AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 4422 F

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MAGNESIUM ALLOY CASTINGS, SAND
AZ63
Solution 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	5.30 - 6.70
Zinc	2.50 - 3.50
Manganese	0.15 min
Silicon	0.30 max
Copper	0.25 max
Nickel	0.01 max
Other Impurities, total	0.30 max
Magnesium	remainder

3. CONDITION: Solution heat treated.

4. TECHNICAL REQUIREMENTS:

4.1 Casting:

4.1.1 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.

4.1.2 A melt shall be the metal withdrawn from a batch furnace charge of 2000 pounds or less as melted for pouring castings, or when permitted by the purchaser, a melt shall be 3000 pounds or less of metal withdrawn from one continuous furnace in not more than 4 consecutive hours.

4.2 Test Specimens: Tensile test specimens, and chemical analysis specimens when required, shall be cast with each melt of metal for castings and, when requested, shall be supplied with the castings.

4.2.1 Tensile Test Specimens: Shall be standard (0.5-inch 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.

4.2.2 Chemical Analysis Specimens: When required by purchaser, shall be of size and shape agreed upon by purchaser and vendor.

4.3 Heat Treatment: All castings and tensile test specimens representing them shall be heat treated as follows:

4.3.1 Tensile test specimens 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. At least one set of tensile test specimens 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.

4.4 Physical Properties:

4.4.1 Tensile test specimens shall conform to the following requirements:

Tensile Strength, psi	32,000 min
Elongation, % in 2 in.	7 min
Hardness, Brinell, 500 kg load and 10 mm ball	48-60

4.4.2 Hardness of castings, except at sprues and risers, shall be Brinell 48-60, using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball, or Brinell 57-72 using 1000 kg load and 10 mm ball.

4.4.3 If castings are cut for examination, not less than four, and preferably ten, tensile test specimens taken from thick and thin sections of castings shall be tested. Average hardness of such specimens shall be as specified in 4.4.2. Average tensile properties shall conform to the following requirements:

Tensile Strength, psi	24,000 min
Elongation, % in 2 in.	1.75 min

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

5. QUALITY:

5.1 Castings shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts. Castings shall have smooth surfaces and shall be wellcleaned.

5.2 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, and of production castings as necessary to ensure maintenance of satisfactory quality.

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

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

5.5 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.