

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).....

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).....

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).....

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).....

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 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: \_\_\_\_\_

\_\_\_\_\_

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		Trunk (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 oils		Vehicle accident	
Other/specify					

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

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) \_\_\_\_\_

<b>Non-disabling injury (Non-LTI)</b>	Hospitalized but resumed duty before end of 48 hrs of accident.	
<b>Disabling injury (other LTI)</b>	Hospitalized & failed to resume duty within next 48 hrs.	
<b>Fatal (LTI)</b>	Death / Expiry	
<b>First Aid case</b>	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:** \_\_\_\_\_

\_\_\_\_\_

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		Trunk (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

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	

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 \_\_\_\_\_

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

FORMAT NO. : HSE-4 REV 0

**NEAR MISS INCIDENT/ DANGEROUS OCCURRENCE REPORT PROFORMA**  
(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, equipment or 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)



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

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	
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)

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								
<b>(A) Has the equipment been ?</b>								
Y NR				Y NR				Y NR
<input type="checkbox"/> <input type="checkbox"/>	Isolated from power/steam/air	<input type="checkbox"/> <input type="checkbox"/>	water flushed &/or steamed	<input type="checkbox"/> <input type="checkbox"/>	radiation sources removed	<input type="checkbox"/> <input type="checkbox"/>		
<input type="checkbox"/> <input type="checkbox"/>	isolated from liquid or gases	<input type="checkbox"/> <input type="checkbox"/>	Man ways open & ventilated	<input type="checkbox"/> <input type="checkbox"/>	proper lighting provided	<input type="checkbox"/> <input type="checkbox"/>		
<input type="checkbox"/> <input type="checkbox"/>	depressurized &/or drained	<input type="checkbox"/> <input type="checkbox"/>	cont. inert gas flow arranged	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>		
<input type="checkbox"/> <input type="checkbox"/>	blanked/ blinded/ disconnected	<input type="checkbox"/> <input type="checkbox"/>	adequately cooled	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>		
<b>(B) Expected Residual Hazards</b>								
<input type="checkbox"/> <input type="checkbox"/>	lack of O <sub>2</sub>	<input type="checkbox"/> <input type="checkbox"/>	combustible gas/ liquid	<input type="checkbox"/> <input type="checkbox"/>	H <sub>2</sub> S / toxic gases	<input type="checkbox"/> <input type="checkbox"/>		
<input type="checkbox"/> <input type="checkbox"/>	corrosive chemicals	<input type="checkbox"/> <input type="checkbox"/>	pyrophoric iron / scales	<input type="checkbox"/> <input type="checkbox"/>	electricity / static	<input type="checkbox"/> <input type="checkbox"/>		
<input type="checkbox"/> <input type="checkbox"/>	heat/ steam / frost	<input type="checkbox"/> <input type="checkbox"/>	high humidity	<input type="checkbox"/> <input type="checkbox"/>	ionizing radiation	<input type="checkbox"/> <input type="checkbox"/>		
<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>		
<b>(C) Protection Measures</b>								
<input type="checkbox"/> <input type="checkbox"/>	gloves	<input type="checkbox"/> <input type="checkbox"/>	ear plug / muff	<input type="checkbox"/> <input type="checkbox"/>	goggles / face shield	<input type="checkbox"/> <input type="checkbox"/>		
<input type="checkbox"/> <input type="checkbox"/>	protective clothing	<input type="checkbox"/> <input type="checkbox"/>	dust / gas / air line mask	<input type="checkbox"/> <input type="checkbox"/>	personal gas alarm	<input type="checkbox"/> <input type="checkbox"/>		
<input type="checkbox"/> <input type="checkbox"/>	grounded air duct/blower /AC	<input type="checkbox"/> <input type="checkbox"/>	attendant with SCBA/air mask	<input type="checkbox"/> <input type="checkbox"/>	rescue equipment/team	<input type="checkbox"/> <input type="checkbox"/>		
<input type="checkbox"/> <input type="checkbox"/>	Fire fighting arrangements	<input type="checkbox"/> <input type="checkbox"/>	safety harness & lifeline	<input type="checkbox"/> <input type="checkbox"/>	communication equipment	<input type="checkbox"/> <input type="checkbox"/>		
<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>		
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
<b>Permit Closure :</b>								
(A) Entry <input type="checkbox"/> was closed <input type="checkbox"/> stopped <input type="checkbox"/> will continue on ...								
(B) <input type="checkbox"/> Site left in a safe condition <input type="checkbox"/> Housekeeping done								
(C) Multi lock <input type="checkbox"/> removed <input type="checkbox"/> key transferred								
<input type="checkbox"/> Ensured all men have come out <input type="checkbox"/> Man-ways barricaded								
Remarks, if any:								

FORMAT NO. : HSE-8 REV 0

**RADIATION WORK PERMIT**

Project : Sr. No. :  
Name of the work : Date :  
Name of site contractor : 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	<input type="checkbox"/>
	Area cordoned off / safe working platform provided	<input type="checkbox"/>
	Lighting arrangements for working during nights ensured	<input type="checkbox"/>
	Warning signs/ flash lights installed	<input type="checkbox"/>
	Cold work permit taken (if applicable)	<input type="checkbox"/>
	PPEs like film badges, dosimeters used	<input type="checkbox"/>

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:

**FORMAT NO. : HSE-9 REV 1**  
**DEMOLISHING/DISMANTLING WORK PERMIT**

Project : Sr.No. :  
Name of the work : Date :  
Name of contractor : 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	<input type="checkbox"/>	<input type="checkbox"/>
	Dismantling/ Demolishing method reviewed & approved	<input type="checkbox"/>	<input type="checkbox"/>
	Usage of appropriate PPEs ensured	<input type="checkbox"/>	<input type="checkbox"/>
	Precautions taken for neighboring structures	<input type="checkbox"/>	<input type="checkbox"/>
	First-Aid arrangements made	<input type="checkbox"/>	<input type="checkbox"/>
	Fire fighting arrangements ensured	<input type="checkbox"/>	<input type="checkbox"/>
	Precautions taken for blasting	<input type="checkbox"/>	<input type="checkbox"/>

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

FORMAT NO. : HSE-11 REV 0

(Sheet 1 of 2)

HOUSEKEEPING ASSESSMENT & COMPLIANCE

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

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,				

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

FORMAT NO. : HSE-12 REV 0

**INSPECTION OF TEMPORARY ELECTRICAL BOOTH / INSTALLATION**

Project : Sr.No. :  
Name of the work : Date :  
Name of contractor : Job No. :  
Sub Station No./Booth 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 <sub>2</sub> ) & 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 3 <sup>rd</sup> 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

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?				

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

FORMAT NO. : HSE-14 REV 1

(sheet 1 of 2)

**PERMIT FOR ERECTION / MODIFICATION & DISMANTLING OF SCAFFOLDING**

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

FORMAT NO. : HSE-14 REV 1

(sheet 2 of 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.								

FORMAT NO. : HSE-15 REV 1

**PERMIT FOR HEAVY LIFT/CRITICAL ERECTION**

Project : Sr. No. :  
 Name of the work : Date :  
 Name of contractor : Job No. :  
 Nature of activities : Duration: From..... To.....  
 Location of work : Name /Type of crane :  
 Equipment/Structure to be erected: 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 crane 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

**FORMAT NO. : HSE-16 REV 1**

**PERMIT FOR ENERGY ISOLATION & DE-ISOLATION**

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

ENERGY ISOLATION PERMIT	
<ul style="list-style-type: none"> <li>• Clearance required from:.....Hrs .....Date To .....Hrs ....Date</li> <li>• Name of equipment/ energy source etc. ....</li> <li>• Nature of job to be done: .....</li> <li>• Area.....Location:.....</li> </ul>	

PERMIT VALIDATION	PERFORMING AUTHORITY
<p>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.</p> <p>Issuing authority Client/Contractor RCM (as applicable) Signature: Date: Name:</p>	<p>The work and precautions will be carried out under my overall responsibility.(Testing/execution engineer)</p> <p>Signature: _____ Date: _____ Name: _____</p>

SAFETY PRECAUTIONS FOR CLEARANCE	NORMALISING AFTER CLEARANCE
<ol style="list-style-type: none"> <li>1. Notify workers of intent to de- energize <input type="checkbox"/></li> <li>2. Obtain lock, tag or locking/tagging devices <input type="checkbox"/></li> <li>3. Shut down, de-energize, dissipate any residual energies. <input type="checkbox"/></li> <li>4. Apply lock ,tag and locking and/or tagging devices <input type="checkbox"/></li> <li>5. *Any other job specific precautions <input type="checkbox"/></li> <li>6. Verify effectiveness of lockout by attempting to restart. <input type="checkbox"/></li> <li>7. Proper PPE is ensured <input type="checkbox"/></li> </ol> <p>I certify that the energy source mentioned above is isolated from all sources and is safe to start the work.</p> <p>Tag No:..... Lock No:.....</p> <p>Issuing authority Client/Contractor RCM (as applicable) Signature: _____ Date: _____ Name: _____ <b>(*to be included by contractor in consultation with issuing authority)</b></p>	<ol style="list-style-type: none"> <li>1. Notify workers of intent to re- energize <input type="checkbox"/></li> <li>2. Conduct visual inspection to confirm that the danger zone is clear of workers <input type="checkbox"/></li> <li>3. Conduct visual inspection to confirm that tools ,equipment’s danger zone is clear of workers <input type="checkbox"/></li> <li>4. Reposition the safety devices(interlocks, valves, guards, covers ,sensors, as applicable, etc.) <input type="checkbox"/></li> <li>5. *Any other job specific normalizing details <input type="checkbox"/></li> <li>6. Remove lock, tag and locking and/or tagging devices. <input type="checkbox"/></li> <li>7. Re-energize. <input type="checkbox"/></li> <li>8. Confirm system is operating properly&amp; safely</li> </ol> <p>I certify that the energy source mentioned above is isolated from all sources and is safe to start the work.</p> <p>Tag No:..... Lock No:.....</p> <p>Issuing authority Client/Contractor RCM (as applicable) Signature: _____ Date: _____ Name: _____ <b>(*to be included by contractor in consultation with issuing authority)</b></p>

ENERGY DE-ISOLATION PERMIT	
PERMIT VALIDATION	PERFORMING AUTHORITY
<p>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..</p> <p>Issuing authority Client/Contractor RCM (as applicable) Signature: _____ Date: _____ Name: _____</p>	<p>I hereby certify that the equipment/energy source mentioned above has been de-isolated and is ready for normal operation.(Testing/execution engineer)</p> <p>Signature: _____ Date: _____ Name: _____</p> <p align="center">Countersigned by Issuing authority</p>

**FORMAT NO. : HSE-17 REV 1**

**PERMIT FOR EXCAVATION (depth 2m and above)**

**(Sheet 1 of 2)**

Project : Sr.No. :  
 Name of the work : Date :  
 Name of contractor : Job No. :  
 Job Description : Location :  
 Size of excavation :

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

FORMAT NO. : HSE-17 REV 1

**PERMIT FOR EXCAVATION**

(Sheet 2 of 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.

FORMAT NO. : HSE-18 REV 0

(Sheet 1 of 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	

(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 E x 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

FORMAT NO. : HSE-19 REV 0 HIRAC

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

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		



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

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)		

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

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		

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**

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		

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**

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		

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		


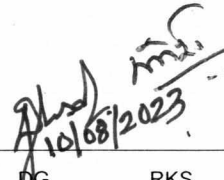
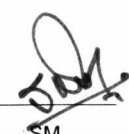
**Signature & Name of  
Operator:**

**Signature & Name of  
Contractor's Concern  
Engineer**

**Signature & Name of Contractor's Safety Officer**

# निर्माण स्थलों पर सकारात्मक सामग्री पहचान के लिए मानक विनिर्देश

## STANDARD SPECIFICATION FOR POSITIVE MATERIAL IDENTIFICATION AT CONSTRUCTION SITES

5	10/08/2023	Revised and updated	 DK	 DG	RKS	 SM
4	23/07/2018	Revised and updated	SKG	AP	AKK	RKT
3	12/10/2015	Revised and updated	DJ	SNB	TKS	SC
2	14/11/2011	Revised and updated	SM	SM	MKG	DM
1	02/01/2007	Revised and updated	AS	MPJ	VNP	VC
0	22/07/2002	Issued as Standard Specification	MPJ	MPJ	RSG	GRR
Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convener	Standards Bureau Chairman
Approved by						

**Abbreviations:**

API	:	American Petroleum Institute
ASM	:	American Society for Metals
ASME	:	American Society of Mechanical Engineers
ASTM	:	American Society for Testing and Materials
AS	:	Alloy Steel
CS	:	Carbon Steel
EIL	:	Engineers India Limited
ITP	:	Inspection Test Plan
PMI	:	Positive Material Identification
RTJ	:	Ring Type Joint
SS	:	Stainless Steel
TPI/ TPIA	:	Third Party Inspection/Third Party Inspection Agency

**Construction Standards Committee**

**Convenor:** Sh. R K Singh, ED (Construction)

**Members:** Sh. Janak Kishore, ED (Projects)  
Sh. Chinmoy Kapuria, CGM (SCM)  
Sh. Udayan Chakravarty, Sr. GM (Piping)  
Sh. Debasish Ghosal, GM (Construction)  
Sh. Pankaj Kumar Rai, DGM (Construction)

## CONTENTS

1.0	SCOPE .....	4
2.0	DEFINITIONS .....	4
3.0	SPECIFIC APPLICABILITY .....	4
4.0	REFERENCES.....	5
5.0	GENERAL REQUIREMENTS .....	5
6.0	EXTENT OF PMI.....	6
7.0	PMI OF PIPING AND HEATER COIL COMPONENTS.....	6
8.0	TESTING METHODOLOGY .....	7
9.0	CHARACTERISTIC ELEMENTS.....	7
10.0	CALIBRATION.....	7
11.0	SITE VERIFICATION OF ANALYZER.....	8
12.0	PERSONNEL QUALIFICATION.....	8
13.0	ACCEPTANCE CRITERIA .....	8
14.0	REJECTION CRITERIA.....	8
15.0	DOCUMENTATION.....	9

ATTACHMENT (REPORTING FORMAT)

FORMAT FOR PMI TEST REPORT - 6-82-0002-F1 REV. 4 (1 SHEET)

## 1.0 SCOPE

- 1.1 This specification applies to metallic alloy materials as well as carbon steel materials as defined in this document used in piping, heater coils, storage tanks, vessels etc. at construction sites. Positive Material Identification (PMI) is to be carried out on Owner supplied material as well on materials purchased by the contractor after installation (before testing). PMI may be carried out at the ware house also for identification / segregation of materials as per instruction of Engineer in Charge
- 1.2 Any deviation from this specification must be approved by Owner/ EIL in the prescribed format.

## 2.0 DEFINITIONS

### 2.1 Positive Material Identification (PMI)

The term Positive Material Identification (PMI) refers primarily for determination/ verification of alloy type or its composition using portable or mobile spectrometer/ alloy analyzer. For the purpose of this specification, some carbon steel materials as defined in clause no 3.1.11 in this document are also included for PMI checking to avoid mix up with Alloy steel during installation.

Chemical spot checking, resistivity testing, eddy current testing, electromagnetic alloy sorting, thermoelectric testing shall not be considered as PMI for the purpose of this specification.

## 3.0 SPECIFIC APPLICABILITY

- 3.1 The following items (AS/SS from clause 3.1.1 up to 3.1.10 and CS at clause 3.1.11) require PMI unless specifically exempted through a Concession/ Deviation permit by Owner/ EIL.
- 3.1.1 All pressure containing piping components including, thermowells instrument manifolds, RTJ gaskets, fasteners etc. All valves installed on line.
- 3.1.2 Tubular products used in the fabrication of heaters.
- 3.1.3 Pressure - containing instrument housings (e.g. gauge glass housings, orifice meter tubes).
- 3.1.4 Internal metallic linings/cladding, and weld overlay, done at site, used for protection against corrosive environments. Weather protection jacket (cladding) materials, securement bands /wires, screws, rivets, 'S' & 'J' – clips etc used for insulation works.
- 3.1.5 Tubing
- 3.1.6 Stud, bolts and nuts
- 3.1.7 Plates
- 3.1.8 All pressure containing welds.
- 3.1.9 Pipe supports (welded/ bolted) such as pads, saddles, dummy pipes etc.
- 3.1.10 Any other components or materials specifically designated for PMI on the purchase order/ contract.
- 3.1.11 a) Pressure containing CS piping components of rating 900# and above  
b) Pressure containing CS steel piping items under H<sub>2</sub> service.

c) Pressure Containing CS Piping NACE MR0103 is applicable as per PMS.

### 3.2 Exclusions

The following items are exempted unless specifically designated for PMI in the purchase order/contract:

- 3.2.1 Gaskets (spiral wound or carbon steel only).
- 3.2.2 Internal instrument parts.
- 3.2.3 Internal machinery parts.
- 3.2.4 Internal non pressure - containing baffles, trays, tray clips, supports, pall-rings, support rings, etc.
- 3.2.5 Electrical components.
- 3.2.6 Internal valve components.
- 3.2.7 Compression-type ferrules and fittings for use with 3/4 inch (19mm) outside diameter and smaller tubing.
- 3.2.8 All carbon steel piping components (including carbon steel pipe supports) other than those specified at 3.1.11.
- 3.2.9 All carbon steel Studs/ bolts/ nuts.
- 3.2.10 Carbon Steel Plates.

### 4.0 REFERENCES

American Society of Mechanical Engineers (ASME) BPV Code Section-II Part A, B and C.

ASME B 31.3

American Society for Testing and Materials (ASTM): As applicable

Material Verification Program for New and Existing Alloy Piping Systems: API RP 578

Any other material specification referenced by the Purchase Order/Contract.

IS 1239, IS 3589 and other relevant BIS codes.

### 5.0 GENERAL REQUIREMENTS

- 5.1 The test methods outlined in this specification are intended to identify the nominal composition of alloy/ Stainless steel materials. These test methods are not intended to establish the conformance of a material to a particular specification.
- 5.2 PMI shall not be considered as a substitute for required mill test reports listing chemical composition. In addition, mill test reports shall not be considered as confirming alloy/ composition verification.
- 5.3 The PMI activity shall be included in the overall quality plan and Inspection & Test Plan for fabrication/ erection. The contractor shall submit to EIL/ Owner, a procedure for PMI to

comply with the requirements of this specification. Approval of PMI procedure shall be obtained from Owner/ EIL prior to commencement of fabrication/ erection as the case may be.

- 5.4 Contractor shall engage reputed TPIA specified in the contract to witness inspection at site and accordingly submit ITP for review of owner/ EIL. In case list of approved TPIA is not available in contract, prior approval shall be taken before engagement of TPIA.
- 5.5 A copy of PMI records duly verified by TPIA shall be submitted to Owner/ EIL.
- 5.6 After installation, but prior to hydrostatic testing/ painting/ insulation, the contractor shall examine all components requiring PMI for proper compliance to this specification. A record of this final check duly endorsed by TPIA, as specified below, shall be submitted to EIL/ Owner and made part of the permanent inspection records.

#### 5.6.1 Owner Supplied Material

Records signed by contractor and duly verified by TPIA (engaged by contractor)/ and reviewed by EIL/ Owner shall be generated as part of the receiving inspection at warehouse.

#### 5.6.2 Contractor Supplied Material

Records signed by contractor and certified by an approved third party inspection agency.

- 5.7 After acceptance, all components shall be marked with a suitable and readily visible paint mark. These markings are in addition to markings / colour coding required by other codes/ specifications/ Technical Notes.
- 5.8 Controls shall be established to keep the non conforming items identified till proper resolution of non conformity.
- 5.9 EIL/ Owner shall have the right to witness the performance of any PMI test.

### 6.0 EXTENT OF PMI

PMI shall be done on each component (100 percent PMI inspection) including welds (Except carbon steel Piping welds), unless specifically exempted by Owner/ EIL.

PMI shall be done on pipe supports (welded/ bolted) such as pads, saddles, dummy pipes etc. (100 percent PMI inspection) in all piping systems of alloy material

PMI shall be done on all bolts and nuts (100 percent PMI inspection) of flange joints in all piping systems of alloy material.

### 7.0 PMI OF PIPING AND HEATER COIL COMPONENTS

PMI testing (irrespective of PMI done at earlier stages) shall be carried out when piping loops/ heater coils have been cleared for hydrostatic testing by EIL/ Owner. Hydrostatic Testing shall be carried out only when non conforming components have been replaced with conforming components and subsequent Non Destructive Testing, Post Weld Heat-Treatment, Hardness checking and re verification by PMI etc., as required by specifications have been completed. PMI records shall form a part of piping/ heater inspection records. Contractor shall demonstrate to EIL that each & every component of the piping system and heater coils has been subjected to PMI by providing line wise records of PMI duly endorsed by TPIA .

## 8.0 TESTING METHODOLOGY

- 8.1 The method used for PMI examination shall provide a quantitative determination of the alloying elements like chromium, nickel, molybdenum or vanadium in alloy steel items for the characteristic elements specified in clause 9.0
- 8.2 Instruments or methods used for PMI examination shall be able to provide quantitative, recordable, elemental composition results for positive identification of elements.
- 8.3 The acceptable instruments for alloy analyzer shall be either “portable X-ray Fluorescence” or “optical Emission type each capable of verifying the percentage of elements within specified range .The instruments must have the printout facility and sensitivity to detect the elements in the specified range.
- 8.4 Chemical spot testing, magnets, alloy sorters and other methods using eddy current or triboelectric testing methods are not acceptable for PMI examination.
- 8.5 All PMI instruments shall have been serviced within a 6 month period of the time of use to verify the suitability of batteries, sources,etc, and the date of the last service shall be stated on the PMI report form.
- 8.6 The surfaces to be examined shall be prepared and cleaned by suitable means before PMI so that surface be free from grease, oil, paint or oxides. Testing shall be done after proper surface cleaning and other requirements as outlined by the manufacturer of the portable alloy analyzer. Modification, if any, of these procedures must be approved by Owner/ EIL.
- 8.7 Ring type joint gaskets shall be inspected by using portable X-ray fluorescence instrument.

## 9.0 CHARACTERISTIC ELEMENTS

Material Specification		Characteristic Elements
ASTM A 335	Gr P11	Cr, Mo
	Gr P5	
	Gr P22	
	Gr P9	
	Gr P91	Cr, Mo, V
ASTM A 312	Type 304	Cr, Ni
	Type 316	Cr, Ni, Mo
	Type 321	Cr, Ni, Ti
	Type 347	Cr, Ni, Columbium, Tantalum

- 9.1 Carbon Steel materials under clause no 3.1.11 shall be checked to confirm that no mix up has taken place with alloy steel components.
- 9.2 Characteristic elements for materials not listed above shall be proposed by the contractor for approval of the Owner/ EIL

## 10.0 CALIBRATION

- 10.1 Instruments used for PMI shall have the sensitivity to detect the alloying elements in the specified ranges. Instruments or methods used for examination shall be of the type that will provide quantitative, recordable, elemental composition results for positive identification of the alloy elements present.

10.2 Each alloy analyzer shall be calibrated using known alloy standards for intended materials to be checked by PMI. A calibration certification from the Manufacturer or his authorized agency shall be submitted to EIL/ Owner for records.

10.3 EIL/ Owner shall review the procedure and qualification and witness sample alloy/ carbon steel materials verification tests to confirm that the procedures, equipment and personnel are capable of providing consistent and accurate results. Certified samples, with full traceability, of a known alloy materials/ carbon steel materials shall be available for use as a random spot checking on instrument calibration.

#### 11.0 SITE VERIFICATION OF ANALYZER

Verification using Standard samples supplied by institutes such as ASM (American Society of Metals) for the intended materials type and grade shall be performed each day before using the analyzer. Such verification shall be done again if PMI test is to be performed on different grade or type of material.

#### 12.0 PERSONNEL QUALIFICATION

The persons performing the PMI test should be knowledgeable about properties of material, all aspects of operation of PMI equipment including the method of testing. Qualification/ experience documents of the person performing the PMI test including his training and experience shall be submitted to EIL/ Owner for review and approval.

#### 13.0 ACCEPTANCE CRITERIA

##### 13.1 Base Metal

PMI test results showing presence of characteristic elements upto 10% less than the minimum specified value in the material specification and upto 10% more than the maximum specified value in the material specification shall be acceptable.

##### 13.2 Deposited Weld Metal

For deposited weld metal between base metals of the same specification using matching consumables, the recorded presence of characteristic elements upto 12.5% less than the minimum specified value in the welding consumables specification and upto 12.5% more than the maximum specified value in the welding consumable specification shall be acceptable.

#### 14.0 REJECTION CRITERIA

14.1 If the PMI test results fall outside the acceptable range as given in 13.0 above, the contractor shall obtain a quantitative check analysis performed by a laboratory acceptable to EIL/ Owner for a complete chemical analysis. Results of this analysis shall be submitted to EIL/ Owner, with contractor's recommendation, for final decision.

Decision of EIL/ Owner shall be final in this regard.

14.2 If any material component or weld is found unacceptable, all other represented materials (e.g. in case of fasteners, supports) or welds shall be considered suspect. In such cases, the contractor has the following options:

14.2.1 Scrapping all those represented materials or components and replacing with new components or welds.

14.2.2 Performing 100% examination of the remainder of the represented materials/ components and replacing each item that fails the PMI check.

14.2.3 If the performance of any verification activity is unacceptable to EIL/ Owner or if any material has been incorrectly identified, all further tests shall be subject to EIL/ Owner approval until the problem is corrected.

## 15.0 DOCUMENTATION

15.1 Print out from alloy analyzer, in original, duly verified by the TPIA engaged by contractor, Contractor and PMI agency.

15.2 PMI report as per format No. 6-82-0002-F1

15.3 Basis and action for resolving and documenting PMI non conformances.

15.4 Contractor shall demonstrate to EIL/ Owner that all components requiring PMI have been subjected to PMI testing and accepted.

REPORT NO: \_\_\_\_\_

Contractor \_\_\_\_\_

Date of PMI \_\_\_\_\_

Project \_\_\_\_\_

Inspection Agency \_\_\_\_\_

Location \_\_\_\_\_

PMI Agency \_\_\_\_\_

Job No. \_\_\_\_\_

PMI Equipment Model \_\_\_\_\_

Line No./ ISO Drg. No./

Make & Serial No. \_\_\_\_\_

Heater No./ Drawing No. \_\_\_\_\_

Last Service date \_\_\_\_\_

Sr. No.	Part Identification	Material As per Drg./ Spec.	Material as per PMI	Result (Accepted/ Rejected/ Retest)

\_\_\_\_\_  
(PMI AGENCY)

\_\_\_\_\_  
(CONTRACTOR)


\_\_\_\_\_  
(TPI AGENCY)

(EIL/ OWNER \*)

\*Sample verification

# पाइपिंग सामग्री के रंग कोड हेतु मानक विनिर्देशन

## STANDARD SPECIFICATION FOR COLOUR CODING OF PIPING MATERIAL

4	24/07/2024	Revised and Updated	 DK	SBB	RKS	MN
3	10/07/2019	Revised and Updated	SKG	AP	AKK	RKT
2	25/06/2014	Revised and updated	SM	DJ	RKD	SC
1	10/07/2009	Revised and updated	SM	SM	RKD	ND
0	30/05/2003	Issued as Standard Specification	RKN	MPJ	RSG	SKG
Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convener	Standards Bureau Chairman
Approved by						

**Abbreviations:**

API	:	American Petroleum Institute
ASTM	:	American Society for Testing & Materials
BIS	:	Bureau of Indian Standards
EIL	:	Engineers India Limited
IBR	:	Indian Boiler Regulatory
IS	:	Indian Standard

**Construction Standards Committee**

**Convenor:** Sh. R K Singh, ED (Construction)

**Members:** Sh. D S N Murthy, GGM (Projects)  
Sh. Chinmoy Kapuria, CGM (SCM)  
Sh. Udayan Chakravarty, CGM (Piping)  
Sh. S.B. Burman, Sr.GM (Construction)  
Sh. Abhijit Chakraborty, GM (Construction)  
Sh. Pankaj Kumar Rai, DGM (Construction)  
Sh. Dhananjay, AGM (Construction)

## CONTENTS

1.0	SCOPE.....	4
2.0	REFERENCES .....	4
3.0	GENERAL GUIDELINES FOR IDENTIFICATION BY COLOUR CODING.....	4
4.0	IDENTIFICATION COLOURS.....	4
5.0	METHOD OF COLOUR CODING .....	4
6.0	TABLE: THE FOLLOWING TABLES SHALL FORM AN INTEGRAL PART OF THIS SPECIFICATION.....	5
	TABLE - 1 BASIC COLOURS FOR IDENTIFICATION.....	6
	TABLE - 2 COLOUR CODES FOR PIPES, FITTINGS & FORGINGS.....	7
	TABLE - 3 COLOUR CODE- STUDS/BOLTS AND NUTS .....	9
	TABLE - 4 COLOUR CODE FOR GASKETS .....	10
	ANNEXURE-1	
	SCHEMATIC REPRESENTATION OF COLOUR IDENTIFICATION.....	11

## 1.0 SCOPE

This standard covers the method of identification of the piping materials by coloring using paints in order to avoid mix-up between materials of different metallurgy but similar in physical appearance.

## 2.0 REFERENCES

The following Code shall be referred to as and when required for resolution of colour shades.

IS: 5-2007: Colours for ready Mixed Paints and Enamels

RAL K5 Classic Edition

## 3.0 GENERAL GUIDELINES FOR IDENTIFICATION BY COLOUR CODING

- i. Materials shall be painted with one colour or combination of colours as set out in this specification.
- ii. Paints used for colour coding shall be of quality so as to last for at least 5 years.
- iii. Studs/Bolts and Nuts shall be painted.
- iv. Colour Identification is not required on Austenitic Steel.
- v. Colour identification is not required on galvanized-materials and non-ferrous metals such as copper, lead, aluminum because they are easily distinguished by their specific color and character.
- vi. Special items like bellows, strainer, steam traps, valves do not require colour identification as these items are tagged with their identification.
- vii. Specified colour shall be marked on the inner and outer surface of pipes & fittings.
- viii. Job specific colour coding covered under MR/PR for Piping items shall be referred for any additional requirements.

## 4.0 IDENTIFICATION COLOURS

- i. Paint colours to be used for identification shall be in accordance with Table-1.
- ii. Application of various colours for identification shall be as per clause 5.0 of this standard.

## 5.0 METHOD OF COLOUR CODING

- i. Colours and locations of colour identification on pipes, fittings, flanges, gaskets, studs/bolts, nuts shall be in accordance with Table-2 to 4 and Annexure-1.
- ii. The identification colour on gaskets shall be painted on the peripheral face of each gasket (refer Annexure-1).
- iii. Ends of the materials to be welded shall not be painted.

- iv. Width of colour band shall be a minimum of 12 mm for less than 3-inch size components and 25mm for 3 inch and larger sizes, unless otherwise specified.

The length of inner surface painting

- Shall be not less than 4 inch (100 mm) at both ends of pipes and shall start 2 inch (50mm) from pipe ends.
  - Shall be about 2 inch (50 mm) at any one end of fittings.
- v. Wherever combination of two or more colours is specified, materials shall be painted in parallel colour bands as close to each other as possible (Refer Annexure-1).
- vi. Paints containing chlorine, chlorides, sulphur, lead, zinc or any contents detrimental to materials are not acceptable. The contractor shall satisfy and produce documents/carry out tests as required by the owner/EIL.
- vii. EIL approval shall be obtained for paint materials which are not covered by this specification.

**6.0 TABLE: THE FOLLOWING TABLES SHALL FORM AN INTEGRAL PART OF THIS SPECIFICATION**

<i>Table No.</i>	<i>Title</i>
1.	Basic colour of identification
2.	Colour identification on pipes, fitting and flanges
3.	Colour identification on Bolts/Nuts/studs
4.	Colour identification on Gaskets
<i>Annexure-1</i>	Schematic representation of colour identification

TABLE – 1

BASIC COLOURS FOR IDENTIFICATION  
(REF. IS: 5 (2007) APPROXIMATE MUNSELL VALUE REFERENCE)

Name of Colour shade	Sl.No.	Indian standard colour (ISC) No.	'Munsell' Value		Equivalent RAL Codes (*)	
			Hue	Value/Chroma	NAME	RAL Code
Dove gray	100	694	2.3 G	5.53/0.48	Mouse Grey	RAL7005
Salmon Pink	68	443	2.5 YR	6.31/4.7	Beige Red	RAL3012
India Brown	65	415	2.7 YR	3.76/3.02	Mahogany brown	RAL 8016
Canary yellow	39	309	4.8 Y	7.89/11.02	Zinc Yellow	RAL1018
Deep orange	87	591	8.9 R	5.04/10.38	Red Orange	RAL2001
Lincoln Green	27	276	0.3 G	3.53/2.81	Fir Green	RAL6009
Sea Green	14	217	6.2 GY	6.12/6.15	Yellow Green	RAL6018
Sky Blue	1	101	8.3G	6.09/2.86	Water Blue	RAL5021
Navy Blue	6	106	6.2 PB	2.61/0.95	Cobalt Blue	RAL5013
Light Purple Brown	73	449	3.2 R	3.07/2.14	Pale brown	RAL8025
Dark Violet	104	796	6.1 P	3.5/4.27	Traffic purple	RAL4006
Chocolate	74	451	3.5 YR	2.82/0.67	Chocolate Brown	RAL8017
Maroon	83	541	1.3 R	2.9/1.36	Wine Red	RAL3005
Post Office Red	81	538	4.2 R	3.55/8.39	Carmine Red	RAL3002

**NOTE:** \* The Colours are based on RAL K5 Classic Edition by RAL, Deutsches institut, incorporated for international jobs.

**TABLE - 2  
COLOUR CODES FOR PIPES, FITTINGS & FORGINGS**

Sl. No.	Pipe	Elbows, Reducers, Tee's Caps	Flange/Blind Flange	Sl. No. (As per Table-1)	Colour No. (As per Table-1)	Colour
1		A-234 Gr WPB/WPBW-IBR		---	---	---
2		A-234 Gr WPB/WPBW-NON IBR	A-105	---	---	None
3		A-234 Gr WPBW-NON IBR & NORMALISED	A-182	---	---	None
4	API 5L Gr B – Seamless	---	---	---	---	None
5	API 5L Gr B – EFSW	---	---	---	---	None
6	API 5L Gr B – ERW	---	---	6/65	106/415	Navy Blue & India Brown
7	A 106 Gr B	---	---	87	591	Deep Orange
8	A 106 Gr B (Normalized)	A-234 Gr WPB(N)	---	87/14	591/217	Deep Orange & Sea Green
9	IS 1239/IS 3589 Gr 410	A-234 WPBW (N)		87/14	591/217	Deep Orange & Sea Green
10	IS 3589 Gr 330			100	694	Dove Grey
11	A 333 Gr 6 (LTCS)	A-420 WPL 6		100/6	694/106	Dove Grey & Navy Blue
		A-420 WPL 6W		83	541	Maroon
12	A 335 Gr P1	A-234 WP1	A 182 F1	83	541	Maroon
		A-234 WP1W		65	443	Salmon Pink
13	Stainless steel			65	443	Salmon Pink
						No Paint

- NOTE** i) For Hydrogen service, white colour band shall be applied in addition to above
- ii) For IBR material, Post Office red shall be applied in addition to above.
- iii) Equivalent RAL Codes shall be used for international jobs for above colour codes as per Table -1
- iv) For NACE Service, Canary Yellow shall be applied in addition to above.
- v) For CRYO Service, Light Purple brown shall be applied in addition to above.

STANDARDS SPECIFICATION FOR  
COLOUR CODING OF  
PIPING MATERIAL

TABLE - 2  
COLOUR CODES FOR PIPES, FITTINGS & FORGINGS (... Contd.)

Sl. No.	Pipe	Elbows, Reducers, Caps	Tee's	Flange/Blind Flange	Sl. No.	Colour No.	Colour
14	A 335 Gr P11	A-234 WP11		A 182 F11	27	276	Lincoln Green
	A 691 Gr 1.25 Cr CL.42 (EFW)	A-234 WP11W			27	276	Lincoln Green
15	A 335 Gr P12	A-234 WP12		A 182 F12	1	101	Sky Blue
		A-234 WP12W		---	1	101	Sky Blue
16	A 335 Gr P22	A-234 WP22		A 182 F22	14	217	Sea Green
	A 691 Gr 2.25 Cr CL.42 (EFW)	A 234 WP22W		---	14	217	Sea Green
17	A 335 Gr P5	A-234 WP5		A 182 F5	6	106	Navy Blue
		A-234 WP5W		---	6	106	Navy Blue
18	A 335 Gr P9	A-234 WP9		A 182 F9	104	796	Dark Violet
		A-234 WP9W		---	104	796	Dark Violet
19	A335Gr P91	A-234 WP91		A182F91	74	451	Chocolate
		A-234 WP91W		---	74	451	Chocolate

NOTE: i) For schematic representation, Refer Annexure-1  
ii) Equivalent RAL Codes shall be used for international jobs for above colour codes as per Table -1

TABLE - 3

COLOUR CODE - STUDS/BOLTS AND NUTS

	ASTM DESIGNATION	SL.NO.	INDIAN STD. COLOUR (ISC) NO.	COLOUR SHADES
Bolt	A 193 GR B 7	39	309	Canary Yellow
Nut	A 194 GR 2 H	39	309	Canary Yellow
Bolt	A 307 GR B	65	415	India Brown
Nut	A 307 GR B	65	415	India Brown
Bolt	A 193 GR B 16	27	276	Lincoln Green
Nut	A 194 GR 4	27	276	Lincoln Green
Bolt	A 320 GR L 7	74	451	Chocolate
Bolt	A 320 GR B 8	73	449	Light Purple Brown
Nut	A 194 GR 8	73	449	Light Purple Brown

**NOTE:** i) For schematic representation, Refer Annexure-1

ii) Equivalent RAL Codes shall be used for international jobs for above colour codes as per Table - 1

TABLE - 4  
COLOUR CODE FOR GASKETS

TYPE	PART	ASTM DESIGNATION/DESCRIPTION	SL.NO.	INDIAN STD. COLOUR (ISC) NO.	COLOUR SHADES
Compressed Fibre (Ring & Full Face)	Gasket	BS7531 GR.X (FULL FACE)	100	694	Dove Gray
		BS7531 GR.X (RING)	---	---	None
Spiral Wound	Gasket	SS 304 H + Grafoil Filler	68	443	Salmon Pink
		SS 304 + Grafoil Filler	73	449	Light Purple Brown
		SS 304 + Teflon Filler	65	415	India Brown
		SS 304 L SPR WND + Grafoil Filler	83	541	Maroon
		SS 316 SPRWND + Grafoil Filler	87	591	Deep Orange
		SS 316 L SPR. WND + Grafoil Filler	27	276	Lincoln Green
		SS 316 H SPR. WND + Grafoil Filler	39	309	Canary Yellow
		Teflon Jacketed SPR. WND	104	796	Dark Violet
		SS321 Spr WND + Grafoil filler	14	217	Sea Green
		SS347 Spr WND + Grafoil Filler	1	101	Sky Blue
OCT. Ring Gasket	Gasket	5 Cr, 1/2 Mo (Max. 120 BHN)	27	276	Lincoln Green
		Soft Iron (Max. 90 BHN)	100	694	Dove Gray

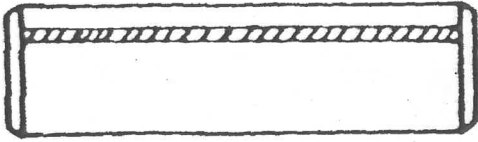
NOTE: i) For schematic representation, Refer Annexure-1

ii) Equivalent RAL Codes shall be used for international jobs for above colour codes as per Table -1

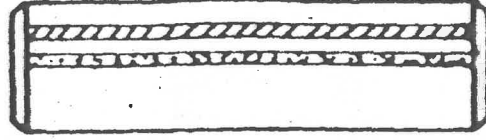
ANNEXURE-1

SCHMATIC REPRESENTATION OF COLOUR IDENTIFICATION

A. COLOUR IDENTIFICATION OF PIPES



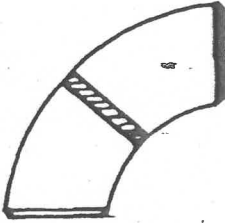
ONE COLOUR



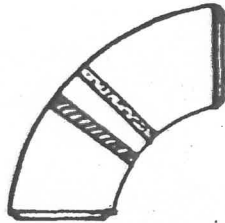
TWO COLOUR

B. COLOUR IDENTIFICATION OF FITTINGS

ELBOW

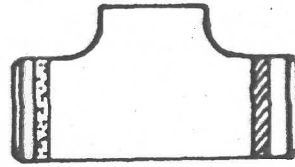


ONE COLOUR



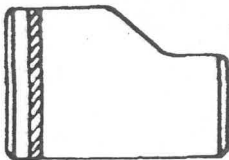
TWO COLOURS

TEE

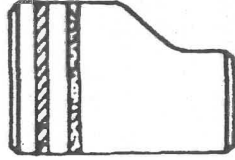


ONE OR TWO COLOUR(S)

REDUCER

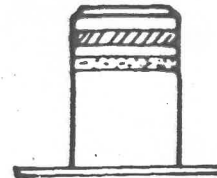


ONE COLOUR



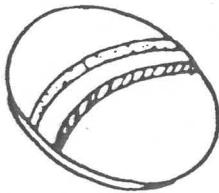
TWO COLOURS

STUB END



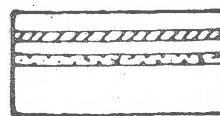
ONE OR TWO COLOUR(S)

CAP



ONE OR TWO COLOUR(S)

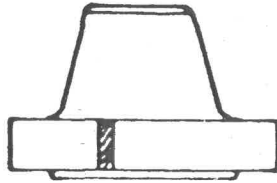
COUPLING



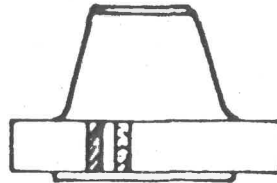
ONE OR TWO COLOUR(S)

SCHEMATIC REPRESENTATION OF COLOUR IDENTIFICATION (Contd...)

C. COLOUR IDENTIFICATION OF FLANGES

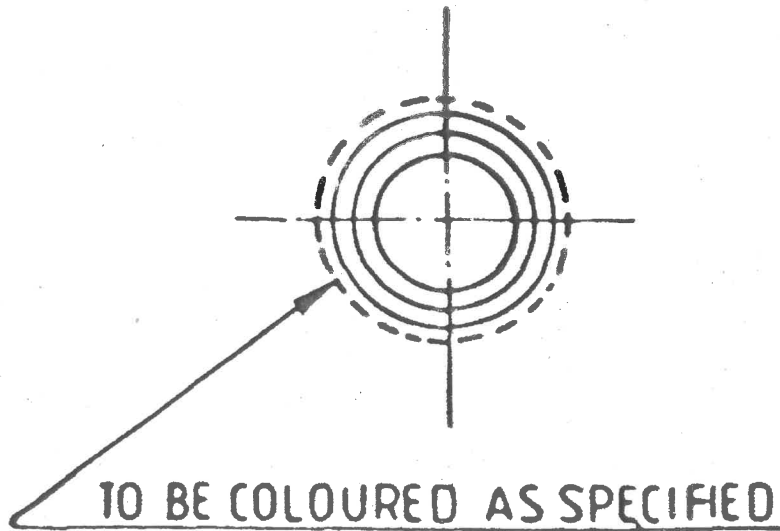


ONE COLOUR



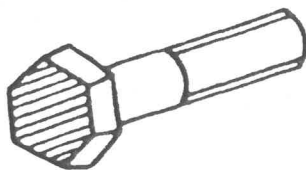
TWO COLOURS

D. COLOUR IDENTIFICATION OF GASKET



TO BE COLOURED AS SPECIFIED

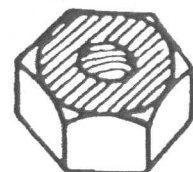
E. COLOUR IDENTIFICATION OF STUDS/BOLTS & NUTS



MACHINE BOLT



STUD BOLT



NUT

सिविल, संरचना एवं वास्तुकला कार्यों  
के लिए निरीक्षण एवं परीक्षण योजना  
(आईटीपी)  
(वर्गीकरण साहित्यमद्वर संविदा)

INSPECTION & TEST PLAN (ITP) FOR  
CIVIL, STRUCTURAL &  
ARCHITECTURAL WORKS  
(ITEM RATE CONTRACTS-WITH  
CATEGORIZATION)

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
2	08.04.2024	REVISED AND REISSUED	DK	AC	RKS	MN
1	30.01.2019	REVISED AND REISSUED	SKG	RK	AKK	RKT
0	14.01.2014	ISSUED AS STANDARD SPECIFICATION	SM	DJ	RKD	SC
					Approved by	

**Abbreviations:**

AFC	:	Approved For Construction
BM	:	Bench Mark
CI	:	Cast Iron
CPT	:	Cone Penetration Test
GI	:	Galvanised Iron
IRC	:	Indian Road Congress
JB	:	Junction Box
MS	:	Mild Steel
MPT	:	Magnetic Particle Testing
NDT	:	Non Destructive Testing
PCC	:	Plain Cement concrete
PQR	:	Procedure Qualification Record
PT	:	Penetration Testing
PVC	:	Poly Vinyl Chloride
PWHT	:	Post Weld Heat Treatment
RCC	:	Reinforced Cement Concrete
RF	:	Reinforcement
SPT	:	Standard Penetration Test
U/G	:	Under Ground
WBM	:	Water Bound Macadam
WPS	:	Welding Procedure Specification

**Construction Standards Committee**

**Convenor:** Sh. R K Singh, ED (Construction)

**Members:** Sh. D S N Murthy, GGM (Projects)  
Sh. Chinmoy Kapuria, CGM (SCM)  
Sh. Udayan Chakravarty, CGM (Piping)  
Sh. Abhijit Chakraborty, GM (Construction)  
Sh. Pankaj Kumar Rai, DGM (Construction)  
Sh. Dhananjay, AGM (Construction)

**CONTENTS**

S. NO	DESCRIPTION	ITPNO.	PAGE NO.
<b>SECTION A</b>			
<b>ITPS FOR CIVIL WORKS</b>			
1.	Land and Topographical survey	3101	6
2.	Soil Investigation	3102	7
3.	Site Grading	3103	8
4.	Excavation	3104	9
5.	Backfilling	3105	10
6.	Underground Piping (RCC/CI)	3106	11
7.	WBM Roads	3107 A	12
8.	WMM Roads	3107 B	13
9.	Black Topping(Premix Carpeting) &	3108	14
10.	Tank Pads	3109	15
11.	Micro Grading	3110	16
12.	Under Ground Piping (Carbon Steel/ AS/ SS )	3140	17-22
<b>ITPS FOR STRUCTURAL WORKS</b>			
13.	Plain cement concrete	3141	23
14.	RCC(Substructure)	3142	24
15.	RCC(Super structure)	3143	25
16.	Flooring/Pavement	3145	26
17.	Brick Work	3146	27
18.	Structural Works	3147	28
19.	Piling works	3148	29
<b>ITPS FOR ARCHITECTURAL WORKS</b>			
20.	Antitermite Treatment	3171	30
21.	Plastering	3172	31
22.	Doors and Windows	3173	32
23.	Painting (building works)	3174	33
24.	Sanitary fittings	3175	34
25.	Water proofing	3176	35
26.	False Flooring and False ceiling	3177	36
27.	Under Deck Insulation	3178	37
28.	Roofing Accessories	3179	38
29.	Lighting works (Non plant Buildings)	3199	39
<b>SECTION B</b>			
	FORMATS FOR CIVIL/STRUCTURAL/ARCHITECTURAL WORKS		<b>40</b>
<b>SECTION C</b>			
	FORMATS FOR UNDERGROUND PIPING WORKS		<b>55</b>

# SECTION - A

## GENERAL NOTE

*The enclosed ITP's shall be followed for the works to be performed by the contractor. The provisions indicated for stage wise inspection by EIL/Owner (For specific activities), which may be modified in line with EIL scope of services as per the contract between EIL and Owner. Activities for which ITP's are not provided in this specification, contractor to develop and get the same approved by EIL/Owner well before start of the work. In general role of EIL has been specified in the document. The role of owner to be specified during preparation of site specific ITPs.*

*Contractor to submit job procedures for the jobs for which ITP's are attached & job specific reporting formats with the aid of enclosed sample reporting formats to EIL/Owner for approval, before commencement of the activity. If the contractor has to deviate from the given ITP for a valid reason, he shall obtain prior written approval of EIL/Owner. Contractor to carry out 100% examination of all activities.*

## LEGEND

**HP** : **Hold Point ;**

A point which requires witnessing/inspection/verification and acceptance by Owner/EIL before any further processing is permitted.

The Contractor shall not process the activity/item beyond a Hold Point without written approval by Owner/EIL except where prior written permission for further processing is available.

**W** : **Witness Point ;**

An activity which requires witnessing/inspection/verification by Owner/EIL when the activity is performed.

After proper notification has been provided (notification modalities and period shall be finalized beforehand), the Contractor is not obliged to hold further processing if Owner/EIL is not available to witness the activity or does not provide comments before the date notified. Basis of acceptance shall be as per relevant technical specification.

**Rw** : **Review** of Contractor's documentation.

**S** : **Surveillance** Inspection by Owner/ EIL.

Monitoring or making observations to verify whether or not material/items or services conform to specified requirements. Surveillance activities may include audit, inspections, witness of testing, review of quality documentation & records, personnel qualifications, etc.

**WC** : **100%** Examination by Contractor.

**Responsibility for execution of the inspection/testing is with the Contractor; Owner/EIL only verifies examination or testing done by the Contractor at important stages**

**LAND & TOPOGRAPHICAL SURVEY**

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ Format No.
1	Boundary markings and submission of drgs./sketches	WC	S	Yes
2	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	Yes/ Format C1
	b) Field calibration, if any	WC	W	Yes
3	Block levels, contour plans, establishing permanent bench marks with ref. to Survey of India B.Ms. by check levels and submission of relevant drgs. & records	WC	W	Format C2
4	Protection of control points, permanent bench marks and regular rechecking	WC	S	-
5	Submission of Master plan showing monuments, structures exposed rocks, weirs, water works, ponds, underground services if crossing that area, etc.	WC	S	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Yes

ITP NO.: 3102

SOIL INVESTIGATION

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ Format No.
1.	Positioning of test location	WC	S	-
2.	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	Yes /Format C1
	b) Field calibration, if any	WC	W	Yes
3.	Boring & sampling	WC	S	-
4.	In-situ testing (SPT, CPT, Plate load test, Soil Resistivity, Block vibration test, etc.)	WC	S/Rw	Yes
5.	Lab testing (as applicable)	WC	W/Rw.	Yes
6.	Monitoring of water level	WC	S	-
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Yes

ITP NO.: 3103

SITE GRADING

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	Clearing and stripping of soil including disposal of unsuitable material	WC	S	-	-
2	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	HP	Yes/Format C1
	b) Field calibration, if any	WC	S	-	Yes
3.	Taking and plotting of initial levels at specified intervals for cutting as well as filling areas	WC	HP	HP	Yes
4.	Classification (Levels of strata) and testing of filling soil for suitability including preparation of Lead Charts to filling/disposal areas.	WC	W/Rw	-	Yes
5.	Proper warning of explosions, misfires and storage of explosive materials (As applicable).	WC	-	S	-
6.	Breaking up of clods, lumps, etc. at the time of filling and compaction.	WC	S	-	-
7.	Identification and suitability of borrow areas for filling soil/murram including verification of payments for royalty, etc.	WC	S/Rw	-	Yes
8.	Compaction test for earth filling in specified layers including finished areas.	WC	W/Rw	-	Format C3
9.	Verification of final finished grade levels.	WC	HP	HP	Yes
10.	Computation of Earth works.	WC	Rw	Rw	Yes
11.	a) Record of tree cuttings	WC	W	W	
	b) stacking of blasted rocks and other quarry materials including handing over to Owner	WC	S	S	Yes
12.	Preparation of "As built drawings	WC	Rw	Rw	Yes
13.	Removal of Surplus earth/excavated material and leveling in disposal areas.	WC	S	-	-
14.	Resolutions of obstacles/hindrances	WC	S	-	-
<b>INSPECTION &amp; TEST DOCUMENTS</b>					
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

CAT A: All fillings

CAT B: All cuttings.

ITP NO.: 3104

EXCAVATION

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	HP	Yes
	b) Field calibration, if any	WC	W	W	Yes/Format C1
2.	Layout checking	WC	S	S	Format C2
3.	Taking initial levels	WC	W	W	Yes
4.	Slopes of excavation, benching, overburden, shoring & strutting (in case of deep excavation)	WC	S	S	-
5.	Check for sub-soil water, dewatering requirements as per specifications.	WC	S	S	-
6.	Bottom level of excavation and compaction	WC	S	S	-
7.	Stacking of different type of soils separately	WC	S	S	-
8.	List of obstacles encountered (cables, pipes, conduits, etc)	WC	S	S	Yes
9.	Barricading of excavated pits for safety & protection from rain	WC	S	S	-
	<b>FOR HARD ROCK</b>				
1	Obtaining license from district authorities for undertaking blasting operations	WC	Rw	Rw	Yes
2	Storing of explosive materials as per explosive rules	WC	S	S	-
3	Prominent display of red flags around the area to be blasted	WC	S	S	-
4	Check the dimensions of bore holes	WC	S	S	-
5	Stacking of hard rock for useable/non useable including handing over to owner	WC	S	S	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

CAT A: Equipment foundations, Plant buildings, Technological structures, piperacks, etc.

CAT B : Non Plant buildings, Boundary walls, wing walls, manholes, drains, pipe culverts ,bridges, etc

ITP NO.: 3105

**BACK FILLING**

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	Selection of materials/selected earth	WC	W	S	Format C4, C5
2.	Check for treatment of soil, if any	WC	S	S	Yes
3.	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	HP	Yes /Format C1
	b) Field calibration, if any	WC	W	W	Yes
4.	Filling in specified layers, consolidating, watering.	WC	S	S	-
5.	Compaction tests for layers	WC	W/Rw	S/Rw	Format C3
6.	Filling to required levels	WC	S	S	-
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

CAT A :Equipment foundations, Plant buildings, Technological structure, Pipe racks, etc.

CAT B :Non Plant buildings, pipe racks ,Boundary walls, wing walls, manholes, drainpipe culverts, bridges etc.

ITP NO.: 3106

UNDERGROUND PIPING (RCC/ CI)

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	Incoming Material a) Owner's supply	Contractor to check all free issue materials and maintain records of MIV for material issued by owner/EIL			
	b) Contractors supply	WC	Note -1		
2.	Adequate slope, benching in excavation for safety purposes (if required)	WC	S	-	-
3.	a) Review of calibration certificates of instruments/ testing equipment's	WC	Rw	Rw	Yes/ Format C1
	b) Field calibration, if any	WC	S	S	Yes
4.	Layout, line & level	WC	S	S	Format C2
5.	Laying & jointing, grouting at manholes/chambers	WC	S	-	-
6.	Check for supports/ firm bed/ sub soil water level	WC	S	-	-
7.	Testing for leakages by blocking pipe ends	WC	W	W	-
8.	Hydro-testing and other tests, Removal of blockages, Cleaning & flushing of system	WC	HP	HP	Format C6
9.	Backfilling in layers	WC	Rw	Rw	Format C3
10.	Check for MS rungs in proper position, inlet/outlet pipe levels in manholes	WC	S	S	-
11.	Preparation of "As-built drawings"	WC	Rw	Rw	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

**NOTE:** 1) For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT A:** Main plant buildings, Utilities ,offsites, etc.

**CAT B:** Non plant buildings, technological buildings admn. Buildings, Gate house, security rooms, etc.

ITP NO.: 3107A

WBM ROADS

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	Rw	Yes /Format C1
	b) Field calibration, if any	WC	W	W	Yes
2.	Layout checking including Road crossings and taking initial levels	WC	W	W	Yes
3.	Approval of source & checking/testing of materials (wherever required)	WC	NOTE 1	NOTE 1	Format C4 Format C5
4.	Filling (if any), compaction, providing cambers in sub-base including levels	WC	W/Rw	W/Rw	Format C3
5.	Spreading metal to required thickness, line & levels, dry rolling including spreading of screening material	WC	S	-	Yes
6.	Check for camber and levels over metalling	WC	S	S	-
7.	Spreading murrum/ sand, watering and rolling	WC	S	-	-
8.	Checking thickness after each layer and rectification thereof (if any)	WC	S	S	Yes
9.	Checking quantity of aggregate by excavation of trial pits as per IRC Code	WC	W	W	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT A: Roads subjected to heavy loading, connected to main highway, main plant roads,etc

CATB: Balance Roads

ITP no: 3107 B

WMM for Roads

SL. NO.	ACTIVITY	CONTRACTOR	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	a.) Review of calibration certificates of instruments/testing equipment's.	WC	HP	Rw	Yes /Format C1
	b)Field calibration, if any.	WC	W	W	
2.	Layout Checking including Road Crossing & taking initial levels.	WC	W	W	
3.	Approval of source & checking /testing of materials (wherever required)	WC	NOTE 1	NOTE 1	Format C4 Format C5
4.	Design Mix to fix the properties of Ingredients	WC	HP	HP	
4.	Filling (if any), compaction, providing chambers in sub-base including levels.	WC	W/Rw	W/Rw	Format C3
5	Spreading metal to required thickness, line & levels, dry rolling including spreading of screening material.	WC	S	-	
6.	Check for camber levels.	WC	S	S	
7.	Spreading, watering & rolling.	WC	S	-	
8.	Checking thickness after each layer and rectification thereof (if any).	WC	S	S	
9.	Compaction Test for Each layer	WC	S/Rw	S/Rw	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT- A –Roads subjected to heavy loading connected to main High way, main plant roads etc.

CAT B- Balance roads

ITP NO.: 3108

**BLACK TOPPING (PREMIX CARPETING) & BITUMINOUS MACADAM (BM)**

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ Format No.
1.	Approval of source of materials (aggregate, bitumen, etc.)	WC	Note 1	Format C4
2.	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	Yes /Format C1
	b) Field calibration, if any	WC	S	Yes
3	Design Mix of PC/BC/BM/DBM	WC	HP	Yes
3.	Surface preparation & check for camber/level	WC	S	-
4.	Checking/ testing of material wherever required	WC	W	Format C5, Yes
5.	Tack coat application	WC	S	-
6.	Laying of Premix carpeting/ BM including rolling	WC	S	Yes
7.	Application of Seal coat	WC	S	Yes
8.	Check for camber and levels	WC	S	-
9.	Check for bitumen temperature and consumption	WC	S	Yes
10.	Thickness check (random)of Premix carpet/ BM	WC	W	Yes
11.	Removal of surplus earth	WC	-	-
12.	Berm preparation	WC	S	-
13.	Final Inspection	WC	W	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Yes

**NOTE :1)** For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT B:** All works

# Black Topping -- Premix Carpeting (PC), Bituminous Concrete (BC),  
Bituminous Macadamc (BM), Dense Bituminous Macadame (DBM)

ITP NO.: 3109

TANK PADS

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	Approval of source of materials (aggregate, bitumen etc.)	WC	NOTE 1	NOTE 1	Format C4
2.	Stripping the area	WC	-	-	-
3.	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	Rw	Yes/ Format C1
	b) Field calibration, if any	WC	W	S	Yes
4.	Layout and marking of ground level	WC	S	-	Format C2
5.	Excavation to required level, compaction of sub-base	WC	W	S	-
6.	Checking/ testing of materials	WC	W	S	Format C5
7.	Filling selected materials in specified layers, rolling, watering	WC	S	-	-
8.	Compaction tests	WC	W	Rw	Format C3
9.	Gravel filling under annular ring with compaction and adding graded filler material (As applicable)	WC	W	S	Yes
10.	Anti-corrosive layer, consolidation	WC	S	-	-
11.	Premix carpeting on side slopes	WC	S	S	-
12.	Preparation of "As-built drawing" for erection	WC	Rw	Rw	Yes
13.	Check for settlement of pads during hydro testing of tanks	WC	W	W	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT A:** All Site fabricated steel storage tanks for process fluid /Hydrocarbon, floating roof tanks having capacity more than 600cum or 10m dia and 8 m height.

**CAT B:** Site fabricated steel storage tanks for Raw water, Fire water, waste water, DM water, etc. and all tanks not covered under "CAT A"

**ITP NO.: 3110**

**MICRO GRADING**

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ Format No.
1.	a) Review of calibration certificates of instruments/ testing equipment's	WC	RW	Yes/ Format C1
	b) Field calibration, if any	WC	-	Yes
2.	Taking initial levels	WC	W	Yes
3.	Clearing/ Removal of extra soil, debris, etc. from site by transportation	WC	S	Yes
4.	Taking final levels	WC	S	Yes
5.	Verification of gradient of ground	WC	S	-
6.	Finishing of ground surface by hand compactor/ Roller (As applicable)	WC	S	-
7.	Final inspection	WC	W	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Yes

**CAT B: All works**

ITP NO.: 3140

FOR UNDERGROUND PIPING (CARBON STEEL/ AS/ SS) (Sheet 1 of 6)

Sl. No	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
<b>A.</b>	<b>PRIOR TO FABRICATION</b>				
1	Incoming Material a) Owner's supply b) Contractors supply	Contractor to check all free issue materials and maintain records of MIV for material issued by owner/EIL			
		WC	Note -1		
2.	Welding Filler Material Approval/Qualification				
	i) Review of Manufacturer's Test Certificates/ other documents	WC	Rw	Rw	Yes
	ii) Testing, if any	WC	Rw	Rw	Yes
3.	WPS/PQR				
	i) Review of proposed Procedure	WC	HP	HP	Yes
	ii) Testing	WC	HP	HP	Yes
	iii) Approval of Final WPS/PQR	WC	HP	HP	Yes
4.	Welder Performance Qualification Test	WC	W	W	Yes
4a.	Certification & approval of welders	WC	W	W	Yes
5.	NDT Procedure Qualification				
	i) Review of proposed Procedure	WC	Rw	Rw	Yes
	ii) Testing	WC	Rw	Rw	Yes
	iii) Approval of NDT procedure	WC	HP	HP	Yes
6.	Preparation of sketches from General Arrangement drawings	WC	Rw	-	Yes
7.	Joint numbering	WC	Rw	-	Yes
8.	Approval of colour coding scheme	WC	Rw	-	Std spec
9.	Monitoring of colour coding on pipes & fittings	WC	S	-	
<b>B.</b>	<b>FABRICATION (SHOP &amp; FIELD)</b>				
1.	Material as per piping class (check w.r.t. approved colour coding procedure)	WC	W		Format P1
	i) Fit-up check	WC	S	Rw	
	ii) Dimensional check	WC	S	Rw	

ITP NO.: 3140

FOR UNDERGROUND PIPING (CARBON STEEL/ AS/ SS) (Sheet 2 of 6)

Sl. No	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
2.	Pre-heat (if any)	WC	S	-	Yes
3	Check for purity of purging/shielding Gas (if any)	WC	S		
4.	Purging (if any)	WC	S		
5.	Shielding rate (if any)	WC	S	-	--
6.	Baking of Electrodes	WC	S	-	Yes
7.	Inter-pass cleaning & Temperature check.	WC	S		--
8.	Visual check of completed welds - For welds with Random Radiography	WC	W	-	Format P2
	-For welds with 100% Radiography	WC	S	S	Format P2
9.	PT/MPT	WC	S	-	Yes
10.	Radiography marking (for Random Radiography)	WC	W	W	Format P3
11.	Radiography Interpretation	WC	W	W	Format P4
C.	<b>HYDROSTATIC/ PNEUMATIC TESTING</b>				
1.	Procedure Review	WC	Rw	Rw	Yes
2.	Correctness of Testing arrangements	WC	S	-	---
3.	Calibration of Pressure Gauges	WC	-	-	Format C1
4.	R.F. Pad testing, if any	WC	W	W	--
5.	Scrutiny of test packs for Mechanical & NDT Clearance (Refer Annexure-1)	WC	HP	HP	Annex-1, Format P5, UG1
6.	Air/Water Flushing (preliminary)	WC	S	S	-
6a.	Addition of corrosion inhibitors, if required – Approval of make & quality	WC	S	S	Yes

ITP NO.: 3140

FOR UNDERGROUND PIPING (CARBON STEEL/ AS/ SS) (Sheet 3 of 6)

Sl. No	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
7.	Pneumatic/ Hydrostatic testing	WC	W	W	Format P6
8.	Draining of water & Air drying	WC	S	S	Format P6
<b>D.</b>	<b>LAYING</b>				
1.	Trench excavation and levels	WC	S	-	Yes
2.	Cleaning of pipe surface	WC	S	-	-
3	Approval of wrapping/coating material/ epoxy coating manufacturers	WC	Note 1	Note 1	Yes
4.	Approval of agency for wrapping & coating /epoxy coating	WC	Rw	Rw	Yes
5.	Sample test of coating materials in approved laboratory	WC	Rw	Rw	Yes
6.	Procedure qualification for wrapping & coating /epoxy coating	WC	HP	HP	Yes
7.	Application of primer	WC	S	S	--
8.	Coal tar temperature	WC	S	-	---
9.	Coating & wrapping /epoxy coating for 3LDPE coated pipes	WC	S	S	---
10.	Check Thickness of coating (if applicable)	WC	S	-	Yes
11.	Calibration of Holiday tester	WC	Rw	Rw	Format C1
12.	Holiday testing	WC	W	W	Yes
13.	Peel test	WC	W	S/Rw	Yes

**NOTE :1)** For Incoming material Inspection please refer ITP no: 6-82-1010

CAT A: All pressure lines, Fire Water line, Cooling Water line, CB & ABD.

CAT B: Balance Works

**ITP NO.: 3140**

**FOR UNDERGROUND PIPING (CARBON STEEL/ AS/ SS) (Sheet 4 of 6)**

Sl. No	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
14.	Lifting arrangement	WC	S	-	Yes
15.	Lowering (levels & orientation of branches)	WC	S	-	--
16.	Checking of wrapping & coating for damages during lowering, their repair, Holiday Testing, etc.	WC	W	W	--
17.	Back filling & compaction	WC	S	-	Yes
18.	Location, Brickwork, plaster of valve pit	WC	-	-	Yes
19.	Top cover & Finish of valve pit	WC	S	S	--
<b>E.</b>	<b>SYSTEM COMPLETION</b>				
1.	Tie in joints (Refer Annexure-2)	WC	Annex-2	Annex-2	
2.	Scrutiny of test packs for system testing (Refer Annexure-1)	WC	Annex-1	Annex-1	
3.	System testing	WC	W	S/Rw	Format UG2
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

CAT A: All pressure lines, Fire Water line, Cooling Water line, etc.

CATB: Balance Works

ITP NO.: 3140

FOR UNDERGROUND PIPING (CARBON STEEL/ AS/ SS) (Sheet 5 of 6)

ANNEXURE – 1

Sl. No.	Activity	Contractor	EIL	
			CAT A	CAT B
<b>F.</b>	<b>MECHANICAL COMPLETION RECORD (U/G Piping)</b>			
1.	Clearance for flushing & testing	WC	Rw	Rw
1a.	Mechanical clearance			
	- Conformity with drawing	WC	Rw	Rw
	- Material as per Specification	WC	Rw	Rw
1b.	Welding & NDT clearance			
	- Material as per Specification	WC	Rw	Rw
	- Fit-up check record	WC	Rw	Rw
	- Visual check of completed welds	WC	Rw	-
	- PT/MPT	WC	Rw	Rw
	- Radiography	WC	Rw	Rw
	- PWHT & hardness	WC	Rw	Rw
	- RF pad testing	WC	Rw	Rw
2.	Flushing & Pressure testing	WC	Rw	Rw
3.	Coating & wrapping			
	- Surface preparation	WC	Rw	-
	- Primer application	WC	Rw	Rw
	- Coating, wrapping & peel test	WC	Rw	-
	- Holiday check	WC	Rw	Rw
4.	Laying			
	- Trench leveling	WC	Rw	Rw
	- Lowering & checking for damages in wrapping & coating, their repair, Holiday testing, etc.	WC	Rw	Rw
	- Backfilling	WC	Rw	Rw

CAT B: All pressure lines, Fire Water line, Cooling Water line, etc.

CAT C: Balance works

ITP NO.: 3140

FOR UNDERGROUND PIPING (CARBON STEEL/ AS/ SS)

(Sheet 6 of 6)

ANNEXURE – 2

TIE-IN

Sl. No.	Activity	Contractor	EIL
A.	FIT UP	WC	W
B.	ROOT RUN DP	WC	W
C.	FINAL RUN DP	WC	W
D.	RADIOGRAPH REVIEW	WC	HP
E.	PWHT HARDNESS	WC	Rw
F.	RF PAD TESTING	WC	HP
G.	CLEANING & PRIMING	WC	S
H.	COATING, WRAPPING	WC	W
I.	PEEL TEST	WC	HP
J.	HOLIDAY TESTING	WC	HP
K.	CHECKING FOR ANY DAMAGE IN WRAPPING & COATING AFTER LOWERING, THEIR REPAIR HOLIDAY TESTING, ETC.	WC	W
L.	BACK FILLING	WC	S

For CAT A as well as CAT B

Note : Job specific ITP to be developed in case of Non-CS/AS/SS MOC of piping materials.

ITP NO: 3141

**PLAIN CEMENT CONCRETE**

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ format no.
1.	a) Review of calibration certificates of instruments/ testing equipment's	WC	Rw	Yes /Format C1
	b) Field calibration, if any	WC	S/Rw	Yes
2.	Checking of layout and materials, compaction of sub -grade	WC	S	Format C2, C3, C5, C7
3.	Mix proportion	WC	S	-
4.	Check for shuttering, dewatering if any.	WC	-	Yes
5.	Concreting with proper compaction	WC	-	-
6.	Checking of top level of PCC	WC	Rw	Yes
7.	Curing	WC	-	-
<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Yes

ITP NO: 3142

REINFORCED CEMENT CONCRETE ( SUBSTRUCTURE)

Sl. No	Activity	Contract or	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1	Approval of source of materials	WC	HP	HP	Format C4
2.	Approval of agency for providing Ready Mixed Concrete (RMC), as applicable	WC	HP	HP	Yes
3.	a) Review of calibration certificates of instruments/ testing equipment's / Batching Plant	WC	HP	HP	Yes /Format C1
	b) Field calibration, if any	WC	W	W	Yes
4.	Checking of layout & condition of PCC/ leveling course	WC	S	S	Yes
5.	Incoming material checking	WC	NOTE 1	NOTE 1	Format C5 , C7
6.	Design of mix & establishment of strength at site by trial mix	WC	HP	HP	Yes
7.	Check for line & level of shuttering including its condition, quality and rigidity.	WC	S	S	
8.	Check for sub-soil water & dewatering arrangement, if any	WC	S	S	-
9.	Reinforcement & covers to reinforcement	WC	S	S	Yes
10.	Inserts, Anchor bolts and pipe sleeves, pockets, dowels, etc.	WC	W	S	-
11.	Pour Card	WC	W	W	Format C8, C9
12.	Quality Records of RMC like Delivery Ticket Formation, If applicable	WC	Rw	Rw	Yes
12.	Check for obstacles encountered (Electrical conduits, pipe lines, etc.)	WC	S	S	Yes
13.	Concreting, compaction & finishing of concrete	WC	W	S	Yes
14.	Casting of cubes/Slump	WC	S	S	Yes
15.	Curing	WC	S	S	
16.	Testing of cubes- 7 days	WC	S/Rw	S/Rw	Format C10
17	Testing of cubes- 28 days	WC	W	W	Format C10
18.	Removal of shuttering	WC	S	-	-
19.	Check for water tightness, rendering, if any	WC	W	W	-
20.	Preparation of As-built drawings	WC	Rw	Rw	Yes
<b>INSPECTION &amp; TEST DOCUMENTS</b>					
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT A:** Critical foundations of equipment's i.e compressors, reactors, columns, stacks, Unit Pipe racks, plant buildings and other equipment foundations with RCC Quantity > 250 Cum, tank foundations

**CAT B:** Non critical pipe racks(branch pipe, offsite pipe rack, etc.) non plant buildings ,pipe sleepers, manhole, catch pit, pipe culverts ,bridges other equipment foundations not covered in CAT A, and balance works

ITP NO: 3143

**REINFORCED CEMENT CONCRETE (SUPER STRUCTURE)**

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CATA	CATB	
1	Approval of source of materials	WC	HP	HP	Format C4
2.	Approval of agency for providing Ready Mixed Concrete (RMC), as applicable	WC	HP	HP	Yes
3.	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	HP	Yes/ Format C1
	b) Field calibration, if any	WC	W	W	Format C1
4.	Checking of layout	WC	S	S	Yes
5.	Incoming material inspection	WC	Note 1	Note 1	Format C5, C7
6.	Design of mix & establishment of strength at site by trial mix	WC	HP	HP	Yes
7	Staging as per Drawing	WC	S	S	
7.	Check for line & level of shuttering and scaffolding/ vertical bracing including hoisting arrangements.	WC	S	S	--
8.	Reinforcement & covers to reinforcement	WC	S	S	Yes
9.	Inserts, bolts, pipe sleeves, MS rungs, concealed electrical conduits, fan hooks, dowels, etc. including welding if any	WC	S	S	Yes
10.	Pockets/ openings	WC	S	S	Yes
11.	Expansion joints, if any	WC	S	S	Yes
12.	Check for water stops, slopes, stoppers, if any	WC	S	S	Yes
13.	Pour Card	WC	W	W	Format C8, C9
14.	Quality Records of RMC like Delivery Ticket Information, if applicable	WC	Rw	Rw	Yes
15.	Concreting, testing, compaction & finishing of concrete	WC	W	S	Yes
16.	Casting of cubes/ Slumps	WC	S	S	Yes
17.	Curing	WC	S	S	-
18	Testing of cubes- 7 days	WC	S/Rw	S/Rw	Format C10
19.	Testing of cubes- 28 days	WC	W	W	Format C10
20.	Removal of formwork/ staging	WC	S	-	-
21.	Verification of dimensions viz AFC drawings and tolerances	WC	S	S	-
22	Check for water tightness, rendering, if any	WC	W	W	--
23	Preparation of As built drawing .	WC	Rw	Rw	Yes-
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				Yes
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT A:** Super structure of foundations for Critical equipment's i.e compressors, reactors, columns, stacks, foundations, Slabs of plant and non plant buildings, tank foundations, Unit Pipe racks, plant buildings and super structure of any other equipment, etc.

**CAT B:** not covered in category A Non critical pipe racks(branch pipe, offsite pipe rack, etc) non plant buildings other than slab, catch pit and balance works, pipe sleepers, pipe culverts, bridges, manhole etc.

ITP NO: 3145

RCC PAVEMENT/FLOORING

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ Format No.
1.	Approval of source of materials	WC	Rw	Format C4
2	Approval of agency for providing Ready Mixed Concrete (RMC), as applicable	WC	HP	Yes
3.	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	Yes
	b) Field calibration, if any	WC	S	Format C1
4.	Layout checking/ excavation of all new foundations	WC	-	Yes
5.	Incoming material inspection	WC	NOTE 1	
6.	Design of mix & establishment of strength at site by trial mix	WC	HP	Yes
7.	Check for proper back filling/compaction/ completion of sub - Structure works	WC	S	Format C3, Yes
8.	Check for edges of shuttering, alternate panels	WC	-	-
9.	Check for slopes, thickness of flooring / pavement	WC	S	-
10.	Shuttering, reinforcement (as applicable)	WC	-	-
11.	Check for expansion joints/ Construction joints	WC	S	-
12.	Check for concealed pipe embedment, earthing, if any	WC	- S	-
13.	Check for dividing strips, as applicable	WC	S	-
14.	Concreting, finishing, etc.	WC	S	Format C8, C9
15.	Quality Records of RMC like Delivery Ticket Information	WC	Rw	Yes
16.	Concreting, testing, finishing, test cubes	WC	W	Yes
17.	Checking for line, levels, slopes, joints, thickness of flooring viz. AFC drawings	WC	S	-
18	Curing	WC	S	-
19.	Grinding & polishing, as applicable	WC	S	-
20.	Testing of concrete cubes (as applicable)	WC	W	Format C10
21.	Testing of vacuum dewatering flooring (as applicable)	WC	Rw	Yes
22.	Preparation of "As Built Drawings"	WC	Rw	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Yes

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT B: All works.

ITP NO: 3146

**BRICK MASONARY**

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	a) Review of calibration certificates of instruments/ testing equipment's	WC	Rw	Rw	Yes/ Format CI
	b) Field calibration, if any	WC	Rw	Rw	Yes
	c) Field testing of Materials, if any	WC	Rw	Rw	
2.	Incoming material inspection	WC	Note 1	Note 1	
3.	Cleaning of surface	WC	-	-	-
4.	Wetting/soaking of bricks	WC	S	S	-
5.	Cement mortar proportion	WC	S	S	-
6.	Staging & scaffolding	WC	-	-	-
7.	Hacking of adjacent concrete surface	WC	S	S	-
8.	Check for bond/closers, thickness of joints .	WC	S	-	-
9.	Line, level & plumb	WC	S	S	-
10.	Raking out joints, keys in brick work, if any	WC	S	S	-
11.	Check for placement of Reinforcement bars in case of partition brick work	WC	S	S	-
12.	Embedment of fixtures	WC	S	S	-
13.	Curing	WC	-	-	-
14.	Preparation of 'As Built' Drawings	WC	Rw	Rw	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw		Yes

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT A: Load bearing walls

CAT B: Balance works

I TP NO: 3147

STRUCTURAL STEEL WORKS

S. No	Activity	Contractor	EIL		Records to be submitted/
			CAT A	CAT B	
<b>A</b>	<b>PRE – FABRICATION ACTIVITIES</b>				
1.	a) Review of calibration certificates of instruments/ testing equipment's	WC	HP	HP	Yes/ Format C1
	b) Field calibration, if any	WC	S	S	Yes
2.	Incoming material inspection	WC	Note 1	Note 1	Yes
3.	Welding Filler material approval/ qualification				
	a) Manufacturing test certificates/ documents	WC	Rw	Rw	Yes
	b) Testing, if any	WC	W	W	Yes
4.	WPS/ PQR	WC	HP	HP	Yes
5.	Welders performance qualification	WC	W	W	Yes
6.	Layout checking	WC	S	-	Yes
7.	Welding equipment and accessories	WC	S	-	-
8.	Preparation and approval of Fabrication drawings	WC	Rw	Rw	Yes
<b>B</b>	<b>FABRICATION ACTIVITIES</b>				
1	Materials as per design drawing	WC	Rw	Rw	Format C12
2	Check straightness and non-warping of members	WC	S	S	Format C12
3	Dimensional and fit-up checks including provision of slopes for deflection wherever required	WC	S	S	Format C12
4	Visual check for welding	WC	S	S	Format C12
5	Grinding including surface preparation for painting and application of primer	WC	S	S	Format C12
6	Checking paint as per specs, shelf-life, etc.	WC	S	S	Yes
7	Application of specified paint, painting thickness, etc.	WC	S	S	Format C12
<b>C</b>	<b>FIELD ERECTION ACTIVITIES</b>				
1	Lifting arrangements including test certificates of lifting tackles	WC	S/Rw	S/Rw	Yes
2	Correctness of location	WC	S	-	Format C12
3	Orientation of bracing, lugs	WC	S	-	-
4	Alignment & levels	WC	S	-	Format C12
5	Field welding (if any)	WC	S	S	Format C12
6	Grouting	WC	S	S	Format C12
7	Finishing coat of paint, thickness of paint etc.	WC	S	S	Format C12
8	Preparation of As-built drawings	WC	Rw	Rw	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT A: Steel structures pertaining to equipment site compressors, reactors, columns, Unit Pipe racks, stacks, Technological structures.

CAT B: Steel structures of Non critical pipe racks(branch pipe, offsite pipe rack, etc. non plant buildings ,walkways, platforms ,etc.

ITP NO: 3148

PILING WORKS

Sl. No.	Activity	Contract or	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1	Approval of source of materials	WC	Rw	Rw	Format C4
2	Approval of agency for providing Ready Mixed Concrete (RMC), if applicable	WC	HP	HP	Yes
3	a) Calibration certificate of measuring & testing equipment's/ instruments	WC	HP	HP	Yes/ Format C1
	b) Field calibration, if any	WC	W	S	Yes
4	Layout and ground level	WC	S	S	Yes
5	Incoming material inspection	WC	Note 1	Note 1	
6	Design of mix & establishment of strength at site by trial mix	WC	HP	HP	Yes
7	Driving of piles & check for set point	WC	S	S	-
8	Check for depth of bore and lowering of cage measuring	WC	S	-	-
9	Check for cage reinforcement, its length, overlaps	WC	S	S	-
10	Pour Card	WC	HP	HP	Format C8, C9
11	Quality records of RMC like Delivery Ticket Information, if applicable	WC	Rw	Rw	Yes
12	Concreting,	WC	W	S	Yes
13	Casting of cubes/Slumps	WC	S	S	Format C10
14	Testing of cubes- 7 days	WC	S/Rw	S/Rw	Format C10
15	Testing of cubes- 28 days	WC	W	W	Format C10
16	Check for cut off level of concreting & quantity of concrete poured	WC	S	-	Yes
17	Lifting of casing pipe	WC	S	S	-
18	Pile load tests (lateral/vertical/cyclic/pull out)	WC	W	W	Yes
18	Pile Integrity test, If applicable	WC	Rw	Rw	Yes
19	Submission of pile load test report	WC	Rw	Rw	Yes
<b>INSPECTION &amp; TEST DOCUMENTS</b>					
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

NOTE : 1) For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT A:** Critical foundations of equipment's i.e compressors, reactors, columns, stacks, Technological structures, Unit Pipe racks, plant buildings and other equipment foundations.

**CAT B:** Non critical pipe racks(branch pipe, offsite pipe rack, etc) non plant buildings

ITP NO: 3171

ANTITERMITE TREATMENT

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ Format No.
1.	Testing of material & spraying devices including personal protective equipment's like facemask, gloves, shoes, etc.	WC	HP & Note 1	Yes
2.	Preparation of surface for taking dosage of emulsion by ramming of each layer of soil by roding the earth at specified intervals	WC	-	-
3.	Backfilling and compaction in specified layers along with application of emulsifier along the sides of masonry & RCC structures	WC	S	Format C3
4	Compaction of top surface for taking dosage of emulsifier by roding the earth at specified intervals for the entire floor area before concreting	WC	-	-
5	Check for consumption of emulsifier utilized	WC	Rw	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Yes

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT B: All works

ITP NO: 3172

PLASTERING

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1	Calibration of testing equipment's	WC	Rw		Format C1
2.	Checking/ testing of materials	WC	W		Format C5, C7
3	Check for completeness of all hidden jobs like piping, conduiting, etc.	WC	-	-	-
4	Check for grading of sand, Mix proportion	WC	S	S	-
5.	Sample preparation for finish and its approval	WC	W	S	-
6.	Neeru application on plaster (as applicable)	WC	S	-	-
7.	Chicken Wire Mesh at joints of brick/stone and concrete / steel	WC	S	-	-
7.	Hacking and cleaning the surface, removing loose particles, wetting the surface	WC	-	-	-
8	Checking of plaster thickness, plumb & even surface	WC	S	-	Yes
9	Check for grooves, openings, rounding off the corners, hollowness in plaster	WC	S	S	-
10	Curing	WC	S	S	-
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw		Yes

**CAT A:** Area requiring special finish

**CAT B:** Balance works.

ITP NO.: 3173

**DOORS, WINDOWS AND VENTILATORS**

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	Incoming material inspection	WC	Note 1	Note 1	
2.	Calibration of testing equipment's	WC	HP	HP	Yes
3.	Check for sections & dimensions	WC	S	-	Yes
4.	Line, level & plumb	WC	-	-	-
5	Section joinery details	WC	Rw	-	-
6	Grouting with lugs/ dash fasteners	WC	-	-	-
7	Check for fixtures & fittings	WC	S	S	Yes
8	Check for thickness & type of glazing	WC	-	-	Yes
9	Check for rubber gasket, anodizing (as applicable)	WC	-	-	-
10	Brand/ shade of paints, no. of coats including surface preparation	WC	S	Rw	-
11	Final inspection	WC	HP	HP	Yes
<b>INSPECTION &amp; TEST DOCUMENTS</b>					
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

**NOTE :1)** For Incoming material Inspection please refer ITP no: 6-82-1010

**CATA:** Main plant buildings

**CATB:** Balance works

ITP NO.: 3174

**PAINTING (BUILDING WORKS)**

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	Completion of surface preparation	WC	-	-	-
2.	Incoming material inspection	WC	Note 1	Note 1	
3.	Confirmation of colour, shade & brand	WC	HP	HP	-
4.	Check for number of coats	WC	S	S	Yes
5.	Curing, if any	WC	S	-	-
<b>INSPECTION &amp; TEST DOCUMENTS</b>					
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

**NOTE :1)** For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT A:** Main plant buildings, Major non plant building (viz: Administrative building, Training center etc

**CATB:** Balance works

ITP NO. : 3175

**SANITARY FITTINGS**

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	Incoming material inspection	WC	Note 1	Note 1	
2.	Checking of sample (as applicable)	WC	S	-	Yes
3.	Check completeness of finishing works w.r.t. line, level & position	WC	S	-	-
4.	Check proper fixing of the sanitary fittings to give aesthetic appeal	WC	S	-	-
5	Check for leakage	WC	S	Rw	-
<b>INSPECTION &amp; TEST DOCUMENTS</b>					
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

**NOTE :1)** For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT A:** Main plant buildings, Major non plant building (viz: Administrative building, Training center etc)

**CATB:** Balance works

ITP NO. : 3176

**WATER PROOFING (ROOF)**

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ Format No.
1.	Approval of materials	WC	HP	Format C4
2.	a) Calibration certificate of measuring & testing equipment's/application instruments (if applicable)	WC	HP	Yes/ Format C1
	b) Field calibration, if any	WC	W	Yes
3	Surface preparation for screeding/ water proof plastering	WC	W	-
4.	Mix proportion, thickness of screeding/ plastering & slope towards rain water pipes	WC	S	Yes
5.	Formation of groove at specified height on parapet wall	WC	-	-
6.	Incoming material inspection, no. of coats, application procedure and consumption.	WC	Note 1	Yes
7.	Termination of material in groove on vertical plane	WC	S	-
8.	Check for hollowness, bubbles in water proofing, if any	WC	S	-
9.	Conducting a sample of water proofing test by flooding the area for specified interval (as applicable)	WC	W	
10	Cleaning of surface	WC	-	--
11	Submission of Guarantee in the requisite Performa	WC	Rw	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Yes

**NOTE :1)** For Incoming material Inspection please refer ITP no: 6-82-1010

ITP NO: 3177

**FALSE FLOORING AND FALSE CEILING**

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ Format No.
	<b>FALSE FLOORING</b>			
1.	Manufacturers Test Certificate	WC	Rw	Yes
2.	Incoming material inspection	WC	Note 1	Yes
3.	Cleaning base floor	WC	-	-
4.	Painting base floor with Polyurethane based paint (as specified)	WC	S	Yes
5.	Check for installation of grid framework	WC	S	-
6	Proper line, level & layout	WC	S	-
7	Final inspection	WC	HP	Yes
	<b>FALSE CEILING</b>			
1.	Manufacturers Test Certificate	WC	Rw	Yes
2.	Incoming material inspection	WC	Note 1	Yes
3.	Surface preparation of panel boards	WC	-	-
4.	Proper line, level & cut-outs	WC	S	-
5.	Painting of panel boards	WC	S	Yes
6	Final inspection	WC	HP	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Yes

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

ITP NO.: 3178

UNDER DECK INSULATION

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ Format No.
1.	Incoming material checking including density	WC	Note 1	Yes
2.	Checking of adhesive, fasteners for anchorage	WC	S	Yes
3.	Fixing of scaffolding, ladders, platforms	WC	S	-
4.	Fixing of under-deck insulation with adhesive	WC	-	-
5.	Fixing of dash fasteners at defined spacing	WC	-	-
6.	Finishing	WC	S	-
7.	Final inspection	WC	W	Yes
<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Yes

**NOTE :1)** For Incoming material Inspection please refer ITP no: 6-82-1010

ITP NO.: 3179

ROOFING ACCESSORIES

Sl. No.	Activity	Contractor	EIL		Records to be submitted/ Format No.
			CAT A	CAT B	
1.	Incoming material inspection	WC	HP/ Note 1	HP/ Note 1	Yes
2.	Ensure proper sequence of sheeting	WC	W		
3.	Check for mitring, overhang, laps, etc.	WC	S	-	-
4.	Slopes line, level of sheets, barge boards, ridges & gutters, overhang of sheets	WC	S	-	-
5	Bolting by drilling only, length of bolts, nos., anodizing and type of washers	WC	S	-	-
6.	Fixing of Wind Ties at the two caves end of the sheet	WC	S	-	-
6	Check for slopes of rain gutters, down take pipes, north lighting curves/ supports for gutters	WC	S	-	-
7	Check for leakage/ passing of light	WC	S	-	-
8.	Final inspection	WC	W	W	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				-
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

NOTE : 1) For Incoming material Inspection please refer ITP no: 6-82-1010

2) Fixing arrangement need to be reviewed with respect to contract specifications.

**CAT A:** Important structures (e.g Compressor House, Ware house, workshop and Pump house etc.), main plant buildings, etc

**CAT B:** Balance works.

ITP NO.: 3199

**LIGHTING WORKS (NON PLANT BUILDINGS)**

Sl. No.	Activity	Contractor	EIL	Records to be submitted/ Format No.
1.	Prepare detailed conduit layout diagram as per the approved electrical drawing	WC	Rw	Yes
2.	Provide GJ/PVC sleeves in columns/beams at identified locations to facilitate laying of conduit on later date.	WC	S	-
3.	Incoming material inspection	WC	Note 1	Yes
4.	Ensure that the conduit is laid in line with execution drawings & provide pull-wires as per requirement.	WC	S	-
5.	Check correctness of drop/JB locations	WC	S	-
6.	Check threaded joints are proper	WC	S	-
7.	Ensure all JB/Fan box are properly stuffed with jute	WC	S	-
8.	Ensure conduits are properly tied to reinforcement bars to prevent floating during concrete	WC	S	-
9.	Ensure proper supporting of conduit lengths wherever required	WC	S	-
10.	Ensure adequate chasing depth for conduit portion coming inside brick walls	WC	S	-
11.	Check workmanship towards joints and presence of any foreign material inside the conduits	WC	S	-
12.	Ensure wiring material is inspected at site before use	WC	W	Yes
13.	Ensure correctness of lighting wire size and no. of wires as per the drawing in each conduit portion	WC	S	-
14.	Preparation of "As Built" drgs.	WC	Rw	Yes
<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Yes

NOTE : 1) For Incoming material Inspection please refer ITP no: 6-82-1010

# SECTION - B

**FORMATS**

**FOR**

**CIVIL, STRUCTURAL &**

**ARCHITECTURAL WORKS**

CONTENTS

S. NO	DESCRIPTION	FORMAT NO.	PAGE NO.
1.	Record of calibration of Measuring/Testing equipment's	C1	43
2.	Surveying and Layout record	C2	44
3.	Test report for determination of dry density & moisture content of sand/soil	C3	45
4.	Record of approval of source(s) for aggregates	C4	46
5.	Sieve analysis report	C5	47
6.	Underground piping – test report (RCC/CI)	C6	48
7.	Cement testing result report	C7	49
8.	Pour card (I) – Programme of concreting	C8	50
9.	Pour card (II) – Observation during concreting	C9	51
10.	Crushing strength testing results of concrete cubes	C10	52
11.	Water absorption, crushing strength & efflorescence testing results of bricks	C11	53
12.	Structural fabrication & erection sheet	C12	54

**FORMAT NO.: C1**

**RECORD OF CALIBRATION OF MEASURING/TESTING EQUIPMENTS**

Project :  
 Client :  
 Name of Work :

Job No. :  
 Contractor :

Sl. No.	Name of Equipment/Apparatus	Model No.	Certificate No.	Calibrated By	Calibration Date	Next Calibration Due on	Remarks	Accepted	
								Contractor	EIL
	Total Station								
	Auto Level								
	Steel measurement tapes								
	Cross staff								
	Distomat								
	All balances								
	Weigh Batcher								
	Cube testing Machine								
	Pressure Gauges								
	Dial gauges								
	Dead weight tester								
	Vernier caliper/ screw gauge								
	Holiday tester								
	Universal Testing Machine								
	Charpy V-notch Impact testing machine								
	Hardness Testing Machine								
	Various Digital and Analog meters								
	Variable current, voltage and resistance generators								
	Temperature/ Pressure Recorders								
	Temperature gauges including RTDs								
	Thermocouples								
	Vibration probes								
	Decibel-meter								
	Any other								

FORMAT NO.: C2

**SURVEYING AND LAYOUT RECORD**

Project :

Job No :

Client :

Contractor :

Name of Work :

1. Reference Drawing :
2. Reference Grid Pillars :
3. Reference Bench Mark/Reduced Level :
4. Co-ordinates :
5. Reduced Level :
6. Closing error, if any :
7. Layout Sketch :

( CONTRACTOR )

( EIL )

( CLIENT )

Date :

FORMAT NO. : C3

TEST REPORT FOR DETERMINATION OF DRY DENSITY & MOISTURE CONTENT OF SAND/SOIL

Project :  
Client :  
Name of Work :  
Location :  
Job No :  
Contractor :  
Layer No :

S. No.	Description	Relation	Test Nos:						Remarks
			1	2	3	4	5	6	
1.	Wt. of mould + wt. of wet soil/sand	$W_1$ gm							
2.	Wt. of mould	$W_2$ gm							
3.	Wt. of wet soil/sand	$(W_1 - W_2)$ gm							
4.	Volume of mould	V cc							
5.	Density of wet soil/sand	$D_w = (W_1 - W_2)/V$ gm/cc							
6.	Wt. of wet sample taken	$W_w$ gm							
7.	Wt. of sample after drying	$W_d$ gm							
8.	Moisture Content (or directly by moisture meter)	$Mc = (W_w - W_d)/w_d \times 100\%$ (or "R" directly by rapid moisture meter)							
9.	Moisture Content after correction (in case of rapid moisture meter)	$MC = R/(100-R) \times 100$							
9.	Dry density	$D_d = D_w/(1+Mc)$ gm/CC							
10.	Laboratory Max dry density	gm/cc							
11.	Degree of Compaction	%							
12.	Required degree of compaction	%							
13.	Obtained degree of compaction	$DOC = D_{fd} / D_{id} \times 100$							
13.	Optimum Moisture Content (OMC)	%							

( TESTED BY/LAB-IN-CHARGE )

( CONTRACTOR )

( EIL )

Date :

FORMAT NO. : C4  
RECORD OF APPROVAL OF SOURCE(S) FOR  
AGGREGATES,SOIL

Project : Job No :  
Client : Contractor :

Name of Work :

1. Reference :
2. Material :
3. Location of Source :
4. Approx. distance from the site :
5. Physical Properties
  - a) Colour (as applicable) :
  - b) Shape (as applicable) : Rounded/Irregular
  - c) Texture (as applicable) : Glossy/Smooth/Granular

6. Tests conducted at :
7. Code of Conformance :
8. Test Report Reviewed : Satisfactory/Un-satisfactory
9. Remarks : The source is approved/not approved
10. Explanation if any :

Enclosures :

- a) Reviewed Test Reports
- b) Request of contractor, if available

COMMITTEE MEMBERS :

APPROVED :

- i) EIL :
- ii) Client :

Signature of the contractor :

Date :

Place :

**FORMAT NO. : C5**  
**SIEVE ANALYSIS REPORT**

Project : \_\_\_\_\_ Name of Work : \_\_\_\_\_  
Client : \_\_\_\_\_ Contractor : \_\_\_\_\_  
Wt. of Sample taken : \_\_\_\_\_ Date : \_\_\_\_\_  
Date on which sample taken : \_\_\_\_\_

**FINE AGGREGATE**

S. No.	Sieve Size	Weight Retained (gm)	Percentage Retained	Cumulative % Retained	% Passing	Fineness Modulus	Zone (As per IS:383)	Remarks
1.	4.75mm							
2.	2.36mm							
3.	1.18mm							
4.	600 u							
5.	300 u							
6.	150 u							
7.	Pan							

**COARSE AGGREGATE/ROAD METAL**

		Wt. of Sample taken :		Passed/ Failed (As per IS:383/EIL Spec 6-64-0018)		Remarks	
1.	125mm						
2.	90mm						
3.	80mm						90-45 (Gr-I),
4.	63mm						63-45 (Gr-II),
5.	53mm						13.2mm (screening) for
6.	45mm						road work
7.	40mm						
8.	22.4mm						
9.	20mm						
10.	16mm						40mm down for PCC
11.	13.2mm						20mm down for RCC
12.	12.5mm						
13.	11.2mm						
14.	10mm						
15.	5.6mm						
16.	4.75mm						
17.	2.36mm						
18.	180 u						

(TEST BY/LAB-IN-CHARGE)

(CONTRACTOR)

(EIL)

**FORMAT NO. : C6**  
**UNDERGROUND PIPING-TEST REPORT (RCC/CI)**

Project : \_\_\_\_\_  
 Client : \_\_\_\_\_  
 Name of Work : \_\_\_\_\_  
 Job No : \_\_\_\_\_  
 Contractor : \_\_\_\_\_

1. Reference Drawing : \_\_\_\_\_
2. Location : \_\_\_\_\_
3. Line Designation : \_\_\_\_\_
4. Type of Pipe & System : \_\_\_\_\_
5. Specification : \_\_\_\_\_
6. Dia of Pipe : \_\_\_\_\_
7. Gradient : \_\_\_\_\_
8. Type of Manhole : \_\_\_\_\_
9. Test (s) Conducted : \_\_\_\_\_
10. Date of Testing : \_\_\_\_\_
11. Remarks, if any : \_\_\_\_\_

Date : \_\_\_\_\_

EIL

CLIENT

FORMAT NO. : C7  
CEMENT TESTING RESULT REPORT

Project : Job No :  
Client : Contractor :  
Name of Work :  
Brand of Cement : Consignment No. :  
Wt. of sample taken : Sample Collected on :  
Room Temperature :

**A. CONSISTENCY**

Trial No.	Wt. of Cement (gm)	Wt. of Water Added (gm)	% of Water	Reading on Indicator (mm)	Consistency	Remarks

**B. SETTING TIME**

Trial No.	Wt. of Cement (gm)	Wt. of Water Added (gm)	W/C Ratio	Time Recorded When Water Added	Time Recorded At set	Initial Set	Final Set	Setting Time	Remarks

**C. FINENESS**

Trial No.	Wt. of Cement <i>Sample Used</i>	Retained on 90 $\mu$ IS sieve in gm	% Retained	Remarks

**D. COMPRESSIVE STRENGTH**

Cube Size : 7.06X7.06X7.06 cm

Trial No.	Mix Proportion	Date of		Age of Specimen	Crushing Surface Area (Cm <sup>2</sup> )	Crushing Load (Kg)	Crushing Strength (Kg/Cm <sup>2</sup> )	Remarks
		Casting	Testing					

( TESTED BY )/LAB-IN-CHARGE

( CONTRACTOR )

( EIL )

Date :

FORMAT NO. : C8  
POUR CARD-I (PROGRAMME OF CONCRETING)

<b>Contractor :</b>		<b>Client :</b>	
<b>Name of work :</b>			
1.	Reference document :		
2.	Type of structure :	Location :	
3.	Levels From :	To :	
4.	Grade of concrete/ Approved Design Mix		
5.	Brand name, Grade and Consignment no. of cement		
6.	Estimated volume of concrete :		
7.	Quantity of cement required :		
8.	<b>Reinforcement checking details :</b>		
		No.	Dia.
			Length
	a) Laps		
	b) Separators		
	c) Chairs		
	d) Any other		
	Remarks		
9.	<b>Pre pour inspection details</b>	<b>Checked</b>	<b>NA</b>
	a) Survey/ Layout		
	b) Sub soil compaction		
	c) Completion of underground works		
	d) Cleanliness		
	e) Cover to reinforcement		
	f) Anchor bolts/Insert plates		
	g) Sleeves/ pockets		
	h) Water stops		
	i) Formwork		
	j) Slopes		
	k) Construction/ Expansion joints		
	l) Admixtures		
	m) Any other		
	Remarks		
10.	Clearance for Electrical/ Mechanical works required/ not required :	<i>Electrical</i>	<i>Mechanical</i>
11.	The above structure is finally inspected on _____ at _____ AM/PM and found/ not found satisfactory for concreting.		
	Remarks, if any		

(Contractor)  
Name  
Designation  
Date

(EIL)  
Name  
Designation  
Date

(Client/ Owner)  
Name  
Designation  
Date

**FORMAT NO. : C9**  
**POUR CARD-II (OBSERVATIONS DURING CONCRETING)**

<b>Contractor :</b>		<b>Client :</b>	
<b>Name of work :</b>			
1.	a) Quality of coarse aggregates	Satisfactory <input type="checkbox"/>	Not satisfactory <input type="checkbox"/>
	b) Quality of fine aggregates	Satisfactory <input type="checkbox"/>	Not satisfactory <input type="checkbox"/>
	c) Bulmage of sand taken into account	Yes <input type="checkbox"/>	No <input type="checkbox"/>
2.	Quality of water	Satisfactory <input type="checkbox"/>	Not satisfactory <input type="checkbox"/>
3.	<b>Machinery mobilization</b>	<b>Nos.</b>	<b>Stand by</b>
	a) Mixture machine		
	b) Ready mixed concrete dumpers		
	c) Vibrators		
	d) Pumps		
	e) Hoists		
4.	Pour start time	: AM/PM ;	Date :
5.	Slump		
6.	W/C Ratio		
8.	Type of weather	Normal <input type="checkbox"/>	Abnormal <input type="checkbox"/>
	Details of abnormality : (Precautions taken for <5°C and >40°C, rainy season)		
10.	Number of cubes taken & Cube identification number/marks		:
11.	Quantity of concrete poured		:
12.	Pour completion time	: AM/PM ;	Date :
13.	Curing method :		
	<input type="checkbox"/> Traditional	<input type="checkbox"/> Curing compound	
	<input type="checkbox"/> Blankets/ foils/ gunny bags	<input type="checkbox"/> Others (specify)	
14.	Period for removal of form work		:
15.	Any defect(s) observed during concreting :		

**(Contractor)**  
Name  
Designation  
Date

**(EIL)**  
Name  
Designation  
Date

**(Client/ Owner)**  
Name  
Designation  
Date

**FORMAT NO. : C10**  
**CRUSHING STRENGTH TESTING RESULTS OF CONCRETE CUBES**

Project : \_\_\_\_\_ Job No : \_\_\_\_\_  
 Client : \_\_\_\_\_ Contractor : \_\_\_\_\_  
 Name of Work : \_\_\_\_\_  
 Grade of Concrete : \_\_\_\_\_ Type of Cement : \_\_\_\_\_  
 W/C Ratio : \_\_\_\_\_ Max. size of Aggregate : \_\_\_\_\_

Cube No.	Id. Mark on cube	Type & Location of Structure	Date of		Age (days)	Dimensions of Cube			Vol. of Cube (m <sup>3</sup> )	Wt. of Cube (Kg)	Unit WT. (Kg/m <sup>3</sup> )	Surface Area (mm <sup>2</sup> )	Crushing Load (Kn)	Crushing Strength (N/mm <sup>2</sup> )	Average Compressive Strength	Remarks
			Casting	Testing		L (Cm)	B (Cm)	H (Cm)								

( TESTED BY)/LAB-IN-CHARGE

( CONTRACTOR )

( EIL )



**FORMAT NO. : C12**  
**STRUCTURE FABRICATION & ERECTION SHEET**

Project : Job No :  
 Client : Contractor :  
 Name of Work :  
 Reference Drawing : Location/Coordinates/Grids :

Layout Clearance obtained : Yes/No

S. No.	Item No.	Material & Dimensional clearance	Shop Fit up		Shop welding		Cleaning & primer painting		Erection Fit up		Alignment & leveling		Field welding		Grouting clearance		Final Painting & thickness		Remarks
			Con	EIL	Con	EIL	Con	EIL	Con	EIL	Con	EIL	Con	EIL	Con	EIL	Con	EIL	

**Abbreviations:**

Con : Contractor's signature with date

# SECTION - C

**FORMATS**

**FOR**

**UNDERGROUND PIPING WORKS**

CONTENTS

S.NO	DESCRIPTION	FORMAT NO.	PAGE NO.
1.	Daily fit up inspection & traceability report	P1	58
2.	Weld visual inspection report	P2	59
3.	Radiography offering report	P3	60
4.	Radiography interpretation report	P4	61
5.	Piping hydrostatic test release record	P5	62
6.	Piping hydrostatic test acceptance record	P6	63
7.	Line wise record	UG1	64
8.	U/G piping system testing record	UG2	65

FORMAT NO. : P1

**DAILY FIT UP INSPECTION & TRACEABILITY REPORT**

Project :  
Client :  
Name of Work :  
Report No. :

Job No :  
Contractor :  
Date :

Sl. No.	Service/Line No.	Dia.	Joint No.	Type	Inch Mtr.	Manufacturers Heat No.	Clearance	Remarks
		<b>TOTAL INCH DIA.</b>			<b>TOTAL INCH MTR.</b>			

Total Inch	Previous	Till Date
Diameter		
Meter		

G – Butt Weld	S – Socket Weld	B – Branch Weld	M – Mitre Weld
---------------	-----------------	-----------------	----------------

(CONTRACTOR)

(EIL)

FORMAT NO. : P2  
WELD VISUAL INSPECTION REPROT

Project : Job No :  
Client : Contractor :  
Name of Work :  
Report No. : Date :  
WPS No. :

Sl. No.	Service/Line No.	Dia.	Joint No.	Type	Welder No.	Visual Inspection Clearance	Remarks
<b>Total inch Dia</b>							

WORK LOAD =  
PREVIOUS =  
TILL DATE =  
% PROGRESS =

G - BUTT WELD  
S - SOCKET WELD  
B - BRANCH WELD  
M - MITRE WELD

CONTRACTOR

EIL



FORMAT NO. : P4  
RADIOGRAPHY INTERPRETATION REPORT

Project : Job No :

Client : Contractor :

Name of Work :

Radiography Technique : SWSI/DWSI/DWDI

Source : Ir192  , X-Ray  , Cobalt 60

Film Type & Make :

IQI : Date :

Radiography Procedure No. :

Sl. No.	Service/ Line No.	Dia.	Joint No.	Welder No.	Radiography No.	Segment	Results	Joint Status A/R/H

SWSI - SINGLE WALL SINGLE IMAGE  
DWSI - DOUBLE WALL SINGLE IMAGE  
DWDI - DOUBLE WALL DOUBLE IMAGE

A - ACCEPTED  
R - REPAIR  
H - HOLD  
S/C - SURFACE CHECK  
RT - RETAKE

CONTRACTOR

EIL

FORMAT NO. : P5  
PIPING HYDROTESTATIC TEST RELEASE RECORD

Project : Job No :  
Client : Contractor :  
Name of Work :

Plan : _____		Date : _____	
Loop No : _____		Area : _____	
		REF P & ID No. : _____	
		INCH MTR : _____	
		From _____ To _____	
	Line No. (s)	Isometric No. (s)	P&ID No. (s)
Test Medium :		Test Duration :	Design/Test Pressure :
Test Pressure Gauge No.	Range	Calibration Certificate No.:	Gauge Calibration Date:
Items to check		Accept	Witness
		Contractor	EIL
Field Installation Checklist Prior to Hydrostatic test Signed			
Punch list Prepared		Yes	No
Pre – Hydrostatic test Punch items Cleared			
Accessibility to Inspection/Witness Locations			
Capacity of pressurizing pump checked			
Cordon off area for high pressure testing, as required			
Pre-hydrostatic test flushing carried out			
IBR/Others test V/witnessing Required		Yes	No
System Released for Pressure Testing :			
Contractor :		EIL:	
Sign :	Name :	Sign :	Name :
Date :		Date :	
Designation :		Designation:	

**FORMAT NO. : P6**  
**PIPING HYDROSTATIC TEST ACCEPTANCE RECORD**

ACTIVITY	Date	Time
Water Filling and Venting started at		
Water Filling Completed		
Vents Closed		
Isolation of Pressurizing pump		
Test completed at :		
- Water drained		
- Air		
- Temp Blinds Removed		
- Checked for reinstallation of a. Valves b. Others		
- Cold setting of spring supports carried out		
Contractor :	EIL :	
Sign :	Sign:	
Date :	Date:	
Name :                      Designation	Name:	Designation:
	Reviewed by EIL Lead Engineer/ Area Coordinator :	
	Sign:	
	Date:	
	Name:	Designation:

**FORMAT NO. : UG1  
LINEWISE RECORD**

Project : \_\_\_\_\_ Job No : \_\_\_\_\_  
Client : \_\_\_\_\_ Contractor : \_\_\_\_\_  
Name of Work: \_\_\_\_\_  
Plant : \_\_\_\_\_ % Radiography : \_\_\_\_\_  
Loop No. : \_\_\_\_\_

Sl. No.	Dia.	Jt. No	Type	Fit-up Clearance Date	Welder No.	Date of Welding	Radiography		Stress Relieve Chart No.	Hardness	Hydrostatic test Date	Clearance date for				Remarks	
							No.	Result & Date				Cleaning & Priming	Wrapping / Coating / Epoxy Coating & repair (if any) for 3LPE Pipe	Trench Level Checking	Holiday Checking		Lowering Back-Filling

CONTRACTOR  
Date:

EIL

FORMAT NO. : UG2  
U/G PIPING SYSTEM TESTING RECORD

ACTIVITY	Date	Time
Air/Water Filling and Venting started at		
Water Filling Completed/Air pressure achieved		
Vents Closed (for water testing)		
Isolation of Pressurizing pump/compressor		
Visual Test/Soap Bubble check completed at :		
- Water drained/Air depressurized		
- Drying, if applicable		
- Temp Blinds Removed		
- Checked for reinstallation of a. Valves b. Others		
Contractor :	EIL :	
Sign :	Sign:	
Date :	Date:	
Name :                      Designation	Name:	Designation:
	Reviewed by EIL EIL Lead Engineer/Area Coordinator :	
	Sign:	
	Date:	
	Name:	Designation:

# INSPECTION & TEST PLAN (ITP) FOR MECHANICAL WORKS (ITEM RATE CONTRACTS-WITH CATEGORIZATION)

2	15.06.2022	Revised & Updated	DK	DG	JPV	SM
1	14.01.2019	Revised and Reissued	SKG	AP	AKK	RKT
0	14.01.2014	ISSUED AS STANDARD SPECIFICATION	SM	DJ	RKD	SC
Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
						Approved by

**Abbreviations:**

A/G	:	Above Ground
AFC	:	Approved for Construction
AS	:	Alloy Steel i.e. Cr-Mo steels like A335 Gr P11, P5, P9,P22,etc.
CFB	:	Ceramic Fibre Blankets
CS	:	Carbon Steel
CSO	:	Car Seal Open
FD	:	Free Draught
GAD	:	General Arrangement Drawings
HIC	:	Hydrogen Induced Cracking
I/S	:	Inner Side
IBR	:	Indian Boiler Regulations
ID	:	Induced Draught
LO/ LC	:	Lock Open/ Lock Close
LTCS	:	Low Temperature Carbon Steel
MRIR	:	Material Receipt Inspection Report
MT	:	Magnetic Particle Testing
NACE	:	National Association of Corrosion Engineers
NDT	:	Non Destructive Testing
NRV	:	Non Return Valve
O/S	:	Outer Side
ODC	:	Over Dimension Consignment
PMI	:	Positive Material Identification
PQR	:	Procedure Qualification Record
PT	:	Penetrant Testing
PWHT	:	Post Weld Heat Treatment
RF	:	Reinforcement
RT	:	Radiographic Testing
SS	:	Stainless Steel like A312 TP 304, 316, 321, 304L, 316L, 316Mo, etc.
SSCC	:	Sulphide Stress Corrosion Cracking
TSR	:	Tray Support Ring
UDFC	:	Under Down Flow Clearance
WPS	:	Welding Procedure Specification

**Construction Standards Committee**

**Convenor:** Sh. John Paul V , ED (Construction)

**Members:** Sh. Janak Kishore, ED (Projects)  
Sh. Chinmoy Kapuria, Sr. GM (SCM)  
Sh. Udayan Chakravarty, Sr. GM (Piping)  
Sh. Ravindra Kumar, Sr. GM (Construction)  
Sh. Debasish Ghosal, GM (Construction)  
Sh. Pankaj Kumar Rai, DGM (Construction)

CONTENTS

S.NO	DESCRIPTION	DOCUMENT NO.	PAGE NO.
<b>SECTION – A</b>			
<b>ITPs FOR MECHANICAL WORKS</b>			
1.	Above Ground Piping	6 – 82 - 3210	5
2.	Installation of Column Internals	6 – 82 - 3220	8
3.	Fired Heaters (Fabrication & Erection)	6 – 82 - 3230	10
4.	Refractory & Insulation Works (Fired Heaters)	6 – 82 - 3240	14
5.	Equipment Erection (Static)	6 – 82 - 3250	20
6.	Equipment Erection (Rotary)	6 – 82 - 3260	23
7.	Crane (EOT/HOT)	6 – 82 - 3270	26
8.	Storage Tanks	6 – 82 - 3280	27
<b>SECTION – B</b>			
<b>FORMATS FOR MECHANICAL WORKS</b>			33

## GENERAL NOTE

*The enclosed ITP's shall be followed for the works to be performed by the contractor. The provisions indicated for stage wise inspection by EIL/Owner (For specific activities), which may be modified in line with EIL scope of services as per the contract between EIL and Owner. Activities for which ITP's are not given, contractor to develop and get the same approved by EIL/Owner well before start of the work. In general role of EIL has been specified in the document. The role of owner to be specified during preparation of site specific ITPs.*

*Contractor to submit required reporting formats and job procedures for each activity listed in ITP's to EIL/Owner for approval, well before commencement of the activity. If the contractor has to deviate from the given ITP for a valid reason, he shall obtain prior written approval of EIL/Owner. Contractor to carry out 100% examination of all activities.*

## LEGEND

**HP** : **Hold Point ;**

An activity which requires witnessing/inspection/verification and acceptance by Owner/EIL before any further processing is permitted.

The Contractor shall not process the activity/item beyond a Hold Point without written approval by Owner/EIL except where prior written permission for further processing is available.

**W** : **Witness Point :**

An activity which requires witnessing/inspection/verification by Owner/EIL when the activity is performed.

After proper notification has been provided (notification modalities and period shall be finalized beforehand), the Contractor is not obliged to hold further processing if Owner/EIL is not available to witness the activity or does not provide comments before the date notified. Basis of acceptance shall be as per relevant technical specification.

**Rw** : **Review** of Contractor's documentation.

**S** : **Surveillance** Inspection by Owner/ EIL.

Monitoring or making observations to verify whether or not material/items or services conform to specified requirements. Surveillance activities may include audit, inspections, witness of testing, Review of quality documentation & records, personnel qualifications, etc.

**WC** : **100%** Examination by Contractor.

**Responsibility for execution of the inspection/testing is with the Contractor; Owner/EIL only verifies examination or testing done by the Contractor at important stages**

ITP NO: 3210

ABOVE GROUND PIPING

(sheet 1of 3)

Sl. No	Activity	Contractor	EIL		Records to be Submitted/ Format No.
			CAT A	CAT B	
<b>A.</b>	<b>PRIOR TO FABRICATION</b>				
1.	Incoming Material a) Owners supply	Contractor to check all free issue materials and maintain records of MIV for material issued by owner/EIL			
	b) Contractors supply	WC	Note -1		Format M2
2.	Welding Filler Material Approval/Qualification a) Review of Manufacturer's Test Certificates/Documents & Sampling	WC*	HP*	Rw*	Format M3, M4
	b) Laboratory Testing, if any	WC	W	W	Format M3, M4
3.	WPS/PQR				
	a) Review of proposed procedure	WC	Rw	Rw	Format M5
	b) Welding of Test Coupons and subsequent testing	WC	W	W	Format M6
	c) Approval of final WPS/PQR	WC	HP	HP	Format M5, M6
4.	Welder performance Qualification	WC	W	W	Format M7
5.	Certification & approval of welders.	WC	HP	HP	Format M8
6.	NDT Procedure Qualification				
	i) Review of proposed procedure	WC	Rw	Rw	Yes
	ii) Witnessing of Proposed Procedure Testing	WC	W	W	Yes
	iii) Approval of Qualified Procedure	WC	HP	HP	Yes
7.	Review of Joint numbering in Isometrics (Big & Small bore)/Sketches	WC	Rw	Rw	Yes
8.	Lines where Isometrics not available a) Preparation of sketches	WC	Rw	Rw	Yes
	b) Joint Numbering in sketches	WC	Rw	Rw	
9.	Material traceability & Transfer of Heat Nos.	WC	HP	S	Format M9

\* a) Notwithstanding any other tests/documentation required for qualification/approval of filler metals :

- i) For Alloy Steel & Stainless Steel welding filler metals, chemical analysis to be carried-out for every batch.
- ii) For Low Temperature Services piping, Impact testing to be carried out for every batch of the filler metal, to be witnessed by PMC/owner

b) For NACE filler metals, corrosion tests like HIC, SSCC, etc. to be carried out for every batch. However, HIC/SSCC tests done earlier & duly witnessed by a reputed third party, will be acceptable.

ITP NO: 3210

ABOVE GROUND PIPING

(sheet 2 of 3)

Sl. No.	Activity	Contractor	EIL		Records to be Submitted/ Format No.
			CAT A	CAT B	
<b>B.</b>	<b>FABRICATION/ERECTION</b>				
1.	Material as per piping class (check w.r.t. approved colour coding procedure), Fit-up check and Traceability check.	WC	W	S	Format M10
	a) Dimensional checks	WC	W	S	
	b) Fit-up check for butt joints and socket joints	WC	W	S	
	c) Fit-up checks for branch joints	WC	W	S	
2.	Pre-heat (if any)	WC	S	--	
3.	Certificate of purity of purging/shielding Gas (if any)	WC	Rw	--	Yes
4.	Purging rate (if any) and arrangement	WC	S	--	
5.	Shielding rate (if any)	WC	S	--	
6.	Baking of Electrodes	WC	S	--	
7.	Inter-pass cleaning & Temperature check.	WC	S	--	
8.	Visual Examination of completed welds having				
	a) Random Radiography	WC	W	S	Format M11
	b) 100% Radiography	WC	S	---	Format M11
9.	a) Monitoring of PWHT Cycle	WC	S	--	
	b) Review of Time – Temperature graph	WC	Rw	Rw	Yes
10.	Hardness Check	WC	S	--	Format M12
	a) For CS material				
	b) For AS Materials	WC	W	S	Format M12
11.	a) PT/MT (Branch Joints)	WC	W	W	Format M13, M14
	b) PT /MT (Others)	WC	W	S	Format M13, M14
12.	a) Identification of Joints for Radiography (for Random Radiography only)	WC	S	--	Format M15
	b) Check shot for radiography	WC	HP	HP	Format M15
13.	Review of Radiographs interpreted by the Contractor	WC	HP	W	Format M16
	a) For Carbon Steel Piping				
	b) For Alloy Steel/SS Piping	WC	HP	W	Format M16
14.	Check shot for Radiography	WC	W	Rw	Format M16
15.	MUT activities at Site	WC	W	W	--
16.	PAUT/TOFD activity at Site	WC	S	S	--
17.	Interpretation of PAUT/TOFD	WC	HP	W	--
18.	Surface cleaning and primer application	WC	W	S	Format M17
19.	Lifting arrangement (for critical piping only)	WC	Rw	Rw	Yes
20.	Test certificates for lifting tackles	WC	Rw	Rw	Yes
21.	Location and orientation of Branch connections	WC	Rw	Rw	Format M51
22.	Provision of Inst. Tappings	WC	HP	W	Format M51
23.	Provision of vents and drains	WC	Rw	Rw	Format M51
24.	Correctness of type of supports, Anchors, Guides	WC	HP	W	Format M51
25.	Correctness of gaskets/ fasteners	WC	W	S	Format M51
26.	Correctness of valves (NRV, Gate, Globe, control Valves etc), steam traps and their direction of flow.	WC	HP	W	Format M51
	a) C.S. piping				
	b) A.S. Piping, S.S Piping, NACE piping	WC	HP	W	Format M51
27.	Provision of cold pull, if any.	WC	HP	W	Format M51
28.		WC	HP	W	Format M51

ITP NO: 3210

ABOVE GROUND PIPING

(sheet 3 of 3)

Sl. No.	Activity	Contractor	EIL		Records to be Submitted/ Format No.
			CAT A	CATB	
<b>C</b>	<b>PROOF TESTING</b>				
1.	Procedure Review	WC	Rw	Rw	Format M52
2.	Correctness of Testing arrangements	WC	S	--	Format M52
3.	Check all valves kept open and confirm that testing is not done against closed valve seat	WC	W	S	Format M52
4.	Isolation of equipments, control valves, Instruments, bellows. Removal of flappers from check valves	WC	W	S	Format M52
5.	Scrutiny of test packs for Mechanical & NDT Clearance	WC	HP	W	Format M51, Format M21
6.	Positive Material Identification as per specification after completion of installation.	WC	Rw	--	Format M18
7.	Preparation of Punch list .	WC	W	W	Format M53
8.	Review of Punch List prepared by Contractor	WC	Rw	Rw	Format M53
9.	Liquidation of check list, if applicable.	WC	HP	HP	Format M53
10.	Review of Calibration certificates of pressure Gauges	WC	Rw	Rw	Format M1
11.	Field Calibration, if any	WC	S	--	Yes
12.	Air/Water Flushing (preliminary)	WC	S	S	---
13.	Visual inspection of all weld joints for leak during Pneumatic/ Hydrotesting	WC	HP	W	----
14.	Draining of Water & Air Drying	WC	S	S	Format M52
15.	Removal of temporary blinds/supports	WC	W	S	Format M52
16.	Pickling of system, if required	WC	W	S	Format M19
17.	Boxing up including reinstallation of flappers of check valves (After Hydrotest)	WC	W	--	Annex-2
18.	Review of Records of fasteners & gaskets	WC	Rw	Rw	Yes
19.	Torque tightening/ tensioning of flange joints, wherever applicable	WC	W	S	Yes **
20.	System testing	WC	HP		Format M20
21.	Setting of spring supports	WC	HP		Format M52
22.	Modification of Tested lines.	WC	Rw	Rw	Format M54
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Rw	Yes

**NOTE :** 1) For Incoming material Inspection please refer ITP no: 6-82-1010

2) Pre-commissioning activities such as chemical cleaning, card board blasting, system testing are not covered by these ITP's. The contractor shall develop ITP's for such activities and obtain Owner/ PMC/ Licensor's approval.

\*\* Refer Procedure for Identification and Boxing up of flange joints not subjected to hydrostatic test at site No. 5-7700-0120, enclosed elsewhere in the contract.

**CAT A:** All services involving hydrogen and hydrogen bearing fluid, all SS, AS, NACE, LTCS, clad Inconel, piping, SHP/HP Steam piping. All CS piping for process lines all steam lines under purview of IBR and excluding category Jacketed piping.

**CAT B,** Piping for "D" class fluid, Non IBR portion of condensate & steam lines

ITP NO: 3220

COLUMN INTERNALS

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT A	
<b>INSTALLATION OF COLUMN INTERNALS</b>				
<b>A.</b>	Before Installation			
1.	Internal Installation Procedure including identification of confined space hazards & mitigation thereof	WC	Rw	Yes
2.	Material inspection	WC	HP	Note-1
3.	Level check on TSRs	WC	S	Format M49
4.	Check for downcomer clearance and Tray clearance	WC	S	Format M49
5.	Distance between TSRs	WC	S	Format M49
<b>B.</b>	<b>After Installation - Check for</b>			
1.	Exit weir height	WC	S	Format M49
2.	UDFC	WC	S	Format M49
3.	Tightness of bolts	WC	S	Format M49
4.	Orientation and tightness of clamps	WC	S	Format M49
5.	Provision of lock nuts/seal plates	WC	HP	Format M49

ITP NO: 3220

COLUMN INTERNALS

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT A	
6.	Correctness of installation of shimming/bolting for top downcomer	WC	HP**	Format M49
7.	Correctness of gasketing (if any)	WC	S	Format M49
8.	Tray to tray distance and level of trays	WC	S	Format M49
9.	Leak testing of seal pans as applicable	WC	S	Format M49
10.	Damaged, missing valves and valve movements for valve trays	WC	S	Format M49
11	Fitting of proper valve combination	WC	S	Format M49
12	Damage to deck components	WC	S	Format M49
13	Level and alignment of inlet weir and exit weir	WC	S	Format M49
14	Check for slots on tray components to be fully covered	WC	S	Format M49
15	Gaps at downcomer ends	WC	S	Format M49
16	Removal of temporary plugs after testing	WC	S	Format M49
17	Cleaning of all trays & inside of equipment	WC*	HP	Format M49
18	Certification of installation by Vendor's representative, Final boxing up, if any.	WC*	HP**	Format M50
<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Yes

\* 100% Check for All activities by Vendor Representative pertaining to material receipt, identification, pre-installation checks and installation to be carried out in the presence of Vendor's representative and duly certified and documented for submission as final document

\*\* By Owner/Process Licensor

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT A: All works

ITP NO: 3230

FIRED HEATERS

(sheet 1 of 4)

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT A	
<b>A.</b>	<b>PRIOR TO FABRICATION</b>			
1.	Incoming Material c) Owner's supply	Contractor to check all free issue materials and maintain records of MIV for material issued by owner/EIL		
	d) Contractors supply	WC	Note -1	Format M2
2.	Welding Filler Material Approval/Qualification			
	a) Review of Manufacturer's Test Certificate/Documents	WC	HP*	Yes
	b) Laboratory testing, if any			
	i) Carbon Steel	WC	Rw	Format M3, M4
	ii) Alloy Steel/Stainless Steel	WC	W	Format M3, M4
3.	WPS/PQR			
	a) Review of proposed Procedure	WC	Rw	Format M5
	b) Welding of Test Coupons and subsequent testing			
	i) Carbon Steel	WC	W	Format M6
	ii) Alloy Steel/Stainless Steel	WC	W	Format M6
	iii) All other materials including NACE CS, CS for H <sub>2</sub> Service	WC	W	Format M5, M6
	c) Approval of final WPS/PQR	WC	HP	Format M5, M6
4.	Welder performance Qualification Test	WC	S/Rw	Format M7
5.	Certification & Approval of welders before deployment on job	WC	HP	Format M8
6.	NDT Procedure Qualification			Yes
	a) Review of proposed Procedure	WC	HP	Yes
	b) Witnessing of Proposed Procedure Testing	WC	W	Yes
	c) Approval of Qualified Procedure	WC	HP	Yes
7.	Joint Numbering for coils/ pressure parts	WC	S	Yes
<b>B.</b>	<b>FABRICATION</b>			
	STEEL WORK			
1.	Materials as per AFC drawing	WC	S	Format M10
2.	Dimensional check	WC	S	Format M10
3.	Fit-up check	WC	S	Format M10

\* Notwithstanding any other tests/documentation required for qualification/approval of filler metals:

- i) For Alloy Steel & Stainless Steel welding filler metals, chemical analysis to be carried out for very batch.
- ii) For NACE filler metals, corrosion tests like HIC, SSCC, etc. to be carried out for every batch. However, HIC/SSCC tests done earlier & duly witnessed by a reputed third party, will be acceptable.

ITP NO: 3230

**FIRED HEATERS**

(sheet 2 of 4)

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT A	
	Weld Visual Inspection	WC	W	Format M11
4.	Radiography, as applicable			Yes
	a) RT Marking (for random/spot radiography only)	WC	S	Format M15
	b) RT Interpretation	WC	W	Format M16
5.	Completion of structures as per AFC drawings(including trial/mock assembly)	WC	W	Yes
6.	Surface cleaning for primer painting	WC	W	Format M17, Note-2
7.	Primer Coating as applicable	*	*	Format M17, Note-2
<b>C</b>	<b>COIL WORK</b>			
1.	a) Material as per specification (check w.r.t. approved colour coding procedure)	WC	W	Yes
	b) Dimensional checks	WC	S	---
	c) Fit-up check for butt joints and socket joints	WC	S	Format M10
	d) Fit-up checks for branch joints	WC	S	Format M10
	e) Cold Pull Check	WC	S	----
	f) Supports and anchor location	WC	S	----
2.	Pre-heat (if any)	WC	S	---
3.	Certificate of purity of purging/shielding Gas (if any)	WC	S	Yes
4.	Purging rate (if any) and arrangement	WC	S	---
5.	Shielding rate (if any)	WC	S	---
6.	Baking of Electrodes	WC	S	---
7.	Inter-pass cleaning & Temperature check	WC	S	---
8.	Visual check of completed welds having	WC	S	Format M11
	a) For Random Radiography	WC	S	Format M11
	b) 100% Radiography	WC	S	Format M11
9.	a)Monitoring of PWHT Cycle	WC	S	
	b)Review of Time – Temperature graph	WC	Rw	
10	Hardness Check			
	(i) For C.S. Coils	WC	S	Format M12
	(ii) For A.S. Coils	WC	W	Format M12
11.	PT/MT	WC	W	Format M13, M14
12.	Radiography marking (for Random Radiography only)	WC	W	Format M15
13.	Radiography Interpretation/ Review	WC	HP	Format M16
	a)For Random Radiography	WC	HP	Format M16
	b) 100% Radiography	WC	HP	Format M16
14.	Check Shot for Radiography, if applicable	WC	W	Format M16
15.	Clearance for Hydrostatic testing	WC	HP	Format M21, M22
16.	Positive Material Identification for base material and welds, as applicable	WC	HP	Format M18
17.	Hydrostatic testing	WC	HP	Format M22

ITP NO: 3230

FIRED HEATERS

(sheet 3 of 4)

Sl. No	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT A	
<b>D.</b>	<b>ERECTION</b>			
1.	Review of foundation check as per AFC drawing and latest heater arrangement drawing	WC	HP	
2.	Lifting arrangements	WC	Rw	Yes
3.	Test certificates for lifting tools and tackles	WC	Rw	Yes
4.	Lifting of radiant section columns and their alignment	WC	S	Yes
5.	Bottom plate fit-up & welding	WC	S	Yes
6.	Radiant shell courses fit-up & welding	WC	S	Yes
7.	Weld visual inspection	WC	S	Yes
8.	Review of radiographs interpreted by the contractors	WC	W	Yes
9.	Cutout			----
	a) Marking for burners, sight doors, soot blowers	WC	S	
	b) Marking for balance cut outs	WC	S	
	c) Cutting	WC	S	
10.	Coil erection in Radiant section			----
	a) Fixing of coil support castings	WC	S	
	b) Clearance for erection of coil	WC	S	
	c) Alignment of completed coil work	WC	W	
11.	Assembly and erection of convection box			
	a) Erection procedure Review	WC	S	Yes
	b) Structural including plate work	WC	S	
	c) End tube sheets and intermediate tube sheets with support brackets	WC	S	
	d) Clearance of coil erection	WC	W	
	e) Erection of box (If applicable)	WC	W	
12.	Check Shot for radiography for coil field joints, if applicable	WC	W	Format M15, M16
13.	Clearance for Hydro test	WC	HP	Format M21 & M22
14.	Hydro test for field Joint	WC	HP	Format M23

ITP NO: 3230

**FIRED HEATERS**

(sheet 4 of 4)

Sl. No	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT A	
15.	Erection, fit-up & welding of stack			
	a) Erection procedure	WC	Rw	Yes
	b) Erection	WC	S	
	c) Alignment	WC	W	
16.	Erection Fit-up, welding of ducts and its support structural	WC	S	Yes
17.	Radiography, as required on steel work			
	a) RT Marking	WC	S	Yes
	b) RT Interpretation	WC	W	Yes
18.	FD & ID Fan	WC	Note 4	Yes
19	Installation of auxiliary equipment			
	a) Burner along with ignition system and transformer	WC	W	Yes
	b) Soot blower alongwith sequential control panel and electrical wirings	WC	W	
	c) Damper and shut-off blades with control panel and winch	WC	W	
	d) Air pre-heater (cast, glass, plate) and steam air heater	WC	W	
	e) Skin thermocouples	WC	W	
	f) Spring Supports	WC	S	
20.	Erection of all platforms. Ladders, Hand rails & miscellaneous structures	WC	S	Yes
21.	Insulation/ refractory lining	WC	Note 3	
22.	Review of Color Codes from Client/EIC	WC	Rw	
23.	Final Painting	WC	Note 2	
24.	Smoke testing of Heater	WC	W	
25.	Liquidation of checklist	WC	HP	Format M26
26.	Final inspection and acceptance	WC	HP	
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review of Test and Inspection documents	WC	Rw	Yes

**NOTE :** 1) For Incoming material Inspection please refer ITP no: 6-82-1010  
2) For cleaning & painting, please refer ITP No. 3301  
3) For Insulation, please refer ITP No. 3305  
4) For Rotary Equipment, please refer ITP No. 2160  
**CAT A:** All works

ITP NO: 3240

REFRACTORY & INSULATION WORKS- FIRED HEATER

(sheet 1of 6)

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT B	
<b>A.</b>	<b>RADIANT SECTION</b>			
<b>1.</b>	<b>RADIANT SHELL</b>			
	Fixing of Ceramic fibre blanket			
	i) Material inspection			Format M2
	- Manufacturing test certificates	WC	Rw	Yes
	- Testing, if any	WC	W	---
	i) Clearance for hot work	WC	HP	Yes
	ii) Marking of studs	WC	S	Yes
	iii) Welding of studs with approved WPS&PQR	WC	S	Yes
	iv) Surface cleaning	WC	S	Yes
	v) Check for individual layers of ceramic fibre blankets and SS foils	WC	W	Yes
	vi) Check for overlap of ceramic blanket	WC	S	Yes
	vii) Fixing of speed fix washer and cup lock	WC	S	Yes
	viii) Cleaning and final inspection	WC	HP	Yes
<b>2.</b>	<b>ARCH PLATE</b>			
	i) Material inspection			Format M2
	- Manufacturing test certificates	WC	Rw	Yes
	- Testing, if any	WC	W	---
	ii) Clearance for hot work	WC	HP	Yes
	iii) Marking of studs/anchors	WC	S	Yes
	iv) Welding of studs/anchors with approved WPS&PQR	WC	S	Yes
	v) Surface cleaning	WC	S	Yes
	vi) Check for individual layers of ceramic Fibre blankets (CFB) modules and SS foils	WC	S	Yes
	vii) Check for overlap of CFB and modules	WC	S	Yes
	viii) Cleaning and final inspection	WC	HP	Yes

ITP NO: 3240

REFRACTORY & INSULATION WORKS- FIRED HEATER

(sheet 2 of 6)

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT B	
<b>3.</b>	<b>FLOOR PLATE</b>			
	Laying of castable/fire bricks			
	i) Material inspection			Format M2
	- Manufacturing test certificates	WC	Rw	Yes
	- Testing, if any	WC	W	---
	ii) Clearance for hot work	WC	HP	Yes
	ii) Surface cleaning	WC	S	Yes
	iv) Check Shelf life prior to application	WC	W	Yes
	v) Check for undulations on floor	WC	S	Yes
	vi) Check for castable mix	WC	W	Yes
	vii) Check for proper compaction	WC	S	Yes
	viii) Check for thickness of castable	WC	S	Yes
	ix) Curing	WC	S	Yes
	x) Cleaning after laying of castable	WC	S	Yes
	xi) Check for cracks and repair	WC	W	Yes
	xii) Fixing of tar paper, if applicable	WC	S	Yes
	xiii) Cleaning and final inspection	WC	HP	Yes
<b>B.</b>	<b>CONVECTION SECTION</b>			
	<b>1)CONVECTION WALLS</b>			
	Laying of castable			
	i) Material inspection			Format M2
	- Manufacturing test certificates	WC	Rw	Yes
	- Testing, if any - Manufacturing test certificates	WC	W/ Rw	Yes

ITP NO: 3240

REFRACTORY & INSULATION WORKS- FIRED HEATER

(sheet 3 of 6)

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT B	
	ii) Clearance for hot work	WC	HP	Yes
	iii) Marking of studs/anchors	WC	S	Yes
	iv) Welding of studs/anchors with approved WPS & PQR	WC	S	Yes
	v) Surface cleaning	WC	S	Yes
	vi) Check for undulations on wall	WC	S	Yes
	vii) Check for castable mixing	WC	W	Yes
	viii) Check for proper compaction	WC	S	Yes
	ix) Check for thickness of castable	WC	S	Yes
	x) Curing	WC	S	Yes
	xi) Cleaning after laying of castable	WC	S	Yes
	xii) Check for cracks and repair	WC	W	Yes
	xiii) Cleaning and final inspection	WC	HP	Yes
	<b>2) END TUBESHEETS</b>			
	Laying of castable			
	i) Material inspection			Format M2
	- Manufacturing test certificates	WC	Rw	Yes
	- Testing, if any	WC	W	Yes
	ii) Clearance for hot work	WC	HP	Yes
	iii) Marking of studs/anchors	WC	S	Yes
	iv) Welding of studs/anchors with approved WPS & PQR	WC	S	Yes
	v) Surface cleaning	WC	S	Yes
	vi) Check for castable mixing	WC	W	Yes
	vii) Check for proper compaction	WC	S	Yes
	viii) Check for thickness of castable	WC	S	Yes
	ix) Curing	WC	S	Yes
	x) Cleaning after laying of castable	WC	S	Yes
	xi) Check for cracks and repair	WC	W	Yes
	xii) Cleaning and final inspection	WC	HP	Yes

ITP NO: 3240

REFRACTORY & INSULATION WORKS- FIRED HEATER

(sheet 4 of 6)

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT B	
<b>3) BREECHING PLATE</b>				
	Laying of castable			
	i) Material inspection			Format M2
	- Manufacturing test certificates	WC	Rw	Yes
	- Testing, if any	WC	W	Yes
	ii) Clearance for hot work	WC	HP	Yes
	iii) Marking of studs/anchors	WC	S	Yes
	iv) Welding of studs/anchors with approved WPR&PQR	WC	S	Yes
	v) Surface cleaning	WC	S	Yes
	vi) Check for undulations on plate	WC	S	Yes
	vii) Check for castable mixing	WC	W	Yes
	viii) Check for proper compaction	WC	S	Yes
	ix) Check for thickness of castable	WC	S	Yes
	x) Curing	WC	S	Yes
	xi) Cleaning after laying of castable	WC	S	Yes
	xii) Check for cracks and repair	WC	W	Yes
	xiii) Cleaning and final inspection	WC	HP	Yes
<b>4) HEADER BOX</b>				
	Laying of castable			
	i) Material inspection			Format M2
	- Manufacturing test certificates	WC	Rw	Yes
	- Testing, if any	WC	W	Yes
	ii) Clearance for hot work	WC	HP	Yes
	iii) Marking of studs/anchors	WC	S	Yes
	iv) Welding of studs/anchors with approved WPR&PQR	WC	S	Yes
	v) Surface cleaning	WC	S	Yes
	vi) Check for undulations on box	WC	S	Yes
	vii) Check for castable mixing	WC	W	Yes
	viii) Check for proper compaction	WC	S	Yes
	ix) Check for thickness of castable	WC	S	Yes
	x) Curing	WC	S	Yes
	xi) Cleaning after laying of castable	WC	S	Yes
	xii) Check for cracks and repair	WC	W	Yes
	xiii) Cleaning and final inspection	WC	HP	Yes

ITP NO: 3240

REFRACTORY & INSULATION WORKS- FIRED HEATER

(sheet 5 of 6)

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT B	
	xiv) Surface cleaning	WC	S	Yes
	xv) Check for undulations on box	WC	S	Yes
	xvi) Check for castable mixing	WC	W	Yes
	xvii) Check for proper compaction	WC	S	Yes
	xviii) Check for thickness of castable	WC	S	Yes
	xix) Curing	WC	S	Yes
	xx) Cleaning after laying of castable	WC	S	Yes
	xxi) Check for cracks and repair	WC	W	Yes
	xxii) Cleaning and final inspection	WC	HP	Yes
<b>C</b>	<b>STACK</b>			
	Laying of castable			
	i) Material inspection			Format M2
	- Manufacturing test certificates	WC	Rw	Yes
	- Testing, if any	WC	W	Yes
	ii) Clearance for hot work	WC	HP	Yes
	iii) Marking of studs/anchors	WC	S	Yes
	iv) Welding of studs/anchors with approved WPR&PQR	WC	S	Yes
	v) Surface cleaning	WC	S	Yes
	vi) Check for undulations on stack shell	WC	S	Yes
	vii) Check for castable mixing	WC	W	Yes
	viii) Check for proper compaction	WC	S	Yes
	ix) Check for thickness of castable	WC	S	Yes
	x) Curing	WC	S	Yes
	xi) Cleaning after laying of castable	WC	S	Yes
	xii) Check for cracks and repair	WC	W	Yes
	xiii) Cleaning and final inspection	WC	HP	Yes

ITP NO: 3240

REFRACTORY & INSULATION WORKS- FIRED HEATER

(sheet 6 of 6)

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT B	
<b>D</b>	<b>HOT AIR DUCT</b>			
	i) Material inspection			Format M2
	- Manufacturing test certificates	WC	Rw	Yes
	- Testing, if any	WC	W	---
	ii) Clearance for insulation	WC	HP	Format M24
	iii) External Surface cleaning	WC	S	Format M24
	iv) Provide spacer rings/anchors	WC	S	Format M24
	v) Check for thickness of the mineral wool insulation	WC	S	Format M24
	vi) Check for staggering of joints in insulation	WC	S	Format M24
	vii) Check for providing expansion joints	WC	W	Format M24
	viii) Overlapping of metal sheet as per specification	WC	S	Format M24
	ix) Overlap on joints for aluminium sheeting as per specifications	WC	W	Format M24
	x) Sealing aluminium sheeting	WC	S	Format M24
	Final inspection & acceptance	WC	HP	Format M25
<b>E</b>	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Yes

CAT B: All works.

ITP NO: 3250

EQUIPMENT ERECTION (STATIC)

(sheet 1 of 3)

Sl. No	Activity	Contractor	EIL		Records to be Submitted/ Format No.
			CAT A	CAT B	
<b>EQUIPMENT ERECTION (STATIC)</b>					
1.	<b>BEFORE ERECTION</b>				
a.	Review of foundation acceptance report	WC	HP	Rw	
b.	Incoming Material	Contractor to check all free issue materials and maintain records of MIV for material issued by owner/EIL			
	a) Owner's supply				
	b) Contractors supply	WC	Note -1		
c.	Readiness for erection				
	i) Centre line marking on equipment and foundation	WC	S	--	Format M27
	ii) Level of foundation (shims/ packing with marking to be prepared & kept ready)	WC	S	--	Format M27
	iii) Correctness of no. & size of Foundation bolts	WC	S	--	Format M27
	iv) Hole dia and no. of holes in base/ structure of equipment columns	WC	S	--	Format M27
	v) Matching equipment base bolt holes with actual foundation bolt layout	WC	S	--	Format M27
	vi) Marking orientation	WC	S	--	Format M27
	vii) Checking the threads of bolts & nuts	WC	S		Format M27
	viii) Chipping & roughening of foundation	WC	S	--	Format M27
d.	Outside cleaning, coating/wrapping, painting(for underground equipment only)	WC	HP	W	

ITP NO: 3250

**EQUIPMENT ERECTION (STATIC)**

(sheet 2 of 3)

Sl. No	Activity	Contractor	EIL		
			CAT A	CAT B	CAT C
2.	<b>ERECTION SCHEMES FOR CRITICAL EQPTS.</b>				
	a. Review of rigging procedure	WC	HP		--
3.	<b>SAFETY TEST</b>				
	a. Load test of cranes, lifting beams, slings and shackles, length and dia. of sling & condition of wire rope by competent authority	WC	Rw	Rw	Rw
4.	<b>DURING ERECTION</b>				
	a. Orientation to be checked	WC	S	--	--
	b. Placement of packing as per AFC drg	WC	S	--	--
	c. Placement of Main & trailing crane as per approved rigging procedure	WC	S	--	--
	d. Orientation of equipment as per AFC drg	WC	S	--	--
5.	<b>AFTER ERECTION</b>				
	a. Tightening of Bolts and Providing washers	WC	S	--	--
	b. Levelling and Alignment of equipments	WC	HP	W	--
	c. Corresponding requirement elevation & distance between nozzles in special cases	WC	S	--	--
	d. Cleaning of Sleeves before grouting	WC	S	--	--
	e. Grouting	WC	S	--	--
	i) Acceptance of Specified grouting materials	WC	HP	Rw	Rw
	ii) Placement of grouting	WC	S	--	--
	iii) Curing of grout	WC	S	--	--
	f. Final tightening of bolts	WC	S	--	--

ITP NO: 3250

**EQUIPMENT ERECTION (STATIC)**

(sheet 3 of 3)

Sl. No	Activity	Contractor	EIL	
			CAT A	CAT B
6.	<b>PACKED EQUIPMENTS</b>			
	<b>1. Before Installation</b>			
	a. Identify the material, check thickness, dimensions, no. and angle of fingers of packing rings	WC	S	--
	<b>2. During Installation</b>			
	a. Degreasing and cleaning of packing material	WC	S	--
	b. Check packing support plate	WC	S	--
	c. Check for stacked or dumped packing as per specifications	WC	S	--
	d. Check for nesting	WC	S	--
	e. Check that packings are touching bed limiter	WC	S	--
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE :1) For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT A** Process columns & Reactors ( including internals ), Mounded Bullets, ODC's or Any special type of equipment (Project specific)Vessels & exchangers above 5 T, Hoppers /bins, Incinerators, combustion chamber, Boilers

**CAT B** Seal pots All vessels/exchangers Up to 5T

ITP NO: 3260

EQUIPMENT ERECTION ROTARY

(sheet 1 of 3)

Sl. No	Activity	Contractor*	EIL	
			CAT A	CAT B
1.	<b>PRE – ERECTION ACTIVITIES</b>			
	a. Review of foundation acceptance report	WC	HP	Rw
	b. Material Supply			
	- Owner's supply including templates, if any	WC	Rw	Rw
	- Contractor's supply & check testing, if any	WC	Note-1	Note-1
	c. Readiness for erection			
	i. Level of foundation (shims/packing with markings to be prepared & kept ready)	WC	W	--
	ii. Marking/Centre line of foundation & equipment	WC	W	--
	iii. No./dia./length of anchor bolts, depth of pockets, verticality of pockets	WC	W	--
	iv. Chipping, roughing & cleaning of pockets/top of foundation	WC	HP	W
	v. Acceptance of grouting materials as per specifications/ Manufacturer's recommendations	WC	HP	Rw
2.	<b>LIFTING TACKLES</b>			
	a. Certificate from competent authority	WC	Rw	--
	b. Load test of Cranes/Lifting beams/slings/ shackles/ Wire ropes, etc. for weight of equipments to be handled	WC	Rw	Format- 32
3.	<b>VISUAL INSPECTION OF EQPT. TAG/IDENTIFICATION NO.</b>			
	a. For any damage	WC	S	--
	b. Free shaft rotation	WC	S	--
4.	Drilling & Tapping, holes in the base plate of eqpt. (if reqd.)	WC	S	--
5.	Approval of Rigging procedure	WC	HP	Rw

\* Inspection by Vendor/Manufacturer for all critical equipments

ITP NO: 3260

EQUIPMENT ERECTION ROTARY

(sheet 2 of 3)

Sl. No	Activity	Contractor*	EIL	
			CAT A	CAT B
6.	<b>DURING ERECTION</b>			
	a. Level/elevation of base frame	WC	S	--
	b. Checking of foundation bolts (for location, threading, greasing, etc.)	WC	S	--
	c. Checking orientation of equipment	WC	S	--
	d. Placement of Crane(s), if applicable	WC	S	--
	e. Elevation/level of equipment and placement of shims/packings as per AFC drawings	WC	S	--
	f. Distance between couplings	WC	S	--
	g. Rough alignment of equipment	WC	S	--
	h. Availability of Vendor's engineer at site (For critical equipments)	WC	S	--
	i. Cleaning of pockets/ grouting of foundation bolts' pockets/base frame	WC	HP	--
	j. Erection of auxiliary equipment/ Accessories	WC	S	--
	k. Final alignment of equipment	WC	S	--
	- Without piping	WC	W	W
	- With piping (After tightening the flange bolts)	WC	HP	W
	l. All protection & safety guards installation	WC	S	--

ITP NO: 3260

**EQUIPMENT ERECTION ROTARY**

(sheet 3 of 3)

Sl. No	Activity	Contractor*	EIL	
			CAT A	CAT B
7.	<b>POST ERECTION ACTIVITIES</b>			
	a. Curing of grout	WC	S	--
	b. Auxiliary connections to be mounted on eqpts. as per drawing	WC	S	--
	c. Final tightening of bolts	WC	S	--
	d. Chemical cleaning of equipment parts/ connected piping	WC	S	--
	e. Boxing up of equipment & connected piping	WC	S	--
	f. Log book maintenance (For rotating of shaft and any other activity to be performed as per vendor's recommendations)	WC	S	--
	g. No load run of motors	WC	HP	W
	h. Re-coupling of motor & reconfirmation of alignment	WC	HP	W
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	S	--

\* Inspection by Vendor/Manufacturer for all critical equipments.

**NOTE :1)** For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT A:** Compressors, Pumps Turbines & Diesel Engines, Rotary Driers or any special type of equipment (Project specific), Fans & Blowers, Conveyors & Material Handling Equipment.

**CAT B:** Metering & Dosing Pumps, non-critical pumps/blowers, any other items etc.

ITP NO: 3270

**INSTALLATION/ERECTION & TESTING OF CRANES (EOT/HOT)**

Sl. No.	Activity	Contractor	EIL	
			CAT A	CAT B
1.	<b>BEFORE ERECTION</b>			
	a. Execution scheme of equipment foundation	WC	Rw	
	b. Materials supply	WC	Note-1	Note-1
	c. Readiness for erection	WC	W	--
	i. Structural steel girder span centre to centre & elevation difference	WC	W	--
	ii. Check centre to centre distance of rails, gaps, elevations, crab wheels distances	WC	W	--
	iii. Check buffer stops	WC	W	--
2	a. Erection and assembly of components like LT, Crane Girders, Crab, Platforms, etc.	WC	S	--
	b. Review of hoist ropes and assembly of hook blocks	WC	S	--
3.	a. Electrical installation, testing & no load test of motors	WC	S	--
	b. Coupling of motors to drivers	WC	S	--
4.	<b>NO LOAD TEST</b>			
	a. Winding & unwinding test	WC	W	--
	b. Traversing test	WC	W	--
	c. Travelling test	WC	W	--
5.	<b>LOAD TEST</b>			
	a. Winding & unwinding test	WC	HP	W
	b. Traversing test	WC	HP	W
	c. Travelling test	WC	HP	W
	d. Load & over load testing	WC	HP	W
	e. Deflection of girder	WC	HP	W
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			
	Review Test and Inspection Documents	WC	Rw	Rw

**NOTE :**1) For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT A:** Special purpose M/c viz. Pot tending M/c All EOT cranes with capacity 10T and above

**CAT B:** All EOT /HOT cranes with capacity below 10T.

ITP NO: 3280

STORAGE TANKS

(sheet 1 of 5)

Sl. No	Activity	Contractor	EIL		Records to be Submitted/ Format No.
			CAT A	CAT B	
<b>A.</b>	<b>PRIOR TO FABRICATION</b>				
1.	Review Acceptance Report of the tanks foundation	WC	HP	Rw	
2.	Incoming Material	WC	Note-1	Note-1	
3.	Welding Filler Material Approval/Qualification				
	a) Review of Manufacturer's Test Certificate/Documents	WC*	Rw	Rw	Yes
	b) Laboratory testing, if any				
	i) Carbon Steel	WC	W	--	Format M3, M4
	ii) Alloy Steel/Stainless Steel	WC	W	--	Format M3, M4
	iii) Low Temperature Services	WC	W	--	Format M5
4.	WPS/PQR				
	a) Review of proposed procedure	WC	HP	HP	Format M5, M6
	b) Testing				Format M6
	i) Carbon Steel	WC	Rw	Rw	Format M6
	ii) Alloy Steel/Stainless Steel	WC	HP	HP	Format M6
	c) Approval of Final WPS/PQR	WC	HP	HP	Format M5, M6
5.	a) Welder performance Qualification Test	WC	W	W	Format M7
	b) Certification & approval of welders	WC	HP	HP	Format M8
6.	NDT Procedure Qualification				---
	i) Review of proposed procedure	WC	Rw	Rw	Yes
	ii) Witnessing of the proposed procedure testing	WC	W	W	Yes
	iii) Approval of Qualified Procedure	WC	HP	HP	---
7.	Review of Joint numbering in drawings	WC	Rw	Rw	Yes
8.	Review fabrication, erection, testing Procedures for job	WC	HP	HP	
<b>B.</b>	<b>FABRICATION/ERECTION BOTTOM</b>				
1.	Blast cleaning & painting of underside of bottom plates	WC	HP	S	

\* Notwithstanding any other tests/documentation required for qualification/approval of filler metals :

- For Alloy Steel & Stainless Steel welding filler metals, chemical analysis to be carried-out for every batch.
- For Low Temperature application, Impact testing to be carried out for every batch of the filler metal, to be witnessed by PMC/Owner.
- For NACE filler metals, corrosion tests like HIC, SSCC, etc. to be carried out for every batch. However, HIC/SSCC tests done earlier & duly witnessed by a reputed third party, will be acceptable.

ITP NO: 3280

STORAGE TANKS

(sheet 2 of 5)

Sl. No	Activity	Contractor	EIL		Records to be Submitted/ Format No.
			CAT A	CATB	
2.	Plate lay out, overlap and fit up	WC	S	--	
3.	Sequence of welding	WC	S	--	
4.	Size and positioning of backing plate for annular plates	WC	S	--	
5.	Baking of electrodes	WC	S	--	
6.	Inter-pass cleaning	WC	W	--	
7.	Visual check of welding	WC	W	S	Format M34
8	PT/MT/NDT of annular plate butt welds and bottom plate butt welds (As applicable)	WC	W	S	
9.	Vacuum box test for bottom plate welding	WC	W	S	
	<b>SHELL</b>				
1.	Shell course alignments and fit-up of vertical and circumferential joints before welding	WC	W	S	
2.	a) Check Shell diameter, circularity, perpendicularity, straight edge before welding.	WC	W	S	
	b) Check Shell diameter, circularity, perpendicularity straight edge after welding,	WC	W	S	
3	Visual check of welding and Back chipping	WC	S	-	Format M 36 & M 37
4.	Inner side welding visual check	WC	S	-	
5.	Location, size, alignment and fit-up of nozzles & other openings	WC	W	W	
6.	R.F. Pads fit-up/welding	WC	S	-	Format M 40
7	PWHT of shell, RF pads, Nozzles, manholes, etc. (As applicable)	WC	W	S	Format M 40
8.	Radiography marking (for Random radiography only)	WC	W	W	Format M 41
9.	Curb angle and Wind girders fit-up/welding	WC	S	Rw	

ITP NO: 3280

STORAGE TANKS

(sheet 3 of 5)

Sl. No	Activity	Contractor	EIL		Records to be Submitted/ Format No.
			CAT A	CATB	
10.	PT/MT of nozzles, wind girders and other attachments (as applicable)	WC	W	S	
11.	RF pads pneumatic test	WC	HP	W	
12.	Shell to bottom fit up	WC	W	S	
13.	Shell to bottom I/S welding root run visual/Oil chalk test	WC	W	S	
14.	Shell to bottom O/S welding visual and PT	WC	W	S	
15.	Fabrication and erection of stair ways	WC	S	--	
16.	Cleats welding for insulation	WC	S	--	
17.	Review of radiographs interpreted by the contractors	WC	HP	Rw	Format M 42
<b>FIXED ROOF</b>					
1.	Blast cleaning and painting Roof Structure, underside of Roof plates	WC	W	S	
2.	Location and Welding of Roof supports	WC	S	--	
3.	Alignment and welding of Roof structures	WC	S	--	Format M 43
4.	Plate layout, overlap and fit-up	WC	S	--	
5.	Visual check of roof welds	WC	S	--	Format M 43
6.	Location, size and alignment of roof nozzles, man-holes vents, etc.	WC	W	S	
7.	PWHT (as applicable)				
	i) Procedure Review	WC	HP	Rw	
	ii) PWHT cycle monitoring	WC	W	--	
	iii) Time-Temp Chart Review	WC	HP	Rw	
8.	RF pads fit-up & Welding	WC	S	--	Format M 40
9.	RF pad pneumatic testing	WC	W	S	
10.	PT/MT of Nozzles, vents & other attachments	WC	W	S	
11.	Welding of Roof plate with shell/ curb angle	WC	S	--	

ITP NO: 3280

STORAGE TANKS

(sheet 4 of 5)

Sl. No	Activity	Contractor	EIL		Records to be Submitted/ Format No.
			CAT A	CATB	
	<b>FLOATING ROOF</b>				
1.	Temporary staging spacing and levels	WC	S	--	
2.	Plate layout, overlap, fit-up/welding	WC	S	--	
3.	Availability of approved calculations for design of buoys	WC	Rw	--	
4.	Buoys fabrications	WC	S	--	
5.	Vacuum testing of roof-plate welds	WC	W	--	
6.	Location of sleeve supports	WC	S	--	
7.	Pad plate welding with roof and sleeve support	WC	S	--	
8.	Fixing and welding of Buoys	WC	S	--	Format M 44
9.	Initial – lift	WC	S	--	
10.	Supports fixing through sleeves	WC	S	--	
11.	Seal welding of support sleeves from beneath after dewatering	WC	S	--	
12.	Air test of Buoys Pontoon welding	WC	S	--	Format M 44
13.	Location, fixing and welding of man holes, drains etc.	WC	W	--	
14.	Shell to pontoon clearance	WC	HP	--	
15.	Seal fixing	WC	HP	--	
16.	Floating Roof Testing, as required e.g. flooding etc.	WC	HP	--	

ITP NO: 3280

STORAGE TANKS

(sheet 5 of 5)

Sl. No	Activity	Contractor	EIL		Records to be Submitted/ Format No.
			CAT A	CATB	
<b>C.</b>	<b>TESTING</b>				
1.	Correctness of testing arrangements especially size of blind flanges/vents/drains/ temporary piping	WC	S	--	
2.	Mechanical / Inspection clearances	WC	HP	HP	
3.	Earthing of ladder & shell	WC	W	W	
4.	Settlement readings during water filling	WC	W	Rw	Format M 47
5.	Hammer test	WC	W	W	Format M 45
6.	Air pressure test	WC	HP	W	Format M 45
7.	Vacuum test	WC	HP	W	Format M 45
8.	Roof collapsibility test in case of floating roof tanks	WC	HP	W	Format M 45
9.	Calibration of tanks from Statutory authorities	WC	Rw	Rw	
	<b>INSPECTION &amp; TEST DOCUMENTS</b>				
	Review Test and Inspection Documents	WC	Rw	Rw	

- NOTE :**
- 1) For Incoming material Inspection please refer ITP No: 6-82-1010
  - 2) For cleaning & painting, please refer ITP No. 3301
  - 3) For Insulation, please refer ITP No. 3305

**CAT A:** All Site fabricated steel storage tanks for process fluid / Hydrocarbon, floating roof, tanks having capacity 600cum or 10m dia and 8 m height.

**CAT B:** Site fabricated steel storage tanks for Raw water, Fire water, waste water, DM water, etc. and all tanks not covered under “CAT A”

# SECTION - B

**FORMATS**

**FOR**

**MECHANICAL WORKS**

CONTENTS

S. NO	DESCRIPTION	FORMAT NO.	PAGE NO.
<b>FORMATS FOR MECHANICAL WORKS</b>			
1.	Record of Calibration of Measuring/Testing Equipments	M-1	36
2.	Incoming Material Inspection Report	M-2	37
3.	Electrode Qualification Test report	M-3	38
4.	Inspection Report - Filler Material Manufacturer's works	M-4	41
5.	Format for Welding Procedure Specification (WPS)	M-5	42
6.	Suggested format for procedure Qualification record (PQR)	M-6	44
7.	Suggested format for manufacturer's record of welder or welding operator qualification tests	M-7	46
8.	Welder's identification card	M-8	47
9.	Material Traceability Report	M-9	48
10.	Daily Fit-up inspection report	M-10	49
11.	Daily Welding inspection report	M-11	50
12.	Hardness test record	M-12	51
13.	Liquid penetrant examination report	M-13	52
14.	Magnetic particle examination report	M-14	53
15.	Radiography offering report	M-15	54
16.	Radiography interpretation report	M-16	55
17.	Daily Painting report	M-17	56
18.	Positive material identification (PMI) report	M-18	57
19.	Pickling above ground piping certificate	M-19	58
20.	System completion report above ground piping	M-20	59
21.	Line wise record	M-21	60
22.	Shop Hydro test report for Coil (Heater)	M-22	61
23.	Mechanical completion record (Heater)	M-23	62
24.	Inspection check sheet – daily inspection record of insulation	M-24	63
25.	Inspection check sheet – installation acceptance certificate for insulation	M-25	64
26.	Erection check list	M-26	65
27.	Execution scheme	M-27	66
28.	Heat exchangers/horizontal vessels Record	M-28	68
29.	Columns/Reactors/Vessels Record	M-29	69
30.	Machinery Alignment record	M-30	70
31.	Permissible tolerance for traveling Rail	M-31	71
32.	Test and inspection record – crane	M-32	72
33.	Sequence of welding for bottom plates & shell of the tanks	M-33	74
34.	Tank bottom/floating roof inspection record	M-34	75

S. NO	DESCRIPTION	FORMAT NO.	PAGE NO.
<b>FORMATS FOR MECHANICAL WORKS</b>			
35.	Tank shell development drawing with radiographic spot location	M-35	76
36.	Inspection record for tank fabrication	M-36	77
37.	Inspection Record for Tank fabrication	M-37	78
38.	Inspection Record for checking roundness of tank	M-38	79
39.	Inspection Record for checking perpendicularity of tank	M-39	80
40.	Openings/Attachments inspection record	M-40	81
41.	Radiography Offering report	M-41	82
42.	Radiography Interpretation report	M-42	83
43.	Fixed Roof tank inspection record	M-43	84
44.	Buoy/Pantoon inspection report	M-44	85
45.	Certificate of pressure tests for tanks	M-45	86
46.	Floating roof tank tolerance record	M-46	87
47.	Tank settlement record	M-47	88
48.	Manufacturer's certification for tank Built to API Standard 650	M-48	89
49.	Installation reporting format for column internals	M-49	90
50.	Installation review check list	M-50	96
51.	Checklist for Mechanical Clearance – A/G piping	M-51	98
52.	Piping HydroTest Record-A/G Piping	M-52	102
53.	Above Ground piping – Punch List	M-53	104
54.	Modification of Piping Joint after Mechanical Clearance	M-54	105
55.	Checklist for Erection of Static Equipment	M-55	106

FORMAT NO. : M-1  
RECORD OF CALIBRATION OF MEASURING/TESTING EQUIPMENTS

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_  
Client : \_\_\_\_\_  
Consultant : \_\_\_\_\_  
Contractor : \_\_\_\_\_  
Work order No. : \_\_\_\_\_

Name of work : \_\_\_\_\_  
Job No. : \_\_\_\_\_

Sl. No.	Test Equipment Description	Range	Make/ Model No./ Sr. No.	Calibrated by	Calibration Certificate No./ Date	Calibration Validity Period & Date	Next Calibration Due Date	Accepted		Remarks
								Contr.	EIL	

**Note :** Ensure measuring/test equipment is sent to laboratory prior to expiry of present certificate

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

Format No: **M: 02**  
**INCOMING MATERIAL INSPECTION REPORT**

Report No. :  
Date :

Project : Unit : Name of Work :  
Contractor : Consultant : Job No. :  
Work order No. : P.O. No. & Date : LR No. :

Sl. No.	SOR Item No.	Material description/Tag no	Date of Receipt	Qty. Received	Qty. Accepted	Manufacturer/ Vendor	MTC No./ IRN No. with Date/ Field, Lab test, etc.	Heat/ Batch No.	Ref. Invoice/ Challan No.	Observation/Remarks/ Storage Instruction

**Notes :**

INSPECTION ACTIVITY AT SITE (Tick as applicable)

- |   |   |  |
|---|---|--|
| 1. Quantity verified and found in order <input type="checkbox"/>      | 2. Material condition appears to be good <input type="checkbox"/> | 3. Heat/Batch/Tag No. mentioned on the material <input type="checkbox"/> |
| 4. Color coding done as applicable <input type="checkbox"/>           | 5. Site identification mark on material <input type="checkbox"/>  | 6. Correlation w.r.t. IRN/MTC/Lab Tests report <input type="checkbox"/>  |
| 7. TC verification w.r.t. IRN/Spec/QAP, etc. <input type="checkbox"/> | 8. Check for Vendor/Source approval <input type="checkbox"/>      | 9. Special Requirement, if any. <input type="checkbox"/>                 |

Based on above, materials are accepted.

\_\_\_\_\_  
Contractor Field Engineer

\_\_\_\_\_  
Contractor RCM/Site Incharge

\_\_\_\_\_  
EIL Field Supervisor

\_\_\_\_\_  
EIL Lead Engineer/Area coordinator/Spread Incharge  
(counter signed)

FORMAT NO. : M-3  
ELECTRODE QUALIFICATION TEST REPORT

(Sheet 1 of 3)

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_  
Name of Work : \_\_\_\_\_  
Job No. : \_\_\_\_\_

Unit : \_\_\_\_\_  
Work order No. : \_\_\_\_\_

Site \_\_\_\_\_

Test started on \_\_\_\_\_

Sponsoring Contractor \_\_\_\_\_

Test completed on \_\_\_\_\_

\_\_\_\_\_

H.O. Reference \_\_\_\_\_

Manufacturer \_\_\_\_\_

Date of approval \_\_\_\_\_

Brand Name \_\_\_\_\_

Batch No./Size \_\_\_\_\_

Ref. Code \_\_\_\_\_

IS/AWS Classification \_\_\_\_\_

Colour code \_\_\_\_\_

**All Weld Test**

Base material used \_\_\_\_\_

Buttering used Yes/No

Preheat temp. \_\_\_\_\_

Interpass temp. \_\_\_\_\_

Postheat temp/time \_\_\_\_\_

Visual Inspection \_\_\_\_\_

Radiographic result : Gr.I/Gr.II/Not required (As per ASME Sec II Part C)

**Mechanical Test Results**

Identification	Size of Electrode	UTS Kgs/mm <sup>2</sup>		YS Kgs/mm <sup>2</sup>		% Elongation Gauge length	
		Code	Actual	Code	Actual	Code	Actual

UTS = Ultimate tensile strength

YS = Yield strength

**IMPACT TEST RESULTS :°C**

Identifi- cation	Size of Elect- rode	Cooling Medium	I <sub>1</sub> Kgf-m	I <sub>2</sub> Kgf-m	I <sub>3</sub> Kgf-m	I <sub>4</sub> Kgf-m	I <sub>5</sub> Kgf-m	I Average Kgf-m	Code Kgf-m

**CHEMICAL ANALYSIS RESULTS**  
**WELD PAD/FILLER WIRE**

Iden- tifi- cation	Size of Elec- trode	C	Mn	P	S	Si	Ni	Cr	Mo	V	Cu	Co/Nb	% As per Code	
														Code/Act

**FILLET WELD TEST RESULT**

Identification	Size of Electrode	F Flat	H Horizontal	V Vertical	OH Over Head

Macro Examinations Result \_\_\_\_\_

**Procedure Test Result**

Material \_\_\_\_\_

Pipe/Plate Size \_\_\_\_\_

In combination if any (ELECTRODE) \_\_\_\_\_

Preheat temp. \_\_\_\_\_

Post heat temp/time \_\_\_\_\_

Visual Examination Result \_\_\_\_\_

Dye Penetrant/Magnetic Particle Testing

Result \_\_\_\_\_

Position \_\_\_\_\_

Current : \_\_\_\_\_ AC/DC

Radiographic Examination

Result \_\_\_\_\_

(Sheet 3 of 3)

**TENSILE AND BEND TEST RESULT**

Position	Identification	Tensile Tests Kg/mm <sup>2</sup>			Bend Tests			
		Code	Actual		F1/S1	F2/S2	R1/S3	R2/S4
			T1	T2				

Impact Test Results \_\_\_\_\_ °C

Identification : \_\_\_\_\_

Location	I1 Kgf-m	I2 Kgf-m	I3 Kgf-m	I4 Kgf-m	I5 Kgf-m	I average Kgf-m	Code requirements Kgf-m
WELD							
HAZ							

**POSITION TEST AS PER IS-814 (M.S. ELECTRODES ONLY)**

Material \_\_\_\_\_

Plate size \_\_\_\_\_

Visual \_\_\_\_\_

Radiography Result \_\_\_\_\_

Identification \_\_\_\_\_

Position	Identification	Tensile Test		Bend Tests				Impact Tests				Code Kgf-m
		T-k/mm <sup>2</sup>		F1	F2	R1	R2	I1 Kgf-m -oC	I2 Kgf-m -oC	I3 Kgf-m -oC	I ave- rage	
		Code	Actual									
1G												
2G												
3G												
4G												

Special Remarks for approval \_\_\_\_\_

Encl 1)

2)

Strike whichever is not applicable

Suffix indicates specimen number.

**Index**

T = Tensile Test  
S = Side Bend  
F = Face Bend  
R = Root Bend  
I = Impact Test

Witnessed by

Approved by

**FORMAT NO. : M-4**  
**INSPECTION REPORT - FILLER MATERIAL**  
**MANUFACTURER'S WORKS**

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
Name of Work : \_\_\_\_\_  
Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_

1. Date of visit \_\_\_\_\_ 2. By \_\_\_\_\_

3. Manufacturer \_\_\_\_\_ 4. Ref. \_\_\_\_\_

5. Location \_\_\_\_\_ 6. Person contacted \_\_\_\_\_

7. Brand name of electrode/Filler wire/Bare electrode \_\_\_\_\_

8. Specification \_\_\_\_\_ 9. Classification \_\_\_\_\_

10. Current I.S. approval available: (Yes/No) Valid upto \_\_\_\_\_

11. Testing laboratory: Available/Not available

12. Testing facilities: A) Mechanical i) Tensile \_\_\_\_\_  
Including Machining ii) Bend \_\_\_\_\_  
iii) Impact \_\_\_\_\_

B) Chemical elements \_\_\_\_\_

13. Qualified chemists: Available/No available  
If yes Name \_\_\_\_\_

14. Quality control procedure: Suitable/Unsuitable  
( copy enclosed for ready reference )

15. Qualified quality control personal: Available/No available

16. Raw material supplier \_\_\_\_\_

17. List of approvals \_\_\_\_\_

18. List of users \_\_\_\_\_

19. Remarks \_\_\_\_\_

To  
Manager of Construction

Through RCM/Site In-charge

Signature

**FORMAT NO. : M-5**  
**FORMAT FOR WELDING PROCEDURE SPECIFICATIONS**  
**(WPS) (Section IX, ASME Boiler and Pressure Vessel Code)**

(Sheet 1 of 2)

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
Name of Work : \_\_\_\_\_ Contractor : \_\_\_\_\_  
Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_

Company Name \_\_\_\_\_ By \_\_\_\_\_  
Welding Procedure Specification No. \_\_\_\_\_ Date \_\_\_\_\_ Supporting PQR No.(s) \_\_\_\_\_  
Revision No. \_\_\_\_\_ Date \_\_\_\_\_  
Welding Process(es) \_\_\_\_\_ Type(s) \_\_\_\_\_  
(Manual, Semi-Auto or Automatic)

<b>JOINTS (QW-402)</b>	Details :
Joint Design _____	
Backing (Yes) _____ (No.) _____	
Backing Material (Type) _____	
Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified. (At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures. etc.)	
<b>*BASE METALS (QW-403)</b>	
P.No. _____ Group No. _____ to P.No. _____ Group No. _____	
OR	
Specification type and grade _____ to _____	
Specification type and grade _____	
OR	
Chem. Analysis and Mech. Prop. _____	
Thickness Range :	
Base Metal : Groove _____ Fillet _____	
Deposited Weld Metal _____	
Pipe Dia Range : Groove _____ Fillet _____	
Other _____	
<b>*FILLER METALS (QW-404)</b>	
F.No. _____ Other _____	
A.No. _____ Other _____	
Spec. No. (SFA) _____	
AWS No. (Class) _____	
Size of filler metals _____	
(Electrode, Cold Wire, Hot wire etc.)	
Electrode-Flux (Class) _____	
Flux Trade Name _____	
Consumable Insert _____	

\* Each base metal-filler metal combination should be recorded individually.

<p><b>POSITIONS (QW-405)</b>                  Position(s) of Groove _____                  Welding Progression : Up _____ Down _____                  Position(s) of Fillet _____</p>	<p><b>POSTWELD HEAT TREATMENT (QW-407)</b>                  Temperature Range _____                  Time Range _____</p>																						
<p><b>PREHEAT (QW-406)</b>                  Preheat Temp. Min. _____                  Interpass Temp. Max. _____                  Preheat Maintenance _____                  (Continuous or special heating where applicable should be recorded)</p>	<p><b>GAS (QW-408)</b>                  Shielding Gas(es) _____                  Percent Composition (mixtures) _____                  _____                  Flow Rate _____                  Gas Backing _____                  Trailing Shielding Gas Composition _____</p>																						
<p><b>ELECTRICAL CHARACTERISTICS (QW-409)</b>                  Current AC or DC _____ Polarity _____                  Amps (Range) _____ Volts (Range) _____                  (Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)                  Tungsten Electrode Size and Type _____                  (Pure Tungsten, 2% Thoriated, etc.)                  Mode of Metal Transfer for GMAW _____                  (Spray arc, short circuiting arc, etc.)                  Electrode wire feed speed range _____</p>																							
<p><b>TECHNIQUE (QW-410)</b>                  String or Weave Bead _____                  Orifice or Gas Cup size _____                  Initial and Interpass Cleaning (Brushing, Grinding etc.) _____                  _____                  Method of Back Gouging _____                  Oscillation _____                  Contact Tube to Work Distance _____                  Multiple or Single Pass (per side) _____                  Multiple or Single Electrodes _____                  Travel Speed (Range) _____                  Peening _____                  Other _____                  _____                  _____</p>																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Weld Layer(s)</th> <th rowspan="2">Process</th> <th colspan="2">Filler Metal</th> <th colspan="2">Current</th> <th rowspan="2">Volt Range</th> <th rowspan="2">Travel Speed Range</th> <th rowspan="2">Other</th> </tr> <tr> <th>Class</th> <th>Dia.</th> <th>Type Polar.</th> <th>Amp Range</th> </tr> </thead> <tbody> <tr> <td style="height: 100px;"></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>e.g. Remarks, Comments Hot Wire Addition Technique Torch Angle Etc.</td> </tr> </tbody> </table>		Weld Layer(s)	Process	Filler Metal		Current		Volt Range	Travel Speed Range	Other	Class	Dia.	Type Polar.	Amp Range									e.g. Remarks, Comments Hot Wire Addition Technique Torch Angle Etc.
Weld Layer(s)	Process			Filler Metal		Current					Volt Range	Travel Speed Range	Other										
		Class	Dia.	Type Polar.	Amp Range																		
								e.g. Remarks, Comments Hot Wire Addition Technique Torch Angle Etc.															

**FORMAT NO. : M-6**  
**SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)**  
**(Section IX, ASME Boiler and Pressure Vessel Code)**

(Sheet 1 of 2)

Report No. : \_\_\_\_\_  
 Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
 Name of Work : \_\_\_\_\_  
 Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_  
 Company Name \_\_\_\_\_  
 Procedure Qualification Record No. \_\_\_\_\_ Date \_\_\_\_\_  
 WPS No. \_\_\_\_\_  
 Welding Process(es) \_\_\_\_\_  
 Type (Manual, Automatic, Semi-Auto) \_\_\_\_\_

JOINTS (QW-402)	
Groove Design Used	
<b>BASE METALS (QW-403)</b> Materials Spec. _____ Type or Grade _____ P. No. _____ to P.No. _____ Thickness _____ Diameter _____ Other _____ _____ _____	<b>POSTWELD HEAT TREATMENT (QW-407)</b> Temperature _____ Time _____ Other _____ _____ _____ <b>GAS (QW-408)</b> Type of Gas or Gases _____ Composition of Gas Mixture _____ Other _____ _____
<b>FILLER METALS (QW-404)</b> Weld Metal Analysis A No. _____ Size of Electrode _____ Filler Metal F No. _____ SFA Specification _____ AWS Classification _____ Other _____ _____	<b>ELECTRICAL CHARACTERISTICS (QW-409)</b> Current _____ Polarity _____ Amps. _____ Volts _____ Other _____ _____
<b>POSITION (QW-405)</b> Position of Groove _____ Weld Progression (Uphill, Downhill) _____ Other _____ _____	<b>TECHNIQUE (QW-410)</b> Travel Speed _____ String or Weave Bead _____ Oscillation _____ Multipass or SinglePass (per side) _____ Single or Multiple Electrodes _____ Other _____ _____ _____
<b>PREHEAT (QW-406)</b> Preheat Temp. _____ Interpass Temp. _____ Other _____ _____	_____ _____ _____

(Sheet 2 of 2)

**Tensile Test (QW – 150)**

Specimen No.	Width	Thickness	Area	Ultimate Total Load lb.	Ultimate Unit Stress psi	Character of Failure & Location

**Guided Bend Tests (QW-160)**

Type and Figure No.	Results

**Toughness Test (QW-170)**

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Values	Lateral Exp.		Drop Weight	
					% shear	M/s	Break	No. Break

**Fillet Weld Test (QW-180)**

Results-Satisfactory : Yes \_\_\_\_\_ No \_\_\_\_\_ Penetration into Parent Metal : Yes \_\_\_\_\_ No \_\_\_\_\_  
Type and Character of Flt: Micro \_\_\_\_\_ Macro-Results \_\_\_\_\_

**Other Tests**

Type of Test \_\_\_\_\_  
Deposit Analysis \_\_\_\_\_  
Other \_\_\_\_\_

Welder's Name \_\_\_\_\_ Clock No. \_\_\_\_\_ Stamp No. \_\_\_\_\_

Tests conducted by: \_\_\_\_\_ Laboratory Test No \_\_\_\_\_

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Date \_\_\_\_\_ Manufacturer \_\_\_\_\_  
By \_\_\_\_\_

(Details of record of tests are illustrative only and may be modified to conform to the type and number of test required by the Code.)

**FORMAT NO. : M-7**  
**SUGGESTED FORMAT FOR MANUFACTURER'S RECORD OF WELDER OR WELDING OPERATOR QUALIFICATION TESTS**  
**(Section IX, ASME Boiler and Pressure Vessel Code)**

Report No. : \_\_\_\_\_  
 Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
 Name of Work : \_\_\_\_\_ Contractor : \_\_\_\_\_  
 Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_  
 Welder Name \_\_\_\_\_ Check No. \_\_\_\_\_ Stamp No. \_\_\_\_\_  
 Welding Process \_\_\_\_\_ Type \_\_\_\_\_  
 In accordance with Welding Procedure Specification (WPS) \_\_\_\_\_  
 Backing (QW-402) \_\_\_\_\_  
 Material (QW-403) Spec. \_\_\_\_\_ to \_\_\_\_\_ of P No. \_\_\_\_\_ to P No. \_\_\_\_\_  
 Thickness \_\_\_\_\_ Dia \_\_\_\_\_  
 Filler Metal (QW-404) Spec.No. \_\_\_\_\_ Class No. \_\_\_\_\_ F. No. \_\_\_\_\_  
 Other \_\_\_\_\_  
 Position (QW-405) (1G, 2G, 6G) \_\_\_\_\_  
 Gas (QW-408 type) \_\_\_\_\_ % Composition \_\_\_\_\_  
 Electrical Characteristics (QW-409) Current \_\_\_\_\_ Polarity \_\_\_\_\_  
 Weld Progression (QW-410) \_\_\_\_\_  
 Other \_\_\_\_\_

**For Information Only**

Filler Metal Diameter and Trade Name \_\_\_\_\_  
 Submerged Arc Flux Trade Name \_\_\_\_\_  
 Gas Metal Arc Welding Shield Gas Trade Name \_\_\_\_\_

**Guided Bend Test Results QW-462.2(a), QW-462.3(a), QW-462.3(b)**

Type and Fig No.	Fault

**Radiographic Test Results (QW-305)**  
**For alternative qualification of groove welds**

Radiographic Results:

**Fillet weld test Results (QW-462.4(a), QW-462.4(b))**

Fracture Test (Describe the location nature arrange of any check ring of the specimen)

Length and per cent of defects \_\_\_\_\_ inches \_\_\_\_\_ %

Macro Test-Fusion

Appearance-Fillet size: deg \_\_\_\_\_ in. x \_\_\_\_\_ in. Convexity \_\_\_\_\_ in. or concavity \_\_\_\_\_ in.

Test conducted by \_\_\_\_\_ Laboratory – Test No. \_\_\_\_\_

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Sections IX of the ASME Code

Date : \_\_\_\_\_ Organization \_\_\_\_\_  
 by \_\_\_\_\_

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code)

**Note :** Any essential variables in addition to those above shall be recorded.

**FORMAT NO. : M-8**  
**WELDER'S IDENTIFICATION CARD**

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
Name of Work : \_\_\_\_\_ Contractor : \_\_\_\_\_  
Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_

NAME :

Identification :

Date of Testing :

Plate/Pipe size :

Welding process :

Filler material  
Classification :

Position :

Qualified to weld :

Valid until :

WELDING ENGINEER

\_\_\_\_\_  
(NAME & DATE)

\_\_\_\_\_  
EMPLOYERS SIGNATURE WITH SEAL

**DETAILS OF QUALIFICATIONS :**  
**BACKSIDE OF IDENTITY CARD**

Sr. No.	WPS/PQR No.	Date of Test	Qualified On	EIL Signature	Remarks
---------	-------------	--------------	--------------	---------------	---------

FORMAT NO. : M-9  
MATERIAL TRACEABILITY REPORT

Project : \_\_\_\_\_ Job No. : \_\_\_\_\_ Report No. : \_\_\_\_\_

Contract No. : \_\_\_\_\_ Date : \_\_\_\_\_

Contractor : \_\_\_\_\_

S. No.	Line/ Heater No.	Area No.	Dia.	Joint No.	Spool No.	Piping Component	Manufacturer	Material	Heat/ Batch No.	Colour Code	Verified			Remarks
											Sub-Contractor	Contractor	EIL/ Owner*	

\* As per approved Inspection & Test Plans (ITPs)

NOTE : A sketch of the spool may be enclosed.

(Sub-Contractor)

(Contractor)

(EIL)

(Owner)

Page 3208 of 4391 : B957-TENDER DOC-B957-300-16-43-MR-T-3001 : Rev. A

**FORMAT NO. : M-10**  
**DAILY FIT-UP INSPECTION REPORT**  
**(FOR ABOVE GROUND PIPING/HEATER)**

Report No. : \_\_\_\_\_

Date : \_\_\_\_\_

Project : \_\_\_\_\_

Unit : \_\_\_\_\_

Name of Work : \_\_\_\_\_

Contractor : \_\_\_\_\_

Job No. : \_\_\_\_\_

Work order No. : \_\_\_\_\_

Sl. No.	Line/Heater No.	Area No.	Dia	Joint No.	Type (*)	Inch Metre	Inspection Clearance	Remarks
TOTAL INCH DIA.				TOTAL INCH MTR				

TOTAL INCH DIA. =

PREVIOUS =

TILL DATE =

TOTAL IN MTR. =

PREVIOUS =

TILL DATE =

(\*)

G - BUTT WELD

S - SOCKET WELD

B - BRANCH WELD

M - MITRE WELD

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL



FORMAT NO. : M-12  
HARDNESS TEST RECORD

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_  
Name of Work : \_\_\_\_\_  
Job No. : \_\_\_\_\_

Unit : \_\_\_\_\_  
Contractor : \_\_\_\_\_  
Work order No. : \_\_\_\_\_

Line No./ Equipment No.	Weld Joint No.	Stress Relief Chart No.	Hardness Bar Factor	Diameter After Impression				B.H.N.		Observation	Remarks
				Bar		Job		0°	180°		
				0°	180°	0°	180°				

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

FORMAT NO. : M-13  
LIQUID PENETRANT EXAMINATION REPORT

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
Name of Work : \_\_\_\_\_ Contractor : \_\_\_\_\_  
Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_

Item Name/No. Drg. No.

Part Name	Method of Examination	Colour Contrast Solvent Removal	Application No.	Material
-----------	-----------------------	---------------------------------	-----------------	----------

**EXAMINATION DETAIL**

Surface Temperature & Penetrant Time \_\_\_\_\_ °C \_\_\_\_\_ Minute

Penetrant

Remover

Developer

Sketch	Line No.	Joint No.	Type	Size
--------	----------	-----------	------	------

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

**FORMAT NO. : M-14**  
**MAGNETIC PARTICLE EXAMINATION REPORT**

Report No. : \_\_\_\_\_  
 Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
 Name of Work : \_\_\_\_\_ Contractor : \_\_\_\_\_  
 Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_

Name of Item \_\_\_\_\_ Drg. No. \_\_\_\_\_

Item No. \_\_\_\_\_

Joint No. \_\_\_\_\_

1. **Test Condition**

Tester Type : \_\_\_\_\_ Magnetizing Type : Not Remained  
 Method : Prod. \_\_\_\_\_ Remained  
 Coil Exam. Medium Dry White  
 Wet Brown  
 Fluorescent

Magnetizing Current \_\_\_\_\_ A Standard JIS A type

Magnetizing Time \_\_\_\_\_ Sec. Surface Condition \_\_\_\_\_ Surface Temp. \_\_\_\_\_

2. **Acceptance Observations**

3. **Sketch**

4. **Result**

Remarks

\_\_\_\_\_  
**CONTRACTOR**

\_\_\_\_\_  
**EIL**



**FORMAT NO. : M-16**  
**RADIOGRAPHY INTERPRETATION REPORT**  
**(FOR ABOVE GROUND PIPING/HEATER)**

Name of Work: \_\_\_\_\_ Report No. : \_\_\_\_\_  
 Radiography Technique : SWSI/DWSI/DWDI Date : \_\_\_\_\_  
 Source  IR 192,  X RAY,  COBALT CO Project : \_\_\_\_\_  
 Film Type & Name : \_\_\_\_\_ Contractor : \_\_\_\_\_  
 IQI : \_\_\_\_\_  
 Radiography Procedure No. \_\_\_\_\_

Sl. No.	Heater/ Line No.	Area No.	Dia	Joint No.	Welder No.	Radio-graphy No.	Segment	Results	Joint Status A/R/H (*)

SWSI - SINGLE WALL SINGLE IMAGE, DWDI - DOUBLE WALL DOUBLE IMAGE  
 DWSI - DOUBLE WALL SINGLE IMAGE

(\*) A - ACCEPTED, R - REPAIR, H - HOLD

\_\_\_\_\_  
 CONTRACTOR EIL

FORMAT NO. : M-17

**DAILY PAINTING REPORT**

Name of Work :					Report No.								
Contractor :					Date								
Drawing No.						Location							
Specification No.					Procedure								
Job Description :													
Daily weather record :													
Time		Relative Humidity		Ambient temperature		Surface temperature		Dew point temperature		Weather condition			
Surface preparation													
a) Method													
Blasting		Power tool		Hand clean		Solvent		Emery cloth		Other			
b) Blasting details													
Abrasive		Sand		Grit		Shot		Certificate No.					
c) Surface standard													
SIS 05 5900 SA-2 ½			Others		Profile		Micron		Result : Accepted /Rejected				
Painting material and application method : Painting System -					Temp. Range -								
		Material brand		Manufacturer		Certificate No.		Batch No.		Shelf life upto		Shade/ Colour	Application
Primer (Base/Hardener)													
Intermediate-1 <sup>st</sup> coat													
Intermediate-2 <sup>nd</sup> coat													
Finish -1 <sup>st</sup> coat													
Finish -2 <sup>nd</sup> coat													
Painting Inspection Record :													
Item	Area/Joint		Coating Layer	Wet Film Thickness			Dry Film Thickness			Holiday Testing	Visual Inspection	Acceptance	
	From	To		Measurements 1,2,3...		Avg.	Reqd	Measurements 1,2,3...		Avg.	Reqd.		
			Primer										
			Intermediate-1 <sup>st</sup> coat										
			Intermediate-2 <sup>nd</sup> coat										
			Finish -1 <sup>st</sup> coat										
			Finish -2 <sup>nd</sup> coat										
Identification colour band & direction marker : Accepted/ Not Accepted													
NOTE: All blasting and coating materials shall be approved by the Owner. All measuring and testing equipments shall have valid calibration certificate and shall adhere to relevant specifications.													

(Contractor)

(EIL)

**FORMAT NO. : M-18**  
**POSITIVE MATERIAL IDENTIFICATION (PMI)**  
**REPORT**

Report No: \_\_\_\_\_

Name of work : \_\_\_\_\_

Contractor : \_\_\_\_\_

Date of PMI : \_\_\_\_\_

Project : \_\_\_\_\_

Inspection Agency : \_\_\_\_\_

Location : \_\_\_\_\_

PMI Agency : \_\_\_\_\_

Job No.: \_\_\_\_\_

PMI Equipment Model : \_\_\_\_\_

Line No. /ISO Drg. No : \_\_\_\_\_  
/Heater No./Drawing No

Make & Serial No.: \_\_\_\_\_

Sr. No.	Part Identification	Material As per drg./spec.	Material as per PMI	Result (Accepted/Rejected/Retest)

\_\_\_\_\_  
(PMI AGENCY)

\_\_\_\_\_  
(TPI AGENCY)

\_\_\_\_\_  
(CONTRACTOR)

\_\_\_\_\_  
(EIL/OWNER)

FORMAT NO. : M-19  
PICKLING ABOVE GROUND PIPING CERTIFICATE

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit/Plant : \_\_\_\_\_  
Name of Work : \_\_\_\_\_ Contractor : \_\_\_\_\_  
Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_

SYSTEM : \_\_\_\_\_  
LOOP/LINE NOS : \_\_\_\_\_  
PICKLING DONE DURING : \_\_\_\_\_

LOOP SKETCH - ATTACHED  
TEST RESULTS - ATTACHED

### CERTIFICATE

Certified that the pickling of the above system has been carried out successfully as per specification and the system is preserved with ..... gas at ..... kg/cm<sup>2</sup> pressure

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

\_\_\_\_\_  
CLIENT

**FORMAT NO. : M-20**  
**SYSTEM COMPLETION REPORT ABOVE**  
**GROUND PIPING**

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_  
Name of Work : \_\_\_\_\_  
Job No. : \_\_\_\_\_

Unit/Plant : \_\_\_\_\_  
Contractor : \_\_\_\_\_  
Work order No. : \_\_\_\_\_

System : \_\_\_\_\_  
Loop Nos. : \_\_\_\_\_  
Ref. P&ID No. : \_\_\_\_\_

Area : \_\_\_\_\_  
Unit : \_\_\_\_\_  
Test Reports – Enclosed

The above system has been cleaned/flushed/tested as per the requirement of drawings and specifications and cleared for operation.

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

\_\_\_\_\_  
CLIENT

**FORMAT NO. : M-21**  
**LINE WISE RECORD**  
**(FOR ABOVE GROUND PIPING/HEATER)**

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
Name of Work : \_\_\_\_\_ Contractor : \_\_\_\_\_  
Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_

HEATER/LINE NO. .... % RADIOGRAPHY \_\_\_\_\_

Sl. No.	Dia.	Joint No. (**)	Type (*)	Area No.	Welder No.	Date of Welding	Radio-graphy		Stress Relieving Chart No.	BHN	DPT/ MPT	Remarks
							No.	Resol. Date				

(\*)  
G - BUTT WELD  
S - SOCKET WELD  
B - BRANCH WELD  
M - MITRE WELD

(\*\*) Joint No. are to be posted from the daily fit up reports Where ever Isos are not available

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

**FORMAT NO. : M-22**  
**SHOP HYDRO TEST REPORT FOR COIL (HEATER)**

Name of Work : \_\_\_\_\_  
Project : \_\_\_\_\_  
Plant : \_\_\_\_\_

Report No : \_\_\_\_\_  
Date : \_\_\_\_\_  
Contractor : \_\_\_\_\_

<p>Sketch</p> <table style="width: 100%; text-align: center;"> <tr> <td>X -</td> <td>X -</td> <td>X -</td> </tr> <tr> <td>C -</td> <td>C -</td> <td>C -</td> </tr> <tr> <td>W -</td> <td>W -</td> <td>W -</td> </tr> <tr> <td>J -</td> <td>J -</td> <td>J -</td> </tr> </table> <table style="width: 100%; text-align: center;"> <tr> <td>J -</td> <td>J -</td> <td>J -</td> </tr> <tr> <td>W -</td> <td>W -</td> <td>W -</td> </tr> <tr> <td>C -</td> <td>C -</td> <td>C -</td> </tr> <tr> <td>X -</td> <td>X -</td> <td>X -</td> </tr> </table>	X -	X -	X -	C -	C -	C -	W -	W -	W -	J -	J -	J -	J -	J -	J -	W -	W -	W -	C -	C -	C -	X -	X -	X -	<p>Coil No. _____</p> <p>Test Medium : _____</p> <p>Test Pressure : _____</p>
X -	X -	X -																							
C -	C -	C -																							
W -	W -	W -																							
J -	J -	J -																							
J -	J -	J -																							
W -	W -	W -																							
C -	C -	C -																							
X -	X -	X -																							

Item	Acceptance By	
	Contractor	EIL
Cleared for Hydro/Pneumatic Testing		
Air Blowing and Flushing		
Pneumatic/Hydrostatic Testing		
Dewatering and Drying		
Cleared for Erection		

Legend : J – Joint No., W – Welder No., C – Stress Relief Chart No., X – X-Ray No.

CONTRACTOR

EIL

**FORMAT NO. : M-23**  
**MECHANICAL COMPLETION RECORD (HEATER)**

Name of work : \_\_\_\_\_ Report No. : \_\_\_\_\_  
Project : \_\_\_\_\_ Date : \_\_\_\_\_  
Plant : \_\_\_\_\_ Area : \_\_\_\_\_  
Contractor : \_\_\_\_\_ Ref P&ID No. : \_\_\_\_\_

Loop No. : \_\_\_\_\_ Inch Mtr. \_\_\_\_\_  
From \_\_\_\_\_ To \_\_\_\_\_

Line Nos. : \_\_\_\_\_

Sl. No.	Activity	Check	Clearance by			
			Contractor		EIL	
			Sign	Date	Sign	Date
1.	Clearance for flushing and testing.					
1.1	Mechanical clearance - Conformity to drawings - Provision of Inst. Tappings - Provision of Vent & Drains - Correctness of gaskets and fasteners - Correctness of type of support anchors, guides, etc. - Correctness of valves - Provision of cold pull - Isolation of equipment, CV, Insts, Bellows, etc.					
1.2	Welding and NDT clearance - Material as per piping class - Fit up checks - Visual check of completed welds - LPT/ MPT checks - Radiography clearance - PWHT & Hardness clearance - Preparatory arrangements for flushing/testing					
2.0	Flushing and testing Medium _____  Pressure _____ KG/CM <sup>2</sup>					
3.0	Draining and drying					
4.0	Pickling					
5.0	Box up					

Remarks : ISO/Loop sketches duly filled in data (Jt. No. W. No. XR No. Sr. chart No.) shall be enclosed for item (1)

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

**FORMAT NO. : M-24**  
**INSPECTION CHECK SHEET –**  
**DAILY INSPECTION RECORD OF INSULATION**  
**(HOT & COLD)**

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
Name of Work : \_\_\_\_\_ Contractor : \_\_\_\_\_  
Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_

Item No. / Equip. No. / Line No. \_\_\_\_\_

Surface Preparation : Visual Acc./Not Acc.  
Fixing of Support Ring/ Lugs & Spacing : Acc./Not Acc.

Sl. No.	Activity & Item No.	Thickness of Insulation	Visual Inspection	Surface Area Length Insulated			Remarks
				From	To	SA(m <sup>2</sup> )	
1.	Lagging of Insulation materials						
2.	Sheeting/Cladding work						
3.	Miscellaneous						
	a) Inspection Window						
	b) Valve boxes						
	c) Flange covers						
	d) Expansion joint						
	e) SS Foil for SS Piping						
	f) Wooden Support						
	g) Vapour Barrier						
	h) Vapour Sealant						
i) Others							

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

**FORMAT NO. : M-25**  
**INSPECTION CHECK SHEET –**  
**INSTALLATION ACCEPTANCE CERTIFICATE FOR**  
**INSULATION**

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_  
Name of Work : \_\_\_\_\_  
Job No. : \_\_\_\_\_

Unit : \_\_\_\_\_  
Contractor : \_\_\_\_\_  
Work order No. : \_\_\_\_\_

SHEET \_\_\_\_\_ OF \_\_\_\_\_

Insulation Items	Result		Remarks
	Contractor	EIL	
<u>Quality control after installation</u> <u>Hot Insulation</u> <input type="checkbox"/> (Visual & position of seam to prevent water penetration)			
<u>Cold Insulation</u> <input type="checkbox"/> (Visual & Sealing)			

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

**FORMAT NO. : M-26**  
**ERECTION CHECK LIST**

Name of work : \_\_\_\_\_  
Project : \_\_\_\_\_  
Plant : \_\_\_\_\_  
Contractor : \_\_\_\_\_  
Loop No: \_\_\_\_\_  
Line Nos.: \_\_\_\_\_

Report No: \_\_\_\_\_  
Date : \_\_\_\_\_  
Page : \_\_\_\_\_ of \_\_\_\_\_  
P & ID Ref. No. : \_\_\_\_\_  
Test Pack No: \_\_\_\_\_

SL. NO.	REMARKS DESCRIPTION OF ERROR FOUND AND ACTION TO BE TAKEN	ACTION TAKEN CONTRACTOR'S SIGN & DATE	RECHECK AND ACCEPTED, DATE

CHECKED BY \_\_\_\_\_

REMARKS:

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

FORMAT NO. : M-27 (Sheet 1 of 2)  
EXECUTION SCHEME

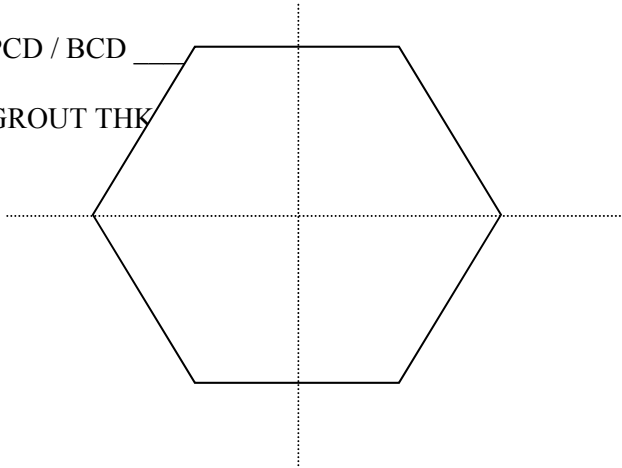
NAME OF WORK :	<b>EXECUTION SCHEME FOR FOUNDATIONS</b>	REPORT NO. :
PROJECT :		DATE :
PLANT :		DATE OF CHECKING :
CONTRACTOR :		

FDN NO:

DRG NO:

PCD / BCD

GROUT THK



( ) TOP OF BOLT

( ) TOP OF CONCRETE

PITCH													
CIRCLE													
DIA (PCD)													
BOLT HT.													

DESCRIPTION	AS PER DRG	ACTUAL	DEVIATION	REMARKS
C/L CO-ORDINATES	N			
	E			
EL. TOP OF CONCRETE				
NO. OF BOLTS & SIZE				
HEIGHT OF BOLTS				
PCD OF BOLTS				
POCKET CLEARING				
FDN. ROUGHENING				
EL. TOP OF GROUT				

Remarks :

CONTRACTOR

EIL

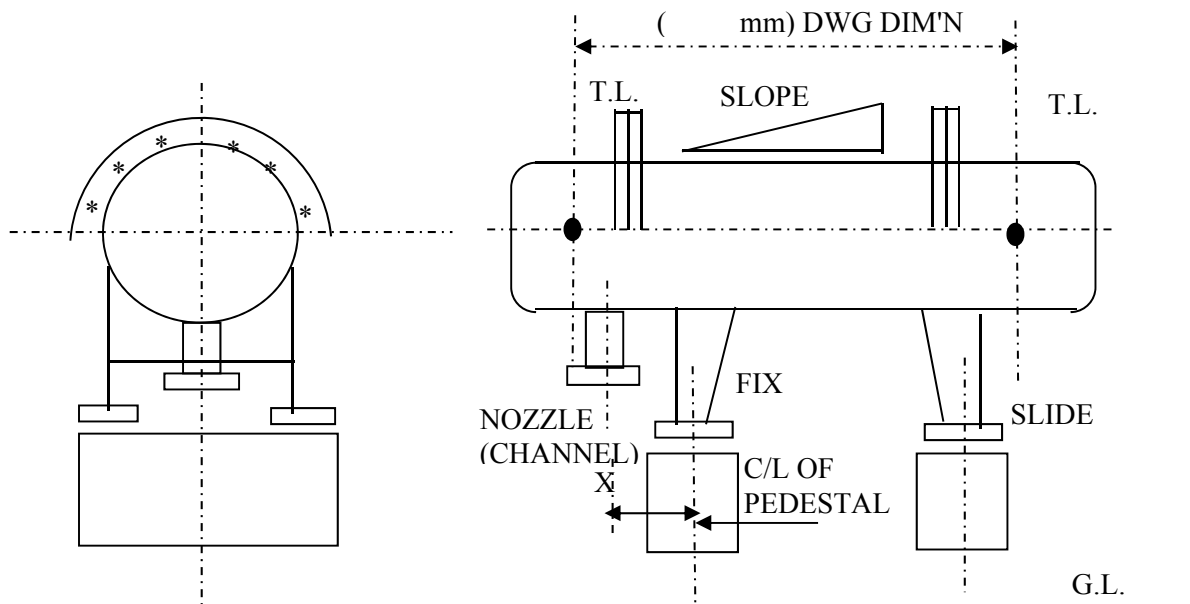


**FORMAT NO. : M-28**  
**HEAT EXCHANGERS/HORIZONTAL VESSELS**  
**RECORD**

Report No. :  
Date :

Name of Work : \_\_\_\_\_ Service : \_\_\_\_\_  
Eqpt. Type & No: \_\_\_\_\_ Location : \_\_\_\_\_  
Client : \_\_\_\_\_ Unit/Area : \_\_\_\_\_  
Project : \_\_\_\_\_ Manufacturer : \_\_\_\_\_  
Contractor : \_\_\_\_\_  
Length/Height : \_\_\_\_\_ Diameter : \_\_\_\_\_ Weight : \_\_\_\_\_  
Vender Drg. No: \_\_\_\_\_

Check Items	Result	Date With Signature	Check Items	Result	Date With Signature
1. Foundations/ Co-ordinates			6. Alignment		
2. Anchor Bolts & Nuts			7. Grouting		
3. Name Plate			8. Sliding Plate Arrangement		
4. Setting of Centre Line			9. Greasing of Bolts/Nuts		
5. Erected on					



NOZZLE NO.	SIZE	DRG. ELV.	ACTUAL ELV	DRG. DIM 'X'	ACTUAL DIM 'X'

NOTES : Deviations on the above dimensions shall be intimated all concerned

REMARKS :

Approvals	Signatures	Designation	Date
Contractor			
EIL			
Client			

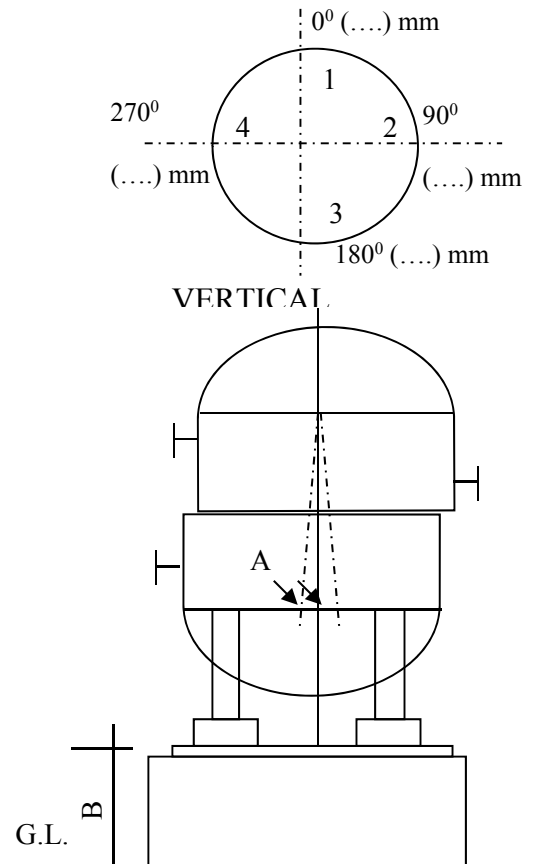
**FORMAT NO. : M-29**  
**COLUMNS/REACTORS/VESSELS RECORD**

Report No. :  
Date :

Name of Work : \_\_\_\_\_ Services : \_\_\_\_\_  
Eqpt. No: \_\_\_\_\_ Location : \_\_\_\_\_  
Client : \_\_\_\_\_ Area/Unit : \_\_\_\_\_  
Project : \_\_\_\_\_ Manufacturers : \_\_\_\_\_  
Contractor : \_\_\_\_\_  
Length/Height : \_\_\_\_\_ Dia Meter : \_\_\_\_\_ Weight : \_\_\_\_\_  
Vendor Drg No.: \_\_\_\_\_

CHECK ITEMS	REMARKS	DATE WITH SIGNATURE	CHECK ITEMS	REMARKS	DATE WITH SIGNATURE
1. FOUNDATION/ CO-ORDINATES			5. VERTICAL ALIGNMENT		
2. ANCHOR BOLTS & NUTS			6. BASE ALIGNMENT		
3. SETTING OF CENTRE LINES WITH TEMPLATE IF REQUIRED.			7. GROUTING		
			8.		
4. ERECTED ON			9.		

NOZZLE NO.	SIZE	DRG. ELV.	ACTUAL ELV.



Approvals	Signatures	Designation	Date
Contractor			
EIL			
Client			

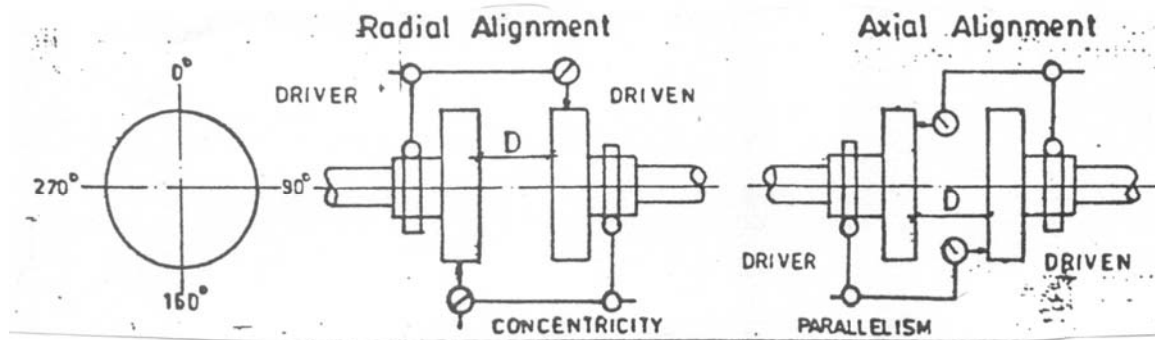
**FORMAT NO. : M-30**  
**MACHINERY ALIGNMENT RECORD**

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_  
Name of Work : \_\_\_\_\_  
Job No. : \_\_\_\_\_

Unit : \_\_\_\_\_  
Contractor : \_\_\_\_\_  
Work order No. : \_\_\_\_\_

- 1) Equipment No. : \_\_\_\_\_  
2) Manufacturer : \_\_\_\_\_  
3) Drive : HP/RPM : \_\_\_\_\_  
4) Weight in M.T. : \_\_\_\_\_  
5) Erected on : \_\_\_\_\_  
6) Aligned & Grouted on : \_\_\_\_\_ Qty \_\_\_\_\_
- 7) Type of Coupling : \_\_\_\_\_  
8) Distance Between Coupling Halves (D) : \_\_\_\_\_
- |   | As/Drg. | Actual |
|---|---------|--------|
| D | _____   | _____  |



Angular Position	Without Piping				With Piping			
	Concentricity		Parallelism		Concentricity		Parallelism	
	A	B	A	B	A	B	A	B
0°								
90°								
180°								
270°								

Tolerances As per Data Sheet/Manual : -

Recoupling of motor and reconfirmation of alignment  Checked

Result :-

Approvals	Signature	Designation	Date
Contractor			
EIL			
Client			

FORMAT NO.:

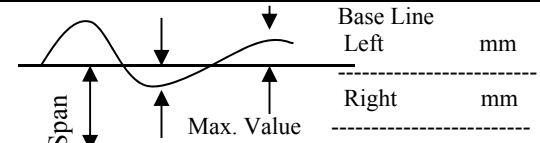
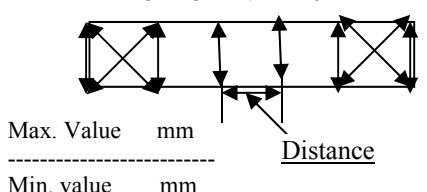
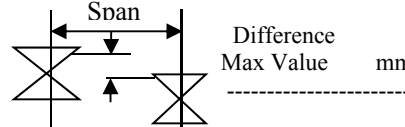
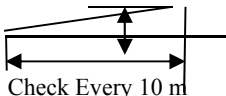
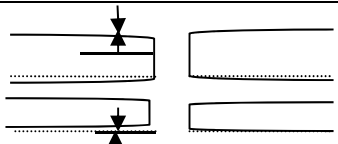
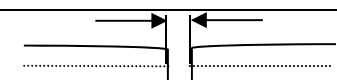
M-31

PERMISSIBLE TOLERANCE FOR TRAVELLING RAIL

Report No. : \_\_\_\_\_

Date : \_\_\_\_\_

Name of work : \_\_\_\_\_

CHECK ITEM	TOLERANCE AT INSTALLATION	CHECK METHOD	TRUTH DATUM
Straight Degree	For Total Length $\leq \pm 5$ mm	 Base Line Left mm Right mm	By Transit or Piano Wire
SPAN	$\leq \pm 5$ mm	CHECK EVERY 5 m  Max. Value mm Min. value mm Distance	(At two ends of the girders diagonal distance should also be checked) By Steel Tape Scale (JIS Fat Class)
Elevation difference between rails	For wheel base length $\leq \frac{\text{SPAN} \times 1}{1000}$	 Span Difference Max Value mm	By Transit
Inclination	$\leq \frac{1}{1000}$	 Check Every 10 m	Max. value (Railway) Left mm Right mm
Joint Difference	$\leq 0.5$ mm		By steel tape scale
Joint gap	$\leq 2$ mm		By steel tape scale

Crane Span

REMARKS : The Span should be measured by steel tape scale stretching with

< 20 mm ----- 7 kg

≥ 20 mm ----- 10 kg

(CONTRACTOR)

(EIL)

FORMAT NO.: M-32  
TEST AND INSPECTION RECORD – CRANE

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

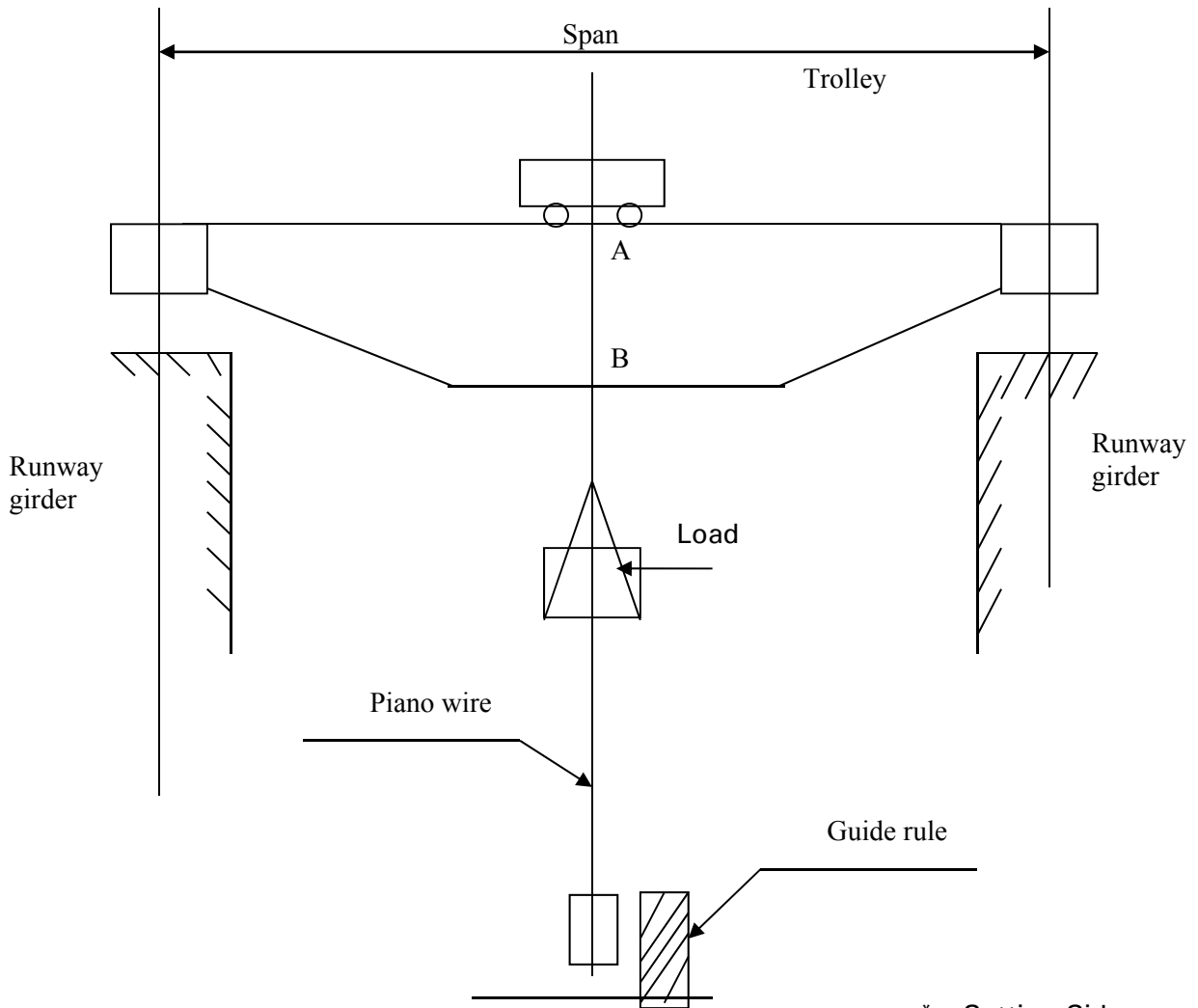
Project : \_\_\_\_\_  
Name of Work : \_\_\_\_\_  
Job No. : \_\_\_\_\_

Contractor : \_\_\_\_\_  
Work order No. : \_\_\_\_\_

(Sheet 1 of 2)

		No Load		0Ton	Rated Load			125% Load		Ton
		Speed (m/mm)	Volt (V)	Ampere (A)	Speed (m/mm)	Volt (V)	Ampere (A)	Speed (m/mm)	Volt (V)	Ampere (A)
Hoisting	Upper									
	Lowering									
Traversing	Right									
	Left									
Travelling	Front									
	Back									

Item Name	Hoisting		Traversing	Travelling
	Lowering (m/min.)	Upper (m/min)	(m/min.)	(m/min.)
1. Maintenance Shop Crane				
2. Warehouse Crane				
3. Emergency Generator Crane				
4. Propane Compressor Crane				
5. B.O.G. Compressor Crane				
6. Return Gas Blower Crane				
7. Sea Water Pump Crane				
8. Air Compressor Crane				



\* Setting Side of wright

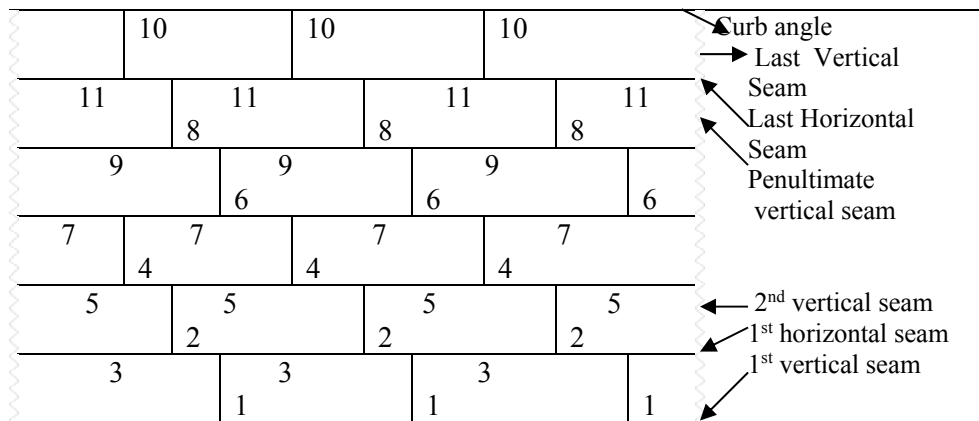
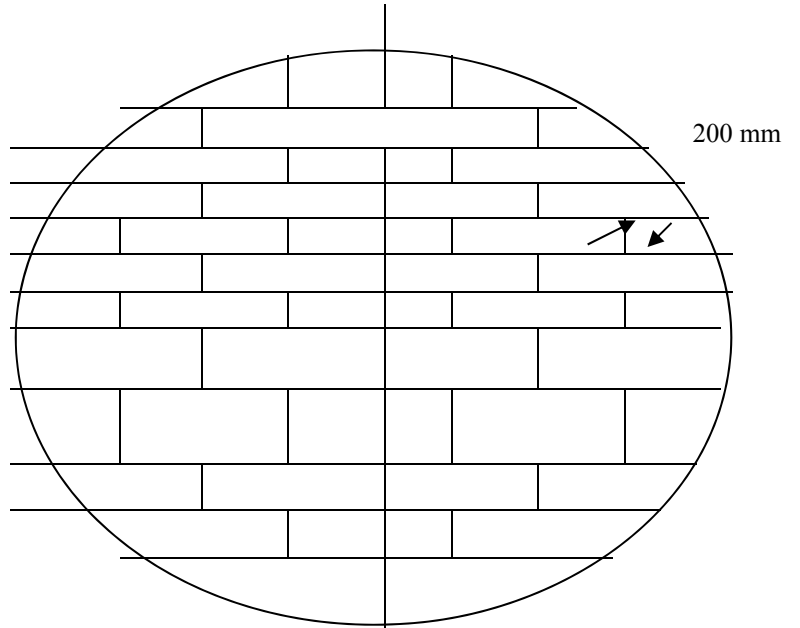
Item Name	Rated Load (Ton)	Allowable Deflection of Girder (m/m) (Drive or Non drive)*	Test Result (m/m)
1. Maintenance Shop Crane			
2. Warehouse Crane			
3. Emergency-Generator Crane			
4. Propane Compressor Crane			
5. B.O.G. Compressor Crane			
6. Return Gas Blower Crane			
7. Sea Water Pump Crane			
8. Air Compressor Crane			

CONTRACTOR

EIL

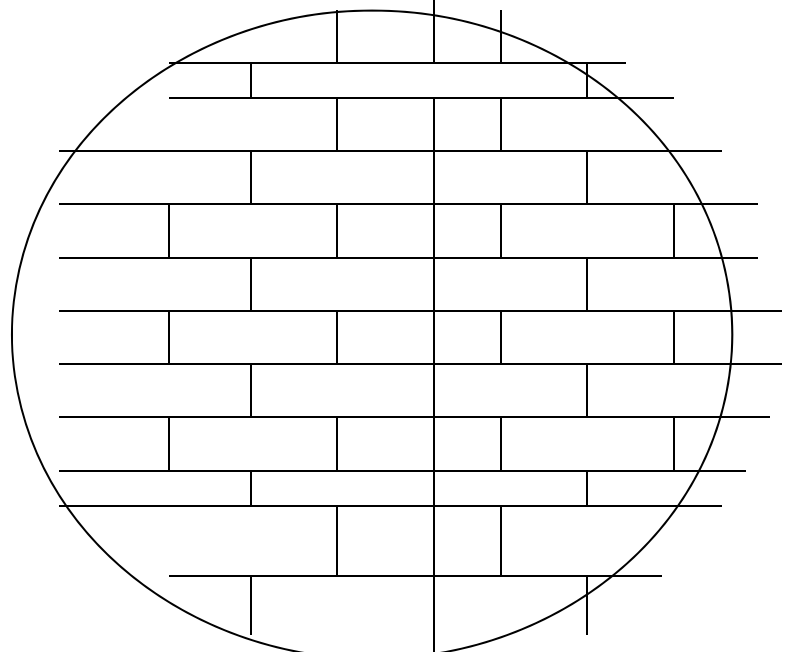
FORMAT NO. : M-33  
SEQUENCE OF WELDING FOR BOTTOM PLATES & SHELL OF THE TANKS

1. All the short seams shall be welded first starting from centre and proceed outwards
2. Then all the long seams shall be welded starting from middle and proceed outwards
3. Joggled Portion when shell erection is to be carried out shall be welded first and then tested before shell erection.



TYPICAL BOTTOM PLATE ARRGT WITHOUT ANNULAR PLATE

SHELL WELDING SEQUENCE



TYPICAL BOTTOM PLATE ARRGT WITH ANNULAR PLATE

CONTRACTOR

EIL

FORMAT NO. : M-34  
 TANK BOTTOM/FLOATING ROOF INSPECTION RECORD

Report No. : \_\_\_\_\_  
 Date : \_\_\_\_\_

Project : \_\_\_\_\_  
 Name of Work : \_\_\_\_\_  
 Job No. : \_\_\_\_\_

Unit : \_\_\_\_\_  
 Contractor : \_\_\_\_\_  
 Work order No. : \_\_\_\_\_

SHORT SEAMS								LONG SEAMS							
Jt. No.	Fit Up		Welding				Remarks	Jt. No.	Fit Up		Welding				Remarks
	Cont.	EIL	Visual		Vacuum				Cont.	EIL	Visual		Vacuum		
			Cont.	EIL	Cont.	EIL					Cont.	EIL	Cont.	EIL	

\_\_\_\_\_  
 CONTRACTOR

\_\_\_\_\_  
 EIL

Page 3235 of 4391 : B957-TENDER DOC-B957-300-16-43-MR-T-3001 : Rev. A

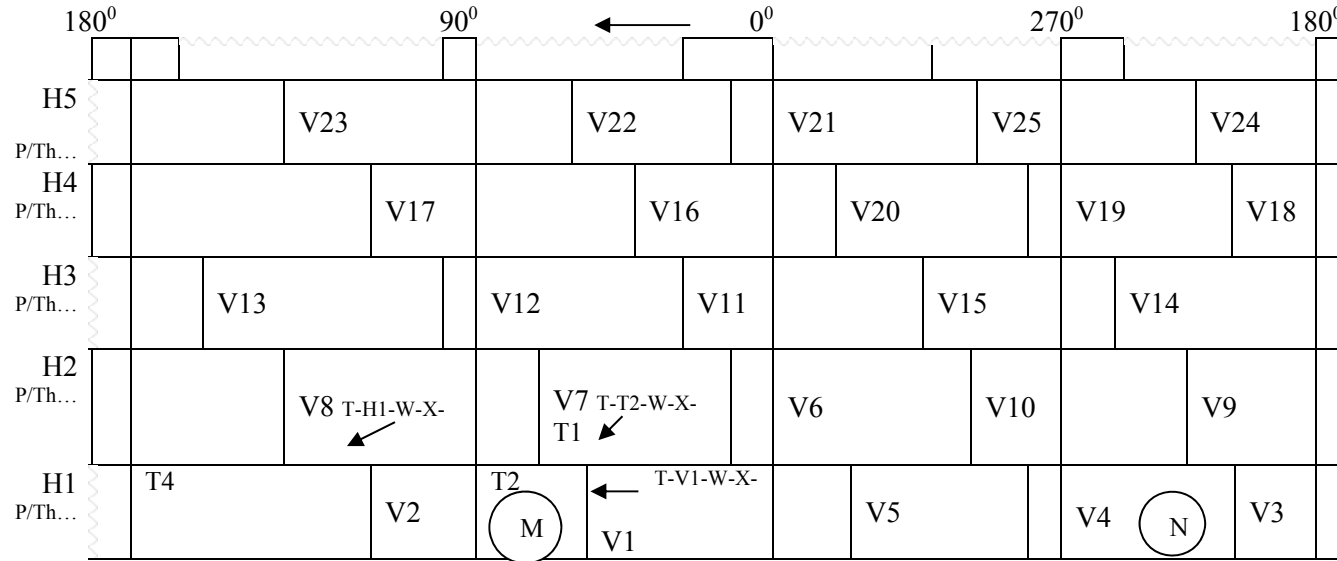
FORMAT NO. : M-35

TANK SHELL DEVELOPMENT DRAWING WITH RADIOGRAPHIC SPOT LOCATION (AS BUILT)

Report No. \_\_\_\_\_

Date : \_\_\_\_\_

Name of work : \_\_\_\_\_



EIL Job No : \_\_\_\_\_  
 Tank No. : \_\_\_\_\_  
 Ref. Drg. No. : \_\_\_\_\_  
 Fab. Code : \_\_\_\_\_  
 Capacity : \_\_\_\_\_  
 Tank Height : \_\_\_\_\_  
 Tank Dia : \_\_\_\_\_

NOTE :-

SHELL TO BOTTOM PLATE TEST

- T - Stands for tank number  
 V - Stands for vertical seam  
 X - Stands for X-ray number  
 W - Stands for welder's number  
 H - Stands for Horizontal seam  
 <T-T< - Stands for in between Tee joints  
 M - Stands for manhole  
 N - Stands for nozzle

	Contractor	EIL
1) Fit Up	_____	_____
2) Welding (Inside)	_____	_____
a) Visual	_____	_____
b) Oil chalk	_____	_____
3) Welding (Outside)	_____	_____
a) Visual	_____	_____
b) D.P.	_____	_____
4) Curb Angle/Wind	_____	_____
Girders (as per details	_____	_____
given in Const./QA/RF/ST/5A)	_____	_____
5) Openings (as per details	_____	_____
given in Const./QA/RF/ST/5A)	_____	_____

FORMAT NO. : M-36  
INSPECTION RECORD FOR TANK FABRICATION  
(VERTICAL JOINTS)

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_  
Name of Work : \_\_\_\_\_  
Job No. : \_\_\_\_\_

Unit : \_\_\_\_\_  
Contractor : \_\_\_\_\_  
Work order No. : \_\_\_\_\_

Course No.	Vertical Joint No.	Heat No. (P1,P2)	Fit-up Check		Welder No.	First Side Welding Check		Back Chip Check		Second Side Welding Check		Remarks
			Cont.	EIL		Cont.	EIL	Cont.	EIL	Cont.	EIL	
1	V 1											
	V 2											
	V 3											
	V 4											
	V 5											
	V 6											
2	V 7											
	V 8											
	V 9											
	V 10											
	V 11											
	V 12											
3	V 13											
	V 14											
	V 15											
	V 16											
	V 17											
	V 18											

V - Vertical Joint

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

FORMAT NO. : M-37  
 INSPECTION RECORD FOR TANK FABRICATION (HORIZONTAL JOINTS)

Report No. : \_\_\_\_\_  
 Date : \_\_\_\_\_

Project : \_\_\_\_\_  
 Name of Work : \_\_\_\_\_  
 Job No. : \_\_\_\_\_

Unit : \_\_\_\_\_  
 Contractor : \_\_\_\_\_  
 Work order No. : \_\_\_\_\_

Joint NO.	Fit-up Check		First Side Welding				Check		Back Chip Check		Second Side Welding Check		Remarks
			Welder Detail										
	Cont.	EIL	0 – 90	90 – 180	180 – 270	270 - 0	Cont.	EIL	Cont.	EIL	Cont.	EIL	
H 1													
H 2													
H 3													
H 4													
H 5													
H 6													
H 7													
H 8													

H - Horizontal Joint

(CONTRACTOR)

(EIL)

Page 3238 of 4391 : B957-TENDER DOC-B957-300-16-43-MR-T-3001 : Rev. A



FORMAT NO.: M-39

Report No. : \_\_\_\_\_

INSPECTION RECORD FOR CHECKING PERPENDICULARITY OF TANK

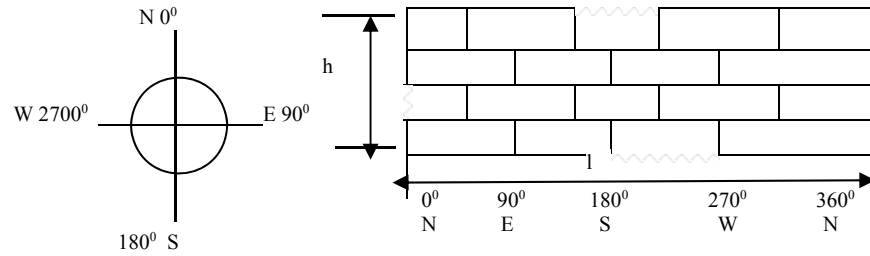
Date : \_\_\_\_\_

Name of work: \_\_\_\_\_

Tank No. : \_\_\_\_\_  
Dia : \_\_\_\_\_  
Height : \_\_\_\_\_  
No of courses : \_\_\_\_\_  
Contractor : \_\_\_\_\_

CONTRACT CLAUSE

Difference in perpendicularity between top & bottom shall not be more than ..... mm per metre of height. When one metre straight edger template is applied at rightangles to a horizontal joint, maximum gap shall not be more than .....



Course No.	N-E		0°-90°				E-S				90°-180°				S-W				180°-270°				W-N				270°-360°				REMARKS
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	
1																															
2																															
3																															
4																															
5																															
6																															
7																															
8																															

**NOTE :** The straight edge shall be moved on the horizontal weld joint and any variation in respect to the specified tolerance shall be highlighted. Minimum three readings shall be taken for each full length plate

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL









FORMAT NO. : M-44  
**BUOY/PANTOON INSPECTION RECORD**

Report No. : \_\_\_\_\_  
 Date : \_\_\_\_\_

Project : \_\_\_\_\_  
 Name of Work : \_\_\_\_\_  
 Job No. : \_\_\_\_\_

Unit : \_\_\_\_\_  
 Contractor : \_\_\_\_\_  
 Work order No. : \_\_\_\_\_

SHELL TO BOTTOM/SLEEVE (BUOY/PANTOON)									OTHER ATTACHMENTS							
Jt. No.	Fit Up		Welding						Jt. No.	Fit Up		Welding				Remarks
	Cont.	EIL	Visual		Oil Chalk		Air Test			Cont.	EIL	Visual		D.P. Test		
			Cont.	EIL	Cont.	EIL	Cont.	EIL				Cont.	EIL	Cont.	EIL	

\_\_\_\_\_  
 CONTRACTOR

\_\_\_\_\_  
 EIL

Page 3245 of 4391 : B957-TENDER DOC-B957-300-16-43-MR-T-3001 : Rev. A

**FORMAT NO. : M-45**  
**CERTIFICATE OF PRESSURE TESTS FOR TANKS**

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
Name of Work : \_\_\_\_\_ Contractor : \_\_\_\_\_  
Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_

Write N.A. when not applicable

TYPE OF TEST	SIGNATURE OF CONTRACTOR WITH DATE	SIGNATURE OF EIL WITH DATE
Hammer Test Water Height _____		
Fixed Roof Test Air Pressure _____		
Vacuum Test Vacuum _____		
Floating Roof Test As Per _____		
Additional Test if Any		

This is to certify that the subject tank was tested at the above pressures in the presence and to the satisfaction of EIL/Client

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL



FORMAT NO. : M-47  
TANK SETTLEMENT RECORD

TANK NO. \_\_\_\_\_

Report No. : \_\_\_\_\_

Date : \_\_\_\_\_

Project : \_\_\_\_\_

Name of Work : \_\_\_\_\_

Job No. : \_\_\_\_\_

Unit : \_\_\_\_\_

Contractor : \_\_\_\_\_

Work order No. : \_\_\_\_\_

Date of Observation	Time of Observation	Height of Water During Observation	Location of Observation (*)										Remarks	
			1	2	3	4	5	6	7	8	9	10		

(\*) No. of Locations area to be decided on the basis of Diameter of the Tank and Specifications/Codes

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
EIL

FORMAT NO. : M-48  
MANUFACTURER'S CERTIFICATION FOR  
TANK BUILT TO API STANDARD 650

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Project : \_\_\_\_\_ Unit : \_\_\_\_\_  
Name of Work : \_\_\_\_\_ Contractor : \_\_\_\_\_  
Job No. : \_\_\_\_\_ Work order No. : \_\_\_\_\_

To \_\_\_\_\_  
(Name & address of purchaser)

We hereby certify that the tank constructed for you at

\_\_\_\_\_  
(Location)

and described as follows: \_\_\_\_\_  
(Serial or contract number, size (diameter x height), capacity,

\_\_\_\_\_  
description of tank, i.e., floating roof or fixed roof)

meets all applicable requirements of API Standard 650 \_\_\_\_\_

Edition, \_\_\_\_\_ Revision and Appendix \_\_\_\_\_

dated \_\_\_\_\_ including the design, materials, fabrication,  
and erection.

The tank is further described on the attached as built data sheet dated \_\_\_\_\_

\_\_\_\_\_  
Manufacturer

\_\_\_\_\_  
Authority Representative

\_\_\_\_\_  
Date

(Sheet 1 of 6)

**FORMAT NO. : M-49**  
**INSTALLATION REPORTING FORMAT FOR**  
**COLUMN INTERNALS (BEFORE INSTALLATION)**

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

Contractor:	Name of Work:
COLUMN NO.:	VENDOR DWG. NO.:
SERVICE:	JOB NO.:
PLANT:	CLIENT:

DISTANCE BETWEEN TRAY SUPPORT RING (BETWEEN CONSECUTIVE TRAYS)

TRAY NO.:							
DWG. DIMENSION:							
AS BUILT DIMENSION AT POINT	A						
	B						
	C						
	D						
	E						
	F						

DIMENSION TO BE TAKEN FROM TOP TO TOP OF TSR WITH POINTS MARKED ON THE SAME ORIENTATION FOR ALL TRAYS MINIMUM AT FOUR POINTS UPTO 2000 Φ & MINIMUM SIX POINTS ABOVE 2000 Φ

**2. LOCATION OF BOLTING BAR**

TRAY NO.							
G1	ACTUAL						
	DIMENSION						
G2	ACTUAL						
	DIMENSION						
G3	ACTUAL						
	DIMENSION						
G4	ACTUAL						
	DIMENSION						
G5	ACTUAL						
	DIMENSION						
G6	ACTUAL						
	DIMENSION						
G7	ACTUAL						
	DIMENSION						
G8	ACTUAL						
	DIMENSION						

INSTALLATION CONTRACTOR.....  (SIGNATURE) NAME: DATE:	ENGINEER IN-CHARGE.....  (SIGNATURE) NAME: DATE:
--	--

Notes:

- (1) This format shall be filled for all the Trays by installation Contractor and counter checked by Engineer In-Charge.
- (2) Tolerance on various drawing dimensions shall be as per applicable drawing / standard.

FORMAT NO. : M-49  
INSTALLATION REPORTING FORMAT FOR  
COLUMN INTERNALS (BEFORE INSTALLATION)

(Sheet 2 of 6)

PLANT:	CLIENT:
--------	---------

DISTANCE BETWEEN TRAY SUPPORT RING (BETWEEN CONSECUTIVE TRAYS)

3. LEVEL READING:							
LEVEL AT	TSR REF. (TRAY / INTERNAL)						
	REF. POINT						
	A						
	B						
	C						
	D						
	E						
	F						
	G						
	H						
	I						
	J						
	K						
	L						
	M						
	N						
LEVEL AT A, B, C ,D.... TAKEN WITH WATER TUBE WITH "A" AS REFERENCE POINT MINIMUM AT FOUR POINTS UPTO 2000 Φ & MINIMUM SIX POINTS ABOVE 2000 Φ. MINIMUM 3 POINTS PER TSR SEGMENTS SHALL BE SELECTED							
INSTALLATION CONTRACTOR.....  (SIGNATURE) NAME: DATE:				ENGINEER IN-CHARGE.....  (SIGNATURE) NAME: DATE:			

Notes:

- (1) This format shall be filled for all the Trays by installation Contractor and counter checked by Engineer In-Charge.
- (2) Tolerance on various drawing dimensions shall be as per applicable drawing / standard.

**FORMAT NO. : M-49**  
**INSTALLATION REPORTING FORMAT FOR**  
**COLUMN INTERNALS (AFTER INSTALLATION)**

(Sheet 3 of 6)

Contractor:	Name of Work:
COLUMN NO.:	VENDOR DWG. NO.:
SERVICE:	JOB NO.:
PLANT:	CLIENT:

TRAY NO.:								
A	DWG. DIMENSION:	A1, A3, A4, A5, A7, A8						
		A2, A6						
HEIGHT OF EXIT WEIR (FROM TOP OF TRAY DECK TO TOP OF WEIR) (mm)		A1						
		A2						
		A3						
		A4						
		A5						
		A6						
		A7						
		A8						
B	DWG. DIMENSION:	B1, B3, B4, B5, B7, B8						
		B2, B6						
UNDER DOWNFLOW CLEARANCE (DISTANCE BETWEEN DOWNCOMER BOTTOM & TRAY DECK / RECESSED SEAL PAN PLATE) (mm)		B1						
		B2						
		B3						
		B4						
		B5						
		B6						
		B7						
		B8						
C	DWG. DIMENSION:	C1, C3, C4, C5, C7, C8						
		C2, C6						
HORIZONTAL DISTANCE BETWEEN DOWNCOMER PLATE & RECESSED SEAL PAN (mm)		C1						
		C2						
		C3						
		C4						
		C5						
		C6						
		C7						
		C8						
INSTALLATION CONTRACTOR..... (SIGNATURE) NAME: DATE:			ENGINEER IN-CHARGE..... (SIGNATURE) NAME: DATE:					

Notes:

- (1) This format shall be filled for all the Trays by installation Contractor and counter checked by Engineer In-Charge.
- (2) Tolerance on various drawing dimensions shall be as per applicable drawing / standard.

**FORMAT NO. : M-49**  
**INSTALLATION REPORTING FORMAT FOR**  
**COLUMN INTERNALS (AFTER INSTALLATION)**

(Sheet 4 of 6)

Contractor:	Name of Work:
COLUMN NO.:	VENDOR DWG. NO.:
SERVICE:	JOB NO.:
PLANT:	CLIENT:

TRAY NO.:								
D	DWG. DIMENSION:	D1, D3, D4, D5, D7, D8						
		D2, D6						
UNDER DOWNFLOW CLEARANCE (DISTANCE BETWEEN DOWNCOMER PLATE & SEAL PAN) (mm)		D1						
		D2						
		D3						
		D4						
		D5						
		D6						
		D7						
		D8						
E	DWG. DIMENSION:	E1, E3, E4, E5, E7, E8						
		E2, E6						
CLEAR DISTANCE BETWEEN DOWNCOMER PLATE & SEAL PAN (mm)		E1						
		E2						
		E3						
		E4						
		E5						
		E6						
		E7						
		E8						
INSTALLATION CONTRACTOR..... (SIGNATURE) NAME: DATE:			ENGINEER IN-CHARGE..... (SIGNATURE) NAME: DATE:					

Notes:

- (1) This format shall be filled for all the Trays by installation Contractor and counter checked by Engineer In-Charge.
- (2) Tolerance on various drawing dimensions shall be as per applicable drawing / standard.

**FORMAT NO. : M-49**  
**INSTALLATION REPORTING FORMAT FOR**  
**COLUMN INTERNALS (AFTER INSTALLATION)**  
 (Sheet 5 of 6)

Contractor:	Name of Work:
COLUMN NO.:	VENDOR DWG. NO.:
SERVICE:	JOB NO.:
PLANT:	CLIENT:

CHECK THE FOLLOWING	TRAY No.					
CHECK EACH BOLT FOR TIGHTNESS						
CHECK ORIENTATION, PROPER MARK (TYPE) AND TIGHTNESS OF EACH CLAMP						
CHECK PROVISION OF LOCK NUTS AND SEAL PLATES WHEREVER SPECIFIED						
CHECK EACH TOP DOWNCOMER PIECE FOR CORRECT INSTALLATION OF SHIMMING INCLUDING TACK WELDING / BOLTING						
CHECK SEAL WELDING / GASKETING WHEREVER APPLICABLE						
CHECK LEAK TESTING OF SEAL PANS RECESSED SEAL PAN, CHIMNEY TRAYS, DISTRIBUTOR, DRAW-OFF BOXES ETC. AS PER DRAWING						
CHECK OVERLAPPING OF DECKS						
CHECK FOR DAMAGED, MISSING VALVES AND VALVE MOVEMENT FOR ALL VALVES FOR VALVE TRAYS						
CHECK FOR FITTING OF PROPER VALVE COMBINATION (MR2, MR6, ETC.)						
CHECK FOR NOTICEABLE DAMAGE TO DECK COMPONENTS						
CHECK LEVELNESS AND ALIGNMENT OF INLET WEIR AND EXIT WEIR AND ADJUST IF NECESSARY						
CHECK BEAM AND CLIPS ARE PROPERLY FITTED						
CHECK THAT TRAY MANWAY CAN BE OPENED FROM TOP AS WELL AS FROM BOTTOM						
CHECK THAT ALL SLOTS ON TRY COMPONENTS ARE FULLY COVERED						
CHECK THAT GAPS AT DOWNCOMER ENDS AND OTHER PLACES ARE WITHIN SPECIFIED LIMITS						
CHECK ORIENTATION IN CASE OF RIPPLE WAVES						
FOR LATTICE GIRDERS, CHECK THE LEVELNESS OF PRIMARY MEMBERS AND COMPLETENESS OF WELDING OF ALL THE BRACINGS AND SECONDARY MEMBERS						
CHECK TEMPORARY PLUGS WHEREVER PROVIDED FOR TESTING HAVE BEEN REMOVED						
CHECK THAT TRAYS HAVE BEEN CLEARED OFF ALL FOREIGN MATERIALS						
INSTALLATION CONTRACTOR .....	ENGINEER INCHARGE .....					
NAME:	(SIGNATURE)					
DATE:	NAME:					
	DATE:					

Notes:

- (1) This format shall be filled for all the Trays by installation Contractor and counter checked by Engineer In-Charge.
- (2) Tolerance on various drawing dimensions shall be as per applicable drawing / standard.

**FORMAT NO. : M-49**  
**INSTALLATION REPORTING FORMAT FOR**  
**COLUMN INTERNALS (AFTER INSTALLATION)**

(Sheet 6 of 6)

Contractor:	Name of Work:
COLUMN NO.:	VENDOR DWG. NO.:
SERVICE:	JOB NO.:
PLANT:	CLIENT:

CHECK THE FOLLOWING	BED NO:					
CHECK THAT MULTIBEAM SUPPORT PLATE SITS PROPERLY ON THE TSR WITH NO UNDESIRED GAPS, ALL SPACING AND GAPS ARE EVENLY DISTRIBUTED ACROSS THE VESSEL DIAMETER						
CHECK FOR PROPER LEVELLING OF TOP BED AND GAP BETWEEN TOP OF BED AND BED LIMITER (NO GAPS PREFERRED, MAXIMUM GAP AT FEW LOCATIONS NOT O EXCEED ONE PACKING SIZE)						
CHECK LEVELNESS FOR DISTRIBUTOR / REDISTRIBUTORS / FLASH GALLERIES / SPRAY HEADER. SAME TO BE WITHIN TOLERANCE SPECIFIED IN DRAWINGS / STANDARDS AND TO BE RECORDED IN SHEET ONE.						
CHECK LEVELNESS FOR DISTRIBUTOR / REDISTRIBUTORS / FLASH GALLERIES / SPRAY HEADERS ARE PROPERLY CLAMPED / BOLTED						
CHECK LEVELNESS FOR DISTRIBUTOR / REDISTRIBUTORS / FLASH GALLERIES (IF REQUIRED) ARE PROPERLY GASKETTED AS SPECIFIED IN DRAWINGS						
CHECK LEAK TIGHTNESS OF THE DISTRIBUTOR / REDISTRIBUTOR / FLASH GALLERIES (IF REQUIRED), TO BE ENSURED BY FILLING WATER AND CHECKING LEAKAGES FROM GASKETTED JOINTS						
FOR CHIMNEY COLLECTOR TRAY, DRAW OFF BOXES, WHEREVER APPLICABLE CHECK COMPLETENESS OF SEAL WELDING, GASKETTING, PROPER FITMENT OF VAPOUR RISER COVERS AND REVIEW RECORD FOR LEAK TESTING.						
FOR SPRAY NOZZLE DISTRIBUTOR CHECK FOR: i) HYDROTEST FOR SPRAY HEADER ii) CLOGGING OF SPRAY NOZZLES, BY RUNNING PUMP, IF FEASIBLE iii) CHECK TIP DISTANCE FROM TOP OF THE BED (TO BE WITHIN 25 mm) iv) CHECK GASKET AT FLANGE JOINT, THREAD SEALANT AT THREADED JOINTS v) ANY OBSTRUCTION IN THE UNIFORM SPRAY PATTERN						
REVIEW OF PROPER ORIENTATION OF VARIOUS TOWER INTERNALS LIKE BED LIMITER WRT DISTRIBUTOR / REDISTRIBUTORS, AS PER DETAIL SHOWN IN RESPECTIVE DRAWINGS						
CHECK TEMPORARY PLUGS WHERE EVER PROVIDED HAVE BEEN REMOVED AFTER TESTING.						
INSTALLATION CONTRACTOR NAME: DATE:	..... (SIGNATURE)	ENGINEER IN-CHARGE..... (SIGNATURE) NAME: DATE:				

Notes:

- (1) This format shall be filled for all the Trays by installation Contractor and counter checked by Engineer In-Charge.
- (2) Tolerance on various drawing dimensions shall be as per applicable drawing / standard.

FORMAT NO. : M-50

**INSTALLATION REVIEW CHECK LIST**

Report No. : \_\_\_\_\_

Date : \_\_\_\_\_

(Sheet 1 of 2)

**TRAY INSTALLATION REVIEW CHECKLIST**

Sl.	Description	Remarks
1.	Review of filled formats for tray levelness and other tray installation data Formats to be completed by Contractor and duly certified for 100% checking by sites. If any dimension is out of permissible tolerances, specialist to review and suggest remedial action, in consultation with HO (if required)	
2	Provide clarification to site on any matter w.r.t. installation of trays and tower internals.	
3	Random check minimum 25% of trays (subject to minimum two trays per set) (Trays selected shall be true representative)	
	<ul style="list-style-type: none"> <li>• EWII&amp; Adjustability (permissible deviation =1 mm)</li> <li>• UDFC (permissible deviation = 3, D/C bottom piece to rest on D/C bracket.</li> <li>• Gap at deck joints (max. gap – 3 mm at deck joint, 5 mm at EW location)</li> <li>• Overlapping of tray decks (no overlapping allowed)</li> <li>• Valve movement, missing &amp; damaged valves (check approx. 5% of valves)</li> <li>• For bubble cap trays, check skirt height &amp; locknuts on caps (check approx 5% caps)</li> <li>• Check plugging of holes in case of sieve trays</li> <li>• Noticeable damage in internal components, wooden hammers to be used in case flattening is required</li> <li>• Chord heights (acceptable limit=(Col. ID/200 I 4)</li> <li>• Check inlet weir/outlet weir scale plate at respective location</li> <li>• Check for proper fitting of gaskets for gasketed deck components.</li> <li>• Also check whether same has been leak tested or not. Also check that drain holes are open unless specified otherwise in the drawings.</li> <li>• Light and heavy valves combination adopted at right place</li> <li>• Check provision of lock nuts wherever specified</li> <li>• For ripple trays, check relative orientation of trays</li> <li>• For cartridge trays, check the top tray of each bundle orientation and removal of lifting box.</li> <li>• Check the provision of anti jump baffle wherever specified</li> <li>• Check for seal plates on recessed seal pans</li> <li>• Check temporary plugs wherever provided has been removed after testing</li> </ul>	
4	For chimney/collector tray, draw-off boxes, wherever applicable, check completeness of seal welding, gasketing, proper fitment of vapour riser covers and review record for leak testing	
5	Check arrangement for proper feeding and liquid withdrawal Reflux of top tray <ul style="list-style-type: none"> <li>• Reflux at top tray</li> <li>• Transition arrangement from one tray to other</li> <li>• Intermediate feed including direction/angle of vapour and liquid slots.</li> <li>• Feed from bottom most seal pan to partitioned column bottom</li> <li>• Vapour/reboiler return,if flush, should be parallel to down comer of bottom most tray.</li> <li>• Location/orientation of withdrawal nozzle. Also check provision of vortex breaker.</li> <li>• Drain &amp; vents holes wherever provided in the feed system shall be clear and open</li> </ul>	
6	List out all discrepancies in a punch list for individual column	

Date:

Signature:

Name:

FORMAT NO. : M-50  
INSTALLATION REVIEW CHECK LIST

(Sheet 2 of 2)

Report No. : \_\_\_\_\_  
Date : \_\_\_\_\_

TOWER INTERNAL INSTALLATION REVIEW CHECKLIST

Sl.	Description	Remarks
1.	Review site record for levelness for distribution/redistributors/flash galleries/spray header. Same to be within tolerance specified in the drawing/standards	
2	Check that the distributor/redistributors/flash galleries/spray headers are properly clamped/bolted.	
3	Check that the distributor/redistributors/flash galleries (if required) are properly gasketted as specified in the drawing.	
4	Review site record of leak tightness of the distributors/redistributors/flash gallery (if required), to be ensured by filling water and checking leakages from gasketted joints.	
5	For chimney/collector tray wherever applicable, check, if possible, completeness of seal welding, gasketting, proper fitment of vapour riser covers and review record for leak testing.	
6	For spray nozzle distributor check for i) Hydrotest record for spray header ii) Clogging of spray nozzles, by running pump, if feasible ii) Sample check tip distance from top of the bed (to be within $\pm 25$ mm). iii) Check proper gasket fitment at flange joint, thread sealant at threaded joints. Any obstruction in uniform spray pattern	
7.	Review of proper orientation of various lower internals like bed limiter w.r.t. Distributor/redistributors, as per detail shown in respective drawings is mandatory.	

Date:

Signature:

Name:

FORMAT NO: M-51

(Sheet 1 of 4)

**CHECKLIST FOR MECHANICAL CLEARANCE – A/G PIPING**

Project : _____		Report No : _____				
Plant/Unit : _____		Date : _____				
Contractor : _____		Area : _____				
Loop No : _____		INCH MTR : _____				
Line No (Isometric No.)	Rev.	GAD No.	Rev.	P&ID No.	Rev.	
	<b>Items to be checked</b>			<b>Compliance Status</b>	<b>Accepted by</b>	
				<b>OK/NA/PL (Note-1)</b>	<b>Contractor</b>	<b>EIL</b>
<b>1.</b>	<b>Installation checked as per Isometric w.r.t. CONFIGURATION :</b> Route, plumb, elevation, Clearance for thermal expansion/ insulation <b>BRANCH :</b> Location, angle, orientation, type, RF pad, etc. <b>STEAM TRAP :</b> Direction					
<b>2.</b>	<b>Installation checked as per GAD w.r.t. CONFIGURATION :</b> Route, clearance for thermal expansion/insulation					
<b>3.</b>	Installation checked as per P&ID					
<b>4.</b>	Isometrics completed for ( enclosed ):					
	a. Joint Numbering (Shop & Field Welds)					
	b. Spool Numbering					
	c. As-built routing & dimensions					
<b>5.</b>	<b>Valves</b> (Check Rating, Gaskets, Flow Direction, Sheet No., Tag No., Spindle direction, CSO LO/LC, Damage, etc)		Nos			
	Gate Valves					
	Globe Valves					
	Check Valves					
	Control Valves Tag Nos.:					
	Safety Valves Tag Nos.:					
	Any other valves :					
<b>6.</b>	<b>Strainers :</b> Check for clearance, flow direction, elements					

**Note-1: OK – Accepted, NA-Not applicable, PL – Punch listed**

**FORMAT NO: M-51**

(Sheet 2 of 4)

**CHECKLIST FOR MECHANICAL CLEARANCE – A/G PIPING**

	Item to check	Compliance Status	Accepted by	
			Contractor	EIL
		OK/NA/PL (Note-1)		
<b>7.</b>	<b>Flanged Joints</b>			
	Total Nos.			
	Check for type of flange			
	Check for Rating			
	Identification of Flange joints not subjected to hydro test in the Test Pack			
	Check for Alignment, (proper gap & parallelity)			
	Check for Correct Studs & nuts – dia., length, Material, uniform protrusion of studs, anti seize compound			
	Check for correct gasket (type, size, spec., thickness, etc.)			
	Torque values used for tightening			
<b>8.</b>	Seal Welding of Screwed Connections (if Required)			
<b>9.</b>	Vents/Drains as per Dwg and Provision of additional high point Vents and/or low point Drains, if reqd.			
<b>10.</b>	Reinforcement pads as per piping class			
<b>11.</b>	<b>Orifice Flanges :</b>			
	Check for Tag No., tapping orientation, tap valve, jack screw, straight run length of upstream & downstream			
<b>12.</b>	<b>Local Gauges :</b> Check for accessibility			
<b>13.</b>	Slope (When Applicable)			
<b>14.</b>	<b>Supports</b>			
	<b>a) Guides, Cross Guides, Trunnion, etc.</b>			
	i) Check for correct type, material & dimension			
	ii) Check welding			
	iii) Check for vent hole on pads (if applicable)			
	iv) Check offset for thermal expansion			
	v) Check clearance of guide			
	vi) Check U bolt for slide support			
	<b>b) Spring Support</b>			
	i) Verify tag no. and check details as per data sheet/spring set			
	ii) Check for locking arrangement and any damage during transit, etc.			
	iii) Check for completeness of installation as per drg. including welding of mounting cleat/ bracket			
	iv) Check for locking during installation and pressure test			
	<b>c) Bracket Support &amp; Inserts with Anchor Fasteners :</b>			
	i) Check for members dimensions and materials			
	ii) Check for welding			
	iii) Check for bolting			
	iv) Check for appearance/ damage			

Note-1: OK – Accepted, NA-Not applicable, PL – Punch listed

FORMAT NO: M-51

(Sheet 3 of 4)

**CHECKLIST FOR MECHANICAL CLEARANCE – A/G PIPING**

	Item to check	Compliance Status	Accepted by	
			Contractor	EIL
		OK/NA/PL (Note-1)		
<b>15.</b>	<b>Vents/ Drains :</b>			
	- As per drg.			
	- Orientation of valve handles			
	- Clearance for hose			
	- Requirement of additional vents/ drains (highest/lowest pt.)			
<b>16.</b>	<b>Earthings :</b>			
	a) Check for location			
	b) Check for dimension of lug welding			
<b>17.</b>	<b>Joists History sheets enclosed for :</b>			
<b>17.1</b>	Material Traceability as per Procedure No: _____ (refer enclosed suggested Format)			
<b>17.2</b>	Fit ups checked			
<b>17.3</b>	NDT Complete (Radiography, MT, PT, UT, PAUT)			
<b>17.4</b>	Stress Relieving & Hardness check complete			
<b>17.5</b>	Positive Material Identification (PMI)			
	Checked for Removal/Blinding-off of:			
	a. Control, Safety and Check Valves			
	b. In-Line Instruments			
	c. Rupture Discs			
	d. Equipment Nozzles			
	e. Others			
<b>18.</b>	Supports and Weld/Flanged/Screwed connections free from insulation or other coverage`			
<b>19.</b>	Checked Installation of (Indicate Location in Drawings)			
	a. Temporary Blinds/Spades			
	b. Temporary Strainers			
	c. Temporary Dummy-Spools			
	d. Temporary Gaskets			
	e. Others			
<b>20.</b>	<b>Expansion Bellows -</b>			
	a) Checks prior to installations			
	- Physical damages			
	- Transit locks are intact			
	- Dimensions as per drgs.			
	b) Check during installation			
	- Parallelity of mating flanges			
	- Face to face dimension of mating flanges			
	- Concentricity of mating flanges			
	- No stress on expansion bellows			
	- Record			

Note-1: OK – Accepted, NA-Not applicable, PL – Punch listed

FORMAT NO: M-51

(Sheet 4 of 4)

**CHECKLIST FOR MECHANICAL CLEARANCE – A/G PIPING**

	Item to check	Compliance Status	Accepted by	
			Contractor	EIL
		OK/NA/PL (Note-1)		
	c) Isolation during pressure tests			
	- Bellow mfg. recommendations on isolation of bellow during pr. Test to be followed			
	- If recommended expn. Bellow to be dropped during pr. Test.			
21.	Cleanliness Internally and Externally			
22.	Rotating Equipment Final Alignment Checked with piping			
23.	Removal of unwanted construction supports			
24.	Instrument tapings provided as per Drawing			
25.	<b>Physical-Walk-Through – The – Line</b> , checked for gross irregularities including physical damages, unwanted tacks, arc strikes, spatters and space for thermal expansion.			
Other :				
Remarks				
<b>Reviewed by Contractor (minimum one level higher than checker)</b>				
<b>Contractor</b>				
Sign :				
Name :		Designation :		
Date :				
<b>EIL</b>				
Sign :				
Date :		Designation :		
Name :				

Note-1: OK – Accepted, NA-Not applicable, PL – Punch listed



**ABOVE GROUND PIPING**

(sheet 2 of 2)

**Piping Hydro Test Record – A/G Piping**

ACTIVITY	Date	Time
Water Filling and Venting started at		
Water Filling Completed		
Vents Closed		
Isolation of Pressurizing pump		
Test completed at :		
- Water drained		
- Air		
- Temp Blinds Removed		
- Checked for reinstallation of <ul style="list-style-type: none"> <li>a. Control &amp; Safety vales</li> <li>b. On line Instruments</li> <li>c. Rupture disks</li> <li>d. Deblinding</li> <li>e. Others</li> </ul>		
- Cold setting of spring supports carried out		
- <b>Test Result</b>	Acceptable	Not Acceptable
<b>Contractor :</b>	<b>EIL :</b>	
Sign :	Sign:	
Date :	Date:	
Name :                      Designation	Name:	Designation:

( Sht 2/2 )



FORMAT NO. : M-54

**ABOVE GROUND PIPING**

Indicative format for Authorizing/Recording of Modification of Piping Joints after Mechanical clearance /NDT Clearance/ Hydro Testing /Pneumatic Testing of pressure Test Packages/Loops in piping jobs.			
Job No. :	Unit No.:	Report No:	Date:
Owner/Client :	Pressure Test Package No.:		
PMC :	System Name/No. :		
Contractor :	Previous Hydrotest Date :		
Drawing No	:		
Line No.	:		
Joint Nos. to be modified (attach sketch)	:		
Size & type of joint	:		
New Joint Nos.	:		
Deleted Joint Nos.	:		
Modification Joint Nos.	:		
Reason for Modification	:		
<b>A) Proposed checks/NDT / Testing after Modification</b>			
1. Fit up and Traceability.:	<input type="checkbox"/>		
2. PMI Checks :	<input type="checkbox"/>	Mark '√' in box as necessary	
3. MPI Test :	<input type="checkbox"/>	PT (root/final) :	<input type="checkbox"/> RT: <input type="checkbox"/>
4. PWHT/Hardness :	Required. : <input type="checkbox"/>	Not Required. :	<input type="checkbox"/>
5. Hydrotesting:	<input type="checkbox"/>	Pneumatic Test :	<input type="checkbox"/>
<b>Authorized Signatory (note-1)</b>			
Name			
Signature			
Date			
<b>B) Proposal Accepted by EIL ( note-2)</b>			
	<b>Area Coordinator</b>	<b>Welding/ NDT Incharge</b>	
Name			
Signature			
Date			
<b>Clearance/Acceptance after modifications (All Supporting Documents enclosed)</b>			
<b>Mechanical clearance:</b>	Contractor Mech. Signature. <input type="checkbox"/>	EIL Mech. Signature.	<input type="checkbox"/>
<b>NDT Clearance</b>	: Contractor QA/QC Signature. <input type="checkbox"/>	EIL Welding /NDT Signature.	<input type="checkbox"/>
<b>Testing Acceptance</b>	: Contractor Mech. Signature. <input type="checkbox"/>	EIL Mech. Signature.	<input type="checkbox"/>
<b>Final acceptance after Modification</b>			
	<b>Contractor</b>	<b>EIL</b>	
Name			
Signature			
Date			

- Note: 1. Authorized signatory(\*): RCM/ Site In charge of execution agency  
2. RCM/SIC of EIL may seek opinion of Engineering, prior to acceptance of proposal from contractor as necessary.

FORMAT NO. : M-55

(4 pages)

**Checklist for Erection of Static Equipment**

S. No.	Description	Status (OK/ Not OK)	Contractor / TPI	EIL / Client	Remarks
<b>1</b>	<b>Shifting of Equipment (within site)</b>				
1.1	Equipment inspected at stores for damages (if any), Arrange for rectification at site/stores, including initiation of insurance claim process (if required).				
1.2	Detailed packing list checked & all loose items identified at stores/site.				
1.3	Special lifting tools & tackles (Spreader bar, lifting beams, shackles etc) if any supplied by Manufacturer/Licensor/Package vendor are identified and shifted to site.				
1.4	Manoeuvring plan identified and Checked by the TPI/Erection contractor for shifting the equipment from the store/ owner point to the designated erection area, including removal of site hindrances for safe movement of the equipment.				
1.5	ODC permits taken from all concerned (if applicable).				
1.6	Adequate height in saddle arrangement provided to carry out installation of Brackets/Insulation etc., at site (If applicable).				
<b>2</b>	<b>Safety/Training</b>				
2.1	Tool box talk (TBT) done.				
2.2	TBT conducted for shifting of equipment from one place to designated location.				
2.3	TBT conducted to the rigging team before erection of the equipment.				
2.4	Adequate ventilation are provided in the confined space (If applicable)				
2.5	Lower Explosive Limit (LEL) checked in the confined space before erection of the equipment (If applicable)				
2.6	High Tension (HT) line passing nearby erection area are within the safe distance limit (If applicable)				
2.7	Safe Access for removal of the sling after erection of the equipment checked.				
2.8	Health check of Man basket done before the erection of the equipment.				
2.9	Fitness Certificate availability for Rigging Team & crane operator checked.				
2.10	Clear demarcation of risk prone area by HSE personnel & job engineer for barricading & insuring the presence of only designated persons in the barricaded area during erection.				

S. No.	Description	Status (OK/ Not OK)	Contractor / TPI	EIL / Client	Remarks
<b>3</b>	<b>Crain Detail Checking</b>				
3.1	Configuration of the crane				
3.2	Age of the crane				
3.3	Boom length and additional arrangements if any shall be indicated				
3.4	Operating radius				
3.5	Cumulative Lifting capacity within SWL				
3.6	Clearance between the equipment and boom				
3.7	Jacks of the crane are positioned in level and safe				
3.8	Barrication done in erection area				
3.9	Adequacy of Counter weight checked and weight of counter weight is embossed/marked				
3.10	Hindrance due existing facilities like drains, Culverts, trenches, any neighbouring foundation, structures, equipments etc., are identified and hindrance are removed before erection and same shall be marked in the scheme.				
3.11	Swing of Boom & counter weight doesn't foul with existing facilities				
3.12	The load chart of the cranes				
3.13	Capacity of the lifting tackles along with all the test certificates are found in order				
3.14	Availability of valid Load Test Certificate issued from Competent Authority/TPI for Main Crane				
3.15	Availability of valid Load Test Certificate issued from Competent Authority/TPI for Trailing Crane				
3.16	Availability of valid Test Certificate from Competent Authority/TPI for Rigging tools & tackles checked				
3.17	Crane safety indications checked				
3.18	Safe Load Indicator (SLI) checked				
3.19	Wind anemometer working indications checked				
3.2	Swing warning alarm/lights working checked				
3.21	Road block permits (if any) taken				
3.22	Intimated to other contractors nearby				

S. No.	Description	Status (OK/ Not OK)	Contractor / TPI	EIL / Client	Remarks
4	<b>Pre-Erection Activities at site</b>				
4.1	Ensure latest revision of Equipment drawing is available				
4.2	Ground compaction of crane & equipment placement area (Hard Stand), if applicable.				
4.3	Testing of Hard Stand, if required				
4.4	Work Permit availability before commencement of the job checked.				
4.5	Damages (if any) checked in equipment nozzle, instrument connection, saddles, structural clips etc. (after shifting to site).				
4.6	Damages (if any) checked on foundation bolt and greasing done.				
4.7	Centre line marking on equipment and foundation for checking verticality. If marking is under Insulation transfer marking outside insulation on equipment				
4.8	Ground compaction of crane & equipment placement area. Hard Stand, if applicable.				
4.9	Level/Elevation, Orientation of the foundation checked				
4.10	Correctness of no. & size of foundation bolts checked				
4.11	Check the size of opening is sufficient enough taking into account all projection of nozzles if equipment to be inserted through opening				
4.12	Hole dia. and no. of holes in case / structure of equipment columns checked				
4.13	Equipment base bolt holes matching with actual foundation bolt layout checked				
4.14	Thread of bolts & nuts checked				
4.15	Check any damages observed in the pre fixed internals like grid, Internal distributor, distributors etc.,				
4.16	Cleaning of Sleeves before erection checked				
4.17	Chipping & roughening of foundation checked				
4.18	Shims, levelling plates, wedges, sliding base plates installation checked				

S. No.	Description	Status (OK/ Not OK)	Contractor / TPI	EIL / Client	Remarks
4.19	Platform brackets installation checked				
4.20	Insulation done before the erection of the equipment				
4.21	Before erection of the equipment, equipment spring support installation at prescribed elevation checked as per the applicable drawings				
4.22	Touch up paint done as per the applicable painting spec and job specification				
<b>5</b>	<b>Erection Scheme</b>				
5.1	All details required in the rigging Scheme & procedure provided by agency/contractor				
5.2	Erection Scheme & Rigging procedure submitted by agency/contractor are approved				
5.3	Wire rope slings checked				
5.4	Spreader beam checked				
5.5	D Shackles checked				
5.6	Hook Blocks checked				
5.7	Orientation, length and size of lifting trunions checked for fouling of slings with any nozzle while lifting				
5.8	Equipment orientation w.r.t equipment GAD and piping GAD are matched				
<b>6</b>	<b>After Erection</b>				
a	Post erection the Temporary saddles used for equipment shifting and templates are shifted to designated location as per instruction of engineer in charge				
b	Tightening of bolts and providing washers checked				
c	Levelling and alignment of equipments checked				
d	Final tightening of bolts checked				
e	Sub assemblies and Commissioning spares etc., received along with equipment (if any) returned to store/owner				
f	Insulation rings checked and found in order				
g	Sub assemblies are installed & Commissioning spares returned to store/owner				
h	Erection of Davit, Checking welding of Sliding Link (if applicable)				
i	Welding of washers checked (if applicable)				



**Abbreviations:**

AFC	:	Approved For Construction
CF	:	Ceramic Fibre
PMC	:	Project Management Consultant
SS	:	Stainless Steel like A312 TP 304, 316, 321, 304L, 316L, 316Mo, etc.

**Construction Standards Committee**

**Convenor:** Sh. R K Singh, ED (Construction)

**Members:** Sh. D S N Murthy, GGM (Projects)  
Sh. Chinmoy Kapuria, CGM (SCM)  
Sh. Udayan Chakravarty, CGM (Piping)  
Sh. Abhijit Chakraborty, GM (Construction)  
Sh. Pankaj Kumar Rai, DGM (Construction)  
Sh. Dhananjay, AGM (Construction)

## CONTENTS

S.NO	DESCRIPTION	ITP/ FORMAT NO.	PAGE NO.
<i>SECTION - A</i>			
ITPs FOR GENERAL WORKS			
1.	Painting	3301	6-7
2.	Insulation	3305	8
3.	Refractory Lining	3310	9-10
4.	Ceramic Fibre Lining	3315	11
<i>SECTION - B</i>			
FORMATS FOR GENERAL WORKS			
1.	Record of Calibration of Measuring/Testing Equipments	G-1	13
2.	Incoming Material Inspection Report	G-2	14
3.	Daily Painting Report	G-3	15
4.	Inspection Check Sheet – Insulation Works	G-4	16

# SECTION – A

## INSPECTION & TEST PLANS

## GENERAL NOTE

*The enclosed ITP's shall be followed for the works to be performed by the contractor. The provisions indicated for stage wise inspection by EIL/Owner (For specific activities), may be modified in line with EIL scope of services as per the contract between EIL and Owner. Activities for which ITP's are not provided in this specification, contractor to develop and get the same approved by EIL/Owner well before start of the work. In general role of EIL has been specified in the document. The role of owner to be specified during preparation of site specific ITPs.*

*Contractor to submit job procedures for the jobs for which ITP's are attached & job specific reporting formats with the aid of enclosed sample reporting formats to EIL/Owner for approval, before commencement of the activity. If the contractor has to deviate from the given ITP for a valid reason, he shall obtain prior written approval of EIL/Owner. Contractor to carry out 100% examination of all activities.*

## LEGEND

**HP** : **Hold Point ;**

A point which requires witnessing/inspection/verification and acceptance by Owner/EIL before any further processing is permitted.

The Contractor shall not process the activity/item beyond a Hold Point without written approval by Owner/EIL except where prior written permission for further processing is available.

**W** : **Witness Point ;**

An activity which requires witnessing/inspection/verification by Owner/EIL when the activity is performed.

After proper notification has been provided (notification modalities and period shall be finalized before hand), the Contractor is not obliged to hold further processing if Owner/EIL is not available to witness the activity or does not provide comments before the date notified. Basis of acceptance shall be as per relevant technical specification.

**Rw** : **Review** of Contractor's documentation.

**S** : **Surveillance** Inspection by Owner/ EIL.

Monitoring or making observations to verify whether or not material/items or services conform to specified requirements. Surveillance activities may include audit, inspections, witness of testing, review of quality documentation & records, personnel qualifications, etc.

**WC** : **100% Examination** by Contractor.

**Responsibility for execution of the inspection/testing is with the Contractor; Owner/EIL only verifies examination or testing done by the Contractor at important stages**

ITP NO: 3301

PAINTING WORKS

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			<b>CAT B</b>	
A.	BEFORE FABRICATION			
1.	a. Calibration certificate of measuring & testing equipments/instruments b. Field calibration, if any	WC	Rw	Format G1
2.	a) Approved supplier, product and supplier's materials test certificate b) Check manufacturing date, expiry period and shelf life	WC	Note 1	Format G2
3.	a) Physical condition of materials; original manufacturers packing/ containers b) Confirm identification/ Transfer of identification of materials before painting c) conducting lab test as specified on receipt of material	WC	Note 1	--- Yes Yes
4.	a) Adequacy of blasting machine capacity for blast cleaning b) Type and quality of abrasive being used for blast cleaning c) Adequacy of Airless spray equipment, air spray equipment and paint brushes	WC	--	--- Format G3 ---
5.	Performance test of paint applicator and blast cleaning operator	WC	W	Yes
6.	Check quality of dry air for blast cleaning and spray application	WC	--	---
7.	Inspection of blast cleaning operation			
	- Inspect for surface cleanliness by visual stds. of ISO 8501	WC	--	Format G3
	- Measurement of surface profile by Micrometer/Elkometer/Stylus instrument	WC	--	Format G3
8.	Wet film thickness and over coating interval for each coat of paint during application	WC	--	Format G3
9.	Dry film thickness after final coat	WC	S	Format G3
10.	Inspection of final curing/ drying, adhesion, hardness, surface finish, sagging, hiding and pinhole detection	WC	--	Format G3
11.	Painting identification band/ code, etc.	WC	--	Format G3
12.	Acceptance prior to shifting to fabrication shop, if applicable	WC	Rw	Yes

Note: 1) For Incoming material Inspection please refer ITP no: 6-82-1010

**CAT B:** All works

ITP NO: 3301

**PAINTING WORKS**

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			<b>CAT B</b>	
B.	AFTER INSTALLATION			
1.	a) Approved supplier product : Suppliers materials test certificate	WC	Note 1	Format G2
	b) Manufacturing date, expiry period and shelf life	WC	Note 1	Format G1, G3
2.	Physical condition of materials; original manufacturers packing/ containers	WC	Note 1	---
3.	Confirm completion of			
	a) Hydrostatic testing of piping	WC	--	Yes
	b) Mechanical clearance of structure & equipments	WC	--	Yes
4.	a) Adequacy of surface preparation tools and tackles	WC	--	---
	b) Check the quality of surface preparation	WC	--	G3
5.	a) Performance test for paint applicator for spray application	WC	Rw	Yes
	b) Adequacy of airless spray equipment and air spray equipment and paint brushes and quality of dry air for paint application	WC	--	---
6.	Repairing / Touch-up of shop applied paint	WC	S	
7.	Wet film thickness and over coating interval for each coat of application.	WC	--	Format G3
8.	Inspection of Final drying, surface finish, sagging, hiding and pinhole detection	WC	S	
9.	Dry film thickness after final coat	WC	S	Format G3
10.	Identification of colour bands, direction marking and stenciling	WC	--	Format G3
11.	Final Acceptance	WC	HP	Format G3
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Yes

**CAT B:** All works

Note: 1) For Incoming material Inspection please refer ITP no: 6-82-1010

ITP NO: 3305

INSULATION WORKS

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CATB	
<b>1.</b>	<b>PRIOR TO APPLICATION OF INSULATION</b>			
	a. Material Test certificates from supplier of insulation material and acceptance thereof	WC	Note 1	Format G1
	b. Check testing, if required	WC	Note 1	Format G2
	c. Confirmation of completion of all works prior to commencement of insulation works	WC	S	
<b>2.</b>	<b>DURING APPLICATION OF INSULATION</b>			
	a. Surface preparation	WC	--	Format G4
	b. Fixing of spacer rings and checking their spacing	WC	S	Format G4
	c. Fixing of support rings and checking their spacing in case of vertical piping	WC	--	Format G4
	d. Fixing of insulation lugs and angle rings in case of vessels, tanks, etc	WC	--	Format G4
	e. Thickness of insulation	WC	--	Format G4
	f. Aluminium foil for S.S. Piping/Vessels	WC	--	Format G4
	g. Overlap of cladding at vertical and horizontal joints	WC	--	---
	h. Expansion joints, if any	WC	S	Format G4
	i. Inspection windows	WC	S	Format G4
	j. S.S. foil for S.S. piping	WC	S	Format G4
	k. Final finish	WC	W	Format G4
	l. Identification of colour bands, direction marking and stenciling	WC	S	
<b>3.</b>	<b>ADDITIONAL CHECKS FOR COLD INSULATION</b>			
	a. Wooden supports	WC	S	Format G4
	b. Vapour barrier	WC	S	Format G4
	c. Vapour sealant	WC	S	Format G4
	d. Insul coat	WC	S	Format G4
	Review Test and Inspection Documents	WC	Rw	Yes

Note: 1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT B: All works

ITP NO: 3310

REFRACTORY LINING

(sheet 1 of 2)

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT B	
1	<b>PRIOR TO START OF LINING</b>			
	i) Material Test certificates from suppliers	WC	Note 1	Format G2
	ii) Field tests and tests from approved laboratories, if required.	WC	Note 1	Format G2
	iii) Availability of Refractory specialist at site (Contractor's/ Vendor's)	WC	HP	Yes
	iv) Mockup application for castable lining	WC	S	
2	<b>DURING LINING</b>			---
	<b>A) INSULATING FIRE BRICKS</b>			
	i. Clearance for completion of structural works including cleats/ lugs/ anchors/ hooks, etc.	WC	S	Yes
	ii. Cleanliness of the surfaces to be lined	WC	S	---
	iii. Insulating layer application, wherever applicable	WC	--	---
	iv. Metal foil application, wherever applicable	WC	--	---
	v. Checking of bricks for their soundness (squareness, cracks and for any other damages)	WC	--	Yes
	vi. Mix proportion	WC	S	Yes
	vii. Laying of bricks as per specifications	WC	S	---
	viii. Line and verticality	WC	S	---
	ix. Identifying location of expansion joints	WC	S	---
	x. Filling expansion joints, wherever applicable	WC	S	---
	xi. Finishing works	WC	S	Yes

ITP NO: 3310

REFRACTORY LINING

(sheet 2 of 2)

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			<b>CAT B</b>	
	B) INSULATING CASTABLE CONCRETE			
	i. Clearance for completion of structural steel work including cleats/ support lugs/ anchors/hooks, etc.	WC	S	Yes
	ii. Cleanliness of the surface to be lined	WC	S	---
	iii. Insulating layer application, wherever applicable	WC	--	---
	iv. Metal foil application, wherever applicable	WC	--	---
	v. Fixing of wire mesh	WC	--	---
	vi. Fixing of shuttering/ scaffolding and providing pockets for pouring mortar	WC	--	---
	vii. Mix proportion	WC	S	Yes
	viii. Identifying location of expansion joints	WC	--	---
	ix. Ramming of mortar for achieving uniform density	WC	--	---
	x. Filling expansion joints, wherever applicable	WC	--	---
	xi. Wetting of previous layer prior to casting the Construction joints	WC	--	---
	xii. Pointing	WC	--	---
	xiii. Curing	WC	--	---
	xiv. Final acceptance	WC	HP	Yes
	<b>INSPECTION &amp; TEST DOCUMENTS</b>			Yes
	Review Test and Inspection Documents	WC	Rw	Yes

Note: 1) For Incoming material Inspection please refer ITP no: 6-82-1010  
2) Surveillance/witness may be increased in case of boilers, heaters, etc. as per specific requirements given in the specifications.

**CAT B: All works**