

ASME/ANSI STANDARD COPPER WATER TUBE & SOLDER-JOINT ENDS - VALVES & FITTINGS

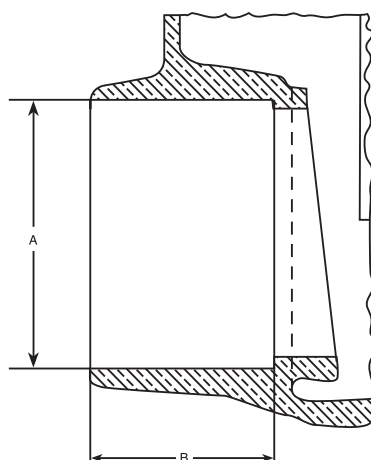
SERVICE RECOMMENDATIONS

Seamless copper water tube is used for such services as steam, water or air and oil, gas or similar fluids.

Type K Tube is especially recommended for underground use and where service conditions are severe. It is also recommended for general plumbing and heating systems and is used for gas, oil and steam.

Type L Tube is for interior use in general plumbing and heating work.

Type M Tube is for use with solder-joint fittings only, for waste, vent and interior drainage lines and other non-pressure applications.



As steam installations, the successful application of copper tube depends upon weight of tube and solder used when making joints. The solder must have a melting point high enough to remain unaffected by the temperature of the steam.

HARD COPPER TUBE: Hard copper tube is intended primarily for use in straight lengths. Without proper bending equipment, its use is not recommended for field bending.

SOFT COPPER TUBE: This tube can be bent without special bending equipment and is recommended for use when bends must be made in the field, as in concealed replacement work. Soft copper tubing may become flattened or distorted when being handled or while in transit. The ends of this tube should therefore be sized to assure a tight soldered joint.

Type K (hard and soft) and Type L (hard and soft) in sizes $\frac{3}{8}$ " to 12" and Type M (hard) in sizes $2\frac{1}{2}$ " to 12" conform to ANSI Standard for Copper Water Tube, H23.1. Also conforms to Federal Specification WW-T-799.

DIMENSIONS OF SOLDER-JOINT ENDS

Standard Water Tube Size Inches	A Inside Diameter		B Depth Min. Inches
	Min. Inches	Max. Inches	
$\frac{1}{4}$	.377	.381	$\frac{5}{16}$
$\frac{3}{8}$	.502	.506	$\frac{3}{8}$
$\frac{1}{2}$	.627	.631	$\frac{1}{2}$
$\frac{3}{4}$	.877	.881	$\frac{3}{4}$
1	1.128	1.132	$\frac{29}{32}$
$1\frac{1}{4}$	1.378	1.382	$\frac{31}{32}$
$1\frac{1}{2}$	1.628	1.633	$\frac{13}{32}$
2	2.128	2.133	$\frac{11}{32}$
$2\frac{1}{2}$	2.628	2.633	$\frac{15}{32}$
3	3.128	3.133	$\frac{121}{32}$
$3\frac{1}{2}$	3.628	3.633	$\frac{129}{32}$
4	4.128	4.133	$\frac{25}{32}$
5	5.128	5.133	$\frac{221}{32}$
6	6.128	6.133	$\frac{37}{32}$
8	8.128	8.133	$\frac{311}{32}$

TUBE DIMENSIONS AND WEIGHTS

Nominal Size of Tube In.	Actual Out-side Diam. of Tube In.	Type K Tube		Type L Tube		Type M Tube	
		Wall Thickness In.	Wgt. Per Foot Lbs.	Wall Thickness In.	Wgt. Per Foot Lbs.	Wall Thickness In.	Wgt. Per Foot Lbs.
$\frac{1}{4}$	$\frac{3}{8}$	—	—	.030	.126	—	—
$\frac{3}{8}$	$\frac{1}{2}$	.049	.269	.035	.198	—	—
$\frac{1}{2}$	$\frac{5}{8}$	.049	.344	.040	.285	—	—
$\frac{3}{4}$	$\frac{7}{8}$	.065	.641	.045	.455	—	—
1	$1\frac{1}{8}$	.065	.839	.050	.655	—	—
$1\frac{1}{4}$	$1\frac{3}{8}$	.065	1.04	.055	.884	.042	.68
$1\frac{1}{2}$	$1\frac{5}{8}$	.072	1.36	.060	1.14	.049	.94
2	$2\frac{1}{8}$	.083	2.06	.070	1.75	.058	1.46
$2\frac{1}{2}$	$2\frac{5}{8}$	.095	2.93	.080	2.48	.065	2.03
3	$3\frac{1}{8}$	.109	4.00	.090	3.33	.072	2.68
$3\frac{1}{2}$	$3\frac{5}{8}$	.120	5.12	.100	4.29	.083	3.58
4	$4\frac{1}{8}$	.130	6.51	.110	5.38	.095	4.66
5	$5\frac{1}{8}$	.160	9.67	.125	7.61	.109	6.66
6	$6\frac{1}{8}$	.192	13.90	.140	10.20	.122	8.92
8	$8\frac{1}{8}$	.271	25.90	.200	19.30	.170	16.50
10	$10\frac{1}{8}$	.338	40.30	.250	30.10	.212	25.60
12	$12\frac{1}{8}$	.405	57.80	.280	40.40	.254	36.70

Data extracted from ASME/ANSI Standard 16.18–1984 (R1994) – Cast Copper Alloy Solder Joint Pressure Fittings.

VALVE INSTALLATION TIPS FOR A SOUND SOLDER JOINT

Kitz solder joint copper alloy ball, gate, globe and check valves are designed to be soft soldered into lines without disassembly, using a low temperature solder 420°F. Other solders, 95/5 tin antimony (460°F) or 96/4 tin silver (430°F) can be used, however, extreme caution must be used to prevent seat and packing damage. Carefully following the succeeding procedure will assure a durable solder connection with copper tubing for servicing distribution of water, oil and gas.

1. Solder

Recommended:

Soft solders having a maximum melting point of 420°F.

Others: 95-5 tin-antimony (460°F)

96.5-3.5 tin-silver (430°F)

2. Soldering Procedure

- (1) Cut tube end square; ream, burr and size.
- (2) Polish tube and cup to a bright metal finish, using sand cloth, wire brush and clean with cloth.
- (3) Apply flux sparingly and evenly to polished surface of tube. No flux need be applied to solder cup.
- (4) Fully open valve before applying heat. Insert tube into valve socket until it contacts internal shoulder of valve socket. Rotate the tube a few times to evenly distribute flux.
- (5) Soldering procedure:
 - (a) Cover the bonnet or valve body with a wet cloth to prevent gland packing and seat damage.
 - (b) Preheat the tube evenly, using an open-flame torch.
 - (c) Heat the joint area to an adequate temperature; remove heat and feed solder around the joint.
 - (d) Check to make sure melted solder is flowing into the jointed surfaces.
 - (e) Visually check joint for continuous fillet.
 - (f) Cool the jointed area with a wet cloth as soon as the solder becomes solid.
 - (g) After cooling, remove solder and flux to prevent surface corrosion.
 - (h) Flush the tube and valve interiors with water to remove internal residue, as soon as piping installation is complete.

CAUTION

- (1) *Do* apply wet cloth to body of valve or bonnet to prevent damage to seat and packing during soldering.
- (2) *Do not* apply heat to the valve body to prevent damage to seats and packing.
- (3) *Do* minimize heating time for solder work to prevent damage to seats and packing.
- (4) *Do not* forget to retighten packing nut after valve cools down for leak-free performance.
- (5) *Do* remember that Service Pressure and Temperature of valve are limited by the properties of the solder.
- (6) *Do not* exceed a service velocity greater than 6 feet per second to prevent erosion of copper tube.