SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4322A

Issued JUL 1992
Cancelled JUL 2005

Superseding AMS 4322

Aluminum Alloy, Die Forgings
4.0Mg - 1.3Li - 1.2C - 0.45O (AL-905XL),
Mechanically Alloyed, As-Fabricated

CANCELLATION NOTICE

This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of July 2005. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications indicating that it has been "CANCELLED".

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1. SCOPE:

1.1 Form:

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

1.2 Application:

These forgings have been used typically for applications requiring moderate triaxial strength, low density, high modulus, and good resistance to a combination of stress-corrosion cracking, but usage is not limited to such applications.

1.2.1 This oxide and carbide dispersion-strengthened aluminum alloy is not heat-treatable. Control of forging parameters is required to achieve the required properties.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

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

AMS 2808 Identification, Forgings
AMS 2355 Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings
MAM 2355 Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings, Metric (SI) Units

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products

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
Magnesium	3.7	4.2
Lithium	1.2	1.4
Carbon	1.0	1.3
Oxygen	0.2	0.7
Iron		0.3
Silicon		0.2
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: As-forged.

3.2.2 Forging stock: As agreed upon by purchaser and vendor.

3.3 Properties:

The product shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355.

3.3.1 Tensile Properties: Shall be as follows:

3.3.1.1 Die Forgings:

3.3.1.1.1 With Grain Flow: Specimens, machined from forgings 3 inches (76 mm) and under in nominal thickness or from prolongations on such forgings, with axis of specimen in area of gage length varying not more than 15 degrees from parallel to forging flow lines, shall have the properties shown in Table 2 or Table 3.

3.3.1.1.1.1 Forgings 0.750 Inch (19.05 mm) and Under In Nominal Thickness:

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	64.0 ksi (441 MPa)
Yield Strength at 0.2% Offset	53.0 ksi (365 MPa)
Elongation in 4D	7%

3.3.1.1.1.2 Forgings Over 0.750 to 3.0 Inches (19.05 to 76 mm), Inclusive, in Nominal Thickness:

TABLE 3 - Minimum Tensile Properties

Property	Value
Tensile Strength	69.0 ksi (476 MPa)
Yield Strength at 0.2% Offset	58.0 ksi (400 MPa)
Elongation in 4D	7%

3.3.1.1.2 Across Grain Flow: Specimens, machined from forgings 3 inches (76 mm) and under in nominal thickness or from prolongations on such forgings, with axis of specimen in area of gage length varying not more than 15 degrees from perpendicular to forging flow lines, shall have the properties shown in Table 4.

TABLE 4 - Minimum Tensile Properties

Property	Value
Tensile Strength	65.0 ksi (448 MPa)
Yield Strength at 0.2% Offset	53.0 ksi (365 MPa)
Elongation in 4D	5%

3.3.1.2 Other Forgings: Tensile property requirements for hand, upset, or die forgings over 3 inches (76 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2 Stress-Corrosion Resistance: Specimens, cut from forgings 0.750 inch (19.05 mm) and over in nominal thickness, shall show no evidence of stress-corrosion cracking when stressed in the short-transverse direction (perpendicular to grain flow) to 75% of the specified minimum longitudinal (parallel to grain flow) yield strength.

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.

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 performing 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 requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for composition (3.1) and tensile properties (3.3.1) are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests for stress-corrosion resistance (3.3.2) are periodic tests 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 or MAM 2355.

4.4 Reports:

4.4.1 The vendor of forgings shall furnish with each shipment a report stating that the composition conforms to the requirements of this specification and showing the results of tests on each lot of forgings to determine conformance to the tensile property requirements. This report shall include the purchase order number, lot number, AMS 4322, size or part number, and quantity.