all depths below plinth level including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc., cutting, straightening, scraping and cleaning of reinforcement bars, stacking of serviceable materials, disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed. (Excavation & backfilling shall be paid separately under relevant items).	1	m^3	2 530	2 530
5526	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2.2	Demolishing RCC WORK (taking all necessary safety precautions) for all heights above plinth level including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc., cutting, straightening, scraping and cleaning of reinforcement bars, stacking of serviceable materials, disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed.	1	m^3	2 710	2 710
5527	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2.3	Chipping of RCC WORK (taking all necessary safety precautions) by CHISELLING, upto & inclusive of 25mm thickness including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc., cutting, lapping/welding of reinforcement bars as per drawings, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete at all heights and depths, as specified and directed. (Excavation and backfilling shall be paid separately under relevant items).	1	m^2	580	580
5528	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2.4	Chipping of RCC WORK (taking all necessary safety precautions) by CHISELLING, beyond 25mm and upto & inclusive of 50mm thickness including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc., cutting, lapping/welding of reinforcement bars as per drawings, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete at all heights and depths, as specified and directed. (Excavation and backfilling shall be paid separately under relevant items).	1	m^2	730	730
5529	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2.5	Chipping of RCC WORK (taking all necessary safety precautions) by CHISELLING, beyond 50mm and upto & inclusive of 100mm thickness including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc., cutting, lapping/welding of reinforcement bars as per drawings, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete at all heights and depths, as specified and directed. (Excavation and backfilling shall be paid separately under relevant items).	1	m^2	1 130	1 130

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5530	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2.6	Chipping of RCC WORK (taking all necessary safety precaution) by CHISELLING for thickness more than 100mm for all depths below plinth level including supply of all tools & tackles, scaffolding, propping, underpinning, etc. exposing, cutting, lapping/welding the reinforcement bars as per drawings & cleaning the same by wire brushing, washing the exposed surfaces, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed. (Excavation and backfilling shall be paid separately under relevant items).	0.2	m^3	4 500	900
5531	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2.7	Chipping of RCC WORK (taking all necessary safety precaution) by CHISELLING for thickness more than 100mm for all heights above plinth level including supply of all tools & tackles, scaffolding, propping, underpinning, etc. exposing, cutting, lapping/welding the reinforcement bars as per drawings & cleaning the same by wire brushing, washing the exposed surfaces, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed.	1	m^3	4 990	4 990
5532	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2.11	Making cut-outs in RCC slab/ wall upto a thickness of 400mm (taking all necessary safety precautions) by vibration-less spark-free mechanical means like core-cutting, wet cutting by diamond wall saw system at all depths & heights including supply of all tools & tackles, necessary scaffolding etc. cutting of reinforcement bars, disposal of unserviceable material, plastering & finishing the cut surfaces, all complete as specified and directed by the Engineer-in- Charge (Measurement on Plan/ Elevation Area basis).	1	m^3	15 450	15 450
5533	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2.12	Cutting/ Dismantling RCC work in pavement, slabs, beams, columns, etc upto a depth of 450 mm by using vibration-less spark-free Diamond Saw Cutter of make HILTI (or equivalent) at all depths & heights, in hazardous areas within process units & offsite which are fire prone due to presence of hydrocarbon vapours etc. taking elaborate precautions for dismantling as per fire permit, clearance etc. and work is to be done with extreme caution. The work item includes cost of all necessary accessories, tools & tackles including diamond saw cutter, disposal of RCC Debris upto lead of 100 m & for all lifts (taking all safety precautions) including cutting reinforcement bars, embedded structural steel members, with necessary scaffolding, propping and underpinning etc. for all elevations with all labour and materials, all complete as per drawings, specifications and directions of the Engineer-in-charge. Payment will be made per sq.m.of cross-sectional cut area. Contractor to submit dismantling plan prior to start of dismantling. Dismantling shall be planned in such a way that each cut piece shall weigh not less than 1.6 MT.	1	m^2	10 380	10 380

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5534	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.2.13	Cutting/ Dismantling of RCC block foundations, raft foundations, pile caps, mass concrete, equipment foundations etc. by using vibration-less spark-free Diamond Wire Saw Cutter of make HILTI (or equivalent) at all depths & heights, in hazardous areas within process units & offsite which are fire prone due to presence of hydrocarbon vapours etc. taking elaborate precautions for dismantling as per fire permit, clearance etc. and work is to be done with extreme caution. The work item includes cost of all necessary accessories, tools & tackles including diamond saw cutter , disposal of RCC Debris upto lead of 100 m & for all lifts (taking all safety precautions) including cutting reinforcement bars, embedded structural steel members, with necessary scaffolding, propping and underpinning etc. for all elevations with all labour and materials complete as per drawings, specificationsand directions of the Engineer-in-charge. Payment will be made per sq.m.of cross-sectional cut area. Contractor to submit dismantling plan prior to start of dismantling. Dismantling shall be planned in such a way that each cut piece shall weigh not less than 1.6 MT.	1	m²	11 030	11 030
5535	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.3	Pockets - Non FIM Items				
5536	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.3.1	Making POCKETS/HOLES of sizes upto & inclusive of 200 x200x500mm in RCC/PCC works (taking all necessary safety precautions) by chiselling/drilling, including supply of all tools & tackles, necessary scaffolding etc. cutting of reinforcement bars, cleaning the pockets of all debris, disposal of the unserviceable material to spoil heaps anywhere within the plant boundary all complete at all heights & depths as specified and directed.	50	each	520	26 000
5537	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.4	PCC _ Non FIM Items				
5538	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.4.1	Demolishing PLAIN CEMENT CONCRETE work (taking all necessary safety precautions) for all depths below plinth level including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc. disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed. (Excavation and backfilling shall be paid separately under relevant items)	1	m³	2 070	2 070
5539	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.4.2	Demolishing PLAIN CEMENT CONCRETE work (taking all necessary safety precautions) for all heights above plinth level including supply of all tools & tackles, necessary scaffolding, propping, underpinning etc. disposal of unserviceable material to spoil heaps anywhere within the plant boundary, all complete as specified and directed.	1	m³	2 220	2 220
5540	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.6	Steelwork - Non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5541	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.6.1	Dismantling bolted/rivetted/welded STRUCTURAL STEEL WORK of all descriptions (taking all necessary safety precautions), including supply of all tools and tackles, consumables, necessary scaffolding etc., providing temporary bracings as required, cutting (by flame or saw) gusset plates, bolts, nuts, weldings etc., transporting and stacking of the serviceable materials, cleaning the site of work of all unserviceable materials for disposal to spoil heaps anywhere within the plant boundary, all complete at all depths and heights, as specified and directed.	1	MT	12 630	12 630
5542	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.7	AC / GI Sheets - Non FIM Items				
5543	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.10.7.1	Dismantling GI/asbestos/translucent sheets, ridges, gutters etc. (taking all necessary safety precautions) in roofings and wall claddings, including supply of all tools & tackles, necessary scaffolding, consumables, cutting (by flame or saw) of fixing hooks, transporting and stacking the serviceable materials, cleaning the site and disposal of the unserviceable material to spoil heaps anywhere within the plant boundary, all complete for all levels, as specified and directed.	1	m^2	150	150
5544	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.11	MISCELLANEOUS ITEMS (REFER SPECIFICATION NO. 6-68-0013)				
5545	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.11.6	Sand Filling - Non FIM Items				
5546	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.11.6.1	Supplying and filling approved SAND of specified quality under floors, in foundations, plinths, tank foundations etc. for all depths and heights including cost of sand, royalties, transportation to site for all leads and lifts, including loading, unloading, spreading in layers of loose thickness not exceeding 150 mm, watering, ramming, compacting with mechanical compactors and/or other equipment to the specified levels to achieve 85% relative density as per IS:2720 Part XIV, including preparation of subgrade to the required slope, providing testing apparatus and testing the degree of consolidation all complete as per drawings, specifications and direction of Engineer-in-charge. The rates shall be inclusive of the cost of all labour, material, equipments etc. all complete .	2200	m^3	3 440	75 68 000
5547	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.11.10	BI-POLAR CONCRETE PENETRATING CORROSION INHIBITING ADMIXTURE				
5548	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.11.10.1	Supplying and mixing of approved brand of BI-POLAR CONCRETE PENETRATING CORROSION INHIBITING ADMIXTURE (confirming to EIL Specification No. 6-68-0017) in concrete as per manufacturer's specification for protection of reinforcement against corrosion. Supply of admixture in Contractor's scope.	5100	kg	220	11 22 000
5549	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.14	BONDING FRESH CONCRETE TO OLD CONCRETE BY EPOXY RESIN BONDING SYSTEM (REFER SPECIFICATION NO. 6-68-0056)				
5550	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.14.1	Epoxy Resin - non FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5551	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.14.1.1	Providing and applying approved EPOXY RESIN (prepared as per manufacturer's recommendation) for bonding of fresh concrete to old concrete in all types of structure at all depths and heights including cleaning of concrete surface, removing of all loose concrete pieces, making rough by chiselling, taking off the skin of concrete, application of Epoxy Resin System by spraying, necessary working platforms, props, scaffolding and other safety measures, removal of same after completion etc. all complete as specified and directed. (Excavation, backfilling, removal of surplus earth, keeping pit dry by pumping/bailing subsoil water shall be paid separately under relevant items).	50	kg	1 350	67 500
5552	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.17	FIREPROOFING OF STEEL STRUCTURES (REF SPEC NO 6-68-0033)				
5553	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.17.11	Concrete - Non FIM Items				
5554	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.17.11.1	Supply and laying of concrete of grade M30 as per Type-I of EIL Standard Specification 6-68-0033 as fire proofing material with 10 mm and down size graded coarse and fine aggregates including admixture around structural steel members (viz. beams, columns, bracings etc.) all complete; cleaning the steel surfaces, supplying, placing and fixing in position cover plates conforming to IS:2062 and stiffeners for members exceeding 600 mm depth, supply and welding of MS nuts on angle and box sections and cover blocks for other sections, supplying, placing and fixing in position galvanized expanded metal sheet with mesh size 4.5 mm x 13.5 mm conforming to IS:412 except on angle and box sections, hot dipped galvanized welded wire fabric reinforcement 2 mm dia 50 mm x 50 mm mesh conforming to IS:1566, and tying the reinforcement to the cover blocks with galvanized 16 SWG tying wire, including cutting, straightening, cleaning, bending, vibrating, tamping, curing or providing a layer of approved membrane of curing compound, rendering with cement sand mortar (1:3) wherever required to achieve a smooth and even surface, providing L50x50x6 at corners or as specified in the drawing, applying primer on MS nuts, angles and affected surfaces, supplying and laying of non-bituminous polysulfide or silicon rubber mastic sealant at terminating edges/ metal joints, painting the surfaces with sealer coat of epoxy polyamide as base and finish coats of coating system No.1 of NORSOK Standard M-501, including the cost of all labour, materials, specified tests, shuttering, staging, scaffolding, working platforms, approaches, etc. for all shapes and positions at all heights upto & including 10 m above pavement etc. all complete as per specifications and directions of Engineer-in-Charge. (ALL MATERIALS INCLUDING CEMENT TO BE SUPPLIED BY THE CONTRACTOR).	200	m²	3 290	6 58 000
5555	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.17.12	Vermiculite Concrete for Structural Steel - Non-FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5556	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.17.12.1	Supply and laying of vermiculite based lightweight cementitious concrete coating as per Type-II of EIL Standard Specification 6-68-0033 as fire proofing material of required thickness around structural steel members (viz. beams, columns, bracings etc.) for the required fire protection from reaching temperature 538 degree C; cleaning the steel surfaces and applying primer compatible to vermiculite material if required as per manufacturer specifications, supplying, placing and fixing in position cover plates conforming to IS:2062 and stiffeners for members exceeding 600 mm depth, supply and welding of MS nuts on angle and box sections and cover blocks for other sections, supplying, placing and fixing in position galvanized expanded metal sheet with mesh size 4.5 mm x 13.5 mm conforming to IS:412 except on angle and box sections, hot dipped galvanized welded wire fabric reinforcement 2 mm dia 50 mm x 50 mm mesh conforming to IS:1566, and tying the reinforcement to the cover blocks with galvanized 16 SWG tying wire, including cutting, straightening, cleaning, bending, applying primer on MS nuts and affected surfaces, curing or providing a layer of approved membrane of curing compound, patching of damaged portion wherever required to achieve a smooth and even surface, providing chamfering at corners, supplying and laying of non-bituminous polysulfide or silicon rubber mastic sealant at terminating edges/ metal joints, painting the surfaces with sealer coat of epoxy polyamide as base and finish coats of coating system No.1 of NORSOK Standard M-501, including the cost of all labour, materials, specified tests, shuttering, staging, scaffolding, working platforms, approaches, etc. for all shapes and positions at all heights upto & including 10 m above pavement etc. all complete as per specifications and directions of Engineer-in-Charge. (ALL MATERIALS SHALL BE SUPPLIED BY THE CONTRACTOR).	3000	m²	4 750	1 42 50 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5557	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.17.12.2	Supply and laying of vermiculite based lightweight cementitious concrete coating as per Type-II of EIL Standard Specification 6-68-0033 as fire proofing material of required thickness around structural steel members (viz. beams, columns, bracings etc.) for the required fire protection from reaching temperature 538 degree C; cleaning the steel surfaces and applying primer compatible to vermiculite material if required as per manufacturer specifications, supplying, placing and fixing in position cover plates conforming to IS:2062 and stiffeners for members exceeding 600 mm depth, supply and welding of MS nuts on angle and box sections and cover blocks for other sections, supplying, placing and fixing in position galvanized expanded metal sheet with mesh size 4.5 mm x 13.5 mm conforming to IS:412 except on angle and box sections, hot dipped galvanized welded wire fabric reinforcement 2 mm dia 50 mm x 50 mm mesh conforming to IS:1566, and tying the reinforcement to the cover blocks with galvanized 16 SWG tying wire, including cutting, straightening, cleaning, bending, applying primer on MS nuts and affected surfaces, curing or providing a layer of approved membrane of curing compound, patching of damaged portion wherever required to achieve a smooth and even surface, providing chamfering at corners, supplying and laying of non-bituminous polysulfide or silicon rubber mastic sealant at terminating edges/ metal joints, painting the surfaces with sealer coat of epoxy polyamide as base and finish coats of coating system No.1 of NORSOK Standard M-501, including the cost of all labour, materials, specified tests, shuttering, staging, scaffolding, working platforms, approaches, etc. for all shapes and positions at all heights more than 10 m above pavement etc. all complete as per specifications and directions of Engineer-in-Charge. (ALL MATERIALS SHALL BE SUPPLIED BY THE CONTRACTOR).	4000	m²	5 020	2 00 80 000
5558	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.17.13	Vermiculite Concrete for Equipments - Non-FIM Items				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5559	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.17.13.1	Supply and laying of vermiculite based lightweight cementitious concrete coating as per Type-III of EIL Standard Specification 6-68-0033 as fire proofing material of required thickness on equipment/ vessel skirts, saddles and supports for the required fire protection from reaching temperature 427 degree C; cleaning the steel surfaces and applying primer compatible to vermiculite material if required as per manufacturer specifications, supplying, placing and fixing in position cover plates conforming to IS:2062, hot dipped galvanized welded wire fabric reinforcement of 2 mm dia 50 mm x 50 mm mesh conforming to IS:1566 and tying the reinforcement with the pre welded nuts by galvanized 16 SWG tying wire, including straightening, cutting, bending of the reinforcement, including supplying and welding of additional MS nuts if directed by the Engineer-in-charge, applying primer wherever required, curing or providing a layer of approved membrane of curing compound, patching of damaged portion wherever required to achieve a smooth and even surface, providing chamfering at corners, supplying and laying of non-bituminous polysulfide or silicon rubber mastic sealant at terminating edges/ metal joints, painting the surfaces with sealer coat of epoxy polyamide as base and finish coats of coating system No.1 of NORSOK Standard M-501, including the cost of all labour, materials, specified tests, shuttering, staging, scaffolding, working platforms, approaches, etc. for all shapes and positions. all complete as per specifications and directions of Engineer-in-Charge. (ALL MATERIALS SHALL BE SUPPLIED BY THE CONTRACTOR).	7140	m²	5 710	4 07 69 400
5560	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.17.MF16	Intumescent coating for Structural Steel				
5561	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.17.MF16.1	Design, Supply and laying of intumescent coating system as per job Specification B957-999-06-43-IF01 as fire proofing material of required thickness (not to be less than 12 mm) around structural steel members (viz. beams, columns, bracings etc.) for the required fire protection from reaching temperature 538 degree C; surface preparation for painting and applying primer as per Job Specification, including the cost of all labour, materials, specified tests, shuttering, staging, scaffolding, working platforms, approaches, etc. for all shapes and positions at all location & levels above pavement etc. all complete as per specifications and directions of Engineer-in-Charge. (ALL MATERIALS SHALL BE SUPPLIED BY THE CONTRACTOR).	4500	sqm	15 450	6 95 25 000
5562	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.18	Mechanical works				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5563	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.18.5	Supplying, fabricating and erecting in position MS plates as per detailed drawings, conforming to grade A of IS:2062 on top of all RCC pedestals supporting the sliding saddles of equipments, including cutting, straightening where necessary, rounding rounding unfinished edges by grinding, machining the exposed top surface, making necessary bolt holes, providing and laying ready mixed free flow non-shrink grout below the base plate at all levels & locations, machining top surfaces etc. all complete and as shown and directed.	1	MT	1 41 520	1 41 520
5564	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.18.9	Dismantling Of steel works				
5565	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.18.9.1	Dismantling structural steel already erected by others including provision of adequate temporary supports, bracings etc. wherever required, to ensure safety of the affected structure or part thereof, and replacing back all original members into their respective positions true to line and level, removing all temporary supports/bracings, welding/bolting of the end connections, splicing or strengthening the member and their joints to regain original strengths, all complete as directed by the Engineer-in-Charge. Note: The weight of dismantled and re- erected structure shall be measured only once.(SUPPLY OF ALL MATERIALS IN CONTRACTOR'S SCOPE)	1	MT	12 630	12 630
5566	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.23	SAFETY (REFER EIL SPECIFICATION)				
5567	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.23.1	Safety Structures - Non FIM Items				
5568	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.23.1.1	Supplying, Transporting, Storing, Fabricating & Erecting in position and testing/ examining bolted and/ or welded Structural Steel Works at all locations and levels in HANGER SCAFFOLDING below piperack, comprising of hangar channels, fabricated pen wen ladder beams, steel planks bent to shape and size and any other sections, if required, all as per sketches/ specifications and load tested for statisfactory performance, including cutting to required size, straightening/ bending if required, edge preparation, cleaning, preheating, bolting/ welding of joints (including sealing the joints of box sections with continuous welding and plugging any open ends & holes of box sections), finishing edges by grinding, fixing in line and level with temporary staging & bracing and removal of the same after erection, including preparation and submission of detailed fabrication drawings, preparing the surface for painting as per BIS codes after fabrication etc. all complete as specified and directed. All items shall be removed & carried back by Contractor as per instructions of Engineer-in-Charge after completion of works. (Supply of All Material In Contractor's Scope).	12450	m²	2 430	3 02 53 500

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5569	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.23.1.3	Providing and fixing double scaffolding system of any height made with 40 mm dia MS tube 1.5 m centre to centre, horizontal & vertical tubes joining with MS tubes, MS tube challies, MS clamps and MS staircase system in the scaffolding for working platform/ staircase etc., and maintaining it in a serviceable condition for the required duration as approved and removing it thereafter. The scaffolding system shall be stiffened with bracings, runners, connection with the building etc., wherever required for inspection of work at required locations with essential safety features for the workmen etc., all complete as per directions and approval of Engineer-in-charge. (Height shall be measured from Floor/ platform from where scaffolding is erected) including providing Aluminium ladders for safe acess of workers.	1500	m³	120	1 80 000
5570	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01CS.23.1.4	Providing of steel scaffold stair tower system with minimum 800 mm wide flights, landings at every 1.5 to 2.0 m height, handrailing around flights and landings for safe access upto a height of 12.0 m, all complete including supply of all materials, tools & tackles, manpower etc., at the location directed by Engineer-in-Charge on monthly rental basis. Rental charges shall be payable after completion of erection of the system and acceptance by the Engineer-in-Charge. Rates shall also be inclusive of dismantling of the system and taking out all materials from the project permises as directed by the Engineer-in-Charge. Rate quoted shall be for Running Meter (Height) per month.	200	RM	5 670	11 34 000
5571	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	11CS	CIVIL, STRUCTURE AND ARCHITECTURE				
5572	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	11CS.22	WATER PROOFING				
5573	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	11CS.22.25	Providing and applying crystalline mortar by mixing in the ratio of 4.5 : 1 (4.5 parts crystalline mortar : 1 part water) for the treatment of faulty construction joints, cracks, tie rod holes and spalled & honeycombed surface of RCC underground structures like basement, water tanks, bridge deck etc. to ensure water tightness. The crystallie mortar shall conform to the EN 1504-3 having compressive strength Class R4 > 45 MPa and adhesive bond strength Class R3 > 1.5 MPa. The work shall be carried out all complete as per specification and the direction of the Engineer-In-Charge. The product performance shall carry guarantee for 10 years against any leakage.				
5574	B	B957-300-81-41-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	11CS.22.25.1	For sealing cracks and faulty construction joints, routed out/making U-shape groove size 25x25mm and then primed the area with integral crystalline slurry @0.05kg/ running metre and while the surface is tacky filled the groove upto surface with crystalline mortar @1.50kg/ running metre. Once crystalline mortar is touch dry then finally applied two coats of integral crystalline slurry @0.05kg/running metre per coat.	50	metre	460	23 000
5575	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC	GENERAL CIVIL				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5576	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7	CONCRETE PAVEMENTS				
5577	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.2	Providing and laying Reinforced Cement Concrete with 20mm and down size graded crushed stone aggregates in flooring, pavements etc. including leaving pockets, if necessary, making recess/drains, laying in alternate panels, etc. for all depths including shuttering, tamping, curing, etc. as specified in any shape, thickness, position and finishing the top surface smooth etc. all complete as per drawings, specifications and directions of Engineer-in-Charge.				
5578	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.2.2	For RCC of M-30 grade concrete (all materials including cement but excluding cost of providing & fixing reinforcement and joint sealing shall be supplied by the contractor).	400	m^3	9 870	39 48 000
5579	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.6	Supplying and laying of 150 micron thick HM HDPE (Grade-I) FILM lining conforming to IS 10889 below concrete pavements, Hard stand, at any other place etc. including royalties, taxes, handling, transportation, unloading, storage, joining etc. all complete as per drawings, manufacturer's specifications and directions of Engineer-in-charge.	2000	m^2	150	3 00 000
5580	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.7	Supply of all materials and Construction of DRY LEAN CEMENT CONCRETE SUB-BASE (7 days compressive strength of 10.0 MPa) with 26.5mm and down size aggregate including cement , water, and approved additives on a prepared sub-grade, mixed in batching plant, transported to site, for all leads & lifts, laid, compacted, finished and cured etc. complete as per IRC:SP:49 (Guidelines for the use of Dry Lean Concrete as Sub-Base), drawings, standards, specifications and directions of Engineer-in-charge.	200	m^3	4 130	8 26 000
5581	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.10	Providing 20mm wide Expansion Joints in pavement slabs as per standard/ drawing including cleaning the joints of all loose material, filling with 20mm thick impregnated fibre boards for the full depth of slab except for 25mm depth from top and sealing the top 25mm with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. all complete as per drawings, specifications and directions of Engineer-in-Charge.				
5582	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.10.1	For type-I pavement (Upto and inclusive of thickness of 200 mm). (Including providing and laying MS dowel bar, painting as required, GI pipe and cap and cotton waste).	240	m	1 880	4 51 200
5583	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.10.3	For type-II pavement (Upto and inclusive of thickness of 150 mm)	50	m	280	14 000
5584	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.10.4	For type-III pavement (Upto and inclusive of thickness of 100 mm).	25	m	220	5 500
5585	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.10.5	For thickened pavement (Upto and inclusive of thickness of 300 mm).	25	m	510	12 750

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5586	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.11	Providing joints in pavements and around foundations as per standard/ drawing including cleaning the joints of all loose materials and sealing with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. complete as per drawings, specifications and directions of Engineer-in-Charge for.				
5587	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.11.1	Construction joints 20mm wide x 25mm deep.	50	m	370	18 500
5588	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.11.2	Sealing joint around pedestal and column etc. 20mm wide x 200 mm deep including filling with 20mm thick impregnated fire board for the full depth of slab except for 25mm depth from top and sealing the top 25mm with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. complete as per drawings, specifications and directions of Engineer-in-Charge.	125	m	580	72 500
5589	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.11.3	Sealing joint around pedestal and column etc. 20mm wide x 150 mm deep including filling with 20mm thick impregnated fire board for the full depth of slab except for 25mm depth from top and sealing the top 25mm with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. complete as per drawings, specifications and directions of Engineer-in-Charge.	125	m	520	65 000
5590	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.11.4	Sealing joint around pedestal and column etc. 20mm wide x 100 mm deep including filling with 20mm thick impregnated fire board for the full depth of slab except for 25mm depth from top and sealing the top 25mm with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. complete as per drawings, specifications and directions of Engineer-in-Charge for.	75	m	460	34 500
5591	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.7.11.5	Sealing joint around pedestal and column etc. 20mm wide x 300 mm deep including filling with 20mm thick impregnated fire board for the full depth of slab except for 25mm depth from top and sealing the top 25mm with Polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved primer compatible with the brand of Polysulphide etc. complete as per drawings, specifications and directions of Engineer-in-Charge for.	75	m	690	51 750
5592	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.26	MISCELLANEOUS ITEMS				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5593	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.26.10	Supply and installation of combined safety shower and eyewash units as per spec. no.6-66-0038, including providing and fixing of necessary foundation bolts in foundations/ pavement etc. complete. Each safety shower shall have proper sign board with florescent letters showing their location, all complete as per specification, drawings and direction of Engineer-in-charge.	17	each	47 690	8 10 730
5594	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.26.17	Supplying and fixing in position CI sluice Gates with frames as per IS:13349 and as per specifications and drawings including transportation to site of work, supplying and fixing bolts, nuts, washers, gaskets etc. complete as per drawings, specifications and directions of Engineer-in-Charge. For following Size(mm) and Type and Class				
5595	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.26.17.1V11	Square 750 mm Class - 1	1	nos	2 31 750	2 31 750
5596	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40	Fabrication and Erection of piping (underground)				
5597	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.5	Laying and joining of pipes and specials for underground system etc. including transportation of all materials from owner's storage points to work site, earthwork in excavation in all types of soil but EXCLUDING SOFT ROCK AND HARD ROCK for trenches etc. including dewatering of rain and /or sub soil water, shoring & strutting if required, dressing of sides, levelining, grading & ramming of bottom of trench, cutting of pipes if required,fitup, edge preparation, joining by welding, providing paint as per specification suitable for temperature mentioned below, laying the pipes in trenches to required alignment and levels, welding the same after laying, installation of fittings like elbows, reducers, tees, flanges, spectacle blind and spacer blinds etc. painting of field joints , hydrostatic testing of system, cleaning and flushing by water/ compressed air, draining, supply and filling 150mm coarse sand / gravel around the pipe as per standard no. 7-65-0269, backfilling the trenches with select material from available excavated soil including re-excavating the deposited soil excavated earlier, breaking clods and laying in layers of 15cm compacted thickness, watering and compacting with mechanical means like vibro rammers etc. to 90% standard proctor density as per IS-2720 Part- VII or 85% of relative density as per IS: 2720 Part XIV as applicable, disposal of surplus earth/ unserviceable material to demarcated area anywhere within the complex limit etc. complete as per drawings, specifications and instructions of engineer-in-charge including return of all unused/scrap pipes to owner's storage points. (Pipes shall be supplied by the owner as free issue material)(Depth of excavation for pipe trench shall be upto 3.0m)				
5598	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.5.1	Carbon Steel Piping (Non IBR), Thickness <=10 mm				
5599	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.5.1.1	Fabrication, For the following nominal sizes				
5600	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.5.1.1.2	NB 2 inch - 6 inch	100	Inch Dia	770	77 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5601	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.5.1.1.3	NB 8 inch - 14 inch	100	Inch Dia	770	77 000
5602	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.5.1.2	Erection including painting and coarse sand/gravel filling, for following Nominal Sizes and temperature for painting				
5603	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.5.1.2.6V3	NB 2 inch - 6 inch 200 °C	400	Inch Mtr	320	1 28 000
5604	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.5.1.2.7V3	NB 8 inch - 14 inch 200 °C	400	Inch Mtr	320	1 28 000
5605	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20	Laying and joining of externally 3L PE pre-coated Carbon Steel pipes and specials underground including transportation of all material from Owner's storage point to worksite, earthwork in excavation in all types of soils excluding soft rock and hard rock, for pipe trenches, saddles, etc. including dewatering, shoring and strutting if required, dressing of sides, levelling, grading and ramming of bottoms, cutting of pipes to required lengths if required, edge preparation, laying the pipes in trenches to required alignment and levels, welding the same after laying, installation of flanges, blind flanges, tapping for pressure gauges, temperature gauges and all other online instruments, fixing of nuts, bolts, gaskets and washers, welding, carrying out repairs of coating defects not attributed to owner (i.e. defects occurring after taking over of pipes from owner), coating of all field weld joints etc. as per specification, including supply of coating material for field joints,inspection and testing for the corrosion protection coating as per specification, cutting of road wherever required and making good the same,hydrostatic testing of the system, flushing, backfilling the trenches with select material from available excavated soil including re-excavating the deposited soil excavated earlier, breaking clods and laying in layers of 15 cm compacted thickness, watering, compacting with mechanical means like vibro rammers etc. to 90% of dry density as per IS:2720 Part- VII or 85% relative density as per IS: 2720 Part XIV as applicable, making good the surface, disposal of surplus earth/ unserviceable material to demarcated area anywhere within the complex limit etc. complete as per drawings, specifications and instructions of Engineer-in-Charge including connecting the pipes to manhole, including return of all unused / scrap pipes and specials to owner's storage point (All the materials except Pre-coated Pipes and fittings shall be supplied by contractor)(Pre-coated Pipes and fittings shall be issued free of cost by Owner.) (Depth of excavation for pipe trench shall be upto 3.0m)				
5606	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1	Carbon Steel Piping (Non IBR), Thickness <=10 mm				
5607	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.1	Fabrication, For the following nominal sizes				
5608	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.1.2	NB 2 inch - 6 inch	100	Inch Dia	770	77 000
5609	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.1.3	NB 8 inch - 14 inch	100	Inch Dia	770	77 000
5610	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.1.4	NB 16 inch - 24 inch	100	Inch Dia	770	77 000
5611	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.1.5	NB 26 inch - 36 inch	100	Inch Dia	770	77 000
5612	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.2	Erection including corrosion protection coating of field joints, for Water System (Pressure Piping), For following Nominal Sizes				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5613	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.2.2	NB 2 inch - 6 inch	400	Inch Mtr	330	1 32 000
5614	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.2.3	NB 8 inch - 14 inch	400	Inch Mtr	330	1 32 000
5615	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.2.4	NB 16 inch - 24 inch	400	Inch Mtr	330	1 32 000
5616	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.2.5	NB 26 inch - 36 inch	400	Inch Mtr	330	1 32 000
5617	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.3	Erection including corrosion protection coating of field joints, for Waste Water Collection System (Gravity Flow), for following Nominal Sizes				
5618	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.3.2	NB 2 inch - 6 inch	400	Inch Mtr	330	1 32 000
5619	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.3.3	NB 8 inch - 14 inch	400	Inch Mtr	330	1 32 000
5620	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.3.4	NB 16 inch - 24 inch	400	Inch Mtr	330	1 32 000
5621	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.20.1.3.5	NB 26 inch - 36 inch	400	Inch Mtr	330	1 32 000
5622	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.55	Extra Over respective underground piping erection items but for excavation in soft rock by mechanical means like hydraulic excavator/ chiseler/ rock breaker/ ripper/ rock hammer/ cutter etc. for trench, saddle etc. including chiseling and cutting to required levels, dressing and trimming of sides, levelling and grading of bottoms, removal of all rock protrusions etc. complete including stacking of material to demarcated areas anywhere within the complex limit. (The measurement and payment shall be as per specification 6-68-0003)				
5623	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.55.1	For depth of excavation for pipe trench, saddle etc. upto 3m	10	m^3	700	7 000
5624	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.55.2	For depth of excavation for pipe trench, saddle etc. beyond 3.0m and upto 4.5m	10	m^3	800	8 000
5625	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.59	Extra Over respective underground piping erection items but for transportation of approved available select earth/ approved material (like fine aggregates, sand dust etc.) excavated & deposited/ stacked earlier within complex limit including re-excavating the deposited soil excavated earlier including clearing and stripping at earlier deposited soil (if necessary), loading, unloading, transportation etc. complete within a lead of 500M. (The efforts for backfilling shall be paid under respective underground piping erection item.) (The payment shall be as per specification 6-65-0006) .	10	m^3	220	2 200
5626	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.60	Extra over Item No.01GC.40.59 above but for lead of available material beyond the initial lead of 500m.				
5627	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.60.1	upto and inclusive of 1.0 km	10	m^3	10	100
5628	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.60.2	beyond 1.0 km and upto and inclusive of 3.0 km	10	m^3	30	300
5629	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.40.60.3	beyond 3.0 km and upto and inclusive of 5.0 km	10	m^3	50	500
5630	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41	Supply, fabrication and Erection of piping(underground)				
5631	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.6	Water System Galvanised Pressure Piping (Under Ground) (Screwed)				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5632	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.6.1	Supplying and laying carbon steel galvanised pipes as per piping materials specification Class underground including supply of all necessory fittings including Tee, reducing Tee, reducing Coupling, nipple, coupling, elbows etc. supply of teflon tapes, PTFE tape, white lead, etc. cutting the pipes to required lengths, making threads, earthwork in excavation for trenches, etc. in all types of soil except soft rock & hard rock including dewatering, shoring and strutting if required, dressing of sides, levelling, grading and ramming of bottoms, including laying of pipes in trenches, jointing the pipes and fittings with threaded connections, hydrostatic testing of the piping, backfilling the trenches with selected/approved earth fill material, cutting of roads wherever required, making good the road surface after laying, disposal of surplus earth at a designated area anywhere within complex limit etc., complete as per specifications, drawings and directions of Engineer-in-Charge. For following Nominal Size and Piping Material Class.				
5633	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.6.1.1V1	Nominal Dia 1 Inch Piping class J2A	1200	m	1 090	13 08 000
5634	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.6.1.1V37	Nominal Dia 3 Inch Piping class J95A	100	m	3 530	3 53 000
5635	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.6.1.1V38	Nominal Dia 4 Inch Piping class J95A	350	m	4 890	17 11 500
5636	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.6.1.1V39	Nominal Dia 2 Inch Piping class J95A	100	m	2 360	2 36 000
5637	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.7	Water System Galvanised Pressure Piping (Under Ground) (Welded)				
5638	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.7.1	Supplying and laying carbon steel galvanised pipes as per piping materials specification Class underground including supply of all necessory fittings including Tee, reducing Tee, reducuing Coupling, nipple, coupling, elbows etc., cutting the pipes to required lengths,welding, providing cold galvanising with zinc coating compound on surfaces where galvanising has been burnt off, earthwork in excavation for trenches, etc. in all types of soil except soft rock and hard rock, including dewatering, shoring and strutting if required, dressing of sides, levelling, grading and ramming of bottoms, including laying of pipes in trenches, jointing the pipes and fittings with welded/ flanged connections, hydrostatic testing of the piping, backfilling the trenches with selected/approved earth fill material, cutting of roads wherever required, making good the road surface after laying, disposal of surplus earth at a designated area anywhere within complex limit etc., complete as per specifications, drawings and directions of Engineer-in-Charge. For following Nominal Size and Piping Material Class .				
5639	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.7.1.1V22	Nominal Dia 6 Inch Piping class J95A	200	m	8 100	16 20 000
5640	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.7.1.1V23	Nominal Dia 8 Inch Piping class J95A	350	m	11 660	40 81 000
5641	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.7.1.1V24	Nominal Dia 12 Inch Piping class J95A	80	m	19 300	15 44 000

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5642	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.41.7.1.1V26	Nominal Dia 10 Inch Piping class J95A	350	m	15 860	55 51 000
5643	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51	fire fighting equipment's				
5644	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.2	Supply and installation of Deluge Valve skid				
5645	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.2.1	Supply, Installation, erection, testing and commissioning of Deluge valve skid, with UL/FM listed/approved Deluge Valve (consisting of deluge valve, strainers, solenoid valve, air pressure regulator, limit switches, pressure gauge, pressure transmitters, inlet/ outlet valves, drain valve, priming valve, vent valve including alarm motor gong, fittings, local control panel including bypass connection to deluge valve along with strainer and ball valve etc. complete) actuated through air (pneumatic) detection system including installation/placing the skid at the designated location and fixing with anchor bolts, connecting the water inlet and system piping, connecting detection network piping, fittings etc. complete for deluge valve skid as per specification, drawings and directions of Engineer-in-Charge. For the following DV skid size (Inlet/ outlet/ bypass fire water line size - Deluge Valve size -)				
5646	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.2.1.1V2	Inlet/ outlet/ bypass fire water line size 4 Inch Deluge Valve size 3 Inch	1	each	6 33 450	6 33 450
5647	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.2.1.1V3	Inlet/ outlet/ bypass fire water line size 4 Inch Deluge Valve size 4 Inch	4	each	7 31 300	29 25 200
5648	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.2.1.1V4	Inlet/ outlet/ bypass fire water line size 6 Inch Deluge Valve size 4 Inch	1	each	7 39 540	7 39 540
5649	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.2.1.1V6	Inlet/ outlet/ bypass fire water line size 8 Inch Deluge Valve size 6 Inch	3	each	10 45 450	31 36 350
5650	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.2.1.1V8	Inlet/ outlet/ bypass fire water line size 6 Inch Deluge Valve size 6 Inch	1	each	9 05 370	9 05 370
5651	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.2.1.1V10	Inlet/ outlet/ bypass fire water line size 10 Inch Deluge Valve size 8 Inch	4	each	13 49 300	53 97 200
5652	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.2.1.1V11	Inlet/ outlet/ bypass fire water line size 8 Inch Deluge Valve size 8 Inch	1	each	12 07 160	12 07 160
5653	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.2.1.1V12	Inlet/ outlet/ bypass fire water line size 12 Inch Deluge Valve size 8 Inch	1	each	14 78 050	14 78 050
5654	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.3	S/I Portable/ trolley mounted Extinguishers				
5655	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.3.1	Supply and installation of portable DCP (Dry Chemical Powder Type) extinguisher including transporting to worksite, fixing in position including all accessories and all labor and material etc. complete as per drawings, specification and directions of Engineer-in-Charge.				
5656	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.3.1.1V1	Capacity 6 kg	225	nos	3 000	6 75 000
5657	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.3.1.1V2	Capacity 9 kg	300	nos	3 890	11 67 000
5658	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.3.2	Supply and installing in position, trolley mounted DCP (Dry Chemical Powder Type) extinguisher including transporting to worksite, placing in position including all accessories and all labor and material etc. complete as per drawings, specification and directions of Engineer-in-Charge.				
5659	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.3.2.1V2	Capacity 50 kg	70	nos	31 210	21 84 700

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5660	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.3.5	Supply and installation of portable CO2 extinguishers including transporting to worksite, fixing in position including all accessories and all labor and material etc. complete as per drawings, specification, data sheet and directions of Engineer-in-Charge.				
5661	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.3.5.1V1	Capacity 4.5 kg	80	nos	5 090	4 07 200
5662	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5	Supply, installation, testing and commissioning of following firefighting equipment as per relevant specifications, data sheet, drawing, including transporting the equipment to worksite, fixing of nuts, bolts, washers, gaskets, welding needed for fixing the equipment with matching flange etc. all complete as per drawings, specifications, standards, data sheet and direction of Engineer-in-Charge.				
5663	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.3	Double headed landing valve	15	each	26 390	3 95 850
5664	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.MG3	Air Release Valve	10	nos	3 300	33 000
5665	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.MG4	Sand Bucket	20	nos	15 450	3 09 000
5666	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.5	First Aid hose reel wall mounted type	65	each	9 540	6 20 100
5667	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.6	First Aid hose reel floor mounted type	10	each	10 020	1 00 200
5668	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.8	Hose box cabinet Type-II (Wall mounted type) including all inside accessories, including all civil works, fixing in position with anchor bolts in foundations or wall	100	each	30 900	30 90 000
5669	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.12	Remote operated long range water/ water cum foam monitor of 1000/1500/2000 GPM (variable) capacity on technological structure/ pipe rack/independent tower etc.	11	each	41 40 600	4 55 46 600
5670	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.13	Variable flow Water cum foam monitor of 500/750/1000 GPM capacity	17	each	2 68 830	45 70 110
5671	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.14	Variable flow Water cum foam monitor of 1000/1500/2000 GPM capacity	10	each	3 96 550	39 65 500
5672	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.15	Stand Post Type Fire Hydrant with Pumper Connection	10	each	30 800	3 08 000
5673	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.5.16	Stand Post Type Fire Hydrant without Pumper Connection	100	each	23 280	23 28 000
5674	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.7	Supply and installation of medium velocity spray nozzles with 1/2" NPT fixing arrangement including transportation to worksite from Owner's storage point, testing, flushing etc. all complete as per specification, drawings, data sheet and directions of Engineer-in-Charge. For nozzle of following K factor				
5675	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.7.1V1	K factor 18	10	nos	620	6 200
5676	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.7.1V4	K factor 22	210	nos	620	1 30 200
5677	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.7.1V7	K factor 41	760	nos	620	4 71 200
5678	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.9	Quartzoid bulb detectors				
5679	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.9.4	Supply, installation, testing and commissioning of quartzoid bulb detectors with 1/2" NPT fixing arrangement at locations as per data sheets, drawings and directions of Engineer-in-Charge.				

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5680	B	B957-300-81-45-MR-SOR-3001-B-0M	Mechanical Works - II For ECU-PART-B	01GC.51.9.4.1V1	Actuation Temperature 79 °C	1000	nos	300	3 00 000
5681	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP	PROJECTS				
5682	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999	Providing pre-commissioning/commissioning assistance to the Owner/EIL by providing Skilled /Semiskilled/unskilled workers as per the direction of Engineer in - Charge with tools tackles, PPEs, consumables and Supervision (including site supervision, safety supervision) with the single point responsibility for quality, safety and speed of execution (one Man day =8 hours shift) with 1 vehicle standby for emergency at site with the following manpower on fix basis. Contractor to provide & mobilise man power in shifts on Need Basis on the instructions of Engineer -in-chrge. Note that the manpower deployment shall be inclusive of required tools and tackles and machinery such as welding machines, grinding machines, gas cutting sets , Mechanical/Electrical tool box, etc.				
5683	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.10000	Skilled manpower				
5684	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.10000.100	Piping Welder (Arc & TIG)	2000	Mandays	1 480	29 60 000
5685	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.10000.200	Mill Wright fitter/ Rotary mechanic	1000	Mandays	1 480	14 80 000
5686	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.10000.300	Instrument Technician	500	Mandays	1 480	7 40 000
5687	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.10000.400	Electrician	500	Mandays	1 480	7 40 000
5688	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.10000.500	Valve Mechanic	500	Mandays	1 480	7 40 000
5689	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.10000.600	Rotary mechanic capable of executing maintenance work	1500	Mandays	1 480	22 20 000
5690	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.11000	DEWATERING : Pumping out rain water from specific location towards downstream side by deploying suitable capacity / adequate numbers of mud pumps / submersible pumps from various types drains / culverts sump pits / unit areas discharge into the outlet point laying and connecting of discharge delivery pipe mentioned in the same contract as directed by Engineer-In-charge at site including supply of all pumps, power/diesel , connecting pipes / hoses, all enabling works, tools and tackles etc. completely in all respect as per the directions of the Engineer-In-charge. (Jointly accepted log book to be maintained for payment)				
5691	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.11000.100	10 HP PUMP (POWER/DIESEL operated)	160	Hour	1 320	2 11 200
5692	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.11000.200	5 HP PUMP (POWER/DIESEL operated)	160	Hour	1 010	1 61 600
5693	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.11000.300	2 HP PUMP (POWER/DIESEL operated)	160	Hour	610	97 600

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5694	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.12000	Contractor to provide & mobilise following man power on the instructions of Engineer in- charge. However, 2 weeks' notice shall be given for mobilisation and 1 day notice Shall be given for demobilisation. Note that quoted rate of manpower deployment shall be inclusive of required PPEs and facilities required for functioning at site. (1 Man-Month should be considered as 30 man-days.				
5695	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.12000.100	Safety supervisor	18	Man month	78 120	14 06 160
5696	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.12000.200	Safety Officer/Engineer	27	Man month	97 650	26 36 550
5697	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.20000	Semi-skilled Manpower				
5698	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.20000.100	Piping/structural fitter	6000	Mandays	1 180	70 80 000
5699	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.20000.200	Structural welder	3500	Mandays	1 180	41 30 000
5700	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.20000.300	Gas cutter	6000	Mandays	1 180	70 80 000
5701	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.20000.400	Grinder/driller	5000	Mandays	1 180	59 00 000
5702	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.20000.500	Rigger	4500	Mandays	1 180	53 10 000
5703	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.20000.600	Concrete chipper	2000	Mandays	1 180	23 60 000
5704	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.30000	Unskilled manpower				
5705	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.30000.100	Helper/Assistants	27000	Mandays	870	2 34 90 000
5706	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.40000	Commissioning operator (Qualification degree with 3 yrs. of experience or diploma with 5 years' experience) --	5000	Mandays	3 200	1 60 00 000
5707	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.50000	Commissioning supervisor (B.E. with 5 years' experience of commissioning activities in refineries, petrochemical etc) (1 man month= 26 days @ 8 hours per day duty)	80	Man month	90 000	72 00 000
5708	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.60000	Supervisor/ Foreman	90	Mandays	1 900	1 71 000
5709	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.70000	Fork lift operator (1 man month= 26 days @ 8 hours per day duty)	3	Man month	44 980	1 34 940
5710	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.70001	Supply of Flame proof torches- rechargeable (with high intensity)	10	nos	8 500	85 000
5711	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.70002	Supply of 40/80 wire-mesh SS for covering strainers/filters	500	nos	2 580	12 90 000
5712	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.70003	Supply of rubber hoses(1", 15 mtr length, pressure-500 psi)	20	nos	7 730	1 54 600
5713	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.70004	Supply of fire hoses with connector for fire hydrants (dia. 63 mm, length-15 mtr as per relevant international specifications)	20	nos	7 210	1 44 200

Sl. No.	PART NO	SOR NO	SOR TITLE	ITEM NO	DESCRIPTION	QTY	UOM	RATE	AMOUNT
5714	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.80000	Providing Hydraulic mobile Crane (min. 15 Ton capacity wheel mounted) including fuel, lube and operator & helper charges, sling web belts d- shackles, guiding ropes etc for lifting/shifting/loading/ unloading material like pipes, equipment, fittings, pipe-spools, concrete blocks, drums, boxes boulders, crates, scraps etc as directed (1 day= 8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE	270	day	8 850	23 89 500
5715	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.90000	Providing trailer including fuel, lube and operator & khalasi charges for transportation of material (including pipes, structural steel, fittings, valves, gaskets, earth, wooden scrap, usable material, metallic or non-metallic scrap) from & to project/unit area, stores, warehouse, dump yard/scrap yard as directed. (1 day= 8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASED FOR COMMISSIONING	270	day	7 500	20 25 000
5716	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.98000	Providing "Telescopic/Lattice" type crane (100 Ton capacity wheel mounted/CRAWLER) including fuel, lube and operator & helper charges, sling web belts d- shackles, guiding ropes etc for lifting/shifting/loading/ unloading material like pipes, equipment, fittings, pipe-spools, concrete blocks, drums, boxes boulders, crates, scraps etc as directed (1 day= 8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE	270	day	50 000	1 35 00 000
5717	B	B957-300-85-41-MR-SOR-3001-B-0M	Mechanical Works For ECU-PART-B	01QP.999.99000	Providing "Telescopic" type crane (40 Ton capacity wheel mounted) including fuel, lube and operator & helper charges, sling web belts d- shackles, guiding ropes etc for lifting/shifting/loading/ unloading material like pipes, equipment, fittings, pipespools, concrete blocks, drums, boxes boulders, crates, scraps etc as directed (1 day=8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE	270	day	25 000	67 50 000
		SUB TOTAL							**466 05 94 779**
		TOTAL							**1055 49 89 823**

BIDDING DOCUMENT

FOR

MECHANICAL WORKS FOR ETHYLENE CRACKER UNIT(ECU)

(BIDDING DOCUMENT NO.: JP/B957-300-MR-T-3001/1030)

PROJECT: BINA PETCHEM AND REFINERY EXPANSION PROJECT (BPREP) OF M/S BHARAT PETROLEUM CORPORATION LIMITED (BPCL)

PART-III OF III : TECHNICAL PART

इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

ENGINEERS INDIA LIMITED
(A Govt. of India Undertaking)

SCOPE OF WORK & SUPPLY

(PIPING)

MECHANICAL WORKS - I FOR ECU

(ETHYLENE CRACKER & ASSOCIATED UNITS)

BPREP, BPCL

TENDER No. : B957-300-16-43-MR-T-3001

PROJECT : ETHYLENE CRACKER & ASSOCIATED UNITS BINA, MADHYA PRADESH, INDIA

OWNER : BPCL

JOB NO : B957

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
1	21.04.2026	ISSUED FOR TENDER	KKV	MK	SH
0	05.03.2026	ISSUED FOR TENDER	KKV	MK	SH

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1.0 SCOPE OF WORK FOR TENDER (PIPING)

Bharat Petroleum Corporation Ltd. ("BPCL"), a Public Sector Undertaking with a "Maharatna" status engaged in refining of crude oil and marketing of petroleum products, intends to set up a world class petrochemicals complex as a part of Bina Petchem and Refinery Expansion Project (BPREP), BPCL at Bina Refinery located at Bina Refinery located at Sagar, Madhya Pradesh for its diversification to petrochemicals apart from expansion of Bina refinery capacity to about 12 MMTPA.

The Ethylene Cracker and Associated Units of capacity of about 1.2 MMTPA has been split up between two parts i.e. PART-A and PART-B under single tender B957-300-16-43-MR-T-3001.

This tender i.e. MECHANICAL WORKS - I FOR ECU (Tender no. B957-300-16-43-MR-T-3001 shall comprise Mechanical (Piping & Equipment erection), Insulation, Painting, Fire-proofing and miscellaneous Civil/ Structural works relating to ETHYLENE CRACKER & ASSOCIATED UNITS.

This document shall read in conjunction with respective Piping Schedule of Rates (Piping SOR) to carry out the Piping related composite works by Composite Contractor at site.

The scope of work of Contractor shall include the following in addition to the scope of work as defined in Standard Specification for Fabrication and Erection of piping, Doc. No. 6-44-0012 Rev 6:

1.1 Clause 2.6 of 6-44-0012 stands modified as under:
The Piping isometrics for main process/utility lines including small bore shall be provided to the Contractor. However, the steam tracing from the Steam supply station manifolds to the traced lines/ instruments, along the traced lines/ instruments and from traced lines/ instruments to the condensate recovery manifolds shall be done by the contractor suit to site condition. The preparation of steam tracing isometrics & bill of material for same, detailing of supports of all steam tracers is in Contractor's scope and any line specified as field routed within the Unit battery limit including subsequent approval from Engineer-in-charge as and when required is in Contractor's scope of work.
No separate payment shall be made on this account.

Small bore piping isometrics given to the contractor shall be rechecked by Contractor before further erection and installation.

Clause 2.7 of 6-44-0012 stands modified as under:
"Contractor, at his own cost, shall obtain the approval for the piping systems falling under purview of IBR from the statutory Indian Boiler Regulations (IBR) authority of the state where the plant is situated. Documentation (Isometrics and Calculations only) for the IBR System shall be provided by the Owner. In case the local IBR authority insists that the documentation provided by the owner is required to be submitted in an alternate format then the contractor shall get the isometrics, system isometrics, IBR calculations etc. redone in the appropriate format as required by the local IBR authority at no extra cost. Shop obtained IBR certificate of equipment & piping material shall be provided to the contractor."

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1.2 Non-destructive examination / testing shall be as per the job standard specification-B957-6-44-0016. In addition to this, welded reinforcing pads shall be pneumatically leak tested.

1.3 Piping materials, in addition to those already specified in clause no. 2.1.1 of standard specification 6-44-0012, shall also include the following but not limited to:

1.3.1 Sample cabinets, vortex flow meters, thermal mass flow meters, rotameters, volume bottles, corrosion probes and any other miscellaneous items as required to execute the job.

1.3.2 Supplying, fabrication and erection of pipe supports like shoes, clamps including bolting materials, saddles, guides, dummy pipes (free issued to contractor), stops, anchors, clips, cradles, hangers, turn buckles, springs used in clamps for pulsating/ vibrating lines, spring washers, supporting fixtures, brackets, cantilevers, struts, tee-posts, including erection of spring supports, corrosion pads/protection shields, low friction pads, expansion bellows, steam supply and condensate manifolds supports and sway braces, supply/ fabrication of wooden/ high density PUF supports for cold lines etc.

1.4 Site Fabrication of piping items in addition to those already specified in 6-44-0012 shall also include the following but not limited to:

a. Fabrication of piping specials like special radius bends, tees, reducers, miters, etc.
b. Fabrication of plain and threaded nipples from pipes as required during erection.
c. Fabrication of swage nipples as and when required.
d. Fabrication of odd angle elbows / bends like 60°, 30°, or any other angle from 90°/45° elbows as and when required as per applicable design standard.
e. Fabrication of flanges, reducing flanges, blind flanges, spectacle blinds, crosses, jump overs etc. as and when required as per applicable design standard.
f. Fabrication of circular pipe for steam rings, fire water lines, utility lines at all levels and elevations.
g. Fabrication of stub in connections with or without reinforcement.
h. Grinding of edges of pipes, fittings, flanges, etc. to match mating edges of uneven / different thickness wherever required as per specifications including beveling of plain end pipes.
i. Threading of all small-bore piping as per piping material specifications.
j. Drilling on blind flange for inserting / joining small bore lines.
k. Fabrication and welding of reinforcement pads at branch pipe locations wherever required.
l. For piping classes for which PWHT is specified for weld joints in the PMS/ Welding specification, PWHT shall be done to all weld attachments to pipe.
m. Fabrication of miscellaneous elements like flash pot, seal pot, injection nozzles, sample cooler, supporting elements like turn-buckles, extension of spindles and interlocking arrangement of valves, operating platforms etc. as required by Engineer-In-Charge.
n. Fabrication & installation of earthing lugs.
o. Fabrication and erection of small vessels

1.5 Modifications like providing additional cleats for extension of stem of valve, locking arrangement of valves, providing chain operation facility etc. as and when required.

1.6 Transportation of required piping materials (as described in clause 1.3), pipe support materials (as described in clause 1.3.2) and all other necessary piping materials from owner's storage point or Contractor's storage point (in case of Contractor's scope of

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supply) to work site / shop including raising store requisitions for issue of materials in the prescribed format & maintaining an account of the materials received from Owner's stores, reconciliation of all Owner supplied free issue materials.
Making material reconciliation statement and return of owner supplied left over materials to Owner's storage. For transportation of structures, piping, equipments etc. from Owner's storage points to contractor's stores / worksite, access preparation, if required along the route shall be under Contractor's scope.

1.7 Obtaining approval for drawings prepared by contractor from concerned statutory authority, wherever required as per instructions of Engineer – in- charge.

1.8 Erection of prefabricated piping spools along with its branches and attached supports, alignment, cutting, beveling, fit up, welding, supporting, non-destructive examination, pressure testing, heat treatment, box up etc. to complete the piping as per isometrics and other applicable drawings. Contractor shall thoroughly inspect the piping spools for presence of any foreign material inside, if any and clean the piping spools accordingly as required, by suitable means prior to erection.

1.9 Providing stiffeners for all small bore (1.5" and below) branches wherever required.
As a rule, for all lines in 600# & above classes, all small bore branches e.g. vents, drain, orifice taps, pressure tapings, temperature tapings, sample connections, PSV inlet, TSV inlet etc. in lines having two phase flow and lines having pulsating flow such as discharge of reciprocating compressors & reciprocating pumps, shall be provided with 2 numbers stiffeners at 90º to each other from the main pipe to impart adequate stiffness to the branch connection. The stiffeners shall be made of 6mm thick flats of material equivalent to the pipe material. Further, irrespective of line rating, the stiffeners shall be provided for all orifice taps, all small-bore tapings from PSV inlet/ outlet lines and all small-bore tapings from Control valve manifolds.
Materials required for above are in Contractor's scope of supply.

1.10 Internal grinding of welds of orifice flanges and wherever required as per drawing / document to render smooth surface.

1.11 All piping must have high point vents and low point drains, unless otherwise specified. All process drains, vents and bleeds shall be in accordance with P&IDs. 3/4" NB maximum or line size if line size is less than 3/4" NB size, high point vent and low point drains to be provided for hydrostatic / pneumatic testing / flushing. (Refer EIL piping standard 7-44-0350 & 7-44-0351).

1.12 Hydraulic bolt tensioning & torque tensioning shall be performed on flange joints as per the requirements specified in "Standard Specification for application of Torque & Hydraulic Bolt Tension for flange joints, No.6-76-0002". Contractor shall hand over one complete set of hydraulic bolt tensioning equipment and torque wrenches along with all adaptors covering all sizes of nuts, as used for this job to the Owner after commissioning of the plant. Values of bolt tensioning and torquing for the joints not covered in this specification shall be provided to the successful bidder.

1.13 Wherever piping class breaks of high pressure / low pressure are involved, the high-pressure circuit shall be tested up to piping class spec. break and the low-pressure circuit shall be tested up to the nearest flange of high-pressure piping.

1.14 In case of high pressure piping certain equipments will require to be included as a part of piping hydro test circuit. Contractor's scope shall include making necessary arrangements thereof and equipment drying after hydro testing. Supplying of temporary

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gaskets for all sizes required for hydro testing is in contractor's scope. The rates for piping shall be inclusive of said equipment testing and separate payment shall not be made on this account.

1.15 Fabrication, erection, testing & commissioning of miscellaneous items like injection nozzles, distributors etc. as per the respective sketches which shall be provided to the bidder. Bidder Scope also includes testing, commissioning of such items in all respect as directed by Engineer-In-Charge. Detailed fabrication drawings if required are to be prepared by the contractor and submit to Owner / PMC for Approval.

1.16 Steam tracing shall be carried out for lines specified as "IT" in P&ID's / Line List/Piping Isometric/Drawings. Fabrication and erection of steam supply/ condensate recovery manifolds and tracer pipes shall be in accordance with approved drawings and standards.

Steam tracing shall be done as per the Standard Specification for Steam tracing, 6-44-0007 and Annexure 6-44-0007-A1, 6-44-0007-A2.

Steam tracing fabrication & erection shall be done by Contractor as per philosophy given below-
Supply Lines and return lines to be of pre-insulated SS tubing. Tracing along CS pipes to be by conventional CS pipes. Tracing along SS Pipes to be of un-insulated SS tubing.

1.17 Pneumatic testing of reinforcement pads shall be in the scope of contractor. SOR item for reinforcement pads also includes pneumatic testing of the pads.

1.18 Erection of all inline instruments like flow instruments & specialty items like static mixers, thermal sleeve, air mixers, exhaust head, rupture disk, flow meters, venture tube, flame arrestor, thermal flow switch etc. except valve shall be considered as part of piping and separate payment shall not be made on this account.

1.19 De-super heaters are not covered separately in the SOR. However, if the de-super heaters are of Control valve type, payment for installation of the same shall be same as for control valve of inlet line size. If the de-super heaters are venturi type, the same shall be treated as pipe for payment of its erection.

1.20 Erection of control valves and other inline instruments shall be done after completion of all kind of works in the lines like pressure testing, flushing/ chemical cleaning etc. For dimensional verification of piping during fabrication of respective process lines, temporary spool pieces have to be used in place of control valves. The spool piece assemblies for each type of control valves and other inline instruments (type means flange end connection size, flange rating and end to end dimension) shall be provided to the Contractor as free issue material. Wherever such spool piece assembly are not provided to the contractor, the spool pieces, shall be fabricated by the contractor at site from pipes (supplied by Owner) & plate flanges (supplied by contractor) and shall be used in place of control valve and other inline instruments. The temporary gaskets required for the above activity shall be in contractor's scope. No separate payment shall be made on this account.
For final installation, the orbit type On-Off valves shall be handled with care at all times to avoid dropping or other impacts that could affect the alignment of the ball and seats and may thus cause leakage.

1.21 Transportation of all safety valves from Owner's storage points to Owner's testing yard and testing them (set pressure test, leak test) etc. Calibration of PSV's/ TSV's shall be

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carried out before installation. Contractor's scope shall also include dropping/shifting of the PSV's/TSV's from the installed position (if required) to workshop for calibration/re-calibration/re-checking, etc., and reinstall back to original location including parts replacement, gasket, stud/bolts etc., re-fixing of the PSV's /TSV's including lapping if required to be done. This includes the PSV's /TSV's which are installed by package vendors also.

1.22 Necessary rain protection and water draining arrangement to facilitate construction work at site shall be in the scope of contractor.

1.23 Supervision of all construction work in Contractor's scope and ensuring the safety of working personnel at site is prime responsibility of the contractor.

1.24 All bare line sizes (2" & above) on pipe rack/ sleeper / structure shall have corrosion pads/ protection shield.

1.25 Providing insert plates with anchor fasteners in concrete structures / paved floors and repair of platform gratings around pipe openings and providing suitable members for support under the platform grating. Materials required for above are in Contractor's scope of supply.

1.26 Casting of concrete pedestals, brick pedestals /steps and fabrication and erection of small structures for pipe supports and valve operation / attending some instruments, spectacle blind etc., providing brackets from structure for pipe supports, modification / extension of platforms, providing additional platforms / ladders for improving / providing accessibility, including supply of necessary materials.

1.27 Scaffolding where ever deemed necessary to execute the activity given in the SOR should be inclusive of Bidder's quoted cost for that particular activity.

1.28 Schedule of Rates: Any item if covered under one SOR and if needs to be executed under the scope (area) of other SOR where this item is not available, bidder shall have to perform the activity as per the instruction of Engineer-in-charge.

1.29 Making connections to underground piping systems erected by other agencies.

1.30 Contractor shall prepare welding specifications for all weld joints where dissimilar welding will be performed, and obtain approval from PMC/ Owner.

1.31 Dismantling/modification of erected piping, if required for routing of lines as per revised isometrics. All necessary clearances have to be taken by contractor from Engineer in charge. Contractor shall note that 1 Inch Dia of beveling is equal to beveling both side of the pipe components for which fit up is being made.

1.32 Contractor shall supply and erect structural davits for air coolers and safety Valves, control valve and wherever required as per operational and maintenance requirements of the Plant.

1.33 Flushing and testing of all piping systems as per "Specification for Inspection, flushing and testing of piping systems, no. 6-44-0013". The accessories required for blinding the line like flange, blind flange, gasket (all sizes, type and rating), stud-bolts, flexible hoses etc. are to be arranged by the Contractor. During flushing the discharged water / air shall be drained / routed as directed by the Engineer–In Charge.

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1.34 Supply, shaping, positioning and fixing of cold line supports as per EIL support standards.

1.35 CLOSE PROXIMITY radiography: In order to minimize cordon off distances, Close proximity radiography has been specified for Radiography. Alternatively, PAUT is also specified for higher thicknesses (where high curie source is required). Radio-Isotope to be used as Selenium-75. Shielding material to effective such that at a distance of 3meter, radiation dose rate should not exceed 1 micro-Sievert per hour. Source strength should be sufficient enough so that exposure time for 2" steel thickness should not exceed more than 4 hrs. for film radiography with minimum 2% IQI sensitivity for panoramic exposure in circumferential joints.

1.36 **AS-BUILT:** Contractor shall provide marked-up As-Built equipment layout, GADs and isometrics and get it reviewed by Engineer In-charge. CDs and hard copies of as-built drawings shall be supplied as per Special Condition of Contract. All the above said work are to be completed within quoted rates of piping and no separate payment shall be made on this account.

1.37 Positive Material identification during storage at Owner's store or Contractor's store, before fabrication and erection at site and after installation & before hydro testing as per the Standard Specification for Positive Material Identification at Construction Sites, 6-82-0002. The instruments required for PMI is to be arranged by the Contractor.

1.38 Tubing Work: Scope includes assembly, installation, supporting, testing of tubes, fittings, valves etc. taking care all assembly & supporting requirements specified in specification (B957-6-44-0005) or elsewhere including supply of tools & tackles, testing arrangements, sealant etc. and completing work in all respect as per specifications, drawings and instruction of Engineer In-charge.

1.39 In case of conflict between different specifications/ standards, the most stringent requirement of the concerned specifications/ standards shall be followed.

1.40 For specific requirements of materials to be supplied by the contractor other than those mentioned in the technical specifications refer General Conditions of Contract and Inspection and testing of contractor supplied items refer Special Conditions of Contract.

1.41 Providing additional pipe openings or filling of extra openings on concrete floors of tech. structures etc.

1.42 Providing sealing of gap between pipe and pipe opening in blast proof wall as per instructions of Engineer In-charge.

1.43 Material identification (color coding) during storage and before fabrication as per Standard Specification for Color coding of piping materials, 6-82-0003.

1.44 Providing low friction pads as specified in isometrics/special support sketches.

1.45 Providing temporary strainers/screens during pre-commissioning & removal of temporary strainers/ screens before start-up / commissioning as directed by Engineer In-charge.

1.46 Providing bird screens at the outlet of lines open to atmosphere.

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1.47 Fabrication, erection, testing of injection nozzles required on the Lines as per the requirements of the P&ID shall be done by Contractor based on the approved drawings.

1.48 Fabrication, erection, testing, painting & Insulation of piping in the vendor packages wherever erection of which is to be done by contractor. Contractor shall also facilitate the work of different other package vendors for successful mechanical completion, wherever required.

1.49 Any damage to Painting and Insulation on the existing equipment and piping shall be made good by the Contractor. The job specifications for Painting & Insulation shall be followed in such cases.

1.50 Fire Fighting/ Drinking Water System (Above Ground):

1.50.1 Fabrication, erection including supporting and testing of CS piping at all elevations for landing valves, fire hydrants, water monitors, hose box, hose reel etc. complete for fire water system. Fire water CS piping above ground shall be fabricated/ erected/ tested etc. as per normal above ground CS piping.

1.50.2 Supplying, fabricating, laying/erection, testing and commissioning the system of above ground G.I. piping (Galvanized Pipes, Flanges, Fittings, Gaskets, Bolts & Nuts etc. including valves as per Piping Material Specification – Piping Class J2A/J95A) for manually operated/ automatic water spray system on pumps, compressors, vessels, columns, etc. and Drinking water line of Eye Wash and Safety Shower. Procurement of the piping items shall be done from EIL approved vendor list.

1.50.3 Field routing, if required of line sizes 2” and below on pumps, columns etc. as per Process Flow Diagram (PFD), P&ID and standard specification for water spray nozzle.

1.50.4 Installation of all above ground Fire water spray and detection system piping including spray nozzles & detector as per Fire Water P&IDs.

1.50.5 Installation of firefighting equipment’s such as landing valves, strainer, fire hydrants, drain valves, spray nozzles, quartzoid bulb detector, restriction orifice plates, water monitors, hose reel, hose cabinets & fire extinguishers etc.

1.50.6 Providing insulation on the above ground galvanized drinking water up to Eye Wash and Safety Shower as per the P&ID’s and isometrics for Drinking Water System.

1.51 CHEMICAL CLEANING / AMINE DEGREASING/ALKALI BOILOUT:

The scope shall be as per marked-up Chemical Cleaning P&IDs with related lines/ equipments highlighted. Supply of chemicals, consumable, DM water (if available, will be provided by client on chargeable basis, however transportation for the same will be in contractor’s scope), equipment boilers, testing equipment and any other item required for chemical cleaning & pickling of lines. Making of temporary neutralization pit (confirming to HSE norms) for chemical cleaning / passivation & temporary piping for chemical cleaning / passivation i.e. Recirculation loops etc. shall be in contractor’s scope and shall be included in quoted rates. After chemical cleaning/ passivation neutralization of discharge in neutralization pit and disposal of same out of plant, taking approvals from concerned authorities regarding above shall be in contractor’s scope and at his own cost.

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The chemical cleaning, passivation, amine degreasing etc. shall be done as per job specifications as per below:

1.51.1 Pretreatment cum on-stream cleaning/ passivation of Recirculating Cooling Water as per the job specification “Job Specification for Pretreatment cum On-stream cleaning of Recirculating Cooling water, B957-000-06-42-CCS-001.”

1.51.2 Degreasing of Carbon Steel and Stainless-steel Piping & Vessels in Amine Service as per the job specification “Job Specification for Degreasing of Carbon steel piping & vessels in amine service, B957-000-06-42-CCS-003.”

1.51.3 Chemical cleaning of VHP/HP steam piping as per job specification “Job specification for chemical cleaning of VHP/HP steam piping, B957-000-06-42-CCS-004.”

1.51.4 Chemical cleaning and post-cleaning passivation treatment of fabricated and erected carbon steel compressor suction lines, inter stage suction lines, spillback lines of compressors prior to commissioning by chemical circulation method as per “Job Specification for Chemical Cleaning & Passivation of Compressor Circuit, B957-000-06-42-CCS-005, Rev.0.

1.51.5 Chemical Cleaning and passivation of the fabricated and erected carbon steel HP steam piping & MP steam generators as per “Job Specification for Chemical Cleaning of HP/MP/LP Steam Generators, ‘‘B957-444-02-42-CCS-007”.

1.51.6 Pre-commissioning Alkali boil out chemical cleaning of boilers for HP/MP steam generation as per “Job Specification for chemical cleaning of boilers by alkali boil out method, B957-000-06-42-CCS-008”.

1.51.7 Chemical cleaning of Stainless-steel Piping & fittings as per the job specification “Job Specification for external chemical cleaning of SS welds and fittings of tanks and pipes, B957-000-06-42-CCS-011”.

1.51.8 Pre-commissioning chemical cleaning and post-cleaning passivation treatment of carbon steel suction drums of compressors, surge drums, KO drums as per “Job specification for chemical cleaning and passivation by inhibited HCL method of CS Surge drums, suction drums of compressors & KO drums, “B957-444-02-42-CCS-0007”.

1.52 **Packages:**

1.52.1 For the vendor packages wherein the equipment / machinery erection is in the contractor scope (as per the scope defined under respective disciplines), the piping fabrication (mainly field welding of spools), erection, NDT, testing, insulation and painting shall also be in the contractor scope. Any items required for completing the packages which for some unforeseen reasons have not been completed by respective vendor shall be completed by the contractor. Field weld of all prefabricated spool of packages shall be measured in Inch Dia & erection in Inch Meter (Erection Spool) under SOR item No.(M10900000000).

1.52.2 The interconnecting piping between modules and up to the module battery limit shall be carried out by the contractor.

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1.53 **Scope at Battery Limit:**

Flushing, blowing & testing of lines shall be carried out up to Contractor's limit shown in drawings/ isometrics. The limit shown is applicable for all elevations along that coordinate. Generally, the piping interface at the battery limit between the unit contractor and the OSBL Contractor (Others) is through a flanged valve. The line shall be hooked up by the OSBL contractor to the flanged valve connection in the line provided by the ISBL contractor at the battery limit. The provision of matching flange at the battery limit tie-in point shall be in the scope of the OSBL contractor. Each line shall be tested by each contractor up to the unit battery limit valve and the flange joint boxing up shall be done by the OSBL contractor. If the OSBL contractor completes all its work including the testing of all lines before the completion of lines by the ISBL contractor at the battery limit then the box up of such balance flange joints shall be done by the ISBL contractor.

In case of interface with OSBL contractor is not through valve / flange connection the ISBL contractor shall weld a spool of required length (if necessary) to match with piping continued from offsite and 100% radiograph the non-hydro tested joint with OSBL piping which shall be available duly beveled.

The accessories required for blinding the line with suitable plates are to be arranged by contractor. After testing the plate blind shall be cut and pipe ends shall be prepared as per piping specification. In case continuation piping (which is in the other contractor's scope) has already been hydro tested & ends have been prepared, the later contractor shall weld his piping at the battery limit, radiograph the joint at battery limit after performing hydro test of system of his portion of piping.

1.54 Any other incidental / intermediate / ancillary or any enabling work not specifically mentioned in any specification but required to complete the work.

1.55 Supply and installation of Acoustic Insulation in the required lines as per the material and the thicknesses recommended by the Vendor, meeting the requirements of the P&IDs/ Vendor Isometrics etc., and as per the directions of the Engineer-in Charge.

1.56 Roto-mol cleaning method for pipes: - Cleaning shall be followed up with boroscopy for checking the cleanliness inside the pipe. Contractor has to offer boroscopy of the lines to BPCL/EIL representatives ensuring satisfactory internal cleaning of lines. All spading, de-spading, erection/dismantling of scaffolding, all tools and tackles, Farhana, Roto-mol Machine, boroscopy machine, Cables from nearest 440V socket, panel and all other accessories Including hose connection jobs required for successful completion of job shall be in the scope of contractor. Contractor to quote on per inch meter basis. For example, if contractor has carried out rotomol cleaning and boroscopy of 10" header for a length of 3 metres, the quantity shall be 10X3=30 inch meter.

1.57 Assistance for Pre-Commissioning/ commissioning activities included in contractor's scope but not limited to: -

1.57.1 Providing pre-commissioning/commissioning assistance to the Owner / PMC by providing Skilled /Semi-skilled/ un-skilled workers as per the direction of Engineer in - Charge with tools tackles, PPEs, consumables and supervision (including site supervision, safety supervision) with single point responsibility for quality, safety and speed of execution (One Man Day =8 hours shift) with 1 vehicle standby for emergency

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at site with the following manpower on fix basis. Contractor to provide & mobilize man power in shifts on Need Basis on the instructions of Engineer in- charge. Note that the manpower deployment shall be inclusive of required tools and tackles and machinery such as welding machines, grinding machines, gas cutting sets, etc.

1.57.2 Opening & box-up of valves, instrumented valves & spool pieces wherever necessary.

1.57.3 Attending leaks by tightening to the required torque/ replacement of faulty gaskets where necessary.

1.57.4 Air blowing, water flushing, cardboard blasting (supply in contractor's scope) & steam blowing, line pigging (as decided by EIL/Owner, post cleaning of line/equipment, will be inspected/certified by EIL.

1.57.5 Manual cleaning in big size compressor suction lines as per requirement.

1.57.6 Cleaning strainers/filters in the pump /piping circuits.

1.57.7 Topping up of bearing oil/lube oil in rotary equipment.

1.57.8 Hose connections/removal.

1.57.9 Opening & box-up of piping for connection & disconnection of chemical drums/ containers & their unloading into the system.

1.57.10 Rechecking of alignments for the rotating equipment.

1.57.11 Providing assistance to Vendor's Representative for equipment preparation/repair and any other similar activity as per the commissioning requirement as per the instruction of Engineer-in-charge including supply of necessary hand tools, equipment, consumables (scaffolding, electrodes, gas) and with single point responsibility of contractor's supervision.

1.57.12 Fabrication /Purchase of valve keys/blinds and other commissioning related consumable as required.

1.57.13 Supplying and installation of locks and chains for locking of valves.

1.57.14 Maintenance and repairing of valves by a skilled valve repair mechanic.

1.57.15 Dropping and reinstatement of valves as per requirement.

1.57.16 Supplying and installation of barricading tape.

1.57.17 Supplying of soap solution and squeeze bottles as required for leak test.

1.57.18 Supplying and installation of cardboard, plastic sheets & gaskets for use in pipeline blowing as required.

1.57.19 Supplying and installation of brass target plates for use in steam blowing as required.

1.57.20 Providing "Hydraulic mobile crane (minimum 15 Ton Capacity wheel mounted) including fuel, lube and operator & helper charges, slings web -belts d -shackles, guiding ropes etc. for lifting/shifting/loading/unloading material like pipes ,equipment, fittings, pipe-spools, concrete blocks, drums, boxes boulders, crates, scraps etc, as directed, (1 day=8 hours; time of deployment shall be reckoned from time of machinery reporting to site to time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE

1.57.21 Providing tractor/trailer as required including fuel, lube and operator & khalasi charges for transportation of material (including pipes, structural steel, fittings, valves, gaskets, earth, wooden scrap, usable material, metallic or nonmetallic scrap) from & to project/unit area, stores, warehouse, dump yard/scrap yard as directed.(1 day=8 hours; Time of deployment shall be reckoned from time of machinery reporting to site to time of releasing from site, part duration shall be paid on pro-rata basis) NEED BASE.

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1.57.22 Providing "Telescopic/Lattice" type crane (100 Ton capacity wheel mounted/CRAWLER) including fuel, lube and operator & helper charges, sling web belts d- shackles, guiding ropes etc for lifting/shifting/loading/ unloading material like pipes, equipment, fittings, pipe-spools, concrete blocks, drums, boxes boulders, crates, scraps etc as directed (1 day= 8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE

1.57.23 Providing "Telescopic" type crane (40 Ton capacity wheel mounted) including fuel, lube and operator & helper charges, sling web belts d- shackles, guiding ropes etc for lifting/shifting/loading/ unloading material like pipes, equipment, fittings, pipespools, concrete blocks, drums, boxes boulders, crates, scraps etc as directed (1 day=8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE

1.57.24 Providing Flame proof Torches- Rechargeable (with high intensity).

1.57.25 Supply of 40/80 SS wire-mesh ss for covering strainers /filters.

1.57.26 Supply of Rubber hoses (1", 15 mtr length, pressure-500 psi)

1.57.27 Supply of All types & sizes brass tools required for the pre-commissioning and commissioning work.

1.57.28 Supply of fire Hoses with connector for fire hydrants. (Dia 63 mm. length-15 mtr as per relevant standard international specifications.

1.57.29 To and Fro transportation arrangement for all electrical, instruments, mechanical items from site /store (EIL) within 50 km radius as per instruction of Engineer-in Charge. Suitable packing shall be included in quoted rates.

1.57.30 Ground preparation for the movement of cranes required for equipment erection. Quoted rate should be inclusive of the same.

1.57.31 Making separate welding booth & storage area for LTSC, Alloy steel & Stainless-Steel material.

1.57.32 TPI for all bought out items.

1.57.33 Supplying of water for hydrotesting & DM water for SS lines.

1.57.34 Providing material reconciliation statement along with every RA bill.

1.57.35 Supplying of oil for various pumps. Oil schedule will be provided to successful bidder.

1.57.36 Fabrication yard if available, shown in the overall plot plan shall be provided to the contractor. In case there is a requirement of more space contractor needs to arrange the same.

1.58 Special Requirements:

1.58.1 Mechanized/semi mechanized Spooling Work Contractor shall carry out Spooling Work at it, or its Sub-Contractor's Workshop.

1.58.2 Piping spools shall be erected at Site only after all reports are reviewed and verified as mentioned in contract.

1.58.3 Inch Meter specified in SOR Items are correspond to Centre line of piping as mentioned in isometrics.

1.58.4 Vendor shall submit all documents electronically through Vendor Document Management system of EIL.

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1.58.5 Pigging shall be carried for pipeline cleaning as per instruction of Engineer-in-Charge or identified lines in consultation with Owner. Bidder Shall develop procedure for pigging in consultation with Engineer-in-Charge.

1.58.6 Contractor to source all types of pre-fabricated pipe supports from external agencies, supply of material for the supports is in contractor's scope.

1.58.7 Scope of Work shall explicitly quantify the requirement of Radiography and Hydro-test. This is essential for deciding the minimum requirement (number) of applicable Machineries which shall have to be mobilized by Contractor for carrying out the projected quantity of Radiography and Hydro-test. The contractor shall also be asked to submit in its offer the Exclusive Deployment Schedule for such Machineries for Radiography and Hydro-test.

1.58.8 Contractor shall carry out manual checking of lines where-ever man entry is possible, by sending personnel along with PPE & oxygen arrangement. Digital snaps & report for manual checking by personnel for identified lines to be submitted to Engineer in-charge. This shall be applicable to all compressor suction lines & other lines as advised by engineer in charge.

1.58.9 Flare header flushing shall be carried out prior to pneumatic testing and clearance shall be taken from operation group and then contractor shall proceed for pneumatic testing and box up.

1.58.10 All large dia. Lines (10" and above) and compressor suction lines of all sizes be erected after internal cleaning and a record of the same is to be generated by Contractor & submitted as part of EIL format system for hand over in line with format approved by engineer in charge.

1.58.11 About 2,98,000 Inch Dia of Piping shall be supplied in the form of Pre-fabricated Piping spools. This includes most piping of 1"-30" in CS, 2"- 30" in LTCS and SS and all sizes in Alloy Steel. In this case Contractor scope will include modification of spools as required, erection and field welds (about 30% of Inch dia. mentioned).

1.58.12 Boroscope (VideoScope) Inspection for Stretch of Inlet Piping of Critical Equipment, /Compressor Suction Lines under Composite Contracts for Process Plants: Stretch of Inlet Piping between Strainer and Equipment Nozzle of each Critical Rotating Equipment shall be examined through Boroscope (High Resolution VideoScope Kit complete with about 25 m of Snake, and Camera & Light at head) Inspection. Such inspection is necessary to ensure that no solid object, which can inflict irreparable damage to rotating equipment, is left behind in the target stretch of boxed-up inlet piping (small flanged nozzle for induction of probe to be planned at appropriate location) and shall be part of erection and no separate payment shall be done for the same.

1.58.13 Automatic Blasting to be carried out.

1.58.14 For sprinkler system, caps/plugs to be supplied for testing purpose.

1.58.15 Dropping of valves (MOV's, PSV's & CV's) by contractor for piping testing purpose shall not be paid separately under SOR item (M13900000000), which are installed for piping mechanical clearance.

1.58.16 Contractor to follow EIL system for handover/Mechanical Completion of various sections of unit. All the punch points raised during this Format system to be rectified to the satisfaction of Engineering charge.

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2.0 BASIS FOR WORK

The basis of work shall be read in conjunction with Standard specification for fabrication and erection of piping, 6-44-0012. Additionally, the following documents shall be referred:

2.1 Job Piping Material Specification (B957-6-44-0005) & General Note to PMS (B957-6-44-0005-A1).

2.2 Standard specification for hot insulation of vessels, piping and equipments, 6-44-0002.

2.3 Standard specification for cold insulation of vessels, piping and equipment, 6-44-0003.

2.4 Job Specification of Non-Destructive Examination Requirements of Piping (B957-6-44-0016)

2.5 Welding Specification Charts for piping classes (B957-000-06-41-WSC-0001).

2.6 Standard Specification for inspection, flushing and testing of piping system (6-44-0013).

2.7 Welding Specification for Fabrication of piping (6-77-0001 & B957-999-06-41-WSP-0001).

2.8 Standard Specification for Steam tracing (6-44-0007) including annexure A1 & A2.

2.9 Standard Specification for application of torque & hydraulic bolt tension for flange joints (6-76-0002).

2.10 Surface preparation, Painting, Color coding, etc. shall be as per Job Specifications for surface preparation and protective coating, B957-000-06-42-PLS-01.

2.11 Standard specification for positive material identification (PMI) at construction sites, 6-82-0002.

2.12 Standard specification for color coding of piping material, 6-82-0003.

2.13 Standard specification for positive material identification (PMI) at supplier's works, 6-81-0001.

2.14 Marked up P&IDs for chemical cleaning.

2.15 Special Piping Support Standards, as applicable.

2.16 Any other PMC, Licensor or other specifications, including job specifications, attached with Piping Material Specification or elsewhere in the tender and special conditions of contract (such as standard for dimensional tolerances etc.).

2.17 Job Specifications for chemical cleaning like

a) “Job Specification for Pretreatment cum On-stream cleaning of Recirculating Cooling water, B957-000-06-42-CCS-001.”
b) “Job Specification for Degreasing of Carbon steel piping & vessels in amine service, B957-000-06-42-CCS-003.”

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c) "Job specification for chemical cleaning of VHP/HP steam piping, B957-000-06-42-CCS-004."
d) "Job specification for chemical cleaning of VHP/HP steam piping, B957-000-06-42-CCS-004."
e) "Job Specification for Chemical Cleaning & Passivation of Compressor Circuit, B957-000-06-42-CCS-005, Rev.0"
f) "Job Specification for Chemical Cleaning of HP/MP/LP Steam Generators, "B957-444-02-42-CCS-007".
g) "Job Specification for chemical cleaning of boilers by alkali boil out method, B957-000-06-42-CCS-008".
h) "Job Specification for external chemical cleaning of SS welds and fittings of tanks and pipes, B957-000-06-42-CCS-011".

3.0 SCOPE OF SUPPLY FOR TENDER (PIPING)

3.1 OWNER'S SCOPE OF SUPPLY

3.1.1 Pipes (All sizes and schedules in random lengths)

3.1.2 Flanges (All sizes, types and Pressure ratings)

3.1.3 Fittings (All sizes, types and schedules)

3.1.4 Valves (All sizes, types and ratings)

3.1.5 Gaskets (All sizes, types and ratings)

3.1.6 Studs, Nuts or M/c Bolts (all types).

3.1.7 Spring, Expansion joint / Bellows (All types).

3.1.8 Prefabricated piping spools along with attached piping supports

3.1.9 Specialty items like sample coolers, sample cabinets, MOVs, steam supply and condensate return manifolds, integrated steam traps, strainers, spray nozzles, air traps, hose pipes and hose couplings, CPV fittings & valves, Victaulic snap couplings, corrosion probes, silencers, snubbers, sight glass etc.

3.1.10 Online instruments like control valve with all auxiliaries like volume bottles, SDVs, orifice flange, annubar, magnetic flow meter, ultrasonic flow meter, restriction orifice, rotameter, rupture disc, corrosion probes, safety valve, de-superheater, PG/PT/ Flow transmitter etc.

3.1.11 Pipes for supporting of piping such as dummy pipe, RF pad, saddle, corrosion pad/ protection shield.

3.2 CONTRACTOR'S SCOPE OF SUPPLY

The procurement and supply in sequence and at appropriate time of all materials and consumables required for the completion of the works in all respects as per specification, codes, drawing and instruction of engineer-in-charge. Pre-commissioning & commissioning shall be the responsibility of the Contractor and prices quoted shall be deemed to be inclusive of such materials.

The supply of these materials shall include but not limited to the following:

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3.2.1 Tools, tackles and machinery required for cutting, fitting, alignment, welding, brazing, cleaning, grinding, threading, bolt tensioning etc.

3.2.2 All industrial gases such as oxygen, acetylene, inert gases, all types of electrodes, filler wire, flux wire, brushes, etc.

3.2.3 MS Tube, Bolts / Anchor fasteners, nuts, washers, spring washer including hangers, U-bolts with nuts, clamps, graphite and Teflon pads, angles, beams, channels etc. for pipe supports, platforms, ladders, stairways and for all miscellaneous steel structure, supporting steel plates, wires, and strip for attachment of steam tracers etc. However, for spring hangers entire spring assembly shall be supplied by Owner.

3.2.4 Shims, wedges, and packing plates (machined wherever required).

3.2.5 Plate flanges for fabricating temporary spool pieces for use in place of control valves and other inline instruments including temporary gaskets as per requirement at site and as instructed by Engineer-In-Charge.

3.2.6 All materials such as hydraulic pumps, Air Compressor, metallic blinds, temporary gaskets etc. and all necessary arrangement required for pressure testing and pneumatic testing.

3.2.7 Supply of MS flats, chequered plates, & flat bar.

3.2.8 Structural material for stiffener for small bore (1.5” & below) branches.

3.2.9 Supply of carbon steel, alloy steel and stainless steel (SS-304) plates for fabrication of saddle supports. It may be noted that most of the alloy steel supports will be furnished by pre-fabricated spool Contractor. However, as required, alloy steel plates shall be arranged for supporting required to be fabricated at site due to any modification. The payment for Alloy Steel plates shall be at the same rate as SS Plates.

3.2.10 Wooden/ high density PUF supports for cold lines.

3.2.11 Arrangement for compressed air, blinds, temporary gaskets etc. and arrangement required for pneumatic pressure testing including suitable compressor.

3.2.12 All materials and arrangement required for all types of non-destructive tests such as radiography, ultrasonic testing, dye-penetrant, magnetic particle, and wet fluorescent test, pneumatic testing for reinforcement pad, PMI instruments etc.

3.2.13 All material and arrangement required for stress relieving.

3.2.14 All grouting material required and specified as per PMC Specification, drawings and instructions of the Engineer-in-charge.

3.2.15 Contractor shall hand over one complete set of hydraulic bolt tensioning equipment and torque wrenches along with all adaptors covering all sizes of nuts, to the Owner after commissioning of the plant.

3.2.16 Arrangement & supply of chemicals, consumables, DM water, equipments, boilers, coupons and other testing equipments required for chemical cleaning, pickling & passivation of lines.

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3.2.17 All sealing and protecting materials as required.

3.2.18 Oil, grease, graphite, molykote, sealing tapes, cleaning agents including acids for cleaning of internals/packing/trough/tray etc.

3.2.19 All tools & tackles, material, consumables and arrangements required for rotomol cleaning.

3.2.20 Protective cloth and water hoses for fire and safety protection as required.

3.2.21 Chain pulley block and all other material handling equipments as per requirements.

3.2.22 Supply of all items required for erection comprising of: -

3.2.22.1 Manually operated ground winches

3.2.22.2 Hoisting ropes

3.2.22.3 Direction pulley on ground, Guide pulleys

3.2.22.4 Motor for hoisting rope, along with fixing bolts and structural support members as required.

3.2.22.5 Thimble for fastening hoisting rope to lifting beam.

3.2.22.6 Supports for ground winch and direction pulley with foundation bolts, as necessary.

3.2.22.7 Welding/fixing of bearing brackets on the platform and support arms on the stack.

3.2.22.8 Structural members as necessary for supporting the guides for lifting beam during lowering/hoisting.

3.2.22.9 Tip lowering/hoisting guides.

3.2.22.10 Supply of structural steel grade pipe for handrails and chequred plates.

3.2.23 All safety equipments required for safe conduct the job, avoid accidents and keep good housekeeping and environment.

3.2.24 Supply, fabrication, & installation etc. of hot dip galvanized plates, for earth wire lug connection required for earthing of pipes.

3.2.25 Supply of cold galvanizing or zinc coating material with approval of Engineer-In- charge.

3.2.26 Bird screens at the outlet of lines open to atmosphere.

3.2.27 Low friction pads like Teflon/graphite pads, Stainless steel plates with suitable bonding material/fastener.

3.2.28 Supply of all materials required for Painting & insulation.

3.2.29 Wherever valves require extended spindle the same shall be provided. The arrangement for the extended spindle shall be prepared by Contractor and submitted to Engineer-in-charge for approval.

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3.2.30 Structural steel required for modifications / extension of platform, providing additional platforms, ladders, jump-overs, movable/portable platforms for valve operation etc. to improve accessibility, wherever required.

3.2.31 All items required for hydro testing / pneumatic testing / blinding / de-blinding / flushing etc.

3.2.32 Supply of all types of steel plate including pressure vessel specification plates.

3.2.33 All other materials though not specified above but required for completion of the work as per specification, codes, drawings and instructions of the Engineer-in-charge.

3.2.34 Supply of pre-insulated tubing as per Specification B957-6-44-0022.

4.0 SCOPE OF WORK (PAINTING)

The scope of work broadly consists of surface preparation as required, selection and application of required primer / finish paint on surfaces of piping, piping supports, on-line instruments, structural steel work and structural steel work for piping supports etc. for **Corrosive Environment** as detailed in schedule of rates as per drawings, Specification for surface preparation and protective coating, B957-000-06-42-PLS-01 and instructions of Engineer-in-charge.
Specification no. **6-79-0020** appearing anywhere (including Schedule of Rates) shall be read as **B957-000-06-42-PLS-01**
The painting activity shall include painting of prefabricated piping spools and piping other than prefabricated spools. The prefabricated piping spools shall be supplied to the contractor with pre-erection/ shop primer painted and only the post erection/ field painting shall be done by the contractor after repair of pre-erection/shop primer after erection/welding.

For the piping other than prefabricated spools, the contractor shall carry out the complete painting procedure including the surface preparation, Pre-erection/Shop Primer application and the post erection/ field painting including the repair of pre-erection/pre-fabrication or Shop Primer after erection/ welding.
Painting of piping in packages is also included in scope of work of the contractor.

The scope of work shall be as per Schedule of Rates (SOR) but not limited to:

4.1 All insulated and un-insulated piping and fittings including flanges and valves as per the painting specification.

4.2 Any other surface as directed by Engineer-in-charge.

4.3 Identification lettering / numbering on all painted surface of equipments, piping, including color bands on all painted surface of equipments / piping. Color coding shall be carried out as per Specification for surface preparation and protective coating, B957-000-06-42-PLS-01.

4.4 Hazardous content marking/ identification signs on painted surface of equipments/ piping.

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4.5 Cleaning up the working areas regularly during the course of work for purpose of good housekeeping as well as cleaning up the site on completion of the work as directed by the Engineer-in-charge.

4.6 Providing besides all materials, consumables, labour & supervision required for carrying out the painting work, all safety devices, equipments, apparatuses, instruments etc. necessary and incidental requirements to perform the work in workmanship and efficient manner within the stipulated time period.

4.7 Scaffolding for all heights, all other incidental/auxiliary /ancillary/accessories, labour, material, tools and tackles /consumables etc. or any enabling work not specifically mentioned in the specifications but necessary for the execution and completion of work as envisaged in the tender document.

4.8 The quantum and scope of painting shall be assessed by the bidder himself based on drawings and documents such as P&ID's, line lists, typical drawings and all other documents and specifications. However complete painting works as necessary shall be in the scope of the contractor.

5.0 SCOPE OF SUPPLY (PAINTING)

Owner's scope of supply: NIL

Contractor's scope of supply:

The procurement and supply in sequence and at appropriate time of all materials and consumables required for the completion of the works shall be the responsibility of the contractor and prices quoted shall be deemed to be inclusive of such materials.

The supply of these materials shall include but not limited to the following:

- All primers and finish paints as per paining specification.
- All equipments for surface preparation & touch-up primer.
- All consumable for surface preparation & touch-up primer.
- All equipments for paint application like brushes, spray nozzles, spray Pumps/blowers etc.
- All equipments like dust collector, protection shield etc. for conducting the job.
- All consumables and equipments required for job completion at all elevation and at any location.
- All items/equipments required to complete the job as per requirement of Specification for surface preparation and protective coating, B957-000-06-42-PLS-01.

6.0 SCOPE OF WORK (INSULATION)

The scope of Work shall include Hot Insulation & Cold Insulation work of equipments, vessels, exchangers, piping, instrumentation etc. as detailed in Schedule of Rates and Standard specification for hot insulation of vessels, piping and equipments, 6-44-0002 and Standard specification for cold insulation of vessels, piping and equipment, 6-44-0003.

6.1 Supply of all insulation and ancillary material like spacer-ring, stays, lacing and binding wires, screws, bands, felt, wooden blocks, studs, flats, support ring clips, sealant and mastic, cement, glass cloth, aluminum sheets/ GI sheets necessary drillings and fixing

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of bolts/nuts, washers etc., as specified and required. All insulation material shall be new and of approved quality with complete test certificates and in accordance with the specifications.

6.2 Application of insulation with weather proofing on vessels, columns, equipments like Heat Exchangers, piping including valves, flanges etc. and instrumentation as per specifications and instructions of Engineer-in-charge.

6.3 Providing besides all materials and consumables labour and supervision required for carrying out the insulation work, all safety devices, equipments, apparatuses, instruments etc. necessary and incidental requirements to perform the work in workmanship and efficient manner within the stipulated time period.

6.4 Color coding identification of equipments, vessels, heat exchangers, column, piping, instrumentation etc. after insulation as per painting specification & instructions of Engineer-in-charge.

6.5 Proper storage and protection of insulation material and consumables brought to site by the Contractor at all stages of work.

6.6 Providing insulation plugs and inspection windows at all locations as per drawings, specifications and instructions of Engineer-in-charge.

6.7 Keeping the working area clean and tidy during course of execution and cleaning the work site to the full satisfaction of the Engineer-in-charge after completion of work.

6.8 Any other incidental/intermediate/ancillary or any enabling work/materials not specifically mentioned in the specifications but necessary for the execution and completion of work as envisaged in the tender document.

6.9 Dismantling of the insulation, if required, as per the instructions of Engineer-in-charge.

6.10 Application of hot insulation on heat traced instruments and level gauges as per specifications and instructions of Engineer-in-charge.

6.11 Insulation of any other surface as per instruction of Engineer-in-charge.

6.12 Providing scaffolding for all heights, all other incidental / auxiliary / ancillary / accessories, labour, material, tools and tackles / consumables, supervision etc. or any enabling work not specifically mentioned in the specifications but necessary for the execution and completion of work as envisaged in the tender document.

6.13 Supply of paint and Color-coding identification of equipments, vessels, heat exchangers, process column, piping, instruments etc. after insulation as per relevant specification and instruction of Engineer-in-charge.

6.14 Any lines requiring dismantling of the insulation for inspection / repair / maintenance, erection of any other equipment shall be done by contractor and again secured back in place after completion of the subject activity.

The actual quantum and scope of work of insulation shall be assessed by the contractor based on drawings and documents such as P&ID's, line list, GAD's, isometrics and other relevant documents and specifications. However complete insulation work as necessary shall be in the scope of the Contractor.

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7.0 SCOPE OF SUPPLY (INSULATION)

Owner's scope of supply: NIL

Contractor's scope of supply:

The procurement and supply in sequence and at appropriate time of all materials and consumables required for the completion of Insulation and Painting (Color coding identification) works shall be the responsibility of the contractor and prices quoted shall be deemed to be inclusive of such materials.
The supply of these materials shall include but not limited to the following:

All items required to complete Insulation (Insulation material, weather protection jacket, attachment material, fixing materials, vapor barrier material, bolting, screws, inspection window, structural attachment, material for color coding identification etc.) as per the attached standards, specifications and instructions of Engineer-in-charge.

All consumables and equipments which are required for job completion at all elevation and any location.

Contractor shall supply all sealing and protecting materials required for protecting items/equipments supplied by Owner / Contractor.

8.0 LIST OF APPLICABLE STANDARDS/ SPECIFICATIONS/ DRAWINGS

Sr. No.	TITLE	Document No.	Rev No
1.	Standard specification for Hot insulation of vessel, piping & equipments.	6-79-0026	0
2.	Standard specification for cold insulation of vessels, piping and equipment	6-79-0027	1
3.	Piping Material Specification	B957-6-44-0005 (Note 3)	-
4.	General Notes to PMS	B957-6-44-0005-A1(Note 3)	-
5.	PMS Extracts	B957-6-44-0005-A2(Note 3)	-
6.	Specification for Steam Tracing	6-44-0007	6
7.	Annexure-1 Steam tracing (Typical Diagrams)	6-44-0007-A1	5
8.	Annexure-2 Steam tracing (Typical Diagrams)	6-44-0007-A2	2
9.	Job Specification for Fabrication & Erection of Piping	6-44-0012	6
10.	Job Specification for Inspection, Flushing and Testing of Piping Systems	6-44-0013	6
11.	Job Specification for Non-Destructive Examination Requirement of Piping	B957-6-44-0016 (Note 2)	D
12.	Standard specification for underground and above ground G.I. pipeline system (water services)	6-65-0027	6
13.	Welding Specification Charts for piping classes	B957-000-06-41-WSC-0001 (NOTE-5)	3
14.	Welding Specification for fabrication of piping	6-77-0001 & B957-999-06-41-WSP-0001(NOTE-5)	5

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Sr. No.	TITLE	Document No.	Rev No
15.	Standard Specification for Positive Material Identification (PMI) at Supplier's Works	6-81-0001	4
16.	Standard Specification for Positive Material Identification (PMI) at Construction Sites	6-82-0002	6
17.	Specification for surface preparation and protective coating	B957-000-06-42-PLS-01 (NOTE-5)	2
18.	Standard Specification for Application of Torque and Hydraulic bolt tension for flange joints	6-76-0002	3
19.	Standard Specification for Color coding of Piping materials	6-82-0003	4
20.	Specification for Quality Management System Requirements from Bidders	6-78-0001	3
21.	Specification for Documentation requirements from Contractors	6-78-0002	3
22.	Specification for documentation requirements from suppliers	6-78-0003	3
23.	Job Specification for Pretreatment Cum Onstream Cleaning of Recirculating Cooling Water	B957-000-06-42-CCS-001 (NOTE-5)	B
24.	Job Specification for Degreasing of Carbon Steel Piping & Vessels in Amine Service	B957-000-06-42-CCS-003 (NOTE-5)	B
25.	Job Specification for Chemical Cleaning of VHP/HP Steam Piping	B957-000-06-42-CCS-004 (NOTE-5)	B
26.	Job Specification for Chemical Cleaning & Passivation of Compressor Circuits	B957-000-06-42-CCS-005 (NOTE-5)	B
27.	Job Specification for Chemical Cleaning of HP/MP/LP Steam Generators	B957-000-06-42-CCS-007 (NOTE-5)	B
28.	Job Specification for Chemical Cleaning of Boilers by Alkali Boil Out Method	B957-000-06-42-CCS-008 (NOTE-5)	B
29.	Job Specification for External Chemical Cleaning and Passivation of SS Welds and Fittings of Tanks and Pipes	B957-000-06-42-CCS-011 (NOTE-5)	B
30.	Standard Quality Assurance Plan – Construction Division (Item Rate Contracts)	6-82-6100	4
31.	Pipe davit.	7-12-0023	8
32.	Symbols of piping elements on drawings.	7-44-0003	6
33.	Details Of Mitered Elbows	7-44-0033	7
34.	Chain Operation Attachment for ANSI Valves (150#, 300# and 600#)	7-44-0050	6
35.	Standard For Spacers and Blinds > 26” (150#, 300#, & 600# FF)	7-44-0162	6
36.	Standard for Spacers and Blinds > 26” (For AWWA Flanges)	7-44-0164	2
37.	Sample cooler- Type-1(non-congealing services)	7-44-0310	6
38.	Sample cooler- Type-2(congealing services)	7-44-0311	4
39.	Vents & Drains (On Lines 1.5" And below)	7-44-0350	6

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Sr. No.	TITLE	Document No.	Rev No
40.	Vents & Drains (On Lines 2.0" And above)	7-44-0351	6
41.	Orientation of Orifice Tap	7-44-0352	6
42.	Well installation	7-44-0353	6
43.	Pressure Tapings	7-44-0354	6
44.	Steam Trap Assembly	7-44-0400	7
45.	Utility Hose Station	7-44-0401	6
46.	Drip leg for steam Line	7-44-0403	7
47.	Pipe Sleeve Details for insulated Line	7-44-0404	6
48.	Welding Of Pipe with Different Thickness	7-44-0476	6
49.	Butt Welding End Preparation	7-44-0477	6
50.	Fillet Weld Details	7-44-0478	6
51.	Welding Details of Branch Connections (Stub-In)	7-44-0479	6
52.	Butt Weld Details	7-44-0480	6
53.	Butt Weld Details (sequence of welds)	7-44-0481	6
54.	Welding Details of Branch Connections (Stub-In)	7-44-0482	6
55.	Branch Connection (Breaking Into)	7-44-0483	6
56.	Branch Connection (Not Breaking Into)	7-44-0484	6
57.	Method Of Cutting and Dimensions of Concentric Reducers	7-44-0485	6
58.	Tolerances For Field Fabrication	7-44-0486	6
59.	Method Of Cutting and Dimensions of Field Manufacture of Eccentric Reducers	7-44-0487	7
60.	Clearance Requirements for Orifice Flange Instrument Piping	7-44-0504	5
61.	Foundation for sliding support for pipes on grade	7-67-0010	7
62.	Earthing/ Bonding of Pipes and Pipe racks	7-51-0112	6
63.	Job specification for pre-insulated tubing	B957-6-44-0022	0
64.	Piping Support Standards	(Note-3)	
65.	Equipment Layout- ECU (Page-1)	B957-300-16-43-00001	-
66.	Equipment Layout- ECU (Page-2)	B957-300-16-43-00002	-
67.	Overall Plot Plan	B957-999-81-45-00001 (NOTE-5)	-
68.	Marked up Chemical Cleaning P&IDS- ECU	Note-3	

Notes:

1. Equipment Layouts are attached for reference. Execution shall be as per latest revision of equipment layout which shall be given to successful bidder.
2. Updated NDT specification shall be given to successful bidder.
3. It shall be provided to the successful bidder.

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4. O&M procedure by Licensor shall be provided to Successful bidder.
5. Attached elsewhere in the tender documents.

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SCOPE OF WORK & SUPPLY

(PIPING)

MECHANICAL WORKS - I FOR ECU

(ETHYLENE CRACKER & ASSOCIATED UNITS)

BPREP, BPCL

TENDER No. : B957-300-16-43-MR-T-3001

PROJECT : ETHYLENE CRACKER & ASSOCIATED UNITS BINA, MADHYA PRADESH, INDIA

OWNER : BPCL

JOB NO : B957

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
1	21.04.2026	ISSUED FOR TENDER	KKV	MK	SH
0	05.03.2026	ISSUED FOR TENDER	KKV	MK	SH

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1.0 SCOPE OF WORK FOR TENDER (PIPING)

Bharat Petroleum Corporation Ltd. ("BPCL"), a Public Sector Undertaking with a "Maharatna" status engaged in refining of crude oil and marketing of petroleum products, intends to set up a world class petrochemicals complex as a part of Bina Petchem and Refinery Expansion Project (BPREP), BPCL at Bina Refinery located at Bina Refinery located at Sagar, Madhya Pradesh for its diversification to petrochemicals apart from expansion of Bina refinery capacity to about 12 MMTPA.

The Ethylene Cracker and Associated Units of capacity of about 1.2 MMTPA has been split up between two parts i.e. PART-A and PART-B under single tender B957-300-16-43-MR-T-3001.

This tender i.e. MECHANICAL WORKS - I FOR ECU (Tender no. B957-300-16-43-MR-T-3001 shall comprise Mechanical (Piping & Equipment erection), Insulation, Painting, Fire-proofing and miscellaneous Civil/ Structural works relating to ETHYLENE CRACKER & ASSOCIATED UNITS.

This document shall read in conjunction with respective Piping Schedule of Rates (Piping SOR) to carry out the Piping related composite works by Composite Contractor at site.

The scope of work of Contractor shall include the following in addition to the scope of work as defined in Standard Specification for Fabrication and Erection of piping, Doc. No. 6-44-0012 Rev 6:

1.1 Clause 2.6 of 6-44-0012 stands modified as under:
The Piping isometrics for main process/utility lines including small bore shall be provided to the Contractor. However, the steam tracing from the Steam supply station manifolds to the traced lines/ instruments, along the traced lines/ instruments and from traced lines/ instruments to the condensate recovery manifolds shall be done by the contractor suit to site condition. The preparation of steam tracing isometrics & bill of material for same, detailing of supports of all steam tracers is in Contractor's scope and any line specified as field routed within the Unit battery limit including subsequent approval from Engineer-in-charge as and when required is in Contractor's scope of work.
No separate payment shall be made on this account.

Small bore piping isometrics given to the contractor shall be rechecked by Contractor before further erection and installation.

Clause 2.7 of 6-44-0012 stands modified as under:
"Contractor, at his own cost, shall obtain the approval for the piping systems falling under purview of IBR from the statutory Indian Boiler Regulations (IBR) authority of the state where the plant is situated. Documentation (Isometrics and Calculations only) for the IBR System shall be provided by the Owner. In case the local IBR authority insists that the documentation provided by the owner is required to be submitted in an alternate format then the contractor shall get the isometrics, system isometrics, IBR calculations etc. redone in the appropriate format as required by the local IBR authority at no extra cost. Shop obtained IBR certificate of equipment & piping material shall be provided to the contractor."

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1.2 Non-destructive examination / testing shall be as per the job standard specification-B957-6-44-0016. In addition to this, welded reinforcing pads shall be pneumatically leak tested.

1.3 Piping materials, in addition to those already specified in clause no. 2.1.1 of standard specification 6-44-0012, shall also include the following but not limited to:

1.3.1 Sample cabinets, vortex flow meters, thermal mass flow meters, rotameters, volume bottles, corrosion probes and any other miscellaneous items as required to execute the job.

1.3.2 Supplying, fabrication and erection of pipe supports like shoes, clamps including bolting materials, saddles, guides, dummy pipes (free issued to contractor), stops, anchors, clips, cradles, hangers, turn buckles, springs used in clamps for pulsating/ vibrating lines, spring washers, supporting fixtures, brackets, cantilevers, struts, tee-posts, including erection of spring supports, corrosion pads/protection shields, low friction pads, expansion bellows, steam supply and condensate manifolds supports and sway braces, supply/ fabrication of wooden/ high density PUF supports for cold lines etc.

1.4 Site Fabrication of piping items in addition to those already specified in 6-44-0012 shall also include the following but not limited to:

a. Fabrication of piping specials like special radius bends, tees, reducers, miters, etc.
b. Fabrication of plain and threaded nipples from pipes as required during erection.
c. Fabrication of swage nipples as and when required.
d. Fabrication of odd angle elbows / bends like 60°, 30°, or any other angle from 90°/45° elbows as and when required as per applicable design standard.
e. Fabrication of flanges, reducing flanges, blind flanges, spectacle blinds, crosses, jump overs etc. as and when required as per applicable design standard.
f. Fabrication of circular pipe for steam rings, fire water lines, utility lines at all levels and elevations.
g. Fabrication of stub in connections with or without reinforcement.
h. Grinding of edges of pipes, fittings, flanges, etc. to match mating edges of uneven / different thickness wherever required as per specifications including beveling of plain end pipes.
i. Threading of all small-bore piping as per piping material specifications.
j. Drilling on blind flange for inserting / joining small bore lines.
k. Fabrication and welding of reinforcement pads at branch pipe locations wherever required.
l. For piping classes for which PWHT is specified for weld joints in the PMS/ Welding specification, PWHT shall be done to all weld attachments to pipe.
m. Fabrication of miscellaneous elements like flash pot, seal pot, injection nozzles, sample cooler, supporting elements like turn-buckles, extension of spindles and interlocking arrangement of valves, operating platforms etc. as required by Engineer-In-Charge.
n. Fabrication & installation of earthing lugs.
o. Fabrication and erection of small vessels

1.5 Modifications like providing additional cleats for extension of stem of valve, locking arrangement of valves, providing chain operation facility etc. as and when required.

1.6 Transportation of required piping materials (as described in clause 1.3), pipe support materials (as described in clause 1.3.2) and all other necessary piping materials from owner's storage point or Contractor's storage point (in case of Contractor's scope of

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supply) to work site / shop including raising store requisitions for issue of materials in the prescribed format & maintaining an account of the materials received from Owner's stores, reconciliation of all Owner supplied free issue materials.
Making material reconciliation statement and return of owner supplied left over materials to Owner's storage. For transportation of structures, piping, equipments etc. from Owner's storage points to contractor's stores / worksite, access preparation, if required along the route shall be under Contractor's scope.

1.7 Obtaining approval for drawings prepared by contractor from concerned statutory authority, wherever required as per instructions of Engineer – in- charge.

1.8 Erection of prefabricated piping spools along with its branches and attached supports, alignment, cutting, beveling, fit up, welding, supporting, non-destructive examination, pressure testing, heat treatment, box up etc. to complete the piping as per isometrics and other applicable drawings. Contractor shall thoroughly inspect the piping spools for presence of any foreign material inside, if any and clean the piping spools accordingly as required, by suitable means prior to erection.

1.9 Providing stiffeners for all small bore (1.5" and below) branches wherever required.
As a rule, for all lines in 600# & above classes, all small bore branches e.g. vents, drain, orifice taps, pressure tapings, temperature tapings, sample connections, PSV inlet, TSV inlet etc. in lines having two phase flow and lines having pulsating flow such as discharge of reciprocating compressors & reciprocating pumps, shall be provided with 2 numbers stiffeners at 90º to each other from the main pipe to impart adequate stiffness to the branch connection. The stiffeners shall be made of 6mm thick flats of material equivalent to the pipe material. Further, irrespective of line rating, the stiffeners shall be provided for all orifice taps, all small-bore tapings from PSV inlet/ outlet lines and all small-bore tapings from Control valve manifolds.
Materials required for above are in Contractor's scope of supply.

1.10 Internal grinding of welds of orifice flanges and wherever required as per drawing / document to render smooth surface.

1.11 All piping must have high point vents and low point drains, unless otherwise specified. All process drains, vents and bleeds shall be in accordance with P&IDs. 3/4" NB maximum or line size if line size is less than 3/4" NB size, high point vent and low point drains to be provided for hydrostatic / pneumatic testing / flushing. (Refer EIL piping standard 7-44-0350 & 7-44-0351).

1.12 Hydraulic bolt tensioning & torque tensioning shall be performed on flange joints as per the requirements specified in "Standard Specification for application of Torque & Hydraulic Bolt Tension for flange joints, No.6-76-0002". Contractor shall hand over one complete set of hydraulic bolt tensioning equipment and torque wrenches along with all adaptors covering all sizes of nuts, as used for this job to the Owner after commissioning of the plant. Values of bolt tensioning and torquing for the joints not covered in this specification shall be provided to the successful bidder.

1.13 Wherever piping class breaks of high pressure / low pressure are involved, the high-pressure circuit shall be tested up to piping class spec. break and the low-pressure circuit shall be tested up to the nearest flange of high-pressure piping.

1.14 In case of high pressure piping certain equipments will require to be included as a part of piping hydro test circuit. Contractor's scope shall include making necessary arrangements thereof and equipment drying after hydro testing. Supplying of temporary

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gaskets for all sizes required for hydro testing is in contractor's scope. The rates for piping shall be inclusive of said equipment testing and separate payment shall not be made on this account.

1.15 Fabrication, erection, testing & commissioning of miscellaneous items like injection nozzles, distributors etc. as per the respective sketches which shall be provided to the bidder. Bidder Scope also includes testing, commissioning of such items in all respect as directed by Engineer-In-Charge. Detailed fabrication drawings if required are to be prepared by the contractor and submit to Owner / PMC for Approval.

1.16 Steam tracing shall be carried out for lines specified as "IT" in P&ID's / Line List/Piping Isometric/Drawings. Fabrication and erection of steam supply/ condensate recovery manifolds and tracer pipes shall be in accordance with approved drawings and standards.

Steam tracing shall be done as per the Standard Specification for Steam tracing, 6-44-0007 and Annexure 6-44-0007-A1, 6-44-0007-A2.

Steam tracing fabrication & erection shall be done by Contractor as per philosophy given below-
Supply Lines and return lines to be of pre-insulated SS tubing. Tracing along CS pipes to be by conventional CS pipes. Tracing along SS Pipes to be of un-insulated SS tubing.

1.17 Pneumatic testing of reinforcement pads shall be in the scope of contractor. SOR item for reinforcement pads also includes pneumatic testing of the pads.

1.18 Erection of all inline instruments like flow instruments & specialty items like static mixers, thermal sleeve, air mixers, exhaust head, rupture disk, flow meters, venture tube, flame arrestor, thermal flow switch etc. except valve shall be considered as part of piping and separate payment shall not be made on this account.

1.19 De-super heaters are not covered separately in the SOR. However, if the de-super heaters are of Control valve type, payment for installation of the same shall be same as for control valve of inlet line size. If the de-super heaters are venturi type, the same shall be treated as pipe for payment of its erection.

1.20 Erection of control valves and other inline instruments shall be done after completion of all kind of works in the lines like pressure testing, flushing/ chemical cleaning etc. For dimensional verification of piping during fabrication of respective process lines, temporary spool pieces have to be used in place of control valves. The spool piece assemblies for each type of control valves and other inline instruments (type means flange end connection size, flange rating and end to end dimension) shall be provided to the Contractor as free issue material. Wherever such spool piece assembly are not provided to the contractor, the spool pieces, shall be fabricated by the contractor at site from pipes (supplied by Owner) & plate flanges (supplied by contractor) and shall be used in place of control valve and other inline instruments. The temporary gaskets required for the above activity shall be in contractor's scope. No separate payment shall be made on this account.
For final installation, the orbit type On-Off valves shall be handled with care at all times to avoid dropping or other impacts that could affect the alignment of the ball and seats and may thus cause leakage.

1.21 Transportation of all safety valves from Owner's storage points to Owner's testing yard and testing them (set pressure test, leak test) etc. Calibration of PSV's/ TSV's shall be

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carried out before installation. Contractor's scope shall also include dropping/shifting of the PSV's/TSV's from the installed position (if required) to workshop for calibration/re-calibration/re-checking, etc., and reinstall back to original location including parts replacement, gasket, stud/bolts etc., re-fixing of the PSV's /TSV's including lapping if required to be done. This includes the PSV's /TSV's which are installed by package vendors also.

1.22 Necessary rain protection and water draining arrangement to facilitate construction work at site shall be in the scope of contractor.

1.23 Supervision of all construction work in Contractor's scope and ensuring the safety of working personnel at site is prime responsibility of the contractor.

1.24 All bare line sizes (2" & above) on pipe rack/ sleeper / structure shall have corrosion pads/ protection shield.

1.25 Providing insert plates with anchor fasteners in concrete structures / paved floors and repair of platform gratings around pipe openings and providing suitable members for support under the platform grating. Materials required for above are in Contractor's scope of supply.

1.26 Casting of concrete pedestals, brick pedestals /steps and fabrication and erection of small structures for pipe supports and valve operation / attending some instruments, spectacle blind etc., providing brackets from structure for pipe supports, modification / extension of platforms, providing additional platforms / ladders for improving / providing accessibility, including supply of necessary materials.

1.27 Scaffolding where ever deemed necessary to execute the activity given in the SOR should be inclusive of Bidder's quoted cost for that particular activity.

1.28 Schedule of Rates: Any item if covered under one SOR and if needs to be executed under the scope (area) of other SOR where this item is not available, bidder shall have to perform the activity as per the instruction of Engineer-in-charge.

1.29 Making connections to underground piping systems erected by other agencies.

1.30 Contractor shall prepare welding specifications for all weld joints where dissimilar welding will be performed, and obtain approval from PMC/ Owner.

1.31 Dismantling/modification of erected piping, if required for routing of lines as per revised isometrics. All necessary clearances have to be taken by contractor from Engineer in charge. Contractor shall note that 1 Inch Dia of beveling is equal to beveling both side of the pipe components for which fit up is being made.

1.32 Contractor shall supply and erect structural davits for air coolers and safety Valves, control valve and wherever required as per operational and maintenance requirements of the Plant.

1.33 Flushing and testing of all piping systems as per "Specification for Inspection, flushing and testing of piping systems, no. 6-44-0013". The accessories required for blinding the line like flange, blind flange, gasket (all sizes, type and rating), stud-bolts, flexible hoses etc. are to be arranged by the Contractor. During flushing the discharged water / air shall be drained / routed as directed by the Engineer–In Charge.

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1.34 Supply, shaping, positioning and fixing of cold line supports as per EIL support standards.

1.35 CLOSE PROXIMITY radiography: In order to minimize cordon off distances, Close proximity radiography has been specified for Radiography. Alternatively, PAUT is also specified for higher thicknesses (where high curie source is required). Radio-Isotope to be used as Selenium-75. Shielding material to effective such that at a distance of 3meter, radiation dose rate should not exceed 1 micro-Sievert per hour. Source strength should be sufficient enough so that exposure time for 2" steel thickness should not exceed more than 4 hrs. for film radiography with minimum 2% IQI sensitivity for panoramic exposure in circumferential joints.

1.36 **AS-BUILT:** Contractor shall provide marked-up As-Built equipment layout, GADs and isometrics and get it reviewed by Engineer In-charge. CDs and hard copies of as-built drawings shall be supplied as per Special Condition of Contract. All the above said work are to be completed within quoted rates of piping and no separate payment shall be made on this account.

1.37 Positive Material identification during storage at Owner's store or Contractor's store, before fabrication and erection at site and after installation & before hydro testing as per the Standard Specification for Positive Material Identification at Construction Sites, 6-82-0002. The instruments required for PMI is to be arranged by the Contractor.

1.38 Tubing Work: Scope includes assembly, installation, supporting, testing of tubes, fittings, valves etc. taking care all assembly & supporting requirements specified in specification (B957-6-44-0005) or elsewhere including supply of tools & tackles, testing arrangements, sealant etc. and completing work in all respect as per specifications, drawings and instruction of Engineer In-charge.

1.39 In case of conflict between different specifications/ standards, the most stringent requirement of the concerned specifications/ standards shall be followed.

1.40 For specific requirements of materials to be supplied by the contractor other than those mentioned in the technical specifications refer General Conditions of Contract and Inspection and testing of contractor supplied items refer Special Conditions of Contract.

1.41 Providing additional pipe openings or filling of extra openings on concrete floors of tech. structures etc.

1.42 Providing sealing of gap between pipe and pipe opening in blast proof wall as per instructions of Engineer In-charge.

1.43 Material identification (color coding) during storage and before fabrication as per Standard Specification for Color coding of piping materials, 6-82-0003.

1.44 Providing low friction pads as specified in isometrics/special support sketches.

1.45 Providing temporary strainers/screens during pre-commissioning & removal of temporary strainers/ screens before start-up / commissioning as directed by Engineer In-charge.

1.46 Providing bird screens at the outlet of lines open to atmosphere.

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1.47 Fabrication, erection, testing of injection nozzles required on the Lines as per the requirements of the P&ID shall be done by Contractor based on the approved drawings.

1.48 Fabrication, erection, testing, painting & Insulation of piping in the vendor packages wherever erection of which is to be done by contractor. Contractor shall also facilitate the work of different other package vendors for successful mechanical completion, wherever required.

1.49 Any damage to Painting and Insulation on the existing equipment and piping shall be made good by the Contractor. The job specifications for Painting & Insulation shall be followed in such cases.

1.50 Fire Fighting/ Drinking Water System (Above Ground):

1.50.1 Fabrication, erection including supporting and testing of CS piping at all elevations for landing valves, fire hydrants, water monitors, hose box, hose reel etc. complete for fire water system. Fire water CS piping above ground shall be fabricated/ erected/ tested etc. as per normal above ground CS piping.

1.50.2 Supplying, fabricating, laying/erection, testing and commissioning the system of above ground G.I. piping (Galvanized Pipes, Flanges, Fittings, Gaskets, Bolts & Nuts etc. including valves as per Piping Material Specification – Piping Class J2A/J95A) for manually operated/ automatic water spray system on pumps, compressors, vessels, columns, etc. and Drinking water line of Eye Wash and Safety Shower. Procurement of the piping items shall be done from EIL approved vendor list.

1.50.3 Field routing, if required of line sizes 2” and below on pumps, columns etc. as per Process Flow Diagram (PFD), P&ID and standard specification for water spray nozzle.

1.50.4 Installation of all above ground Fire water spray and detection system piping including spray nozzles & detector as per Fire Water P&IDs.

1.50.5 Installation of firefighting equipment’s such as landing valves, strainer, fire hydrants, drain valves, spray nozzles, quartzoid bulb detector, restriction orifice plates, water monitors, hose reel, hose cabinets & fire extinguishers etc.

1.50.6 Providing insulation on the above ground galvanized drinking water up to Eye Wash and Safety Shower as per the P&ID’s and isometrics for Drinking Water System.

1.51 CHEMICAL CLEANING / AMINE DEGREASING/ALKALI BOILOUT:

The scope shall be as per marked-up Chemical Cleaning P&IDs with related lines/ equipments highlighted. Supply of chemicals, consumable, DM water (if available, will be provided by client on chargeable basis, however transportation for the same will be in contractor’s scope), equipment boilers, testing equipment and any other item required for chemical cleaning & pickling of lines. Making of temporary neutralization pit (confirming to HSE norms) for chemical cleaning / passivation & temporary piping for chemical cleaning / passivation i.e. Recirculation loops etc. shall be in contractor’s scope and shall be included in quoted rates. After chemical cleaning/ passivation neutralization of discharge in neutralization pit and disposal of same out of plant, taking approvals from concerned authorities regarding above shall be in contractor’s scope and at his own cost.

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The chemical cleaning, passivation, amine degreasing etc. shall be done as per job specifications as per below:

1.51.1 Pretreatment cum on-stream cleaning/ passivation of Recirculating Cooling Water as per the job specification "Job Specification for Pretreatment cum On-stream cleaning of Recirculating Cooling water, B957-000-06-42-CCS-001."

1.51.2 Degreasing of Carbon Steel and Stainless-steel Piping & Vessels in Amine Service as per the job specification "Job Specification for Degreasing of Carbon steel piping & vessels in amine service, B957-000-06-42-CCS-003."

1.51.3 Chemical cleaning of VHP/HP steam piping as per job specification "Job specification for chemical cleaning of VHP/HP steam piping, B957-000-06-42-CCS-004."

1.51.4 Chemical cleaning and post-cleaning passivation treatment of fabricated and erected carbon steel compressor suction lines, inter stage suction lines, spillback lines of compressors prior to commissioning by chemical circulation method as per "Job Specification for Chemical Cleaning & Passivation of Compressor Circuit, B957-000-06-42-CCS-005, Rev.0.

1.51.5 Chemical Cleaning and passivation of the fabricated and erected carbon steel HP steam piping & MP steam generators as per "Job Specification for Chemical Cleaning of HP/MP/LP Steam Generators, "B957-444-02-42-CCS-007".

1.51.6 Pre-commissioning Alkali boil out chemical cleaning of boilers for HP/MP steam generation as per "Job Specification for chemical cleaning of boilers by alkali boil out method, B957-000-06-42-CCS-008".

1.51.7 Chemical cleaning of Stainless-steel Piping & fittings as per the job specification "Job Specification for external chemical cleaning of SS welds and fittings of tanks and pipes, B957-000-06-42-CCS-011".

1.51.8 Pre-commissioning chemical cleaning and post-cleaning passivation treatment of carbon steel suction drums of compressors, surge drums, KO drums as per "Job specification for chemical cleaning and passivation by inhibited HCL method of CS Surge drums, suction drums of compressors & KO drums, "B957-444-02-42-CCS-0007".

1.52 **Packages:**

1.52.1 For the vendor packages wherein the equipment / machinery erection is in the contractor scope (as per the scope defined under respective disciplines), the piping fabrication (mainly field welding of spools), erection, NDT, testing, insulation and painting shall also be in the contractor scope. Any items required for completing the packages which for some unforeseen reasons have not been completed by respective vendor shall be completed by the contractor. Field weld of all prefabricated spool of packages shall be measured in Inch Dia & erection in Inch Meter (Erection Spool) under SOR item No.(M10900000000).

1.52.2 The interconnecting piping between modules and up to the module battery limit shall be carried out by the contractor.

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1.53 **Scope at Battery Limit:**

Flushing, blowing & testing of lines shall be carried out up to Contractor's limit shown in drawings/ isometrics. The limit shown is applicable for all elevations along that coordinate. Generally, the piping interface at the battery limit between the unit contractor and the OSBL Contractor (Others) is through a flanged valve. The line shall be hooked up by the OSBL contractor to the flanged valve connection in the line provided by the ISBL contractor at the battery limit. The provision of matching flange at the battery limit tie-in point shall be in the scope of the OSBL contractor. Each line shall be tested by each contractor up to the unit battery limit valve and the flange joint boxing up shall be done by the OSBL contractor. If the OSBL contractor completes all its work including the testing of all lines before the completion of lines by the ISBL contractor at the battery limit then the box up of such balance flange joints shall be done by the ISBL contractor.

In case of interface with OSBL contractor is not through valve / flange connection the ISBL contractor shall weld a spool of required length (if necessary) to match with piping continued from offsite and 100% radiograph the non-hydro tested joint with OSBL piping which shall be available duly beveled.

The accessories required for blinding the line with suitable plates are to be arranged by contractor. After testing the plate blind shall be cut and pipe ends shall be prepared as per piping specification. In case continuation piping (which is in the other contractor's scope) has already been hydro tested & ends have been prepared, the later contractor shall weld his piping at the battery limit, radiograph the joint at battery limit after performing hydro test of system of his portion of piping.

1.54 Any other incidental / intermediate / ancillary or any enabling work not specifically mentioned in any specification but required to complete the work.

1.55 Supply and installation of Acoustic Insulation in the required lines as per the material and the thicknesses recommended by the Vendor, meeting the requirements of the P&IDs/ Vendor Isometrics etc., and as per the directions of the Engineer-in Charge.

1.56 Roto-mol cleaning method for pipes: - Cleaning shall be followed up with boroscopy for checking the cleanliness inside the pipe. Contractor has to offer boroscopy of the lines to BPCL/EIL representatives ensuring satisfactory internal cleaning of lines. All spading, de-spading, erection/dismantling of scaffolding, all tools and tackles, Farhana, Roto-mol Machine, boroscopy machine, Cables from nearest 440V socket, panel and all other accessories Including hose connection jobs required for successful completion of job shall be in the scope of contractor. Contractor to quote on per inch meter basis. For example, if contractor has carried out rotomol cleaning and boroscopy of 10" header for a length of 3 metres, the quantity shall be 10X3=30 inch meter.

1.57 Assistance for Pre-Commissioning/ commissioning activities included in contractor's scope but not limited to: -

1.57.1 Providing pre-commissioning/commissioning assistance to the Owner / PMC by providing Skilled /Semi-skilled/ un-skilled workers as per the direction of Engineer in - Charge with tools tackles, PPEs, consumables and supervision (including site supervision, safety supervision) with single point responsibility for quality, safety and speed of execution (One Man Day =8 hours shift) with 1 vehicle standby for emergency

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at site with the following manpower on fix basis. Contractor to provide & mobilize man power in shifts on Need Basis on the instructions of Engineer in- charge. Note that the manpower deployment shall be inclusive of required tools and tackles and machinery such as welding machines, grinding machines, gas cutting sets, etc.

1.57.2 Opening & box-up of valves, instrumented valves & spool pieces wherever necessary.

1.57.3 Attending leaks by tightening to the required torque/ replacement of faulty gaskets where necessary.

1.57.4 Air blowing, water flushing, cardboard blasting (supply in contractor's scope) & steam blowing, line pigging (as decided by EIL/Owner, post cleaning of line/equipment, will be inspected/certified by EIL.

1.57.5 Manual cleaning in big size compressor suction lines as per requirement.

1.57.6 Cleaning strainers/filters in the pump /piping circuits.

1.57.7 Topping up of bearing oil/lube oil in rotary equipment.

1.57.8 Hose connections/removal.

1.57.9 Opening & box-up of piping for connection & disconnection of chemical drums/ containers & their unloading into the system.

1.57.10 Rechecking of alignments for the rotating equipment.

1.57.11 Providing assistance to Vendor's Representative for equipment preparation/repair and any other similar activity as per the commissioning requirement as per the instruction of Engineer-in-charge including supply of necessary hand tools, equipment, consumables (scaffolding, electrodes, gas) and with single point responsibility of contractor's supervision.

1.57.12 Fabrication /Purchase of valve keys/blinds and other commissioning related consumable as required.

1.57.13 Supplying and installation of locks and chains for locking of valves.

1.57.14 Maintenance and repairing of valves by a skilled valve repair mechanic.

1.57.15 Dropping and reinstatement of valves as per requirement.

1.57.16 Supplying and installation of barricading tape.

1.57.17 Supplying of soap solution and squeeze bottles as required for leak test.

1.57.18 Supplying and installation of cardboard, plastic sheets & gaskets for use in pipeline blowing as required.

1.57.19 Supplying and installation of brass target plates for use in steam blowing as required.

1.57.20 Providing "Hydraulic mobile crane (minimum 15 Ton Capacity wheel mounted) including fuel, lube and operator & helper charges, slings web -belts d -shackles, guiding ropes etc. for lifting/shifting/loading/unloading material like pipes ,equipment, fittings, pipe-spools, concrete blocks, drums, boxes boulders, crates, scraps etc, as directed, (1 day=8 hours; time of deployment shall be reckoned from time of machinery reporting to site to time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE

1.57.21 Providing tractor/trailer as required including fuel, lube and operator & khalasi charges for transportation of material (including pipes, structural steel, fittings, valves, gaskets, earth, wooden scrap, usable material, metallic or nonmetallic scrap) from & to project/unit area, stores, warehouse, dump yard/scrap yard as directed.(1 day=8 hours; Time of deployment shall be reckoned from time of machinery reporting to site to time of releasing from site, part duration shall be paid on pro-rata basis) NEED BASE.

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1.57.22 Providing "Telescopic/Lattice" type crane (100 Ton capacity wheel mounted/CRAWLER) including fuel, lube and operator & helper charges, sling web belts d- shackles, guiding ropes etc for lifting/shifting/loading/ unloading material like pipes, equipment, fittings, pipe-spools, concrete blocks, drums, boxes boulders, crates, scraps etc as directed (1 day= 8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE

1.57.23 Providing "Telescopic" type crane (40 Ton capacity wheel mounted) including fuel, lube and operator & helper charges, sling web belts d- shackles, guiding ropes etc for lifting/shifting/loading/ unloading material like pipes, equipment, fittings, pipespools, concrete blocks, drums, boxes boulders, crates, scraps etc as directed (1 day=8 hours; time of deployment shall be reckoned from time of machinery reporting to site time of releasing from site. Part duration shall be paid on pro-rata basis) NEED BASE

1.57.24 Providing Flame proof Torches- Rechargeable (with high intensity).

1.57.25 Supply of 40/80 SS wire-mesh ss for covering strainers /filters.

1.57.26 Supply of Rubber hoses (1", 15 mtr length, pressure-500 psi)

1.57.27 Supply of All types & sizes brass tools required for the pre-commissioning and commissioning work.

1.57.28 Supply of fire Hoses with connector for fire hydrants. (Dia 63 mm. length-15 mtr as per relevant standard international specifications.

1.57.29 To and Fro transportation arrangement for all electrical, instruments, mechanical items from site /store (EIL) within 50 km radius as per instruction of Engineer-in Charge. Suitable packing shall be included in quoted rates.

1.57.30 Ground preparation for the movement of cranes required for equipment erection. Quoted rate should be inclusive of the same.

1.57.31 Making separate welding booth & storage area for LTSC, Alloy steel & Stainless-Steel material.

1.57.32 TPI for all bought out items.

1.57.33 Supplying of water for hydrotesting & DM water for SS lines.

1.57.34 Providing material reconciliation statement along with every RA bill.

1.57.35 Supplying of oil for various pumps. Oil schedule will be provided to successful bidder.

1.57.36 Fabrication yard if available, shown in the overall plot plan shall be provided to the contractor. In case there is a requirement of more space contractor needs to arrange the same.

1.58 Special Requirements:

1.58.1 Mechanized/semi mechanized Spooling Work Contractor shall carry out Spooling Work at it, or its Sub-Contractor's Workshop.

1.58.2 Piping spools shall be erected at Site only after all reports are reviewed and verified as mentioned in contract.

1.58.3 Inch Meter specified in SOR Items are correspond to Centre line of piping as mentioned in isometrics.

1.58.4 Vendor shall submit all documents electronically through Vendor Document Management system of EIL.

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1.58.5 Pigging shall be carried for pipeline cleaning as per instruction of Engineer-in-Charge or identified lines in consultation with Owner. Bidder Shall develop procedure for pigging in consultation with Engineer-in-Charge.

1.58.6 Contractor to source all types of pre-fabricated pipe supports from external agencies, supply of material for the supports is in contractor's scope.

1.58.7 Scope of Work shall explicitly quantify the requirement of Radiography and Hydro-test. This is essential for deciding the minimum requirement (number) of applicable Machineries which shall have to be mobilized by Contractor for carrying out the projected quantity of Radiography and Hydro-test. The contractor shall also be asked to submit in its offer the Exclusive Deployment Schedule for such Machineries for Radiography and Hydro-test.

1.58.8 Contractor shall carry out manual checking of lines where-ever man entry is possible, by sending personnel along with PPE & oxygen arrangement. Digital snaps & report for manual checking by personnel for identified lines to be submitted to Engineer in-charge. This shall be applicable to all compressor suction lines & other lines as advised by engineer in charge.

1.58.9 Flare header flushing shall be carried out prior to pneumatic testing and clearance shall be taken from operation group and then contractor shall proceed for pneumatic testing and box up.

1.58.10 All large dia. Lines (10" and above) and compressor suction lines of all sizes be erected after internal cleaning and a record of the same is to be generated by Contractor & submitted as part of EIL format system for hand over in line with format approved by engineer in charge.

1.58.11 About 2,98,000 Inch Dia of Piping shall be supplied in the form of Pre-fabricated Piping spools. This includes most piping of 1"-30" in CS, 2"- 30" in LTCS and SS and all sizes in Alloy Steel. In this case Contractor scope will include modification of spools as required, erection and field welds (about 30% of Inch dia. mentioned).

1.58.12 Boroscope (VideoScope) Inspection for Stretch of Inlet Piping of Critical Equipment, /Compressor Suction Lines under Composite Contracts for Process Plants: Stretch of Inlet Piping between Strainer and Equipment Nozzle of each Critical Rotating Equipment shall be examined through Boroscope (High Resolution VideoScope Kit complete with about 25 m of Snake, and Camera & Light at head) Inspection. Such inspection is necessary to ensure that no solid object, which can inflict irreparable damage to rotating equipment, is left behind in the target stretch of boxed-up inlet piping (small flanged nozzle for induction of probe to be planned at appropriate location) and shall be part of erection and no separate payment shall be done for the same.

1.58.13 Automatic Blasting to be carried out.

1.58.14 For sprinkler system, caps/plugs to be supplied for testing purpose.

1.58.15 Dropping of valves (MOV's, PSV's & CV's) by contractor for piping testing purpose shall not be paid separately under SOR item (M13900000000), which are installed for piping mechanical clearance.

1.58.16 Contractor to follow EIL system for handover/Mechanical Completion of various sections of unit. All the punch points raised during this Format system to be rectified to the satisfaction of Engineering charge.

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2.0 BASIS FOR WORK

The basis of work shall be read in conjunction with Standard specification for fabrication and erection of piping, 6-44-0012. Additionally, the following documents shall be referred:

2.1 Job Piping Material Specification (B957-6-44-0005) & General Note to PMS (B957-6-44-0005-A1).

2.2 Standard specification for hot insulation of vessels, piping and equipments, 6-44-0002.

2.3 Standard specification for cold insulation of vessels, piping and equipment, 6-44-0003.

2.4 Job Specification of Non-Destructive Examination Requirements of Piping (B957-6-44-0016)

2.5 Welding Specification Charts for piping classes (B957-000-06-41-WSC-0001).

2.6 Standard Specification for inspection, flushing and testing of piping system (6-44-0013).

2.7 Welding Specification for Fabrication of piping (6-77-0001 & B957-999-06-41-WSP-0001).

2.8 Standard Specification for Steam tracing (6-44-0007) including annexure A1 & A2.

2.9 Standard Specification for application of torque & hydraulic bolt tension for flange joints (6-76-0002).

2.10 Surface preparation, Painting, Color coding, etc. shall be as per Job Specifications for surface preparation and protective coating, B957-000-06-42-PLS-01.

2.11 Standard specification for positive material identification (PMI) at construction sites, 6-82-0002.

2.12 Standard specification for color coding of piping material, 6-82-0003.

2.13 Standard specification for positive material identification (PMI) at supplier's works, 6-81-0001.

2.14 Marked up P&IDs for chemical cleaning.

2.15 Special Piping Support Standards, as applicable.

2.16 Any other PMC, Licensor or other specifications, including job specifications, attached with Piping Material Specification or elsewhere in the tender and special conditions of contract (such as standard for dimensional tolerances etc.).

2.17 Job Specifications for chemical cleaning like

a) “Job Specification for Pretreatment cum On-stream cleaning of Recirculating Cooling water, B957-000-06-42-CCS-001.”
b) “Job Specification for Degreasing of Carbon steel piping & vessels in amine service, B957-000-06-42-CCS-003.”

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c) "Job specification for chemical cleaning of VHP/HP steam piping, B957-000-06-42-CCS-004."
d) "Job specification for chemical cleaning of VHP/HP steam piping, B957-000-06-42-CCS-004."
e) "Job Specification for Chemical Cleaning & Passivation of Compressor Circuit, B957-000-06-42-CCS-005, Rev.0"
f) "Job Specification for Chemical Cleaning of HP/MP/LP Steam Generators, "B957-444-02-42-CCS-007".
g) "Job Specification for chemical cleaning of boilers by alkali boil out method, B957-000-06-42-CCS-008".
h) "Job Specification for external chemical cleaning of SS welds and fittings of tanks and pipes, B957-000-06-42-CCS-011".

3.0 SCOPE OF SUPPLY FOR TENDER (PIPING)

3.1 OWNER'S SCOPE OF SUPPLY

3.1.1 Pipes (All sizes and schedules in random lengths)

3.1.2 Flanges (All sizes, types and Pressure ratings)

3.1.3 Fittings (All sizes, types and schedules)

3.1.4 Valves (All sizes, types and ratings)

3.1.5 Gaskets (All sizes, types and ratings)

3.1.6 Studs, Nuts or M/c Bolts (all types).

3.1.7 Spring, Expansion joint / Bellows (All types).

3.1.8 Prefabricated piping spools along with attached piping supports

3.1.9 Specialty items like sample coolers, sample cabinets, MOVs, steam supply and condensate return manifolds, integrated steam traps, strainers, spray nozzles, air traps, hose pipes and hose couplings, CPV fittings & valves, Victaulic snap couplings, corrosion probes, silencers, snubbers, sight glass etc.

3.1.10 Online instruments like control valve with all auxiliaries like volume bottles, SDVs, orifice flange, annubar, magnetic flow meter, ultrasonic flow meter, restriction orifice, rotameter, rupture disc, corrosion probes, safety valve, de-superheater, PG/PT/ Flow transmitter etc.

3.1.11 Pipes for supporting of piping such as dummy pipe, RF pad, saddle, corrosion pad/ protection shield.

3.2 CONTRACTOR'S SCOPE OF SUPPLY

The procurement and supply in sequence and at appropriate time of all materials and consumables required for the completion of the works in all respects as per specification, codes, drawing and instruction of engineer-in-charge. Pre-commissioning & commissioning shall be the responsibility of the Contractor and prices quoted shall be deemed to be inclusive of such materials.

The supply of these materials shall include but not limited to the following:

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3.2.1 Tools, tackles and machinery required for cutting, fitting, alignment, welding, brazing, cleaning, grinding, threading, bolt tensioning etc.

3.2.2 All industrial gases such as oxygen, acetylene, inert gases, all types of electrodes, filler wire, flux wire, brushes, etc.

3.2.3 MS Tube, Bolts / Anchor fasteners, nuts, washers, spring washer including hangers, U-bolts with nuts, clamps, graphite and Teflon pads, angles, beams, channels etc. for pipe supports, platforms, ladders, stairways and for all miscellaneous steel structure, supporting steel plates, wires, and strip for attachment of steam tracers etc. However, for spring hangers entire spring assembly shall be supplied by Owner.

3.2.4 Shims, wedges, and packing plates (machined wherever required).

3.2.5 Plate flanges for fabricating temporary spool pieces for use in place of control valves and other inline instruments including temporary gaskets as per requirement at site and as instructed by Engineer-In-Charge.

3.2.6 All materials such as hydraulic pumps, Air Compressor, metallic blinds, temporary gaskets etc. and all necessary arrangement required for pressure testing and pneumatic testing.

3.2.7 Supply of MS flats, chequered plates, & flat bar.

3.2.8 Structural material for stiffener for small bore (1.5” & below) branches.

3.2.9 Supply of carbon steel, alloy steel and stainless steel (SS-304) plates for fabrication of saddle supports. It may be noted that most of the alloy steel supports will be furnished by pre-fabricated spool Contractor. However, as required, alloy steel plates shall be arranged for supporting required to be fabricated at site due to any modification. The payment for Alloy Steel plates shall be at the same rate as SS Plates.

3.2.10 Wooden/ high density PUF supports for cold lines.

3.2.11 Arrangement for compressed air, blinds, temporary gaskets etc. and arrangement required for pneumatic pressure testing including suitable compressor.

3.2.12 All materials and arrangement required for all types of non-destructive tests such as radiography, ultrasonic testing, dye-penetrant, magnetic particle, and wet fluorescent test, pneumatic testing for reinforcement pad, PMI instruments etc.

3.2.13 All material and arrangement required for stress relieving.

3.2.14 All grouting material required and specified as per PMC Specification, drawings and instructions of the Engineer-in-charge.

3.2.15 Contractor shall hand over one complete set of hydraulic bolt tensioning equipment and torque wrenches along with all adaptors covering all sizes of nuts, to the Owner after commissioning of the plant.

3.2.16 Arrangement & supply of chemicals, consumables, DM water, equipments, boilers, coupons and other testing equipments required for chemical cleaning, pickling & passivation of lines.

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3.2.17 All sealing and protecting materials as required.

3.2.18 Oil, grease, graphite, molykote, sealing tapes, cleaning agents including acids for cleaning of internals/packing/trough/tray etc.

3.2.19 All tools & tackles, material, consumables and arrangements required for rotomol cleaning.

3.2.20 Protective cloth and water hoses for fire and safety protection as required.

3.2.21 Chain pulley block and all other material handling equipments as per requirements.

3.2.22 Supply of all items required for erection comprising of: -

3.2.22.1 Manually operated ground winches

3.2.22.2 Hoisting ropes

3.2.22.3 Direction pulley on ground, Guide pulleys

3.2.22.4 Motor for hoisting rope, along with fixing bolts and structural support members as required.

3.2.22.5 Thimble for fastening hoisting rope to lifting beam.

3.2.22.6 Supports for ground winch and direction pulley with foundation bolts, as necessary.

3.2.22.7 Welding/fixing of bearing brackets on the platform and support arms on the stack.

3.2.22.8 Structural members as necessary for supporting the guides for lifting beam during lowering/hoisting.

3.2.22.9 Tip lowering/hoisting guides.

3.2.22.10 Supply of structural steel grade pipe for handrails and chequred plates.

3.2.23 All safety equipments required for safe conduct the job, avoid accidents and keep good housekeeping and environment.

3.2.24 Supply, fabrication, & installation etc. of hot dip galvanized plates, for earth wire lug connection required for earthing of pipes.

3.2.25 Supply of cold galvanizing or zinc coating material with approval of Engineer-In- charge.

3.2.26 Bird screens at the outlet of lines open to atmosphere.

3.2.27 Low friction pads like Teflon/graphite pads, Stainless steel plates with suitable bonding material/fastener.

3.2.28 Supply of all materials required for Painting & insulation.

3.2.29 Wherever valves require extended spindle the same shall be provided. The arrangement for the extended spindle shall be prepared by Contractor and submitted to Engineer-in-charge for approval.

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3.2.30 Structural steel required for modifications / extension of platform, providing additional platforms, ladders, jump-overs, movable/portable platforms for valve operation etc. to improve accessibility, wherever required.

3.2.31 All items required for hydro testing / pneumatic testing / blinding / de-blinding / flushing etc.

3.2.32 Supply of all types of steel plate including pressure vessel specification plates.

3.2.33 All other materials though not specified above but required for completion of the work as per specification, codes, drawings and instructions of the Engineer-in-charge.

3.2.34 Supply of pre-insulated tubing as per Specification B957-6-44-0022.

4.0 SCOPE OF WORK (PAINTING)

The scope of work broadly consists of surface preparation as required, selection and application of required primer / finish paint on surfaces of piping, piping supports, on-line instruments, structural steel work and structural steel work for piping supports etc. for **Corrosive Environment** as detailed in schedule of rates as per drawings, Specification for surface preparation and protective coating, B957-000-06-42-PLS-01 and instructions of Engineer-in-charge.
Specification no. **6-79-0020** appearing anywhere (including Schedule of Rates) shall be read as **B957-000-06-42-PLS-01**
The painting activity shall include painting of prefabricated piping spools and piping other than prefabricated spools. The prefabricated piping spools shall be supplied to the contractor with pre-erection/ shop primer painted and only the post erection/ field painting shall be done by the contractor after repair of pre-erection/shop primer after erection/welding.

For the piping other than prefabricated spools, the contractor shall carry out the complete painting procedure including the surface preparation, Pre-erection/Shop Primer application and the post erection/ field painting including the repair of pre-erection/pre-fabrication or Shop Primer after erection/ welding.
Painting of piping in packages is also included in scope of work of the contractor.

The scope of work shall be as per Schedule of Rates (SOR) but not limited to:

4.1 All insulated and un-insulated piping and fittings including flanges and valves as per the painting specification.

4.2 Any other surface as directed by Engineer-in-charge.

4.3 Identification lettering / numbering on all painted surface of equipments, piping, including color bands on all painted surface of equipments / piping. Color coding shall be carried out as per Specification for surface preparation and protective coating, B957-000-06-42-PLS-01.

4.4 Hazardous content marking/ identification signs on painted surface of equipments/ piping.

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4.5 Cleaning up the working areas regularly during the course of work for purpose of good housekeeping as well as cleaning up the site on completion of the work as directed by the Engineer-in-charge.

4.6 Providing besides all materials, consumables, labour & supervision required for carrying out the painting work, all safety devices, equipments, apparatuses, instruments etc. necessary and incidental requirements to perform the work in workmanship and efficient manner within the stipulated time period.

4.7 Scaffolding for all heights, all other incidental/auxiliary /ancillary/accessories, labour, material, tools and tackles /consumables etc. or any enabling work not specifically mentioned in the specifications but necessary for the execution and completion of work as envisaged in the tender document.

4.8 The quantum and scope of painting shall be assessed by the bidder himself based on drawings and documents such as P&ID's, line lists, typical drawings and all other documents and specifications. However complete painting works as necessary shall be in the scope of the contractor.

5.0 SCOPE OF SUPPLY (PAINTING)

Owner's scope of supply: NIL

Contractor's scope of supply:

The procurement and supply in sequence and at appropriate time of all materials and consumables required for the completion of the works shall be the responsibility of the contractor and prices quoted shall be deemed to be inclusive of such materials.

The supply of these materials shall include but not limited to the following:

- All primers and finish paints as per paining specification.
- All equipments for surface preparation & touch-up primer.
- All consumable for surface preparation & touch-up primer.
- All equipments for paint application like brushes, spray nozzles, spray Pumps/blowers etc.
- All equipments like dust collector, protection shield etc. for conducting the job.
- All consumables and equipments required for job completion at all elevation and at any location.
- All items/equipments required to complete the job as per requirement of Specification for surface preparation and protective coating, B957-000-06-42-PLS-01.

6.0 SCOPE OF WORK (INSULATION)

The scope of Work shall include Hot Insulation & Cold Insulation work of equipments, vessels, exchangers, piping, instrumentation etc. as detailed in Schedule of Rates and Standard specification for hot insulation of vessels, piping and equipments, 6-44-0002 and Standard specification for cold insulation of vessels, piping and equipment, 6-44-0003.

6.1 Supply of all insulation and ancillary material like spacer-ring, stays, lacing and binding wires, screws, bands, felt, wooden blocks, studs, flats, support ring clips, sealant and mastic, cement, glass cloth, aluminum sheets/ GI sheets necessary drillings and fixing

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of bolts/nuts, washers etc., as specified and required. All insulation material shall be new and of approved quality with complete test certificates and in accordance with the specifications.

6.2 Application of insulation with weather proofing on vessels, columns, equipments like Heat Exchangers, piping including valves, flanges etc. and instrumentation as per specifications and instructions of Engineer-in-charge.

6.3 Providing besides all materials and consumables labour and supervision required for carrying out the insulation work, all safety devices, equipments, apparatuses, instruments etc. necessary and incidental requirements to perform the work in workmanship and efficient manner within the stipulated time period.

6.4 Color coding identification of equipments, vessels, heat exchangers, column, piping, instrumentation etc. after insulation as per painting specification & instructions of Engineer-in-charge.

6.5 Proper storage and protection of insulation material and consumables brought to site by the Contractor at all stages of work.

6.6 Providing insulation plugs and inspection windows at all locations as per drawings, specifications and instructions of Engineer-in-charge.

6.7 Keeping the working area clean and tidy during course of execution and cleaning the work site to the full satisfaction of the Engineer-in-charge after completion of work.

6.8 Any other incidental/intermediate/ancillary or any enabling work/materials not specifically mentioned in the specifications but necessary for the execution and completion of work as envisaged in the tender document.

6.9 Dismantling of the insulation, if required, as per the instructions of Engineer-in-charge.

6.10 Application of hot insulation on heat traced instruments and level gauges as per specifications and instructions of Engineer-in-charge.

6.11 Insulation of any other surface as per instruction of Engineer-in-charge.

6.12 Providing scaffolding for all heights, all other incidental / auxiliary / ancillary / accessories, labour, material, tools and tackles / consumables, supervision etc. or any enabling work not specifically mentioned in the specifications but necessary for the execution and completion of work as envisaged in the tender document.

6.13 Supply of paint and Color-coding identification of equipments, vessels, heat exchangers, process column, piping, instruments etc. after insulation as per relevant specification and instruction of Engineer-in-charge.

6.14 Any lines requiring dismantling of the insulation for inspection / repair / maintenance, erection of any other equipment shall be done by contractor and again secured back in place after completion of the subject activity.

The actual quantum and scope of work of insulation shall be assessed by the contractor based on drawings and documents such as P&ID's, line list, GAD's, isometrics and other relevant documents and specifications. However complete insulation work as necessary shall be in the scope of the Contractor.

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7.0 SCOPE OF SUPPLY (INSULATION)

Owner's scope of supply: NIL

Contractor's scope of supply:

The procurement and supply in sequence and at appropriate time of all materials and consumables required for the completion of Insulation and Painting (Color coding identification) works shall be the responsibility of the contractor and prices quoted shall be deemed to be inclusive of such materials.
The supply of these materials shall include but not limited to the following:

All items required to complete Insulation (Insulation material, weather protection jacket, attachment material, fixing materials, vapor barrier material, bolting, screws, inspection window, structural attachment, material for color coding identification etc.) as per the attached standards, specifications and instructions of Engineer-in-charge.

All consumables and equipments which are required for job completion at all elevation and any location.

Contractor shall supply all sealing and protecting materials required for protecting items/equipments supplied by Owner / Contractor.

8.0 LIST OF APPLICABLE STANDARDS/ SPECIFICATIONS/ DRAWINGS

Sr. No.	TITLE	Document No.	Rev No
1.	Standard specification for Hot insulation of vessel, piping & equipments.	6-79-0026	0
2.	Standard specification for cold insulation of vessels, piping and equipment	6-79-0027	1
3.	Piping Material Specification	B957-6-44-0005 (Note 3)	-
4.	General Notes to PMS	B957-6-44-0005-A1(Note 3)	-
5.	PMS Extracts	B957-6-44-0005-A2(Note 3)	-
6.	Specification for Steam Tracing	6-44-0007	6
7.	Annexure-1 Steam tracing (Typical Diagrams)	6-44-0007-A1	5
8.	Annexure-2 Steam tracing (Typical Diagrams)	6-44-0007-A2	2
9.	Job Specification for Fabrication & Erection of Piping	6-44-0012	6
10.	Job Specification for Inspection, Flushing and Testing of Piping Systems	6-44-0013	6
11.	Job Specification for Non-Destructive Examination Requirement of Piping	B957-6-44-0016 (Note 2)	D
12.	Standard specification for underground and above ground G.I. pipeline system (water services)	6-65-0027	6
13.	Welding Specification Charts for piping classes	B957-000-06-41-WSC-0001 (NOTE-5)	3
14.	Welding Specification for fabrication of piping	6-77-0001 & B957-999-06-41-WSP-0001(NOTE-5)	5

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Sr. No.	TITLE	Document No.	Rev No
15.	Standard Specification for Positive Material Identification (PMI) at Supplier's Works	6-81-0001	4
16.	Standard Specification for Positive Material Identification (PMI) at Construction Sites	6-82-0002	6
17.	Specification for surface preparation and protective coating	B957-000-06-42-PLS-01 (NOTE-5)	2
18.	Standard Specification for Application of Torque and Hydraulic bolt tension for flange joints	6-76-0002	3
19.	Standard Specification for Color coding of Piping materials	6-82-0003	4
20.	Specification for Quality Management System Requirements from Bidders	6-78-0001	3
21.	Specification for Documentation requirements from Contractors	6-78-0002	3
22.	Specification for documentation requirements from suppliers	6-78-0003	3
23.	Job Specification for Pretreatment Cum Onstream Cleaning of Recirculating Cooling Water	B957-000-06-42-CCS-001 (NOTE-5)	B
24.	Job Specification for Degreasing of Carbon Steel Piping & Vessels in Amine Service	B957-000-06-42-CCS-003 (NOTE-5)	B
25.	Job Specification for Chemical Cleaning of VHP/HP Steam Piping	B957-000-06-42-CCS-004 (NOTE-5)	B
26.	Job Specification for Chemical Cleaning & Passivation of Compressor Circuits	B957-000-06-42-CCS-005 (NOTE-5)	B
27.	Job Specification for Chemical Cleaning of HP/MP/LP Steam Generators	B957-000-06-42-CCS-007 (NOTE-5)	B
28.	Job Specification for Chemical Cleaning of Boilers by Alkali Boil Out Method	B957-000-06-42-CCS-008 (NOTE-5)	B
29.	Job Specification for External Chemical Cleaning and Passivation of SS Welds and Fittings of Tanks and Pipes	B957-000-06-42-CCS-011 (NOTE-5)	B
30.	Standard Quality Assurance Plan – Construction Division (Item Rate Contracts)	6-82-6100	4
31.	Pipe davit.	7-12-0023	8
32.	Symbols of piping elements on drawings.	7-44-0003	6
33.	Details Of Mitered Elbows	7-44-0033	7
34.	Chain Operation Attachment for ANSI Valves (150#, 300# and 600#)	7-44-0050	6
35.	Standard For Spacers and Blinds > 26” (150#, 300#, & 600# FF)	7-44-0162	6
36.	Standard for Spacers and Blinds > 26” (For AWWA Flanges)	7-44-0164	2
37.	Sample cooler- Type-1(non-congealing services)	7-44-0310	6
38.	Sample cooler- Type-2(congealing services)	7-44-0311	4
39.	Vents & Drains (On Lines 1.5" And below)	7-44-0350	6

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Sr. No.	TITLE	Document No.	Rev No
40.	Vents & Drains (On Lines 2.0" And above)	7-44-0351	6
41.	Orientation of Orifice Tap	7-44-0352	6
42.	Well installation	7-44-0353	6
43.	Pressure Tapings	7-44-0354	6
44.	Steam Trap Assembly	7-44-0400	7
45.	Utility Hose Station	7-44-0401	6
46.	Drip leg for steam Line	7-44-0403	7
47.	Pipe Sleeve Details for insulated Line	7-44-0404	6
48.	Welding Of Pipe with Different Thickness	7-44-0476	6
49.	Butt Welding End Preparation	7-44-0477	6
50.	Fillet Weld Details	7-44-0478	6
51.	Welding Details of Branch Connections (Stub-In)	7-44-0479	6
52.	Butt Weld Details	7-44-0480	6
53.	Butt Weld Details (sequence of welds)	7-44-0481	6
54.	Welding Details of Branch Connections (Stub-In)	7-44-0482	6
55.	Branch Connection (Breaking Into)	7-44-0483	6
56.	Branch Connection (Not Breaking Into)	7-44-0484	6
57.	Method Of Cutting and Dimensions of Concentric Reducers	7-44-0485	6
58.	Tolerances For Field Fabrication	7-44-0486	6
59.	Method Of Cutting and Dimensions of Field Manufacture of Eccentric Reducers	7-44-0487	7
60.	Clearance Requirements for Orifice Flange Instrument Piping	7-44-0504	5
61.	Foundation for sliding support for pipes on grade	7-67-0010	7
62.	Earthing/ Bonding of Pipes and Pipe racks	7-51-0112	6
63.	Job specification for pre-insulated tubing	B957-6-44-0022	0
64.	Piping Support Standards	(Note-3)	
65.	Equipment Layout- ECU (Page-1)	B957-300-16-43-00001	-
66.	Equipment Layout- ECU (Page-2)	B957-300-16-43-00002	-
67.	Overall Plot Plan	B957-999-81-45-00001 (NOTE-5)	-
68.	Marked up Chemical Cleaning P&IDS- ECU	Note-3	

Notes:

1. Equipment Layouts are attached for reference. Execution shall be as per latest revision of equipment layout which shall be given to successful bidder.
2. Updated NDT specification shall be given to successful bidder.
3. It shall be provided to the successful bidder.

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4. O&M procedure by Licensor shall be provided to Successful bidder.
5. Attached elsewhere in the tender documents.

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SCOPE OF WORK & SUPPLY (MTMS)

Mechanical Works - I for ECU

PROJECT: Overall Project Management as MPMC and PMC/EPCM Services for Ethylene Cracker Unit and U&O for BPREP

Client: BPCL

TENDER No- B957-300-16-43-MR-T-3001

Rev.	Date	Purpose	Prepared by	Checked by	Approved by
0	25.02.2026	ISSUED WITH TENDER	VM	HD	PG

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SCOPE OF WORK AND SUPPLY

1.0 This scope of work and supply of contractor shall be read in conjunction with Schedule of rates (Doc. No.B957-300-80-46-MR-SOR-3001-0, Item No. 01HM) and specifications, standards appearing in the list of attachments furnished below.

S.NO.	DESCRIPTION	Document No.	Rev.
1.0	**Standard Specification**		
1	Installation procedure for trays and tower internals	6-14-0003	6
2	Standard specification for filling the packing inside the column	6-14-0011	6
3	Standard specification for review of site installation of column internals	6-14-0016	5
2.0	**Standards**		
1	Construction tolerance for welded supports for tray / tower internals	7-14-0001	5
3.0	**Specification**		
1	Standard specification for health, safety and environment (HSE) management at construction sites	6-82-0001	2
4.0	**Inspection and Test Plans**		
1	Standard specification for positive material identification (PMI) at supplier's works	6-81-0001	4
2	ITP For Bolting Material	6-81-0007	5
3	ITP for Trays & Tower Internals	6-81-0015	4
4	ITP for Tower Packings	6-81-0016	3
5	ITP for un-engineered Trays & Tower Internals	6-81-0017	6

A. SCOPE OF WORK AND SUPPLY FOR CLOUMN TRAYS, TOWER PACKINGS AND TOWER INTERNALS

2.0 Followings are a broad list of activities to be carried out by Contractor for installation of Trays and Tower Internals under the supervision of Tray/ Internal supplier at site. Any other work not specifically listed but required for completion of job shall also be in Contractor's scope.

- Installation of all types of trays/ Tower Internals, Packing and associated components such as Seal Pan, Recess seal pans, Distributors, Feed Pipes, Collector Trays, Chimney Trays, Deflector Baffle etc. in Column as per General Arrangement Drawings
- Leak Testing of Internals at site (as applicable)
- Minor modification (if required) like bending/ cutting/ grinding etc. for Removable Internals / Welded attachments during the fitment/ Installation of Internals.

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The broad details of the columns covered under this Scope of Work (SOW) are as follows:

Sr. No.	Col. Tag No.	Service	Col. Dia. (mm), TL-TL	Type of Internals
1	300-CC-00-2201	HP DEPROPANIZER	5000/3800mm, TL-TL 24900	TRAY 1-4, SIEVE TRAYS + TRAY 5-32-, V1 TYPE VALVE
2	300-CC-00-2202	LP DEPROPANIZER	2800/3400mm, TL-TL 39300	#1- #28 SIEVE TRAYS (4 P) & #29 - #50 VALVE TRAYS (2P & 4P)
3	300-CC-00-3001	DEMETHANIZER	4800/2500/3200mm, TL-TL 62100	TOTAL 7 RANDOM PACKED BED BED #1,2,4,5,6 (IMTP 50) & BED #3 & #7 (IMTP 40)
4	300-CC-00-4001	DETHANIZER	4500mm, TL-TL 39100	TRAY #1-#49 (4P CONVENTIONAL VALVE TRAYS) TRAY #50-#70 (2P CONVENTIONAL VALVE TRAYS)
5	300-CC-00-4201	DEBUTANIZER	3000mm, TL-TL 29200	45 VALVE TRAYS
6	302-CC-00-2601	DEPENTANIZER	2100/3000mm, TL-TL 46000	TRAY #1-#37 (2P FIXED VALVE TRAYS) TRAY #38-#65 (1P FIXED VALVE TRAYS)
7	302-CC-00-2602	RERUN TOWER	5100mm, TL-TL 23900	TRAY #1-#13 (2P FIXED VALVE TRAYS) TRAY #14-#33 (1P FIXED VALVE TRAYS)
8	302-CC-00-2701	H2S STRIPPER	2400mm, TL-TL 18900	TRAY 1-25 (2P FIXED VALVE TRAYS)
9	302-CC-00-2702	BTX TOWER	4300mm, TL-TL 28400	TRAY #1-#23 (2P FIXED VALVE TRAYS) TRAY #24-#42 (1P FIXED VALVE TRAYS)
10	303-CC-00-3502	SOLVENT RECOVERY COLUMN (SRC)	3400/5000mm, TL-TL 33600	TRAY #1-15 (2 PASS) & TRAY #16-17 (1 PASS) GT OPTIM VALVE TRAYS 1 STRUCTURED PACKED BED (GT-OPTIMPAK 250Y)
11	303-CC-00-3503	WATER STRIPPER	600mm, TL-TL 4000	1 PACKED BED (Sulzer NeXRingTM 0.6 or equivalent)
12	303-CC-00-3602	BENZENE COLUMN	2800mm, TL-TL 43750	60 VALVE TRAYS (GT-DMVTM OR SULZER UFMTM OR EQUIVALENT)

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13	303-CC-00-3603	TOLUENE COLUMN	2600mm, TL-TL 44200	60 VALVE TRAYS (GT-DMVTM or Sulzer UFMTM or equivalent)
14	303-CC-00-3604	XYLENE COLUMN	1500mm, TL-TL 38200	60 VALVE TRAYS (GT-DMVTM or Sulzer UFMTM or equivalent)

2.1 The site installation works shall be carried out by contractor under the supervision of Internal supplier. The contractor to ensure that adequate Safety precautions to be taken care before starting the installation work inside the Column.

2.3 Contractor to note that Site Installation work of column trays/ internals for all the columns, which includes Installation of new trays and tower internals etc. as per details given in approved drawings/EIL specification 6-14-0003/6-14-0011, Tray/ Internal vendor's installation procedure, shall be carried out by Contractor. Adequate Safety precautions to be taken care before starting the HOT-WORK inside the Column (as per Standard specification for health, safety & environment (HSE) management at construction sites (6-82-0001).

2.5 Site activities (Installation/ Testing) of trays and Internals shall be done as per approved General Arrangement Drawings of trays/Internals, EIL Specification No. 6-14-0003/ 6-14-0011 and Site Installation/modification procedure/ instructions of Tray vendor, under supervision and stage-wise inspection of Tray supplier/ Engineer-in-Charge. All requirements of the drawings shall be complied with in totality.

2.8 Following infrastructural facilities and all necessary help/manpower shall be provided by Contractor to Tray supplier / Engineer-in-Charge and/or EIL-specialist during checking/review of tray installations:

i) Exhaust fan at the column to free it of welding gases, fumes etc. before entry of EIL-personnel into the column.
ii) Proper lighting arrangement (24V) inside the column.
iii) Suitable scaffolding and other inspection aids required inside the column.
iv) Water manometer for levelness checking.
v) Hose pipe connection etc. for supply of water and Teflon tape for sealing threaded joints.

2.9 Various leak tests of Chimney Trays/Seal Pans/Recess Seal Pans/ Draw-off Boxes/ Distributors etc. as per requirements of drawings/specifications shall be carried out by Contractor. These shall be witnessed by Tray supplier/ Engineer-in-Charge.

2.10 Provision of all tools and tackles including labours required for handling of components shall be in Contractor's scope. Trained personnel and labours required for Installation, Testing and Inspection works shall be in Contractor's scope.

2.11 The column/ vessel interior walls, debris etc. shall be cleaned/ Vacuumed cleaned thoroughly prior to starting of installation work and Before Box-up after completion of installation activities.

2.12 All carbon steel components shall be cleaned to remove rust preventive coating.(if applicable)

2.13 All consumables like electrodes etc. shall be in the scope of contractor. All welding shall be done by qualified welders only. The electrodes/filler material to be used shall be compatible with the metallurgy of component and shall be used only after prior approval of Tray supplier/ Engineer-in-Charge.

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2.14 For Welding Procedure Specification (WPS) & Safety, Health & Environment, Contractor shall refer approved WPS/ PQR Specifications. Same shall be provided by Tray supplier before start of installation/modification work on the column internals.

2.15 It shall be ensured that trays are not used as working platform inside the column. Any damage caused to these shall be repaired/ replaced by Contractor free of charge.

2.16 Checking of installed Trays/Internals and filling of "Installation Reporting Formats" and getting these counters checked by Tray supplier/ Engineer-in-Charge as per 6-14-0016 "Specification for Review of Installation of Column Internals". These shall be submitted to Engineer-in-Charge.

2.17 After the Trays/ internals have been inspected by Tray supplier, Engineer-in-Charge, these shall be inspected by Tray/ Internal Designer/ EIL Specialist / Licensor / Owner as required before final box-up.

2.18 All the Punch List points given by Tray & Internal Designer/ Engineer-in-Charge/ EIL-Specialist/Licensor/ Owner shall be attended by Contractor and necessary rectifications/ modifications shall be carried out.

2.19 Tray/ Internals design engineer shall satisfy himself that the column is ready for box-up i.e. all Internals have been installed correctly, properly cleaned by Vacuum cleaner and without leakage (as required per drawings) and bolts are tight with lock-nuts (wherever specified).

2.20 Box-up, after complete installation/ testing/ Inspection of all necessary works shall be carried out by the Contractor.

2.21 Final box-up clearance shall be obtained from the Tray & Internal Designer.

2.22 Contractor work shall be deemed complete only after necessary clearance of Engineer-in-Charge.

2.23 SPECIAL REQUIREMENT FOR INSTALLATION AGENCY

The installation/modification of column internals inside the column shall be carried out either by the Mechanical Contractor or by any installation Agency appointed by the Mechanical Contractor. The Mechanical Contractor/Installation Agency shall be reputed and must have successfully executed similar column internal installation works within the last seven (7) years from the date of issue of the Tender. The Mechanical Contractor/Installation Agency shall have completed at least one (1) such installation/modification job within the Petroleum Refinery or Petrochemical or Fertilizer sector. The Mechanical Contractor shall submit a reference list of such executed jobs along with supporting documentary evidence (such as a copy of Purchase Order, copy of SOR/SOW, and Commissioning/Completion Certificate) for finalization of the Column Internal Installation Agency.

The Mechanical Contractor shall submit the PTR documents of the proposed Installation Agency to EIL for review and acceptance prior to placement of order for installation/modification of column internals at site.

B. SCOPE OF WORK AND SUPPLY FOR DE-HUMIDIFICATION AND AIR-CONDITIONING FOR COLUMNS

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De-humidification and Air-conditioning system for columns shall be arranged by the Mechanical contractor during installation of column internals. System shall be designed to provide 40 air changes per hour & ensure a temperature from 32 to 35 degree Celsius or 10-12 degree Celsius less than ambient temperature whichever is less with a Uniform humidity (RH) of 50-55% inside the column. At a time minimum 15m of column height for inside diameter of range 6000 to 9000mm and 10m of column height for inside diameter of more than 9000mm shall maintain above temperature and humidity; for other columns above shall be maintained across the full length of column. Above shall be ensured for every column section wherever installation work is in progress. The power required for the system shall be given free of cost by Client. However, it may be noted that Power shall be provided at a single point, Mechanical Contractor to take tap off from single point by his own arrangement. This system shall be used by the installation agency during installation of Column Internals and various Inspection agencies during the inspection of Internals inside the columns till the BOX-UP of the Columns.

De-humidification and Air-conditioning system shall be arranged from specialized agencies who are well experienced in this line of service having proven PTR (proven track record). The Agency shall visit site to identify the location of all columns in advance and necessary arrangements shall be made in advance so that the De-humidification and Air-conditioning system are in place before the start of internal installation work. The system shall be designed in such a manner that any kind of combination of column work may progress (e.g. Both Major Column or One Major Column with two smaller Columns or Two Major Columns with one small column etc.). The sequence of column internals installation along with schedule shall be finalized by the successful Vendor/Contractor at later stage. The machine shall be installed at the Grade Level or at the scaffolding to be decided by the Contractor / Agency and shall be as per the direction of the Engineer-In-Charge. Also, all Statutory Regulations and Safety, Health and Environment Requirements shall be complied by the Contractor / Agency. The agency selected by the Contractor shall mobilize, supply and make all necessary arrangements for the provision of De-humidification and Air-conditioning system for all the columns as listed in Sr. no. 16 of SOR (B957-300-80-46-MR-SOR-3001) for the entire duration of work after obtaining entry permit till the BOX- UP of Columns. This system shall be working whenever the installation work inside the column is in progress. The system shall work 12 hours/day. In case the column internals installation or inspection activities require extended working hours (16/24 hours), the De-humidification and Air-conditioning system shall be operated accordingly.

Suitable measuring instruments are to be employed to note down the temperature & humidity till the top of the column, which are required to be submitted on daily basis. Entire job will have to be carried out as per the direction of the Engineer-In-Charge.

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SCOPE OF WORKS / SUPPLY

(STATIC & MACHINERY EQUIPMENT)

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ANNEXURE A: STATIC EQUIPMENT

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CONTRACTOR'S SCOPE OF WORK FOR STATIC EQUIPMENTS

The Scope includes the following:

1.0 This scope of work and supply of contractor shall be read in conjunction with Schedule of rates (Doc. Nos. B957-300-80-42-MR-SOR-3001-A & B957-300-80-42-MR-SOR-3001-B) and specifications, standards appearing in the list of applicable documents / attachments furnished below.

2.0 The scope includes the erection, painting, insulation (Hot, Cold, and Safety); for Reactors, Columns, Vessels, Heat Exchangers etc. as defined in the tender.

3.0 Hydro testing of new exchangers shall be carried out according to Clause 4.1.14 of EIL Specification 6-76-0001. (Refer Item no. 01VV.30.3 of SOR B957-300-80-42-MR-SOR-3001-A & B957-300-80-42-MR-SOR-3001-B).

4.0 Cleaning of site, shifting and handing over of the removed items to owner at their designated location.

5.0 Chemical Cleaning shall be carried out as per Specifications attached in the tender document. (Refer item no. 01VV.30.14 and 01VV.30.15 of B957-300-80-42-MR-SOR-3001-A and 01VV.30.15 of SOR B957-300-80-42-MR-SOR-3001-B).

LIST OF APPLICABLE DOCUMENTS

SL. NO.	DESCRIPTION	DOCUMENT NO.	REMARKS
SCHEDULE OF RATES			
1.	Schedule Of Rates for Composite Works-New Units (ECU)	B957-300-80-42-MR-SOR-3001-A	
2.	Schedule Of Rates for Composite Works-New Units (ECU)	B957-300-80-42-MR-SOR-3001-B	
JOB SPECIFICATION & OTHER APPLICABLE DOCUMENTS			
3.	Equipment details for Erection	B957-80-42-EE-3001A	
4.	Equipment details for Erection	B957-80-42-EE-3001B	
5.	Equipment details for Insulation	B957-80-42-EI-3001A	
6.	Equipment details for Insulation	B957-80-42-EI-3001B	
7.	Job specification for Surface preparation and protective coating (SMMS)	B957-000-06-42-PLS-01	
8.	Scope marked P&ID for Chemical Cleaning of ECU	Refer Attachment	
9.	Job specification for pretreatment cum on-stream cleaning of recirculating fresh cooling water system	B957-000-06-42-CCS-001	
10.	Job specification for degreasing of carbon steel piping vessels & equipment in amine service	B957-000-06-42-CCS-003	

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11.	Job specification for chemical cleaning & passivation of compressor circuits	B957-000-06-42-CCS-005	
12.	Scope of Work/Supply	B957-300-80-42-SOW-3001	
13.	Perlite Technical Specification	B957-300-80-42-SP-1001	
EIL STANDARD SPECIFICATIONS			
14.	Standard specification for hot insulation of vessels, piping and equipment's	6-79-0026	
15.	Standard specification for cold insulation of vessels, piping and equipment.	6-79-0027	
16.	Standard specification for rockwool insulation	6-79-0040	
17.	Standard Specification for erection of equipment and machinery	6-76-0001	
18.	Specification for quality management system requirements from bidders	6-78-0001	
19.	Specification for documentation requirements from contractors	6-78-0002	
EIL STANDARDS			
20.	Vessel tolerances	7-12-0001	
21.	Support for Horizontal Vessel	7-12-0002	
22.	Wooden pillows for saddle support.	7-12-0003	
23.	Skirt Base details	7-12-0004	
24.	Skirt Opening details	7-12-0005	
25.	Angle Leg Support	7-12-0006	
26.	Pipe Leg Support	7-12-0007	
27.	Bracket Support For Vertical Vessel	7-12-0008	
28.	Manhole with hinged cover.	7-12-0009	
29.	Manhole with davit.	7-12-0010	
30.	Nozzle reinforcement and projection.	7-12-0013	
31.	Standard bolt hole orientation.	7-12-0015	
32.	Internal flanges.	7-12-0018	
33.	Pipe davit.	7-12-0023	
34.	Lifting lug top head type	7-12-0024	
35.	Fire proofing & insulation supports	7-12-0025	
36.	Name plate.	7-12-0027	

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37.	Manufacturer name plate.	7-12-0028	
38.	Bracket for name plate.	7-12-0029	
39.	Name plate for small equipment.	7-12-0030	
40.	Hot Insulation supports for horizontal vessel	7-12-0033	
41.	Allowable Nozzle Loads	7-12-0038	
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42.	Standard specification for positive material identification (PMI) at supplier's work	6-81-0001	
43.	Standard specification for health, safety & environment (HSE) management at construction sites	6-82-0001	
44.	Standard specification for positive material identification at construction sites	6-82-0002	
45.	Inspection and test plan (ITP) for general works (item rate contracts with categorization)	6-82-3300	
46.	Inspection and test plan (ITP) for mechanical works (item rate contracts with categorization)	6-82-3200	
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47.	MDS OF 300-CC-00-2201 (HP DEPROPANIZER)	B957-300-80-42-DS-3006	
48.	MDS OF 300-CC-00-2202 (LP DEPROPANIZER)	B957-300-80-42-DS-3007	
49.	MDS OF 300-CC-00-3001 (DEMETHANIZER)	B957-300-80-42-DS-3008	
50.	MDS OF 300-CC-00-4001 (DEETHANIZER)	B957-300-80-42-DS-3009	
51.	MDS OF 300-CC-00-4201 (DEBUTANIZER)	B957-300-80-42-DS-3013	
52.	MDS OF 302-CC-00-2601 (DEPENTANIZER)	B957-302-80-42-DS-3001	
53.	MDS OF 302-CC-00-2602 (RERUN TOWER)	B957-302-80-42-DS-3002	
54.	MDS OF 302-CC-00-2701 (H2S STRIPPER)	B957-302-80-42-DS-3003	
55.	MDS OF 302-CC-00-2702 (BTX TOWER)	B957-302-80-42-DS-3004	
56.	MDS OF 303-CC-00-3502 (SOLVENT RECOVERY COLUMN)	B957-303-80-42-DS-3002	

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57.	MDS OF 303-CC-00-3503 (WATER STRIPPER)	B957-303-80-42-DS-3003	
58.	MDS OF 303-CC-00-3601 A/B (CLAY TOWERS)	B957-303-80-42-DS-3004	
59.	MDS OF 303-CC-00-3602 (BENZENE COLUMN)	B957-303-80-42-DS-3005	
60.	MDS OF 303-CC-00-3603 (TOLUENE COLUMN)	B957-303-80-42-DS-3006	
61.	MDS OF 303-CC-00-3604 (XYLENE COLUMN)	B957-303-80-42-DS-3007	
62.	MDS OF 300-CC-00-4002 (ETHYLENE FRACTIONATOR)	B957-300-80-42-DS-3010	
63.	MDS OF 300-CC-00-4101 (PROPYLENE FRACTIONATOR NO.1)	B957-300-80-42-DS-3011	
64.	MDS OF 300-CC-00-4102 (PROPYLENE FRACTIONATOR NO.2)	B957-300-80-42-DS-3012	
65.	MDS OF 303-CC-00-3501 (EXTRACTIVE DISTILLATION COLUMN)	B957-303-80-42-DS-3001	
66.	MDS OF 300-RB-00-2201A-C (ACETYLENE CONVERTER)	B957-300-80-42-DS-3201	
67.	MDS OF 300-RB-00-4101A/B (MAPD CONVERTER)	B957-300-80-42-DS-3203	
68.	MDS OF 301-RB-00-1601A/B (C4 HYDROGENATION REACTOR)	B957-301-80-42-DS-3201	
69.	MDS OF 302-RB-00-2601AB (PGH 1ST STAGE REACTOR)	B957-302-80-42-DS-3201	
70.	MDS OF 302-RB-00-2701A/B (PGH 2ND STAGE REACTOR)	B957-302-80-42-DS-3202	
71.	MDS OF 300-VD-00-2001A-C (CHARGE GAS DRYER)	B957-300-80-42-DS-3301	
72.	MDS OF 300-VD-00-2002AB (LIQUID CONDENSATE DRYERS)	B957-300-80-42-DS-3302	
73.	MDS OF 300-VD-00-4101AB (PG PROPYLENE TREATERS)	B957-300-80-42-DS-3305	
74.	MDS OF 300-VD-00-2201 (ACETYLENE CONVERTER DRYER)	B957-300-80-42-DS-3303	
MECHANICAL DATA SHEET OF VESSELS (ITEMS FOR SOR NO. B957-300-80-42-MR-SOR-3001-A)			
75.	MDS OF 300-VV-HW-2202 (LP DEPROPANIZER REFLUX DRUM)	B957-300-80-42-DS-3131	
76.	MDS OF 300-VV-HW-4002 (ETHYLENE FRACTIONATOR REFLUX DRUM)	B957-300-80-42-DS-3155	

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77.	MDS OF 300-VV-HW-4101 (PROPYLENE FRACTIONATOR REFLUX DRUM)	B957-300-80-42-DS-3156	
78.	MDS OF 300-VV-HW-4202 (DEBUTANIZER REFLUX DRUM)	B957-300-80-42-DS-3157	
79.	MDS OF 300-VV-HW-4210 (DEBUTANIZER AREA HC DRAIN DRUM)	B957-300-80-42-DS-3159	
80.	MDS OF 300-VV-HW-6004 (BINARY REFRIGERATION ACCUMULATOR)	B957-300-80-42-DS-3172	
81.	MDS OF 300-VV-HW-6005 (BINARY REFRIGERANT COMPRESSOR SUCTION DRUM BLOWCASE)	B957-300-80-42-DS-3173	
82.	MDS OF 300-VV-HW-6007 (BINARY REFRIGERANT COMPRESSOR CASING DRAIN POT)	B957-300-80-42-DS-3175	
83.	MDS OF 300-VV-VI-2301 (REGENERATION GAS K.O. DRUM)	B957-300-80-42-DS-3135	
84.	MDS OF 300-VV-VI-5008 (LIQUID PROPYLENE ACCUMULATOR FOR FOR 300-LZ-00-3001-EP-00-17)	B957-300-80-42-DS-3167	
85.	MDS OF 300-VV-VI-5009 (LIQUID PROPYLENE ACCUMULATOR FOR FOR 300-LZ-00-3001-EP-00-18)	B957-300-80-42-DS-3168	
86.	MDS OF 300-VV-VI-6001 (BINARY REFRIG COMPRESSOR 1ST STAGE SUCTION DRUM)	B957-300-80-42-DS-3169	
87.	MDS OF 300-VV-VI-6002 (BINARY REFRIG COMPRESSOR 2ND STAGE SUCTION DRUM)	B957-300-80-42-DS-3170	
88.	MDS OF 300-VV-VI-6003 (BINARY REFRIG COMPRESSOR 3RD STAGE SUCTION DRUM)	B957-300-80-42-DS-3171	
89.	MDS OF 300-VV-VW-2201 (HP DEPROPANIZER REFLUX DRUM)	B957-300-80-42-DS-3130	
90.	MDS OF 300-VV-VW-2203 (CONDENSATE POT FOR 300-EE-00-2208)	B957-300-80-42-DS-3132	
91.	MDS OF 300-VV-VW-2204 (CONDENSATE POT FOR 300-EE-00-2201 A/B)	B957-300-80-42-DS-3133	
92.	MDS OF 300-VV-VW-2205 (CONDENSATE POT FOR 300-EE-00-2204 A/B)	B957-300-80-42-DS-3134	
93.	MDS OF 300-VV-VW-2302 (CONDENSATE POT FOR 300-EE-00-2303)	B957-300-80-42-DS-3136	
94.	MDS OF 300-VV-VW-2303 (CONDENSATE POT FOR 300-EE-00-2304)	B957-300-80-42-DS-3137	

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95.	MDS OF 300-VV-VW-3001 (DEMETHANIZER REFLUX DRUM)	B957-300-80-42-DS-3149	
96.	MDS OF 300-VV-VW-3004 (DEMETHANIZER FEED SEPARATOR NO.1)	B957-300-80-42-DS-3151	
97.	MDS OF 300-VV-VW-3005 (DEMETHANIZER FEED SEPARATOR NO.2)	B957-300-80-42-DS-3152	
98.	MDS OF 300-VV-VW-3006 (DEMETHANIZER FEED SEPARATOR NO.3)	B957-300-80-42-DS-3153	
99.	MDS OF 300-VV-VW-4001 (DEETHANIZER REFLUX DRUM)	B957-300-80-42-DS-3154	
100.	MDS OF 300-VV-VW-4203 (CONDENSATE POT FOR 300-EE-00-4201A/B)	B957-300-80-42-DS-3158	
101.	MDS OF 300-VV-VW-5006 (LIQUID PROPYLENE ACCUMULATOR FOR 300-EE-00-3012)	B957-300-80-42-DS-3165	
102.	MDS OF 300-VV-VW-5007 (LIQUID PROPYLENE ACCUMULATOR FOR 300-EE-00-4003A-D)	B957-300-80-42-DS-3166	
103.	MDS OF 300-VV-VW-6006 (BINARY REFRIGERANT RETROGRADE DRUM)	B957-300-80-42-DS-3174	
104.	MDS OF 301-VV-HW-1601 (C4 FEED SURGE DRUM)	B957-301-80-42-DS-3101	
105.	MDS OF 301-VV-HW-1602 (C4 HP FLASH DRUM)	B957-301-80-42-DS-3102	
106.	MDS OF 301-VV-VW-1603 (CONDENSATE POT FOR 301-EE-00-1604)	B957-301-80-42-DS-3103	
107.	MDS OF 302-VV-HW-2602 (PGH FEED SURGE DRUM)	B957-302-80-42-DS-3101	
108.	MDS OF 302-VV-HW-2606 (DEPENTANIZER REFLUX DRUM)	B957-302-80-42-DS-3105	
109.	MDS OF 302-VV-HW-2608 (RERUN TOWER REFLUX DRUM)	B957-302-80-42-DS-3107	
110.	MDS OF 302-VV-HW-2703 (H2S STRIPPER REFLUX DRUM)	B957-302-80-42-DS-3111	
111.	MDS OF 302-VV-HW-2706 (BTX TOWER REFLUX DRUM)	B957-302-80-42-DS-3113	
112.	MDS OF 302-VV-HW-2712 (PGH AREA HC DRAIN DRUM)	B957-302-80-42-DS-3115	
113.	MDS OF 302-VV-VI-2702 (PGH RECYCLE COMPRESSOR SUCTION DRUM)	B957-302-80-42-DS-3110	

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114.	MDS OF 302-VV-VW-2603 (PGH 1ST STAGE HP FLASH DRUM)	B957-302-80-42-DS-3102	
115.	MDS OF 302-VV-VW-2604 (CONDENSATE POT FOR 302-EE-00-2602)	B957-302-80-42-DS-3103	
116.	MDS OF 302-VV-VW-2605 (PGH 1ST STAGE LP FLASH DRUM)	B957-302-80-42-DS-3104	
117.	MDS OF 302-VV-VW-2607 (CONDENSATE POT FOR 302-EE-00-2604)	B957-302-80-42-DS-3106	
118.	MDS OF 302-VV-VW-2609 (CONDENSATE POT FOR 302-EE-00-2607)	B957-302-80-42-DS-3108	
119.	MDS OF 302-VV-VW-2701 (PGH 2ND STAGE HP FLASH DRUM)	B957-302-80-42-DS-3109	
120.	MDS OF 302-VV-VW-2704 (CONDENSATE POT FOR 302-EE-00-2705)	B957-302-80-42-DS-3112	
121.	MDS OF 302-VV-VW-2708 (CONDENSATE POT FOR 302-EE-00-2708)	B957-302-80-42-DS-3114	
122.	MDS OF 303-VV-HI-3502 (EDC OVHD RECEIVER)	B957-303-80-42-DS-3102	
123.	MDS OF 303-VV-HI-3504 (SRC OVHD RECEIVER)	B957-303-80-42-DS-3104	
124.	MDS OF 303-VV-HW-3501 (EDC FEED SURGE DRUM)	B957-303-80-42-DS-3101	
125.	MDS OF 303-VV-HW-3511 (SOLVENT SUMP)	B957-303-80-42-DS-3111	
126.	MDS OF 303-VV-HW-3512 (AROMATIC SUMP)	B957-303-80-42-DS-3112	
127.	MDS OF 303-VV-HW-3601 (CLAY TOWER CHARGE DRUM)	B957-303-80-42-DS-3113	
128.	MDS OF 303-VV-HW-3603 (BENZENE COLUMN OVHD RECEIVER)	B957-303-80-42-DS-3115	
129.	MDS OF 303-VV-HW-3606 (TOULENE COLUMN OVHD RECEIVER)	B957-303-80-42-DS-3118	
130.	MDS OF 303-VV-HW-3608 (XYLENE COLUMN OVHD RECEIVER)	B957-303-80-42-DS-3120	
131.	MDS OF 303-VV-VI-3506 (SOLVENT REGENERATOR)	B957-303-80-42-DS-3106	
132.	MDS OF 303-VV-VW-3503 (EDC REBOILER CONDENSATE POT)	B957-303-80-42-DS-3103	
133.	MDS OF 303-VV-VW-3505 (SRC REBOILER CONDENSATE POT)	B957-303-80-42-DS-3105	

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134.	MDS OF 303-VV-VW-3507 (SOLVENT REGENERATOR REBOILER CONDENSATE POT)	B957-303-80-42-DS-3107	
135.	MDS OF 303-VV-VW-3508 (WATER SURGE DRUM)	B957-303-80-42-DS-3108	
136.	MDS OF 303-VV-VW-3602 (CLAY TOWER CHARGE HEATER CONDENSATE POT)	B957-303-80-42-DS-3114	
137.	MDS OF 303-VV-VW-3604 (BENZENE COLUMN REBOILER II CONDESATE POT)	B957-303-80-42-DS-3116	
138.	MDS OF 303-VV-VW-3607 (TOULENE COLUMN REBOILER CONDENSATE POT)	B957-303-80-42-DS-3119	
139.	MDS OF 303-VV-VW-3609 (XYLENE COLUMN REBOILER CONDENSATE POT)	B957-303-80-42-DS-3121	
140.	MDS OF 303-VV-VI-3610 (REGENERATION KO DRUM)	B957-303-80-42-DS-3122	
141.	MDS OF 303-VV-VI-3605 (MOISTURE GUARD BED)	B957-303-80-42-DS-3117	
142.	MDS OF 303-VV-VW-3509 (SOLVENT VENT DRUM)	B957-303-80-42-DS-3109	
MECHANICAL DATASHEETS FOR REACTOR / COLUMN / DRYERS (ITEMS FOR SOR NO. B957-300-80-42-MR-SOR-3001-B)			
143.	MDS OF 300-CC-00-2201(HP Depropanizer)	B957-300-80-42-DS-3006	
144.	MDS OF 300-CC-00-1202(Pyrolysis Fuel Oil Stripper)	B957-300-80-42-DS-3002	
145.	MDS OF 300-CC-00-1401(Process Water Stripper)	B957-300-80-42-DS-3004	
146.	MDS OF 300-CC-00-2401(DCU Offgas Caustic / Wash Water Tower)	B957-300-80-42-DS-3014	
147.	MDS OF 300-VD-00-2401A/B (PG Propylene Treaters)	B957-300-80-42-DS-3304	
148.	MDS OF 300-RB-00-2401 (DCU Offgas Oxygen Converter)	B957-300-80-42-DS-3202	
149.	MDS OF 304-RB-00-4501 (WAO REACTOR)	B957-304-80-42-DS-3501	
MECHANICAL DATA SHEET OF VESSELS (ITEMS FOR SOR NO. B957-300-80-42-MR-SOR-3001-B)			
150.	MDS OF 300-VV-HI-2101(Spent Caustic Coalescer)	B957-300-80-42-DS-3126	
151.	MDS OF 300-VV-HI-2102 (Spent Gasoline Coalescer)	B957-300-80-42-DS-3127	

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152.	MDS OF 300-VV-HW-1002(Kero Feed Surge Drum)	B957-300-80-42-DS-3102	
153.	MDS OF 300-VV-HW-1003(Naphtha Feed Surge Drum)	B957-300-80-42-DS-3103	
154.	MDS OF 300-VV-HW-1201(Quench Oil Drain Drum)	B957-300-80-42-DS-3112	
155.	MDS OF 300-VV-HW-2007 (Charge Gas Compressor Casing Drain Drum)	B957-300-80-42-DS-3122	
156.	MDS OF 300-VV-HW-2010 (CGC Area Hydrocarbon Drain Drum)	B957-300-80-42-DS-3125	
157.	MDS OF 300-VV-HW-2103 (8% Caustic Surge Drum)	B957-300-80-42-DS-3128	
158.	MDS OF 300-VV-HW-2104 (Caustic Drain Drum)	B957-300-80-42-DS-3129	
159.	MDS OF 300-VV-HW-2505 (MEA Drain Drum)	B957-300-80-42-DS-3146	
160.	MDS OF 300-VV-HW-5005 (Propylene Refrigerant Accumulator)	B957-300-80-42-DS-3164	
161.	MDS OF 300-VV-HW-7002 (Dry Flare Knock Out Drum)	B957-300-80-42-DS-3177	
162.	MDS OF 300-VV-VI-2004 (Charge Gas Compressor 2nd Stage Discharge Drum)	B957-300-80-42-DS-3119	
163.	MDS OF 300-VV-VI-2005 (Charge Gas Compressor 3rd Stage Suction Drum)	B957-300-80-42-DS-312	
164.	MDS OF 300-VV-VI-2006 (Charge Gas Compressor 3rd Stage Discharge Drum)	B957-300-80-42-DS-3121	
165.	MDS OF 300-VV-VI-2401(DCU Offgas Compressor Suction Drum)	B957-300-80-42-DS-3138	
166.	MDS OF 300-VV-VI-2402(DCU Offgas Caustic Tower Feed KO Drum)	B957-300-80-42-DS-3139	
167.	MDS OF 300-VV-VI-2403(DCU Offgas Dryer/Treater Feed Gas KO Drum)	B957-300-80-42-DS-3140	
168.	MDS OF 300-VV-VI-2405(DCU Offgas Top Caustic Feed KO Drum)	B957-300-80-42-DS-3142	
169.	MDS OF 300-VV-VI-3002(Fuel Gas KO Drum - Out Drum)	B957-300-80-42-DS-3150	
170.	MDS OF 300-VV-VI-5003(Propylene Refrig Compressor 3rd Stage Suction Drum)	B957-300-80-42-DS-3162	
171.	MDS OF 300-VV-VW-1001(LPG vaporizer Drum)	B957-300-80-42-DS-3101	
172.	MDS OF 300-VV-VW-1004(Condensate Pot for 300-EE-00-1003)	B957-300-80-42-DS-3104	

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173.	MDS OF 300-VV-VW-1005(Condensate Pot for 300-EE-00-1005)	B957-300-80-42-DS-3105	
174.	MDS OF 300-VV-VW-1006(Condensate Pot for 300-EE-00-1007)	B957-300-80-42-DS-3106	
175.	MDS OF 300-VV-VW-1007(Condensate Pot for 300-EE-00-1009)	B957-300-80-42-DS-3107	
176.	MDS OF 300-VV-VW-1184(VHP Steam Continuous Blowdown Drum)	B957-300-80-42-DS-3110	
177.	MDS OF 300-VV-VW-1185(VHP Steam Intermittent Blowdown Drum)	B957-300-80-42-DS-3111	
178.	MDS OF 300-VV-VW-1202(Quench Oil Drain Drum Vent Seal Pot)	B957-300-80-42-DS-3113	
179.	MDS OF 300-VV-VW-1402(Condensate Pot for 300-EE-00-1401)	B957-300-80-42-DS-3115	
180.	MDS OF 300-VV-VW-1403(Condensate Pot for 300-EE-00-1402 A/B)	B957-300-80-42-DS-3116	
181.	MDS OF 300-VV-VW-2008(Medium Gasoline Flash Drum)	B957-300-80-42-DS-3123	
182.	MDS OF 300-VV-VW-2009(Condensate Pot for 300-EE-00-2007A/B)	B957-300-80-42-DS-3124	
183.	MDS OF 300-VV-VW-2404(Condensate Pot for 300-EE-00-2404)	B957-300-80-42-DS-3141	
184.	MDS OF 300-VV-VW-2501(Condensate Pot for 300-EE-00-2503A/B)	B957-300-80-42-DS-3143	
185.	MDS OF 300-VV-VW-2502(Condensate Pot for 300-EE-00-2502)	B957-300-80-42-DS-3144	
186.	MDS OF 300-VV-VW-2503(MEA Regenerator Reflux Drum)	B957-300-80-42-DS-3145	
187.	MDS OF 300-VV-VW-8001(LP Condensate Flash Drum)	B957-300-80-42-DS-3178	
188.	MDS OF 300-VV-VW-8002(MP Condensate Flash Drum)	B957-300-80-42-DS-3179	
189.	MDS OF 300-VV-HW-8010(QUENCH WATER DRAIN DRUM)	B957-300-80-42-DS-3181	
190.	MDS OF 300-VV-VW-9002(Skimmed Yellow Oil Drum)	B957-300-80-42-DS-3180	
191.	MDS OF 304-VV-HI-4502(WAO DRAIN SUMP)	B957-304-80-42-DS-3102	
192.	MDS OF 304-VV-HI-4504(WAO ACID SUMP)	B957-304-80-42-DS-3104	
193.	MDS OF 304-VV-HW-4503(WAO SULFURIC ACID TANK)	B957-304-80-42-DS-3103	

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194.	MDS OF 304-VV-VI-4501(WAO Separator)	B957-304-80-42-DS-3101	

6.0 Contractor scope includes supply of materials like insulation, painting etc., transportation, documentation, installation, touch-up, insulation installation, NDTs & Testing, Inspection, Local PWHT, Local / complete equipment hydrotesting (as applicable) in Column, Vessels, Heat Exchangers. Additionally, scaffolding inside as well as outside as required, barricading works etc.

Scope also includes issuance of FIMs, transportation form Owner's storage to erection site, erection, alignment, grouting, touch-up painting, insulation, chemical cleaning for Columns, Vessels, Heat Exchangers, Air Coolers etc. as per Doc. Nos. **B957-80-42-EE-3001A & B957-80-42-EE-3001B, B957-80-42-EI-3001A & B957-80-42-EI-3001B**, Process Datasheets / Mechanical Datasheets, Standards and Specifications enclosed as defined in the Tender document.

Scope also includes dressing up of Column/Vessel involves the activities of installation of insulation with cladding, ladders, platforms and handrails, piping spools with supports wherever applicable, demister, internal gratings, distributors, pipe davit and other associated internals/accessories in horizontal position of Equipment, complete in all respects. The same is taken up for Erection on foundation with adequate safety as per Instruction of Engineer In-Charge.

7.0 All necessary spading/ despading works, including providing necessary tools, tackles, equipment, labours required for the job, before start of any work inside the equipment and also after completion of all works shall be in Contractor's scope. The same shall be included in the quoted price.

8.0 Provision of adequate local barricading or screening, if any as required by Engineer-in-Charge shall be in Contractor's scope.

9.0 Provision of any scaffolding (both internal and external), as per instructions of Engineer-in-Charge shall be in Contractor's scope. The Scaffolding is to be made out of tubular structures (standard scaffolding pipes of 40mm dia.) and shall be self-locking type. Working platforms or stages shall be provided as per instructions of Engineer-in-Charge. A clear gap of 50 -70mm should be maintained between the edge of scaffolding pipes and side wall of shell. In no case the pipe edges should touch shell surface except at bottom support points (for Internal Scaffolding only), where pipes should be supported on flat plates (flat pieces of plates to be welded at the end of the vertical scaffolding pipes) to avoid damages to shell surfaces. Wooden planks, bamboo, coir ropes, nylon ropes, cotton or any such combustible material should not be used for making scaffolding.

10.0 All tools, tackles, equipment including providing labours required for internal cleaning along with supervision shall be provided by Contractor as per instruction of Engineer In-Charge. Any residual cleaning, if required, for carrying out hot jobs shall also be in the scope of Contractor.

11.0 Preservation of static equipment using desiccants and moisture control materials shall be executed as instructed by EIC.

12.0 Static equipment flanges, fasteners and related preservation activities including greasing shall be included; dedicated preservation team with one supervisor to be deployed.

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13.0 Preparation of all documents like Procedures, Documents, Detail fabrication Drawings etc., approval from Client / Consultant, as-built drawings after completion of all works shall be in scope of Contractor.

14.0 **CHEMICAL CLEANING**:

Preparation of procedure and approval of same from Client / Consultant, procurement of all chemicals, blinding of nozzles, piping connections etc., temporary blinds, temporary spools / jump overs, fabrication including supply of all required materials, installation, all tools & tackles, instruments, equipment, accessories required for carrying out chemical cleaning of equipment, taking samples and noting parameters etc. including manpower, supervision etc. shall be in scope of Contractor. The Chemical Cleaning of the following equipment shall be carried out as per Specifications attached in the tender document.

Chemical Cleaning and passivation shall be performed by the mechanical contractor for the below items as per Schedule of rates (**B957-300-80-42-MR-SOR-3001-A & B957-300-80-42-MR-SOR-3001-B**), For equipment's which required Chemical Cleaning and passivation, refer the scope marked P&ID of Chemical Cleaning and job specification attached elsewhere in the tender document.

CHEMICAL CLEANING / DREASING / PRE TREATMENT CUM ON STREAM CLEANING / PASSIVATION

Items covered are as follows. However, Bidder to refer scope marked P&ID of chemical cleaning as attached in Tender: -

B957-300-80-42-MR-SOR-3001-A

1. 300-CC-00-2502
2. 300-CC-00-2501
3. 300-VV-VW-2503
4. 300-VV-HW-2505
5. 300-CC-00-2503
6. 302-VV-VI-2702
7. 300-VV-VI-5001
8. 300-VV-VI-5004
9. 300-VV-VI-5003
10. 300-VV-VW-5007
11. 300-VV-VI-5002
12. 300-VV-VI-6003
13. 300-VV-VI-6001
14. 300-VV-VI-6002
15. 300-VV-VI-2002
16. 300-VV-VI-2003
17. 300-VV-VI-2005
18. 300-VV-VI-2401
19. 300-EE-00-2001A-D (Tube Side)
20. 300-EE-00-2002A/B (Tube Side)
21. 300-EE-00-2003A/B (Tube Side)
22. 300-EE-00-2101 (Tube Side)
23. 300-EE-00-2202 (Tube Side)
24. 300-EE-00-2209 (Tube Side)
25. 300-EE-00-2210 (Tube Side)
26. 300-EE-00-2211 (Tube Side)
27. 300-EE-00-2302 (Tube Side)

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28. 300-EE-00-2401 (Tube Side)
29. 300-EE-00-4102 (Tube Side)
30. 300-EE-00-4105A/B (Tube Side)
31. 300-EE-00-4107 (Tube Side)
32. 300-EE-00-4202 (Tube Side)
33. 300-EE-00-4203 (Tube Side)
34. 302-EE-00-2601 (Tube Side)
35. 302-EE-00-2605 (Tube Side)
36. 302-EE-00-2608A/B (Tube Side)
37. 302-EE-00-2706 (Tube Side)
38. 302-EE-00-2709A/B (Tube Side)
39. 302-EE-00-2711 (Tube Side)
40. 302-EE-00-2712 (Tube Side)

B957-300-80-42-MR-SOR-3001-B

1. 300-EE-00-1181 (Tube side)
2. 300-EE-00-1182 (Tube side)
3. 300-EE-00-1301A-D (Tube side)
4. 300-EE-00-1302A/B (Tube side)
5. 300-EE-00-1404A/B (Tube side)
6. 300-EE-00-1405 (Tube side)
7. 300-EE-00-2405 (Tube side).
8. 300-EE-00-2505 (Tube side)
9. 300-EE-00-5001A-D (Tube side)
10. 300-EE-00-8003 (Tube side)
11. 300-EE-00-3010 (Tube side)
12. 300-EE-00-3011 (Tube side)
13. 300-EE-00-6001 (Tube side)
14. 301-EE-00-1602 (Tube side)
15. 302-EE-00-2603 (Tube side)
16. 302-EE-00-2703 (Tube side).

- **However, Scope marked P&ID and job specification shall also be referred as attached elsewhere in the Tender before finalizing the chemical cleaning.**

15.0 PAINTING:

Supply and application of Touch-up painting work for all equipment's shall be included in contractor's scope. Painting for the equipment's to be carried-out as per the details furnished in SOR doc. no. **B957-300-80-42-MR-SOR-3001-A & B957-300-80-42-MR-SOR-3001-B**.

Note for Touch Up painting works: The Surface preparation, primer application and finish paint is done by Equipment vendor. Only touch up paint wherever required (i.e.: Paint damage due to erection, transportation...etc) shall be done at site by mechanical contractor.

16.0 INSULATION

Insulation for the equipment's to be carried-out as per the details furnished in SOR doc. no. **B957-300-80-42-MR-SOR-3001-A & B957-300-80-42-MR-SOR-3001-B** and Equipment details for insulation (Doc. no. **B957-80-42-EI-3001A & B957-80-42-EI-3001B**).

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Insulation of Equipment: Contractor scope includes procurement of all insulation materials hot as well as cold (wherever applicable) insulation including all ancillary material, transportation from supplier shop to Contractor yard, storing at Contractor's yard, transportation to erection site from Contractor's yard, protective covering, all consumables and other necessary materials, testing of the material as required, applying insulation on surfaces as specified, including all preparatory works thereon, all binding, tying, lacing, stitching and/or otherwise securing, providing Vapour barrier wherever applicable, finishing with plain/corrugated sheet cladding or as specified, providing bolts, rivets, self-tapping screws wherever specified, providing inspection windows etc. arranging necessary scaffolding, all tools and tackles, equipment, apparatus etc. labour and supervision and completing the work in all respect at all heights as per drawings, specifications and instructions of Engineer-in-Charge. Contractor to strictly follow the Insulation table for type and thickness for new equipment & existing drawings for modification equipment. For insulation, Contractor to fulfill the requirements given in EIL Standard specifications no. 6-79-0026 & 6-79-0027 for hot & cold service respectively.

17.0 BURIED VESSELS

Site work for the Buried Vessels: The nozzle sections (refer site welding marked in the MDS) including internals and stiffeners shall be made fit up and welded on the vessel at the site to the satisfaction of Engineer in-charge. After the welding, full radiography, box hydrotesting, Local PWHT, draining, cutting, flushing and finishing of box, drying put of the vessel after completion of site work etc. shall be carried out to the satisfaction of Engineer-In-Charge. All tools and tackles, consumables and others required for the site work shall be in contractor scope of supply.

Checking the alignment of equipment in underground with all aspects, touch up paint, providing all tools and tackles, machinery. Consumables, transportation/handling of equipment, erection in sump, sand filling, labor etc. to complete the work in all respects for the items specified in SOR No.: **B957-300-80-42-MR-SOR-3001-A & B957-300-80-42-MR-SOR-3001-B** attached elsewhere in tender.

18.0 IBR REQUIREMENT

The following items are Under IBR service. All work related to IBR requirement shall be compliance with at site.

B957-300-80-42-MR-SOR-3001-A

1. 300-VV-VW-2302
2. 300-VV-VW-2303
3. 302-VV-VW-2604
4. 302-VV-VW-2607
5. 302-VV-VW-2609
6. 302-VV-VW-2704
7. 302-VV-VW-2708
8. 303-VV-VW-3604
9. 303-VV-VW-3607
10. 303-VV-VW-3609
11. 303-CC-00-3503
12. 303-VV-VW-3507
13. 303-VV-VW-3602

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14. 303-VV-VW-3503
15. 303-VV-VW-3505
16. 300-EE-00-2208 (Shell side)
17. 300-EE-00-2303 (Tube side)
18. 300-EE-00-2304 (Tube side)
19. 300-EE-00-4201 (Shell side)
20. 301-EE-00-1604 (Shell side)
21. 302-EE-00-2602 (Shell side)
22. 302-EE-00-2604 (Shell side)
23. 302-EE-00-2607 (Shell side)
24. 302-EE-00-2702 (Shell side)
25. 302-EE-00-2705 (Shell side)
26. 302-EE-00-2708 (Shell side)
27. 303-EE-00-3503 (Shell side)
28. 303-EE-00-3507 A/B (Tube side)
29. 303-EE-00-3508 (Shell side)
30. 303-EE-00-3509 (Tube side)
31. 303-EE-00-3601 (Tube side)
32. 303-EE-00-3605 (Shell side)
33. 303-EE-00-3607 (Shell side)
34. 303-EE-00-3610 (Shell side)
35. 303-EE-DP-3510 (Inner pipe tube)

B957-300-80-42-MR-SOR-3001-B

1. 300-VV-VW-1184
2. 300-VV-VW-1403.
3. 300-VVVW-2502.
4. 300-VV-VW-8002.
5. 300-EE-00-1205 (Shell side)
6. 300-EE-00-1402A/B (Shell side)
7. 300-EE-00-1403 (Shell side)
8. 300-EE-00-2404 (Tube Side)
9. 300-EE-00-2502 (Tube side)

19.0 HEAT EXCHANGERS

19.1 GENERAL

1. This section covers the minimum requirement for erection of Shell & Tube Heat Exchangers at site by an Erection Contractor.

   Abbreviation used
   EC Erection contractor/turnkey contractor
   EIC Engineer-in-Charge (designated by EIL)
   HEI Heat Exchanger(s)
   AEI Air Cooled Heat Exchanger(s)

2. SCOPE OF WORK OF ERECTION CONTRACTOR

The scope of work for the EC as per schedule of quantities given in the mechanical tender

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shall include the following as a minimum:

2.1 Transportation of heat exchanger (HEI) as stipulated in Job specifications & Schedule of Rates.

2.2 Preparation of foundation by chipping & installation of base plates for foundations**.**

2.3 Erection of HEI on foundations.

2.4 Leveling, aligning, grouting and completing the work in all respect as per drawings, specifications and instructions of the EIC.

2.5 **Hydro-testing of HEI if the time gap between last hydro-test is more than six months or in case it is found to be necessary by EIC or for the exchangers where bundle pullout check is required at site as per procedure given in Para 19.4 & 19.5.**

2.6 The EC shall take care of Torquing/Tensioning and de-tensioning/de-torquing of equipment flange joints

Pneumatic and Electric Torquing/tensioning machine to be deployed in sufficient numbers. In case of Pneumatic machine deployed by contractor, contractor to arrange compressor for air pressure. All bolting above 200 NB nozzle shall be tightened be by Torque wrench or BTD. No manual tightening is allowed.

2.7 Drying by passing compressed air and blinding off of HEI to prevent ingress of rain, dust, extraneous matter etc. as per Para 19.6 below.

2.8 The EC shall take proper care to avoid undesirable corrosion during various stages of erection and prior to pre-commissioning activity.

In addition to the above, EC may be called upon to do other jobs like rectification of defects etc. as per instructions of EIC.

19.2 SCHEDULE OF COST

1. EC shall include in his cost for carrying out work as per Para 19.1 (2) above for HEI as given in the Doc. Nos. **B957-80-42-EE-3001A & B957-80-42-EE-3001B**.

   All equipment, consumable and other Accessories required for completion of the job shall be arranged by the EC. This would include but not limited to, cranes, tools and tackles, manpower, machinery, instruments like plumb line, theodolite etc. for checking the erection, hydrostatic testing pumps, potable water, pressure gauge, hoses blinds etc. for hydrotesting and shims and wedges & other consumable for alignment & grouting.

2. EC shall also supply the base plate to be installed on the sliding foundation. The dimensions of the base plate shall be as per the foundation drawings enclosed with tender.

19.3 ERECTION OF SHELL & TUBE HEAT EXCHANGERS

1. HEI shall be erected with proper orientation on prepared foundation.

2. EC shall install base plate over the sliding end foundation before erection of HEI. The HEI shall then be erected, properly leveled and aligned with limits as below by providing

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necessary shims/wedges as required under the fixed support/base plate before grouting.

3. HEI shall be leveled properly after erection on the foundation. Difference in elevation of centerline from one end to the other end shall not be more than 1mm/m, limited to + 3mm maximum. Further, elevation difference shall be such as to ensure complete draining of HEI.

4. Leveling and plumpness shall be approved by EIC and shall be checked using theodolite before grouting and final finishing of the foundations. The record of the same shall be maintained.

5. Instruments, as required shall be mounted on the HEI by EC. On instructions of EIC, EC shall also remove and handover the instruments to EIC for calibrations. During this period, EC shall cover all openings to protect the equipment.

6. EC to ensure that foundation bolts at the sliding saddle end are at the center of slotted holes & nuts at sliding end are only hand tightened. Projected bolt threads shall be properly protected by application of grease etc.

19.4 HYDRO TESTING

1. HEIs shall be hydrotested using potable water. Hydrotesting of both shell and tube sides shall be carried out as per procedure given below or as per instructions of EIC. For HEI's fitted with SS bellow or SS part, use potable water with max. 25 ppm chlorides for hydrotesting.

2. Suitable pump set, piping, test pressure gauges and other instruments, water-hoses, temporary gaskets, metallic blinds, bolts, nuts, consumable and other temporary arrangements and equipment for testing shall be provided by the EC at his cost. Test pressure gauges shall be calibrated by the EC and got approved from EIC.

3. Stacked HEIs shall be hydrotested in stacked conditions.

4. Test pressure shall be as indicated in the name plates mounted on each HEI. Duration of hydrotest shall be at least one hour. Test pressures and duration of hydrotest may be reduced by EIC. Minimum test water temperature shall be 20 °C.

5. Any defects noticed during hydrotesting shall be repaired by EC as per the procedure approved by EIC. Cost for rectifying defects, not attributable to the EC shall be paid separately.

6. No HEI shall in general, form part of the piping loop during hydrotesting and shall be blinded off, except when instructed otherwise by EIC.

7. EC to take adequate care during pressurizing & depressurizing the equipment. EC shall also take care of any instruction given regarding hydrotest in the HEI equipment drawing.

19.5 HYDRO TESTING PROCEDURE

1. Shell side & tube side shall be hydrotested separately.

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2. The side, shell or tube which ever to be tested at higher pressure shall be taken first.

3. During hydrotest all gasket joints should be checked for any leakage. In case of leakage from any gasket joint, bolting at that joint shall be further tightened following proper tightening sequence (bolts should not be over tightened or tightened by hammering). In case it is not possible to stop leakage by bolt tightening, drain the water in exchanger & replace gasket at that joint by new gasket (gasket will be supplied by owner). After replacing gasket, exchanger must be again hydrotested with same procedure to ensure leak tightness.

4. In case of floating head heat exchangers, if it is found during hydrotest that the pressure is dropping, while the external gasketed joints are not leaking, this could be due to floating head gasket joint leakage. This shall be further investigated, by removing shell cover & pressurizing tube side to check the floating head gasket joint leakage. In case of leakage observed at floating head flange joint, replace floating head gasket by new gasket. After replacing gasket, exchanger must be again hydrotested first on tube side & then on shell side with same procedure to ensure leak tightness of gasket joints.
In case of heat exchangers with shell side hydrotest pressure higher than tube side, it is possible that above procedure (with tube side hydrotest to detect floating head gasket leakage) may not help. Absence of leakage during this test is not conclusive in such a case, as the shell side pressure was dropping during hydrotest. In such a case, floating head gasket shall in any case be replaced and then equipment retested to ensure leak tightness.

5. When hydrotested as per above procedure after floating head gasket replacement, if it is observed that test pressure is still dropping, this could mean leakage from tube to tubesheet joint. For such cases matter shall be reported to EIC for further investigations/instructions.

19.6 **DRYING**

1. After hydrotesting, HEI shall be completely drained of all water. It shall then be dried by passing dry compressed air. Air shall be passed for a sufficiently long time to ensure that no moisture is left. That the equipment has been properly dried shall be approved by the EIC.

2. After drying, HEI shall be blinded off to avoid any ingress of moisture/dust or any other extraneous matter.

   EC shall ensure that no HEI is subjected to any corrosion during any stage during his period of work till handing over to EIC/Client.

20.0 **Reactor Internals and loading of new Catalyst:**

1. Carrying out preliminary inspection and checks, and complying with all specific technical recommendations. Cleaning of the equipment, installation and removal of temporary structures / working platforms; installing all trays and reactor internals & filling of catalyst / inert balls (as per loading method specified in Licensor Data Sheet) as per approved drawings and Licensor supervision; providing scaffolding and performing minor adjustments during installation; conducting required tests; completing all documentation; attending punch-list items and carrying out necessary rectifications; and providing manpower/infrastructure support to Engineer-in-Charge/Licensor/Client during inspection.

2. Contractor shall arrange Mechanized Tripod/Quadripod with all necessary safety equipment for man entry into reactor/column/vessel.

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ANNEXURE-B

(Rotating Equipment)

SCOPE OF WORK & SUPPLY (SMED) FOR

MECHANICAL TENDER

(TENDER NO. B957-300-16-43-MR-T-3001)

PROJECT	**:**	**MPMC AND PMC/EPCM SERVICES FOR ETHYLENE CRACKER UNIT AND UTILITIES & OFFSITES RELATED TO BINA PETCHEM & REFINERY EXPANSION PROJECT (BPREP)**
OWNER	**:**	**BHARAT PETROLEUM CORPORATION LIMITED (BPCL)**
EPCM	**:**	**ENGINEERS INDIA LIMITED**
EIL JOB No.	**:**	**B957**

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PART -A

SCOPE OF WORK & SUPPLY

1. SCOPE

1.1 The intent of this document is to outline the **Contractor's Scope** for all rotating equipments including all associated works as required for **REFINERY FACILITIES RELATED TO BPREP-BPCL**, comprising of following units:

1.2 Contractor shall carry out erection and commissioning of the following Rotating Equipments & Miscellaneous items of package as specified in below tables (refer Table A.1) which shall be given to the Contractor by the Purchaser as Free Issue Materials (FIM):

Table A.1

a) Pumps

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries
1	303-PA-CF-3501 A/B	2	Horizontal Centrifugal Pump	Electric Motor
2	303-PA-CF-3502 A/B	2	Horizontal Centrifugal Pump	Electric Motor
3	303-PA-CF-3503 A/B	2	Horizontal Centrifugal Pump	Electric Motor
4	303-PA-CF-3504 A/B	2	Horizontal Centrifugal Pump	Electric Motor
5	303-PA-CF-3505 A/B	2	Horizontal Centrifugal Pump	Electric Motor
6	303-PA-CF-3506 A/B	2	Horizontal Centrifugal Pump	Electric Motor
7	303-PA-CF-3507 A/B	2	Horizontal Centrifugal Pump	Electric Motor
8	303-PA-CF-3508 A/B	2	Horizontal Centrifugal Pump	Electric Motor
9	303-PA-CF-3509	1	Horizontal Centrifugal Pump	Electric Motor
10	303-PA-CF-3510	1	Horizontal Centrifugal Pump	Electric Motor
11	303-PA-CF-3601 A/B	2	Horizontal Centrifugal Pump	Electric Motor
12	303-PA-CF-3602 A/B	2	Horizontal Centrifugal Pump	Electric Motor
13	303-PA-CF-3603 A/B	2	Horizontal Centrifugal Pump	Electric Motor
14	303-PA-CF-3604 A/B	2	Horizontal Centrifugal Pump	Electric Motor
15	303-PA-CF-3605 A/B	2	Horizontal Centrifugal Pump	Electric Motor
16	303-PA-CF-3606 A/B	2	Horizontal Centrifugal Pump	Electric Motor
17	303-PA-CF-3607 A/B	2	Horizontal Centrifugal Pump	Electric Motor
18	300-PA-CF-2503	1	Horizontal Centrifugal Pump	Electric Motor
19	302-PA-CF-2601 A/B	2	Horizontal Centrifugal Pump	Electric Motor
20	302-PA-CF-2603 A/B	2	Horizontal Centrifugal Pump	Electric Motor
21	302-PA-CF-2604 A/B	2	Horizontal Centrifugal Pump	Electric Motor
22	302-PA-CF-2607 A/B	2	Horizontal Centrifugal Pump	Electric Motor
23	302-PA-CF-2701 A/B	2	Horizontal Centrifugal Pump	Electric Motor
24	302-PA-CF-2703 A/B	2	Horizontal Centrifugal Pump	Electric Motor
25	302-PA-CF-2704 A/B	2	Horizontal Centrifugal Pump	Electric Motor

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S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries
26	300-PA-CF-2201 A/B	2	Horizontal Centrifugal Pump	Electric Motor
27	302-PA-CF-2705 A/B	2	Horizontal Centrifugal Pump	Electric Motor
28	300-PA-CF-2202 A/B	2	Horizontal Centrifugal Pump	Electric Motor
29	300-PA-CF-4002 A/B	2	Horizontal Centrifugal Pump	Electric Motor
30	300-PA-CF-4104 A/B	2	Horizontal Centrifugal Pump	Electric Motor
31	301-PA-CF-1601 A/B/C	3	Horizontal Centrifugal Pump	Electric Motor
32	301-PA-CF-1602 A/B/C	3	Horizontal Centrifugal Pump	Electric Motor
33	302-PA-CF-2602 A/B	2	Horizontal Centrifugal Pump	Electric Motor
34	302-PA-CF-2605 A/B	2	Horizontal Centrifugal Pump	Electric Motor
35	302-PA-CF-2606 A/B	2	Horizontal Centrifugal Pump	Electric Motor
36	303-PA-CF-3608 A/B	2	Vertical Centrifugal Pump	Electric Motor
37	300-PA-CF-3002 A/B	2	Vertical Centrifugal Pump	Electric Motor
38	300-PA-CF-4001 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
39	300-PA-CF-1502 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
40	300-PA-CF-4003 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
41	300-PA-CF-4004 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
42	300-PA-CF-4210 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
43	302-PA-CF-2712 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
44	303-PA-SM-3511 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
45	303-PA-SM-3512 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
46	300-PA-CF-1501 A/B/C/D	**4**	WASH OIL PUMP	Electric Motor
47	300-PA-CF-4102 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
48	300-PA-CF-4103 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
49	300-PA-CF-3001A/B	**2**	Vertical Centrifugal Pump	Electric Motor
50	300-PA-CF-4101 A/B/C/D	**4**	Horizontal Centrifugal Pump	Electric Motor
51	300-PA-CF-4202 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
52	300-PA-CF-4203 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
53	300-PA-CF-9501 A/B/C	**3**	Horizontal Centrifugal Pump	Electric Motor

b) Dosing skids

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Equipment	Type of Driver & Auxiliaries
1	300-LZ-00-2501	**1**	MEA ANTIFOAM INJECTION PACKAGE	Electric Motor

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S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Equipment	Type of Driver & Auxiliaries
2	300-LZ-00-2502	**1**	MEA CORROSION INHIBITOR PACKAGE	Electric Motor
3	300-LZ-00-3003	**1**	METHANOL INJECTION PACKAGE	Electric Motor
4	300-LZ-00-4201	**1**	POLYMERIZATION INHIBITOR INJECTION PACKAGE	Electric Motor
5	300-LZ-00-4205	**1**	TBC INJECTION PACKAGE	Electric Motor
6	302-LZ-00-2710	**1**	PGH CORROSION INHIBITOR INJECTION PACKAGE	Electric Motor
7	302-LZ-00-2711	**1**	PGH ANTIOXIDANT INJECTION PACKAGE	Electric Motor
8	303-LZ-00-3501	**1**	MEA INJECTION SYSTEM	Electric Motor
9	303-LZ-00-3502	**1**	ANTIFOAMING INJECTION SYSTEM	Electric Motor
10	302-LZ-00-2605	**1**	RERUN TOWER VACUUM PACKAGE	Electric Motor
11	302-LZ-00-2712	**1**	BTX TOWER VACUUM PACKAGE	Electric Motor

c) Compressors

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Equipment	Type of Driver & Auxiliaries
1	300-KA-CF-6001	**1**	Binary Refrigerant Compressor- Centrifugal compressor	Electric Motor
2	300-KA-CF-3001	**1**	Hydrogen Compressor- Centrifugal compressor	Electric Motor
3	302-KA-CF-2701	**1**	PGH Recycle Compressor- Centrifugal compressor	Electric Motor
4	300-KA-CF-3002	**1**	Reject Gas Compressor- Centrifugal compressor	Electric Motor

2. PREPARATION FOR MECHANICAL ERECTION OF ROTATING EQUIPMENT & MISCELLANEOUS ITEMS

2.1 Vendor's representatives shall be present at site only for supervision of erection and pre-commissioning work. However, total responsibility for this shall be of Contractor. The entire material shall be issued to the Contractor by the Engineer-in-Charge. The Contractor will return all the unused material / items identified as per the packing list to Engineer-in-Charge to store at the Owner's store.

2.2 The Contractor shall carefully study the vendor drawings, manuals and other data before start of the job to ensure correct erection, alignment and commissioning.

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2.3 Material opened from vendor supplied boxes after open box installation shall be stacked/stored equipment/package wise. The Contractor shall arrange for visual inspection of all vendor equipment in line with manufacturer's drawing and maintain a record.

2.4 Reconciliation of material issued and return special tools and unused material / spare items to warehouse as per the packing list.

2.5 The Contractor shall make sure from the vendor's drawing and data that whether there is any transportation dummy provided in the equipment or its auxiliaries and accessories or not. If such dummy has been provided the same shall be removed by the contractor before starting the erection activities. Preservation made by vendor shall be maintained by the Contractor.

2.6 In case the Rotating Equipment is received in knocked down condition, the various parts shall be assembled as per the instructions of the Engineer-in-Charge and as per manufacturer's instructions. On the basis of the part list and the handling procedures provided with the equipment, the Contractor shall make suitable arrangements to move the assemblies and sub-assemblies to the site. All parts of the equipment shall be thoroughly cleaned with solvents to remove protective compounds if any, before assembly. Contractor shall follow OEM recommended procedures for cleaning.

2.7 All protective and safety guards shall be installed and all foundation bolts shall be checked before starting the trial runs.

2.8 All Alignment shall be done by Laser Alignment only for all rotating equipment.

2.9 All the rotating equipment package erection shall be done by the Qualified technical personal. Contractor shall depute qualified technical personal for carry out erection, installation and commissioning of rotating equipment. The contractor shall engage qualified rotary equipment overhauling contractors for carrying out all rotary equipment jobs from grouting to commissioning. Qualified technical personal shall possess minimum 10 years of relevant experience.

2.10 Preservation of rotary equipment including barring, LO flushing/greasing, nitrogen charging (if required) and associated preservation activities shall be in contractor scope as instructed by EIC. A dedicated preservation team incl MWF with one supervisor shall be deployed.1 Team=1 Supervisor+1MWF+3 Riggers.

2.11 All type of Special consumables required by Pump/turbine/compressor/vendor specifications shall be included in contractor scope supply and shall be provided.

2.12 Contractor shall provide all measuring, testing and other tools required to complete mechanical jobs as directed by EIC, including specialized instruments.

2.13 Epoxy grouting of equipment bases, grout pads and associated surfaces shall be included in contractor's scope. During grouting of Rotary equipment, contractor to include supervision of grouting by OEM of Grouting material (GP2 and epoxy or OEM recommended grout material etc..) at site.

2.14 Correction of soft foot on Motors and rotating equipment shall be in contractor scope.

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2.15 Alignment of all the rotary equipment shall be done only by Laser alignment kit at site. And Laser Kit alignment report shall be generated and submitted with Package commissioning report.

2.16 Blue matching of sole plate for all the rotary equipment is in contractor scope.

2.17 Alignment of vertical equipment shall be done through total station only.

2.18 Alignment of all Rotary equipment like pumps/compressors etc. and its auxiliary skids are in contractor's scope.

2.19 Alignment of all rotary equipment shall be carried out in all respects as per OEM recommendation.

2.20 Decoupling and recoupling with prime-movers during no-load/loads trials for multiple occasions is in Contractor's scope.

2.21 Two (2) sets of laser alignment tools of size covering all equipment of plant shall be provided and handed over to BPCL upon completion of works.

3. ERECTION OF EQUIPMENTS (LISTED IN TABLE A.1 ABOVE)

3.1 The Contractor shall use the proper specified/supplied material handling equipment / lifting tools and manufacturer recommended / safe handling procedure for erection of the equipment and their driver and auxiliaries / accessories. The Contractor shall submit erection scheme along with details of proposed lifting tools.

3.2 The Contractor shall ensure that the lifting tools/ accessories are attached to the equipment at the place where is has been recommended by the manufacture. In case the manufacturer has not recommended the place of attaching the lifting tools/ accessories on the equipment, the Contractor shall decide the place in consultation with the Engineer-in-charge to ensure that no damage is occurred to the equipment or any part of that.

3.3 The alignment between driver and driven equipment of the complete train shall be rechecked and corrected as per the recommendations of the equipment manufacturer. The readings of final alignment shall be verified by the Engineer-in-charge.

3.4 For the purpose of critical rotating equipment like compressors etc. erection, Contractor to engage qualified technical personnel for carrying out erection, installation and commissioning of equipment. (Ex Reputed Turbomachinery specialist to be engaged by Contractor for erection of large compressor machines). Contractor shall engage qualified rotating equipment overhauling contractors for carrying out all rotary jobs (esp Critical high speed machinery like compressor) from grouting to Commissioning. Agency/subcontractor should have sufficient expertise in the field (Min 10 years experience) with valid PO of PTR of executing similar type of jobs.

3.5 Contractor shall maintain nitrogen cylinders and gas supply required to maintain pressure in spare rotor containers as needed till CDD.

4. PRECOMMISSIONING WORK (LISTED IN TABLE A.1 ABOVE)

4.1 All the piping i.e. either main or auxiliary (for utilities) shall be cleaned (steam / water flushing) and then complete connections shall be made. The manpower as required for this

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purpose shall be provided by the Contractor depending on the contract / P.O. All site fabricated piping shall be hydro tested.

4.2 The Contractor shall carryout initial charge (for flushing/cleaning of systems) of the lubricants. All the oil systems shall be run, flushed and the oils changed by fresh charge. Unless otherwise specified, all lubricants shall be supplied by the Contractor, including the initial charge.

4.3 Contractor shall note that lubricants, sealing fluid & other consumables etc. required for startup and commissioning of free issue Items shall be included in Contractor's scope of supply. A consolidated list for all free issue items shall be provided to Contractor indicating type of lubricant, grease, oil etc. giving specifications, quantities, brand name and their BPCL equivalent. Contractor to note that supplied Lubricants should be of Mak Brand (BPCL make).

4.4 Cooling Water System, Lube Oil System and all other auxiliary systems shall be run / operated at rated pressures and the leaks shall be checked and corrected.

4.5 All flushing work shall be done with temporary strainers (as applicable) or with the temporary fine mesh SS sheets (exact mesh size to be confirmed by OEM/ Engineer in-charge) and after final cleanliness & clearance, permanent strainer shall be installed.

4.6 Temporary piping required for flushing, chemical cleaning, blowing shall be fabricated and erected by the Contractor. If not supplied by the vendor, temporary strainer for flushing shall be arranged by the Contractor.

4.7 In case of pump's mechanical seal leakage during pre-commissioning, the Contractor shall arrange for disassembly, transportation of pumps from site to Owner's workshop & back to site and again reassemble & align at site as per the instructions of Owner/Engineer-in-Charge *(Seal repair at workshop will be done by Owner)*.

4.8 The Contractor shall carryout all other pre-commissioning activities as deemed necessary and as per the instructions of the engineer in-charge.

4.9 Requirement of mobilization of the package / equipment supplier representative for supervisory services shall be intimated to Engineer in Charge 45 days in advance by the Contractor. Specific activity list, along with requirement of labor (skilled / unskilled) and erection equipment required for carrying out specific activity shall be obtained by the Contractor from the package / equipment supplier representative, through Engineer in Charge. The Contractor shall ensure to provide the desired manpower, equipment required for erection works, as deemed necessary by the package / equipment supplier representative. The overall coordination shall be the Contractor's responsibility.

4.10 Unless indicated to the contract, all the rotating equipment will be subjected to trial runs for a continuous operation of 72 hours. In case of motor driven rotating equipments, motors shall be decoupled and turned over for testing and no load running of motors. After the no load runs of motors are satisfactorily completed, the Contractor shall recouple the motors to the rotating equipment and recheck the alignment. The trial run of the rotating equipment shall be started only after the above is completed. Contractor shall provide, as part of his work, necessary skilled personnel (excluding the operating personnel) for conducting the trial runs round the clock during the trial runs period. Final inspection of bearing etc. shall be carried out by the Contractor after the Machinery had gone through the trial run and

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defects if any, shall be made good for rendering the rotating equipment ready for start-up. Defects due to Contractor's fault noticed during trial runs shall be rectified by him.

5. HANDING OVER FOR COMMISSIONING

5.1 The Contractor shall arrange for removal of all scrap and debris generated during erection activities from the site before handing over the equipment for commissioning activities and transporting the same as within or outside the plant as per instruction of Engineer-in-Charge or as specified elsewhere.

5.2 After the mechanical completion while handing over to the client or to the commissioning agency, the Contractor shall provide a list of construction defects, rectified by them. The Owner or commissioning agency will check the Contractor's work before taking over.

5.3 The Contractor shall also provide a team of skilled labor to client or to the commissioning agency during their commissioning period if requisitioned by them.

5.4 If some defects are noticed during commissioning and are attributed to Contractor, the Contractor shall arrange to rectify to the satisfaction of Engineer-in-Charge.

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ANNEXURE – 1 (MECHANICAL ERECTION & PRE-COMMISSIONING WORK)

A.0 SCHEDULE OF QUANTITIES FOR ALL TYPE OF ROTATING EQUIPMENTS & MISCELLANEOUS ITEMS WITH DRIVERS AND ACCESSORIES

A.1 SCHEDULE OF QUANTITIES (SOQ) FOR ALL TYPE OF PUMPS WITH DRIVERS AND ACCESSORIES (SOR Item No. 01RR.1.1.1 as per Doc # B957-300-80-42-MR-SOR-3001-A):

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + seal plan etc.) (MT) (***Refer Note-1***)	Overall Dimensions Each pump (LXBXH) (m)
1	303-PA-CF-3501 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.91	2.5X2.0X3.0
2	303-PA-CF-3502 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*3.72	3.5X2.0X3.0
3	303-PA-CF-3503 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.27	2.0X2.0X3.0
4	303-PA-CF-3504 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*3.72	3.0X2.5X3.0
5	303-PA-CF-3505 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.80	2.5X2.0X3.0
6	303-PA-CF-3506 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.27	2.0X2.0X3.0
7	303-PA-CF-3507 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*9.35	4.5X3.0X3.0
8	303-PA-CF-3508 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.38	2.0X2.0X3.0
9	303-PA-CF-3509	1	Horizontal Centrifugal Pump	Electric Motor	2*3.72	3.0X2.0X3.0
10	303-PA-CF-3510	1	Horizontal Centrifugal Pump	Electric Motor	2*3.72	3.0X2.0X3.0
11	303-PA-CF-3601 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*4.57	3.5X2.0X3.0
12	303-PA-CF-3602 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.70	2.5X2.0X3.0
13	303-PA-CF-3603 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.60	2.5X2.0X3.0
14	303-PA-CF-3604 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.60	2.5X2.0X3.0
15	303-PA-CF-3605 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*3.2	3.0X2.0X3.0

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S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + seal plan etc.) (MT) (***Refer Note-1***)	Overall Dimensions Each pump (LXBXH) (m)
16	303-PA-CF-3606 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.6	2.5X2.0X3.0
17	303-PA-CF-3607 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2.23	3.0X2.0X3.0
18	300-PA-CF-2503	1	Horizontal Centrifugal Pump	Electric Motor	1*1.27	2.0X2.0X3.0
19	302-PA-CF-2601 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*7.0	6.0X2.5X3.0
20	302-PA-CF-2603 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*3.2	3.0X2.0X3.0
21	302-PA-CF-2604 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.7	3.0X2.0X3.0
22	302-PA-CF-2607 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2.23	3.0X2.0X3.0
23	302-PA-CF-2701 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.28	2.0X2.0X3.0
24	302-PA-CF-2703 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2.55	3.0X2.0X3.0
25	302-PA-CF-2704 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2.13	3.0X2.0X3.0
26	300-PA-CF-2201 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*4.78	2.5 x 2.25 x 3.2
27	302-PA-CF-2705 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*3.72	2.75 x 2.25 x 3.5
28	300-PA-CF-2202 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*10.6	5.5 x 3.2 x 3.5
29	300-PA-CF-4002 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*7.5	4.75 x 2.75 x 3.5
30	300-PA-CF-4104 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*10.6	5.5 x 3.2 x 3.5
31	301-PA-CF-1601 A/B/C	3	Horizontal Centrifugal Pump	Electric Motor	3*9.6	5.2 x 3.0 x 3.5
32	301-PA-CF-1602 A/B/C	3	Horizontal Centrifugal Pump	Electric Motor	3*13.82	5.5 x 3.2 x 3.5
33	302-PA-CF-2602 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*12.76	5.75 x 3.75 x 3.5
34	302-PA-CF-2605 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*9.5	5.2 x 3.0 x 3.5
35	302-PA-CF-2606 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*18	5.5 x 3.5 x 3.5
36	303-PA-CF-3608 A/B	2	Vertical Centrifugal Pump	Electric Motor	2*1.85	2.5 x 2.0 x 2.5
37	300-PA-CF-3002 A/B	2	Vertical Centrifugal Pump	Electric Motor	2*1.85	2.5 x 2.0 x 2.5
38	300-PA-CF-4001 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*6.5	3.5 x 2.5 x 3.0

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S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + seal plan etc.) (MT) (***Refer Note-1***)	Overall Dimensions Each pump (LXBXH) (m)
39	300-PA-CF-1502 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*4.8	4 x 2.5 x 3.5
40	300-PA-CF-4003 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*17	5.5 x 3.8 x 4
41	300-PA-CF-4004 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*19	6 x 4 x 4
42	300-PA-CF-4210 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*3.4	Pump: 24" dia x 8 (installation depth)
43	302-PA-CF-2712 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*3.4	Pump: 24" dia x 8 (installation depth)
44	303-PA-SM-3511 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*3.4	Pump: 24" dia x 8 (installation depth)
45	303-PA-SM-3512 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*3.4	Pump: 24" dia x 8 (installation depth)
46	300-PA-CF-1501 A/B/C/D	**4**	WASH OIL PUMP	Electric Motor	1*4.8	6 x 2.5 x 2.5
47	300-PA-CF-4102 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*26.5	5.7 x3.7x3.1
48	300-PA-CF-4103 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*19.16	5.9 x3.5x3.0
49	300-PA-CF-3001A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*16	Pump: 24" dia x 8 (installation depth)
50	300-PA-CF-4101 A/B/C/D	**4**	Horizontal Centrifugal Pump	Electric Motor	4*4	3.2 x 2.5 x 3.0
51	300-PA-CF-4202 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*7.5	3.8 x 2.6 x 3.0
52	300-PA-CF-4203 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*3.4	2.0 x 1.8 x 3.0
53	300-PA-CF-9501 A/B/C	**3**	Horizontal Centrifugal Pump	Electric Motor	3*3.3	3.2 x 2.5 x 3.0
Total Weight (Pumps)					**660**	

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A.2 SCHEDULE OF QUANTITIES (SOQ) FOR ALL TYPE OF SKID MOUNTED CHEMICAL DOSING PACKAGES WITH DRIVERS AND ACCESSORIES (SOR Item No. 01RR.1.8.1 as per Doc # B957-300-80-42-MR-SOR-3001-A):

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Equipment	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + seal plan etc.) (MT) (*Refer Note-1*)	Overall Dimensions Each pump/skid (LXBXH) (m)
1	300-LZ-00-2501	1	MEA ANTIFOAM INJECTION PACKAGE	Electric Motor	1*9	6 x 3 x 6
2	300-LZ-00-2502	1	MEA CORROSION INHIBITOR PACKAGE	Electric Motor	1*9	5 x 2.5 x 6
3	300-LZ-00-3003	1	METHANOL INJECTION PACKAGE	Electric Motor	1*13.8	10 x 5 x 8
4	300-LZ-00-4201	1	POLYMERIZATION INHIBITOR INJECTION PACKAGE	Electric Motor	1*28	10 x 5 x 12
5	300-LZ-00-4205	1	TBC INJECTION PACKAGE	Electric Motor	1*34	6 x 3 x 8
6	302-LZ-00-2710	1	PGH CORROSION INHIBITOR INJECTION PACKAGE	Electric Motor	1*31.7	7 x 5 x 8
7	302-LZ-00-2711	1	PGH ANTIOXIDANT INJECTION PACKAGE	Electric Motor	1*23	8 x 5 x 8
8	303-LZ-00-3501	1	MEA INJECTION SYSTEM	Electric Motor	1*9	5 x 2.5 x 6
9	303-LZ-00-3502	1	ANTIFOAMING INJECTION SYSTEM	Electric Motor	1*9	5 x 2.5 x 6
10	302-LZ-00-2605	1	RERUN TOWER VACUUM PACKAGE	Electric Motor	1*20	7 x 4 x 3.5
11	302-LZ-00-2712	1	BTX TOWER VACUUM PACKAGE	Electric Motor	1*13.5	7 x 4 x 3.5
Total Weight					**200**	

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A.3 SCHEDULE OF QUANTITIES (SOQ) FOR ALL TYPE OF COMPRESSOR PACKAGES WITH DRIVERS AND ACCESSORIES (SOR Item No. 01RR.1.2.1 as per Doc # B957-300-80-42-MR-SOR-3001-A):

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Equipment	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + auxiliaries etc.) (MT) (*Refer Note-1*)	Overall Dimensions skid (LXBXH) (m)
1	300-KA-CF-6001	1	Binary Refrigerant Compressor-Centrifugal compressor	Electric Motor	Compressor train: 237 LO Console: 78	Compressor: 17 x 4 x 8 LO Console: 13 x 5 x 3.5
2	300-KA-CF-3001	1	Hydrogen Compressor-Centrifugal compressor	Electric Motor	Compressor: 78 LO Console: 34	Compressor: 15 x 4.5 x 8 LO Console: 12 x 5 x 3.5
3	302-KA-CF-2701	1	PGH Recycle Compressor-Centrifugal compressor	Electric Motor	Compressor: 56 LO Console: 32	Compressor: 13 x 4.5 x 8 LO Console: 7 x 5 x 3.5
4	300-KA-CF-3002	1	Reject Gas Compressor-Centrifugal compressor	Electric Motor	Compressor: 102 LO Console: 33	Compressor: 20 x 5 x 8 LO Console: 13 x 5 x 3.5
Total Weight					**650**	

A.4 SCHEDULE OF QUANTITIES (SOQ) FOR EPOXY GROUT (SOR Item No. 01RR.3.1 as per Doc # B957-300-80-42-MR-SOR-3001-A):

S. No.	Equipment Item Nos.	Overall Quantity Epoxy Grout [m3] (*Refer Note-2*)
1	**REFER TABLE A.1 FOR LIST OF EQUIPMENTS**	**40**

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A.5 SCHEDULE OF QUANTITIES (SOQ) FOR INITIAL FILL OF LUBRICANTS, SEALING FLUID & OTHER CONSUMABLES ETC. REQUIRED FOR STARTUP AND COMMISSIONING (SOR Item No. 01RR.1.MH01.1 as per Doc # B957-300-80-42-PK-SOR-3001-0):

S. No.	Equipment Item Nos.	Overall Quantity (Lubricants, Sealing Fluids & Other Consumables) [Litres] (***Refer Note-3***)
1	**REFER TABLE A.1 FOR LIST OF EQUIPMENTS**	**50,000**

NOTES:

1. Weights and dimensions indicated in SOQ are estimated only. Final weights and dimensions shall be as per General Arrangement drawing of vendor which shall be provided to contractor after award of the job.

2. Supply and application of Epoxy grout

3. A consolidated list for all free issue items shall be provided to Contractor indicating type of lubricant, grease, oil etc. giving specifications, quantities, brand name and their BPCL equivalent. Contractor to note that supplied Lubricants should be of Mak Brand (BPCL make).

ANNEXURE – 2 (LIST OF ATTACHMENTS)

S. No.	Document Description	Document No.	Rev
1	Standard specification for documentation requirements from Contractors	6-78-0002	3
2	Standard Specification for erection of equipment & machinery	6-76-0001	4

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PART-B

SCOPE OF WORK & SUPPLY

1. SCOPE

1.1 The intent of this document is to outline the **Contractor's Scope** for all rotating equipments including all associated works as required for **REFINERY FACILITIES RELATED TO BPREP-BPCL**, comprising of following units:

1.2 Contractor shall carry out erection and commissioning of the following Rotating Equipments & Miscellaneous items of package as specified in below tables (refer Table B.1) which shall be given to the Contractor by the Purchaser as Free Issue Materials (FIM):

Table B.1

a) Pumps

i) Pumps with electric motor

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries
1	300-PA-CF-1004 A/B	2	Horizontal Centrifugal Pump	Electric Motor
2	300-PA-CF-1202 A/B	2	Horizontal Centrifugal Pump	Electric Motor
3	300-PA-CF-1205 A/B	2	Horizontal Centrifugal Pump	Electric Motor
4	300-PA-CF-1401 A/B	2	Horizontal Centrifugal Pump	Electric Motor
5	300-PA-CF-1402 A/B	2	Horizontal Centrifugal Pump	Electric Motor
6	300-PA-CF-2001 A/B	2	Horizontal Centrifugal Pump	Electric Motor
7	300-PA-CF-2003 A/B	2	Horizontal Centrifugal Pump	Electric Motor
8	300-PA-CF-2004 A/B	2	Horizontal Centrifugal Pump	Electric Motor
9	300-PA-CF-2101	1	Horizontal Centrifugal Pump	Electric Motor
10	300-PA-CF-2102 A/B	2	Horizontal Centrifugal Pump	Electric Motor
11	300-PA-CF-2103 A/B	2	Horizontal Centrifugal Pump	Electric Motor
12	300-PA-CF-2106 A/B	2	Horizontal Centrifugal Pump	Electric Motor
13	300-PA-CF-2401 A/B	2	Horizontal Centrifugal Pump	Electric Motor
14	300-PA-CF-2402 A/B	2	Horizontal Centrifugal Pump	Electric Motor
15	300-PA-CF-2501 A/B	2	Horizontal Centrifugal Pump	Electric Motor
16	300-PA-CF-2502 A/B	2	Horizontal Centrifugal Pump	Electric Motor
17	300-PA-CF-2506 A/B	2	Horizontal Centrifugal Pump	Electric Motor
18	300-PA-CF-2505 A/B	2	Horizontal Centrifugal Pump	Electric Motor
19	300-PA-CF-7001 A/B	2	Horizontal Centrifugal Pump	Electric Motor
20	300-PA-CF-9001	1	Horizontal Centrifugal Pump	Electric Motor
21	300-PA-CF-1203 A/B/C	3	Horizontal Centrifugal Pump	Electric Motor
22	300-PA-CF-1206 A/B	2	Horizontal Centrifugal Pump	Electric Motor
23	300-PA-CF-2002 A/B	2	Horizontal Centrifugal Pump	Electric Motor

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S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries
24	300-PA-CF-2104 A/B	2	Vertical Centrifugal Pump	Electric Motor
25	304-PA-CF-4501 A/B	2	Vertical Centrifugal Pump	Electric Motor
26	300-PA-CF-1001 A/B/C	**3**	Horizontal Centrifugal Pump	Electric Motor
27	304-PA-CF-4502 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
28	300-PA-CF-5001	**1**	Horizontal Centrifugal Pump	Electric Motor
29	300-PA-CF-8005 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
30	300-PA-CF-1204 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
31	300-PA-CF-2010 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
32	300-PA-CF-2011 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
33	300-PA-CF-2504 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
34	300-PA-RL-1001 A/B	**2**	Rotary Lobe Pump	Electric Motor
35	300-PA-RL-2001 A/B	**2**	Rotary Lobe Pump	Electric Motor
36	300-PA-RL-3001 A/B	**2**	Rotary Lobe Pump	Electric Motor
37	300-PA-RL-4001 A/B/C	**3**	Rotary Lobe Pump	Electric Motor
38	300-PA-RL-1011 A/B	**2**	Rotary Lobe Pump	Electric Motor
39	300-PA-RL-2011 A/B	**2**	Rotary Lobe Pump	Electric Motor
40	300-PA-RL-3011 A/B	**2**	Rotary Lobe Pump	Electric Motor
41	300-PA-RL-4011 A/B	**2**	Rotary Lobe Pump	Electric Motor
42	304-PA-CF-RP-4503 A/B	**2**	WAO SULFURIC ACID PUMP	Electric Motor
43	300-PA-CF-8001 B/C	**2**	Horizontal Centrifugal Pump	Electric Motor
44	300-PA-CF-1201 C/D/E (EM Driven)	**3**	Horizontal Centrifugal Pump	Electric Motor
45	300-PA-CF-1302 B/C (EM Driven)	**2**	Horizontal Centrifugal Pump	Electric Motor
46	300-PA-CF-2507 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
47	300-PA-CF-8002 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
48	300-PA-CF-8003 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
49	300-PA-CF-8004 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
50	304-PA-CF-4504 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
51	304-PA-CF-4505 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
52	300-PA-CF-2004	**1**	Horizontal Centrifugal Pump	Electric Motor
53	300-PA-CF-2501A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
54	300-PA-CF-8010 A/B	**2**	Vertical Centrifugal Pump	Electric Motor
55	300-PA-CF-8011 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor
56	300-PA-CF-8012 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor

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ii) Pumps with steam turbine

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries
1	300-PA-CF-8001 A (ST Driven)	1	Horizontal Centrifugal Pump	Steam Turbine
2	300-PA-CF-1201 A/B (ST Driven)	2	Horizontal Centrifugal Pump	Steam Turbine
3	300-PA-CF-1302 A (ST Driven)	1	Horizontal Centrifugal Pump	Steam Turbine

b) Dosing skids

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Equipment	Type of Driver & Auxiliaries
1	300-LZ-00-1182	**1**	DMDS INJECTION PACKAGE	Electric Motor
2	300-LZ-00-1183	**1**	PHOSPHATE INJECTION PACKAGE	Electric Motor
3	300-LZ-00-1301	**1**	AMINE INJECTION PACKAGE	Electric Motor
4	300-LZ-00-1302	**1**	EMULSION BREAKER INJECTION PACKAGE	Electric Motor
5	300-LZ-00-1403	**1**	DILUTE CAUSTIC INJECTION PACKAGE	Electric Motor
6	300-LZ-00-8003	**1**	AMINE/OXYGEN SCAVENGER INJECTION PACKAGE	Electric Motor
7	303-LZ-3504	**1**	LRVP PKG	Electric Motor

c) Compressors

i) Centrifugal Compressor

S. No.	**Equipment Item No.**	**Quantity (Working / Standby)**	**Type of Equipment**	**Type of Driver & Auxiliaries**
1	300-KA-CF-2001	**1**	Binary Refrigerant Compressor- Centrifugal compressor	Electric Motor
2	300-KA-CF-5001	**1**	Hydrogen Compressor- Centrifugal compressor	Electric Motor
3	300-KA-2401	**1**	PGH Recycle Compressor- Centrifugal compressor	Electric Motor
4	300-LZ-00-1181	**1**	Reject Gas Compressor- Centrifugal compressor	Electric Motor

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ii) Reciprocating Compressor

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Equipment	Type of Driver & Auxiliaries
1	304-KA-RP-4501	1	WAO Compressor-Reciprocating compressor	Electric Motor

2. PREPARATION FOR MECHANICAL ERECTION OF ROTATING EQUIPMENT & MISCELLANEOUS ITEMS

2.1 Vendor's representatives shall be present at site only for supervision of erection and pre-commissioning work. However, total responsibility for this shall be of Contractor. The entire material shall be issued to the Contractor by the Engineer-in-Charge. The Contractor will return all the unused material / items identified as per the packing list to Engineer-in-Charge to store at the Owner's store.

2.2 The Contractor shall carefully study the vendor drawings, manuals and other data before start of the job to ensure correct erection, alignment and commissioning.

2.3 Material opened from vendor supplied boxes after open box installation shall be stacked/stored equipment/package wise. The Contractor shall arrange for visual inspection of all vendor equipment in line with manufacturer's drawing and maintain a record.

2.4 Reconciliation of material issued and return special tools and unused material / spare items to warehouse as per the packing list.

2.5 The Contractor shall make sure from the vendor's drawing and data that whether there is any transportation dummy provided in the equipment or its auxiliaries and accessories or not. If such dummy has been provided the same shall be removed by the contractor before starting the erection activities. Preservation made by vendor shall be maintained by the Contractor.

2.6 In case the Rotating Equipment is received in knocked down condition, the various parts shall be assembled as per the instructions of the Engineer-in-Charge and as per manufacturer's instructions. On the basis of the part list and the handling procedures provided with the equipment, the Contractor shall make suitable arrangements to move the assemblies and sub-assemblies to the site. All parts of the equipment shall be thoroughly cleaned with solvents to remove protective compounds if any, before assembly. Contractor shall follow OEM recommended procedures for cleaning.

2.7 All protective and safety guards shall be installed and all foundation bolts shall be checked before starting the trial runs.

2.8 All Alignment shall be done by Laser Alignment only for all rotating equipment.

2.9 All the rotating equipment package erection shall be done by the Qualified technical personal. Contractor shall depute qualified technical personal for carry out erection, installation and commissioning of rotating equipment. The contractor shall engage qualified rotary equipment overhauling contractors for carrying out all rotary equipment jobs from

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grouting to commissioning. Qualified technical personal shall possess minimum 10 years of relevant experience.

2.10 Preservation of rotary equipment including barring, LO flushing/greasing, nitrogen charging (if required) and associated preservation activities shall be in contractor scope as instructed by EIC. A dedicated preservation team incl MWF with one supervisor shall be deployed.1 Team=1 Supervisor+1MWF+3 Riggers.

2.11 All type of Special consumables required by Pump/turbine/compressor/vendor specifications shall be included in contractor scope supply and shall be provided.

2.12 Contractor shall provide all measuring, testing and other tools required to complete mechanical jobs as directed by EIC, including specialized instruments.

2.13 Epoxy grouting of equipment bases, grout pads and associated surfaces shall be included in contractor's scope. During grouting of Rotary equipment, contractor to include supervision of grouting by OEM of Grouting material (GP2 and epoxy or OEM recommended grout material etc..) at site.

2.14 Correction of soft foot on Motors and rotating equipment shall be in contractor scope.

2.15 Alignment of all the rotary equipment shall be done only by Laser alignment kit at site. And Laser Kit alignment report shall be generated and submitted with Package commissioning report.

2.16 Blue matching of sole plate for all the rotary equipment is in contractor scope.

2.17 Alignment of vertical equipment shall be done through total station only.

2.18 Alignment of all Rotary equipment like pumps/compressors etc. and its auxiliary skids are in contractor's scope.

2.19 Alignment of all rotary equipment shall be carried out in all respects as per OEM recommendation.

2.20 Decoupling and recoupling with prime-movers during no-load/loads trials for multiple occasions is in Contractor's scope.

2.21 Two (2) sets of laser alignment tools of size covering all equipment of plant shall be provided and handed over to BPCL upon completion of works.

3. ERECTION OF EQUIPMENTS (LISTED IN TABLE B.1 ABOVE)

3.1 The Contractor shall use the proper specified/supplied material handling equipment / lifting tools and manufacturer recommended / safe handling procedure for erection of the equipment and their driver and auxiliaries / accessories. The Contractor shall submit erection scheme along with details of proposed lifting tools.

3.2 The Contractor shall ensure that the lifting tools/ accessories are attached to the equipment at the place where is has been recommended by the manufacture. In case the manufacturer has not recommended the place of attaching the lifting tools/ accessories on the equipment, the Contractor shall decide the place in consultation with the Engineer-in-charge to ensure that no damage is occurred to the equipment or any part of that.

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3.3 The alignment between driver and driven equipment of the complete train shall be rechecked and corrected as per the recommendations of the equipment manufacturer. The readings of final alignment shall be verified by the Engineer-in-charge.

3.4 For the purpose of critical rotating equipment like compressors etc. erection, Contractor to engage qualified technical personnel for carrying out erection, installation and commissioning of equipment. (Ex Reputed Turbomachinery specialist to be engaged by Contractor for erection of large compressor machines). Contractor shall engage qualified rotating equipment overhauling contractors for carrying out all rotary jobs (esp Critical high speed machinery like compressor) from grouting to Commissioning. Agency/subcontractor should have suffiecient expertise in the field (Min 10 years experience) with valid PO of PTR of executing similar type of jobs.

3.5 Contractor shall maintain nitrogen cylinders and gas supply required to maintain pressure in spare rotor containers as needed till CDD.

4. PRECOMMISSIONING WORK (LISTED IN TABLE B.1 ABOVE)

4.1 All the piping i.e. either main or auxiliary (for utilities) shall be cleaned (steam / water flushing) and then complete connections shall be made. The manpower as required for this purpose shall be provided by the Contractor depending on the contract / P.O. All site fabricated piping shall be hydro tested.

4.2 The Contractor shall carryout initial charge (for flushing/cleaning of systems) of the lubricants. All the oil systems shall be run, flushed and the oils changed by fresh charge. Unless otherwise specified, all lubricants shall be supplied by the Contractor, including the initial charge.

4.3 Contractor shall note that lubricants, sealing fluid & other consumables etc. required for startup and commissioning of free issue Items shall be included in Contractor's scope of supply. A consolidated list for all free issue items shall be provided to Contractor indicating type of lubricant, grease, oil etc. giving specifications, quantities, brand name and their BPCL equivalent. Contractor to note that supplied Lubricants should be of Mak Brand (BPCL make).

4.4 Cooling Water System, Lube Oil System and all other auxiliary systems shall be run / operated at rated pressures and the leaks shall be checked and corrected.

4.5 All flushing work shall be done with temporary strainers (as applicable) or with the temporary fine mesh SS sheets (exact mesh size to be confirmed by OEM/ Engineer in-charge) and after final cleanliness & clearance, permanent strainer shall be installed.

4.6 Temporary piping required for flushing, chemical cleaning, blowing shall be fabricated and erected by the Contractor. If not supplied by the vendor, temporary strainer for flushing shall be arranged by the Contractor.

4.7 In case of pump's mechanical seal leakage during pre-commissioning, the Contractor shall arrange for disassembly, transportation of pumps from site to Owner's workshop & back to site and again reassemble & align at site as per the instructions of Owner/Engineer-in-Charge *(Seal repair at workshop will be done by Owner)*.

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4.8 The Contractor shall carryout all other pre-commissioning activities as deemed necessary and as per the instructions of the engineer in-charge.

4.9 Requirement of mobilization of the package / equipment supplier representative for supervisory services shall be intimated to Engineer in Charge 45 days in advance by the Contractor. Specific activity list, along with requirement of labor (skilled / unskilled) and erection equipment required for carrying out specific activity shall be obtained by the Contractor from the package / equipment supplier representative, through Engineer in Charge. The Contractor shall ensure to provide the desired manpower, equipment required for erection works, as deemed necessary by the package / equipment supplier representative. The overall coordination shall be the Contractor's responsibility.

4.10 Unless indicated to the contract, all the rotating equipment will be subjected to trial runs for a continuous operation of 72 hours. In case of motor driven rotating equipments, motors shall be decoupled and turned over for testing and no load running of motors. After the no load runs of motors are satisfactorily completed, the Contractor shall recouple the motors to the rotating equipment and recheck the alignment. The trial run of the rotating equipment shall be started only after the above is completed. Contractor shall provide, as part of his work, necessary skilled personnel (excluding the operating personnel) for conducting the trial runs round the clock during the trial runs period. Final inspection of bearing etc. shall be carried out by the Contractor after the Machinery had gone through the trial run and defects if any, shall be made good for rendering the rotating equipment ready for start-up. Defects due to Contractor's fault noticed during trial runs shall be rectified by him.

5. HANDING OVER FOR COMMISSIONING

5.1 The Contractor shall arrange for removal of all scrap and debris generated during erection activities from the site before handing over the equipment for commissioning activities and transporting the same as within or outside the plant as per instruction of Engineer-in-Charge or as specified elsewhere.

5.2 After the mechanical completion while handing over to the client or to the commissioning agency, the Contractor shall provide a list of construction defects, rectified by them. The Owner or commissioning agency will check the Contractor's work before taking over.

5.3 The Contractor shall also provide a team of skilled labor to client or to the commissioning agency during their commissioning period if requisitioned by them.

5.4 If some defects are noticed during commissioning and are attributed to Contractor, the Contractor shall arrange to rectify to the satisfaction of Engineer-in-Charge.

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ANNEXURE – 1 (MECHANICAL ERECTION & PRE-COMMISSIONING WORK)

B.0 SCHEDULE OF QUANTITIES FOR ALL TYPE OF ROTATING EQUIPMENTS & MISCELLANEOUS ITEMS WITH DRIVERS AND ACCESSORIES

B.1 SCHEDULE OF QUANTITIES (SOQ) FOR ALL TYPE OF PUMPS WITH DRIVERS AND ACCESSORIES (SOR Item No. 01RR.1.1.1as per Doc # B957-300-80-42-PK-SOR-3001-B):

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + seal plan etc.) (MT) (***Refer Note-1***)	Overall Dimensions Each pump (LXBXH) (m)
1	300-PA-CF-1004 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*4	2.75 x 2.25 x 3.2
2	300-PA-CF-1202 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*10	5.0 x 2.75 x 3.2
3	300-PA-CF-1205 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*4	3.25 x 2.5 x 3.2
4	300-PA-CF-1401 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2.5	3.0 x 2.5 x 2.5
5	300-PA-CF-1402 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*8	4.5 x 2.5 x 2.5
6	300-PA-CF-2001 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2	2.5 x 2.25 x 3.2
7	300-PA-CF-2003 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*4	2.20 x 2.25 x 3.2
8	300-PA-CF-2004 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2.5	2.20 x 2.25 x 3.2
9	300-PA-CF-2101	1	Horizontal Centrifugal Pump	Electric Motor	1*2	2.2 x 1.80 x 2.0
10	300-PA-CF-2102 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2.25	2.2 x 1.80 x 2.0
11	300-PA-CF-2103 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2.25	2.2 x 1.80 x 2.0
12	300-PA-CF-2106 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.5	2.2 x 2.0 x 3.2
13	300-PA-CF-2401 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.25	2.0 x 1.75 x 2.0
14	300-PA-CF-2402 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.25	2.0 x 1.75 x 2.0
15	300-PA-CF-2501 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2.25	2.2 x 2.25 x 3.2

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S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + seal plan etc.) (MT) (***Refer Note-1***)	Overall Dimensions Each pump (LXBXH) (m)
16	300-PA-CF-2502 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*5.25	4.5 x 2.5 x 3.2
17	300-PA-CF-2506 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.75	2.2 x 2.25 x 3.2
18	300-PA-CF-2505 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*1.5	2.25 x 2.25 x 3.2
19	300-PA-CF-7001 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*2.25	2.75 x 2.5 x 3.2
20	300-PA-CF-9001	1	Horizontal Centrifugal Pump	Electric Motor	1*1.5	2.0 x 2.25 x 3.2
21	300-PA-CF-1203 A/B/C	3	Horizontal Centrifugal Pump	Electric Motor	3*10	5.75 x 3.2 x 3.5
22	300-PA-CF-1206 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*5	4.0 x 2.5 x 3.5
23	300-PA-CF-2002 A/B	2	Horizontal Centrifugal Pump	Electric Motor	2*5.5	4.0 x 2.5 x 3.5
24	300-PA-CF-2104 A/B	2	Vertical Centrifugal Pump	Electric Motor	2*2	2.5 x 2.0 x 2.5
25	304-PA-CF-4501 A/B	2	Vertical Centrifugal Pump	Electric Motor	2*2	2.5 x 2.0 x 2.5
26	300-PA-CF-1001 A/B/C	**3**	Horizontal Centrifugal Pump	Electric Motor	3*7	3.6 x 2.6 x 3.0
27	304-PA-CF-4502 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*3.2	2.0 x 1.8 x 3.0
28	300-PA-CF-5001	**1**	Horizontal Centrifugal Pump	Electric Motor	1*8	4 x 2.75 x 3.5
29	300-PA-CF-8005 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*7.5	4 x 2.5 x 3.5
30	300-PA-CF-1204 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*3.2	Pump: 24" dia x 8 (installation depth)
31	300-PA-CF-2010 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*3.2	Pump: 24" dia x 8 (installation depth)
32	300-PA-CF-2011 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*3.2	Pump: 24" dia x 8 (installation depth)
33	300-PA-CF-2504 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*3.2	Pump: 24" dia x 8 (installation depth)
34	300-PA-RL-1001 A/B	**2**	Rotary Lobe Pump	Electric Motor	2*1.75	2.5 x 1.5 x 1.0
35	300-PA-RL-2001 A/B	**2**	Rotary Lobe Pump	Electric Motor	2*1.75	2.5 x 1.5 x 1.0
36	300-PA-RL-3001 A/B	**2**	Rotary Lobe Pump	Electric Motor	2*1.75	2.5 x 1.5 x 1.0
37	300-PA-RL-4001 A/B/C	**3**	Rotary Lobe Pump	Electric Motor	2*1.75	2.5 x 1.5 x 1.0
38	300-PA-RL-1011 A/B	**2**	Rotary Lobe Pump	Electric Motor	2*1.5	2.0 x 1.2 x 0.8
39	300-PA-RL-2011 A/B	**2**	Rotary Lobe Pump	Electric Motor	2*1.5	2.0 x 1.2 x 0.8

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S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + seal plan etc.) (MT) (***Refer Note-1***)	Overall Dimensions Each pump (LXBXH) (m)
40	300-PA-RL-3011 A/B	**2**	Rotary Lobe Pump	Electric Motor	2*1.5	2.0 x 1.2 x 0.8
41	300-PA-RL-4011 A/B	**2**	Rotary Lobe Pump	Electric Motor	2*1.5	2.0 x 1.2 x 0.8
42	304-PA-CF-RP-4503 A/B	**2**	WAO SULFURIC ACID PUMP	Electric Motor	2*2.5	1.5 x 1.2 x 2.5
43	300-PA-CF-8001 B/C	**2**	Horizontal Centrifugal Pump	Electric Motor	2*32=64	9.6 x3.7x2.5; LO skid size 3.1x2.5x2.5
44	300-PA-CF-1201 C/D/E (EM Driven)	**3**	Horizontal Centrifugal Pump	Electric Motor	3*27=81	5.97x4.0x2.8
45	300-PA-CF-1302 B/C (EM Driven)	**2**	Horizontal Centrifugal Pump	Electric Motor	2*27=54	6.98x4.5x2.5
46	300-PA-CF-2507 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*3.5	3.2 x 2.5 x 3.0
47	300-PA-CF-8002 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*4	3.2 x 2.5 x 3.0
48	300-PA-CF-8003 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*3.5	3.2 x 2.5 x 3.0
49	300-PA-CF-8004 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*10	4.2 x 3.0 x 3.0
50	304-PA-CF-4504 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*5	Pump: 24" dia x 8 (installation depth)
51	304-PA-CF-4505 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*5	Pump: 24" dia x 8 (installation depth)
52	300-PA-CF-2004	**1**	Horizontal Centrifugal Pump	Electric Motor	5	3X2.5X3.0
53	300-PA-CF-2501A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*4.5	3X2.5X3.0
54	300-PA-CF-8010 A/B	**2**	Vertical Centrifugal Pump	Electric Motor	2*4	Pump: 24" dia x 8 (installation depth)
55	300-PA-CF-8011 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*4.5	3X2.5X3.0
56	300-PA-CF-8012 A/B	**2**	Horizontal Centrifugal Pump	Electric Motor	2*4.5	3X2.5X3.0
Total Weight (Pumps)					**590**	

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B.2 **SCHEDULE OF QUANTITIES (SOQ) FOR ALL TYPE OF PUMPS WITH DRIVERS AND ACCESSORIES (SOR Item No. 01RR.1.1.2 as per Doc # B957-300-80-42-PK-SOR-3001-B):**

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Pump	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + seal plan etc.) (MT) (***Refer Note-1***)	Overall Dimensions Each pump (LXBXH) (m)
1	300-PA-CF-8001 A (ST Driven)	**1**	Horizontal Centrifugal Pump	Steam Turbine	1*30=30	10.2x3.7x2.5; LO skid size 3.3x2.9x2.5
2	300-PA-CF-1201 A/B (ST Driven)	**2**	Horizontal Centrifugal Pump	Steam Turbine	2*40=80	7.5x4.0x2.55
3	300-PA-CF-1302 A (ST Driven)	**1**	Horizontal Centrifugal Pump	Steam Turbine	1*40=40	7.5x4.0x2.55
	Total Weight				**150**	

B.3 **SCHEDULE OF QUANTITIES (SOQ) FOR ALL TYPE OF SKID MOUNTED CHEMICAL DOSING PACKAGES WITH DRIVERS AND ACCESSORIES (SOR Item No. 01RR.1.8.1 as per Doc # B957-300-80-42-PK-SOR-3001-B):**

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Equipment	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + seal plan etc.) (MT) (***Refer Note-1***)	Overall Dimensions Each pump/skid (LXBXH) (m)
1	300-LZ-00-1182	**1**	DMDS INJECTION PACKAGE	Electric Motor	1*40	12 x 6 x 15
2	300-LZ-00-1183	**1**	PHOSPHATE INJECTION PACKAGE	Electric Motor	1*15	10 x 5 x 8
3	300-LZ-00-1301	**1**	AMINE INJECTION PACKAGE	Electric Motor	1*30	7 x 5 x 8
4	300-LZ-00-1302	**1**	EMULSION BREAKER INJECTION PACKAGE	Electric Motor	1*30	6 x 3 x 8
5	300-LZ-00-1403	**1**	DILUTE CAUSTIC INJECTION PACKAGE	Electric Motor	1*15	6.5 x 3 x 8
6	300-LZ-00-8003	**1**	AMINE/OXYGEN SCAVENGER INJECTION PACKAGE	Electric Motor	1*Skid 1:13 1*Skid 2: 12	Skid 1: 8 x 5 x 8 Skid 2: 8 x 5 x 8
7	303-LZ-3504	**1**	LRVP PKG	Electric Motor	1*15	7 x 4 x 3.5
Total Weight					**170**	

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B.4 **SCHEDULE OF QUANTITIES (SOQ) FOR ALL TYPE OF COMPRESSOR PACKAGES WITH DRIVERS AND ACCESSORIES (SOR Item No. 01RR.1.2.1 as per Doc # B957-300-80-42-PK-SOR-3001-B):**

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Equipment	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + auxiliaries etc.) (MT) (*Refer Note-1*)	Overall Dimensions skid (LXBXH) (m)
1	300-KA-CF-2001	1	Charge Gas compressor Centrifugal compressor	Electric Motor	Compressor train: 605 LO Console: 75 Surface condensor: 250 Condensate Pumps: 2*10	Compressor: 25 x 8 x 8 LO Console: 14 x 5 x 3.5 Surface Condensor: 22 x 6 x 13 Condensate Pumps: 3.5 x 2.8 x 2.8
2	300-KA-CF-5001	1	Propylene Refrigerant compressor-Centrifugal compressor	Electric Motor	Compressor train: 455 LO Console: 75 Surface condensor: 250 Condensate Pumps: 2*10	Compressor: 25 x 5 x 7 LO Console: 13 x 5 x 3.5 Surface Condensor: 22 x 6 x 13 Condensate Pumps: 3.5 x 2.8 x 2.8
3	300-KA-2401	1	DCU OFF GAS COMPRESSOR	Electric Motor	Compressor -60 LO skid-30	Compressor: 13 x 4.5 x 8 LO Console: 7 x 5 x 3.5
4	300-LZ-00-1181	1	Centrifugal Compressor (Integrally Geared)	Electric Motor	Compressor 1*110	Compressor: 30.0 x 14.5 x 10
Total Weight					**1950**	

B.5 **SCHEDULE OF QUANTITIES (SOQ) FOR ALL TYPE OF COMPRESSOR PACKAGES WITH DRIVERS AND ACCESSORIES (SOR Item No. 01RR.1.4.1 as per Doc # B957-300-80-42-PK-SOR-3001-B):**

S. No.	Equipment Item No.	Quantity (Working / Standby)	Type of Equipment	Type of Driver & Auxiliaries	No. of units x Total Weight (each eqpt. Incl. of eqpt. + driver + baseplate + cplg + auxiliaries etc.) (MT) (*Refer Note-1*)	Overall Dimensions skid (LXBXH) (m)
1	304-KA-RP-4501	1	WAO Compressor-Reciprocating compressor	Electric Motor	Compressor -50	Compressor: 5.5 x 4.35 x 3
Total Weight					**50**	

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B.6 **SCHEDULE OF QUANTITIES (SOQ) FOR EPOXY GROUT (SOR Item No. 01RR.3.1 as per Doc # B957-300-80-42-PK-SOR-3001-B):**

S. No.	Equipment Item Nos.	Overall Quantity Epoxy Grout [m3] (***Refer Note-2***)
1	EPOXY Grout	40

B.7 **SCHEDULE OF QUANTITIES (SOQ) FOR INITIAL FILL OF LUBRICANTS, SEALING FLUID & OTHER CONSUMABLES ETC. REQUIRED FOR STARTUP AND COMMISSIONING(SOR Item No. 01RR.1.MH10.1 as per Doc # B957-300-80-42-PK-SOR-3001-B):**

S. No.	Equipment Item Nos.	Overall Quantity (Lubricants, Sealing Fluids & Other Consumables) [Litres] (***Refer Note-3***)
1	REFER TABLE A.1 OF PART-A: UNIT (ECU) FOR LIST OF EQUIPMENTS	85,000

NOTES:

4. Weights and dimensions indicated in SOQ are estimated only. Final weights and dimensions shall be as per General Arrangement drawing of vendor which shall be provided to contractor after award of the job.

5. Supply and application of Epoxy grout

6. A consolidated list for all free issue items shall be provided to Contractor indicating type of lubricant, grease, oil etc. giving specifications, quantities, brand name and their BPCL equivalent. Contractor to note that supplied Lubricants should be of Mak Brand (BPCL make).

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ANNEXURE – 5 (LIST OF ATTACHMENTS)

S. No.	Document Description	Document No.	Rev
1	Standard specification for documentation requirements from Contractors	6-78-0002	3
2	Standard Specification for erection of equipment & machinery	6-76-0001	4

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ANNEXURE-C

SCOPE OF WORK & SUPPLY (SMED) FOR

MECHANICAL TENDER

(TENDER NO. B957-300-16-43-MR-T-3001)

PROJECT	**:**	**MPMC AND PMC/EPCM SERVICES FOR ETHYLENE CRACKER UNIT AND UTILITIES & OFFSITES RELATED TO BINA PETCHEM & REFINERY EXPANSION PROJECT (BPREP)**
OWNER	**:**	**BHARAT PETROLEUM CORPORATION LIMITED (BPCL)**
EPCM	**:**	**ENGINEERS INDIA LIMITED**
EIL JOB No.	**:**	**B957**

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
0	21.04.2025	ISSUED AS TENDER INPUT	SG	PR	KCP

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1.0 GENERAL

1.1 The Contractor shall receive the equipment/packages from owner's store and shall arrange lifting and transportation to the site of installation. The Contractor shall then execute the job as per schedule to be finalized in consultation with the Engineer-in-Charge. The quantities, indicative level of installations and approximate weights are as mentioned under clause 6.0, SOQ (Schedule of Quantities).

1.2 The contractor shall take proper care to avoid damage to painting during various stages of erection and prior to pre-commissioning activity.

2.0 SCOPE OF SUPPLY AND SERVICES FOR PACKAGED EQUIPMENT ITEMS

Items listed in **cl. no. 6.1** shall be issued as **free issue materials (except insulation materials required for Filters/Coalescers packages)** by the owner. The erection, installation, testing and commissioning of the above said items shall be in the scope of the contractor.

The intent of this specification is to specify detailed scope of work, scope of supply and services for installation and commissioning as specified below.

2.1 Lifting of Equipment / Skid Mounted Packages at owner's store.

2.2 Transportation of Equipment / Skid Mounted Packages from owner's store to site of installation.

2.3 Minor chipping of foundation (if required).

2.4 Placing, leveling, aligning, fixing and grouting (including supply of grouting material) of Equipment / Skids on the foundations.

2.5 For Skid mounted pumps/compressors, initial alignment & alignment with piping shall be checked by the erection contractor and corresponding modification work if any, required for completing the alignment.

2.6 Installation of interconnecting piping, hook-up/connection of the Equipment with the plant piping and control system as per vendor drawings (*drawing will be provided during erection).*

2.7 Modification of prefabricated spools as per site condition.

2.8 Field joints, if any, in the loose supplied items shall also be in erection contractor's scope including radiography and other NDT requirements. For Quench Oil Removal Package, PSA Hydrogen Package (item listed in cl. no. 6.6.1 & 6.1.1) payment for the same shall be made as per unit rate provided against respective Piping SOR items and for Filter / Coalescer Package (item listed in cl. no. 6.1.2 & 6.6.2) this price shall be included in the lump sum price quoted against this SOR item.

(Refer Sl. No. 01QQ.MK1, 01QQ.MK2, 01QQ.MH2, 01QQ.MH3 & 01QQ.9 of SOR Doc. Nos. B957-300-80-42-MR-SOR-3001-A & 3001-B).

2.9 Installation of any other loose items (Control valves, PSV, online items, etc.) supplied by package Vendor.

2.10 Repair and touch-up painting for the locally damaged areas of the equipment and field welding of piping shall be carried out by the erection contractor as per EIL/Owner painting specification attached in the tender document.

2.11 Application of insulation material for the field joint portion, un-insulated part of the package which has been left for erection purpose

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2.12 Hydro-testing/ Pneumatic testing of the installed piping for the above said packages, if required.

2.13 Erection Equipment (like crane, etc.) required for installation and commissioning of all items and components at all elevations including arrangement and installation of temporary scaffolding.

2.14 Preservation of rotary equipment specially entry from foreign materials until handing over to Client shall be specified

2.15 Final inspection and punch list liquidation of vessel/ equipment along with EIL/Client and handing over to Client in all aspect shall be included.

2.16 Assistance to Performance Guarantee test for packages by providing skilled and unskilled labour and handover to owner.

2.17 All labour, materials, facilities and supplies required during installation, testing and commissioning.

2.18 In addition to the above, contractor may be called upon by Engineer-in-Charge to do other jobs like rectification of defects etc. in the said packages.

3.0 Technical Requirement

3.1 Chain Pulley Blocks

3.1.1 Chain pulley blocks and geared trolleys suitable for hazardous area shall be supplied, installed, shop tested, commissioned in position including any modifications required in the already installed structures based on the Structural and Piping drgs. and as per the instruction of the Site –In charge.

3.1.2 Contractor shall procure the chain pulley blocks & geared trolleys from the EIL approved vendors. For vendor list, contractor to refer APPENDIX-1 of this document.

3.1.3 Mechanical erection contractor shall procure, test, paint, install the chain pulley blocks & geared trolleys in line with EIL std specification no.: 6-61-0015, attached with this tender. Chain Pulley Block shall be of detachable type suitable for mounting on geared trolley of same rating /capacities.

3.1.4 Painting (Primer +finish coats) of the chain pulley blocks & geared trolleys shall be as per manufacturer standard and shall be suitable for highly corrosive industrial environment.

3.1.5 Contractor shall ensure that the chain pulley blocks and geared trolleys are supplied with commissioning spares of adequate quantity.

3.1.6 Contractor shall ensure that chain pulley blocks and geared trolleys are supplied & installed with first fill of lubricants and grease nipple points are provided suitably.

3.1.7 Contractor shall submit the documentation as per doc no. B957-300-80-42-VDR-3001 attached elsewhere in the tender.

3.1.8 Contractor shall ensure that the chain pulley blocks & geared trolleys are supplied with statutory approvals and formats, as applicable. Each Chain Pulley Block and Trolley shall be marked with the tag no., SWL capacity & “Non-Sparking Type”.

4.0 ERECTION

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4.1 Complete erection of packages / equipment & piping works etc. under supervision of respective package / equipment supplier as per EIL standard specification no.6-76-0001. The overall coordination shall be Contractor's responsibility.

4.2 Equipment shall be erected with proper orientation on foundation.

4.3 Contractor shall install base plates, erect equipment, level and properly align with necessary shims and wedges wherever applicable.

4.4 Leveling and plumbness shall be approved by EIL and shall be checked using suitable instruments as to be decided by Engineer-in-Charge before grouting / fixing. Finishing of the foundation shall be carried out, wherever applicable.

4.5 Equipment shall be firmly bolted down to foundations, wherever applicable.

5.0 EXCLUSIONS

Civil Foundation. However, minor chipping of foundation (if required) and grouting of equipment (including supply of grouting material) shall be in contractor's scope.

6.0 SCHEDULE OF QUANTITIES

The schedule of quantities is as given below. Dimensions and weights are approximate only. Final data along with equipment manufacturer's drawings will be furnished during erection of equipment to the successful contractor.

Part-A

6.1 Packages/ Equipment to be erected

6.1.1 **PSA Hydrogen package (item no. 300-LZ-00-3002)** (Refer Sl. No. 01QQ.9 of SOR doc. No. B957-300-80-42-MR-SOR-3001-A)

Size, Erection weight are tentative. Actual details shall be as per approved vendor drwgs provided at the time of erection.

6.1.1.1 Erection contractor shall apply the insulation material (free issue material) for the field joint portion, un-insulated part of the package which has been left for erection purpose and carry out rectification work for any damaged insulation which had been already applied on equipment / piping by package supplier as part of their package supply. Price for the same shall be included in the Unit rate of erection.

Overall estimated weight for PSA Hydrogen package shall be approximately 1117 MT (Weight break up for major items are as below):

SL. NO.	DESCRIPTION OF ITEMS	Approx. Erection Weight (MT)	QTY.	Approx. Overall Dimension (L X W X H) (meter)	Elevation from grade (in meters)	Remarks
1.	Adsorber vessel and associated piping	60	12	Overall height-10.5, Diameter-3.5-	(Details shall be as per equipment layout	For each vessel.
2.	Tail Gas Drum and associated piping	75	2	Overall height-25, Diameter- 4		For each drum.

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3.	PSA Valve Skid-A	66	1	13.3X5.2X5.4	provided at the time of erection)	
4.	PSA Valve Skid-B	65	1	12.2X5.2X5.4		
5.	PSA Valve Skid-C	66	1	13.2X5.2X5.4		
6.	PSA Valve Skid-D	25	1	5.6X5.2X4.0		
7.	PSA Valve Skid-E	25	1	6.2X5.2X4.2		
8.	All skid interconnecting piping (both SS, CS), fittings, valves, structure support, insulation, control valves, all types of instruments etc.	2	Lot	DEC	(Refer equipment layout)	

6.1.1.2 Erection contractor shall load the adsorbent material for each adsorber vessel under supervision of equipment vendor/ Engineer in charge.

Overall estimated weight for adsorbent shall be 600 MT (Weight break up are as below):

SL. NO.	DESCRIPTION OF ITEMS	Approx. Weight (MT)	QTY.	Total weight (MT)
1.	Loading of adsorbent to be filled in each adsorber vessel	50	12	600

6.1.2 **Filters / Coalescer Package (**Refer Sl. No. 01QQ.MH3 of SOR doc. No. B957-300-80-42-MR-SOR-3001-A)

Size, Erection weight are tentative. Actual details shall be as per approved vendor drgs provided at the time of erection.

6.1.2.1 Erection contractor shall apply the insulation material (including supply of insulation material) for the field joint portion, un-insulated part of the package which has been left for erection purpose and carry out rectification work for any damaged insulation which had been already applied on equipment / piping by package supplier as part of their package supply. Price for the above shall be included in the Unit rate of erection.

(Weight break up for major items are as below):

SL. NO.	DESCRIPTION OF ITEMS	Approx. Erection Weight (MT)	QTY.	Approx. Overall Dimension (L X W X H) (meter)	Elevation from grade (in meters)	Remarks
1.	Wash Oil Filter 300-GN-00-1501	2	1		(Details shall be as per equipment layout provided at the time of erection)	
2.	Lean Solvent Filters 303-GN-00-3501 A/B	3	2			
3.	SRC Reflux Filters 303-GN-00-3502 A/B	4	2			
4.	Propylene Product Filters 300-GN-00-4101 A/B	5	2			
5.	Liquid Condensate	20	1			

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	Coalescer Package 300-LZ-00-2001					
6.	PGH Feed Filtration Package 302-LZ-00-2601	20	1			

Notes:

1. Tag will be provided to successful contractor during detail engineering.
2. Sizes & Elevation of equipment / skids / Piping mentioned above are tentative. Actual GA drawing of individual equipment & package layout will be given to successful bidder. For the estimation purpose, bidder shall refer the building layout showing the location of individual equipment.
3. Actual weight of equipment shall be as per AFC drawing, which will be given to successful bidder.
4. Prefabricated piping along-with some loose free length piping and fittings shall be supplied by package vendor. Welding, some amount of cutting & re-welding may be required to adjust the lengths at site. Bidder shall erect all loose prefabricated piping / free length piping between equipment and skids. For the estimation purpose, bidder shall refer building layout attached with tender. Actual isometrics and layout will be given to successful bidder.

6.2 **Equipment to be fabricated**

Nil

6.3 **Equipment to be procured and erected**

6.3.1 **Chain Pulley Block & Gear trolley (Hazardous Area):**

(Refer Sl. No. 01QQ.7 of SOR Doc. No. B957-300-80-42-MR-SOR-3001-A)

Following items shall be supplied and erected by the Contractor as per attached EIL Std. Specification for Chain Pulley Block (Doc. No. 6-61-0015), and Cl. No. 3.1 of this document (Part-C). Chain pulley blocks supplied shall be suitable for Hazardous area application. Chain Pulley Block (CPB), as indicated in the AFC drwgs. and as per the tag no. and respective maintenance equipment shall be installed in position, as per the instruction of Site in Charge.

Sl. No	Description	Qty.	Capacity * (MT)	Remarks
a.	Chain Pulley Blocks (Trolley mounted / hook mounted)	66	Up to 10 MT	* - As per the AFC drawing of Piping & structural and vendor drawings.
b.	Chain Pulley Blocks (Trolley mounted / hook mounted)	11	15.0 MT to 25.0 MT	* - As per the AFC drawing of Piping & structural and vendor drawings.
c.	Chain Pulley Blocks (Trolley mounted / hook mounted)	1	30.0 MT to 50.0 MT	* - As per the AFC drawing of Piping & structural and vendor drawings.

Quantity mentioned above are estimated and may be changed during detail engineering. Payment to the contractor shall be made based on the actual quantity erected and quoted unit rate against the item.

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6.4 **Equipment to be painted**

Repair and touch-up painting for the locally damaged areas of the free issue packages shall be carried out by the erection contractor as per EIL/Owner painting specification attached elsewhere in the tender document.

6.5 **Equipment to be Insulated**

Application of insulation material (free issue material) for the field joint portion, un-insulated part of the package which has been left for erection purpose, repair and touch-up insulation for the locally damaged areas of the above packages shall be carried out by the erection contractor as per EIL/Owner instruction.

Part-B

6.6 **Packages/ Equipment to be erected**

6.6.1 **Quench Oil Coke Removal Package (Item no. 300-LZ-00-1202) (**Refer Sl. No. 01QQ.MK1 of SOR doc. No. B957-300-80-42-MR-SOR-3001-B)

Size, Erection weight are tentative. Actual details shall be as per approved vendor drwgs provided at the time of erection.

6.1.2.2 Erection contractor shall apply the insulation material (free issue material) for the field joint portion, un-insulated part of the package which has been left for erection purpose and carry out rectification work for any damaged insulation which had been already applied on equipment / piping by package supplier as part of their package supply. Price for the above shall be included in the Unit rate of erection.

(Weight break up for major items are as below):

SL. NO.	DESCRIPTION OF ITEMS	Approx. Erection Weight (MT)	QTY.	Approx. Overall Dimension (L X W X H) (meter)	Elevation from grade (in meters)	Remarks
Quench Oil Coke Removal Package (Item no. 300-LZ-00-1202)						
1.	Module-1	35	1	5X5X12	(Details shall be as per equipment layout provided at the time of erection)	
2.	Module-2	35	1	5X5X12		
3.	Module-3	35	1	5X5X12		
4.	Module-4	35	1	5X5X12		
5.	Module-5	35	1	5X5X12		
6.	Module-6	15	1	4X5X12		
7.	Module-7	30	1	4X15X5		
8.	Module-8	40	1	4X15X5		
9.	All skid interconnecting piping, fittings, structure support, insulation, control valves, all types of instruments etc.	0.5	Lot	DEC		

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6.6.2 **Filters / Coalescer Package (**Refer Sl. No. 01QQ.MH2 of SOR doc. No. B957-300-80-42-MR-SOR-3001-B)

Size, Erection weight are tentative. Actual details shall be as per approved vendor drwgs provided at the time of erection.

6.1.2.3 Erection contractor shall apply the insulation material (including supply of insulation material) for the field joint portion, un-insulated part of the package which has been left for erection purpose and carry out rectification work for any damaged insulation which had been already applied on equipment / piping by package supplier as part of their package supply. Price for the above shall be included in the Unit rate of erection.

(Weight break up for major items are as below):

SL. NO.	DESCRIPTION OF ITEMS	Approx. Erection Weight (MT)	QTY.	Approx. Overall Dimension (L X W X H) (meter)	Elevation from grade (in meters)	Remarks
1.	Kerosene Feed Filters 300-GN-00-1001 A/B	2	2	(Details shall be as per GAD, equipment layout provided at the time of erection)	(Details shall be as per equipment layout provided at the time of erection)	
2.	Naphtha Feed Filters 300-GN-00-1002 A/B	3	2			
3.	UCO Feed Filters 300-GN-00-1003 A/B	2	2			
4.	LGO Feed Filters 300-GN-00-1004 A/B	2	2			
5.	Purge Oil Filters 300-GN-00-1203 A/B	2	2			
6.	Lean MEA Pre-filters 300-GN-00-2501 A/B	2	2			
7.	Lean MEA Activated Carbon Filter 300-GN-00-2502	30+15 (activated carbon)	1			
8.	Lean MEA Post-filters 300-GN-00-2503 A/B	2	2			
9.	Quench Oil Suction Filters 300-GN-00-1201 A-E	35	5			
10.	PFO Stripper Bottoms Filters 300-GN-00-1204 A/B	5	2			
11.	Fuel Gas Filter/Coalescer (Tag No.: 300-GN-00-3001 A/B)	15	2			
12.	Gasoline/MEA Separator (300-VV-HI-2506)	15	1			
13.	Gasoline/MEA Contactor Bottoms Separator (300-VV-HI-2507)	15	1			

Notes:

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1. Tag will be provided to successful contractor during detail engineering.
2. Sizes & Elevation of equipment / skids / Piping mentioned above are tentative. Actual GA drawing of individual equipment & package layout will be given to successful bidder. For the estimation purpose, bidder shall refer the building layout showing the location of individual equipment.
3. Actual weight of equipment shall be as per AFC drawing, which will be given to successful bidder.
4. Prefabricated piping along-with some loose free length piping and fittings shall be supplied by package vendor. Welding, some amount of cutting & re-welding may be required to adjust the lengths at site. Bidder shall erect all loose prefabricated piping / free length piping between equipment and skids. For the estimation purpose, bidder shall refer building layout attached with tender. Actual isometrics and layout will be given to successful bidder.

6.7 **Equipment to be fabricated**

Nil

6.8 **Equipment to be procured and erected**

6.8.1 **Chain Pulley Block & Gear trolley (Hazardous Area):**

(Refer Sl. No. 01QQ.7 of SOR Doc. No. B957-300-80-42-MR-SOR-3001-B)

Following items shall be supplied and erected by the Contractor as per attached EIL Std. Specification for Chain Pulley Block (Doc. No. 6-61-0015), and Cl. No. 3.1 of this document (Part-C). Chain pulley blocks supplied shall be suitable for Hazardous area application.
Chain Pulley Block (CPB), as indicated in the AFC drwgs. and as per the tag no. and respective maintenance equipment shall be installed in position, as per the instruction of Site in Charge.

Sl. No	Description	Qty.	Capacity * (MT)	Remarks
d.	Chain Pulley Blocks (Trolley mounted / hook mounted)	67	Up to 10 MT	* - As per the AFC drawing of Piping & structural and vendor drawings.
e.	Chain Pulley Blocks (Trolley mounted / hook mounted)	11	15.0 MT to 25.0 MT	* - As per the AFC drawing of Piping & structural and vendor drawings.
f.	Chain Pulley Blocks (Trolley mounted / hook mounted)	1	30.0 MT to 50.0 MT	* - As per the AFC drawing of Piping & structural and vendor drawings.

Quantity mentioned above are estimated and may be changed during detail engineering. Payment to the contractor shall be made based on the actual quantity erected and quoted unit rate against the item.

6.9 **Equipment to be painted**

Repair and touch-up painting for the locally damaged areas of the free issue packages shall be carried out by the erection contractor as per EIL/Owner painting specification attached elsewhere in the tender document.

6.10 **Equipment to be Insulated**

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Application of insulation material (free issue material) for the field joint portion, un-insulated part of the package which has been left for erection purpose, repair and touch-up insulation for the locally damaged areas of the above packages shall be carried out by the erection contractor as per EIL/Owner instruction.

7.0 ENCLOSURES

7.1 Schedule of Rates for mechanical works, SOR (Doc. No. B957-300-80-42-MR-SOR-3001-A, B957-300-80-42-MR-SOR-3001-B)

7.2 Data sheet of chain pulley block (Doc. no. B957-300-80-42-DS-3001)

7.3 Vendor Data Requirement (Static & Machinery Equipment) (Doc. no. B957-300-80-42-VDR-3001)

7.4 EIL Standard Specification no. 6-61-0015.

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APPENDIX-1

PMVL for BPREP Project of BPCL at Bina Refinery, Madhya Pradesh

Date :28/03/2026

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Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code : 07AH		Description : CHAIN PULLEY BLOCK		
Approved Suppliers				
1	3921	BAKELITE ELECTRICAL MFG CO.PVT LTD	INDIA	
2	H129	HERCULES HOISTS LTD	INDIA	
3	T038	TRACTEL TIRFOR (I) PVT LTD	INDIA	
4	W005	BRADY & MORRIS ENGINEERING CO. LTD.	INDIA	
5	BPCL VC 100008	A.K. MARINE & INDUSTRIAL APPLIANCES	INDIA	
6	BPCL VC 101038	MACHINERY IMPEX CORPORATION	INDIA	
7	BPCL VC 372218	DAMAN INTERNATIONAL	INDIA	
8	BPCL VC 180128	INDIAN CHAIN PVT LTD	INDIA	
9	BPCL VC 101897	W. H. BRADY & CO. LTD.	INDIA	
10	BPCL VC 101914	WESTERN INDIA MARINEMILLS&ENGINEERS	INDIA	

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SCOPE OF WORK & SUPPLY (STRUCTURAL)

Tender No. : B957-300-16-43-MR-T-3001
(MECHANICAL WORKS – I FOR ECU – PART – A
&
MECHANICAL WORKS – II FOR ECU – PART – B)

PROJECT : **BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (BPREP)**

UNIT : **ETHYLENE CRACKER UNIT (300)**

CLIENT : **M/S BHARAT PETROLEUM CORPORATION LIMITED**

CONSULTANT : **M/S ENGINEERS INDIA LIMITED (EIL)**

JOB NO. : **B957**

Rev. No	Date	Purpose	Prepared by	Reviewed by	Approved by
1	24/04/2026	ISSUED FOR TENDER	IFG	MA	SP
0	17/02/2026	ISSUED FOR TENDER	IFG	MA	SP

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1.0 SCOPE OF WORK

The scope of work in general shall include Construction of all Civil-Structural Works for **Mechanical Works for Bina Petrochemical & Refinery Expansion Project (BPREP) at Bina, Madhya Pradesh of M/s Bharat Petroleum Corporation Limited (BPCL)** as per the Scope of Work, Scope of Material Supply, Schedule of Rates, Specifications, Standards and Drawings included in the Tender document, etc. all complete.

The contractor shall be responsible to complete the entire work in all respect, including any other work necessary to complete the job, though specifically not covered in the scope of work.

Major structures shall include following but not be limited to the same:

- Operational platforms and pipe supports within unit.
- Structural steel works for manifold structure for airfin coolers in superstructure.
- Structural steel works for piperacks, trestles and miscellaneous structures.
- Structural steel works for platforms on/around equipment in unit.
- Retrofitting & modification works in existing steel structures in unit and offsite.
- Addition/modification of structures over/on existing structures.
- Erection of already fabricated steel structures, handrail, gratings, ladders, etc.
- Brick masonry works in unit .
- Painting of Structural steel in unit.
- Fire proofing of steel structures & equipment in unit.
- Sand filling in UG Pits etc in unit .
- Dismantling of PCC, RCC, brick work, stone masonry Structural steel works, sheeting etc.
- Foundation treatment and ground improvement works below foundations.
- Electrical & Instrumentation supports envisaged on grade/rack/bridge/trestle/ existing structures anywhere in unit.
- Any kind of structural steel works including grating, handrail, ladder, staircase etc. not covered above.
- Scaffolding for structures (erection, dismantling & carrying back the same after completion of work)
- Temporary rain protection structure.
- Hanger scaffolding below pipe rack (erection, dismantling & carrying back the same after completion of work)

Contractor shall visit the site to ascertain actual site conditions to quantify/ assess the job himself before quoting rates. No extra claim at a later date shall be entertained due to non-familiarization of site.

Major civil and structural activities involved shall include but not be limited to the following:

1. Obtaining all approvals from owner, statutory authorities such as Factory Inspector, Local Municipal or Development Authorities (including existing refinery) and other designated authorities etc. for necessary construction works.

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2. Earthwork in excavation in all types of soil, soft rock (by chiseling, chemical blasting etc.), hard rock (by chiseling, chemical blasting, etc.) including dewatering by deploying adequate capacity of pumps or dewatering techniques, if required, below ground level for all types of soils, and providing shoring & strutting, wherever required, by open and/ or closed timbering method.

3. Storing/ stacking excavated earth at safe location near foundation or at designated place for reuse within the plant boundary as instructed by owner/ Engineer-in-Charge. Segregating unserviceable earth separately and disposing the same at designated place as instructed by owner/ Engineer-in-Charge.

4. Backfilling at all depths with selected and approved earth available and from borrow areas, and transportation & disposal of surplus earth (including rock material) and debris to the areas designated by Engineer-in-charge.

5. Backfilling at all depths with selected and approved crushed rock available within the plant boundary.

6. PCC works including lean concrete at all depths below foundations of all types, plinth beams, walls, non-suspended slabs, trenches, etc., and in screed at all depths below plinth level.

7. PCC Works including lean concrete in screed at all depths below plinth level & at all heights above plinth level.

8. RCC works in sub-structure for foundation of all types including open foundation etc., plinth beams, walls, basement, non-suspended floor slabs, trenches, pits etc. at all depths.

9. RCC works in super-structure for columns, beams, walls, floor & roof slabs, etc. at all heights.

10. RCC works for pre-cast elements, trenches (including covers) etc. and any other miscellaneous works required as per AFC drawings and transportation of precast elements to site for erection.

11. Supply, cutting, bending, fixing of reinforcement for RCC works in sub-structure at all depths and in super-structure at all heights.

12. Preparation of Bar Bending Schedule for concrete structures as per the ‘Approved for Construction’ (AFC) drawings.

13. Centering & Shuttering (including curved shuttering) in sub-structure at all depths and in super-structure at all heights/ elevations.

14. Concrete encasing works.

15. Providing isolation joints around column/pedestal/trenches etc.

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16. Masonry works in substructure and superstructure for all depths and heights as per specifications.

17. Providing & laying sand-filling at all locations; as specified or directed by Engineer-In-Charge.

18. Supplying and fixing mechanical rebar coupler.

19. Structural steel works with rolled steel, parallel flange sections, built-up sections and tubular/hollow sections, including supply, fabrication, transporting, storing, assembling & erecting in position & testing/examining bolted &/or welded Structural Steel & preparation of detailed fabrication drawings for all types of structures at all locations and heights in super-structure.

20. Painting for Structural steel shall be as per painting Job Specification no. B957-000-06-42-PLS-01.

21. Dismantling/ Demolishing of PCC/ RCC, masonry, Structural steel works/sheeting for all depths below plinth level and all heights above plinth level including disposal of unserviceable item anywhere within the plant boundary. Stacking & depositing serviceable items in Owner's yard, location as approved by Engineer-in-Charge.

22. Dismantling, modification & re-erection of Structural steel members, electroforged galvanized gratings & handrailing for all types of Structures; at all locations & all heights.

23. Dismantling & re-erecting of Steel structures; wherever required.

24. Retrofitting/Jacketing works on existing Steel/RCC structures, as per drawings and directions of Engineer-in-charge.

25. Addition/modification of structures over/on existing structures, as per drawings and directions of Engineer-in-charge.

26. Erection of already fabricated steel structures/ members, handrails, ladders, gratings, etc. (fabricated by others) for new structures, over/on existing structures, over/on equipment's, at all locations & all heights.

27. Treatment works of faulty construction joints, cracks, tie rod holes & spalled & honeycombed surface of RCC underground structures to ensure water tightness; as per specification; as directed by Engineer-In-Charge, at any location wherever required.

28. Fabrication & placing / erection of miscellaneous steel items like Anchor Bolts, metal insert plates, Pipe sleeves, rungs, prefabricated hand railing etc. as per EIL standards/specs. as directed by Engineer-in-charge at any location wherever required.

29. Mixing of approved brand of BI-POLAR concrete penetrating corrosion inhibiting admixture in concrete as per manufacturer's specification & EIL Specifications for protection of reinforcement against corrosion.

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30. Fixing of BITUMEN IMPREGNATED FIBRE BOARD conforming to IS: 1838 of approved quality in expansion joints at all locations and levels in concrete structures.

31. Sealing of EXPANSION JOINTS at all locations and levels in Concrete Structures with POLYSULPHIDE SEALING COMPOUND as per IS: 12118 including raking of joints etc.

32. Providing and fixing electro-forged hot dipped galvanized MS gratings as per EIL Standards.

33. Providing fixing MS chequered plates & at all heights on structures.

34. Design, supply, fabrication of bolted/or welded structural steel works for rain protection structures above pipe racks, open areas for fabrication. Maintenance of the structure during the project phase and dismantling, removing and taking away all materials after the completion of retention period.

35. Providing anchor fasteners to fix structures/ pipe supports etc

36. Fire proofing of equipment supports, structures etc. as per approved Engineering design basis, specifications & AFC drawings.

37. Supplying & applying intumescent paint as per job specification B957-999-06-43-IF01 as fireproofing material of required thickness around steel structures for all heights.

38. Providing one side machined sliding plates, embedded in the grout, under horizontal equipment.

39. Fixing of re-bars in already cast concrete.

40. Concrete retrofitting works using epoxy resin.

41. Providing & laying of geogrid, boulder soling and sand gravel mix as per specification/drawing.

42. Preparation of detailed fabrication drawings using TEKLA or Autodesk Advance Steel or equivalent 3D Modeling software, including submission of design calculation for connections, showing the master index of particular structures indicating nomenclature to facilitate sequence of erection activity, for all types of structures. Connections in fabrication drawing shall be prepared only after review of connection details by the owner. Final model shall be submitted for records which shall include all fabrication drawings, related files, catalogues along with all erection/ part marks and material reports.

43. Providing temporary supporting/protection arrangement to protect the existing facilities like pipes, cables, equipments and other miscellaneous structures which may be affected during the course of work at all depths & heights.

44. Isolation of existing structures (concrete/steel) if necessary, by providing necessary permanent supports for existing structures during the course of work at all depth & heights.

45. Providing safety structures & safety personnel as per specification.

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46. Preparation of AS-BUILT mark-up prints on AFC drawings and subsequent updation of the same in soft copy (Auto Cad) of AFC drawing and submission of hard copy (as specified elsewhere in the bid package) and soft copy to Engineer-in-charge.

47. Removal of scrap, generated during construction, includes segregation of scrap into serviceable and unserviceable material and transportation of serviceable material to Owner's storage.

48. Clearing and removal of debris includes clearing the site of all unserviceable material from the site after completion of work and disposal of the same at a designated area as directed by Engineer- in- charge.

49. It shall be clearly understood that all the above works together with all incidental works to complete the work whether specifically mentioned or not shall be deemed to have been included in the scope of work.

50. This scope of work is to be read in conjunction with the other scope of works enclosed in the tender document.

Any other Civil Structural Works, not specifically mentioned herein, but required for the satisfactory and successful completion of the project as per directions of the Engineer-in-Charge shall also be in the scope of the contractor.

2.0 SCOPE OF SUPPLY OF MATERIALS

2.1. OWNER'S SCOPE

NIL

2.2. CONTRACTOR'S SCOPE

Procurement and supply of all material (consumables/ non-consumables) required for the execution of Civil Structural works under this contract shall be in the scope of the Contractor.

All material shall be of approved brand/ make as per the list of approved brand/ vendors for Civil Structural and Architectural items attached elsewhere in the contract. However, in case of any deviation from the list of approved brand/ vendors, approval from Owner/ Engineer-In-charge shall be obtained prior to use of the material at site.

3.0 SPECIFIC REQUIREMENTS TO BE FULFILLED BY THE CONTRACTOR

Note: In case of any contradiction between these Specific Requirements and Requirements/ Specification specified elsewhere in the tender document, the Specific Requirements given below shall have precedence.

3.1 Mandatory use of mechanical excavators for excavation, however manual excavation for minor foundations & new foundations to be constructed close to existing foundations & around existing Underground facilities, can be taken up after due approval of Engineer-in-Charge.

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3.2 Mandatory installation of weigh batching plant of adequate capacity for concrete/ usage of ready mix concrete (RMC) along with transit mixers and concrete pumps as per the direction of Engineer-in-Charge.

3.3 Batching plant shall be located outside plant boundary. Land for same shall be arranged by contractor.

3.4 Disposal of unserviceable material etc. shall be done outside plant boundaries. Land required for the disposal shall be arranged by the Contractor. Contractor shall obtain relevant statutory approval from all statutory authorities (like municipal etc.) and including payment of charges/ royalty/ octroi for the same. Contractor shall keep the client indemnified of any liability and/ or complaint from local authorities/ municipal bodies. However, serviceable surplus earth and rock materials shall be disposed within plant boundary limit at designated location as per direction of Engineer-in-charge.

3.5 In case of borrow earth is required from outside refinery; location for the same shall be identified by the contractor. Contractor shall obtain relevant statutory approval from all statutory authorities (like municipal etc.) and including payment of charges/ royalty/ octroi for the same. Contractor shall keep client indemnified of any liability and/ or complaint from local authorities/ municipal bodies.

3.6 For cutting & bending of re bars mechanized equipment/ cutting- bending machine shall be used.

3.7 Dismantling shall be done by mechanical means; as approved by Engineer-In-Charge.

3.8 Controlled specialized demolition of part of a structure (RCC/ Structural Steel) shall be done with absolutely no disturbance of remaining part, as the same may be in operation.

3.9 Controlled specialized demolition shall be done to retain only selective part of a structure as decided by Site Engineer-In-charge, and to provide supports for existing facilities to be retained.

3.10 Structural concrete mix shall be approved Design Mix.

3.11 Generally the use of one of the following cements shall be considered,

- 43/53 Grade Ordinary Portland Cement (OPC) conforming to IS 269.
- Portland Pozzolana Cement (PPC, fly ash based) confirming to IS 1489 Part 1.
- Portland Pozzolana Cement (PPC, calcined based) confirming to IS 1489 Part 2.
- Portland Slag cement (PSC) conforming to IS 455.
- *Sulphate Resistant Portland Cement(SRC) conforming to IS 12330.

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* For specific requirement as specified in respective drawings.

3.12 Reinforcing steel shall be high strength deformed steel bars of grade Fe500D(TMT) conforming to IS 1786.

3.13 All lugs shall be of high strength deformed bars of minimum grade Fe500D conforming to IS 1786

3.14 Anchor bolts shall be of grade E250 quality BR/B0 confirming to IS 2062. All primer/ epoxy except finish paint shall be applied to all insert/sleeve prior to fixing in position before pouring of concrete.

3.15 Metal insert plates shall be of grade E250 quality BR/B0 confirming to IS 2062.All inserts/ sleeves shall be properly secured in position before pouring of concrete.

3.16 Supply of connection bolts is in the Contractor's scope. For all bolted connections high strength hot dip galvanized bolts of property class 8.8 as per IS 3757 & IS 4000 shall be used. Hot dip galvanized Nuts and washers shall conform to IS 6623 & IS 6649 respectively.

3.17 Mandatory use of Electro-forged hot-dipped Galvanized MS grating.

3.18 Structural steel shall be of grade E350 Quality BR/B0 confirming to IS 2062. Minimum grade of steel for insert plate, grating & steel structures in platforms taken from equipment; shall be of Grade E250 Quality BR/B0 conforming to IS 2062. For Steel Structures, field welding shall be minimized by employing modular construction to the extent possible.

3.19 Fabrication of Anchor bolts to be taken on priority to ensure placement of the same at the time of concreting.

3.20 The contractor shall ensure the required founding strata confirming to soil recommendation for all foundations and bring it to the notice of Engineer-in-charge, if the founding depth encountered is different from that specified in the drawings.

3.21 Dewatering including supply of adequate no. of pumps wherever required shall be carried out by the contractor at his cost to keep the Ground water table down below the founding level.

3.22 The construction of underground piping & drainage system, if provided at a depth lower than that of the foundations, shall be taken up before construction of foundation. However in general underground piping activity shall be executed before backfilling of soil.

3.23 Fabrication of structure steel shall be done in contractor’s fabrication shop outside plant boundary; area to be arranged by contractor. All shop connections shall be welded & field/ site connections shall be bolted unless otherwise mentioned.

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3.24 Contractor shall make his own arrangements for casting the precast elements, outside the plant premises. Land required for the same shall be arranged by the contractor.

3.25 Contractor has to take of all safety measures as per Refinery fire and safety standard.

3.26 Contractor shall consider recycling of construction & demolition waste to the extent possible. Usage of recycled aggregate, recycled coarse aggregate, M-sand & usage of products having less embodied carbon (i.e. low carbon foot-print); shall be adopted for sustainable construction, with approval of Owner/Engineer-In-Charge.

3.27 Whenever new Construction or demolishing/ dismantling is considered close to the existing structure, manual excavation shall be carried out as per direction of Engineer-in-Charge. Trail pit, if required, shall be carried out before excavation to check the existence of underground facilities.

3.28 Proper scaffolding shall be provided around the working area for sufficient height with cladding adopted for barricading in premises to isolate construction area. The quoted rate shall be inclusive of barricading, no extra claim shall be made at later date.

3.29 During the execution of the work, the contractor, at his own cost, shall keep structures, materials and equipment adequately braced by guys, struts or otherwise approved means which shall be supplied and installed by the Contractor as required till such time the installation work is satisfactorily completed. The provided guys, shoring, bracing, strutting, planking supports etc. shall not interfere with the work of other agencies and shall not damage or cause distortion to other works executed by him or other agencies.

3.30 The contractor shall ensure proper co-ordination / co-operation with other agencies, while working in the Construction area, without affecting others work front areas.

3.31 Various tolerances required as marked on the drawings conforming to codal requirements/ specifications or as directed by the Engineer-in-Charge shall be maintained by the Contractor. Verticality shall be maintained at every stage and the same shall be verified with Theodolite/ Total Station.

3.32 During execution of work, all existing facilities (Temporary /Permanent) shall be protected from any damage. In case of any damage / dismantling (if required) is required to be carried out for carrying out contractor's work, the same shall be restored to original condition to the satisfaction of Owner/ Engineer-In-charge without additional time and cost implication.

3.33 All works shall be done to the entire satisfaction of the Engineer-in-Charge. Any work not carried out in accordance with the instructions shall be dismantled and made good without any extra cost and time implication to the owner.

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4.0 LIST OF ATTACHMENTS

4.1. SPECIFICATIONS

S. NO.	SPECIFICATION NUMBER	REVISION	TITLE OF DOCUMENT
1	6-68-0001	6	Standard specification civil and structural works -General scope
2	6-68-0002	7	Standard specification civil and structural works -Materials.
3	6-68-0003	6	Standard specification civil and structural works -Earthwork.
4	6-68-0004	8	Standard specification civil and structural works -Plain & Reinforced Cement Concrete
5	6-68-0005	7	Standard specification civil and structural works reinforced cement concrete for liquid retaining structures
6	6-68-0006	8	Standard specification civil and structural works -Structural steel works
7	6-68-0007	8	Standard specification civil and structural works structural steel works (tubular / hollow sections)
8	6-68-0008	9	Standard specification civil and structural works -Miscellaneous Steel Works
9	6-68-0009	6	Standard specification civil and structural works -Brick Masonry
10	6-68-0012	6	Standard specification civil and structural works -Demolition & Dismantling
11	6-68-0013	6	Standard specification civil and structural works -Miscellaneous Items
12	6-68-0014	2	Standard specification civil & structural works precast concrete
13	6-68-0017	2	Standard specification - civil & structural works - bipolar concrete penetrating corrosion inhibiting admixture
14	6-68-0054	5	Standard specification - civil & structural works – epoxy resin injection system
15	6-68-0056	5	Standard specification - civil & structural works – bonding fresh concrete to old concrete by epoxy resin bonding system
16	6-68-0063	2	Standard specification - civil and structural works - design of scaffolding (for RCC beam and slab)

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S. NO.	SPECIFICATION NUMBER	REVISION	TITLE OF DOCUMENT
17	6-82-3100	2	Inspection & test plan (ITP) for civil, structural & architectural works (item rate contracts – with categorization)
18	6-82-6100	4	Standard Quality Assurance Plan (Item Rate contracts)
19	6-82-0001	2	Standard specification for health, safety & environment (HSE) management at construction sites
20	6-78-0001	3	Specification for quality management system requirements from bidders
21	6-78-0002	3	Specification for documentation requirements from Contractor

4.2. JOB SPECIFICATIONS

	Document NO.	Rev	Title of Document
1	B957-000-06-42-PLS-01	2	Job Specification for Surface preparation and protective coating
2	B957-300-81-47-SP-0003	0	Specification for blast monitoring and measurement
3	B957-999-06-43-IF01	0	Job Specification for Passive fireproofing by Epoxy Intumescent Coating

4.3. STANDARDS

S. NO.	STANDARD NUMBER	REVISION	DESCRIPTION OF STANDARD
1	7-67-0008	8	Pedestal for stair/Ladders
2	7-67-0010	7	Foundation for sliding supports for pipes on grade
3	7-67-0012	5	Short sliding pipe supports on existing RCC pavement
4	7-68-0051	7	Standard lifting hooks in precast slabs & chequered plates.
5	7-68-0052	8	Details for M.S. Rungs for conc. Structures
6	7-68-0056	8	Metal Insert Plates
7	7-68-0060	1	Handrails – Tube & Ball Type
8	7-68-0062	7	Typical cranking detail of rebar at beam and col. Junctions
9	7-68-0101	7	Standard re-bar shapes & cut length

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S. NO.	STANDARD NUMBER	REVISION	DESCRIPTION OF STANDARD
			computation
10	7-68-0102	6	Adjustment of stirrups beam crossing
11	7-68-0103	7	Reinforcement details at circular cut-out in slab.
12	7-68-0104	7	Reinforcement details at Sq. /Rect. Cut-out in slab.
13	7-68-0106	8	Standard lap length for rebars
14	7-68-0201	7	Standard lugs.
15	7-68-0202	8	Typical grating support.
16	7-68-0203	8	Typical chequered plate supports.
17	7-68-0206	1	Detail of welded column splice (unequal parallel flange section).
18	7-68-0207	6	Welded column splice (unequal joist section).
19	7-68-0208	7	Splicing detail for rolled section.
20	7-68-0211	6	Beam to beam and beam to column connection details.
21	7-68-0213	7	Base plate for channels
22	7-68-0214	7	Base plate for angles
23	7-68-0215	8	Base plate for joists
24	7-68-0224	0	Bolted bracing connection details of angles, channels and square hollow sections
25	7-68-0251	7	Welding symbols
26	7-68-0355	4	Instrumentation cable duct / tray supporting arrangement
27	7-68-0417	9	M.S. Anchor Bolt Assemblies
28	7-68-0501	9	Handrails
29	7-68-0503	1	Arrangements for access from grade to spiral staircase of steel tanks
30	7-68-0506	8	Steel stairs.
31	7-68-0507	9	Details of steel ladder.
32	7-68-0509	8	Steel ladder joint details
33	7-68-0562	6	Small operating platforms on grade / RCC elevated structure
34	7-68-0563	5	Pipe sleeper crossover

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S. NO.	STANDARD NUMBER	REVISION	DESCRIPTION OF STANDARD
35	7-68-0626	6	Cable trench.
36	7-68-0627	2	Precast cable trench and joint detail
37	7-68-0631	7	Liquid retaining structure concrete joints.
38	7-68-0653	4	Typical detail of weld length for angle members
39	7-68-0654	4	Detail of moment connection for MC [ ] column to [ ] beam.
40	7-68-0655	6	Cable trench for class-AA tracked / 70R-wheeled vehicle (crane approach)
41	7-68-0658	1	Bolted shear connection details for beam to beam
42	7-68-0659	0	Bolted shear connection details for beam with column
43	7-68-0660	3	Typ. detail of moment connection with MB col. / MC box col. to MB beam
44	7-68-0683	5	Monorail fixing details with steel members
45	7-68-0684	5	Monorail fixing details with R.C.C. Beam
46	7-68-0686	1	Welded shear connection details for parallel flange beam with parallel flange beam
47	7-68-0687	1	Details of moment connection for parallel flange beams with parallel flange columns
48	7-68-0688	1	Welded shear connection details for parallel flange beam with parallel flange column
49	7-68-0689	4	Shear connections welded type - beam to beam
50	7-68-0690	0	Bolted moment connection detail
51	7-68-0691	4	Detail of Sliding T-Support
52	7-68-0692	3	Detail of sliding t-support using hollow sections
53	7-68-0695	4	Electrical cable tray supporting structure
54	7-68-0696	3	Detail of lacing connections
55	7-68-0697	6	Electro forged grating type-I & type-II

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S. NO.	STANDARD NUMBER	REVISION	DESCRIPTION OF STANDARD
56	7-68-0699	2	Saddle supports for equipments on tech. structures
57	7-68-0250	1	Equivalent structural steel sections for substitution

4.4. DRAWINGS

Sl. No	Drawing No.	Rev	Title of Document
1	B957-300-16-43-00001 & 00002	0	Equipment layout for Ethylene Cracker Unit

4.5. OTHER DOCUMENTS

Sl. No	Standard No.	Rev	Title of Document
1	B957-300-81-41-LL-3001	1	List of approved manufacturers for products related to Civil-Structural works.

5.0 ADDENDUM TO STRUCTURAL SPECIFICATIONS & SOR

Sl. No	Specification/ SOR item No.	Clause No.	MODIFICATION
1.	6-68-0003 Rev.6	2.2	Clause "*This is fissured/ disintegrated rocky strata, boulders (volume more than 0.028 m3and less than 0.400 m3) and also which cannot be quarried/ excavated by using above manual tools but can be quarried/ excavated manually by using crow bars is classified as soft rock. Soft rock shall include all kinds of stiff and stratified rock, such as shales, thinly bedded phillites, laterite hard conglomerate, lime stone, sand stone and unreinforced cement concrete below ground level. Soft rock may be quarried or split with crow bar or picks and can also be excavated by rippers, dozers and other mechanical equipment, but without the aid of blasting. If required and permitted, light blasting may be restored to, for loosening the materials, but this will not, in any way entitle the material to be classified as "Hard Rock"*." is withdrawn and shall be read as *"This is fissured/ disintegrated rocky strata, boulders (volume more than 0.028 m3and less than 0.400 m3) and also which cannot be quarried/ excavated by using above manual tools but can be quarried/ excavated manually by using crow bars is classified as soft rock. Soft*

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Sl. No	Specification/ SOR item No.	Clause No.	MODIFICATION
			rock shall include all kinds of stiff and stratified rock, such as shales, thinly bedded philites, laterite hard conglomerate, lime stone, sand stone and unreinforced cement concrete below ground level. Soft rock may be quarried or split with crow bar or picks and can also be excavated by rippers, dozers and other mechanical equipment. If required & permitted, Control Blasting, Chiseling, Chemical Blasting may be resorted to, for loosening the materials, but this will not, in any way entitle the material to be classified as "Hard Rock".”
2.	6-68-0002 6-68-0006 6-68-0008	All Relevant	Wherever “EIL Specification No. 6-79-020” is mentioned, the same shall be read as “Job Specification No. B957-000-06-42-PLS-01”

6.0 PREAMBLE TO SCHEDULE OF QUANTITIES

6.1 SOR indicates only estimated quantities. Unit rate quoted against each SOR item shall be applicable for any addition & deletion during execution of the project.

6.2 Depth of foundation in general shall be 3.5 m below HPP. (This data is for general guidance of the Contractors; however deviation from the noted depth shall not form a basis for any extra claim).

6.3 The maximum approximate height of structures shall be 100.0 m (This data is for general guidance of the Contractors; however, deviation from the noted height shall not form a basis for any extra claim).

6.4 As per Geotechnical data, ground water table is at finished ground level. The expected water table depth may fluctuate. The quoted rate of excavation shall include requirement of dewatering etc. for completion of total works including concreting, backfilling etc. and no extra amount is payable on this account.

6.5 Item description provided in Schedule of Rates (Short Description) is in brief, while quoting and filling the rate in these Schedule of Rates (Short Description), Bidder shall take into consideration complete scope of work/item description as mentioned in Schedule of Rates (Detailed Description) for the relevant item. **The rate quoted in Schedule of Rates (Short Description) shall be deemed to include all activities of work mentioned in item description of Schedule of Rates (Detailed), scope of work, specifications, standards etc. & stringent of all shall govern.**

6.6 For protective coating/ painting system, plant location shall be considered as Inland.

6.7 Wherever “plant boundary” is mentioned in the SOR or specifications, the same shall be read as “Refinery property limit”.

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6.8 All items in the Schedule of Rates shall be inclusive of all material, workmen, constructional infrastructures like scaffolding/ staging, finishing, cleaning, cutting chases/ holes etc. in brick work/AAC block work/ RCC work and making good the same and rectification of any damaged work shall be applicable for all heights and locations.

6.9 The minimum cement content and maximum water-cement ratio for RCC & PCC works shall be as below:

Exposure condition	Type of concrete	Grade of Concrete	Minimum cement content (kg/m^3)	Maximum free water-cement ratio
Moderate	Plain concrete	M20	240	0.6
	Reinforced concrete (sub-structure)	M25	300	*0.5
	Reinforced concrete (super-structure)	M25	300	*0.5
	Reinforced concrete (Liquid retaining sub-structure)	M30	350	*0.45
	Reinforced concrete (Liquid retaining super-structure)	M30	350	*0.45

*For self-compacting concrete, maximum free water-cement ratio shall be 0.4

7.0 Digital Reporting & Tracking for Structural Steel

1. Fabrication model shall be submitted simultaneously with fabrication drawing. Model shall be submitted through online downloadable link with minimum 6-month validity.
2. Excel sheet of status of all individual Assembly shall be E-mailed to Engineer-In-Charge on daily basis. Following two tables shall be part of the daily digital status reporting.
3. Model Identification (Sheet 1 in Excel)

Model Name	List of EIL Design Drawing	List of EIL Standards
Structure-1	Drawing-1 Drawing-2 Drawing-3 …….	Standard-1 Standard-2 …….
Structure-2	…….	…….

4. Assembly wise Status in Separate Sheet for each Model/Structure.
   a. Name of Sheet shall be same as Model Name.
   b. Plates forming integral part of the assembly need not be reported separately. Only Loose plates for field erection shall be reported in following table.
   c. For Multiple count identical assemblies, sub-mark shall be tagged in fabrication shop. Each sub-mark shall be reported in different rows.

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Assembly Name / Mark	Sub Mark	Highest / Top Elevation.	Drawing Submitted Date	Fabrication Completed Date	Dispatch Date	Site Received Date	Erection Date
C-01	1	109.100					
C-02	1	121.100					
…….	….	…….					
BEAM-1	1	108.000					
BEAM-2	1	108.000					
…….	….	…….					
BRACE-1	1	107.975					
BRACE-1	2	107.975					
BRACE-2	1	120.975					
BRACE-2	2	120.975					
……..	….	…….					
and so on.							

8.0 SCHEDULE OF RATES

Refer **Document No. B957-300-81-41-MR-SOR-3001-A & B957-300-81-41-MR-T-3001-B**

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SCOPE OF WORKS & SUPPLY
(GENERAL CIVIL)

Tender No. : B957-300-16-43-MR-T-3001

(MECHANICAL WORKS – I FOR ECU – PART – A

&

MECHANICAL WORKS – II FOR ECU – PART – B)

PROJECT	:	**BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (BPREP PROJECT)**
OWNER	:	**BHARAT PETROLEUM CORPORATION LIMITED (BPCL)**
PMC / EPCM	:	**ENGINEERS INDIA LIMITED (EIL)**
JOB NO.	:	**B957**

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
C	22.04.2026	REISSUED FOR TENDER	BP	SB	AK
B	24.02.2026	REISSUED FOR TENDER	BP	SB	AK
A	16.02.2026	ISSUED FOR TENDER	BP	SB	AK

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1.0 SCOPE OF WORK

The scope of work under this contract in general shall include Construction of all relevant Mechanical works for Bina Petrochemical & Refinery Expansion Project (BPREP) at Bina, Madhya Pradesh of M/s Bharat Petroleum Corporation Limited (BPCL) including supply of all materials (as defined in scope of supply), tools & tackles, labour, etc., as per the Schedule of rates, Specifications, Standards, drawings and codes (latest revision), good engineering practices and directions of Engineer-in-charge etc. complete, and as per approved for construction drawings made available to the successful bidder.

The Contractor shall be responsible to complete the entire work in all respect and any other work necessary to complete the job though specifically not covered in the scope of work.

Contractor shall visit the site to ascertain actual site condition to assess the job himself before quoting the rates. No extra claim at a later date shall be entertained due to non-familiarization of site.

2.0 BROAD SCOPE OF WORK

The detailed scope of work shall be in general but not limited to the following:

i) Supply of all materials & construction of RCC pavements.

ii) Supply of all materials & construction of RCC drains with gratings/perforated precast covers.

iii) Supply & installation of CI Sluice Gates with frames as per IS: 13349.

iv) Supply & installation of Combined Safety Shower & Eye Wash Units.

v) Supply Fabrication & Laying / Erection of Underground GI pipes for Fire water spray lines, instrument air.

vi) Fabrication, laying and jointing of Under-Ground 3-layer Polyethylene (3LPE) coated CS piping as per PMS for Fire Water System (Pressure).

vii) Fabrication, laying and jointing of Under-Ground 3-layer Polyethylene (3LPE) coated CS piping as per PMS for Gravity system like CRWS, OWS, SS, vents.

viii) Fabrication, laying and jointing of Under-Ground CS piping as per PMS for Process Blowdowns like Closed Blowdown (CBD), Quench Water blowdown (QWD), Caustic Blowdown (CCBD) as per specification suitable for temperature range give in the SOR.

ix) Supply & installation of Fire Hydrant, Monitors, Landing Valves, Long Range Monitors, Remote Operated Long-Range Monitors, First Aid Hose Reel (Wall Mounted & Floor Mounted), Hose Box Cabinet (Type – II) & Air Release Valve etc.

x) Supply & installation of Deluge Valve skids

xi) Supply & installation of spray nozzle, Quartzoid bulb

xii) Supply & installation of Portable & Trolly mounted Fire Extinguishers.

xiii) Supply of all materials and construction of Hydrant & Monitor platforms on grade.

xiv) Clearing and removal of debris/ scraps.

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As per drawings, detailed scope of work and schedule of rates mentioned elsewhere in the bid document. All materials, equipment's, tools and tackles, consumables, manpower and supervision required for satisfactory completion of the job shall be supplied by the contractor.

3.0 DETAILED MECHANICAL WORKS ACTIVITIES

The Detailed works shall be as per the its relevant Broad scope of work descried In Clause - 2 above and shall include the following but not limited to the same.

3.1 Earthwork in excavation for all civil works such as RCC pavement, RCC drains etc. including backfilling and disposal of surplus earth as directed by Engineer in charge.

3.2 Earthwork in excavation for all U/G piping works such as Oily waste Sewer (OWS) Contaminated rain water sewer (CRWS), Storm sewer (SS), all closed blowdown services, Fire water (FW) etc. including backfilling and disposal of surplus earth as directed by Engineer in charge.

3.3 Earthwork in excavation in soft rock by splitting with crow bars or picks and wedging or similar mean for trench, saddle etc. including chiseling and cutting to required levels, dressing and trimming of sides, levelling and grading of bottoms, removal of all rock protrusions etc. complete including stacking of material to demarcated areas anywhere within the complex limit.

3.4 Earthwork in excavation in soft rock by controlled or muffled blasting using blasting mats, G.I. sheets, Nylon nets etc. including counter weight loading of the area to be blasted by sand bags/ mats, removal of all sand bags, blast control mats, nets etc. after blasting, including all labour, materials, all related work for blasting such as drilling, supplying, storage and charging of explosives with all safety measure, including taking all necessary statutory/ local body approvals for blasting for trench, saddle etc. including chiseling and cutting to required levels, dressing and trimming of sides, levelling and grading of bottoms, removal of all rock protrusions etc. complete including stacking of material to demarcated areas anywhere within the complex limit.

3.5 Earthwork in excavation in hard rock by controlled or muffled blasting using blasting mats, G.I. sheets, Nylon nets etc. including counter weight loading of the area to be blasted by sand bags/ mats, removal of all sand bags, blast control mats, nets etc. after blasting, including all labour, materials, all related work for blasting such as drilling, supplying, storage and charging of explosives with all safety measure, including taking all necessary statutory/ local body approvals for blasting for trench, saddle etc. including chiseling and cutting to required levels, dressing and trimming of sides, levelling and grading of bottoms, removal of all rock protrusions etc. complete including stacking of material to demarcated areas anywhere within the complex limit.

3.6 Construction of RCC Pavements including supplying & laying of DLC (Dry Lean Concrete) 150micron thick HM HDPE (GRADE-I) film conforming to IS:10889 shall be provided as separation layer between DLC and RCC.

3.7 Providing and laying of Construction joints, expansion joints, sealing joints etc. in the RCC pavements as per drawing / specifications.

3.8 Reinforced cement concrete work of various grades in RCC drains.

3.9 Providing and fixing Galvanized MS gratings at all heights on RCC drains.

3.10 RCC work for encasing of U/G pipe as per drawings/standards.

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3.11 Supply & installation and fixing in position CI sluice Gates with frames as per IS:13349 and as per specifications and drawings including transportation to site of work, supplying and fixing bolts, nuts, washers, gaskets etc. complete as per drawings, specifications and directions of Engineer-in-Charge.

3.12 Supply and installation of Combined Safety Shower & Eyewash Units as per spec. no. 6-66-0038, including providing and fixing of necessary foundation bolts in foundations/ pavement.

3.13 Fabrication and laying and jointing of Under-Ground 3-layer Polyethylene (3LPE) coated piping works for underground pipes Oily Waste Sewers (OWS), Contaminated rain water sewer (CRWS), Storm Sewer (SS) systems (Gravity) and Vent Pipe for manholes as per the PMS, including installation of valves, flanges, fittings, etc., to proper grade and alignment, transporting the pipes, fittings, flanges, valves etc. from Owner's storage point to the work site, including, fixing the pipe in walls of manholes, valve pits, all complete.

3.14 Fabrication and laying and jointing of Under-Ground 3-layer Polyethylene (3LPE) as per the PMS for Fire Water System (Pressure), including installation of valves, flanges, fittings, etc., to proper grade and alignment, transporting the pipes, fittings, flanges, valves etc. from Owner's storage point to the work site, fixing the pipe in walls of manholes, valve pits, all complete.

3.15 Fabrication, laying and jointing of Under-Ground CS piping as per PMS for Process Blowdowns like Closed Blowdown (CBD), Aromatic Blowdown (ABD), Caustic Blowdown (CCBD) including installation of valves, flanges, fittings, etc., to proper grade and alignment, transporting the pipes, fittings, flanges, valves etc. from Owner's storage point to the work site, including corrosion protection coating of pipes as per specification, fixing the pipe in walls of manholes, valve pits, all complete.

3.16 Supply, fabrication, laying and joining of Carbon steel galvanized pipes, valves & specials for U/G Fire water spray lines (pressure pipe) as per the PMS/VMS including supply & installation of valves, flanges, fittings, etc., to proper grade and alignment, transporting the pipes, fittings, flanges, valves, pipe specials, etc. from contractor's storage point to the work site, etc. complete.

3.17 Supply and installation of Firefighting equipment such as Fire Hydrant, Monitors, Landing Valves, Long Range Monitors, Remote Operated Long-Range Monitors, First Aid Hose Reel (Wall Mounted & Floor Mounted), Hose Box Cabinet (Type – II) & Air Release Valve etc. at grade & at elevations including transportation to worksite from storage point, testing, flushing etc. all complete.

3.18 Supply and installation of Portable & Trolly mounted Firefighting equipment such as 6kg / 9kg / 50kg DCP Fire extinguishers, 4.5kg CO_2 Fire extinguishers, etc. including transportation to worksite from storage point, testing, flushing etc. all complete.

3.19 Supply and installation, erection, testing and commissioning of Deluge valve skid, with UL/FM listed/approved Deluge Valve (consisting of deluge valve, strainers, solenoid valve, air pressure regulator, limit switches, pressure gauge, pressure transmitters, inlet/ outlet valves, drain valve, priming valve, vent valve including alarm motor gong, fittings, local control panel including bypass connection to deluge valve along with strainer and ball valve etc. complete) actuated through air (pneumatic) detection system including installation/placing the skid at the designated location and fixing with anchor bolts, connecting the water inlet and system piping, connecting detection network piping, fittings etc. complete.

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3.20 Supply and installation of spray nozzle in fire water spray system for columns, vessels, pumps and air fin coolers for all above height above HPP.

3.21 Supply and installation of quartzoid bulb detectors in fire water spray system for columns, vessels, pumps and air fin coolers for all above height above HPP.

3.22 Earthwork in excavation for civil works for construction of Hydrants & Monitor's platforms including backfilling and disposal of surplus earth as directed by Engineer in charge.

3.23 Providing and laying Brick Masonry in cement mortar 1:4 (1 cement : 4 Coarse sand) in one or more brick thickness and in any shape for Hydrant/Monitor's platforms, etc. including providing recesses, openings, etc. including curing, finishing the joints flush below ground level.

3.24 Providing 13mm thick average cement plaster in cement mortar 1:3 (1 cement : 3 sand) on brick walls for hydrant platforms.

3.25 Providing and laying 100 mm thick cement concrete lining of M-20 grade with 20mm and down size graded stone aggregates for Hydrant & Monitor.

It shall be clearly understood that all the works mentioned above together with all the incidental works whether specifically mentioned or not shall be deemed to have been included in the scope of work.

4.0 SCOPE OF SUPPLY

4.1 OWNER'S SCOPE OF SUPPLY

All CS pipes including fittings, valves etc. (Bare and 3L PE coated).

4.2 CONTRACTOR'S SCOPE OF SUPPLY

a. All materials (consumables/ non-consumables) including tools, tackles, plant machinery, workers/labors, etc. required for completion of the works as per Schedule of Rates shall be in contractor's scope of supply and shall be the responsibility of Contractor within the quoted rates.

b. All material shall be of approved brand/ make as per the list of approved brand/ vendors for Civil Structural & Piping, valves, fittings etc. items attached elsewhere in the contract. However, in case of any deviation from the list of approved brand/ vendors, prior approval from Owner/ Engineer In-charge shall be obtained prior to use of the material at site. All the material required to complete the entire work as per scope of work, schedule of rates, specifications, standards and drawings.

c. Galvanized pipe of PMS J95A & J2A including fittings and valves.

d. All firefighting equipment including Deluge Valve, Hydrant, Landing Valves, Monitor, Long Range Monitor, Remote Operated Long-Range Monitor, First Aid Hose Reel, Hose Cabinet, Air Release valve etc.

The contractor shall refer to the attached Fire Water Layout drawing (Drawing No. B957-000-81-45-00442) to understand the scope of supply and installation of firefighting equipment.

Additionally, the table for Remote Operated Long-Range Monitors (ROLRM), indicating the platform elevation/installation height, is included in the same drawing.

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e. Portable & Trolly mounted Fire Extinguishers.

f. Safety Shower & Eye Wash Assembly.

5.0 SPECIFIC REQUIREMENTS TO BE FULFILLED BY THE CONTRACTOR

Note: In case of any contradiction between these Specific Requirements and Requirements/ Specification specified elsewhere in the tender document, the Specific Requirements given below shall have precedence.

a. Contractor shall arrange all the approvals required.

b. All works shall be done to the entire satisfaction of the Engineer-in-Charge. Any work not carried out in accordance with the instructions shall be dismantled and made good without any extra cost and time implication to the owner.

6.0 PREAMBLE TO SCHEDULE OF RATES

a. Wherever “plant boundary” or “complex limit” is mentioned in the SOR or specifications, the same shall be read as “Refinery property limit of Bina Refinery Complex & Bina Despatch Terminal”.

b. Environment for selection of painting system shall be considered as Industrial.

7.0 APPROVALS

Obtaining statutory approval from local authorities such as Municipal Corporation, Development Authorities, Inspector of Factories and any other concerned authorities required for their own working before starting the works at site.

8.0 LIST OF ATTACHMENTS

8.1 STANDARD SPECIFICATIONS

Sl. No.	Title of Document	Specification No.	Rev
1	Standard Specification for earthwork for U/G piping	6-65-0006	4
2	Standard specification for concrete pavement	6-65-0019	4
3	Standard Specification for underground & above ground G.I. pipeline system (water services)	6-65-0027	6
4	Standard specification for fabrication and laying of underground piping	6-65-0030	6
5	Standard specification for portable fire extinguisher	6-66-0004	1
6	Standard specification for standard post type fire hydrant (with or without pumper connection)	6-66-0012	5
7	Standard specification for first aid hose reel	6-66-0018	5
8	Standard specification for stand post type water monitor	6-66-0021	4
9	Standard specification for water cum foam monitor single barrel type (fixed & variable flow)	6-66-0027	5
10	Standard specification for safety shower and eye wash	6-66-0038	5

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Sl. No.	Title of Document	Specification No.	Rev
11	Standard specification for remote operated foam / water monitor tower / grade mounted	6-66-0042	3
12	Standard specification for hose cabinet	6-66-0047	4
13	Standard specification for deluge valve skid	6-66-0048	4
14	Standard specification for 50 kg and 75 kg capacity dry chemical powder extinguisher	6-66-0061	4
15	Standard specification for fabrication and erection of piping	6-44-0012	6
16	Standard specification for inspection, flushing and testing of piping systems	6-44-0013	6

8.2 STANDARDS

Sl. No.	Standard	Document No.	Rev.
1	Abbreviations, legends and equipment symbols	7-65-0001	5
2	Unit drainage details (rectangular ditch details)	7-65-0272	6
3	RCC pavement details	7-65-0404	5
4	Installation details of fire water hydrant	7-65-0420	5
5	Installation details of water or water cum foam monitor, long range foam / water monitor	7-65-0421	4

8.3 LIST OF INSPECTION TEST PLANS

Sl. No.	Standard	Document No.	Rev.
1	Inspection and test plan (ITP) for civil, structural and architectural works (item rate contracts-with categorization)	6-82-3100	2
2	Inspection and test plan (ITP) for mechanical works (item rate contracts-with categorization)	6-82-3200	2

8.4 JOB SPECIFICATION

Sl. No.	Specification	Document No.	Rev.
1	Job Specification for Surface Preparation & Protective Coating	B957-000-06-42-PLS-01	0
2	Job Specification for Surface Preparation & Protective Coating for 3LPE	B957-000-06-42-PLS-04	0

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8.5 DATA SHEETS

Sl. No.	Specification	Document No.
1	Data sheet of Stand post type fire hydrant (Stand Post Type)	B957-999-81-45-DS-8003
2	Data sheet of Hose cabinet	B957-999-81-45-DS-8004
3	Data sheet of Water cum foam Monitor	B957-999-81-45-DS-8005
4	Data sheet of Long-Range Water Cum Foam Monitor (Remote Operated)	B957-999-81-45-DS-8006
5	Data sheet of Spray Nozzles (Medium Velocity)	B957-999-81-45-DS-8007
6	Data sheet of Quartzoid Bulb Detectors	B957-999-81-45-DS-8010
7	Data sheet of Deluge Valve	B957-999-81-45-DS-8011
8	Data sheet of Data Sheet for Air Release Valve	B957-999-81-45-DS-8017
9	Data sheet of Landing Valve (Stand Post Type)	B957-999-81-45-DS-8018
10	Data sheet of First Aid Hose Reel	B957-999-81-45-DS-8019
11	Data sheet of Long-Range Water Cum Foam Monitor	B957-999-81-45-DS-8020
12	Data sheet of Long-Range Water Cum Foam Monitor (Manual with JRCP Foam Induction)	B957-999-81-45-DS-8021
13	Data sheet of Sand Bucket	B957-999-81-45-DS-8024
14	Data sheet for First Aid Hose Reel (horizontal, stand mounting)	B957-999-81-45-DS-8026

8.6 DRAWINGS

S. No.	Drawing No.	Title
1	B957-000-81-45-00442	Fire Water Layout of Ethylene Cracker Unit

8.7 AMENDMENT TO STANDARD SPECIFICATION

S. No	Standard No.	Title
1.	B957-300-81-45-AD-3001	Addendum to Standard Specification No. 6-65-0006, 6-65-0019, 6-66-0004 & 6-66-0061

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JOB SPECIFICATIONS FOR PRE-INSULATED SS TUBING AND FITTINGS

PROJECT: ETHYLENE CRACKER & ASSOCIATED UNITS BINA, MADHYA PRADESH, INDIA

OWNER : BPCL

JOB NO. : B957

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
A	05.03.2026	ISSUED AS JOB SPECIFICATION	KKV	MK	SNH

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1.0 SCOPE

This specification outlines the minimum requirements for supply of pre- insulated tubing, connectors, adapters and sealant kits suitable for design conditions of temperatures up to 350°C and pressure 21 kg/cm^{2}g operating temperature of 270°C & Pressure of 17 kg/ cm^{2}g condition respectively.

Pre insulated tubing is intended to be used for: -

- Steam supply lines from SS manifold to the tracer leads for tracing along the pipe (End Connection-Plain end (PE))
- Condensate returns lines from the tracer leads for tracing along the pipe to Condensate return manifold (End connection- socket weld (SW), 3000#).
- Supply and returns lines to/from manifold from contra tracing (End connection-socket weld (SW), 3000#)

2.0 MATERIALS OF CONSTRUCTION

2.1 Tubing

Tubing shall be ASTM A269-TP304/316, seamless, cold drawn and fully annealed. Tube hardness shall be RB90 or less, and shall be suitable for bending and flaring. Thickness of Tubing shall be 1.24mm. The tubing shall be supplied in bundles of 30m minimum to 100m maximum length.

2.2 Thermal Insulation System

The insulation system shall consist of High Temperature Woven Glass Fiber Thermal Insulation along with Thermal Diffusion foil and Heat Reflective foil shall be used so as to limit the outer jacket sheath temperature 60°C maximum during 27°C ambient & no wind and 270°C tube temperature as Thermal Insulation system may be designed considering operating temperature of the steam (Refer clause 1.0).
The ambient conditions are as under: -

Site Location	Min. Ambient Temperature	Max. Ambient Temperature
BPREP, BINA REFINERY	1.1°C	45.6°C

2.3 Outer Jacket

The standard outer jacket material shall be black 105°C Polyvinyl Chloride (PVC) compound /Arctic Grade Thermoplastic (ATP) compound. The outer jacket shall have a nominal thickness of .080" and shall be black in color. The outer jacket material shall be suitable for installation in Oil and Gas industry and shall have UV resistance.

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Jacket Patch is also required to seal a splice in a bundle or to extend the insulation, The Jacket patch contains thermal insulation, fiber glass tape and self sealing patch.

2.4 Fittings

Tube fittings (adapters and connectors) shall be double compression type, SS316 SWAGELOK or equal. All requirements of **6-52-0067** shall be met.

The Adapter (Male) shall have one 0.5" pipe end and the other shall be 0.5" OD Tubing end (Swagelok -810-1-8W or equal)

The Adapter (Female) shall have one 0.5" SW Class 3000 and the other shall be 0.5" OD Tubing end (Swagelok -810-1-8W or equal)

The Connectors shall be straight union fittings with 0.5" OD Tubing ends (Swagelok -810-6 or equivalent)

2.5 Insulation termination kits

Insulation terminations for pre-insulated tubing shall be made with RTV (room temperature vulcanization) Silicone sealant (black).

2.6 TESTING

All tubes shall be hydrostatically tested as per ASTM A450 before application of Insulation. All other mandatory testing requirements of ASTM A269 shall be met.

3.0 MARKING

The finished product shall be labeled its entire length with a minimum of the manufacturers name, material grade of the tube, outer diameter and thickness.

4.0 DISPATCH

4.1 The tube shall be plugged at both ends prior to transportation to prevent entry of foreign matter.

4.2 The coils shall be wound round wooden drums and plastic wrapped. Manufacturer to ensure that packing shall withstand overseas shipment without damage.

4.3 The tubes shall be packed carefully so as to avoid damage during transport.

4.4 Long lengths of product shall be coiled and level wound on a wooden spool.

5.0 INSPECTION & TESTING

Purchaser reserves the right to inspect and witness testing at vendor's works. All the tests, marking, dimensional tolerance as per applicable code shall be duly

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completed by the Supplier and test reports shall be submitted to Purchaser for scrutiny on demand.

6.0 INSTALLATION

Pre-insulated tubing will be used between the steam and condensate manifolds and the tracer end connections. Installation of pre-insulated tubing shall be as per manufacturer's installation guidelines. However, as a minimum, the following shall be followed:

6.1 All lines should be routed symmetrically and run together, when possible, to maintain a neat appearance. Pockets shall be avoided when possible. The total length of the pre-insulated tubing between the manifold and the tracer shall be kept to a minimum. A gap of minimum 15mm shall be maintained between two adjacent lead lines from and to manifold.

6.2 Tubing shall be continuous from manifold to tracer. Tubing unions and fittings are not permitted within these runs except at connections at the manifold and the tracer. At tubing termination points, it is imperative that the exposed ends of the insulation be covered with sealant to prevent deterioration of the insulation, and in some cases, damage to the tubing. All joints are to be insulated only after hydrostatic testing has been completed.

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6.3 Turns shall be made by bending tubing. In most cases, the pre-insulated tubing can be installed by hand with bends over a simple mandrel. The minimum bend radius for a single ½" pre-insulated tube shall be 14". In rare cases where very tight bends, less than the recommended radius are required, the insulation jacket may be stripped to the length needed to make the bend, then sealant must be applied over the exposed insulation.

6.4 Support pre-insulated tubing every 2.5 to 3 meters in vertical runs and 1.8 to 2.5 meters in horizontal runs. Field support brackets for pre-insulated tubing installation shall be from existing structural steel.

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पाइपिंग के अध्वंसात्मक परीक्षण की आवश्यकताओं हेतु मानक विनिर्देश

JOB SPECIFICATION FOR NON DESTRUCTIVE EXAMINATION REQUIREMENTS OF PIPING

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
D	05.02.26	REVISED & ISSUED AS JOB SPECIFICATION	SRG	PK	SNH
C	01.01.25	REVISED & ISSUED AS JOB SPECIFICATION	SRG	PK	SNH
B	24.12.24	REVISED & ISSUED AS JOB SPECIFICATION	SRG	PK	SNH
A	19.11.24	ISSUED AS JOB SPECIFICATION	SRG	PK	SNH

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Abbreviations:

DP/LP	:	Dye/Liquid Penetrant
MP	:	Magnetic Particle
CS	:	Carbon Steel
AS	:	Alloy Steel
SS	:	Stainless Steel
ASTM	:	American Society for Testing & Materials
ASME	:	American Society of Mechanical Engineers
IBR	:	Indian Boiler Regulations
PMS	:	Piping Material Specification

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1.0 GENERAL

1.1 Scope

This specification covers the general requirements for non destructive examination of shop & field fabricated piping.

1.2 Related Codes & Engineering Standards

Referred codes / standards are as follows. Latest editions of the Codes/Standards referred to shall be followed.

a) ASME Boiler & Pressure Vessel Codes, Section V & VIII (Div.1) including addenda.

b) ASME B31.3

c) ASME B16.5

d) ASME B16.34

e) Job Piping Material Specification, B957-6-44-0005

f) Welding Specification Charts for Piping Classes, B957-999-06-41-WSC-0001

g) Standard Specification for Fabrication & Erection of Piping 6-44-0012

h) ASTM E10

i) Welding Specification for Fabrication of Piping, 6-77-0001 & B957-999-06-41-WSP-0001

j) Design Guide for Radiography Requirements, 8-77-0010

k) Indian Boiler Regulations (IBR)

2.0 VISUAL EXAMINATION

2.1 Weld shall be visually inspected wherever accessible in accordance with the following requirements:

a)	Internal misalignment	1.5 mm or less
b)	Cracks or lack of fusion	not permitted
c)	Incomplete penetration	Depth shall not exceed the lesser of 0.8mm or 0.2 times thickness of thinner component joined by butt-weld. The total length of such imperfections shall not exceed 38 mm in any 150 mm of weld length.
d)	Surface porosity and exposed slag inclusions (For nom. wall thickness 4.7 mm and less)	not permitted

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e)	Concave root surface (Suck up)	For single sided welded joints, concavity of the root surface shall not reduce the total thickness of joint, including reinforcement, to less than the thickness of the thinner of the components being joined.
f)	Weld ripples irregularities	2.5 mm or less.
g)	Lack of uniformity in bead width	2.5 mm or less.
h)	Lack of uniformity of leg length	2.5 mm or less.
i)	Unevenness of bead	2.0 mm or less.
j)	Weld undercutting	0.8 mm or 1/4 thickness of thinner components joined by butt weld, whichever is less. (shall be smooth finished)
k)	Overlap	1.5 mm or less
l)	Bead deflection	2.5 mm or less

m) External weld reinforcement and internal weld protrusion (when backing rings are not used) shall be fused with and shall merge smoothly into the component surfaces. The height of the lesser projection of external weld reinforcement or internal weld protrusion from the adjacent base material surface shall not exceed the following limits:

Wall thickness of thinner component joined by butt weld (mm)	Weld reinforcement or internal weld protrusion (mm) max
6.4 and under	1.6
Over 6.4 -12.7	3.2
Over 12.7 -25.4	4.0
Over 25.4	4.8

n) Throat thickness of fillet welds:

Nominal thickness of the thinner component x 0.7 or more.

o) Flattening

Flattening of a bend, as measured by difference between the nominal outside diameter and minimum or maximum diameter at any cross section shall not exceed 5 % of the nominal outside diameter of pipe.

p) Reduction of wall thickness

Reduction of wall thickness of a bend, as measured by difference between the nominal thickness and minimum thickness shall not exceed 10 % of the nominal wall thickness of pipe.

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2.2 Welds having any of imperfections which exceed the limitations specified in various clauses of 2.1 shall be repaired by welding, grinding or overlaying etc. Number of times of repair welding for the same weld, however shall conform to applicable notes to Table 1- Note 6(b)b.5.

3.0 NON DESTRUCTIVE EXAMINATION

3.1 The type and extent of weld examination shall be in accordance with Table-1. All visual and supplementary methods of girth weld examination shall be in accordance with ASME B31.3 & the requirements of this standard specification.

3.2 Welds between dissimilar materials shall be examined by method & to the extent required for the material having the more stringent examination.

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4. TABLE-1 (with applicable notes)

TABLE 1 : CLASS, TYPE & EXTENT OF WELD EXAMINATION

INSPECTION CLASS: I

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P.NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH-MENT WELD	FAB. BRANCH WELD (NOTE 1)	FAB. WELDS OF MITRES / REDUC.
1	2	3	4	5	6	7	8	9	10	11	12	13
I	CATEGORY 'D' FLUID SERVICE	CARBON STEEL	1	0 TO 186	150# UPTO 10.55 KG/CM^2	**A3A, A39A, J2A, A4Y, A5Y, A91A, A95A, A96A**	a) VISUAL	100%	100%	100%	100%	100%
		AUSTENIC S.S.	8	- 29 TO 186		**A3K**						
		HDPE	---	- 20 TO 50		**A1Z, A4Z, A5Z**	b) LP (NOTE 4, 6, 9)	---	---	---	5%	10%
		CUPRO NICKEL	34	- 29 TO 60								

REMARKS FOR ABOVE TABLE :

1. LP TEST NOT APPLICABLE TO NON-METALLIC CLASSES.
2. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: II

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG. C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH-MENT WELD	FAB. BRANCH WELD (NOTE 1)	FAB. WELDS OF MITRES/ REDUC.
1	2	3	4	5	6	7	8	9	10	11	12	13
	a) ALL SERVICES COVERED UNDER INSPECTION CLASS-I, BUT, EXCEEDING CATAGORY 'D' PR./TEMP LIMITATIONS. b) ALL SERVICES OTHER THAN THOSE COVERED UNDER INSPECTION CLASS-I BUT NON-TOXIC, NOT SUBJECTED TO SEVERE CYCLIC CONDITIONS. c) TOXIC, NON-LETHAL & FLAMMABLE. d) FLAMMABLE / NON FLAMMABLE & TOXIC / NON-TOXIC; NOT SUBJECT TO SEVERE CYCLIC CONDITIONS	CARBON STEEL	1	- 29 TO 427	150# TO 600#	**A1A,B1A, D1A, A6A, B6A, A7A, A8A, A9A, B9A, D9A, A11A, A13A, B13A, A15A, A20A, A32A, B32A, B28A, A71A, A83A, A41A, B41A, B72A**	a) VISUAL	100%	100%	100%	100%	100%
							b) RADIOGRAPHY (NOTE 5, 6, 14, 15)	5%	---	---	---	20%
							c) MP / LP (NOTE 4, 6, 10, 11, 16)	---	5%	---	5%	20%
		LTCS		-45 TO 204		**A4A, B4A, D4A, ~~A41A~~, A42A, ~~B41A~~, B42A, D42A, A40A, B40A, D40A**	d) HARDNESS	NOTE 7	NOTE 7	NOTE-7	NOTE-7	NOTE-7
		AUSTENITIC STAINLESS STEEL	8	-29 TO 500		**A1K, B1K,D1K, A6K, B6K, A11K, A1M,B1M,B3M, A1N,B1N, B6N, A21K, A23K, A24K, A28K, A28M, D21K, D23M, A71K, A92K, B92K**						

REMARKS FOR ABOVE TABLE :

1. EXTENT OF HARDNESS TEST FOR A11A IS 100%.
2. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.
3. NOTE- 7 FOR HARDNESS IS NOT VALID FOR P. NO. 8.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: III

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH -MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
III	FIRE WATER AND IBR SERVICES.	CARBON STEEL (FIRE WATER)	1	- 29 TO 427	150# TO 600#	A33A, A33Y, A94A, A97A, J95A	a) VISUAL	100%	100%	100%	100%	100%
		CARBON STEEL (IBR)				A2A, B2A, D2A	b) RADIOGRAPHY (NOTE 5, 6, 14, 15)	10%	---	---	---	50%
							c) LP / MP (NOTE 4,6,11)	---	10%	---	10%	---
							d) HARDNESS	NOTE 7	NOTE 7	NOTE 7	NOTE 7	NOTE 7

REMARKS FOR ABOVE TABLE :

1. FOR IBR SERVICE A2A, B2A & D2A NOTE- 8 IS ALSO APPLICABLE.
2. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.
3. FOR A33A & A33Y FIRE WATER SERVICE, NOTE-12 IS ALSO APPLICABLE.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: III (CONTD.)

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH -MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
III (CONTD)	ALL GENERAL SERVICES EXCEPT THOSE SUBJECT TO SEVERE CYCLIC CONDITIONS.	C - 0.5 Mo STEEL. 0.5 Cr - 0.5 Mo STEEL C - 0.5 Mo STEEL (IBR)	3	ABOVE -29	150# TO 600#		a) VISUAL	100%	100%	100%	100%	100%
							b) RADIOGRAPHY (NOTE 5, 6, 14, 15)	20%	---	---	---	50%
							c) LP / MP (NOTE 4,6,11)	---	20%	20%	20%	---
							d) HARDNESS	NOTE 7	NOTE 7	NOTE 7	NOTE 7	NOTE 7

REMARKS FOR ABOVE TABLE :

1. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: III (CONTD.)

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH -MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
III (CONTD)	ALL GENERAL SERVICES EXCEPT THOSE SUBJECT TO SEVERE CYCLIC CONDITIONS.	1 TO 3 Cr Mo. STEEL.	4,5A	ABOVE -29	150# TO 600#	**B1D, D1D B1E, B4D, B72D**	a) VISUAL	100%	100%	100%	100%	100%
							b) RADIOGRAPHY (NOTE 5, 6, 14, 15)	20%	---	---	---	50%
		1 - 3 Cr Mo STEEL (IBR)	4,5A			**D2D, B20D**	c) LP / MP (NOTE 4, 6, 11)	---	100%	100%	100%	---
		NI ALLOYS	43			**D20Q**	d) HARDNESS	NOTE 7	NOTE 7	NOTE 7	NOTE 7	NOTE 7

REMARKS FOR ABOVE TABLE :

1. FOR IBR SERVICE B20D, D2D & D20Q NOTE- 8 IS ALSO APPLICABLE.
2. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: III (CONTD.)

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH-MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
III (CONTD)	ALL GENERAL SERVICES EXCEPT THOSE SUBJECT TO SEVERE CYCLIC CONDITIONS.	3.5 Ni STEEL	9B	- 80 TO 120	150# TO 600#		a) VISUAL	100%	100%	100%	100%	100%
							b) RADIOGRAPHY (NOTE 5, 6, 14, 15)	20%	---	---	---	50%
							c) LP / MP (NOTE 4,6,10,11)	---	10%	---	10%	---
							d) HARDNESS	NOTE 7	NOTE 7	NOTE 7	NOTE 7	NOTE 7

REMARKS FOR ABOVE TABLE:

1. NOTE- 7 FOR HARDNESS IS NOT VALID FOR P. NO. 9B.
2. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: III (CONTD.)

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH -MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
III (CONTD)	ALL GENERAL SERVICES EXCEPT THOSE SUBJECT TO SEVERE CYCLIC CONDITIONS	ALUMINIUM & ALUMINIUM BASE ALLOY	21 TO 25	ALL	150#		a) VISUAL	100%	100%	100%	100%	100%
		COPPER & COPPER BASE ALLOY	31				b) RADIOGRAPHY (NOTE 5,6, 14, 15)	20%	---	---	---	50%
		ALUMINIUM BRONZE	35				c) LP / MP (NOTE 4,6,10,11)	---	20%	---	20%	---
		OTHER NON FERROUS ALLOYS	---									

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: III (CONTD.)

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH-MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
III (CONTD)	SPECIAL SERVICES (CAUSTIC)	CARBON STEEL	1	ALL	150# TO 600#	**A19A, B19A, D19A, A69A, A99A, B99A, B20Y**	a) VISUAL	100%	100%	100%	100%	100%
							b) RADIOGRAPHY (NOTE 5,6)	20%	---	---	---	50%
	SPECIAL SERVICES (O, H)	CARBON STEEL			150# TO 300#	**B5A, B55A**	c) LP / MP (NOTE 4,6,10,11)	10%	20%	10%	20%	---
							d) HARDNESS	NOTE 7	NOTE 7	NOTE 7	NOTE 7	NOTE 7
	SPECIAL SERVICES (CAUSTIC)	AUSTENITIC STAINLESS STEEL	8		150# TO 600#	**A69M, B69M, D69M**						

REMARKS FOR ABOVE TABLE :

1. EXTENT OF HARDNESS TEST FOR CLASSES B5A, B55A, A19A, B19A & D19A IS 100%.
2. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: III (CONTD.)

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH -MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
III (CONTD)	SPECIAL SERVICES (NACE)	CARBON STEEL	1	ALL	150# TO 600#	**A16A, B16A, D16A, ~~A61A, B61A, B62A, A62A, A63A~~**	a) VISUAL	100%	100%	100%	100%	100%
							b) RADIOGRAPHY (NOTE 5,6)	20%	---	---	---	50%
							c) LP / MP (NOTE 4,6,10,11, 18)	100%	100%	10%	100%	100%
		AUSTENITIC STAINLESS STEEL	8		150# TO 600#	**A60K, A60N, B60K, B60N**	d) HARDNESS	NOTE 7	NOTE 7	NOTE 7	NOTE 7	NOTE 7

REMARKS FOR ABOVE TABLE :

1. EXTENT OF HARDNESS TEST FOR CLASSES A16A, ~~A61A, A62A~~, B16A & D16A IS 100%.
2. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: IV

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH -MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
IV	ALL SERVICES OTHER THAN SPECIAL SERVICES (O,H)	CARBON STEEL	1	ALL	ABOVE 600#	**E1A, F1A, E9A, F9A, E19A, F19A**	a) VISUAL	100%	100%	100%	100%	100%
		LTCS				**E40A**	b) RADIOGRAPHY (NOTE 5, 6, 14, 15)	100%	---	---	---	100%
		CARBON STEEL (IBR)				**E2A, F2A**	c) LP / MP (NOTE 4,6,10,11)	---	100%	10%	100%	---
		CARBON STEEL (IBR) ASME SEC-I				**F22A**	d) HARDNESS	NOTE 7	NOTE 7	NOTE 7	NOTE 7	NOTE 7

REMARKS FOR ABOVE TABLE :

1. FOR IBR SERVICE E2A, F2A & F22A NOTE- 8 IS ALSO APPLICABLE.
2. EXTENT OF HARDNESS TEST FOR CLASSES E19A, F19A IS 100% .
3. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: IV (CONTD.)

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH-MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
IV (CONTD)	ALL GENERAL SERVICES.	C - 0.5 Mo STEEL	3	ALL	ABOVE 600#	--	a) VISUAL	100%	100%	100%	100%	100%
		5 Cr - 9 Cr Mo STEEL	5B		150# TO 600#	A4F, A4G, B3F, B4F, B4G, D23F	b) RADIOGRAPHY (NOTE 5, 6, 14, 15)	100%	---	---	---	100%
		13 Cr (TYPE-410 SS)	6		ALL	--						
		KILLED CARBON STEEL & LTCS	1	UPTO - 45	ABOVE 600#	--	c) LP / MP (NOTE 4,6,10,11)	100%	100%	100%	100%	100%
		1 TO 3 Cr, 9Cr-1Mo-V STEEL (IBR)	4,5A, 15E	ALL		F2D, F2G, G2D, G2G	d) HARDNESS	NOTE 7	NOTE 7	NOTE 7	NOTE 7	NOTE 7
		1 TO 3 Cr, 9Cr-1Mo-V STEEL (IBR) ASME SEC-I	4,5A, 15E	ALL		F22D, G22D, G22G						

REMARKS FOR ABOVE TABLE :

1. FOR IBR SERVICE F2D, F2G, F22D, G2D, G22D, G2G & G22G NOTE- 8 IS ALSO APPLICABLE..
2. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.
3. FOR F2G, G22G & G2G, ALL WELDS FOR WHICH RADIOGRAPHY HAS BEEN DONE, SHALL ALSO BE SUBJECTED TO 100% LP/MP EXAMINATION.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: IV (CONTD.)

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH-MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
IV (CONTD)	SPECIAL SERVICES (O, H) , BENZENE ETC.	CARBON STEEL	1	ALL	ABOVE 300#	**D5A, E5A, F5A, F25A, D55A, D52A, A87A,**						
	SPECIAL SERVICES (NACE)				150# TO 600#	**A61A, B61A, B62A, A62A, A63A**						
	SPECIAL SERVICES (TEAL, HYDROGEN-ECU)				ALL	**A43A, A44A, A45A A46A, B43A,B44A, B45A, B46A, A21A, B21A, B52A**						
	SERVICES SUBJECT TO SEVERE CYCLIC CONDITIONS					**A24A, B24A, B27A, D28A**	a) VISUAL	100%	100%	100%	100%	100%
	SERVICES SUBJECT TO SEVERE CYCLIC CONDITIONS	0.5 TO 9 CR Mo STEEL	3, 4, 5A, 5B	ALL	ALL	--	b) RADIOGRAPHY (NOTE 5, 6, 14, 15)	100%	---	---	---	100%
	SPECIAL SERVICES (NACE, O, H, CAUSTIC)					**B5D, D5D, D5E, E5E, D52D**						
	SERVICES SUBJECT TO SEVERE CYCLIC CONDITIONS	13 CR STEEL (TYPE 410SS)	6			--	c) LP / MP (NOTE 4,6,10,11, 18)	10%	100%	10%/ 100% REMARKS -4	100%	---
	SERVICES SUBJECT TO SEVERE CYCLIC CONDITIONS.	3.5 NI STEEL	9B			--	d) HARDNESS	NOTE 7	NOTE 7	NOTE 7	NOTE 7	NOTE 7
	SPECIAL SERVICES (NACE, O, H, CAUSTIC)					--						
	SPECIAL SERVICES (NACE, O, H, CAUSTIC)	NI ALLOYS	41, 42, 43			~~**A99P**~~**, B21Q**						
	ALL SERVICES		45			**A21P, B21P**						

REMARKS FOR ABOVE TABLE:

1. NOTE-7 FOR HARDNESS IS NOT VALID FOR P.NO.9B.
2. EXTENT OF HARDNESS TEST FOR CLASS A61A, A62A, A63A, B61A, B62A, D5A, E5A F25A, D55A, D52A AND F5A IS 100%.
3. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.
4. ATTACHMENT WELDS SHALL BE 100% LP/MP TESTED FOR ALLOY STEEL CLASS.

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TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: IV (CONTD.)

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P. NO.	TEMP. DEG.C	PRESS. CLASS B16.5/ B16.34	APPLICABLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTACH-MENT WELD	FAB. BRANCH WELDS (NOTE 1)	FAB. WELDS OF MITRES / REDUC.)
1	2	3	4	5	6	7	8	9	10	11	12	13
IV (CONTD)	SERVICES SUBJECT TO SEVERE CYCLIC CONDITIONS.	AUSTENITIC STAINLESS STEEL	8	ALL	ALL	D42K, B46K,	a) VISUAL	100%	100%	100%	100%	100%
	LOW TEMP. SERVICE			BELOW - 45	150# 300# & 600#	A2K, B2K, D2K, A42K, B42K, D54K, A41K, B41K, D41K	b) RADIOGRAPHY (NOTE 5, 6, 14, 15)	100%	--	--	--	100%
					ABOVE 600#	E41K						
	GENERAL SERVICES			ALL	ABOVE 600#	F92K	c) LP (NOTE 4, 6, 10, 11, 16)	--	100%	10%	100%	--
	HIGH TEMP. SERVICES			> 500	ALL	B4K, B5K	d) HARDNESS	-	-	-	-	-
	SPECIAL SERVICES (O,H,) ETC.			ALL	ALL	B5M, A44K, A45K, B44K, B45K, F55K						
	SPECIAL SERVICES (TEAL)			ALL	ALL	A20K, B20K, D20K						

REMARKS FOR ABOVE TABLE :

1. MITRES & FABRICATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.

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Applicable Notes to Table-1

1. Branch welds shall consist of the welds between the pipe & reinforcing element (if any), nozzles & reinforcing element and the pipe & nozzle under the reinforcing element. Reinforcing element to be interpreted as pads, saddles, weldolets, sockolets etc.

2. Seal welds of threaded joints shall be given the same examination as socket welds.

3. Unless specifically stated, all materials shall be for "Non-IBR" service.

4. Magnetic Particle & the Liquid Penetrant method of examination shall be in accordance with Section V of the ASME Boiler and Pressure Vessel Code, Article VII and VI respectively. The entire area of the accessible finished weld surface shall be examined. Selected root runs, subject to a maximum of 10%, before finished weld, may also be examined, at the discretion of the engineer-in-charge.

   a) Wherever MP / LP testing is specified, either MP or LP test may be used. But wherever only MP test is specified, LP method of examination may be used only if MP examination is impracticable in the field as concurred by EIL site-in charge.

   b) "Random 5%" of Liquid Penetrant / Magnetic Particle test shall mean testing, by applicable test, one weld for each twenty welds or less made by the same welding procedure. "Random 10%" shall mean testing, by applicable test, one weld for each ten welds or less made by the same welding procedure. Similarly "Random 20%" shall mean testing, by applicable test, one weld for each five welds or less made by the same welding procedure. The welds to be examined in each designated lot shall include the work product of each welder or welding operator whose welds are part of the lot.

   c) When Liquid Penetrant examination is specified, the surface shall be free of peened discontinuities.

   d) Inspection shall be performed in the welds excluding those for which Radiography has been done.

   e) Girth weld, branch weld, attachment weld & socket weld of 3-1/2% Ni steel shall be Liquid Penetrant tested only when welded with austenitic material where MP test has been specified.

5. Radiography (Note-14,15):

   a) "Random 5%, 10% or 20% Radiography" shall mean examining not less than one from each 20 welds or less in case of "Random 5% Radiography", not less than one from each 10 welds or less in case of "Random 10% Radiography", not less than one from each five welds or less in case of "Random 20% Radiography" made by the same welding procedure. The welds to be examined in each designated lot shall include the work product of each welder or welding operator whose welds are part of the lot. Irrespective of percentage, no. of welds to be radiographed shall be minimum 1. However first two welds made by each welder shall also be radiographed in case of "Random Radiography". Welds selected for examination shall not include flange welds and shall be radiographed for their entire length. However, where it is impossible or impracticable to examine the entire weld length of field welds for either random or 100% Radiography, and if the same impossibility is agreeable to EIL site-in- charge, then a single 120 deg. exposure of the weld length may be given a Magnetic Particle test or Liquid Penetrant test.

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However in such cases for ferro-magnetic materials, only MP test shall be acceptable for classes higher than 600#.

b) In-process examination shall not be substituted for any required radiographic examination.

c) Number of radiographs per one circumferential weld shall be as per ASME Sec.V Articles 2 and 22.

6. When radiography or other non destructive inspection is specified, acceptance criteria for repairs or defects shall be as follows:

a) In case of 100% examination, any unacceptable weld shall be repaired and reinspected.

b) If required random examination reveals a defect requiring repair, then:

b.1 Two additional examinations of same type shall be made of the same kind of item (if welded joint, then by the same welding procedure and same welder or welding operator).

b.2 If the group of items examined as required by b.1 above is acceptable, the items requiring repair shall be repaired or replaced and reexamined as required and all items represented by this additional examination shall be accepted.

b.3 If any of the items examined as required by b.1 above reveals a defect requiring repair, two further comparable items shall be examined for each defective item found by examination.

b.4 If all the items examined as required by b.3 are acceptable, the items requiring repair shall be repaired or replaced and reexamined as required, and all items represented by this further examination shall be accepted.

b.5 Number of times repair welding could be done for the same weld before acceptance shall be as follows:

Material	**No. of times repair welding is allowed**
C.S. upto 300 #	3 or less
C.S. above 300 #	2 or less
Killed steel	2 or less
Low alloy steel	2 or less
Austenitic S.S.	2 or less
3.5 Ni steel	2 or less
Al & Al base alloy	2 or less
Cu & Cu base alloy	2 or less
Others	2 or less

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b.6 Welds not found acceptable for allowed number of times of repair as per b.5 above shall be replaced and reexamined.

b.7 If any of the items examined as required by b.4 above reveals a defect requiring repair, all items represented by these examinations shall be either:

- repaired or replaced and reexamined as required.
- fully examined and repaired or replaced as necessary, and reexamined as necessary.

7. Hardness Test:

a) Hardness test shall be in accordance with ASTM specification E10. Hardness tests of the heat affected zone shall be made at a point as near as practicable to the edge of the weld. One test per weld shall be performed.

b) Hardness test where specifically called out in Table-1 of this specification or in PMS, shall be carried out irrespective of thickness and to the extent (%age) as mentioned therein.

c) All welds which are given heat treatment shall be hardness tested. Hardness test shall be performed after final heat treatment.

d) A minimum of 10% of welds, hot bends, and hot formed components in each furnace heat treated batch and 100% of those which are locally heat treated shall be hardness tested.

e) Hardness test requirement not covered in this specification shall be as per Engineering Specifications.

f) The hardness limit applies to the weld and heat affected zone. Following hardness values shall be maintained unless otherwise mentioned in Job specification :

Base Metal Group	**Hardness (BHN/RC)**
CS	200 BHN Max.
Cr Upto 2%	225BHN max.
Cr 2.25%-10%	241BHN max.
18/8 SS (NACE)	RC22 max.
9CR-1MO-V	190 BHN (min.)-250 BHN (max.)

g) In case hardness values are mentioned in both Welding Specification Charts for Piping Classes, (B957-999-06-41-WSC-0001) & table given in Note-7(f), the lower of the two values shall be applicable.

8. For IBR service lines, following IBR requirements shall apply in addition to the notes 4, 5, 6, 7, 12 and Table 1. In case of conflict between above notes and these requirements, the more stringent ones shall apply. IBR piping shall be erected of IBR inspector approved material and

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construction procedure. Erected piping shall be hydrotested, inspected and approved by IBR inspector.

a) Piping over 102 mm (4") bore:

10% of welds made by each welder on a pipeline with a minimum of two welds per welder, selected at random, shall be subjected to Radiography.

b) Piping 102 mm (4") bore and under, but not less than 38 mm (1-1/2") bore:

Two percent of welds made by each welder on a pipeline with a minimum of one weld per welder, selected at random, shall be subjected to Radiography or may be cut for visual examination and tests.

c) Piping less than 38 mm (1.5") bore:

Special tests are not normally required but 2% of welds by each welder on a pipe line may be cut out from the pipeline for the visual examination and bend tests.

d) Retests:

If any test specimen is unsatisfactory, two further weld specimens for retests shall be selected from the production welds and subjected to tests. In the event of failure of any retest specimens, the production welds carried out by this welder subsequent to the previous test shall be given special consideration.

9. For fabricated fittings LP test shall be done on the final pass of welding only, in addition to visual examination.

10. For mitres and fabricated reducers, LP / MP test shall be done on root pass in addition to Radiography applicable to circumferential joint of respective piping class.

11. For branch connections, LP/MP test shall be done on root pass and final pass.

12. 10% of the butt weld joints shall be radiographed, however, 50% of these butt weld joints shall be field weld joints.

13. For lined specs, testing (MP/LP/Radiography etc.) shall be performed before lining.

14. Digital/Close Proximity Radiography are also acceptable along with Conventional Radiography with prior approval of Owner/Engineer-in-charge. The same shall be performed in accordance with Welding Specification for Fabrication of Piping.

15. In place of Radiography, Automated Ultrasonic Testing (AUT) as per Welding specification for Fabrication of Piping is also acceptable subject to prior approval of Owner/Engineer-in-charge.

16. LP test is to be performed for Austenitic stainless steel, regardless of MP test specified.

17. For all fluid services, surfaces where attachment welds have been removed shall be visually examined and shall show no evidence of cracking, lack of fusion, or surface porosity.

Where temporary attachments are made on P-No. 4, P-No. 5A, P-No. 5B, and P-No. l5E materials, the surfaces shall also be examined by the MP/ LP methods.

18. All joints including butt weld joints for A16A, A61A, A62A, B16A and D16A and any other NACE classes shall be wet fluorescent magnetic particle tested. Percentage of wet fluorescent

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magnetic particle testing of butt weld joints shall be 100% and this testing shall be in addition to radiography.

Signature Not Verified
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Location: eProcure-EPROC

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