



Designation: B592 – 20

Standard Specification for Copper-Zinc-Aluminum-Cobalt Alloy, Copper-Zinc-Tin-Iron Alloy Plate, Sheet, Strip, and Rolled Bar¹

This standard is issued under the fixed designation B592; 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.

1. Scope*

1.1 This specification establishes the requirements for Copper Alloy UNS C66300 and C68800 plate, sheet, strip, and rolled bar.²

NOTE 1—Since alloy C68800 is frequently used in a variety of applications where yield strength and stress-corrosion resistance may be critical, it is recommended that drawings or samples of the part to be fabricated and details of application be submitted for use in establishing temper and treatment of material.

1.2 *Units*—The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units, which are provided for information only and are not considered 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*:³

B193 Test Method for Resistivity of Electrical Conductor Materials

B248 Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar

B601 Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast

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 ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights are entirely their own.

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 Document Summary page on the ASTM website.

B846 Terminology for Copper and Copper Alloys

E8/E8M Test Methods for Tension Testing of Metallic Materials

E54 Test Methods for Chemical Analysis of Special Brasses and Bronzes (Withdrawn 2002)⁴

E75 Test Methods for Chemical Analysis of Copper-Nickel and Copper-Nickel-Zinc Alloys (Withdrawn 2010)⁴

E112 Test Methods for Determining Average Grain Size

E255 Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition

E478 Test Methods for Chemical Analysis of Copper Alloys

3. General Requirements

3.1 The following sections of Specification B248 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

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

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 Specification B248.

4. Terminology

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

⁴ The last approved version of this historical standard is referenced on www.astm.org.

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

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, width, length, and edges (Section 12);
- 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 Type of edge, if required, (slit, sheared, sawed, square corners, round corners, rounded edges, or full rounded edges);
- 5.2.5 Type of width and straightness tolerances, if required (Section 12); and
- 5.2.6 If product is purchased for agencies of the U.S. Government (see Supplementary Requirements section of Specification B248 for additional requirements).

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. C66300 or C68800 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 2—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 chemical composition requirements in Table 1 for the copper alloy UNS No. 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 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 are determined, the sum of the results shall be 99.5 % min.

7.4 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 99.5 % min.

8. Temper

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

- 8.1.1 Cold rolled tempers H01 to H14.
- 8.1.2 Annealed-to-temper O61 and O82.

9. Grain Size for Annealed Tempers

9.1 Although no grain size range has been established, the product must be fully recrystallized as determined by Test Methods E112.

10. Physical Property Requirements

10.1 Electrical Resistivity Requirement:

10.1.1 When specified in the contract or purchase order, the product furnished shall conform to the electrical mass resistivity requirement prescribed in Table 3, when tested in accordance with Test Method B193.

TABLE 1 Chemical Requirements

Element	Composition, %		Element	Composition, %	
	Copper Alloy UNS No.			Copper Alloy UNS No.	
	C68800			C66300	
Copper, incl Silver	remainder		Copper, incl Silver	84.5–87.5	
Aluminum	3.0–3.8		
Zinc	21.3–24.1		Zinc	remainder	
Zinc+Aluminum	25.1–27.1		
Cobalt	0.25–0.55		Cobalt	0.20 max	
Lead	0.05 max		Lead	0.05 max	
Iron	0.20 max		Iron	1.4–2.4	
			Iron+Cobalt	1.4–2.4	
			Tin	1.5–3.0	
			Phos	0.35 max	