AERONAUTICAL MATERIAL SPECIFICATION

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

AMS 4424 D

Issued 12-5-39
Revised 1-1-46

MAGNESIUM ALLOY CASTINGS

Sand

6 Al 3 Zn 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:

Aluminum	5.3 - 6.7
Zinc	2.5 - 3.5
Manganese	0.15 min
Silicon	0.30 max
Copper	0.05 max
Nickel	0.01 max
Total Other Impurities	0.30 max
Magnesium	remainder

3. CASTING: (a) All metal which is poured into castings shall conform in composition to Section 2 above. The molten metal shall be subjected to superheating or other grain-refining treatment.

(b) A melt shall be the metal withdrawn from a batch furnace charge of 2,000 pounds or less as melted for pouring castings; or, when permitted by purchaser, a melt may be 3,000 pounds or less of metal withdrawn from one continuous furnace in not more than 4 consecutive hours.

4. TEST BARS AND ANALYTICAL SAMPLES: (a) Unless otherwise specified, tensile test bars as required in ASTM B80-44T and chemical analysis coupons of size and shape as agreed between vendor and purchaser shall be cast with each melt of castings. Test bars and coupons shall be supplied with castings when requested.

(b) Metal for casting tensile test bars and chemical analysis coupons shall be part of the melt used for the castings. Metal for tensile test bars shall be given the same superheating or other grain refining treatment given metal for castings. Tensile test bars shall be cast in molds made with the regular foundry mix of green sand, without using chills; chemical analysis coupons shall be cast in permanent molds.

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

Test bars from each melt, together with production castings, shall be heated to the proper temperature and for the proper time for solution treatment, and cooled in air, and then heated to the proper temperature and for the proper time for precipitation treatment to produce physical properties specified in Section 6. At least one set of test bars 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.

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6. PHYSICAL PROPERTIES: (a) Test bars poured and treated as specified in Sections 4 and 5 shall conform to the following minimum physical properties:

Tensile Strength, psi	34,000
Yield Strength (0.2% Offset), psi	16,000
Equivalent Extension Under Load, inch in 2 in.	0.0089
Elongation, % in 2 in.	3
Hardness, Brinell, 500 kg load, 10 mm ball	65-85

(b) Hardness of castings, except at sprues or risers, shall be Brinell 65-85, using 500 kg load and 10 mm ball or equivalent, or Brinell 75-95, using 1000 kg load and 10 mm ball.

(c) If castings are cut for examination, not less than four, and preferably ten, specimens taken from thick and thin sections of castings shall be tested. Average hardness of such specimens shall be as specified in 6 (b) above. Average tensile properties from such specimens shall be not less than the following:

Tensile Strength, psi	25,500
Yield Strength (0.2% Offset), psi	12,000
Equivalent Extension Under Load, inch in 2 in.	0.0077
Elongation, % in 2 in.	0.75

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 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 drawing requirements, but excessive size or weight will not be permitted.

8. REPORTS: (a) Unless otherwise specified, vendor of castings shall furnish with each shipment three copies of a notarized report showing results of tests made to determine conformance of the castings and test bars to this specification. If accuracy of control is adequate, each melt need not be analyzed but frequency of analysis shall be as agreed between purchaser and vendor.