



Designation: B 169 – 95

AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
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Standard Specification for Aluminum Bronze Sheet, Strip, and Rolled Bar¹

This standard is issued under the fixed designation B 169; 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 Department of Defense.

1. Scope *

1.1 This specification² establishes the requirements for UNS Alloy Nos. C61300 and C61400 aluminum bronze sheet, strip and rolled bar.

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

1.2 This specification is the companion to SI Specification B 169M; therefore, no metric equivalents are presented in this specification.

NOTE 1—The products produced under this general specification may be used in many applications where 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 in order to be assured that the product furnished is suitable for the intended application.

NOTE 2—Refer to Specification B 171 for plate product.

2. Referenced Documents

2.1 The following documents in the current Book of Standards form a part of this specification to the extent referenced herein:

2.2 ASTM Standards:

B 169M Specification for Aluminum Bronze Plate, Sheet, Strip and Rolled Bar (Metric)³

B 171 Specification for Copper Alloy Plate and Sheet for Pressure Vessels, Condensers and Heat Exchangers³

B 248 Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip and Rolled Bar³

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

¹ This specification is under the jurisdiction of ASTM Committee B-5 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.01 on Plate, Sheet and Strip.

Current edition approved Jan. 15, 1995. Published March 1995. Originally published as B 169 – 41 T. Last previous edition B 169 – 85a (1991).

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

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.

E 62 Test Methods for Chemical Analysis of Copper and Copper Alloys (Photometric)⁵

E 478 Test Methods for Chemical Analysis of Copper Alloys⁵

E 290 Test Method for Semi-Guided Bend Test for Ductility of Metallic Materials⁴

3. Ordering Information

3.1 Orders for products under this specification should include the following information:

3.1.1 ASTM designation and year of issue (for example, B 169 – 95),

3.1.2 Copper Alloy UNS No. (for example, C61300),

3.1.3 Temper (for example, Section 6),

3.1.4 Dimensions, thickness and width (for example, Section 10),

3.1.5 Length,

3.1.6 How furnished, flat or rolls,

3.1.7 Total Weight; each size,

3.1.8 When product is purchased for ASME Boiler and Pressure Vessel Code Application, and

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

3.2 The following options are available and should be specified when required:

3.2.1 Type of Edge, (for example, slit, sheared, sawed, etc.),

3.2.2 Heat identification or traceability details,

3.2.3 Bend test,

3.2.4 Certification, and

3.2.5 Mill Test Report.

4. Materials and Manufacture

4.1 Material:

4.1.1 The material of manufacture shall be from cast slabs (also termed cakes or ingots) of Copper Alloy UNS Numbers C61300 or C61400 of such purity and soundness as to be suitable for processing into the products prescribed herein.

4.2 Manufacture:

4.2.1 The products shall be manufactured by such 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 invoked.

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

4.2.2 Edges:

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

5. Chemical Composition

5.1 The specified copper alloy shall conform to the requirements of Table 1.

5.1.1 These specification limits do not preclude the presence of unnamed elements. Limits may be established and analysis required for unnamed elements by agreement between the supplier and the purchaser.

5.2 When all elements in Table 1 for the specified alloy are determined, the sum of the results shall be:

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

6. Temper

6.1 Products in both alloys shall be available in the following tempers as defined in Practice B 601: annealed tempers O25, O60 and hot rolled temper M20.

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

7. Mechanical Property Requirements

7.1 The product furnished shall conform to the requirements of Table 2 for the specified alloy, temper and dimensions prescribed.

8. Bending Requirements

8.1 When specified in the contract or purchase order, the test specimen shall withstand being bent cold, perpendicular to the direction of rolling (right way 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.

9. U.S. Government Orders

9.1 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 Specification B 248.

10. Dimensions, Mass and Permissible Variations

10.1 The dimensions and tolerances for material described

TABLE 1 Chemical Requirements

Element	Composition, %	
	Copper Alloy UNS No.	
	C61300 ^A	C61400
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.

by this specification shall be as specified in the current edition of Specification B 248 with particular reference to the following tables and related paragraphs in that specification:

10.1.1 Thickness—Table 2.

10.1.2 Width:

10.1.2.1 Slit Metal and Slit Metal with Rolled Edges—Table

4.

10.1.2.2 Square Sheared Metal—Table 5.

10.1.2.3 Sawed Metal—Table 6.

10.1.3 Length:

10.1.3.1 Length Tolerances for Straight Lengths—Table 7.

10.1.3.2 Schedule for Minimum Lengths and Maximum Weights of Ends for Specific Lengths with Ends, and Stock Lengths with Ends—Table 8.

10.1.3.3 Length Tolerance for Square Sheared Metal—Table 9.

10.1.3.4 Length Tolerances for Sawed Metal—Table 10.

10.1.4 Straightness:

10.1.4.1 Slit Metal or Slit Metal Either Straightened or Edge Rolled—Table 11.

10.1.4.2 Square Sheared Metal—Table 12.

10.1.4.3 Sawed Metal—Table 13.

10.1.5 Edges:

10.1.5.1 Square Edges—Table 14.

10.1.5.2 Rounded Corners—Table 15.

10.1.5.3 Rounded Edges—Table 16.

10.1.5.4 Full Rounded Edges—Table 17.

11. General Requirements

11.1 The following sections of Specification B 248 form a part of this specification:

11.1.1 Terminology,

11.1.2 Workmanship, Finish and Appearance,

11.1.3 Sampling,

11.1.4 Significance of Numerical Limits,

11.1.5 Inspection,

11.1.6 Rejection and Rehearing,

11.1.7 Certification,

11.1.8 Mill Test Reports,

11.1.9 Packaging and Package Marking,

11.1.10 Supplementary Requirements.

11.2 An identical section in this specification is supplementary to the referenced section in Specification B 248.

12. Number of Tests and Retests

12.1 Tests:

12.1.1 Chemical Analysis:

12.1.1.1 Composition shall be determined as the average of at least two replicate determinations for each element in Table 1 for the specified alloy.

12.1.2 Mechanical Properties:

12.1.2.1 Tensile strength, yield strength and elongation shall be reported as the average of results from at least two specimens.

12.1.3 Bending Requirements:

12.1.3.1 Two specimens shall be tested and both shall pass.

12.2 Retests:

12.2.1 Chemical Analysis:

12.2.1.1 Should the results for one or more of the elements