

Types of Standard Copper Tube

Long lasting copper tube is a favorite choice for plumbing, heating, cooling and other systems. In the United States, it is manufactured to meet the requirements of specifications established by the American Society for Testing and Materials (ASTM).

All tube supplied to these ASTM standards is a minimum of 99.9 percent pure copper. The copper customarily used for tube supplied to these specifications is deoxidized with phosphorus and referred to as C12200 (Copper No. 122) or DHP¹ Copper. Other coppers may also be used.

Table 1 identifies the six standard types of copper tube and their most common applications.² The table also shows the ASTM Standard appropriate to the use of each type along with a listing of its commercially available lengths, sizes and tempers.

Types K, L, M, DWV and Medical Gas tube are designated by ASTM standard sizes, with the actual outside diameter always 1/8-inch larger than the standard size designation. Each type represents a series of sizes with different wall thicknesses. **Type K tube has thicker walls than Type L tube, and Type L walls are thicker than Type M, for any given diameter. All inside diameters depend on tube size and wall thickness.**

Copper tube for air-conditioning and refrigeration field service (ACR) is designated by actual outside diameter.

"Temper" describes the strength and hardness of the tube. In the piping trades, drawn temper tube is often referred to as "hard" tube and annealed as "soft" tube. Tube in the hard temper condition is usually joined by soldering or brazing, using capillary fittings or by welding.

Tube in the soft temper is commonly joined by the same techniques and also by the use of flare-type and compression fittings. It is also possible to expand the end of one tube so that it can be joined to another by soldering or brazing without a capillary fitting—a procedure that can be efficient and economical in many installations.

Tube in both the hard and soft tempers can also be joined by a variety of "mechanical" joints that can be assembled without the use of the heat source required for soldering and brazing.

See table below for technical detail and typical applications of each

Copper Tube - Types, Standards, Applications, Tempers, and Lengths

Tube type	Color code	Standard	Application ¹	Commercially available lengths ²		
				Nominal or standard sizes	Drawn	Annealed
Type K	Green	ASTM B 88 ³	<ul style="list-style-type: none"> - Domestic water service and distribution - Fire protection - Solar - Fuel/fuel oil - HVAC - Snow melting 	Straight lengths:		
				1/4 inch to 8 inch	20 ft.	20 ft.
				10 inch	18 ft.	18 ft.
				12 inch	12 ft.	12 ft.
				Coils:		
				1/4 inch to 1 inch	–	60 ft.
					–	100 ft.
				1 1/4 inch and 1 1/2 inch	–	60 ft.
Type L	Blue	ASTM B 88	<ul style="list-style-type: none"> - Domestic water service and distribution - Fire protection - Solar - Fuel/fuel oil - Natural Gas - Liquefied petroleum (LP) gas - HVAC - Snow melting 	Straight lengths:		
				1/4 inch to 8 inch	20 ft.	20 ft.
				12 inch	18 ft.	18 ft.
				Coils:		
				1/4 to 1 inch	–	60 ft.
					–	100 ft.
				1 1/4 inch to 1 1/2 inch	–	60 ft.
				2 inch	–	40 ft.
Type M	Red	ASTM B 88	<ul style="list-style-type: none"> - Domestic water service and distribution - Fire protection - Solar - Fuel/fuel oil - HVAC - Snow melting 	Straight lengths:		
				1/4 inch to 12 inch	20 ft.	N/A
DWV	Yellow	ASTM B 306	<ul style="list-style-type: none"> - Drain, waste, vent - Solar - HVAC 	Straight lengths:		
				1 1/4 inch to 8 inch	20 ft.	N/A
ACR	Blue	ASTM B 280	<ul style="list-style-type: none"> - Air conditioning - Refrigeration - Natural gas - Liquefied petroleum (LP) gas 	Straight lengths:		
				3/8 inch to 4 1/8 inch	20 ft.	⁴
				Coils:		
				1/8 inch 1 5/8 inch	–	50
OXY, MED OXY/MED OXY/ACR ACR/MED	(K) Green (L) Blue	ASTM B 819	- Medical gas	Straight lengths:		
				1/4 inch to 8 inch	20 ft.	N/A

1. There are many other copper and copper alloy tubes and pipes available for specialized applications. For information on these products, <http://www.copper.org/applications/plumbing/techref>
2. Individual manufacturers may have commercially available lengths in addition to those shown in this table.
3. Tube made to other ASTM standards is also intended for plumbing applications, although ASTM B 88 is by far

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				Nominal or standard sizes	Drawn Annealed
				the most widely used. ASTM Standard Classifications B 698 lists six plumbing tube standards including B 88.	