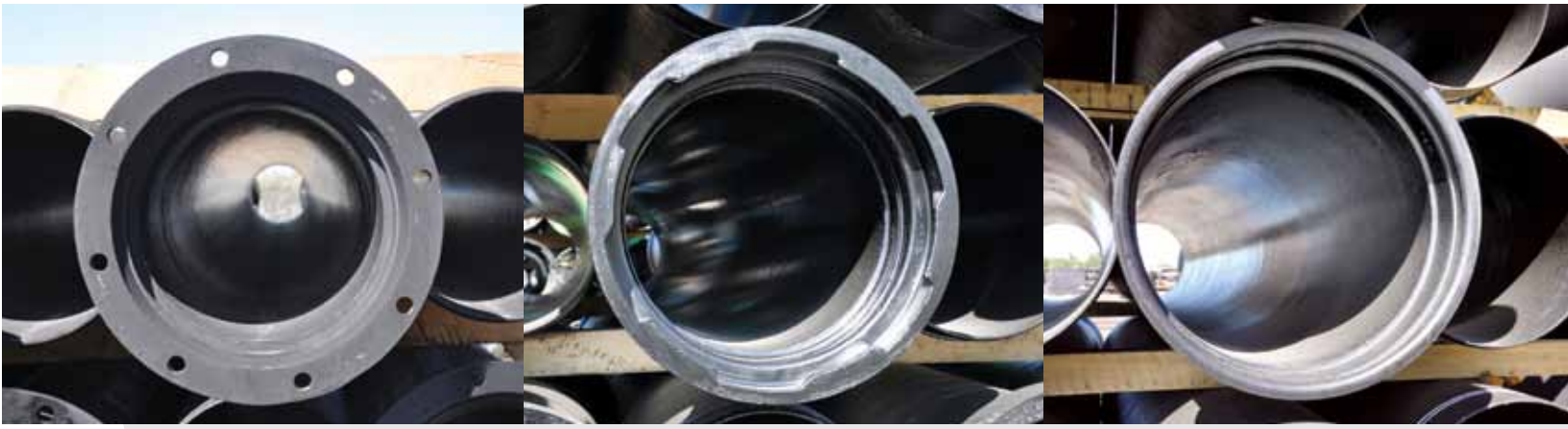
For Generations

MCWANE DUCTILE IRON PIPE



NSF 61 ISO 9001 DIPRA

Boltless restrained joint systems • Multiple design options available from 3"–36" • Fast and easy installation • 350 psi pressure rating • Independently tested

Atlantic States

CLOW Water Systems Company

PSCIPCO

Canada Pipe Company ULC

www.mcwane.com

TYTON® AND FASTITE® PUSH-ON JOINTS

ASSEMBLY INSTRUCTIONS

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. Apply lubricant to the inside surface 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.

Step 4. Guide the plain end into the bell and, while maintaining straight alignment, push the plain end into the bell socket. Once the joint is assembled, necessary deflection can be accomplished. When assembly is complete, the bell face should be aligned between the two white depth rings, for Tyton® Joints. Fastite® Joints have only 1 assembly stripe.

MECHANICAL JOINT

ASSEMBLY INSTRUCTIONS

Step 1. Clean the bell socket and spigot or plain end. Lubricate both the gasket and plain end by brushing an approved pipe lubricant.

Step 2. Place the gland on the plain end with the lip extension toward the plain end. Place the gasket on the plain end with the narrow edge facing the plain end.

Step 3. Insert the plain end into the bell and press the gasket into the bell recess. Push the gland toward the socket and center it around the pipe with the gland lip against the gasket.

Step 4. Insert and tighten the bolts. It is important to mainatain the same distance between the gland and the bell face at all times. This is best done by alternating side to side and top to bottom, while tightening the bolts.

Note: Achieving the recommended bolt torque, particularly with large diameter pipe, may require repeating the process up to 5 times or more. Recommended bolt torque ranges are as follows:

Pipe Size In.	Bolt Diameter In.	Nut Across Flats In.	Wrench Length In.	Torque Range Foot Lbs.
3	5/8	1-1/16	8	45 to 60
4–24	3/4	1-1/14	10	75 to 90

NOMINAL THICKNESS FOR STANDARD PRESSURE CLASSES OF DUCTILE IRON PIPE

Size In.	Outside Diameter In.	Pressure Class*				
		150	200	250	300	350
		Normal Thickness — in.				
3	3.96	—	—	—	—	0.25**
4	4.80	—	—	—	—	0.25**
6	6.90	—	—	—	—	0.25**
8	9.05	—	—	—	—	0.25**
10	11.10	—	—	—	—	0.26
12	13.20	—	—	—	—	0.28
14	15.30	—	—	0.28	0.30	0.31
16	17.40	—	—	0.30	0.32	0.34
18	19.5	—	—	0.31	0.34	0.36
20	21.60	—	—	0.33	0.36	0.38
24	25.80	—	0.33	0.37	0.40	0.43
30	32.00	0.34	0.38	0.42	0.45	0.49
36	38.30	0.38	0.42	0.47	0.51	0.56

* Pressure Classes are defined as the rated water pressure of the pipe in psi. The thicknesses shown are adequate for the rated water working pressure plus a surge allowance of 100 psi. Calculations are based on a minimum yield strength of 42,000 and a 2.0 safety factor times the sum of the working pressure and 100 psi surge allowance.

**Calculated thicknesses for these sizes and pressure ratings are less than those shown above. Presently, these are the lowest nominal thicknesses available in these sizes.

NOTE: Per ANSI/AWWA C150/A21.50 the thicknesses above include the 0.08" service allowance and the casting tolerance listed below by size ranges:

SIZE (Inches)	CASTING TOLERANCES (Inches)
3–8	-0.05
10–12	-0.06
14–36	-0.07

TR FLEX® RESTRAINED JOINT

ASSEMBLY INSTRUCTIONS

Step 1. (4"– 10") Lay pipe such that one of the bell slots is accessible.
(12"– 20") Lay pipe such that both of the bell slots are accessible, in the horizontal position if possible.
(24"– 36") Lay pipe such that all four of the bell slots are accessible, in the diagonal position if possible.

Step 2. Clean the bell socket and insert gasket.

Step 3. Clean the spigot end to the assembly stripes.

Step 4. Lubricate the exposed surface of the gasket and pipe spigot end back to the weld bead.

Step 5. Make a normal push-on joint assembly, completely homing the pipe until the first assembly strip is in the bell socket. Keeping the joint in straight alignment during the assembly process.

Step 6. (4"– 10") Insert the right-hand locking segment into a bell slot and slide the segment clockwise around the pipe.
(12"– 36") Insert lower locking segment into a bell slot and slide the segment around the pipe.

Step 7. (4"– 10") Insert left-hand locking segment into the bell slot and slide the segment counter-clockwise around the pipe.
(12"– 36") Insert upper locking segment into the same bell slot and rotate around the pipe.

Step 8. (4"– 10") Hold the segments apart and wedge the rubber retainer into the slot between the two locking segments.
(12"– 36") Hold the upper segment in place and wedge the rubbber retainer into the slot between the two locking segments.

Step 9. (4"– 10") None.
(12"– 20") Repeat steps 6–8 for other slot. Make sure that all 4 locking segments and 2 rubber retainers are securely in place.
(24"– 36") Repeat steps 6–8 for other slot. Make sure that all 8 locking segments and 4 rubber retainers are securely in place.

Step 10. Extend the joint to remove the slack in the locking segment cavity. Joint extension is necessary to attain the marked laying length on the pipe and to minimize growth or extension of the line as it is pressurized.

Step 11. Set the joint deflection as required.

THRUST-LOCK™ RESTRAINED JOINT

ASSEMBLY INSTRUCTIONS

Step 1. Ring Installation. Put lock ring on the spigot end of the pipe. Pry the lock ring over the weldment. Use the hammer to tap the cover. Lock ring installation is complete.

Step 2. Clean the Bell and Spigot. Thoroughly clean out the bell with special attention to the gasket recess. Remove any foreign material or excess paint. Clean the spigot end and remove any sharp edges.

Step 3. Insert the gasket into the recess in the bell with the small end of the gasket facing the bell face.

Step 4. Lubricate the Bell and Spigot. Apply lubricant to the inside surface of the gasket. Apply a generous coating of lubricant to the spigot end.

Step 5. Insert Pipe. Guide the spigot end into the bell and, while maintaining straight alignment, push the pipe into the bell socket.

Step 6. Insert Lock Ring. Push lock ring into the bell.

Step 7. Rotate the lock ring until the lugs align. Use a hammer to tap the ring if required. Install the anti-rotation wedges at 3 and 9 o'clock if the pipe is being used inside of a casing. Deflect the joint if desired.

SUPER-LOCK®

ASSEMBLY INSTRUCTIONS

Step 1. Remove hook bolts securing retainer to plain end. Clean plain end of pipe. Clean out any dirt behind retainer lugs. Lubricant should be applied to the beveled nose.

Step 2. Assemble the joint in accordance with Clow Assembly Instructions (See Table A on page 13). Make certain that the bell is clean prior to gasket insertion. Be sure that the correct gasket is used.

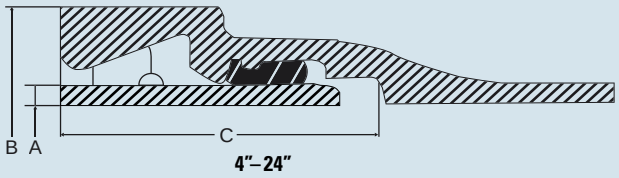
Step 3. Guide plain end into Super-Lock® bell and provide reasonably straight alignment. "Make" joint by pushing the plain end into the bell. A jack or come-a-long may also be used to pull the plain end into the bell. Position retainer so that the recesses line up with the lugs on the bell. Slide retainer over bell and rotate until the lugs on the bell and the retainer line up.

Step 4. At drilled hole on retainer O.D., insert retainer lock in recess formed by lugs on bell and retainer. Insert roll pin in drilled hole and drive flush with retainer O.D.

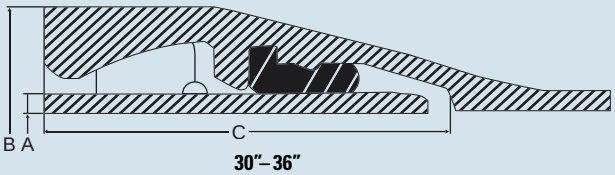
Step 5. Take any necessary deflection after joint is completely assembled.

Caution: do not over deflect the joint beyond the maximum deflection column specified on page 2 or subject the joint to bending stress to obtain additional deflection.

TR FLEX® RESTRAINED JOINT PIPE



4"–24"



30"–36"

Pipe Size In.	*Pressure Rating psi	A In.	B PIPE In.	C In.	# of D.I. Locking Segments	# of Rubber Segments Retainers	Max Deflection Degrees	Pullout
4	350	4.80	7.25	4.84	2	1	5	0.03
6	350	6.90	9.52	5.27	2	1	5	0.04
8	350	9.05	11.93	5.82	2	1	5	0.04
10	350	11.10	14.37	6.03	2	1	5	0.05
12	350	13.20	16.68	6.30	4	2	5	0.06
14	350	15.30	19.16	7.75	4	2	3-1/4	0.05
16	350	17.40	21.46	7.95	4	2	3-1/4	0.05
18	350	19.50	23.76	8.19	4	2	3	0.05
20	350	21.60	26.04	8.40	4	2	2-1/2	0.05
24	350	25.80	30.61	8.86	8	4	2-1/4	0.05
30	250	32.00	36.88	10.28	8	4	1-3/4	0.05
36	250	38.30	43.85	10.87	8	4	1-1/2	0.05

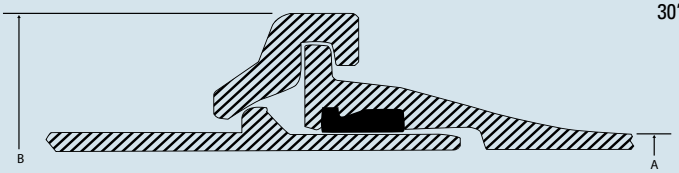
*The TR FLEX® Restrained Joint has a working pressure rating equivalent to the working pressure rating of the parent pipe with a maximum working pressure rating of 350 psi for 4" through 24" and 250 psi for 30" through 36".

NOTE: These deflections are based on joints with nominal dimensions.

SUPER-LOCK® RESTRAINED JOINT PIPE

TYTON® JOINT PIPE
Sizes 6"–24"

FASTITE® JOINT PIPE
30" Size

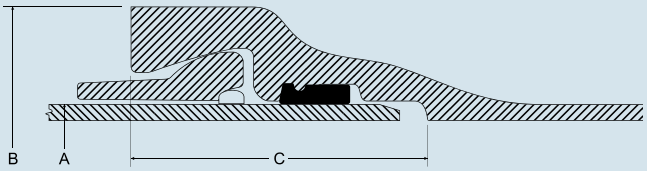


6"–30"

Pipe Size In.	*Pressure Rating psi	Deflection		A	B
		Degrees	Inches in 18ft	Pipe O.D.	Retainer O.D.
6	350	4	15	6.90	11.75
8	350	4	15	9.05	14.38
10	350	4	15	11.10	16.75
12	350	4	15	13.20	19.13
14	350	3	11	15.30	21.75
16	350	3	11	17.40	24.00
18	350	3	11	19.50	26.38
20	350	3	11	21.60	28.63
24	350	3	11	25.80	33.75
30	250	3	11	32.00	40.13

* In the 14" and larger sizes, pressure rating is limited to the rating of the pipe barrel thickness selected.
Dimensions subject to manufacturing tolerances.

THRUST-LOCK™ BOLTLESS RESTRAINED JOINT PIPE



Thrust-Lock™ Boltless Restrained Joint

Pipe Size In.	*Pressure Rating psi	Deflection		A	B	C
		Degrees	Inches in 18ft	Pipe O.D.	Bell O.D.	Spigot Socket
6	350	4	15	6.90	10.187	5.01
8	350	4	15	9.05	13.187	5.57
10	350	4	15	11.10	15.187	5.88
12	350	4	15	13.20	17.250	6.13
14	350	4	15	15.30	20.625	7.63
16	350	4	15	17.40	22.375	7.88
18	350	4	15	19.50	25.125	8.13
20	350	4	15	21.60	27.250	8.38
24	350	4	15	25.80	31.562	8.63
30	250	2	7	32.00	39.06	10.53

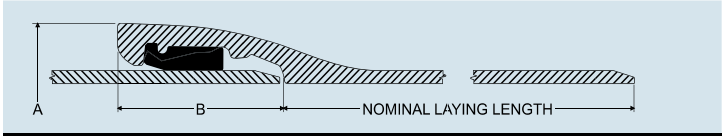
*The THRUST-LOCK™ Restrained Joint has a working pressure rating equivalent to the working pressure rating of the parent pipe with a maximum working pressure rating of 350 psi for 6" through 24" and 250 psi for 30".
NOTE: These deflections are based on joints with nominal dimensions.

RATED WORKING PRESSURE AND MAXIMUM DEPTH OF COVER

Pipe Size In.	*Pressure Rating 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				
3	350	0.25	78	88	99	100§	100§
4	350	0.25	53	61	69	85	100§
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
30	150	0.34	††	--	9	14	22
	200	0.38	††	8**	12	16	24
	250	0.42	††	11	15	19	27
	300	0.45	††	12	16	21	29
	350	0.49	††	15	19	25	33
36	150	0.38	††	--	9	14	21
	200	0.42	††	8**	12	15	23
	250	0.47	††	10	14	18	25
	300	0.51	††	12	16	20	28
	350	0.56	††	15	19	24	32

‡ 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.

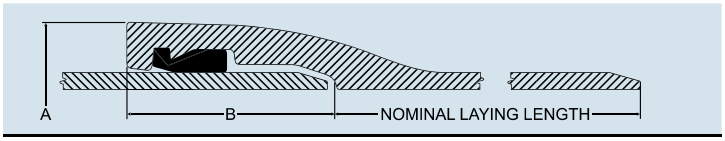
TYTON® AND FASTITE® JOINT PIPE



Tyton® Joint

Pipe Size In.	Pipe Thickness In.		Outside Diameter	*Dimensions In.	
	From	To	In.	A	B
3	.25	.40	3.96	5.80	3.00
4	.25	.41	4.80	7.10	3.15
6	.25	.43	6.90	8.63	3.38
8	.25	.45	9.05	10.94	3.69
10	.26	.47	11.10	13.32	3.75
12	.28	.49	13.20	15.06	3.75
14	.28	.51	15.30	17.80	5.00
16	.30	.52	17.40	19.98	5.00
18	.31	.53	19.50	22.00	5.00
20	.33	.54	21.60	24.12	5.25
24	.33	.56	25.80	28.43	5.50
30	.34	.63	32.00	35.40	6.55
36	.38	.73	38.30	41.84	7.00

*Nominal laying length is 18 ft.

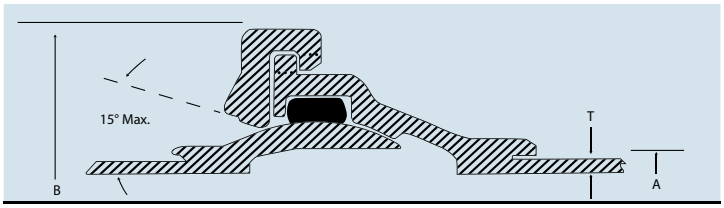


Fastite® Joint

Pipe Size In.	Pipe Thickness In.		Outside Diameter	*Dimensions In.	
	From	To	In.	A	B
30	.34	.63	32.00	34.95	6.50
36	.38	.73	38.30	41.37	6.50

*Nominal laying length is 18 ft.

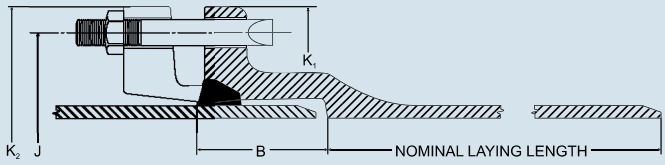
BALL AND SOCKET JOINT PIPE



Pipe Size In.	Thickness		A	B	Full Length Weight - Lb.**			Safe End Pull Lb.
	Class (A21.51)	T	Pipe O.D.	Retainer O.D.	As Shipped	Under Water		
						Full of Air	Full of Water	
6	55	.40	6.90	13.88	545	240	465	50,000
8	55	.42	9.05	16.63	770	240	655	70,000
10	55	.44	11.10	19.13	1005	220	860	95,000
12	55	.46	13.20	22.00	1270	155	1080	120,000
14	56	.51	15.30	24.50	1655	160	1410	145,000
16	56	.52	17.40	27.00	1990	45	1685	165,000
18	56	.53	19.50	30.00	2375	-70	2015	195,000
	58*	.59			2560	110	2170	
20	56	.54	21.60	32.75	2810	-200	2375	210,000
	59*	.63			3110	100	2635	
24	56	.56	25.80	38.25	3700	-620	3110	260,000
	62*	.74			4415	95	3715	
30	58	.71	32.00	46.25	5855	-900	4920	335,000
	61*	.83			6435	-180	5360	
36	57	.78	38.30	54.25	8145	-1300	6880	400,000
	59*	.88			8725	-725	7330	

* Thickness required to overcome buoyancy.
** Weights listed are for 18'–0" laying lenghts. Nominal full lengths vary by size.
Pipe, Bell, Ball and Retainer are ductile iron.
Dimensions and weights are subject to manufacturing tolerances.
6"–24" pressure rating: 350 psi
30"–36" pressure rating: 250 psi

MECHA IPE



Pipe Size In.	Pipe Thickness In.		Outside Diameter	*Dimensions In.					Bolts		Bell Weight Lb.	Gland** Bolts Gasket Weight Lb.
	From	To	In.	B	J	K1	K2	No.	Size In.	Length In.		
3	.25	.40	3.96	2.50	6.19	7.62	7.69	4	5/8	3	11	7
4	.26	.41	4.80	2.50	7.50	9.06	9.12	4	3/4	3-1/2	16	10
6	.25	.43	6.90	2.50	9.50	11.06	11.12	6	3/4	3-1/2	18	16
8	.27	.45	9.05	2.50	11.75	13.31	13.37	6	3/4	4	24	25
10	.29	.47	11.10	2.50	14.00	15.62	15.62	8	3/4	4	31	30
12	.31	.49	13.20	2.50	16.25	17.88	17.88	8	3/4	4	37	40
14	.33	.51	15.30	3.50	18.75	20.25	20.25	10	3/4	4-1/2	61	45
16	.34	.52	17.40	3.50	21.00	22.50	22.50	12	3/4	4-1/2	74	55
18	.35	.53	19.50	3.50	23.25	24.75	24.75	12	3/4	4-1/2	85	65
20	.36	.54	21.60	3.50	25.50	27.00	27.00	14	3/4	4-1/2	98	85
24	.38	.56	25.80	3.50	30.00	31.50	31.50	16	3/4	5	123	105

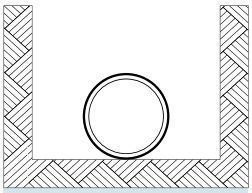
* Nominal laying length is 18 ft.
** Weight shown for regular grey cast iron follower gland, corton bolts, and rubber gasket.

STANDARD DIMENSIONS AND WEIGHTS OF 3" THROUGH 36" PUSH-ON JOINT DUCTILE IRON PIPE

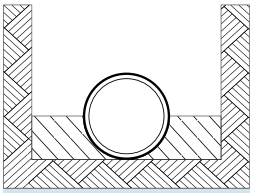
Pipe Size In.	Pressure Class psi	Nominal Thickness In.	OD* In.	Wt. of Barrel Per Ft. † Lb.	Tyton® Joint		
					Wt. of Bell Lb.	Wt. Per Lgth.† Lb.	Avg. Wt. Per Ft.‡ Lb.
3	350	0.25	3.96	8.90	7.00	185	9.20
4	350	0.25	4.80	10.90	9.00	225	11.30
6	350	0.25	6.90	16.00	11.00	300	16.60
8	350	0.25	9.05	21.10	17.00	395	22.00
10	350	0.26	11.10	27.10	24.00	510	28.40
12	350	0.28	13.20	34.80	29.00	655	36.40
14	250	0.28	15.30	40.40	45.00	770	42.90
	300	0.30	15.30	43.30	45.00	825	45.80
	350	0.31	15.30	44.70	45.00	850	47.20
16	250	0.30	17.40	49.30	54.00	940	52.30
	300	0.32	17.40	52.50	54.00	1000	55.50
	350	0.34	17.40	55.80	54.00	1060	58.80
18	250	0.31	19.50	57.20	59.00	1090	60.50
	300	0.34	19.50	62.60	59.00	1185	65.90
	350	0.36	19.50	66.20	59.00	1250	69.50
20	250	0.33	21.60	67.50	74.00	1290	71.60
	300	0.36	21.60	73.50	74.00	1395	77.60
	350	0.38	21.60	77.50	74.00	1470	81.60
24	200	0.33	25.80	80.80	95.00	1550	86.10
	250	0.37	25.80	90.50	95.00	1725	95.80
	300	0.40	25.80	97.70	95.00	1855	103.00
	350	0.43	25.80	104.90	95.00	1985	110.20
30**	150	0.34	32.00	103.50	139.00	2000	111.20
	200	0.38	32.00	115.50	139.00	2220	123.20
	250	0.42	32.00	127.50	139.00	2435	135.20
	300	0.45	32.00	136.50	139.00	2595	144.20
	350	0.49	32.00	148.40	139.00	2810	156.10
36**	150	0.38	38.30	138.50	184.00	2675	148.70
	200	0.42	38.30	152.90	184.00	2935	163.10
	250	0.47	38.30	170.90	184.00	3260	181.10
	300	0.51	38.30	185.30	184.00	3520	195.50
	350	0.56	38.30	203.20	184.00	3840	213.40

† 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.
* Tolerances of OD of spigot end: 3–12 in. = +0.06 in. & -0.06 in. ; 14–24 in. = +0.05 in. & -0.08 in. ; 30–36 in. = +0.08 in. & -0.06 in.
** Fastite® Joint

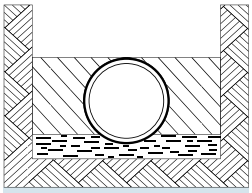
LAYING CONDITIONS



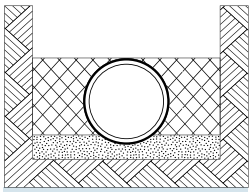
Type 1*
Flat-bottom trench.† Loose backfill.



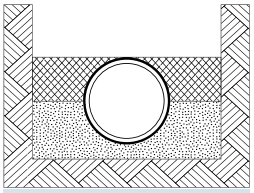
Type 2
Flat-bottom trench.† Backfill lightly consolidated to centerline of pipe.



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.

Notes:
Consideration of the pipe-zone embedment conditions included in this figure may be influenced by factors other than pipe strength. For additional information on pipe bedding and backfill, see ANSI/AWWA C600.

American Association of State Highway and Transportation Officials, 444 N. Capitol St. N.W., Suite 225, Washington, DC 20001.

STANDARDS APPLICABLE TO DUCTILE IRON PIPE AND FITTINGS

THICKNESS DESIGN OF DUCTILE IRON PIPE	ANSI/AWWA C150/A21.50
DUCTILE IRON PIPE FOR WATER AND OTHER LIQUIDS	ANSI/AWWA C151/A21.51
	FEDERAL WWP421D, Grade C
DUCTILE IRON PIPE FOR GRAVITY FLOW SERVICE	ANSI/ASTM A746
DUCTILE IRON FITTINGS FOR WATER AND OTHER LIQUIDS	
3" through 36"	ANSI/AWWA C110/A21.10
DUCTILE IRON COMPACT FITTINGS	
3" through 24"	ANSI/AWWA C153/A21.53
FLANGED FITTINGS	ANSI/AWWA C110/A21.10
	ANSI B16.1
DUCTILE IRON PIPE WITH THREADED FLANGES	ANSI/AWWA C115/21.15
COATINGS AND LININGS	
Asphaltic	ANSI/AWWA C151/A21.51
	ANSI/AWWA C110/A21.10
	ANSI/AWWA C153/A21.53
Cement Lining	ANSI/AWWA C104/A21.4
Various Epoxy Linings and Coatings	MANUFACTURER'S STANDARD
Exterior Polyethylene Encasement	ANSI/AWWA C105/A21.5
JOINTS – PIPE AND FITTINGS	
Push-On and Mechanical Rubber-Gasket Joints	ANSI/AWWA C111/A21.11
	FEDERAL WWP421D
Flanged	ANSI/AWWA C115/A21.15
	ANSI B16.1
Grooved and Shouldered	ANSI/AWWA C606
PIPE THREADS	ANSI B2.1
INSTALLATION	ANSI/AWWA C600

Atlantic States

ATLANTIC STATES CAST IRON PIPE CO.
183 Sitgreaves St.
Phillipsburg, NJ 08865
908-454-1161
atlanticstates.com

CLOW Water Systems Company

CLOW WATER SYSTEMS COMPANY
2266 S. 6th St.
Coshocton, OH 43812
740-622-6651
clowwater.com

PSCIPCO

PACIFIC STATES CAST IRON PIPE CO.
1401 E 2000 S.
Provo, UT 84603
801-373-6910
pscipco.com

Canada Pipe Company ULC

CANADA PIPE COMPANY ULC
1757 Burlington St. E
Hamilton, ON L8N-3R5
905-547-3251
canadapipe.com

McWane

MCWANE CAST IRON PIPE CO.
1201 Vanderbilt Road
Birmingham, AL 35234
205-322-3521
mcwanepipe.com

UL FM APPROVED NSF 61 ISO 9001 VPP DIPRA wasda

DIMENSION AND WEIGHTS FOR SPECIAL CLASSES OF PUSH-ON JOINT AND MECHANICAL JOINT DUCTILE IRON PIPE

Pipe Size In.	Thickness Class	Nominal Thickness In.	OD* In.	Wt. of Barrel Per Ft. † Lb.	Tyton® Joint		
					Wt. of Bell Lb.	Wt. Per Lgth.† Lb.	Avg. Wt. Per Ft.‡ Lb.
3	52	.28	3.96	9.90	9	205	10.40
3	54	.34	3.96	11.80	9	245	12.20
4	51	.26	4.80	11.30	11	235	11.80
4	52	.29	4.80	12.60	11	265	13.20
4	53	.32	4.80	13.80	11	285	14.40
4	54	.35	4.80	15.00	11	310	15.60
6	50	.25	6.90	16.00	13	300	16.70
6	51	.28	6.90	17.80	13	335	18.50
6	52	.31	6.90	19.60	13	365	20.30
6	53	.34	6.90	21.40	13	400	22.10
6	54	.37	6.90	23.20	13	430	23.90
6	55	.40	6.90	25.00	13	465	25.70
6	56	.43	6.90	26.70	13	490	27.40
8	50	.27	9.05	22.80	20	430	23.90
8	51	.30	9.05	25.20	20	480	26.30
8	52	.33	9.05	27.70	20	525	28.80
8	53	.36	9.05	30.10	20	570	31.20
8	54	.39	9.05	32.50	20	610	33.60
8	55	.42	9.05	34.80	20	650	35.90
8	56	.45	9.05	37.20	20	695	38.30
10	50	.29	11.10	30.10	27	575	31.60
10	51	.32	11.10	33.20	27	630	34.70
10	52	.35	11.10	36.20	27	685	37.70
10	53	.38	11.10	39.20	27	740	40.70
10	54	.41	11.10	42.10	27	790	43.60
10	55	.44	11.10	45.10	27	845	46.60
10	56	.47	11.10	48.00	27	900	49.50
12	50	.31	13.20	38.40	31	735	40.10
12	51	.34	13.20	42.00	31	800	43.70
12	52	.37	13.20	45.60	31	865	47.30
12	53	.40	13.20	49.20	31	930	50.90
12	54	.43	13.20	52.80	31	995	54.50
12	55	.46	13.20	56.30	31	1055	58.00
12	56	.49	13.20	59.90	31	1120	61.60
14	50	.33	15.30	47.50	59	915	50.80
14	51	.36	15.30	51.70	59	990	55.00
14	52	.39	15.30	55.90	59	1065	59.20
14	53	.42	15.30	60.10	59	1140	63.40
14	54	.45	15.30	64.20	59	1215	67.50
14	55	.48	15.30	68.40	59	1290	71.70
14	56	.51	15.30	72.50	59	1365	75.80
16	50	.34	17.40	55.80	65	1070	59.40
16	51	.37	17.40	60.60	65	1155	64.20
16	52	.40	17.40	65.40	65	1240	69.00
16	53	.43	17.40	70.10	65	1325	73.70
16	54	.46	17.40	74.90	65	1415	78.50
16	55	.49	17.40	79.70	65	1500	83.30
16	56	.52	17.40	84.40	65	1585	88.00
18	50	.35	19.50	64.40	74	1235	68.50
18	51	.38	19.50	69.80	74	1330	73.90
18	52	.41	19.50	75.20	74	1430	79.30
18	53	.44	19.50	80.60	74	1525	84.70
18	54	.47	19.50	86.00	74	1620	90.10
18	55	.50	19.50	91.30	74	1715	95.40
18	56	.53	19.50	96.70	74	1815	100.80
20	50	.36	21.60	73.50	80	1405	77.90
20	51	.39	21.60	79.50	80	1510	83.90
20	52	.42	21.60	85.50	80	1620	89.90
20	54	.48	21.60	97.50	80	1835	101.90
20	55	.51	21.60	103.40	80	1940	107.80
20	56	.54	21.60	109.30	80	2045	113.70
24	50	.38	25.80	92.90	101	1775	98.50
24	51	.41	25.80	100.10	101	1905	105.70
24	52	.44	25.80	107.30	101	2030	112.90
24	53	.47	25.80	114.40	101	2160	120.00
24	54	.50	25.80	121.60	101	2290	127.20
24	55	.53	25.80	128.80	101	2420	134.40
24	56	.56	25.80	135.90	101	2545	141.50
30**	50	.39	32.00	118.50	170	2305	127.90
30**	51	.43	32.00	130.50	170	2520	139.90
30**	52	.47	32.00	142.50	170	2735	151.90
30**	53	.51	32.00	154.40	170	2950	163.80
30**	54	.55	32.00	166.30	170	3165	175.70
30**	55	.59	32.00	178.20	170	3380	187.60
30**	56	.63	32.00	190.00	170	3590	199.40
36**	50	.43	38.30	156.50	239	3055	169.80
36**	51	.48	38.30	174.50	239	3380	187.80
36**	52	.53	38.30	192.40	239	3700	205.70
36**	53	.58	38.30	210.30	239	4025	223.60
36**	54	.63	38.30	228.10	239	4345	241.40
36**	55	.68	38.30	245.90	239	4665	259.20
36**	56	.73	38.30	263.70	239	4985	277.00

†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.
**Fastite® Joint

SURE STOP® GASKET FOR TYTON® JOINT

Size In.	Rating psi	Deflection Degrees
3	350	5
4	350	5
6	350	5
8	350	5
10	350	5
12	350	5
14	350	4
16	350	4
18	350	4
20	350	2.5
24	350	2.5

SURE STOP 350® GASKETS are available in sizes 3"–24", and with a rating of 350 psi they will meet or exceed the capabilities of ductile iron pipe, valves, and fittings.

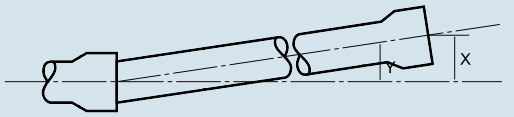
SURE STOP 350® GASKETS are NSF 61 approved, UL listed, and FM approved.

FM Rating: 4"– 6" = 250 psi
18"–24" = 200 psi

APPLICATION NOTES

1. For ductile iron applications utilizing TYTON® pipe, vales, and fittings made to AWWA specifications.
2. In cold weather assembly maintain the temperature of the gasket above 40° F.
3. The socket of the joint should be clean and free of debris or significant corrosion.
4. Gasket should be properly seated in the bell socket.
5. Keep the pipe and joint in alignment during assembly. If installed out of alignment, the gasket can be pushed out of position, creating the potential for leaks or failure.
6. If deflection is wanted in the joint, deflect before fully inserting the joint.
7. Some extension of the joint will occur when pressurized. To avoid this, the joint should be pulled out after assembly to "set" the stainless steel teeth in the inserted pipe.
8. Once assembled, the joint can be disassembled using steel shims.
9. When cut pipe is used, the following steps are required:
   a. Ensure that the spigot end is properly beveled
   b. Mark the joint depth on the spigot so it is clear when the joint is fully inserted.
   c. Ensure that the pipe meets the required dimensional tolerances.
10. Do not reuse SURE STOP 350® GASKETS, as they may have been damaged during any previous installation or during removal.
11. Do not use SURE STOP 350® GASKETS to conduct electricity through the pipe joint, as they could be damaged and fail.
12. Do not use SURE STOP 350® GASKETS in above ground applications.
13. Do not use SURE STOP 350® GASKETS with thick coating on the pipe exterior.
14. If SURE STOP 350® GASKETS are used in straight casings, you must pull the pipe through the casing. Do not push the pipe.

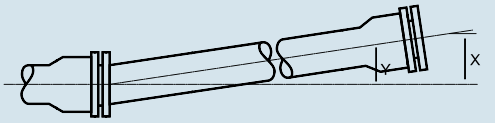
JOINT DEFLECTION CHART



PUSH-ON 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
3	5°	19	205
4	5°	19	205
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
30	5°	19	205
36	4°	15	260

MAXIMUM DEFLECTION FOR FULL LENGTH PIPE



MECHANICAL 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	7°–7′	27	145
8	5°–21′	20	195
10	5°–21′	20	195
12	5°–21′	20	195
14	3°–35′	13.5	285
16	3°–35′	13.5	285
18	3°–0′	11	340
20	3°–0′	11	340
24	2°–23′	9	450

FIELD CUT PIPE

When pipe is cut in the field, the cut end may be readily conditioned so that it can be used to make up the next joint. The outside of the cut end should be beveled about 1/4–inch at an angle of about 30 degrees (Figure 1). This can be quite easily done with a coarse file or a portable grinder. The operation removes any sharp, rough edges which otherwise might damage the gasket.

Figure 1

When ductile iron pipe 14" and larger is to be cut in the field, the material should be ordered as "GAUGED FULL LENGTH". Pipe that is "gauged full length" is specially marked to avoid confusion. The ANSI/AWWA standard for ductile iron pipe requires factory gauging of the spigot end. Accordingly, pipe selected for field cutting should also be field gauged in the location of the cut and found to be within the tolerances shown in Table 1. In the field, a mechanical joint gland can be used as a gauging device.

TABLE 1: SUITABLE PIPE DIAMETERS FOR FIELD CUTS AND RESTRAINED JOINT FIELD FABRICATION

Pipe Size In.	Min. Pipe Diameter In.	Max. Pipe Diameter In.	Min. Pipe Circumference In.	Max. Pipe Circumference In.
3	3.9	4.02	12-1/4	12-5/8
4	4.74	4.86	14-29/32	15-9/32
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
30	31.94	32.08	100-11/32	100-25/32
36	38.24	38.38	120-1/8	120-9/16

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

THE BACKHOE METHOD OF ASSEMBLY

A backhoe may be used to assemble pipe of intermediate and larger sizes. The plain end of the pipe should be carefully guided by hand into the bell of the previously assembled pipe. The bucket of the backhoe may then be used to push the pipe until fully seated. A timber header should be used between the pipe and backhoe bucket to avoid damage to the pipe.