

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 4227

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

Issued 9-15-57
Revised

ALUMINUM ALLOY CASTINGS, SAND
8Cu - 6Mg - 0.5Mn - 0.5Ni (XA-140F)

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. APPLICATION: Primarily for parts operating at temperatures up to 500 F and may be used for parts operating at temperatures up to 600 F where stresses are low.
3. COMPOSITION:

Copper	7.0 - 9.0
Magnesium	5.5 - 6.5
Manganese	0.30 - 0.7
Nickel	0.30 - 0.7
Silicon	0.50 max
Iron	0.50 max
Titanium	0.20 max
Zinc	0.10 max
Other Impurities, each	0.05 max
Other Impurities, total	0.15 max
Aluminum	remainder

4. CONDITION: As cast, unless otherwise specified.

5. TECHNICAL REQUIREMENTS:

- 5.1 Casting:

- 5.1.1 All metal which is melted for castings shall be ingot conforming in composition to Section 3 above; gates, risers, and rejected castings may be used but shall first be converted into such ingot. Furnace or ladle additions of small amounts of grain refining elements or alloys are permissible. When permitted by purchaser, molten metal may be taken from the alloying furnaces for pouring into castings without first casting into ingot and remelting provided that a sample for chemical analysis is taken after the last addition of metal to the furnace prior to removal of the alloy to the holding furnace or pouring ladle.
- 5.1.2 A melt shall be the metal withdrawn from a batch furnace charge of 2000 lb or less as melted for pouring castings or, when permitted by the purchaser, a melt shall be 3000 lb or less of metal withdrawn from one continuous furnace in not more than 8 consecutive hours.
- 5.2 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.

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 agreement 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 approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

5.2.1 Tensile Test Specimens: 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. If the metal for castings is given any treatment, such as fluxing, or cooling and reheating, the metal for the specimens shall be a portion of the metal so treated, and during such treatment shall be heated to the same maximum temperature and held for approximately the same length of time as the molten metal for castings. The temperature of the metal during pouring of the specimens shall be not lower than the temperature of the metal during pouring of the castings.

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

5.3 Tensile Properties:

5.3.1 Tensile Test Specimens:

Tensile Strength, psi 29,000 min

5.3.2 Castings: 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 shall conform to the following:

Tensile Strength, psi 21,750 min

5.4 Hardness of Castings: Except at sprues and risers, the castings shall have hardness not lower than Brinell 80 using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball or not lower than Brinell 85 using 1000 kg load and 10 mm ball.

5.5 Tensile Properties at 400 F: Tensile test specimens, produced in accordance with 5.2.1, shall be capable of meeting the following requirements. Specimens shall be heated to $400\text{ F} \pm 5$, held at $400\text{ F} \pm 5$ for 30 min. before testing, and tested at $400\text{ F} \pm 5$ at a rate not greater than 0.05 in. per in. per min. up to the yield strength and at a rate of 0.11 - 0.14 in. per in. per min. above the yield strength.

Tensile Strength, psi 27,000 min
Yield Strength at 0.2% Offset, psi 24,000 min

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.