AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 4234 A

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ALUMINUM ALLOY CASTINGS

Sand

Secondary 4 Copper Solution and Precipitation (S195-T6)

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

2. COMPOSITION:

Copper	3.0 - 4.5
Silicon	2.5 max
Iron	1.2 max
Manganese	0.5 max
Zinc	0.5 max
Nickel	0.3 max
Titanium	0.2 max
Magnesium	0.05 max
Other Impurities, total	0.3 max
Aluminum	remainder

3. CASTING: (a) All the metal which is melted for castings shall be ingot conforming in composition to section 2 above; gates, risers and rejected castings may be used but shall first be converted into such ingot. Furnace or ladle additions of small amounts of grain refining elements or alloys are permissible.

(b) A melt shall be the metal withdrawn from a batch furnace charge of 2000 pounds or less as melted for pouring castings, or when permitted by the purchaser, a melt may be 3000 pounds or less of metal withdrawn from one continuous furnace in not more than 8 consecutive hours.

4. TEST BARS: (a) Tensile test bars shall be cast with each melt 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 metal while pouring castings. The mold shall be made with the regular foundry mix of green sand without using chills.

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.

5. HEAT TREATMENT: (continued)

(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	32,000
Yield Strength (Offset 0.2%), psi	18,000
Equivalent Extension Under Load, inch in 2 in.	0.0076
Elongation, % in 2 in.	2.0

(b) The hardness of the castings shall be within the limits of Brinell 65-95 using 500 kg load and the 10 mm ball, or the equivalent, or Brinell 70-100 using 1000 kg load and the 10 mm ball.

(c) If castings are cut for examination, the average values 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	24,000
Yield Strength (Offset 0.2%), psi	13,500
Equivalent Extension Under Load, inch in 2 in.	0.0067
Elongation, % in 2 in.	0.5
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 pattern.

(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".

(g) Castings shall be of sufficient size to allow for finishing to blueprint requirements, but excessive size or weight will not be permitted.