



AEROSPACE MATERIAL SPECIFICATION

AMS4215™

REV. J

Issued	1961-01
Reaffirmed	2013-05
Revised	2020-02

Superseding AMS4215H

Aluminum Alloy, Castings
5.0Si - 1.2Cu - 0.50Mg (C355.0-T6)
Solution and Precipitation Heat Treated
(Composition similar to UNS A33550)

RATIONALE

AMS4215J prohibits unauthorized exceptions (3.8), revises composition (3.1) to delete withdrawn standards, quality (3.7.1), and reports (4.5.1), and results from a Five-Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of sand, permanent mold, composite mold, and investment castings.

1.2 Application

These castings have been used typically for components requiring high strength at room and elevated temperatures, but usage is not limited to such application.

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 International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2175	Castings, Classification and Inspection of
AMS2694	In-Process Welding of Castings
AMS2771	Heat Treatment of Aluminum Alloy Castings
AMS2804	Identification Castings
ARP1917	Clarification of Terms Used in Aerospace Metals Specifications

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2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B557	Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products
ASTM B557M	Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products (Metric)
ASTM B660	Packaging/Packing of Aluminum and Magnesium Products
ASTM E10	Brinell Hardness of Metallic Materials
ASTM E29	Using Significant Digits in Test Data to Determine Conformance with Specifications
ASTM E34	Chemical Analysis of Aluminum and Aluminum-Base Alloys
ASTM E155	Reference Radiographs for Inspection of Aluminum and Magnesium Castings
ASTM E716	Sampling and Sample Preparation of Aluminum and Aluminum Alloys for Determination of Chemical Composition by Spark Atomic Emission SpectrometrySpectrochemical
ASTM E1251	Analysis of Aluminum and Aluminum Alloys by Atomic Emission Spectrometry
ASTM E1417/E1417M	Liquid Penetrant Testing
ASTM E1742/E1742M	Radiographic Examination

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E34, by spectrochemical methods in accordance with ASTM E1251, or by other analytical methods acceptable to purchaser (see 3.4.1).

Table 1 - Composition

Element	Min	Max
Silicon	4.5	5.5
Iron	--	0.20
Copper	1.0	1.5
Manganese	--	0.10
Magnesium	0.40	0.6
Zinc	--	0.10
Titanium	--	0.20
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.1.1 Test results may be rounded in accordance with the "rounding off" method of ASTM E29.

3.2 Condition

Solution and precipitation heat treated (see 3.5).

3.3 Casting

Castings shall be produced from metal conforming to 3.1, determined by analysis of a specimen (3.4.1) cast after the last melt addition. The type of mold for castings is not restricted.

3.4 Cast Test Specimens

Chemical analysis specimens and tensile specimens, when required, shall be cast after the last melt addition and shall be tested to qualify the melt lot as in 3.1.

3.4.1 Chemical Analysis Specimens

Shall be cast from each melt. Spectrochemical sample shall be prepared in accordance with ASTM E716.

3.4.2 Tensile Specimens

When purchaser specifies use of separately-cast specimens, they shall be cast with each lot of castings, shall be of standard proportions conforming to ASTM B557 or ASTM B557M, and shall be cast to size in molds representative of the practice used for castings. Metal for the specimens shall be part of the melt which is used for the castings. Chills are not permitted in the specimen cavity except on the end face of the specimen when approved in accordance with 4.4.2. A tensile specimen shall be processed with each heat treat lot and tested for conformance with 3.6.1.3.

3.5 Heat Treatment

Castings and representative tensile specimens (3.4.2) shall be solution and precipitation heat treated in accordance with AMS2771 except as follows:

3.5.1 Solution Heat Treatment

Quenching medium shall be an aqueous polymer solution (15 to 30% polymer) or hot water at not lower than 150 °F (66 °C).

3.5.2 Precipitation Heat Treatment

May begin immediately after quenching; product shall be at temperature for not less than 3 hours.

3.6 Properties

Castings and integrally-cast coupons or separately-cast tensile specimens when required, shall conform to the following requirements:

3.6.1 Tensile Properties

Shall be as follows, determined in accordance with ASTM B557 or ASTM B557M; conformance to the requirements of 3.6.1.1 shall be used as basis for acceptance of castings except when purchaser specifies that the requirements of 3.6.1.2 or 3.6.1.3 apply:

3.6.1.1 Specimens Cut from Any Area of a Casting

Specimens as in 4.3.3 shall have the properties shown in Table 2.

Table 2 - Minimum tensile properties

Property	Value
Tensile Strength	35.0 ksi (241 MPa)
Yield Strength at 0.2% Offset	28.0 ksi (193 MPa)
Elongation in 4D	2%