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400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 4135M

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Superseding AMS 4135L

ALUMINUM ALLOY FORGINGS
4.5Cu - 0.85Si - 0.80Mn - 0.50Mg (2014-T6)
Solution and Precipitation Heat Treated

UNS A92014

1. Superseding Specification: The requirements of this specification are embodied in the latest issue of AMS 4133, ALUMINUM ALLOY FORGINGS, 4.5Cu - 0.85Si - 0.80Mn - 0.50Mg (2014-T6), Solution and Precipitation Heat Treated. The requirements of the latest issue of AMS 4133 shall be fulfilled whenever reference is made to this specification AMS 4135.

This specification is under the jurisdiction of AMS Committee "D".

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ALUMINUM ALLOY FORGINGS
4.5Cu - 0.85Si - 0.80Mn - 0.50Mg (2014-T6)
Solution and Precipitation Heat Treated

1. SCOPE:

- 1.1 Form: This specification covers an aluminum alloy in the form of die forgings, hand forgings, rolled rings, and stock for forging or rolled rings.
- 1.2 Application: Primarily for applications, such as aircraft structural members, requiring material with moderately high strength. Certain design and processing procedures may cause these forgings to become susceptible to stress corrosion cracking; ARP 823 recommends practices to minimize such conditions.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) and Aerospace Recommended Practices (ARP) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

- 2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2201 - Tolerances, Aluminum and Aluminum Alloy Bar, Rod, Wire, and Forging Stock, Rolled or Drawn
AMS 2350 - Standards and Test Methods
AMS 2375 - Control of Forgings Requiring First Article Approval
AMS 2630 - Ultrasonic Inspection
AMS 2645 - Fluorescent Penetrant Inspection
AMS 2808 - Identification, Forgings

2.1.2 Aerospace Recommended Practices:

ARP 823 - Minimizing Stress Corrosion Cracking in Wrought Heat Treatable Aluminum Alloy Products

- 2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM B557 - Tension Testing of Wrought and Cast Aluminum- and Magnesium-Alloy Products
ASTM E10 - Brinell Hardness of Metallic Materials
ASTM E34 - Chemical Analysis of Aluminum and Aluminum Alloys

- 2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

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2.3.2 Military Specifications:

MIL-H-6088 - Heat Treatment of Aluminum Alloys

2.3.3 Military Standards:

MIL-STD-649 - Aluminum and Magnesium Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E34, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Copper	3.9	5.0
Silicon	0.50	1.2
Manganese	0.40	1.2
Magnesium	0.20	0.8
Iron	--	0.7
Zinc	--	0.25
Titanium	--	0.15
Chromium	--	0.10
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

3.2 Condition: The product shall be supplied in the following condition:

3.2.1 Forgings and Rolled Rings: Solution and precipitation heat treated in accordance with
Ø MIL-H-6088.

3.2.2 Stock for Forgings or Rolled Rings: As ordered by the forging or rolled ring manufacturer.

3.3 Properties: The product shall conform to the following requirements:

Ø 3.3.1 Tensile Properties: Shall be as follows; determined in accordance with ASTM B557.

3.3.1.1 Die Forgings:

3.3.1.1.1 Test Specimens: Test 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 die forgings, shall have the following properties:

Tensile Strength, min	65,000 psi (448 MPa)
Yield Strength at 0.2% Offset, min	55,000 psi (379 MPa)
Elongation in 4D, min	10%

3.3.1.1.2 With Grain Flow: Test specimens machined from forgings, with the axis of the specimens in the area of the gage length varying not more than 15 deg from parallel to the forging flow lines shall have the properties specified in 3.3.1.1.1 except that elongation may be as low as 7%.