SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS4130M

Issued 1940-03
Revised 2001-04
Reaffirmed 2006-04
Noncurrent 2009-08

Superseding AMS4130L

Aluminum Alloy Die Forgings
4.4Cu – 0.85Si – 0.80Mn (2025-T6)
Solution and Precipitation Heat Treated

(Composition similar to UNS A 92025)

RATIONALE

AMS4130M results from a Five Year Review and update of this specification. A survey of producers found no new designs being quoted with this material/product. Accordingly, this document has been designated Non-Current..

NONCURRENCY NOTICE

This specification has been declared “NONCURRENT” by the Aerospace Materials Division, SAE, as of August 2009. It is recommended, therefore, that this specification not be specified for new designs.

“NONCURRENT” refers to those materials which may have been widely used previously and which may be required for production or processing of existing designs in the future. The Aerospace Materials Division, however, does not recommend these specifications for future use in new designs.

“NONCURRENT” specifications are available from SAE upon request.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4130M

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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4130L

Issued MAR 1940
Revised APR 2001
Reaffirmed APR 2006

Superseding AMS 4130K

Aluminum Alloy Die Forgings
4.4Cu - 0.85Si - 0.80Mn (2025-T6)
Solution and Precipitation Heat Treated

(Composition similar to UNS A 92025)

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of die forgings and forging stock.

1.2 Application:

These products have been used typically for complex-shaped parts requiring moderate strength and good forgeability of the material, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause these forgings to become susceptible to stress-corrosion cracking; ARP823 recommends practices to minimize such conditions.

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 canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

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

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 2772	Heat Treatment of Aluminum Alloy Raw Materials
AMS 2808	Identification, Forgings

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.1 (Continued):

ARP823 Minimizing Stress Corrosion in Wrought Heat Treatable Aluminum Alloy Products

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 594 Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications
ASTM B 660 Packing/Packaging of Aluminum and Magnesium Products
ASTM E 1417 Liquid Penetrant Examination

2.3 ANSI Publications:

Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

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 AMS 2355 or MAM 2355:

TABLE 1 - Composition

Element	min	max
Silicon	0.50	1.2
Iron	--	1.0
Copper	3.9	5.0
Manganese	0.40	1.2
Magnesium	--	0.05
Chromium	--	0.10
Zinc	--	0.25
Titanium	--	0.15
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition:

The product shall be supplied in the following condition:

3.2.1 Forgings: Solution and precipitation heat treated in accordance with AMS 2772 to the T6 temper.

3.2.2 Forging Stock: As ordered by the forging manufacturer.

3.3 Properties:

The product shall conform to the following requirements determined in accordance with AMS 2355 or MAM 2355 on the mill produced size:

3.3.1 Forgings:

3.3.1.1 Tensile Properties: Shall be as follows:

3.3.1.1.1 Test Specimens: Specimens, machined from separately-forged coupons or from forging stock representing the forgings and, in either case, heat treated with the forgings or machined from prolongations on heat treated forgings, shall have the properties specified in Table 2.

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	55.0 ksi (379 MPa)
Yield Strength at 0.2% Offset	33.0 ksi (228 MPa)
Elongation in 4D	16%

3.3.1.1.2 Forgings, With Grain Flow: Specimens, machined from forgings not over 4 inches (102 mm) in nominal thickness with axis of specimen in area of gage length varying not more than 15 degrees from parallel to the forging flow lines, shall have properties as specified in Table 2 except that elongation may be as low as 11%.

3.3.1.1.3 Forgings, Across Grain Flow: Specimens, machined from forgings with the axis of the specimen in the area of the gage length varying not more than 15 degrees from perpendicular to the forging flow lines, shall have the properties specified in Table 3:

TABLE 3 - Minimum Tensile Properties

Property	Value
Tensile Strength	52.0 ksi (359 MPa)
Yield Strength at 0.2% Offset	32.0 ksi (221 MPa)
Elongation in 4D	8%

3.3.1.2 Hardness: Shall be not lower than 100 HB/10/500 or 106 HB/10/1000, or equivalent, but forgings shall not be rejected on the basis of hardness if the tensile property requirements are met on the material exhibiting the nonconforming hardness.

3.3.2 Forging Stock: When a sample of stock is forged to a test coupon having a degree of mechanical working not greater than the forging and heat treated in the same manner as the forgings, tensile specimens taken from the heat treated coupon shall conform to the requirements of 3.3.1.1.1 and 3.3.1.2. If specimens taken from the stock after heat treatment in the same manner as forgings conform to the requirements of 3.3.1.1.1 and 3.3.1.2, the tests shall be accepted as equivalent to tests of a forged coupon.

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.

3.4.1 When specified, each die forging shall be etched to produce a surface suitable for visual inspection. Surface shall be evaluated for defects and, if defects can be removed so they do not appear on re-etching and if the required section thickness is maintained, the forgings are acceptable.

3.4.1.1 When approved by purchaser, a sampling plan may be used in lieu of etching each forging.

3.4.2 When specified, forgings shall be subjected to fluorescent penetrant inspection in accordance with ASTM E 1417 and/or to ultrasonic inspection in accordance with ASTM B 594. Standards for acceptance shall be as agreed upon by purchaser and vendor.

3.4.3 Grain flow of die forgings, except in areas which contain flash-line end grain, shall follow the general contour of the forgings, showing no evidence of re-entrant grain flow.

3.5 Tolerances:

Forging stock shall conform to all applicable requirements of ANSI H35.2 or ANSI H35.2M.

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:

4.2.1 Acceptance Tests: The following requirements are acceptance tests and, except for composition, shall be performed on each lot: