AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

AMS4284B

Issued 6-1-42
Revised 12-1-51

ALUMINUM ALLOY CASTINGS, PERMANENT MOLD
7Si - 0.3Mg (356-T6)
Solution and Precipitation Treated

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. COMPOSITION:

Silicon	6.5 - 7.5
Magnesium	0.2 - 0.4
Iron	0.6 max
Manganese	0.3 max
Zinc	0.3 max
Copper	0.2 max
Titanium	0.2 max
Other Impurities, each	0.05 max
Other Impurities, total	0.15 max
Aluminum	remainder

3. CONDITION: Solution and precipitation heat treated.

4. TECHNICAL REQUIREMENTS:

4.1 Casting:

4.1.1 A lot of castings shall consist of not more than 1000 pounds of cleaned castings of the same part number, produced in a pouring period of not more than 8 consecutive hours from molten metal consisting of ingot from a single heat, and gates, risers and defective castings from that heat of ingot. When the lot is changed by reason of a change in the heat of ingot used in a remelting or holding pot, foundry scrap from the preceding lot may be used.

4.1.2 Castings, after removal from molds, shall be cooled at rates which will be as uniform as practicable for castings of each part number.

4.2 Test Specimens: Tensile test specimens, and chemical analysis specimens when required, shall be cast with each lot of castings, and when requested, shall be supplied with the castings.

4.2.1 Tensile Test Specimens: Shall be standard (0.5-inch diameter at the reduced parallel section) and shall be cast to size in permanent molds. Metal for the specimens shall be part of the melt which is used for the castings.

4.2.2 Chemical Analysis Specimens: When required by purchaser, shall be of size and shape agreed upon by purchaser and vendor.

4.3 Heat Treatment: All castings and tensile test specimens representing them shall be heat treated as follows:

4.3.1 Tensile test specimens from each lot, together with production castings, shall be heated to the proper temperature and for the proper time for solution treatment and quenched at a rate not faster than that produced by immersion in water which is boiling at the time of immersion. At least one set of tensile test specimens shall be put into a batch-type furnace with each load of castings or into a continuous furnace at intervals of not longer than 3 hours.

4.3.2 Tensile test specimens from each lot, together with production castings, shall, after solution treatment as in 4.3.1, be heated uniformly to not lower than 300 F, held at that temperature for not less than 1.5 hr and cooled in air. At least one set of tensile test specimens shall be put into a batch-type furnace with each load of castings or into a continuous furnace at intervals of not longer than 3 hours.

4.4 Tensile Properties:

4.4.1 Tensile Test Specimens:

Tensile Strength, psi	33,000	min
Yield Strength at 0.2% Offset or at 0.0083 in. in 2 in. Extension Under Load (E=10,300,000), psi	22,000	min
Elongation, % in 2 in.	3.0	min

4.4.2 Tensile Properties of Castings: When tensile properties of actual castings are determined for acceptance, not less than 4, and preferably 10, tensile test specimens shall be cut from thick and thin sections. The average value of all specimens selected shall conform to the following:

Tensile Strength, psi	24,750	min
Yield Strength at 0.2% Offset or at 0.0072 in. in 2 in. Extension Under Load (E=10,300,000), psi	16,500	min
Elongation (Round Specimens), % in 4D	0.7	min

4.4.2.1 Conformance to these requirements may be used as basis for acceptance of castings.

4.5 Hardness of Castings: Except at sprues and risers the castings shall have hardness of Brinell 65-95 using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball, or Brinell 70-100 using 1000 kg load and 10 mm ball.

5. QUALITY:

5.1 Castings shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts. Castings shall have smooth surfaces and shall be well cleaned.