

FF-W[®]
2011

Lee Brass

Made in the U.S.A.

Copper-Nickel - Socketweld Fittings/Flanges/Unions Catalog



**Quality Brass Castings
Since 1917**

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FF-W PRODUCTS

Lee Brass and Stanley G. Flagg & Company have combined over 150 years of foundry and piping technology with 50 years of marine product experience to develop the new FF-W® product line. This was accomplished by working very closely with NAVSEA and the major shipyards to coordinate the product evaluation and testing requirements.

In 1992, the U.S. Navy approved the Class 400 FF-W® products for use wherever Class 200 or 700 Copper-Nickel Tubing to Mil-T-16420 is permitted on surface ships. This includes the "Fire Hazardous Areas and Systems."

FF-W® Copper-Nickel cast socket weld fittings meet all NAVSEA and ABS dimensional and material requirements. Testing and other procurement requirements are in accordance with the military and commercial standards identified throughout this catalog.

FEATURES / ADVANTAGES

The FF-W® products offer the following:

- Streamline design—reduced turbulence—the same as Flagg-Flow® products.
- FF-W® products replace ASME 16.11 3000LB. Copper Nickel forged fittings on low pressure systems.
- Our newly designed reducing fittings use the same lay lengths and center-to-bottom of socket of the largest end on all ends in an effort to minimize variation in purchased fittings and increase efficiencies in the pipe cutting and fitting processes.
- Extensive visual, dimensional, and structural inspections combined with hydrostatic and air underwater testing insures the quality of our fittings.

COST SAVINGS

Savings in initial cost, weight, and installation when compared to other weld and mechanical fittings.

FF-W SPECIFICATIONS

FITTINGS

DIMENSIONS — Lee Dwg. No. LEE-82104.

Reference documents:

NAVSEA's Dwg. No. 803-6397430.

Note: Fittings are interchangeable with ASME B16.11 for class 200 pipe.

PRESSURE — SIZES 6" and smaller 200lbs. W.S.P. ABOVE 6" 150lbs. W.S.P. refer to applicable service rating table.

UNIONS

DIMENSIONS — Reference 803-6397430 & MIL-F1183 modified for socket weld.

PRESSURE — 200 lbs. W.S.P. 400 lbs. W.O.G. Refer to applicable service rating tables.

MATERIAL — Nuts may be ASTM B61, QQC390 (C92200)

FLANGES

DIMENSIONS — Reference documents:

NAVY

NAVSEA DWG 810-4715319

LEE COMMERCIAL

ASME/ANSI B16.24 (Bolting Only)

COMMERCIAL

ASME/ANSI B16.5

PRESSURE — Refer to applicable service rating tables.

The FF-W® products are an extension of our Flagg-Flow® Threadless Bronze Fittings product line demonstrating our ability to provide quality engineered pipe connections for a variety of markets.

Our capabilities include engineering, pattern making, casting, machining, testing, and packaging.

When you think of pipe fittings, think of FF and FF-W® fittings. Lee Brass also manufactures a complete line of threaded brass pipe fittings, unions, and flanges.



SIZE	DEPTH OF SOCKET MIN	METAL THICKNESS OVER SOCKET DIAMETER		BODY METAL THICKNESS		DIAMETER OF SOCKET		INSIDE DIAMETER	RADIUS MIN	WIDTH OF BAND MIN	BAND DIAMETER AVG. MAX
		MIN	AVG. MAX	MIN	AVG. MAX						
1/4	17/64	.130	.200	.070	.132	.545	$\begin{smallmatrix} +.030 \\ -.000 \end{smallmatrix}$	.398 ± .015	5/64	9/32	.945
3/8	5/16	.130	.208	.080	.142	.680	$\begin{smallmatrix} +.030 \\ -.000 \end{smallmatrix}$	.532 ± .015	3/32	21/64	1.096
1/2	3/8	.130	.215	.080	.142	.845	$\begin{smallmatrix} +.030 \\ -.000 \end{smallmatrix}$	.697 ± .020	3/32	25/64	1.275
3/4	13/32	.130	.224	.090	.152	1.055	$\begin{smallmatrix} +.030 \\ -.000 \end{smallmatrix}$	.907 ± .025	7/64	27/64	1.503
1	7/16	.130	.230	.100	.170	1.320	$\begin{smallmatrix} +.030 \\ -.000 \end{smallmatrix}$	1.171 ± .025	7/64	15/32	1.780
1 1/4	1/2	.144	.232	.110	.180	1.665	$\begin{smallmatrix} +.030 \\ -.000 \end{smallmatrix}$	1.502 ± .030	1/8	17/32	2.129
1 1/2	5/8	.144	.241	.120	.190	1.905	$\begin{smallmatrix} +.030 \\ -.000 \end{smallmatrix}$	1.742 ± .030	1/8	21/32	2.387
2	21/32	.166	.264	.140	.233	2.380	$\begin{smallmatrix} +.046 \\ -.000 \end{smallmatrix}$	2.186 ± .030	5/32	11/16	2.908
2 1/2	25/32	.166	.264	.150	.243	2.880	$\begin{smallmatrix} +.051 \\ -.000 \end{smallmatrix}$	2.686 ± .030	5/32	13/16	3.408
3	53/64	.190	.268	.170	.270	3.505	$\begin{smallmatrix} +.055 \\ -.000 \end{smallmatrix}$	3.286 ± .035	3/16	55/64	4.041
3 1/2	7/8	.190	.268	.180	.280	4.005	$\begin{smallmatrix} +.055 \\ -.000 \end{smallmatrix}$	3.786 ± .035	3/16	29/32	4.541
4	29/32	.218	.296	.200	.300	4.505	$\begin{smallmatrix} +.060 \\ -.000 \end{smallmatrix}$	4.252 ± .040	7/32	15/16	5.097
5	1	.280	.350	.280	.380	5.568	$\begin{smallmatrix} +.060 \\ -.000 \end{smallmatrix}$	5.278 ± .040	5/16	1-1/32	6.268
6	1-7/64	.320	.390	.320	.410	6.630	$\begin{smallmatrix} +.060 \\ -.000 \end{smallmatrix}$	6.321 ± .040	11/32	1-9/64	7.410
8	1-5/16	.380	.450	.380	.480	8.630	$\begin{smallmatrix} +.060 \\ -.000 \end{smallmatrix}$	8.286 ± .040	13/32	1-23/64	9.530
10	1-1/2	.455	.525	.455	.525	10.755	$\begin{smallmatrix} +.060 \\ -.000 \end{smallmatrix}$	10.325 ± .040	1/2	1-9/16	11.805
12	1-5/8	.540	.615	.540	.615	12.755	$\begin{smallmatrix} +.060 \\ -.000 \end{smallmatrix}$	12.322 ± .040	9/16	1-11/16	13.985

SERVICE RATING TABLE

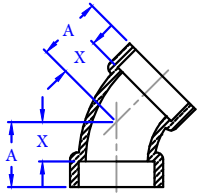
NOMINAL PIPE SIZE (INCHES)	STEAM SERVICE		AIR, OIL, WATER SERVICE	
	MAXIMUM WORKING PRESSURE (LB/IN ²)	MAXIMUM TEMPERATURE (°F)	MAXIMUM WORKING PRESSURE (LB/IN ²)	MAXIMUM TEMPERATURE (°F)
1/4" THRU 6"	200	425	400	150
ABOVE 6"	150	425	250	150

COPPER-NICKEL MATERIAL SPECIFICATIONS

	Grade	UNS No.	Specification
Casting	90-10	C96200	ASTM B369
	70-30	C96400	
Bar Stock	90-10	C70600	MIL-C-24679
	70-30	C71500	

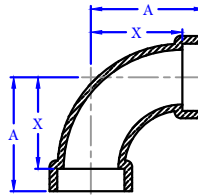


ALL FITTINGS MEET THE LEE-82104 DWG AND REFERENCE NAVSEA DWG: 803-6397430.
 FITTINGS AVAILABLE IN 68-- PART #'S COPPER NICKEL ALLOY 90/10 ASTM B369 UNS C96200.
 AND 69-- PART #'S COPPER NICKEL ALLOY 70/30 ASTM B369 UNS C96400.



FFW SOCKET WELD 45° ELBOW

PART #	SIZE	WGT	A	X
6804-060	3/8	0.19	5/8	15/16
6804-100	1/2	0.28	25/32	13/32
6804-150	3/4	0.38	7/8	15/32
6804-200	1	0.54	1 1/16	5/8
6804-250	1 1/4	0.79	1 7/32	23/32
6804-300	1 1/2	1.05	1 5/16	11/16
6804-400	2	1.47	1 7/16	25/32
6804-450	2 1/2	2.37	1 15/16	1 5/32
6804-500	3	3.83	2 3/16	1 23/64

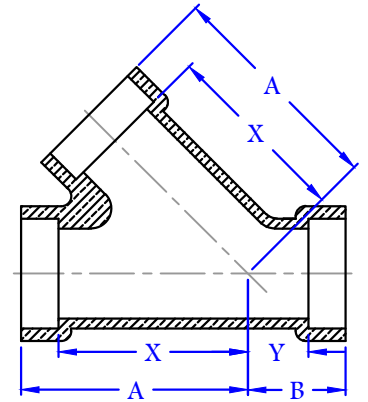


FFW SOCKET WELD 90° LONG TURN ELBOW

PART #	SIZE	WGT	A	X
6811-060	3/8	0.31	1 1/2	1 3/16
6811-100	1/2	0.38	1 3/4	1 3/8
6811-150	3/4	0.57	2	1 19/32
6811-200	1	0.78	2 5/16	1 7/8
6811-250	1 1/4	1.18	2 3/4	2 1/4
6811-300	1 1/2	1.82	3 1/8	2 1/2
6811-400	2	2.67	3 3/4	3 3/32
6811-450	2 1/2	4.07	4 1/2	3 23/32
6811-500	3	7.49	5 7/16	4 39/64

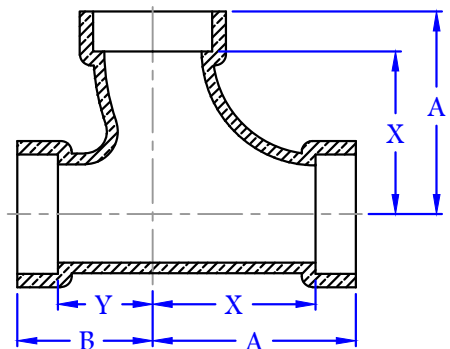
PART #	SIZE	A	X	B	Y	WGT
6840-100	1/2	1 19/32	1 7/32	5/8	1/4	0.45
6840-150	3/4	1 29/32	1 1/2	23/32	5/16	0.62
6840-200	1	2 11/32	1 29/32	27/32	13/32	0.90
6840-250	1 1/4	2 27/32	2 11/32	1 1/32	17/32	1.33
6840-300	1 1/2	3 1/8	2 1/2	1 3/32	15/32	1.75
6840-400	2	3 3/4	3 3/32	1 1/4	19/32	3.25
6840-450	2 1/2	4 23/32	3 15/16	1 17/32	3/4	5.26
6840-500	3	5 35/64	4 23/32	1 23/32	57/64	7.27

FFW SOCKET WELD 45° LATERAL Y BRANCH

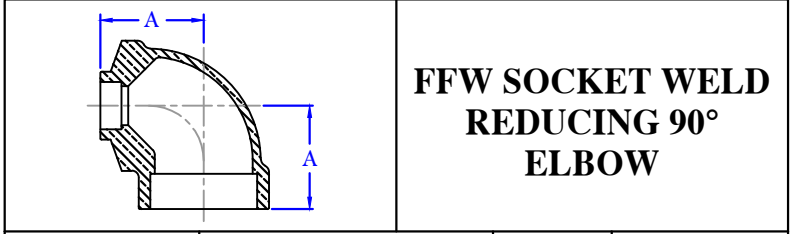
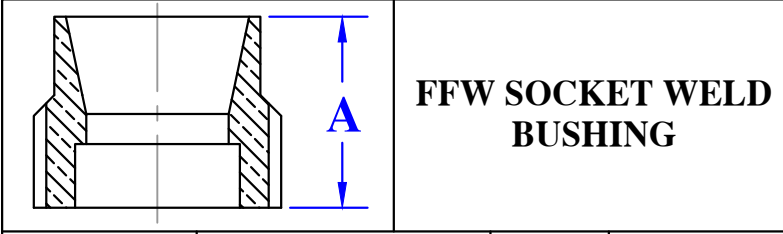


PART #	SIZE	A	X	B	Y	WGT
6830-100	1/2	1 3/4	1 3/8	1	5/8	0.51
6830-150	3/4	2	1 19/32	1 3/16	25/32	0.93
6830-200	1	2 5/16	1 7/8	1 5/16	7/8	1.34
6830-250	1 1/4	2 3/4	2 1/4	1 11/16	1 3/16	1.90
6830-300	1 1/2	3 1/8	2 1/2	1 7/8	1 1/4	2.50
6830-400	2	3 3/4	3 3/32	2 1/8	1 15/32	3.40
6830-450	2 1/2	4 1/2	3 23/32	2 9/16	1 25/32	5.24

FFW SOCKET WELD SINGLE SWEEP TEE



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 FITTINGS AVAILABLE IN 68-- PART #'S COPPER NICKEL ALLOY 90/10 ASTM B369 UNS C96200.
 AND 69-- PART #'S COPPER NICKEL ALLOY 70/30 ASTM B369 UNS C96400.

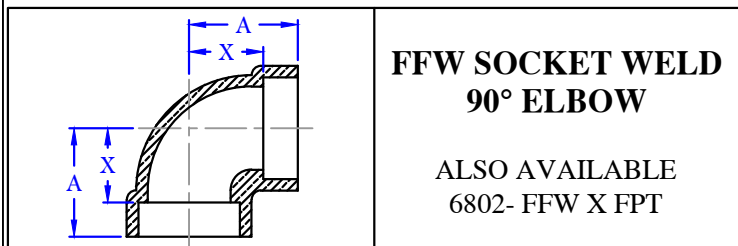


PART #	SIZE	WGT	A
6857-098	1/2 X 1/4	0.11	1 1/16
6857-099	1/2 X 3/8	0.13	1 1/16
6857-147	3/4 X 1/4	0.17	1 1/16
6857-148	3/4 X 3/8	0.18	1 3/16
6857-149	3/4 X 1/2	0.17	1 3/16
6857-196	1 X 1/4	0.27	1 1/4
6857-197	1 X 3/8	0.25	1 3/16
6857-198	1 X 1/2	0.27	1 5/32
6857-199	1 X 3/4	0.26	1 1/4
6857-245	1-1/4 X 1/4	0.27	1 15/32
6857-246	1-1/4 X 3/8	0.28	1 13/32
6857-247	1-1/4 X 1/2	0.31	1 13/32
6857-248	1-1/4 X 3/4	0.46	1 11/32
6857-249	1-1/4 X 1	0.39	1 7/16
6857-294	1-1/2 X 1/4	0.66	1 23/32
6857-295	1-1/2 X 3/8	0.61	1 21/32
6857-296	1-1/2 X 1/2	0.65	1 5/8
6857-297	1-1/2 X 3/4	0.68	1 19/32
6857-298	1-1/2 X 1	0.65	1 15/32
6857-299	1-1/2 X 1-1/4	0.58	1 5/8
6857-393	2 X 1/4	0.63	1 31/32
6857-394	2 X 3/8	0.63	1 15/16
6857-395	2 X 1/2	1.14	1 29/32
6857-396	2 X 3/4	1.21	1 27/32
6857-397	2 X 1	1.06	1 3/4
6857-398	2 X 1-1/4	0.97	1 5/8
6857-399	2 X 1-1/2	0.91	1 5/8
6857-446	2-1/2 X 1	1.46	2 1/8
6857-448	2-1/2 X 1-1/2	1.77	2
6857-449	2-1/2 X 2	1.12	1 25/32

PART #	SIZE	WGT	A
6801-059	3/8 X 1/4	0.40	1 1/64
6801-098	1/2 X 1/4	0.35	1 1/64
6801-099	1/2 X 3/8	0.28	1 1/64
6801-147	3/4 X 1/4	0.49	1 3/16
6801-148	3/4 X 3/8	0.47	1 3/16
6801-149	3/4 X 1/2	0.45	1 3/16
6801-197	1 X 3/8	0.70	1 7/16
6801-198	1 X 1/2	0.68	1 7/16
6801-199	1 X 3/4	0.67	1 7/16
6801-246	1-1/4 X 3/8	1.13	1 11/16
6801-247	1-1/4 X 1/2	1.05	1 11/16
6801-248	1-1/4 X 3/4	0.98	1 11/16
6801-249	1-1/4 X 1	0.92	1 11/16
6801-296	1-1/2 X 1/2	1.58	1 27/32
6801-297	1-1/2 X 3/4	1.46	1 27/32
6801-298	1-1/2 X 1	1.45	1 27/32
6801-299	1-1/2 X 1-1/4	1.21	1 27/32
6801-395	2 X 1/2	2.75	2 1/8
6801-396	2 X 3/4	2.53	2 1/8
6801-397	2 X 1	2.35	2 1/8
6801-398	2 X 1-1/4	2.24	2 1/8
6801-399	2 X 1-1/2	2.18	2 1/8
6801-445	2-1/2 X 3/4	3.85	2 23/32
6801-446	2-1/2 X 1	4.80	2 23/32
6801-447	2-1/2 X 1-1/4	4.76	2 23/32
6801-448	2-1/2 X 1-1/2	3.71	2 23/32
6801-449	2-1/2 X 2	3.95	2 23/32

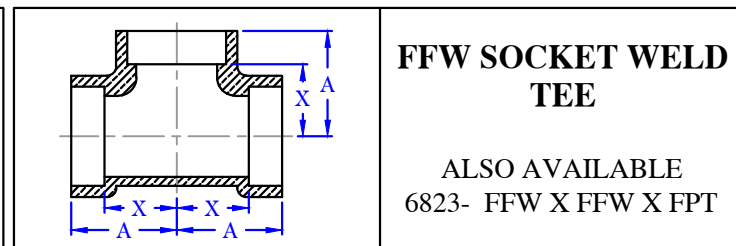


ALL FITTINGS MEET THE LEE-82104 DWG AND REFERENCE NAVSEA DWG: 803-6397430.
 FITTINGS AVAILABLE IN 68-- PART #'S COPPER NICKEL ALLOY 90/10 ASTM B369 UNS C96200.
 AND 69-- PART #'S COPPER NICKEL ALLOY 70/30 ASTM B369 UNS C96400.



**FFW SOCKET WELD
90° ELBOW**

ALSO AVAILABLE
6802- FFW X FPT

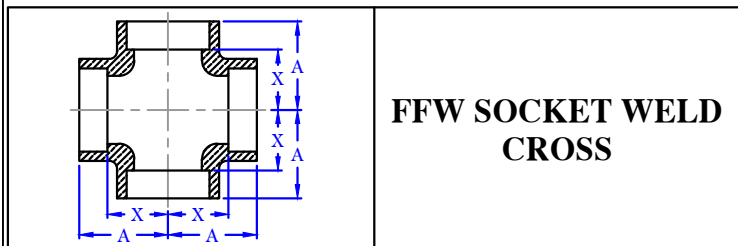


**FFW SOCKET WELD
TEE**

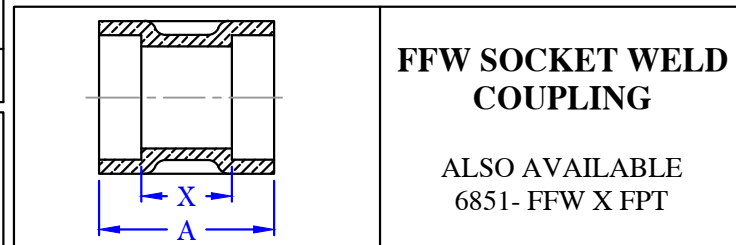
ALSO AVAILABLE
6823- FFW X FFW X FPT

PART #	SIZE	WGT	A	X
6801-040	1/4	0.12	23/32	29/64
6801-060	3/8	0.21	13/16	1/2
6801-100	1/2	0.29	1	5/8
6801-150	3/4	0.40	1 3/16	25/32
6801-200	1	0.64	1 7/16	1
6801-250	1 1/4	0.93	1 11/16	1 3/16
6801-300	1 1/2	1.16	1 27/32	1 7/32
6801-400	2	1.77	2 1/8	1 15/32
6801-450	2 1/2	2.58	2 11/16	1 29/32
6801-500	3	4.35	3 3/32	2 17/64
6801-550	3 1/2	6.50	3 13/32	2 17/32

PART #	SIZE	WGT	A	X
6821-040	1/4	0.18	23/32	29/64
6821-060	3/8	0.30	13/16	1/2
6821-100	1/2	0.41	1	5/8
6821-150	3/4	0.59	1 3/16	25/32
6821-200	1	0.89	1 7/16	1
6821-250	1 1/4	1.32	1 11/16	1 3/16
6821-300	1 1/2	1.58	1 27/32	1 7/32
6821-400	2	2.39	2 1/8	1 15/32
6821-450	2 1/2	3.75	2 11/16	1 29/32



**FFW SOCKET WELD
CROSS**



**FFW SOCKET WELD
COUPLING**

ALSO AVAILABLE
6851- FFW X FPT

PART #	SIZE	WGT	A	X
6835-100	1/2	0.55	1	5/8
6835-150	3/4	0.69	1 3/16	25/32
6835-200	1	1.20	1 7/16	1
6835-250	1 1/4	1.57	1 11/16	1 3/16
6835-300	1 1/2	1.90	1 27/32	1 7/32
6835-400	2	3.78	2 1/8	1 15/32
6835-450	2 1/2	4.30	2 11/16	1 29/32

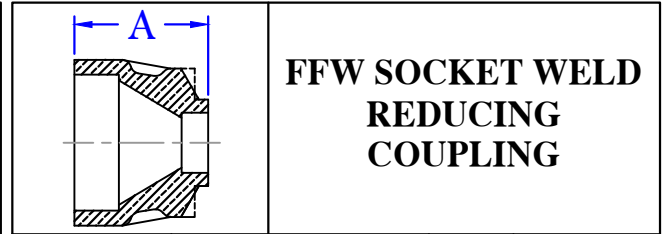
PART #	SIZE	WGT	A	X
6850-040	1/4	0.13	31/32	7/16
6850-060	3/8	0.19	1 1/16	7/16
6850-100	1/2	0.25	1 9/32	17/32
6850-150	3/4	0.34	1 7/16	5/8
6850-200	1	0.48	1 11/16	13/16
6850-250	1 1/4	0.72	1 7/8	7/8
6850-300	1 1/2	0.82	1 29/32	21/32
6850-400	2	1.24	2 3/16	7/8
6850-450	2 1/2	2.02	2 7/8	1 5/16



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 AND 69-- PART #'S COPPER NICKEL ALLOY 70/30 ASTM B369 UNS C96400.

PART #	SIZE	WGT	A
6860-040	1/4	0.10	1 7/32
6860-060	3/8	0.15	1 5/16
6860-100	1/2	0.26	1 19/32
6860-150	3/4	0.36	1 5/8
6860-200	1	0.77	1 29/32
6860-250	1 1/4	1.80	2
6860-300	1 1/2	1.26	2 5/32
6860-400	2	1.38	2 1/4

FFW SOCKET WELD X MALE THD ADAPTER



PART #	SIZE	WGT	A
6850-059	3/8 X 1/4	0.19	1 1/16
6850-098	1/2 X 1/4	0.22	1 9/32
6850-099	1/2 X 3/8	0.25	1 9/32
6850-147	3/4 X 1/4	0.31	1 7/16
6850-148	3/4 X 3/8	0.28	1 7/16
6850-149	3/4 X 1/2	0.33	1 7/16
6850-197	1 X 3/8	0.48	1 11/16
6850-198	1 X 1/2	0.48	1 11/16
6850-199	1 X 3/4	0.41	1 11/16
6850-245	1-1/4 X 1/4	0.58	1 7/8
6850-246	1-1/4 X 3/8	0.55	1 7/8
6850-247	1-1/4 X 1/2	0.55	1 7/8
6850-248	1-1/4 X 3/4	0.67	1 7/8
6850-249	1-1/4 X 1	0.59	1 7/8
6850-296	1-1/2 X 1/2	0.72	1 29/32
6850-297	1-1/2 X 3/4	0.68	1 29/32
6850-298	1-1/2 X 1	0.97	1 29/32
6850-299	1-1/2 X 1-1/4	0.82	1 29/32
6850-395	2 X 1/2	1.41	2 3/16
6850-397	2 X 1	1.41	2 3/16
6850-398	2 X 1-1/4	1.12	2 3/16
6850-399	2 X 1-1/2	1.02	2 3/16
6850-446	2-1/2 X 1	2.66	2 7/8
6850-447	2-1/2 X 1-1/4	1.76	2 7/8
6850-448	2-1/2 X 1-1/2	1.87	2 7/8
6850-449	2-1/2 X 2	1.84	2 7/8

PART #	SIZE	WGT	A	X
6815-040	1/4	0.40	1 5/8	1 3/32
6815-060	3/8	0.55	1 13/16	1 3/16
6815-100	1/2	0.70	1 15/16	1 3/16
6815-150	3/4	1.12	2 1/4	1 7/16
6815-200	1	1.75	2 7/16	1 9/16
6815-250	1 1/4	2.52	2 13/16	1 13/16
6815-300	1 1/2	3.15	3	1 3/4
6815-400	2	5.05	3 3/8	2 1/16

FFW SOCKET WELD UNION ASSEMBLY

PART #	SIZE	WGT	A
6863-100	1/2	0.23	1 17/32
6863-150	3/4	0.23	1 13/32
6863-200	1	0.36	1 9/16
6863-250	1 1/4	0.77	2 1/8
6863-300	1 1/2	1.01	2 3/16
6863-400	2	1.35	2 3/8

FFW FEM THD X MALE SOCKET WELD ADAPTER

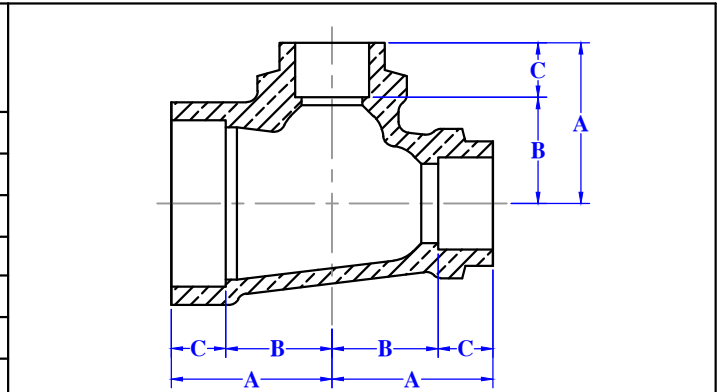
PART #	SIZE	WGT	A
6854-100	1/2	0.34	13/16
6854-150	3/4	0.46	15/16
6854-200	1	0.65	1 1/16
6854-250	1 1/4	0.65	1 3/16
6854-300	1 1/2	0.75	1 1/4
6854-400	2	1.29	1 5/16
6854-450	2 1/2	1.47	1 9/16

FFW SOCKET WELD CAP



ALL FITTINGS MEET THE LEE-82104 DWG AND REFERENCE NAVSEA DWG: 803-6397430.
 FITTINGS AVAILABLE IN 68-- PART #'S COPPER NICKEL ALLOY 90/10 ASTM B369 UNS C96200.
 AND 69-- PART #'S COPPER NICKEL ALLOY 70/30 ASTM B369 UNS C96400.

LARGEST END SIZE	A CENTER-TO-END	B CENTER-TO-BOTTOM OF SOCKET (MAX)	C SOCKET DEPTH (MIN)
3/8	.82 ±.05	0.557	0.313
1/2	1.01 ±.06	0.695	0.375
3/4	1.18 ±.06	0.834	0.406
1	1.43 ±.07	1.062	0.438
1 1/4	1.69 ±.07	1.260	0.500
1 1/2	1.84 ±.08	1.295	0.625
2	2.12 ±.08	1.544	0.656
2 1/2	2.7 ±.1	2.019	0.781



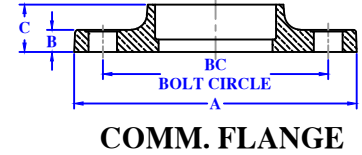
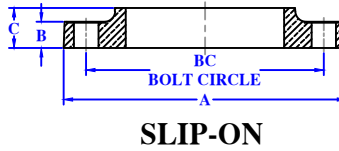
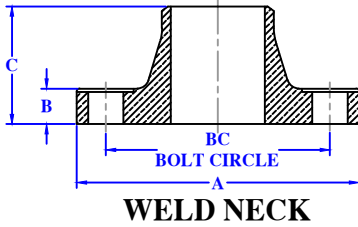
FFW SOCKET WELD REDUCING TEE

6821- FFW X FFW X FFW
 6823- FFW X FFW X FPT

THE CENTER-TO-END, CENTER-TO-BOTTOM OF SOCKET, AND SOCKET DEPTH DIMENSIONS OF THE LARGEST END SIZE WILL BE USED ON ALL ENDS OF THE CASTING.

SIZE CODE	SIZE	WGT	SIZE CODE	SIZE	WGT	SIZE CODE	SIZE	WGT	SIZE CODE	SIZE	WGT	SIZE CODE	SIZE	WGT
054	3/8X1/4X1/4	0.287	169	1X3/8X3/4	0.853	233	1-1/4X1X3/4	1.338	347	2X1/2X1	2.226	405	2-1/2X3/4X3/4	3.854
055	3/8X1/4X3/8	0.270	170	1X3/8X1	0.811	234	1-1/4X1X1	1.502	348	2X1/2X1-1/4	2.749	411	2-1/2X3/4X1	3.803
059	3/8X3/8X1/4	0.270	176	1X1/2X1/4	0.743	235	1-1/4X1X1-1/4	1.426	349	2X1/2X1-1/2	2.697	412	2-1/2X3/4X1-1/4	3.665
078	1/2X1/4X1/4	0.374	177	1X1/2X3/8	0.738	246	1-1/4X1-1/4X3/8	1.295	350	2X1/2X2	2.523	413	2-1/2X3/4X1-1/2	4.597
079	1/2X1/4X3/8	0.369	178	1X1/2X1/2	0.720	247	1-1/4X1-1/4X1/2	1.285	355	2X3/4X1/2	2.298	414	2-1/2X3/4X2	4.460
080	1/2X1/4X1/2	0.384	179	1X1/2X3/4	0.836	248	1-1/4X1-1/4X3/4	1.255	356	2X3/4X3/4	2.273	415	2-1/2X3/4X2-1/2	4.072
088	1/2X3/8X1/4	0.369	180	1X1/2X1	0.793	249	1-1/4X1-1/4X1	1.426	357	2X3/4X1	2.201	416	2-1/2X1X1	3.752
089	1/2X3/8X3/8	0.364	186	1X3/4X1/4	0.906	261	1-1/2X1/2X1/2	1.490	358	2X3/4X1-1/4	2.726	417	2-1/2X1X1-1/4	3.614
090	1/2X3/8X1/2	0.379	187	1X3/4X3/8	0.901	262	1-1/2X1/2X3/4	1.467	359	2X3/4X1-1/2	2.674	418	2-1/2X1X1-1/2	4.546
098	1/2X1/2X1/4	0.393	188	1X3/4X1/2	0.883	263	1-1/2X1/2X1	1.404	360	2X3/4X2	2.500	419	2-1/2X1X2	4.409
099	1/2X1/2X3/8	0.388	189	1X3/4X3/4	0.984	264	1-1/2X1/2X1-1/4	1.841	365	2X1X1/2	2.226	420	2-1/2X1X2-1/2	4.021
117	3/4X1/4X1/4	0.491	190	1X3/4X1	0.938	265	1-1/2X1/2X1-1/2	1.778	366	2X1X3/4	2.201	421	2-1/2X1-1/4X1	3.615
118	3/4X1/4X3/8	0.484	196	1X1X1/4	0.847	266	1-1/2X3/4X1/2	1.467	367	2X1X1	2.130	422	2-1/2X1-1/4X1-1/4	3.477
119	3/4X1/4X1/2	0.597	197	1X1X3/8	0.842	267	1-1/2X3/4X3/4	1.445	368	2X1X1-1/4	2.664	423	2-1/2X1-1/4X1-1/2	4.408
120	3/4X1/4X3/4	0.576	198	1X1X1/2	0.824	268	1-1/2X3/4X1	1.382	369	2X1X1-1/2	2.612	424	2-1/2X1-1/4X2	4.271
127	3/4X3/8X1/4	0.484	199	1X1X3/4	0.938	269	1-1/2X3/4X1-1/4	1.752	370	2X1X2	2.438	425	2-1/2X1-1/4X2-1/2	3.883
128	3/4X3/8X3/8	0.477	211	1-1/4X3/8X3/8	1.183	270	1-1/2X3/4X1-1/2	1.690	375	2X1-1/4X1/2	3.005	426	2-1/2X1-1/2X1	4.968
129	3/4X3/8X1/2	0.593	212	1-1/4X3/8X1/2	1.171	276	1-1/2X1X1/2	1.407	376	2X1-1/4X3/4	2.982	427	2-1/2X1-1/2X1-1/4	4.830
130	3/4X3/8X3/4	0.572	213	1-1/4X3/8X3/4	1.137	277	1-1/2X1X3/4	1.385	377	2X1-1/4X1	2.920	428	2-1/2X1-1/2X1-1/2	5.726
137	3/4X1/2X1/4	0.598	214	1-1/4X3/8X1	1.313	278	1-1/2X1X1	1.321	378	2X1-1/4X1-1/4	3.077	429	2-1/2X1-1/2X2	5.568
138	3/4X1/2X3/8	0.595	215	1-1/4X3/8X1-1/4	1.238	279	1-1/2X1X1-1/4	1.609	379	2X1-1/4X1-1/2	2.993	430	2-1/2X1-1/2X2-1/2	5.090
139	3/4X1/2X1/2	0.577	216	1-1/4X1/2X1/2	1.160	280	1-1/2X1X1-1/2	1.546	380	2X1-1/4X2	2.681	431	2-1/2X1-1/2X3/4	5.019
140	3/4X1/2X3/4	0.556	217	1-1/4X1/2X3/4	1.125	286	1-1/2X1-1/4X1/2	1.901	385	2X1-1/2X1/2	2.944	435	2-1/2X2X3/4	4.837
147	3/4X3/4X1/4	0.579	218	1-1/4X1/2X1	1.302	287	1-1/2X1-1/4X3/4	1.858	386	2X1-1/2X3/4	2.921	436	2-1/2X2X1	4.786
148	3/4X3/4X3/8	0.576	219	1-1/4X1/2X1-1/4	1.227	288	1-1/2X1-1/4X1	1.840	387	2X1-1/2X1	2.859	437	2-1/2X2X1-1/4	4.648
149	3/4X3/4X1/2	0.562	220	1-1/4X1/2X3/8	1.171	289	1-1/2X1-1/4X1-1/4	1.861	388	2X1-1/2X1-1/4	3.016	438	2-1/2X2X1-1/2	5.568
161	1X1/4X1/4	0.766	221	1-1/4X3/4X3/8	1.137	290	1-1/2X1-1/4X1-1/2	1.792	389	2X1-1/2X1-1/2	2.932	439	2-1/2X2X2	5.410
162	1X1/4X3/8	0.761	222	1-1/4X3/4X1/2	1.126	296	1-1/2X1-1/2X1/2	1.823	390	2X1-1/2X2	2.597	440	2-1/2X2X2-1/2	4.932
163	1X1/4X1/2	0.743	223	1-1/4X3/4X3/4	1.091	297	1-1/2X1-1/2X3/4	1.780	395	2X2X1/2	2.698	445	2-1/2X2-1/2X3/4	4.326
164	1X1/4X3/4	0.859	224	1-1/4X3/4X1	1.273	298	1-1/2X1-1/2X1	1.762	396	2X2X3/4	2.675	446	2-1/2X2-1/2X1	4.275
165	1X1/4X1	0.816	225	1-1/4X3/4X1-1/4	1.197	299	1-1/2X1-1/2X1-1/4	1.792	397	2X2X1	2.613	447	2-1/2X2-1/2X1-1/4	4.137
167	1X3/8X3/8	0.755	231	1-1/4X1X3/8	1.379	345	2X1/2X1/2	2.323	398	2X2X1-1/4	2.770	448	2-1/2X2-1/2X1-1/2	5.090
168	1X3/8X1/2	0.737	232	1-1/4X1X1/2	1.368	346	2X1/2X3/4	2.298	399	2X2X1-1/2	2.686	449	2-1/2X2-1/2X2	4.932

FLANGES AVAILABLE IN 66--LB & 68--LB PART #'S COPPER NICKEL ALLOY 90/10 ASTM B369 UNS C96200.
AND 67--LB & 69--LB PART #'S COPPER NICKEL ALLOY 70/30 ASTM B369 UNS C96400.



CLASS 150 FFW COMMERCIAL WELD NECK B16.5							
PART #	SIZE	WGT	A	B	C	# OF HOLES	BC
6605LB-100	1/2	1.27	3 1/2	7/16	1 7/8	4	2 3/8
6605LB-150	3/4	1.92	3 7/8	1/2	2 1/16	4	2 3/4
6605LB-200	1	2.72	4 1/4	9/16	2 3/16	4	3 1/8
6605LB-250	1 1/4	3.68	4 5/8	5/8	2 1/4	4	3 1/2
6605LB-300	1 1/2	4.84	5	11/16	2 7/16	4	3 7/8
6605LB-400	2	6.98	6	3/4	2 1/2	4	4 3/4
6605LB-450	2 1/2	11.43	7	7/8	2 3/4	4	5 1/2
6605LB-500	3	13.73	7 1/2	15/16	2 3/4	4	6
6605LB-550	3 1/2	16.67	8 1/2	15/16	2 13/16	8	7
6605LB-600	4	18.70	9	15/16	3	8	7 1/2
6605LB-650	5	23.48	10	15/16	3 1/2	8	8 1/2
6605LB-700	6	28.76	11	1	3 1/2	8	9 1/2
6605LB-750	8	47.40	13 1/2	1 1/8	4	8	11 3/4
6605LB-800	10	80.00	16	1 3/16	4	12	14 1/4
6605LB-820	12	98.00	19	1 1/4	4 1/2	12	17

ASME / ANSI B16.5 Schedule 40

CLASS 150 FFW COMMERCIAL SLIP-ON B16.5							
PART #	SIZE	WGT	A	B	C	# OF HOLES	BC
6602LB-100	1/2	1.25	3 1/2	7/16	5/8	4	2 3/8
6602LB-150	3/4	1.74	3 7/8	1/2	5/8	4	2 3/4
6602LB-200	1	2.20	4 1/4	9/16	11/16	4	3 1/8
6602LB-250	1 1/4	2.94	4 5/8	5/8	13/16	4	3 1/2
6602LB-300	1 1/2	3.69	5	11/16	7/8	4	3 7/8
6602LB-400	2	5.70	6	3/4	1	4	4 3/4
6602LB-450	2 1/2	9.34	7	7/8	1 1/8	4	5 1/2
6602LB-500	3	10.53	7 1/2	15/16	1 3/16	4	6
6602LB-550	3 1/2	12.80	8 1/2	15/16	1 1/4	8	7
6602LB-600	4	14.50	9	15/16	1 5/16	8	7 1/2
6602LB-650	5	16.53	10	15/16	1 7/16	8	8 1/2
6602LB-700	6	20.50	11	1	1 9/16	8	9 1/2
6602LB-750	8	32.45	13 1/2	1 1/8	1 3/4	8	11 3/4
6602LB-800	10	44.20	16	1 3/16	1 15/16	12	14 1/4
6602LB-820	12	72.19	19	1 1/4	2 3/16	12	17

ASME / ANSI B16.5 Schedule 40

CLASS 150 FFW COMMERCIAL FLANGE B16.5							
PART #	SIZE	WGT	A	B	C	# OF HOLES	BC
6603LB-100	1/2	1.24	3 1/2	7/16	5/8	4	2 3/8
6603LB-150	3/4	1.71	3 7/8	1/2	5/8	4	2 3/4
6603LB-200	1	2.27	4 1/4	9/16	11/16	4	3 1/8
6603LB-250	1 1/4	2.98	4 5/8	5/8	13/16	4	3 1/2
6603LB-300	1 1/2	3.86	5	11/16	7/8	4	3 7/8
6603LB-400	2	5.79	6	3/4	1	4	4 3/4
6603LB-450	2 1/2	9.48	7	7/8	1 1/8	4	5 1/2
6603LB-500	3	10.76	7 1/2	15/16	1 3/16	4	6
6603LB-550	3 1/2	13.80	8 1/2	15/16	1 1/4	8	7
6603LB-600	4	15.05	9	15/16	1 5/16	8	7 1/2
6603LB-650	5	17.32	10	15/16	1 7/16	8	8 1/2
6603LB-700	6	21.44	11	1	1 9/16	8	9 1/2
6603LB-750	8	34.16	13 1/2	1 1/8	1 3/4	8	11 3/4
6603LB-800	10	45.72	16	1 3/16	1 15/16	12	14 1/4
6603LB-820	12	57.66	19	1 1/4	2 3/16	12	17

ASME / ANSI B16.5 Schedule 40

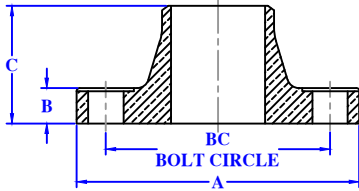
CLASS 150 FFW COMMERCIAL FLANGE B16.24							
PART #	SIZE	WGT	A	B	C	# OF HOLES	BC
6870LB-100	1/2	1.01	3 1/2	5/16	5/8	4	2 3/8
6870LB-150	3/4	1.27	3 7/8	11/32	5/8	4	2 3/4
6870LB-200	1	1.71	4 1/4	3/8	11/16	4	3 1/8
6870LB-250	1 1/4	2.04	4 5/8	13/32	13/16	4	3 1/2
6870LB-300	1 1/2	2.66	5	7/16	7/8	4	3 7/8
6870LB-400	2	4.21	6	1/2	1	4	4 3/4
6870LB-450	2 1/2	6.39	7	9/16	1 1/16	4	5 1/2
6870LB-500	3	7.62	7 1/2	5/8	1 1/8	4	6
6870LB-550	3 1/2	9.87	8 1/2	11/16	1 3/16	8	7
6870LB-600	4	11.22	9	11/16	1 5/16	8	7 1/2
6870LB-650	5	13.84	10	3/4	1 1/2	8	8 1/2
6870LB-700	6	17.61	11	13/16	1 11/16	8	9 1/2
6870LB-750	8	28.37	13 1/2	15/16	1 15/16	8	11 3/4
6870LB-800	10	41.33	16	1	2 1/8	12	14 1/4
6870LB-820	12	59.95	19	1 1/16	2 5/16	12	17

ASME / ANSI B16.24 Class 200 Tube

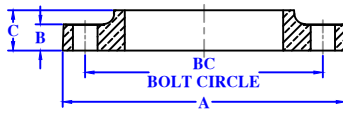
COMMERCIAL FLANGE SERVICE RATING TABLE			
CLASS	NOMINAL PIPE SIZE (INCHES)	MAXIMUM WORKING PRESSURE (LB/IN ²)	MAXIMUM TEMPERATURE (F°)
150#	1/2 TO 12	225	150
200#	2 TO 12	200	150

BLIND AND RAISED FACE FLANGES
AVAILABLE UPON REQUEST.

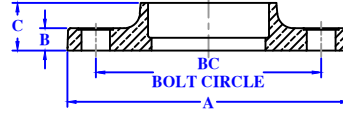
FLANGES AVAILABLE IN 66--LB & 68--LB PART #'S COPPER NICKEL ALLOY 90/10 ASTM B369 UNS C96200.
AND 67--LB & 69--LB PART #'S COPPER NICKEL ALLOY 70/30 ASTM B369 UNS C96400.



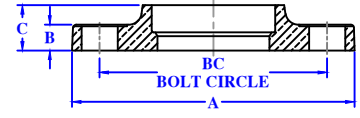
WELD NECK



SLIP-ON



NAVY FLANGE



BUTTERFLY

CLASS 150 FFW NAVY FLANGE							
PART #	SIZE	WGT	A	B	C	# OF HOLES	BC
6875LB-100	1/2	1.22	3 9/16	3/8	3/4	3	2 7/16
6875LB-150	3/4	1.55	3 13/16	7/16	3/4	4	2 11/16
6875LB-200	1	1.92	4 1/4	7/16	3/4	4	3 1/8
6875LB-250	1 1/4	2.04	4 1/2	7/16	3/4	4	3 3/8
6875LB-300	1 1/2	2.62	5 1/16	7/16	13/16	6	3 15/16
6875LB-400	2	2.94	5 9/16	7/16	15/16	6	4 7/16
6875LB-450	2 1/2	4.15	6 1/8	1/2	15/16	6	5
6875LB-500	3	4.24	6 5/8	1/2	15/16	8	5 1/2
6875LB-550	3 1/2	4.96	7 3/16	1/2	15/16	8	6 1/16
6875LB-600	4	5.96	7 11/16	1/2	1 1/8	8	6 9/16
6875LB-650	5	8.61	9 1/16	9/16	1 5/16	10	7 13/16
6875LB-700	6	10.3	10 1/8	9/16	1 7/16	12	8 7/8
6875LB-750	8	16.23	12 3/8	5/8	1 5/8	14	11 1/16
6875LB-800	10	24.21	15	11/16	1 13/16	15	13 7/16
6875LB-820	12	40	17 5/8	3/4	2	18	16 1/16

NAVSEA DWG: 810-4715319, 2-A Class 200 Tube

CLASS 150 FFW NAVY SLIP-ON							
PART #	SIZE	WGT	A	B	C	# OF HOLES	BC
6880LB-100	1/2	1.03	3 9/16	3/8	-	3	2 7/16
6880LB-150	3/4	1.32	3 13/16	7/16	-	4	2 11/16
6880LB-200	1	1.64	4 1/4	7/16	-	4	3 1/8
6880LB-250	1 1/4	1.77	4 1/2	7/16	-	4	3 3/8
6880LB-300	1 1/2	2.67	5 1/16	7/16	-	6	3 15/16
6880LB-400	2	3	5 9/16	7/16	-	6	4 7/16
6880LB-450	2 1/2	4.09	6 1/8	1/2	-	6	5
6880LB-500	3	4.25	6 5/8	1/2	-	8	5 1/2
6880LB-550	3 1/2	5.01	7 3/16	1/2	-	8	6 1/16
6880LB-600	4	5.65	7 11/16	1/2	-	8	6 9/16
6880LB-650	5	8.18	9 1/16	9/16	-	10	7 13/16
6880LB-700	6	9.49	10 1/8	9/16	-	12	8 7/8
6880LB-750	8	15.28	12 3/8	5/8	-	14	11 1/16
6880LB-800	10	17.4	15	11/16	-	15	13 7/16
6880LB-820	12	25.51	17 5/8	3/4	-	18	16 1/16

NAVSEA DWG: 810-4715319, 1-A Class 200 Tube

CLASS 250 FFW NAVY FLANGE							
PART #	SIZE	WGT	A	B	C	# OF HOLES	BC
6881LB-100	1/2	2.04	3 9/16	11/16	13/16	3	2 7/16
6881LB-150	3/4	2.27	3 13/16	11/16	13/16	4	2 11/16
6881LB-200	1	3.03	4 1/4	3/4	15/16	4	3 1/8
6881LB-250	1 1/4	3.59	4 1/2	13/16	1 1/16	4	3 3/8
6881LB-300	1 1/2	4.50	5 1/16	13/16	1 3/16	6	3 15/16
6881LB-400	2	5.18	5 9/16	13/16	1 5/16	6	4 7/16
6881LB-450	2 1/2	7.27	6 1/8	15/16	1 7/16	6	5
6881LB-500	3	7.61	6 5/8	15/16	1 7/16	8	5 1/2
6881LB-550	3 1/2	9.27	7 3/16	1	1 1/2	8	6 1/16
6881LB-600	4	10.31	7 11/16	1	1 5/8	8	6 9/16
6881LB-650	5	15.08	9 1/16	1 1/16	1 13/16	10	7 13/16
6881LB-700	6	19.22	10 1/8	1 3/16	2 1/16	12	8 7/8
6881LB-750	8	29.64	12 3/8	1 5/16	2 5/16	14	11 1/16
6881LB-800	10	45.05	15	1 7/16	2 9/16	15	13 7/16
6881LB-820	12	69	17 5/8	1 1/2	2 3/4	18	16 1/16

NAVSEA DWG: 810-4715319, 5-C Class 200 Tube

CLASS 250 FFW NAVY WELD NECK							
PART #	SIZE	WGT	A	B	C	# OF HOLES	BC
6615LB-400	2	7.25	5 9/16	7/8	2 5/8	6	4 7/16
6615LB-450	2 1/2	8.35	6 1/8	15/16	2 13/16	6	5
6615LB-500	3	9.03	6 5/8	15/16	2 3/4	8	5 1/2
6615LB-550	3 1/2	11.24	7 3/16	1	2 7/8	8	6 1/16
6615LB-600	4	12.97	7 11/16	1	3 1/16	8	6 9/16
6615LB-650	5	19	9 1/16	1 1/16	3 5/8	10	7 13/16
6615LB-700	6	25.17	10 1/8	1 3/16	3 7/8	12	8 7/8
6615LB-750	8	38.36	12 3/8	1 5/16	4 3/8	14	11 1/16
6615LB-800	10	55	15	1 7/16	4 5/8	15	13 7/16
6615LB-820	12	90	17 5/8	1 1/2	5 1/8	18	16 1/16

NAVSEA DWG: 810-1385992 Class 200 Tube

CLASS 200 FFW NAVY BUTTERFLY							
PART #	SIZE	WGT	A	B	C	# OF HOLES	BC
6888LB-400	2	4.06	6	1/2	1	4	4 3/4
6888LB-450	2 1/2	6.42	7	9/16	1 1/16	4	5 1/2
6888LB-500	3	7.75	7 1/2	5/8	1 1/8	4	6
6888LB-550	3 1/2	9.97	8 1/2	11/16	1 3/16	8	7
6888LB-600	4	11.36	9	11/16	1 5/16	8	7 1/2
6888LB-650	5	14.60	10	3/4	1 1/2	8	8 1/2
6888LB-700	6	18.94	11	13/16	1 11/16	8	9 1/2
6888LB-750	8	30.50	13 1/2	15/16	1 15/16	8	11 3/4
6888LB-800	10	41.83	16	1	2 1/8	12	14 1/4
6888LB-820	12	66	19	1 1/16	2 5/16	12	17

NAVSEA DWG: 810-4715319, 2-C Class 200 Tube

NAVY FLANGE SERVICE RATING TABLE			
CLASS	NOMINAL PIPE SIZE (INCHES)	MAXIMUM WORKING PRESSURE (LB/IN ²)	MAXIMUM TEMPERATURE (F°)
150#	1/2 TO 12	150	150
		100	425
200#	2 TO 14	200	180
		250	150
250#	1/2 TO 12	150	425

BLIND AND RAISED FACE FLANGES
AVAILABLE UPON REQUEST.

Table 1**

Dimensions and 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	0.540	0.410	0.065	0.132	0.376	0.004	0.0035
3/8	0.675	0.545	0.065	0.233	0.483	0.004	0.004
1/2	0.840	0.710	0.065	0.396	0.613	0.005	0.004
3/4	1.050	0.920	0.065	0.665	0.780	0.005	0.004
1	1.315	1.185	0.065	1.10	0.989	0.005	0.004
1 1/4	1.600	1.530	0.065	1.84	1.26	0.006	0.004
1 1/2	1.900	1.770	0.065	2.46	1.45	0.006	0.004
2	2.375	2.245	0.065	3.96	1.83	0.007	0.006
2 1/2	2.875	2.745	0.065	5.92	2.22	0.007	0.006
3	3.500	3.334	0.083	8.73	3.45	0.008	0.007
3 1/2	4.000	3.810	0.095	11.4	4.52	0.008	0.007
4	4.500	4.286	0.107	14.4	5.72	0.010	0.009
5	5.562	5.298	0.132	22.0	8.73	0.012	0.010
6	6.625	6.309	0.158	31.3	12.4	0.014	0.010
8	8.625	8.215	0.205	53.0	21.0	0.018	0.014
10	10.750	10.238	0.256	82.3	32.7	0.018	0.016
12	12.750	12.124	0.313	115	47.4	0.018	0.020

*The average outside diameter of a tube is the average of the maximum and 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 2

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	0.540	0.065	0.376	0.414	0.005
3/8	0.675	0.065	0.483	0.531	0.005
1/2	0.840	0.065	0.614	0.675	0.006
3/4	1.050	0.065	0.780	0.858	0.006
1	1.315	0.065	0.990	1.09	0.008
1 1/4	1.600	0.072	1.39	1.53	0.008
1 1/2	1.900	0.072	1.60	1.76	0.008
2	2.375	0.083	2.32	2.55	0.010
2 1/2	2.875	0.083	2.82	3.10	0.010
3	3.500	0.095	3.94	4.33	0.012
3 1/2	4.000	0.095	4.52	4.97	0.012
4	4.500	0.109	5.83	6.41	0.015
5	5.563	0.125	8.28	9.11	0.017
6	6.625	0.134	10.60	11.70	0.020
8	8.625	0.148	15.30	16.80	0.026
10	10.750	0.187	24.10	26.50	0.030
12	12.750	0.250	38.10	41.90	0.035

*Includes 10% overweight allowance per foot of individual tube.

Terms

Remittances must be made in funds free of exchange or collection charges.

The amount of any excise, sales, purchase, use transaction, or other similar tax imposed or assessed under any effective statute applicable to material sold by us shall be borne by the purchaser, and if same are payable by us, will be added to the purchase price. All orders and/or contracts are accepted subject to the understanding that we are not liable for delays or inability to ship caused by fire, strikes, acts of God, or other circumstances beyond our control.

All orders and/or contracts are received subject to final acceptance by our general office.

Claims for shortages must be made immediately upon receipt of material, and be accompanied by the following information:

- (a) Itemized list of shortages.
 - (b) Order number of shipment in question.
 - (c) Package number.
 - (d) Gross and Net weights of package.
- (This information is essential as our shipments are checked by count and weight.)

Claims for loss or damage to material in transit must be made directly to the carrier. Our material is sold F.O.B. Plant and our responsibility ceases after the material is delivered to carrier in good condition.

Material must not be returned without our express permission given in writing, and then only in accordance with our shipping instructions and terms.

Orders for material of special design or specification are made to customer's order and are not subject to cancellation or return.

All orders received by us for delivery under Government Contracts are accepted subject to the provisions of the United States Government's standard termination clause in effect at the time the order is accepted by us.

Prices and designs are subject to change without notice.

Credit Terms: Upon Approval
MINIMUM ORDER: \$100.00 per order.

Warranty

Lee Brass will, at its election, furnish replacement fittings without cost or will credit your account with the cost of such fittings for all fittings purchased by you and found by Lee Brass to have defects in materials and workmanship. Lee Brass' obligation to furnish replacement parts herein will be limited to making replacements at its factory at no charge to you for those items returned to Lee Brass with transportation charges prepaid and which, upon examination by Lee Brass, shall be found to be defective in material and workmanship under normal use and service. Lee Brass' obligation to furnish replacement fittings shall not apply to any item which has been subject to abuse or misuse, or to any fitting damaged from causes other than the normal and ordinary use of the fittings.

Except as expressly stated above, seller makes no warranty, expressed or implied, whether of merchantability or fitness for any particular purpose or use or otherwise, on any product, or on any parts or labor furnished during the sale, delivery or servicing or any product.

Except as expressly stated above, Seller shall not be liable to the Buyer or to any other person, firm, or corporation for any incidental or consequential loss, damage, or injury arising out of any breach of warranty or any other act or default relating to Buyer's order or to product or services provided to Buyer, even if any such loss, damage, or injury is caused by Seller's negligence. The correction of defects as provided in the warranty statement above shall constitute Seller's full obligation with respect to all claims and Seller's liability shall in no event exceed the unit purchase price of the product in question.

Any lawsuit or other action based upon breach of the contract or upon other claim arising out of this sale (other than an action by Seller for any amount due to Seller by Buyer) must be commenced within one year from the date of the tender of delivery by Seller or, in the case of a cause of action based upon an alleged breach of warranty, within one year from the date within the warranty period on which the defect is or should have been discovered by Buyer.

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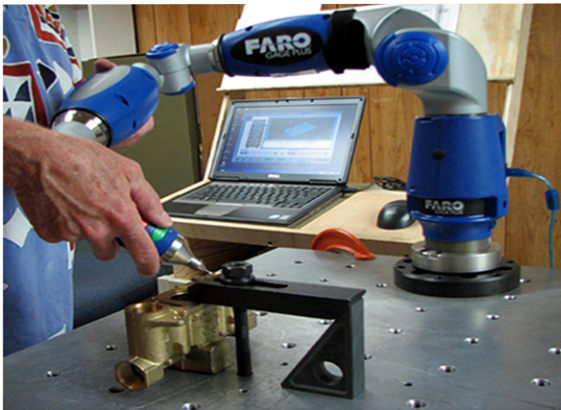
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where 100% of the fittings, meters, and other
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Established 1917 in Anniston, Alabama, we offer complete service with a Foundry, Machine Shop, Pattern Shop, Engineering & Design Staff, and a Metals Lab



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