

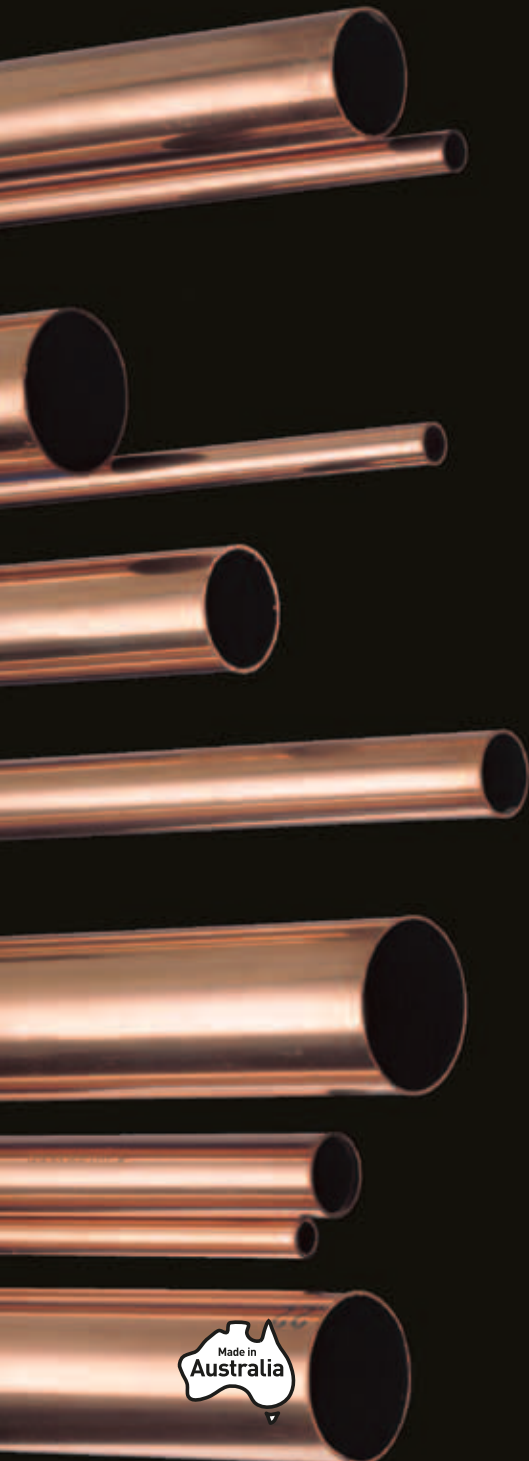
Copper Tube - ASTM B88

QUALITY, RELIABILITY,
RANGE AND PERFORMANCE

COPPER TUBE → PLUMBING → GAS FITTING → DRAINAGE



Crane copper tube is manufactured to the ASTM B88 standard using the highest grade raw materials and modern extruding and drawing technology to provide superior products for water, gas and waste in domestic, commercial and industrial applications.



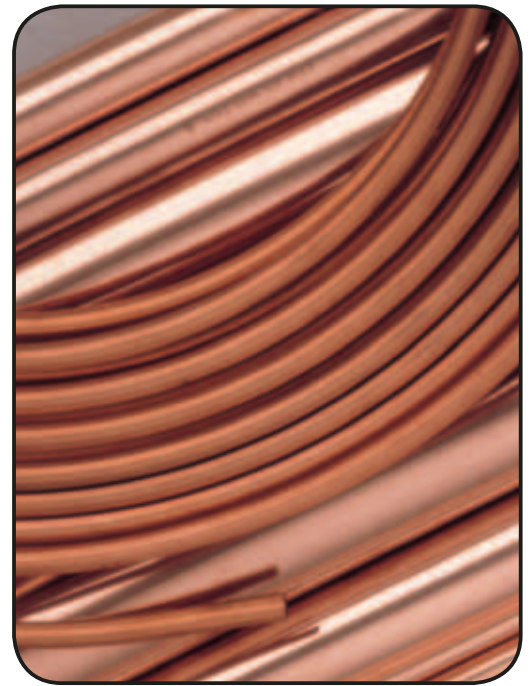
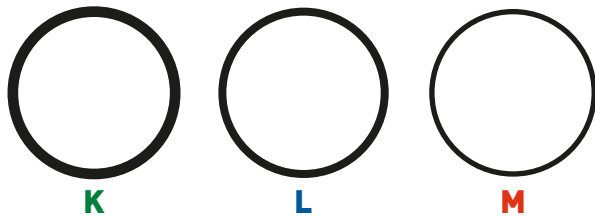
Crane Copper Tube – ASTM B88

- **Quality Certified:** Crane copper tube is Australian made, and is certified to comply with ASTM B88 - Standard specification for seamless copper water tube.
- **Internal Surface Quality:** Crane Copper Tube uses special manufacturing processes to provide enhanced internal bore characteristics that offer improved corrosion resistance and levels of carbon residue well below the values set by the Standard.
- **Multi Applications:** Crane copper tube has great versatility for multiple uses including hot and cold water, above and below ground services, gas reticulation, sanitary and drainage, heating and general plumbing applications.
- **Inherent Strength:** Copper tube has inherent strength, providing good resistance to external damage, puncture, abrasion, vibration bumps, and has a wide operating range for pressure and vacuum.
- **Impervious:** Copper tube is impervious to oxygen, insecticide, solvents and toxins.
- **Non-Flammable:** Copper tube is non-flammable and does not emit toxic fumes during fire.
- **Full Flow Joints:** Copper tube jointing does not reduce the bore of the tube, therefore providing high flow performance.
- **Low Friction Loss:** Copper tube provides high flow rates with minimal external dimensions.
- **U.V. Resistant:** Copper tube does not degrade from direct sunlight or become brittle with age.
- **Resists Rodent Attack:** Copper tube is not prone to damage due to rodent attack.
- **Standard Industry Sizes:** Copper tube is made to industry standard sizes not a unique brand size.
- **Stability:** Copper tube does not creep with age and has 7 to 15 times less lineal expansion than other materials with heat, and continues to perform at high temperatures.
- **Healthier & Non-tainting:** Copper tube does not adversely affect the taste of water, and *reduces the number of harmful micro-organisms in water.
*Study conducted by INCRA under project N°348 – 1984 using water contaminated with coliforms.
- **Proven Track Record:** Crane copper tube is part of a superior system with a proven track record.
- **Add Value For Life:** Copper tube adds value and is recognised as the superior plumbing material.
- **Recyclable:** Copper tube is a valuable recyclable material.

ASTM B88 Copper Tube

This specification covers hard drawn temper, seamless copper tubes which are suitable for use in general plumbing applications, such as underground water services, potable water distribution, gas distribution and fire sprinkler installations.

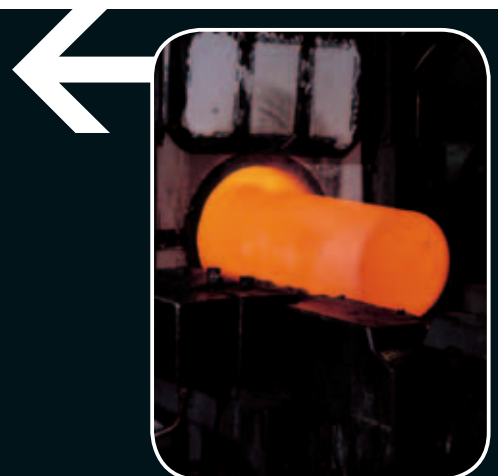
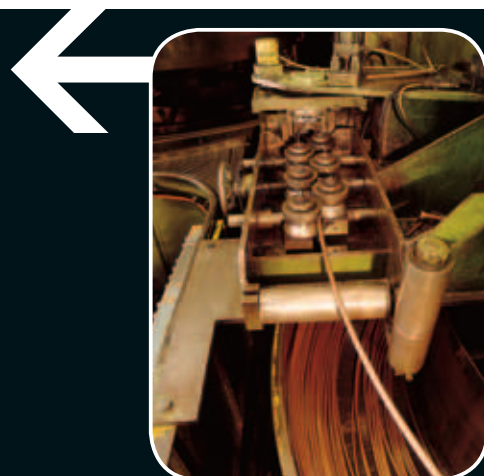
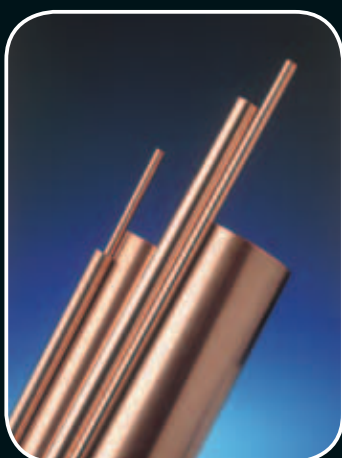
To assist with selection, this standard is separated into three tube types - K, L and M. Each type is differentiated by a range of wall thicknesses, with Type K having a thicker wall than Type L, and Type L being thicker than type M, for any given diameter.



ASTM B88 – TYPE K – DRAWN

Crane Item Number	Nominal Size	Actual Size	Outside Diameter		Wall Thickness		Lineal Weight		Form	Temper	Safe Working Pressure	
			in	(mm)	in	(mm)	lb/ft	(kg/m)			@ ≤250°F	@ ≤121°C
											psi	(kPa)
*	1/4"	3/8"	0.375	(9.52)	0.035	(0.89)	0.145	(0.216)	5.8m Straight	Drawn	1850	(12757)
*	3/8"	1/2"	0.5	(12.7)	0.049	(1.24)	0.269	(0.4)	5.8m Straight	Drawn	1946	(13420)
*	1/2"	5/8"	0.625	(15.9)	0.049	(1.24)	0.344	(0.512)	5.8m Straight	Drawn	1534	(10581)
*	5/8"	3/4"	0.75	(19.1)	0.049	(1.24)	0.419	(0.624)	5.8m Straight	Drawn	1266	(8733)
*	3/4"	7/8"	0.875	(22.2)	0.065	(1.65)	0.639	(0.953)	5.8m Straight	Drawn	1467	(10114)
*	1"	1 1/8"	1.125	(28.6)	0.065	(1.65)	0.838	(1.25)	5.8m Straight	Drawn	1126	(7766)
*	1 1/4"	1 3/8"	1.375	(34.9)	0.065	(1.65)	1.034	(1.54)	5.8m Straight	Drawn	914	(6306)
*	1 1/2"	1 5/8"	1.625	(41.3)	0.072	(1.83)	1.359	(2.03)	5.8m Straight	Drawn	850	(5863)
*	2"	2 1/8"	2.125	(54.0)	0.083	(2.11)	2.060	(3.07)	5.8m Straight	Drawn	748	(5155)
*	2 1/2"	2 5/8"	2.625	(66.7)	0.095	(2.41)	2.922	(4.36)	5.8m Straight	Drawn	684	(4719)
*	3"	3 1/8"	3.125	(79.4)	0.109	(2.77)	3.996	(5.96)	5.8m Straight	Drawn	662	(4567)
*	3 1/2"	3 3/8"	3.625	(92.1)	0.12	(3.05)	5.112	(7.62)	5.8m Straight	Drawn	628	(4334)
*	4"	4 1/8"	4.125	(104.8)	0.134	(3.40)	6.500	(9.69)	5.8m Straight	Drawn	619	(4265)
*	5"	5 1/8"	5.125	(130.2)	0.16	(4.06)	9.654	(14.40)	5.8m Straight	Drawn	592	(4082)
*	6"	6 1/8"	6.125	(155.6)	0.192	(4.88)	13.843	(20.64)	5.8m Straight	Drawn	595	(4104)
*	8"	8 1/8"	8.125	(206.4)	0.271	(6.88)	25.865	(38.57)	5.8m Straight	Drawn	634	(4370)

* Tube made to order where minimum order quantities are required.



ASTM B88 – TYPE L – DRAWN

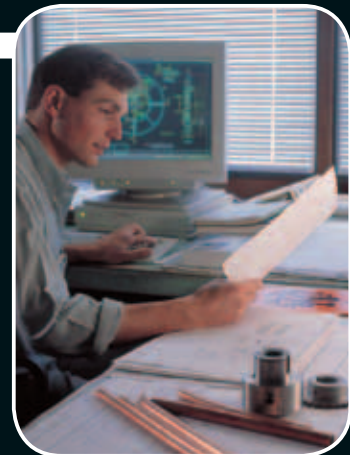
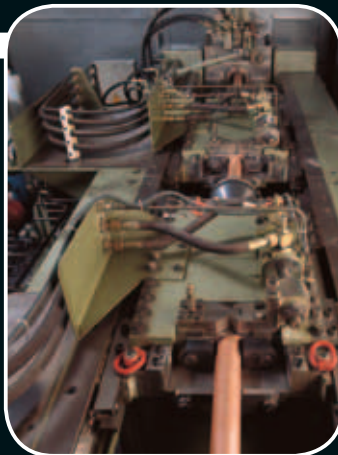
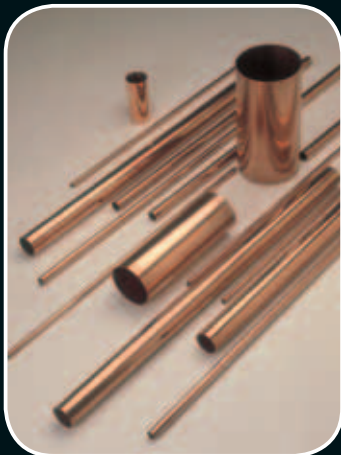
Crane Item Number	Nominal Size	Actual Size	Outside Diameter		Wall Thickness		Lineal Weight		Form	Temper	Safe Working Pressure	
			in	(mm)	in	(mm)	lb/ft	(kg/m)			@≤250°F	@≤121°C
											psi	(kPa)
50109249	¼"	⅜"	0.375	(9.52)	0.030	(0.76)	0.126	(0.187)	5.8m Straight	Drawn	1569	(10824)
50104658	⅜"	½"	0.5	(12.7)	0.035	(0.89)	0.198	(0.295)	5.8m Straight	Drawn	1341	(9249)
50103138	½"	⅝"	0.625	(15.9)	0.040	(1.02)	0.285	(0.425)	5.8m Straight	Drawn	1242	(8564)
50127987	½"	⅝"	0.625	(15.9)	0.040	(1.02)	0.285	(0.425)	6.1m Straight	Drawn	1242	(8564)
50103171	⅝"	¾"	0.75	(19.1)	0.042	(1.07)	0.362	(0.54)	5.8m Straight	Drawn	1086	(7492)
50103214	¾"	⅞"	0.875	(22.2)	0.045	(1.14)	0.453	(0.676)	5.8m Straight	Drawn	1002	(6908)
50127988	¾"	⅞"	0.875	(22.2)	0.045	(1.14)	0.453	(0.676)	6.1m Straight	Drawn	1002	(6908)
50103261	1"	1⅛"	1.125	(28.6)	0.050	(1.27)	0.654	(0.975)	5.8m Straight	Drawn	850	(5863)
50127992	1"	1⅛"	1.125	(28.6)	0.050	(1.27)	0.654	(0.975)	6.1m Straight	Drawn	850	(5863)
50103281	1¼"	1⅜"	1.375	(34.9)	0.055	(1.40)	0.881	(1.31)	5.8m Straight	Drawn	755	(5206)
50103304	1½"	1⅝"	1.625	(41.3)	0.060	(1.52)	1.142	(1.70)	5.8m Straight	Drawn	702	(4844)
50103332	2"	2⅛"	2.125	(54.0)	0.070	(1.78)	1.749	(2.61)	5.8m Straight	Drawn	625	(4310)
50103353	2½"	2⅝"	2.625	(66.7)	0.080	(2.03)	2.475	(3.69)	5.8m Straight	Drawn	577	(3981)
50103364	3"	3⅛"	3.125	(79.4)	0.090	(2.29)	3.320	(4.95)	5.8m Straight	Drawn	545	(3758)
*	3½"	3⅝"	3.625	(92.1)	0.100	(2.54)	4.284	(6.39)	5.8m Straight	Drawn	522	(3597)
50121149	4"	4⅛"	4.125	(104.8)	0.110	(2.79)	5.368	(8.01)	6.1m Straight	Drawn	504	(3475)
50111763	5"	5⅛"	5.125	(130.2)	0.125	(3.18)	7.596	(11.33)	6.1m Straight	Drawn	462	(3187)
50111764	6"	6⅛"	6.125	(155.6)	0.140	(3.56)	10.183	(15.19)	6.1m Straight	Drawn	431	(2971)
50111772	8"	8⅛"	8.125	(206.4)	0.200	(5.08)	19.261	(28.72)	6.1m Straight	Drawn	465	(3203)

* Tube made to order where minimum order quantities are required.

ASTM B88 – TYPE M – DRAWN

Crane Item Number	Nominal Size	Actual Size	Outside Diameter		Wall Thickness		Lineal Weight		Form	Temper	Safe Working Pressure	
			in	(mm)	in	(mm)	lb/ft	(kg/m)			@≤250°F	@≤121°C
											psi	(kPa)
*	⅜"	½"	0.5	(12.7)	0.025	(0.64)	0.144	(0.215)	5.8m Straight	Drawn	982	(6771)
*	½"	⅝"	0.625	(15.9)	0.028	(0.71)	0.203	(0.303)	5.8m Straight	Drawn	850	(5861)
*	¾"	⅞"	0.875	(22.2)	0.032	(0.81)	0.327	(0.488)	5.8m Straight	Drawn	701	(4831)
50103252	1"	1⅛"	1.125	(28.6)	0.035	(0.89)	0.464	(0.692)	5.8m Straight	Drawn	580	(3998)
*	1¼"	1⅜"	1.375	(34.9)	0.042	(1.07)	0.680	(1.01)	5.8m Straight	Drawn	582	(4011)
*	1½"	1⅝"	1.625	(41.3)	0.049	(1.24)	0.939	(1.40)	5.8m Straight	Drawn	569	(3927)
*	2"	2⅛"	2.125	(54.0)	0.058	(1.47)	1.457	(2.17)	5.8m Straight	Drawn	514	(3543)
*	2½"	2⅝"	2.625	(66.7)	0.065	(1.65)	2.023	(3.02)	5.8m Straight	Drawn	471	(3249)
*	3"	3⅛"	3.125	(79.4)	0.072	(1.83)	2.672	(3.98)	5.8m Straight	Drawn	435	(3003)
*	3½"	3⅝"	3.625	(92.1)	0.083	(2.11)	3.573	(5.33)	5.8m Straight	Drawn	433	(2987)
*	4"	4⅛"	4.125	(104.8)	0.095	(2.41)	4.653	(6.94)	5.8m Straight	Drawn	431	(2975)
*	5"	5⅛"	5.125	(130.2)	0.109	(2.77)	6.644	(9.91)	5.8m Straight	Drawn	400	(2758)
*	6"	6⅛"	6.125	(155.6)	0.122	(3.01)	8.900	(13.27)	5.8m Straight	Drawn	375	(2588)
*	8"	8⅛"	8.125	(206.4)	0.170	(4.32)	16.434	(24.51)	5.8m Straight	Drawn	394	(2716)

* Tube made to order where minimum order quantities are required.



ASTM B88 – TYPE K – ANNEALED

Crane Item Number	Nominal Size	Actual Size	Outside Diameter		Wall Thickness		Lineal Weight		Form	Temper	Safe Working Pressure			
			in	(mm)	in	(mm)	lb/ft	(kg/m)			@≤100°F (37.8°C)		@150°F (65.5°C)	
											psi	(kPa)	psi	(kPa)
*	¼"	⅜"	0.375	(9.52)	0.035	(0.89)	0.145	(0.216)	30m Coil	Annealed	1075	(7410)	913	(6299)
*	⅜"	½"	0.5	(12.7)	0.049	(1.24)	0.269	(0.4)	15m Coil	Annealed	1130	(7792)	960	(6624)
*	½"	⅝"	0.625	(15.9)	0.049	(1.24)	0.344	(0.512)	15m Coil	Annealed	891	(6148)	758	(5226)
*	⅝"	¾"	0.75	(19.1)	0.049	(1.24)	0.419	(0.624)	15m Coil	Annealed	736	(5077)	626	(4315)
*	¾"	⅞"	0.875	(22.2)	0.065	(1.65)	0.639	(0.953)	15m Coil	Annealed	852	(5877)	724	(4996)
*	1"	1⅛"	1.125	(28.6)	0.065	(1.65)	0.838	(1.25)	15m Coil	Annealed	655	(4516)	557	(3838)
*	1¼"	1⅜"	1.375	(34.9)	0.065	(1.65)	1.034	(1.54)	15m Coil	Annealed	532	(3666)	452	(3116)
*	1½"	1⅝"	1.625	(41.3)	0.072	(1.83)	1.359	(2.03)	15m Coil	Annealed	495	(3410)	420	(2899)

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ASTM B88 – TYPE L – ANNEALED

Crane Item Number	Nominal Size	Actual Size	Outside Diameter		Wall Thickness		Lineal Weight		Form	Temper	Safe Working Pressure			
			in	(mm)	in	(mm)	lb/ft	(kg/m)			@≤100°F (37.8°C)		@150°F (65.5°C)	
											psi	(kPa)	psi	(kPa)
*	¼"	⅜"	0.375	(9.52)	0.030	(0.76)	0.126	(0.187)	30m Coil	Annealed	912	(6287)	775	(5344)
*	⅜"	½"	0.5	(12.7)	0.035	(0.89)	0.198	(0.295)	15m Coil	Annealed	779	(5371)	662	(4565)
*	½"	⅝"	0.625	(15.9)	0.040	(1.02)	0.285	(0.425)	15m Coil	Annealed	722	(4976)	613	(4230)
*	⅝"	¾"	0.75	(19.1)	0.042	(1.07)	0.362	(0.54)	15m Coil	Annealed	632	(4355)	537	(3702)
*	¾"	⅞"	0.875	(22.2)	0.045	(1.14)	0.453	(0.676)	15m Coil	Annealed	582	(4015)	495	(3412)
*	1"	1⅛"	1.125	(28.6)	0.050	(1.27)	0.654	(0.975)	15m Coil	Annealed	494	(3409)	420	(2898)
*	1¼"	1⅜"	1.375	(34.9)	0.055	(1.40)	0.881	(1.31)	15m Coil	Annealed	439	(3027)	373	(2573)
*	1½"	1⅝"	1.625	(41.3)	0.060	(1.52)	1.142	(1.70)	15m Coil	Annealed	409	(2817)	347	(2395)

* Tube made to order where minimum order quantities are required.

ASTM B88 – TYPE M – ANNEALED

Crane Item Number	Nominal Size	Actual Size	Outside Diameter		Wall Thickness		Lineal Weight		Form	Temper	Safe Working Pressure			
			in	(mm)	in	(mm)	lb/ft	(kg/m)			@≤100°F (37.8°C)		@150°F (65.5°C)	
											psi	(kPa)	psi	(kPa)
*	⅜"	½"	0.5	(12.7)	0.025	(0.64)	0.144	(0.215)	30m Coil	Annealed	570	(3932)	485	(3342)
*	½"	⅝"	0.625	(15.9)	0.028	(0.71)	0.203	(0.303)	15m Coil	Annealed	494	(3406)	420	(2895)
*	¾"	⅞"	0.875	(22.2)	0.032	(0.81)	0.327	(0.488)	15m Coil	Annealed	407	(2808)	346	(2387)
*	1"	1⅛"	1.125	(28.6)	0.035	(0.89)	0.464	(0.692)	15m Coil	Annealed	337	(2325)	287	(1976)
*	1¼"	1⅜"	1.375	(34.9)	0.042	(1.07)	0.680	(1.01)	15m Coil	Annealed	338	(2332)	287	(1982)
*	1½"	1⅝"	1.625	(41.3)	0.049	(1.24)	0.939	(1.40)	15m Coil	Annealed	331	(2284)	282	(1941)

* Tube made to order where minimum order quantities are required.

Quality, reliability and performance





Physical Properties of Copper Tube

Composition	Alloy C12200 Copper = 99.90%min; Phosphorus = 0.015-0.040%
Melting point	1981°F (1083°C)
Density	558lb/ft ³ (8.94 x 10 ³ kg/m ³)
Thermal Expansion	0.00118in/10°F.ft (0.177mm/10°C.m)
Modulus of Elasticity	2.46 x 10 ⁶ psi (17,000 MPa)

Working Pressure

The calculated values for the Rated Internal Working Pressures have been determined from the formula used in the American Society for Mechanical Engineer Code for Pressure Piping (ASME B31).

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

Where: P = allowable pressure (psi)
S = allowable stress in tension (psi)
t_m = wall thickness - minimum (in)
D = outside diameter (in)

In designing a system where fabrication methods call for welding or brazing to join tubes, the annealed ratings must be used, as the heating involved will cause localised annealing in the heat affected zone.

Where:
S = allowable stress in tension (psi)

Drawn:
S = 10,300 psi for 250°F

Annealed:
S = 6,000 psi for 100°F
S = 5,100 psi for 150°F

Pressures at which copper tubes will burst are many times higher than the rated working pressures, due to the requirement for safety factors. These factors provide a necessary allowance to cope with unpredictable pressure surges that may occur during long periods of time.

Information contained in this brochure is provided as a guide only. Crane Copper Tube does not warrant that the information is accurate or without errors or omissions. Crane Copper Tube reserves the right to correct any errors or misprints. All information and product details contained within this document are provided as a guide only.

Crane Copper Tube

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