Designation: ~~B19 – 15~~ B19 – 20

Standard Specification for Cartridge Brass Sheet, Strip, Plate, Bar, and Disks[1]

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, which 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~~SI units.

1.3 The following safety caveat pertains only to the test method described in Section 10 of this specification.~~(**Warning**—Mercury has been designated by many regulatory agencies as a hazardous material that can cause serious medical issues. Mercury, or its vapor, has been demonstrated to be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury containing products. See the applicable product Safety Data Sheet (SDS) for additional information. Users should be aware that selling mercury and/or mercury containing products into your state or country may be prohibited by law.)~~

1.4 *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~~ safety, health, and ~~health~~environmental practices and determine the applicability of regulatory limitations prior to use. (***Warning—***Mercury has been designated by many regulatory agencies as a hazardous substance that can cause serious medical issues. Mercury, or its vapor, has been demonstrated to be hazardous to health and corrosive to materials. Use caution when handling mercury and mercury-containing products. See the applicable product Safety Data Sheet (SDS) for additional information. The potential exists that selling mercury or mercury-containing products, or both, is prohibited by local or national law. Users must determine legality of sales in their location.)*

1.5 *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]

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 Mill Products for U.S. Government Agencies
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
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

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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] 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~~standard's Document Summary page on the ASTM website.

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

E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

2.2 *Federal ~~Standards:~~Standard:*[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

2.4 *SAE Standard:*

AMS-STD-185A Identification Marking of Copper and Copper Base Alloy Mill Products

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 specified choices when placing orders for product under this specification, as applicable:

4.1.1 ASTM designation and year of issue (for example, ~~B19-XX),~~B19-XX);

4.1.2 Product form: sheet, strip, plate, bar, or disks ~~(blanks),~~(blanks);

4.1.3 Temper (Section 7~~),~~);

4.1.4 Dimension: thickness, width, ~~length,~~length;

4.1.5 How furnished: flat lengths, coils, or ~~blanks,~~blanks;

4.1.6 Quantity: total weight each temper, form, and ~~size,~~size; and

4.1.7 When severe drawing or deep cupping is required.

4.2 The following options are available but may not be included unless specified at the time of placing the order when required:

4.2.1 Type of edge (for example, slit, sheared, sawed, and so forth),

4.2.2 Heat identification or traceability details,

4.2.3 Caliber or diameter of Type IV cups or disks (Section 11),

4.2.4 Residual Stress Test (Section 10),

4.2.4.1 The pH value for the Ammonia Vapor Test if other than 10,

4.2.5 Product Marking (Section 22),

4.2.6 On-site inspection (Section 18.1),

4.2.7 Certification (Section 20), and

4.2.8 Mill Test Report (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 and soundness as to be suitable for processing into the products prescribed herein.

5.1.2 When specified in the contract or purchase ~~order,~~order that heat identification or traceability is required, the purchaser shall specify the details desired.

NOTE 1—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 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 The product shall be hot or cold worked to the finished size, and subsequently annealed, when required, to meet the temper properties specified.

5.3 *Edges:*

5.3.1 Slit edges shall be furnished unless otherwise specified in the contract or purchase order.

6. Chemical Composition

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

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

[3] Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, http://quicksearch.dla.mil.

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

6.2 For alloys in which zinc is listed as "remainder," either copper or zinc may be taken as the difference between the sum of results of all other elements determined and 100 %. Copper, when determined by difference, must conform to the requirements of Table 1. When all elements in Table 1 are determined, the sum of the results shall be 99.7 % min.

7. Temper

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

7.1.1 *Hot Rolled Temper:* M20,

7.1.2 *Cold Rolled Tempers:* H01, H02, H03, H04, H06, H08, and H10.

7.1.3 *Annealed Tempers:* OS015, OS025, OS035, OS050, OS070, and OS100.

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

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 Acceptance or rejection based upon grain size shall depend only on the average grain size of a test specimen taken from each of two sample portions, and each specimen shall be within the limits prescribed in Table 2 when determined in accordance with Test Methods E112.

8.3 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.

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

8.4.1 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 mm to 0.120 mm inclusive.

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

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

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

8.6 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 *Tensile Strength Requirements:*

9.1.1 Product (Cold Rolled Tempers) furnished under this specification shall conform to the tensile requirements prescribed in Table 5, when tested in accordance with Test Methods E8/E8M.

9.1.2 Product (Annealed Tempers) furnished under this specification shall conform to the tensile requirements prescribed in Table 6, when tested in accordance with Test Methods E8/E8M.

9.1.3 Product (Hot Rolled Temper) furnished under this specification shall conform to the tensile requirements prescribed in Table 6, when tested in accordance with Test Methods E8/E8M.

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

10. Performance Requirements

10.1 *Residual Stress Test:*

10.1.1 When specified in the contract or purchase order, the product shall be tested for residual stress according to the requirements of Test Method B154 or Test Method B858, and show no signs of cracking. (**Warning—**Mercury is a definite health hazard. With the Mercurous Nitrate Test, equipment for the detection and removal of mercury vapor produced in volatilization, and the use of protective gloves is recommended.)

11. Dimensions, Mass, and Permissible Variations

11.1 The dimensions and tolerances for products described 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~~ 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 1⁄32 in. (0.8 mm) by means of a ~~straightedge~~ straight edge 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 residual stress 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.