SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York, N.Y. 10017

AEROSPACE MATERIAL SPECIFICATIONS

AMS 4420J
Superseding AMS 4420H
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MAGNESIUM ALLOY CASTINGS, SAND
6Al - 3Zn (AZ63A-F)

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 (149 C).

3. COMPOSITION: Castings shall conform to the following:

	min	max
Aluminum	5.3	6.7
Zinc	2.5	3.5
Manganese	0.15	--
Silicon	--	0.30
Copper	--	0.10
Nickel	--	0.01
Other Impurities, total	--	0.30
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. Furnace or ladle additions of grain refining elements are permissible. If grain refining elements are not added, the molten metal shall be subjected to superheating or other grain refining treatment. 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5.1.1 A melt shall be the metal withdrawn from a batch furnace charge of 2000 lb or less as melted for pouring castings or, when permitted by the purchaser, a melt shall be 4000 lb or less of metal withdrawn from one continuous furnace in not more than 8 consecutive hours.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.

5.2 Cast 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.

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 grain-refining or alloying 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.

5.3 Tensile Properties:

5.3.1 Cast Tensile Test Specimens:

Tensile Strength, psi	26,000 min
Yield Strength at 0.2% Offset or at 0.0074 in. in 2 in. Extension Under Load (E = 6,500,000), psi	11,000 min
Elongation, % in 2 in.	4 min

5.3.2 Specimens Cut From Castings:

5.3.2.1 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. or 4D	1 min

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

5.3.2.2 When specified on the order, 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.

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

5.4 Hardness of Castings: Except at sprues and risers, 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 not lower than 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. Unless otherwise permitted by purchaser, castings cleaned by blasting shall be pickled in a sulfuric or sulfuric-nitric acid solution to remove not less than 0.002 in. of metal before treatment as in Section 9.

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

6.3 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 imperfections, is established for each part number, and of production castings as necessary to ensure maintenance of satisfactory quality.

6.4 Castings shall not be repaired by plugging, welding, or other methods, without written permission from purchaser.

6.5 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.