



AEROSPACE MATERIAL SPECIFICATION

AMS4625™**REV. J**

Issued 1946-11
Reaffirmed 2016-03
Revised 2023-02

Superseding AMS4625H

Phosphor Bronze Bars, Rods, and Tubing

95Cu - 5Sn

Hard Temper

(Composition similar to UNS C51000)

RATIONALE

AMS4625J results from a Five-Year Review and update of this specification with changes to prohibit unauthorized exceptions (3.3.1.1, 3.6, 4.4.2, 5.1.1, 8.4), relocate definitions (2.3), update applicable documents (Section 2, 3.1, 4.3.2), test reference from embrittlement to residual stress based on test method description (3.3.2, 4.3.4), update sampling and testing (4.3.2, 4.3.3, 4.3.4), and allow the use of the immediate prior specification revision (8.3).

1. SCOPE

1.1 Form

This specification covers one type of bronze in the form of bars and rods of any size, and tubing over 1.00 inch (25.4 mm) in nominal outer diameter (see 8.5).

1.2 Application

For parts, such as bushings and bearings, requiring low coefficient of friction, moderate strength, and good electrical conductivity.

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.

AMS2221 Tolerances, Copper and Copper Alloy Bars and Rods

AMS2223 Tolerances, Copper and Copper Alloy Seamless Tubing

AS7766 Terms Used in Aerospace Metals Specifications

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2023 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
<http://www.sae.org>

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS4625J/>

SAE WEB ADDRESS:

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.

ASTM B154	Mercurous Nitrate Test for Copper Alloys
ASTM B249/B249M	General Requirements for Wrought Copper and Copper-Alloy Rod, Bar, Shapes and Forgings
ASTM B251/B251M	General Requirements for Wrought Seamless Copper and Copper-Alloy Tube
ASTM B601	Temper Designations for Copper and Copper Alloys—Wrought and Cast
ASTM B858	Ammonia Vapor Test for Determining Susceptibility to Stress Corrosion Cracking in Copper Alloys
ASTM E8/E8M	Tension Testing of Metallic Materials
ASTM E478	Chemical Analysis of Copper Alloys

2.3 Definitions

Terms used in AMS are defined in AS7766.

2.3.1 Copper temper designations are defined in ASTM B601.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM E478 or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element (3.1.1)	Min	Max
Tin	4.2	5.8
Phosphorus	0.03	0.35
Zinc	--	0.30
Iron	--	0.10
Lead	--	0.05
Copper	--	(see 3.1.2)
Sum of Named Elements (3.1.3)	99.5	--

- 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 "remainder," or as the difference between the sum of results for all elements and 100%, or as the result of direct analysis.
- 3.1.3 When all named elements in Table 1 are analyzed, the sum shall be 99.5% minimum, but such determination is not required for routine acceptance of each lot.

3.2 Condition

Cold finished, hard temper (H04) (see 2.3.1).

3.3 Properties

The product shall conform to the following requirements:

3.3.1 Tensile Properties

Shall be as specified in Table 2, determined in accordance with ASTM E8/E8M.

- 3.3.1.1 Mechanical property requirements for product outside the range shown in Table 2 shall be agreed upon between purchaser and producer and reported per 4.4.2 (see 8.5).

Table 2A - Minimum tensile properties, inch/pound units

Nominal Diameter or Distance Between Parallel Sides, Inches	Tensile Strength ksi	Elongation in 4D %
Rounds		
Up to 0.25, excl	80	12
Rounds and Hexagons		
0.25 to 0.50, incl	70	13
Over 0.50 to 1.00, incl	60	15
Over 1.00	55	18
Squares and Rectangles		
Nominal Thickness		
Up to 0.375, incl	60	10
Over 0.375	55	15
Tubing, Nominal OD		
Over 1.00	55	12

Table 2B - Minimum tensile properties, SI units

Nominal Diameter or Distance Between Parallel Sides, Millimeters	Tensile Strength MPa	Elongation in 4D %
Rounds		
Up to 6.4, excl	552	12
Rounds and Hexagons		
6.4 to 12.7, incl	483	13
Over 12.7 to 25.4, incl	414	15
Over 25.4	379	18
Squares and Rectangles		
Nominal Thickness		
Up to 9.52, incl	414	10
Over 9.52	379	15
Tubing, Nominal OD		
Over 25.4	379	12

3.3.2 Residual Stress Test

Specimens as in 4.3.4 shall withstand, without cracking, immersion in mercurous nitrate solution in accordance with ASTM B154, Procedure A, or the ammonia vapor test in accordance with ASTM B858.

3.4 Quality

The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the product.

3.5 Tolerances

Shall conform to the following:

3.5.1 Bars and Rods

AMS2221, as applicable to refractory alloys.

3.5.2 Tubing

AMS2223, as applicable to refractory alloys.

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.2.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

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

4.2 Classification of Tests

All technical requirements of this specification are acceptance tests and shall be performed on each lot.

4.3 Sampling and Testing

Shall be in accordance with the following:

4.3.1 Bars and Rods

ASTM B249/B249M.

4.3.2 Tubing

ASTM B251/B251M.

4.3.3 The tensile specimen shall be prepared in accordance with ASTM E8/E8M.

4.3.4 Specimens for the Residual Stress test shall be full cross-section of the product and shall have length of approximately 6 inches (152 mm), or twice the diameter, or least distance between parallel sides, whichever is greater.

4.4 Reports

The producer of the product shall furnish with each shipment a report showing the results of tests on each lot to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, lot number, AMS4625J, size, and quantity.