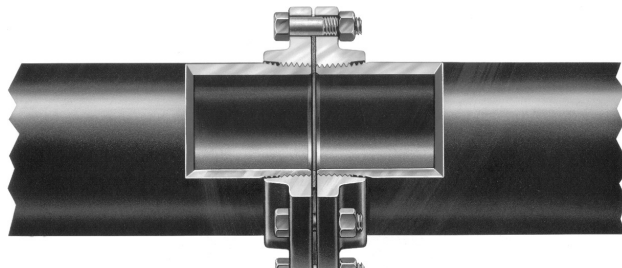




AMERICAN Flanged Pipe



The principal standards covering Flanged Pipe are ANSI/AWWA C115/A21.15 and ANSI/AWWA C110/A21.10. These and other standards are referenced throughout this Section either by the full ANSI/AWWA designation or by only the AWWA numbering, such as AWWA C115.

AMERICAN produces 4" - 64" ductile iron flanged pipe with threaded flanges for water or other liquids in accordance with AWWA C115. Maximum length of flanged pipe is 17'6", 19'0", 19'6", or 20'0", depending on size; any length less than maximum can be furnished down to minimum practical lengths, varying also with pipe size. Flanges generally are threaded on all flanged pipe, except for short lengths of pipe which may be produced statically with integrally cast flanges as shown in Table Nos. 8-9 and 8-10; static castings are manufactured in accordance with applicable requirements of AWWA C110.

Flanged pipe is generally specified for aboveground service for air, water, sewage, oil and other liquids where rigid, restrained joints are needed. It is widely used in industrial piping systems, water treatment plants and sewage treatment plants, and for other interior piping.

Long runs of flanged pipe should normally include design provisions for thermal expansion and contraction, such as flexible joints or couplings at strategic intervals.

Pipe may be furnished with one end flanged and the other end with Fastite bell, mechanical joint bell, restrained joint bell, plain end, grooved or shouldered end, or with other type end as may be required.

The underground use of the flanged joint is generally not recommended due to

the rigidity of the joint as noted in appendices of appropriate ANSI/AWWA standards.

Flanged pipe is rated for a maximum working pressure of at least 250 psi as specified in the tables in this Section. The AWWA C110 and C115 flanges (as well as the flanges faced and drilled per ANSI B16.1 Class 250) are also rated for maximum water working pressure of at least 250 psi. The flanges faced and drilled per ANSI B16.1 Class 250 are special; they do not match other flanges and are infrequently furnished. AMERICAN furnishes these only as a transition from equipment with these flanges to regular AWWA C110 or C115 flanges. These flanges faced and drilled per ANSI B16.1 Class 250 are shown in Table Nos. 8-11, 8-12 and 8-13 which are shaded to signify their special nature. AMERICAN flanged pipe in sizes 24" and smaller is rated for 350 psi working pressure only when AMERICAN Toruseal® gaskets are used. In some cases other sizes of flanged pipe have been supplied for working pressures greater than 250 psi, again when joined with AMERICAN Toruseal® gaskets. Check AMERICAN for details.

Coatings and Linings

The standard outside coating for flanged pipe is a one-mil-thick asphaltic paint, but other outside coatings per Section 11 can be furnished when specified.



AMERICAN DUCTILE IRON PIPE

While other linings are available as described in Section 11, cement lining, per AWWA C104, is usually furnished in flanged piping. Where AMERICAN is given the option, flanged pipe is normally furnished cement lined depending on availability.

A rust preventive coating is applied to the machined faces of the flanges; this coating may be removed prior to installation.

Pipe Barrel and Flanges

Ductile iron pipe barrels conform to the requirements of AWWA C151. All flanges furnished by AMERICAN for threading on ductile iron pipe are ductile iron in accordance with AWWA C115. (AMERICAN recommends only ductile iron flanges for strength and safety, though AWWA C115 currently allows both ductile iron and gray iron flanges.)

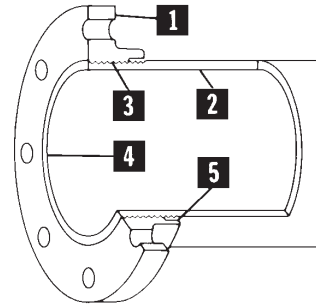
Flanges conform to the chemical and physical properties specified for ductile iron fittings in AWWA C110.

The minus thickness tolerances of the pipe barrels are shown below.

Table No. 8-1

Pipe Size in.	Minus Tolerance AWWA C151 in.
4"–8"	0.05
10"–12"	0.06
14"–42"	0.07
48"	0.08
54"–64"	0.09

Pipe barrels and flanges have tapered pipe threads (NPT) in accordance with ANSI B2.1 adapted to the ductile iron pipe outside diameters. The flange is threaded onto the pipe and machine tightened until the pipe end projects beyond the face of the flange; it is then machined to give a flush finish of the pipe end and flange and to ensure that the flange face is perpendicular to the axis of the pipe. The flange is designed so that a shroud substantially covers the working threads of the pipe for thread protection. Prior to assembly of the flange on the pipe, a commercial-grade thread compound is applied to the threads to ensure leak-free fabrication.



1—Ductile iron flange; 2—Ductile iron pipe barrel; 3—AMERICAN Standard Pipe Threads, ANSI B2.1, adapted to ductile iron outside diameters; 4—Pipe end and barrel machined simultaneously to a flush finish; and 5—Shroud.

AMERICAN Flanged Pipe is shop fabricated in accordance with AWWA C115 and threading at the job site is not recommended. Flanges furnished on pipe are not interchangeable in the field and generally cannot be removed after fabrication without damaging the pipe and/or flange threads. If installation conditions require assembly of the flange on the job, the flange may be factory assembled to a "hand-tight" condition. This permits removal and re-assembly at the job site at which time suitable thread compound must be used. "Hand-tight" flanges should be limited to 16" and smaller sizes because of the difficulty in tightening larger flanges at the job site.

JOINT MATERIALS

Joint materials are normally furnished for all mechanical joint bell openings on pipe or fittings. With the exception of AMERICAN Toruseal® gaskets specifically recommended for superior performance, flanged joint materials are not normally furnished by AMERICAN, although they are generally available from stock. See Table Nos. 8-2 in this section and 8-3 in Details and Accessories.

Since flanged bolts are not generally furnished by AMERICAN, the following is given for information only.



Bolts and Nuts

Size, length and number of bolts and nuts are shown in Table Nos. 8-3 (Details and Accessories-AWWA C110 or C115 flange) and 8-11 (Details and Accessories-flange faced and drilled per ANSI B16.1 Class 250). Bolts are specified in ANSI B18.2.1 and nuts are specified in ANSI B18.2.2. Bolts and nuts of low-carbon steel conforming to ASTM A307 are specified in the Appendix of AWWA C110 and C115 for flanged pipe when rubber gaskets are used. Nuts of regular or heavy hex design are used according to customer specifications. Also, per the Appendix of AWWA C110 and C115, high-strength bolts should not be used when a gray iron flange is involved in the connection.

lengths of pipe) or with any underground flanges* that could be subjected to undesirable beam loading. Toruseal® gaskets are normally furnished of high-quality black, molded SBR rubber with required properties per ANSI/AWWA C111/A21.11. Standard Toruseal® SBR rubber gaskets are ANSI/NSF Standard 61 certified for contact with potable water. Other type rubber is available on special order. AMERICAN Toruseal® gaskets meet the description of “specially designed gaskets” shown in the appendices of AWWA C110, C111, and C115, and “special gaskets” shown in the body of AWWA C111.

*As noted in the appendices of appropriate ANSI/AWWA standards, the use of flanged joints underground is generally not recommended because of the rigidity of the joint.



NSF 61 certified Toruseal® Gasket

AMERICAN Toruseal® Flange Gasket

The AMERICAN Toruseal® flange gasket is available for improved joint performance. It is vastly superior to conventional full-face or ring gaskets. Although recommended for all normal water and sewer service, it especially must be used in demanding services such as very large diameter flanged piping, specially designed long-span installations (i.e. spans involving 2 or 3

Gaskets

AMERICAN Toruseal® gaskets are recommended for AWWA standard flanged joints in normal water and sewage service. The ANSI B16.21 standard specifies the inside of 3”-12” non-metallic full-face and ring gaskets to be greater (the same as standard steel pipe outside diameters) than nominal. Any flat gaskets used for ductile iron flanged pipe must have “nominal” inside diameters as shown in the appendix of ANSI/AWWA C115/A21.15, not the larger inside diameters per ANSI B16.21. **The larger I.D. gaskets per ANSI B16.21 are not recommended by AMERICAN.**



AMERICAN Toruseal® Flange Gasket

Full-Face — Nominal 1/8” Thickness — Dual Raised Torus Bulbs

Table No. 8-2

Pipe Size in.	Pressure Rating* psi	Gasket Weight lbs	Approx. Bolt Torque** ft.-lbs
4	350	0.3	100
6	350	0.3	150
8	350	0.5	150
10	350	0.6	200
12	350	0.8	200
14	350	0.9	250
16	350	1.1	250
18	350	1.1	300
20	350	1.3	300

Pipe Size in.	Pressure Rating* psi	Gasket Weight lbs	Approx. Bolt Torque** ft.-lbs
24	350	1.6	400
30	250	2.1	400
36	250	2.7	500
42	250	3.5	500
48	250	4.0	500
54	250	4.3	600
60	250	6.4	600
64	250	9.1	600
—	—	—	—

Notes:

*Pressure rating designated is maximum water working pressure and is based on the 350 psi allowable rating of 24” and smaller flanges in C111 and the 250 psi maximum rating of other sizes of C110 or C115 flanges. Contact AMERICAN on higher pressure or temperature requirements.

**Bolt torque applicable only to flanged joints with Toruseal® gaskets.

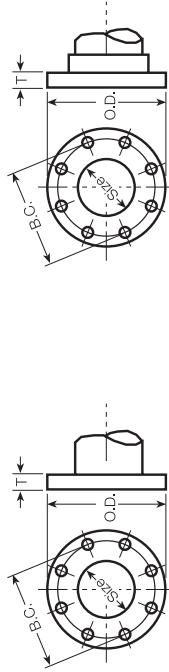
Clean flange faces and faced pipe ends thoroughly prior to installation. Do not use joint or gasket compounds with Toruseal® gaskets (assemble joints dry).

For use with standard flange bolts. Holes match AWWA C110, C111, and C115 flange drilling. They also match certain flange drilling classes of AWWA C207 and ANSI B16.1 and B16.42 flanges.

Toruseal® gaskets may be used with steel pipe flanges in the 14”-54” sizes in some cases. Check AMERICAN for details, or when connecting to any flange configured differently than flanges per AWWA C110 or C115.



AMERICAN Flanged Pipe Details and Accessories



Cast-On Flange ANSI/AWWA C110/A21.10

Threaded-On Flange ANSI/AWWA C115/A21.15

Table No. 8-3

Size in.	O.D. Flange in.	B.C. Bolt Circlelet in.	Thickness ^T in.	Bolt Hole Dia. in.	BOLTS AND STUDS				Approx. Weight per Bolt lbs.
					No. per Joint	Bolt Size ^{††} in.	Stud Size ^{††} in.	Threads per inch	
4	9.00	7.50	.94	3/4	8	5/8 X 3 1/2	5/8 X 3	11	.35
6	11.00	9.50	1.00	7/8	8	3/4 X 3 1/2	3/4 X 3 1/2	10	.5
8	13.50	11.75	1.12	7/8	8	3/4 X 3 1/2	3/4 X 3 1/2	10	.5
10	16.00	14.25	1.19	1	12	7/8 X 4	7/8 X 4	9	.8
12	19.00	17.00	1.25	1	12	7/8 X 4	7/8 X 4	9	.8
14	21.00	18.75	1.38	1 1/8	12	1 X 4 1/2	1 X 4 1/2	8	1.2
16	23.50	21.25	1.44	1 1/8	16	1 X 4 1/2	1 X 4 1/2	8	1.2
18	25.00	22.75	1.56	1 1/4	16	1 1/8 X 5	1 1/8 X 5	7	1.8
20	27.50	25.00	1.69	1 1/4	20	1 1/8 X 5	1 1/8 X 5	7	1.8
24	32.00	29.50	1.88	1 3/8	20	1 1/4 X 5 1/2	1 1/4 X 5 1/2	7	2.4
30	38.75	36.00	2.12	1 3/8	28	1 1/4 X 6 1/2	1 1/4 X 6 1/2	7	2.7
36	46.00	42.75	2.38	1 5/8	32	1 1/2 X 7	1 1/2 X 7	6	5.1
42	53.00	49.50	2.62	1 5/8	36	1 1/2 X 7 1/2	1 1/2 X 7 1/2	6	5.4
48	59.50	56.00	2.75	1 5/8	44	1 1/2 X 8	1 1/2 X 8	6	5.6
54	66.25	62.75	3.00	2	44	1 3/4 X 8 1/2	1 3/4 X 8 1/2	5	8.3
60	73.00	69.25	3.12	2	52	1 3/4 X 9	1 3/4 X 9	5	8.7
*64	80.00	76.00	3.38	2	52	1 3/4 X 9	1 3/4 X 9	5	8.7

*The dimensions of 64" flange correspond with applicable dimensions of 66" Class E flange in ANSI/AWWA C207, and 64" ductile iron flanges can be connected to those flanges.

†Bolt circle and thickness tolerances are per AWWA C115.

††Bolts are hex head machine bolts with regular or heavy hex nuts as specified. Studs with one hex nut each are required for tapped flanges. Bolts, studs and nuts are low-carbon steel per ASTM A307, Grade B; threads are ANSIB1, 1 Coarse Thread Series, Class 2A external and Class 2B internal. Recommended studs are the same length as corresponding bolt length with "tap end" threaded approximately the same length as flange thickness.

Facing: Flanges are plain-faced without projection and are furnished smooth or with shallow serrations.

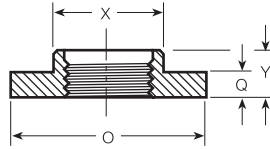
Back Facing: Flanges may be back-faced or spot-faced for compliance with the flange thickness tolerance.

Flanges: The flanges are adequate for water service of 250 psi working pressure or 350 psi in 4"-24" sizes when employing "Foruseal" gasket seats. The bolt circle and bolt holes match those of ANSI B16.1 Class 125 flanges and ANSI B16.5 Class 150 flanges. The flanges do not match and cannot be joined with the ANSI B16.1 Class 250 flanges or with other type flanges. Drilling of flanges can be rotated when required; for those sizes with an even number of bolt holes in each quadrant, pipe can be rotated 45° with standard drilling.

See Section 6 for dimensions of flanges larger than 64".



AMERICAN Flanged Pipe
Companion Flanges for Use
on Ductile Iron Pipe
ANSI/AWWA C115/A21.15



Ductile Companion Flange

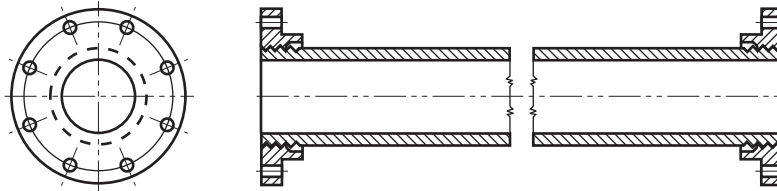
Table No. 8-4

Parent Pipe Size in.	Pipe O.D.	AWWA C115			
		O Dia. of Flange in.	Q Thickness in.	X Dia. Hub in.	Y Length incl. Hub in.
4	4.80	9.00	.94	6.00	1.88
6	6.90	11.00	1.00	7.78	2.06
8	9.05	13.50	1.12	10.01	2.25
10	11.10	16.00	1.19	12.31	2.44
12	13.20	19.00	1.25	14.75	2.68
14	15.30	21.00	1.38	16.59	2.87
16	17.40	23.50	1.44	18.94	3.06
18	19.50	25.00	1.56	20.38	3.31
20	21.60	27.50	1.69	22.62	3.50
24	25.80	32.00	1.88	26.91	3.93
30	32.00	38.75	2.12	33.31	4.50
36	38.30	46.00	2.38	39.62	5.12
42	44.50	53.00	2.62	46.00	5.75
48	50.80	59.50	2.75	52.31	6.38
54	57.56	66.25	3.00	58.75	7.00
60	61.61	73.00	3.12	63.76	7.00
64	65.67	80.00	3.38	70.32	7.00

Hub diameter and length are AMERICAN Design. See Table No. 8-3 for data on bolt holes and bolt circle. When ordering Companion Flanges for Ductile Iron Pipe specify the outside diameter of the pipe. "X" and "Y" dimensions may vary depending on foundry equipment.



AMERICAN Flanged Pipe
AMERICAN Ductile Iron Flanged Pipe
ANSI/AWWA C115/A21.15



Flange and Flange

Table No. 8-5

Size in.	Pressure* Rating psi	Nominal Wall Thickness in.	Pipe O.D. in.	Minimum Length** in.	Maximum Length** ft.-in.	Weight in Pounds		
						Per Foot Plain End	One Flange	Per Maximum Length with Two Flanges
4	350†	.32	4.80	4 1/2	20'-0"	13.8	13	300
6	350†	.34	6.90	4 1/2	20'-0"	21.4	17	460
8	350†	.36	9.05	4 1/2	20'-0"	30.1	27	655
10	350†	.38	11.10	6	20'-0"	39.2	38	860
12	350†	.40	13.20	6	20'-0"	49.2	59	1100
14	350†	.42	15.30	7	20'-0"	60.1	70	1340
16	350†	.43	17.40	7	20'-0"	70.1	90	1580
18	350†	.44	19.50	7	20'-0"	80.6	88	1790
20	350†	.45	21.60	7	20'-0"	91.5	112	2060
24	350†	.47	25.80	8	20'-0"	114.4	155	2600
30	250	.51	32.00	12	19'-6"	154.4	245	3500
36	250	.58	38.30	14	19'-6"	210.3	354	4810
42	250	.65	44.50	18	19'-6"	274.0	512	6370
48	250	.72	50.80	18	19'-6"	346.6	632	8020
54	250	.81	57.56	20	19'-6"	441.9	716	10050
60	250	.83	61.61	20	19'-6"	485.0	1113	11680
64	250	.87	65.67	21	19'-0"	542.0	1824	13950

*Pressure rating designated is maximum water working pressure. Contact AMERICAN on higher pressure requirements.

**Check AMERICAN if longer or shorter lengths required.

†This rating is only applicable to flanged joints utilizing AMERICAN Toruseal® gaskets as per page 8-3.

Pipe is available with greater wall thickness than shown. Thicknesses above correspond to Special Class 53 for 4"-54" diameters, and Pressure Class 350 for 60" and 64" diameters as shown in AWWA C151.

Any length between minimum and maximum shown can be furnished.

Tolerance on length is ±0.12 in.

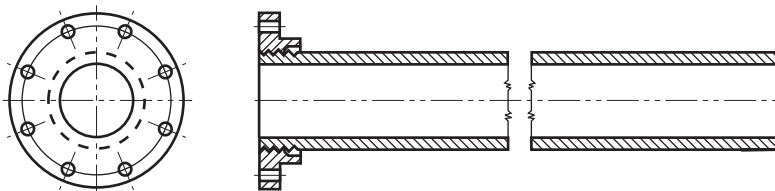
Standard drilling is with bolt holes aligned, straddling a common centerline. Special drilling can be furnished on request.

Where required, specify flanges "Tap for Studs."

The bolt circle and bolt holes of AWWA C115 flanges, AWWA C110 flanges and ANSI B16.1 Class 125 flanges are identical, and these flanges can be joined. AWWA C115 and AWWA C110 flanges are rated for 250-350 psi water working pressure depending on size and specified gasketing system.



AMERICAN Flanged Pipe
AMERICAN Ductile Iron Flanged Pipe
ANSI/AWWA C115/A21.15



Flange and Plain End

Table No. 8-6

Size in.	Pressure* Rating psi	Nominal Wall Thickness in.	Pipe O.D. in.	Minimum Length** in.	Maximum Length** ft.-in.	Weight in Pounds		
						Per Foot Plain End	One Flange	Per Maximum Length with One Flange
4	350†	.32	4.80	1 ³ / ₄	20'-0"	13.8	13	285
6	350†	.34	6.90	2	20'-0"	21.4	17	445
8	350†	.36	9.05	2 ¹ / ₂	20'-0"	30.1	27	630
10	350†	.38	11.10	2 ¹ / ₂	20'-0"	39.2	38	820
12	350†	.40	13.20	2 ¹ / ₂	20'-0"	49.2	59	1045
14	350†	.42	15.30	2 ³ / ₄	20'-0"	60.1	70	1270
16	350†	.43	17.40	3	20'-0"	70.1	90	1490
18	350†	.44	19.50	3	20'-0"	80.6	88	1700
20	350†	.45	21.60	3	20'-0"	91.5	112	1950
24	350†	.47	25.80	3 ³ / ₄	20'-0"	114.4	155	2450
30	250	.51	32.00	8	19'-6"	154.4	245	3260
36	250	.58	38.30	10	19'-6"	210.3	354	4450
42	250	.65	44.50	10	19'-6"	274.0	512	5850
48	250	.72	50.80	10	19'-6"	346.6	632	7390
54	250	.81	57.56	12	19'-6"	441.9	716	9330
60	250	.83	61.61	12	19'-6"	485.0	1113	10570
64	250	.87	65.67	12	19'-0"	542.0	1824	12120

*Pressure rating designated is maximum water working pressure. Contact AMERICAN on higher pressure requirements.

**Check AMERICAN if longer or shorter lengths required. All minimum lengths assume a "no-gauge" plain end (no joint will be made at the plain end).

†This rating is only applicable to flanged joints utilizing AMERICAN Toruseal® gaskets as per page 8-3.

Plain ends to be assembled in a joint (MJ, Fastite, coupling, etc.) must be ordered gauged for the specific joint.

Pipe is available with greater wall thickness than shown. Thicknesses above correspond to Special Class 53 for 4"-54" diameters, and Pressure Class 350 for 60" and 64" diameters as shown in AWWA C151.

Any length between minimum and maximum shown can be furnished.

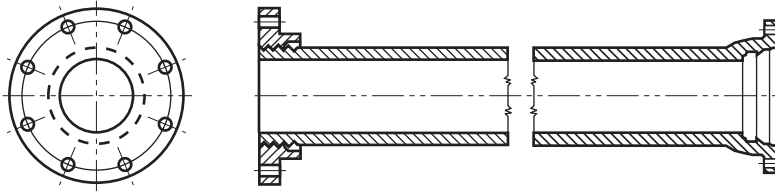
Tolerance on length is ±0.25 in.

Where required, specify flanges "Tap for Studs."

The bolt circle and bolt holes of AWWA C115 flanges, AWWA C110 flanges and ANSI B16.1 Class 125 flanges are identical, and these flanges can be joined. AWWA C115 and AWWA C110 flanges are rated for 250-350 psi water working pressure depending on size and specified gasketing system.



AMERICAN Flanged Pipe
AMERICAN Ductile Iron Flanged Pipe
ANSI/AWWA C115/A21.15 and AMERICAN Standard



Flange and MJ

Table No. 8-7

Size in.	Pressure Rating psi*	Nominal Wall Thickness in.	Pipe O.D. in.	Minimum Laying Length** in.	Maximum Laying Length** ft.-in.	Weight in Pounds			
						Per Foot Plain End	Flange	MJ Bell	Maximum Length
4	350†	.32	4.80	113 ¹ / ₂	19'-6"	13.8	13	14	295
6	350†	.34	6.90	113 ¹ / ₂	19'-6"	21.4	17	19	455
8	350†	.36	9.05	113 ¹ / ₂	19'-6"	30.1	27	25	640
10	350†	.38	11.10	116	19'-6"	39.2	38	31	835
12	350†	.40	13.20	116	19'-6"	49.2	59	38	1055

*Pressure rating designated is maximum water working pressure. Contact AMERICAN on higher pressure requirements.

**Check AMERICAN if longer or shorter lengths required.

†This rating is only applicable to flanged joints utilizing AMERICAN Toruseal® gaskets as per page 8-3.

14"-64" pipe is not available with integrally cast MJ Bell. See Table 8-8 for Flange and Fastite Pipe.

Pipe is available with greater wall thickness than shown. Thicknesses above correspond to Special Class 53.

Any length between minimum and maximum shown can be furnished.

Tolerance on length is ±0.25 in.

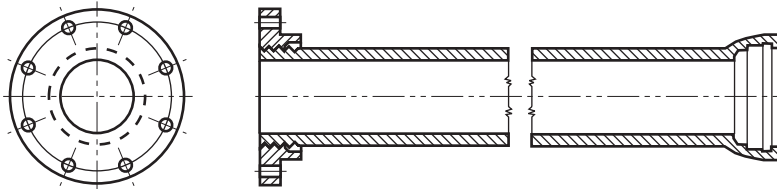
If specified, bolt holes both ends can be drilled, straddling a common centerline.

Where required, specify flanges or MJ Bells "Tap for Studs."

The bolt circle and bolt holes of AWWA C115 flanges, AWWA C110 flanges and ANSI B16.1 Class 125 flanges are identical, and these flanges can be joined. AWWA C115 and AWWA C110 flanges are rated for 250-350 psi water working pressure depending on size and specified gasketing system.



AMERICAN Flanged Pipe
AMERICAN Ductile Iron Flanged Pipe
ANSI/AWWA C115/A21.15 and AMERICAN Standard



Flange and Fastite

Table No. 8-8

Size in.	Pressure Rating psi*	Nominal Wall Thickness in.	Pipe O.D. in.	Minimum Laying Length** in.	Maximum Laying Length** ft.-in.	Weight in Pounds			
						Per Foot Plain End	Flange	Fastite Bell	Maximum Length
4	350†	.32	4.80	2½	19'-6"	13.8	13	10	290
6	350†	.34	6.90	2½	19'-6"	21.4	17	15	450
8	350†	.36	9.05	3	19'-6"	30.1	27	21	635
10	350†	.38	11.10	2	19'-6"	39.2	38	27	830
12	350†	.40	13.20	2	19'-6"	49.2	59	32	1050
14	350†	.42	15.30	2¾	19'-6"	60.1	70	57	1300
16	350†	.43	17.40	2¾	19'-6"	70.1	90	64	1520
18	350†	.44	19.50	3	19'-6"	80.6	88	73	1735
20	350†	.45	21.60	3	19'-6"	91.5	112	81	1980
24	350†	.47	25.80	2¾	19'-6"	114.4	155	96	2480
30	250	.51	32.00	12	19'-6"	154.4	245	164	3420
36	250	.58	38.30	14	19'-6"	210.3	354	214	4670
42	250	.65	44.50	14	19'-6"	274.0	512	289	6140
48	250	.72	50.80	16	19'-6"	346.6	632	354	7745
54	250	.81	57.56	16	19'-6"	441.9	716	439	9770
60	250	.83	61.61	16	19'-6"	485.0	1113	819	11390
64	250	.87	65.67	16	19'-6"	542.0	1824	932	13320

*Pressure rating designated is maximum water working pressure. Contact AMERICAN on higher pressure requirements.

**Check AMERICAN if longer or shorter lengths required.

†This rating is only applicable to flanged joints utilizing AMERICAN Toruseal® gaskets as per page 8-3.

Pipe is available with greater wall thickness than shown. Thicknesses above correspond to Special Class 53 for 4"-54" diameters, and Pressure Class 350 for 60" and 64" diameters as shown in AWWA C151.

Any length between minimum and maximum shown can be furnished.

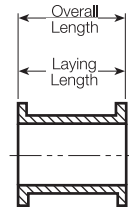
Tolerance on length is ±0.25 in.

Where required, specify flanges "Tap for Studs."

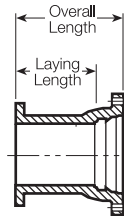
The bolt circle and bolt holes of AWWA C115 flanges, AWWA C110 flanges and ANSI B16.1 Class 125 flanges are identical, and these flanges can be joined. AWWA C115 and AWWA C110 flanges are rated for 250-350 psi water working pressure depending on size and specified gasketing system.



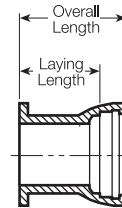
AMERICAN Flanged Pipe Short Lengths Statically Cast Ductile Iron Spools Minimum Lengths



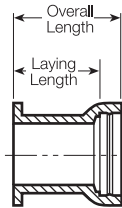
Flange and Flange



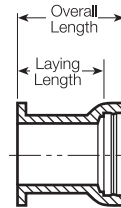
Flange and MJ



Flange and Fastite



Flange and Lok-Ring



Flange and Flex-Ring

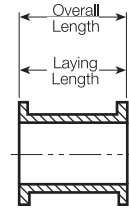
Table No. 8-9

Size in.	Minimum Lengths									
	Flange & Flange		Flange & MJ		Flange & Fastite		Flange & Lok-Ring		Flange & Flex-Ring	
	Laying Length	Overall Length	Laying Length	Overall Length	Laying Length	Overall Length	Laying Length	Overall Length	Laying Length	Overall Length
30	18 ³ / ₄	18 ¹ / ₄	0'-10"	1'-12 ¹ / ₂ "	0'-10"	1'-13 ¹ / ₄ "	N/A	N/A	0'-10"	1'-7 ³ / ₈ "
36	18 ³ / ₄	18 ³ / ₄	0'-10"	1'-12 ¹ / ₂ "	0'-10"	1'-13 ¹ / ₄ "	N/A	N/A	0'-10"	1'-7 ³ / ₈ "
42	10 ¹ / ₄	10 ¹ / ₄	0'-10"	1'-12 ¹ / ₂ "	0'-10"	1'-15 ¹ / ₂ "	N/A	N/A	0'-10"	1'-8 ⁷ / ₈ "
48	10 ¹ / ₂	10 ¹ / ₂	0'-10"	1'-12 ¹ / ₂ "	0'-10"	1'-16 ¹ / ₂ "	N/A	N/A	0'-10"	1'-10 ³ / ₈ "
54	12 ¹ / ₂	12 ¹ / ₂	N/A	N/A	0'-10"	1'-16 ¹ / ₂ "	0'-10"	1'-18 ¹ / ₂ "	N/A	N/A
60	12 ¹ / ₂	12 ¹ / ₂	N/A	N/A	0'-10"	1'-16 ³ / ₄ "	0'-10"	1'-18 ¹ / ₂ "	N/A	N/A
64	12 ¹ / ₂	12 ¹ / ₂	N/A	N/A	0'-10"	1'-17 ¹ / ₂ "	0'-10"	1'-18 ¹ / ₂ "	N/A	N/A

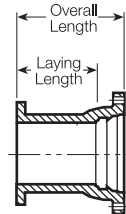
Flanges are AWWA C110.
 Shorter lengths are furnished as Flange Fillers. See Section 6, Table No. 6-18.
 All sizes and lengths of Flange and Plain End, MJ and Plain End, Fastite and Plain End, and Plain End and Plain End Pipe are generally fabricated from centrifugally cast pipe.
 Some sizes of pipe in shorter lengths than shown above can be furnished statically cast by special pattern adaptation.
 Statically cast flanged spools are made of ductile iron and are pressure rated 250 psi. Contact AMERICAN on higher pressure or longer/shorter length requirements.



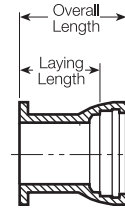
**AMERICAN Flanged Pipe
Short Lengths
Statically Cast Ductile Iron Spools
Maximum Lengths**



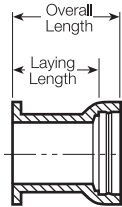
Flange and Flange



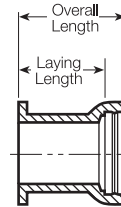
Flange and MJ



Flange and Fastite



Flange and Lok-Ring



Flange and Flex-Ring

Table No. 8-10

Size in.	Maximum Lengths									
	Flange & Flange		Flange & MJ		Flange & Fastite		Flange & Lok-Ring		Flange & Flex-Ring	
	Laying Length	Overall Length	Laying Length	Overall Length	Laying Length	Overall Length	Laying Length	Overall Length	Laying Length	Overall Length
30	1'-6"	1'-6"	3'-0"	3'-4 ¹ / ₂ "	3'-0"	3'-15 ¹ / ₄ "	N/A	N/A	3'-0"	3'-19 ³ / ₈ "
36	1'-6"	1'-6"	3'-0"	3'-4 ¹ / ₂ "	3'-0"	3'-15 ¹ / ₄ "	N/A	N/A	3'-0"	3'-19 ³ / ₈ "
42	1'-6"	1'-6"	3'-0"	3'-4 ¹ / ₂ "	3'-0"	3'-17 ¹ / ₂ "	N/A	N/A	5'-8"	6'-16 ³ / ₈ "
48	1'-6"	1'-6"	3'-0"	3'-4 ¹ / ₂ "	3'-0"	3'-18 ¹ / ₂ "	N/A	N/A	5'-8"	6'-18 ³ / ₈ "
54	2'-0"	2'-0"	N/A	N/A	3'-0"	3'-18 ¹ / ₂ "	3'-0"	3'-10 ¹ / ₂ "	N/A	N/A
60	2'-0"	2'-0"	N/A	N/A	3'-0"	3'-18 ³ / ₄ "	3'-0"	3'-10 ¹ / ₂ "	N/A	N/A
64	2'-0"	2'-0"	N/A	N/A	3'-0"	3'-19 ¹ / ₂ "	3'-0"	3'-10 ¹ / ₂ "	N/A	N/A

Flanges are AWWA C110.
Longer lengths of Flange and Flange, Flange and MJ, Flange and Fastite, Flange and Lok-Ring, and Flange and Flex-Ring Pipe than shown above are normally fabricated from centrifugally cast pipe. Lengths shorter than the maximum shown above may also be fabricated from centrifugally cast pipe.

All sizes and lengths of Flange and Plain End, MJ and Plain End, Fastite and Plain End, and Plain End and Plain End Pipe are generally fabricated from centrifugally cast pipe.

To determine weight of any statically cast pipe with various joint combinations and lengths, use data in Section 7, Table No. 7-3.

Some sizes of pipe in longer lengths than shown above can be furnished statically cast by special pattern adaptation.

Statically cast flanged spools are made of ductile iron and are pressure rated 250 psi. Contact AMERICAN on higher pressure requirements.



AMERICAN DUCTILE IRON PIPE

**AMERICAN Flanged Pipe
Flex-Ring X Flange Adapter**

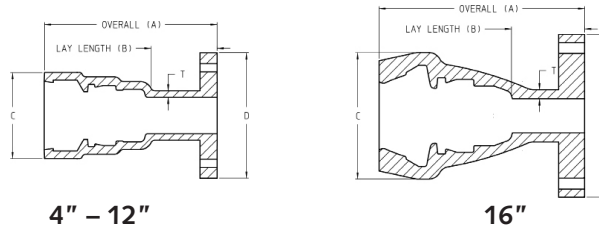


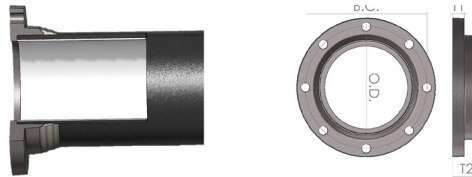
Table No. 8-11

Size	Laying Length (B)	Overall Length (A)	T	Flex-Ring Bell (C)	Flange Diameter (D)	Weight
4	4.00	9.71	0.34	7.18	9.00	45
6	4.00	9.71	0.36	9.20	11.00	65
8	4.00	9.83	0.38	11.35	13.50	80
10	4.00	10.74	0.40	13.75	16.00	125
12	4.00	10.74	0.42	16.37	19.00	165
16	4.00	11.38	0.50	21.49	23.50	260

Notes:

1. All dimensions are in inches.
2. Casting manufactured in accordance with ANSI/AWWA C153/A21.53.
3. Material ductile iron as specifies by ANSI/AWWA C153/A21.53.
4. Marking per ANSI/AWWA C153/A21.53.
5. Flanges per AWWA/ANSI C110/A21.10 and ASME B16.1 Class 125.

**AMERICAN Flanged Pipe
Ductile Iron Welded Flange
Class 125 Welded Flange Dimensions**



Welded flanges may be used on flanged outlets and pipes in sizes 4-inch through 36-inch. The ductile iron class 125 flange is produced in accordance with the requirements of ANSI/AWWA C115/A21.15 and ASME B16.1. Class 250 ductile iron flanges can be furnished upon request. Class 125 welded flanges are rated for 250 psi working pressure. Class 125 welded flanges 4-inch through 24-inch are rated up to a maximum working pressure of 350 psi when a Toruseal gasket is used. In performance evaluations, for both pressure testing and long-span moment loaded testing, all welded flanges currently offered perform equal to or better than threaded flanges. The AWS weld wire designation used in fabrication is ENiFeT3-CI. Stoodly Castweld Ni55 is the current approved wire.

This information covers the specification requirements for purchased ductile iron weld-on flanges in accordance with the latest revisions of ANSI/AWWA C115/A21.15, C110/A21.10, and/or ASME B16.1, as applicable.

Material, Metallurgical, and Mechanical Requirements

Weld-on flanges shall be made of ductile iron conforming to the mechanical

requirements of C110/A21.10 and ASTM A536, ductile iron grade 65-45-12. Ductile iron grades 70-50-05 and 60-40-12 may be allowed with approval by the purchaser. The ductile iron shall meet the chemical requirements shown in ANSI/AWWA C110/A21.10, Section 5.5.2 and/or ANSI/AWWA C153/A21.53, Section 5.3 (phosphorous <0.08%). Hollow-back flanges are not acceptable.



Table No. 8-12

Size in.	O.D. Flange in.	B.C. Bolt Circle in.	T1: Flange Thickness in.	T2: Overall Thickness in.	Bolt Hole Diameter in.	Number of Bolt Holes	Approx. Weight Pounds
4	9.00	7.50	.94	2.56	0.750	8	15
6	11.00	9.50	1.01	2.64	0.875	8	19
8	13.50	11.75	1.12	2.68	1.000	8	28
10	16.00	14.25	1.19	2.80	1.000	12	40
12	19.00	17.00	1.25	2.93	1.125	12	59
14	21.00	18.75	1.38	3.11	1.125	12	69
16	23.50	21.25	1.44	3.31	1.125	16	87
18	25.00	22.75	1.57	3.44	1.125	16	85
20	27.50	25.00	1.69	3.56	1.125	20	108
24	32.00	29.50	1.88	3.81	1.375	20	145
30	38.75	36.00	2.12	3.93	1.375	28	210
36	46.00	42.75	2.38	4.05	1.625	32	301

Casting Surface Quality

Castings shall conform to the Surface Finish Number, or a lower number, according to MSS SP-112 Quality Standard for Evaluation of Cast Surface Finishes.

OD Surface Finishes: External Surfaces of castings shall conform to Surface Finish Number 5 with the allowance that a maximum of 30% of the total surface area may conform to Number 7.

Protruding Metal: Protruding extra metal, including, but not limited to, flash at parting lines and core assembly joints, chaplets, gate and riser pads and core-surface burn-in, shall be ground flush with the surrounding surfaces such that the final ring is capable to pass the relevant sized go/no-go cross section gauge.

Voids, shrinkage, inclusions, and porosity: Voids, Shrinkage, Inclusions, and Porosity located on cast surfaces shall be acceptable according to the Definition of Surface Quality by Visual Examination for Types II, III, IV, and VII, in MSS SP-55.

Grind Marks: Grind marks shall be acceptable according to the Definition of Surface Quality by Visual Examination for Type VIIIa in MSS SP-55.

Fabrication

Machined surfaces shall be free of any voids, protruding metal, inclusions, or porosity. The repair of defects by plugging or welding is not allowed on castings and machined surfaces.

Coatings and Linings

Coatings and linings shall be as specified on the purchase order. A rust preventative coating shall be applied to the machined faces of the flanges. The coating must be easily removable by a solvent prior to welding.

Markings

The flange manufacturer's mark, country where cast, flange size, and the letters "DI" shall be cast or stamped with metal die on the back face of the flanges. In addition, "B16.1" and the relevant class designation number shall be cast or stamped on the flanges per the requirements listed in ASME B16.1, section 5.2 unless otherwise specified by the customer.

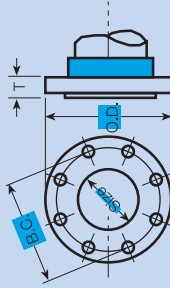
Referenced Documents

- ANSI/AWWA C115/A21.15-11 "Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges"
- ANSI/AWWA C151/A21.51-17 "Ductile-Iron Pipe, Centrifugally Cast"
- ANSI/AWWA C110/A21.10-12 "Ductile-Iron and Gray-Iron Fittings"
- ANSI/ASME B1.20.1 "Pipe Threads, General Purpose, Inch" (2013)
- ANSI/AWWA C104/A21.04-16 "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings"
- ISO 2531:2009 "Ductile iron pipes, fittings, accessories and their joints for water applications"
- ISO 7005-2:1988 "Metallic flanges — Part 2: Cast iron flanges"
- MSS SP 9 2018 "Spot Facing for Bronze, Iron, and Steel Flanges" (2018)



AMERICAN Flanged Pipe—Flange Details and Accessories

Faced and Drilled Per ANSI B16.1 Class 25



Threaded-On Flange
Faced and Drilled Per ANSI B16.1 Class 250

Table No. 8-12

Size in.	O.D. Flange in.	B.C. Bolt Circle in.	T Thickness in.	Dia. of Raised Face in.	Bolt Hole Dia. in.	BOLTS AND STUDS				Size Ring Gasket in.
						No. per Joint	Bolt Size* in.	Stud Size* in.	Threads per inch	
4	10.00	7.88	1.25	6.94	1 7/8	8	1 3/4 x 13 3/4	1 3/4 x 13 3/4	10 1/2	14 x 17 1/8
6	12.50	10.62	1.44	9.69	1 7/8	12	1 3/4 x 14 1/2	1 3/4 x 14 1/2	10 1/2	16 x 19 7/8
8	15.00	13.00	1.62	11.94	1 1/2	12	1 7/8 x 14 1/2	1 7/8 x 14 1/2	19 1/2	18 x 12 1/8
10	17.50	15.25	1.88	14.06	1 1/8	16	1 1/2 x 15 1/2	1 1/2 x 15 1/4	18 1/2	10 x 14 1/4
12	20.50	17.75	2.00	16.44	1 1/4	16	1 1/8 x 15 1/2	1 1/4 x 15 1/2	17 1/2	12 x 16 5/8
14	23.00	20.25	2.12	18.94	1 1/4	20	1 1/8 x 16 1/2	1 1/8 x 16 1/2	17 1/2	14 x 19 1/8
16	25.50	22.50	2.25	21.06	1 3/8	20	1 1/4 x 16 1/2	1 1/4 x 16 1/2	17 1/2	16 x 21 1/4
18	28.00	24.75	2.38	23.31	1 3/8	24	1 1/4 x 16 1/2	1 1/4 x 16 1/2	17 1/2	18 x 23 1/2
20	30.50	27.00	2.50	25.56	1 3/8	24	1 1/4 x 17 1/2	1 1/4 x 17 1/2	17 1/2	20 x 25 3/4
24	36.00	32.00	2.75	30.31	1 5/8	24	1 1/2 x 17 1/2	1 1/2 x 17 1/2	16 1/2	24 x 30 1/2
30	43.00	39.25	3.00	37.19	2 1/2	28	1 3/4 x 18 1/2	1 3/4 x 18 1/2	15 1/2	30 x 37 1/2
36	50.00	46.00	3.38	43.69	2 1/4	32	2 1/2 x 19 1/2	2 1/2 x 19 1/2	14 1/2	36 x 44 1/2
42	57.00	52.75	3.69	50.44	2 1/4	36	2 1/2 x 10 1/2	2 1/2 x 10 1/2	14 1/2	42 x 50 3/4
48	65.00	60.75	4.00	58.44	2 1/4	40	2 1/2 x 11 1/2	2 1/2 x 10 3/4	14 1/2	48 x 58 3/4

*Bolts are hex head machine bolts with regular or heavy hex nuts as specified. Studs with one hex nut each are required for tapped flanges. Bolts, studs and nuts are low-carbon steel per ASTM A307; threads are ANSI B1.1 Coarse Thread Series, Class 2A external and Class 2B internal. Recommended studs are the same length as corresponding bolt length with "tap end" threaded approximately the same length as flange thickness.

Facing: Flanges have a 0.06" raised face and are furnished with shallow serrations. Flanges may be furnished with a flat face upon special request.

Back Facing: Flanges may be back-faced or spot-faced for compliance with the flange thickness tolerance.

Flanges: The flanges are adequate for water service of 250 psi working pressure. The bolt circle and bolt holes do not match those of AWWA C115 or C110 flanges. Drilling of flanges can be rotated when required; for those sizes with an even number of bolt holes in each quadrant, pipe can be rotated 45° with standard drilling.



AMERICAN Flanged Pipe
Companion Flanges for Use
on Ductile Iron Pipe
Faced and Drilled Per ANSI B16.1 Class 250

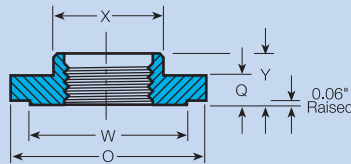


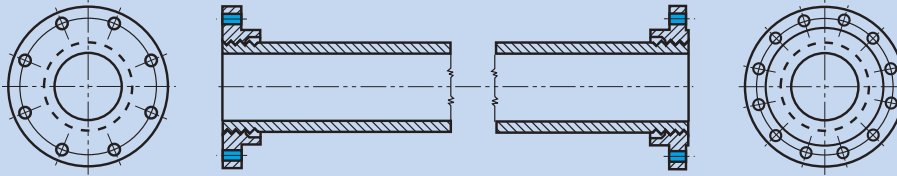
Table No. 8-13

Size in.	Pipe O.D. in.	Flanges Faced and Drilled Per ANSI B16.1 Class 250				
		O Dia. of Flange in.	Q Thickness in.	W Dia. of Raised Face in.	X Dia. of Hub in.	Y Length incl. Hub in.
4	4.80	10.00	1.25	6.94	6.00	2.12
6	6.90	12.50	1.44	9.69	8.50	2.31
8	9.05	15.00	1.62	11.94	10.78	2.50
10	11.10	17.50	1.88	14.06	12.81	2.68
12	13.20	20.50	2.00	16.44	15.13	2.93
14	15.30	23.00	2.12	18.94	17.50	3.12
16	17.40	25.50	2.25	21.06	19.56	3.31
18	19.50	28.00	2.38	23.31	21.75	3.56
20	21.60	30.50	2.50	25.56	24.00	3.75
24	25.80	36.00	2.75	30.31	28.50	4.18
30	32.00	43.00	3.00	37.19	35.00	4.75
36	38.30	50.00	3.38	43.69	41.25	5.37
42	44.50	57.00	3.69	50.44	48.50	6.00
48	50.80	65.00	4.00	58.44	56.55	6.63

Flanges faced and drilled per ANSI B16.1 Class 250 have a 0.06" raised face; they do not match AWWA C110 or C115 flanges. Flanges may be furnished with a flat face upon special request.
 Hub diameter and length are AMERICAN Design. See Table No. 8-11 for data on bolt holes and bolt circle.
 When ordering Companion Flanges for Ductile Iron Pipe specify the outside diameter of the pipe.



AMERICAN Flanged Pipe
AMERICAN Ductile Iron Flanged Pipe
Flanges Faced & Drilled
ANSI/AWWA C115/A21.15 & ANSI B16.1 Class 250



Flange and Flange
 C115 to B16.1 Class 250 Transition Pipe

Table No. 8-14

Size in.	Pressure Rating** psi	Nominal Wall Thickness in.	Pipe O.D. in.	Minimum Laying Length in.*	Maximum Laying Length ft.-in.	Weight in Pounds			
						Per Foot Plain End	C115 Flange	B16.1 250 Flange	Min. Length Total Wt.
4	250	.32	4.80	6	19'-6"	13.8	13	20	40
6	250	.34	6.90	6	20'-0"	21.4	17	32	60
8	250	.36	9.05	6	20'-0"	30.1	27	49	91
10	250	.38	11.10	8	20'-0"	39.2	38	68	132
12	250	.40	13.20	8	20'-0"	49.2	59	99	191
14	250	.42	15.30	10	20'-0"	60.1	70	127	247
16	250	.43	17.40	10	20'-0"	70.1	90	157	305
18	250	.44	19.50	10	20'-0"	80.6	88	194	349
20	250	.45	21.60	10	20'-0"	91.5	112	239	427
24	250	.47	25.80	10	20'-0"	114.4	155	358	608
30	250	.51	32.00	12	19'-6"	154.4	245	508	907
36	250	.58	38.30	14	19'-6"	210.3	354	697	1296
42	250	.65	44.50	18	19'-6"	274.0	512	1010	1933
48	250	.72	50.80	18	19'-6"	346.6	632	1545	2697

*The minimum lengths shown may not allow clearance in all cases for installation of bolts between flanges, requiring bolt clearance from the other direction. Very short (shorter than the minimums as per above table) fabricated steel adapters are also available for connecting AWWA C115 flanged pipe or AWWA C110 fittings to ANSI B16.1 Class 250 flanged items. Contact AMERICAN for details.

Pressure rating designated is maximum water working pressure.
 Flanges faced and drilled per ANSI B16.1 Class 250 have 0.06" raised face; they do not match AWWA C110 or C115 flanges. Flanges may be furnished with a flat face upon special request.

Pipe is available with greater wall thickness than shown.
 Tolerance on length for Flange and Flange pipe is ±0.12 in.
 Standard drilling is with bolt holes aligned, straddling a common centerline. Class 250 is special drilling and all connecting equipment must have flanges faced and drilled per ANSI B16.1 Class 250.
 Where required, specify flanges "Tap for Studs."