



Standard Specification for Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock¹

This standard is issued under the fixed designation B111/B111M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This specification² establishes the requirements for seamless tube and ferrule stock of copper and various copper alloys up to 3½ in. [80 mm] inclusive, in diameter, for use in surface condensers, evaporators, and heat exchangers. The following coppers and copper alloys are specified:³

Copper or Copper Alloy UNS No.	Previously Used Designation	Description
C10100	OFE	Oxygen-free electronic
C10200	OF ^A	Oxygen-free without residual deoxidants
C10300	...	Oxygen-free, extra low phosphorus
C10800	...	Oxygen-free, low phosphorus
C12000	DLP ^A	Phosphorized, low residual phosphorus
C12200	DHP ^A	Phosphorized, high residual phosphorus
C14200	DPA ^A	Phosphorized, arsenical
C19200	...	Phosphorized, 1 % iron
C23000	...	Red Brass
C28000	...	Muntz Metal
C44300	...	Admiralty Metals, B, C, and D
C44400	...	...
C44500	...	...
C60800	...	Aluminum Bronze
C61300	...	...
C61400	...	Aluminum Bronze, D
C68700	...	Aluminum Brass, B
C70400	...	95-5 Copper-Nickel
C70600	...	90-10 Copper-Nickel
C70620	...	90-10 Copper-Nickel—Welding Grade
C71000	...	80-20 Copper-Nickel
C71500	...	70-30 Copper-Nickel
C71520	...	70-30 Copper-Nickel—Welding Grade
C71640	...	Copper-nickel-iron-manganese
C72200	...	...

^A Designations listed in Classification B224.

1.2 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The

¹ This specification is under the jurisdiction of ASTM Committee B05 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.04 on Pipe and Tube.

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² For *ASME Boiler and Pressure Vessel Code* applications, see related Specification SB-111 in Section II of the Code.

³ The UNS system for copper and copper alloys (see Practice E527) is a simple expansion of the former standard designation system accomplished by the addition of a prefix “C” and a suffix “00.” The suffix can be used to accommodate composition variations of the base alloy.

values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3 The following safety hazards caveat pertains only to the test methods portion, Section 19, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. (Warning—Mercury has been designated by many regulatory agencies as a hazardous substance that can cause serious medical issues. Mercury, or its vapor, has been demonstrated to be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury containing products. See the applicable product Safety Data Sheet (SDS) for additional information. Users should be aware that selling mercury and/or mercury containing products in your state or country may be prohibited by law.)*

2. Referenced Documents

2.1 The following documents in the current issue of the *Annual Book of ASTM Standards* form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards*:⁴

B153 Test Method for Expansion (Pin Test) of Copper and Copper-Alloy Pipe and Tubing

B154 Test Method for Mercurous Nitrate Test for Copper Alloys

B170 Specification for Oxygen-Free Electrolytic Copper—Refinery Shapes

B224 Classification of Coppers

B846 Terminology for Copper and Copper Alloys

B858 Test Method for Ammonia Vapor Test for Determining Susceptibility to Stress Corrosion Cracking in Copper Alloys

⁴ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard