



Designation: ~~B569-04~~ Designation: **B 569 – 09**

## Standard Specification for Brass Strip in Narrow Widths and Light Gage for Heat- Exchanger Tubing<sup>1</sup>

This standard is issued under the fixed designation B 569; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope\*

1.1 This specification establishes the requirements for brass strip in narrow widths and light gages produced from Copper Alloys Nos. C23000, C26000, and C26130.

NOTE 1—This product is commonly used for the manufacture of thin-wall tubes for water passages in heat exchangers for internal combustion engines and other closed system heat sources.

1.2 *Units*—~~The values stated in inch-pound units are to be regarded as standard, except for grain size, which is stated in SI units. The values given in parentheses are mathematical conversions to SI units, which are provided for information only and are not considered standard.~~—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*—Grain size and chemical analysis sampling are stated in SI units.

### 2. Referenced Documents

2.1 *ASTM Standards*:<sup>2</sup>

~~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~~ 601 Classification for Temper Designations for Copper and Copper Alloys Wrought and Cast

B 846 Terminology for Copper and Copper Alloys

B 950 Guide for Editorial Procedures and Form of Product Specifications for Copper and Copper Alloys

E 3 Practice Guide for Preparation of Metallographic Specimens

E 8 8/E 8M Test Methods for Tension Testing of Metallic Materials

E 29 ~~Practice for Using Significant Digits in Test Data to Determine Conformance With Specifications~~ Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

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

E 112 Test Methods for Determining Average Grain Size

E 255 Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition

E 478 Test Methods for Chemical Analysis of Copper Alloys

### 3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology B 846

3.1 For definitions of terms related to copper and copper alloys, refer to Terminology B 846.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *capable of*—~~the test need not be performed by the producer of the material. However, if subsequent testing by the purchaser establishes that the material does not meet these requirements, the material shall be subject to rejection.~~

### 4. Ordering Information

4.1 Include the following information when placing orders for products to this specification:

4.1.1 ASTM designation and year of issue (for example, B 569–XX),

4.1.2 Copper [Alloy] UNS No. designation (for example, C26000),

<sup>1</sup> 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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<sup>2</sup> 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.

- 4.1.3 Temper (Section 7),
- 4.1.4 Dimensions: thickness, width, length (Section 10), and
- 4.1.5 Quantity: total weight each form, temper, and size.
- 4.2 The following options are available and should be specified at the time of placing an order when required:
  - 4.2.1 Heat identification or traceability details,
  - 4.2.2 Certification, and
  - 4.2.3 Mill test report.

## 5. Materials and Manufacture

### 5.1 Material:

5.1.1 The material of manufacture shall be a form (cast bar, cake, or slab) of Copper Alloy UNS No. C23000, C26000, or C26130 of such purity and soundness as to be suitable for processing into the products prescribed herein.

5.1.2 In the event heat identification or traceability is required, the purchaser shall specify the details desired.

NOTE 2—Because of 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.

### 5.2 Manufacture:

5.2.1 The product width shall be no greater than 3 in. (76.2 mm), and thickness shall be less than 0.0181 in. (~~0.457~~0.460 mm).

5.2.2 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.

5.2.2.1 The product shall be hot- or cold-worked to the finished size, and subsequently annealed, when required, to meet the temper properties specified.

~~5.2.3 Edges—Slit edges shall be furnished.:~~

5.2.3.1 Slit edges shall be furnished.

## 6. Chemical Composition

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

6.1.1 These composition limits do not preclude the presence of other elements. Limits shall be established and analysis required for unnamed elements when agreed upon between the manufacturer and the purchaser.

6.2 For alloys in which zinc is listed as “remainder,” zinc is the difference between the sum results of all elements determined and 100 %.

6.3 When all elements listed in Table 1 are determined for C26000 and C26130 the sum of results shall be 99.7 % min and for C23000 the sum of results shall be 99.8 % min.

## 7. Temper

~~7.1 Products shall be produced in tempers H01 (¼ hard), H02 (½ hard), O81 (Annealed-to-Temper—¼ hard), and O82 (Annealed-to-Temper—½ hard) as defined in Classification B601~~

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

7.1.1 Cold rolled tempers H01 or H02.

7.1.2 Annealed-to-temper O81 or O82.

NOTE 3—The purchaser should confer with the manufacturer or supplier for the availability of product in a specific temper.

## 8. Grain Size of Annealed Tempers

8.1 Annealed-to-Temper (O81 and O82) strip shall have an average grain size of 0.015 mm maximum as determined by Test Methods E 112.

## 9. Mechanical Property Requirement

~~9.1 Tensile Strength Requirement —The product:~~

**TABLE 1 Chemical Requirements**

Copper Alloy UNS No.	Composition, %				
	Copper	Lead, max	Iron, max	Arsenic	Zinc
C23000	84.0–86.0 <sup>A</sup>	0.05	0.05	...	Remainder
C26000	68.5–71.5 <sup>B</sup>	0.07	0.05	...	Remainder
C26130	68.5–71.5 <sup>B</sup>	0.05	0.05	0.02–0.08	Remainder

<sup>A</sup> Cu + Sum of Named Elements = 99.8 %.

<sup>B</sup> Cu + Sum of Named Elements = 99.7 %.

**TABLE 2 Tensile Strength-Req<sub>u</sub>, Yield Stremengtsh, and Te Elongsgation-T Rest-Valquirements for Rolled-to-Temper Material**

Copper Alloy UNS No.	Temper Designation	Tensile Strength, ksi (MPa <sup>A</sup> )				Yield Strength, ksi (MPa <sup>A</sup> )				% Elongation In 2 in. (50 mm)
		Standard Temper Designation	Minimum	Maximum	At 0.5 % Extension Under Load		At 0.2 % Offset			
					At 0.5 % Extension Under Load		At 0.2 % Offset			
					Minimum	Maximum	Minimum	Maximum		
C23000	H01	¼ Hard	44 (305)	54 (370)	25 (170)	48 (330)	23 (160)	48 (330)	18	
C26000 and C26130	H01	¼ Hard	49 (340)	59 (405)	33 (230)	48 (330)	30 (205)	45 (205)	12	
C26000 and C26130	H02	½ Hard	58 (400)	68 (470)	43 (295)	58 (400)	40 (275)	55 (380)	10	

<sup>A</sup> See Appendix X1.

**TABLE 3 Tensile Strength-Req<sub>u</sub>, Yield Stremengtsh, and Te Elongsgation-T Rest-Valquirements for Annealed-to-Temper Material**

Copper Alloy UNS No.	Standard Temper Designation	Tensile Strength, ksi (MPa <sup>A</sup> )		Yield Strength, ksi (MPa <sup>A</sup> )				% Elongation In 2 in. (50 mm)
		Minimum	Maximum	At 0.5 % Extension Under Load		At 0.2 % Offset		
				At 0.5 % Extension Under Load		At 0.2 % Offset		
				Minimum	Maximum	Minimum	Maximum	
C23000	O81	42 (210)	52 (360)	21 (145)	36 (250)	20 (140)	35 (240)	34
C26000 and C26130	O82	60 (415)	70 (485)	35 (240)	50 (345)	34 (235)	49 (340)	25

<sup>A</sup> See Appendix X1.

9.1.1 Product furnished to this specification shall conform to the tensile strength requirements prescribed in Tables 2 and 3 for the temper and alloy specified in the ordering information when tested in accordance with Test Methods E 8/E 8M.

9.2 Yield Strength Requirement —The product furnished shall be capable of conforming to the requirements prescribed in:

9.2.1 Product furnished to this specification shall be capable of conforming to the yield strength requirements prescribed in Tables 2 and 3 for the temper specified in the ordering information when tested in accordance with Test Methods E 8/E 8M. The purchaser must specify at the time of ordering which yield strength method shall be used.

9.3 Elongation Test Requirement —The product furnished shall conform to the requirements prescribed in:

9.3.1 Product furnished to this specification shall conform to the elongation requirements prescribed in Tables 2 and 3 for the temper and alloy specified in the ordering information when tested in accordance with Test Methods E 8/E 8M.

9.4 Acceptance or rejection based upon mechanical properties shall depend only on tensile strength and elongation.

**10. Dimensions, Mass, and Permissible Variations**

10.1 Unless closer tolerances are specified in the contract or purchase order, the product furnished shall conform to the following thickness and width tolerances:

10.1.1 Thickness Tolerances—Table 4.

10.1.2 Width Tolerances—Table 5.

10.2 Straightness Tolerances—The maximum edgewise curvature (depth of arc) in any 72-in. (1830-mm)(1829-mm) continuous length shall not exceed 1/8 in. (3.18(3.175) mm).

**11. Workmanship, Finish and Appearance**

11.1 The strip shall be free of defects, but blemishes of a nature that do not interfere with normal commercial operations are acceptable. It shall be well-cleaned and free of dirt. A superficial film of residual light lubricant may be present and is acceptable unless otherwise specified.

11.2 The surface finish and appearance shall be the normal commercial quality for the alloy, thickness, and temper ordered. When application information is provided with the purchase order, the surface shall be that commercially producible for the application. Superficial films of discoloration, or lubricants, or tarnish inhibitors are permissible unless otherwise specified.

**TABLE 4 Thickness Tolerances**

Thickness, in. (mm)	Thickness Tolerance, ±in. (mm), <sup>A,B</sup> 3 in. (7.62 mm) and Under in Width
0.006 (0.01) and under	0.0003 (0.008)
0.006 (0.152) and under	0.0003 (0.008)
Over 0.0006 to 0.009 (0.152 to 0.229)	0.0004 (0.010)
Over 0.006 to 0.009 (0.152 to 0.229)	0.0004 (0.010)
Over 0.009 to 0.018 (0.229 to 0.330)	0.0005 (0.013)
Over 0.009 to 0.018 (0.229 to 0.457)	0.0005 (0.013)

<sup>A</sup> When tolerances are specified as all plus or minus, double the values shown.

<sup>B</sup> Some applications may require a closer tolerance control within any one coil even though the overall tolerance between coils or shipments can be to the tolerance shown. Such special tolerance requirements shall be negotiated between the manufacturer or supplier and the purchaser at the time the order is placed.