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400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4323

Issued 10-1-88

Submitted for recognition as an American National Standard

ALUMINUM ALLOY HAND FORGINGS
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T7452)
Solution Heat Treated, Stress Relieved, and Precipitation Heat Treated

UNS A97075

1. SCOPE:

1.1 Form: This specification covers an aluminum alloy in the form of hand forgings procured to inch/pound dimensions. MAM 4323 is the equivalent, specified in SI (metric) units, of this AMS.

1.2 Application: Primarily for parts requiring a high level of mechanical properties and good resistance to stress-corrosion cracking.

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

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2355 - Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings
AMS 2375 - Control of Forgings Requiring First Article Approval
AMS 2808 - Identification, Forgings

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

ASTM B594 - Ultrasonic Inspection of Aluminum-Alloy Products for Aerospace Applications

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

2.3.1 Military Specifications:

MIL-H-6088 - Heat Treatment of Aluminum Alloys

2.3.2 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 in accordance with AMS 2355:

	min		max
Zinc	5.1	-	6.1
Magnesium	2.1	-	2.9
Copper	1.2	-	2.0
Chromium	0.18	-	0.28
Iron	--		0.50
Silicon	--		0.40
Manganese	--		0.30
Titanium	--		0.20
Other Impurities, each	--		0.05
Other Impurities, total	--		0.15
Aluminum	remainder		

3.2 Condition: Solution heat treated, stress relieved by compressing to produce a permanent set of 1 - 5%, and precipitation heat treated. Heat treatments shall be performed in accordance with MIL-H-6088 but cycles may require modification to achieve required properties.

3.3 Properties: Forgings shall conform to the following requirements, determined in accordance with AMS 2355:

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3.3.1 Tensile Properties: Shall be as specified in Table I, determined on specimens machined from forgings not over 6 inches in nominal as-forged thickness and having an essentially rectangular or square cross-section not exceeding 156 sq inch in area and heat treated in the indicated thickness.

TABLE I

Nominal Thickness At Time of Heat Treatment Inches	Specimen Orientation	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation in 4D %, min
Up to 2, incl	Longitudinal	71,000	61,000	9
	Long Trans.	69,000	58,000	5
Over 2 to 3, incl	Longitudinal	71,000	61,000	9
	Long Trans.	69,000	58,000	5
	Short Trans.	67,000	54,000	4
Over 3 to 4, incl	Longitudinal	69,000	58,000	9
	Long Trans.	68,000	56,000	5
	Short Trans.	66,000	51,000	4
Over 4 to 5, incl	Longitudinal	65,000	54,000	8
	Long Trans.	64,000	52,000	5
	Short Trans.	63,000	49,000	4
Over 5 to 6, incl	Longitudinal	63,000	51,000	8
	Long Trans.	61,000	49,000	5
	Short Trans.	60,000	46,000	4

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3.3.1.1 Tensile property requirements for forgings having configurations or size limitations not covered by 3.3.1 shall be as specified on the drawing or as agreed upon by purchaser and vendor.

3.3.2 Hardness: Should be not lower than 135 HB/10/500 or 140 HB/10/1000 but forgings shall not be rejected on the basis of hardness if the tensile property requirements are met.

3.3.3 Stress-Corrosion Resistance: Forgings shall meet the conductivity test of 3.3.3.1 and shall exhibit no evidence of stress-corrosion cracking when tested in accordance with 3.3.3.2. The test of 3.3.3.2 need not be performed on forgings meeting the requirements of 3.3.3.1.1 or 3.3.3.1.2.

3.3.3.1 Conductivity: Shall be as follows, determined on the surface of the sample:

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3.3.3.1.1 If the conductivity is 40.0% IACS (International Annealed Copper Standard) or higher and longitudinal tensile properties meet specified requirements, the forgings are acceptable.

3.3.3.1.2 If the conductivity is 38.0 - 39.9% IACS, if the longitudinal tensile properties meet specified properties, and if the longitudinal yield strength does not exceed the specified minimum by more than 11,900 psi, the forgings are acceptable.

3.3.3.1.3 If the conductivity is between 38.0 - 39.9% IACS and longitudinal yield strength exceeds the specified minimum value by more than 11,900 psi, the forgings shall be given additional precipitation heat treatment. If, after such treatment, the forgings meet the requirements of 3.3.1 and 3.3.3.1.1 or 3.3.3.1.2, the forgings are acceptable.

3.3.3.1.4 If the conductivity is below 38.0% IACS, the forgings are not acceptable but may be reheat treated or additionally aged to meet requirements.

3.3.3.2 Stress-Corrosion Cracking Resistance: Specimens cut from forgings shall show no evidence of stress-corrosion cracking when stressed in the short-transverse direction at 35,000 psi for forgings 3.0 inches and under in least section thickness or to 50% of the specified minimum longitudinal yield strength for forgings over 3.0 inches in section thickness.

3.4 Quality: Forgings, 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 forgings.

3.4.1 All forgings shall be subjected to ultrasonic inspection in accordance with ASTM B594 and shall meet Ultrasonic Class A.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of forgings shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the forgings conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1), tensile properties (3.3.1), conductivity (3.3.3.1), and ultrasonic soundness (3.4.1) are classified as acceptance tests and shall be performed on each lot.

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