AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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MAGNESIUM ALLOY CASTINGS, PERMANENT MOLD
AZ92
Solution and Precipitation 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	8.30 - 9.70
Zinc	1.70 - 2.30
Manganese	0.20 min
Silicon	0.30 max
Copper	0.25 max
Nickel	0.01 max
Other Impurities, total	0.30 max
Magnesium	remainder

3. CONDITION: Solution and precipitation 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.

4.1.2 A lot of castings shall consist of not more than 1000 pounds of cleaned castings of the same part number, produced in a pouring period of not more than 8 consecutive hours.

4.1.3 Castings, after removal from molds, shall be cooled at rates which will be as uniform as practicable for castings of each part number.

4.2 Test Specimens: Tensile test specimens, and chemical analysis specimens when required, shall be cast with each lot of 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 permanent molds. Metal for the specimens shall be part of the melt which is used 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 lot, 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.

4.3.2 Tensile test specimens from each lot, together with production castings, shall, after solution treatment as in 4.3.1, be heated to the proper temperature and for the proper time for precipitation treatment. 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	34,000	min
Yield Strength at 0.2% offset or at 0.0095 inch in 2 in. extension under load, psi	18,000	min
Elongation, % in 2 in.	1.0	min
Hardness, Brinell, 500 kg load and 10 mm ball	70-95	

4.4.2 Hardness of castings, except at sprues and risers, shall be Brinell 70-95 using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball, or Brinell 80-105 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	25,500 min
Yield Strength at 0.2% offset or at 0.0082 inch in 2 in. extension under load, psi	13,500 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 well cleaned.

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 mold, 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.