

FF[®]
2013

Lee Brass

Made in the U.S.A.

Flagg-Flow Catalog

Threadless Bronze Fittings
for Brazed Joints



Quality Brass Castings
Since 1917

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Brass Castings Since 1917



The Flagg-Flow product line was developed in the early 1940's in conjunction with Naval Sea System Command personnel. We created a durable bronze pipe fitting to join Iron Pipe Size (IPS) red brass, copper, and copper nickel pipe or tubing. Flagg-Flow Fittings, when properly brazed to pipe or tubing, provide a connection which is stronger than the pipe or fitting.



Lee Brass Factory, Anniston, Alabama

Please Visit: WWW.LEEBRASS.com

1800 Golden Springs Road, Anniston, AL 36207 800-876-1811



Specifications: - Fittings

MIL. F-1183 - 6" and smaller than 6" 200 lbs. W. S. P. (Dimensions)
MIL. F-1183 -Over 6" 150 lbs. W. S. P. 400 lbs. W.O.G. (Dimensions)

Material

ASTM B-61
(as permitted in latest revision of MIL. F-1183)

(The latest issue of any specification shall constitute the authority)

Since the introduction of our Flagg-Flow® threadless bronze fittings, we have been most gratified by their ready acceptance in a constantly widening number of applications in the piping field.

Flagg-Flow® Bronze Fittings meet today's increasing demand for "one piece" security on installations using I.P.S. brass, I.P.S. copper pipe or tubing, or I.P.S. copper nickel tubing.

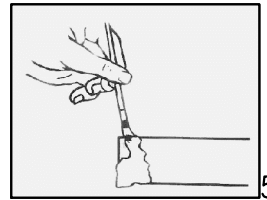
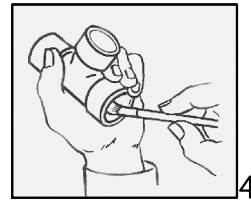
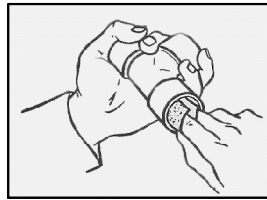
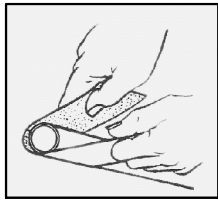
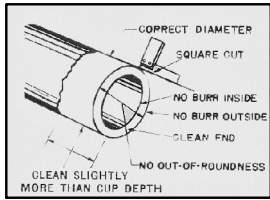
Attention is called to the fact that if silver brazing fittings are used, the order for copper or red brass pipe must state that it is to be used with silver brazed fittings and must be of a proper outside diameter to permit insertion into the fittings and make a proper joint.

With a wider range of material from which to choose, pipe fabricators may now select the pipe or I.P.S. tubing best suited to special needs; yet retain the strength and simplicity of a Flagg-Flow® installation.

There are no threads to weaken the joint and the full depth of the fitting cup is brazed to the tube. Flagg-Flow® Type A Fittings have a streamlined interior. This interior design tends to reduce turbulence. Close tolerances in the machining of the cups ensure rigid support and a thorough bond.

Flagg-Flow® Fittings in this section are tested in accordance with the requirements of the above specifications.

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Caution – Do Not Use Tin Lead Solder

Fig. 1 - Pipe should be cut square to ensure an all-round contact with the bottom of the socket of the fitting. Any burrs or upset on the end of the pipe should be removed by reaming or filing.

In all cases, a reducing flame should be used to preheat the pipe around it's entire circumference. Heating of the pipe should continue until the flux is clear and transparent.

Cleaning

Figs. 2 and 3 - Surfaces to be joined must be free of all grease, oil, oxides and dirt of any kind. Oil and grease can be removed with a solvent such as acetone or alcohol (Carbon Tetrachloride should not be used). Dirt and oxides can be removed with an abrasive cloth.

The flame should then be applied to the circumference of the fitting until the flux on the face of the fitting is transparent.

This is an indication that the assembly is at approximately 1100° F.

At this point, the brazing technique will depend on whether the fitting is face-fed or of the preinserted ring type.

Fluxing

Figs. 4 and 5 - The brazing flux should be of a paste like consistency and applied evenly to the cleaned surfaces of the pipe and fitting. If necessary, warm water may be added to the flux to obtain the desired consistency.

Figs. 10 and 11 - If it is of the preinserted ring type, a segment of the band of the fitting should have additional heat applied to it with a wiping motion from the base of the cup to the pipe. This will produce a pumping action that will force the alloy from the groove and distribute it throughout the joint area. If the gap between the pipe and fitting is too large, it may be necessary to prime the joint by face-feeding supplemental alloy in order to start the insert flowing.

Once the alloy starts to flow, heat should be applied to another segment of the fitting and the brazing procedure repeated until the joint is completed.

Assemble & Support

Figs. 6 and 7 - Insert the pipe the full depth of the cup of the fitting and rotate approximately 1/2 turn in order to ensure that the flux is evenly distributed in the joint area. The depth of the insertion can be checked by inscribing a line at a predetermined distance from the end of the pipe.

The piping assembly must be adequately supported to ensure proper alignment and minimize stress on the joint area during the brazing cycle.

It is desirable to have a fillet around the circumference of the joint when it is complete. If this was not obtained with the alloy in the insert, then supplemental alloy should be used. (CAUTION: Do not overheat the fitting as this will cause it to expand and the pumping action will be lost.

Figs. 12 and 13 - When the fitting is the face-fed type, the following procedure should be used.

After the initial preheat of pipe and fitting, a segment of the cup of the fitting should be heated with most of the heat being applied to the base of the cup. The flame should be directed toward the pipe in order to keep the pipe from cooling.

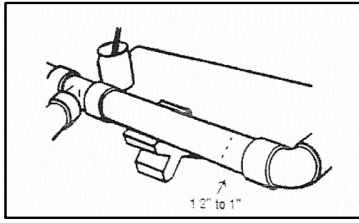
Brazing

Figs. 8 and 9 - Oxyacetylene equipment is recommended for the fabrication of Flagg-Flow fittings, although any oxyfuel gas combination can be used.

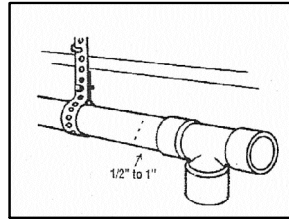
The position of the joint and the type of fitting, whether face-fed or of the preinserted ring type, is immaterial during the preheating cycle.

The brazing alloy should be applied to the face of the fitting in the area where the heat is being applied. The alloy should be fed until the joint area is filled and a fillet appears at the face of the fitting. After the fillet has formed, the adjoining segment should be heated and the procedure repeated. This procedure is followed until there is a fillet around the joint.

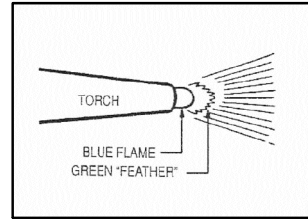
On larger sizes (8" and above), it may be necessary to use two torches in order to maintain a uniform temperature.



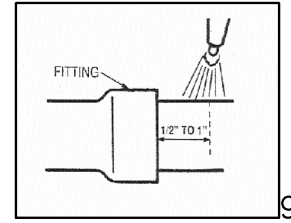
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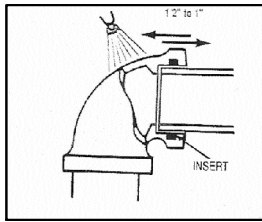
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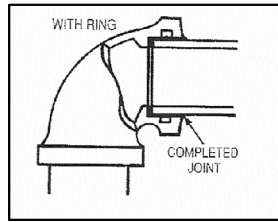
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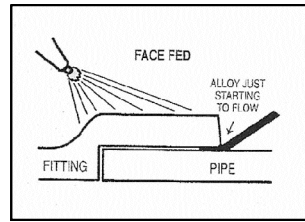
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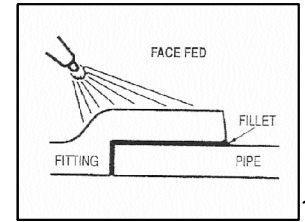
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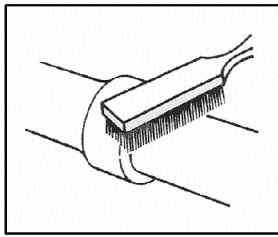
11



12



13



14

Use water and a stiff brush to remove excess flux after completing a joint.

Fluxes: The flux used should be that recommended by the manufacturer of the brazing alloy.

Flux Removal & Visual Inspection

Fig. 14 - All flux must have been removed from the completed joint for a visual inspection and pressure testing. This is best accomplished by quenching the assembly with water after it has air cooled to approximately 200° F.

After the flux has been removed, a smooth fillet should be visible around the entire circumference of the joint.

If there are any voids in the fillet area that should have flux reapplied and the brazing procedure repeated in that area.

Dimensions

Size	O.D. Tubing		Ream Fitting		Depth of Ream (Min.)
	Min.	Max.	Min.	Max.	
1/4	.538	.540	.540	.543	17/64
3/8	.673	.675	.675	.678	5/16
1/2	.838	.840	.840	.843	3/8
3/4	1.047	1.050	1.050	1.053	13/32
1	1.312	1.315	1.315	1.318	7/16
1 1/4	1.656	1.660	1.660	1.663	1/2
1 1/2	1.896	1.900	1.900	1.905	5/8
2	2.371	2.375	2.735	2.380	21/32
2 1/2	2.871	2.875	2.875	2.882	25/32
3	3.496	3.500	3.500	3.507	53/64
3 1/2	3.996	4.000	4.000	4.007	7/8
4	4.496	4.500	4.500	4.507	29/32
5	5.559	5.563	5.563	5.570	1
6	6.621	6.625	6.625	6.632	1 7/64
7	7.619	7.625	7.625	7.632	1 7/32
8	8.619	8.625	8.625	8.632	1 5/16
9	9.617	9.625	9.625	9.632	1 13/32
10	10.742	10.750	10.750	10.757	1 1/2
12	12.742	12.750	12.750	12.757	1 5/8

For more information regarding brazing and brazing techniques, send for booklet, "Successful brazing with Flagg-Flow Threadless Bronze Fittings."

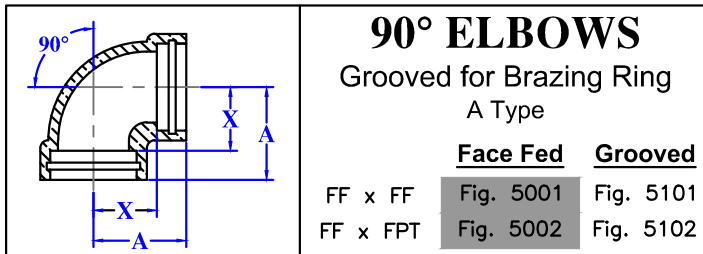
Brazing Alloys

For Best Results, the Alloy Conforming to the Following Specification is Recommended

AWS A5-8-56T	Federal Specification QQ-B-654	Melting Point Degrees F.	Flow Point Degrees	Brazing Temperature Range Degrees F.
B CUP-5	3	1185	1300	1300-1500

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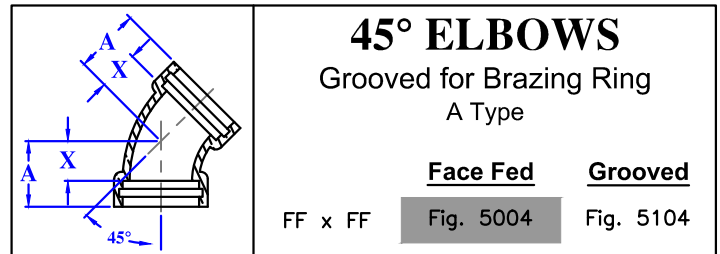
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90° ELBOWS
Grooved for Brazing Ring
A Type

Face Fed **Grooved**
FF x FF Fig. 5001 Fig. 5101
FF x FPT Fig. 5002 Fig. 5102

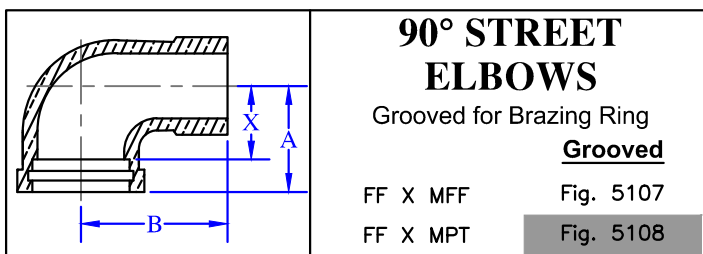
SIZE CODE	SIZE	A	X	WEIGHT
040	1/4	23/32	7/16	.110
060	3/8	13/16	1/2	.163
100	1/2	1	5/8	.232
150	3/4	1 3/16	25/32	.299
200	1	1 7/16	1	.559
250	1 1/4	1 11/16	1 3/16	.772
300	1 1/2	1 27/32	1 7/32	1.116
400	2	2 1/8	1 15/32	1.792
450	2 1/2	2 11/16	1 29/32	2.873
500	3	3 3/32	2 1/4	4.673
550	3 1/2	3 7/16	2 9/16	5.296
600	4	3 25/32	2 7/8	7.701
650	5	4 1/2	3 1/2	15.427
700	6	5 1/8	4 1/32	21.930
750	8	6 9/16	5 1/4	44.420
800	10	8 3/32	6 19/32	78.510
820	12	9 1/2	7 7/8	131.830



45° ELBOWS
Grooved for Brazing Ring
A Type

Face Fed **Grooved**
FF x FF Fig. 5004 Fig. 5104

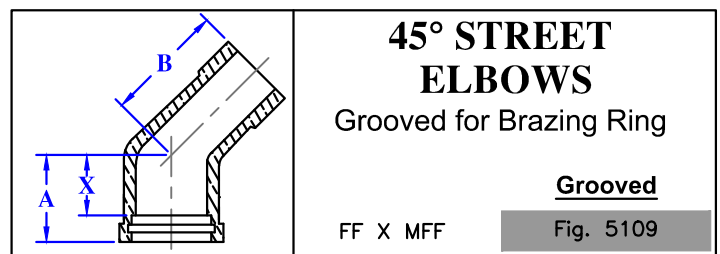
SIZE CODE	SIZE	A	X	WEIGHT
040	1/4	9/16	9/32	.105
060	3/8	5/8	5/16	.137
100	1/2	25/32	13/32	.165
150	3/4	7/8	15/32	.263
200	1	1 1/16	5/8	.468
250	1 1/4	1 7/32	23/32	.728
300	1 1/2	1 5/16	11/16	.951
400	2	1 7/16	25/32	1.418
450	2 1/2	1 15/16	1 5/32	2.310
500	3	2 5/32	1 11/32	3.780
550	3 1/2	2 3/8	1 1/2	4.510
600	4	2 5/8	1 23/32	5.890
650	5	3 1/16	2 1/16	11.310
700	6	3 15/32	2 11/32	18.230
750	8	4 9/32	2 31/32	34.500
800	10	5 5/32	3 21/32	62.000
820	12	5 31/32	4 11/32	94.000



90° STREET ELBOWS
Grooved for Brazing Ring

Grooved
FF X MFF Fig. 5107
FF X MPT Fig. 5108

SIZE CODE	SIZE	A	B	X	WEIGHT
040	1/4	25/32	1 3/16	1/2	.100
060	3/8	15/16	1 1/4	5/8	.170
100	1/2	1	1 15/32	5/8	.220
150	3/4	1 3/16	1 21/32	25/32	.295
200	*1	1 7/16	1 31/32	1	.510
250	*1 1/4	1 11/16	2 1/4	1 3/16	.860
300	*1 1/2	1 27/32	2 15/32	1 7/32	1.147
400	2	2 1/8	2 7/8	1 15/32	1.735



45° STREET ELBOWS
Grooved for Brazing Ring

Grooved
FF X MFF Fig. 5109

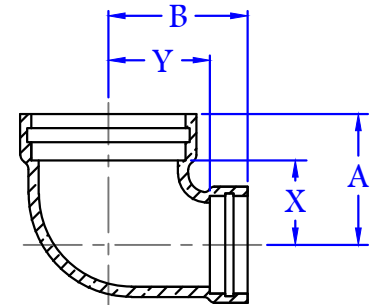
SIZE CODE	SIZE	A	B	X	WEIGHT
150	3/4	31/32	1 9/32	9/16	.370
300	1 1/2	1 7/16	1 7/8	1 3/16	1.187

* Indicates A Type
■ Indicates "Consult the Factory"

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SIZE CODE	SIZE	A	B	X	Y	WEIGHT
059	*3/8 X 1/4	3/4	25/32	7/16	1/2	.110
098	1/2 X 1/4	7/8	7/8	1/2	5/8	.170
099	1/2 X 3/8	15/16	29/32	9/16	19/32	.191
148	*3/4 X 3/8	1	1	19/32	11/16	.220
149	*3/4 X 1/2	1 3/32	1 1/8	11/16	3/4	.248
197	1 X 3/8	1 1/8	1 1/8	11/16	13/16	.460
198	*1 X 1/2	1 3/16	1 1/4	3/4	7/8	.331
199	*1 X 3/4	1 5/16	1 5/16	7/8	29/32	.410
247	*1 1/4 X 1/2	1 9/32	1 13/32	25/32	1 1/32	.493
248	*1 1/4 X 3/4	1 13/32	1 1/2	29/32	1 3/32	.535
249	*1 1/4 X 1	1 17/32	1 19/32	1 1/32	1 5/32	.678
298	*1 1/2 X 1	1 9/16	1 23/32	15/16	1 9/32	.772
299	*1 1/2 X 1 1/4	1 23/32	1 13/16	1 3/32	1 5/16	.930
397	*2 X 1	1 19/32	1 15/16	15/16	1 1/2	1.097
398	2 X 1 1/4	1 25/32	2 1/32	1 1/8	1 17/32	1.280
399	2 X 1 1/2	1 7/8	2 1/16	1 7/32	1 7/16	1.500
448	2 1/2 X 1 1/2	2 5/32	2 1/2	1 3/8	1 7/8	2.670
449	*2 1/2 X 2	2 3/8	2 19/32	1 19/32	1 15/16	2.410
498	3 X 2	2 17/32	2 7/8	1 11/16	2 7/32	4.060
499	3 X 2 1/2	2 27/32	3	2	2 7/32	4.800
597	4 X 2 1/2	3 5/16	3 5/8	2 13/32	2 27/32	7.130
598	4 X 3	3 5/16	3 19/32	2 13/32	2 25/32	8.670
599	4 X 3 1/2	3 9/16	3 23/32	2 21/32	2 27/32	9.070
649	*5 X 4	4	4 13/32	3	3 1/2	11.670
698	6 X 4	4 1/8	4 15/16	3	4 1/32	16.380



REDUCING 90° ELBOW

Grooved for Brazing Ring

Grooved

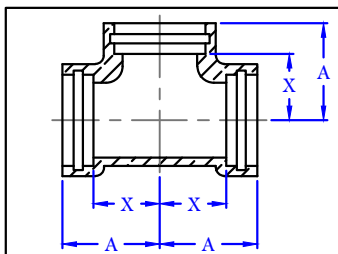
FF X FF
FF X FPT

Fig. 5101
Fig. 5102

Face Fed

FF X FF
FF X FPT

Fig. 5001
Fig. 5002



TEES

Grooved for Brazing Ring
A Type

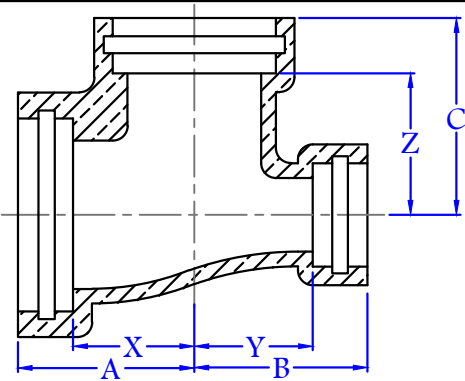
Face Fed Grooved
FF X FF X FF Fig. 5021 Fig. 5121
FF X FPT X FF Fig. 5022 Fig. 5122
FF X FF X FPT Fig. 5023 Fig. 5123

SIZE CODE	SIZE	A	X	WEIGHT
040	1/4	23/32	7/16	.158
060	3/8	13/16	1/2	.233
100	1/2	1	5/8	.354
150	3/4	1 3/16	25/32	.506
200	1	1 7/16	1	.648
250	1 1/4	1 11/16	1 3/16	1.166
300	1 1/2	1 27/32	1 7/32	1.310

TEES CONTINUED

SIZE CODE	SIZE	A	X	WEIGHT
400	2	2 1/8	1 15/32	2.465
450	2 1/2	2 11/16	1 29/32	3.915
500	3	3 3/32	2 1/4	6.110
550	3 1/2	3 7/16	2 9/16	7.510
600	4	3 25/32	2 7/8	10.705
650	5	4 1/2	3 1/2	17.828
700	6	5 1/8	4 1/32	27.240
750	8	6 9/16	5 1/4	55.500
800	10	8 3/32	6 19/32	99.250
820	12	9 1/2	7 7/8	170.000

* Indicates A Type
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REDUCING TEES

Grooved for Brazing Ring

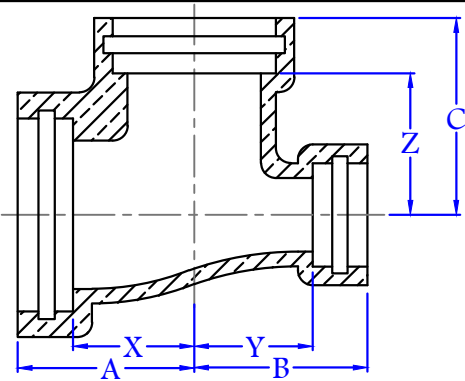
	<u>Face Fed</u>	<u>Grooved</u>
FF X FF X FF	Fig. 5021	Fig. 5121
FF X FPT X FF	Fig. 5022	Fig. 5122
FF X FF X FPT	Fig. 5023	Fig. 5123

SIZE CODE	SIZE	A	B	C	X	Y	Z	WEIGHT
054	*3/8 X 1/4 X 1/4	3/4	23/32	25/32	7/16	7/16	1/2	.140
055	3/8 X 1/4 X 3/8	13/16	25/32	13/16	1/2	1/2	1/2	.170
059	*3/8 X 3/8 X 1/4	3/4	3/4	25/32	7/16	7/16	1/2	.215
061	3/8 X 3/8 X 1/2	29/32	29/32	15/16	19/32	19/32	9/16	.220
078	1/2 X 1/4 X 1/4	15/16	13/16	29/32	17/32	17/32	5/8	.200
080	*1/2 X 1/4 X 1/2	1	7/8	1	19/32	19/32	5/8	.224
089	*1/2 X 3/8 X 3/8	15/16	13/16	29/32	1/2	1/2	19/32	.220
090	1/2 X 3/8 X 1/2	1	29/32	1	19/32	19/32	5/8	.245
098	*1/2 X 1/2 X 1/4	7/8	7/8	7/8	1/2	1/2	19/32	.279
099	*1/2 X 1/2 X 3/8	15/16	15/16	29/32	9/16	9/16	19/32	.235
101	*1/2 X 1/2 X 3/4	1 1/8	1 1/8	1 3/32	3/4	3/4	11/16	.320
102	*1/2 X 1/2 X 1	1 5/16	1 5/16	1 5/16	15/16	15/16	7/8	.500
120	3/4 X 1/4 X 3/4	1 3/16	31/32	1 3/16	11/16	11/16	25/32	.450
128	*3/4 X 3/8 X 3/8	1	15/16	1	5/8	5/8	11/16	.340
130	*3/4 X 3/8 X 3/4	1 3/16	1 1/8	1 3/16	13/16	13/16	25/32	.390
138	*3/4 X 1/2 X 3/8	1	15/16	1	9/16	9/16	11/16	.293
139	*3/4 X 1/2 X 1/2	1 3/32	1	1 1/8	5/8	5/8	3/4	.330
140	*3/4 X 1/2 X 3/4	1 3/16	1 1/8	1 3/16	3/4	3/4	25/32	.365
147	*3/4 X 3/4 X 1/4	1	1	1	19/32	19/32	3/4	.366
148	*3/4 X 3/4 X 3/8	1	1	1	19/32	19/32	11/16	.323
149	*3/4 X 3/4 X 1/2	1 3/32	1 3/32	1 1/8	11/16	11/16	3/4	.369
151	*3/4 X 3/4 X 1	1 5/16	1 5/16	1 5/16	29/32	29/32	7/8	.510
165	*1 X 1/4 X 1	1 1/2	1 7/32	1 1/2	15/16	15/16	1 1/16	.700
170	*1 X 3/8 X 1	1 7/16	1 1/8	1 7/16	13/16	13/16	1	.546
178	*1 X 1/2 X 1/2	1 3/16	1 1/16	1 1/4	11/16	11/16	7/8	.410

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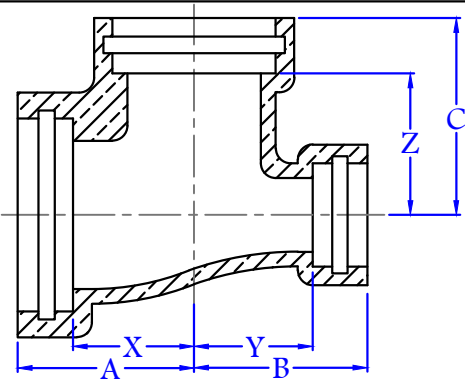
REDUCING TEES

Grooved for Brazing Ring

	Face Fed	Grooved
FF X FF X FF	Fig. 5021	Fig. 5121
FF X FPT X FF	Fig. 5022	Fig. 5122
FF X FF X FPT	Fig. 5023	Fig. 5123

SIZE CODE	SIZE	A	B	C	X	Y	Z	WEIGHT
179	*1 X 1/2 X 3/4	1 5/16	1 1/8	1 5/16	3/4	3/4	29/32	.480
180	*1 X 1/2 X 1	1 7/16	1 1/4	1 7/16	7/8	7/8	1	.560
187	*1 X 3/4 X 3/8	1 3/16	1 1/16	1 1/4	3/4	21/32	15/16	.410
188	*1 X 3/4 X 1/2	1 3/16	1 1/16	1 1/4	21/32	21/32	7/8	.442
189	*1 X 3/4 X 3/4	1 5/16	1 3/16	1 5/16	25/32	25/32	29/32	.470
190	*1 X 3/4 X 1	1 7/16	1 5/16	1 7/16	29/32	29/32	1	.570
196	*1 X 1 X 1/4	1 1/8	1 1/8	1 1/8	11/16	11/16	7/8	.460
197	*1 X 1 X 3/8	1 1/8	1 1/8	1 1/8	11/16	11/16	13/16	.438
198	*1 X 1 X 1/2	1 3/16	1 3/16	1 1/4	3/4	3/4	7/8	.521
199	*1 X 1 X 3/4	1 5/16	1 5/16	1 5/16	7/8	7/8	29/32	.694
201	*1 X 1 X 1 1/4	1 19/32	1 19/32	1 1/8	1 5/32	1 5/32	5/8	.790
202	*1 X 1 X 1 1/2	1 23/32	1 23/32	1 9/16	1 9/32	1 9/32	15/16	1.160
218	*1 1/4 X 1/2 X 1	1 17/32	1 1/4	1 19/32	7/8	7/8	1 5/32	.722
219	1 1/4 X 1/2 X 1 1/4	1 11/16	1 13/32	1 11/16	1 1/32	1 1/32	1 3/16	.870
222	1 1/4 X 3/4 X 1/2	1 11/32	1 3/16	1 17/32	27/32	25/32	1 5/32	.720
223	*1 1/4 X 3/4 X 3/4	1 3/8	1 5/16	1 15/32	29/32	29/32	1 1/16	.680
224	*1 1/4 X 3/4 X 1	1 17/32	1 7/16	1 19/32	1 1/32	1 1/32	1 5/32	.780
225	*1 1/4 X 3/4 X 1 1/4	1 11/16	1 15/32	1 11/16	1 3/16	1 1/16	1 3/16	.870
232	1 1/4 X 1 X 1/2	1 3/8	1 5/16	1 15/32	7/8	7/8	1 3/32	.699
233	*1 1/4 X 1 X 3/4	1 3/8	1 5/16	1 15/32	7/8	7/8	1 1/16	.703
234	*1 1/4 X 1 X 1	1 17/32	1 7/16	1 19/32	1 1/32	1	1 5/32	.760
235	*1 1/4 X 1 X 1 1/4	1 11/16	1 19/32	1 11/16	1 3/16	1 5/32	1 3/16	.970
246	*1 1/4 X 1 1/4 X 3/8	1 9/32	1 9/32	1 13/32	25/32	25/32	1 3/32	.670
247	*1 1/4 X 1 1/4 X 1/2	1 9/32	1 9/32	1 13/32	25/32	25/32	1 1/32	.709
248	*1 1/4 X 1 1/4 X 3/4	1 3/8	1 3/8	1 15/32	7/8	7/8	1 1/16	.800

* Indicates A Type
 ■ Indicates "Consult the Factory"



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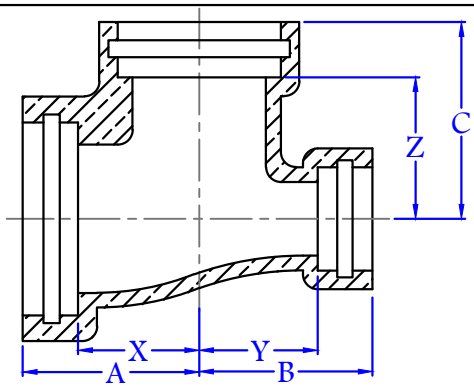
	Face Fed	Grooved
FF X FF X FF	Fig. 5021	Fig. 5121
FF X FPT X FF	Fig. 5022	Fig. 5122
FF X FF X FPT	Fig. 5023	Fig. 5123

SIZE CODE	SIZE	A	B	C	X	Y	Z	WEIGHT
249	*1 1/4 X 1 1/4 X 1	1 17/32	1 17/32	1 19/32	1 1/32	1 1/32	1 5/32	.910
251	1 1/4 X 1 1/4 X 1 1/2	1 13/16	1 13/16	1 23/32	1 5/16	1 5/16	1 3/32	1.150
265	*1 1/2 X 1/2 X 1 1/2	1 27/32	1 19/32	1 27/32	1 7/32	1 7/32	1 7/32	1.120
267	*1 1/2 X 3/4 X 3/4	1 9/16	1 17/32	1 23/32	15/16	1 1/8	1 5/16	.850
268	*1 1/2 X 3/4 X 1	1 9/16	1 17/32	1 23/32	15/16	1 1/8	1 9/32	.870
269	*1 1/2 X 3/4 X 1 1/4	1 27/32	1 19/32	1 27/32	1 7/32	1 3/16	1 11/32	1.120
270	*1 1/2 X 3/4 X 1 1/2	1 27/32	1 19/32	1 27/32	1 7/32	1 3/16	1 7/32	1.126
276	1 1/2 X 1 X 1/2	1 9/16	1 17/32	1 23/32	15/16	1 3/32	1 11/32	1.170
277	1 1/2 X 1 X 3/4	1 9/16	1 17/32	1 23/32	15/16	1 3/32	1 5/16	1.080
278	*1 1/2 X 1 X 1	1 9/16	1 17/32	1 23/32	15/16	1 3/32	1 9/32	.934
279	*1 1/2 X 1 X 1 1/4	1 23/32	1 11/16	1 13/16	1 3/32	1 1/4	1 5/16	1.130
280	*1 1/2 X 1 X 1 1/2	1 27/32	1 13/16	1 27/32	1 7/32	1 3/8	1 7/32	1.253
281	1 1/2 X 1 X 2	2 1/16	2 1/16	1 7/8	1 7/16	1 5/8	1 7/32	.850
286	*1 1/2 X 1 1/4 X 1/2	1 5/16	1 9/32	1 17/32	11/16	25/32	1 5/32	.820
287	1 1/2 X 1 1/4 X 3/4	1 9/16	1 17/32	1 23/32	15/16	1 1/32	1 5/16	1.140
288	*1 1/2 X 1 1/4 X 1	1 9/16	1 17/32	1 23/32	15/16	1 1/32	1 9/32	1.010
289	*1 1/2 X 1 1/4 X 1 1/4	1 23/32	1 11/16	1 13/16	1 3/32	1 3/16	1 5/16	1.162
290	*1 1/2 X 1 1/4 X 1 1/2	1 27/32	1 13/16	1 27/32	1 7/32	1 5/16	1 7/32	1.290
295	*1 1/2 X 1 1/2 X 3/8	1 5/16	1 5/16	1 17/32	11/16	11/16	1 7/32	.803
296	*1 1/2 X 1 1/2 X 1/2	1 5/16	1 5/16	1 17/32	11/16	11/16	1 5/32	.857
297	*1 1/2 X 1 1/2 X 3/4	1 13/32	1 13/32	1 19/32	25/32	25/32	1 3/16	.942
298	*1 1/2 X 1 1/2 X 1	1 9/16	1 9/16	1 23/32	15/16	15/16	1 9/32	1.087
299	*1 1/2 X 1 1/2 X 1 1/4	1 23/32	1 23/32	1 13/16	1 3/32	1 3/32	1 5/16	1.250
302	1 1/2 X 1 1/2 X 2	2 1/16	2 1/16	1 7/8	1 7/16	1 7/16	1 7/32	1.710
350	*2 X 1/2 X 2	2 1/8	1 27/32	2 1/8	1 15/32	1 15/32	1 15/32	1.860

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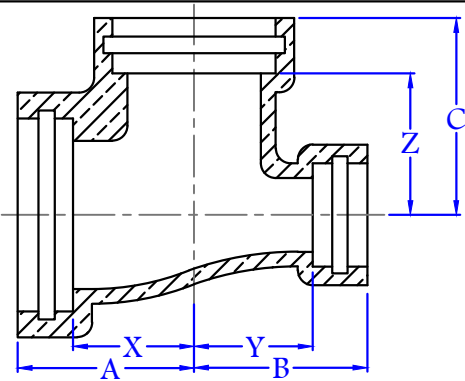
REDUCING TEES

Grooved for Brazing Ring

	Face Fed	Grooved
FF X FF X FF	Fig. 5021	Fig. 5121
FF X FPT X FF	Fig. 5022	Fig. 5122
FF X FF X FPT	Fig. 5023	Fig. 5123

SIZE CODE	SIZE	A	B	C	X	Y	Z	WEIGHT
360	*2 X 3/4 X 2	2 1/8	1 27/32	2 1/8	1 15/32	1 7/16	1 15/32	1.720
367	2 X 1 X 1	1 23/32	1 1/2	2 1/32	1 1/16	1 1/16	1 19/32	1.750
370	*2 X 1 X 2	2 1/8	2 1/16	2 1/8	1 15/32	1 5/8	1 15/32	1.950
378	*2 X 1 1/4 X 1 1/4	1 25/32	1 23/32	2 1/32	1 1/8	1 7/32	1 17/32	1.517
379	*2 X 1 1/4 X 1 1/2	1 7/8	1 27/32	2 1/16	1 7/32	1 11/32	1 7/16	1.760
380	*2 X 1 1/4 X 2	2 1/8	2 1/16	2 1/8	1 15/32	1 9/16	1 15/32	2.090
386	2 X 1 1/2 X 3/4	1 25/32	1 23/32	2 1/32	1 1/8	1 3/32	1 5/8	1.950
387	*2 X 1 1/2 X 1	1 25/32	1 23/32	2 1/32	1 1/8	1 3/32	1 19/32	1.360
388	*2 X 1 1/2 X 1 1/4	1 25/32	1 23/32	2 1/32	1 1/8	1 3/32	1 17/32	1.610
389	*2 X 1 1/2 X 1 1/2	1 7/8	1 27/32	2 1/16	1 7/32	1 7/32	1 7/16	1.730
390	*2 X 1 1/2 X 2	2 1/8	2 1/16	2 1/8	1 15/32	1 7/16	1 15/32	2.070
395	2 X 2 X 1/2	1 15/32	1 15/32	1 27/32	13/16	13/16	1 15/32	1.606
396	2 X 2 X 3/4	1 15/32	1 15/32	1 27/32	13/16	13/16	1 7/16	1.533
397	*2 X 2 X 1	1 19/32	1 19/32	1 15/16	15/16	15/16	1 1/2	1.527
398	*2 X 2 X 1 1/4	1 25/32	1 25/32	2 1/32	1 1/8	1 1/8	1 17/32	1.683
399	*2 X 2 X 1 1/2	1 7/8	1 7/8	2 1/16	1 7/32	1 7/32	1 7/16	1.805
401	2 X 2 X 2 1/2	2 19/32	2 19/32	2 3/8	1 15/16	1 15/16	1 19/32	3.300
410	*2 1/2 X 1/2 X 2 1/2	2 11/16	2 7/32	2 11/16	1 29/32	1 27/32	1 29/32	3.230
420	2 1/2 X 1 X 2 1/2	2 3/8	2 1/4	2 19/32	1 19/32	1 13/16	1 13/16	4.140
428	*2 1/2 X 1 1/2 X 1 1/2	2 3/8	2 1/4	2 19/32	1 19/32	1 5/8	1 31/32	2.370
429	*2 1/2 X 1 1/2 X 2	2 3/8	2 1/4	2 19/32	1 19/32	1 5/8	1 15/16	2.895
430	*2 1/2 X 1 1/2 X 2 1/2	2 11/16	2 19/32	2 11/16	1 29/32	1 31/32	1 29/32	3.420
435	2 1/2 X 2 X 3/4	1 3/4	1 19/32	2 5/16	31/32	15/16	1 29/32	2.500
438	*2 1/2 X 2 X 1 1/2	2 3/8	2 1/4	2 19/32	1 19/32	1 19/32	1 31/32	2.750
439	*2 1/2 X 2 X 2	2 3/8	2 1/4	2 19/32	1 19/32	1 19/32	1 15/16	2.920

* Indicates A Type
 ■ Indicates "Consult the Factory"



REDUCING TEES

Grooved for Brazing Ring

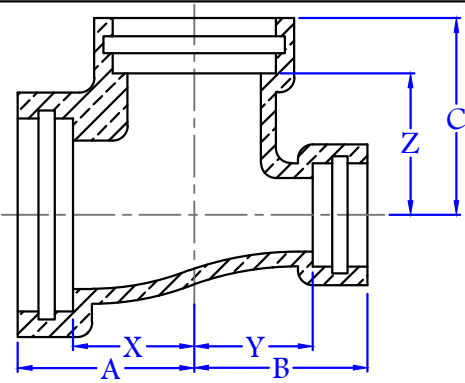
	Face Fed	Grooved
FF X FF X FF	Fig. 5021	Fig. 5121
FF X FPT X FF	Fig. 5022	Fig. 5122
FF X FF X FPT	Fig. 5023	Fig. 5123

SIZE CODE	SIZE	A	B	C	X	Y	Z	WEIGHT
440	2 1/2 X 2 X 2 1/2	2 23/32	2 19/32	2 23/32	1 15/16	1 15/16	1 15/16	4.050
444	2 1/2 X 2 1/2 X 1/2	1 7/8	1 7/8	2 3/8	1 3/32	1 3/32	2	2.500
445	*2 1/2 X 2 1/2 X 3/4	1 7/8	1 7/8	2 3/8	1 3/32	1 3/32	1 31/32	2.160
446	*2 1/2 X 2 1/2 X 1	1 7/8	1 7/8	2 3/8	1 3/32	1 3/32	1 15/16	2.370
447	2 1/2 X 2 1/2 X 1 1/4	2 1/32	2 1/32	2 7/16	1 1/4	1 1/4	1 15/16	3.180
448	*2 1/2 X 2 1/2 X 1 1/2	2 5/32	2 5/32	2 1/2	1 3/8	1 3/8	1 7/8	2.830
449	*2 1/2 X 2 1/2 X 2	2 3/8	2 3/8	2 19/32	1 19/32	1 19/32	1 15/16	3.200
451	2 1/2 X 2 1/2 X 3	3	3	2 27/32	2 7/32	2 7/32	2	5.750
460	3 X 1 X 3	3 3/32	2 21/32	3 3/32	2 1/4	2 7/32	2 1/4	5.800
470	3 X 1 1/2 X 3	3 1/16	2 5/8	3 1/16	2 1/4	2	2 1/4	5.600
478	*3 X 2 X 2	2 27/32	2 23/32	3	2 1/32	2 1/16	2 11/32	3.890
480	*3 X 2 X 3	3 3/32	3	3 3/32	2 9/32	2 11/32	2 9/32	4.840
488	*3 X 2 1/2 X 2	2 27/32	2 11/16	3	3	2	1 29/32	4.700
489	*3 X 2 1/2 X 2 1/2	2 27/32	2 11/16	3	2	1 29/32	2 7/32	4.540
490	3 X 2 1/2 X 3	3 3/32	3	3 3/32	2 1/4	2 7/32	2 1/4	6.620
495	3 X 3 X 1	2 5/32	2 5/32	2 3/4	2 11/32	2 11/32	2 5/16	4.820
496	3 X 3 X 1 1/4	2 5/32	2 5/32	2 3/4	1 11/32	1 11/32	2 1/4	4.500
497	*3 X 3 X 1 1/2	2 9/32	2 9/32	2 13/16	1 15/32	1 15/32	2 3/16	3.820
498	*3 X 3 X 2	2 17/32	2 17/32	2 7/8	1 11/16	1 11/16	2 7/32	4.140
499	*3 X 3 X 2 1/2	2 27/32	2 27/32	3	2	2	2 7/32	5.250
536	*3 1/2 X 3 X 1 1/4	2 1/8	2 1/16	2 1/8	1 15/32	1 5/8	1 15/32	7.730
538	3 1/2 X 3 X 2 1/2	2 15/16	2 13/16	3 1/4	2 1/16	2	2 15/32	5.570
546	*3 1/2 X 3 1/2 X 1 1/2	2 9/16	2 9/16	3 1/8	1 11/16	1 11/16	2 1/2	4.667
548	*3 1/2 X 3 1/2 X 2 1/2	2 15/16	2 15/16	3 1/4	2 1/16	2 1/16	2 15/32	5.670
549	*3 1/2 X 3 1/2 X 3	3 7/16	3 7/16	3 7/16	2 9/16	2 9/16	2 5/8	6.610

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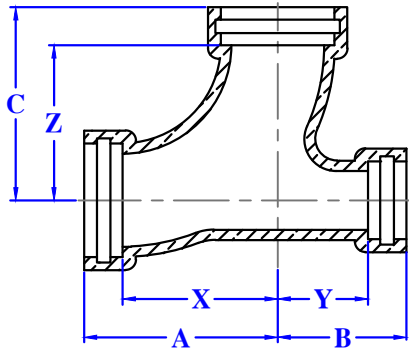
REDUCING TEES

Grooved for Brazing Ring

	<u>Face Fed</u>	<u>Grooved</u>
FF X FF X FF	Fig. 5021	Fig. 5121
FF X FPT X FF	Fig. 5022	Fig. 5122
FF X FF X FPT	Fig. 5023	Fig. 5123

SIZE CODE	SIZE	A	B	C	X	Y	Z	WEIGHT
589	*4 X 3 X 3	3 5/16	3 3/32	3 19/32	2 13/32	2 1/4	2 25/32	7.850
590	4 X 3 X 4	3 13/16	3 19/32	3 13/16	2 9/32	2 25/32	2 9/32	12.890
595	4 X 4 X 1 1/2	2 1/2	2 1/2	3 5/16	1 19/32	1 19/32	2 11/16	7.870
596	4 X 4 X 2	2 3/4	2 3/4	3 13/32	1 27/32	1 27/32	2 3/4	8.730
597	4 X 4 X 2 1/2	3 5/16	3 5/16	3 19/32	2 13/32	2 13/32	2 13/16	.987
598	*4 X 4 X 3	3 5/16	3 5/16	3 19/32	2 13/32	2 13/32	2 25/32	8.110
639	5 X 4 X 4	4	4	4 13/32	3	3 3/32	3 1/2	21.500
646	5 X 5 X 2 1/2	3 1/4	3 1/4	4 1/8	2 1/4	2 1/4	3 11/32	15.750
647	5 X 5 X 3	3 1/2	3 1/2	4 7/32	2 1/2	2 1/2	3 3/8	14.550
649	5 X 5 X 4	4	4	4 13/32	3	3	3 1/2	16.000
696	6 X 6 X 3	3 5/8	3 5/8	4 3/4	2 17/32	2 17/32	3 15/16	21.380
749	*8 X 8 X 6	5 9/16	5 9/16	6 3/8	4 1/4	4 1/4	5 1/4	43.360
818	*12 x 12 x 8	9 1/2	9 1/2	9 1/2	7 7/8	7 7/8	8 3/16	151.900

* Indicates A Type
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REDUCING LONG TURN SINGLE SWEEP TEES

Grooved for Brazing Ring

B Type

Grooved

Fig. 5130

FF X FF X FF

FF X FPT X FF

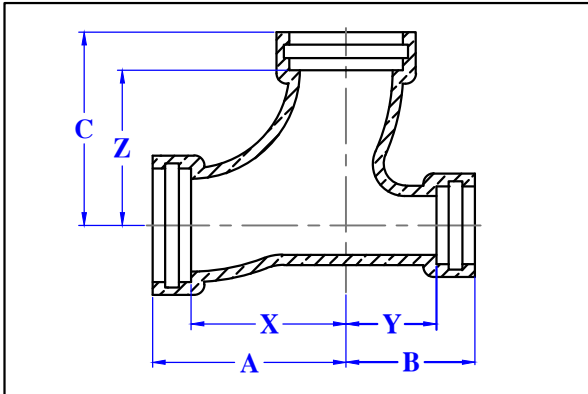
Fig. 5131

SIZE CODE	SIZE	A	B	C	X	Y	Z	WEIGHT
149	3/4 X 3/4 X 1/2	2	1 3/16	2	1 19/32	25/32	1 5/8	.570
190	1 X 3/4 X 1	2 5/16	1 5/16	2 5/16	1 7/8	7/8	1 7/8	1.080
198	1 X 1 X 1/2	2 5/16	1 5/16	2 5/16	1 7/8	7/8	1 15/16	.830
199	1 X 1 X 3/4	2 5/16	1 5/16	2 5/16	1 7/8	7/8	1 29/32	.910
225	1 1/4 X 3/4 X 1 1/4	2 3/4	1 5/8	2 3/4	2 1/4	1 7/32	2 1/4	1.430
234	1 1/4 X 1 X 1	2 3/4	1 5/8	2 3/4	2 1/4	1 3/16	2 5/16	1.430
235	1 1/4 X 1 X 1 1/4	2 3/4	1 5/8	2 3/4	2 1/4	1 3/16	2 1/4	1.610
249	1 1/4 X 1 1/4 X 1	2 3/4	1 5/8	2 3/4	2 1/4	1 1/8	2 5/16	1.965
270	1 1/2 X 3/4 X 1 1/2	3 1/8	1 7/8	3 1/8	2 1/2	1 15/32	2 1/2	2.440
278	1 1/2 X 1 X 1	3 1/8	1 7/8	3 1/8	2 1/2	1 7/16	2 11/16	2.740
280	1 1/2 X 1 X 1 1/2	3 1/8	1 7/8	3 1/8	2 1/2	1 7/16	2 1/2	2.405
289	1 1/2 X 1 1/4 X 1 1/4	3 1/8	1 7/8	3 1/8	2 1/2	1 3/8	2 5/8	2.375
290	1 1/2 X 1 1/4 X 1 1/2	3 1/8	1 7/8	3 1/8	2 1/2	1 3/8	2 1/2	2.150
296	1 1/2 X 1 1/2 X 1/2	3 1/8	1 7/8	3 1/8	2 1/2	1 1/4	2 3/4	2.280
297	1 1/2 X 1 1/2 X 3/4	3 1/8	1 7/8	3 1/8	2 1/2	1 1/4	2 23/32	2.470
298	1 1/2 X 1 1/2 X 1	3 1/8	1 7/8	3 1/8	2 1/2	1 1/4	2 11/16	2.385
299	1 1/2 X 1 1/2 X 1 1/4	3 1/8	1 7/8	3 1/8	2 1/2	1 1/4	2 5/8	2.150
360	2 X 3/4 X 2	3 3/4	2 1/8	3 3/4	3 3/32	1 23/32	3 3/32	4.350
370	2 X 1 X 2	3 3/4	2 1/8	3 3/4	3 3/32	1 11/16	3 3/32	4.400
380	2 X 1 1/4 X 2	3 3/4	2 1/8	3 3/4	3 3/32	1 5/8	3 3/32	4.270
389	2 X 1 1/2 X 1 1/2	3 3/4	2 1/8	3 3/4	3 3/32	1 1/2	3 1/8	4.390
390	2 X 1 1/2 X 2	3 3/4	2 1/8	3 3/4	3 3/32	1 1/2	3 3/32	3.990
396	2 X 2 X 3/4	3 3/4	2 1/8	3 3/4	3 3/32	1 15/32	3 11/32	4.010
397	2 X 2 X 1	3 3/4	2 1/8	3 3/4	3 3/32	1 15/32	3 5/16	3.897
398	2 X 2 X 1 1/4	3 3/4	2 1/8	3 3/4	3 3/32	1 15/32	3 1/4	3.715

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REDUCING LONG TURN SINGLE SWEEP TEES

Grooved for Brazing Ring

B Type

Grooved

FF X FF X FF

Fig. 5130

FF X FPT X FF

Fig. 5131

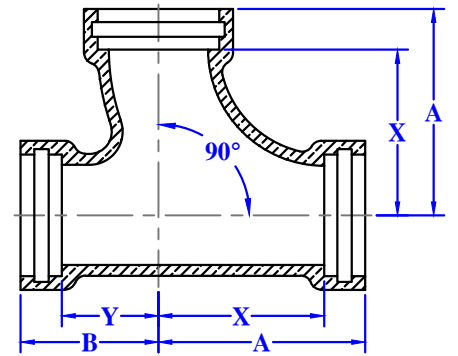
SIZE CODE	SIZE	A	B	C	X	Y	Z	WEIGHT
399	2 X 2 X 1 1/2	3 3/4	2 1/8	3 3/4	3 3/32	1 15/32	3 1/8	3.460
416	2 1/2 X 1 X 1	4 1/2	2 9/16	4 1/2	3 23/32	2 1/8	4 1/16	7.500
420	2 1/2 X 1 X 2 1/2	4 1/2	2 9/16	4 1/2	3 23/32	2 1/8	3 23/32	7.630
438	2 1/2 X 2 X 1 1/2	4 1/2	2 9/16	4 1/2	3 23/32	1 29/32	3 7/8	8.770
439	2 1/2 X 2 X 2	4 1/2	2 9/16	4 1/2	3 23/32	1 29/32	3 27/32	7.500
440	2 1/2 X 2 X 2 1/2	4 1/2	2 9/16	4 1/2	3 23/32	1 29/32	3 23/32	6.980
447	2 1/2 X 2 1/2 X 1 1/4	4 1/2	2 9/16	4 1/2	3 23/32	1 25/32	4	8.970
448	2 1/2 X 2 1/2 X 1 1/2	4 1/2	2 9/16	4 1/2	3 23/32	1 25/32	3 7/8	8.970
449	2 1/2 X 2 1/2 X 2	4 1/2	2 9/16	4 1/2	3 23/32	1 25/32	3 27/32	7.020
470	3 X 1 1/2 X 3	5 7/16	2 7/8	5 7/16	4 19/32	2 1/4	4 19/32	8.570
478	3 X 2 X 2	5 7/16	2 7/8	5 7/16	4 19/32	2 7/32	4 25/32	9.150
480	3 X 2 X 3	5 7/16	2 7/8	5 7/16	4 19/32	2 7/32	4 19/32	9.050
488	3 X 2 1/2 X 2	5 7/16	2 7/8	5 7/16	4 19/32	2 3/32	4 25/32	8.450
489	3 X 2 1/2 X 2 1/2	5 7/16	2 7/8	5 7/16	4 19/32	2 3/32	4 21/32	12.950
497	3 X 3 X 1 1/2	5 7/16	2 7/8	5 7/16	4 19/32	2 1/16	4 13/16	9.630
498	3 X 3 X 2	6 15/16	3 9/16	6 15/16	6 1/32	2 1/16	4 25/32	8.077
499	3 X 3 X 2 1/2	5 7/16	2 7/8	5 7/16	4 19/32	2 1/16	4 21/32	11.800
533	3 1/2 X 2 1/2 X 2 1/2	6 3/16	3 1/4	6 3/16	5 5/16	2 15/32	5 13/32	12.000
565	4 X 1 1/2 X 4	6 15/16	3 9/16	6 15/16	6 1/32	2 15/16	6 1/32	17.000
572	4 X 2 X 2	6 15/16	3 9/16	6 15/16	6 1/32	2 29/32	6 9/32	20.330
575	4 X 2 X 4	6 15/16	3 9/16	6 15/16	6 1/32	2 29/32	6 1/32	18.000
589	4 X 3 X 3	6 15/16	3 9/16	6 15/16	6 1/32	2 23/32	6 3/32	20.220
590	4 X 3 X 4	6 15/16	3 9/16	6 15/16	6 1/32	2 23/32	6 1/32	18.700
596	4 X 4 X 2	6 15/16	3 9/16	6 15/16	6 1/32	2 21/32	6 9/32	16.250
598	4 X 4 X 3	6 15/16	3 9/16	6 15/16	6 1/32	2 21/32	6 3/32	19.720

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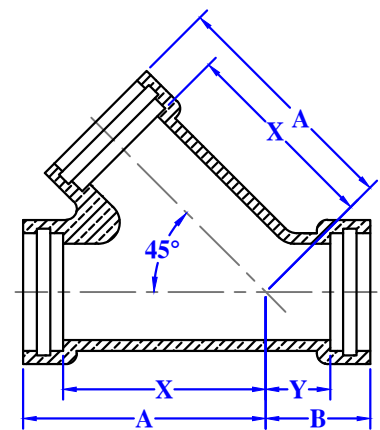
SIZE CODE	SIZE	A	B	X	Y	WEIGHT
040	1/4	1 1/4	3/4	31/32	15/32	.200
060	3/8	1 1/2	7/8	1 3/16	9/16	.290
100	1/2	1 3/4	1	1 3/8	5/8	.400
150	3/4	2	1 3/16	1 19/32	25/32	.620
200	1	2 5/16	1 5/16	1 7/8	7/8	1.178
250	1 1/4	2 3/4	1 5/8	2 1/4	1 1/8	1.816
300	1 1/2	3 1/8	1 7/8	2 1/2	1 1/4	2.030
400	2	3 3/4	2 1/8	3 3/32	1 15/32	4.064
450	2 1/2	4 1/2	2 9/16	3 23/32	1 25/32	5.616
500	3	5 7/16	2 7/8	4 5/8	2 1/16	9.938
550	3 1/2	6 3/16	3 1/4	5 5/16	2 3/8	13.900
600	4	6 15/16	3 9/16	6 1/32	2 21/32	17.770
650	5	8 1/8	4 5/16	7 1/8	3 5/16	35.380
700	6	9	5	7 7/8	3 7/8	48.540
750	8	10	6 5/16	8 11/16	5	75.000



**LONG TURN
SINGLE SWEEP TEE**
Grooved for Brazing Ring
A Type

Grooved
FF X FF X FF Fig. 5130
FF X FPT X FF Fig. 5131

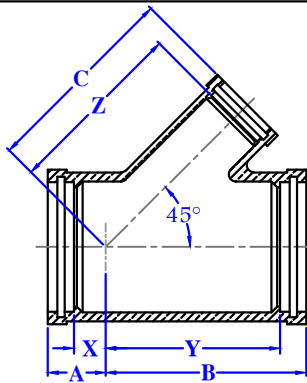
SIZE CODE	SIZE	A	B	X	Y	WEIGHT
100	*1/2	1 19/32	5/8	1 7/32	1/4	.318
150	*3/4	1 29/32	23/32	1 1/2	5/16	.490
200	*1	2 11/32	27/32	1 29/32	13/32	.834
250	*1 1/4	2 27/32	1 1/32	2 11/32	17/32	1.537
300	*1 1/2	3 1/8	1 3/32	2 1/2	15/32	1.806
400	*2	3 3/4	1 1/4	3 3/32	19/32	3.170
450	*2 1/2	4 23/32	1 17/32	3 15/16	3/4	5.450
500	*3	5 9/16	1 23/32	4 23/32	7/8	8.606
550	*3 1/2	6 1/4	1 27/32	5 3/8	31/32	10.960
600	*4	6 31/32	2	6 1/16	1 3/32	13.864
650	*5	8 7/16	2 11/32	7 7/16	1 11/32	28.600
700	*6	9 13/16	2 21/32	8 11/16	1 9/16	42.750
750	8	12 3/4	3 5/16	11 7/16	2	74.000



45° "Y" BRANCHES
Grooved for Brazing Ring

Grooved
FF X FF X FF Fig. 5140
FF X FF X FPT Fig. 5141

* Indicates A Type
■ Indicates "Consult the Factory"



REDUCING 45° "Y" BRANCHES

Grooved for Brazing Ring
B Type

Grooved

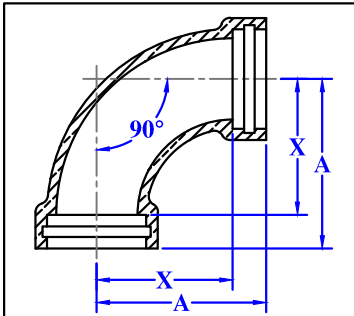
FF X FF X FF
FF X FF X FPT

Fig. 5140

Fig. 5141

SIZE CODE	SIZE	A	B	C	X	Y	Z	WEIGHT
189	1 X 3/4 X 3/4	27/32	2 11/32	2 11/32	13/32	1 15/16	1 15/16	.800
198	1 X 1 X 1/2	27/32	2 11/32	2 11/32	13/32	1 29/32	1 31/32	.700
199	1 X 1 X 3/4	27/32	2 11/32	2 11/32	13/32	1 29/32	1 15/16	.890
234	1 1/4 X 1 X 1	1 1/32	2 27/32	2 27/32	17/32	2 13/32	2 13/32	1.230
296	1 1/2 X 1 1/2 X 1/2	1 3/32	3 1/8	3 1/8	15/32	2 1/2	2 3/4	1.885
297	1 1/2 X 1 1/4 X 3/4	1 3/32	3 1/8	3 1/8	15/32	2 5/8	2 23/32	1.750
298	1 1/2 X 1 1/2 X 1	1 3/32	3 1/8	3 1/8	15/32	2 1/2	2 11/16	1.750
299	1 1/2 X 1 1/2 X 1 1/4	1 3/32	3 1/8	3 1/8	15/32	2 1/2	2 5/8	1.760
370	2 X 1 X 2	1 1/4	3 3/4	3 3/4	19/32	3 3/32	3 5/16	2.680
389	2 X 1 1/2 X 1 1/2	1 1/4	3 3/4	3 3/4	19/32	3 1/8	3 1/8	2.655
390	2 X 1 1/2 X 2	1 1/4	3 3/4	3 3/4	19/32	3 1/8	3 3/32	2.925
397	2 X 2 X 1	1 1/4	3 3/4	3 3/4	19/32	3 3/32	3 5/16	2.547
398	2 X 2 X 1 1/4	1 1/4	3 3/4	3 3/4	19/32	3 3/32	3 1/4	3.107
399	2 X 2 X 1 1/2	1 1/4	3 3/4	3 3/4	19/32	3 3/32	3 1/8	2.905
439	2 1/2 X 2 X 2	1 17/32	4 23/32	4 23/32	3/4	4 1/16	4 1/16	5.900
446	2 1/2 X 2 1/2 X 1	1 17/32	4 23/32	4 23/32	3/4	3 15/16	4 9/32	6.330
448	2 1/2 X 2 1/2 X 1 1/2	1 17/32	4 23/32	4 23/32	3/4	3 15/16	4 3/32	4.060
449	2 1/2 X 2 1/2 X 2	1 17/32	4 23/32	4 23/32	3/4	3 15/16	4 1/16	4.010
478	3 X 2 X 2	1 23/32	5 9/16	5 9/16	7/8	4 29/32	4 29/32	12.250
480	3 X 2 X 3	1 23/32	5 9/16	5 9/16	7/8	4 29/32	4 23/32	10.000
488	3 X 2 1/2 X 2	1 23/32	5 9/16	5 9/16	7/8	4 25/32	4 29/32	11.100
497	3 X 3 X 1 1/2	1 23/32	5 9/16	5 9/16	7/8	4 23/32	4 15/16	6.410
498	3 X 3 X 2	1 23/32	5 9/16	5 9/16	7/8	4 23/32	4 29/32	6.760
499	3 X 3 X 2 1/2	1 23/32	5 9/16	5 9/16	7/8	4 23/32	4 25/32	9.370
547	3 1/2 X 2 1/2 X 2	1 27/32	6 1/4	6 1/4	31/32	5 3/8	5 19/32	15.750
548	3 1/2 X 3 1/2 X 2 1/2	1 27/32	6 1/4	6 1/4	31/32	5 3/8	5 15/32	10.000
589	4 X 3 X 3	2	6 31/32	6 31/32	1 3/32	6 1/16	6 5/32	13.500
596	4 X 4 X 2	2	6 31/32	6 31/32	1 3/32	6 1/16	6 5/16	16.125
598	4 X 4 X 3	2	6 31/32	6 31/32	1 3/32	6 1/16	6 5/32	13.840

■ Indicates "Consult the Factory"

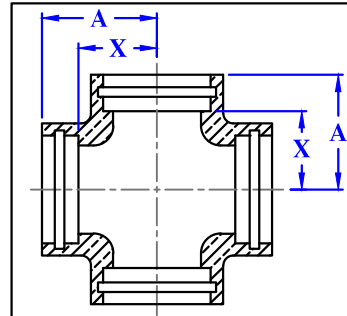


LONG TURN 90° ELBOW

Grooved for Brazing Ring
A Type

Grooved

FF x FF Fig. 5111



CROSS

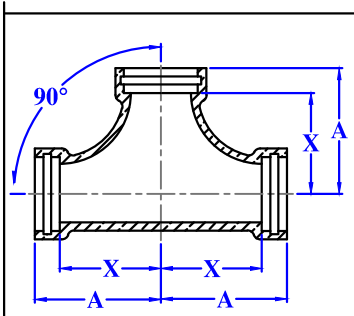
Grooved for Brazing Ring
A Type

Grooved

FF X FF X
FF X FF Fig. 5135

SIZE CODE	SIZE	A	X	WEIGHT
040	1/4	1 1/4	31/32	.120
060	3/8	1 1/2	1 3/16	.204
100	1/2	1 3/4	1 3/8	.304
150	3/4	2	1 19/32	.579
200	1	2 5/16	1 7/8	.848
250	1 1/4	2 3/4	2 1/4	1.330
300	1 1/2	3 1/8	2 1/2	1.585
400	2	3 3/4	3 3/32	3.167
450	2 1/2	4 1/2	3 23/32	4.565
500	3	5 7/16	4 19/32	7.155
550	3 1/2	6 3/16	5 5/16	10.080
600	4	6 15/16	6 1/32	13.100
650	5	8 1/8	7 1/8	28.790
700	6	9	7 7/8	39.000

SIZE CODE	SIZE	A	X	WEIGHT
040	1/4	23/32	15/32	.110
060	3/8	13/16	1/2	.210
100	1/2	1	5/8	.342
150	3/4	1 3/16	25/32	.510
200	1	1 7/16	1	.771
250	1 1/4	1 11/16	1 3/16	1.170
300	1 1/2	1 27/32	1 7/32	1.560
400	2	2 1/8	1 15/32	2.547
450	2 1/2	2 11/16	1 29/32	4.450
500	3	3 3/32	2 1/4	6.550
550	3 1/2	3 7/16	2 9/16	8.811
600	4	3 25/32	2 7/8	10.900
650	5	4 1/2	3 1/2	22.400



LONG TURN DOUBLE SWEEP TEE

Grooved for Brazing Ring
A Type

Grooved

FF X FF X FF Fig. 5133

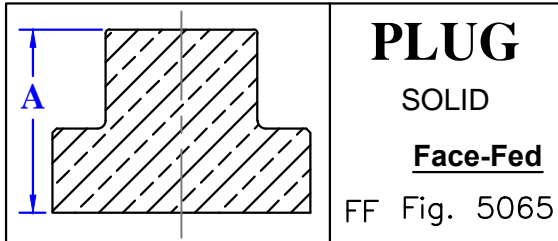
SIZE CODE	SIZE	A	X	WEIGHT
060	3/8	1 1/2	1 3/16	.337
100	1/2	1 3/4	1 3/8	.500
150	3/4	2	1 19/32	.770

LONG TURN DOUBLE SWEEP TEE CONT...				
SIZE CODE	SIZE	A	X	WEIGHT
200	1	2 5/16	1 7/8	1.091
250	1 1/4	2 3/4	2 1/4	1.830
300	1 1/2	3 1/8	2 1/2	2.634
400	2	3 3/4	3 3/32	4.470
450	2 1/2	4 1/2	3 23/32	7.780
500	3	5 7/16	4 19/32	12.190
550	3 1/2	6 3/16	5 5/16	15.040
600	4	6 15/16	6 1/32	23.550
650	5	8 1/8	7 1/8	40.000
700	6	9	7 7/8	55.360

■ Indicates "Consult the Factory"

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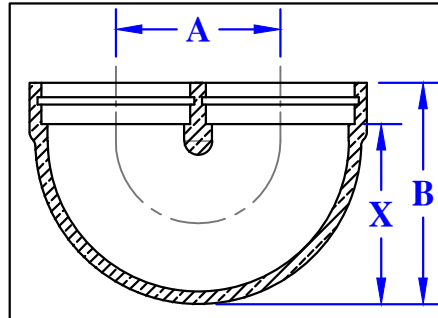


PLUG

SOLID
Face-Fed

FF Fig. 5065

SIZE CODE	SIZE	A	WEIGHT
040	1/4	11/16	.030
060	3/8	23/32	.060
100	1/2	15/16	.125
150	3/4	1	.200
200	1	1 3/16	.372
250	1 1/4	1 1/4	.555
300	1 1/2	1 3/8	.850
400	2	1 7/16	1.309
600	4	2 1/8	4.790



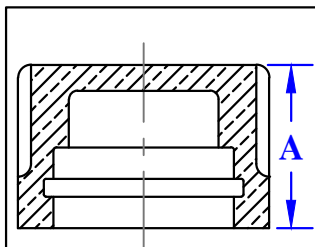
RETURN BEND

Close Pattern
Grooved for Brazing Ring

Grooved

FF X FF Fig. 5155

SIZE CODE	SIZE	A	B	X	WEIGHT
150	3/4	1 1/4	3 1/4	1 11/32	.630
200	*1	1 1/2	1 7/16	1	.640
250	1 1/4	1 7/8	2 1/2	2	1.680
300	*1 1/2	2 3/16	2 15/16	2 5/16	1.680
400	*2	2 5/8	3 7/16	2 25/32	3.130



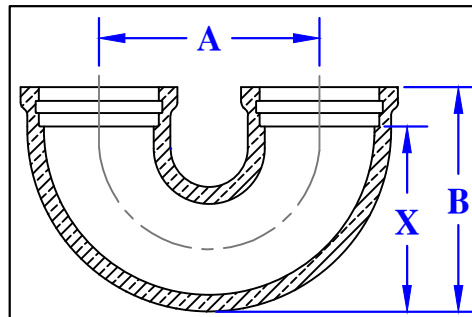
CAPS

Grooved for
Brazing Ring
A Type

Grooved

FF Fig. 5154

SIZE CODE	SIZE	A	WEIGHT
040	1/4	19/32	.074
060	3/8	5/8	.087
100	1/2	3/4	.114
150	3/4	27/32	.222
200	1	1	.370
250	1 1/4	1 3/32	.570
300	1 1/2	1 5/32	.716
400	2	1 5/16	1.162
450	2 1/2	1 13/16	2.033
500	3	1 13/16	2.880
550	3 1/2	1 29/32	4.100
600	4	2 3/32	5.570



RETURN BEND

Open Pattern
Grooved for Brazing Ring

Grooved

FF X FF Fig. 5156

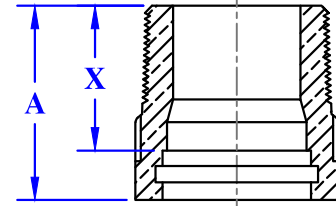
SIZE CODE	SIZE	A	B	X	WEIGHT
150	*3/4	2	2 1/4	1 27/32	.600
200	*1	2 1/2	2 5/8	2 3/16	.894
250	*1 1/4	3	3 1/8	2 5/8	1.367
300	1 1/2	3 1/2	3 9/16	2 15/16	2.730
400	2	4	4 3/16	3 17/32	5.175
450	2 1/2	4 1/2	4 13/16	4 1/32	5.150
500	*3	5	5 1/2	4 5/8	9.410
600	4	6	6 5/8	5 23/32	16.065

CAPS (CONTINUED)

SIZE CODE	SIZE	A	WEIGHT
650	5	2 5/16	8.500
700	6	2 1/2	12.180
750	8	3	23.000

* Indicates A Type
■ Indicates "Consult the Factory"

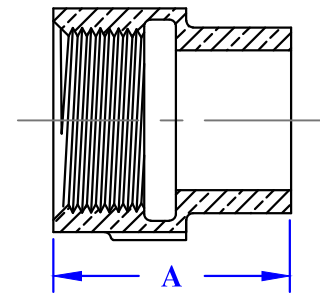
SIZE CODE	SIZE	A	X	WEIGHT
040	1/4	1 1/16	13/16	.073
060	3/8	1 1/8	13/16	.113
100	1/2	1 7/16	1 1/16	.179
150	3/4	1 1/2	1 1/16	.208
200	1	1 3/4	1 5/16	.370
250	1 1/4	1 7/8	1 3/8	.512
300	1 1/2	2 1/16	1 7/16	.760
400	2	2 1/8	1 1/2	1.184
450	2 1/2	3 3/16	2 13/32	2.100
500	3	3 11/32	2 17/32	2.875
600	4	3 11/16	2 25/32	4.750



ADAPTER
Female FF X Same Size
Male Thread
 Grooved for Brazing Ring

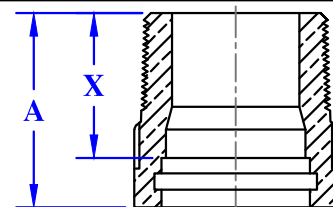
Face Fed Grooved
 FF x MPT **Fig. 5060** Fig. 5160

SIZE CODE	SIZE	A	WEIGHT
040	1/4	1	.077
060	3/8	1 3/8	.130
100	1/2	1 17/32	.200
150	3/4	1 13/32	.209
200	1	1 9/16	.330
250	1 1/4	2 1/8	.648
300	1 1/2	2 3/16	.889
400	2	2 3/8	1.250
450	2 1/2	2 17/32	2.900
500	3	2 5/8	2.390
600	4	4 3/8	5.950



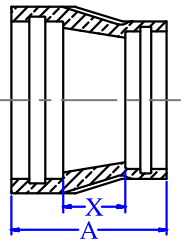
ADAPTER
Female Thread X Male FF
 Face Fed
 FPT X MFF Fig. 5063

SIZE CODE	SIZE	A	X	WEIGHT
041	1/4 X 3/8	1 1/16	13/16	.080
042	1/4 X 1/2	1 5/16	1 1/16	.155
061	3/8 X 1/2	1 5/16	1	.614
101	1/2 X 3/4	1 3/8	1	.200
102	1/2 X 1	1 5/8	1 1/4	.480
151	3/4 X 1	1 5/8	1 7/32	1.060
201	1 X 1 1/4	1 23/32	1 9/32	1.980
251	1 1/4 X 1 1/2	1 7/8	1 3/8	.835
302	1 1/2 X 2	1 31/32	1 11/32	1.080
401	2 X 2 1/2	2 5/8	1 31/32	2.040



ADAPTER
Female FF X Male Thread
One Size Larger
 Grooved for Brazing Ring

Face Fed Grooved
 FF X MPT One Size Larger Fig. 5061 Fig. 5161
 FF X MPT Over One Size Larger Fig. 5062 **Fig. 5162**



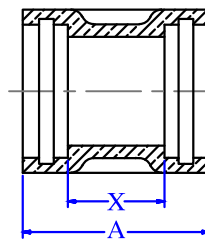
REDUCING COUPLINGS

Grooved for Brazing Ring
A Type

Face Fed Grooved
FF x FF Fig. 5050 Fig. 5150
FF X FPT Fig. 5051 Fig. 5151

SIZE CODE	SIZE	A	X	WEIGHT
039	1/4 X 1/8	1	17/32	.085
059	3/8 X 1/4	1	7/16	.080
098	1/2 X 1/4	1 1/8	1/2	.115
099	1/2 X 3/8	1 5/32	15/32	.184
147	3/4 X 1/4	1 1/4	9/16	.165
148	3/4 X 3/8	1 1/4	17/32	.150
149	3/4 X 1/2	1 3/8	19/32	.281
197	1 X 3/8	1 9/16	13/16	.260
198	1 X 1/2	1 1/2	11/16	.408
199	1 X 3/4	1 9/16	23/32	.392
247	1 1/4 X 1/2	1 25/32	29/32	.510
248	1 1/4 X 3/4	1 21/32	3/4	.520
249	1 1/4 X 1	1 25/32	27/32	.594
296	1 1/2 X 1/2	1 9/32	13/16	.910
297	1 1/2 X 3/4	1 7/8	27/32	.700
298	1 1/2 X 1	1 13/16	3/4	.789
299	1 1/2 X 1 1/4	1 7/8	3/4	.810
396	2 X 3/4	2 13/16	1 3/4	1.600
397	2 X 1	2 13/16	1 23/32	1.536
398	2 X 1 1/4	2 1/32	7/8	1.130
399	2 X 1 1/2	2 1/16	25/32	1.220
448	2 1/2 X 1 1/2	3 1/4	1 27/32	2.130
449	2 1/2 X 2	3 1/4	1 13/16	2.280
497	3 X 1 1/2	3 11/16	2 1/4	2.865
498	3 X 2	3 11/16	2 7/32	3.245
499	3 X 2 1/2	3 11/16	2 3/32	3.600
547	3 1/2 X 2	4	2 15/32	4.680
548	3 1/2 X 2 1/2	4	2 11/32	3.320
549	3 1/2 X 3	4	2 9/32	4.240

SIZE CODE	SIZE	A	X	WEIGHT
596	4 X 2	4 3/8	2 13/16	7.320
597	4 X 2 1/2	4 3/8	2 11/16	7.270
598	4 X 3	4 3/8	2 21/32	5.870
599	4 X 3 1/2	4 3/8	2 19/32	5.180
648	5 X 3 1/2	5	3 1/8	7.120
649	5 X 4	5	3 3/32	10.440
696	6 X 3	5 3/4	3 13/16	19.000
698	6 X 4	5 3/4	3 23/32	14.660
699	6 X 5	5 3/4	3 5/8	19.768
749	8 X 6	6 3/4	4 5/16	27.690
799	10 X 8	8 3/4	5 15/16	51.750
819	12 X 10	10 3/4	7 5/8	61.800



COUPLINGS

Grooved for Brazing Ring
A Type

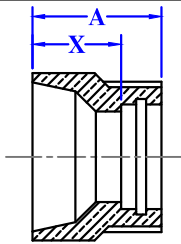
Face Fed Grooved
FF x FF Fig. 5050 Fig. 5150
FF X FPT Fig. 5051 Fig. 5151
SLIP ON Fig. 5153

SIZE CODE	SIZE	A	X	WEIGHT
040	1/4	31/32	7/16	.122
060	3/8	1 1/16	7/16	.105
100	1/2	1 9/32	17/32	.220
150	3/4	1 7/16	5/8	.351
200	1	1 11/16	13/16	.502
250	1 1/4	1 7/8	7/8	.765
300	1 1/2	1 29/32	21/32	.955
400	2	2 3/16	7/8	1.492
450	2 1/2	2 7/8	1 5/16	2.303
500	3	3 3/16	1 17/32	3.760
550	3 1/2	3 7/16	1 11/16	4.510
600	4	3 11/16	1 7/8	6.028
650	5	4 7/32	2 7/32	11.140
700	6	4 3/4	2 17/32	17.990
750	8	5 3/4	3 1/8	28.250
800	10	6 1/2	3 1/2	38.250
820	12	7	3 3/4	56.750

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BUSHINGS

Grooved for Brazing Ring
A Type

Face Fed Grooved

FF x FF Fig. 5057 Fig. 5157
FF X FPT Fig. 5058

SIZE CODE	SIZE	A	X	WEIGHT
039	1/4 X 1/8	3/4	9/16	.050
058	3/8 X 1/8	15/16	3/4	.229
059	3/8 X 1/4	15/16	11/16	.100
097	1/2 X 1/8	15/16	3/4	.080
098	1/2 X 1/4	1 1/16	13/16	.100
099	1/2 X 3/8	1 1/16	3/4	.121
147	3/4 X 1/4	1 1/16	13/16	.136
148	3/4 X 3/8	1 5/32	27/32	.150
149	3/4 X 1/2	1 5/32	25/32	.167
196	1 X 1/4	1 3/16	15/16	.150
197	1 X 3/8	1 3/16	7/8	.200
198	1 X 1/2	1 7/32	27/32	.224
199	1 X 3/4	1 7/32	13/16	.246
245	1 1/4 X 1/4	1 7/16	1 3/16	.324
246	1 1/4 X 3/8	1 7/16	1 1/8	.290
247	1 1/4 X 1/2	1 7/16	1 1/16	.330
248	1 1/4 X 3/4	1 7/16	1 1/32	.346
249	1 1/4 X 1	1 7/16	1	.406
294	1 1/2 X 1/4	1 5/8	1 3/8	.448
295	1 1/2 X 3/8	1 5/8	1 5/16	.420
296	1 1/2 X 1/2	1 5/8	1 1/4	.363
297	1 1/2 X 3/4	1 5/8	1 7/32	.544
298	1 1/2 X 1	1 5/8	1 3/16	.501
299	1 1/2 X 1 1/4	1 5/8	1 1/8	.589
393	2 X 1/4	1 7/8	1 5/8	.620
394	2 X 3/8	1 7/8	1 9/16	.680
395	2 X 1/2	1 7/8	1 1/2	.650
396	2 X 3/4	1 7/8	1 15/32	.639
397	2 X 1	1 7/8	1 7/16	.882
398	2 X 1 1/4	1 3/4	1 1/4	.835
399	2 X 1 1/2	1 3/4	1 1/8	.766

SIZE CODE	SIZE	A	X	WEIGHT
444	2 1/2 X 1/2	2 1/8	1 3/4	1.000
445	2 1/2 X 3/4	2 1/8	1 23/32	.995
446	2 1/2 X 1	2 1/8	1 11/16	1.029
447	2 1/2 X 1 1/4	2 1/8	1 5/8	1.110
448	2 1/2 X 1 1/2	1 15/16	1 5/16	1.068
449	2 1/2 X 2	1 15/16	1 9/32	1.190
495	3 X 1	2 3/8	1 15/16	1.570
496	3 X 1 1/4	2 3/8	1 7/8	1.600
497	3 X 1 1/2	2 3/8	1 3/4	1.680
498	3 X 2	2 1/8	1 15/32	1.779
499	3 X 2 1/2	2 1/8	1 11/32	1.902
544	3 1/2 X 1	2 5/8	2 3/16	2.260
546	3 1/2 X 1 1/2	2 5/8	2	2.180
547	3 1/2 X 2	2 5/8	1 31/32	2.250
548	3 1/2 X 2 1/2	2 3/16	1 13/32	2.080
549	3 1/2 X 3	2 3/16	1 3/8	2.410
595	4 X 1 1/2	2 7/8	2 1/4	2.970
596	4 X 2	2 7/8	2 7/32	3.700
597	4 X 2 1/2	2 9/16	1 25/32	2.880
598	4 X 3	2 1/4	1 7/16	2.820
599	4 X 3 1/2	2 1/4	1 3/8	3.000
645	5 X 2	3 1/4	2 19/32	5.220
646	5 X 2 1/2	3 1/8	2 11/32	5.300
647	5 X 3	3 1/8	2 5/16	5.270
648	5 X 3 1/2	2 3/4	1 7/8	5.370
649	5 X 4	2 3/4	1 27/32	5.120
694	6 X 2	4	3 11/32	7.890
695	6 X 2 1/2	3 7/8	3 3/32	8.350
696	6 X 3	3 3/8	2 9/16	7.840
697	6 X 3 1/2	3 3/8	2 1/2	7.660
698	6 X 4	3 3/8	2 15/32	7.990
699	6 X 5	3	2	6.620
747	8 X 4	4 7/16	3 17/32	16.120
748	8 X 5	3 5/8	2 5/8	18.730
749	8 X 6	3 5/8	2 1/2	13.770

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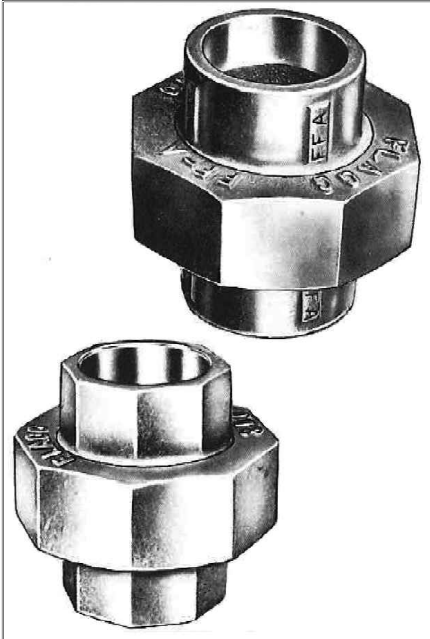
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Pressure Rating:

200 Lbs. W.S.P. at 425°F.

400 Lbs. W.O.G. at 150°F.



**Specifications: - 200-300 Lbs.
Unions and Union Fittings**

MIL. F-1183-200 Lbs. (Dimensions)

MIL. F-1183B-Table 18 300 Lbs. (Dimensions)

Material

200 Lb. Rating

ASTM B-61 (as permitted in the latest revision of MIL. F-1183)

300 Lb. Rating

ASTM B-61 (as permitted in MIL. F-1183J)

(The latest issue of any specification shall constitute the authority)

The Unions and Union Fittings in this section can be supplied face-fed, grooved only, or with the ring of silver brazing alloy.

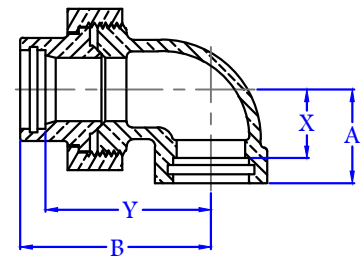
The same standards of quality inherent in all Flagg-Flow® products are applicable to the items shown in this section. Quality control methods of the highest order are maintained. Close adherence to allowable tolerances and strict metallurgical control is assurance of a high quality product.

The 300 Lb. Unions and Union Fittings shown in this section are also for commercial installation at the designated working steam pressure. The 300 Lb. Unions in this section are not designated for use with the 800-1500 Lb. fittings on naval installations.

See. 800-1500 Lb. Unions

Flagg-Flow® Unions and Union Fittings are tested in accordance with the requirements of the above specifications.

SIZE CODE	SIZE	A	B	X	Y	WEIGHT
040	1/4	15/16	1 15/16	21/32	1 21/32	.390
060	3/8	1 1/16	2 7/32	3/4	1 29/32	.565
100	1/2	1 1/4	2 13/32	7/8	2 1/32	.771
150	3/4	1 7/16	2 7/8	1 1/32	2 15/32	1.290
200	1	1 5/8	3 5/32	1 3/16	2 23/32	1.840
250	1 1/4	1 15/16	3 21/32	1 7/16	3 5/32	2.930
300	1 1/2	2 1/8	3 15/16	1 1/2	3 5/16	3.720
400	2	2 1/2	4 1/2	1 27/32	3 27/32	5.920



90° UNION ELBOW

Grooved for Brazing Ring
A Type

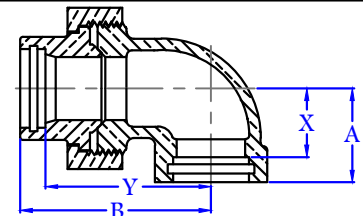
Grooved

FF X FF Fig. 5305

FF X MPT Fig. 5308

One Size Larger

SIZE CODE	SIZE	A	B	X	Y	WEIGHT
040	1/4	15/16	1 15/16	21/32	1 21/32	.540
060	3/8	1 1/16	2 7/32	3/4	1 29/32	.700
100	1/2	1 1/4	2 13/32	7/8	2 1/32	.970
150	3/4	1 7/16	2 7/8	1 1/32	2 15/32	1.630
200	1	1 5/8	3 5/32	1 3/16	2 23/32	2.360
250	1 1/4	1 15/16	3 21/32	1 7/16	3 5/32	4.330
300	1 1/2	2 1/8	3 15/16	1 1/2	3 5/16	5.343
400	2	2 1/2	4 1/2	1 27/32	3 27/32	8.433
450	2 1/2	2 15/16	5 13/32	2 5/32	4 5/8	13.600



90° UNION ELBOW

300 LB W.S.P. at 500° F- 600 LB W.O.G.

Grooved for Brazing Ring

A Type

Face Fed

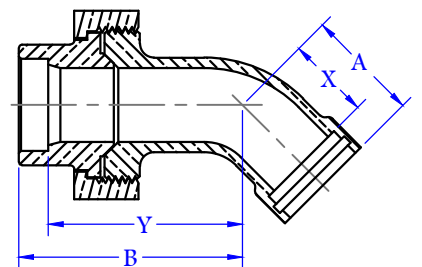
Grooved

FF X FF Fig. 5430 Fig. 5530

FF X FPT Fig. 5431 Fig. 5531

FF X MPT Fig. 5433 Fig. 5533

SIZE CODE	SIZE	A	B	X	Y	WEIGHT
040	1/4	13/16	1 9/16	17/32	1 5/16	.370
060	3/8	7/8	1 3/4	9/16	1 7/16	.460
100	1/2	1	1 15/16	5/8	1 9/16	.710
150	3/4	1 1/8	2 3/16	23/32	1 25/32	1.210
200	1	1 5/16	2 1/2	7/8	2 1/16	1.720
250	1 1/4	1 1/2	2 7/8	1	2 3/8	2.660
300	1 1/2	1 11/16	3 1/8	1 1/16	2 1/2	3.390
400	2	2	3 11/16	1 11/32	3 1/32	5.330



45° UNION ELBOW

Grooved for Brazing Ring
A Type

Grooved

FF X FF

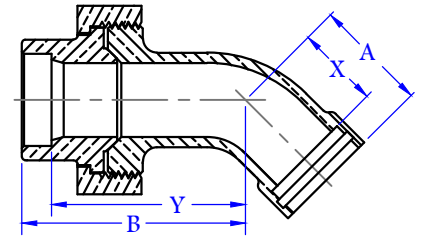
Fig. 5309

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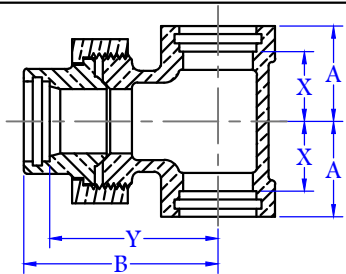
SIZE CODE	SIZE	A	B	X	Y	WEIGHT
040	1/4	1 9/16	13/16	1 9/32	17/32	.460
060	3/8	1 23/32	7/8	1 13/32	9/16	.650
100	1/2	1 15/16	1	1 9/16	5/8	.920
150	3/4	2 3/16	1 1/8	1 25/32	23/32	1.560
200	1	2 1/2	1 5/16	2 1/16	7/8	2.300
250	1 1/4	2 27/32	1 1/2	2 11/32	1	3.600
300	1 1/2	3 5/32	1 11/16	2 17/32	1 1/16	4.650
400	2	3 21/32	2	3	1 11/32	7.250
450	2 1/2	4 5/32	2 1/4	3 3/8	1 15/32	11.830



45° UNION ELBOW
300 LB W.S.P. at 500° F-600 LB W.O.G.
Grooved for Brazing Ring

	Face Fed	Grooved
FF X FF	Fig. 5435	Fig. 5535
FF X FPT	Fig. 5436	Fig. 5536
FF X MFF	Fig. 5437	Fig. 5537
FF X MPT	Fig. 5438	Fig. 5538
FF X MPT One Size Larger	Fig. 5439	Fig. 5539

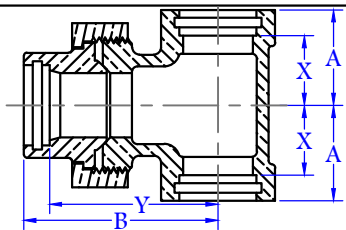
SIZE CODE	SIZE	A	B	X	Y	WEIGHT
040	1/4	15/16	1 15/16	11/16	1 11/16	.440
060	3/8	1 1/16	2 7/32	3/4	1 29/32	.293
100	1/2	1 1/4	2 13/32	7/8	2 1/32	.940
150	3/4	1 7/16	2 7/8	1 1/32	2 15/32	.695
200	1	1 5/8	3 5/32	1 3/16	2 23/32	.928
250	1 1/4	1 15/16	3 21/32	1 7/16	3 5/32	3.330
300	1 1/2	2 1/8	3 15/16	1 1/2	3 5/16	1.843
400	2	2 1/2	4 1/2	1 27/32	3 27/32	6.500



UNION BRANCH TEE
Grooved for Brazing Ring
A Type

	Grooved
FF X FF	Fig. 5313

SIZE CODE	SIZE	A	B	X	Y	WEIGHT
040	1/4	15/16	1 15/16	21/32	1 21/32	.550
060	3/8	1 1/16	2 7/32	3/4	1 29/32	.870
100	1/2	1 1/4	2 13/32	7/8	2 1/32	1.230
150	3/4	1 7/16	2 7/8	1 1/32	2 15/32	2.050
200	1	1 5/8	3 5/32	1 3/16	2 23/32	3.020
250	1 1/4	1 15/16	3 21/32	1 7/16	3 5/32	4.750
300	1 1/2	2 1/8	3 15/16	1 1/2	3 5/16	6.000
400	2	2 1/2	4 15/32	1 27/32	3 13/16	8.870

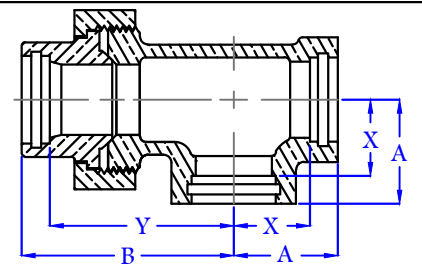


UNION BRANCH TEE
300 LB W.S.P. at 500° F-600 LB W.O.G.
Grooved for Brazing Ring
A Type

	Face Fed	Grooved
FF X FF X FF	Fig. 5445	Fig. 5545
FF X FF X FPT	Fig. 5446	Fig. 5546
FF X FF X MFF	Fig. 5447	Fig. 5547
FF X FF X MPT	Fig. 5448	Fig. 5548
FF X FF X MPT One Size Larger	Fig. 5449	Fig. 5549



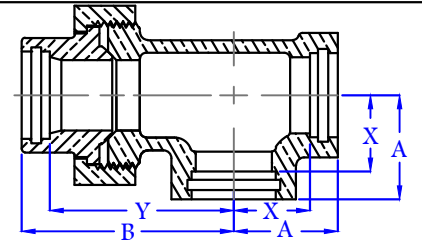
SIZE CODE	SIZE	A	B	X	Y	WEIGHT
040	1/4	15/16	1 15/16	11/16	1 11/16	.201
060	3/8	1 1/16	2 7/32	3/4	1 29/32	.600
100	1/2	1 1/4	2 13/32	7/8	2 1/32	.401
150	3/4	1 7/16	2 7/8	1 1/32	2 15/32	.673
200	1	1 5/8	3 5/32	1 3/16	2 23/32	2.030
250	1 1/4	1 15/16	3 21/32	1 7/16	3 5/32	3.130
300	1 1/2	2 1/8	3 15/16	1 1/2	3 5/16	4.010
400	2	2 1/2	4 1/2	1 27/32	3 27/32	6.410



UNION RUN TEE
Grooved for Brazing Ring
A Type Grooved

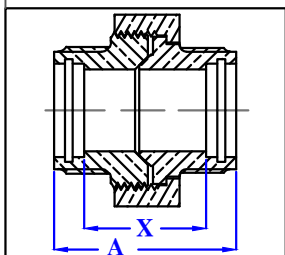
FF x FF Fig. 5317
FF x MPT x FF One Size Larger Fig. 5320

SIZE CODE	SIZE	A	B	X	Y	WEIGHT
040	1/4	15/16	1 15/16	21/32	1 21/32	.550
060	3/8	1 1/16	2 7/32	3/4	1 29/32	.870
100	1/2	1 1/4	2 13/32	7/8	2 1/32	1.230
150	3/4	1 7/16	2 7/8	1 1/32	2 15/32	2.050
200	1	1 5/8	3 5/32	1 3/16	2 23/32	3.510
250	1 1/4	1 15/16	3 21/32	1 7/16	3 5/32	4.750
300	1 1/2	2 1/8	3 15/16	1 1/2	3 5/16	6.250
400	2	2 1/2	4 15/32	1 27/32	3 13/16	9.620



UNION RUN TEE
300LB W.S.P. at 500° F-600LB W.O.G.
Grooved for Brazing Ring
A Type Grooved

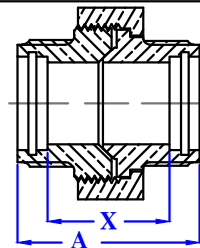
FF x FF Fig. 5317
FF x MPT x FF One Size Larger Fig. 5320



UNION-FEMALE
200 LB W.S.P. 400 LB W.O.G.
Grooved for Brazing Ring

Face Fed Grooved
FF x FF Fig. 5201 Fig. 5301
FF x MPT One Size Larger Fig. 5204 Fig. 5304

SIZE CODE	SIZE	A	X	WEIGHT
040	1/4	1 5/8	1 3/32	.340
060	3/8	1 13/16	1 3/16	.490
100	1/2	1 15/16	1 3/16	.710
150	3/4	2 1/4	1 7/16	1.110
200	1	2 7/16	1 9/16	1.580
250	1 1/4	2 25/32	1 25/32	2.420
300	1 1/2	3	1 3/4	3.050
400	2	3 3/8	2 1/16	4.630



UNION-FEMALE
300 LB W.S.P. 600 LB W.O.G.
Grooved for Brazing Ring

Face Fed Grooved
FF x FF Fig. 5425 Fig. 5525
FF x FPT Fig. 5426 Fig. 5526
FF x MPT One Size Larger Fig. 5428 Fig. 5528

SIZE CODE	SIZE	A	X	WEIGHT
040	1/4	1 5/8	1 3/32	.330
060	3/8	1 13/16	1 3/16	.500
100	1/2	1 15/16	1 3/16	.620
150	3/4	2 1/4	1 7/16	1.420
200	1	2 7/16	1 9/16	1.540
250	1 1/4	2 25/32	1 25/32	2.510
300	1 1/2	3	1 3/4	3.050
400	2	3 3/8	2 1/16	5.010
450	2 1/2	4 1/32	2 15/32	8.150
500	2 5/8	4 9/32	2 5/8	9.550

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The brazed joints for the illustrated Flagg-Flow® Unions and Union Fittings all have Female Flagg-Flow® ends. They can, however, be furnished in any combination of Flagg-Flow Female ends to Flagg-Flow® Male or threaded Male end pieces.
Prices on application.

200 LB. W.S.P. Union Parts	Face Fed	Grooved
FF Union Head Piece	Fig. 5221	Fig. 5321
FF Union Nut		Fig. 5222
FF Union Tail Piece	Fig. 5223	Fig. 5323
Union Male THD Tail Piece One Size Larger		Fig. 5226

300 LB. W.S.P. Union Parts	Face Fed	Grooved
FF Union Head Piece	Fig. 5460	Fig. 5560
FF Union Nut		Fig. 5461
FF Union Tail Piece	Fig. 5462	Fig. 5562
MFF Union Tail Piece		Fig. 5463
MPT Union Tail Piece		Fig. 5464
MPT Union Tail Piece One Size Larger		Fig. 5465
90° Union Ell THD Piece	Fig. 5466	Fig. 5566
45° Union Ell THD Piece	Fig. 5467	Fig. 5567
Union Run Tee THD Piece	Fig. 5468	Fig. 5568
Union Branch Tee THD Piece	Fig. 5469	Fig. 5569

**Handbook or DVD
Available:**

Send for a copy of our booklet entitled...

**"Successful Brazing with Threadless Bronze
Fittings"**

This book is for those who put piping systems together and deals fully with subjects as listed in the various sections shown below. It gives the basic facts needed in making silver-brazed joints. Because the information is for practical people on the job, little has been included on theoretical design data. The science of silver-brazing is discussed only where it helps explain the work.

Section 1 . . . Where And Why Silver-Brazed Fittings Are Used

Section 2 . . . What Happens In A Sound Brazed Joint

Section 3 . . . The Right Tools And Materials

Section 4 . . . What You Do To Braze A Pipe Joint

Section 5 . . . How To Work In Different Positions

Section 6 . . . Various Kinds Of Fittings

Section 7 . . . Doing A Good Job The Easy Way

Section 8 . . . Brazing Terms And What They Mean

Section 9 . . . Dimensions, Weights And Tolerances Of Threadless
Copper Pipe And CU. NI. Tube

BRONZE FLANGES FOR BRAZED JOINTS



SPECIFICATIONS and SERVICE: - FLANGES

DIMENSIONS-

MIL.- PRF-20042:50-150-250-400 Lb. W.O.G. (Navy Type)

BuShips Dwg. 810-1385892 200 Lb. W.O.G.

(Navy Butterfly Valve Type)

ANSI B-16.24:150-300 Lb. W.S.P. (Commercial Type)

MATERIAL:-

ASTM B-61 (Navy* and Commercial Type)

(The latest issue of any specification shall constitute the authority)

The Flanges in this section can be supplied face-fed or grooved only.

Flagg-Flow® Flanges listed herein represent the more popular items used in Naval and Commercial Construction.

Special Flanges and Bulkhead Flanges are not illustrated. Information will be furnished upon request.

Flanges will be furnished FACED AND DRILLED unless otherwise specified.

SPECIAL FINISHING: Flanges can be furnished blind and faced only.

Blind Flanges, Reducing Flanges or Flanges with special reaming of the waterway are priced on application.

Flagg-Flow® Flanges are tested in accordance with the requirements of the above specifications.



Flanges - Commercial Type

150 Lbs. W.S.P. at 450°F. 225 Lbs. W.O.G. at 150°F.

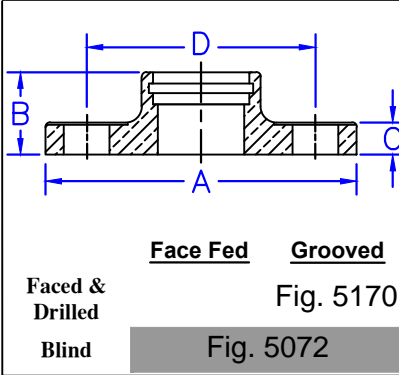
Grooved For Brazing Ring

SIZE CODE	Pipe Size (inches)	Outside Diameter A	Overall Height B	Flange Thickness C	# of Bolt Holes	Diameter of Holes	Bolt Circle D	Weight
040	1/4	3 1/2	3/4	5/16	4	5/8	2 3/8	.930
060	3/8	3 1/2	7/8	5/16	4	5/8	2 3/8	1.170
100	1/2	3 1/2	1	5/16	4	5/8	2 3/8	.963
150	3/4	3 7/8	1 1/16	11/32	4	5/8	2 3/4	1.400
200	1	4 1/4	1 5/32	3/8	4	5/8	3 1/8	1.905
250	1 1/4	4 5/8	1 9/32	13/32	4	5/8	3 1/2	2.280
300	1 1/2	5	1 7/16	7/16	4	5/8	3 7/8	2.850
400	2	6	1 17/32	1/2	4	3/4	4 3/4	4.490
450	2 1/2	7	1 25/32	9/16	4	3/4	5 1/2	6.930
500	3	7 1/2	1 27/32	5/8	4	3/4	6	8.270
550	3 1/2	8 1/2	1 31/32	11/16	8	3/4	7	11.230
600	4	9	2 1/8	11/16	8	3/4	7 1/2	12.900
650	5	10	2 5/16	3/4	8	7/8	8 1/2	15.500
700	6	11	2 15/32	13/16	8	7/8	9 1/2	21.030
750	8	13 1/2	2 11/16	15/16	8	7/8	11 3/4	33.200
800	10	16	3	1	12	1	14	57.000
820	12	19	3 3/16	1 1/16	12	1	17	74.140

■ Indicates " Consult the Factory"



Fig. 5170
Flanges - Com. - 150 lb. Female



Faced & Drilled
Blind

Face Fed Grooved
Fig. 5170

Fig. 5072

Flanges - Male Commercial Type

150 Lbs. W.S.P. at 450°F. 225 Lbs. W.O.G. at 150°F.

Grooved For Brazing Ring

SIZE CODE	Pipe Size (inches)	Outside Diameter A	Overall Height B	Flange Thickness C	# of Bolt Holes	Diameter of Holes	Bolt Circle D	Weight
150	3/4	3 7/8	1 1/4	11/32	4	5/8	2 3/4	1.370
200	1	4 1/4	1 5/16	3/8	4	5/8	3 1/8	1.710
250	1 1/4	4 5/8	1 13/32	13/32	4	5/8	3 1/2	2.330
300	1 1/2	5	1 9/16	7/16	4	5/8	3 7/8	2.980
400	2	6	1 21/32	1/2	4	3/4	4 3/4	4.320
450	2 1/2	7	1 31/32	9/16	4	3/4	5 1/2	6.530
500	3	7 1/2	2 5/64	5/8	4	3/4	6	8.900
600	4	9	2 11/32	11/16	8	3/4	7 1/2	13.000
650	5	10	2 1/2	3/4	8	7/8	8 1/2	17.500
700	6	11	2 43/64	13/16	8	7/8	9 1/2	20.520

■ Indicates " Consult the Factory"

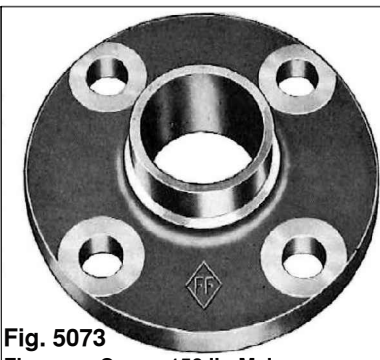
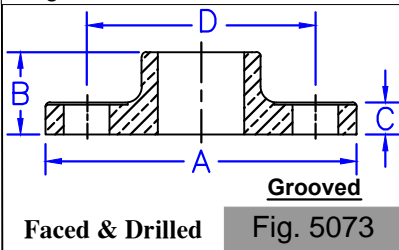


Fig. 5073
Flanges - Com. - 150 lb. Male



Faced & Drilled

Grooved

Fig. 5073

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1800 Golden Springs Rd. Anniston, AL 36207 800-876-1811

Flanges - Commercial Type

300 Lbs. W.O.G. at 450°F. F. -500 Lbs. W.S.P. at 150°F.

Grooved For Brazing Ring

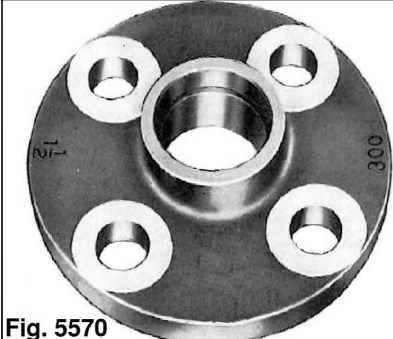
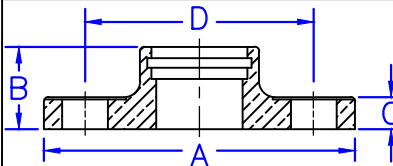


Fig. 5570
Flanges - Commercial - 300 lb.

SIZE CODE	Pipe Size (inches)	Outside Diameter A	Overall Height B	Flange Thickness C	# of Bolt Holes	Diameter of Holes	Bolt Circle D	Weight
150	3/4	4 5/8	1 1/4	17/32	4	3/4	3 1/4	2.720
200	1	4 7/8	1 3/8	19/32	4	3/4	3 1/2	3.500
250	1 1/4	5 1/4	1 1/2	5/8	4	3/4	3 7/8	4.235
400	2	6 1/2	1 25/32	3/4	8	3/4	5	7.273
600	4	10	2 7/16	1 1/16	8	7/8	7 7/8	23.250
800	10	17 1/2	3 15/16	1 7/16	16	1 1/8	15 1/4	48.500

■ Indicates " Consult the Factory"



Grooved
Faced & Drilled Fig. 5570

Flagg-Flow®

Bronze Flanges - Navy Type

Flanges - Navy Type

150 Lbs. W.O.G. at 150°F. F. -100 Lbs. W.S.P. at 425°F.

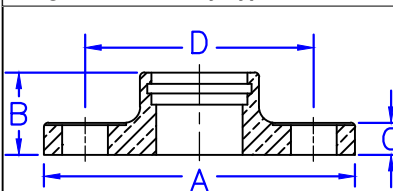
Grooved For Brazing Ring



Fig. 5175
Flanges - 150 lb. Navy Type

SIZE CODE	Pipe Size (inches)	Outside Diameter A	Overall Height B	Flange Thickness C	# of Bolt Holes	Diameter of Holes	Bolt Circle D	Weight
040	1/4	3 1/4	7/8	3/8	3	9/16	2 1/8	1.000
060	3/8	3 3/8	15/16	3/8	3	9/16	2 1/4	1.160
100	1/2	3 9/16	1	3/8	3	9/16	2 7/16	1.280
150	3/4	3 13/16	1 1/16	7/16	4	9/16	2 11/16	1.620
200	1	4 1/4	1 1/8	7/16	4	9/16	3 1/8	2.060
250	1 1/4	4 1/2	1 1/4	7/16	4	9/16	3 3/8	2.340
300	1 1/2	5 1/16	1 3/8	7/16	6	9/16	3 15/16	2.800
400	2	5 9/16	1 3/8	7/16	6	9/16	4 7/16	3.220
450	2 1/2	6 1/8	1 3/8	1/2	6	9/16	5	4.350
500	3	6 5/8	1 3/8	1/2	8	9/16	5 1/2	4.800
550	3 1/2	7 3/16	1 7/16	1/2	8	9/16	6 1/16	5.845
600	4	7 11/16	1 7/16	1/2	8	9/16	6 9/16	6.200
615	4 1/2	8 3/16	1 1/2	1/2	10	9/16	7 1/16	7.670
650	5	9 1/16	1 9/16	9/16	10	11/16	7 13/16	9.000
700	6	10 1/8	1 11/16	9/16	12	11/16	8 7/8	11.100
710	7	11 5/16	1 13/16	9/16	12	11/16	10	13.970
750	8	12 3/8	2	5/8	14	11/16	11 1/16	16.800
800	10	15	2 1/4	11/16	15	13/16	13 7/16	28.990
820	12	17 5/8	2 1/2	3/4	18	13/16	16 1/16	41.250

■ Indicates " Consult the Factory"



Face Fed Grooved
Faced & Drilled Fig. 5175
Blind Fig. 5077



Flanges - Navy Type

250 Lbs. W.O.G. at 150°F. -150 Lbs. W.S.P. at 425°F.

Grooved For Brazing Ring

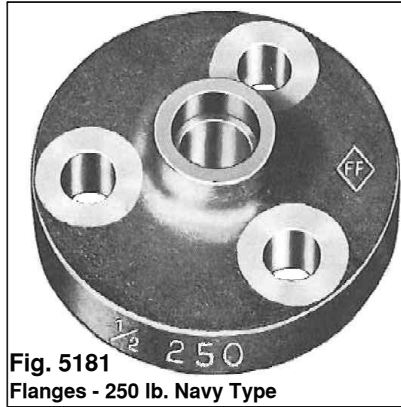
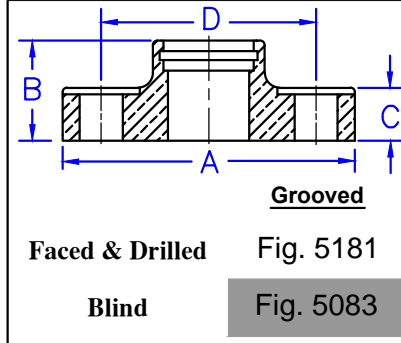


Fig. 5181
Flanges - 250 lb. Navy Type



SIZE CODE	Pipe Size (inches)	Outside Diameter A	Overall Height B	Flange Thickness C	# of Bolt Holes	Diameter of Holes	Bolt Circle D	Weight
040	1/4	3 1/4	1 3/16	11/16	3	9/16	2 1/8	1.750
060	3/8	3 3/8	1 1/4	11/16	3	9/16	2 1/4	1.913
100	1/2	3 9/16	1 5/16	11/16	3	9/16	2 7/16	2.050
200	1	4 1/4	1 7/16	3/4	4	9/16	3 1/8	3.300
250	1 1/4	4 1/2	1 5/8	13/16	4	9/16	3 3/8	3.710
300	1 1/2	5 1/16	1 3/4	13/16	6	9/16	3 15/16	4.630
400	2	5 9/16	1 3/4	13/16	6	11/16	4 7/16	5.370
450	2 1/2	6 1/8	1 13/16	15/16	6	11/16	5	7.350
500	3	6 5/8	1 13/16	15/16	8	11/16	5 1/2	7.790
550	3 1/2	7 3/16	1 15/16	1	8	11/16	6 1/16	9.570
600	4	7 11/16	1 15/16	1	8	11/16	6 9/16	11.145
650	5	9 1/16	2 1/16	1 1/16	10	11/16	7 13/16	14.410
700	6	10 1/8	2 5/16	1 3/16	12	11/16	8 7/8	19.400
750	8	12 3/8	2 11/16	1 5/16	14	11/16	11 1/16	31.920
760	9	13 15/16	2 7/8	1 3/8	14	13/16	12 3/8	42.000
800	10	15	3	1 7/16	15	13/16	13 7/16	47.800
820	12	17 5/8	3 1/8	1 1/2	18	13/16	16 1/16	68.050

■ Indicates " Consult the Factory"

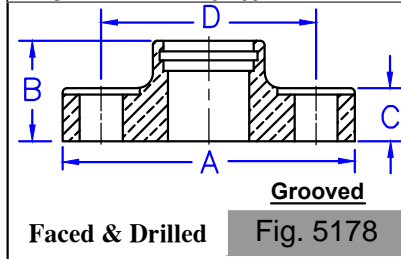
Flanges - Navy Type

400 Lbs. W.O.G. at 150°F. -200 Lbs. W.S.P. at 425°F.

Grooved For Brazing Ring



Fig. 5178
Flanges - 400 lb. Navy Type



SIZE CODE	Pipe Size (inches)	Outside Diameter A	Overall Height B	Flange Thickness C	# of Bolt Holes	Diameter of Holes	Bolt Circle D	Weight
040	1/4	3 3/4	1 3/16	11/16	3	9/16	2 5/8	2.320
100	1/2	4	1 5/16	11/16	4	9/16	2 7/8	2.620
250	1 1/4	5 3/8	1 5/8	13/16	5	11/16	4 1/16	5.500
300	1 1/2	5 15/16	1 3/4	13/16	6	11/16	4 5/8	6.450
400	2	6 1/2	1 3/4	13/16	7	11/16	5 3/16	6.620
450	2 1/2	7 9/16	2 5/16	15/16	8	13/16	6	12.040
500	3	8 1/8	2 3/8	15/16	8	13/16	6 9/16	13.120
550	3 1/2	8 11/16	2 7/16	1	9	13/16	7 1/8	16.123
600	4	9 1/4	2 5/8	1	9	13/16	7 11/16	17.770
650	5	10 3/8	2 13/16	1 1/16	11	13/16	8 13/16	24.300
750	8	14 3/4	3 1/2	1 5/16	13	1 1/16	12 3/4	56.480

■ Indicates " Consult the Factory"

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1800 Golden Springs Rd. Anniston, AL 36207 800-876-1811

Flanges - Butterfly - Navy Type

200 Lbs. W.S.P. at 450°F. 225 Lbs. W.O.G. at 150°F.

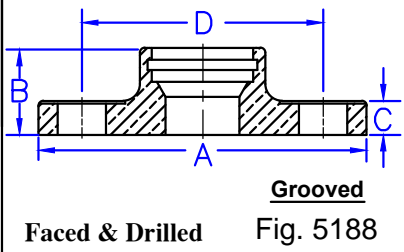
Grooved For Brazing Ring



Fig. 5188
Flanges - Butterfly - 200 lb. Navy

SIZE CODE	Pipe Size (inches)	Outside Diameter A	Overall Height B	Flange Thickness C	# of Bolt Holes	Diameter of Holes	Bolt Circle D	Weight
400	2	6	1 17/32	1/2	4	3/4	4 3/4	4.350
450	2 1/2	7	1 25/32	9/16	4	3/4	5 1/2	7.255
500	3	7 1/2	1 27/32	5/8	4	3/4	6	8.350
550	3 1/2	8 1/2	1 31/32	11/16	8	3/4	7	11.230
600	4	9	2 1/8	11/16	8	3/4	7 1/2	13.160
650	5	10	2 5/16	3/4	8	7/8	8 1/2	16.390
700	6	11	2 15/32	13/16	8	7/8	9 1/2	20.070
750	8	13 1/2	2 11/16	15/16	8	7/8	11 3/4	33.180
800	10	16	3	1	12	1	14	48.450
820	12	19	3 3/16	1 1/16	12	1	17	72.000

■ Indicates "Consult the Factory"



Butterfly Flanges are covered under Flagg Fig. No. 5188.
They are available grooved.

*Indicates Type A. ■ Indicates "Consult the Factory". Manufacturers of Flagg-Flow® Products. Please contact LEE BRASS COMPANY, or our Representative for your individual requirements. Please use Flagg Figure Numbers when ordering. Only our most popular products are displayed in this catalog. We also manufacture: Fittings in other copper alloys - Custom fittings - Different thread combinations - Additional sizes and shapes.

Please Use Flagg Figure Numbers When Ordering.



BRONZE FITTINGS FOR BRAZED JOINTS

1500 Lbs. W.O.G. ($\frac{1}{8}$ " to 2" sizes) NAVY
800 Lbs. W.O.G. (2 $\frac{1}{2}$ " to 12" sizes) NAVY
300 Lbs. W.S.P. - COMMERCIAL

SPECIFICATIONS: - FITTINGS

U.S. Navy BuShips Dwg. - 5000-S4823-1385766 Fittings (Dimensions)

U.S. Navy BuShips Dwg. - 810-1385863 Bushings (Dimensions)

ASTM B-61* - Chemical and Physical Properties

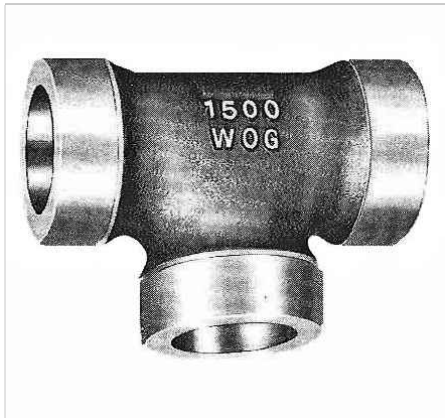
90° Service Ells, 45° Service Ells, Caps (Dimensions Commercial)

ASTM B-61 - Chemical and Physical Properties

* As authorized by BuShips letters 9480/23, Ser 648A1-912, 13 August 1963 & 9480. Ser 648A11-1321, 7 August 1964.

The fittings in this section can be supplied with the pre-inserted ring of silver brazing alloy or grooved only. The fittings in this section are made to order only.

These fittings are tested in accordance with the requirements of the above specifications.



BRONZE FITTINGS DESIGNED FOR UT INSPECTION OF BRAZED JOINTS

1500 PSI W.O.G. ($\frac{1}{8}$ " to 2" sizes)
800 PSI W.O.G. (2 $\frac{1}{2}$ " to 8" sizes)

SPECIFICATIONS:

Dept. of Navy BuShips Dwg. 810-1385942 (Dimensions)

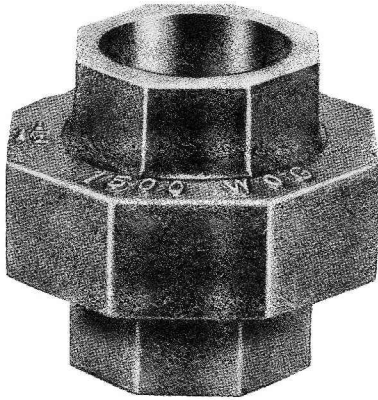
ASTM B-61* (Chemical and Physical Properties)

*As authorized by BuShips letters 9480/23, Ser 648A1-912, 13 August 1963 & 9480. Ser 648A11-1321, 7 August 1964.

This type of fitting is normally furnished grooved for, but without the pre-inserted ring of silver brazing alloy. Exterior machined surfaces and sockets are protected from damage during shipping.

These fittings are tested in accordance with the requirements of the above specifications.

Please Use Flagg Figure Numbers When Ordering.



**BRONZE UNIONS
FOR BRAZED JOINTS
("O" RING GASKET TYPE)**

1500 Lbs. W.O.G. (1/8" to 2" sizes) NAVY

800 Lbs. W.O.G. (2 1/2" size) NAVY

SPECIFICATIONS:

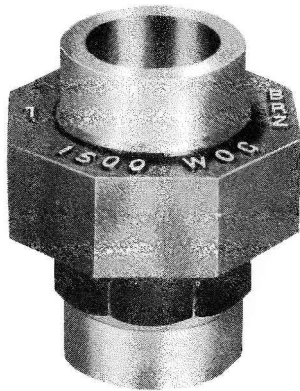
U.S. Navy BuShips Dwg. - 810-1385859 (Dimensions)

ASTM B-61* - Chemical and Physical Properties

* As authorized by BuShips letters 9480/23, Ser 648A1-912, 13 August 1963 & 9480. Ser 648A11-1321, 7 August 1964.

The unions in this section can be supplied with pre-inserted ring of silver brazing alloy or grooved only. The unions in this section are made to order only.

These unions are tested in accordance with the requirements of the above specifications.



**BRONZE UNIONS
DESIGNED FOR UT INSPECTION
OF BRAZED JOINTS
("O" RING GASKET TYPE)**

1500 PSI W.O.G. (1/8" to 2" sizes)

800 PSI W.O.G. (2 1/2" to 8" sizes)

SPECIFICATIONS:

Dept. of Navy BuShips Dwg. 810-1385946 (Dimensions)

ASTM B-61* (Chemical and Physical Properties)

MIL-P-5516 - ("O" ring material)

*As authorized by BuShips letters 9480/23, Ser 648A1-912, 13 August 1963 & 9480. Ser 648A11-1321, 7 August 1964.

This type of union is normally furnished grooved for, but without the pre-inserted ring of silver brazing alloy. This union is available with female brazing ends only.

Exterior machined surfaces and sockets are protected from damage during shipping.

These unions are tested in accordance with the requirements of the above specifications.

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Please Use Flagg Figure Numbers When Ordering.

**BRONZE FITTINGS
FOR BRAZED JOINTS
(IRON PIPE SIZE)**

3000 LB. W.O.G.



SPECIFICATIONS: - FITTINGS

ASTM B-61* - Chemical and Physical Properties

U.S. Navy BuShips Dwg. 5000-S4823-841338

GAGE LINE FITTINGS, UNIONS AND UNION FITTINGS

U.S. Navy BuShips Dwg. 5000-S4823-841626

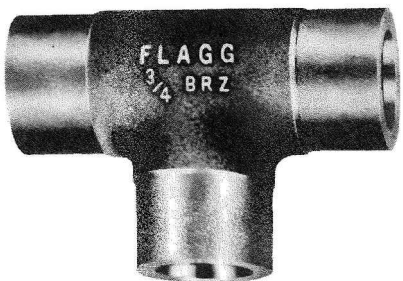
* As authorized by BuShips letters 9480/23, Ser 648A1-912, 13 August 1963 & 9480. Ser 648A11-1321, 7 August 1964.

The fittings in this section can be supplied with the pre-inserted ring of silver brazing alloy or grooved only. The fittings in this section are made to order only.

These fittings are tested in accordance with the requirements of the above specifications.

**BRONZE FITTINGS
DESIGNED FOR UT INSPECTION
OF BRAZED JOINTS
(IRON PIPE SIZE)**

3000 PSI W.O.G.



SPECIFICATIONS:

Dept. of Navy BuShips Dwg. 810-1385941 (Dimensions)

GAGE LINE FITTINGS

Dept. of Navy BuShips Dwg. 810-1385944 (Dimensions)

ASTM B-61* - Chemical and Physical Properties

*As authorized by BuShips letters 9480/23, Ser 648A1-912, 13 August 1963 & 9480. Ser 648A11-1321, 7 August 1964.

This type of fitting is normally furnished grooved for, but without the pre-inserted ring of silver brazing alloy. Exterior machined surfaces and sockets are protected from damage during shipping.

These fittings are tested in accordance with the requirements of the above specifications.

NOTE: -

Fittings in this classification are suitable for high pressure oxygen service. If requirements are for this service, order should so stipulate.

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1800 Golden Springs Rd. Anniston, AL 36207 800-876-1811

Please Use Flagg Figure Numbers When Ordering.

**BRONZE UNIONS
FOR BRAZED JOINTS
(IRON PIPE SIZE)**

**3000 LB. W.O.G.
RECTANGULAR GASKET TYPE**

SPECIFICATIONS:

UNIONS AND UNION FITTINGS

U.S. Navy BuShips Dwg. 5000-S4823-841337

UNION NUTS

STEEL-MIL-S-16782 or MIL-S-18411 Class 2

Nickel Copper- Q-Q-N-281, Class B or Q-Q-N-288, Comp A

UNION HEADS

Bronze ASTM-61*

STEEL-MIL-S-16782

Nickel Copper-Q-Q-N-281, Class B or Q-Q-N-288, Comp A

UNION TAILS

Bronze-ASTM B-61*

Bronze-QQ-B-639

BRAZING RING-QQB-654

GASKET-Buna-N and Teflon

* As authorized by BuShips letters 9480/23, Ser 648A1-912, 13 August 1963 & 9480. Ser 648A11-1321, 7 August 1964.



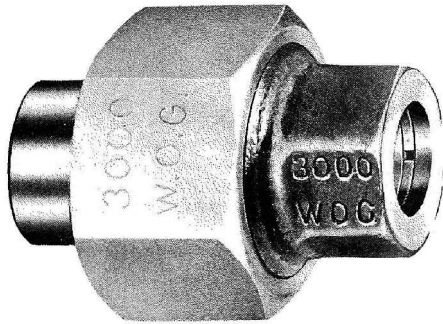
The unions in this section can be supplied with pre-inserted ring of silver brazing alloy or grooved only. Unions in this section are made to order only.

These unions are tested in accordance with the requirements of the above specifications.

Please Use Flagg Figure Numbers When Ordering.

**BRONZE UNIONS
FOR BRAZED JOINTS
(IRON PIPE SIZE)**

**3000 PSI W.O.G.
("O" RING GASKET TYPE)**



SPECIFICATIONS:

UNIONS

U.S. Navy BuShips Dwg. 810-1385883

Sup. Ships SS845-1889885

UNION HEADS AND TAILS

ASTM B-61*

QQ-B-639 or ASTM B-124, Alloy 3

UNION NUTS

Steel-MIL-S-18411, Class 2

Nickel Copper-QQ-N-281

Nickel Copper-QQ-N-288 Comp. A

"O" RING

Buna-N MIL-P-5516

Viton MIL-R-25897

Special gaskets for oxygen service are required.

*As authorized by BuShips letters 9480/23, Ser 648A1-912, 13 August 1963 & 9480. Ser 648A11-1321, 7 August 1964.

The unions in this section can be supplied with pre-inserted ring of silver brazing alloy or grooved only. Unions in this section are made to order only.

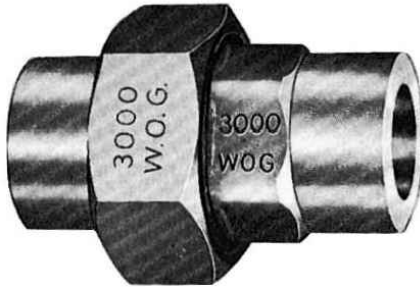
These unions are tested in accordance with the requirements of the above specifications.

Please Use Flagg Figure Numbers When Ordering.

**BRONZE UNIONS
DESIGNED FOR UT INSPECTION
OF BRAZED JOINTS
(IRON PIPE SIZE)**

3000 PSI W.O.G.

("O" RING GASKET TYPE)



SPECIFICATIONS:

DIMENSIONS-

Dept. of Navy BuShips Dwg. 810-1385943

MATERIAL:-

UNION HEAD AND TAILS

ASTM B-61*

UNION NUTS

Steel-MIL-S-16782

Nickel Copper-QQ-N-281, Class B

QQ-N-288, Comp. A

"O" RING

MIL-P-5516

*As authorized by BuShips letters 9480/23, Ser 648A1-912, 13 August 1963 & 9480. Ser 648A11-1321,
7 August 1964.

This type of union is normally furnished grooved for, but without the pre-inserted ring of silver brazing alloy. This union is available with female brazing ends only. Exterior machined surfaces and sockets are protected from damage during shipping. These unions are tested in accordance with the requirements of the above specifications.

Table I**

Dimensions, Weights, and Tolerances in Diameter and Wall Thickness for Copper Threadless Pipe (TP) Sizes

Standard Pipe Size (In.)	Nominal Dimensions, in.			Cross- Sectional Area of Bore (Sq. In.)	Nominal Weight (Lb. per Ft.)	Tolerances, in.	
	Outside Diameter	Inside Diameter	Wall Thickness			Average Outside Diameter, * (all minus)	Wall Thickness, plus and minus
1/4	.540	.410	.065	.132	.376	.004	.0035
3/8	.675	.545	.065	.233	.483	.004	.004
1/2	.840	.710	.065	.396	.613	.005	.004
3/4	1.050	.920	.065	.665	.780	.005	.004
1	1.315	1.185	.065	1.10	.989	.005	.004
1 1/4	1.600	1.530	.065	1.84	1.26	.006	.004
1 1/2	1.900	1.770	.065	2.46	1.45	.006	.004
2	2.375	2.245	.065	3.96	1.83	.007	.006
2 1/2	2.875	2.745	.065	5.92	2.22	.007	.006
3	3.500	3.334	.083	8.73	3.45	.008	.007
3 1/2	4.000	3.810	.095	11.4	4.52	.008	.007
4	4.500	4.286	.107	14.4	5.72	.010	.009
5	5.562	5.298	.132	22.0	8.73	.012	.010
6	6.625	6.309	.158	31.3	12.4	.014	.010
8	8.625	8.215	.205	53.0	21.0	.018	.014
10	10.750	10.238	.256	82.3	32.7	.018	.016
12	12.750	12.124	.313	115	47.4	.018	.020

* The average outside diameter of a tube is the average of the maximum and the minimum outside diameters, as determined at any one cross-section of the tube.

** Table 1, 'Standard Specification for Threadless Copper Pipe', ASTM Designation; B 302-61, reprinted with permission of the American Society for Testing and Materials.

Table II

Class 200 70-30 CU. NI. Tube MIL-T-16420 F (Ships)

Nominal Size	Outside Diameter	Wall Thickness	Weight per Foot Calculated	Weight per Foot (Max.)*	Outside Diameter Tolerance (all Minus)
1/4	.540	.065	.376	.414	.005
3/8	.675	.065	.483	.531	.005
1/2	.840	.065	.614	.675	.006
3/4	1.050	.065	.780	.858	.006
1	1.315	.065	.990	1.09	.008
1 1/4	1.660	.072	1.39	1.53	.008
1 1/2	1.900	.072	1.60	1.76	.008
2	2.375	.083	2.32	2.55	.010
2 1/2	2.875	.083	2.82	3.10	.010
3	3.500	.095	3.94	4.33	.012
3 1/2	4.000	.095	4.52	4.97	.012
4	4.500	.109	5.83	6.41	.015
5	5.563	.125	8.28	9.11	.017
6	6.625	.134	10.60	11.70	.020
8	8.625	.148	15.30	16.80	.026
10	10.750	.187	24.10	26.50	.030
12	12.750	.250	38.10	41.90	.035

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- (b) Order number of shipment in question.
- (c) Package number.
- (d) Gross and net weights of package.

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INDEX :
Alphabetical and Numerical

	Page #
A DAPTERS	
200 LBS.....	18
B RAZING INSTRUCTIONS	2-3
B USHINGS	
200 LBS.....	20
C APS	
200 LBS.....	17
C OUPLINGS	
200 LBS.....	19
C OUPLINGS, REDUCING	
200 LBS.....	19
E LBOWS 90°, E LBOWS 90° (REDUCING)	
200 LBS.....	1, 4, 5
E LBOWS 90° (SERVICE/STREET)	
200 LBS.....	4
E LBOWS 45°	
200 LBS.....	4
E LBOWS 45° (SERVICE/STREET)	
200 LBS.....	4
E LBOWS, LONG TURN	
200 LBS.....	16
F LANGES	
150 LBS.....	27, 28, 29
200 LBS.....	31
250 LBS.....	30
300 LBS.....	29
400 LBS.....	30
P LUGS, SOLID	
300 LBS.....	17

	Page #
R ETURN BENDS, CLOSE PATTERN	
200 LBS.....	17
R ETURN BENDS, OPEN PATTERN	
200 LBS.....	17
T EEs, T EEs (REDUCING)	
200 LBS.....	5-11
T EEs, LONG TURN DOUBLE SWEEP	
200 LBS.....	16
T EEs, LONG TURN SINGLE SWEEP	
200 LBS.....	14
T EEs, LONG TURN SINGLE SWEEP (REDUCING)	
200 LBS.....	12, 13
U NIONS	
200 LBS.....	24
300 LBS.....	24
U NION, PARTS	
200 LBS.....	25
300 LBS.....	25
U NION ELBOWS, 90°	
200 LBS.....	22
300 LBS.....	22
U NION ELBOWS, 45°	
200 LBS.....	22
300 LBS.....	23
U NION TEES, BRANCH - U NION TEES, RUN	
200 LBS.....	23, 24
300 LBS.....	23, 24
Y BRANCHES 45°	
200 LBS.....	14, 15

INDEX :
Figure Numbers

Less Ring	Grooved	Page #	Less Ring	Grooved	Page #	Less Ring	Grooved	Page #
5001.....	5101	4,5	5061.....	5161	18	5426.....	5526	24
5002.....	5102	4,5	5062.....	5162	18	5428.....	5528	24
.....	5103	5	5063.....	.....	18	5430.....	5530	22
5004.....	5104	4	5065.....	.....	17	5431.....	5531	22
.....	5107	4	5070.....	5170	28	5433.....	5533	22
.....	5108	4	5072.....	.....	28	5435.....	5535	23
.....	5109	4	5073.....	.....	28	5436.....	5536	23
.....	5111	16	5075.....	5175	29	5437.....	5537	23
5021.....	5121	5-11	5077.....	.....	29	5438.....	5538	23
5022.....	5122	5-11	5083.....	.....	30	5439.....	5539	23
5023.....	5123	5-11	.....	5178	30	5445.....	5545	23
.....	5130	12-14	.....	5181	30	5446.....	5546	23
.....	5131	12-14	.....	5188	31	5447.....	5547	23
.....	5133	16	5201.....	5301	24	5448.....	5548	23
.....	5135	16	5204.....	5304	24	5449.....	5549	23
.....	5140	14,15	.....	5305	22	5460.....	5560	24
.....	5141	14,15	.....	5308	22	5461.....	.....	24
5050.....	5150	19	.....	5309	22	5462.....	5562	24
5051.....	5151	19	.....	5313	23	5463.....	.....	22
.....	5153	19	.....	5317	24	5464.....	.....	22
.....	5154	17	.....	5320	24	5465.....	.....	22
.....	5155	17	5221.....	5321	25	5466.....	5566	23
.....	5156	17	5222.....	.....	25	5467.....	5567	23
5057.....	5157	20	5223.....	5323	25	5468.....	5568	23
5058.....	.....	20	5226.....	.....	25	5469.....	5525	23
5060.....	5160	18	5425.....	5525	24	.....	5570	29