AEROSPACE MATERIAL SPECIFICATION

AMS4128™	REV. E

Issued 1969-11
Reaffirmed 2013-09
Revised 2021-06

Superseding AMS4128D

Aluminum Alloy Bars, Rolled or Cold Finished
1.0Mg - 0.60Si - 0.30Cu - 0.20Cr (6061-T451)
Solution Heat Treated and Stress Relieved by Stretching
(Composition similar to UNS A96061)

RATIONALE

AMS4128E is the result of a Five-Year Review and update of this specification with changes to prohibit unauthorized exceptions (3.3.3, 3.6, 8.5, 8.7) adds 5D elongation for SI unit testing (Table 2, Table 3, 8.6), and allows the use of the immediate prior revision (8.4) and updates form (1.1), references (2.1, 2.3), reporting (4.4.1), and identification (5.1.1).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of bars and rods 0.500 inch (12.7 mm) to 8.000 inches (203.2 mm) in nominal diameter or least difference between parallel sides and up to 50 square inches (322.6 square centimeters) in cross-sectional area (see 8.7).

1.2 Application

These bars have been used typically for parts where moderate ductility, formability, and response to precipitation heat treatment are required and where distortion during machining must be minimized, 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 form 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.

AMS2355 Quality Assurance, Sampling and Testing, Aluminum Alloys and Magnesium Alloy Wrought Products (Except Forging Stock), and Rolled, Forged, or Flash Welded Rings

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

ARP1917 Clarification of Terms Used in Aerospace Metals Specifications

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**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4128E

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 B660 Packaging/Packing of Aluminum and Magnesium Products

ASTM B666/B666M Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Accredited Publications

Copies of these documents are available online at http://webstore.ansi.org/.

ANSI H35.1/H35.1M Temper Designation

ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products

ANSI H35.2M Dimensional Tolerances for Aluminum Mill Products (Metric)

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2355.

Table 1 - Composition

Element	Min	Max
Silicon	0.40	0.8
Iron	--	0.7
Copper	0.15	0.40
Manganese	--	0.15
Magnesium	0.8	1.2
Chromium	0.04	0.35
Zinc	--	0.25
Titanium	--	0.15
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

Rolled or cold finished, as ordered, solution heat treated in accordance with AMS2772, and stress-relieved by stretching to produce a nominal permanent set of 1-1/2% but not less than 1% nor more than 3% to produce the -T451 temper (refer to ANSI H35.1/H35.1M).

3.2.1 Product shall receive no further straightening operations after stretching, unless specifically authorized by purchaser.

3.3 Properties

Product 0.500 inch (12.7 mm) to 8.000 inches (203.2 mm) in nominal diameter or least distance between parallel sides shall conform to the following requirements, determined in accordance with AMS2355 on the mill produced size.

3.3.1 As Solution Heat Treated and Stress-Relieved by Stretching

3.3.1.1 Tensile Properties

Shall be as shown in Table 2:

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

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation % In 2 Inches or 4D
0.500 to 8.000(1)	30.0	16.0	18

(1) For bar maximum cross-sectional area is 50 square inches.

Table 2B - Minimum tensile properties, SI units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation % in 50 mm or 4D	Elongation % in 5.65√A or 5D
Over 12.7 to 203.2(1)	205	110	18	16

(1)For bar maximum cross-sectional area is 322.6 cm^2.

3.3.2 Response to Temper Conversion

The product shall, after precipitation heat treatment in accordance with AMS2772 to the -T62 temper, have the properties shown in Table 3. In this case, -T62 temper is the accepted designation demonstrating response to heat treatment when starting from -T451 temper. For engineering drawings, the -T451 product, when precipitation heat treated similarly with the heat treated product, would be described as -T651.

3.3.2.1 Tensile Properties

Shall be as shown in Table 3:

Table 3A - Minimum tensile properties, inch/pound units

Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation % in 2 Inches 4D
42.0	35.0	10

Table 3B - Minimum tensile properties, SI units

Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation % in 50mm or 4D	Elongation % in 5.65√A or 5D
290	241	10	9

3.3.3 Mechanical property requirements for product outside the size range covered by 1.1 shall be agreed upon between purchaser and producer and reported per 4.4.1.

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 ANSI H35.2 or ANSI H35.2M.

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.

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 specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

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 AMS2355.

4.4 Reports

The vendor of bars 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 acceptance test requirements. This report shall include the purchase order number, lot numbers, AMS4128E, size, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.

4.4.1 When material produced to this specification is beyond the sizes allowed in the scope or tables, or other exceptions are taken to the technical requirements listed in Section 3, the report shall contain a statement "This material is certified as AMS4128E(EXC) because of the following exceptions:" and the specific exceptions shall be listed (also see 5.1.1).

4.5 Resampling and Retesting

Shall be in accordance with AMS2355.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with ASTM B666/ASTM B666M.

5.1.1 When technical exceptions are taken (see 4.4.1), the material shall be identified with AMS4128(EXC).

5.2 Packaging

The product shall be prepared for shipment in accordance with ASTM B660 and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the product to ensure 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.