



Standard Specification for Seamless Copper Heat Exchanger Tubes With Internal Enhancement¹

This standard is issued under the fixed designation B 903; 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.

1. Scope

1.1 This specification establishes the requirements for seamless, internally enhanced copper tube, in straight lengths or coils, suitable for use in refrigeration and air-conditioning products or other heat exchangers.

1.2 The values stated in inch-pound units are the standard. SI values are given in parentheses for information only.

1.3 Tubes for this application are manufactured from the following copper:

Copper UNS No.	Type of Metal
C12200	Phosphorized, high residual phosphorus (DHP)

1.4 The following pertains to the test method described in 15.4 of this specification: *This standard does not purport to address all 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.*

2. Referenced Documents

2.1 ASTM Standards:

- B 153 Test Method for Expansion (Pin Test) of Copper and Copper-Alloy Pipe and Tubing²
- B 251 Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube²
- B 601 Practice for Temper Designations for Copper and Copper Alloys—Wrought and Cast²
- B 846 Terminology for Copper and Copper Alloys²
- E 3 Practice for Preparation of Metallographic Specimens³
- E 8 Test Methods for Tension Testing of Metallic Materials⁴
- E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications⁵
- E 53 Methods for Chemical Analysis of Copper⁶
- E 62 Test Methods for Chemical Analysis of Copper and

Copper Alloys (Photometric Methods)⁶

E 112 Test Methods for Determining Average Grain Size⁴

E 243 Practice for Electromagnetic (Eddy-Current) Examination of Copper and Copper-Alloy Tubes⁷

E 255 Practice for Sampling Copper and Copper Alloys for Determination of Chemical Composition⁶

3. General Requirements

3.1 The following sections of Specification B 251 constitute a part of this specification:

3.1.1 Workmanship, Finish, and Appearance.

3.1.2 Sampling.

3.1.3 Number of Tests and Retests.

3.1.4 Specimen Preparation.

3.2 In addition, when a section with a title identical to those referenced in 5.1 appears in this specification, it contains additional information which supplements those appearing in Specification B 251. In case of conflict, this specification shall prevail.

4. Terminology

4.1 *Definitions*—For the definition of terms related to copper and copper alloys refer to Terminology B 846.

4.1.1 *bottom wall, n*—the wall thickness measured from the base of the enhancement to the outside surface.

4.1.2 *coil, n*—a length of the product wound into a series of connected turns.

4.1.3 *enhancement, adj*—a geometrical feature intentionally formed on a tube I.D. surface to improve heat transfer.

4.1.4 *level wound, adj*—a coil in which the turns are wound into layers parallel to the axis of the coil such that successive turns in a given layer are next to one another.

4.2 *Definitions of Terms Specific to This Standard:*

4.2.1 *unaided eye, n*—visual inspection, without the use of special equipment or enhancement excepting the use of corrective lenses.

5. Ordering Information

5.1 Orders for products under this specification should include the following information:

5.1.1 ASTM Designation number and the year of issue.

¹ This specification is under the jurisdiction of ASTM Committee B-05 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.04 on Pipe and Tube.

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² *Annual Book of ASTM Standards*, Vol 02.01.

³ Discontinued. See 1982 *Annual Book of ASTM Standards*, Vol 03.01.

⁴ *Annual Book of ASTM Standards*, Vol 03.01.

⁵ *Annual Book of ASTM Standards*, Vol 14.02.

⁶ *Annual Book of ASTM Standards*, Vol 03.05.

⁷ *Annual Book of ASTM Standards*, Vol 03.03.