PIPING CLASS: HL2S3E-JA

SECTION 1.0 – GENERAL

PIPE CLASS:	**HL2S3E-JA**	**DESIGN CODE:**	ASME B31.3
RATING:	10000	**PWHT:**	NOTE 5
FLANGE FACE:	RTJ	**VALVE TRIM:**	SDSS
BASIC MATERIAL:	LTCS-X60 - IMPACT TESTED	**SOUR:**	YES (NOTE 4 & 13)
CORROSION ALLOWANCE:	3.0 MM	**SPECIAL REQUIREMENT:**	NACE & NOTE-9,171

TEMPERATURE (DEG.C) AND PRESSURE (BARG) RATING - (NOTE-171,207)

TEMP.	-46	0	38	50	100	121
PRESS.	460	460	460	460	460	460

SERVICE

REFER TO PIPING CLASS INDEX

SIZE RANGE, PIPE WALL THICKNESS (MM) TABLE – (NOTE-9, 211)

NPS	1	1 ½	2	3	4	6	8	10	12
SCHEDULE	160	XXS	160	160	160	160	XXS	160	160
THICKNESS	6.35	10.15	8.74	11.13	13.49	18.26	22.23	28.58	33.32

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SECTION 2.0 – NOTES

GENERAL NOTES

2. ALL BUTT-WELDED COMPONENT THICKNESSES SHALL MATCH THE PIPE THICKNESS.
3. FOR SPECTACLE BLINDS (FIG-8 FLANGES) & BLINDS REFER TO SPECIFICATION AGES-SP-09-002.
4. ALL MATERIAL FOR SOUR SERVICE SHALL CONFORM TO THE REQUIREMENTS FOR MATERIAL SELECTION GUIDELINES AGES-GL-07-001, REQUIREMENTS FOR MATERIALS IN SEVERE SERVICE AGES-SP-07-003 AND NACE MR0175/ISO 15156 (FOR UPSTREAM) & NACE MR0103/ISO 17945 (FOR REFINERY SERVICE).
5. PWHT SHALL BE BASED ON ASME B31.3 AND THE REQUIREMENTS OF SPECIFICATION AGES-SP-09-002 PIPING MATERIAL SPECIFCATION INDEX. FOR SOUR SERVICE PWHT REQUIREMENT SHALL BE ALSO GOVERNED BY HARDNESS CRITERIA AS PER NACE MR0175 / ISO 15156 (FOR UPSTREAM) & NACE MR0103/ISO 17945 (FOR REFINERY SERVICE).
9. WALL THICKNESS TO BE IN ACCORDANCE WITH ASME B31.3 CHAPTER IX (SECTION K304.1.2 AND FORMULA (34A)), AND ALSO THE PRESSURE -TEMPERATURE LIMITS SHALL BE ADJUSTED TO SUIT PROJECT SPECIFIC REQUIREMENTS.
11. FOR SDSS MATERIAL PREN SHALL BE >40.
13. FOR SOUR/ LETHAL SERVICE 100%RT,100%MT/PT HAS TO BE CONSIDERED IRRESPECTIVE OF RATING IN LINE WITH REQUIREMENT FOR MATERIALS IN SEVERE SERVICE AGES-SP-07-003.
15. EXTERNAL FASTENERS (BOLTS, STUDS & NUTS) SHALL BE COATED WITH FLUOROCARBON POLYMER SYSTEM AND SHALL COMPLY WITH SALT SPRAY TEST AS PER MATERIAL SELECTION GUIDELINE AGES-GL-07-001.
16. ALL VALVES IN SOUR OR TOXIC OR HYDROCARBON SERVICE SHALL MEET FUGITIVE EMISSION TESTING REQUIREMENTS AS PER BS EN ISO 15848 PART-1 & PART-2 WITH LEAKAGE CLASS 'BH' (REFER TO VALVE SPECIFICATION AGES-SP-09-003).
26. API 5L PIPES (GRADE B OR HIGHER GRADES X) SHALL CONFORM TO PSL 2 AS MINIMUM AND SHALL BE IMPACT TESTED AT -29 DEGC OR MDMT (WHICHEVER IS LOWER) IRRESPECTIVE OF THICKNESS.
43. THREADED JOINTS ARE NOT PERMITTED.
51. EXTENDED BONNET VALVES SHALL BE ADDED IN PROJECT STAGE IF THE VALVES ARE OPERATING IN CONTINUOUS OPERATING TEMPERATURE BETWEEN -10 DEG. C AND -50 DEG. C IN LINE WITH EEUMA 192.
54. COMPLETE ORIFICE ASSEMBLY SHALL BE SUPPLIED WITH PAIR OF ORIFICE FLANGES EACH HAVING ONE NPS 1/2 FLANGED TAP (RATING SAME AS PIPE CLASS).
58. THE USE OF SOFT SEATED BALL VALVES IS RESTRICTED TO MAX. DESIGN TEMPERATURE OF 150^{O}C. THE MATERIALS OF CONSTRUCTION FOR SEAT ARE INDICATIVE. VENDOR IS RESPONSIBLE TO SELECT SUITABLE MATERIAL TO ENSURE SERVICE LIFE OF THE VALVE CONSIDERING THE TYPE OF FLUID, SIZE AND SERVICE CONDITIONS.
71. TO BE USED ONLY WHEN INDICATED ON THE P&ID.
81. PIPING CLASS COVERS ALL TYPES OF VALVES NORMALLY USED IN THE INDUSTRY. HOWEVER, VALVE TYPE SELECTION SHALL BE AS PER PROCESS ISOLATION PHILOSOPHY (AGES-PH-08-001, AGES-SP-09-003) AND P&ID.
84. BOLT TENSIONING REQUIREMENT SHALL BE AS PER PIPING MATERIAL SPECIFICATION AGES-SP-09-002.
85. SMALL BORE PIPE THE MINIMUM SCHEDULE SHALL BE AS PER AGES-SP-09-001 APPENDIX A1.
90. PIPING TO INSTRUMENT IDBB, FLANGED ON BOTH PROCESS SIDE AND INSTRUMENT SIDE.TO BE USED IN SOUR, TOXIC, SULPHURIC ACID AND VIBRATING SERVICE.
171. MATERIAL CLASS-EE (FOR SOUR SERVICE), PRODUCT SPECIFICATION LEVEL PSL-3 AND TEMPERATURE CLASS SELECTED BASED ARE AS PER API 6A.
173. FOR API 6A (API 10,000 /5000 PSI) LINE CLASSES THE SELECTED NOMINAL SIZE OF API SPEC 6A FLANGES SHALL BE SELECTED SUCH THAT THERE IS MINIMUM DIMENSIONAL DIFFERENCE BETWEEN THE API 6A FLANGE BORE AND THE BORE OF THE MATING PIPING SYSTEM REFER SECTION 12.3 OF THIS SPECFICATION API 6A. IN ADDITION, API 6A FLANGES SHALL BE SUPPLIED WITH INTEGRAL TRANSITION SPOOL OF 75MMTO MATCH THE PIPE OD AND SCHEDULE.
176. BRANCH TO HEADER CONNECTION SHALL BE REDUCED TEES, EQUAL TEES, SWEEPOLETS OR SIMILAR IN ACCORDANCE WITH CHAPTER IX OF ASME B31.3.

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178. THIS TYPE OF GRADE IS PERMITTED ONLY IN THE SEAMLESS CONDITION AS PER CHAPTER IX OF ASME B31.3.

206. 100% NDE OF ALL GIRTH, LONGITUDINAL AND BRANCH CONNECTIONS IN ACCORDANCE WITH ASME 31.3 K341.4.2.

207. FOR OPERATING TEMPERATURE ABOVE 121°C, DESIGN VERIFICATION SHALL BE DONE ACCORDING TO APPENDIX G OF API SPEC 6A. THE DE RATING SHALL BE APPLIED IN ACCORDANCE TO API 6A ANNEXURE G. IF APPLICABLE THE PROJECT SPECIFIC PIPE CLASS DESIGN TEMPERATURE SHALL BE RESTRICTED ACCORDINGLY.

208. MATERIAL TO CONFORM API 6A AND SHALL COMPLY WITH API 6A PSL 3 REQUIREMENTS.

209. VALVE BODY THICKNESS SHALL INCLUDE THE CORROSION ALLOWANCE OVER AND ABOVE THE MINIMUM THICKNESS AS REQUIRED BY API 6A.

210. WITH PRIOR APPROVAL FROM COMPANY, HUB END VALVES AND PIPE COMPONENTS MAY BE USED IN PLACE OF FLANGED ONE FOR SIZE NPS 6 AND ABOVE. ACCEPTANCE TO BE REVIEWED IN PROJECT STAGE.

211. MINIMUM SIZE FOR THIS PIPE CLASS IS DN50, UNLESS NEEDED AS CONTINUATION FOR BRANCH-OFF (BRANCH OFF SHALL BE BY REDUCING TEE ONLY).

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SECTION 3.0 – BRANCH TABLE

90^0 BRANCH CONNECTIONS (NOTE 176)

BRANCH PIPE (NPS)											
	12									E	
	10								E	T	
	8							E	T	T	
	6						E	T	T	T	
	4					E	T	T	T	SP	
	3				E	T	T	SP	SP	SP	
	2			E	T	T	SP	SP	SP	SP	
	1 ½		E	T	T	T	SP	SP	SP	SP	
	1	E	T	T	SP	SP	SP	SP	SP	SP	
		1	**1 ½**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	
		HEADER PIPE (NPS)									

LEGEND (STANDARD SYMBOLOGY)

C	CALCULATION IN ACCORDANCE WITH ASME B31.3
E	EQUAL TEE
T	REDUCING TEE
TR	REDUCING TEE + REDUCER
W	WELDOLET
SP	SWEEPOLET

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SECTION 4.0 – PIPING COMPONENTS

COMPONENT (TYP)	NPS (INCH)		END	DESCRIPTION	DIM/ MFG STD.	MATERIAL STD	NOTES
	FROM	TO					
PIPE (NOTE 206)							
PIPE	1	12	BE	SEAMLESS	B36.10	API 5L GR. X60 PSL 2, (IMPACT TESTED), SOUR SERVICE	26,178, 211
NIPPLE	2	2	BE	AS PIPE, L=100mm	B36.10	API 5L GR. X60 PSL 2, (IMPACT TESTED), SOUR SERVICE	26,178
FITTINGS (NOTE 206)							
ELBOW	1	12	BE	90 DEGREE, LR, WROUGHT, SEAMLESS	B16.9	MSS SP 75, ASTM A860 WPHY 60 (IMPACT TESTED), SOUR SERVICE	2,171
ELBOW	1	12	BE	45 DEGREE, LR, WROUGHT, SEAMLESS	B16.9	MSS SP 75, ASTM A860 WPHY 60 (IMPACT TESTED), SOUR SERVICE	2,171
REDUCER	1 ½	12	BE	CONCENTRIC, WROUGHT, SEAMLESS	B16.9	MSS SP 75, ASTM A860 WPHY 60 (IMPACT TESTED), SOUR SERVICE	2,171
REDUCER	1 ½	12	BE	ECCENTRIC, WROUGHT, SEAMLESS	B16.9	MSS SP 75, ASTM A860 WPHY 60 (IMPACT TESTED), SOUR SERVICE	2,171
CAP	1	12	BE	WROUGHT, SEAMLESS	B16.9	MSS SP 75, ASTM A860 WPHY 60 (IMPACT TESTED), SOUR SERVICE	2,171
BRANCH FITTINGS (NOTE 176, 206)							
TEE	1	12	BE	EQUAL, WROUGHT, SEAMLESS	B16.9	MSS SP 75, ASTM A860 WPHY 60 (IMPACT TESTED), SOUR SERVICE	2,171
TEE	1 ½	12	BE	REDUCING, WROUGHT, SEAMLESS	B16.9	MSS SP 75, ASTM A860 WPHY 60 (IMPACT TESTED), SOUR SERVICE	2,171
SWEEPOLET	1	4	BE	FORGED, SCH AS PIPE	MSS SP-97	ASTM A694 Gr.F60 (IMPACT TESTED), SOUR SERVICE	2,171
FLANGES (NOTE-206, 207, 208)							
WELDNECK	2	12	RTJ	API 10000 PSI, TYPE 6BX WITH INTREGRAL TRANSISION PIECE TO MATCH THE OD AND BORE OF PIPE, PSL 3	API 6A	API 6A 60K, TEMPERATURE CLASS -LX, SOUR SERVICE	2,171,173

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COMPONENT (TYP)	NPS (INCH)		END	DESCRIPTION	DIM/ MFG STD.	MATERIAL STD	NOTES
	FROM	TO					
FLANGES (NOTE-206,207,208)-CONT,D							
BLIND	2	2	RTJ	API 10000, TYPE 6BX, PSL 3	API 6A	API 6A 60K, TEMPERATURE CLASS -LX, SOUR SERVICE	2,171
ORIFICE	2	12	RTJ	API 10000, TYPE 6BX, PSL 3	B16.36	API 6A 60K, TEMPERATURE CLASS -LX, SOUR SERVICE	2,54
LINE BLINDS							
LINE BLIND	2	12	RTJ	API 10000 PSI, TYPE 6BX, SPADE & SPACER	API 6A	ASTM A516 GR. 70N, IMPACT TESTED, SOUR SERVICE	3,171
GASKETS							
GASKET	2	12	-	API 10000 PSI, TYPE 6BX	API 6A	SOFT IRON OCTAGONAL RING JOINT GASKET, GALVANIZED, SOUR SERVICE	171
BOLTS							
STUD BOLT & NUTS	2	12	-	STUD BOLT C/W 2 HEAVY HEX. NUTS	B18.2.1/ B18.2.2	STUD: ASTM A320 GR. L7M ASTM A194 GR. 7M	15,84, 171

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SECTION 5.0 – VALVES

COMPONENT (TYP)	NPS (INCH)		END	DESCRIPTION	DIM/ MFG STD.	MATERIAL STD	NOTES
	FROM	TO					
VALVES (NOTE -11,51,81,207,208,209,210)							
CHECK	2	2	RTJ	API 10000 PSL, LIFT TYPE, PSL 3, SOUR SERVICE	API 6A	BODY: API 6A CLASS EE 60K TRIM: SDSS+HF	171,173
CHECK	3	12	RTJ	API 10000 PSI, SWING CHECK, PSL 3, SOUR SERVICE	API 6A	BODY: API 6A CLASS EE 60K TRIM: SDSS+HF	171,173
BALL	2	12	RTJ	API 10000 PSI, REDUCED BORE, TRUNNION MOUNTED, GEAR, PSL 3, SOUR SERVICE	API 6A	BODY: API 6A CLASS EE 60K TRIM: SDSS SEAT: PEEK	16,23,58, 171,173
BALL	2	12	RTJ	API 10000 PSI, FULL BORE, TRUNNION MOUNTED, GEAR, PSL 3, SOUR SERVICE	API 6A	BODY: API 6A CLASS EE 60K TRIM: SDSS SEAT: PEEK	16,23,58, 171,173
GLOBE	2	8	RTJ	API 10000 PSI, SWIVEL PLUG DISC, OS&Y, BOLTED BONNET, GEAR, PSL 3, SOUR SERVICE	API 6A	BODY: API 6A CLASS EE 60K TRIM: SDSS+HF	16,23, 171,173
IDBB VALVE (FLG X FLG)	2	2	RTJ	API 10000 PSI, BALL TYPE BLOCK AND ½" NEEDLE TYPE BLEED VALVE, SPLIT BODY, TRUNNION MOUNTED, GEAR OPERATED, PSL 3, SOUR SERVICE MIN.14MM BORE	API 6A + MANF STD	BODY: API 6A CLASS EE 60K TRIM: SDSS BALL SEAT: PEEK BLEED VALVE: BODY: API 6A CLASS EE 60K TRIM- SDSS +HF	16,23,90, 171,173