

COPPER TUBE FOR MEDICAL GAS APPLICATIONS

Job Name	Contractor
Job Location	Wholesaler
Engineer	Streamline[®] Rep

Product Description:

Streamline[®] Copper Tube for use in medical gas applications. Available sizes ranging from 1/8" to 8-1/8" in outside diameter. All tube should be manufactured in the United States.

Material:

Streamline[®] Copper Tube shall be made from material in compliance with ASTM B75 and of UNS C12200 grade of copper.


Key Specifications:

Streamline[®] Copper Tube Type K and Type L (ACR/MED) are made to meet the chemical, mechanical, cleanliness, and eddy current testing requirements of the applicable specification of ASTM B280. Streamline[®] copper tube is third party verified in select sizes¹ through Underwriters Laboratories (UL) for operating pressure of 700psi at 250°F. Oxygen and medical service tube is made to meet ASTM B819 (Types K & L) in hard drawn straight-lengths only and in accordance with CGA cleanliness specifications, CGA G4.1 and NFPA99.

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.

References:

Product Line	Product Type	Diameter
Copper Tube 	Streamline [®] Refrigeration Service Coils	1/8" – 1-1/8"
	Streamline [®] Line Sets & Mini-Splits	1/8" – 1-1/8"
	Streamline [®] ACR - Type L (Hard Lengths)	1/8" – 1-3/8"
	Streamline [®] ACR - Type K (Hard Lengths)	1/8" – 2-5/8"

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|-----------|---|
| ASTM B75 | Seamless Copper Tube |
| C12200 | 99.9% Pure Copper |
| ASTM B280 | Seamless Copper Tube for Air Conditioning and Refrigeration |
| ASTM B819 | Oxy/Med Service Tube |
| NFPA 99 | Health Care Facilities Code |
| CGA G4.1 | Compressed Gas Association |



COPPER TUBE DATA

Mueller Industries' cleaning, purging and pressurizing process assures the high level of tube cleanliness in conformance to ASTM B280, the refrigeration industry standard. The tube is sealed with plugs which maintain the standard of cleanliness from the factory to the job site.

STREAMLINE® COPPER TUBE PRESSURIZED WITH NITROGEN provides maximum protection against the formation of harmful oxides normally formed during brazing operations. Reduction of these oxides greatly reduces system contamination. Plugs are reusable. When less than a 20' length of tube is required for an installation the unused length of tube may be re-plugged to prevent atmospheric contamination during storage.

STREAMLINE® NITROGENIZED seamless copper tube is available in sizes 3/8" OD through 3-1/8" OD. Larger sizes from 3-5/8" OD through 8-1/8" OD are cleaned and capped. Manufactured and cleaned in accordance with ASTM B280. 20-ft. lengths hard drawn - cleaned and capped - color coded - Marked "ACR/MED"

TYPE K NITROGENIZED ACR / MED

RATED WORKING PRESSURE (PSIG)

NOM. DIM	O.D.	WT/FT	FT/BNDL	WALL	150°F	200°F	300°F	400°F
1/4	3/8	0.145	500	0.035	913	860	842	537
3/8	1/2	0.269	500	0.049	960	904	885	565
1/2	5/8	0.344	500	0.049	758	713	698	446
5/8	3/4	0.418	200	0.049	700 †	700 †	577	368
3/4	7/8	0.641	200	0.065	700 †	700 †	668	426
1	1 1/8	0.839	100	0.065	700 †	700 †	513	327
1 1/4	1 3/8	1.04	100	0.065	700 †	700 †	416	266
1 1/2	1 5/8	1.36	100	0.072	700 †	700 †	387	247
2	2 1/8	2.06	—	0.083	700 †	700 †	341	217
2 1/2	2 5/8	2.93	—	0.095	700 †	700 †	312	199
3	3 1/8	4.00	—	0.109	328	308	302	193
3 1/2	3 5/8	5.12	—	0.120	311	293	286	183
4	4 1/8	6.51	—	0.134	306	288	282	180
5	5 1/8	9.67	—	0.160	293	276	270	172
6	6 1/8	13.90	—	0.192	295	277	271	173
8	8 1/8	25.90	—	0.271	314	295	289	184

TYPE L NITROGENIZED ACR / MED

1/4	3/8	0.126	500	0.030	775	729	714	456
3/8	1/2	0.198	500	0.035	700 †	700 †	610	389
1/2	5/8	0.285	500	0.040	700 †	700 †	565	361
5/8	3/4	0.362	200	0.042	700 †	700 †	495	316
3/4	7/8	0.455	200	0.045	700 †	700 †	456	291
1	1 1/8	0.655	100	0.050	700 †	700 †	387	247
1 1/4	1 3/8	0.884	100	0.055	700 †	700 †	344	219
1 1/2	1 5/8	1.14	100	0.060	347	327	320	204
2	2 1/8	1.75	—	0.070	309	291	285	182
2 1/2	2 5/8	2.48	—	0.080	285	269	263	168
3	3 1/8	3.33	—	0.090	270	254	248	159
3 1/2	3 5/8	4.29	—	0.100	258	243	238	152
4	4 1/8	5.38	—	0.110	249	235	230	147
5	5 1/8	7.61	—	0.125	229	215	211	135
6	6 1/8	10.2	—	0.140	213	201	196	125
8	8 1/8	19.3	—	0.200	230	216	212	135

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

† UL Recognized to 700 PSI (select sizes)

COPPER TUBE DATA

REFRIGERATION SERVICE TUBE

STREAMLINE[®] dehydrated and nitrogen purged and sealed copper tube is of a consistent annealed temper, bright and thoroughly dried and packaged in individual cartons. Each carton is clearly labeled showing size and length.

Tube is manufactured in accordance with ASTM B280 and ANSI B9.1, refrigeration industry standards. For special lengths and sizes not listed please consult your local Mueller Industries representative.

COILS

SIZE		RATED INTERNAL WORKING PRESSURE (PSIG)				50 FEET		SHIP INFO	100 FOOT	
O.D.	WALL	150°F	200°F	350°F	400°F	COIL DIA	WT/COIL	COIL/MSTR	COL DIA	WT/COIL
1/8	0.030	2613	2459	2049	1537	10 3/4	1.74	10	17	3.48
3/16	0.030	1645	1548	1290	968	11 3/4	2.88	10	18 5/8	5.76
1/4	0.030	1195	1125	938	703	13 1/2	4.02	10	18 5/8	8.04
5/16	0.032	1017	957	798	598	15 1/2	5.45	10	19 7/8	10.90
3/8	0.032	836	787	656	492	17	6.70	10	21 7/8	13.40
1/2	0.032	700 †	700 †	485	363	19 7/8	9.10	5	25	18.20
5/8	0.035	700 †	700 †	412	309	21 1/4	12.55	5	25 1/4	25.10
3/4	0.035	700 †	700 †	341	256	23 1/4	15.25	3	29	30.50
7/8	0.045	700 †	700 †	388	291	27 1/4	22.75	3	32 1/4	45.50
1 1/8	0.050	700 †	700 †	330	247	34 1/2	32.75	-	38 1/2	65.50
1 3/8	0.055	373	351	293	219	45	44.20	-	45	88.40
1 5/8	0.060	347	327	272	204	45	57.00	-	49	114.00

† UL Recognized to 700 PSI (select sizes)

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:

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

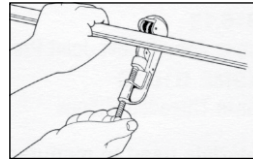
P = Allowable Pressure	@ 150°F S = 5100 PSIG annealed
S = Allowable stress	@ 200°F S = 4800 PSIG annealed
T = Wall thickness	@ 300°F S = 4700 PSIG annealed
D Max = Outside Diameter	@ 400°F S = 3000 PSIG annealed

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.

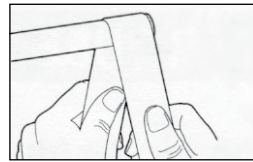
COPPER TUBE AND SOLDER TYPE FITTINGS

1. Cut tube square with the cutter or fine hack saw (32 tooth blade is recommended). Remove Burr.



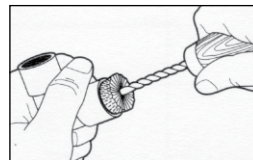
1. Cut tube to length & remove burr with file or scraper.

2. Clean outside end of copper tube thoroughly with sand cloth or sandpaper equal depth of fitting. Leave no dark spots.



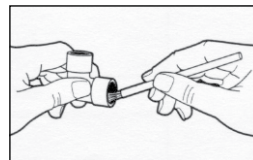
2. Clean outside of tube with sandpaper or sand cloth.

3. Clean inside of fitting carefully to tube stop with wire brush. Note: Sand cloth or sandpaper may also be used.



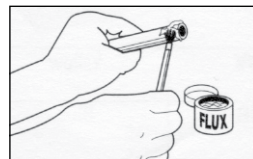
3. Clean inside of fitting with wire brush, sand cloth or sandpaper.

4. Using a brush, apply light uniform coat of soldering flux to the outside of the tube and inside of the fitting.



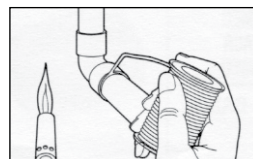
4. Apply flux thoroughly to inside of fitting.

5. Slip tube into fitting to tube stop. Turn tube back and forth once or twice to distribute flux evenly.



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

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.



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.

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.