



Designation: B19 – 10

Standard Specification for Cartridge Brass Sheet, Strip, Plate, Bar, and Disks¹

This standard is issued under the fixed designation B19; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This specification establishes the requirements for sheet, strip, plate, bar, and disks for the manufacture of ammunition component parts thereof from alloy UNS C26000.

1.2 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 metric units.

1.3 The following safety caveat pertains only to the test method described in Section 10 of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- [B154 Test Method for Mercurous Nitrate Test for Copper Alloys](#)
- [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](#)
- [B846 Terminology for Copper and Copper Alloys](#)
- [B858 Test Method for Ammonia Vapor Test for Determining Susceptibility to Stress Corrosion Cracking in Copper Alloys](#)
- [B900 Practice for Packaging of Copper and Copper Alloy](#)

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 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.

Mill Products for U.S. Government Agencies

- [E3 Guide for Preparation of Metallographic Specimens](#)
- [E8 Test Methods for Tension Testing of Metallic Materials](#)
- [E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)
- [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 \(UNS\)](#)

2.2 Federal Standards:³

- [Fed. Std. No. 123 Marking for Shipment \(Civil Agencies\)](#)
- [Fed. Std. No. 185 Identification Marking of Copper and Copper-Base Alloy Mill Products](#)

2.3 Military Standards:³

- [MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes](#)
- [MIL-STD-129 Marking for Shipment and Storage](#)

3. Terminology

3.1 *Definitions*—For standard terms related to copper and copper alloys, refer to Terminology B846.

4. Ordering Information

4.1 Orders for products should include the following information:

- 4.1.1 ASTM designation and year of issue (for example, B19-XX),
- 4.1.2 Product form: sheet, strip, plate, bar, or disks (blanks),
- 4.1.3 Temper (Section 7),
- 4.1.4 Dimension: thickness, width, length,
- 4.1.5 How furnished: flat lengths, coils, or blanks,
- 4.1.6 Quantity: total weight each temper, form, and size, and
- 4.1.7 When severe drawing or deep cupping is required.

4.2 The following options are available and should be specified in the contract or purchase order when required:

- 4.2.1 Heat identification or traceability details,

³ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, <http://dodssp.daps.dla.mil>.

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

- 4.2.2 Caliber or diameter of Type IV cups or disks (Section 11),
- 4.2.3 Mercurous Nitrate Test (Section 10),
- 4.2.4 Product Marking (Section 22),
- 4.2.5 On-site inspection (Section 18.1),
- 4.2.6 Certification (Section 20), and
- 4.2.7 Test Report (Mill) (Section 21).

5. Materials and Manufacture

5.1 Materials:

5.1.1 The material of manufacture shall be a cast bar of copper alloy UNS C26000 of such purity, uniformity, and soundness as to be suitable for processing into the products prescribed herein.

5.2 Manufacture:

5.2.1 The product shall be manufactured by such hot working, cold working, and annealing processes as to produce a uniform wrought structure in the specified temper for the finished product.

5.2.2 The products shall be furnished with slit edges unless otherwise specified.

5.3 In the event heat identification or traceability is required, the purchaser shall specify the details desired in the contract or purchase order.

NOTE 1—Because of the discontinued 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. Chemical Composition

6.1 The product material shall conform to the requirements prescribed in Table 1.

6.1.1 These specification limits do not preclude the presence of other elements. Limits for unnamed elements may be established and analysis required by agreement between manufacturer and purchaser.

6.2 Either copper or zinc may be taken as the difference between the sum of all elements analyzed and 100 %. Copper, when determined by difference, must conform to the requirements of Table 1. When all elements in Table 1 are analyzed, their sum shall be 99.7 % min.

7. Temper

7.1 Product tempers, as defined in Practice B601, shall be as follows:

7.1.1 *Rolled Product:* H01, H02, H03, H04, H06, H08, and H10.

7.1.2 *Annealed Product:* OS015, OS025, OS035, OS050, OS070, and OS100.

7.1.3 The purchaser should confer with the manufacturer or supplier for availability of product in a specific temper, form, and size.

TABLE 1 Chemical Requirements

Copper	Composition, %		Zinc	Bismuth
	Lead, max	Iron, max		
68.5 to 71.5	0.07	0.05	remainder	0.0059 max

8. Grain Size Requirements

8.1 Annealed sheet, strip, and bar furnished under this specification shall conform to the requirements specified in Table 2.

8.2 Except for material ordered by the U.S. Government, annealed material to be used for the manufacture of cartridge brass cups and disks shall conform to the requirements of Table 3.

8.3 Annealed plate, bar, and disks ordered by the U.S. Government shall meet the following requirements:

8.3.1 Material up to 0.500 in. (12.70 mm) in thickness inclusive, except material for 20 mm disks, shall be furnished to a grain size of 0.055 to 0.120 mm inclusive.

8.3.2 Material over 0.500 in. (12.70 mm) in thickness, except material for 20-mm disks, shall be furnished to a grain size of 0.070 to 0.150 mm inclusive.

8.3.3 Disks (blanks) of 20 mm and material for blanking 20-mm disks (blanks) shall be furnished to a grain size of 0.070 to 0.130 mm inclusive.

8.4 Material ordered as-hot rolled shall be furnished to a grain size as agreed upon between the manufacturer or supplier and the producer.

8.5 Material to be used for the manufacture of primer cup and primer anvils shall conform to the grain size requirements of Table 4.

9. Mechanical Property Requirements

9.1 Materials furnished under this specification shall conform to the tension test requirements specified in this specification.

9.1.1 Rolled-to-temper material shall conform to the requirements specified in Table 5.

9.1.2 Annealed material shall conform to the requirements specified in Table 6.

9.1.3 Material furnished as-hot rolled shall conform to the requirements specified in Table 6.

10. Mercurous Nitrate Test

10.1 When specified in the contract or purchase order, the product shall meet the requirements of Test Method B154.

10.1.1 Mercury is a recognized health hazard. Proper equipment for the detection and removal of vapors is recommended. The use of suitable gloves while testing is advised.

NOTE 2—Ammonia vapor test, Test Method B858, is a possible alternative to Test Method B154.

TABLE 2 Grain Size Requirements for Annealed Material

Temper	Nominal	Grain Size, mm	
		Min	Max
OS015	0.015	^A	0.025
OS025	0.025	0.015	0.035
OS035	0.035	0.025	0.050
OS050	0.050	0.035	0.070
OS070	0.070	0.050	0.100
OS100	0.100	0.060	0.150

^A No minimum grain size required, but the material shall be fully recrystallized.

TABLE 3 Grain Size Requirements for Material for Manufacture of Cartridge Brass Cups and Disks

Type	Temper	Grain Size, mm		Use
		Min	Max	
I	OS065	0.035	0.090	Strip for 0.30 and 0.45 caliber cups
II	OS110	0.080	0.140	Strips for 0.50 caliber cups
III	OS055	0.055	0.115	Disks 0.500 in. (12.7 mm) and under in thickness
IV	OS115	0.075	0.150	Disks over 0.500 in. (12.7 mm) in thickness

11. Dimensions, Mass, and Permissible Variations

11.1 The dimensions and tolerances covered by this specification, except as covered herein, shall be as specified in the current edition of Specification **B248**, with particular reference to Section 6 and the dimensional tables of that specification.

11.2 The diameter of the disks measured at the large end shall not vary from that specified in the order by more than the amounts shown in **Table 7**.

11.3 Disks shall not vary in thickness by more than the amounts shown in **Table 8**, except that disks for 20-mm cartridge cases shall be not less than the thickness specified and shall not exceed the specified thickness by more than 0.008 in. (0.20 mm) in the area 1 in. (25 mm) in diameter in the center of the disk.

11.4 Material to be used for the manufacture of primer cup and primer anvil shall conform to the dimensional tolerances requirements shown in **Table 4**.

11.5 Special dimensional tolerances shall be as agreed upon between the manufacturer or supplier and the purchaser.

11.6 Straightness shall be determined by placing the piece on a level surface so that the arc or departure from straightness is horizontal. The maximum depth of arc shall be measured to the nearest $\frac{1}{32}$ in. (0.8 mm) by means of a straightedge and a steel scale.

12. Workmanship, Finish, and Appearance

12.1 Cartridge brass shall be free of defects, and it shall be well cleaned and free of dirt.

12.2 In addition to the above requirement, cartridge brass disks shall be free of oxidation, pinholes, surface splits, dirt inclusions, segregations, or any other defects. They shall be free of oil and grease, acid, dirt, grit of any kind, and shall be clean and bright.

13. Sampling

13.1 The lot size, portion size, and selection of pieces for materials purchased shall be as follows:

13.1.1 *Lot Size*—20 000 lb (9070 kg) or fraction thereof.

13.1.2 *Portion Size*—Pieces from at least ten individual lengths of the finished product. If the lot consists of less than the number of lengths indicated in the portion size, a piece shall be taken from each individual length.

13.2 For materials purchased by the U.S. Government, sampling shall be accomplished as follows:

13.2.1 The lot size, portion size, and selection of pieces shall conform to the sampling plan of **Table 9** for chemical analysis, for tension tests, for grain size determinations and for the mercurous nitrate test.

13.2.2 *Sampling for Visual and Dimensional Examination*—If the weight of each piece is more than 150 lb (68 kg), every piece shall be examined. If the weight of each piece is 150 lb or less, a representative specimen shall be visually examined to determine compliance with the requirements of the contract for identification marking and workmanship, and shall be measured for compliance with the dimensional requirements of this specification and the contract.

13.3 When material is furnished in rolls or on reels or spools, the sample for examination shall be taken within 10 ft (3.0 m) of the outer end. If the sample is rejected due to handling marks, an additional 20 ft (6.1 m) shall be selected for examination.

13.4 *Chemical Analysis*—A sample for chemical analysis shall be taken and prepared in accordance with Practice **E255**. Drilling, millings, etc., shall be taken in approximately equal weight from each of the sample pieces selected in accordance with **13.1.2** or **13.2.1** and combined into composite samples. The minimum weight of the composite sample that is to be divided into three equal parts shall be 150 g. The maximum number of samples from which a composite sample may be made shall be ten.

13.4.1 Instead of sampling in accordance with Practice **E255**, the manufacturer shall have the option of determining conformance to chemical composition as follows: Conformance shall be determined by the manufacturer by analyzing samples taken at the time the castings are poured or samples taken from the semifinished product. If the manufacturer determines the chemical composition of the material during the course of manufacture, he shall not be required to sample and analyze the finished product. The number of samples taken for determination of chemical composition shall be as follows:

13.4.1.1 When samples are taken at the time the castings are poured, at least one sample shall be taken for each group of castings poured simultaneously from the same source of molten metal.

13.4.1.2 When samples are taken from the semi-finished product, a sample shall be taken to represent each 10 000 lb (4540 kg) or fraction thereof, except that not more than one sample shall be required per piece.

14. Number of Tests and Retests

14.1 *Tests:*

14.1.1 Chemical composition shall be determined as the per element average of results from at least two replicate analyses.

14.2 *Other Test*—Other tests shall be performed using the samples selected in accordance with **13.1.2** or **13.2**, as appropriate. The required tests shall be made on each of the specimens so selected.

14.3 *Retests:*

14.3.1 When requested by the manufacturer or supplier, a retest may be permitted should test results obtained by the purchaser fail to conform with specification requirements.