



Process Industry Practices
Piping

PIP PN03CS1S01
Piping Material Specification 3CS1S01
Class 300, Carbon Steel, 0.063" C.A.
Process

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In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determinations concerning fitness for purpose and particular matters or application of the Practice to particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

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TECHNICAL CORRECTION
May 2001

PIP PN03CS1S01
Piping Material Specification Line Class 3CS1S01

SERVICE:	Process	MATERIAL:	Carbon Steel
RATING CLASS:	300, ASME B16.5a-1998	DESIGN CODE:	ASME B31.3-1999
TEMPERATURE LIMIT:	-20F to 800F (Note 09, 27)	STRESS RELIEF:	Per ASME B31.3
NOMINAL CORROSION ALLOWANCE:	0.063 in. (0.05 in. MIN)	EXAMINATION:	Per ASME B31.3

PRESSURE - TEMPERATURE RATINGS

TEMP F	-20 to 100	200	300	400	500	600	700	800
TEMP C	-29 to 38	93	149	204	260	316	371	427

For NPS 1/2 through NPS 10 (Full flange ratings per ASME B16.5, Table 2-1.1.)

psig	740	675	655	635	600	550	535	410
kPag	5100	4655	4515	4380	4135	3790	3690	2825

For NPS 12 through NPS 48 (Note 01)

psig	Calc	Calc	Calc	Calc	Calc	Calc	Calc	Calc
kPag	Calc	Calc	Calc	Calc	Calc	Calc	Calc	Calc

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION
PIPE	01, 19, 136	1/2 – 1-1/2	XS		CS, SMLS, ASTM A106-B or A53-B, type S or API 5L-B (E _j =1.00)
		2 – 10	STD		CS, ERW, ASTM A53-B type E (E _j =0.85)
		12 – 24	Calc		CS, ERW, ASTM A53-B type E (E _j =0.85)
		26 – 48	Calc		CS, DSAW, API 5L-B, straight seam (E _j =0.95)
NIPPLES	03, 19				
Branch		1/2 – 1-1/2	XS		CS, SMLS, ASTM A106-B or A53-B, type S or API 5L-B (E _j =1.00)
Swage (CONC)		1/2 – 1-1/2	XS		CS, ASTM A234-WPB-S, MSS SP-95
Swage (ECC)		1/2 – 1-1/2	XS		CS, ASTM A234-WPB-S, MSS SP-95
FITTINGS	02				
Socket		1/2 – 1-1/2	Class 3000	Weld	CS, ASTM A105, MSS SP-97
Thredolet	03	1/2 – 2	Class 3000	Weld	CS, ASTM A105, MSS SP-97
SW Latrolet		1/2 – 1-1/2	Class 3000	Weld	CS, ASTM A105
THRD Latrolet	03	1/2 – 2	Class 3000	Weld	CS, ASTM A105
SW Elbolet		1/2 – 1-1/2	Class 3000	Weld	CS, ASTM A105
THRD Elbolet	03	1/2 – 2	Class 3000	Weld	CS, ASTM A105
90 ELL		1/2 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11
45 ELL		1/2 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11
Tee		1/2 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11
Tee (RED)		1/2 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11
Plug	03	1/2 – 2		THRD	CS, ASTM A105, round head, ASME B16.11
Coupling		1/2 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11
Coupling (RED)		1/2 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11
Coupling	03	1/2 – 2	Class 3000	THRD	CS, ASTM A105, ASME B16.11
Coupling (RED)	03	1/2 – 2	Class 3000	THRD	CS, ASTM A105, ASME B16.11
Cap		1/2 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11
Cap	03	1/2 – 2	Class 3000	THRD	CS, ASTM A105, ASME B16.11
Reducing Insert		1/2 – 1-1/2	Class 3000	SW	CS, ASTM A105, MSS SP-79
Union (GJ)		1/2 – 1-1/2	Class 3000	SW	CS, ASTM A105, integral seat, MSS SP-83
Reducer (CONC)		2 – 48		Weld	CS, ASTM A234-WPB-W, ASME B16.9
Reducer (ECC)		2 – 48		Weld	CS, ASTM A234-WPB-W, ASME B16.9
Weldolet	05	2 – 42		Weld	CS, ASTM A105, MSS SP-97
90 LR ELL		2 – 48		Weld	CS, ASTM A234-WPB-W, ASME B16.9
45 LR ELL		2 – 48		Weld	CS, ASTM A234-WPB-W, ASME B16.9
Tee		2 – 48		Weld	CS, ASTM A234-WPB-W, ASME B16.9
Cap		2 – 48		Weld	CS, ASTM A234-WPB-S, ASME B16.9

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	
VALVES						
Gate	15	1/2 – 2	Class 300	RF	CS body w/ 13 CR trim, HF ST	GA03CB500
Gate		1/2 – 2	Class 800	SW	CS body w/ 13 CR trim, HF ST	GA08CB300
Gate	06	1/2 – 2	Class 800	T/SW	CS body w/ 13 CR trim, HF ST	GA08CB200
Gate		3 – 24	Class 300	RF	CS body w/ 13 CR trim, HF ST, FP	GA03CB501
Gate		26 – 48	Class 300	RF	CS body w/ 13 CR trim, HF ST, FP	GA03CB502
Globe		1/2 – 2	Class 800	SW	CS body w/ 13 CR trim, HF ST	GL08CB300
Globe		3 – 12	Class 300	RF	CS body w/ 13 CR trim, HF ST	GL03CB501
Lift Check	61	1/2 – 2	Class 800	SW	CS body w/ 13 CR trim, HF ST, piston	CL08CB300
Swing Check	62	3 – 24	Class 300	RF	CS body w/ 13 CR trim, HF ST	CS03CB500
Swing Check	62	26 – 48	Class 300	RF	CS body w/ 13 CR trim, HF ST	CS03CB501
Dual PLT Check	07, 26, 63	3 – 24	Class 300		CS body w/ 410 SS disc/ST	CD03CB700
Dual PLT Check	07, 26, 63	26 – 48	Class 300		CS body w/ 410 SS disc/ST	CD03CB701
Ball	09	1/2 – 2	Class 300	SW	CS body w/ 316 SS trim, RTFE ST	BA03CB300
Ball	09	3 – 4	Class 300	RF	CS body w/ 316 SS trim, RTFE ST	BA03CB500
Ball	08, 09	3 – 4	Class 300	RF	CS body w/ 316 SS trim, RTFE ST, FP	BA03CB501
Ball	09	6 – 10	Class 300	RF	CS body w/ 316 SS trim, RTFE ST, GO	BA03CB505
Ball	09	12 – 24	Class 300	RF	CS body w/ 316 SS trim, RTFE ST, GO	BA03CB502
Ball	09	26 – 48	Class 300	RF	CS body w/ 316 SS trim, RTFE ST, GO	BA03CB506
Ball	08, 09	6 – 8	Class 300	RF	CS body w/ 316 SS trim, RTFE ST, GO, FP	BA03CB504
Ball	08, 09	10 – 24	Class 300	RF	CS body w/ 316 SS trim, RTFE ST, GO, FP	BA03CB503
Ball	08, 09	26 – 48	Class 300	RF	CS body w/ 316 SS trim, RTFE ST, GO, FP	BA03CB507
Lug Butterfly	09	3 – 24	Class 300		CS body w/ 316 SS trim, RTFE ST, GO	BF03CB700
Lug Butterfly	09	26 – 48	Class 300		CS body w/ 316 SS trim, RTFE ST, GO	BF03CB701
Plug	09	1/2 – 3	Class 300	RF	CS body w/ 316 SS trim, PTFE sleeve lined	PL03CB500
Plug	09	4 – 18	Class 300	RF	CS body w/ 316 SS trim, PTFE sleeve lined, GO	PL03CB501
FLANGES						
Socket Weld	02	1/2 – 1-1/2	Class 300	RF	CS, ASTM A105, ASME B16.5	
Blind		1/2 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5	
Blind		26 – 48	Class 300	RF	CS, ASTM A105, ASME B16.47 Series B	
Slip-On		2 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5	
Weld Neck	13	2 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5	
Weld Neck	13	26 – 48	Class 300	RF	CS, ASTM A105, ASME B16.47 Series B	
Pair WN Orifice		2 – 24	Class 300	RF	CS, ASTM A105, ASME B16.36, SW taps	
GASKETS						
		1/2 – 24	Class 300		1/16" thick flexible graphite w/ 304 or 316 SS corrugated insert, ASME B16.21	
		26 – 48	Class 300		Spiral wound type 304 SS, w/ flexible graphite filler, ASME B16.20, ASME B16.47 Series B dimensions	
BOLTING						
Stud Bolts					ASTM A193, Gr B7 stud w/ 2 heavy hex nuts ASTM A194, Gr 2H	

TECHNICAL CORRECTION

May 2001

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90° BRANCH CONNECTION

Legend and Chart

[illegible]

E	Reducing Tee
P	Branch Weld w/ Reinforcing Pad (Pad thickness equals run pipe thickness. Pad width equals 1/2 branch OD.)
S	Sockolet
T	Tee
W	Weldolet (Note 05)

NOTES:

- 01 Where pipe schedule is shown under “SCH/RAT,” it is adequate for the full flange rating. Where “Calc” is shown, the pressure limit may be lower
than flange rating.
- 02 All butt welded component thicknesses shall match pipe thicknesses.
- 03 Threaded joints are permitted only at outlet of vent and drain valves, at hydrostatic connections, at outlet of instrument take-off valves, and to match
equipment.
- 05 Integrally reinforced branch connections are permitted outside the sizes shown in the branch connection table. Designer shall check weld thickness of
integrally reinforced connections to determine if PWHT is required.
- 06 These valves shall be used for vent, drain and instrument connections only.
- 07 These valves have no flanges, but are installed between line flanges with extra length bolts.
- 08 Full port valves shall be used when indicated on P&ID.
- 09 Pressure and temperature rating may be limited by certain components permitted by this specification. Refer to manufacturer’s recommended
pressure-temperature restrictions.
- 13 Weld neck flanges shall be used against butt welded fittings. Otherwise, use slip-on flanges.
- 15 To be used when mating to flanged nozzles.
- 19 Sch 160 pipe and pipe nipples shall be used for threaded connections for sizes NPS 1/2 – 1-1/2.
- 26 To be used only when indicated on the P&ID.
- 27 Pipe and pipe components thicker than 1/2-inch may require impact tested materials when the minimum design metal temperature is below 100F
(38C) (See ASME B31.3, paragraph 323.2.2).
- 61 Install in horizontal position with cover up.
- 62 Install in horizontal position with cover up or in vertical position with upward flow.
- 63 Install in horizontal position with hinge pin vertical or in vertical position with upward flow.
- 136 Sch XS pipe shall be used for threaded connections for size NPS 2.

REFERENCES:

Process Industry Practices (PIP)

PIP PNF0200 - *Vents, Drains, and Instrument Connection Details*
 PIP PNSMV003 - *Carbon Steel Gate Valve Descriptions*
 PIP PNSMV004 - *Carbon Steel Globe Valve Descriptions*
 PIP PNSMV005 - *Carbon Steel Check Valve Descriptions*
 PIP PNSMV006 - *Carbon Steel Ball Valve Descriptions*
 PIP PNSMV007 - *Carbon Steel Butterfly Valve Descriptions*
 PIP PNSMV008 - *Carbon Steel Plug Valve Descriptions*