



Designation: ~~B870-02~~ Designation: **B 870 – 08**

## Standard Specification for Copper-Beryllium Alloy Forgings and Extrusions Alloys (UNS Nos. C17500 and C17510)<sup>1</sup>

This standard is issued under the fixed designation B 870; 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 copper-beryllium alloy forgings and extrusions. The following alloys are specified:

Copper Alloy UNS No.	Nominal Composition, %		
	Beryllium	Cobalt	Nickel
<del>C17500</del>	<del>0.50</del>	<del>2.6</del>	
C17500	0.50	2.6	
C17510	0.40		1.8

1.2 *Units*—The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units, which units that are provided for information only and are not considered standard.

1.3 The following safety hazard caveat pertains to Sections 10 and 11 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.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

B 194 Specification for Copper-Beryllium Alloy Plate, Sheet, Strip, and Rolled Bar

B 249/B 249M Specification for General Requirements for Wrought Copper and Copper-Alloy Rod, Bar, ~~Shapes, Shapes~~ and Forgings

B 441 Specification for Copper-Cobalt-Beryllium (UNS No. C17500) and Copper-Nickel-Beryllium (UNS No. C17510) Rod and Bar<sup>2</sup> Specification for Copper-Cobalt-Beryllium, Copper-Nickel-Beryllium, and Copper-Nickel-Lead-Beryllium Rod and Bar (UNS Nos. C17500, C17510, and C17465)

B 601 Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast<sup>2</sup>

~~B 846 Terminology for Copper and Copper Alloys<sup>2</sup> Classification for Temper Designations for Copper and Copper Alloys Wrought and Cast~~

B 846 Terminology for Copper and Copper Alloys

B 950 Guide for Editorial Procedures and Form of Product Specifications for Copper and Copper Alloys

E 8 Test Methods for Tension Testing of Metallic Materials

~~E 18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials<sup>3</sup>~~ Test Methods for Rockwell Hardness of Metallic Materials

~~E 527 Practice for Numbering Metals and Alloys (UNS)~~ 527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

E 1004 Practice for Determining Electrical Conductivity Using the Electromagnetic (Eddy-Current) Method

### 3. General Requirements

3.1 The following sections of Specification B 249/B 249M form a part of this specification:

3.1.1 Material and Manufacture,

3.1.2 Sampling,

3.1.3 Number of Tests and Retests,

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee B05 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.02 on Rod, Bar, Wire, Shapes and Forgings.

Current edition approved Oct. 10, 2002; April 1, 2008. Published December 2002; April 2008. Originally approved in 1996. Last previous edition approved in 1996 as B 870 - 96:02.

<sup>2</sup> 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, Vol 02.01, 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.

- 3.1.4 Specimen Preparation,
- 3.1.5 Significance of Numerical Limits,
- 3.1.6 Inspection,
- 3.1.7 Rejection and Rehearing,
- 3.1.8 Certification,
- 3.1.9 Test Reports, and
- 3.1.10 Packaging and Package Marking.

#### 4. Terminology

4.1 ~~4.1.1~~ For definitions of terms related to copper and copper alloys, see Terminology B 846.

4.2 *Definitions of Terms Specific to This Standard:*

4.2.1 *extrusion, n*—a uniform metal shape, long in relation to its cross-sectional dimensions, produced by forcing a suitably preheated billet or pre-formed shape through an orifice (die) of the desired cross section.

4.2.2 *forging, n*—a metal part worked to a predetermined shape by one or more such processes as hammering, upsetting, pressing, rolling, and so forth.

NOTE 1—Forged and extruded shapes in the context of this specification are generally construed to be large section products; round, oval, half round, geometric custom-ordered cross-sections, and asymmetrical metal shapes. This is to generally differentiate products supplied according to this document as opposed to forged and extruded “Rod and Bar” in Specification B 441.

#### 5. Ordering Information

~~5. Include the following information in orders for product: Ordering Information~~

5.1 Include the following information when placing orders for product under this specification, as applicable:

5.1.1 ASTM designation and year of issue,

5.1.2 Copper Alloy UNS No. (Section 1),

5.1.3 Temper (Section 8) or condition (Section 11),

5.1.4 Drawing, when required, and

5.1.5 Quantity: number of pieces or pounds.

5.2 The following requirements are optional under this specification and shall be included in the contract or purchase order, when specified.

5.2.1 Tension tests (Section 10),

5.2.2 Special marking or packaging (Specification B 249/B 249M),

~~5.2.3 Inspection (Specification B 249)~~

5.2.3 Inspection (Specification B 249/B 249M),

~~5.2.4 Certification (Specification B 249)~~

5.2.4 Certification (Specification B 249/B 249M),

5.2.5 Mill test report (Specification B 249/B 249M),

5.2.6 Finish (Section 14), and

5.2.7 When material is purchased for agencies of the U.S. government, this shall be specified in the contract or purchase order, and the material shall conform to the supplementary requirements as defined in the current issue of Specification B 249/B 249M.

#### 6. Materials and Manufacture

6.1 *Materials:*

6.1.1 The material of manufacture should be a cast billet conforming to the chemical composition requirements for the alloy specified in the ordering information and shall be of such purity and soundness as to be suitable for processing into the product prescribed herein.

6.2 *Manufacture:*

6.2.1 The product shall be manufactured by hot working or extrusion, solution heat-treating, precipitation hardening, and straightening as may be necessary to meet the properties specified.

#### 7. Chemical Composition

7.1 The material shall conform to the chemical composition in Table 1 for the alloy specified.

7.1.1 These composition limits do not preclude the presence of other elements. Limits may be established and analysis required for unnamed elements by agreement between the manufacturer and purchaser.

7.1.2 Copper, given as the remainder, is the difference between the sum of results of all elements determined and 100 %.

7.1.3 When all elements listed in Table 1 for the alloy specified in the ordering information are determined the sum of results shall be 99.5 % minimum.

#### 8. Temper

8.1 The standard temper designations available under this specification and as prescribed in Classification B 601 are solution