



Standard Specification for Copper Alloy Bullet Jacket Cups¹

This standard is issued under the fixed designation B 131; 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 bullet jacket preform cups produced of Copper Alloy UNS No. C22000 for processing into bullet jackets of the following types and classes:

- 1.1.1 *Type I*—Caliber 0.30.
- 1.1.2 *Type II*—Caliber 0.45.
- 1.1.3 *Type III*—Caliber 0.50.
- 1.1.4 *Type IV*—As specified in the contract or order.
- 1.1.5 *Class I*—Not annealed.
- 1.1.6 *Class II*—Annealed.

1.2 The values stated in inch-pound units are the standard, except for grain size, which is given in SI units. Values in parentheses are for information only.

2. Referenced Documents

- 2.1 *ASTM Standards*:
 - B 601 Practice for Temper Designations for Copper and Copper Alloys—Wrought and Cast²
 - E 3 Practice for Preparation of Metallographic Specimens³
 - E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications⁴
 - E 112 Test Methods for Determining Average Grain Size³
 - E 255 Practice for Sampling Copper and Copper Alloys for Determination of Chemical Composition⁵
 - E 478 Test Methods for Chemical Analysis of Copper Alloys⁵

3. Terminology

3.1 Definitions:

3.1.1 *blank (blanking), n*—a piece of metal removed from sheet or strip, intended for subsequent fabrication such as cupping and drawing.

3.1.2 *cup (cupping), n*—a shallow cylindrical shell closed at one end, normally intended for further fabrication, formed from a blank.

¹ This specification is under the jurisdiction of ASTM Committee B-5 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.01 on Plate, Sheet and Strips.

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² *Annual Book of ASTM Standards*, Vol 02.01.

³ *Annual Book of ASTM Standards*, Vol 03.01.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ *Annual Book of ASTM Standards*, Vol 03.05.

4. Ordering Information

4.1 Orders for product under this specification should include the following information:

- 4.1.1 ASTM designation and year of issue.
- 4.1.2 Type and class (Section 1),
- 4.1.3 Grain size (Section 7),
- 4.1.4 Dimensions and tolerances (see 8.1),
- 4.1.5 Drawing number to which order applies (see 8.1), and
- 4.1.6 Work test requirements if required (Section 11).
- 4.1.7 In addition, when material is purchased for agencies of the U.S. Government (see Supplementary Requirements section).

5. Material and Manufacture

5.1 Material:

5.1.1 The material of manufacture shall be annealed plate, sheet, strip, or disks of wrought Alloy UNS No. C22000 processed to produce even-topped cups.

5.2 Manufacture:

5.2.1 The material shall be blanked and cupped to meet the cup dimensions specified, and subsequently annealed, if required. The annealed cups shall be cleaned to provide a surface suitable for subsequent redrawing into bullet jackets.

6. Chemical Composition

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

6.2 Limits may be established and analysis required for unnamed elements by agreement between manufacturer and purchaser.

6.3 Either copper or zinc may be taken as the difference between the sum of all elements analyzed and 100 %. When all elements in Table 1 are analyzed, the sum shall be 99.8 % min.

7. Grain Size of Annealed Tempers

7.1 Unless there is a prior agreement between the purchaser and supplier the grain size of class II cups shall be produced to have average grain size corresponding to the limits of the O5025 or O5040 tempers as specified in Table 2.

7.1.1 Grain size ranges other than those specified in Table 2 are to be established by agreement between manufacturer and purchaser.

7.2 Grain size ranges for other cups shall be established by agreement between manufacturer and purchaser.

TABLE 1 Chemical Requirements^A

Element	Composition, %
Copper	89.0–91.0
Lead, max	0.05
Iron, max	0.05
Zinc	remainder

^A If the presence of bismuth is suspected during analysis, further analysis shall be made to determine the concentration of this. If bismuth is found in excess of 0.006 %, the lot shall be rejected.

TABLE 2 Grain Size Requirements

Standard Designation (B 601)	Average Grain Size, mm		
	nominal	min	max
OS025	0.025	0.015	0.035
OS040	0.040	0.025	0.050

8. Dimensions, Mass, and Permissible Variations

8.1 All dimensions and tolerances of cups shall be as indicated on the drawings furnished with the purchase order or contract.

9. Workmanship, Finish, and Appearance

9.1 The cups shall be uniform in quality and shall be free of conditions which would interfere with the purpose for which the cups are intended.

10. Sampling

10.1 The lot size, portion size, and selection of pieces shall be as follows:

10.1.1 *Lot Size*—40 000 lb (18 144 kg) or fraction thereof.

10.1.2 *Portion Size*:

10.1.2.1 For chemical analysis—5 cups. In accordance with Practice E 255, drillings, millings, etc., shall be taken in approximately equal weight from each of the sample cups selected and combined into one composite sample. The minimum weight of the composite sample that is divided into three equal parts shall be 150 g. Each of the three equal parts shall be placed in a package and sealed: one for the seller, one for the purchaser, and one for an umpire.

10.1.2.2 For grain size determination—20 cups.

10.1.2.3 For the determination of dimensions—200 cups.

10.1.2.4 For the visual inspection—2000 cups.

10.1.2.5 For work tests—500 cups or 5000 cups, when and as required.

11. Number of Tests and Retests

11.1 *Visual Inspection*—Each cup in the sample shall be visually inspected.

11.1.1 *Major Defects*—Not more than 0.25 % of the cups in the sample shall contain the following major defects: scaly metal, deep scratches, laminations, slivers, laps, cracks, or wrinkles.

11.1.2 *Minor Defects*—Not more than 2 % of the cups in the sample shall contain the following minor defects: oily cup, greasy cup, dirty cup, oxidized cup, dented or bent edges, or scratches.

11.2 *Work Test*—If required by the purchase order or contract, one of the following work tests may be performed by the purchaser before approval of a lot for shipment:

11.2.1 Five hundred cups or more shall be subjected to a working test by processing them through the first drawing operation. The cups shall draw satisfactorily without showing defects that will cause them to be unsuitable for the purpose intended.

11.2.2 Five thousand cups shall be subjected to a working test by processing them satisfactorily into bullet jackets.

11.3 *Grain Size*—Each cup in the sample shall be tested.

11.3.1 If the material fails to pass the visual inspection examination or a work test, or if more than one specimen fails the grain size test, a retest shall be permitted on a sample double that of the original sample. The result of the retest or retests shall meet the specified requirements.

11.4 *Chemical Analysis*—An additional sample in accordance with 10.1.2.1 is permitted to be made and tested.

12. Specimen Preparation

12.1 For grain size measurements, either tangential grinding and polishing, or cutting, mounting, and polishing methods may be used to reach the zone (Fig. 1).

12.1.1 The test specimen shall be prepared in accordance with Practice E 3.

12.2 Specimens for chemical analysis shall be prepared in accordance with Practice E 255.

13. Test Methods

13.1 The properties and chemical composition enumerated in this specification shall, in case of disagreement, be determined in accordance with the following ASTM methods:

Test	ASTM Designation
Chemical analysis	E 478
Grain size	E 3, E112

13.2 The test method(s) used for determination of element(s) required by contractual or purchase order agreement shall be as agreed upon between the manufacturer and the purchaser.

13.3 Grain size measurements shall be made in a zone that is the approximate mid-point of the sidewall length and thickness of the cup as shown in Fig. 1. At least three

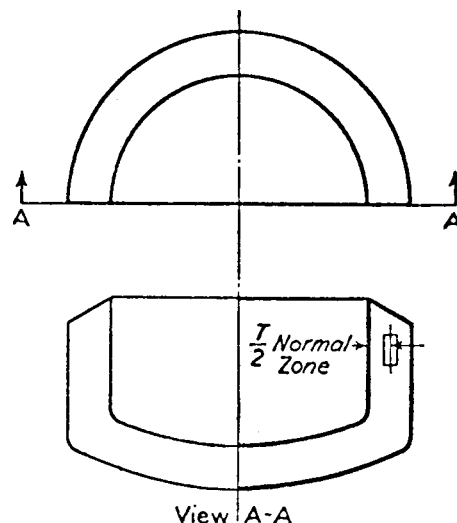


FIG. 1 Location of Areas to Be Examined for Grain Size in Bullet Jacket Cups