Designation: B 569 – 04

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

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 (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.

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.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

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

B 601 Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast

B 846 Terminology for Copper and Copper Alloys

E 3 Practice for Preparation of Metallographic Specimens

E 8 Test Methods for Tension Testing of Metallic Materials

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

E 112 Test Methods for Determining Average Grain Size

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.

3.2 *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),

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 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 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.

[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 May 1, 2004. Published May 2004. Originally approved in 1972. Last previous edition approved in 1998 as B 569 – 98.

[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.

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

5.2.3 *Edges*—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 B 601.

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 furnished shall conform to the requirements prescribed in Tables 2 and 3 for the temper specified in the ordering information when tested in accordance with Test Methods E 8.

9.2 *Yield Strength Requirement*—The product furnished shall be capable of conforming to the requirements prescribed in Tables 2 and 3 for the temper specified in the ordering information when tested in accordance with Test Methods E 8.

9.3 *Elongation Test Requirement*—The product furnished shall conform to the requirements prescribed in Tables 2 and 3 for the temper specified in the ordering information when tested in accordance with Test Methods E 8.

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.

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 %.

10.2 *Straightness Tolerances*—The maximum edgewise curvature (depth of arc) in any 72-in. (1830-mm) continuous length shall not exceed ⅛ in. (3.18 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.

12. Sampling

12.1 *Sampling*—The lot size, portion size, and selection of sample pieces shall be as follows:

12.1.1 *Lot Size*—An inspection lot shall be 10 000 lb (4550 kg) or less of material of the same mill form, alloy, temper, and nominal dimensions, subject to inspection at one time or shall be the product of one cast bar from a single melt charge, whose weight shall not exceed 25 000 lb (11 350 kg), that has been processed continuously and subject to inspection at one time.

12.1.2 *Portion Size*—A portion shall be four or more pieces selected to be representative of each lot. If the lot consists of less than four pieces, representative samples shall be taken from each piece.

12.1.2.1 *Chemical Analysis*—The sample for chemical analysis shall be taken in accordance with Practice E 255 for product in its final form. Unless otherwise required by the purchaser, at the time the order is placed the manufacturer shall have the option of determining conformance to chemical composition by analyzing samples taken at the time the castings are poured or samples taken from the semifinished product if heat identity can be maintained throughout all operations. If the manufacturer determines the chemical composition during manufacture, he shall not be required to sample and analyze the finished product. The minimum weight of the composite sample in accordance with Practice E 255 shall be 150 g.

12.1.2.2 *Samples for All Other Tests*—Samples for all other tests shall be taken from the sample portion in 12.1.2 and be of a convenient size to accommodate the test and comply with the requirements of the appropriate ASTM product standards and test methods.

13. Number of Tests and Retests

13.1 *Tests*:

13.1.1 *Chemical Composition*—Composition shall be determined as per the element mean of results from at least two replicate analyses of the sample and the results of each replication must meet the requirements of the product specification.

13.1.2 *Other Tests*: