



# AEROSPACE MATERIAL SPECIFICATION

AMS7322™

REV. H

Issued 1940-10  
Reaffirmed 1994-04  
Revised 2025-03

Superseding AMS7322G

Rings, Sealing, Cast Tin Bronze,  
80Cu - 19Sn,  
As Cast

(Composition similar to UNS C91300)

## RATIONALE

AMS7322H results from a Five-Year Review and update of this specification with changes to clarify that casting approval and reapproval actions are to be carried out by the cognizant engineering organization (see 4.2 and 4.4), update wording to prohibit unauthorized exceptions (see 5.1.2.1 and 8.4), relocate Definitions (see 2.3), update Applicable Documents (see Section 2), Composition (see 3.1), Hardness (see 3.3.1), and Ordering Information (see 8.5), and allow the use of the immediate prior specification revision (see 8.3).

## 1. SCOPE

### 1.1 Form

This specification covers a cast tin bronze in the form of sealing rings (see 8.5).

### 1.2 Application

This product has been used typically for oil seal rings, but usage is not limited to such product.

## 2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

### 2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

AS7766 Terms Used in Aerospace Metals Specifications

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<https://www.sae.org/standards/content/AMS7322H/>

## 2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, [www.astm.org](http://www.astm.org).

ASTM B824 General Requirements for Copper Alloy Castings

ASTM E18 Rockwell Hardness of Metallic Materials

## 2.3 Definitions

Terms used in AMS are defined in AS7766.

## 3. TECHNICAL REQUIREMENTS

### 3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM B824 or other analytical methods approved by the purchaser (see 8.5).

**Table 1 - Composition**

Element (see 3.1.1)	Min	Max
Copper (see 3.1.2)	79.0	82.0
Tin	18.0	20.0
Lead	0.25	
Zinc	0.25	
Iron	0.25	
Phosphorus	1.0	
Nickel (incl Cobalt) (see 3.1.3)	0.50	
Aluminum	0.005	
Sulfur	0.05	
Antimony	0.20	
Silicon	0.005	
Sum of Named Elements	99.4	--

3.1.1 These composition limits do not preclude the presence of other elements. Limits may be established, and analysis required, for unnamed elements by agreement between the manufacturer or supplier and purchaser.

3.1.2 Copper may be reported as the difference between the sum of all other elements determined and 100%.

3.1.3 In determining copper minimum, copper may be calculated as copper plus nickel (including cobalt).

### 3.2 Condition

As cast.

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. 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 to 92 HRB determined in accordance with ASTM E18.

### 3.3.2 Light-Tightness of Periphery

A ring, placed in a circular gauge having ID equal to the gauge diameter of the ring  $\pm 0.0005$  inch ( $\pm 0.012$  mm), shall have not less than 85% of the ring periphery light-tight, with 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 pounds (22 N) to the ID of the ring. Light source shall be a 40-W lamp.

### 3.4 Quality

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

### 3.5 Tolerances

Rings shall conform to the following tolerances:

#### 3.5.1 Squareness of Periphery

The ring periphery shall be square with the sides within 0.0005 inch (0.012 mm).

#### 3.5.2 Wall Thickness

Shall be within the limits specified on the drawing but shall vary not more than 0.004 inch (0.10 mm).

### 3.6 Any exceptions shall be authorized by the purchaser and reported as in 4.5.1.

## 4. QUALITY ASSURANCE PROVISIONS

### 4.1 Responsibility for Inspection

The producer of rings shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. The purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the rings conform to specified requirements.

### 4.2 Classification of Tests

All technical requirements are acceptance tests and preproduction tests and shall be performed prior to or on the first-article shipment of a ring to a purchaser, on each lot, when a change in material and/or processing requires reapproval by the cognizant engineering organization as in 4.4.2, and when the purchaser and/or cognizant engineering organization deems confirmatory testing to be required.

### 4.3 Sampling and Testing

Shall be in accordance with the following; a lot shall be all rings of one size from the same melt of alloy presented for the producer'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

One or more rings from each lot.

#### 4.3.4 Tolerances

One or more rings from each lot.

#### 4.4 Approval

4.4.1 Sample rings shall be approved by the cognizant engineering organization before rings for production use are supplied, unless such approval be waived by the cognizant engineering organization.

4.4.2 The producer shall use manufacturing procedures, processes, and methods of inspection on production rings that are essentially the same as those used on the approved sample rings. If necessary to make any change in manufacturing procedures or processes, the producer shall submit for reapproval to the cognizant engineering organization a statement of the proposed changes in operations and, when requested, sample rings. Production rings incorporating the revised operations shall not be shipped prior to receipt of reapproval by the cognizant engineering organization.

#### 4.5 Reports

The producer of rings shall furnish with each shipment a report stating that the product conforms to the composition and tolerances and showing the numerical results of tests on each inspection lot to determine conformance to the other technical requirements. This report shall include the purchase order number, lot number, AMS7322H, part number, size of rings or section identification number, and quantity. The report shall also report the identity of the manufacturer.

4.5.1 When material produced to this specification has exceptions authorized by the purchaser taken to the technical requirements listed in Section 3 (see 5.1.2.1), the report shall contain a statement "This material is certified as AMS7322H(EXC) because of the following exceptions:" and the specific exceptions shall be listed.

#### 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 two 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. Results of all tests shall be reported.

### 5. PREPARATION FOR DELIVERY

#### 5.1 Identifications 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 with not less than the following information:

Rings, sealing, cast tin bronze

AMS7322H

Part number

Lot number

Purchase order number

Quantity

Manufacturer's identification

5.1.2.1 When technical exceptions are taken (see 4.5.1), the material shall be identified with AMS7322H(EXC).

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.