AERONAUTICAL MATERIAL SPECIFICATION

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

AMS 4424A

Issued 12/5/39
Revised 11/1/41

CAST MAGNESIUM ALLOY
Solution Precipitation Heat Treated

1. ACKNOWLEDGMENT: A vendor must 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
Iron	0.03 max
Total Other Impurities	0.30 max
Magnesium	remainder

3. CASTING: (a) The metal which is poured into castings shall be given the same superheating or grain refining treatment as that which is given to the metal which is poured into test bars.

(b) The molten metal for making tensile test bars of the standard size for testing shall be taken from the same melt as the castings immediately before or after the metal for the castings is taken. The mold shall be made with the regular foundry mix of green sand without using chills.

4. HEAT TREATMENT: (a) The test bars, together with the castings which they represent shall be given the solution and precipitation heat treatments. Cooling after each treatment shall be in air.

(b) Heat treated castings shall have a hardness of Brinell 65-85, but the impression is not to be taken at a sprue or riser. If the hardness of the castings is outside of these limits, one casting may be rejected and examined as in paragraph 6 (c); if all requirements of that paragraph are fulfilled, the lot may be accepted.

5. TEST BARS: (a) Tensile test bars shall be cast with each melt of castings, unless otherwise specified. A melt shall mean one pot (2000 pounds or less) of metal without additions of magnesium or magnesium alloys as melted for superheating and/or casting. Test bars are to be supplied with the castings when requested.

(b) 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.	34,000
Yield Strength, lb per sq in.	16,000
Elongation, % in 2 in.	3
Brinell Hardness	65

 Printed in U.S.A.

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6. QUALITY: (a) Castings must be homogeneous and free from shrinkage defects, cracks, blowholes, sand holes, hard spots, foreign matter, and other injurious defects, and must not disclose defects in 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, particularly in locations subject to stresses in service.

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

Tensile Strength, lb per sq in.	24,000
Yield Strength, lb per sq in.	12,000
Elongation, % in 2 in.	1/2
Brinell Hardness	65

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 of the chemical composition representing the castings and of the physical properties of each melt of castings. This report shall include the results of test of each bar tested, melt number, part numbers, quantity of each part, material specification number, and purchase order number.

9. IDENTIFICATION: Each casting shall be identified by the manufacturer's trade mark, or letter as allocated, part number, and AMS 4424, in raised characters. The part number and AMS 4424 shall be located where shown on the drawing. The melt number, or serial number, shall be stamped plainly on each casting.

10. CORROSION: The manufacturer shall treat all castings to protect the surface against corrosion during shipment or storage before machining.

11. APPROVAL: (a) Unless otherwise ordered, sample castings from new or reworked patterns shall be approved by the purchaser's Inspection and Metallurgical Departments before production castings are supplied. A change in gating, risers, locations of chills, etc., shall not be made after approval without notifying the purchaser.

(b) A new casting manufacturer must submit a casting, made from the purchaser's pattern, which is satisfactory to both the Inspection and Metallurgical Departments before supplying production castings.

12. REJECTIONS: Material not conforming to this specification, or modification specified on the drawing or the purchase order, is subject to rejection. If samples for verification are desired by the vendor, they must be claimed within three weeks. Rejected material or parts will be held a reasonable time, at vendor's risk, awaiting shipping instructions for the return of same for credit or replacement, as specified. Vendor shall pay all transportation charges.