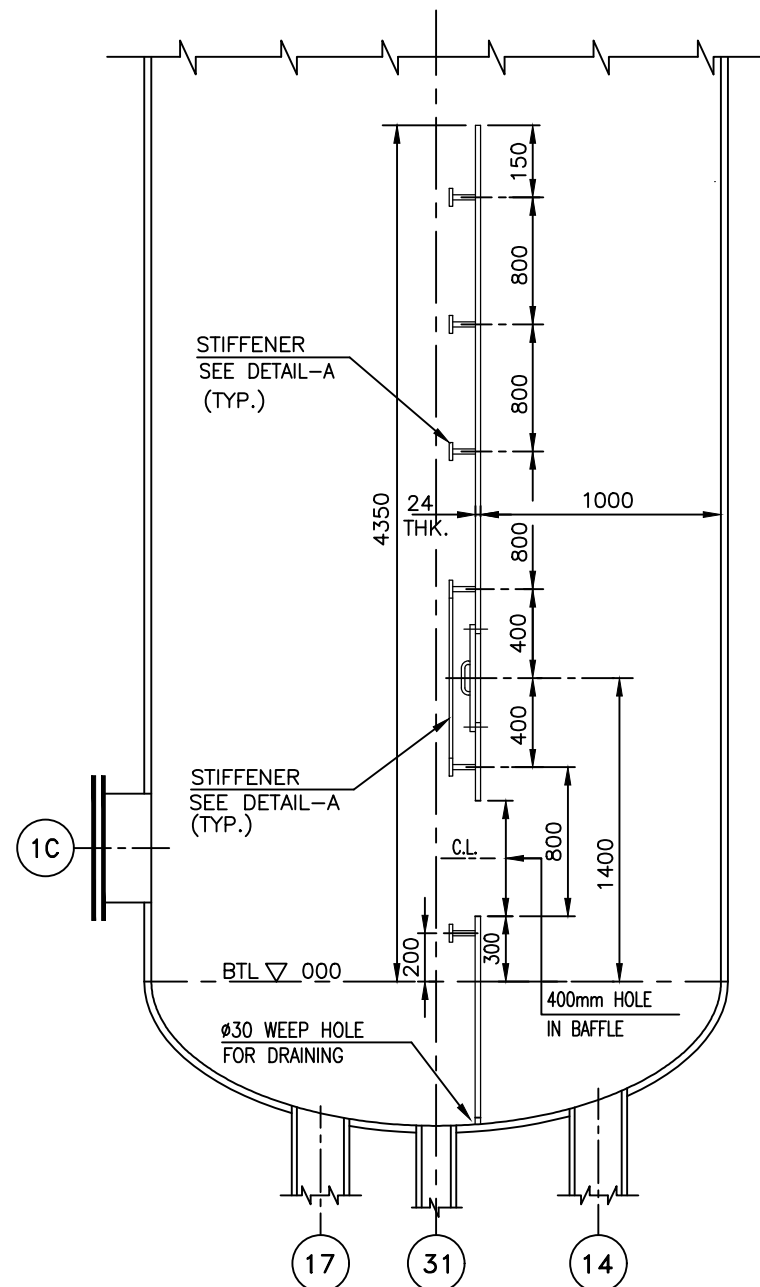
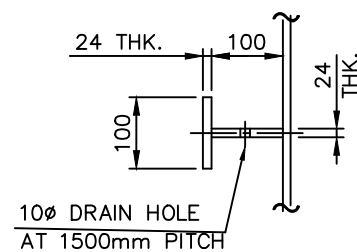


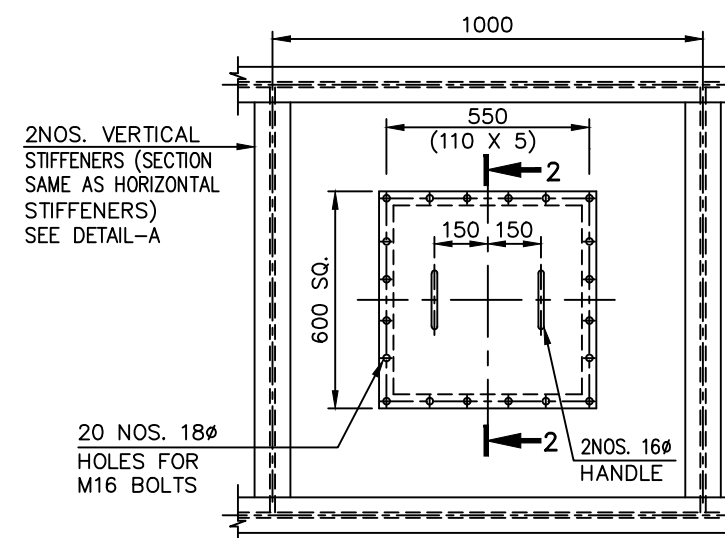
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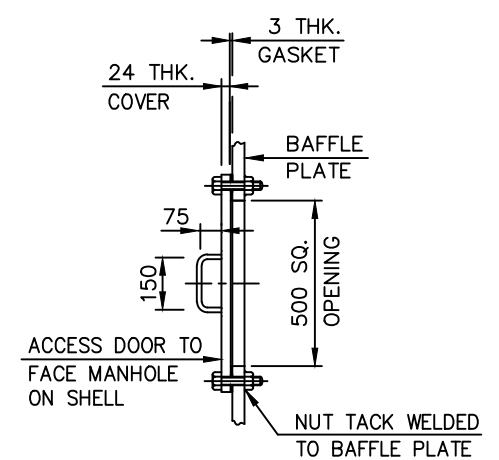
COLUMN BOTTOM DETAIL
(FOR OTHER DETAILS REFER PDS)



DETAIL-'A'



DETAIL OF MANWAY ON BAFFLE



SECTION 2-2



ENGINEERS INDIA LIMITED
NEW DELHI



**BHARAT PETROLEUM CORP. LTD.
BINA PETROCHEMICAL &
REFINERY EXPANSION
PROJECT (BPREP)**

0	10.03.2026	ISSUED FOR PURCHASE	AS	CRG/VIVEK	PB		
A	24.05.2025	ISSUED FOR BIDS/ENGG.	AS	CRG/VIVEK	PB		
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED	

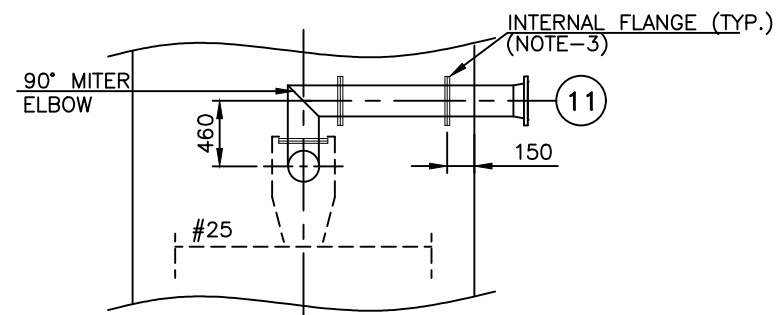
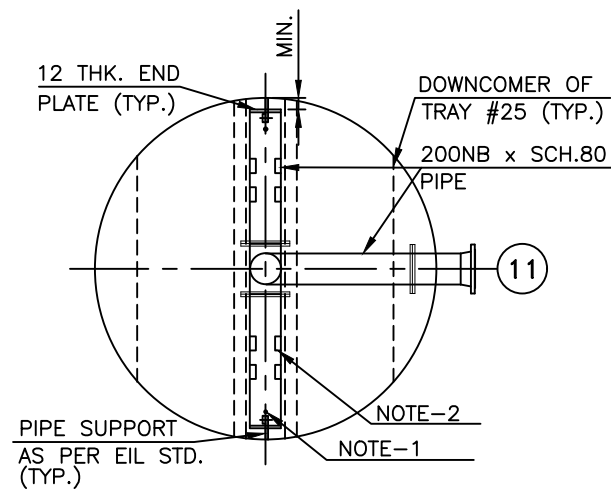
	VESSEL DESIGN DATA
	H2S STRIPPER
ITEM NO.	302-CC-00-2701

वेसेल डिजाइन डाटा
एच2एस स्ट्रिपर
आइटम नम्बर 302-सीसी-00-2701

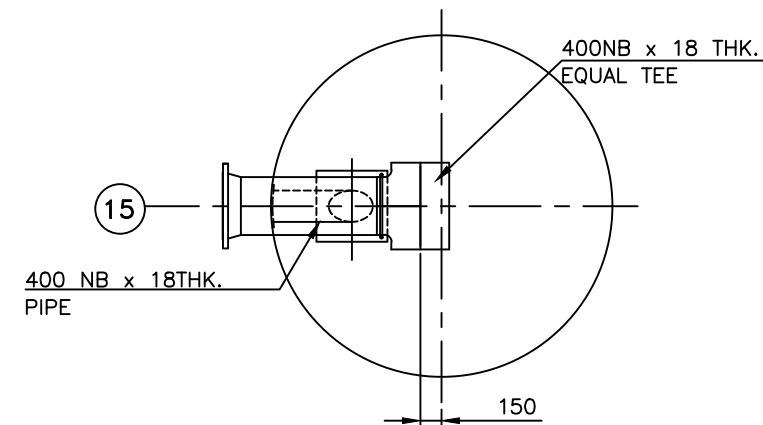
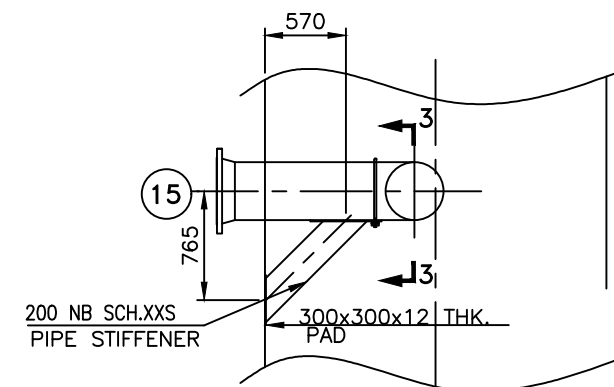
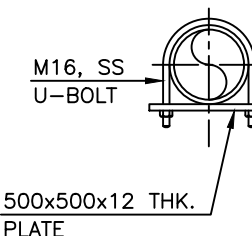
DRAWING NO.	REV.
B957-302-80-42-DS-3003	0
SHEET 3 OF 4	

1-1641-0503 REV.0 A3-420x297

(*) TENTATIVE DETAILS ARE FURNISHED, FINAL DETAILS WILL BE FURNISHED AT POST ORDER PHASE.

**ELEVATION****DETAIL OF NOZZLE '11' (HOLD) (*)****NOTES FOR NOZZLE-11:-**

1. DISTRIBUTOR PIPE ENDS TO BE CAPPED, WITH 10mm (3/8") DRAIN HOLE AND 6mm (1/4") VENT HOLE.
2. PROVIDE 2 DISTRIBUTOR EXIT SLOTS OF HEIGHT 100mm AND LENGTH 100mm ON EACH SIDE OF EACH DISTRIBUTOR PIPE BRANCH, FOR A TOTAL OF 8 SLOTS. LEAVE PIPE WALL WEB OF MINIMUM LENGTH 100mm BETWEEN SLOTS. THE SLOTTED DISTRIBUTOR PIPE MUST END IN WEB ADJACENT TO THE CAPPED ENDS. EXIT SLOTS ARE TO BE CENTERED HORIZONTALLY.
3. ALL INTERNAL PIPE FLANGES IN FLASHING FEED SERVICE SHALL BE ASME B16.5 150 CLASS RAISED FACE FORGED FLANGES OR ASME B16.47 150 CLASS FOR LARGER PIPE SIZES WHERE MANHOLE PASSAGE WILL ALLOW. ALL FLANGE JOINTS MUST BE GASKETED, AND GASKET MATERIAL MUST BE APPROPRIATE FOR THE SERVICE.

**PLAN****DETAIL OF NOZZLE '15' (HOLD) (*)****SECTION 3-3**

BHARAT PETROLEUM CORP. LTD.
BINA PETROCHEMICAL &
REFINERY EXPANSION
PROJECT (BPREP)

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
0	10.03.2026	ISSUED FOR PURCHASE	AS	CRG/VVEK	PB	
A	24.05.2025	ISSUED FOR BIDS/ENGG.	AS	CRG/VVEK	PB	

VESSEL DESIGN DATA
H2S STRIPPER
ITEM NO. 302-CC-00-2701

वेसेल डिजाइन डेटा
एच2एस स्ट्रिपर
आइटम नम्बर 302-सीसी-00-2701

DRAWING NO.	REV.
B957-302-80-42-DS-3003	0
SHEET 4 OF 4	

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PDS B957-302-79-41-DS-1-202 REV.1

0
0

NOZZLES AND CONNECTIONS (नोजल व कनेक्शन)										GENERAL NOTES (जनरल नोट्स)				SPECIFICATIONS (स्पेसिफिकेशन्स)				DESIGN DATA (डिजाइन डाटा)			
MARK	QTY	NOM. DIA	SCH./THK.	FLANGES			PROJECTI ON NOTE- 4	PAD W x T	SERVICE	UNLESS STATED OTHER WISE				X	DENOTES APPLICABILITY		CODE		ASME SECTION VIII DIV-1 EDITION 2023		
मार्क	क्वांटिटी	नॉमिनल डायं	शेड्यूल व थिकनेस	क्लास	टाइप	फेसिंग	प्रोजेक्शन	पैड	सर्विस	1	ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.	X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001	WORKING PRESSURE	(kg/cm ² g)	26.1 - 27.6				
										2	ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.	X	SUPP. SPEC. FOR CS VESSELS	6-12-0002	DESIGN PRESSURE	(kg/cm ² g)	INT. 33	EXT. --			
1	1	600	14 THK	300	WN	RF	1160	255X T	MANHOLE + BF + GASKET + BOLTING + DAVIT	3	NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.	X	STD. SPEC. FOR BQCS PLATE	6-12-0011	WORKING TEMPERATURE	(°C)	44				
7	1	100 (H)	120	600	WN	RF	940	60X T	VAPOUR OUTLET TO 302-VV-VI- 2702	4 (A)	FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.	X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014	DESIGN TEMPERATURE	(°C)	230				
8	1	50	160	600	WN	RF	940	-	VENT	4 (B)	FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.	X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-SP-01	MDMT	(°C)	1.1				
11	1	80	160	600	WN	RF	1060	40X T	FEED FROM 300-EE-00-2603	5	THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.				CORROSION ALLOWANCE	(mm)	3				
12	1	150	80	300	WN	RF	1060	70X T	FEED FROM 302-EE-00-2601	6	FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.				TYPE OF HEAD		2:1 ELLIPTICAL				
17	1	200	80	300	WN	RF	SEE DWG.	110X T	LIQUID BOTTOM OUTLET TO 302-VV-VW-2605	7	DIMENSIONS OF FLANGES FOR NOZZLES UPTO 600NB SHALL BE AS PER ASME B16.5 AND FOR NOZZLE ABOVE 600NB SHALL BE AS PER ASME B16.47 SERIES-B UNLESS SPECIFIED OTHERWISE.	X	VESSEL TOLERANCES	7-12-0001	HEAT TREATMENT		HEAD: AS PER CODE / SPEC.				
31	1	80	160	600	WN	RF	SEE DWG.	45X T	DRAIN	8	ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.	X	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002	OPERATING MEDIUM	-					
35	1	50	160	600	WN	RF	1010	-	UTILITY CONNECTION	9	NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90° APART.	X	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003	SP. GRAVITY	0.807					
47 A-B	2	50	160	300	WN	RF	1010	-	LEVEL TRANSMITTER (DP)	10	ALL FABRICATED NOZZLES SHALL BE FULLY RADIOGRAPHED.	X	SKIRT BASE DETAILS	7-12-0004	WIND SPECIFICATION		IS-875 (PART-3)				
45 A-B	2	50	160	300	WN	RF	1010	-	STAND PIPE	11	NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.	X	SKIRT OPENING DETAILS	7-12-0005	SEISMIC		SITE SPECTRA + IS-1893 (PART-4)				
AO	1	500 ID	14 THK.	AS PER EIL STD.				250 X T	ACCESS OPENING	12	NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.	X	ANGLE LEG SUPPORT	7-12-0006	CAPACITY (M ³)		17.5				
SKV 1-3	3	100	Sch 40	AS PER EIL STD.				-	SKIRT VENT	13	SURFACE PREPARATION, SHOP PRIMER & FINSH PAINT AS PER JOB SPECIFICATION FOR SURFACE PREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.	X	PIPE LEG SUPPORT	7-12-0007	PAINTING/CLEANING		(NOTE-13)				
										14	FULL RADIOGRAPHY WHEREVER SPECIFIED SHALL IMPLY 100% RADIOGRAPHY OF ALL BUTT WELDS.	X	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008	INSULATION THICKNESS (mm)		☐ HOT ☐ COLD				
										15	VENDOR SHALL PROVIDE 2 NOS. PERMANENT SLOPING STEEL MONKEY LADDERS INSIDE THE SKIRT TO ACCESS THE BOTTOM HEAD FOR INSPECTION.	X	MANHOLE WITH HINGED COVER	7-12-0009	FIRE PROOFING CLEATS(mm)	☒ YES ☐ NO					
										16	VENDOR TO DESIGN AND PROVIDE TAILING LUG (AT 90° TO LIFTING LUGS) AND BRACING ARRANGEMENT CONSIDERING AN IMPACT FACTOR OF 1.5. ANY MODIFICATION (IF REQUIRED DUE TO DESIGN OF TAILING LUG) ENVISAGED IN TAILING LUG, BRACING AND BASE BLOCK SHALL BE CARRIED OUT BY VENDOR. COST OF THE SAME SHALL BE INCLUDED IN BASE PRICE. DETAILS PROVIDED IN THE MDS ARE MINIMUM TO BE FOLLOWED.	X	MANHOLE WITH DAVIT	7-12-0010	HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL	(AT TOP)				
										17	EQUIPMENT SHALL BE SUBJECT TO STEAM OUT AT 0.5Kg/cm2(g) @190°C.	X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011	PRESSURE (NEW & COLD)		42.9				
												X	RETAINING PLATE	7-12-0012	INSPECTION BY	☒ EIL ☐ CIB ☐ TPJA					
												X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013	MATERIAL OF CONSTRUCTION (मैटेरियल ऑफ कन्स्ट्रक्शन)						
												X	PAD NOZZLES FOR VESSELS	7-12-0014	(AS PER ASME / IS OR-EQUIVALENT)						
												X	STANDARD BOLT HOLE ORIENTATION	7-12-0015							
													ALLOY LINER DETAILS	7-12-0016	SHELL		SA 516 Gr.70				
													SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017	REINFORCEMENT PAD		SA 516 Gr.70				
													INTERNAL FLANGES	7-12-0018	HEADS		SA 516 Gr.70				
													VORTEX BREAKERS	7-12-0019	SHELL FLANGES		-				
													INLET DEFLECTOR BAFFLE	7-12-0020	NOZZLE FLANGES		SA 105				
													SUPPORT RING AND BOLTING BAR	7-12-0021	NOZZLE NECK UPTO 250 NB		SA 106 GR. B				
													SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022	NOZZLE NECK ABOVE 250 NB		SA 516 Gr.70				
													PIPE DAVIT	7-12-0023	PIPE FITTINGS		SA 234 GR. WPB				
													LIFTING LUG TOP HEAD TYPE	7-12-0024	GASKET EXTERNAL		SPIRAL WOUND GASKET WITH SS 304				
													FIRE PROOFING AND INSULATION SUPPORTS	7-12-0025	METAL WINDING AND GRAFOIL FILLER		MATERIAL WITH CS OUTER & SS 304				
													EARTHING LUG	7-12-0026	INNER RING AS PER ASME B 16.20.						
													NAME PLATE	7-12-0027							
													MANUFACTURER NAME PLATE	7-12-0028	GASKET INTERNAL		-				
													BRACKET FOR NAME PLATE	7-12-0029	EXTERNAL STUDS/BOLTS/NUTS		SA 193 GR.B7 / SA 194 GR.2H				
													NAME PLATE FOR SMALL EQUIPMENT	7-12-0030	INTERNAL STUDS/BOLTS/NUTS		-				
													DETAILS OF FORGED NOZZLES	7-12-0031	SKIRT/-SUPPORT		SA 516 GR.70/IS2062 Gr E 250 QUALITY BR/B0				
													SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032	SKIRT/-SUPPORT BASE		IS 2062 GR. E 250 QUALITY BR/B0				
													HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033	INTERNAL PARTS (WELDED)		SA 516 GR.70/ SA 106 Gr B				
													PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034	INTERNAL PARTS (BOLTED)		-				
													TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036	CLIPS & ATTACHMENTS (EXTERNAL)		SA 516 GR.70/IS 2062 GR.E 250 QUALITY BR/B0 WELDED OVER BQCS PAD				
													S.R NOZZLE NECK	7-12-0037							
													ALLOWABLE NOZZLE LOADS	7-12-0038	WRAPPER PLATE		-				
															DEMISTER/GRID		-				
															PAD FOR EXTERNAL ATTACHMENTS		SA 516 GR.70				
															PIPE DAVIT		-				
															VACUUM STIFFENER		-				
															LIFTING LUG		SA 516 GR.70				
															TAILING LUG		IS 2062 GR. E 250 QUALITY BR/B0				



BHARAT PETROLEUM CORP. LTD.
BINA PETROCHEMICAL & REFINERY EXPANSION PROJECT (BPREP)

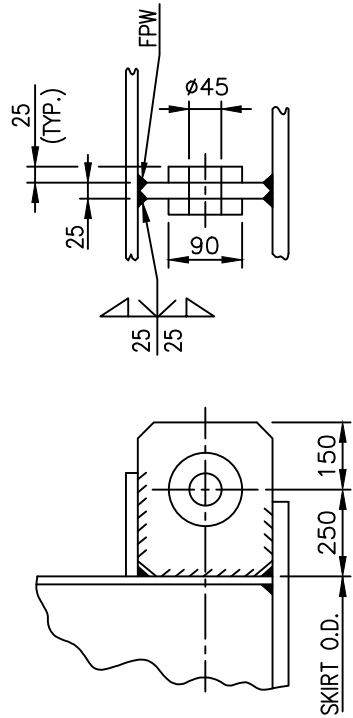
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A	28.08.2025	ISSUED FOR BIDS/ENGG.	NS	SA/VIVEK	PB		
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED	

VESSEL DESIGN DATA
PGH 1ST STAGE
HP FLASH DRUM
ITEM NO. 302-VV-VW-2603

वेसेल डिजाइन डाटा
पीजीएच 1स्ट स्टेज
एचपी फ्लैश ड्रम
आइटम नम्बर 302-वीवी-वीडब्ल्यू-2603

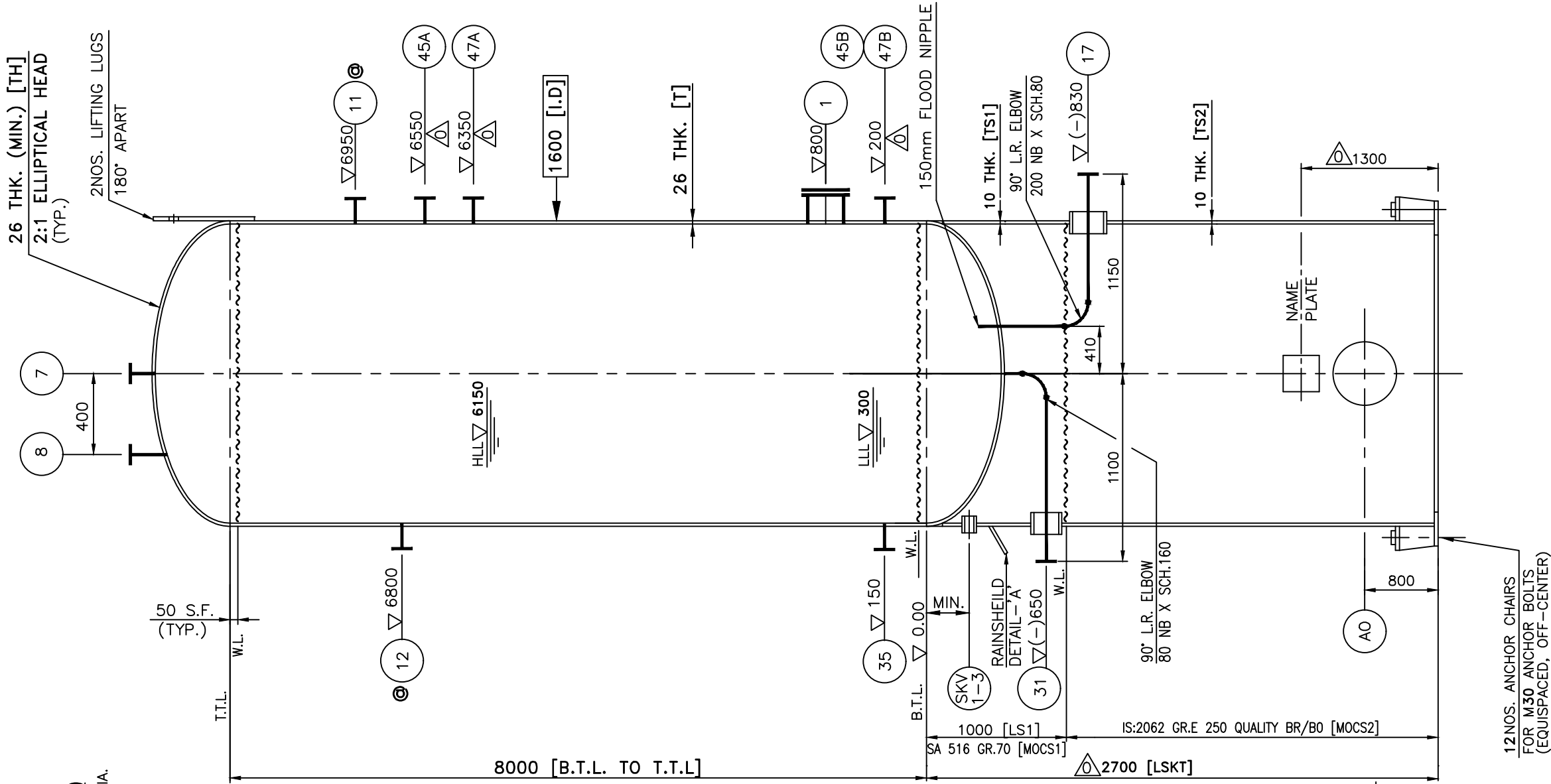
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SHEET 2 OF 2	

1-1641-0503 REV.0 A3-420x297

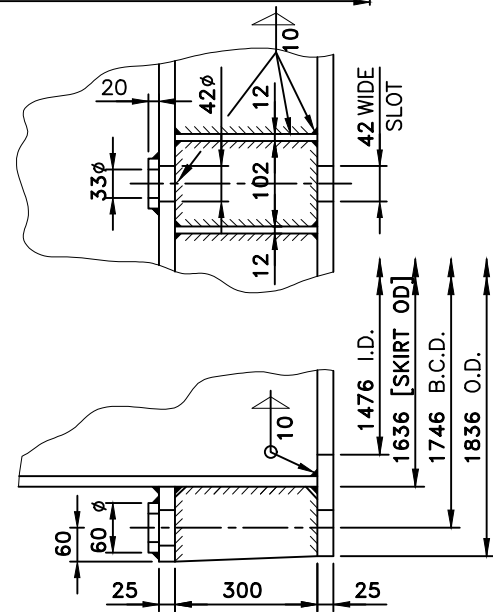
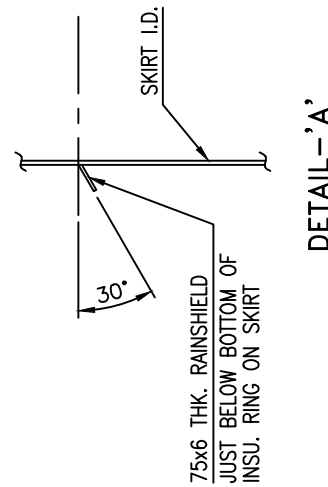


DETAIL OF TAILING LUG (HOLD)

VENDOR TO ENSURE THE ADEQUACY OF HOLE DIA.



NOZZLE-11 & NOZZLE-12 SHALL BE ORIENTED 90° WITH RESPECT TO EACH OTHER



SKIRT BASE DETAIL
(ALL OTHER DIMENSIONS AS PER EIL STD.)



ENGINEERS INDIA LIMITED
NEW DELHI



**BHARAT PETROLEUM CORP. LTD.
BINA PETROCHEMICAL &
REFINERY EXPANSION
PROJECT (BPREP)**

A	01.09.2025	ISSUED FOR BIDS/ENGG.	AS	RR/VIVEK	PB	
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED

VESSEL DESIGN DATA
H₂S STRIPPER
REFLUX DRUM
ITEM NO. 302-VV-HW-2703

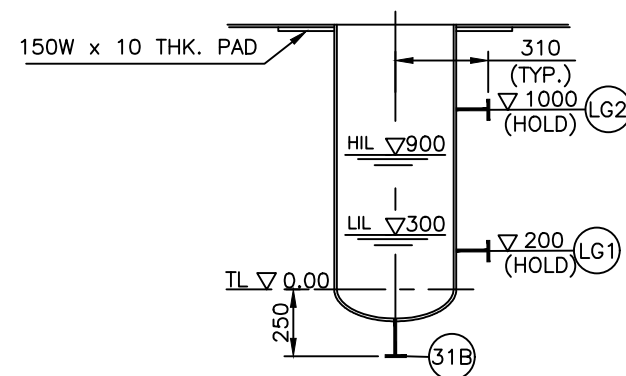
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एच2एस स्ट्रिपर
रिप्लक्स ड्रम
आइटम नम्बर 302-बीबी-एचडब्ल्यू-2703

DRAWING NO.	REV.
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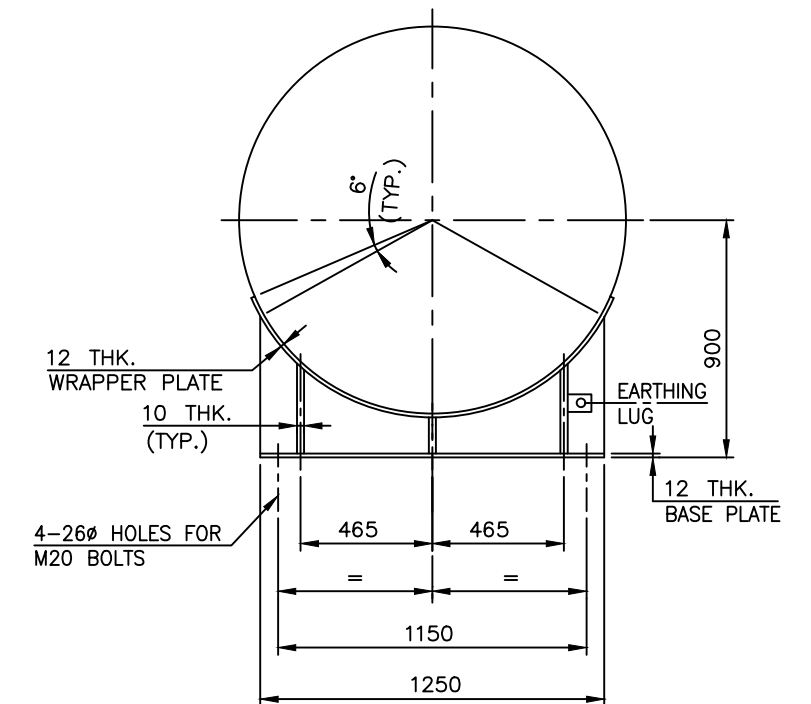
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SHEET 2 OF 2

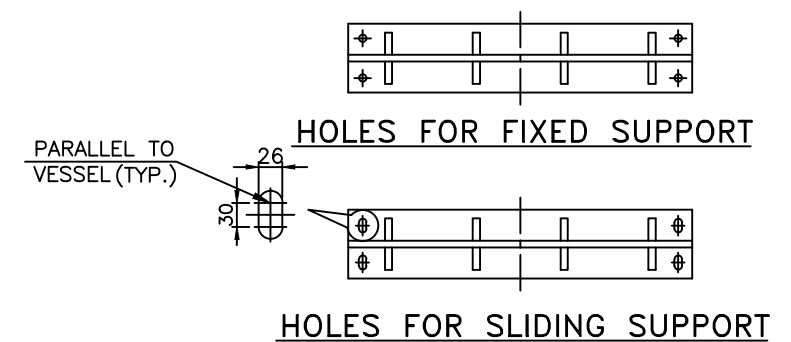
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BOOT DETAIL



END VIEW
(NOZZLES NOT SHOWN)
(ALL OTHER DIMENSIONS AS PER EIL STD.)



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NEW DELHI



BHARAT PETROLEUM CORP. LTD.
BINA PETROCHEMICAL &
REFINERY EXPANSION
PROJECT (BPREP)

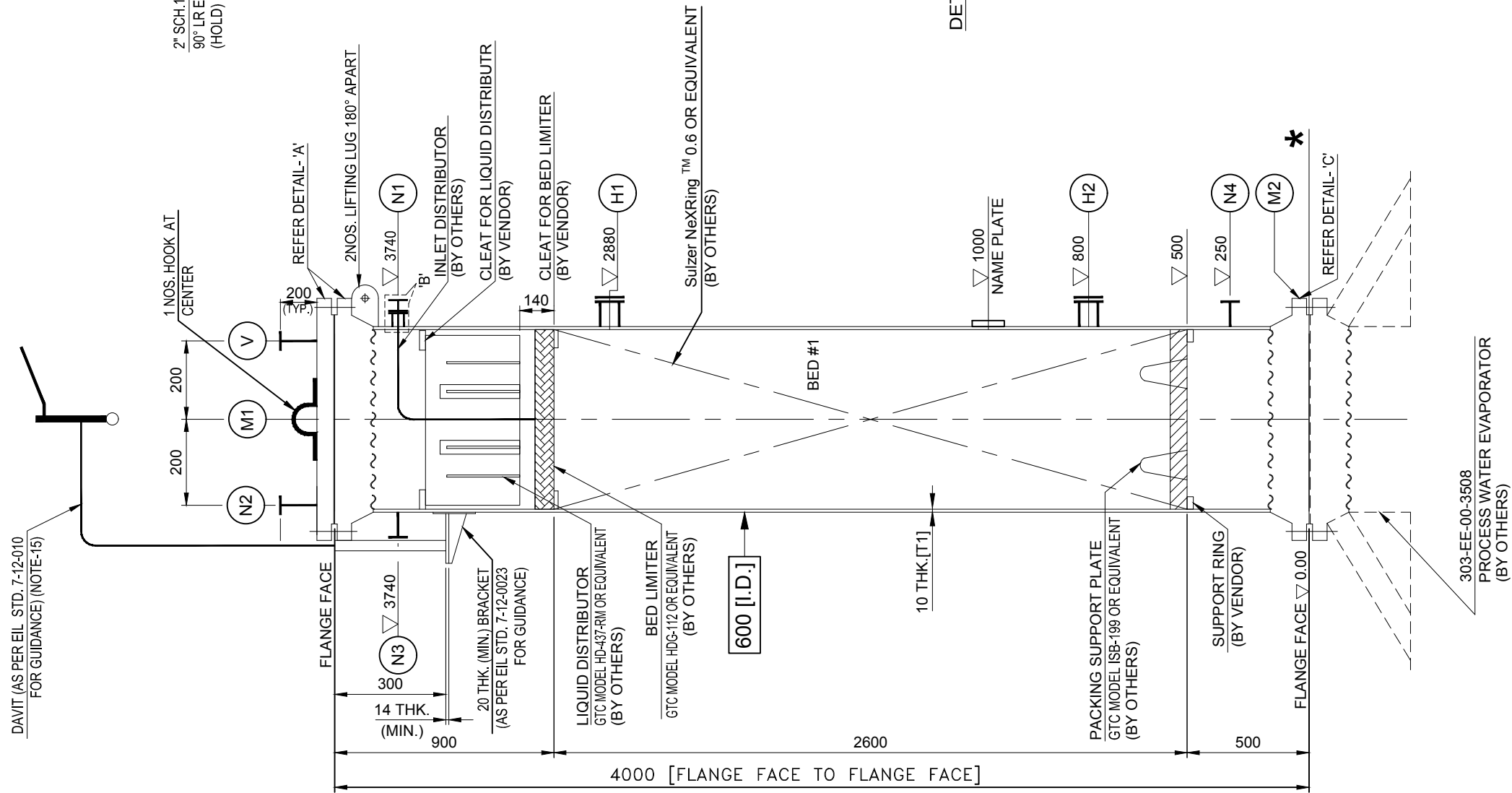
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0	10.03.2026	ISSUED FOR PURCHASE	AS	CRG/VIVEK	PB	
A	23.05.2025	ISSUED FOR BIDS/ENGG.	RS	CRG/VIVEK	PB	

VESSEL DESIGN DATA
WATER STRIPPER
ITEM NO. 303-CC-00-3503

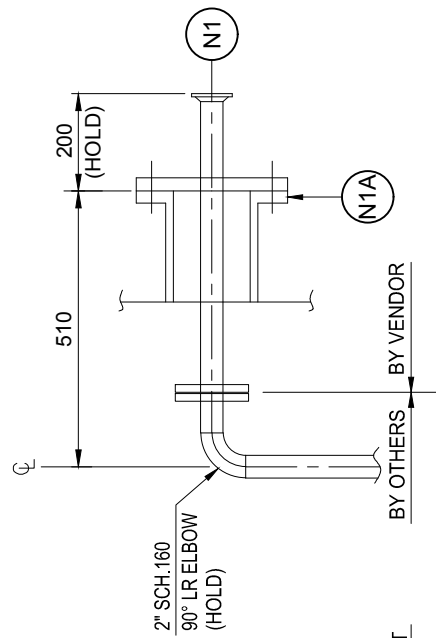
वेसल डिजाइन डाटा
वाटर स्ट्रीपर
आइटम नम्बर 303-सीसी-00-3503

DRAWING NO.	REV.
B957-303-80-42-DS-3003	1
SHEET 2 OF 2	

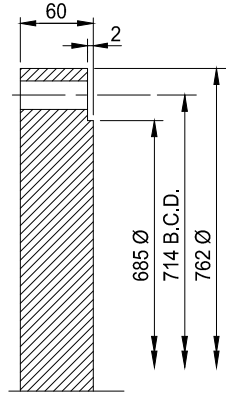
1-1641-0503 REV.0 A3-420x297



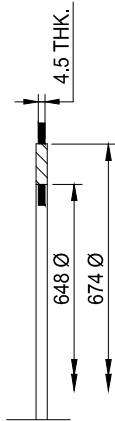
* FLANGE FACE SHALL BE ALIGNED WITH TRUE HORIZONTAL PLANE WITH NO TOLERANCE.



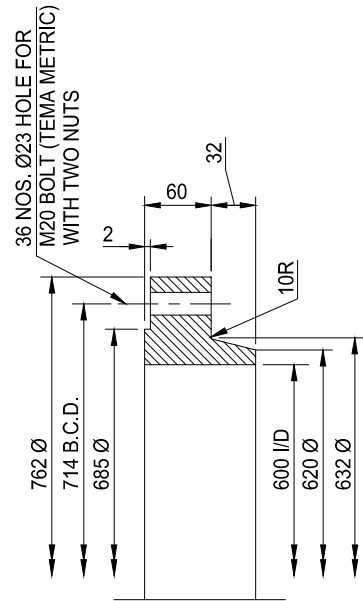
DETAIL - 'B'
(HOLD)



DETAIL OF 'M1' BLIND FLANGE

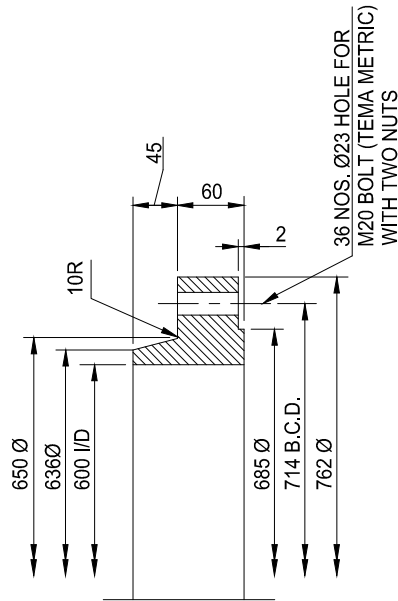


DETAIL OF GASKET FOR DETAIL A & C (TYP.)



DETAIL OF 'A'

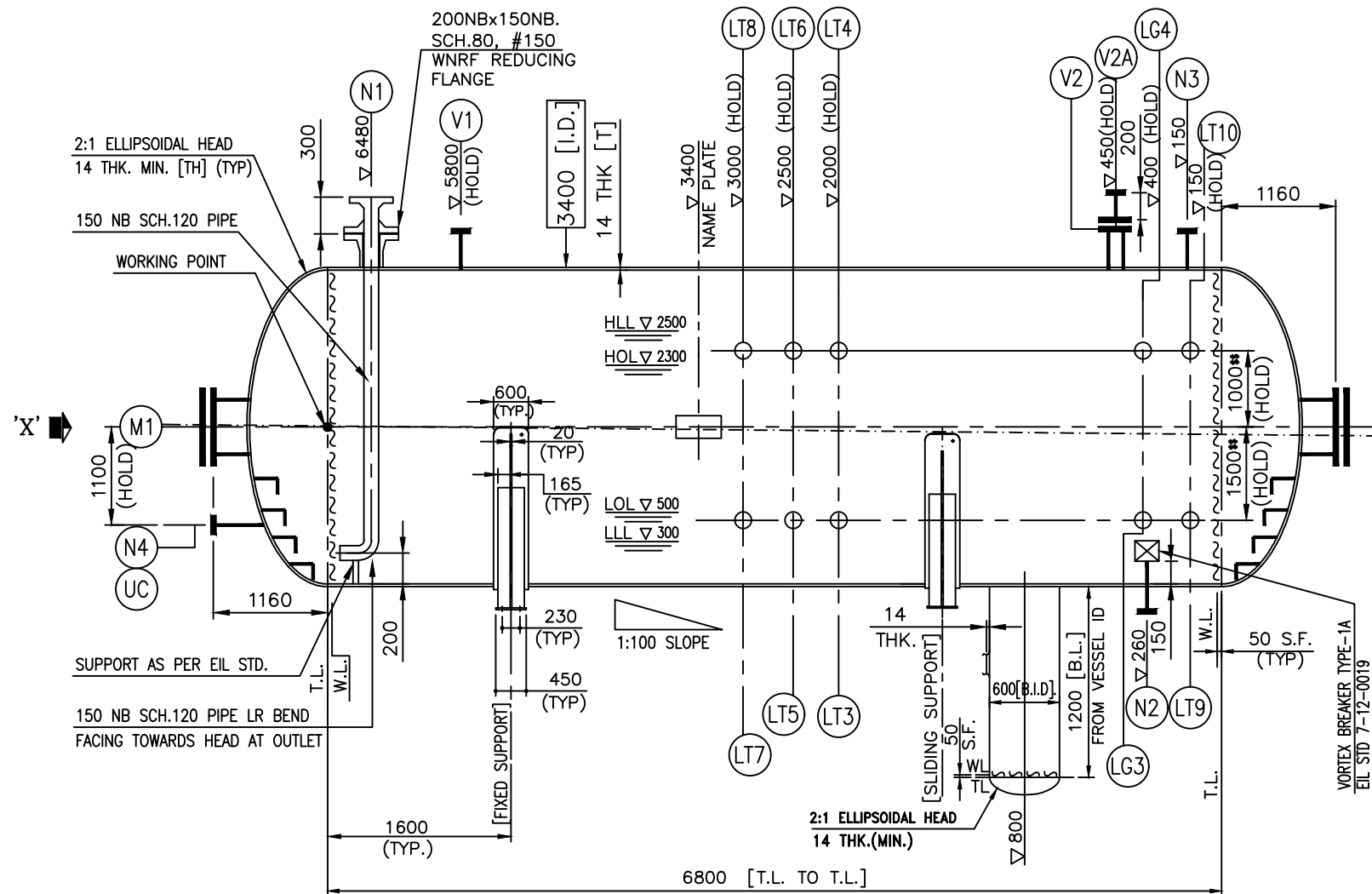
(ALL OTHER REQUIREMENTS OF ASME 16.5)



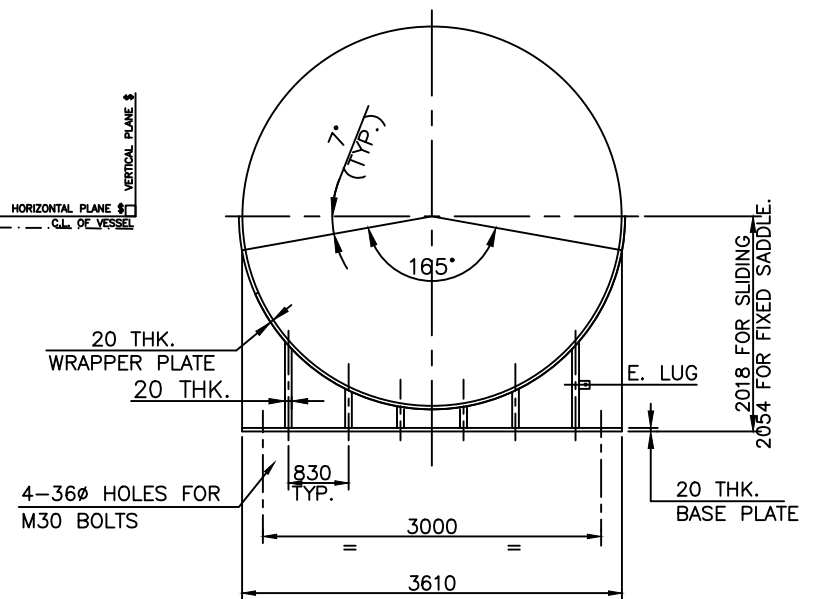
DETAIL OF 'C'

(ALL OTHER REQUIREMENTS OF ASME 16.5)

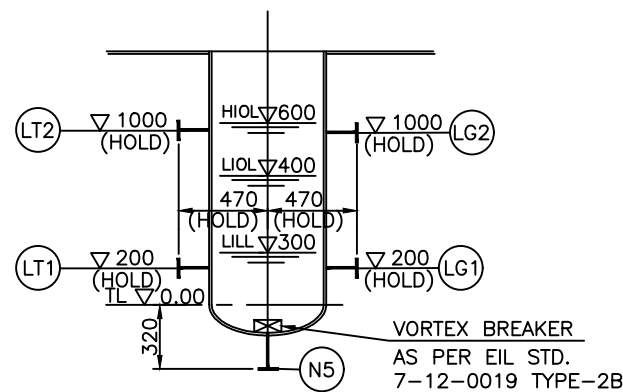
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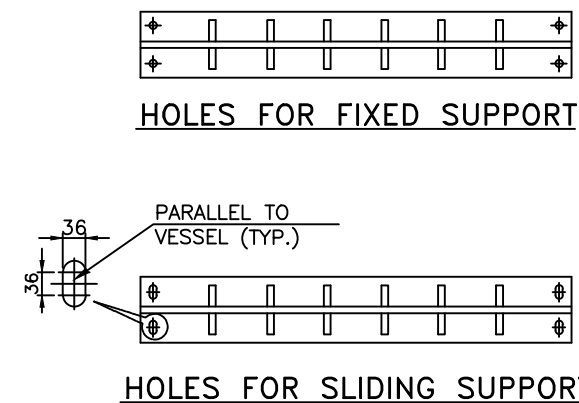
- \$ NOZZLES AND GASKET FACE OF FLANGES SHALL BE PARALLEL TO VERTICAL PLANE/HORIZONTAL PLANE.
● SADDLE BASE PLATE SHALL BE PARALLEL TO HORIZONTAL PLANE.
⊗ NOZZLE ELEVATIONS ARE WITH REFERENCE TO VERTICAL PLANE.
\$\$ INDICATED LOCATION IS FROM HORIZONTAL PLANE.



END VIEW
(NOZZLES NOT SHOWN)
(ALL OTHER DIMENSIONS AS PER EIL STD.)



BOOT DETAIL



 ENGINEERS INDIA LIMITED NEW DELHI	 BHARAT PETROLEUM CORP. LTD. BINA PETROCHEMICAL & REFINERY EXPANSION PROJECT (BPREP)								VESSEL DESIGN DATA EDC FEED SURGE DRUM ITEM NO. 303-VV-HW-3501	वेसेल डिजाइन डाटा ईडीसी फीड सर्ज ड्रम आइटम नम्बर 303-वीवी-एचडब्ल्यू-3501	DRAWING NO.	REV.
		B	16.12.2025	REVISED & REISSUED FOR BIDS/ENGG.	AS	SSR/SA	PB				B957-303-80-42-DS-3101	B
		A	11.12.2025	ISSUED FOR BIDS/ENGG.	AS	SSR/SA	PB					
		REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED			SHEET 2 OF 2	

**भारत
पेट्रोलियम**

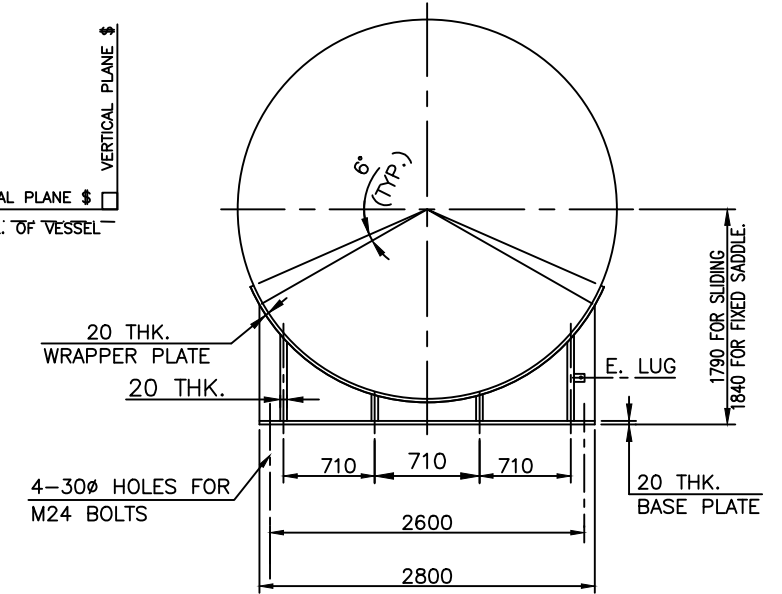
एन०१आइडिएल लाहौर

B	16.12.2025	REVISED & REISSUED FOR BIDS/ENGG.	AS	SSR/SA	PB	
A	11.12.2025	ISSUED FOR BIDS/ENGG.	AS	SSR/SA	PB	
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED

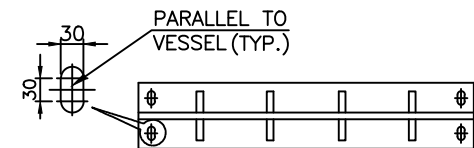
वेसेल डिजाइन डाटा
एसआरसी ओविण्चडी
रीसीवर
आइटम नम्बर 303-वीवी-एचआइ-3504

DRAWING NO.	REV.
B957-303-80-42-DS-3104	B
SHEET 2 OF 2	

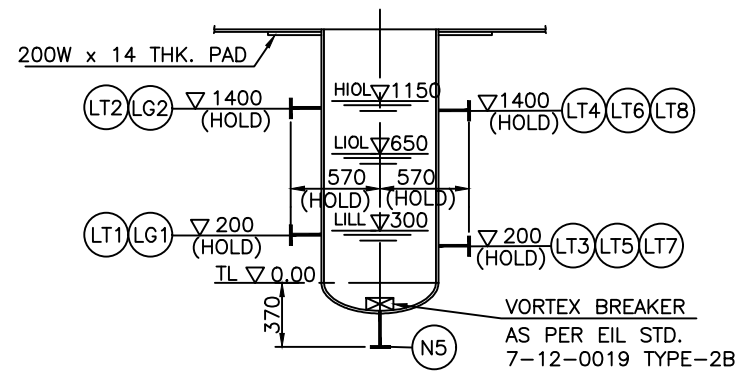
1-1641-0503 REV.0 A3-420x297



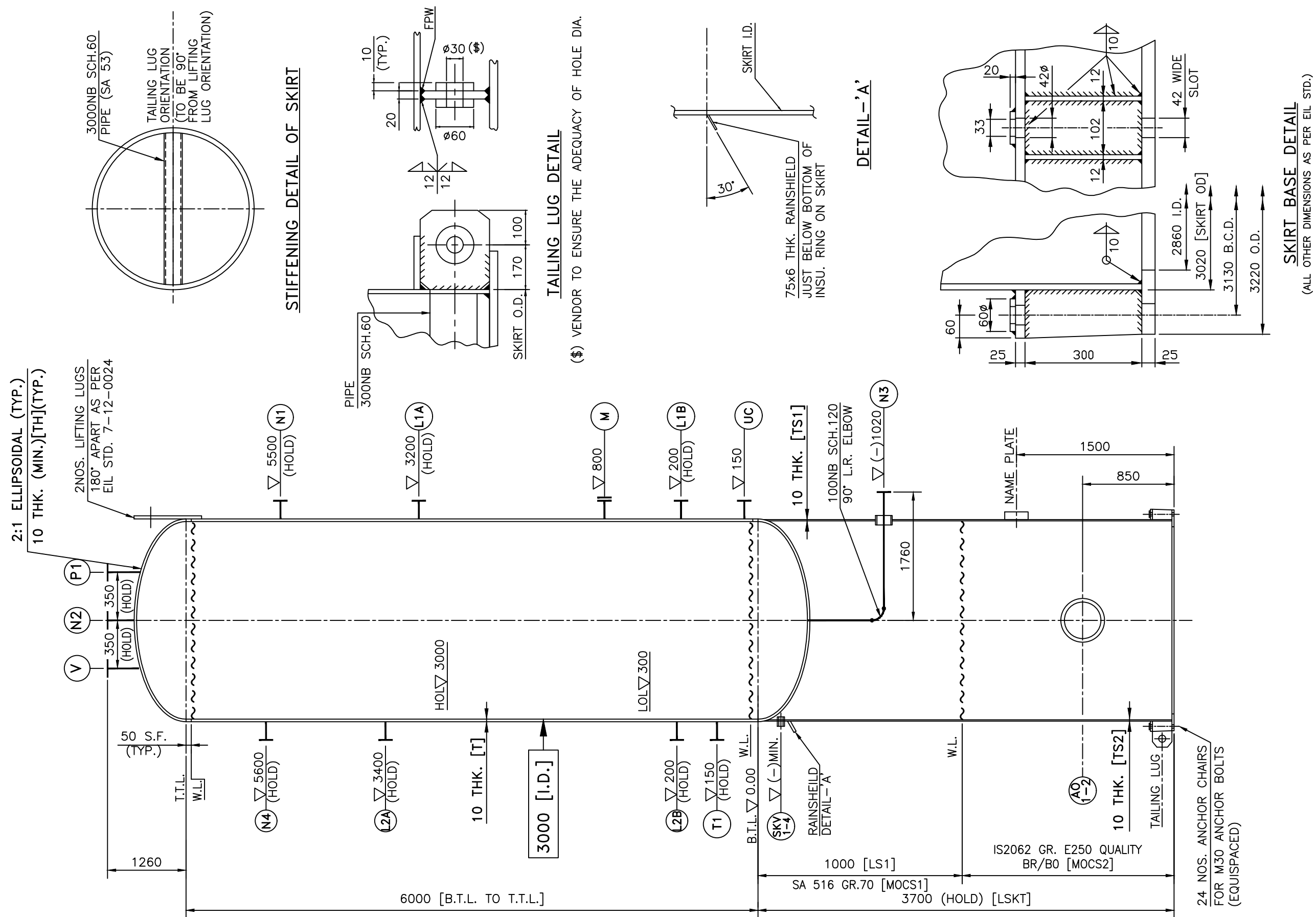
HOLES FOR FIXED SUPPORT



HOLES FOR SLIDING SUPPORT



BOOT DETAIL





भारत पेट्रोलियम

A	25.03.2026	ISSUED FOR BIDS/ENGG.	AS	CRG/VIVEK	PB	
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED

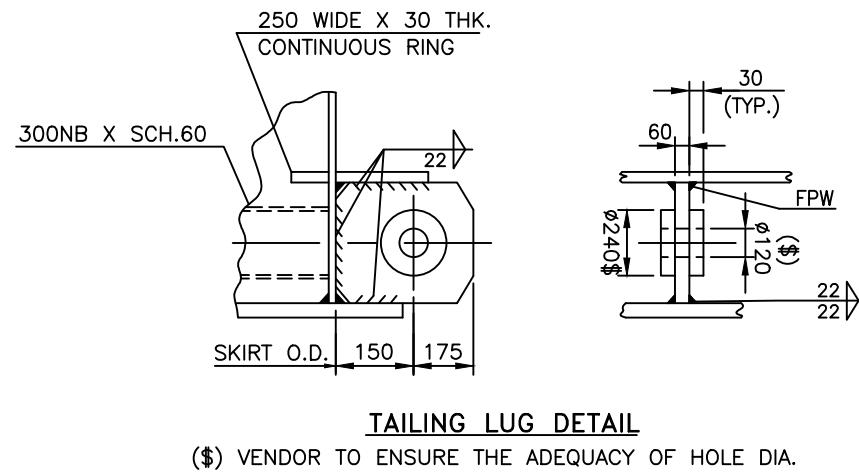
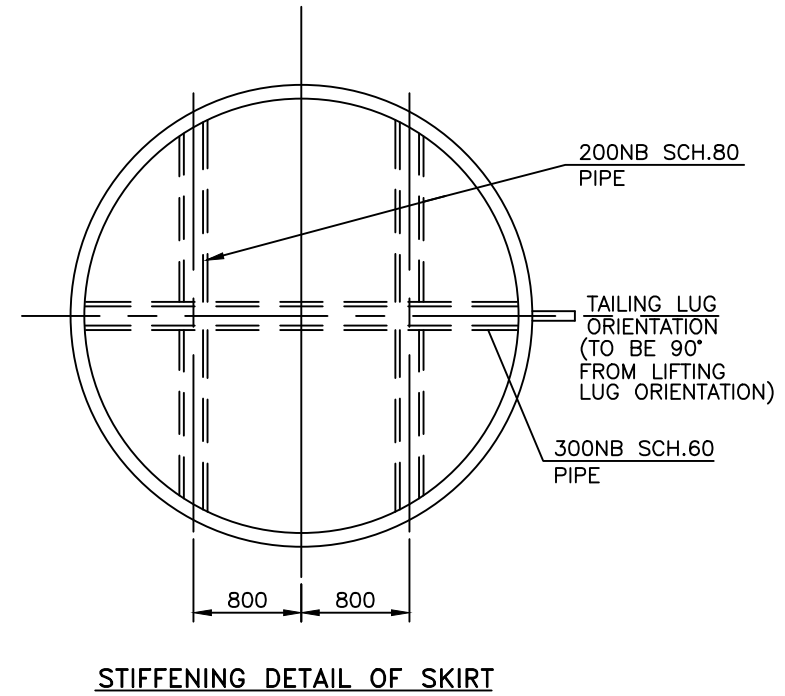
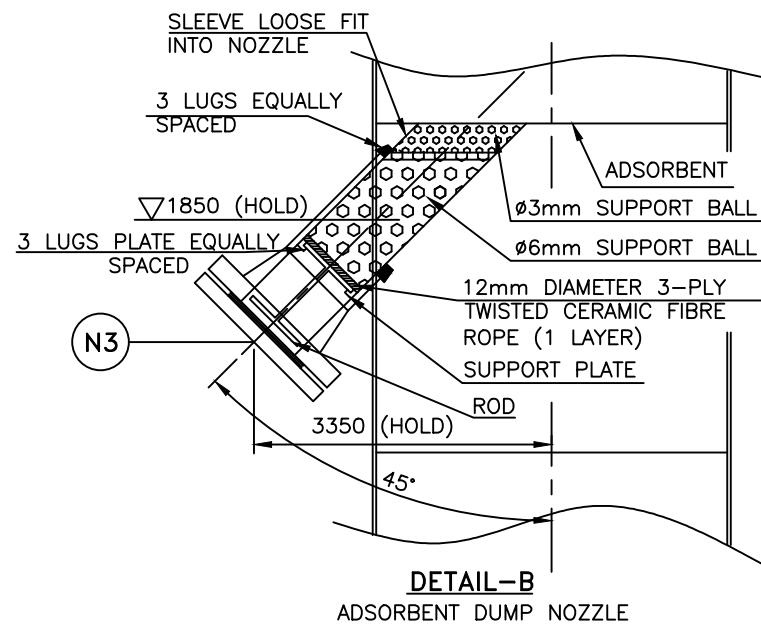
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मॉइस्चर गॉर्ड बेड
आइटम नम्बर 303-विवि-विआय-3605

DRAWING NO.
B957-303-80-42-DS-3117
SHEET 2 OF 3

1-1641-0503 REV.0 A3-420x297



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ENGINEERS INDIA LIMITED
NEW DELHI



BHARAT PETROLEUM CORP. LTD.
BINA PETROCHEMICAL &
REFINERY EXPANSION
PROJECT (BPREP)

A	25.03.2026	ISSUED FOR BIDS/ENGG.	AS	CRG/VIVEK	PB		
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED	

VESSEL DESIGN DATA
MOISTURE GUARD
BED
ITEM NO. 303-VV-VI-3605

वैसल डिजाइन डाटा
मॉइस्चर गॉर्ड बेड
आइटम नम्बर 303-वि-विआय-3605

DRAWING NO.	REV.
B957-303-80-42-DS-3117	A
SHEET 3 OF 3	

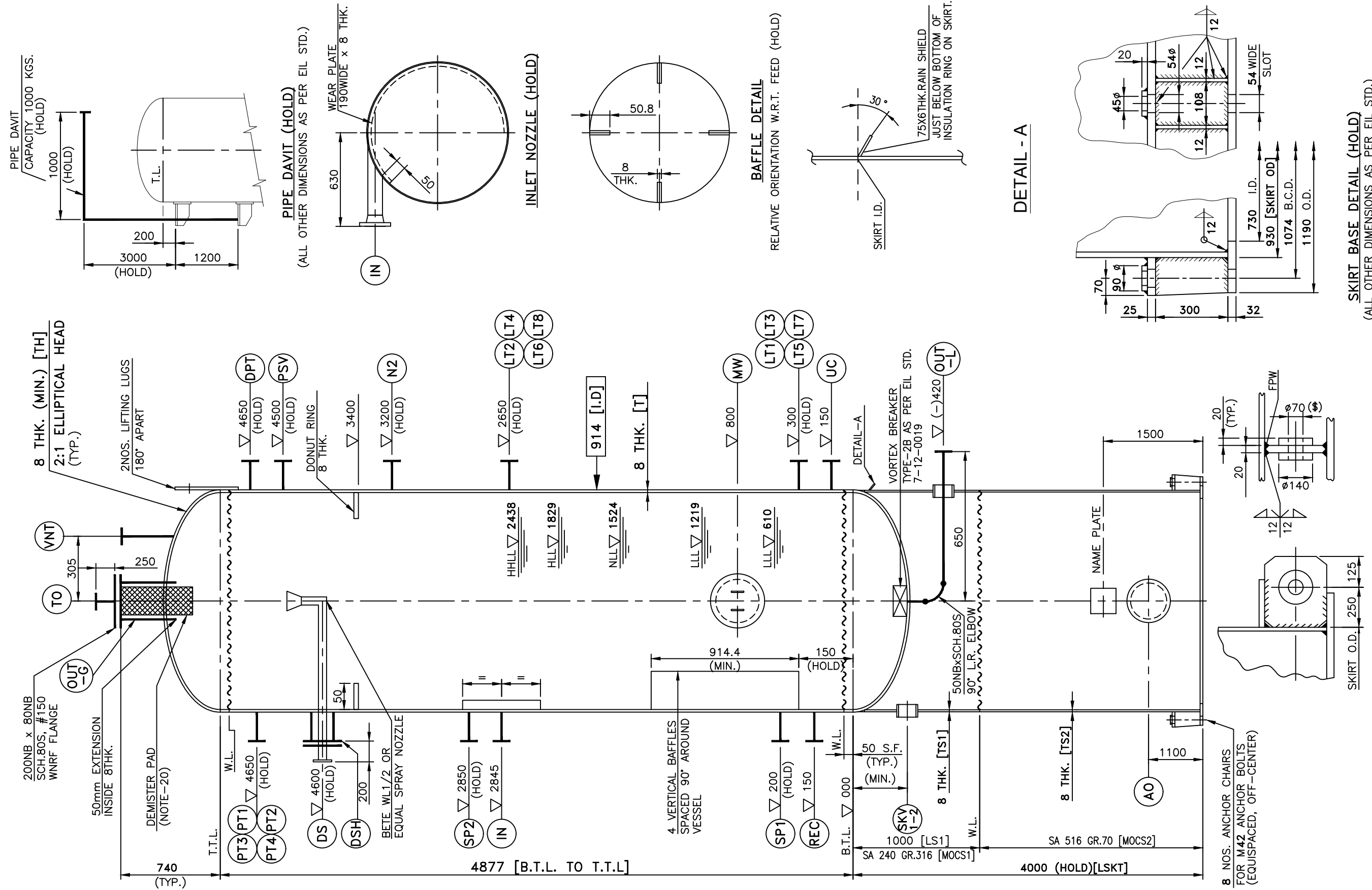
1-1641-0503 REV.0 A3-420x297



A	11.12.2025	ISSUED FOR BIDS/ENGG.	AS	CRG/SRIKANTH	PB	
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED

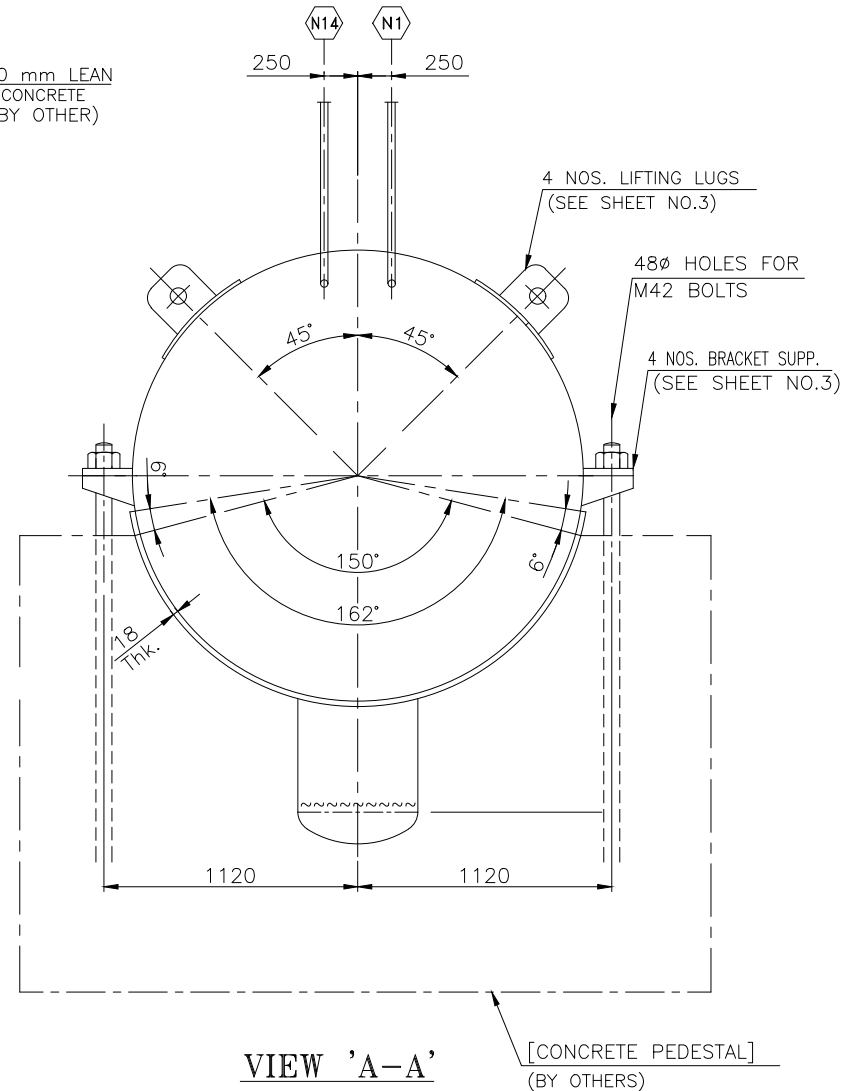
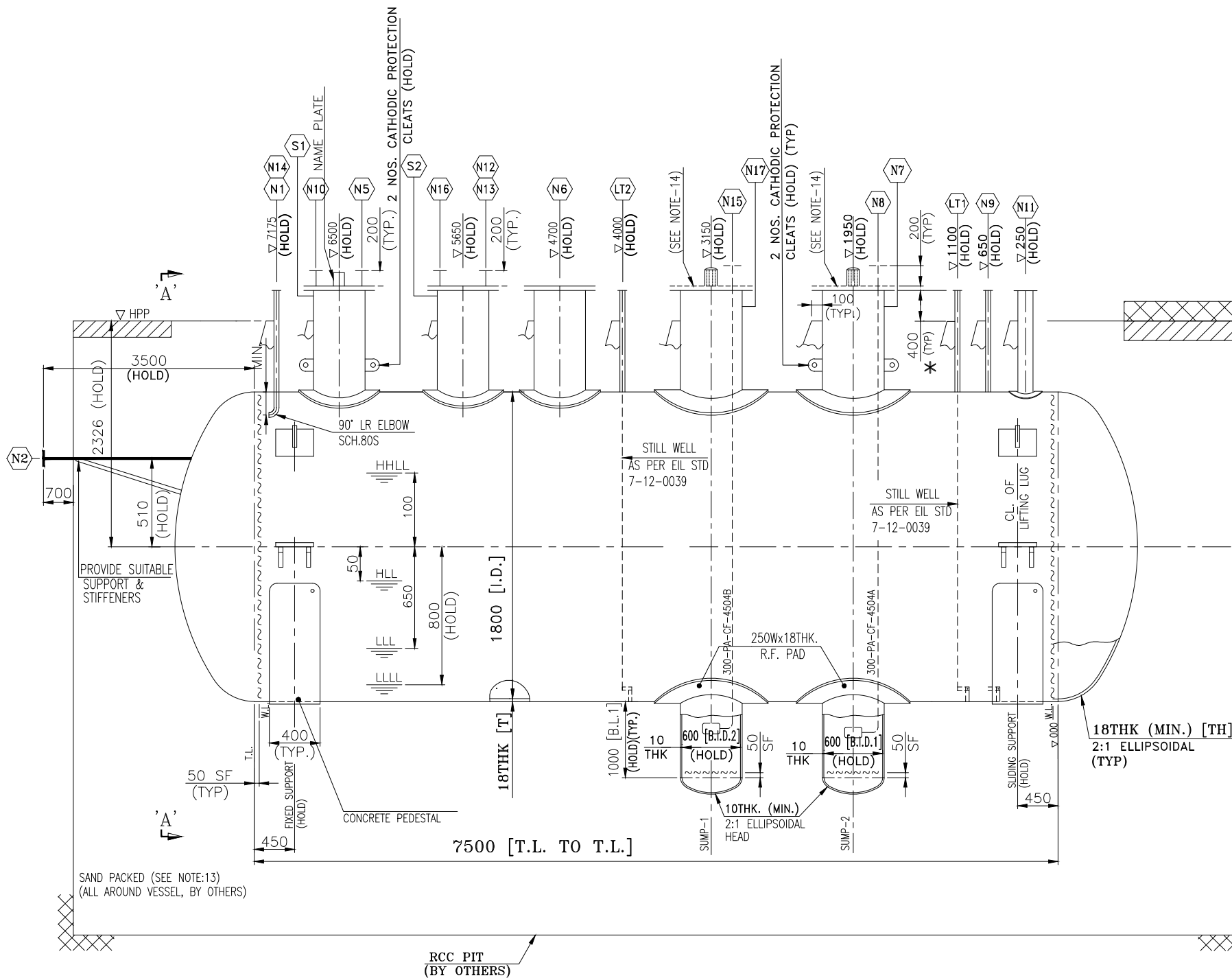
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डब्ल्यूओ सेपरेटर
आइटम नम्बर 304-वीवी-वीआई-4501

DRAWING NO.	REV.
B957-304-80-42-DS-3101	A
SHEET 2 OF 2	



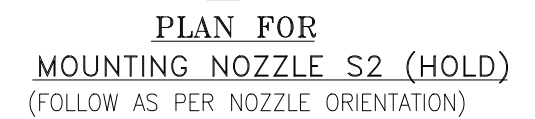
(\$) VENDOR TO ENSURE THE ADEQUACY OF HOLE DIA.

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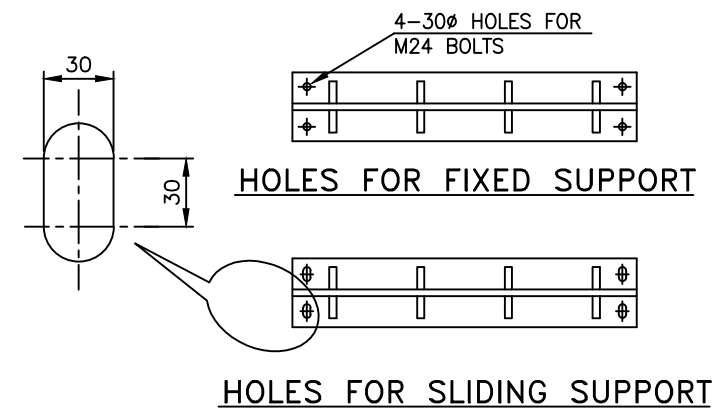
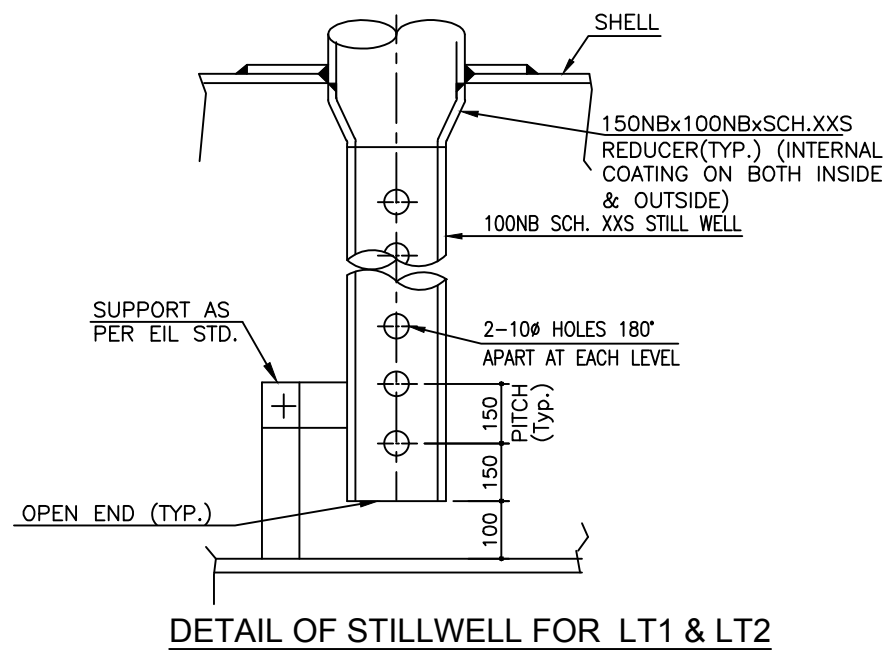
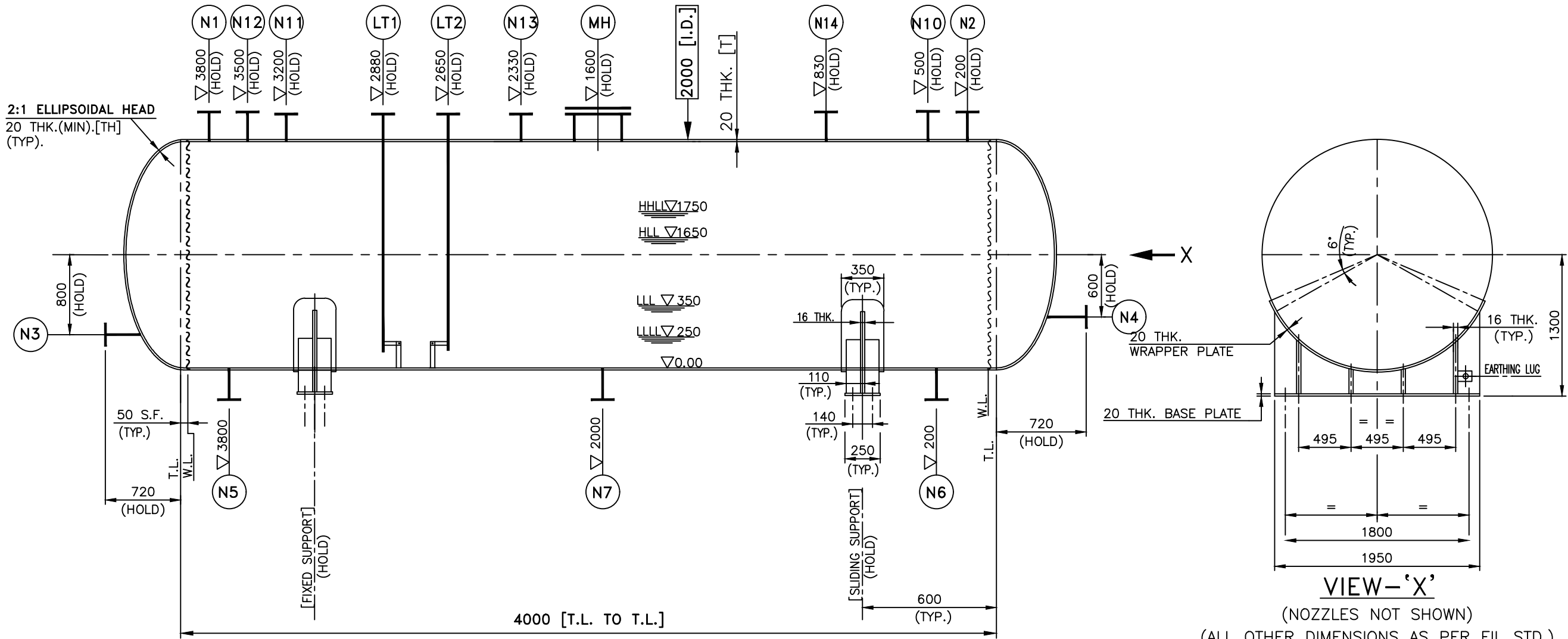
* NOZZLES MAY BE SUITABLY CUT WITH WELD EDGE PREPARATION (WITH SUITABLE COVER) FOR TRANSPORTATION. SUITABLE CUTTING ALLOWANCE IN NOZZLES SHALL BE CONSIDERED TO MAINTAIN THE GIVEN PROJECTION. FINAL ASSEMBLY OF NOZZLES AT SITE SHALL BE BY OTHERS (NOT BY VESSEL FABRICATOR)

 ENGINEERS INDIA LIMITED NEW DELHI	 BHARAT PETROLEUM CORP. LTD. BINA PETROCHEMICAL & REFINERY EXPANSION PROJECT (BPREP)								VESSEL DESIGN DATA	वेसेल डिजाइन डाटा	DRAWING NO.	REV.	
										WAO DRAIN SUMP	डब्ल्यूएओ ड्रेन संप	B957-304-80-42-DS-3102	A
										ITEM NO. 304-VV-HI-4502	आइटम नम्बर 304-वीवी-एचआई-4502	SHEET 2 OF 3	
				REV.	DATE	ISSUED FOR BIDS/ENGG. REVISION		BY	CHK	APPROVED	APPROVED	1-1641-0503 REV.0 A3-420x297	
				A	11.12.2025	ISSUED FOR BIDS/ENGG.		AS	CRG/VIVEK	PB			



1-1641-0503 REV.0 A3-420x297

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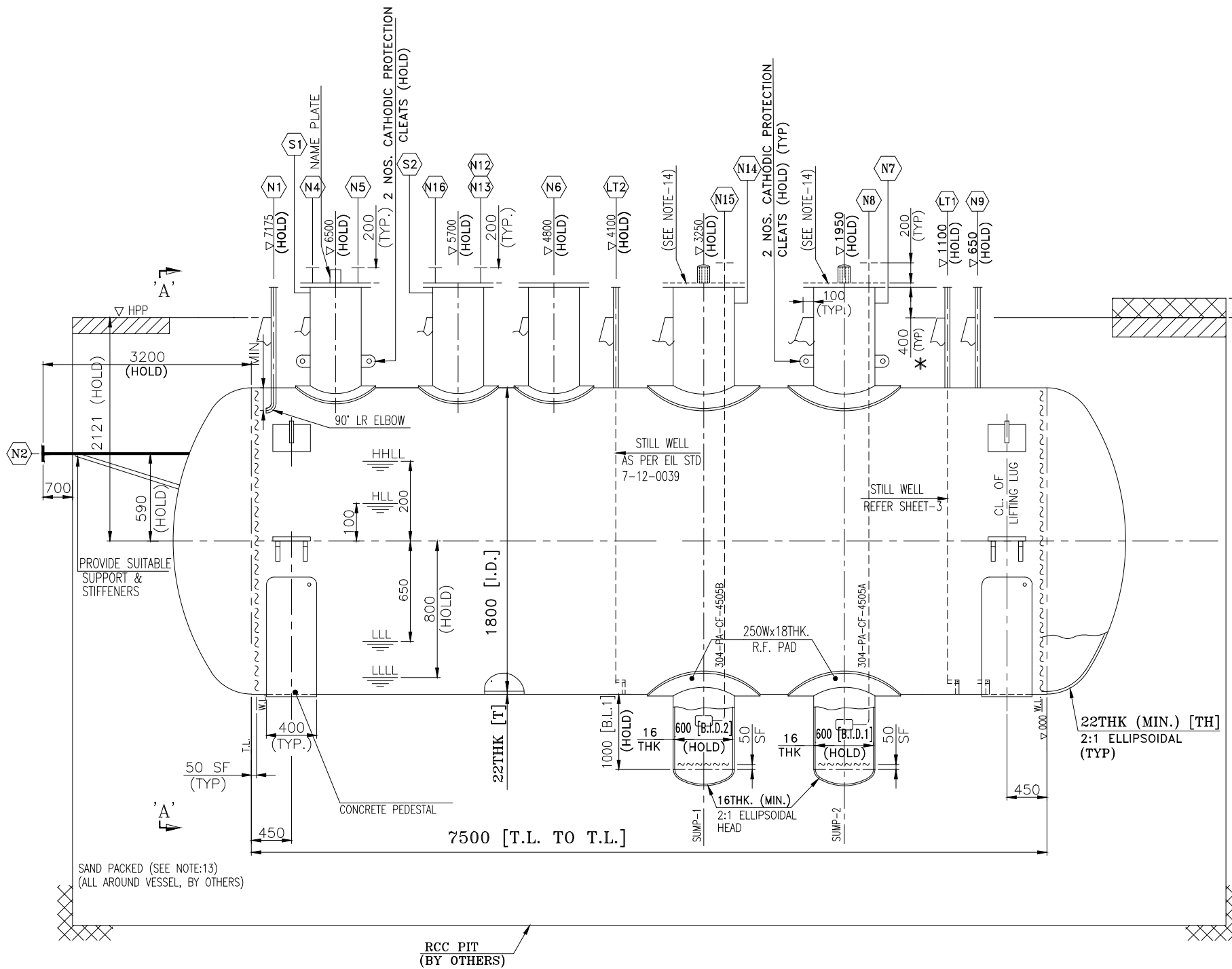
 ENGINEERS INDIA LIMITED NEW DELHI	 BHARAT PETROLEUM CORP. LTD. BINA PETROCHEMICAL & REFINERY EXPANSION PROJECT (BPREP)									VESSEL DESIGN DATA	वसल डिजाइन डाटा	DRAWING NO.	REV.	
											WAO SULFURIC ACID DRUM	डब्ल्यूएओ सल्फ्यूरिक एसिड ड्रम	B957-304-80-42-DS-3103	A
		A	16.09.2025	ISSUED FOR BIDS/ENGG.	AS	RR/VIVEK	PB				ITEM NO. 304-VV-HW-4503	आइटम नम्बर 304-वीवी-एचडब्ल्यू-4503	SHEET 2 OF 2	
		REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED	1-1641-0503 REV.0 A3-420x297					

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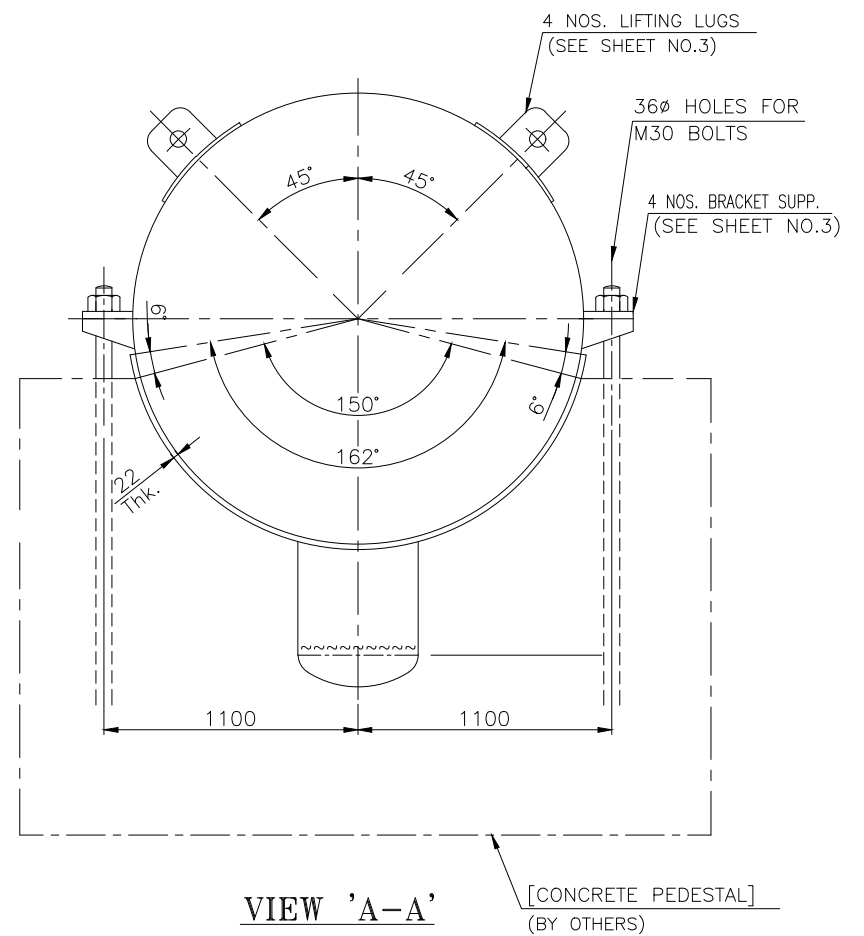
PDS B957-304-79-41-DS-1304 REV.3

NOZZLES AND CONNECTIONS (नोजल व कनेक्शन)										GENERAL NOTES (जनरल नोट्स)				SPECIFICATIONS (स्पेसिफिकेशन्स)				DESIGN DATA (डिजाइन डाटा)			
MARK	QTY	NOM. DIA	SCH./THK.	FLANGES			PROJECTI ON NOTE- 4	PAD W x T	SERVICE	UNLESS STATED OTHER WISE				X DENOTES APPLICABILITY		CODE		ASME SEC.-VIII DIV.-1 EDITION 2023			
मार्क	क्वांटिटी	नामिनल डाया	शटुल व थिकनेस	क्लास	टाइप	फेसिंग	प्रोजेक्शन	पैड	सर्विस	1	ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.	X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001	WORKING PRESSURE	(kg/cm ² g)	0.4				
										2	ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.	X	STD. SPEC. FOR CS VESSELS	6-12-0002	DESIGN PRESSURE	(kg/cm ² g)	INT.	5	EXT.	F.V	
N1	1	80	XXS	300	WN	RF	SEE DWG.	40X T	ACID DRUM PSV	3	NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.	X	STD. SPEC. FOR BQCS PLATE	6-12-0011	WORKING TEMPERATURE	(°C)	AMB.				
N2	1	50.8 ID	-	300	LWN	RF	SEE DWG.	-	ACID DRAIN	4 (A)	FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.	X	STD. SPEC. FOR HARDNESS REQUIREMENT	6-15-0091	DESIGN TEMPERATURE	(°C)	100				
N4	1	50.8 ID	-	300	LWN	RF	SEE DWG.	-	PRESSURE GAUGE	4 (B)	FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.	X	SPEC. FOR SURFACE PREPARATION & PROTECTIVE COATING	B957-000-06-42-PLS-01	MDMT	(°C)	1.1				
N5	1	100	160	300	WN	RF	SEE DWG.	-	VENT	5	THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.				CORROSION ALLOWANCE	(MM)	6.35				
N6	1	600	16 THK.	150	WN	RF	SEE DWG.	200X T	MANWAY+BF+GASKET+BOLTIN G+HINGE	6	FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.				TYPE OF HEAD	2:1 ELLIPSOIDAL					
N7/ N14	2	600 (H)	16 THK.	150	WN	RF	SEE DWG.	200 X T	PUMP HOST	7	DIMENSIONS OF FLANGES FOR NOZZLES UPTO 600NB SHALL BE AS PER ASME B16.5 AND FOR NOZZLE ABOVE 600NB SHALL BE AS PER ASME B16.47 SERIES-B UNLESS SPECIFIED OTHERWISE.	X	VESSEL TOLERANCES	7-12-0001	HEAT TREATMENT	HEAD: AS PER CODE /SPEC.					
N8/ N15	2	100 (H)	BY PUMP VENDOR						SUMP PUMP	8	ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.		SUPPORT FOR HORIZONTAL VESSEL	7-12-0002	OPERATING MEDIUM	-					
N9	1	100	160	300	WN	RF	SEE DWG.	50XT	VENT STACK	9	NOZZLES SHALL BE STIFFENED WITH 4 NOS. 100 x 10 THK FLATS AT 90 DEG.APART. MANHOLE,PUMP NOZZLE AND MOUNTING NOZZLES SHALL BE STIFFENED WITH 8 NOS 10THKx R.F PAD WIDE FLATS EQUISPACED.		WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003	SP. GRAVITY	1.07 NORM. - 1.12 MAX.					
LT1	1	100 (H)	160	300	WN	RF	SEE DWG.	50xT	LEVEL TRANSMITTER (GWR)	10	ALL FABRICATED NOZZLES SHALL BE 100% RADIOGRAPHED.	X	SKIRT BASE DETAILS	7-12-0004	WIND SPECIFICATION	IS 875 (PART-3)					
LT2	1	150 (H)	120	300	WN	RF	SEE DWG.	70XT	LEVEL TRANSMITTER (RADAR)	11	NOZZLES SHOWN WITH BLIND FLANGES / REDUCING FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.	X	SKIRT OPENING DETAILS	7-12-0005	SEISMIC	IS 1893 + SITE SPECTRA (PART-4)					
N12	1	50.8 ID	-	300	LWN	RF	SEE DWG.	-	INSTRUMENT AIR	12	SURFACE PREPARATION, SHOP PRIMER & FINISH PAINT AS PER JOB SPECIFICATION FOR SURFACE PREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.EXTERNAL COATING SHALL BE AS PER TABLE 10.2 OF JOB SPECIFICATION.	X	ANGLE LEG SUPPORT	7-12-0006	CAPACITY (M ³)	20.65-					
N13	1	50.8 ID	-	300	LWN	RF	SEE DWG.	-	NITROGEN	13	THE VESSEL SHALL BE LOCATED IN RCC PIT AND SAND PACKED WITH VIBRO COMPRESSION WITH 100mm THK OF LEAN CONCRETE ON TOP (BY OTHERS).	X	PIPE LEG SUPPORT	7-12-0007	PAINTING/CLEANING	REFER AS PER JOB SPEC. (NOTE-12)					
N16	1	50.8 ID	-	300	LWN	RF	SEE DWG.	-	UTILITY	14 (a)	SIZE OF SUMP1-2 & NOZZLE N7 & N14 IS UNDER HOLD & SHALL BE AS CONFIRMED BY PUMP VENDOR.	X	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008	INSULATION THICKNESS (mm)	NIL	☐ HOT	☐ COLD			
S1	1	500	16 THK.	150	WN	RF	SEE DWG.	170xT	MOUNTING NOZZLE + BF + GASKET + BOLTING FOR N4 & N5	14 (b)	PUMP NOZZLE COVER / BLIND FLANGE WITH PUMP ASSEMBLY, NOZZLES N8 & N15, BOLTING & GASKET SHALL BE SUPPLIED BY PUMP SUPPLIER.	X	MANHOLE WITH HINGED COVER	7-12-0009	FIRE PROOFING CLEATS	☐ YES	☒ NO				
S2	1	500	16 THK.	150	WN	RF	SEE DWG.	170xT	MOUNTING NOZZLE + BF + GASKET + BOLTING FOR N12, N13 & N16	15	CATHODIC PROTECTION IS BY OTHERS. HOWEVER,CLIP FOR THE SAME TO BE PROVIDED BY VENDOR.	X	MANHOLE WITH DAVIT	7-12-0010	HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL	/-VERTICAL-	(AT TOP)			
										16	UNLESS OTHERWISE SPECIFIED MINIMUM THICKNESS OF WELDED/BOLTED SS INTERNAL SHALL BE 8mm. IN CASE OF PIPE AND PIPE FITTINGS SCHEDULE TO BE SELECTED ACCORDINGLY.	X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011	PRESSURE (NEW & COLD)	6.5					
T' DENOTES CORRESPONDING SHELL/DISH END NOMINAL THICKNESS										17	VESSEL SHALL BE SUBJECTED TO STEAM OUT CONDITIONS OF 0.5 Kg/Cm²(g) AT 190 °C.	X	RETAINING PLATE	7-12-0012	INSPECTION BY	☒ EIL	☐ CIB	☐ TPIA			
H' DENOTES (HOLD)										18	LIFTING LUG FOR HANDLING OF VESSEL SHALL BE DESIGNED (CONSIDERING IMPACT FACTOR 1.5) AND PROVIDED BY VENDOR. INDICATIVE DETAILS ARE FURNISHED ON SHEET-3.	X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013	MATERIAL OF CONSTRUCTION (मैटेरियल ऑफ कन्स्ट्रक्शन) (AS PER ASME / IS OR-EQUIVALENT)						
										19	COMPLETE EQUIPMENT SHALL BE POST WELD HEAT TREATED. HARDNESS OF BASE METAL, WELDS AND HAZ AFTER PWHT SHALL BE LIMITED TO VALUES SPECIFIED IN 6-15-0091.	X	PAD NOZZLES FOR VESSELS	7-12-0014							
										20	ALL BUTT WELD (CIRCUMFERENTIAL AND LONGITUDINAL SEAMS) IN PRESSURE PART INCLUDING NOZZLE NECK TO FLANGE, PIPE TO PIPE, PIPE TO PIPE FITTING SHALL BE 100% RADIOGRAPHED.	X	STANDARD BOLT HOLE ORIENTATION	7-12-0015							
										21	INTERNAL COATING SHALL BE APPLIED AS PRE CLASE NO.7.2, TABLE-7 OF B957-000-06-42-PL-01 NO COATING IS REQUIRED ON FLANGE FACE	X	ALLOY LINER DETAILS	7-12-0016							
												X	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017							
												X	INTERNAL FLANGES	7-12-0018							
												X	VORTEX BREAKERS	7-12-0019							
												X	INLET DEFLECTOR BAFFLE	7-12-0020							
												X	SUPPORT RING AND BOLTING BAR	7-12-0021							
												X	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022							
												X	PIPE DAVIT	7-12-0023							
												X	LIFTING LUG TOP HEAD TYPE	7-12-0024							
												X	FIRE PROOFING AND INSULATION SUPPORTS	7-12-0025							
												X	EARTHING LUG	7-12-0026							
												X	NAME PLATE	7-12-0027							
												X	MANUFACTURER NAME PLATE	7-12-0028							
												X	BRACKET FOR NAME PLATE	7-12-0029							
												X	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030							
												X	DETAILS OF FORGED NOZZLES	7-12-0031							
												X	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032							
												X	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033							
												X	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034							
												X	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036							
												X	S.R NOZZLE NECK	7-12-0037							
												X	ALLOWABLE NOZZLE LOADS	7-12-0038							
												X	STILL WELL FOR LEVEL TRANSMITTER (RADAR TYPE) FOR BURIED VESSEL	7-12-0039							

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100 mm LEAN
CONCRETE
(BY OTHER)



VIEW 'A-A'

[CONCRETE PEDESTAL]
(BY OTHERS)

* NOZZLES MAY BE SUITABLY CUT WITH WELD EDGE PREPARATION (WITH SUITABLE COVER) FOR TRANSPORTATION. SUITABLE CUTTING ALLOWANCE IN NOZZLES SHALL BE CONSIDERED TO MAINTAIN THE GIVEN PROJECTION. FINAL ASSEMBLY OF NOZZLES AT SITE SHALL BE BY OTHERS (NOT BY VESSEL FABRICATOR)

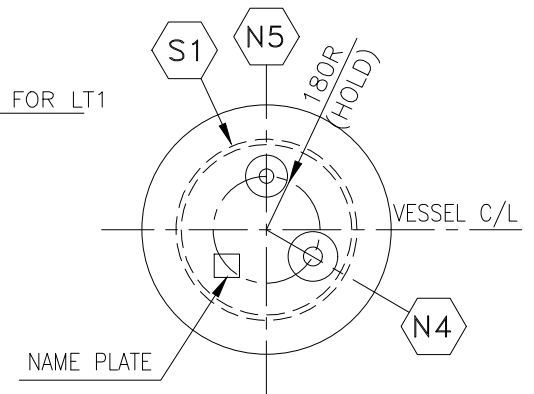
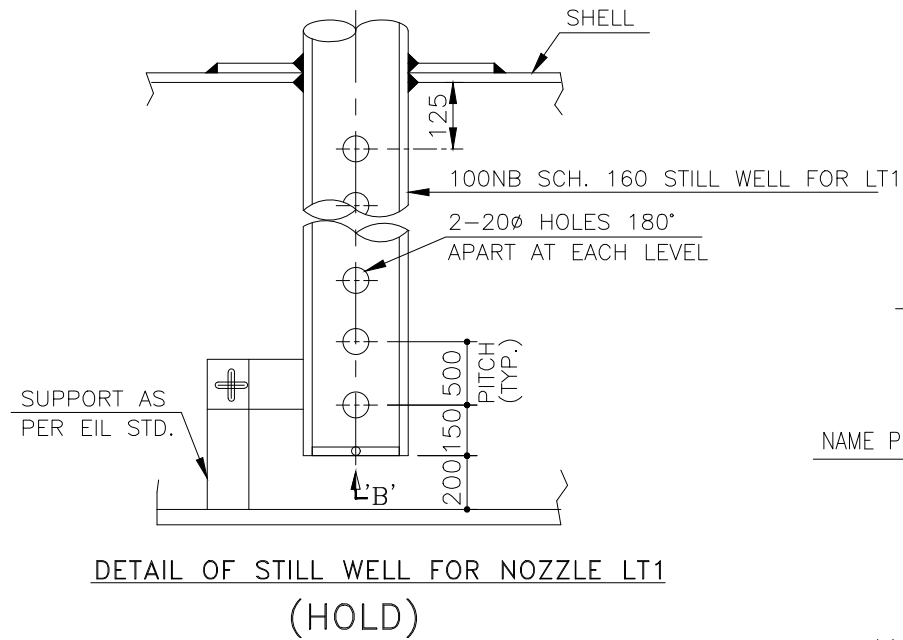
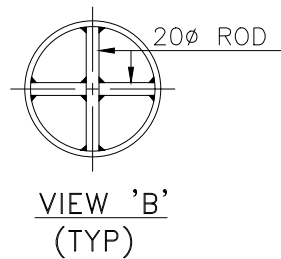


REV.	DATE	ISSUED FOR BIDS/ENGG.	AS	RR/VIVEK	PB		
A	15.12.2025	ISSUED FOR BIDS/ENGG.	BY	CHK	APPROVED	APPROVED	

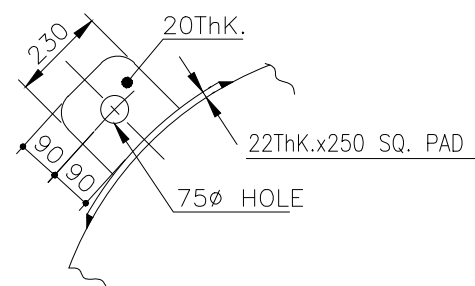
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WAO ACID SUMP	डब्ल्यूएओ एसिड संप	B957-304-80-42-DS-3104	A
ITEM NO. 304-VV-HI-4504	आइटम नम्बर 304-वोवी-एचआई-4504	SHEET 2 OF 3	

1-1641-0503 REV.0 A3-420x297

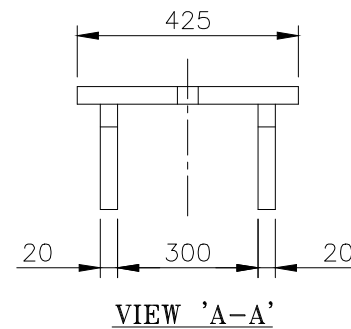
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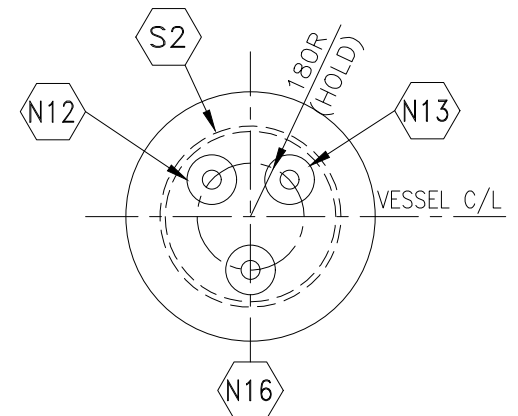
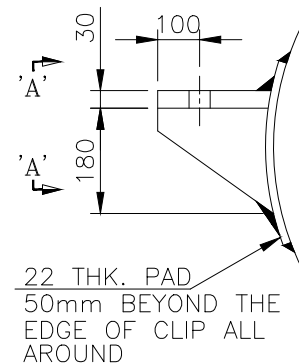
PLAN FOR
MOUNTING NOZZLE S1 (HOLD)
(FOLLOW AS PER NOZZLE ORIENTATION)



DETAIL OF LIFTING LUG (TYP)



DETAIL OF BRACKET SUPPORT (TYP)



PLAN FOR
MOUNTING NOZZLE S2 (HOLD)
(FOLLOW AS PER NOZZLE ORIENTATION)



ENGINEERS INDIA LIMITED
NEW DELHI



BHARAT PETROLEUM CORP. LTD.
BINA PETROCHEMICAL &
REFINERY EXPANSION
PROJECT (BPREP)

A	15.12.2025	ISSUED FOR BIDS/ENGG.	AS	RR/VIVEK	PB		
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED	

VESSEL DESIGN DATA
WA0 ACID SUMP
ITEM NO. 304-VV-HI-4504

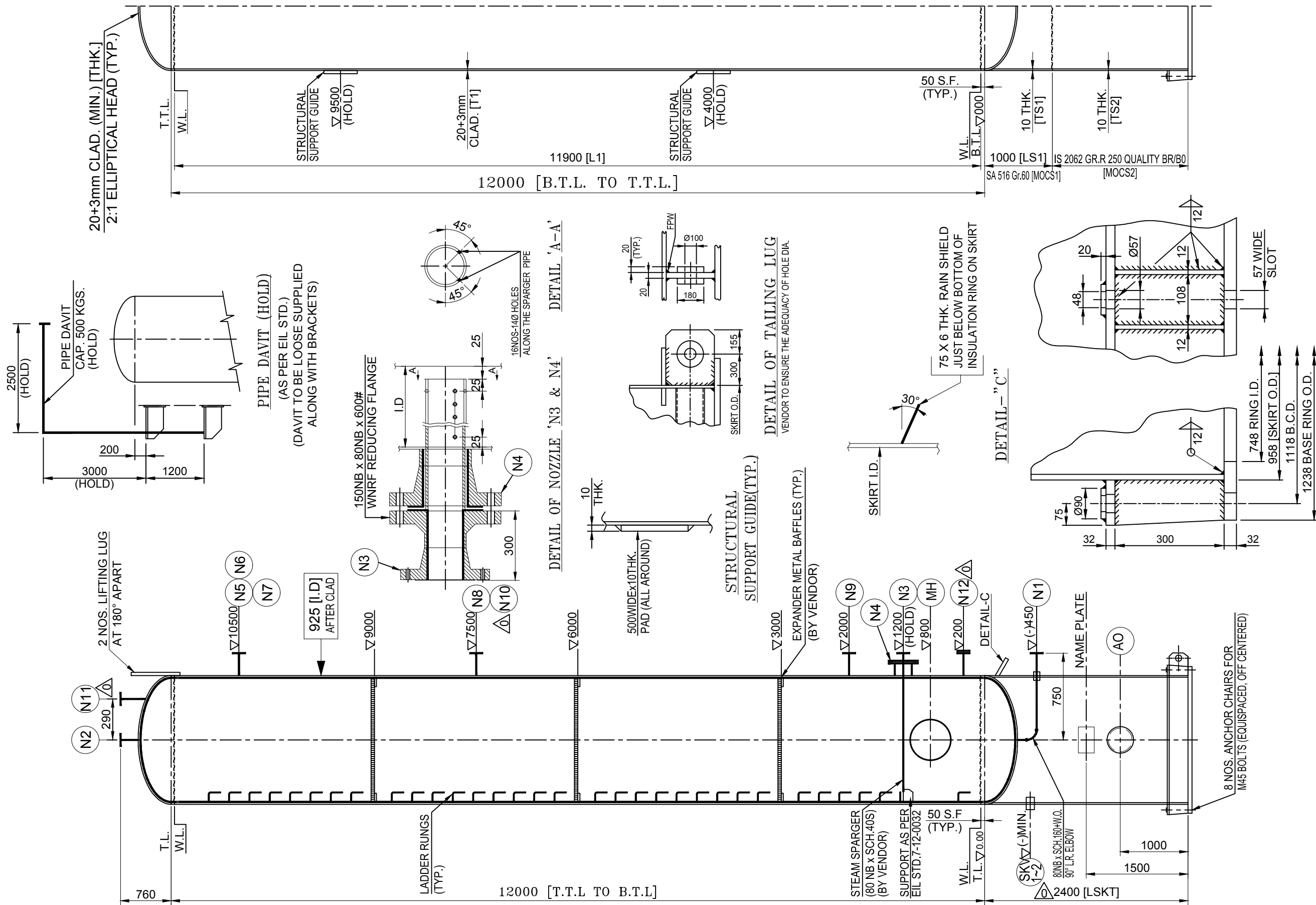
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डब्ल्यूएओ एसिड संप
आइटम नम्बर 304-वीवी-एचआई-4504

DRAWING NO.
B957-304-80-42-DS-3104
REV.
A

SHEET 3 OF 3

1-1641-0503 REV.0 A3-420x297

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SKIRT BASE DETAIL
(ALL OTHER DIMENSIONS AS PER EIL STD. 7-12-0004)

 ENGINEERS INDIA LIMITED NEW DELHI	 BHARAT PETROLEUM CORP. LTD. BINA PETROCHEMICAL & REFINERY EXPANSION PROJECT (BPREP)							VESSEL DESIGN DATA	वेसल डिजाइन डाटा	DRAWING NO.	REV.	
		0	04.02.2026	ISSUED FOR PURCHASE	ROHIT	AD/VIVEK	PB		WAO REACTOR	डब्लूओ रिेक्टर	B957-304-80-42-DS-3501	0
		B	29.08.2025	REVISED & REISSUED FOR BIDS/ENGG.	ROHIT	AD/VIVEK	PB	-				
		A	13.06.2025	ISSUED FOR BIDS/ENGG.	ROHIT	AD/VIVEK	PB	-	ITEM NO. 304-RB-00-4501	आइटम नम्बर 304-आरबी-00-4501	SHEET 2 OF 2	
		REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED				

1-1641-0503 REV.0 A3-420x297

EQUIPMENT DETAILS FOR ERECTION

MPMC AND PMC/EPCM SERVICES FOR ETHYLENE CRACKER UNIT AND UTILITIES & OFFSITES RELATED TO BINA PETCHEM & REFINERY EXPANSION PROJECT (BPREP)

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO.	REV
		0	20.04.2026	RNK/ CRG	VIVEK	PB		B957-80-42-EE-3001A	0
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EQUIPMENT DETAILS FOR ERECTION

DEPT.: STATIC EQUIPMENT

JOB NO. : B957

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
COLUMNS											
1.	300-CC-00-2201	HP Depropanizer	1	V	Skirt	5144 / 3912	25180	35580 (H)	264300 (H)	*	
2.	300-CC-00-2202	LP Depropanizer	1	V	Skirt	3432 / 2828	39475	48895 (H)	97000 (H)	*	
3.	300-CC-00-3001	Demethanizer	1	V	Skirt	4848 / 3248 / 2528	62450	72290 (H)	168000 (H)	*	
4.	300-CC-00-4001	Deethanizer	1	V	Skirt	4600	39300	47680 (H)	310000 (H)	*	
5.	300-CC-00-4201	Debutanizer	1	V	Skirt	3028	29200	38670 (H)	61000 (H)	*	
6.	302-CC-00-2601	Depentanizer	1	V	Skirt	3036 / 2228	46050	53250 (H)	91000 (H)	*	
7.	302-CC-00-2602	Rerun Tower	1	V	Skirt	5144	23900	37650	150000	*	
8.	302-CC-00-2701	H2S Stripper	1	V	Skirt	2424	18900	27220 (H)	30500 (H)	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO.	REV
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		REV	DATE	BY	CHK	APPD		Page 2 of 21	

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
9.	302-CC-00-2702	BTX Tower	1	V	Skirt	4340	28400	37000 (H)	113000 (H)	*	
10.	303-CC-00-3502	Solvent Recovery Column (SRC)	1	V	Skirt	5044 / 3444	33600	42170 (H)	133000 (H)	*	
11.	303-CC-00-3503	Water Stripper	1	V	-	620	4000	4200	1750	*	(FLANGED HEAD) (ABOVE EXCHANGER)
12.	303-CC-00-3601 A/B	Clay Towers	2	V	Skirt	3154	13880	18400	67000	*	
13.	303-CC-00-3602	Benzene Column	1	V	Skirt	2840	43750	52660	84500	*	
14.	303-CC-00-3603	TOLUENE COLUMN	1	V	Skirt	2652	44200	53070	90000	*	
15.	303-CC-00-3604	XYLENE COLUMN	1	V	Skirt	1596	38200	46800 (H)	84500 (H)	*	
VESSELS											
1.	300-VV-HW-2202	LP Depropanizer Reflux Drum	1	H	Saddle	1924	5700	6937	8300	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001A Page 3 of 21	REV 0
		0	20.04.2026	RNK/ CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
2.	300-VV-HW-4002	Ethylene Fractionator Reflux Drum	1	H	Saddle	3364	13200	15185	51000	*	
3.	300-VV-HW-4101	Propylene Fractionator Reflux Drum	1	H	Saddle	4400	17200	19725	135000	*	
4.	300-VV-HW-4202	Debutanizer Reflux Drum	1	H	Saddle	2628	7800	9434	12500	*	
5.	300-VV-HW-4210	Debutanizer Area HC Drain Drum	1	H	-	2744	8100	12000	23600	*	
6.	300-VV-HW-6004	Binary Refrigeration Accumulator	1	H	Saddle	4592	17600	21000	268500	*	
7.	300-VV-HW-6005	Binary Refrigerant Compressor Suction Drum Blowcase	1	H	Saddle	1984	7600	9140	25000	*	
8.	300-VV-HW-6007	Binary Refrigerant Compressor Casing Drain Pot	1	H	Saddle	628	1200.00	2200	1000	*	
9.	300-VV-VI-2301	Regeneration Gas K.O. Drum	1	V	Skirt	3040	3600.00	8770	14200	*	
10.	300-VV-VI-5008	Liquid Propylene Accumulator for FOR 300-LZ-00-3001-EP-00-17	1	V	Skirt	1936	4100.00	7300	8300	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001A Page 4 of 21	REV 0
		0	20.04.2026	RNK/ CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
11.	300-VV-VI-5009	Liquid Propylene Accumulator for FOR 300-LZ-00-3001-EP-00- 18	1	V	Skirt	2860	5300.00	9530	23500	*	
12.	300-VV-VI-6001	Binary Refrig Compressor 1st Stage Suction Drum	1	V	Skirt	3176	5000	12520	39000	*	
13.	300-VV-VI-6002	Binary Refrig Compressor 2nd Stage Suction Drum	1	V	Skirt	2564	5000	10860	25000	*	
14.	300-VV-VI-6003	Binary Refrig Compressor 3rd Stage Suction Drum	1	V	Skirt	2972	6800	12530	35000	*	
15.	300-VV-VW- 2201	HP Depropanizer Reflux Drum	1	V	Skirt	5040	5100	14910	121000	*	
16.	300-VV-VW- 2203	Condensate Pot for 300-EE-00- 2208	1	V	Angle Leg	828	1300	3200	1000	*	
17.	300-VV-VW- 2204	Condensate Pot for 300-EE-00- 2201 A/B	1	V	Angle Leg	724	1100	2790	900	*	
18.	300-VV-VW- 2205	Condensate Pot for 300-EE-00- 2204 A/B	1	V	Angle Leg	720	1200	3090	900	*	
19.	300-VV-VW- 2302	Condensate Pot for 300-EE-00- 2303	1	V	Pipe Leg	856	1100	3330	2000	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO.	REV
		0	20.04.2026	RNK/ CRG	VIVEK	PB		B957-80-42-EE-3001A Page 5 of 21	0
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S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
20.	300-VV-VW-2303	Condensate Pot for 300-EE-00-2304	1	V	Angle Leg	620	1200	3060	800	*	
21.	300-VV-VW-3001	Demethanizer Reflux Drum	1	V	Skirt	2520	3200	9240	8500	*	
22.	300-VV-VW-3004	Demethanizer Feed Separator No.1	1	V	Skirt	3176	10800	16110	54000	*	
23.	300-VV-VW-3005	Demethanizer Feed Separator No.2	1	V	Skirt	2152	7800	14560	21500	*	
24.	300-VV-VW-3006	Demethanizer Feed Separator No.3	1	V	Skirt	2048	4000	9530	13500	*	
25.	300-VV-VW-4001	Deethanizer Reflux Drum	1	V	Skirt	3580	8100	18520	61000	*	
26.	300-VV-VW-4203	Condensate Pot for 300-EE-00-4201A/B	1	V	Angle Leg	720	1100	2990	750	*	
27.	300-VV-VW-5006	Liquid Propylene Accumulator for 300-EE-00-3012	1	V	Pipe Leg	1024	1900	3950	2000	*	
28.	300-VV-VW-5007	Liquid Propylene Accumulator for 300-EE-00-4003A-D	1	V	Skirt	1540	2800	5800	6000	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO.	REV
		0	20.04.2026	RNK/ CRG	VIVEK	PB		B957-80-42-EE-3001A Page 6 of 21	0
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S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
29.	300-VV-VW-6006	Binary Refrigerant Retrograde Drum	1	V	Skirt	1256	3800	9930	9500	*	
30.	301-VV-HW-1601	C4 Feed Surge Drum	1	H	Saddle	3064	9000	10862	34000	*	
31.	301-VV-HW-1602 (EXCHANGER OVER IT)	C4 HP Flash Drum With exchanger mounted over vessel	1	H	Saddle	4732	13800	16706	161000	*	
32.	301-VV-VW-1603	Condensate Pot for 301-EE-00-1604	1	V	Pipe Leg	1040	1600	4370	2600	*	
33.	302-VV-HW-2602	PGH Feed Surge Drum	1	H	Saddle	2628	7800	9384	13500	*	
34.	302-VV-HW-2606	Depentanizer Reflux Drum	1	H	Saddle	1624	4800	5892	5500	*	
35.	302-VV-HW-2608 (EXCHANGER OVER IT)	Rerun Tower Reflux Drum With exchanger mounted over vessel	1	H	Saddle	2636	7800	9388	17800	*	
36.	302-VV-HW-2703	H2S Stripper Reflux Drum	1	H	Saddle	1320	3900	4835	3000	*	
37.	302-VV-HW-2706	BTX Tower Reflux Drum	1	H	Saddle	1828	5400	6584	6500	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001A Page 7 of 21	REV 0
		0	20.04.2026	RNK/ CRG	VIVEK	PB			
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S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
38.	302-VV-HW-2712	PGH Area HC Drain Drum	1	H	-	2744	8100	12000	23600	*	
39.	302-VV-VI-2702	PGH Recycle Compressor Suction Drum	1	V	Skirt	1240	4200	7600	6000	*	
40.	302-VV-VW-2603	PGH 1st Stage HP Flash Drum	1	V	Skirt	1652	8000	11640	15000	*	
41.	302-VV-VW-2604	Condensate Pot for 302-EE-00-2602	1	V	Angle Leg	628	1000	2850	800	*	
42.	302-VV-VW-2605	PGH 1st Stage LP Flash Drum	1	V	Skirt	1720	6300	10440	7500	*	
43.	302-VV-VW-2607	Condensate Pot for 302-EE-00-2604	1	V	Angle Leg	724	1200	3080	900	*	
44.	302-VV-VW-2609	Condensate Pot for 302-EE-00-2607	1	V	Angle Leg	724	1200	3080	900	*	
45.	302-VV-VW-2701	PGH 2nd Stage HP Flash Drum	1	V	Skirt	1756	8100	15250	20000	*	
46.	302-VV-VW-2704	Condensate Pot for 302-EE-00-2705	1	V	Angle Leg	620	1000	2850	700	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001A Page 8 of 21	REV 0
		0	20.04.2026	RNK/ CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
47.	302-VV-VW-2708	Condensate Pot for 302-EE-00-2708	1	V	Angle Leg	724	1300	3180	950	*	
48.	303-VV-HI-3502	EDC OVHD RECEIVER	1	H	Saddle	2424	6000	7740	10500	*	
49.	303-VV-HI-3504	SRC OVHD RECEIVER	1	H	Saddle	3028	7000	9040	16500	*	
50.	303-VV-HW-3501	EDC FEED SURGE DRUM	1	H	Saddle	3428	6800	9120	18000	*	
51.	303-VV-HW-3511	SOLVENT SUMP	1	H	-	3240	7500	9320	25000	*	
52.	303-VV-HW-3512	AROMATIC SUMP	1	H	-	3240	7500	9320	25500	*	
53.	303-VV-HW-3601	CLAY TOWER CHARGE DRUM	1	H	Saddle	3228	6400	8540	15500	*	
54.	303-VV-HW-3603	BENZENE COLUMN OVHD RECEIVER	1	H	Saddle	2828	6800	8740	13500	*	
55.	303-VV-HW-3606	TOULENE COLUMN OVHD RECEIVER	1	H	Saddle	3228	6400	8540	17000	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001A Page 9 of 21	REV 0
		0	20.04.2026	RNK/ CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
56.	303-VV-HW-3608	XYLENE COLUMN OVHD RECEIVER	1	H	Saddle	2020	4000	5280	5300	*	
57.	303-VV-VI-3506	SOLVENT REGENERATOR	1	V	Skirt	2836	6000	13420	23000	*	
58.	303-VV-VW-3503	EDC REBOILER CONDENSATE POT	1	V	Pipe Leg	1336	1800	4350	3400	*	
59.	303-VV-VW-3505	SRC REBOILER CONDENSATE POT	1	V	Pipe Leg	1232	1800	4080	2600	*	
60.	303-VV-VW-3507	SOLVENT REGENERATOR REBOILER CONDENSATE POT	1	V	Pipe Leg	724	1100	3000	1100	*	
61.	303-VV-VW-3508	WATER SURGE DRUM	1	V	Skirt	2016	3700	6410	7000	*	
62.	303-VV-VW-3602	CLAY TOWER CHARGE HEATER CONDENSATE POT	1	V	Pipe Leg	856	1100	3030	1800	*	
63.	303-VV-VW-3604	BENZENE COLUMN REBOILER II CONDESATE POT	1	V	Pipe Leg	1232	1700	3970	2600	*	
64.	303-VV-VW-3607	TOULENE COLUMN REBOILER CONDENSATE POT	1	V	Pipe Leg	1388	1900	4475	7000	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO.	REV
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S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
65.	303-VV-VW-3609	XYLENE COLUMN REBOILER CONDENSATE POT	1	V	Pipe Leg	856	1400	3330	2000	*	
66.	303-VV-VI-3610	REGENERATION KO DRUM	1	V	Pipe Leg	1024	2500	4710	2100	*	
67.	303-VV-VI-3605	MOISTURE GUARD BED	1	V	Skirt	5084	13200	18200	110000	*	
68.	303-VV-VW-3509	SOLVENT VENT DRUM	1	V	Skirt	3020	6000	11000	12000	*	
DRYERS											
1.	300-VD-00-2001A-C	Charge Gas Dryer	3	V	Skirt	5328	9300	16970	158000	*	
2.	300-VD-00-2002AB	Liquid Condensate Dryers	2	V	Skirt	2284	11500	20300	50000	*	
3.	300-VD-00-4101AB	PG Propylene Treaters	2	V	Skirt	1680	5700	15200	26000	*	
REACTORS											

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO.	REV
		0	20.04.2026	RNK/ CRG	VIVEK	PB		B957-80-42-EE-3001A Page 11 of 21	0
		REV	DATE	BY	CHK	APPD			

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (NOTE-3)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
1.	300-RB-00-2201A-C	Acetylene Converter	3	V	Skirt	4520	7500	14870	120000	*	
2.	300-RB-00-4101A/B	MAPD Converter	2	V	Skirt	2696	13100	22010	65500	*	
3.	301-RB-00-1601A/B	C4 Hydrogenation Reactor	2	V	Skirt	4540	18100	27820	231000	*	
4.	302-RB-00-2601AB	PGH 1st Stage Reactor	2	V	Skirt	3080	18600	28590	92000	*	
5.	302-RB-00-2701A/B	PGH 2nd Stage Reactor	2	V	Skirt	3210	8000	16400	77000	*	

EQUIPMENT DETAILS FOR ERECTION OF HEAT EXCHANGERS

SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNT ING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
1.	300-EE-00-2201A/B	HP DEPROPANIZER REBOILER	BEL- CONE	NO	2	V	1011	6631	12700	*	
2.	300-EE-00-2202	HP DEPROPANIZER BOTTOMS COOLER	AES-Helix	NO	1	H	1032(H)	10772(H)	18545(H)	*	#
3.	300-EE-00-2203	HP DEPROPANIZER CONDENSER	BKM	NO	1	H	2230/3172	14502	130000	*	(NOTE-6)
4.	300-EE-00-2204A/B	LP DEPROPANIZER REBOILER	BEL- CONE	NO	2	V	1128	6415	13500	*	

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		0	20.04.2026	RNK/ CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

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SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNTING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
5.	300-EE-00-2205	LP DEPROPANIZER CONDENSER	BKU	NO	1	H	1248/1840	9020	24000	*	(NOTE-6)
6.	300-EE-00-2206A/B	ACETYLENE CONVERTER FEED/EFFLUENT EXCHANGER NO.1	BEM	YES	2	H	2475	14562	150000	*	Total No. stack = 1 Wt. Per stack = 300000 Kg (NOTE-6)
7.	300-EE-00-2207 A-D	ACETYLENE CONVERTER FEED/EFFLUENT EXCHANGER NO.2	BEM	YES	4	H	2640	14902	190000	*	Total No. stack = 2 Wt. Per stack = 380000 Kg
8.	300-EE-00-2208	ACETYLENE CONVERTER HEATER	AEL- CONE	NO	1	H	1473	5582	25200	*	
9.	300-EE-00-2209	ACETYLENE CONVERTER INTERCOOLER NO.1	AXS	NO	1	H	1547	11645	51500	*	
10.	300-EE-00-2210	ACETYLENE CONVERTER INTERCOOLER NO.2	AXS	NO	1	H	1497	11545	48200	*	
11.	300-EE-00-2211	ACETYLENE CONVERTER AFTERCOOLER	AJ21L	NO	1	H	2990	13992	200000	*	
12.	300-EE-00-2301 A/B	REGENERATION FEED / EFFLUENT EXCHANGER	BES	NO	2	H	1528	12793	40000	*	
13.	300-EE-00-2302	REGENERATION GAS COOLER	AXS	NO	1	H	1548	8928	31500	*	
14.	300-EE-00-2303	REGENERATION GAS HEATER	BXU	NO	1	H	1460	8300	36800	*	
15.	300-EE-00-2304	REACTOR REDUCTION GAS HEATER	AJ12U	NO	1	H	724	6880	7000	*	
16.	300-EE-00-3002	DEMETHANIZER FEED CHILLER	BKM	NO	1	H	1664/2552	10162	55000	*	(NOTE-6)
17.	300-EE-00-3003	DEMETHANIZER SIDE REBOILER	BEM	NO	1	V	2160	7822	42000	*	
18.	300-EE-00-3009	DEMETHANIZER REBOILER	BJ12U	NO	1	H	2106	11350	75000	*	(NOTE-6)

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		0	20.04.2026	RNK/ CRG	VIVEK	PB			
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SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNT ING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
19.	300-EE-00-3010	HYDROGEN COMPRESSOR INTERCOOLER	AEL	NO	1	H	HOLD	HOLD	18000 (H)	*	#
20.	300-EE-00-3011	HYDROGEN COOLER AFTERCOOLER	AEL	NO	1	H	HOLD	HOLD	18000 (H)	*	#
21.	300-EE-00-3012	ETHYLENE PRODUCT VAPORIZER	BKU	NO	1	H	1780/2354	10370	72000	*	(NOTE-6)
22.	300-EE-00-4001 A/B	DEETHANIZER REBOILER	AHS	NO	2	H	2435(H)	11933(H)	125000 (H)	*	
23.	300-EE-00-4002A/B	DEETHANIZER CONDENSER	BKM	NO	2	H	2080/2970	8932	72000	*	(NOTE-6)
24.	300-EE-00-4003A-D	ETHYLENE FRACTIONATOR REBOILER	BEL- CONE	NO	4	V	2506	9295	78000	*	
25.	300-EE-00-4004	ETHYLENE FRACTIONATOR SIDE REBOILER NO.1	AKL- CONE	NO	1	H	1798	8882	20000	*	(NOTE-6)
26.	300-EE-00-4005A/B	ETHYLENE FRACTIONATOR CONDENSER	BKM	NO	2	H	3185/4490	16592	285000	*	(NOTE-6)
27.	300-EE-00-4006	ETHYLENE FRACTIONATOR SIDE REBOILER NO.2	BKM	NO	1	H	1302/2102	8012	27500	*	(NOTE-6)
28.	300-EE-00-4102	MAPD CONVERTER FEED COOLER	AEL	NO	1	H	1456	8312	42000	*	
29.	300-EE-00-4103A/B	PROPYLENE FRACTIONATOR NO.1 REBOILER	AJ12M	NO	2	H	2131(H)	12500(H)	110000(H)	*	
30.	300-EE-00-4104A/B	PROPYLENE FRACTIONATOR NO.2 REBOILER	AJ12M	NO	2	H	2568(H)	15602(H)	184500(H)	*	
31.	300-EE-00-4105A/B/C/D	PROPYLENE FRACTIONATOR CONDENSER	AEL-Helix	NO	4	H	1688(H)	15179(H)	78200(H)	*	#
32.	300-EE-00-4106	PROPYLENE FRACTIONATOR VENT CONDENSER	BKU	NO	1	H	462.1/974	6120	3400	*	
33.	300-EE-00-4107	PROPYLENE TREATER FEED	AEM	NO	1	H	752	7708	14500	*	

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SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNTING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
		COOLER									
34.	300-EE-00-4108	PROPYLENE START-UP VAPORIZER	NKN	NO	1	H	523/908	8724	8500	*	
35.	300-EE-00-4201A/B	DEBUTANIZER REBOILER	BEL - CONE	NO	2	V	2028	7365	38000	*	
36.	300-EE-00-4202	DEBUTANIZER CONDENSER	AEL-Helix	NO	1	H	1675(H)	11539(H)	52600(H)	*	#
37.	300-EE-00-4203	PYROLYSIS GASOLINE COOLER	AES-Helix	NO	1	H	1075(H)	8789(H)	18200 (H)	*	#
38.	300-EE-00-6001	BINARY REFRIGERANT COOLER	AXL	NO	1	H	2135	9482	107000	*	
39.	301-EE-00-1601	C4 REACTOR FEED/EFFLUENT EXCHANGER	BEM	NO	1	H	1520	8932	40000	*	
40.	301-EE-00-1602	C4 REACTOR EFFLUENT CONDENSER	AEL-Helix	NO	1	H	2370(H)	17173(H)	181800(H)	*	#
41.	301-EE-00-1603	C4 HP FLASH VENT CONDENSER	BEL	NO	1	V	599(H)	4714(H)	4200(H)	*	(Note-4)
42.	301-EE-00-1604	C4 START UP PREHEAT EXCHANGER	BEM	NO	1	H	2109(H)	9312(H)	92000(H)	*	
43.	302-EE-00-2601	PGH 1ST STAGE REACTOR RECYCLE COOLER	AES-Helix	NO	1	H	1577(H)	11547(H)	64000(H)	*	#
44.	302-EE-00-2602	PGH 1ST STAGE REACTOR RECYCLE HEATER	AES	NO	1	H	1044	6198	19000	*	
45.	302-EE-00-2603	PGH 1ST STAGE REACTOR OFFGAS COOLER	AES	NO	1	H	355.60	6932	1900	*	
46.	302-EE-00-2604	DEPENTANIZER REBOILER	BEL (CONE)	NO	1	V	1498	5965	17000	*	
47.	302-EE-00-2605	DEPENTANIZER CONDENSER	AES-Helix	NO	1	H	1185(H)	7405(H)	17100(H)	*	#

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SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNTING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
48.	302-EE-00-2607	RERUN TOWER REBOILER	AEL	NO	1	H	1606	11362	52000	*	
49.	302-EE-00-2608A/B	RERUN TOWER CONDENSER	AJ21S-Helix	NO	2	H	1645(H)	11249(H)	51700(H)	*	#
50.	302-EE-00-2609	RERUN TOWER VENT CONDENSER	BEM	NO	1	V	799(H)	4391(H)	6400(H)	*	(Note- 5)
51.	302-EE-00-2701	PGH 2ND STAGE FEED / EFFLUENT EXCHANGER	CES-Helix	NO	1	V	2552(H)	27534(H)	370000(H)	*	#
52.	302-EE-00-2702	PGH 2ND STAGE REACTOR FEED HEATER	AES	NO	1	H	1175	8451	53000	*	
53.	302-EE-00-2703	PGH 2ND STAGE REACTOR EFFLUENT CONDENSER	AEM-Helix	NO	1	H	1264(H)	8754(H)	27400(H)	*	#
54.	302-EE-00-2704	H2S STRIPPER FEED / BOTTOM EXCHANGER	AES	NO	1	H	610	7252	4800	*	
55.	302-EE-00-2705	H2S STRIPPER REBOILER	BEL-CONE	NO	1	V	828	5241	5500	*	
56.	302-EE-00-2706	H2S STRIPPER CONDENSER	AES	NO	1	H	570	7252	4300	*	
57.	302-EE-00-2708	BTX TOWER REBOILER	BEL-CONE	NO	1	V	1890	7615	37000	*	
58.	302-EE-00-2709A/B	BTX TOWER CONDENSER	AJ21S-Helix	NO	2	H	1175(H)	8893(H)	19600(H)	*	#
59.	302-EE-00-2711	C6-C8 PRODUCT COOLER	AES	NO	1	H	570	7092	4100	*	
60.	302-EE-00-2712	C9-180 CUT PRODUCT COOLER	AES	NO	1	H	406.4	7022	2400	*	
61.	303-EE-00-3501	EDC FEED PREHEATER	AES	NO	1	H	793	7624	9500	*	
62.	303-EE-00-3502	AROMATIC EXTRACT PREHEATER	AES	NO	1	H	930	7710	13300	*	

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SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNTING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
63.	303-EE-00-3503	EDC REBOILER	BEM	NO	1	V	1148	9355	22000	*	
64.	303-EE-00-3504	EDC SIDE COOLER	CEU (STAB-IN)	NO	1	H	-	5727	21000	*	(Note-7)
65.	303-EE-00-3505	RAFFINATE COOLER	AES	NO	1	H	323.80	6012	1500	*	
66.	303-EE-00-3506	SRC OVHD TRIM COOLER	AJ21S	NO	1	H	799	7292	7700	*	
67.	303-EE-00-3507A/B	SRC REBOILER	BEU (STAB-IN)	NO	2	H	-	5370	13000	*	(Note-8)
68.	303-EE-00-3508	STEAM GENERATOR	BKU	NO	1	H	1436/1936	10900	35000	*	
69.	303-EE-00-3509	SOLVENT REGENERATOR REBOILER	BEU (STAB-IN)	NO	1	H	-	2910	3200	*	(Note-9)
70.	303-EE-00-3511	WET SOLVENT COOLER	AES	NO	1	H	890	10688	16300	*	
71.	303-EE-00-3512	AROMATIC SUMP COOLER	AES	NO	1	H	545	7192	3600	*	
72.	303-EE-00-3601	CLAY TOWER CHARGE HEATER	AEU	NO	1	H	323.80	7100	1600	*	
73.	303-EE-00-3602 A/B	CLAY TOWERS FEED / EFFLUENT EXCHANGER	AES	YES	2	H	528	7232	5000	*	Total No. stack = 1 Wt. Per stack = 10000 Kg
74.	303-EE-00-3603	BENZENE PRODUCT COOLER	AEM	NO	1	H	495	6142	2800	*	
75.	303-EE-00-3604	BENZENE COLUMN REBOILER I	BEL - CONE	NO	1	V	1653(H)	7075(H)	28200(H)	*	
76.	303-EE-00-3605	BENZENE COLUMN REBOILER II	AEL - CONE	NO	1	V	703	4801	4500	*	

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SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNT ING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
77.	303-EE-00-3606	TOLUENE PRODUCT COOLER	AES	NO	1	H	323.80	6982	1700	*	
78.	303-EE-00-3607	TOLUENE COLUMN REBOILER	AEL- CONE	NO	1	V	1462	6705	28000	*	
79.	303-EE-00-3608	CLAY TOWER FEED TOLUENE EXCHANGER	AES	NO	1	H	355.6	6952	2100	*	
80.	303-EE-00-3609	XYLENE PRODUCT COOLER	AES	NO	1	H	323.80	5917	1600	*	
81.	303-EE-00-3610	XYLENE COLUMN REBOILER	AEL- CONE	NO	1	V	544(H)	4391(H)	3500(H)	*	
82.	303-EE-00-3612	REGENERATION OFF GAS COOLER	AES	NO	1	H	645	7297	5200	*	
83.	303-EE-DP-3510	MAKE-UP WATER COOLER	DOUBLE PIPE	NO	6 pipes	H	2.5 inch	6980	1100	*	
84.	303-EE-00-3613	REGENERATION GAS HEAT EXCHANGER	AES	NO	1	H	655	4422	3800	*	
85.	303-EE-DP-3611	XYLENE COLUMN BOTTOMS COOLER	DOUBLE PIPE	NO	2 pipes	H	1.5 inch	6728	350	*	
PACKAGE											
86.	300-LZ-00-3001	ECU COLD BOX PACKAGE-PART B	CB- PART B	NO	1	V	Rectangular dimensions 6448 X 4718	30133	180000(H)		# REFER DRG
87.	300-LZ-00-3001	ECU COLD BOX PACKAGE-PART C	CB- PARTC	NO	1	V	Rectangular dimensions 6448 X 4270	30133	180000(H)		# REFER DRG
88.	300-LZ-00-3001	ECU COLD BOX PACKAGE-PART D	CB- PART D	NO	1	V	Rectangular dimensions 6448 X	30133	190000(H)		# REFER DRG

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SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNT ING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
							4704				
89.	300-EP-00-4007	ETHYLENE RUNDOWN CHILLER	BAHX	NO	1	V	1344 X 2275	4017	7000(H)		# REFER DRG
ELECTRIC HEATER											
90.	300-EI-00-2305	REACTOR REGENERATION VHP STEAM ELECTRIC HEATER	Electric Heater	HOLD	HOLD	HOLD	HOLD	HOLD	10000(H)		#
91.	300-EI-00-2306	ECU TREATER REGENERATION GAS ELECTRIC HEATER	Electric Heater	HOLD	HOLD	HOLD	HOLD	HOLD	10000(H)		#
92.	303-EI-00-3601	REGENERATION GAS ELECTRICAL HEATER	Electric Heater	HOLD	HOLD	HOLD	HOLD	HOLD	10000(H)		#

EQUIPMENT DETAILS FOR ERECTION FOR AIR COOLERS

SL. NO.	ITEM NO.	DESCRIPTION	MOUNTING (NOTE-3)	NO. OF BAYS	DIMENSIONS PER BAY			~ERECTION WT PER BAY (KG)	TOTAL WT (KG)	EL FROM GRADE	REMARKS (Bundle &Frame weight)
					OVERALL LENGTH (MM)	OVERALL WIDTH (MM)	OVERALL, HEIGHT (MM)				
1.	303-EA-00-3501 A/B	LEAN SOLVENT AIR COOLER	H	1	11000	7210	7100	26000(H)	26000 (H)	*	# (Note-10)
2.	303-EA-00-3502 A~D	EDC OVHD CONDENSER	H	2	11000	12600	7100	29000(H)	58000 (H)	*	# (Note-10)
3.	303-EA-00-3601 A~D	BENZENE COLUMN OVHD CONDENSER	H	2	13000	14110	7100	30000(H)	60000 (H)	*	# (Note-11)
4.	303-EA-00-3602	TOLUENE COLUMN OVHD CONDENSER	H	1	8000	4020	7100	20000(H)	20000 (H)	*	# (Note-11)

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SL. NO.	ITEM NO.	DESCRIPTION	MOUNTING (NOTE-3)	NO. OF BAYS	DIMENSIONS PER BAY			~ERECTION WT PER BAY (KG)	TOTAL WT (KG)	EL FROM GRADE	REMARKS (Bundle &Frame weight)
					OVERALL LENGTH (MM)	OVERALL WIDTH (MM)	OVERALL, HEIGHT (MM)				
5.	303-EA-00-3603	TOLUENE PRODUCT AIR COOLER	H	1	7000	3000	7100	15000(H)	15000 (H)	*	# (Note-11)
6.	303-EA-00-3604	XYLENE COLUMN OVERHEAD CONDENSER	H	1	7000	3150	7100	20000(H)	20000 (H)	*	# (Note-11)
7.	303-EA-00-3605	XYLENE PRODUCT AIR COOLER	H	1	7000	2000	7100	16000(H)	16000 (H)	*	# (Note-11)

Details given in this Row is tentative & approximated. For Final detail, refer GA Drawing/ Mechanical datasheet.

* Refer equipment layout for elevation from grade.

NOTES:

- Removal of temporary supports/ wedges (provided by equipment vendor to support the equipment / the Internals of the equipment) as applicable including supply of all materials, consumables, labour, equipment, machinery, tools, tackles etc, to complete the work in all respects shall be carried out as per instructions of Engineer-in-charge.
- Erection contractor shall carry out other minor works, such as tack welding of washers above anchor chairs and erection of wooden pillows for cold vessel etc and any other work required to complete the job as per instruction of Engineer-in-charge.
- H – Horizontal, V – Vertical; (H)- HOLD
- Top mounted Heat exchanger (301-EE-00-1603) shall be installed on Vessel 301-VV-HW-1602 by Mechanical Contractor as per instruction of Engineer- In-charge.
- Top mounted Heat exchanger (302-EE-00-2609) shall be installed on Vessel 302-VV-HW-2609 by Mechanical Contractor as per instruction of Engineer- In-charge.
- Wooden pillow (wooden block) shall be installed as per MDS.
- Complete tube bundle assembly with channel shall be installed in the Nozzle – F of the column 303-CC-00-3501.
- Complete tube bundle assemblies with channel shall be installed in the Nozzle – N5 A/B of the column 303-CC-00-3502
- Complete tube bundle assembly along with channel shall be installed in the Nozzle – N6 of the vessel 300-VV-VI-3506
- Air coolers 303-EA-00-3501 A/B and 303-EA-00-3502 A~D shall be installed in one structure. Refer vendor drawing.
- Air coolers 303-EA-00-3601 A~D, 303-EA-00-3602, 303-EA-00-3603, 303-EA-00-3604 and 303-EA-00-3605 shall be installed in one structure. Refer vendor drawing.
- Furnished erection weights are approximate weight of the equipment's.
- Installation of demisters, wire mesh screen, coalescer pads etc. in vessels/columns (supplied loose by others) shall be carried out as per instructions of Engineer-in-Charge.
- For buried vessels, RCC Pit shall be filled with sand, packed with vibro-compression and 100mm lean concrete shall be provided on top as per instructions of Engineer-in-Charge.

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- 15) Loading & procurement of sand shall be carried out as per instructions of Engineer-in-charge. The specification & quantity shall be as per Engineering Data sheet enclosed in the tender.

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EQUIPMENT DETAILS FOR ERECTION

MPMC AND PMC/EPCM SERVICES FOR ETHYLENE CRACKER UNIT AND UTILITIES & OFFSITES RELATED TO BINA PETCHEM & REFINERY EXPANSION PROJECT (BPREP)

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EQUIPMENT DETAILS FOR ERECTION

DEPT.: STATIC EQUIPMENT

JOB NO.: B957

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (See note 5)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
COLUMNS											
1.	300-CC-00-1202	Pyrolysis Fuel Oil Stripper	1	V	Skirt	1952	10950	33060	62000	*	
2.	300-CC-00-1401	Process Water Stripper	1	V	Skirt	3228	16500	24600	40000	*	
3.	300-CC-00-2401	DCU Offgas Caustic / Wash Water Tower	1	V	Skirt	1340	36300	41125	40000	*	
4.	300-CC-00-2502	MEA Regenerator	1	V	Skirt	3434	32200	40270	77000	*	
VESSELS											
1.	300-VV-HI-2101	Spent Caustic Coalescer	1	H	Saddle	2028	6000	7600	8600	*	
2.	300-VV-HI-2102	Spent Gasoline Coalescer	1	H	Saddle	1436	4200	5440	7000	*	
3.	300-VV-HW-1002	Kero Feed Surge Drum	1	H	Saddle	2248	6600	7900	15500	*	

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S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (See note 5)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
4.	300-VV-HW-1003	Naphtha Feed Surge Drum	1	H	Saddle	4280	12600	15050	80500	*	
5.	300-VV-HW-1201	Quench Oil Drain Drum	1	H	Buried	2032	7500	9000	15400	*	
6.	300-VV-HW-2007	Charge Gas Compressor Casing Drain Drum	1	H	Saddle	624	1000	1500	900	*	
7.	300-VV-HW-2010	CGC Area Hydrocarbon Drain Drum	1	H	Buried	2744	8100	12000	23600	*	
8.	300-VV-HW-2103	8% Caustic Surge Drum	1	H	Saddle	1324	3900	4875	3300	*	
9.	300-VV-HW-2104	Caustic Drain Drum	1	H	Buried	2744	8100	12000	23600	*	
10.	300-VV-HW-2505	MEA Drain Drum	1	H	Buried	3250	8100	12000	32000	*	
11.	300-VV-HW-5005	Propylene Refrigerant Accumulator	1	H	Saddle	3160	9300	11110	37500	*	
12.	300-VV-HW-7002	Dry Flare Knock Out Drum	1	H	Saddle	4540	27000	28125	83000	*	

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S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (See note 5)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
13.	300-VV-VI-2004	Charge Gas Compressor 2nd Stage Discharge Drum	1	V	Skirt	4768	6700	12110	58500	*	
14.	300-VV-VI-2005	Charge Gas Compressor 3rd Stage Suction Drum	1	V	Skirt	4468	8400	15740	72000	*	
15.	300-VV-VI-2006	Charge Gas Compressor 3rd Stage Discharge Drum	1	V	Skirt	3692	7800	16450	90000	*	
16.	300-VV-VI-2401	DCU Offgas Compressor Suction Drum	1	V	Pipe Leg	1128	3200	5040	3100	*	
17.	300-VV-VI-2402	DCU Offgas Caustic Tower Feed KO Drum	1	V	Pipe Leg	1028	2900	4760	2700	*	
18.	300-VV-VI-2403	DCU Offgas Dryer/Treater Feed Gas KO Drum	1	V	Pipe Leg	1024	2900	4570	2500	*	
19.	300-VV-VI-2405	DCU Offgas Top Caustic Feed KO Drum	1	V	Pipe Leg	1024	2900	4760	2500	*	
20.	300-VV-VI-3002	Fuel Gas KO Drum - Out Drum	1	V	Skirt	2236	3600	7770	13000	*	
21.	300-VV-VI-5003	Propylene Refrig Compressor 3rd Stage Suction Drum	1	V	Skirt	4668	13500	22190	89500	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001B Page 4 of 12	REV 0
		0	21.04.2026	CHG/ RNK	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (See note 5)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
22.	300-VV-VW-1001	LPG vaporizer Drum	1	V	Skirt	3248	6300	16530	32000	*	
23.	300-VV-VW-1004	Condensate Pot for 300-EE-00-1003	1	V	Angle Leg	620	1300	3160	700	*	
24.	300-VV-VW-1005	Condensate Pot for 300-EE-00-1005	1	V	Angle Leg	620	1100	3160	650	*	
25.	300-VV-VW-1006	Condensate Pot for 300-EE-00-1007	1	V	Angle Leg	620	1100	2960	700	*	
26.	300-VV-VW-1007	Condensate Pot for 300-EE-00-1009	1	V	Angle Leg	620	1000	2960	650	*	
27.	300-VV-VW-1184	VHP Steam Continuous Blowdown Drum	1	V	Skirt	1236	4300	9820	5200	*	
28.	300-VV-VW-1185	VHP Steam Intermittent Blowdown Drum	1	V	Skirt	2836	5700	11520	15000	*	
29.	300-VV-VW-1202	Quench Oil Drain Drum Vent Seal Pot	1	V	Angle Leg	620	1500	3600	800	*	
30.	300-VV-VW-1402	Condensate Pot for 300-EE-00-1401	1	V	Angle Leg	720	1300	3190	800	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001B Page 5 of 12	REV 0
		0	21.04.2026	CHG/ RNK	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (See note 5)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
31.	300-VV-VW-1403	Condensate Pot for 300-EE-00-1402 A/B	1	V	Pipe Leg	1232	2300	4700	3100	*	
32.	300-VV-VW-2008	Medium Gasoline Flash Drum	1	V	Skirt	1836	5200	10870	13500	*	
33.	300-VV-VW-2009	Condensate Pot for 300-EE-00-2007A/B	1	V	Angle Leg	620	1100	2960	600	*	
34.	300-VV-VW-2404	Condensate Pot for 300-EE-00-2404	1	V	Pipe Leg	648	1000	2680	1100	*	
35.	300-VV-VW-2501	Condensate Pot for 300-EE-00-2503A/B	1	V	Angle Leg	824	1400	3320	1200	*	
36.	300-VV-VW-2502	Condensate Pot for 300-EE-00-2502	1	V	Angle Leg	620	1100	3960	700	*	
37.	300-VV-VW-2503	MEA Regenerator Reflux Drum	1	V	Skirt	2424	3700	8420	9300	*	
38.	300-VV-VW-8001	LP Condensate Flash Drum	1	V	Skirt	3632	8000	15120	25800	*	
39.	300-VV-VW-8002	MP Condensate Flash Drum	1	V	Skirt	3640	10600	17720	35000	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO.	REV
		0	21.04.2026	CHG/ RNK	VIVEK	PB		B957-80-42-EE-3001B	0
		REV	DATE	BY	CHK	APPD		Page 6 of 12	

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (See note 5)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
40.	300-VV-HW-8010	QUENCH WATER DRAIN DRUM	1	H	Buried	3050	8100	11850	30900	*	
41.	300-VV-VW-9002	Skimmed Yellow Oil Drum	1	V	Pipe Leg	1020	2900	5360	2000	*	
42.	304-VV-HI-4502	WAO DRAIN SUMP	1	H	Buried	1836	7500	11450	15000	*	
43.	304-VV-HI-4504	WAO ACID SUMP	1	H	Buried	1844	7500	11450	17000	*	
44.	304-VV-HW-4503	WAO SULFURIC ACID TANK	1	H	Saddle	2040	4000	5440	8000	*	
45.	304-VV-VI-4501	WAO Separator	1	V	Skirt	930	4877	9617	3500	*	
46.	300-VV-HW-8011	ATM CONDENSATE DRUM	1	H	Saddle	1828	6300	7300	6800	*	
DRYERS											
1.	300-VD-00-2401A/B	PG Propylene Treaters	2	V	Skirt	2840	13400	18625	30000	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001B Page 7 of 12	REV 0
		0	21.04.2026	CHG/ RNK	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO	ITEM NO.	DESCRIPTION	QTY. (Nos.)	POSITION (See note 5)	SUPPORT TYPE	OUTSIDE DIA. (mm)	TL TO TL (mm)	OVERALL LENGTH (mm)	UNIT ERECTION WT. (Kg)	EL. FROM GRADE	REMARKS
REACTORS											
1.	300-RB-00-2401	DCU Offgas Oxygen Converter	1	V	Skirt	2032	5900	10620	13000	*	
2.	304-RB-00-4501	WAO REACTOR	1	V	Skirt	971	12000	16760	9500	*	

EQUIPMENT DETAILS FOR ERECTION FOR HEAT EXCHANGERS

SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNT ING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
1.	300-EE-00-1001	ETHANE/PROPANE RECYCLE PREHEATER	AEM	NO	1	H	899	6432	10500	*	
2.	300-EE-00-1002	PROPANE FEED VAPORIZER	BKM	NO	1	H	774(H)	5500(H)	2500(H)	*	
3.	300-EE-00-1003	LPG FEED STEAM VAPORIZER	BEL- CONE	NO	1	V	1078	7340	13500	*	
4.	300-EE-00-1004	LPG FEED QW VAPORIZER	BEM	NO	1	H	2610()	10392(H)	109200(H)	*	
5.	300-EE-00-1005	LPG FEED SUPERHEATER	BXU	NO	1	H	824	5580	5600	*	
6.	300-EE-00-1006	NAPHTHA FEED PREHEATER	AES	NO	1	H	1152	7805	21500	*	
7.	300-EE-00-1007	LGO FEED PREHEATER	AES	NO	1	H	570	6202	4000	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001B Page 8 of 12	REV 0
		0	21.04.2026	CHG/ RNK	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

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SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNT ING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
8.	300-EE-00-1008	KEROSENE FEED PREHEATER	AES	NO	1	H	459	7042	3200	*	
9.	300-EE-00-1009	UCO FEED PREHEATER	AES	NO	1	H	699	4384	4700	*	
10.	300-EE-00-1181	CONTINUOUS BLOWDOWN COOLER	AES-Helix	NO	1	H	742(H)	6861(H)	7650(H)	*	#
11.	300-EE-00-1182	INTERMITTENT BLOWDOWN COOLER	AES-Helix	NO	1	H	699(H)	8943(H)	7700(H)	*	#
12.	300-EE-00-1201	QUENCH OIL /DILUTION STEAM DRUM FEED PREHEATER	AES-Helix	NO	1	H	2594(H)	13022(H)	149000(H)	*	#
13.	300-EE-00-1202A-D	PFO PRODUCT COOLER	AES-Helix	NO	4	H	610(H)	8891(H)	6900(H)	*	#
14.	300-EE-00-1203	PAN OIL/PROCESS WATER STRIPPER FEED HEATER	AES-Helix	NO	1	H	1525(H)	8500(H)	31700(H)	*	#
15.	300-EE-00-1204A-H,J	QUENCH OIL/ DILUTION STEAM REBOILER	AJ21S-Helix	NO	9	H	2594(H)	13943(H)	173600(H)	*	#
16.	300-EE-00-1301A-D	QUENCH WATER COOLER NO.1	AES-Helix	NO	4	H	2451(H)	12522(H)	138300(H)	*	#
17.	300-EE-00-1302A/B	QUENCH WATER COOLER NO.2	AES-Helix	NO	2	H	2451(H)	12846(H)	138800(H)	*	#
18.	300-EE-00-1401	PROCESS WATER REBOILER STRIPPER	BEL- CONE	NO	1	V	1678	8205	32000	*	
19.	300-EE-00-1402A/B	DILUTION STEAM/MP STEAM EXCHANGER	BEL	NO	2	V	2930	9465	125000	*	
20.	300-EE-00-1403	DILUTION STEAM SUPERHEATER	AEL - CONE	NO	1	H	1623	7112	25000	*	
21.	300-EE-00-1404A/B	DILUTION STEAM BLOWDOWN COOLER	AES-Helix	NO	2	H	1075(H)	7756(H)	16000(H)	*	#

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001B Page 9 of 12	REV 0
		0	21.04.2026	CHG/ RNK	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNT ING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
22.	300-EE-00-1405	BOILER FEED WATER COOLER	BEM	NO	1	H	406.4	7202	2700	*	
23.	300-EE-00-2001A-D	CGC 1ST STAGE AFTERCOOLER	AJ21S-Helix	NO	4	H	2025(H)	11812(H)	75600(H)	*	#
24.	300-EE-00-2002A/B	CGC 2ND STAGE AFTERCOOLER	AJ21S-Helix	NO	2	H	2238(H)	12076(H)	107400(H)	*	#
25.	300-EE-00-2003A/B	CGC 3RD STAGE AFTERCOOLER	AJ21S-Helix	NO	2	H	1594(H)	11545(H)	56400(H)	*	#
26.	300-EE-00-2004	CGC 3RD STAGE AFTERCOOLER NO.2	BKM	NO	1	H	2660(H)	17382(H)	135000(H)	*	
27.	300-EE-00-2005	AMINE CHARGE GAS FEED HEATER	AXS	NO	1	H	1681	8189	40700	*	
28.	300-EE-00-2006A/B	ETHYLENE FRACTIONATOR SIDE REBOILER NO 1	BKM	NO	2	H	2656(H)	11342(H)	67000(H)	*	
29.	300-EE-00-2007A/B	MEDIUM GASOLINE HEATER	BEL-CONE	NO	2	V	1678	7205	26500	*	
30.	300-EE-00-2101	SPENT CAUSTIC WASH GASOLINE COOLER	HAIRPIN	NO	1	H	219.1	6981	1500	*	
31.	300-EE-00-2401	DCU OFFGAS COMPRESSOR AFTERCOOLER	AES	NO	1	H	570	7162	3900	*	
32.	300-EE-00-2402	DCU OFFGAS DRYER/TREATER FEED CHILLER	BKM	NO	1	H	1078(H)	6393(H)	11200 (H)	*	
33.	300-EE-00-2403	DCU OFFGAS OXYGEN CONVERTER FEED/EFFLUENT EXCHANGER	BES	NO	1	H	640	5842	4000	*	
34.	300-EE-00-2404	DCU OFFGAS OXYGEN CONVERTER FEED HEATER	BEU	NO	1	H	503	5058	3500	*	
35.	300-EE-00-2405	DCU OFFGAS OXYGEN CONVERTER EFFLUENT COOLER	AES	NO	1	H	670	7292	6000	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001B Page 10 of 12	REV 0
		0	21.04.2026	CHG/RNK	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

SL. NO.	ITEM NO	DESCRIPTION	TEMA TYPE	STACKED YES/NO	QUANTITY OF SHELLS	MOUNT ING	SHELL OD (MM)	~OVERALL LENGTH (MM)	EMPTY WT PER SHELL (KG)	EL FROM GRADE	REMARKS
36.	300-EE-00-2501	MEA REGENERATOR CONDENSER	AES	NO	1	H	1145	7985	22000	*	
37.	300-EE-00-2502	MEA RECLAIMER	BKU	NO	1	H	1224/1944	9380	21000	*	
38.	300-EE-00-2503A/B/C/D	MEA REGENERATOR REBOILER	AEL	NO	4	V	2850	10535	115000	*	
39.	300-EE-00-2504A/B	LEAN MEA/RICH MEA EXCHANGER	AES-Helix	NO	2	H	1432(H)	8323(H)	30150(H)	*	#
40.	300-EE-00-2505	LEAN MEA COOLER	AES-Helix	NO	1	H	1129(H)	9352(H)	22100(H)	*	#
41.	300-EE-00-5001A-D	PROPYLENE REFRIGERANT CONDENSER	AEL-Helix	NO	4	H	2344(H)	16471(H)	147850 (H)	*	#
42.	300-EE-00-7001	DRY FLARE DRUM VAPORIZER	NKN	NO	1	H	799/1299	7604	8500	*	
43.	300-EE-00-7002	DRY FLARE HEADER SUPERHEATER	NKN	NO	1	H	2248/2740	6572	35000	*	
44.	300-EE-00-8001	LP CONDENSATE FLASH DRUM CONDENSER	BEM	NO	1	H	699	5208	4100	*	
45.	300-EE-00-8002	LP CONDENSATE FLASH DRUM COOLER	BEM	NO	1	H	749	5498	5000	*	
46.	300-EE-00-8003	CONDENSATE POLISHER FEED COOLER	BEM	NO	1	H	924	7852	11000	*	
47.	304-EE-00-4502	WAO PROCESS COOLER	AEU	NO	1	H	406.40	7100	2500	*	
48.	304-EE-DP-4501	WAO FEED/EFFLUENT HEAT EXCHANGER	DOUBLE PIPE	NO	HOLD	HOLD	HOLD	HOLD	3800(H)	*	#
PHE											
49.	304-EP-00-4503	WAO EFFLUENT COOLER	Plate and frame	HOLD	HOLD	HOLD	HOLD	HOLD	10000(H)	*	

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO. B957-80-42-EE-3001B Page 11 of 12	REV 0
		0	21.04.2026	CHG/ RNK	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO.	REV
		0	21.04.2026	CHG/ RNK	VIVEK	PB		B957-80-42-EE-3001B	0
		REV	DATE	BY	CHK	APPD		Page 12 of 12	

Details given in this Row is tentative & approximated. For Final detail, refer GA Drawing/ Mechanical datasheet.
* Refer equipment layout for elevation from grade.

NOTES:

- 1) Removal of temporary supports/ wedges (provided by equipment vendor to support the equipment / the Internals of the equipment) as applicable including supply of all materials, consumables, labour, equipment, machinery, tools, tackles etc, to complete the work in all respects shall be carried out as per instructions of Engineer-in-charge.
- 2) Erection contractor shall carry out other minor works, such as tack welding of washers above anchor chairs and erection of wooden pillows for cold vessel etc and any other work required to complete the job as per instruction of Engineer-in-charge.
- 3) H – Horizontal, V – Vertical; (H)- HOLD
- 4) Wooden pillow (wooden block) shall be provided as per MDS.
- 5) Furnished erection weights are approximate weight of the equipment's.
- 6) Erection weight indicated are tentative. Final weight shall be as per approved vendor drawing.
- 7) Erection contractor shall carry out any other minor works, such as tack welding of washers above anchor chairs and any other work required to complete the job as per instructions of Engineer-in-Charge.
- 8) Installation of demisters, wire mesh screen, coalescer pads etc. in vessels/columns (supplied loose by others) wherever applicable in column shall be carried out as per instructions of Engineer-in-Charge.
- 9) For buried vessels, RCC Pit shall be filled with sand, packed with vibro-compression and 100mm lean concrete shall be provided on top as per instructions of Engineer-in-Charge.
- 10) Loading & procurement of sand shall be carried out as per instructions of Engineer-in-charge. The specification & quantity shall be as per Engineering Data sheet enclosed in the tender.

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR ERECTION	DOCUMENT NO.	REV
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EQUIPMENT DETAILS FOR INSULATION

MPMC AND PMC/EPCM SERVICES FOR ETHYLENE CRACKER UNIT AND UTILITIES & OFFSITES RELATED TO BINA PETCHEM & REFINERY EXPANSION PROJECT (BPREP)

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 1 of 16	REV 0
		0	20.04.2026	RNK/ CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

EQUIPMENT DETAILS FOR INSULATION

DEPT.: STATIC EQUIPMENT

JOB NO.: B957

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
COLUMNS															
1.	300-CC-00-2201	HP Depropanizer	1	5144 / 3912	25180	Skirt	V	(-)45 / 100	IH	25	170	27			Rock Wool
									IC	70			232	47	PIR
2.	300-CC-00-2202	LP Depropanizer	1	3432 / 2828	39475	Skirt	V	(-)45 / 100	IH	25	387	21			Rock Wool
									IC	65			77	15	PIR
3.	300-CC-00-3001	Demethanizer	1	4848 / 3248 / 2528	62450	Skirt	V	(-)145 /65	IC	125			166	44	PIR
									IC	175			600	14	PIR
4.	300-CC-00-4001	Deethanizer	1	4600	39300	Skirt	V	(-)45 /70	IC	80			318	38	PIR
									IH	25	335	37			Rock Wool
5.	300-CC-00-4201	Debutanizer	1	3028	29200	Skirt	V	140	IH	25	313	31			Rock Wool
6.	302-CC-00-2601	Depentanizer	1	3036 / 2228	46050	Skirt	V	170	IH	25	161	9			Rock Wool
									IH	50	60.	17			Rock Wool
									IH	40	182	-			Rock Wool
7.	302-CC-00-2602	Rerun Tower	1	5144	23900	Skirt	V	190	IH	50	185	47			Rock Wool
									IH	25	270	46			Rock Wool
8.	302-CC-00-2701	H2S Stripper	1	2424	18900	Skirt	V	180	IH	50	145	11			Rock Wool
									IH	40	28	11			Rock Wool
9.	302-CC-00-2702	BTX Tower	1	4340	28400	Skirt	V	195	IH	65	281	34			Rock Wool
									IH	25	173	33			Rock Wool
10.	303-CC-00-3502	Solvent Recovery Column (SRC)	1	5044 / 3444	33600	Skirt	V	250	IH	50	599	86			Rock Wool

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 2 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
11.	303-CC-00-3503	Water Stripper	1	620	4000	-	V	200	IH	40	12	1			Rock Wool
12.	303-CC-00-3601 A/B	Clay Towers	2	3154	13880	Skirt	V	250	IH	65	165	37			Rock Wool
13.	303-CC-00-3602	Benzene Column	1	2840	43750	Skirt	V	200	IH	40	440	28			Rock Wool
14.	303-CC-00-3603	TOLUENE COLUMN	1	2652	44200	Skirt	V	300	IH	80	428	23			Rock Wool
15.	303-CC-00-3604	XYLENE COLUMN	1	1596	38200	Skirt	V	250	IH	65	228	9			Rock Wool
VESSELS															
16.	300-VV-HW-2202	LP Depropanizer Reflux Drum	1	1924	5700	Saddle	H	(-)45 /65	IC	80			40	13	PIR
17.	300-VV-HW-4002	Ethylene Fractionator Reflux Drum	1	3364.00	13200.00	Saddle	H	(-) 45 / 65	IC	100			159	38	PIR
18.	300-VV-HW-4101	Propylene Fractionator Reflux Drum	1	4400	17200	Saddle	H	(-)29/65	IH	25	258	65			Rock Wool
19.	300-VV-HW-4202	Debutanizer Reflux Drum	1	2628	7800	Saddle	H	65	IH	25	70	23			Rock Wool
20.	300-VV-HW-4210	Debutanizer Area HC Drain Drum	1	2744	8100	Buried	H	150	-	-	-	-			
21.	300-VV-HW-6004	Binary Refrigeration Accumulator	1	4592	17600	Saddle	H	(-)60 /65	IC	100			284	71	PIR
22.	300-VV-HW-6005	Binary Refrigerant Compressor Suction Drum Blowcase	1	1984	7600	Saddle	H	(-)115 /100	IC	50			67.5	18.4	Cellular Glass
									IC	125			65	17	PIR

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 3 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
23.	300-VV- HW-6007	Binary Refrigerant Compressor Casing Drain Pot	1	628	1200.00	Saddle	H	(-) 115 /120	IC	150			4	1.5	PIR
24.	300-VV-VI- 2301	Regeneration Gas K.O. Drum	1	3040	3600.00	Skirt	V	95	-	-	-	-			
25.	300-VV-VI- 5008	Liquid Propylene Accumulator for FOR 300-LZ-00-3001-EP- 00-17	1	1936	4100.00	Skirt	V	-45 / 100	IC	100			37	13	PIR
26.	300-VV-VI- 5009	Liquid Propylene Accumulator for FOR 300-LZ-00-3001-EP- 00-18	1	2860	5300.00	Skirt	V	(-) 45 / 100	IC	80			64	27.50	PIR
27.	300-VV-VI- 6001	Binary Refrig Compressor 1st Stage Suction Drum	1	3176	5000	Skirt	V	(-) 115 /100	IC	50			72	42	Cellular Glass
									IC	125			69	40	PIR
28.	300-VV-VI- 6002	Binary Refrig Compressor 2nd Stage Suction Drum	1	2564	5000	Skirt	V	(-) 90 /100	IC	50			58	28	Cellular Glass
									IC	100			56	26	PIR
29.	300-VV-VI- 6003	Binary Refrig Compressor 3rd Stage Suction Drum	1	2972	6800	Skirt	V	(-) 75 /100	IC	50			84.5	34.9	Cellular Glass
									IC	75			81.9	32.8	PIR
30.	300-VV- VW-2201	HP Depropanizer Reflux Drum	1	5040	5100	Skirt	V	(-) 45 /65	IC	80			106.7	90.9	PIR
31.	300-VV- VW-2203	Condensate Pot for 300-EE-00-2208	1	828	1300	Angle Leg	V	350	IH	80	4.5	2.30			Rock Wool
32.	300-VV- VW-2204	Condensate Pot for 300-EE-00-2201 A/B	1	724	1100	Angle Leg	V	240	IH	40	3	2			Rock Wool
33.	300-VV- VW-2205	Condensate Pot for 300-EE-00-2204 A/B	1	720	1200	Angle Leg	V	240	IH	40	4	2			Rock Wool
34.	300-VV- VW-2302	Condensate Pot for 300-EE-00-2303	1	856	1100	Pipe Leg	V	420	IH	80	4	3			Rock Wool

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 4 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
35.	300-VV- VW-2303	Condensate Pot for 300-EE-00-2304	1	620	1200	Angle Leg	V	350	IH	80	3.2	1.3			Rock Wool
36.	300-VV- VW-3001	Demethanizer Reflux Drum	1	2520	3200	Skirt	V	(-)145 /65	IC	175			41	22	PIR
37.	300-VV- VW-3004	Demethanizer Feed Separator No.1	1	3176	10800	Skirt	V	(-)100 /65	IC	140			138	34	PIR
38.	300-VV- VW-3005	Demethanizer Feed Separator No.2	1	2152	7800	Skirt	V	(-)145 /65	IC	175			74	16	PIR
39.	300-VV- VW-3006	Demethanizer Feed Separator No.3	1	2048	4000	Skirt	V	(-)160 /65	IC	190			41	14	PIR
40.	300-VV- VW-4001	Deethanizer Reflux Drum	1	3580	8100	Skirt	V	(-)45 /65	IC	80			115	43	PIR
41.	300-VV- VW-4203	Condensate Pot for 300-EE-00-4201A/B	1	720	1100	Angle Leg	V	240	IH	40	3	2			Rock Wool
42.	300-VV- VW-5006	Liquid Propylene Accumulator for 300- EE-00-3012	1	1024	1900	Pipe Leg	V	(-)45 /100	IC	40			7	4	PIR
43.	300-VV- VW-5007	Liquid Propylene Accumulator for 300- EE-00-4003A-D	1	1540	2800	Skirt	V	(-)29 /100	IC	65			22	8	PIR
44.	300-VV- VW-6006	Binary Refrigerant Retrograde Drum	1	1256	3800	Skirt	V	(-)165 /65	IC	190			26.40	5.30	PIR
45.	301-VV- HW-1601	C4 Feed Surge Drum	1	3064	9000	Saddle	H	65	-	-	-	-			
46.	301-VV- HW-1602	C4 HP Flash Drum With exchanger mounted over vessel	1	4732	13800	Saddle	H	130	-	-	-	-			(EXCHAN GER OVER IT)

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 5 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
47.	301-VV- VW-1603	Condensate Pot for 301-EE-00-1604	1	1040	1600	Pipe Leg	V	240	IH	40	6	4			Rock Wool
48.	302-VV- HW-2602	PGH Feed Surge Drum	1	2628	7800	Saddle	H	65	-	-	-	-			
49.	302-VV- HW-2606	Depentanizer Reflux Drum	1	1624	4800	Saddle	H	65	-	-	-	-			
50.	302-VV- HW-2608	Rerun Tower Reflux Drum With exchanger mounted over vessel	1	2636	7800	Saddle	H	65	-	-	-	-			(EXCHAN GER OVER IT)
51.	302-VV- HW-2703	H2S Stripper Reflux Drum	1	1320	3900	Saddle	H	65	-	-	-	-			
52.	302-VV- HW-2706	BTX Tower Reflux Drum	1	1828	5400	Saddle	H	65	-	-	-	-			
53.	302-VV- HW-2712	PGH Area HC Drain Drum	1	2744	8100	Buried	H	150	IH	25	86	26.3			Rock Wool
54.	302-VV-VI- 2702	PGH Recycle Compressor Suction Drum	1	1240	4200	Skirt	V	185	-	-	-	-			
55.	302-VV- VW-2603	PGH 1st Stage HP Flash Drum	1	1652	8000	Skirt	V	230	-	-	-	-			
56.	302-VV- VW-2604	Condensate Pot for 302-EE-00-2602	1	628	1000	Angle Leg	V	350	IH	80	3	2			Rock Wool
57.	302-VV- VW-2605	PGH 1st Stage LP Flash Drum	1	1720	6300	Skirt	V	230	-	-	-	-			
58.	302-VV- VW-2607	Condensate Pot for 302-EE-00-2604	1	724	1200	Angle Leg	V	350	IH	80	4	2			Rock Wool

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 6 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
59.	302-VV-VW-2609	Condensate Pot for 302-EE-00-2607	1	724	1200	Angle Leg	V	350	IH	80	4	2			Rock Wool
60.	302-VV-VW-2701	PGH 2nd Stage HP Flash Drum	1	1756	8100	Skirt	V	185	-	-	-	-			
61.	302-VV-VW-2704	Condensate Pot for 302-EE-00-2705	1	620	1000	Angle Leg	V	350	IH	80	3	2			Rock Wool
62.	302-VV-VW-2708	Condensate Pot for 302-EE-00-2708	1	724	1300	Angle Leg	V	350	IH	80	4	2			Rock Wool
63.	303-VV-HI-3502	EDC OVHD RECEIVER	1	2424	6000	Saddle	H	150	-	-	-	-			
64.	303-VV-HI-3504	SRC OVHD RECEIVER	1	3028	7000	Saddle	H	150	-	-	-	-			
65.	303-VV-HW-3501	EDC FEED SURGE DRUM	1	3428	6800	Saddle	H	150	-	-	-	-			
66.	303-VV-HW-3511	SOLVENT SUMP	1	3240	7500	Buried	H	250	IH	25	94	36.4			Rock Wool
									IC	25			95.4	37.5	PIR
67.	303-VV-HW-3512	AROMATIC SUMP	1	3240	7500	Buried	H	150	IH	25	94	36.4			Rock Wool
									IC	25			95.4	37.5	PIR
68.	303-VV-HW-3601	CLAY TOWER CHARGE DRUM	1	3228	6400	Saddle	H	150	-	-	-	-			
69.	303-VV-HW-3603	BENZENE COLUMN OVHD RECEIVER	1	2828	6800	Saddle	H	150	IS	-	79.4	31			Wire Mesh
70.	303-VV-HW-3606	TOULENE COLUMN OVHD RECEIVER	1	3228	6400	Saddle	H	250	IS	-	86	39.5			Wire Mesh
71.	303-VV-HW-3608	XYLENE COLUMN OVHD RECEIVER	1	2020	4000	Saddle	H	250	IS	-	38	17			Wire Mesh

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 7 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
72.	303-VV-VI-3506	SOLVENT REGENERATOR	1	2836	6000	Skirt	V	250	IH	50	69	27			Rock Wool
73.	303-VV-VW-3503	EDC REBOILER CONDENSATE POT	1	1336	1800	Pipe Leg	V	350	IH	80	9	6.00			Rock Wool
74.	303-VV-VW-3505	SRC REBOILER CONDENSATE POT	1	1232	1800	Pipe Leg	V	350	IH	80	8.5	5.10			Rock Wool
75.	303-VV-VW-3507	SOLVENT REGENERATOR REBOILER CONDENSATE POT	1	724	1100	Pipe Leg	V	350	IH	80	3.3	2			Rock Wool
76.	303-VV-VW-3508	WATER SURGE DRUM	1	2016	3700	Skirt	V	150	-	-	-	-			
77.	303-VV-VW-3602	CLAY TOWER CHARGE HEATER CONDENSATE POT	1	856	1100	Pipe Leg	V	420	IH	80	4	3			Rock Wool
78.	303-VV-VW-3604	BENZENE COLUMN REBOILER II CONDESATE POT	1	1232	1700	Pipe Leg	V	350	IH	80	8	5			Rock Wool
79.	303-VV-VW-3607	TOULENE COLUMN REBOILER CONDENSATE POT	1	1388	1900	Pipe Leg	V	420	IH	80	10	7			Rock Wool
80.	303-VV-VW-3609	XYLENE COLUMN REBOILER CONDENSATE POT	1	856	1400	Pipe Leg	V	420	IH	80	5	3			Rock Wool
81.	303-VV-VI-3610	REGENERATION KO DRUM	1	1024	2500	Pipe Leg	V	150	IH	25	13	4			Rock Wool

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 8 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
82.	303-VV-VI-3605	Moisture Guard Bed	1	5080	13200	Skirt	Vertical	150-310	IH	90	251.1	93			Rock Wool
83.	303-VV-VW-3509	Solvent Vent Drum	1	3020	6000	Skirt	Vertical	250	IH	25	72.3	31.7			Rock Wool
									IH	25	73.5	33			Rock Wool
DRYERS															
84.	300-VD-00-2001A-C	Charge Gas Dryer	3	5328	9300	Skirt	V	(-)29/ 65/ 250	IK	80	190	95.5			Cellular Glass
85.	300-VD-00-2002AB	Liquid Condensate Dryers	2	2284	11500	Skirt	V	(-)29/ 65/ 250	IK	80	102.7	17.6			Cellular Glass
86.	300-VD-00-4101AB	PG Propylene Treaters	2	1680	5700	Skirt	V	305 /65	IH	90	41.9	9.5			Rock Wool
REACTORS															
87.	300-RB-00-2201A-C	Acetylene Converter	3	4520	7500	Skirt	V	345	IH	100	134.9	68.7			Rock Wool
88.	300-RB-00-4101A/B	MAPD Converter	2	2696	13100	Skirt	V	-45/ 80/ 250/ 150/ 500	IH	175	144.4	24.5			Rock Wool
89.	301-RB-00-1601A/B	C4 Hydrogenation Reactor	2	4540	18100	Skirt	V	200/ 500/ 250/ 150	IH	175	314	70			Rock Wool
90.	302-RB-00-2601AB	PGH 1st Stage Reactor	2	3080	18600	Skirt	V	230/ 500/ 150/ 250	IH	175	226	32			Rock Wool

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 9 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
91.	302-RB-00-2701A/B	PGH 2nd Stage Reactor	2	3210	8000	Skirt	V	400/ 500/ 250/ 150	IH	150	106.5	35			Rock Wool

EQUIPMENT DETAILS FOR INSULATION FOR HEAT EXCHANGERS

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE		SHELL / OUTER PIPE	CHANNEL / INNER PIPE
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD		
1.	300-EE-00-2201A/B	HP DEPROPANIZER REBOILER	2	V	IH	IH	40	25	30.2	-	14.8	5.2	148/143.2	60.6/82
2.	300-EE-00-2202 (###)	HP DEPROPANIZER BOTTOMS COOLER	1	H	PP	Nil	50	Nil	42.5	4	Nil	Nil	82/40	33/40
3.	300-EE-00-2203	HP DEPROPANIZER CONDENSER	1	H	IC	IC	80	80	105	-	33	24	-27/-27	1/-24
4.	300-EE-00-2204A/B	LP DEPROPANIZER REBOILER	2	V	IH	IH	40	25	33.4	-	15.2	6.4	148/143.2	74.4/79
5.	300-EE-00-2205	LP DEPROPANIZER CONDENSER	1	H	IC(PIR)	IC(PIR)	80	80	47.3	8.3	5.2	3.7	1	0.5625
6.	300-EE-00-2206A/B	ACETYLENE CONVERTER FEED/EFFLUENT EXCHANGER NO.1	2	H	IC	IC	70	40	165	-	80	64	-9.3/28.3	39.7/0.7
7.	300-EE-00-2207 A-D	ACETYLENE CONVERTER FEED/EFFLUENT EXCHANGER NO.2	4	H	IH	IS	25	50	388	-	136	144	28.3/124.1	139.5/44
8.	300-EE-00-2208	ACETYLENE CONVERTER HEATER	1	H	IH	IH	80	40	17	0	15	0	205/200.5	63.9/130
9.	300-EE-00-2209	ACETYLENE CONVERTER INTERCOOLER NO.1	1	H	IS (WIRE MESH)	Nil	50	Nil	55	7	-	-	143.6/76.8	33/45
10.	300-EE-00-2210	ACETYLENE CONVERTER INTERCOOLER NO.2	1	H	IS (WIRE MESH)	Nil	50	Nil	53	7	-	-	140.8/78.6	33/45

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 10 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE			
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD	SHELL / OUTER PIPE	CHANNEL / INNER PIPE
11.	300-EE-00-2211	ACETYLENE CONVERTER AFTERCOOLER	1	H	IS (WIRE MESH)	Nil	50	Nil	108	-	-	-	97.8/40	33/39
12.	300-EE-00-2301 A/B	REGENERATION FEED / EFFLUENT EXCHANGER	2	H	HC(H)	HC(H)	50(H)	50(H)	126 (H)	14 (H)	14 (H)	12(H)	230.6/80	40/199.7
13.	300-EE-00-2302	REGENERATION GAS COOLER	1	H	PP	Nil	50	Nil	44	8	-	-	80/40	33/39
14.	300-EE-00-2303	REGENERATION GAS HEATER	1	H	IH	IH	80	125	36.1	5.3	7	5.4	40/240	379.2/246.2
15.	300-EE-00-2304	REACTOR REDUCTION GAS HEATER	1	H	IH	IH	65	90	18	1.5	3	1.0	29.2/190	268.5/203.5
16.	300-EE-00-3002	DEMETHANIZER FEED CHILLER	1	H	IC	IC	100	100	54	-	24	16	-40/-40	-24.3/-32.3
17.	300-EE-00-3003	DEMETHANIZER SIDE REBOILER	1	V	CC	CC	125	125	37	0	17	22	-63/-68.3	-86.7/-73.2
18.	300-EE-00-3009	DEMETHANIZER REBOILER	1	H	IC	IC	100	115	68.5	10.8	14.2	10.6	-31.9/-43.6	-49.7/-48.7
19.	300-EE-00-3010 (###)	HYDROGEN COMPRESSOR INTERCOOLER	1	H	PP	Nil	50	Nil	20	0	-	-	79.8/40	33/39
20.	300-EE-00-3011 (###)	HYDROGEN COOLER AFTERCOOLER	1	H	PP	Nil	50	Nil	21.5	0	Nil	Nil	79.8/40	33/39
21.	300-EE-00-3012	ETHYLENE PRODUCT VAPORIZER	1	H	IC	IC	65	40	69	15	10	8	-45/65	-45/100
22.	300-EE-00-4001 A/B	DEETHANIZER REBOILER	2	H	IH	IH	25	25	192	36	44	16	52.6/52.7	71.8/55.7
23.	300-EE-00-4002A/B	DEETHANIZER CONDENSER	2	H	IC	IC	80	80	118.2	-	36	41.2	-45/100	-45/70
24.	300-EE-00-4003A- D	ETHYLENE FRACTIONATOR REBOILER	4	V	IC	IC	65	70	181.6	-	98.4	60.8	-29/100	-45/65
25.	300-EE-00-4004	ETHYLENE FRACTIONATOR SIDE REBOILER NO.1	1	H	IC	IC	80	70	45	-	10	-	-45/65	-29/100

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		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE			
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD	SHELL / OUTER PIPE	CHANNEL / INNER PIPE
26.	300-EE-00-4005A/B	ETHYLENE FRACTIONATOR CONDENSER	2	H	IC	IC	100	100	365.6	-	79.2	95.2	-45/100	-45/65
27.	300-EE-00-4006	ETHYLENE FRACTIONATOR SIDE REBOILER NO.2	1	H	IC	IC	80	70	42	-	9.6	8	-45/65	-45/100
28.	300-EE-00-4102	MAPD CONVERTER FEED COOLER	1	H	PP	Nil	50	Nil	33	-	-	-	57/40.7	33/39
29.	300-EE-00-4103A/B	PROPYLENE FRACTIONATOR NO.1 REBOILER	2	H	IH	IH	25	25	144	-	60	40	54.4/54.4	68.7/60
30.	300-EE-00-4104A/B	PROPYLENE FRACTIONATOR NO.2 REBOILER	2	H	IH	IH	25	25	224	-	76	52	65.3/65.7	85/68.7
31.	300-EE-00-4106	PROPYLENE FRACTIONATOR VENT CONDENSER	1	H	IC	IC	40	40	18.5	2.5	1.3	0.7	09/09	44.2/12
32.	300-EE-00-4108	PROPYLENE START-UP VAPORIZER	1	H	IH(H)	IH(H)	50(H)	50 (H)	17.5	0	3.5	0.7	172.9/145.8	40/65
33.	300-EE-00-4201A/B	DEBUTANIZER REBOILER	2	V	IH	IH	40	25	58	-	33.2	20	148/143.2	118.1/122.7
34.	300-EE-00-4203 (####)	PYROLYSIS GASOLINE COOLER	1	H	PP	Nil	50	Nil	35	4.5	-	-	113.8/40	33/39
35.	300-EE-00-6001	BINARY REFRIGERANT COOLER	1	H	PP	NIL	50	0	93	0	-	-	70.7/43	33/41
36.	301-EE-00-1601	C4 REACTOR FEED/EFFLUENT EXCHANGER	1	H	IH	IH	25	25	29.8	-	17.6	11.4	103.5/87.5	40.6/61.2
37.	301-EE-00-1602 (####)	C4 REACTOR EFFLUENT CONDENSER	1	H	PP	NIL	50	0	80	0	-	-	90.1/40	33/39
38.	301-EE-00-1603	C4 HP FLASH VENT CONDENSER	1	V	IC	IC	40	40	11	-	6	3	09/09	40/12
39.	301-EE-00-1604	C4 START UP PREHEAT EXCHANGER	1	H	IH	IH	50	40	48	-	14	14	172.9/145.8	61.5/130

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 12 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE			
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD	SHELL / OUTER PIPE	CHANNEL / INNER PIPE
40.	302-EE-00-2601 (###)	PGH 1ST STAGE REACTOR RECYCLE COOLER	1	H	PP	Nil	50	Nil	62	8	Nil	Nil	94.5/44	33/44
41.	302-EE-00-2602	PGH 1ST STAGE REACTOR RECYCLE HEATER	1	H	IH	IH	90	65	18.7	5.3	6.7	1.6	268.5/203.5	170/180
42.	302-EE-00-2603	PGH 1ST STAGE REACTOR OFFGAS COOLER	1	H	PP (WIRE MESH)	NIL	50	0	11	0.7	-	-	177/44	33/44
43.	302-EE-00-2604	DEPENTANIZER REBOILER	1	V	IH	IH	80	50	17.1	-	12	5.4	205/200.5	147.3/151.5
44.	302-EE-00-2605 (###)	DEPENTANIZER CONDENSER	1	H	PP	Nil	50	0	32	5	-	-	79.7/40.1	33/39
45.	302-EE-00-2607	RERUN TOWER REBOILER	1	H	IH	IH	80	65	54.8	-	15	5.4	205/200.5	175.3/190.3
46.	302-EE-00- 2608A/B (###)	RERUN TOWER CONDENSER	2	H	PP	Nil	50	Nil	66.5	9	-	-	85.8/42	33/42
47.	302-EE-00-2609	RERUN TOWER VENT CONDENSER	1	V	IC	IC	40	40	12	-	3	3	9/9	41.8/15
48.	302-EE-00-2701 (###)	PGH 2ND STAGE FEED / EFFLUENT EXCHANGER	1	V	HC(H)	HC(H)	50(H)	50 (H)	276	22	30	9	296.7/83.2	52.8/260
49.	302-EE-00-2702	PGH 2ND STAGE REACTOR FEED HEATER	1	H	IH	IH	175	90	35	4.7	9	1.8	463.5/300	230/290
50.	302-EE-00-2703 (###)	PGH 2ND STAGE REACTOR EFFLUENT CONDENSER	1	H	PP	Nil	50	Nil	35	0	-	-	83.2/40	33/40
51.	302-EE-00-2704	H2S STRIPPER FEED / BOTTOM EXCHANGER	1	H	IH	IH	50	25	15.9	1.3	2	0.6	163.4/108.2	41.2/105
52.	302-EE-00-2705	H2S STRIPPER REBOILER	1	V	IH	IH	90	50	10.5	-	5.4	1.8	268.5/203.5	159.8/163.5
53.	302-EE-00-2706	H2S STRIPPER CONDENSER	1	H	PP (WIRE MESH)	Nil	50	Nil	15	1.5	-	-	139.6/40	33/40
54.	302-EE-00-2708	BTX TOWER REBOILER	1	V	IH	IH	90	65	32.1	-	15.7	8.4	268.5/203.5	175.6/176.5

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 13 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE			
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD	SHELL / OUTER PIPE	CHANNEL / INNER PIPE
55.	302-EE-00-2709A/B (###)	BTX TOWER CONDENSER	2	H	PP	Nil		Nil	#	#	Nil	Nil	102.7/46	33/45
56.	302-EE-00-2711	C6-C8 PRODUCT COOLER	1	H	PP (WIRE MESH)	Nil	50	Nil	15	2	-	-	46/40	33/39.3
57.	302-EE-00-2712	C9-180 CUT PRODUCT COOLER	1	H	PP (WIRE MESH)	Nil	50	Nil	12	1	-	-	177.4/45	33/44
58.	303-EE-00-3501	EDC FEED PREHEATER	1	H	IH	IH	25	40	18.8	2.2	3.7	0.9	46.3/105	132.3/120.6
59.	303-EE-00-3502	AROMATIC EXTRACT PREHEATER	1	H	IH	IH	25	25	22	2.8	4.1	1.1	40.7/104.8	120.6/109.8
60.	303-EE-00-3503	EDC REBOILER	1	V	IH	IH	80	50	27.2	-	12.54	5.24	203.5/203.5	137.7/161.5
61.	303-EE-00-3504	EDC SIDE REBOILER	1	H	NIL	IH	0	65	-	-	8.9	2.8	130.2/135.8	175.7/158
62.	303-EE-00-3505	RAFFINATE COOLER	1	H	IS (METAL CAGE)	NIL	50	0	9	0.7	-	-	55.5/45	33/40
63.	303-EE-00-3506	SRC OVHD TRIM COOLER	1	H	IS (METAL CAGE)	NIL	50	0	21	2.5	-	-	55/40	33/39
64.	303-EE-00-3507A/B	SRC REBOILER	2	H	NIL	IH	0	80	0	0	12	8	141.6/175	203.5/203.5
65.	303-EE-00-3508	STEAM GENERATOR	1	H	IH	IH	25	50	69.5	9.2	7	5.3	40.4/121.3	158/132.3
66.	303-EE-00-3509	SOLVENT REGENERATOR REBOILER	1	H	NIL	IH	0	80	0	0	2.5	2	127.6/175.1	203.5/203.5
67.	303-EE-00-3511	WET SOLVENT COOLER	1	H	IS (METAL CAGE)	NIL	50	0	33	3	-	-	175/40	33/39
68.	303-EE-00-3512	AROMATIC SUMP COOLER	1	H	IS (METAL CAGE)	NIL	50	0	16	1.5	-	-	90/45	33/44

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 14 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE			
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD	SHELL / OUTER PIPE	CHANNEL / INNER PIPE
69.	303-EE-00-3601	CLAY TOWER CHARGE HEATER	1	H	IH	IH	50	125	9.5	0.4	1.5	0.4	168/195	380/247.8
70.	303-EE-00-3602 A/B	CLAY TOWERS FEED / EFFLUENT EXCHANGER	2	H	IH	IH	65	50	29.4	2.4	4	1	195/147.4	116.9/168
71.	303-EE-00-3603	BENZENE PRODUCT COOLER	1	H	IS (METAL CAGE)	NIL	50	0	12	1	-	-	93.9/45	33/44
72.	303-EE-00-3604	BENZENE COLUMN REBOILER I	1	V	IH	IH	65	50	26	-	16	8	181.9/162	146.3/147.3
73.	303-EE-00-3605	BENZENE COLUMN REBOILER II	1	V	IH	IH	90	40	9.3	-	6.8	-	270/206.3	146.3/147.3
74.	303-EE-00-3606	TOLUENE PRODUCT COOLER	1	H	IS (METAL CAGE)	NIL	50	NIL	10	1	-	-	65/45	33/43
75.	303-EE-00-3607	TOLUENE COLUMN REBOILER	1	V	IH	IH	125	80	23.6	-	14	-	380/247.8	219.2/219.2
76.	303-EE-00-3608	CLAY TOWER FEED TOLUENE EXCHANGER	1	H	IH	IH	25	40	9.3	0.7	1.2	0.4	104.9/117.4	162.4/122.4
77.	303-EE-00-3609	XYLENE PRODUCT COOLER	1	H	IS (METAL CAGE)	NIL	50	NIL	10	1	-	-	65/45	33/42
78.	303-EE-00-3610	XYLENE COLUMN REBOILER	1	V	IH	IH	125	65	10	-	4	-	380/247.8	195.5/195.6
79.	303-EE-00-3612	REGENERATION OFF GAS COOLER	1	H	IH	IH	50	50	16.5	1.5	2.5	0.7	86.2/40	33/39
80.	303-EE-DP-3510	MAKE-UP WATER COOLER	6 pipes	H	NIL	IS (METAL CAGE)	0	50	0	0	2	0	33/39	130.6/40
81.	303-EE-00-3613	REGENERATION GAS HEAT EXCHANGER	1	H	IH	IH	50	50	9	1.5	3	0.7	39.9/155.2	259.9/160.2
82.	303-EE-DP-3611	XYLENE COLUMN BOTTOMS COOLER	2 pipes	H	NIL	IS	NIL	40	-	-	1	-	33/36.7	195.9/45
83.	300-EI-00-2305 (#)	REACTOR REGENERATION VHP	Electric Heater	H	H	H	H	H	H	H	H	H	H	H

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 15 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE			
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD	SHELL / OUTER PIPE	CHANNEL / INNER PIPE
		STEAM ELECTRIC HEATER												
84.	300-EI-00-2306(#)	ECU TREATER REGENERATION GAS ELECTRIC HEATER	Electric Heater	H	H	H	H	H	H	H	H	H	H	H
85.	303-EI-00-3601(#)	REGENERATION GAS ELECTRICAL HEATER	Electric Heater	H	H	H	H	H	H	H	H	H	H	H

Vendor designed item details will be given later on.
 ### Details given in this Row is tentative & approximated. For Final detail, refer GA Drawing/ Mechanical datasheet.

LEGEND

NOTES:

- For elevation of equipment from grade, refer to equipment layout enclosed elsewhere in the tender document.
- H - Horizontal; V – Vertical; (H)-Hold
- IH- Hot Insulation; IS - Personnel Protection; IC - Cold Insulation
- Also refer respective MDS / Setting Plan attached elsewhere in this tender.

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001A Page 16 of 16	REV 0
		0	20.04.2026	RNK/CRG	VIVEK	PB			
		REV	DATE	BY	CHK	APPD			

EQUIPMENT DETAILS FOR INSULATION

MPMC AND PMC/EPCM SERVICES FOR ETHYLENE CRACKER UNIT AND UTILITIES & OFFSITES RELATED TO BINA PETCHEM & REFINERY EXPANSION PROJECT (BPREP)

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001B Page 1 of 11	REV 0
		0	21.04.2026	CRG/R NK	VIVEK	PB			
		RE V	DATE	BY	CHK	APPD			

EQUIPMENT DETAILS FOR INSULATION

DEPT.: STATIC EQUIPMENT

JOB NO.: B957

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
COLUMNS															
1.	300-CC-00-1202	Pyrolysis Fuel Oil Stripper	1	1952	10950	Skirt	V	340	IH	40	85	13	-	-	ROCKWOOL
									IH	40	140	38	-	-	ROCKWOOL
2.	300-CC-00-1401	Process Water Stripper	1	3228	16500	Skirt	V	190	IH	25	193	36	-	-	ROCKWOOL
3.	300-CC-00-2401	DCU Offgas Caustic / Wash Water Tower	1	1340	36300	Skirt	V	100	IH	25	175	8	-	-	ROCKWOOL
4.	300-CC-00-2502	MEA Regenerator	1	3434	32200	Skirt	V	150	IH	40	395	40	-	-	ROCKWOOL
VESSELS															
1.	300-VV-HI-2101	Spent Caustic Coalescer	1	2028	6000	Saddle	H	65	-	-	-	-	-	-	-
2.	300-VV-HI-2102	Spent Gasoline Coalescer	1	1436	4200	Saddle	H	150	IH	25	21	7	-	-	ROCKWOOL
3.	300-VV-HW-1002	Kero Feed Surge Drum	1	2248	6600	Saddle	H	85	-	-	-	-	-	-	-
4.	300-VV-HW-1003	Naphtha Feed Surge Drum	1	4280	12600	Saddle	H	85	-	-	-	-	-	-	-
5.	300-VV-HW-1201	Quench Oil Drain Drum	1	2032	7500	Buried	H	225	IH	65	62	14	-	-	ROCKWOOL
6.	300-VV-HW-2007	Charge Gas Compressor Casing Drain Drum	1	624	1000	Saddle	H	150	IS	100	3	2	-	-	WIREMESH

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001B Page 2 of 11	REV 0
		0	21.04.2026	CRG/R NK	VIVEK	PB			
		RE V	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
7.	300-VV- HW-2010	CGC Area Hydrocarbon Drain Drum	1	2744	8100	Buried	H	150	IH	25	86	26	-	-	ROCKWOOL
8.	300-VV- HW-2103	8% Caustic Surge Drum	1	1324	3900	Saddle	H	65	-	-	-	-	-	-	-
9.	300-VV- HW-2104	Caustic Drain Drum	1	2744	8100	Buried	H	100	-	-	-	-	-	-	-
10.	300-VV- HW-2505	MEA Drain Drum	1	3250	8100	Buried	H	150	-	-	-	-	-	-	-
11.	300-VV- HW-5005	Propylene Refrigerant Accumulator	1	3160	9300	Saddle	H	(-) 29 / 120	-	-	-	-	-	-	-
12.	300-VV- HW-7002	Dry Flare Knock Out Drum	1	4540	27000	Saddle	H	(-)180/100	IS	100	435	70	-	-	WIREMESH
13.	300-VV-VI- 2004	Charge Gas Compressor 2nd Stage Discharge Drum	1	4768	6700	Skirt	V	100	-	-	-	-	-	-	-
14.	300-VV-VI- 2005	Charge Gas Compressor 3rd Stage Suction Drum	1	4468	8400	Skirt	V	100	-	-	-	-	-	-	-
15.	300-VV-VI- 2006	Charge Gas Compressor 3rd Stage Discharge Drum	1	3692	7800	Skirt	V	150	IC	50	115	46	-	-	PIR
16.	300-VV-VI- 2401	DCU Offgas Compressor Suction Drum	1	1128	3200	Pipe Leg	V	155	-	-	-	-	-	-	-
17.	300-VV-VI- 2402	DCU Offgas Caustic Tower Feed KO Drum	1	1028	2900	Pipe Leg	V	100	-	-	-	-	-	-	-
18.	300-VV-VI- 2403	DCU Offgas Dryer/Treater Feed Gas KO Drum	1	1024	2900	Pipe Leg	V	65	-	-	-	-	-	-	-

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001B Page 3 of 11	REV 0
		0	21.04.2026	CRG/R NK	VIVEK	PB			
		RE V	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
19.	300-VV-VI-2405	DCU Offgas Top Caustic Feed KO Drum	1	1024	2900	Pipe Leg	V	65	-	-	-	-	-	-	-
20.	300-VV-VI-3002	Fuel Gas KO Drum - Out Drum	1	2236	3600	Skirt	V	100	-	-	-	-	-	-	-
21.	300-VV-VI-5003	Propylene Refrig Compressor 3rd Stage Suction Drum	1	4668	13500	Skirt	V	-29/100	IC	65	235	75	-	-	PIR
22.	300-VV- VW-1001	LPG vaporizer Drum	1	3248	6300	Skirt	V	85	IH	25	82	65	-	-	ROCKWOOL
23.	300-VV- VW-1004	Condensate Pot for 300-EE-00-1003	1	620	1300	Angle Leg	V	240	IH	40	4	2	-	-	ROCKWOOL
24.	300-VV- VW-1005	Condensate Pot for 300-EE-00-1005	1	620	1100	Angle Leg	V	240	IH	40	3	2	-	-	ROCKWOOL
25.	300-VV- VW-1006	Condensate Pot for 300-EE-00-1007	1	620	1100	Angle Leg	V	240	IH	40	3	2	-	-	ROCKWOOL
26.	300-VV- VW-1007	Condensate Pot for 300-EE-00-1009	1	620	1000	Angle Leg	V	240	IH	40	3	2	-	-	ROCKWOOL
27.	300-VV- VW-1184	VHP Steam Continuous Blowdown Drum	1	1236	4300	Skirt	V	230	IH	80	25	6	-	-	ROCKWOOL
28.	300-VV- VW-1185	VHP Steam Intermittent Blowdown Drum	1	2836	5700	Skirt	V	150	IS	100	69	28	-	-	WIREMESH
29.	300-VV- VW-1202	Quench Oil Drain Drum Vent Seal Pot	1	620	1500	Angle Leg	V	225	IH	65	4	2	-	-	ROCKWOOL
30.	300-VV- VW-1402	Condensate Pot for 300-EE-00-1401	1	720	1300	Angle Leg	V	240	IH	40	4	2	-	-	ROCKWOOL

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001B Page 4 of 11	REV 0
		0	21.04.2026	CRG/R NK	VIVEK	PB			
		RE V	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
31.	300-VV- VW-1403	Condensate Pot for 300-EE-00-1402 A/B	1	1232	2300	Pipe Leg	V	350	IH	80	12	6	-	-	ROCKWOOL
32.	300-VV- VW-2008	Medium Gasoline Flash Drum	1	1836	5200	Skirt	V	150	IH	25	40	12	-	-	ROCKWOOL
33.	300-VV- VW-2009	Condensate Pot for 300-EE-00-2007A/B	1	620	1100	Angle Leg	V	240	IH	40	3	2	-	-	ROCKWOOL
34.	300-VV- VW-2404	Condensate Pot for 300-EE-00-2404	1	648	1000	Pipe Leg	V	420	IH	80	3	2	-	-	ROCKWOOL
35.	300-VV- VW-2501	Condensate Pot for 300-EE-00-2503A/B	1	824	1400	Angle Leg	V	240	IH	40	5	3	-	-	ROCKWOOL
36.	300-VV- VW-2502	Condensate Pot for 300-EE-00-2502	1	620	1100	Angle Leg	V	350	IH	80	3	2	-	-	ROCKWOOL
37.	300-VV- VW-2503	MEA Regenerator Reflux Drum	1	2424	3700	Skirt	V	70	-	-	-	-	-	-	-
38.	300-VV- VW-8001	LP Condensate Flash Drum	1	3632	8000	Skirt	V	150	IH	25	115	45	-	-	ROCKWOOL
39.	300-VV- VW-8002	MP Condensate Flash Drum	1	3640	10600	Skirt	V	180	IH	50	146	45	-	-	ROCKWOOL
40.	300-VV- HW-8010	QUENCH WATER DRAIN DRUM	1	3050	8100	Buried	H	150	-	-	-	-	-	-	-
41.	300-VV- HW-8011	ATM CONDENSATE DRUM	1	1828	6300	Saddle	H	125	IH	25	40	12	-	-	ROCKWOOL
42.	300-VV- VW-9002	Skimmed Yellow Oil Drum	1	1020	2900	Pipe Leg	V	100	-	-	-	-	-	-	-

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001B Page 5 of 11	REV 0
		0	21.04.2026	CRG/R NK	VIVEK	PB			
		RE V	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUT SIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	DESIGN TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL. THK. (mm)	TOTAL INSULATION AREA (M2) (FOR EACH ITEM)				REMARKS
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
43.	304-VV-HI-4502	WAO DRAIN SUMP	1	1836	7500	Buried	H	165	-	-	-	-	-	-	-
44.	304-VV-HI-4504	WAO ACID SUMP	1	1844	7500	Buried	H	100	-	-	-	-	-	-	-
45.	304-VV-HW-4503	WAO SULFURIC ACID TANK	1	2040	4000	Saddle	H	65	-	-	-	-	-	-	-
DRYERS															
1.	300-VD-00-2401A/B	PG Propylene Treaters	2	2840	13400	Skirt	V	65/305	IH	90	150	30	-	-	ROCKWOOL
REACTORS															
1.	300-RB-00-2401	DCU Offgas Oxygen Converter	1	2032	5900	Skirt	V	280/500/150/250	IH	175	56	15	-	-	ROCKWOOL
2.	304-RB-00-4501	WAO REACTOR	1	971	12000	Skirt	V	235	IH	65	50	5	-	-	ROCKWOOL

EQUIPMENT DETAILS FOR INSULATION FOR HEAT EXCHANGERS

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE		SHELL / OUTER PIPE	CHANNEL / INNER PIPE
									SH	HD	SH	HD		
1.	300-EE-00-1001	ETHANE/PROPANE RECYCLE PREHEATER	1	H	IH	IH	25	25	15.8	-	4.9	3.1	36.3/60	85/65

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO.		REV
		0	21.04.2026	CRG/R NK	VIVEK	PB		B957-80-42-EI-3001B		0
		RE V	DATE	BY	CHK	APPD		Page 6 of 11		

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE			
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD	SHELL / OUTER PIPE	CHANNEL / INNER PIPE
2.	300-EE-00-1002	PROPANE FEED VAPORIZER	1	H	IH	IH	25	25	15.2	-	4	1	19.4/21.4	85/61.5
3.	300-EE-00-1003	LPG FEED STEAM VAPORIZER	1	H	IH	IH	50	25	18.5	-	8.7	3	172.9/145.8	63.9/66.1
4.	300-EE-00-1004	LPG FEED QW VAPORIZER	1	H	IH	IH	25	25	65	-	27	36	63.9/66.1	85/71.1
5.	300-EE-00-1005	LPG FEED SUPERHEATER	1	H	IH	IH	25	50	13.2	1.8	2.5	1.8	63.7/90	172.9/145.8
6.	300-EE-00-1006	NAPHTHA FEED PREHEATER	1	H	IH	IH	25	25	26.8	4.3	5	1.7	40.5/60	85/65
7.	300-EE-00-1007	LGO FEED PREHEATER	1	H	IH	IH	50	25	12.7	1.5	1.8	0.5	172.9/145.8	40.1/90
8.	300-EE-00-1008	KEROSENE FEED PREHEATER	1	H	IH	IH	25	25	11.5	0.9	1.3	0.5	40.6/60	85/65
9.	300-EE-00-1009	UCO FEED PREHEATER	1	H	IH	IH	50	25	9.2	2.2	2.5	0.7	172.9/145.8	80/90
10.	300-EE-00-1181(###)	CONTINUOUS BLOWDOWN COOLER	1	H	PP (WIRE MESH)	Nil	50	Nil	19.5	2	-	-	204.5/45	33/44
11.	300-EE-00-1182(###)	INTERMITTENT BLOWDOWN COOLER	1	H	PP (WIRE MESH)	Nil	50	Nil	26	2	-	-	100/45	33/45
12.	300-EE-00-1201(###)	QUENCH OIL /DILUTION STEAM DRUM FEED PREHEATER	1	H	IH	IH	50	50	94	20	15	7	120.5/159.3	175/165
13.	300-EE-00-1202A-D (###)	PFO PRODUCT COOLER	4	H	HC(H)	PP(H)	50(H)	50 (H)	96 (H)	8 (H)	10(H)	4(H)	189.6/80	69.1/74
14.	300-EE-00-1203(###)	PAN OIL/PROCESS WATER STRIPPER FEED HEATER	1	H	IH	IH	25	50	39	7	7	3	85.1/113.2	151.4/135.8
15.	300-EE-00-1204A-H,J (###)	QUENCH OIL/ DILUTION STEAM REBOILER	9	H	IH	IH	50	65	990	180	153	90	170/170	195.4/175.5

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001B Page 7 of 11	REV 0
		0	21.04.2026	CRG/R NK	VIVEK	PB			
		RE V	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE			
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD	SHELL / OUTER PIPE	CHANNEL / INNER PIPE
16.	300-EE-00-1205	QUENCH OIL/ LP STEAM GENERATOR	1	H	IH	IH	50	50	90	-	20	20	154.9/154.9	175/171.3
17.	300-EE-00-1301A-D(###)	QUENCH WATER COOLER NO.1	4	H	PP (WIRE MESH)	Nil	50	Nil	87	20	-	-	72.9/50.9	35.4/45
18.	300-EE-00-1302A/B(###)	QUENCH WATER COOLER NO.2	2	H	Nil	Nil	Nil	Nil	-	-	-	-	51.4/37	33/36.3
19.	300-EE-00-1401	PROCESS WATER STRIPPER REBOILER	1	V	IH	IH	50	25	30.1	-	12.7	6.8	172.9/145.8	120.3/120.3
20.	300-EE-00-1402A/B	DILUTION STEAM/MP STEAM EXCHANGER	2	V	IH	IH	80	50	95.6	-	86	58	241.9/201.4	170/170
21.	300-EE-00-1403	DILUTION STEAM SUPERHEATER	1	H	IH	IH	90	65	32	-	12.5	-	268.5/236.9	170/185
22.	300-EE-00-1404A/B(###)	DILUTION STEAM BLOWDOWN COOLER	1	H	PP (WIRE MESH)	NIL	50	0	68	10	-	-	170/40	33/39.4
23.	300-EE-00-1405	BOILER FEED WATER COOLER	1	H	PP (WIRE MESH)	Nil	50	Nil	12	-	-	-	130/45	33/45
24.	300-EE-00-2001A-D(###)	CGC 1ST STAGE AFTERCOOLER	4	H	PP (WIRE MESH)	Nil	50	Nil	328	56	-	-	90/39	33/38
25.	300-EE-00-2002A/B(###)	CGC 2ND STAGE AFTERCOOLER	2	H	PP (WIRE MESH)	Nil	50	Nil	180	32	-	-	90/39	33/38
26.	300-EE-00-2003A/B(###)	CGC 3RD STAGE AFTERCOOLER NO.1	2	H	PP (WIRE MESH)	Nil	50	Nil	134	20	-	-	86/39	33/38
27.	300-EE-00-2004	CGC 3RD STAGE AFTERCOOLER NO.2	1	H	IC	IC	50	50	130	-	35	28	09/09	39/12
28.	300-EE-00-2005	AMINE CHARGE GAS FEED HEATER	1	H	IH	IH	25	25	38.5	8	8.7	3.1	38.9/50	71.8/53
29.	300-EE-00-2006A/B	CAUSTIC TOWER EFFLUENT COOLER	2	H	IC	IC	50	50	130	-	48	36	09/09	48/15
30.	300-EE-00-2007A/B	MEDIUM GASOLINE HEATER	2	V	IH	IH	40	25	48.4	-	26.2	13.8	148/143.2	112.4/121.7

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001B Page 8 of 11	REV 0
		0	21.04.2026	CRG/R NK	VIVEK	PB			
		RE V	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE			
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD	SHELL / OUTER PIPE	CHANNEL / INNER PIPE
31.	300-EE-00-2101	SPENT CAUSTIC WASH GASOLINE COOLER	1	H	PP (WIRE MESH)	Nil	50	Nil	12	0	-	-	84.4/45	33/40
32.	300-EE-00-2401	DCU OFFGAS COMPRESSOR AFTERCOOLER	1	H	IS(WIRE MESH)	Nil	50	Nil	16	1.5	-	-	132/45	33/44
33.	300-EE-00-2402	DCU OFFGAS DRYER/TREATER FEED CHILLER	1	H	IC(PIR)	IC(PIR)	40	40	22	-	5	3	09/09	44.8/12
34.	300-EE-00-2403	DCU OFFGAS OXYGEN CONVERTER FEED/EFFLUENT EXCHANGER	1	H	IH	IH	50	90	12.5	1.5	2.2	1.1	44/159	262.2/163
35.	300-EE-00-2404	DCU OFFGAS OXYGEN CONVERTER FEED HEATER	1	H	IH	IH	80	125	9.8	0.7	1.6	0.7	44/205	379.2/246.2
36.	300-EE-00-2405	DCU OFFGAS OXYGEN CONVERTER EFFLUENT COOLER	1	H	IS (WIRE MESH)	Nil	50	Nil	18	1.7	-	-	163/45	33/44
37.	300-EE-00-2501	MEA REGENERATOR CONDENSER	1	H	PP (WIRE MESH)	Nil	50	Nil	30	4	-	-	132.3/53	33/45
38.	300-EE-00-2502A/B	MEA RECLAIMER	1	H	IH	IH	40	80	49.6	9.1	5.3	3.7	135/140.5	205/200.5
39.	300-EE-00-2503A/B/C/D	MEA REGENERATOR REBOILER	4	V	IH	IH	40	40	262.4	-	138.4	63.2	148/143.8	134.9/135
40.	300-EE-00-2504A/B(###)	LEAN MEA/RICH MEA EXCHANGER	2	H	IH	IH	40	25	45	8	12	4	135.4/93.7	47.2/90
41.	300-EE-00-2505(###)	LEAN MEA COOLER	1	H	PP (WIRE MESH)	Nil	50	Nil	40	5	-	-	93.7/55	33/45
42.	300-EE-00-5001A-D(###)	PROPYLENE REFRIGERATION CONDENSER	4	H	PP	Nil	50	Nil	400	-	-	-	78.8/43	33/41

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001B Page 9 of 11	REV 0
		0	21.04.2026	CRG/R NK	VIVEK	PB			
		RE V	DATE	BY	CHK	APPD			

S.NO.	ITEM NO.	DESCRIPTION	NO. OF SHELL	Mounting (Note-2)	TYPE OF INSULATION (NOTE-3)		INSULATION THK. (mm)		TOTAL INSULATION AREA PER SHELL (m2)				OPERATING TEMPERATURE (°C)	
									SHELL SIDE / OUTER PIPE		CH. SIDE / INNER PIPE			
					SHELL SIDE / OUTER PIPE	CHANNEL SIDE / INNER PIPE	SHELL SIDE / OUTER PIPE	CH. SIDE / INNER PIPE	SH	HD	SH	HD	SHELL / OUTER PIPE	CHANNEL / INNER PIPE
43.	300-EE-00-7001	DRY FLARE DRUM VAPORIZER	1	H	HC(H)	ANTI-SWEAT(IC)(H)	50(H)	100(H)	28	0	8	1	172.9/145.8	-45/-45
44.	300-EE-00-7002	DRY FLARE HEADER SUPERHEATER	1	H	IH(H)	ANTI-SWEAT(IC)(H)	50(H)	100(H)	53	0	10	10	172.9/145.8	-69.4/5
45.	300-EE-00-8001	LP CONDENSATE FLASH DRUM CONDENSER	1	H	IH	IH	25	25	9.4	0	4.8	2.6	109.3/109.3	60/75.1
46.	300-EE-00-8002	LP CONDENSATE FLASH DRUM COOLER	1	H	IH	IS (WIRE MESH)	25	0	11.2	-	-	-	45/60	109.3/70.1
47.	300-EE-00-8003	CONDENSATE POLISHER FEED COOLER	1	H	PP (WIRE MESH)	NIL	50	0	22	-	-	-	70.3/45	33/44
48.	304-EE-00-4502	WAO PROCESS COOLER	1	H	NIL	PP (WIRE MESH)	0	50	-	-	1.4	0.4	33/45	136/50
49.	304-EE-DP-4501(###)	WAO FEED/EFFLUENT HEAT EXCHANGER	1	H	IH	IH	25	25	50	-	5	-	200/136.2	45/136
50.	304-EP-00-4503(###)	WAO EFFLUENT COOLER	1	H	IS	NIL	25(H)	0	25	-	-	-	56.6/40	33/45

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO. B957-80-42-EI-3001B Page 10 of 11	REV 0
		0	21.04.2026	CRG/R NK	VIVEK	PB			
		RE V	DATE	BY	CHK	APPD			

DETAILS GIVEN IN THIS ROW IS TENTATIVE & APPROXIMATED. FOR FINAL DETAIL, REFER GA DRAWING/ MECHANICAL DATASHEET.
VENDOR DESIGNED ITEM DETAILS WILL BE GIVEN LATER ON INSULATION AREA FURNISHED IS TENTATIVE.

NOTES:

1. FOR ELEVATION OF EQUIPMENT FROM GRADE, REFER TO EQUIPMENT LAYOUT ENCLOSED ELSEWHERE IN THE TENDER DOCUMENT.
2. H - HORIZONTAL; V – VERTICAL (H)-HOLD
3. IH & IT - HOT INSULATION; IS - PERSONNEL PROTECTION; IC – COLD INSULATION PIR- POLYISOCYANURATE
4. ALSO REFER RESPECTIVE MDS / SETTING PLAN ATTACHED ELSEWHERE IN THIS TENDER.

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT: M/s BPCL PROJECT: BPREP						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO.	REV
		0	21.04.2026	CRG/R NK	VIVEK	PB		B957-80-42-EI-3001B Page 11 of 11	0
		RE V	DATE	BY	CHK	APPD			



VENDOR LIST (STRUCTURAL)

Tender No. : B957-300-16-43-MR-T-3001
(MECHANICAL WORKS – I FOR ECU – PART – A
&
MECHANICAL WORKS – II FOR ECU – PART – B)

PROJECT : BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (BPREP)
UNIT : ETHYLENE CRACKER UNIT (300)
CLIENT : M/S BHARAT PETROLEUM CORPORATION LIMITED
CONSULTANT : M/S ENGINEERS INDIA LIMITED (EIL)
JOB NO. : B957

1	24/04/2026	ISSUED WITH TENDER	IFG	MA	SP
0	24/02/2026	ISSUED WITH TENDER	IFG	MA	SP
Rev. No	Date	Purpose	Prepared by	Reviewed by	Approved by

Sr No	Supplier Name	City	Phone	E-Mail	Remarks
Department : STRUCTURE - LIST OF APPROVED PRODUCTS					
Area of Experience: Other					
Item : A. INTEGRAL WATER-PROOFING COMPOUNDS FOR CONCRETE (AS PER IS:2645)					
1	Refer Remark	INDIA	, ,	NA	All Integral Waterproofing Compounds for Concrete which carry "ISI" certification mark of BIS along with standard number "IS 2645" and the license number "CM/L**....*)" and listed at BIS website "https://www.bis.gov.in".
Item : B. CONCRETE ADMIXTURES -(AS PER IS:9103)					
1	Refer Remark	INDIA	, ,	NA	All Accelerating, Retarding, Water-reducing, Air-entraining & Super-plastizing Admixtures for Concrete which carry "ISI" certification mark of BIS along with standard number "IS 9103" and the license number "CM/L**....*)" and listed at BIS website "https://www.bis.gov.in".
Item : C. BI-POLAR CONCRETE PENETRATING CORROSION INHIBITING ADMIXTURE (AS PER EIL STD SPEC NO 6-68-0017)					
1	APPLE CHEMIE INDIA PVT LTD	NAGPUR	+91 9607001014, ,	www.applechemie.com	PRODUCT NAME-AC CORROGUARD-BP
2	BUILDPRO TECHNOLOGIES	HUBLI, KARNATAKA	+91 7045000315, +91 9324924396,	projects.buildprotechnologies@gmail.com	PRODUCT NAME-CEBRICORR BP
3	CHRYSO INDIA PRIVATE LIMITED	NAVI MUMBAI	022 2768 5991, ,	info.india@chryso.com	BRAND NAME-CHRYSO CORROCRETE
4	CLEAN COATS PVT LTD	THANE	, ,		PRODUCT NAME-CONPROOF 1A (DOSAGE 1% W/W OF CEMENT)
5	FAIRMATE CHEMICALS PRIVATE LIMITED	VADODARA	, , 9879613004	nandan@fairmate.net	PRODUCT NAME- FAIRCRETE C
6	FOSROC CHEMICALS (INDIA) PVT LTD	BENGALURU	+91 8042521900, ,	enquiry.india@fosroc.com	BRAND NAME-AURAMIX BCI
7	HINDCON CHEMICALS LTD	KOLKATA	, ,	NA	BRAND NAME- HIND CORROGUARD
8	KRISHNA CONCHEM PRODUCTS PVT LTD	NAVI MUMBAI	, ,		PRODUCT NAME-EPCO KP-200 (DOSAGE 1% W/W OF CEMENT)
9	MASTER BUILDERS SOLUTIONS INDIA PVT LTD	NAVI MUMBAI	, ,	NA	PRODUCT NAME- MASTERLIFE CI 220 (DOSAGE 1% W/W OF CEMENT)

Departmental List

Date :24/04/2026 11:32:20

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Sr No	Supplier Name	City	Phone	E-Mail	Remarks
10	NORMET INDIA PVT LTD	NOIDA, U.P.	+91 120 4504800, ,	india.info@normet.com	PRODUCT NAME-TamCem BPCI
11	REDWOP CHEMICALS PVT. LTD.	RAJKOT, GUJARAT	0281 2576664, ,	ravi.ramani@redwop.net	PRODUCT NAME-PLASTCONE BPO
12	SP CONCARE PVT. LTD.	SANGLI	, ,	NA	BRAND NAME:ADDMIX 109 PCCI
13	STP LTD.	DELHI	, ,	NA	PRODUCT NAME-SHALIPLAST MCI (DOSAGE 1% W/W OF CEMENT)
14	SUNANDA SPECIALITY COATING PVT LTD	MUMBAI	, ,		PRODUCT NAME-POLYALK CP 293 (DOSAGE 1% W/W OF CEMENT)
Item : D. POLYSULPHIDE SEALANTS (TWO PART, AS PER IS:12118)					
1	APPLE CHEMIE INDIA PVT LTD	NAGPUR	+91 9607001014, ,	www.applechemie.com	PRODUCT NAME-AC POLYSEAL (PG)
2	CHOWKSEY CHEMICALS PVT LTD	MUMBAI	, ,		PRODUCT NAME-TECHSEAL 940/941
3	CICO TECHNOLOGIES LIMITED	DELHI	, ,		PRODUCT NAME-CICO SEAL T680
4	DON CONSTRUCTION CHEMICALS INDIA LTD	CHENNAI	, ,	NA	BRAND NAME- 1. FLEXSEAL PS660 (GUN GRADE) 2. FLEXSEAL PS660 (POUR GRADE)
5	DURA BUILD CARE PVT LTD	DELHI	, ,	NA	PRODUCT NAME- DURASIL PPS (POURING GRADE)
6	FOSROC CHEMICALS (INDIA) PVT LTD	BENGALURU	+91 8042521900, ,	enquiry.india@fosroc.com	PRODUCT NAME-THIOFLEX 600
7	HINDCON CHEMICALS LTD	KOLKATA	, ,	NA	BRAND NAME- 1. HIND SEALANT PS (POUR GRADE). 2. HIND SEALANT PS (GUN GRADE)
8	JAY CHEMICAL INDUSTRIES PVT LTD	AHMEDABAD	, ,	NA	PRODUCT NAME- K2 POLYSEAL 22P (POUR GRADE)
9	KANSAI NEROLAC PAINTS LIMITED	MUMBAI	9999100064, ,	preetirohatgi@nerolac.com	PRODUCT NAME- 1. PERMA POLYSEAL (GUN GRADE) 2. PERMA POLYSEAL (POUR GRADE)
10	PIDILITE INDUSTRIES LTD (DR. FIXIT)	MUMBAI	, ,	NA	PRODUCT NAME-1. PIDISEAL PS41G, 2. PIDISEAL PS42P
11	SIKA INDIA PVT LTD	KOLKATA	, ,		BRAND NAME- 1. SIKA POLYSULPHIDE (SIKALASTIC) 2. SIKAFLEX CONSTRUCTION 3. IGAS Ih
12	STP LIMITED	NEW DELHI	, ,		PRODUCT NAME- SHALISEAL PS

Sr No	Supplier Name	City	Phone	E-Mail	Remarks
13	ZZ-Refer Remarks (ZZ inserted to maintain the alphabetic chronology)	INDIA	, ,	NA	All other Polysulphide Sealants (Two Parts) which carry "ISI" certification mark of BIS along with standard number "IS 12118" and the license number "CM/L**....*)" and listed at BIS website " https://www.bis.gov.in ".
Item : E. ANCHOR FASTENERS - CHEMICAL TYPE (EOTA / DIBt/ FM/ ICBO-ES APPROVED). Note- Design of post-installed Anchors and Rebars shall be provided/ verified by the approved manufacturer with installation instructions and execution shall be done by an applicator trained by the approved manufacturer (preferably in the presence of manufacturer for critical applications/ structures).					
1	FISCHER FIXING SYSTEMS(MICO) LTD	BENGALURU	, ,		BRAND NAME-FISCHER ANCHORS
2	FOSROC CHEMICALS (INDIA) PVT LTD	BENGALURU	+91 8042521900, ,	enquiry.india@fosroc.com	CHEMICAL ANCHORING OF REBAR, BRANDS NAMES- LOKFIX E55, LOKFIX E77 & LOKFIX E45T
3	HILTI INDIA PVT LTD	DELHI	, ,		BRAND NAME-HILTI ANCHORS
4	INDO SPARK CONSTRUCTION SERVICES	KOLHAPUR	, , 067053049053	NA	BRAND NAME-ICFS CM VESF, CM VESF TROPICAL, CM SH, CM SH TROPICAL, CM 585 PE PRO, CM 385 PE PRO, CM 400 PE, CM 650 PE
5	MASTER BUILDERS SOLUTIONS INDIA PVT LTD	NAVI MUMBAI	, ,	NA	BRAND NAMES-MASTERFLOW 916 AN, 918 AN, 920 AN, 932 AN, 936 AN
6	MUNGO FIXINGS INDIA PVT LTD	BENGALURU	, ,	NA	BRAND NAME-MIT 700 RE, MIT SE PLUS, MIT TROPICAL, MIT SP & MVA CAPSULE
7	POWERS FASTENERS(THROUGH M/S KRAFT SALES & SERVICES (I) LTD.)	PUNE	, ,	NA	BRAND NAME-POWERS FASTENERS
8	UIP SYSTEMS (INDIA) PVT LTD	MUMBAI	, ,	NA	UIP FASTENERS
9	WUERTH INDIA PVT LTD	DELHI	, ,	NA	BRAND NAME-WUERTH ANCHORS
Item : F. ANCHOR FASTENERS - MECHANICAL TYPE (EOTA / DIBt/ FM/ ICBO-ES APPROVED). Note- Design of post-installed Anchors and Rebars shall be provided/ verified by the approved manufacturer with installation instructions and execution shall be done by an applicator trained by the approved manufacturer (preferably in the presence of manufacturer for critical applications/ structures).					
1	FISCHER FIXING SYSTEMS(MICO) LTD	BENGALURU	, ,		BRAND NAME-FISCHER ANCHORS
2	HILTI INDIA PVT LTD	DELHI	, ,		BRAND NAME-HILTI ANCHORS

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Sr No	Supplier Name	City	Phone	E-Mail	Remarks
3	INDO SPARK CONSTRUCTION SERVICES	KOLHAPUR	, ,	NA	BRAND NAME: (ICFS) INDO WEDGE ANCHOR IWA, IWA-A2, IWA-A4
4	MUNGO FIXINGS INDIA PVT LTD	BENGALURU	, ,	NA	BRAND NAME-M1 POWER GRIP, M1r POWER GRIP, M1T, M2, M2r, MCS, MEA
5	POWERS FASTENERS(THROUGH M/S KRAFT SALES & SERVICES (I) LTD.)	PUNE	, ,	NA	BRAND NAME-POWERS FASTENERS
6	UIP SYSTEMS (INDIA) PVT LTD	MUMBAI	, ,	NA	UIP FASTENERS
7	WUERTH INDIA PVT LTD	DELHI	, ,	NA	PRODUCT NAME- WUERTH ANCHORS
Item : G. ELECTRO-FORGED GALVANISED GRATINGS (AS PER EIL STD 7-68-0697, BS:4592)					
1	ABHYANT EFG & ENGINEERING PVT. LTD	RAIPUR	, ,	NA	TYPE-I & TYPE-II
2	ANKIT ELECTROGRATING	RAIPUR	, ,	NA	TYPE-I & TYPE-II
3	BHOLA RAM STEEL PVT LTD	PATNA	, ,		BRAND NAME-BHOLARAM GRATINGS
4	CELL COM TELESERVICES PVT LTD	SIKANDRABAD	, ,	NA	BRAND NAME-CELLCOM GRATINGS
5	FERROTECH STRUCTURALS (INDIA) PVT LTD	KANCHIPURAM & PUNE	+91 9840308880, ,	www.ferrotechindia.net	TYPE-I & TYPE-II
6	GREATWELD ENGINEERING PVT. LTD.	PUNE	+91 7350304304, ,	sumit.rungta@greatweld.com	BRAND NAME-GREATWELD GRATINGS, TYPE-I & TYPE-II
7	INDIANA GRATING PVT.LTD	MUMBAI	, ,		BRAND NAME-INDIANA GRATINGS
8	IRONWELD ENGINEERING PVT LTD	PUNE	, ,	NA	TYPE-I & TYPE-II
9	JACINTH ENGINEERING PVT LTD	MUMBAI	, ,	NA	BRAND NAME-JACINTH GRATINGS
10	KANADE ANAND UDYOG PVT LTD	MUMBAI	, ,		BRAND NAME-KANADE GRATINGS
11	LANCER VINIMAY PVT. LTD.	DURGAPUR, WB	+91 9331391910, ,	lancervinimay@gmail.com	TYPE-I & TYPE-II
12	LIONWELD MEISER LLC	DUBAI	, ,	NA	TYPE-I & TYPE-II
13	MEET ENGINEERING	VADODARA	, ,	NA	TYPE-I & TYPE-II
14	METALIC INDUSTRIES	VADODRA, GUJARAT	, , 9909255335	admin@metallic-industries.com	TYPE-I & TYPE-II
15	MKSD INDUSTRIES PVT. LTD.	NAVI MUMBAI	9930131143/44, , 9930131143	mkswdworks@gmail.com	BRAND NAME- MKSD GRATINGS TYPE-I & TYPE-II
16	OASIS METAL MANUFACTURING LLC	DUBAI, UAE	00971504531142, ,	info@oasismetall.com	TYPE-I & TYPE-II

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Sr No	Supplier Name	City	Phone	E-Mail	Remarks
17	OMKAR GRATINGS PVT LTD	MUMBAI	, ,		BRAND NAME-OMKAR GRATINGS (FOR EIL TYPE-II GRATING ONLY)
18	PARCO ENGINEERS (MUMBAI) PVT LTD	Mumbai	9819278530, , 9819278530	info@parcoengineers.com	TYPE-I & TYPE-II
19	PINAX STEEL INDUSTRIES PVT LTD	KOLKATA	, ,		BRAND NAME-PINAX GRATINGS
20	PREMIER POWER PRODUCTS PVT LTD	KOLKATA	, ,		BRAND NAME-PREMIER GRATINGS
21	RATAN PROJECTS & ENGINEERING CO.PVT LTD.	KOLKATTA	, ,	sales@ratans.com	BRAND NAME- RATAN GRATINGS
22	SIGMA GALVANIZING PVT LTD	NAVI MUMBAI	, ,	NA	TYPE-I & TYPE-II
23	TECH-FAB INDUSTRIES	AMBERNATH (E) MAHARASHTRA	+91 7738995869, , 7738995869	sales@techfabind.com	BRAND NAME- TECH-FAB GRATINGS TYPE-I & TYPE-II
24	VINFAB GRATINGS	MUMBAI	, ,		BRAND NAME-VINFAB GRATINGS
25	WHEELS INDIA LTD	CHENNAI	, ,	NA	PRODUCT NAME-WHEELS GRATINGS
Item : H. INTEGRAL CRYSTALLINE ADMIXTURE FOR WATERPROOFING TREATMENT TO CONCRETE (AS PER CPWD SPECIFICATION 2019, CLAUSE 22.14)					
1	APPLE CHEMIE INDIA PVT LTD	NAGPUR	+91 9607001014, , 022 2768 5991	www.applechemie.com	PRODUCT NAME-AC CRSYTACRETE
2	CHRYSO INDIA PRIVATE LIMITED	NAVI MUMBAI	022 2768 5991, ,	info.india@chryso.com	PRODUCT NAME-CHRYSO CWA10
3	FOSROC CHEMICALS (INDIA) PVT LTD	BENGALURU	+91 8042521900, ,	enquiry.india@fosroc.com	PRODUCT NAME-CONPLAST CRYSTALLINE
4	KRYTON BUILDMAT CO PVT LTD	GURUGRAM	0124 4381 140, ,	info@kryton.in	PRODUCT NAME-KRYSTOL INTERNAL MEMBRANE "KIM"
5	PENETRON INFRA PRODUCTS PVT LTD	NAVI MUMBAI	+91 7738444041, ,	inquiry@penetron.co.in	PRODUCT NAME-PENETRON ADMIX
6	SHALIMAR SEAL & TAR PRODUCTS PVT LTD	JAIPUR	+91 9829065184, ,	ocrd@shalimartar.com	PRODUCT NAME-KAVASSU CRYSTALLOMIX-PG
7	XYPEX	GAUTAM BUDH NAGAR	0120-4090900, ,	info@xypex.in	PRODUCT NAME-XYPEX ADMIX C-2000 NF

LINE LIST FOR

PROJECT: BPREP				
Sr. No.	LINE NUMBER	SERVICE	FLUID STATE	SIZE INCHES
1	ACD-303-34904-A40A	ACD	L	2
2	ACD-303-34908-A40A	ACD	L	2
3	ACD-303-34901-A40A	ACD	L	2
4	ACD-303-35001-A40A	ACD	L	3
5	ACD-303-37101-A40A	ACD	L	2
6	ACD-303-37101-B9A	ACD	L	2
7	ACD-303-37102-A40A	ACD	L	2
8	ACD-303-37102-B9A	ACD	L	2
9	ACD-303-37401-A40A	ACD	L	2
10	ACD-303-37402-A40A	ACD	L	2
11	ACD-303-37601-A40A	ACD	L	2
12	ACD-303-37401-B9A	ACD	L	2
13	ACD-303-37402-B9A	ACD	L	2
14	CSD-303-33501-A40A	CSD	L	1
15	CSD-303-33501-B9A	CSD	L	1
16	CSD-303-31105	CSD	L	2
17	CSD-303-31501--	CSD	L	2
18	CSD-303-31101	CSD	L	3
19	CSD-303-33203-A40A	CSD	L	2
20	CSD-303-31105	CSD	L	2
21	CSD-303-33203-A9A	CSD	L	2
22	CSD-303-31501-	CSD	L	2
23	CSD-303-33204-A40A	CSD	L	2
24	CSD-303-31502--	CSD	L	2
25	CSD-303-33204-A9A	CSD	L	2
26	CSD-303-33301-A40A	CSD	L	2
27	CSD-303-31901-	CSD	L	3
28	CSD-303-33302-A40A	CSD	L	2
29	CSD-303-33201-A71A	CSD	L	3
30	CSD-303-33401-A40A	CSD	L	2
31	CSD-303-33202-A71A	CSD	L	3
32	CSD-303-34002-A40A	CSD	L	2
33	CSD-303-34003-A40A	CSD	L	2
34	CSD-303-33401-A9A	CSD	L	2
35	CSD-303-33601-A9A	CSD	L	3
36	CSD-303-33701-A9A	CSD	L	2

37	CSD-303-33301-A9A	CSD	L	2
38	CSD-303-33702-A9A	CSD	L	2
39	CSD-303-33302-A9A	CSD	L	2
40	CSD-303-31502--	CSD	L	2
41	CSD-303-33901-A9A	CSD	L	3
42	CSD-303-31102	CSD	L	3
43	CSD-303-34002-A9A	CSD	L	2
44	CSD-303-31901	CSD	L	3
45	CSD-303-34003-A9A	CSD	L	2
46	CSD-303-33201-A40A	CSD	L	3
47	CSD-303-33202-A40A	CSD	L	3
48	CSD-303-33502-A40A	CSD	L	3
49	CSD-303-33601-A40A	CSD	L	3
50	CSD-303-33701-A40A	CSD	L	3
51	CSD-303-33702-A40A	CSD	L	3
52	CSD-303-33502-A71A	CSD	L	3
53	CSD-303-33801-A40A	CSD	L	4
54	CSD-303-33901-A40A	CSD	L	4
55	FG-300-32213	FG	V	8
56	IG-303-34509-B9A	IG	V	2
57	ACD-303-35001-A9A	P	L	3
58	ACD-303-37601-A9A	P	L	3
59	ACD-303-34901-B9A	P	L	2
60	ACD-303-34904-B9A	P	L	2
61	ACD-303-34908-B9A	P	L	2
62	P-303-34908-B9A	P	L	2
63	P-303-34909-B9A	P	L	2
64	P-303-33201-A9A	P	L	10
65	P-303-33202-A9A	P	L	6
66	P-303-33205-A71A	P	L	4
67	P-303-33206-A71A	P	L	4
68	P-303-33207-A71A	P	L	4
69	P-303-33208-A71A	P	L	4
70	P-303-33210-A9A	P	L	6
71	P-303-33211-A9A	P	L	6
72	P-303-33212-A71A	P	L	4
73	P-303-33212-A9A	P	L	4
74	P-303-33213-A9A	P	L	3/4
75	P-303-33214-A9A	P	L	3/4
76	P-303-33219-A9A	P	L	3/4
77	P-303-33505-A71A	P	V	3/4
78	P-303-34401-A9A	P	L	4
79	P-303-34401-B9A	P	L	4
80	P-303-34402-A9A	P	L	4

81	P-303-34403-A9A	P	L	4
82	P-303-34404-A40A	P	L	2
83	P-303-34404-B9A	P	L	2
84	P-303-34606-A9A	P	L	6
85	P-303-34607-A9A	P	L	6
86	P-303-34608-A9A	P	L	6
87	P-303-34701-B9A	P	L	8
88	P-303-34702-B9A	P	L	6
89	P-303-34703-B9A	P	L	6
90	P-303-34704-B9A	P	L	6
91	P-303-34705-A9A	P	L	4
92	P-303-34705-B9A	P	L	4
93	P-303-34706-B9A	P	L	3/4
94	P-303-34707-B9A	P	L	3/4
95	P-303-34901-B9A	P	L	6
96	P-303-34907-B9A	P	L	6
97	P-303-34911-B9A	P	L	6
98	P-303-34902-B9A	P	L	6
99	P-303-34903-B9A	P	L	6
100	P-303-34905-B9A	P	L	6
101	P-303-34906-B9A	P	L	6
102	P-303-34910-B9A	P	L	8
103	ACD-303-34902-B9A	P	L	3/4
104	P-303-34918-B9A	P	L	3/4
105	P-303-34919-B9A	P	L	3/4
106	P-303-33503-A71A	P	V	3/4
107	P-303-33504-A71A	P	V	3/4
108	SM-303-34901-B9A	SM	V	2
109	SOL-303-34202-A40A	SOL	L	2
110	SOL-303-33501-B9A	SOL	L	2
111	SOL-303-33501-A71A	SOL	L	2
112	SOL-303-34102-A11A	SOL	L	4
113	SOL-303-34201-B9A	SOL	L	4
114	SOL-303-31501-	SOL	L	12
115	SOL-303-31502-	SOL	L	12
116	SOL-303-31504-	SOL	L	12
117	SOL-303-31506-	SOL	L	6
118	SOL-303-33801-A9A	SOL	L	8
119	SOL-303-33802-A9A	SOL	L	8
120	SOL-303-33803-B9A	SOL	L	8
121	SOL-303-33901-A9A	SOL	L	8
122	SOL-303-33902-A9A	SOL	L	8
123	SOL-303-33903-B9A	SOL	L	8
124	SOL-303-34001-B9A	SOL	L	6

125	SOL-303-34002-B9A	SOL	L	6
126	SOL-303-34003-B9A	SOL	L	8
127	SOL-303-34004-B9A	SOL	L	3/4
128	SOL-303-34005-B9A	SOL	L	3/4
129	SOL-303-34006-B9A	SOL	L	6
130	SOL-303-34008-A9A	SOL	L	6
131	SOL-303-34008-B9A	SOL	L	6
132	SOL-303-34009-B9A	SOL	L	6
133	SOL-303-34010-B9A	SOL	L	6
134	SOL-303-34011-A9A	SOL	L	6
135	SOL-303-34011-B9A	SOL	L	6
136	SOL-303-34012-B9A	SOL	L	2
137	SOL-303-34013-B9A	SOL	L	3/4
138	SOL-303-34014-B9A	SOL	L	3/4
139	SOL-303-33402-B9A	SOL	L	12
140	SOL-303-34201-A9A	SOL	L	4
141	SOL-303-34202-B9A	SOL	L	2
142	X-SOL-303-31507-	SOL	V	size not available
143	X-SOL-303-31508-	SOL	V	size not available
144	WFL-303-31504-	WFL	V	2
145	WFL-303-31504	WFL	V	2
146	XO-300-11406	XO	L	2"
147	P-300-11516	P	L	8"
148	P-300-11501	P	L	8"
149	P-300-11506	P	L	8", 10"
150	P-300-11507	P	L	3
151	P-300-11509	P	L	8"
152	P-300-11523	P	L	3"(H)
153	P-300-11529	P	L	2"
154	P-300-11530	P	L	2"
155	P-300-11532	P	L	2"
156	P-300-11533	P	L	2"
157	P-300-11534	P	L	8"
158	P-300-11536	P	L	3"(H)
159	WFL-300-11501	WFL	V	3"(H)
160	WFL-300-11503	WFL	V	3"(H)
161	WFL-300-11504	WFL	V	2"
162	WFL-300-11504	WFL	L	2"
163	WFL-300-11505	WFL	V	2"
164	WFL-300-11505	WFL	L	2"
165	WFL-300-11507	WFL	V	2"
166	WFL-300-11513	WFL	V	2"
167	WFL-300-11513	WFL	V	2"
168	WFL-300-11547	WFL	V	3"(H)

169	P-300-11522	P	L	3"(H)
170	FG-300-13901	FG	V	2"
171	FG-300-32213	FG	V	10"
172	P-300-32253	P	V	20", 3/4"
173	FG-300-32206	FG	V	30"
174	FG-300-32207	FG	V	3"(H)
175	FG-300-32208	FG	V	2"
176	FG-300-32209	FG	V	30"
177	FG-300-32210	FG	V	2"(H)
178	FG-300-32211	FG	V	2"
179	FG-300-32213	FG	V	8"
180	P-300-32201	P	V	2"
181	P-300-32202	P	V	2"
182	P-300-32253	P	V	20"
183	P-300-32254	P	V	2"(H)
184	P-300-32255	P	V	2"(H)

ANNEXURE-1
OR ELECTRICAL HEAT TRACING SYSTEM

UNIT: ECU		
LOCATION FROM	LOCATION TO	OPERATING TEMP. (°C)
SPEC BREAK	ACD	45-90
SPEC BREAK	ACD	45-90
SPEC BREAK	ACD	45-175
SPEC BREAK	ACD	45-90
SPEC BREAK	ACD	45-90
303-PA-CF-3607 A	SPEC BREAK	138
SPEC BREAK	ACD	45-90
303-PA-CF-3607 B	SPEC BREAK	138
SPEC BREAK	ACD	45-90
SPEC BREAK	ACD	45-90
SPEC BREAK	ACD	45-90
303-PA-CF-3608 A	SPEC BREAK	196.3
303-PA-CF-3608 B	SPEC BREAK	196.3
SPEC BREAK	CSD-303-33502-A71A	45-175
LINE SOL-303-32704-B2A	SPEC BREAK	175.6851018
SPEC BREAK	CSD	45-175
CSD-303-31501-B9A	CSD	45-175
LINE P-303-31103-A9A	SPEC BREAK	46.2225972
SPEC BREAK	CSD	45-175
303-VV-HW-3501	SPEC BREAK	46.2225972
303-PA-CF-3505A	SPEC BREAK	45-175
303-GN-00-3501A	CSD-303-31501-A40A	110
SPEC BREAK	CSD	45-175
303-GN-00-3501B	CSD-303-31502-A40A	110
303-PA-CF-3505B	SPEC BREAK	45-175
SPEC BREAK	CSD	45-175
LINE WP-303-31901 P-303-31903-B9A	Spec break	55.02587517
SPEC BREAK	CSD	45-175
303-GN-00-3502A	SPEC BREAK	40.30890401
SPEC BREAK	CSD	45-175
303-GN-00-3502B	SPEC BREAK	40.30890401
SPEC BREAK	CSD	45-175
SPEC BREAK	CSD	45-175
303-EE-00-3508	SPEC BREAK	121.2742536
303-VV-VW-3508	SPEC BREAK	40.27076151
303-PA-CF-3508A	SPEC BREAK	40.26665694

303-PA-CF-3506A	SPEC BREAK	39.99754385
303-PA-CF-3508A	SPEC BREAK	40.26665694
303-PA-CF-3506B	SPEC BREAK	39.99754385
CSD-303-31502-B9A	CSD	45-175
303-TT-00-3502	SPEC BREAK	40
SPEC BREAK	CSD	45-175
303-PA-CF-3509	SPEC BREAK	40
Spec break	CSD	45-175
303-PA-CF-3510	SPEC BREAK	40
SPEC BREAK	CSD	45-175
SPEC BREAK	CSD	45-175
SPEC BREAK	CSD	45-175
SPEC BREAK	CSD	45-175
SPEC BREAK	CSD	45-175
303-VV-VI-3506	SPEC BREAK	175.6851018
SPEC BREAK	CSD	45-175
SPEC BREAK	CSD	45-175
300-VV-VI-3002	FG-300-32213-A1D	40
SPEC BREAK	LINE SM-303-34901-B2A	194.9867285
LINE P-303-35009-A9A	SPEC BREAK	147.8236531
303-VV-VI-3610	SPEC BREAK	40
LINE ACD-303-34902-B9A	SPEC BREAK	194.9867285
P-303-34909-B9A	SPEC BREAK	194.9867285
P-303-34908-B9A	SPEC BREAK	194.9867285
LINE P-303-34902-B9A	LINE P-303-34910-B9A	194.9867285
LINE P-303-34903-B9A	LINE P-303-34910-B9A	194.9867285
LINE P-303-32901-A9A	303-PA-CF-3505B	40
303-PA-CF-3505B	LINE P-303-33203-A9A	40.10906369
LINE P-303-33206-A71A	303-GN-00-3502B	40.30890401
LINE P-303-33203-A9A	303-GN-00-3502A	40.30890401
303-GN-00-3502A	LINE P-303-33209-A71A	40.44416897
303-GN-00-3502B	LINE P-303-33209-A71A	40.44416897
LINE P-303-33204-A9A	LINE P-303-31101-A9A	40.39432331
LINE P-303-33204-A9A	LINE P-303-34201-A9A	40.39432331
SPEC BREAK	303-VV-VI-3504	40.10906369
LINE P-303-33203-A9A	SPEC BREAK	40.10906369
LINE P-303-33203-A9A	LINE P-303-32901-A9A	40.10906369
SC-2-33201	LINE P-303-32901-A9A	40.10906369
LINE P-303-33203-A9A	SC-2-33201	40.10906369
LINE P-303-33502-A71A	- SC-7 33501	40
303-PA-SM-3512	SPEC BREAK	40
SPEC BREAK	303-EE-00-3512	90
303-EE-00-3512	LINE P-303-35702-A9A	45

LINE P-303-34402-A9A	303-VV-HW-3501	45
SPEC BREAK	P-303-34301-A90A(A1D)	45-90
P-303-34402-B9A(A1D)	SPEC BREAK	90
LINE P-303-37303-B9A	LINE P-303-31101-A9A	46.2
FROM OFF-SPEC AROMATICSTANK	LINE P-303-33204-A9A	40.39432331
LINE P-303-35702-A9A	FROM OFF-SPEC AROMATICSTANK	45
LINE P-303-34601-B9A	303-PA-CF-3601B	40.39432331
303-PA-CF-3601A	P-303-34703	40.73243862
303-PA-CF-3601B	LINE P-303-34702-B9A	40.73243862
LINE P-303-34702-B9A	303-VV-HW-3501	40.73243862
SPEC BREAK	303-VV-HW-3601	46.2
P-303-34702-B9A	SPEC BREAK	40.73243862
LINE P-303-34702-B9A	SC-7-34701	40.73243862
SC-7-34701	LINE P-303-34601-B9A	40.73243862
LINE P-303-34804-B9A	303-CC-00-3601B	195
LINE P-303-34804-B9A	LINE P-303-34903-B9A	195
LINE P-303-34901-B9A	303-CC-00-3601A	195
303-CC-00-3601A	LINE P-303-34904-B9A	194.9867285
303-CC-00-3601B	LINE P-303-34904-B9A	194.9867285
LINE P-303-34902-B9A	LINE P-303-34901-B9A	194.9867285
LINE P-303-34903-B9A	LINE P-303-34911-B9A	194.9867285
LINE P-303-34909-B9A	303-EA-00-3503	194.9867285
SC-6-34901	LINE ACD-303-34901-B9A	194.9867285
LINE P-303-34905-B9A	SC-6-34901	194.9867285
SC-6-34901	LINE P-303-34906-B9A	194.9867285
LINE P-303-33502-A71A	LINE P-303-33504-A71A	175.0922655
LINE P-303-33502-A71A	LINE P-303-33505-A71A	175.0922655
SPEC BREAK	P-303-34901-B9A	194.9867285
SPEC BREAK	SOL-303-34102-A40A	45-175
LINE SOL-303-32704-B2A	SPEC BREAK	175.6851018
SPEC BREAK	303-VV-VI-3506	175
303-VV-VW-3509	303-VV-HW-3511	175
SPEC BREAK	303-EE-00-3511	175
303-GN-00-3501A	303-GN-00-3501B	110
303-GN-00-3501B	303-GN-00-3501A	110
SOL-303-31503-B9A	SOL-303-31505-B9A	110
SOL-303-31401-B9A	303-TT-00-3501/3502	109.8
303-TT-00-3501	LINE SOL-303-33802-A9A	40
303-TT-00-3501	LINE SOL-303-33803-A9A	40
LINE SOL-303-33802-A9A	303-PA-CF-3509	40
303-TT-00-3502	LINE SOL-303-33902-A9A	40
303-TT-00-3502	LINE SOL-303-33903-A9A	40
LINE SOL-303-33902-A9A	303-PA-CF-3510	40
303-PA-CF-3509	LINE SOL-303-34006-B9A	40

303-PA-CF-3510	LINE SOL-303-34006-B9A	40
LINE SOL-303-33903-B9A	LINE SOL-303-33803-B9A	40
SC-2-34003	SC-2-34003 SOL-303-33803-B9A	40
SC-2-34002	SC-2-34002 SOL-303-33903-B9A	40
LINE SOL-303-31506-B9A	LINE SOL-303-34201-B9A	40
SPEC BREAK	303-TT-00-3501	40
LINE SOL-303-34201-B9A	SPEC BREAK	40
LINE SOL-303-34006-B9A	LINE SOL-303-34008-B9A	40
LINE SOL-303-34008-B9A	LINE SOL-303-34011-B9A	40
SPEC BREAK	303-TT-00-3502	40
LINE SOL-303-34009-B9A	SPEC BREAK	40
LINE SOL-303-31506-B9A	LINE SOL-303-32704-B9A	40
SC-2-34003 SOL-303-34001-B9A	SC-2-34003	40
SC-2-34002 SOL-303-34002-B9A	SC-2-34002	40
LINE SOL-303-31603	LINE SOL-303-33401-B9A	160
303-PA-SM-3511	SPEC BREAK	40
LINE SOL-303-34201-B9A	SPEC BREAK	40
303-GN-00-3501A	PSV-31501 A	110
303-GN-00-3501B	PSV-31501 B	110
WFL-303-31504-B9A	WFL-303-31503-A11A	45-175
WFL-303-31508-B9A	WFL-303-31504-A11A	110
FLUX OIL	P-300-11506	40
300-GN-00-1003B	300-EE-00-1009	65.428
300-EE-00-1009	TO 300-FF-00-1112 TO 1114	90
FROM STORAGE	300-GN-00-1003B	80
P-300-11509	WFL-300-11501	80
P-300-11506	300-GN-00-1003A	80
P-300-11522	WFL-300-11503	90
300-GN-00-1003B	QOD-300-11510	65.428
P-300-11516	P-300-11529	65.428
P-300-11534	P-300-11533	65.428
300-GN-00-1003A	QOD-300-11503	65.428
300-GN-00-1003A	P-300-11516	65.428
P-300-11506	WFL-300-11507	80
P-300-11507	UCO RELIEF	AMB
P-300-11523	WFL-300-11547	AMB
Spec Break	WFL-300-11547	AMB
P-300-11523	Spec Break	90
Spec Break	WFL-300-11501	AMB
P-300-11507	Spec Break	80
P-300-11536	UCO RELIEF	AMB
Spec Break	WFL-300-11507	AMB
P-300-11536	Spec Break	80
P-300-11522	UCO RELIEF	AMB

P-300-11501	WFL-300-11547	90
DISTRIBUTION	300-LZ-00-1202	40
300-VV-VI-3002	FG-300-32213-A1D	40
LPG VAPOR FROM OSBL	20"-FG-300-32205-A1A(A1B)-IS	45
300-GN-00-3001A	TO 300-FF-00-1111 THRU 300-FF-00-1118	40
30"-FG-300-32206-A1A(A1B)-IE	PSV 32202	40
-FG-300-32207-A1A(A1B)-IE	2"-FG-300-32208-A11A(A1D)-	40
300-GN-00-3001B	30"-FG-300-32206-A1A(A1B)-IE	40
30"-FG-300-32209-A9A(A1D)-IE	PSV 32203	40
-FG-300-32210-A1A(A1B)-IE	2"-FG-300-32211-A11A(A1D)-	40
30"-FG-300-32206-A1A(A1B)-IE	VACUUM BREAKER TO 300-CC-00-1301	40
300-GN-00-3001A	2"-P-300-32201-A9A(A1D)-	40
300-GN-00-3001B	-P-300-32202-A9A(A1D)-	40
300-EE-00-8001	300-VV-VI-3002	45
20"-P-300-32253-B9A-IE	PSV 32252A	45
-P-300-32254-B9A	PSV 32252B	45

JOB NO: B957				
DESIGN TEMP. (°C)	INSULATION TYPE	THICKNESS (MM)	MAINTENANCE TEMP. (°C)	STEAM OUT (YES/NO)
150	IE	40+25	10	Y
150	IE	40+25	10	Y
150	IE	65+25	10	Y
150	IE	50+25	10	Y
150	IE	40+25	10	Y
200	IE	65+25	10	Y
150	IE	40+25	10	Y
200	IE	65+25	10	Y
150	IE	40+25	10	Y
150	IE	40+25	10	Y
150	IE	40+25	10	Y
250	IE	65+25	10	Y
250	IE	65+25	10	Y
250	IE	40+25	10	Y
250	IE	40+25	10	Y
250	IE	65+25	10	Y
250	IE	65+25	10	Y
150	IE	25+25	10	Y
250	IE	65+25	10	Y
150	IE	25+25	10	Y
250	IE	65+25	10	Y
200	IE	50+25	10	Y
250	IE	65+25	10	Y
200	IE	50+25	10	Y
250	IE	65+25	10	Y
250	IE	65+25	10	Y
150	IE	25+25	10	Y
250	IE	65+25	10	Y
150	IE	25+25	10	Y
250	IE	65+25	10	Y
150	IE	25+25	10	Y
250	IE	65+25	10	Y
150	IE	25+25	10	Y
250	IE	65+25	10	Y
200	IE	50+25	10	Y
150	IE	25+25	10	Y
150	IE	25+25	10	Y

250	IE	25+25	10	Y
250	IE	40+25	10	Y
250	IE	40+25	10	Y
150	IE	25+25	10	Y
65	IE	25+25	10	Y
150	IE	25+25	10	Y
150	IE	25+25	10	Y
150	IE	25+25	10	Y
150	IE	25+25	10	Y
150	IE	25+25	10	Y
150	IE	25+25	10	Y
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250	IE	90+25	10	Y
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250	IE	90+25	10	Y
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250	IE	40+25	10	Y
250	IE	40+25	10	Y
250	IE	40+25	10	Y
250	IE	65+25	10	N
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250	IE	90+25	10	Y
250	IE	90+25	10	Y
200	IE	75+25	10	Y
200	IE	75+25	10	Y
200	IE	75+25	10	Y
200	IE	75+25	10	Y
90	IE	25+25	10	Y
90	IE	25+25	10	Y
90	IE	25+25	10	Y
90	IE	25+25	10	Y
90	IE	25+25	10	Y
90	IE	25+25	10	Y
150	IE	25+25	10	Y

150	IE	25+25	10	Y
90	IE	25+25	10	Y
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150	IE	25+25	10	Y
90	IE	25+25	10	Y
150	IE	25+25	10	Y
150	IE	25+25	10	Y
150	IE	25+25	10	Y
90	IE	25+25	10	Y
150	IE	25+25	10	Y
250	IE	25+25	10	Y
150	IE	25+25	10	Y
150	IE	25+25	10	Y
200	IE	90+25	10	Y
250	IE	25+25	10	Y
250	IE	25+25	10	Y
200	IE	50+25(HOLD)	10	Y
200	IE	50+25(HOLD)	10	Y
200	IE	65+25	10	Y
200	IE	50+25	10	Y
65	IE	25+25	10	Y
110	IE	50+25	10	Y
150	IE	65+25	10	Y
110	IE	50+25	10	Y
110	IE	50+25	10	Y
110	IE	50+25	10	Y
150	IE	65+25	10	Y
110	IE	40+25	10	Y
110	IE	40+25	10	Y
110	IE	40+25	10	Y
110	IE	50+25	10	Y
110	IE	50+25	10	Y
200	IE	25+25	10	Y
200	IE	25+25	10	Y
200	IE	25+25	10	Y
150	IE	65+25	10	Y
200	IE	25+25	10	Y
110	IE	50+25	10	Y
200	IE	25+25	10	Y
200	IE	25+25	10	Y
110	IE	50+25	10	Y
200	IE	25+25	10	Y

150	IE	65+25	10	Y
75	IE	25	10	Y
100	IE	25+25	10	Y
-29/65	IE	25+25	10	Y
100	IE	25+25	10	Y
100	IE	25+25	10	Y
100	IE	25+25	10	Y
100	IE	25+25	10	Y
100	IE	25+25	10	Y
100	IE	25+25	10	Y
100	IE	25+25	10	Y
100	IE	25+25	10	Y
100	IE	25+25	10	Y
-29/65	IE	25+25	10	Y
-29/65	IE	25+25	10	Y
-29/65	IE	25+25	10	Y

LENGTH (MTRS.)	REMARKS
2	PART-A
2	PART-A
8	PART-A
23	PART-A
5	PART-A
1	PART-A
5	PART-A
1	PART-A
4	PART-A
4	PART-A
5	PART-A
1	PART-A
1	PART-A
1	PART-A
2	PART-A
1	PART-A
1	PART-A
5	PART-A
4	PART-A
4	PART-A
1	PART-A
4	PART-A
4	PART-A
4	PART-A
1	PART-A
4	PART-A
1	PART-A
4	PART-A
1	PART-A
9	PART-A
1	PART-A
4	PART-A
4	PART-A
1	PART-A
1	PART-A
1	PART-A

1	PART-A
1	PART-A
1	PART-A
1	PART-A
1	PART-A
1	PART-A
1	PART-A
4	PART-A
1	PART-A
4	PART-A
4	PART-A
8	PART-A
3	PART-A
4	PART-A
4	PART-A
1	PART-A
8	PART-A
7	PART-A
175	PART-B
25	PART-A
3	PART-A
4	PART-A
3	PART-A
2	PART-A
2	PART-A
10	PART-A
90	PART-A
6	PART-A
15	PART-A
15	PART-A
11	PART-A
8	PART-A
7	PART-A
130	PART-A
35	PART-A
60	PART-A
1	PART-A
2	PART-A
1	PART-A
1	PART-A
5	PART-A
85	PART-A
5	PART-A
50	PART-A

150	PART-A
15	PART-A
5	PART-A
150	PART-A
240	PART-A
175	PART-A
7	PART-A
100	PART-A
15	PART-A
90	PART-A
70	PART-A
5	PART-A
1	PART-A
1	PART-A
10	PART-A
75	PART-A
10	PART-A
10	PART-A
10	PART-A
25	PART-A
25	PART-A
10	PART-A
4	PART-A
1	PART-A
1	PART-A
1	PART-A
1	PART-A
50	PART-A
10	PART-A
1	PART-A
6	PART-A
25	PART-A
5	PART-A
9	PART-A
7	PART-A
15	PART-A
100	PART-A
3	PART-A
3	PART-A
35	PART-A
3	PART-A
3	PART-A
25	PART-A
30	PART-A

40	PART-A
5	PART-A
1	PART-A
1	PART-A
60	PART-A
80	PART-A
5	PART-A
65	PART-A
55	PART-A
40	PART-A
5	PART-A
55	PART-A
1	PART-A
1	PART-A
15	PART-A
75	PART-A
5	PART-A
60	PART-A
60	PART-A
5	PART-A
5	PART-A
25	PART-A
12	PART-B
166	PART-B
333	PART-B
253	PART-B
2	PART-B
3	PART-B
1	PART-B
3	PART-B
2	PART-B
3	PART-B
260	PART-B
5	PART-B
8	PART-B
8	PART-B
5	PART-B
5	PART-B
5	PART-B
5	PART-B
5	PART-B
5	PART-B
5	PART-B
10	PART-B

250	PART-B
50	PART-B
150	PART-B
1	PART-B
30	PART-B
40	PART-B
2	PART-B
15	PART-B
40	PART-B
5	PART-B
30	PART-B
110	PART-B
5	PART-B
1	PART-B
1	PART-B
1	PART-B

KPI List for BPREP Control Tower for Package Contracts

Sr. No.	Category	KPI	Description	Frequency
1	Overview	Forecast commissioning date	Estimated date when the project/unit is expected to be operational	Fortnightly
2		Number of days to production start	Remaining days until production is scheduled to begin/Commissioning	Daily
3		Mechanical completion date	Remaining days to mechanical completion	Fortnightly
4	Progress	Progress S-curve	Progress S curve plan vs actual	Fortnightly
5		Work progress percentage	Percentage completion of actual versus planned progress	Fortnightly
6		Milestones achieved	Number of milestones completed on time versus planned milestones	Weekly
7		Critical path progress	Progress of tasks on the critical path and impact on project timelines	Fortnightly
8		Sub-critical path progress	Progress of tasks on the sub-critical path and impact on project timelines	Fortnightly
9		Schedule adherence rate	Percentage of tasks completed on time	As updated
10		Area of concern	Roadblocks with achieving the milestone	As updated
11	Cost	Cost s-curve	Cost S curve plan vs actual	Quarterly
12		Total cost	Total project expenditure and comparison of planned vs actual	Quarterly
13		Committed cost	Committed cost planned vs actual	Quarterly
14		Cost over run vs DFR	Savings or over run vs DFR estimate	Quarterly
15		Procurement cost	Total cost of procurement activities	Monthly
16		Procurement budget plan vs actual	Comparison of planned versus actual procurement expenditures	Monthly
17		Tendering cost	Contract tender cost	Monthly
18		Tendering budget plan vs actual	Comparison of planned versus actual tendering expenditures	Monthly
19	Procurement	Upcoming tenders	Number and status of upcoming tenders	Weekly
20		Live tenders	Number and status of current tenders	Weekly
21		RFP to PO timelines	Time taken from request for proposal (RFP) to Purchase Order (PO)	As updated
22		Change orders	Number and impact of change orders	Weekly
23		Payables status and aging	Status and aging of payables	Weekly
24		Equipment procurement plan vs actual	Percentage equipment procured against the plan	Weekly
25		Major critical equipment procurement status (LLI plus few non LLI)	Detailed plan status, including steps such as bidding, datasheet review, PR, and bid submission	Weekly

KPI List for BPREP Control Tower for Package Contracts

Sr. No.	Category	KPI	Description	Frequency
26		Bulk material status	Status of Material Procurement Categorywise	Weekly
27		Construction quantity release status	Categorywise Status of Release of Construction Qty.	Weekly
28		Contractor award plan vs actual	Percentage contractors awarded against the plan Contractors are the MEI, civil and structural and so on	Weekly
29		Contractor award detailed status	Comparison of the planned status, including stages like bid submission and contract finalization	Weekly
30	Engineering	Detailed engineering for each package	Status of Detailed Engineering (DE)	Weekly
31		BDEP status	Status of Basic Design Engineering Package (BDEP)	Weekly
32		FEED status	Status of Front-End Engineering Design (FEED)	Weekly
33		Number of datasheets received vs planned	Datasheets received compared to the planned number in the BDEP	Weekly
34		Drawing status	Current state of drawing approvals and completions	Weekly
35	Construction	Structural steel fabrication	Comparison of planned versus actual structural steel fabrication	Fortnightly
36		Piping fabrication	Comparison of planned versus piping fabrication	Fortnightly
37		Critical equipment delivery plan vs actual	Timeliness of delivery of critical equipment	Fortnightly
38		Equipment construction progress overview	Percentage equipment construction completed vs plan	Fortnightly
39		Equipment-wise construction progress	Actual progress of equipment construction post delivery at site	Fortnightly
40		Civil works completion	Measures the planned versus actual progress of civil construction works	Fortnightly
41		Structural assembly progress	Compares planned to actual progress in structural assembly	Fortnightly
42		Piping installation progress	Monitors the planned versus actual progress of piping installations	Fortnightly
43		Electrical installation status	Tracks the progress of electrical installations compared to the plan	Fortnightly
44		Insulation and cladding completion	Compares planned versus actual completion of insulation and cladding work	Fortnightly
45		Fireproofing application progress	Measures the actual progress of fireproofing applications against the planned schedule	Fortnightly

KPI List for BPREP Control Tower for Package Contracts

Sr. No.	Category	KPI	Description	Frequency
46		LSTK/Package contract progress statistics	Progress Statistics at the Contract and and Functional Levels for each Contarct	Fortnightly
47	Manpower Productivity	Manpower attendance	Tracking of manpower attendance with entry and exit times, and total working hours	Daily
48		Entry and exit time	Average manpower entry and exit times at the site	Daily
49		Contractor-wise manpower deployed	Number of manpower per contractor	Daily
50		Working hours	Total working hours of manpower based on attendance records	Daily
51		Supervisor and manpower turnover rate	Frequency of supervisor and manpower turnover	Fortnightly
52		Gang ratio: skilled vs unskilled	Ratio of skilled to unskilled manpower in the workforce	Daily
53		Contractor manpower productivity comparison	Comparison of contractor manpower productivity from best to worst performing	Weekly
54		Manpower downtime	Percentage of time manpower is not productive	Daily
55	Equipment Productivity	Number of critical equipment at site	Tracking of critical equipment at site	Daily
56		Critical equipment downtime	Downtime of critical equipment and its impact on the project	Daily
57		Equipment utilization rate	Percentage of time equipment is operational versus idle	Daily
58	Safety	Total Manhours Worked	Category wise and Total Manhours Worked	Daily
59		LTA Free Manhours	Category wise and Overll LTA Free Manhours	Monthly
60		Frequency Rate	Frequency Rate	Monthly
61		Severity Rate	Severity Rate	Monthly
62		No of Tool Box Talks Conducted	Category wise and Overll No of Tool Box Talks Conducted	Monthly
63		No. of Near Misses	Category Wise No. of Near Misses and Trends	Monthly
64		No. of Incidents	Category Wise No. of Incidents and Trends	Monthly
65		No. of NCR's/OSA	Instances of non-compliance with requirements or Safety Violations	Monthly
66		No. of non compliance/ safety violation detected by DSMS	Category wis e and Overall No. of non compliance/ safety violation detected by DSMS	Daily
67		No. of violations not resolved	Category wis e and Overall No. Vioations not resolved	Daily
68	Planning and Scheduling	Daily task completion rate - contractor comparison	Tracks the percentage of planned daily tasks completed	Daily
69	Quality	Overall status	Total inspections done vs total passed vs total defects area specific	Daily
70		Contractor Quality Assurance	Site Quality Check	

KPI List for BPREP Control Tower for Package Contracts

Sr. No.	Category	KPI	Description	Frequency
71		Supplier quality Assurance	Measures the quality of materials and equipment supplied by vendors	Daily
72		Number of non-conformance reports (NCRs)	Total no. and percentage of NCRs issued from inspections	Daily
73		Corrective action closure rate	Percentage of corrective actions closed out effectively	Daily
74		Failure rate of inspected items	rate at which inspected items fail quality criteria	Daily
75		Best and worst performing contractor	Contractor with minimum inspection failure and contractor with the maximum test failure	Daily
76		Field quality issues	Monitors the number of quality issues across each types	Daily
77	Warehouse and Management	Material and equipment availability status	Monitors the percentage of required materials that are available in the warehouse when needed	Daily
78		Critical equipment availability status	Measures the availability of high-priority or critical materials required for project milestones	Daily
79		Order delay incidents	Tracks the number of delays in material orders and shipments	Daily
80	Transport Management	Risk of delay	Percentage of equipment at the risk of delay in delivery	Daily
81		Distance travelled vs total distance	For critical equipment: percentage distance covered	Daily
82		Touch points of the journey	Assesses adherence to planned schedules at critical touchpoints, such as ports, terminals, and warehouse	Daily
83	Commissioning	Piping loop hydro-testing status	MC, NDT, HT Status	Daily
84		System completion outlook	Format 1, 2 and 3 Status	Daily
85		Summary of system handing over status	Format 4	Daily



Scope of Work and Job Specifications for BPREP Package Contracts (Digital Technology Solutions)

PROJECT : BINA PETCHEM & REFINERY EXPANTION PROJECT,
(BPREP)

OWNER : BHARAT PETROLEUM CORPORATION LIMITED
(BPCL)

PMC / EPCM : ENGINEERS INDIA LIMITED (EIL)

JOB NO. : B957/ B925/ B933

0	11.01.2025	REVISED AND ISSUED FOR TENDERING	AKP	DP	SB
A	23.12.2024	ISSUED FOR CIENT COMMNETS	AKP	DP	SB
Rev. No.	Date	Purpose	Prepared by	Checked by	Approved by

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1.0 GENERAL

1.1 The Specification given below provides Scope of Work and Job Specifications for Digital Technology Solutions. The same shall be read in conjunction with the Licensor's process package, Scope of Work and Job Specifications for other functions and depts. provided elsewhere in the tender document. Bidder shall provision, implement, support, utilize the digital solutions (as applicable) as per requirements of process package, engineering design basis, standards, specifications and drawings enclosed with this bid package.

1.2 **Location of field equipment & accessories:** The field equipment and accessories for digital solutions covered in this document shall be deployed during construction phase. The same shall be uninstalled and removed before feed cut-in i.e. from the hazardous area. In existing refinery areas, where work is to be conducted in hazardous area, IS Mobile Phones and Active RFID/BLE devices shall be suitable for respective hazardous area.

Bidder shall ensure that Bidders and their subcontractor's personnel having ordinary (Safe Area use) mobile devices and/or Active RFID/BLE Cards do not enter the units of existing BPCL Plants, as those are electrically hazardous areas.

2.0 SCOPE OF WORK/SUPPLY

S. No.	DESCRIPTION	Scope of Supply/Work	
		Bidder	Purchaser
2.1	Scope of Supply/Work: For Digital Solutions in Bidders Scope- Design, Engineering including residual engineering, detail engineering, procurement, supply, implementation and operations including all hardware and software of all systems preparation of engineering drawings and documents, review of vendor drawings, manpower support, coordination with Clients other Contractors/Vendors etc. Scope of Work also includes providing support and utilizing (Note-1) Digital Solutions deployed by Client or their contractors/vendors. All the digital solutions shall be operational only for the project duration and shall be decommissioned and removed at the end of the construction/during commissioning period, or as instructed by Engineer-In charge.		
2.1.1	Control Tower/ Common Data Environment (CT/CDE) – Provisioning and Implementation.		Yes
2.1.2	Control Tower/ Common Data Environment (CT/CDE) – Support.	Yes	
2.1.3	Project Management Information System (PMIS) – Provisioning and Implementation.		Yes

2.1.4	Project Management Information System (PMIS) – Support.	Yes	
2.1.5	4D Monitoring Solution – Provisioning and Implementation.		Yes
2.1.6	4D Monitoring Solution – Support (Note 2)	Yes	
2.1.7	Digital Quality Inspection System (DQIS) – Provisioning and Implementation.		Yes
2.1.8	Digital Quality Inspection System (DQIS) – Support.	Yes	
2.1.9	Camera based- Digital Safety Management System (DSMS-CAMERA) – Provisioning and Implementation.		Yes
2.1.10	Camera based- Digital Safety Management System (DSMS-CAMERA) – Support.	Yes	
2.1.11	App Based Digital Safety Management System (DSMS-APP) – Provisioning and Implementation.		Yes
2.1.12	App Based Digital Safety Management System (DSMS-APP) – Support.	Yes	
2.1.13	Automated Manpower Productivity System (MANPS) – Provisioning and Implementation		Yes
2.1.14	Automated Manpower Productivity System (MANPS) – Support.	Yes	
2.1.15	Warehouse management system (WMS) – Provisioning and Implementation. (Note-3)	Yes	
2.1.16	Warehouse management system (WMS) - Integration with Purchaser's CT/CDE.		Yes
2.1.17	Transport Management System (TMS) – Provisioning and Implementation.	Yes	
2.1.18	Transport Management System (TMS) - Integration with Purchaser's CT/CDE.		Yes
2.1.19	Spool Management System – Provisioning and Implementation (<i>Where Spool Fabrication at site is in Bidder's Scope</i>)	Yes	
2.1.20	Welding Management System- Provisioning and Implementation. (<i>Where Piping Welding Works at site are in Bidder's Scope</i>)	Yes	
2.1.21	Cabling Management System- Provisioning and Implementation (<i>Where Cabling Works at site are in Bidder's Scope</i>)	Yes	

2.1.22	Providing Mobile Devices (Tablets /Smart Phones) to Bidders concerned personnel, for use of DQIS, DSMS-APP, CT/CDE and other digital solutions.	Yes	
2.2	Coordination		
2.2.1	Coordination with - Purchaser - Owner Management Consultant (OMC) - MPMC (Managing PMC) - PMC/EPCM - Purchaser's Master System Integrator (MSI) for CT/CDE, PMIS, 4D Monitoring, DQIS, DSMS-Camera, DSMS-APP and MANPS. - Purchaser's Hardware Service Provider (HSP) for DSMS-CAMERA and MANPS. - Sub-vendors of Digital Solutions Implemented by Bidder.	Yes	
2.3	Training		
2.3.1	Training for Spool Management System, Welding Management System and Cable Management System for purchaser's personnel, bidder's own personnel and sub-contractor's personnel.	Yes	
2.4	Operations, Support and Maintenance		
2.4.1	Operations Support and Maintenance Services for Spool Management System, Welding Management System and Cable Management System.	Yes	
2.5	Cyber Security Requirements		
2.5.1	Cybersecurity Compliance as per BPCL's Cybersecurity guidelines for Spool Management System, Welding Management System and Cable Management System.	Yes	
2.6	Watch and Ward/Safekeeping of Digital Technology Solutions Devices	Yes	
2.6.1	Responsibility for safekeeping of Digital Technology Solutions devices deployed by Purchaser viz. DSMS-CAMERA - Camera, routers, Network/ Edge devices, Server, NVR, workstation PCs etc. and MANPS-RFID/BLE Cards, Readers, Network/ Edge devices inside Bidders B/L or Work Area.	Yes	

Notes:

1. **Support-** Support consists of aid in implementation of the digital solution on ground:
 - a. Providing information for the checklists/ KPI's

- b. Providing Data for self/ sub-contractors in a timely manner
 - c. Distributing/ setting up of active RFID/BLE Tags/ sensors from the purchaser's implementation partner.
 - d. Providing Power Supply/ Installation Supports, as applicable, for respective digital solutions.
 - e. Use the functionality of the digital solution/ tools for the intended purpose.
 - f. Coordination with purchaser's digital implementation partners
2. Where 3D Modelling is in bidder's scope.
 3. Where Warehouse is in bidder's scope.
 4. In case of non-functionality of any of the digital solution planned by Purchaser, bidder shall report for each use case in other forms as instructed by Engineer-in-Charge
 5. Bidder shall ensure that smartphones deployed are not misused for taking unauthorized photos and videos. Person found doing so may be handed over to the security team for further action.
 6. One or more solution may not be applicable based on nature of job / tender conditions / scope of work.
 7. OMC/MPMC/PMC/EPCM are having responsibility of project progress monitoring. These consultants will be actively engaged with the bidder for successful utilisation of the digital solutions
 8. In case devices deployed by Purchaser as per point 2.6.1 are damaged by contractor, recovery shall be made from their running bills for actual cost incurred by BPCL plus admin charges in line with GCC.

3.0 JOB SPECIFICATIONS

3.1 CONTROL TOWER/ COMMON DATA ENVIRONMENT & PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)

3.1.1 System Overview

- 3.1.1.1 Purchaser intends to deploy a Control Tower/CDE and PMIS System for Project Planning, Scheduling and Monitoring, Project Cost Control, Workflows between Client, MPMC, PMCs, EPCs and EPCMs Contractors; Report Generation and 4D Project Monitoring, etc. The entire reporting including Planning Package, Project Schedules, DPR, WPR, MPR etc is expected to be executed online through the above systems.
- 3.1.1.2 The systems deployed by Purchaser shall be broadly in alignment with the relevant specs for Project Planning, Scheduling, Monitoring And Control System for this Contract (Encl. elsewhere in the tender) and bidder's obligations shall be read in context and in alignment with the same.

3.1.2 Bidders Obligations

- 3.1.2.1 Bidder shall support implementation of CT-CDE and PMIS (deployed by the Purchaser) by providing data/ update for the KPIs for self and sub-contractors through APIs/ Excel templates/ Manual Data Entry etc. in the PMIS System. Data shall be provided by bidder through excel templates or manual entry or online forms etc which will be specified and provided by purchaser.
- 3.1.2.2 Bidder shall be provided 1-2 No. User Id's to access the PMIS System for providing input.

- 3.1.2.3 As a minimum bidder shall provide data for KPIs in CT-CDE as per Annexure-1-KPI List.
- 3.1.2.4 Bidder shall be responsible for complying with the workflows as defined in the PMIS.
- 3.1.2.5 Bidder shall nominate representatives to attend mandatory PMIS training sessions and achieve proficiency in use of the same.
- 3.1.2.6 Bidder shall provide URL's for Viewing Physical Location on Critical Equipment, Long Lead Items (LLI's) interfaced from Transport Management Solutions of Vendors/Contractors.
- 3.1.2.7 Bidder shall be required to prepare schedule either in primavera or MSP and submit the same through PMIS System MPMC/PMC for approval and subsequent monitoring. Bidder will also have to carry out schedule updation on regular basis. Scheduling platform, frequency of schedule updation (daily/ weekly/ fortnightly / monthly), mechanism of schedule updation either in primavera/MSP or PMIS platform or primavera/MSP export excel file upload etc, schedule weightages, schedule formats etc will be informed to successful bidder. Bidder may also have to revise schedule to take care of emergent activities or crashing / fast tracking of schedule to overcome delays. Bidder will have to comply these requirements or any other requirement for success of scheduling tools deployed by Purchaser.
- 3.1.2.8 Reporting of Daily Progress, Weekly Progress, Monthly Progress covering Executive Summary, Areas of concern, problems and hold ups, resource deployment, project risks etc will be carried out through excel or manual entry or templates or online forms etc which will be provided by purchaser.
- 3.1.2.9 PMIS shall have provision of maintaining DCI, procurement status, manufacturing status, site construction works status. Bidder to provide needful information for these index/status/report. Format for input shall be informed to successful bidder.
- 3.1.2.10 Bidder shall provide relevant information for project cost status such as cost commitment, cost expenditure, expected cash flow etc in the prescribed formats specified by Purchaser.
- 3.1.2.11 Bidder to also refer and comply to "PROCEDURE FOR SMART INTEGRATED ENGG., DIGITAL HANDOVER OF DRAWING/DOCUMENT/ 3D MODEL AND DIGITAL INTERVENTION BY BIDDER".
- 3.1.2.12 The Bidder is responsible for ensuring data integrity and timely submission. Failure to provide data/ info on timely basis may be considered a breach of contract.

3.2 4D MONITORING

- 3.2.1 4D Monitoring Platform will be provisioned and implemented by purchaser. The solution will integrate the schedule and actual progress data and 3D Models for rendering the 4D model. It will implement visualization of work at different stages of Procurement and Construction w.r.t. the schedule. The 4D rendering will highlight items, color code items and work done during any specified period.
- 3.2.2 Wherever 3D Modelling is in Bidder's scope, bidder shall support and utilize 4D Monitoring Platform deployed by Purchaser by using Navisworks (.nwd) files from 3D models and Schedule and Actual progress data from PMIS/ P6 EPPM or MS Projects for the unit.
- 3.2.3 Bidder has to prepare schedule in such a manner that activities/ tasks can be mapped to 3D model elements.

- 3.2.4 4D Monitoring will be progressively detailed from L1 to approx. L4 Level (Work Package) as 3D Model Matures and the project moves from Engineering to Commissioning Phase. Update Frequency will be Monthly. Bidder shall provide inputs accordingly.

3.3 DIGITAL QUALITY INSPECTION SYSTEM (DQIS).

3.3.1 System Overview

- 3.3.1.1 Purchaser intends to deploy a Digital Quality Inspection System for quality inspection for status monitoring, recording and storing digital copy of quality inspection records for inspections at Vendor Shops and Fabrication Yards and Construction site .All quality inspection process is expected to be conducted through DQIS. DQIS shall have provision for stagewise inspection activities for Shop Inspection ,Civil, Structural, Piping, Mechanical, Equipment Erection, Electrical, Instrumentation, Pre-commissioning and commissioning works and shall align with the job specifications and ITPs for respective activities provided elsewhere in the tender documents. Project Progress reports (PMIS) shall also be linked to DQIS.

- 3.3.1.2 DQIS shall have inbuilt user help features, offline working capabilities on the mobile devices/ smart phones and Dashboards for status monitoring.

- 3.3.1.3 DQIS shall maintain detailed immutable audit trails for each inspection, ensuring transparency and traceability. This helps in tracking any changes made during the inspection process.

- 3.3.1.4 DQIS shall be accessed through browser-based interface on laptops, tablets and mobiles. A Mobile App shall also be provided for user access from smart phones (Android™ 11 or later versions and IOS).

3.3.2 Bidders Obligations:

- 3.3.2.1 Bidder shall be responsible for capturing/entering data, observations, and deviations, annotations, submitting resolutions (as applicable) ,providing info to prepopulate dropdown lists for the forms defined in DQIS and in line with bidders' scope and ITP's and obtaining the approval on DQIS report from relevant inspector. In-built cameras of tablets and smart phones will be utilized for capturing images during inspection. The images can be of the detail inspection reports, backup documents and photograph(s), if any, taken by inspector during inspection..

- 3.3.2.2 Bidder shall comply with the workflows defined in the DQIS broadly covering the shop inspection and entire site inspection process including raising inspection calls, conducting inspection, raising queries/ observations/ problems/ comments, submitting resolution to PMC/ MPMC/ Client observations/ comments/ issues etc.

- 3.3.2.3 Bidder and its supervisory personnel shall actively monitor dashboards and reports generated by DQIS to track unresolved issues and compliance trends, ensuring timely compliance.

- 3.3.2.4 Bidder shall coordinate with all stakeholders as necessary for timely and effective execution of inspections of the project through DQIS.

- 3.3.2.5 Bidder shall nominate representatives to attend mandatory DQIS training sessions and achieve system proficiency within one month of deployment.

- 3.3.2.6 Bidder shall comply with the DQIS data security protocols and ensure that only authorized personnel access the system using approved devices.
- 3.3.2.7 Bidder shall ensure their personnel including sub-contractors and vendors are equipped with laptops/ tablets/ smartphones (AndroidTM 11 or later) for use of the DQIS System. User/ Role based access to the system shall be provided. For Refinery revamps contracts, intrinsically safe smartphones are to be deployed.
- 3.3.2.8 Bidder shall follow the manual paper/ email-based Quality Templates as defined in the relevant specs and directions of Engineer-in-Charge in case the DQIS is dysfunctional or is withdrawn during the course of execution of the contract.

3.4 CAMERA BASED DIGITAL SAFETY MANAGEMENT SYSTEM (DSMS-CAMERA)

3.4.1 Solution Overview

- 3.4.1.1 Purchaser intends to deploy a Camera based Digital Safety Management System with AI video analytics for the BPREP Project. DSMS Camera shall have feature to detect and report different types of safety violations/ incidents by AI based video analytics in real-time like PPE (Helmet, Safety Jacket, Safety Shoe) non-compliance detection, Intrusion in restricted zones detection, Absence of barricades/ safety railing, Unsafe working at height etc. The system shall also have workflows for reporting and resolving the detected safety violations.
- 3.4.1.2 Purchasers other Vendors shall be deploying multiple devices like wireless cameras, routers, field network, network switches, cables, network devices, servers/ edge devices, Network Video Recorder etc throughout the project area. A number of devices shall be deployed in the Bidders work areas including laydown and fabrication yards.

3.4.2 Bidders Obligations

- 3.4.2.1 BIDDER shall coordinate with all stakeholders (MPMC, PMC, Purchasers Other Vendor) to facilitate timely and seamless installation, operation, maintenance and decommissioning of the entire DSMS-CAMERA Solution within Bidders work area including relocation of devices as per project progress during execution of the project.
- 3.4.2.2 Bidder shall coordinate their site works with purchaser's DSMS Camera Solution Provider. Bidder shall support DSMS camera solution provider to facilitate hindrance free camera view
- 3.4.2.3 The System will have feature to automatically report the safety violations observed to the bidder/ bidder's vendor/ sub-contractor HSE personnel with observation (text and photo/ video and other details. Bidder shall address and resolve reported violations within 48 hours by submitting detailed proof of resolution through the DSMS-CAMERA. This may include textual descriptions of corrective actions, updated photographs, demonstrating rectification measures, and additional comments if required. Rejected resolutions shall be readdressed promptly as per feedback provided within the system.
- 3.4.2.4 Bidder shall depute safety officers to identify the contractor against each violation where multiple contractors are deployed in a working area.
- 3.4.2.5 Purchaser's vendor will also deploy TV screens for monitoring of safety using live view cameras, safety videos. If instructed by the Engineer-In-Charge bidder shall deploy

dedicated safety officer for monitoring of the cameras, observe any violation and inform other safety officers deployed at site to immediately take corrective action.

- 3.4.2.6 Bidder shall actively monitor DSMS-Camera dashboards and reports generated by DSMS-CAMERA to track unresolved issues and compliance trends, ensuring timely compliance.
- 3.4.2.7 Bidder shall comply with the DSMS-CAMERA data security protocols and ensure that only authorized personnel access the system using approved devices.
- 3.4.2.8 Bidder shall nominate representatives to attend mandatory DSMS-CAMERA training sessions and achieve system proficiency within one month of deployment.
- 3.4.2.9 Bidder shall be responsible for safekeeping of DSMS-CAMERA devices and TV screens deployed by Purchaser's Vendors in the Bidders Unit/ Work area.

3.5 APP BASED DIGITAL SAFETY MANAGEMENT SYSTEM (DSMS-APP)

3.5.1 Solution Overview

- 3.5.1.1 A web application and Mobile App based Digital Safety Management System (DSMS-APP) hosted in Meity empanelled cloud data centre, will be provisioned and implemented by purchaser. The application will have feature to report different types of safety violations, incidents e.g. PPE non-compliance, unsafe working at height, absence of fence/ barricade in required areas, intrusion in restricted zones, proximity to heavy/ dangerous machinery, fire/smoke etc. in real-time from Smart phones (Android™). Safety violation reporting will include capture of violations/ non-compliance observed by BPCL, EIL, Bidder with photo(s), short (upto ten second) video from the field.
- 3.5.1.2 The application will have feature to report the safety violation observed to the bidder/ bidder's vendor/ sub-contractor HSE personnel with observation (text and photo/ video) along with corresponding contract name, type and category of violation, date, time etc. It shall also have feature for concerned contractor's/ sub-contractor's HSE personnel to submit resolution against the violation with Text plus Photo(s), short (upto ten second) video. The application will have feature to accept/ reject & return Contractor's/ sub-contractor's Resolution against the violation.

3.5.2 Bidders Obligations

- 3.5.2.1 Bidder shall support implementing DSMS-APP by providing consent by their employees and vendors'/ sub-contractors' employees and utilizing the application. Bidder shall ensure that each and every safety violation/ incident observed and reported through the DSMS-APP in their work unit are looked into, corrective actions are taken and resolution is submitted.
- 3.5.2.2 Bidder shall ensure all their own and vendors/ sub-contractors designated HSE personnel at field are equipped with smartphones (Android™ 11 or later) to use the DSMS-APP.
- 3.5.2.3 Bidder shall nominate representatives to attend mandatory DSMS-APP training sessions and achieve system proficiency within one month of deployment.
- 3.5.2.4 Bidder shall facilitate full compliance with the use of DSMS-APP for safety violation reporting, good observations reporting, resolution tracking, and emergency notifications.

- 3.5.2.5 Bidder shall follow the manual paper/ email based HSE compliance system as defined in the HSE Specs and directions of Engineer-in-Charge in case the DSMS-APP is dysfunctional or is withdrawn during the course of execution of the contract.
- 3.5.2.6 Bidder shall ensure that all safety violations, incidents, and near-miss events observed on-site are reported through the DSMS-APP timely. Each report shall include accurate details, relevant photos, short videos (10 seconds max), and annotations to highlight the specific safety issue.
- 3.5.2.7 Bidder shall address and resolve reported violations within 48 hours by submitting detailed proof of resolution through the DSMS-APP. This includes textual descriptions of corrective actions, updated photographs, or short videos demonstrating rectification measures, and additional comments if required. Rejected resolutions shall be readdressed promptly as per feedback provided within the system.
- 3.5.2.8 Bidder shall actively monitor dashboards and reports generated by DSMS-APP to track unresolved issues and compliance trends, ensuring timely compliance.
- 3.5.2.9 Bidder shall utilize DSMS-APP to raise real-time alerts in emergencies requiring immediate action, providing accurate location data for response teams.
- 3.5.2.10 Bidder shall comply with the DSMS-APP data security protocols and ensure that only authorized personnel access the system using approved devices.
- 3.5.2.11 Bidder shall ensure their personnel including sub-contractors and vendors are equipped with laptops/ tablets/ smartphones (AndroidTM 11 or later) for use of the DSMS-APP. User/ Role based access to the system shall be provided. For Refinery revamps contracts, intrinsically safe smartphones are to be deployed.

3.6 AUTOMATED MANPOWER PRODUCTIVITY SYSTEM (MANPS)

3.6.1 Solution Overview

- 3.6.1.1 Automated web-based Manpower Productivity System (Active RFID/ BLE based), hosted in MeitY empanelled cloud data centre, will be provisioned and implemented by purchaser. The digital solution will be used for tracking of deployment/ mobilization of manpower including attendance/ variance in total mobilization, labour composition vs plan (skilled, semi-skilled, unskilled), average daily working hours, location tracking etc.

Active RFID/ BLE cards may be an addition to contractor's entry gate pass.

3.6.2 Bidders Obligations

- 3.6.2.1 Bidder shall support implementing MANPS by their employees and vendors'/ sub-contractors' employees and by utilizing the application.
- 3.6.2.2 Bidder shall furnish accurate details of all workers, name, gender, Photo ID Card No., skill levels (skilled, semi-skilled, unskilled), and vendor/ sub-contractor specific details, to the MANPS system at least four working days prior to mobilization.
- Bidder shall consider Active RFID/ BLE cards equivalent to gate pass.
- 3.6.2.3 Bidder shall provide monthly projections of worker mobilization and demobilization for the next two months to ensure smooth operations.

- 3.6.2.4 Bidder shall ensure that all bidder's, and bidder's vendors', sub-contractors' personnel/ workers wear the Active RFID/ BLE cards while inside the BPREP Project Area.
- 3.6.2.5 Bidder shall nominate representatives responsible for managing worker data, verifying card issuance, collecting cards and returning, changing of card battery, and addressing any system-related queries.
- 3.6.2.6 Bidder shall nominate representatives to attend mandatory MANPS training sessions and achieve proficiency in use of the same.
- 3.6.2.7 Bidder shall provide distribution of workers based on work allocation in the MANPS package.
- 3.6.2.8 Bidder shall use MANPS to track worker attendance, deployment and location, ensuring compliance with authorized areas and reporting and taking corrective actions for any unauthorized access detected by the system.
- 3.6.2.9 Bidder shall promptly update the MANPS system with details of demobilized workers and return their RFID/BLE cards daily to the MANPS solution provider as per process requirements. In case card is not returned, bidder will have to bear the actual cost of card incurred by BPCL plus admin charges in line with GCC.
- 3.6.2.10 Bidder shall report any lost or damaged RFID/BLE cards through the MANPS system and bear the cost of replacements (actual cost of card incurred by BPCL plus admin charges in line with GCC), as applicable. Also, the case of non-submission of the RFID/ BLE cards / lost RFID/ BLE cards shall require the contractor to lodge complaint at the local Police Thana and submit a copy of the same to BPCL Security.
- 3.6.2.11 Bidder shall utilize the dashboards and reports generated by MANPS for monitoring worker attendance, deployment w.r.t. skill level, location tracking, ensuring alignment with project requirements.
- 3.6.2.12 Bidder shall ensure all workers comply with the MANPS usage protocols.
- 3.6.2.13 Bidder shall obtain and maintain explicit consent from all their/ their vendors/ sub-contractor personnel/ workers for the collection, use, and processing of their data within the MANPS system, with compliance with relevant data protection regulations and project guidelines.
- 3.6.2.14 Bidder shall coordinate with the MANPS solution provider to ensure smooth integration of worker data into the MANPS system, flag any system-related issues promptly, and provide general cooperation for effective system operation.
- 3.6.2.15 Bidder shall coordinate their site works with purchaser's MANPS Solution Provider.
- 3.6.2.16 Bidder shall be responsible for watch and ward/safekeeping of devices deployed by MANPS Solution Provider within or near the B/L or contractors work area.

3.7 WAREHOUSE MANAGEMENT SYSTEM (WMS)

- 3.7.1 Bidder shall deploy Warehouse Management System and provide APIs/ Manual Data Entry (as necessary) for sharing information with purchaser's CT-CDE to facilitate a live view of the material availability in bidder's warehouse.

3.7.2 Bidder shall provide all assistance and guidance to Purchasers CT/CDE Vendor to integrate the WMS with CT/CDE and ensure uninterrupted and seamless data exchange throughout the contract period.

3.7.2.1 Bidder shall provide login credentials to Purchaser, MPMC and PMC/ EPCM to provide access to their WMS in case the bidder WMS is not able to integrate with Purchaser CT/ CDE or CT/ CDE is dysfunctional during the course of execution of the contract. Bidder may also have to provide manual entry in CT-CDE related to WMS in case of integration failure.

3.8 TRANSPORT MANAGEMENT SYSTEM (TMS)

3.8.1 Bidder shall deploy URL's for Viewing Physical Location on Key Materials, Long Lead Items (LLI's), ODC equipment etc. interfaced from Transport Management Solutions of Bidder's Vendor's (TMS shall be by bidder's OEMs/ Transporters)

3.8.2 Bidder shall provide all assistance and guidance to Purchasers CT/CDE Vendor to integrate the TMS with CT/CDE and ensure uninterrupted and seamless data exchange throughout the contract period.

3.8.3 Bidder to also refer and comply to "PROCEDURE FOR SMART INTEGRATED ENGG., DIGITAL HANDOVER OF DRAWING/DOCUMENT/ 3D MODEL AND DIGITAL INTERVENTION BY BIDDER".

3.9 SPOOL MANAGEMENT SYSTEM

3.9.1 Bidder shall deploy and use Piping Spool Management System to reduce construction errors and delay during identifying, tracing and installing piping spools. The objective of the system shall be as under.

- (i) Productivity and trackability improvement
- (ii) Job tracking and availability of real time data capture
- (iii) Better inventory control
- (iv) Reducing the errors and associated cost in sending incorrect spools to site for installation

3.9.2 Methodology and controls: The general guidelines for piping spool management are stated below

- (i) The Spool Tracing System shall work in alignment with DQIS where records for Piping Spool Fabrication, Erection , Alignment and Piping Quality Control (NDT Records, LHS etc) are maintained.
- (ii) A unique numbering system for pipe-spools shall be developed. The system shall incorporate unit designation/ number, line number and spool sequence number as a minimum. The spool number shall be hard-punched on the pipe spool at a conspicuous location.
- (iii) All fabricated / completed spools shall be marked and identified using conventional multi-line bar code stickers which shall have information pertaining to spool number

as well as traceable correlation to other parameters recorded in a database. Printed bar code stickers shall be properly fixed on to the pipe spools.

- (iv) The barcode stickers fixed on spools shall be readable with the help of bar code readers and shall show a unique bar code serial number upon reading. The bar code shall be co-relatable to the spool number of the pipe.
- (v) Apart from the above, spools shall be affixed with suitable RFID (Radio Frequency Identification) tags which can be read through a RFID scanner. The RFID system shall have search and Id capability and shall be co-relatable to spool number in the database
- (vi) All Hardware, software, consumables, labour and supervision required for implementing the spool management system shall be provided by contractor at no extra cost. Contractor shall develop a detailed procedure incorporating the above suggested elements and submit the same to Engineer In-charge for approval before implementation.

3.9.3 Bidder shall provide direct access to 3 Nos. Users of PMC and 2 Nos. Users of Purchaser to the Spool Management System during the contract duration. Bidder shall also arrange training session to PMC and Purchaser personnel on using the system.

3.10 WELDING MANAGEMENT SYSTEM

3.10.1 Welding Management System shall assist in monitoring, tracking and recording of all Pining Welding Works to enable efficient management of piping welding activities. The solution shall work in sync with the Spool Management System deployed by the Bidder.

3.10.2 This digital solution consolidates the relevant piping drawings, PQR (Welding Procedure Qualification Record), and track data of number and quality of piping joints and productivity of welding team etc.

3.10.3 The Welding Management System deployed by the Bidder shall have the following broad functionalities:

- (i) Marking of pipe spools
- (ii) Joint numbering, field jointing identification including incorporation of revisions
- (iii) Welding Workload, front analysis and balance work identification.
- (iv) WPS/PQR (welding procedure specification, procedure Qualification Record)
- (v) Welder performance reports
- (vi) Welder list vis-a vis WPS.
- (vii) Line History sheet for weld joints, flanged joints, traceability record
- (viii) Hydrotest reports/ NDT Clearance (as applicable)
- (ix) Line wise/ Area wise / loop wise final completion report
- (x) Material appropriation/ traceability report
- (xi) Manpower & consumable estimation for fit-up, welding, NDT etc.
- (xii) Reallocation of fabricated spools etc.
- (xiii) Re sequencing of welding joints
- (xiv) Reports for Welding Progress Monitoring.

3.11 CABLING MANAGEMENT SYSTEM

- 3.11.1.1 Bidder shall deploy a digital solution to consolidate the relevant cable schedules with detail of type and length, daily upload the progress on the system, generates cabling progress report
- 3.11.1.2 The Cabling Management System shall have functionalities for managing the entire site cabling works. The system shall identify the cable schedules with drum schedules, keep record of total length of cables in each drum as supplied, balance cable remaining after cutting of cables from the drum. The system shall also display the total length of each type of cables available at site.

3.12 COMMON SYSTEM FEATURES & FUNCTIONALITIES

- 3.12.1 BPCL cyber security guidelines as Circular IS24-25.1 and IS24-25.2 (attached) are to be followed for the integrated Digital Solutions under bidder's scope (Spool Management System, Welding Management System and Cabling Management System). Bidder shall also comply to the BPCL Cybersecurity Checklist (attached), BPCL Security Checklist for Cloud/ Third-party solutions (attached) and BPCL Security conditions in tender for purchasing Commercial software (attached).
- 3.12.2 Software applications, including 3rd Party applications, with valid licenses & support should only be deployed. Any liability arising out of any software non-compliance would strictly lie with the bidder.
- 3.12.3 Bidder is responsible for complete system architecture, setup and maintenance of all system software components including Operating System, Database Server, Security devices etc, as needed for robust performance and as per system performance standards in the SLA.
- 3.12.4 For all solutions providing file upload scenarios, following functionalities to be ensured:
- (i) File upload should verify the file types. Only required file-types to be accepted by the application.
 - (ii) While uploading, files need to be scanned against malware. Solution should allow only clean files to be uploaded.
- 3.12.5 For APIs, following minimum security controls should be included: -
- (i) Strong Authentication
 - (ii) Encryption
 - (iii) Rate limiting
- 3.12.6 All web-based applications/ dashboards etc. shall have feature of session auto-log out in case of idling of user by 10 min.
- 3.12.7 **PROVEN TRACK RECORD**
- 3.12.7.1 The digital solutions under bidder's scope (Spool Management System, Welding Management System and Cabling Management System) shall have been supplied or provided as managed solution (either cloud hosted or on premise) by bidder/ bidder's

respective digital solution provider either by themselves or with support from any OEM(s), and each of the solutions shall have completed a period of minimum six (6) months after go-live.

3.12.8 In case bidder proposes to provide the digital solutions Spool Management System, Welding Management System and Cabling Management System through OEM(s)/ solution provider(s), following shall apply:

- (i) Bidder shall furnish Manufacturer Authorization Certificate and Logistic Support letter from OEM(s)/ digital solution provider(s) of Spool Management System, Welding Management System and Cabling Management System confirming the following. The letter must be signed by OEM(s)/ digital solution provider(s) corporate level signatory on company letter head.

“The OEM(s)/ digital solution provider(s) assumes complete responsibility for their involvement with the bidder in all phases of work during the contract period like system engineering, cloud hosting, User Acceptance Test, Go-live, operation, maintenance, decommissioning and exit management.”

3.12.9 **MANPOWER DEPLOYMENT**

3.12.9.1 Bidder shall deploy necessary manpower at the BPCL BR site dedicated for operation and maintenance and to provide support and assistance to users of Spool Management System, Welding Management System and Cabling Management System . The persons shall have minimum 2 years of experience in IT support. Bidder shall also be responsible for deploying additional personnel as per project exigencies.

4.0 **ADHERENCE TO STANDARDS**

4.1 **QUALITY, SAFETY, DOCUMENTATION AND CYBERSECURITY**

4.1.1 The bidder shall comply with the mentioned standards for the execution of the work as mentioned in the following clauses.:

- (i) Quality Management System: Bidder shall comply to EIL Standard Specification for Quality Management System, 6-78-0001.
- (ii) Documentation Requirements: Bidder shall comply to EIL Standard Specification for Documentation Requirements for Contractors 6-78-0002 and from Suppliers, 6-78-0003.
- (iii) HSE Management and Safety Measures for Electrical Installations: Bidder shall comply to EIL Standard Specification for Health, Safety and Environment, 6-82-0001 and Safety Measures for Electrical Installations during Construction, 7-51-0332.
- (iv) Cybersecurity Requirements: Bidder shall comply to BPCL's Cybersecurity requirements as per Circular. IS24-25.1, IS24-25.2 (attached), BPCL Security Checklist for Cloud/ Third-party solutions (attached) and BPCL Security conditions in tender for purchasing Commercial software (attached).

5.0 **INTEGRATED ACCEPTANCE TEST (SAT)**

5.1 GENERAL

- 5.1.1 Bidder/ bidder's respective digital solution provider for Spool Management System, Welding Management System and Cabling Management System shall demonstrate the functional requirements of the respective digital solution to BPCL and EIL for acceptance.
- 5.1.2 Bidder shall furnish the SAT Procedure for Spool Management System, Welding Management System and Cabling Management System for BPCL/ EIL review prior to offering the respective digital solution for SAT.

6.0 LIST OF ATTACHMENTS

- (i) EIL Standard Specification for Quality Management System, 6-78-0001
- (ii) EIL Standard Specification for Documentation Requirements from Contractors, 6-78-0002.
- (iii) EIL Standard Specification for Documentation Requirements from Suppliers, 6-78-0003.
- (iv) EIL Standard Specification for Health, Safety and Environment, 6-82-0001
- (v) EIL Standard Specification for Safety Measures for Electrical Installations during Construction, 7-51-0332
- (vi) BPCL Cybersecurity requirements as per Circular. IS24-25.1
- (vii) BPCL Cybersecurity requirements as per Circular. IS24-25.2
- (viii) BPCL IT Security Compliance Check List
- (ix) BPCL Security Checklist for Cloud/ Third-party solutions
- (x) BPCL Security conditions in tender for purchasing Commercial software
- (xi) KPI List

Security conditions in tender for purchasing Commercial software

1. **Non-Disclosure Agreement (NDA):** Non-Disclosure Agreement (NDA) should be signed between BPCL and the vendor (on Rs.100/- non-judicial stamp paper) before the start of contract. NDA should be signed by the representatives of both the organizations. No data should be shared before signing of the NDA.
2. Software should be secured by design. It should support following security functionalities: -
 - a. Authentication
 - b. Authorization
 - c. Generating Logs and Audit trails
 - d. Role based access
3. Software should support configuring multiple roles with the least privilege principles. Software should also support configuring strong password policy (complexity, age, history etc.).
4. Vulnerability Assessment Penetration Testing (Level1 and Level2) of the proposed software should be done through CERT-In empanelled auditor:
 - before initial roll-out,
 - subsequently before a major change/ upgrade or once in a year, whichever is earlier.and submit Level2 report to BPCL.
5. All identified vulnerabilities need to be closed before deploying the solution into production.
6. The software provider should inform whenever any new security issue or vulnerability is identified related to the software. The provider should release security patches or updates for the same in timely manner. The software provider should also patch the vulnerability in timely manner in case any vulnerability is reported by BPCL.
7. The vendor should ensure deploying security patches/updates and software upgrades in timely manner during the period of the contract including warranty/extended warranty/ comprehensive contracts post warranty. The software provider should maintain the compatibility of the software in line with newly released operating system/ database/ webserver/ browser etc.
8. The software should have provision to integrate with other standard security technologies like:
 - a. Multi-factor authentication
 - b. Single Sign-ON
 - c. Identity and Access management
9. The software should support encryption for data at rest using the latest encryption algorithms such as AES 256 or higher. It should support encryption of data in-transit using minimum TLS 1.2 or above.
10. Software should support generating logs and audit trails. It should support retention of logs for at least 180 days.
11. Vendor should submit the SBOM (Software Bill of Materials) of the proposed software. SBOM should include, at a minimum: name of the component, version of the component, name of the publisher etc.
12. In case any cyber incident/data breach is reported in relation to the deployed software in BPCL, the vendor should provide all necessary support during cyber incident response and forensic investigation without charging any additional cost to BPCL.
13. BPCL may conduct security audit or assessment (through third-party auditors) of the software after deployment. The vendor should extend all necessary support and assistance during the

audit process as well as mitigate the reported observations without charging any additional cost to BPCL.

Security Checklist for Cloud/ Third-party solutions

1. **Non-Disclosure Agreement (NDA)** should be signed between BPCL and the Contracting Agency (on Rs.100/- non-judicial stamp paper) as well as between contracting agency and their service providers before the start of contract. NDA should be signed by the contracting agency as well as BPCL signatory. No data should be shared before signing of the NDA.
2. Data centre on which the application to be hosted should preferably be within India, unless there is a strong justification for hosting it outside and acceptable to BPCL.
3. Access to the applications should be preferably restricted to **India Region**.
4. Cloud Service Provider or the Data Centre Provider should maintain accreditation by MeitY or Local accreditation agency (for data hosted outside India).
5. Cloud Service Provider or the Data Centre Provider should maintain relevant security standards. e.g.
 - a. ISO/IEC 27001 (Information Security Management)
 - b. ISO/ IEC 27017 (Code of practice for securing cloud services)
 - c. ISO/IEC 27018 (Code of Practice for Protecting Personal Data)
 - d. SOC 2
6. Solution provider should submit the detailed asset inventory, application & database platform and network architecture details as per template shared by BPCL.
7. Backups of all components are taken periodically (periodicity to be decided by the business) to ensure the availability of data & the relevant applications in case of a major failure or a security incident.
8. Network/ perimeter should be protected through a **Firewall** and **intrusion protection system (IPS / IDS)**.
9. All components including Operating System, DB, Web server, application server, Network & Security systems etc. should be **hardened** before deployment of any new solution with minimum of following (but not limited to) controls: -
 - a. Local Administrator accounts should be renamed.
 - b. Unused accounts should be disabled or deleted.
 - c. Guest accounts should be disabled.
 - d. Default passwords should be changed.
 - e. All unused ports and services should be disabled or removed.
 - f. Account lock-out policy should be configured.
 - g. All applicable security updates/patches should be installed.
10. Timestamp of all system components should be in sync with the Network Time Protocol (NTP) servers of National Informatics Centre (NIC) or National Physical Laboratory (NPL).
11. **Patching and reboot** of systems (if applicable) should be done on periodic basis.
12. The servers should be protected through a leading **Anti-malware/ EDR / XDR solution**.

13. Data in transit should be encrypted using **TLS1.2** or above.
14. The **data at rest** should be **encrypted** with **AES-256** encryption algorithm or above.
15. Passwords should be **complex** and **not easily guessable or common phrases**. Passwords should not be hardcoded in any program/ script. Passwords should be changed periodically (between 42 to 90 days).
16. Access to the solution should be configured with **multi-factor authentication**.
17. Administrator/ Privilege access extended to the personnel of solution provider should be logged and reviewed periodically.
18. All whitelisted IP addresses should have access only to a specific service/ ports.
19. All outgoing access from servers to Internet must be restricted through limited IP addresses or URLs as per the business requirement.
20. Except production applications, all other application and systems (including development, UAT, DB and other infrastructure components) should not be made accessible directly over Internet. In case remote access to such systems is required by vendor personnel (Administrators/ developers/ other employees) or BPCL, the access should be provisioned via secure mechanism (such as VPN, IP restriction etc.).
21. Captcha to be enabled on the login screen, and also for critical transactions.
22. Vulnerability Assessment Penetration Testing (Level1 and Level2) should be done through CERT-In empanelled auditor:
 - before initial roll-out,
 - subsequently before a major change/ upgrade or once in a year, whichever is earlier.and submit Level2 report to BPCL.
23. All identified vulnerabilities need to be closed before deploying the solution into production.
24. Vulnerabilities identified either through VAPT/ WAPT or through other mediums (disclosure by OEM, advisories by statutory agencies, tool-based scanning etc.) should be patched as per below timelines:
 - Critical – 3 days
 - High – 5 days
 - Medium – 15 days
 - Low – 21 days
25. Any unused published web services/ APIs should be taken down.
26. All types of clear-text protocols such as TELNET, FTP etc. must be disabled.
27. Software with valid licenses & support should only be deployed.
28. In case the solution provider has used an open-source or third-party software codes/ libraries in building the offered software, then they should carry out necessary security

tests against those software components (such as Static Application Security testing, source code review, Secure Composition Analysis etc.) to ensure such components are secured by design. In addition, solution provider should share **the Software Bill of Materials (SBOM)** for all open-source components with BPCL.

29. All Internet-facing web applications should have Web Application Firewall (WAF), Anti-DDoS, Anti-BOT, API security protection enabled.
30. Logging should be enabled at all layers of the infrastructure and logs to be provided for auditing/ forensic investigations as and when requested by BPCL. All security, access & transaction logs should be retained for minimum 180 days.
31. Change Management process should be followed for making changes in the solution as well as in the infrastructure.
32. The solution should be governed through continuous monitoring & response (identify-protect-detect-respond-recover) from any security incident/ data breach.
33. The solution provider should follow secure software development lifecycle practices (including Static Application Security Testing, source code review, etc.) to develop & maintain the software being offered.
34. The solution provider must notify BPCL immediately as soon as they know or believe that a Cyber Security Incident/ Breach of Data/ Loss of Information has or may have taken place and must provide full details of the incident and any mitigation measures already taken and intended to be taken by them and (where applicable) any mitigation measures recommended by them to be taken by BPCL.
35. Following a Cyber Security Incident involving BPCL's services/ data, the solution provider should:
 - a. use their best endeavours to mitigate the impact of the Cyber Security Incident, e.g. if any system is reported under breach/ incident, the solution provider should disconnect it from the network immediately to contain its lateral movement.
 - b. extend all necessary support and assistance to BPCL for carrying out incident analysis/ forensic investigation till its conclusion.
 - c. ensure to preserve the digital evidence and logs till the conclusion of the investigation and confirmation from BPCL about the deletion of the evidence.
 - d. take any action deemed necessary by BPCL in the circumstances, including complying with any additional security measures deemed appropriate by BPCL.
36. In case the solution provider has purchased the entire solution/ service (to be offered to BPCL) or parts of it from another supplier/ provider, then they must be aware of the complete chain of suppliers/ providers.
37. The solution provider should ensure to obtain the necessary security compliance documents (such as VAPT report/ other Security Audit report/ 'Safe to Host' Certificate etc.) from the suppliers/ providers for all the components purchased. The solution provider must conduct all necessary checks to ensure that the purchased product does not have any embedded security threat such as malware, rootkit, remote access trojans or backdoor etc.

----- End of Document -----



Application Name

Application URL/ IP Address

Business Case

Application owner
(SBU/ Entity of BPCL)

Name of the Vendor

Technical Contact Person(s) of vendor

Name: _____

Email: _____

Mobile: _____

Security Control

Response

Remarks

Is **Non-Disclosure Agreement (NDA)** signed between BPCL and Contracting Agency?

☐ Yes ☐ No

Is **NDA** signed between the vendor and their Service Provider? (if applicable)

☐ Yes ☐ No

Note: NDA shall be signed and stamped by the vendor and BPCL on a non-judicial stamp paper (of Rs. 100/-)

Type of the offered solution (IaaS/ PaaS/ SaaS or others)

- **IaaS (Infrastructure as a Service):** Vendor will manage dedicated infrastructure alongwith software for BPCL requirement, in which Infrastructure contains underlying servers, storage, network, security devices etc.

• PaaS (Platform as a Service): Hardware & Software platform will be managed by the Cloud Service Provider whereas vendor will manage BPCL application. • SaaS (Software as a Service): Vendor has offered a standard or enterprise-level application/ software to BPCL which will be customized as per BPCL's requirement. • Any other type: Please specify.		
Details of data hosted by the application: • Employee data, Consumer/ Customer data, Third-party or vendor data, or others. Specify details. • Does it contain any sensitive/ personal data (such as mobile no, address, PAN no, Ration card no., bank details, etc.). If yes, specify details. • Does it contain Aadhaar related data? • Does it contain any sensitive or confidential information of BPCL or any other third-party? If yes, provide details.	☐ Yes ☐ No ☐ Yes ☐ No	
Is Data Centre located within India? (specify location) If 'No', provide SBU/ Entity Head approval as per Part-I	☐ Yes ☐ No Primary: _____ DR: _____	
Is Data Centre accredited by MeitY (for DC within India)/ local authority (for DC outside India)?	☐ Yes ☐ No	
Is Data Centre compliant with following Security standards? • ISO/ IEC 27001 • ISO/ IEC 27017 • ISO/ IEC 27018 • SOC 2	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
Details of Asset Inventory (Use the excel file for providing asset inventory)		

 BPCL_IT_Asset_Invent ory_Template.xlsx		
Attach Network architecture diagram Note: <i>In the network architecture diagram, specify all the components, draw their connections and data flows. Also specify IP addresses (private and public IPs as applicable).</i>		
Application platform	_____	
Database platform	_____	
Is access to the application restricted within India region? (Or, is Geo-fencing enabled?)	☐ Yes ☐ No If 'No', provide SBU/ Entity Head approval as per Part-II	
Is access to the application configured with multi-factor authentication?	☐ Yes ☐ No	
Is Captcha enabled on the login page and for critical transaction screens?	☐ Yes ☐ No	
Is account lockout policy configured at the application and system level? If Yes, specify the threshold value (maximum no. of invalid login attempts allowed)	☐ Yes ☐ No Threshold _____	
Password Policy: - Is Password policy configured? - Is default password changed at all layers (e.g. OS, Application, DB & all other associated systems/ devices)? - Are passwords hardcoded in any program/ scripts? - Is password changed periodically? (Frequency of Password change)	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No _____	
Account Security: Is Local Administrator account renamed?	☐ Yes ☐ No	

- Are all unused accounts disabled/ deleted? - Administrators - Developers - Users (transferred/ resigned/ terminated/ suspended/ role-changed)	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
Are timestamps across all systems synchronized with NTP (Network Time Protocol) servers? Note: As per CERT-In's directive, NTP server should be in sync with NTP of National Informatics Centre (NIC) or National Physical Laboratory (NLP)	☐ Yes ☐ No	
Is backup of all components taken periodically? (Specify periodicity)	☐ Yes ☐ No 	
Is network/ perimeter protected through Firewall and Intrusion detection system (IPS/ IDS)? Specify make & model of the solution:	☐ Yes ☐ No 	
Is hardening of all components completed before deployment of the solution?	☐ Yes ☐ No	
Is patching (and reboot of systems, wherever applicable) done on periodic basis?	☐ Yes ☐ No	
Are servers protected through anti-virus/ anti-malware/ EDR/ XDR solution? If yes, specify the product name:	☐ Yes ☐ No 	
Is data in transit encrypted by TLS? (Specify TLS version)	☐ Yes ☐ No 	
Is critical & sensitive data at rest, if any, encrypted with AES-256 algorithm or more?	☐ Yes ☐ No	
Provide VAPT (Vulnerability Assessment and Penetration Testing) and WAPT (Web Application Penetration Testing) compliance report issued by CERT-In empaneled Security Auditor (for application hosted within India)/ Authorized Third Party Security Auditor (application hosted outside India). Note: (i) VAPT/ WAPT to be done before roll-out and, (ii) repeated once a year or before roll-out of a major upgrade, whichever is earlier. All		

observations need to be closed and final closure report to be submitted. VAPT to be carried out for all infrastructure components (servers/ network/ security devices/ load-balancers and all other associated devices). WAPT to be carried out for all web applications, APIs, mobile apps etc.		
Does vendor follow secure coding practices where vulnerabilities are detected and mitigated during the development phase via Static Application Security Testing (SAST) process?	☐ Yes ☐ No	
Is any open-source component (such as open-source codes/ libraries etc.) used during the development of the solution? If yes, provide Software Bill of Material (SBOM):	☐ Yes ☐ No 	
Are all unused published web services/ APIs for information exchange deactivated?	☐ Yes ☐ No	
Do all whitelisted IP addresses have access only on a specific service/ ports?	☐ Yes ☐ No	
Is incoming Internet access disabled or restricted from limited IP addresses or URLs as per business requirement? Is outgoing Internet access from servers disabled or restricted to limited IP addresses or URLs only as per business requirement?	☐ Yes ☐ No ☐ Yes ☐ No	
Are all types of clear-text protocols such as TELNET, FTP etc. disabled across all layers of systems?	☐ Yes ☐ No	
Does software have valid licenses & support?	☐ Yes ☐ No	
Is any system/ application accessible from the Internet (without using VPN)? If yes, provide the list (including URL, public IP address)	☐ Yes ☐ No 	
Are Development and UAT environment accessible from the Internet (without using VPN)? If yes, provide the details.	☐ Yes ☐ No 	
Is any Database directly accessible from the Internet (without using VPN)?	☐ Yes ☐ No	

If yes, provide the details.	_____	
Are all Internet-facing websites protected using WAF, Anti-DDoS, Anti-BOT, API protection solution? If yes, specify details (name of the solution):	☐ Yes ☐ No _____	
Is logging & auditing enabled across all layers (OS, Web server, Application, DB etc.) and includes origin client IP address, transaction date & time, etc. wherever applicable? (Specify Log retention period) Note: As per CERT-In's directive, security logs are required to be preserved for 180 days.	☐ Yes ☐ No _____	
Specify how developers access the application remotely if they are not in office	_____	
Specify how system administrators access the systems if they are not in office	_____	
Specify how BPCL users access the Dev/ UAT environment	_____	
Are all administrative (privilege access) activities recorded and reviewed periodically?	☐ Yes ☐ No	
Is any change control process followed for making the changes in the application and infrastructure?	☐ Yes ☐ No	
Compliance Report Submitted by (BPCL Officer In-Charge)	Name:	
	Signature:	
Recommendation by CISO		



☐ **Part I: Hosting of Application on Cloud/ Data Centre located outside India**

☐ **Part II: Application access to be provided from outside India**

Application Name

Part I: Hosting of Application on Cloud/ Data Centre located outside India

Business Justification for hosting/ transferring the data outside India

Locations where data shall reside

Details and Type of data stored outside India
(e.g. Employee Name, Staff No., email, etc.)

Name of the Data Centre provider (who shall host the data)

Is GDPR (General Data Protection Regulation) or any other local Data Protection Law applicable to the location?

If "Yes", whether the Data Centre Provider is compliant to it?

Any plan to shift the data back to India in course of time?

If yes, expected time duration

Part II: Application access to be provided from outside India	
Business Justification for providing access from outside India	
Countries from where access to be provided	
Who will access? [BPCL Employees, Customers, Vendors, Others (specify details)]	
Validity of access permission (Temporary/ Permanent)	
Approvals:	
Requested By	Name : Designation : Signature :
Recommended By (DGM or above)	Name : Designation : Signature :
Approved By (Business/ Entity Head)	Name : Signature : Remark (If any) :
Note: Why Data Localization? 1. The main intent behind data localization is to protect the personal/ sensitive information of the country's citizens and residents from foreign surveillance and give local governments and regulators the jurisdiction to call for the data when required. 2. Storing of data locally is expected to help law-enforcement agencies to access information that is needed for the detection of a crime or to gather evidence. 3. Local laws of land are applicable for the data hosted outside India.	

CIRCULAR

Circular.IS.24-25/ 1

30th May, 2024

Subject: Guideline for ensuring cyber security compliance of new IT initiatives

BPCL is leveraging Information Technology extensively for its various business needs by deploying a wide range of systems and applications. Over a period, many SBUs and Entities have also started implementing various IT solutions hosted in cloud/ third-party data centers.

With such an expansive growth in digitization, our exposure to cyber-risk is also increasing. While adopting a new IT solution, any gap in cyber security controls may lead to severe cyber incidents resulting in financial loss, operational disruptions, statutory/ regulatory penalties, reputational damage etc. Under the Digital Personal Data Protection Act, 2023, penalties for data breaches will vary in the range of INR 50 Crore to INR 250 Crore based on the severity and nature of the breach.

Therefore, it is essential to incorporate all necessary cyber security controls right from the planning & design phase itself, so that cyber security requirements become part of the overall specifications (or RFP). At the same time, it is equally important to ensure that all such requirements are complied with before deploying the solution into production.

To ensure that the planned IT solution (and its underlying infrastructure) is secure by design, it is recommended to conduct **Vulnerability Assessment & Penetration Testing (VAPT)/ Web Application Penetration Testing (WAPT)**, as applicable, through an independent auditor empaneled with Indian Computer Emergency Response Team (CERT-In) before the initial roll-out. Subsequently, VAPT/ WAPT to be repeated before a major change/ upgrade or once in a year, whichever is earlier.

What is VAPT?

VAPT is a comprehensive assessment through which security weaknesses or loopholes are identified, which can be exploited by malicious actors. This assessment also simulates real-world attacks to determine viability and impact if the vulnerabilities are exploited. Generally, VAPT is performed on the backend IT infrastructure of the application such as application server, database server, network/ security devices, etc.

What is WAPT?

WAPT is a type of VAPT designed to discover vulnerabilities in web applications/mobile applications/ Application Programming Interface (APIs)/ Software-as-a-Service (SaaS) solutions.



Why VAPT/ WAPT is to be conducted?

Conducting VAPT/ WAPT helps to identify and address security issues early, reduce risks, and ensure compliance. It is a proactive approach that contributes to a more secure and reliable system.

What is the assessment process?

The build which is ready to be rolled out after User Acceptance Test (UAT), should be given for VAPT/ WAPT. The auditor carries out Level1 assessment and identifies the vulnerabilities. The solution provider must patch these vulnerabilities. The auditor carries out retest in Level2 assessment and if all vulnerabilities are closed, then issues a Level2 Report and/ or 'Safe to Host' certificate. In short, there are a minimum of 2 assessments in one cycle. **Overall, it may take an additional 3-4 weeks to complete this process, which needs to be factored in the project schedule.**

Regarding VAPT, following points to be noted: -

- I. The auditing agency should be empaneled with the **CERT-In**. Refer the list of CERT-In empaneled auditors at https://www.cert-in.org.in/PDF/Empanel_org_2022.pdf.
- II. The solution provider should submit Level2 report to BPCL. If a solution provider is unable to disclose the Level2 report as per their policy, then 'Safe to Host' certificate from CERT-In empaneled auditor is acceptable.
- III. For global solutions or the solutions which are not hosted in India, the solution provider is required to submit the VAPT Level2 report/ any other equivalent security audit report/ 'Safe to Host' Certificate issued by a reputed third-party independent auditing firm, in case audit by CERT-In empaneled agency is not feasible.
- IV. New Solution/ major upgrades should be deployed into production only after obtaining the Level2 report/ 'Safe to Host' certificate.

In addition to the VAPT requirements, a comprehensive security checklist also to be included in the tender (refer **Annexure I**) and its compliance to be submitted for security clearance.

You are requested to follow these guidelines for all IT initiatives.



Shital Jiwane
GM IS Cyber Security & GRC

Annexure -I: Security Checklist for Cloud/ Third-party solutions

1. **Non-Disclosure Agreement (NDA)** should be signed between BPCL and the Contracting Agency (on Rs.100/- non-judicial stamp paper) as well as between contracting agency and their service providers before the start of contract. NDA should be signed by the contracting agency as well as BPCL signatory. No data should be shared before signing of the NDA.
2. Data centre on which the application to be hosted should preferably be within India, unless there is a strong justification for hosting it outside and acceptable to BPCL.
3. Access to the applications should be preferably restricted to **India Region**.
4. Cloud Service Provider should maintain accreditation by MeitY or Local accreditation agency (for data hosted outside India).
5. Cloud Service Provider should maintain relevant security standards. e.g.
 - ISO/IEC 27001 (Information Security Management)
 - ISO/ IEC 27017 (Code of practice for securing cloud services)
 - ISO/IEC 27018 (Code of Practice for Protecting Personal Data)
 - SOC 2
6. Backups of all components are taken periodically (to be decided by the business) to ensure the availability of data & the relevant applications in case of a major failure or a security incident.
7. Network/ perimeter should be protected through a **Firewall** and **intrusion protection system (IPS/ IDS)**.
8. All components including Operating System, DB, Web server, application server, Network & Security devices etc. should be **hardened** before deployment of any new solution.
9. **Patching and reboot** of systems (if applicable) should be done on periodic basis.
10. The servers should be protected through a leading **Anti-virus/ Anti-malware solution**.
11. Exchange of data should be carried on encrypted channel using **TLS1.2** or above.
12. The **data at rest** should be **encrypted** with **AES-256** encryption algorithm or more.
13. Default passwords should be changed at all layers of components including Operating System, Applications, Web Servers, Database, Network & Security devices & all other related systems. Passwords should be **complex** and **not easily guessable or common phrases**. Passwords should be changed periodically.
14. Access to the solution should be configured with **multi-factor authentication**.
15. Local Administrator accounts should be renamed.
16. Unused accounts should be disabled or deleted.



17. Vulnerability Assessment Penetration Testing (Level1 and Level2) should be done through CERT-In empanelled auditor:
- before initial roll-out,
 - subsequently before a major change/ upgrade or once in a year, whichever is earlier.
- and submit Level2 report to BPCL.
18. All identified vulnerabilities need to be closed before deploying the solution into production.
19. Apart from VAPT assessment, vulnerabilities identified through other mediums (disclosure by OEM, advisories by statutory agencies, tool-based scanning etc.) should be patched as per below timelines:
- Critical - 3 days
 - High - 5 days
 - Medium - 15 days
 - Low - 21 days
20. Any unused published web services/ APIs for information exchange should be taken down.
21. All whitelisted IP addresses should have access only to a specific service/ ports.
22. All outgoing access to public Internet from servers must be restricted to limited IP addresses or URLs only as per the business requirement.
23. All types of clear-text protocols such as TELNET, FTP etc. must be disabled.
24. Software with valid licenses & support should only be deployed.
25. All Internet-facing web applications should have Web Application Firewall (WAF), Anti-DDoS, Anti-BOT, API security protection enabled.
26. Logging should be enabled at all layers of the infrastructure and logs to be provided for auditing/ forensic investigations as and when requested by BPCL. All security, access & transaction logs should be retained for minimum 180 days.
27. The solution should be governed through continuous monitoring & response (identify-protect-detect-respond-recover) from any security incident/ data breach.
28. The solution provider should follow secure software development lifecycle practices to develop & maintain the software being offered.
29. The solution provider must notify BPCL immediately as soon as they know or believe that a Cyber Security Incident/ Breach of Data/ Loss of Information has or may have taken place and must provide full details of the incident and any mitigation measures already taken and intended to be taken by them and (where applicable) any mitigation measures recommended by them to be taken by BPCL.
30. Following a Cyber Security Incident involving BPCL's services/ data, the solution provider shall:

- (a) use their best endeavours to mitigate the impact of the Cyber Security Incident, e.g. if any system is reported under breach/ incident, the solution provider shall disconnect it from the network immediately to contain its lateral movement;
 - (b) shall extend all necessary support and assistance to BPCL for carrying out incident analysis/ forensic investigation till its conclusion.
 - (c) shall ensure to preserve the digital evidence and logs till the conclusion of the investigation and confirmation from BPCL about the deletion of the evidence.
 - (d) take any action deemed necessary by BPCL in the circumstances, including complying with any additional security measures deemed appropriate by BPCL.
31. In case the solution provider has purchased the entire solution/ service (to be offered to BPCL) or parts of it from another supplier/ provider, then they must be aware of the complete chain of suppliers/ providers.
32. The solution provider shall ensure to obtain the necessary security compliance documents (such as VAPT report/ Any other Security Audit report/ 'Safe to Host' Certificate etc.) from the suppliers/ providers for all the components purchased. The solution provider must conduct all necessary checks to ensure that the purchased product does not have any embedded security threat such as malware, rootkit, remote access trojans or backdoor etc.
33. In case the solution provider has used an open-source or third-party software codes/ libraries in building the offered software, then they shall carry out necessary security tests against those software components (such as Static Application Security testing, source code review, Secure Composition Analysis etc.) to ensure such components are secured by design.

----- End of Document -----

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CIRCULAR

Circular.IS.24-25/ 2

29th July 2024

Subject: Guidelines for BUs/ Entities on Cyber Security matters

BPCL is leveraging Information Technology (IT) and Operations Technology (OT) extensively for its various business needs. Though most solutions are managed by IS, Refinery IS and Digital; businesses and entities have also deployed IT/ OT/ IoT solutions for their specific business needs.

With such a widespread rise in technology adoption, it becomes more imperative to ensure the cyber security of all solutions and their underlying infrastructure. If not protected properly, a cyber-attack may cause severe impact such as operational disruptions, financial and/ or reputational damage to the organization.

In view of it, it is essential to discuss the requirement of a new system/ application/ solution with the Chief Information Security Officer (CISO):

- **At the beginning of the project** so that adequate security controls commensurate with the requirement can be suggested and can be incorporated into the solution design & tender.
- Also, the **Security Checklist along with NDA** (to be signed before the start of contract), **VAPT** (for third-party data center/ cloud infrastructure)/ **WAPT** (for applications) **Level2 reports** to be submitted before go-live.

This point was also covered in the circular (**Circular.IS.24-25/ 1 dated 30.05.2024**) issued by the CISO on '**Guideline for ensuring cyber security compliance of new IT initiatives**'. It was discussed, inter alia, during the recent Information Security Council meeting held on 26.06.2024. CFD has also perceived the need for better cyber governance and have passed below resolution:

1. All SBUs and Entities of BPCL shall seek CISO's (Chief Information Security Officer) approval on cyber security controls implemented in the solution before launching any new system/ application/ solution.
2. Any non-compliance shall be treated as a security violation and shall be dealt in accordance with CDA rules.
3. All cases of non-compliance shall be reported to the CFD during the quarterly cyber security status update by CISO and respective SBU/ Entity Head.

You are kindly requested to make a note of the same and follow these guidelines in your respective SBU/ Entity. It may please be noted that regular reporting must be made by the undersigned to the CFD.

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