

SECTION 2.1  
PIPE, TUBE, AND FITTINGS

# COPPER TUBE FOR PLUMBING AND MECHANICAL APPLICATIONS

<b>Job Name</b>	<b>Contractor</b>
<b>Job Location</b>	<b>Wholesaler</b>
<b>Engineer</b>	<b>Streamline® Rep</b>

## Product Description:

Streamline® CopperTube for use in plumbing and mechanical applications. Available sizes (Type K, L, M, & DWV) ranging from ¼" to 8" in diameter. All tube shall be manufactured in the United States.

## Material:

Streamline® CopperTube is manufactured from UNS C12200 grade of copper.

## Key Specifications:

Streamline® CopperTube (Type K, L, M) shall conform to the NSF/ANSI 61 Annex G requirements and is manufactured to meet ASTM B88. Copper drainage tube (DWV) is made to meet ASTM B306. Copper refrigeration coils, ACR/Nitrogenized straight lengths and line sets are made to meet the chemical, mechanical, cleanliness and eddy current testing requirements of the applicable specifications of ASTM B280.

## Installation:

Installations shall comply with the latest applicable building codes for the local jurisdiction. For detailed installation instructions, consult the Copper Development Association at [copper.org](http://copper.org).

## References:

C12200	99.9% Pure Copper (can be used for potable water)
NSF/ANSI 61 Annex G	Safe Drinking Water Act (third party certification)
ASTM B88	Seamless Copper Water and Gas Tube (Type K, L, M)
ASTM B280	Seamless Copper Tube for Air Conditioning and Refrigerants
ASTM B306	Seamless Drainage Tube Code (DWV)

*Copper [tube or fitting] UNS C122000 has been evaluated by NSF International to NSF/ANSI 61 for use in drinking water supplies of pH 6.5 and above. Drinking water supplies that are less than pH 6.5 may require corrosion control to limit leaching of copper into the drinking water.*



## COPPER TUBE DATA

Streamline® Copper Tube sets the standard for quality, consistency and service in the plumbing industries. With a full line of copper tube products to support most all plumbing supply and DWV applications, Streamline® Copper Tube is available in all common types including Type K, Type L, Type M and DWV. Each piece of tube is incised marked and color coded for easy, long lasting identity. Manufactured in accordance with applicable standards, our ongoing commitment to quality continues to make Streamline® Copper Tube the preferred and specified brand of industry professionals.

### TYPE K RATED WORKING PRESSURE (PSIG)

NOM. DIA.	WT/FT	FT/BNDL	150°F	200°F	300°F	400°F
1/4	0.145	500	913	860	842	537
3/8	0.269	500	960	904	885	565
1/2	0.344	500	758	713	698	446
5/8	0.418	200	626	589	577	368
3/4	0.641	200	724	682	668	426
1	0.839	100	557	524	513	327
1 1/4	1.04	100	452	425	416	266
1 1/2	1.36	100	420	396	387	247
2	2.06	—	370	348	341	217
2 1/2	2.93	—	338	319	312	199
3	4.00	—	328	308	302	193
3 1/2	5.12	—	311	293	286	183
4	6.51	—	306	288	282	180
5	9.67	—	293	276	270	172
6	13.90	—	295	277	271	173
8	25.90	—	314	295	289	184

### TYPE L

1/4	0.126	500	775	729	714	456
3/8	0.198	500	662	623	610	389
1/2	0.285	500	613	577	565	361
5/8	0.362	200	537	505	495	316
3/4	0.455	200	495	466	456	291
1	0.655	100	420	395	387	247
1 1/4	0.884	100	373	351	344	219
1 1/2	1.14	100	347	327	320	204
2	1.75	—	309	291	285	182
2 1/2	2.48	—	285	269	263	168
3	3.33	—	270	254	248	159
3 1/2	4.29	—	258	243	238	152
4	5.38	—	249	235	230	147
5	7.61	—	229	215	211	135
6	10.2	—	213	201	196	125
8	19.3	—	230	216	212	135

Tables give computed allowable stress for annealed copper tube at indicated temperature.

## COPPER TUBE DATA

### TYPE M RATED WORKING PRESSURE (PSIG)

NOM. DIA.	WT/FT	FT/BNDL	150°F	200°F	300°F	400°F
3/8	0.145	500	485	456	447	285
1/2	0.204	500	420	395	387	247
3/4	0.328	200	346	326	319	204
1	0.465	100	286	270	264	169
1 1/4	0.682	100	287	271	265	169
1 1/2	0.94	100	282	265	259	166
2	1.46	-	254	239	234	149
2 1/2	2.03	-	233	219	215	137
3	2.68	-	215	203	199	127
3 1/2	3.58	-	214	202	197	126
4	4.66	-	213	201	197	126
5	6.66	-	198	186	182	116
6	8.92	-	186	175	171	109
8	16.5	-	195	183	180	115

### TYPE DWV

NOM. DIA	WT/FT	FT/BNDL	150°F	200°F	300°F	400°F
1 1/4	0.65	100	280	269	258	165
1 1/2	0.809	100	249	240	230	147
2	1.07	-	185	178	170	109
3	1.69	-	135	130	125	80
4	2.87	-	127	122	117	75
5	4.43	-	129	124	119	76
6	6.1	-	126	121	116	74
8	10.6	-	124	119	114	73

Table give computed allowable stress for annealed copper tube at indicated temperature.

### TECHNICAL DATA

Values of allowable internal working pressure for copper tube in service are based on the formula from ANSI B31, Standard Code for Pressure Piping:

$$P = \frac{2 S tm}{D \max - 0.8 tm}$$

P = Allowable Pressure	@ 150°F S = 5100 PSIG annealed
S = Allowable stress	@ 200°F S = 4800 PSIG annealed
T = Wall thickness	@ 300°F S = 4700 PSIG annealed
D Max = Outside Diameter	@ 400°F S = 3000 PSIG annealed

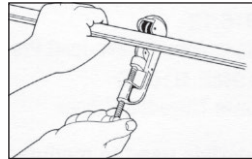
All ratings listed for types K, L, M, DWV and refrigeration service tube in the preceding charts are calculated for tube in the annealed condition. These values should be used when soldering, brazing or welding is employed for joining components in a system. While the ratings for hard drawn tube are substantially higher, they should only be used for systems using properly designed flare or compression mechanical joints, since joining by any heating process might anneal (soften) the tube.

In designing a system, careful consideration should also be given to joint ratings as well as those of the components.

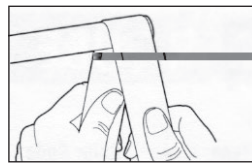
## COPPER TUBE AND SOLDER TYPE FITTINGS

1. Cut tube square with the cutter or fine hack saw (32 tooth blade is recommended). Remove Burr.
2. Clean outside end of copper tube thoroughly with sand cloth or sandpaper equal depth of fitting. Leave no dark spots.
3. Clean inside of fitting carefully to tube stop with wire brush. Note: Sand cloth or sandpaper may also be used.
4. Using a brush, apply light uniform coat of soldering flux to the outside of the tube and inside of the fitting.
5. Slip tube into fitting to tube stop. Turn tube back and forth once or twice to distribute flux evenly.
6. Apply heat uniformly around the fitting with torch. When solder melts upon contact with heated fitting, the proper soldering temperature has been reached. Remove flame and feed solder slightly off center at the bottom of the joint. Proceed across the bottom of the fitting and up to the top center position. Return to the starting point, and then proceed up the incomplete side to the top, again, overlapping the solder metal. Wipe off surplus solder with a piece of cloth.

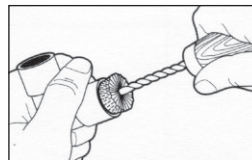
**CAUTION: No not overheat the joint or direct the flame into the face of the fitting cup. Overheating could burn the flux, which will destroy its effectiveness and the solder will not enter the joint properly.**



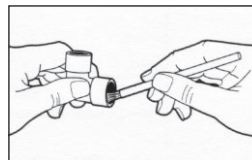
1. Cut tube to length & remove burr with file or scraper.



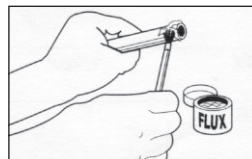
2. Clean outside of tube with sandpaper or sand cloth.



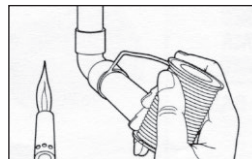
3. Clean inside of fitting with wire brush, sand cloth or sandpaper.



4. Apply flux thoroughly to inside of fitting.



5. Apply flux thoroughly to outside of tube - assemble tube and fitting.



6. Apply heat with torch. When solder melts upon contact with heated fitting, the proper temp for soldering has been reached. Remove flame & feed solder to the joint at one or two points until a ring of solder appears at the end of the fitting.