



Designation: B36/B36M – 23

Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar¹

This standard is issued under the fixed designation B36/B36M; 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.

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 brass (copper-zinc alloy) plate, sheet, strip, and rolled bar of the following alloys:

Copper Alloy UNS No.	Type of Metal
C21000	Gilding
C22000	Commercial Bronze
C22600	Jewelry Bronze
C23000	Red Brass
C24000	Low Brass
C26000	Cartridge Brass
C26800	Yellow Brass
C27200	...
C28000	Muntz Metal

1.2 *Units*—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 The following safety hazard caveat pertains only to the test method(s) described in this specification.

1.3.1 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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.*

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.

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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

E478 Test Methods for Chemical Analysis of Copper Alloys

3. General Requirements

3.1 The following sections of Specification **B248** or **B248M** constitute a part of this specification:

3.1.1 Terminology

3.1.2 Materials and Manufacture

3.1.3 Dimensions, Mass, and permissible Variations

3.1.4 Workmanship, Finish, and Appearance

3.1.5 Sampling

3.1.6 Number of tests and Retests

3.1.7 Specimen Preparation

3.1.8 Test Methods

3.1.9 Significance of Numerical Limits

3.1.10 Inspection

3.1.11 Rejection and Rehearing

3.1.12 Certification

3.1.13 Test Reports

3.1.14 Packaging and Package Marking

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 which supplement those appearing in Specification **B248** or **B248M**.

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 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 7);
- 5.1.4 Dimensions: thickness, width, and edges;
- 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; and
- 5.1.7 Intended application.

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

- 5.2.1 Heat identification or traceability details,
- 5.2.2 Certification,
- 5.2.3 Test Report,
- 5.2.4 If product is purchased for agencies of the U.S. Government (see the Supplemental Requirements section of Specification B248 or B248M for additional requirements, if specified).

6. Chemical Composition

6.1 The material shall conform to the chemical compositional requirements in Table 1 for the copper alloy UNS No. designation specified in the ordering information.

6.2 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.

6.3 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
C21000	99.8
C22000	99.8
C22600	99.8
C23000	99.8
C24000	99.8
C26000	99.7
C26800	99.7
C27200	99.7
C28000	99.7

7. Temper

7.1 *As Hot Rolled Temper M20*—The standard temper of sheet and plate and produced by hot rolling as designated in Table 2 or Table 3.

7.2 *Cold Rolled Tempers H01 to H10*—The standard tempers of cold rolled material are as designated in Table 2 or Table 3 with the prefix “H.” Former designations and the standard designations as detailed in Classification B601 are shown.

7.3 *Annealed Tempers OS015 to OS120*—The standard tempers of annealed material are as designated in Tables 4 and 5. Nominal grain size and the standard designations are detailed in Classification B601 are shown.

7.4 *Annealed-To-Temper O81 or O82*—The standard tempers of annealed-to-temper material are as designated in Table 6 or Table 7 with the prefix “O.” Former designations and the standard designations as detailed in Classification B601 are shown.

7.5 Special or nonstandard tempers are subject to negotiation between the manufacturer and purchaser (see 5.1.3).

8. Grain Size for Annealed Tempers

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

8.2 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 4 when determined in accordance with Test Methods E112.

8.3 The average grain size shall be determined on a plane parallel to the surface of the product.

TABLE 1 Chemical Requirements

Copper Alloy UNS No.	Copper, %	Lead, max, %	Iron, max, %	Zinc
C21000	94.0 to 96.0	0.05	0.05	remainder
C22000	89.0 to 91.0	0.05	0.05	remainder
C22600	86.0 to 89.0	0.05	0.05	remainder
C23000	84.0 to 86.0	0.05	0.05	remainder
C24000	78.5 to 81.5	0.05	0.05	remainder
C26000	68.5 to 71.5	0.07	0.05	remainder
C26800 ^A	64.0 to 68.5	0.09	0.05	remainder
C27200 ^B	62.0 to 65.0	0.07	0.07	remainder
C28000 ^C	59.0 to 63.0	0.09	0.07	remainder

^A Material shall be free from beta constituent when examined at a magnification of 75 diameters.

^B Small amounts of beta constituent, if present, may interfere in some instances with severe forming or drawing; therefore, suitability for forming or drawing should be established between manufacturer and purchaser.

^C It is anticipated that this material will contain the beta constituent that may interfere with severe forming or drawing operations.