SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS4635 REV. F

Issued 1941-11
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Superseding AMS4635E

Aluminum Bronze Bars, Rods, and Forgings
87Cu – 9Al - 3Fe
Stress Relieved

(Composition similar to UNS C62300)

RATIONALE

AMS4635F results from a 5 Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers one type of aluminum bronze in the form of bars, rods, forgings, and forging stock.

1.2 Application

These products have been used typically for parts requiring strength and corrosion resistance at moderate temperatures, but usage is not limited to such applications.

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 724-776-4970 (outside USA), www.sae.org.

AMS2221 Tolerances, Copper and Copper Alloy Bars and Rods
AMS2808 Identification, Forgings

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
SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4635F

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 B 249/B 249M General Requirements for Wrought Copper and Copper-Alloy Rod, Bar, Shapes, and Forgings
ASTM E 10 Brinell Hardness of Metallic Materials
ASTM E 478 Chemical Analysis of Copper Alloys

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 478, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

Element (3.1.1)	min	max
Aluminum	8.5	10.0
Iron	2.0	4.0
Nickel (including Cobalt)	--	1.0
Tin	--	0.6
Manganese	--	0.50
Silicon	--	0.25
Copper (including Silver)		(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

The product shall be supplied in the following condition:

3.2.1 Bars and Rods

As rolled or extruded and stress relieved.

3.2.2 Forgings

Stress relieved (M12) (See 8.2).

3.2.3 Forging Stock

As ordered by the forging manufacturer.

3.3 Properties

The product shall conform to the following requirements:

3.3.1 Bars, Rods and Forgings

3.3.1.1 Hardness

Shall be 155 to 190 HB/10/1000, or equivalent, determined in accordance with ASTM E 10 on the surface except on rounds where a flat, as necessary for accuracy, may be made.

3.3.2 Forging Stock

As agreed upon by purchaser and vendor.

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 Tolerance

Bars and rods shall conform to AMS2221 as applicable to refractory alloys.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The vendor of the product shall supply all samples for vendor'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 are acceptance tests and shall be performed on each lot.

4.3 Sampling and Testing

4.3.1 Bars and Rods

Shall be in accordance with ASTM B 249/B 249M.

4.3.2 Forgings and Forging Stock

As agreed upon by purchaser and vendor.

4.4 Reports

4.4.1 The vendor of bars, rods, and forgings shall furnish with each shipment a report showing the results of tests for chemical composition and hardness of each lot. This report shall include the purchase order number, lot number, AMS4635F, size, and quantity. If forgings are supplied, the part number and the size and melt source of stock used to make the forgings shall also be included.

4.4.2 The vendor of forging stock shall furnish with each shipment a report showing the results of tests for chemical composition of each lot. This report shall include the purchase order number, lot number, AMS4635F, size and quantity.

4.5 Resampling and Retesting

If any specimen used in the above tests fails to meet the specified requirements, disposition of the product 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 product represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY

5.1 Identification

The product shall be identified as follows:

5.1.1 Bars and Rods

Individual pieces or bundles shall have attached a durable tag or label marked with the purchase order number, AMS4635F, lot number, and nominal size or shall be boxed and the box marked with the same information.

5.1.2 Forgings

Shall be in accordance with AMS2808.

5.1.3 Forging Stock

As agreed upon by purchaser and vendor.

5.2 Packaging

The product 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 product to endure carrier acceptance and safe delivery.

6. ACKNOWLEDGMENT

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

7. REJECTIONS

Products not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.