

AEROSPACE MATERIAL SPECIFICATION

SAE

AMS 4319

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Submitted for recognition as an American National Standard

ALUMINUM ALLOY, ROLLED OR COLD FINISHED BARS AND RODS
12.2Si - 1.0Mg - 0.90Cu - 0.90Ni (4032-T651)
Solution Heat Treated, Stress-Relieved, and Artificially Aged
UNS A94032

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of bars and rods.

1.2 Application:

These products have been used typically for parts requiring wear resistance and moderate strength where limited formability is acceptable, but usage is not limited to such applications.

- 1.2.1 These products cover size range of 0.875 to 3.500 inches (22.22 to 88.90 mm) in nominal diameter or least distance between parallel sides.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

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2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

- AMS 2201 Tolerances, Aluminum and Aluminum Alloy Bar, Rod, Wire, and Forging Stock, Rolled or Cold Finished
- MAM 2201 Tolerances, Metric, Aluminum and Aluminum Alloy Bar, Rod, Wire, and Forging Stock, Rolled, Drawn, or Cold Finished
- AMS 2355 Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
- MAM 2355 Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings, Metric (SI) Units
- AMS 2811 Identification, Aluminum and Magnesium Alloy Wrought Products

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-H-6088 Heat Treatment of Aluminum Alloys

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS 2355 or MAM 2355.

TABLE 1 - Composition

Element	min	max
Silicon	11.0	13.5
Magnesium	0.8	1.3
Copper	0.50	1.3
Nickel	0.50	1.3
Iron	--	1.0
Zinc	--	0.25
Chromium	--	0.10
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

3.2 Condition

The product shall be solution heat treated, stress-relieved by stretching to produce a nominal permanent set of 1.5% but not less than 1% nor more than 3%, and artificially aged. Heat treatments shall be performed in accordance with conditions shown in MIL-H-6088 for 4032-T6 die forgings.

- 3.2.1 Bars and rods stress-relieved by stretching shall receive no further straightening operations after stretching unless specifically authorized by purchaser.

3.3 Properties:

Product shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355:

- 3.3.1 Tensile Properties: Shall be as shown in Table 2 for product 0.875 to 3.500 inches (22.22 to 88.90 mm), inclusive, in nominal diameter or least distance between parallel sides.

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	52.0 ksi (358 MPa)
Yield Strength at 0.2% Offset	48.0 ksi (331 MPa)
Elongation in 2 Inches (50.8 mm) or 4D	4%

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 all applicable requirements of AMS 2201 or MAM 2201.

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 performing 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 requirements of this specification.

4.2 Classification of Tests:

Tests for all technical requirements are acceptance tests and, except for composition, shall be performed on each lot.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2355 or MAM 2355.

4.4 Reports:

The vendor of the product shall furnish with each shipment a report stating that the product conforms to the chemical composition and showing the results of tests on each lot to determine conformance to the other technical requirements. This report shall include the purchase order number, lot number, AMS 4319, size, and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2355 or MAM 2355.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

Shall be in accordance with AMS 2811.

5.2 Packaging:

5.2.1 The product shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to handling, packaging, and transportation of the product to ensure carrier acceptance and safe delivery.

5.2.2 For direct U.S. Military procurement, packaging shall be in accordance with ASTM B 660, Level C, unless Level A is specified in the request for procurement.

6. ACKNOWLEDGMENT:

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

7. REJECTIONS:

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