

CASTINGS, ALUMINUM ALLOY DIE
9.5Si - 0.50Mg - (360.0)
As Cast

UNS A03600

1. SCOPE:

1.1 Form: This specification covers an aluminum alloy in the form of die castings.

1.2 Application: Primarily for components requiring moderate strength at room temperature.

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 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 2635 - Radiographic Inspection
- AMS 2645 - Fluorescent Penetrant Inspection
- AMS 2646 - Contrast Dye Penetrant Inspection
- AMS 2694 - Repair Welding of Aerospace Castings
- AMS 2804 - Identification, Castings

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2.2 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103.

ASTM B660 – Packaging/Packing of Aluminum and Magnesium Products

ASTM E34 – Chemical Analysis of Aluminum and Aluminum Alloys

ASTM E505 – Reference Radiographs for Inspection of Aluminum and Magnesium Die Castings

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 spectrochemical methods, or by other analytical methods acceptable to purchaser:

	min	max
Silicon (3.1.1)	9.0	10.0
Magnesium (3.1.1)	0.40	0.6
Iron	--	2.0
Copper	--	0.6
Nickel	--	0.50
Zinc	--	0.50
Manganese	--	0.35
Tin	--	0.15
Other Impurities, total	--	0.25
Aluminum	remainder	

3.1.1 When low-pressure die casting is permitted by purchaser, silicon may be 11.0 – 13.0% in which case magnesium shall be not higher than 0.10% (413.0 Alloy).

3.2 Condition: As cast.

3.3 Casting: Castings shall be produced in lots from metal conforming to 3.1. Metal remelted from previously analyzed ingot may be poured directly into castings. Furnace or ladle additions of grain-refining elements or alloys are permissible. Molten metal taken from alloying furnaces, with or without additions of foundry operating scrap (gates, sprues, risers, and rejected castings), shall not be poured into castings unless first converted to ingot, analyzed, and remelted or unless the composition of a sample taken after the last addition to the melt conforms to 3.1.

3.3.1 A melt shall be the metal withdrawn from a batch-furnace charge of 2000 pounds (907 kg) or less as melted for pouring castings or, when permitted by purchaser, a melt shall be 4000 pounds (1814 kg) or less of metal withdrawn from one continuous furnace in not more than eight consecutive hours.

3.3.2 A lot shall be all castings poured from a single melt in not more than eight consecutive hours.

3.4 Chemical Analysis Specimens: Shall be cast from each melt and shall be of any suitable size and shape.

3.5 Quality:

- 3.5.1 Castings, 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 castings.
- 3.5.1.1 Castings shall have smooth surfaces and shall be well cleaned.
- 3.5.2 Castings shall be produced under radiographic control, when specified. This control shall consist of radiographic examination of castings in accordance with AMS 2635 until proper foundry technique, which will produce castings free from harmful internal imperfections, is established for each part number and of production castings as necessary to ensure maintenance of satisfactory quality.
- 3.5.3 When specified, castings shall be subjected to fluorescent penetrant inspection in accordance with AMS 2645, to contrast dye penetrant inspection in accordance with AMS 2646, or to both.
- 3.5.4 Radiographic, fluorescent penetrant, contrast dye penetrant, and other quality standards shall be as agreed upon by purchaser and vendor. ASTM E505 may be used to define radiographic acceptance standards.
- 3.5.5 Castings shall not be repaired by peening, plugging, welding, or other methods without written permission from purchaser.
- 3.5.5.1 When permitted in writing by purchaser, defects in castings may be removed and the castings repaired by welding in accordance with AMS 2694.
- 3.5.6 Castings shall not be impregnated, chemically treated, or coated to prevent leakage, unless specified or allowed by written permission of purchaser, designating the method to be used.

4. QUALITY ASSURANCE PROVISIONS:

- 4.1 Responsibility for Inspection: The vendor of castings 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 castings conform to the requirements of this specification.
- 4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and as preproduction tests and shall be performed prior to or on the first-article shipment of a casting to a purchaser, on each lot, when a change in material and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.
- 4.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling: Shall be in accordance with the following:

4.3.1 At least one chemical analysis specimen in accordance with 3.4.1 from each
Ø melt, a casting from each lot, or both.

4.3.2 Two preproduction castings in accordance with 4.4.1 of each part number.

4.4 Approval:

4.4.1 Sample castings from new or reworked dies and the casting procedure shall be approved by purchaser before castings for production use are supplied, unless such approval be waived by purchaser.

4.4.2 Vendor shall use the same foundry practices for production castings as for approved sample castings. If necessary to make any change in processing, vendor shall submit for reapproval a statement of the proposed changes in processing and, when requested, sample castings. Production castings incorporating the revised operations shall not be shipped prior to receipt of reapproval.

4.5 Reports: The vendor of castings shall furnish with each shipment a report showing the results of tests for chemical composition of at least one casting or of separately-cast specimens from each melt and stating that the castings conform to the other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 4290H, part number, and quantity.

4.6 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the castings may be based on the results of testing two additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the castings represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Shall be in accordance with AMS 2804.

5.1.1 Impregnated castings shall be marked "IMP".

5.2 Packaging:

5.2.1 Castings shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the castings to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.2.2 For direct U.S. Military procurement, packaging shall be in accordance
Ø with ASTM B660, Commercial Level, unless Level A is specified in the request for procurement.