

PIPING CLASS: AC4A1A-FA

SECTION 1.0 – GENERAL

PIPE CLASS:	AC4A1A-FA	DESIGN CODE:	ASME B31.3
RATING:	150	PWHT:	NOTE 52
FLANGE FACE:	RF	VALVE TRIM:	SS316+HF
BASIC MATERIAL:	CS- GALVANIZED (GROUP 1.1)	SOUR:	NO
CORROSION ALLOWANCE:	1.5 MM	SPECIAL REQUIREMENT:	NOTE 122,123

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

TEMP.	-29	0	38	50	100	150
PRESS.	19.6	19.6	19.6	19.2	17.7	15.8

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	10	12
SCHEDULE	-	-	160	160	160	80	30	40	20	20	20
THICKNESS	-	-	6.35	7.14	8.74	7.62	4.78	7.11	6.35	6.35	6.35

NPS	14	16
SCHEDULE	10	10
THICKNESS	6.35	6.35

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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.
15. ALL BOLTS & NUTS SHALL BE SUPPLIED WITH PTFE COATING AND SHALL COMPLY WITH SALT SPRAY TEST AS PER MATERIAL SELECTION GUIDELINES AGES-GL-07-001.
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.
25. 13CR MAY SUBSTITUTE SS316 IN NON-SOUR SERVICE WHEN APPROVED BY COMPANY BASED ON THE SERVICE CONDITION.
28. RF FLANGE SHALL BE USED TO MATCH WITH METALLIC FLANGES; HOWEVER MATING WITH GRE/GRP/FRP/RTR FLANGES SHALL BE FLAT FACED.
33. TO BE USED FOR FLANGED CLASS 300 RF CONNECTION.
46. PIPE SIZES UPTO NPS 3 SHALL BE PROVIDED WITH THREADED ENDS C/W FULL COUPLING ON ONE END. COUPLING RATING CL 3000.
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 ½ FLANGED TAP (RATING SAME AS PIPE CLASS).
58. THE USE OF SOFT SEATED BALL VALVES IS RESTRICTED TO MAX. DESIGN TEMPERATURE OF 150 °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.
65. THE MIN. LINE SIZE IN THIS CLASS IS NPS 1.
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.
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) AND P&ID.
85. SMALL BORE PIPE THE MINIMUM SCHEDULE SHALL BE AS PER AGES-SP-09-001 APPENDIX A1.
86. DISSIMILAR FLANGE MATERIAL SHALL BE SEPERATED USING INSULATING GASKET, ONLY TO BE USED WHEN STATED IN CORROSION REPORT AND IN P&ID OR OTHERWISE WITH COMPANY APPROVAL. FOR HYDROCARBON SERVICE FIRE SAFE INSULATING GASKET IS MANDATORY (REFER AGES-SP-09-005 FOR INSULATING GASKET DETAILS).
122. PREFABRICATED PIPE SPOOLS SHALL HAVE FLANGED ENDS AND BE LIMITED TO L AND Z SHAPES AND SHALL BE HOT DIP GALVANIZED ACCORDING TO GALVANIZING SPECIFICATION, AGES-SP-07-009. WELDS SHALL NOT BE ALLOWED AFTER GALVANIZATION.
123. GALVANIZING (DIA. ≤ NPS 3) SHALL BE HOT DIP BOTH INSIDE AND OUTSIDE AS PER GALVANIZING SPECIFICATION, AGES-SP-07-009.
202. THREADS OF GALVANIZED PIPES SHALL BE FREE OF GALVANIZING AND SHALL BE IN ACCORDANCE WITH ASME B1.20.1 (NPT).

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SECTION 3.0 – BRANCH TABLE

90° BRANCH CONNECTIONS

BRANCH PIPE (NPS)													
	16											E	
	14										E	T	
	12									E	T	T	
	10								E	T	T	T	
	8							E	T	T	W	W	
	6						E	T	T	W	W	W	
	4					E	T	T	W	W	W	W	
	3				E	T	T	TH	TH	TH	TH	TH	
	2			E	T	T	TH	TH	TH	TH	TH	TH	
	1 ½		E	T	T	T	TH	TH	TH	TH	TH	TH	
	1	E	T	T	TH	TH	TH	TH	TH	TH	TH	TH	
		1	1 ½	2	3	4	6	8	10	12	14	16	
HEADER PIPE (NPS)													

LEGEND (STANDARD SYMBOLOGY)

C	CALCULATION IN ACCORDANCE WITH ASME B31.3
E	EQUAL TEE
T	REDUCING TEE
TR	REDUCING TEE + REDUCER
TH	THREADOLET
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	1	3	NPT	SEAMLESS	B36.10	ASTM A106 GR. B / API 5L GR. B, GALVANIZED	46,65, 123,202
PIPE	4	16	BE	SEAMLESS	B36.10	ASTM A106 GR. B	122
NIPPLE	1	2	TBE	AS PIPE, L=100MM	B36.10	ASTM A106 GR. B / API 5L GR. B, GALVANIZED	123,202
FITTINGS							
ELBOW	1	3	THD	90 DEGREE, LR, CL. 3000, FORGED	B16.11	ASTM A105N, GALVANIZED	123
ELBOW	4	16	BE	90 DEGREE, LR, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB	2,122
ELBOW	1	3	THD	45 DEGREE, LR, CL. 3000, FORGED	B16.11	ASTM A105N, GALVANIZED	123
ELBOW	4	16	BE	45 DEGREE, LR, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB	2,122
REDUCER COUPLING	1	3	THD	CL 3000, FORGED	B16.11	ASTM A105N, GALVANIZED	123
REDUCER	4	16	BE	CONCENTRIC, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB	2,122
REDUCER	4	16	BE	ECCENTRIC, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB	2,122
CAP	1	3	THD	CL 3000, FORGED	B16.11	ASTM A105N, GALVANIZED	123
CAP	4	16	BE	WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB	2,122
FULL COUPLING	1	3	THD	CL 3000, FORGED	B16.11	ASTM A105N, GALVANIZED	123
UNION	1	3	THD	CL 3000, FORGED	B16.11	ASTM A105N, GALVANIZED	123
BUSHING	1	3	THD	CL 3000, HEX HEAD BUSHING	B16.11	ASTM A105N, GALVANIZED	123
PLUG	1	3	THD	CL 3000, HEX HEAD PLUG	B16.11	ASTM A105N, GALVANIZED	123
BRANCH FITTINGS							
TEE	1	3	THD	EQUAL, FORGED, CL. 3000	B16.11	ASTM A105N, GALVANIZED	123
TEE	4	16	BE	REDUCING, FORGED, CL. 3000	B16.9	ASTM A234 GR. WPB	2,122

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COMPONENT (TYP)	NPS (INCH)		END	DESCRIPTION	DIM/ MFG STD.	MATERIAL STD	NOTES
	FROM	TO					
BRANCH FITTINGS – CONT'D							
TEE	1 ½	3	THD	REDUCING, CL 3000, FORGED	B16.11	ASTM A105N, GALVANIZED	123
TEE	4	16	BE	REDUCING, WROUGHT, SEAMLESS	B16.9	ASTM A234 GR. WPB	2,122
THREDOLET	1	3	TBE	CL 3000, FORGED	MSS SP-97	ASTM A105N, GALVANIZED	123
WELDOLET	4	8	BE	FORGED, SCH AS PIPE	MSS SP-97	ASTM A105N	2,122
FLANGES							
THREADED	1	3	RF	CL.150	B16.5	ASTM A105N, GALVANIZED	123
THREADED	1	3	FF	CL.150	B16.5	ASTM A105N, GALVANIZED	123
WELDNECK	4	16	RF	CL.150	B16.5	ASTM A105N	2,122
THREADED	1	3	RF	CL.300	B16.5	ASTM A105N, GALVANIZED	33,71,123
WELDNECK	4	16	RF	CL.300	B16.5	ASTM A105N	2,33,71, 122
NIPOFLANGE	1	2	RF	CL.150, L=150 MM	B16.5	ASTM A105N, GALVANIZED	2,73,123
BLIND	1	16	RF	CL.150	B16.5	ASTM A105N, GALVANIZED	123
ORIFICE THREADED	2	3	RF	CL.300	B16.36	ASTM A105N, GALVANIZED	2,54,123
ORIFICE WELDNECK	4	16	RF	CL.300	B16.36	ASTM A105N	2,54,122
LINE BLINDS							
LINE BLIND	1	10	RF	CL.150, SPECTACLE BLIND	B16.48	ASTM A516 GR 70	3,123
LINE BLIND	12	16	RF	CL.150, SPADE & SPACER	B16.48	ASTM A516 GR.70	3
GASKETS							
GASKET	1	16	-	CL.150, SPIRAL WOUND, 4.5MM THK.	B16.20/ B16.5	SP. WINDING + INNER RING: SS316, FILLER: GRAPHITE, CS OUTER RING, LOW STRESS	70
GASKET	1	16	-	CL.300, SPIRAL WOUND, 4.5MM THK.	B16.20/ B16.5	SP. WINDING + INNER RING: SS316, FILLER: GRAPHITE, CS OUTER RING	33,71

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COMPONENT (TYP)	NPS (INCH)		END	DESCRIPTION	DIM/ MFG STD.	MATERIAL STD	NOTES
	FROM	TO					
GASKETS – CONT'D							
INSULATING GASKET	2	16	-	CL.150, RF FLANGE INSULATING GASKET SET, FULL FACE	MANF. STD.	GASKETS AND WASHERS SS316 CORE LAMINATED WITH DIELECTRIC COATING SUITABLE FOR DESIGN CONDCTIONS	86
BOLTS							
STUD BOLT & NUTS	1	16	-	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	1	3	THD	CL.800, THD (FNPT) TO B16.11, SPRING LOADED LIFT CHECK, SCREWED COVER	API 602 + ASME B16.34	BODY: ASTM A105N / ASTM A216 GR.WCB TRIM: SS316+HF	25
CHECK	4	16	RF	CL.150, DUAL PLATE, WAFER TYPE, TO FIT BETWEEN B16.5 FLANGES	API 594	BODY: ASTM A216 GR.WCB TRIM: SS316+HF	25
CHECK	4	16	RF	CL.150, SWING CHECK FLGD TO B16.5	API 6D	BODY: ASTM A216 GR.WCB TRIM: SS316+HF	25
GATE	1	3	THD	CL.800, THD (FNPT) TO B16.11, SOLID WEDGE, STD PORT, OS&Y, UNION BONNET, HANDWHEEL	API 602 + ASME B16.34	BODY: ASTM A105N / ASTM A216 GR.WCB TRIM: SS316+HF	25
GATE	4	16	RF	CL.150, FLGD TO B16.5, FLEXIBLE WEDGE, STD PORT, OS&Y, BOLTED BONNET, HANDWHEEL / GEAR	API 600 + ASME B16.34	BODY: ASTM A216 GR.WCB TRIM: SS316+HF	25
GLOBE	1	3	THD	CL.800, THD (FNPT) TO B16.11, SWIVEL PLUG DISC, OS&Y, UNION BONNET, HANDWHEEL	API 602 + ASME B16.34	BODY: ASTM A105N / ASTM A216 GR.WCB TRIM: SS316+HF	25
GLOBE	4	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: SS316+HF	25
BUTTERFLY	14	16	RF	CL.150, DOUBLE OFFSET, WAFER LUG TYPE TO FIT BETWEEN B16.5 FLANGES, GEAR	API 609, CAT.B	BODY: ASTM A216 GR.WCB TRIM & SEAT: SS316+HF / RPTFE	25
BALL	4	6	RF	CL.150, FLGD TO B16.5, REDUCED BORE, FLOATING BALL, LEVER / GEAR	API 6D	BODY: ASTM A216 GR.WCB TRIM: SS316 SEAT: RPTFE	25,58

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COMPONENT (TYP)	NPS (INCH)		END	DESCRIPTION	DIM/ MFG STD.	MATERIAL STD.	NOTES
	FROM	TO					
VALVES – CONT, D (NOTE-81)							
BALL	8	16	RF	CL.150, FLGD TO B16.5, REDUCED BORE, TRUNNION MOUNTED, GEAR	API 6D	BODY: ASTM A216 GR WCB TRIM: SS316 SEAT: RPTFE	25,58
BALL	2	3	THD	CL.800, THD (FNPT) TO B16.11, REDUCED BORE, FLOATING BALL, LEVER	API 608	BODY: ASTM A216 GR WCB TRIM: SS316 SEAT: RPTFE	25,58
BALL	1	3	THD	CL.800, THD (FNPT) TO B16.11, FULL BORE, FLOATING BALL, LEVER	API 608	BODY: ASTM A105N / ASTM A216 GR WCB TRIM: SS316 SEAT: RPTFE	25,58
BALL	4	6	RF	CL.150, FLGD TO B16.5, FULL BORE, FLOATING BALL, LEVER / GEAR	API 6D	BODY: ASTM A216 GR WCB TRIM: SS316 SEAT: RPTFE	25,58,71
BALL	8	16	RF	CL.150, FLGD TO B16.5, FULL BORE, TRUNNION MOUNTED, GEAR	API 6D	BODY: ASTM A216 GR WCB TRIM: SS316 SEAT: RPTFE	25,58,71