



Standard Specification for Copper-Nickel-Silicon Alloy Wire¹

This standard is issued under the fixed designation B 412; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

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

1. Scope *

1.1 This specification establishes the requirements for round, hexagonal, octagonal, rectangular, and square wire of copper alloy C64700.

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

1.3 The following safety hazard caveat pertains only to Section 9 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:

B 193 Test Method for Resistivity of Electrical Conductor Materials²

B 250 Specification for General Requirements for Wrought Copper-Alloy Wire³

B 601 Practice for Temper Designations for Copper and Copper Alloys—Wrought and Cast³

E 8 Test Methods for Tension Testing of Metallic Materials⁴

E 54 Test Methods for Chemical Analysis of Special Brasses and Bronzes⁵

E 255 Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition⁵

E 478 Test Methods for Chemical Analysis of Copper Alloys⁵

3. Terminology

3.1 For definition of terms related to copper and copper alloys refer to Terminology B 846.

4. Ordering Information

4.1 Orders for product under this specification should include the following information:

¹ This specification is under the jurisdiction of ASTM Committee B-5 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.02 on Rod, Bar, Wire Shapes and Forgings.

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² Annual Book of ASTM Standards, Vol 02.03.

³ Annual Book of ASTM Standards, Vol 02.01.

⁴ Annual Book of ASTM Standards, Vol 03.01.

⁵ Annual Book of ASTM Standards, Vol 03.05.

4.1.1 ASTM designation and year of issue (for example, B 412 – XX),

4.1.2 Copper alloy designation (for example, C64700),

4.1.3 Temper designation (Section 6),

4.1.4 Form: round, hexagonal, octagonal, rectangular, or square,

4.1.5 Edge contours,

4.1.6 Length required,

4.1.7 Quantity; total weight, footage, or number of pieces, each size and type, and

4.1.8 When product is purchased for agencies of the U.S. Government.

4.2 The following options are available under this specification and should be included in the contract or purchase order when required:

4.2.1 Certification,

4.2.2 Mill Test Reports.

5. Chemical Composition

5.1 The material shall conform to the requirements specified in Table 1.

5.1.1 Copper, listed as “remainder”, is the difference between the sum of results for the elements determined and 100 %.

5.1.2 When all elements listed in Table 1 are determined, the sum of results shall be 99.5 % minimum.

5.2 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 the purchaser.

6. Temper

6.1 The product is available in the following tempers as defined by Practice B 601:

6.1.1 Solution heat treated (A) TB00,

6.1.2 Solution heat treated and cold worked ($1/8$ hard) TD00,

6.1.3 Solution heat treated and cold worked ($1/4$ hard) TD01,

6.1.4 Solution heat treated and cold worked ($1/2$ hard) TD02,

6.1.5 Solution heat treated and cold worked ($3/4$ hard) TD03,

6.1.6 Solution heat treated and cold worked (hard) TD04, and

6.1.7 Precipitation hardened (AT) TF00.

6.2 Solution heat treated and cold worked tempers are suitable for cold forming and subsequent precipitation heat