AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 4282

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Revised

ALUMINUM ALLOY CASTINGS (Permanent Mold)
4 Copper - 2 Silicon (Solution Precipitation)

1. ACKNOWLEDGMENT: A vendor must mention this specification number in all quotations and when acknowledging purchase orders.

2. COMPOSITION:

Copper	4.0 - 5.0
Silicon	2.0 - 3.0
Iron	1.2 max
Manganese	0.3 max
Zinc	0.2 max
Titanium	0.2 max
Magnesium	0.05 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 to section 2.

(b) During melting the metal shall be heated to not over 1450°F if any section of the casting is 1/8 inch or less; or to not over 1400°F if all sections are more than 1/8 inch. Written permission must be obtained from the purchaser by letter or by revising the drawing before deviating from the requirements of this paragraph.

(c) After the casting technique which produces satisfactory castings has been determined, the temperature of the molten metal, the temperature of the mold and the time in the mold shall be held as close as possible to produce the established structure.

(d) Castings after removal from the mold, shall be cooled by a uniform method so that the rate of cooling will be the same for each casting. Cooling in piles is definitely prohibited.

(e) The molten metal for making tensile test bars of the standard size for testing shall be taken from the same melt as the castings, poured under conditions to produce the same structure as that of the castings and cooled under the same conditions as the castings.

4. HEAT TREATMENT: (a) The test bars, together with the castings which they represent, shall be heated to the required temperature and time for the solution treatment, and quenched in water which is boiling before the quench.

(b) The test bars, together with the castings which they represent, after the solution treatment as in paragraph 4(a) shall be heated uniformly to a minimum temperature of 300°F, held at heat for not less than 1-1/2 hours and cooled in air. The hardness of the castings shall then be Brinell 70-100 when tested with a 500 kg load and a 10 mm ball, or the equivalent.

5. TEST BARS: (a) Unless otherwise specified, tensile test bars shall be cast to represent each lot of metal, or the castings of each different part number, but in no case shall the test bars represent a longer period of casting than 8 hours. Three test bars shall be supplied with the castings, unless otherwise ordered.

(b) Unless otherwise specified or noted on the drawing, the test bars poured and treated as specified in sections 3 and 4 shall conform to the following minimum physical properties:

Tensile Strength, lb per sq in.	38,000
Yield Strength (0.2% Set), lb per sq in.	28,000
Equivalent Extension Under Load, inch in 2 in.	0.0094
Elongation, % in 2 in.	2

6. QUALITY: (a) Castings must be homogeneous and free from shrinkage defects, cracks, blowholes, porosity, hard spots, foreign matter, and other injurious defects, and must not disclose defects during machining. The castings shall be smooth and well cleaned.

(b) Castings when broken for fracture test must show a uniform color and be substantially free from oxides, and other defects.

(c) Castings may be subject to x-ray examination for blowholes, porosity, shrinkage defects, cracks, and other internal defects.

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

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

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

8. REPORTS: Unless otherwise specified, the manufacturer of the castings shall supply three copies of a notarized report of the chemical composition and the physical properties representing the castings. This report shall include the results of each bar tested and the identification of the bar, part numbers, quantity of each part, material specification number, and purchase order number.

9. IDENTIFICATION: Castings shall be identified in accordance with AMS 2804.

10. APPROVAL: (a) Unless otherwise ordered, sample castings from new or reworked molds shall be approved by the purchaser before production castings are supplied. A change in gating shall not be made after approval without notifying the purchaser.

(b) A new casting manufacturer must submit a casting, made from the purchaser's mold, which is satisfactory before supplying production castings.