



Designation: B121/B121M—16 B121/B121M – 23

**Standard Specification for
Leaded Brass Plate, Sheet, Strip, and Rolled Bar¹**

This standard is issued under the fixed designation B121/B121M; 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 U.S. Department of Defense.

1. Scope*

1.1 This specification establishes the requirements for leaded brass plate, sheet, strip, and rolled bar. ~~The following alloys are covered:~~ bar for general application produced from

Copper Alloy UNS No. ²	Previously Used Designation	Nominal Composition, %			
		Copper	Zinc	Lead	Iron
C33500	2	63.5	36.0	0.5	...
C34000	3	63.5	35.5	1.0	...
C34200	5	63.5	34.5	2.0	...
C35000	...	61.5	37.4	1.1	...
C35300	4	61.5	36.7	1.8	...
C35600	6	61.5	36.0	2.5	...

Copper Alloy UNS Nos. C33500, C34000, C34200, C35000, C35300, and C35600.

1.2 ~~Units—Values~~ The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, SI units are shown in brackets. 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.

1.3 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards:*²

- [B248 Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar](#)
- [B248M Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar \(Metric\)](#)
- [B601 Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast](#)
- [B846 Terminology for Copper and Copper Alloys](#)
- [E8/E8M Test Methods for Tension Testing of Metallic Materials](#)
- [E112 Test Methods for Determining Average Grain Size](#)

¹ This specification is under the jurisdiction of ASTM Committee B05 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.01 on Plate, Sheet, and Strip.

Current edition approved April 1, 2016April 1, 2023. Published April 2016May 2023. Originally approved in 1939. Last previous edition approved in 20142016 as B121/B121M—11B121/B121M – 16. DOI: 10.1520/B0121-B0121M-16.10.1520/B0121_B0121M-23.

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**



~~E255 Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition (Withdrawn 2023)~~³

~~E478 Test Methods for Chemical Analysis of Copper Alloys~~

~~E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)~~

3. General Requirements

3.1 The following sections of Specifications **B248** or **B248M** 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—except for chemical analysis

3.1.5 Number of Tests and Retests

3.1.6 Specimen Preparation

3.1.7 Test Methods—except for chemical analysis

3.1.8 Significance of Numerical Limits

3.1.9 Inspection

3.1.10 Rejection and Rehearing

3.1.11 Certification

3.1.12 Test Reports

3.1.13 Packaging and Package Marking

3.1.14 Supplementary Requirements [standards/sist/272b6065-9b7b-4727-be46-c9f47797b836/astm-b121-b121m-23](https://standards.sist/272b6065-9b7b-4727-be46-c9f47797b836/astm-b121-b121m-23)

3.2 In addition, when a section with a title identical to that referenced in 3.1, above, appears in this specification, it contains additional requirements which supplement those appearing in Specifications **B248** or **B248M**.

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³ The last approved version of this historical standard is referenced on www.astm.org.



4. Terminology

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

5. Ordering Information

5.1 Include the following specified choices 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. designation,

5.1.3 Temper (Section 8),

5.1.4 Dimensions: thickness and width (~~H.1.11.2~~ and ~~H.1.211.3~~),

5.1.5 How furnished: straight lengths or coils,

5.1.6 Quantity—total weight or total length or number of pieces of each size,

5.1.7 Type of edge, if required (slit, sheared, sawed, square corners, round corners, rounded edges, or full-rounded edges) (~~H.1.511.6~~),

5.1.8 Length (~~H.1.311.4~~), and

5.1.9 Intended application.

5.2 The following options are available but may not be included unless specified at the time of placing the order when required:

5.2.1 Heat identification or traceability details.

5.2.2 Certification,

5.2.3 Mill Test Report,

5.2.4 If product is purchased for agencies of the U. S. government (see the Supplementary Requirements section of Specifications B248 or B248M for additional requirements, if specified).

6. Materials and Manufacture

6.1 *Materials:*

6.1.1 The material of manufacture shall be a form (cast bar, cake, slab, et cetera) of Copper Alloy UNS No. Nos. C33500, C34000, C34200, C35000, C35300, or C35600 of such purity and soundness as to be suitable for processing into the products prescribed herein.

6.1.2 When specified in the contract or purchase order that heat identification or traceability is required, the purchaser shall specify the details desired.

NOTE 1—Due to the discontinuous nature of the processing of castings into wrought products, it is not always practical to identify a specific casting analysis with a specific quantity of finished material.

6.2 *Manufacture:*

6.2.1 The product shall be manufactured by such hot working, cold working, and annealing processes as to produce a uniform wrought structure in the finished product.



6.2.2 The product shall be hot or cold worked to the finished size and subsequently annealed when required, to meet the temper properties specified.

6.3 Edges:

6.3.1 Slit edges shall be furnished unless otherwise specified in the contract or purchase order.

7. Chemical Composition

7.1 The material shall conform to the composition requirements in Table 1 for the copper [alloy]Copper Alloy UNS No. designation specified in the ordering information.

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

7.3 For alloys in which zinc is listed as “remainder,” either copper or zinc may be taken as the difference between the sum of results of all other elements determined and 100 %. When all elements in Table 1 are determined, the sum of the results shall be as shown in the following table:

Copper Alloy UNS No.	Copper Plus Named Elements, % min.
C33500	99.6
C34000	99.6
C34200	99.6
C35000	99.6
C35300	99.5
C35600	99.5

8. Temper

8.1 The standard tempers for products described in this specification are given in Tables 2 and 3.

8.1.1 Cold rolled tempers H01 and to H10. <https://standards.iteh.ai/catalog/standards/sist/272b6065-9b7b-4727-be46-c9f47797b836/astm-b121-b121m-23>

8.1.2 Annealed tempers OS025 to OS070.

9. Grain Size for Annealed Tempers

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

9.2 Acceptance or rejection based upon grain size shall depend only on the average grain size of a test specimen taken from each of two sample portions, and each specimen shall be within the limits prescribed in Table 3 when determined in accordance with Test Methods E112.

9.3 Grain size shall be determined on a plane parallel to the flat surfaces of the product.

TABLE 1 Chemical Requirements

Copper Alloy UNS No.	Composition			
	Copper	Lead	Iron	Zinc
C33500	62.0–65.0	0.25–0.7	0.10 max	remainder
C34000	62.0–65.0	0.8–1.5	0.10 max	remainder
C34200	62.0–65.0	1.5–2.5	0.10 max	remainder
C35000	60.0–63.0	0.8–2.0	0.10 max	remainder
C35300	60.0–63.0	1.5–2.5	0.10 max	remainder
C35600	60.0–63.0	2.0–3.0	0.10 max	remainder



TABLE 2 Tensile Strength Requirements and Approximate Rockwell Hardness Values for Rolled Temper Product

NOTE 1—Plate is generally available in only the O60 (soft), H01 (quarter-hard), and H02 (half-hard) tempers. Required properties for other tempers shall be agreed upon between the manufacturer and the purchaser at the time of placing the order.

Table with 7 columns: Temper Designation (Code, Name), Tensile Strength (ksi, MPa, Min, Max), and Approximate Rockwell Hardness (B Scale, Superficial 30-T). Rows include Copper Alloy UNS Nos. C33500, C34000, C34200, C35000, C35300, and C35600 with various temper designations (H01-H10).

A Standard designations defined in Classification B601.

B Rockwell Hardness values apply as follows:

The B scale hardness values apply to metal 0.020 in. [0.508 mm] and over in thickness, and

The 30-T scale hardness values apply to metal 0.012 in. [0.305 mm] and over in thickness.

C ksi = 1000 psi.

D See Appendix.

E Spring and extra spring temper are generally furnished only in alloy No. C35300.

TABLE 3 Grain Size Requirements for Annealed (OS) Product

Table with 5 columns: Copper Alloy UNS No., Standard Temper Designation (B601), and Grain Size (Nominal, Min, Max) in mm. Rows list UNS Nos. C33500, C34000, C34200, C35000, C35300, C35600 and corresponding OS designations (OS070, OS050, OS035, OS025).

10. Mechanical Property Requirements

10.1 Tensile Strength Requirements:

10.1.1 Product furnished under this specification shall conform to the tensile requirements prescribed in Table 2 when tested in accordance with Test Methods Method E8/E8M.

10.1.2 Acceptance or rejection based on mechanical properties shall depend only on tensile strength.

10.2 Rockwell Hardness:

10.2.1 The approximate Rockwell hardness values given in Table 2 and Table 4 are for general information and assistance in testing, and shall not be used as a basis for product rejection.

TABLE 4 Approximate Rockwell Hardness of Annealed Material

Table with 4 columns: Nominal Grain Size (mm), Standard Temper Designation, and Approximate Rockwell Hardness (F Scale, Superficial 30-T). Rows list UNS Nos. C33500, C34000, C34200, C35000, C35300, and C35600 with grain sizes (0.070, 0.050, 0.035, 0.025) and corresponding OS designations (OS070, OS050, OS035, OS025).

A Rockwell hardness values apply as follows:

The F scale hardness values apply to metal 0.020 in. [0.508 mm] and over in thickness, and

The 30-T scale hardness values apply to metal 0.015 in. [0.381 mm] and over in thickness.