



Designation: **B169/B169M—15 B169/B169M – 20**

Standard Specification for Aluminum Bronze Sheet, Strip, and Rolled Bar¹

This standard is issued under the fixed designation B169/B169M; 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 specification² establishes the requirements for Copper Alloy UNS Nos. C61300 and C61400 aluminum bronze sheet, strip, and rolled bar.

1.2 The products made to this specification are commonly used for drawing, forming, stamping, and bending applications and are not intended for electrical applications.

NOTE 1—The products produced under this general specification may be used in many applications in which the individual requirements may be too specific to be determined by normal physical or mechanical testing. Therefore, it may be advisable for the purchaser to submit samples or drawings to the manufacturer to be assured that the product furnished is suitable for the intended application.

NOTE 2—Refer to Specification **B171/B171M** for plate product.

1.3 ~~Units—Values—~~The values stated in either ~~SI~~ inch-pound units or ~~inch-pound~~ 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~~ are not ~~be~~necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other. ~~Combining~~ together, and values from the two systems ~~may result in non-conformance with the standard; shall not be combined.~~

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.

2. Referenced Documents

2.1 *ASTM Standards:*³

B171/B171M Specification for Copper-Alloy Plate and Sheet for Pressure Vessels, Condensers, and Heat Exchangers

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

E290 Test Methods for Bend Testing of Material for Ductility

3. General Requirements

3.1 The following sections of Specifications **B248** or **B248M** ~~form~~ constitute a part of this ~~specification;~~ specification.

3.1.1 ~~Terminology;~~ Terminology

3.1.2 ~~Workmanship, Finish, and Appearance;~~ Appearance

3.1.3 ~~Sampling;~~ Sampling

3.1.4 ~~Number of Tests and Retests;~~ Retests

3.1.5 ~~Specimen Preparation;~~ Preparation

3.1.6 ~~Significance of Numerical Limits;~~ Limits

3.1.7 ~~Inspection;~~ Inspection

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 ~~May 1, 2015~~ April 1, 2020. Published ~~May 2015~~ April 2020. Originally approved in 1941. Last previous edition approved in 2014~~2015~~ as B169/B169M—10—15. DOI: 10.1520/B0169_B0169M-15.10.1520/B0169_B0169M-20.

² For *ASME Boiler and Pressure Vessel Code* applications, see related Specification SB-169 in Section II of that code.

³ 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~~ standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard



- 3.1.8 Rejection and ~~Rehearing~~, Rehearing
- 3.1.9 ~~Certification~~, Certification
- 3.1.10 ~~Mill-Test Reports~~, Reports
- 3.1.11 Packaging and Package ~~Marking~~, Marking
- 3.1.12 Supplementary ~~Requirements~~, Requirements

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.

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~~: applicable:

- 5.1.1 ASTM designation and year of ~~issue~~, issue;
- 5.1.2 Copper [Alloy] UNS No. ~~designation~~, designation;
- 5.1.3 Temper, (Section 8););
- 5.1.4 Dimensions, thickness, width, and ~~width~~length (Section ~~1211~~););
- 5.1.5 ~~Length~~;
- 5.1.5 How ~~furnished~~, furnished: straight lengths or ~~coils~~, coils; and
- 5.1.6 Quantity—total weight or total length or number of pieces of each ~~size~~, size.
- 5.1.8 ~~When product is ordered for ASME Boiler and Pressure Vessel Code Application, and~~
- 5.1.9 ~~When product is ordered for agencies of the U.S. government.~~

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 Type of edge (for example, slit, sheared, sawed, and so ~~forth~~); forth);
- 5.2.2 Heat identification or traceability ~~details~~, details;
- 5.2.3 Bend ~~test~~, test;
- 5.2.4 Certification;
- 5.2.5 Test Report;
- 5.2.6 ~~Certification~~, If product is purchased for agencies of the U.S. Government (see Supplementary Requirements section of Specifications B248 or B248M for additional requirements); and
- 5.2.7 ~~Mill-Test Report~~. If product is ordered for ASME Boiler and Pressure Vessel Code Application (See Certification Section 14).

6. Materials and Manufacture

6.1 *Materials:*

6.1.1 The material of manufacture shall be a form (cast bar, cake, slab, etc.) of Copper Alloy UNS No. C61300 or C61400 of such purity and soundness as to be suitable for processing into the products prescribed herein.

6.2 *Manufacture:*

6.2.1 The product shall be manufactured by such ~~hot-working, cold-working~~, hot working, cold working, and annealing processes as to produce a uniform wrought structure in the finished product. ~~The product shall be hot or cold rolled to finish gage and subsequently annealed, if required, to meet the temper properties specified.~~

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 chemical composition requirements in Table 1 for the Copper [alloy] UNS No. designation specified in the ordering information.

7.1.1 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.

7.2 For alloys in which copper is listed as “remainder,” copper is the difference between the sum of results of all elements determined and 100 %. When all elements in Table 1 for the specified alloy are determined, the sum of the results shall be:

Copper Alloy UNS No.	Sum of Results % min.
C61300	99.8
C61400	99.5



TABLE 1 Chemical Requirements

Element	Composition, %	
	Copper Alloy UNS No.	
	C61300 ^A	C61400
Copper (including silver)	remainder	remainder
Copper (including Silver)	remainder	remainder
Lead, max	0.01	0.01
Iron	2.0–3.0	1.5–3.5
Zinc, max	0.10	0.20
Aluminum	6.0–7.5	6.0–8.0
Manganese, max	0.20	1.0
Phosphorus, max	0.015	0.015
Silicon, max	0.10	...
Tin	0.20–0.50	...
Nickel (including cobalt), max	0.15	...

^A When the product is for subsequent welding applications and is so specified by the purchaser, chromium shall be 0.05 % max, cadmium 0.05 % max, zirconium 0.05 % max, and zinc 0.05 % max.

8. Temper

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

8.1.1 Hot-rolled temper M20.

8.1.2 Annealed-to-temper O25 or O60.

NOTE 3—Inquiry should be made to the supplier concerning the availability of the specific temper required.

9. Mechanical Property Requirements

9.1 *Tensile Strength Requirements:*

9.1.1 Product furnished under this specification shall conform to the tensile requirements prescribed in Table 2 or Table 3 when tested in accordance with Test Methods E8/E8M. The test specimens shall be taken so the longitudinal axis of the specimen is parallel to the direction of rolling.

9.1.2 The test specimens shall be taken so that the longitudinal axis of the specimen is parallel to the direction of rolling.

10. Bending Requirements

10.1 When specified in the contract or purchase order, the test specimen shall withstand being bent cold perpendicular to the direction of rolling (rightway bend) through 120° around a mandrel whose radius is equal to the thickness of the product. When the outside surface of the bend is examined with an unaided eye, no sign of fracturing shall be observed.

11. Purchases for U.S. Government Agencies

11.1 When specified in the contract or purchase order, product purchased for agencies of the U.S. government shall conform to the special government stipulations in the Supplementary Requirements section of Specifications B248 or B248M.

TABLE 2 Tensile Requirements (Inch-Pound)

Copper Alloy UNS No.	Temper Designation ^A		Thickness, in.	Width, in.	Tensile Strength min, ksi ^B	Yield Strength at 0.5 % Extension Under Load, min, ksi ^B	Yield Strength at 0.2 % Extension Under Load, min, ksi ^B	Elongation in 2 in., min, %
	Standard Code	Former Name						
C61300	O25, O60, or M20	soft	½ and under	all widths	75	36	34	35
			Over ½ to 2, incl	all widths	72	32	30	35
			Over 2 to 5, incl	all widths	65	28	26	35
C61400	O25, O60, or M20	soft	½ and under	all widths	72	32	30	35
			Over ½ to 2, incl	all widths	70	30	28	35
			Over 2 to 5, incl	all widths	65	28	26	35

^A Standard designations defined in Classification B601.

^B ksi = 1000 psi.