

TECHNICAL UPDATE - TU-5012

SUBJECT: ASTM B 88 Copper Water Tube vs ASTM B 68 / B 75 Copper Tubing

Occasionally, there has been confusion regarding the specification of copper tubing manufactured to ASTM B 88 versus tubing manufactured to ASTM B 68 or ASTM B 75 for preinsulated and heat-traced tubing bundles. The purpose of this Technical Update is to help the customer determine the correct material for his application.

Dekoron/Unitherm and other bundle manufacturers use copper tubing that meets ASTM Standards B68 and B75 as their standard offering in bundles. To meet both standards, the material must be bright annealed.

Bright annealed tubing is free from scale, oxides, and dirt on the OD and ID of the tube. The tubing is used in refrigeration, gas and oil lines, steam lines, and other applications where a clean interior surface is required.

Adherence to these standards also means that the tubing will have the ductility and strength to be shaped and bent in the field, connected with flaired or compression fittings, and operated at the pressures seen in industrial applications.

Tubing is purchased by specifying the diameter and wall thickness needed for the application, and is generally available in long continuous coils.

Tubing manufactured to ASTM B 88 is generally used to pipe water in residential, commercial, and industrial buildings. This is the copper water pipe familiar to all plumbers.

This specification is written around typical plumbing construction methods and requirements. The tubing is generally joined together using soldered fittings, though some compression type fittings are available. Tubing is supplied in both drawn and annealed conditions. Straight lengths of drawn tubing in 10 foot sections are the most common tube seen, but short coils (60 to 100 feet) of some sizes are available.

The tube generally has an oxide coating on the inner and outer surface. The outer oxide coating must be cleaned off the tube before it can be soldered to a fitting. The inner surface may require cleaning if required by the application.

This tubing is produced in "trade sizes". The trade size called out is 1/8th inch smaller than the actual Outside Diameter. That is, a 1/2 inch trade size copper water tube has a 5/8 inch outside diameter. Each trade size has a range of wall thickness selections specified by "Type".

A light wall tube is "Type M", medium wall tube is "Type K" and a heavy wall tube is "Type L". These are the only sizes allowed by the standard.

This can be confusing to a customer that typically purchases copper tubing for steam lines and other industrial applications. If he needs a tube with a 1/2" OD and 0.035" wall, he must order a 3/8" Type L copper water tube. Conversely, if he orders a 3/8" Type L copper water tube, he must be certain that any fittings and connectors are sized for a 1/2" OD tube. And, if he needs a tube with a 1/2" OD and 0.065" wall, he cannot purchase it to B 88, because the size is not allowed by the specification.

There are a number of times where tubing manufactured to ASTM B 68 and B 75 will meet the dimensional and mechanical requirements of ASTM B 88. The example above is typical. However, there are requirements in ASTM B 88, most notably the marking called out in Section 19, that are not called out in the other specifications. The customer must be certain that the end user and his certification authority will allow the exceptions to the specification before using tubing that is not specifically fabricated to ASTM B 88.

