AERONAUTICAL MATERIAL SPECIFICATION

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

AMS4484

Issued 8-1-44
Revised

MAGNESIUM ALLOY CASTINGS (Permanent Mold)
9 Al 2 Zn (Solution Precipitation)

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

2. COMPOSITION:

Aluminum	8.3 - 9.7
Zinc	1.7 - 2.3
Manganese	0.10 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 the metal which is melted for castings shall conform to section 2.

(b) After the casting technique which produces satisfactory castings from a given mold 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 that determined for producing the established quality.

(c) A lot of castings shall consist of not more than 1000 pounds of cleaned castings of the same part number, but no lot shall consist of castings poured during a period longer than 8 hours.

(d) The molten metal for making tensile test bars of the standard size for testing shall be a portion of the metal from which the castings are poured. It shall be treated in the same manner as the metal for the castings and poured into a test bar permanent mold.

4. HEAT TREATMENT: (a) Test bars, together with production castings conforming to this specification, shall be given the solution and precipitation heat treatments. Cooling after each treatment shall be in air. At least one set of test bars shall be put into a batch type furnace with each load of castings, or into a continuous type furnace at intervals not longer than 3 hours.

(b) Heat treated castings shall have a hardness of Brinell 70-95, using 500 kg load and 10 mm ball or the equivalent, or Brinell 80-105, using 1000 kg load and 10 mm ball.

5. TEST BARS: (a) Tensile test bars shall be cast to represent each lot of castings, unless otherwise specified. One set of test bars shall be supplied with the castings, unless otherwise ordered.

(b) 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.	34,000
Yield Strength (Offset 0.2%) lb per sq in.	18,000
Equivalent Extension Under Load, inch in 2 in.	0.0095
Elongation, % in 2 in.	1
Brinell Hardness (500 kg load - 10 mm ball)	70

6. QUALITY: (a) Castings must be of uniform quality and condition, free from injurious cracks, blowholes, porosity, hard spots, foreign matter, shrinkage defects and other defects which will adversely affect their serviceability. Castings must not disclose defects during machining and shall be smooth and well cleaned.

(b) Castings when broken for fracture test must show a fine grain and must not show excessive discoloration and must be substantially free from oxides and other defects, particularly in locations subject to stresses in service.

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

Tensile Strength, lb per sq in.	25,500
Yield Strength (Offset 0.2%), lb per sq in.	13,500
Equivalent Extension Under Load, inch in 2 in.	0.0082
Brinell Hardness (500 kg load - 10 mm ball)	70

(d) Unless otherwise specified, castings shall be produced under x-ray control. This shall consist in the examination of castings under x-ray until the proper foundry technique is established which will produce castings free from serious internal defects in all parts of the casting subject to stress in service. Occasional check x-ray examination shall be made.

(e) When specified, castings shall be x-ray examined by the vendor.

(f) Quality, grain size and radiographic standards for the examination of the castings shall be as agreed upon by the purchaser and the vendor.

(g) When specified, castings shall be subject to black light inspection to detect cracks or other discontinuities.

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

(b) Castings shall not be impregnated, chemically treated, or coated to prevent leaking, unless the drawing or written memorandum grants permission, stating 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 showing the results of tests made to determine conformance of the castings to this specification. This report shall show the chemical composition and physical properties of the test bars representing the castings in each lot.