Monsanto

PROJECT SPECIFICATION

PROJECT 1106 LOCATION TEXAS CITY
PROJECT SPECIFICATION FOR PIPING

CLASS 150 STEEL CLASS C CONDENSATE SERVICE

Socketweld (1½) Buttweld (2½) Socketweld & Flanged Steel Valves - 400 F

PSP F2P113

ISSUE 1 DATE 11/76

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MODIFICATIONS NONE

1. APPLICATION This specification is intended for use in hot condensate service requiring extra protection from erosion/corrosion. Use E4.25 STD YF4 for instrument tubing and fittings.

1.1 Service Range System rating is 285 psig at 100F; 245 psig at 400F. See Figure 1 and Table I, p.2 for ratings in detail.

1.2 Temperature Limitations System is limited to 400 F by code restrictions on A53 Type F pipe. Valve DE41K is limited to 350 F.

PLAINTIFF'S EXHIBIT

MON-2610

2. PIPING COMPONENTS

CONSTRUCTION	Slip-on flanges Socketweld fittings					Buttweld fittings										
	Socketweld valves					Flanged valves										
NOMINAL PIPE SIZE	1/2	3/4	1	1½	2	3	4	6	8	10	12	14	16	18	20	24
PIPE	CW CS; A53 tp F (1F2)					ERW CS; API5L/A53 tp E Gr A (1F3) •										
	Extra Strong Weight					Standard Weight										
NIPPLES	Carbon steel; A53 type F XS weight															
FITTINGS	CS; A105; 3000 lb. socketweld; B16.11					Carbon steel; A234 Gr WPB; buttweld; B16.9 (par 3.4) XS wt Standard weight										
COUPLINGS	Carbon steel; A105 3000 lb; socketweld															
UNIONS	Carbon steel; A105 3000 lb; socketweld															
OUTLETS	Carbon steel; A105 3000 lb; socketweld					Carbon steel; A105 XS bore Standard weight bore										
FLANGED JOINT	CS; A105; CL 150; slip-on; B16.5 0.06 in. raised face Compressed asbestos flat ring gasket; Class 150; 1/8" thick; Garlock 7021 or equal. Carbon steel; A307 Gr B; heavy hexagonal head bolts and heavy hex nuts. P03-0621															
FLANGES, ORIFICE																
ELECTRODES	Bare: AWS A5.18 Class ER70S-2 Coated: AWS A5.1 series E60															
PRESSURE CONN *	Detail P17 Valve: 1/2 FA151					Detail P17 Valve: 3/4 FA152										
VENT *	Detail V2					Detail V13 Valve: 3/4 DE1K										
DRAIN *	Detail D9 Valve: 1/2 DE1K					Det D13 1/2 DE1K	Detail D13 Valve: 1 DE1K		Detail D21 Valve: 1½ DE1K			Detail D24 Valve: 2 DE41K				
TW CONNECTION *	P25-0031															
ORIFICE CONNECTION *																
DIRECTIONAL CHANGES	Socketweld ells					Buttweld ells										
LINE SIZE CHANGES	Socketweld reducer					Buttweld reducer										
BRANCHES	P13-0231 (par 3.3)															
NOMINAL PIPE SIZE	1/2	3/4	1	1½	2	3	4	6	8	10	12	14	16	18	20	24
GATE VALVE	FA37 800 lb socketweld					FA44 FA41 Class 150 flanged, RF										
GLOBE/ANGLE VALVE	FB37/FL37 800 lb socketweld					FB42/FL42 Class 150 flanged, RF										
SWING CHECK VALVE (VERT OR HOR USE)	FC36 800 lb socketweld					FC41 Class 150 flanged, RF										
LIFT CHECK VALVE (HOR USE)	FC37 800 lb socketweld															
BALL VALVE See par 3.2	FP33 300 lb socketweld					DP41 Class 150 flanged, RF										
PLUG VALVE						DE1K Class 150 (350F max)										

Piping Installation Details (PIDs) are referred to on this document. PIDs must be listed on each isometric drawing as they apply. PIDs are found in Section 20 of this manual.

3. MATERIAL

3.1

3.2 Ball Valves Specify stem extension length for ball valves by a dash suffix number per MCo P4.2 STD 1 Table VIII for insulated piping systems.

3.3 Branches Use unreinforced stub-ins in accordance with Table IA, if: (1) Design pressure (corrected to 100F) does not exceed value in Table IA for any planned branches. (2) Piping flexibility and stresses are within acceptable limits. Otherwise, use branch construction in Table IB.

3.4 Optional Materials 304SS materials should be used, (sized not larger than NPS 2) in high velocity or flashing steam condensates, for a distance equal to about 100 nominal pipe diameters beyond trap.

ITEM	PIPE VICINITY FLASH	PIPE BEYOND TRAP VICINITY
fittings	A182 Gr F304 to NPS 1½ A403 Gr WP304 NPS 2	Carbon steel; A105
pipe	A312 Gr TP304; Sch 10S	A53 Tp F-CS (ES)

SC 15466

• 1F2, 1F3, etc., See P3.1 STD 1F2, 1F3.

*THE DETAILS FOR THESE CONN ARE FOUND IN P5.5. REF. ARE TO A53 GR A/B ST'D UNLESS NOTED. PUBLISHED AS P12-0421 ARE IN SECT. 20 OF THIS MANUAL

SOURCE CEA 1196 P2.2 STD F2P256 Issue 1

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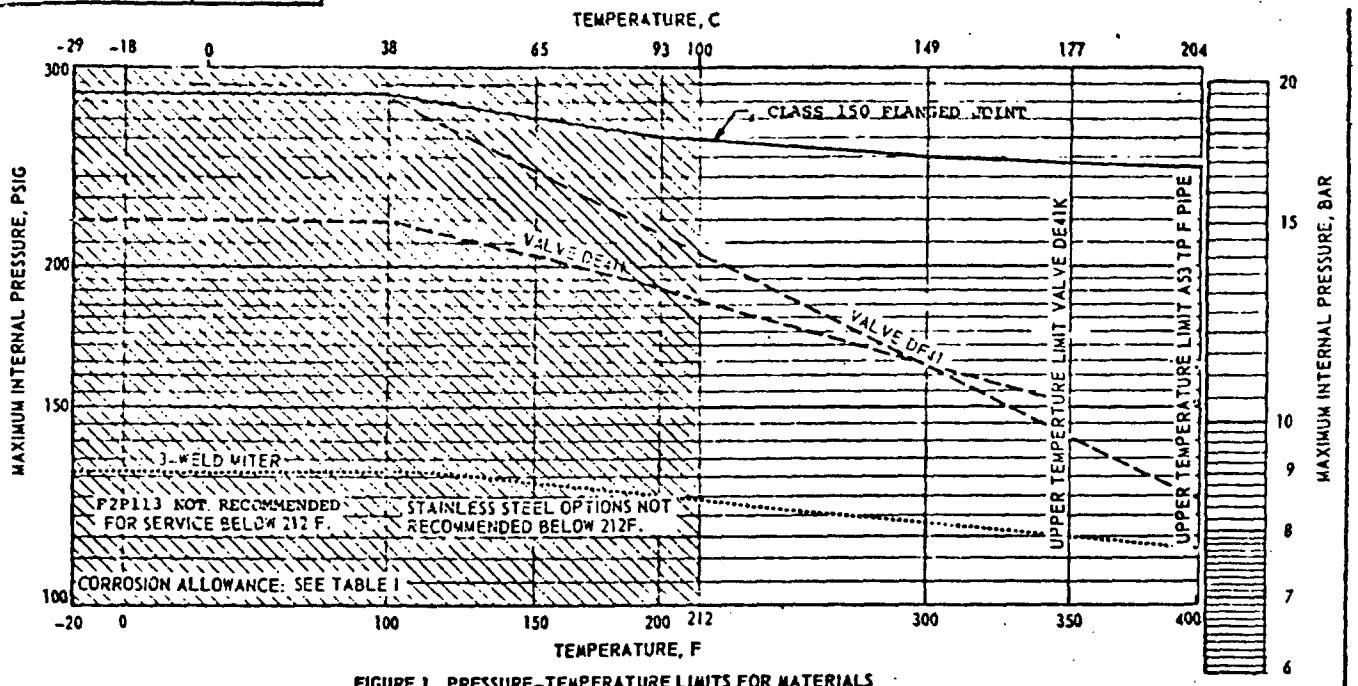


FIGURE I. PRESSURE-TEMPERATURE LIMITS FOR MATERIALS

TABLE I. BRANCH CONSTRUCTION (SEE PAR. 3.3, P. 1) †

(SHORT CODE T) TABLE IA. UNREINFORCED (STUB-IN) BRANCHES – ALLOWABLE PRESSURE*, psig

HEADER SIZE, NPS	½	¾	1	1½	2	3	4	6	8	10	12	14	16	18	20	24	
	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	SCHEDULE
	.147	.154	.179	.200	.218	.216	.237	.280	.322	.365	.375	.375	.375	.357	.375	.375	NOM WALL THK, in.
	.091	.093	.111	.120	.128	.109	.111	.151	.167	.182	.184	.171	.150	.129	.109	.067	CORR ALLOW., in.
	.938	.042	.046	.055	.062	.080	.096	.094	.115	.137	.144	.157	.178	.199	.219	.261	RETIREMENT THK, in.
	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285	PIPE RATING, psig ?
																	3-WELD MITER RTG, psig
	TTS	TTS	TTS	TTS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TCS	TCS	TCS	TCS	½
		TTS	TTS	TTS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TCS	TCS	TCS	TCS	¾
24		TTW		TTS	TTS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TCS	TCS	TCS	TCS	1
20	9/16	26.5	TTW		TTS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TCS	TCS	TCS	TCS	1½
18	9/16	23.5	23.5	TTW		282	282	269	270	241	222	210	204	196	191	185	178	3/8	2
16	9/16	21.0	21.0	21.0	TTW		253	231	231	211	198	190	186	180	176	172	168	3/8	3
14	9/16	18.5	18.0	18.0	18.0	TTW		214	214	198	188	181	177	173	170	167	163	3/8	4
12	9/16	16.5	16.5	16.5	16.5	16.5	TTW		207	192	183	177	174	170	167	164	161	7/16	6
10	9/16	14.0	14.0	14.0	14.0	14.0	14.0	TTW		193	184	177	174	170	168	164	161	1/2	8
8	1/2	11.5	11.0	11.0	11.0	11.0	11.0	11.0	TTW		185	178	175	171	168	165	162	9/16	10
6	7/16	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	TTW		174	171	168	165	162	159	9/16	12
4	3/8	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	TTW		169	166	163	161	158	9/16	14
3	3/8	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	TTW		164	162	159	157	9/16	16
2	3/8	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	TTW		161	158	155	9/16	18
1½		TCS	TCS	TCS	TCS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TTS		157	155	9/16	20
1		TCS	TCS	TCS	TCS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TTS	TTS		153	9/16	24
¾		TCS	TCS	TCS	TCS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TTS	TTS	TTS			
½		TCS	TCS	TCS	TCS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TWS	TTS	TTS	TTS	TTS		
WELD, PAD TO RUN, in.		9/16	9/16	1/2	1/2	3/8	3/8	3/8	5/16	5/16	3/16	3/16							
REINF PAD THK, in.		.75	.75	.625	.625	.5	.5	.5	.375	.375	.25	.25							
		24	20	18	16	14	12	10	8	6	4	3	2	1½	1	¾	½		

TABLE IB. BRANCH SIZE, NPS — WELD, PAD TO BRANCH, in. — TABLE IA. BRANCH SIZE, NPS — WELD, BRANCH TO RUN, in.

HEADER SIZE, NPS

(SHORT CODE TB) TABLE IB.1 FULL STRENGTH BRANCHES – CONSTRUCTION METHODS

* BASED ON STRESS OF 9000 PSI AT 100F, SIZES THROUGH 4" OD AT 650F AT 100F, SIZES 6 AND LARGER.
† TTS=SOCKET WELD TEE, TTW=BUTT WELD TEE, TWS=SOCKET WELD OUTLET, TCS=SOCKET WELD COUPLING. WHOLE NUMBER=UNREINFORCED STUB-IN, OR CALCULATED NUMBER=REINFORCED STUB-IN.
BRANCH RATING IN PSIG FOR STUB-IN INSTALLATIONS PER P13-0231 ARE INDICATED BY WHOLE NUMBERS SUCH AS 179 FOR NPS 10 BRANCH ON NPS 12 RUN. DIAMETER OF PAD IN INCHES FOR REINFORCED STUB-IN INSTALLATIONS PER P13-0231 ARE INDICATED BY NUMBERS WITH A DECIMAL SUCH AS 4.0 FOR NPS 2 BRANCH ON NPS 3 RUN. RETIREMENT THICKNESS IS THICKNESS IN CORRODED CONDITION AT WHICH PIPE SHOULD BE REMOVED FROM SERVICE.

TABLE II. PIPE TEMPERATURE CORRECTION FACTORS

TEMPERATURE, F	MIN TO 100	200	300	400
FACTOR	1.0	.95	.91	.85