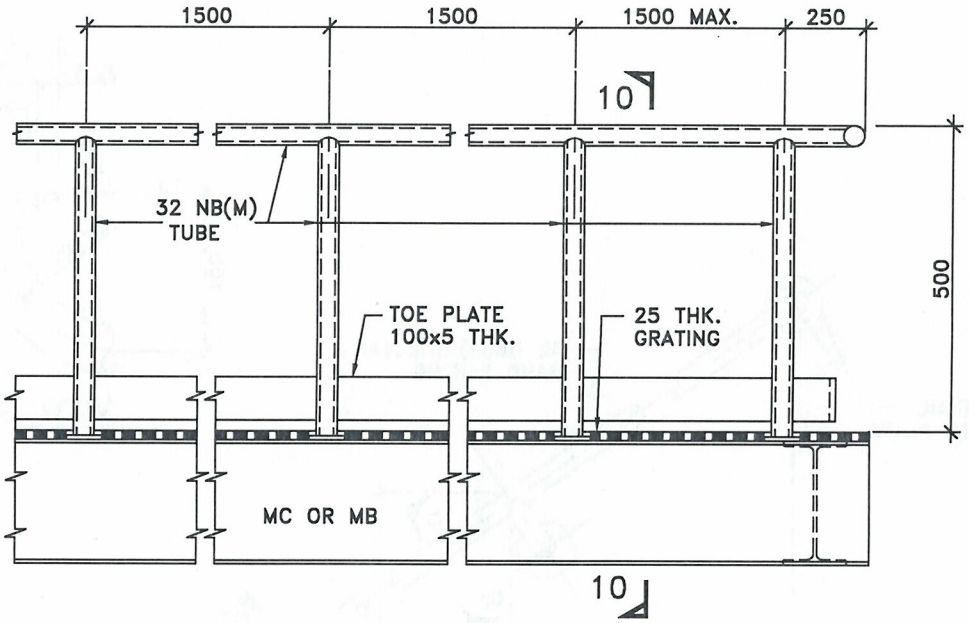
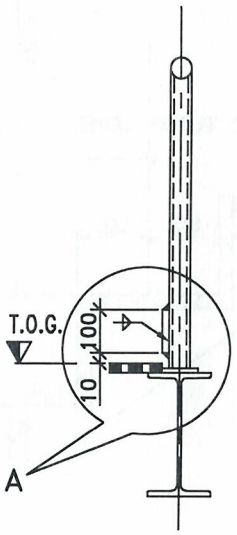
TYPE – IV



HANDRAIL ON HORIZONTAL PLATFORM (STEEL)



SEC. 10–10

NOTE : HANDRAIL TYPE–IV SHALL BE USED OVER PIPE CROSS OVER AND LOW LEVEL PLATFORMS SUCH AS FOR VALVE OPERATION ETC. AS MENTIONED IN STD 7–68–0562 & 0563.

(FOR DETAILS (A) REFER PAGE 8 OF 8)

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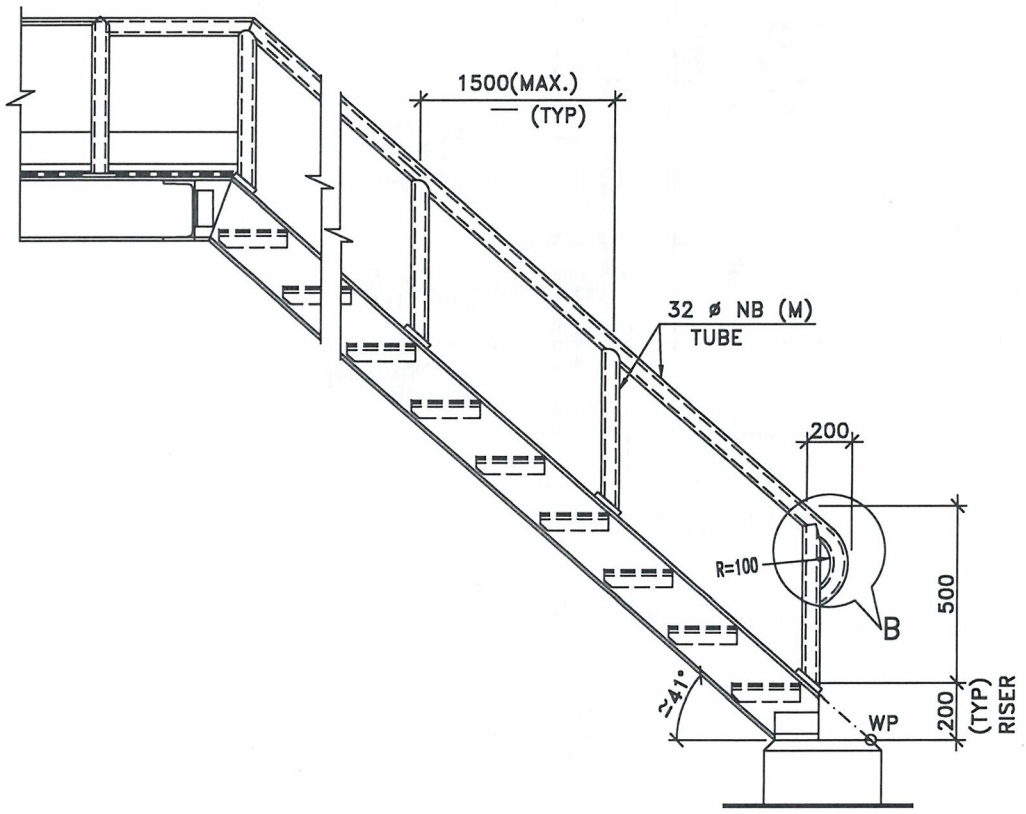
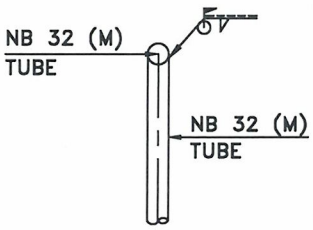
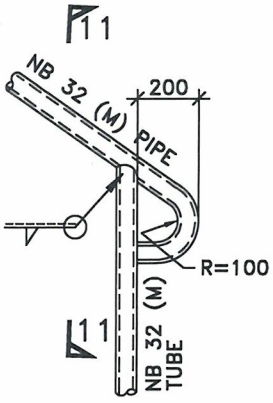
TYPE – IV



SLOPING HALF HANDRAIL ON STEEL STAIR



SEC. 11–11



DETAIL – (B)

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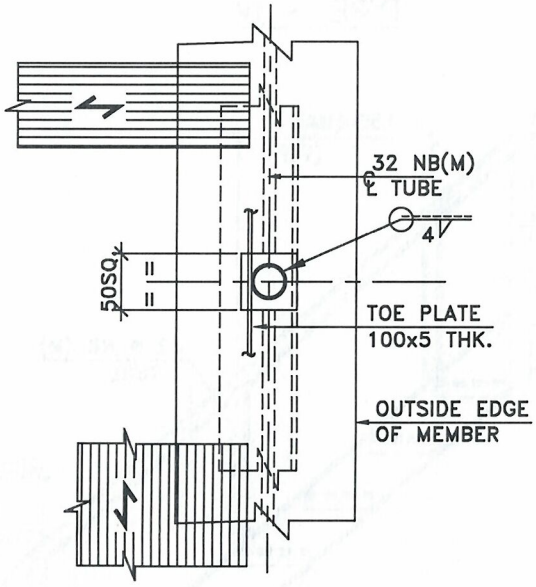
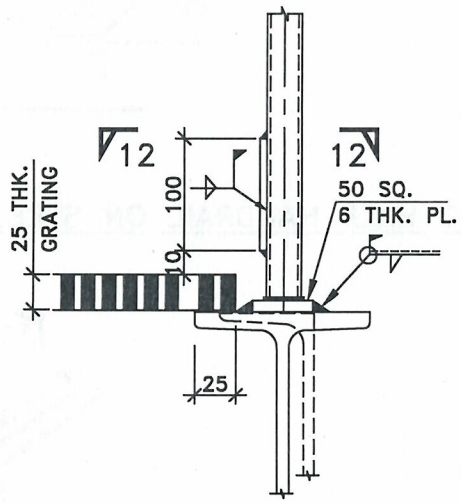


VIEW 12–12



DETAIL – (A)

CONNECTION DETAILS
(FOR TYPE II & IV)

NOTE : CHEQUERED PLATES / GRATINGS SHALL BE SUITABLY NOTCHED TO ACCOMMODATE THE TUBE IN CASE OF BEAM MC100 OR MC125.

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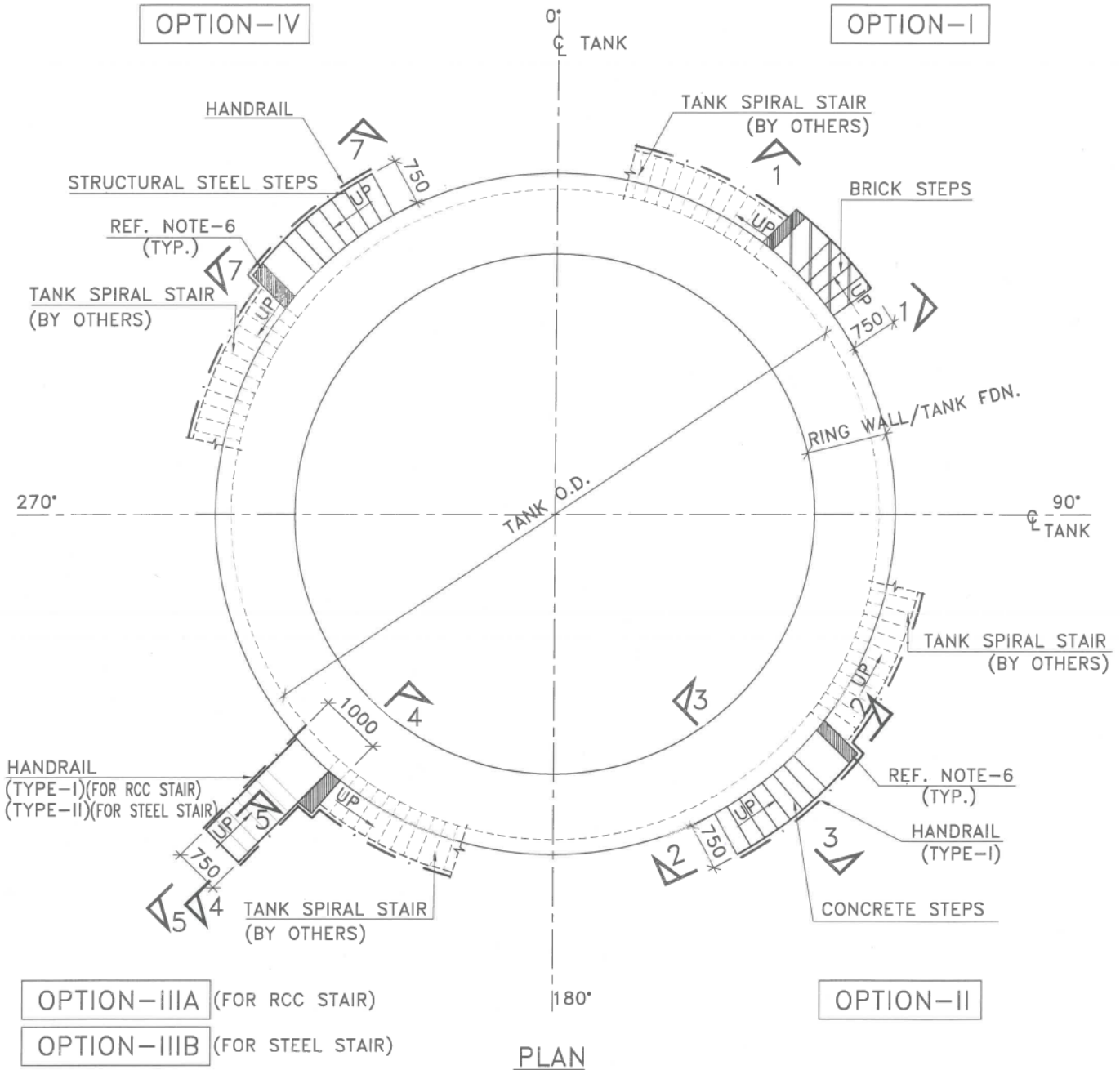

PLAN

ACCESS OPTIONS TO SPIRAL STAIRCASE

NOTES:–

1. ALL DIMENSIONS ARE IN mm.
2. CONCRETE & STRUCTURAL STEEL WORKS SHALL BE AS PER PROJECT GENERAL NOTES.
3. ANY UNDESIRABLE SOIL SHALL BE REMOVED & REPLACED BY COMPACTED SAND.
4. FOR HANDRAIL DETAILS REFER EIL STD. NO. 7–68–0501.
5. FOR INSERT PLATE REFER EIL STD. NO. 7–68–0056.
6. FOR TANKS WITH FIRE–BRICK LINING, ADDITIONAL STEP, SUIT TO SITE SHALL BE PROVIDED AT LANDING LEVEL.
7. GRATING SHALL BE TYPE–I AS PER EIL STD. NO. 7–68–0697.
8. ALL WELDS ARE 6 mm FILLET WELDS U.N.O.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
2	13.04.26	REAFFIRMED & ISSUED AS STANDARD	RKAUR/DIVYA	SUDIP PAUL	ANURAG SINHA	NALIN KUMAR
1	08.02.21	REVISED & REISSUED AS STANDARD	/DIVYA	DEEPAK AGRAWAL	ANURAG SINHA	S.MAZUMDAR
0	09.03.15	ISSUED AS STANDARD	KKS/DIVYA	DEEPAK AGARWAL	P. K. MITTAL	S. CHANDA

Approved by

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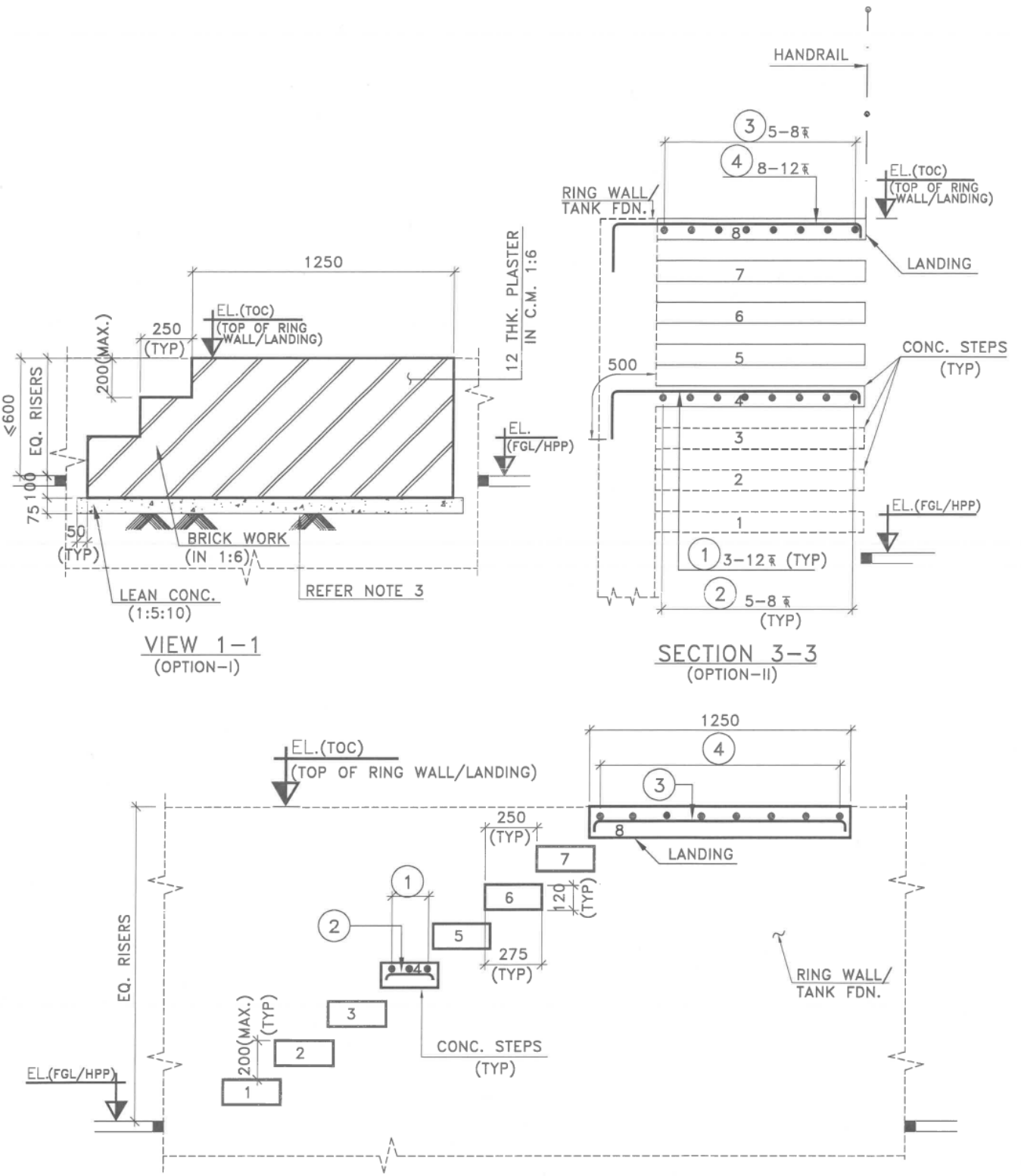

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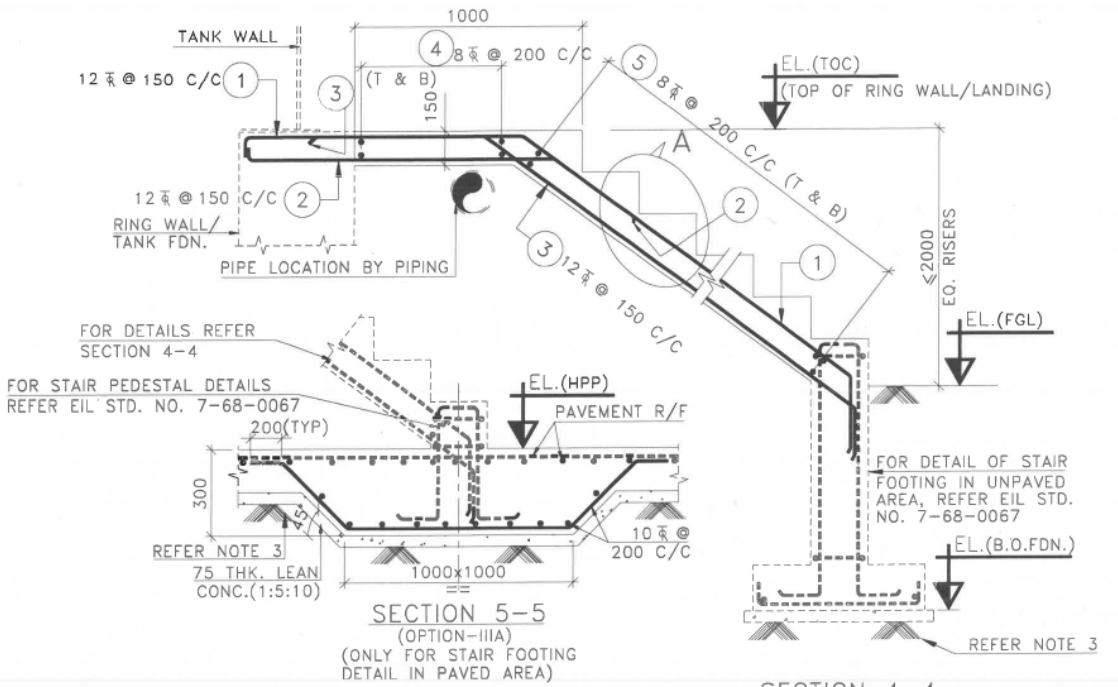
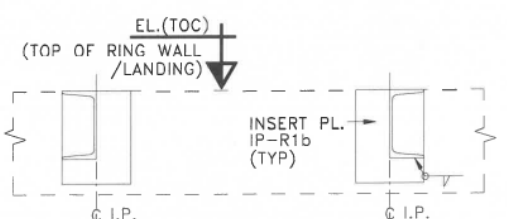
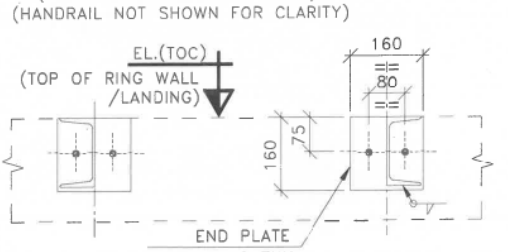


SECTION 5-5
(OPTION-IIIA)
(ONLY FOR STAIR FOOTING DETAIL IN PAVED AREA)

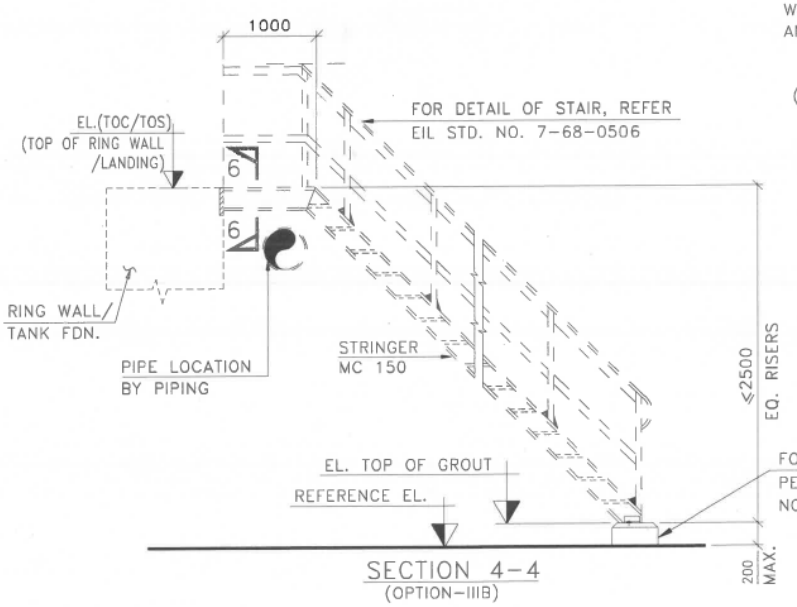
SECTION 4-4
(OPTION-IIIA)
(FOR STAIR IN UNPAVED AREA)
(HANDRAIL NOT SHOWN FOR CLARITY)



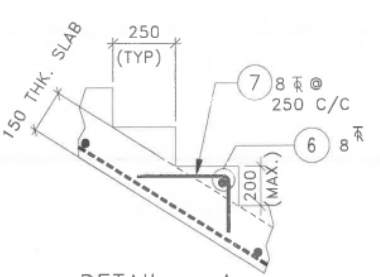
VIEW 6-6
(WITH INSERT PLATE)



VIEW 6-6
(WITH ANCHOR FASTENERS)



SECTION 4-4
(OPTION-IIIB)



DETAIL - A

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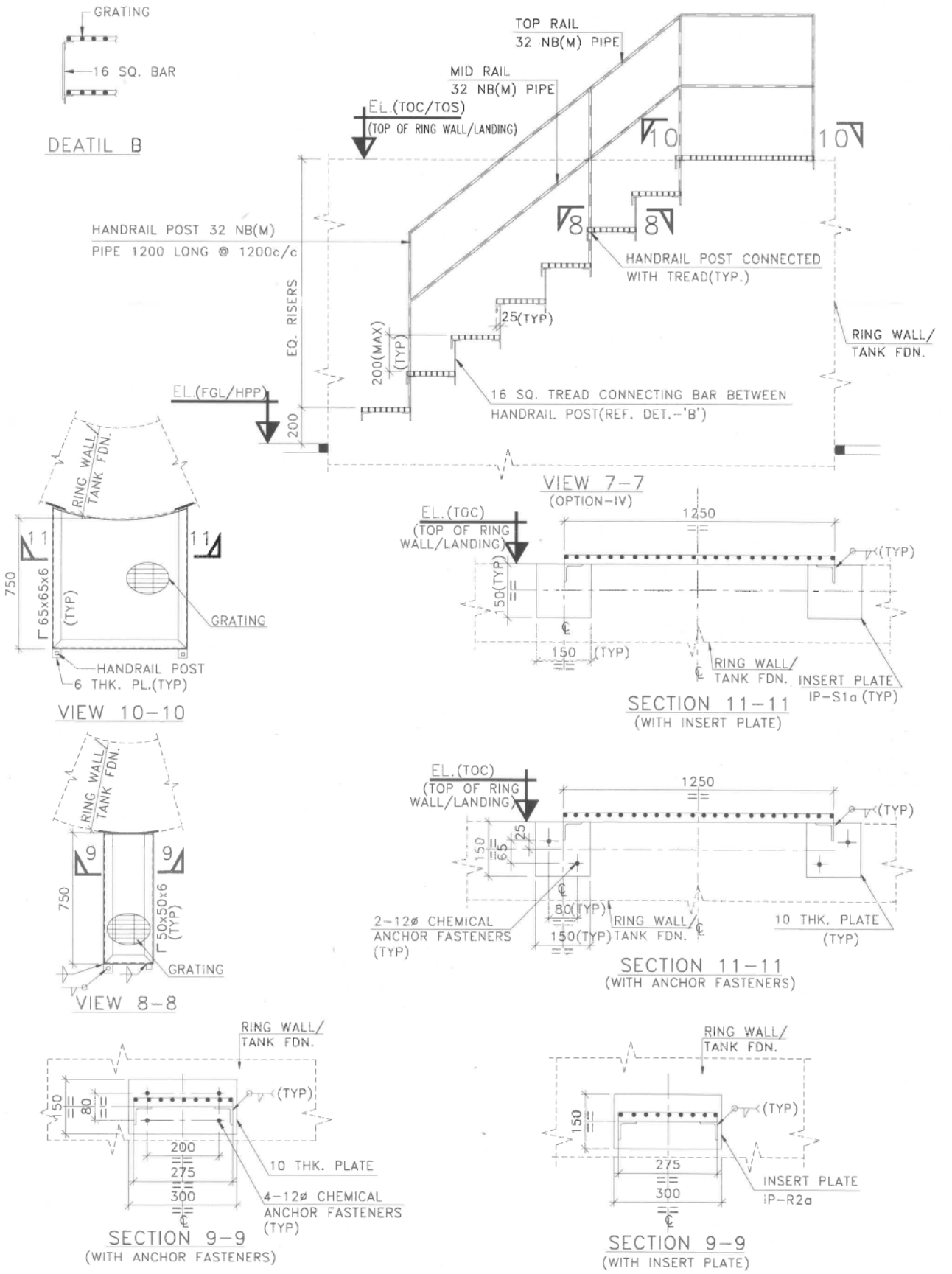

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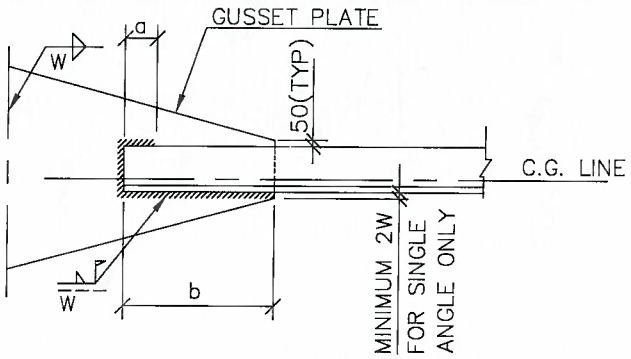

TYP. DET. OF WELD LENGTH FOR ANGLE MEMBERS

ANGLE SIZE	w (mm)	a(mm)	b(mm)	MIN. GUSSET THK.(mm)
L 50x50x6	6	50	150	8
L 65x65x6	6	75	200	8
L 65x65x8	6	100	250	8
L 75x75x6	6	75	225	8
L 75x75x8	6	100	300	8
L 90x90x6	6	75	275	8
L 90x90x8	6	100	350	8
L 100x100x10	8	125	350	10
L 110x110x10	8	125	400	10
L 130x130x10	8	125	500	10
L 150x150x12	10	150	525	12
2L 50x50x6 B/B	6	50	150	8
2L 65x65x6 B/B	6	75	200	8
2L 65x65x8 B/B	6	100	250	8
2L 75x75x6 B/B	6	75	225	8
2L 75x75x8 B/B	6	100	300	8
2L 90x90x6 B/B	6	75	275	8
2L 90x90x8 B/B	6	100	350	8
2L 100x100x10 B/B	8	125	350	10
2L 110x110x10 B/B	8	125	400	10
2L 130x130x10 B/B	8	125	500	10
2L 150x150x12 B/B	10	150	525	12

NOTES:

1) THIS STANDARD IS NOT APPLICABLE FOR DOUBLE ANGLE ON THE SAME SIDE OF THE GUSSET PLATE.
2) THIS STANDARD IS VALID FOR STRUCTURAL STEEL OF GRADE E350 & E250 CONFIRMING TO IS 2062.
3) GRADE OF CONNECTION PLATES SHALL BE SAME AS THAT OF GRADE OF ANGLE MEMBER.
4) WELDING ELECTRODE SHALL BE COMPATIBLE WITH CORRESPONDING GRADE OF STEEL.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	27.02.26	REVISED AND ISSUED AS STANDARD	AB	SP	ANURAG SINHA	NALIN KUMAR
4	28.01.20	REAFFIRMED AND ISSUED AS STANDARD	JG	ALPANA SRIVASTAVA	RAJANJI SRIVASTAVA	R.K TRIVEDI
3	18.07.14	REVISED AND ISSUED AS STANDARD	OM PRAKASH	AJS	P K MITTAL	S. CHANDA

Approved by

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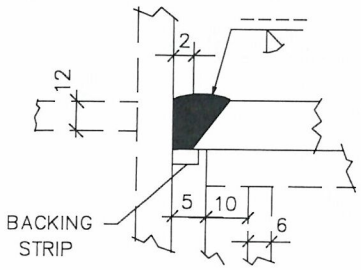
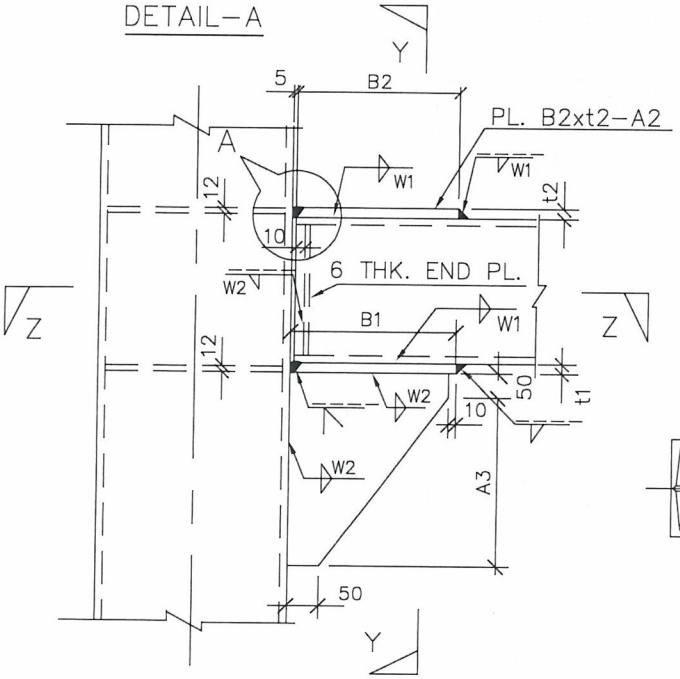
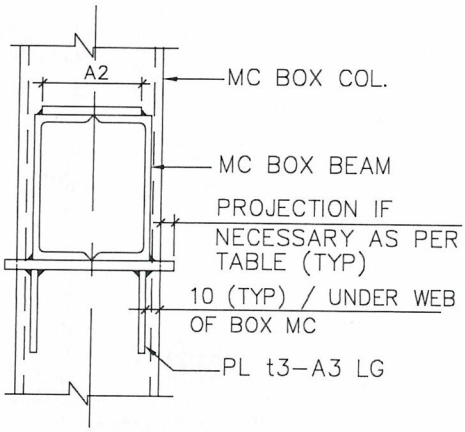


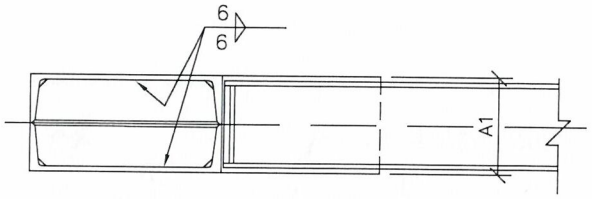
DETAIL–A



ELEVATION



SEC Y–Y



PLAN Z–Z

TYPICAL DETAILS OF MOMENT CONNECTION FOR MC BOX SECTIONS (TYPE–2)

COLUMN	MC 400 BOX				MC 300 BOX			MC 250 BOX		MC 200 BOX	
BEAM	MC–400 BOX	MC–300 BOX	MC–250 BOX	MC–200 BOX	MC–300 BOX	MC–250 BOX	MC–200 BOX	MC–250 BOX	MC–200 BOX	MC–200 BOX	MC–150 BOX
A1 mm	220	200	200	200	200	180	180	180	180	170	170
A2 mm	180	160	140	130	160	140	130	140	130	130	130
A3 mm	350	300	250	200	300	250	200	250	200	200	150
B1 mm	500	400	350	250	400	350	250	350	250	250	200
B2 mm	425	325	275	200	325	275	200	275	200	200	150
t1 mm	20	16	16	12	16	16	12	16	12	12	10
t2 mm	25	20	20	16	20	20	16	20	16	16	12
t3 mm	10	10	10	10	10	10	10	10	10	10	10
w1 mm	10	10	10	10	10	10	10	10	10	10	10
w2 mm	6	6	6	6	6	6	6	6	6	6	6

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	27.02.26	REAFFIRMED AND ISSUED AS STANDARD	AB	SP	ANURAG SINHA	NALIN KUMAR
4	22.09.20	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	AS	SM
3	07.08.14	REAFFIRMED AND ISSUED AS STANDARD	K K SHARMA	V. GOEL	P. K. MITTAL	S. CHANDA

Approved by

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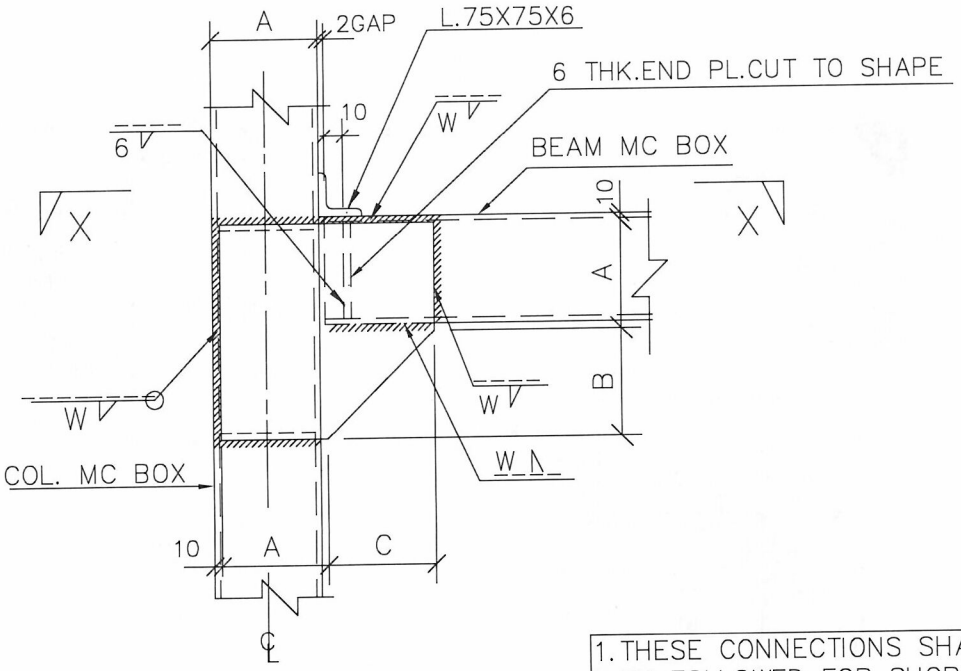
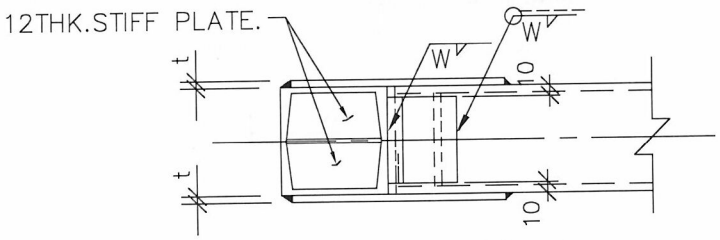


ELEVATION

1. THESE CONNECTIONS SHALL BE FOLLOWED FOR SHOP WELDING ONLY.

2. CONNECTIONS ARE SHOWN FOR FULL MOMENT PLUS 50% SHEAR CAPACITIES.



PLAN X–X

TYPICAL DETAILS OF MOMENT CONNECTION FOR MC BOX SECTIONS (TYPE–1)

COLUMN	BEAM	A (mm)	B (mm)	C (mm)	t (mm)	w(mm)
MC 150 BOX	MC 150 BOX	150	150	300	10	6
MC 200 BOX	MC 200/150 BOX	200/150	200/150	350	10	6
MC 250 BOX	MC 250 BOX	250	250	400	10	8
MC 300 BOX	MC 300 BOX	300	225	450	10	8
MC 400 BOX	MC 400 BOX	400	300	550	10	8

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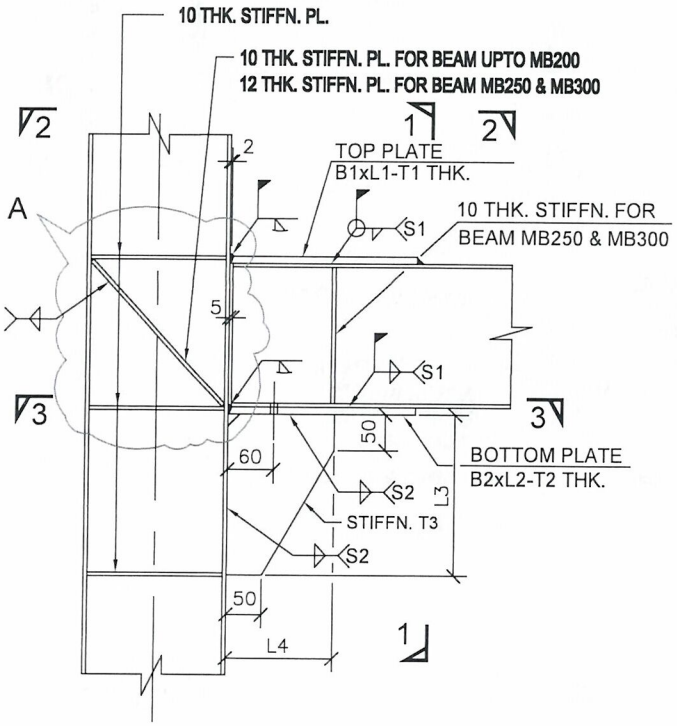
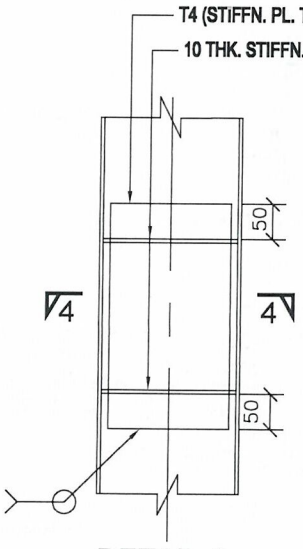
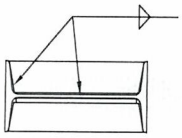


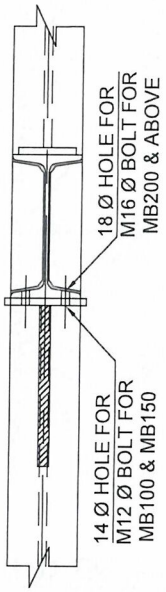
TYP. DET. OF MOMENT CONNECTION



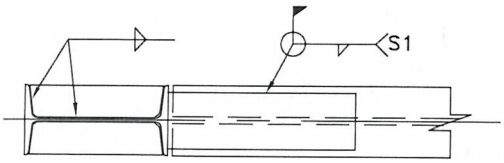
DETAIL-A
(ALTERNATE)



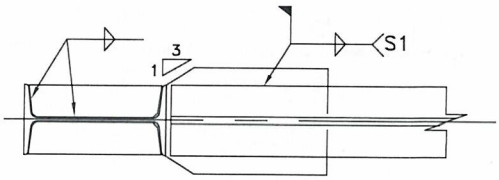
SEC. 4-4



SEC. 1-1



VIEW 2-2



VIEW 3-3

BEAM SIZE	COLUMN SIZE	TOP PLATE SIZE			BOTTOM PLATE SIZE			STIFFN. SIZE				WELD SIZE		
		L1	B1	T1	L2	B2	T2	L3	L4	T3	T4	S1	S2	
MB100	≥MB100	150	55	16	150	95	10	175	150	10	10	6	6	
MB150	≥MB150	155	60	16	155	100	10	230	150	10	8	6	6	
MB200	≥MB200	260	80	20	260	120	16	225	150	10	8	6	10	
MB250	≥MB250	290	105	25	290	145	20	265	150	10	8	8	10	
MB300	≥MB250	335	120	25	335	160	20	330	170	10	10	8	10	

NOTES:-

1. ALL CONNECTIONS ARE DESIGNED FOR FULL BENDING AND SHEAR STRENGTH OF BEAM.
2. ALTERNATE DETAIL `A' IS TO BE PROVIDED WHEN LONGITUDINAL BEAMS FOUL WITH DIAGONAL STIFFENER.
3. CONNECTION IS SHOWN FOR FIELD MOMENT CONNECTION.
4. WHEREVER FILLET WELD SIZE NOT MARKED IT SHALL BE CONSIDERED AS 6mm.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	27-02-2026	REAFFIRMED AND ISSUED AS STANDARD	AB	SP	ANURAG SINHA	NALIN KUMAR
3	21-09-2020	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	AS	SM
2	07-08-2014	REAFFIRMED AND ISSUED AS STANDARD	K K SHARMA	V. GOEL	P. K. MITTAL	S. CHANDA

Approved by

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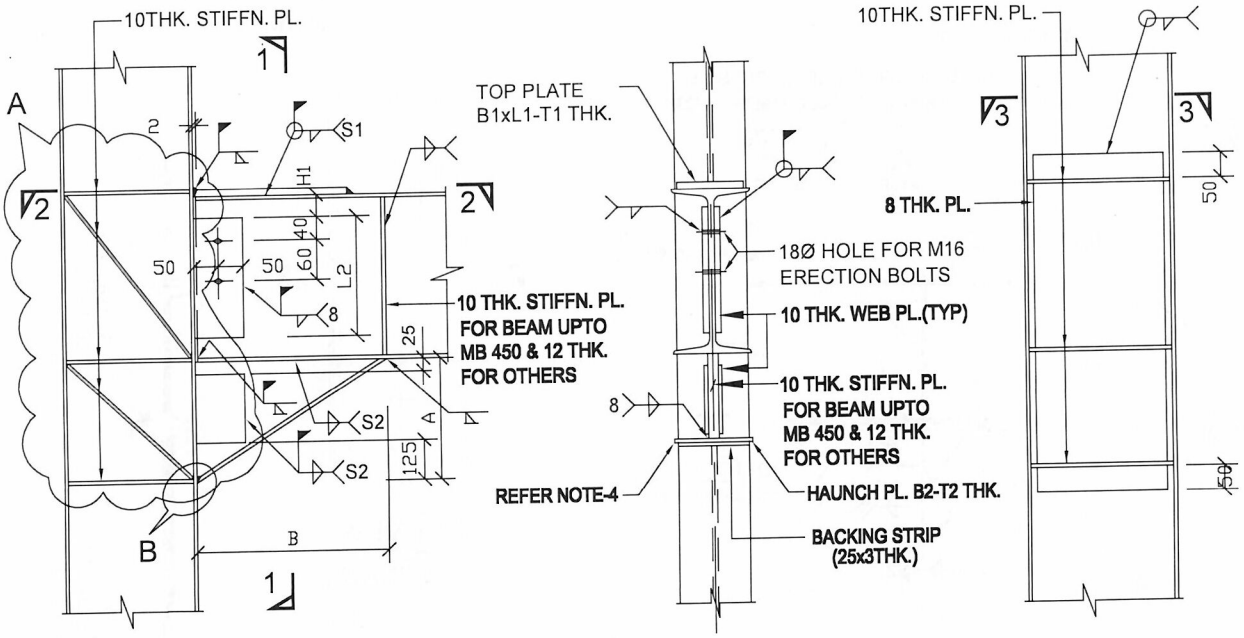
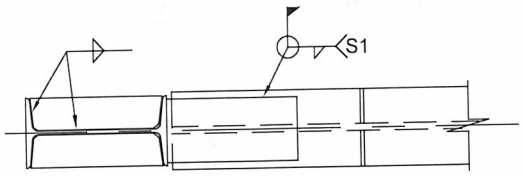


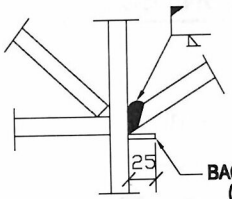
TYP. DET. OF MOMENT CONNECTION

SEC. 1-1

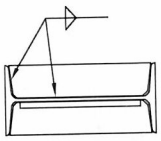
DETAIL-A
(ALTERNATE)



VIEW 2-2



DETAIL-B



SEC. 3-3

BEAM SIZE	COLUMN SIZE	TOP PLATE SIZE			HAUNCH PLATE SIZE				WEB PL. SIZE		WELD SIZE	
		L1	B1	T1	A	B	B2	T2	H1	L2	S1	S2
MB350	≥ MB250	225	120	20	260	450	140	16	50	250	8	10
MB400	≥ MB300	250	120	20	300	525	140	16	55	290	8	10
MB450	≥ MB300	300	130	22	340	600	150	20	55	340	8	10
MB500	≥ MB400	350	140	22	375	650	180	20	60	380	8	10
MB600	≥ MB500	400	180	25	450	800	210	22	70	460	10	10

NOTES:

1. ALL CONNECTIONS ARE DESIGNED FOR FULL BENDING STRENGTH & 50% OF SHEAR STRENGTH OF BEAM.
2. ALTERNATE DETAIL 'A' IS TO BE PROVIDED WHEN LONGITUDINAL BEAMS FOUL WITH STIFFENER.
3. CONNECTION IS SHOWN FOR FIELD MOMENT CONNECTION.
4. WIDTH OF PLATE SHALL BE NOTCHED IN 1:3 SLOPE AT COLUMN CONNECTION TO MATCH WITH COLUMN FLANGE WIDTH.
5. WHEREVER FILLET WELD SIZE NOT MARKED IT SHALL BE CONSIDERED AS 6mm.

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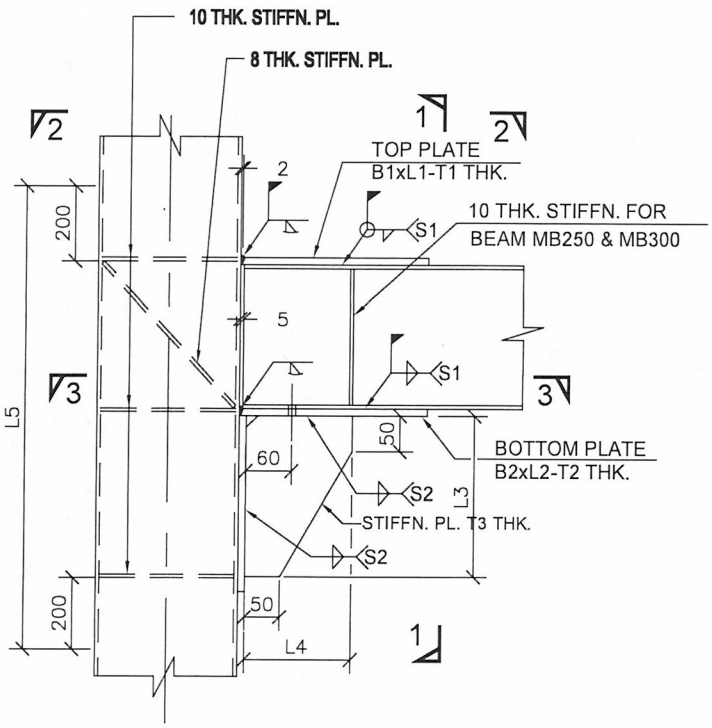
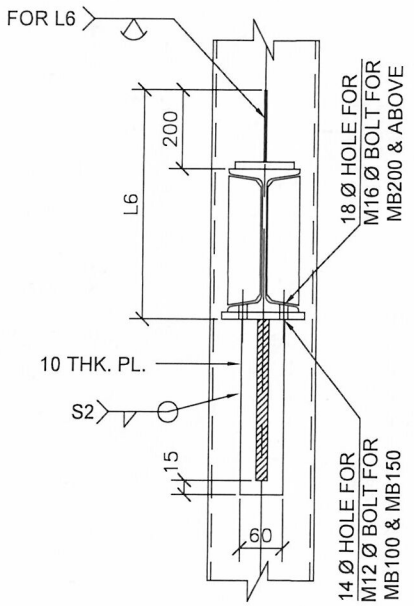
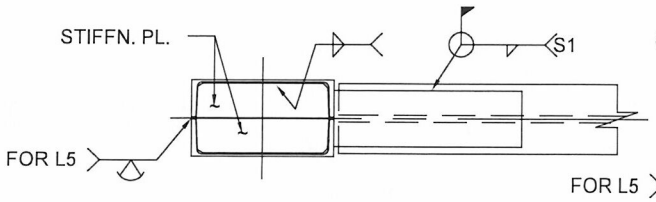


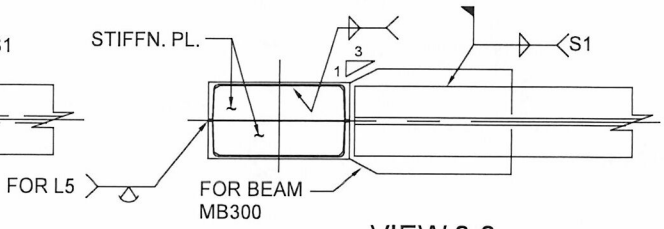
TYP. DET. OF MOMENT CONNECTION



SEC. 1-1



VIEW 2-2



VIEW 3-3

BEAM SIZE	COLUMN SIZE	TOP PLATE SIZE			BOTTOM PLATE SIZE			STIFFN. SIZE			WELD SIZE		
		L1	B1	T1	L2	B2	T2	L3	L4	T3	S1	S2	
MB100	>MC100 []	150	55	16	150	95	10	175	150	10	6	6	
MB150	>MC100 []	155	60	16	155	100	10	230	150	10	6	6	
MB200	>MC150 []	260	80	20	260	120	16	225	150	10	6	10	
MB250	>MC200 []	290	105	25	290	145	20	265	150	10	8	10	
MB300	>MC200 []	335	120	25	335	160	20	330	170	10	8	10	

NOTES:-

1. ALL CONNECTIONS ARE DESIGNED FOR FULL BENDING AND SHEAR STRENGTH OF BEAM.
2. THIS STANDARD IS NOT APPLICABLE FOR BEAM CONNECTING WITH WEB OF MC BOX COLUMN.
3. CONNECTION IS SHOWN FOR FIELD MOMENT CONNECTION.
4. WHEREVER FILLET WELD SIZE NOT MARKED IT SHALL BE CONSIDERED AS 6mm.

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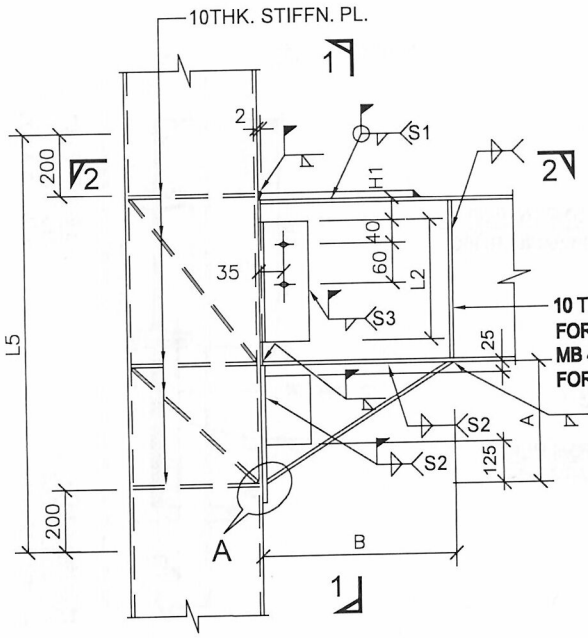
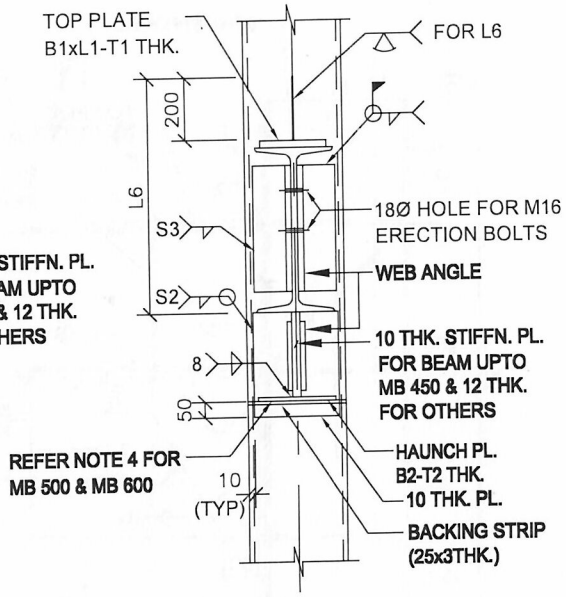
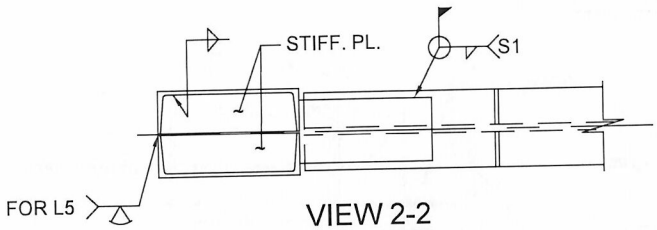


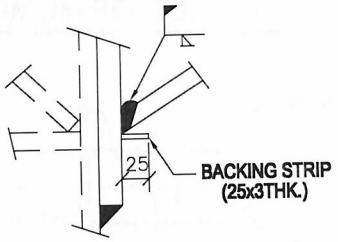
TYP. DET. OF MOMENT CONNECTION



SEC. 1-1



VIEW 2-2



DETAIL-A

BEAM SIZE	COLUMN SIZE	TOP PL. SIZE			HAUNCH PLATE SIZE				WEB ANGLE SIZE			WELD SIZE		
		L1	B1	T1	A	B	B2	T2	H1	L2	ANGLE SIZE	S1	S2	S3
MB350	≥ MC250 □	225	120	20	260	450	140	16	50	250	65x65x6	8	10	6
MB400	≥ MC250 □	250	120	20	300	525	140	16	55	290	65x65x6	8	10	6
MB450	≥ MC300 □	300	130	22	340	600	150	20	55	340	75x75x8	8	10	8
MB500	≥ MC300 □	350	140	22	375	650	180	20	60	380	75x75x8	8	10	8
MB600	≥ MC400 □	400	180	25	450	800	210	22	70	460	75x75x8	10	10	8

NOTES:

1. ALL CONNECTIONS ARE DESIGNED FOR FULL BENDING STRENGTH & 50% OF SHEAR STRENGTH OF BEAM.
2. **CONNECTION IS SHOWN FOR FIELD MOMENT CONNECTION.**
3. WHEREVER FILLET WELD SIZE NOT MARKED IT SHALL BE CONSIDERED AS 6mm.
4. **WIDTH OF PLATE SHALL BE NOTCHED IN 1:3 SLOPE AT COLUMN CONNECTION TO MATCH WITH COLUMN** FLANGE PLATE WIDTH.
5. **THIS STANDARD IS NOT APPLICABLE FOR BEAM CONNECTING WITH WEB OF MC BOX COLUMN.**

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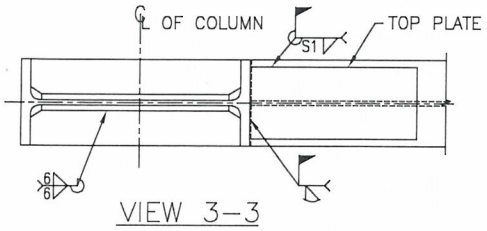
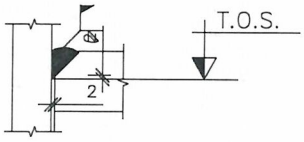
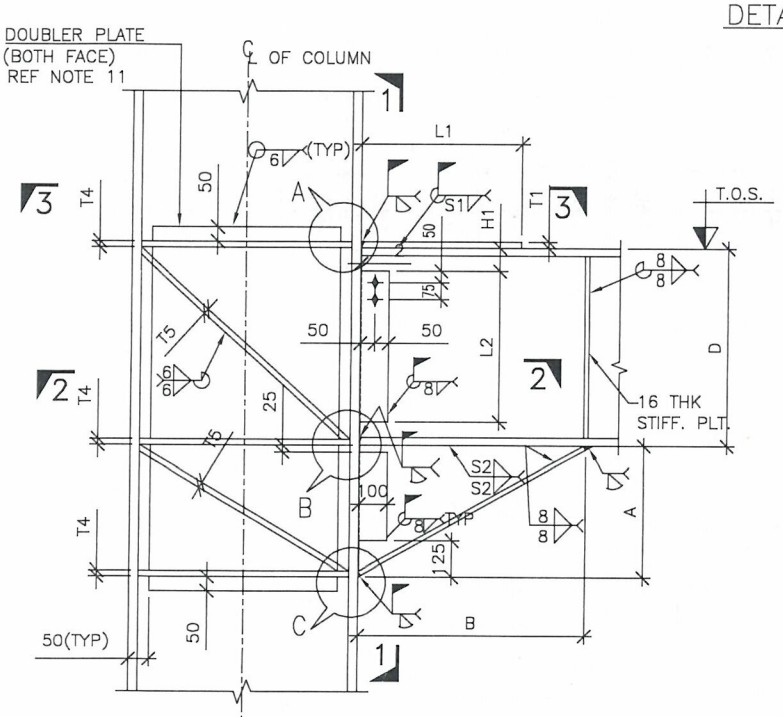
DETAILS OF MOMENT CONNECTION FOR PARALLEL FLANGE BEAMS WITH PARALLEL FLANGE COLUMNS



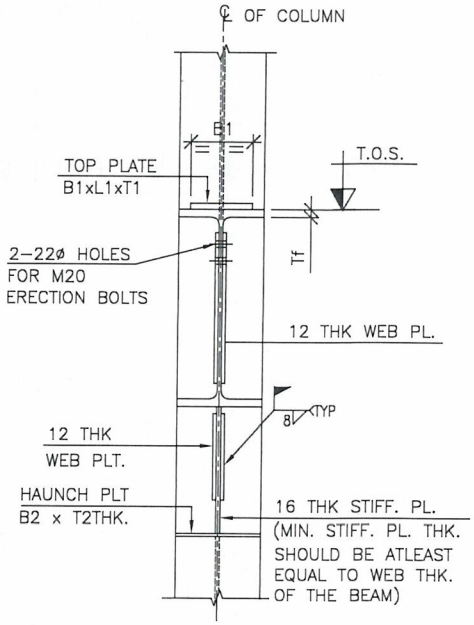
VIEW 3–3



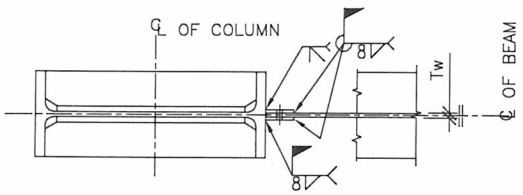
DETAIL–A



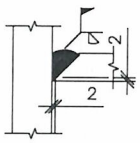
TYP. DETAIL OF MOMENT CONNECTION



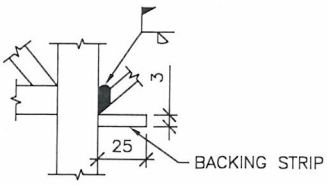
SEC. 1–1



SECTION 2–2



DETAIL–B



DETAIL–C

NOTES :-

1. ALL DIMENSIONS ARE IN mm.
2. PARALLEL FLANGE SECTIONS SHALL CONFORM TO IS 808.
3. STRUCTURAL STEEL FOR CONNECTION PLATES SHALL BE OF SAME GRADE AS THAT OF THE CONNECTING MEMBERS.
4. ALL CONNECTIONS ARE DESIGNED FOR FULL BENDING STRENGTH & MINIMUM 50% OF SHEAR STRENGTH OF THE BEAM.
5. CONNECTION DETAILS SHOWN HERE ARE FOR FIELD MOMENT CONNECTION, SAME SHALL BE FOLLOWED FOR SHOP MOMENT CONNECTION.
6. ALL FIELD WELDS SHALL BE MINIMUM 8 mm FILLET WELD (UNO).
7. ALL HOLES ARE SHOWN THUS ⊕ ARE 22ø FOR M20 ERECTION BOLTS.
8. ERECTION BOLTS SHALL BE OF PROPERTY CLASS 8.8 CONFORMING TO IS 1367 & EQUALLY SPACED.
9. FOR MOMENT CONNECTIONS OF ISMB SECTIONS, EIL STANDARD 7–68–0660 SHALL BE FOLLOWED.
10. DOUBLER PLATE TO BE PROVIDED ON COLUMN WEB ONLY WHERE DIAGONAL STIFFENER IS NOT POSSIBLE.
11. REFER TABLE–1 FOR SECTION WISE MARKED DETAILS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	02.03.26	REVISED & ISSUED AS STANDARD	JH/SS	SUDIP PAUL	ANURAG SINHA	NALIN KUMAR
1	22.09.20	REAFFIRMED & ISSUED AS STANDARD	JEETU	AVM	AS	SM
0	15.07.14	ISSUED AS STANDARD	VPS	AS	PKM	SC

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TABLE–1:

MOMENT CONNECTION BETWEEN PARALLEL FLANGE BEAMS & COLUMNS

SL. NO.	BEAM SIZE	COLUMN SIZE	BEAM DIMENSIONS			TOP PLATE SIZE			HAUNCH PLATE SIZE				WEB PLT SIZE		WELD SIZE		DBLR PLT	HOR STF PLT	DIAG STF PLT
			D	Tf	Tw	L1	B1	T1	A	B	B2	T2	H1	L2	S1	S2	T3	T4	T5
1	NPB 450x190x67.15	COLUMN SIZE EQUAL TO OR LARGER THAN BEAM SIZE	447	13.1	7.6	400	150	16	400	700	190	12	45	300	8	8	8	16	16
2	WPB 600x300x128.79		571	15.5	12.0	500	260	20	500	875	300	16	60	450	10	10	8	16	16
3	WPB 600x300x177.77		590	25.0	13.0	500	260	28	500	875	300	25	70	450	10	10	8	16	16
4	WPB 700x300x149.89		670	17.0	13.0	550	260	20	500	875	300	16	60	550	12	10	8	16	16
5	WPB 700x300x204.48		690	27.0	14.5	550	260	32	600	1050	300	28	70	550	12	10	8	16	16
6	WPB 700x300x240.51		700	32.0	17.0	550	260	36	600	1050	300	32	70	550	12	10	8	16	16
7	WPB 800x300x224.37		790	28.0	15.0	600	260	32	700	1200	300	28	70	650	14	10	8	16	16
8	WPB 800x300x262.33		800	33.0	17.5	600	260	36	700	1200	300	32	75	650	14	10	8	16	16
9	WPB 900x300x291.45		900	35.0	18.5	700	260	40	800	1400	300	36	80	750	16	10	8	16	16

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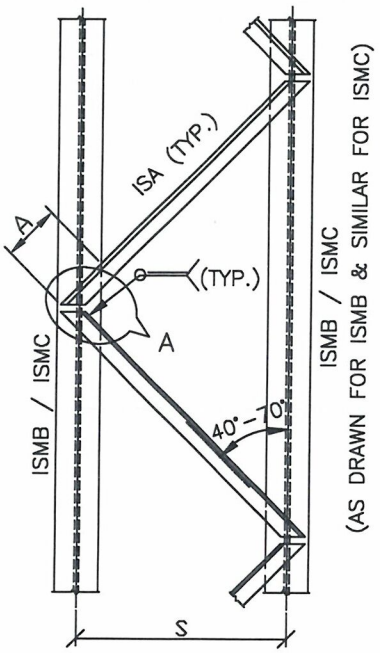
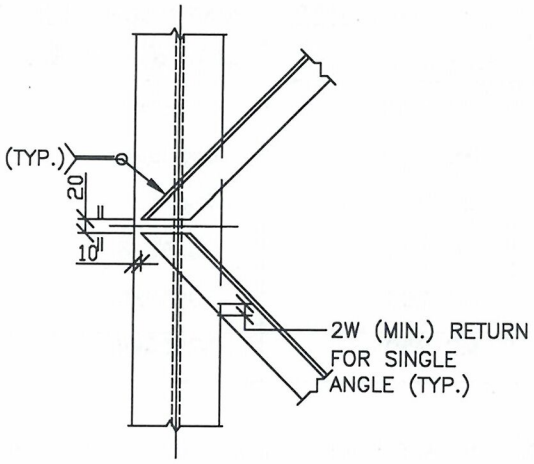
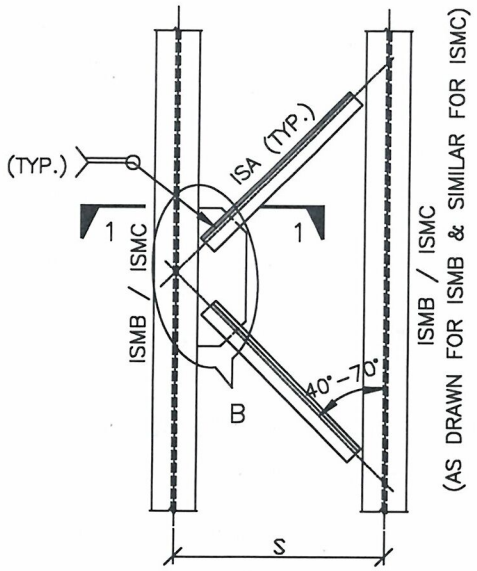


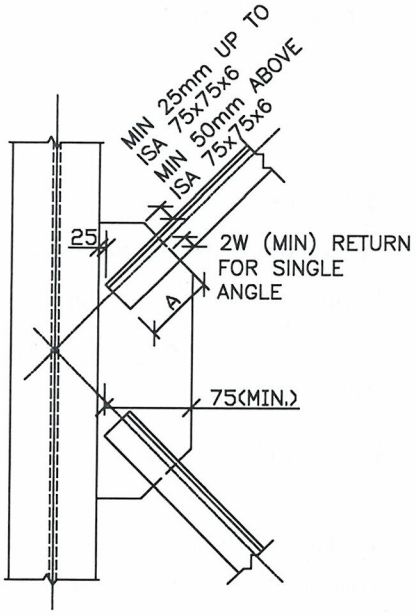


DET.–A

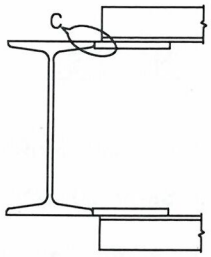
OPTION I–LACINGS LAPPED ON COLUMN FLANGE

(PREFERABLE)

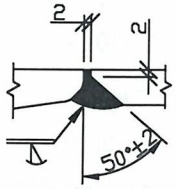




DET.–B



SEC. 1–1



DET.–C

OPTION II–LACINGS CONNECTED WITH GUSSET PLATES

(IN CASE OPTION–1 IS NOT FEASIBLE)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	16.03.26	REAFFIRMED AND ISSUED AS STANDARD	REVISED	SUDIP PAUL	ANURAG SINHA	NALIN KUMAR
3	29.09.20	REAFFIRMED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET	ANURAG SINHA	S.MAZUMDAR

Approved by

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TABLE-I : FOR OPTION-I(S≤600)

S. NO.	COLUMN SIZE ISMB / ISMC	MAXIMUM SIZE OF LACING ANGLE *
1	MB 150	50x50x6
2	MB 200	65x65x6
3	MB 250	75x75x6
4	MC 150	50x50x6
5	MC 200	50x50x6
6	MC 250	50x50x6

NOTE: * BASED ON 80% OF FULL STRENGTH OF MEMBER

LEGEND: W = WELD SIZE
S = C/C OF C.G. OF ISMB OR B/B OF ISMC SPACING

NOTES:

1 ALL DIMENSIONS ARE IN mm.

2 SHOP WELDING SHALL BE USED IN CONNECTIONS.

3 LACING SHOWN IN OPTION II CAN BE PROVIDED ON INSIDE FACE OF GUSSET PLATE, FOR ISMB/ ISMC SIZES >300 MM AND SPACING >600MM.

4 SPACING 'S' BETWEEN COLUMNS IS TO BE SELECTED AS PER FOLLOWING BROAD GUIDELINES:

a) FOR COLUMNS UP TO 5M HEIGHT / CRANE CAPACITIES UP TO 5MT. – (S≤600)

b) FOR COLUMNS >5M HEIGHT / CRANE CAPACITIES >5MT. – (S>600)

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TABLE–II : FOR OPTION–I (S>600)

S. NO.	ANGLE SIZE AND SPACING		WELD LENGTH 'A' mm	WELD SIZE	GUSSET PLATE THK. 't' mm (OPTION II ONLY)
1	ISA 65x65x6	*S ⩽ 700mm FOR SINGLE ANGLE S ⩽ 1100mm FOR DOUBLE ANGLE	150	6	10
		S > 700mm FOR SINGLE ANGLE S > 1100mm FOR DOUBLE ANGLE	75	6	10
2	ISA 65x65x8	S ⩽ 700mm FOR SINGLE ANGLE S ⩽ 1100mm FOR DOUBLE ANGLE	200	6	10
		S > 700mm FOR SINGLE ANGLE S > 1100mm FOR DOUBLE ANGLE	100	6	10
3	ISA 75x75x6	S ⩽ 900mm FOR SINGLE ANGLE S ⩽ 1300mm FOR DOUBLE ANGLE	200	6	10
		S > 900mm FOR SINGLE ANGLE S > 1300mm FOR DOUBLE ANGLE	100	6	10
4	ISA 75x75x8	S ⩽ 900mm FOR SINGLE ANGLE S ⩽ 1300mm FOR DOUBLE ANGLE	250	6	10
		S > 900mm FOR SINGLE ANGLE S > 1300mm FOR DOUBLE ANGLE	125	6	10
5	ISA 90x90x6	S ⩽ 1000mm FOR SINGLE ANGLE S ⩽ 1600mm FOR DOUBLE ANGLE	225	6	10
		S > 1000mm FOR SINGLE ANGLE S > 1600mm FOR DOUBLE ANGLE	125	6	10

CONTD...

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TABLE II (CONTD...)

S. NO.	ANGLE SIZE AND SPACING		WELD LENGTH 'A' mm	WELD SIZE	GUSSET PLATE THK. 't' mm (OPTION II ONLY)
6	ISA 90x90x8	*S ≤ 1000mm FOR SINGLE ANGLE S ≤ 1600mm FOR DOUBLE ANGLE	275	8	10
		S > 1000mm FOR SINGLE ANGLE S > 1600mm FOR DOUBLE ANGLE	150	8	10
7	ISA 100x100x10	S ≤ 1100mm FOR SINGLE ANGLE S ≤ 1700mm FOR DOUBLE ANGLE	300 300	8	10 12
		S > 1100mm FOR SINGLE ANGLE S > 1700mm FOR DOUBLE ANGLE	150	8	10
8	ISA 110x110x10	S ≤ 1200mm FOR SINGLE ANGLE S ≤ 1900mm FOR DOUBLE ANGLE	325 325	8	10 12
		S > 1200mm FOR SINGLE ANGLE S > 1900mm FOR DOUBLE ANGLE	175	8	10
9	ISA 130x130x10	S ≤ 1500mm FOR SINGLE ANGLE S ≤ 2200mm FOR DOUBLE ANGLE	375 375	8	10 16
		S > 1500mm FOR SINGLE ANGLE S > 2200mm FOR DOUBLE ANGLE	200	8	10
10	ISA 150x150x12	S ≤ 1700mm FOR SINGLE ANGLE S ≤ 2600mm FOR DOUBLE ANGLE	425 425	10	12 16
		S > 1700mm FOR SINGLE ANGLE S > 2600mm FOR DOUBLE ANGLE	200	10	12

NOTE: *S(c/c OF C.G. OF ISMB OR B/B OF ISMC SPACING) SHOWN THUS 'S ≤' ARE SIZED FOR FULL STRENGTH OF MEMBER SPACING SHOWN THUS 'S >' ARE SIZED FOR 50% OF FULL STRENGTH OF MEMBER.

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SITE SPECIFIC SEISMIC SPECTRA

(Engineering & Technology Development)

PROJECT : **BINA PETCHEM & REFINERY EXPANSION PROJECT (BPREP), BINA**

OWNER : **M/s BHARAT PETROLEUM COOPERATION LIMITED**

CONSULTANT : **Engineers India Ltd.**

JOB NO. : **B857**

Rev. No	Date	Purpose	Prepared by	Reviewed by	Approved by
0	11.11.2024	ISSUED FOR IMPLEMENTATION	MBA	GGSA	SVRS

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SITE SPECIFIC SEISMIC SPECTRA

Site specific seismic spectrum is generated in accordance with Section 7 of IS 1893 (Part 4): 2024 for 10% probability of exceedance in 50 years for different damping values. The design horizontal seismic coefficient shall be estimated in accordance with Clause no. 7.3.1 of IS 1893 (Part 4) using spectral acceleration coefficient presented below. All other seismic parameters shall be as per IS 1893.

Spectral Acceleration Coefficients (S_a/g) for 10% probability of exceedance in 50 years:

Spectral Acceleration Coefficients (Sa/g) for 5% damping for 10% probability of exceedance in 50 years in the horizontal direction shall be based on the following equation. The spectral acceleration values for different damping ratio are presented in Figure 1 and Table 1.

S_a/g (damping: 5%)	= 0.052	for 0.00<T≤0.01 sec
	= 0.043+0.867T	for 0.01<T≤0.10 sec
	= 0.13	for 0.10<T≤0.40 sec
	$= \frac{0.052}{T}$	for 0.40<T≤6.00 sec
	$= \frac{0.312}{T^2}$	for 6.00<T≤10.0 sec

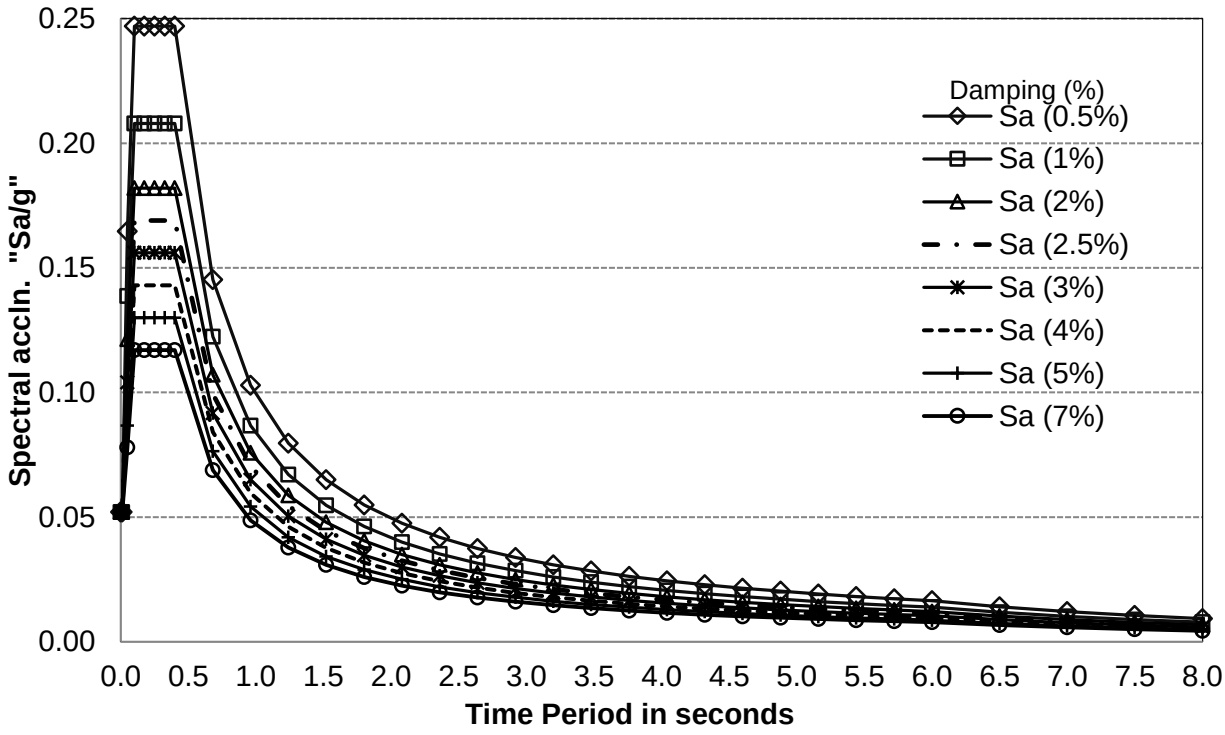

Figure 1: Site specific seismic spectra for 10% probability of exceedance in 50 years

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Table 1: Spectral Acceleration Coefficients (S_a/g) for 10% probability of exceedance in 50 years

Time Period (sec)	Percentage of critical damping							
	0.5	1.0	2.0	2.5	3.0	4.0	5.0	7.0
0.000	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
0.010	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
0.050	0.165	0.139	0.121	0.113	0.104	0.095	0.087	0.078
0.100	0.247	0.208	0.182	0.169	0.156	0.143	0.130	0.117
0.175	0.247	0.208	0.182	0.169	0.156	0.143	0.130	0.117
0.250	0.247	0.208	0.182	0.169	0.156	0.143	0.130	0.117
0.325	0.247	0.208	0.182	0.169	0.156	0.143	0.130	0.117
0.400	0.247	0.208	0.182	0.169	0.156	0.143	0.130	0.117
0.680	0.145	0.122	0.107	0.099	0.092	0.084	0.076	0.069
0.960	0.103	0.087	0.076	0.070	0.065	0.060	0.054	0.049
1.240	0.080	0.067	0.059	0.055	0.050	0.046	0.042	0.038
1.520	0.065	0.055	0.048	0.044	0.041	0.038	0.034	0.031
1.800	0.055	0.046	0.040	0.038	0.035	0.032	0.029	0.026
2.080	0.048	0.040	0.035	0.033	0.030	0.028	0.025	0.023
2.360	0.042	0.035	0.031	0.029	0.026	0.024	0.022	0.020
2.640	0.037	0.032	0.028	0.026	0.024	0.022	0.020	0.018
2.920	0.034	0.028	0.025	0.023	0.021	0.020	0.018	0.016
3.200	0.031	0.026	0.023	0.021	0.020	0.018	0.016	0.015
3.480	0.028	0.024	0.021	0.019	0.018	0.016	0.015	0.013
3.760	0.026	0.022	0.019	0.018	0.017	0.015	0.014	0.012
4.040	0.024	0.021	0.018	0.017	0.015	0.014	0.013	0.012
4.320	0.023	0.019	0.017	0.016	0.014	0.013	0.012	0.011
4.600	0.021	0.018	0.016	0.015	0.014	0.012	0.011	0.010
4.880	0.020	0.017	0.015	0.014	0.013	0.012	0.011	0.010
5.160	0.019	0.016	0.014	0.013	0.012	0.011	0.010	0.009
5.440	0.018	0.015	0.013	0.012	0.011	0.011	0.010	0.009
5.720	0.017	0.015	0.013	0.012	0.011	0.010	0.009	0.008
6.000	0.016	0.014	0.012	0.011	0.010	0.010	0.009	0.008
6.500	0.014	0.012	0.010	0.010	0.009	0.008	0.007	0.007
7.000	0.012	0.010	0.009	0.008	0.008	0.007	0.006	0.006
7.500	0.011	0.009	0.008	0.007	0.007	0.006	0.006	0.005
8.000	0.009	0.008	0.007	0.006	0.006	0.005	0.005	0.004
8.500	0.008	0.007	0.006	0.006	0.005	0.005	0.004	0.004
9.000	0.007	0.006	0.005	0.005	0.005	0.004	0.004	0.003
9.500	0.007	0.006	0.005	0.004	0.004	0.004	0.003	0.003
10.000	0.006	0.005	0.004	0.004	0.004	0.003	0.003	0.003

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NOTES:

1. For methodology of calculation of seismic forces and other seismic design criteria, refer latest revisions of the following codes:

   IS 1893 (Part 1): 2016 General provisions and buildings

   IS 1893 (Part 4): 2024 Industrial structures including stack-like structures

2. Seismic design of liquid storage tanks shall be in accordance with IS 1893 (Part 2). For tanks not covered under IS 1893 (Part 2), shall be designed with relevant international standards as specified in project specifications (such as API650/620, Eurocodes, etc).

3. When cylindrical storage tanks are designed as per API 650/620 or another relevant standard using site-specific design methods, the percentage of critical damping and response reduction shall be taken in accordance with the respective design codes. For these tanks, importance factor and category shall be as per IS 1893 (Part 4).

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DESIGN BASIS FOR WIND LOAD ON PIPING

(Engineering & Technology Development)

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

OWNER : M/s BHARAT PETROLEUM COOPERATION LIMITED

CONSULTANT : Engineers India Ltd.

JOB NO. : B857

1. SCOPE

Rev. No	Date	Purpose	Prepared by	Reviewed by	Approved by
1	30.04.2025	Basic wind Speed is updated	VBA	PG	SVRS
0	19.11.2024	ISSUED AS GUIDE	VBA	PG	SVRS

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The scope of this document is to specify the wind pressure to be considered for calculation of wind load on piping systems. The effect of wind on a piping system is to produce a set of vibratory/dynamic loads acting along different directions depending on the configuration of the piping. However, the design wind load for a piping system is often calculated on the basis of a statically applied maximum pressure(s) that can be expected over the design life of the plant/unit.

2. GENERAL NOTES

The wind load analysis shall be done for the following piping systems.

(i) Two Phase Flow Lines.
(ii) Flare Header.
(iii) Any other line of size 20" (O.D.) & above (including insulation, if any) running above 10-meter height from HPP level.

However, all lines should have a sufficient number of horizontal restraints/guides to resist the design wind load to be calculated as per the formula indicated in section 3 of this document. Additional horizontal supports may be required to reduce excessive horizontal deflection of pipe due to wind load.

3. DESIGN WIND LOAD

The design wind load on a pipe shall be calculated from the following relation:

$$F_{wz} = C_f \; p_d D_o$$

Where F_{wz} = Wind load at height z **per unit length of pipe**
C_f = Shape factor (to be considered as 0.7)
D_o = External diameter of pipe including the insulation
p_d = $K_d * K_a * K_c * p_z$, Design wind pressure on pipe at height z
p_z = Wind pressure on pipe at height z

Height (in 'm') of pipe above ground	≤ 10	15	20	30	50	100
Design wind pressure p_d (in 'N/m^2')	1265	1438	1559	1717	1917	2200

Notes:

(i) Above wind pressures are based on k_1 value corresponding to Basic Wind Speed of 47 m/s and Design Life of 100 years, k_2 value corresponding to Category 3, k_3 (topography factor) value to be 1.0 and k_4 (importance factor for the cyclonic region) value to be 1.0 respectively as defined in IS 875 (Part 3) 2015 amendment no.2.

(ii) K_d (Wind directionality factor) value to be 1.0, K_a (Area averaging factor) value to be 1.0 and K_c (Combination factor) value to be 1.0 respectively as defined in IS 875.

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(iii) Wind pressure for any intermediate height may be linearly interpolated.

4. LOAD COMBINATIONS

All supports should be adequate for the following load combinations due to wind load alone in addition to other load conditions considered for the design of piping:

(i) Sustained load + Wind Load

(ii) Sustained load + Thermal load (operating) + Wind Load

However, the stress in the piping should be checked only for the first load case (i.e., Sustained load + Wind Load) and the maximum stress in the pipe should be limited to 1.33 times the allowable stress at the maximum operating temperature.

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SEISMIC DESIGN REQUIREMENTS FOR PIPING

(Engineering & Technology Development)

PROJECT : **BINA PETCHEM & REFINERY EXPANSION PROJECT (BPREP), BINA**

OWNER : **M/s BHARAT PETROLEUM COOPERATION LIMITED**

CONSULTANT : **Engineers India Ltd.**

JOB NO. : **B857**

Rev. No	Date	Purpose	Prepared by	Reviewed by	Approved by
0	19.11.2024	ISSUED AS GUIDE	VBA	PG	SVRS

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1. SCOPE

This document provides certain guidelines/methods to be used for seismic analysis of the piping. However, detailed mathematical formulations for seismic analysis are outside its scope.

2. DESIGN ACCELERATION DUE TO EARTHQUAKE

The spectral acceleration coefficients (S_a/g) shall be obtained from the site-specific seismic spectra document no. B857-000-16-54-DB-0001. The horizontal seismic acceleration coefficients (A_h) shall be calculated as per section 7.3.1 of IS 1893, Part 4: 2024. I/R ratio (Importance factor to response reduction factor) shall be considered as 0.75 for process piping while for utility piping it shall be 0.6. Vertical acceleration values may be taken as 2/3rd of the corresponding horizontal values.

3. METHOD OF SEISMIC DESIGN

3.1 METHOD OF ANALYSIS

Response Spectrum Method shall be used for seismic analysis of piping. The piping that requires seismic analysis has to be designed for multi-component earthquakes (i.e., two horizontal directions and the vertical direction) as per the procedure given in section 8.3.2.1 of code IS 1893 (Part-4): 2024.

3.2 SUGGESTED DAMPING (IN PERCENTAGE OF CRITICAL) VALUES

Component	Damping Value (%)
All piping except for the following systems	2.0
Integrated systems (i.e. piping modeled alongwith vessel/equipment and structure)	5.0

4. CRITERIA FOR REQUIREMENT OF SEISMIC ANALYSIS

Seismic analysis has to be performed when the piping satisfies any one of the following criteria:

(i) All emergency service lines such as fire water line of diameter 10" and above
(ii) All two-phase flow lines having slug flow of diameter 12" and above
(iii) All lines with 900 # and higher-pressure class of diameter 16" and above
(iv) For those lines which do not come under any of the above types, following criteria shall be considered:

For elevations* < 25.0 m	For elevations* ≥ 25.0 m
Line diameter 26" and above	Line diameter 16" and above

***** Elevation of highest portion of piping

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IMPORTANT NOTES:

1. Gapped restraints/supports which are effective in operating load condition shall be treated as full restraints/supports while carrying out seismic analysis.
2. Only mechanical restraints including snubbers and sway braces should be considered in seismic analysis. Frictional resistance should not be considered as a restraint.
3. Only operating temperature and pressure need to be considered for load combinations involving the seismic effect.

5. LOAD COMBINATIONS

All supports should be adequate for the following load combinations due to seismic load alone in addition to other load conditions considered for the design of piping:

(i) Sustained load + Seismic load
(ii) Sustained load + Thermal load (operating) + Seismic load

However, the stress in the piping should be checked only for the first load case (i.e., sustained load + Seismic load) and the maximum stress in the pipe should be limited to 1.33 times the allowable stress at the maximum operating temperature.

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ADDENDUM TO

STANDARD SPECIFICATION

No. 6-65-0006, 6-65-0019, 6-66-0004 & 6-66-0061

PROJECT : **BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (BPREP PROJECT)**

OWNER : **BHARAT PETROLEUM CORPORATION LIMITED (BPCL)**

PMC / EPCM : **ENGINEERS INDIA LIMITED (EIL)**

JOB NO. : **B957**

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
A	24.02.26	ISSUED FOR TENDER	BP	SB	AK

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1. ADDENDUM TO STANDARD SPECIFICATION: 6-65-0006 (Standard specification for earthwork for underground piping)

Sl. NO.	DOCUMENT NUMBER	CLAUSE NO.	MODIFICATIONS
1	6-65-0006 Rev.4	5.1	**Clause "BACKFILLING AND COMPACTION"** Trenches shall be back filled with suitable materials which should be compacted to the same degree or better as the surrounding soils. The soil used should be selected and approved by Engineer-in-Charge. Suitable material can be extracted from available excavated material. The soil should be free from rubbish, grass, organic matter, stones, building waste and Black Cotton Soil etc. It should be free from clods and hard lumps. In case good soil is not available from excavated material for back filling, trench shall be filled back with locally available coarse sand upto 30 cm. thick above the pipe and rest of trench shall be filled back with excavated soil upto required level.' **"Shall be read as"** The trench shall be excavated 150 mm beyond the bottom level of the pipe. Pipe bedding of 150 mm compacted thick sand layer shall be provided before placement of the pipe. The backfilling after laying of the pipe shall be done with sand up to 150 mm above the top of pipe. The sand shall be laid in layers of 150 mm compacted thickness including watering and compacting with mechanical means like vibro rammers etc. to 85% relative density as per IS: 2720 Part XIV. Balance backfilling of the trench shall be by the soil selected and approved by Engineer-in-Charge. Suitable material can be extracted from available excavated material. The soil should be free from rubbish, grass, organic matter, stones, building waste and black cotton soil etc. It should be free from clods and hard lumps. In case good soil is not available from excavated material for backfilling, the approved available select earth excavated & deposited earlier within complex limit shall be used or approved borrow earth shall be used.

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2. ADDENDUM TO STANDARD SPECIFICATION: 6-65-0019 (Standard specification for concrete pavement)

Sl. NO.	DOCUMENT NUMBER	CLAUSE NO.	MODIFICATIONS
1	6-65-0019 Rev.4	10.2.1	**Clause "SEALING OF JOINTS"** After the curing, the temporary seal or other intruded materials of all expansion and contraction joints shall be removed completely and the slots filled with approved silicone sealant. It shall be self-leveling low modulus type confirming to ASTM 5893. The sealant shall conform to IRC 57. The filler material for Expansion and Sealing joints shall be performed fillers of Bitumen Impregnated Fiber, conforming to IS: 1838, Part-I. **"Shall be read as"** After the curing, the temporary seal or other intruded materials of all expansion and contraction joints shall be removed completely and the slots filled with polysulphide base joint sealant of approved make conforming to BS:5212, including applying 2 coats of approved compatible primer with the brand of Polysulphide. The filler material for Expansion and Sealing joints shall be pre-formed fillers of Bitumen Impregnated Fiber, conforming to IS: 1838, Part-I.

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3. ADDENDUM TO STANDARD SPECIFICATION: 6-66-0004 (Standard Specification for Portable Fire Extinguisher)

Sl. NO.	DOCUMENT NUMBER	CLAUSE NO.	MODIFICATIONS
1	6-66-0004 Rev.1	3.2.1	**Clause "Dry Chemical Powder Type"** Extinguisher shall be portable low pressure Cartridge type with capacities 1 / 2 / 4 / 6 /per requirement based on fire rating. **"Shall be read as"** Extinguisher shall be portable stored Pressure type with capacities 6 Kg /9 Kg. per requirement based on fire rating.
2	6-66-0004 Rev.1	3.2.3	**Clause "Dry Chemical Powder Type"** Dry powder conforming to IS: 14609, I.S. 4308 and **IS**: 4861 shall be used for charging the extinguishers. **"Shall be read as"** Dry powder shall conform to IS: 14609, i.e. 90% Mono Ammonium phosphate (MAP)
3	6-66-0004 Rev.1	3.2.5	Clause 3.2.5 shall be considered as deleted.
4	Additional Clause		Thickness of body plate used in 9 Kg. Capacity DCP Fire extinguisher shall be minimum **2mm**.

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4. ADDENDUM TO STANDARD SPECIFICATION: 6-66-0061 (STANDARD SPECIFICATION 50KG & 75KG CAPACITY DRY CHEMICAL POWDER EXTINGUISHER

Sl. NO.	DOCUMENT NUMBER	CLAUSE NO.	MODIFICATIONS
1	6-66-0061 Rev.4	3.2	**Clause "DESIGN REQUIREMENTS"** The method of expulsion of dry powder shall be by means of pressure produced from compressed or liquefied gas from gas cylinder attached to the body and suitably mounted on trolley. **"Shall be read as"** The method of expulsion of dry powder shall be by means of pressure stored within the main cylinder using propellant.
2	6-66-0061 Rev.4	3.3	Propellant for cartridge operated wheeled fire extinguisher shall be CO2 gas type and having maximum dew point of -55°C.Gas cartridge shall conform to IS 4947 in all aspects. **"Shall be read as"** Propellant for stored pressure type wheeled extinguisher shall be Dry Nitrogen. Purity of dully filled Nitrogen shall be 99.99%.
3	6-66-0061 Rev.4	3.4	Chemical content for Dry chemical powder used as extinguishing media shall cover more than 50% of Mono ammonium phosphates of total composition of the extinguishing powder, and shall comply with IS 14609, with maximum fill density as specified in IS: 16018. **"Shall be read as"** Chemical content for Dry chemical powder used as extinguishing media shall cover more than **90%** of Mono ammonium phosphates of total composition of the extinguishing powder, and shall comply with IS 14609, with maximum fill density as specified in IS: 16018.
4	6-66-0061 Rev.4	7.0	**Clause "TSETING INSPECTION AND APPROVALS"** A clearance/approval certificate from the PESO, Nagpur shall be submitted for each gas cartridge supplied with the DCP extinguishers. **"Shall be read as"** Same shall be considered as deleted

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5	6-66-0061 Rev.4	8.2	**Clause "INFORMAION REQUIRED FROM VENDOR"** A clearance/approval certificate from PESO as described in clause 7. **"Shall be read as"** Same shall be considered as deleted
6	Additional Clause		Thickness of body plate used in 50 Kg. Capacity DCP Fire extinguisher shall be minimum **5mm**.

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B957-999-81-45-00001

PLANT NORTH / TRUE NORTH

WIND ROSE BASED OF NEERI

LOCATION PLAN
NOT TO SCALE

DETAIL-1

DETAIL-2

DETAIL-3

COMPLETE SITE DETAILS OF BHARAT PETROLEUM CORPORATION LTD. BINA REFINERY, BINA	
SURVEY NO.	2,3,4,5/1,5/2,6/1,6/2,6/3,6/4,7/1,8/2,8/3,8/4,8,9/1, 9/2,9/3,10/1,10/2,10/3,12,13,15,16,17,18,19,20,21/1, 31/1,42/1,2,3,22/3,22/5,23/1,25/5/2,5/1,21,7+22/4+25/6, 121/3+22/2+25/2,23/3,23/2,1/2,7,11,14, 5/2,1,2,1/2,2/3,3,21, 22,23,24,26/1,26/2,27,28,29,30,31,32,33,34,35,35/4/6,36, 39,40,41,42,44,47,48,49,50,52,53,54,56,57,60,61,62,63,14/2, 20,12,18,19,25,37,38,43,45,46,51,55,58,59,64,65,66,67,68, 155,156,157,160,161/2,1,7,8,9,21,22,23,24,25,26,37,38,39, 40,41,42,43,43/3,45/4,44,45,46,47,48,49,50,51/2,51/3,54,152, 153,154, 323/2,324/2,330/2,2,276,277,278,319,321,322, 327/5,324/3,326,330/1, 65/2/82,83/1, 3,4,5/2,7/2,26,27, 47,50,65,66,67,68,94/2,118/2,767,768,770,1227,1228,1229, 1230,1231/1,1231/2,1232,1233,1234/1,1234/2,1235,1236, 1237,1238,1247,1248,1249,1250/2,1251/2,1253,1254,1255, 1256,1257,1258,1260,1498/2,1499/2,500/2,501/2,502/2, 503/2,504/2,505/2,507/2,509/2,511/2,512/2,513/2,514/2, 515,516/2,524/2,525/2,528/2,528/3,543/2,544/2,556/2, 557/2,561/2,563/2,564/2,771,772,773,774/2,775/2,1223,2, 1224,1225,1226,1239,1240,1241,1242,1246/2,1313/2, 1314/2,1315,1316/2,764,765,766,769,1259,1261,1262,1263, 1264,1265,1266,1267/1,1267/2,1267/3,1267/4,1267/5, 1267/6,1268,1269,1270,1271,1272,1273,1274,1275,1276, 1277,1278,1280,1281,1307,1308.
LOCATION/VILLAGE	BEDKHEDI TADA/CHHAK: AGASOD/DONMADHU/BILDHAN (BIJURG/BHAKNA/MUNDAR/NEHRONE/AGASOD

AREA CHART -	
TOTAL AREA	795.6 HECTARE
NATURAL POND AREA	8 HECTARE
PLANT AREA INCLUDING FUTURE & OPEN AREA	579.5 HECTARE
GREEN BELT AREA IN REFINERY COMPLEX	208.1 HECTARE
GREEN BELT REQUIRED (33%)	265.43 HECTARE
GREEN BELT IN BDT COMPLEX (COMPENSATED FOR REFINERY AREA)	12.43 HECTARE
ADDITIONAL AREA REQUIRED FOR GREEN BELT	65 HECTARE

REF. DWG. NO.	REFERENCE DRAWING TITLE
B109-000-17-44-00001	OVERALL PLOT PLAN
B857-000-81-45-00001	OVERALL PLOT PLAN

NOTES :-

1. ALL CO-ORDINATES,DIMENSIONS AND LEVELS ARE IN METRES.
2. THIS DRW. IS MADE BASED ON DWG. NO. CCPL/9802249/1/2/3/4/5 BY M/S CONSTELL CONSULTANTS PVT. LTD.
3. ALL LEVELS ARE BASED ON GTS BENCH MARK VALUE 411.60 M ABOVE MEAN SEA LEVEL MARKED ON NE CORNER OF CENTRAL PARAPET OF RAILWAY CULVERT AT KM 977 BINA JHANSI RAIL LINE.
4. ALL CO-ORDINATES ARE BASED ON REFERENCE POINT OF ORIGIN PBM 8 WHOSE VALUE IS ASSUMED AS E 50000,N 50000
5. NGL OF THE PLANT VARIES BETWEEN 440 TO 394 M.
6. THE PLANT IS NOT PRONE TO FLOOD AS HFL ESTABLISHED IN THIS REGION IS 390.6 M.
7. DELETED
8. DELETED

JOB NO. B957

9. POST EXPANSION, ONE NEW CHAIN SHALL BE LOCATED IN THE EXISTING CPU.
10. THE LAND LIMIT SHOWN IS INDICATIVE. THE SAME WILL BE UPDATED ON RECEIPT OF SURVEY DATA.
11. LOCATION OF EXISTING CONTROL ROOM TO BE REVIEWED AS PER THE RISK STUDY DURING CONSTRUCTION OF CDU/ VDU OF 8 MMTPA.
12. THE LOCATION OF THE OPERATOR CABIN FOR NEW UNITS UNDER JOB NO. B857 SHALL BE FINALIZED DURING DEVELOPMENT OF EQUIPMENT LAYOUT OF EACH UNIT.
13. SS & SRR SHOWN INSIDE THE UNIT BATTERY LIMIT SHALL BE MINIMUM 16 M FROM THE NEAREST EQUIPMENT IN THE UNIT.
14. COMMON SHUTDOWN PHILOSOPHY SHALL BE FOLLOWED FOR ARU & BBU UNIT.

LIST OF EXISTING STORAGE TANKS (TABLE-A)

SNO.	TANK NO.	PRODUCT	NUMBER OF TANKS			CAP. (M3)	MOC	TYPE OF TANKS	DIA (M)	HEIGHT (M)	CLASS	FLASH POINT °C	TANK FARM NO.	REMARKS
			TANKS CURRENTLY REQUIRED	ADDITIONAL TANK TO BE CONSIDERED FOR OUTAGE IN FUTURE	ADDITIONAL TANK TO BE CONSIDERED FOR STORED FUTURE EXPANSION UP TO 9 MMTPA	LIQUID STORED								
		CLASS A												
1	51-TT-FR-01A/B/C	CRUDE	3	–	–	180000	CS	FR	68	20	A	<24		–
2	52-TT-FR-06	NHT FEED	1	1	–	28860	CS	FR	52	15.3	A	<23	TF-4	–
3	52-TT-CR-07	CCR FEED	1	–	–	4960	CS	CR	24	11	A	<23	TF-17	N2 BLANKETING
4	52-TT-DR-08	ISOM / HYDROGEN FEED	1	–	–	4250	CS	DR	20	14	A	<23	TF-14/15	N2 BLANKETING
5	52-TT-FR-09	DRY SLOP	1	–	–	2600	CS	FR	18	12	A	<24	TF-9	–
6	52-TT-DR-11A/B	ISOMERATE	2	–	–	8500	CS	DR	20	14	A	<23	TF-14/15	N2 BLANKETING
7	52-TT-FR-12	REFORMATE	1	–	–	9370	CS	FR	30	15	A	<24	TF-9	–
8	52-TT-DR-16	HCU LIGHT NAPHTHA	1	–	–	4250	CS	DR	20	14	A	<10	TF-14/15	N2 BLANKETING
9	52-TT-DR-18	MTBE	1	–	–	4250	CS	DR	20	14	A	<23	TF- 15	N2 BLANKETING
10	52-TT-CR-19	COKER NAPHTHA	1	–	–	4960	CS	CR	24	11	A	<23	TF- 17	N2 BLANKETING
11	52-TT-FR-09A	DRY SLOP	1	–	–	2600	CS	FR	18	12	A	<24	TF-9	–
12	52-TT-CR-19A	COKER NAPHTHA	1	–	–	4973.8	CS	CR	24	11	A	<23	TF- 17	N2 BLANKETING
13	51-TT-FR-01D	CRUDE	1	–	–	60000	CS	FR	68	20	A	<24	TF-1	–
14	52-TT-CR-06B	NHT FEED	1	–	–	28860	CS	CR	52	15.3	A	<23	TF-4	–
15	52-TT-CR-07B	CCR FEED	1	–	–	4960	CS	CR	24	11	A	<23	TF-17A	–
16	52-TT-DR-08B	ISOM/HYDROGEN FEED	1	–	–	4410	CS	DR	20	14	A	<23	TF-15	–
17	52-TT-FR-12B	REFORMATE	1	–	–	9370	CS	FR	30	15	A	<24	TF-9	–
18	52-TT-DR-18B	MTBE	1	–	–	4410	CS	DR	20	14	A	<23	TF-15	–
	TOTAL CAPACITY OF CLASS A PRODUCT. (INCLUDING UNDER GROUND VESSELS CAPACITIES SHOWN IN TABLE-B.)		371691.10											
		CLASS B												
1	52-TT-CR-05A/B/C	DHDT FEED	3	1	–	45720	CS	CR	38	13.5	B	>35<66	TF-12	N2 BLANKETING
2	52-TT-CR-13A/B	CDU/VDU IFO (1% WT SULPHUR)	2	–	–	3080	CS	CR	14	10	B	>35<66	TF-12	–
3	52-TT-CR-14A/B	REFINERY IFO (2.0% WT SULPHUR)	2	1	–	3700	CS	CR	14	12	B	>35<66	TF-12	–
4	52-TT-CR-17	LCGO	1	–	–	5190	CS	CR	24	12	B	>35	TF-11	N2 BLANKETING
5	52-TT-CR-17A	LCGO	1	–	–	14680	CS	CR	38	13.5	B	>35<66	TF- 13	N2 BLANKETING
6	CFP HSD TANK	HSD	1	–	–	850	CS	CR	10.5	12	B	>35<66	– –	N2 BLANKETING
7	52-TT-CR-05D	DHDT FEED	1	–	–	15240	CS	CR	38	13.5	B	>35<66	TF-13	–
	TOTAL CAPACITY OF CLASS B PRODUCT		88460											
		CLASS C												
1	52-TT-CR-02A/B/C	VGO	3	1	–	51150	CS	CR	40	14	C	>66	TF-7/8	N2 BLANKETING
2	52-TT-CR-03A/B	HCGO	2	1	–	11100	CS	CR	26	11	C	>66	TF-10/11	N2 BLANKETING
3	52-TT-CR-04A/B	VR	2	–	–	28740	CS	CR	40	12	C	>66	TF-6	–
4	52-TT-CR-10	BLACK SLOP	1	–	–	1970	CS	CR	14	13.3	C	>66	TF-5	–
5	52-TT-CR-15	CRUDE WATER DRAW/ WT SLOP	1	–	–	1540	CS	CR	14	10	C	>66	TF-3	–
6	52-TT-CR-03C	HCGO	1	–	–	5820	CS	CR	26	11	C	>66	TF-10/11	N2 BLANKETING
7	52-TT-CR-04C	VR	1	–	–	14400	CS	CR	40	12	C	>66	TF-6	–
8	49-TT-2401	DAY OIL TANK	1	–	–	459	CS	CR	7.5	10.8	C	>66	NEW UTILITY BOILER PLOT	N2 BLANKETING
9	52-TT-CR-02D	VGO	1	–	–	17050	CS	CR	40	14	C	>66	TF-8	–
	TOTAL CAPACITY OF CLASS C PRODUCT		1352229											
	GRAND TOTAL CAPACITY OF CLASS A, B & C PRODUCT		592380.1											

LIST OF UNDER GROUND VESSELS (TABLE-B)

SNO.	VESSEL NO.	PRODUCT	NUMBER OF VESSEL	CAP. (M3)	MOC	DIA (M)	LENGTH (M) TL TO TL	CLASS
1	52-V-01	MTBE BLOW DOWN VESSEL	1	3	CS	1.0	3.0	A
2	52-V-02	WHITE OIL BLOW DOWN	1	5	CS	1.2	3.8	A
3	52-V-03	BLACK OIL BLOW DOWN	1	5	CS	1.2	3.8	A
4	52-V-04	CRUDE SURGE STORAGE VESSEL	1	70	CS	3.0	9.0	A
5	60-TT-001-301	CRUDE OIL U/G VESSEL	1	20	CS	2.1	5.25	A
6	49-TT-2402	CLOSE BLOW DOWN TANK	1	4.3	CS	1.5	3.0	A
	UNDER GROUND VESSEL CAPACITY CONSIDERED UNDER CLASS A		107.3					

LIST OF STORAGE TANKS UNDER JOB NO. B109

SNO.	TANK NO.	PRODUCT		NUMBER OF TANKS	CAP. (M3) LIQUID STORED	MOC	TYPE OF TANKS	DIA (M)	HEIGHT (M)	CLASS	FLASH POINT °C	TANK FARM NO.	REMARKS
		EXISTING	NEW										
	INTERMEDIATED PRODUCT												
1	52-TT-FR-101		KHDS FEED	1	16963	CS	FR	35	20	B	>45	TF-8	
	52-TT-CR-13A	CDU/VDU IFO (1% WT SULPHUR)	HDS KEROSENE	1	1030	CS	IFR	14	10	B	50	TF-12	

LIST OF PROCESS UNIT (EXISTING)

SNO.	UNIT	CAPACITY MMTPA	LICENCER
1	CDU / VDU	7.5	EIL
2	NAPHTHA HYDROTREATER/NSU	1.553	UOP
3	CCR	0.837	UOP
4	ISOM	0.634	UOP
5	FULL CONVERSION HYDRO CRACKER UNIT/DHDT	2.625/2.372	CHEVRON
6	ATF TREATER	0.711	UOP
7	HYDROGEN GENRATION UNIT	0.099	KTI
8	DELAYED COKER UNIT	1.822	ABB LUMMUS
9	SULPHUR RECOVERY UNIT/TGTU	3x243 MTPD	EIL/SINI
10	SOUR WATER STRIPPER(REFINERY)	162m3/HR. (SINGLE STAGE)	EIL
	SOUR WATER STRIPPER(HYDRO PROCESSING)	65m3/HR. (TWO STAGE)	
11	AMINE REGENRATION SYSTEM (RICH AMINE BASIS)	468 T/Hr. OF RICH AMINE	EIL
12	LPG TREATING UNIT	0.179	EIL
13	FG TREATING UNIT	0.1	EIL
14	SRU	1x180 MTPD	
15	KHDS	0.6 MMTPA	M/S AXENS

LIST OF NON-PLANT BLDGS

S.NO.	BUILDING
1	WORKSHOP EXTENSION
2	LABORATORY BUILDING
3	DRIVER REST ROOM
4	FWPH EXTENSION
5	POLYMER PRODUCT WAREHOUSE

LIST OF NEW PROCESS UNIT (BPREP)

SNO.	UNIT	CAPACITY	LICENSOR
1	ECU	1200 KTPA ETHYLENE	LUMMUS
2	LLDPE/ HDPE SWING	2 X 575 KTPA	UNIVATION
3	PPU	550 KTPA	GRACE
4	BUTENE-1	50 KTPA	AXENS
5	BBU	300 KTPA	PORNER
6	ARU	172 TPH	EIL

LIST OF REVAMP PROCESS UNIT (BPREP)

SNO.	UNIT	CAPACITY	LICENSOR
1	CDU FGTU IN CDU UNIT	4 MMTPA 40 KTPA	EIL
2	LPGTU IN DCU UNIT	90 KTPA	EIL
3	FCHCU TO OHCU	HCU =3.65 MMTPA DHDT=2.292 MMTPA	EXISTING

LIST OF UTILITIES (BPREP)

SNO.	UTILITY	CAPACITY
1	RAW WATER RESERVOIR	2.2 LAKH CUM (~2.5 DAYS STORAGE)
2	RWTP	3600 CUM/HR. (TREATED)
3	ZLD	2 X 36 CUM/HR. (1+1) CHAIN
4	RO-DM	250 CUM/HR (DM WATER)
5	CPU	2 X 70 CUM/HR (1+1) CHAIN (CPU-HYDE EXPANSION, ONE NEW CHAIN SHALL BE LOCATED IN THE EXISTING CPU)
6	ETP	260 CUM/HR.
7	GTS	250 MW
8	N2/ IA/ PA	N2 2 X 9000 NM3/HR LP AIR COMP. (4+1) X 25000 NM3/HR IA DRYER – 4 X 5000 NM3/HR
9	FLARE	DE-MOUNTABLE TYPE
10	CT-01 (ECU)	23 + 0 CELLS @4000 CUM/HR. [3 CELLS FUTURE]
11	CT-02 (POLYMER)	15 + 1 CELLS @4000 CUM/HR.
12	CT-REFINERY	2 CELLS @4000 CUM/HR. IN EXISTING REFINRY CT
13	STEAM GENERATION BLOCK	UB – 1x265 TPH VHP STEAM
14	FIRE WATER PUMP HOUSE	EXTENSION FOR NEW PUMPS

LIST OF PRESSURIZED / DWST STORAGE TANKS UNDER PROJECT BPREP

SNO.	TANK NO.	PRODUCT	NUMBER OF TANKS	NOML. CAP. (M3)	MOC	TYPE OF TANKS	DIA (M)	HEIGHT (M)	CLASS	FLASH POINT °C	TANK FARM NO.	REMARKS
1	500-TT-00-001A/B	ETHYLENE	2	29500	–	DWST	48	20.4	–	–	TF-21	OUTER DIMENSIONS
2	500-TT-00-002A-C	PROPYLENE	5	4288	–	MB	8	80	–	–	TF-24	
3	500-TS-00-001	OFF SPEC ETHYLENE	1	3820	–	SPHERE	19.4	–	–	–	TF-22	
4	500-TT-00-003	OFF SPEC PROPYLENE	1	4288	–	MB	8	80	–	–	TF-24	
5	500-TS-00-002	RAW C4 MIX/ OFFSPEC BUTENE-1	1	2480	–	SPHERE	16.8	–	–	–	TF-22	
6	500-TT-00-006A/B	BUTENE-1	2	1217	–	MB	7	27	–	–	TF-26	

LIST OF ATMOSPHERIC STORAGE TANKS UNDER PROJECT BPREP

SNO.	TANK NO.	PRODUCT	NUMBER OF TANKS	STORED CAP. (M3)	MOC	TYPE OF TANKS	DIA (M)	HEIGHT (M)	CLASS	FLASH POINT °C	TANK FARM NO.	REMARKS
1	52-TT-CR-201A-E	BITUMEN	5	2650	–	CR	16.2	14	EXCL.	220	TF-25	N2 BLANKETING
2	52-TT-CR-203	UCO	1	7300	–	CR	22.4	19.6	EXCL.	120 (H)	TF-5A	N2 BLANKETING
3	500-TT-00-004A/B	RPG	2	12271	–	DR	29.3	18.7	A	<23	TF-20	N2 BLANKETING
4	500-TT-00-005A-C	BTX UNIT FEED	3	3425	–	IFR	18	17	A	<23	TF-20	N2 BLANKETING
5	500-TT-FR-007	OFF SPEC BENZENE,TOLUENE,XYLENE	1	3425	–	IFR	18	17	A	<23	TF-20	N2 BLANKETING
6	500-TT-CR-008	C9-180	1	1659	–	CR	13	10.5	B	>40	TF-20	N2 BLANKETING
7	510-TT-FR-002A/B	HEXENE-1	2	3600	–	IFR	18	16.5	A	<23	TF-20	N2 BLANKETING
8	510-TT-FR-001	HEXANE	1	240	–	IFR	10.3	9	A	<23	TF-20	N2 BLANKETING
9	510-TT-00-003A/B	ISOPENTANE	2	500	–	A/G VESSEL	4.6	34.5	A	<23	TF-23	N2 BLANKETING
10	52-TT-CR-202	BLACK SLOP	1	3880	–	CR	19	14.7	C	>65	TF-5	

LIST OF SUBSTATION (BPREP)

S. NO.	UNIT/ FACILITY	SUBSTATION NO.
1	GIS (MAIN RECEIVING SUB-STATION)	SS-100
2	ECU	SS-101
3	ECU	SS-102
4	LLDPE/HDPE SWING	SS-103
5	PPU	SS-105
6	CT-01 (ECU), TF-21	SS-106
7	OG	SS-107
8	POLYMER W/H, GANTRY	SS-108
9	CT-02, BUTENE-1, N2/IA/PA, TF-22, 23, 24, 26, 06	SS-109
10	RWTP, RO-DM, ZLD, KWPS, WAREHOUSES, FLARE, TF-20	SS-110
11	CTP, CPU	SS-111
12	LAB, PETCHEM MCR, SITE OFC., FWPH	SS-5A
13	HCU REVAMP, CT-03	SS-3 REVAMP
14	BBU + ARU	SS-9A
15	TF-5, 8	SS-7 REVAMP
16	STEAM GEN. BLOCK	SS-112
17	TF-25, BITUMEN LOADING GANTRY	SS-9B
18	TOWNSHIP	SS-16 REVAMP
19	CDU REVAMP/ FGTU	SS-01A REVAMP
20	DCU REVAMP (LPGTU)	SS-2 REVAMP
21	POLYMER GATE HOUSE, DRIVER REST ROOM	SS-113

LIST OF CONTROL ROOM/ SRR (BPREP)

S.NO.	UNIT/ FACILITY	SRR/ CR	TYPE
1	PETCHEM	PETCHEM MCR	BLAST RESISTANT
2	ECU , CT-01	SRR-101	BLAST RESISTANT
3	ECU, ECU AUXILARY UNITS	SRR-102	BLAST RESISTANT
4	LLDPE/HDPE SWING, CT-02	SRR-103	BLAST RESISTANT
5	BUTENE-1, TF-22, 23, 24	SRR-104	BLAST RESISTANT
6	PPU, TF-20, TF-21	SRR-105	BLAST RESISTANT
7	N2/ IA PLANT	MCC+CR-01	NON-BLAST RESISTANT
8	RWTP, RO-DM, ZLD	CR-02	NON-BLAST RESISTANT
9	ETP	CR-03	NON-BLAST RESISTANT
10	PROPYLENE/ BUTENE-1 GANTRY	CR-04	BLAST RESISTANT
11	TF-25, BITUMEN GANTRY	CR-05	NON-BLAST RESISTANT
12	STEAM GEN. BLOCK	SRR UB-2	NON-BLAST RESISTANT
13	REFINERY UNITS	CONTROL ROOM REVAMP	EXISTING
14	TF-5, 8	SRR-5 REVAMP	EXISTING
15	CDU, VDU, DCU REVAMP	SRR-2 EXTENSION	EXISTING
16	BBU, ARU & CT-03	SRR-8	BLAST RESISTANT
17	OHCU REVAMP	SRR-4 REVAMP	EXISTING

LEGEND :-

BARBED WIRE FENCING & PROPERTY LINE
CHAIN LINK FENCING
COMPOUND WALL
CONTOURS
TENTATIVE FGL
PRESENT TANKS
FUTURE TANKS
WATCH TOWER
RCC RETAINING WALL
RAILWAY TRACK
TRESTLE
CHAIN LINK FENCING
BPREP FACILITY UNDER PMC-1 (8925)
BPREP FACILITY UNDER PMC-2
NEW BOUNDARY WALL
PIPE RACK
PIPE SLEEPER
PIPE SLEEPER(FUTURE)
HEAVY LIFT CRANE APPROACH
FEEDER PILLARS
CONSTRUCTION POWER SUB-STATION
FLOOD LIGHT MASTS
WATCH TOWER
SANITARY SUMP & P.STN. NO.-3
NEW FACILITIES PETCHEM (8957)
NEW FACILITIES REFINERY (8933)
REVAMP (8933 REFINERY AREA)
REVAMP (8957 PETCHEM AREA)

J	14.08.25	ISSUED FOR PESO APPROVAL	Anil	UF/NS	AK/SKN	
H	01.05.25	BROUGHT UPTO DATE & REISSUED	Anil	UF/NS	AK/SKN	
G	29.11.24	ISSUED FOR ENGINEERING/ PPRC	Anil	UF/NS	AK/SKN	
F	14.11.24	UPDATED & ISSUED FOR INFORMATION	Anil	UF/NS	AK/SKN	
E	10.04.24	REVISED & REISSUED FOR PRE-PROJECT ACTIVITY	NS	AK	SKN	
D	03.04.24	ISSUED FOR PRE-PROJECT ACTIVITY	NS	AK	SKN	
C	01.03.24	ISSUED FOR PPRC	NS	AK	SKN	
B	02.02.24	ISSUED FOR CLIENT'S COMMENTS	NS	AK	SKN	
A	30.01.24	ISSUED FOR COMMENTS	NS	AK	SKN	
REV.	DATE	DESCRIPTION	BY	CHKD	APPD	PEM

इंजीनियर्स इंडिया लिमिटेड ENGINEERS INDIA LIMITED (A Govt. of India Undertaking)

BHARAT_PETROLEUM_CORP._LTD.
भारत पेट्रोलियम कॉरपोरेशन लिमिटेड

चीना पैट्रोकेमिकल एवं रिफाइनरी एक्सपैन्शन परियोजना (बी.पी.आर.ई.पी.)

BINA_PETROCHEMICAL_& REFINERY_EXPANSION PROJECT_(BPREP)

सम्पूर्ण क्षेत्र विन्यास

OVERALL PLOT PLAN

SCALE	JOB NO.	UNIT	DIVN.	DEPT.	DWG. NO.	REV.
1:5000	B957	999	81	45	00001	J

3-1641-0500 REV.4 / 06.03.2024 A0-1189 x 841

प्रस्तुत आरेख एवं इसमें दिखित डिज़ाइन इंजीनियर्स इंडिया लिमिटेड की संपत्ति है। वे यहां प्रस्तुत किया है कि न तो इन्हें पूर्ण या आंशिक रूप से प्रकाशित किया जाएगा, न प्रकाश की जाएगी, न उपयोग किए जाएंगे, न प्रतिलिपि किए जाएंगे और न ही सार्वजनिक और किसी प्रकार के अन्यथा इसका इस्तेमाल किसी अन्य उद्देश्य के लिए किया जाएगा। इसका सभी अन्य प्रकार और तरीके सीमित रूप से लिखित रूप में ही सार्वजनिक और किसी प्रकार के अन्यथा इसका इस्तेमाल किसी अन्य उद्देश्य के लिए किया जाएगा।
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FIRE HYDRANT DOUBLE HEADED (STAND POST TYPE)

PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (CLIENT BHARAT PETROLEUM CORPORATION LTD.
UNIT OFFSITE JOB NO. B957 UNIT NO. 999

GENERAL		
CODES		IS 5290 AND EIL SPEC. 6-66-0012
LOCATION		OUTDOOR
TYPE		REFER NOTE 1
OPERATING CONDITIONS		
FLUID HANDLED		FRESH WATER
TEMPERATURE		AMBIENT
WORKING PRESSURE		
MAX.	Kg/cm2g	13.5
MIN.	Kg/cm2g	7
FLOW RATE	lpm	900 lpm PER VALVE 7 kg/cm2 g
HEIGHT OF HORIZONTAL ARMS	mm	AS PER DRAWING
DESIGN FEATURES		
VERTICAL POST DIAMETER	mm	100
HOR. HYDRANT ARM DIAMETER	mm	75
HOSE CONNECTOR		
COUPLING		INSTANTANEOUS, FEMALE, 63 MM AS PER IS 903
VALVE		TYPE A, IS5290,75 MM SIZE (2 VALVES PER HYDRANT POST)
MATERIALS		
HYDRANT VERTICAL POST AND ARMS		AS PER PIPING MATERIAL SPECIFICATION CLASS
FLANGE		
BASE		AS PER PIPING MATERIAL SPECIFICATION CLASS
ARM		ANSI B 16.5, S.O., RF, 150 (ASTM A-105)
LANDING VALVES		STAINLESS STEEL, GRADE IV AS PER IS 3444
HOSE CONNECTOR		STAINLESS STEEL, GRADE IV AS PER IS 3444
CAP		STAINLESS STEEL, GRADE IV AS PER IS 3444
CHAIN		STAINLESS STEEL, GRADE IV AS PER IS 3444
TEST & INSPECTION		
DIMENSION & WORKMANSHIP		YES
HYDROSTATIC TEST PRESSURE	Kg/cm2g	21
FLOW		YES, 900 lpm PER VALVE 7 Kg/cm2g
PAINTING		
STAND POST & ITS ARMS		
OUTSIDE		REFER NOTE 3
INTERNAL SURFACE		REFER NOTE 4

APPROVED

NOTES

1 WET BARREL, VERTICAL STAND POST, WITH TYPE-A LANDING VALVES AS PER IS 5290, DOUBLE HEADED (2 VALVES (75 MM) PER HYDRANT POST) WITH / WITHOUT PUMPER CONNECTION.
2 VALVE PAINTING SHALL BE AS PER IS 5290
3 THE OUTSIDE SURFACE OF STAND POST SHALL BE PAINTED WITH THREE COATS OF ANTI-CORROSIVE FIRE RED PAINT AS PER IS2932 CONFORMING TO SHADE NO. 536 TO IS5 OVER 2 COATS OF RED OXIDE ZINC CHROMATE PRIMER OR A SINGLE COAT OF ALUMINUM PAINT.
THE HANDWHEEL SHALL BE PAINTED BLACK. PAINTS SHALL CONFORM TO IS 2932.
4 THE INTERNAL SURFACE SHALL BE PAINTED WITH THREE COATS OF CHLORINATED RUBBER BASED RESIN PAINT OVER 2 COATS OF RED OXIDE ZINC CHROMATE PRIMER OR A SINGLE COAT OF ALUMINUM PAINT.
5 FOR DETAILED SPECIFICATION, REFER EIL SPEC. NO. 6-66-0012.
6 IN CASE OF ANY CONFLICT BETWEEN DATA GIVEN HERE WITH DATA GIVEN IN THE STD. SPEC. NO. 6-66-0012, DATA SHEET SHALL BE GIVEN PREFERENCE.
7 HYDRANTS SHALL BE BIS MARKED AND APPROVED. VENDOR SHALL SUBMIT THE ISI CERTIFICATE.

Rev. No.	Date	Purpose	Prepared By	Reviewed By	Approved By
0	26-MAR-2025	Issued For Engineering	SB	SB	AK
A	07-MAR-2025	Issued For Comments	SB	SB	AK

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8 EACH HYDRANT SHALL BE CLEARLY AND PERMANENTLY MARKED WITH THE FOLLOWING A) MANUFACTURERS NAME OR TRADE MARK. B) YEAR OF MANUFACTURE. C) PURCHASER NAME. D) BIS CERTIFICATION MARKING ON LANDING VALVE AND COUPLINGS.

APPROVED

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HOSE CABINET

Document No. B957-999-81-45-DS-8004
Rev. No. 0

PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (CLIENT BHARAT PETROLEUM CORPORATION LTD.
UNIT OFFSITE JOB NO. B957 UNIT NO. 999

GENERAL		
TYPE		TYPE-II
LOCATION		INDOOR, OUTDOOR
MECHANICAL DATA		
DELIVERY HOSE SIZE	mm	63
LENGTH OF HOSE	m	15m x 2 NOS.
MATERIALS		
BODY		18 GAUGE M.S.SHEET AS PER IS 513
DOORS		M.S.FRAME WITH GLASS DOORS (3 MM THICK)
HAMMERS		MILD STEEL
CHAIN		G.I.
UNIVERSAL BRANCH PIPE		SS 316
END COUPLING/JET NOZZLE/BRANCH PIPE		SS 316
DELIVERY HOSE		2 NOS. AS PER IS : 636 Type-3
STANDARD HANDLE TYPE LOCKS		MORTISE LOCK SET
DELIVERY COUPLINGS		SS 316
PAINTING		
INSIDE		REFER NOTE-8
OUTSIDE		REFER NOTE-8
UNIT WEIGHT		
EMPTY	Kg	BY VENDOR
TOTAL	Kg	BY VENDOR

APPROVED

NOTES

1 HOSE CABINET SHALL BE OF SELF-SUPPORTING TYPE, SUITABLE FOR OUTSIDE INSTALLATION. NECESSARY HANGERS AND BRACKETS FOR HOSES, BRANCH PIPE AND UNIVERSAL BRANCH PIPE SHALL BE PROVIDED WITHIN THE CABINET. BREAK GLASS RECESS FOR KEY SHALL ALSO BE PROVIDED.

2 TYPE-II HOSE CABINET SHALL BE SUPPLIED WITH TWO DELIVERY HOSES WITH END COUPLINGS, ONE NOZZLE (JET/SPRAY) WITH BRANCH PIPE OF SS316 AS PER IS903 & ONE UNIVERSAL BRANCH PIPE OF SS316 AS PER IS 2871, SELF SUPPORTING TYPE, NECESSARY HANGERS AND BRACKET FOR HOSE, NOZZLE AND BRANCH PIPE WITH WITH DOUBLE PANEL GLASS DOOR.

3 HOSES AND COUPLINGS SHALL BE ISI MARKED

4 DELIVERY COUPLINGS SHALL BE 63 MM DIAMETER WITH REDUCED SHANK.

5 DELIVERY COUPLINGS SHALL BE INSTANTANEOUS SPRING LOCK TYPE AS PER IS 903

6 DELIVERY COUPLINGS SHALL BE INSTANTANEOUS SPRING LOCK TYPE AS PER IS 903

7 EACH CABINET SHALL BE CLEARLY AND PERMANENTLY MARKED WITH THE FOLLOWING.
A) THE WORDS HOSE CABINET-TYPE II
B) INSTRUCTIONS FOR USE.

8 THREE COATS OF ANTI-CORROSIVE FIRE RED PAINT AS PER IS:2932 CONFORMING TO SHADE NO. 536 TO IS:5 FROM OUTSIDE AND WHITE PAINT FROM INSIDE OVER 2 COATS OF RED OXIDE ZINC CHROMATE PRIMER OR A SINGLE COAT OF ALUMINUM PAINT. SURFACE PREPARATION & PRE-ERECTION/ SHOP PRIMER SHALL BE AS PER JOB SPECIFICATION.

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WATER CUM FOAM MONITOR
AQUA FOG TYPE

PROJECT	BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT	CLIENT	BHARAT PETROLEUM CORPORATION LTD.
UNIT	OFFSITE	JOB NO.	B957 UNIT NO. 999

GENERAL		
CODES		AS PER EIL SPECIFICATION NO. 6-66-0027
LOCATION		OUTDOOR
TYPE		STAND POST TYPE (FIXED), SINGLE BARREL, LEVER OPERATED, NON-ASPIRATING AQUA FOG/FOAM TYPE
FLOW RATE	USGPM	500-1000
OPERATING CONDITIONS		
FLUID HANDELED		FRESH WATER
TEMPERATURE		AMBIENT
PRESSURE		
MAX.	Kg/cm2g	13.5
MIN.	Kg/cm2g	7.0
DESIGN FEATURES		
MONITOR BODY		
OPERATION TYPE		MANUALLY OPERATED
MOVEMENT	Deg	HORIZONTALLY- 340°; VERTICALLY- 135° (+90°, -45°).
INLET CONNECTION	Inch	4, ANSI B 16.5, S.O., RF, 150# (ASTM A 105)
OUTLET CONNECTION		BY VENDOR
NOZZLE		
TYPE		REFER NOTE - 1
CONNECTION		BY VENDOR
SIZE	mm	BY VENDOR
FINISH		YELLOW EPOXY PAINTED
FOAM INDUCTION		
FOAM EXPANSION RATIO		NA
FOAM INDUCTION RATE		NA
PERFORMANCE		
AT NOZZLE PRESSURE OF 7 Kg/cm2g		
MIN. DISCHARGE THROW RANGE IN STILL AIR		500-1000 USGPM
HORIZONTAL (WATER) AT 30 DEG. FROM HOR.	m	AS PER EIL SPECIFICATION NO. 6-66-0027
HORIZONTAL (FOAM) AT 30 DEG. FROM HOR.	m	AS PER EIL SPECIFICATION NO. 6-66-0027
VERTICAL (WATER) AT 60 DEG. FROM HOR.	m	AS PER EIL SPECIFICATION NO. 6-66-0027
VERTICAL (FOAM) AT 60 DEG. FROM HOR.	m	AS PER EIL SPECIFICATION NO. 6-66-0027
MATERIALS		
NOZZLE		SS 316 OR STAINLESSS SEEL GRADE IV as per IS:3444
SWIVEL JOINT/ WORM WHEEL & GEAR		SS 316 OR STAINLESSS SEEL GRADE IV as per IS:3444
BODY/ ELBOWS/ BENDS		SS 316 OR STAINLESSS SEEL GRADE IV as per IS:3444
WATER BARREL		SS 316 OR STAINLESSS SEEL GRADE IV as per IS:3444
LOCKS OF HOR. & VER. ROTATION		SS 316 OR STAINLESSS SEEL GRADE IV as per IS:3444
HANDLE		SS 316 OR STAINLESSS SEEL GRADE IV as per IS:3444
DRAIN VALVE		STAINLESS STEEL
JRCP		NA
PICK UP TUBE		PVC TUBE REINFORCED WITH HIGH TENSILE STEEL WIRE HELIX AS PER ASTM D1785 SCH. 80 (3-4 METER LENGTH) WITH SS 316 STRAINER.
TEST & INSPECTION		
DIMENSION & WORKMANSHIP		YES
PERFORMANCE TEST		YES
HYDROSTATIC TEST PRESSURE		AS PER EIL SPECIFICATION NO. 6-66-0027
FUNCTIONAL TEST FOR HOR. & VER. MOVEMENT		YES
APPROVAL		REFER NOTE - 3
PAINTING		

APPROVED

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PROJECT	BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT	CLIENT	BHARAT PETROLEUM CORPORATION LTD.
UNIT	OFFSITE	JOB NO.	B957 UNIT NO. 999
BODY (ABOVE GROUND)		AS PER EIL SPECIFICATION NO. 6-66-0027	

NOTES

1 MONITOR SHALL BE NON-ASPIRATING TYPE WITH ARRANGEMENT OF JET AND SPRAY (AQUA FOG).

2 IN CASE OF ANY CONFLICTION BETWEEN DATA GIVEN HERE WITH DATA GIVEN IN THE STD.SPEC. NO. 6-65-0027, DATA SHEET SHALL BE GIVEN PREFERENCE.

3 ALL THE MONITORS SHALL BE BIS APPROVED/UL LISTED/FM APPROVED AND MULTIPURPOSE COMBINATION NOZZLES FOR JET SPRAY AND FOG ARRANGEMENT.

4 FOR DETAILED SPECIFICATION, REFER EIL SPEC. NO. 6-66-0027.

APPROVED

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PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT | CLIENT BHARAT PETROLEUM CORPORATION LTD.
UNIT OFFSITE | JOB NO. B957 | UNIT NO. 999

GENERAL		
CODES		EIL SPEC. 6-66-0042
LOCATION		OUTDOOR
TYPE		STAND POST TYPE (FIXED), SINGLE BARREL, REMOTE OPERATED
FLOW RATE	USGPM	1000-2000
OPERATING CONDITIONS		
FLUID HANDELED		FRESH WATER
TEMPERATURE		AMBIENT
PRESSURE		
MAX.	Kg/cm2g	13.0
MIN.	Kg/cm2g	7
DESIGN FEATURES		
MONITOR BODY		
OPERATION TYPE		REMOTE
MOVEMENT	Deg	HORIZONTALLY-340 DEG; VERTICALLY-125 DEG (+80,-45)
INLET CONNECTION	Inch	6, ANSI B 16.5, S.O., RF, 150# (ASTM A 105)
OUTLET CONNECTION		BY VENDOR
NOZZLE		
TYPE		NON-ASPIRATING TYPE WITH ARRANGEMENT OF JET AND SPRAY (AQUA
CONNECTION		BY VENDOR
SIZE	mm	BY VENDOR
FINISH		YELLOW EPOXY PAINTED
FOAM INDUCTION		
FOAM EXPANSION RATIO		NA
FOAM INDUCTION RATE		NA
PERFORMANCE		
NOZZLE PRESSURE	Kg/cm2g	7
MIN. DISCHARGE THROW RANGE IN STILL AIR		
HORIZONTAL (WATER) AT 30 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0042
HORIZONTAL (FOAM) AT 30 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0042
VERTICAL (WATER) AT 60 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0042
VERTICAL (FOAM) AT 60 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0042
MATERIALS		
NOZZLE		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
SWIVEL JOINT/ WORM WHEEL & GEAR		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
BODY/ ELBOWS/ BENDS		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
WATER BARREL		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
LOCKS OF HOR. & VER. ROTATION		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
HANDLE		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
PICK UP TUBE FOR JRCP(JRCP)		NA
DRAIN VALVE		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
JRCP		NA
TEST & INSPECTION		
DIMENSION & WORKMANSHIP		YES
FUNCTIONAL TEST FOR HOR. & VER. MOVEMENT		YES
PERFORMANCE TEST		YES
HYDROSTATIC TEST PRESSURE		AS PER EIL SPEC. 6-66-0042
APPROVAL		REFER NOTE - 1
PAINTING		
BODY (ABOVE GROUND)		AS PER EIL SPEC. 6-66-0042 & REFER NOT - 5

APPROVED

NOTES

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0	26-MAR-2025	Issued For Engineering	SB	AK	AK
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PROJECT	BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT	CLIENT	BHARAT PETROLEUM CORPORATION LTD.
UNIT	OFFSITE	JOB NO. B957	UNIT NO. 999

1 COMPLETE MONITOR ASSEMBLY ALONG WITH NOZZLE SHALL BE BIS APPROVED / UL LISTED / FM APPROVED.

2 PUSH BUTTON ON/OFF FOR OPENING & CLOSING OF ISOLATION VALVE (MOV) AND JOYSTICK / PUSH BUTTON FOR UP/DOWN MOTION AND HORIZONTAL ROTATION SHALL BE PROVIDED IN REMOTE CONTROL PANELFOR REMOTE OPERATION.

3 REMOTE CONTROL STSTEM SHALL BE PROVIDED FOR HORIZONTAL AND VERTICAL ROTATION OF THE MONITOR FROM THE FLAMEPROOF CONTROL PANEL TO BE SUPPLIED ALONG WITH THE MONITOR. JET AND SPRAY MOVEMENT OF THE MONITOR NOZZLE SHALL ALSO BE REMOTELY CONTROLLED FROM CONTROL PANEL.

4 IN CASE OF ANY CONFLICT BETWEEN DATA GIVEN HERE WITH DATA GIVEN IN THE STD. SPECIFICATIONS, DATA SHEET SHALL BE GIVEN PREFERENCE.

5 THE HANDWHEEL SHALL BE PAINTED BLACK PAINTS SHALL CONFORM TO IS: 2932.

6 FOR DETAILS, REFER SPECIFICATION 6-66-0042.

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SPRAY NOZZLES (MEDIUM VELOCITY)

Document No. B957-999-81-45-DS-8007

Rev. No. 0

PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (I CLIENT BHARAT PETROLEUM CORPORATION LTD.

UNIT OFFSITE JOB NO. B957 UNIT NO. 999

GENERAL		
TYPE		MEDIUM VELOCITY, OPEN, NON CLOG TYPE
SERVICE		FIRE WATER
FLUID		FRESH WATER
STATE		LIQUID
DESIGN REQUIREMENT		
CAPACITY	LPM	REFER NOTE - 3 & 5
PRESSURE AT INLET	KG/CM2 G	1.4 - 3.5
K-FACTOR		REFER NOTE - 3 & 5
DISCHARGE PATTERN		120 DEGREE ANGLE,UNIFORM FULL CONE SPRAY PATTERN
SIZE	Inch	1/2" NPT
LIQUID PROPERTIES		
SPECIFIC GRAVITY		1.000
VISCOSITY	CP	1
MATERIAL OF CONSTRUCTION		
BODY		SS 316
DEFLECTOR		SS 316
MS FULL COUPLING		3000 lbs RATING AS PER ANSI B 16.11
ACCESSORIES		
FORGED STEEL SPANNERS FOR FIXING THE NOZZLES TO FULL COUPLING		YES
TESTING AND INSPECTION		YES
APPROVAL		REFER NOTE - 1
MARKING		REFER NOTE - 4

APPROVED

Notes

1 SPRAY NOZZLES SHALL BE UL / FM / Vds / LPCB APPROVED.
2 SPRAY NOZZLES SHALL BE SUPPLIED ALONG WITH 3000 lbs RATING FEMALE COUPLING
3 REFER MR/SOR FOR K FACTOR.
4 MANUFACTURER NAME, YEAR OF MANUFACTURE, UL/FM MARK, K- FACTOR, SPRAY ANGLE.
5 FOR DETAIL SPECIFICATION, REFER EIL SPEC NO. 6-66-0046

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PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT CLIENT BHARAT PETROLEUM CORPORATION LTD.
UNIT OFFSITE JOB NO. B957 UNIT NO. 999

GENERAL		
CODES		*
TYPE		PENDENT TYPE QUARTZOID BULB
FLUID HANDELED		WATER/PNEUMATIC
DESIGN REQUIREMENT		
DEFLECTOR TYPE		QUARTZOID BULB
ACTUATION		BY TEMPERATURE RISE TO 79 DEG. C
MATERIAL OF CONSTRUCTION		
BODY		BRASS
COUPLING		BRASS
END CONNECTION	Inch	1/2" NPT
DEFLECTOR		*
BULB COLOR		YELLOW COLOUR
TEST & INSPECTION		YES
APPROVAL		UL/FM APPROVED

APPROVED

NOTES

1 * INDICATES DATA TO BE FILLED BY VENDOR
2 FOR SELECTION OF DRY/WET SYSTEM, REFER MR ITEM DESCRIPTION.

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DELUGE VALVE

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PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (CLIENT BHARAT PETROLEUM CORPORATION LTD.
UNIT OFFSITE JOB NO. B957 UNIT NO. 999

GENERAL		
MODEL		DETECTION BY HYDRAULIC/PNEUMATIC
TYPE OF ACTUATION		THROUGH QBD
SIZE	mm	AS PER P&ID
END CONNECTION		AS PER PMS
OPERATING CONDITIONS		
WORKING PRESSURE		
MAX.	Kg/cm2g	13.0 KG/CM2G
MIN.	Kg/cm2g	7.0 KG/CM2G TO 12 KG/CM2G
HYDRO TEST PRESSURE	Kg/cm2g	BODY 25.0KG/CM2G, SEAT 18.0 KG/CM2G
MATERIAL		
BODY/HOUSING & COVER		DUCTILE IRON
SEAT, CLAPPER, CLAMP RING		BRONZE
DIAPHRAGM SEAT RUBBER		NEOPRENE/ EPDM
BOLTS (INTERNAL)		SS 304
BOLTS (EXTERNAL)		STEEL
ACCESSORIES		
TEST STRAINERS, DRAIN VALVE & NRV		YES
WATER MOTER CONG		YES
CAPABLE OF RESETTING MANUALLY		YES
INSTRUMENTS (PRESSURE GAUGE, SOV ETC)		YES
TEST AND ALARM TRIM		YES
PAINTING		
OUTSIDE		REFER NOTE 6
INTERNAL SURFACE		(*)
COLOUR		REFER NOTE 6
APPROVAL		UL / FM / Vds / LPCB APPROVED
TEST & INSPECTION		AS PER EIL SECIFICATION 6--66-0048
MARKING ON EQUIPMENT		AS PER EIL SECIFICATION 6--66-0048

APPROVED

NOTES

1 FOR DETAILED SPECIFICATION, REFER SPEC. NO. 6-66-0048
2 IN CASE OF ANY CONFLICTION BETWEEN DATA GIVEN HERE WITH DATA GIVEN IN THE SPEC. NO. 6-66-0048
3 PNEUMATICALLY BY INSTRUMENT AIR (DRY TRIM)/HYDRAUCALLY BY WATER (WET TRIM)/ELECTRIC OPERATED (ELECTRIC TRIM) (REFER MR DESCRIPTION FOR TRIM TYPE)
4 MANUFACTURER NAME, YEAR OF MANUFACTURE, SERIAL NO.,SIZE AND MODEL, UL LISTED MARK, DESIGN AND TEST PRESSURE
5 SURFACE PREPARATION & PRE-ERECTION /SHOP PRIMER SHALL BE AS PER SPEC NO-6-79-0020
6 2 COATS OF ANTI-COROSIVE FIRE RED PAINT AS PER IS: 2932 AND CONFORMING TO SHADE NO. 536 OF IS: 5, OVER 2 COATS OF RED OXIDE ZINC CHROMATE PRIMER OR SINGLE COAT OF ALUMINIUM PAINT.
7 (*) VENDOR TO FURNISH

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PROJECT	BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (BPREP)	CLIENT	M/S BHARAT PETROLEUM CORPORATION LTD.		
PLANT	BINA PETROCHEMICAL COMPLEX	JOB NO	B957	UNIT	999

GENERAL	
CODES	AS PER MANUFACTURER STANDARD
WORKING PRESSURE	7.0 KG/CM^2 G
INLET CONNECTION	1" (MALE, NPT THREADED)
MATERIAL OF CONSTRUCTION	
BODY	STAINLESS STEEL, GRADE IV AS PER IS: 3444
BALL & 'O'- RING	RUBBER CONFORMING TO IS: 937
TEST & INSPECTION	
SHAPE, DIMENSION & WORKMANSHIP	AS PER MANUFACTURER STANDARD
HYDROSTATIC TEST FOR EACH ASSEMBLED UNIT	21 KG/CM^2 G FOR 2 ½ MINUTE (SHALL SHOW NO SIGN OF LEAKAGE)
MARKING	EACH AIR RELEASE VALVE SHALL BE CLEARLY MARKED ON ITS BODY WITH FOLLOWING INFORMATION ALONG WITH THE PURCHASER'S NAME 1. MANUFACTURER'S NAME OR TRADEMARK 2. YEAR OF MANUFACTURE

NOTES:

1. CLIENT OR ITS AUTHORIZED REPRESENTATIVE SHALL ALWAYS HAVE ACCESS TO THE MANUFACTURER'S WORK IN WHICH THE AIR RELEASE VALVES ARE MANUFACTURED, ASSEMBLED AND/OR TESTED. INSPECTION OF EQUIPMENT SHALL BE AS PER APPROVED QAP.
2. HYDROSTATIC PRESSURE TEST CERTIFICATES OF AIR RELEASE VALVE SHALL BE SUBMITTED AT THE TIME OF DELIVERY OF MATERIAL.

REV.	DATE	REVISION	PREPD	CHKD	APPD
0	26.03.2025	ISSUED FOR ENGINEERING	NS	SB	AK
A	18.02.2025	ISSUED FOR COMMENTS	NS	SB	AK

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LANDING VALVE (STAND POST TYPE)

PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (B CLIENT BHARAT PETROLEUM CORPORATION LTD.
UNIT OFFSITE JOB NO. B957 UNIT NO. 999

GENERAL		
CODES		IS: 5290
LOCATION		INDOOR / OUTDOOR
TYPE		REFER NOTE-1
OPERATING CONDITIONS		
FLUID HANDELED		FRESH WATER
TEMPERATURE		AMBIENT
PRESSURE		
MAX.	Kg/cm2g	13.5
MIN.	Kg/cm2g	7.0
FLOW RATE	lpm	900 lpm PER VALVE @7 kg/cm2 g
DESIGN FEATURES		
HOSE CONNECTOR		
COUPLING		INSTANTANEOUS, FEMALE, 63 MM AS PER IS:903.
VALVE		TYPE A, IS:5290, 75 MM SIZE (2 VALVES PER LANDING VALVE POST)
MATERIALS		
FLANGE		
BASE		AS PER PMS
ARM		ANSI B16.5, S.O.,RF, 150# (ASTM A-105)
LANDING VALVES		STAINLESS STEEL, GRADE IV AS PER IS 3444
HOSE CONNECTOR		STAINLESS STEEL, GRADE IV AS PER IS 3444
CAP		STAINLESS STEEL, GRADE IV AS PER IS 3444
CHAIN		STAINLESS STEEL, GRADE IV AS PER IS 3444
TEST & INSPECTION		
DIMENSION & WORKMANSHIP		YES
HYDROSTATIC TEST PRESSURE	Kg/cm2g	21
FLOW		YES, 900 lpm PER VALVE @ 7 KG/CM2g.
PAINTING		REFER NOTE 2, 3, 4, 5, 6
COLOR		FIRE RED PAINT AS PER IS: 2932 & CONFORMING TO SHADE NO. 536 OF IS:5

APPROVED

NOTES

1. WET BARREL, VERTICAL STAND POST OF 100 MM DIA SHALL BE PROVIDED WITH 2 NOS. OF TYPE-A LANDING VALVES AS PER IS:5290, ONE ON EACH ARM OF 75 MM DIA
2. VALVE PAINTING SHALL BE AS PER IS 5290
3. SURFACE PREPARATION & PRE-ERECTION/ SHOP PRIMER SHALL BE AS PER JOB SPECIFICATION FOR PAINITNG.
4. THE HANDWHEEL SHALL BE PAINTED WITH 2 COATS OF BLACK PAINT OVER EPOXY BASED PRIMER.
5. THE OUTSIDE SURFACE OF STAND POST SHALL BE PAINTED WITH THREE COATS OF ANTI-CORROSIVE FIRE RED PAINT AS PER IS 2932 CONFORMING TO SHADE NO. 536 TO IS5 OVER 2 COATS OF RED OXIDE ZINC CHROMATE PRIMER OR A SINGLE COAT OF ALUMINUM PAINT
6. THE INTERNAL SURFACE SHALL BE PAINTED WITH THREE COATS OF CHLORINATED RUBBER BASED RESIN PAINT OVER 2 COATS OF RED OXIDE ZINC CHROMATE PRIMER OR A SINGLE COAT OF ALUMINUM PAINT.
7. EACH LANDING VALVE SHALL BE CLEARLY AND PERMANENTLY MARKED WITH THE FOLLOWING: A) MANUFACTURERS NAME OR
TRADE MARK. B) YEAR OF MANUFACTURE. C) PURCHASER NAME. D) BIS CERTIFICATION MARKING ON LANDING VALVE AND COUPLINGS.
8. LANDING VALVE SHALL BE BIS MARKED AND APPROVED. VENDOR SHALL SUBMIT THE ISI CERTIFICATE.

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PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (B CLIENT BHARAT PETROLEUM CORPORATION LTD.
UNIT OFFSITE JOB NO. B957 UNIT NO. 999

9 RO SHALL BE PROVIDED AT THE INLET OF EACH LANDING VALVE AS PER THE GAD ATTACHED WITH THE TENDER/ MR. THE SIZE OF RO SHALL BE AS PER THE DATA SHEET ATTACHED WITH THE TENDER/MR.

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FIRST AID HOSE REEL

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Rev No. 0

PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (BP CLIENT BHARAT PETROLEUM CORPORATION LTD.
UNIT OFFSITE JOB NO. B957 UNIT NO. 999

GENERAL		
CODES		IS: 884
LOCATION		INDOOR / OUTDOOR
TYPE		SWINGING TYPE (WALL MOUNTED)
OPERATING CONDITIONS		
FLUID HANDELED		FRESH WATER
TEMPERATURE		AMBIENT
PRESSURE		
MAX.	Kg/cm2g	13.5
MIN.	Kg/cm2g	7.0
DESIGN FEATURES		
BODY		
OPERATION TYPE		MANUAL
MOVEMENT		SWINGING (180 deg) WALL MOUNTING TYPE
INLET CONNECTION	mm	25
OUTLET CONNECTION		THREADS AS PER IS: 2643 (PART I).
PERFORMANCE		
AT NOZZLE PRESSURE of 7 Kg/cm2g		
FLOW RATE		SHALL NOT BE LESS THAN 24 LPM
MIN. DISCHARGE RANGE		SHALL NOT BE LESS THAN 6m
MATERIALS		
HUB		M.S. IS: 513
SIDES		M.S. IS: 513
SUPPORT FRAMES		M.S. IS: 513
SWIVEL JOINT		STAINLESS STEEL, GRADE IV AS PER IS:3444
HOSE REEL TUBING		BRAIDED RUBBER (AS PER IS : 444 Type-2)
STRAIGHT JET TYPE NOZZLE WITH BRANCH PIPE AND COUPLING.		STAINLESS STEEL, GRADE IV AS PER IS:3444
STOP VALVE		IS: 778
TEST & INSPECTION		
DIMENSION & WORKMANSHIP		AS PER IS:884
PERFORMANCE TEST		AS PER IS:884
HYDROSTATIC TEST PRESSURE		7 kg/cm2g FOR 5 MINUTES WITHOUT ANY LEAKAGE
BURSTING PRESSURE FOR HOSE	Kg/cm2g	30
PAINTING		
OUTSIDE		REFER NOTE 2
COLOUR		FIRE RED PAINT AS PER IS: 2932 & CONFORMING TO SHADE NO. 536 OF IS:5

APPROVED

NOTES

1 HOSE REEL TUBING LENGTH SHALL BE 40M WITH INTERNAL BORE 25MM.

2 THREE COATS OF ANTI-CORROSIVE FIRE RED PAINT AS PER IS:2932 CONFORMING TO SHADE NO. 536 TO IS:5 OVER 2 COATS OF RED OXIDE ZINC CHROMATE PRIMER OR A SINGLE COAT OF ALUMINUM PAINT.

3 FIXING ARRANGEMENT (BRACKET) ALONG WITH SUITABLE ANCHOR FASTENERS MADE OF M.S. GALVANIZED SHALL ALSO BE SUPPLIED ALONG WITH HOSE REEL FOR FIXING.

4 IN CASE OF ANY CONTRADICTION IN THE DATA GIVEN IN THE SPECIFICATION 6-66-0018 VS DATASHEET, DATA GIVEN IN THE DATASHEET SHALL BE FOLLOWED.

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PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT | CLIENT BHARAT PETROLEUM CORPORATION LTD.
UNIT OFFSITE | JOB NO. B957 | UNIT NO. 999

GENERAL		
CODES		EIL SPEC. 6-66-0027
LOCATION		OUTDOOR
TYPE		STAND POST TYPE (FIXED)
FLOW RATE	USGPM	1000-2000
OPERATING CONDITIONS		
FLUID HANDELED		FRESH WATER
TEMPERATURE		AMBIENT
PRESSURE		
MAX.	Kg/cm2g	13.0
MIN.	Kg/cm2g	7
DESIGN FEATURES		
MONITOR BODY		
OPERATION TYPE		MANUALLY OPERATED
MOVEMENT	Deg	HORIZONTALLY-340 DEG; VERTICALLY-125 DEG (+80,-45)
INLET CONNECTION	Inch	6, ANSI B 16.5, S.O., RF, 150# (ASTM A 105)
OUTLET CONNECTION		BY VENDOR
NOZZLE		
TYPE		AQUA FOG/FOAM NON-ASPIRATING TYPE WITH JET/SPRAY ARRANGEMENT
CONNECTION		BY VENDOR
SIZE	mm	BY VENDOR
FINISH		YELLOW EPOXY PAINTED
FOAM INDUCTION		
FOAM EXPANSION RATIO		NA
FOAM INDUCTION RATE		NA
PERFORMANCE		
NOZZLE PRESSURE	Kg/cm2g	7
MIN. DISCHARGE THROW RANGE IN STILL AIR		
HORIZONTAL (WATER) AT 30 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0027
HORIZONTAL (FOAM) AT 30 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0027
VERTICAL (WATER) AT 60 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0027
VERTICAL (FOAM) AT 60 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0027
MATERIALS		
NOZZLE		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
SWIVEL JOINT/ WORM WHEEL & GEAR		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
BODY/ ELBOWS/ BENDS		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
WATER BARREL		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
LOCKS OF HOR. & VER. ROTATION		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
HANDLE		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
PICK UP TUBE FOR JRCP(JRCP)		NA
DRAIN VALVE		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
JRCP		NA
TEST & INSPECTION		
DIMENSION & WORKMANSHIP		YES
FUNCTIONAL TEST FOR HOR. & VER. MOVEMENT		YES
PERFORMANCE TEST		YES
HYDROSTATIC TEST PRESSURE		AS PER EIL SPEC. 6-66-0027
APPROVAL		REFER NOTE - 1
PAINTING		
BODY (ABOVE GROUND)		AS PER EIL SPEC. 6-66-0027 & REFER NOTE - 3

NOTES

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PROJECT	BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT	CLIENT	BHARAT PETROLEUM CORPORATION LTD.
UNIT	OFFSITE	JOB NO.	B957 UNIT NO. 999

1 COMPLETE MONITOR ASSEMBLY ALONG WITH NOZZLE SHALL BE BIS APPROVED / UL LISTED / FM APPROVED.

2 IN CASE OF ANY CONFLICT BETWEEN DATA GIVEN HERE WITH DATA GIVEN IN THE STD. SPECIFICATIONS, DATA SHEET SHALL BE GIVEN PREFERENCE.

3 THE HANDWHEEL SHALL BE PAINTED BLACK PAINTS SHALL CONFORM TO IS: 2932.

4 FOR DETAILS, REFER SPECIFICATION 6-66-0027.

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LONG RANGE WATER CUM FOAM MONITOR

PROJECT BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT | CLIENT BHARAT PETROLEUM CORPORATION LTD.
UNIT OFFSITE | JOB NO. B957 | UNIT NO. 999

GENERAL		
CODES		EIL SPEC. 6-66-0027
LOCATION		OUTDOOR
TYPE		STAND POST TYPE (FIXED)
FLOW RATE	USGPM	1000-2000
OPERATING CONDITIONS		
FLUID HANDELED		FRESH WATER
TEMPERATURE		AMBIENT
PRESSURE		
MAX.	Kg/cm2g	13.0
MIN.	Kg/cm2g	7
DESIGN FEATURES		
MONITOR BODY		
OPERATION TYPE		MANUALLY OPERATED
MOVEMENT	Deg	HORIZONTALLY-340 DEG; VERTICALLY-125 DEG (+80,-45)
INLET CONNECTION	Inch	6, ANSI B 16.5, S.O., RF, 150# (ASTM A 105)
OUTLET CONNECTION		BY VENDOR
NOZZLE		
TYPE		AQUA FOG/FOAM NON-ASPIRATING TYPE WITH JET/SPRAY ARRANGEMENT
CONNECTION		BY VENDOR
SIZE	mm	BY VENDOR
FINISH		YELLOW EPOXY PAINTED
FOAM INDUCTION		THROUGH AQUA POWERED FOAM INDUCTOR(JRCP) FROM A MAX. DISTANCE OF 60M
FOAM EXPANSION RATIO		1:3 TO 1:4
FOAM INDUCTION RATE		3%
PERFORMANCE		
NOZZLE PRESSURE	Kg/cm2g	7
MIN. DISCHARGE THROW RANGE IN STILL AIR		
HORIZONTAL (WATER) AT 30 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0027
HORIZONTAL (FOAM) AT 30 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0027
VERTICAL (WATER) AT 60 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0027
VERTICAL (FOAM) AT 60 DEG. FROM HOR.	m	AS PER EIL SPEC. 6-66-0027
MATERIALS		
NOZZLE		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
SWIVEL JOINT/ WORM WHEEL & GEAR		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
BODY/ ELBOWS/ BENDS		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
WATER BARREL		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
LOCKS OF HOR. & VER. ROTATION		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
HANDLE		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
PICK UP TUBE FOR JRCP(JRCP)		PVC TUBE REINFORCED WITH HIGH TENSILE STEEL WIRE HELIX AS PE
DRAIN VALVE		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
JRCP		SS 316 OR STAINLESS STEEL, GRADE IV as per IS:3444
TEST & INSPECTION		
DIMENSION & WORKMANSHIP		YES
FUNCTIONAL TEST FOR HOR. & VER. MOVEMENT		YES
PERFORMANCE TEST		YES
HYDROSTATIC TEST PRESSURE		AS PER EIL SPEC. 6-66-0027
APPROVAL		REFER NOTE - 1
PAINTING		
BODY (ABOVE GROUND)		AS PER EIL SPEC. 6-66-0027 & REFER NOTE - 4

APPROVED

NOTES

Rev. No.	Date	Purpose	Prepared By	Reviewed By	Approved By
0	26-MAR-2025	Issued For Engineering	AK	AK	AK
A	07-MAR-2025	Issued For Comments	SB	SB	AK

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PROJECT	BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT	CLIENT	BHARAT PETROLEUM CORPORATION LTD.
UNIT	OFFSITE	JOB NO.	B957 UNIT NO. 999

1 COMPLETE MONITOR ASSEMBLY ALONG WITH NOZZLE SHALL BE BIS APPROVED / UL LISTED / FM APPROVED.

2 JRCP SHALL BE PROVIDED WITH 21/2 INCH INLET/OUTLETMALE/FEMALE COUPLING OF SS-316.

3 FOAM SOLUTION INDUCTION HOSE OF TOTAL 60M LENGTH SHALL BE SUPPLIED ALONG WITH END COUPLINGS OF SS16.THE HOSE SHALL BE MADE OF REINFORCED PVC.

4 THE HANDWHEEL SHALL BE PAINTED BLACK PAINTS SHALL CONFORM TO IS: 2932.

5 FOR DETAILS, REFER SPECIFICATION 6-66-0027.

APPROVED

Rev. No.	Date	Purpose	Prepared By	Reviewed By	Approved By
0	26-MAR-2025	Issued For Engineering	AK	AK	AK
A	07-MAR-2025	Issued For Comments	SB	SB	AK

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PROJECT	BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (BPREP)	CLIENT	M/S BHARAT PETROLEUM CORPORATION LTD.		
PLANT	BINA PETROCHEMICAL COMPLEX	JOB NO	B957	UNIT NO	999

GENERAL	
TYPE	SAND BUCKET (STAND MOUNTED)
LOCATION	OUTDOOR
REFERENCE STANDARD	IS: 2546
QUANTITY	AS PER APPROVED DRAWING
EXTINGUISHER AGENT	SAND
MATERIALS OF CONSTRUCTION	
BODY	MS GALVANIZED AS PER IS : 2546
BOTTOM	ROUND BOTTOM
TECHNICAL DATA	
CAPACITY	9 – 10 LIT. (SET OF 3 BUCKET)
MOUNTING	STAND MOUNTED (MS WITH WEATHER SHED)
TOTAL FILLED WEIGHT	*
TESTING	AS PER IS: 2546
ADDITIONAL INFORMATION	
PAINTING	FIRE BUCKET FIRE RED, SHADE 536 AS PER IS:5 FOR BODY HANDLE-BLACK “FIRE” WORD ON BODY OF BUCKET. SAND BUCKET STAND- FIRE RED, SHADE536 AS PER IS:5 (110MICRON)
MARKING	1. MANUFACTURER’S NAME OR TRADEMARK OR BOTH 2. YEAR OF MANUFACTURE & CAPACITY

NOTES:

1. (*) DATA TO BE FURNISH BY THE VENDOR.

NO	DATE	REVISION	BY	CHK.	APP.
0	26.03.2025	ISSUED FOR ENGINEERING	NS	SB	AK
A	07.03.2025	ISSUED FOR COMMENTS	NS	SB	AK

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PROJECT	BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (BPREP)	CLIENT	M/S BHARAT PETROLEUM CORPORATION LTD.		
PLANT	BINA PETROCHEMICAL COMPLEX	JOB NO	B957	UNIT	999

GENERAL			
	CODES		IS: 884
	LOCATION		INDOOR / OUTDOOR
	TYPE		HORIZONTAL, STAND MOUNTING
OPERATING CONDITIONS			
	FLUID HANDLED		FRESH WATER
	TEMPERATURE		AMBIENT
	PRESSURE	MAX.	13.5KG/CM^{2}g
		MIN.	7.0 KG/CM^{2}g
DESIGN FEATURES			
	BODY	OPERATION TYPE	MANUAL.
		INLET CONNECTION	25MM (1") FLANGED END CONNECTION, DRILLING STANDARD AS PER ASME B 16.5 150#, RF / AS PER PMS OF A94A (ABOVE GROUND)
		OUTLET CONNECTION	THREADS AS PER IS: 2643 (PART I).
	PERFORMANCE	NOZZEL PRESSURE	7.0 KG/CM^{2}g.
		FLOW RATE	SHALL NOT BE LESS THAN 24 LPM AT REEL INLET PRESSURE OF 7 KG/CM^2 g
		MIN. DISCHARGE RANGE	SHALL NOT BE LESS THAN 6m AT 7 KG/CM^{2}g.
MATERIALS			
	SIDES		M.S. IS: 513
	DETACHABLE HANDLE		M.S.
	STAND		M.S. ANGLE
	HOSE REEL TUBING		BRAIDED RUBBER CONFORMING TO IS:444, Type-II
	STRAIGHT JET TYPE NOZZLE WITH BRANCH PIPE AND COUPLING		SS 316
	STOP VALVE		IS: 778
TEST & INSPECTION			
	DIMENSION & WORKMANSHIP		AS PER IS:884
	PERFORMANCE TEST		AS PER IS:884
	HYDROSTATIC TEST PRESSURE FOR HOSE		7 KG/CM^{2}g FOR 5 MINUTES WITHOUT ANY LEAKAGE.
	BURSTING PRESSURE FOR HOSE		30 KG/CM^{2}g.
PAINTING			
	BODY (ABOVE GROUND)		FIRE RED PAINT AS PER IS: 2932 (CONFORMING TO SHADE NO. 536 OF IS: 5), OVER 2 COATS OF RED OXIDE ZINC CHROMATE PRIMER OR SINGLE COAT OF ALUMINIUM PAINT& SHALL BE SUITABLE FOR CORROSIVE ENVIRONMENT.
	MARKING		EACH HOSE REEL SHALL BE CLEARLY & PERMANENTLY MARKED WITH THE FOLLOWING INFORMATION ALONG WITH PURCHASER'S NAME: a) MANUFACTURER'S NAME OR TRADEMARK b) YEAR OF MANUFACTURE c) LENGTH & SIZE OF TUBE CARRIED ON HOSE REEL d) TYPE OF HOSE REEL e) BIS CERTIFICATION MARK ON HOSE REEL TUBING

NOTES:

1. FOR DETAILED SPECIFICATION, REFER EIL SPEC. NO. 6-66-0018.
2. IN CASE OF ANY CONFLICT BETWEEN DATA GIVEN HERE WITH DATA GIVEN IN THE STD. SPEC. NO. 6-66-0018, DATA SHEET SHALL BE GIVEN PREFERENCE.
3. HOSE REEL MOUNTING DRUM SHOULD BE SELF LOCKING TYPE (FRICTION BRAKES) TO AVOID OVER RUN WHILE OPENING OF HOSE REEL.
4. SUITABLE FIXING ARRANGEMENT ALONG WITH NUTS, BOLTS, ANCHOR BOLTS ETC. TO BE SUPPLIED WITH HOSE REEL ASSEMBLY.

REV.	DATE	REVISION	BY	CHK	APP.
0	27.01.2026	ISSUED FOR BIDS	BP	SB	AK

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SUB-VENDOR LIST
(GENERAL CIVIL)

PROJECT : **BINA PETROCHEMICAL & REFINERY EXPANSION PROJECT, BPREP**

OWNER : **M/s BHARAT PETROLEUM COOPERATION LIMITED.**

JOB NO. : **B957**

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
A	20.04.2026	ISSUED FOR TENDER	UF	SB	AK

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GENERAL

1.1. CONTRACTOR shall necessarily procure all the material / equipment forming permanent part of the unit / plant from OWNER / PMC approved vendors only. This shall include sub-ordered items / components also. The “Approved Vendors” shall be item specific.

1.2. OWNER / PMC approved vendor list for the various items is enclosed in this section.

1.3. CONTRACTOR may procure material from any of OWNER / PMC approved vendors. However, current validity, holiday status and range of approval as per EIL enlistment letter, workload, stability and solvency need to be verified by the CONTRACTOR with vendor before placement of order. CONTRACTOR is also required to ensure that equipment qualification criteria, specified elsewhere in the bid document, are also simultaneously met.

1.4. Vendors on OWNER / PMC holiday list shall not be considered for ordering. CONTRACTOR shall comply with this requirement without any time or cost implication to the OWNER. If a vendor is put on OWNER / PMC’s holiday list subsequent to CONTRACTOR placing an order, it shall be CONTRACTOR’s responsibility to ensure quality work and timely supply from the vendor.

1.5. CONTRACTOR shall make an independent assessment of capability of all the vendors for timely deliveries of material / equipment. Any delays in deliveries by vendor(s) shall not be a cause of schedule and cost implication.

1.6. At any stage of the project, if it comes to the notice of OWNER / PMC that CONTRACTOR has procured material / equipment, intentionally or unintentionally whatsoever, from an unapproved vendor and / or items not falling in approved range of vendor(s), the same shall be rejected fort with and CONTRACTOR shall be liable to replace such material / plant / machinery without any schedule and cost implication to the OWNER.

1.7. List of vendors appearing anywhere else in the contract document in case of duplication of the items at two or more places shall not be considered by CONTRACTOR and shall be superseded by the vendor list enclosed herewith. And if in this vendor list also, items seem to be duplicated / repeated then CONTRACTOR shall get clarified the issue by OWNER / PMC before proceeding ahead for procurement activity.

1.8. It is understood that should the name of vendor be changed due to change in their company or corporate shareholding, OWNER may accept such vendors under its new name with prior approval.

1.9. It is understood that should the name of vendor be changed due to change in their company or corporate shareholding, OWNER may accept such vendors under its new name with prior approval.

2. GENERAL CIVIL:

For General Civil item supplier List refer Annexure: A (Attached)

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ANNEXURE – A

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05AA		**Description:** FIRE EXTINGUISHERS		
Approved Suppliers				
1	I205	INTIME FIRE APPLIANCES PVT LTD	INDIA	
2	K181	KANEX FIRE SOLUTIONS LIMITED	INDIA	
3	U185	UNITED FIRE EQUIPMENTS PVT. LTD.	INDIA	
4	V072	VIMAL FIRE CONTROLS PVT LTD	INDIA	
5	I212	INTEGRATED FIRE PROTECTION PVT. LTD.	INDIA	
6	S081	SUPREMEX EQUIPMENTS	INDIA	
7	B033	BHARAT ENGG. WORKS	INDIA	
8	S060	SAFEX FIRE SERVICES LTD.	INDIA	
9	F202	FIRE SAFETY DEVICES PVT. LIMITED	INDIA	
10	BPCL VC 174535	KANADIA FYR FYTER PRIVATE LIMITED	INDIA	
11	BPCL VC 306445	BRIJBASI HI-TECH UDYOG LTD	INDIA	
12	BPCL VC 148348	SIEMENS LIMITED	INDIA	
13	BPCL VC 157471	NEWAGE FIRE PROTECTION INDUSTRIES	INDIA	
14	BPCL VC 301609	FIRE STONE INDUSTRIES	INDIA	
15	BPCL VC 329569	TYCO FIRE & SECURITY(INDIA) PVT LTD	INDIA	

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05AB		**Description:** SAFETY SHOWER & EYE WASHER		
Approved Suppliers				
1	F005	FRANCIS LESLIE & CO.	INDIA	
2	4063	SAFETY SERVICES	INDIA	
3	C215	CREATIVE ENGINEERS	INDIA	
4	U019	UNICARE EMERGENCY EQPT	INDIA	
5	BPCL VC 168099	SARVAM SAFETY EQUIPMENT(P)LTD	INDIA	
6	BPCL VC 101872	VIJAY SABRE SAFETY PRIVATE LIMITED	INDIA	
7	BPCL VC 123362	SAFETY EQUIPMENT CORPORATION	INDIA	
8	BPCL VC 313010	GEOFRANC ENTERPRISES	INDIA	

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05AD		**Description:** DELUGE VALVE (Diaphragm Type)		
Approved Suppliers				
1	F115	FIRETECH EQUIPMENTS & SYSTEM PVT. LTD.	INDIA	
2	H091	HD FIREPROTECT PVT. LTD.	INDIA	
3	BPCL VC 103907	DARLING MUESCO (INDIA) PVT. LTD	INDIA	

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05AF		**Description:** FIRE HOSE		
Approved Suppliers				
1	D144	DEWAS HYDROQUIP PVT LTD	INDIA	
2	3646	SUKAN EQUIPMENTS PVT. LTD.	INDIA	
3	N214	NEWAGE FIREFIGHTING CO,LTD.	INDIA	
4	3651	INDUSTRIAL COMMERCIAL CORPORATION	INDIA	
5	N215	NEWAGE FIRE PROTECTION INDUSTRIES P LTD	INDIA	

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05AG		**Description:** FIRE HOSE ACCESSORIES		
Approved Suppliers				
1	U185	UNITED FIRE EQUIPMENTS PVT. LTD.	INDIA	
2	V072	VIMAL FIRE CONTROLS PVT LTD	INDIA	
3	N214	NEWAGE FIREFIGHTING CO,LTD.	INDIA	
4	S081	SUPREMEX EQUIPMENTS	INDIA	
5	N215	NEWAGE FIRE PROTECTION INDUSTRIES P LTD	INDIA	
6	S313	SHAH BHOGILAL JETHALAL & BROTHERS	INDIA	
7	3646	SUKAN EQUIPMENTS PVT. LTD.	INDIA	
8	A077	ASCO STRUMECH PVT.LTD.	INDIA	
9	BPCL VC 101016	IDEX INDIA PRIVATE LTD	INDIA	
10	BPCL VC 100844	INTEGRATED FIRE PROTECTION PRIVATE LIMITED	INDIA	

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05AK		**Description:** UNIVERSAL BRANCH PIPE		
Approved Suppliers				
1	V072	VIMAL FIRE CONTROLS PVT LTD	INDIA	
2	U185	UNITED FIRE EQUIPMENTS PVT. LTD.	INDIA	
3	S313	SHAH BHOGILAL JETHALAL & BROTHERS	INDIA	
4	S081	SUPREMEX EQUIPMENTS	INDIA	
5	N214	NEWAGE FIREFIGHTING CO,LTD.	INDIA	
6	3646	SUKAN EQUIPMENTS PVT. LTD.	INDIA	
7	N215	NEWAGE FIRE PROTECTION INDUSTRIES P LTD	INDIA	

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05AL		**Description:** INLINE FOAM INDUCTOR		
Approved Suppliers				
1	I212	INTEGRATED FIRE PROTECTION PVT. LTD.	INDIA	
2	F115	FIRETECH EQUIPMENTS & SYSTEM PVT. LTD.	INDIA	
3	N214	NEWAGE FIREFIGHTING CO,LTD.	INDIA	
4	N215	NEWAGE FIRE PROTECTION INDUSTRIES P LTD	INDIA	
5	H091	HD FIRE PROTECT LTD	INDIA	

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05AQ		**Description:** LANDING VALVES		
Approved Suppliers				
1	N214	NEWAGE FIREFIGHTING CO, LTD.	INDIA	
2	3646	SUKAN EQUIPMENTS PVT. LTD.	INDIA	
3	N215	NEWAGE FIRE PROTECTION INDUSTRIES P LTD	INDIA	
4	U185	UNITED FIRE EQUIPMENTS PVT. LTD.	INDIA	
5	A077	ASCO STRUMECH PVT.LTD.	INDIA	
6	S313	SHAH BHOGILAL JETHALAL & BROTHERS	INDIA	

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05AS		**Description:** SPRAY NOZZLE- FIRE FIGHTING		
Approved Suppliers				
1	N214	NEWAGE FIREFIGHTING CO, LTD.	INDIA	
2	3820	HD FIREPROTECT PVT. LTD.	INDIA	
3	H091	HD FIREPROTECT PVT. LTD.	INDIA	
4	F115	FIRETECH EQUIPMENTS & SYSTEM PVT. LTD.	INDIA	

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05BC		**Description:** WATER CUM FOAM MONITOR		
Approved Suppliers				
1	N214	NEWAGE FIREFIGHTING CO, LTD.	INDIA	
2	F115	FIRETECH EQUIPMENTS & SYSTEM PVT. LTD.	INDIA	
3	V072	VIMAL FIRE CONTROLS PVT LTD	INDIA	
4	S313	SHAH BHOGILAL JETHALAL & BROTHERS	INDIA	
5	H091	HD FIREPROTECT PVT. LTD.	INDIA	
6	N215	NEWAGE FIRE PROTECTION INDUSTRIES P LTD	INDIA	
7	BPCL VC 357100	ARIHANT FIRE PROTECTION SERVICES	INDIA	

Sr No	Supplier Code	Supplier Name	Country	Holiday Description
Item Code: 05BE		**Description**: REMOTE CONTROLLED FIRE WATER CUM FOAM MONITOR		
Approved Suppliers				
1	N215	NEWAGE FIRE PROTECTION INDUSTRIES P LTD	INDIA	
2	V072	VIMAL FIRE CONTROLS PVT LTD	INDIA	
3	S313	SHAH BHOGILAL JETHALAL & BROTHERS	INDIA	
4	N214	NEWAGE FIREFIGHTING CO, LTD.	INDIA	
5	H091	HD FIRE PROTECT LTD	INDIA	
6	BPCL VC 167093	SMAART FIRE PROTECTION PVT. LTD.	INDIA	

MECHANICAL WORKS II (PART - B) | MECHANICAL WORKS I (PART - A)

B957-300-81-45-00442

इस ड्राइंग को इस प्रारूप में तैयार करने में हमने जो श्रम किया है और कुशल किया है उसका उल्लेख करना हमारा कर्तव्य है। इस ड्राइंग को किसी तीसरे व्यक्ति द्वारा बिना हमारी लिखित अनुमति के किसी भी रूप में प्रयोग में लाया जाना हमारे अधिकारों का उल्लंघन होगा।

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PLANT NORTH 36.47°W | TRUE NORTH | GRID BEARING NORTH DIRECTION

FLARE / ETHYLENE

ACCESS WAY

E. 47335750 E. 47345750 E. 47355750 E. 47365750 E. 47375750 E. 47385750 E. 47391750 E. 47403750 E. 47413750 E. 47421750 E. 47430750 E. 47440750 E. 47450750 E. 47460750 E. 47470750 E. 47480750 E. 47490750 E. 47498750 E. 47507750 E. 47519750 E. 47528750 E. 47538750 E. 47548750 E. 47558750 E. 47568750 E. 47578750 E. 47588750 E. 47597750 E. 47606750 E. 47615750 E. 47624750 E. 47635750 E. 47645750 E. 47654750 E. 47663750 E. 47673750 E. 47683750 E. 47693750 E. 47703750 E. 47713750 E. 47722750 E. 47728750 E. 47738750 E. 47748750 E. 47758750

N. 50477000 N. 50476000 N. 50466000 N. 50456000 N. 50446000 N. 50436000 N. 50426000 N. 50416000 N. 50406000 N. 50396000 N. 50386000 N. 50376000 N. 50366000 N. 50356000 N. 50348000 N. 50336000 N. 50324000 N. 50316000 N. 50306000 N. 50296000 N. 50286000 N. 50276000 N. 50266000 N. 50256000 N. 50246000 N. 50236000 N. 50226000 N. 50216000 N. 50206000 N. 50196000 N. 50186000 N. 50176000 N. 50166000 N. 50156000 N. 50146000 N. 50137000

E. 47291050 E. 47335.75 E. 47361600 E. 47435750 E. 47513750 E. 47539750

TS-1 TS-2 TS-3 TS-4 TS-5 TS-6 TS-7 TS-8 TS-9 TS-10 TS-11 TS-12 TS-13 TS-14 TS-15 TS-16

HS-01 HS-02 HS-03 HS-04 HS-05 HS-06

BPR-1 BPR-2 BPR-3 BPR-4 BPR-5 BPR-5A BPR-6 BPR-6A BPR-7 BPR-7A BPR-8 BPR-9

FIRE WATER HEADER ALONG WITH HYDRANTS & MONITORS BY HEATER CONTRACTOR

MAINTENANCE AREA

GASOLINE FRACTIONATOR

QUENCH TOWER

DEPENTANIZER

DEBUTANIZER

DEETHANIZER

PRC

CHARGE GAS DRYERS

DRYER & REACTOR FEGER

HYDROGEN PSA UNIT

DECOKING AIR-COMPRESSOR

STEAM DRUM BLOWDOWN SYSTEM

STEAM COND. SYSTEM

BFW

FUEL GAS

CAUSTIC WATERWASH

PROPYLENE SPLIT CASKET

AMINE TREATMENT SYSTEM

ACETYLENE CONVERTERS

COLD BOX

S/S-101 (104M X 34M)

SRR-101 (54M X 33M)

BATTERY LIMIT ELECT

8 M WIDE ACCESS WAY

NOTES :-

1. ALL DIMENSIONS ARE IN M.M. UNLESS OTHERWISE SPECIFIED.
2. ALL ELEVATIONS ARE IN M.M. AND ARE WITH REFERENCE TO HIGHEST POINT OF PAVEMENT EL. 100000 WHICH CORRESPONDS TO 405.0M ABOVE MEAN SEA LEVEL (MSL).
3. PMS SHALL BE AS FOLLOWS:-
   (a) FIRE WATER A/G – A94A
   (b) FIRE WATER U/G – A97A
   (c) FIRE WATER SPRAY PIPING – J95A
   (d) INSTRUMENT AIR DETECTION PIPING UPSTREAM OF DELUGE VALVE (A/G)–A3K
   (e) INSTRUMENT AIR DETECTION PIPING (DOWNSTREAM OF DELUGE VALVE) & U/G– J2A
4. FIRE WATER SPRAY HEADERS DOWNSTREAM OF DELUGE VALVES SHALL BE PREFERABLY LAID ABOVE GROUND ON SLEEPERS OR ON PIPE RACK ON TIER CARRYING UTILITY LINES WITHIN UNIT BATTERY LIMIT.
5. ISOLATION VALVES ON FIRE WATER HEADER SHALL BE CAST STEEL GATE VALVE TYPE AS PER SPECIFICATION. GATE VALVES MORE THAN 16" SHOULD BE PROVIDED WITH GEAR MECHANISM.
6. LANDING VALVES WITH HOSE REEL (TYPE A) AND HOSE BOX (TYPE B) SHALL BE PROVIDED FOR EACH LANDING OF TECH STRUCTURES NEAR STAIR LANDING AND SHALL BE AT AN ELEVATION OF 1.0 M FROM PLATFORM LEVEL.
7. ALL LANDING VALVES SHALL BE PROVIDED WITH ISOLATION VALVE AT GROUND FLOOR ON RISER PIPE & 4" ISOLATION VALVE FOR EVERY LANDING VALVE.
8. HOSE BOX (TYPE B) SHALL BE INSTALLED WITH EVERY HYDRANT INSIDE UNIT BATTERY LIMIT & EVERY ALTERNATE HYDRANT FOR HEADERS AROUND UNITS.
9. HOSE REEL (TYPE B) SHALL BE CONSIDERED FOR BELOW PIPE RACK AREAS.
10. NECESSARY ACCESS WAYS AND PLATFORMS LEVEL SHALL BE PROVIDED FOR EASY OPERATION OF ALL FIRE–FIGHTING EQUIPMENT.
11. THE INSTALLATION OF LANDING VALVE, MONITOR, HOSE REEL ETC. SHALL BE AS PER EIL STANDARD INSTALLATION DRAWINGS.
12. SIZE OF PNEUMATIC DETECTION LINE OF INSTRUMENT AIR SHALL BE 1" FOR EACH DELUGE VALVE NETWORK.
13. ALL ISOLATION VALVES ON UNDERGROUND FIRE WATER HEADERS TO BE PROVIDED ABOVE GROUND (BY TAKING LOOP).
14. FLANGE JOINT TO BE PROVIDED FOR HOSE REEL CONNECTION.
15. ABOVE GROUND FIRE WATER LINES SHALL BE PAINTED FIRE RED AS PER SHADE NO. 536 OF IS 5 AND SHALL BE SUPPORTED ON INDEPENDENT RCC SLEEPERS/ ON PIPE RACK.
16. FIRE HYDRANTS SHALL BE PROVIDED AT A MAXIMUM SPACING OF 30M. REQUIREMENT OF ADDITIONAL HYDRANT FOR ENSURING COVERAGE TO BE REVIEWED BY ENGINEERING, IF ANY.
17. ALL FIREWATER HEADERS AND BRANCH LINES IN RCC PAVED AREAS SHALL BE LAID DIRECTLY BURIED WITHOUT RCC TRENCHES WITH PRECAST RCC SLABS/HEAVY DUTY PAVER BLOCKS ON TOP. UNDERGROUND FIRE WATER MAINS SHALL BE LAID 1.0M BELOW GROUND. HOWEVER, WHEREVER IT CROSSES ROAD THE MAINS SHALL BE LAID 1.5M BELOW GROUND LEVEL. IN CRANE MOVEMENT AREAS, FW PIPES SHOULD BE PROTECTED WITH CONCRETE/ STEEL ENCASEMENT.
18. DELUGE VALVE ASSEMBLY SHALL BE LOCATED IN SAFE PLACE AT LEAST 15M AWAY FROM THE EQUIPMENT BEING PROTECTED.
19. THE MOV AND BYPASS VALVE OF ROM TO BE LOCATED AT EASILY ACCESSIBLE LOCATION. REMOTE OPERATED LONG RANGE MONITORS SHALL BE PROVIDED WITH MOV (MOTOR OPERATED VALVE) AT DOWNSTREAM SIDE OF ISOLATION VALVE ON THE BRANCH CONNECTION.
20. SOIL TO AIR INTERFACE OF CORROSION RESISTANCE 3LPE COATING SHALL BE UPTO 500 MM ABOVE GROUND LEVEL.
21. RO AT INTERNAL HYDRANT SHALL BE PROVIDED TO REDUCE PRESSURE TO 7KG/CM².

REF. DWG. NO.	REFERENCE DRAWING TITLE
B957-999-81-45-00001 Rev H	OVERALL PLOT PLAN
B957-300-16-43-00001 Rev 0	EQUIPMENT LAYOUT ECU UNIT
B957-17-43-300-1111	FIREWATER P&ID FOR E.C.U.
B957-17-43-300-1118	FIREWATER BOOSTER PUMPING P&ID FOR E.C.U.

HOLD:

1. FINAL LIST OF EQUIPMENTS REQUIRING FIRE WATER SPRAY SYSTEM.

LEGEND

LEGEND	DESCRIPTION
	GATE VALVE
	WATER CUM FOAM MONITOR (WM), 750 GPM
	REMOTE OPERATED MONITOR (ROM), 1000-2000 GPM
	FIRE WATER HYDRANT (FH)
	HIGH VOLUME LONG RANGE MONITOR (LRM), 1000-2000 GPM
LCP	LOCAL CONTROL PANEL
MOV	MOTOR OPERATED VALVE (MOV)
	STRAINER (WELDED T-TYPE)
	EQUIPMENT PROVIDED WITH FIRE WATER SPRAY

REV.	DATE	DESCRIPTION	BY	CHKD	APPD	PEM
1	20.04.26	REVISED AND RE-ISSUED FOR ENGINEERING	DK	SB	AK	
0	13.03.26	ISSUED FOR ENGINEERING	DK	SB	AK	
A	13.01.26	ISSUED FOR COMMENTS	DK	SB	AK	

इंजीनियर्स इंडिया लिमिटेड ENGINEERS INDIA LIMITED (A Govt. of India Undertaking)

BHARAT PETROLEUM CORPORATION LTD. BINA REFINERY EXPANSION PROJECT

बीना पेट्रोकेमिकल एवं रिफाईनरी एक्सपेंशन परियोजना बी.पी.आर.ई.पी.

BINA PETROCHEMICAL AND REFINERY EXPANSION PROJECT (B.P.R.E.P.) BINA, MADHYA PRADESH

इथिलीन क्रेकर यूनिट का फायरवाटर लेआउट

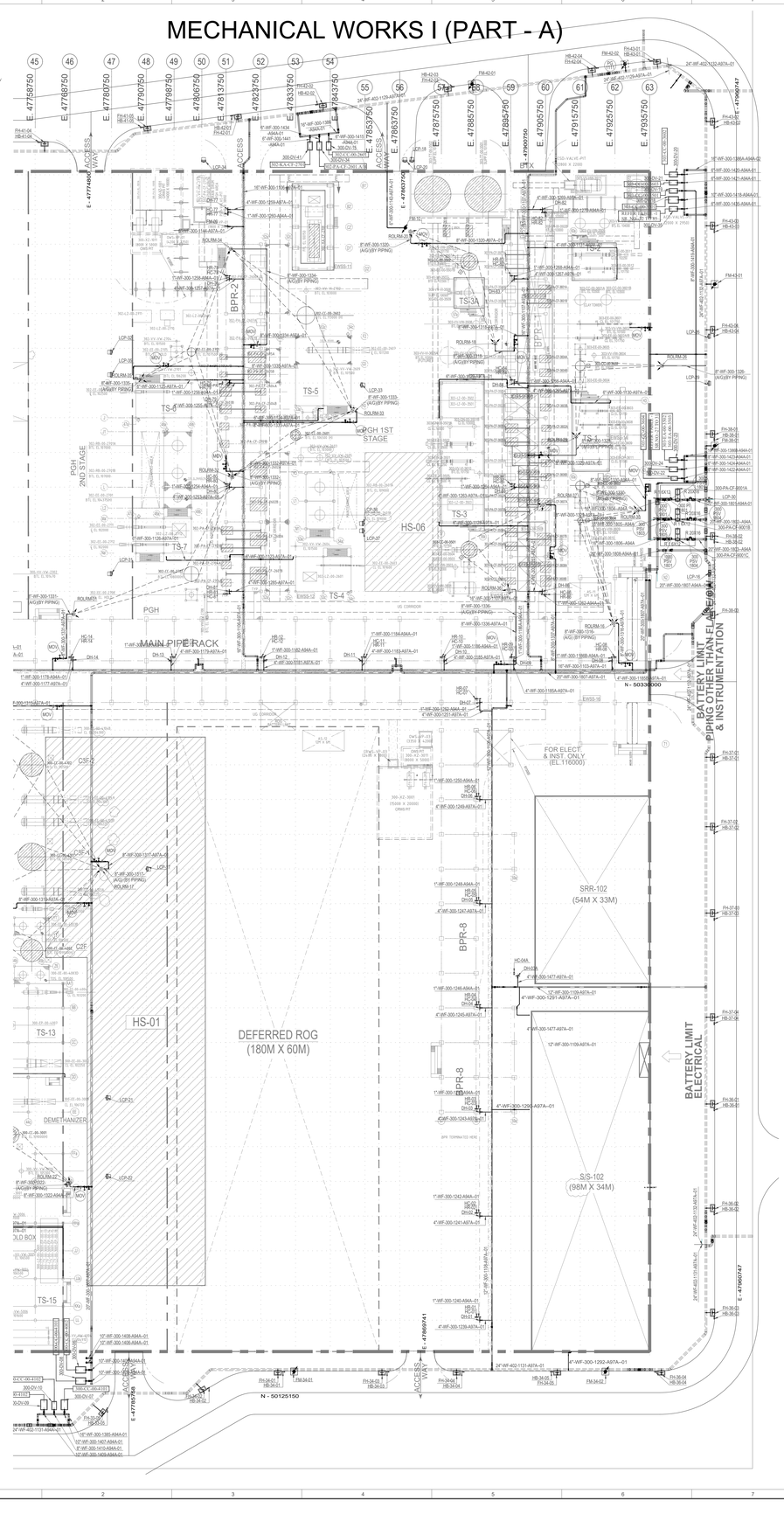
FIREWATER LAYOUT OF ETHYLENE CRACKER UNIT (SHEET 1 OF 2)

SCALE	JOB NO.	UNIT	DIVN.	DEPT.	DWG. NO.	REV.
1:530	B957	300	81	45	00442	1

3-1641-0500 REV.5 / 06.12.2024 A0-1189 x 841

Print 2611414391 | WBS/TENDER DOC-B957-300-16-43-MR-7-3001 | Rev A

MECHANICAL WORKS I (PART - A)



SCOPE OF WORK & SUPPLY (MTMS)

FOR

TENDER No- B957-300-16-43-MR-T-3001

PROJECT : Overall Project Management as MPMC and PMC/EPCM Services for Ethylene Cracker Unit and U&O for BPREP

OWNER : M/s BHARAT PETROLEUM CORPORATION LIMITED

EPCM: : ENGINEERS INDIA LIMITED

Rev.	Date	Purpose	Prepared by	Checked by	Approved by
0	22.04.2026	ISSUED WITH TENDER	VM	HD	PG

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PART-A (B957-300-16-43-MR-T-3001-A)

SCOPE OF WORK AND SUPPLY

1.0 This scope of work and supply of contractor shall be read in conjunction with Schedule of rates (Doc. No.B957-300-80-46-MR-SOR-3001-A, Item No. 01HM) and specifications, standards appearing in the list of attachments furnished below.

S.NO.	DESCRIPTION	Document No.	Rev.
1.0	**Standard Specification**		
1	Installation procedure for trays and tower internals	6-14-0003	7
2	Standard specification for filling the packing inside the column	6-14-0011	6
3	Standard specification for review of site installation of column internals	6-14-0016	6
4	Standard specification for application of torque and hydraulic bolt tension for flange joints	6-76-0002	3
2.0	**Standards**		
1	Construction tolerance for welded supports for tray / tower internals	7-14-0001	5
3.0	**Specification**		
1	Standard specification for health, safety and environment (HSE) management at construction sites	6-82-0001	2
4.0	**Inspection and Test Plans**		
1	Standard specification for positive material identification (PMI) at supplier's works	6-81-0001	4
2	ITP For Bolting Material	6-81-0007	5
3	ITP for Trays & Tower Internals	6-81-0015	4
4	ITP for Tower Packings	6-81-0016	4
5	ITP for un-engineered Trays & Tower Internals	6-81-0017	4
6	ITP for Ejector	6-81-0061	5

A. SCOPE OF WORK AND SUPPLY FOR CLOUMN TRAYS, TOWER PACKINGS AND TOWER INTERNALS

2.0 Followings are a broad list of activities to be carried out by Contractor for installation of Trays and Tower Internals under the supervision of Tray/ Internal supplier at site. Any other work not specifically listed but required for completion of job shall also be in Contractor's scope.

- Installation of all types of trays/ Tower Internals, Packing and associated components such as Seal Pan, Recess seal pans, Distributors, Feed Pipes, Collector Trays, Chimney Trays, Deflector Baffle etc. in Column as per Approved General Arrangement Drawings
- Leak Testing of Internals at site (as applicable)

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- Minor modification (if required) like bending/ cutting/ grinding etc. for Removable Internals / Welded attachments during the fitment/ Installation of Internals.

The broad details of the columns covered under this Scope of Work (SOW) are as follows:

Sr. No.	Col. Tag No.	Service	Col. Dia. (mm), TL-TL	Type of Internals
1	300-CC-00-2201	HP DEPROPANIZER	5000/3800mm, TL-TL 24900	TRAY 1-4, SIEVE TRAYS + TRAY 5-32-, V1 TYPE VALVE
2	300-CC-00-2202	LP DEPROPANIZER	2800/3400mm, TL-TL 39300	#1- #28 SIEVE TRAYS (4 P) & #29 - #50 VALVE TRAYS (2P & 4P)
3	300-CC-00-3001	DEMETHANIZER	4800/2500/3200mm, TL-TL 62100	TOTAL 7 RANDOM PACKED BED BED #1,2,4,5,6 (IMTP 50) & BED #3 & #7 (IMTP 40)
4	300-CC-00-4001	DETHANIZER	4500mm, TL-TL 39100	TRAY #1-#49 (4P CONVENTIONAL VALVE TRAYS) TRAY #50-#70 (2P CONVENTIONAL VALVE TRAYS)
5	300-CC-00-4201	DEBUTANIZER	3000mm, TL-TL 29200	45 VALVE TRAYS
6	302-CC-00-2601	DEPENTANIZER	2100/3000mm, TL-TL 46000	TRAY #1-#37 (2P FIXED VALVE TRAYS) TRAY #38-#65 (1P FIXED VALVE TRAYS)
7	302-CC-00-2602	RERUN TOWER	5100mm, TL-TL 23900	TRAY #1-#13 (2P FIXED VALVE TRAYS) TRAY #14-#33 (1P FIXED VALVE TRAYS)
8	302-CC-00-2701	H2S STRIPPER	2400mm, TL-TL 18900	TRAY 1-25 (2P FIXED VALVE TRAYS)
9	302-CC-00-2702	BTX TOWER	4300mm, TL-TL 28400	TRAY #1-#23 (2P FIXED VALVE TRAYS) TRAY #24-#42 (1P FIXED VALVE TRAYS)
10	303-CC-00-3502	SOLVENT RECOVERY COLUMN (SRC)	3400/5000mm, TL-TL 33600	TRAY #1-15 (2 PASS) & TRAY #16-17 (1 PASS) GT OPTIM VALVE TRAYS 1 STRUCTURED PACKED BED (GT-OPTIMPAK 250Y)
11	303-CC-00-3503	WATER STRIPPER	600mm, TL-TL 4000	1 PACKED BED (Sulzer NeXRingTM 0.6 or equivalent)

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12	303-CC-00-3602	BENZENE COLUMN	2800mm, TL-TL 43750	60 VALVE TRAYS (GT-DMVTM OR SULZER UFMTM OR EQUIVALENT)
13	303-CC-00-3603	TOLUENE COLUMN	2600mm, TL-TL 44200	60 VALVE TRAYS (GT-DMVTM or Sulzer UFMTM or equivalent)
14	303-CC-00-3604	XYLENE COLUMN	1500mm, TL-TL 38200	60 VALVE TRAYS (GT-DMVTM or Sulzer UFMTM or equivalent)

2.1 The site installation works shall be carried out by contractor under the supervision of Internal supplier. The contractor to ensure that adequate Safety precautions to be taken care before starting the installation work inside the Column.

2.2 Contractor to note that Site Installation work of column trays/ internals for all the columns, which includes Installation of new trays and tower internals etc. as per details given in approved drawings/EIL specification 6-14-0003/6-14-0011, Tray/ Internal vendor's installation procedure, shall be carried out by Contractor. Adequate Safety precautions to be taken care before starting the HOT-WORK inside the Column (as per Standard specification for health, safety & environment (HSE) management at construction sites (6-82-0001).

2.3 Site activities (Installation/ Testing) of trays and Internals shall be done as per approved General Arrangement Drawings of trays/Internals, EIL Specification No. 6-14-0003/ 6-14-0011 and Site Installation/modification procedure/ instructions of Tray vendor, under supervision and stage-wise inspection of Tray supplier/ Engineer-in-Charge. All requirements of the drawings shall be complied with in totality.

2.4 Following infrastructural facilities and all necessary help/manpower shall be provided by Contractor to Tray supplier / Engineer-in-Charge and/or EIL-specialist during checking/review of tray installations:

i) Exhaust fan at the column to free it of welding gases, fumes etc. before entry of EIL-personnel into the column.
ii) Proper lighting arrangement (24V) inside the column.
iii) Suitable scaffolding and other inspection aids required inside the column.
iv) Water manometer for levelness checking.
v) Hose pipe connection etc. for supply of water and Teflon tape for sealing threaded joints.

2.5 Various leak tests of Chimney Trays/Seal Pans/Recess Seal Pans/ Draw-off Boxes/ Distributors etc. as per requirements of drawings/specifications shall be carried out by Contractor. These shall be witnessed by Tray supplier/ Engineer-in-Charge.

2.6 Provision of all tools and tackles including labours required for handling of components shall be in Contractor's scope. Trained personnel and labours required for Installation, Testing and Inspection works shall be in Contractor's scope.

2.7 The column/ vessel interior walls, debris etc. shall be cleaned/ Vacuumed cleaned thoroughly prior to starting of installation work and Before Box-up after completion of installation activities.

2.8 All carbon steel components shall be cleaned to remove rust preventive coating.(if applicable)

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2.9 All consumables like electrodes etc. shall be in the scope of contractor. All welding shall be done by qualified welders only. The electrodes/filler material to be used shall be compatible with the metallurgy of component and shall be used only after prior approval of Tray supplier/ Engineer-in-Charge.

2.10 For Welding Procedure Specification (WPS) & Safety, Health & Environment, Contractor shall refer approved WPS/ PQR Specifications. Same shall be provided by Tray supplier before start of installation/modification work on the column internals.

2.11 It shall be ensured that trays are not used as working platform inside the column. Any damage caused to these shall be repaired/ replaced by Contractor free of charge.

2.12 Prior to installation work for Trays & Tower Internals, Mechanical contractor to fill “Installation Reporting Format for Column Internals (Before Installation)”, Format No 3-0542- 4001(sht.1 & 2) enclosed as annexure to EIL specification 6-14-0016. Duly filled & approved format by Engineer-in-charge shall be submitted to EIL-HO for information/ record.

2.13 After installation work for Trays & Tower Internals, Checking of installed Trays/Internals and filling of "Installation Reporting Formats" and getting these counters checked by Tray supplier/ Engineer-in-Charge as per 6-14-0016 "Specification for Review of Installation of Column Internals". These shall be submitted to Engineer-in-Charge for approval and Duly filled & approved format by Engineer-in-charge shall be submitted to EIL-HO for information/ record.

2.14 After the Trays/ internals have been inspected by Tray supplier, Engineer-in-Charge, these shall be inspected by Tray/ Internal Designer/ EIL Specialist / Licensor / Owner as required before final box-up.

2.15 All the Punch List points given by Tray & Internal Designer/ Engineer-in-Charge/ EIL-Specialist/Licensor/ Owner shall be attended by Contractor and necessary rectifications/ modifications shall be carried out.

2.16 Tray/ Internals design engineer shall satisfy himself that the column is ready for box-up i.e. all Internals have been installed correctly, properly cleaned by Vacuum cleaner and without leakage (as required per drawings) and bolts are tight with lock-nuts (wherever specified).

2.17 Box-up, after complete installation/ testing/ Inspection of all necessary works shall be carried out by the Contractor.

2.18 Final box-up clearance shall be obtained from the Tray & Internal Designer/ Engineer-in-Charge/ EIL-Specialist/Licensor/ Owner.

2.19 Contractor work shall be deemed complete only after necessary clearance of Engineer-in-Charge.

2.20 SPECIAL REQUIREMENT FOR INSTALLATION AGENCY

The installation/modification of column internals inside the column shall be carried out either by the Mechanical Contractor or by any installation Agency appointed by the Mechanical Contractor. The Mechanical Contractor/Installation Agency shall be reputed and must have successfully executed similar column internal installation works within the last seven (7) years from the date of issue of the Tender. The Mechanical Contractor/Installation Agency shall have completed at least one (1) such

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installation/modification job within the Petroleum Refinery or Petrochemical or Fertilizer sector. The Mechanical Contractor shall submit a reference list of such executed jobs along with supporting documentary evidence (such as a copy of Purchase Order, copy of SOR/SOW, and Commissioning/Completion Certificate) for finalization of the Column Internal Installation Agency.

The Mechanical Contractor shall submit the PTR documents of the proposed Installation Agency to EIL for review and acceptance prior to placement of order for installation/modification of column internals at site.

B. SCOPE OF WORK AND SUPPLY FOR DE-HUMIDIFICATION AND AIR-CONDITIONING FOR COLUMNS

De-humidification and Air-conditioning system for columns shall be arranged by the Mechanical contractor during installation of column internals. System shall be designed to provide 40 air changes per hour & ensure a temperature from 32 to 35 degree Celsius or 10-12 degree Celsius less than ambient temperature whichever is less with a Uniform humidity (RH) of 50-55% inside the column. At a time minimum 15m of column height for inside diameter of range 6000 to 9000mm and 10m of column height for inside diameter of more than 9000mm shall maintain above temperature and humidity; for other columns above shall be maintained across the full length of column. Above shall be ensured for every column section wherever installation work is in progress. The power required for the system shall be given free of cost by Client. However, it may be noted that Power shall be provided at a single point, Mechanical Contractor to take tap off from single point by his own arrangement. This system shall be used by the installation agency during installation of Column Internals and various Inspection agencies during the inspection of Internals inside the columns till the BOX-UP of the Columns.

De-humidification and Air-conditioning system shall be arranged from specialized agencies who are well experienced in this line of service having proven PTR (proven track record). The Agency shall visit site to identify the location of all columns in advance and necessary arrangements shall be made in advance so that the De-humidification and Air-conditioning system are in place before the start of internal installation work. The system shall be designed in such a manner that any kind of combination of column work may progress (e.g. Both Major Column or One Major Column with two smaller Columns or Two Major Columns with one small column etc.). The sequence of column internals installation along with schedule shall be finalized by the successful Vendor/Contractor at later stage. The machine shall be installed at the Grade Level or at the scaffolding to be decided by the Contractor / Agency and shall be as per the direction of the Engineer-In-Charge. Also, all Statutory Regulations and Safety, Health and Environment Requirements shall be complied by the Contractor / Agency. The agency selected by the Contractor shall mobilize, supply and make all necessary arrangements for the provision of De-humidification and Air-conditioning system for all the columns as listed in Sr. no. 21 of SOR (B957-300-80-46-MR-SOR-3001-A) for the entire duration of work after obtaining entry permit till the BOX- UP of Columns. This system shall be working whenever the installation work inside the column is in progress. The system shall work 12 hours/day. In case the column internals installation or inspection activities require extended working hours (16/24 hours), the De-humidification and Air-conditioning system shall be operated accordingly.

Suitable measuring instruments are to be employed to note down the temperature & humidity till the top of the column, which are required to be submitted on daily basis. Entire job will have to be carried out as per the direction of the Engineer-In-Charge.

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The Mechanical Contractor shall develop a procedure for operation/execution of the dehumidification and air conditioning system and obtain approval from the dehumidification agency. The duly approved procedure shall be submitted to the EIL Specialist/Engineer-in-Charge/Owner for information and record.

C. SCOPE OF WORK AND SUPPLY FOR EJECTOR

3.0 Followings are a broad list of activities to be carried out by Contractor for Erection, Painting and Insulation for Ejectors/ Eductors (Tag No. 303-JA-00-3501 and 303-JA-00-3502). The Details are as follows:

EQUIPMENT DETAILS FOR ERECTION, PAINTING & INSULATION FOR EJECTORS

SL. NO.	ITEM NO.	DESCRIPTION	QTY	POSITION (NOTE-2)	SUPPORT TYPE	SHELL OD (MM)	~OVERALL LENGTH (MM)	DESIGN TEMP (°C)	APPOX. PAINTING AREA (SQ.M), PER ITEM	ERECTION HEIGHT(mm)	INSULATION
1.	303-JA-00-3501	EJECTOR	1	H	Pipe support (If required)	80	550	350	1	Refer Equip-ment Layout	Required Heat Insulation Refer SOR
2.	303-JA-00-3502	EJECTOR	1	H		80	550	350	1		

NOTES :

1. For elevation of equipment from grade, refer to equipment layout
2. H - Horizontal ; V – Vertical
3. The above information is based on preliminary data from Ejector vendor, final details may vary and the same shall be made available by Engineer-in-charge during execution stage.

3.1 Contractor to conduct Performance testing of Ejector at site (if required by Client) in the presence of vendor's representative.

3.2 Necessary instruments duly calibrated from reputed test house shall be arranged by the Ejector Vendor for the performance testing (at site).

3.3 Contractor scope includes procurement of insulation materials, Painting etc. as per Specification attached elsewhere with Tender.

3.4 Insulation & Painting work shall be carried out as per Approved General Arrangement Drawings & Vendor's recommended procedures.

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PART-B (B957-300-16-43-MR-T-3001-B)

SCOPE OF WORK AND SUPPLY

1.0 This scope of work and supply of contractor shall be read in conjunction with Schedule of rates (Doc. No. B957-300-80-46-MR-SOR-3001-B), Item No. 01HM) and specifications, standards appearing in the list of attachments furnished below.

S.NO.	DESCRIPTION	Document No.	Rev.
1.0	**Standard Specification**		
1	Installation procedure for trays and tower internals	6-14-0003	7
2	Standard specification for filling the packing inside the column	6-14-0011	6
3	Standard specification for review of site installation of column internals	6-14-0016	6
4	General Specification for Pressure Vessel	6-12-0001	7
5	Supplementary specification for carbon steel vessels	6-12-0002	9
6	Standard specification for erection of equipment and machinery	6-76-0001	4
7	Standard specification for application of torque and hydraulic bolt tension for flange joints	6-76-0002	3
2.0	**Standards**		
1	Construction tolerance for welded supports for tray / tower internals	7-14-0001	5
2	Vessel tolerances	7-12-0001	7
3.0	**Specification**		
1	Standard specification for health, safety and environment (HSE) management at construction sites	6-82-0001	2
4.0	**Inspection and Test Plans**		
1	Standard specification for positive material identification (PMI) at supplier's works	6-81-0001	4
2	ITP For Bolting Material	6-81-0007	5
3	ITP for Trays & Tower Internals	6-81-0015	4
4	ITP for Tower Packings	6-81-0016	4
5	ITP for un-engineered Trays & Tower Internals	6-81-0017	4
6	ITP for Ejector	6-81-0061	5
7	ITP for pressure vessels / columns carbon steel.	6-81-0011	4

A. SCOPE OF WORK AND SUPPLY FOR CLOUMN TRAYS, TOWER PACKINGS AND TOWER INTERNALS

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2.0 Followings are a broad list of activities to be carried out by Contractor for installation of Trays and Tower Internals under the supervision of Tray/ Internal supplier at site. Any other work not specifically listed but required for completion of job shall also be in Contractor's scope.

- Installation of all types of trays/ Tower Internals, Packing and associated components such as Seal Pan, Recess seal pans, Distributors, Feed Pipes, Collector Trays, Chimney Trays, Deflector Baffle etc. in Column as per Approved General Arrangement Drawings
- Leak Testing of Internals at site (as applicable)
- Minor modification (if required) like bending/ cutting/ grinding etc. for Removable Internals / Welded attachments during the fitment/ Installation of Internals.

The broad details of the columns covered under this Scope of Work (SOW) are as follows:

Sr. No.	Col. Tag No.	Service	Col. Dia. (mm), TL-TL	Type of Internals
1	300-CC-00-1401	PROCESS WATER STRIPPER	Col. ID 3200mm, TL-TL 16500	TRAY #1-15 (2 PASS)
2	300-CC-00-2401	DCU OFFGAS CAUSTIC/WASH WATER TOWER	Col. ID 1300mm, TLTL 36300	TRAY #1-6 BUBBLE CAP TRAYS, BED#1 (IMTP#40), BED#2 (IMTP#40)
3	300-CC-00-2502	MEA REGENERATOR	Col. ID 3400mm, TL-TL 32200	BED#1-#2 (IMTP#50, 9300MM) BED#3 (IMTP#25, 3200MM)

2.1 The site installation works shall be carried out by contractor under the supervision of Internal supplier. The contractor to ensure that adequate Safety precautions to be taken care before starting the installation work inside the Column.

2.2 Contractor to note that Site Installation work of column trays/ internals for all the columns, which includes Installation of new trays and tower internals etc. as per details given in approved drawings/EIL specification 6-14-0003/6-14-0011, Tray/ Internal vendor's installation procedure, shall be carried out by Contractor. Adequate Safety precautions to be taken care before starting the HOT-WORK inside the Column (as per Standard specification for health, safety & environment (HSE) management at construction sites (6-82-0001).

2.3 Site activities (Installation/ Testing) of trays and Internals shall be done as per approved General Arrangement Drawings of trays/Internals, EIL Specification No. 6-14-0003/ 6-14-0011 and Site Installation/modification procedure/ instructions of Tray vendor, under supervision and stage-wise inspection of Tray supplier/ Engineer-in-Charge. All requirements of the drawings shall be complied with in totality.

2.4 Following infrastructural facilities and all necessary help/manpower shall be provided by Contractor to Tray supplier / Engineer-in-Charge and/or EIL-specialist during checking/review of tray installations:

i) Exhaust fan at the column to free it of welding gases, fumes etc. before entry of EIL-personnel into the column.
vi) Proper lighting arrangement (24V) inside the column.
vii) Suitable scaffolding and other inspection aids required inside the column.

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viii) Water manometer for levelness checking.
ix) Hose pipe connection etc. for supply of water and Teflon tape for sealing threaded joints.

2.5 Various leak tests of Chimney Trays/Seal Pans/Recess Seal Pans/ Draw-off Boxes/ Distributors etc. as per requirements of drawings/specifications shall be carried out by Contractor. These shall be witnessed by Tray supplier/ Engineer-in-Charge.

2.6 Provision of all tools and tackles including labours required for handling of components shall be in Contractor's scope. Trained personnel and labours required for Installation, Testing and Inspection works shall be in Contractor's scope.

2.7 The column/ vessel interior walls, debris etc. shall be cleaned/ Vacuumed cleaned thoroughly prior to starting of installation work and Before Box-up after completion of installation activities.

2.8 All carbon steel components shall be cleaned to remove rust preventive coating.(if applicable).

2.9 All consumables like electrodes etc. shall be in the scope of contractor. All welding shall be done by qualified welders only. The electrodes/filler material to be used shall be compatible with the metallurgy of component and shall be used only after prior approval of Tray supplier/ Engineer-in-Charge.

2.10 For Welding Procedure Specification (WPS) & Safety, Health & Environment, Contractor shall refer approved WPS/ PQR Specifications. Same shall be provided by Tray supplier before start of installation/modification work on the column internals.

2.11 It shall be ensured that trays are not used as working platform inside the column. Any damage caused to these shall be repaired/ replaced by Contractor free of charge.

2.12 Prior to installation work for Trays & Tower Internals, Mechanical contractor to fill "Installation Reporting Format for Column Internals (Before Installation)", Format No 3-0542- 4001(sht.1 & 2) enclosed as annexure to EIL specification 6-14-0016. Duly filled & approved format by Engineer-in-charge shall be submitted to EIL-HO for information/ record.

2.13 After installation work for Trays & Tower Internals, Checking of installed Trays/Internals and filling of "Installation Reporting Formats" and getting these counters checked by Tray supplier/ Engineer-in-Charge as per 6-14-0016 "Specification for Review of Installation of Column Internals". These shall be submitted to Engineer-in-Charge for approval and Duly filled & approved format by Engineer-in-charge shall be submitted to EIL-HO for information/ record.

2.14 After the Trays/ internals have been inspected by Tray supplier, Engineer-in-Charge, these shall be inspected by Tray/ Internal Designer/ EIL Specialist / Licensor / Owner as required before final box-up.

2.15 All the Punch List points given by Tray & Internal Designer/ Engineer-in-Charge/ EIL-Specialist/Licensor/ Owner shall be attended by Contractor and necessary rectifications/ modifications shall be carried out.

2.16 Tray/ Internals design engineer shall satisfy himself that the column is ready for box-up i.e. all Internals have been installed correctly, properly cleaned by Vacuum cleaner and without leakage (as required per drawings) and bolts are tight with lock-nuts (wherever specified).

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2.17 Box-up, after complete installation/ testing/ Inspection of all necessary works shall be carried out by the Contractor.

2.18 Final box-up clearance shall be obtained from the Tray & Internal Designer.

2.19 Contractor work shall be deemed complete only after necessary clearance of Engineer-in-Charge.

2.20 SPECIAL REQUIREMENT FOR INSTALLATION AGENCY

The installation/modification of column internals inside the column shall be carried out either by the Mechanical Contractor or by any installation Agency appointed by the Mechanical Contractor. The Mechanical Contractor/Installation Agency shall be reputed and must have successfully executed similar column internal installation works within the last seven (7) years from the date of issue of the Tender. The Mechanical Contractor/Installation Agency shall have completed at least one (1) such installation/modification job within the Petroleum Refinery or Petrochemical or Fertilizer sector. The Mechanical Contractor shall submit a reference list of such executed jobs along with supporting documentary evidence (such as a copy of Purchase Order, copy of SOR/SOW, and Commissioning/Completion Certificate) for finalization of the Column Internal Installation Agency.

The Mechanical Contractor shall submit the PTR documents of the proposed Installation Agency to EIL for review and acceptance prior to placement of order for installation/modification of column internals at site.

B. SCOPE OF WORK AND SUPPLY FOR DE-HUMIDIFICATION AND AIR-CONDITIONING FOR COLUMNS

De-humidification and Air-conditioning system for columns shall be arranged by the Mechanical contractor during installation of column internals. System shall be designed to provide 40 air changes per hour & ensure a temperature from 32 to 35 degree Celsius or 10-12 degree Celsius less than ambient temperature whichever is less with a Uniform humidity (RH) of 50-55% inside the column. At a time minimum 15m of column height for inside diameter of range 6000 to 9000mm and 10m of column height for inside diameter of more than 9000mm shall maintain above temperature and humidity; for other columns above shall be maintained across the full length of column. Above shall be ensured for every column section wherever installation work is in progress. The power required for the system shall be given free of cost by Client. However, it may be noted that Power shall be provided at a single point, Mechanical Contractor to take tap off from single point by his own arrangement. This system shall be used by the installation agency during installation of Column Internals and various Inspection agencies during the inspection of Internals inside the columns till the BOX-UP of the Columns.

De-humidification and Air-conditioning system shall be arranged from specialized agencies who are well experienced in this line of service having proven PTR (proven track record). The Agency shall visit site to identify the location of all columns in advance and necessary arrangements shall be made in advance so that the De-humidification and Air-conditioning system are in place before the start of internal installation work. The system shall be designed in such a manner that any kind of combination of column work may progress (e.g. Both Major Column or One Major Column with two smaller Columns or Two Major Columns with one small column etc.). The sequence of column internals installation along with schedule shall be finalized by

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the successful Vendor/Contractor at later stage. The machine shall be installed at the Grade Level or at the scaffolding to be decided by the Contractor / Agency and shall be as per the direction of the Engineer-In-Charge. Also, all Statutory Regulations and Safety, Health and Environment Requirements shall be complied by the Contractor / Agency. The agency selected by the Contractor shall mobilize, supply and make all necessary arrangements for the provision of De-humidification and Air-conditioning system for all the columns as listed in Sr. no. 26 of SOR (B957-300-80-46-MR-SOR-3001- PART B) for the entire duration of work after obtaining entry permit till the BOX-UP of Columns. This system shall be working whenever the installation work inside the column is in progress. The system shall work 12 hours/day. In case the column internals installation or inspection activities require extended working hours (16/24 hours), the De-humidification and Air-conditioning system shall be operated accordingly.

Suitable measuring instruments are to be employed to note down the temperature & humidity till the top of the column, which are required to be submitted on daily basis. Entire job will have to be carried out as per the direction of the Engineer-In-Charge.

The Mechanical Contractor shall develop a procedure for operation/execution of the dehumidification and air conditioning system and obtain approval from the dehumidification agency. The duly approved procedure shall be submitted to the EIL Specialist/Engineer-in-Charge/Owner for information and record.

C. SCOPE OF WORK AND SUPPLY FOR EJECTOR

3.0 Followings are a broad list of activities to be carried out by Contractor for Erection, Painting and Insulation for Ejectors/ Eductors (Tag No. 300-JA-00-1201). The Details are as follows:

EQUIPMENT DETAILS FOR ERECTION, PAINTING & INSULATION FOR EJECTORS

SL. NO.	ITEM NO.	DESCRIPTION	QTY	POSITION (NOTE-2)	SUPPORT TYPE	SHELL OD (MM)	~OVERALL LENGTH (MM)	DESIGN TEMP (°C)	APPOX. PAINTING AREA (SQ.M), PER ITEM	ERECTION HEIGHT(mm)	INSULATION
1.	300-JA-00-1201	EJECTOR	1	H	Pipe support (If required)	80	550	350	1	Refer Equip-ment Layout	Required Heat Insulation 40 mm thick.

NOTES :

4. For elevation of equipment from grade, refer to equipment layout
5. H - Horizontal ; V – Vertical
6. The above information is based on preliminary data from Ejector vendor, final details may vary and the same shall be made available by Engineer-in-charge during execution stage.

3.1 Contractor to conduct Performance testing of Ejector at site (if required by Client) in the presence of vendor's representative.

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3.2 Necessary instruments duly calibrated from reputed test house shall be arranged by the Ejector Vendor for the performance testing (at site).

3.3 Contractor scope includes procurement of insulation materials, Painting etc. as per Specification attached elsewhere with Tender.

3.4 Insulation & Painting work shall be carried out as per Approved General Arrangement Drawings & Vendor's recommended procedures.

D. SCOPE OF WORK AND SUPPLY FOR DEAERATOR

4.0 Followings are a broad list of activities to be carried out by Contractor for Erection, Painting and Insulation for Deaerator Package (Tag No. 300-LZ-00-8001). The Details are as follows:

EQUIPMENT DETAILS FOR PAINTING & INSULATION FOR DEAERATOR

SL. NO.	ITEM NO.	DESCRIPTION	QTY	POSITION (NOTE-2)	SUPPORT TYPE	SHELL OD (MM)	~OVERALL LENGTH (MM)	DESIGN TEMP (°C)	APPOX. PAINTING AREA (SQ.M), PER ITEM	ERECTION HEIGHT(mm)	INSULATION
1.	300-LZ-00-8001	DEAERATOR STORAGE VESSEL	1	H	SADDLE	4180	37340	240	550	Refer Equipment Layout	Required Heat Insulation 85mm thick.
		DEAERATING TOWER	1	V	LEG	3500	3950				

NOTES :

1. For elevation of equipment from grade, refer to equipment layout enclosed elsewhere in the tender document.
2. H - Horizontal ; V – Vertical
3. The above information is based on preliminary data from Ejector vendor, final details may vary and the same shall be made available by Engineer-in-charge during execution stage.
4. Equipment to be erecting dressed-up condition, Insulation application shall be done in horizontal condition at site. Insulation area in the SOR has been considered accordingly. Insulation for this dressed-up equipment shall be supplied & available on priority before dressed-up followed by erection of the equipment as per instructions of Engineer-In-charge.
5. These are preliminary data, final details may vary and the same shall be made available by Engineer-in-charge during execution stage.

4.1 Removal of temporary supports/ wedges (provided by equipment vendor to support the equipment / the Internals of the equipment) as applicable including supply of all

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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.

4.2 Erection Contractor shall Include Design, supply and fabrication of saddle extension / stools to maintain equipment at suitable height from ground level for assembly of platform, ladders, insulation & piping spools in horizontal condition, including supply of all materials, consumables, labour, equipment, machinery, tools, tackles etc, to complete in all respects as per Instructions of Engineer-in-Charge.

4.3 Contractor scope includes procurement of insulation materials, Painting etc. as per Specification attached elsewhere with Tender.

4.4 Insulation & Painting work shall be carried out as per Approved General Arrangement Drawings & Vendor's recommended procedures.

4.5 Supply and application of Fire proofing as per Specification attached elsewhere with Tender.

4.6 Installation of ladder / cage ladder / platform members and gratings/ hand rail (however welded cleats and supply of equipment platforms, ladders, cage ladders and hand railing are by others).

4.7 Dressing up of equipment.

4.8 Any modification/ strengthening/ compaction of route inside refinery from entry point to unloading point (near unit point).

4.9 Erection of equipment and Hard stand near foundation for erection.

4.10 Bolt tightening by Hydraulic bolt tensioner.

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WELDING SPECIFICATION CHARTS FOR PIPING CLASSES

(SMMS DIVISION)

PROJECT : **EPCC TENDER FOR POLYPROPYLENE & BUTENE-1 UNIT OF BINA PETCHEM & REFINERY EXPANTION PROJECT (BPREP)**

OWNER : **M/s BHARAT PETROLEUM COOPERATION LIMITED**

PMC : **ENGINEERS INDIA LIMITED**

JOB NO. : **B957**

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
6	27-03-2026	REISSUED FOR TENDER	RITIK N.	UTTAM K.	PRABHAKAR
5	05-03-2026	REISSUED FOR TENDER	RITIK N.	UTTAM K.	PRABHAKAR
4	05-02-2026	REISSUED FOR TENDER	RITIK N.	UTTAM K.	PRABHAKAR
3	17.12.2025	REISSUED FOR TENDER	RITIK N.	UTTAM K.	PRABHAKAR
2	11.07.2025	A19A, B19AM A67A, B67AW, B4F, B50M, B78A added	U KUMAR	PRABHAKAR	R CHITARA
1	27.03.2025	WSC FOR D41A ADDED AND REISSUED FOR TENDER	U KUMAR	PRABHAKAR	R CHITARA

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Revision History:

Rev. No	Date	Purpose
A	8-11-2024	Issued for Tender
B	28-11-2024	A1K, A32A, A3K, A41A, A42A, A43A, A44A, A44K, A45A, A45K, A46A, A91A, A94A, A95A, A96A, A97A, B41A, B42A, B43A, B44A, B44K, B45A, B45K, B46A, B55A, D42A, J95A added
C	20-12-2024	Issued for Tender
0	13.03.2025	WSC FOR A11A, A41K, A9A, B20D, B4D, B72A, B72D, B92K, B9A, D23F, F22A, F2A, F92K, G22G, G2G PIPING CLASSES AND DISSIMILAR WELDING OF B72A TO B72D ADDED
1	27.03.2025	WSC FOR D41A ADDED AND REISSUED FOR TENDER
2	11.07.2025	A19A, B19AM A67A, B67AW, B4F, B50M, B78A added
3	17.12.2025	A11K, A11KI, A16A, A19AW, A1AI, AIF, A1N, A27M, A27N, A3F, A41F, A4F, A6A, A70M, A72F, A74M, A75A, A76A, A78A, A78AI, A79A, A7A, A88A, A92A, A98A, B11K, B4G, B51A, B51Q, B53AW, B59Q, B5A, B65D, B67A, B69AW, B6A, B70M, B72F, B74M, B77M, B78AI, B79A, B88A, D1F, D2D, D3F, D4F, D5A, D65A, D6A, D9A, F21K, F22AW, F27AW, F51Q, F52Q, F53M, F55AW,F55D, F55F, F56F, F57AW, F59AW, F59Q, F67AW, F88A, G51M, G53M, G55F, G59Q Added
4	05-02-2026	A21P, A40A, A60K, A61N, A61A, A62A, A69M, A71A, A83A, A92K, A99A, B21P, B21Q, B40A, B41K, B52A, B60K, B61A, B62A, B69M, B99A, B20Y, D23M, D40A, D41K, D52A, D69M, D20Q, F1A added
5	05-03-2026	F2G added
6	27-03-2026	B24M Piping Classes Added and Reissued For Tender

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GENERAL NOTES

1.1 Scope :
This document covers the Welding Specification for the piping classes covered in the Piping Material Specification (B957-6-44-0005-PMC01Rev. B dated 22.08.24, B957-6-44-0005-7401 REV.D Rev.0 dated 28.02.2025, B957-6-44-0005-PMC01 Rev.E dated 26.03.2025, B933-6-44-0005 Rev.A dated 19.9.2025, B957-6-44-0005 Rev. 0).WPS and PQR for the field fabrication and erection of piping system shall be made in conformity with this document. In case of any conflict between this document and Piping Material Specification for any piping class, the most stringent requirement shall be followed.

1.2 This document shall be read in conjunction with the latest revisions/editions of the following documents:

a) ASME Boiler and Pressure Vessel Codes

Section II Part C – Specification for Welding Rods, Electrodes, and Filler Metals
Section V – Nondestructive Examination
Section IX - Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators

b) ASME B31.3, Process Piping

c) ASTM E10, Standard Test Method for Brinell Hardness of Metallic Materials

d) Job Specification for Non Destructive Examination Requirements of Piping, B957-6-44-0016

e) Welding Specification for Fabrication of Piping, 6-77-0001 Rev.5. and B957-000-06-41-WSP-0001.

1.3 GTAW process can be applied in place of SMAW process with a corresponding suitable filler metal for the application.

1.4 Abbreviations:

GTAW : Gas Tungsten Arc Welding

PMS : Piping Material Specification

PQR : Procedure Qualification Record

SMAW : Shielded Metal Arc Welding

WSC : Welding Specification Chart

WPS : Welding Procedure Specification

1.5 ASME B31.3 PWHT thickness exemption for P no. 1 materials is not permitted for material thickness greater than 1.5 inch (38mm).

1.6 Additional CLG requirements (Doc no. RA-260816) given in the PMS shall be met.

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WSC FOR PIPING CLASSES: **A1A, A6A, A7A, A9A, A21A, A32A, A41A, A44A, A45A, A71A, A83A, B1A, B6A, B9A, B21A, B41A, B44A, B45A, B72A, B20Y, D1A, D6A, D9A, D28A, D41A, D65A, F1A, F25A, A75A**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 106 GR.B, ASTM A 53 TYPE E GRADE B, ASTM A 672 GR.B60 CL.12**		
	FITTINGS	**ASTM A 105, ASTM A234 GR.WPB, ASTM A 234 GR.WPB-W**		
	FLANGES	**ASTM A 105**		
	OTHERS	-		
BASE METAL `P' NO	**1**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW / SMAW (NOTE-1, 2)**	FILLER PASS: **GTAW / SMAW (NOTE-2)**	ROOT PASS: **GTAW / SMAW (NOTE-1, 2)**	FILLER PASS: **GTAW / SMAW (NOTE- 2)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **ER70S-2 / E6010**	FILLER PASS: **ER70S-2 / E7016 / E7018**	ROOT PASS: **ER70S-2 / E6010**	FILLER PASS: **ER70S-2 / E7016 / E7018**
	FILLET JOINT/SOCKET JOINT: **E7016 / E7018/ ER70S-2**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: -		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: -		SHIELDING: **99.995%**	
PREHEATING **(NOTE-3)**	PREHEAT TEMP: **10°C MIN/ 100°C FOR THK >25 mm**		INTERPASS TEMP.: **----**	
POST HEATING: --				
POST WELD HEAT TREATMENT	HOLDING TEMP---		HOLDING TIME: **----**	
	RATE OF HEATING: **---**		MIN. HOLDING TIME: **---**	
	METHOD OF COOLING: **---**		RATE OF COOLING: **---**	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS:			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1 **THE ROOT PASS FOR SINGLE SIDE WELDING SHALL BE DONE BY GTAW PROCESS**

2 **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

3 **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK>=12.5 mm & ≤ 25 mm.**

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WSC FOR PIPING CLASSES: **A1AI, A2A, B2A, D2A, F2A**					
MATERIAL SPECIFICATIONS	PIPES	ASTM A106 GR. B, ASTM A672 GR. B60 CL.12 ASTM A 672 GR.B60 CL.22			
	FITTINGS	ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPB-W			
	FLANGES	ASTM A 105			
	OTHERS	-			
BASE METAL `P' NO	**1**				
WELDING PROCESS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: **GTAW / SMAW (NOTE 1)**	FILLER PASS: **GTAW / SMAW (NOTE 1)**	ROOT PASS: **GTAW / SMAW (NOTE-1)**	FILLER PASS: **GTAW/ / SMAW (NOTE-1)**	
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**				
WELDING MATERIALS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: **ER70S-2 / E6010**	FILLER PASS: **ER70S-2 / E7016/E7018**	ROOT PASS: **ER70S-2/ E6010**	FILLER PASS: **ER70S-2 / E7016/ E7018**	
	FILLET JOINT/SOCKET JOINT: **E7016/E7018/ER70S-2**				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	**ASME B31.3**				
GASES	PURGING: -		SHIELDING: **ARGON**		
GAS COMPOSITION	PURGING: -		SHIELDING: **99.995%**		
PREHEATING **(NOTE-2)**	PREHEAT TEMP: **10°C MIN/ 100°C FOR THK >25 mm**		INTERPASS TEMP: ---: -		
POST HEATING: ---					
POST WELD HEAT TREATMENT **(NOTE-3)**	HOLDING TEMP: **-**		HOLDING TIME**: -**		
	RATE OF HEATING: **-**		MIN. HOLDING TIME: **-**		
	METHOD OF COOLING: **-**		RATE OF COOLING: **-**		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -	
	AT TEMPERATURE:		-		
	HARDNESS:				
CODE OF FABRICATION	**ASME B31.3& IBR**				

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER. THE ROOT PASS FOR SINGLE SIDE WELDING SHALL BE DONE BY GTAW PROCESS.**

2. **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK>= 12.5MM & ≤ 25 MM.**

3. **PWHT SHALL BE DONE AS PER IBR FOR WALL THICKNESS EXCEEDING 20MM**

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WSC FOR PIPING CLASSES: **A3A, A91A, A92A, A94A, A95A, A96A, A97A, J2A, J95A**				
MATERIAL SPECIFICATIONS	PIPES	ASTM A 106 GR.B , IS-3589 GR.410, IS-1239		
	FITTINGS	ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPB-W, IS-3589 GR.410, ASTM A 285 GR.C, IS-1239		
	FLANGES	ASTM A 105		
	OTHERS	-		
BASE METAL `P' NO	**1, Unassigned (IS-3589, IS-1239)**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW /SMAW**	FILLER PASS: **SMAW (NOTE-1)**	ROOT PASS **GTAW /SMAW**	FILLER PASS: **SMAW (NOTE-1)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **ER70S-2/E6010**	FILLER PASS: **E6013/E7016/E7018**	ROOT PASS: **ER70S-2/ E6010**	FILLER PASS: **E6013/E7016/E7018**
	FILLET JOINT/SOCKET JOINT: **E6013/ E7016/E7018/ ER70S-2**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: -		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: -		SHIELDING: **99.995%**	
PREHEATING **(NOTE-2)**	PREHEAT TEMP: **10°C MIN/100°C FOR THK >25 mm**		INTERPASS TEMP.: ---	
POST HEATING: ---				
POST WELD HEAT TREATMENT	HOLDING TEMP: --		HOLDING TIME: **---**	
	RATE OF HEATING: **---**		MIN. HOLDING TIME: **---**	
	METHOD OF COOLING: **---**		RATE OF COOLING: **---**	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS:			
CODE OF FABRICATION	ASME B31.3			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**
2. **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK >=12.5 MM & <=25MM.**
3. **THREADED JOINTS FOR J2A & J95A PIPING CLASS SHALL BE MADE WITH 1" PTFE JOINING TAPE.**

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WSC FOR PIPING CLASSES: **A4A, A40A, A42A, A43A, A46A, B4A, B40A, B42A, B43A, B46A, D4A, D40A, D42A**

MATERIAL SPECIFICATIONS	PIPES	ASTM A 333 GR.6, ASTM A 671 Gr CC60 CL. 32
	FITTINGS	ASTM A 350 GR.LF2 CL.1, ASTM A 420 GR.WPL6, ASTM A 420 GR.WPL6-W
	FLANGES	ASTM A 350 GR.LF2 CL.1
	OTHERS	-

BASE METAL `P' NO	**1**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW / SMAW (NOTE-2)**	ROOTPASS: **GTAW**	FILLER PASS: **GTAW / SMAW (NOTE-2)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **ER 80SNi 1 (NOTE-1)**	FILLER PASS: **ER 80SNi 1 /E7018-1 (NOTE-1)**	ROOT PASS: **ER80S-Ni1 (NOTE-1)**	FILLER PASS: **ER 80SNi 1 /E7018-1 (NOTE-1)**
	FILLET JOINT/SOCKET JOINT: **E7018 -1/**: **ER 80SNi 1 (NOTE-1)**			
	BACKING RING: -		CONSUMABLE INSERT: -	

JOINT PREPARATION	**ASME B31.3**		
GASES	PURGING: -	SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: -	SHIELDING: **99.995%**	
PREHEATING **(NOTE-3)**	PREHEAT TEMP: **10°C MIN/ 100°C FOR THK >25 mm**	INTERPASS TEMP.: **315°C MAX.**	
POST HEATING: -			
POST WELD HEAT TREATMENT	HOLDING TEMP: **-**	HOLDING TIME: **-**	
	RATE OF HEATING: **-**	MIN. HOLDING TIME: **-**	
	METHOD OF COOLING: **-**	RATE OF COOLING: **-**	
MECHANICAL PROPERTY REQUIREMENTS **(NOTE-4)**	CHARPY `V' NOTCH VALUE:	MIN: **20 J**	AVERAGE: **27 J**
	AT TEMPERATURE:	**-45 DEG C**	
	HARDNESS:		
CODE OF FABRICATION	**ASME B31.3**		

TECHNICAL NOTES:

1. **ALL BATCHES OF WELDING CONSUMABLES SHALL BE IMPACT TESTED AT - 45°C. FOR B4A PIPING CLASS, IMPACT TEST OF WELDING CONSUMABLES BATCH SHALL BE PERFORMED AT - 46°C.**

2. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMTER 2" AND SMALLER.**

3. **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK >=12.7 MM & <= 25 MM.**

4. **DURING PQR, IMPACT TESTING SHALL BE CARRIED OUT AT – (MINUS) 45°C. FOR B4A PIPING CLASS, IMPACT TESTING SHALL BE CARRIED OUT AT – (MINUS) 46°C.**

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WSC FOR PIPING CLASSES: **B5A, D5A, B52A, D52A, F27AW, B51A, B53AW, B55A, D55A, F55AW, F57AW, F59AW**

MATERIAL SPECIFICATIONS	PIPES	**ASTM A106 GR.B, ASTM A 672 GR.B60 CL.22**		
	FITTINGS	**ASTM A105, ASTM A234 GR.WPB, ASTM A234 GR.WPB-W**		
	FLANGES	**ASTM A105**		
	OTHERS	**-**		
BASE METAL `P' NO	**1**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/ SMAW (NOTE-1)**	ROOT PASS: **GTAW**	FILLER PASS: **SMAW**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW**			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: E**R70S-2**	FILLER PASS: **ER70S-2/ E7016 / E7018**	ROOT PASS: **ER70S-2**	FILLER PASS: **E7016 / E7018**
	FILLET JOINT/SOCKET JOINT: **E7016 / E7018**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: -		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: -		SHIELDING: **99.995%**	
PREHEATING **(NOTE-2)**	PREHEAT TEMP: **10°C MIN/ 100°C FOR THK ≥25 mm**		INTERPASS TEMP.: ---	
POST HEATING: ---				
POST WELD HEAT TREATMENT **(NOTE-3)**	HOLDING TEMP: **595 - 620°C**		HOLDING TIME: **1 HR / INCH THK**	
	RATE OF HEATING: **200°C / HR MAX**		MIN. HOLDING TIME: **1 HR**	
	METHOD OF COOLING: **CONTROLLED**		RATE OF COOLING: **200°C / HR MAX**	
MECHANICAL PROPERTY REQUIREMENTS **(NOTE-4)**	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS: **200 BHN MAX (NOTE-3)**			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **FOR PIPING SIZES 2" OD AND BELOW SHALL BE ENTIRELY WELDED BY GTAW PROCESS.**

2. **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK>=12.5 mm & < 25 mm.**

3. **PWHT SHALL BE CARRIED OUT FOR WELD JOINTS FOR ANY ONE OR BOTH THE CONDITIONS GIVEN BELOW.**

   - **DESIGN TEMPERTURE OF LINE EXCEED 204 DEGREE CELSIUS.**
   - **WALL THICKNESS OF PIPE IS GREATER THAN 20MM IRRESPECTIVE OF DESIGN TEMPERATURE.**

   THE HARDNESS OF WELD AND HAZ SHALL NOT EXCEED 200 BHN. ANY KIND OF ATTACHMENTS ON SUCH PIPING SHALL BE STRESS RELIEVED AND SHALL ALSO MEET THE HARDNESS LIMIT.

4. **CHARPY V-NOTCH IMPACT TESTING OF WELD METAL SHALL BE CARIED OUT DURING WELDING PROCEDURE QUALIFICATION FOR THE PIPE WALL THICKNESS OVER 20 MM. IMPACT TESTING SHALL BE CARRIED OUT AT –(MINUS) 29°C.**

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WSC FOR PIPING CLASSES: **A61A, A62A, B61A, B62A, B78A, B79A, B88A, F88A, B69AW, F67AW, F22AW**

MATERIAL SPECIFICATIONS	PIPES	**ASTM A 106 GR.B, ASTMA A 672 GR.B60 CL.22**		
	FITTINGS	**ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPB-W**		
	FLANGES	**ASTM A 105**		
	OTHERS	**-**		
BASE METAL `P' NO	**1**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/ SMAW (NOTE-1)**	ROOT PASS: **GTAW**	FILLER PASS: **GTAW/ SMAW (NOTE-1)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/ GTAW**			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **ER70S-2 (NOTE-2)**	FILLER PASS: **ER70S-2/ E7018-1/E7018 (NOTE-2)**	ROOT PASS: **ER70S-2 (NOTE-2)**	FILLER PASS: **ER70S-2/ E7018-1/E7018 (NOTE-2)**
	FILLET JOINT/SOCKET JOINT: **E7018-1 / E7018/ ER70S-2 (NOTE-2)**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: -		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: -		SHIELDING: **99.995%**	
PREHEATING **(NOTE-3)**	PREHEAT TEMP: **10°C MIN/ 100°C FOR THK >25 mm**		INTERPASS TEMP.: ---	
POST HEATING: ---				
POST WELD HEAT TREATMENT **(NOTE-4)**	HOLDING TEMP: **-**		HOLDING TIME: **-**	
	RATE OF HEATING: **-**		MIN. HOLDING TIME: **-**	
	METHOD OF COOLING: **-**		RATE OF COOLING: **-**	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS: **200 BHN MAX**			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1 **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

2 **EVERY BATCH OF ALL WELDING CONSUMABLES SHALL BE QUALIFIED FOR NACE SERVICE (NACE MR0103 and TM0284).**

3 **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK >=12.5 MM & <= 25MM.**

4 **ALL WELD JOINTS SHALL BE STRESS RELIEVED AND PWHT SHALL BE DONE AS PER LATEST EDITION OF ASME B31.3. HARDNESS SHALL BE MEASURED AFTER PWHT.**

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WSC FOR PIPING CLASSES: **F22A**				
MATERIAL SPECIFICATIONS	PIPES	ASTM A106/ A 106M GR. B		
	FITTINGS	ASTM A234/A234M GR.WPB		
	FLANGES	ASTM A 105/ A 105M		
	OTHERS	-		
BASE METAL `P' NO	**1**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW / SMAW (NOTE 1)**	FILLER PASS: **GTAW / SMAW (NOTE 1)**	ROOT PASS: **GTAW / SMAW (NOTE-1)**	FILLER PASS: **GTAW/ / SMAW (NOTE-1)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **ER70S-2 / E6010**	FILLER PASS: **ER70S-2 / E7016/E7018**	ROOT PASS: **ER70S-2/ E6010**	FILLER PASS: **ER70S-2 / E7016/ E7018**
	FILLET JOINT/SOCKET JOINT: **E7016/E7018/ER70S-2**			
	BACKING RING: -		CONSUMABLE INSERT: -	
	ASME B31.3			
GASES	PURGING: -		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: -		SHIELDING: **99.995%**	
PREHEATING **(NOTE-2)**	PREHEAT TEMP: **10°C MIN/ 100°C FOR THK >25 mm**		INTERPASS TEMP: ---: -	
POST HEATING: ---				
	HOLDING TEMP: **-**		HOLDING TIME**: -**	
POST WELD HEAT TREATMENT **(NOTE-4)**	RATE OF HEATING: **-**		MIN. HOLDING TIME: **-**	
	METHOD OF COOLING: **-**		RATE OF COOLING: **-**	
MECHANICAL PROPERTY REQUIREMENTS (NOTE-3)	CHARPY `V' NOTCH VALUE:		MIN: **20J**	AVERAGE: **27J**
	AT TEMPERATURE:		-	
	HARDNESS:			
CODE OF FABRICATION	**ASME B31.3& IBR**			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER. THE ROOT PASS FOR SINGLE SIDE WELDING SHALL BE DONE BY GTAW PROCESS.**

2. **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK>= 12.5MM & ≤ 25 MM.**

3. **CHARPY V-NOTCH IMPACT TESTING OF WELD METAL SHALL BE CARIED OUT DURING WELDING PROCEDURE QUALIFICATION FOR THE PIPE WALL THICKNESS OVER 12.7 MM. IMPACT TESTING SHALL BE CARRIED OUT AS PER ASME B31.3.**

4. **PWHT SHALL BE DONE AS PER IBR FOR WALL THICKNESS EXCEEDING 20MM.**

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WSC FOR PIPING CLASSES: **A11A**

MATERIAL SPECIFICATIONS	PIPES	**ASTM A106 GR. B, ASTM A672 GR. B60 CL.12**		
	FITTINGS	**ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPB-W**		
	FLANGES	**ASTM A 105**		
	OTHERS	**-**		
BASE METAL `P' NO	**1**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW/SMAW (NOTE-1,2)**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS:**GTAW/ SMAW (NOTE-1,2)**	FILLER PASS: **GTAW/SMAW (NOTE-1)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **ER70S-2 / E6010**	FILLER PASS: **ER70S-2 / E7016/E7018**	ROOT PASS: **ER70S-2 / E6010**	FILLER PASS: **ER70S-2 / E7016/E7018**
	FILLET JOINT/SOCKET JOINT: **E7016/E7018/ER70S-2**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING:		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING:		SHIELDING: **99.995%**	
PREHEATING **(NOTE-3)**	PREHEAT TEMP: **10°C MIN./100°C (FOR THK>25MM)**		INTERPASS TEMP.: -	
POST HEATING:-				
POST WELD HEAT TREATMENT	HOLDING TEMP: **-**		HOLDING TIME: **-**	
	RATE OF HEATING: **-**		MIN. HOLDING TIME: **-**	
	METHOD OF COOLING: **-**		RATE OF COOLING: **-**	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS: **200 BHN MAX. (NOTE-4)**			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1 GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.

2 ROOT PASS FOR SINGLE SIDE WELDING SHALL BE DONE BY GTAW PROCESS.

3 PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FORTHK>=12.5 MM & <= 25 MM.

4 HARDNESS SHALL BE RESTRICTED TO LESS THAN 200 BHN.

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WSC FOR PIPING CLASSES: **A24A, B24A, B27A, B28A, D28A**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 106 GR.B, ASTM A 53 TYPE E GRADE B, ASTM A 672 GRADE C 70 CLASS 32**		
	FITTINGS	**ASTM A 105, ASTM A234 GR.WPB, ASTM A 234, GRADE WPB-W**		
	FLANGES	**ASTM A 105**		
	OTHERS	-		
BASE METAL `P' NO	**1**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW**	FILLER PASS: **GTAW / SMAW (NOTE-2)**	ROOT PASS: **GTAW / SMAW (NOTE-1, 2,3)**	FILLER PASS: **GTAW / SMAW (NOTE- 2)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **ER70S-2**	FILLER PASS: **ER70S-2 / E7016 / E7018**	ROOT PASS: **ER70S-2 / E6010**	FILLER PASS: **ER70S-2 / E7016 / E7018**
	FILLET JOINT/SOCKET JOINT: **E7016 / E7018/ ER70S-2**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: -		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: -		SHIELDING: **99.995%**	
PREHEATING **(NOTE-3)**	PREHEAT TEMP: **10°C MIN/ 100°C FOR THK >25 mm**		INTERPASS TEMP.: **----**	
POST HEATING: --				
POST WELD HEAT TREATMENT	HOLDING TEMP---		HOLDING TIME: **----**	
	RATE OF HEATING: **---**		MIN. HOLDING TIME: **---**	
	METHOD OF COOLING: **---**		RATE OF COOLING: **---**	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS:			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1 **THE ROOT PASS FOR SINGLE SIDE WELDING SHALL BE DONE BY GTAW PROCESS**

2 **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

3 **FOR PIPING CLASS B27A & B28A, GTAW SHALL BE USED FOR THE ROOT PASS OF ALL WELDS.**

4 **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK>=12.5 mm & ≤ 25 mm.**

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WSC FOR PIPING CLASSES: **A16A, A67A, A19AW, A67AW, A78A, B78A, A79A, A88A**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A106 GR.B, ASTM A 672 GR.B60 CL.22**		
	FITTINGS	**ASTM A105, ASTM A234 GR.WPB, ASTM A234 GR.WPB-W**		
	FLANGES	**ASTM A105**		
	OTHERS	**-**		
BASE METAL `P' NO	**1**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/ SMAW (NOTE-1)**	ROOT PASS: **GTAW**	FILLER PASS: **SMAW**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW**			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **ER70S-2**	FILLER PASS: **ER70S-2/ E7016 / E7018**	ROOT PASS: **ER70S-2**	FILLER PASS: **E7016 / E7018**
	FILLET JOINT/SOCKET JOINT: **E7016 / E7018**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: -		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: -		SHIELDING: **99.995%**	
PREHEATING **(NOTE-2)**	PREHEAT TEMP: **10°C MIN/ 100°C FOR THK ≥25 mm**		INTERPASS TEMP.: ---	
POST HEATING: ---				
POST WELD HEAT TREATMENT **(NOTE-3)**	HOLDING TEMP: **595 - 620°C**		HOLDING TIME: **1 HR / INCH THK**	
	RATE OF HEATING: **200°C / HR MAX**		MIN. HOLDING TIME: **1 HR**	
	METHOD OF COOLING: **CONTROLLED**		RATE OF COOLING: **200°C / HR MAX**	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS: **200 BHN MAX (NOTE-3)**			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **FOR PIPING SIZES 2" OD AND BELOW SHALL BE ENTIRELY WELDED BY GTAW PROCESS.**

2. **ALL THE BATCHES OF WELDING CONSUMABLES SHALL BE NACE QUALIFIED (NACE MR0103 & NACE TM0284).**

3. **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK>=12.5 mm & < 25 mm.**

4. **PWHT SHALL BE CARRIED OUT FOR ALL PIPE WALL THICKNESS AND POST HEAT TREATED HARDNESS OF WELD SHALL NOT EXCEED 200 BHN. ANY KIND OF ATTACHMENTS ON SUCH PIPING SHALL BE STRESS RELIEVED AND SHALL ALSO MEET THE HARDNESS LIMIT.**

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WSC FOR PIPING CLASSES: **A78AI, B78AI**

MATERIAL SPECIFICATIONS	PIPES	**ASTM A106 GR.B, ASTM A 672 GR.B60 CL.22**		
	FITTINGS	**ASTM A105, ASTM A234 GR.WPB, ASTM A234 GR.WPB-W**		
	FLANGES	**ASTM A105**		
	OTHERS	**-**		
BASE METAL `P' NO	**1**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/ SMAW (NOTE-1)**	ROOT PASS: **GTAW**	FILLER PASS: **SMAW**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW**			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: E**R70S-2**	FILLER PASS: **ER70S-2/ E7016 / E7018**	ROOT PASS: **ER70S-2**	FILLER PASS: **E7016 / E7018**
	FILLET JOINT/SOCKET JOINT: **E7016 / E7018**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: -		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: -		SHIELDING: **99.995%**	
PREHEATING **(NOTE-2)**	PREHEAT TEMP: **10°C MIN/ 100°C FOR THK ≥25 mm**		INTERPASS TEMP.: ---	
POST HEATING: ---				
POST WELD HEAT TREATMENT **(NOTE-3)**	HOLDING TEMP: **595 - 620°C**		HOLDING TIME: **1 HR / INCH THK**	
	RATE OF HEATING: **200°C / HR MAX**		MIN. HOLDING TIME: **1 HR**	
	METHOD OF COOLING: **CONTROLLED**		RATE OF COOLING: **200°C / HR MAX**	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS: **200 BHN MAX (NOTE-3)**			
CODE OF FABRICATION	**ASME B31.3& IBR**			

TECHNICAL NOTES:

1. **FOR PIPING SIZES 2" OD AND BELOW SHALL BE ENTIRELY WELDED BY GTAW PROCESS.**
2. **ALL THE BATCHES OF WELDING CONSUMABLES SHALL BE NACE QUALIFIED (NACE MR0103 & NACE TM0284).**
3. **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK>=12.5 mm & < 25 mm.**
4. **PWHT SHALL BE CARRIED OUT FOR ALL PIPE WALL THICKNESS AND POST HEAT TREATED HARDNESS OF WELD SHALL NOT EXCEED 200 BHN. ANY KIND OF ATTACHMENTS ON SUCH PIPING SHALL BE STRESS RELIEVED AND SHALL ALSO MEET THE HARDNESS LIMIT.**

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WSC FOR PIPING CLASSES: **A19A, B19A, A76A, A98A, F56A, A99A, B99A**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM A106 GR.B, ASTM A 672 GR.B60 CL.22**			
	FITTINGS	**ASTM A105, ASTM A234 GR.WPB, ASTM A234 GR.WPB-W**			
	FLANGES	**ASTM A105**			
	OTHERS	**-**			
BASE METAL `P' NO	**1**				
WELDING PROCESS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/ SMAW (NOTE-1)**	ROOT PASS: **GTAW**	FILLER PASS: **GTAW/SMAW**	
	FILLET JOINTS/ SOCKET JOINTS: **GTAW/SMAW**				
WELDING MATERIALS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: E**R70S-2**	FILLER PASS: **ER70S-2/ E7016 / E7018**	ROOT PASS: **ER70S-2**	FILLER PASS: : **ER70S-2/ E7016 / E7018**	
	FILLET JOINT/SOCKET JOINT: : **ER70S-2/E7016 / E7018**				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	**ASME B31.3**				
GASES	PURGING: -		SHIELDING: **ARGON**		
GAS COMPOSITION	PURGING: -		SHIELDING: **99.995%**		
PREHEATING **(NOTE-2)**	PREHEAT TEMP: **10°C MIN/ 100°C FOR THK ≥25 mm**		INTERPASS TEMP.: ---		
POST HEATING: ---					
POST WELD HEAT TREATMENT **(NOTE-3)**	HOLDING TEMP: **595 - 620°C**		HOLDING TIME: **1 HR / INCH THK**		
	RATE OF HEATING: **200°C / HR MAX**		MIN. HOLDING TIME: **1 HR**		
	METHOD OF COOLING: **CONTROLLED**		RATE OF COOLING: **200°C / HR MAX**		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -	
	AT TEMPERATURE:		-		
	HARDNESS: **200 BHN MAX (NOTE-3)**				
CODE OF FABRICATION	**ASME B31.3**				

TECHNICAL NOTES:

1 **FOR PIPING SIZES 2" OD AND BELOW SHALL BE ENTIRELY WELDED BY GTAW PROCESS.**

2 **PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK>=12.5 mm & < 25 mm.**

3 **PWHT SHALL BE CARRIED OUT FOR ALL PIPE WALL THICKNESS AND POST HEAT TREATED HARDNESS OF WELD SHALL NOT EXCEED 200 BHN. ANY KIND OF ATTACHMENTS ON SUCH PIPING (EXCEPT A76A, A98A) SHALL BE STRESS RELIEVED AND SHALL ALSO MEET THE HARDNESS LIMIT.**

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WSC FOR PIPING CLASSES: **B65D, F55D**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 335 GR.P11, ASTM A 691 GR.1.25CR CL.42**		
	FITTINGS	**ASTM A 182 GR.F11 CL.2, ASTM A234 GR.WP11 CL.1, ASTM A234 GR.WP11-W CL.1**		
	FLANGES	**ASTM A 182 GR.F11 CL.2**		
	OTHERS	-		
BASE METAL `P' NO	**4**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAWNOTE-1)	ROOTPASS: GTAW	FILLER PASS: GTAW/ SMAW
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: ER70S-B2L/ ER80S-B2 (NOTE-2)	FILLER PASS: ER70S-B2L/ ER80S-B2/ E7016-B2L/ E7018-B2L//E8016-B2/ E8018-B2 (NOTE-2)	ROOT PASS: ER70S-B2L/ ER80S-B2 (NOTE-2)	FILLER PASS: ER70S-B2L/ ER80S-B2/ E7016-B2L/ E7018-B2L/ E8016-B2/ E8018-B2
	FILLET JOINT/SOCKET JOINT: E7016-B2L/ E7018-B2L /ER70S-B2L/E8016-B2/E8018-B2 (NOTE-2)			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	ASME B31.3			
GASES	PURGING: **-**		SHIELDING: ARGON	
GAS COMPOSITION	PURGING: **-**		SHIELDING: **99.995** %	
PREHEATING	PREHEAT TEMP: 150°C MIN.		INTERPASS TEMP.: 250°C MAX.	
POST HEATING: ---				
POST WELD HEAT TREATMENT (NOTE-2)	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE: (NOTE-3)		MIN: 20J	AVERAGE: 27J
	AT TEMPERATURE:		-	
	HARDNESS: 225 BHN MAX. (NOTE-2)			
CODE OF FABRICATION	ASME B31.3			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**
2. **PWHT SHALL BE DONE AS PER LATEST ASME B31.3 FOR ALL WALL THICKNESSES. HARDNESS SHALL BE MEASURED AFTER PWHT.**
3. **CHARPY V-NOTCH IMPACT TESTING OF WELD METAL SHALL BE CARRIED OUT DURING WELDING PROCEDURE QUALIFICATION FOR THE PIPE WALL THICKNESS OVER 20 MM. IMPACT TESTING SHALL BE CARRIED OUT AT 0°C.**

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WSC FOR PIPING CLASSES: **B4D, B72D**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 335 GR.P11, ASTM A 691 GR.1.25CR CL.42**			
	FITTINGS	**ASTM A 182 GR.F11 CL.2, ASTM A234 GR.WP11 CL.1, ASTM A234 GR.WP11-W CL.1**			
	FLANGES	**ASTM A 182 GR.F11 CL.2**			
	OTHERS	-			
BASE METAL `P' NO	**4**				
WELDING PROCESS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW (NOTE-1)	ROOTPASS: GTAW	FILLER PASS: GTAW/ SMAW (NOTE-1)	
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW				
WELDING MATERIALS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: ER70S-B2L/ ER80S-B2	FILLER PASS: ER70S-B2L/ ER80S-B2/ E7016-B2L/ E7018-B2L//E8016-B2/ E8018-B2	ROOT PASS: ER70S-B2L/ ER80S-B2	FILLER PASS: ER70S-B2L/ ER80S-B2/ E7016-B2L/ E7018-B2L/ E8016-B2/ E8018-B2	
	FILLET JOINT/SOCKET JOINT: E7016-B2L/ E7018-B2L /ER70S-B2L/E8016-B2/E8018-B2				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	ASME B31.3				
GASES	**PURGING: -**		SHIELDING: ARGON		
GAS COMPOSITION	PURGING: **-**		SHIELDING: **99.995** %		
PREHEATING	PREHEAT TEMP: 150°C MIN.		INTERPASS TEMP.: 250°C MAX.		
POST HEATING: ---					
POST WELD HEAT TREATMENT (NOTE-2)	HOLDING TEMP: -		HOLDING TIME: -		
	RATE OF HEATING: -		MIN. HOLDING TIME: -		
	METHOD OF COOLING: -		RATE OF COOLING: -		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -	
	AT TEMPERATURE:		-		
	HARDNESS: 225 BHN MAX. (NOTE-2)				
CODE OF FABRICATION	ASME B31.3				

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

2. **PWHT SHALL BE DONE AS PER LATEST ASME B31.3 FOR ALL WALL THICKNESSES. HARDNESS SHALL BE MEASURED AFTER PWHT.**

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WSC FOR PIPING CLASSES: **B20D**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 335 GR.P11, ASTM A 691 GR.1.25CR CL.42**		
	FITTINGS	**ASTM A 182 GR.F11 CL.2, ASTM A234 GR.WP11 CL.1, ASTM A234 GR.WP11-W CL.1**		
	FLANGES	**ASTM A 182 GR.F11 CL.2**		
	OTHERS	-		
BASE METAL `P' NO	**4**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW (NOTE-1)	ROOTPASS: GTAW	FILLER PASS: GTAW/ SMAW (NOTE-1)
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: ER70S-B2L/ ER80S-B2	FILLER PASS: ER70S-B2L/ ER80S-B2/ E7016-B2L/ E7018-B2L//E8016-B2/ E8018-B2	ROOT PASS: ER70S-B2L/ ER80S-B2	FILLER PASS: ER70S-B2L/ ER80S-B2/ E7016-B2L/ E7018-B2L/ E8016-B2/ E8018-B2
	FILLET JOINT/SOCKET JOINT: E7016-B2L/ E7018-B2L /ER70S-B2L/E8016-B2/E8018-B2			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	ASME B31.3			
GASES	**PURGING: -**		SHIELDING: ARGON	
GAS COMPOSITION	PURGING: **-**		SHIELDING: **99.995** %	
PREHEATING	PREHEAT TEMP: 150°C MIN.		INTERPASS TEMP.: 250°C MAX.	
POST HEATING: ---				
POST WELD HEAT TREATMENT (NOTE-2)	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS: 225 BHN MAX. (NOTE-2)			
CODE OF FABRICATION	ASME B31.3 & IBR			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

2. **PWHT SHALL BE DONE AS PER LATEST EDITION OF IBR. HARDNESS SHALL BE MEASURED AFTER PWHT.**

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WSC FOR PIPING CLASSES: **A1F, A3F, B72F, A4F, D1F, D3F, D4F, B4F, D41F, A41F, A72F**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 335 GR.P5, ASTM A 691 GR.5CR CL.42**			
	FITTINGS	**ASTM A 182 GR.F5 , ASTM A 234 GR.WP5 CL.1, ASTM A 234 GR.WP5-W CL.1**			
	FLANGES	**ASTM A 182 GR.F5**			
	OTHERS	-			
BASE METAL `P' NO	**5B**				
WELDING PROCESS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW**	FILLER PASS: **GTAW/ SMAW**	
	FILLET JOINTS/ SOCKET JOINTS: **SMAW**				
WELDING MATERIALS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: E**R80S-B6**	FILLER PASS: **ER80S-B6 / E8016-B6L/ E8018-B6L**	ROOT PASS:**ER80S-B6**	FILLER PASS: **ER80S-B6 / E8016-B6L/E8018-B6L**	
	FILLET JOINT/SOCKET JOINT: **E8016-B6L/E8018-B6L**				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	**ASME B31.3**				
GASES	PURGING: **ARGON**		SHIELDING: **ARGON**		
GAS COMPOSITION	PURGING: **99.995%**		SHIELDING: **99.995%**		
PREHEATING	PREHEAT TEMP: **180°C MIN**		INTERPASS TEMP.: **250-300°C**		
POST HEATING: **(NOTE 2)**					
POST WELD HEAT TREATMENT **(NOTE-3)**	HOLDING TEMP: **705-760°C**		HOLDING TIME: **1HOUR PER INCH THK**		
	RATE OF HEATING: **200°C/HR MAX**		MIN. HOLDING TIME: **2 HRS**		
	METHOD OF COOLING: **CONTROLLED**		RATE OF COOLING: **200°C/HR MAX**		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -	
	AT TEMPERATURE:		-		
	HARDNESS: **241 BHN MAX (NOTE-3)**				
CODE OF FABRICATION	**ASME B31.3**				

TECHNICAL NOTES:

1. **FOR PIPING SIZES 2" OD AND BELOW SHALL BE ENTIRELY WELDED BY GTAW PROCESS.**

2 **POST HEATING IS REQUIED IF THE WELDMETAL IS ALLOWED TO COOL DOWN BELOW 150 °C AFTER COMPLETION OF WELDING AND BEFORE PWHT IS CARRIED OUT. POST HEATING INVOLVES HEATING TO 300 °C AND MAINTAINING FOR AN HOUR MINIMUM, THEN WRAPPED WITH MINERAL WOOL BEFORE ALLOWING IT TO COOL TO ROOM TEMPERATURE.**

3 **PWHT SHALL BE DONE FOR ALL WALL THICKNESSES AND POST HEAT TRATED HARDNESS OF WELD SHALL NOT EXCEED 241 BHN. ANY KIND OF ATTACHMENTS ON SUCH PIPING SHALL BE STRESS RELIEVED AND SHALL ALSO MEET THE HARDNESS LIMIT.**

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WSC FOR PIPING CLASSES: **F55F, G55F**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 335 GR.P5, ASTM A 691 GR.5CR CL.42**			
	FITTINGS	**ASTM A 182 GR.F5 , ASTM A 234 GR.WP5 CL.1, ASTM A 234 GR.WP5-W CL.1**			
	FLANGES	**ASTM A 182 GR.F5**			
	OTHERS	-			
BASE METAL `P' NO	**5B**				
WELDING PROCESS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW**	FILLER PASS: **GTAW/ SMAW**	
	FILLET JOINTS/ SOCKET JOINTS: **SMAW**				
WELDING MATERIALS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: E**R80S-B6**	FILLER PASS: **ER80S-B6 / E8016-B6L/ E8018-B6L**	ROOT PASS:**ER80S-B6**	FILLER PASS: **ER80S-B6 / E8016-B6L/E8018-B6L**	
	FILLET JOINT/SOCKET JOINT: **E8016-B6L/E8018-B6L**				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	**ASME B31.3**				
GASES	PURGING: **ARGON**		SHIELDING: **ARGON**		
GAS COMPOSITION	PURGING: **99.995%**		SHIELDING: **99.995%**		
PREHEATING	PREHEAT TEMP: **180°C MIN**		INTERPASS TEMP.: **250-300°C**		
POST HEATING: **(NOTE 2)**					
POST WELD HEAT TREATMENT **(NOTE-3)**	HOLDING TEMP: **705-760°C**		HOLDING TIME: **1HOUR PER INCH THK**		
	RATE OF HEATING: **200°C/HR MAX**		MIN. HOLDING TIME: **2 HRS**		
	METHOD OF COOLING: **CONTROLLED**		RATE OF COOLING: **200°C/HR MAX**		
MECHANICAL PROPERTY REQUIREMENTS **(NOTE-4)**	CHARPY `V' NOTCH VALUE:		MIN: **20J**	AVERAGE: **27J**	
	AT TEMPERATURE:		-		
	HARDNESS: **225 BHN MAX (NOTE-3)**				
CODE OF FABRICATION	**ASME B31.3**				

TECHNICAL NOTES:

1. **FOR PIPING SIZES 2" OD AND BELOW SHALL BE ENTIRELY WELDED BY GTAW PROCESS.**

2. **POST HEATING IS REQUIED IF THE WELDMETAL IS ALLOWED TO COOL DOWN BELOW 150 °C AFTER COMPLETION OF WELDING AND BEFORE PWHT IS CARRIED OUT. POST HEATING INVOLVES HEATING TO 300 °C AND MAINTAINING FOR AN HOUR MINIMUM, THEN WRAPPED WITH MINERAL WOOL BEFORE ALLOWING IT TO COOL TO ROOM TEMPERATURE.**

3. **PWHT SHALL BE DONE FOR ALL WALL THICKNESSES AND POST HEAT TRATED HARDNESS OF WELD SHALL NOT EXCEED 225 BHN. ANY KIND OF ATTACHMENTS ON SUCH PIPING SHALL BE STRESS RELIEVED AND SHALL ALSO MEET THE HARDNESS LIMIT.**

4. **CHARPY V-NOTCH IMPACT TESTING OF WELD METAL SHALL BE CARRIED OUT DURING WELDING PROCEDURE QUALIFICATION FOR THE PIPE WALL THICKNESS OVER 20 MM. IMPACT TESTING SHALL BE CARRIED OUT AT 0°C**

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WSC FOR PIPING CLASSES: **D23F**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 335 GR.P5, ASTM A 691 GR 5CR CL.42**		
	FITTINGS	**ASTM A 182 GR.F5, ASTM A 234 GR.WP5 CL. 1, ASTM A 234 GR.WP5-W CL.1**		
	FLANGES	**ASTM A 182 GR.F5**		
	OTHERS	-		
BASE METAL `P' NO	**5B**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW (NOTE-1)	ROOTPASS: GTAW	FILLER PASS: GTAW/ SMAW (NOTE-1)
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: ER80S- B6	FILLER PASS: ER80S-B6/ E8016-B6L/ E8018-B6L/ E8016-B6/ E8018-B6	ROOT PASS: ER80S- B6	FILLER PASS: ER80S-B6/ E8016-B6L/ E8018-B6L/ E8016-B6/ E8018-B6
	FILLET JOINT/SOCKET JOINT: E8016-B6L/ E8018-B6L/ E8016-B6/ E8018-B6/ ER80S-B6/			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	ASME B31.3			
GASES	**PURGING: ARGON**		SHIELDING: ARGON	
GAS COMPOSITION	PURGING: **99.995**%		SHIELDING: **99.995** %	
PREHEATING	PREHEAT TEMP: 200°C MIN.		INTER PASS TEMP.: 300°C MAX	
POST HEATING: 300°C MIN. FOR 60 MINUTES FOLLOWED BY SUITALBE INSULATION COVER BEFROE PWHT				
POST WELD HEAT TREATMENT (NOTE-2)	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS: 241 BHN MAX. (NOTE-2)			
CODE OF FABRICATION	ASME 31.3			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

2. **PWHT SHALL BE DONE AS PER LATEST EDITION OF ASME B31.3 FOR ALL WALL THICKNESSES. HARDNESS SHALL BE MEASURED AFTER PWHT.**

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WSC FOR PIPING CLASSES: **B4G**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 335 GR.P9, ASTM A 691 GR.9CR CL.42**		
	FITTINGS	**ASTM A 182 GR.F9, ASTM A 234 GR.WP9 CL. 1, ASTM A 234 GR.WP9-W CL. 1**		
	FLANGES	**ASTM A 182 GR.F9, ASTM A 105**		
	OTHERS	**-**		
BASE METAL `P' NO	**5B**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW	ROOTPASS: GTAW	FILLER PASS: GTAW/ SMAW
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: ER80S-B8 (NOTE-1)	FILLER PASS: ER80S-B8/ E8016-B8L/ E8018-B8L / E8016-B8/ E8018-B8 (NOTE-1)	ROOT PASS: ER80S-B8 (NOTE-1)	FILLER PASS: ER80S-B8/ E8016-B8L/E8018-B8L / E8016-B8/ E8018-B8 (NOTE-1)
	FILLET JOINT/SOCKET JOINT: E8016-B8L/E8018-B8L/ E8016-B8/ E8018-B8/ ER80S-B8			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	ASME B31.3			
GASES	PURGING: **- ARGON**		SHIELDING: ARGON	
GAS COMPOSITION	PURGING: - **99.995** %		SHIELDING: **99.995** %	
PREHEATING	PREHEAT TEMP: 250°C MIN.		INTERPASS TEMP.: 300°C MAX.	
POST HEATING: 300°C MIN. FOR 30 MINUTES FOLLOWED BY SUITALBE INSULATION COVER BEFROE PWHT				
POST WELD HEAT TREATMENT (NOTE-2)	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS: 241 BHN MAX. (NOTE-2)			
CODE OF FABRICATION	ASME B31.3			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

2. **PWHT SHALL BE DONE AS PER LATEST EDITION OF ASME B31.3 FOR ALL WALLTHICKNESSES. HARDNESS SHALL BE MEASURED AFTER PWHT.**

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WSC FOR PIPING CLASSES: **F2G, G2G, G22G**

MATERIAL SPECIFICATIONS	PIPES	**ASTM A 335/ A335M GR.P91, ASTM A 691 GR.P91 CL.42**					
	FITTINGS	**ASTM A 234 GR.WP91, ASTM A 234 GR.WP91-W**					
	FLANGES	**ASTM A 182 GR.F91**					
	OTHERS	-					
BASE METAL 'P' NO	**15E**						
WELDING PROCESS	GROOVE JOINTS						
	BUTT			OTHER THAN BUTT			
	ROOT PASS **GTAW**	FILLER PASS **GTAW/ SMAW (NOTE-1)**		ROOT PASS **GTAW**	FILLER PASS **GTAW/ SMAW (NOTE-1)**		
	FILLET JOINTS / SOCKET JOINTS **SMAW/GTAW**						
WELDING MATERIALS	GROOVE JOINTS						
	BUTT			OTHER THAN BUTT			
	ROOT PASS ER90S-B91 (NOTE-2,3,4)	**FILLER PASS ER90S-B91 / E9015-B91/ E9018-B91 (NOTE-2,3,4)**		**ROOT PASS ER90S-B91 (NOTE-2,3,4)**	**FILLER PASS ER90S-B91 / E9015-B91/ E9018-B91 (NOTE-2,3,4)**		
	FILLET JOINTS / SOCKET JOINTS E9015-B91/E9018-B91/ER90S-B91 (NOTE-2,3,4)						
	BACKING RING	-		CONSUMABLE INSERT	-		
JOINT PREPN.	**ASME B31.3**						
GASES	PURGING	**ARGON**		SHIELDING	**ARGON**		
GAS COMPOSITION	PURGING	**99.995%**		SHIELDING	**99.995%**		
PREHEATING	PREHEAT TEMP	**250°C MIN.**		POST HEATING	**350°C MIN. FOR 1 HOUR FOLLOWED BY SUITALBE INSULATION COVER AND COOLED DOWN TO 93°C MINIMUM BEFORE PWHT**		
CONTINUITY OF WELDING AND INTERPASS	**250-300°C**						
POST WELD HEAT TREATMENT **(NOTE-5)**	HOLDING TEMP	**-**		HOLDING TIME	**-**		
	RATE OF HEATING	**-**		MIN HOLDING TIME	**-**		
	METHOD OF COOLING	**-**		RATE OF COOLING	**-**		
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE **(NOTE-4)**				MIN **21J**		AVERAGE **27J**	
	AT TEMPERATURE -						
	HARDNESS- **196-270 BHN (NOTE-5)**						
CODE OF FABRICATION	**ASME B31.3 & IBR**						

TECHNICAL NOTES :

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**
2. **FILLER METAL AND WELD DEPOSIT SHALL HAVE DIFFUSIBLE HYDROGEN CONTENT TYPICALLY BELOW 4ML/100G.**
3. **NICKEL PLUS MANGANESE CONTENT OF FILLER METAL SHALL NOT BE GREATER THAN 1.2%.**
4. **DURING EQT, IMPACT TESTING SHALL BE CARRIED OUT AT 20°C.**
5. **PWHT SHALL BE DONE AS PER LATEST IBR FOR ALL WALL THICKNESSES. HARDNESS SHALL BE MEASURED AFTER PWHT.**

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WSC FOR PIPING CLASSES: **A92K, B92K, F92K**

MATERIAL SPECIFICATIONS	PIPES	**ASTM A 312 TP304, ASTM A 358 TP304 CL.1**		
	FITTINGS	**ASTM A 182 GR.F304, ASTM A 403 GR.WP304-S, ASTM A 403 GR.WP304-WX**		
	FLANGES	**ASTM A 182 GR.F304**		
	OTHERS	-		
BASE METAL `P' NO	**8**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW (NOTE-1)	ROOTPASS: GTAW/SMAW (NOTE-1)	FILLER PASS: GTAW/ SMAW (NOTE-1)
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: ER308/ER308L	FILLER PASS: ER308/ ER308L/ E308-15/16/ E308L-15/16	ROOT PASS: ER308/ ER308L/ E308-15/16/ E308L-15/16	FILLER PASS: ER308/ ER308L/ E308-15/16/ E308L-15/16
	FILLET JOINT/SOCKET JOINT: E308-15/16/ E308L-15/16 /ER308 / ER 308L			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	ASME B31.3			
GASES	**PURGING: - ARGON**		SHIELDING: ARGON	
GAS COMPOSITION	PURGING: **- 99.995** %		SHIELDING: **99.995** %	
PREHEATING	PREHEAT TEMP: 10 °C		INTERPASS TEMP.: 175°C MAX.	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS: -			
CODE OF FABRICATION	ASME B31.3			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

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WSC FOR PIPING CLASSES: **A11K, B11K, F21K**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 312 TP304L, ASTM A 358 TP304L CL.1**		
	FITTINGS	**ASTM A 182 GR.F304L, ASTM A 403 GR.WP304L-S, ASTM A 403 GR.WP304L-WX**		
	FLANGES	**ASTM A 182 GR.F304L**		
	OTHERS	**-**		
BASE METAL `P' NO	**8**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW	ROOTPASS: GTAW/SMAW	FILLER PASS: GTAW/ SMAW
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: ER308L (NOTE-1)	FILLER PASS: ER308L / E308L-15/16 (NOTE-1)	ROOT PASS: ER308L / E308L-15/16 (NOTE-1)	FILLER PASS : ER308L/ E308L-15/16 (NOTE-1)
	FILLET JOINT/SOCKET JOINT: E308L-15/16 /ER308L			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	ASME B31.3			
GASES	PURGING: **- ARGON**		SHIELDING: ARGON	
GAS COMPOSITION	PURGING: - **99.995** %		SHIELDING: **99.995** %	
PREHEATING	PREHEAT TEMP: 10 °C		INTERPASS TEMP.: 175°C MAX.	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:
	AT TEMPERATURE:		-	
	HARDNESS: -			
CODE OF FABRICATION	ASME B31.3			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

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WSC FOR PIPING CLASSES: **A11KI**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 312 TP304L, ASTM A 358 TP304L CL.1**		
	FITTINGS	**ASTM A 182 GR.F304L, ASTM A 403 GR.WP304L-S, ASTM A 403 GR.WP304L-WX**		
	FLANGES	**ASTM A 182 GR.F304L**		
	OTHERS	**-**		
BASE METAL `P' NO	**8**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW	ROOTPASS: GTAW/SMAW	FILLER PASS: GTAW/ SMAW
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: ER308L (NOTE-1)	FILLER PASS: ER308L / E308L-15/16 (NOTE-1)	ROOT PASS: ER308L / E308L-15/16 (NOTE-1)	FILLER PASS : ER308L/ E308L-15/16 (NOTE-1)
	FILLET JOINT/SOCKET JOINT: E308L-15/16 /ER308L			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	ASME B31.3			
GASES	PURGING: **- ARGON**		SHIELDING: ARGON	
GAS COMPOSITION	PURGING: - **99.995** %		SHIELDING: **99.995** %	
PREHEATING	PREHEAT TEMP: 10 °C		INTERPASS TEMP.: 175°C MAX.	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:
	AT TEMPERATURE:		-	
	HARDNESS: -			
CODE OF FABRICATION	ASME B31.3 & IBR			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

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WSC FOR PIPING CLASSES: **A60K, B60K**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 312 TP304L, ASTM A 358 TP304L CL.1**			
	FITTINGS	**ASTM A 182 GR.F304L, ASTM A 403 GR.WP304L-S, ASTM A 403 GR.WP304L-WX**			
	FLANGES	**ASTM A 182 GR.F304L**			
	OTHERS	**-**			
BASE METAL `P' NO	**8**				
WELDING PROCESS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW	ROOTPASS: GTAW/SMAW	FILLER PASS: GTAW/ SMAW	
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW				
WELDING MATERIALS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: ER308L (NOTE-1)	FILLER PASS: ER308L / E308L-15/16 (NOTE-1)	ROOT PASS: ER308L / E308L-15/16 (NOTE-1)	FILLER PASS : ER308L/ E308L-15/16 (NOTE-1)	
	FILLET JOINT/SOCKET JOINT: E308L-15/16 /ER308L				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	ASME B31.3				
GASES	PURGING: **- ARGON**		SHIELDING: ARGON		
GAS COMPOSITION	PURGING: - **99.995** %		SHIELDING: **99.995** %		
PREHEATING	PREHEAT TEMP: 10 °C		INTERPASS TEMP.: 175°C MAX.		
POST HEATING: -					
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -		
	RATE OF HEATING: -		MIN. HOLDING TIME: -		
	METHOD OF COOLING: -		RATE OF COOLING: -		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:	
	AT TEMPERATURE:		-		
	HARDNESS: -				
CODE OF FABRICATION	ASME B31.3				

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

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WSC FOR PIPING CLASSES: **A20K, A21K, A23K, A24K, A28K, B20K, D20K, D21K,**				
MATERIAL SPECIFICATIONS	**PIPES**	**ASTM A 312 TP304/304L, ASTM A 358 TP304/304L CL.2**		
	FITTINGS	**ASTM A 182 DUAL GRADE F304 / 304L, ASTM A 403 GR.WP304/304L-S, ASTM A403 GR.WP304/304LWX**		
	FLANGES	**ASTM A 182 GR.F304/304L**		
	OTHERS	**-**		
BASE METAL `P' NO	**8**			
WELDING PROCESS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: GTAW	**FILLERPASS: GTAW/SMAW (NOTE-1)**	**ROOTPASS: GTAW/SMAW (NOTE-1)**	**FILLER PASS: GTAW/ SMAW (NOTE-1)**
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: ER308L	**FILLER PASS: : ER308L / E308L-15/16**	**ROOT PASS: ER308L / E308L-15/16**	**FILLER PASS : ER308L/ E308L-15/16**
	FILLET JOINT/SOCKET JOINT: E308L-15/16 /ER308L			
	BACKING RING: -		**CONSUMABLE INSERT: -**	
JOINT PREPARATION	**ASME B31.3**			
GASES	**PURGING: - ARGON**		**SHIELDING: ARGON**	
GAS COMPOSITION	**PURGING: - 99.995 %**		**SHIELDING: 99.995 %**	
PREHEATING	**PREHEAT TEMP: 10 °C**		**INTERPASS TEMP.: 175°C MAX.**	
POST HEATING: -				
POST WELD HEAT TREATMENT	**HOLDING TEMP: -**		**HOLDING TIME: -**	
	RATE OF HEATING: -		**MIN. HOLDING TIME: -**	
	METHOD OF COOLING: -		**RATE OF COOLING: -**	
MECHANICAL PROPERTY REQUIREMENTS	**CHARPY `V' NOTCH VALUE:**		**MIN:**	**AVERAGE:**
	AT TEMPERATURE:		**-**	
	HARDNESS: -			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

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WSC FOR PIPING CLASSES: **A42K, B42K, B46K, D42K, D54K, F55K**				
MATERIAL SPECIFICATIONS	**PIPES**	**ASTM A 312 TP304/304L**		
	FITTINGS	**ASTM A 182 GR.F304/304L, ASTM A 403 GR.WP304/304L-S, ASTM A 403 DUAL GRADE WP-WX 304 / 304L**		
	FLANGES	**ASTM A 182 GR.F304/304L**		
	OTHERS	**-**		
BASE METAL `P' NO	**8**			
WELDING PROCESS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: GTAW	**FILLERPASS: GTAW/SMAW (NOTE-1)**	**ROOTPASS: GTAW/SMAW (NOTE-1,2)**	**FILLER PASS: GTAW/ SMAW (NOTE-1)**
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: ER308L (NOTE-2,3)	**FILLER PASS:ER308L / E308L-15/16 (NOTE-2,3)**	**ROOT PASS: ER308L / E308L-15/16 (NOTE-2,3)**	**FILLER PASS : ER308L/ E308L-15/16 (NOTE-2,3)**
	FILLET JOINT/SOCKET JOINT: E308L-15/16 /ER308L (NOTE-2,3)			
	BACKING RING: -		**CONSUMABLE INSERT: -**	
JOINT PREPARATION	**ASME B31.3**			
GASES	**PURGING: - ARGON**		**SHIELDING: ARGON**	
GAS COMPOSITION	**PURGING: - 99.995 %**		**SHIELDING: 99.995 %**	
PREHEATING	**PREHEAT TEMP: 10 °C**		**INTERPASS TEMP.: 175°C MAX.**	
POST HEATING: -				
POST WELD HEAT TREATMENT	**HOLDING TEMP: -**		**HOLDING TIME: -**	
	RATE OF HEATING: -		**MIN. HOLDING TIME: -**	
	METHOD OF COOLING: -		**RATE OF COOLING: -**	
MECHANICAL PROPERTY REQUIREMENTS	**CHARPY `V' NOTCH VALUE:**		**MIN: 0.38MM**	**AVERAGE: 0.38MM**
	AT TEMPERATURE:		**MINUS (-) 196°C**	
	HARDNESS:			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**
2. **FOR PIPING CLASS B46K, GTAW SHALL BE USED FOR THE ROOT PASS OF ALL WELDS.**
3. **ALL THE BATCHES OF FILLER MATERIALS SHALL HAVE GUARANTEED MINIMUM AS WELDED IMPACT VALUE OF 0.38 MM LATERAL EXPANSION AT MINUS (-) 196°C AT SITE. ALL THE FIVE VALUES SHALL BE OVER 0.38 MM.**
4. **FERRITE NUMBER IN THE WELDING CONSUMABLES SHALL BE GREATER THAN 1.**

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WSC FOR PIPING CLASSES: **A1N, A27N**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 312 TP316L, ASTM A 358 TP316L CL.1**			
	FITTINGS	**ASTM A 182 GR.F316L, ASTM A 403 GR.WP316L-S, ASTM A 403 GR.WP316L-WX**			
	FLANGES	**ASTM A 182 GR.F316L**			
	OTHERS	**-**			
BASE METAL `P' NO	**8**				
WELDING PROCESS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW (NOTE-1)	ROOTPASS: GTAW/SMAW (NOTE-1)	FILLER PASS: GTAW/ SMAW (NOTE-1)	
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW				
WELDING MATERIALS	GROOVE JOINTS				
	BUTT		OTHER THAN BUTT		
	ROOT PASS: ER316L	FILLER PASS: ER316L/ E316L-15/16	ROOT PASS: ER316L/ E316L-15/16	FILLER PASS : ER316L/ E316L-15/16	
	FILLET JOINT/SOCKET JOINT: E316L-15/16/ER316L				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	ASME B31.3				
GASES	PURGING: **- ARGON**		SHIELDING: ARGON		
GAS COMPOSITION	PURGING: - **99.995** %		SHIELDING: **99.995** %		
PREHEATING	PREHEAT TEMP: 10 °C		INTERPASS TEMP.: 175°C MAX.		
POST HEATING: -					
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -		
	RATE OF HEATING: -		MIN. HOLDING TIME: -		
	METHOD OF COOLING: -		RATE OF COOLING: -		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:	
	AT TEMPERATURE:		-		
	HARDNESS: -				
CODE OF FABRICATION	ASME B31.3				

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

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WSC FOR PIPING CLASSES: **A60N**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 312 TP316L, ASTM A 358 TP316L CL.1**			
	FITTINGS	**ASTM A 182 GR.F316L, ASTM A 403 GR.WP316L-S, ASTM A 403 GR.WP316L-WX**			
	FLANGES	**ASTM A 182 GR.F316L**			
	OTHERS	**-**			
BASE METAL `P' NO	**8**				
WELDING PROCESS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW/SMAW (NOTE-1)**	FILLER PASS: **GTAW/ SMAW (NOTE-1)**	
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**				
WELDING MATERIALS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **ER316L**	FILLER PASS: **ER316L/ E316L-15/16**	ROOT PASS: **ER316L/ E316L-15/16**	FILLER PASS : **ER316L/ E316L-15/16**	
	FILLET JOINT/SOCKET JOINT: **E316L-15/16/ER316L**				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	**ASME B31.3**				
GASES	PURGING: **- ARGON**		SHIELDING: **ARGON**		
GAS COMPOSITION	PURGING: - **99.995 %**		SHIELDING: **99.995 %**		
PREHEATING	PREHEAT TEMP: **10 °C**		INTERPASS TEMP.: **175°C MAX.**		
POST HEATING: -					
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -		
	RATE OF HEATING: -		MIN. HOLDING TIME: -		
	METHOD OF COOLING: -		RATE OF COOLING: -		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:	
	AT TEMPERATURE:		-		
	HARDNESS: -				
CODE OF FABRICATION	**ASME B31.3**				

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

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WSC FOR PIPING CLASSES: **A28M, A69M, B69M, D69M**

MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP316/316L DUAL		
	FITTINGS	ASTM A 182 GR.F316/316L DUAL, ASTM A403GR.WP316/316L-WX DUAL		
	FLANGES	ASTM A 182 GR.F316/316L DUAL		
	OTHERS	-		
BASE METAL `P' NO	8			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW	ROOTPASS: GTAW/SMAW	FILLER PASS: GTAW/ SMAW
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: ER316L(NOTE-1)	FILLER PASS: : ER316L/ E316L-15/16(NOTE-1)	ROOT PASS: ER316L/ E316L-15/16(NOTE-1)	FILLER PASS : ER316L/ E316L-15/16(NOTE-1)
	FILLET JOINT/SOCKET JOINT: ER316L/ E316L-15/16 (NOTE-1)			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	ASME B31.3			
GASES	PURGING: - ARGON		SHIELDING: ARGON	
GAS COMPOSITION	PURGING: - 99.995 %		SHIELDING: 99.995 %	
PREHEATING	PREHEAT TEMP: 10 °C MIN.		INTERPASS TEMP.: 175°C MAX.	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:
	AT TEMPERATURE:		-	
	HARDNESS: -			
CODE OF FABRICATION	ASME B31.3			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

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WSC FOR PIPING CLASSES: **A1K, A3K, A44K, A45K, B44K, B45K**				
MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP304, ASTM A 358 TP304 CL.1		
	FITTINGS	ASTM A 182 GR.F304, ASTM A 403 GR.WP304-S, ASTM A 403 GR.WP304-WX		
	FLANGES	ASTM A 182 GR.F304		
	OTHERS	-		
BASE METAL `P' NO	8			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: GTAW	FILLERPASS: GTAW/SMAW	ROOTPASS: GTAW/SMAW	FILLER PASS: GTAW/ SMAW
	FILLET JOINTS/ SOCKET JOINTS: SMAW/GTAW			
WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: ER308/ ER308L	FILLER PASS: ER308 ER308L/ E308-15/16/ E308L-15/16 (NOTE-1)	ROOT PASS: ER308/ ER308L/ E308-15/16/ E308L-15/16 (NOTE-1)	FILLER PASS: ER308 ER308L/ E308-15/16 E308L-15/16 (NOTE-1)
	FILLET JOINT/SOCKET JOINT: E308-15/16/ E308L-15/16 /ER308 / ER 308L			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	ASME B31.3			
GASES	PURGING: - ARGON		SHIELDING: ARGON	
GAS COMPOSITION	PURGING: - 99.995 %		SHIELDING: 99.995 %	
PREHEATING	PREHEAT TEMP: 10 °C		INTERPASS TEMP.: 175°C MAX.	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:		-	
	HARDNESS: -			
CODE OF FABRICATION	ASME B31.3			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

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WSC FOR PIPING CLASSES: **A41K, B41K, D41K**

MATERIAL SPECIFICATIONS	PIPES	**ASTM A 312 TP304, ASTM A 358 TP304 CL.1**
	FITTINGS	**ASTM A 182 GR.F304, ASTM A 403 GR.WP304-S, ASTM A 403 GR.WP304-WX**
	FLANGES	**ASTM A 182 GR.F304**
	OTHERS	**-**

BASE METAL `P' NO	**8**			
WELDING PROCESS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW/SMAW**	FILLER PASS: **GTAW/ SMAW (NOTE-1)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **ER308/ER308L (NOTE-2,3)**	FILLER PASS: **ER308/ ER308L/ E308-15/16/ E308L-15/16 (NOTE-2,3)**	ROOT PASS: **ER308/ ER308L/ E308-15/16/ E308L-15/16 (NOTE-2,3)**	FILLER PASS: **ER308/ ER308L/ E308-15/16/ E308L-15/16 (NOTE-2,3)**
	FILLET JOINT/SOCKET JOINT: **E308-15/16/ E308L-15/16 /ER308 / ER 308L (NOTE-2,3)**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING**: - ARGON**		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: **- 99.995** %		SHIELDING: **99.995 %**	
PREHEATING	PREHEAT TEMP: **10 °C**		INTERPASS TEMP.: **175°C MAX.**	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: 0.38MM	AVERAGE: **0.38MM**
	AT TEMPERATURE: **MINUS (-) 196°C**		**-**	
	HARDNESS: -			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**
2. **EACH BATCH OF WELDING CONSUMABLES SHALL MEET LATERAL EXPANSION VALUE OF 0.38MM MINIMUM AT (-196°C).**
3. **FERRITE NUMBER IN THE WELDING CONSUMABLES SHALL BE GREATER THAN 1.**

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WSC FOR PIPING CLASSES: **A70M, B24M, B70M, B50M, F53M, G51M, G53M**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 312 TP321, ASTM A 358 TP321 CL.1**			
	FITTINGS	**ASTM A 182 GR.F321, ASTM A 403 GR.WP321-S, ASTM A 403 GR.WP321-WX**			
	FLANGES	**ASTM A 182 GR.F321**			
	OTHERS	**-**			
BASE METAL `P' NO	**8**				
WELDING PROCESS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW**	FILLER PASS: **GTAW/ SMAW**	
	FILLET JOINTS/ SOCKET JOINTS: **SMAW**				
WELDING MATERIALS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **ER321/ER347**	FILLER PASS: **ER321/ER347 / E347-15/16**	ROOT PASS: **ER321/ER347**	FILLER PASS: **ER321/ ER347 / E347-15/16**	
	FILLET JOINT/SOCKET JOINT: **E347-15/16**				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	**ASME B31.3**				
GASES	PURGING: **ARGON**		SHIELDING: **ARGON**		
GAS COMPOSITION	PURGING: **99.995%**		SHIELDING: **99.995 %**		
PREHEATING	PREHEAT TEMP: **10°C**		INTERPASS TEMP.: **175°C MAX**		
POST HEATING: ---					
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -		
	RATE OF HEATING: -		MIN. HOLDING TIME: -		
	METHOD OF COOLING: -		RATE OF COOLING: -		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -	
	AT TEMPERATURE:		**-**		
	HARDNESS: -				
CODE OF FABRICATION	**ASME B31.3**				

TECHNICAL NOTES:

1. **FOR PIPING SIZES 2" OD AND BELOW SHALL BE ENTIRELY WELDED BY GTAW PROCESS.**

2. **FERRITE NUBMBER OF THE WELD DEPOSIT SHALL BE CHECKED DURING PROCEDURE QUAILFICATION AND SHALL BE IN THE RANGE OF 3-8 %. FERRITE SCOPE SHALL BE USED FOR MEASURING FERRITE LEVELS.**

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WSC FOR PIPING CLASSES: **D2D**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 335 GR.P11, ASTM A 691 GR.1.25CR CL.42**			
	FITTINGS	**ASTM A 182 GR.F11 CL.2, ASTM A234 GR.WP11 CL.1**			
	FLANGES	**ASTM A 182 GR.F11 CL.2**			
	OTHERS	**-**			
BASE METAL `P' NO	**4**				
WELDING PROCESS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW**	FILLER PASS: **GTAW/ SMAW (NOTE-1)**	
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**				
WELDING MATERIALS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **ER70S-B2L/ ER80S-B2**	FILLER PASS: **ER70S-B2L/ ER80S-B2/ E7016-B2L/ E7018-B2L//E8016-B2/ E8018-B2**	ROOT PASS: **ER70S-B2L/ ER80S-B2**	FILLER PASS: **ER70S-B2L/ ER80S-B2/ E7016-B2L/ E7018-B2L/ E8016-B2/ E8018-B2**	
	FILLET JOINT/SOCKET JOINT: **E7016-B2L/ E7018-B2L /ER70S-B2L/E8016-B2/E8018-B2**				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	**ASME B31.3**				
GASES	PURGING: **-**		SHIELDING: **ARGON**		
GAS COMPOSITION	PURGING: **-**		SHIELDING: **99.995** %		
PREHEATING	PREHEAT TEMP: **150°C MIN.**		INTERPASS TEMP.: **250°C MAX.**		
POST HEATING: ---					
POST WELD HEAT TREATMENT **(NOTE-2)**	HOLDING TEMP: -		HOLDING TIME: -		
	RATE OF HEATING: -		MIN. HOLDING TIME: -		
	METHOD OF COOLING: -		RATE OF COOLING: -		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -	
	AT TEMPERATURE:		**-**		
	HARDNESS: **225 BHN MAX. (NOTE-2)**				
CODE OF FABRICATION	**ASME B31.3 & IBR**				

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**
2. **PWHT SHALL BE DONE AS PER LATEST IBR FOR ALL WALL THICKNESSES. HARDNESS SHALL BE MEASURED AFTER PWHT.**

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WSC FOR PIPING CLASSES: **B72A TO B72D**				
MATERIAL SPECIFICATIONS	PIPES			
	FITTINGS	---		
	FLANGES			
	OTHERS	---		
BASE METAL `P' NO	**1 TO 4**			
WELDING PROCESS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW**	FILLER PASS: **GTAW/ SMAW (NOTE-1)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW**			
WELDING MATERIALS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **ER70S-B2L/ ER80S-B2**	FILLER PASS: **ER70S-B2L/ ER80S-B2/ E7016-B2L/ E7018-B2L//E8016-B2/ E8018-B2**	ROOT PASS: **ER70S-B2L/ ER80S-B2**	FILLER PASS : **ER70S-B2L/ ER80S-B2/ E7016-B2L/ E7018-B2L//E8016-B2/ E8018-B2**
	FILLET JOINT/SOCKET JOINT: **E7016-B2L/ E7018-B2L /ER70S-B2L/E8016-B2/E8018-B2**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING**: - ARGON**		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: **99.995%**		SHIELDING: **99.995%**	
PREHEATING	PREHEAT TEMP: **150ºC**		INTERPASS TEMP.: **250ºC Max.**	
POST HEATING: -				
POST WELD HEAT TREATMENT **(NOTE-2)**	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE: --
	AT TEMPERATURE:		-	
	HARDNESS: **(NOTE-3)**			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**
2. **PWHT SHALL BE DONE AS PER LATEST ASME B31.3 FOR ALL WALL THICKNESSES. THE PWHT TEMPERATURE SHALL BE OF P11 MATERIAL.**
3. **HARDNESS SHALL BE MEASURED AFTER PWHT. HARDNESS OF WELD AND P11 HAZ SIDE SHALL BE 225 BHN MAX AND FOR CS HAZ HARDNESS SHALL BE 200BHN MAX.**

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WSC FOR PIPING CLASSES: **A27M, A74M, D23M**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 312 TP321, ASTM A 358 TP 321 CL.1**			
	FITTINGS	**ASTM A 182 GR.F321, ASTM A 403 GR.WP321-S, ASTM A403 GR.WP 321-WX**			
	FLANGES	**ASTM A 182 GR.F321**			
	OTHERS	**-**			
BASE METAL `P' NO	**8**				
WELDING PROCESS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW/SMAW (NOTE-1)**	FILLER PASS: **GTAW/ SMAW**	
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**				
WELDING MATERIALS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS**: ER347 (NOTE-2)**	FILLER PASS**: ER347/ E347-15/16 (NOTE-2)**	ROOT PASS: **ER347 / E347-15/16 (NOTE-2)**	FILLER PASS : **ER347/ E347-15/16 (NOTE-2)**	
	FILLET JOINT/SOCKET JOINT: **E347-15/16 / ER347 (NOTE-2)**				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	**ASME B31.3**				
GASES	PURGING: **- ARGON**		SHIELDING: **ARGON**		
GAS COMPOSITION	PURGING: - **99.995 %**		SHIELDING: **99.995 %**		
PREHEATING	PREHEAT TEMP: **40 °C**		INTERPASS TEMP.: **175°C MAX.**		
POST HEATING: -					
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -		
	RATE OF HEATING: -		MIN. HOLDING TIME: -		
	METHOD OF COOLING: -		RATE OF COOLING: -		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:	
	AT TEMPERATURE:		-		
	HARDNESS: -				
CODE OF FABRICATION	**ASME B31.3**				

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

2. **CARBON CONTENT OF WELDING CONSUMABLES SHALL BE GREATER THAN OR EQUAL TO 0.04 WT.%.**

3. **FERRITE CONTENT SHALL BE CHECKED DURING PQR AND SHALL BE IN THE RANGE OF 3-8 PERCENT.**

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WSC FOR PIPING CLASSES: **B51Q, B59Q, F51Q, F52Q, F59Q, G59Q**					
MATERIAL SPECIFICATIONS	PIPES	**ASTM B423 UNS N08825, ASTM B705 UNSN08825**			
	FITTINGS	**ASTM B564, ASTM B366 WPNICMC-S UNS N08825, ASTM B366WPNICMC-WX UNS N08825,**			
	FLANGES	**ASTM B 564 ANNLD (UNS N08825),**			
	OTHERS	**-**			
BASE METAL `P' NO	**45**				
WELDING PROCESS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW**	FILLER PASS: **GTAW/ SMAW (NOTE-1)**	
	FILLET JOINTS/ SOCKET JOINTS: **SMAW**				
WELDING MATERIALS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **ERNiCrMo-3 (NOTE-2)**	FILLER PASS: **ERNiCrMo-3/ ENiCrMo-3 (NOTE-2)**	ROOT PASS: **ERNiCrMo-3 (NOTE-2)**	FILLER PASS **ERNiCrMo-3/ ENiCrMo-3 (NOTE-2)**	
	FILLET JOINT/SOCKET JOINT: **ENiCrMo-3 (NOTE-2)**				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	**ASME B31.3**				
GASES	PURGING**: - ARGON**		SHIELDING: **ARGON**		
GAS COMPOSITION	PURGING: - **99.995%**		SHIELDING: **99.995%**		
PREHEATING	PREHEAT TEMP: **10 ºC**		INTERPASS TEMP.: **150 ºC**		
POST HEATING: -					
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -		
	RATE OF HEATING: -		MIN. HOLDING TIME: -		
	METHOD OF COOLING: -		RATE OF COOLING: -		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:	
	AT TEMPERATURE:		-		
	HARDNESS: -				
CODE OF FABRICATION	**ASME B31.3**				

TECHNICAL NOTES:

1. **GTAW SHALL BE EMPLOYED FOR ENTIRE WELDING OF SMALL BORE PIPING, DIAMETER 2" AND SMALLER.**

2. **SPECIAL REQUIREMENTS APPLICABLE FOR ALLOY 825 MATERIALS AS SPECIFIED IN LICENSOR (M/S CLG) SPECIFICATION RA-260816 AND CPM-SU-5013 SHALL ALSO BE COMPLIED.**

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WSC FOR PIPING CLASSES: **A27M, A74M**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 516 GR.70 + 3MM SS410S**		
	FITTINGS	**ASTM A 516 GR.70 + 3MM SS410S**		
	FLANGES	**ASTM A 105 + 3MM 410S DEP**		
	OTHERS	**-**		
BASE METAL `P' NO	**1 + 8**			
WELDING PROCESS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW**	ROOTPASS: **GTAW**	FILLER PASS:
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **ERNiCrMo-3 (NOTE-1, 2)**	FILLER PASS: **ERNiCrMo-3/ ENiCrMo-3 (NOTE-1, 2)**	ROOT PASS: **ERNiCrMo-3 (NOTE-1, 2)**	FILLER PASS : **ERNiCrMo-3/ ENiCrMo-3 (NOTE-1, 2)**
	FILLET JOINT/SOCKET JOINT: **ERNiCrMo-3/ ENiCrMo-3 (NOTE-1, 2)**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: **- ARGON**		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: - **99.995 %**		SHIELDING: **99.995 %**	
PREHEATING	PREHEAT TEMP: **40 °C**		INTERPASS TEMP.: **175°C MAX**.	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:
	AT TEMPERATURE:		-	
	HARDNESS: -			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **ER309MoL ROD CAN BE USED FOR ROOT AND FIRST PASS (HOT PASS) PASS WELDING. E7018 ELECTRODE SHALL BE USED FOR CARBON STEEL SECTION.**
2. **DURING WELDING OF GRADE 321 TO ANY CLAD PIPING COMPONENTS, ERNiCrMo-3 & ENiCrMo-3 SHALL BE USED.**

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WSC FOR PIPING CLASSES: **A27N**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A 516 GR.70 + 3MM SS316L**		
	FITTINGS	**ASTM A 516 GR.70 + 3MM SS316L**		
	FLANGES	**ASTM A 105 + 3MM SS316L DEP**		
	OTHERS	**-**		
BASE METAL `P' NO	**1 + 8**			
WELDING PROCESS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW**	ROOTPASS: **GTAW**	FILLER PASS:
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **ER316L-3 (NOTE-1, 2)**	FILLER PASS: **ER316L / E316L-15/16 (NOTE-1, 2)**	ROOT PASS: **ER316L (NOTE-1, 2)**	FILLER PASS **ER316L / E316L-15/16 (NOTE-1, 2)**
	FILLET JOINT/SOCKET JOINT: **ER316L / E316L-15/16 (NOTE-1, 2)**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: **- ARGON**		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: - **99.995 %**		SHIELDING: **99.995 %**	
PREHEATING	PREHEAT TEMP: **40 °C**		INTERPASS TEMP.: **175°C MAX.**	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:
	AT TEMPERATURE:		-	
	HARDNESS: -			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **ER309MoL BARRIED LAYER SHALL BE USED BETWEEN ROOT AND FILLER PASS WELDING. E7018 ELECTRODE SHALL BE USED FOR CARBON STEEL SECTION.**
2. **DURING WELDING OF GRADE 316L TO ANY A27N (PIPING CLASS) CLAD PIPING COMPONENTS, ERNiCrFe-3 & ENiCrFe-3 SHALL BE USED.**

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WSC FOR PIPING CLASSES: **B77M**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM A387GR.22CL.2+3MM 410S**		
	FITTINGS	**ASTM A387GR.22CL.2+3MM 410S**		
	FLANGES	**A182GR.F22CL.3+3MM 410S DEP**		
	OTHERS	**-**		
BASE METAL `P' NO	**5 + 8**			
WELDING PROCESS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW**	ROOTPASS: **GTAW**	FILLER PASS:
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **ERNiCrMo-3 (NOTE-1, 2)**	FILLER PASS: **ERNiCrMo-3/ ENiCrMo-3 (NOTE-1, 2)**	ROOT PASS: **ERNiCrMo-3 (NOTE-1, 2)**	FILLER PASS : **ERNiCrMo-3/ ENiCrMo-3 (NOTE-1, 2)**
	FILLET JOINT/SOCKET JOINT: **ERNiCrMo-3/ ENiCrMo-3 (NOTE-1, 2)**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: **- ARGON**		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: - **99.995 %**		SHIELDING: **99.995 %**	
PREHEATING	PREHEAT TEMP: **10 °C**		INTERPASS TEMP.: **175°C MAX.**	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:
	AT TEMPERATURE:		-	
	HARDNESS: -			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **DURING WELDING OF GRADE 321 TO ANY CLAD PIPING COMPONENTS, ERNiCrMo-3 & ENiCrMo-3 SHALL BE USED.**
2. **PWHT SHALL BE DONE AFTER WELDING AS PER LATEST EDITION OF ASME B31.3 FOR ALL WALLTHICKNESSES. HARDNESS OF HAZ OF P22 MATERIAL SIDE SHALL BE 241 BHN MAX AND MEASURED AFTER PWHT.**

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WSC FOR PIPING CLASSES: **B21Q**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM B 167 (UNS N06600)**		
	FITTINGS	**ASTM B 366 GR.WPNCI-S(N06600)**		
	FLANGES	**ASTM** B **564 (UNS N06600)**		
	OTHERS	**-**		
BASE METAL `P' NO	**43**			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW**	FILLER PASS: **GTAW/SMAW (NOTE-1)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **ERNiCr-3/ ERNiCrFe-5**	FILLER PASS: **ERNiCr-3/ ERNiCrFe-5/ ENiCrFe-2**	ROOT PASS: **ERNiCr-3/ ERNiCrFe-5**	FILLER PASS : **ERNiCr-3/ ERNiCrFe-5/ ENiCrFe-2**
	FILLET JOINT/SOCKET JOINT: **ENiCrFe-2/ERNiCr-3/ ERNiCrFe-5**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING**: - ARGON**		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: **99.995 %**		SHIELDING: **99.995 %**	
PREHEATING	PREHEAT TEMP: **10 °C MIN.**		INTERPASS TEMP.: **150°C MAX.**	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:
	AT TEMPERATURE:		-	
	HARDNESS: -			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **FOR PIPING SIZES 2" OD AND BELOW SHALL BE ENTIRELY WELDED BY GTAW PROCESS.**

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WSC FOR PIPING CLASSES: **D20Q**				
MATERIAL SPECIFICATIONS	PIPES	**ASTM B 167 (UNS N06600)**		
	FITTINGS	**ASTM B 564 (UNS N06600), ASTM B 366 GR.WPNCI-S(N06600), ASTM B 366 GR.WPNCIWX(N06600)**		
	FLANGES	**ASTM B 564 (UNS N06600)**		
	OTHERS	**-**		
BASE METAL `P' NO	**43**			
WELDING PROCESS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW**	FILLER PASS: **GTAW/SMAW (NOTE-1)**
	FILLET JOINTS/ SOCKET JOINTS: **SMAW/GTAW**			
WELDING MATERIALS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **ERNiCr-3/ ERNiCrFe-5**	FILLER PASS: **ERNiCr**-3/ ERNiCrFe-5/ **ENiCrFe-2**	ROOT PASS: **ERNiCr-3/ ERNiCrFe-5**	FILLER PASS : **ERNiCr-3/ ERNiCrFe-5/ ENiCrFe-2**
	FILLET JOINT/SOCKET JOINT: : **ENiCrFe-2/ERNiCr-3/ ERNiCrFe-5**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING**: - ARGON**		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: **99.995 %**		SHIELDING: **99.995 %**	
PREHEATING	PREHEAT TEMP: **10 °C MIN.**		INTERPASS TEMP.: **150°C MAX.**	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN:	AVERAGE:
	AT TEMPERATURE:		-	
	HARDNESS: -			
CODE OF FABRICATION	**ASME B31**.3 **& IBR**			

TECHNICAL NOTES:

1. **FOR PIPING SIZES 2" OD AND BELOW SHALL BE ENTIRELY WELDED BY GTAW PROCESS.**

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WSC FOR PIPING CLASSES: **A21P, B21P**

MATERIAL SPECIFICATIONS	PIPES	**ASTM B 729 ANNLD (UNS NO. N08020)**		
	FITTINGS	**ASTM B 366 ANLD WP20CB-S N08020, ASTM B 462 UNS NO. N08020**		
	FLANGES	**ASTM B 462 UNS NO. N08020**		
	OTHERS	**-**		
BASE METAL `P' NO	**45**			
WELDING PROCESS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **GTAW**	FILLERPASS: **GTAW/SMAW (NOTE-1)**	ROOTPASS: **GTAW**	FILLER PASS: **GTAW/ SMAW**
	FILLET JOINTS/ SOCKET JOINTS: **GTAW/SMAW**			
WELDING MATERIALS	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS: **ER320LR**	FILLER PASS: **ER320LR/ E320LR**	ROOT PASS: **ER320LR**	FILLER PASS: **E320LR**
	FILLET JOINT/SOCKET JOINT: **ER320LR/ E320LR**			
	BACKING RING: -		CONSUMABLE INSERT: -	
JOINT PREPARATION	**ASME B31.3**			
GASES	PURGING: **ARGON**		SHIELDING: **ARGON**	
GAS COMPOSITION	PURGING: **99.995**%		SHIELDING: **99.995** %	
PREHEATING	PREHEAT TEMP: **10 °C**		INTERPASS: **175°C MAX**	
POST HEATING: -				
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -	
	RATE OF HEATING: -		MIN. HOLDING TIME: -	
	METHOD OF COOLING: -		RATE OF COOLING: -	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -
	AT TEMPERATURE:			
	HARDNESS: -			
CODE OF FABRICATION	**ASME B31.3**			

TECHNICAL NOTES:

1. **FOR PIPING SIZES 2" OD AND BELOW SHALL BE ENTIRELY WELDED BY GTAW PROCESS.**

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WSC FOR PIPING CLASSES: **B24M**

MATERIAL SPECIFICATIONS	PIPES	**ASTM A516 GR.70+3MM 410S**			
	FITTINGS	**ASTM A 516 GR.70 + 3 MM 410S**			
	FLANGES	**ASTM A 105+3MM 410S DEP**			
	OTHERS	**-**			
BASE METAL `P' NO	**1+7**				
WELDING PROCESS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **GTAW**	FILLERPASS: **SMAW (NOTE-1)**	ROOTPASS: **GTAW/ SMAW**	FILLER PASS: **SMAW**	
	FILLET JOINTS/ SOCKET JOINTS: **SMAW**				
WELDING MATERIALS	**GROOVE JOINTS**				
	BUTT		**OTHER THAN BUTT**		
	ROOT PASS: **ER309LMo (CLAD PORTION) (NOTE-1, 3)**	FILLER PASS: **E7018 (NOTE- 2)**	ROOT PASS: **ER309LMo/E309LMo-15/16 (NOTE-3)**	FILLER PASS: **E7018 (NOTE-2)**	
	FILLET JOINT/SOCKET JOINT: **E7018**				
	BACKING RING: -		CONSUMABLE INSERT: -		
JOINT PREPARATION	**ASME B31.3**				
GASES	PURGING: **ARGON**		SHIELDING: **ARGON**		
GAS COMPOSITION	PURGING: **99.995**%		SHIELDING: **99.995** %		
PREHEATING	PREHEAT TEMP: **10 °C MIN**		INTERPASS:		
POST HEATING: -					
POST WELD HEAT TREATMENT	HOLDING TEMP: -		HOLDING TIME: -		
	RATE OF HEATING: -		MIN. HOLDING TIME: -		
	METHOD OF COOLING: -		RATE OF COOLING: -		
MECHANICAL PROPERTY REQUIREMENTS	CHARPY `V' NOTCH VALUE:		MIN: -	AVERAGE: -	
	AT TEMPERATURE:				
	HARDNESS: -				
CODE OF FABRICATION	**ASME B31.3**				

TECHNICAL NOTES:

1. **CLAD PORTION SHALL BE COMPLETELY WELDED WITH ER309LMo.**
2. **DURING SINGLE-SIDE WELDING, USE OF PURE IRON BARRIER LAYER OVER THE STAINLESS STEEL ROOT WELD IS PREFERRED BEFORE DEPOSITING E7018/E7016 WELD METAL. DIRECT DEPOSITION OF E7018/E7016 WELD METAL OVER ER309LMo MAY ALSO BE DONE PROVIDED WELDING PROCEDURE QUALIFICATION IS DONE.**
3. **DURING WELDING FROM BOTH SIDE, E309LMo SHALL BE DEPOSITED AFTER GOUGING THE ROOT PASS FROM INSIDE.**
4. **DURING SS321 TO 410S CLAD CS WELDING, ROOT PASS SHALL BE BY ERNiCr-2/ERNiCrMo-3 AND FILLER PASSES BY ENiCrFe-3/ENiCrMo-3.**

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WELDING SPECIFICATION FOR FABRICATION OF PIPING

(SMMS DIVISION)

PROJECT : **EPCC TENDER FOR POLYPROPYLENE & BUTENE-1 UNIT OF BINA PETCHEM & REFINERY EXPANTION PROJECT (BPREP)**

OWNER : **M/s BHARAT PETROLEUM COOPERATION LIMITED**

PMC : **ENGINEERS INDIA LIMITED**

JOB NO. : **B957**

1	07-01-2026	REISSUED FOR TENDER	Ritik	Uttam	Prabhakar
0	24-12-2024	ISSUED FOR TENDER	Uttam	Prabhakar	R Chitara
Rev. No	**Date**	**Purpose**	**Prepared by**	**Checked by**	**Approved by**

AMENDMENTS/ADDITIONAL REQUIREMENTS

Specification No.: 6-77-0001 Rev.5

Title: Welding specification for fabrication of piping

Following amendments/additional requirements shall be applicable:

1. Addition in Clause 5.0:

   5.9: The ferrite number of the austenitic welds shall be in the range of 3FN to 8FN unless otherwise specified in the welding specification chart for piping. The ferrite number shall be measured during welding procedure qualification.

2. Modification of Clause 14.2 (e) as : New PQR shall be established for this job.

3. Addition in Clause 14.6 (a):

   Wherever MPI is required for inspection of alloy steel welds, use WFMPI instead of MPI.

4.

5. Addition in Clause 14.8:

   Hardness checking of alloy steel welds (P No. 4, 5A, 5B, 15E) shall be verified using the standard blocks having same P No.

6. Exhibit- M (Automatic Welding Procedure Guideline) added:

EXHIBIT M: AUTOMATIC WELDING PROCEDURE GUIDELINE

1.0 INTRODUCTION

All welding procedures can be classified as manual, semi-automatic, mechanized, automatic and robotic system. Automatic welding is a generic term for welding processes using equipment that perform welding of two components without the continuous involvement of an operator. It increases the productivity, improve weld quality, reliability and safety.

2.0 SCOPE

This document provides the guidelines for use of various arc welding processes as automatic/robotic/mechanized system in the field. Autogenous welding process is not permitted. The use of this procedure is mainly aimed at piping and structural weld joints.

3.0 DEFINITIONS

Automatic welding is defined as "Welding with equipment which performs the welding operation without adjustment of the controls by a welding operator. Manual adjustments may be made between welding operations but not during welding. The equipment may or may not perform the loading and unloading of work."

Mechanised welding is defined as "Welding in which the welding parameters are controlled mechanically or electronically and may be manually varied during welding to maintain the required welding position."

Robotic welding is defined as "Automatic welding using a robot that can be pre-programmed to different welding paths and fabrication geometries."

Welding operator is defined as "one who operates machine or automatic welding equipment." **Semiautomatic arc welding** is defined as "arc welding with equipment which controls only the filler metal feed. The advance of the welding is manually controlled."

4.0 REFERENCE STANDARDS

a) IS-7310-1,Approval tests for welders working to approved welding procedure, Part I: Fusion welding of steel.

b) AWS D1.1, Structural welding code—Steel.

c) ASME BPV SECTION IX, Welding, Brazing and Fusing qualifications.

d) ISO 14732, Welding personnel—Qualification testing of welding operators and weld setters for

e) mechanized and automatic welding of metallic materials.

f) API RP 582, Welding in the oil and gas industries.

5.0 BASE MATERIALS APPLICABLE

CS, LTCS, Alloy steels, Stainless steels, Ti alloys, Ni alloys

6.0 WELDING PROCESS

The limitations stated in API RP582 (latest edition) for various welding process shall be applicable in addition to the following.

a) Orbital Tungsten Inert Gas (TIG) welding

b) Gas Metal Arc Welding (GMAW)

- GMAW equipment manufacturer shall specify the range of current for various filler wire diameters for classification as short-circuit, spray, globular and pulsed metal transfer mode.
- GMAW-S (short-circuit) shall be used in the root pass when the backside of the weld is accessible and the root pass is completely removed from the backside.

c) Flux Cored Arc Welding (FCAW)

- Only Gas shielded FCAW process shall be employed for pressure retaining weld joints.
- During butt welding, FCAW process shall be employed for other than root passes.

d) SAW

- For field application, the welding machine set-up shall be approved by the site-in-charge.
- Alloy fluxes shall not be used as defined in ASME Section II Part C SFA 5.17 and SFA 5.23.
- The maximum bead width shall be 7X the electrode diameter.
- The maximum individual layer thickness for submerged arc welds shall not exceed 9.5mm or 3 times electrode diameter.
- Fluxes recommended for single pass by manufacturer shall not be used for multiple pass welds.
- Welding procedure shall be requalified whenever welding flux or wire is changed from one manufacturer to another, or from one grade to another of the same manufacturer.
- SAW shall not be used for pipes of NPS 8 inch and below.

7.0 WELDING PROCEDURE QUALIFICATION

a) Welding procedure qualification shall be carried out using same make and model of welding equipment, program, controller parameter settings.

b) The position limitations listed in ASME Section IX, QW-461.9 shall be considered an essential variable for procedure qualifications.

c) Bevel preparation and tolerances for the test piece and production joints shall be similar.

Repair welding procedure shall also be qualified. Manual welding process may be used for repair procedures.

8.0 WELDING OPERATOR QUALIFICATIONS

a) Operators handling robotic welding system and automatic welding machines shall have completed specialized training and safety courses and submit valid certificate issued by their company.

b) Each welding operator shall be qualified as per ASME Section IX or any other standard specified in the design code for all welding.

c) The test records of all welding operators shall be available at all times at the job location.

9.0 PRODUCTION WELDING

a) Joint bevel preparation and fit-up shall be similar to that carried out during welding procedure qualification.

b) Only qualified operators shall be performing the Welding.

c) Any unplanned interruptions during welding shall be reported to the site-in-charge. Welding shall be resume after assessing the impact of interruption on weld quality.

d) Inspection of finished welds shall be carried out as per the ITP.

e) Repair rate of each welding operator shall be recorded.

JOB SPECIFICATION
FOR
PASSIVE FIREPROOFING BY EPOXY INTUMESCENT COATING
(SMMS)

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

OWNER : M/s BHARAT PETROLEUM COOPERATION LIMITED

PMC : ENGINEERS INDIA LIMITED

JOB NO. : B957

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
A	26/12/2024	ISSUED FOR TENDER	VT	PP	PS

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1.0 INTRODUCTION

1.1 Scope

This specification outlines the technical requirement of passive fire protection (PFP) of external steel structures by epoxy intumescent coating.

The epoxy intumescent PFP coating system shall be designed for fire protection against hydrocarbon pool fire such that in the event of external fire, temperature of structural beams & columns etc. shall be restricted to 538°C and equipment skirts/ saddles/ supports etc. made of steel plates shall be restricted to 427°C for a period of two hours.

The intumescent coating shall be suitable for application on structural steel prior to erection as well as for application in-situ to suit project specific requirement/ schedule. The coating shall be transporting worthy such that the steel structures applied with the coating can be transported and erected safely without damage and in the event of minor damage a touch-up repair is possible.

Based on the brief outline of the fireproofing system and materials provided in this specification, EPC contractor shall select appropriate fireproofing material and system, develop detail design and application procedure and carry out application of the fireproof coating complying relevant P&ID's/ datasheet/ drawings as applicable. Aspects for HSE for execution of the fireproofing job shall be separately addressed by the contractor meeting requirements of health, safety and environment practices of BPCL.

1.2 Extent of fireproofing

Extent of fireproofing shall be defined in respective structural documents, equipment drawing/ data sheets and/ or equipment lists. In absence of any information, engineer-in-charge may advise extent of fireproofing based on OISD-164 standard.

1.3 Reference Standard

The following standard shall form a part of this specification:

API Publication 2218	Fireproofing Practices in Petroleum and Petrochemical Processing Plants
ASTM E-1529	Standard Test Methods for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies
UL 1709	Rapid Rise Fire Tests of Protection Materials for Structural steel
OISD-164	Fire proofing of steel structures in oil & gas industry
NORSOK M501	Surface preparation and protective coating
NACE SP 0198	The control of corrosion under insulation and fireproofing materials
SSPC-AB 1	Mineral and Slag Abrasives

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SSPC-AB 3	Ferrous Metallic Abrasives
SSPC-SP 10	Near –White Metal Blast Cleaning
SSPC-SP 3	Power Tool Cleaning

1.4 Document precedence

In the event of conflicting requirements noticed, the contractor shall notify BPCL/ EIL and obtain resolution before proceeding. The order of precedence shall be

a) This specification
b) Engineering design basis given in tender
c) Industry codes and standards
d) Application procedure/ quality plan prepared by EPC contractor

2.0 PRE-QUALIFICATION

As a minimum requirement, the intumescent coating system for the PFP

a) Must be certified for UL-1709

b) The intumescent coating without topcoat shall be certified for compliance to Norsok M501-coating system 5A

c) The coating system may have additional certification for thickness chart with respect to section factors tested in any of the laboratory listed in OISD 164 and certified by DNV/ Lloyd Register or independent third-party agency for hydrocarbon fire test.

3.0 TESTS FOR HYDROCARBON POOL FIRE

3.1 Fire test

The present specification is based on hydrocarbon pool fire characterized by high heat flux 50000 to 65000 Btu/ft^2-hr and rapid rise of temperature. Fire rating of a coating is pre-determined through a fire test simulating heat flux and temperature conditions as specified in different standards below:

a) In UL-1709, test specimen is exposed to a heat flux of 65,000 Btu/h·ft^2 (204 kW/m^2) and temperature rises to 1093°C within 5 minute and maintained throughout the test.

b) ASTM E 1529 simulates hydrocarbon pool fire conditions with temperatures and rate of rise same as UL 1709, but with a heat flux of 50,000 BTU/hr-ft^2 (158 kW/m^2).

c) NORSOK S001 also specifies a similar peak load heat flux for the hydrocarbon pool fire as 150 KW/m^2 (47500 BTU/hr-ft^2).

d) BS 476 Part-20 fire curve as per Appendix-D

UL-1709 certificate shall be a mandatory requirement. Additionally, for section factor specific thickness chart, fire test complying to minimum heat flux as per any of the above-

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mentioned test standards certified by DNV/ Lloyd Register or independent third-party agency shall be referred.

3.2 Test for external environment

In addition to the test for fire rating, material for exterior use shall be evaluated for accelerated ageing, high humidity, salt spray, wet-freeze-dry cycling, acid spray, solvent spray etc. and shall not cause corrosion of the substrate. For this, the proposed coating system shall be certified for compliance to Norsok M501-coating system 5A.

4.0 INTUMESCENT COATING MATERIALS & THICKNESS

4.1 Selection of epoxy intumescent coating

Epoxy intumescent fireproof coating shall consist of two pack solvent free high build thick film epoxy coating, applied over steel substrate for passive hydrocarbon fire protection for the intended duration. The coating shall not cause toxic release when subjected to heat and withstand shock or vibration. The material shall have the following general properties:

Characteristics	Values	Remarks
Applied dry density, (kg/m^3)	950-1300	Each batch
Compressive Strength (kg/cm^2), min. ASTM D 695	140	Each batch
Bond Strength, min. (kg/cm^2), ASTM D 1002	70	Each batch
Impact test, ASTM D-256/BS EN ISO 6272	Pass	Each batch
Hardness (Shore-D) 24 hours, ASTM D-256/BS EN ISO 6272	25	Each batch
Salt spray(hours), ASTM B117/ BS3900 Part F4	2000	Type test, test certificate not older than 3 years old
Air erosion(gm/mm^2), ASTM E859	<20	
Fungal Resistance, ASTM G21	0	
Flame spread index, max	Pass	

4.2 Criteria for thickness/ Section factor (Hp/A)

Unless otherwise specified, thickness of the epoxy intumescent coating shall be specific to material selected corresponding to 2 hours fire rating as per UL-1709 or third-party certification by DNV/ Lloyd register etc. The thickness shall also depend on section factor of the structural member.

Heat dissipation within the steel structure is an important factor that determines rate of temperature rise and have an influence on thickness requirement. Temperature rise in a heavier steel column will be slow compared to a lighter column, due to difference in heat dissipation within the steel member with different massivity.

UL-1709 thickness chart (fire rating) is specific to column size W10x49. Structural steel/ column heavier than this shall require less thickness and lighter will require more thickness. This is determined by section factor Hp/A (heater perimeter divided by cross section). W10x49 column corresponds to a section factor 160. Section factor will be less for heavier column and more for lighter column.

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4.3 Selection of coating thickness

Appropriate thickness shall be selected by the contractor based on fire rating certificate (UL-1709 or DNV/ Lloyd Register etc.) specific to the product and section factors of the steel members. All thickness shall be based on dry film thickness (DFT) basis.

a) Option-1: Where product specific thickness from UL-1709/ DNV/ Lloyd Register/ third party certificate is available

- Wherever the product selected has UL-1709/DNV/ Lloyd Register/third party fire test certificate for thickness chart with respect to section factors (Hp/A), the thickness shall be selected based on section factor of the steel member.
- UL-1709 certificate shall be submitted as minimum pre-qualification for the epoxy intumescent coating.
- Wherever UL-1709 does not address the section factor wise thicknesses, additional documentation shall be submitted for fire rating with respect to section factors certified by DNV/ Lloyd Register etc.
- For structural steel, thickness chart shall be corresponding to two-hour protection against 538 deg C. whereas, for equipment skirts/ saddles/ supports etc. made of steel plates same shall be corresponding to 427°C.
- The contractor shall prepare a list all structural member sizes, calculate section factor for each and select appropriate thickness based on the certified fire ratings.
- The certificates from UL-1709 / DNV / Lloyd Register etc. for the fire rating thickness basis for multi sections shall be submitted in original form duly signed and stamped by the vendor for review by PMC / owner.

For the convenience of execution, section factors (Hp/A) shall be clubbed into following groups. Section factors in a group shall be applied with thickness corresponding to highest section factor in the respective group as below:

Range of Section Factors (Hp/A)	Applicable (Hp/A) for thickness selection
Below 80	80
81 to 100	100
101 to 130	130
131 to 160	160
161 and above	200

b) Option-2: Where proposed coating does not have the multi section thickness certificate or the vendor is unable to produce the complete certificate / data for multi section thicknesses in original form, the thickness shall be selected as per following basis.

- The contractor shall prepare a list all structural member sizes, calculate

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section factor for each and arrange them in increasing order of section factor (Hp/A).

- For structural steel members having section factor 160 or less, UL-1709 thickness corresponding to 2-hour hydrocarbon fire rating for W10x49 column shall be selected.

- For structural steel members having section factor more than 160, UL-1709 thickness corresponding to 3-hour hydrocarbon fire rating for W10x49 column shall be selected.

5.0 EPOXY INTUMESCENT PFP COATING SYSTEM

Epoxy intumescent PFP coating shall consist of the following:

a) UL-1709 certified epoxy intumescent coating
b) Primer
c) Reinforcement fiber glass/ fabric/ carbon fiber mesh (where applicable)
d) Weather barrier finish coat

5.1 Epoxy intumescent coating

The material shall comply to the minimum qualification criteria specified in section 2.0 of this specification. The supplied material shall

a) Have UL design number under XR category (rapid rise fire test)
b) Manufacturing location listed in UL website and covered under UL follow up service (bear authorized UL mark on the packing)

Besides, UL-1709 and other fire test certificates, the epoxy intumescent supplier shall provide type test certificate for the material.

5.2 Primer

Prior to application of epoxy intumescent coating, the steel surface shall be blast cleaned and applied with compatible primer for corrosion protection. The primer shall be recommended by the intumescent coating manufacturer. In absence of specific information, a two-pack epoxy primer such as epoxy polyamide/ epoxy zinc phosphate/Zinc rich epoxy (@50-75µ DFT) shall be considered.

In a structural member, where intumescent coating is to be applied for some heights and rest with other paints, appropriate primers shall be applied for respective area.

In the event, the structural steel is already supplied with other primer/ painting, the applied paint shall be removed for the length/ height up to which the intumescent coating to be applied by blast cleaning and applied with intumescent manufacturer's recommended primer.

5.3 Reinforcement system

Certain epoxy intumescent coating requires reinforcement. The reinforcement may

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consist of fibre glass (min.152 gm/m^2)/ nylon fabric (min. 203 gm/m^2) / carbon fibre knitted with glass as recommended by the epoxy intumescent coating manufacturer. Some epoxy intumescent coating do not require reinforcement fibres. Requirement of reinforcement shall be as per UL-1709 certification.

5.4 Weather barrier polyurethane finish coat

The epoxy intumescent system shall be protected from weather damage by means of UV resistant polyurethane top coat 100-125 µ DFT. The polyurethane top coat must be applied over the epoxy intumescent coating irrespective of whether it is a requirement in respective UL-1709 certificate.
The polyurethane top coat shall be pre-qualified for coating system No. 1 of NORSOK M-501, withstand mechanical abrasion/ air erosion, to be applied after full curing and drying of the epoxy coating. The polyurethane top coat shall be recommended by epoxy intumescent supplier. The colour of polyurethane top coat shall be as per the client's requirement.

6.0 APPLICATION

6.1 The contractor shall coordinate with the epoxy intumescent vendor, obtain the required information for appropriate planning and application.

6.2 The epoxy intumescent coating shall be applied by air less spray using a plural machine. The machine shall provide a smooth and continuous supply of coating material to the nozzle and shall not contribute to laminations, voids, rebound entrapment, or other deleterious effects in the installed Coating.

6.3 Structural steel columns / beams etc. can be blast cleaned and applied with appropriate compatible primer from fabricator shop.

6.4 Epoxy intumescent coating shall be sprayed over the dried and cured primer.

6.5 The epoxy intumescent coating shall be installed by a qualified application vendor/ crew licensed/ certified by the intumescent manufacturer.

6.6 Intumescent coating material shall be stored in well-ventilated area, out of direct sunlight and temperature maintained in between 15 to 30 deg. C or as recommended by epoxy intumescent manufacturer.

6.7 Before actual application, the application crew must be pre-qualified through a mock application on a surface approx. 1m^2 to demonstrate their skill to carry out the application with available equipment, tools and machineries. The installed surface shall be inspected within one hour of application for any shrinkage/ gaps/ cracks and accordingly adjustment may be made as necessary. Parameters maintained in successful mock-up i.e. mixing ratio, temperature etc. shall be maintained during actual application.

6.8 For applications at shop/ yard prior to erection, approx 300-350mm from the edges shall be cutback, which shall be field applied after assembly/ erection. For field welding which requires pre heat, cutback allowance depends on the preheat temperature and duration. Manufacturer shall be consulted for the required cutback allowance.

6.9 For in-situ applications after assembly/ erection, the contractor shall arrange all

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approaches, scaffolding, stair ways, ladder, working platform etc, for carrying out the entire works safely. The working area shall be neatly maintained and all the facilities required by engineer-in-charge for proper supervision of the work shall be provided. In case, any special precaution is needed for the safety of the structure till the completion of application, the contractor shall make and provide all such arrangement to the complete satisfaction of the engineer-in-charge and shall remove the same after completion of works.

6.10 Always use complete kits of multi-component coatings. No partial use shall be allowed. Once discharged into the machine, the material shall be used within the manufacturer's published pot life. Material shall be discarded after pot life.

6.11 Coating shall be always applied from lower to higher elevation, gradually building up the desired thickness.

6.12 Reinforcement is used in some coating. In such cases, reinforcement shall be placed after half thickness is build such that the reinforcement is placed at middle of the thickness with overlap of 50mm with adjacent mesh (or as may be specified by intumescent vendor).

6.13 Weather barrier top coat shall be applied with appropriate DFT after the applied intumescent coating is dried and cured.

6.14 Time gap between primer and intumescent coating, application of subsequent coats over applied intumescent and minimum interval for polyurethane top coat shall be maintained strictly as per manufacturer's recommendation.

6.15 Thickness of applied primer, intumescent coating and weather barrier polyurethane top coat shall be maintained strictly as per manufacturer's recommendation.

7.0 QUALITY CONTROL

The epoxy intumescent vendor shall specify quality control requirements for application of the coating. The contractor (or its sub vendor/ agency responsible for the application) in consultation with the intumescent coating supplier shall develop and identify step by step check points for quality control procedure and define compliance mechanism. Minimum general quality control requirements are outlined below.

7.1 Surface preparation

Blast cleaning is recommended before application of primer. Steel surface to be fireproofed shall be blast cleaned in accordance with Sa2½ as per ISO 8501-1 or SSPC SP 10 or equal and removed all dirt, oil and grease and prepared to a profile 50-75 microns or as recommended by the intumescent manufacturer/ paint vendor.

Abrasives for blast cleaning shall comply with SSPC-AB1 (mineral and slag abrasives), or SSPC-AB 3 (steel abrasives) and be clean, dry and free of oil and contaminants. Smaller area (typically not exceeding $1m^2$), welds and local repair may be prepared by power tool cleaning to surface finish SSPC-SP3 or ST3. Alternative surface preparation, if any shall be recommended/ approved by intumescent manufacturer.

7.2 Ambient conditions

Ambient temperature, relative humidity / dew point and substrate temperature shall be

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checked for compliance with epoxy intumescent / paint supplier's recommended range before application. Usually, minimum air temperature 10°C, maximum relative humidity 85% and substrate temperature 3°C above dew point is a normal requirement.

7.3 Shelf life

Primer / epoxy intumescent / polyurethane top coat shall have specified shelf life. Supply of all materials bearing shelf life shall be appropriately planned to minimize storage period and ensure use well before the expiry date.

7.4 Primer application

After the surface is prepared to desired cleanliness and profile, primer shall be applied to appropriate thickness to achieve desired dry film thickness. DFT shall be measured and recorded after drying.

7.5 Segregation / identification of steel structures as per thickness chart

The structural steels shall be physically identified and segregated as per thickness chart provided by intumescent vendor and/ or approved by owner/ PMC.

7.6 Application of epoxy intumescent coating

a) The epoxy intumescent is a two-pack system usually applied by airless plural spray machine. Consumption ratio of the two components, temperature of storage tanks, spray exit temperature etc. are typical regular check points while carrying out the application.

b) As a minimum a ratio check by weight should be performed at start of each day's application and every restart, if the machine is shut down for any reason.
c) Intumescent base material and hardener shall be conditioned prior to use as per manufacturer recommended temperature/guideline.

7.7 DFT check of intumescent coating

Applied thickness shall be checked for compliance as per thickness chart.

The thickness can be measured by electro-magnetic induction gauge and also by physical measurement of applied thickness by drilling holes on the coating. Readings shall be taken 25mm away from edges of I-section or flange to web joints.

Frequency, span and method of measurement shall be part of the defined quality control procedure to be provided by intumescent vendor. Unless otherwise specified, the following method shall be adopted:

a) I-Sections, Tee Sections and Channels:

Web: minimum three readings per meter on each face of web

Flanges: minimum three readings per meter on outer face and minimum two readings on the inner face

b) Square and Rectangular hollow sections and angles: three readings per meter on

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each face

c) Circular hollow sections: ten readings per meter evenly spread

7.8 Inspection & acceptance of epoxy intumescent coating

Applied intumescent coating shall be free of defects. Where possible, defects such as runs, sags, drips, and voids shall be corrected as detected during application of the fireproofing. Loss of adhesion, blistering, peeling, mud cracking, inadequate cure, or rusting of the substrate shall be reworked.

Thickness readings shall be verified for acceptance as below:

a) The average readings must be equal to or greater than the specified Dry film thickness (DFT), but shall not exceed 10%

b) Individual thickness readings shall be at least 80%, but shall not cross 150% of the specified DFT

7.9 Repair of damage

Repair work is to be under taken for the following

- if, the intumescent coating thickness, surface integrity and finish are not in line with the approved mock-up/ manufacturer supplied specimen

- Damage of intumescent coating of shop applied structural member in transit.
- Damage due to welding operation

<u>For small weld operations:</u>

Initially remove 100-150 mm in all directions from welding area, on both sides of the steel. After completion of welding, if any blistering or discoloration of the product has occurred, the cutback should be extended 50 mm beyond these defects.

<u>For larger weld operations:</u>

Welding of a pipe support or similar structure, initially cutback 200-250 mm in all directions from welding area, on both sides of the steel. After completion of welding, if any blistering or discoloration of the product has occurred, the cutback should be extended 75 mm beyond these defects.

a) Any repair must be authorized and vetted by the intumescent manufacturer.

b) The area identified for repair should be cut and sliced using angle grinders and then mechanically chopped and scraped using hand held pneumatic chisels. In case of intumescent coating applied with no- reinforcement mesh cut back shall be at 90° at the edges.

c) After removal of coating, for area less than $1m^2$, surface shall be prepared by power tool cleaning to surface finish SSPC-SP 3 or ST3 or as recommended by manufacturer.

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d) Intumescent coating applied with reinforcement mesh; the edges of the repair should be feathered down to the reinforcement so that the mesh within the repair patch can be overlapped with the existing for a minimum of 50mm.

7.10 Documentation

Daily log sheet shall be maintained for details of Fireproofing work executed and quality control records. All inspection reports, Non-conformance reports (NCR), Corrective action reports etc., shall be maintained in a systematic manner with proper traceability

8.0 MEASUREMENT

The quantum of epoxy intumescent coating system applied shall be measured in square meter (m2) basis of ***un-coated*** steel surface.

All components of epoxy intumescent coating such as primer, reinforcement, top coat etc. shall be considered as one lump-sum item.

The rate shall be quoted all-inclusive in square meter basis including supply and execution, which shall include but not limited to providing required access, working platforms, props, scaffolding and other safety measures including their removal after completion, surface preparation, removal of already applied primer/ paint, if any, application of primer and intumescent coating, polyurethane top coating, all labour, material, machines, tools, consumables etc. required for the successful completion & testing meeting the specification.

9.0 HSE REQUIREMENT

The contractor responsible for the insulation installation shall be fully conversant and meet the HSE requirements of BPCL. The contractor shall strictly adhere to safety instructions and MSDS requirements of the insulation/ ancillary products and application. The insulation contractor shall provide adequate personnel protection and safety gears like hand gloves, masks, spectacles etc. as necessary for compliance to MSDS safety requirements to the workmen on the job.

10.0 VENDOR DATA REQUIREMENT

The following data / information shall be supplied by epoxy intumescent coating manufacturer for review/ approval:

a) UL-1709 certificate for the proposed epoxy intumescent coating

b) Additional fire test certification for hydrocarbon fire test report & fire rating for hollow section from DNV/ Lloyd register etc.

c) Product datasheet and MSDS for the epoxy intumescent coating

d) Type test certificate for the epoxy intumescent coating

e) Thickness chart for different structural members with Hp/A section factor

f) Shelf life

g) Specific storage requirements

h) Compatible primer - brand name, datasheet, application procedure

i) Pre-qualification requirements of application crew / certification

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j) Method statement for application & quality control

k) Painting system for weather barrier polyurethane finish coat

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VENDOR DATA REQUIREMENTS
FOR
STATIC & MACHINERY EQUIPMENT

Rev. No.	Date	Purpose	Prepared by	Checked by	Approved by
A	26-FEB-2026	ISSUED WITH TENDER	SS	PR	KCP

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VENDOR DATA REQUIREMENTS

The following drawings/documents marked "✔" shall be furnished by the bidder.

CHAIN PULLEY BLOCK

S. NO.	DESCRIPTION	WITH BID	POST ORDER			REMARKS
			FOR REVIEW	FOR RECORD	WITH DATA BOOK (FINAL)	
1.	GA Drawings showing major diemnsions and MOC with individual equipment weight/load data		✔		✔	
2.	Installation, operation & maintenance manuals containing all certified drawings & documents			✔	✔	
3.	Quality Assurance Plan			✔	✔	@
4.	Test Certificates - Mechanical Performance Test Reports			✔		@
5.	Any other Test Report, as required			✔		@
6.	Test Certificates - Material Test Certificates			✔	✔	@
7.	Filled in Data Sheets		✔		✔	

Notes :

1. "TICK" denotes applicability.
2. Post order, drawing / document review shall commence only after approval of Document Control Index (DCI).
3. All post order documents shall be submitted / approved through EIL eDMS portal.
4. Final documentation shall be submitted in hard copy (Six prints) and soft (two CDs/DVDs) in addition to submission through EIL eDMS.
5. Refer - 6-78-0001: Specification for quality management system from Bidders.
6. Refer - 6-78-0002: Specification for documentation requirements from Contractors.
7. Refer - 6-78-0003: Specification for documentation requirement from Suppliers.
8. All drawings & documents shall be submitted in A4 or A3 paper sizes. Documents in higher paper size shall be submitted in exceptional circumstances or as indicated in the MR/Tender.
9. Post order- The schedule of drawing / data submission shall be mutually agreed between EIL & the bidder / contractor / supplier during finalization of Document Control Index (DCI).
10. "@" indicates submission of documents to Inspection Agency.
11. Final documentation shall be submitted in hard copy (Six prints) and soft (three CDs/DVDs) in addition to submission through EIL eDMS and BPCL EPPDMS.

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PDS REV .1

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK	QTY	NOM. DIA	SCH./THK.	FLANGES			PROJECTION NOTE-4	PAD W x T	SERVICE
		नामिनल	शेड्यूल व	CLASS	TYPE	FACING			
मार्क	क्वान्टिटी	डांया	थिकनैस	क्लास	टाईप	फेसिंग	प्रोजेक्शन	पैड	सर्विस
1A	1	600	#	300	SRWN	RF	#	-	MANHOLE + BF + GASKET + BOLTING
1 B~C	2	600	#	300	SRWN	RF	#	-	MANHOLE + BF + GASKET + BOLTING
7	1	1000 (H)	#	300	SRWN	RF	#	-	VAPOR OUTLET TO 300-EE-00-2206 A/B
8	1	80	-	600	SRWN	RF	#	-	VENT
10	1	300	#	300	SRWN	RF	#	-	REFLUX IN FROM 300-PA-CF-2201A/B/300-PA-CF-2202A/B
11	1	900	#	300	SRWN	RF	#	-	FEED FROM 300-VD-00-2001A-C
12	1	150	#	300	SRWN	RF	#	-	FEED FROM 300-VD-00-2002A/B
14	1	450	#	300	SRWN	RF	#	-	TO REBOILER 300-EE-00-2201A/B
15 A-B	2	500	#	300	SRWN	RF	#	-	FROM REBOILER 300-EE-00-2201A/B
17	1	350	#	300	SRWN	RF	#	-	LIQUID BOTTOM OUTLET TO 300-00-EE-2202
31	1	80	#	600	SRWN	RF	#	-	DRAIN
35	1	50 (H)	160	600	WN	RF	2160	-	UTILITY CONNECTION
36	1	50 (H)	160	300	WN	RF	2160	-	PRESSURE INDICATOR
39 A-B	2	50 (H)	160	300	WN	RF	2775	-	PRESSURE DIFFERENTIAL INDICATOR
39C	1	50 (H)	160	300	WN	RF	2160	-	PRESSURE DIFFERENTIAL INDICATOR
40	1	50 (H)	160	300	WN	RF	2160	-	TEMPERATURE INDICATOR
41	1	50 (H)	160	300	WN	RF	2160	-	TEMPRATURE CONTROLLER
SP 1-2	2	50 (H)	160	300	WN	RF	2160	-	STAND PIPE
LT 1-2	2	50 (H)	160	300	WN	RF	2160	-	LEVEL TXMR (DP)
LT 3-4	2	50 (H)	160	300	WN	RF	2160	-	LEVEL TXMR (DP)
AO 1-2	2	500 ID	14 THK.	AS PER EIL STD.				250 x T	ACCESS OPENING
SKV 1-4	4	100	Sch 40	AS PER EIL STD.				-	SKIRT VENT

T' DENOTES CORRESPONDING SHELL/CONE/DISH END NOMINAL THICKNESS

REFER SHEET - 3

'H' DENOTES (HOLD)

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकशन्स

FOUNDATION LOADING DATA (OPERATING CONDITION)
फॉऊंडशन लोडिगं डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC (DB)	1229000	48500
WIND	850500	33000

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2 ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3 NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A) FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B) FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5 THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6 FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
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.
8 ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9 NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90^0 APART.
10 ALL FABRICATED NOZZLES SHALL BE 100% RADIOGRAPHED.
11 NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.
12 SURFACE PREPARATION, PRIMER & FINISH PAINT SHALL BE CARRIED OUT AT YARD BY EQUIPMENT VENDOR AS PER PAINTING SPEC.
13 ALL REMOVABLE INTERNALS SHALL BE SIZED SO AS TO PASS THROUGH NEAREST MANHOLE.
14 VESSEL SHALL BE SUBJECTED TO DRY OUT CONDITIONS OF 7 Kg/Cm²(g) AT 80ºC.
15 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.
16 LIFTING TRUNNION & TAILING LUGS SHALL BE DESIGNED BY VENDOR FOR ALL THE SECTIONS IN DRESSED UP CONDITION (CONSIDERING AN IMPACT FACTOR OF 1.5).CALCULATION TO BE SUBMITTED FOR REVIEW. VENDOR TO PROVIDE INSERT PLATE OF SUITABLE SIZE AND THICKNESS WHEREVER TAILING LUGS & LIFTING TRUNNIONS ARE WELDED TO SHELL. DESIGN CALCULATION SHALL INCLUDE CHECK FOR SKIRT THK., SHELL THK., BASE BLOCK FOR LIFTING/TAILING FORCES. ANY ADDITIONAL REQUIREMENT OF INCREASE THICKNESS OF ANY COMPONENT OR PROVIDING STIFFENERS, INSERT PLATE OVER AND ABOVE WHICH IS INDICATED IN DATASHEET SHALL BE PROVIDED BY VENDOR WITHOUT ANY TIME & COST IMPLICATION. INDUCED STRESSES AT THE JUNCTION OF SHELL & TRUNNION SHALL BE LIMITED TO 0.9 OF YIELD STRESS.TAILING LUG SHALL BE PROVIDED 90° TO THE LIFTING LUG/LIFTING TRUNNION. VENDOR SHALL INDICATE C.G. OF EQUIPMENT IN FABRICATION DRAWING.
17 VENDOR SHALL PROVIDE 2 NOS. PERMANENT SLOPING STEEL MONKEY LADDERS INSIDE THE SKIRT TO ACCESS THE BOTTOM HEAD FOR INSPECTION.
18 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.
19 DENSITY OF LIQUID AT OPERATING TEMPERATURE IS :
TOP: 508 Kg/M3 & BOTTOM: 528 Kg/M3
20 ALL PLATES AND WELDS INCLUDING HAZ SHALL BE IMPACT TESTED AT (-) 45ºC WITH MIN. ENERGY VALUE AS PER FIG. UG 84.1 OF ASME SEC. VIII DIV.1.
21 AT TOP, MAXIMUM PRESSURE DROP OF 0.21 KG/SQ.CM & LIQUID LEVEL OF 15150 MM DUE TO LIQUID OVERALL CASE (I.E. TOTAL 31.7 KG/SQ.CM (g)) IS CONSIDERED FOR MECHANICAL DESIGN.
22 COLUMN SHALL BE FIRST COMPLETELY FABRICATED & HYDROTESTED AT SHOP. THEREAFTER IT SHALL BE CUT INTO MAXIMUM TWO SECTIONS (PROVIDE ADDITIONAL LENGTH TO TAKE CARE OF CUTTING & REJOINING ALLOWANCES) BEFORE TRANSPORTATION FROM SHOP TO SITE (WHERE FINAL C-SEAM SHALL BE CARRIED OUT). SECTION LENGTH OF COLUMN SHALL BE DECIDED BASED ON TRANSPORTATION FEASIBILITY (BY VENDOR). COLUMN SHALL BE ASSEMBLED AT SITE IN HORIZONTAL POSITION COMPLETE IN ALL RESPECTS. DP EXAMINATION SHALL BE CARRIED OUT ON SITE JOINT FOR ROOT RUN & FINAL RUNS (INSIDE & OUTSIDE) BY COLUMN FABRICATOR. 100% RADIOGRAPHY SHALL BE CARRIED OUT ON SITE JOINT BY COLUMN FABRICATOR. NDT SHALL BE CARRIED OUT AS PER MDS. ONLY LOCAL BOX TYPE (INSIDE) HYDROTEST SHALL BE CARRIED OUT FOR SITE CIRC. SEAM. COMPLETE HYDROTEST OF THE ENTIRE COLUMN AT SITE IS NOT
23 ABOVE NOOZLE -11 COLD INSULATION SHALL BE USED (PIR/65mm). BELOW NOZZLE-11 HOT INSULATION SHALL BE USED (ROCK WOOL/25mm).

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION & PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
X	SKIRT BASE DETAILS	7-12-0004
X	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
X	MANHOLE WITH HINGED COVER	7-12-0009
	MANHOLE WITH DAVIT	7-12-0010
X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
X	INTERNAL FLANGES	7-12-0018
	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
X	SUPPORT RING AND BOLTING BAR(FOR GUIDENCE)	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
X	PIPE DAVIT	7-12-0023
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
X	SUPPORTS FOR INTERNAL FEED PIPE(FOR GUIDENCE)	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
X	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038
	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034

REFERENCE DRAWINGS(रेफरेन्स डाईंग)

	NOZZLE ORIENTATIONS	
	LADDERS/PLATFORM CLEATS	
	PIPE SUPPORT CLEATS	
	TRAY SUPPORT AND BOLTING BARS	
	DEMISTER DATA SHEET	
X	SKETCH FOR MONKEY LADDER	B957-000-80-42-SK-0010
X	PDS FOR 300-CC-00-2201	300-CC-00-2201

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES
X	NOZZLE ELEVATIONS	X	PIPE SUPPORT CLEATS
X	SUPPORT HEIGHT	X	LADDER/PLATFORM CLEATS
X	DETAILS OF INTERNALS	X	TRAY SUPPORT/BOLTING BARS
X	NOZZLE	X	PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	ASME SECTION VIII DIV-1 EDITION 2023
WORKING PRESSURE (kg/cm^2g)	TOP:24.3 BOTTOM:24.5
DESIGN PRESSURE (kg/cm^2g)	INT. 31.5 EXT. --
WORKING TEMPERATURE (°C)	TOP: (-)9.0 BOTTOM:82.0
DESIGN TEMPERATURE (°C)	(-)45/100
MDMT (°C)	(-)45
CORROSION ALLOWANCE (mm)	1.5
TYPE OF HEAD	2:1 ELLIPTICAL
JOINT EFFICIENCY	SHELL 1 HEAD / CONE 1
RADIOGRAPHY	SHELL FULL HEAD / CONE FULL
POST WELD HEAT TREATMENT	YES (NOTE-15)
HEAT TREATMENT	HEAD: AS PER CODE / SPEC.
OPERATING MEDIUM	HP DEPROPANIZER (H)
SP. GRAVITY	NOTE-23
WIND SPECIFICATION	IS 875
SEISMIC	IS 1893 + SITE SPECTRA
CAPACITY (M^3)	411
PAINTING/CLEANING	AS PER JOB SPECIFICATION (REFER NOTE-12)
INSULATION THICKNESS (mm) (IH/HC)	NOTE-23 [X] HOT [X] COLD
FIRE PROOFING CLEATS	[X] YES [ ] NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	41.2
INSPECTION BY	[X] EIL [ ] CIB [ ] TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL/~~BOOT~~	SA 516 Gr.60 *
REINFORCEMENT PAD/INSERT PLATE	SA 516 Gr.60 *
HEADS	SA 516 Gr.60 *
~~SHELL FLANGES~~/SR/LWN	SA 350 LF2 CL.1
NOZZLE FLANGES	SA 350 LF2 CL.1
NOZZLE NECK UPTO 250 NB	SA 350 LF2 CL.1 / SA 333 Gr.6
NOZZLE NECK ABOVE 250 NB	SA 350 LF2 CL.1/ SA 516 Gr.60 *
PIPE FITTINGS	SA 420 WPL 6 (SEAMLESS)
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS304 METAL WINDING & GRAFOIL FILLER WITH CS OUTER RING & SS304 INNER RING AS PER ASME B16.20
GASKET INTERNAL	COMPRESSED FIBRE ASBESTOS FREE #
EXTERNAL STUDS/BOLTS/NUTS	SA 320 L7 / SA 194 GR.7
INTERNAL STUDS/BOLTS/NUTS	SS 304
SKIRT/ ~~SUPPORT~~	SA 516 GR.60 * / IS 2062 GR. E 250 QUALITY BR/BO
SKIRT/~~SUPPORT~~ BASE	IS 2062 GR. E 250 QUALITY BR/BO
INTERNAL PARTS (WELDED)	SA 516 GR.60 */ SA 333 Gr.6 (SEAMLESS)
INTERNAL PARTS (BOLTED)	SA 516 GR.60 */ SA 333 Gr.6 (SEAMLESS)
CLIPS & ATTACHMENTS (EXTERNAL)	SA 516 GR.60* / IS 2062 GR. E 250 QUALITY BR/BO
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENT	SA 516 GR.60 *
PIPE DAVIT	SA 106 GR.B
VACUUM STIFFENER	-
LIFTING TRUNION	SA 333 Gr.6 / SA 516 GR.60 *
TAILING LUG	IS 2062 GR. E 250 QUALITY BR/BO

INTERNAL GASKETS SHALL BE SUITABLE FOR DESIGN TEMP. AND OPERATING LIQUID.

* IMPACT TESTED AS PER SA 20S(5) REFER NOTE-21.

△C **SITE ASSEMBLED COLUMN**

SPECIAL SERVICE : △C **ARMOATICS/BENZENE**

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

	INDIAN BOILER REGULATIONS (IBR)
	DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	264300	OPERATING	600600
HYDROTEST(SHOP)	702700	HYDROTEST (FIELD)	887000
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
C	11.11.2025	REVISED AND REISSUED FOR BIDS/ENGG.	AS	CSM/VIVEK	PB
B	12.08.2025	SHEET-5 ADDED & REISSUED FOR BIDS / ENGG.	AS	CSM/VIVEK	PB
A	21.07.2025	ISSUED FOR BIDS / ENGG.	J.SINGH	CSM/VIVEK	PB

DESIGN DATA	डिजाइन डाटा	DRAWING NUMBER / डाईंग नम्बर	REV
HP DEPROPANIZER	एच पी डीप्रोपेनाइज़र	B957-300-80-42-DS-3006	C
ITEM NO. 300-CC-00-2201	आइटम नम्बर 300-सीसी-00-2201	SHEET 1 OF 5	

FORMAT NO.3-8042-0501 REV.0 (28.02.2024) A3-420 X 297

105

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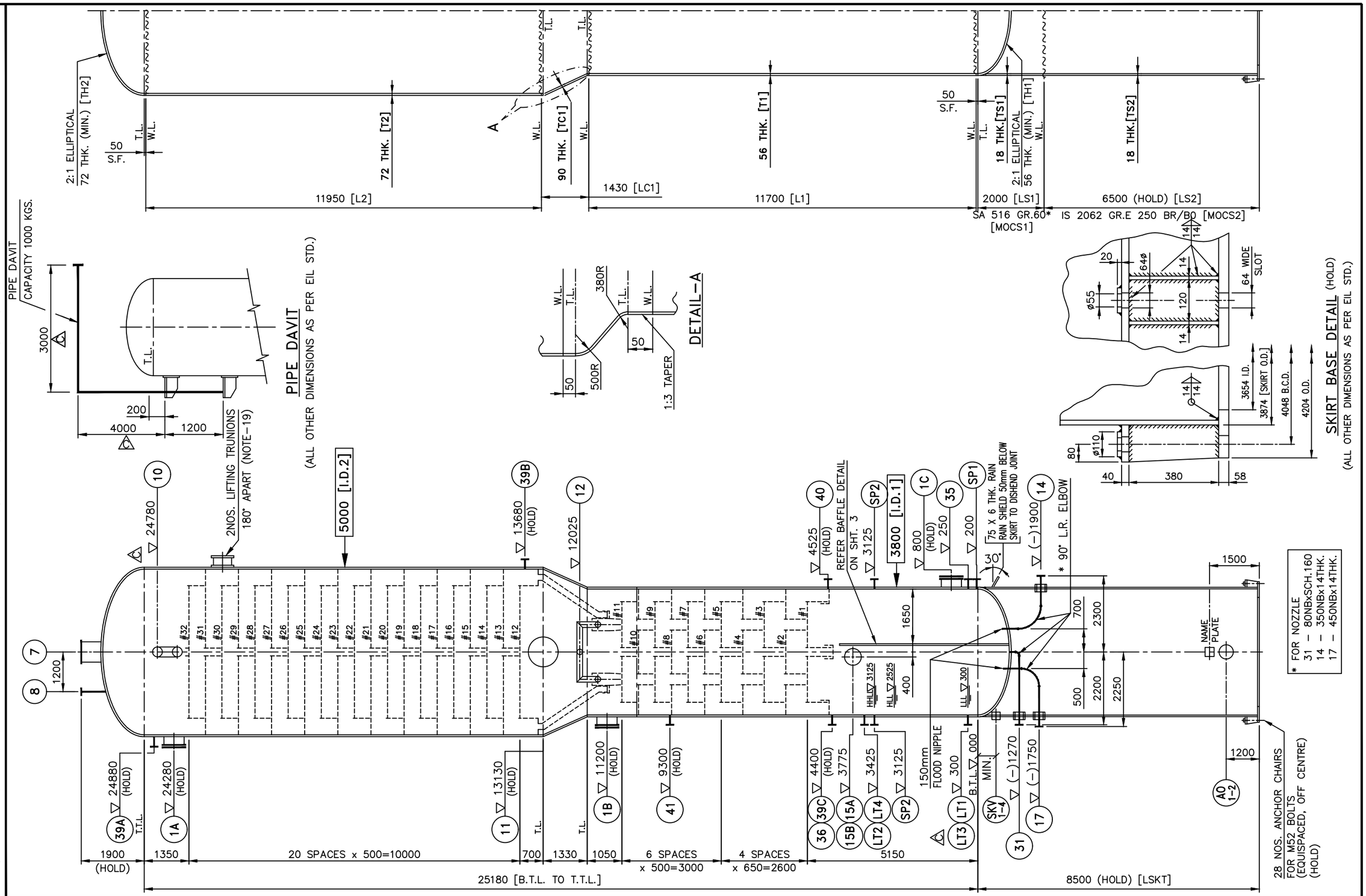

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
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ENGINEERS INDIA LIMITED
NEW DELHI

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

VESSEL DESIGN DATA	वेसल डिजाइन डाटा	DRAWING NO.	REV.
HP DEPROPANIZER	एच पी डीप्रोपेनाइज़र	B957-300-80-42-DS-3006	C
ITEM NO. 300-CC-00-2201	आइटम नम्बर 300-सीसी-00-2201	SHEET 2 OF 5	

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

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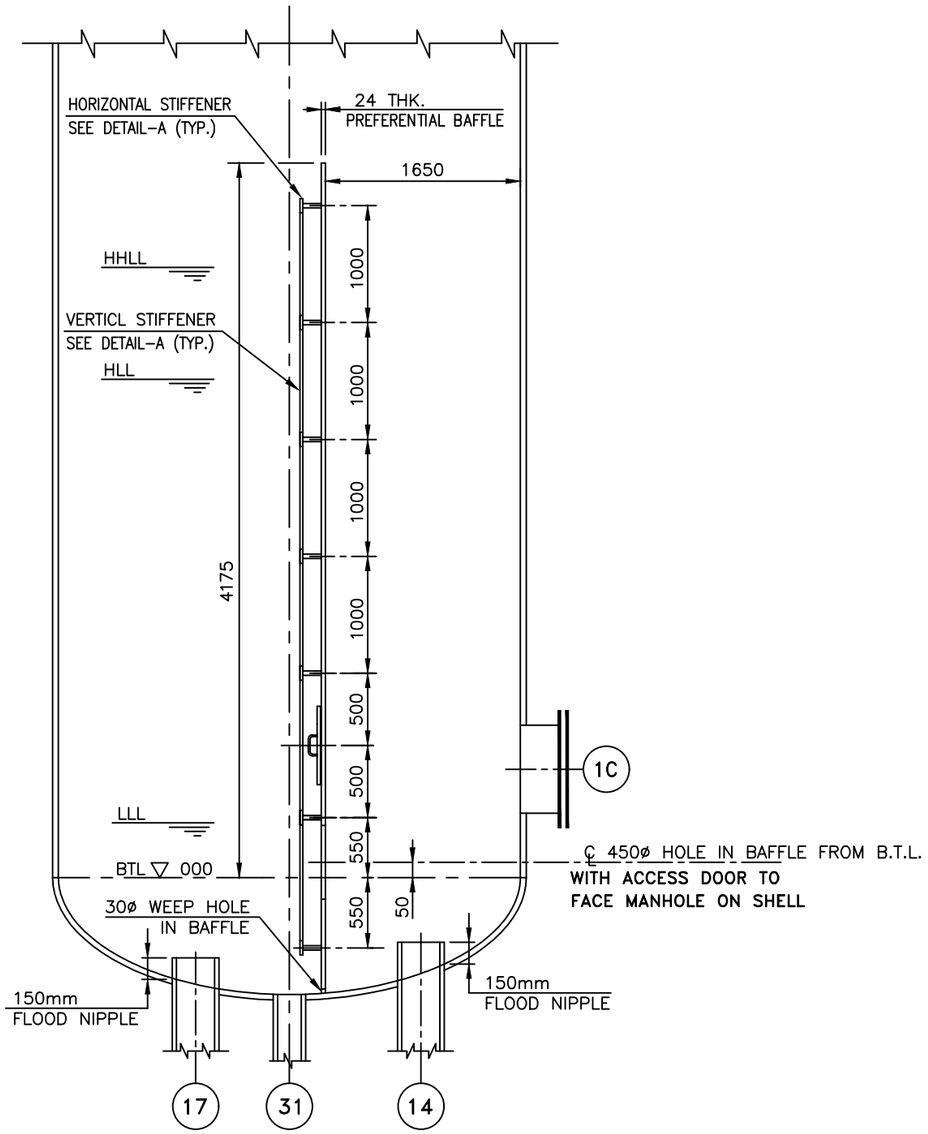
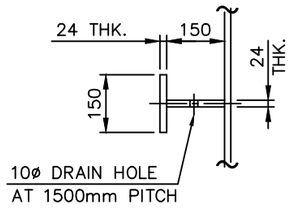
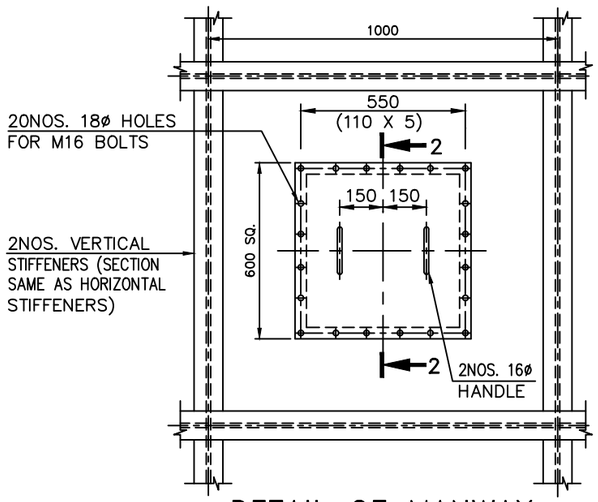


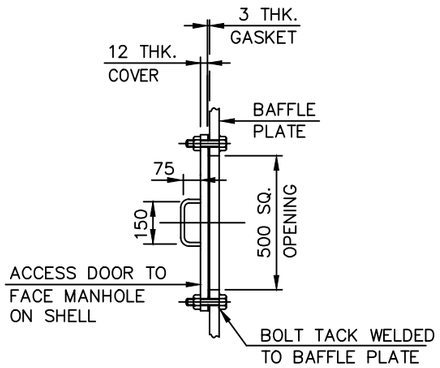
COLUMN BOTTOM DETAIL
(FOR OTHER DETAILS REFER PDS)



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)

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
B	12.08.2025	SHEET-5 ADDED & REISSUED FOR BIDS / ENGG.	AS	CSM/VIVEK	PB	
A	21.07.2025	ISSUED FOR BIDS/ENGG.	J.SINGH	CSM/VIVEK	PB	

VESSEL DESIGN DATA	वेसल डिजाइन डाटा
HP DEPROPANIZER	एच पी डीप्रोपेनाइज़र
ITEM NO. 300-CC-00-2201	आइटम नम्बर 300-सीसी-00-2201

DRAWING NO.	REV.
B957-300-80-42-DS-3006	A
SHEET 3 OF 5	

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

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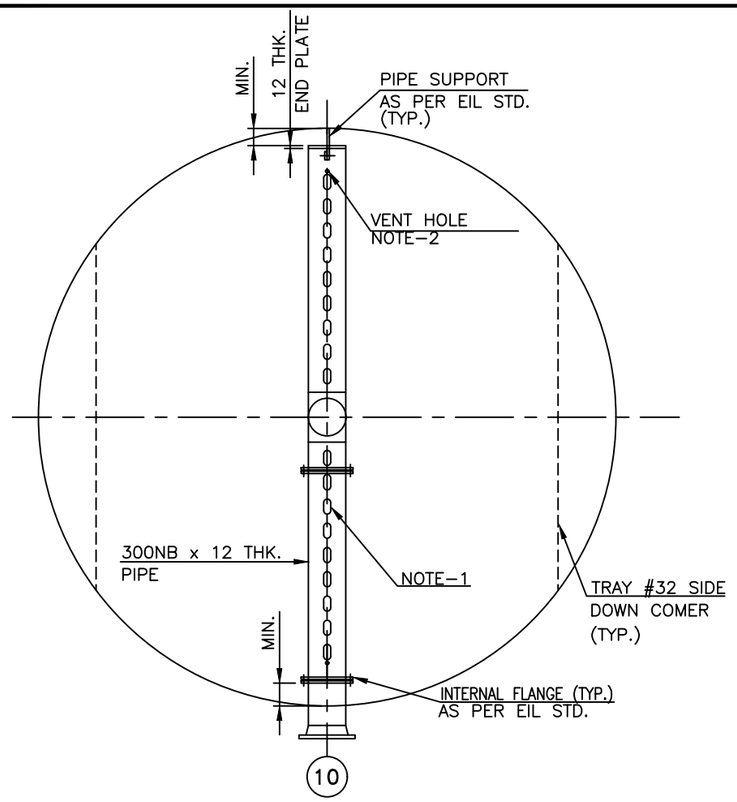
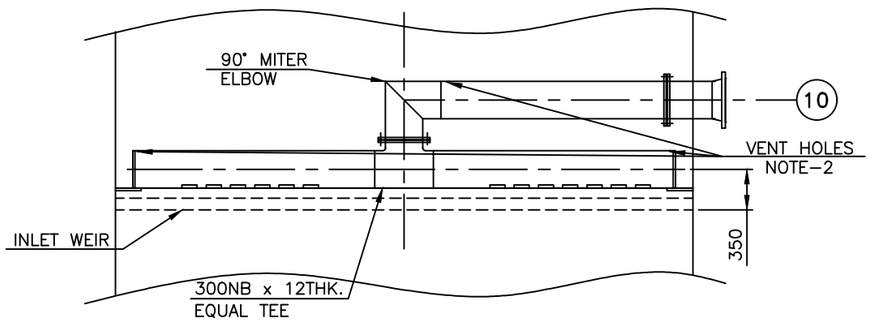
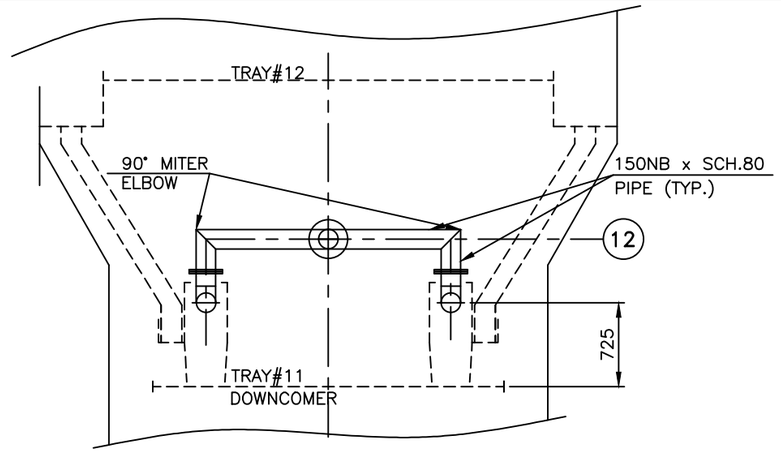
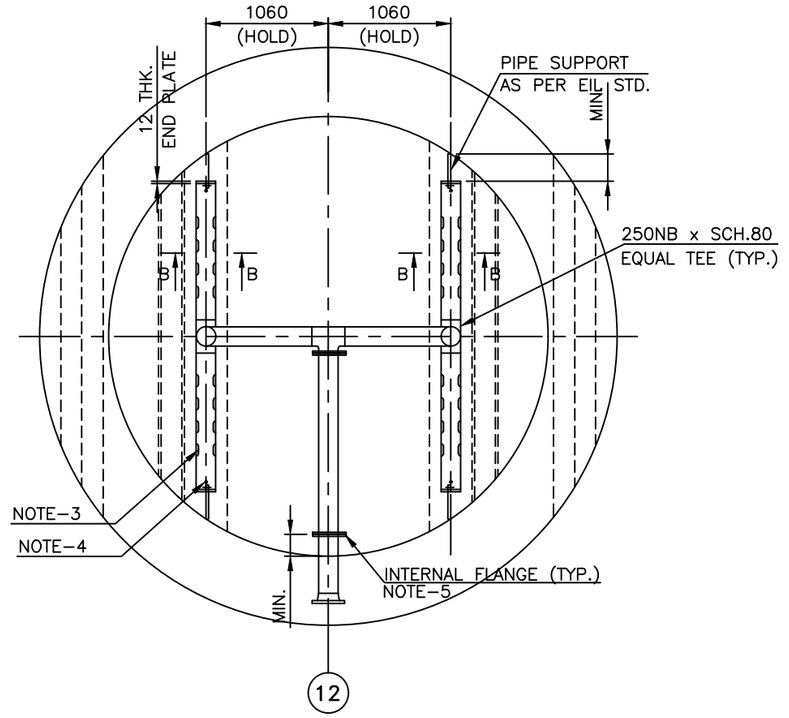


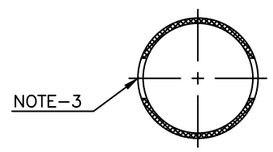


DETAIL OF NOZZLE '10' (HOLD)





DETAIL OF NOZZLE '12'



SECTION B-B

NOTES :-

1. PROVIDE 10 SLOTS EQUALLY SPACED (5 ON EACH LATERAL) ALONG BOTTOM OF PIPE EACH WITH WIDTH= 75mm AND LENGTH = 115mm RESULTING IN TOTAL AREA = 0.086m2. NO SLOTS DIRECTLY BELOW TEE.
2. NOZZLE 10 INTERNAL PIPING TO HAVE THREE 6mm DIAMETER VENT HOLES. ALL VENT HOLES MUST HAVE COVER (OPEN FROM SIDES, BUT COVERED ON TOP).
3. PROVIDE 8 DISTRIBUTOR EXIT SLOTS OF HEIGHT 75 mm AND LENGTH 90 mm ON EACH LATERAL PIPE BRANCH, FOR A TOTAL OF 32 SLOTS. A MINIMUM PIPE WALL WEB OF LENGTH 225mm SHALL BE MAINTAINED BETWEEN SLOTS. THE SLOTTED DISTRIBUTOR PIPE END SHALL NOT BE PERFORATED ADJACENT TO THE CAPPED ENDS. EXIT SLOTS SHALL BE ORIENTED HORIZONTALLY ON BOTH SIDES OF THE LATERALS.
4. DISTRIBUTOR PIPE ENDS TO BE CAPPED, WITH 10mm (3/8 IN) DRAIN HOLES AND 6mm (1/4 IN) VENT HOLES.
5. ALL INTERNAL PIPE FLANGES IN FLASHING FEED SERVICE MUST 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.

ENGINEERS INDIA LIMITED
NEW DELHI

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

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C	11.11.2025	REVISED & REISSUED FOR BIDS/ENGG.	AS	CSM/VIVEK	PB	
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A	21.07.2025	ISSUED FOR BIDS/ENGG.	AS	CSM/VIVEK	PB	

VESSEL DESIGN DATA | वेसल डिजाइन डाटा
HP DEPROPANIZER | एच पी डीप्रोपेनाइज़र
ITEM NO. 300-CC-00-2201 | आइटम नम्बर 300-सीसी-00-2201

DRAWING NO. B957-300-80-42-DS-3006 | REV. C
SHEET 4 OF 5

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

120

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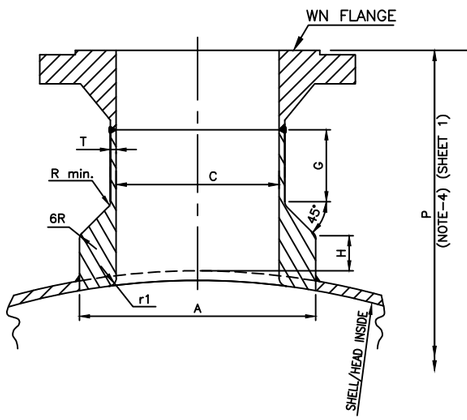

FIG.–1

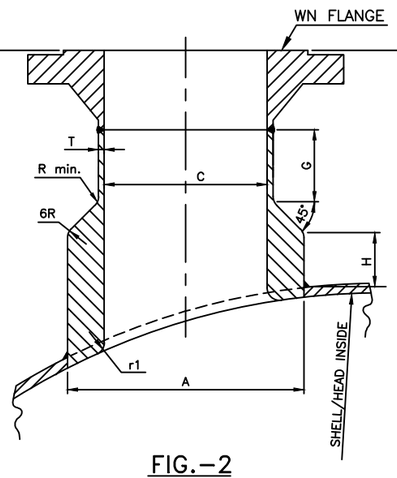

FIG.–2

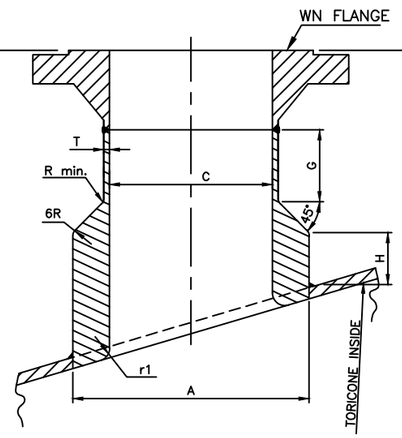

FIG.–3

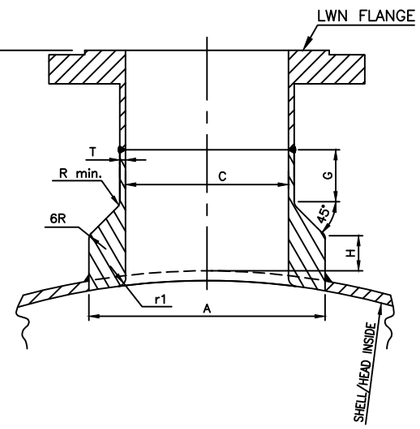

FIG.–4

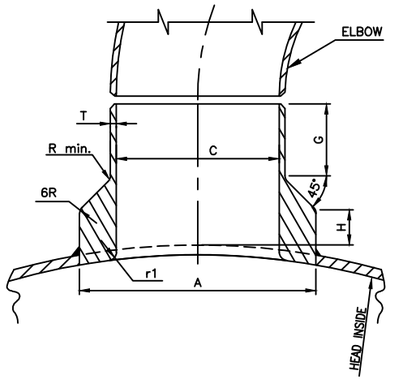

FIG.–5

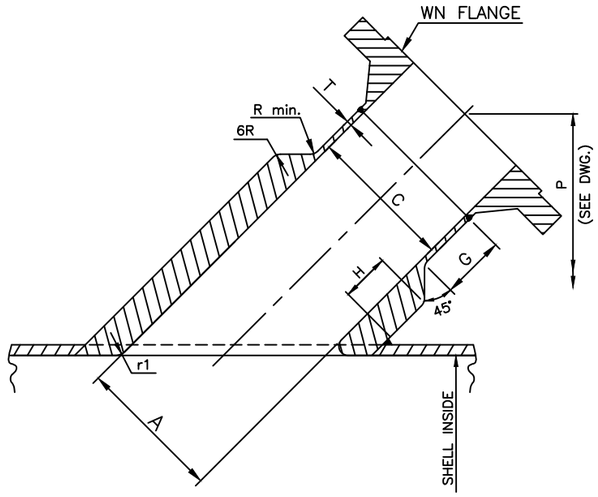

FIG.–6

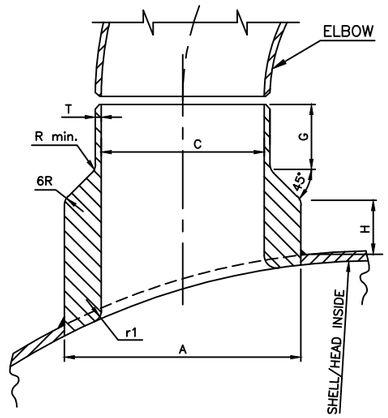

FIG.–7

NOZZLE MARK	SIZE (NB) NOTE–(1,2)	P (MM)	A (MM)	C (MM)	H (MM) (MIN.)	T (MM)	G (MM)(MIN.) NOTE–(3)	FIG.
1A	600	3050	881.6	581.6	110	14 THK.	50	1
1B/C	600	2450	861.6	581.6	100	14 THK.	50	1
7	1000 (H)	SEE DWG.	1388	988	130	14 THK.	50	4
8	80	SEE DWG.	153.66	73.66	50	SCH. 80	50	3
10	300	3000	495.9	295.9	110	14 THK.	50	1
11	900	3050	1306.4	886.4	130	14 THK.	50	1
12	150	2500	326.36	146.36	50	SCH. 80	50	6
14	450	SEE DWG.	629.2	429.2	80	14 THK.	50	7
15A/B	500	2400	720	480	100	14 THK.	50	1
17	350	SEE DWG.	517.6	327.6	80	14 THK.	50	7
31	80	SEE DWG.	153.66	73.66	50	SCH. 80	50	3

DETAIL OF SELF REINFORCED NOZZLE

NOTE:–

1. ALL NOZZLE TO SHELL JOINTS ARE TO BE FULLY RADIOGRAPHED EXCEPT FOR 80 NB NOZZLES.
2. NOZZLE OF SIZE 80 NB ARE SRWN WITHOUT LIP.
3. PROJECTION 'P' SHALL BE MAINTAINED. 'G' VALUE FURNISHED ARE MINIMUM AND SHALL BE SUITABLY INCREASE TO MAINTAIN PROJECTION 'P'.
4. RADIUS 'R min','r1' TO BE FINALISED IN ACCORDANCE WITH DESIGN CODE.

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
C	11.11.2025	REVISED & REISSUED FOR BIDS/ENGG.	AS	CSM/VIVEK	PB	
B	12.08.2025	ISSUED FOR BIDS/ENGG.	AS	CSM/VIVEK	PB	

VESSEL DESIGN DATA
HP DEPROPANIZER
ITEM NO. 300-CC-00-2201

वेसल डिजाइन डाटा
एच पी डीप्रोपेनाइज़र
आइटम नम्बर 300-सीसी-00-2201

DRAWING NO. B957–300–80–42–DS–3006
REV. C
SHEET 5 OF 5

1–1641–0503 REV.0 A3–420x297

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PDS REV.1

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK मार्क	QTY क्वान्टिटी	NOM. DIA नामिनल डांया	SCH./THK. शड्ल व थिकनैस	FLANGES CLASS क्लास	FLANGES TYPE टाईप	FLANGES FACING फेसिग	PROJECTION NOTE-4 प्रोजेशन	PAD W x T B पैड	SERVICE सार्विस
1A	1	600	12 THK.	150	WN	RF	1700	300XT	MANHOLE + B.F + GASKET + BOLTING + DAVIT
1 B~E	4	600	12 THK.	150	WN	RF	2000	300XT	MANHOLE + B.F + GASKET + BOLTING + DAVIT
7	1	450	12 THK.	150	WN	RF	SEE DWG.	225XT	VAPOR OUTLET TO 300-EE-00-4006
8	1	50	160	300	WN	RF	SEE DWG.	50	VENT
10	1	200	80	150	WN	RF	1650	110XT	REFLUX IN FROM 300-PA-CF-2202A/B
11	1	300	12 THK.	150	WN	RF	1950	160XT	FEED FROM 300-EE-00-2202
14	1	500	12 THK.	150	WN	RF	SEE DWG.	250XT	TO REBOILER 300-EE-00-2204 A/B
15 A-B	2	750	20 THK.	150	WN	RF	2050	380XT	FROM REBOILER 300-EE-00-2204 A/B
17	1	300	12 THK.	150	WN	RF	SEE DWG.	160XT	LIQUID BOTTOM OUTLET TO 300-CC-00-4201
31	1	80	80	300	WN	RF	SEE DWG.	45XT	DRAIN
35	1	50	160	300	WN	RF	1900	-	UTITLITY CONNECTION
36	1	50 (H)	160	300	WN	RF	1900	-	PRESSURE INDICATOR
39A	1	50 (H)	160	300	WN	RF	1600	-	PRESSURE DIFFERENTIAL INDICATOR
39 B~C	2	50 (H)	160	300	WN	RF	1900	-	PRESSURE DIFFERENTIAL INDICATOR
40	1	50 (H)	160	300	WN	RF	1900	-	TEMPERATURE INDICATOR
41	1	50 (H)	160	300	WN	RF	1900	-	TEMPERATURE CONTROLLER
LT 1-4	4	50 (H)	160	300	WN	RF	1900	-	LEVEL TXMR (DP)
SP 1-2	2	50 (H)	160	300	WN	RF	1900	-	STAND PIPE
AO 1-2	2	500 I.D.	14 THK.	AS PER STANDARD				250XT	ACCESS OPENING
SKV 1-4	4	100	40	AS PER STANDARD					SKIRT VENT

'T' DENOTES CORRESPONDING SHELL/DISH END/SKIRT NOMINAL THICKNESS.

'H' DENOTES HOLD

LICENSOR'S SPECIFICATION
लाईसन्सर स्पेसीफिकशन्स

FOUNDATION LOADING DATA (OPERATING CONDITION)
फाऊडशन लोडिगं डाटा (ऑपरटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC	642000	28000
-	-	-
WIND	1060000	38500

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3. NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4. FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
5. FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
6. THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
7. FLANGE GASKET FACE SHALL HAVE 125AARH FINISH.
8. 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.
9. ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
10. NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90^0 APART.
11. ALL FABRICATED NOZZLES SHALL BE 100% RADIOGRAPHED.
12. NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.
13. SURFACE PREPARATION, SHOP PRIMER & FINISH PAINT AS PER JOB SPECIFICATION FOR SURFACE PREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.
14. ALL REMOVABLE INTERNALS SHALL BE SIZED SO AS TO PASS THROUGH MANHOLE.
15. EQUIPMENT SHALL BE SUBJECTED TO DRY OUT CONDITIONS OF 7.0 Kg/Cm²(g) AT 80ºc
16. ALL PRESSURE INSTRUMENTS TO BE LOCATED IN THE VAPOR SPACE.
17. VENDOR SHALL PROVIDE 2 NOS. PERMANENT SLOPING STEEL MONKEY LADDERS INSIDE THE SKIRT TO ACCESS THE BOTTOM HEAD FOR INSPECTION.
18. VENDOR TO DESIGN AND PROVIDE TAILING LUG (AT 90° TO LIFTING LUGS) AND BRACING ARRANGEMENT BASED ON 1.25 TIMES THE ACTUAL ERECTION WEIGHT AND 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.
19. EQUIPMENT SHALL BE ERECTED IN SINGLE PIECE IN DRESSED UP CONDITION (BY OTHERS). DRESSED UP IMPLIES THAT THE EQUIPMENT WILL BE ERECTED AFTER INSTALLATION OF INSULATION, PLATFORM/LADDERS ETC. (BY OTHERS). CORRESPONDINGLY EQUIPMENT VENDOR SHALL SELECT LIFTING LUG BASED ON 1.25 TIMES THE ACTUAL ERECTION WEIGHT.
20. UNLESS OTHERWISE SPECIFIED MINIMUM THICKNESS OF WELDED INTERNAL SHALL BE 12mm & BOLTED INTERNAL SHALL BE 9mm. IN CASE OF PIPE AND PIPE FITTINGS SCHEDULE TO BE SELECTED ACCORDINGLY.
21. ALL PLATES AND WELDS INCLUDING HAZ SHALL BE IMPACT TESTED AT (-)45 ºC WITH MIN. ENERGY VALUE AS PER FIG. UG84.1 OF ASME SEC. VIII DIV.1.
22. 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.
23. ABOVE NOZZLE-11, COLD INSULATION OF 65mm.
    BELOW NOZZLE-11, HOT INSULATION OF 25mm.
24. COLUMN SHALL BE FIRST COMPLETELY FABRICATED & HYDROTESTED AT SHOP. THEREAFTER IT SHALL BE CUT INTO MAXIMUM TWO SECTIONS (PROVIDE ADDITIONAL LENGTH TO TAKE CARE OF CUTTING & REJOINING ALLOWANCES) BEFORE TRANSPORTATION FROM SHOP TO SITE (WHERE FINAL C-SEAM SHALL BE CARRIED OUT). SECTION LENGTH OF COLUMN SHALL BE DECIDED BASED ON TRANSPORTATION FEASIBILITY (BY VENDOR). COLUMN SHALL BE ASSEMBLED AT SITE IN HORIZONTAL POSITION COMPLETE IN ALL RESPECTS. DP EXAMINATION SHALL BE CARRIED OUT ON SITE JOINT FOR ROOT RUN & FINAL RUNS (INSIDE & OUTSIDE) BY COLUMN FABRICATOR.100% RADIOGRAPHY SHALL BE CARRIED OUT ON SITE JOINT BY COLUMN FABRICATOR. NDT SHALL BE CARRIED OUT AS PER MDS. ONLY LOCAL BOX TYPE (INSIDE) HYDROTEST SHALL BE CARRIED OUT FOR SITE CIRC. SEAM. COMPLETE HYDROTEST OF THE ENTIRE COLUMN AT SITE IS NOT ENVISAGED.
25. AT TOP, MAXIMUM PRESSURE DROP OF 0.35 KG/SQ.CM & LIQUID LEVEL OF 17180 MM DUE TO LIQUID OVERALL CASE (I.E. TOTAL 9.8 KG/SQ.CM (g)) IS CONSIDERED FOR MECHANICAL DESIGN
26. ALL PRESSURE INSTRUMENTS TO BE LOCATED IN THE VAPOR SPACE.
27. B 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.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC. FOR SURFACE PREPARATION & PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
X	SKIRT BASE DETAILS	7-12-0004
X	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
X	MANHOLE WITH DAVIT	7-12-0010
X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
X	INTERNAL FLANGES	7-12-0018
X	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
X	SUPPORT RING AND BOLTING BAR	7-12-0021
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
X	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
X	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

	NOZZLE ORIENTATIONS	-
	LADDERS/PLATFORM CLEATS	-
	PIPE SUPPORT CLEATS	-
	TRAY SUPPORT AND BOLTING BARS	-
	DEMISTER DATA SHEET	-
	INTERNALS DETAIL (FEED PIPE / DIST.)	-
X	SKETCH FOR MONKEY LADDER	B957-000-80-42-SK-0010
X	PROCESS DATASHEET	300-CC-00-2202

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES AS MARKED
X	NOZZLE ELEVATIONS (AS MARKED)	X	PIPE SUPPORT CLEATS
X	SUPPORT HEIGHT	X	LADDER/PLATFORM CLEATS
X	DETAILS OF INTERNALS	X	TRAY SUPPORT/BOLTING BARS
X	INSULATION THK./TYPE	X	PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE		ASME SECTION VIII DIV.1 EDITION 2023		
WORKING PRESSURE	(kg/cm^2g)	TOP 6.3	BOTT. 6.6	
DESIGN PRESSURE	(kg/cm^2g)	INT. 8.5	EXT. -	
WORKING TEMPERATURE	(°C)	TOP 0	BOTT. 79	
DESIGN TEMPERATURE	(°C)	-45/ 100		
MDMT	(°C)	(-)45		
CORROSION ALLOWANCE	(mm)	1.5		
TYPE OF HEAD		2:1 ELLIPTICAL		
JOINT EFFICIENCY		SHELL 1	HEAD 1	
RADIOGRAPHY		SHELL FULL	HEAD FULL	
POST WELD HEAT TREATMENT		B YES (NOTE-27)		
HEAT TREATMENT		AS PER CODE/SPEC.		
OPERATING MEDIUM		-		
SP. GRAVITY		0.552(TOP) / 0.582 (BOTTOM)		
WIND SPECIFICATION		IS 875 (PART-3)		
SEISMIC		IS 1893 + SITE SPECTRA (PART-4)		
CAPACITY	(M^3)	346		
PAINTING/CLEANING		(NOTE-13)		
INSULATION THICKNESS (mm) (IC)		65/25(NOTE-23) ☐ HOT ☒ COLD		
FIRE PROOFING CLEATS		☒ YES ☐ NO		
HYDROSTATIC TEST	(kg/cm2g)	HORIZONTAL / VERTICAL		(AT TOP)
PRESSURE (NEW & COLD)		11.05		B
INSPECTION BY		☒ EIL ☐ CIB ☐ TPIA		

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL / ~~BOOT~~	SA 516 Gr.70*
REINFORCEMENT PAD / INSERT PAD	SA 516 Gr.70*
HEADS	SA 516 Gr.70*
SHELL FLANGES	-
NOZZLE FLANGES / ~~LWN~~	SA 350 GR. LF2
NOZZLE NECK UPTO 250 NB	SA 333 GR 6
NOZZLE NECK ABOVE 250 NB	SA 516 Gr.70*
PIPE FITTINGS	SA 420 WPL
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS 304 METAL WINDING AND GRAFOIL FILLER MATERIAL WITH CS OUTER & SS 304 INNER RING AS PER ASME B 16.20.
GASKET INTERNAL	COMPRESSED FIBRE ASBESTOS FREE@
EXTERNAL STUDS/BOLTS/NUTS	SA 320 L7 / SA 194 GR7
INTERNAL STUDS/BOLTS/NUTS	SS 304
SKIRT/ ~~SUPPORT~~	SA 516 Gr.70*
SKIRT/ ~~SUPPORT BASE~~	SA 516 Gr.70 /IS 2062 GR. E 250 QUALITY BR/B0
INTERNAL PARTS (WELDED)	SA 516 GR.70*/ SA 106 GR.B
INTERNAL PARTS (BOLTED)	SA 516 GR.70*/ SA 106 GR.B
CLIPS & ATTACHMENTS (EXTERNAL)	SA 516 GR.70
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENTS	SA 516 GR.70*
PIPE DAVIT	SA 106 GR. B
LIFTING TRUNNION	-
TAILING LUG	IS 2062 GR. E 250 QUALITY BR/B0

* MATERIAL SHALL BE IMPACT TESTED AS PER SPEC./CODE REQUIREMENT.

@ INTERNAL GASKET SHALL BE SUITABLE FOR DESIGN TEMP, AND OPERATIING LIQUID.

SITE ASSEMBLED COLUMN

SPECIAL SERVICE : B **AROMATIC/ BENZENE SERVICE**

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

	INDIAN BOILER REGULATIONS (IBR)
	DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	97000	OPERATING	379000
HYDROTEST(SHOP)	443000	HYDROTEST (FIELD)	631000
NUMBER OF ITEMS :	ONE		

B	30.10.2025	REVISED & REISSUED FOR BIDS/ENGG.	ROHIT	SA/VIVEK	PB		
A	08.07.2025	ISSUED FOR BIDS/ENGG.	ROHIT	SA/VIVEK	PB		
REV	DATE	REVISION	BY	CHECKED	APPROVED		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

DESIGN DATA	डिजाइन डाटा	DRAWING NUMBER डाईग नम्बर	REV
LP DEPROPANIZER	एलपी डिप्रोपेनाइज़र	B957-300-80-42-DS-3007	B
ITEM NO. 300-CC-00-2202	आइटम नम्बर 300-सीसी-00-2202	SHEET 1 OF 3	

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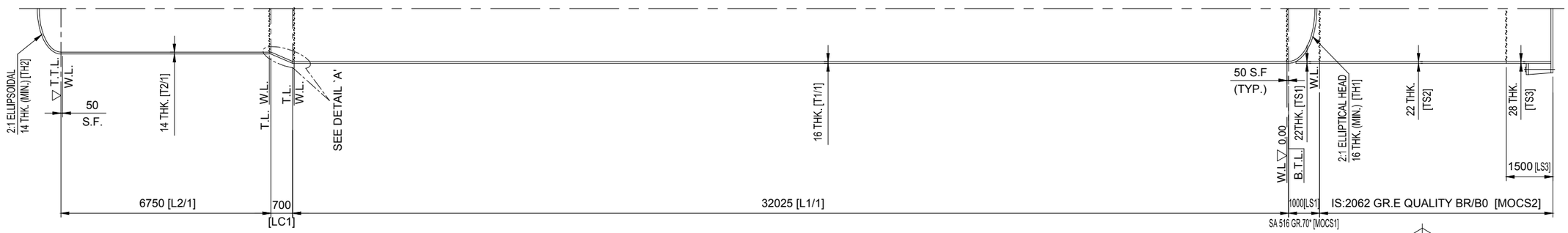
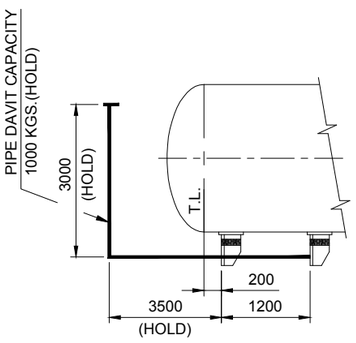
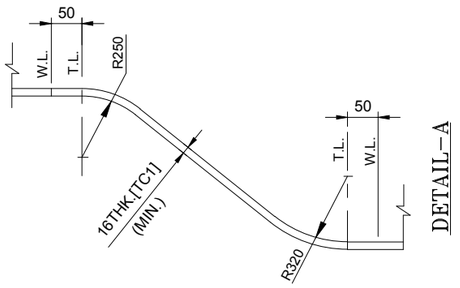


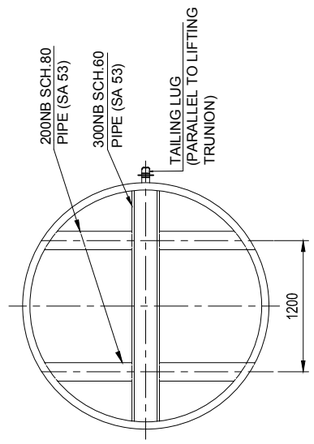


PIPE DAVIT (HOLD)

(ALL OTHER DIMENSIONS AS PER EIL STD.)

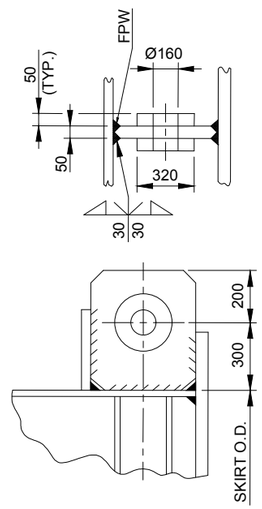


DETAIL – A



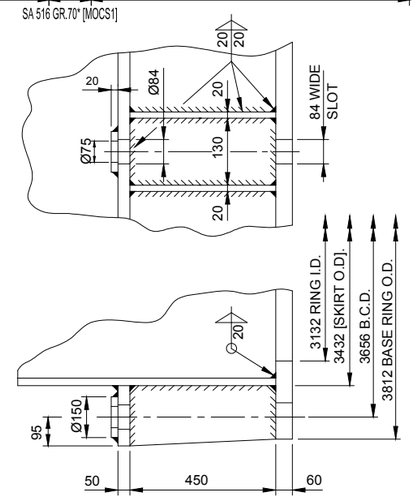
STIFFENING DETAIL OF SKIRT

(\$\$) TO BE FINALISED BY VENDOR CONSIDERING BOTH TAILING-LUG WILL BE FINALIZED WHILE ERECTION OF EQUIPMENTS)



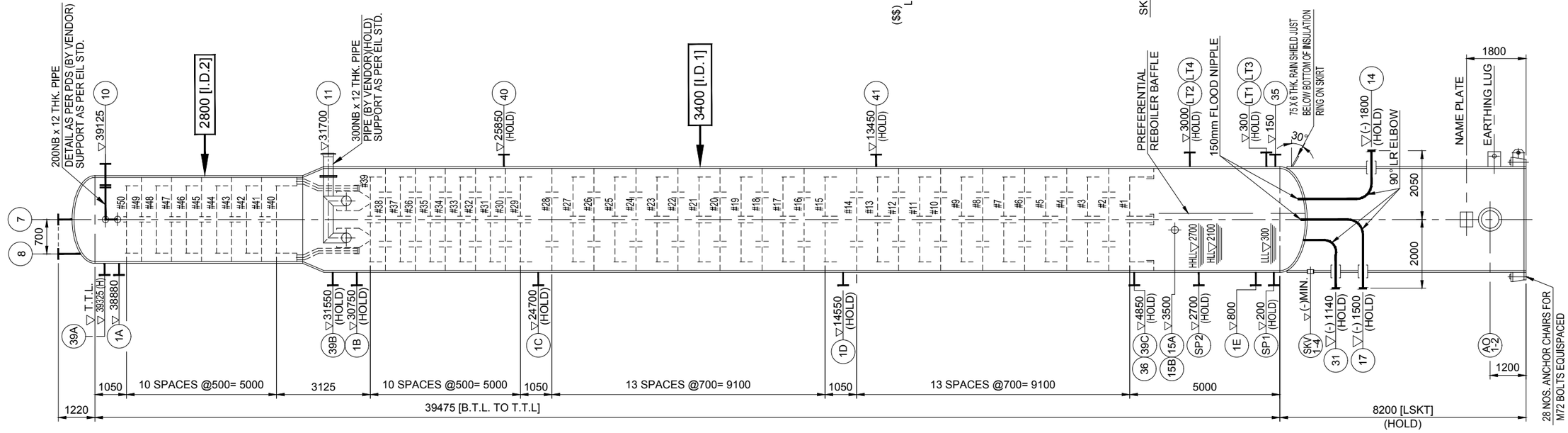
TAILING LUG DETAIL

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



SKIRT BASE DETAIL

(ALL OTHER DIMENSIONS AS PER EIL STD.)



B	30.10.2025	REVISED & REISSUED FOR BIDS/ENGG.	ROHIT	SA/VIVEK	PB	
A	08.07.2025	ISSUED FOR BIDS/ENGG.	ROHIT	SA/VIVEK	PB	
REV.	DATE	DESCRIPTION	BY	CHK	APPROVED	APPROVED

ENGINEERS INDIA LIMITED
NEW DELHI

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

VESSEL DESIGN DATA	वेसल डिजाइन डाटा	DRAWING NO. B957-300-80-42-DS-3007
LP DEPROPANIZER	एलपी डिप्रोपेनाइज़र	REV. B
ITEM NO. 300-CC-00-2202	आइटम नम्बर 300-सीसी-00-2202	SHEET 2 OF 3

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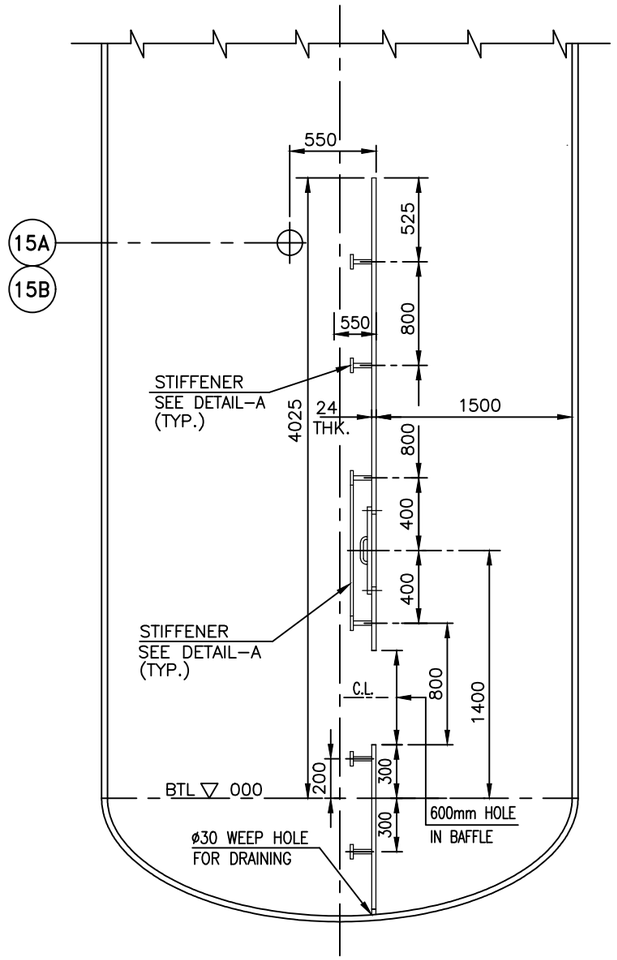
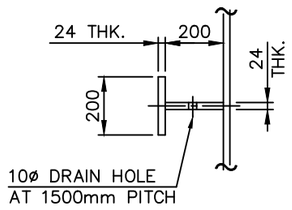
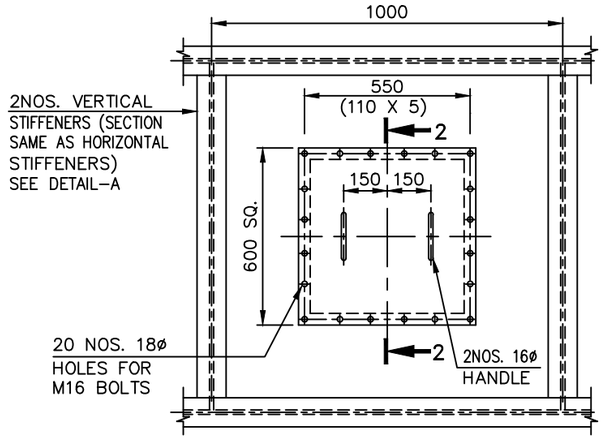


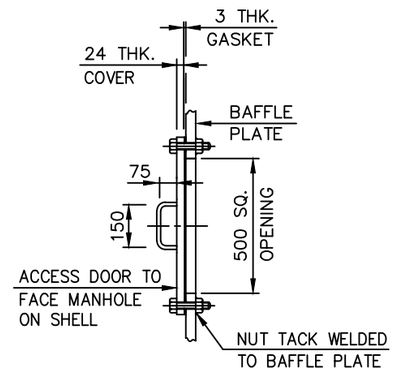
COLUMN BOTTOM DETAIL
(FOR OTHER DETAILS REFER PDS)



DETAIL–'A'



DETAIL OF MANWAY ON BAFFLE



SECTION 2–2

B	30.10.2025	REVISED & REISSUED FOR BIDS/ENGG.	ROHIT	SA/VIVEK	PB		
A	08.07.2025	ISSUED FOR BIDS/ENGG.	ROHIT	SA/VIVEK	PB		
REV.	DATE	DESCRIPTION	BY	CHK	APPROVED	APPROVED	

ENGINEERS INDIA LIMITED
NEW DELHI

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

VESSEL DESIGN DATA
LP DEPROPANIZER
ITEM NO. 300-CC-00-2202

वेसल डिजाइन डाटा
एलपी डिप्रोपेनाइज़र
आइटम नम्बर 300-सीसी-00-2202

DRAWING NO. B957-300-80-42-DS-3007
REV. B
SHEET 3 OF 3

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NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK / मार्क	QTY / क्वान्टिटी	NOM. DIA नामिनल डांया	SCH./THK. शड्ल व थिकनैस	FLANGES CLASS क्लास	FLANGES TYPE टाईप	FLANGES FACING फेसिग	PROJECTION NOTE-4 प्रोजेक्शन	PAD W x T पैड	SERVICE सर्विस
1 A~C	3	600	14 THK.	300	WN	RF	2720	300xT	MANHOLE + BF + HINGE
1 D~G	4	600	14 THK.	300	WN	RF	2600	300xT	MANHOLE + BF + HINGE
7	1	600	14 THK.	300	WN	RF	SEE DWG	300xT	VAPOR OUTLET TO 300-EE-00-4002 A/B
8	1	80	160	300	WN	RF	SEE DWG	45xT	VENT
10	1	300	14 THK.	300	WN	RF	2620	160xT	REFLUX IN FROM 300-PA-CF-4001A/B (NOTE-30)
11	1	100	120	300	WN	RF	2620	60xT	FEED FROM 300-PA-CF-5703A/B (NOTE-30)
12	1	250	80	300	WN	RF	2620	135xT	FEED FROM 300-LZ-00-3001-EP-00-18
13 A-B	2	350	14 THK.	300	WN	RF	2550	175xT	FEED FROM 00-LZ-00-3001-EP-00-18
14	1	750 (H)	14 THK.	300	WN	RF	SEE DWG	380xT	TO REBOILER 300-EE-4001A/B
15 A-B	2	600 (H)	14 THK.	300	WN	RF	2600	300xT	FROM REBOILER 300-EE-00-4001A/B
17	1	350	14 THK.	300	WN	RF	SEE DWG	175xT	LIQUID BOTTOM OUTLET TO 300-PA-CF-4002A/B
20	1	200 (H)	80	300	WN	RF	2500	110xT	MIN. FLOW RETURN FROM 300-PA-CF-4002A/B
22	1	80 (H)	160	300	WN	RF	2500	45xT	PUMP VENT RETURN FROM 300-PA-CF-4002A/B
24	1	50	160	600	WN	RF	2500	-	VENT
31	1	80	160	300	WN	RF	SEE DWG	45xT	DRAIN
35	1	50	160	600	WN	RF	2500	-	UTILITY CONNECTION
36	1	50 (H)	160	300	WN	RF	2500	-	PRESSURE GAUGE
39 A~C	3	50 (H)	160	300	WN	RF	2620	-	PRESSURE DIFFERENTIAL INDICATOR
39 D~E	2	50 (H)	160	300	WN	RF	2500	-	PRESSURE DIFFERENTIAL INDICATOR
40 A~B	2	50 (H)	160	300	WN	RF	2620	-	TEMPERATURE INDICATOR
40C	1	50 (H)	160	300	WN	RF	2500	-	TEMPERATURE INDICATOR
41	1	50 (H)	160	300	WN	RF	2500	-	TEMPERATURE INDICATOR
45 A-B	2	50 (H)	160	300	WN	RF	2500	-	LEVEL GAUGE ON STAND PIPE WITH HHL ALARM
46 A-B	2	50 (H)	160	300	WN	RF	2500	-	LEVEL INDICATOR
47 A-B	2	50 (H)	160	300	WN	RF	2500	-	LEVEL CONTROLLER
SKV 1-4	4	100	AS PER STANDARD						SKIRT VENT
AO 1-2	2	500 I.D.	AS PER STANDARD						ACCESS OPENING

T' DENOTES CORRESPONDING SHELL/CONE/DISH END/SKIRT NOMINAL THICKNESS & (H) DENOTES HOLD

LICENSOR'S SPECIFICATION
लाईसन्सर स्पेसिफिकेशन्स

FOUNDATION LOADING DATA (OPERATING CONDITION)(HOLD)
फॉऊडेशन लोडिगं डाटा (आपरटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC (DB)	1529000	55500
WIND	1360000	46500

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3. NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A). FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B). FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5. THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6. FLANGE GASKET FACE SHALL HAVE 125-250 AARH FINISH.
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.
8. ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9. NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90^0 APART.
10. ALL FABRICATED NOZZLES SHALL BE FULLY RADIOGRAPHED.
11. IN CASE INTERNAL GASKET ARE REQUIRED SAME SHALL BE FULL FACED. VENDOR TO ENSURE THAT MOC FOR INTERNAL GASKET SHALL BE SUITABLE FOR DESIGN TEMPERATURE & OPERATING FLUID.
12. NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.
13. EQUIPMENT IS SUBJECTED TO DRY OUT @ 7kg/cm^2(g) AND 180°C.
14. SURFACE PREPARATION, APPLICATION OF PRIMER & FINISH PAINT SHALL BE CARRIED OUT AS PER PAINTING SPEC.
15. ALL REMOVABLE INTERNALS SHALL BE SIZED SO AS TO PASS THROUGH MANHOLE.
16. FULL RADIOGRAPHY WHEREVER SPECIFIED SHALL IMPLY 100% RADIOGRAPHY OF ALL BUTT WELDS.
17. VENDOR TO DESIGN AND PROVIDE TAILING LUG (AT 90° TO LIFTING LUGS) AND BRACING ARRANGEMENT BASED ON 1.25 TIMES THE ACTUAL ERECTION WEIGHT AND 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.
18. VENDOR SHALL PROVIDE 2 NOS. PERMANENT SLOPING STEEL MONKEY LADDERS INSIDE THE SKIRT TO ACCESS THE BOTTOM HEAD FOR INSPECTION.
19. EQUIPMENT MAY BE ERECTED IN SINGLE PIECE IN DRESSED UP CONDITION (BY OTHERS). DRESSED UP IMPLIES THAT THE EQUIPMENT WILL BE ERECTED AFTER INSTALLATION OF INSULATION, PLATFORM/LADDERS ETC. (BY OTHERS). CORRESPONDINGLY EQUIPMENT VENDOR SHALL SELECT LIFTING LUG BASED ON 1.25 TIMES THE ACTUAL ERECTION WEIGHT
20. COMPLETE EQUIPMENT INCLUDING SUPPORT SHALL BE POST WELD HEAT TREATED. HARDNESS OF BASE METAL, WELD & HAZ SHALL NOT EXCEED 200BHN.
21. ALL BUTT WELD (CIRCUMFERENTIAL AND LONGITUDINAL SEAMS) IN PRESSURE PART INCLUDING NOZZLE NECK TO FLANGE, PIPE TO PIPE, PIPE TO PIPE FITTING SHALL BE FULLY RADIOGRAPHED.
22. AT TOP MAXIMUM PRESSURE DROP OF 0.49 kg/cm2(g) & LIQUID LEVEL OF 17720mm DUE TO LIQUID OVERFILL CASE (i.e. TOTAL OF 24.8 kg/cm2(g) IS CONSIDERED FOR MECHANICAL DESIGN.
23. UNLESS OTHERWISE SPECIFIED MINIMUM THICKNESS OF INTERNAL SHALL BE 12mm. IN CASE OF PIPE AND PIPE FITTINGS SCHEDULE TO BE SELECTED ACCORDINGLY.
24. DENSITY OF LIQUID AT OPERATING TEMPERATURE IS : TOP: 433 Kg/M3 BOTTOM: 457 Kg/M3
25. ALL PRESSURE INSTRUMENT CONNECTIONS TO BE LOCATED IN THE VAPOR SPACE.
26. ALL TEMPERATURE INSTRUMENTS TO BE LOCATED WITHIN THE CLEAR LIQUID PORTION APPROXIMATELY 50 MM ABOVE THE BOTTOM OF TRAY DECK.
27. TEMPERATURE INSTRUMENT NOZZLE #40A, #40B, #40C AND #41 ARE TO BE LOCATED IN THE DOWNCOMER OF TRAYS #62, #48, #18, AND #30, RESPECTIVELY.
28. COLUMN SHALL BE FIRST COMPLETELY FABRICATED & HYDROTESTED AT SHOP. THEREAFTER IT SHALL BE CUT INTO MAXIMUM TWO SECTIONS (PROVIDE ADDITIONAL LENGTH TO TAKE CARE OF CUTTING & REJOINING ALLOWANCES) BEFORE TRANSPORTATION FROM SHOP TO SITE (WHERE FINAL C-SEAM SHALL BE CARRIED OUT). SECTION LENGTH OF COLUMN SHALL BE DECIDED BASED ON TRANSPORTATION FEASIBILITY (BY VENDOR). COLUMN SHALL BE ASSEMBLED AT SITE IN HORIZONTAL POSITION COMPLETE IN ALL RESPECTS. DP EXAMINATION SHALL BE CARRIED OUT ON SITE JOINT FOR ROOT RUN & FINAL RUNS (INSIDE & OUTSIDE) BY COLUMN FABRICATOR.100% RADIOGRAPHY SHALL BE CARRIED OUT ON SITE JOINT BY COLUMN FABRICATOR. NDT SHALL BE CARRIED OUT AS PER MDS. ONLY LOCAL BOX TYPE (INSIDE) HYDROTEST SHALL BE CARRIED OUT FOR SITE CIRC. SEAM. COMPLETE HYDROTEST OF THE ENTIRE COLUMN AT SITE IS NOT ENVISAGED.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
X	SKIRT BASE DETAILS	7-12-0004
X	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
X	MANHOLE WITH HINGED COVER	7-12-0009
	MANHOLE WITH DAVIT	7-12-0010
X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
X	INTERNAL FLANGES	7-12-0018
X	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
X	SUPPORT RING AND BOLTING BAR	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
X	PIPE DAVIT	7-12-0023
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
X	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
X	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

	NOZZLE ORIENTATIONS	
	LADDERS/PLATFORM CLEATS	
	PIPE SUPPORT CLEATS	
	TRAY SUPPORT AND BOLTING BARS	
	DEMISTER DATA SHEET	NOT APPLICABLE
X	SKETCH FOR MONKEY LADDER	B957-000-80-42-SK-0010
X	PROCESS DATASHEET	300-CC-00-4001

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES
X	NOZZLE ELEVATIONS	X	PIPE SUPPORT CLEATS
X	SUPPORT HEIGHT	X	LADDER/PLATFORM CLEATS
X	DETAILS OF INTERNALS	X	TRAY SUPPORT/BOLTING BARS
		X	PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	ASME SECTION VIII DIV-1 EDITION 2023
WORKING PRESSURE (kg/cm^{2}g)	TOP 19.90 BOTTOM 20.39
DESIGN PRESSURE (kg/cm^{2}g)	INT. 23.5 EXT. --
WORKING TEMPERATURE (°C)	TOP -22 BOTTOM:53
DESIGN TEMPERATURE (°C)	(-)45/70
MDMT (°C)	(-)45
CORROSION ALLOWANCE (mm)	1.5
TYPE OF HEAD	2:1 ELLIPTICAL
JOINT EFFICIENCY	SHELL 1 HEAD 1
RADIOGRAPHY	SHELL FULL HEAD FULL
POST WELD HEAT TREATMENT	YES (NOTE-20)
HEAT TREATMENT	AS PER CODE / SPEC.
OPERATING MEDIUM	-
SP. GRAVITY	NOTE-25
WIND SPECIFICATION	IS-875 (PART-3)
SEISMIC	SITE SPECTRA + IS-1893 (PART-4)
CAPACITY (M^3)	649
PAINTING/CLEANING	AS PER JOB SPECIFICATION (REFER NOTE-14)
INSULATION THICKNESS (mm) (IC)	(REF. DWG.) ☐ HOT ☒ COLD
FIRE PROOFING CLEATS	☒ YES ☐ NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	30.55
INSPECTION BY	☒ EIL ☐ CIB ☐ TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL/ INSERT PLATE	SA 516 Gr.60 *
REINFORCEMENT PAD	SA 516 Gr.60 *
HEADS	SA 516 Gr.60 *
~~SHELL FLANGES~~/SR/LWN	-
NOZZLE FLANGES	SA 350 LF2 CL.1
NOZZLE NECK FOR UP TO 250NB	SA 333 Gr.6
NOZZLE NECK FOR ABOVE 250NB	SA 516 Gr.60 *
PIPE FITTINGS	SA 420 WPL 6 (SEAMLESS)
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS304 METAL WINDING & GRAFOIL FILLER WITH CS OUTER RING & SS304 INNER RING AS PER ASME B16.20
GASKET INTERNAL	COMPRESSED FIBRE ASBESTOS FREE #
EXTERNAL STUDS/BOLTS/NUTS	SA 320 GR.L7 / SA 194 GR.7
INTERNAL STUDS/BOLTS/NUTS	SS 304
SKIRT/ ~~SUPPORT~~	SA 516 GR.60 * / IS 2062 GR. E 250 QUALITY BR/B0
SKIRT/ ~~SUPPORT~~ BASE	IS 2062 GR. E 250 QUALITY BR
INTERNAL PARTS (WELDED)	SA 516 GR.60 */ SA 333 Gr.6
INTERNAL PARTS (BOLTED)	SA 516 GR.60 */ SA 333 Gr.6
CLIPS & ATTACHMENTS (EXTERNAL)	SA 516 GR.60*
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENT	SA 516 GR.60 *
PIPE DAVIT	SA 106 GR. B
VACUUM STIFFENER	-
TAILING LUG	IS 2062 GR. E 250 QUALITY BR/B0

INTERNAL GASKETS SHALL BE SUITABLE FOR DESIGN TEMP. AND OPERATING LIQUID

* MATERIAL SHALL BE IMPACT TESTED

SITE ASSEMBLED COLUMN

SPECIAL SERVICE :

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

INDIAN BOILER REGULATIONS (IBR)

DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन) (HOLD)

ERECTION	310000	OPERATING	765500
HYDROTEST(SHOP)	959000	HYDROTEST (FIELD)	1041000
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
A	27.06.2025	ISSUED FOR BIDS / ENGG.	AS	SRIKANTH/VIVEK	PB

DESIGN DATA	डिजाइन डाटा
DEETHANIZER	डिइथनाइजर
ITEM NO. 300-CC-00-4001	आइटम नम्बर 300-सीसी-00-4001

DRAWING NUMBER डाईग नम्बर	REV
B957-300-80-42-DS-3009	A
SHEET 1 OF 3	

FORMAT NO.3-8042-0501 REV.0 (28.02.2024) A3-420 X 297

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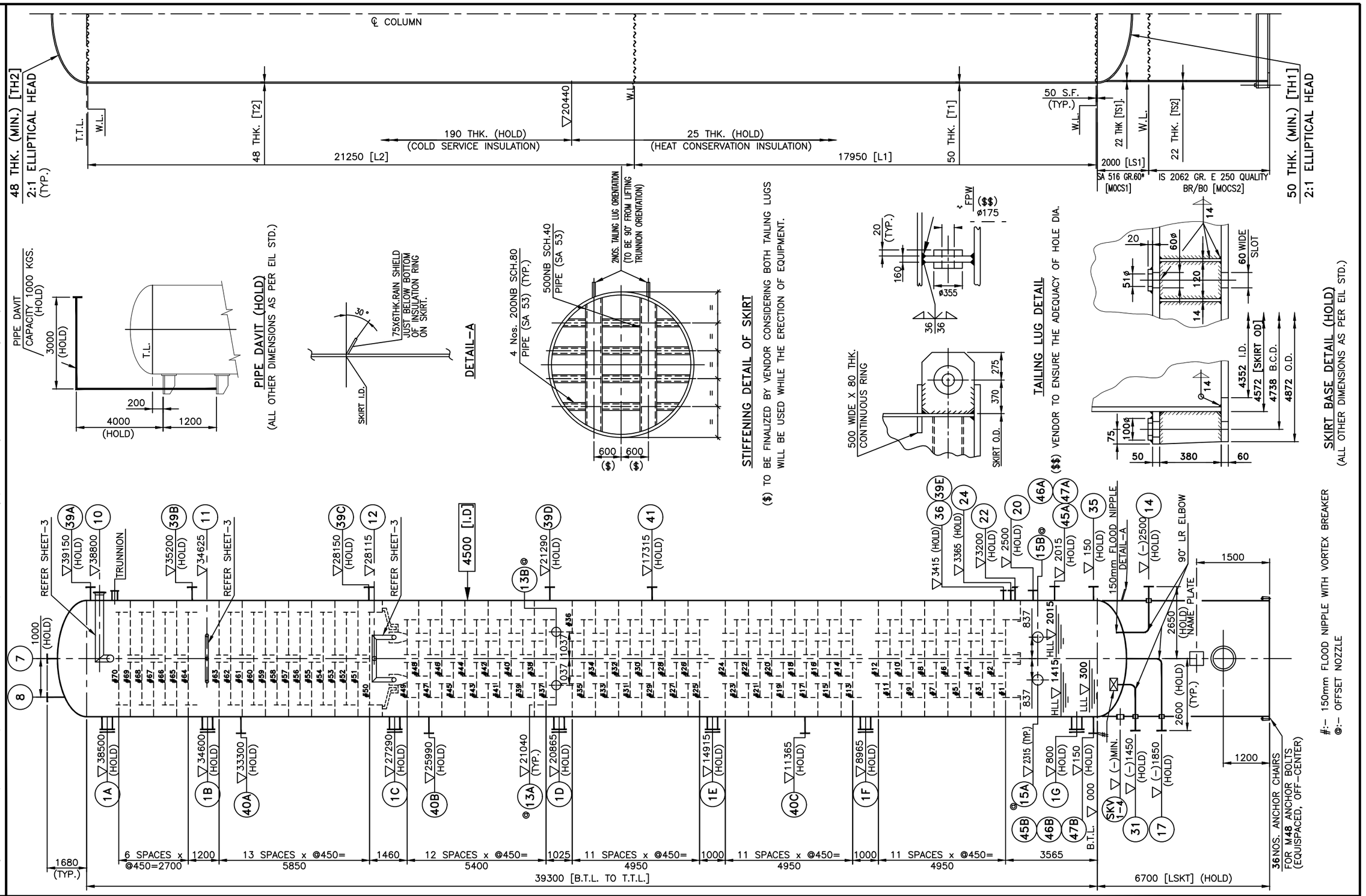

A	27.06.2025	ISSUED FOR BIDS/ENGG.	AS	SRIKANTH/VIVEK	PB		
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED	

ENGINEERS INDIA LIMITED
NEW DELHI

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

VESSEL DESIGN DATA
DEETHANIZER
ITEM NO. 300-CC-00-4001

वेसल डिजाइन डाटा
डिइथनाइजर
आइटम नम्बर 300-सीसी-00-4001

DRAWING NO. B957-300-80-42-DS-3009 | REV. A

SHEET 2 OF 3

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

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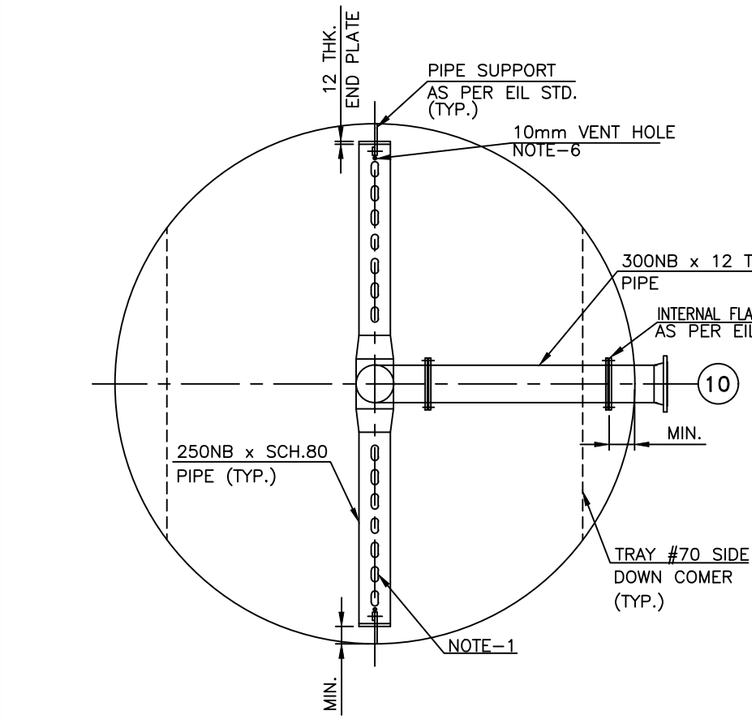
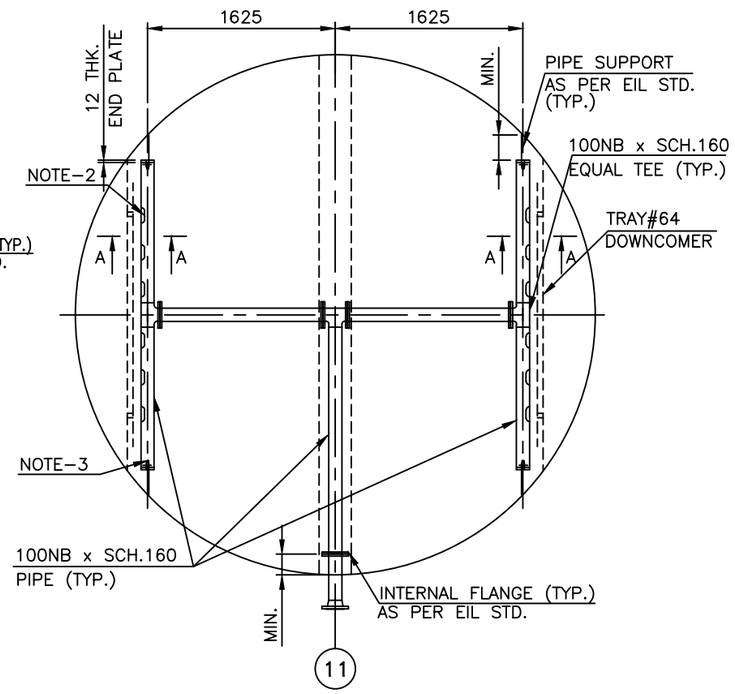
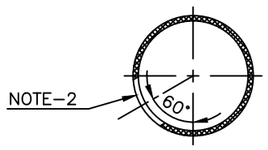
(*) TENTATIVE DETAILS ARE FURNISHED, FINAL DETAILS WILL BE FURNISHED AT POST ORDER PHASE.

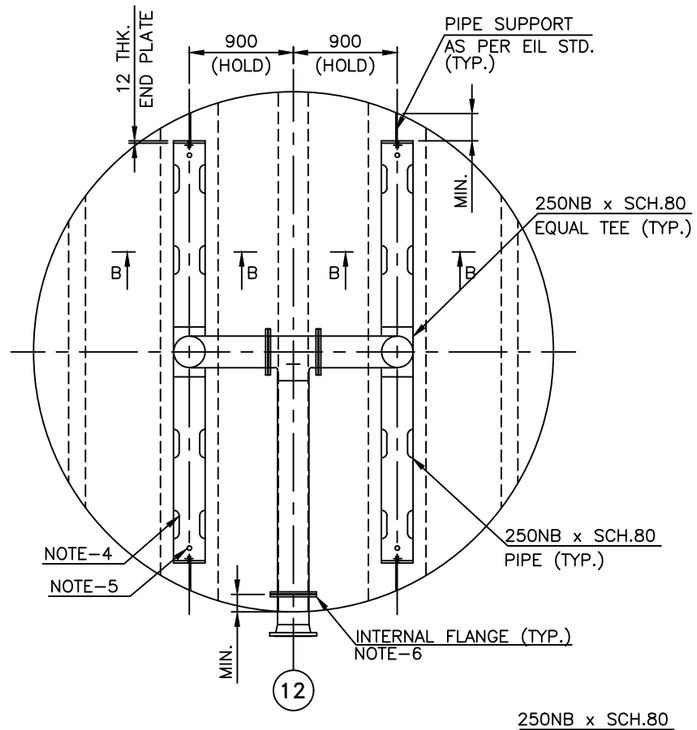


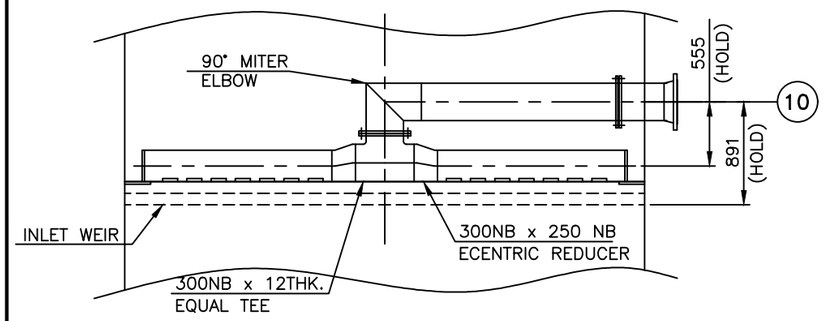


DETAIL OF NOZZLE '11'

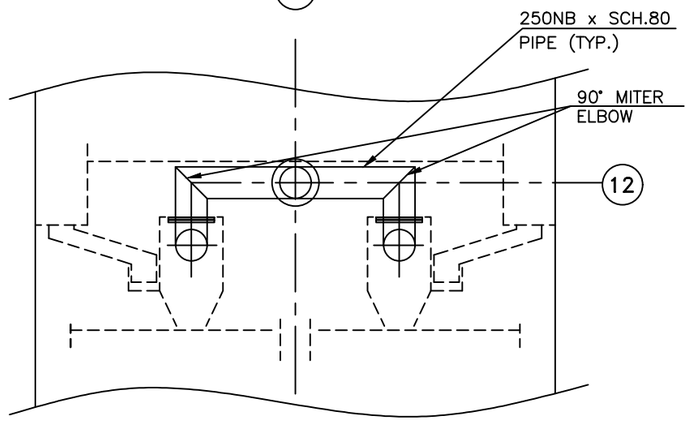


SECTION A-A

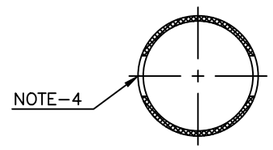




DETAIL OF NOZZLE '10' (HOLD) (*)



DETAIL OF NOZZLE '12'



SECTION B-B

NOTES :-

1. PROVIDE 14 SLOTS EQUALLY SPACED (7 ON EACH LATERAL) ALONG BOTTOM OF PIPE EACH WITH WIDTH= 60mm AND LENGTH = 70mm RESULTING IN TOTAL AREA = 0.059m2. NO SLOTS DIRECTLY BELOW INLET PIPE.
2. DISTRIBUTOR TO HAVE A TOTAL OF 12 HOLES (6 PER LATERAL, 3 PER SIDE). HOLES TO HAVE A DIAMETER OF 25mm.
3. PROVIDE A COVERED VENT HOLE (6mm) AND A BOTTOM DRAIN HOLE (10mm) AT EACH END OF LATERAL.
4. PROVIDE 4 DISTRIBUTOR EXIT SLOTS OF HEIGHT 90 mm AND LENGTH 135 mm ON EACH LATERAL PIPE BRANCH, FOR A TOTAL OF 16 SLOTS. A MINIMUM PIPE WALL WEB OF LENGTH 300 mm SHALL BE MAINTAINED BETWEEN SLOTS. THE SLOTTED DISTRIBUTOR PIPE END SHALL NOT BE PERFORATED ADJACENT TO THE CAPPED ENDS. EXIT SLOTS SHALL BE ORIENTED HORIZONTALLY ON BOTH SIDES OF THE LATERALS.
5. DISTRIBUTOR PIPE ENDS TO BE CAPPED, WITH 10mm (3/8 IN) DRAIN HOLES AND 6mm (1/4 IN) VENT HOLES.
6. ALL INTERNAL PIPE FLANGES IN FLASHING FEED SERVICE MUST 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.

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
A	27.06.2025	ISSUED FOR BIDS/ENGG.	AS	SRIKANTH/VIVEK	PB	

VESSEL DESIGN DATA
DEETHANIZER
ITEM NO. 300-CC-00-4001

वेसल डिजाइन डाटा
डिइथनाइजर
आइटम नम्बर 300-सीसी-00-4001

DRAWING NO. B957-300-80-42-DS-3009 | REV. A
SHEET 3 OF 3

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

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PDS REV.2

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK मार्क	QTY क्वान्टिटी	NOM. DIA नामिनल डांया	SCH./THK. शड्यूल व थिकनैस	FLANGES CLASS क्लास	FLANGES TYPE टाईप	FLANGES FACING फेसिंग	PROJECTION NOTE-4 प्रोजेक्शन	PAD W x T पैड	SERVICE सर्विस
1A	1	800	$	300	SRWN	RF	$	-	MANHOLE + BF + HINGE
1 B-J	9	600	$	300	SRWN	RF	$	-	MANHOLE + BF + HINGE
4	1	50.8 I.D.	-	600	LWN	RF	3490	-	ANALYZER CONTROLLER (CONTINUOUS)
7	1	900	$	300	SRWN	RF	$	-	VAPOR OUTLET TO 300-EE-00-4005A/B
8	1	80	$	300	SRWN	RF	$	-	VENT
10	1	450	$	300	SRWN	RF	$	-	REFLUX IN FROM 300-PA-CF-4003A/B
11 A-B	2	400	$	300	SRWN	RF	$	-	FEED FROM 300-VV-VW-4001
14 A-B	2	600	$	300	SRWN	RF	$	-	TO REBOILER 300-EE-00-4003A/B/C/D
15 A-D	4	500	$	300	SRWN	RF	$	-	FROM REBOILER 300-EE-00-4003A/B/C/D
17	1	350	$	300	SRWN	RF	$	-	LIQUID BOTTOM OUTLET TO 300-LZ-00-3001-EP-00-17
19 A-B	2	250	$	300	SRWN	RF	$	-	LIQUID DRAWOFF TO 300-EE-00-4004
20 A-B	2	250	$	300	SRWN	RF	$	-	VAPOR RETURN FROM 300-EE-00-4004
21 A-B	2	300	$	300	SRWN	RF	$	-	LIQUID DRAWOFF TO 300-EE-00-4006
22 A-B	2	300	$	300	SRWN	RF	$	-	VAPOR RETURN FROM 300-EE-00-4006
31	1	100	$	300	SRWN	RF	$	-	DRAIN
32 A~C	3	50.8 I.D	-	600	LWN	RF	3490	-	SAMPLE CONNECTION
35	1	80	$	300	SRWN	RF	$	-	UTILITY CONNECTION
36	1	50.8 I.D.	-	300	LWN	RF	3490	-	PRESSURE GAUGE
39 A-E	5	50.8 I.D.	-	300	LWN	RF	3490	-	PRESSURE DIFFERENTIAL INDICATOR
40 A-D	4	50.8 I.D.	-	300	LWN	RF	3490	-	TEMPRATURE INDICATOR
45 A-B	2	50.8 I.D.	-	300	LWN	RF	3490	-	STAND PIPE
46 A-B	2	50.8 I.D.	-	300	LWN	RF	3490	-	LEVEL TXMR (DP)
47 A-B	2	50.8 I.D.	-	300	LWN	RF	3490	-	LEVEL TXMR (DP)
50 A-D	4	50.8 I.D.	-	600	LWN	RF	3490	-	METHANOL INJECTION
AO 1-2	2	500 ID	14 THK.	AS PER EIL STD.				200 X T	ACCESS OPENING
SKV 1-4	4	100	Sch 40	AS PER EIL STD.				-	SKIRT VENT

'T' DENOTES CORRESPONDING SHELL/DISH END/SKIRT NOMINAL THICKNESS

'$' REFER SHEET-3 OF 3

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकेशन्स

1 FOUNDATION LOADING DATA (OPERATING CONDITION)
फॉउंडेशन लोडिंग डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC	4600000	125000
WIND	8500000	145000

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2 ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3 NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A) FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B) FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5 THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6 FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
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.
8 ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9 NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90^0 APART.
10 ALL FABRICATED NOZZLES SHALL BE 100% RADIOGRAPHED.
11 NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.
12 SURFACE PREPARATION, PRIMER & FINISH PAINT SHALL BE CARRIED OUT AT YARD BY EQUIPMENT VENDOR AS PER PAINTING SPEC.
13 ALL REMOVABLE INTERNALS SHALL BE SIZED SO AS TO PASS THROUGH NEAREST MANHOLE.
14 VESSEL SHALL BE SUBJECTED TO DRY OUT CONDITIONS OF 7 Kg/Cm²(g) AT 80^oC.
15 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.
16 LIFTING TRUNNION & TAILING LUGS SHALL BE DESIGNED BY VENDOR FOR ALL THE SECTIONS IN DRESSED UP CONDITION (CONSIDERING AN IMPACT FACTOR OF 1.5).CALCULATION TO BE SUBMITTED FOR REVIEW. VENDOR TO PROVIDE INSERT PLATE OF SUITABLE SIZE AND THICKNESS WHEREVER TAILING LUGS & LIFTING TRUNNIONS ARE WELDED TO SHELL. DESIGN CALCULATION SHALL INCLUDE CHECK FOR SKIRT THK., SHELL THK., BASE BLOCK FOR LIFTING/TAILING FORCES. ANY ADDITIONAL REQUIREMENT OF INCREASE THICKNESS OF ANY COMPONENT OR PROVIDING STIFFENERS, INSERT PLATE OVER AND ABOVE WHICH IS INDICATED IN DATASHEET SHALL BE PROVIDED BY VENDOR WITHOUT ANY TIME & COST IMPLICATION. INDUCED STRESSES AT THE JUNCTION OF SHELL & TRUNNION SHALL BE LIMITED TO 0.9 OF YIELD STRESS.TAILING LUG SHALL BE PROVIDED 90° TO THE LIFTING LUG/LIFTING TRUNNION. VENDOR SHALL INDICATE C.G. OF EQUIPMENT IN FABRICATION DRAWING.
17 VENDOR SHALL PROVIDE 2 NOS. PERMANENT SLOPING STEEL MONKEY LADDERS INSIDE THE SKIRT TO ACCESS THE BOTTOM HEAD FOR INSPECTION.
18 NOZZLES 19 A/B & 21A/B SHALL BE FLUSHED WITH BOTTOM OF DRAW OFF SUMP.
19 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.
20 DENSITY OF LIQUID AT OPERATING TEMPERATURE IS :
TOP: 448 Kg/M3 & BOTTOM: 424 Kg/M3
21 ALL PLATES AND WELDS INCLUDING HAZ SHALL BE IMPACT TESTED AT (-) 45^oC WITH MIN. ENERGY VALUE AS PER FIG. UG 84.1 OF ASME SEC. VIII DIV.1.
22 AT TOP, MAXIMUM PRESSURE DROP OF 1.04 KG/SQ.CM & LIQUID LEVEL OF 22640 MM DUE TO LIQUID OVERALL CASE (I.E. TOTAL 21.5 KG/SQ.CM (g)) IS CONSIDERED FOR MECHANICAL DESIGN.
23 **AT YARD:** EQUIPMENT SHALL BE FIRST COMPLETELY FABRICATED, HYDROTESTED IN SINGLE PIECE AND PAINTED. THEREAFTER IT SHALL BE CUT IN MAXIMUM FOUR (4) SECTION. FABRICATOR SHALL PROVIDE ADDITIONAL LENGTH TO TAKE CARE OF CUTTING AND REJOINING ALLOWANCE.
AT SITE: EQUIPMENT SHALL BE ERECTED IN SECTIONS AND CIRCUMFERENTIAL SEAMS SHALL BE COMPLETED IN IN-SITU POSITION. LOCAL PWHT & NDT SHALL BE CARRIED OUT AS PER DRAWING. LOCAL BOX TYPE HYDROTESTING FROM INSIDE SHALL BE CARRIED OUT FOR IN-SITU CIRCUMFERENTIAL SEAMS. COMPLETE HYDROTEST OF ENTIRE COLUMN IS NOT ENVISAGED AFTER ERECTION AT SITE.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
X	SKIRT BASE DETAILS	7-12-0004
X	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
X	MANHOLE WITH HINGED COVER	7-12-0009
	MANHOLE WITH DAVIT	7-12-0010
X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
X	INTERNAL FLANGES	7-12-0018
	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
X	SUPPORT RING AND BOLTING BAR (FOR GUIDANCE)	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
X	PIPE DAVIT	7-12-0023
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
X	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
X	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038
		-

REFERENCE DRAWINGS(रेफरेन्स डाईग)

X	NOZZLE ORIENTATIONS	B957-300-16-43-NZ-43010
	LADDERS/PLATFORM CLEATS	
	PIPE SUPPORT CLEATS	
	TRAY SUPPORT AND BOLTING BARS	
	DEMISTER DATA SHEET	NOT APPLICABLE
X	SKETCH FOR MONKEY LADDER	B957-000-80-42-SK-0010
X	PDS FOR 300-CC-00-4002	300-CC-00-4002

1 HOLD UPS (होल्ड अप्स)

	NOZZLE ORIENTATIONS		SIZE OF NOZZLES
X	NOZZLE ELEVATIONS	X	PIPE SUPPORT CLEATS
	SUPPORT HEIGHT	X	LADDER/PLATFORM CLEATS
X	DETAILS OF INTERNALS	X	TRAY SUPPORT/BOLTING BARS
	NOZZLE RATING	X	PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	ASME SECTION VIII DIV-1 ED.2023
WORKING PRESSURE (kg/cm²g)	TOP 16.51 BOTTOM 17.55
DESIGN PRESSURE (NOTE- 22)(kg/cm²g)	INT. 19.5 EXT. NIL
WORKING TEMPERATURE (°C)	TOP (-)34.0 BOTTOM (-)11.0
DESIGN TEMPERATURE (°C)	(-)45/65
MDMT (°C)	(-)45
CORROSION ALLOWANCE (mm)	1.5
TYPE OF HEAD	2:1 ELLIPTICAL
JOINT EFFICIENCY	SHELL 1 HEAD 1
RADIOGRAPHY	SHELL FULL HEAD FULL
POST WELD HEAT TREATMENT	YES (NOTE-15)
HEAT TREATMENT	HEAD: AS PER CODE / SPEC.
OPERATING MEDIUM	HYDROCARBON
SP. GRAVITY	NOTE-20
WIND SPECIFICATION	IS-875 (PART-3)
SEISMIC	SITE SPECTRA + IS-1893 (PART-4)
CAPACITY (M^3)	2926
PAINTING/CLEANING	AS PER JOB SPECIFICATION (REFER NOTE-12)
INSULATION THICKNESS (mm) (IC)	140 ☐ HOT ☒ COLD
FIRE PROOFING CLEATS	☒ YES ☐ NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	25.35
INSPECTION BY	☒ EIL ☐ CIB ☐ TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 Gr.60 *
REINFORCEMENT PAD / INSERT PAD	SA 516 Gr.60 *
HEADS	SA 516 Gr.60 *
~~SHELL FLANGES /~~ SRN / LWN	SA 350 LF2 CL1
NOZZLE FLANGES	SA 350 LF2 CL1
NOZZLE NECK UPTO 250 NB	SA 350 LF2 CL1/ SA 333 GR.6
NOZZLE NECK ABOVE 250 NB	SA 350 LF2 CL1/ SA 516 GR.60 *
PIPE FITTINGS	SA 420 WPL 6
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS 304
	METAL WINDING AND GRAFOIL FILLER
	MATERIAL WITH CS OUTER & SS 304
	INNER RING AS PER ASME B 16.20.
GASKET INTERNAL	COMPRESSED FIBRE ASBESTOS FREE #
EXTERNAL STUDS/BOLTS/NUTS	SA 320 GR L7 / SA 194 GR.7
INTERNAL STUDS/BOLTS/NUTS	SS 304
~~SKIRT / SUPPORT~~	SA 516 GR.60 * / IS 2062 GR. E 250 QUALITY BR/B0
~~SKIRT / SUPPORT~~ BASE	IS 2062 GR. E 250 QUALITY BR/B0
INTERNAL PARTS (WELDED)	SA 516 GR.60 */ SA 333 Gr.6
INTERNAL PARTS (BOLTED)	SA 516 GR.60 */ SA 333 Gr.6
CLIPS & ATTACHMENTS (EXTERNAL)	SA 516 GR.60*/ IS 2062 GR. E 250 QUALITY BR/B0 WELDED OVER BQCS PAD
WRAPPER PLATE	-
DEMISTER / GRID	-
PAD FOR EXTERNAL ATTACHMENTS	SA 516 GR.60 *
PIPE DAVIT	SA 106 GR. B
VACUUM STIFFENER	-
LIFTING TRUNION	SA 516 GR.60
TAILING LUG	SA 516 GR.60/IS 2062 GR. E 250 QUALITY BR/B0

INTERNAL GASKETS SHALL BE SUITABLE FOR DESIGN TEMP. AND OPERATING LIQUID.

* IMPACT TESTED AS PER SA 20 S(5) REFER NOTE-21

@ ERECTION WEIGHT INDICATED IS EXCLUSIVE OF WEIGHT OF INTERNALS, PLATFORMS, INSULATION, PIPING SPOOL, ETC.

SITE FABRICATED COLUMN

SPECIAL SERVICE :

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

INDIAN BOILER REGULATIONS (IBR)

DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

1 APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	1115000 @	OPERATING	2520000
HYDROTEST(SHOP)	4041000	HYDROTEST (FIELD)	4345000
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED	
1	29.12.2025	REVISED FOR ENGG.	AS	CRG/VIVEK	PB	
0	22.09.2025	ISSUED FOR PURCHASE	AS	CRG/VIVEK	PB	
B	29.04.2025	REVISED & REISSUED FOR BIDS / ENGG.	AS	CRG/VIVEK	PB	
A	28.02.2025	ISSUED FOR BIDS / ENGG.	AS	CRG/VIVEK	PB	

DESIGN DATA	डिजाइन डाटा	DRAWING NUMBER / डाईग नम्बर	REV
ETHYLENE FRACTIONATOR	एथीलीन फ्रेक्शनेटर	B957-300-80-42-DS-3010	1
ITEM NO. 300-CC-00-4002	आइटम नम्बर 300-सीसी-00-4002	SHEET 1 OF 3	

FORMAT NO.3-8042-0501 REV.0 (28.02.2024) A3-420 X 297

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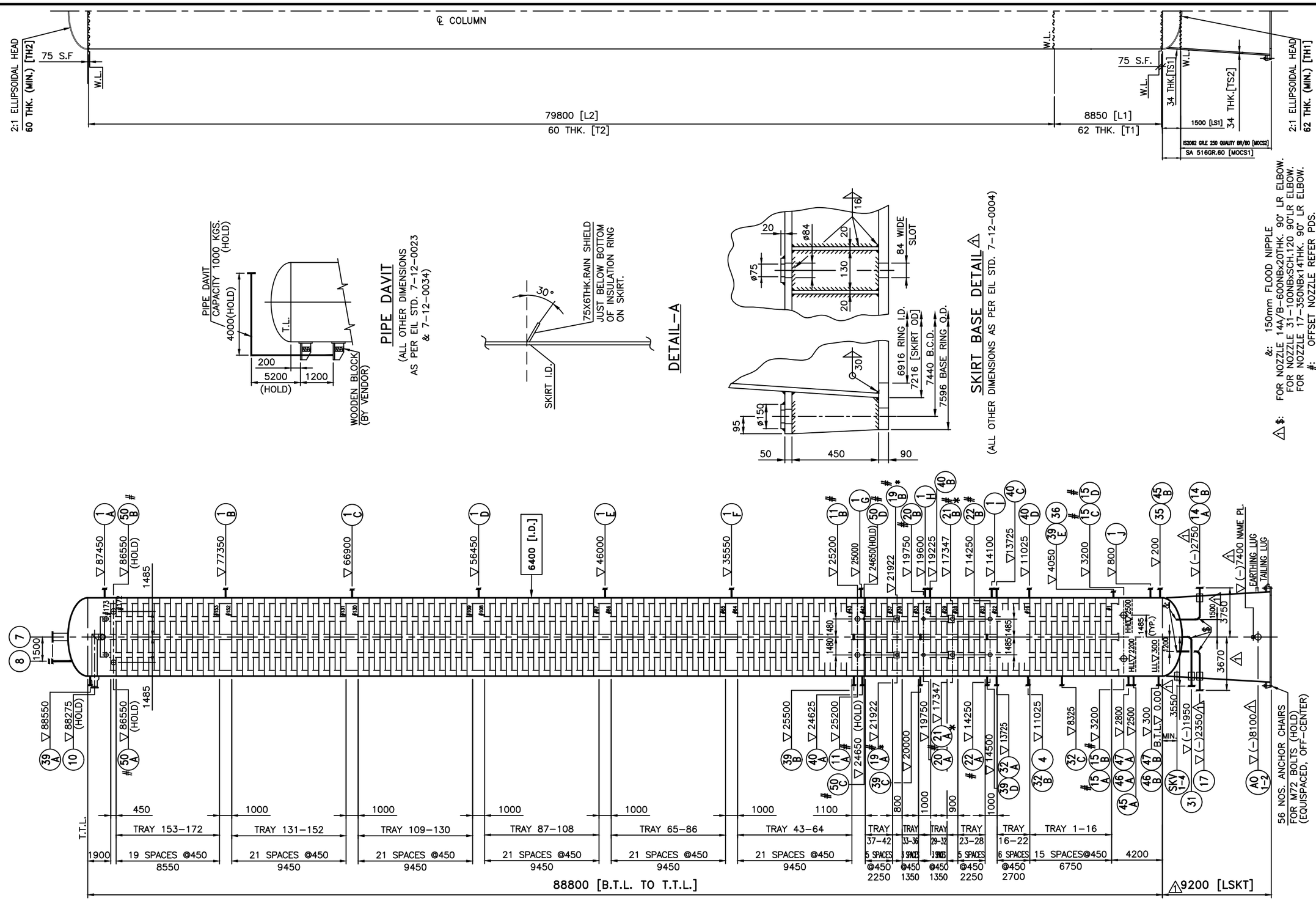

1	29.12.2025	REISSUED FOR ENGG.	AS	CRG/VIVEK	PB	
0	22.09.2025	ISSUED FOR PURCHASE	AS	CRG/VIVEK	PB	
B	29.04.2025	REVISED & REISSUED FOR BIDS/ENGG.	AS	CRG/VIVEK	PB	
A	28.02.2025	ISSUED FOR BIDS/ENGG.	AS	CRG/VIVEK	PB	
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED

ENGINEERS INDIA LIMITED
NEW DELHI

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

VESSEL DESIGN DATA
ETHYLENE FRACTIONATOR
ITEM NO. 300-CC-00-4002

वेसेल डिजाइन डाटा
एथीलीन फ्रैक्शनेटर
आइटम नम्बर 300-सीसी-00-4002

DRAWING NO. B957-300-80-42-DS-3010
REV. 1
SHEET 2 OF 3

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

120

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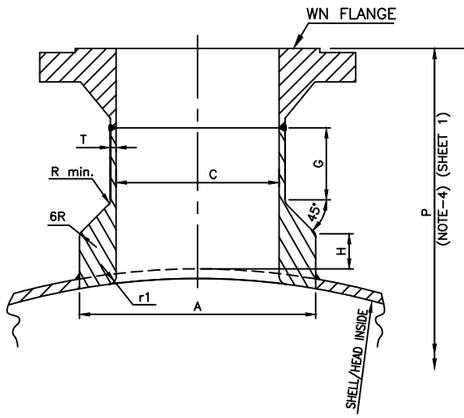

FIG.–1

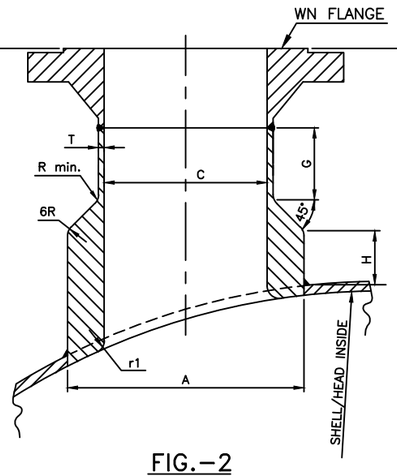

FIG.–2

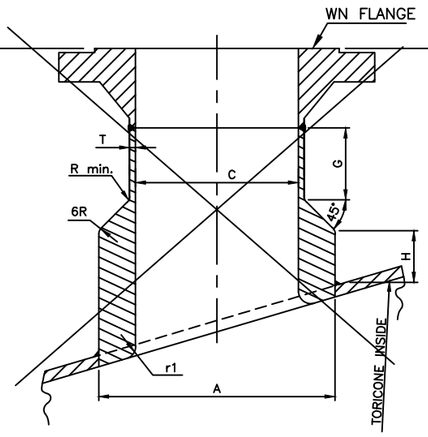

FIG.–3

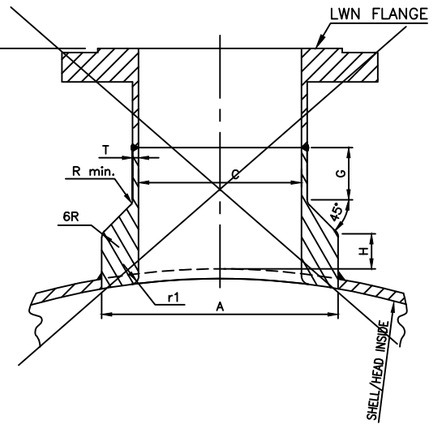

FIG.–4

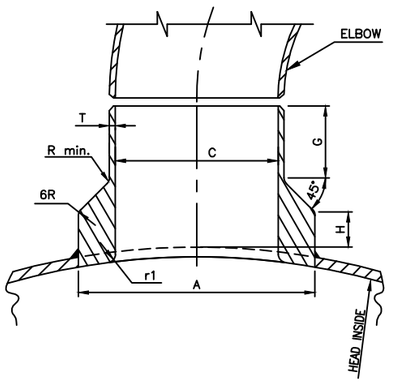

FIG.–5

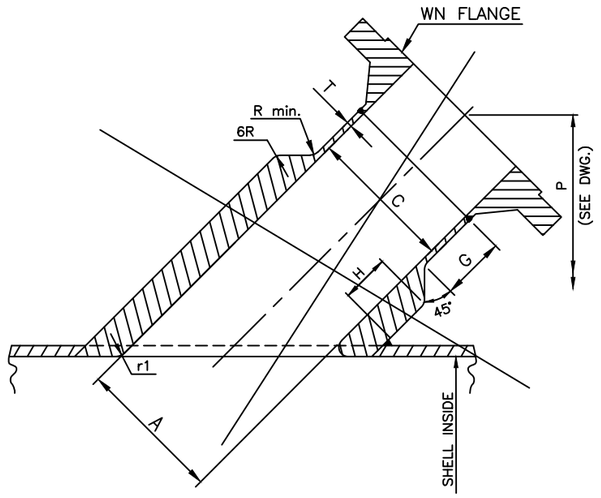

FIG.–6

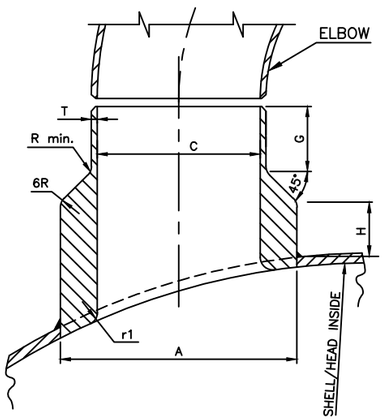

FIG.–7

NOZZLE MARK	SIZE (NB) (NOTE–1,2)	P (MM)	A (MM)	C (MM)	H (MM)	T (MM)	G (MM) (MIN.) (NOTE–3)	FIG.
1 A	800	3760	1102.8	772.8	130	20 THK.	50	1
1 B~J	600	3720	819.6	569.6	130	20 THK.	50	1
7	900	2160	1174.4	874.4	130	20 THK.	50	1
8	80	2160	146.64	66.64	40	SCH.160	50	2
10	450	3680	629.2	429.2	125	14 THK.	50	1
11(A–B)	400	3450	548.4	378.4	130	14 THK.	50	2
14(A–B)	600	SEE SHT.2	789.6	569.6	125	20 THK.	50	7
15(A–D)	500	3500	688	468	125	20 THK.	50	2
17	350	SEE SHT.2	465.6	327.6	125	14 THK.	50	7
31	100	SEE SHT.2	182.04	92.04	45	SCH.120	50	5
19 (A–B)	250	3350	373	245	125	14 THK.	50	2
20 (A–B)	250	3350	373	245	125	14 THK.	50	2
21 (A–B)	300	3400	435.8	295.8	125	14 THK.	50	2
22 (A–B)	300	3400	435.8	295.8	125	14 THK.	50	2
35	80	3550	146.64	66.64	50	SCH.160	50	1

DETAIL OF SELF REINFORCED NOZZLE

NOTE:–

1. ALL NOZZLE TO SHELL JOINTS ARE TO BE FULLY RADIOGRAPHED EXCEPT FOR 80 NB NOZZLES.
2. NOZZLE OF SIZE 80 NB ARE SRWN WITHOUT LIP.
3. PROJECTION 'P' SHALL BE MAINTAINED. 'G' VALUE FURNISHED ARE MINIMUM AND SHALL BE SUITABLY INCREASE TO MAINTAIN PROJECTION 'P'.
4. RADIUS 'R min.' 'r1' TO BE FINALISED IN ACCORDANCE WITH DESIGN CODE.

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
1	29.12.2025	REISSUED FOR ENGG.	AS	CRG/VIVEK	PB	
0	22.09.2025	ISSUED FOR PURCHASE	AS	CRG/VIVEK	PB	
B	29.04.2025	REVISED & REISSUED FOR BIDS/ENGG.	AS	CRG/VIVEK	PB	
A	28.02.2025	ISSUED FOR BIDS/ENGG.	AS	CRG/VIVEK	PB	

VESSEL DESIGN DATA
ETHYLENE FRACTIONATOR
ITEM NO. 300–CC–00–4002

वेसेल डिजाइन डाटा
एथीलीन फ्रैक्शनेटर
आइटम नम्बर 300–सीसी–00–4002

DRAWING NO. B957–300–80–42–DS–3010
REV. 1
SHEET 3 OF 3

1–1641–0503 REV.0 A3–420x297

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NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK / मार्क	QTY / क्वान्टिटी	NOM. DIA / नामिनल डांया	SCH./THK. / शड्ल व थिकनैस	FLANGES CLASS / क्लास	FLANGES TYPE / टाईप	FLANGES FACING / फेसिग	PROJECTION NOTE-4 / प्रोजेक्शन	PAD W x T / पैड	SERVICE / सॉवंस
1A	1	900	$	300	SRWN	RF	$	-	MANHOLE + B.F. + DAVIT
1 B-F	5	600	$	300	SRWN	RF	$	-	MANHOLE + B.F. + DAVIT
4	1	50.8 I.D.	-	600	LWN	RF	3675	-	ANALYZER (CONTINOUS)
7	1	900	$	300	SRWN	RF	$	-	VAPOR OUTLET TO 300-CC-00-4101
8	1	50.8 I.D.	-	600	LWN	RF	$	-	VENT
10	1	500	$	300	SRWN	RF	$	-	REFLUX IN FROM 300-PA-CF-4103 A/B
14	1	1050	$	300	SRWN	RF	$	-	TO RE-BOILER 300-EE-00-4104 A/B
15 A-B	2	750	$	300	SRWN	RF	$	-	FROM RE-BOILER 300-EE-00-4104 A/B
17	1	150	$	300	SRWN	RF	$	-	LIQUID BOTTOM OUTLET TO 300-EE-00-1002
31	1	80	$	300	SRWN	RF	$	-	DRAIN
32	1	50.8 I.D.	-	600	LWN	RF	3675	-	SAMPLE CONNECTION
35	1	80	$	300	SRWN	RF	$	-	UTILITY CONNECTION
36	1	50.8 I.D.	-	300	LWN	RF	3675	-	PRESSURE GAUGE
39 A-B	2	50.8 I.D.	-	300	LWN	RF	3675	-	PRESSURE DIFFERENTIAL INDICATOR
40	1	50.8 I.D.	-	300	LWN	RF	3675	-	TEMPERATURE INDICATOR
45 A-B	2	50.8 I.D.	-	300	LWN	RF	3675	-	STAND PIPE
46 A-B	2	50.8 I.D.	-	300	LWN	RF	3675	-	LEVEL TXMR (DP)
47 A-B	2	50.8 I.D.	-	300	LWN	RF	3675	-	LEVEL TXMR (DP)
SKV 1-4	4	100	40	AS PER STANDARD					SKIRT VENT
AO 1-2	2	500 I.D.	14 THK.	AS PER STANDARD					ACCESS OPENING

'$' REFER SHEET-3

LICENSOR'S SPECIFICATION
लाईसन्सर स्पेसिफिकशन्स

FOUNDATION LOADING DATA (OPERATING CONDITION)
फॉऊडशन लोडिगं डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC	4375000	130000
	-	-
WIND	4614000	109000

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3. NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4. FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
5. FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
6. THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
7. FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
8. 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.
9. ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
10. NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90^0 APART.
11. ALL FABRICATED NOZZLES SHALL BE 100% RADIOGRAPHED.
12. NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.
13. SURFACE PREPARATION, PRIMER & FINISH PAINT SHALL BE CARRIED OUT AT YARD BY EQUIPMENT VENDOR AS PER PAINTING SPEC.
14. ALL REMOVABLE INTERNALS SHALL BE SIZED SO AS TO PASS THROUGH MANHOLE.
15. EQUIPMENT SHALL BE SUBJECT DRY OUT AT 7 Kg/cm^2(g) @80C.
16. 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.
17. VENDOR SHALL PROVIDE 2 NOS. PERMANENT SLOPING STEEL MONKEY LADDERS INSIDE THE SKIRT TO ACCESS THE BOTTOM HEAD FOR INSPECTION.
18. LIFTING TRUNNION & TAILING LUGS SHALL BE DESIGNED BY VENDOR FOR ALL THE SECTIONS IN DRESSED UP CONDITION (CONSIDERING AN IMPACT FACTOR OF 1.5).CALCULATION TO BE SUBMITTED FOR REVIEW. VENDOR TO PROVIDE INSERT PLATE OF SUITABLE SIZE AND THICKNESS WHEREVER TAILING LUGS & LIFTING TRUNNIONS ARE WELDED TO SHELL. DESIGN CALCULATION SHALL INCLUDE CHECK FOR SKIRT THK., SHELL THK., BASE BLOCK FOR LIFTING/TAILING FORCES. ANY ADDITIONAL REQUIREMENT OF INCREASE THICKNESS OF ANY COMPONENT OR PROVIDING STIFFENERS, INSERT PLATE OVER AND ABOVE WHICH IS INDICATED IN DATASHEET SHALL BE PROVIDED BY VENDOR WITHOUT ANY TIME & COST IMPLICATION. INDUCED STRESSES AT THE JUNCTION OF SHELL & TRUNNION SHALL BE LIMITED TO 0.9 OF YIELD STRESS.TAILING LUG SHALL BE PROVIDED 90° TO THE LIFTING LUG/LIFTING TRUNNION. VENDOR SHALL INDICATE C.G. OF EQUIPMENT IN FABRICATION DRAWING.
19. ALL BUTT WELD (CIRCUMFERENTIAL AND LONGITUDINAL SEAMS) IN PRESSURE PART INCLUDING NOZZLE NECK TO FLANGE, PIPE TO PIPE, PIPE TO PIPE FITTING SHALL BE FULLY RADIOGRAPHED.
20. **AT YARD:** EQUIPMENT SHALL BE FIRST COMPLETELY FABRICATED, HYDROTESTED IN SINGLE PIECE AND PAINTED. THEREAFTER IT SHALL BE CUT IN MAXIMUM TWO (2) SECTION. FABRICATOR SHALL PROVIDE ADDITIONAL LENGTH TO TAKE CARE OF CUTTING AND REJOINING ALLOWANCE.
AT SITE: EQUIPMENT SHALL BE ERECTED IN SECTIONS AND CIRCUMFERENTIAL SEAMS SHALL BE COMPLETED IN IN-SITU POSITION. LOCAL PWHT & NDT SHALL BE CARRIED OUT AS PER DRAWING. LOCAL BOX TYPE HYDROTESTING FROM INSIDE SHALL BE CARRIED OUT FOR IN-SITU CIRCUMFERENTIAL SEAMS. COMPLETE HYDROTEST OF ENTIRE COLUMN IS NOT ENVISAGED AFTER ERECTION AT SITE.
21. DENSITY OF LIQUID AT OPERRATING TEMPERATURE
TOP:- 448 Kg/m3, BOTTOM:- 421 Kg/M3.
22. AT TOP, MAXIMUM PRESSURE DROP OF 0.58 KG/SQ.CM & LIQUID LEVEL OF 33730 MM DUE TO LIQUID OVERFILLL CASE (I.E. TOTAL 28 KG/SQ.CM (g)) IS CONSIDERED FOR MECHANICAL DESIGN. 0
23. ALL PLATES AND WELDS INCLUDING HAZ SHALL BE IMPACT TESTED AT (-)29ºC WITH MIN. ENERGY VALUE AS PER FIG. UG84.1 OF ASME SEC. VIII DIV.1.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
X	SKIRT BASE DETAILS	7-12-0004
X	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
X	MANHOLE WITH DAVIT	7-12-0010
X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
X	INTERNAL FLANGES	7-12-0018
	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
	SUPPORT RING AND BOLTING BAR	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
X	PIPE DAVIT	7-12-0023
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
X	SUPPORTS FOR INTERNAL FEED PIPE (FOR GUIDANCE)	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईंग)

X	NOZZLE ORIENTATIONS	B957-300-16-43-NZ-43012
	LADDERS/PLATFORM CLEATS	
	PIPE SUPPORT CLEATS	
	TRAY SUPPORT AND BOLTING BARS	
	DEMISTER DATA SHEET	NOT APPLICABLE
X	SKETCH FOR MONKEY LADDER	B957-000-80-42-SK-0010
X	PROCEES DATASHEET	300-CC-00-4102

HOLD UPS (होल्ड अप्स)

	NOZZLE ORIENTATIONS		SIZE OF NOZZLES
X	NOZZLE ELEVATIONS 10	X	PIPE SUPPORT CLEATS
	SUPPORT HEIGHT	X	LADDER/PLATFORM CLEATS
	DETAILS OF INTERNALS	X	TRAY SUPPORT/BOLTING BARS
	NOZZLE RATING	X	PIPE DAVIT
	NOZZLE PROJECTION		PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	ASME SECTION VIII DIV-1 ED. 2023
WORKING PRESSURE (kg/cm²g)	TOP: 21.7 BOTTOM: 22.28
DESIGN PRESSURE (kg/cm²g)	INT. 26 (NOTE-22) EXT. --
WORKING TEMPERATURE (°C)	TOP: 55 BOTTOM: 65
DESIGN TEMPERATURE (°C)	-29/85
MDMT (°C)	(-) 29
CORROSION ALLOWANCE (mm)	1.5
TYPE OF HEAD	HEMISPERICAL
JOINT EFFICIENCY	SHELL 1 HEAD 1
RADIOGRAPHY	SHELL FULL HEAD FULL
POST WELD HEAT TREATMENT	YES (NOTE-16)
HEAT TREATMENT	AS PER CODE
OPERATING MEDIUM	PROPYLENE (HOLD)
SP. GRAVITY	NOTE-21
WIND SPECIFICATION	IS 875
SEISMIC	IS 1893 + SITE SPECTRA
CAPACITY (M^3)	2256
PAINTING/CLEANING	AS PER JOB SPECIFICATION (REFER NOTE-14)
INSULATION THICKNESS (mm) (IH)	25 [X] HOT [ ] COLD
FIRE PROOFING CLEATS	[X] YES [ ] NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	33.8
INSPECTION BY	[X] EIL [ ] CIB [ ] TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)
(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 Gr.70 *
REINFORCEMENT PAD/INSERT PLATE	-
HEADS	SA 516 Gr.70 *
SHELL FLANGES/SR/LWN	SA 350 Gr. LF2 CL.1
NOZZLE FLANGES	SA 350 Gr. LF2 CL.1
NOZZLE NECK UPTO 250 NB	SA 333 GR.6 / SA 350 GR. LF2 CL.1
NOZZLE NECK ABOVE 250 NB	SA 516 Gr.70 * / SA 350 GR. LF2 CL.1
PIPE FITTINGS	SA 420 WPL6
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS304 METAL WINDING & GRAFOIL FILLER WITH CS OUTER RING & SS304 INNER RING AS PER ASME B16.20
GASKET INTERNAL	COMPRESSED FIBRE ASBESTOS FREE #
EXTERNAL STUDS/BOLTS/NUTS	SA 193 GR.B7 / SA 194 GR.2H
INTERNAL STUDS/BOLTS/NUTS	SS 304
SKIRT/ ~~SUPPORT~~	SA 516 GR.70 / IS 2062 GR. E250 QUALITY BR/B0
SKIRT/ ~~SUPPORT~~ BASE	IS 2062 GR. E 250 QUALITY BR/B0
INTERNAL PARTS (WELDED)	SA 516 GR.70 */ SA 333 GR.6
INTERNAL PARTS (BOLTED)	SA 516 GR.70 */ SA 333 GR.6
CLIPS & ATTACHMENTS (EXTERNAL)	SA 516 GR.70 * / IS 2062 GR. E 250 QUALITY BR/B0 WELDED OVER BQCS PAD
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENT	SA 516 GR.70 *
PIPE DAVIT	SA 106 GR. B
VACUUM STIFFENER	-
LIFTING TRUNNION	SA 516 GR.70
TAILING LUG	SA 516 GR.70 /IS 2062 GR. E 250 QUALITY BR/B0

*** IMPACT TESTED AS PER SA20 S(5) REFER NOTE-23**

@ ERECTION WEIGHT EXCLUDING INTERNALS, PLATFORMS, INSULATION AND PIPING SPOOL.

INTERNAL GASKETS SHALL BE SUITABLE FOR DESIGN TEMP. AND OPERATING LIQUID.

SITE FABRICATED COLUMN

SPECIAL SERVICE : --

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

- **INDIAN BOILER REGULATIONS (IBR)**
- **DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)**

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एप्रौक्सिमेंट वजन)

ERECTION	877500@	OPERATING	2158000
HYDROTEST(SHOP)	3134000	HYDROTEST (FIELD)	3860000
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
0	19.09.2025	ISSUED FOR PURCHASE	AS	CSM/VIVEK	PB
B	13.05.2025	REVISED & REISSUED FOR BIDS / ENGG.	AS	CSM/VIVEK	PB
A	28.02.2025	ISSUED FOR BIDS / ENGG.	AS	CSM/VIVEK	PB

DESIGN DATA	डिजाइन डाटा	DRAWING NUMBER / डाईंग नम्बर	REV
PROPYLENE FRACTIONATOR NO. 2	प्रोपलीन फ्रक्शनेटर नं0 2	B957-300-80-42-DS-3012	0
ITEM NO. 300-CC-00-4102	आइटम नम्बर 300-सीसी-00-4102	SHEET 1 OF 3	

FORMAT NO.3-8042-0501 REV.0 (28.02.2024) A3-420 X 297

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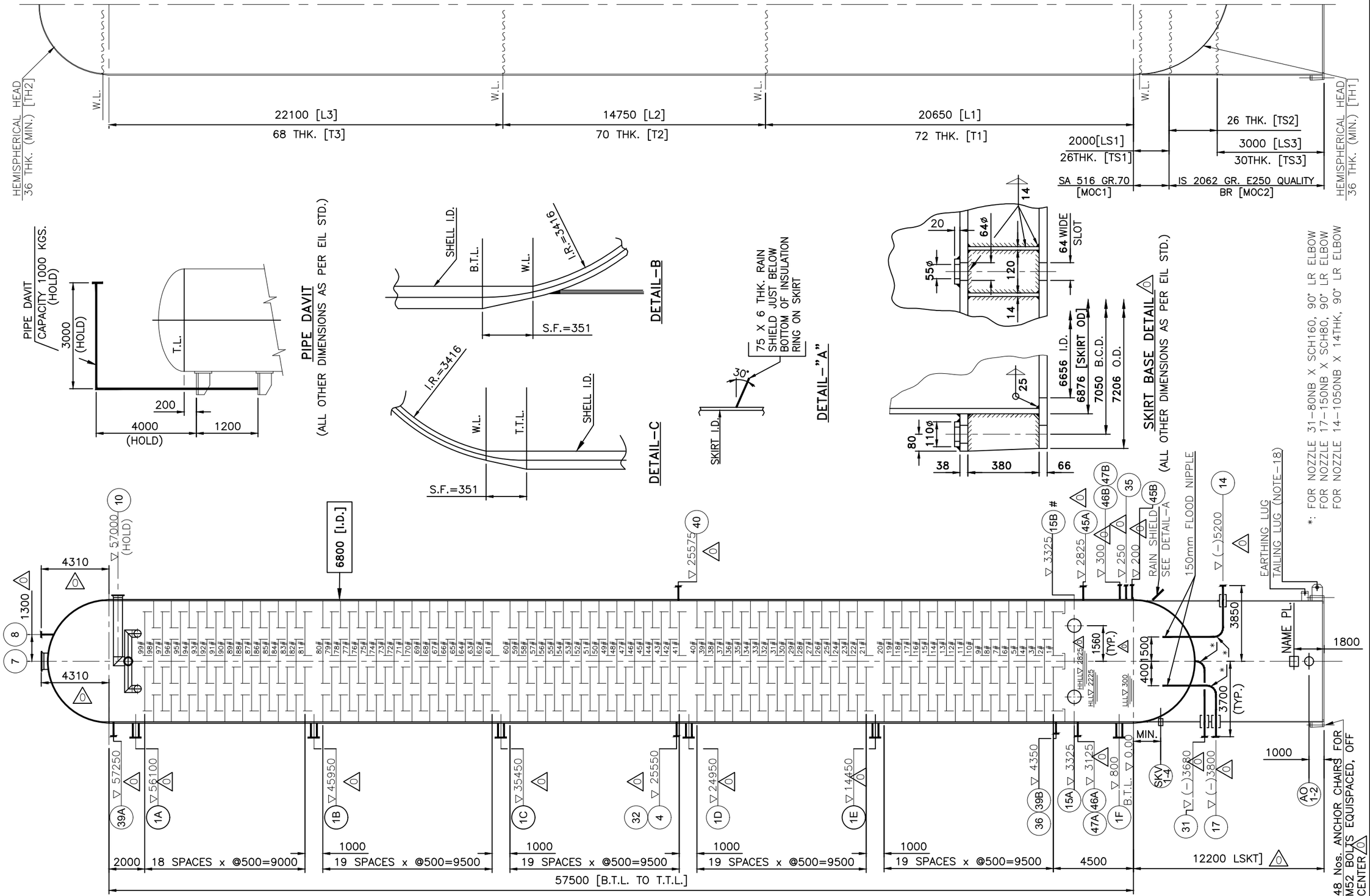

0	19.09.2025	ISSUED FOR PURCHASE	AS	CSM/VIVEK	PB	
B	13.05.2025	REVISED & REISSUED FOR BIDS/ENGG.	AS	CSM/VIVEK	PB	
A	28.02.2025	ISSUED FOR BIDS/ENGG.	AS	CSM/VIVEK	PB	
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED

ENGINEERS INDIA LIMITED
NEW DELHI

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

VESSEL DESIGN DATA
PROPYLENE
FRACTIONATOR No. 2
ITEM NO. 300-CC-00-4102

वेसल डिजाइन डाटा
प्रोपलीन फ्रक्शनेटर नं0 2
आइटम नम्बर 300-सीसी-00-4102

DRAWING NO. B957-300-80-42-DS-3012 | REV. 0

SHEET 2 OF 3

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

120

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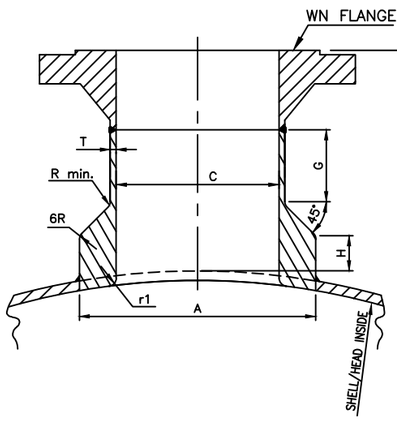

FIG.–1

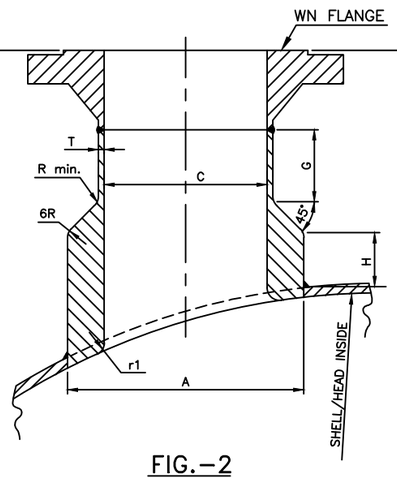

FIG.–2

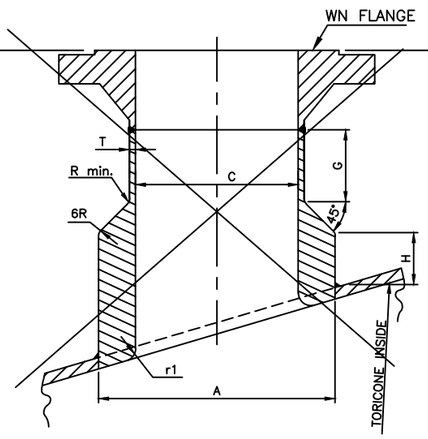

FIG.–3

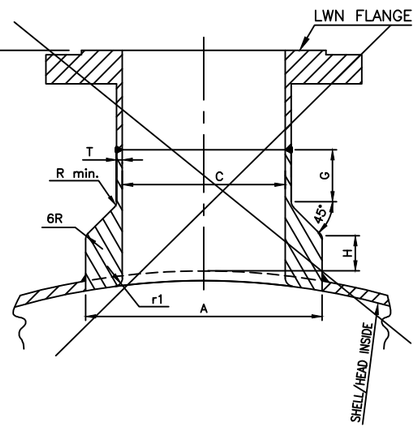

FIG.–4

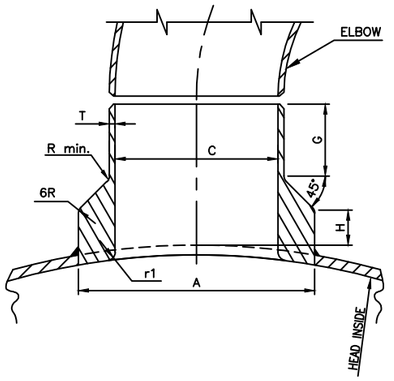

FIG.–5

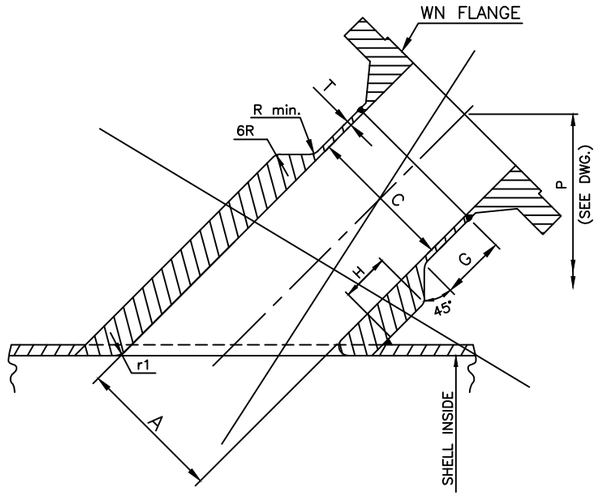

FIG.–6

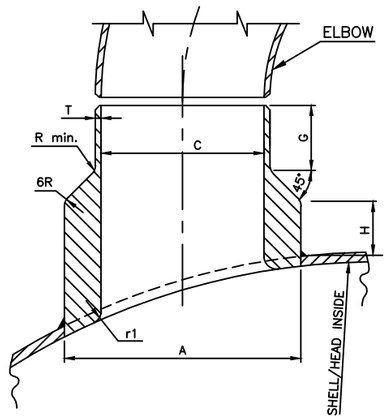

FIG.–7

NOZZLE MARK	SIZE (NB) NOTE–(1,2)	P (MM)	A (MM)	C (MM)	H (MM) (MIN.)	T (MM)	G (MM)(MIN.) NOTE–(3)	FIG.
1 A	900	4050	1266.4	886.4	160	14 THK.	50	1
1 B–F	600	3940	901.6	581.6	90	14 THK.	50	1
7	900	SEE DWG.	1306	886	80	14 THK.	50	1
10	500	3930	800	480	90	14 THK.	50	1
14	△0 1050	SEE DWG.	1608.8	1038.8	100	14 THK.	50	7
△0 15 A–B	900	4000	1306.4	886.4	110	14 THK.	50	2
17	150	SEE DWG.	246.3	146.3	40	SCH. 80	50	7
31	80	SEE DWG.	143.66	73.66	40	SCH. 80	50	5
35	80	3700	153.66	73.66	50	SCH. 80	50	1

DETAIL OF SELF REINFORCED NOZZLE

NOTE:–

1. ALL NOZZLE TO SHELL JOINTS ARE TO BE FULLY RADIOGRAPHED EXCEPT FOR 80 NB NOZZLES.
2. NOZZLE OF SIZE 80 NB ARE SRWN WITHOUT LIP.
3. PROJECTION 'P' SHALL BE MAINTAINED. 'G' VALUE FURNISHED ARE MINIMUM AND SHALL BE SUITABLY INCREASE TO MAINTAIN PROJECTION 'P'.
4. RADIUS 'R min','r1' TO BE FINALISED IN ACCORDANCE WITH DESIGN CODE.

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
0	19.09.2025	ISSUED FOR PURCHASE	AS	CSM/VIVEK	PB	
B	13.05.2025	REVISED & REISSUED FOR BIDS/ENGG.	AS	CSM/VIVEK	PB	
A	28.02.2025	ISSUED FOR BIDS/ENGG.	AS	CSM/VIVEK	PB	

VESSEL DESIGN DATA
PROPYLENE
FRACTIONATOR No. 2
ITEM NO. 300-CC-00-4102

वेसल डिजाइन डाटा
प्रोपलीन फ्रक्शनेटर नं0 2
आइटम नम्बर 300-सीसी-00-4102

DRAWING NO. B957–300–80–42–DS–3012 | REV. 0

SHEET 3 OF 3

1–1641–0503 REV.0 A3–420x297

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PDS REV.1

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK	QTY	NOM. DIA	SCH./THK.	FLANGES			PROJECTION NOTE-4	PAD W x T B	SERVICE
		नामिनल	शड्यूल व	CLASS	TYPE	FACING			
मार्क	क्वान्टिटी	डांया	थिकनैस	क्लास	टाईप	फेसिग	प्रोजेशन	पैड	सर्विस
1A-E	5	600	14 THK.	150	WN	RF	1790	300X T	MANHOLE + BF + GASKET + BOLTING + DAVIT
7	1	450	14 THK.	150	WN	RF	SEE DWG.	225X T	VAPOR OUTLET TO 300-EE-00-4202/300-VV-HW-4202
8	1	50	160	300	WN	RF	SEE DWG.	45X T	VENT
10	1	200	80	150	WN	RF	1740	110X T	REFLUX IN FROM 300-PA-CF-4202A/B
11	1	250	60	150	WN	RF	1740	135X T	FEED FROM 300-CC-00-2202
14	1	500 (H)	14 THK.	150	WN	RF	SEE DWG.	250X T	TO REBOILER 300-EE-00-4201A/B
15 A-B	2	750 (H)	20 THK.	150	WN	RF	1780	@	FROM REBOILER 300-EE-00-4201A/B
17	1	200	80	150	WN	RF	SEE DWG.	110X T	LIQUID BOTTOM OUTLET TO 300-PA-CF-4203A/B
20	1	50(H)	160	300	WN	RF	1690	-	MIN. FLOW RETURN FROM 300-PA-CF-4203A/B
22	1	50(H)	160	300	WN	RF	1690	-	VENT RETURN FROM 300-PA-CF-4203A/B
31	1	80	160	300	WN	RF	SEE DWG.	45X T	DRAIN
35	1	50	160	300	WN	RF	1690	-	UTILITY CONNECTION
36	1	50(H)	160	300	WN	RF	1690	-	PRESSURE GAUGE
39 A-C	3	50(H)	160	300	WN	RF	1690	-	PRESSURE DIFFERENTIAL INDICATOR
40	1	50(H)	160	300	WN	RF	1690	-	TEMPERATURE INDICATOR
41	1	50(H)	160	300	WN	RF	1690	-	TEMPERATURE CONTROLLER
45 A-B	2	50(H)	160	300	WN	RF	1690	-	LEVEL GAUGE ON STANDPIPE WITH HHL ALARM
46 A-B	2	50(H)	160	300	WN	RF	1690	-	LEVEL INDICATOR
47 A-B	2	50(H)	160	300	WN	RF	1690	-	LEVEL CONTROLLER
AO 1-2	2	500 ID	14 THK.	AS PER EIL STD.				250 X T	ACCESS OPENING
SKV 1-4	4	100	Sch 40	AS PER EIL STD.				-	SKIRT VENT

'T' DENOTES CORRESPONDING SHELL/DISH END NOMINAL THICKNESS

'H' DENOTES (HOLD)

@ INSERT PLATE 1950 DIA. X 20THK. INCLUDING 1:3 TAPPER

LICENSOR'S SPECIFICATION

FOUNDATION LOADING DATA (OPERATING CONDITION) फॉऊंडशन लोडिगं डाटा (ऑपरेटिंग कनडिशन) B

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC	450000	22000
WIND	774000	34500

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2 ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3 NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A) FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B) FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5 THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6 FLANGE GASKET FACE SHALL HAVE 125-250 AARH FINISH.
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.
8 ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9 NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90^0 APART.
10 ALL FABRICATED NOZZLES SHALL BE 100% RADIOGRAPHED.
11 REQUIREMENT OF INTERNAL GASKETS SHALL BE AS PER SPEC./STD. IN CASE INTERNAL GASKET ARE REQUIRED SAME SHALL BE FULL FACED. VENDOR TO ENSURE THAT MOC FOR INTERNAL GASKET SHALL BE SUITABLE FOR DESIGN TEMPERATURE & OPERATING FLUID.
12 NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.
13 SPARES SHALL BE AS PER THE REQUISITION.
14 SURFACE PREPARATION, SHOP PRIMER & FINISH PAINT SHALL BE CARRIED OUT AT SHOP BY EQUIPMENT VENDOR AS PER PAINTING SPEC.
15 ALL REMOVABLE INTERNALS SHALL BE SIZED SO AS TO PASS THROUGH NEAREST MANHOLE.
16 VENDOR SHALL PROVIDE 2 NOS. PERMANENT SLOPING STEEL MONKEY LADDERS INSIDE THE SKIRT TO ACCESS THE BOTTOM HEAD FOR INSPECTION.
17 VENDOR TO DESIGN AND PROVIDE TAILING LUG (AT 90° TO LIFTING LUGS) AND BRACING ARRANGEMENT BASED ON 1.25 TIMES THE ACTUAL ERECTION WEIGHT AND 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.
18 UNLESS OTHERWISE SPECIFIED MINIMUM THICKNESS OF WELDED INTERNAL SHALL BE 18mm & BOLTED INTERNAL SHALL BE 12mm. IN CASE OF PIPE AND PIPE FITTINGS SCHEDULE TO BE SELECTED ACCORDINGLY.
19 COLUMN IS SUBJECTED TO STEAM OUT CONDITION OF 0.5 $Kg/Cm^2(g)$ AT 190^0C.
20 AT TOP, MAXIMUM PRESSURE DROP OF 0.29 KG/SQ.CM & LIQUID LEVEL OF 12120 MM DUE TO LIQUID OVERALL CASE (I.E. TOTAL 7.6 KG/SQ.CM (g)) IS CONSIDERED FOR MECHANICAL DESIGN.
21 REBOILER RETURN NOZZLES #15A AND #15B TO BE ORIENTED PARALLEL TO THE BOTTOM PREFERENTIAL REBOILER BAFFLE AND AT 180° FROM EACH OTHER.
22 EQUIPMENT MAY BE ERECTED IN SINGLE PIECE IN DRESSED UP CONDITION (BY OTHERS). DRESSED UP IMPLIES THAT THE EQUIPMENT WILL BE ERECTED AFTER INSTALLATION OF INSULATION, PLATFORM/LADDERS ETC. (BY OTHERS). CORRESPONDINGLY EQUIPMENT VENDOR SHALL SELECT LIFTING LUG BASED ON 1.25 TIMES THE ACTUAL ERECTION WEIGHT.
23 COLUMN SHALL BE FIRST COMPLETELY FABRICATED & HYDROTESTED AT SHOP. THEREAFTER IT SHALL BE CUT INTO MAXIMUM TWO SECTIONS (PROVIDE ADDITIONAL LENGTH TO TAKE CARE OF CUTTING & REJOINING ALLOWANCES) BEFORE TRANSPORTATION FROM SHOP TO SITE (WHERE FINAL C-SEAM SHALL BE CARRIED OUT). SECTION LENGTH OF COLUMN SHALL BE DECIDED BASED ON TRANSPORTATION FEASIBILITY (BY VENDOR). COLUMN SHALL BE ASSEMBLED AT SITE IN HORIZONTAL POSITION COMPLETE IN ALL RESPECTS. DP EXAMINATION SHALL BE CARRIED OUT ON SITE JOINT FOR ROOT RUN & FINAL RUNS (INSIDE & OUTSIDE) BY COLUMN FABRICATOR.100% RADIOGRAPHY SHALL BE CARRIED OUT ON SITE JOINT BY COLUMN FABRICATOR. NDT SHALL BE CARRIED OUT AS PER MDS. ONLY LOCAL BOX TYPE (INSIDE) HYDROTEST SHALL BE CARRIED OUT FOR SITE CIRC.SEAM. COMPLETE HYDROTEST OF THE ENTIRE COLUMN AT SITE IS NOT ENVISAGED.
24 SUPPLY OF ALL PIPE DISTRIBUTOR AND ITS SUPPORT IS IN VENDOR SCOPE.
25 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. B

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
X	SKIRT BASE DETAILS	7-12-0004
X	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
X	MANHOLE WITH DAVIT	7-12-0010
X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
X	INTERNAL FLANGES	7-12-0018
X	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
X	SUPPORT RING AND BOLTING BAR	7-12-0021
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
X	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईंग)

	NOZZLE ORIENTATIONS	
	LADDERS/PLATFORM CLEATS	
	PIPE SUPPORT CLEATS	
	TRAY SUPPORT AND BOLTING BARS	
	DEMISTER DATA SHEET	NOT APPLICABLE
X	SKETCH FOR MANIKEY LADDER	B957-000-80-42-SK-0010
X	PROCESS DATA SHEET	300-CC-00-4201

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES (AS MARKED)
X	NOZZLE ELEVATIONS (AS MARKED)	X	PIPE SUPPORT CLEATS
	SUPPORT HEIGHT	X	LADDER/PLATFORM CLEATS
X B	DETAILS OF INTERNALS	X	TRAY SUPPORT/BOLTING BARS
		X	PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	ASME SECTION VIII DIV-1 EDITION 2023
WORKING PRESSURE (kg/cm^2g)	TOP:4.4 BOTTOM:4.7
DESIGN PRESSURE (kg/cm^2g)	INT. 6.5 EXT. -
WORKING TEMPERATURE (°C)	TOP:47 BOTTOM:123
DESIGN TEMPERATURE (°C)	140
MDMT (°C)	1.1
CORROSION ALLOWANCE (mm)	3
TYPE OF HEAD	2:1 ELLIPTICAL
JOINT EFFICIENCY	SHELL 1 HEAD 1
RADIOGRAPHY B	SHELL FULL HEAD FULL
POST WELD HEAT TREATMENT B	YES (NOTE-25)
HEAT TREATMENT	HEAD: AS PER CODE / SPEC.
OPERATING MEDIUM	-
SP. GRAVITY	TOP:0573 BOTTOM:0.660
WIND SPECIFICATION	IS-875 (PART-3)
SEISMIC	SITE SPECTRA + IS-1893 (PART-4)
CAPACITY (M^3)	214
PAINTING/CLEANING	AS PER JOB SPECIFICATION (REFER NOTE-14)
INSULATION THICKNESS (mm) (IH)	25 [X] HOT [ ] COLD
FIRE PROOFING CLEATS	[X] YES [ ] NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	8.45
INSPECTION BY	[X] EIL [ ] CIB [ ] TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 Gr.70
REINFORCEMENT PAD/INSERT PLATE	SA 516 Gr.70
HEADS	SA 516 Gr.70
~~SHELL FLANGES/SR/LWN~~	-
NOZZLE FLANGES~~/SRWN/LWN~~	SA 105
NOZZLE NECK UPTO 250 NB	SA 106 GR.B
NOZZLE NECK ABOVE 250 NB	SA 516 Gr.70
PIPE FITTINGS	SA 234 WPB.
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS304 METAL WINDING & GRAFOIL FILLER WITH CS OUTER RING & SS304 INNER RING AS PER ASME B16.20
GASKET INTERNAL	COMPRESSED FIBRE ASBESTOS FREE @
EXTERNAL STUDS/BOLTS/NUTS	SA193 GR.B7/SA 194 GR.2H
INTERNAL STUDS/BOLTS/NUTS	SS 304
SKIRT/ ~~SUPPORT~~	SA 516 GR.70/ IS 2062GR. E 250 QUALITY BR
SKIRT/~~SUPPORT~~ BASE	IS 2062 GR. E 250 QUALITY BR
INTERNAL PARTS (WELDED)	SA 516 GR.70 / SA 106 GR.B
INTERNAL PARTS (BOLTED)	SS 516 GR.70 / SA 106 GR.B
CLIPS & ATTACHMENTS (EXTERNAL)	SA 516 GR.70/IS 2062 GR. E 250 QUALITY BR WELDED OVER BQCS PAD.
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENT	SA 516 GR.70
PIPE DAVIT	SA 106 GR. B
VACUUM STIFFENER	-
LIFTING TRUNION	-
TAILING LUG	IS 2062 GR. E 250 QUALITY BR/B0 /SA 516 Gr.70
SUPPORTS FOR INTERNALS	SA 516 GR.70

@ INTERNAL GASKETS SHALL BE SUITABLE FOR DESIGN TEMP. AND OPERATING LIQUID.

SITE ASSEMBLED COLUMN

SPECIAL SERVICE : B **AROMATIC/ BENZENE SERVICE**

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

INDIAN BOILER REGULATIONS (IBR)

DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन) B

ERECTION	61000	OPERATING	241000
HYDROTEST(SHOP)	275000	HYDROTEST (FIELD)	401500
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
B	24.10.2025	REVISED & REISSUED FOR BIDS / ENGG.	ROHIT	SA/VIVEK	PB
A	27.06.2025	ISSUED FOR BIDS / ENGG.	AS	SA/VIVEK	PB

DESIGN DATA	डिजाइन डाटा	DRAWING NUMBER / डाईंग नम्बर	REV
DEBUTANIZER	डिबुटेनाइज़र	B957-300-80-42-DS-3013	B
ITEM NO. 300-CC-00-4201	आइटम नम्बर 300-सीसी-00-4201	SHEET 1 OF 3	

FORMAT NO.3-8042-0501 REV.0 (28.02.2024) A3-420 X 297

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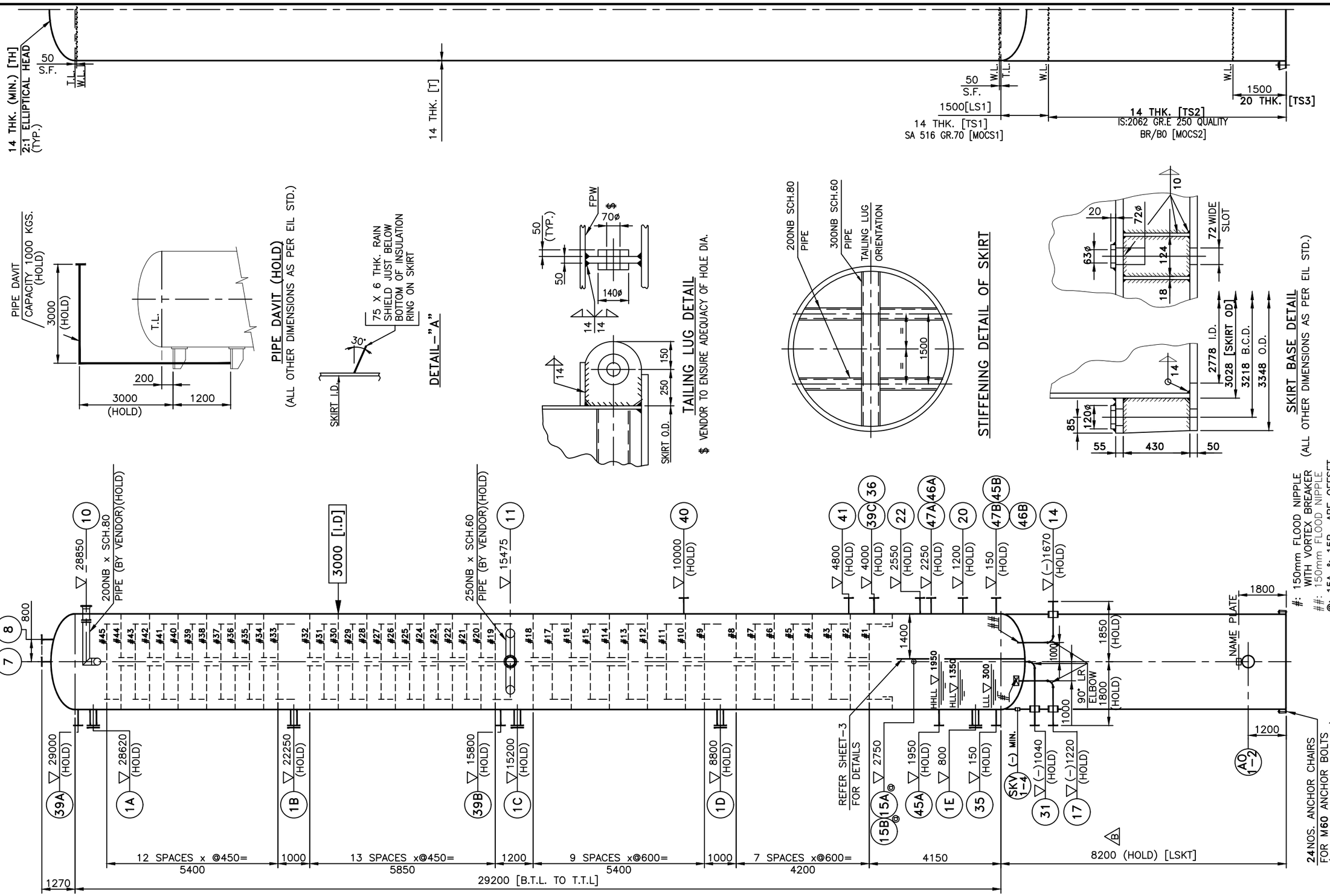

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
B	24.10.2025	REVISED & REISSUED FOR BIDS/ENGG.	ROHIT	SA/VIVEK	PB	
A	27.06.2025	ISSUED FOR BIDS/ENGG.	AS	SA/VIVEK	PB	

VESSEL DESIGN DATA
DEBUTANIZER
ITEM NO. 300-CC-00-4201

वेसल डिजाइन डाटा
डिब्युटेनाइज़र
आइटम नम्बर 300-सीसी-00-4201

DRAWING NO.	REV.
B957–300–80–42–DS–3013	B
SHEET 2 OF 3	

1–1641–0503 REV.0 A3–420x297

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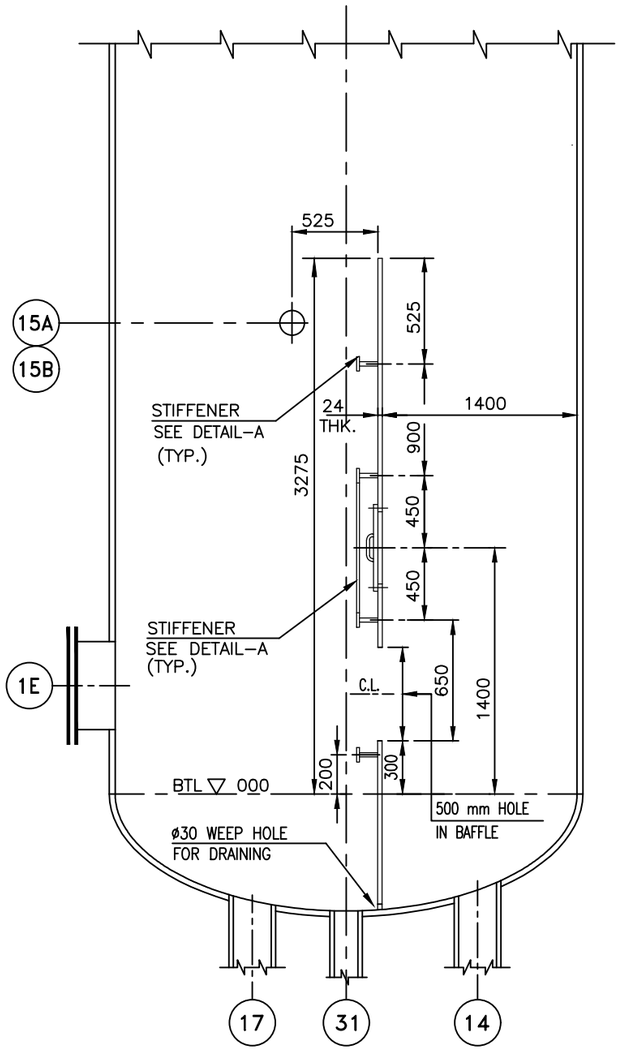
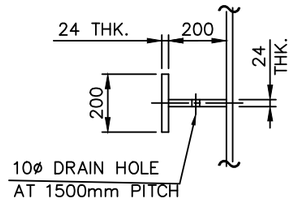
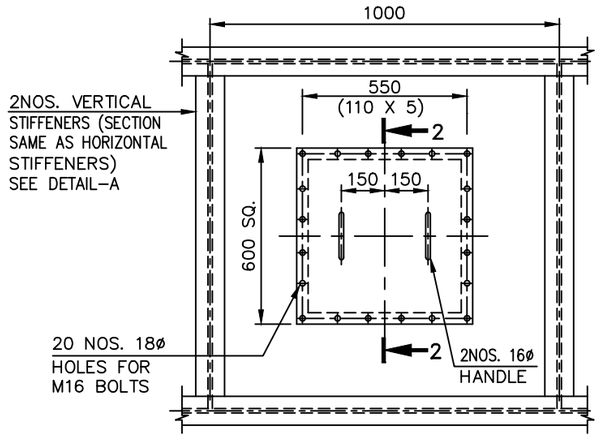


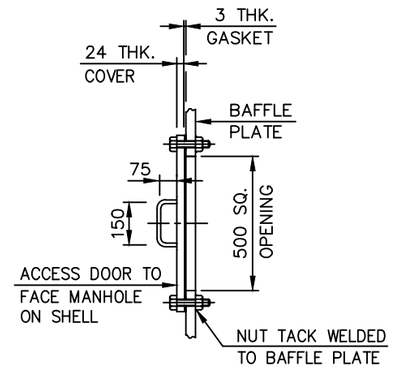
COLUMN BOTTOM DETAIL
(FOR OTHER DETAILS REFER PDS)



DETAIL–'A'



DETAIL OF MANWAY
ON BAFFLE



SECTION 2–2

B	24.10.2025	REVISED & REISSUED FOR BIDS/ENGG.	ROHIT	SA/VIVEK	PB	
A	27.06.2025	ISSUED FOR BIDS/ENGG.	AS	SA/VIVEK	PB	
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED

ENGINEERS INDIA LIMITED
NEW DELHI

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

VESSEL DESIGN DATA
DEBUTANIZER
ITEM NO. 300-CC-00-4201

वेसल डिजाइन डाटा
डिब्युटेनाइज़र
आइटम नम्बर 300-सीसी-00-4201

DRAWING NO. B957-300-80-42-DS-3013 REV. B
SHEET 3 OF 3

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

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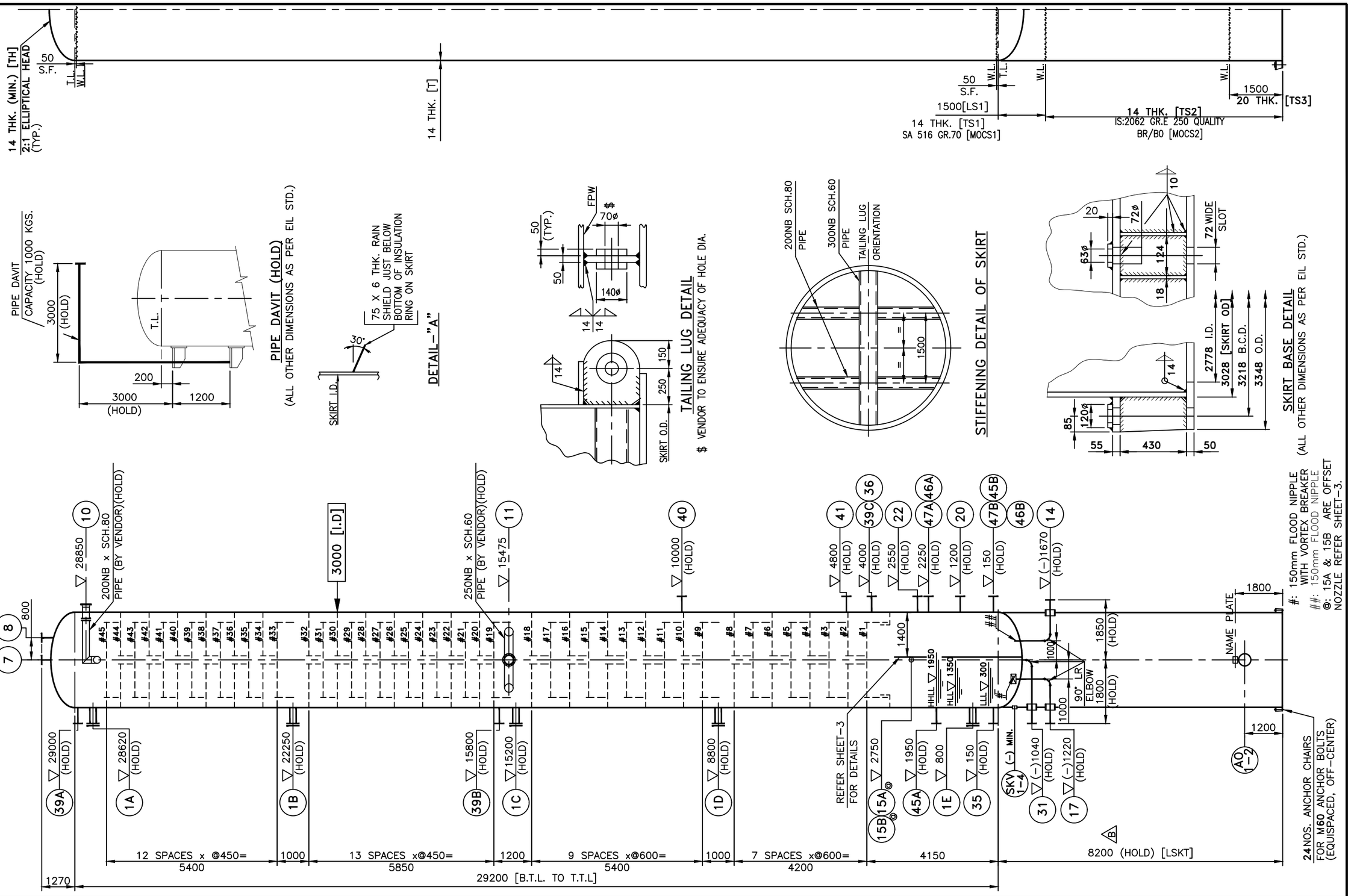

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
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VESSEL DESIGN DATA
DEBUTANIZER
ITEM NO. 300-CC-00-4201

वेसल डिजाइन डाटा
डिब्युटेनाइज़र
आइटम नम्बर 300-सीसी-00-4201

DRAWING NO.	REV.
B957–300–80–42–DS–3013	B
SHEET 2 OF 3	

1–1641–0503 REV.0 A3–420x297

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PDS REV.0

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK मार्क	QTY क्वान्टिटी	NOM. DIA नामिनल डांया	SCH./THK. शड्ल व थिकनैस	FLANGES CLASS क्लास	FLANGES TYPE टाईप	FLANGES FACING फेसिग	PROJECTION NOTE-4 प्रोजेशन	PAD W x T पैड	SERVICE सार्विस
1	1	600	$	300	SRWN	RF	$	–	MANHOLE + B.F. + DAVIT
7	1	750	$	300	SRWN	RF	$	–	VAPOUR OUTLET TO 300-EE-00-3002
8	1	50.8ID	-	600	SRLWN	RF	$	–	VENT
11	1	1050	$	300	SRWN	RF	$	–	FEED FROM 300-EE-00-2203
17	1	250	$	300	SRWN	RF	$	–	LIQUID BOTOM OUTLET TO 300-PA-CF-2201A/B
20	1	100 (H)	$	300	SRWN	RF	$	–	MIN. FLOW RETURN FROM FROM 300-PA-CF-2201A/B
B 22	1	50.8 ID (H)	$	600 (H)	SRLWN	RF	$	–	PUMP VENT RETURN FROM 300-PA-CF-2201 A/B
31	1	80	$	600	SRWN	RF	$	–	DRAIN
35	1	50.8 ID	$	600	SRLWN	RF	$	–	UTILITY CONNECTION
LT 1-2	2	50.8 ID (H)	$	300	SRLWN	RF	$	–	LEVEL GAUGE/GLASS
LG 1-2	2	50.8 ID (H)	$	300	SRLWN	RF	$	–	LEVEL CONTROLLER WITH ALARMS
SKV 1-4	4	100	40	AS PER STANDARD				–	SKIRT VENT
AO 1-2	2	500 I.D.	14 THK.	AS PER STANDARD				255 X T	ACCESS OPENING

T' DENOTES CORRESPONDING SHELL/DISH END / SKIRT NOMINAL THICKNESS

H' DENOTES (HOLD)

'$' REFER SHEET-3

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकेशन्स

FOUNDATION LOADING DATA (OPERATING CONDITION)(HOLD)
फॉऊडेशन लोडिगं डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC (DB)	378000	33000
WIND	124000	10500

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2 ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3 NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A) FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B) FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5 THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6 FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
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.
8 ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9 NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90º APART.
10 ALL FABRICATED NOZZLES SHALL BE FULLY RADIOGRAPHED.
11 NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.
12 SURFACE PREPARATION & SHOP PRIMER AS PER JOB SPECIFICATION FOR SURFACE PREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE (FIELD COATING SYSTEM IS BY OTHERS)
13 VENDOR SHALL PROVIDE 2 NOS. PERMANENT SLOPING STEEL MONKEY LADDERS INSIDE THE SKIRT TO ACCESS THE BOTTOM HEAD FOR INSPECTION.
14 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.
15 ALL BUTT WELD (CIRCUMFERENTIAL AND LONGITUDINAL SEAMS) IN PRESSURE PART INCLUDING NOZZLE NECK TO FLANGE, PIPE TO PIPE, PIPE TO PIPE FITTING SHALL BE FULLY RADIOGRAPHED.
16 EQUIPMENT SHALL BE SUBJECTED TO DRY OUT AT 7.0 kg/cm²(g) @ 80°C.
17 UNLESS OTHERWISE SPECIFIED MINIMUM THICKNESS OF WELDED INTERNAL SHALL BE 12mm & BOLTED INTERNAL SHALL BE 9mm. IN CASE OF PIPE AND PIPE FITTINGS SCHEDULE TO BE SELECTED ACCORDINGLY.
18 IT SHALL BE ENSURED BY VENDOR THAT FOR NOZZLE ABOVE 600 NB NOZZLE PIPE O.D. SHALL MATCH WITH CORRESPONDING STANDARD FLANGE O.D .
19 B EQUIPMENT MAY BE ERECTED IN DRESSED UP CONDITON (I.E AFTER INSTALLATION OF INSULATION/ STRUCTURAL MEMBERS ETC. BY OTHERS. CORRESPONDINGLY EQUIPMENT VENDOR SHALL SELECT LIFTING LUG BASED ON 1.25 TIMES OF ACTUAL ERECTION WEIGHT.
20 B VENDOR TO DESIGN AND PROVIDE TAILING LUG (AT 90° TO LIFTING LUGS / TRUNNIONS) AND BRACING ARRANGEMENT CONSIDERING 1.25 TIMES OF EQUIPMENT ERECTION WEIGHT AND 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.
21 ALL PLATES AND WELDS INCLUDING HAZ SHALL BE IMPACT TESTED AT (-)45ºC WITH MIN. ENERGY VALUE AS PER FIG. UG84.1 OF ASME SEC. VIII DIV.1.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
X	SKIRT BASE DETAILS	7-12-0004
X	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
X	MANHOLE WITH DAVIT	7-12-0010
X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
	INTERNAL FLANGES	7-12-0018
X	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
	SUPPORT RING AND BOLTING BAR	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
X	PIPE DAVIT	7-12-0023
X	LIFTING LUG TOP HEAD TYPE	7-12-0024
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
X	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

	NOZZLE ORIENTATIONS	
	LADDERS/PLATFORM CLEATS	
	PIPE SUPPORT CLEATS	
	TRAY SUPPORT AND BOLTING BARS	NOT APPLICABLE
	DEMISTER DATA SHEET	NOT APPLICABLE
X	SKETCH FOR MONKEY LADDER	B957-000-80-42-SK-0010

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES
X	NOZZLE ELEVATIONS	X	PIPE SUPPORT CLEATS
X	SUPPORT HEIGHT	X	LADDER/PLATFORM CLEATS
	DETAILS OF INTERNALS		TRAY SUPPORT/BOLTING BARS
X	INSULATION THICKNESS	X	PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE					ASME SECTION VIII DIV-1 EDITION 2023
WORKING PRESSURE	(kg/cm²g)				19.2
DESIGN PRESSURE	(kg/cm²g)	INT.	31.5	EXT.	-
WORKING TEMPERATURE	(°C)				(-)23
DESIGN TEMPERATURE	(°C)				(-) 45/65
MDMT	(°C)				(-)45
CORROSION ALLOWANCE	(mm)				3
TYPE OF HEAD					2:1 ELLIPTICAL
JOINT EFFICIENCY		SHELL	1	HEAD	1
RADIOGRAPHY		SHELL	FULL	HEAD	FULL
POST WELD HEAT TREATMENT					YES (NOTE-14)
HEAT TREATMENT					HEAD: AS PER CODE / SPEC B
OPERATING MEDIUM					-
SP. GRAVITY					0.521 AT OPERATING TEMPERATURE
WIND SPECIFICATION					IS-875 (PART-3)
SEISMIC					SITE SPECTRA + IS-1893 (PART-4)
CAPACITY	(M^3)				127
PAINTING/CLEANING					AS PER JOB SPECIFICATION
INSULATION THICKNESS	(mm) (IC)	165 (HOLD)	☐ HOT	☒ COLD	
FIRE PROOFING CLEATS		☒ YES	☐ NO		
HYDROSTATIC TEST	(kg/cm2g)	HORIZONTAL	/ VERTICAL	(AT TOP)	
PRESSURE (NEW & COLD)		40.95			
INSPECTION BY		☒ EIL	☐ CIB	☐ TPIA	

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL/~~BOOT~~	SA 516 Gr.60*
REINFORCEMENT PAD/INSERT PLATE	SA 516 Gr.60*
HEADS	SA 516 Gr.60*
SHELL FLANGES/SR/LWN	SA 350 LF2 CL1
NOZZLE FLANGES	SA 350 LF2 CL1
NOZZLE NECK UPTO 250 NB	SA 350 LF2 CL1 / SA 333 Gr 6
NOZZLE NECK ABOVE 250 NB	SA 350 LF2 CL1
PIPE FITTINGS	SA 420 WPL 6 (SEAMLESS)
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS304 METAL WINDING & GRAFOIL FILLER WITH CS OUTER RING & SS304 INNER RING AS PER ASME B16.20
GASKET INTERNAL	-
EXTERNAL STUDS/BOLTS/NUTS	SA 320 Gr L7 / SA 194 Gr. 7
INTERNAL STUDS/BOLTS/NUTS	SS 304
SKIRT/ ~~SUPPORT~~	SA 516 GR.60*/IS2062 Gr E 250 QUALITY BR
SKIRT/ ~~SUPPORT~~ BASE	IS 2062 GR. E 250 QUALITY BR
INTERNAL PARTS (WELDED)	SA 516 GR.60*/ SA 333 Gr 6
INTERNAL PARTS (BOLTED)	-
CLIPS & ATTACHMENTS (EXTERNAL)	SA 516 GR.60*
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENT	SA 516 GR.60*
PIPE DAVIT	SA 106 GR. B
VACUUM STIFFENER	-
LIFTING LUG	SA 516 GR.60*
TAILING LUG	IS 2062 GR. E 250 QUALITY BR

B * IMPACT TESTED AS PER CODE/SPEC. (REFER NOTE -21)

B

SPECIAL SERVICE : --

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

INDIAN BOILER REGULATIONS (IBR)
DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)(HOLD)

ERECTION	121000	OPERATING	201000
HYDROTEST(SHOP)	248000	HYDROTEST (FIELD)	310000
NUMBER OF ITEMS :	ONE		

B	10.06.2026	REVISED & REISSUED FOR BIDS / ENGG.	ROHIT	AD/VIVEK	PB	
A	15.05.2025	ISSUED FOR BIDS / ENGG.	AS	AD/VIVEK	PB	
REV	DATE	REVISION	BY	CHECKED	APPROVED	

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

DESIGN DATA	डिजाइन डाटा	DRAWING NUMBER डाईग नम्बर	REV
H P DEPROPANIZER REFLUX DRUM	एच पी डिप्रोपानाईजर रिफलक्स ड्रम	B957-300-80-42-DS-3130	B
ITEM NO. 300-VV-VW-2201	आइटम नम्बर 300-वीवी-वीडब्ल्यू-2201	SHEET 1 OF 3	

FORMAT NO.3-8042-0501 REV.0 [28.02.2024] A3-420 X 297

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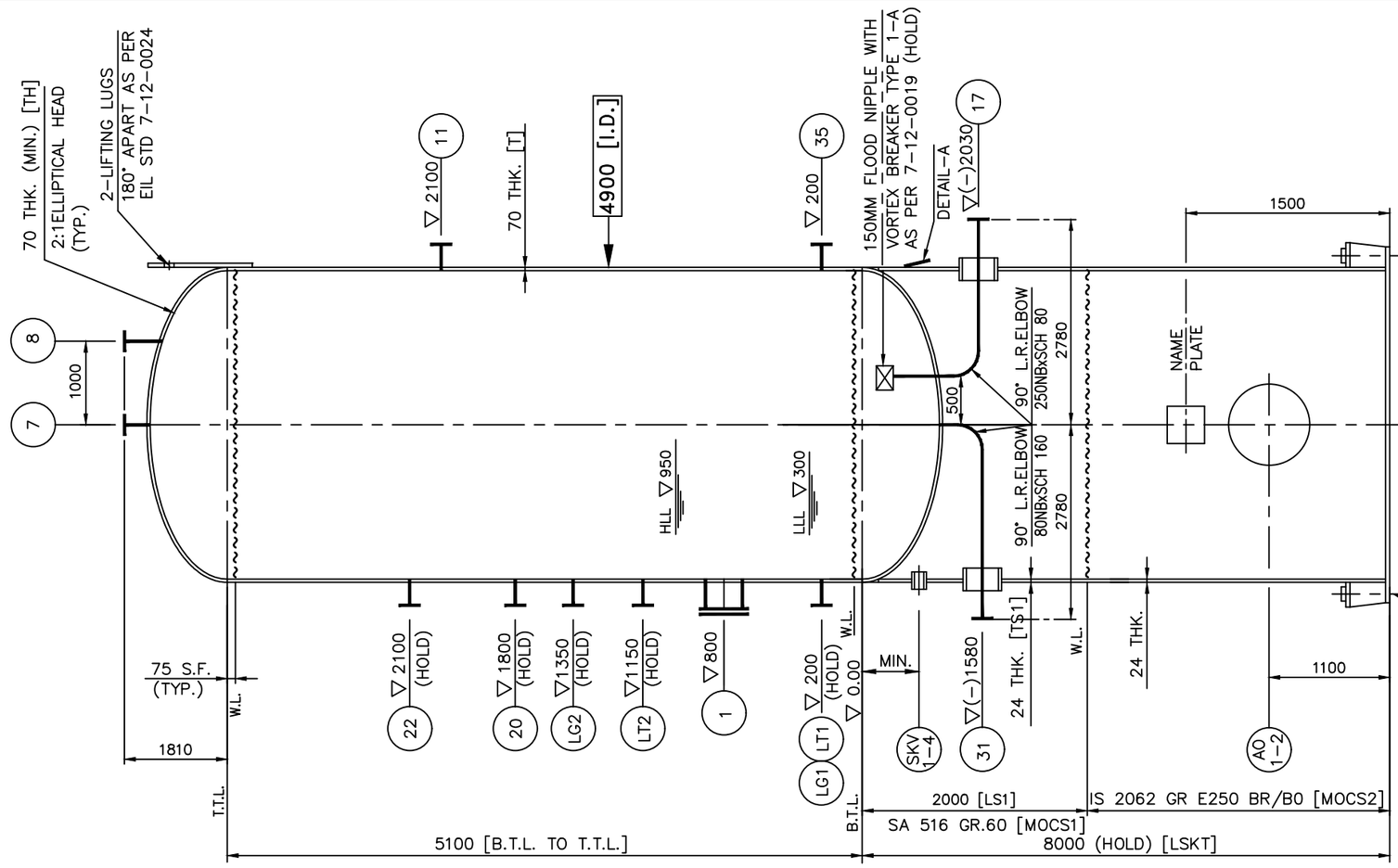
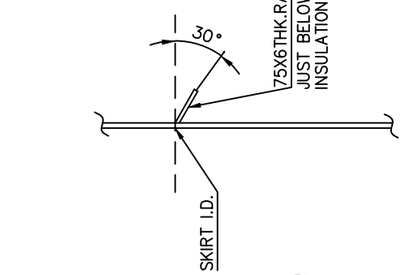
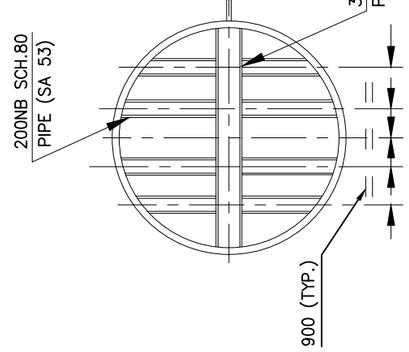
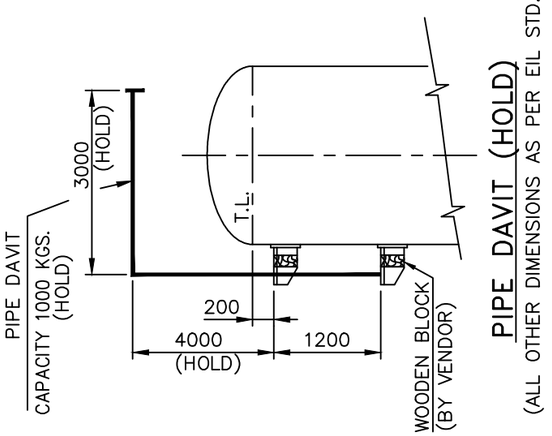




DETAIL - A

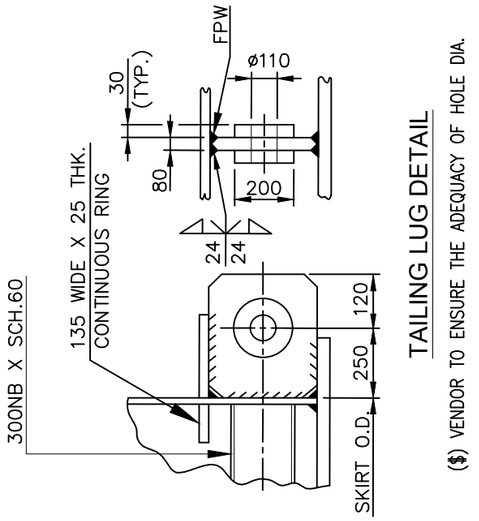


STIFFENING DETAIL OF SKIRT



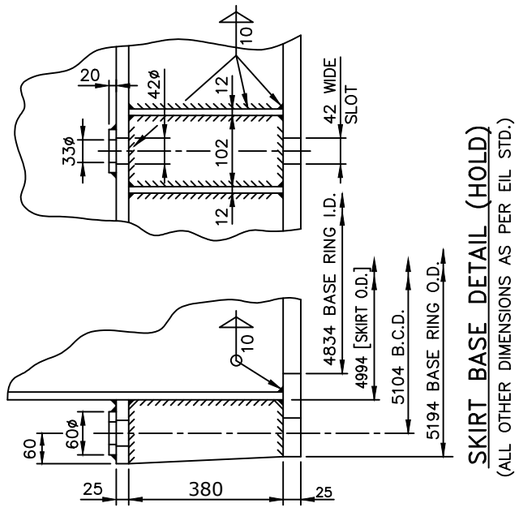
PIPE DAVIT (HOLD)

(ALL OTHER DIMENSIONS AS PER EIL STD.)



TAILING LUG DETAIL

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



SKIRT BASE DETAIL (HOLD)

(ALL OTHER DIMENSIONS AS PER EIL STD.)

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
B	10.06.2025	REVISED & REISSUED FOR BIDS/ENGG.	ROHIT	AD/VIVEK	PB	
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VESSEL DESIGN DATA
H P DEPROPANIZER REFLUX DRUM
ITEM NO. 300-VV-VW-2201

वेसल डिजाइन डाटा
एच पी डिप्रोपानाईजर रिफलक्स ड्रम
आइटम नम्बर 300-वीवी-वीडब्ल्यू-2201

DRAWING NO. B957-300-80-42-DS-3130 | REV. B

SHEET 2 OF 3

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

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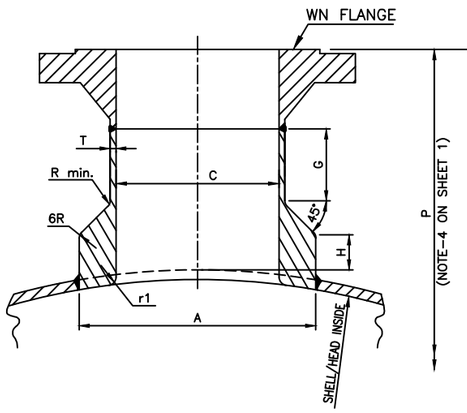

FIG.–1

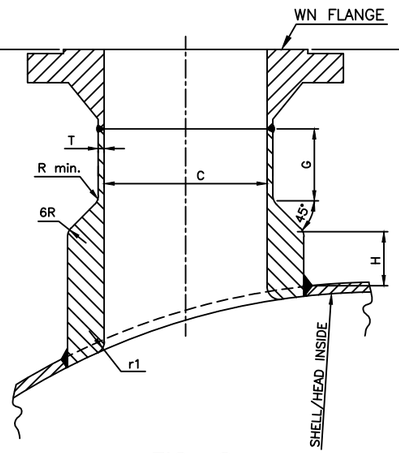

FIG.–2

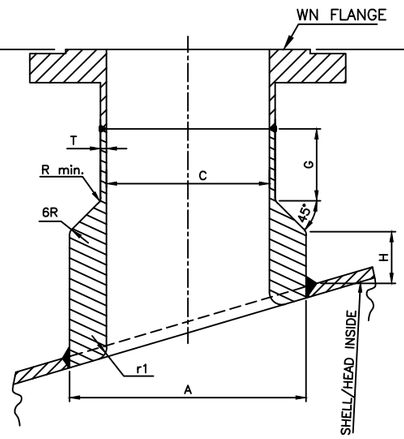

FIG.–3

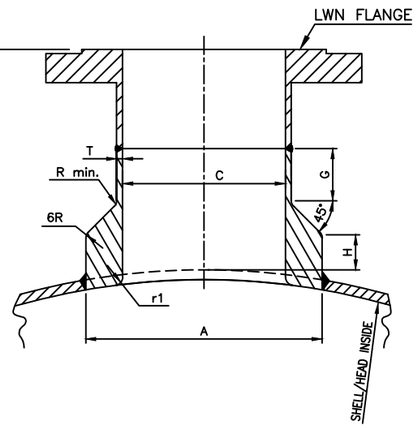

FIG.–4

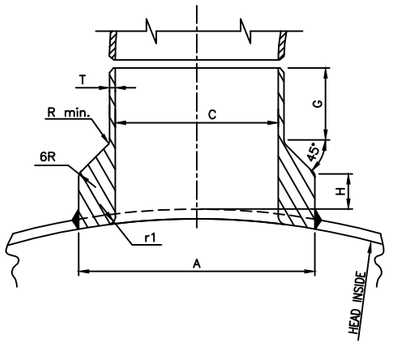

FIG.–5

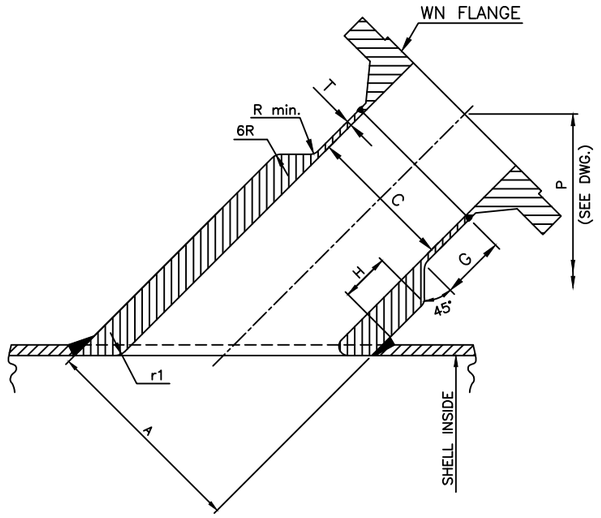

FIG.–6

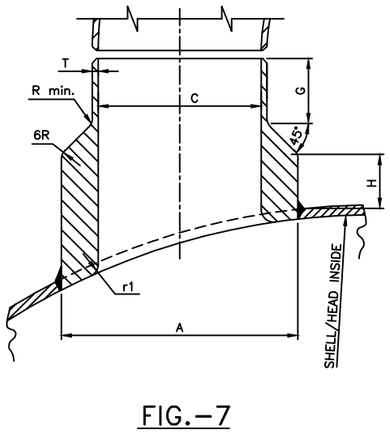

FIG.–7

	NOZZLE MARK	SIZE (NB)	P (MM) (NOTE–1)	A (MM)	C (MM)	H (MM) (MIN.)	T (MM)	G (MM) (MIN.) NOTE–(1)	FIG.
	1	600	3000	902	582	100	14THK.	50	1
	7	750	SEE SHEET –2	1036.35	736.35	160	16THK.	50	1
	11	1050	3200	1573	1043	160	16THK.	50	1
	17	250	SEE SHEET –2	382.93	242.93	130	SCH80	50	7
	20	100	2770	192.05	92.05	70	SCH120	50	1
	31	80	SEE SHEET –2	146.65	66.65	70	SCH160	50	5
	8	50	SEE SHEET –2	130.8	50.8	70	16.76THK.	50	3
(HOLD)	LT1–2,LG1–2	50	2750	130.8	50.8	70	16.76THK.	50	4
	35	50	2750	130.8	50.8	70	16.76THK.	50	4
(HOLD)	22	50	2750	130.8	50.8	70	16.76THK.	50	4

NOTE:–

1. PROJECTION 'P' SHALL BE MAINTAINED. 'G' VALUE FURNISHED ARE MINIMUM AND SHALL BE SUITABLY INCREASE TO MAINTAIN PROJECTION 'P'.
2. RADIUS 'R min','r1' TO BE FINALISED IN ACCORDANCE WITH DESIGN CODE.

DETAIL OF SELF REINFORCED WELD NECK NOZZLE

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
B	10.06.2025	REVISED & REISSUED FOR BIDS/ENGG.	ROHIT	AD/VIVEK	PB	
A	15.05.2025	ISSUED FOR BIDS/ENGG.	AS	AD/VIVEK	PB	

VESSEL DESIGN DATA
H P DEPROPANIZER REFLUX DRUM
ITEM NO. 300-VV-VW-2201

वेसल डिजाइन डाटा
एच पी डिप्रोपानाईजर रिफलक्स ड्रम
आइटम नम्बर 300-वीवी-वीडब्ल्यू-2201

DRAWING NO. B957–300–80–42–DS–3130
REV. B
SHEET 3 OF 3

1–1641–0503 REV.0 A3–420x297

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NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK	QTY	NOM. DIA	SCH./THK.	FLANGES			PROJECTION NOTE-4	PAD W x T	SERVICE
		नामिनल	शड्यूल व	CLASS	TYPE	FACING			
मार्क	क्वान्टिटी	डांया	थिकनैस	क्लास	टाईप	फेसिग	प्रोजेक्शन	पैड	सर्विस
1	1	600	12 THK.	150	WN	RF	SEE DWG	300X T	MANHOLE + BF + GASKET + BOLTING
3	1	150	80	150	WN	RF	1370	70XT	VENTILATION NOZZLE
6	1	200 (H)	80	150	WN	RF	1370	95XT	VAPOR OUTLET TO DRY FLARE/PSV/300-VV-VI-2203
11	1	200	80	150	WN	RF	1370	95XT	FEED FROM 300-EE-00-2205
12	1	80	160	300	WN	RF	1370	40XT	STARTUP FROM PROPYLENE PRODUCT HEADER (START-UP)
17	1	250	12 THK.	150	WN	RF	1170	115XT	LIQUID BOTTOM OUTLET TO 300-PA-CF-2202A/B
20	1	100 (H)	120	300	WN	RF	1370	50XT	MIN.FLOW RETURN FROM 300-PA-CF-2202A/B
24	1	100 (H)	120	300	WN	RF	1370	50xT	PUMP VENT RETURN FROM 300-PA-CF-2202A/B
31	1	80	160	300	WN	RF	1170	40XT	DRAIN
35	1	50	160	300	WN	RF	SEE DWG.	-	UTILITY CONNECTION
LG 1-2	2	50 (H)	160	300	WN	RF	1120	-	LEVEL GAUGE MAGNETIC (SS)
LT 1-2	2	50 (H)	160	300	WN	RF	1120	-	LEVEL TRANSMITTER (DP)

T' DENOTES CORRESPONDING SHELL/DISH END NOMINAL THICKNESS

'H' DENOTES (HOLD)

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकेशन

FOUNDATION LOADING DATA (OPERATING CONDITION)
फॉउन्डेशन लोडिगं डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC (DB)	-	-
SEISMIC (MC)	-	-
WIND	-	-

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2 ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3 NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A) FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B) FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5 THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6 FLANGE GASKET FACE SHALL HAVE 125-250 AARH FINISH.
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.
8 ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9 NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90° APART.
10 ALL FABRICATED NOZZLES SHALL BE FULLY RADIOGRAPHED.
11 NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.
12 SURFACE PREPARATION, SHOP PRIMER & FINISH PAINT AS PER JOB SPECIFICATION FOR SURFACE PREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.
13 EQUIPMENT SHALL BE SUBJECT TO DRY OUT AT 7 Kg/cm2(g) @80°C.
14 COLD INSULATION (IC) OF PIR (POLYISOCYANURATE)
15 ALL PLATES AND WELDS INCLUDING HAZ SHALL BE IMPACT TESTED AT (-)45°C WITH MIN. ENERGY VALUE AS PER FIG. UG84.1 OF ASME SEC. VIII DIV.1.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC. FOR SURFACE PREPARATION & PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
X	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
X	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
	SKIRT BASE DETAILS	7-12-0004
	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
X	MANHOLE WITH HINGED COVER	7-12-0009
	MANHOLE WITH DAVIT	7-12-0010
X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
	INTERNAL FLANGES	7-12-0018
X	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
	SUPPORT RING AND BOLTING BAR	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
	PIPE DAVIT	7-12-0023
	LIFTING LUG TOP HEAD TYPE	7-12-0024
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
X	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

	NOZZLE ORIENTATIONS	
	LADDERS/PLATFORM CLEATS	
	PIPE SUPPORT CLEATS	
	TRAY SUPPORT AND BOLTING BARS	NOT APPLICABLE
	DEMISTER DATA SHEET	NOT APPLICABLE

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES LG, LT, 20 & 24
X	NOZZLE ELEVATIONS LG, LT, 20 & 24	X	PIPE SUPPORT CLEATS
	SUPPORT HEIGHT	X	LADDER/PLATFORM CLEATS
	DETAILS OF INTERNALS		TRAY SUPPORT/BOLTING BARS
	INSULATION THICKNESS		PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	ASME SECTION VIII DIV.1 EDITION 2023
WORKING PRESSURE (kg/cm²g)	5.16
DESIGN PRESSURE (kg/cm²g)	INT. 8.5 EXT. -
WORKING TEMPERATURE (°C)	(-)24
DESIGN TEMPERATURE (°C)	(-)45/65
MDMT (°C)	(-)45
CORROSION ALLLOWANCE (MM)	3
TYPE OF HEAD	2:1 ELLIPSOIDAL
JOINT EFFICIENCY	SHELL 0.85 HEAD 1
RADIOGRAPHY	SHELL SPOT HEAD FULL
POST WELD HEAT TREATMENT	AS PER CODE/SPEC.
HEAT TREATMENT	AS PER CODE/SPEC.
OPERATING MEDIUM	-
SP. GRAVITY	0.561 (AT OPERATING TEMP.)
WIND SPECIFICATION	IS 875
SEISMIC	IS 1893 + SITE SPECTRA
CAPACITY (M³)	18
PAINTING/CLEANING	AS PER JOB SPECIFICATION (REFER NOTE)
INSULATION THICKNESS (mm) (IC)	80 ☐ HOT ☒ COLD
FIRE PROOFING CLEATS	☐ YES ☒ NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / ~~VERTICAL~~ (AT TOP)
PRESSURE (NEW & COLD)	11.05
INSPECTION BY	☒ EIL ☐ CIB ☐ TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 GR.70*
REINFORCEMENT PAD	SA 516 GR.70*
HEADS	SA 516 GR.70*
SR NOZZLE	-
NOZZLE FLANGES	SA 350 LF2 CL.1
NOZZLE NECK UPTO 250 NB	SA 333 GR. 6
NOZZLE NECK ABOVE 250 NB	SA 516 GR.70*
PIPE FITTINGS	SA 420 GR. WPL6
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS304 METAL WINDING & GRAFOIL FILLER WITH CS OUTER RING & SS304 INNER RING AS PER ASME B16.20
GASKET INTERNAL	-
EXTERNAL STUDS/BOLTS/NUTS	SA 320 GR.L7 / SA 194 GR.7
INTERNAL STUDS/BOLTS/NUTS	-
~~SKIRT/~~ SUPPORT	SA 516 GR.70*
~~SKIRT/~~ SUPPORT BASE	SA 516 GR.70*
INTERNAL PARTS (WELDED)	SA 516 GR.70*/ SA 333 GR.6
INTERNAL PARTS (BOLTED)	-
CLIPS & ATTACHMENTS (EXTERNAL)	SA 516 GR.70*
WRAPPER PLATE	SA 516 GR.70*
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENT	SA 516 GR.70*
PIPE DAVIT	-
VACUUM STIFFENER	-

* MATERIAL SHALL BE IMPACT TESTED AS PER CODE/SPEC.REQUIREMENTS

SPECIAL SERVICE : --

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

INDIAN BOILER REGULATIONS (IBR)
DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	8300	OPERATING	18500
HYDROTEST(SHOP)	26300	HYDROTEST (FIELD)	27000
NUMBER OF ITEMS :	ONE		

PDS B957-300-79-41-DS-1252 REV.1

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
A	27.08.2025	ISSUED FOR BIDS/ENGG	AS	RR/VIVEK	PB

DESIGN DATA	डिजाइन डाटा
L P DEPROPANIZER REFLUX DRUM	एल पी डिप्रोपनाइजर रिफलक्स ड्रम
ITEM NO. 300-VV-HW-2202	आइटम नम्बर 300-वीवी-एचडब्ल्यू-2202

DRAWING NUMBER डाईग नम्बर	REV
B957-300-80-42-DS-3131	A
SHEET 1 OF 2	

FORMAT NO.3-8042-0501 REV.0 (28.02.2024) A3-420 X 297

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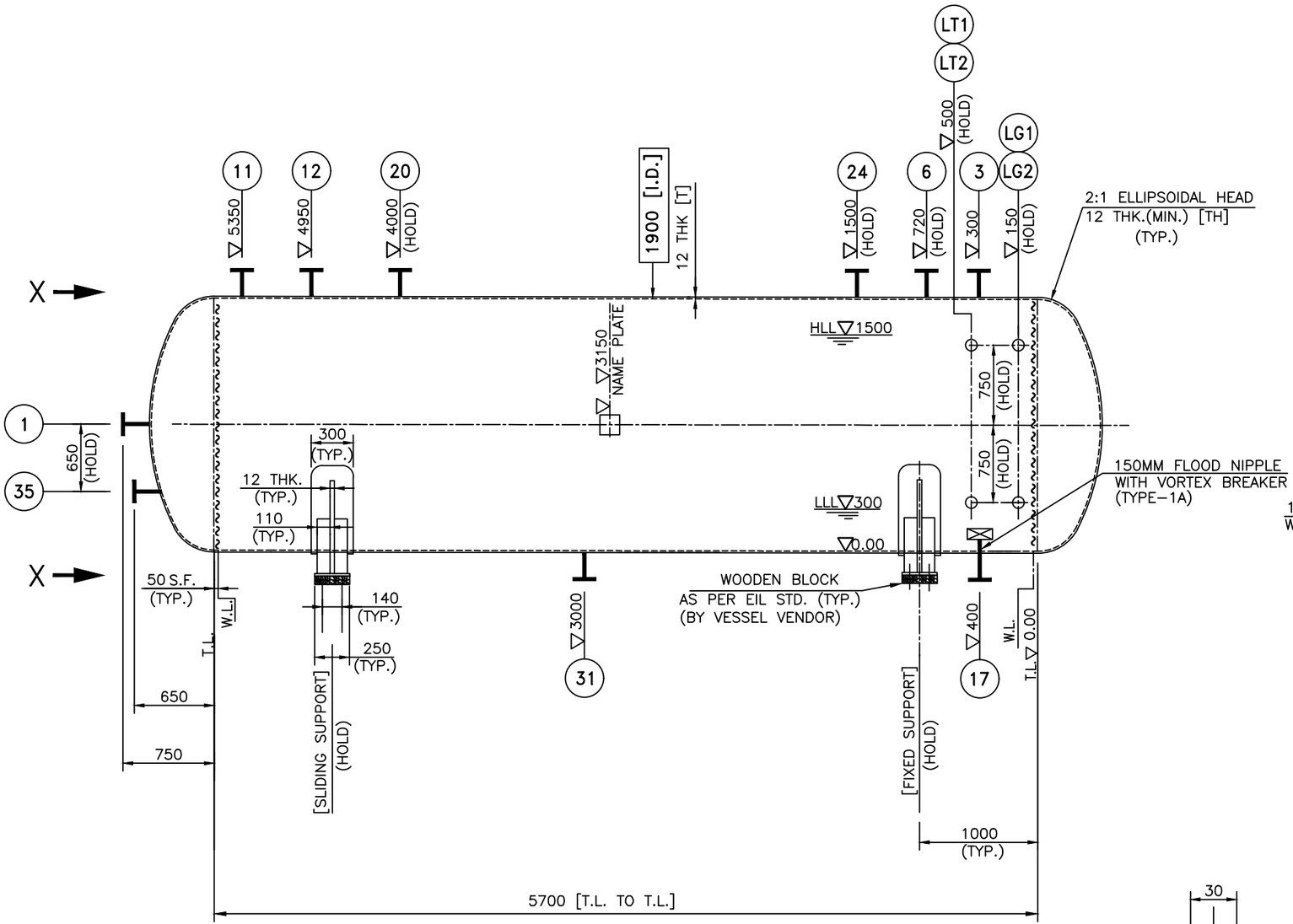
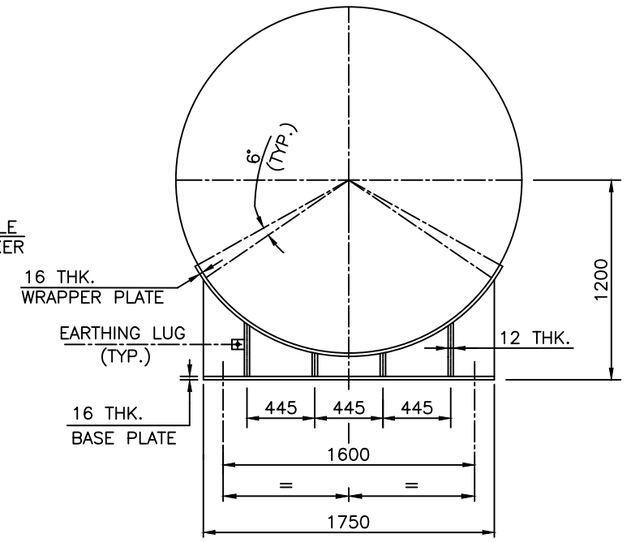
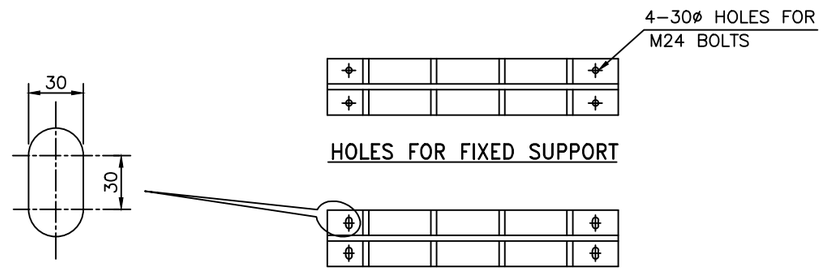




VIEW X–X

(NOZZLES NOT SHOWN)

(ALL OTHER DIMENSIONS AS PER EIL STD.)



HOLES FOR FIXED SUPPORT

HOLES FOR SLIDING SUPPORT

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
A	27.08.2025	ISSUED FOR BIDS/ENGG.	AS	RR/VIVEK	PB	

VESSEL DESIGN DATA
LP DEPROPANIZER REFLUX DRUM
ITEM NO. 300-VV-HW-2202

वेसल डिजाइन डाटा
एल पी डिप्रोपनाइजर रिफलक्स डम
आइटम नम्बर 300-वीवी-एचडब्ल्यू-2202

DRAWING NO.	REV.
B957–300–80–42–DS–3131	A
SHEET 2 OF 2	

1–1641–0503 REV.0 A3–420x297

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PDS B957-300-79-41-DS-1253 REV-1

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK	QTY	NOM. DIA	SCH./THK.	FLANGES			PROJECTION NOTE-4	PAD W x T	SERVICE
		नामिनल	शड्यूल व	CLASS	TYPE	FACING			
मार्क	क्वान्टिटी	डांया	थिकनैस	क्लास	टाईप	फेसिग	प्रोजेशन	पैड	सर्विस
5 A-B	2	200	80	300	WN	RF	620	95X T	HANDHOLE + BF + GASKET + BOLTING + HANDLE
8	1	50	160	600	WN	RF	SEE DWG.	-	VENT
11	1	150	80	300	WN	RF	620	70X T	FEED FROM 300-EE-00-2208
17	1	150	80	300	WN	RF	SEE DWG.	85X T	LIQUID BOTTOM OUTLET TO MP COND. HEADER
35	1	50	160	600	WN	RF	570	-	UTILITY CONNECTION
LG 1-2	2	50 (H)	160	300	WN	RF	570	-	LEVEL GAUGE MAGNETIC (SS)
LT1	1	50 (H)	160	300	WN	RF	570	-	LEVEL TRANSMITTER (DP)

T' DENOTES CORRESPONDING SHELL/DISH END NOMINAL THICKNESS

H' DENOTES HOLD

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकेशन्स

FOUNDATION LOADING DATA (OPERATING CONDITION)
फॉउन्डेशन लोडिगं डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC (DB)	-	-
WIND	-	-

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3. NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A). FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B). FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5. THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6. FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
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.
8. ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9. NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90º APART.
10. SURFACE PREPARATION, SHOP PRIMER & FINSH PAINT AS PER JOB SPECIFICATION FOR SURFACEPREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.
11. HOT INSULATION OF ROCKWOOL

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
	SKIRT BASE DETAILS	7-12-0004
	SKIRT OPENING DETAILS	7-12-0005
X	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
	MANHOLE WITH DAVIT	7-12-0010
	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
	INTERNAL FLANGES	7-12-0018
	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
	SUPPORT RING AND BOLTING BAR	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

NOZZLE ORIENTATIONS	
LADDERS/PLATFORM CLEATS	NOT APPLICABLE
PIPE SUPPORT CLEATS	NOT APPLICABLE
TRAY SUPPORT AND BOLTING BARS	NOT APPLICABLE
DEMISTER DATA SHEET	NOT APPLICABLE

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES LG & LT
X	NOZZLE ELEVATIONS LG & LT		PIPE SUPPORT CLEATS
X	SUPPORT HEIGHT		LADDER/PLATFORM CLEATS
	DETAILS OF INTERNALS		TRAY SUPPORT/BOLTING BARS
			PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	ASME SECTION VIII DIV-1 EDITION 2023
WORKING PRESSURE (kg/cm²g)	15
DESIGN PRESSURE (kg/cm²g)	INT. 24.5 EXT. FV
WORKING TEMPERATURE (°C)	200.5
DESIGN TEMPERATURE (°C)	350
MDMT (°C)	1.1
CORROSION ALLOWANCE (mm)	3
TYPE OF HEAD	2:1 ELLIPSOIDAL
JOINT EFFICIENCY	SHELL 0.85 HEAD 1
RADIOGRAPHY	SHELL SPOT HEAD FULL
POST WELD HEAT TREATMENT	AS PER CODE / SPEC.
HEAT TREATMENT	HEAD: AS PER CODE / SPEC.
OPERATING MEDIUM	-
SP. GRAVITY	0.864 (AT OPERATING TEMPERATURE)
WIND SPECIFICATION	IS-875
SEISMIC	SITE SPECTRA + IS-1893
CAPACITY (M³)	0.8
PAINTING/CLEANING	AS PER JOB SPECIFICATION (REFER NOTE)
INSULATION THICKNESS (mm) (IH)	80 [X] HOT [ ] COLD
FIRE PROOFING CLEATS	[X] YES [ ] NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	32.5
INSPECTION BY	[X] EIL [ ] CIB [ ] TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 Gr.70
REINFORCEMENT PAD	SA 516 Gr.70
HEADS	SA 516 Gr.70
SHELL FLANGES	-
NOZZLE FLANGES	SA 105
NOZZLE NECK UPTO 250 NB	SA 106 GR. B
NOZZLE NECK ABOVE 250 NB	-
PIPE FITTINGS	-
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS 304
	METAL WINDING AND GRAFOIL FILLER
	MATERIAL WITH CS OUTER & SS 304
	INNER RING AS PER ASME B 16.20.
GASKET INTERNAL	-
EXTERNAL STUDS/BOLTS/NUTS	SA 193 GR.B7 / SA 194 GR.2H
INTERNAL STUDS/BOLTS/NUTS	-
~~SKIRT/~~ SUPPORT	IS 2062 GR. E 250 QUALITY BR/B0
~~SKIRT/~~ SUPPORT BASE	IS 2062 GR. E 250 QUALITY BR/B0
INTERNAL PARTS (WELDED)	-
INTERNAL PARTS (BOLTED)	-
CLIPS & ATTACHMENTS (EXTERNAL)	-
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENTS	SA 516 Gr.70
PIPE DAVIT	-
LIFTING LUG	SA 516 GR.70

PLATFORM OR PIPE CLIPS NOT TO BE SUPPORTED ON THE EQUIPMENT

SPECIAL SERVICE : --

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

INDIAN BOILER REGULATIONS (IBR)

DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	1000	OPERATING	1550
HYDROTEST(SHOP)	1800	HYDROTEST (FIELD)	1800
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
A	22.08.2025	ISSUED FOR BIDS / ENGG.	AS	RR/VIVEK	PB

DESIGN DATA	डिजाइन डाटा
CONDENSATE POT FOR 300-EE-00-2208	कन्डनसेट पॉट फॉर 300-ईई-00-2208
ITEM NO. 300-VV-VW-2203	आइटम नम्बर 300-वीवी-वीडब्ल्यू-2203

DRAWING NUMBER डाईग नम्बर	REV
B957-300-80-42-DS-3132	A
SHEET 1 OF 2	

FORMAT NO.3-8042-0501 REV.0 [28.02.2024] A3-420 X 297

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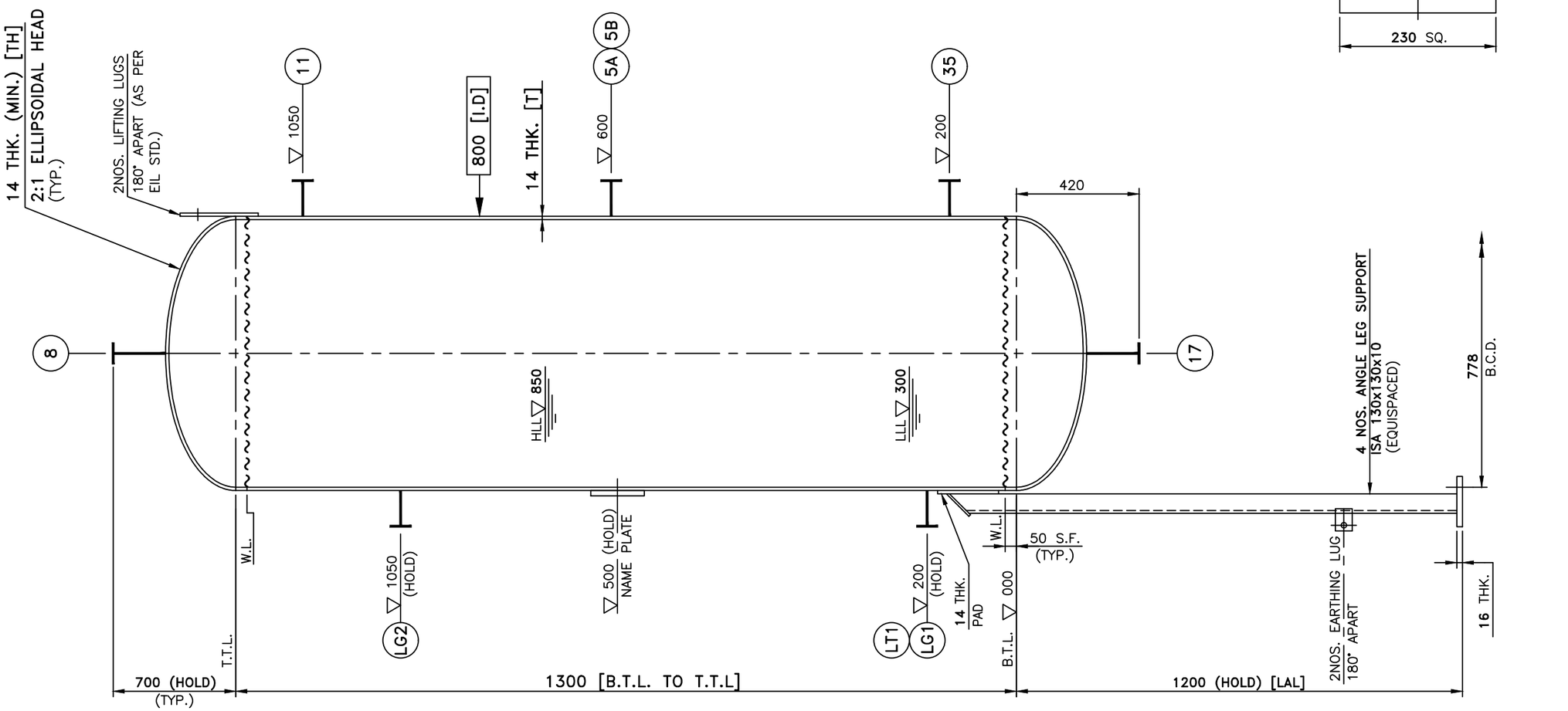

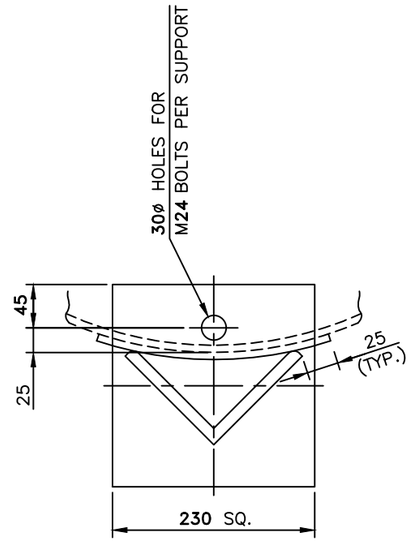

DETAIL OF BASE PLATE
(ALL OTHER DIMENSIONS AS PER EIL STD.)

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
A	22.08.2025	ISSUED FOR BIDS/ENGG.	AS	RR/VIVEK	PB	

VESSEL DESIGN DATA
CONDENSATE POT FOR
300-EE-00-2208
ITEM NO. 300-VV-VW-2203

वेसल डिजाइन डाटा
कन्डनसेट पॉट फॉर
300-ईई-00-2208
आइटम नम्बर 300-वीवी-वीडब्ल्यू-2203

DRAWING NO.	REV.
B957-300-80-42-DS-3132	A
SHEET 2 OF 2	

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

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PDS REV.1

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK / मार्क	QTY / क्वान्टिटी	NOM. DIA नामिनल डांया	SCH./THK. शड्यूल व थिकनैस	FLANGES CLASS / क्लास	FLANGES TYPE / टाईप	FLANGES FACING / फेसिग	PROJECTION NOTE-4 / प्रोजेशन	PAD W x T / पैड	SERVICE / सर्विस
5 A-B	2	200	80 B	300	WN	RF	570	95X T	HANDHOLE + BF + GASKET + BOLTING
8	1	50	160	600	WN	RF	SEE DWG.	-	VENT
11	1	150	80 B	300	WN	RF	570	70X T	FEED FROM 300-EE-00-2201A/B
17	1	150	80 B	300	WN	RF	SEE DWG.	85X T	LIQUID BOTTOM OUTLET TO LP COND. HEADER
35	1	50	160	600	WN	RF	520	-	UTILITY CONNECTION
B LG 1-2	2	50 (H)	160	300	WN	RF	520	-	LEVEL GAUGE/MAGNETIC (SS)
B LT1	1	50 (H)	160	300	WN	RF	520	-	LEVEL TRANSMITTER (DP)

T' DENOTES CORRESPONDING SHELL/DISH END NOMINAL THICKNESS

H' DENOTES (HOLD)

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकेशन

FOUNDATION LOADING DATA (OPERATING CONDITION)
फॉउन्डेशन लोडिगं डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC (DB)	-	-
WIND	-	-

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2 ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3 NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A) FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B) FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5 THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6 FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
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.
8 ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9 NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90º APART.
10 B SURFACE PREPARATION, SHOP PRIMER & FINISH PAINT AS PER JOB SPECIFICATION FOR SURFACE PREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING B	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
	SKIRT BASE DETAILS	7-12-0004
	SKIRT OPENING DETAILS	7-12-0005
X	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
	MANHOLE WITH DAVIT	7-12-0010
	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
	INTERNAL FLANGES	7-12-0018
	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
	SUPPORT RING AND BOLTING BAR	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
	PIPE DAVIT	7-12-0023
X	LIFTING LUG TOP HEAD TYPE	7-12-0024
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

NOZZLE ORIENTATIONS	
LADDERS/PLATFORM CLEATS	NOT APPLICABLE
PIPE SUPPORT CLEATS	NOT APPLICABLE
TRAY SUPPORT AND BOLTING BARS	NOT APPLICABLE
DEMISTER DATA SHEET	NOT APPLICABLE

B HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES LG & LT
X	NOZZLE ELEVATIONS LG & LT		PIPE SUPPORT CLEATS
X	SUPPORT HEIGHT		LADDER/PLATFORM CLEATS
	DETAILS OF INTERNALS		TRAY SUPPORT/BOLTING BARS
			PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	ASME SECTION VIII DIV-1 EDITION 2023
WORKING PRESSURE (kg/cm²g)	3.0
DESIGN PRESSURE (kg/cm²g)	INT. 25.5 B EXT. F.V.
WORKING TEMPERATURE (°C)	143.2
DESIGN TEMPERATURE (°C)	240
MDMT (°C)	1.1 B
CORROSION ALLOWANCE (mm)	3
TYPE OF HEAD	2:1 ELLIPTICAL
JOINT EFFICIENCY	SHELL 0.85 HEAD 1
RADIOGRAPHY	SHELL SPOT HEAD FULL
POST WELD HEAT TREATMENT	AS PER CODE / SPEC.
HEAT TREATMENT	HEAD: AS PER CODE / SPEC.
OPERATING MEDIUM	-
SP. GRAVITY	0.924 AT OPERATING TEMPERATURE
WIND SPECIFICATION	IS-875 (PART-3)
SEISMIC	SITE SPECTRA + IS-1893 (PART-4)
CAPACITY (M³)	0.52
PAINTING/CLEANING	AS PER JOB SPECIFICATION (REFER NOTE)
INSULATION THICKNESS (mm) (IH)	B 40 [X] HOT [ ] COLD
FIRE PROOFING CLEATS	[X] YES [ ] NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	B 33.15
INSPECTION BY	[X] EIL [ ] CIB [ ] TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 Gr.70
REINFORCEMENT PAD	SA 516 Gr.70
HEADS	SA 516 Gr.70
SHELL FLANGES	-
NOZZLE FLANGES	SA 105
NOZZLE NECK UPTO 250 NB	SA 106 GR. B
NOZZLE NECK ABOVE 250 NB	-
PIPE FITTINGS	-
GASKET EXTERNAL	B SPIRAL WOUND GASKET WITH SS 304
	METAL WINDING AND GRAFOIL FILLER
	MATERIAL WITH CS OUTER & SS 304
	INNER RING AS PER ASME B 16.20.
GASKET INTERNAL	-
EXTERNAL STUDS/BOLTS/NUTS	SA 193 GR.B7 / SA 194 GR.2H
INTERNAL STUDS/BOLTS/NUTS	B -
~~SKIRT/~~ SUPPORT	IS 2062 GR. E 250 QUALITY BR/B0
~~SKIRT/~~ SUPPORT BASE	IS 2062 GR. E 250 QUALITY BR/B0
INTERNAL PARTS (WELDED)	-
INTERNAL PARTS (BOLTED)	-
CLIPS & ATTACHMENTS (EXTERNAL)	-
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENTS	-
PIPE DAVIT	-
LIFTING LUG	SA 516 GR.70

PLATFORM OR PIPE CLIPS NOT TO BE SUPPORTED ON THE EQUIPMENT

SPECIAL SERVICE : --

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

INDIAN BOILER REGULATIONS (IBR)
DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	900	OPERATING	1200
HYDROTEST(SHOP)	1450	HYDROTEST (FIELD)	1450
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
B	07.08.2025	REVISED & REISSUED FOR BIDS / ENGG.	AS	VIVEK	PB
A	09.05.2025	ISSUED FOR BIDS / ENGG.	AS	VIVEK	PB

DESIGN DATA	डिजाइन डाटा
CONDENSATE POT FOR 300-EE-00-2201A/B	कन्डनसेट पॉट फॉर 300-ईई-00-2201ए/बी
ITEM NO. 300-VV-VW-2204	आइटम नम्बर 300-वीवी-वीडब्ल्यू-2204

	REV
DRAWING NUMBER / डाईग नम्बर	
B957-300-80-42-DS-3133	B
SHEET 1 OF 2	

FORMAT NO.3-8042-0501 REV.0 [28.02.2024] A3-420 X 297

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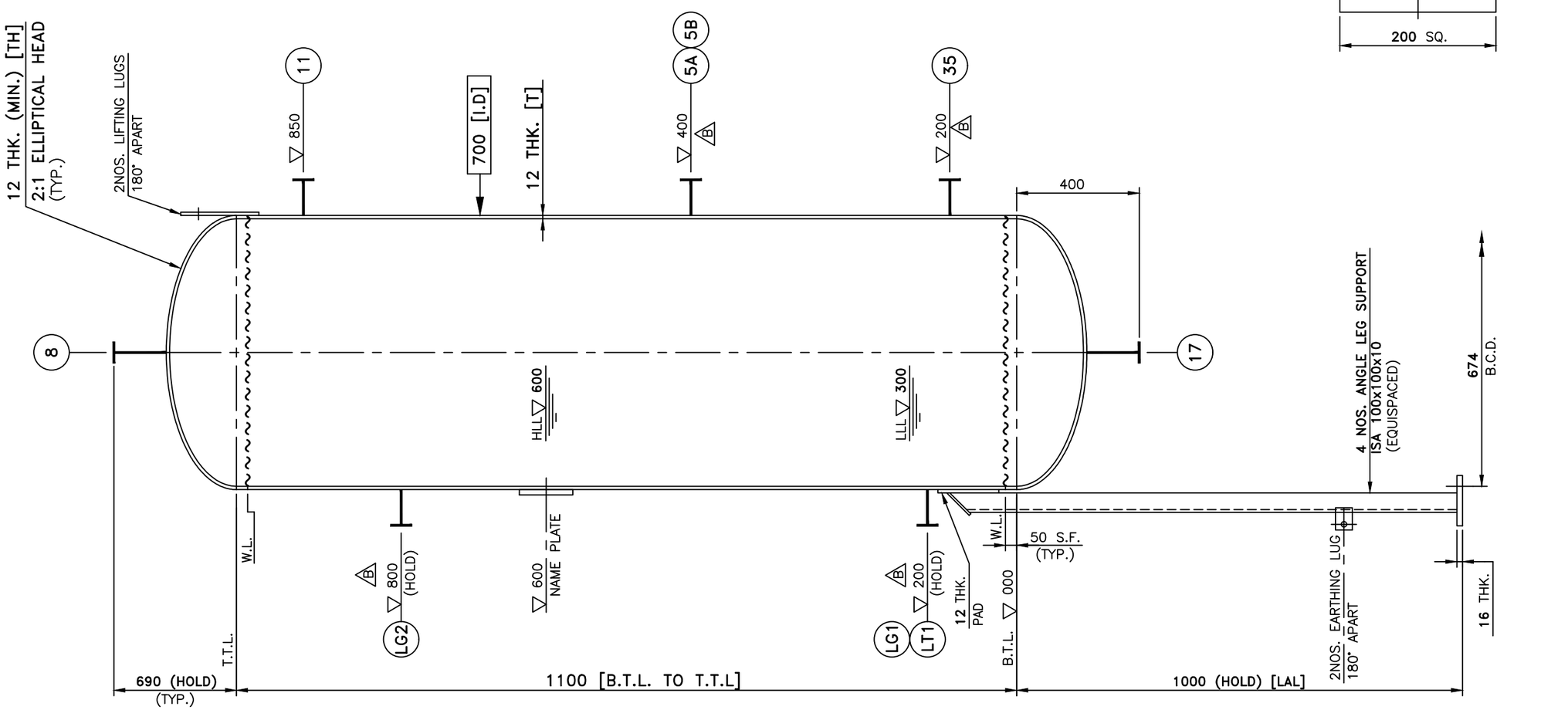

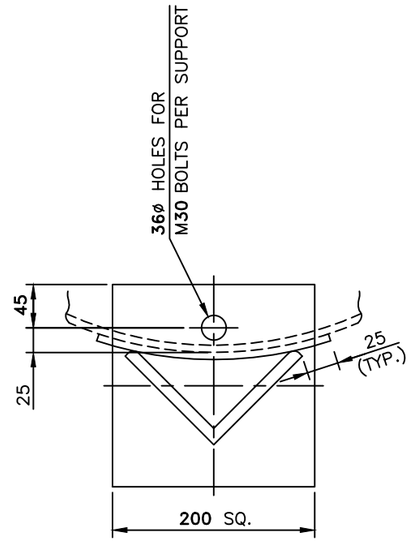

DETAIL OF BASE PLATE
(ALL OTHER DIMENSIONS AS PER EIL STD.)

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
B	07.08.2025	REVISED & REISSUED FOR BIDS/ENGG.	AS	VVEK	PB	
A	09.05.2025	ISSUED FOR BIDS/ENGG.	AS	VVEK	PB	

VESSEL DESIGN DATA
CONDENSATE POT FOR
300-EE-00-2201A/B
ITEM NO. 300-VV-VW-2204

वेसल डिजाइन डाटा
कन्डनसेट पॉट फॉर
300-ईई-00-2201ए/बी
आइटम नम्बर 300-वीवी-वीडब्ल्यू-2204

DRAWING NO.	REV.
B957-300-80-42-DS-3133	B
SHEET 2 OF 2	

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

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NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK	QTY	NOM. DIA	SCH./THK.	FLANGES			PROJECTION NOTE-4	PAD W x T	SERVICE
		नामिनल	शेड्यूल व	CLASS	TYPE	FACING			
मार्क	क्वान्टिटी	डांया	थिकनैस	क्लास	टाईप	फेसिंग	प्रोजेक्शन	पैड	सर्विस
5 A-B	2	200	80	150	WN	RF	560	95X T	HANDHOLE + BF + GASKET + BOLTING
8	1	50	160	600	WN	RF	SEE DWG.	-	VENT
11	1	150	80	300	WN	RF	560	70X T	FEED FROM 300-EE-00-2204A/B
17	1	150	80	300	WN	RF	SEE DWG.	85X T	LIQUID BOTTOM OUTLET TO LP COND. HEADER
35	1	50	160	600	WN	RF	510	-	UTILITY CONNECTION
LG 1-2	2	50 (H)	160	300	WN	RF	510	-	LEVEL GAUGE MAGNETIC (SS)
LT1	1	50 (H)	160	300	WN	RF	510	-	LEVEL TRANSMITTER (DP)

'T' DENOTES CORRESPONDING SHELL/DISH END NOMINAL THICKNESS

'H' DENOTES (HOLD)

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकेशन

FOUNDATION LOADING DATA (OPERATING CONDITION)
फॉउन्डेशन लोडिंग डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC (DB)	-	-
WIND	-	-

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3. NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A). FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B). FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5. THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6. FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
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.
8. ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9. NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90º APART.
10. SURFACE PREPARATION, SHOP PRIMER & FINISH PAINT AS PER JOB SPECIFICATION FOR SURFACE PREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
	SKIRT BASE DETAILS	7-12-0004
	SKIRT OPENING DETAILS	7-12-0005
X	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
	MANHOLE WITH DAVIT	7-12-0010
	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
	INTERNAL FLANGES	7-12-0018
	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
	SUPPORT RING AND BOLTING BAR	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

NOZZLE ORIENTATIONS	
LADDERS/PLATFORM CLEATS	NOT APPLICABLE
PIPE SUPPORT CLEATS	NOT APPLICABLE
TRAY SUPPORT AND BOLTING BARS	NOT APPLICABLE
DEMISTER DATA SHEET	NOT APPLICABLE

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES LG-1,2 & LT1
X	NOZZLE ELEVATIONS LG-1,2 & LT1		PIPE SUPPORT CLEATS
X	SUPPORT HEIGHT		LADDER/PLATFORM CLEATS
	DETAILS OF INTERNALS		TRAY SUPPORT/BOLTING BARS
			PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE		ASME SECTION VIII DIV-1 EDITION 2023
WORKING PRESSURE	(kg/cm^2g)	3.0
DESIGN PRESSURE	(kg/cm^2g)	INT. 8 EXT. F.V.
WORKING TEMPERATURE	(°C)	143.2
DESIGN TEMPERATURE	(°C)	240
MDMT	(°C)	1.1
CORROSION ALLOWANCE	(mm)	3
TYPE OF HEAD		2:1 ELLIPTICAL
JOINT EFFICIENCY		SHELL 0.85 HEAD 1
RADIOGRAPHY		SHELL SPOT HEAD FULL
POST WELD HEAT TREATMENT		AS PER CODE / SPEC.
HEAT TREATMENT		HEAD: AS PER CODE / SPEC.
OPERATING MEDIUM		-
SP. GRAVITY		0.924 AT OPERATING TEMPERATURE
WIND SPECIFICATION		IS-875 (PART-3)
SEISMIC		SITE SPECTRA + IS-1893 (PART-4)
CAPACITY	(M^3)	0.56
PAINTING/CLEANING		AS PER JOB SPECIFICATION (REFER NOTE)
INSULATION THICKNESS (mm) (IH)		40 [X] HOT [ ] COLD
FIRE PROOFING CLEATS		[X] YES [ ] NO
HYDROSTATIC TEST	(kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)		10.4
INSPECTION BY		[X] EIL [ ] CIB [ ] TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)
(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 Gr.70
REINFORCEMENT PAD	SA 516 Gr.70
HEADS	SA 516 Gr.70
SHELL FLANGES	-
NOZZLE FLANGES	SA 105
NOZZLE NECK UPTO 250 NB	SA 106 GR. B
NOZZLE NECK ABOVE 250 NB	-
PIPE FITTINGS	-
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS 304
	METAL WINDING AND GRAFOIL FILLER
	MATERIAL WITH CS OUTER & SS 304
	INNER RING AS PER ASME B 16.20.
GASKET INTERNAL	-
EXTERNAL STUDS/BOLTS/NUTS	SA 193 GR.B7 / SA 194 GR.2H
INTERNAL STUDS/BOLTS/NUTS	-
~~SKIRT/~~ SUPPORT	IS 2062 GR. E 250 QUALITY BR/B0
~~SKIRT/~~ SUPPORT BASE	IS 2062 GR. E 250 QUALITY BR/B0
INTERNAL PARTS (WELDED)	-
INTERNAL PARTS (BOLTED)	-
CLIPS & ATTACHMENTS (EXTERNAL)	-
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENTS	SA 516 GR.70
PIPE DAVIT	-
LIFTING LUG	SA 516 GR.70

PLATFORM OR PIPE CLIPS NOT TO BE SUPPORTED ON THE EQUIPMENT

SPECIAL SERVICE : --

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

- **INDIAN BOILER REGULATIONS (IBR)**
- **DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)**

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	900	OPERATING	1200
HYDROTEST(SHOP)	1450	HYDROTEST (FIELD)	1450
NUMBER OF ITEMS :	ONE		

PDS B957-300-79-41-DS-1255 REV.1

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
A	06.11.2025	ISSUED FOR BIDS / ENGG.	ROHIT	SA/VIVEK	PB

DESIGN DATA
CONDENSATE POT FOR 300-EE-00-2204A/B

ITEM NO. 300-VV-VW-2205

डिजाइन डाटा
कन्डनसेट पॉट फॉर 300-ईई-00-2204ए/बी

आइटम नम्बर 300-वीवी-वीडब्ल्यू-2205

DRAWING NUMBER / डाईग नम्बर: **B957-300-80-42-DS-3134** REV: A

SHEET 1 OF 2

FORMAT NO.3-8042-0501 REV.0 [28.02.2024] A3-420 X 297

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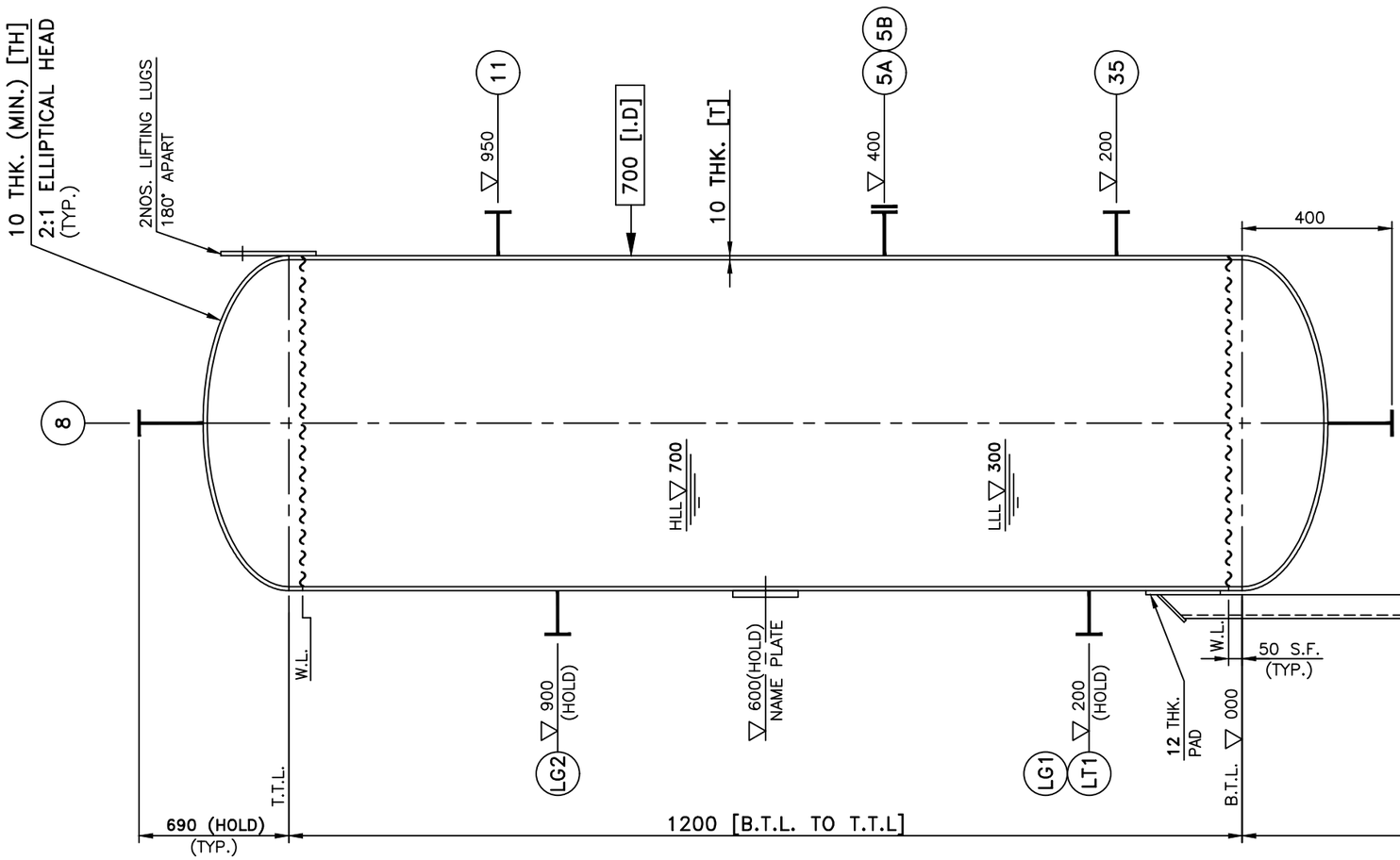

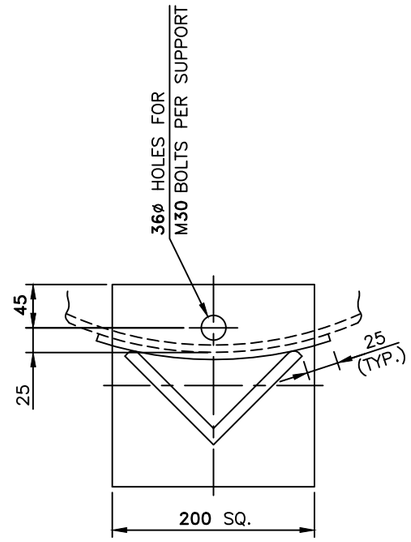

DETAIL OF BASE PLATE
(ALL OTHER DIMENSIONS AS PER EIL STD.)

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
A	06.11.2025	ISSUED FOR BIDS/ENGG.	ROHIT	SA/VIVEK	PB	

VESSEL DESIGN DATA
CONDENSATE POT FOR
300-EE-00-2204A/B
ITEM NO. 300-VV-VW-2205

वेसल डिजाइन डाटा
कन्डनसेट पॉट फॉर
300-ईई-00-2204ए/बी
आइटम नम्बर 300-वीवी-वीडब्ल्यू-2205

DRAWING NO.	REV.
B957-300-80-42-DS-3134	A
SHEET 2 OF 2	

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

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PDS NO. B957-300-79-41-DS-1247 REV.2

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK	QTY	NOM. DIA	SCH./THK.	FLANGES			PROJECTION NOTE-4	PAD W x T	SERVICE
		नामिनल	शेड्यूल व	CLASS	TYPE	FACING			
मार्क	क्वान्टिटी	डांया	थिकनैस	क्लास	टाईप	फेसिंग	प्रोजेक्शन	पैड	सर्विस
1	1	600	14 THK.	150	WN	RF	1770	255X T	MANHOLE + BF + GASKET + BOLTING
7	1	750	18 THK.	150	WN	RF	SEE DWG.	380xT	VAPOUR OUTLET TO 300-VV-VI-3002
8	1	50	160	300	WN	RF	SEE DWG.	-	VENT
11	1	750	18 THK.	150	WN	RF	1770	325X T	FEED FROM 300-EE-00-2302
17	1	50	160	300	WN	RF	SEE DWG.	-	BOTTOM OUTLET TO 300-CC-00-1301
31	1	80	160	300	WN	RF	SEE DWG.	45xT	DRAIN
35	1	50	160	300	WN	RF	1670	-	UTILITY CONNECTION
36	1	50	160	300	WN	RF	1670	-	PRESSURE GAUGE
LG 1-2	2	50 (H)	160	300	WN	RF	1670	-	LEVL GAUGE MAGNETIC (SS)
LT 1-2	2	50 (H)	160	300	WN	RF	1670	-	LEVEL TRANSMITTER (GWR)
AO 1-2	2	500 ID	14 THK.	AS PER EIL STD.				250 X T	ACCESS OPENING
SKV 1-4	4	100	Sch 40	AS PER EIL STD.				-	SKIRT VENT

T' DENOTES CORRESPONDING SHELL/DISH END NOMINAL THICKNESS

'H' DENOTES HOLD

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकेशन्स

FOUNDATION LOADING DATA (OPERATING CONDITION)
फॉउन्डेशन लोडिंग डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC	67700	8200
WIND	60900	7700

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3. NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A). FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B). FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5. THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6. FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
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.
8. ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9. NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90º APART.
10. SURFACE PREPARATION, SHOP PRIMER & FINSH PAINT AS PER JOB SPECIFICATION FOR SURFACEPREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.
11. VENDOR SHALL PROVIDE 2 NOS. PERMANENT SLOPING STEEL MONKEY LADDERS INSIDE THE SKIRT TO ACCESS THE BOTTOM HEAD FOR INSPECTION.
12. ALL FABRICATED NOZZLES SHALL BE 100% RADIOGRAPHED.
13. NOZZLE SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKET.
14. VESSEL IS SUBJECT TO STEAM OUT AT 190°C AND 0.5 kg/cm2g.
15. VENDOR TO DESIGN AND PROVIDE TAILING LUG (AT 90° TO LIFTING LUGS / TRUNNIONS) 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.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
X	SKIRT BASE DETAILS	7-12-0004
X	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
X	MANHOLE WITH DAVIT	7-12-0010
X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
	INTERNAL FLANGES	7-12-0018
	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
	SUPPORT RING AND BOLTING BAR	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

	NOZZLE ORIENTATIONS	
	LADDERS/PLATFORM CLEATS	
	PIPE SUPPORT CLEATS	
	TRAY SUPPORT AND BOLTING BARS	NOT APPLICABLE
	DEMISTER DATA SHEET	NOT APPLICABLE
X	SKETCH FOR MONKEY LADDER	B957-000-80-42-SK-0010

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES LG & LT
X	NOZZLE ELEVATIONS LG & LT	X	PIPE SUPPORT CLEATS
X	SUPPORT HEIGHT	X	LADDER/PLATFORM CLEATS
	DETAILS OF INTERNALS		TRAY SUPPORT/BOLTING BARS
			PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	ASME SECTION VIII DIV-1 ED.2023
WORKING PRESSURE (kg/cm^2g)	3.85
DESIGN PRESSURE (kg/cm^2g)	INT. 7.5 EXT. -
WORKING TEMPERATURE (°C)	39.9
DESIGN TEMPERATURE (°C)	95
MDMT (°C)	1.1
CORROSION ALLOWANCE (mm)	3
TYPE OF HEAD	2:1 ELLIPSOIDAL
JOINT EFFICIENCY	SHELL 0.85 HEAD 1
RADIOGRAPHY	SHELL SPOT HEAD FULL
POST WELD HEAT TREATMENT	AS PER CODE / SPEC.
HEAT TREATMENT	HEAD: AS PER CODE / SPEC.
OPERATING MEDIUM	-
SP. GRAVITY	0.992 (AT OPERATING TEMP.)
WIND SPECIFICATION	IS-875
SEISMIC	SITE SPECTRA + IS-1893
CAPACITY (M^3)	32.6
PAINTING/CLEANING	AS PER JOB SPECIFICATION (REFER NOTE-10)
INSULATION THICKNESS (mm)	NIL ☐ HOT ☐ COLD
FIRE PROOFING CLEATS	☒ YES ☐ NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	9.75
INSPECTION BY	☒ EIL ☐ CIB ☐ TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 Gr.70
REINFORCEMENT PAD	SA 516 Gr.70
HEADS	SA 516 Gr.70
SHELL FLANGES	-
NOZZLE FLANGES / LWN	SA 105
NOZZLE NECK UPTO 250 NB	SA 106 GR. B
NOZZLE NECK ABOVE 250 NB	SA 516 Gr.70
PIPE FITTINGS	SA 234 GR. WPB (SEAMLESS)
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS 304 METAL WINDING AND GRAFOIL FILLER
	MATERIAL WITH CS OUTER & SS 304 INNER RING AS PER ASME B 16.20.
GASKET INTERNAL	-
EXTERNAL STUDS/BOLTS/NUTS	SA 193 GR.B7 / SA 194 GR.2H
INTERNAL STUDS/BOLTS/NUTS	-
SKIRT/ ~~SUPPORT~~	SA 516 GR.70 / IS 2062 GR. E 250 QUALITY BR/B0
SKIRT/~~SUPPORT~~ BASE	IS 2062 GR. E 250 QUALITY BR/B0
INTERNAL PARTS (WELDED)	SA 516 GR.70/ SA 106 GR.B
INTERNAL PARTS (BOLTED)	-
CLIPS & ATTACHMENTS (EXTERNAL) DIRECTLY WELDED OVER VESSEL	SA 516 GR.70
CLIPS & ATTACHMENTS (EXTERNAL) WELDED OVER PAD	IS 2062 GR. E 250 QUALITY BR/B0
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENTS	SA 516 GR.70
LIFTING LUG	SA 516 GR.70

SPECIAL SERVICE : --

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

- **INDIAN BOILER REGULATIONS (IBR)**
- **DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)**

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	14200	OPERATING	33200
HYDROTEST(SHOP)	47000	HYDROTEST (FIELD)	56000
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
B	18.12.2025	REVISED & REISSUED FOR BIDS / ENGG.	AS	RR/VIVEK	PB
A	29.08.2025	ISSUED FOR BIDS / ENGG.	AS	RR/VIVEK	PB

DESIGN DATA	डिजाइन डाटा
REGENERATION GAS K.O. DRUM	रीजनरेशन गैस के.ओ. ड्रम
ITEM NO. 300-VV-VI-2301	आइटम नम्बर 300-वीवी-वीआइ-2301

DRAWING NUMBER डाईग नम्बर: **B957-300-80-42-DS-3135** REV: B

SHEET 1 OF 2

FORMAT NO.3-8042-0501 REV.0 (28.02.2024) A3-420 X 297

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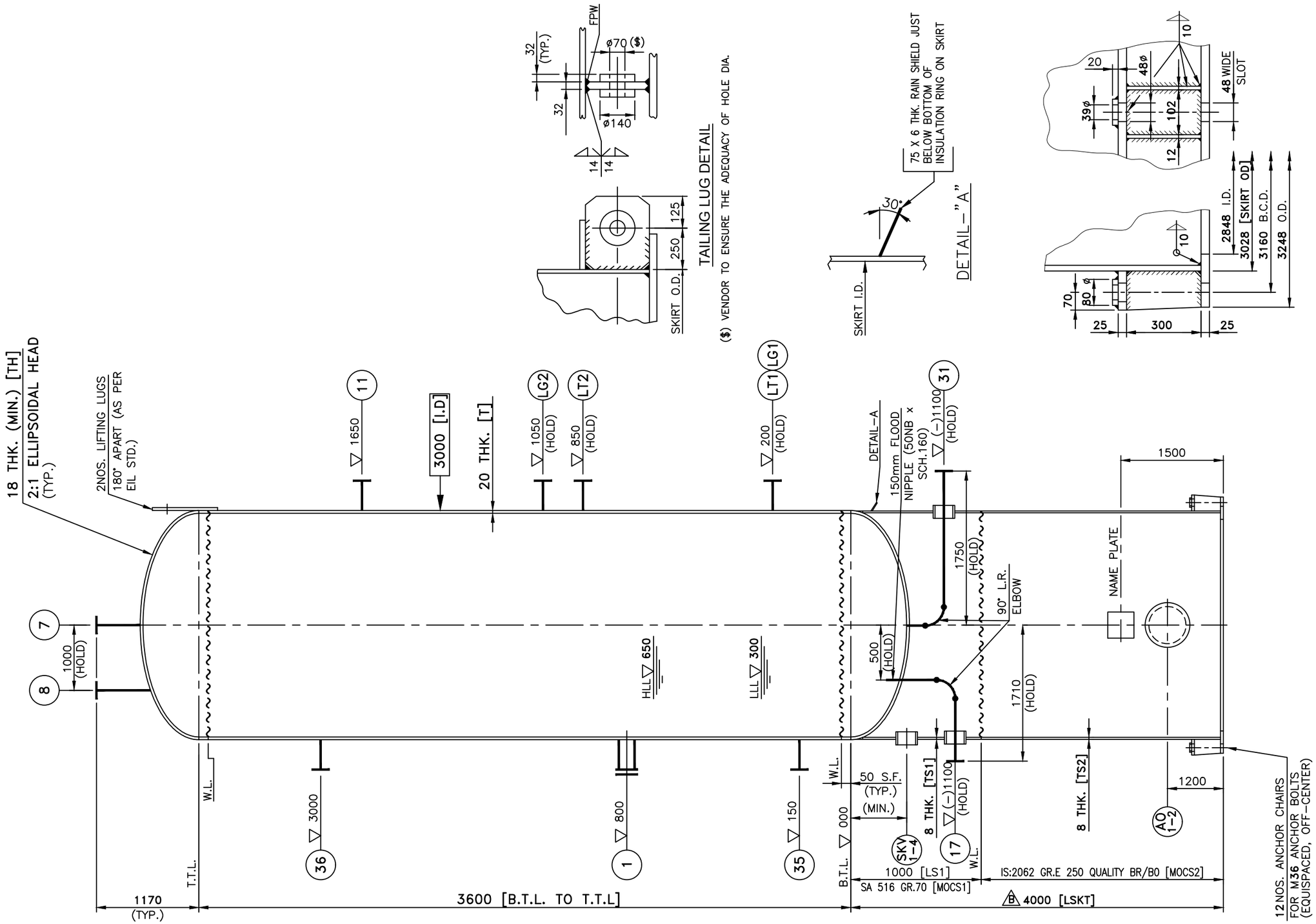

TAILING LUG DETAIL

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

DETAIL – "A"

SKIRT BASE DETAIL

(ALL OTHER DIMENSIONS AS PER EIL STD.)

B	18.12.2025	REVISED & REISSUED FOR BIDS/ENGG.	AS	RR/VIVEK	PB		
A	29.08.2025	ISSUED FOR BIDS/ENGG.	AS	RR/VIVEK	PB		
REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED	

ENGINEERS INDIA LIMITED
NEW DELHI

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

VESSEL DESIGN DATA
REGENERATION GAS K.O. DRUM
ITEM NO. 300-VV-VI-2301

वेसेल डिजाइन डाटा
रीजनरेशन गैस के.ओ. ड्रम
आइटम नम्बर 300-वीवी-वीआइ-2301

DRAWING NO. B957-300-80-42-DS-3135

REV. B

SHEET 2 OF 2

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

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PDS B957-300-79-41-DS-1248 REV.1

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK	QTY	NOM. DIA	SCH./THK.	FLANGES			PROJECTION NOTE-4	PAD W x T	SERVICE
		नामिनल	शड्यूल व	CLASS	TYPE	FACING			
मार्क	क्वान्टिटी	डांया	थिकनैस	क्लास	टाईप	फेसिग	प्रोजेक्शन	पैड	सर्विस
5	2	200	120	600	WN	RF	680	110 X T	HANDHOLE + BF
8	1	50.8 I.D.	-	600	LWN	RF	SEE DWG.	-	VENT
11	1	150	120	600	WN	RF	630	85 X T	FEED FROM 300-EE-00-2303
17	1	150	120	600	WN	RF	SEE DWG.	85 X T	LIQUID BOTTOM OUTLET TO HP CONDENSATE HEADER
35	1	50.8 I.D.	-	600	LWN	RF	580	-	UTILITY CONNECTION
LT 1-2	2	50.8 I.D.	-	600	LWN	RF	580	-	LEVEL TANSMITTER (GWR)
LG 1-2	2	50.8 I.D.	-	600	LWN	RF	580	-	LEVEL GAUGE MAGNETIC (SS)

'T' DENOTES CORRESPONDING SHELL/ DISH END NOMINAL THICKNESS

'H' DENOTES HOLD

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकशन्स

FOUNDATION LOADING DATA (OPERATING CONDITION) (HOLD)
फॉऊडशन लोडिगं डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC	-	-
SEISMIC		
WIND	-	-

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2 ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3 NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A) FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B) FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5 THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6 FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
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.
8 ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9 NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90° APART.
10 ALL FABRICATED NOZZLES SHALL BE 100% RADIOGRAPHED.
11 NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.
12 SURFACE PREPARATION, SHOP PRIMER & FINISH PAINT AS PER JOB SPECIFICATION FOR SURFACE PREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.
13 VENDOR SHALL CARRY OUT COMPLETE MECHANICAL DESIGN AS PER IBR & MODIFY THE THICKNESS, IF NECESSARY, WITHOUT ANY COST AND TIME IMPLICATION. HOWEVER, INDICATED THK. ARE MINIMUM TO BE PROVIDED. IT IS SOLE RESPONSIBILITY OF VENDOR TO GET APPROVAL OF ALL DOCUMENTS & DESIGN CALCULATION FROM CIB & ALSO GET THE EQPT. INSPECTED BY CIB.
14 ALL MATERIAL / FABRICATION / TESTING (INCLUDING HYDROTEST) / INSPECTION SHALL MEET IBR REQUIREMENTS.
15 ALL PRESSURE BEARING WELDS SHALL BE CHECKED BY MP/DP TESTED AFTER HYDROTEST.
16 PARTS NOT COVERED BY IBR SHALL BE DESIGNED AS PER ASME SEC. VIII DIV.1.
17 WELD FOR ALL PRESSURE BEARING COMPONENTS SHALL BE FULL PENETRATION WELD. TEST FOR CLASS-I FUSION WELDED SEAMS SHALL COMPLY WITH REQUIREMENTS OF IBR.
18 ALL CIRCUMFERENTIAL, LONGITUDINAL WELDS SHALL BE WELD FROM BOTH SIDE. WHEREVER WELDING IS NOT POSSIBLE FROM OTHER SIDE FIRST TWO (2) ROOT RUNS SHALL BE CARRIED OUT BY TIG.
19 HYDROTEST SHALL BE CARRIED OUT AS PER IBR REQUIREMENTS.
20 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.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC. FOR SURFACE PREPARATION & PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
	SKIRT BASE DETAILS	7-12-0004
	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
X	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
	MANHOLE WITH DAVIT	7-12-0010
	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
	INTERNAL FLANGES	7-12-0018
	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
	SUPPORT RING AND BOLTING BAR	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS (FOR GUIDANCE)	7-12-0022
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

NOZZLE ORIENTATIONS	
LADDERS/PLATFORM CLEATS	NOT APPLICABLE
PIPE SUPPORT CLEATS	NOT APPLICABLE
TRAY SUPPORT AND BOLTING BARS	NOT APPLICABLE
DEMISTER DATA SHEET	NOT APPLICABLE
SKETCH FOR MONKEY LADDER	-

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES LT,LG
X	NOZZLE ELEVATIONS LT,LG		PIPE SUPPORT CLEATS
X	SUPPORT HEIGHT		LADDER/PLATFORM CLEATS
	DETAILS OF INTERNALS		TRAY SUPPORT/BOLTING BARS
			PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	IBR (CLASS-I) (NOTE-16)
WORKING PRESSURE (kg/cm²g)	37
DESIGN PRESSURE (kg/cm²g)	INT. 46 EXT. F.V
WORKING TEMPERATURE (°C)	246
DESIGN TEMPERATURE (°C)	420
MDMT (°C)	1.1
CORROSION ALLLOWANCE (MM)	3
TYPE OF HEAD	2:1 ELLIPTICAL
JOINT EFFICIENCY	SHELL AS PER IBR HEAD SINGLE PIECE
RADIOGRAPHY	SHELL AS PER IBR HEAD SINGLE PIECE
POST WELD HEAT TREATMENT	YES (NOTE-20)
HEAT TREATMENT	HEAD: AS PER CODE/SPEC.
OPERATING MEDIUM	-
SP. GRAVITY	0.804 (AT OPERATING TEMP.)
WIND SPECIFICATION	IS 875 (PART-3)
SEISMIC	IS 1893 + SITE SPECTRA (PART-4)
CAPACITY (M³)	0.7
PAINTING/CLEANING	AS PER JOB SPECIFICATION (NOTE-12)
INSULATION THICKNESS (mm) (IH)	80 [X] HOT [ ] COLD
FIRE PROOFING CLEATS	[X] YES [ ] NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	AS PER IBR
INSPECTION BY	[ ] EIL [X] CIB [ ] TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 GR.70
REINFORCEMENT PAD	SA 516 GR.70
HEADS	SA 516 GR.70
~~SHELL FLANGES/ SR/ LWN~~	-
NOZZLE FLANGES	SA 105
NOZZLE NECK UPTO 250 NB	SA 106 GR. B
NOZZLE NECK ABOVE 250 NB	-
PIPE FITTINGS	-
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS304 METAL WINDING & GRAFOIL FILLER WITH CS OUTER SS304 INNER RING AS PER ASME B16.20
GASKET INTERNAL	-
EXTERNAL STUDS/BOLTS/NUTS	SA 193 GR.B7/SA 194 GR.2H
INTERNAL STUDS/BOLTS/NUTS	-
~~SKIRT/~~ SUPPORT	SA 106 GR. B
~~SKIRT/~~ SUPPORT BASE	IS 2062 GR. E 250 QUALITY BR/B0
INTERNAL PARTS (WELDED)	-
INTERNAL PARTS (BOLTED)	-
CLIPS & ATTACHMENTS (EXTERNAL)	SA 516 GR.70
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENT	SA 516 GR.70
PIPE DAVIT	-
LIFTING LUG	SA 516 GR.70
TAILING LUG	-

NO PLATFORM, LADDER, PIPING SHALL BE SUPPORTED ON THIS EQUIPMENT

SPECIAL SERVICE : --

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स) (HOLD)

X	**INDIAN BOILER REGULATIONS (IBR)**
	DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	2000	OPERATING	2200
HYDROTEST(SHOP)	2700	HYDROTEST (FIELD)	2600
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
A	11.08.2025	ISSUED FOR BIDS/ENGG.	ROHIT	CRG / VIVEK	PB

DESIGN DATA
CONDENSATE POT
FOR 300-EE-00-2303

ITEM NO. 300-VV-VW-2302

डिजाइन डाटा
कन्डनसेट पॉट
फॉर 300-00-इइ-2303

आइटम नम्बर 300-वीवी-वीडब्ल्यू-2302

DRAWING NUMBER / डाईग नम्बर: **B957-300-80-42-DS-3136** REV: A

SHEET 1 OF 2

FORMAT NO.3-8042-0501 REV.0 (28.02.2024) A3-420 X 297

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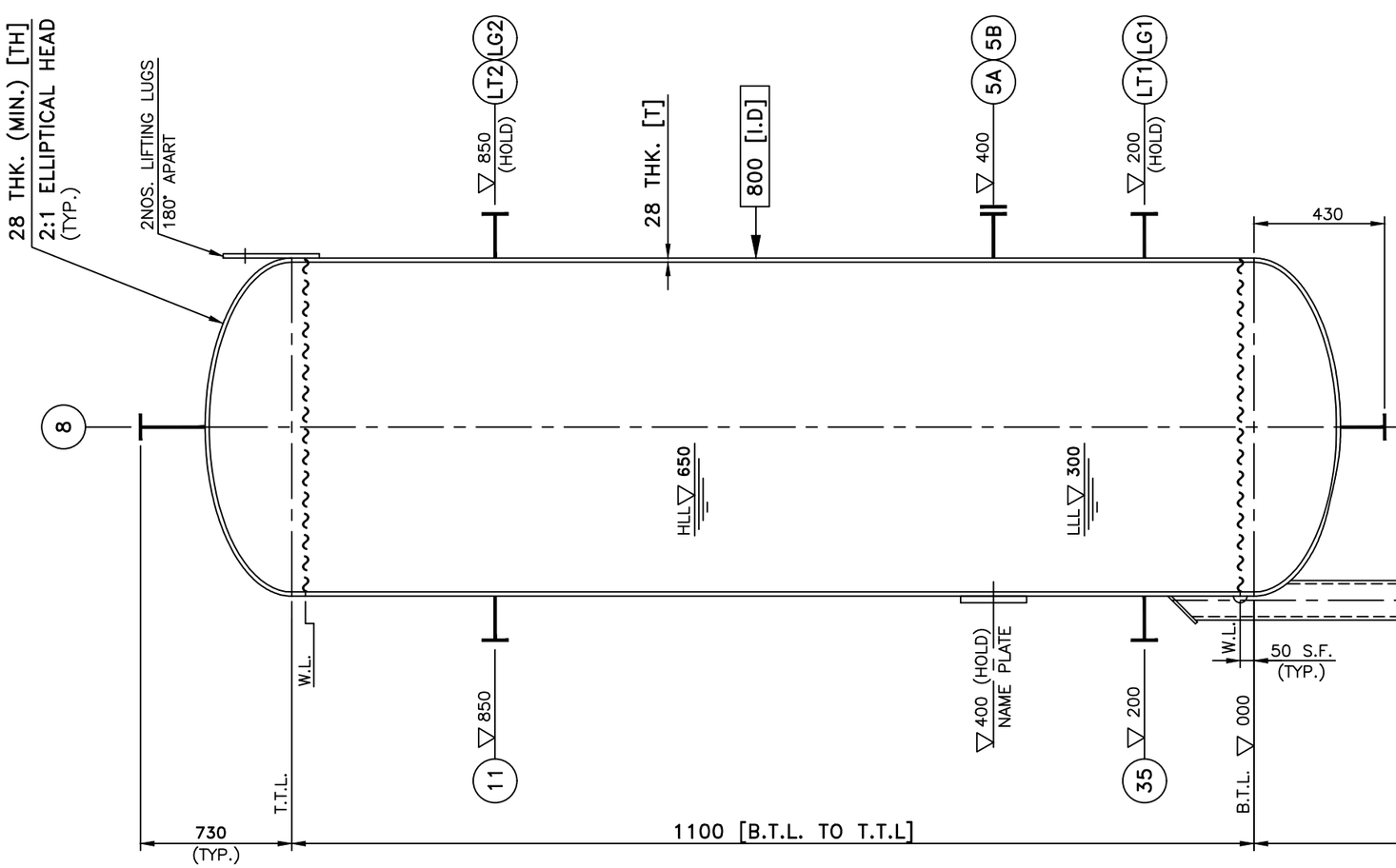

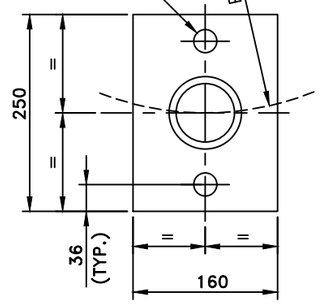

DETAIL OF BASE PLATE (HOLD)
(ALL OTHER DIMENSIONS AS PER EIL STD.)

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
A	11.08.2025	ISSUED FOR BIDS/ENGG.	ROHIT	CRG/VIVEK	PB	

VESSEL DESIGN DATA
CONDENSATE POT
FOR 300-EE-00-2303
ITEM NO. 300-VV-VW-2302

वेसेल डिजाइन डाटा
कन्डनसेट पॉट
फॉर 300-00-इइ-2303
आइटम नम्बर 300-वीवी-वीडब्ल्यू-2302

DRAWING NO.	REV.
B957-300-80-42-DS-3136	A
SHEET 2 OF 2	

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

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PDS B957-300-79-41-DS-1249 REV.1

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK / मार्क	QTY / क्वान्टिटी	NOM. DIA नामिनल डांया	SCH./THK. शड्यूल व थिकनैस	FLANGES CLASS क्लास	FLANGES TYPE टाईप	FLANGES FACING फेसिंग	PROJECTION NOTE-4 प्रोजेक्शन	PAD W x T पैड	SERVICE सर्विस
5 A-B	2	200	80	300	WN	RF	510	95X T	HANDHOLE + BF + GASKET + BOLTING
8	1	50	160	600	WN	RF	SEE DWG.	-	VENT
11	1	50	160	600	WN	RF	460	-	FEED FROM 300-EE-00-2304
17	1	50	160	600	WN	RF	SEE DWG.	-	LIQUID BOTTOM OUTLET TO MP CONDENSATE HEADER
35	1	50	160	600	WN	RF	460	-	UTILITY CONNECTION
LG 1-2	2	50(H)	160	300	WN	RF	460	-	LEVEL GAUGE MAGNETIC (SS)
LT 1-2	2	50(H)	160	300	WN	RF	460	-	LEVEL TRANSMITTER (GWR)

'T' DENOTES CORRESPONDING SHELL/DISH END NOMINAL THICKNESS

'H' DENOTES (HOLD)

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकेशन

FOUNDATION LOADING DATA (OPERATING CONDITION)
फॉउन्डेशन लोडिंग डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC (DB)	-	-
WIND	-	-

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3. NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A). FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B). FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5. THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6. FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
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.
8. ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9. NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90º APART.
10. SURFACE PREPARATION, SHOP PRIMER & FINISH PAINT AS PER JOB SPECIFICATION FOR SURFACE PREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.
11. ALL FABRICATED NOZZLES SHALL BE 100% RADIOGRAPHED.
12. NOZZLES SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKETS.
13. VENDOR SHALL CARRY OUT COMPLETE MECHANICAL DESIGN AS PER IBR & MODIFY THE THICKNESS, IF NECESSARY, WITHOUT ANY COST AND TIME IMPLICATION. HOWEVER, INDICATED THK. ARE MINIMUM TO BE PROVIDED. IT IS SOLE RESPONSIBILITY OF VENDOR TO GET APPROVAL OF ALL DOCUMENTS & DESIGN CALCULATION FROM CIB & ALSO GET THE EQPT. INSPECTED BY CIB.
14. ALL MATERIAL / FABRICATION / TESTING (INCLUDING HYDROTEST) / INSPECTION SHALL MEET IBR REQUIREMENTS.
15. ALL PRESSURE BEARING WELDS SHALL BE CHECKED BY MP/DP TESTED AFTER HYDROTEST.
16. PARTS NOT COVERED BY IBR SHALL BE DESIGNED AS PER ASME SEC. VIII DIV.1.
17. WELD FOR ALL PRESSURE BEARING COMPONENTS SHALL BE FULL PENETRATION WELD. TEST FOR CLASS-I FUSION WELDED SEAMS SHALL COMPLY WITH REQUIREMENTS OF IBR.
18. ALL CIRCUMFERENTIAL, LONGITUDINAL WELDS SHALL BE WELD FROM BOTH SIDE. WHEREVER WELDING IS NOT POSSIBLE FROM OTHER SIDE FIRST TWO (2) ROOT RUNS SHALL BE CARRIED OUT BY TIG.
19. HYDROTEST SHALL BE CARRIED OUT AS PER IBR REQUIREMENTS.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
	SKIRT BASE DETAILS	7-12-0004
	SKIRT OPENING DETAILS	7-12-0005
X	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
	MANHOLE WITH DAVIT	7-12-0010
	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
	INTERNAL FLANGES	7-12-0018
	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
	SUPPORT RING AND BOLTING BAR	7-12-0021
	SUPPORT RING SIZES FOR PACKED TOWERS	7-12-0022
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

NOZZLE ORIENTATIONS	
LADDERS/PLATFORM CLEATS	NOT APPLICABLE
PIPE SUPPORT CLEATS	NOT APPLICABLE
TRAY SUPPORT AND BOLTING BARS	NOT APPLICABLE
DEMISTER DATA SHEET	NOT APPLICABLE

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES LG 1-2 & LT 1-2
X	NOZZLE ELEVATIONS LG 1-2 & LT 1-2		PIPE SUPPORT CLEATS
X	SUPPORT HEIGHT		LADDER/PLATFORM CLEATS
	DETAILS OF INTERNALS		TRAY SUPPORT/BOLTING BARS
			PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE		IBR (CLASS-I) (NOTE-16)
WORKING PRESSURE	(kg/cm^2g)	16
DESIGN PRESSURE	(kg/cm^2g)	INT. 22 EXT. F.V.
WORKING TEMPERATURE	(°C)	204
DESIGN TEMPERATURE	(°C)	350
MDMT	(°C)	1.1
CORROSION ALLOWANCE	(mm)	3
TYPE OF HEAD		2:1 ELLIPTICAL
JOINT EFFICIENCY		SHELL AS PER IBR HEAD SINGLE PIECE
RADIOGRAPHY		SHELL AS PER IBR HEAD SINGLE PIECE
POST WELD HEAT TREATMENT		AS PER CODE / SPEC.
HEAT TREATMENT		HEAD: AS PER CODE / SPEC.
OPERATING MEDIUM		-
SP. GRAVITY		0.861 AT OPERATING TEMPERATURE
WIND SPECIFICATION		IS-875 (PART-3)
SEISMIC		SITE SPECTRA + IS-1893 (PART-4)
CAPACITY	(M^3)	0.4
PAINTING/CLEANING		AS PER JOB SPECIFICATION (NOTE-10)
INSULATION THICKNESS (mm) (IH)		80 [X] HOT [ ] COLD
FIRE PROOFING CLEATS		[X] YES [ ] NO
HYDROSTATIC TEST	(kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)		AS PER IBR
INSPECTION BY		[ ] EIL [X] CIB [ ] TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 Gr.70
REINFORCEMENT PAD	SA 516 Gr.70
HEADS	SA 516 Gr.70
SHELL FLANGES	-
NOZZLE FLANGES	SA 105
NOZZLE NECK UPTO 250 NB	SA 106 GR. B
NOZZLE NECK ABOVE 250 NB	-
PIPE FITTINGS	-
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS 304 METAL WINDING AND GRAFOIL FILLER MATERIAL WITH CS OUTER & SS 304 INNER RING AS PER ASME B 16.20.
GASKET INTERNAL	-
EXTERNAL STUDS/BOLTS/NUTS	SA 193 GR.B7 / SA 194 GR.2H
INTERNAL STUDS/BOLTS/NUTS	-
~~SKIRT/~~ SUPPORT	IS 2062 GR. E 250 QUALITY BR/B0
~~SKIRT/~~ SUPPORT BASE	IS 2062 GR. E 250 QUALITY BR/B0
INTERNAL PARTS (WELDED)	-
INTERNAL PARTS (BOLTED)	-
CLIPS & ATTACHMENTS (EXTERNAL)	-
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENTS	SA 516 GR.70
PIPE DAVIT	-
LIFTING LUG	SA 516 GR.70

PLATFORM OR PIPE CLIPS NOT TO BE SUPPORTED ON THE EQUIPMENT

SPECIAL SERVICE : --

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

X **INDIAN BOILER REGULATIONS (IBR)**

DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	800	OPERATING	1000
HYDROTEST(SHOP)	1200	HYDROTEST (FIELD)	1200
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
A	12.11.2025	ISSUED FOR BIDS / ENGG.	ROHIT	SA/VIVEK	PB

DESIGN DATA	डिजाइन डाटा
CONDENSATE POT FOR 300-EE-00-2304	कन्डनसेट पॉट फॉर 300-ईई-00-2304
ITEM NO. 300-VV-VW-2303	आइटम नम्बर 300-वीवी-वीडब्ल्यू-2303

DRAWING NUMBER डाईग नम्बर	REV
B957-300-80-42-DS-3137	A
SHEET 1 OF 2	

FORMAT NO.3-8042-0501 REV.0 [28.02.2024] A3-420 X 297

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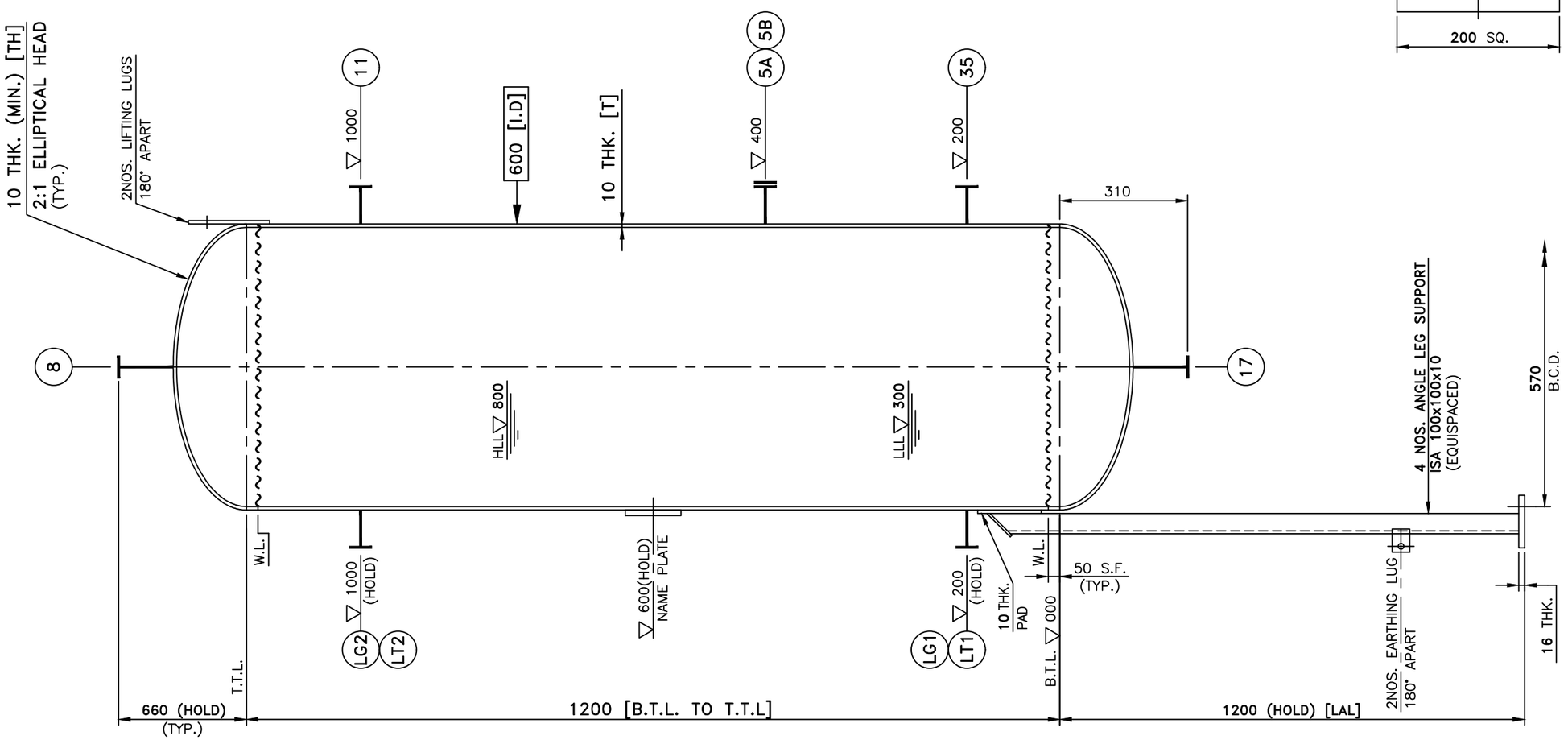

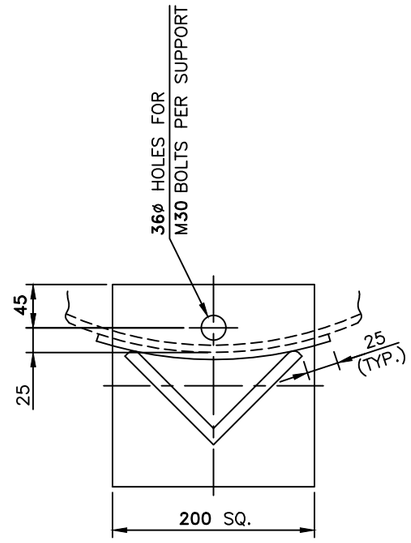

DETAIL OF BASE PLATE
(ALL OTHER DIMENSIONS AS PER EIL STD.)

ENGINEERS INDIA LIMITED
NEW DELHI

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

REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED
A	12.11.2025	ISSUED FOR BIDS/ENGG.	ROHIT	SA/VIVEK	PB	

VESSEL DESIGN DATA	वेसल डिजाइन डाटा
CONDENSATE POT FOR 300-EE-00-2304	कन्डनसेट पॉट फॉर 300-ईई-00-2304
ITEM NO. 300-VV-VW-2303	आइटम नम्बर 300-वीवी-वीडब्ल्यू-2303

DRAWING NO.	REV.
B957-300-80-42-DS-3137	A
SHEET 2 OF 2	

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

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PDS B957-300-79-41-DS-1263 REV.1

NOZZLES AND CONNECTIONS (नोजल व कनैक्शन)

MARK	QTY	NOM. DIA	SCH./THK.	FLANGES			PROJECTION NOTE-4	PAD W x T	SERVICE
		नामिनल	शड्यूल व	CLASS	TYPE	FACING			
मार्क	क्वान्टिटी	डांया	थिकनैस	क्लास	टाईप	फेसिग	प्रोजेशन	पैड	सर्विस
1	1	600	14 THK.	300	WN	RF	2100	300X T	MANHOLE + BF + GASKET + BOLTING
7	1	500	14 THK.	300	WN	RF	SEE DWG.	250X T	VAPOR OUTLET TO 300-CC-00-4002
8	1	50	160	600	WN	RF	SEE DWG.	-	VENT
11	1	750	20 THK.	300	WN	RF	2100	380X T	FEED FROM 300-EE-00-4002 A/B
12	1	100	120	300	WN	RF	2000	60X T	FEED FROM LIQUID ETHYLENE FROM OSBL
17	1	400	14 THK.	300	WN	RF	SEE DWG.	200X T	LIQUID BOTTOM OUTLET TO 300-PA-CF-4001 A/B
20	1	200 (H)	80	300	WN	RF	2000	110X T	MIN. FLOW RETURN FROM 300-PA-CF-4001 A/B
24	1	200 (H)	80	300	WN	RF	2000	110X T	PUMP VENT RETURN FROM 300-PA-CF-4001 A/B
31	1	80	160	300	WN	RF	SEE DWG.	45x T	DRAIN
35	1	50	160	300	WN	RF	2000	-	UTILITY CONNECTION + BF
LT 1-2	2	50 (H)	160	300	WN	RF	1950	-	LEVEL TRANSMITTER
SP 1-2	2	50 (H)	160	300	WN	RF	1950	-	STAND PIPE
AO 1-2	2	500 ID	16 THK.	AS PER EIL STD.				250 X T	ACCESS OPENING
SKV 1-4	4	100	Sch 40	AS PER EIL STD.				-	SKIRT VENT

T' DENOTES CORRESPONDING SHELL/DISH/SKIRT END NOMINAL THICKNESS

'H' DENOTES (HOLD)

LICENSOR'S SPECIFICATION
लाईसेन्सर स्पेसिफिकेशन्स

FOUNDATION LOADING DATA (OPERATING CONDITION)
फॉउन्डेशन लोडिगं डाटा (ऑपरेटिंग कनडिशन)

TYPE	MAX MOMENT AT BASE (M) (kgm)	MAX. SHEAR FORCE AT BASE (H) (kg)
SEISMIC	360000	25000
WIND	162000	12000

GENERAL NOTES (जनरल नोट्स)

UNLESS STATED OTHER WISE

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRE LINE.
3. NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
4 (A). FOR NOZZLES ON SHELL PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
4 (B). FOR NOZZLES ON HEAD PROJECTIONS ARE REFERRED FROM HEAD T.L TO FLANGE CONTACT FACE.
5. THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
6. FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH.
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.
8. ID OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING ID OF NOZZLE PIPE/SHELL.
9. NOZZLES 50NB AND BELOW SHALL BE STIFFENED WITH 2 NOS. 40 x 6 THK FLATS 90º APART.
10. SURFACE PREPARATION, SHOP PRIMER & FINSH PAINT AS PER JOB SPECIFICATION FOR SURFACE PREPARATION AND PROTECTIVE COATING IS IN VENDOR'S SCOPE.
11. VENDOR SHALL PROVIDE 2 NOS. PERMANENT SLOPING STEEL MONKEY LADDERS INSIDE THE SKIRT TO ACCESS THE BOTTOM HEAD FOR INSPECTION.
12. ALL FABRICATED NOZZLES SHALL BE 100% RADIOGRAPHED.
13. NOZZLE SHOWN WITH BLIND FLANGES SHALL BE PROVIDED WITH BOLTS/NUTS AND GASKET.
14. COLD INSULATION (IC) OF PIR (POLYISOCYANURATE).
15. VESSEL SHALL BE SUBJECTED TO DRY OUT CONDITIONS OF 7.0 Kg/Cm²(g) AT 80ºC.
16. ALL PLATES AND WELDS INCLUDING HAZ SHALL BE IMPACT TESTED AT (-)45ºC WITH MIN. ENERGY VALUE AS PER FIG. UG84.1 OF ASME SEC. VIII DIV.1.
17. COMPLETE EQUIPMENT SHALL BE POST WELD HEAT TREATED. HARDNESS OF BASE METAL, WELDS AND HAZ AFTER PWHT SHALL BE LIMITED 200 BHN.
18. VENDOR SHALL ENSURE THAT FOR NOZZLE ABOVE 600NB, PIPE OD SHALL MATCH WITH CORRESPONDING STD. FLANGE OD.
19. 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.

SPECIFICATIONS (स्पेसिफिकेशन्स)

X	DENOTES APPLICABLITY	
X	GENERAL SPEC. FOR PRESSURE VESSELS	6-12-0001
X	SUPP. SPEC. FOR CS VESSELS	6-12-0002
X	STD. SPEC. FOR BQCS PLATE	6-12-0011
X	STD. SPEC. FOR STRUCTRAL QUALITY PLATES	6-12-0014
X	SPEC.FOR SURFACE PREPARATION&PROTECTIVE COATING	B957-000-06-42-PLS-01

STANDARDS (स्टैण्डर्डस)

X	VESSEL TOLERANCES	7-12-0001
	SUPPORT FOR HORIZONTAL VESSEL	7-12-0002
	WOODEN PILLOWS FOR SADDLE SUPPORT	7-12-0003
X	SKIRT BASE DETAILS	7-12-0004
X	SKIRT OPENING DETAILS	7-12-0005
	ANGLE LEG SUPPORT	7-12-0006
	PIPE LEG SUPPORT	7-12-0007
	BRACKET SUPPORT FOR VERTICAL VESSEL	7-12-0008
	MANHOLE WITH HINGED COVER	7-12-0009
X	MANHOLE WITH DAVIT	7-12-0010
X	LADDER RUNGS FOR MANHOLE/DEMISTER	7-12-0011
	RETAINING PLATE	7-12-0012
X	NOZZLE REINFORCEMENT AND PROJECTION	7-12-0013
	PAD NOZZLES FOR VESSELS	7-12-0014
X	STANDARD BOLT HOLE ORIENTATION	7-12-0015
	ALLOY LINER DETAILS	7-12-0016
	SIGHT GLASSES FOR PRESSURE VESSELS	7-12-0017
	INTERNAL FLANGES	7-12-0018
X	VORTEX BREAKERS	7-12-0019
	INLET DEFLECTOR BAFFLE	7-12-0020
	SUPPORT RING AND BOLTING BAR	7-12-0021
	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
	NAME PLATE FOR SMALL EQUIPMENT	7-12-0030
	DETAILS OF FORGED NOZZLES	7-12-0031
	SUPPORTS FOR INTERNAL FEED PIPE	7-12-0032
	HOT INSULATION SUPPORT FOR HORIZONTAL VESSEL	7-12-0033
X	PIPE DAVIT SUPPORT FOR COLD INS. VESSELS	7-12-0034
	TYP. DETAILS OF WIRE MESH DEMISTER SUPPORTS	7-12-0036
	S.R NOZZLE NECK	7-12-0037
X	ALLOWABLE NOZZLE LOADS	7-12-0038

REFERENCE DRAWINGS(रेफरेन्स डाईग)

	NOZZLE ORIENTATIONS	
	LADDERS/PLATFORM CLEATS	
	PIPE SUPPORT CLEATS	
	TRAY SUPPORT AND BOLTING BARS	NOT APPLICABLE
	DEMISTER DATA SHEET	NOT APPLICABLE
X	SKETCH FOR MONKEY LADDER	B957-000-80-42-SK-0010

HOLD UPS (होल्ड अप्स)

X	NOZZLE ORIENTATIONS	X	SIZE OF NOZZLES (AS MARKED)
X	NOZZLE ELEVATIONS (AS MARKED)	X	PIPE SUPPORT CLEATS
	SUPPORT HEIGHT	X	LADDER/PLATFORM CLEATS
	DETAILS OF INTERNALS		TRAY SUPPORT/BOLTING BARS
			PIPE DAVIT
			PACKING SUPPORT

DESIGN DATA (डिजाइन डाटा)

CODE	ASME SECTION VIII DIV-1 EDITION 2023
WORKING PRESSURE (kg/cm²g)	19.5
DESIGN PRESSURE (kg/cm²g)	INT. 23.5 EXT. NIL
WORKING TEMPERATURE (°C)	(-)24
DESIGN TEMPERATURE (°C)	(-)45/65
MDMT (°C)	(-)45
CORROSION ALLOWANCE (mm)	3
TYPE OF HEAD	2:1 ELLIPSOIDAL
JOINT EFFICIENCY	SHELL 1 HEAD 1
RADIOGRAPHY	SHELL FULL HEAD FULL
POST WELD HEAT TREATMENT	YES (NOTE-17)
HEAT TREATMENT	HEAD: AS PER CODE / SPEC.
OPERATING MEDIUM	-
SP. GRAVITY	0.433 (AT OPERATING TEMP.)
WIND SPECIFICATION	IS-875
SEISMIC	IS-1893 + SITE SPECTRA
CAPACITY (M³)	89.2
PAINTING/CLEANING	AS PER JOB SPECIFICATION (REFER NOTE-10)
INSULATION THICKNESS (mm) (IC)	80 (NOTE-14) ☐ HOT ☒ COLD
FIRE PROOFING CLEATS	☒ YES ☐ NO
HYDROSTATIC TEST (kg/cm2g)	HORIZONTAL / VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	30.55
INSPECTION BY	☒ EIL ☐ CIB ☐ TPIA

MATERIAL OF CONSTRUCTION (मैटिरियल ऑफ कन्सट्रक्शन)

(AS PER ASME / IS ~~OR EQUIVALENT~~)

SHELL	SA 516 Gr.60 (#)
REINFORCEMENT PAD	SA 516 Gr.60 (#)
HEADS	SA 516 Gr.60 (#)
SRN	-
NOZZLE FLANGES	SA 350 LF2 CL.1
NOZZLE NECK UPTO 250 NB	SA 333 GR.6
NOZZLE NECK ABOVE 250 NB	SA 516 Gr.60 (#)
PIPE FITTINGS	SA 420 WPL6
GASKET EXTERNAL	SPIRAL WOUND GASKET WITH SS 304
	METAL WINDING AND GRAFOIL FILLER
	MATERIAL WITH CS OUTER & SS 304
	INNER RING AS PER ASME B 16.20.
GASKET INTERNAL	-
EXTERNAL STUDS/BOLTS/NUTS	SA 320 Gr.L7 / SA 194 GR.4 OR GR.7
INTERNAL STUDS/BOLTS/NUTS	-
SKIRT	SA 516 Gr.60 (#)/ IS 2062 GR. E 250 QUALITY BR/B0
SKIRT BASE	IS 2062 GR. E 250 QUALITY BR/B0
INTERNAL PARTS (WELDED)	SA 516 Gr.60 (#)/ SA 333 GR.6
INTERNAL PARTS (BOLTED)	-
CLIPS & ATTACHMENTS (EXTERNAL) DIRECTLY WELDED OVER VESSEL	SA 516 Gr.60 (#)
CLIPS & ATTACHMENTS (EXTERNAL) WELDED OVER PAD	SA 516 Gr.60 (#)
WRAPPER PLATE	-
DEMISTER/GRID	-
PAD FOR EXTERNAL ATTACHMENTS	SA 516 Gr.60 (#)
LIFTING LUG	SA 516 Gr.60 (#)
TAILING LUG	IS 2062 GR. E 250 QUALITY BR/B0

MATERIAL SHALL BE IMPACT TESTED AS PER CODE/SPEC. REQUIREMENTS

SPECIAL SERVICE : --

STATUTORY REGULATIONS (स्टैचुअरी रेगुलेशन्स)

INDIAN BOILER REGULATIONS (IBR)

DEPARTMENT OF EXPLOSIVES, NAGPUR (CCOE)

APPROXIMATE WEIGHT (kgs) (PER ITEM) (एपरौक्सिमेंट वजन)

ERECTION	61000	OPERATING	160000
HYDROTEST(SHOP)	150000	HYDROTEST (FIELD)	216000
NUMBER OF ITEMS :	ONE		

ENGINEERS INDIA LIMITED
NEW DELHI
इंजीनियर्स इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

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

REV	DATE	REVISION	BY	CHECKED	APPROVED
A	05.09.2025	ISSUED FOR BIDS / ENGG.	AS	CS/VIVEK	PB

DESIGN DATA	डिजाइन डाटा	DRAWING NUMBER / डाईग नम्बर	REV
DEETHANIZER REFLUX DRUM	डीथनाइजर रिफ्लक्स ड्रम	B957-300-80-42-DS-3154	A
ITEM NO. 300-VV-VW-4001	आइटम नम्बर 300–वीवी–वीडब्ल्यू–4001	SHEET 1 OF 2	

FORMAT NO.3-8042-0501 REV.0 (28.02.2024) A3-420 X 297

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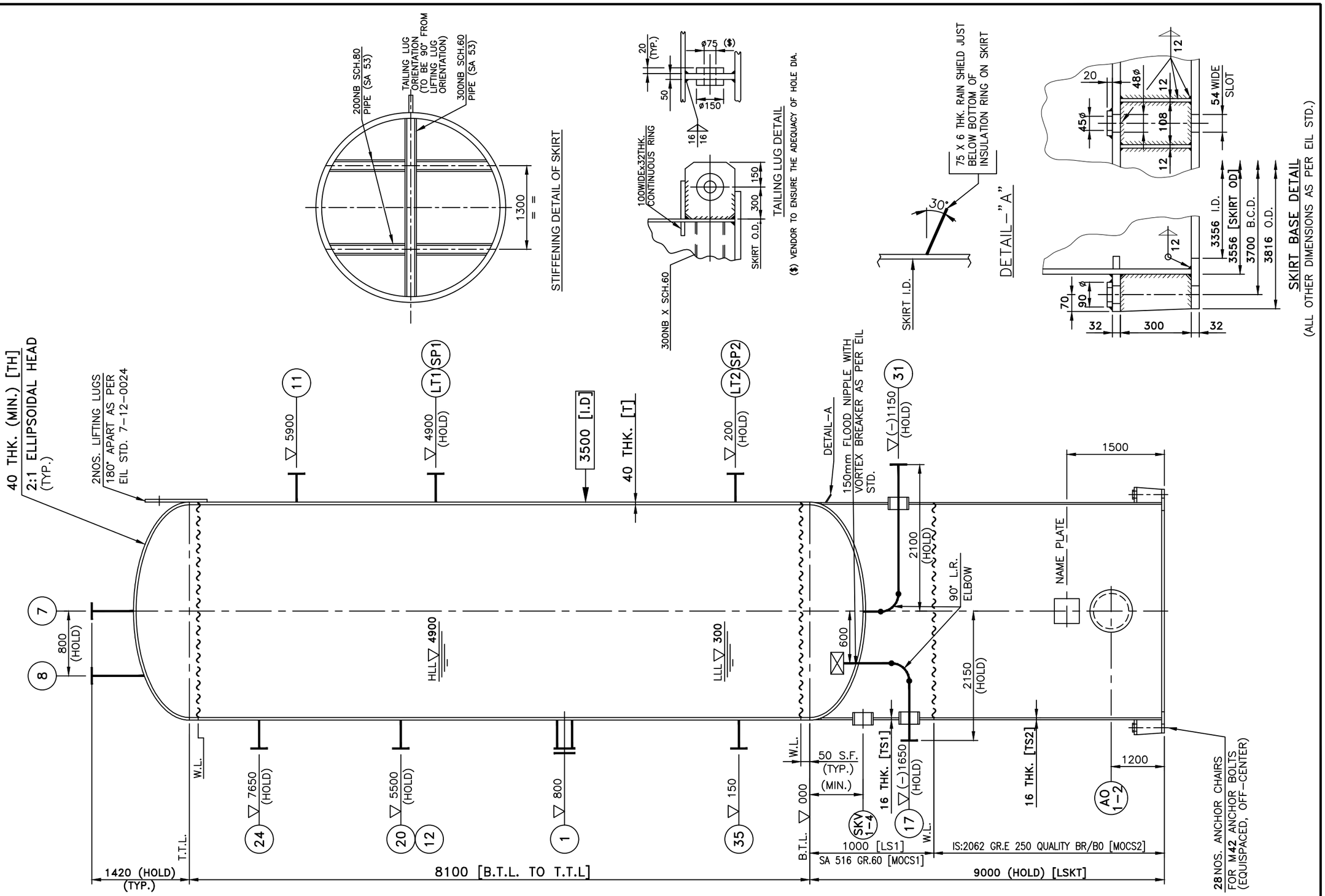

ENGINEERS INDIA LIMITED NEW DELHI	BHARAT PETROLEUM CORP. LTD. BINA PETROCHEMICAL & REFINERY EXPANSION PROJECT (BPREP)					VESSEL DESIGN DATA DEETHANIZER FLUX DRUM NO. 300-VV-VW-4001	वेसेल डिजाइन डाटा डीथनाइजर रिफ्लक्स ड्रम आइटम नम्बर 300-वीवी-वीडब्ल्यू-4001	DRAWING NO. B957-300-80-42-DS-3154	REV. A
		0	06.05.2026	ISSUED FOR BIDS/ENGG.	AS	CS/VIVEK	PB			SHEET 2 OF 2	
		REV.	DATE	REVISION	BY	CHK	APPROVED	APPROVED			

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

Signature Not Verified
Digitally signed by ARITRA DE
Date: 2026.05.18 17:00:55 IST
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