

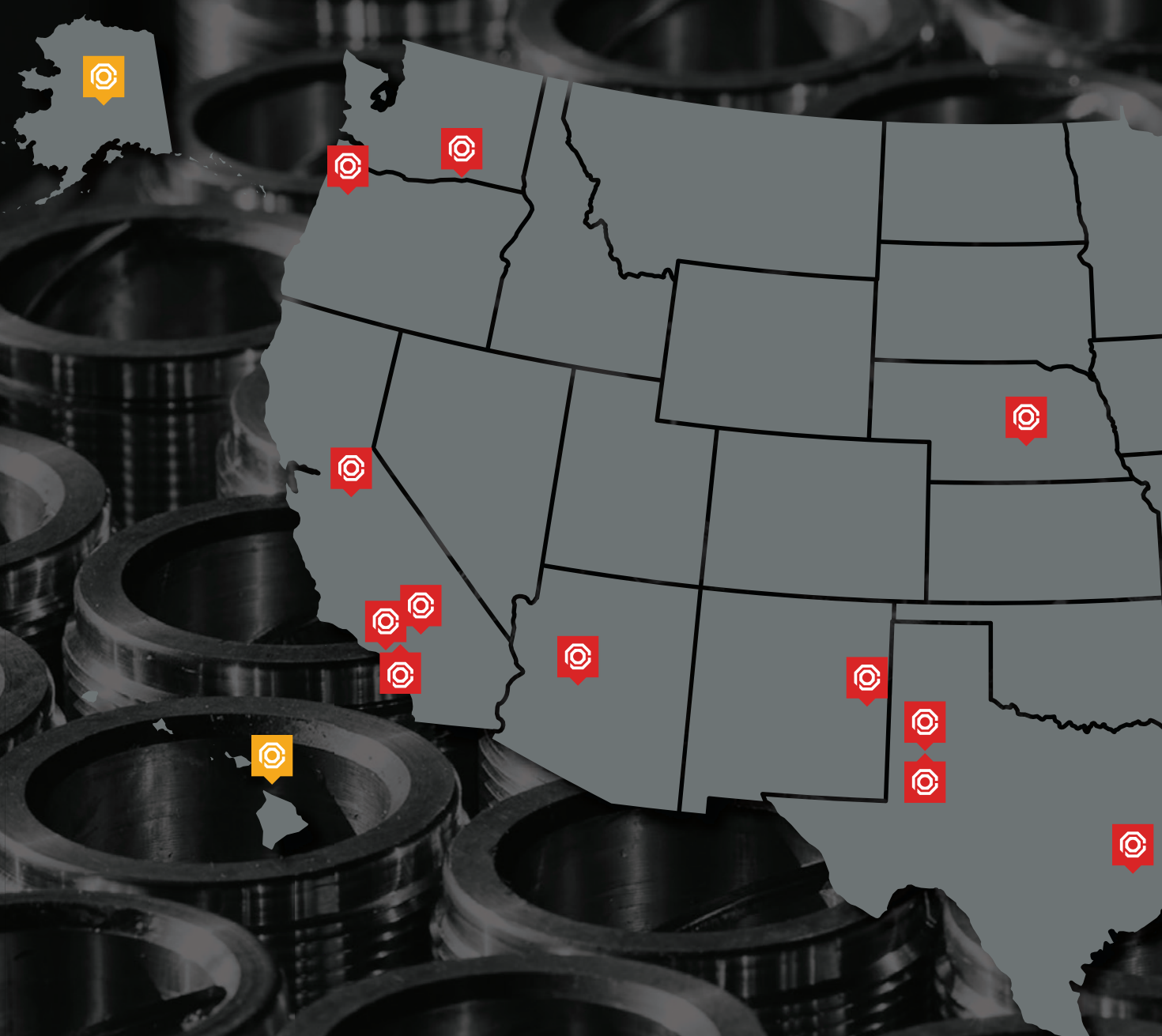
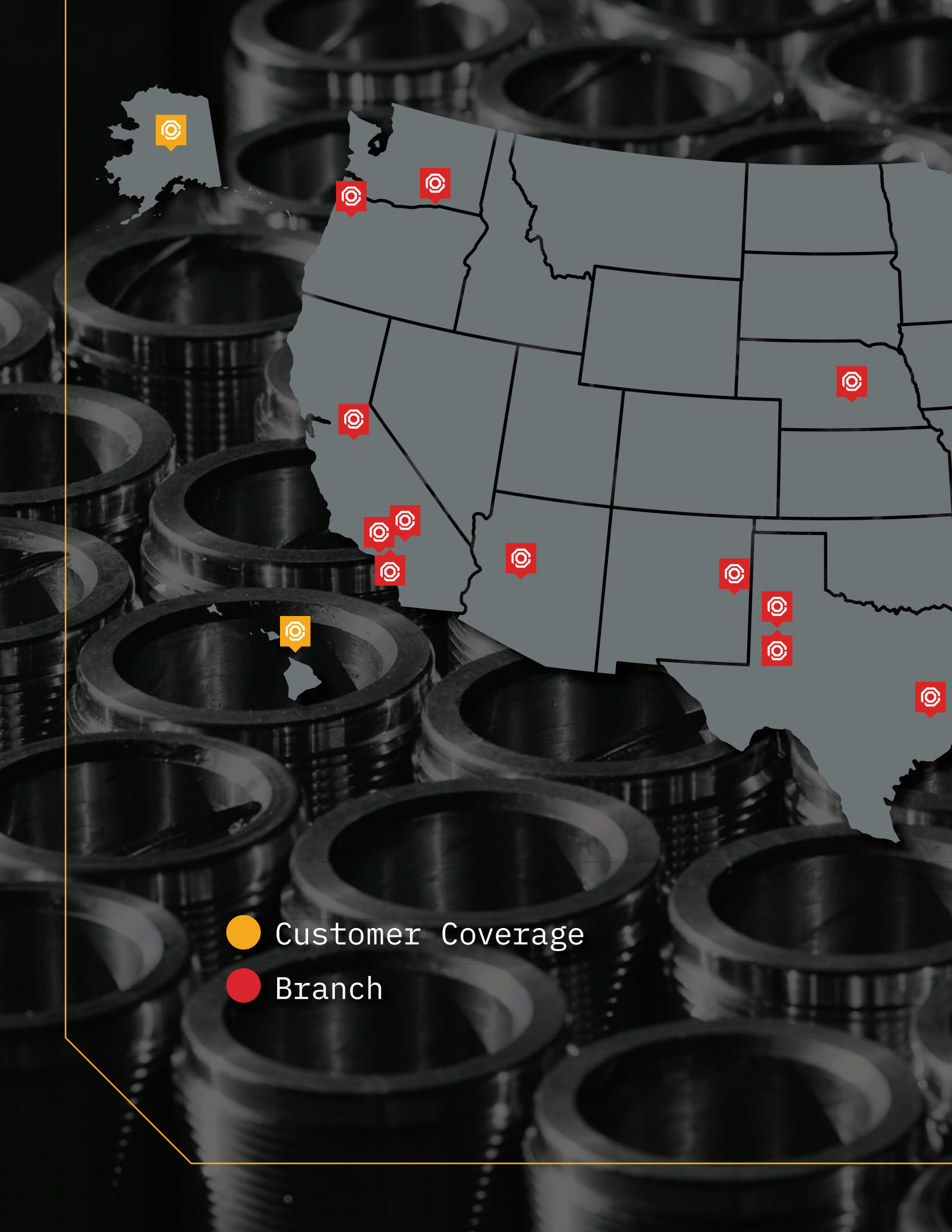


CUSTOM
+ FABRICATION

PIPE

WATERWORKS PRODUCTS

Technical Product Guide



- Customer Coverage
- Branch



Waterworks Products

We fabricate high-quality waterworks products that support critical infrastructure from the source to the point of use.

With decades of expertise and nationwide reach, Custom Pipe & Fabrication delivers dependable, custom-built solutions for suppliers, distributors, OEMs, and contractors. Together, we strengthen the systems that move water, helping safeguard the future of our nation's water infrastructure.





Waterworks Overview

Ductile Iron Pipe Fabrication

- + Flanged Pipe
- + Grooved Pipe
- + Welded Outlets
- + Anchor Pipe
- + Restrained Joints
- + Wall Pipe
- + Thrust Collars
- + Mechanical Joints
- + Filler Flanges
- + Victaulic® Specialty Ends

Fittings

- + AWWA C110 and C153
- + Victaulic® Groove
- + Flange
- + MJ

Linings

- + Cement
- + Unlined
- + Protecto 401
- + Ceramapure PL90
- + Tnemec
- + Fusion Bonded Epoxy
- + Sherwin Williams® DURA-PLATE® 6000

Coatings

- + Bituminous
- + Ceramawrap
- + Tnemec
- + Fusion Bonded Epoxy

Steel Fabrication

- + Stainless Steel Pipe 304SS and 316SS
- + Carbon Steel Pipe
- + Galvanized Steel Pipe
- + Pipe Supports and Hangers
- + Valve Stem Extensions, Keys, and Wrenches
- + Pipe Vents

Services

- + Special Machining Services
- + Specialty Linings and Coatings
- + Certified In-House Welding
- + NSF 61 Independently Certified*

**Tapping through 6"
NPT for caps, plugs,
and blind flanges**

CC taps 3/4" through 2"

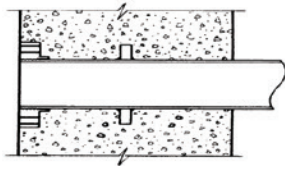
*Contact us to learn more about our NSF Certified Products.

Waterworks Pipe Chart

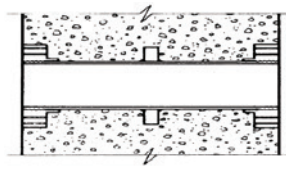
FLANGE / PIPE DIMENSTIONS

NOM. PIPE SIZE	FLANGE OD	FLANGE THICKNESS	BOLT CIRCLE	PIPE OD	PIPE THICKNESS	BOLT HOLE DIAMETER	BOLT SIZE	NUMBER OF BOLTS
3"	7.5	0.75	6	3.96	0.31	0.75	0.625 X 2.5	4
4"	9	0.94	7.5	4.80	0.32	0.75	0.625 X 3	8
6"	11	1	9.5	6.90	0.34	0.875	0.75 X 3.5	8
8"	13.5	1.12	11.75	9.05	0.36	0.875	0.75 X 3.5	8
10"	16	1.19	14.25	11.10	0.38	1	0.875 X 4	12
12"	19	1.25	17	13.20	0.4	1	0.875 X 4	12
14"	21	1.38	18.75	15.30	0.42	1.125	1 X 4.5	12
16"	23.5	1.44	21.25	17.40	0.43	1.125	1 X 4.5	16
18"	25	1.56	22.75	19.50	0.44	1.25	1.125 X 5	16
20"	27.5	1.69	25	21.60	0.45	1.25	1.125 X 5	20
24"	32	1.88	29.5	25.80	0.47	1.375	1.25 X 5.5	20
30"	38.75	2.12	36	32.00	0.51	1.375	1.25 X 6.5	28
36"	46.00	2.38	42.75	38.30	0.58	1.625	1.5 X 7	32
42"	53.00	2.62	49.5	44.50	0.65	1.625	1.5 X 7.5	36
48"	59.50	2.75	56	50.80	0.72	1.625	1.5 X 8	44
54"	66.25	3.00	62.75	57.56	0.81	2.00	1.75 X 8.5	44
60"	73.00	3.12	69.25	61.61	0.83	2.00	1.75 X 9	52
64"	80.00	3.38	76	65.67	0.87	2.00	1.75 X 9	52

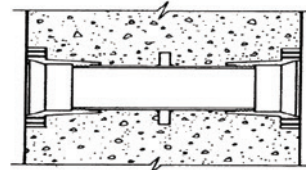




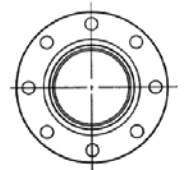
FLG X PLN



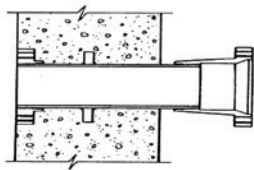
FLG X FLG



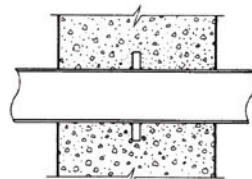
MJ X MJ



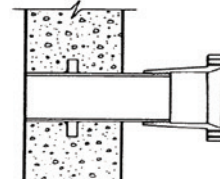
125# DUCTILE
IRON FLANGE



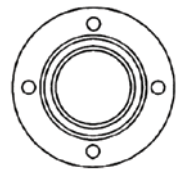
FLG X MJ



PLN X PLN



MJ X PLN



MJ ADAPTER BELL

FABRICATION SPECIFICATIONS—NOTES

FLANGED

PER AWWA C115 / A21.15 FLANGS SHALL HAVE A TAPER PIPE THREAD
IN ACCORDANCE WITH ANSI B1-20.1 / 250 PSI WORKING

PIPE

PER AWWA C151 / CLASS 53-56 DUCTILE IRON

THREADED MECHANICAL JOINT ADAPTERS

PRODUCED FROM DIMENSIONS PROVIDED BY ANSI / AWWA C111 / A21.11 AND
ARE THREADED IN ACCORDANCE WITH AWWA C115 / A21.15

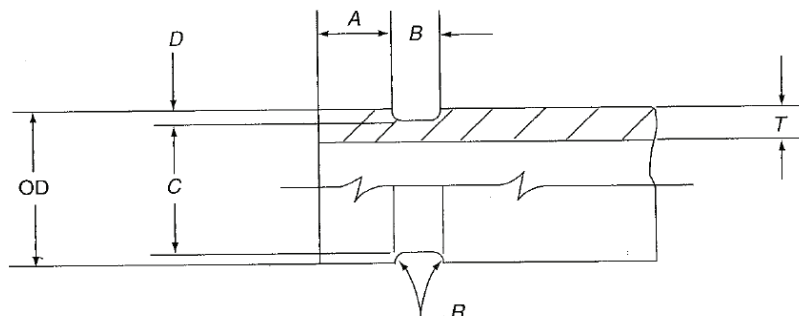
WALL RING

WALL RINGS SHALL BE CONTINUOUSLY WELDED 360° AROUND ON ONE SIDE, EXCEPT
ON FABRICATED SPOOL PIECES WITH HEAT-SENSITIVE SPECIALTY LININGS. FOR THESE
APPLICATIONS, WELDING SHALL BE MINIMIZED TO PREVENT THERMAL DAMAGE, AND
WALL RINGS SHALL INSTEAD BE INSTALLED USING *THE PRECISION SEATING METHOD*, A
CONTROLLED INSTALLATION PROCESS DESIGNED TO MAINTAIN LINING INTEGRITY AND
ENSURE PROPER SEALING.



Cut Grooving Dimensions for Flexible Joints

DUCTILE IRON PIPE
AWWA C606-22



NOTE: Grooving dimensions are the same for any one pipe outside diameter, regardless of pipe class and pressure

Nominal Pipe Size	Pipe OD	Gasket Seat +0.016 -0.047 (A**)	Grove Width +0.031 -0.016 (B)	Groove Diameter (C†)	Radius (R)	(T‡)	Grove Depth (D)	
							Minimum	Maximum
4	4.80 ±0.06	0.750	0.375	4.563 ⁺⁰ / _{-0.020}	0.120	0.32	0.096	0.151
6	6.90 ±0.06	0.750	0.375	6.656 ⁺⁰ / _{-0.020}	0.120	0.34	0.100	0.154
8	9.05 ±0.06	0.875	0.500	8.781 ⁺⁰ / _{-0.025}	0.145	0.36	0.104	0.177
10	11.10 ±0.06	0.938	0.500	10.813 ⁺⁰ / _{-0.025}	0.145	0.38	0.114	0.186
12	13.20 ±0.06	0.938	0.500	12.906 ⁺⁰ / _{-0.030}	0.145	0.40	0.117	0.192
14	15.30 ^{+0.05} / _{-0.08}	0.938	0.625	14.969 ⁺⁰ / _{-0.030}	0.165	0.42	0.126	0.206
16	17.40 ^{+0.05} / _{-0.08}	1.188	0.625	17.063 ⁺⁰ / _{-0.030}	0.165	0.43	0.128	0.208
18	19.50 ^{+0.05} / _{-0.08}	1.188	0.625	19.125 ⁺⁰ / _{-0.030}	0.185	0.44	0.148	0.228
20	21.60 ^{+0.05} / _{-0.08}	1.188	0.625	21.219 ⁺⁰ / _{-0.030}	0.185	0.45	0.150	0.230
24	25.80 ^{+0.05} / _{-0.08}	1.188	0.625	25.406 ⁺⁰ / _{-0.030}	0.185	0.47	0.157	0.237
30	32.00 ^{+0.08} / _{-0.06}	1.375	0.750	31.550 ⁺⁰ / _{-0.035}	0.215	0.51	0.195	0.282
36	38.30 ^{+0.08} / _{-0.06}	1.375	0.750	37.850 ⁺⁰ / _{-0.035}	0.215	0.58	0.195	0.282

Dimensions are in inches where applicable. To convert inches to millimeters, multiply by 25.4.

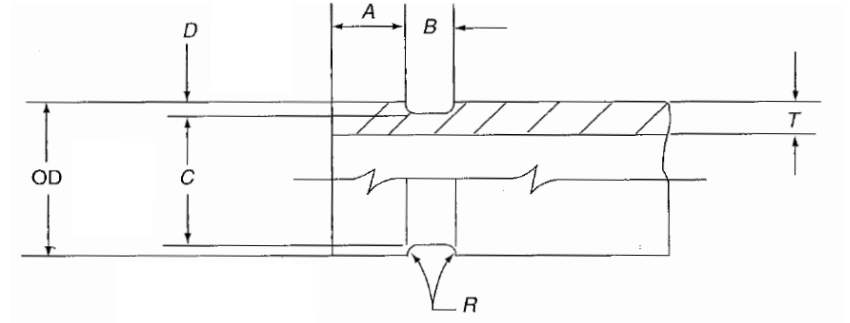
* A is the gasket seating surface (see Sec. 4.3.4).

† C diameters are average values.

‡ T is the minimum standard wall thickness (Class 53-56 for 4 in. [100 mm] through 36 in. [900 mm]) that should be grooved; tolerances referenced in ANSI/AWWA C606/A21.51 shall apply.

Cut Grooving Dimensions for Rigid Joints

DUCTILE IRON PIPE
AWWA C606-22



NOTE: Grooving dimensions are the same for any one pipe outside diameter, regardless of pipe class and pressure

Nominal Pipe Size	Pipe OD	Gasket Seat +0.016 -0.047 (A**)	Grove Width +0.031 -0.016 (B)	Grove Diameter (C†)	Radius (R)	(T‡)	Grove Depth (D)	
							Minimum	Maximum
4	4.80 ±0.06	0.840	0.375	4.563 +0 -0.020	0.120	0.32	0.096	0.151
6	6.90 ±0.06	0.840	0.375	6.656 +0 -0.020	0.120	0.34	0.100	0.154
8	9.05 ±0.06	0.950	0.500	8.781 +0 -0.025	0.145	0.36	0.104	0.177
10	11.10 ±0.06	1.015	0.500	10.813 +0 -0.025	0.145	0.38	0.114	0.186
12	13.20 ±0.06	1.015	0.500	12.906 +0 -0.030	0.145	0.40	0.117	0.192
14	15.30 +0.05 -0.08	1.015	0.625	14.969 +0 -0.030	0.165	0.42	0.126	0.206
16	17.40 +0.05 -0.08	1.340	0.625	17.063 +0 -0.030	0.165	0.43	0.128	0.208
18	19.50 +0.05 -0.08	1.340	0.625	19.125 +0 -0.030	0.185	0.44	0.148	0.228
20	21.60 +0.05 -0.08	1.340	0.625	21.219 +0 -0.030	0.185	0.45	0.150	0.230
24	25.80 +0.05 -0.08	1.340	0.625	25.406 +0 -0.030	0.185	0.47	0.157	0.237
30	32.00 +0.08 -0.06	1.625	0.750	31.550 +0 -0.035	0.215	0.51	0.195	0.282
36	38.30 +0.08 -0.06	1.625	0.750	37.850 +0 -0.035	0.215	0.58	0.195	0.282

Dimensions are in inches where applicable. To convert inches to millimeters, multiply by 25.4.

* A is the gasket seating surface (see Sec. 4.3.4).

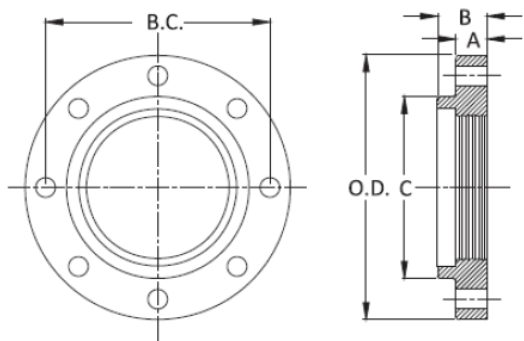
† C diameters are average values.

‡ T is the nominal wall thickness corresponding to the minimum standard pipe classes (special thickness Class 53-56 for 4 in. [100 mm] through 36 in. [900 mm]) that should be grooved; tolerances referenced in ANSI/AWWA C151/A21.51 shall apply.





High Hub DI 125 LB. Threaded Flanges

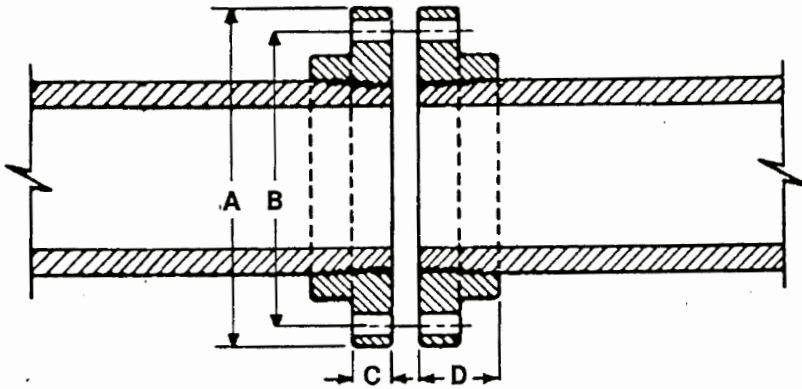


FOR DUCTILE IRON PIPE
ANSI/AWWA C115/121.15

Nom Pipe Size	Pipe OD	Flange THK (A)	Total THK (B)	Thread Length	Flange OD (O.D.)	Hub Dia (C)	Bolt Circle (B.C.)	Bolt Hole Dia	Bolt Size (Dia x Length)	# Bolt Holes	WT (Lbs.)
2	2.50	0.62	1.25	1.00	6.00	3.06	4.75	3/4	5/8 x 2 1/4	4	4
3	3.96	0.75	1.69	1.25	7.50	4.25	6.00	3/4	5/8 x 2 1/2	4	7
4	4.80	0.94	1.81	1.37	9.00	5.32	7.50	3/4	5/8 x 3	8	12
6	6.90	1.00	2.00	1.53	11.00	7.56	9.50	7/8	3/4 x 3 1/2	8	17
8	9.05	1.12	2.25	1.75	13.50	9.69	11.75	7/8	3/4 x 3 1/2	8	26
10	11.10	1.19	2.44	1.88	16.00	12.00	14.25	1	7/8 x 4	12	37
12	13.20	1.25	2.56	2.12	19.00	14.06	17.00	1	7/8 x 4	12	55
14	15.30	1.38	2.62	2.12	21.00	16.25	18.75	1 1/8	1 x 4 1/2	12	70
16	17.40	1.44	2.75	2.12	23.50	18.44	21.25	1 1/8	1 x 4 1/2	16	80
18	19.50	1.56	3.00	2.25	25.00	20.53	22.75	1 1/4	1 1/8 x 5	16	85
20	21.60	1.69	3.25	2.44	27.50	22.673	25.00	1 1/4	1 1/8 x 5	20	106
24	25.80	1.88	3.50	2.75	32.00	26.82	29.50	1 3/8	1 1/4 x 5 1/2	20	147
30	32.00	2.12	3.75	3.37	38.75	32.75	36.00	1 3/8	1 1/4 x 6 1/2	28	224
36	38.30	3.38	5.00	4.00	46.00	39.12	42.75	1 5/8	1 1/2 x 7	32	337
42	44.50	2.62	5.12	4.50	53.00	46.00	49.50	1 5/8	1 1/2 x 7 1/2	36	495
48	50.80	2.75	5.50	4.75	59.50	52.25	56.00	1 5/8	1 1/2 x 8	44	622
54	57.56	3.00	6.45	5.12	66.25	58.75	62.75	2	1 3/4 x 8 1/2	44	711
60	61.61	3.12	6.75	5.00	73.00	63.00	69.25	2	1 3/4 x 9	52	1084
64	65.67	3.38	7.06	5.25	80.00	67.18	76.00	2	1 3/4 x 9	52	1575

- Dimensions are in inches where applicable; To convert inches to millimeters, multiply by 25.4.
- Ductile Iron ASTM A536
- Machined, Drilled, and Faced in accordance with ANSI/AWWA C110/21.10, ASME B16.1 Class 125 and ASME B16.42 Class 150
- Rated for maximum working pressure 250 psi
- Threaded in accordance with ASME B1.20.1 adapted to ductile iron pipe O.D.

Threaded X-Heavy Flanges for Ductile Iron Flanged Pipe

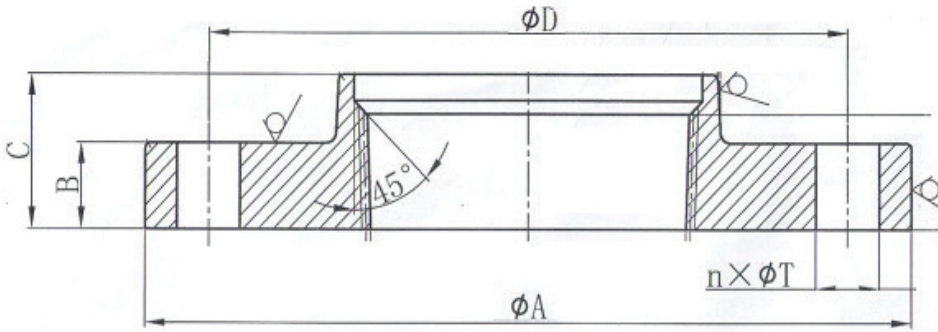


FOR DUCTILE IRON PIPE
ANSI/AWWA C115/A21.15

Nominal Pipe Size	Flange OD (A)	Bolt Circle (B)	Bolt Hole Diameter	Flange Thickness (C)	Length Thru Hub (D)	Number of Holes	Weight (lbs.)
3	8.25	6.62	0.875	1.06	1.56	8	12
4	10.00	7.88	0.875	1.19	1.69	8	20
6	12.50	10.62	0.875	1.38	1.94	12	32
8	15.00	13.00	1.00	1.56	2.18	12	51
10	17.50	15.25	1.125	1.87	2.44	16	77
12	20.50	17.75	1.25	1.93	2.56	16	103
14	23.00	20.25	1.25	2.12	2.68	20	148
16	25.50	22.50	1.375	2.19	2.87	20	171
18	28.00	24.75	1.375	2.31	3.00	24	255
20	30.50	27.00	1.375	2.44	3.31	24	270
24	36.00	32.00	1.625	2.75	3.75	24	310
30	41.00	36.00	1.75	3.00	4.25	28	450
36	48.00	42.75	1.875	3.25	4.75	32	650
42	54.00	48.75	2.00	3.50	5.00	36	900
48	63.00	56.75	2.25	4.00	5.50	44	1,450

- Dimensions are in inches where applicable; To convert inches to millimeters, multiply by 25.4.
- Sizes 3"-24" Ductile Iron (C115/A21.15)
- Machined, Drilled, and Faced in accordance with ANSI B16.1 – Class 250
- Bolt holes in accordance with ANSI A21.10
- Flanges have 0.06" raised face
- Threaded in accordance with ANSI B2.1

6-Hole Ductile Iron Threaded Flange Specifications



6" Ductile Iron Threaded Flanges
with 6 Holes for Ductile Iron Pipe
Ref: DPF066H

UV Item Number	Nom Pipe Size	Flange Outer Diameter (A)	Bolt Circle (D)	B. Hole Diameter (T)	No. of Holes (n)	Flange Thickness (B)	Length Through Hub (C)	Weight (lbs)
DPF066H	6"	11.00	9.50	0.88	6	1.00	2.00	25

- Dimensions are in inches where applicable; To convert inches to millimeters, multiply by 25.4.
- Ductile Iron ASTM A536 (65-45-12)
- Machined, Drilled and Faced in accordance ANSI B16.1 - Class 125 (only change is No of Bolt Holes 6 instead of 8)
- Rated for a maximum working pressure 250 psi
- Coating : Bare
- Threaded in accordance with ANSI /ASME B 1.20.1

Field Guide for Installation of Flanged Ductile Iron Pipe

1. Thoroughly check all flanged ductile iron spools when they are received at the job site to ensure there has been no damage to the lining, coating, or the ends of the pipe as a result of shipping. If there has been any damage take pictures and send immediately to your supplier.
 - a. All flanged pipe should be lifted by use of a pallet or sling and not the flanged end as this could potentially result in breaking the watertight thread seal of the flanged joint. Proper and safe handling is critical as any impact such as dropping may damage this seal as well.
 - b. Inserting or lifting the flanged pipe by using the forks of a forklift is not acceptable and will damage the lining. If the lining is damaged or compromised, then it must be properly repaired before the flanged pipe is installed and placed into service.
 - c. The flanged face must be checked before installation to make sure it is clean and free of debris. The rust preventative coating the flange face should be removed with solvent or wire brush.
2. The accepted industry protocol on gasket use for flanged ductile iron pipe, as written in the ANSA/ AWWA C115/A21.15, Appendix A states “Unless otherwise specified by the purchaser, gaskets shall be synthetic rubber, either ring or full face, and 1/8” (3.18 mm) thick. Gaskets should conform to the dimension shown in Table A.1/AWWA C115. When considering the use of gaskets thinner than 1/8” (3.18mm) and/or gaskets of materials other than synthetic rubber, the purchaser should contact the pipe manufacturer or fabricator concerning such gaskets’ suitability for a particular application. Also available in most sizes are the specially designed gaskets, either ring or full faced employing one or more annular rings molded into the gasket to improve joint performance. By the use of these or other special gaskets it may be possible to obtain a pressure rating greater than 250 psi (1,720kPA). Contact the pipe manufacturer or fabricator for details.”
3. Recommendations for the bolts to be used for installation of flanged ductile iron pipe have also been made by the AWWA. The recommended size, length, and number of bolts are shown in Table 2 and 3 of ANSI/AWWA C115/A21.15. Bolts are to conform to ANSI/ASME B18.2.1, Square and Hex bolts and Screws Inch Series including Hex Cap Screws and Lag Screws. Nuts are to conform to ANSI/ASME B18.2.2, Square and Hex Nuts Inch Series. Bolts and nuts used with gray-iron flanges should have standard square or heavy hex bolts and heavy hex nuts. Bolts and nuts are threaded in accordance with ASME/ANSI B1.1, Unified inch screw threads (UN and UNR thread form), class 2A, external and class 2B, internal. Bolts and nuts of low carbon steel conforming to the chemical and mechanical requirements so ASTM A307, standard specification for the carbon steel bolts and studs, 60,000 psi Tensile Strength are suitable for use with the flanges described in ANSI/AWWA C115/A21.15 when used with the rubber gaskets described. Higher strength (Grade A) bolts and higher torque values should not be used with gray-iron flanges.

4. The AWWA also states, “The purchaser is responsible for the design, assembly and installation of flanged piping system.” The following suggestion are for general guidance:
 - a. The use of flanged joints underground is generally not recommended because of the rigidity of the joint. It should be noted that because of the extremely limited availability and long lead times associated with MJ Bell pipe, MJ threaded adapt-a-bell can be an alternative. However, these are not recommended for underground service. It is strongly recommended to use restrained joint pipe, or push-on pipe with field locking gaskets as an alternative for underground applications.
 - b. Due to the nature of aerial crossings, it is strongly recommended to use flex joint pipe and a properly engineered support system.
 - c. Flanged faces should bear uniformly on the gasket, and the bolts should be tightened in a progressively crisscrossed pattern. (See the attached Bolt Torque Procedure).
 - d. The use of a torque wrench is critical when bolting flanged ductile iron pipe. (See attached Torque Values table).

Suggested Torque Values (Ft. Lbs.)

Standard Ductile Iron 150# Flange, Grade 2 Nut and Bolt with Flat Washer, Dry Assembly

Pipe Size (inches)	Bolt Diameter (inches)	Full Face (RR or Neo.) Minimum (Per IFI 100/107-1987)	Toruseal Minimum (Per ACIPCO)	Flange-Type Minimum (Per U.S. Pipe)
3	$\frac{5}{8}$	100		
4	$\frac{5}{8}$	100	100	90
6	$\frac{3}{4}$	175	150	90
8	$\frac{3}{4}$	175	150	90
10	$\frac{7}{8}$	200	200	90
12	$\frac{7}{8}$	200	200	90
14	1	250	250	110
16	1	250	250	110
18	$1\frac{1}{8}$	350	300	120
20	$1\frac{1}{8}$	350	300	120
24	$1\frac{1}{4}$	500	400	130
30	$1\frac{1}{4}$	500	400	140
36	$1\frac{1}{2}$	870	500	160
42	$1\frac{1}{2}$	870	500	585
48	$1\frac{1}{2}$	870	500	625
54	$1\frac{3}{4}$		600	550*
60	$1\frac{3}{4}$		600	600*
64	$1\frac{3}{4}$		600	600*

* 150 PSI working

It is recommended that torque be applied in increments of one fifth ($\frac{1}{5}$) of the total torque required.

This information has been compiled from various technical references



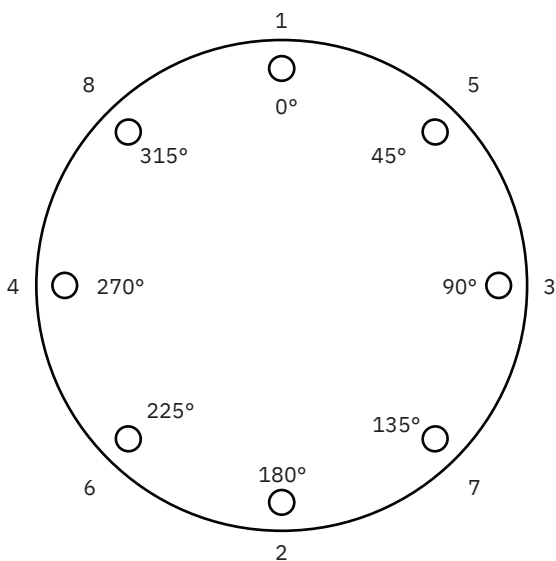
Field Guide for Installation of Flanged Ductile Iron Pipe (cont'd)

Bolt Torque Procedure

Procedure for Application

Bolt Torque on Flanged Joints

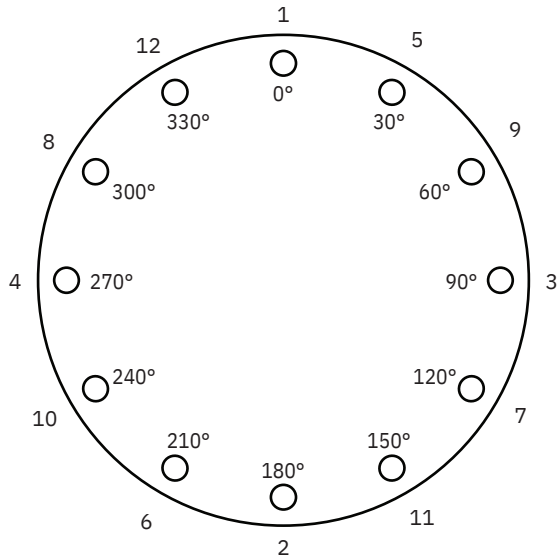
1. Align component part and clamp together with hold down.
2. Lubricate stud (or bolt) threads in area of nut (or forged ring) engagement, also lubricate face of nuts (or bolt head) using a suitable lubricant.
3. Install all bolts and nuts finger tight.
4. Number bolts so that torquing requirements can be followed.
5. Apply torque in 20% (1/5) steps of required final torque, loading all bolts at each step before proceeding to next step.
6. Tighten bolts in sequential order 0-180°, 90°-270°, 45°-225°, 135°-315°, at each step until final torque is reached.
7. Use rotational tightening until all bolts are stable at final torque level (two complete times around is usually required).



8-Bolts

Sequential Order	Rotational Order
1-2	1
3-4	5
5-6	3
7-8	7
	2
	6
	4
	8

Field Guide for Installation of Flanged Ductile Iron Pipe (cont'd)



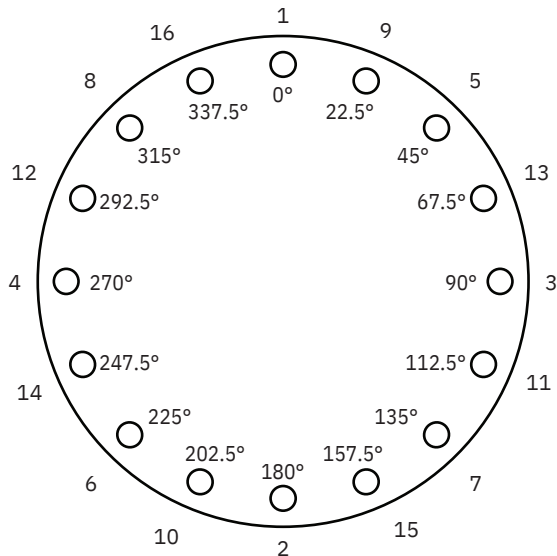
12-Bolts

Sequential Order

1-2
3-4
5-6
7-8
9-10
11-12

Rotational Order

1 2
5 6
9 10
3 4
7 8
11 12



16-Bolts

Sequential Order

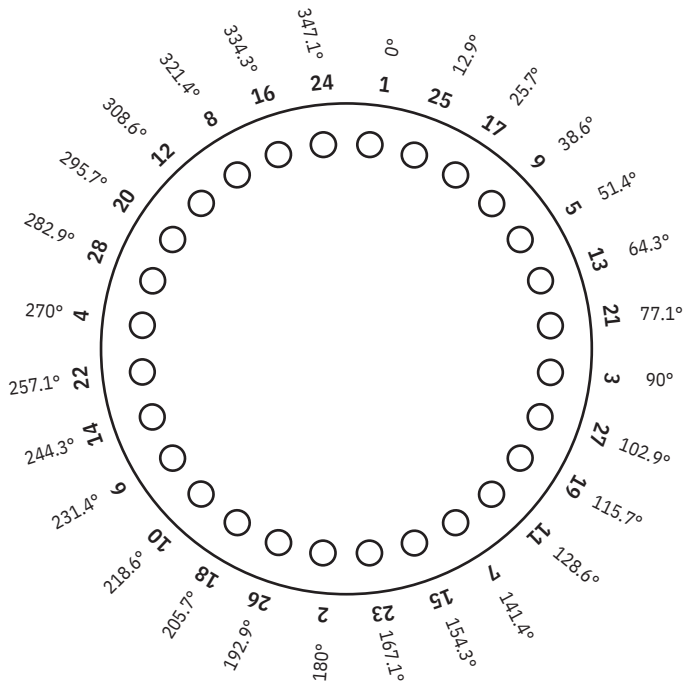
1-2
3-4
5-6
7-8
9-10
11-12
13-14
15-16

Rotational Order

1 2
9 10
5 6
13 14
3 4
11 12
7 8
15 16

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Field Guide for Installation of Flanged Ductile Iron Pipe (cont'd)



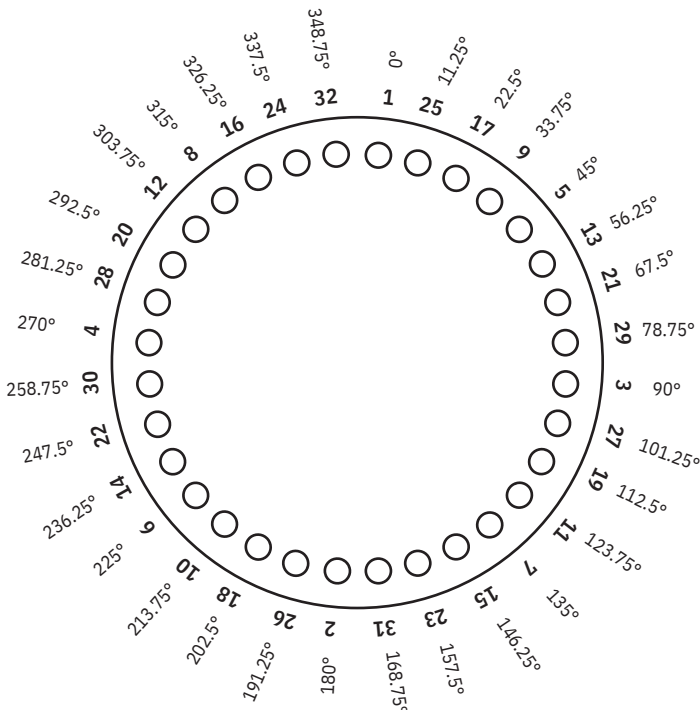
28-Bolts

Sequential Order

1-2	15-16
3-4	17-18
5-6	19-20
7-8	21-22
9-10	23-24
11-12	25-26
13-14	27-28

Rotational Order

1	2
25	26
17	18
9	10
5	6
13	14
21	22
3	4
27	28
19	20
11	12
7	8
15	16
23	24



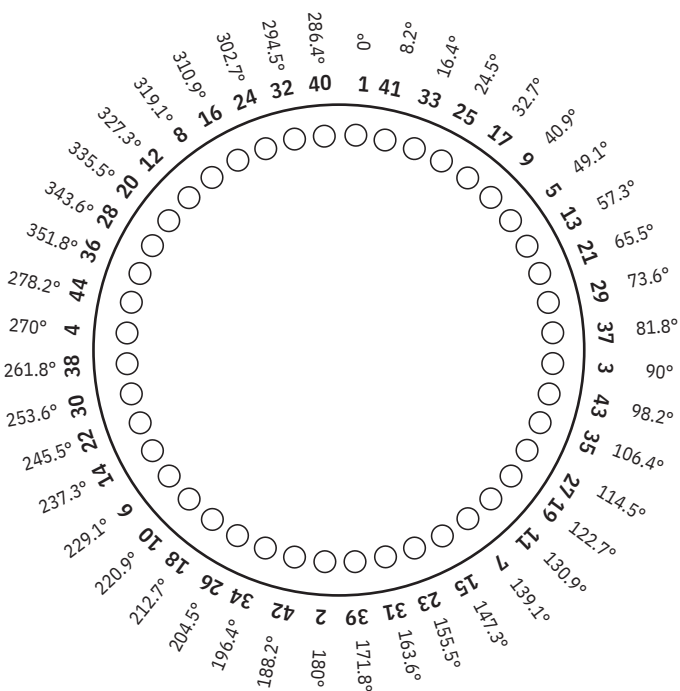
32-Bolts

Sequential Order

1-2	17-18
3-4	19-20
5-6	21-22
7-8	23-24
9-10	25-26
11-12	27-28
13-14	29-30
15-16	31-32

Rotational Order

1	2
25	26
17	18
9	10
5	6
13	14
21	22
29	30
3	4
27	28
19	20
11	12
7	8
15	16
23	24
31	32



Sequential Order

1-2	19-20
3-4	21-22
5-6	23-24
7-8	25-26
9-10	27-28
11-12	29-30
13-14	31-32
15-16	33-34
17-18	35-36

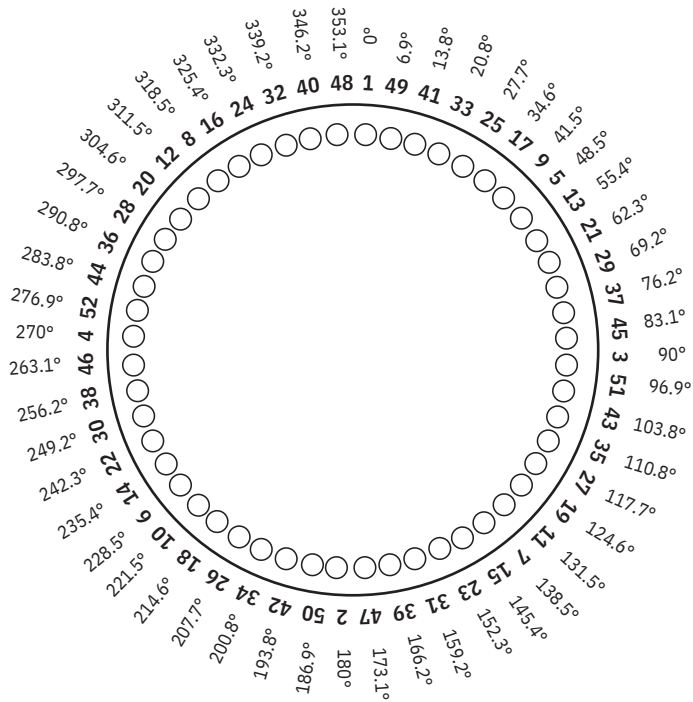
1	19	14
33	11	22
25	7	30
17	15	4
9	23	36
5	31	28
13	2	20
21	34	12
29	26	8
3	18	16
35	10	24
27	6	32

Sequential Order

1-2	23-24
3-4	25-26
5-6	27-28
7-8	29-30
9-10	31-32
11-12	33-34
13-14	35-36
15-16	37-38
17-18	39-40
19-20	41-42
21-22	43-44

1	19	22
41	11	30
33	7	38
25	15	4
17	23	44
9	31	36
5	39	28
13	2	20
21	42	12
29	34	8
37	26	16
3	18	24
43	10	32
35	6	40
27	14	

Field Guide for Installation of Flanged Ductile Iron Pipe (cont'd)



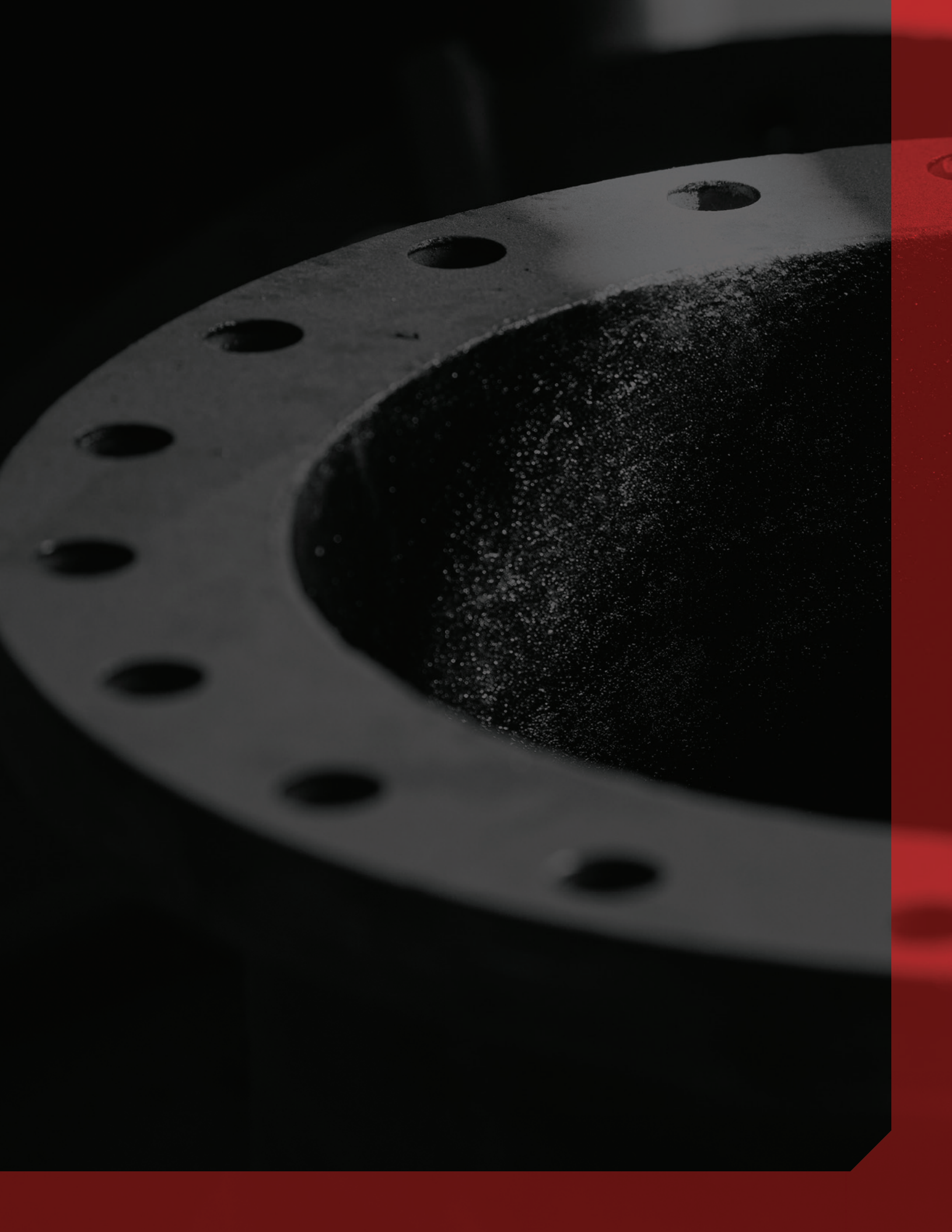
52-Bolts

Sequential Order

1-2	27-28
3-4	29-30
5-6	31-32
7-8	33-34
9-10	35-36
11-12	37-38
13-14	39-40
15-16	41-42
17-18	43-44
19-20	45-46
21-22	47-48
23-24	49-50
25-26	51-52

Rotational Order

1	2
49	50
41	42
33	34
25	26
17	18
9	10
5	6
13	14
21	22
29	30
37	38
45	46
3	4
51	52
43	44
35	36
27	28
19	20
11	12
7	8
15	16
23	24
31	32
39	40
47	



Ductile Spools Minimum Lengths

Diameter	125# FLG x 125# FLG	125# FLG x 250# FLG	250# FLG x 250# FLG	125# FLG x MJ	250# FLG x MJ	MJ x MJ	FLG x G	G x G
3"	4"	3 $\frac{1}{16}$ "	3 $\frac{5}{8}$ "	6 $\frac{1}{4}$ "	6 $\frac{3}{16}$ "	8 $\frac{3}{4}$ "	4"	3 $\frac{1}{2}$ "
4"	4"	3 $\frac{7}{8}$ "	3 $\frac{7}{8}$ "	6 $\frac{7}{16}$ "	6 $\frac{7}{16}$ "	9"	4"	3 $\frac{1}{2}$ "
6"	4"	4 $\frac{3}{8}$ "	4 $\frac{3}{8}$ "	6 $\frac{7}{8}$ "	6 $\frac{7}{8}$ "	9 $\frac{3}{8}$ "	4 $\frac{1}{4}$ "	3 $\frac{1}{2}$ "
8"	5"	4 $\frac{15}{16}$ "	4 $\frac{7}{8}$ "	7 $\frac{1}{2}$ "	7 $\frac{1}{16}$ "	10"	4 $\frac{3}{4}$ "	3 $\frac{3}{4}$ "
10"	5 $\frac{3}{8}$ "	4 $\frac{7}{8}$ "	5 $\frac{3}{8}$ "	7 $\frac{3}{4}$ "	7 $\frac{1}{16}$ "	10 $\frac{1}{4}$ "	5"	3 $\frac{3}{4}$ "
12"	5 $\frac{5}{8}$ "	5 $\frac{9}{16}$ "	5 $\frac{5}{8}$ "	8 $\frac{1}{8}$ "	8 $\frac{3}{16}$ "	10 $\frac{3}{4}$ "	5 $\frac{1}{4}$ "	3 $\frac{3}{4}$ "
14"	5 $\frac{3}{4}$ "	5 $\frac{13}{16}$ "	5 $\frac{7}{8}$ "	9 $\frac{5}{8}$ "	9 $\frac{11}{16}$ "	13 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	3 $\frac{3}{4}$ "
16"	5 $\frac{3}{4}$ "	6"	6 $\frac{1}{4}$ "	9 $\frac{7}{8}$ "	10 $\frac{1}{8}$ "	14"	6"	4 $\frac{1}{2}$ "
18"	6"	6 $\frac{3}{8}$ "	6 $\frac{1}{2}$ "	10 $\frac{3}{8}$ "	10 $\frac{1}{2}$ "	14 $\frac{1}{2}$ "	6 $\frac{1}{4}$ "	4 $\frac{1}{2}$ "
20"	6 $\frac{1}{2}$ "	6 $\frac{13}{16}$ "	7 $\frac{1}{8}$ "	10 $\frac{3}{4}$ "	11 $\frac{1}{16}$ "	15"	6 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "
24"	7"	7 $\frac{1}{2}$ "	8"	11 $\frac{1}{4}$ "	11 $\frac{3}{4}$ "	15 $\frac{1}{2}$ "	7"	4 $\frac{1}{2}$ "
30"	8 $\frac{1}{2}$ "	9"	9 $\frac{7}{16}$ "	13 $\frac{5}{8}$ "	14 $\frac{1}{8}$ "	18 $\frac{3}{4}$ "	7 $\frac{3}{4}$ "	5"
36"	9 $\frac{1}{2}$ "	10 $\frac{1}{8}$ "	10 $\frac{5}{16}$ "	15"	15 $\frac{1}{8}$ "	20"	8 $\frac{1}{2}$ "	5"

**Note: Lengths void if piece requires a wall collar or thrust ring.*



ANSI / AWWA Standards

Custom Pipe & Fabrication meets or exceeds the latest revision of the following ANSI/AWWA standards:

C104/A21.4 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings

C115/A21.15 Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges

C200 Steel Water Pipe, 6 In. (150 mm) and Larger

C207 Steel Pipe Flanges for Waterworks Service Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm)

C210 Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines

C213 Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines

C606 Grooved and Shouldered Joints



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