AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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Revised

ALUMINUM ALLOY CASTINGS
Permanent Mold
5 Silicon Solution and Precipitation (355-T6)

1. ACKNOWLEDGMENT: Vendor shall mention this specification number in all quotations and when acknowledging purchase orders.

2. COMPOSITION:

Silicon	4.5 - 5.5
Copper	1.0 - 1.5
Magnesium	0.4 - 0.6
Iron	0.6 max
Chromium	0.2 max
Titenium	0.2 max
Manganese	0.3 max
Zinc	0.3 max
Other Impurities, each	0.05 max
Other Impurities, total	0.15 max
Aluminum	remainder

3. CASTING: (a) All the metal which is melted for castings shall conform in composition to section 2 above.

(b) A lot of castings shall be not more than 1000 pounds of cleaned castings produced in a pouring period of not more than 8 consecutive hours from a melt consisting of ingot from a single heat and gates, risers and defective castings from the same melt. 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 added to the melt.

(c) Castings after removal from the mold, shall be cooled at a rate which will be as uniform as practicable for each casting.

4. TEST BARS: (a) Tensile test bars shall be cast to represent each lot of castings unless otherwise specified. Test bars are to be supplied with the castings when requested.

(b) Metal for casting tensile test bars shall be part of the melt which is used for the castings. In the event the metal for the castings is given any treatment, such as fluxing or cooling and reheating, the metal for the test bars shall be a portion of the metal so treated, and during such treatment shall be heated to the same maximum temperature and held for approximately the same length of time as the molten metal for castings. The temperature of the metal while pouring test bars shall be not lower than the temperature of the melt while pouring castings. The mold shall be a test bar permanent mold.

5. HEAT TREATMENT: All castings and test bars representing them shall be heat treated as follows:

(a) The test bars, together with any portion of the castings which they represent, 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.

(b) The test bars, together with any portion of the castings which they represent, shall, after the solution treatment as in paragraph 5(a), be heated uniformly to not less than 290°F, held at heat for not less than 1-1/2 hours and cooled in air.

6. PHYSICAL PROPERTIES: (a) Unless otherwise specified, test bars poured and treated as specified in sections 4 and 5 shall conform to the following minimum physical property requirements:

Tensile Strength, psi	37,000
Yield Strength (Offset 0.2%), psi	23,000
Equivalent Extension Under Load, inch in 2 in.	0.0086
Elongation, % in 2 in.	1.5

(b) The hardness of the castings shall be within the limits of Brinell 80-110 using 500 kg load and 10 mm ball, or the equivalent, or Brinell 85-115 using 1000 kg load and 10 mm ball.

(c) If castings are cut for examination, the average value for physical properties obtained from not less than 4, preferably 10, specimens taken from thick and thin sections of the castings shall be not less than the following:

Tensile Strength, psi	27,700
Yield Strength (Offset 0.2%), psi	17,000
Equivalent Extension Under Load, inch in 2 in.	0.0074
Elongation (round specimens), % in 4D	0.4
Brinell Hardness	Same as in 6(b)

7. QUALITY: (a) Castings shall be of uniform quality and condition, and free from defects detrimental to fabrication or to performance of the parts. If injurious defects are revealed during fabrication, castings shall be subject to rejection. Castings shall have smooth surfaces and shall be well cleaned.

(b) Unless otherwise specified, castings shall be produced under radiographic control. This shall consist of radiographic examination of castings until proper foundry technique, which will produce castings free from harmful internal defects, is established for each mold.

(c) Radiographic and other quality standards shall be as agreed between purchaser and vendor.

(d) Castings and parts made therefrom shall be subject to examination by any method which, in purchaser's judgment, will reveal defects.

(e) Castings shall not be repaired by plugging, welding or other methods without written permission from the purchaser.

(f) Castings shall not be impregnated, chemically treated, or coated to prevent leaking, unless specified or allowed by written permission which states the method to be used. Impregnated castings shall be marked "IMP".