



Designation: B100 – 20

Standard Specification for Wrought Copper-Alloy Bearing and Expansion Plates and Sheets for Bridge and Other Structural Use¹

This standard is issued under the fixed designation B100; 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 wrought copper-alloy bearing plate and bearing sheets for application in bridges and other structures. Specifically, the plates and sheets are to be used for fixed or expansion bearings where the motion is slow and intermittent with pressures not exceeding 3 ksi (20 MPa).

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 that are provided for information only and are not considered standard.

1.2.1 *Exception*—Values given in inch-pound units are the standard except for grain size, which is stated in SI units.

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](#)
 - [B846 Terminology for Copper and Copper Alloys](#)
 - [E8/E8M Test Methods for Tension Testing of Metallic Materials](#)
 - [E9 Test Methods of Compression Testing of Metallic Materials at Room Temperature](#)
 - [E10 Test Method for Brinell Hardness of Metallic Materials](#)
 - [E18 Test Methods for Rockwell Hardness of Metallic Materials](#)

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, 2020. Published April 2020. Originally approved in 1935. Last previous edition approved in 2013 as B100–13. DOI: 10.1520/B0100–20.

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.

- [E54 Test Methods for Chemical Analysis of Special Brasses and Bronzes \(Withdrawn 2002\)³](#)
- [E62 Test Methods for Chemical Analysis of Copper and Copper Alloys \(Photometric Methods\) \(Withdrawn 2010\)³](#)
- [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 Workmanship, Finish, and Appearance;
- 3.1.3 Sampling;
- 3.1.4 Number of Tests and Retests;
- 3.1.5 Specimen Preparation;
- 3.1.6 Test Methods;
- 3.1.7 Significance of Numerical Limits;
- 3.1.8 Inspection;
- 3.1.9 Rejection and Rehearing;
- 3.1.10 Certification;
- 3.1.11 Test Reports;
- 3.1.12 Packaging and Package Marking; and
- 3.1.13 Supplementary Requirements.

3.2 In addition, when a section with a title identical to one of those referenced in 3.1 appears in this specification, it contains additional requirements that supplement those appearing in Specification B248.

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 (for example, C51000);

³ 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

5.1.3 Dimensions: length, width, thickness (Section 11 and Table 1);

5.1.4 Quantity or weight for each size;

5.1.5 Temper (Section 8);

5.1.6 When product produced of Copper Alloy UNS No. C61300 is to be used in applications requiring welding (Table 2, footnote B); and

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 When product is purchased for agencies of the U.S. Government (Section 10).

5.2.2 Heat identification or traceability (Section 6.1.2),

5.2.3 Certification (Specification B248), and

5.2.4 Test Report (Specification B248).

6. Materials and Manufacture

6.1 *Material:*

6.1.1 The material of manufacture shall be a form (cast bar, slab, cake, billets, etc.) of Copper Alloy UNS No. C51000, C51100, C61300, C61400, or C65500 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.

6.2 *Manufacture:*

6.2.1 The product shall be manufactured by 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.

7. Chemical Composition

7.1 The material shall conform to the chemical composition requirements prescribed in Table 2 for the 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 the 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 %.

7.4 When all elements in Table 2 for the specified Copper Alloy UNS No. designation are determined, the sum of results shall be 99.5 % min except for C61300 which shall be 99.8 %.

8. Temper

8.1 The temper of product furnished to this specification, and as defined in Practice B601, shall be as follows:

UNS Alloy No.	Temper
C51000	H03 (¾ hard)
C51100	H03 (¾ hard)
C65500	H01 (¼ hard)
C61300	M20 (as hot rolled) or 061 (annealed)
C61400	M20 (as hot rolled) or 061 (annealed)

9. Mechanical Property Requirements

9.1 Product in final form shall conform to the requirements of Table 3.

9.1.1 Product in plate form less than ¾ in. (20 mm) in thickness and product in sheet form shall conform to the tensile requirements when tested in accordance with Test Methods E8/E8M.

9.1.2 Product in plate form ¾ in. (20 mm) or over in thickness shall conform to either tensile or compression

TABLE 1 Thickness and Weight Tolerances

Ordered Weight lb/ft ² (kg/m ²) ^A	Weight Tolerance,%		Ordered Thickness, in. (mm)	Thickness Tolerance, %	
	Over	Under		Over	Under
Plates and Sheets 20 in. (508 mm) and Under in Width					
5.0 to 7.5 (24.4 to 36.6), excl	4.5	3.5	Under 1/8 (3.18)	9	0
7.5 to 10.0 (36.6 to 48.8), excl	4	3	1/8 to 3/16 (3.18 to 4.76), excl	8	0
10.0 to 12.5 (48.8 to 61.0), excl	4	2.5	3/16 to 1/4 (4.76 to 6.35), excl	7	0
12.5 to 15.0 (61.0 to 73.2), excl	3.5	2.5	1/4 to 5/16 (6.35 to 7.94), excl	6	0
15.0 to 17.5 (73.2 to 85.4), excl	2.5	2.5	5/16 to 3/8 (7.94 to 9.52), excl	5	0
17.5 to 20.0 (85.4 to 97.6), excl	2.5	2.0	3/8 to 7/16 (9.52 to 11.1), excl	4.5	0
20 (97.6) or over	2.5	2.0	7/16 to 1/2 (11.1 to 12.7), excl	4 ^B	0
			1/2 to 5/8 (12.7 to 15.9), excl	3.5 ^B	0
			5/8 to 3/4 (15.9 to 19.0), excl	3 ^B	0
			3/4 to 1 (19.0 to 25.4), excl	2.5 ^B	0
			1 (25.4) or over	2.5 ^B	0
Plates and Sheets Over 20 in. (508 mm) in Width					
All weights	5.0	5.0	All thicknesses	10.0	0

^A For purposes of calculating weights, cross section, etc., the density of rolled phosphor bronze (Copper Alloy UNS Nos. C51000 and C51100) shall be taken as 0.320 lb/in.³ (8.86 g/cm³) and the density of rolled copper silicon alloy (Copper Alloy UNS No. C65500) as 0.308 lb/in.³ (8.53 g/cm³).

^B These “Over” thickness tolerances apply to plates and sheets 10 in. (254 mm) and under in width. For plates and sheets over 10 to 20 in. (254 to 508 mm), incl. in width the “Over” thickness tolerances shall be as follows:

Ordered Thickness, in. (mm).....Thickness Tolerance, Over, %
 7/16 to 5/8 (11.1 to 15.9), excl.....4.5
 5/8 to 3/4 (15.9 to 19.0), excl.....4.0
 3/4 (19.0) or over.....3.5