PIPING CLASS: AC1A6H-FA

SECTION 1.0 – GENERAL

PIPE CLASS:	**AC1A6H-FA**	**DESIGN CODE:**	ASME B31.3
RATING:	150	**PWHT:**	NOTE-52
FLANGE FACE:	RF	**VALVE TRIM:**	ALLOY 20
BASIC MATERIAL:	CARBON STEEL (GROUP 1.1)	**SOUR:**	NO
CORROSION ALLOWANCE:	6.0 MM	**SPECIAL REQUIREMENT:**	SULPHURIC ACID SERVICE NACE SP 0391

TEMPERATURE (DEG.C) AND PRESSURE (BARG) RATING - (NOTE-22)

TEMP.	4	38	50	100
PRESS.	19.6	19.6	19.2	17.7

SERVICE

REFER TO PIPING CLASS INDEX

SIZE RANGE, PIPE WALL THICKNESS (MM) TABLE - (NOTE-80)

NPS	½	¾	1	1 ½	2	3	4	6	8
SCHEDULE	-	-	XXS	XXS	XXS	160	120	80	80
THICKNESS	8.69	8.69	9.09	10.15	11.07	11.13	11.13	10.97	12.70

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SECTION 2.0 - NOTES

GENERAL NOTES

1. IN LINE WITH AGES-GL-08-001 (PROCESS DESIGN BASIS) THE MINIMUM PIPING SIZE IS NPS 1. HOWEVER, THE LINE SIZE IN THIS CLASS NPS 3/4 & NPS 1/2 ARE INCLUDED FOR INSTRUMENT CONNECTIONS ONLY.
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.

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).
22. ALL PIPING COMPONENTS UP TO NPS 24 SHALL BE DESIGNED FOR VACUUM CONDITION AT AMBIENT TEMPERATURE. FOR HIGHER SIZES VACUUM DESIGN SHALL BE APPLICABLE IF INDICATED IN THE LINE LIST.
27. CS PIPE AND PIPE COMPONENTS WITH NOMINAL THICKNESS GREATER THAN 5.08 MM SHALL BE IMPACT TESTED AT -29 ° C OR LTCS MATERIAL MAY BE USED INSTEAD.
33. TO BE USED FOR FLANGED CLASS 300 RF CONNECTION.
39. DELETED.
43. THREADED JOINTS ARE NOT PERMITTED.
47. SPRAY GUARDS OR FLANGE SHIELDS (e.g., TECHNOSHIELD OR EQUIVALENT) SHALL BE INSTALLED AROUND FLANGE JOINTS AND FLANGED VALVE BONNETS TO PROTECT PERSONNEL FROM LEAKS OR ACCIDENTAL SPRAYS.
52. PWHT SHALL BE BASED ON ASME B31.3 AND THE REQUIREMENTS OF SPECIFICATION AGES-SP-09-002 PIPING MATERIAL SPECIFICATION INDEX.
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).
57. PIPE BENDS SHALL HAVE A RADIUS OF ATLEAST 5D.
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.
61. STANDARD LONG RADIUS ELBOWS FOR SIZE NPS 3 AND LARGER SHALL BE USED FOR SWEEP-IN CONNECTIONS.
70. LOW STRESS SPIRAL WOUND GASKET.
71. TO BE USED ONLY WHEN INDICATED ON THE P&ID.
73. NIPOFLANGE SHALL BE USED FOR THERMOWELL CONNECTION FOR HEADER NPS 4 AND ABOVE.
75. CORROSION ALLOWANCE OF PIPE CLASS IS ABOVE 3.0 MM. MINIMUM BODY WALL THICKNESS OF VALVES SHALL HAVE ADDITIONAL WALL THICKNESS CONSIDERING THE CORROSION ALLOWANCE SPECIFIED IN THE PIPE CLASS IN EXCESS OF ASME B16.34 REQUIREMENTS.
80. THE PIPE THICKNESS ARE CALCULATED BASED ON P-T RATING TABLE FOR THIS CLASS, HOWEVER FOR SIZES NPS 26 AND ABOVE THICKNESS SHALL BE CALCULATED BASED ON PROJECT PROCESS DESIGN PARAMETER.
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.
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.

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SECTION 3.0 – BRANCH TABLE

90^0 BRANCH CONNECTIONS

BRANCH PIPE (NPS)	1/2	3/4	1	1 ½	2	3	4	6	8
8									E
6								E	T
4							E	T	T
3						E	T	T	W
2					E	T	T	W	W
1 ½				E	T	T	T	W	W
1			E	T	T	W	W	W	W
3/4		E	T	T	T	W	W	W	W
1/2	E	T	T	T	TR	W	W	W	W

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

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SECTION 4.0 – PIPING COMPONENTS

COMPONENT (TYP)	NPS (INCH)		END	DESCRIPTION	DIM/ MFG STD.	MATERIAL STD.	NOTES
	FROM	TO					
PIPE							
PIPE	½	8	BE	SEAMLESS	B36.10	ASTM A106 GR B	1,27, 85
NIPPLE	2	2	BE	AS PIPE, L=100mm	B36.10	ASTM A106 GR B	27,85
FITTINGS							
ELBOW	½	8	BE	90 DEGREE, LR, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB-S	2,27, 61
ELBOW	2	8	BE	90 DEGREE, RADIUS=5D WROUGHT, SEAMLESS	MFG STD.	ASTM A234 GR. WPB-S	2,27, 57
ELBOW	½	8	BE	45 DEGREE, LR, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB-S	2,27, 61
ELBOW	2	8	BE	45 DEGREE, RADIUS=5D WROUGHT, SEAMLESS	MFG STD.	ASTM A234 GR. WPB-S	2,27, 57
REDUCER	¾	8	BE	CONCENTRIC, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB-S	2,27
REDUCER	¾	8	BE	ECCENTRIC, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB-S	2,27
CAP	½	8	BE	WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB-S	2,27
BRANCH FITTINGS							
TEE	½	8	BE	EQUAL, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB-S	2,27
TEE	¾	8	BE	REDUCING, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB-S	2,27
WELDOLET	½	3	BE	FORGED, SCH AS PIPE	MSS SP-97	ASTM A105N	27

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COMPONENT (TYP)	NPS (INCH)		END	DESCRIPTION	DIM/ MFG STD.	MATERIAL STD.	NOTES
	FROM	TO					
FLANGES							
WELDNECK	½	8	RF	CL.150	B16.5	ASTM A105N	2,27, 47
WELDNECK	½	8	RF	CL.300	B16.5	ASTM A105N	2,27, 33,47
NIPOFLANGE	1	2	RF	CL.150, L=150 MM	B16.5	ASTM A105N	2,27, 47,73
BLIND	½	8	RF	CL.150	B16.5	ASTM A105N	27
ORIFICE	2	8	RF	CL.300	B16.36	ASTM A105N	2,27, 54
LINE BLINDS							
LINE BLIND	½	8	RF	CL.150, SPECTACLE BLIND	B16.48	ASTM A516 GR.70	3,27
GASKETS							
GASKET	½	8	-	CL.150, SPIRAL WOUND, 4.5MM THK.	B16.20/ B16.5	SP. WINDING + INNER RING: SS316, FILLER: PTFE, CS OUTER RING,LOW STRESS	70
GASKET	½	8	-	CL.300, SPIRAL WOUND, 4.5MM THK.	B16.20/ B16.5	SP. WINDING + INNER RING: SS316, FILLER: PTFE, CS OUTER RING	33
BOLTS							
STUD BOLT & NUTS	½	8	-	STUD BOLT C/W 2 HEAVY HEX. NUTS	B18.2.1/ B18.2.2	STUD: ASTM A193 GR. B7 ASTM A194 GR. 2H,	15

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SECTION 5.0 - VALVES

COMPONENT (TYP)	NPS (INCH)		END	DESCRIPTION	DIM/ MFG STD.	MATERIAL STD.	NOTES
	FROM	TO					
VALVES (NOTE -81)							
CHECK	½	1 ½	RF	CL.150, FLGD TO B16.5, SPRING LOADED LIFT CHECK, BOLTED COVER	BS1868 + ASME B16.34	BODY: ASTM A105N TRIM: ALLOY 20+HF	75
CHECK	2	8	RF	CL.150, DUAL PLATE, TYPE A, RF DOUBLE FLGD TO B16.5	API 594	BODY: ASTM A216 GR.WCB TRIM: ALLOY 20+HF	75
CHECK	2	8	RF	CL.150, SWING CHECK FLGD TO B16.5	API 6D	BODY: ASTM A216 GR.WCB TRIM: ALLOY 20+HF	75
GLOBE	½	1 ½	RF	CL.150, FLGD TO B16.5, SWIVEL PLUG DISC, OS & Y, BOLTED BONNET, HANDWHEEL	API 602 + ASME B16.34	BODY: ASTM A105N TRIM: ALLOY 20+HF	16,75
GLOBE	2	12	RF	CL.150, FLGD TO B16.5, SWIVEL PLUG DISC, OS & Y, BOLTED BONNET, HANDWHEEL / GEAR	API 623 + ASME B16.34	BODY: ASTM A216 GR.WCB TRIM: ALLOY 20+HF	16,75
BALL	½	1 ½	RF	CL.150, FLGD TO B16.5, FULL BORE, FLOATING BALL, LEVER	API 6D	BODY: ASTM A105N TRIM: ALLOY 20 SEAT: RPTFE	16,58,75
BALL	2	4	RF	CL.150, FLGD TO B16.5, FULL BORE, FLOATING BALL, LEVER	API 6D	BODY: ASTM A216 GR.WCB TRIM: ALLOY 20 SEAT: RPTFE	16,58,75
BALL	6	8	RF	CL.150, FLGD TO B16.5, FULL BORE, TRUNNION MOUNTED, GEAR	API 6D	BODY: ASTM A216 GR.WCB TRIM: ALLOY 20 SEAT: RPTFE	16,58,75
PLUG	½	8	RF	CL.300, FLGD TO B16.5, PLUG VALVE, TAPER PLUG, PTFE SLEEVE, LEVER / GEAR	API 599	BODY: ASTM A105N / ASTM A216 GR.WCB TRIM: ALLOY 20 SLEEVE: PTFE LINED	16,75

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COMPONENT (TYP)	NPS (INCH)		END	DESCRIPTION	DIM/ MFG STD.	MATERIAL STD.	NOTES
	FROM	TO					
VALVES CONT,D (NOTE -81)							
DIAPHRAGM	½	8	RF	CL.300, FLGD TO B16.5, DIAPHRAGM STRAIGHT THRU TYPE, BOLTED BONNET, HANDWHEEL	MSS SP- 88	BODY: ASTM A105N / ASTM A216 GR.WCB TRIM: ALLOY 20 DIAPHRAGM: RPTFE	75
IDBB VALVE (FLG X FLG)	¾	2	RF	CL. 150, BALL TYPE BLOCK, REDUCING BODY DESIGN , FLOATING BALL AND ½" NEEDLE TYPE BLEED VALVE, LEVER OPERATED MIN.14MM BORE	API 6D + MANF STD	BODY: ASTM A105N / ASTM A216 GR.WCB TRIM: ALLOY 20 BALL SEAT: RPTFE BLEED VALVE: BODY-ASTM A105N , TRIM-ALLOY 20+HF	16,75,90