

Copper-Nickel Products

*Copper-Nickel Tubing
Fittings, Flanges, Sheet,
Plate and Rod*

ALASKAN COPPER



ALASKAN COPPER WORKS
ALASKAN COPPER & BRASS COMPANY

Copper-nickel alloys are used in ship board and offshore drilling piping systems, industrial condensers, heat exchangers, evaporating equipment, and power installations. Their anti-fouling properties and resistance to pitting and general corrosion has led to increased use of these alloys for piping, fittings and fabrication.

70-30 copper-nickel is commonly used for applications where severe temperature and velocities require high reliability and dependability. Both military and commercial vessels utilizing copper-nickel components have operated for periods of up to thirty years with minimal maintenance.

This catalog covers sizes, weights, specifications and dimensional requirements for the military, marine, waste-water and power industries.

Contact one of our informed sales representatives for assistance with your inquiries for price and availability or the placement of your next order.



Automatic straight-seam welding using double-head, gas tungsten-arc produces pipe and tubing in sizes up to 24 inches and in continuous lengths up to 20 feet. Sizes up to 54 inches are also available, using other welding techniques.



Buttwelding and belled end fittings per NAVSEA and MSS Drawings and Specifications are available.



NAVSEA Outlets are available for prompt delivery. Boss outlets can be supplied with threaded, socket weld or buttwelding ends. See page 44.



Pipe is formed and welded from ASTM B 171 or MIL-C-15726 plate.



Flanges are offered in a wide variety of alloys and configurations. See page 45.



Threaded and socket weld fittings are stocked in most common sizes, alloys and pressure ratings. See page 49.

History

When Alaskan Copper Works was founded as a marine coppersmithing company in 1913, one of its major activities was forming and brazing pipe and pipe fittings made from copper, brass and bronze, primarily for use in the Pacific Northwest shipbuilding industry.

Beginning in the 1920's, many of the area's growing process industries, such as pulp and paper, which had relied on wood stave and cast iron as corrosion resistant materials for their tanks and piping, welcomed the development of a new weldable alloy, silicon bronze. This alloy had special advantages in weight, cost and corrosion resistance. Alaskan Copper Works participated in the transition to this innovative metal and in the development of the welding techniques necessary for its proper fabrication.

In the 1930's, alloys with even better corrosion resistance, such as the austenitic stainless steels, became available and quickly came into general use not only in the pulp and paper industry but also in the other process industries then beginning to develop, such as



Alaskan Copper Works yesterday

petrochemical and food processing. Again, Alaskan Copper Works participated in the application of these new, advantageous materials and in the development of the welding and fabricating procedures required to maximize their usefulness.

Over the intervening years, improvements in our manufacturing capacities have seen the standard lengths of most pipe sizes increase from 4 feet to 10 feet and then to 20 feet. Die-formed smooth-flow

elbows began to be made in small sizes and gradually advanced to include larger sizes and many radii and wall thicknesses. Other advances over the years have led to tees being made with smooth-drawn outlets, the development of many available choices in the types of stub ends for different services and our manufacturing of pipe and fittings to advanced specifications and in "exotic" alloys, including our qualification to produce fittings for the nuclear power industry.

As a result, today's customers of the Stainless Products Division of Alaskan Copper Works benefit from the accumulated experience of one of the nation's largest organizations devoted exclusively to the manufacturing of pipe and pipe fittings in stainless steels, high-nickel alloys, duplex stainless alloys, copper-nickel alloys, aluminum, titanium, zirconium, copper and other weldable corrosion resistant alloys.



Alaskan Copper Works today.

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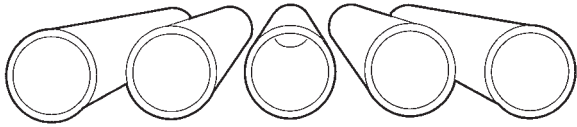
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Copper-Nickel Tubing

90-10 Seamless Tubing, Annealed Temper



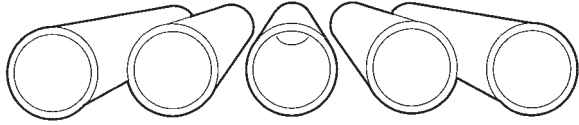
- **UNS Designation Number:** 90-10 (UNS C70600).
- **Nominal Chemicals:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Average Mechanical Properties:** Tensile 45,000 psi, Yield 18,000 psi, Elongation 35%.
- **Specifications:** MIL-T-16420K, Type I, Grade 1, ASTM B 466.
- **Stocked in 20 foot standard lengths.**
- **Widely used in marine applications where resistance to both corrosion and biofouling is important.**

Nominal Pipe Size	OD	Class 200 MIL-T-16420			ASTM B 466 Regular Wall		
		Minimum Wall	Lbs/Ft	Part Number	Nominal Wall	Lbs/Ft	Part Number
	.250	.035	.1	134192			
	.375	.035	.17	152483			
	.375	.049	.2	152506			
	.500	.035	.2	152548			
1/4	.540	.065	.4	139998	.082	.55	140177
3/8	.675	.065	.5	140004	.091	.63	140193
1/2	.840	.065	.7	140012	.107	.65	140185
3/4	1.050	.065	.9	140020	.114	.97	140216
1	1.315	.065	1	140038	.126	1.3	140208
1 1/4	1.660	.072	1.5	140046	.146	1.9	140224
1 1/2	1.900	.072	1.8	140054	.150	3.1	140232
2	2.375	.083	2.6	140062	.156	4.2	140240
2 1/2	2.875	.083	3	140070	.187	6.6	140258
3	3.500	.095	4	140088	.219	8.6	140389
3 1/2	4.000	.095	5	140096			
4	4.500	.109	6.4	140101	.250	12.9	140397
4 1/2	5.000	.120	8	140119			
5	5.563	.125	9	140127	.250	16.8	152580
6	6.625	.134	12	513142	.250	21.7	152603
7	7.625	.140	13	152564			
8	8.625	.148-.151	17	140143	.312	31	152629
10	10.75	.187	26.5	140151			
12	12.75	.250	42	140169			

Regular wall per ASTM B 466 is similar to Sch 40 in ANSI B 36.10 and Sch 40s in ANSI B36.19. Dimensions are in inches. All weights are approximate. Specifications: pg. 60. Sizes not shown may be available upon request.

Copper-Nickel Tubing

90-10 Welded Tubing, Annealed Temper

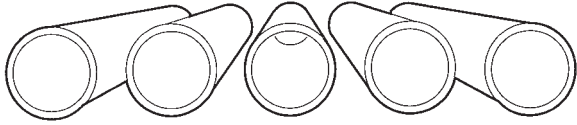


Nominal Pipe Size	OD	Class 200 Wall	Class 200 Lbs/Ft	Part Number	Minimum Class 50 Wall	Class 50 Lbs/Ft	Part Number
5	5.563	.125	9	140266			
6	6.625	.134	11.5	140274			
8	8.625	.151	16	433910			
9	9.625	.187	23	235508			
10	10.75	.187	25	299421	.134	19	235493
12	12.75	.250	40.	140305	.156	26	235485
14	14	.250	45	436015	.165	30	235477
16	16	.250	51	152700	.165	35	152687
18	18	.250	58	439047	.180	42	235469
20	20	.250	68	281151	.180	47.5	434241
24	24	.250	80	434217	.180	57.4	438588

Note: 90-10 welded tubing is manufactured from raw material inventory on hand and is available thru 54" OD.
 Wall thicknesses for Class 200 sizes 14"-24" are per Alaskan standard.
 Dimensions are in inches. All weights are approximate. Specifications: pg. 60.
 Sizes not shown may be available upon request.

Copper-Nickel Tubing

70-30 Welded Tubing, Annealed Temper



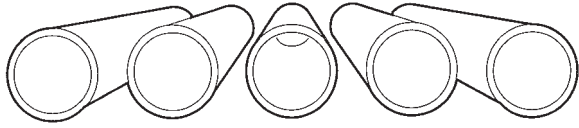
- **UNS Designation Number:** 70-30 (UNS C71500).
- **Nominal Chemicals:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.
- **Average Mechanical Properties:** Tensile 55,000 psi, Yield 20,000 psi, Elongation 30%.
- **Specifications:** MIL-T-16420K, Type II, Grade 1 or Grade 2, ASTM B 467, ASTM B 608.
- **Normally supplied in 15 foot lengths .**
- **70-30 Copper-Nickel tubing has excellent resistance to impingement attack and other forms of corrosion in sea water. These tubes maintain their strength at elevated temperatures better than the brasses or copper. They are widely used in evaporators, feed water heaters, refinery and chemical equipment.**

Nominal Pipe Size	OD	Class 200 MIL-T-16420K		Part Number
		Minimum Wall	Lbs/Ft	
5	5.563	.125	9	140347
6	6.625	.134	11.5	140339
8	8.625	.148	16	140355
10	10.75	.187	25	140363
12	12.75	.250	40	140371
14	14	.250	45	226876
16	16	.250	51	277631
20	20	.250	68	467723
24	24	.250	80	467749

Note: 70-30 welded tubing is manufactured from raw material inventory on hand and is available thru 54" OD.
 Wall thickness for Class 200 sizes 14"-24" are per Alaskan standard.
 Dimensions are in inches. All weights are approximate. Specifications: pg. 60.
 Sizes not shown may be available upon request.

Copper-Nickel Tubing

70-30 Seamless Tubing, Annealed Temper



- **UNS Designation Number:** 70-30 (UNS C71500).
- **Nominal Chemicals:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.
- **Average Mechanical Properties:** Tensile 55,000 psi, Yield 20,000 psi, Elongation 35%.
- **Specifications:** MIL-T-16420K, Type I, Grade 1 or 2, Annealed.
- **Stocked in 20 foot standard lengths.**
- **70-30 Copper-Nickel tubing has excellent resistance to impingement attack and other forms of corrosion in sea water. These tubes maintain their strength at elevated temperatures better than the brasses or copper.**
- **They are widely used in evaporators, feed water heaters, refinery and chemical equipment.**

Nominal Pipe Size	OD	Class	Minimum Wall	Lbs/Ft	70-30 Part Number
	.250	200	.035	.1	152302
	.250	3300	.035	.1	140818
	.250	6000	.058	.15	140999
	.375	3300	.049	.2	140834
	.375	6000	.083	.33	141000
1/8	.405	3300	.058	.27	140842
1/8	.405	6000	.095	.4	663604
	.500	200	.035	.2	140703
	.500	700	.065	.37	140559
	.500	3300	.072	.4	140850
	.500	6000	.120	.6	141026
1/4	.540	200	.065	.4	152132
1/4	.540	700	.065	.4	140567
1/4	.540	3300	.072	.45	140868
1/4	.540	6000	.120	.68	141034
3/8	.675	200	.065	.5	140410
3/8	.675	700	.072	.6	140575
3/8	.675	3300	.095	.7	140876
3/8	.675	6000	.148	1	141042
	.750	1650	.058	.5	235003
	.750	3300	.109	.9	140884
1/2	.840	200	.065	.67	140428
1/2	.840	700	.072	.74	140583
1/2	.840	3300	.120	1	140892
1/2	.840	6000	.203	1.7	141050
	1.000	3300	.134	1.6	140907
3/4	1.050	200	.065	.85	140436
3/4	1.050	700	.083	1	140591
3/4	1.050	3300	.148	1.8	140915
3/4	1.050	6000	.238	2.6	141068
1	1.315	200	.065	1	140444
1	1.315	700	.095	1.5	140606
1	1.315	3300	.180	2.7	140931

Dimensions are in inches. All weights are approximate.
 Sizes not shown may be available upon request. Specifications: pg. 60.

70-30 Seamless Tubing, Annealed Temper (continued)

Nominal Pipe Size	OD	Class	Wall Thickness	Lbs/Ft	70-30 Part Number
1	1.315	6000	.300	3.7	231122
1 ¹ / ₄	1.660	200	.072	1.5	140452
1 ¹ / ₄	1.660	700	.095	2	140614
1 ¹ / ₄	1.660	1650	.120	2.5	140753
1 ¹ / ₄	1.660	3300	.220	4	140949
1 ¹ / ₄	1.660	6000	.380	6	253857
1 ¹ / ₂	1.900	200	.072	1.8	140460
1 ¹ / ₂	1.900	700	.109	2.6	140622
1 ¹ / ₂	1.900	1650	.134	3	140761
1 ¹ / ₂	1.900	3300	.250	5.5	140957
1 ¹ / ₂	1.900	6000	.425	8	152378
2 (1.5?)	2.000	3300	.284	6.5	152386
2	2.375	200	.083	2.6	140478
2	2.375	700	.120	3.6	140630
2	2.375	1650	.165	4.9	269515
2	2.375	3300	.340	9	140965
2 ¹ / ₂	2.875	200	.083	3	140486
2 ¹ / ₂	2.875	700	.134	5	140648
2 ¹ / ₂	2.875	1650	.203	7	140787
2 ¹ / ₂	2.875	3300	.380	13	140973
3	3.500	200	.095	4.3	140494
3	3.500	700	.165	7.4	140656
3	3.500	1650	.250	11	140795
3	3.500	3300	.458	19	140981
3 ¹ / ₂	4.000	200	.095	5	140509
3 ¹ / ₂	4.000	700	.180	9	140664
3 ¹ / ₂	4.000	1650	.284	14	231091
4	4.500	200	.109	6	140517
4	4.500	700	.203	12	140672
4	4.500	1650	.340	19	140800
5	5.563	200	.125	9	140525
5	5.563	700	.220	15.5	140698
6	6.625	200	.134	12	140533
6	6.625	700	.259	22	226850
8	8.625	200	.148	17	140541
8	8.625	700	.340	36	231106
10	10.75	200	.187	26	417728
12	12.75	200	.250	40	417126

Dimensions are in inches. All weights are approximate.
 Sizes not shown may be available upon request. Specifications: pg. 60.

Seamless Condenser Tubing

90-10 & 70-30 Copper-Nickel Seamless Condenser Tubing, Annealed Temper



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals:**
 - 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
 - 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.
- **Average Mechanical Properties:**
 - 90-10: Tensile 45,000 psi, Yield 18,000 psi.
 - 70-30: Tensile 60,000 psi, Yield 20,000 psi.
- **Specifications:** MIL-T-15005F, ASME SB-111, ASTM B 111, Temper 061 (Annealed).
- **Stock lengths to 26 foot.**
- **Copper-Nickel alloys are used in industrial condensers, heat exchangers, and evaporating equipment where their resistance to the corrosive action of a wide range of chemicals leads to durability and protection against contamination. These tubes maintain their strength at elevated temperatures better than the brasses or copper. 70-30 Copper-Nickel is preferred to 90-10 Copper-Nickel where corrosion and temperature conditions are more severe.**

OD	Minimum Wall	Gauge	Lbs/Ft	90-10 Part Number	70-30 Part Number
1/4	.035	20	.1	134192	152302
1/4	.049	18	.1	152467	286818
3/8	.035	20	.15	152483	140402
3/8	.049	18	.2	152506	
1/2	.035	20	.2	152548	140703
1/2	.049	18	.3		140711
5/8	.049	18	.35	230744	230613
5/8	.065	16	.45	260155	230663
3/4	.049	18	.4	230809	230689
3/4	.065	16	.55	230833	230710
1	.049	18	.6		230728
1	.065	16	.7	230867	

Arsenical Admiralty Brass Seamless Condenser Tubing

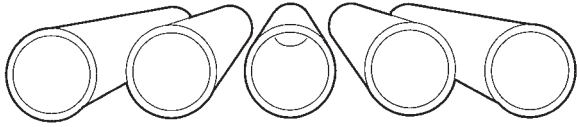
- **UNS Designation Number:** UNS C44300.
- **Nominal Chemicals:** Copper 71%, Zinc 27.96%, Tin 1.00%, Arsenic 0.04%.
- **Average Mechanical Properties:** Tensile 52,000 psi, Yield 20,000 psi.
- **Specifications:** ASTM B 111, Temper 061 (Annealed).
- **Stock lengths to 26 foot.**
- **Arsenical Admiralty brass condenser tube is a standard condenser and heat exchanger tube, offering good corrosion resistance in fresh and salt water (at moderate velocities) and exceptional heat transfer characteristics.**

OD	Minimum Wall	Gauge	Lbs/Ft	Part Number
3/8	.035	20	.1	230338
3/8	.049	18	.2	230354
1/2	.049	18	.3	230370
5/8	.049	18	.35	230396
5/8	.065	16	.4	225993
3/4	.049	18	.4	230419
3/4	.065	16	.5	230435

Dimensions are in inches. All weights are approximate.
 Sizes not shown may be available upon request. Specifications: pg. 60.

Copper Tubing

Drawn Seamless Copper Tubing, Navy Specification Sizes MIL-T-24107B



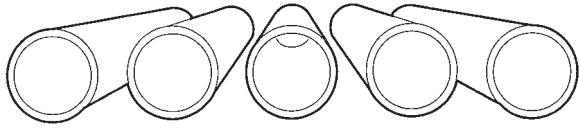
- **UNS Designation Number:** UNS C12200.
- **Nominal Chemicals:** Copper 99.9%, Phosphorus .02%.
- **Average Mechanical Properties:** Tensile 45,000 psi, Yield 35,000 psi, Hardness F75.
- **Specifications:** MIL-T-24107B, Drawn Temper.
- **Stocked in 20 foot lengths.**

Nominal Pipe Size	OD	Minimum Wall	Lbs/Ft	Lbs/20 Ft Length	Part Number
1	1.315	.340	4.32	86.5	251261
1 1/4	1.660	.065	1.31	26	139207
1 1/4	1.660	.084	1.72	34.5	263616
1 1/2	1.900	.065	1.90	39	139215
1 1/2	1.900	.096	2.21	44	139396
2	2.375	.065	1.90	38	139223
2	2.375	.083	2.44	49	139427
2	2.375	.120	3.53	71	139443
2	2.375	.220	6.06	121	139451
2 1/2	2.875	.065	2.31	46	139231
2 1/2	2.875	.100	3.51	70	139469
2 1/2	2.875	.134	4.78	96	251279
3	3.500	.065	2.94	59	139249
3	3.500	.122	5.298	106	402171
3	3.500	.165	7.03	141	139485
3 1/2	4.000	.065	3.36	67	139257
3 1/2	4.000	.095	4.88	98	139493
4	4.500	.065	3.79	76	139265
4	4.500	.107	6.18	123	139516
4	4.500	.157	8.88	178	139524
5	5.563	.068	5.33	106	139273
5	5.563	.132	9.60	192	139532
6	6.625	.081	7.33	146	139281

Dimensions are in inches. All weights are approximate.
 Sizes not shown may be available upon request. Specifications: pg. 60.

Copper Tubing

Drawn Seamless Copper Tubing, Navy Specification Sizes (continued)



Nominal Pipe Size	OD	Minimum Wall	Lbs/Ft	Lbs/20 Ft Length	Part Number
	.188	.032	.059	1	138984
	.250	.032	.092	2	138992
	.250	.065	.156	3	137441
	.375	.032	.134	3	139029
	.375	.049	.209	4	139582
	.375	.065	.262	5	139590
$\frac{1}{8}$	.405	.065	.280	6	139150
$\frac{1}{8}$	.500	.032	.195	4	283200
$\frac{1}{8}$	.500	.065	.368	7	139613
$\frac{1}{4}$	.540	.065	.391	8	228705
$\frac{1}{4}$	.540	.072	.431	8.6	139053
$\frac{1}{4}$	.540	.109	.612	12	139061
$\frac{3}{8}$	.675	.065	.502	10	139168
$\frac{3}{8}$	.675	.095	.704	14	139087
$\frac{1}{2}$	.840	.065	.637	13	139176
$\frac{1}{2}$	.840	.083	.803	16	139118
$\frac{1}{2}$	.840	.120	1.11	22	139126
$\frac{1}{2}$	.840	.165	1.42	28	139134
$\frac{1}{2}$	.840	.220	1.74	35	139142
$\frac{3}{4}$	1.050	.065	.811	16	139184
$\frac{3}{4}$	1.050	.148	1.71	34	139304
1	1.315	.065	1.02	21	139192
1	1.315	.180	2.61	52	139346

Dimensions are in inches. All weights are approximate.
 Sizes not shown may be available upon request. Specifications: pg. 60.

Copper-Nickel Butt Welding Fittings

90° Long Radius Elbows - NAVSEA 810-1385880, Revision D



- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	A (Min)	C (Min)	K	Class 200		90-10 Part Number	70-30 Part Number	Class 50		
					Nominal Wall	Weight			Nominal Wall	Weight	90-10 Part Number
1/4	.540	1 9/32	9/32		.065	.1	408305	477346			
3/8	.675	1 5/8	3/8		.065	.1	132695	477354			
1/2	.840	1 15/16	7/16	1 1/2	.065	.1	408313	481939			
3/4	1.05	1 19/32	15/32	1 1/8	.065	.1	132718	481947			
1	1.315	2	1/2	1 1/2	.065	.2	132734	249434			
1 1/4	1.660	2 7/16	9/16	1 7/8	.072	.3	132653	266729			
1 1/2	1.900	2 15/16	11/16	2 1/4	.072	.5	129993	132750			
2	2.375	3 23/32	23/32	3	.083	.8	132938	130059			
2 1/2	2.875	4 5/8	7/8	3 3/4	.083	1	113138	130075			
3	3.500	5 13/32	29/32	4 1/2	.095	2	132962	130114			
3 1/2	4.000	6 1/4	15/16	5 1/4	.095	3	132378	411641			
4	4.500	6 31/32	31/32	6	.109	5	113251	130156			
5	5.563	8 19/32	1 3/32	7 1/2	.125	9	132899	130198			
6	6.625	10 11/64	1 11/64	9	.134	15	133015	130211			
8	8.625	13 3/8	1 3/8	12	.148	34	132310	132823			
10	10.75	16 9/16	1 9/16	15	.187	67	132255	130237	.134	38	435768
12	12.75	19 11/16	1 11/16	18	.250	96	130279	132522	.156	60	435776
14	14.00	21 1/2	1/2	21	.250	120	130334	437168	.165	75	436756
16	16.00	24 1/2	1/2	24	.250	157	130392	113536	.165	104	435297
18	18.00	27 1/2	1/2	27	.250	197	249248	477362	.180	142	435302
20	20.00	30 1/2	1/2	30	.250	243	229670	477370	.180	175	439055
22	22.00	33 1/2	1/2	33	.250	294			.180	212	436798
24	24.00	36 1/2	1/2	36	.250	350			.180	252	436803
30**	30.00	45 1/2	1/2	45	.250	544					
36**	36.00	54 1/2	1/2	54	.250	781					

Dimensions are in inches. All weights are approximate.
 Specifications: pg. 60. Tolerances: pg. 58.
 Sizes not shown may be available upon request.
 Available in "regular" thickness (similar to Schedule 40s).
 ** Four piece construction.

Copper-Nickel Butt Welding Fittings

45° Long Radius Elbows - NAVSEA 810-1385880, Revision D



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5% .

Nominal Pipe Size	OD	B (Min)	C (Min)	N	Class 200		90-10 Part Number	70-30 Part Number	Class 50		90-10 Part Number
					Nominal Wall	Weight			Nominal Wall	Weight	
1/4	.540	45/64	9/32		.065	.03	477419	477443			
3/8	.675	57/64	3/8		.065	.04	477435	477469			
1/2	.840	1 1/16	7/16	5/8	.065	.05	269816	477477			
3/4	1.050	15/16	15/32	7/16	.065		418716	477485			
1	1.315	1 1/8	1/2	7/8	.065	.1	229604	477493			
1 1/4	1.660	1 11/32	9/16	1	.072	.2	132679	477516			
1 1/2	1.900	1 5/8	11/16	1 1/8	.072	.3	132912	249442			
2	2.375	1 31/32	23/32	1 3/8	.083	.5	132475	270053			
2 1/2	2.875	2 7/16	7/8	1 3/4	.083	.8	113162	249450			
3	3.500	2 49/64	29/32	2	.095	1.2	132336	269858			
3 1/2	4.000	3 11/64	15/16	2 1/4	.095	2	132394	473740			
4	4.500	3 29/64	31/32	2 1/2	.109	3	113285	113497			
5	5.563	4 13/64	1 3/32	3 1/8	.125	5	113340	113528			
6	6.625	4 29/32	1 11/64	3 3/4	.134	9	133065	132865			
8	8.625	6 11/32	1 3/8	5	.148	19	132297	132881			
10	10.75	7 25/32	1 9/16	6 1/4	.187	38	132792	130253	.134	27	435807
12	12.75	9 9/64	1 11/16	7 1/2	.250	45	130295	132548	.156	28	435815
14	14.00	9 1/4	1/2	8 3/4	.250	60	130350	477532	.165	40	436764
16	16.00	10 1/2	1/2	10	.250	79	130415	435695	.165	52	435255
18	18.00	11 3/4	1/2	11 1/4	.250	100	130457	477558	.180	72	435336
20	20.00	13	1/2	12 1/2	.250	122	477590	477605	.180	126	465381
22	22.00	14	1/2	13 1/2	.250	148			.180	107	436780
24	24.00	15 1/2	1/2	15	.250	175	229696	477613	.180	126	436811
30**	30.00	19	1/2	18 1/2	.250	272					
36**	36.00	22 3/4	1/2	22 1/4	.250	391					

Dimensions are in inches. All weights are approximate.

Specifications: pg. 60. Tolerances: pg. 58.

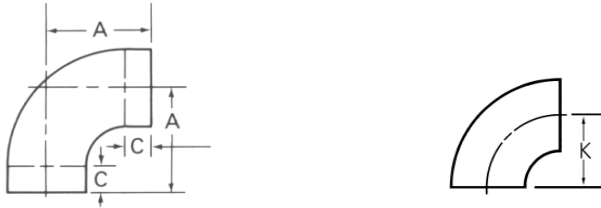
Wall thicknesses for class 200, size 14" and larger are per Alaskan standard.

Sizes not shown may be available upon request.

Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

90° Short Radius Elbows - NAVSEA 810-1385880, Revision D



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	A (Min)	C (Min)	K	Class 200		90-10 Part Number	70-30 Part Number	Class 50		90-10 Part Number
					Nominal Wall	Weight			Nominal Wall	Weight	
1 1/2	1.900	2 3/16	11/16	1 1/2	.072	.5	413732	477621			
2	2.375	2 23/32	23/32	2	.083	1	132459	262343			
2 1/2	2.875	3 3/8	7/8	2 1/2	.083	1	132996	130106			
3	3.500	3 29/32	29/32	3	.095	2	132352	130130			
3 1/2	4.000	4 7/16	15/16	3 1/2	.095	2	132417	438449			
4	4.500	4 31/32	31/32	4	.109	3	132433	130172			
5	5.563	6 3/32	1 3/32	5	.125	6	133031	243250			
6	6.625	7 11/64	1 11/64	6	.134	11	133057	243268			
8	8.625	9 3/8	1 3/8	8	.148	19	132271	132849			
10	10.75	11 9/16	1 9/16	10	.187	36	132506	132776	.134	26	435784
12	12.75	13 11/16	1 11/16	12	.250	66	130318	284337	.156	41	435792
14	14.00	14 1/2	1/2	14	.250	80	130376	438457	.165	55	436772
16	16.00	16 1/2	1/2	16	.250	105	130431	437469	.165	70	435263
18	18.00	18 1/2	1/2	18	.250	131	435205	477639	.180	95	435344
20	20.00	20 1/2	1/2	20	.250	162	229688	433855	.180	135	439275
22	22.00	22 1/2	1/2	22	.250	196	477647	438465	.180	150	
24	24.00	24 1/2	1/2	24	.250	233	477655	477663	.180	176	439283
26	26.00	26 1/2	1/2	26	.250	276	467838				
30	30.00	30 1/2	1/2	30	.250	363	562010				
36	36.00	36 1/2	1/2	36	.250	521					

Dimensions are in inches. All weights are approximate.

Specifications: pg. 60. Tolerances: pg. 58.

*Short Radius 90° are not referenced in NAVSEA. Dimensions are per ANSI B16.9 plus the NAVSEA tangent lengths.

** ANSI B 16.9 dimensions up to and including 24" size. Sizes larger than 24" are manufactured to Alaskan dimensional standards.

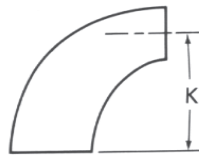
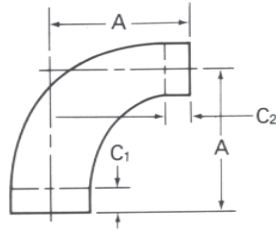
Sizes not shown may be available upon request.

Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

90° Reducing Long Radius Elbows - NAVSEA 810-1385880, Revision D

ANSI B16.9



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

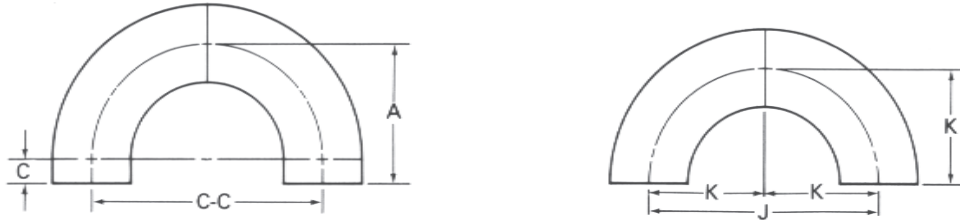
Nominal Pipe Size	OD	A (Min)	C ₁ (Min)	C ₂ (Min)	K	Nominal Wall	Weight	90-10 Part Number	70-30 Part Number
2 x 1 1/2	2.375 x 1.90	3 23/32	23/32	11/16	3	.083	.8	275118	274560
3 x 1 1/4	3.5 x 1.66	5 13/32	29/32	9/16	4.5	.095	2	475849	477697
3 x 2	3.5 x 2.375	5 13/32	29/32	23/32	4.5	.095	2	438473	477702
3 x 2 1/2	3.5 x 2.875	5 13/32	29/32	7/8	4.5	.095	2	437223	477728
3 1/2 x 3	4.0 x 3.5	6 1/4	15/16	29/32	5.25	.095	3	435409	477744
4 x 3	4.5 x 3.5	6 31/32	31/32	29/32	6	.109	4	431853	477752
5 x 4	5.562 x 4.5	8 19/32	1 3/32	31/32	7 1/2	.125	8	431861	476829
6 x 4	6.625 x 4.5	10 11/64	1 11/64	31/32	9	.134	14	435271	477760
6 x 5	6.625 x 5.562	10 11/64	1 11/64	1 3/32	9	.134	14	431879	477786
8 x 5	8.625 x 5.562	13 3/8	1 3/8	1 3/32	12	.148	24	431887	477809
8 x 6	8.625 x 6.625	13 3/8	1 3/8	1 11/64	12	.148	24	431895	477817
10 x 6	10.75 x 6.625	16 9/16	1 9/16	1 11/64	15	.187	47	477833	477859
10 x 8	10.75 x 8.625	16 9/16	1 9/16	1 3/8	15	.187	48	431900	477867
12 x 10	12.75 x 10.75	19 11/16	1 11/16	1 9/16	18	.250	88	465496	477883
14 x 12	14 x 12.75	21 1/2	1/2	1 11/16	21	.250	114		
16 x 14	16 x 14	24 1/2	1/2	1/2	24	.250	148		
18 x 16	18 x 16	27 1/2	1/2	1/2	27	.250	186		
20 x 18	20 x 18	30 1/2	1/2	1/2	30	.250	231		
22 x 20	22 x 20	33 1/2	1/2	1/2	33	.250	281		
24 x 22	24 x 22	36 1/2	1/2	1/2	36	.250	334		
30 x 24	30 x 24	45 1/2	1/2	1/2	45	.250	490		
36 x 30	36 x 30	54 1/2	1/2	1/2	54	.250	716		

Note: Sizes and reductions not shown are available on request.
 Dimensions are in inches. All weights are approximate.
 Specifications: pg. 60. Tolerances: pg. 58.
 Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

180° Long Radius Return Bends - NAVSEA 810-1385880, Revision D

ANSI B16.9



■■■

Nominal Pipe Size	OD	C-C (Min)	C (Min)	A (Min)	J	K*	Class 200 Nom. Wall	Weight	90-10 Part Number	70-30 Part Number
1	1.315	3	1/2	2	3	1 1/2	.065	.4	293572	477891
1 1/4	1.660	3 3/4	9/16	2 7/16	3 3/4	1 7/8	.072	.6	113756	477906
1 1/2	1.900	4 1/2	11/16	2 15/16	4 1/2	2 1/4	.072	.9	113780	477914
2	2.375	6	23/32	3 23/32	6	3	.083	1.5	113811	477922
2 1/2	2.875	7 1/2	7/8	4 5/8	7 1/2	3 3/4	.083	2.5	113845	477948
3	3.500	9	29/32	5 13/32	9	4 1/2	.095	4	113586	447545
3 1/2	4.000	10 1/2	15/16	6 1/4	10 1/2	5 1/4	.095	6.5	431950	477956
4	4.500	12	31/32	6 31/32	12	6	.109	10	113617	477964
5	5.563	15	1 3/32	8 19/32	15	7 1/2	.125	18	113641	477972
6	6.625	18	1 3/8	10 11/64	18	9	.134	30	113675	477998
8	8.625	24	1 3/8	13 3/8	24	12	.148	54	113706	478009
10	10.75	30	1 9/16	16 9/16	30	15	.187	106		
12	12.75	36	1 11/16	19 11/16	36	18	.250	192		
14	14.00	42	1/2	21 1/2	42	21	.250	240		
16	16.00	48	1/2	24 1/2	48	24	.250	314		
18	18.00	54	1/2	27 1/2	54	27	.250	394		
20	20.00	60	1/2	30 1/2	60	30	.250	486		
22	22.00	66	1/2	33 1/2	66	33	.250	588		
24	24.00	72	1/2	36 1/2	72	36	.250	698		
30	30.00	90	1/2	45 1/2	90	45	.250	1088		
36	36.00	108	1/2	54 1/2	108	54	.250	1562		

180° return bends are also available in short radius configurations (radii dimensions per ANSI B 16.28).

Dimensions are in inches. All weights are approximate.

Specifications: pg. 60. Tolerances: pg. 58.

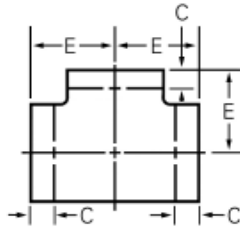
* ANSI B16.9 dimensions up to and including 24" size. Sizes larger than 24" are manufactured to Alaskan dimensional standards.

Sizes not shown may be available upon request.

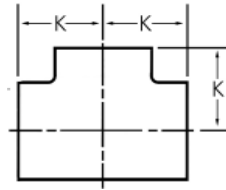
Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

Straight Tees - NAVSEA 810-1385880, Revision D



NAVSEA



ANSI B16.9

- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Dimensions			Class 200		90-10 Part		Class 50		90-10 Part
		E	C (Min)	K*	Nominal Wall	Weight	Number	Number	Nominal Wall	Weight	Number
1/4	.540	11/16	9/32		.065	.03	413415	478025			
3/8	.675	29/32	3/8		.065	.05	413423	478033			
1/2	.840	1 3/32	7/16	1	.065	.1	413431	478059			
3/4	1.05	1 1/4	15/32	1 1/8	.065	.2	413449	478075			
1	1.315	1 1/2	1/2	1 1/2	.065	.3	127543	478091			
1 1/4	1.660	1 7/8	9/16	1 7/8	.072	.4	127577	478114			
1 1/2	1.900	2 1/4	11/16	2 1/4	.072	.6	127585	236245			
2	2.375	2 1/2	23/32	2 1/2	.083	1	127624	127658			
2 1/2	2.875	3	7/8	3	.083	2	127747	127860			
3	3.500	3 3/8	29/32	3 3/8	.095	3	127828	127844			
3 1/2	4.000	3 3/4	15/16	3 3/4	.095	4	128028	259421			
4	4.500	4 1/8	31/32	4 1/8	.109	5	128109	230998			
5	5.563	4 7/8	1 3/32	4 7/8	.125	8	128248	128484			
6	6.625	5 5/8	1 11/64	5 5/8	.134	11	132637	231009			
8	8.625	7	1 3/8	7	.148	22	128264	111657			
10	10.75	8 1/2	1 9/16	8 1/2	.187	46	128280	111681	.134	27	439110
12	12.75	10	1 11/16	10	.250	83	128303	437207	.156	52	465535
14	14.00	11	1/2	11	.250	88	128329	478130	.165	58	454681
16	16.00	12	1/2	12	.250	112	431926	478156	.165	75	478164
18	18.00	13 1/2	1/2	13 1/2	.250	140					
20	20.00	15	1/2	15	.250	165					
22	22.00	16 1/2	1/2	16 1/2	.250	182					
24	24.00	17	1/2	17	.250	222					
30	30.00	22	1/2	22	.250	277	562337				
36	36.00	26 1/2	1/2	26 1/2	.250	333					

Dimensions are in inches. All weights are approximate.

Specifications: pg. 60. Tolerances: pg. 58.

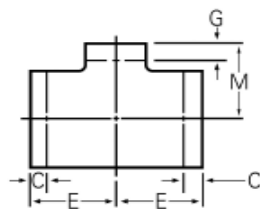
* ANSI B16.9 dimensions. For sizes 26" and larger, outlet dimension "K" is recommended, but not mandatory.

Sizes not shown may be available upon request.

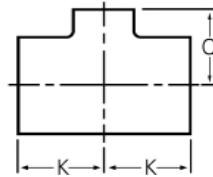
Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

Reducing Tees - NAVSEA 810-1385880, Revision D



NAVSEA



ANSI B16.9

■ **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).

■ **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.

■ **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD		K	M	C (Min)	G (Min)	E	Q	Nominal Wall	Weight	90-10 Part Number	70-30 Part Number	
1 1/4 x 1 1/4 x 3/4	1.66	x 1.66	x 1.05	1 7/8	1 11/16	9/16	13/32	1 7/8	1 7/8	.072	.4	259366	478211
x 1			x 1.315	1 7/8	1 3/4	9/16	7/16	1 7/8	1 7/8	.072	.4	265511	478237
1 1/2 x 1 1/2 x 1/2	1.90	x 1.90	x .840	2 1/4	1 3/4	11/16	3/8	2 1/4	2 1/4	.072	.6	231041	478245
x 3/4			x 1.05	2 1/4	1 13/16	11/16	13/32	2 1/4	2 1/4	.072	.6	259358	478853
x 1			x 1.315	2 1/4	1 7/8	11/16	7/16	2 1/4	2 1/4	.072	.6	265529	478279
x 1 1/4			x 1.66	2 1/4	2	11/16	1/2	2 1/4	2 1/4	.072	.6	127616	478287
2 x 2 x 1/2	2.375	x 2.375	x .840	2 1/2	1 15/16	23/32	3/8	2 1/2	1 3/4	.083	.8	127674	478300
x 3/4			x 1.05	2 1/2	2	23/32	13/32	2 1/2	1 3/4	.083	.8	249345	478326
x 1			x 1.315	2 1/2	2 1/16	23/32	7/16	2 1/2	2	.083	.8	127682	478342
x 1 1/4			x 1.66	2 1/2	2 3/16	23/32	1/2	2 1/2	2 1/4	.083	.8	127705	478350
x 1 1/2			x 1.90	2 1/2	2 7/16	23/32	5/8	2 1/2	2 1/4	.083	1	127721	478376
2 1/2 x 2 1/2 x 1	2.875	x 2.875	x 1.315	3	2 5/16	7/8	7/16	3	2 1/4	.083	1	127763	473148
x 1 1/4			x 1.66	3	2 7/16	7/8	1/2	3	2 1/2	.083	1	231059	468232
x 1 1/2			x 1.90	3	2 11/16	7/8	5/8	3	2 5/8	.083	1.5	127789	420242
x 2			x 2.375	3	2 3/4	7/8	21/32	3	2 3/4	.083	1.5	127802	478392
3 x 3 x 1/2	3.5	x 3.5	x .840	3 3/8	2 1/2	29/32	3/8	3 3/8	2 1/2	.095	2	127886	478407
x 3/4			x 1.05	3 3/8	2 9/16	29/32	13/32	3 3/8	2 9/16	.095	2	127909	478423
x 1			x 1.315	3 3/8	2 5/8	29/32	7/16	3 3/8	2 5/8	.095	2	127925	473164
x 1 1/4			x 1.66	3 3/8	2 3/4	29/32	1/2	3 3/8	2 3/4	.095	2	127941	478431
x 1 1/2			x 1.90	3 3/8	3	29/32	5/8	3 3/8	2 7/8	.095	2	127967	473122
x 2			x 2.375	3 3/8	3 1/16	29/32	21/32	3 3/8	3	.095	2	127983	266737
x 2 1/2			x 2.875	3 3/8	3 5/16	29/32	25/32	3 3/8	3 1/4	.095	2	128002	473130
3 1/2 x 3 1/2 x 1 1/2	4	x 4	x 1.90	3 3/4	3 1/4	15/16	5/8	3 3/4	3 1/8	.095	3	128060	478465
x 2			x 2.375	3 3/4	3 5/16	15/16	21/32	3 3/4	3 1/4	.095	3	243080	478481
x 2 1/2			x 2.875	3 3/4	3 9/16	15/16	21/32	3 3/4	3 1/2	.095	3	128044	478504
x 3			x 3.5	3 3/4	3 11/16	15/16	21/32	3 3/4	3 5/8	.095	4	128086	478512
4 x 4 x 1 1/2	4.5	x 4.5	x 1.90	4 1/8	3 1/2	31/32	5/8	4 1/8	3 3/8	.109	4	128125	128141
x 2			x 2.375	4 1/8	3 9/16	31/32	21/32	4 1/8	3 1/2	.109	4	128167	478538
x 2 1/2			x 2.875	4 1/8	3 13/16	31/32	25/32	4 1/8	3 3/4	.109	4	128183	413601
x 3			x 3.5	4 1/8	3 15/16	31/32	27/32	4 1/8	3 7/8	.109	4	128206	478554
x 3 1/2			x 4	4 1/8	4	31/32	7/8	4 1/8	4	.109	4.5	111607	478570
5 x 5 x 2	5.56	x 5.56	x 2.375	4 7/8	4 5/16	1 3/32	21/32	4 7/8	4 1/8	.125	7	128832	478596
x 2 1/2			x 2.875	4 7/8	4 3/8	1 3/32	25/32	4 7/8	4 1/4	.125	7	128816	478619
x 3			x 3.50	4 7/8	4 7/16	1 3/32	27/32	4 7/8	4 3/8	.125	7	128793	478635
x 3 1/2			x 4.00	4 7/8	4 9/16	1 3/32	7/8	4 7/8	4 1/2	.125	7	128777	292924
x 4			x 4.50	4 7/8	4 5/8	1 3/32	29/32	4 7/8	4 5/8	.125	7.5	132611	478651

Sizes and reductions not shown are available on request. Dimensions are in inches. All weights are approximate. Specifications: pg. 60. Tolerances: pg. 58.

Sizes not shown may be available upon request.

Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

Reducing Tees - NAVSEA 810-1385880, Revision D (continued)

Nominal Pipe Size	OD	K	M	C (Min)	G (Min)	E	Q	Nominal Wall	Weight	90-10 Part Number	70-30 Part Number	
6 x 6	x 2	6.625 x 6.625 x 2.375	5 5/8	4 13/16	1 11/64	21/32	5 5/8	4 3/4	.134	10	231033	478669
	x 2 1/2	x 2.875	5 5/8	5 1/16	1 11/64	25/32	5 5/8	4 3/4	.134	10	128670	478685
	x 3	x 3.5	5 5/8	5	1 11/64	27/32	5 5/8	4 7/8	.134	10	128696	478708
	x 3 1/2	x 4.0	5 5/8	5 1/16	1 11/64	7/8	5 5/8	5	.134	10	128719	478716
	x 4	x 4.5	5 5/8	5 1/8	1 11/64	29/32	5 5/8	5 1/8	.134	10.5	128735	111746
	x 5	x 5.562	5 5/8	5 3/8	1 11/64	1 1/32	5 5/8	5 3/8	.134	11	128751	259502
8 x 8	x 2 1/2	8.625 x 8.625 x 2.875	7	5 7/8	1 3/8	25/32	7	6	.148	20	128638	478724
	x 3	x 3.5	7	6	1 3/8	27/32	7	6	.148	20	272958	466793
	x 3 1/2	x 4	7	6 1/16	1 3/8	7/8	7	6	.148	20	128468	478732
	x 4	x 4.5	7	6 1/8	1 3/8	29/32	7	6 1/8	.148	20.5	128442	471683
	x 5	x 5.562	7	6 3/8	1 3/8	1 1/32	7	6 3/8	.148	21	128426	406599
	x 6	x 6.625	7	6 9/16	1 3/8	1 1/8	7	6 5/8	.148	21.5	128400	454649
10 x 10	x 3	10.75 x 10.75 x 3.5	8 1/2	7 1/16	1 9/16	27/32	8 1/2	7 1/4	.187	41	231025	478740
	x 4	x 4.5	8 1/2	7 3/16	1 9/16	29/32	8 1/2	7 1/4	.187	41	128573	259497
	x 5	x 5.562	8 1/2	7 7/16	1 9/16	1 1/32	8 1/2	7 1/2	.187	42	128531	462244
	x 6	x 6.625	8 1/2	7 5/8	1 9/16	1 1/8	8 1/2	7 5/8	.187	43	128557	439071
	x 8	x 8.625	8 1/2	8	1 9/16	1 5/16	8 1/2	8	.187	44	128387	478758
12 x 12	x 5	12.75 x 12.75 x 5.562	10	8 7/16	1 11/16	1 1/32	10	8 1/2	.250	74	128612	478766
	x 6	x 6.625	10	8 5/8	1 11/16	1 1/8	10	8 5/8	.250	76	128599	478774
	x 8	x 8.625	10	9	1 11/16	1 5/16	10	9	.250	78	128361	478782
	x 10	x 10.75	10	9 3/8	1 11/16	1 1/32	10	9 1/2	.250	81	128345	473009
14 x 14	x 6	14 x 14 x 6.625	11	9 3/8	1 1/2	1 1/8	11	9 3/8	.250	80	461921	478805
	x 8	x 8.625	11	9 3/4	1 1/2	1 5/16	11	9 3/4	.250	82	437998	478813
	x 10	x 10.75	11	10 1/8	1 1/2	1 1/2	11	10 1/8	.250	84	436722	478839
	x 12	x 12.75	11	10 5/8	1 1/2	1 1/8	11	10 5/8	.250	86	436730	478855
16 x 16	x 8	16 x 16 x 8.625	12	10 3/4	1 1/2	1 5/16	12	10 3/4	.250	102	478889	478902
	x 10	x 10.75	12	11 1/8	1 1/2	1 1/2	12	11 1/8	.250	105	445632	473449
	x 12	x 12.75	12	11 5/8	1 1/2	1 5/16	12	11 5/8	.250	107	439089	478928
	x 14	x 14	12	12	1 1/2	1 1/2	12	12	.250	109	293394	478944
18 x 18	x 10	18 x 18 x 10.75	13 1/2	12 1/8	1 1/2	1 1/2	13 1/2	12 1/8	.250	127	562264	
	x 12	x 12.75	13 1/2	12 5/8	1 1/2	1 5/8	13 1/2	12 5/8	.250	130		
	x 14	x 14	13 1/2	13	1 1/2	1 1/2	13 1/2	13	.250	133		
	x 16	x 16	13 1/2	13	1 1/2	1 1/2	13 1/2	13	.250	135		
20 x 20	x 12	20 x 20 x 12.75	15	13 5/8	1 1/2	1 5/8	15	13 5/8	.250	153		
	x 14	x 14	15	14	1 1/2	1 1/2	15	14	.250	156		
	x 16	x 16	15	14	1 1/2	1 1/2	15	14	.250	158		
	x 18	x 18	15	14 1/2	1 1/2	1 1/2	15	14 1/2	.250	160	469018	
24 x 24	x 14	24 x 24 x 14	17	16	1 1/2	1 1/2	17	16	.250	204		
	x 16	x 16	17	16	1 1/2	1 1/2	17	16	.250	208		
	x 18	x 18	17	16 1/2	1 1/2	1 1/2	17	16 1/2	.250	211		
	x 20	x 20	17	17	1 1/2	1 1/2	17	17	.250	214		
30 x 30	x 18	30 x 30 x 18	22	19 1/2	1 1/2	1 1/2	22	19 1/2	.250	256		
	x 20	x 20	22	20	1 1/2	1 1/2	22	20	.250	261		
	x 24	x 24	22	21	1 1/2	1 1/2	22	21	.250	267		
36 x 36	x 20	36 x 36 x 20	26 1/2	23	1 1/2	1 1/2	26 1/2	23	.250	306		
	x 24	x 24	26 1/2	24	1 1/2	1 1/2	26 1/2	24	.250	314		
	x 30	x 30	26 1/2	25	1 1/2	1 1/2	26 1/2	25	.250	322		

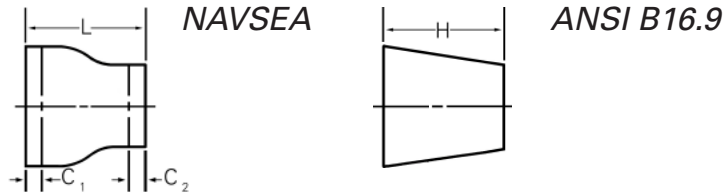
Note: Sizes and reductions not shown are available. Dimensions are in inches. All weights are approximate. Specifications: pg. 60. Tolerances: pg. 58.

Sizes not shown may be available upon request. Available in "regular" thickness (similar to Schedule 40s).

* ANSI B16.9 dimensions. For sizes 26" and larger, outlet dimension "K" is recommended, but not mandatory.

Copper-Nickel Butt Welding Fittings

Concentric Reducers - NAVSEA 810-1385880, Revision D



- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	L	C ₁ (Min)	C ₂ (Min)	Nominal Wall	Weight	90-10 Part Number	70-30 Part Number
1/2 x 1/4	.840 x .540	1 1/2	7/16	9/32	.065	.07	559889	482587
1/2 x 3/8	.840 x .675	1 1/2	7/16	3/8	.065	.07	509038	482595
3/4 x 1/2	1.05 x .840	1 1/2	15/32	7/16	.065	.09	253035	478978
1 x 1/2	1.315 x .840	2	1/2	7/16	.065	.15	130465	478994
x 3/4	x 1.05	2	1/2	15/32	.065	.15	130481	265163
1 1/4 x 3/4	1.66 x 1.05	2	9/16	15/32	.072	.2	130504	479013
x 1	x 1.315	2	9/16	1/2	.072	.2	130546	111869
1 1/2 x 1/2	1.90 x .840	2 1/2	11/16	7/16	.072	.3	229701	479047
x 3/4	x 1.05	2 1/2	11/16	15/32	.072	.3	130562	439843
x 1	x 1.315	2 1/2	11/16	1/2	.072	.3	130588	131144
x 1 1/4	x 1.66	2 1/2	11/16	9/16	.072	.3	130643	130677
2 x 1/2	2.375 x .840	3	23/32	7/16	.083	.7	273425	479055
x 3/4	x 1.05	3	23/32	15/32	.083	.7	130619	130635
x 1	x 1.315	3	23/32	1/2	.083	.7	130693	130708
x 1 1/4	x 1.66	3	23/32	9/16	.083	.7	130732	130758
x 1 1/2	x 1.90	3	23/32	11/16	.083	.7	130774	130790
2 1/2 x 3/4	2.875 x 1.05	3 1/2	7/8	15/32	.083	.9	130813	479063
x 1	x 1.315	3 1/2	7/8	1/2	.083	.9	130839	479089
x 1 1/4	x 1.66	3 1/2	7/8	9/16	.083	.9	130855	272631
x 1 1/2	x 1.90	3 1/2	7/8	11/16	.083	.9	130871	130897
x 2	x 2.375	3 1/2	7/8	23/32	.083	.9	130910	130936
3 x 1	3.5 x 1.315	3 1/2	29/32	1/2	.095	1	111893	479102
x 1 1/4	x 1.66	3 1/2	29/32	9/16	.095	1	130960	479110
x 1 1/2	x 1.90	3 1/2	29/32	11/16	.095	1	130986	131005
x 2	x 2.375	3 1/2	29/32	23/32	.095	1	131021	131055
x 2 1/2	x 2.875	3 1/2	29/32	7/8	.095	1	131089	131110
3 1/2 x 1	4 x 1.315	4	15/16	1/2	.095	2	409539	479128
x 1 1/2	x 1.90	4	15/16	11/16	.095	2	131128	479136
x 2	x 2.375	4	15/16	23/32	.095	2	131152	229785
x 2 1/2	x 2.875	4	15/16	7/8	.095	2	131178	111924
x 3	x 3.5	4	15/16	29/32	.095	2	131209	435425
4 x 1	4.5 x 1.315	4	31/32	1/2	.109	2	400187	479152
x 1 1/4	x 1.66	4	31/32	9/16	.109	2	402846	479178
x 1 1/2	x 1.90	4	31/32	11/16	.109	2	131225	479194
x 2	x 2.375	4	31/32	23/32	.109	2	131241	229939
x 2 1/2	x 2.875	4	31/32	7/8	.109	2	131275	131291
x 3	x 3.5	4	31/32	29/32	.109	2	131330	249256
x 3 1/2	x 4	4	31/32	15/16	.109	2	131372	249264

Sizes and reductions not shown are available. Dimensions are in inches. All weights are approximate. Specifications: pg. 60. Tolerances: pg. 58.

Sizes not shown may be available upon request.

Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

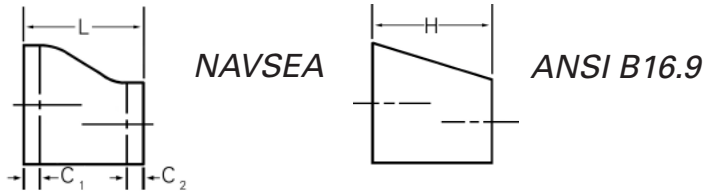
Concentric Reducers - NAVSEA 810-1385880, Revision D (continued)

Nominal Pipe Size	OD	L	C ₁ (Min)	C ₂ (Min)	Class 200				Class 50		
					Nominal Wall	Weight	90-10 Part Number	70-30 Part Number	Nominal Wall	Weight	90-10 Part Number
5 x 2	5.562 x 2.375	5	1 ³ / ₃₂	2 ³ / ₃₂	.125	4	131429	479217			
x 2 1/2	x 2.875	5	1 ³ / ₃₂	7/8	.125	4	131445	229971			
x 3	x 3.500	5	1 ³ / ₃₂	2 ⁹ / ₃₂	.125	4	131479	131495			
x 3 1/2	x 4.000	5	1 ³ / ₃₂	1 ⁵ / ₁₆	.125	4	131518	249272			
x 4	x 4.500	5	1 ³ / ₃₂	3 ¹ / ₃₂	.125	4	131550	230207			
6 x 2	6.625 x 2.375	5 1/2	1 ¹¹ / ₆₄	2 ³ / ₃₂	.134	5	131576	471895			
x 2 1/2	x 2.875	5 1/2	1 ¹¹ / ₆₄	7/8	.134	5	131592	479241			
x 3	x 3.500	5 1/2	1 ¹¹ / ₆₄	2 ⁹ / ₃₂	.134	4	131623	437100			
x 3 1/2	x 4.000	5 1/2	1 ¹¹ / ₆₄	1 ⁵ / ₁₆	.134	4	111958	236253			
x 4	x 4.500	5 1/2	1 ¹¹ / ₆₄	3 ¹ / ₃₂	.134	5	131649	131665			
x 5	x 5.562	5 1/2	1 ¹¹ / ₆₄	1 ³ / ₃₂	.134	5	131704	111982			
8 x 3	8.625 x 3.500	6	1 ³ / ₈	2 ⁹ / ₃₂	.148	6	131712	479267			
x 3 1/2	x 4.000	6	1 ³ / ₈	1 ⁵ / ₁₆	.148	6.5	131746	479283			
x 4	x 4.500	6	1 ³ / ₈	3 ¹ / ₃₂	.148	7	131754	236229			
x 5	x 5.562	6	1 ³ / ₈	1 ³ / ₃₂	.148	7	131801	112019			
x 6	x 6.625	6	1 ³ / ₈	1 ¹¹ / ₆₄	.148	8	131843	131869			
10 x 4	10.75 x 4.500	7	1 ⁹ / ₁₆	3 ¹ / ₃₂	.187	14	131893	479306	.134	10	435857
x 5	x 5.562	7	1 ⁹ / ₁₆	1 ³ / ₃₂	.187	15	131932	479322	.134	12	439445
x 6	x 6.625	7	1 ⁹ / ₁₆	1 ¹¹ / ₆₄	.187	16	131958	112043	.134	12	439097
x 8	x 8.625	7	1 ⁹ / ₁₆	1 ³ / ₈	.187	18	131990	132019	.134	12	435865
12 x 5	12.75 x 5.562	8	1 ¹¹ / ₁₆	1 ³ / ₃₂	.250	21	479330	479356	.156	15	479649
x 6	x 6.625	8	1 ¹¹ / ₁₆	1 ¹¹ / ₆₄	.250	22	132035	483012	.156	15	446963
x 8	x 8.625	8	1 ¹¹ / ₁₆	1 ³ / ₈	.250	23.5	132051	421808	.156	15	435831
x 10	x 10.75	8	1 ¹¹ / ₁₆	1 ⁹ / ₁₆	.250	27	132108	132124	.156	17	435849
14 x 6	14 x 6.625	13	1/2	1 ¹¹ / ₆₄	.250	38	433813	479429	.165	29	479665
x 8	x 8.625	13	1/2	1 ³ / ₈	.250	41	132140	460789	.165	29	439699
x 10	x 10.75	13	1/2	1 ⁹ / ₁₆	.250	44	132166	132174	.165	29	435289
x 12	x 12.75	13	1/2	1 ¹¹ / ₁₆	.250	49	132190	249337	.165	29	437891
16 x 8	16 x 8.625	14	1/2	1 ³ / ₈	.250	44	402147	479445	.165	35	479673
x 10	x 10.75	14	1/2	1 ⁹ / ₁₆	.250	47	112077	479461	.165	35	435580
x 12	x 12.75	14	1/2	1 ¹¹ / ₁₆	.250	51	112108	404131	.165	35	435556
x 14	x 14	14	1/2	1/2	.250	53	132239	479495	.165	35	436748
18 x 10	18 x 10.75	15	1/2	1 ⁹ / ₁₆	.250	55	439128	479518	.180	39	479681
x 12	x 12.75	15	1/2	1 ¹¹ / ₁₆	.250	58	439136	479542	.180	39	439144
x 14	x 14	15	1/2	1/2	.250	61	465331	479568	.180	39	435328
x 16	x 16	15	1/2	1/2	.250	65	449678	479584	.180	39	439209
20 x 12	20 x 12.75	20	1/2	1 ¹¹ / ₁₆	.250	89	467163		.180	64	439291
x 14	x 14	20	1/2	1/2	.250	95					
x 16	x 16	20	1/2	1/2	.250	101					
x 18	X 18	20	1/2	1/2	.250	106					
24 x 14	24 X 14	20	1/2	1/2	.250	106					
x 16	x 16	20	1/2	1/2	.250	112					
x 18	x 18	20	1/2	1/2	.250	118			.180	90	461078
x 20	X 20	20	1/2	1/2	.250	123					
30 x 18	30 X 18	24	1/2	1/2	.250	161			.250	161	461086
x 20	x 20	24	1/2	1/2	.250	168	562492			168	
x 24	x 24	24	1/2	1/2	.250	181	436837			181	
36 x 30	36 X 30	24	1/2	1/2	.250	222					

Note: Sizes and reductions not shown are available.
Dimensions are in inches. All weights are approximate.
Specifications: pg. 60. Tolerances: pg. 58.
Sizes not shown may be available upon request.
Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

Eccentric Reducers - NAVSEA 810-1385880, Revision D



- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	L	C ₁ (Min)	C ₂ (Min)	Nominal Wall	Lbs/Ft	90-10 Part Number	70-30 Part Number
$\frac{3}{4} \times \frac{1}{2}$	1.05 x .840	1 $\frac{1}{2}$	$\frac{15}{32}$	$\frac{7}{16}$	.065	.09	479699	479924
1 x $\frac{1}{2}$	1.315 x .840	2	$\frac{1}{2}$	$\frac{7}{16}$	.065	.15	405098	479940
x $\frac{3}{4}$	x 1.05	2	$\frac{1}{2}$	$\frac{15}{32}$	.065	.15	479712	479966
1 $\frac{1}{4}$ x $\frac{3}{4}$	1.66 x 1.05	2	$\frac{9}{16}$	$\frac{15}{32}$	.072	.2	130520	479982
x 1	x 1.315	2	$\frac{9}{16}$	$\frac{1}{2}$	.072	.2	438635	479990
1 $\frac{1}{2}$ x $\frac{1}{2}$	1.90 x .840	2 $\frac{1}{2}$	$\frac{11}{16}$	$\frac{7}{16}$	.072	.3	402155	480014
x $\frac{3}{4}$	x 1.05	2 $\frac{1}{2}$	$\frac{11}{16}$	$\frac{15}{32}$	.072	.3	437752	480022
x 1	x 1.315	2 $\frac{1}{2}$	$\frac{11}{16}$	$\frac{1}{2}$	.072	.3	430572	480048
x 1 $\frac{1}{4}$	x 1.66	2 $\frac{1}{2}$	$\frac{11}{16}$	$\frac{9}{16}$	.072	.3	408452	480056
2 x $\frac{1}{2}$	2.375 x .840	3	$\frac{23}{32}$	$\frac{7}{16}$	.083	.7	479746	480072
x $\frac{3}{4}$	x 1.05	3	$\frac{23}{32}$	$\frac{15}{32}$	.083	.7	411625	468999
x 1	x 1.315	3	$\frac{23}{32}$	$\frac{1}{2}$	.083	.7	465747	480098
x 1 $\frac{1}{4}$	x 1.66	3	$\frac{23}{32}$	$\frac{9}{16}$	.083	.7	411617	480111
x 1 $\frac{1}{2}$	x 1.90	3	$\frac{23}{32}$	$\frac{11}{16}$	.083	.7	430580	480137
2 $\frac{1}{2}$ x $\frac{3}{4}$	2.875 x 1.05	3 $\frac{1}{2}$	$\frac{7}{8}$	$\frac{15}{32}$	.083	.9	479762	480145
x 1	x 1.315	3 $\frac{1}{2}$	$\frac{7}{8}$	$\frac{1}{2}$	.083	.9	406793	480161
x 1 $\frac{1}{4}$	x 1.66	3 $\frac{1}{2}$	$\frac{7}{8}$	$\frac{9}{16}$	.083	.9	411617	480111
x 1 $\frac{1}{2}$	x 1.90	3 $\frac{1}{2}$	$\frac{7}{8}$	$\frac{11}{16}$	.083	.9	229727	480187
x 2	x 2.375	3 $\frac{1}{2}$	$\frac{7}{8}$	$\frac{23}{32}$	.083	.9	229735	480195
3 x 1	3.5 x 1.315	3 $\frac{1}{2}$	$\frac{29}{32}$	$\frac{1}{2}$	.095	1	476992	480200
x 1 $\frac{1}{4}$	x 1.66	3 $\frac{1}{2}$	$\frac{29}{32}$	$\frac{9}{16}$	.095	1	479788	480349
x 1 $\frac{1}{2}$	x 1.90	3 $\frac{1}{2}$	$\frac{29}{32}$	$\frac{11}{16}$	.095	1	462090	480357
x 2	x 2.375	3 $\frac{1}{2}$	$\frac{29}{32}$	$\frac{23}{32}$	.095	1	131063	480365
x 2 $\frac{1}{2}$	x 2.875	3 $\frac{1}{2}$	$\frac{29}{32}$	$\frac{7}{8}$	.095	1	229777	480373
3 $\frac{1}{2}$ x 1	4 x 1.315	4	$\frac{15}{16}$	$\frac{1}{2}$	.095	2	479835	480381
x 1 $\frac{1}{2}$	x 1.90	4	$\frac{15}{16}$	$\frac{11}{16}$	.095	2	472273	480399
x 2	x 2.375	4	$\frac{15}{16}$	$\frac{23}{32}$	.095	2	229793	480404
x 2 $\frac{1}{2}$	x 2.875	4	$\frac{15}{16}$	$\frac{7}{8}$	.095	2	479843	480412
x 3	x 3.5	4	$\frac{15}{16}$	$\frac{29}{32}$	.095	2	229808	480420
4 x 1	4.5 x 1.315	4	$\frac{31}{32}$	$\frac{1}{2}$	.109	2	479877	480438
x 1 $\frac{1}{4}$	x 1.66	4	$\frac{31}{32}$	$\frac{9}{16}$	.109	2	479908	480446
x 1 $\frac{1}{2}$	x 1.90	4	$\frac{31}{32}$	$\frac{11}{16}$	.109	2	411463	480454
x 2	x 2.375	4	$\frac{31}{32}$	$\frac{23}{32}$	.109	2	131259	274510
x 2 $\frac{1}{2}$	x 2.875	4	$\frac{31}{32}$	$\frac{7}{8}$	.109	2	131314	480462
x 3	x 3.5	4	$\frac{31}{32}$	$\frac{29}{32}$	.109	2	131356	281339
x 3 $\frac{1}{2}$	x 4	4	$\frac{31}{32}$	$\frac{15}{16}$	.109	2	131398	480470

Sizes and reductions not shown are available.
 Dimensions are in inches. All weights are approximate.
 Specifications: pg. 60. Tolerances: pg. 58.
 Sizes not shown may be available upon request.
 Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

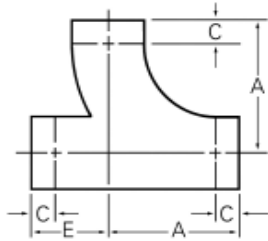
Eccentric Reducers - NAVSEA 810-1385880, Revision D (continued)

Nominal Pipe Size	OD	L	C ₁ (Min)	C ₂ (Min)	Nominal Wall	Lbs/Ft	90-10 Part Number	70-30 Part Number
5 x 2	5.562 x 2.375	5	1 ³ / ₃₂	2 ³ / ₃₂	.125	4	480488	480543
x 2 1/2	x 2.875	5	1 ³ / ₃₂	7/8	.125	4	131453	480569
x 3	x 3.500	5	1 ³ / ₃₂	2 ⁹ / ₃₂	.125	4	230192	480577
x 3 1/2	x 4	5	1 ³ / ₃₂	1 ⁵ / ₁₆	.125	4	131534	480585
x 4	x 4.5	5	1 ³ / ₃₂	3 ¹ / ₃₂	.125	4	293603	480593
6 x 2	6.625 x 2.375	5 1/2	1 ¹¹ / ₆₄	2 ³ / ₃₂	.134	5	480608	480624
x 2 1/2	x 2.875	5 1/2	1 ¹¹ / ₆₄	7/8	.134	5	411544	480658
x 3	x 3.5	5 1/2	1 ¹¹ / ₆₄	2 ⁹ / ₃₂	.134	4	249298	480674
x 3 1/2	x 4	5 1/2	1 ¹¹ / ₆₄	1 ⁵ / ₁₆	.134	4	249280	480705
x 4	x 4.5	5 1/2	1 ¹¹ / ₆₄	3 ¹ / ₃₂	.134	5	131681	480721
x 5	x 5.562	5 1/2	1 ¹¹ / ₆₄	1 ³ / ₃₂	.134	5	236211	480747
8 x 3	8.625 x 3.5	6	1 ³ / ₈	2 ⁹ / ₃₂	.148	6	480496	480789
x 3 1/2	x 4	6	1 ³ / ₈	1 ⁵ / ₁₆	.148	6.5	480501	480802
x 4	x 4.5	6	1 ³ / ₈	3 ¹ / ₃₂	.148	7	131770	411112
x 5	x 5.562	6	1 ³ / ₈	1 ³ / ₃₂	.148	7	131819	480836
x 6	x 6.625	6	1 ³ / ₈	1 ¹¹ / ₆₄	.148	8	131877	480860
10 x 4	10.75 x 4.5	7	1 ⁹ / ₁₆	3 ¹ / ₃₂	.187	14	284688	480894
x 5	x 5.562	7	1 ⁹ / ₁₆	1 ³ / ₃₂	.187	15	230095	480917
x 6	x 6.625	7	1 ⁹ / ₁₆	1 ¹¹ / ₆₄	.187	16	131974	411633
x 8	x 8.625	7	1 ⁹ / ₁₆	1 ³ / ₈	.187	18	230100	414550
12 x 5	12.75 x 5.562	8	1 ¹¹ / ₁₆	1 ³ / ₃₂	.250	21	480519	480925
x 6	x 6.625	8	1 ¹¹ / ₁₆	1 ¹¹ / ₆₄	.250	22	437150	480941
x 8	x 8.625	8	1 ¹¹ / ₁₆	1 ³ / ₈	.250	23.5	132077	480959
x 10	x 10.75	8	1 ¹¹ / ₁₆	1 ⁹ / ₁₆	.250	27	230231	421874
14 x 6	14 x 6.625	13	1/2	1 ¹¹ / ₆₄	.250	38	414649	480967
x 8	x 8.625	13	1/2	1 ³ / ₈	.250	41	293409	480975
x 10	x 10.75	13	1/2	1 ⁹ / ₁₆	.250	43.5	293417	480991
x 12	x 12.75	13	1/2	1 ¹¹ / ₁₆	.250	48.5	132213	481028
16 x 8	16 x 8.625	14	1/2	1 ³ / ₈	.250	43.5	480527	481044
x 10	x 10.75	14	1/2	1 ⁹ / ₁₆	.250	47	435239	481060
x 12	x 12.75	14	1/2	1 ¹¹ / ₁₆	.250	50.5	230566	404694
x 14	x 14	14	1/2	1/2	.250	53	435247	481086
18 x 10	18 x 10.75	15	1/2	1 ⁹ / ₁₆	.250	54.5	480535	481109
x 12	x 12.75	15	1/2	1 ¹¹ / ₁₆	.250	58	435221	481141
x 14	x 14	15	1/2	1/2	.250	60.5	465323	481167
x 16	x 16	15	1/2	1/2	.250	64.5	435213	481175

Note: Sizes and reductions not shown are available.
Dimensions are in inches. All weights are approximate.
Specifications: pg. 60. Tolerances: pg. 58.
Sizes not shown may be available upon request.
Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

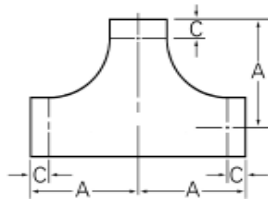
Long Turn Tees, Single Sweep - NAVSEA 810-1385880, Revision D



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	A	E	C (Min)	Nominal Wall	Weight	90-10 Part Number	70-30 Part Number
1 1/4	1.660	2 7/16	2	9/16	.072	.6	511386	
1 1/2	1.900	2 15/16	2 1/4	11/16	.072	.9	481206	470035
2	2.375	3 23/32	2 5/8	23/32	.083	1	262482	462422
2 1/2	2.875	4 5/8	3 1/8	7/8	.083	2	129838	462430
3	3.500	5 13/32	3 13/32	29/32	.095	3	129854	433245
3 1/2	4.000	6 1/4	3 7/16	15/16	.095	4	481222	481230
4	4.500	6 31/32	3 31/32	31/32	.109	6	129896	462448
5	5.563	8 19/32	5 3/32	1 3/32	.125	12	129870	472710
6	6.625	10 11/64	6 11/64	1 11/64	.134	19	129919	472702
8	8.625	13 3/8	8 7/8	1 3/8	.148	36	129935	481272
10	10.750	16 9/16	10 3/4	1 9/16	.187	75		582060

Long Turn Tees, Double Sweep - NAVSEA 810-1385880, Revision D



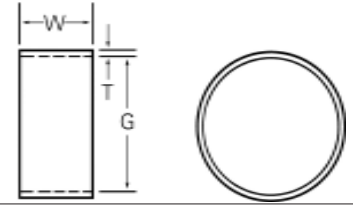
Nominal Pipe Size	OD	A	C (Min)	Nominal Wall	Weight	90-10 Part Number	70-30 Part Number
1	1.315	2	1/2	.065	.9	481298	470051
1 1/4	1.660	2 7/16	9/16	.072	1	511394	
1 1/2	1.900	2 15/16	11/16	.072	1.5	481311	461662
2	2.375	3 23/32	23/32	.083	3	261575	462383
2 1/2	2.875	4 5/8	7/8	.083	5	286119	462391
3	3.500	5 13/32	29/32	.095	3	132598	462406
3 1/2	4.000	6 1/4	15/16	.095	5		
4	4.500	6 31/32	31/32	.109	7.5	132572	462414
5	5.563	8 19/32	1 3/32	.125	14	129951	481353
6	6.625	10 11/64	1 11/64	.134	24	129977	481379
8	8.625	13 3/8	1 3/8	.148	46	231017	481395

Sizes not shown may be available upon request.
Available in "regular" thickness (similar to Schedule 40s).

Copper-Nickel Butt Welding Fittings

Class 200 Sleeves - NAVSEA 810-1385880, Revision D

- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

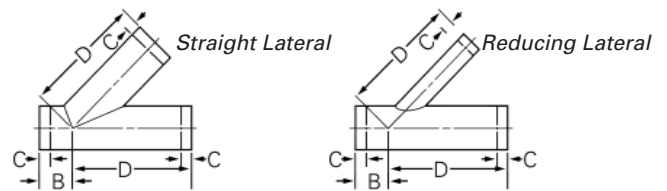


Nominal Pipe Size	Inside (G) Diameter	Class 200			Class 50			90-10 Part Numbers	70-30 Part Numbers	T	90-10 Part Numbers
		W	Weight	T	90-10 Part Numbers	70-30 Part Numbers	T				
1/4	.540	17/32	.02	.065	128882	481418					
3/8	.675	5/8	.03	.065	111445	481434					
1/2	.840	3/4	.04	.065	128866	402197					
3/4	1.050	13/16	.06	.065	111479	472833					
1	1.315	7/8	.08	.072	128905	128921					
1 1/4	1.660	1	.1	.072	128955	128971					
1 1/2	1.900	1 1/4	.2	.083	128997	129016					
2	2.375	1 5/16	.3	.083	129032	129058					
2 1/2	2.875	1 9/16	.5	.095	129074	111314					
3	3.500	1 21/32	.6	.095	129090	129113					
3 1/2	4.000	1 3/4	.7	.109	111398	470459					
4	4.500	1 13/16	1	.125	129139	129155					
5	5.563	2 1/16	2	.134	129171	129197					
6	6.625	2 7/32	2	.134	129210	111330					
8	8.625	2 5/8	4	.187	129236	243103					
10	10.75	3	8	.250	129252	111364	.134			465894	
12	12.75	3 1/4	11	.250	129278	273768	.156			465909	
14	14.00	3	11	.250	129286	293653	.165			437184	
16	16.00	3	12	.250	129309	473643	.165			456625	
18	18.00	3	14	.250	433774	481450	.180			437192	
20	20.00	3	19	.250	481484	481492	.180			437948	
22	22.0	3	19	.250	437859	481468					
24	24.00	3	20	.250	437867	481476					

Dimensions are in inches.
Specifications: pg. 60. Tolerances: pg. 58.

45° Laterals - NAVSEA 810-1385880, Revision D

- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

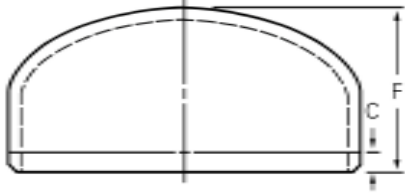


Nominal Pipe Size	OD	C (Min)	B	D	Class 200		90-10 Part Number	70-30 Part Number
					Nom. Wall	Weight		
1 1/4	1.660	9/16	1 3/4	6 1/4	.072	2	435687	481515
1 1/2	1.900	11/16	2	7	.072	2	249400	469301
2	2.375	23/32	2 1/2	8	.083	4	129676	469296
2 1/2	2.875	7/8	2 1/2	9 1/2	.083	5	129692	476308
3	3.500	29/32	3	10	.095	7	129715	470043
3 1/2	4.000	15/16	3	11 1/2	.095	9	129731	481523
4	4.500	31/32	3	12	.109	12	129757	468224
5	5.563	1 3/32	3 1/2	13 1/2	.125	19	129773	435108
6	6.625	1 11/64	3 1/2	14 1/2	.134	26	129799	473504
8	8.625	1 3/8	4 1/2	17 1/2	.148	47	129812	469319
10	10.75	1 9/16	5	20 1/2	.187	93	481531	486735
12	12.75	1 11/16	5 1/2	24 1/2	.250	165	486743	486751

Dimensions are in inches. All weights are approximate.
Dimensions "B" and "D" per ANSI B16.1 cl.125.
Sizes not shown may be available upon request.
Available in "regular" thickness (similar to Schedule 40s).

Copper Nickel Butt Welding Fittings

Caps - NAVSEA 810-1385880, Revision D



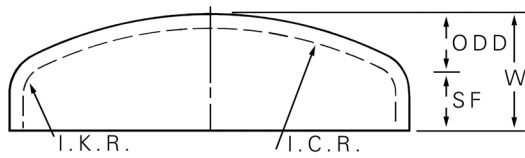
- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	C* (Min)	F	Class 200				Class 50		
				Nominal Wall	Weight	90-10 Part Number	70-30 Part Number	Nominal Wall	Weight	90-10 Part Number
1	1.315	1/2	1 1/2	.065	.2	129325	129341			
1 1/4	1.660	9/16	1 1/2	.072	.2	129414	477566			
1 1/2	1.900	11/16	1 1/2	.072	.2	129375	129391			
2	2.375	23/32	1 1/2	.083	.5	129430	129456			
2 1/2	2.875	7/8	1 1/2	.083	.8	129472	129498			
3	3.500	29/32	2	.095	1	129511	111534			
3 1/2	4.000	15/16	2 1/2	.095	1.5	249395	477574			
4	4.500	31/32	2 1/2	.109	2	129537	111550			
5	5.563	1 3/32	3	.125	3	129553	129579			
6	6.625	1 11/64	3 1/2	.134	4.5	129595	249387			
8	8.625	1 3/8	4	.148	7	129618	249379			
10	10.75	1 9/16	5	.187	14	129634	249361	.134	10	463800
12	12.75	1 11/16	6	.250	27	129650	477582	.156	17	435823
14	14.00			.250	28	453465	477401	.165	19	460616
16	16.00			.250	37	477524	477540	.165	24	477710
18	18.00			.250	47	477451	477508	.180	33	477736
20	20.00			.250	49	477388	477396	.180	35	439267
24	24.00			.250	51	476293	477427	.180	37	431780

Sizes not shown may be available upon request.
Available in "regular" thickness (similar to Schedule 40s).

Copper Nickel Butt Welding Fittings

ASME Flanged and Dished Heads



Nominal Pipe Size	OD	ODD	SF	W
2	2.375	$1^{13}/_{16}$	$1/2$	$1^{5}/_{16}$
2 1/2	2.875	$7/8$	$1/2$	$1^{3}/_{8}$
3	3.500	$1^{5}/_{16}$	$1/2$	$1^{7}/_{16}$
4	4.500	$1^{1}/_{16}$	$1/2$	$1^{9}/_{16}$
5	5.563	$1^{3}/_{16}$	$1/2$	$1^{11}/_{16}$
6	6.625	$1^{13}/_{16}$	$1/2$	$2^{5}/_{16}$
8	8.625	$2^{1}/_{16}$	$1/2$	$2^{9}/_{16}$
10	10.750	$3^{1}/_{2}$	$1/2$	$2^{13}/_{16}$
12	12.750	$2^{5}/_{8}$	$1/2$	$3^{1}/_{8}$
14	14.000	$2^{3}/_{4}$	$1/2$	$3^{1}/_{4}$
16	16.000	3	$1/2$	$3^{1}/_{2}$
18	18.000	$3^{5}/_{16}$	$1/2$	$3^{13}/_{16}$
20	20.000	$3^{5}/_{8}$	$1/2$	$4^{1}/_{8}$
24	24.000	$4^{1}/_{4}$	$1/2$	$4^{3}/_{4}$
30	30.000	$5^{5}/_{16}$	$1/2$	$5^{13}/_{16}$
36	36.000	$6^{5}/_{16}$	$1/2$	$6^{13}/_{16}$

Inside knuckle radius (I.K.R.) minimum = 6% of outside diameter or 3T whichever is greater.

Inside crown radius (I.C.R.) shall not exceed the outside diameter.

"SF" refers to straight flange length normally supplied, however special SF lengths can be provided. "W" refers to nominal height normally supplied.

"ODD" refers to outside depth of dish. Dimensions are in inches.

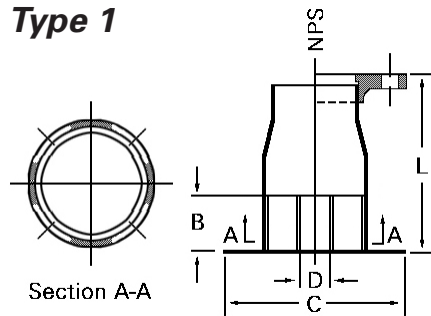
Available in "regular" thickness (similar to Schedule 40s).

Copper Nickel Bellmouth Fittings

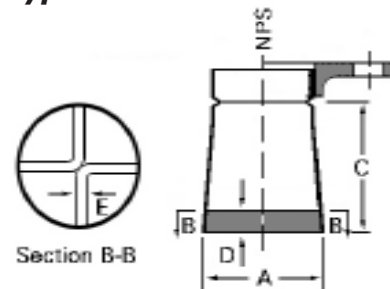
Bellmouths

- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.
- **Dimensions per BUSHIPS DWG. 810-1385792**
- **Bellmouths are available plain (for butt welding) or flanged. If flanged is required, please specify type of flange (BuShips, ANSI, etc.).**

Type 1



Type 2



Type 1

Nominal Pipe Size	D	B	C	L	90-10 Part Number	70-30 Part Number
$\frac{3}{4}$	$\frac{3}{8}$	$\frac{3}{4}$	3	2.815	273904	593508
1	$\frac{3}{8}$	$\frac{3}{4}$	$3\frac{1}{2}$	2.822	273881	593524
$1\frac{1}{4}$	$\frac{3}{8}$	$\frac{3}{4}$	4	3.322	593396	593532
$1\frac{1}{2}$	$\frac{1}{2}$	1	$4\frac{1}{2}$	4.083	273899	439649
2	$\frac{5}{8}$	$1\frac{1}{2}$	5	5.083	593401	593540
$2\frac{1}{2}$	1	2	6	5.595	593419	593558
3	$1\frac{1}{2}$	3	7	7.109	593427	593566
$3\frac{1}{2}$	$1\frac{3}{4}$	$3\frac{1}{2}$	$8\frac{1}{4}$	8.625	593451	273962
4	$1\frac{3}{4}$	$3\frac{1}{2}$	$8\frac{1}{4}$	8.625	593469	273938
5	2	4	$9\frac{1}{2}$	9.634	593477	456764
6	$2\frac{1}{2}$	5	12	11.148	593485	593574
8	3	$6\frac{1}{4}$	16	13.437	593493	593582
10	$3\frac{1}{2}$	$7\frac{1}{4}$	20	15.500	273873	593516

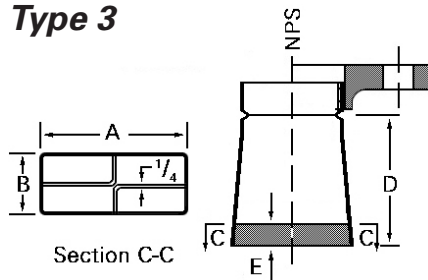
Type 2

Nominal Pipe Size	A	C	D	E	90-10 Part Number	70-30 Part Number
$1\frac{1}{4}$	$2\frac{1}{4}$	$1\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{16}$	593590	593710
$1\frac{1}{2}$	$2\frac{1}{8}$	1	$\frac{3}{4}$	$\frac{3}{16}$	593605	593728
2	$3\frac{5}{8}$	$2\frac{7}{8}$	$\frac{3}{4}$	$\frac{3}{16}$	593613	273946
$2\frac{1}{2}$	$4\frac{1}{8}$	$3\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{4}$	593621	593744
3	$6\frac{1}{4}$	6	$\frac{3}{4}$	$\frac{1}{4}$	593639	593752
$3\frac{1}{2}$	$6\frac{1}{4}$	$5\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{4}$	593647	593760
4	$8\frac{1}{8}$	$7\frac{5}{8}$	$\frac{3}{4}$	$\frac{1}{4}$	593655	487804
5	$12\frac{5}{8}$	$14\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{4}$	593663	593778
6	$13\frac{7}{8}$	$14\frac{5}{8}$	1	$\frac{1}{4}$	593697	412540
8	$20\frac{1}{4}$	$22\frac{7}{8}$	1	$\frac{1}{4}$	593702	593786

Copper Nickel Bellmouth Fittings (continued)

- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.
- Dimensions per BUSHIPS DWG. 810-1385792
- Bellmouths are available plain (for butt welding) or flanged. If flanged is required, please specify type of flange (BuShips, ANSI, etc.).

Type 3

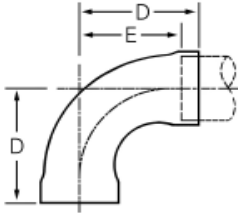


Nominal Pipe Size	A	B	E	D	90-10 Part Number	70-30 Part Number
3	6 ⁵ / ₈	3 ¹ / ₈	³ / ₄	6 ⁵ / ₈	593794	593859
3 ¹ / ₂	6 ¹ / ₂	3 ¹ / ₂	³ / ₄	5 ¹ / ₂	593809	593867
4	8 ³ / ₄	4	³ / ₄	8 ³ / ₄	593817	593875
5	15	5	³ / ₄	18 ¹ / ₂	593825	593883
6	15 ⁵ / ₈	6 ¹ / ₈	1	17 ³ / ₈	593833	593891
8	23 ⁷ / ₈	8	1	29 ⁵ / ₈	593841	593906

Dimensions are in inches. All weights are approximate.

Copper-Nickel Belled End Fittings

90° Long Radius Elbows - NAVSEA 802-5959353 App.B, MSS SP-119



- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	NAVSEA		MSS		Weight	NAVSEA/MSS	
			D	E	D	E		90-10 Part Number	70-30 Part Number
1/4	.540	.065	1.88	1.56	2.12	1.80	.2	479071**	479097**
3/8	.675	.065	1.94	1.62	2.12	1.80	.3	479186**	479209**
1/2	.840	.065	2.25	1.94	2.25	1.94	.5	479259	479275
3/4	1.050	.065	1.91	1.59	2.25	1.94	.6	479348**	479364**
1	1.315	.065	2.38	2.00	2.38	2.00	.7	479398	476691
1 1/4	1.660	.072	2.88	2.44	2.88	2.44	1	479453	479479
1 1/2	1.900	.072	3.50	2.94	3.50	2.94	1.	479526	476706
2	2.375	.083	4.28	3.72	4.28	3.72	2	469791	470603
2 1/2	2.875	.083	5.38	4.62	5.38	4.62	4	467456	471722
3	3.500	.095	6.17	5.41	6.17	5.41	5	469806	470629
3 1/2*	4.000	.095	6.98	6.18	6.98	6.18	8	508448	494487
4	4.500	.109	7.78	6.97	7.78	6.97	10	467464	471730
5	5.563	.125	9.53	8.59	9.53	8.59	16.5	468240	478790
6	6.625	.134	11.17	10.17	11.17	10.17	26.5	468258	476714
8	8.625	.151	14.62	13.38	14.62	13.38	36	467228	478821
10	10.75	.187	18.00	16.56	18.00	16.56	68	467278	467294
12	12.75	.250	21.25	19.69	21.25	19.69	120	478986	479005

Dimension E is center of fitting to end of adjoining pipe.

Dimension D is center to end of the fitting.

Dimensions are in inches.

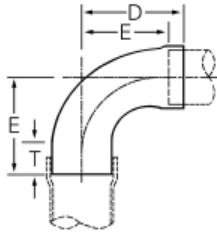
Sizes not shown may be available upon request.

*3 1/2" size is not included in NAVSEA or MSS, dimensions per Alaskan standards.

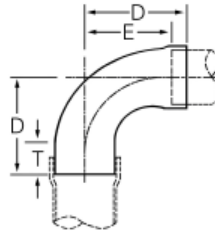
** Part numbers shown for sizes 1/4", 3/8" and 3/4" are NAVSEA, MSS also available.

Copper-Nickel Belled End Fittings

90° Long Radius Street Elbows - NAVSEA 802-5959353 App.B, MSS SP-119



NAVSEA



MSS

- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	NAVSEA				MSS				NAVSEA		MSS	
			D	E	T (Tangent)	Weight	D	E	T (Tangent)	90-10 Part Number	70-30 Part Number	90-10 Part Number	70-30 Part Number	
1/4	.540	.065	1.59	1.28	.28	.2	2.12	1.80	.62	479144	479160			
3/8	.675	.065	1.94	1.62	.38	.3	2.12	1.80	.62	479225	479233			
1/2	.840	.065	2.25	1.94	.44	.5	2.25	1.94	.75	479291	479314			
3/4	1.050	.065	1.91	1.59	.47	.6	2.25	1.94	.75	479372	479380			
1	1.315	.065	2.38	2.00	.50	.7	2.38	2.00	.88	479411	479437			
1 1/4	1.660	.072	2.88	2.44	.56	1	2.88	2.44	1.00	479487	479500			
1 1/2	1.900	.072	3.50	2.94	.69	1	3.50	2.94	1.25	479550	479576			
2	2.375	.083	4.28	3.72	.72	2	4.28	3.72	1.28	474267	478847			
2 1/2	2.875	.083	5.38	4.62	.88	4	5.38	4.62	1.63	469898	478863	494479	494607	
3	3.500	.095	6.17	5.41	.91	5	6.17	5.41	1.67	469903	478871	494453	494445	
3 1/2*	4.00	.095	6.98	6.18	.94	8	6.98	6.18	1.73					
4	4.500	.109	7.78	6.97	.97	9.6	7.78	6.97	1.78	469911	478897	494500		
5	5.563	.125	9.53	8.59	1.09	16.5	9.53	8.59	2.03	469929	478910			
6	6.625	.134	11.17	10.17	1.17	27	11.17	10.17	2.17	469945	478936			
8	8.625	.151	14.62	13.38	1.38	35	14.62	13.38	2.62	467236	478952	587086		
10	10.75	.187	18.00	16.56	1.56	65.5	18.00	16.56	3.00	474275	478960			
12	12.75	.250	21.25	19.69	1.69	116	21.25	19.69	3.25	479021	479039			

Dimension E is center to end of fitting for street end and center of fitting to end of adjoining pipe for socket end.

Dimension D is center to end of the fitting. Dimension T is the tangent length of the street end.

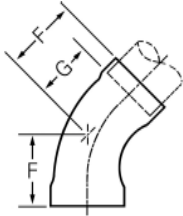
Dimensions are in inches.

Sizes not shown may be available upon request.

*3 1/2" size is not included in NAVSEA or MSS, dimensions per Alaskan standards.

Copper-Nickel Belled End Fittings

45° Long Radius Elbows - NAVSEA 802-5959353 App.B, MSS SP-119



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	NAVSEA		MSS		Weight	NAVSEA/MSS*	
			F	G	F	G		90-10 Part Number	70-30 Part Number
1/4	.540	.065	1.02	0.70	1.24	0.92	.1	477778	477794
3/8	.675	.065	1.20	0.89	1.24	0.92	.1	477825	477841
1/2	.840	.065	1.38	1.06	1.38	1.06	.4	477875	477930
3/4	1.050	.065	1.25	0.94	1.38	1.06	.6	477980	478017
1	1.315	.065	1.50	1.12	1.50	1.12	.7	474259	478041
1 1/4	1.660	.072	1.78	1.34	1.78	1.34	.9	478067	478083
1 1/2	1.900	.072	2.19	1.62	2.19	1.62	1	478106	478122
2	2.375	.083	2.53	1.97	2.53	1.97	2	476926	476730
2 1/2	2.875	.083	3.19	2.44	3.19	2.44	2	469814	478148
3	3.500	.095	3.52	2.76	3.52	2.76	4	469822	471756
3 1/2**	4.000	.095	3.96	3.17	3.96	3.17	6	564509	512853
4	4.500	.109	4.27	3.45	4.27	3.45	7	469830	476748
5	5.563	.125	5.14	4.20	5.14	4.20	11	469848	476756
6	6.625	.134	5.91	4.91	5.91	4.91	17	469856	471764
8	8.625	.151	7.59	6.34	7.59	6.34	22	467252	478172
10	10.75	.187	9.22	7.78	9.22	7.78	39	467286	467309
12	12.75	.250	10.70	9.14	10.70	9.14	80	478677	478693

Dimension G is center of fitting to end of adjoining pipe.

Dimension F is center to end of the fitting.

Dimensions are in inches.

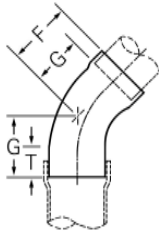
Sizes not shown may be available upon request.

*Part numbers shown for sizes 1/4", 3/8" and 3/4" are NAVSEA, MSS also available.

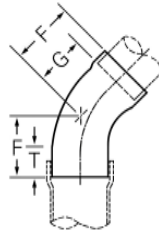
**3 1/2" size is not included in NAVSEA or MSS, dimensions per Alaskan standards.

Copper-Nickel Belled End Fittings

45° Long Radius Street Elbows - NAVSEA 802-5959353 App.B, MSS SP-119



NAVSEA



MSS

- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	NAVSEA			Weight	MSS			NAVSEA	MSS		
			F	G	T (Tangent)		F	G	T (Tangent)	90-10 Part Number	70-30 Part Number	90-10 Part Number	70-30 Part Number
1/4	.540	.065	1.02	0.70	0.28	.2	1.24	0.92	0.62	478180	478198		
3/8	.675	.065	1.20	0.89	0.38	.3	1.24	0.92	0.62	478203	478229		
1/2	.840	.065	1.38	1.06	0.44	.5	1.38	1.06	0.75	478253	478261		
3/4	1.050	.065	1.25	0.94	0.47	.6	1.38	1.06	0.75	478295	478318		
1	1.315	.065	1.50	1.12	0.50	.7	1.50	1.12	0.88	478334	478368	494356	
1 1/4	1.660	.072	1.78	1.34	0.56	1	1.78	1.34	1.00	478384	478415		
1 1/2	1.900	.072	2.19	1.62	0.69	1	2.19	1.62	1.25	478449	478457		
2	2.375	.083	2.53	1.97	0.72	2	2.53	1.97	1.28	474283	478473		
2 1/2	2.875	.083	3.19	2.44	0.88	4	3.19	2.44	1.63	469961	478499	494623	497273
3	3.500	.095	3.52	2.76	0.91	5	3.52	2.76	1.67	469995	478520	494380	
3 1/2*	4.000	.095	3.96	3.17	0.93	8	3.96	3.17	1.73				
4	4.500	.109	4.27	3.45	0.97	10	4.27	3.45	1.78	471706	478546	494364	496984
5	5.563	.125	5.14	4.20	1.09	16.5	5.14	4.20	2.03	470001	478562		
6	6.625	.134	5.91	4.91	1.17	26.5	5.91	4.91	2.17	470019	478588		
8	8.625	.151	7.59	6.34	1.38	21	7.59	6.34	2.62	467260	478601		
10	10.75	.187	9.22	7.78	1.56	36.5	9.22	7.78	3.00	470027	478627		
12	12.75	.250	10.70	9.14	1.69	76	10.70	9.14	3.25	474291	478643		

Dimension G is center to end of fitting for street end and center of fitting to end of adjoining pipe for socket end.

Dimension F is center to end of the fitting.

Dimension T is the tangent length of the street end.

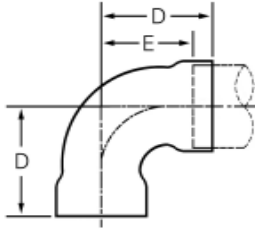
Dimensions are in inches.

Sizes not shown may be available upon request.

**3 1/2" size is not included in NAVSEA or MSS, dimensions per Alaskan standards.

Copper-Nickel Belled End Fittings

Short Radius 90° Elbows - NAVSEA 802-5959353 App.B, MSS SP-119



- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

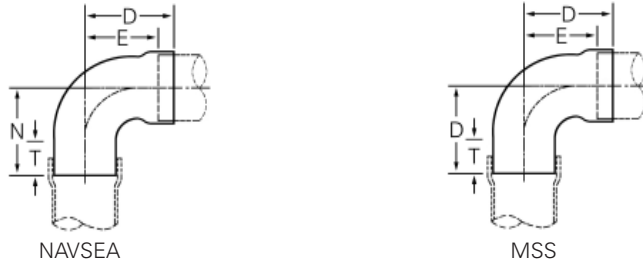
Nominal Pipe Size	OD	A (Min)	C (Min)	NAVSEA		MSS		NAVSEA/MSS			
				K	Nominal Wall	Weight	90-10 Part Number	70-30 Part Number	Nominal Wall	Weight	90-10 Part Number
1 1/2	1.900	2 3/16	1 1/16	1 1/2	.072	.5	413732	477621			
2	2.375	2 23/32	2 23/32	2	.083	1	132459	262343			
2 1/2	2.875	3 3/8	7/8	2 1/2	.083	1	132996	130106			
3	3.500	3 29/32	29/32	3	.095	2	132352	130130			
3 1/2	4.000	4 7/16	15/16	3 1/2	.095	2	132417	438449			
4	4.500	4 31/32	31/32	4	.109	3	132433	130172			
5	5.563	6 3/32	1 3/32	5	.125	6	133031	243250			
6	6.625	7 11/64	1 11/64	6	.134	11	133057	243268			
8	8.625	9 3/8	1 3/8	8	.148	19	132271	132849			
10	10.75	11 9/16	1 9/16	10	.187	36	132506	132776	.134	26	435784
12	12.75	13 11/16	1 11/16	12	.250	66	130318	284337	.156	41	435792
14	14.00	14 1/2	1/2	14	.250	80	130376	438457	.165	55	436772
16	16.00	16 1/2	1/2	16	.250	105	130431	437469	.165	70	435263
18	18.00	18 1/2	1/2	18	.250	131	435205	477639	.180	95	435344
20	20.00	20 1/2	1/2	20	.250	162	229688	433855	.180	135	439275
22	22.00	22 1/2	1/2	22	.250	196	477647	438465	.180	150	
24	24.00	24 1/2	1/2	24	.250	233	477655	477663	.180	176	439283
26	26.00	26 1/2	1/2	26	.250	276	467838				
30	30.00	30 1/2	1/2	30	.250	363	562010				
36	36.00	36 1/2	1/2	36	.250	521					

*NAVSEA part number only. MSS also available.

**3 1/2" size is not included in NAVSEA or MSS, dimensions per Alaskan standards.

Copper-Nickel Belled End Fittings

Short Radius 90° Street Elbows



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	NAVSEA				T (Tangent)	Weight	MSS			NAVSEA		MSS	
			D	E	N	D			E	T (Tangent)	90-10 Part Number	70-30 Part Number	90-10 Part Number	70-30 Part Number	
1	1.315	.081	1.75	1.37	1.50	0.50	.7	1.81	1.43	0.81	483559	483606	582272		
1 1/4	1.660	.090	2.00	1.56	1.81	0.56	1.5	2.00	1.56	1.00	483575	483614			
1 1/2	1.900	.090	2.62	2.06	2.19	0.69	2	2.62	2.06	1.12	483583	483622			
2	2.375	.104	3.12	2.56	2.72	0.72	3	3.12	2.56	1.12	483591	483630			
2 1/2	2.875	.104	4.00	3.25	3.38	0.88	3.5	4.00	3.25	1.50	470069	483486	494372		
3	3.500	.119	4.50	3.75	3.91	0.91	6	4.50	3.75	1.50	470077	483494	494461	589428	
3 1/2*	4.000	.119	5.06	4.31	4.44	0.93	7	5.06	4.31	1.56					
4	4.500	.136	5.62	4.81	4.97	0.97	10	5.62	4.80	1.62	470085	483509			
5	5.563	.156	6.75	5.81	6.09	1.09	17	6.75	5.81	1.75	474314	483517			
6	6.625	.168	7.81	6.81	7.17	1.17	23	7.81	6.81	1.81	470093	483525			
8	8.625	.189	10.19	8.94	9.38	1.38	32	10.19	8.94	2.19	470108	483533	497744		
10	10.75	.234	12.50	11.06	11.56	1.56	70	12.50	11.06	2.50	470116	483541	587060		
12	12.75	.313	14.62	13.06	13.69	1.69	97	14.62	13.06	2.62	483664	483672	587078		

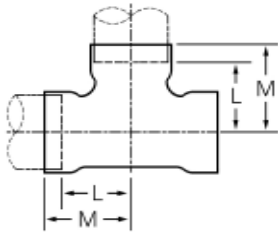
Dimensions N and D are fitting center to end.
 Dimension E is center of fitting to end of adjoining pipe.
 Dimension T is the tangent length of the street end.
 Dimensions are in inches.

Sizes not shown may be available upon request.

*3 1/2" size is not included in NAVSEA or MSS, dimensions per Alaskan standards.

Copper-Nickel Belled End Fittings

Straight Tees - NAVSEA 802-5959353 App.B, MSS SP-119



- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	M	L	Weight	NAVSEA/MSS	
						90-10 Part Number	70-30 Part Number
1/4	.540	.065	0.69	0.38	.1	481264	481280
3/8	.675	.065	0.91	0.59	.2	480276	481256
1/2	.840	.065	1.09	0.78	.4	481303	481329
3/4	1.050	.065	1.25	0.94	.5	481337	481345
1	1.315	.065	1.50	1.12	.7	481361	481387
1 1/4	1.660	.072	1.88	1.44	.9	481400	481426
1 1/2	1.900	.072	2.25	1.69	2	480284	481442
2	2.375	.083	2.50	1.94	2	470124	481549
2 1/2	2.875	.083	3.00	2.25	4	470132	481573
3	3.500	.095	3.38	2.62	4	470158	481599
3 1/2*	4.000	.095	3.75	2.94	7	568511	494495
4	4.500	.109	4.12	3.31	8	467472	470653
5	5.563	.125	4.88	3.94	11	470166	481620
6	6.625	.134	5.62	4.62	18	470174	481646
8	8.625	.151	7.00	5.75	36	467317	481662
10	10.75	.187	8.50	7.06	67	467325	467333
12	12.75	.250	10.00	8.43	135	481688	481701

Dimension M is center to end of the fitting.

Dimension L is center of fitting to end of adjoining pipe.

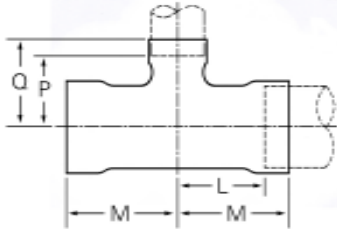
Dimensions are in inches.

Sizes not shown may be available upon request.

*3 1/2" size is not included in NAVSEA or MSS, dimensions per Alaskan standards.

Copper-Nickel Belled End Fittings

Reducing Tees - NAVSEA 802-5959353 App.B, MSS SP-119



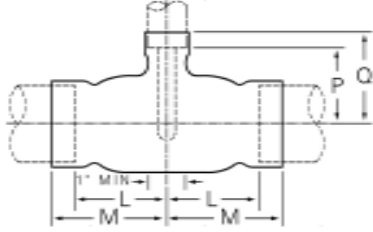
- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	M	L	Q	P	Weight	NAVSEA/MSS	
								90-10 Part Number	70-30 Part Number
1 x 1 x 3/4	1.315 x 1.315 x 1.05	.065	1.50	1.12	1.50	1.18	.4	587191	
2 x 2 x 1	2.375 x 2.375 x 1.315	.083	2.50	1.94	2.00	1.62	2	587183	499974
2 x 2 x 1 1/2	2.375 x 2.375 x 1.90	.083	2.50	1.94	2.38	1.82	2	480292	480307
2 1/2 x 2 1/2 x 1 1/4	2.875 x 2.875 x 1.66	.083	3.00	2.25	2.50	2.06	2	470205	479592
2 1/2 x 2 1/2 x 1 1/2	2.875 x 2.875 x 1.90	.083	3.00	2.25	2.62	2.06	2	470302	479893
2 1/2 x 2 1/2 x 2	2.875 x 2.875 x 2.375	.083	3.00	2.25	2.75	2.19	2	470297	479885
3 x 3 x 1 1/2	3.500 x 3.500 x 1.90	.095	3.38	2.62	2.88	2.32	3	470213	479607
3 x 3 x 2	3.500 x 3.500 x 2.375	.095	3.38	2.62	3.00	2.44	3	470849	479869
3 x 3 x 2 1/2	3.500 x 3.500 x 2.875	.095	3.38	2.62	3.25	2.50	3	470263	479819
4 x 4 x 2	4.500 x 4.500 x 2.375	.109	4.12	3.31	3.50	2.94	5.5	470221	479615
4 x 4 x 2 1/2	4.500 x 4.500 x 2.875	.109	4.12	3.31	3.75	3.00	5.5	470310	479916
4 x 4 x 3	4.500 x 4.500 x 3.500	.109	4.12	3.31	3.88	3.13	6	474330	479932
5 x 5 x 2 1/2	5.563 x 5.563 x 2.875	.125	4.88	3.94	4.25	3.50	9	470239	479623
5 x 5 x 3	5.563 x 5.563 x 3.500	.125	4.88	3.94	4.38	3.63	9	480006	479974
5 x 5 x 4	5.563 x 5.563 x 4.500	.125	4.88	3.94	4.62	3.80	9.5	470271	479827
6 x 6 x 3	6.625 x 6.625 x 3.500	.134	5.62	4.62	4.88	4.13	13.5	470247	479631
6 x 6 x 4	6.625 x 6.625 x 4.500	.134	5.62	4.62	5.12	4.30	14	474322	479657
6 x 6 x 5	6.625 x 6.625 x 5.563	.134	5.62	4.62	5.38	4.44	14	470289	479851
8 x 8 x 4	8.625 x 8.625 x 4.500	.151	7.00	5.75	6.12	5.30	26	467391	479704
8 x 8 x 5	8.625 x 8.625 x 5.563	.151	7.00	5.75	6.38	5.44	27	467406	479720
8 x 8 x 6	8.625 x 8.625 x 6.625	.151	7.00	5.75	6.62	5.62	27	467414	479738
10 x 10 x 5	10.75 x 10.75 x 5.563	.187	8.50	7.06	7.50	6.56	50	470255	479754
10 x 10 x 6	10.75 x 10.75 x 6.625	.187	8.50	7.06	7.62	6.62	50.5	476007	479958
10 x 10 x 8	10.75 x 10.75 x 8.625	.187	8.50	7.06	8.00	6.75	52	480080	480103
12 x 12 x 6	12.75 x 12.75 x 6.625	.250	10.00	8.43	8.62	7.62	116	479796	479770
12 x 12 x 8	12.75 x 12.75 x 8.625	.250	10.00	8.43	9.00	7.75	117	480129	480153
12 x 12 x 10	12.75 x 12.75 x 10.75	.250	10.00	8.43	9.50	8.06	120	480030	480064

Dimensions M and Q are center to end of fitting.
 Dimensions P and L are center of fitting to end of adjoining pipe.
 Dimensions are in inches.
 Sizes not shown may be available upon request.

Copper-Nickel Belled End Fittings

Straight Thermowell Tees- NAVSEA 802-5959353 App.B, MSS SP-119



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	Body Nominal Pipe Size	Minimum Wall	L	M	P	Q	Weight	90-10 Part Number	70-30 Part Number
$1/2 \times 1/2 \times 3/4$	$3/4$	.065	2.18	2.5	1.87	2.19	.5	470572	480268
$3/4 \times 3/4 \times 3/4$	1	.065	2.18	2.5	1.87	2.19	.7	483428	483452
$1 \times 1 \times 3/4$	$1 1/4$	.065	2.12	2.5	1.87	2.19	.8	483436	483266
$1 1/4 \times 1 1/4 \times 3/4$	$1 1/2$	.072	2.56	3.0	2.06	2.38	1	483444	483274
$1 1/2 \times 1 1/2 \times 3/4$	2	.072	2.44	3.0	2.06	2.38	1.5	483460	483478

Dimensions M and Q are center to end of fitting.

Dimensions P and L are center of fitting to end of adjoining pipe or thermowell base.

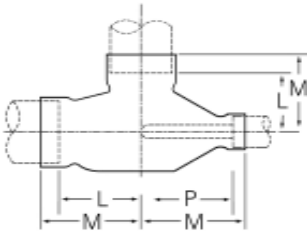
Fitting minimum wall thickness corresponds with Body Nominal Pipe Size.

The radius of curvature of the external contoured portion of the branch outlet measured in the plane containing the axes of the run and branch shall not be less than 0.05 times the outside diameter of the branch.

Dimensions are in inches.

Sizes not shown may be available upon request.

Angle Thermowell Tees- NAVSEA 802-5959353 App.B, MSS SP-119



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	Body Nominal Pipe Size	Minimum Wall	L	M	P	Weight	90-10 Part Number	70-30 Part Number
$1/2 \times 3/4 \times 1/2$	$3/4$	.065	1.88	2.19	1.88	.5	483787	483826
$3/4 \times 3/4 \times 3/4$	1	.065	1.88	2.19	1.88	.6	483795	483834
$1 \times 3/4 \times 1$	$1 1/4$	.065	1.82	2.19	1.88	.8	483800	483842
$1 1/4 \times 3/4 \times 1 1/4$	$1 1/2$	.072	1.94	2.38	2.07	1	483818	483850

Dimension M is center to end of fitting.

Dimensions P and L are center of fitting to end of adjoining pipe or thermowell base.

Fitting minimum wall thickness corresponds with Body Nominal Pipe Size.

The radius of curvature of the external contoured portion of the branch outlet measured in the plane containing the axes of the run and branch shall not be less than 0.05 times the outside diameter of the branch.

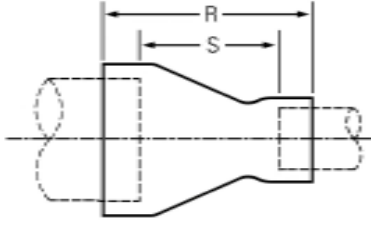
There shall be sufficient tangent length in the midbody of each fitting to form the branch and not effect the midbody to run transition shape.

Dimensions are in inches.

Sizes not shown may be available upon request.

Copper-Nickel Belled End Fittings

Concentric Reducers - NAVSEA 802-5959353 App.B, MSS SP-119



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals 90-10:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Nominal Chemicals 70-30:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	R	S	Weight	NAVSEA/MSS	
						90-10 Part Number	70-30 Part Number
$\frac{3}{8} \times \frac{1}{4}$	.675 x .540	.065	1.84	1.22	.1	481735	481743
$\frac{1}{2} \times \frac{1}{4}$	.840 x .540	.065	1.90	1.27	.1	481777	482587
$\frac{1}{2} \times \frac{3}{8}$	.840 x .675	.065	1.90	1.27	.2	481824	482595
$\frac{3}{4} \times \frac{1}{4}$	1.05 x .540	.065	1.90	1.27	.2	482600	482781
$\frac{3}{4} \times \frac{3}{8}$	1.05 x .675	.065	1.90	1.27	.2	482618	482799
$\frac{3}{4} \times \frac{1}{2}$	1.05 x .840	.065	1.90	1.27	.2	482626	482804
1 x $\frac{1}{4}$	1.315 x .540	.065	2.60	1.91	.3	482634	482812
1 x $\frac{3}{8}$	1.315 x .675	.065	2.60	1.91	.3	482642	482820
1 x $\frac{1}{2}$	1.315 x .840	.065	2.60	1.91	.3	482650	482838
1 x $\frac{3}{4}$	1.315 x 1.05	.065	2.60	1.91	.3	482668	482846
1 $\frac{1}{4} \times \frac{1}{4}$	1.66 x .540	.072	2.75	2.00	.6	482676	482854
1 $\frac{1}{4} \times \frac{3}{8}$	1.66 x .675	.072	2.75	2.00	.6	482684	482862
1 $\frac{1}{4} \times \frac{1}{2}$	1.66 x .840	.072	2.75	2.00	.6	474518	482870
1 $\frac{1}{4} \times \frac{3}{4}$	1.66 x 1.05	.072	2.75	2.00	.6	482692	482888
1 $\frac{1}{4} \times 1$	1.66 x 1.315	.072	2.75	1.94	.6	482707	482896
1 $\frac{1}{2} \times \frac{1}{4}$	1.90 x .540	.072	3.37	2.50	.7	482715	482901
1 $\frac{1}{2} \times \frac{3}{8}$	1.90 x .675	.072	3.37	2.50	.7	482723	482919
1 $\frac{1}{2} \times \frac{1}{2}$	1.90 x .840	.072	3.37	2.50	.7	482731	482927
1 $\frac{1}{2} \times \frac{3}{4}$	1.90 x 1.05	.072	3.37	2.50	.7	474526	482935
1 $\frac{1}{2} \times 1$	1.90 x 1.315	.072	3.37	2.44	.7	482749	482943
1 $\frac{1}{2} \times 1 \frac{1}{4}$	1.90 x 1.66	.072	3.37	2.37	.7	474534	482951
2 x $\frac{1}{2}$	2.375 x .840	.083	3.84	2.97	.9	482757	482969
2 x $\frac{3}{4}$	2.375 x 1.05	.083	3.84	2.97	.9	482765	482985
2 x 1	2.375 x 1.315	.083	3.84	2.90	.9	482773	482993
2 x 1 $\frac{1}{4}$	2.375 x 1.66	.083	3.84	2.84	.9	474380	483004
2 x 1 $\frac{1}{2}$	2.375 x 1.90	.083	3.84	2.72	.9	480551	474403
2 $\frac{1}{2} \times 1^{**}$	2.875 x 1.315	.083	4.34*	3.15*	1	501412	
2 $\frac{1}{2} \times 1 \frac{1}{4}$	2.875 x 1.66	.083	4.34*	3.15*	1	495962	480616
2 $\frac{1}{2} \times 1 \frac{1}{2}$	2.875 x 1.90	.083	4.34*	3.03*	1	495954	480632
2 $\frac{1}{2} \times 2$	2.875 x 2.375	.083	4.34*	3.03*	1	494681	480640

Dimension R is end to end of fitting. Dimension S is end to end of the adjoining pipe. Dimensions are in inches. Sizes not shown may be available upon request.

*MSS SP-119 dimensions are .19" longer.

**These sizes not included in NAVSEA/MSS, dimensions per Alaskan standards. All other sizes are dual certified.

Copper-Nickel Belled End Fittings

Concentric Reducers - NAVSEA 802-5959353 App.B, MSS SP-119 (continued)

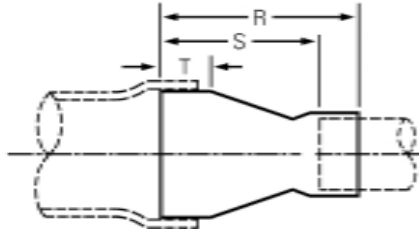
Nominal Pipe Size	OD	Minimum Wall	R	S	Weight	NAVSEA/MSS	
						90-10 Part Number	70-30 Part Number
3 x 1**	3.50 x 1.315	.095	4.72	3.40	2		
3 x 1 1/4**	3.50 x 1.66	.095	4.72	3.40	2	501420	
3 x 1 1/2	3.50 x 1.90	.095	4.72	3.40	2	470700	471798
3 x 2	3.50 x 2.375	.095	4.72	3.40	2	470718	480666
3 x 2 1/2	3.50 x 2.875	.095	4.72	3.22	2	470726	480682
3 1/2 x 1 1/2*	4.00 x 1.90	.095	5.25	3.78	2	584729	
3 1/2 x 2*	4.00 x 2.375	.095	5.25	3.78	2	512706	
3 1/2 x 2 1/2*	4.00 x 2.875	.095	5.25	3.59	2	584737	
3 1/2 x 3*	4.00 x 3.50	.095	5.25	3.59	2	512691	
4 x 2	4.50 x 2.375	.109	5.25	3.87	3	470734	480690
4 x 2 1/2	4.50 x 2.875	.109	5.25	3.69	3	467498	480713
4 x 3	4.50 x 3.50	.109	5.25	3.69	3	470742	480739
4 x 3 1/2*	4.50 x 4.00	.109	5.25	3.66	3	512683	
5 x 2 1/2	5.563 x 2.875	.125	6.32	4.63	6	480755	480771
5 x 3	5.563 x 3.50	.125	6.32	4.63	6	470750	480797
5 x 3 1/2*	5.563 x 4.00	.125	6.32	4.66	6	574384	
5 x 4	5.563 x 4.50	.125	6.32	4.57	6	470768	480828
6 x 2 1/2*	6.625 x 2.875	.134	6.80	5.12	8	491154	
6 x 3	6.625 x 3.50	.134	6.80	5.05	8	470776	480852
6 x 3 1/2*	6.625 x 4.00	.134	6.80	5.02	8	491162	
6 x 4	6.625 x 4.50	.134	6.80	4.99	8	470792	480886
6 x 5	6.625 x 5.563	.134	6.80	4.86	8	470807	480933
8 x 4	8.625 x 4.50	.148	7.45	5.39	12	480983	481002
8 x 5	8.625 x 5.563	.148	7.45	5.26	12	470815	481010
8 x 6	8.625 x 6.625	.148	7.45	5.20	12	470823	481036
10 x 5	10.75 x 5.563	.187	8.75	6.38	23	481052	481078
10 x 6	10.75 x 6.625	.187	8.75	6.32	24	481094	481117
10 x 8	10.75 x 8.625	.187	8.75	6.06	25	474398	481125
12 x 6	12.75 x 6.625	.250	9.87	7.31	34	481133	481159
12 x 8	12.75 x 8.625	.250	9.87	7.06	36	481183	481191
12 x 10	12.75 x 10.75	.250	9.87	6.87	38	481214	481248

Dimension R is end to end of fitting. Dimension S is end to end of the adjoining pipe. Dimensions are in inches.
 Sizes not shown may be available upon request.

*These sizes are not included in NAVSEA/MSS, dimensions per Alaskan standards.
 All other sizes are dual certified.

Copper-Nickel Belled End Fittings

Concentric Street Reducers - NAVSEA 802-5959353 App.B, MSS SP-119



- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	T Tangent	NAVSEA			MSS SP-119			NAVSEA		MSS SP-119	
				R	S	Weight	R	S	Weight	90-10 Part Number	70-30 Part Number	90-10 Part Number	70-30 Part Number
3/8 x 1/4	.675 x .540	.065	.38	1.59	1.28	.11	1.84	1.52	.12	471714	482197	591289	591297
1/2 x 1/4	.840 x .540	.065	.44	1.75	1.44	.12	1.90	1.58	.13	470556	482202	591310	591328
1/2 x 3/8	.840 x .675	.065	.44	1.75	1.44	.12	1.90	1.58	.13	480331	482210	591336	591344
3/4 x 1/4	1.05 x .540	.065	.47	1.81	1.50	.13	1.90	1.58	.14	481832	482228	591360	591378
3/4 x 3/8	1.05 x .675	.065	.47	1.81	1.50	.13	1.90	1.58	.14	481840	482236	591394	591409
3/4 x 1/2	1.05 x .840	.065	.47	1.81	1.50	.13	1.90	1.58	.14	481858	482244	563993	591425
1 x 1/4	1.315 x .540	.065	.5	2.28	1.96	.22	2.60	2.28	.25	481866	482252	591433	591441
1 x 3/8	1.315 x .675	.065	.5	2.28	1.96	.22	2.60	2.28	.25	481971	482260	591459	591467
1 x 1/2	1.315 x .840	.065	.5	2.28	1.96	.22	2.60	2.28	.25	481989	482278	591475	591483
1 x 3/4	1.315 x 1.05	.065	.5	2.28	1.96	.22	2.60	2.28	.25	482008	482286	564004	591491
1 1/4 x 1/4	1.66 x .540	.072	.56	2.31	2.00	.3	2.75	2.43	.35	482016	482294	591506	591514
1 1/4 x 3/8	1.66 x .675	.072	.56	2.31	2.00	.3	2.75	2.43	.35	482032	482309	591522	591530
1 1/4 x 1/2	1.66 x .840	.072	.56	2.31	2.00	.3	2.75	2.43	.35	482040	482317	587418	591548
1 1/4 x 3/4	1.66 x 1.05	.072	.56	2.31	2.00	.3	2.75	2.43	.35	482058	482325	591556	497728
1 1/4 x 1	1.66 x 1.315	.072	.56	2.31	1.94	.3	2.75	2.37	.35	482066	482333	564012	591564
1 1/2 x 1/4	1.90 x .540	.072	.69	2.94	2.62	.4	3.37	3.05	.5	470564	482341	591611	591629
1 1/2 x 3/8	1.90 x .675	.072	.69	2.94	2.62	.4	3.37	3.05	.5	482074	482359	591637	591645
1 1/2 x 1/2	1.90 x .840	.072	.69	2.94	2.62	.4	3.37	3.05	.5	474495	482367	564020	591653
1 1/2 x 3/4	1.90 x 1.05	.072	.69	2.94	2.62	.4	3.37	3.05	.5	482082	482375	564038	591661
1 1/2 x 1	1.90 x 1.315	.072	.69	2.94	2.56	.4	3.37	3.00	.5	482090	482383	494615	591679
1 1/2 x 1 1/4	1.90 x 1.66	.072	.69	2.94	2.50	.4	3.37	2.93	.5	482105	482391	564046	591687
2 x 1/2	2.375 x .840	.083	.72	3.44	3.12	.7	3.84	3.52	.8	482113	482406	587492	591700
2 x 3/4	2.375 x 1.05	.083	.72	3.44	3.12	.7	3.84	3.52	.8	482121	482414	564054	591718
2 x 1	2.375 x 1.315	.083	.72	3.44	3.06	.7	3.84	3.46	.8	470328	482422	564062	591815
2 x 1 1/4	2.375 x 1.66	.083	.72	3.44	3.00	.7	3.84	3.40	.8	476934	482430	564070	591823
2 x 1 1/2	2.375 x 1.90	.083	.72	3.44	2.88	.7	3.84	3.28	.8	470336	481874	561771	508286
2 1/2 x 1*	2.875 x 1.315	.083	.88	3.91	3.49	.95	4.53	4.15	1.1	584672	591849	591857	505995
2 1/2 x 1 1/4	2.875 x 1.66	.083	.88	3.91	3.47	.95	4.53	4.09	1.1	470344	481882	564088	591865
2 1/2 x 1 1/2	2.875 x 1.90	.083	.88	3.91	3.34	.95	4.53	3.97	1.1	467480	474500	502426	508278
2 1/2 x 2	2.875 x 2.375	.083	.88	3.91	3.34	.95	4.53	3.97	1.1	470352	481890	494796	507094

Dimension R is end to end of fitting. Dimension S is end of fitting to end of adjoining pipe. Dimension T is the tangent length of the street end. Dimensions are in inches. Sizes not shown may be available upon request.

*These sizes not included in NAVSEA/MSS, dimensions per Alaskan standards. Dimensions for all other sizes qualify for both NAVSEA/MSS.

Copper-Nickel Belled End Fittings

Concentric Street Reducers - NAVSEA 802-5959353 App.B, MSS SP-119 (continued)

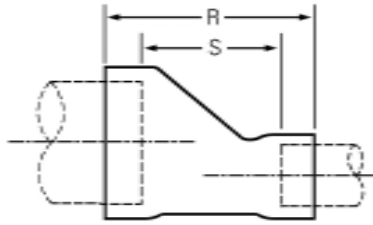
Nominal Pipe Size	OD	Minimum Wall	T Tangent	NAVSEA			MSS SP-119			NAVSEA		MSS SP-119	
				R	S	Weight	R	S	Weight	90-10 Part Number	70-30 Part Number	90-10 Part Number	70-30 Part Number
3 x 1*	3.50 x 1.315	.095	.91	4.12	3.70	1.8	4.72	4.34	2	581064	591996	591988	592007
3 x 1 1/4*	3.50 x 1.66	.095	.91	4.12	3.68	1.8	4.72	4.28	2	568870	592023	592015	592031
3 x 1 1/2	3.50 x 1.90	.095	.91	4.12	3.56	1.8	4.72	4.16	2	470360	474372	578427	592049
3 x 2	3.50 x 2.375	.095	.91	4.12	3.56	1.8	4.72	4.16	2	470378	471772	494429	497736
3 x 2 1/2	3.50 x 2.875	.095	.91	4.12	3.38	1.8	4.72	3.97	2	470386	481905	494411	497281
3 1/2 x 1 1/2*	4.00 x 1.90	.095	.93	4.59	4.03	2	5.25	4.69	2.3	585466	592057	592065	592073
3 1/2 x 2*	4.00 x 2.375	.095	.93	4.59	4.03	2	5.25	4.69	2.3	583919	592099	585424	592104
3 1/2 x 2 1/2*	4.00 x 2.875	.095	.93	4.59	3.84	2	5.25	4.50	2.3	585440	592154	592188	592170
3 1/2 x 3*	4.00 x 3.50	.095	.93	4.59	3.84	2	5.25	4.57	2.3	583901	592196	586226	592201
4 x 2	4.50 x 2.375	.109	.97	4.59	4.03	2.3	5.25	4.69	2.7	470394	481913	592219	494398
4 x 2 1/2	4.50 x 2.875	.109	.97	4.59	3.84	2.3	5.25	4.50	2.7	470409	482448	492516	495970
4 x 3	4.50 x 3.50	.109	.97	4.59	3.84	2.3	5.25	4.50	2.7	470417	482456	494403	560416
4 x 3 1/2*	4.50 x 4.00	.109	.97	4.59	3.80	2.3	5.25	4.50	2.7	581072	592235	592227	592243
5 x 2 1/2	5.563 x 2.875	.125	1.09	5.66	4.91	5	6.32	5.57	5.5	482139	482464	592251	592269
5 x 3	5.563 x 3.50	.125	1.09	5.66	4.91	5	6.32	5.57	5.5	470425	482472	592277	560385
5 x 3 1/2*	5.563 x 4.00	.125	1.09	5.66	4.87	5	6.32	5.53	5.5	584680	592293	592285	592308
5 x 4	5.563 x 4.50	.125	1.09	5.66	4.84	5	6.32	5.50	5.5	470433	482480	592316	560377
6 x 2 1/2*	6.625 x 2.875	.134	1.17	6.16	5.41	7	6.80	6.05	7.6	549216	592332	592324	578833
6 x 3	6.625 x 3.50	.134	1.17	6.16	5.41	7	6.80	6.05	7.6	470441	482503	551938	592340
6 x 3 1/2*	6.625 x 4.00	.134	1.17	6.16	5.37	7	6.80	6.01	7.6	592358	592374	592366	592382
6 x 4	6.625 x 4.50	.134	1.17	6.16	5.34	7	6.80	5.98	7.6	470467	482511	551946	592390
6 x 5	6.625 x 5.563	.134	1.17	6.16	5.22	7	6.80	5.86	7.6	470475	482529	592455	560806
8 x 4	8.625 x 4.50	.151	1.38	6.64	5.83	11	7.45	6.63	12	470483	482537	592463	592471
8 x 5	8.625 x 5.563	.151	1.38	6.64	5.70	11	7.45	6.51	12	470491	482545	592489	592497
8 x 6	8.625 x 6.625	.151	1.38	6.64	5.64	11	7.45	6.45	12	470506	471780	592502	496918
8 x 7	8.625 x 7.625	.148	1.38	6.64	5.64	12	7.45	6.33	13	568707	592528	592510	592536
10 x 5	10.75 x 5.563	.187	1.56	7.81	6.88	17	8.75	7.81	18	482147	482553	592544	592552
10 x 6	10.75 x 6.625	.187	1.56	7.81	6.81	18	8.75	7.75	19	482155	482561	592560	592578
10 x 8	10.75 x 8.625	.187	1.56	7.81	6.56	18	8.75	7.50	19	474348	483397	592586	495425
12 x 6	12.75 x 6.625	.250	1.69	8.94	7.94	29	9.87	8.87	30	482163	482579	592594	592609
12 x 8	12.75 x 8.625	.250	1.69	8.94	7.69	30	9.87	8.62	31	482171	483402	592617	592625
12 x 10	12.75 x 10.75	.250	1.69	8.94	7.50	31	9.87	8.43	32	482189	483410	592633	592641

Dimension R is end to end of fitting. Dimension S is end of fitting to end of pipe. Dimension T is the tangent length of the street end. Dimensions are in inches. Sizes not shown may be available upon request.

*These sizes not included in NAVSEA/MSS, dimensions per Alaskan standards. Dimensions for all other sizes qualify for both NAVSEA/MSS.

Copper-Nickel Belled End Fittings

Eccentric Reducers - NAVSEA 802-5959353 App.B, MSS SP-119



- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	R	S	Weight	NAVSEA/MSS	
						90-10 Part Number	70-30 Part Number
$\frac{3}{8} \times \frac{1}{4}$	.675 x .540	.065	1.84	1.22	.1	483884	484369
$\frac{1}{2} \times \frac{1}{4}$	.840 x .540	.065	1.90	1.27	.1	483876	484377
$\frac{1}{2} \times \frac{3}{8}$	.840 x .675	.065	1.90	1.27	.2	483892	484385
$\frac{3}{4} \times \frac{1}{4}$	1.05 x .540	.065	1.90	1.27	.2	483868	484393
$\frac{3}{4} \times \frac{3}{8}$	1.05 x .675	.065	1.90	1.27	.2	483907	484408
$\frac{3}{4} \times \frac{1}{2}$	1.05 x .840	.065	1.90	1.27	.2	483915	484416
1 x $\frac{1}{4}$	1.315 x .540	.065	2.60	1.91	.3	483923	484424
1 x $\frac{3}{8}$	1.315 x .675	.065	2.60	1.91	.3	483931	484432
1 x $\frac{1}{2}$	1.315 x .840	.065	2.60	1.91	.3	483949	484440
1 x $\frac{3}{4}$	1.315 x 1.05	.065	2.60	1.91	.3	483957	484458
1 $\frac{1}{4} \times \frac{1}{4}$	1.66 x .540	.072	2.75	2.00	.6	483965	484466
1 $\frac{1}{4} \times \frac{3}{8}$	1.66 x .675	.072	2.75	2.00	.6	483973	484474
1 $\frac{1}{4} \times \frac{1}{2}$	1.66 x .840	.072	2.75	2.00	.6	483981	484482
1 $\frac{1}{4} \times \frac{3}{4}$	1.66 x 1.05	.072	2.75	2.00	.6	483999	484490
1 $\frac{1}{4} \times 1$	1.66 x 1.315	.072	2.75	1.94	.6	484000	484505
1 $\frac{1}{2} \times \frac{1}{4}$	1.90 x .540	.072	3.37	2.50	.7	484018	484513
1 $\frac{1}{2} \times \frac{3}{8}$	1.90 x .675	.072	3.37	2.50	.7	484026	484521
1 $\frac{1}{2} \times \frac{1}{2}$	1.90 x .840	.072	3.37	2.50	.7	484034	484539
1 $\frac{1}{2} \times \frac{3}{4}$	1.90 x 1.05	.072	3.37	2.50	.7	484042	484547
1 $\frac{1}{2} \times 1$	1.90 x 1.315	.072	3.37	2.44	.7	484050	484555
1 $\frac{1}{2} \times 1 \frac{1}{4}$	1.90 x 1.66	.072	3.37	2.37	.7	484068	484563
2 x $\frac{1}{2}$	2.375 x .840	.083	3.84	2.97	.9	484076	484571
2 x $\frac{3}{4}$	2.375 x 1.05	.083	3.84	2.97	.9	484084	484589
2 x 1	2.375 x 1.315	.083	3.84	2.90	.9	484092	484597
2 x 1 $\frac{1}{4}$	2.375 x 1.66	.083	3.84	2.84	.9	484107	484602
2 x 1 $\frac{1}{2}$	2.375 x 1.90	.083	3.84	2.72	.9	484115	484610
2 $\frac{1}{2} \times 1 \frac{1}{4}$	2.875 x 1.66	.083	4.34	3.15	1	484123	484628
2 $\frac{1}{2} \times 1 \frac{1}{2}$	2.875 x 1.90	.083	4.34	3.03	1	484131	484636
2 $\frac{1}{2} \times 2$	2.875 x 2.375	.083	4.34	3.03	1	484149**	484644

Dimension R is end to end of fitting. Dimension S is end to end of the adjoining pipe.
Dimensions are in inches.

Sizes not shown may be available upon request.

Also available as Street Reducers.

*2 $\frac{1}{2}$ " reducers are .19" longer on MSS.

**MSS part number.

Copper-Nickel Belled End Fittings

Eccentric Reducers - NAVSEA 802-5959353 App.B, MSS SP-119 (continued)

Nominal Pipe Size	OD	Minimum Wall	R*	S*	Weight	NAVSEA/MSS	
						90-10 Part Number	70-30 Part Number
3 x 1 1/2	3.50 x 1.90	.095	4.72	3.40	2	484157	484652
3 x 2	3.50 x 2.375	.095	4.72	3.40	2	484165	484660
3 x 2 1/2	3.50 x 2.875	.095	4.72	3.22	2	484173	484678
4 x 2	4.50 x 2.375	.109	5.25	3.87	3	484181	484686
4 x 2 1/2	4.50 x 2.875	.109	5.25	3.69	3	484199	484694
4 x 3	4.50 x 3.50	.109	5.25	3.69	3	484204	484709
5 x 2 1/2	5.563 x 2.875	.125	6.32	4.63	6	484212	484717
5 x 3	5.563 x 3.50	.125	6.32	4.63	6	484220	484725
5 x 4	5.563 x 4.50	.125	6.32	4.57	6	484238	484733
6 x 3	6.625 x 3.50	.134	6.80	5.05	8	484246	484741
6 x 4	6.625 x 4.50	.134	6.80	4.99	8	484254	484759
6 x 5	6.625 x 5.563	.134	6.80	4.86	8	484262	484767
8 x 4	8.625 x 4.50	.151	7.45	5.39	12	484270	484775
8 x 5	8.625 x 5.563	.151	7.45	5.26	12	484288	484783
8 x 6	8.625 x 6.625	.151	7.45	5.20	12	484296	484791
10 x 5	10.75 x 5.563	.187	8.75	6.38	23	484301	484806
10 x 6	10.75 x 6.625	.187	8.75	6.32	24	484319	484814
10 x 8	10.75 x 8.625	.187	8.75	6.06	25	484327	484822
12 x 6	12.75 x 6.625	.250	9.87	7.31	34	484335	484830
12 x 8	12.75 x 8.625	.250	9.87	7.06	36	484343	484848
12 x 10	12.75 x 10.75	.250	9.87	6.87	38	484351	484856

Dimension R is end to end of fitting. Dimension S is end to end of the adjoining pipe.
Dimensions are in inches.

Sizes not shown may be available upon request.

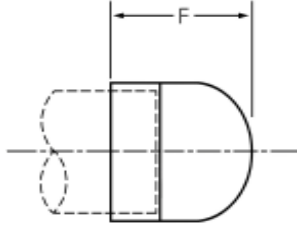
Also available as Street Reducers.

*2 1/2" reducers are .19" longer on MSS.

**MSS part number.

Copper-Nickel Belled End Fittings

Caps- NAVSEA 802-5959353 App.B, MSS SP-119



- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	OD	Minimum Wall	Cap F	Weight	NAVSEA/MSS	
					90-10 Part Number	70-30 Part Number
1/4	.540	.065	0.85	.3	483046	483135
3/8	.675	.065	1.00	.3	483054	483143
1/2	.840	.065	1.19	.35	483062	483151
3/4	1.050	.065	1.19	.4	483070	483169
1	1.315	.065	1.44	.4	483088	483177
1 1/4	1.66	.072	1.44	.5	483096	483185
1 1/2	1.90	.072	1.44	.6	480315	483020
2	2.375	.083	1.44	.6	483101	470661
2 1/2	2.875	.083	1.44	.7	480323	483038
3	3.50	.095	1.90	.95	477338	483193
3 1/2*	4.00	.095	2.41	1	496887	
4	4.50	.109	2.41	2	474356	483208
5	5.563	.125	2.91	3	483119	483216
6	6.625	.134	3.39	5	470580	483224
8	8.625	.151	3.94	9	467341	483232
10	10.75	.187	4.94	19	470598	483240
12	12.75	.250	5.93	32	483127	483258

Dimension F is the end to end of the fitting.

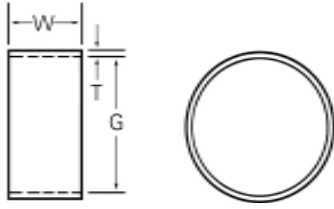
Dimensions are in inches.

Sizes not shown may be available upon request.

*3 1/2 size is not included in NAVSEA/MSS, dimensions per Alaskan standards.

Copper-Nickel Belled End Fittings

Couplings - MSS SP-119



Dimensions per MSS SP-119

- UNS Designation Numbers: 90-10 (UNS C70600) and 70-30 (UNS C71500).
- Nominal Chemicals 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- Nominal Chemicals 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.

Nominal Pipe Size	Inside Diameter G (Min)	W	Minimum Thickness T	Weight	90-10 Part Number	70-30 Part Number
1/4	.57	.88	.07	.03		
3/8	.70	.88	.07	.04	565547	
1/2	.87	.88	.07	.09	469686	
3/4	1.08	.88	.07	.1	585628	
1	1.35	1.0	.07	.15	587028	
1 1/4	1.69	1.12	.08	.2	587036	
1 1/2	1.93	1.36	.08	.3	469725	
2	2.41	1.36	.09	.3	578809	
2 1/2	2.91	1.74	.09	.55	469741	
3	3.53	1.74	.10	.7	501739	
3 1/2*	4.03	2	.10	1	501747	
4	4.53	1.88	.12	1	558590	496683
5	5.59	2.12	.14	2	578841	502222
6	6.66	2.24	.15	2.5	561810	580343
8	8.66	2.74	.16	5	561713	502248
10	10.79	3.12	.20	11	501797	502256
12	12.79	3.36	.27	16	501802	502264

Dimensions are in inches.

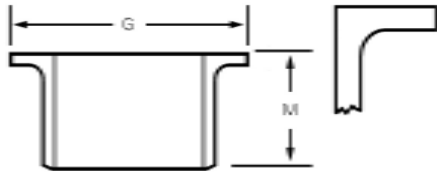
Specifications: pg. 61. Tolerances: pg. 58.

Closure couplings to MSS SP-119 available on request.

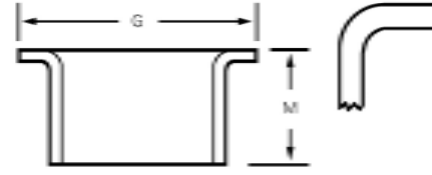
*3 1/2 size is not included in NAVSEA/MSS, dimensions per Alaskan standards.

Copper-Nickel Stub Ends & Bosses

Lap-Joint Stub Ends



Type A



Type C

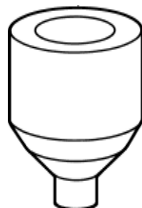
Nominal Pipe Size	OD	Class 200 Nominal Wall	Weight	Length M	Lap Diameter G	Type C 90-10 Part Number
1/2	.840	.065	.1	2	1 3/8	416471
3/4	1.05	.065	.2	2	1 11/16	415093
1	1.31	.065	.2	2	2	267115
1 1/4	1.66	.072	.3	2	2 1/2	267123
1 1/2	1.90	.072	.4	2	2 7/8	267131
2	2 3/8	.083	.6	2 1/2	3 5/8	266648
2 1/2	2 7/8	.083	.7	2 1/2	4 1/8	267149
3	3 1/2	.095	1	2 1/2	5	267157
3 1/2	4	.095	2	3	5 1/2	415085
4	4 1/2	.109	2	3	6 3/16	267165
5	5 9/16	.125	3	3	7 5/16	406719
6	6 5/8	.134	4	3 1/2	8 1/2	414487
8	8 5/8	.148	7	4	10 5/8	433863
10	10 3/4	.187	14	5	12 3/4	434209
12	12 3/4	.250	26	6	15	497752
	14	.250		6	16 1/4	435182
	16	.250		6	18 1/2	
	18	.250		6	21	562272
	20	.250		6	23	
	22	.250		6	25 1/4	
	24	.250		6	27 1/4	

Specifications: pg. 60. Tolerances: pg. 58.
 Dimension M per MSS SP-43 and ASME B16.9 (short pattern).
 Sizes and lengths not shown are available upon request.

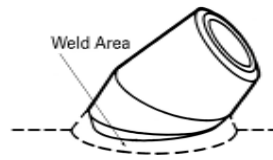
Bosses



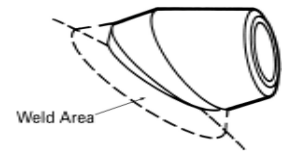
Straight Piping Outlet



NAVSEA Outlet
 DWG 810-1385912



Lateral Outlet



Elbow Outlet



Copper-Nickel Flanges

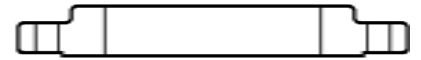
Solid Copper-Nickel Flanges, Classes 150, 250, & 300



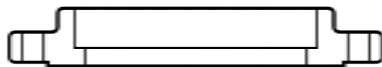
NAVSEA
810-1385992



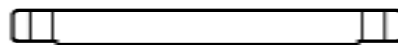
Weld Neck
ANSI B16.5



Slip-On
ANSI B16.5



Socket Welding
ANSI B16.5



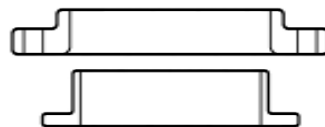
Blind
ANSI B16.5

- 90-10 and 70-30 copper nickel flanges are available in sizes $\frac{1}{2}$ " nominal and larger.
- Flanges can be supplied as slip-on, threaded, socket welding, weld neck, or blind.
- Silver-brazing flange ends comply dimensionally with MIL-F-1183 and can be finished as a face fed socket without a groove, or a grooved socket for use with a pre-inserted silver-brazing ring. Rings are ordered and supplied separately.
- Flanges may be ordered manufactured from material conforming to the requirements of MIL-C-15726F, ASTM B 151 or B 171.
- Alloys 90-10 (UNS C70600) and 70-30 (UNS C71500).

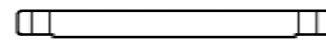
Special Copper-Nickel Flanges, Classes 150, 250 and 300



Overlay
ANSI B16.5



Composite
ANSI B16.5

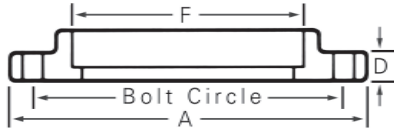


Clad
ANSI B16.5

- These special flanges offer an economical alternative to the solid copper-nickel flanges listed above and are normally available in sizes 2" nominal and larger.
- Overlay slip-on flanges utilize a forged steel slip-on flange which is weld overlaid with copper-nickel material on the gasket and wetted surfaces. Normally supplied flat face.
- Composite flange sets are generally used instead of weld neck flanges when butt welding to a pipe or fitting is necessary but a loose backing flange is desired for ease of installation. Backing flanges are usually steel.
- Clad blind flanges utilize a forged steel blind flange which is clad with copper-nickel material on the wetted surfaces.
- Alaskan also stocks a complete line of MSS and ANSI style stainless steel flanges and can manufacture flanges to special dimensions, specifications and alloys.

Copper-Nickel Flanges

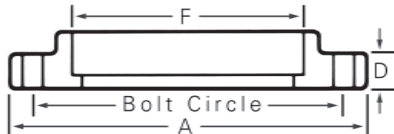
Socket Weld Commercial Flange, Class 150



- Dimensions per ANSI B16.5.
- Flanges normally supplied with bore for Class 200 pipe per MIL-T-16420.
- Raised faces are available.

Nominal Pipe Size	A	D	F	Number of Holes	Hole Diameter	Bolt Circle	Weight	90-10 Part Number	70-30 Part Number
1/2	3.50	.438	.880	4	5/8	2.375	1	580945	581242
3/4	3.875	.500	1.090	4	5/8	2.75	2	581145	581250
1	4.25	.563	1.355	4	5/8	3.125	2	581153	581349
1 1/4	4.625	.625	1.700	4	5/8	3.50	3	581161	581357
1 1/2	5.00	.688	1.950	4	3/4	3.875	4	581179	581365
2	6.00	.750	2.440	4	3/4	4.75	6	581187	581373
2 1/2	7.00	.875	2.940	4	3/4	5.50	9	581195	581381
3	7.50	.938	3.570	4	3/4	6.0	11	581200	581399
4	9.00	.938	4.570	8	3/4	7.5	14.5	581218	581404
5	10.0	.938	5.660	8	7/8	8.5	17	581226	581412
6	11.0	1.0	6.720	8	7/8	9.5	20	581234	581420

Socket Weld Commercial Flange, Class 300



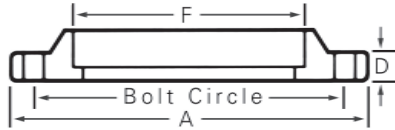
- Dimensions per ANSI B16.5.
- Flanges normally supplied with bore for Class 200 pipe per MIL-T-16420.
- Raised faces are available.

Nominal Pipe Size	A	D	F	Number of Holes	Hole Diameter	Bolt Circle	Weight	90-10 Part Number	70-30 Part Number
1/2	3.75	.563	.88	4	5/8	2.625	2	495912	590762
3/4	3.625	.625	1.09	4	3/4	3.25	3	590673	590770
1	4.875	.688	1.36	4	3/4	3.5	3	590681	590788
1 1/4	5.25	.75	1.70	4	3/4	3.875	5	590699	590796
1 1/2	6.125	.813	1.95	4	7/8	4.5	7	590704	590801
2	6.5	.875	2.44	8	3/4	5	7	590712	590819
2 1/2	7.5	1	2.94	8	7/8	5.875	10	404000	590827
3	8.25	1.125	3.57	8	7/8	6.625	13	590720	590835
4	10	1.25	4.57	8	7/8	7.875	24	590738	590843
5	11	1.375	5.66	8	7/8	9.25	29	590746	590851
6	12.5	1.438	6.72	12	7/8	10.625	36	590754	590869

Sizes not shown available upon request.

Copper-Nickel Flanges

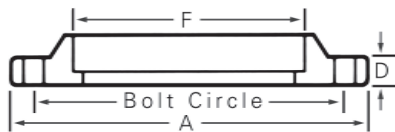
Socket Weld Navy Flange, 150 Pound Class



- Drilling, flange thickness and diameter per MIL-F-20042.
- Hub and socket per NAVSEA 810-4715319 for 1 1/4 NPS and above; per ANSI B16.5 for 1/2 to 1 NPS.

Nominal Pipe Size	A	D	F	Number of Holes	Hole Diameter	Bolt Circle	Weight	90-10 Part Number	70-30 Part Number
1	4.25	.438	1.355	4	9/16	3.125	2	581446	581535
1 1/4	4.5	.438	1.70	4	9/16	3.375	2	581454	581357
1 1/2	5.063	.438	1.950	6	9/16	3.938	3	581462	581543
2	5.563	.438	2.411	6	9/16	4.438	3	581438	581569
2 1/2	6.125	.500	2.913	6	9/16	5.000	4	581470	581577
3	6.625	.500	3.543	8	9/16	5.500	4.5	581488	581527
4	7.688	.500	4.552	8	9/16	6.563	6	581496	581585
5	9.063	.563	5.62	10	11/16	7.813	8.5	581501	581593
6	10.125	.563	6.682	12	11/16	8.875	10	581519	581608

Socket Weld Navy Flange, 250 Pound Class



- Drilling, flange thickness and diameter per MIL-F-20042.
- Hub and socket per NAVSEA 810-4715319 for 2 NPS and above; per ANSI B16.5 for 1/2 to 1 1/2 NPS.

Nominal Pipe Size	A	D	F	Number of Holes	Hole Diameter	Bolt Circle	Weight	90-10 Part Number	70-30 Part Number
2	5.563	.813	2.411	6	11/16	4.438	5.0	294227	581674
2 1/2	6.125	.938	2.913	6	11/16	5.000	6.5	581624	581682
3	6.625	.938	3.543	8	11/16	5.500	7.0	581632	581690
4	7.688	1.000	4.552	8	11/16	6.563	10.5	581640	581705
5	9.063	1.063	5.620	10	11/16	7.813	15.0	581658	581713
6	10.125	1.188	6.682	12	11/16	8.875	20.5	294633	581721

Sizes not shown available upon request.

Copper-Nickel Flanges

Solid Forged Copper Nickel Flanges, Classes 150, 200, 300 and 400.

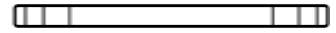
Special Order Flanges



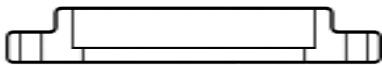
Slip-On
ANSI B16.5
NAVSEA 810-4715319
AWWA Large Diameter



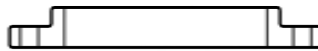
Weld Neck
NAVSEA 810-1385992
ANSI B16.5
MIL-F-20670



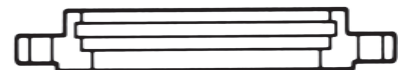
Blind
ANSI B16.5
Plate Flanges
(Dimensions to your sketch)



Socket Weld
ANSI B16.5
NAVSEA 810-4715319-Butterfly Type (2c)
MIL-F-20042



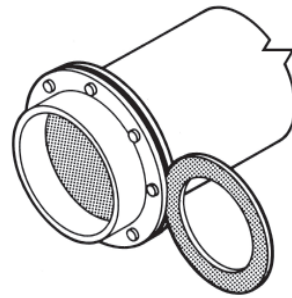
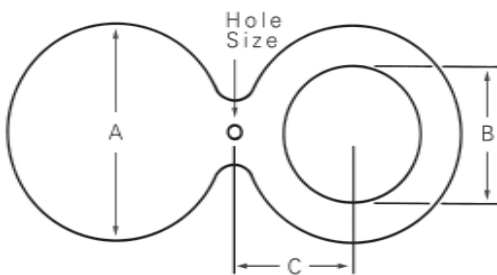
Threaded
ANSI B16.5
ANSI B16.24



Silver-Brazing
NAVSEA 810-1385947
MIL-F-20042
Face Fed or Grooved for Ring

Note: ANSI B16.5 Flanges Can be Ordered as Raised or Flat Faced.

Spectacle Blind Flange



Spectacle Blind

Spectacle Blind Bolted In

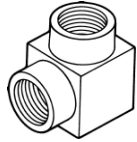
Nominal Pipe Size	2 1/2	3	4	6	8	10	12
A (OD)	4 5/8	5 1/8	6 5/8	8 1/2	10 3/4	13 1/8	15 7/8
B (ID)	Bore made to required specifications						
W	1	1	1	1	1 1/2	1 1/2	1 1/2
C	2 3/4	3	3 3/4	4 3/4	5 7/8	7 1/8	8 1/2
Hole Size	3/4	3/4	3/4	7/8	7/8	1	1

Copper-Nickel Fittings

90-10 & 70-30 Copper-Nickel Threaded Fittings, Classes 150, 3000 and 6000



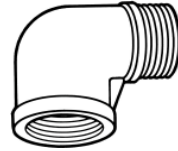
90° Elbow



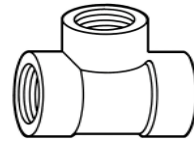
90° Elbow



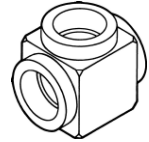
45° Elbow



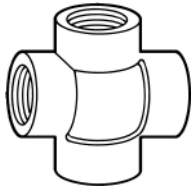
Street Elbow



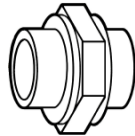
Tee



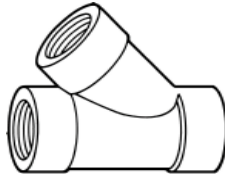
Tee



Cross



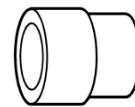
Union



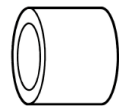
Lateral



Cap



Type 1 Reducer Insert



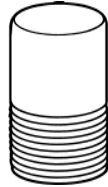
Type 2 Reducer Insert



Hexagon Bushing



Flush Bushing



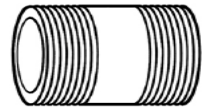
Round Head Plug



Hexagon Head Plug



Square Head Plug



Nipple

- Round fittings such as couplings, caps and plugs may be machined from solid round bar.
- Shape fittings such as elbows, tees, crosses and laterals may be machined from plate.
- Wall thickness, center-to-center and center-to-end dimensions will meet or exceed applicable specifications.
- Mating ends of the fittings can be butt welding, socket welding, grooved or face fed for silver-brazing per MIL-F-1183 or threaded, or can be finished in a combination of ends when required.
- Block pattern fittings are normally available in copper-nickel alloys, in sizes 2" NPS and under.
- Class 150 threaded fittings conform to ANSI B16.3.
- Class 3000 and 6000 socket welding and threaded fittings conform to ANSI B16.11.
- Fittings grooved or face fed for silver-brazing conform to MIL-F-1183.
- Fittings are available in non-standard sizes and most corrosion resistant metals.

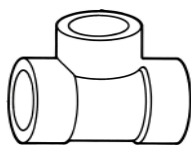
Socket Weld Fittings, Classes 3000 & 6000



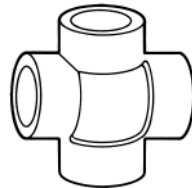
90° Elbow



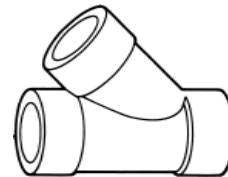
45° Elbow



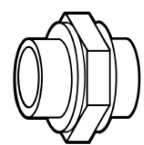
Tee



Cross



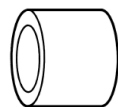
Lateral



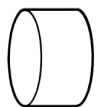
Union



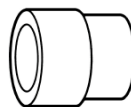
Coupling



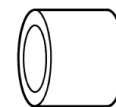
Half Coupling



Cap



Type 1 Reducer Insert



Type 2 Reducer Insert

- Fittings are normally used where socket welding is desired for ease of assembly.
- Eliminates the necessity of tack welding or clamping prior to welding.
- Accurate bore provides slip fit alignment.
- Sizes range from 1/8" to 4" NPS with larger sizes upon application.
- Dimensions are in accordance with ANSI B16.11, MSS SP-79 and applicable ASME, ASTM and Navy specifications.
- Available in non-standard sizes and dimensions.

Copper-Nickel Socket Weld Fittings, Class 400



- Dimensions per NAVSEA 803-6397430.
- Made from MIL-C-24679 forgings per paragraph 2.2 of NAVSEA 803-6297430.
- Reducing sizes available.
- Ends can be machined for Sil-Braze rings per MIL-F-1183.
- For Class 400 adaptors and unions, see page 52.

90° Elbow

Nominal Pipe Size	OD	A	Weight	90-10 Part Number	70-30 Part Number
1/4	.540		.25	553948	553956
3/8	.675		.25	503951	553964
1/2	.840	1	.3	589800	589868
3/4	1.050	1 3/16	.5	589818	589876
1	1.315	1 7/16	.8	589826	589884
1 1/4	1.660	1 11/16	1	589834	589892
1 1/2	1.900	1 27/32	1.5	589842	589907
2	2.375	2 1/8	2	589850	589915

45° Elbow

Nominal Pipe Size	OD	B	Weight	90-10 Part Number	70-30 Part Number
1/4	.540		.25	589923	590005
3/8	.675		.25	589931	590013
1/2	.840	25/32	.3	589949	590021
3/4	1.050	7/8	.4	589957	590039
1	1.315	1 1/16	.6	589965	590047
1 1/4	1.660	1 7/32	1	589973	590055
1 1/2	1.900	1 5/16	1	589981	590063
2	2.375	1 7/16	2	589999	590071

Tee

Nominal Pipe Size	OD	C	Weight	90-10 Part Number	70-30 Part Number
1/4	.540		.25	590097	587206
3/8	.675		.3	590102	590089
1/2	.840	1	.5	590110	590136
3/4	1.050	1 3/16	.9	558867	590144
1	1.315	1 7/16	1	590128	590152
1 1/4	1.660	1 11/16	2	468622	590160
1 1/2	1.900	1 27/32	2.5	468630	590178
2	2.375	2 1/8	4	468614	590186

Copper-Nickel Forged Fittings, Class 3000

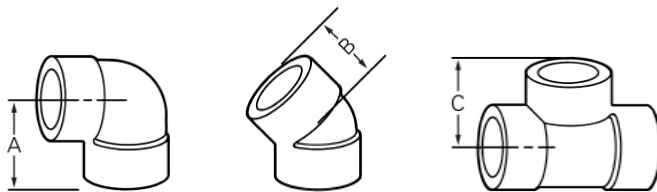
Threaded



- Class 3000 dimensions per ANSI B16.11.
- Reduction sizes available.
- Made from MIL-C-24679 forgings.
- Class 150 dimensions are available.

Nominal Pipe Size	OD	A	B	C	90° Elbow		45° Elbow		Tee	
					90-10 Part Number	70-30 Part Number	90-10 Part Number	70-30 Part Number	90-10 Part Number	70-30 Part Number
1/4	.540	.81	.73	.81	590194	590267	590348	590437	590518	590592
3/8	.675	.95	.80	.95	590209	590275	590356	590445	590526	590607
1/2	.840	1.12	.88	1.12	590217	590283	590364	590453	590534	590615
3/4	1.05	1.31	.98	1.31	590225	590291	590380	590461	590542	590623
1	1.315	1.50	1.12	1.50	414893	590306	590398	590479	590550	590631
1 1/4	1.660	1.75	1.29	1.75	590233	590314	590403	590487	590568	590649
1 1/2	1.900	1.94	1.43	1.94	590241	590322	590411	590495	590576	590657
2	2.375	2.25	1.68	2.25	590259	590330	590429	590500	590584	590665

Socket Weld



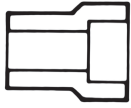
- Dimensions per ANSI B16.11
- A combination of threaded and socket ends are available.
- Reducing sizes available.
- Ends can also be machined for Sil-Braze rings per MIL-F-1183.

Nominal Pipe Size	OD	A	B	C	90° Elbow		45° Elbow		Tee	
					90-10 Part Number	70-30 Part Number	90-10 Part Number	70-30 Part Number	90-10 Part Number	70-30 Part Number
1/4	.540	.82	.69	.82	295702	581755	295736		295786	
3/8	.675	.92	.69	.92	295710		295744		295794	
1/2	.840	1.0	.82	1.0	231782		298873	276198	298899	277479
3/4	1.05	1.25	1.0	1.25	297657	277500	297681		297699	277487
1	1.315	1.38	1.06	1.38	297649	277461	295752		295809	
1 1/4	1.660	1.56	1.19	1.56	295728		295760	494047	295817	417045
1 1/2	1.900	1.75	1.31	1.75	297665	277518	298881	494055	297704	421060
2	2.375	2.12	1.62	2.12	297673	402228	262995	494063	295825	
2 1/2	2.875	2.24	1.74	2.24						
3	3.500	2.87	1.87	2.87						
4	4.500	3.37	2.37	3.37						

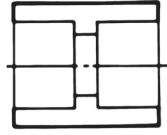
Sizes not shown are available, our quick turnaround time allows for a short term delivery.

Copper-Nickel Machined Fittings

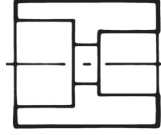
Socket Weld



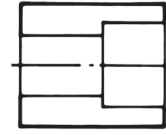
Bushings
Reducing Inserts



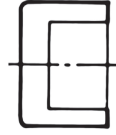
Couplings



Reducing Couplings



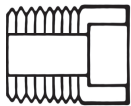
Half Couplings



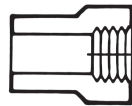
Caps

- Available in Class 400 or Class 3000.
- Machined from MIL-C-15726F bar stock.
- 90-10 UNS C70600 or 70-30 UNS C71500
- Above items available in socket weld or threaded.

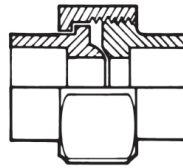
Threaded/Socket Weld



MPT X FSW
Adapters



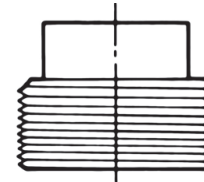
FPT X MSW
Adapters



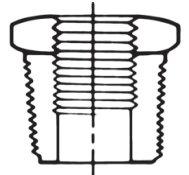
Ground Joint
Unions



Hex Plugs



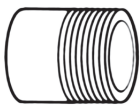
Square Head
Plugs



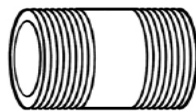
Reduced Hex
Bushing

- Machined from MIL-C-15726F in 90-10 UNS C70600 or 70-30 UNS C71500.
- Fittings are also available in Class 400 WOG.
- Class 3000 socket weld fittings conform to ANSI B16.11.
- Class 3000 reducing inserts conform to MSS SP-79.
- Mating ends of the fittings can be socket-welding or finished in a combination of ends when required.
- Crosses available upon request.
- Block pattern fittings available in all corrosion resistant alloys.
- Class 6000 also available.

Nipples



Single End Thread

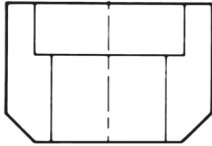


Double End Thread

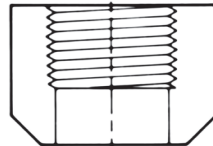
- Threaded from MIL-T-16420K tube or ASTM B 466 Pipe.
- Short/close lengths available up to 12".
- Nipples may be provided threaded one end or both ends.

Copper-Nickel Outlets

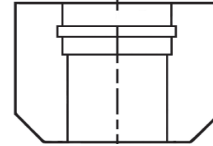
Outlets, Class 400



Socket Weld

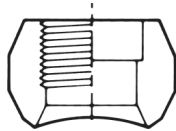


Threaded

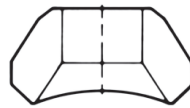


Brazed

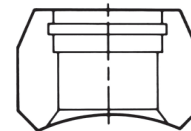
Outlets, Class 3000



Threaded or Socket Weld



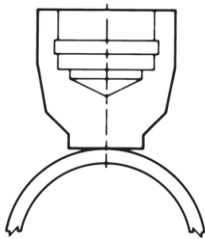
Buttwelding



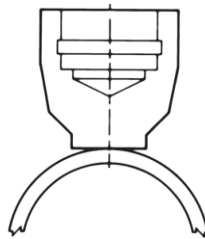
Brazed

- Weld base ground for full penetration weld per MIL-STD-22D (P68 joint)
- Conforms to the requirements of MSS SP-97.
- Brazing outlet can be provided grooved for ring or chamfered for face fed solder.
- Ordering data necessary: Outlet size, type of connection, run size for base.

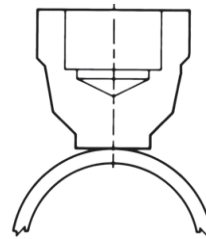
Pilot and Non-Pilot Bosses



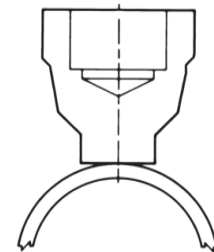
Silver Brazed per NAVSEA 810-1385912



Silver Brazed per NAVSEA 810-1385950



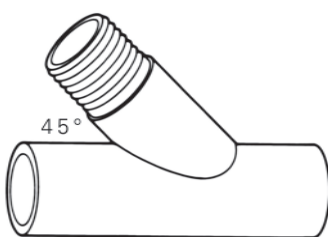
Non-Pilot Boss, Class 400. Socket Weld



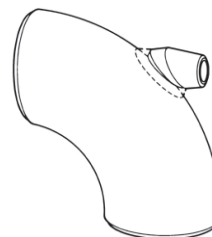
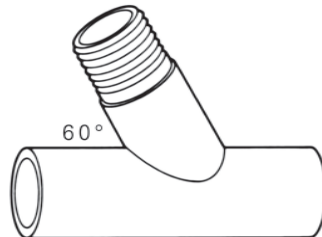
Pilot Boss, Class 400 Socket Weld

- Pilot and non-pilot bosses may be modified for threaded or silver braze.

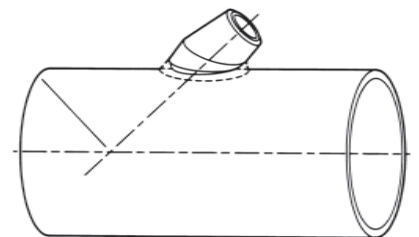
Miscellaneous Outlets



Sanitary Hose Barb Outlets



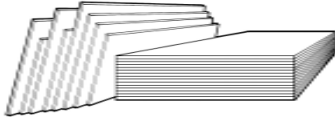
Elbow Outlet



45° Lateral Outlet

Copper-Nickel Sheet & Plate

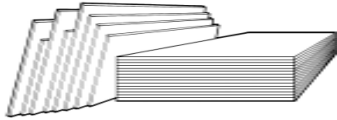
90-10 Copper-Nickel Sheet & Plate



- **UNS Designation Numbers:** 90-10 (UNS C70600).
- **Nominal Chemicals:** Copper 88.6%, Nickel 10.0%, Iron 1.4%.
- **Average Mechanical Properties:** Tensile 40,000 psi, Yield 15,000 psi, Elongation 30%.
- **Machinability = 20.**
- **Specifications:** MIL-C-15726F, ASTM B 171, ASME SB-171.
- **Widely used in marine applications where resistance to both corrosion and biofouling is important.**

Thickness	Size	Lbs/Sq Ft	Lbs/Sheet	90-10 Part Number
.032	38 x 96	1.5	47	510306
.063	36 x 120	2.9	88	141474
.095	36 x 120	4.8	144	281096
.125	48 x 120	5.8	232	141505
.134	48 x 120	6.38	255	141513
.156	39.565 x 240	7.42	489	446832
.165	43.21 x 180	8.44	456	141555
.165	49.50 x 180	8.5	529	433295
.180	55.65 x 180	9.0	630	141602
.180	61.9 x 240	9.77	1008	433994
.180	74.84 x 240	9.0	1123	434005
.1875	48 x 96	9.0	289	254926
.1875	48 x 120	9.0	361	298182
.250	43.1 x 240	12.0	862	435645
.250	48 x 96	12.0	384	141636
.250	49.18 x 180	12.0	737	141660
.250	49.18 x 240	12.0	984	435653
.250	55.43 x 240	12.0	1145	433986
.250	61.68 x 240	12.0	1233	141686
.250	74.5 x 240	12.0	1490	561852
.3125	48 x 96	14.8	473	141725
.3125	61.85 x 240	15.9	1639	431578

Dimensions are in inches. All weights are approximate.
 Sizes not shown may be available upon request. Specifications: pg. 62.

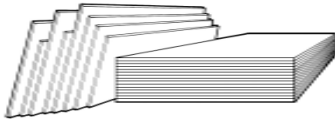
90-10 Copper-Nickel Sheet & Plate (continued)

Thickness	Size	Lbs/Sq Ft	Lbs/Sheet	90-10 Part Number
.313	74.42 x 240	15.8	1956	483313
.375	74.25 x 120	18	1114	420624
.375	48 x 96	18	576	141791
.375	49.1 x 120	18	737	141806
.375	55.4 x 120	18	831	141822
.375	61.65 x 120	18	925	141814
.375	80 x 120	18	1200	141848
.500	48 x 96	24	757	141864
.500	80 x 120	24	1506	141880
.625	76.5 x 120	30	1971	141903
.750	48 x 96	36	1177	141911
.750	80 x 120	36	2487	141937
1.00	48 x 96	48	1488	420496
1.00	60 x 120	48	2400	276279
1.25	60 x 96	60	2400	141961
1.50	80 x 120	72	4737	235516
2.00	48 x 96	96	3072	510500
2.50	36 x 72	120	2093	142006
3.00	60 x 60	144	2415	142014
4.00	60 x 60	192	4785	142022

Dimensions are in inches. All weights are approximate.
 Sizes not shown may be available upon request. Specifications: pg. 62.

Copper-Nickel Sheet & Plate

70-30 Copper-Nickel Sheet & Plate



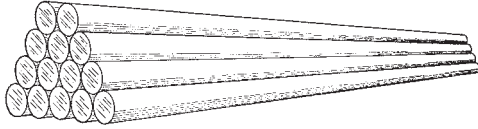
- **UNS Designation Number:** 70-30 (UNS C71500).
- **Nominal Chemicals:** Copper 69.5%, Nickel 30.0%, Iron 0.5%.
- **Average Mechanical Properties:** Tensile 50,000 psi, Yield 20,000 psi, Elongation 30%.
- **Machinability = 20.**
- **Specifications:** MIL-C-15726F, ASTM B 171, ASME SB-171.
- **Widely used in marine applications where resistance to both corrosion and biofouling is important.**

Thickness	Size	Lbs/Sq Ft	Lbs/Sheet	70-30 Part Number
.063	32 x 120	3	80	512968
.095	24 x 144	4.56	106	141115
.125	48 x 120	6	232.6	141123
.134	48 x 120	6.43	277.2	141131
.165	49.50 x 180	7.92	365	491112
.1875	48 x 120	9	360	488428
.1875	49.75 x 180	9	586.1	141157
.250	49.18 x 180	12	777.7	250126
.250	55.43 x 180	12	831	141199
.250	61.68 x 180	12	799.3	467765
.250	74.5 x 180	12	960.3	467773
.313	65 x 120	15	788.7	509143
.375	49.1 x 120	18	736.5	141246
.375	55.375x 120	18	830.6	276261
.375	61.65 x 120	18	924.8	226004
.500	48 x 120	24	960	141270
.625	76.5 x 144	30	2295	259405
.750	72 x 120	36	2160	141296
1.00	48 x 96	48	1548	510550
1.00	80 x 120	48	3227	141327
1.25	80 x 120	60	4000	141343
1.50	50 x 120	72	3000	141369
1.75	49 x 98	84	2722	141377
2.00	50 x 127.5	96	4205	271326
2.50	36 x 96	120	2856	141416
3.00	52 x 72	144	3744	235427
4.00	37 x 49	192	2367	141458

Dimensions are in inches. All weights are approximate.
 Sizes not shown may be available upon request. Specifications: pg. 62.

Copper-Nickel Rod

90-10 & 70-30 Rod



- **UNS Designation Numbers:** 90-10 (UNS C70600) and 70-30 (UNS C71500).
- **Nominal Chemicals:**
 - 90-10: Copper 88.6%, Nickel 10.0%, Iron 1.4%.
 - 70-30: Copper 69.5%, Nickel 30.0%, Iron 0.5%.
- **Average Mechanical Properties:**
 - 90-10: Tensile 40,000 psi, Yield 18,000 psi, Elongation 35%, Machinability = 20.
 - 70-30: Tensile 45,000 psi, Yield 18,000 psi, Elongation 30%, Machinability = 20.
- **Specifications:** MIL-C-15726F, ASTM B 151, Temper 060 Soft.
- **Stocked in random lengths.**
- **70-30 Copper-Nickel rod is regarded as one of the best materials for marine applications because it is used in petroleum and chemical industries where conditions of temperature and corrosion are too severe for other alloys. Widely used in marine applications where resistance to both corrosion and biofouling is important. Because of its excellent corrosion resistance, anti-fouling characteristics, resistance to erosion in turbulent water and strength under different conditions of temperature and pressure.**

Diameter Size	Lbs/Ft	90-10 Part Number	70-30 Part Number
1/4	0.200		143028 (Ho1 Temper)
3/8	0.432		416934
1/2	0.756	143303	143002
5/8	1.180		143010
3/4	1.710	143329	143036
7/8	2.320	143337	
1	3.060	143345	143052
1 1/8	3.840	143353	295697
1 1/4	5.000	143361	143060
1 3/8	6.000	143379	143078
1 1/2	7.000	143387	143086
1 3/4	9.760	143400	143094
2	12.750	143418	143109
2 1/4	16.130	143426	143125
2 3/8	17.320	143434	143133
2 1/2	20.000	143442	143141
2 3/4	24.000	143450	143159
3	28.000	143468	143167
3 1/16	30.000		487244
3 1/2	38.000	143264	143175
3 3/4	42.850	476099	476099
4	48.000	142983	143183
4 1/2	64.500		143191
5	80.000	405438	143206
5 1/2	96.000		143214
6	115.000	283690	143222
7	156.000		143230
8	207.500		143248
9	258.000		143256
10	320.000		143272

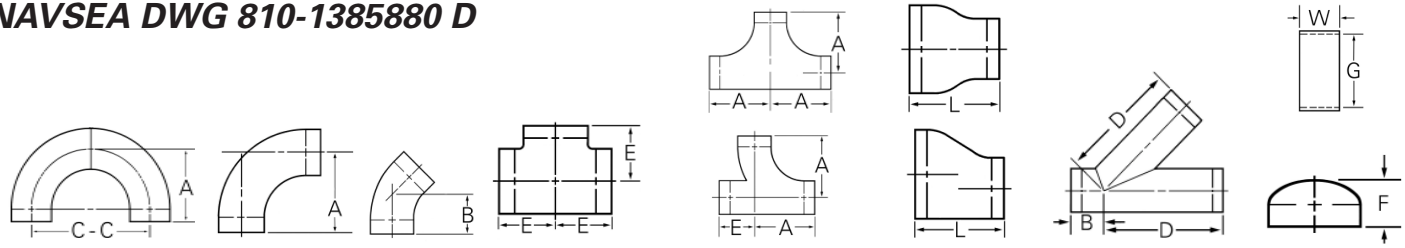
Sizes 5 1/2" and over are hot forged and turned.

Dimensions are in inches. All weights are approximate.

Sizes not shown may be available upon request. Specifications: pg. 62.

Fitting Tolerances

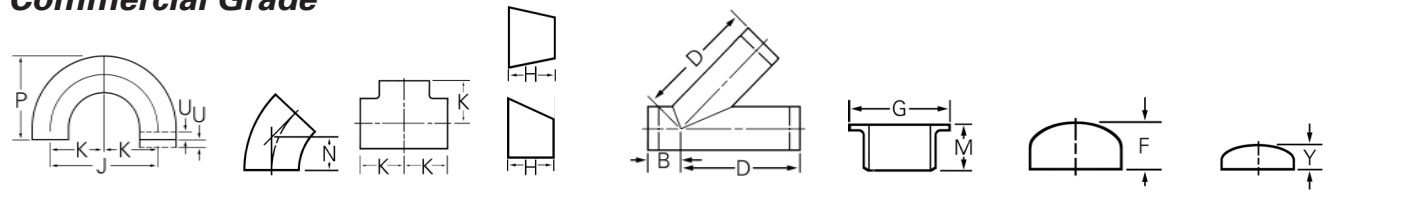
NAVSEA DWG 810-1385880 D



Nominal Pipe Size	All Fittings		90° & 45° Ells, Tees, Swp Tees & Lateral	Reducers & Sleeves	Caps	180° Return Bends	Sleeves
	Outside Diameter	Wall Thickness	Center-to-End A, B, E	End-to-End L, W	Height F	Center-to-Center C - C	Inside Diameter G
1 to 1 1/4	*	**	+0.125 -0.000	+0.125 -0.000	+0.125 -0.000	+0.250 -0.250	+0.003 -0.000
1 1/2 to 2	*	**	+0.125 -0.000	+0.125 -0.000	+0.125 -0.000	+0.250 -0.250	+0.005 -0.000
2 1/2 to 8	*	**	+0.125 -0.000	+0.125 -0.000	+0.125 -0.000	+0.250 -0.250	+0.007 -0.000
8 & larger	*	**	+0.188 -0.000	+0.188 -0.000	+0.188 -0.000	+0.375 -0.375	+0.007 -0.000

Note: Tolerance of outside diameter shall be in accordance with MIL-T-16420K for a length equal to dimension C, the tangent length.
 * Major and minor outside diameter at any one cross section shall not exceed 3% of the nominal outside diameter.
 ** Not less than 87.5% of nominal thickness in localized areas.
 Sizes not shown may be available upon request.

Commercial Grade



Nominal Pipe Size	Outside ⁽¹⁾ Diameter at Bevel	Inside ⁽²⁾ Diameter at End	Wall Thickness	90° & 45° Ells, Tees & Laterals	Reducers & Lap-Joint Stub Ends	Caps & Heads	Center-to-Center J	Back-to-Face P	Alignment of Ends U	Lap-Joint Stub Ends
				Center-to-End B, D, K, N	Over-all Length H, M	Over-all Height F, Y				Outside Diameter of Lap G
1/2 to 2 1/2	+0.06 -0.03	±0.03	*	±0.06	±0.06	±0.12	±0.25	±0.25	±0.03	+0 -0.03
3 to 3 1/2	±0.06	±0.06	*	±0.06	±0.06	±0.12	±0.25	±0.25	±0.03	+0 -0.03
4	±0.06	±0.06	*	±0.06	±0.06	±0.12	±0.25	±0.25	±0.03	+0 -0.03
5 to 8	+0.09 -0.06	±0.06	*	±0.06	±0.06	±0.25	±0.25	±0.25	±0.03	+0 -0.03
10 to 18	+0.16 -0.12	±0.12	*	±0.09	±0.09	±0.25	±0.38	±0.25	±0.06	+0 -0.03
20 to 24	+0.25 -0.19	±0.19	*	±0.09	±0.09	±0.25	±0.38	±0.25	±0.06	+0 -0.03
26 to 30	+0.25 -0.19	±0.19	*	±0.12	±0.19	±0.38				
32 to 48	+0.25 -0.19	±0.19	*	±0.19	±0.19	±0.38				

Dimensions are in inches.
 (1) Out of round is the sum of absolute values of plus and minus tolerance.
 (2) The inside diameter at ends and the nominal wall thickness are to be specified by the purchaser.
 * Not less than 87.5% of nominal thickness.
 Sizes not shown may be available upon request.

Copper-Nickel

Comparison of Wall Thicknesses

Pipe and Tubing: ANSI, ASTM and MIL-T-16420K

Nominal Pipe Size	Outside Diameter	ANSI B36.19 Nominal Walls				ASTM B 466 Nominal Walls		MIL-T-16420K Minimum Walls						
		Sch 5s	Sch 10s	Sch 40s	Sch 80s	Regular	Extra Strong	Class 50	Class 200	Class 700	Class 1650	Class 3300	Class 6000	
1/8	.405		.049	.068	.095	.062	.100						.058	.095
1/4	.540		.065	.088	.119	.082	.123		.065	.065	.042	.072	.120	
3/8	.675		.065	.091	.126	.090	.127		.065	.072	.049	.095	.148	
1/2	.840	.065	.083	.109	.147	.107	.149		.065	.072	.058	.120	.203	
3/4	1.05	.065	.083	.113	.154	.114	.157		.065	.083	.083	.148	.238	
1	1.31	.065	.109	.133	.179	.126	.182		.065	.095	.095	.180	.300	
1 1/4	1.66	.065	.109	.140	.191	.146	.194		.072	.095	.120	.220	.380	
1 1/2	1.90	.065	.109	.145	.200	.150	.203		.072	.109	.134	.250	.425	
2	2 3/8	.065	.109	.154	.218	.156	.221		.083	.120	.165	.340	.520	
2 1/2	2 7/8	.083	.120	.203	.276	.187	.280		.083	.134	.203	.380		
3	3 1/2	.083	.120	.216	.300	.219	.304		.095	.165	.250	.458		
3 1/2	4	.083	.120	.226	.318	.250	.321		.095	.180	.284			
4	4 1/2	.083	.120	.237	.337	.250	.341		.109	.203	.340			
5	5 9/16	.109	.134	.258	.375	.250	.375		.125	.220	.425			
6	6 5/8	.109	.134	.280	.432	.250	.437		.134	.259				
8	8 5/8	.109	.148	.322	.500	.312			.148	.340				
10	10 3/4	.134	.165	.365	.500			.134	.187	.380				
12	12 3/4	.156	.180	.375	.500			.156	.250	.454				
	14	.156	.188	.375	.500			.165	.250					
	16	.165	.188	.375	.500			.165	.250					
	18	.165	.188	.375	.500			.180	.250					
	20	.188	.218	.375	.500			.180	.250					
	22	.188	.218	.375	.500			.180	.250					
	24	.218	.250	.375	.500				.250					
	26			.375	.500									
	28			.375	.500									
	30	.250	.312	.375	.500			.250						
	32			.375	.500									
	34			.375	.500									
	36			.375	.500									
	38			.375	.500									
	40			.375	.500			.312						
	42			.375	.500									
	44			.375	.500									
	46			.375	.500									
	48			.375	.500									

Wall thicknesses for Class 200 size 14" through 24" are per Alaskan Standard. Alaskan will use the regular schedule thickness shown for all sizes not specified by a standard unless otherwise directed.

Dimensions are in inches.

Sizes not shown may be available upon request.

Wall thickness for 8" regular per ASTM B 42.

Specifications

Pipe and Tubing

MIL-T-15005E Amend 3

This specification covers fully annealed copper-nickel condenser and heat exchanger tubing in Alloys 90-10 and 70-30. See page 8 for sizes carries in stock.

MIL-T-16420K

This specification covers copper-nickel tubing in Alloys 90-10 and 70-30 intended for basic piping systems on surface ships and submarines. Alaskan stocks this tubing in Classes 50, 200, 700, 1650, 3300, 6000 and other special classes. (Class identification denotes maximum working pressure in lbs/sq. in.). Under this specification, seamless tubing is specified as Type I and welded tubing as Type II. Alaskan stocks Grade 1 (lot identified) MIL-T-16420 tubing. Grade 2 (heat identified) is available upon request. See pages 3-7 for sizes carried in stock.

MIL-T-24107A

This specification covers annealed and drawn temper seamless copper tubing in nominal pipe size diameters. Alaskan stocks tubing of this specification in Alloy C12200 (phosphor-deoxidized), drawn temper. See pages 9 and 10 for sizes carried in stock.

ASTM B 111 (ASME SB-111 is generally identical)

This specification covers copper and copper alloy seamless condenser tubing intended for use in industrial condensers, evaporators and heat exchangers. Alaskan stocks B 111 tubing in the copper-nickel Alloys 90-10 and 70-30 and in Arsenical Admiralty Brass, Alloy C44300. See pages 9 and 10 for sizes carried in stock.

ASTM B 466 (ASME SB-466 is generally identical)

This specification includes Alloy 90-10 and Alloy 70-30 seamless copper-nickel pipe intended for general engineering purposes. See pages 5 and 8 for sizes carried in stock.

ASTM B 467 (ASME SB-467 is generically identical)

This specification covers Alloy 90-10 and Alloy 70-30 welded copper-nickel pipe intended for general engineering purposes. Alaskan pipe of this specification is rolled and straight-seam welded from ASTM B 171 annealed sheet, strip or plate. See pages 6 and 7 for sizes carried in stock.

ASTM B 608

This specification covers welded copper alloy pipe intended for use in brackish water or seawater piping systems. Alaskan manufacturers B 608 pipe from ASTM B 171 annealed sheet, strip or plate in the copper-nickel Alloys 90-10 and 70-30. See pages 6 and 7 for sizes carried in stock.

Welding Fittings, Buttwelding

NAVSEA 810-1385880 D

This drawing provides a basic plan for the manufacture of 200 PSI at 150 F maximum seamless and welded 90-10 copper-nickel fittings for use on shipboard piping systems. Fittings manufactured per this drawing are fully annealed and are intended for use with Class 200, MIL-T-16420K tubing; and are designed for either buttwelding or for welding with slip-on sleeves. This drawing is also used as a general guideline throughout the shipbuilding industry for specifying 70-30 copper-nickel fittings and other fitting configurations not shown on the drawing (e.g., short radius 90 elbows, reducing elbows, eccentric reducers, laterals and long turn tees).

Alaskan manufactures a complete line of 90-10 and 70-30 copper-nickel fittings in accordance with this drawing.

Commercial Grade

This designation covers seamless and welded copper-nickel buttwelding fittings intended for general corrosive service in fresh and salt water environments. Alaskan manufactures 90-10, 70-30 and other weldable copper alloy commercial grade fittings in either the "as welded" or "annealed" condition and generally, in those diameters and schedule wall thicknesses as shown in ANSI B36.19 (See page 59). Fittings are made to dimensional standards ANSI B16.1, ANSI B16.3, ANSI B16.5, ANSI B16.9, ANSI B16.11, ANSI B16.28, ANSI B31.1, MSS SP-43 and SP-79. Fittings with special configurations can also be manufactured.

Specifications

Welding Fittings, Belled End Fittings

NAVSEA 802-5959353 Appendix B

Belled End Fittings

This appendix provides a basic plan for the manufacture of seamless and welded (wrought) socket welding fittings in stainless steel and copper-nickel, intended for use with Schedules 5s and 10s stainless steel and Class 200 and Class 50 copper-nickel piping systems. Belled end fittings are designed for fillet welding which improves fit-up and welding time and allows for visual inspection for joint efficiency without radiography. Alaskan manufactures a complete line of 90-10 and 70-30 copper nickel, T-304L, T-316L and T-321 stainless steel belled end fittings. Other alloys are available on request.

MSS SP-119 Belled End Fittings

This specification also covers seamless and welded socket weld fittings in stainless steel and copper-nickel, intended for use with Schedules 5s and 10s stainless steel and Class 200 and Class 50 copper-nickel piping systems. MSS SP-119 belled end fittings are mostly identical to NAVSEA fittings with some minor changes in the tangent lengths of street fittings. Alaskan manufactures a complete line of 90-10 and 70-30 copper nickel, T-304L, T-316L and T-321 stainless steel belled end fittings per MSS SP-119. Other alloys are available on request.

NAVSEA 803-6397430 Socket Weld Fittings

This drawing covers 400 psi 90-10 and 70-30 copper-nickel socket weld fittings intended for use with Class 200 or Class 700 tubing per MIL-T-16420. These fittings are rated for 400 psi @ 150 degrees F. for air, oil and water service; and rated for 200 psi @ 425 degrees F. for steam service. Socket dimensions are similar to MIL-F-1183. Shapes (elbows and tees) made from forgings, are allowed, as are straight fittings made from bar stock.

Flanges and Bosses

NAVSEA 810-1385992

This drawing covers Class 250 weld-neck flanges forged in 90-10 and 70-30 copper-nickel. Bores shown are for use with wall thicknesses per MIL-T-16420K. Bores may be modified to match commercial wall thicknesses.

NAVSEA 810-4715319

This drawing covers "Navy" flanges forged from copper-nickel. It is subdivided by "figure" numbers. Figures 2A and 5C are socket weld with "Navy" drilling. For Class 150 (2A) and 250 (5C). Figure 2C flanges are also socket weld, but with commercial drilling for butterfly valves, rated as Class 200. Socket weld flanges are designed for use with Class 200 tube. Slip-On flanges are also covered as Class 150 (1A) and 250 (5A) with "Navy" drilling.

NAVSEA 810-1385912

This drawing covers Class 3000 bosses with sockets grooved for silver-braze rings. Bosses are pilot type weld base. Alaskan Copper machines bosses from 70-30 copper-nickel bar stock which meets MIL-C-15726F. Modification to socket and alloy can be accommodated.

NAVSEA 810-1385950

This drawing covers Class 3000 bosses similar to NAVSEA 810-1385912 but differs in the exterior radiused finished around the weld base.

Specifications

Sheet, Plate, Rod and Bar

ASTM B 151

This specification covers copper-nickel rod and bar. Alaskan stocks rod and bar in Alloys C70600 (90-10) and C71500 (70-30), which is certified to MIL-C-15626 and meets the requirements of ASTM B 151.

ASTM B 122

This specification includes copper-nickel plate, sheet, strip and rolled bar.

ASTM B 171/ASME SB-171

This specification covers rolled and annealed copper-nickel alloy plate and sheet intended for use for pressure vessels. Alaskan stocks sheet and plate in Alloys C70600 (90-10) and C71500 (70-30). See pages 54-56 for sizes carried in stock.

MIL-C-15726

This specification covers copper-nickel rod, bar, flat wire, strip, sheet and plate in Alloys C70600 (90-10) and C71500 (70-30). These products are

available hot forged in soft and hard tempers. See pages 54-56 for products and sizes carried in stock.

B 151

This specification covers copper-nickel alloy rod and bar in various annealed and drawn tempers. Alaskan stocks rod and bar in Alloys C70600 (90-10) and C71500 (70-30). This material is certified to MIL-C-15626F and meets the requirements of ASTM B 151.

ANSI (ASME)

B 16.3

This specification covers requirements for malleable-iron threaded fittings Class 150 and 300. Used for dimensions and tolerances of threaded fittings from $\frac{1}{8}$ " to 6" nominal pipe size.

B 16.5

This specification covers flanges and flanged fittings, including ratings for Classes 150, 300, 400, 600, 900, 1500 and 2500. Used for dimensions and tolerances of threaded, slip-on, socket weld, welding neck, lap-joint and blind flanges for the above ratings and/or to denote "commercial" drilling. Sizes are from $\frac{1}{2}$ " through 24" nominal pipe size.

B 16.9

This specification covers buttwelding fittings from $\frac{1}{2}$ " through 48" nominal pipe size. For specifications covering low pressure corrosion resistant buttwelding fittings, see MSS SP-43.

B 16.11

This specification covers requirements for forged carbon and alloy steel fittings both socket weld and threaded. Dimensional standards are commonly used for other alloys such as copper-nickel and stainless steel.

B 16.15

This specification covers Class 125 and 250 cast (forged or machined) bronze threaded fittings from $\frac{1}{8}$ " through 4" nominal pipe size with Class 125 or 250 rating. Certain requirements also pertain to wrought or cast plugs, bushings, couplings and caps.

B 16.28

This specification covers buttwelding short radius elbows and returns from $\frac{1}{2}$ " through 24" nominal pipe size.

MSS Standard Practices

SP-51

This specification covers Class 150 corrosion resistant cast flanges and flanged fittings.

SP-79

This specification covers Class 3000 and 6000 socket weld reducing inserts for use with B 16.11. Reducing inserts may be made to special dimensions other than those covered by this standard by agreement between manufacturer and the purchaser.

SP-83

This specification covers requirements for Class 3000 socket weld or threaded forged carbon steel pipe unions.

SP-97

This specification covers requirements for Class 3000 and 6000 90 degree carbon steel forged branch outlet fittings of buttwelding, socket weld and threaded types. Fittings may be made to special dimensions, size shape, tolerances or of other wrought materials.

Specifications

Military Specifications

MIL-C-24679

This specification covers copper-nickel forgings in alloy C70600 (90-10) and C71500 (70-30). Previously included in MIL-C-15726E.

MIL-F-1183

Originally written to cover the manufacture of cast bronze silver-braze fittings, this specification has also become the dimensional standard for many Class 400 WOG copper-nickel fittings not covered under NAVSEA 803-6397430. In particular, ground joint unions and their sub assemblies (i.e. threaded pieces, tail pieces and nut). MIL-F-1183 is often referenced in copper-nickel fittings and bosses to denote

a socket that is to be grooved for silver-braze ring or chamfered for face fed solder. This type socket is a very tight fit for nominal pipe (+.003"-.000") and requires special preparation of the pipe before insertion into the socket.

MIL-F-20042

This specification covers Class 50, 100, 150, 250 and 400 silver-brazed bronze pipe and bulkhead flanges for use with water, oil, gas or steam service not to exceed 425 Deg. F. Used as reference to denote "Navy" drilling for other flanges.

MIL-F-20670

Class 150 slip-on and weld neck flanges in carbon steel. Used as a reference for dimensions and tolerances for alloys other than carbon steel.

MIL-STD-22

This specification covers full penetration weld base fittings for socket weld, butt welding, and brazing outlets.

Warranty

Alaskan sells its products under terms and conditions of sale which appear on applicable quotations, acknowledgements or invoices. Under these terms, Alaskan warrants to Purchaser, but not to anyone else, that the goods will conform to the express specifications shown on the applicable quotation, acknowledgment or invoice. Alaskan makes no other warranty of any kind, express or implied, (including no warranty of merchantability, fitness for particular purpose, usage or trade) to any person or entity with regard to the goods or services covered hereby and forbids Purchaser to represent otherwise to anyone with which it deals. Purchaser must inspect the goods, at its sole expense, within ten (10) days of the receipt thereof and notify Alaskan of any claimed defect, shortage or inaccuracy therein within ten (10) days thereafter or it shall be

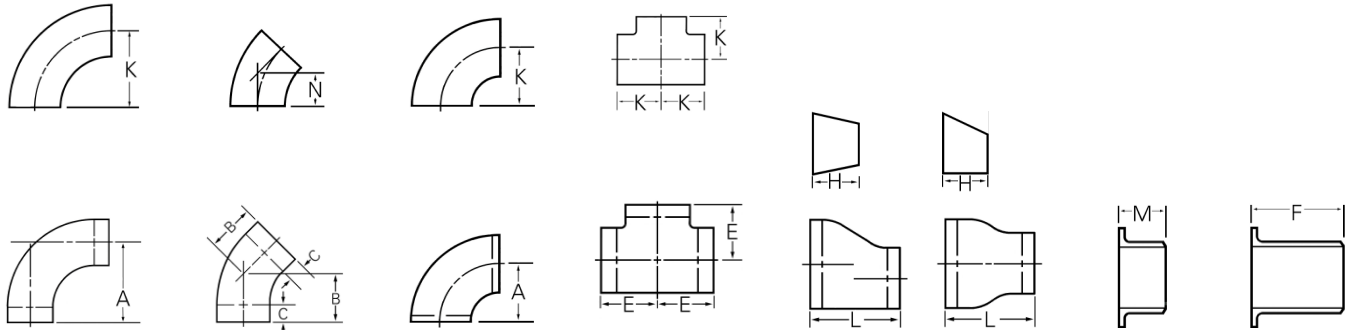
held to have waived its right to seek remedy thereof or recovery thereon from Alaskan. No goods shall be deemed defective if the alleged defect is discoverable only by inspection means more stringent than those requested by Purchaser in connection with the placing of its order. If Purchaser shall have timely notified Alaskan of alleged defects in the goods and made the goods available for inspection and testing by Alaskan, Alaskan shall determine whether defects exist which are attributable to it, rather than to Purchaser's improper installation, use or maintenance and, if it determines that there are, proceed to remedy the defects under the options available to it in the following paragraph.

Purchaser's sole and exclusive remedy for defective goods or services shall be, at Alaskan's option, repair, replacement or refund of pur

chase price. Alaskan shall not be liable under any circumstances, including, but not limited to, any claim for breach of warranty (express or implied), tort (including negligence) or strict liability, for any actual, incidental, contingent, special or consequential damages arising from or out of this agreement or the goods or services purchased hereunder, including but not limited to, no liability for loss of profits or revenue, loss of use of goods or services or other items to be furnished to Purchaser hereunder, cost of capital, cost of substitute equipment, additional costs incurred by Purchaser at its plant or in the field (whether by way of correction or otherwise) or claims of Purchaser's, customers or other third parties for damages.

Dimensional Summary

Welding Fittings



Nominal Pipe Size	Outside Diameter	B 16.9 LR 90 K	NAVSEA LR 90 A	B 16.9 LR 45 N	NAVSEA LR 45 B	B 16.28* SR 90 K	NAVSEA SR 90 A	B 16.9 NAVSEA Tees or Cross E, K	B 16.9 NAVSEA Reducer L, H	ANSI Stub End F	ANSI Stub End M
1/2	.840	1 1/2		5/8							2
3/4	1.05	1 1/8		7/16				1 1/8	1 1/2	3	2
1	1.31	1 1/2	2	7/8	1 1/8	1		1 1/2	2	4	2
1 1/4	1.66	1 7/8	2 7/16	1	1 11/32	1 1/4		1 7/8	2	4	2
1 1/2	1.90	2 1/4	2 15/16	1 1/8	1 5/8	1 1/2		2 1/4	2 1/2	4	2
2	2.375	3	3 23/32	1 3/8	1 31/32	2		2 1/2	3	6	2 1/2
2 1/2	2.875	3 3/4	4 5/8	1 3/4	2 7/16	2 1/2		3	3 1/2	6	2 1/2
3	3.50	4 1/2	5 13/32	1 7/8	2 49/64	3	3 29/32	3 3/8	3 1/2	6	2 1/2
4	4.50	6	6 31/32	2 1/2	3 29/64	4	4 31/32	4 1/8	4	6	3
5	5.562	7 1/2	8 19/32	3 1/8	4 13/64	5	6 3/32	4 7/8	5	8	3
6	6.625	9	10 11/64	3 3/4	4 29/64	6	7 11/64	5 5/8	5 1/2	8	3 1/2
8	8.625	12	13 3/8	5	6 11/32	8	9 3/8	7	6	8	4
10	10.75	15	16 9/16	6 1/4	7 25/32	10	11 9/16	8 1/2	7	10	5
12	12.75	18	19 11/16	7 1/2	9 9/64	12	11 11/16	10	8	10	6
14		21	21 1/2	8 3/4	9 1/4	14	14 1/2	11	13	12	6
16		24	24 1/2	10	10 1/2	16	16 1/2	12	14	12	6
18		27	27 1/2	11 1/4	11 3/4	18	18 1/2	13 1/2	15	12	6
20		30	30 1/2	12 1/2	13	20	20 1/2	15	20	12	6
22		33	33 1/2	13 1/2	14	22	22 1/2	16 1/2	20	12	
24		36	36 1/2	15	15 1/2	24	24 1/2	17	20	12	6
26		39		16		26		19 1/2	24		
28		42		17 1/2		28		20 1/2	24		
30		45		18 1/2	19	30	30 1/2	22	24		
32		48		19 3/4		32		23 1/2	24		
34		51		21		34		25	24		
36		54		22 1/4	22 3/4	36	36 1/2	26 1/2	24		
38		57		23 5/8		38		28	24		
40		60		24 7/8		40		29 1/2	24		
42		63		26 1/8		42			24		
44		66		27 3/8		44			24		
46		69		28 5/8		46			28		
48		72		29 7/8		48			28		

Dimensions for welding fittings with OD and ID tubing size diameters are identical to the fitting dimensions above.

Dimensions are in inches.

* Sizes 26" through 48" are per Alaskan Standard.

Sizes not shown may be available upon request.

Belled end fittings: See pages to for dimensions.

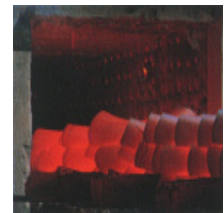
Alaskan Quality is achieved through a rigorous program designed to get the right instructions to the right people, so that a product is fabricated correctly the first time.

Since our beginning in 1913, the **Alaskan Quality Program** has been continually analyzed, revised and improved to meet the increasing challenges and complexity of specifications for piping, fittings, and custom fabrication. Our current **Quality Program** allows us to create an assignment of responsibility for engineering, drafting, layout, purchasing, scheduling, fabrication, examination, documentation and packaging. Thus our goal...conformance to specification...is consistently shared with you, the Purchaser.

Alaskan's facilities for radiography, liquid penetrant examination, ultrasonic gaging, hydrotesting and dimensional checking further confirm the quality that the program creates. Our program of proven procedures also enables the certification of parts and pressure vessels with the symbols of UM, U and U2 in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code. Your purchase of **Alaskan** quality-crafted products will enable us to share with you our experience, knowledge and dependability.



Hydrotesting verifies pressure capabilities of pipe and tubing.



Heat-treatment stress relieves fittings after forming.



Geometric accuracy is checked on all Alaskan fittings.



Specialized film reader and digital densitometer are used in interpreting radiographic film.



Radiographic inspection checks the integrity of welds.

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