

# AERONAUTICAL MATERIAL SPECIFICATIONS

## AMS 4420G

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

Issued 12-5-39  
Revised 8-15-58

### MAGNESIUM ALLOY CASTINGS, SAND 6Al - 3Zn (AZ63A-F) As Cast

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

2. APPLICATION: Primarily for parts operating at temperatures up to 300 F.

3. COMPOSITION:

Aluminum	5.3 - 6.7
Zinc	2.5 - 3.5
Manganese	0.15 min
Silicon	0.30 max
Copper	0.10 max
Nickel	0.01 max
Other Impurities, total	0.30 max
Magnesium	remainder

4. CONDITION: As cast.

5. TECHNICAL REQUIREMENTS:

5.1 Casting: Castings shall be produced in lots from metal conforming to Section 3. Metal remelted from previously analyzed ingot may be poured directly into castings. Unless otherwise agreed upon by purchaser and vendor, molten metal taken from alloying furnaces, with or without additions of foundry operating scrap (gates, sprues, risers, and rejected castings), shall not be poured into castings unless first converted to ingot, analyzed, and remelted or until the composition of a sample taken after the last addition to the melt has been found to conform to Section 3.

5.1.1 A melt shall be the metal withdrawn from a batch furnace charge of 2000 lb or less as melted for pouring castings or, when permitted by purchaser, a melt shall be 4000 lb or less of metal withdrawn from one continuous furnace in not more than 8 consecutive hours.

5.1.2 A lot shall consist of castings poured from a single melt in not more than 8 consecutive hours.

5.1.3 The molten metal shall be subjected to superheating or other grain-refining treatment.

5.2 Test Specimens: Tensile test specimens, and chemical analysis specimens when required, shall be cast as follows and, when requested, shall be supplied with the castings.

Section 7C of the SAE Technical Board rules provides that: "All technical reports including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no attempt to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and securing patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against infringement of patents."

SAE TECHNICAL BOARD. Click to view the full PDF of ams4420g

5.2.1 Tensile Test Specimens: Shall be cast with each lot of castings, shall be standard (0.5 in. diameter at the reduced parallel section), and shall be cast to size in molds made with the regular foundry mix of green sand, without using chills. Metal for the specimens shall be part of the melt which is used for the castings and shall be subjected to the same superheating or other grain-refining treatment given the metal for the castings.

5.2.2 Chemical Analysis Specimens: When required by purchaser, shall be cast from each melt and shall be of size and shape agreed upon by purchaser and vendor.

5.4 Physical Properties:

5.4.1 Cast Tensile Test Specimens:

Ø	Tensile Strength, psi	24,000 min
	Yield Strength at 0.2% Offset or at 0.0071 in. in 2 in. Extension Under Load (E = 6,500,000), psi	10,000 min
	Elongation, % in 2 in.	4 min

5.4.2 Tensile Properties of Castings:

5.4.2.1 When tensile properties of actual castings are determined for acceptance, not less than 4, and preferably 10, tensile test specimens shall be cut from thick and thin sections. The average value of all specimens selected shall conform to the following:

Tensile Strength, psi	18,000 min
Elongation, % in 2 in.	1 min

5.4.2.1.1 Conformance to these requirements may be used as basis for acceptance of castings.

5.4.2.2 When specified, tensile test specimens taken in locations indicated on the drawing, from a casting chosen at random to represent the lot, shall have the properties indicated on the drawing for each specimen.

5.4.3 When a dispute occurs between purchaser and vendor over the yield strength value, yield strength determined by the offset method shall apply.

5.5 Hardness of Castings: Except at sprues and risers, the castings shall have hardness not lower than Brinell 48 using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball, or Brinell 57 using 1000 kg load and 10 mm ball.

6. QUALITY:

6.1 Castings shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts. Castings shall have smooth surfaces and shall be well cleaned.

6.2 Radiographic and other quality standards shall be as agreed upon by purchaser and vendor.