

ITP NO: 3315

CERAMIC FIBRE LINING

Sl. No.	Activity	Contractor	EIL	Records to be Submitted/ Format No.
			CAT B	
1	PRIOR TO START OF LINING			
	i. Material Test certificates from suppliers	WC	Note 1	Format G2
	ii. Field tests and tests from approved laboratories, if applicable	WC	Note 1	Format G2
	iii. Availability of Refractory specialist at site (Contractor's/ Vendor's/PMCs)	WC	HP	Yes
2	DURING LINING			
	i. Clearance for completion of structural works including welding of cleats/ lugs/ anchors/hooks, etc.	WC	S	Yes
	ii. Cleanliness of surfaces to be lined	WC	S	----
	iii. Laying of Ceramic fibre blanket layer wise (As per AFC drawings)	WC	--	---
	iv. Provision of cups locks/ arrangement for CF lining holding	WC	--	---
	v. Identifying location of expansion joints	WC	--	---
	vi. Filling expansion joints as per specifications/ AFC drawings	WC	--	---
	vii. Finishing works	WC	S	---
	viii. Final acceptance	WC	HP	Yes
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Yes

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

CAT B: All works

SECTION - B

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

Report No. :
Date :

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

Name of work :
Job No. :

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

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

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

Report No. :
Date :

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

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

Notes :

INSPECTION ACTIVITY AT SITE (Tick as applicable)

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

Based on above, materials are accepted.

Contractor Field Engineer

Contractor RCM/Site Incharge

EIL Field Supervisor

EIL Lead Engineer/Area coordinator/Spread Incharge
(Countersigned)

FORMAT NO. : G-03
DAILY PAINTING REPORT

Drawing No.						Location				
Specification No.						Report No.				
Procedure						Dated				
Job Description :										
Daily weather record :										
Time	Relative Humidity	Ambient temperature	Surface temperature	Dew point temperature	Weather condition					
Surface preparation										
a) Method										
	Blasting	Power tool	Hand clean	Solvent	Emery cloth	Other				
b) Blasting details										
	Abrasive	Sand	Grit	Shot	Certificate No.					
c) Surface standard										
	ISO 8501-1/SIS-05 5900/SSPC-SP	Others	Profile	Micron	Result : Accepted /Rejected					
Painting material and application method : Painting System - Temp. Range -										
	Material brand	Manufacturer	Certificate No.	Batch No.	Shelf life upto	Shade/ Colour	Application			
Base										
Hardener										
Primer (1 st coat)										
(2 nd coat)										
Paint (1 st coat)										
(2 nd coat)										
Painting Inspection Record :										
Item	Area/Joint		Coating Layer	Wet Film Thickness		Dry Film Thickness		Completion of hydrostatic testing	Visual Inspection	Acceptance
	From	To		Measurements 1,2,3...	Minimum Req'd.	Measurements 1,2,3...	Minimum Req'd.			
			Primer							
			1 st coat (intr)							
			2 nd coat (intr)							
			Finish							
			1 st coat							
			2 nd coat							
Identification colour band & direction marker : Accepted/ Not Accepted										
NOTE: All blasting and coating materials shall be approved by EIL/Owner. All measuring and testing equipment's shall have valid calibration certificate and shall adhere to relevant specifications.										

(Contractor)

(EIL)

(OWNER)

FORMAT NO. : G-04

INSPECTION CHECK SHEET – INSULATION WORKS

Report No. :

Date :

Project :
Client :
Contractor :
Name of work :
Unit :

Job No. :
Item No./Equip No./Line No. :
Work order No. :

Surface preparation: Visual inspection : Accepted/Not accepted

Fixing of spacer & support Rings, insulation lugs and Spacing : OK/Not OK

Sl. No.	Activity & Item No.	Thickness of Insulation	Visual Inspection	Surface area insulated			Remarks
				From	To	SA (m ²)	
1.	Lagging of Insulations Materials						
2.	Thickness of Insulation						
3.	Moisture barrier, if applicable						
4.	Heat tracer putty application, if applicable						
2.	Sheeting/Cladding work						
3.	Miscellaneous						
	a) Inspection window						
	b) Valve boxes						
	c) Flange covers						
	d) Expansion joint						
	e) SS Foil for SS Piping						
4.	FOR COLD INSULATION						
	a) Wooden support	<input type="checkbox"/>					
	b) Vapour barrier	<input type="checkbox"/>					
	c) Vapour Sealant	<input type="checkbox"/>					
	d) Insul coat	<input type="checkbox"/>					

HOT INSULATION (Visual & position of seam to prevent water penetration)

COLD INSULATION (Visual & sealing)

FINAL FINISH: ACCEPTED/NOT ACCEPTED


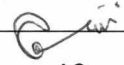
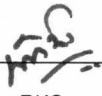
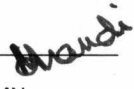
(Contractor)

(EIL)

(Owner)

मानक गुणवत्ता आश्वासन योजना
(आइटम रेट ठेकेदारों के लिये)

STANDARD QUALITY ASSURANCE PLAN
(FOR ITEM RATE CONTRACTORS)

4	29.03.2024	REVISED AND UPDATED	 DK	 AC	 RKS	 MN
3	30/03/2019	REVISED AND UPDATED	SKG	AP	AKK	RKT
2	26/02/2014	REVISED AND UPDATED	SM	DJ	RKD	SC
1	23/05/2008	REVISED AND UPDATED	AS	RK	SCB	VC
0	05/12/2002	ISSUED FOR IMPLEMENTATION	AB	MPJ	RSG	GRR
Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convener	Standards Bureau Chairman
					Approved by	

Abbreviations :

CI	:	Cast Iron
EHT	:	Extra High Tension
EMCC	:	Emergency Motor Control Centre
EOT	:	Electrically Operated Traveling
GI	:	Galvanized Iron
HOT	:	Hand Operated Traveling
HT	:	High Tension
JB	:	Junction Box
M	:	Supervisor (Mechanical)
MCC	:	Motor Control Centre
PCC	:	Power Control Centre
QAP	:	Quality Assurance Plan
RCC	:	Reinforced Cement Concrete
VSD	:	Variable Speed Drives
WBM	:	Water Bound Macadam

Construction Standards Committee

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

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

CONTENTS

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3.	Quality Assurance Plan for Architectural Works	6-82-6110	9
4.	Quality Assurance Plan for Mechanical Works	6-82-6115	10
5.	Quality Assurance Plan for Electrical Works	6-82-6120	11
6.	Quality Assurance Plan for Instrumentation Works	6-82-6125	12
7.	Quality Assurance Plan for General Works	6-82-6130	13

GENERAL NOTE

1. *These are only sample Quality Assurance Plans (QAPs). Contractor to prepare job specific QAP depending upon the contract specification, scope, technology, etc. and submit the same for approval of the Engineer-in-Charge well before commencement of the activity*
2. *Specifications mentioned under 'Code of conformance' column are only for the purpose of illustration. The applicable specification(s) shall be followed by the contractor.*

LEGEND

RE	:	Resident Engineer / Resident Construction Manager
SC	:	Engineer/Supervisor (Civil)
SM	:	Engineer/Supervisor (Mechanical)
SE	:	Engineer/Supervisor (Electrical)
SI	:	Engineer/Supervisor (Instrumentation)
SQ	:	Engineer/Supervisor (Quality)
SS	:	Engineer/Supervisor (HSE)
LE	:	Lead Discipline Engineer

QAP No. : 6101

QAP FOR GENERAL CIVIL WORKS

(Sheet 1 of 2)

ACTIVITY DESCRIPTION		PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Survey works	Contractor's Procedure	EIL Spec. No. 6-65-0002	SC	LE/SQ	RE	Yes
2.	Earthwork for underground piping	- Do -	EIL Spec. No. 6-65-0006	SC	LE/SQ	RE	Yes
3.	Compound wall	- Do -	EIL Spec. No. 6-65-0010	SC	LE/SQ	RE	Yes
4.	Classification of soil for Earth Work in site grading	- Do -	EIL Spec. No. 6-65-0016	SC	LE/SQ	RE	Yes
5.	Site grading & rock cutting for site grading	- Do -	EIL Spec. No. 6-65-0017	SC	LE/SQ	RE	Yes
6.	Road & flexible pavements (upto WBM layer)	- Do -	EIL Spec. No. 6-65-0018	SC	LE/SQ	RE	Yes
7.	Road & flexible pavements (upto WMM layer)	- Do -	EIL Spec. No. 6-65-0014	SC	LE/SQ	RE	Yes
8.	Concrete Pavement	- Do -	EIL Spec. No. 6-65-0019	SC	LE/SQ	RE	Yes
9.	Flexible pavements with bitumen premix carpet	- Do -	EIL Spec. No. 6-65-0020	SC	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

QAP No. : 6101

QAP FOR GENERAL CIVIL WORKS

(Sheet 2 of 2)

ACTIVITY DESCRIPTION		PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
9.	Tank Pads	Contractor's Procedure	EIL Spec. No. 6-65-0022	SC	LE/SQ	RE	Yes
10.	Underground and above ground G.I. pipeline system (water services)	- Do -	EIL Spec. No. 6-65-0027	SC	LE/SQ	RE	Yes
11.	Fabrication and laying of Underground piping	- Do -	EIL Spec. No. 6-65-0030	SC/SM	LE/SQ	RE	Yes
12.	Corrosion protection tape coating for underground steel piping	- Do -	EIL Spec. No. 6-79-0011	SC/SM	LE/SQ	RE	Yes
13.	Underground C.I. piping system	- Do -	EIL Spec. No. 6-65-0036	SC	LE/SQ	RE	Yes
14.	Underground sewer system - pre cast R.C.C. pipes	- Do -	EIL Spec. No. 6-65-0042	SC	LE/SQ	RE	Yes
15.	Underground sewer system-HDPE Pipes	- Do -	EIL Spec. No. 6-65-0044	SC	LE/SQ	RE	Yes
16.	Film lining covered with concrete lining for earthen reservoir	- Do -	EIL Spec. No. 6-65-0046	SC	LE/SQ	RE	Yes
17.	Plumbing and building drainage	- Do -	EIL Spec. No. 6-65-0053	SC	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

QAP No. : 6105

QAP FOR STRUCTURAL WORKS

(Sheet 1 of 2)

ACTIVITY DESCRIPTION	PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1. Civil & structural works – materials	Contractor's Procedure	EIL Spec. No. 6-68-0002	SC	LE/SQ	RE	Yes
2. Earth work	- Do -	EIL Spec. No. 6-68-0003	SC	LE/SQ	RE	Yes
3. Plain & reinforced cement concrete	- Do -	EIL Spec. No. 6-68-0004	SC	LE/SQ	RE	Yes
4. Reinforced cement concrete in liquid retaining structures	- Do -	EIL Spec. No. 6-68-0005	SC	LE/SQ	RE	Yes
5. Structural steel works	- Do -	EIL Spec. No. 6-68-0006	SC/SM	LE/SQ	RE	Yes
6. Structural steel works (tubular/ hollow sections)	- Do -	EIL Spec. No. 6-68-0007	SC/SM	LE/SQ	RE	Yes
7. Miscellaneous steel works	- Do -	EIL Spec. No. 6-68-0008	SC/SM	LE/SQ	RE	Yes
8. Brick masonry	- Do -	EIL Spec. No. 6-68-0009	SC	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

QAP No. : 6105

QAP FOR STRUCTURAL WORKS

(Sheet 2 of 2)

ACTIVITY DESCRIPTION		PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
9.	Demolition and dismantling	Contractor's Procedure	EIL Spec. No. 6-68-0012	SC	LE/SQ	RE	Yes
10.	Miscellaneous items (like Anti-termite treatment)	- Do -	EIL Spec. No. 6-68-0013	SC	LE/SQ	RE	Yes
11.	Fire proofing of steel structures	- Do -	EIL Spec. No. 6-68-0033	SC	LE/SQ	RE	Yes
12.	Shotcreting (guniting)	- Do -	EIL Spec. No. 6-68-0055	SC	LE/SQ	RE	Yes
13.	Vacuum dewatering concrete system	- Do -	EIL Spec. No. 6-68-0062	SC	LE/SQ	RE	Yes
14.	Materials for reinforced concrete piles	- Do -	EIL Spec. No. 6-74-0006	SC	LE/SQ	RE	Yes
15.	Construction and installation of driven cast-in-situ piles	- Do -	EIL Spec. No. 6-74-0010	SC	LE/SQ	RE	Yes
16.	Testing of concrete piles	- Do -	EIL Spec. No. 6-74-0013	SC	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

QAP No. : 6110

QAP FOR ARCHITECTURAL WORKS

ACTIVITY DESCRIPTION		PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Floor finishing	Contractor's Procedure	EIL Spec. No. 6-75-0002	SC	LE/SQ	RE	Yes
2.	Steel/Aluminium Doors, Windows and Ventilators	- Do -	EIL Spec. No. 6-75-0004	SC	LE/SQ	RE	Yes
3.	Plastering and pointing	- Do -	EIL Spec. No. 6-75-0005	SC	LE/SQ	RE	Yes
4.	Roofing Treatment	- Do -	EIL Spec. No. 6-75-0006	SC	LE/SQ	RE	Yes
5.	Whitewashing, Colour Washing Distempering, Painting and Polishing	- Do -	EIL Spec. No. 6-75-0007	SC	LE/SQ	RE	Yes
6.	Roofing	- Do -	EIL Spec. No. 6-75-0008	SC	LE/SQ	RE	Yes
7.	Sanitary Fittings and Fixtures	- Do -	EIL Spec. No. 6-75-0009	SC	LE/SQ	RE	Yes
8.	False Ceiling, False Flooring Under deck Insulation & Partitioning	- Do -	EIL Spec. No. 6-75-0010	SC	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

QAP No. : 6115

QAP FOR MECHANICAL WORKS

ACTIVITY DESCRIPTION		PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Above Ground & Underground Piping	Contractor's/ Vendor's Procedure	EIL Spec. Nos. 6-44-0005, 0012,0013, 0016	SM	LE/SQ	RE	Yes
2.	Column Internals	- Do -	EIL Spec. No. 6-14-0016	SM	LE/SQ	RE	Yes
3.	Fired Heaters	- Do -	EIL Spec. No. 6-17-0001	SM	LE/SQ	RE	Yes
4.	Refractory & Insulation Works-Fired Heaters	- Do -	EIL Spec. No. 6-17-0001, 6-79-0001	SM	LE/SQ	RE	Yes
5.	Equipment Erection (Static)	- Do -	EIL Spec. No. 6-76-0001	SM	LE/SQ	RE	Yes
6.	Equipment Erection (Rotary)	- Do -	EIL Spec. No. 6-76-0001	SM	LE/SQ	RE	Yes
7.	Crane (EOT/HOT)	- Do -	EIL Spec. No. 6-48-0002, 0003	SM	LE/SQ	RE	Yes
8.	Storage Tanks	- Do -	EIL Spec. No. 6-13-0053	SM	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

QAP No. : 6120

QAP FOR ELECTRICAL WORKS

ACTIVITY DESCRIPTION	PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1. Transformer (Power/Distribution/Lighting)	Contractor's/Vendor's Procedure	EIL Spec. No. 6-51-0081	SE	LE/SQ	RE	Yes
2. Motor (HT/LT)	- Do -	EIL Spec. No. 6-51-0081	SE	LE/SQ	RE	Yes
3. Generator	- Do -	EIL Spec. No. 6-51-0035, 0040, 6-51-0081	SE	LE/SQ	RE	Yes
4. Switch Gears (HV/MV)/ VSD	- Do -	EIL Spec. No. 6-51-0081	SE	LE/SQ	RE	Yes
5. EHT/HT Main Bus & Allied Equip.	- Do -	EIL Spec. No. 6-51-0081	SE	LE/SQ	RE	Yes
6. Cable Laying	- Do -	EIL Spec. No. 6-51-0082	SE	LE/SQ	RE	Yes
7. Lighting	- Do -	EIL Spec. No. 6-51-0083	SE	LE/SQ	RE	Yes
8. Earthing	- Do -	EIL Spec. No. 6-51-0084	SE	LE/SQ	RE	Yes
9. Field inspection, testing and commissioning of electrical installations	- Do -	EIL Spec. No. 6-51-0087	SE	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

QAP No. : 6125

QAP FOR INSTRUMENTATION WORKS (FIELD)

ACTIVITY DESCRIPTION		PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Installation of field instruments including calibration	Contractor's Procedure	EIL Spec. No. 6-52-0060	SI	LE/SQ	RE	Yes
2.	Cable works	- Do -	EIL Spec. No. 6-52-0060	SI	LE/SQ	RE	Yes
3.	Impulse piping/tubing works	- Do -	EIL Spec. No. 6-52-0060	SI	LE/SQ	RE	Yes
4.	Panel/Console works including DCS/PLC works	- Do -	EIL Spec. Nos. 6-52-0049, 6-52-0060	SI	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

QAP No. : 6130

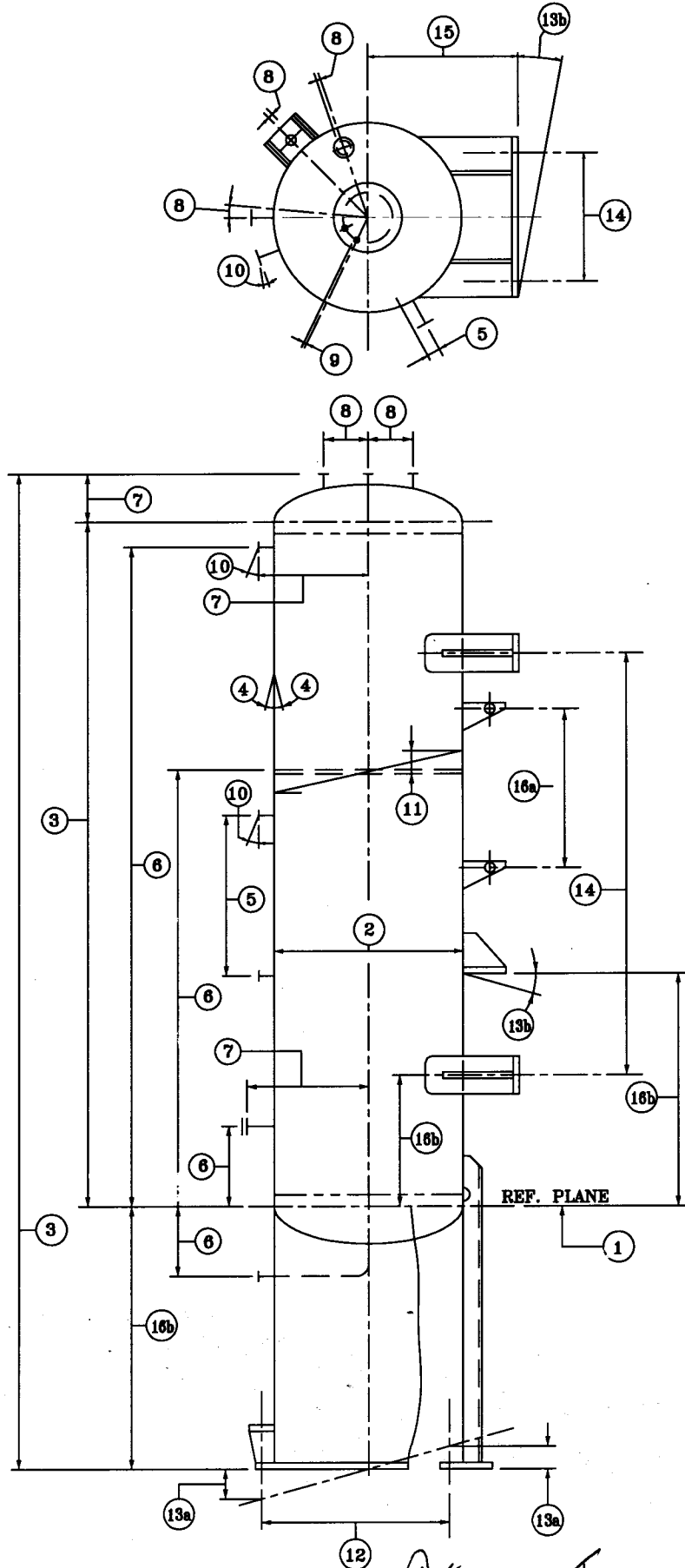
QAP FOR GENERAL WORKS

ACTIVITY DESCRIPTION		PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Painting	Contractor's/Vendor's Procedure	EIL Spec. No. 6-79-0021	SC/SM	LE/SQ	RE	Yes
2.	Insulation	- Do -	EIL Spec. Nos. 6-79-0026, 0027	SC/ SM	LE/SQ	RE	Yes
3.	Refractory Lining	- Do -	EIL Spec. No. 6-79-0001	SC/SM	LE/SQ	RE	Yes
4.	Ceramic Fibre Lining	- Do -	EIL Spec. No. 6-79-0005	SC/SM	LE/SQ	RE	Yes
5.	Incoming material Inspection	- Do -	EIL Spec. No. 6-82-1010	SC/SM/SI/SE	LE/SQ	RE	Yes
6.	Health, Safety & Environmental Management	- Do -	EIL Spec. No. 6-82-0001	SS/SC/SM/SE/SI	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend



VESSEL TOLERANCES



7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	J NIKHIL	SK/KJH	RKT	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
					Approved by	

NOTES

1. REFERENCE LINES SHALL BE LIGHTLY PUNCH-MARKED INSIDE AND OUTSIDE AROUND THE CIRCUMFERENCE OF THE SHELL PLATE ON THE TANGENT LINES OF THE VESSEL.
2. a) OUT OF ROUNDNESS (OVALITY) SHALL BE AS PER APPLICABLE CODE.
b) OUTSIDE CIRCUMFERENCE OF SHELL SHALL BE WITHIN THE FOLLOWING LIMITS.
 ± 10 mm FOR NOMINAL DIAMETER 1200 mm AND UNDER.
 ± 12 mm FOR NOMINAL DIAMETER 1201 mm THROUGH 2400 mm.
 ± 20 mm FOR NOMINAL DIAMETER ABOVE 2400 mm.
- c) FOLLOWING TOLERANCES ON DIAMETER SHALL APPLY THROUGHOUT ITS LENGTH FOR VESSELS WITH TRAYS AND / OR PACKING. (FOR CARTRIDGE TYPE TRAY REFER SPECIAL NOTE-E).

VESSEL NOM. DIA.	TOLERANCE ON NOM. DIA.
2000 mm AND UNDER	$\pm 0.5\%$
2001 mm TO 4000 mm	GREATER OF ± 10 mm OR $\pm 0.35\%$
4001 mm TO 8000 mm	GREATER OF ± 14 mm OR $\pm 0.25\%$
ABOVE 8000 mm	TO BE SPECIFIED ON VESSEL DRAWING.

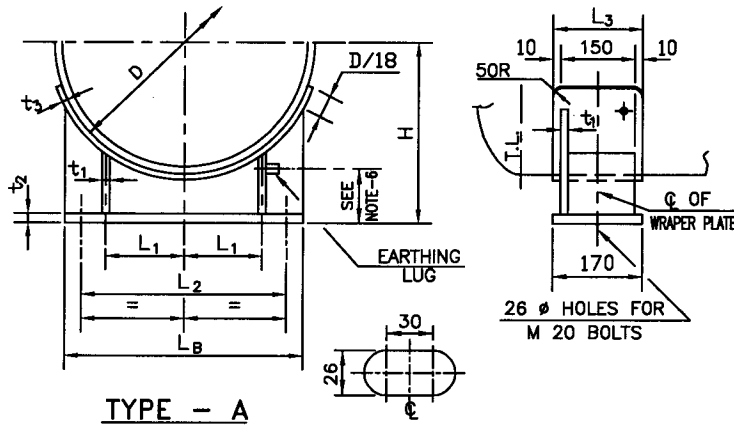
3. TOLERANCE FOR LENGTH ± 5 mm PER 3000 mm, MAXIMUM 15 mm.
4. OUTSIDE SURFACE OF CYLINDER MAY BE OUT OF ALIGNMENT / STRAIGHTNESS NOT MORE THAN 6 mm PER 6000 mm STRAIGHT LENGTH, BUT NOT MORE THAN 20 mm FOR ANY LENGTH.
5. TOLERANCE FOR CENTRE TO CENTRE DISTANCE BETWEEN ANY PAIR OF INSTRUMENT CONNECTIONS TO BE AS FOLLOWS:-
DISTANCE BETWEEN NOZZLES : ± 1 mm
ORIENTATION : ± 1 mm
NOZZLE FACE INCLINATION : $\pm 1/4^\circ$
6. ELEVATIONS FROM REFERENCE PLANE MAY VARY AS FOLLOWS:-
MANHOLE: ± 12 mm, NOZZLE ± 6 mm, INTERNAL SUPPORTS: ± 3 mm, EXCEPT THAT LOCATIONS OF MANHOLES AND NOZZLES NEAR THE TRAY SHALL NOT VARY MORE THAN ± 3 mm FROM THE TRAY.
7. PROJECTION OF FLANGE FACE FROM SHELL CENTRAL LINE / TANGENT LINE MAY VARY ± 5 mm FOR NOZZLES AND ± 12 mm FOR MANHOLES.
8. CIRCUMFERENTIAL AND RADIAL DEVIATION OF NOZZLES, MANHOLES AND SUPPORTS FROM THE TRUE POSITION SHALL NOT VARY MORE THAN ± 3 mm.
9. BOLT HOLE ORIENTATION OF NOZZLES MAY VARY ± 2 mm AT BOLT CIRCLE.
10. VERTICAL AND HORIZONTAL DEFLECTION OF NOZZLE FLANGE FACES FROM PLANES NORMAL TO NOZZLE CENTRE LINES OR PARALLEL TO VESSEL CENTRE LINE SHALL NOT BE MORE THAN $\pm 1/2^\circ$
11. ALL TOLERANCES OF TRAY SUPPORTS TO BE AS PER TRAY SPECIFICATIONS / DRAWING.
12. THE BASE RING BOLT CIRCLE DIAMETER MAY VARY ± 5 mm. FOR ANY DIAMETER MEASURED AT POINTS 90° APART, DISTANCE BETWEEN TWO CONSECUTIVE HOLES MAY VARY BY ± 5 mm.
13. a) DEVIATION OF SUPPORT BASE FROM HORIZONTAL MAY BE AS FOLLOWS:-
FOR VESSEL DIA. 1500 mm AND UNDER 3 mm
FOR VESSEL DIA. OVER 1500 mm TO 2000 mm 5 mm
FOR VESSEL DIA. OVER 2000 mm TO 4000 mm 6 mm
FOR VESSEL DIA. OVER 4000 mm TO 5000 mm 8 mm
FOR VESSEL DIA. OVER 5000 mm 10 mm
b) DEVIATION OF SUPPORT BASE FOR BRACKET TYPE SUPPORT / SADDLE SUPPORT FROM HORIZONTAL MAY BE $\pm 1^\circ$
14. DISTANCE BETWEEN CL TO CL OF SUPPORTS AND BOLT HOLES IN SUPPORTS FOR HORIZONTAL VESSELS MAY VARY ± 3 mm.
15. DISTANCE BETWEEN CENTRE LINE OF HORIZONTAL VESSEL AND BOTTOM OF SUPPORT MAY VARY ± 3 mm.
16. a) TOLERANCE FOR CENTRE TO CENTRE DISTANCE BETWEEN ANY PART OF EXTERNAL STRUCTURAL ATTACHMENT SHALL NOT VARY MORE THAN ± 3 mm.
b) TOLERANCE FOR DISTANCE FROM REFERENCE PLANE TO BASE OF VERTICAL SUPPORTS AND CENTRE LINE OF SADDLE SUPPORT MAY VARY ± 6 mm.

SPECIAL NOTES

- A. CUMULATIVE TOLERANCES ON CONSECUTIVE DIMENSIONS SHALL BE LIMITED BY OVERALL DIMENSIONAL TOLERANCES. ALL TOLERANCES ARE FROM REFERENCE PLANE UNLESS OTHERWISE INDICATED.
- B. INTERFERENCE BETWEEN INTERNAL AND EXTERNAL PARTS OR ANY RESTRICTION TO THE INTENDED FUNCTION OF ANY PART SHALL BE KEPT IN VIEW WHERE TOLERANCES ARE CUMULATIVE.
- C. SPECIFIC TOLERANCES FOR ANY PART SHOWN ON EIL DRAWING SHALL BE GIVEN PREFERENCE TO THOSE GIVEN IN THIS STANDARD.
- D. UNUSUALLY LARGE OR COMPLEX VESSELS MAY BE EXECUTED AS PER FABRICATOR'S STANDARD WHEN THE TOLERANCES AS SHOWN ARE UNREASONABLE. IN SUCH INSTANCES FABRICATOR'S TOLERANCES & LIMITS MUST BE SUBMITTED FOR APPROVAL.
- E. VESSEL UPTO AND INCLUDING 750 mm NOMINAL DIAMETER SHALL HAVE CARTRIDGE TYPE TRAY. FOLLOWING TOLERANCES ON DIAMETER SHALL APPLY THROUGHOUT ITS LENGTH.

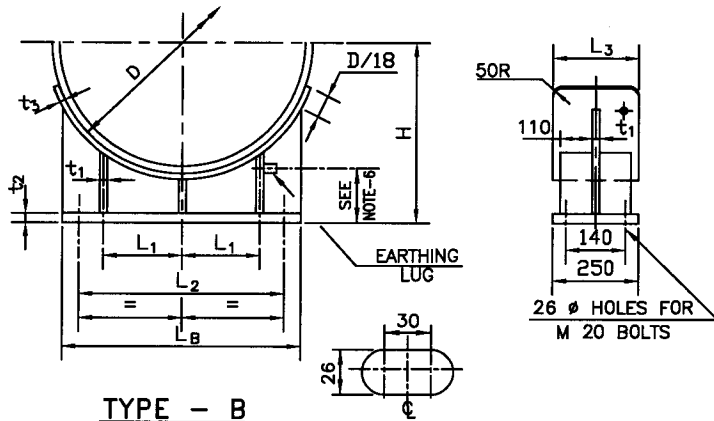
VESSEL NOMINAL DIAMETER	TOLERANCE
500 mm AND UNDER	VESSEL I.D. ± 1 mm ± 0 mm
501 mm TO 750 mm	VESSEL I.D. ± 3 mm

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL		NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by



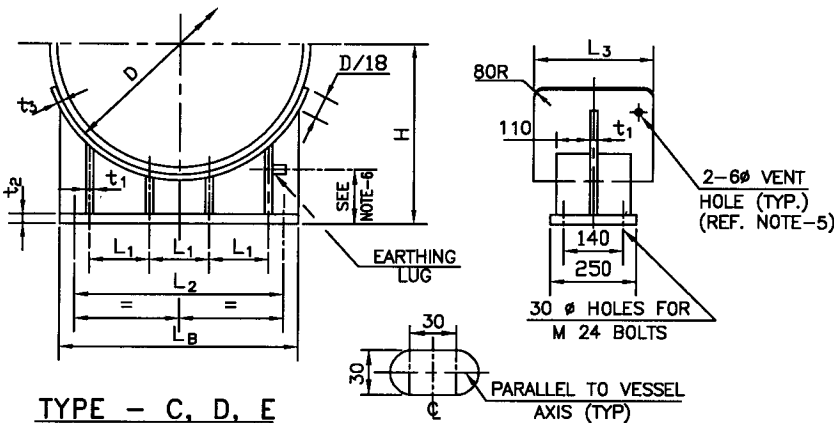
TYPE - A

HOLE FOR SLIDING SUPPORT



TYPE - B

HOLE FOR SLIDING SUPPORT



TYPE - C, D, E

HOLE FOR SLIDING SUPPORT

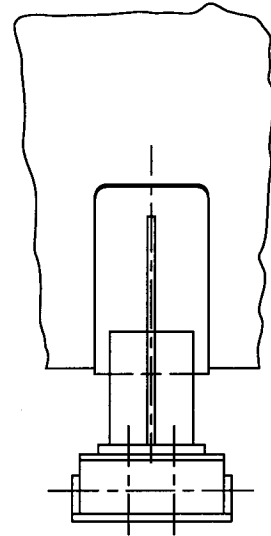
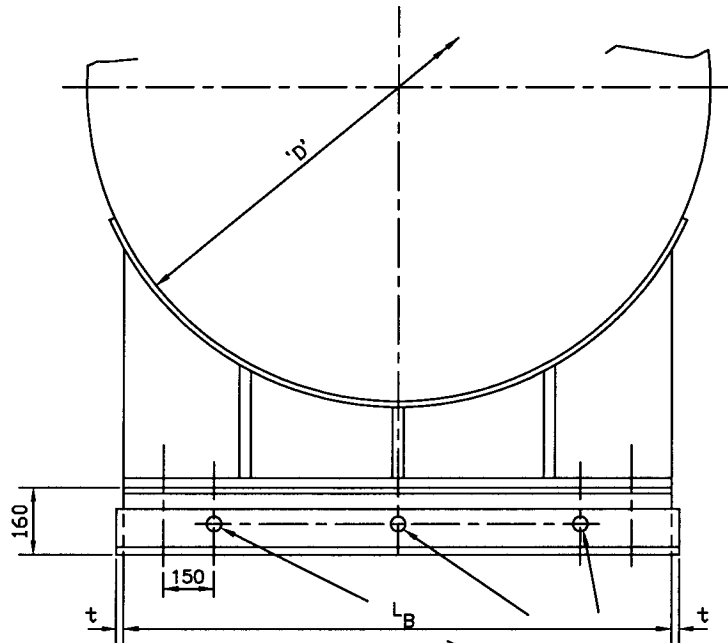
D	L _B	H	L ₁	L ₂	TYPE	MAX. LOAD PER SADDLE (M. TON)	APPROX. WT. PER SADDLE (KGS.)
300	260	300	50	200	A	4.4	17
350	280	325	55	210	A	4.8	18
400	330	350	75	250	A	4.5	20
450	370	375	95	300	A	3.6	22
500	450	450	125	370	A	14.9	40
600	560	500	175	470	A	13.2	50
700	650	550	225	570	A	11.0	55
800	750	600	275	670	A	10.6	65
900	850	650	300	760	A	11.0	75
1000	950	700	330	820	B	12.3	85
1200	1100	800	375	960	B	19.4	130
1400	1250	900	465	1150	B	19.7	140
1600	1450	1000	370	1300	C	23.3	165
1800	1600	1100	410	1450	C	39.1	260
2000	1750	1200	445	1600	C	43.5	290
2200	1950	1300	495	1800	D	49.1	295
2400	2150	1450	545	2000	D	53.5	390
2600	2300	1550	585	2150	D	52.9	440
2800	2500	1650	620	2300	E	52.7	475
3000	2670	1750	670	2500	E	64.9	600
3200	2800	1850	710	2600	E	63.8	620
3400	3000	1950	760	2800	E	64.9	630
3600	3200	2050	830	3000	E	60.5	725
3800	3350	2150	845	3150	E	61.0	745
4000	3550	2250	895	3300	E	60.6	820

TYPE	t ₁	t ₂	L ₃	t ₃
A	10	10	170	12
B	10	12	250	12
C	12	16	300	16
D	16	20	350	20
E	20	20	400	20

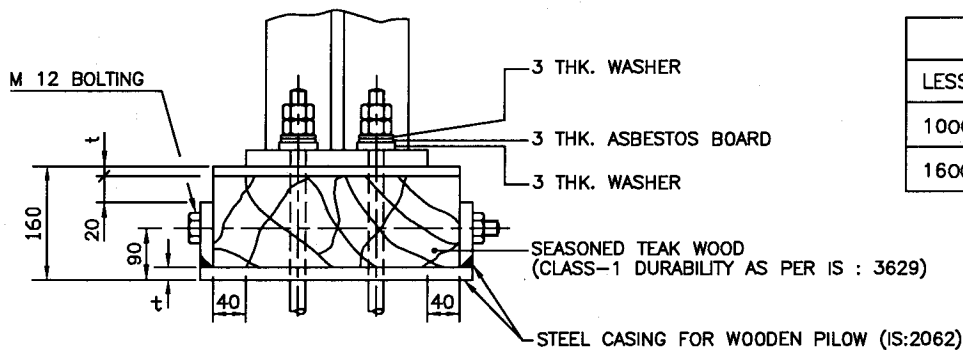
NOTES

- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
- VESSEL DIAMETER 'D' REFERS TO THE OUTER DIAMETER OF THE SHELL.
- FOR INTERMEDIATE DIAMETERS TAKE THE IMMEDIATE NEAREST DIAMETER SUPPORT.
- WELDING SHALL BE DONE ALL AROUND AND SHALL BE CONTINUOUS FILLET WELD. WELD SIZE SHALL BE 6 mm FOR VESSELS UPTO 1400 mm DIA. AND 8 mm FOR VESSELS ABOVE 1400 mm DIA.
- PROVIDE 2 NO. 6Ø VENT HOLES IN SADDLE WRAPPER PLATE. THESE HOLES SHALL BE PROVIDED DIAGONALLY OPPOSITE AND BE LEFT UNPLUGGED AND SHALL BE FILLED WITH HARD GREASE ONLY.
- WHERE EARTHING LUG CANNOT BE PUT AT AN ELEVATION OF 400 mm ABOVE THE SADDLE BASE PLATE IT SHALL BE LOCATED AS HIGH AS POSSIBLE.
- EARTHING LUGS ARE NOT TO BE PAINTED OR GALVANIZED.
- DETAIL, DIMENSIONS AND NOTES IN ENGINEERING DRAWING TAKE PRECEDENCE OVER THOSE SHOWN HERE.
- MATERIALS SHALL BE AS PER ENGINEERING DRAWING.
- EARTHING LUG SHALL BE AS PER STANDARD 7-12-0026.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK/KJH	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
Approved by						



- 1 NO. M12 BOLTING FOR SADDLE LENGTH (L_B) UPTO 950 mm.
2 NO. M12 BOLTING FOR SADDLE LENGTH (L_B) ABOVE 950 mm.

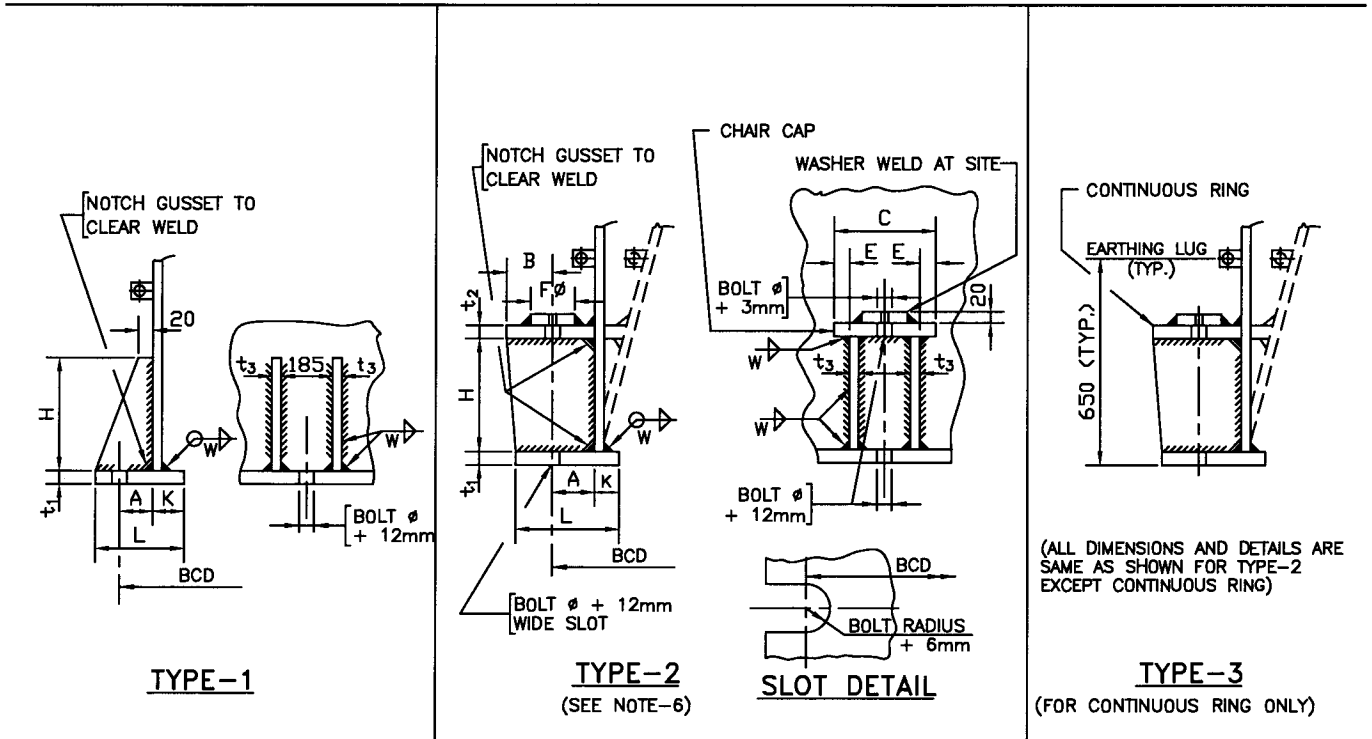


D	t
LESS THAN 1000	8
1000 TO 1599	10
1600 TO 4000	12

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. THIS STANDARD IS APPLICABLE FOR ALL HORIZONTAL VESSELS WITH DESIGN TEMPERATURE BELOW 0°C
3. FOR SADDLE DIMENSIONS REFER STANDARD 7-12-0002.
4. 2-WEEP HOLES OF 20 mm DIA SHALL BE PROVIDED AT THE BOTTOM OF THE FRAME.
5. UNLESS OTHERWISE SPECIFIED THE WOODEN PILLOWS REQUIRED FOR SADDLE SUPPORTS SHALL BE SUPPLIED BY MECHANICAL ERECTION CONTRACTOR.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK/KJH	RKT	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
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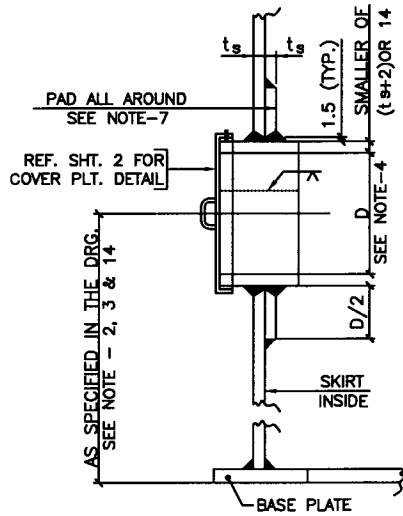


BOLT ϕ	t ₁ *	t ₂ *	t ₃ *	A ▼	B	C	E	F	H	K	L *	W	TYPE	REMARKS
24	20	-	10	60	-	-	-	-	250	75	165	10	1	
27	20	-	10	60	-	-	-	-	250	80	170	10		
30	25	25	12	55	60	150	12	60	300	80	180	10		
33	25	25	12	58	65	150	12	70	300	80	185	10		
36	25	25	12	66	70	150	12	80	300	90	200	10		
39	32	25	12	70	70	160	14	80	300	95	215	12		
42	32	25	12	72	70	160	14	90	300	100	230	12		
45	32	25	12	80	75	160	14	90	300	105	245	12		
48	32	30	14	83	75	180	16	100	380	110	260	14		
52	38	30	14	87	80	180	16	110	380	110	275	14		
56	38	30	16	91	85	180	18	120	380	115	280	14		
60	38	35	18	95	85	200	20	120	430	125	285	14		
64	38	35	18	104	90	200	25	130	430	135	300	16		
68	42	40	20	108	90	220	25	140	450	145	320	16		
72	42	40	20	112	95	220	25	150	450	150	340	16		
													2 AND 3	

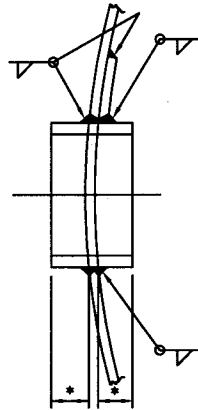
NOTES

- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
- BOLT CIRCLE DIAMETER (BCD), NUMBER AND SIZE OF THE BOLTS SHALL BE AS PER ENGINEERING DRAWING.
- * DIMENSIONS t₁, t₂, t₃ AND 'L' ARE TO BE CHECKED IN EVERY CASE.
- IN CASE OF ANY CONFLICT THE ENGINEERING DRAWING SHALL GOVERN.
- NUMBER OF BOLTS USED IS TO BE A MULTIPLE OF 4 AND BOLTS SHALL STRADDLE VESSEL NORTH-SOUTH CENTRE LINE IN PLAN.
- USE CONTINUOUS RING (CHAIR CAP) IF DISTANCE BETWEEN CONSECUTIVE BOLTS IS LESS THAN 400 mm.
- CIRCULAR WASHER SHALL BE SHIPPED LOOSE AND WELDED AT SITE AFTER ANCHOR BOLTS ARE IN POSITION.
- ▼ PREFERRED DIMENSION 'A'
- EARTHING LUG SHALL BE LOCATED BETWEEN THE ANCHOR BOLTS AND SHALL BE AS PER STANDARD 7-12-0026.
- WHEN THE ANCHOR CHAIR CAP IS NOT CONTINUOUS, THE BASE PLATE SHALL BE SUITABLY STIFFENED USING REMOVABLE STRUCTURAL SECTIONS (BEAM/SPIDER) AT SITE DURING ERECTION.

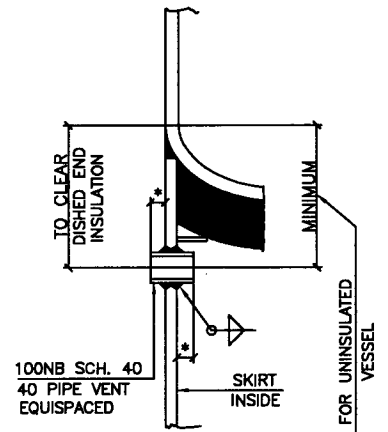
8	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NS	TR	NK	SM
7	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
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ACCESS OPENING

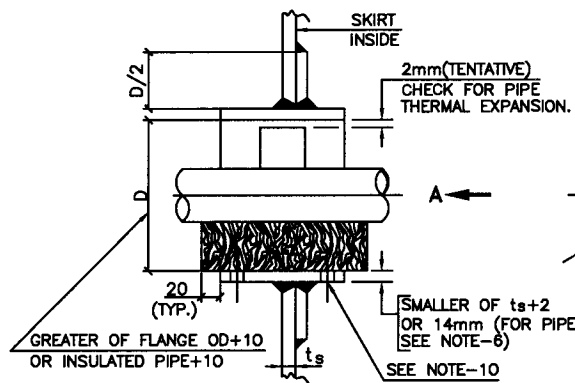


PLAN

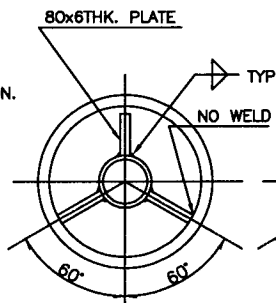


VENT
(SEE NOTE-5)

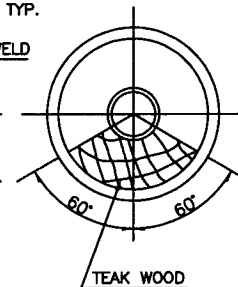
ACCESS OPENING/PIPE OPENING/
VENT OPENING (TYPICAL)



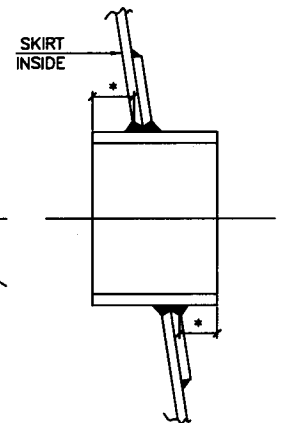
PIPE OPENING



VIEW A
(HOT TYPE VESSEL)

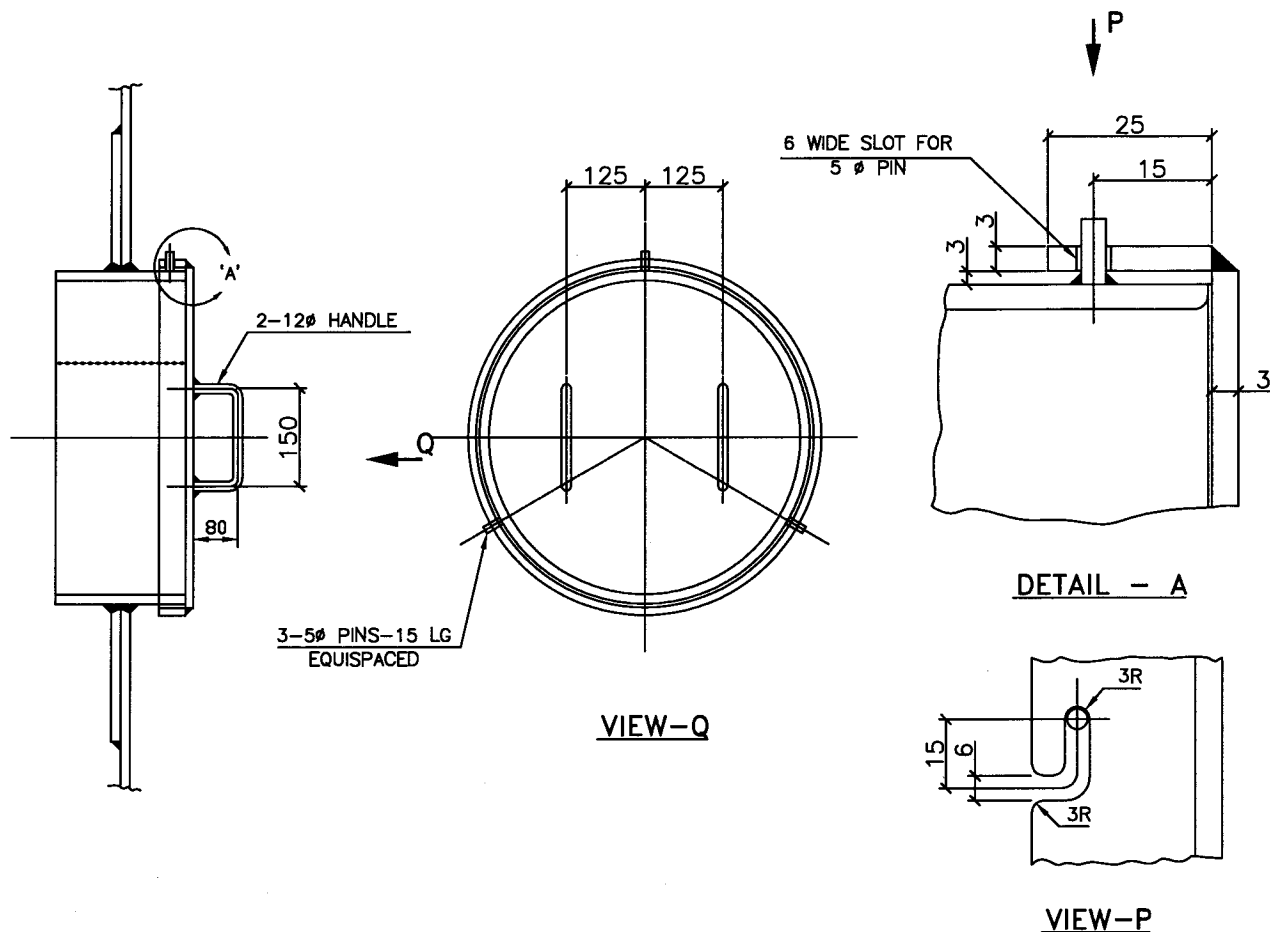


VIEW A
(COLD TYPE VESSEL)



FLARED SKIRT

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKIL	FK	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
						Approved by



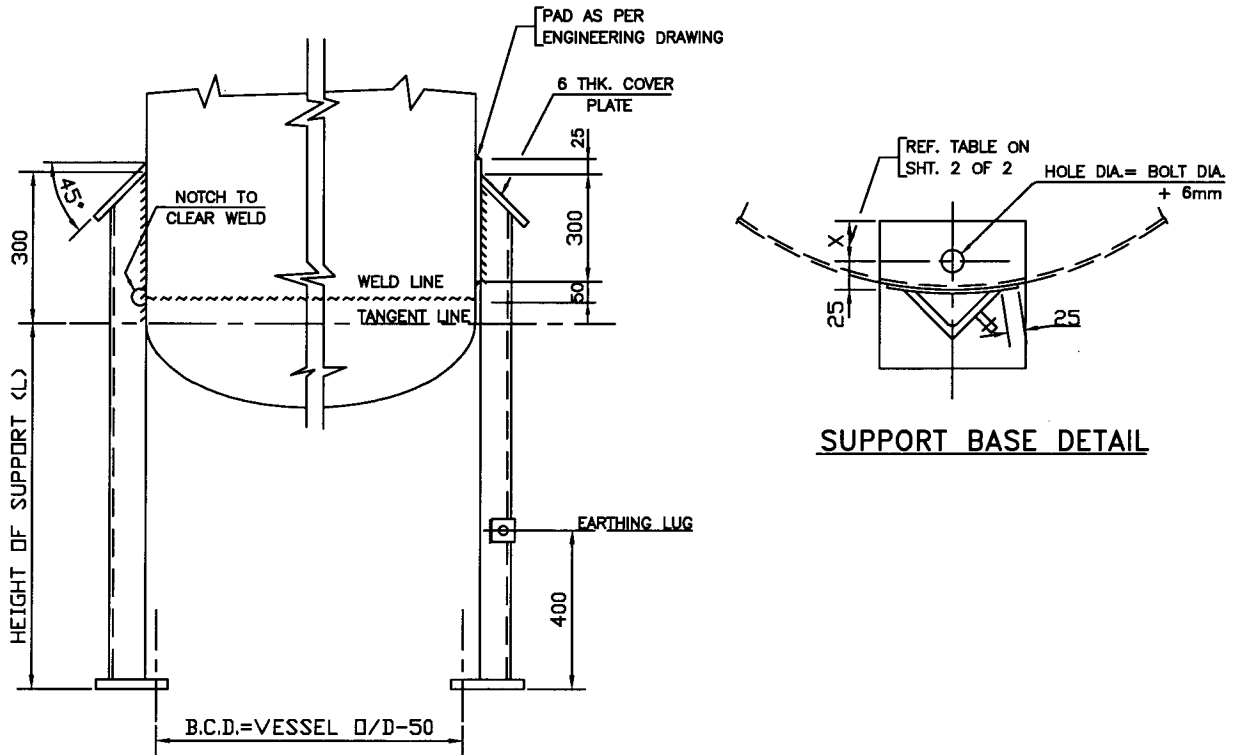
NOTES

(HOT TYPE VESSEL)

(COLD TYPE VESSEL)

- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
- ACCESS OPENING SHALL BE LOCATED BETWEEN ANCHOR BOLTS WHEREVER POSSIBLE.
- ACCESS OPENING IS NOT TO BE BLOCKED BY BOTTOM HEAD.
- | SKIRT DIAMETER | ACCESS OPENING DIA.(D) | NO. OF ACCESS OPENING |
|---------------------|------------------------|-----------------------|
| UP TO 1000 | 400 | 1 |
| OVER 1000 UPTO 1500 | 450 | 1 |
| OVER 1500 UPTO 3000 | 500 | 1 |
| OVER 3000 | 500 | 2 |
- | SKIRT DIAMETER | NO. OF VENT HOLES |
|---------------------|-------------------|
| UP TO 1000 | 2 |
| OVER 1000 UPTO 2000 | 3 |
| OVER 2000 | 4 |
- MINIMUM SIZE OF PIPE SLEEVE IS 150NB SCH 40. USE SCH 40 UPTO 250NB PIPE SLEEVE. FOR 300NB AND ABOVE, PIPE SLEEVE SHALL BE FABRICATED FROM PLATE.
- ALL OPENINGS 300 DIA. AND ABOVE SHALL BE PROVIDED WITH REINFORCEMENT PADS ON INNER SURFACE OF SKIRT.
- IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
- IN FLARED SKIRT, OPENING DETAIL IS SAME AS THAT FOR CYLINDRICAL SKIRT.
- WOODEN BLOCK SHALL BE FIXED TO SLEEVE WITH TWO NO. OF WOOD SCREWS.
- ACCESS OPENING/PIPE OPENING/VENT SHALL BE OF SAME MATERIAL AS THAT OF SKIRT.
- ALL FILLET WELDS SHALL BE 6 mm MINIMUM.
- * PROJECTION OF SLEEVE/NECK SHALL BE GREATEST OF (30+INSULATION THK.), (30+FIRE PROOFING) & 50mm.
- CENTER LINE OF ACCESS OPENING SHALL BE 850 MM (MINIMUM) ABOVE BOTTOM BASE RING FOR ANCHOR BOLTS OF SIZE M45 & BELOW AND 1100 MM (MINIMUM) FOR ANCHOR BOLTS OF SIZE ABOVE M45. IF ANCHOR CHAIR HEIGHT IS MORE THAN THAT OF GIVEN IN STANDARD. LOCATION OF ACCESS OPENING SHALL BE ESTABLISHED SUITABLY.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHL	SK/KJH	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by



NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. THIS STD. IS APPLICABLE FOR VESSEL DIAMETER UPTO AND INCLUDING 2000mm, MAXIMUM SHELL THICKNESS OF 20mm AND MAXIMUM LENGTH (T.L. TO T.L.) OF 3000mm VESSELS BEYOND ABOVE RANGE REQUIRE SPECIAL CONSIDERATION.
3. FOR CALCULATION, FOLLOWINGS PARAMETERS HAVE BEEN CONSIDERED.
 - a) WIND PRESSURE 200 Kg/m²
 - SHAPE FACTOR 0.7
 - BASIC SEISMIC CO-EFFICIENT (α_0) 0.08
 - SOIL FOUNDATION SYSTEM FACTOR (β) 1.5
 - IMPORTANCE FACTOR (I) 2.0
 - b) EMPTY WEIGHT WITH WIND LOADING OR HYDROSTATIC WEIGHT WITH SEISMIC LOADING.
4. HEIGHT AND NUMBER OF LEG SUPPORTS AND SIZE OF ANCHOR BOLTS SHALL BE AS PER ENGINEERING DRAWING.
5. MINIMUM BOLT SIZE SHALL BE M 20.
6. MAXIMUM INSULATION THICKNESS CONSIDERED IS 150 mm.
7. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
8. ALL FILLET WELDS SHALL BE 6 mm MINIMUM.
9. MATERIALS SHALL BE AS PER ENGINEERING DRAWING.
10. EARTHING LUG SHALL BE AS PER STANDARD 7-12-0026.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL		NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
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


LEG SUPPORT SIZES

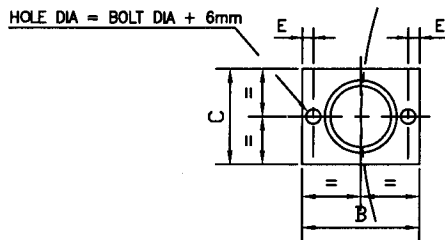
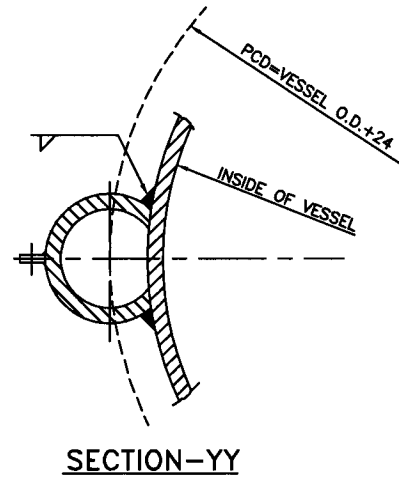
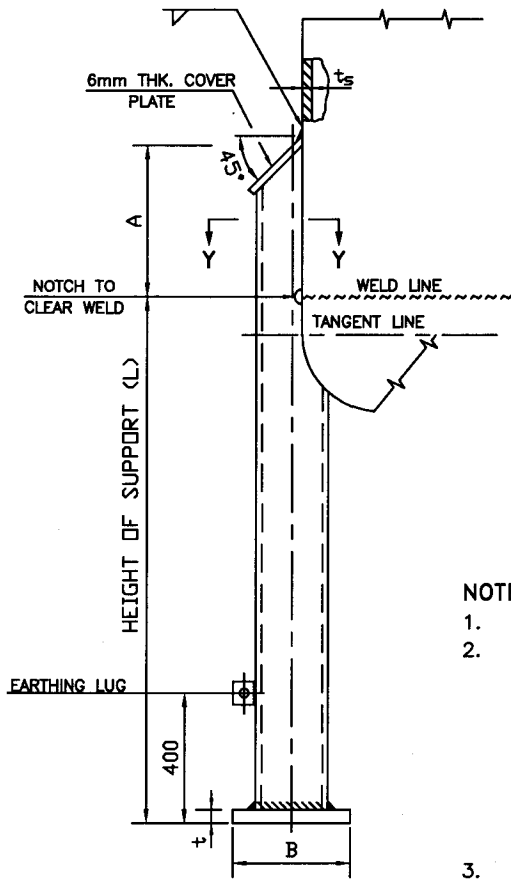
VESSEL O/D(mm)	NO.OF LEGS	LEG SIZE			BASE PLATE SIZE (mm)	X (mm)	MAXIMUM ALLOWABLE LOAD OF VESSEL (Kg.)
		MAX. VESSEL LENGTH (T.L. TO T.L.) UP TO AND INCLUDING 3.0 M					
		L = 1.5 M	L = 2.0 M	L = 2.5 M			
500	3	ISA 100x100x8	ISA 100x100x10	ISA 110x110x15	170x170x16 THK.	40	1500
800	4	ISA 100x100x10	ISA 130x130x8	ISA 130x130x12	200x200x16 THK.	45	3150
1000	4	ISA 100x100x12	ISA 130x130x10	ISA 150x150x12	230x230x16 THK.	45	4600
1250	4	ISA 110x110x15	ISA 150x150x10	ISA 150x150x12	230x230x16 THK.	45	6750
1600	4	ISA 130x130x15	ISA 150x150x15	ISA 150x150x18	230x230x16 THK.	60	9500
1750	4	ISA 150x150x12	ISA 150x150x18	ISA 200x200x12	300x300x16 THK.	60	12700
2000	4	ISA 150x150x18	ISA 200x200x12	ISA 200x200x15	300x300x20 THK.	75	16400

NOTES

FOR A VESSEL WITH MAXIMUM SUPPORT LEG HEIGHT OF 1500mm, FOLLOWING ALTERNATIVE LEG SIZES MAY BE USED :-

- ISA 65x65x8 WITH HYDROSTATIC WEIGHT UPTO 500 Kg.
- ISA 80x80x8 WITH HYDROSTATIC WEIGHT 501 Kg. TO 1000 Kg.

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6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN	
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman	
						Approved by	



SUPPORT BASE DETAIL

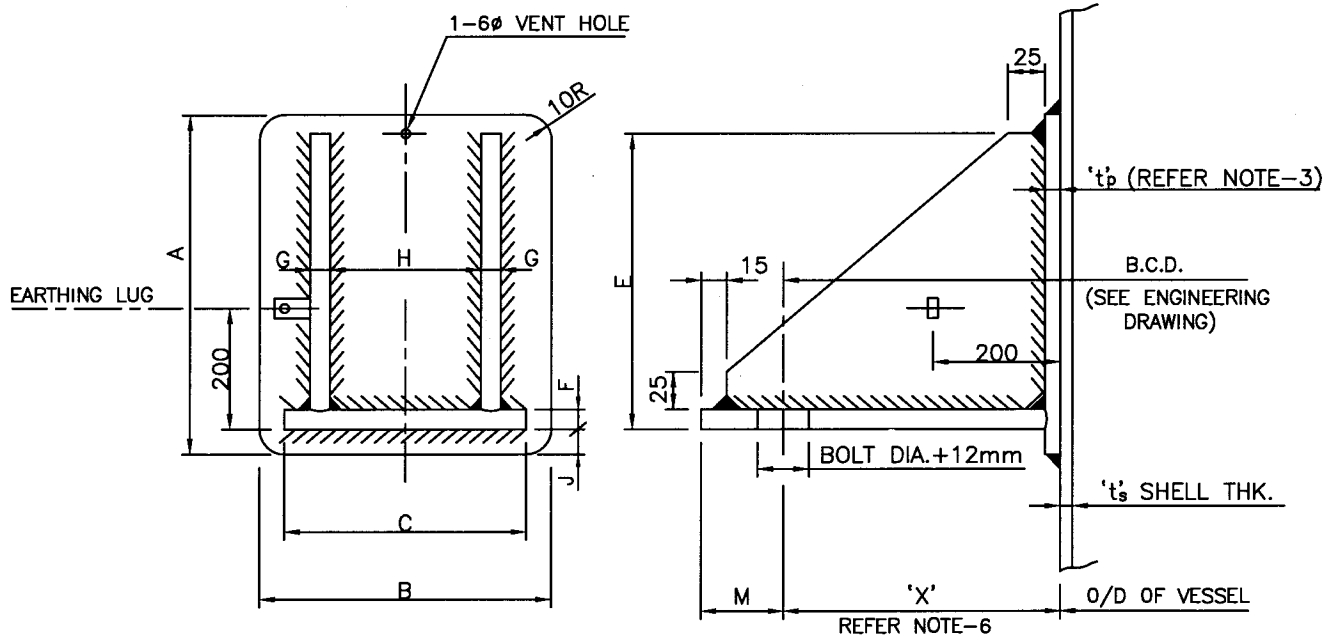
NOTES

- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
- FOR DESIGN OF SUPPORT, FOLLOWINGS PARAMETERS HAVE BEEN CONSIDERED.
 - a) WIND PRESSURE 200 Kg/m²
 - SHAPE FACTOR 0.7
 - BASIC SEISMIC CO-EFFICIENT (α_0) 0.08
 - SOIL FOUNDATION SYSTEM FACTOR (β) 1.5
 - IMPORTANCE FACTOR (I) 2.0
 - b) EMPTY WEIGHT WITH WIND LOADING OR HYDROSTATIC WEIGHT WITH SEISMIC LOADING.
- HEIGHT AND NUMBER OF LEG SUPPORTS AND SIZE OF ANCHOR BOLTS SHALL BE AS PER ENGINEERING DRAWING.
- MINIMUM BOLT SIZE SHALL BE M 20.
- MAXIMUM INSULATION THICKNESS CONSIDERED IS 150 mm.
- IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
- ALL FILLET WELDS SHALL BE 6 mm MINIMUM.
- MATERIALS SHALL BE AS PER ENGINEERING DRAWING.
- EARTHING LUG SHALL BE AS PER STANDARD 7-12-0026.
- SUITABLE PAD FOR SS VESSEL SHALL BE PROVIDED.

LEG PIPE SIZE	A	B	C	E	t	MAXIMUM ALLOWABLE LOAD PER LEG (Kgs)		
						MAXIMUM HEIGHT OF SUPPORT (L) IN METERS		
						2.0	2.5	3.0
50NB x EXTRA STRONG	120	230	140	36	20	2300	2050	1800
80NB x EXTRA STRONG	180	250	160	36	25	5700	5500	4900
100NB x EXTRA STRONG	230	310	185	42	25	9000	8600	8300
150NB x EXTRA STRONG	320	370	235	44	25	18500	18000	17500

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6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
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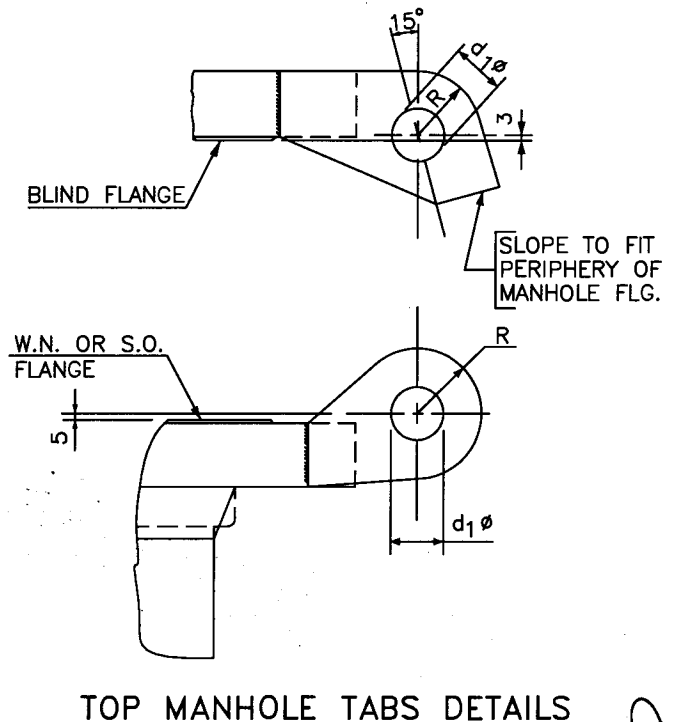
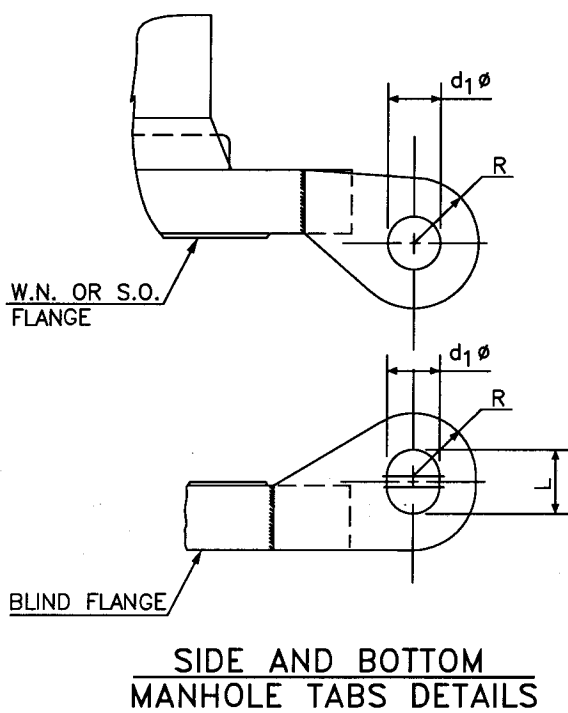
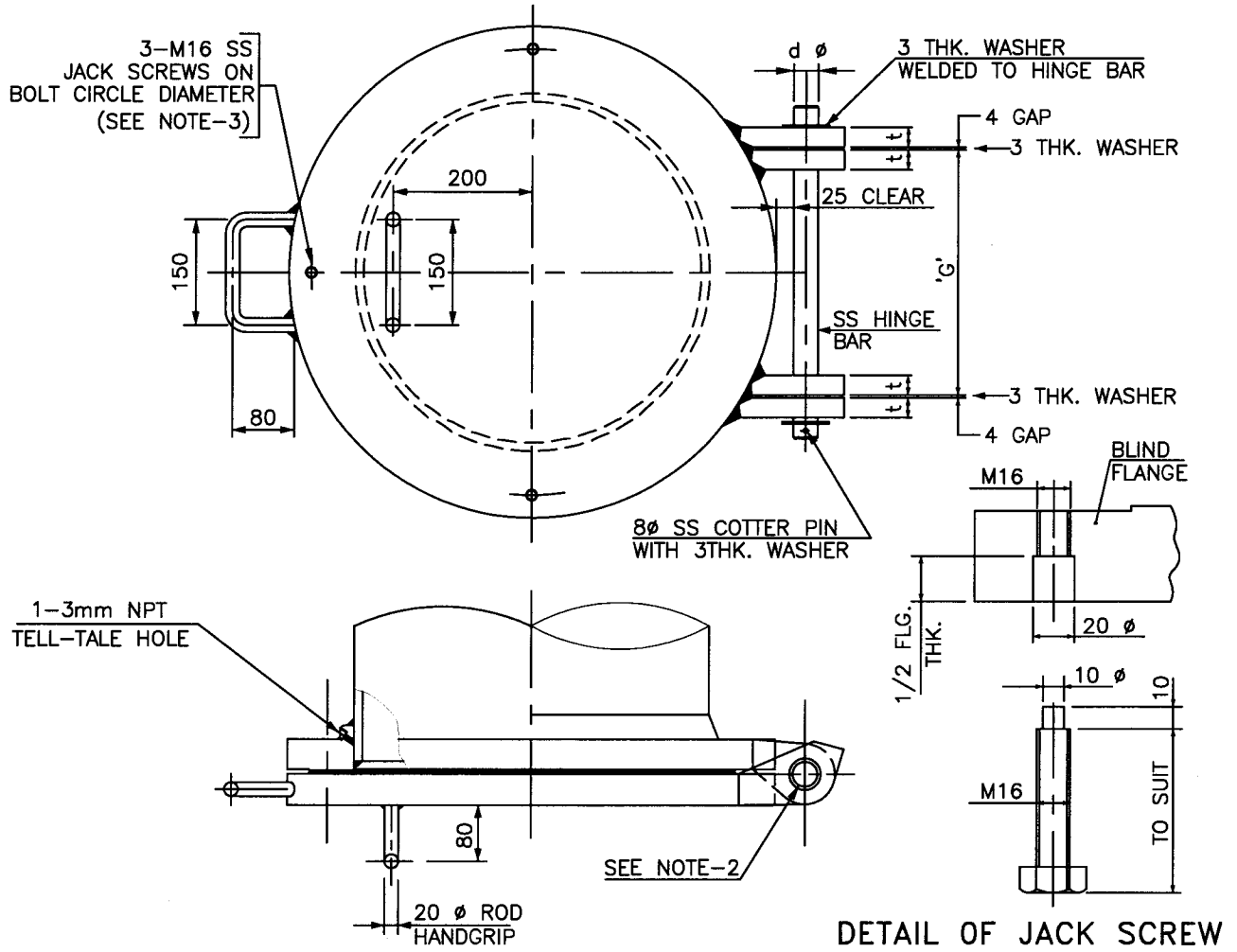
1801 - 2000	650	500	400	550	25	14	350	50	SEE ENGINEERING DRAWING 60 (MINIMUM)	SEE ENGINEERING DRAWING M30 (MINIMUM)	550	60
1601 - 1800	600	450	350	500	25	14	300	50			540	55
1401 - 1600	550	400	300	450	25	14	250	50			540	50
1201 - 1400	500	350	250	450	25	12	200	25			470	40
1001 - 1200	450	320	220	400	20	12	180	25			450	30
801 - 1000	450	280	200	400	20	12	150	25			450	25
VESSEL OUTSIDE DIA.	A	B	C	E	F	G	H	J	M	ANCHOR BOLT DIA.	'X' MAXIMUM	MAXIMUM ALLOWABLE VESSEL WEIGHT (TONNE)



NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. NUMBER OF BRACKETS SHALL BE FOUR PER VESSEL.
3. PAD THICKNESS SHALL BE AS PER ENGINEERING DRAWING.
4. FOR VESSELS UPTO 800 mm DIA. REFER ENGINEERING DRAWING.
5. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
6. DISTANCE 'X' IS TO BE FINALISED CONSIDERING INSULATION THICKNESS, BOLT SIZE AND ERECTION REQUIREMENT AND SHALL BE KEPT MINIMUM.
7. EARTHING LUG SHALL BE AS PER STANDARD 7-12-0026.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NS	SK/KJH	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
Approved by						



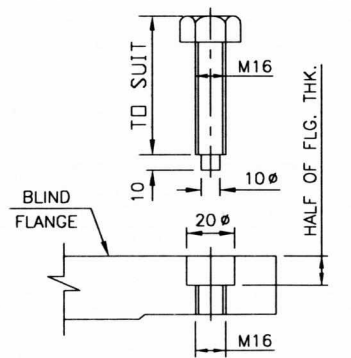
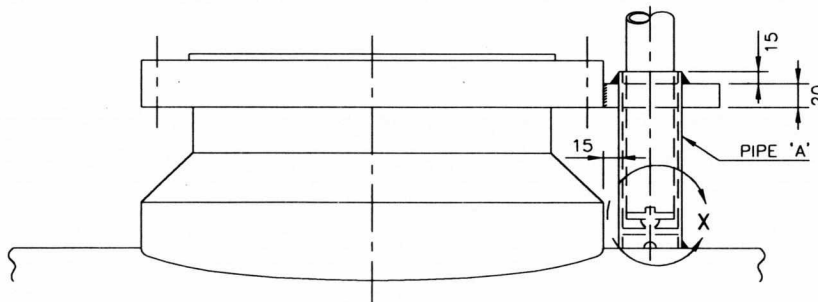
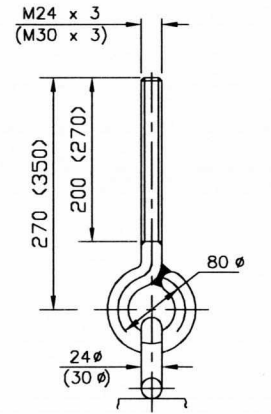
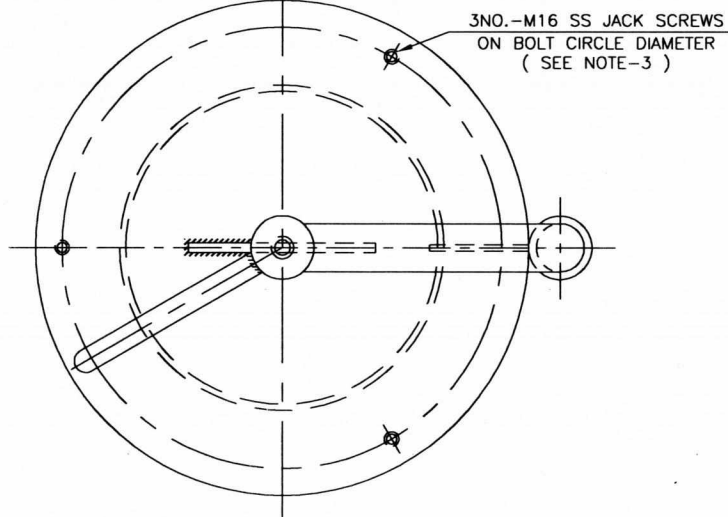
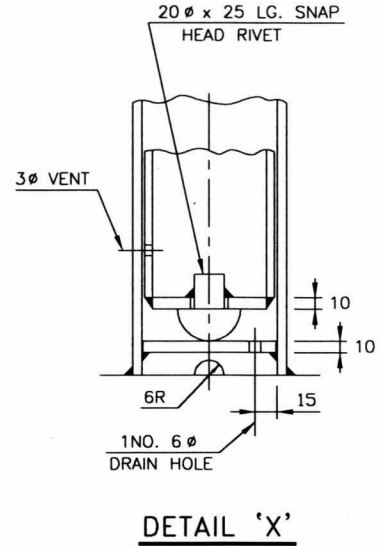
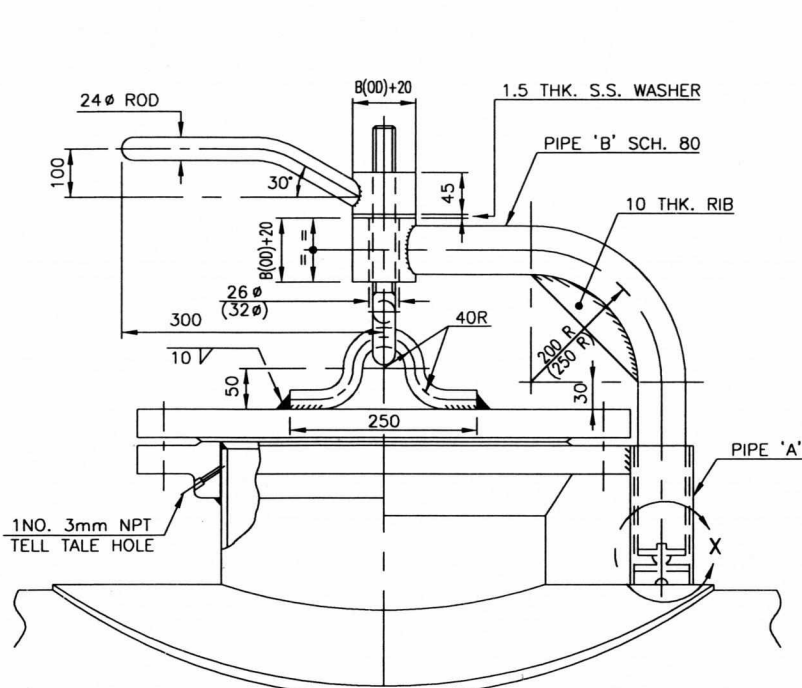
8	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL				SM
7	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT		RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman	Approved by

FLANGE RATING	NOMINAL BORE	G	t	d	R	d ₁	L
CLASS 150	400	298	28	35	55	36	42
	450	318	28	35	55	36	42
	500	348	28	35	55	36	42
	600	406	28	35	55	36	42
CLASS 300	400	324	28	35	55	36	42
	450	355	28	35	55	36	42
	500	386	30	35	55	36	42
	600	458	30	35	55	36	42
CLASS 600	400	342	32	40	55	41	47
	450	372	32	40	60	41	47
	500	406	36	40	60	41	47
	600	470	36	40	75	41	47
CLASS 900	400	352	32	40	60	41	47
	450	394	32	40	65	41	47
	500	428	40	40	70	41	47
	600	520	40	40	90	41	47

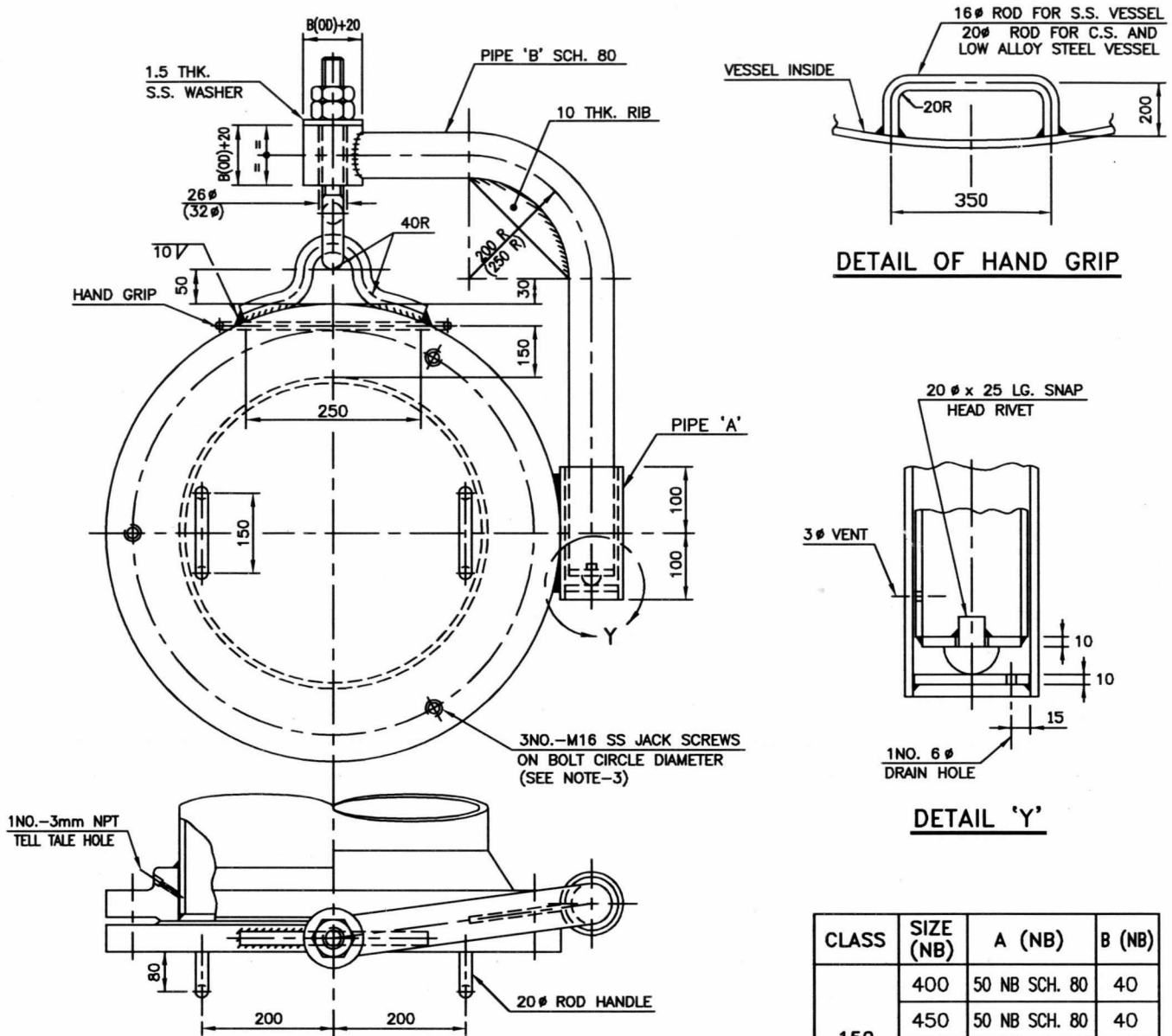
NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. WELD HINGE TABS AFTER TIGHTENING THE COVER WITH GASKET IN PLACE AND MAINTAIN A LOOSE FIT OF HINGE BAR IN HINGE TABS.
3. BCD OF JACK SCREWS IS TO BE SUITABLY CHANGED IF MANHOLE STUDS INTERFERE WITH JACK SCREWS.
4. IF SQUARE RODS ARE USED FOR HANDLES, THEIR EDGES SHALL BE ROUNDED OFF.
5. IN CASE OF CONFLICT, ENGINEERING DRAWING SHALL GOVERN.
6. ALL FILLET WELDS SHALL BE 6mm MINIMUM.
7. TELLTALE HOLE SHALL NOT BE PLUGED AND SHALL BE FILLED WITH HARD GREASE ONLY.
8. THE MATERIAL OF COMPONENTS SHALL GENERALLY BE IS : 2062 UNLESS OTHERWISE SPECIFIED ON ENGINEERING DRAWING. FOR LOW TEMPERATURE SERVICES AND SERVICES ABOVE 425°C THE HINGE TABS AND HANDLE SHALL BE OF SAME MATERIAL AS THAT OF SHELL.

8	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK/KJH	NK/N	SM
7	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
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8	07.07.2022	REVISED AND REISSUED AS STANDARD	JIT SINGH	PVSS/KA	NK	SM
7	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
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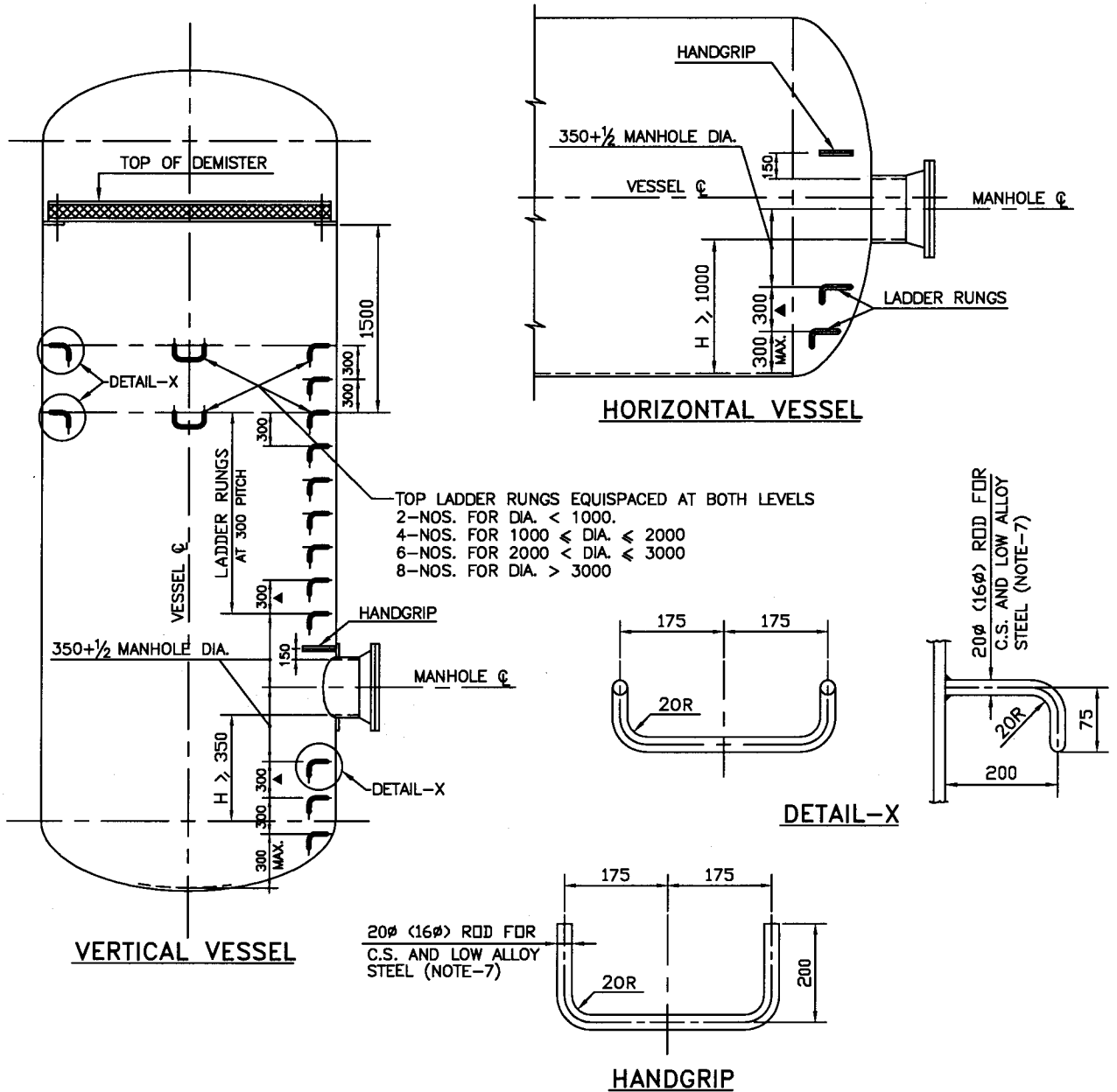


NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. DIMENSIONS IN BRACKETS ARE FOR CLASS 900.
3. B.C.D. OF JACK SCREWS IS TO BE SUITABLY CHANGED IF MANHOLE STUDS INTERFERE WITH JACK SCREWS.
4. THE SLEEVE PIPE 'A' SHOULD BE IN TRUE VERTICAL POSITION WITHIN A TOLERANCE OF 2 1/2 DEGREE, AFTER WELDING TO THE FLANGE.
5. EDGES SHALL BE ROUNDED OFF IF SQUARE ROD IS USED FOR HANDGRIP.
6. THE COMPONENTS WHICH ARE DIRECTLY WELDED TO MANHOLE SHALL BE OF SAME METALLURGY AS THAT OF EQUIPMENT. MATERIAL FOR OTHER DAVIT COMPONENTS SHALL BE C.S. UNLESS OTHERWISE SPECIFIED IN ENGINEERING DRAWING.
7. ALL FILLET WELDS SHALL BE 6mm MINIMUM.
8. THIS STANDARD IS NOT APPLICABLE FOR LOW TEMPERATURE SERVICES.
9. MP/DP TEST SHALL BE CARRIED OUT FOR ALL THE WELD JOINTS.
10. VENDOR TO ENSURE PROPER FUNCTIONING OF DAVIT AND GUARANTEE THEIR HOLDING CAPACITY WITHOUT ANY FAILURE OF WELDED JOINTS/FILLET/ EYEBOLTS/LINKS ETC. BY TESTING AT VENDOR'S SHOP AS BELOW:-KEEP THESE HANDLING ITEMS IN HANGED POSITION ALONG WITH CONNECTED BLIND FLANGES/ASSEMBLY ETC. KEPT OPENED & HANGED FOR A CONTINUOUS DURATION OF 8 HOURS MINIMUM.
11. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.

CLASS	SIZE (NB)	A (NB)	B (NB)
150	400	50 NB SCH. 80	40
	450	50 NB SCH. 80	40
	500	65 NB SCH. 40	50
	600	65 NB SCH. 40	50
300	400	65 NB SCH. 40	50
	450	65 NB SCH. 40	50
	500	65 NB SCH. 40	50
	600	90 NB SCH. 40	80
600	400	80 NB SCH. 40	65
	450	90 NB SCH. 40	80
	500	125 NB SCH. 80	100
	600	125 NB SCH. 80	100
900	400	125 NB SCH. 80	100
	450	125 NB SCH. 80	100
	500	150 NB SCH. 80	125
	600	150 NB SCH. 80	125

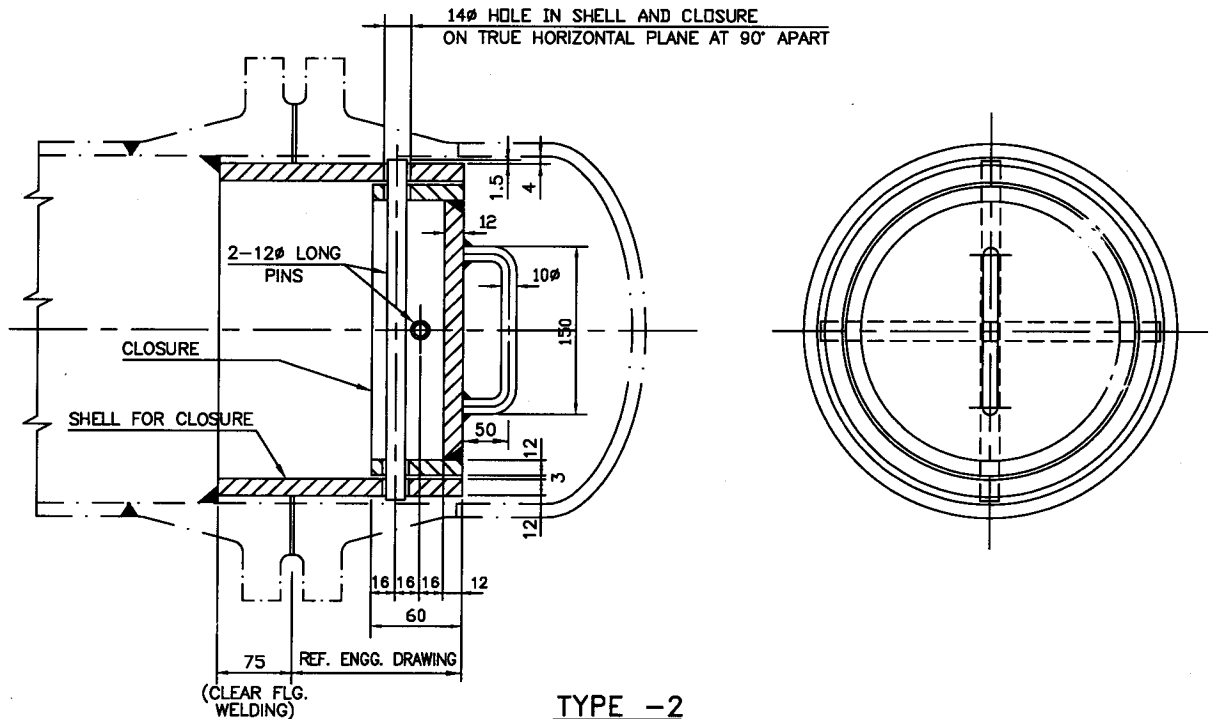
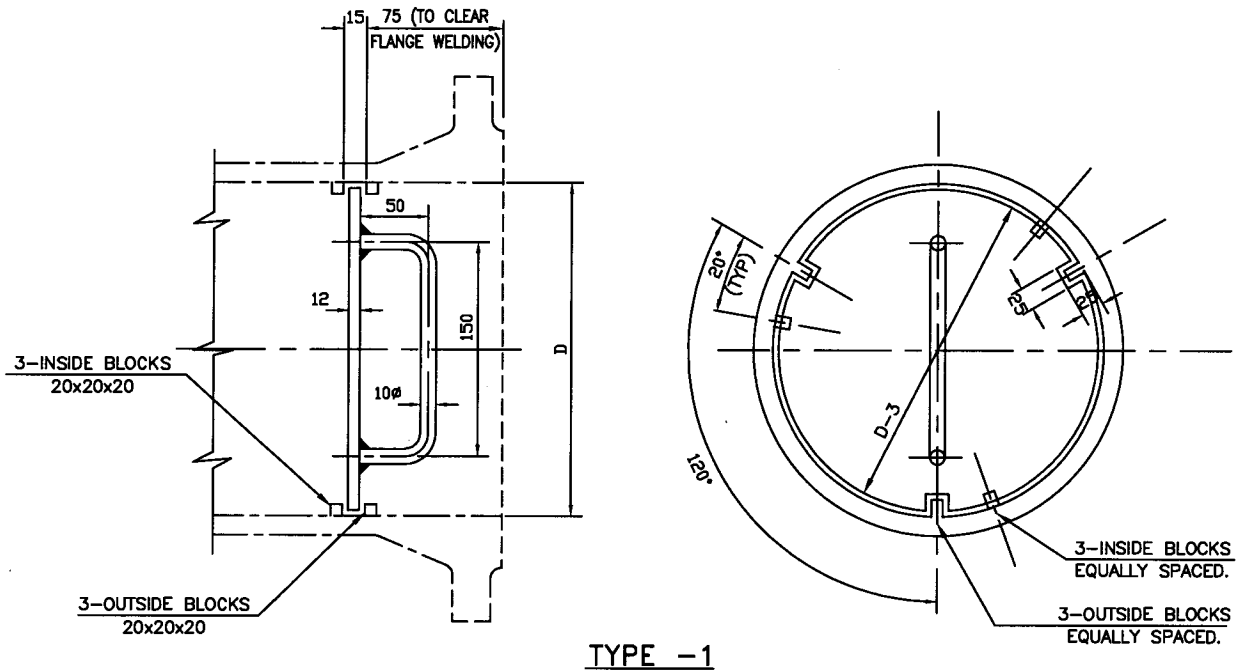
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
8	07.07.2022	REVISED AND REISSUED AS STANDARD	JIT SINGH	PVSS/KA	NK Nalin	SM
7	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN



NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
- ▲ 2. VARIATION IN SPACING BETWEEN LADDER RUNGS IS PERMITTED IN CASE OF INTERFERENCE WITH SOME NOZZLE OR INTERNALS. HOWEVER THE SPACING OF RUNGS SHALL BE EQUAL.
3. SQUARE RODS MAY BE USED FOR HANDGRIP / LADDER RUNGS. IF FABRICATED FROM PLATE THE EDGES ARE TO BE ROUNDED OFF.
4. MATERIAL SHALL BE AS PER ENGINEERING DRAWING.
5. ALL FILLET WELDS SHALL BE 6 mm MINIMUM.
6. ORIENTATION OF LADDER RUNGS SHALL BE SAME AS OF MANHOLE.
7. DIMENSIONS SHOWN IN BRACKETS ARE FOR STAINLESS STEEL MATERIAL.

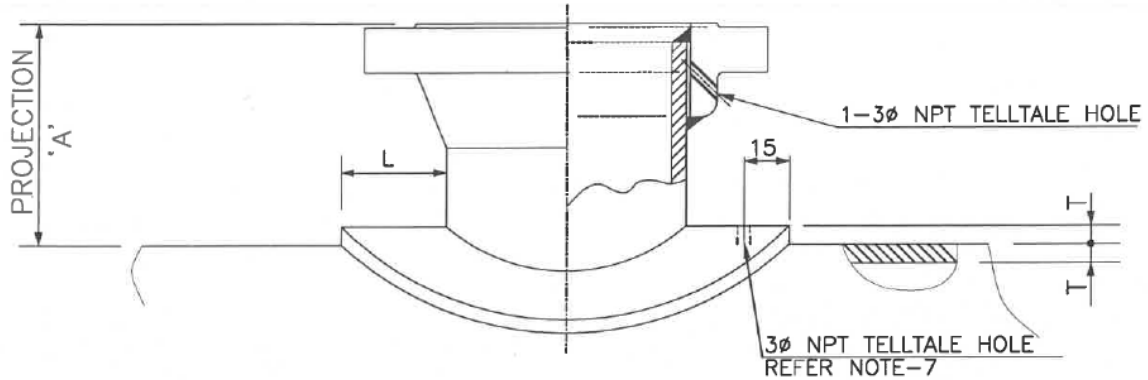
7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NS	TK	NK	BM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
Approved by						



NOTE

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TK	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
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						Approved by
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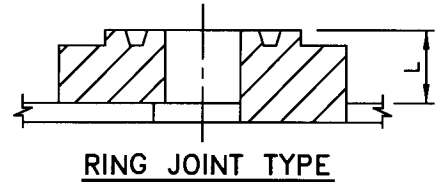
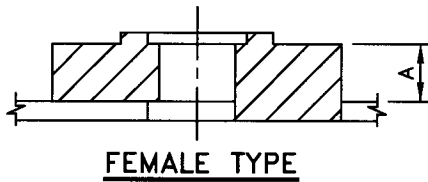
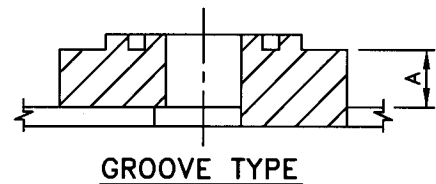
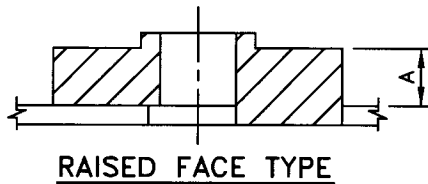
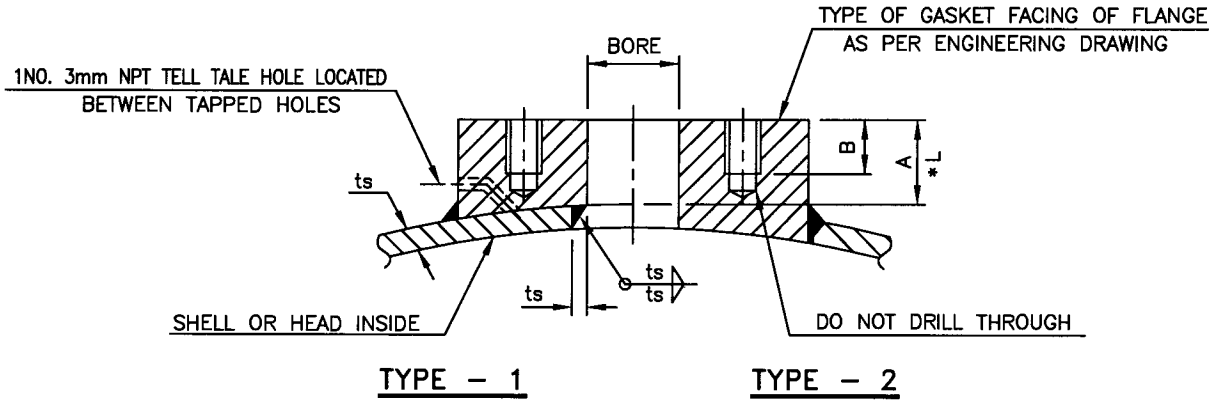
NOMINAL PIPE SIZE	OUTSIDE DIAMETER	L (WIDTH OF PAD) (⊛)		PROJECTION 'A' SEE NOTE-4,5,9&10			
		SHELL WELD EFF.=0.85	SHELL WELD EFF.=1.0	CLASS 150	CLASS 300	CLASS 600	CLASS 900
BELOW 3"	STANDARD	—	—	150	150	150	150
3"	88.9	40	45	200	200	200	200
4"	114.3	50	60	200	200	200	200
6"	168.3	70	85	200	200	200	250
8"	219.1	95	110	200	200	250	250
10"	273.0	115	135	200	200	250	300
12"	323.8	135	160	200	200	250	300
14"	355.6	150	175	250	250	250	300
16"	406.4	170	200	250	250	250	300
18"	457.2	195	225	250	300	300	350
20"	508.0	215	250	250	300	300	350
22"	558.8	235	275	250	300	300	—
24"	609.6	255	300	250	300	300	400
26"	660.4	285	330	250	300	350	450
28"	711.2	305	355	250	300	350	450
30"	762	325	380	250	300	400	450
32"	812.8	350	405	300	350	400	500
34"	863.6	370	430	300	350	400	500
36"	914.4	390	455	300	350	—	—
38"	965.2	410	480	300	350	—	—
40"	1016	435	505	300	350	—	—
42"	1066.8	455	530	300	400	—	—
44"	1117.6	475	555	300	400	—	—
46"	1168.4	500	585	300	400	—	—
48"	1219.2	520	610	300	400	—	—

8	21.02.2025	REVISED AND REISSUED AS STANDARD	AS	TKh	KA/NK	LN
7	23.01.2020	REAFFIRMED AND REISSUED AS STANDARD	DP	TK	KJH	RKT
6	07.06.2013	REVISED AND REISSUED AS STANDARD	NIKHIL	KA	RKT/SC	DM
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
- ③ 3. WIDTH IS MINIMUM AND SHALL BE CHECKED AGAINST CODE REQUIREMENT. CHECK REINFORCEMENT REQUIREMENT FOR ALL EXTERNAL PIPING LOADING ALSO.
4. NOZZLE PROJECTIONS ARE BASED ON INSULATION THICKNESS EQUAL TO 75mm. FOR INSULATION THICKNESS GREATER THAN 75mm, THE NOZZLE PROJECTION IS 'A' + [INSULATION THICKNESS(mm)-75].
5. PROJECTION 'A' FOR SELF-REINFORCED NOZZLE SHALL BE BASED ON DESIGN OF REINFORCEMENT SUBJECT TO MINIMUM REQUIREMENTS AS PER THIS STD.
6. EXTEND PAD LOCALLY FOR MANHOLE DAVIT SUPPORT, IF REQUIRED.
7. EXTERNAL REINFORCING PADS SHALL HAVE A MINIMUM OF 1 NO. TELL-TALE HOLE EXCEPT THAT PADS FOR NOZZLES GREATER THAN 10"NB(250NB) SHALL HAVE MINIMUM TWO NOS. TELL-TALE HOLES AND NOZZLES IN EXCESS OF 36"NB (900NB) SHALL HAVE 4 NOS. TELL-TALE HOLES. PAD INSTALLED IN SECTIONS SHALL HAVE ATLEAST ONE TELL-TALE HOLE PER SECTION. TELL-TALE HOLES ON REINFORCEMENT PADS SHALL BE EQUALLY SPACED IN CIRCUMFERENTIAL DIRECTION OF PAD.
8. TELL-TALE HOLE SHALL NOT BE PLUGGED AND SHALL BE FILLED WITH HARD GREASE ONLY, AFTER HYDROTEST/PNEUMATIC TEST OF EQUIPMENT.
9. a) FOR COLUMNS & VERTICAL VESSELS, PROJECTION OF NOZZLE ON TOP HEAD SHALL BE 500mm MINIMUM FROM OUTSIDE.
b) FOR HORIZONTAL VESSELS, PROJECTION OF NOZZLES ON TOP SIDE OF SHELL SHALL BE 400mm MINIMUM FROM OUTSIDE.
10. PROJECTIONS ARE BASED ON ASME B16.5 FLANGES FOR UPTO AND INCLUDING 24"NB NOZZLES AND ASME B16.47 SERIES 'B' FLANGES FOR NOZZLE SIZES ABOVE 24"NB.

8	21.02.2025	REVISED AND REISSUED AS STANDARD	AS	TKh	KA/NK	MN
7	23.01.2020	REAFFIRMED AND REISSUED AS STANDARD	DP	TK	KJH	RKT
6	07.06.2013	REVISED AND REISSUED AS STANDARD	NIKHIL	KA	RKT/SC	DM
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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NOMINAL PIPE SIZE OR BORE	CLASS 150		CLASS 300		CLASS 600			CLASS 900		
	A	B	A	B	A	B	L	A	B	L
40	28	20	36	28	40	32	46	46	38	54
50	34	24	36	28	40	32	46	48	38	54
65	34	24	36	28	42	34	48	50	38	56
80	34	24	38	30	44	34	52	50	40	58
100	34	24	40	30	48	38	54	56	44	62
150	38	30	44	34	52	42	60	58	48	66
200	40	30	46	36	58	48	66	64	54	72
250	44	34	48	38	64	54	72	70	60	78
300	44	34	50	40	68	58	76	74	64	82
350	48	38	54	44	70	60	78	86	76	98
400	48	38	58	48	76	66	84	88	78	100
450	54	44	58	48	82	72	91	102	92	115
500	54	44	58	48	88	78	99	108	98	122
600	58	48	66	56	102	92	113	120	130	156

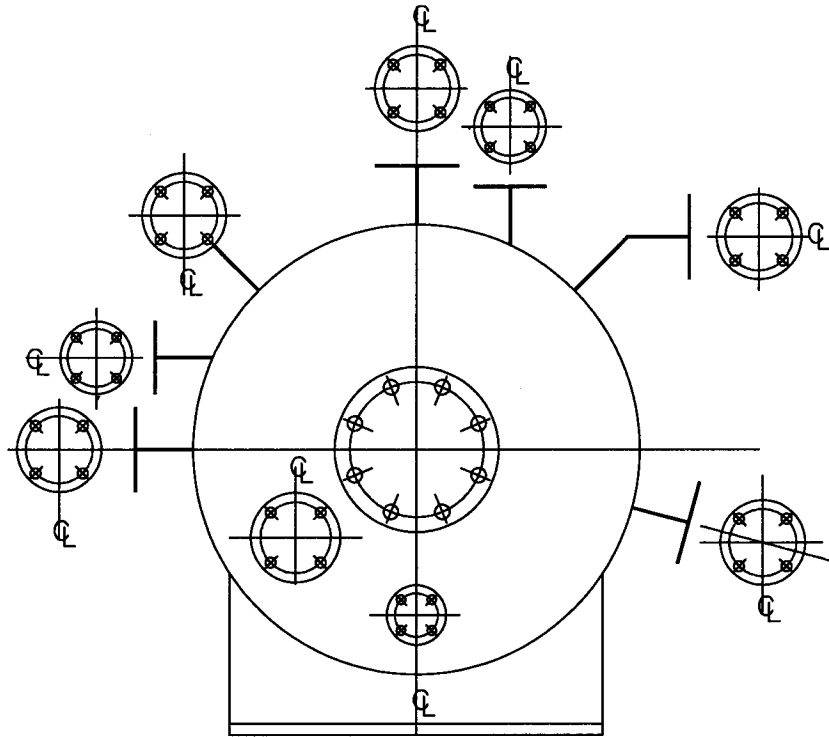
NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. PAD NOZZLE OUTSIDE DIAMETER, FACING, STUD CIRCLE DIAMETER, NUMBER AND SIZE OF STUDS AND TOLERANCES SHALL BE AS PER ASME B 16.5 LATEST EDITION.
3. MATERIAL SHALL BE AS PER ENGINEERING DRAWING.
4. FABRICATOR SHALL SUPPLY REQUIRED NUMBER OF GASKETS AND STUDS.
5. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
- *6. DIMENSION 'L' INCLUDES HEIGHT OF RAISED FACE.
7. THESE TYPE OF NOZZLES ARE NOT TO BE USED FOR HYDROGEN SERVICE, UNLESS SPECIFICALLY REQUIRED BY LICENSOR.

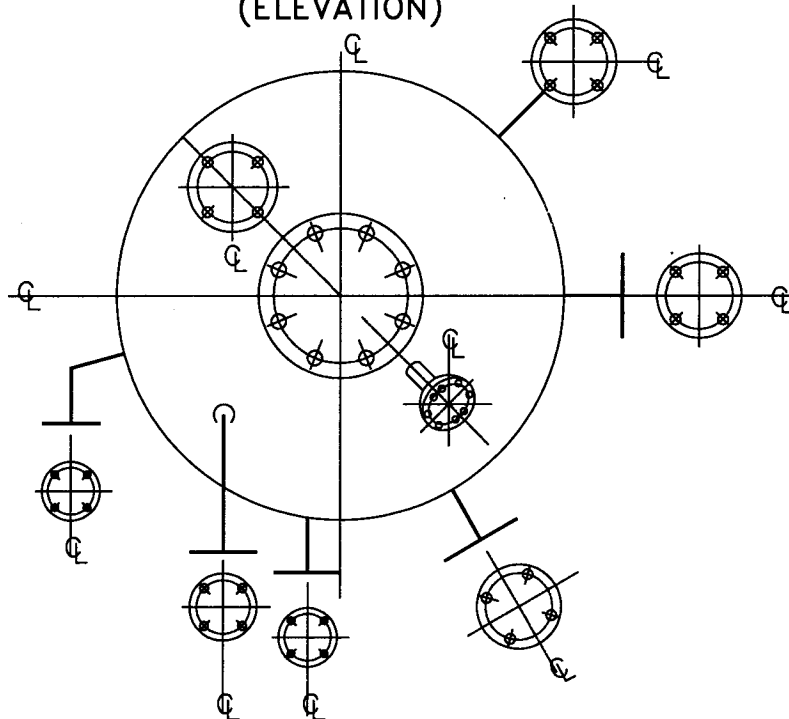
7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
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STANDARD BOLT HOLE ORIENTATION

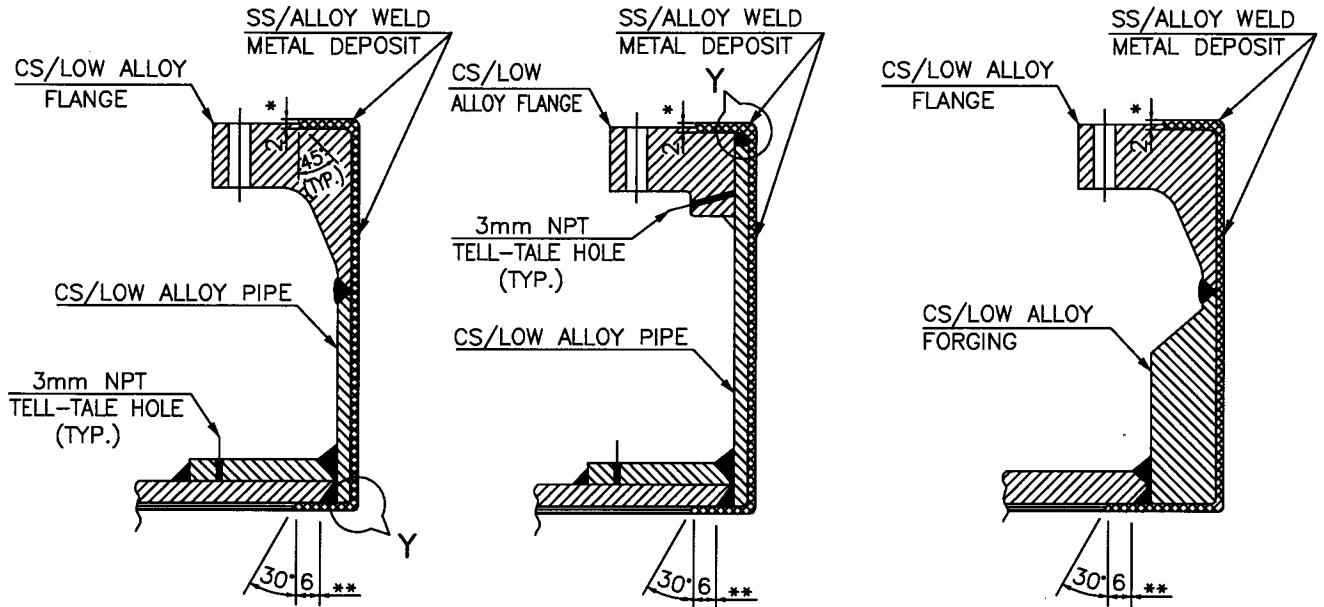


HORIZONTAL VESSEL
(ELEVATION)



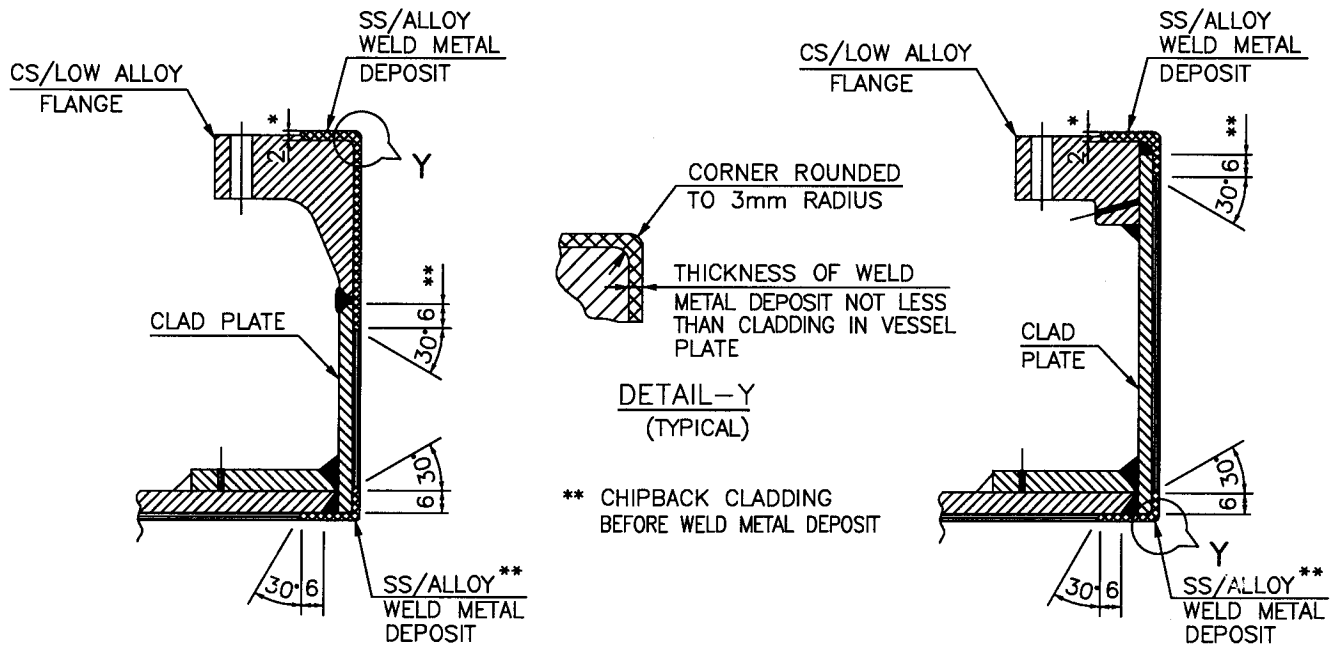
VERTICAL VESSEL
(PLAN)

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TK	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by

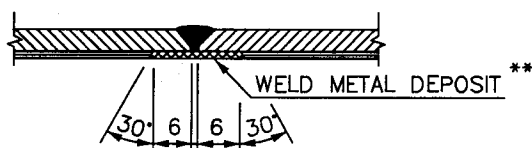


NOZZLE WELDING DETAIL
FOR SIZE UPTO 150NB

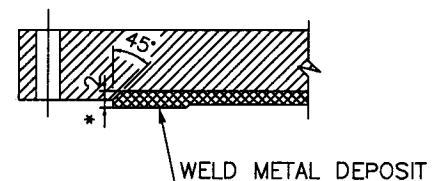
WELDING DETAIL FOR
SR NOZZLES



NOZZLE WELDING DETAIL
FOR SIZE ABOVE 150NB.



WELDING DETAIL FOR CIRCUMFERENTIAL
AND LONGITUDINAL JOINTS



WELD DEPOSIT DETAIL
FOR BLIND FLANGES

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TK	NK Nalin	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
						Approved by



NOTES

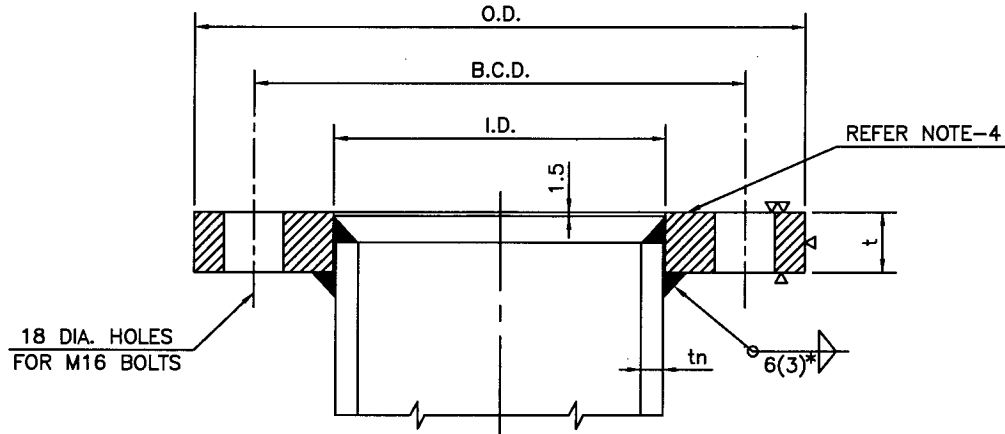
1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. WELD DEPOSIT SHALL BE OF MINIMUM TWO LAYER CONSTRUCTION WITH TOP 2mm OF FINISHED WELD THICKNESS HAVING THE SAME CHEMISTRY AS THAT OF ALLOY SPECIFIED FOR CLADDING / LINING (NOTE-7). CHECK OF FERRITE CONTENT AND ITS ACCEPTANCE CRITERIA SHALL BE AS PER MATERIAL REQUISITION.
- *3. FINISHED RAISED FACE AS WELL AS GROOVE DIMENSIONS OF RTJ AND T&G SHALL BE AS PER APPLICABLE STANDARD.
4. CS/LOW ALLOY WELDMENT OF S.O. FLANGE AND OF RF PAD SHALL BE PNEUMATICALLY CHECKED AT 1.8 kg/cm²(g) FOR LEAK-TIGHTNESS BEFORE DEPOSITING SS/ALLOY WELD METAL.
5. THE TELL-TALE HOLE SHALL NOT BE PLUGGED AND SHALL BE FILLED WITH GREASE.
6. CORNER RADIUS OF WELD METAL DEPOSITS SHALL BEAR SMOOTH FINISH.
7. WELDING IN CONJUNCTION WITH ALLOY LINING SHALL BE DONE WITH COVERED ELECTRODES OR FILLER WIRE MADE IN ACCORDANCE WITH SPECIFICATION LISTED BELOW:-

CLADDING	APPLIED LINING	BARRIER/FIRST LAYER	TOP LAYER
A 263	A 240 TYPE 405,410S	(2)	(8)
A 264	A 240 TYPE 304	(1)	(3)
A 264	A 240 TYPE 304L	(8)	(4)
A 264	A 240 TYPE 316	(2)	(5)
A 264	A 240 TYPE 316L	(8)	(6)
A 264	A 240 TYPE 321 OR 347	(8)	(7)
A 265	B-127	(10)	(9)

SPECIFICATION	ELECTRODE CLASSIFICATION
(1) AWS A 5.4, ASME SFA 5.4	E 309L
(2) AWS A 5.4, ASME SFA 5.4	E 309MoL
(3) AWS A 5.4, ASME SFA 5.4	E 308
(4) AWS A 5.4, ASME SFA 5.4	E 308L
(5) AWS A 5.4, ASME SFA 5.4	E 316
(6) AWS A 5.4, ASME SFA 5.4	E 316L
(7) AWS A 5.4, ASME SFA 5.4	E 347
(8) AWS A 5.4, ASME SFA 5.4	E 410S/E430
(9) AWS A 5.11, ASME SFA 5.11	ENi Cu7
(10) AWS A 5.11, ASME SFA 5.11	ENi1

- (i). FILLER WIRE FOR GTAW, GMAW, SAW PROCESS SHALL BE AS FOLLOWS:-
 - A) FOR STAINLESS STEEL SPECIFICATION AS PER AWS A 5.9, ASME SFA 5.9 WITH COMPOSITION AS LISTED ABOVE FROM (1) TO (8).
 - B) FOR MONEL (NICKEL COPPER ALLOY) SPECIFICATION AS PER AWS A 5.14, ASME SFA 5.14 WITH COMPOSITIONS AS LISTED ABOVE AT (9) & (10).
- (ii). WHEREVER SPECIFIED ENiCr Fe3 (INCONEL) WELDING SHALL BE DONE DUE TO SERVICE REQUIREMENTS.
- (iii). FOR JOINTS BETWEEN PIPE TO PIPE/PIPE-FITTING IN ALLOY/SS LINED CONSTRUCTION IF OTHER SIDE OF JOINT IS NOT ACCESSIBLE, SHALL BE DONE WITH WELDING CONSUMABLE MATCHING THE CLAD MATERIAL FOLLOWED BY A BARRIER LAYER OF PURE IRON (ARMO/KATDO IRON) AND THEN BY WELDING CONSUMABLE MATCHING THE BASE MATERIAL.
8. IN CASE OF MONEL CLAD CONSTRUCTION, FREE IRON CONTENT IN THE WELD OVERLAY SHALL NOT EXCEED 2.5% AT A DEPTH OF 2mm FROM FINISHED OVERLAY THICKNESS.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK/KJH	NK	SM
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Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
						Approved by



NOMINAL PIPE SIZE (mm)	I.D.	B.C.D.	O.D.	NUMBER OF BOLTS	THICKNESS OF FLANGE t	
					CARBON STEEL	S. STEEL OR MONEL
40	51	110	160	4	16	10
50	63	120	170	4	16	10
80	92	150	200	4	16	10
100	117	180	230	4	16	10
150	171	240	290	4	16	10

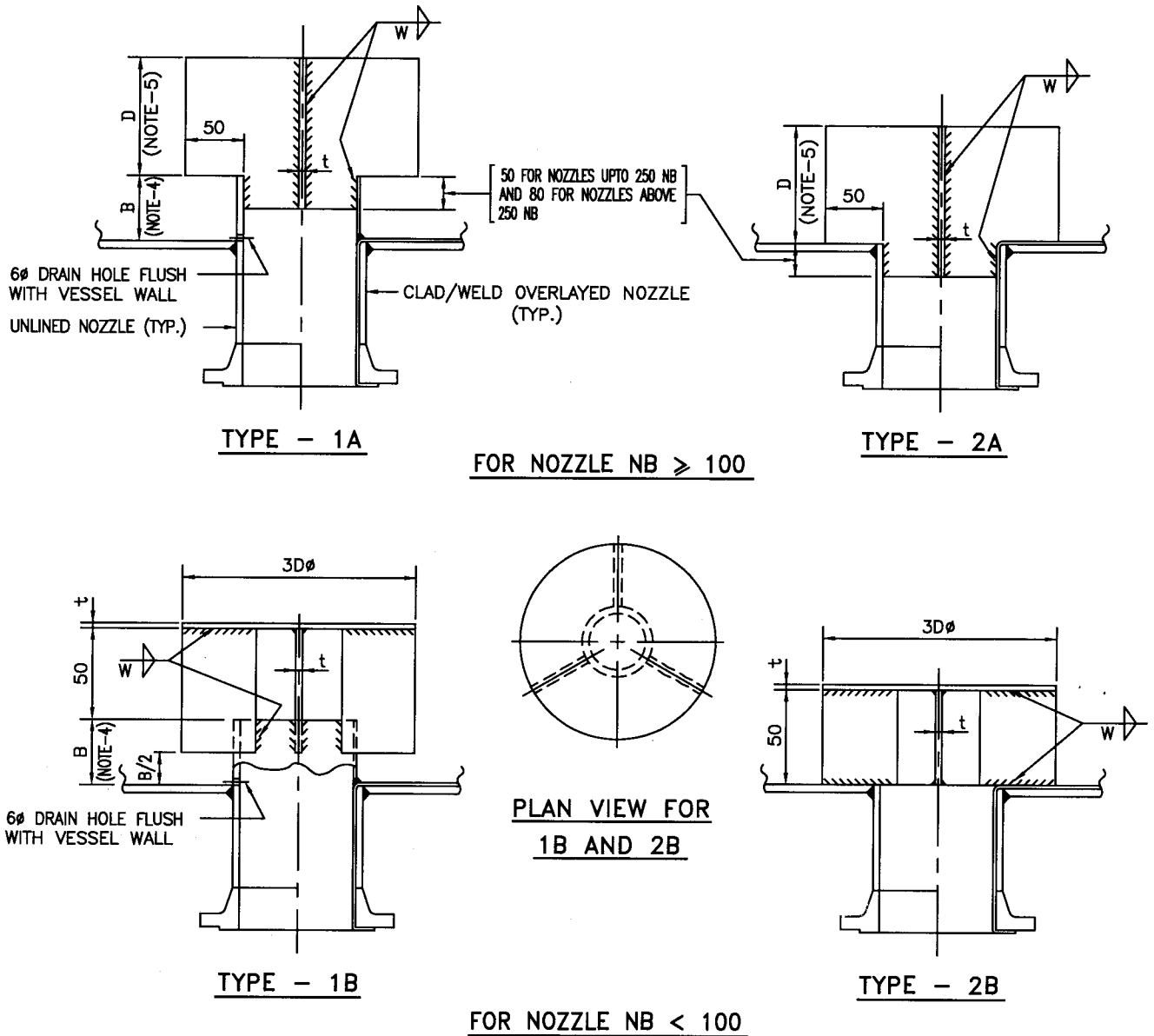
200	222	290	340	8	20	12
250	276	350	400	8	20	12
300	327	400	450	8	20	12

350	358	430	480	12	24	16
400	409	480	530	12	24	16
450	460	530	580	12	24	16
500	511	580	630	12	24	16
600	612	680	730	12	24	16

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
- * 3. FILLET SIZE IN BRACKET ARE FOR STAINLESS STEEL / MONEL.
4. FULL FACED GASKETS SHALL BE USED.
5. DIMENSIONS EXCEPT THICKNESS FOR INTERNAL FLANGES OF SIZE 25NB OR LESS SHALL BE AS PER ASME B16.5 CLASS 150. FLANGE THICKNESS AND FACING SHALL BE EQUIVALENT TO 40NB FLANGE COVERED IN THIS STANDARD.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TK	NK Nair	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convor	Stds. Bureau Chairman
						Approved by

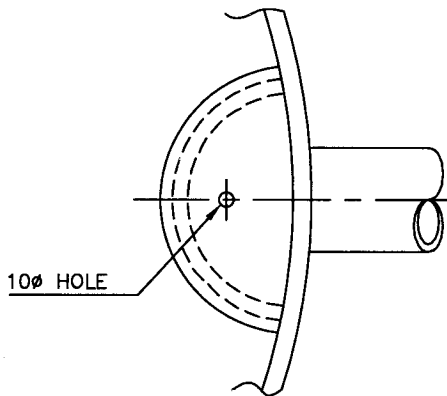
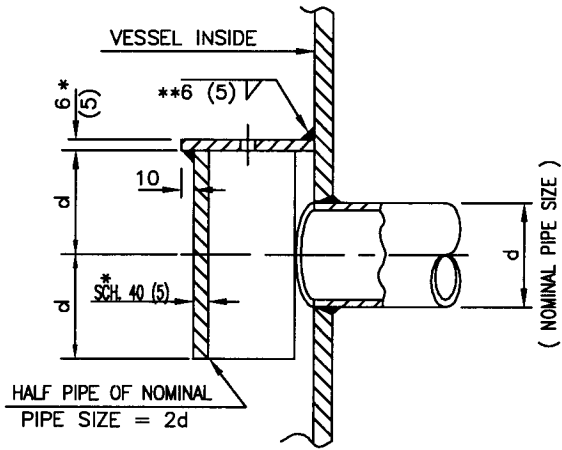


VESSEL MATERIAL	CARBON STEEL/LOW ALLOY STEEL				ALLOY / ALLOY CLAD/ ALLOY LINED (NOTE-3a)	CONCRETE LINED (NOTE-3b)
	1.5	3	4.5	6		
CORROSION ALLOWANCE	1.5	3	4.5	6	-	-
THICKNESS 't'	6	8	12	14	5	5
WELD SIZE 'W'	6	6	8	8	5	5

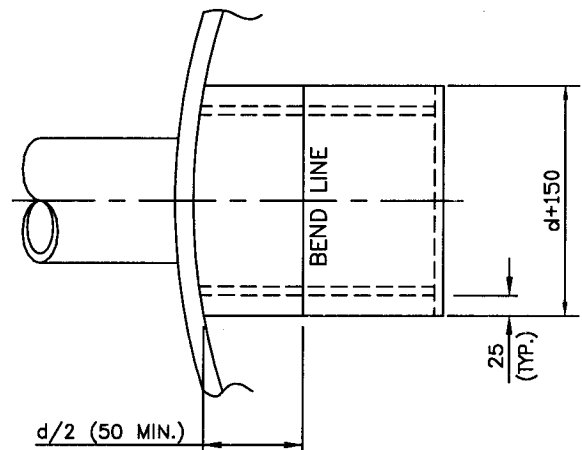
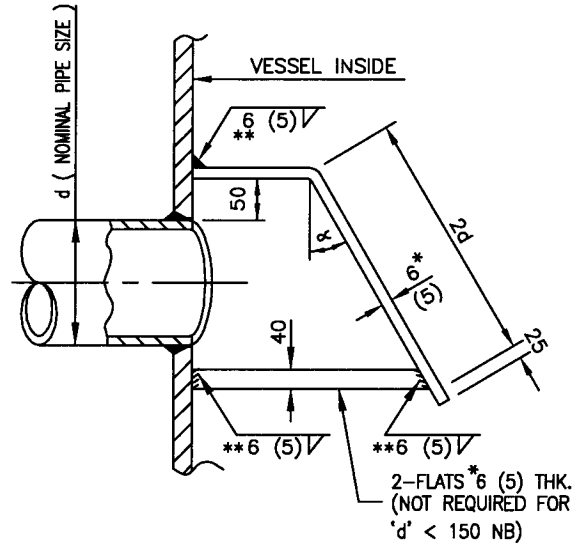
NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
- 3.a) FOR ALLOY LINED VESSELS, THE BAFFLE MATERIAL SHALL BE SAME AS ALLOY LINING.
b) FOR CONCRETE LINED VESSELS, THE BAFFLE MATERIAL SHALL BE ALLOY AS SPECIFIED IN ENGINEERING DRAWING.
4. REFER ENGINEERING DRAWING FOR DIMENSION 'B'.
5. 'D' DENOTES NOMINAL BORE SIZE OF SUBJECT NOZZLE.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TK	NK Nataraj	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
						Approved by



TYPE-1

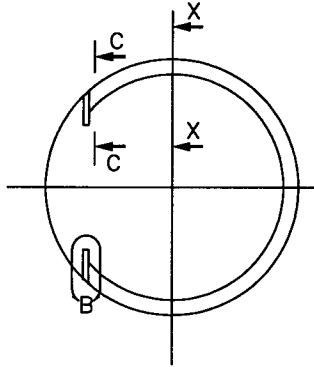


TYPE-2

NOTES

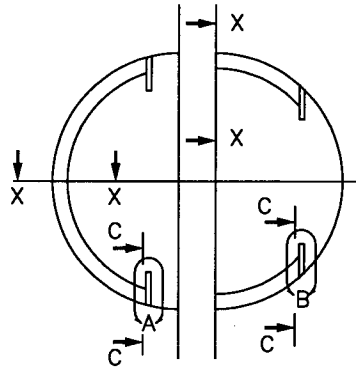
1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. $\alpha = 30^\circ$ UNLESS OTHERWISE STATED (TO BE ADJUSTED TO PREVENT BLOWING INTO SEAL PAN).
3. MATERIALS SHALL BE AS PER ENGINEERING DRAWING.
4. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
5. DIMENSIONS IN BRACKETS ARE FOR STAINLESS STEEL.
- * 6. INDICATED THICKNESS OF INTERNAL BAFFLE PLATE IS MINIMUM TO WHICH TWICE THE CORROSION ALLOWANCE IS TO BE ADDED.
- **7. ALL FILLET WELD SIZE SHALL BE OF 6MM MINIMUM TO WHICH THE CORROSION ALLOWANCE IS TO BE ADDED.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL		NK	
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman



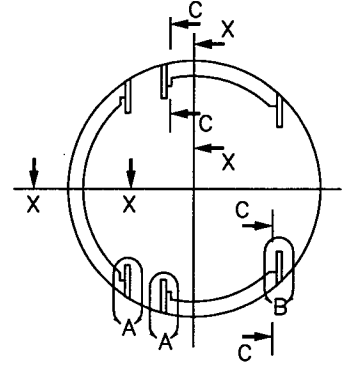
SIDE DOWNCOMER

SINGLE PASS TRAY

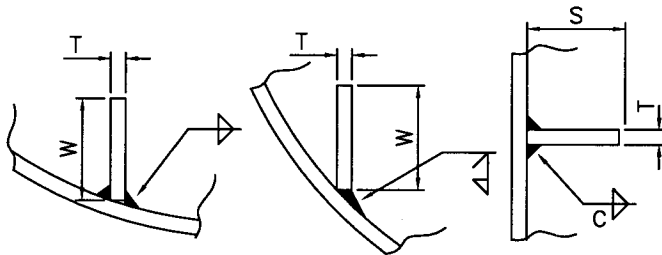


CENTRAL DOWNCOMER SIDE DOWNCOMER

DOUBLE PASS TRAY



THREE PASS TRAY

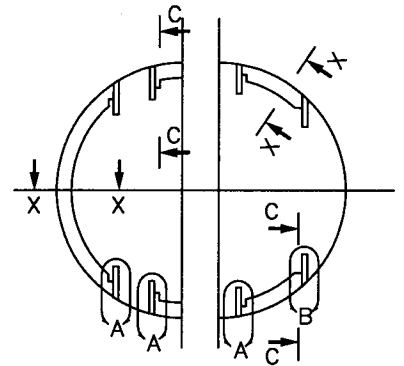


DETAIL - A

DETAIL - B

SECTION-XX

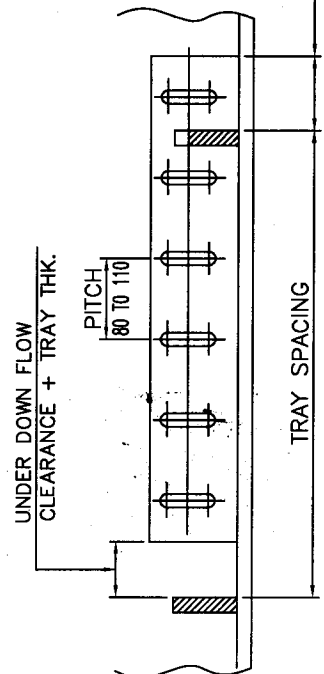
SUPP. RING THICKNESS MM	FILLET SIZE-C MM
UPTO 12	6
ABOVE 12 - UPTO 16	10
ABOVE 16	0.7 T



CENTER & OFFCENTER DOWNCOMER

FOUR PASS TRAY

EXIT WEIR HEIGHT
+ TRAY THICKNESS



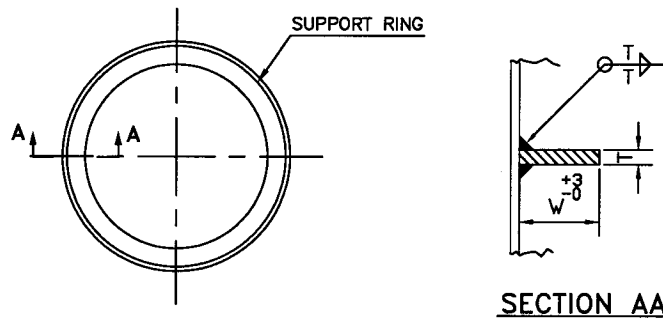
SECTION - CC

VESSEL I/D.	BOLTING BAR (WXT) **	SUPPORT RING (SXT) **
UPTO 1200	85 X 6	40 X 6 *
1201 TO 2000	110 X 6	50 X 6
2001 TO 3000	125 X 6	65 X 6
3001 TO 4500	150 X 10	75 X 10
4501 TO 6000	175 X 10	90 X 10
6001 TO 7500	200 X 10	90 X 10
7501 TO 9000	200 X 10	100 X 10
9001 TO 12000	225 X 10	110 X 10
12001 TO 14000	225 X 10	125 X 10
UPTO 1200	-	-
1201 TO 2000	125 X 6	50 X 6
2001 TO 3000	150 X 6	65 X 6
3001 TO 4500	175 X 10	75 X 10
4501 TO 6000	200 X 10	90 X 10
6001 TO 7500	225 X 10	90 X 10
7501 TO 9000	235 X 10	100 X 10
9001 TO 12000	280 X 10	110 X 10
12001 TO 14000	305 X 10	125 X 10

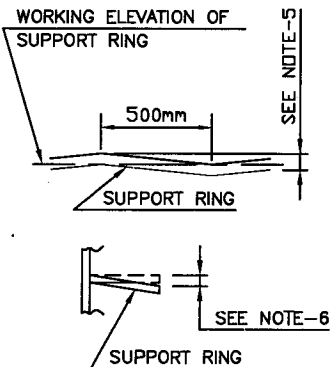
NOTES :

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. THIS STANDARD IS FOR THE PURPOSE OF QUOTATION / INFORMATION ONLY.
- **3. FINAL DETAIL, SIZES OF TRAY SUPPORT RING, BOLTING BAR ETC. SHALL BE AS PER TRAY DRAWING.
4. INDICATED THICKNESS OF TRAY SUPPORT RINGS AND BOLTING BARS IS MINIMUM TO WHICH TWICE THE CORROSION ALLOWANCE IS TO BE ADDED.
- *5. SUPPORT RING WIDTH SHALL BE 50mm WHEREVER VESSEL CORROSION ALLOWANCE IS 6mm OR MORE.
6. MATERIAL OF CONSTRUCTION SHALL BE AS PER ENGG. DRAWING.

7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TR	NK Nalin	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman



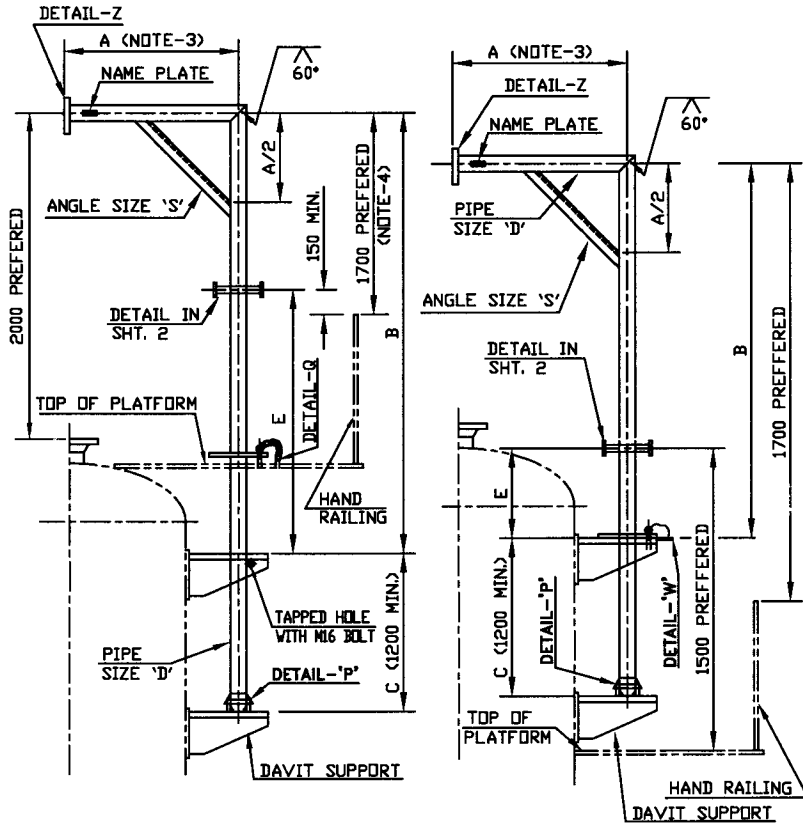
TOWER INTERNAL DETAILS		INSIDE DIAMETER OF TOWER								
		250 TO 500	501 TO 900	901 TO 1800	1801 TO 3000	3001 TO 4500	4501 TO 7500	7501 TO 9000	9001 TO 12000	12001 TO 14000
TYPE OF INTERNALS	MATERIAL OF CONSTRUCTION	SIZE OF SUPPORT RING (W X T) **								
PACKING SUPPORT PLATE	METAL	* 25 X 4	* 35 X 6	50 X 6	65 X 6	75 X 10	90 X 10	100 X 10	110 X 10	125 X 10
	CERAMIC	30 X 4	50 X 6	65 X 6	-	-	-	-	-	-
LIQUID DISTRIBUTOR	METAL	* 25 X 4	* 35 X 6	50 X 6	65 X 6	75 X 10	90 X 10	100 X 10	110 X 10	125 X 10
	CERAMIC	30 X 4	50 X 6	65 X 6	-	-	-	-	-	-
REDISTRIBUTOR	METAL	* 25 X 4	* 35 X 6	50 X 6	65 X 6	75 X 10	90 X 10	100 X 10	110 X 10	125 X 10
BED LIMITER	METAL	* 45 X 4	* 45 X 6	50 X 6	65 X 6	75 X 10	90 X 10	100 X 10	110 X 10	125 X 10



NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. INDICATED THICKNESS OF SUPPORT RING IS MINIMUM TO WHICH TWICE THE CORROSION ALLOWANCE IS TO BE ADDED.
3. THIS STANDARD IS FOR PURPOSE OF QUATATION & INFORMATION ONLY. SIZE AND THICKNESS SHALL BE CHECKED FOR THE LOAD APPLIED (SUPPORTED INTERNALS + DIFFERENTIAL PRESSURE).
- ** 4. FINAL SIZE OF THE RING SHALL BE AS SPECIFIED ON ENGINEERING DRAWING FOR INTERNALS.
5. SUPPORT RING SHALL NOT HAVE WAVINESS EXCEEDING 1.5 mm FOR ANY 500 mm OF CIRCUMFERENTIAL LENGTH.
6. INCLINATION OF SUPPORT RING OVER ITS WIDTH SHALL NOT EXCEED 0.75 mm.
- * 7. SUPPORT RING WIDTH SHALL BE MIN. 50MM WHEREVER VESSEL CORROSION ALLOWANCE IS 6.0MM OR MORE.
8. MATERIAL OF CONSTRUCTION SHALL BE AS PER ENGG. DRAWING.

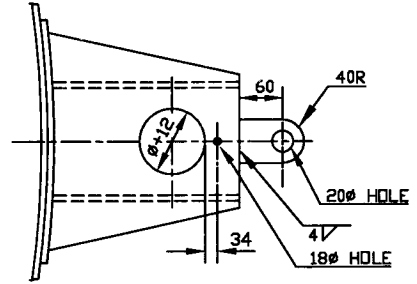
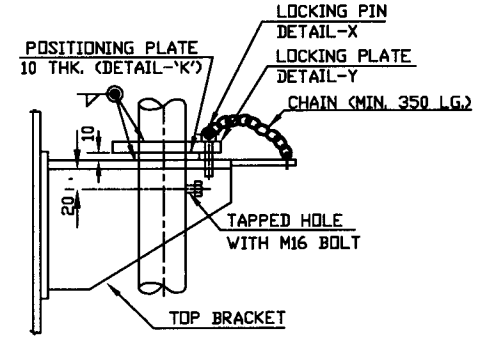
7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK/KJH	NK Nalin	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
Approved by						



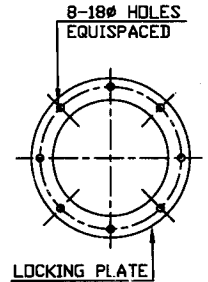
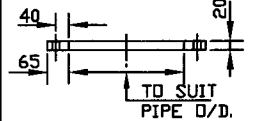
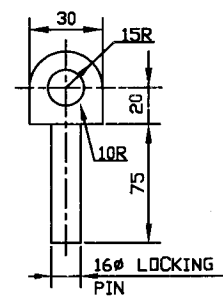
(TYPE-1)
DAVIT FOR TOP MOUNTED PLATFORM

(TYPE-2)
DAVIT FOR SIDE MOUNTED PLATFORM

A (MAX) (mm)	B (mm)	CAPACITY (kgs.)	PIPE SIZE D	ANGLE SIZE S	R1	R2	r	t
1000	4000 (NOTE-13)	500	100NBxSCH.160	75x75x6	75	60	10	20
		1000	150NBxSCH.80	100x100x8	110	60	12	25
2000		500	150NBxSCH.80	100x100x8	110	60	10	20
		1000	200NBxSCH.80	150x150x10	140	60	12	25
3000		500	200NBxSCH.80	150x150x10	140	60	10	20
		1000	200NBxSCH.160	150x150x12	140	60	12	25

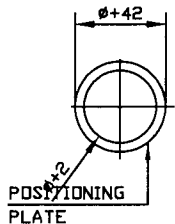


DETAIL - W

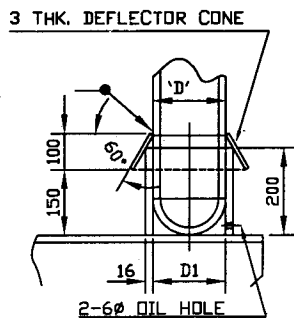


DETAIL-X

DETAIL-Y

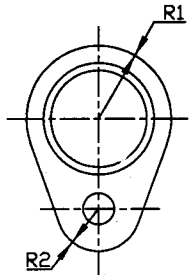
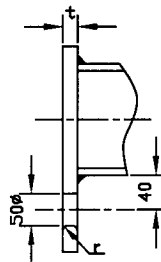


DETAIL-K



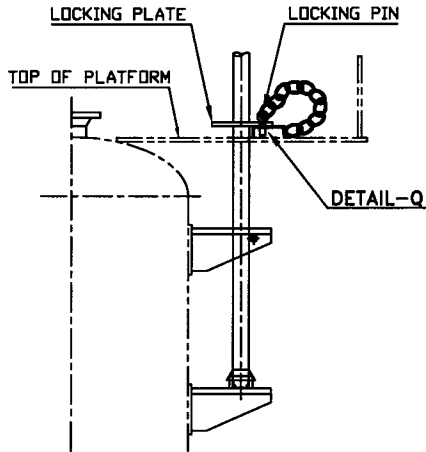
DETAIL-P

D (NB)	D1
100	120
150	175
200	225

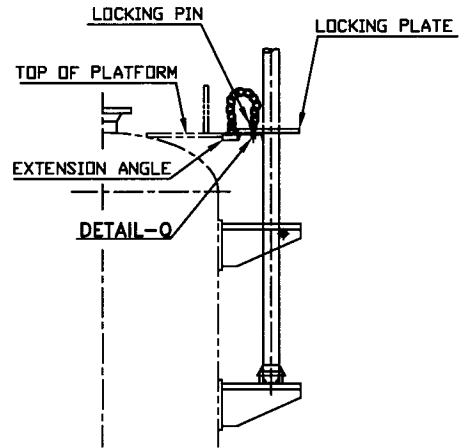


DETAIL-Z (DAVIT EYE)

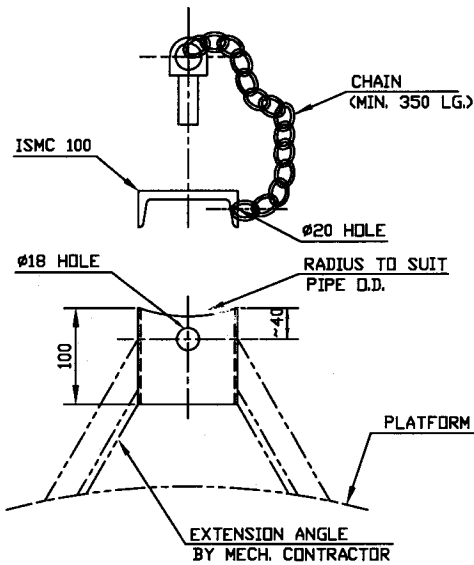
8	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK	NK Nalin	SM
7	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
Approved by						



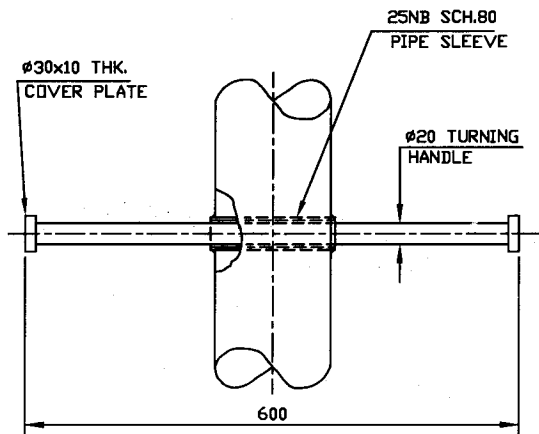
LOCKING ARRANGEMENT OF DAVIT PIPE PASSING THROUGH PLATFORM



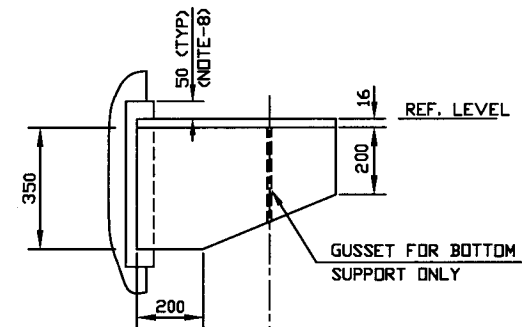
LOCKING ARRANGEMENT OF DAVIT PIPE PASSING THROUGH SIDE OF PLATFORM



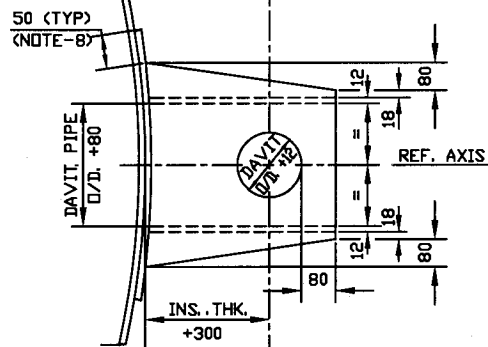
DETAIL - Q



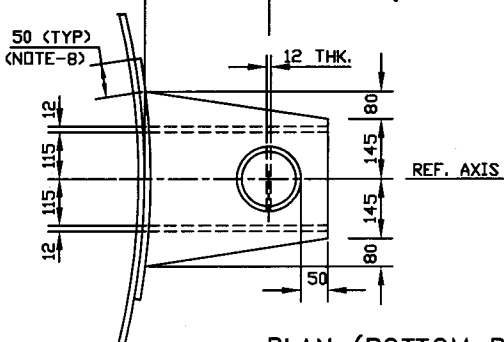
TURNING HANDLE DETAIL



ELEVATION



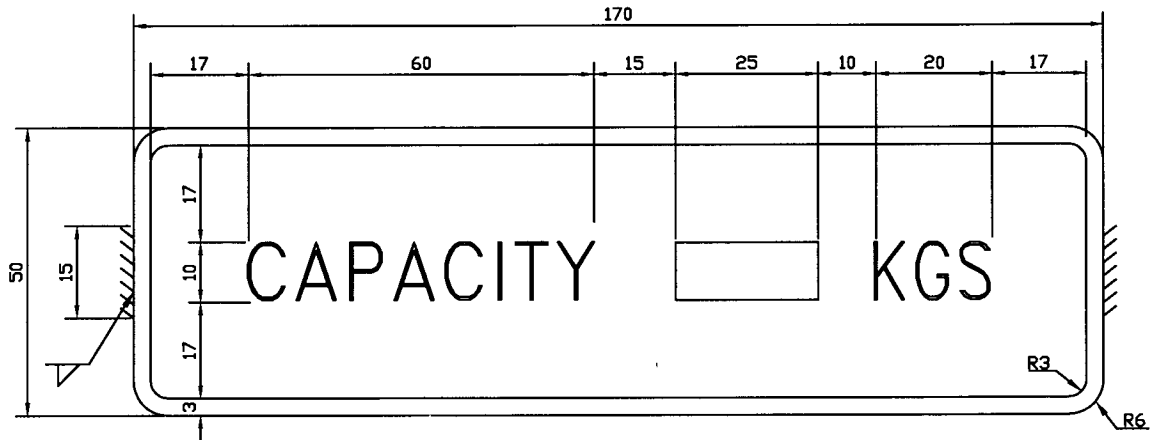
PLAN (TOP BRACKET)



PLAN (BOTTOM BRACKET)

DAVIT SUPPORTS

8	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	NK	NK Nalin	SM
7	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
Approved by						

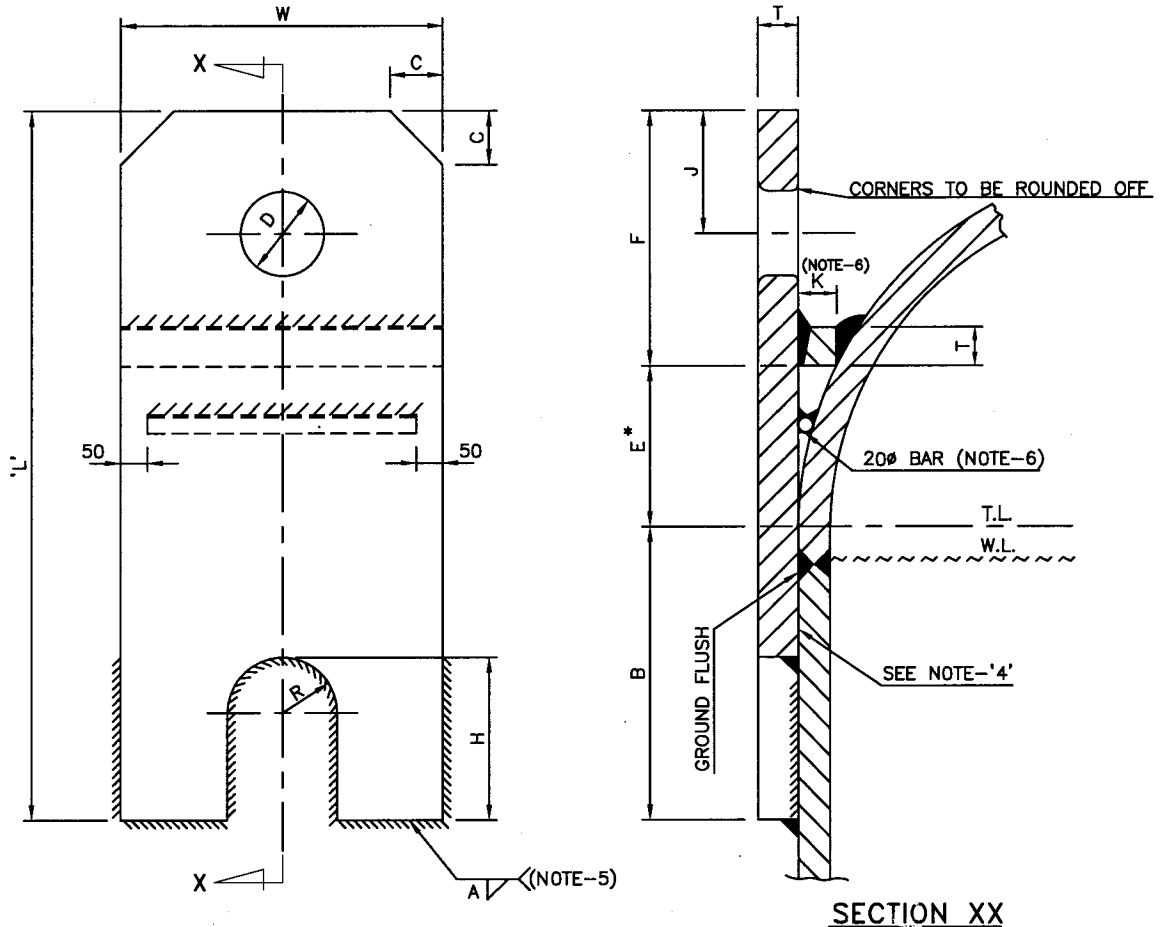


NAME PLATE

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. NAME PLATE
 - a) MATERIAL STAINLESS STEEL 2mm THICK.
 - b) NAME PLATE IS TO BE TACK WELDED TO THE DAVIT PIPE.
 - c) THE LETTERS AND NUMBERS SHALL HAVE RAISED POLISHED FACE.
 - d) BACKGROUND SHALL BE BLACK.
3. DIMENSION 'A' SHALL BE SUCH THAT THE DAVIT EYE EXTENDS PREFERABLY BY 900 mm OUTSIDE PLATFORM.
4. REFER ENGINEERING DRAWING FOR DIMENSIONS A, B, C, E, CAPACITY OF DAVIT AND INSULATION THICKNESS.
5. THE DAVIT USED SHALL CLEAR HANDRAIL OF THE EQUIPMENT.
6. MATERIAL OF PIPE SHALL BE A-53 / IS:1978 OR EQUIVALENT AND STRUCTURAL PARTS SHALL BE IS:2062 GR.B OR EQUIVALENT.
7. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
8. FOR THIN WALLED EQUIPMENT, DESIGNER SHALL ANALYSE THE STIFFNESS OF SHELL AT THE BRACKET LOCATIONS.
9. DETAIL DIMENSIONS AND NOTES IN ENGINEERING DRAWING TAKE PRECEDENCE OVER THOSE SHOWN HERE.
10. LOCKING PLATE (DETAIL -Y), LOCKING PIN (DETAIL -X) WITH CHAIN, POSITIONING PLATE (DETAIL -K), DEFLECTOR CONE (DETAIL-P) AND LOCKING SUPPORT CHANNEL (DETAIL -Q) SHALL BE SUPPLIED LOOSE BY FABRICATOR AND WELDED AT SITE BY MECHANICAL CONTRACTOR.
11. ALL FILLET WELDS SHALL BE 6 mm MINIMUM.
12. FOR LOW TEMPERATURE SERVICE, BRACKET DETAILS SHALL BE AS PER EIL STD. 7-12-0034
13. IN CASE DIMENSIONS 'B' IS BEYOND THIS STANDARD, IT IS RECOMMENDED TO INSTALL PIPE DAVIT ON STRUCTURAL PLATFORM.

8	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	FK	NK	SM
7	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by

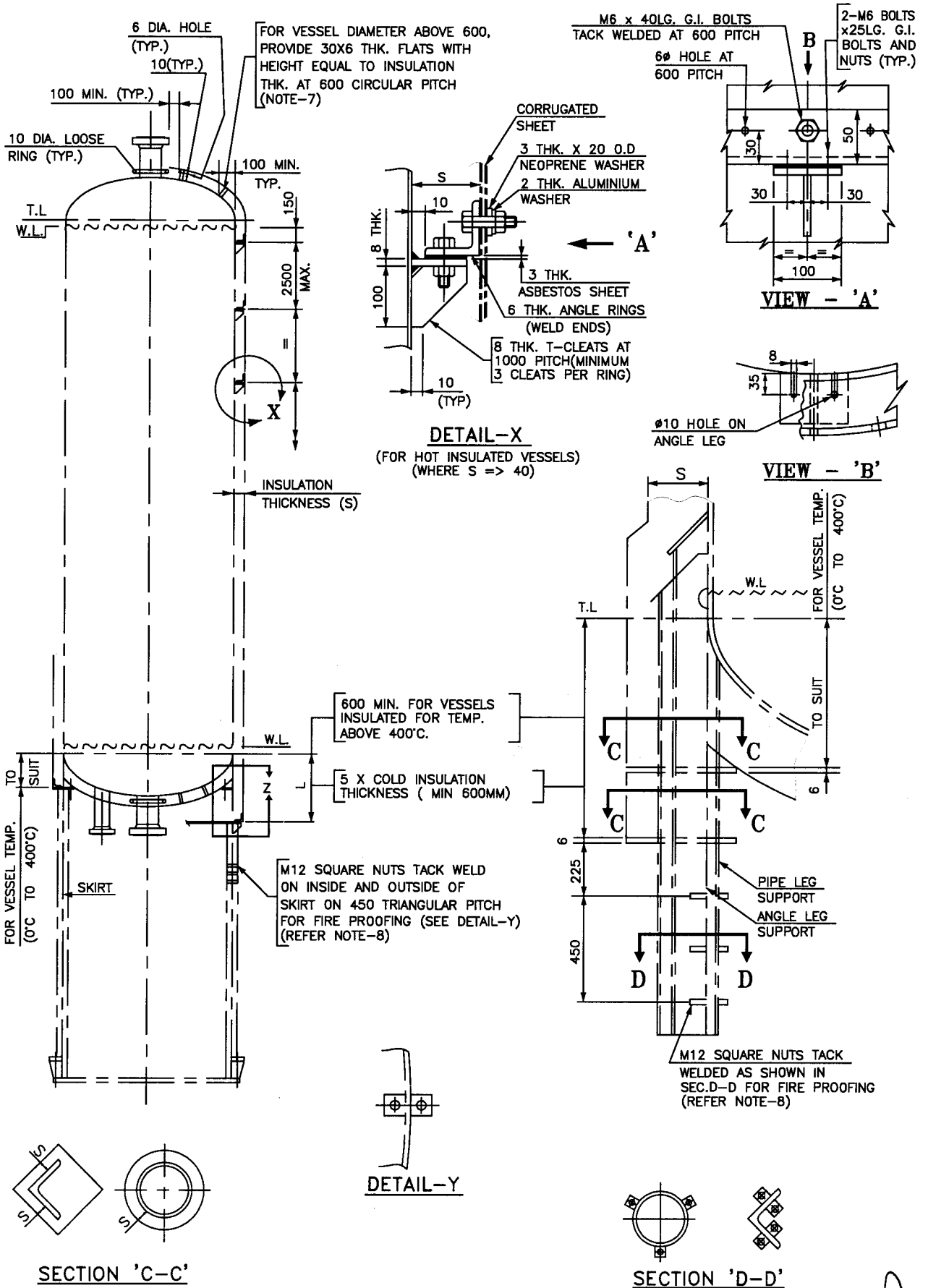


MAX. ERECTION WT. OF VESSEL (TONNES)		≤10	25	45	90	140	180
THICKNESS OF PLATE (MINIMUM)	T	12	28	40	50	70	80
WIDTH	W	200	230	300	400	500	610
LENGTH	L	400+E	460+E	580+E	750+E	900+E	1080+E
DIAMETER OF HOLE	D	60	75	75	100	130	150
HEIGHT OF NOTCH & SIDE WELD	H	130	130	150	200	250	300
RADIUS OF NOTCH	R	40	40	50	75	90	100
WELD SIZE (SEE NOTE 5)	A	10	14	20	30	38	46
BOTTOM OF BRACE TO TOP OF LUG	F	200	230	300	400	500	600
BOTTOM OF BRACE TO T.L. OF HEAD	E	SEE NOTE 2					
T.L. OF VESSEL TO BOTTOM OF LUG	B	200	230	280	350	400	480
	C	30	40	50	70	90	100
TOP OF LUG TO ϕ OF HOLE	J	90	90	115	150	180	230
	K	30	40	50	70	80	100
NO. OF LUGS		2	2	2	2	2	2

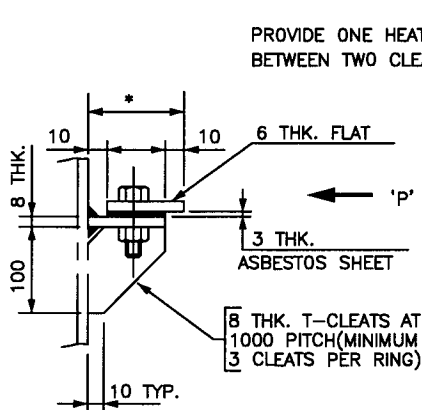
NOTES

- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
- *2. DIMENSION 'E' IS TO BE DETERMINED BY THE SHAPE OF HEAD IN CONJUNCTION WITH DIMENSION 'K'.
- DETAIL, DIMENSIONS AND NOTES GIVEN IN ENGINEERING DRAWING TAKE PRECEDENCE OVER THOSE SHOWN HERE.
- FOR THIN WALLED EQUIPMENTS, DESIGNER SHALL ANALYSE THE STIFFNESS OF SHELL AT THE LIFTING LUG LOCATION.
- IF PADS ARE USED ON STAINLESS STEEL EQUIPMENTS THE SIZE OF FILLET WELD BETWEEN SHELL AND STAINLESS STEEL PAD SHALL BE ANALYSED.
- MATERIAL SHALL BE COMPATIBLE WITH HEAD MATERIAL.
- FOR INTERMEDIATE ERECTION WEIGHT, NEXT HIGHER SIZE OF LIFTING LUG SHALL BE USED.
- LIFTING LUG SHALL BE MACHINED TO COVER OFFSET BETWEEN OUTER DIAMETERS OF SHELL AND HEAD.

9	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKIL	SK	NK Nalwa	SM
8	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by



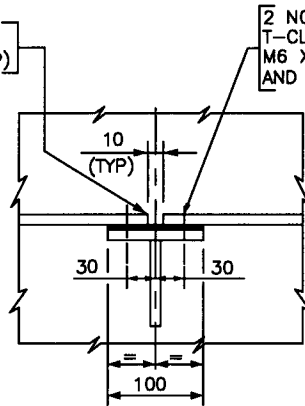
7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	NK	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
Approved by						



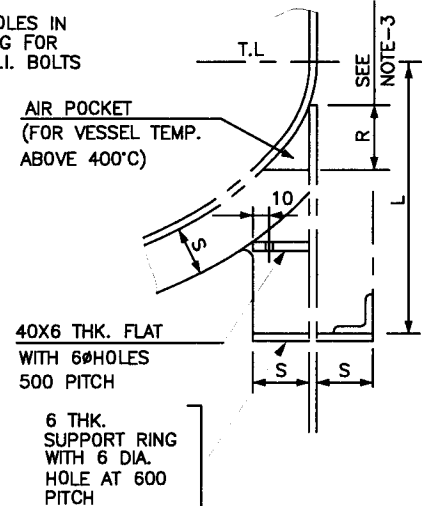
* = (COLD INSULATION THICKNESS - 50 MM)
 = 50 MM (MIN)

DETAIL-X

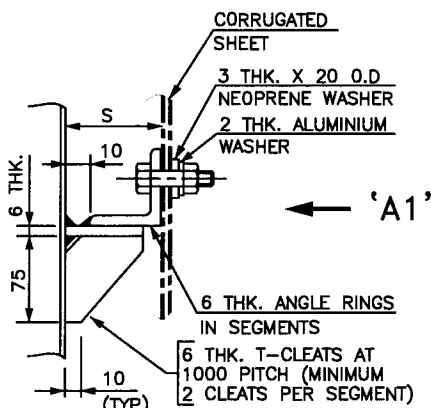
(FOR COLD INSULATED VESSELS)



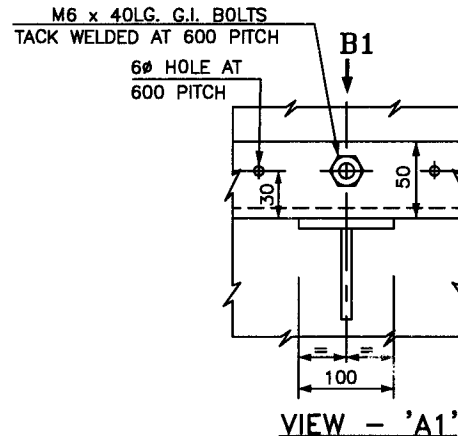
VIEW - 'P'



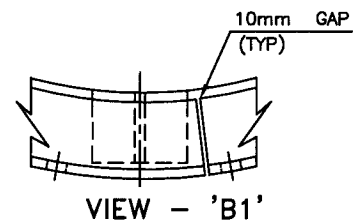
DETAIL - 'Z'



DETAIL-X
 (FOR HOT INSULATED VESSELS)
 (WHERE S < 40)



VIEW - 'A1'

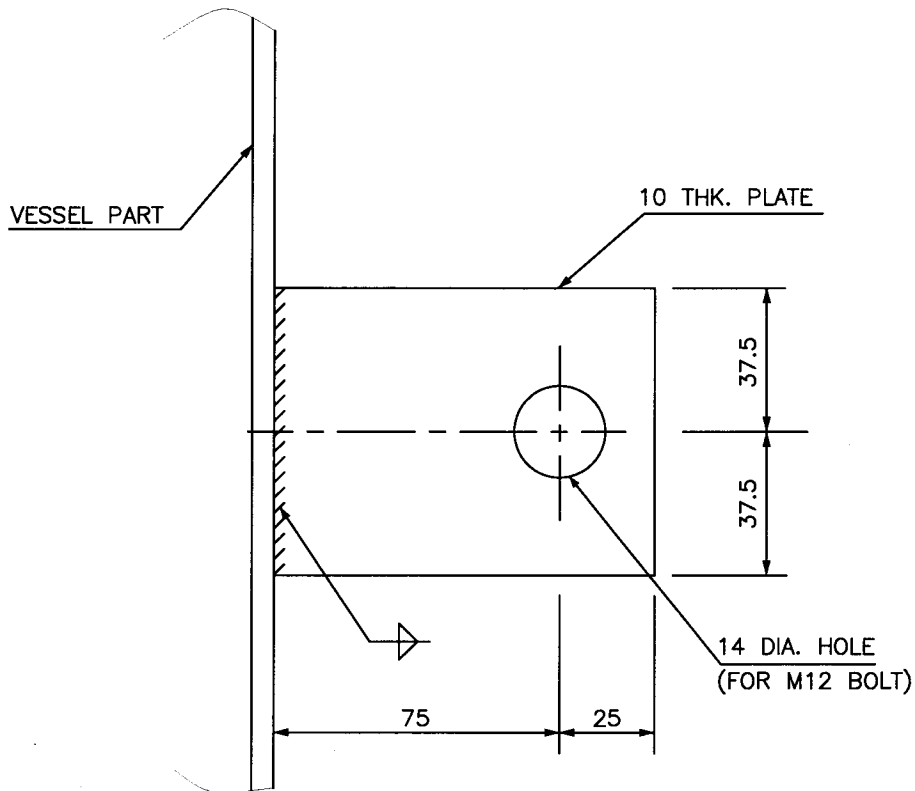


VIEW - 'B1'

NOTES

1. ALL DIMENSIONS ARE IN mm.
2. FOR MATERIAL SPECIFICATION REFER ENGINEERING DRAWING.
3. 'R' SHALL BE EQUAL TO 175mm FOR VESSELS UPTO 3000mm DIAMETER AND 300mm FOR VESSELS ABOVE 3000mm DIAMETER.
4. DETAILS, DIMENSIONS AND NOTES ON ENGINEERING DRAWING SHALL TAKE PRECEDENCE OVER THOSE SHOWN HEREIN.
5. CLIPS SHALL CLEAR WELD SEAMS AND INSULATION RINGS SHALL BE SUITABLY NOTCHED INCASE OF INTERFERENCE WITH NOZZLES/ATTACHMENTS.
6. ONLY T-CLEATS WITH ASBESTOS SHEET AND G.I. BOLTINGS, ANGLE RING ALONG WITH TACK WELDED BOLTS, INSULATION SUPPORT CLEATS WELDED TO EQUIPMENT, LOOSE RINGS & M12 NUTS SHALL BE SUPPLIED BY EQUIPMENT FABRICATOR.
7. a) FOR COLD INSULATED VESSELS CLEATS ON DISHED ENDS ARE NOT REQUIRED.
 b) FOR COLD INSULATED VESSELS CLEATS ON SHELL ARE TO BE PROVIDED IF COLD INSULATION THICKNESS IS MORE THAN 60mm.
8. FOR UNINSULATED VESSELS SQUARE NUTS SHALL BE PROVIDED FOR ENTIRE HEIGHT OF SUPPORT (SKIRT, PIPE/ANGLE LEG).

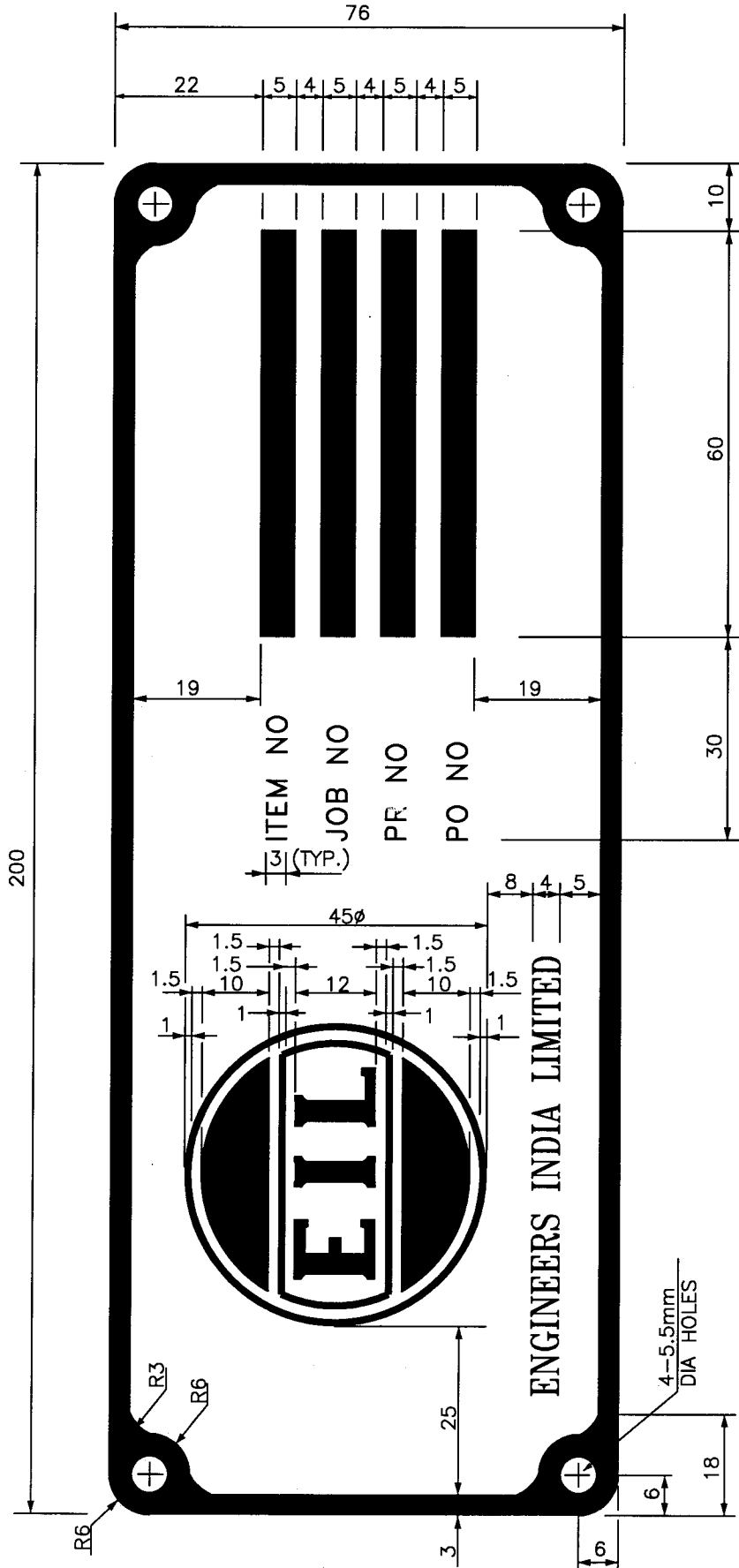
7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TR	NK Nalin	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
						Approved by



NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. ALL EQUIPMENTS SHALL BE PROVIDED WITH TWO(2) EARTHING LUGS, UNLESS OTHERWISE STATED.
- 3.(a) EARTHING LUGS SHALL BE LOCATED DIAMETRICALLY OPPOSITE ON NORTH-SOUTH CENTER LINE ON SKIRT SUPPORTED EQUIPMENTS, ON ANY TWO(2) LEGS OF THREE(3) LEG SUPPORTED VERTICAL VESSEL, ON DIAMETRICALLY OPPOSITE LEGS OF FOUR(4) LEG SUPPORTED VERTICAL VESSEL AND ON EACH SADDLE OF HORIZONTAL VESSEL.
- (b) TWO(2) EARTHING LUGS ARE TO BE LOCATED ON EACH SADDLE OF HORIZONTAL VESSEL OF LENGTH GREATER THAN 20 METERS.
- (c) FOR SPHERE, TOTAL 4-NOS. OF EARTHING LUGS SHALL BE PROVIDED PREFERABLY ON DIAMETRICALLY OPPOSITE AND EQUALLY SPACED LEGS. (SPHERES ARE USUALLY PROVIDED WITH LEGS IN NUMBERS WHICH ARE MULTIPLE OF 4 FOR THE SYMMETRY)
4. DO NOT WELD EARTHING LUG ON PRESSURE PART.
5. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
6. MATERIAL OF CONSTRUCTION SHALL BE CARBON STEEL.

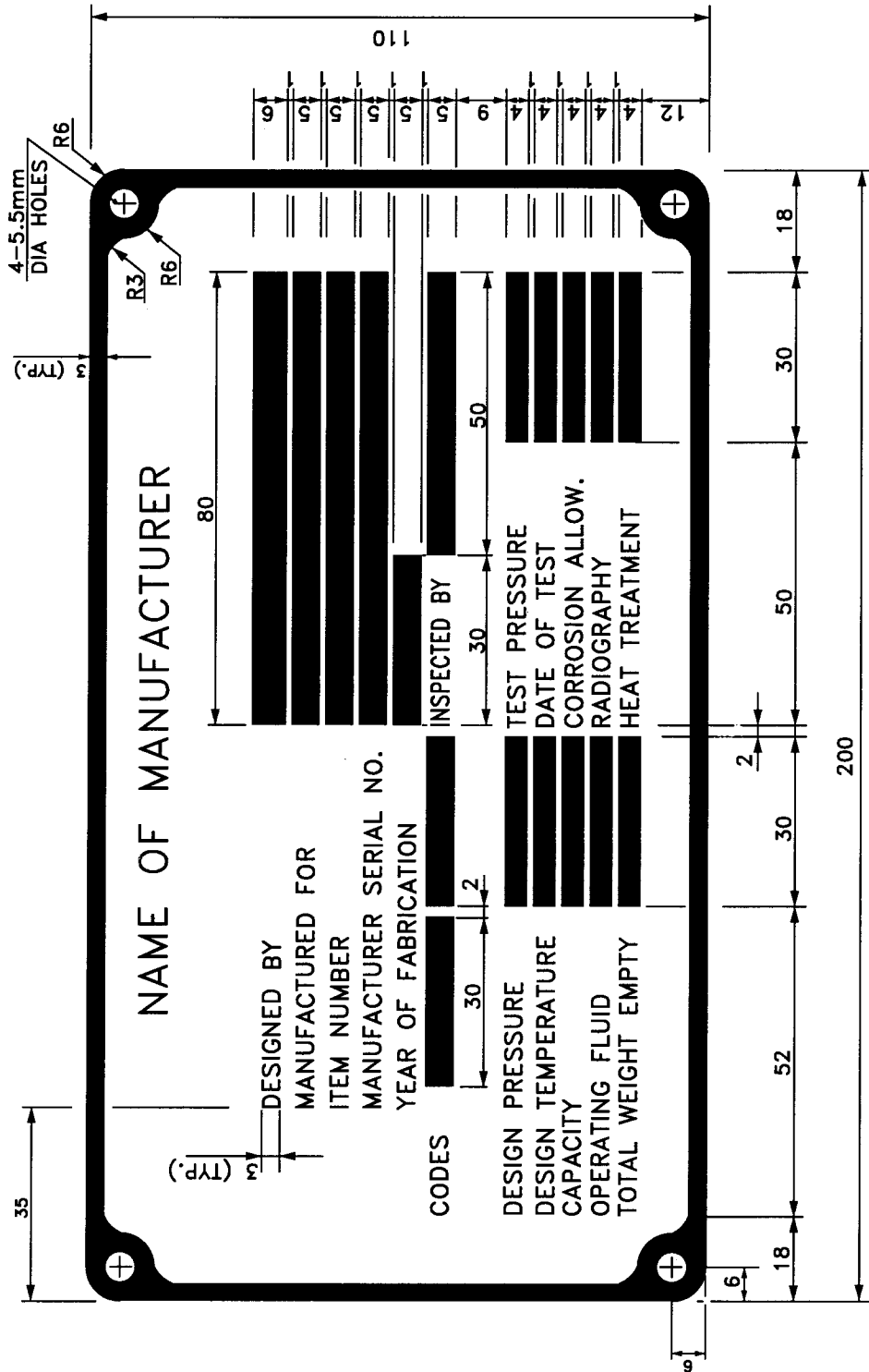
7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by



NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. ALL LETTERS, BLOCKS AND BORDER SHALL BE OF RAISED POLISHED FACE.
3. BACK GROUND SHALL BE BLACK.
4. NAME PLATE SHALL BE TACK-WELDED TO THE BRACKET. WHERE NOT POSSIBLE IT MAY BE RIVETTED.
5. REFER STANDARD 7-12-029 FOR BRACKET DETAIL OF NAME PLATE.
6. NAME PLATE SHALL BE OF STAINLESS STEEL OF 2mm THICK.

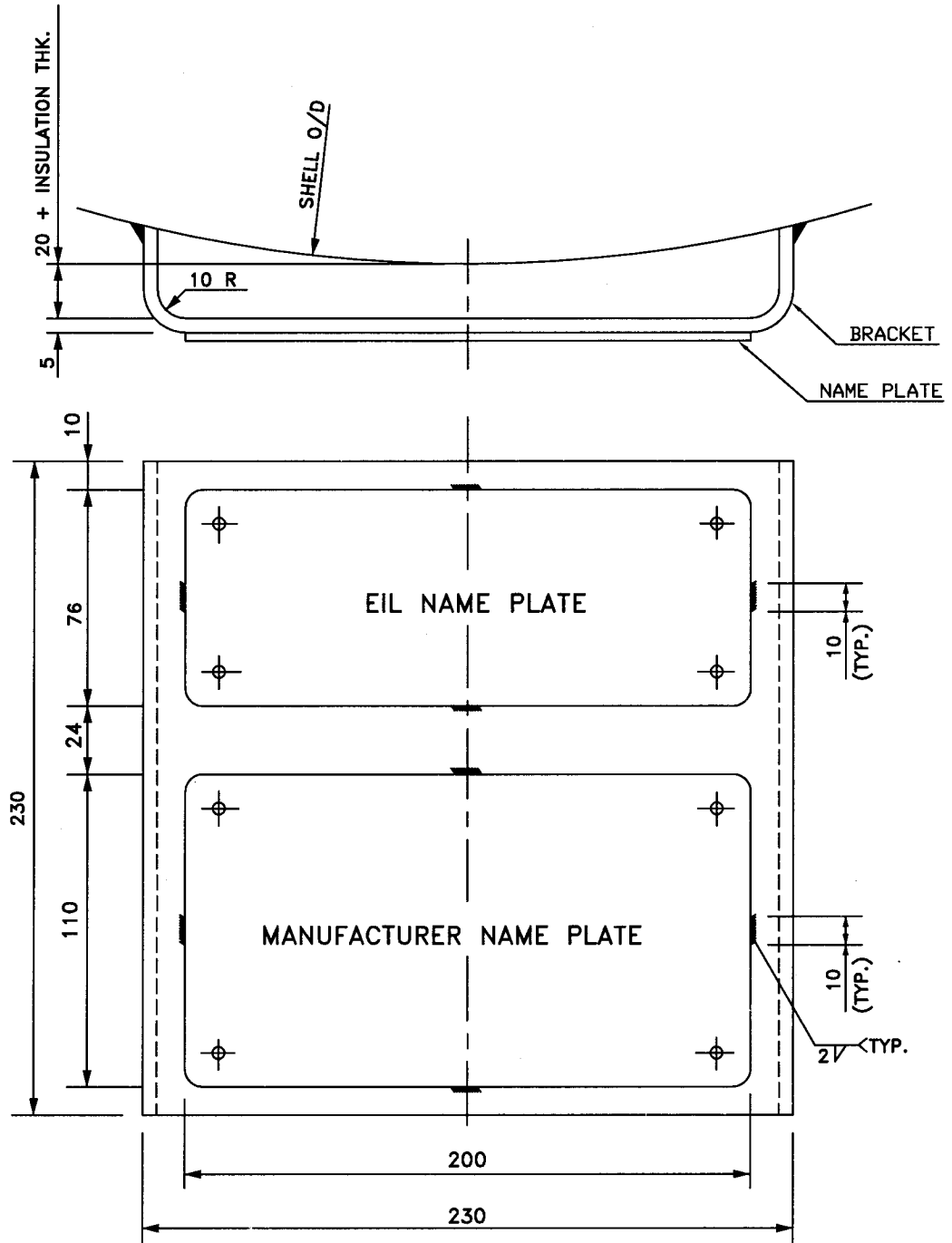
7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TK	NK	Nikhil	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT		RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman	
						Approved by	



NOTES



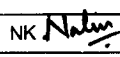

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. ALL LETTERS, BLOCKS AND BORDER SHALL BE OF RAISED POLISHED FACE.
3. BACK GROUND SHALL BE BLACK.
4. NAME PLATE SHALL BE TACK-WELDED TO THE BRACKET. WHERE NOT POSSIBLE IT MAY BE RIVETTED.
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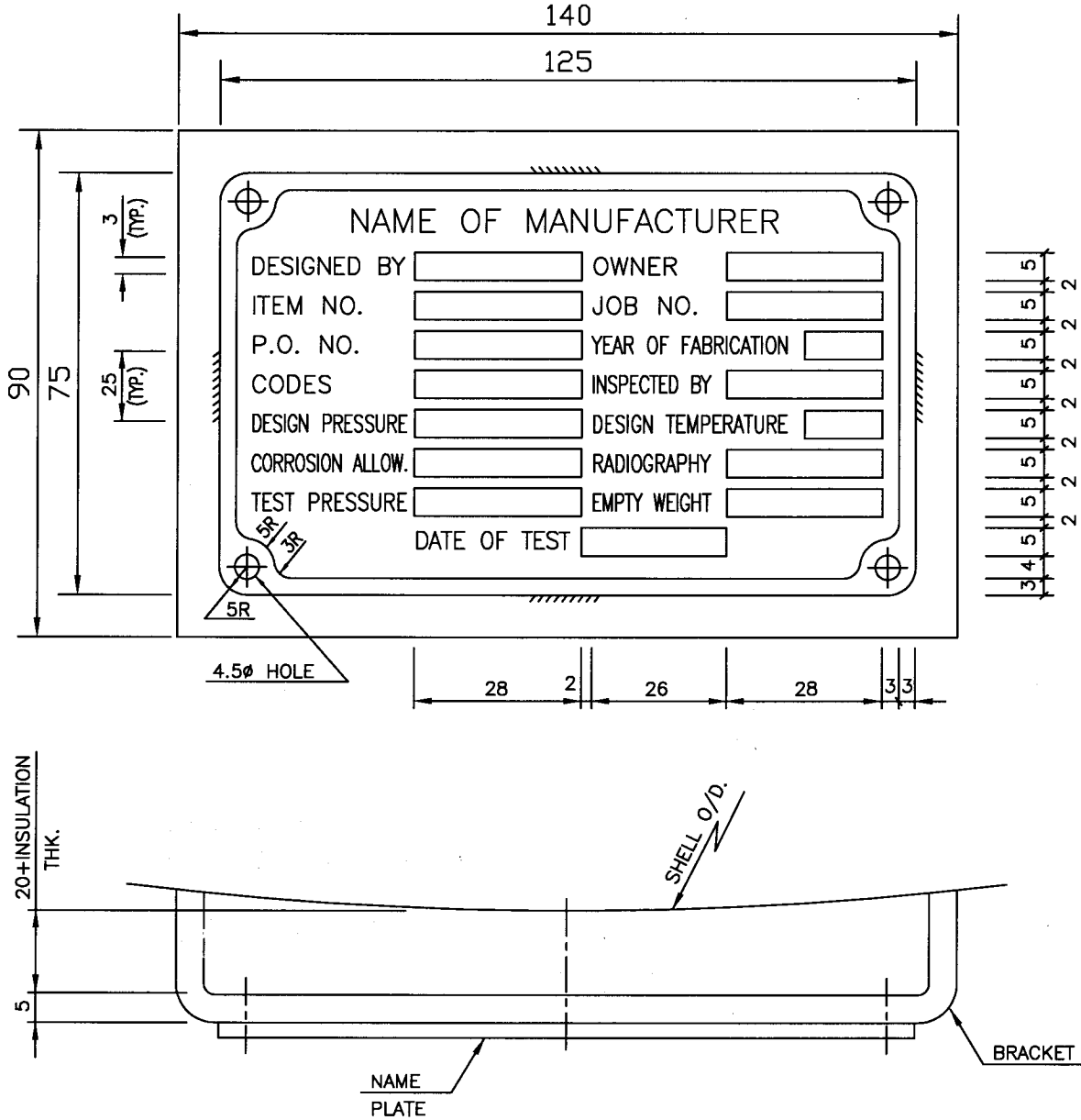
7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
						Approved by



NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. BRACKET MATERIAL SHALL BE SAME AS SHELL MATERIAL.

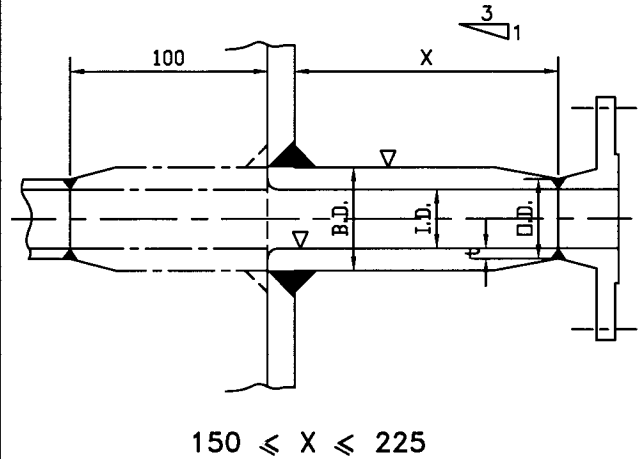
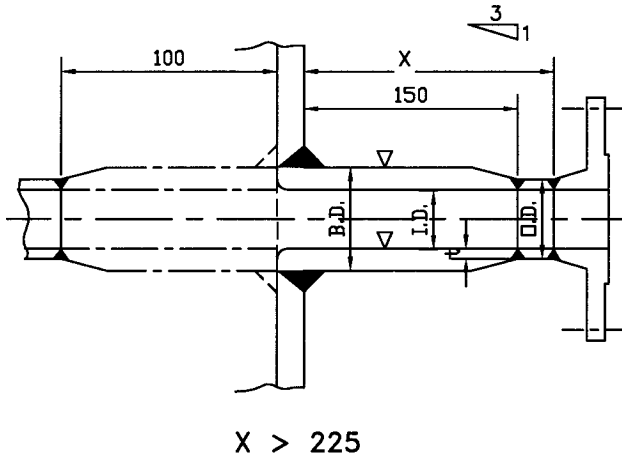
7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	 NIKHIL	 SK/KJH	NK 	 RN	
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN	
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman	
						Approved by	



NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LETTERS, BLOCKS AND BORDERS SHALL BE RAISED POLISHED FACE.
3. BACKGROUND SHALL BE BLACK.
4. NAME PLATE SHALL BE TACK-WELDED TO THE BRACKET. WHERE NOT POSSIBLE IT MAY BE RIVETTED.
5. NAME PLATE SHALL BE OF STAINLESS STEEL OF 2mm THICK.
6. BRACKET MATERIAL SHALL BE SAME AS SHELL MATERIAL.

6	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK	NK	BM
5	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by



ANSI - 150 - 600 CLASS, W.N.

SIZE N.B.	O.D.	B.D.	PIPE SCH.	I.D.	t	PIPE SCH.	I.D.	t	PIPE SCH.	I.D.	t
15	21.3	40	80	13.84	3.73	160	11.74	4.78	XXS	6.36	7.47
20	26.7	45	80	18.88	3.91	160	15.58	5.56	XXS	11.06	7.82
25	33.4	55	80	24.3	4.55	160	20.7	6.35	XXS	15.22	9.09
30	42.2	70	80	32.5	4.85	160	29.5	6.35	XXS	22.8	9.7
40	48.3	80	80	38.14	5.08	160	34.02	7.14	XXS	27.9	10.2
50	60.3	85	80	49.22	5.54	160	42.82	8.74	XXS	38.1	11.1

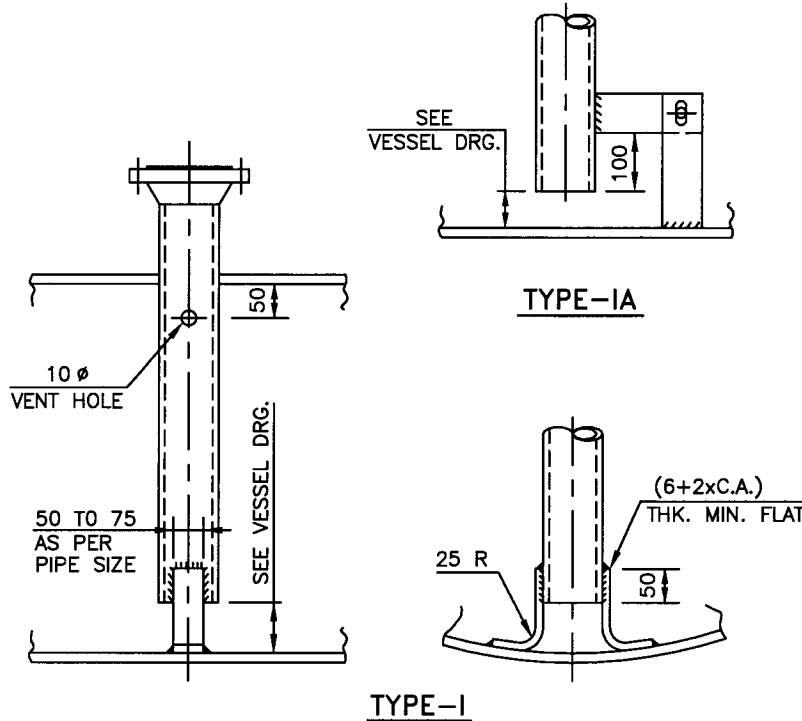
ANSI - 900 CLASS W.N.

SIZE N.B.	O.D.	B.D.	PIPE SCH.	I.D.	t	PIPE SCH.	I.D.	t
15	21.3	40	80	13.84	3.73	160	11.74	4.78
20	26.7	45	80	18.88	3.91	160	15.58	5.56
25	33.4	55	80	24.3	4.55	160	20.7	6.35
30	42.2	70	80	32.5	4.85	XXS	22.8	9.7
40	48.3	80	160	34.02	7.14	XXS	27.9	10.2
50	60.3	105	160	42.82	8.74	XXS	38.1	11.1

NOTES

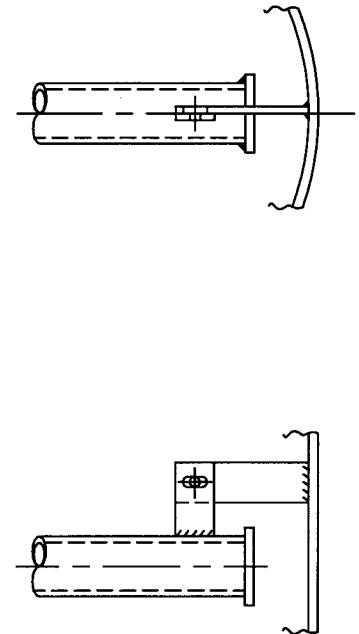
1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL PIPES FOR NECKS TO BE SEAMLESS AND FROM FORGED MATERIALS.
3. FLANGE DIMENSIONS AND FACING ARE AS PER ANSI B.16.5
4. FOR TYPE OF FLANGE FACING REFER VESSEL DRAWING.
5. SET ON NOZZLE ATTACHMENT TO VESSEL IS NOT PERMITTED.
6. THE ABOVE ARRANGEMENT SHALL BE USED ON VESSELS WHEN THICKNESS OF VESSEL WALL EXCEEDS 50mm OR WHEN REQUIRED BY APPLICABLE CODE/STANDARD.

6	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD		NIKHIL		SK/KJH		NK Nalin		RN
5	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD		JIT SINGH		SK/KJH		RKT		RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman	Approved by			

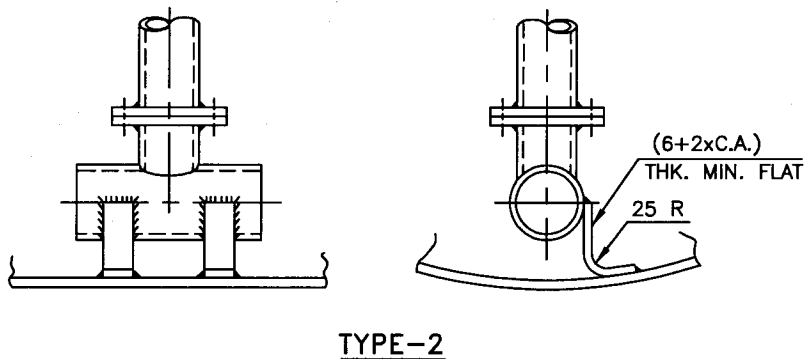


INTERNAL FEED PIPE FOR HORIZONTAL VESSEL

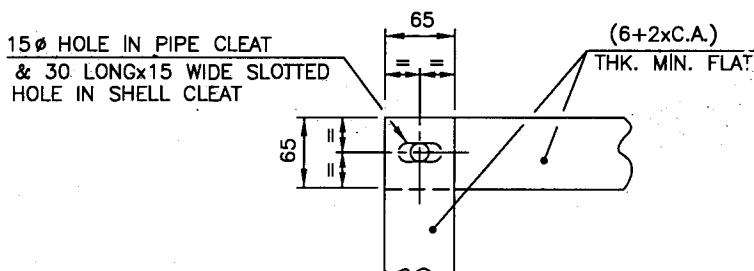
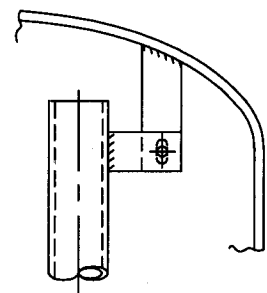
NOTE TYPE-IA IS APPLICABLE FOR LARGE THERMAL EXPANSION



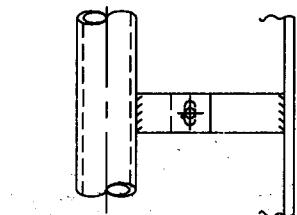
**SPARGER/FEED PIPE SUPPORT
(AIR / GAS SERVICE)**



INTERNAL SPLASH FEED PIPE FOR HORIZONTAL VESSEL

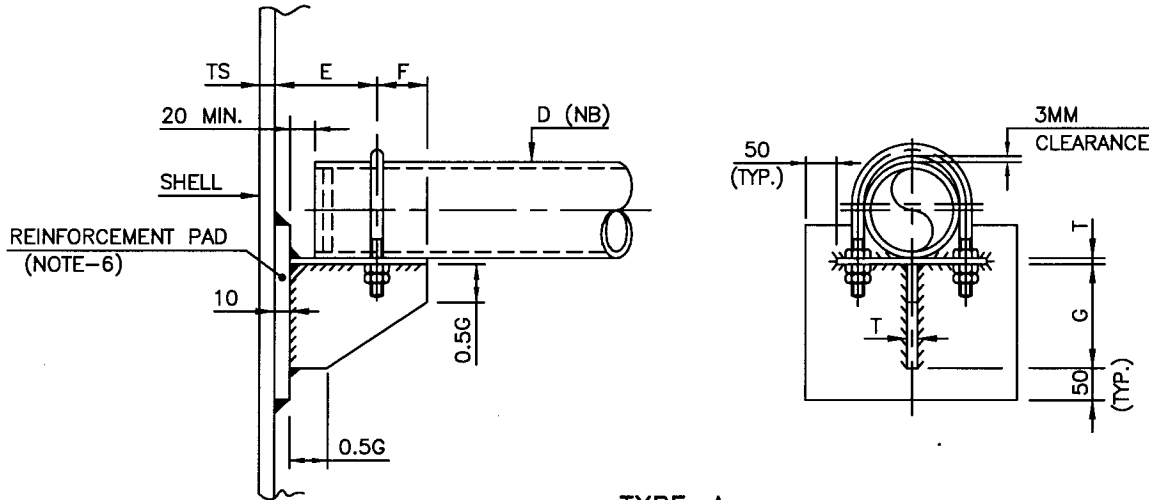


TYPICAL DETAIL OF BOLTING CLEATS

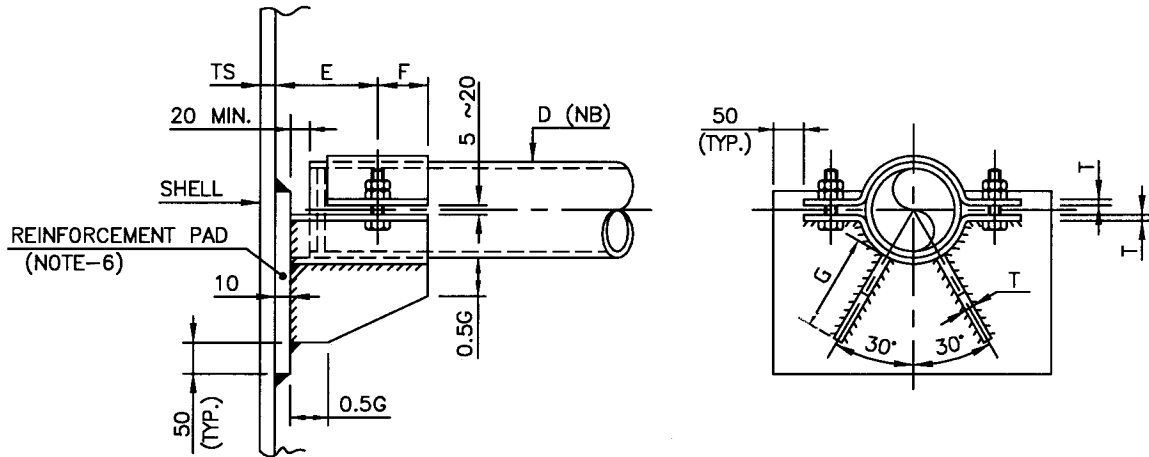


**SUPPORT CLEAT
FOR VERTICAL VESSEL**

6	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK	NK	GM
5	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by



TYPE-A
 (FOR PIPES UPTO 250NB)



TYPE-B
 (FOR PIPES ABOVE 250NB)

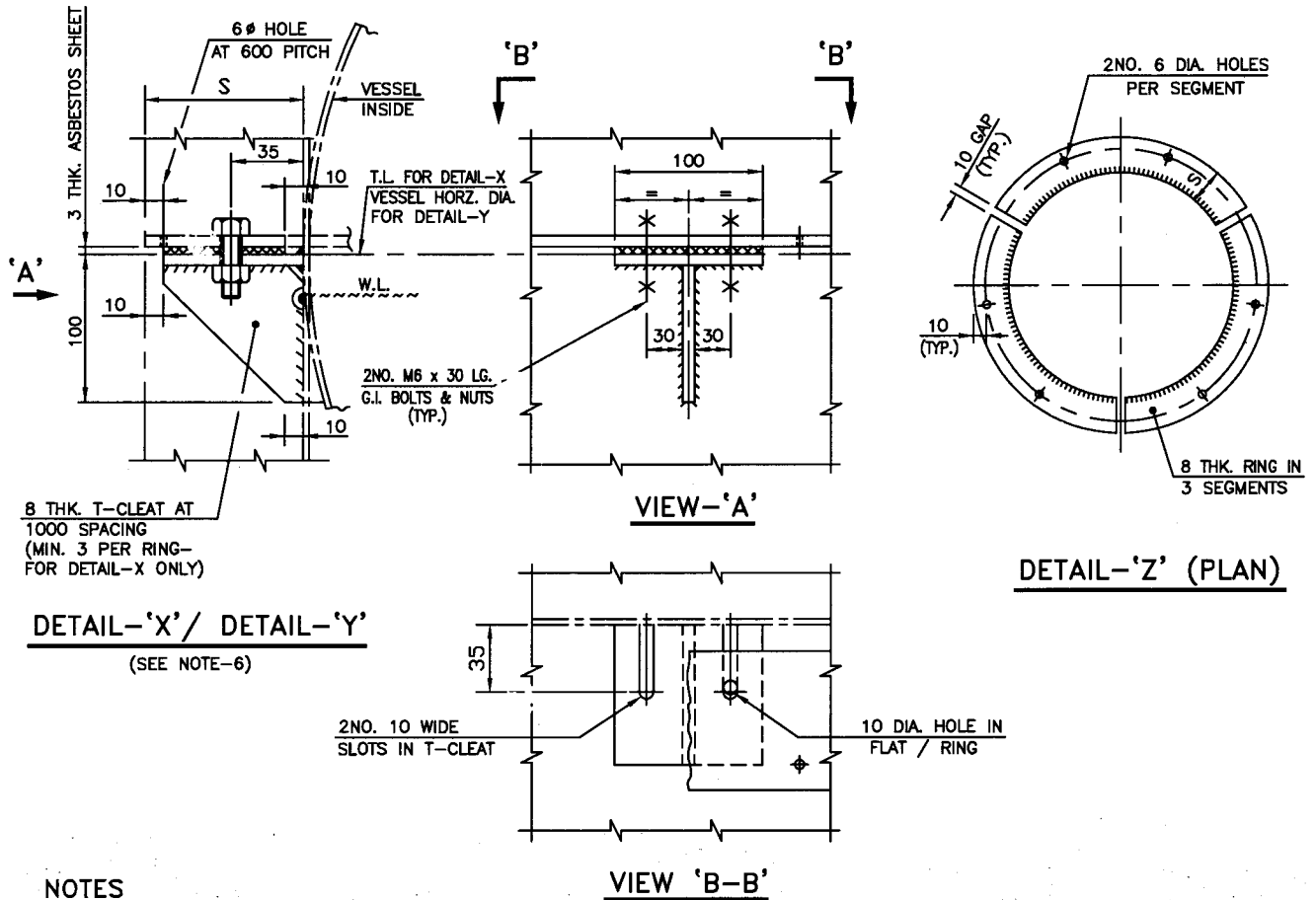
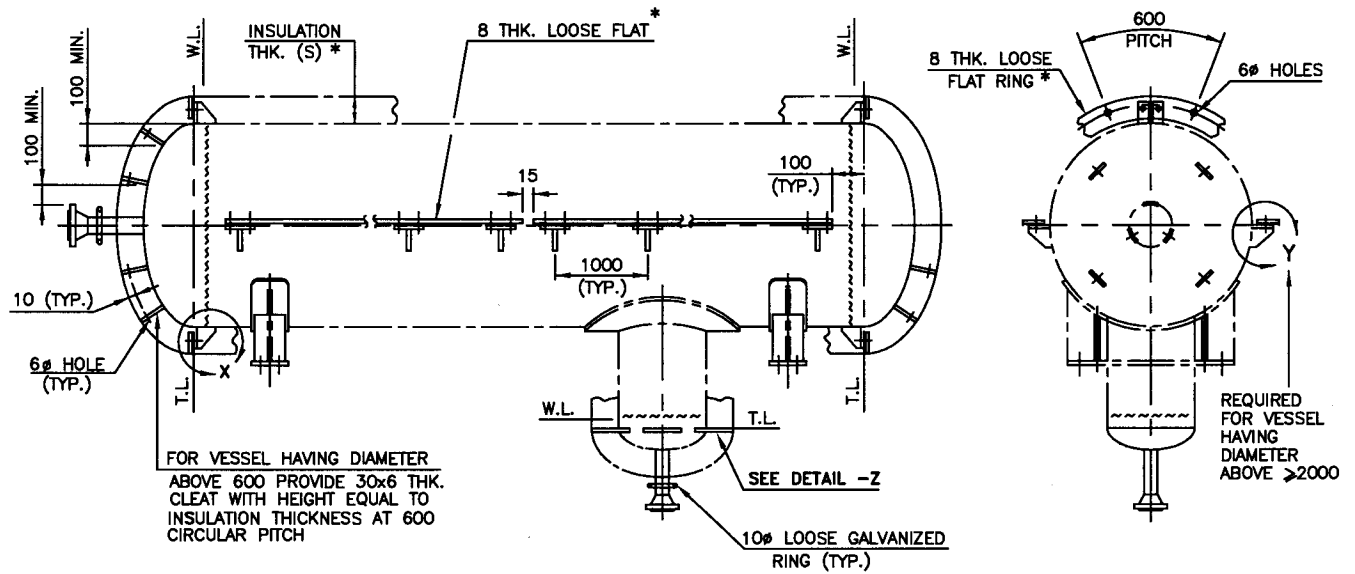
INTERNAL FEED PIPE FOR VERTICAL VESSEL/COLUMN

PIPE N.B. D	BOLT SIZE	T					E	F	G
		CA=0	CA=1.5	CA=3	CA=5	CA=7			
50 - 80	M 12	6	10	12	16	20	60	40	60
100 - 200	M 16	10	14	16	20	25	100	50	100
250 ~ OVER	M 16	14	18	20	25	28	150	100	150

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. IN CASE OF CONFLICT VESSEL ENGG. DRAWING SHALL GOVERN.
3. MATERIAL OF CLEATS SHALL BE AS PER VESSEL ENGG. DRAWING.
4. ALL FILLET WELDS TO BE ALL AROUND & SIZE OF WELDS ARE (6+1xC.A.) MINIMUM UNLESS OTHERWISE STATED.
5. ALL INTERNAL BOLTS SHALL BE MIN. M 12 SIZE AND OF STAINLESS STEEL WITH DOUBLE NUTS.
6. REINFORCING PAD SHALL BE LARGER BY 50mm ALL AROUND THAN BRACKET CLEATS. NO PAD IS REQUIRED FOR VESSELS WITH WALL THICKNESS GREATER THAN 25mm.

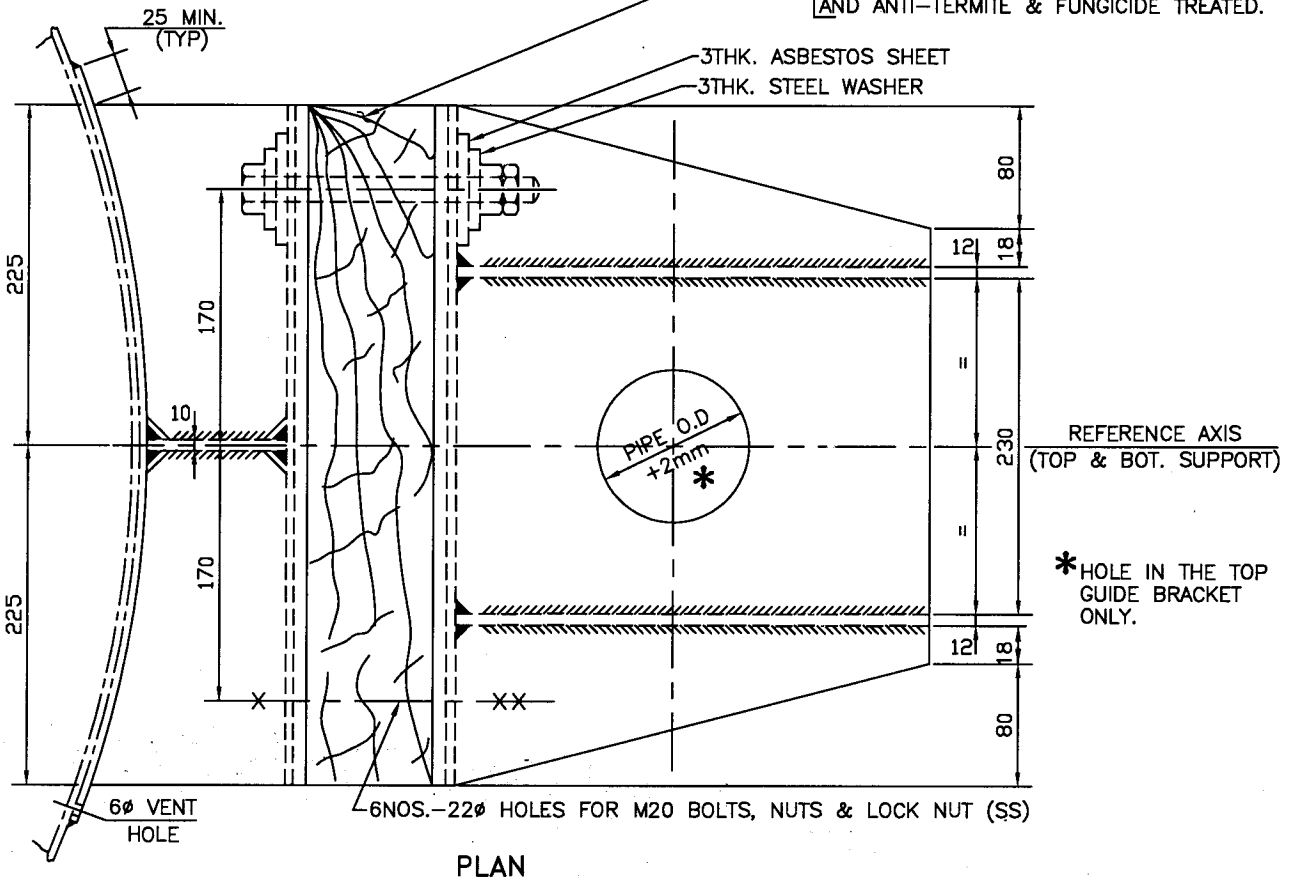
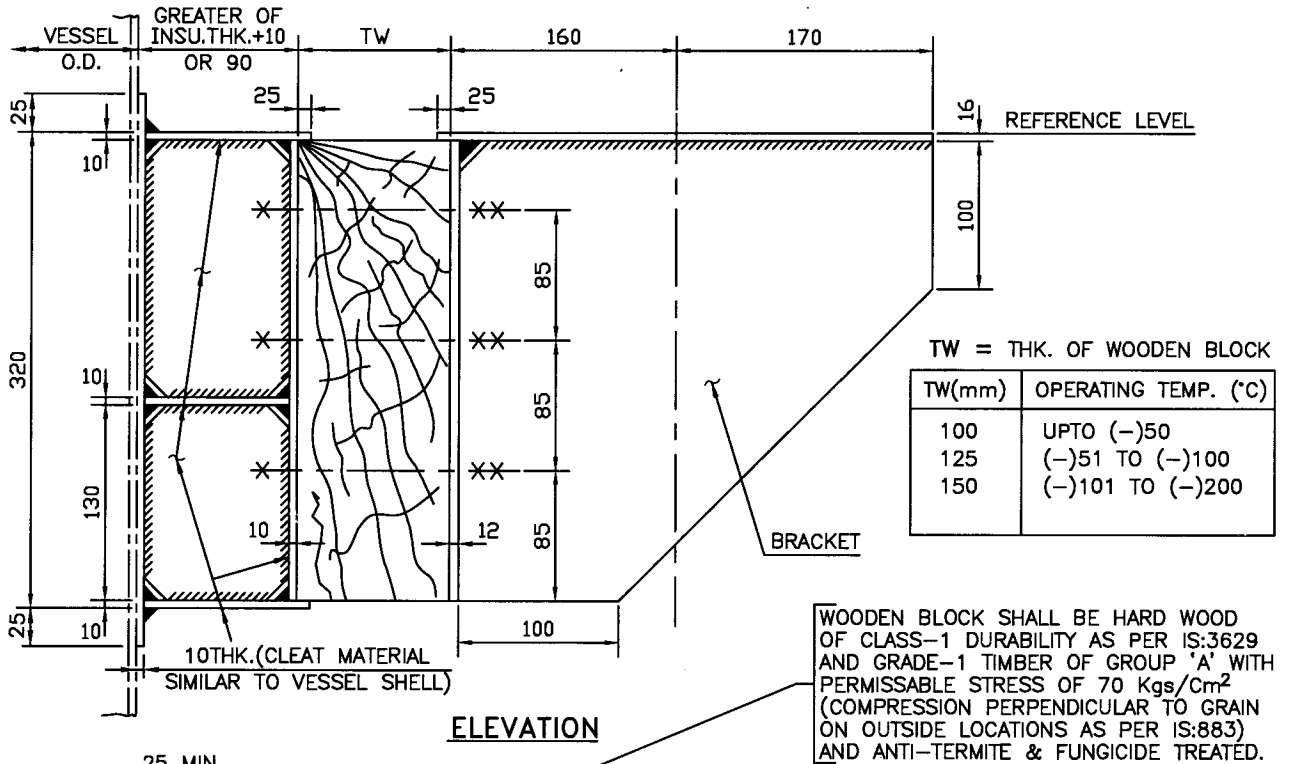
6	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK/KJH	NK Nalin	SM
5	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
Approved by						



NOTES

- ALL DIMENSIONS ARE IN mm.
- FOR MATERIAL SPECIFICATION REFER ENGINEERING DRAWING.
- DETAILS, DIMENSIONS AND NOTES ON ENGINEERING DRAWING SHALL TAKE PRECEDENCE OVER THOSE SHOWN HEREIN.
- CLEATS SHALL CLEAR WELD SEAMS AND IN CASE OF INTERFERENCE WITH NOZZLES/ATTACHMENTS, INSULATION RINGS SHALL BE NOTCHED/MODIFIED SUITABLY.
- ONLY T-CLEATS WITH ASBESTOS SHEET, G.I. BOLTING, INSULATION SUPPORT CLEATS AND LOOSE RING/FLAT SHALL BE SUPPLIED BY THE EQUIPMENT FABRICATOR.
- FOR INSULATION THICKNESS (S) 40mm AND LESS, ONLY RINGS AND FLATS IN PIECES SHALL BE DIRECTLY WELDED TO SHELL/HEAD, AS SHOWN IN DETAIL-'Z'.

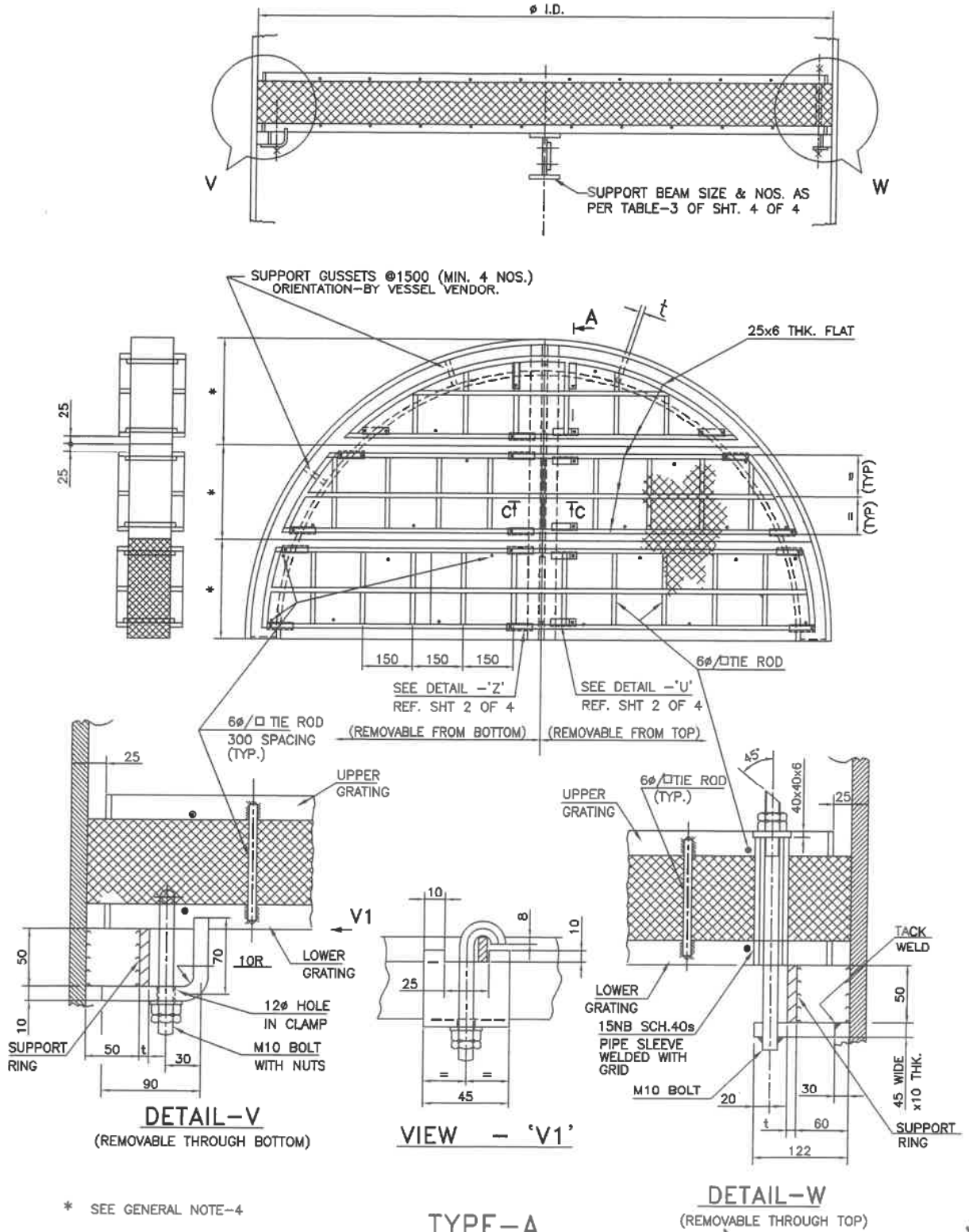
6	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TK	NK Nalin	SM
5	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
Approved by						



NOTES

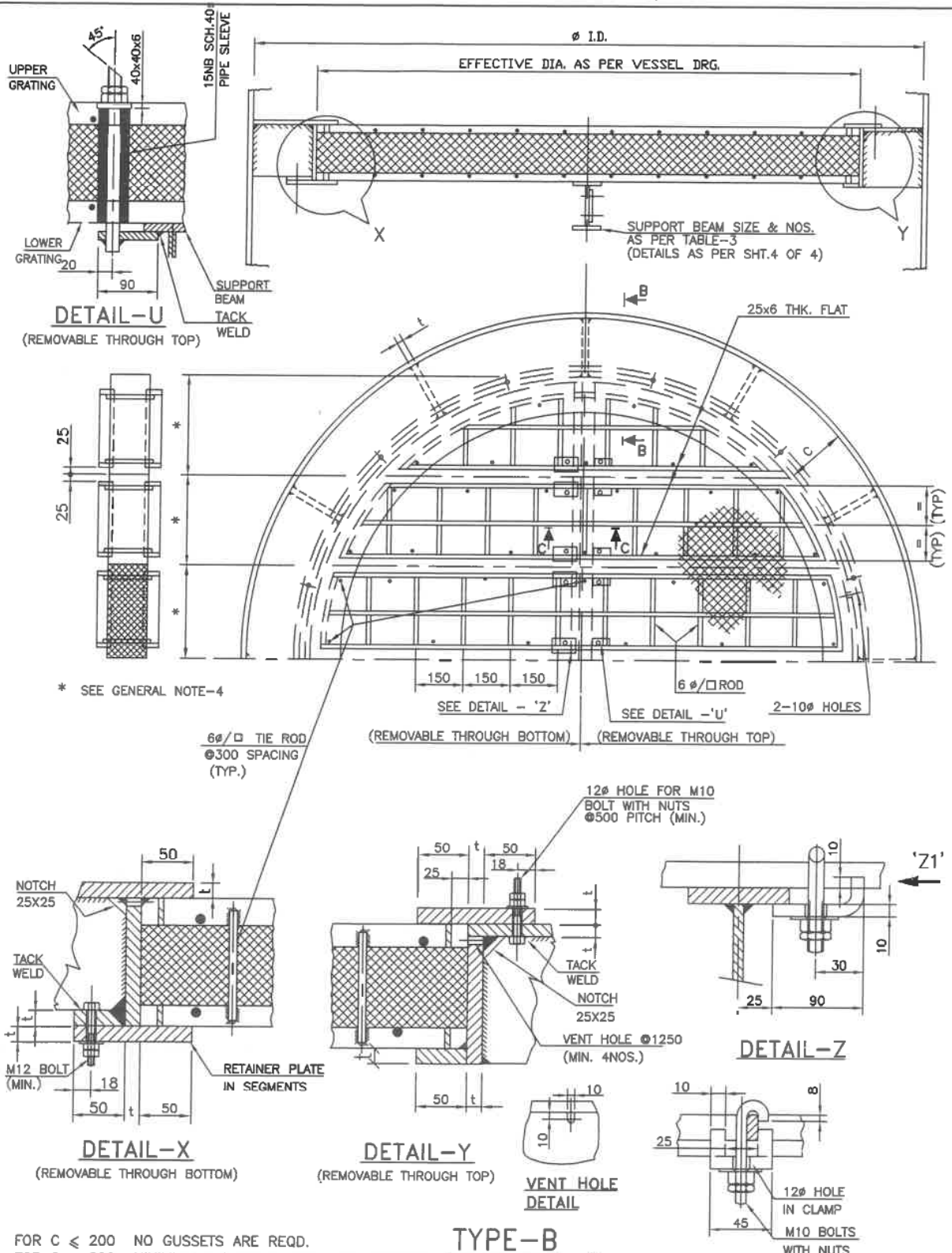
1. ALL DIMENSIONS ARE IN mm.
2. MATERIAL SPECIFICATION FOR BRACKET SHALL BE IS : 2062 UNLESS OTHERWISE STATED.
3. FOR DETAIL OF PIPE DAVIT REFER EIL STD. NO. 7-12-023.
4. TOP & BOTTOM SUPPORTS ARE IDENTICAL.
5. ALL FILLET WELDS ARE 10mm CONTINUOUS.

6	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TK	NK	SM
5	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
Approved by						



6	21.11.2024	REVISED AND REISSUED AS STANDARD	AS	TKh	KA/NK	MN
5	20.06.2019	REAFFIRMED AND REISSUED AS STANDARD	DP	TK	KJH	RKT
4	01.10.2013	REVISED AND REISSUED AS STANDARD	GCP	TK	RKT	SC

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
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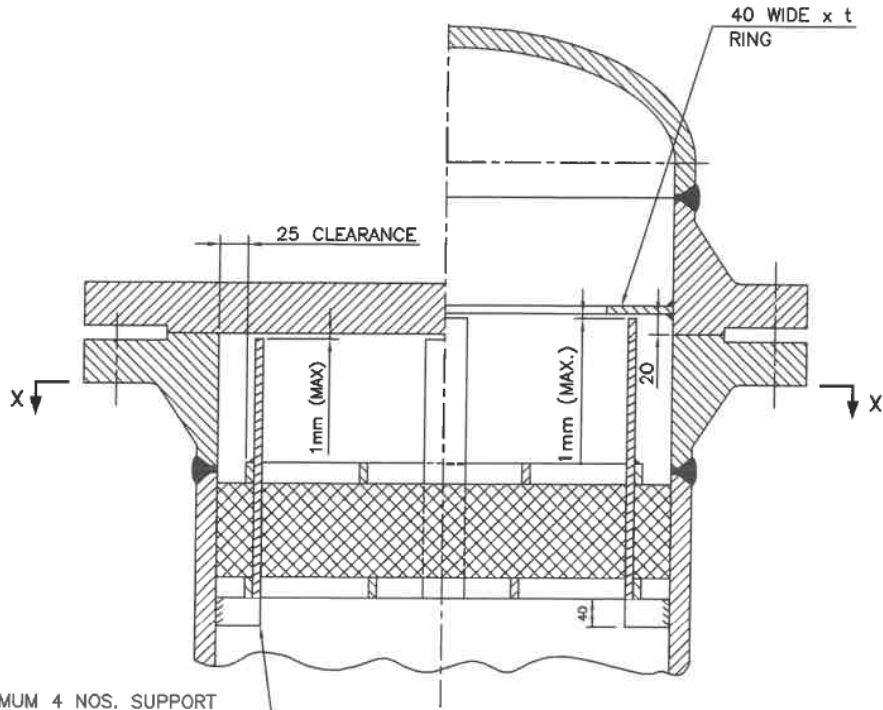


FOR C ≤ 200 NO GUSSETS ARE REQD.
FOR C > 200 MINIMUM 4 GUSSETS SHALL BE PROVIDED.
Ø1250 (MIN. 4 NOS.)

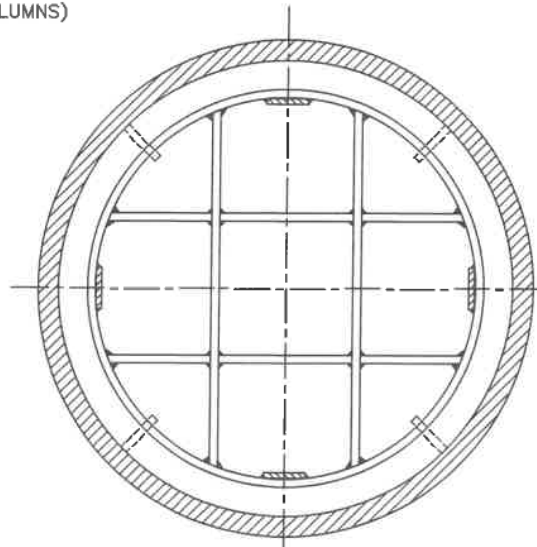
TYPE-B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
6	21.11.2024	REVISED AND REISSUED AS STANDARD	AS	TKh	KANK Nalin	MN
5	20.06.2019	REAFFIRMED AND REISSUED AS STANDARD	DP	TK	KJH	RKT
4	01.10.2013	REVISED AND REISSUED AS STANDARD	GCP	TK	RKT	SC

Moudi



MINIMUM 4 NOS. SUPPORT
 CLEATS (65x40xt)
 EQUALLY SPACED
 (t AS PER TABLE-1)
 (NOT TO BE FOLLOWED FOR
 TRAYED/PACKED COLUMNS)



SECTION X-X

TYPE-C

NOTES

1. THIS TYPE IS APPLICABLE FOR VESSELS WITH REMOVABLE COVERS.
2. GRATING FRAME AND HOLD DOWN BARS TO BE MADE FROM 25 X 6 THK. PLATE.

6	21.11.2024	REVISED AND REISSUED AS STANDARD	AS	TKh	KA/NK/Nalin	MN
5	20.06.2019	REAFFIRMED AND REISSUED AS STANDARD	DP	TK	KJH	RKT
4	01.10.2013	REVISED AND REISSUED AS STANDARD	GCP	TK	RKT	SC
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
					Approved by	

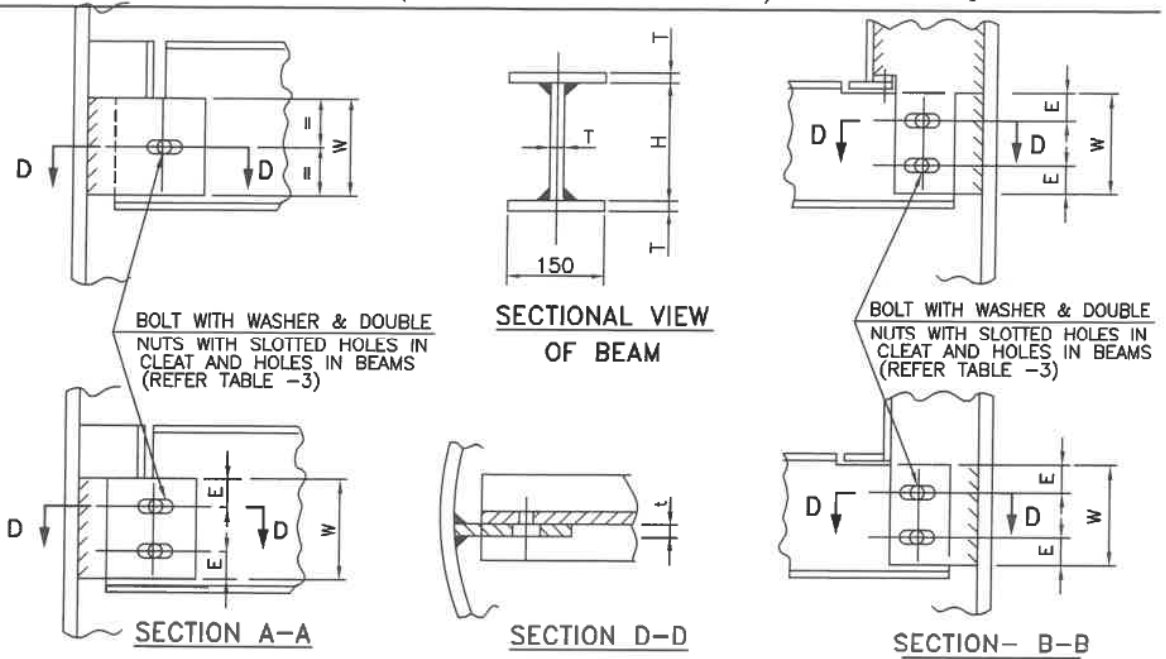
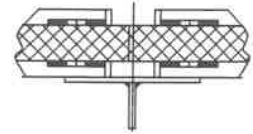


TABLE-1

CORROSION ALLOWANCE	SUPPORT CLEAT/RING THICKNESS (t)			
	CARBON & LOW ALLOY		STAINLESS STEEL [⊕]	
	UPTO 3000 ϕ	ABOVE 3001 ϕ	UPTO 3000 ϕ	ABOVE 3001 ϕ
0	6	10	6	10
1.5	10	14		
3.0	12	16		
6.0	18	22		

TABLE-2

CORROSION ALLOWANCE	MIN. FILLET WELD SIZE
0	6
1.5	8
3.0	10
6.0	12



SECTION- C-C
(REFER NOTE-4)

⊕ IF CORROSION ALLOWANCE IS SPECIFIED IN VESSEL DRG. THEN ADD 2xCA

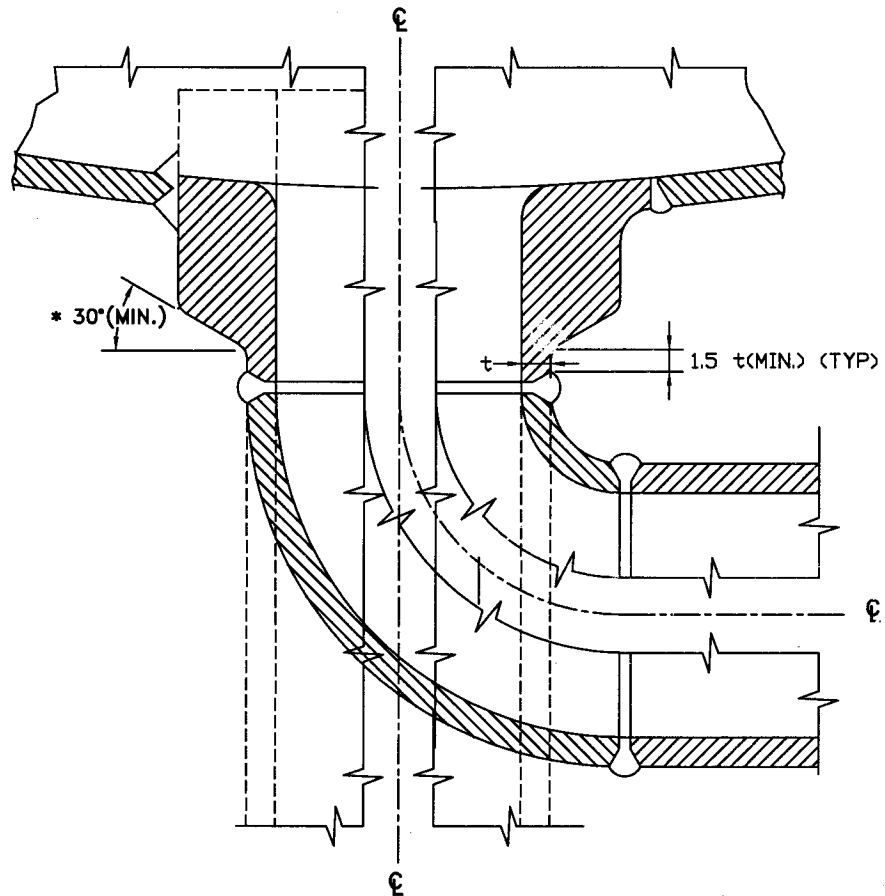
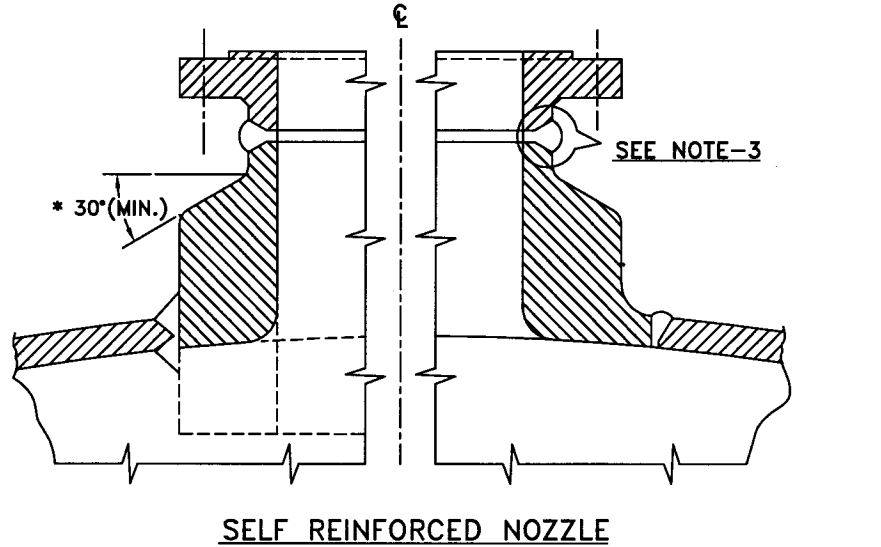
TABLE-3

VESSEL I.D.(D)/ DEMISTER EFFECTIVE DIA.	NO. OF SUPPORT BEAM	H	T				S. STEEL (ADD 2xCA)	BOLT SIZE	SLOTTED HOLE	HOLE SIZE (ϕ)	NO OF BOLT		E	W
			CARBON STEEL AND LOW-ALLOY STEEL CORROSION ALLOWANCE								TYPE-A	TYPE-B		
			0.0	1.5	3.0	6.0								
UPTO 1800	—													
1801 < 3600	1	150					M16	18X30	20	1	2	30	90	
3601 < 5400	2	200	6	10	12	18	6	M16	18X30	20		35	125	
5401 < 7200	3	300						M20	22X36	24		50	175	
7201 < 9000	4	400						M24	26X40	28		50	325	

GENERAL NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. DEMISTER TYPE AND MATERIAL SHALL BE AS PER VESSEL DRAWING.
3. ALL INTERNAL BOLTS SHALL BE STAINLESS STEEL, OTHER MATERIALS SHALL BE AS PER VESSEL DRAWING.
4. WIDTH AND LENGTH OF EACH DEMISTER PIECE SHALL BE DECIDED BY VENDOR. HOWEVER THE WIDTH OF EACH PIECE SHALL BE SUCH THAT THE SAME CAN PASS THROUGH THE MANHOLE. THE LENGTH OF EACH PIECE SHALL NOT EXCEED 2.5 M.
5. ANY DETAIL SHOWN IN VESSEL DRAWING SHALL BE GIVEN PREFERENCE TO THAT OF STANDARD.
6. WIDTH OF SUPPORTING RING SHALL BE DECIDED BY VENDOR BASED ON LOADINGS.
7. DEMISTER PAD SHALL BE SUPPLIED SUITABLY OVER SIZED FOR SNUG FITTING.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
6	21.11.2024	REVISED AND REISSUED AS STANDARD	AS		KV/INK	MN
5	20.06.2019	REAFFIRMED AND REISSUED AS STANDARD	DP	TK	KJH	RKT
4	01.10.2013	REVISED AND REISSUED AS STANDARD	GCP	TK	RKT	SC

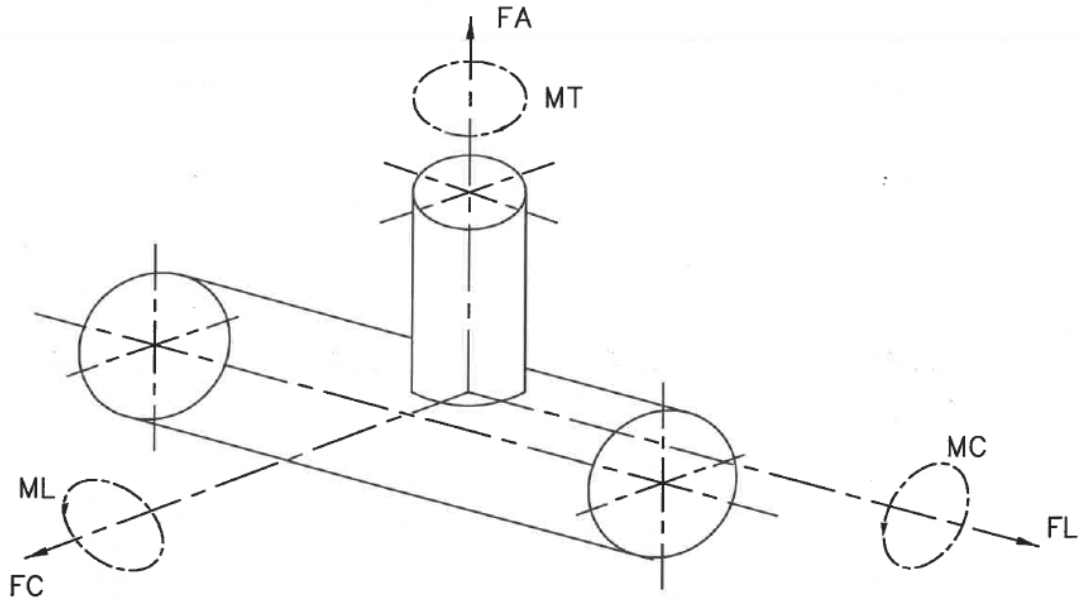


NOTES :-

SELF REINFORCED WELD ENDS

1. DESIGN CALCULATION FOR ALL THE DIMENSIONS OF S.R. NOZZLES / WELD ENDS SHALL BE APPROVED BY EIL.
2. ANY DEVIATION IN THE OVERALL PROJECTION FROM THE SPECIFIED DESIGN DATA SHALL BE MADE ONLY AFTER OBTAINING PRIOR APPROVAL FROM EIL.
3. FLANGES MAY BE FORGED INTEGRALLY WITH S.R. NOZZLE NECK.
4. I.D. OF FORGING SHALL BE AS SPECIFIED ON ENGG. DATA SHEET.
- * 5. APPLICABLE FOR ASME SEC. VIII DIV.1 EQUIPMENT ONLY.
6. ALL SHARP CORNERS SHALL BE ROUNDED-OFF SMOOTH.

5	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	TR	NK	SM
4	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
						Approved by



NOTES: -

1. THIS STANDARD COVERS ALLOWABLE NOZZLE LOADS FOR PRESSURE VESSELS & COLUMNS ONLY.
2. EACH PROCESS NOZZLE OF VESSELS SHALL BE ANALYZED FOR THE LOADS PROVIDED IN THIS STANDARD.
3. THESE LOADS SHALL BE CONSIDERED TO BE ACTING SIMULTANEOUSLY WITH INTERNAL/EXTERNAL DESIGN PRESSURE. ALLOWABLE STRESS SHALL BE AS PER APPLICABLE DESIGN CODE.
4. STRESS CALCULATIONS SHALL BE CARRIED OUT AS PER WRC BULLETIN NO. 537/ 297 (AS APPLICABLE). WRC 537 SHALL BE USED FOR NOZZLES ON DISHED ENDS AND WRC 297 SHALL BE USED FOR NOZZLES ON CYLINDRICAL SHELL.

2	02.12.2024	REVISED AND REISSUED AS STANDARD	JS/SM	TKh	KA/NK	MN
1	20.06.2019	REAFFIRMED AND REISSUED AS STANDARD	DP	TK	KJH	RKT
0	31.07.14	ISSUED AS STANDARD	GCP	KA	RKT	SC
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
					Approved by	

CARBON STEEL AND LOW ALLOY STEEL EQUIPMENTS
(CLASS 150 AND CLASS 300)

NOZZLE SIZES (DN)	FA (Kgf)	FL (Kgf)	FC (Kgf)	MT (Kgf-m)	ML (Kgf-m)	MC (Kgf-m)
50	135	200	200	50	40	30
80	202	300	300	112	90	67
100	270	400	400	200	160	120
150	405	600	600	450	360	270
200	540	800	800	800	640	480
250	675	1000	1000	1250	1000	750
300	810	1200	1200	1800	1440	1080
350	945	1400	1400	2450	1960	1470
400	1080	1600	1600	3200	2560	1920
450	1215	1800	1800	4050	3240	2430
500	1350	2000	2000	5000	4000	3000
600	1620	2400	2400	7200	5760	4320
650	1755	2600	2600	8450	6760	5070
700	1890	2800	2800	9800	7840	5880
750	2025	3000	3000	11250	9000	6750
800	2160	3200	3200	12800	10240	7680
850	2295	3400	3400	14450	11560	8670
900	2430	3600	3600	16200	12960	9720
950	2565	3800	3800	18050	14440	10830
1000	2700	4000	4000	20000	16000	12000
1050	2835	4200	4200	22050	17640	13230
1100	2970	4400	4400	24200	19360	14520
1150	3105	4600	4600	26450	21160	15870
1200	3240	4800	4800	28800	23040	17280
1250	3375	5000	5000	31250	25000	18750
1300	3510	5200	5200	33800	27040	20280
1350	3645	5400	5400	36450	29160	21870
1400	3780	5600	5600	39200	31360	23520
1450	3915	5800	5800	42050	33640	25230
1500	4050	6000	6000	45000	36000	27000

2	02.12.2024	REVISED AND REISSUED AS STANDARD	JS/SM	TKh	KA/NK Nalin	MN
1	20.06.2019	REAFFIRMED AND REISSUED AS STANDARD	DP	TK	KJH	RKT
0	31.07.2014	ISSUED AS STANDARD	GCP	KA	RKT	SC
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by

CARBON STEEL AND LOW ALLOY STEEL EQUIPMENTS
(CLASS 600 AND ABOVE)

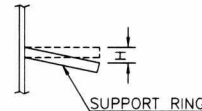
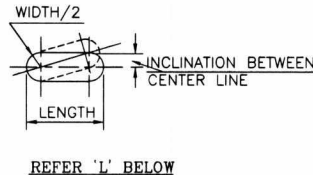
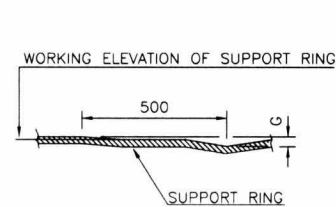
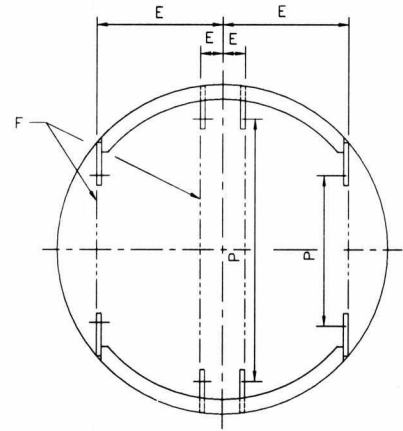
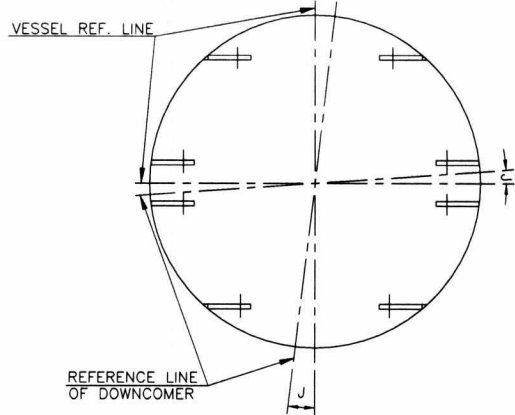
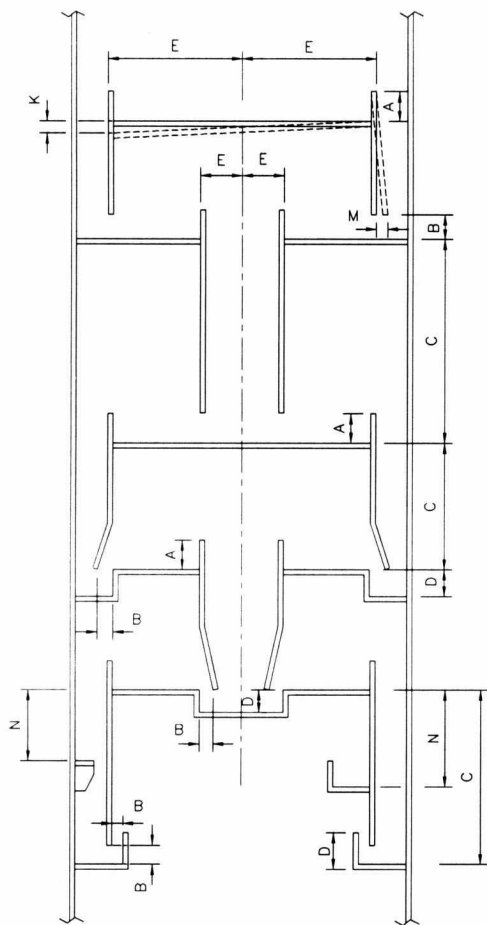
NOZZLE SIZES (DN)	FA (Kgf)	FL (Kgf)	FC (Kgf)	MT (Kgf-m)	ML (Kgf-m)	MC (Kgf-m)
50	168	250	250	62	50	37
80	253	375	375	140	112	84
100	337	500	500	250	200	150
150	506	750	750	562	450	337
200	675	1000	1000	1000	800	600
250	843	1250	1250	1562	1250	937
300	1012	1500	1500	2250	1800	1350
350	1181	1750	1750	3062	2450	1837
400	1350	2000	2000	4000	3200	2400
450	1518	2250	2250	5062	4050	3037
500	1687	2500	2500	6250	5000	3750
600	2025	3000	3000	9000	7200	5400
650	2193	3250	3250	10562	8450	6337
700	2362	3500	3500	12250	9800	7350
750	2531	3750	3750	14062	11250	8437
800	2700	4000	4000	16000	12800	9600
850	2868	4250	4250	18062	14450	10837
900	3037	4500	4500	20250	16200	12150
950	3206	4750	4750	22562	18050	13537
1000	3375	5000	5000	25000	20000	15000
1050	3543	5250	5250	27562	22050	16537
1100	3712	5500	5500	30250	24200	18150
1150	3881	5750	5750	33062	26450	19837
1200	4050	6000	6000	36000	28800	21600
1250	4218	6250	6250	39062	31250	23437
1300	4387	6500	6500	42250	33800	25350
1350	4556	6750	6750	45562	36450	27337
1400	4725	7000	7000	49000	39200	29400
1450	4893	7250	7250	52562	42050	31537
1500	5062	7500	7500	56250	45000	33750

2	02.12.2024	REVISED AND REISSUED AS STANDARD	JS/SM	TKh	KA/NK Nalin	MN
1	20.06.2019	REAFFIRMED AND REISSUED AS STANDARD	DP	TK	KJH	RKT
0	31.07.14	ISSUED AS STANDARD	GCP	KA	RKT	SC
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman

STAINLESS STEEL EQUIPMENTS
(ALL CLASSES)

NOZZLE SIZES (DN)	FA (Kgf)	FL (Kgf)	FC (Kgf)	MT (Kgf-m)	ML (Kgf-m)	MC (Kgf-m)
50	135	200	200	50	40	20
80	202	300	300	112	90	45
100	270	400	400	200	160	80
150	405	600	600	450	360	180
200	540	800	800	800	640	320
250	675	1000	1000	1250	1000	500
300	810	1200	1200	1800	1440	720
350	945	1400	1400	2450	1960	980
400	1080	1600	1600	3200	2560	1280
450	1215	1800	1800	4050	3240	1620
500	1350	2000	2000	5000	4000	2000
600	1620	2400	2400	7200	5760	2880
650	1755	2600	2600	8450	6760	3380
700	1890	2800	2800	9800	7840	3920
750	2025	3000	3000	11250	9000	4500
800	2160	3200	3200	12800	10240	5120
850	2295	3400	3400	14450	11560	5780
900	2430	3600	3600	16200	12960	6480
950	2565	3800	3800	18050	14440	7220
1000	2700	4000	4000	20000	16000	8000
1050	2835	4200	4200	22050	17640	8820
1100	2970	4400	4400	24200	19360	9680
1150	3105	4600	4600	26450	21160	10580
1200	3240	4800	4800	28800	23040	11520
1250	3375	5000	5000	31250	25000	12500
1300	3510	5200	5200	33800	27040	13520
1350	3645	5400	5400	36450	29160	14580
1400	3780	5600	5600	39200	31360	15680
1450	3915	5800	5800	42050	33640	16820
1500	4050	6000	6000	45000	36000	18000

2	02.12.2024	REVISED AND REISSUED AS STANDARD	JS/SM	TKh	KA/NK	MN
1	20.06.2019	REAFFIRMED AND REISSUED AS STANDARD	DP	TK	KJH	RKT
0	31.07.2014	ISSUED AS STANDARD	GCP	KA	RKT	SC
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman



WELDED INTERNALS SHALL BE FABRICATED WITHIN THE FOLLOWING TOLERANCES AND ALL PARTS SHALL BE INTERCHANGEABLE

SYMBOL	DESCRIPTION
A	EXIT WEIR HEIGHT SHALL BE IN LEVEL WITHIN ± 1 mm RELATIVE TO THE SPECIFIED DATUM SURFACE AND TO EACH OTHER.
B	CLEARANCE BETWEEN BOTTOM EDGE OF DOWNCOMER BOLTING BAR AND TOP OF SUPPORT RING SHALL BE WITH IN ± 3 mm OF SPECIFIED DIMENSION.
C	DISTANCE BETWEEN RELATED TRAY SUPPORT RING SHALL BE WITHIN ± 3 mm OF SPECIFIED DIMENSION.
D	THE DEPTH OF SEAL PAN AND DRAW-OFF PAN SHALL BE WITHIN ± 1 mm OF THE SPECIFIED DIMENSIONS.
E	DIMENSIONS IN THE HORIZONTAL DIRECTION OF VERTICAL DOWNCOMER BOLTING BAR, SUPPORT BRACKET OR CLIPS SHALL BE WITHIN TOLERANCES AS PER DRAWINGS.
F	BOLTING BARS WELDED ON OPPOSITE FACES OF COLUMN SHOULD LIE EXACTLY ON ONE LINE.
G	TRAY SUPPORT RING AND BOLTING BAR SHALL NOT HAVE WAVINESS EXCEEDING 1.5mm FOR ANY 500mm OF CIRCUMFERENTIAL LENGTH.
H	LEVEL DIFFERENCE OF A TRAY SUPPORT RING OVER ITS WIDTH SHOULD NOT EXCEED 0.75mm.
J	ORIENTATION OF DOWNCOMER REFERENCE LINE SHALL BE WITHIN ± 3 mm OF ITS NOMINAL DISTANCE FROM THE VESSEL CENTER LINE.
K	INCLINATION OF SUPPORT RING TO HORIZONTAL PLANE TO BE WITHIN TOLERANCES GIVEN BELOW: 1.5mm FOR COLUMN I/D ≤ 1500 mm. 3.0mm FOR 1500 mm $<$ COLUMN I/D ≤ 3000 mm. 4.5mm FOR 3000 mm $<$ COLUMN I/D ≤ 4500 mm. 6.0mm FOR COLUMN I/D > 4500 mm.
L	HORIZONTAL SLOTS ON BOLTING BARS SHALL BE FABRICATED WITHIN FOLLOWING TOLERANCES: LENGTH $+2.0$ mm WIDTH ± 0.25 mm, MAX. INCLINATION WITH HORIZONTAL $\angle \pm 1.0$ mm.
M	THE VERTICALITY OF BOLTING BAR SHOULD BE WITHIN ± 1 mm.
N	THE ELEVATION OF DOWNCOMER AND MAJOR BEAM STOOL WITH RESPECT TO REFERENCE TRAY SUPPORT RING SHOULD BE WITHIN -0 mm $+6$ mm
P	SLOT CENTERS FOR DOWNCOMERS (AS SHOWN) SHALL BE WITHIN TOLERANCES AS SPECIFIED ON DRAWINGS.

NOTES:-

1. TOLERANCES SHOWN IN THE FABRICATION DRAWINGS TAKE PRECEDENCE OVER THOSE SHOWN HERE IN.
2. IN CASE OF THESE TOLERANCES CLASHING WITH THAT OF VESSEL, THE DIMENSIONS ARE TO BE MAINTAINED SO THAT IT SATISFIES BOTH TOLERANCES.
3. TOLERANCES ON CONSECUTIVE DIMENSIONS ARE NON-CUMULATIVE.
4. FOR DETAILS SUCH AS WIDTH, THICKNESS OF BOLTING BARS, WELDING REQUIREMENTS, TOLERANCES NOT COVERED IN THIS STANDARD, REFER TSR/BB DRAWINGS.

5	10.03.2023	RE-AFFIRMED & REISSUED AS STANDARD	AKP/HD	TK	NK	SM
4	21.03.2018	RE-AFFIRMED & REISSUED AS STANDARD	VK/SK	IK/KJH	RKT	RN
3	17-08-10	RE-AFFIRMED & ISSUED AS STANDARD	SKJ/VDY	KKG	AKG	ND
Rev No	Date	Purpose	Prepd by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	



CONSTRUCTIONAL TOLERANCES FOR WELDED SUPPORTS FOR TRAYS/TOWER INTERNALS

STANDARD NO.	7 - 14 - 0001 Rev. 5
Page 1 of 1	

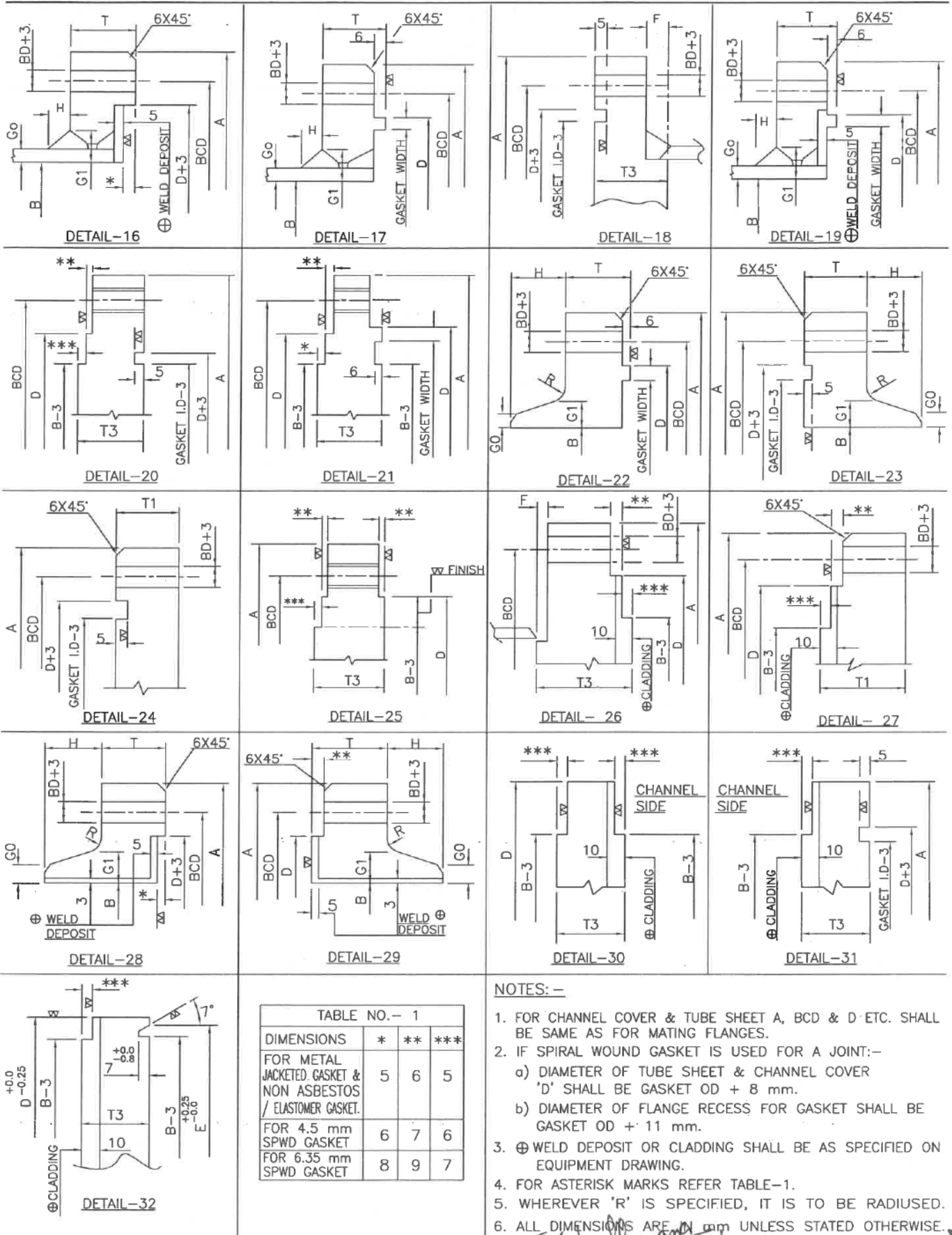


TABLE NO.- 1

DIMENSIONS	*	**	***
FOR METAL JACKETED GASKET & NON ASBESTOS / ELASTOMER GASKET.	5	6	5
FOR 4.5 mm SPWD GASKET	6	7	6
FOR 6.35 mm SPWD GASKET	8	9	7

NOTES: -

- FOR CHANNEL COVER & TUBE SHEET A, BCD & D ETC. SHALL BE SAME AS FOR MATING FLANGES.
- IF SPIRAL WOUND GASKET IS USED FOR A JOINT:-
 - DIAMETER OF TUBE SHEET & CHANNEL COVER 'D' SHALL BE GASKET OD + 8 mm.
 - DIAMETER OF FLANGE RECESS FOR GASKET SHALL BE GASKET OD + 11 mm.
- ⊕ WELD DEPOSIT OR CLADDING SHALL BE AS SPECIFIED ON EQUIPMENT DRAWING.
- FOR ASTERISK MARKS REFER TABLE-1.
- WHEREVER 'R' IS SPECIFIED, IT IS TO BE RADIUSED.
- ALL DIMENSIONS ARE IN mm UNLESS STATED OTHERWISE.

6	02.12.24	REVISED AND REISSUED AS STANDARD	J.SINGH	TKh	KA/NK/Nalin	MN
5	31.10.19	REAFFIRMED AND REISSUED AS STANDARD	DP	NSK	KJH	RKT
4	06.05.14	REVISED AND REISSUED AS STANDARD	GCP	KA	RKT	SC
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman

DESCRIPTION	FLANGED	SCREWED	WELDED (NOTE-1)	SOCKET WELD
90° ELBOW				
ELBOW (TURNED UP)				
ELBOW (TURNED DOWN)				
MITERED BEND 90°				
MITERED BEND 45°				
45° ELBOW				
45° ELBOW (TURNED UP)				
45° ELBOW (TURNED DOWN)				
TEE EQUAL/UNEQUAL				
TEE (OUTLET UP)				
TEE (OUTLET DOWN)				
CROSS				
CONCENTRIC REDUCER				
ECCENTRIC REDUCER				
DEAD END				
LATERAL				
SIGHT GLASS				
UNION				
HALF COUPLING				
FULL COUPLING				
HOSE COUPLING				

6	31.12.24	REAFFIRMED & ISSUED AS STANDARD	PK	SH	GB	MN
5	06.12.19	REAFFIRMED & ISSUED AS STANDARD	SG	SH	MI	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by

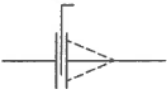
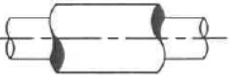
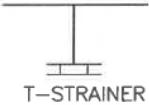

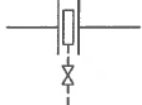
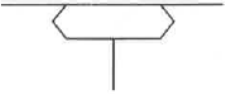
DESCRIPTION	FLANGED	SCREWED	WELDED (NOTE)	SOCKET WELD
GATE VALVE (PLAN)				
GATE VALVE (ELEVATION)				
GLOBE VALVE (PLAN)				
GLOBE VALVE (ELEVATION)				
ANGLE VALVE (PLAN)				
ANGLE VALVE (ELEVATION)				
CHECK VALVE (PLAN OR ELEVATION)				
ANGLE STOP CHECK VALVE (PLAN)				
ANGLE STOP CHECK VALVE (ELEVATION)				
PLUG VALVE (PLAN)				
PLUG VALVE (ELEVATION)				
BALL VALVE (PLAN)				
BALL VALVE (ELEVATION)				
NEEDLE VALVE (PLAN OR ELEVATION)				
RELIEF VALVE (PLAN)				
RELIEF VALVE (ELEVATION)				
CONTROL VALVE GLOBE TYPE (PLAN)				
CONTROL VALVE GLOBE TYPE (ELEV)				
CONTROL VALVE BUTTERFLY TYPE (PLAN)				
CONTROL VALVE BUTTERFLY TYPE (ELEV)				
SOLENOID OPERATED VALVE (PLAN OR ELEV)				
BUTTERFLY VALVE (PLAN OR ELEVATION)				

6	31.12.24	REAFFIRMED & ISSUED AS STANDARD	PK	SH	MN
5	06.12.19	REAFFIRMED & ISSUED AS STANDARD	SG	SH	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener
					Stds. Bureau Chairman
					Approved by
Format No. 8-00-0001-F4 Rev.0					Copyright EIL - All rights reserved

DESCRIPTION	FLANGED	SCREWED	WELDED (NOTE-1)	SOCKET WELD
DIAPHRAGM VALVE (PLAN OR ELEVATION)				
3-WAY PLUG VALVE (PLAN OR ELEVATION)				
4-WAY PLUG VALVE (PLAN OR ELEVATION)				
EXPANSION JOINT				
ANGLE CONTROL VALVE				
CHAIN OPERATING VALVE (TYP)				
GEAR OPERATED VALVE (BEVEL GEAR) PLAN				
GEAR OPERATED VALVE (SPUR GEAR) PLAN				
MOTOR OPERATING VALVE				
STEAM TRAP				
Y-STRAINER				

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
SLIP-ON FLANGE		STUB - IN (WITH OR WITHOUT REINF)	
WELDNECK FLANGE			
SCREWED FLANGE		STUB - IN (SADDLE REINF)	
SOCKET WELD FLANGE			
SPACER		STUB - IN WITH REINF (IN PLAN)	
SPACER BLIND			
SPECTACLE FIG. 8 (BLIND)		INSULATED (LINES 12" AND BELOW)	
SPECTACLE FIG. 8 (OPEN)			

6	31.12.24	REAFFIRMED & ISSUED AS STANDARD	PK	SH	MI	MN
5	06.12.19	REAFFIRMED & ISSUED AS STANDARD	SG	SH	MI	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
CONICAL STRAINER		INSULATED (LINES 14" & ABOVE)	
T-TYPE STRAINER	 T-STRAINER	STEAM TRACED	
DRIP-RING		WELDOLET	

NOTES :

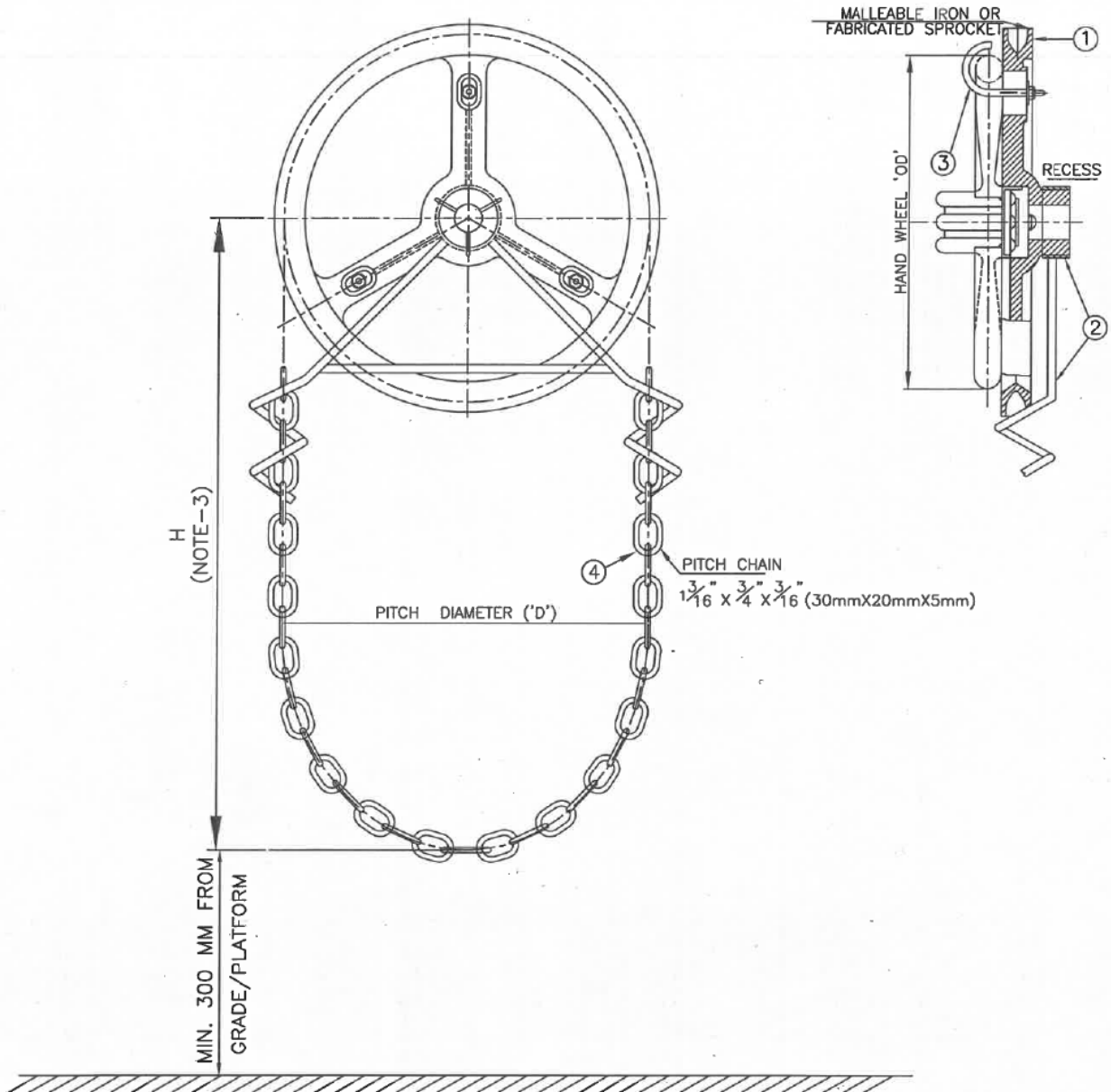
1. WELD DOTS NOT TO BE SHOWN ON PIPING G.A.Ds.
2. FOR SYMBOLS/LEGENDS RELATED TO CIVIL ENGINEERING/UNDERGROUND PIPING WORK, REFER CIVIL ENGINEERING STANDARD 7-65-0001.

6	31.12.24	REAFFIRMED & ISSUED AS STANDARD	PK	SH	MI	MN
5	06.12.19	REAFFIRMED & ISSUED AS STANDARD	SG	SH	MI	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
					Approved by	

FOR FIGURES
REF. EIL STANDARD NO. 7-44-0033 (SHT. 1 OF 2)

NOM. PIPE SIZE	'L' FOR FF OR RF		'R' FOR ALL TYPES	TYPE-I				TYPE-II				TYPE-III				NOM. PIPE SIZE
	150#	300#		A	B	C	D	A	B	C	D	A	B	C	D	
38	1572	1640	1448	800	600	400	848	517	388	259	1060	384	288	192	1160	38
40	1653	1722	1524	842	631	421	893	544	408	273	1116	404	303	202	1221	40
42	1733	1805	1600	884	663	442	937	572	429	286	1171	424	318	213	1282	42
44	1813	1890	1676	926	694	463	982	599	449	299	1227	445	333	222	1343	44
46	1898	1975	1753	968	726	484	1027	626	470	313	1283	465	349	233	1404	46
48	1978	2053	1829	1010	758	505	1071	653	490	327	1339	485	363	243	1465	48
50	2059	2140	1905	1052	789	526	1116	681	510	340	1395	505	379	253	1526	50
52	2138	2224	1981	1094	821	547	1160	708	531	354	1450	525	394	263	1587	52
54	2219	2297	2057	1136	852	568	1205	735	551	367	1506	546	409	273	1648	54
56	2301	2402	2134	1178	884	589	1250	762	572	381	1562	566	424	283	1710	56
58	2385	2485	2210	1220	915	610	1295	790	592	395	1618	586	440	293	1770	58
60	2465	2558	2286	1263	947	631	1339	817	613	408	1673	606	455	303	1831	60

7	09.10.25	REVISED & ISSUED AS STANDARD	SRG	PK	SH	MN
6	23.09.20	REVISED & ISSUED AS STANDARD	SG	SH	GB	SM
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
Approved by						



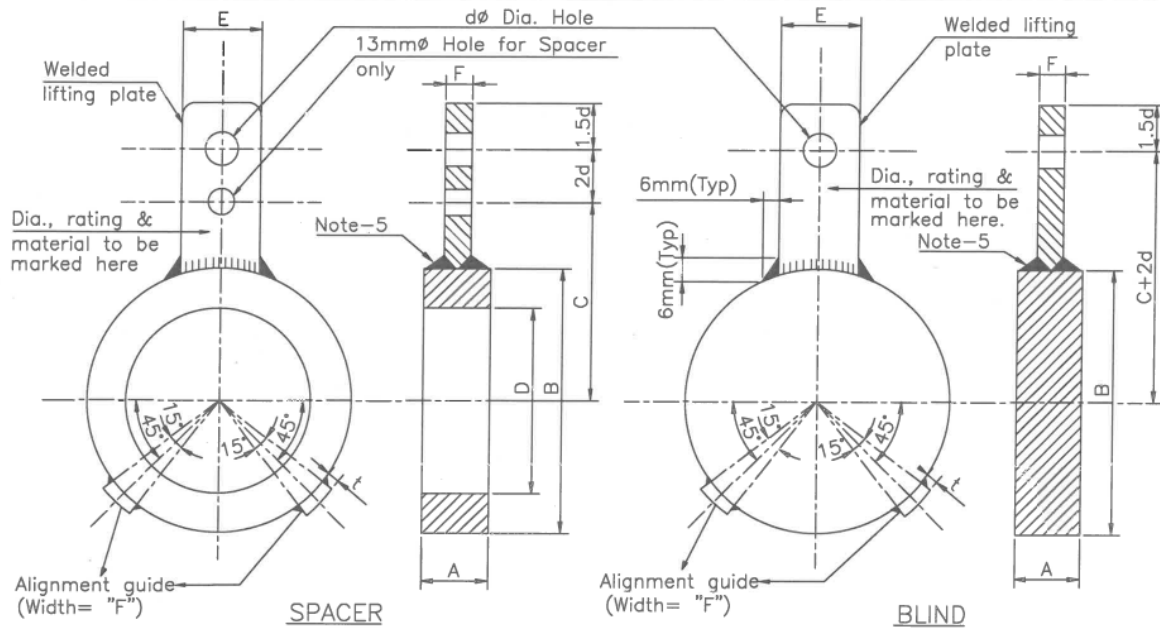
VENDORS SCOPE OF SUPPLY :

1. SPROCKET
2. CHAIN GUIDE LEVER WITH FIXING ITEMS.
3. INSTALLATION KIT INCLUDING J-BOLTS, NUTS & WASHERS.
4. CHAIN

NOTES:

1. THIS IS A SCHEMATIC ARRANGEMENT FOR QUOTATIONS ONLY.
2. VENDOR DESIGN TO BE BASED ON THE SCHEMATIC ARRANGEMENT SHOWN.
3. 'H' IS THE DIMENSION FROM THE CENTERLINE OF VALVE STEM OR GEAR INPUT SHAFT TO THE BOTTOM OF THE CHAIN LOOP, WHICH WILL BE PROVIDED IN THE REQUISITION.
4. VENDOR TO SUBMIT DETAIL DRAWING INCLUDING CHAIN LENGTH.

6	06.01.25	REVISED & ISSUED AS STANDARD	PK	SH	GB	MN
5	06.12.19	REVISED & ISSUED AS STANDARD	SG	SH	MI	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
					Approved by	

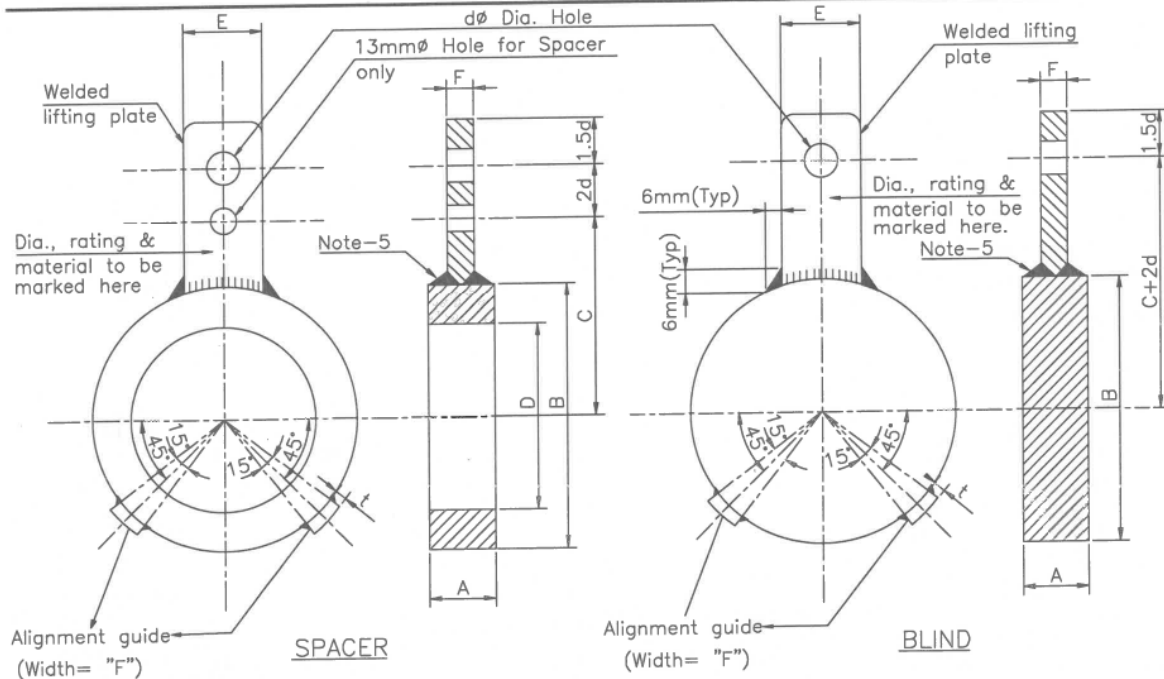


NOTES:

- Both surfaces shall have a resultant surface finish of 125µin to 250µin average roughness with either a concentric or spiral serrated finish.
- Dimensions are for flanges to ASME B 16.47B (erstwhile API 605) for sizes 26" to 60".
- Diameter, rating & material specification shall be marked on welded fixed plate. Material as per line class.
- Thickness 'A' is based on ASTM A285 Gr.C for 150# and ASTM A516 Gr.70 for 300# & 600# with corrosion allowance of 1.5mm on each face.
- Welding and heat treatment requirements shall be in accordance with ASME B31.3
- Alignment Guide shall be welded in the middle of thickness of Spacer & Blind.
- All dimensions are in mm unless otherwise specified.

DIA. NB	150#								WEIGHT KG(APPROX)	
	A	B	C	D	E	F	d	t	BLIND	SPACER
26	40	711	473	648	35	15	20	5	120	22
28	42	762	498	698	33	15	20	5	140	25
30	45	813	524	749	31	15	20	5	175	30
32	48	864	551	800	29	15	20	6	210	35
34	50	921	583	851	42	15	20	5	250	40
36	53	972	609	902	39	15	20	6	295	45
38	54	1022	642	925	48	15	20	9	345	50
40	59	1080	668	1003	44	15	20	6	400	65
42	61	1130	693	1054	41	18	20	6	460	70
44	64	1181	718	1105	38	18	20	6	520	80
46	67	1235	751	1156	62	18	20	8	595	90
48	70	1289	776	1205	56	18	20	7	680	100
50	72	1340	803	1255	51	18	26	7	770	110
52	75	1391	827	1306	45	18	26	6	865	120
54	77	1441	855	1356	44	27	26	9	950	125
56	80	1492	880	1406	42	27	26	9	1060	140
58	83	1543	918	1455	63	27	26	16	1180	160
60	86	1600	943	1505	59	27	26	13	1315	175
TOL.	±0.3	±0.5		±0.5	±0.5					

6	17.12.25	REVISED & ISSUED AS STANDARD	SRG	PK	SH	MN
5	04.05.20	REAFFIRMED & ISSUED AS STANDARD	SG	SH	GB	SKS
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman

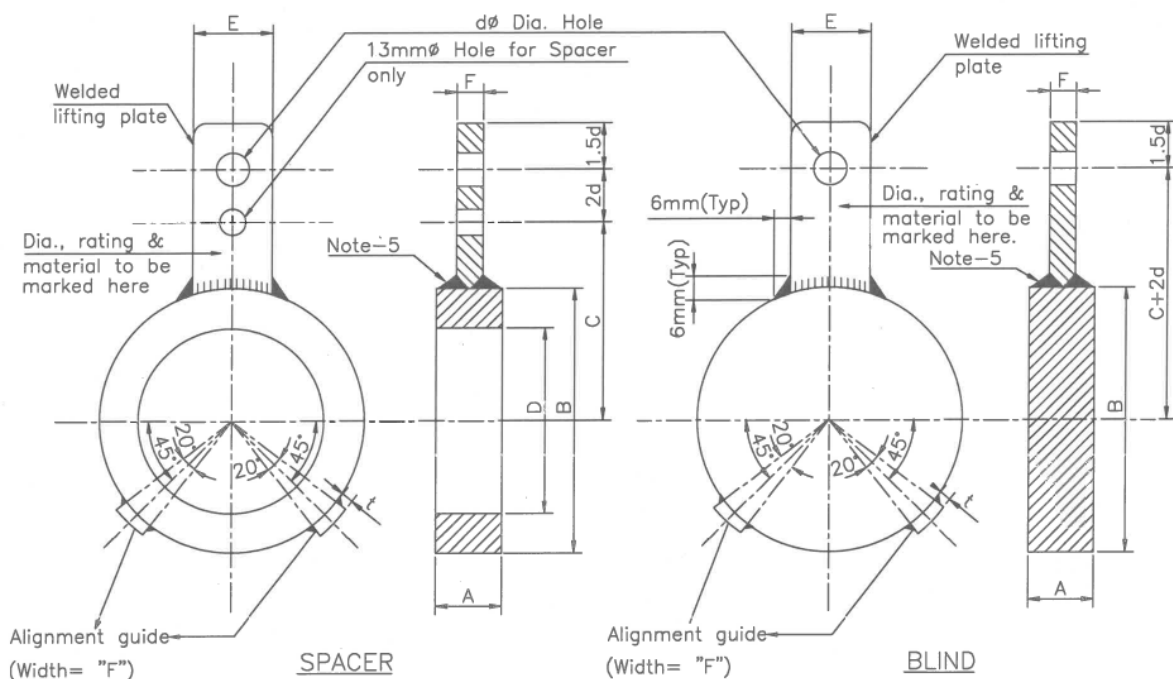


NOTES:

REFER PAGE 1 OF 3 FOR NOTES.

DIA. NB	300#								WEIGHT KG(APPROX)	
	A	B	C	D	E	F	d	t	BLIND	SPACER
26	60	737	513	641	36	15	20	15	195	55
28	65	787	540	689	32	15	20	17	240	60
30	69	845	575	738	35	15	20	18	295	70
32	73	902	608	787	47	15	20	17	355	85
34	77	953	635	835	41	15	20	18	420	95
36	82	1010	665	886	55	18	20	17	495	115
38	86	1060	690	941	47	18	20	17	595	130
40	91	1114	718	992	41	18	20	16	685	150
42	95	1168	748	1038	53	18	26	14	785	165
44	100	1219	773	1092	47	27	26	14	895	185
46	104	1270	810	1140	61	27	26	22	1010	200
48	107	1327	835	1183	53	27	26	19	1145	225
50	112	1378	860	1234	46	35	26	19	1285	250
52	116	1429	888	1286	41	35	26	18	1430	270
54	119	1480	918	1333	45	35	26	23	1575	290
56	125	1537	963	1381	76	40	32	26	1785	330
58	130	1594	993	1429	67	40	32	29	2000	380
60	133	1651	1020	1478	71	40	36	26	2210	420
TOL.	±0.3	±0.5		±0.5						

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						Approved by

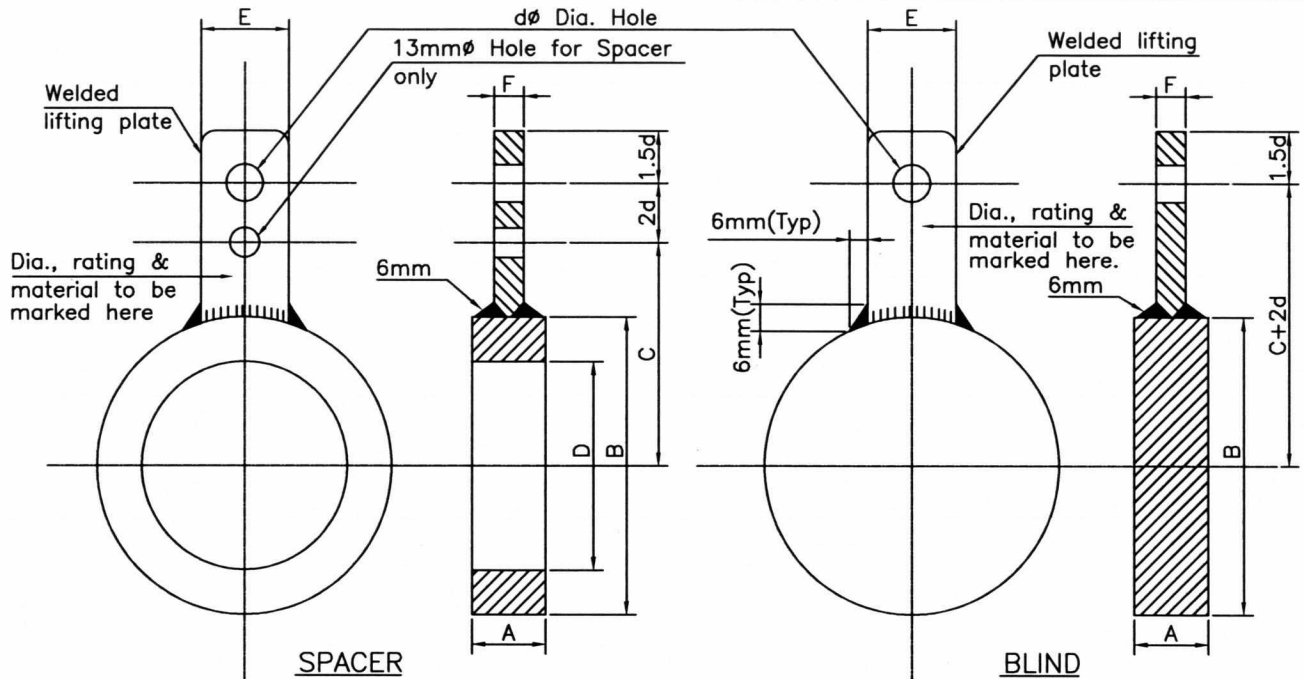


NOTES:

REFER PAGE 1 OF 3 FOR NOTES.

DIA. NB	600#								WEIGHT KG(APPROX)	
	A	B	C	D	E	F	d	t	BLIND	SPACER
26	82	727	525	632	38	15	20	17	260	65
28	88	784	555	681	42	15	20	15	320	80
30	95	841	590	732	46	15	20	17	405	100
32	100	895	623	779	49	18	20	17	490	115
34	107	953	660	829	70	18	20	20	595	140
36	113	1010	688	879	56	18	20	17	705	165
38	119	1054	715	930	62	18	26	23	800	170
40	125	1111	740	975	51	27	26	20	940	205
42	130	1168	783	1022	69	27	26	24	1090	240
44	137	1226	808	1073	57	27	26	20	1265	275
46	143	1276	835	1122	62	35	32	23	1435	300
48	149	1334	878	1172	63	35	32	26	1635	345
50	155	1384	915	1219	84	35	32	30	1830	380
52	161	1435	940	1267	67	40	32	30	2040	410
54	167	1492	970	1316	73	40	32	30	2290	460
56	172	1543	1008	1364	73	40	36	33	2535	495
58	178	1600	1033	1413	78	40	36	30	2820	565
60	185	1657	1078	1462	104	40	36	36	3150	635
TOL.	±0.3	±0.5		±0.5	±0.5					

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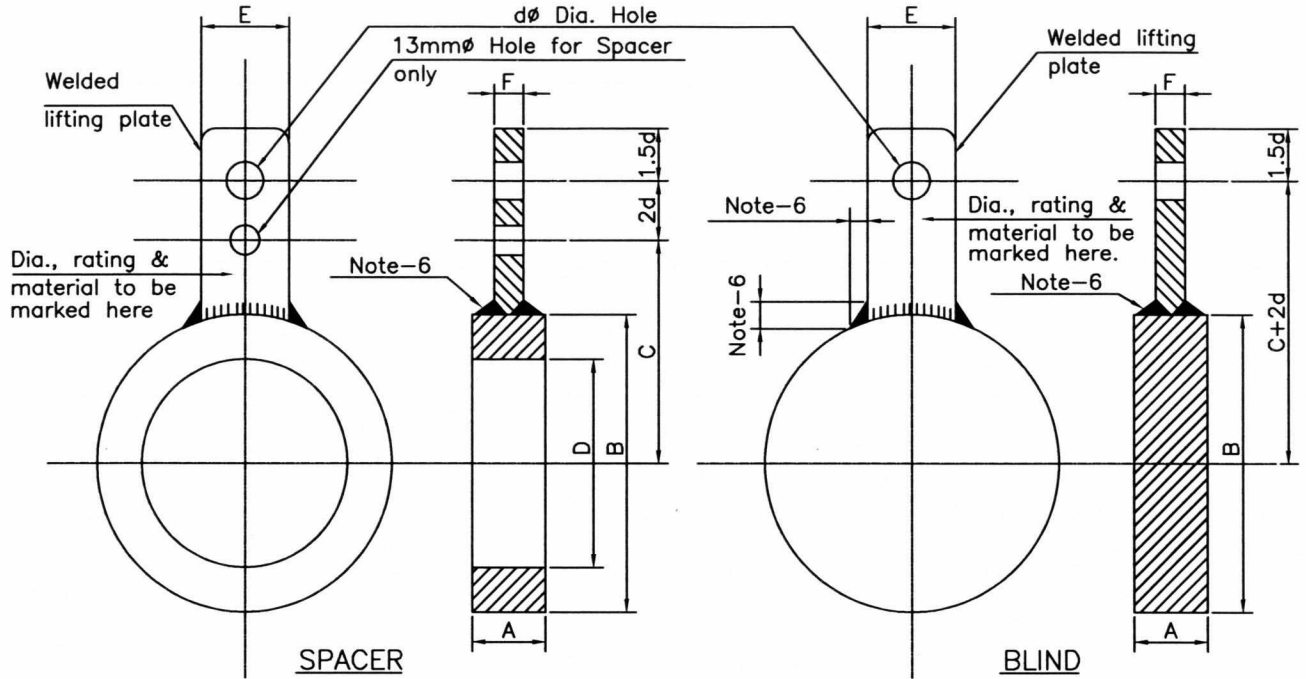


NOTES:

- Both surfaces shall have a resultant surface finish of $125\mu\text{in}$ to $250\mu\text{in}$ average roughness with either a concentric or spiral serrated finish.
- Dimensions are for flanges AWWA-C-207 CLASS D 175-150 PSI.
- Diameter, rating, material specification max pressure & max temperature shall be marked on welded lifting plate Material as per line class.
- Thickness 'A' is based on ASTM A516 Gr.70, with corrosion allowances of 1.5mm on each face.
- Max Pressure & Max Temp. are 10.55 Kg/cm² & 65°C.
- Weld size shall be 6 mm for upto 96", 8 mm for 102" to 132" and 8 mm for 138" & 144".
- All dimensions are in mm unless otherwise specified.

DIA. NB	150#							WEIGHT KG(APPROX)	
	A	B	C	D	E	F	d	BLIND	SPACER
26	28	772	485	665	50	15	20	104	27
28	29	829	514	716	50	15	20	128	33
30	31	879	542	767	50	15	20	149	36
32	33	937	580	818	50	15	20	180	43
34	35	988	606	869	50	15	20	211	49
36	37	1045	634	919	50	15	20	250	57
38	39	1109	669	970	50	15	20	296	70
40	40	1159	695	1021	50	15	20	341	77
42	42	1217	723	1072	50	18	20	384	87
44	44	1274	752	1123	50	18	20	441	99
46	46	1325	777	1173	50	18	20	499	108
48	48	1382	806	1224	50	18	20	566	122
50	49	1433	834	1275	50	18	25	634	132
52	51	1490	863	1326	50	18	25	713	148
TOL.	±0.3	±0.5		±0.5	±0.5				

2	28.09.23	REVISED & ISSUED AS STANDARD	ABA	SH	GB	SM
1	04.05.20	REAFFIRMED & ISSUED AS STANDARD	SG	SH	GB	SKS
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
Approved by						

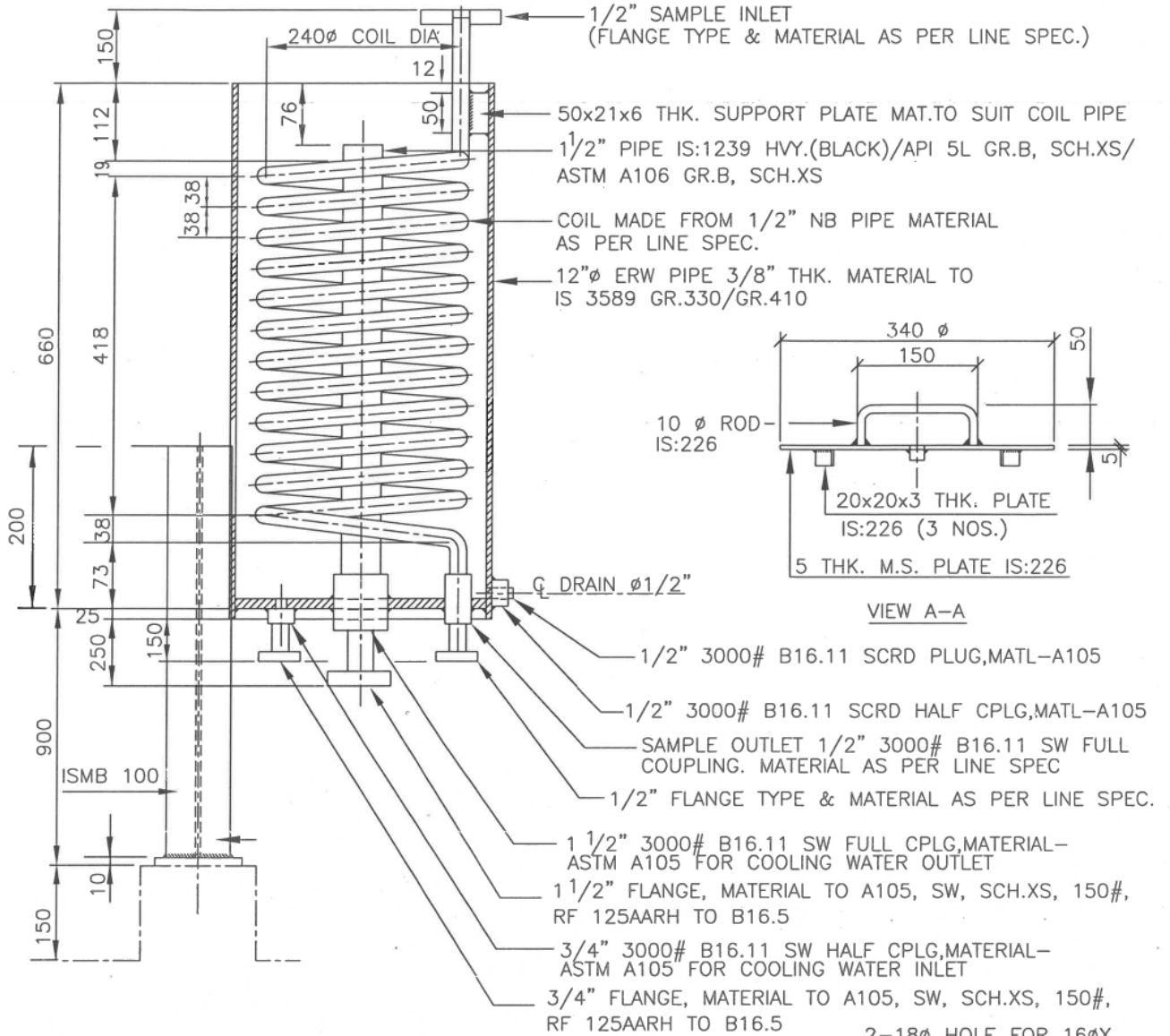


NOTES:

REFER PAGE 1 OF 2 FOR NOTES.

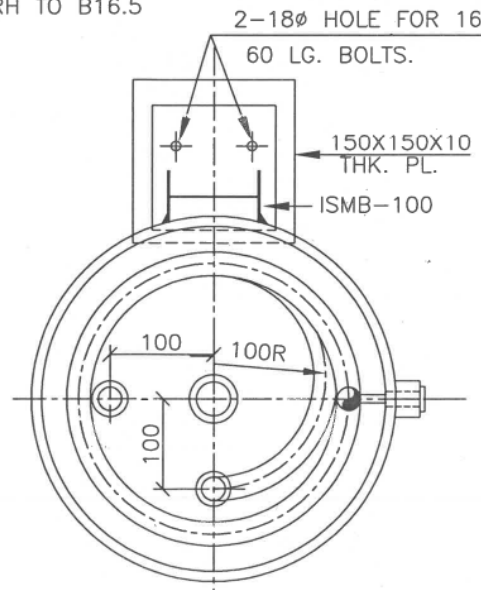
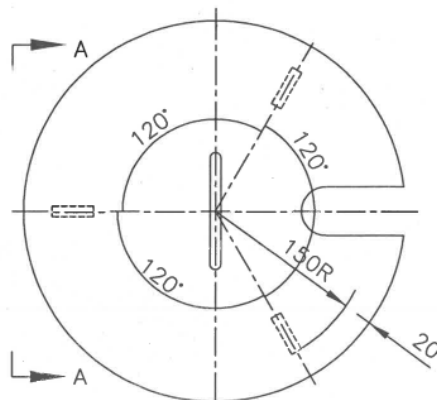
DIA. NB	150#							WEIGHT KG(APPROX)	
	A	B	C	D	E	F	d	BLIND	SPACER
54	53	1547	892	1377	55	25	25	784	164
60	59	1712	977	1529	55	25	25	1068	217
64	62	1883	1066	1681	55	25	25	1359	342
66	64	1883	1066	1681	55	25	25	1403	286
72	69	2048	1149	1834	55	25	25	1814	361
78	75	2207	1231	1986	55	25	30	2257	431
80	77	2372	1317	2138	55	25	30	2677	704
84	80	2372	1317	2138	55	25	30	2815	530
90	86	2530	1403	2291	55	25	30	3400	614
96	91	2696	1489	2443	55	25	30	4130	741
102	97	2842	1574	2596	55	25	30	4839	803
108	102	3000	1660	2748	55	30	30	5725	924
114	108	3146	1746	2900	55	40	30	6603	996
120	113	3299	1831	3053	55	50	30	7597	1095
126	119	3458	1917	3205	55	60	30	8791	1245
132	124	3623	2003	3358	55	75	30	10056	1424
138	129	3775	2089	3510	55	75	30	11445	1558
144	135	3934	2174	3662	55	75	30	12906	1731
TOL.	±0.3	±0.5		±0.5	±0.5				

2	28.09.23	REVISED & ISSUED AS STANDARD	ABA	SH	GB	SM
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Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by

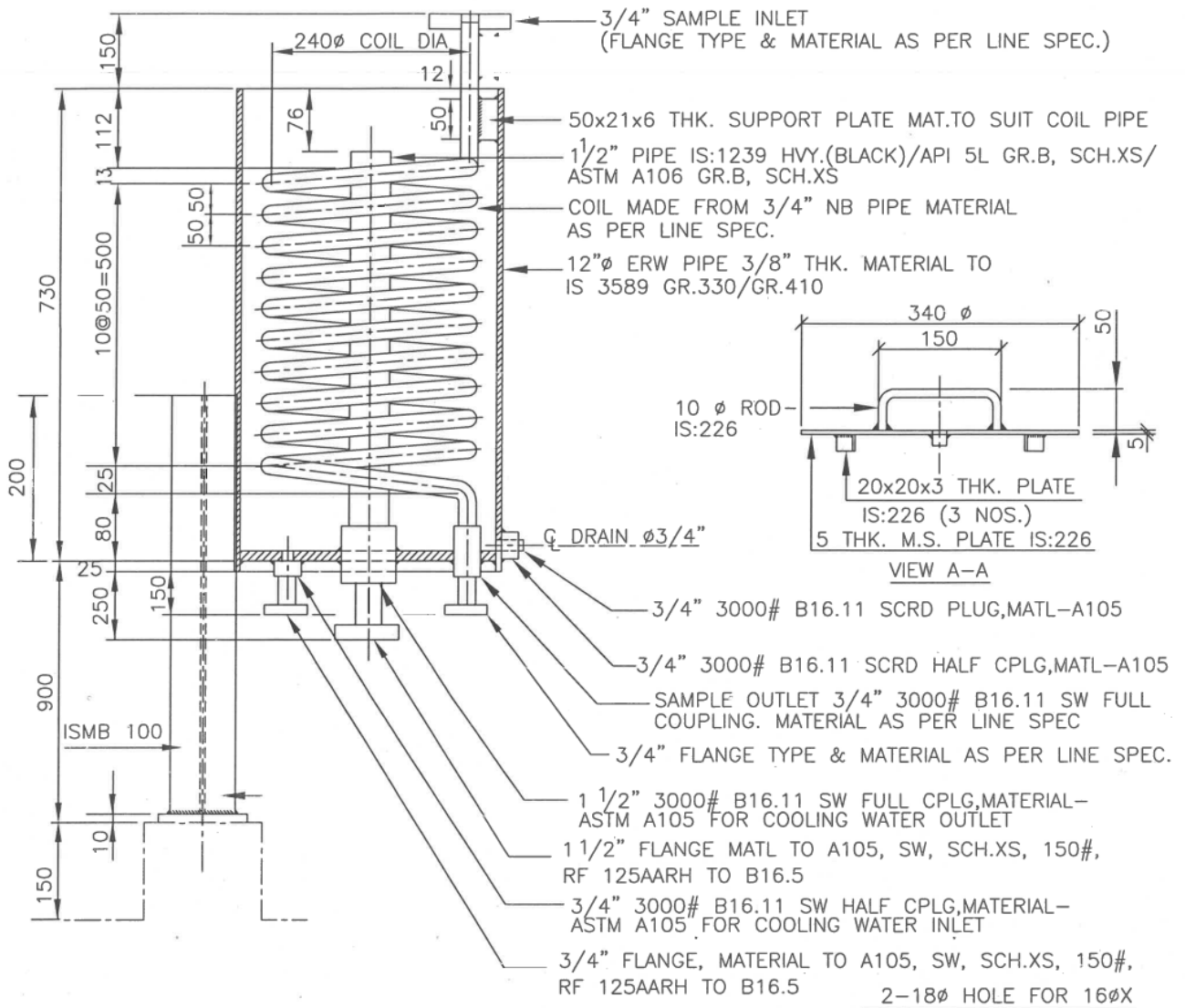


NOTE:

1. INSTEAD OF FIXING COOLER TO ISMB-100 AS INDICATED,
IT CAN BE FIXED TO ANY CONVENIENT STEEL SUITABLY

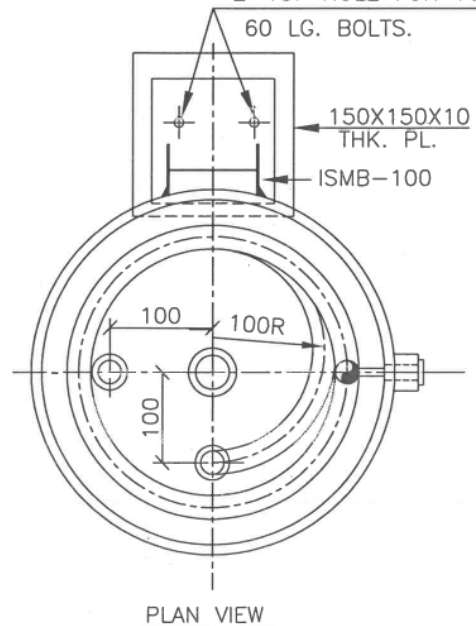
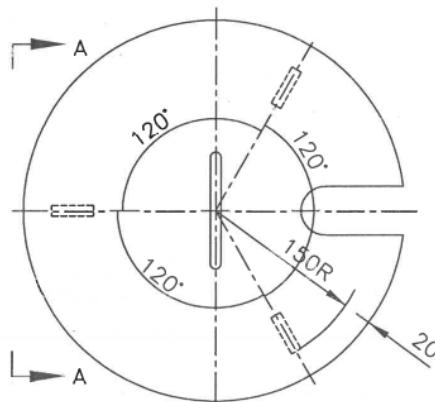


6	04.03.25	REVISED & ISSUED AS STANDARD	PK	SH	GB	MN
5	06.12.19	REVISED & ISSUED AS STANDARD	SG	SH	MI	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman

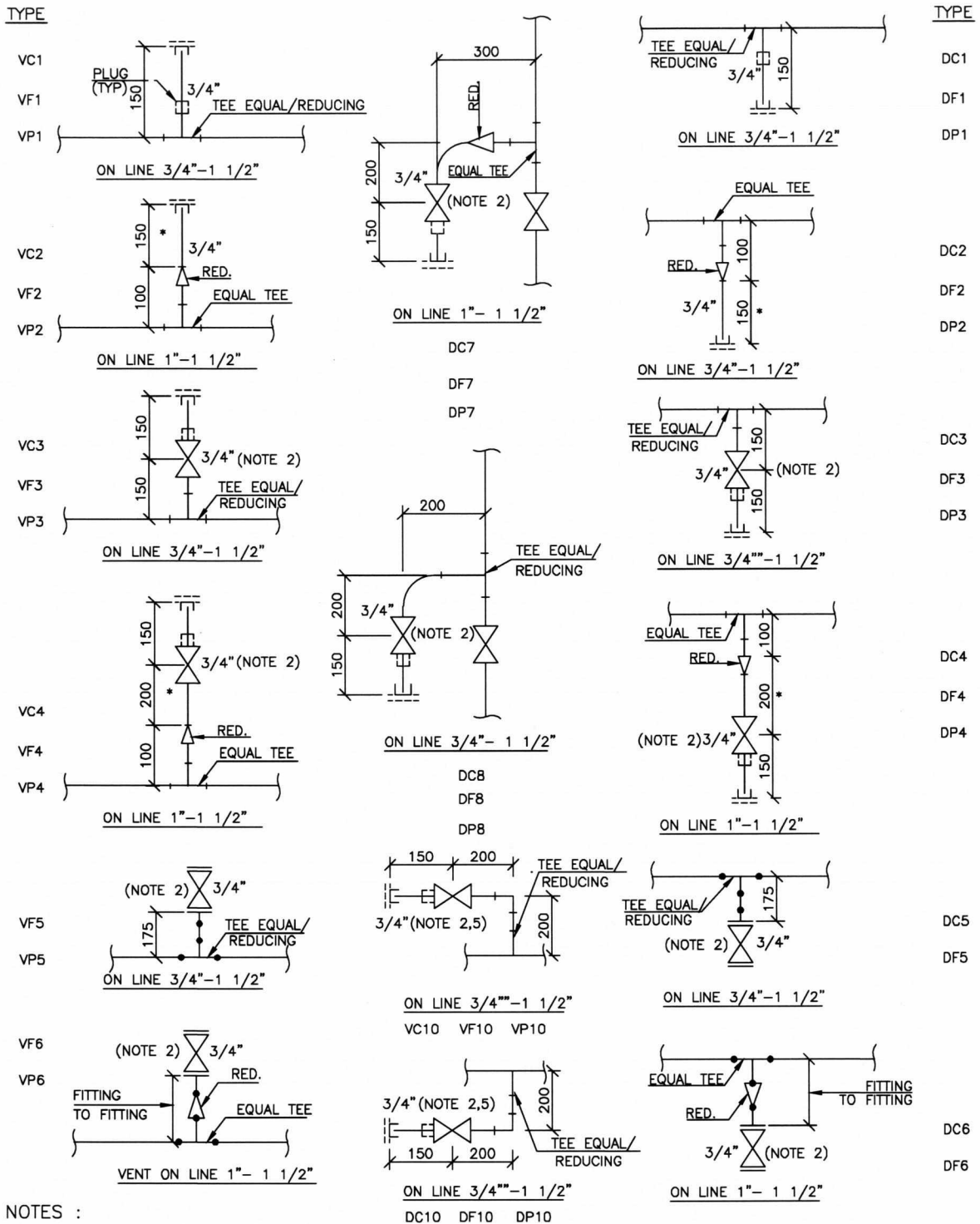


NOTE:

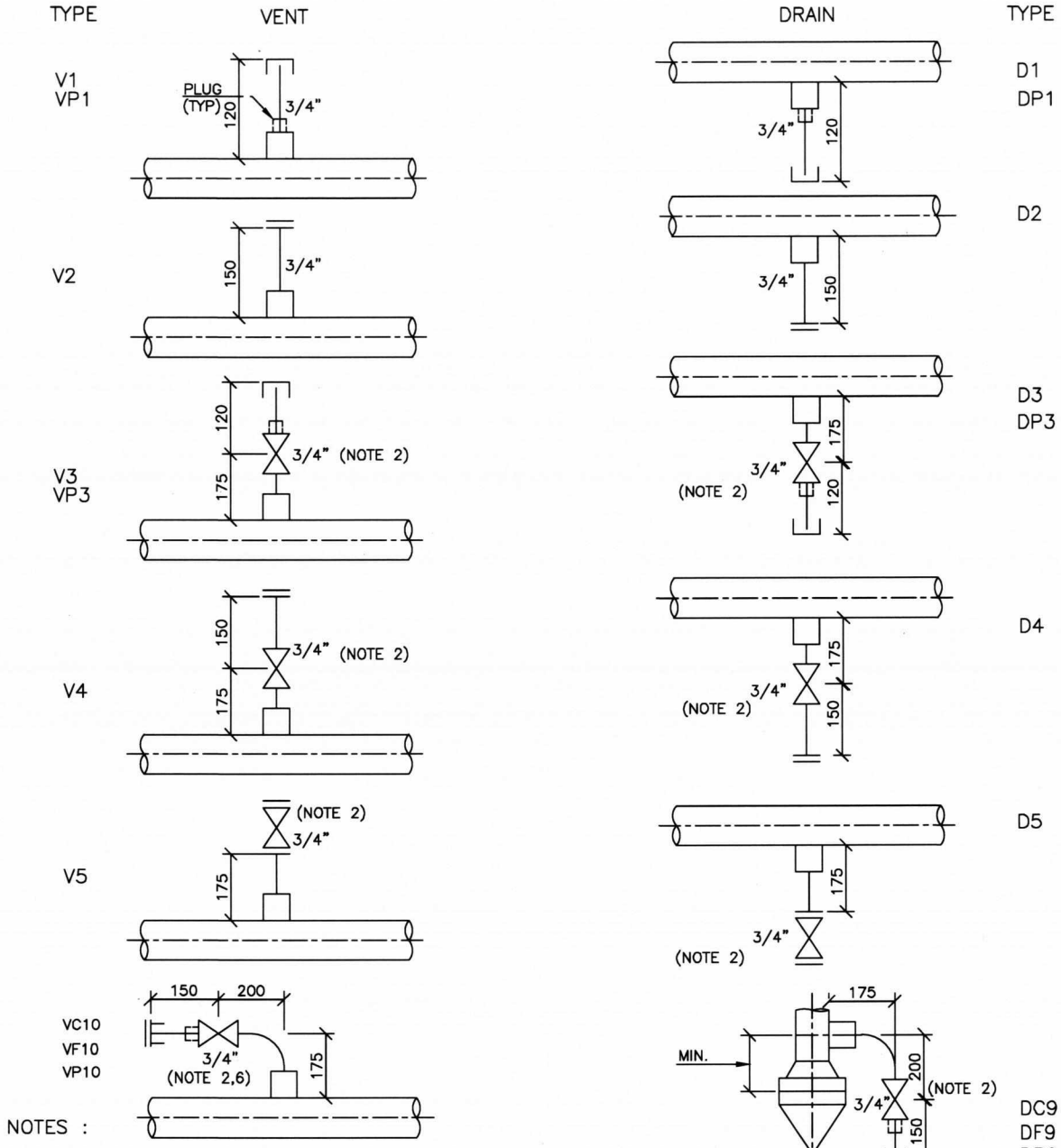
1. INSTEAD OF FIXING COOLER TO ISMB-100 AS INDICATED, IT CAN BE FIXED TO ANY CONVENIENT STEEL SUITABLY



4	04.03.25	REVISED & ISSUED AS STANDARD	PK	SH	GB	MN
3	06.12.19	REVISED & ISSUED AS STANDARD	SG	SH	MI	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman



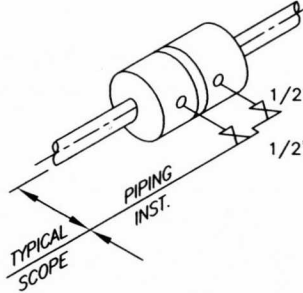
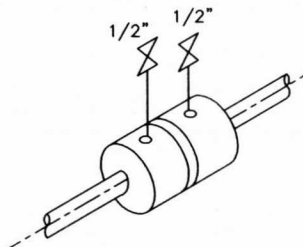
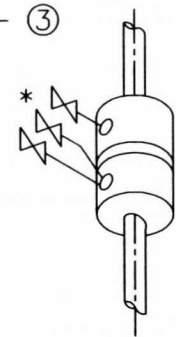
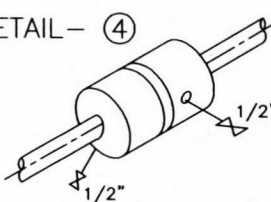
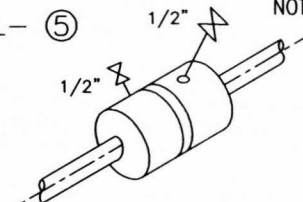
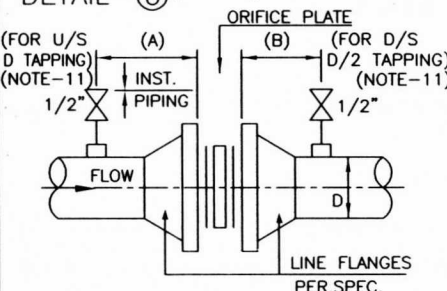
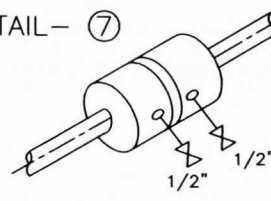
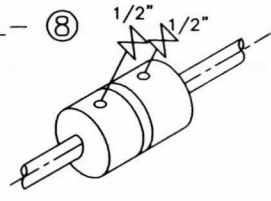
6	20.06.22	REVISED & ISSUED AS STANDARD	PK	SH	GB	SM
5	06.12.19	REAFFIRMED & ISSUED AS STANDARD	SG	SH	MI	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by



NOTES :

- DIMENSIONS INDICATED ARE VALID FOR 75mm (MAX) INSULN. THICKNESS. FOR HIGHER INSULATION THICKNESS INCREASE DIMENSION AS REQUIRED
- VALVES TO BE PROVIDED SHALL BE SIMILAR TO LINE ISOLATION VALVE (GATE, BALL OR PLUG VALVE ETC., WITH FLGD, SW OR SCR'D ENDS) UNLESS OTHERWISE SPECIFIED IN PMS. BRANCH-OFFS LIKE HALF CPLG(SW OR SCR'D)/SOCKET/WELDOLET & END CONNECTIONS LIKE CAP/PLUG/FLANGE & BLIND FLANGE SHALL BE AS PER PIPING MATERIAL SPECIFICATIONS.
- VENTS/DRAINS CAN BE PROVIDED ON FLAT SIDE OF ECCENTRIC REDUCER ON SIZES 4" & ABOVE
- LEGEND V=VENT, D=DRAIN, C=CAP, F=FLANGE, P=PLUG
- PLUGGED END OF VALVE OR FITTING SHALL BE THREADED
- FOR LIQUID CRYOGENIC SERVICE VALVE STEM ORIENTATION TO BE AT OR ABOVE 45° ABOVE HORIZONTAL POSITION.

6	20.06.22	REVISED & ISSUED AS STANDARD	PK	SH	GB	SM
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Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
						Approved by

FOR LIQUID	FOR GAS LINES & STEAM LINES (NOTE-10)	FOR VERTICAL LINES
<p>DETAIL- ①</p> 	<p>DETAIL- ②</p> 	<p>DETAIL- ③</p>  <p>* FOR STEAM & CONDENSIBLES, LOWER BLOCK VALVE SHALL BE RAISED TO THE LEVEL OF THE UPPER BLOCK VALVE</p>
<p>FOR LIQUID LINES ON PIPE RACK WITH OPERATING TEMP $\geq 0^{\circ}\text{C}$</p> <p>DETAIL- ④</p>  <p>NOTE-5</p>	<p>FOR STEAM & GAS LINES ON PIPE RACK & LIQUID LINES WITH TEMP BELOW 0°C</p> <p>DETAIL- ⑤</p>  <p>NOTE-5</p>	<p>FOR TAPS ON PIPE RACK (150# & 300#)</p> <p>DETAIL- ⑥ (NOTE-3)</p>  <p>ORIENTATION OF TAPS SHALL BE LIQUID LINES WITH OPERATING TEMP. $\geq 0^{\circ}\text{C}$: 45° FROM VERTICAL DOWNWARDS STEAM, GAS & LIQUID LINES WITH OP.TEMP $< 0^{\circ}\text{C}$: 45° FROM VERTICAL UPWARDS</p>
<p>DETAIL- ⑦</p>  <p>NOTE-5</p>	<p>DETAIL- ⑧</p>  <p>NOTE-5</p>	

INSTRUMENT SCOPE

- A. ORIFICE FLANGES ASSEMBLY WITH BOLTS/NUTS AND GASKETS
- B. IMPULSE LINE STARTING AFTER THE TAPPING VALVE

NOTES :

1. ORIFICE FLANGES IN HORIZONTAL LINES SHALL BE PREFERRED.
2. TAPS SHALL BE ORIENTED TO SUIT LOCATION OF INSTRUMENT.
3. TAPPING ON PIPE AS PER DETAIL-6 SHALL BE CONSIDERED IN ACCORDANCE WITH THE COUPLING POSITIONS FROM UPSTREAM AND DOWNSTREAM SIDE FLANGE FACES FOR LINE OF :-
 - A. RATING 150# AND SIZE $\geq 16"$
 - B. RATING 300# AND SIZE $\geq 20"$
 FOR ALL OTHER LINE SIZES AND RATINGS. TAP SHALL BE CONSIDERED ON ORIFICE FLANGE FOR ORIFICE ASSEMBLIES BY INSTRUMENTATION.
4. IN CASE OF VERTICAL LINES FLOW SHALL BE UPWARDS FOR LIQUIDS CONTAINING VAPOUR & DOWNWARDS FOR WET GASES & STEAM.
5. THE ORIENTATION OF TAPPING IN CASE OF DETAILS 4 & 5 SHALL BE AS FOLLOWS:
 - FOR LIQUID LINES WITH OPERATING TEMPERATURE $\geq 0^{\circ}\text{C}$:
 - 4,8 & 16 BOLT FLANGE - AT 45° TO VERTICAL POINTING DOWNWARDS
 - 12 BOLT FLANGE - AT 60° TO VERTICAL POINTING DOWNWARDS
 - 20 BOLT FLANGE - AT 54° TO VERTICAL POINTING DOWNWARDS.
 - FOR LIQUID LINES WITH OPER. TEMP. $< 0^{\circ}\text{C}$ AND STEAM AND GAS LINES :
 - 4,8 & 16 BOLT FLANGE - AT 45° TO VERTICAL POINTING UPWARDS,
 - 12 BOLT FLANGE - AT 60° TO VERTICAL POINTING UPWARDS
 - 20 BOLT FLANGE - AT 54° TO VERTICAL POINTING UPWARDS.
6. DETAILS 4 & 5 SHALL NOT BE USED FOR PRE-FABRICATED HOOK-UPS.
7. FOR CLEARANCE REQUIREMENT AROUND ORIFICE FLANGE REFER EIL STD. 7-44-0504
8. FOR DETAILS OF ORIFICE TAPPINGS AND ORIENTATION, REFER EIL STD. 7-52-0005.
9. IN CASE OF PRE-FABRICATED HOOKUP, NIPPLE & ISOLATION VALVE SHALL BE SUPPLIED BY PREFABRICATION VENDOR.
10. FOR STEAM LINES, DETAIL-1 CAN BE CONSIDERED IN CASE OF SPACE CONSTRAINTS OR AS PER LICENSOR REQUIREMENT.
11. FOR DIMENSIONS A & B REFER STD. 7-52-0022.
12. FOR LIQUID CRYOGENIC SERVICE VALVE STEM ORIENTATION TO BE AT OR ABOVE 45° ABOVE HORIZONTAL POSITION.

PIPING SCOPE

- A. TAPPING NIPPLE, COUPLINGS AND VALVES

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						Approved by

FOR LIQUID	FOR GAS LINES & STEAM LINES (NOTE-10)	FOR VERTICAL LINES
<p>DETAIL- ①</p>	<p>DETAIL- ②</p>	<p>DETAIL- ③</p> <p>* FOR STEAM & CONDENSIBLES, LOWER BLOCK VALVE SHALL BE RAISED TO THE LEVEL OF THE UPPER BLOCK VALVE</p>
<p>FOR LIQUID LINES ON PIPE RACK WITH OPERATING TEMP $\geq 0^{\circ}\text{C}$</p>	<p>FOR STEAM & GAS LINES ON PIPE RACK & LIQUID LINES WITH TEMP BELOW 0°C</p>	
<p>DETAIL- ④</p> <p>NOTE-5</p>	<p>DETAIL- ⑤</p> <p>NOTE-5</p>	
<p>DETAIL- ⑦</p>	<p>DETAIL- ⑧</p>	

INSTRUMENT SCOPE

- ORIFICE FLANGES ASSEMBLY WITH BOLTS/NUTS AND GASKETS
- IMPULSE LINE STARTING AFTER THE TAPPING VALVE

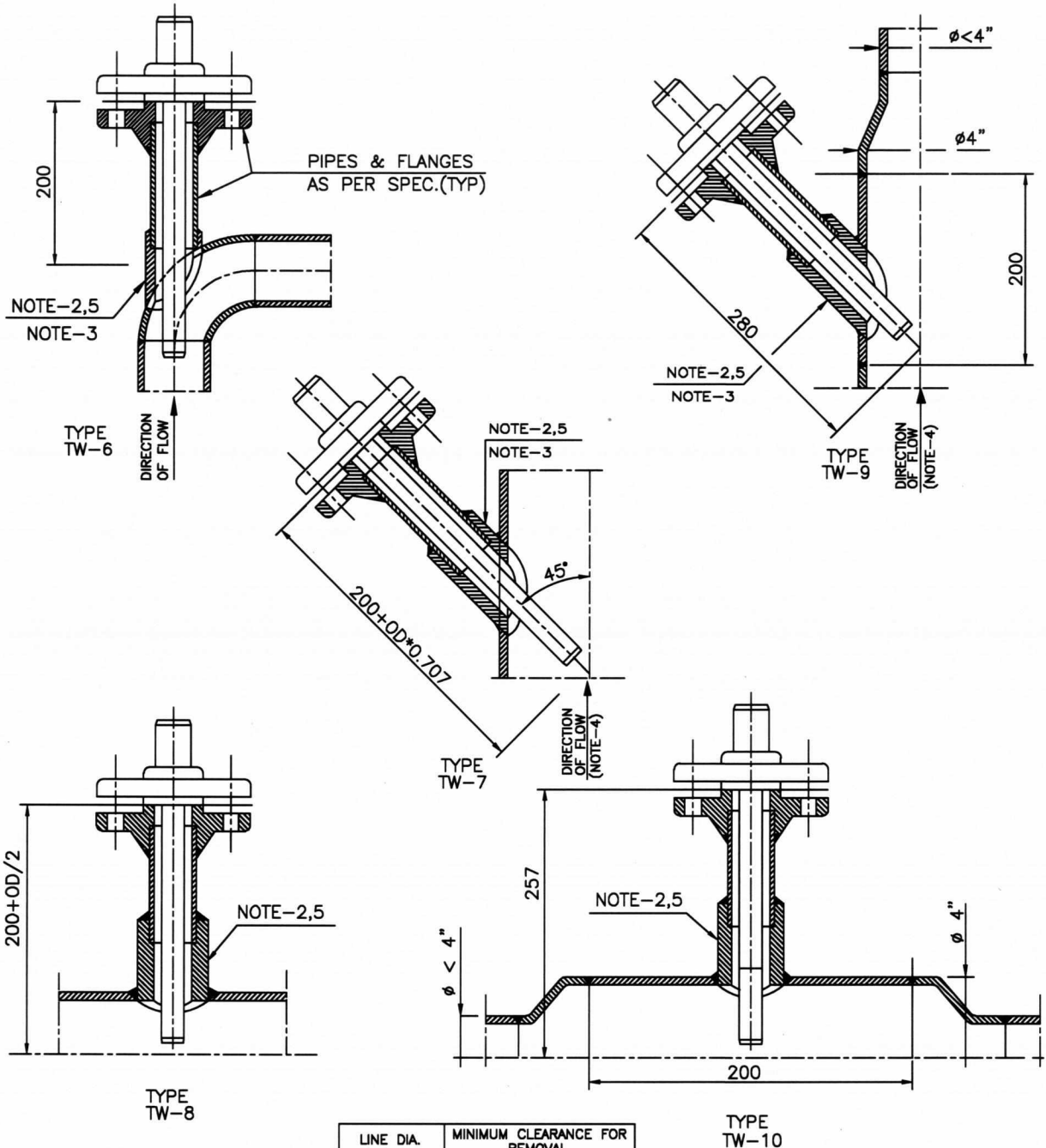
PIPING SCOPE

- TAPPING NIPPLE, COUPLINGS AND VALVES

NOTES :

- ORIFICE FLANGES IN HORIZONTAL LINES SHALL BE PREFERRED.
- TAPS SHALL BE ORIENTED TO SUIT LOCATION OF INSTRUMENT.
- DELETED.
- IN CASE OF VERTICAL LINES FLOW SHALL BE UPWARDS FOR LIQUIDS CONTAINING VAPOUR & DOWNWARDS FOR WET GASES & STEAM.
- THE ORIENTATION OF TAPPING IN CASE OF DETAILS 4 & 5 SHALL BE AS FOLLOWS:
FOR LIQUID LINES WITH OPERATING TEMPERATURE $\geq 0^{\circ}\text{C}$:
4,8 & 16 BOLT FLANGE - AT 45° TO VERTICAL POINTING DOWNWARDS
12 BOLT FLANGE - AT 60° TO VERTICAL POINTING DOWNWARDS
20 BOLT FLANGE - AT 54° TO VERTICAL POINTING DOWNWARDS.
FOR LIQUID LINES WITH OPER. TEMP. $< 0^{\circ}\text{C}$ AND STEAM AND GAS LINES :
4,8 & 16 BOLT FLANGE - AT 45° TO VERTICAL POINTING UPWARDS,
12 BOLT FLANGE - AT 60° TO VERTICAL POINTING UPWARDS
20 BOLT FLANGE - AT 54° TO VERTICAL POINTING UPWARDS.
- DETAILS 4 & 5 SHALL NOT BE USED FOR PRE-FABRICATED HOOK-UPS.
- FOR CLEARANCE REQUIREMENT AROUND ORIFICE FLANGE REFER EIL STD. 7-44-0504
- FOR DETAILS OF ORIFICE TAPPINGS AND ORIENTATION. REFER EIL STD. 7-52-0005.
- IN CASE OF PRE-FABRICATED HOOKUP, NIPPLE & ISOLATION VALVE SHALL BE SUPPLIED BY PREFABRICATION VENDOR.
- FOR STEAM LINES, DETAIL-1 CAN BE CONSIDERED IN CASE OF SPACE CONSTRAINTS OR AS PER LICENSOR REQUIREMENT.
- FOR LIQUID CRYOGENIC SERVICE VALVE STEM ORIENTATION TO BE AT OR ABOVE 45° ABOVE HORIZONTAL POSITION.

6	20.06.22	REVISED & ISSUED AS STANDARD	PK	SH	GB	SM
5	24.01.20	REVISED & ISSUED AS STANDARD	SG	SH	MI	RKT
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						Approved by



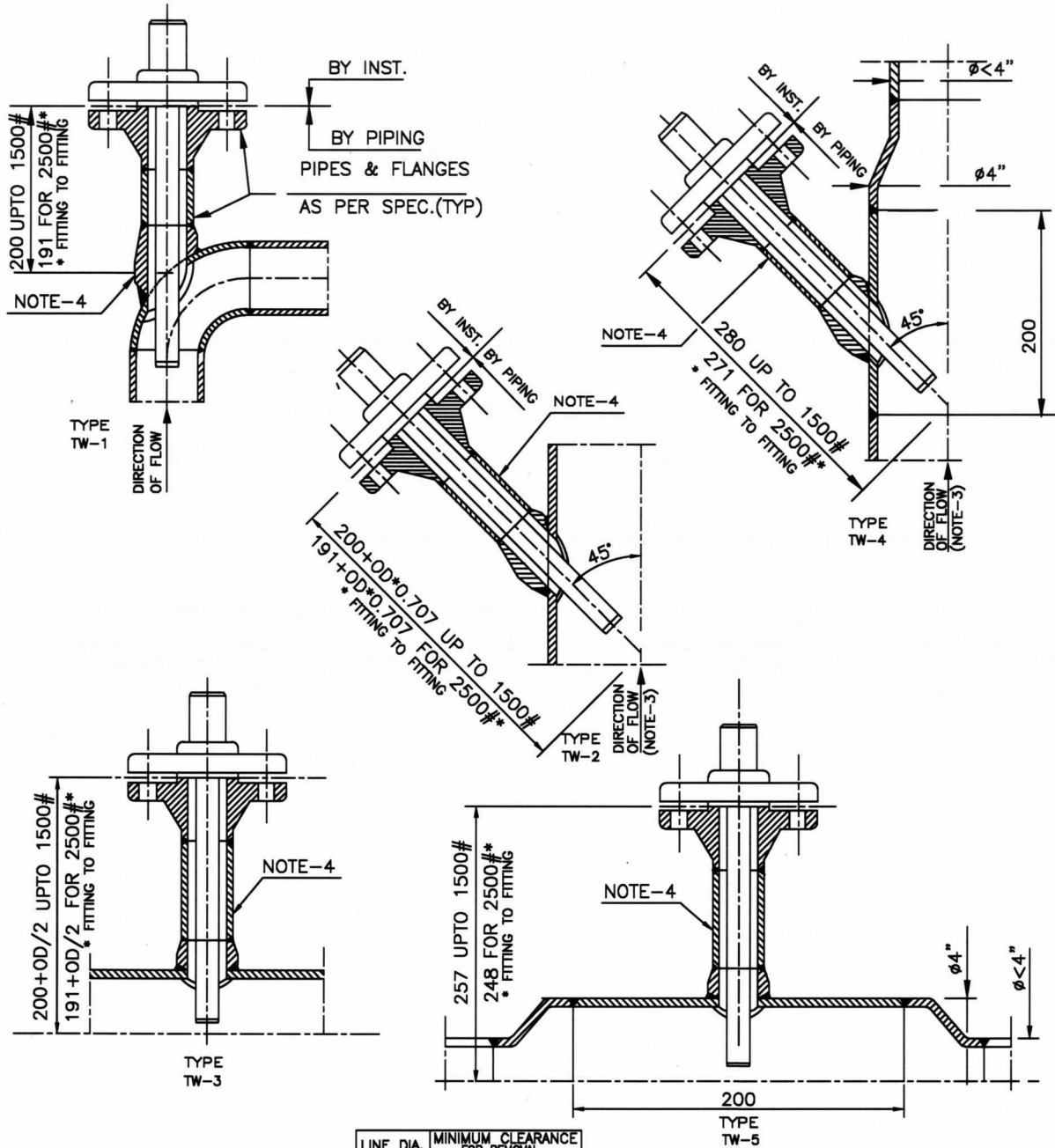
LINE DIA.	MINIMUM CLEARANCE FOR REMOVAL
4"	630
6"	630
8"	670
10"	670
12"	670
14"	670
16"	670
18"	670
20" AND LARGER	750
VESSELS	750

NOTES:-

- 1 BOLTS, NUTS AND GASKETS BY PIPING.
- 2 BRANCH FITTING SHALL BE AS PER PMS
- 3 IF BRANCH FITTING IS A COUPLING, IT SHALL BE OF SPECIAL LENGTH.
- 4 THE ARRANGEMENT CAN BE USED FOR DOWNWARD FLOW ALSO, IF CONFIRMED BY INSTRUMENTATION.
- 5 SIZE AND DETAIL OF TAPPING SHALL BE AS PER APPLICABLE SPECIFICATION FOR CLADDED/LINED/JACKETED PIPING.

- OD : OUTSIDE DIA IN MM
- TYPE TW-6 : ELBOW MIN. 4" DIA. OR LARGER
- TYPE TW-7 : VERTICAL LINE 4" DIA. OR LARGER
- TYPE TW-8 : HORIZONTAL LINE 4" DIA. OR LARGER
- TYPE TW-9 : VERTICAL LINE DIA. LESS THAN 4"
- TYPE TW-10: HORIZONTAL LINE DIA. LESS THAN 4"

6	20.06.22	REVISED & ISSUED AS STANDARD	PK	SH	GB	SM
5	24.01.20	REVISED & ISSUED AS STANDARD	SG	SH	MI	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau
						Approved by



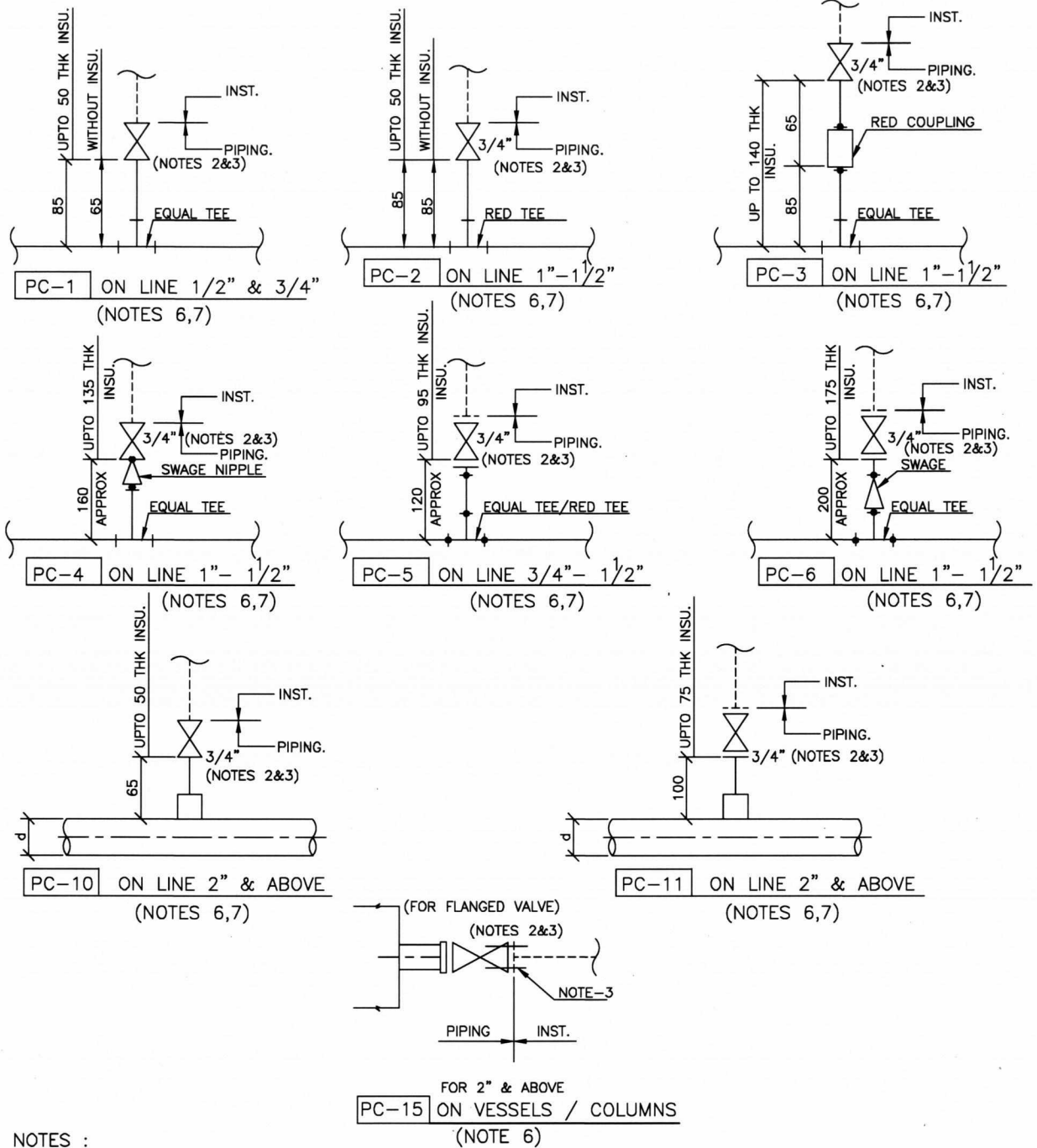
NOTES:-

- 1 BOLTS, NUTS AND GASKETS BY PIPING.
- 2 BRANCH FITTING SHALL BE AS PER PMS.
- 3 THE ARRANGEMENT CAN BE USED FOR DOWNWARD FLOW ALSO, IF CONFIRMED BY INSTRUMENTATION.
- 4 SIZE AND DETAIL OF TAPPING SHALL BE AS PER APPLICABLE SPECIFICATION FOR CLADDED/LINED/JACKETED PIPING.

LINE DIA.	MINIMUM CLEARANCE FOR REMOVAL
4"	630
6"	630
8"	670
10"	670
12"	670
14"	670
16"	670
18"	670
20" & ABV VESSELS	750

- OD : OUTSIDE DIA IN MM
- TYPE TW-1 : ELBOW MIN. 4" Ø OR LARGER
- TYPE TW-2 : VERTICAL LINE 4" Ø OR LARGER
- TYPE TW-3 : HORIZONTAL LINE 4" Ø OR LARGER
- TYPE TW-4 : VERTICAL LINE DIA. LESS THAN 4"
- TYPE TW-5 : HORIZONTAL LINE DIA. LESS THAN 4"

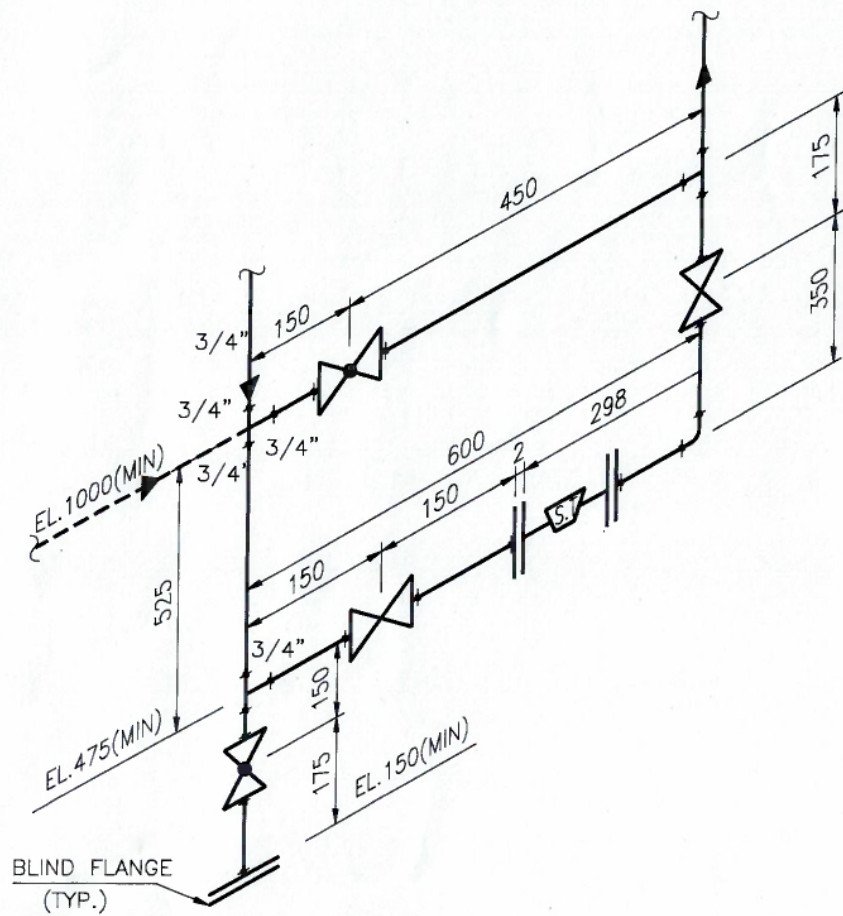
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
6	20.06.22	REVISED & ISSUED AS STANDARD	PK	SH	GB	SM
5	24.01.20	REVISED & ISSUED AS STANDARD	SG	SH	MI	RKT



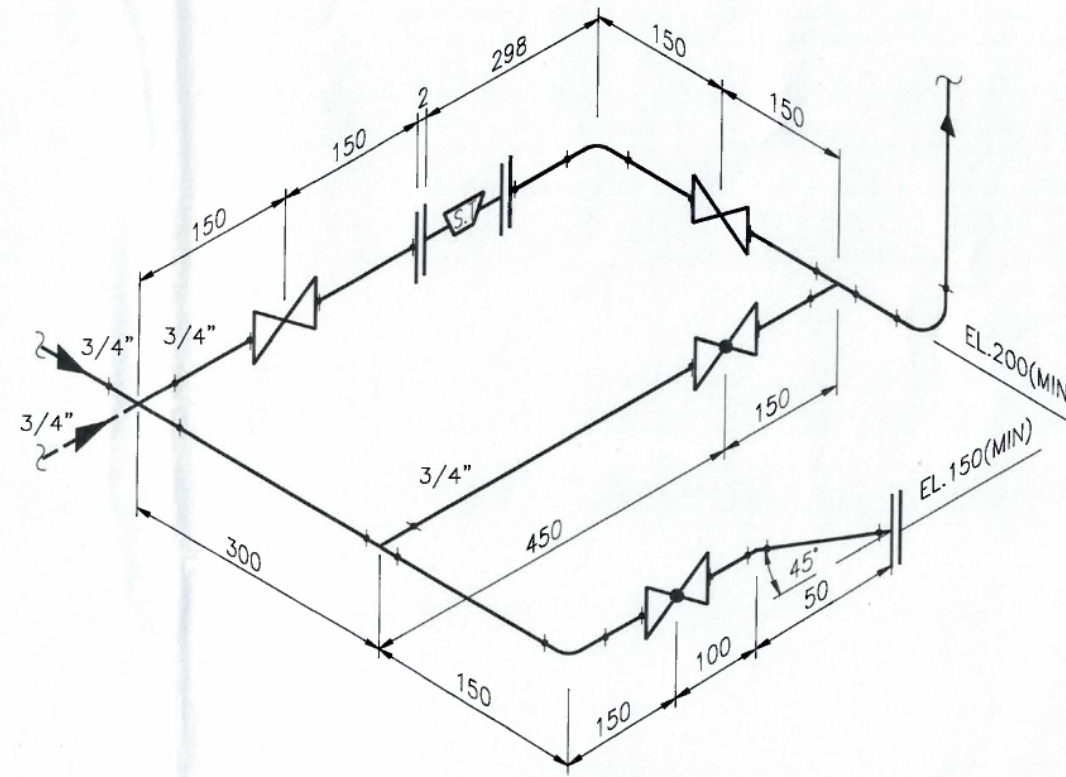
NOTES :

1. THE INDICATED DIMENSIONS ARE MINIMUM WHICH ALSO COVER INSULATION TO THE EXTENT SHOWN ABOVE. IN CASE OF HIGHER THICKNESS OF INSULATION THAN INDICATED THE DIFFERENCE SHALL BE ADDED IN THE DIMENSIONS SHOWN ABOVE.
2. PRESSURE TAPPING SHALL BE PROVIDED WITH VALVE SIMILAR TO LINE ISOLATION VALVE (GATE, BALL OR PLUG VALVE ETC., WITH FLGD, S.W. OR SCR'D ENDS) UNLESS OTHERWISE SPECIFIED IN PMS, TEE(EQUAL OR REDUCING)/HALF COUPLING(S.W. OR SCR'D)/STUB IN/SOCKOLET/WELDOLET SHALL BE AS PER PIPING MATERIAL SPECS. DOUBLE ISOLATION VALVE SHALL BE USED FOR CLASS 900 & ABOVE.
3. IN CASE OF FLGD VALVES BOLTING & GASKET ON BOTH SIDES OF VALVE SHALL BE IN PIPING SCOPE
4. IN CASE OF TAPPING PROVIDED OTHER THAN INDICATED IN THIS STD FOR LAYOUT REASONS DETAILED DIMENSIONS WILL BE CALLED OUT.
5. IN CASE OF PRE-FABRICATED HOOKUP, ISOLATION VALVE WITH NIPPLE SHALL BE SUPPLIED BY PREFABRICATION VENDOR HOWEVER, 3/4" WELDOLET/SOCKOLET/HALF COUPLING/EQUAL TEE/RED. TEE ETC. AS PER PMS SHALL BE IN PIPING SCOPE.
6. VALVE STEM ORIENTATION TO BE AT OR ABOVE 45° ABOVE THE HORIZONTAL POSITION IN LIQUID CRYOGENIC SERVICE.
7. FOR LIQUID CRYOGENIC SERVICE ADDITIONAL 45°/90° ELBOW TO BE INTRODUCED TO ENSURE REQUIREMENT GIVEN IN NOTE-6 IS MET.

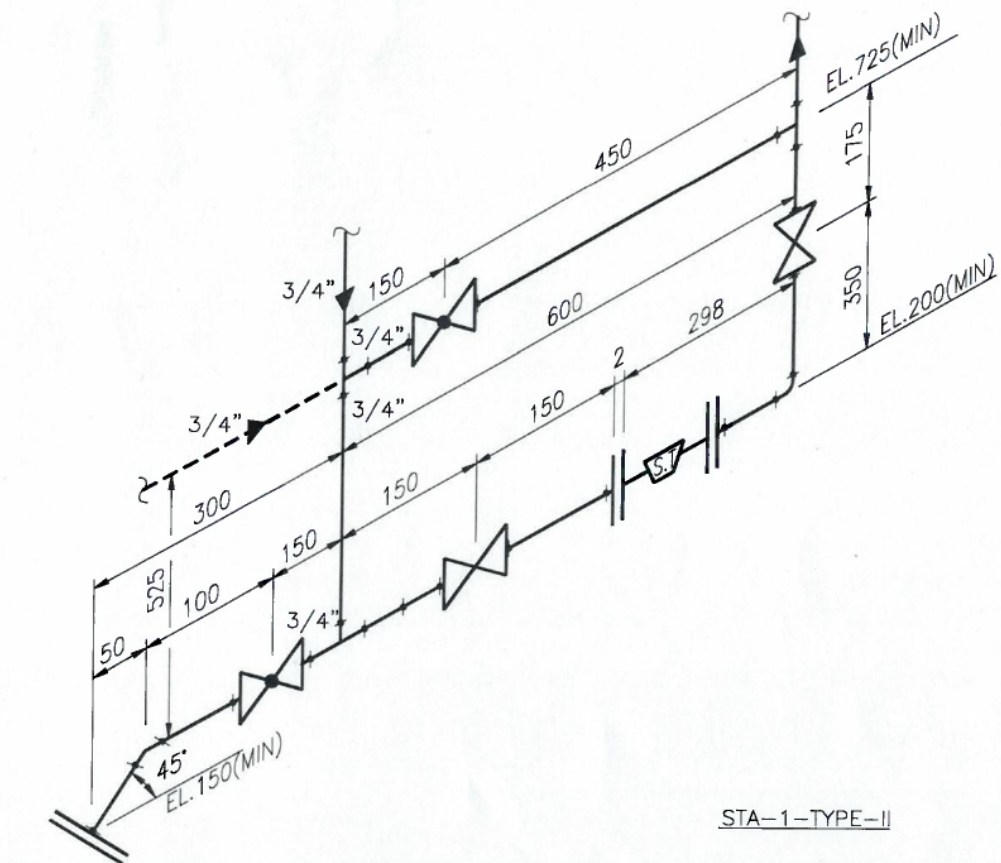
6	20.06.22	REVISED & ISSUED AS STANDARD	PK	SH	GB	SM
5	24.01.20	REAFFIRMED & ISSUED AS STANDARD	SG	SH	MI	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
Approved by						



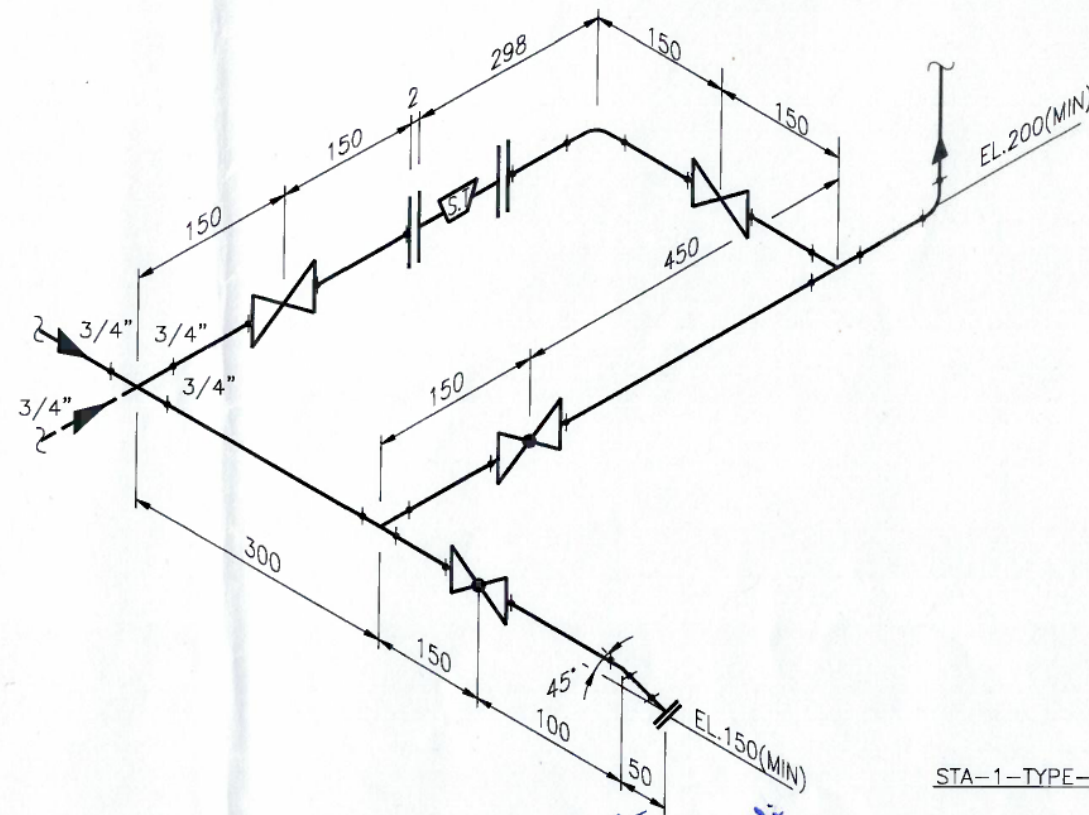
STA-1-TYPE-I



STA-1-TYPE-III



STA-1-TYPE-II



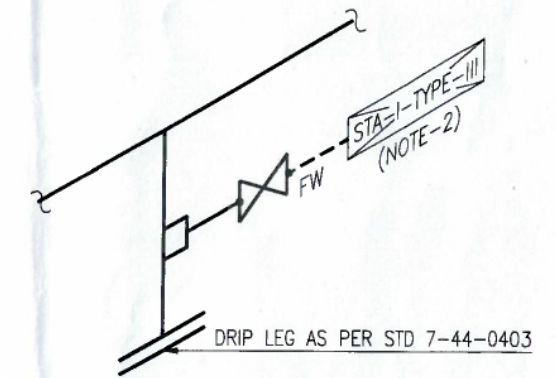
STA-1-TYPE-IV

NOTE-

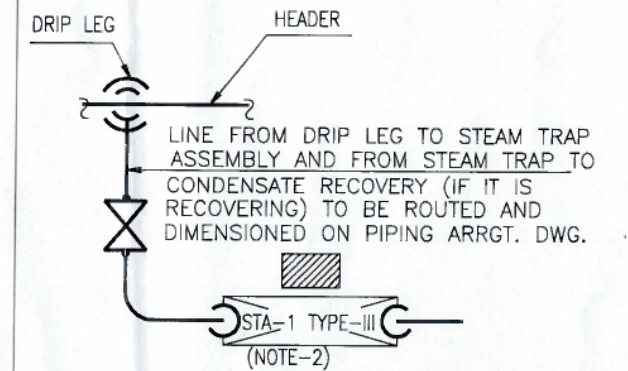
- 1 INPUT CODE-STA1/211.(APPLICABLE UPTO CLASS 600 ONLY)
- 2 COMPACT STEAM TRAP ASSEMBLY WITH BREAK UP FLANGES SHALL BE USED FOR UPTO CLASS 600 RATING UNLESS OTHERWISE AGREED.
3. DOUBLE VALVES SHALL BE PROVIDED IN PLACE OF SINGLE VALVE SHOWN IN FIGURES FOR CLASS 900 AND ABOVE.

SYMBOL OF REPRESENTATION

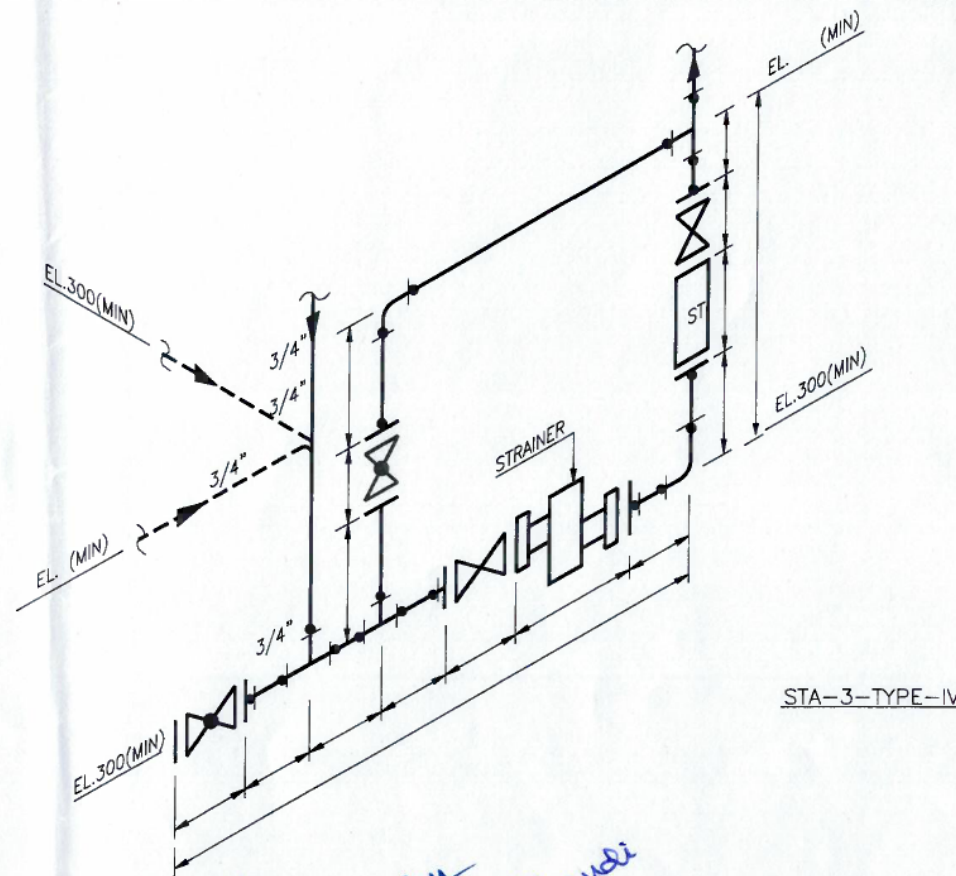
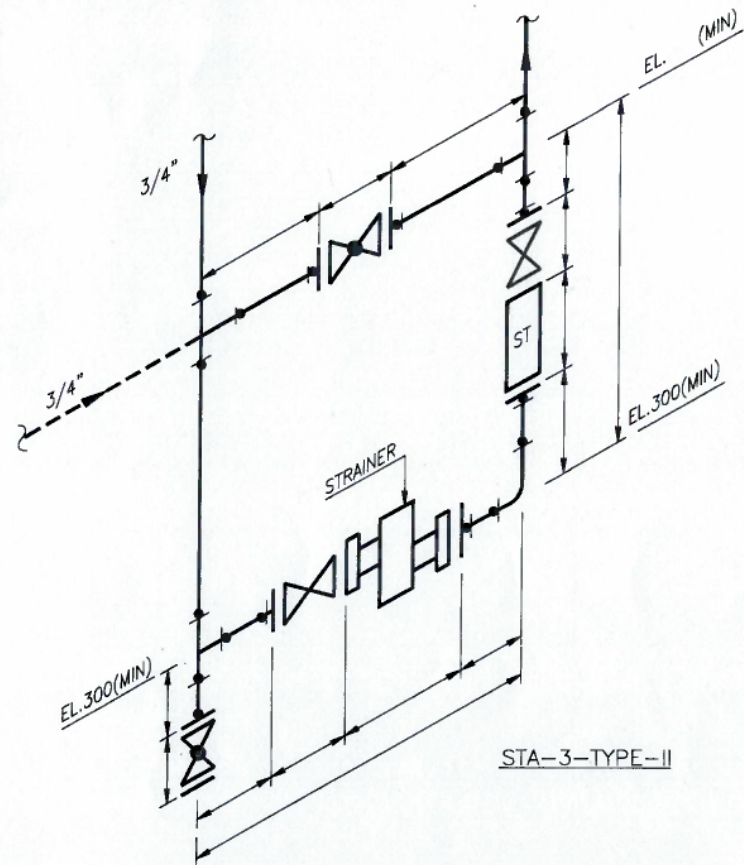
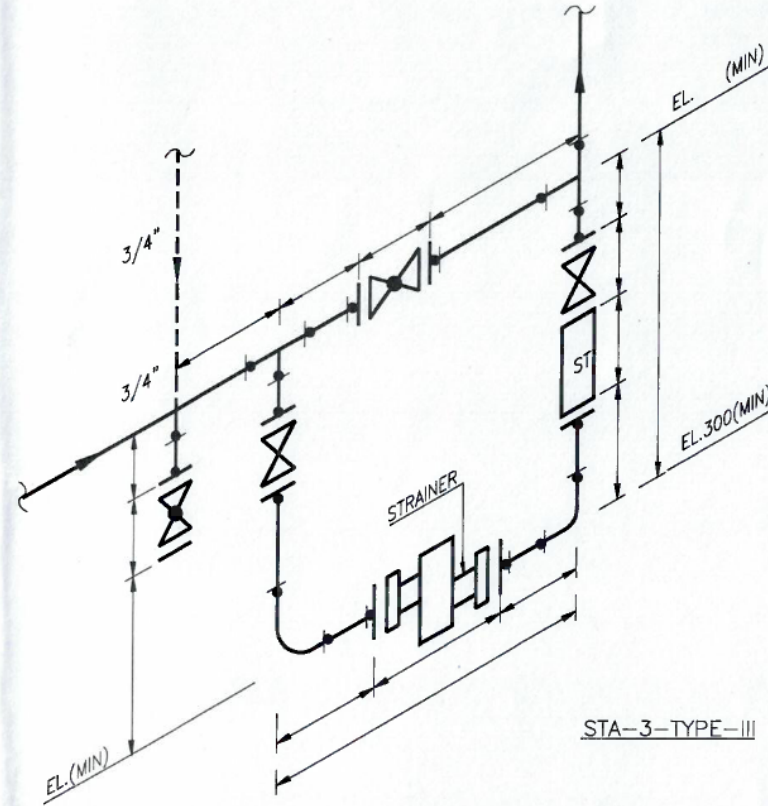
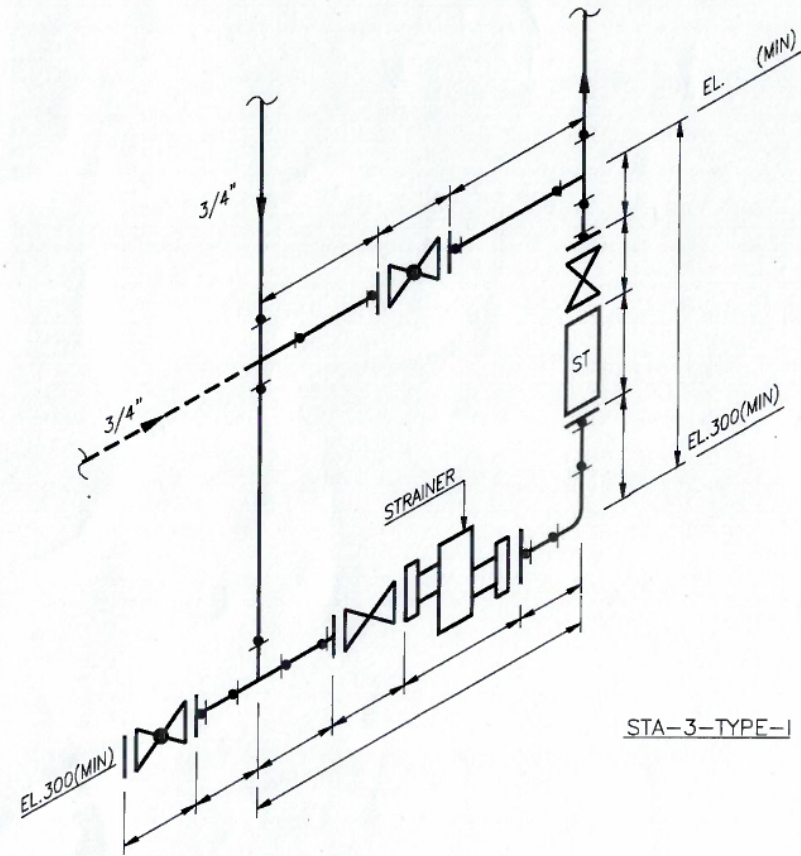
(a) IN ISOMETRIC



(b) IN ARRANGEMENT DWG.



7	12.09.2025	REVISED AND ISSUED AS STANDARD	glsrsg	mpk	sh	MN
6	30.12.2020	REVISED AND ISSUED AS STANDARD	SG	SH	GB	SM
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	

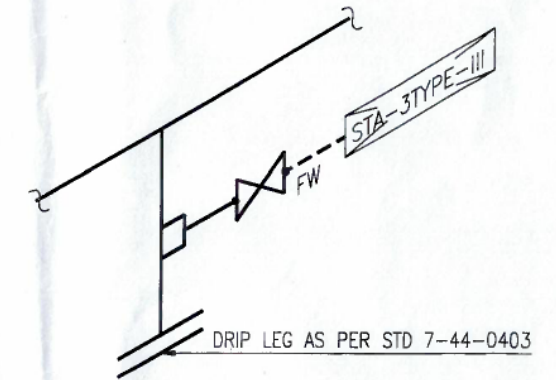


NOTES:-

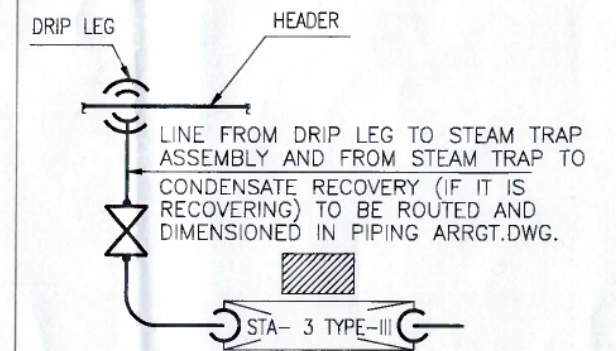
1. INPUT CODE STA 3/213(APPLICABLE UPTO CLASS 600 ONLY)
2. TRAP TYPE IS INVERTED BUCKET. BOTTOM INLET/TOP OUTLET WITH SEPARATE STRAINER AS PER JOB SPECIFICATION
3. DOUBLE VALVES SHALL BE PROVIDED IN PLACE OF SINGLE VALVE SHOWN IN FIGURES FOR CLASS 900 AND ABOVE.

SYMBOL OF REPRESENTATION

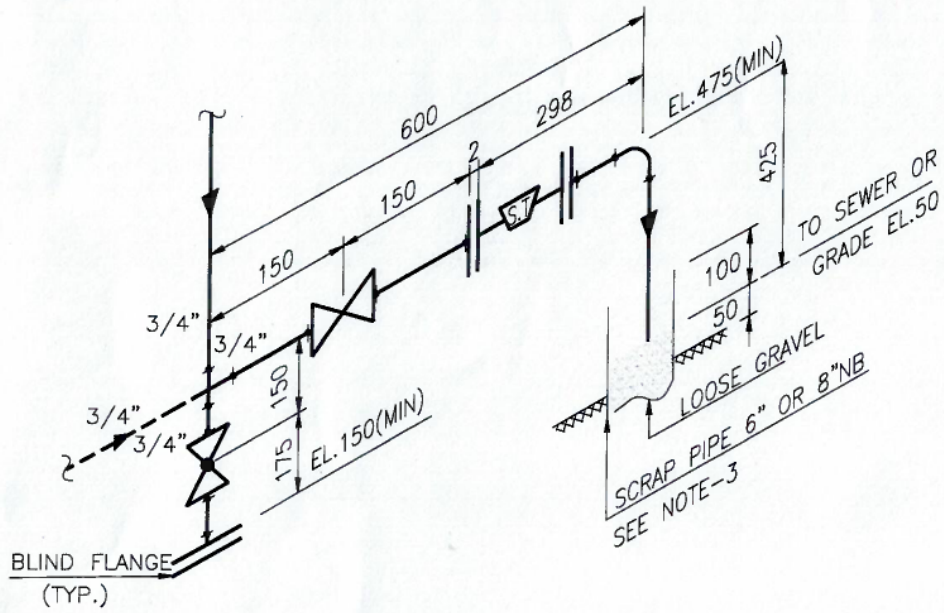
(a) IN ISOMETRIC



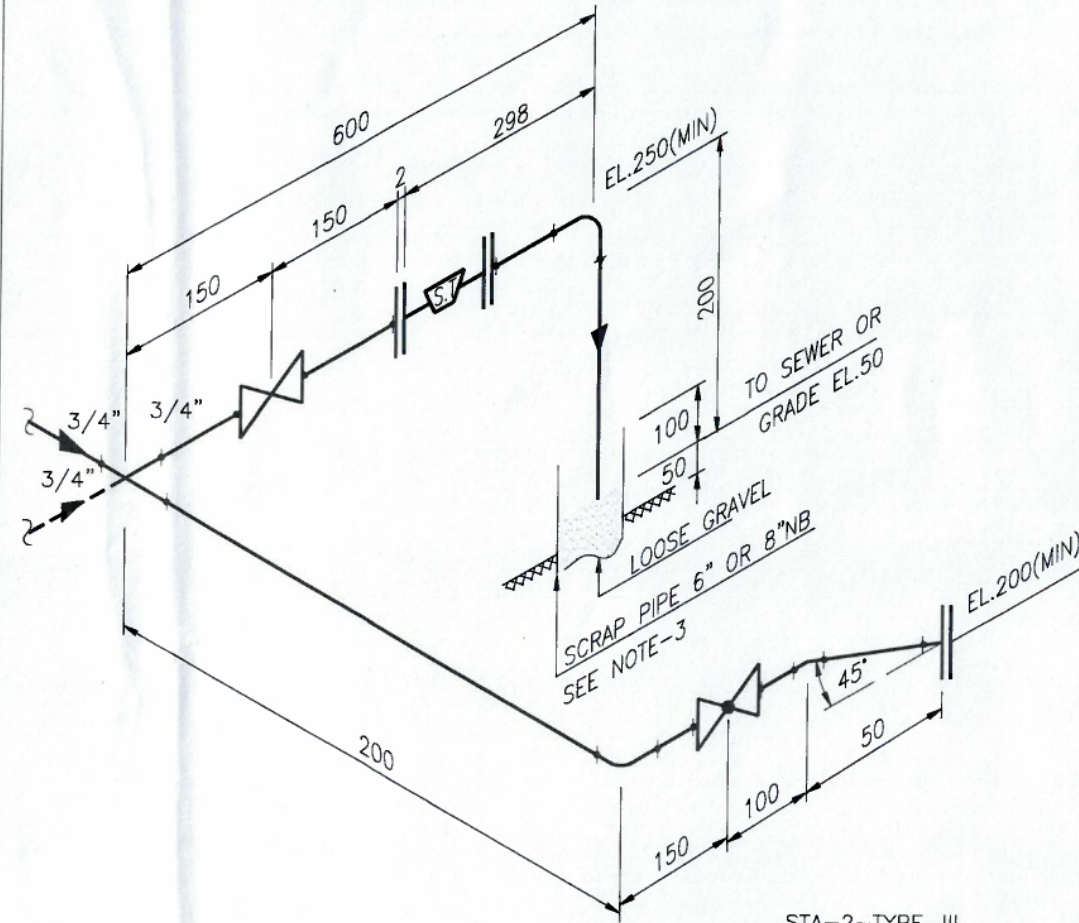
(b) IN ARRANGEMENT DRG.



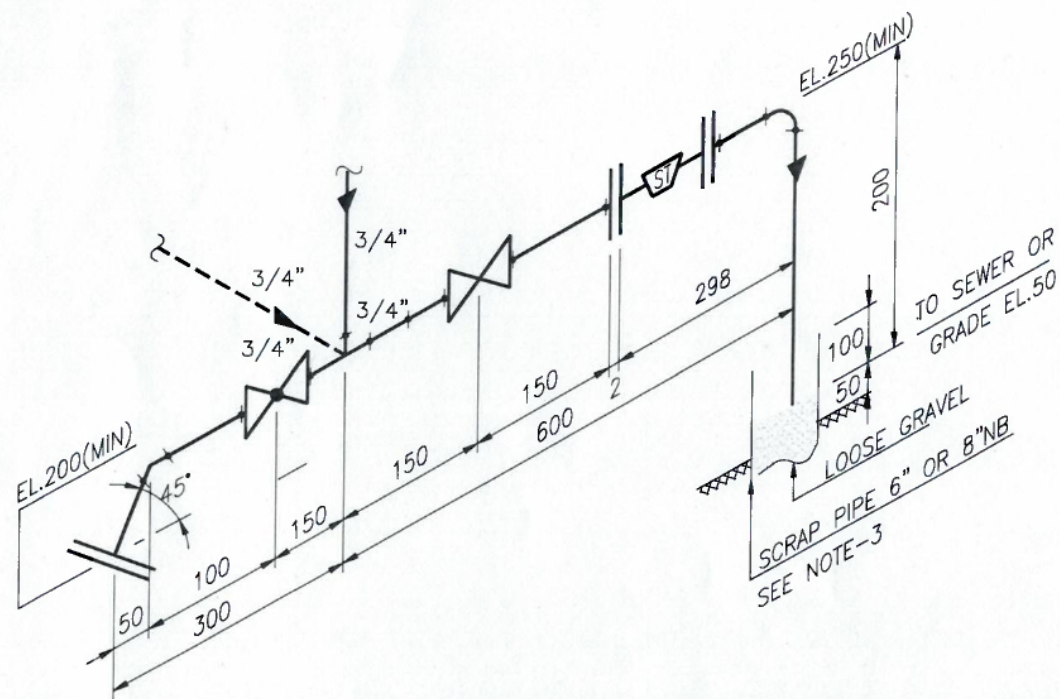
7	12.09.2025	REVISED AND ISSUED AS STANDARD	SH SRG	PK	SH	MN
6	30.12.2020	REVISED AND ISSUED AS STANDARD	SG	SH	GB	SM
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
			Approved by			



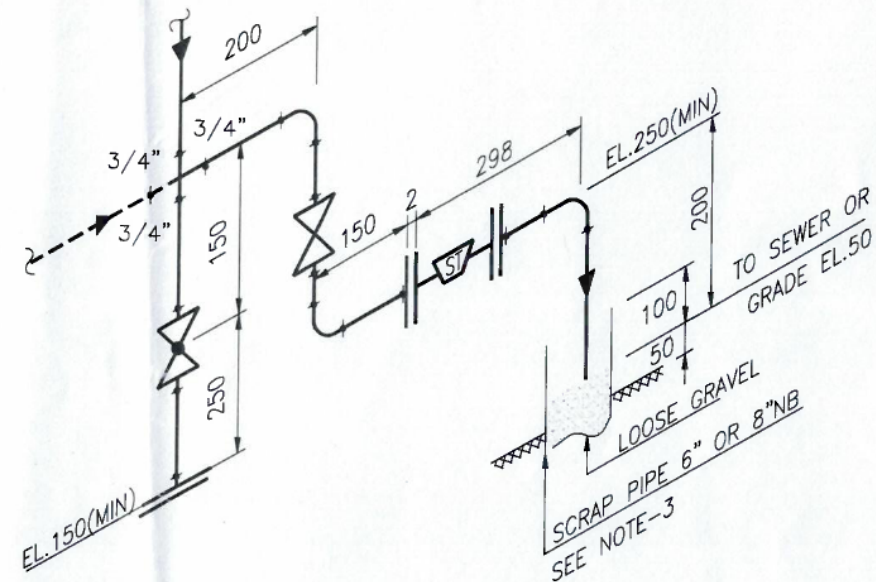
STA-2-TYPE-I



STA-2-TYPE-III



STA-2-TYPE-II



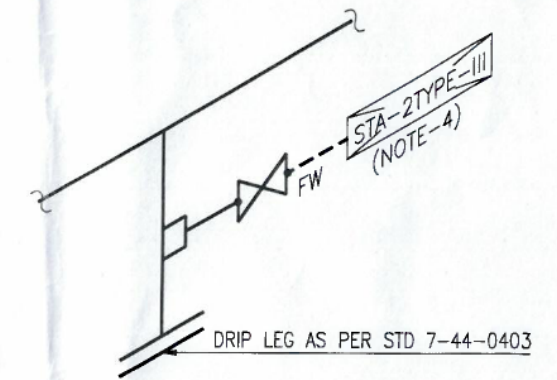
STA-2-TYPE-IV

NOTES:-

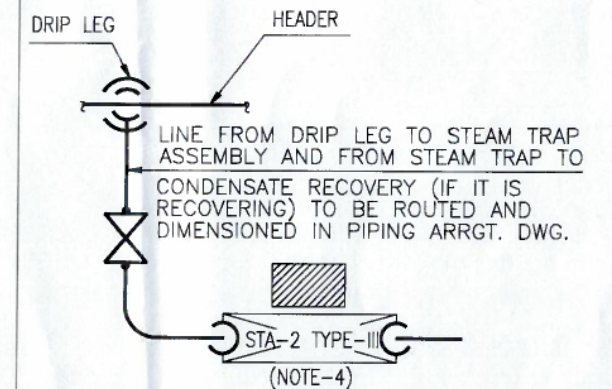
- 1 STEAM TRAP 3/4" S.W, TD TRAP WITH INTEGRAL STRAINER
- 2 INPUT CODE- STA 2/212(APPLICABLE UPTO CLASS 600 ONLY)
- 3 SCRAP PIPE TO BE PROVIDED FOR OFF SITE FOR LOCATION WITH NO DITCHES NEARBY AND AREAS WHICH ARE NOT PAVED FOR UNITS AND OTHER PAVED AREAS, DRAIN LINES TO O.W.S. FUNNEL LOCATED NEAREST TO MANIFOLD (FIELD RUN)
- 4 COMPACT STEAM TRAP ASSEMBLY WITH BREAK UP FLANGES SHALL BE USED FOR UPTO CLASS 600 RATING. UNLESS OTHERWISE AGREED.
5. DOUBLE VALVES SHALL BE PROVIDED IN PLACE OF SINGLE VALVE SHOWN IN FIGURES FOR CLASS 900 AND ABOVE.

SYMBOL OF REPRESENTATION

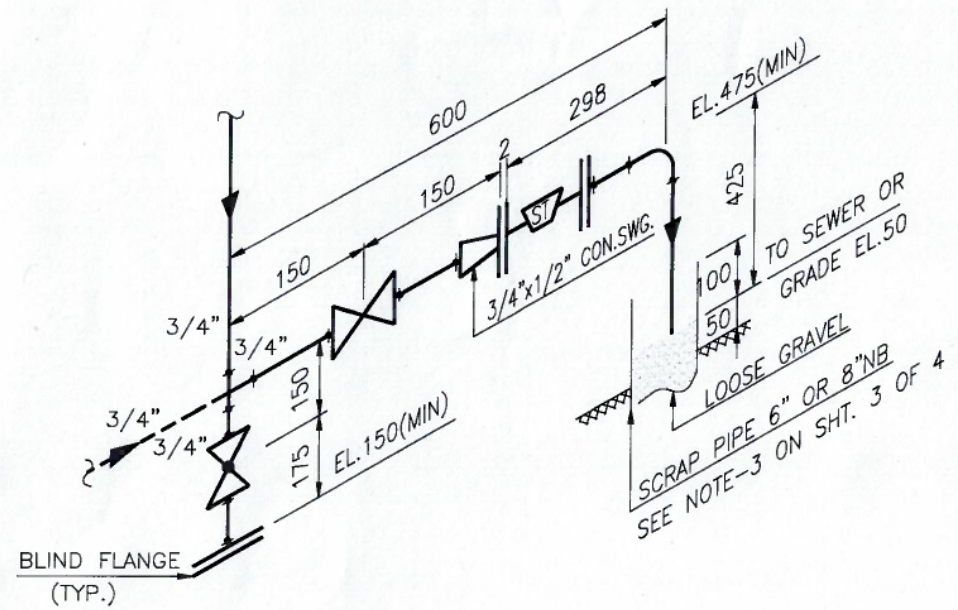
(a) IN ISOMETRIC



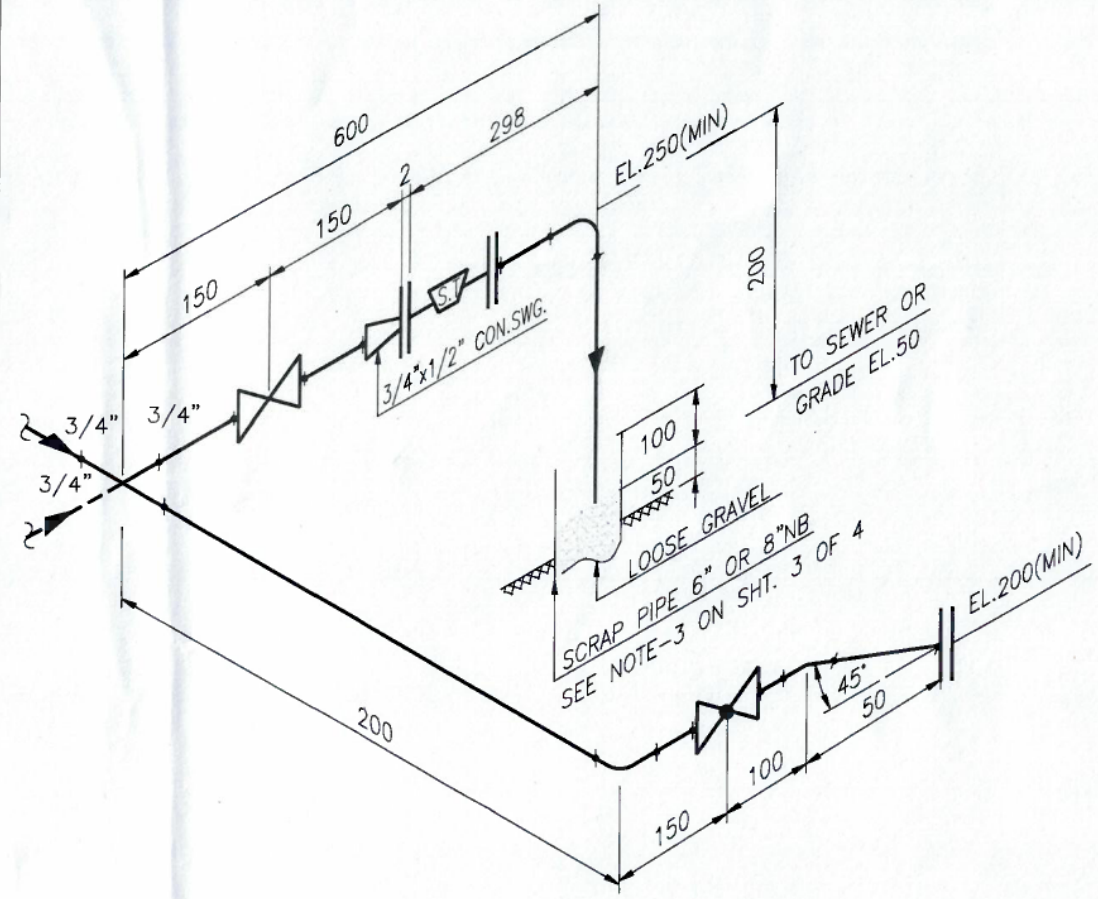
(b) IN ARRANGEMENT DRG.



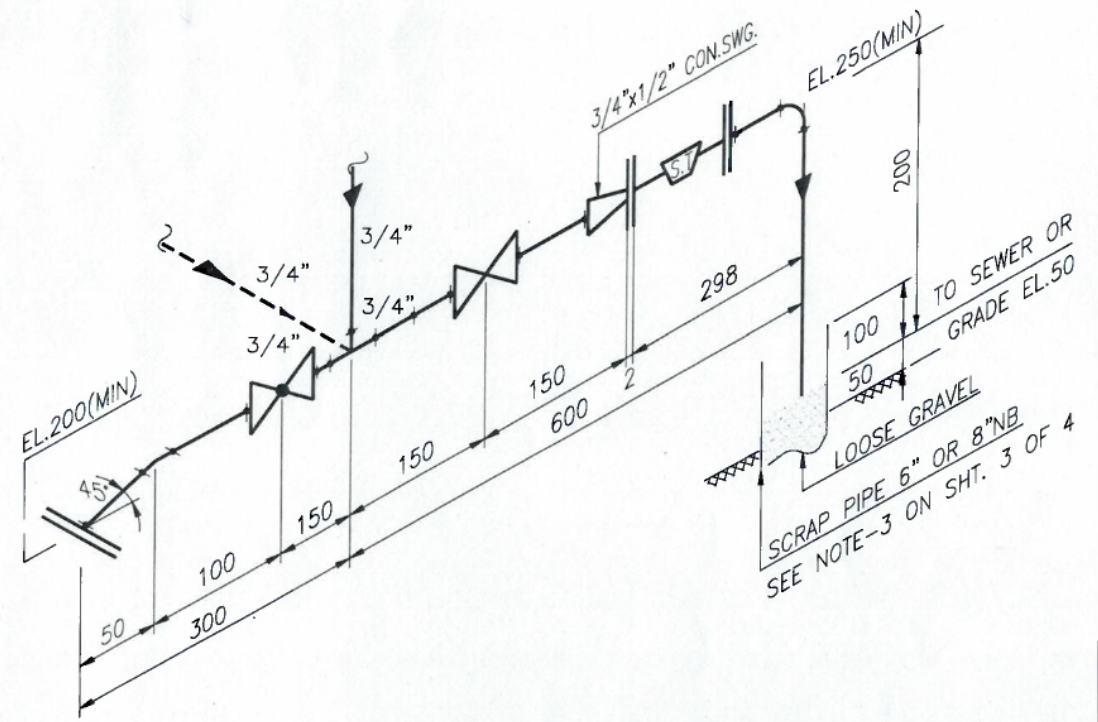
7	12.09.2025	REVISED AND ISSUED AS STANDARD	SG	PK	SH	MN
6	30.12.2020	REVISED AND ISSUED AS STANDARD	SG	SH	GB	SM
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	



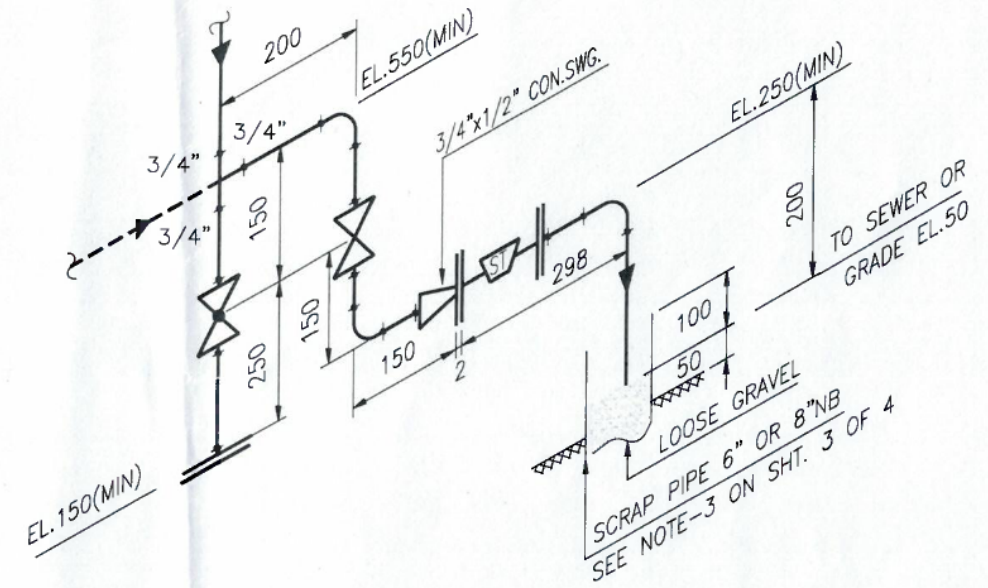
STA-9-TYPE-I



STA-9-TYPE-III



STA-9-TYPE-II



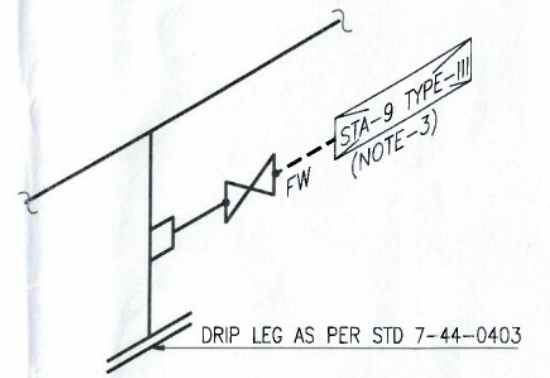
STA-9-TYPE-IV

NOTES:-

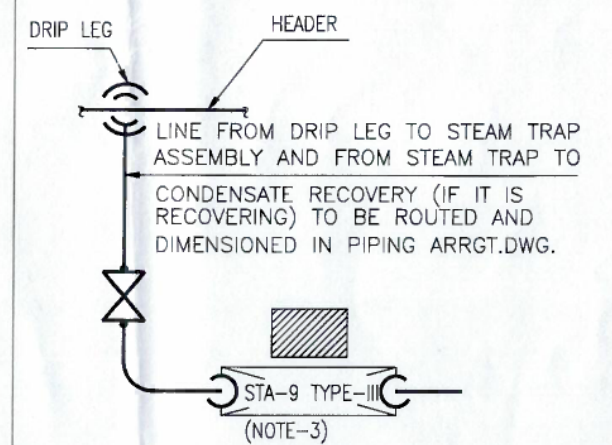
- 1 STEAM TRAP 1/2" SW TD TRAP WITH INTEGRAL STRAINER.
- 2 INPUT CODE- STA-9/186 (APPLICABLE UPTO CLASS 600 ONLY)
- 3 COMPACT STEAM TRAP ASSEMBLY WITH BREAK UP FLANGES SHALL BE USED FOR UPTO CLASS 600 RATING, UNLESS OTHERWISE AGREED.
4. DOUBLE VALVES SHALL BE PROVIDED IN PLACE OF SINGLE VALVE SHOWN IN FIGURES FOR CLASS 900 AND ABOVE.

SYMBOL OF REPRESENTATION

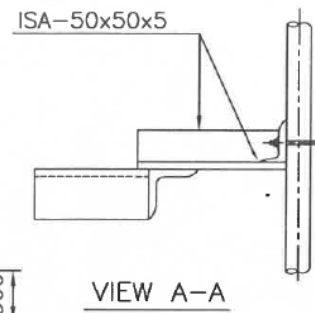
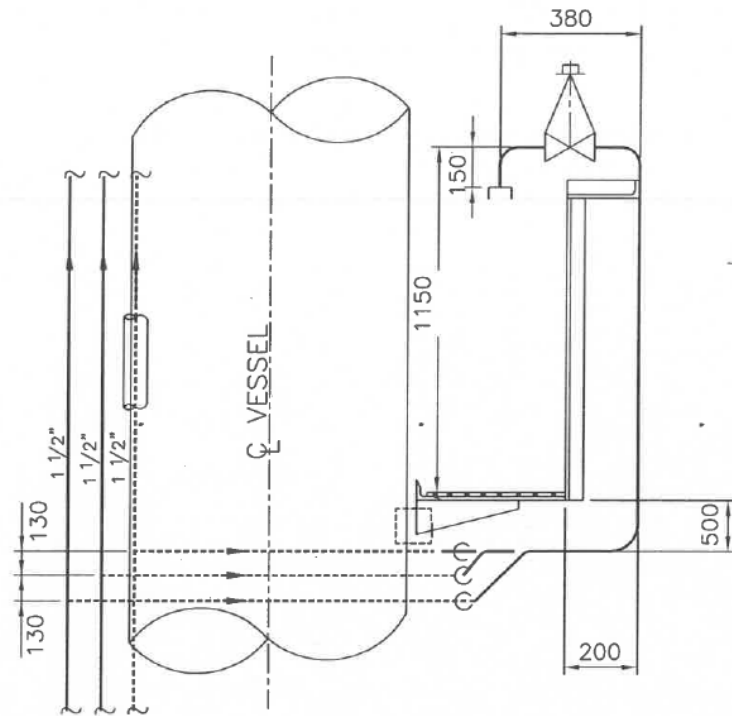
(a) IN ISOMETRIC



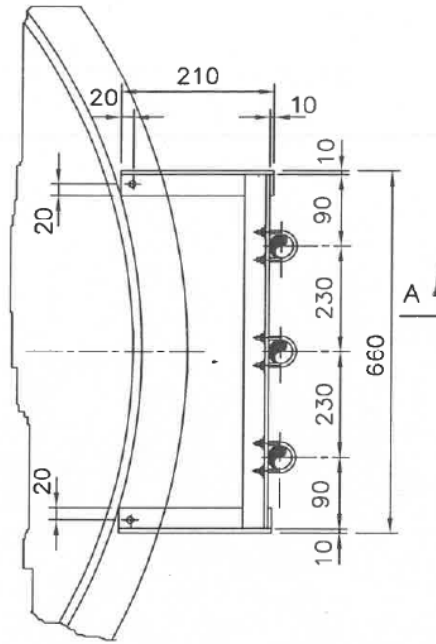
(b) IN ARRANGEMENT DWG.



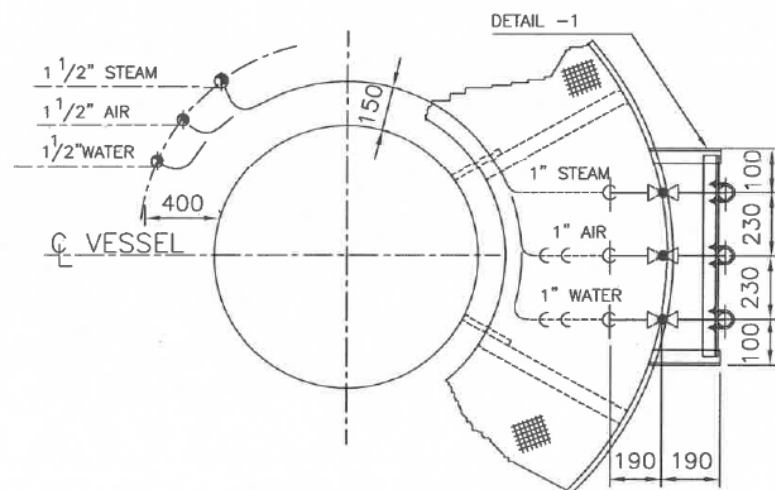
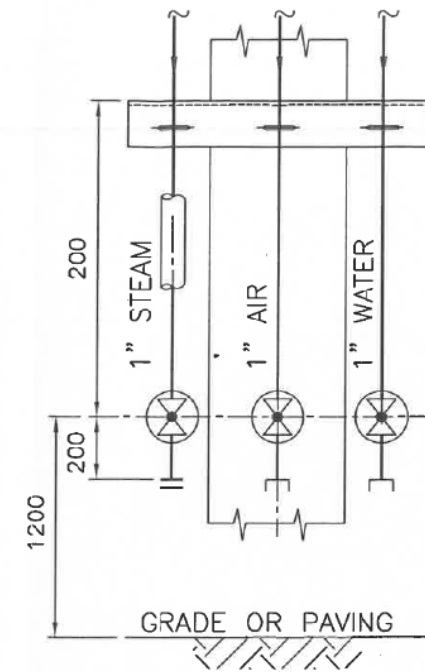
7	12.09.2025	REVISED AND ISSUED AS STANDARD	glrSRG	PK	SH	MN
6	30.12.2020	REVISED AND ISSUED AS STANDARD	SG	SH	GB	SM
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convener	Stds. Bureau Chairman
					Approved by	



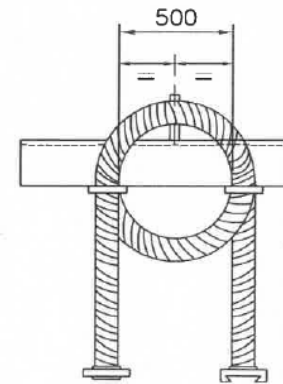
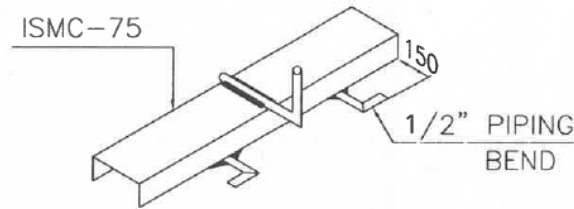
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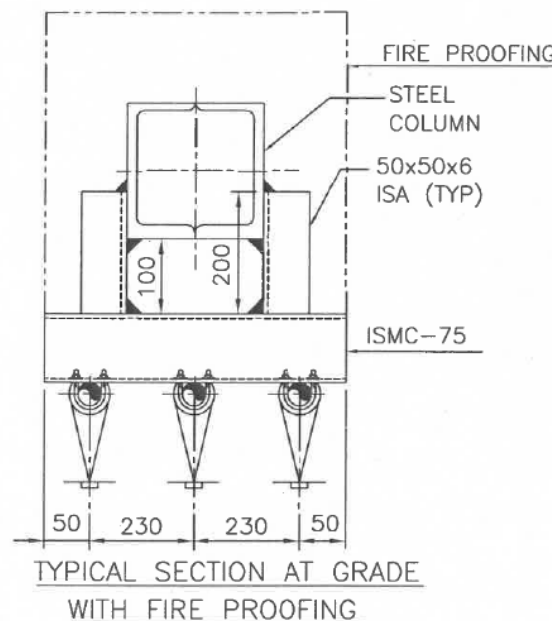
DETAIL -1



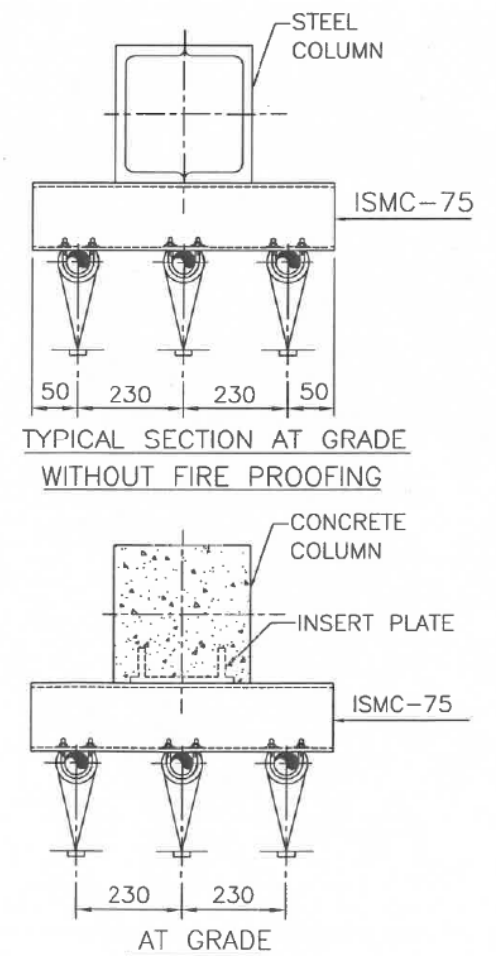
UTILITY HOSE STATION ON VESSEL PLATFORM



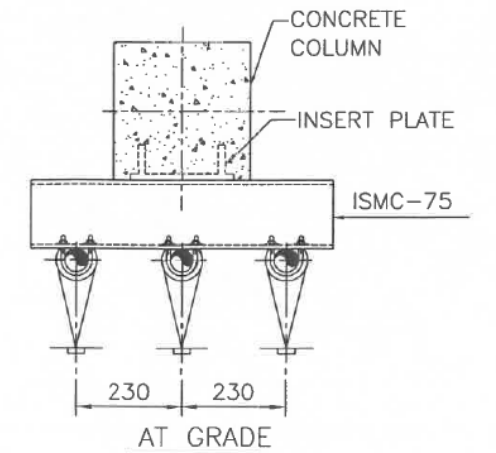
THE HOSE SUPPORT WHEN REQD. SHALL BE MOUNTED AS CLOSE AS POSSIBLE. HOSE STATION ORIENTATION AND POSITION SHALL BE DECIDED CASE BY CASE.



TYPICAL SECTION AT GRADE WITH FIRE PROOFING



TYPICAL SECTION AT GRADE WITHOUT FIRE PROOFING



AT GRADE

NOTES:

- HOSE STATIONS AT GRADE SHALL BE SO LOCATED THAT AREAS TO BE SERVED CAN BE REACHED WITH A 15M HOSE.
- SERVICE POINTS SHALL ALWAYS BE GROUPED STEAM, AIR & WATER IN THAT ORDER FROM LEFT TO RIGHT.
- THE SIZE OF LINES SHALL BE AS GIVEN IN THIS STD. UNLESS OTHERWISE SPECIFIED ON P&ID.

6	31.12.24	REAFFIRMED & ISSUED AS STANDARD	PK	SH	GB	MN
5	06.12.19	REAFFIRMED & ISSUED AS STANDARD	SG	SH	MI	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Approved by	Approved by