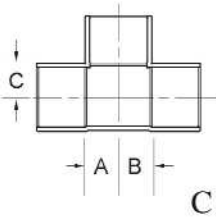


## PRESSURE FITTINGS TEE - WROT Copper x Copper x Copper



Mueller: WT-600 wrot  
T-300 cast

Elkhart: 111 wrot  
4711 cast

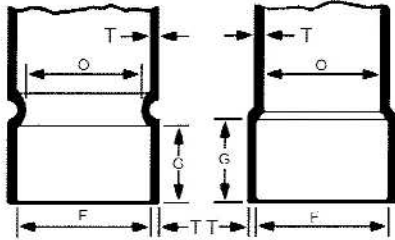
Nibco: 611 wrot  
711 cast

Item No.	Nom. Size (in inches)	Mstr Crtn	Net Wt. Approx.	Dim A	Dim B	Dim C
VPT-02	1/8	50/1000	.02	1/8	1/8	1/8
VPT-03	3/16 OD	50/500	--	-	-	-
VPT-04	1/4	50/1000	.03	17/64	17/64	1/4
VPT-05	5/16 OD	50/1000	.02	7/32	7/32	9/32
VPT-06	3/8	50/500	.05	5/16	5/16	3/8
VPT-08	1/2	50/500	.06	21/64	21/64	21/64
VPT-10	5/8	25/250	.11	7/16	7/16	1/2
VPT-12	3/4	25/200	.14	1/2	1/2	17/32
VPT-16	1	10/100	.31	21/32	21/32	21/32
VPT-20	1-1/4	5/50	.41	7/8	7/8	25/32
VPT-24	1-1/2	5/50	.56	1-5/32	1-5/32	1-5/32
VPT-32	2	5/25	1.29	1-3/8	1-3/8	1-3/8
VPT-40	2-1/2	1/10	4.18	1-21/32	1-21/32	1-11/16
VPT-48	3	1/10	3.49	1-7/8	1-7/8	1-11/16
VPT-56	3-1/2	1/8	5.29	2-5/32	2-5/32	2-1/4
CPT-64	4 cast	1/1	6.1	2-13/32	2-13/32	2-9/16
VPT-64	4	1/8	7.0	2-13/32	2-13/32	2-9/16
CPT-80	5 cast	1/1	12.03	2-37/64	2-37/64	2-29/32
VPT-80	5	1/1	8.29	2-37/64	2-37/64	2-29/32
CPT-96	6 cast	1/1	13.46	3-1/8	3-1/8	3-11/16
VPT-96	6	1/1	12.08	3-1/8	3-1/8	3-11/16
VPT-99	8	1/1	33.00	4-1/16	4-1/16	4-3/4
VPT-02-02-04	1/8 x 1/8 x 1/4	50/1000	.02	13/32	13/32	1/4
VPT-04-02-04	1/4 x 1/8 x 1/4	50/1000	.03	17/64	13/32	1/4
VPT-04-04-02	1/4 x 1/4 x 1/8	50/1000	.03	13/64	13/64	7/32
VPT-04-04-03	1/4 OD x 3/8 OD	50/500	-	-	-	-
VPT-04-04-06	1/4 x 1/4 x 3/8	50/500	.05	-	-	-
VPT-05-05-06	5/16OD x 3/8OD	50/500	.02	-	-	-
VPT-06-04-04	3/8 x 1/4 x 1/4	50/500	.05	5/16	15/32	15/32
VPT-06-04-06	3/8 x 1/4 x 3/8	50/500	.05	5/16	15/32	3/8
VPT-06-06-02	3/8 x 3/8 x 1/8	50/500	.05	5/16	5/16	39/64
VPT-06-06-04	3/8 x 3/8 x 1/4	50/500	.04	5/16	5/16	15/32
VPT-06-06-08	3/8 x 3/8 x 1/2	50/500	.07	17/32	17/32	11/32
VPT-08-04-06	1/2 x 1/4 x 3/8	50/500	.06	-	-	-
VPT-08-06-04	1/2 x 3/8 x 1/4	50/500	.06	-	-	-
VPT-08-06-06	1/2 x 3/8 x 3/8	50/500	.06	5/16	1/2	13/32
VPT-08-06-08	1/2 x 3/8 x 1/2	50/500	.06	3/8	17/32	11/32
VPT-08-08-02	1/2 x 1/2 x 1/8	50/500	.06	9/32	9/32	1/2

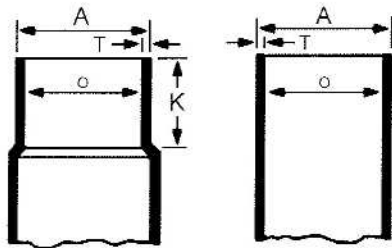
Item No.	Nom. Size (in inches)	Mstr Crtn	Net Wt. Approx.	Dim A	Dim B	Dim C
VPT-08-08-04	1/2 x 1/2 x 1/4	50/500	.08	9/32	9/32	13/32
VPT-08-08-06	1/2 x 1/2 x 3/8	50/500	.08	5/16	5/16	13/32
VPT-08-08-12	1/2 x 1/2 x 3/4	25/250	.17	33/64	33/64	15/32
VPT-08-08-16	1/2 x 1/2 x 1	10/100	.29	15/16	15/16	3/4
VPT-10-10-06	5/8 x 5/8 x 3/8	25/250	.09	27/64	27/64	21/32
VPT-10-10-12	5/8 x 5/8 x 3/4	25/250	.16	-	-	-
VPT-12-06-06	3/4 x 3/8 x 3/8	25/250	.12	25/64	23/32	11/16
VPT-12-08-06	3/4 x 1/2 x 3/8	25/250	.19	25/64	5/8	11/16
VPT-12-08-08	3/4 x 1/2 x 1/2	25/250	.15	25/64	5/8	19/32
VPT-12-08-12	3/4 x 1/2 x 3/4	25/250	.17	1/2	25/32	17/32
VPT-12-12-06	3/4 x 3/4 x 3/8	25/250	.12	25/64	25/64	11/16
VPT-12-12-08	3/4 x 3/4 x 1/2	25/250	.12	25/64	25/64	1/2
VPT-12-12-16	3/4 x 3/4 x 1	10/100	.20	3/4	3/4	17/32
VPT-16-08-08	1 x 1/2 x 1/2	10/100	.22	23/64	13/16	11/16
VPT-16-08-12	1 x 1/2 x 3/4	10/100	.23	1/2	15/16	5/8
VPT-16-08-16	1 x 1/2 x 1	10/100	.31	21/32	5/64	21/32
VPT-16-12-06	1 x 3/4 x 3/8	10/100	.24	-	-	-
VPT-16-12-08	1 x 3/4 x 1/2	10/100	.23	23/64	9/16	11/16
VPT-16-12-12	1 x 3/4 x 3/4	10/100	.27	1/2	11/16	5/8
VPT-16-12-16	1 x 3/4 x 1	10/100	.30	21/32	53/64	21/32
VPT-16-16-06	1 x 1 x 3/8	10/100	.21	23/64	23/64	13/16
VPT-16-16-08	1 x 1 x 1/2	10/100	.20	23/64	23/64	3/4
VPT-16-16-12	1 x 1 x 3/4	10/100	.22	1/2	1/2	3/4
VPT-16-16-20	1 x 1 x 1 1/4	5/50	.44	1-5/32	1-5/32	31/32
VPT-16-16-24	1 x 1 x 1-1/2	5/50	.73	1-1/4	1-1/4	1-5/32
VPT-20-08-08	1-1/4 x 1/2 x 1/2	10/50	.29	-	-	-
VPT-20-08-12	1-1/4 x 1/2 x 3/4	5/50	.30	9/16	5/8	7/8
VPT-20-08-16	1-1/4 x 1/2 x 1	5/50	.37	3/4	3/4	7/8
VPT-20-08-20	1-1/4 x 1/2 x 1-1/4	5/50	.42	7/8	7/8	25/32
VPT-20-12-08	1-1/4 x 3/4 x 1/2	5/50	.28	1/2	1/2	25/32
VPT-20-12-12	1-1/4 x 3/4 x 3/4	5/50	.28	5/8	5/8	25/32
VPT-20-12-16	1-1/4 x 3/4 x 1	5/50	.45	3/4	3/4	25/32
VPT-20-12-20	1-1/4 x 3/4 x 1-1/4	5/50	.42	7/8	7/8	25/32
VPT-20-16-08	1-1/4 x 1 x 1/2	5/50	.27	1/2	1/2	25/32
VPT-20-16-12	1-1/4 x 1 x 3/4	5/50	.35	5/8	5/8	25/32
VPT-20-16-16	1-1/4 x 1 x 1	5/50	.39	3/4	3/4	25/32
VPT-20-16-20	1-1/4 x 1 x 1-1/4	5/50	.41	7/8	7/8	25/32
VPT-20-20-08	1-1/4 x 1-1/4 x 1/2	10/50	.25	1/2	1/2	25/32
VPT-20-20-12	1-1/4 x 1-1/4 x 3/4	10/50	.26	5/8	5/8	25/32
VPT-20-20-16	1-1/4 x 1-1/4 x 1	5/50	.38	3/4	3/4	25/32
VPT-20-20-24	1-1/4 x 1-1/4 x 1-1/2	5/50	.70	1-3/16	1-3/16	1-5/32
VPT-20-20-32	1-1/4 x 1-1/4 x 2	5/40	1.41	1-3/4	1-3/4	1-3/8
VPT-24-08-08	1-1/2 x 1/2 x 1/2	10/50	.33	-	-	-
VPT-24-08-12	1-1/2 x 1/2 x 3/4	5/50	.36	-	-	-
VPT-24-08-16	1-1/2 x 1/2 x 1	5/50	-	-	-	-
VPT-24-08-20	1-1/2 x 1/2 x 1-1/4	5/50	.56	-	-	-

### Dimensions of Solder Joint Ends - Pressure Fittings (inches)

#### Wrought-Copper and Wrought-Copper Alloy Solder Joint Pressure Fittings



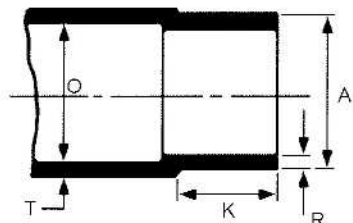
FEMALE (COPPER)



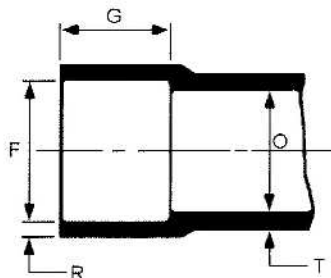
MALE (FITTING)

Standard Water Tube Size	Male End (fitting end)			Female End (copper end)			Metal Thickness		Inside Dia. Of Fitting O Min.
	Outside Diameter A		Length K	Inside Diameter F		Depth G	T		
	Min.	Max.	Min.	Min.	Max.	Min.	Min.	Min.	
1/8	0.248	0.251	0.31	0.252	0.256	0.25	0.019	0.18	
1/4	0.373	0.376	0.38	0.377	0.381	0.31	0.023	0.30	
3/8	0.497	0.501	0.44	0.502	0.506	0.38	0.026	0.39	
1/2	0.622	0.626	0.56	0.627	0.631	0.50	0.029	0.52	
5/8	0.747	0.751	0.69	0.752	0.756	0.62	0.031	0.63	
3/4	0.872	0.876	0.81	0.877	0.881	0.75	0.033	0.74	
1	1.122	1.127	0.97	1.128	1.132	0.91	0.040	0.98	
1 1/4	1.372	1.377	1.03	1.378	1.382	0.97	0.044	1.23	
1 1/2	1.621	1.627	1.16	1.628	1.633	1.09	0.051	1.47	
2	2.121	2.127	1.41	2.128	2.133	1.34	0.059	1.94	
2 1/2	2.621	2.627	1.53	2.628	2.633	1.47	0.067	2.42	
3	3.121	3.127	1.72	3.128	3.133	1.66	0.075	2.89	
3 1/2	3.621	3.627	1.97	3.628	3.633	1.91	0.086	3.37	
4	4.121	4.127	2.22	4.128	4.133	2.16	0.096	3.84	
5	5.121	5.127	2.72	5.128	5.133	2.66	0.111	4.70	
6	6.121	6.127	3.22	6.128	6.133	3.09	0.124	5.72	
8	8.119	8.127	4.09	8.128	8.133	3.97	0.173	7.55	

#### Cast Copper Alloy Solder Joint Pressure Fittings



MALE (FITTING)



FEMALE (COPPER)

Standard Water Tube Size	Male End (fitting end)			Female End (copper end)			Metal Thickness +/- 10%		Inside Dia. Of Fitting O Min.
	Outside Diameter A		Length K	Inside Diameter F		Depth G	Body T	Joint R	
	Min.	Max.	Min.	Min.	Max.	Min.			
1/4	0.373	0.376	0.38	0.377	0.381	0.31	0.08	0.05	0.31
3/8	0.497	0.501	0.44	0.502	0.506	0.38	0.09	0.05	0.43
1/2	0.622	0.626	0.56	0.627	0.631	0.50	0.09	0.05	0.54
3/4	0.872	0.876	0.81	0.877	0.881	0.75	0.10	0.06	0.78
1	1.122	1.127	0.97	1.128	1.132	0.91	0.11	0.07	1.02
1 1/4	1.372	1.377	1.03	1.387	1.382	0.97	0.12	0.07	1.26
1 1/2	1.621	1.627	1.16	1.628	1.633	1.09	0.13	0.08	1.50
2	2.121	2.127	1.41	2.128	2.133	1.34	0.15	0.09	1.98
2 1/2	2.621	2.627	1.53	2.628	2.633	1.47	0.17	0.10	2.46
3	3.121	3.127	1.72	3.128	3.133	1.66	0.19	0.11	2.94
3 1/2	3.621	3.627	1.97	3.628	3.633	1.91	0.20	0.12	3.42
4	4.121	4.127	2.22	4.128	4.133	2.16	0.22	0.13	3.90
5	5.121	5.127	2.72	5.128	5.133	2.66	0.28	0.17	4.87
6	6.121	6.127	3.22	6.128	6.133	3.09	0.34	0.20	5.84
8	8.119	8.127	4.09	8.128	8.133	3.97	0.38	0.31	7.72
10	10.119	10.127	4.12	10.128	10.133	4.00	0.48	0.48	9.62
12	12.119	12.127	4.62	12.128	12.133	4.50	0.56	0.56	11.56

The information contained herein is produced in good faith and is believed to be reliable but is for guidance only. ARGCO and its agents cannot assume liability or responsibility for results obtained in the use of its product by persons whose methods are outside or beyond our control. It is the user's responsibility to determine the suitability of any of the products, methods of use, or preparation prior to use, mentioned in our literature. It is the user's responsibility to observe and adapt such precautions as may be advisable for the protection of personnel and property in the handling and use of any of our products.

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## Rated Internal Working Pressure for Copper Fittings ( lbs/square inch)

Standard Water Tube Size (Nom. Inches)	-20 - 100° F	150° F	200° F	250° F	300° F	350° F	400° F
1/4	912	775	729	729	714	608	456
3/8	779	662	623	623	610	519	389
1/2	722	613	577	577	565	481	361
5/8	631	537	505	505	495	421	316
3/4	582	495	466	466	456	388	291
1	494	420	395	395	387	330	247
1-1/4	439	373	351	351	344	293	219
1-1/2	408	347	327	327	320	272	204
2	364	309	291	291	285	242	182
2-1/2	336	285	269	269	263	224	168
3	317	270	254	254	248	211	159
3-1/2	304	258	243	243	238	202	152
4	293	249	235	235	230	196	147
5	269	229	215	215	211	179	135
6	251	213	201	201	196	167	125
8	270	230	216	216	212	180	135

Copper fittings have the same "rated" internal working pressure as straight, seamless ASTM B88 Type K annealed copper water tube. The "actual" bursting pressure of both fittings and tube exceed 4 times the internal water pressure above. Example: the bursting pressure of 1/2" drawn Type K is 5600 psi.

### Soldering and Brazing Copper Tube

Soldering and Brazing with capillary solder joint fittings is the most common system for joining copper tube. In actual practice, most soldering is done at temperatures about 350° F to 550° F, while brazing is done at temperatures ranging from 1100° F to 1550° F.

The theory of soldering and brazing is the same for all diameters. Basically, when two metal surfaces are close to one another as copper tube is when coupled into a fitting, liquid metal will be drawn into the gap by "capillary" action. In normal copper systems the gap will be between 0.0005" and 0.005". However, capillary action will occur up to 0.010" gaps.

### Basic Steps in the Joining Process

**Measuring** - Measuring the length of the tube must be accurate since it is imperative that the copper tube must fit to the end of the socket in the fitting in order for the strongest joint to be made.

**Cutting** - Cutting the tube can be accomplished in a number of ways to produce a satisfactory, square-end cut. The tube can be cut with a disc type tube cutter, a hacksaw, abrasive wheel, or on a bandsaw. Care must be taken that the tube is not significantly deformed while being cut.

**Reaming** - Most methods of cutting leave a small burr on the end of the tube which must be removed since erosion-corrosion may occur due to local turbulence and increased velocities in the tube. Tools used to ream tube ends include the reaming blade on the tube cutter, files, a pocket knife, or a suitable deburring tool. With soft tube, care must be taken not to get the tube end out-of-round by applying too much pressure. Both the inside and the outside of the tube may require removal of the burr.

**Cleaning** - Cleaning the outside of the tube and the fitting socket is crucial to a good joint. The removal of oxides and surface soil is necessary if filler metal is to flow properly and form intermetallic bonds with the two metal surfaces. Oxides, surface soil and oil can interfere with the strength of the joint and this can result in the joint's failure. Mechanical cleaning is a simple operation. The end of the tube can be cleaned using sand cloth or nylon abrasive pads for a distance only slightly more than the depth of the fitting socket. The socket of the fitting should also be cleaned using sand cloth, abrasive pads, or properly sized fitting wire brushes.

Copper is a soft metal; if too much material is removed, a loose fit will result and interfere with satisfactory capillary action in making the joint. Chemical cleaning may be utilized, providing the tube and fittings are thoroughly rinsed, according to the manufacturer's recommendations furnished with the cleaner. This will help neutralize any acidic conditions that may exist. The surfaces, once cleaned, should not be touched with



## **Product Specification:**

Cello Products Inc. certifies that it manufactures all its cast brass and wrought copper solder joint fittings to the general specifications outlined in the following industry standards:

Wrought Copper and Copper Alloy Solder Joint Pressure Fittings: ASME/ANSI Std. B16.22 - 2001

Cast Copper Alloy Solder Joint Pressure Fittings: ASME/ANSI Std. B16.18 - 2001

Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings -- DWV ASME/ANSI Std. B16.29 - 2001

Cast Copper Alloy Solder Joint Drainage Fittings: ASME/ANSI Std. B16.23 - 2002

Bronze Pipe Flanges and Flanged Fittings: ASME/ANSI Std. B16.24 - 2001

Cast Bronze Threaded Fittings: ASME/ANSI Std. B16.15 - 1985

Wrought Copper and Copper Alloy Braze - Joint Pressure Fitting ASME/ANSI Std. B16.50 - 2001

Cast Copper Alloy Pipe Flanges and Flanged Fittings ASME/ANSI Std. B16.24 - 2001

Wrought Copper LW Solder Joint Pressure Fittings: MSS SP-104 - 1990

Cast Copper Alloy Flanges and Flanged Fittings

Class 125, 150, 300: MSS SP-106 - 1990

Cello further certifies that the materials used to manufacture these fittings are made in compliance with the following industry standards:

Tubular Wrought Copper:

Standard Specification for Seamless Copper Tube: ASTM B75 Alloy C12200

Products Made From Sheet:

Standard Specification for Copper Sheet, Strip, Plate

and Rolled Bar: ASTM B152 Alloy C11000

Cast Products:

Standard Specification for Copper Alloy Sand Castings for General

Applications; Federal Specification WW-U-516 for Type III,

Class A and B Copper Alloy Unions: ASTM B584 Alloy C84400

The industry standards are: ANSI (American National Standards Institute); ASME (The American Society of Mechanical Engineers); MSS (Manufacturers Standardization Society of the Valve and Fittings Industry Inc.); ASTM (American Society for Testing and Materials).

All Cello Products Inc. wrought copper fittings are NSF 61 registered.

All pressure fittings manufactured by Cello Products Inc. have Canadian Registration Numbers (CRN)

0A4925.5C Pressure pipe fittings

0B4925.5C Flanges

(note - the 5 is needed to designate the first province of registration)

International Quality Standard: Cello Products is certified to ISO 9002 standards through QMI (Quality Management Institute) and will be certified to ISO 9001:2000, by 2004.

The information contained herein is produced in good faith and is believed to be reliable but is for guidance only. ARGCO and its agents cannot assume liability or responsibility for results obtained in the use of its product by persons whose methods are outside or beyond our control. It is the user's responsibility to determine the suitability of any of the products, methods of use, or preparation prior to use, mentioned in our literature. It is the user's responsibility to observe and adapt such precautions as may be advisable for the protection of personnel and property in the handling and use of any of our products.

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