



# AEROSPACE MATERIAL SPECIFICATION

**Society of Automotive Engineers, Inc.**  
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

## AMS 7322C

Superseding AMS 7322B

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RINGS, SEALING, CAST TIN BRONZE  
80Cu - 19Sn

1. SCOPE:

1.1 Form: This specification covers a cast tin bronze in the form of sealing rings.

1.2 Application: Primarily for oil seal rings.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

ASTM E54 - Chemical Analysis of Special Brasses and Bronzes

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E54, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

Ø	min	max
Copper	78.00	82.00
Tin	18.00	19.50
Copper + Tin	99.0	--

3.2 Condition: As cast.

SAE Technical Board rules provide that: "All technical reports, including standards approved and prepared by SAE, are advisory only. Their use by anyone engaged in industry or trade or by governmental agencies is entirely voluntary. There is no agreement to adhere to SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

3.2.1 Rings shall be finished all over. Periphery shall be turned smooth, ID shall be turned smooth or ground, and sides shall be ground or lapped, unless otherwise specified. Markings resultant from hammering or rolling operations will be acceptable.

3.3 Properties: Rings shall conform to the following requirements:

∅ 3.3.1 Hardness: Shall be 85 - 92 HRB or equivalent, determined in accordance with ASTM E18.

3.3.2 Light-Tightness of Periphery: A ring, placed in a circular gage having ID equal to the gage diameter of the ring  $\pm 0.0005$  in. ( $\pm 0.013$  mm), shall have not less than 85% of the ring periphery light-tight, fuzzy light being considered as light-tight. A ring shall be rendered 100% light-tight by application of a radial load not greater than 5 lb (22.2 N) to the ID of the ring. Light source shall be a 40 W lamp.

3.4 Quality: Rings, as received by purchaser, shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to their performance.

3.5 Tolerances: Rings shall conform to the following tolerances, unless otherwise specified:

3.5.1 Squareness of Periphery: The ring periphery shall be square with the sides within 0.0005 in. (0.013 mm).

3.5.2 Wall Thickness: Shall be within the limits specified on the drawing but shall vary not more than 0.004 in. (0.10 mm) throughout the circumference of any one ring.

#### 4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of rings shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the rings conform to the requirements of this specification.

#### 4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed on the first-article shipment of a ring to a purchaser, when a change in material or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be in accordance with the following; a lot shall be all rings of one size from the same melt of alloy presented for vendor's inspection at one time:

∅ 4.3.1 Composition: One ring from each lot.

∅ 4.3.2 Hardness: Not less than five rings from each lot.

∅ 4.3.3 Light-Tightness of Periphery: Not less than one ring from each lot.

∅ 4.3.4 Tolerances: Not less than one ring from each lot.

#### 4.4 Approval:

- 4.4.1 Sample rings shall be approved by purchaser before rings for production use are supplied, unless such approval be waived.
- 4.4.2 Vendor shall use manufacturing procedures, processes, and methods of inspection on production rings which are essentially the same as those used on the approved sample rings. If any change is necessary in manufacturing procedures or processes, vendor shall submit for reapproval of the process a statement of the proposed changes in operations and, when requested, rings produced by the revised procedure. Production rings incorporating the revised operations shall not be shipped prior to receipt of reapproval.
- 4.5 Reports: The vendor of rings shall furnish with each shipment three copies of a report showing the results of tests to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, lot number, this specification number and its revision letter, part number, and quantity.
- 4.6 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the rings may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the rings represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification and Packaging:

- 5.1.1 Rings shall be packaged in such a manner as to ensure that the rings, during shipment and storage, will be protected against mechanical injury.
- 5.1.2 Each package of rings shall be marked to show not less than the following information:

RINGS, SEALING, CAST TIN BRONZE  
 AMS 7322C  
 PART NUMBER \_\_\_\_\_  
 LOT NUMBER \_\_\_\_\_  
 PURCHASE ORDER NUMBER \_\_\_\_\_  
 QUANTITY \_\_\_\_\_  
 MANUFACTURER'S IDENTIFICATION \_\_\_\_\_

- 5.1.3 Packages of rings shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the rings to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.
- 5.1.4 For direct U. S. Military procurement, packaging shall be in accordance with MIL-STD-794, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.1.1 and 5.1.3 will be acceptable if it meets the requirements of Level C.

6. ACKNOWLEDGMENT: A vendor shall mention this specification and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Rings not conforming to this specification or to authorized modifications will be subject to rejection.