SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4323B

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Superseding AMS 4323A

Aluminum Alloy, Hand Forgings
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T7452)
Solution Heat Treated, Stress Relieved, and Precipitation Heat Treated
(Composition similar to UNS A97075)

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of hand forgings.

1.2 Application:

These forgings have been used typically for parts requiring a high level of mechanical properties and good resistance to stress-corrosion cracking, 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 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 cancelled 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 or www.sae.org.

AMS 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
AMS 2772	Heat Treatment of Aluminum Alloy Wrought Materials
AMS 2808	Identification, Forgings
AS1990	Aluminum Alloy Tempers

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM B 594	Ultrasonic Inspection of Aluminum-Alloy Products for Aerospace Applications
ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM G 47	Determining Susceptibility to Stress Corrosion Cracking of 2XXX and 7XXX 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.

TABLE 1 - Composition

Element	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 to 5%, and precipitation heat treated (See 8.3) to the T7452 temper (see AS1990). Heat treatments shall be performed in accordance with AMS 2772.

3.3 Properties:

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

3.3.1 Tensile Properties: Shall be as specified in Table 2, determined on specimens machined from forgings not over 6 inches (152 mm) in nominal as-forged thickness and having an essentially rectangular or square cross-section not exceeding 156 square inches in area and heat treated in the indicated thickness.

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units

Nominal Thickness at Time of Heat Treatment Inches	Specimen Orientation	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 4D %
Up to 2, incl	Longitudinal	71.0	61.0	9
	Long Trans.	69.0	58.0	5
Over 2 to 3, incl	Longitudinal	71.0	61.0	9
	Long Trans.	69.0	58.0	5
	Short Trans.	67.0	54.0	4
Over 3 to 4, incl	Longitudinal	69.0	58.0	9
	Long Trans.	68.0	56.0	5
	Short Trans.	66.0	51.0	4
Over 4 to 5, incl	Longitudinal	65.0	54.0	8
	Long Trans.	64.0	52.0	5
	Short Trans.	63.0	49.0	4
Over 5 to 6, incl	Longitudinal	63.0	51.0	8
	Long Trans.	61.0	49.0	5
	Short Trans.	60.0	46.0	4

TABLE 2B - Minimum Tensile Properties, SI Units

Nominal Thickness at Time of Heat Treatment Millimeters	Specimen Orientation	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 4D %
Up to 50, incl	Longitudinal	490	420	9
	Long Trans.	476	400	5
Over 50 to 75, incl	Longitudinal	490	420	9
	Long Trans.	476	400	5
	Short Trans.	762	372	4
Over 75 to 100, incl	Longitudinal	476	400	9
	Long Trans.	469	386	5
	Short Trans.	455	352	4
Over 100 to 125, incl	Longitudinal	448	372	8
	Long Trans.	441	379	5
	Short Trans.	434	358	4
Over 125 to 150, incl	Longitudinal	434	351	8
	Long Trans.	420	338	5
	Short Trans.	414	317	4

3.3.1.1 The axis of longitudinal specimens in area of gage length shall vary not more than 15 degrees from parallel to the forging flow lines. The axis of transverse specimens in area of gage length shall vary not more than 15 degrees from perpendicular to the forging flow lines.

3.3.2 Stress-Corrosion Resistance: Forgings shall meet the conductivity test of 3.3.2.1 and shall exhibit no evidence of stress-corrosion cracking when tested in accordance with 3.3.2.2. The test of 3.3.2.2 need not be performed on forgings meeting the requirements of 3.3.2.1.1 or 3.3.2.1.2.

3.3.2.1 Conductivity: Shall be as follows, determined in accordance with AMS 2355:

3.3.2.1.1 If the conductivity is 40.0% IACS (International Annealed Copper Standard) (23.2 MS/m) or higher and longitudinal tensile properties meet specified requirements, the forgings are acceptable.

3.3.2.1.2 If the conductivity is 38.0 to 39.9% IACS (22.0 to 23.1 MS/m), if the longitudinal tensile properties meet specified properties, and if the longitudinal yield strength does not exceed the specified minimum by more than 11.9 ksi, the forgings are acceptable.

3.3.2.1.3 If the conductivity is between 38.0 to 39.9% IACS (22.0 to 23.1 MS/m) and longitudinal yield strength exceeds the specified minimum value by more than 11.9 ksi, the forgings shall be given additional precipitation heat treatment. If, after such treatment, the forgings meet the requirements of 3.3.1 and 3.3.2.1.1 or 3.3.2.1.2, the forgings are acceptable.

3.3.2.1.4 If the conductivity is below 38.0% IACS (22.0 MS/m), the forgings are not acceptable but may be reheat treated to meet specified requirements.

3.3.2.2 Stress-Corrosion Cracking Resistance: Specimens cut from forgings shall show no evidence of stress-corrosion cracking when stressed in the short-transverse direction at 35.0 ksi 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 as tested in accordance with ASTM G 47..

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 B 594 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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the forgings conform to specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Composition (3.1), tensile properties (3.3.1), stress corrosion resistance (3.3.2), and ultrasonic soundness (3.4.1) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests: Stress-corrosion cracking resistance (3.3.2.2) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2355.

4.4 Reports:

The vendor of forgings shall furnish with each shipment a report stating that the forgings conform to the chemical composition and ultrasonic inspection 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, inspection lot number(s), AMS 4323B, size, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2355.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

Shall be in accordance with AMS 2808.

5.2 Protective Treatment:

Product shall be protected from damage during storage and shipment by a method determined by vendor unless specified by purchaser. An example of a typical protective method includes but is not limited to oiling of the surface.