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~~Designation:B19–05~~ Designation: B19 – 10

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 Department of Defense.

1. Scope*

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

~~1.2Values given in inch-pound units are the standard except for grain size which is stated in metric units. SI values given in parenthesis are for information only.~~

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 AlloysWrought 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 Test Methods for Tension Testing of Metallic Materials
E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
~~E112~~
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-129Marking for Shipment and Storage~~
~~MIL-C-3993 Packaging of Copper and Copper-Base Alloy Mill Products~~

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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 Document Summary page on the ASTM website.

[3] Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA ~~19111-5094, Attn: NPODS.~~19111-5098, http://dodssp.daps.dla.mil.

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

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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 ~~contrast~~contract or purchase order when required:
4.2.1 Heat identification or traceability details,
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 ~~13~~18.1),
4.2.6 Certification (Section 20), and
4.2.7 Test Report (Mill) (Section 21).

5. ~~Material and Manufacture~~ Materials and Manufacture

5.1 ~~*Material*~~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 ~~*Manufacturing*~~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.

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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:* ~~B601,~~ 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.

~~8.*Mechanical Property Requirements* Mechanical Property Requirements~~

~~8.1Materials furnished under this specification shall conform to the tension test requirements specified in this specification.~~

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

~~8.1.1Rolled-to-temper material shall conform to the requirements specified in~~

8. Grain Size Requirements

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

~~8.1.2Annealed material shall conform to the requirements specified in~~

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.

~~8.1.3Material furnished as-hot rolled shall conform to the requirements specified in Table 3.~~

~~**9.Grain Size Requirements**~~

~~9.1Annealed sheet, strip, and bar furnished under this specification shall conform to the requirements specified in~~

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.

~~9.2Except 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~~

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.

~~9.3Annealed plate, bar, and disks ordered by the U.S. Government shall meet the following requirements:~~

~~9.3.1Material 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.~~

~~9.3.2Material 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.~~

~~9.3.3Disks (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.~~

~~9.4Material ordered as-hot rolled shall be furnished to a grain size as agreed upon between the manufacturer or supplier and the producer.~~

~~9.5Material to be used for the manufacture of primer cup and primer anvils shall conform to the grain size requirements of~~

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.

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

TABLE 4 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.

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TABLE ~~5~~ 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

TABLE ~~6~~ 4 Dimensional Tolerances, Grain Size, and Temper of Brass for Primer Cup and Primer Anvils

Item	Size Case, caliber	Thickness, in. (mm)	Permissible Variation in Thickness Plus and Minus, in. (mm)	Standard Temper Designations	Nominal Grain Size, mm or Temper
Cup	0.50	0.035 (0.899)	0.0008 (0.020)	OS100	0.100 (OS100)
	0.45	0.018 (0.458) or 0.020 (0.508)	0.001 (0.025)	OS050	0.050 (OS050)
	7.62 mm	0.027 (0.686) or 0.029 (0.737)	0.0008 (0.020)	OS100	0.100 (OS100)
	5.56 mm	0.027 (0.686)	0.0005 (0.0125)	OS070	0.070 (OS070)
	0.30	0.027 (0.686)	0.0008 (0.020)	OS100	0.100 (OS100)
	0.30 carbine	0.020 (0.508)	0.001 (0.025)	OS070	0.070 (OS070)
Anvil	0.50	0.0485 (1.2315)	0.001 (0.025)	OS025	0.025 (OS025)
	0.45	0.038 (0.965)	0.001 (0.025)	H01	¼ hard (H01)
	7.62 mm	0.038 (0.965)	0.001 (0.025)	H01 or H02	¼ or ½ hard (H01 or H02)
	5.56 mm	0.038 (0.965)	0.001 (0.025)	H01 or H02	¼ or ½ hard (H01 or H02)
	0.30	0.038 (0.965)	0.001 (0.025)	H01 or H02	¼ or ½ hard (H01 or H02)
	0.30 carbine	0.034 (0.864)	0.001 (0.025)	H01	¼ hard (H01)

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TABLE ~~2~~ 5 Tensile Strength Requirements for Rolled Tempers

NOTE 1—Plate is generally available in only the soft O60, quarter-hard H01, and half-hard H02 tempers. Required properties for other tempers shall be agreed upon between the manufacturer or supplier and the purchaser at time of placing the order or contract.

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Temper Designation		Tensile Strength, ksi[A] (MPa)	
Standard	Former	min	max
H01	quarter hard	49 (340)	59 (405)
H02	half hard	57 (395)	67 (460)
H03	three-quarter hard	64 (440)	74 (510)
H04	hard	71 (490)	81 (560)
H06	extra hard	83 (570)	92 (635)
H08	spring	91 (625)	100 (690)
H10	extra spring	95 (655)	104 (720)

[A] 1 ksi = 1000 psi.

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 6~~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 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