



PACIFIC STATES CAST IRON PIPE COMPANY

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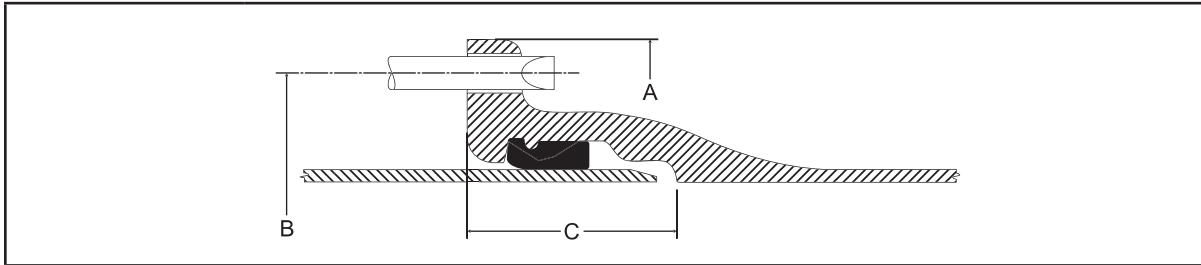
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Mechanical with Tyton® Joint

Drawings and Dimensions



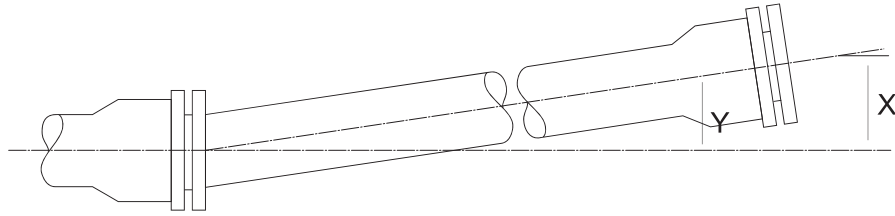
Size	OD	A	B	C
6	6.90	11.06	9.50	3.38
8	9.05	13.31	11.75	3.69
10	11.10	15.62	14.00	3.75
12	13.20	17.88	16.25	3.75
14	15.30	20.25	18.75	5.00
16	17.40	22.50	21.00	5.00
18	14.50	24.25	23.25	5.00
20	21.60	27.00	25.50	.25
24	25.80	31.50	30.00	.50

Mechanical with TYTON JOINT® Pipe Assembly

- Step 1.** Thoroughly clean out the bell with special attention to the gasket recess. Remove any foreign material or excess paint. Clean the spigot or beveled plain end and remove any sharp edges with a standard file.
- Step 2.** After making sure that the correct gasket is being used, insert it into the recess in the bell with the small end of the gasket facing the bell face.
- Step 3.** Place the wedge type restraining device on the plain end with the lip extension toward the plain end.
- Step 4.** Apply lubricant to the inside surface only of the gasket, making sure that the entire surface is coated. Apply a generous coating of lubricant to the beveled portion of the plain end. Guide the plain end into the bell and, while maintaining straight alignment, push the plain end into the bell socket.
- Step 5.** Insert and start the nuts on the T-head bolts.
- Step 6.** Deflect the joint to the desired alignment. When assembly is complete, the bell face should be aligned between the two white depth rings.
- Step 7.** Tighten the T-head bolts to finger tight.
- Step 8.** Tighten the wedge type restraining device to the manufactures recommended torque.



MAXIMUM DEFLECTION FOR FULL LENGTH PIPE



MECHANICAL with TYTON JOINT® PIPE
Maximum Allowable Joint Deflection

Pipe Size In.	Y-Maximum Joint Deflection in Degrees	X Deflection in Inches 18 ft. Length	Approximate Radius in ft. of Curve Produced by Succession of Joints 18 ft. Length
6	5°	19	205
8	5°	19	205
10	5°	19	205
12	5°	19	205
14	5°	19	205
16	5°	19	205
18	5°	19	205
20	5°	19	205
24	5°	19	205



FIELD CUTTING MECHANICAL WITH TYTON JOINT® PIPE

When it is necessary to field cut ductile iron pipe, the installer should select a piece of pipe that has been marked for field cutting. All ductile iron pipe has a slight taper due to the manufacturing process. If the pipe is not marked for field cutting then the diameter of the pipe should be checked prior to cutting. This can be done with an OD tape or by using an MJ follower to check the diameter of the pipe. No pipe should be cut within 24 inches of the bell face.

<i>Pipe Size In.</i>	<i>Min. Pipe Diameter In.</i>	<i>Max. Pipe Diameter In.</i>	<i>Min. Pipe Circumference In.</i>	<i>Max. Pipe Circumference In.</i>
6	6.84	6.96	21-1/2	21-7/8
8	8.99	9.11	28-1/4	28-5/8
10	11.04	11.16	34-11/16	35-1/16
12	13.14	13.26	41-9/32	41-21/32
14	15.22	15.35	47-13/16	48-7/32
16	17.32	17.45	54-13/32	54-13/16
18	19.42	19.55	61	61-13/32
20	21.52	21.65	67-19/32	68
24	25.72	25.85	80-13/16	81-7/32

Above Table Based on ANSI/AWWA C151/A21.51 Guidelines for Push-On Joints.



PRESSURE CLASS SUBMITTAL MECHANICAL WITH TYTON JOINT®

Selection Table for Laying Conditions

This table shows pressure class of pipe necessary for the rated water working pressures and maximum depth of cover. The thicknesses in this table are equal to or in excess of those required to withstand the rated working pressures plus a surge allowance of 100 psi. Ductile iron pipe for working pressures higher than 350 psi is available.

Pipe Size In.	Pressure Class psi	Nominal Thickness In.	Laying Conditions				
			Type 1 Trench	Type 2 Trench	Type 3 Trench	Type 4 Trench	Type 5 Trench
			Maximum depth of cover ‡-ft				
6	350	0.25	26	31	37	47	65
8	350	0.25	16	20	25	34	50
10	350	0.26	11**	15	19	28	45
12	350	0.28	10**	15	19	28	44
14	250	0.28	††	11**	15	23	36
	300	0.30	††	13	17	26	42
	350	0.31	††	14	19	27	44
16	250	0.30	††	11**	15	24	34
	300	0.32	††	13	17	26	39
	350	0.34	††	15	20	28	44
18	250	0.31	††	10**	14	22	31
	300	0.34	††	13	17	26	36
	350	0.36	††	15	19	28	41
20	250	0.33	††	10	14	22	30
	300	0.36	††	13	17	26	35
	350	0.38	††	15	19	28	38
24	200	0.33	††	8**	12	17	25
	250	0.37	††	11	15	20	29
	300	0.40	††	13	17	24	32
	350	0.43	††	15	19	28	37

‡An allowance for a single H-20 truck with 1.5 impact factor is included for all depths of cover.

§Calculated maximum depth of cover exceeds 100 ft (30.5 m).

**Minimum allowable depth of cover is 3 ft (0.9 m).

††For pipe 14 in. (350 mm) and larger, consideration should be given to the use of laying conditions other than Type 1.



PRESSURE CLASS SUBMITTAL MECHANICAL WITH TYTON JOINT®

Thickness, Dimensions and Weights of by Size for Each Pressure Class

Size	Pressure Class	Nominal Thickness In.	OD* In.	Wt. of Barrel Per Ft. † Lb.	Wt. of Bell Lb.	Nominal Wt. Per Lgth. † Lb.	Nom. Wt Per Ft. ‡ Lb.	Laying** Length
6	350	0.25	6.90	16.00	18	315	17.38	18.125
8	350	0.25	9.05	21.10	24	410	22.62	18.125
10	350	0.26	11.10	27.10	31	530	29.24	18.125
12	350	0.28	13.20	34.80	37	680	37.52	18.125
14	250	0.28	15.30	40.40	61	810	44.69	18.125
	300	0.30	15.30	43.30	61	860	47.45	18.125
	350	0.31	15.30	44.70	61	885	48.83	18.125
16	250	0.30	17.40	49.30	74	980	54.07	18.125
	300	0.32	17.40	52.50	74	1040	57.38	18.125
	350	0.34	17.40	55.80	74	1100	60.69	18.125
18	250	0.31	19.50	57.20	85	1140	62.90	18.125
	300	0.34	19.50	62.60	85	1235	68.14	18.125
	350	0.36	19.50	66.20	85	1300	71.72	18.125
20	250	0.33	21.60	67.50	98	1325	73.10	18.125
	300	0.36	21.60	73.50	98	1445	79.72	18.125
	350	0.38	21.60	77.50	98	1500	82.76	18.125
24	200	0.33	25.80	80.80	123	1605	88.55	18.125
	250	0.37	25.80	90.50	123	1778	98.10	18.125
	300	0.40	25.80	97.70	123	1910	105.38	18.125
	350	0.43	25.80	104.90	123	2040	112.55	18.125

* Tolerances of OD of spigot end; 3-12 in ±0.06 in., 14-24 in. +0.05 in., -0.08 in.

** Average lengths only. Variances may occur as a result of foundry processes or installation.

† Including bell; calculated weight of pipe rounded off to the nearest 5 lb.

‡ Including bell; average weight per foot, based on calculated weight of pipe before rounding.



THICKNESS CLASS SUBMITTAL MECHANICAL WITH TYTON JOINT®

Selection Table for Laying Conditions

This table shows thickness class of pipe necessary for the rated water working pressures and maximum depth of cover. The thicknesses in this table are equal to or in excess of those required to withstand the rated working pressures plus a surge allowance of 100 psi. Ductile iron pipe for working pressures higher than 350 psi is available.

Pipe Size In.	Thickness Class	Nominal Thickness In.	Rated Water Working Press. psi	Laying Condition				
				Maximum Depth of Cover, Feet ‡				
				Type 1 Trench	Type 2 Trench	Type 3 Trench	Type 4 Trench	Type 5 Trench
6	50	.25	350	32	38	44	56	75
6	51	.28	350	49	57	64	80	100*
6	52	.31	350	67	77	86	100*	100*
6	53	.34	350	91	100*	100*	100*	100*
6	54	.37	350	100*	100*	100*	100*	100*
6	55	.40	350	100*	100*	100*	100*	100*
6	56	.43	350	100*	100*	100*	100*	100*
8	50	.27	350	25	30	36	46	64
8	51	.30	350	36	42	49	61	81
8	52	.33	350	47	54	62	77	99
8	53	.36	350	64	73	82	100*	100*
8	54	.39	350	80	91	100*	100*	100*
8	55	.42	350	98	100*	100*	100*	100*
8	56	.45	350	100*	100*	100*	100*	100*
10	50	.29	350	19	24	29	38	55
10	51	.32	350	27	32	38	49	66
10	52	.35	350	35	41	47	59	79
10	53	.38	350	45	52	59	74	95
10	54	.41	350	57	65	74	91	100*
10	55	.44	350	67	77	86	100*	100*
10	56	.47	350	81	92	100*	100*	100*
12	50	.31	350	17	22	27	36	52
12	51	.34	350	23	28	33	43	60
12	52	.37	350	30	35	41	53	71
12	53	.40	350	36	42	49	61	81
12	54	.43	350	45	52	59	74	95
12	55	.46	350	54	62	71	87	100*
12	56	.49	350	64	73	83	100*	100*

‡An allowance for single H-20 truck with 1.5 impact factor is included for all depths of cover.

*Calculated maximum depth of cover exceeds 100 ft.

§Calculated maximum depth of cover is 3ft (0.9 m).

††For pipe 14 in. (350 mm) and larger, consideration should be given to the use of laying conditions other than Type 1.



THICKNESS CLASS SUBMITTAL MECHANICAL WITH TYTON JOINT®

Selection Table for Laying Conditions

Pipe Size In.	Thickness Class	Nominal Thickness In.	Rated Water Working Press. psi	Laying Conditions				
				Maximum Depth of Cover, Feet ‡				
				Type 1 Trench	Type 2 Trench	Type 3 Trench	Type 4 Trench	Type 5 Trench
14	50	.33	350	15	19	24	33	49
14	51	.36	350	19	23	28	38	55
14	52	.39	350	24	29	34	44	62
14	53	.42	350	30	35	41	53	71
14	54	.45	350	36	42	49	61	81
14	55	.48	350	43	50	57	71	92
14	56	.51	350	52	59	67	83	100*
16	50	.34	350	13	17	21	30	47
16	51	.37	350	16	21	25	34	51
16	52	.40	350	20	25	30	40	57
16	53	.43	350	25	30	36	46	64
16	54	.46	350	30	35	41	53	71
16	55	.49	350	35	41	47	59	79
16	56	.52	350	41	48	55	68	89
18	50	.35	350	11	15	20	29	42
18	51	.38	350	14	19	23	32	49
18	52	.41	350	18	22	27	36	53
18	53	.44	350	22	26	31	41	58
18	54	.47	350	25	30	36	46	64
18	55	.50	350	30	35	41	53	71
18	56	.53	350	35	41	47	59	79
20	50	.36	300	10	14	18	27	38
20	51	.39	350	13	17	21	30	44
20	52	.42	350	16	20	25	34	50
20	53	.45	350	19	23	28	38	54
20	54	.48	350	22	27	32	42	59
20	55	.51	350	26	31	37	47	65
20	56	.54	350	30	35	41	53	71
24	50	.38	250	8	12	17	23	31
24	51	.41	300	10	15	19	27	36
24	52	.44	350	13	17	21	30	41
24	53	.47	350	15	19	24	33	47
24	54	.50	350	18	22	27	36	53
24	55	.53	350	20	25	30	40	57
24	56	.56	350	24	29	34	44	61

‡An allowance for single H-20 truck with 1.5 impact factor is included for all depths of cover.

*Calculated maximum depth of cover exceeds 100 ft.

§Calculated maximum depth of cover is 3ft (0.9 m).

††For pipe 14 in. (350 mm) and larger, consideration should be given to the use of laying conditions other than Type 1.



THICKNESS CLASS SUBMITTAL MECHANICAL WITH TYTON JOINT® PIPE

Thickness, Dimensions and Weights of Pipe by Size for Each Thickness

Pipe Size In.	Thickness Class	Nominal Thickness In.	OD* In.	Wt. of Barrel Per Ft. † Lb.	Wt. of Bell Lb.	Nominal Wt. Per Lgth. † Lb.	Nom. Wt. Per Ft. ‡ Lb.	Laying** Length Ft.
6	50	.25	6.90	16.00	29	315	17.71	18.125
6	51	.28	6.90	17.80	29	345	19.37	
6	52	.31	6.90	19.60	29	380	21.30	
6	53	.34	6.90	21.40	29	410	22.95	
6	54	.37	6.90	23.20	29	445	24.88	
6	55	.40	6.90	25.00	29	475	26.54	
6	56	.43	6.90	26.70	29	505	28.19	
8	50	.27	9.05	22.80	51	445	25.43	18.125
8	51	.30	9.05	25.20	51	490	27.64	
8	52	.33	9.05	27.70	51	535	30.12	
8	53	.36	9.05	30.10	51	575	32.61	
8	54	.39	9.05	32.50	51	620	35.09	
8	55	.42	9.05	34.80	51	660	37.30	
8	56	.45	9.05	37.20	51	705	39.78	
10	50	.29	11.10	30.10	66	590	33.60	18.13
10	51	.32	11.10	33.20	66	645	36.91	
10	52	.35	11.10	36.20	66	695	39.94	
10	53	.38	11.10	39.20	66	750	42.70	
10	54	.41	11.10	42.10	66	805	45.74	
10	55	.44	11.10	45.10	66	860	48.77	
10	56	.47	11.10	48.00	66	910	51.53	
12	50	.31	13.20	38.40	79	750	42.21	18.13
12	51	.34	13.20	42.00	79	815	45.79	
12	52	.37	13.20	45.60	79	880	49.66	
12	53	.40	13.20	49.20	79	945	53.24	
12	54	.43	13.20	52.80	79	1010	56.55	
12	55	.46	13.20	56.30	79	1070	59.86	
12	56	.49	13.20	59.90	79	1135	63.45	
14	50	.33	15.30	47.50	148	935	54.90	18.13
14	51	.36	15.30	51.70	148	1010	59.31	
14	52	.39	15.30	55.90	148	1085	63.45	
14	53	.42	15.30	60.10	148	1160	67.59	
14	54	.45	15.30	64.20	148	1235	71.72	
14	55	.48	15.30	68.40	148	1310	75.59	
14	56	.51	15.30	72.50	148	1385	79.72	

†Including bell; calculated weight of pipe rounded off to the nearest 5lb.

‡Including bell; average weight per foot, based on calculated weight of pipe before rounding.

*Tolerances of OD of spigot end; 3-12 in. ±0.06 in., 14-24 in. +0.05 in., -0.08 in.

**Average lengths only. Variances may occur as a result of foundry processes or installation.



THICKNESS CLASS SUBMITTAL MECHANICAL WITH TYTON JOINT® PIPE

Thickness, Dimensions and Weights of Pipe by Size for Each Thickness

Page Size In.	Thickness Class	Nominal Thickness In.	OD* In.	Wt. of Barrel Per Ft. † Lb.	Wt. of Bell Lb.	Nominal Wt. Per Lgth. † Lb.	Nom. Wt. Per ft. ‡ Lb.	Laying** Length
16	50	.34	17.40	55.80	74	1100	60.69	18.125
16	51	.37	17.40	60.60	74	1185	65.38	
16	52	.40	17.40	65.40	74	1270	70.07	
16	53	.43	17.40	70.10	74	1355	74.76	
16	54	.46	17.40	74.90	74	1445	79.72	
16	55	.49	17.40	79.70	74	1530	84.41	
16	56	.52	17.40	84.40	74	1615	89.10	
18	50	.35	19.50	64.40	85	1270	70.07	18.125
18	51	.38	19.50	69.80	85	1365	75.31	
18	52	.41	19.50	75.20	85	1465	80.83	
18	53	.44	19.50	80.60	85	1560	86.07	
18	54	.47	19.50	86.00	85	1660	91.59	
18	55	.50	19.50	91.30	85	1755	96.83	
18	56	.53	19.50	96.70	85	1850	102.07	
20	50	.36	21.60	73.50	98	1445	79.72	18.13
20	51	.39	21.60	79.50	98	1555	85.79	
20	52	.42	21.60	85.50	98	1665	91.86	
20	53	.45	21.60	91.50	98	1770	97.66	
20	54	.48	21.60	97.50	98	1880	103.72	
20	55	.51	21.60	103.40	98	1985	109.52	
20	56	.54	21.60	109.30	98	2090	115.31	
24	50	.38	25.80	92.90	123	1830	100.97	18.13
24	51	.41	25.80	100.10	123	1960	108.14	
24	52	.44	25.80	107.30	123	2090	115.31	
24	53	.47	25.80	114.40	123	2215	122.21	
24	54	.50	25.80	121.60	123	2345	129.38	
24	55	.53	25.80	128.80	123	2475	136.55	
24	56	.56	25.80	135.90	123	2605	143.72	

†Including bell; calculated weight of pipe rounded off to the nearest 5lb.

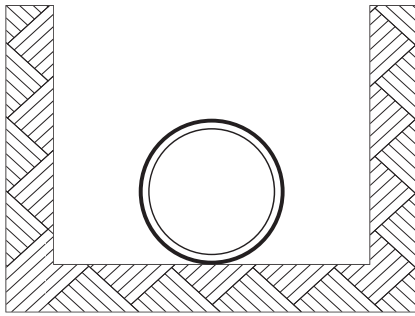
‡Including bell; average weight per foot, based on calculated weight of pipe before rounding.

*Tolerances of OD of spigot end; 3-12 in. ±0.06 in., 14-24 in.

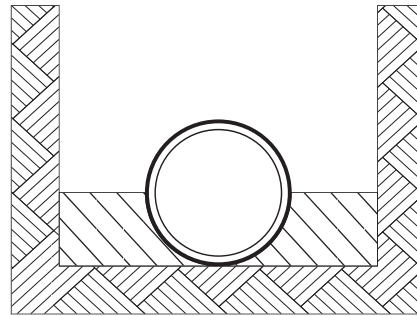
+0.05 in., -0.08 in., 30-36 in. +0.08 in., -0.06 in.

**Average lengths only. Variances may occur as a result of foundry processes or installation.

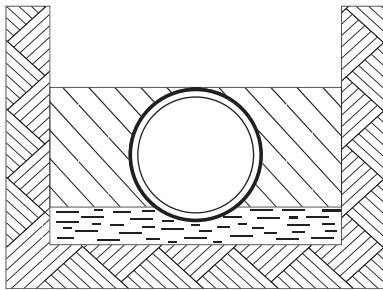
LAYING CONDITIONS FOR DUCTILE IRON PIPE



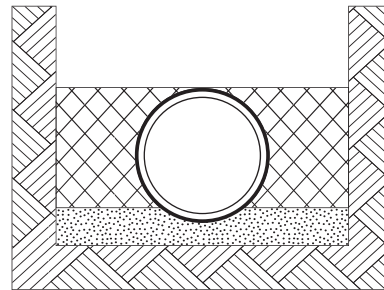
Type 1*
Flat-bottom trench.† Loose backfill.



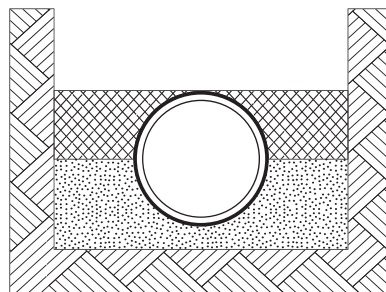
Type 2
Flat-bottom trench.† Backfill lightly consolidated to centerline of pipe.



Type 3
Pipe bedded in 4 in. (100 mm) minimum of loose soil.++ Backfill lightly consolidated to top of pipe.



Type 4
Pipe bedded in sand, gravel, or crushed stone to depth of 1/8 pipe diameter, 4 in. (100 mm) minimum. Backfill compacted to top of pipe. (Approximately 80 percent Standard Proctor, AASHTO T-99.)



Type 5

Pipe bedded in compacted granular material to centerline of pipe. Compacted granular or select material++ to top of pipe. (Approximately 90 percent Standard Proctor, AASHTO T-99.)

*For 14 in. (355-mm) and larger pipe, consideration should be given to the use of laying conditions other than Type 1.

†"Flat-bottom" is defined as undisturbed earth.

++"Loose soil" or "select material" is defined as native soil excavated from the trench, free of rocks, foreign materials, and frozen earth.



SHORT FORM SPECIFICATION

For Mechanical with Tyton® Joint Pipe

SCOPE

This specification covers the general requirements for Pacific States' Mechanical with Tyton® Joint ductile iron pipe.

CONFORMANCE

Ductile iron pipe 6" through 24" shall be manufactured in accordance with ANSI/AWWA C151/A21.51 under method of design outlined in ANSI/AWWA C150/A21.50.

Joints

Rubber-gasket joints shall be Mechanical with Tyton® Joint 6" through 24" and shall meet the requirements of ANSI/AWWA C111/A21.11.

External Coating

External pipe coating shall be an asphaltic coating in accordance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 for fittings.

Internal Pipe Lining

The pipe shall be cement-mortar lined in accordance with ANSI/AWWA C104/A21.4.

PRESSURE RATINGS

For pressures higher than 350 psi contact your local sales representative.

FITTINGS

Fittings for ductile iron pressure pipe shall be produced in accordance with ANSI/AWWA C110/A21.10.