Designation: ~~B569 – 09~~ B569 – 14

Standard Specification for Brass Strip in Narrow Widths and Light Gage for Heat-Exchanger Tubing[1]

This standard is issued under the fixed designation B569; 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 brass strip in narrow widths and light gages produced from Copper Alloys Nos. C23000, C26000, and C26130.[2]

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. The values given in parentheses are mathematical conversions to SI ~~units that~~units, which 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*:[3]

B601 Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast
B846 Terminology for Copper and Copper Alloys
B950 Guide for Editorial Procedures and Form of Product Specifications for Copper and Copper Alloys
E3 Guide for Preparation of Metallographic Specimens
E8/E8M Test Methods for Tension Testing of Metallic Materials
E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
E62 Test Methods for Chemical Analysis of Copper and Copper Alloys (Photometric Methods) (Withdrawn 2010)[4]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
E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

3. Terminology

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

4. Ordering Information

4.1 Include the following ~~information~~ specified choices when placing orders for products ~~to this specification:~~under this specification, as applicable:

4.1.1 ASTM designation and year of issue (for example, B569–XX),
4.1.2 Copper [Alloy] UNS No. designation (for example, C26000),
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.

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[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] The UNS system for copper and copper alloys (see Practice E527) is a simple expansion of the former standard designation system accomplished by the addition of a prefix "C" and a suffix "00." The suffix can be used to accommodate composition variations of the base alloy.

[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.

[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**

4.2 The following options are available ~~and should be~~ but may not be included unless specified at the time of placing ~~an~~ of the 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~~ When specified in the contract or purchase order, that heat identification or traceability is required, the purchaser shall specify the details desired.

NOTE 2—~~Because of~~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.

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. (0.460 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:*

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~~ By agreement between the manufacturer and purchaser, limits may be established and analysis required for unnamed ~~elements when agreed upon between the manufacturer and the purchaser.~~elements.

6.2 For alloys in which zinc is listed as "remainder," copper or zinc is taken as 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 The standard tempers for products described in this specification are given in Table 2 and Table 3.—as defined in Classification B601.

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.

TABLE 1 Chemical Requirements

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

TABLE 1 Chemical Requirements

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

[A] Cu + Sum of Named Elements = 99.8 %.

[B] Cu + Sum of Named Elements = 99.7 %.

TABLE 2 Tensile Strength, Yield Strength, and Elongation Requirements for Rolled-to-Temper Material

Copper Alloy UNS No.	Standard Temper Designation	Tensile Strength, ksi (MPa[A])			Yield Strength, ksi (MPa[A])				% Elongation
					At 0.5 % Extension Under Load		At 0.2 % Offset		In 2 in. (50 mm)
		Former	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
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

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					At 0.5 % Extension Under Load		At 0.2 % Offset		In 2 in. (50 mm)
	Code	Name	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
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

[A] See Appendix X1.

TABLE 3 Tensile Strength, Yield Strength, and Elongation Requirements for Annealed-to-Temper Material

Copper Alloy UNS No.	Standard Temper Designation	Tensile Strength, ksi (MPa[A])		Yield Strength, ksi (MPa[A])				% Elongation
				At 0.5 % Extension Under Load		At 0.2 % Offset		In 2 in. (50 mm)
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
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

TABLE 3 Tensile Strength, Yield Strength, and Elongation Requirements for Annealed-to-Temper Material

Copper Alloy UNS No.	Temper Designation	Tensile Strength, ksi (MPa[A])		Yield Strength, ksi (MPa[A])				% Elongation
				At 0.5 % Extension Under Load		At 0.2 % Offset		In 2 in. (50 mm)
	Code	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
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

[A] See Appendix X1.

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 E112.

9. Mechanical Property Requirement

9.1 *Tensile Strength ~~Requirement :~~ Requirement:*

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 E8/E8M.

9.2 *Yield Strength ~~Requirement :~~ Requirement:*

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 and alloy specified in the ordering information when tested in accordance with Test Methods E8/E8M. The purchaser must specify at the time of ordering which yield strength method shall be used.

9.3 *Elongation Test ~~Requirement :~~ Requirement:*

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 E8/E8M.

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. (1829-mm) continuous length shall not exceed ⅛ in. (3.175 mm).