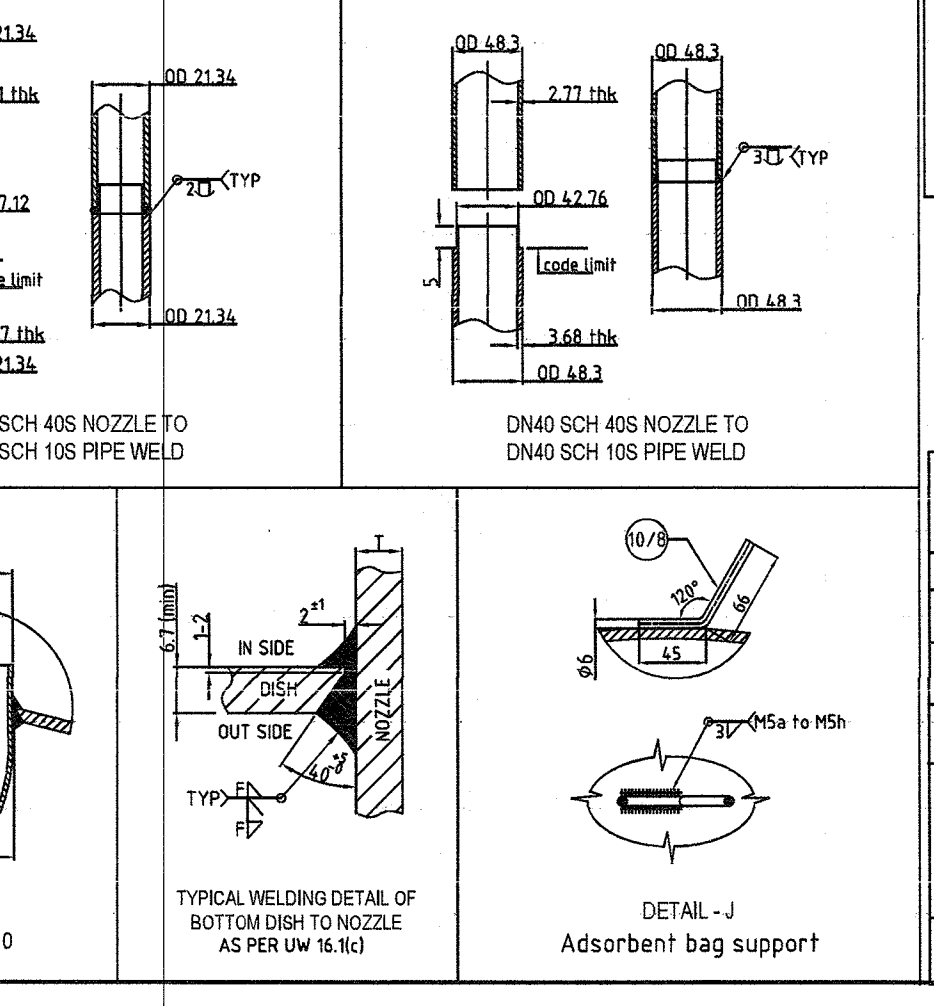
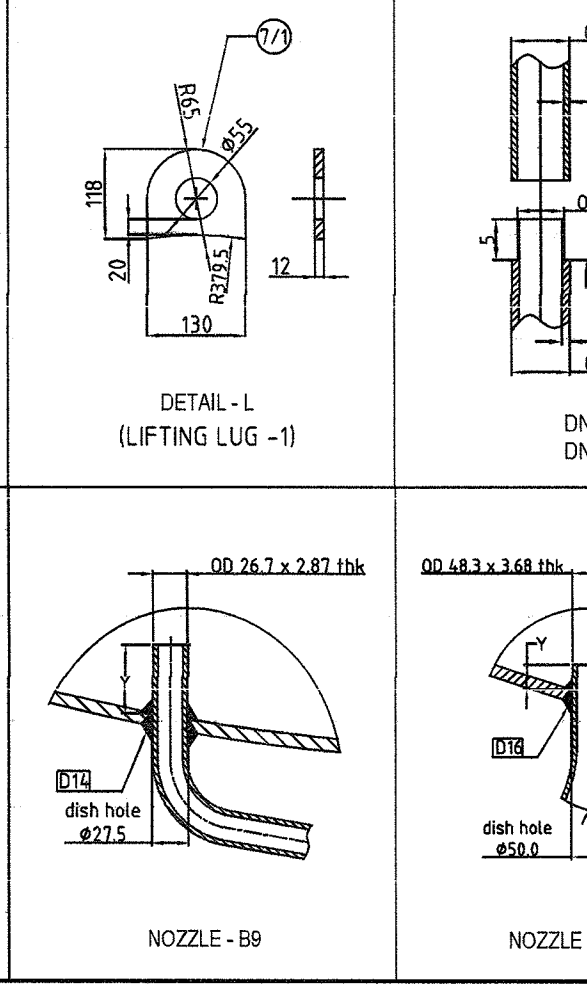
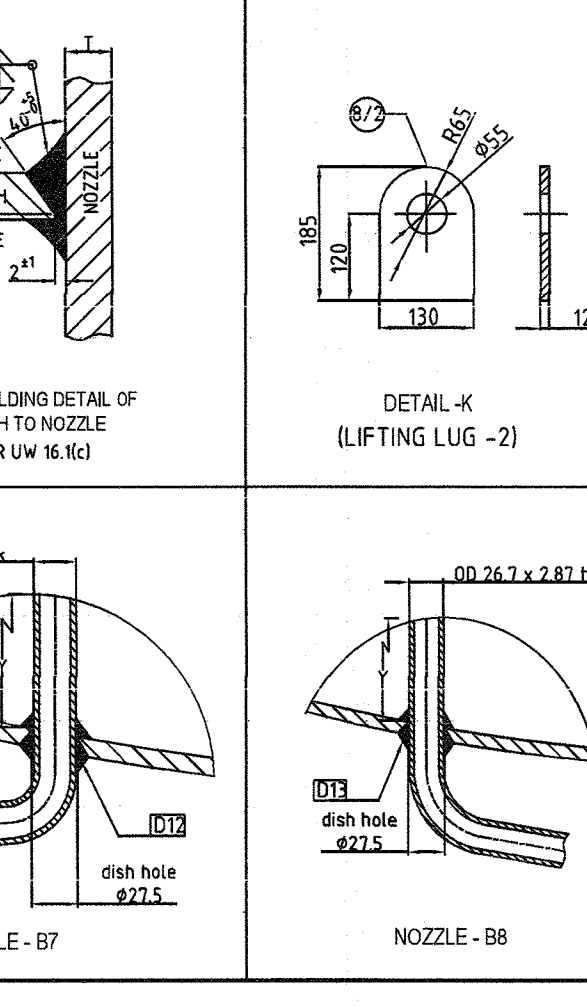
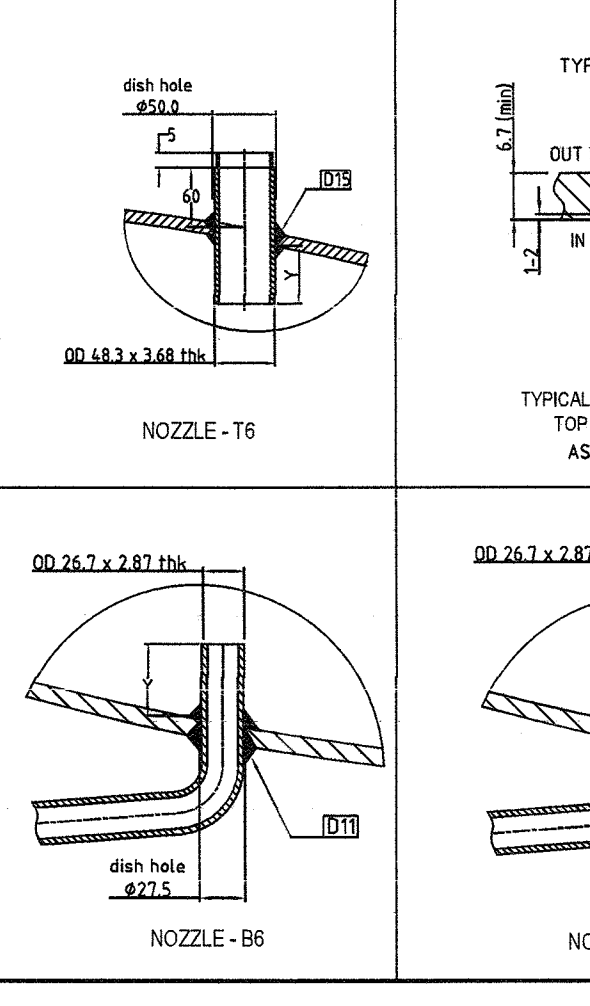
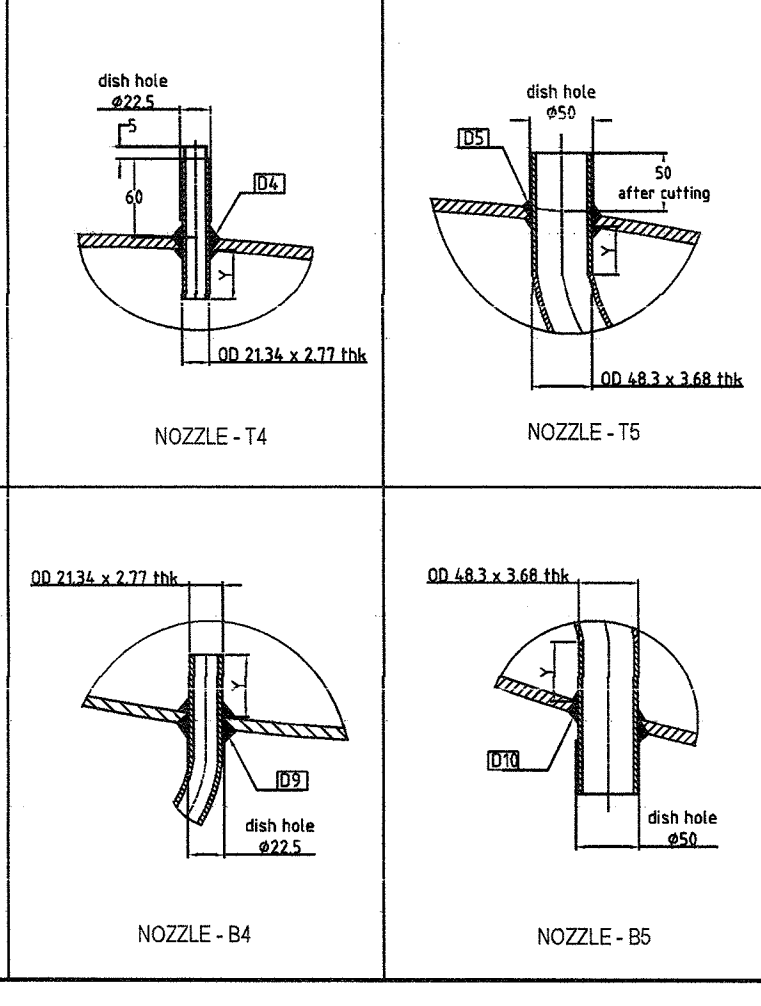
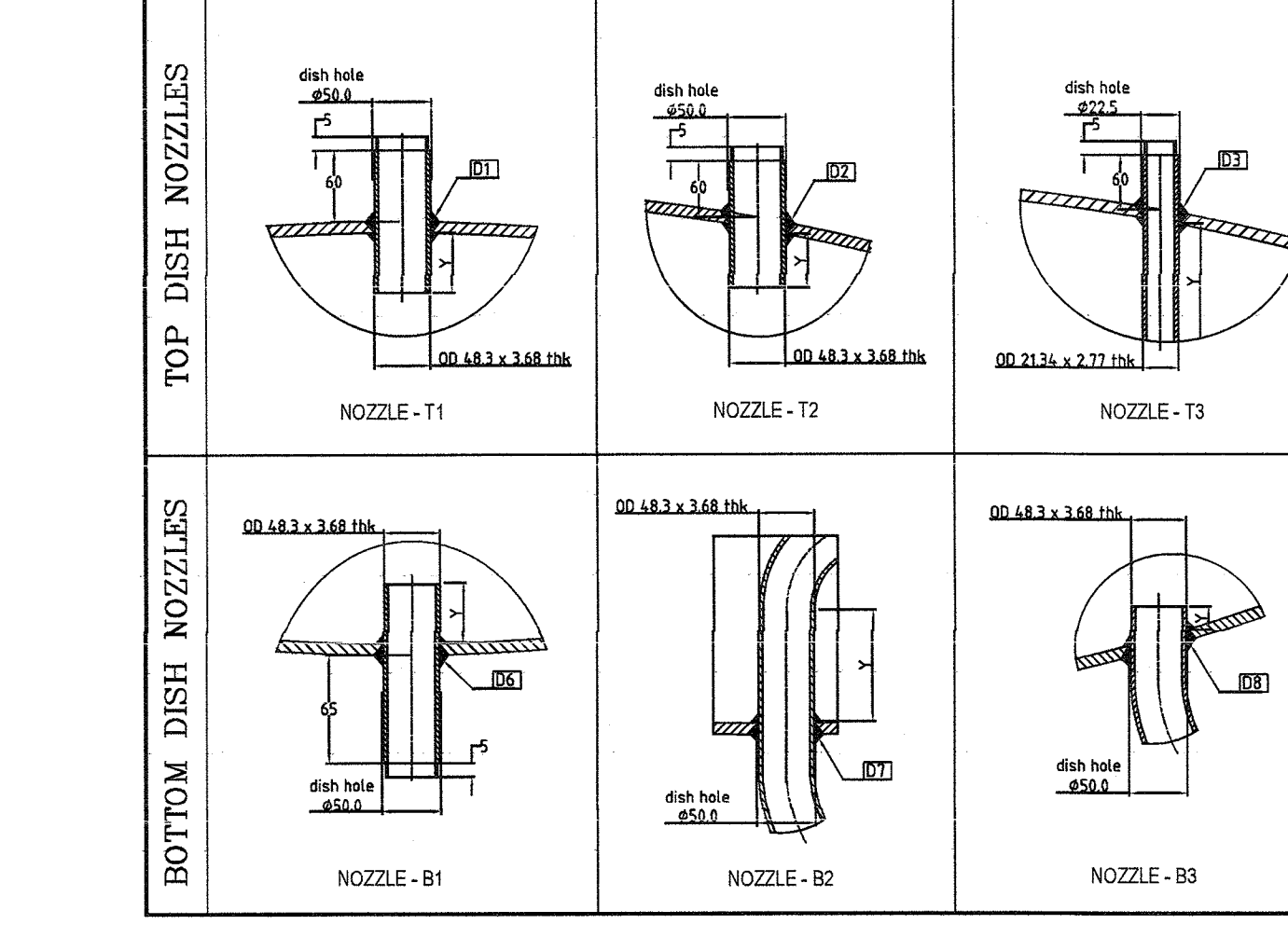
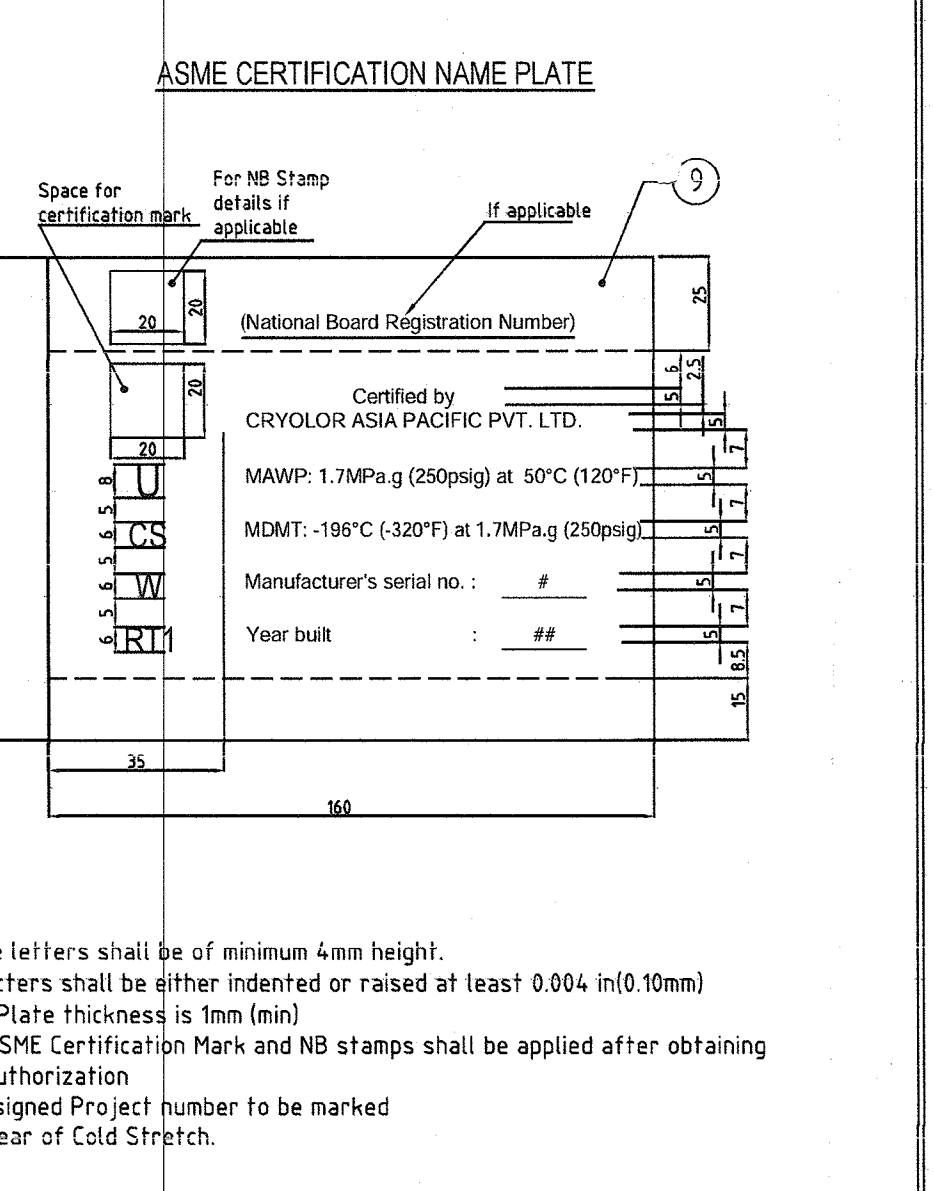
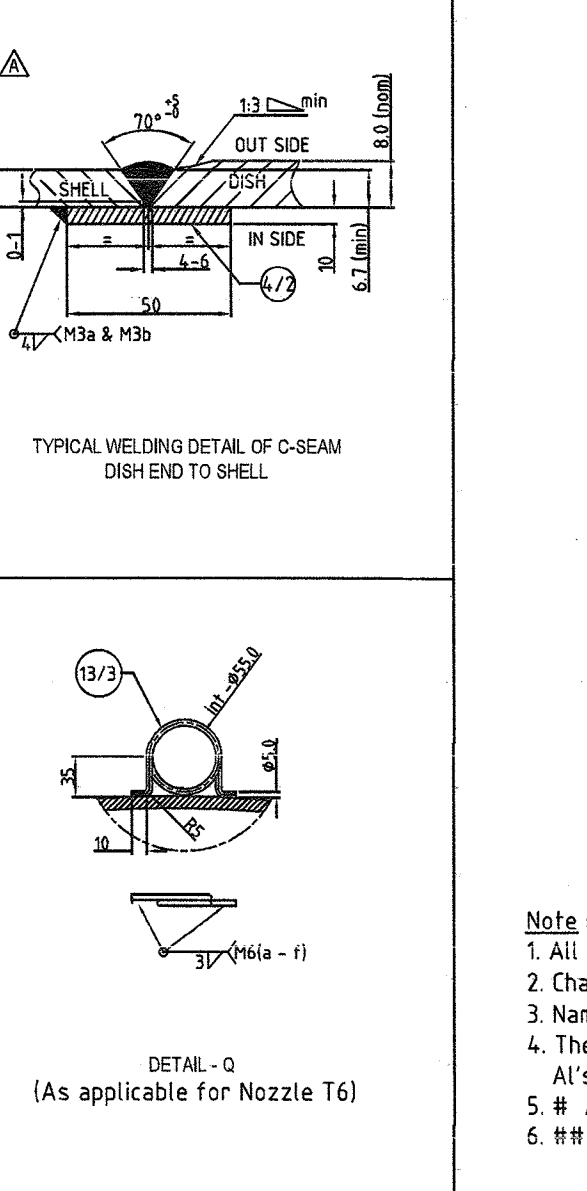
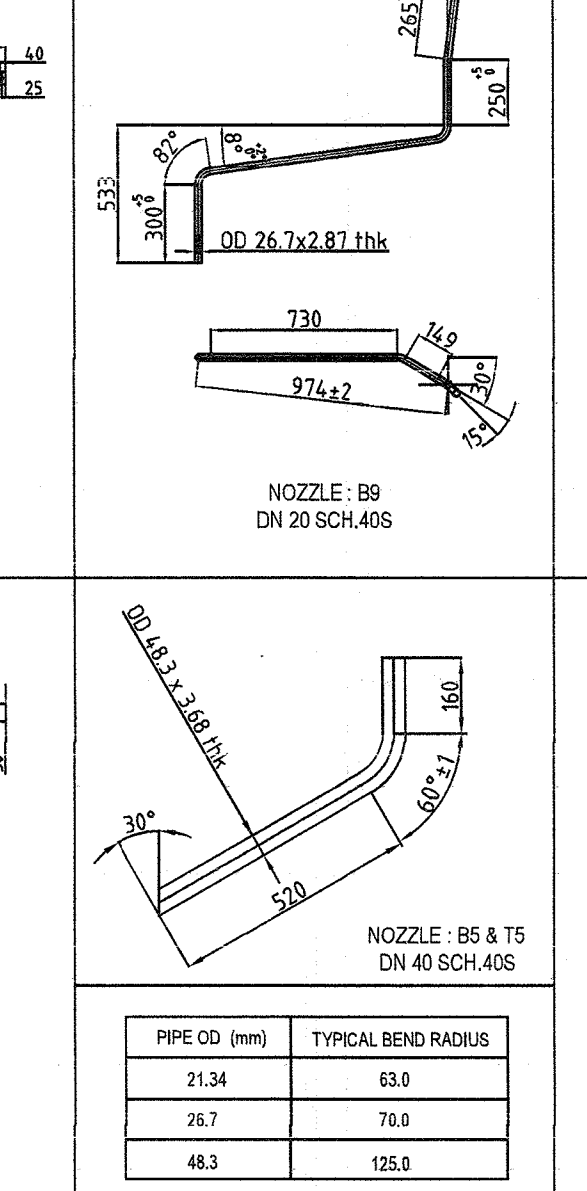
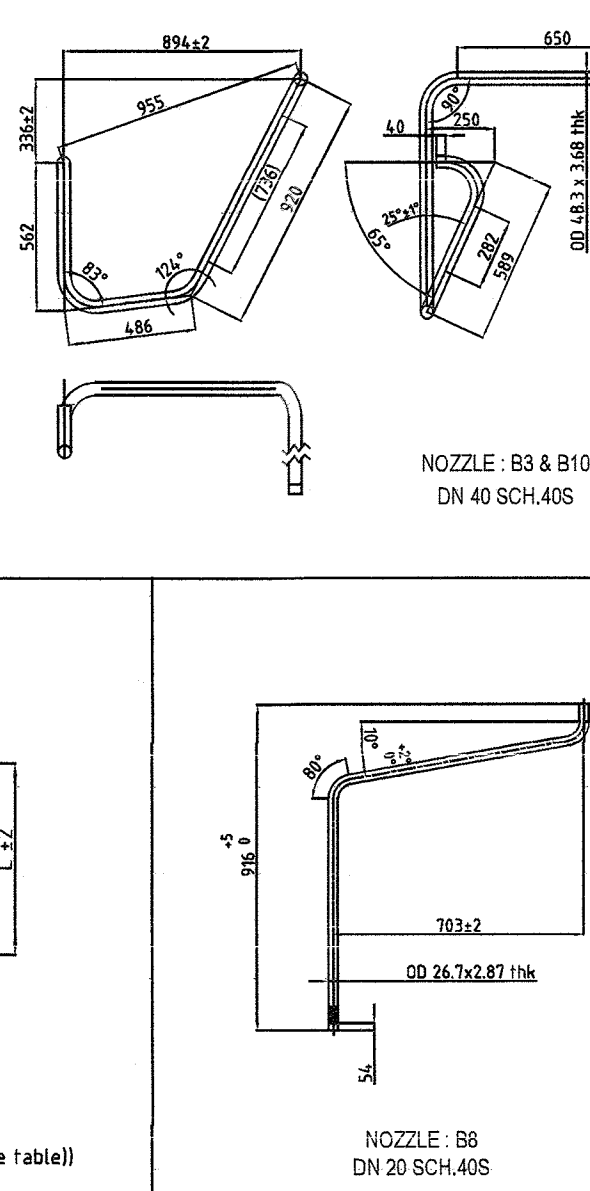
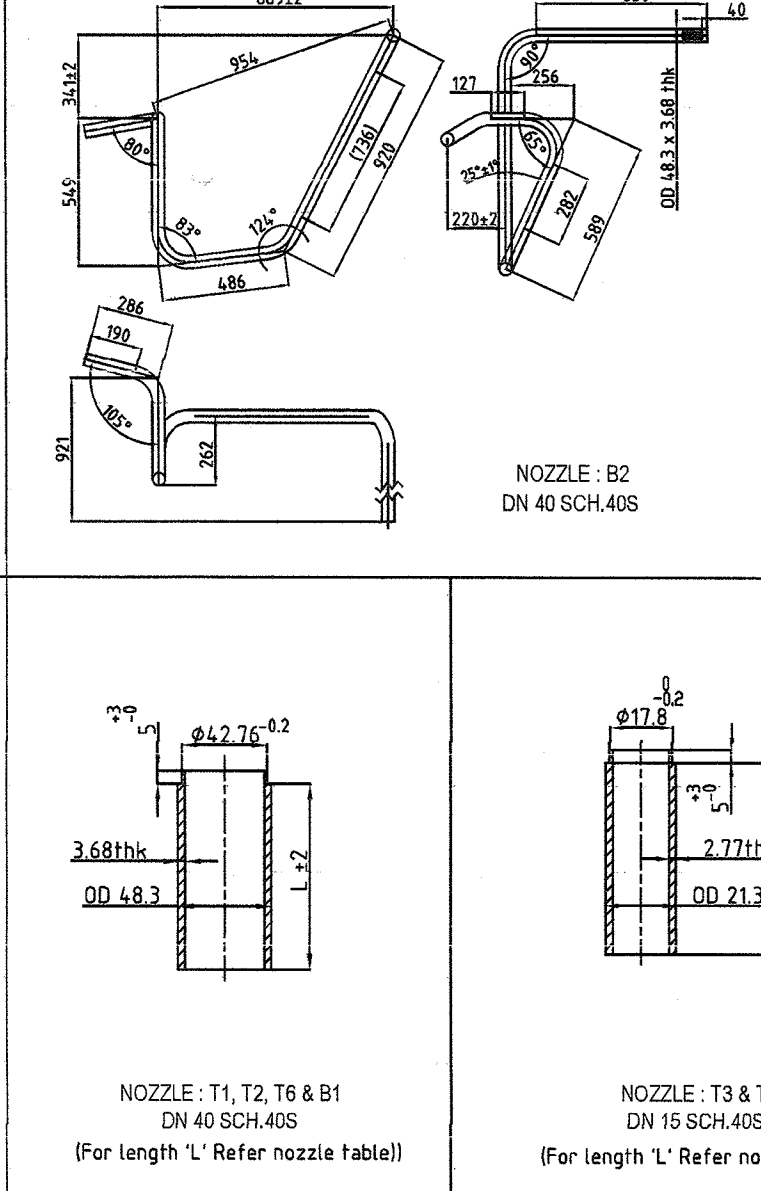
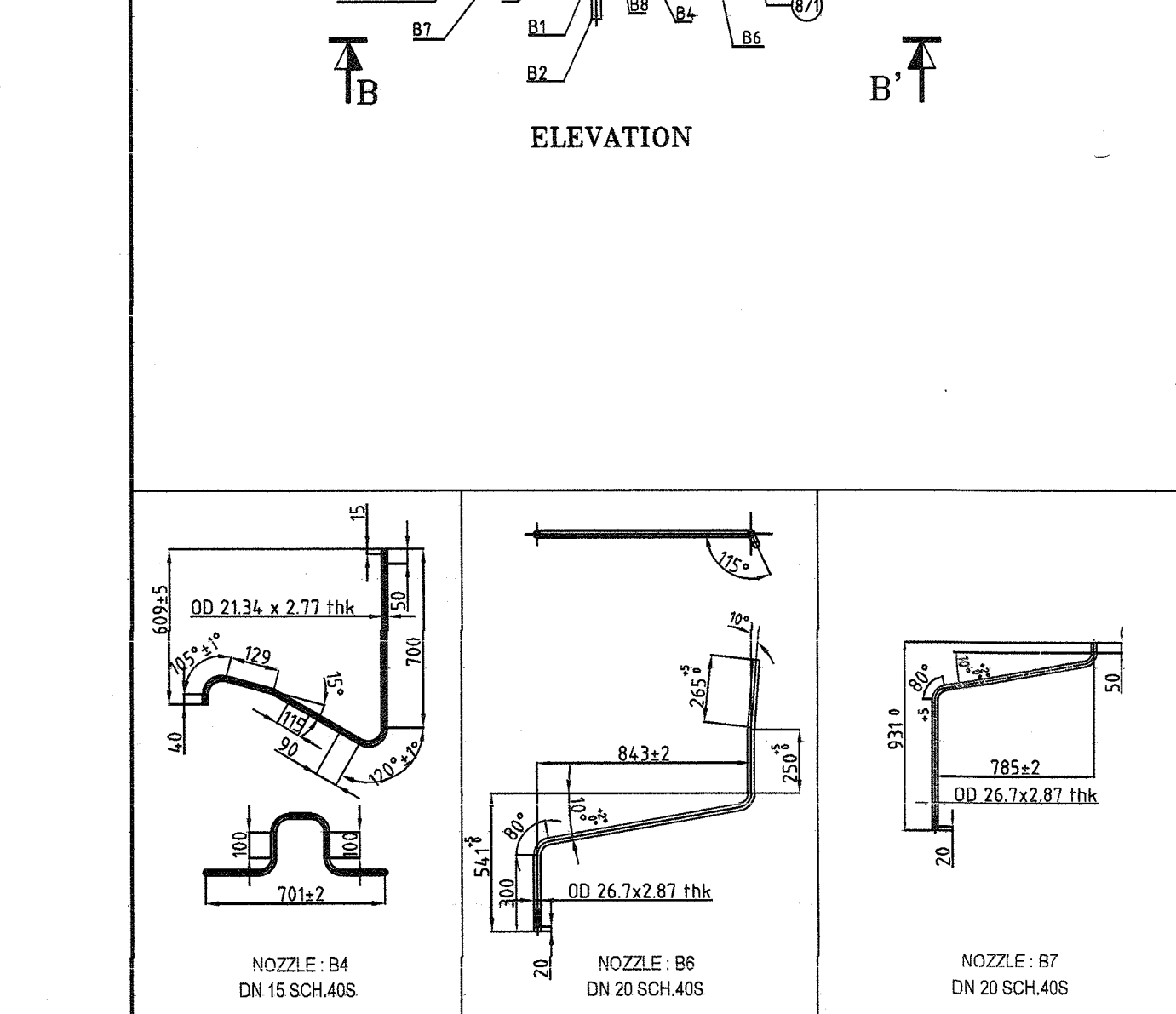


		DESIGN DATA		VERTICAL - STORAGE	
CONFIGURATION		ASME SEC VIII Div. 1, Edition 2015 - Mandatory Appendix 4, SMV Rules 2016			
DESIGN CODE		YES WITH 'U' DESIGNATOR / AS APPLICABLE (Note 45)			
ASME CERTIFICATION MARK / NB REGISTRATION		1700 / 17000 / 25000 / 17.335			
HAWP ALLOWABLE WORKING PRESSURE (HAWP)		NA / NA / NA / NA		MPa / bar / psig / kg/cm <sup>2</sup>	
EXTERNAL DESIGN PRESSURE		0.1 / 0.009 / 14.584 / 1020		MPa / bar / psig / kg/cm <sup>2</sup>	
VACUUM CORRECTION		0.090 / 0.900 / 13.047 / 0.918		MPa / bar / psig / kg/cm <sup>2</sup>	
STATIC HEAD		1890 / 18.900 / 274.115 / 19.272		MPa / bar / psig / kg/cm <sup>2</sup>	
INTERNAL DESIGN PRESSURE (HAWP - Vacuum correction - Static head)		0.000 / 8.000 / 116.030 / 8.158		MPa / bar / psig / kg/cm <sup>2</sup>	
VAPOUR PRESSURE		0.000 - "NON CORROSIVE SERVICE"			
CORROSION ALLOWANCE (INTERNAL / EXTERNAL)		50 / 120			
DESIGN TEMPERATURE FOR INTERNAL PRESSURE		50 / 120			
DESIGN TEMPERATURE FOR EXTERNAL PRESSURE		-196 / -320			
OPERATING TEMPERATURE		-196 / -320			
MINIMUM DESIGN METAL TEMPERATURE (MDMT) at HAWP		-196 / -320			
RADIOGRAPHY (SHELL/DISH)		FULL / FULL (RT) AS PER UG-116			
JOINT EFFICIENCY		CIRCUMFERENTIAL SEAM-10; SHELL LONG SEAM-10; SHELL TO HEAD-6; HEAD-10			
DISH END TYPE		21 SEED ELLIPSOIDAL			
SERVICE FLUID		LIN / LOX / LAR			
DENSITY OF FLUID		808 / 114.1 / 1393			
COLD STRETCH MINIMUM PRESSURE AS PER MANDATORY APPENDIX 4-5 (C)		2.835 / 28.349 / 411.172 / 28.908		MPa / bar / psig / kg/cm <sup>2</sup>	
COLD STRETCH MAXIMUM PRESSURE AS PER MANDATORY APPENDIX 4-5 (C)		3.024 / 30.239 / 426.854 / 30.835		MPa / bar / psig / kg/cm <sup>2</sup>	
COLD STRETCH & HYDRO TEST PRESSURE (SELECTED)		2.900 / 29.000 / 426.869 / 29.572		MPa / bar / psig / kg/cm <sup>2</sup>	
COLD STRETCH TEMPERATURE		Recommended between 20°C to 40°C (68°F to 104°F) maximum			
COLD STRETCH MEDIA/POSITION		DOWNWARD LEAD WATER / HORIZONTAL POSITION WITH PRESSURE GAUGE AT TOP			
POST WELD HEAT TREATMENT (PWHT)		Refer Design data note-32			
IMPACT TESTING		Refer Design data note-34			
WEIGHT DETAILS--		INNER		TOTAL	
(i) EMPTY		3960		9210	
(ii) HYDROTEST		20838		-	
(iii) OPERATING		28588		34788	
VOLUME BEFORE COLD STRETCHING		17.770		m <sup>3</sup>	
GROSS VOLUME		19.290		m <sup>3</sup>	
NET VOLUME - 5% GAS PHASE		18.326		m <sup>3</sup>	
NET VOLUME - 10% GAS PHASE		17.361		m <sup>3</sup>	
VESSEL IS TO CONTAIN LETHAL SUBSTANCE (YES / NO)		NO		-	
CODE STAMPING - ASME CERTIFICATION MARK WITH 'U' CERTIFICATION DESIGNATOR					
32 POST WELD HEAT TREATMENT IS NOT REQUIRED FOR VESSEL AS PER UHA-32 AND TABLE UHA-32-3					
33 POST FORMING HEAT TREATMENT (PFHT) OF HEAD / NOZZLES FORMED PARTS NOT REQUIRED AS PER UHA-44					
34 IMPACT TEST FOR BASE MATERIAL IS EXEMPTED UNDER UHA-51 (6) (i) (a) & MANDATORY APPENDIX 4-5 (1)(i) AND REQUIRED FOR WELDING PROCEDURE AS PER UHA-51 (6) (i) (a) & MANDATORY APPENDIX 4-5 (1)(i)					
36 FOR WEIGHT & PRESSURE CALCULATION, DENSITY OF LAR IS CONSIDERED.					
35 FOR VESSELS UNDER NON CORROSIVE SERVICE, INSPECTION OPENING MAY BE OMITTED IN ACCORDANCE WITH UG-46(a)(1). HENCE NO INSPECTION OPENING IS PROVIDED.					
BILL OF MATERIALS					
DESCRIPTION	MATERIAL	SPECIFICATION	STD REF. NO.	QTY.	BAAN REF NO.
TOP DEND	SA 240M Type 304	ID 1836 X 8 Hk (nom) X 6.7 Hk (min)	SC00000 Rev 5.7	01	HC000061
BOTTOM DEND	SA 240M Type 304	ID 1836 X 8 Hk (nom) X 6.7 Hk (min)	SC00000 Rev 5.7	01	HC000061
STAINLESS STEEL PLATE	SA 240M Type 304	5791 X 1500 X 6.7 Hk (nom) X 6.433 Hk (min)	SC00000 Rev 6.0	04	AC000038
BACKING STRIP	SA 240M Type 304	5739 X 50 X 10 Hk (min)	SC00000 Rev 6.0	02	AC000094
MAIN SUPPORT PLATE	SA 240M Type 304	470 X 200 X 6 Hk (min)	SC00000 Rev 6.0	02	HC000185
FOUR HOLE PIPE SUPPORT	SA 192H F 304 / SA 192H F 304	Ø4 X L-1320	SC00000 Rev 6.0	03	HC000445
LIFTING LUG-1	SA 240M Type 304	130 X 118 X 12 Hk	SC00000 Rev 6.0	01	HC000347
LIFTING LUG-2	SA 240M Type 304	130 X 118 X 12 Hk	SC00000 Rev 6.0	02	HC000419
CODE NAME PLATE	SA 240M Type 304	160 X 118 X 2 Hk	SC00000 Rev 6.0	01	HC000258
ADSORBENT BAG SUPPORT	SA 192H F 304 / SA 192H F 304	Ø5 X L-120	SC00000 Rev 6.0	08	HC000477
NAME PLATE SUPPORT	SA 192H F 304 / SA 192H F 304	Ø6 X L-172	SC00000 Rev 6.0	02	HC000645
PLUG	SA 240 Type 304	Ø50 X 8 Hk	SC00000 Rev 6.0	02	HC000994
SINGLE HOLE PIPE SUPPORT	SA 192H F 304 / SA 192H F 304	Ø5 X L-395	SC00000 Rev 6.0	03	HC000594
ECONOMIZER PIPE SUPPORT	SA 192H F 304 / SA 192H F 304	Ø6 X L-1130	SC00000 Rev 6.0	03	HC000644
NOTE:-					
GENERAL					
1. Dimensions are in mm unless otherwise specified.					
2. All cut edge surfaces shall be visually examined before further fabrication.					
3. All NDE is to be performed by NDE personnel certifying by CAP.					
4. Radiography shall be performed before cold stretching.					
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NOTE:-			
1. Radiography Required: All category - A & B welds as per UW-11a.			
2. All cut edge surfaces shall be visually examined before further fabrication.			
3. All NDE to be performed by NDE personnel certified by CAP.			
4. Design change request for each Project number shall be referred in the design calculation C000252 Rev A Attachment-1.			
5. In areas such as nozzle-to-shell attachment locations, abrupt changes in thickness or contour, and other similar structural discontinuities, high local stress and strain concentrations are anticipated during the coldstretching process. To check for potential crack formation in these areas, after depressurization of the vessel following cold stretching, all Category A weld joints and all attachment welds shall be examined externally for their entire length using the liquid penetrant method in accordance with ASME Sec VIII Div-1 Mandatory Appendix B. If rejectable defects are detected in the above inspections, all Category 3 weld joints and attachment welds shall be examined in the same manner.			
FABRICATION			
1. Shell forming shall be in longitudinal Rolling direction of plates.			
2. All Bevel edges shall be ground smooth before further fabrication.			
3. Ends of nozzle neck which remain unwelded in completed vessels must be cut by mechanical means (if applicable).			
4. Any exposed inside edges shall be chamfered or rounded to radius 3mm (min).			
5. All welding shall be as per approved Welding Catalogue.			
6. All temporary attachment shall be removed by grinding only & Liquid Penetrant Examination examined.			
7. Any surfaces damaged during fabrication where temporary attachment removed (inside/outside) shall be treated for restoring thickness as per UW-42 with concurrence of the AI and Liquid Penetrant Examination examined.			
8. All certification markings on pressure parts shall be plainly visible when vessel is completed.			
9. Avoid flat spots along longitudinal joints in shell section while Re-rolling See UG-79(b).			
10. All sharp corners shall be rounded off to smooth radius.			
11. Out of roundness shall be within 1% of ID of shell as per UG-80 (a) (1) and Dish and as per UG-81 (d).			
12. When Dish and used with spin hole the same shall be Plugged as per UW-34 (Detail-S) and vent joint shall be Examined as per UW-34.			
13. Misalignment at root of joint shall be as per Table UW-33.			
WELDING			
1. All welding shall be as per ASME Section IX.			
2. All welding shall be done by qualified welder / welding operator and as per approved WPS.			
3. All tack welds shall be done by welder / welding operator only.			
4. Tack welds shall be removed completely or ends prepared for fit to form part of the final weld.			
5. Surfaces to be welded shall be clean and free from scale, rust, oil, grease, slag, and detrimental oxides at least 50mm from either side of the weld joint.			
6. All fillet weld leg length shall be equal with convex surface.			
7. No peening is permitted in root and final weld.			
8. All butt welds and head to nozzle welds shall be Full Penetration Welding.			
9. Avoid excessive welding on all joints.			
10. Any grinding shall be tapered and smooth.			
11. Welding Procedure Impact Testing is required as per UHA-51(c)(2)(a) and Mandatory appendix 4-4-6.1 (g)(2) Test shall be conducted at -196°C and Energy value 27J minimum. Prior to testing of welding, pre use testing of welding consumables is required as per UHA-51(f) However, Production Impact testing is not required as per UHA-51(b)(2)(b) and Mandatory Appendix 4, clause 4-4-6.1 (g)(2).			
12. Welding reinforcement as per UW-35 for other than Category A joint. Weld reinforcement of Category A weld shall not exceed 10% of the plate thickness or 1mm whichever is less. The weld deposits shall blend smoothly into the base metal without undercut or abrupt transition. All attachment welds shall be continuous and have a smooth contour with no undercut permitted.			
13. Full thickness fillet weld shall be provided at Support and attachment location.			
14. UTS of weld fillet metal shall not be less than UTS of Base metal.			
SIGNATURE			
Inspector Name: <i>M. V. Narayanan</i>			
Designation: <i>Senior Vice President</i>			
CODE No. : <i>7441C/656110-4</i>			
TUV SÜD SOUTH ASIA PVT. LTD.			
PRESSURE VESSEL (CRYOGENIC STORAGE TANK)			
MODEL: CA19 / RVTA19-17 bar - INNER VESSEL DETAIL			
GENERAL TOLERANCES			
Unless otherwise stated: Dimensions in mm			
Manufacturing tolerances following IS 2768 - mK			
Dimensional tolerances and angular parts: sheet metal, under 0.5mm per meter 2° ± 3°			
No of F.A.O. : <i>1</i>			
PAGE 1 OF 1			
Scale: 1:10			
Size: A			
Project number: As applicable			
Drawing Number with revision: H0002573 Rev.A			