

**MUELLER BRASS CO.  
MATERIAL SAFETY DATA SHEET  
COPPER ALLOYS**

<b>COMPANY PLANT</b> Mueller Brass Co. 1925 Lapeer Avenue Port Huron, MI 48060	<b>ISSUE DATE</b> October 17, 1985	<b>IDENTIFICATION NUMBER</b> N/A
<b>TRADE NAME (Common Name or Synonym)</b> COPPER ALLOYS	<b>EMERGENCY PHONE NUMBER</b> (313) 987-4000	
<b>CHEMICAL NAME</b> COPPER	<b>FORMULA</b> CU	<b>DOT Identification Number</b> N/A

**I. INGREDIENTS**

MATERIAL OR COMPONENT	CAS Number	% Composition by Weight
<u>Base Metal</u>		
COPPER	7440-50-8	99.3 Min.
<u>Alloying Element</u>	<u>CAS Number</u>	<u>Maximum % Composition by Weight</u>
PHOSPHORUS	7723-14-0	0.06
SULFUR	7704-34-9	0.50
TELLURIUM	13494-80-9	0.70
OXYGEN	7782-44-7	0.02

**NOTE:** Mueller COPPER Alloys may consist of all or any combination thereof of items listed above.

**II. PHYSICAL DATA**

<b>MATERIAL IS (At Normal Conditions)</b> <input type="checkbox"/> LIQUID <input checked="" type="checkbox"/> SOLID <input type="checkbox"/> GAS <input type="checkbox"/> OTHER		<b>APPEARANCE AND ODOR</b> Reddish - Brown Metal / NO ODOR	
<b>ACTIVITY / ALKALINITY</b> pH = N/A	<b>Melting Point</b> 1924-1981 °F <b>Boiling Point</b> N/A °F	<b>Specific Gravity (H<sub>2</sub>O = 1)</b> 8.94 <b>Solubility in water (% by weight)</b> NIL	<b>VAPOR PRESSURE (mm Hg at 20°C)</b> N/A

**III. PERSONAL PROTECTIVE EQUIPMENT**

**Not applicable as shipped but;**  
 Personal protective equipment is determined by processing activity i.e., Casting, Forging, Machining, etc. Appropriate protective equipment should be used to adequately protect the individual for the processing activity incurred.

**IV. EMERGENCY MEDICAL PROCEDURES**

**FOR SKIN CONTACT:**    N/A  
**FOR EYE CONTACT:**    Flush with water for 15 minutes: Consult Physician.

N/A = Not Applicable.

### V. HEALTH / SAFETY INFORMATION

<b>Health</b>	<b>Not applicable as shipped but;</b> Inhalation: With inhalation of metal dust remove to fresh air and consult physician.  Ingestion: Not likely.  Skin: Wash with soap and water.  <b>Not applicable as shipped but;</b> Eyes: Metal dust may irritate eyes . . . flush with water for 15 minutes and consult physician.			
	<b>Fire and Explosion</b>	Flash Point N/A °F	Auto Ignition Temperature N/A °F	Flammable Limits in Air Lower Upper N/A %
	Unusual Fire and Explosion Hazards N/A			Extinguishing Media Not to be used. N/A
<b>Reactivity</b>	STABILITY <input checked="" type="checkbox"/> STABLE <input type="checkbox"/> UNSTABLE		INCOMPATIBILITY (Materials to Avoid) OXIDIZERS, ACIDS, AMMONIA	
	CONDITIONS TO AVOID Those which would result in contact of products above.			
	HAZARDOUS DECOMPOSITION PRODUCTS NO <sub>x</sub> fumes with contact of Nitric Acid.			

### VI. ENVIRONMENTAL

SPILL OR LEAK PROCEDURES  N/A
WASTE DISPOSAL METHODS  <b>Not applicable as shipped but;</b> Waste or residue from this product should be tested to determine hazard classification and disposed of in accordance with Federal, State and Local laws.

### VII. ADDITIONAL INFORMATION

When remelting COPPER avoid presence of moisture.

The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any representation or warranty, express or implied regarding the accuracy or correctness.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.

## REFRIGERATION SERVICE TUBE

**STREAMLINE®** dehydrated and nitrogen purged and sealed copper tube is of a consistent fully 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 B 280 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)				SHIPPING INFORMATION				
O.D.	WALL	150°F	250°F	350°F	400°F	50 FT.		100 FT.		
						COIL DIA	WT/COIL	COILMASTER	COIL DIA	WT/COIL
1/8	.030	2613	2459	2049	1537	10 3/4	1.74	10	17	3.48
3/16	.030	1645	1548	1290	968	11 3/4	2.88	10	18 3/8	5.76
1/4	.030	1195	1125	938	703	13 1/2	4.02	10	18 3/8	8.04
5/16	.032	1017	957	798	598	15 1/2	5.45	10	19 7/8	10.90
3/8	.032	836	787	656	492	17	6.70	10	21 7/8	13.40
1/2	.032	618	581	485	363	19 7/8	9.10	5	25	18.20
5/8	.035	525	494	412	309	21 1/4	12.55	5	25 1/4	25.10
3/4	.035	435	409	341	256	23 1/4	15.25	3	29	30.50
7/8	.045	495	466	388	291	26 1/4	22.75	3	32 1/4	45.50
1 1/8	.050	420	395	330	247	34 1/4	32.75	—	38 1/2	65.50
1 3/8	.055	373	351	293	219	45	44.20	—	49	88.40
1 5/8	.060	347	327	272	204	45	57.00	—	48	114.00

## 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:

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

P = Allowable pressure  
 Allowable stress  
 Wall thickness  
 Diameter

@ 150°F S = 5100 PSIG annealed  
 @ 200°F S = 4800 PSIG annealed  
 @ 300°F S = 4700 PSIG annealed  
 @ 400°F S = 3000 PSIG annealed

All ratings listed for types ACR 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:

## NITROGENIZED® ACR COPPER TUBE

Mueller Industries' patented\*\* 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 patented\* 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 replugged to prevent atmospheric contamination during storage.

**STREAMLINE®** Nitrogenized® ACR seamless copper tube is available in sizes 3/8" OD thru 3 1/8" OD. Larger sizes from 3 5/8" OD thru 8 1/8" 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".

### STRAIGHT LENGTHS

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

SIZE	WT/FT	FT/BNDL	WALL	RATED INTERNAL WORKING PRESSURE (PSIG)			
				150°F	200°F	300°F	400°F
3/8	.126	500	.030	775	729	714	456
1/2	.198	500	.035	662	623	610	389
5/8	.285	500	.040	613	577	565	361
3/4	.362	200	.042	537	505	495	316
7/8	.455	200	.045	495	466	456	291
1 1/8	.655	100	.050	420	395	387	247
1 1/4	.884	100	.055	373	351	344	219
1 1/2	1.14	100	.060	347	327	320	204
2 1/8	1.75		.070	309	291	285	182
2 1/4	2.48		.080	285	269	263	168
3 1/8	3.33		.090	270	254	248	159
3 1/4	4.29		.100	258	243	238	152
4 1/8	5.38		.110	249	235	230	147
5 1/8	7.61		.125	229	215	211	135
6 1/8	10.20		.140	213	201	196	125
8 1/8	19.30		.200	230	216	212	135

\*U.S. Patent 3,200,984

\*\*U.S. Patent RE. 28124, Canadian Patents - 723,463 and 751,099

### TEMPERATURE-PRESSURE RATING OF SOLDERED JOINTS

**STREAMLINE®** Nitrogenized® ACR Copper Tube is your best investment against system contamination.

ALLOY USED FOR JOINTS	SERVICE TEMPERATURE °F	STANDARD TUBE SIZE, TYPES K, L, AND M				
		WATER AND NON-CORROSIVE LIQUIDS AND GASES				
		1/4-1	1 1/4-2	2 1/2-4	5-8	SATURATED ALL
95 - 5	100	500	400	300	270	—
	150	400	350	275	250	—
Tin-Antimony	200	300	250	200	180	—
Solder (a)	250	200	175	150	135	15
Brazing Alloys	100-150-200	(b)	(b)	(b)	(b)	—
(Melting at or above 1000°F)	250	300	210	170	150	—
	350	270	190	150	150	120

NOTE: Ratings are those given in ASME/ANSI Standard B16.22 "Wrought Copper and Copper Alloy Solder Joint Pressure Fittings" and ANSI B 16.18 "Cast Copper Alloy Solder Joint Pressure Fittings."  
 (a) Solder alloys are covered by ASTM Standard Specification B32.  
 (b) Rated internal pressure is that of tube or fittings being joined (whichever is less).