



Designation: **B134/B134M—08 B134/B134M – 15**

Standard Specification for Brass Wire¹

This standard is issued under the fixed designation B134/B134M; 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.

1. Scope*

1.1 This specification establishes requirements for round, hexagonal, octagonal, rectangular and square brass wire of UNS Alloy Nos. C21000, C22000, C22600, C23000, C23400, C24000, C26000, C27000, and C27400.

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

2. Referenced Documents

2.1 *ASTM Standards*:²

[B250/B250M Specification for General Requirements for Wrought Copper Alloy Wire](#)

[B601 Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast](#)

[B846 Terminology for Copper and Copper Alloys](#)

[E8E8/E8M Test Methods for Tension Testing of Metallic Materials](#)

[E8M Test Methods for Tension Testing of Metallic Materials \[Metric\] \(Withdrawn 2008\)](#)³

[E112 Test Methods for Determining Average Grain Size](#)

[E478 Test Methods for Chemical Analysis of Copper Alloys](#)

3. General Requirements

3.1 The following sections of Specification [B250/B250M](#) constitute a part of this specification.

3.1.1 Terminology,

3.1.2 Materials and Manufacture,

3.1.3 Workmanship, Finish and Appearance,

3.1.4 Sampling,

3.1.5 Number of Tests and Retests,

3.1.6 Specimen Preparation,

3.1.7 Test Methods,

3.1.8 Significance of Numerical limits,

3.1.9 Inspection,

3.1.10 Rejection and Rehearing,

3.1.11 Certification,

3.1.12 Mill Test Reports,

3.1.13 Product Marking,

3.1.14 Packaging and Package Marking,

3.1.15 Supplementary Requirements.

3.2 In addition, when a section with a title identical to that referenced in [3.1](#) appears in this specification, it contains additional requirements that supplement those that appear in Specification [B250/B250M](#).

¹ 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.

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² 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



4. Terminology

4.1 Definitions of Terms Specific to This Standard:

4.1.1 camber offset, n—the axial component of curvature of wire in an unrestrained state.

4.1.1.1 Discussion—

The camber is measured as the offset in the ends of one turn of freely hanging wire.

4.1.2 cast, n—the maximum diameter of coiled wire when one complete circumference rests completely on a flat surface as a table, workbench, or floor.

4.2 For other definitions of terms related to copper and copper alloys, refer to Terminology B846.

5. Ordering Information

5.1 Include the following information in orders for product:

- 5.1.1 ASTM Designation and year of issue,
5.1.2 Copper Alloy UNS No. designation,
5.1.3 Temper,
5.1.4 Cross section: round, hexagonal, octagonal, rectangular, or square,
5.1.5 Quantity: total weight, footage, or number of pieces of each temper, cross section, or alloy,
5.1.6 Dimensions: diameter or distance between parallel surfaces, width and thickness, length,
5.1.7 Type of edge: square corners, rounded edge, full-rounded edge,
5.1.8 How furnished: coil, spool, or reel, specific lengths with or without ends, and
5.1.9 When material is purchased for agencies of the U.S. government (Specification B250/B250M).

5.2 The following options are available to this specification and should be specified in the contract or purchase order when required:

- 5.2.1 Certification (Specification B250/B250M, and
5.2.2 Mill test report (Specification B250/B250M.
5.2.3 Cast and camber requirements, if specified.

6. Materials and Manufacture

6.1 Material—The material shall be made from cast billets, logs, or rods of Copper Alloy UNS Nos. C21000, C22000, C22600, C23000, C23400, C24000, C26000, C27000, or C27400, of such purity, soundness, and structure to be suitable for processing into the desired product.

6.2 Manufacture—The products shall be manufactured by such hot working, cold working, and annealing processing as to produce a uniform wrought structure in the finished product.

7. Chemical Composition

7.1 The material shall conform to the chemical compositional requirements specified in Table 1 for the copper alloy specified in the ordering information.

7.1.1 When all elements specified for a given alloy in Table 1 are determined, their sum of results shall be as follows:

Table with 2 columns: Alloy UNS Nos. and Sum of Results, Percent, Minimum. Rows include C21000, C22000, C22600, C23000, C23400, C24000, C26000, C27000, C27400.

TABLE 1 Chemical Requirements

Table with 5 columns: Copper Alloy UNS No., Copper, Lead, max, Iron, max, Zinc. Rows list various alloy UNS numbers and their corresponding chemical composition ranges.



7.2 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 or supplier and the purchaser.

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

8. Temper

8.1 The product in drawn or rolled wire of UNS Alloy Nos. C21000, C22000, C22600, C23000, C23400, C24000, C26000, C27000, and C27400 shall be available in H00, H01, H02, H03, H04, H06, H08, and H10 tempers as defined in Classification **B601**.

8.1.1 Product made in H04 temper is not generally available in sizes over ½ in. [13 mm] in diameter.

8.1.2 Product made in H06 temper is not generally available in sizes over ¾ in. [10 mm] in diameter.

8.1.3 Product made in H08 temper is not generally available in sizes over ¼ in. [6 mm] in diameter.

8.1.4 Square product is not generally available in H06 or H08 tempers.

8.1.5 The tension test shall be the standard temper test for all H temper wire.

8.1.6 The product in annealed form of UNS Alloys Nos. C21000 and C22000 shall be available in OS050, OS035, OS025, and OS015 tempers as defined in Classification **B601**.

8.1.7 The product in annealed form of UNS Alloy Nos. C22600, C23000, C23400, and C24000 shall be available in OS070, OS050, OS035, OS025, OS015, and OS010 tempers as defined in Classification **B601**.

8.1.8 The product in annealed form of UNS Alloy Nos. C26000, C27000, and C27400 shall be available in OS120, OS070, OS050, OS035, OS025, and OS015 tempers as defined in Classification **B601**.

9. Grain Size for Annealed Wire

9.1 Grain size shall be the standard requirement for all product in the annealed tempers.

TABLE 2 Grain Size Requirements and Approximate Rockwell Hardness Values for Annealed Wire

Temper Designation	Grain Size, mm	Approximate Rockwell Hardness for Rectangular Wire ^A					
		F Scale		30-T Scale			
Standard Code (B601)	Nominal	Min	Max	Min	Max	Min	Max
Copper Alloy UNS No. C21000							
OS050	0.050	0.035	0.090	40 ^B	52 ^B	...	4
OS035	0.035 ^C	0.025	0.050	47 ^B	54 ^B	...	7
OS025	0.025	0.015	0.035	50 ^B	61 ^B	1	17
OS015	0.015 ^C	^D	0.025	54 ^B	65 ^B	7	23
Copper Alloy UNS No. C22000							
OS050	0.050	0.035	0.090	50	60	1	16
OS035	0.035 ^C	0.025	0.050	54	64	7	21
OS025	0.025	0.015	0.035	58	70	13	31
OS015	0.015 ^C	^D	0.025	62	75	19	39
Copper Alloy UNS Nos. C22600, C23000, and C23400							
OS070	0.070	0.050	0.100	53	60	6	16
OS050	0.050 ^C	0.035	0.070	56	63	10	20
OS035	0.035 ^C	0.025	0.050	58	66	13	24
OS025	0.025 ^C	0.015	0.035	60	72	16	34
OS015	0.015 ^C	^D	0.025	62	79	19	48
OS010	0.010 ^C	^D	0.015	66	83	25	50
Copper Alloy UNS No. C24000							
OS070	0.070	0.050	0.120	53	64	2	21
OS050	0.050 ^C	0.035	0.070	57	67	8	27
OS035	0.035 ^C	0.025	0.050	61	72	16	35
OS025	0.025 ^C	0.015	0.035	63	77	20	42
OS015	0.015 ^C	^D	0.025	66	83	25	50
Copper Alloy UNS Nos. C26000, C27000, and C27400							
OS120	0.120	0.070	...	50	62	...	21
OS070	0.070	0.050	0.120	52	67	3	27
OS050	0.050	0.035	0.070	61	73	20	35
OS035	0.035	0.025	0.050	65	76	25	38
OS025	0.025	0.015	0.035	67	79	27	42
OS015	0.015	^D	0.025	72	85	33	50

^A Rockwell hardness values apply as follows: The F scale applies to metal 0.020 in. [0.5 mm] in thickness and over; the 30-T scale applies to metal 0.015 in. [0.4 mm] in thickness and over.

^B Copper Alloy UNS No. C21000 in these several OS (annealed) tempers is too soft for Rockwell F hardness tests below 0.030 in. [0.75 mm] in thickness.

^C The nominal grain sizes are those in which wire other than rectangular are normally available. Rectangular wire is normally available in any of the nominal grain sizes listed.

^D Although no minimum grain size is required, the material must be fully recrystallized.



9.2 Acceptance or rejection based on grain size shall depend only on the average grain size of test specimens taken from each of two sample portions and each specimen shall be within the limits prescribed in Table 2 when determined in accordance with Test Methods E112.

10. Mechanical Property Requirements

10.1 Tensile Strength Requirements – Requirements:

10.1.1 Drawn or rolled product shall conform to the requirements specified in Tables 3-6, by alloy and temper, for wire 0.020 in. [0.5 mm] and over in diameter or distance between parallel surfaces.

10.1.1.1 The temper of wire under 0.020 in. [0.5 mm] in diameter or distance between parallel surfaces shall be subject to agreement between the manufacturer, or supplier, and the purchaser.

10.1.2 Rectangular product, furnished in the “H” tempers shall conform to the requirements in Tables 5 and 6 for the temper and Copper Alloy UNS No. designation specified in the ordering information when tested in accordance with Test Methods E8E8/E8M or E8M.

10.1.3 Acceptance or rejection based upon mechanical property shall depend on the tensile strength values obtained when tested in accordance with Test Methods E8E8/E8M or E8M.

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TABLE 3 Tensile Strength Requirements for Round, Hexagonal, Octagonal, and Square Wire 0.020 in. and Over in Diameter or Distance Between Parallel Surfaces

Table with 12 columns: Temper Designation (Code, Name), Tensile Strength (ksi) for various UNS Nos. (C21000, C22000, C22600/C23000, C23400/C24000, C26000/C27000/C27400). Rows include H00, H01, H02, H03, H04, H06, and H08 with their respective min/max values.

A ksi = 1000 psi.
B H04 (hard) temper wire is not generally available in sizes over 1/2 in. in diameter.
C H06 (extra-hard) temper is not generally available in sizes over 3/8 in. in diameter.
D Square wire is not generally available in extra hard or spring tempers.
E H08 (spring) temper is not generally available in sizes over 1/4 in. in diameter.