AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 4220

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Revised

CAST ALUMINUM ALLOY
Copper Nickel Magnesium

1. ACKNOWLEDGMENT: A vendor must mention this specification number in all quotations and when acknowledging purchase orders.

2. USE: Primarily for air-cooled cylinder heads.

3. COMPOSITION:

Copper	3.7 - 4.5	Iron	0.8 max
Nickel	1.8 - 2.3	Silicon	0.6 max
Magnesium	1.2 - 1.7	Other Impurities, each	0.03 max
Chromium	0.15 - 0.25	Other Impurities, total	0.1 max
Titanium	0.07 - 0.18	Aluminum	remainder

4. CASTING: (a) All the metal which is melted for castings shall conform to section 3 ingot; gates, risers and rejected castings, may be used but shall first be converted into such ingot.

(b) During melting, the metal shall be heated to not over 1450°F. The metal being poured into the mold shall not exceed a temperature of 1450°F. Written permission must be obtained from the purchaser by letter or by revising the physical properties on the drawing before deviating from the requirements of this paragraph.

(c) The metal for making tensile test bars of the standard size for testing shall form a part of the melt or heat which is used for the castings. In event the metal for the castings is given any treatment such as fluxing, or cooling and reheating, the metal for the test bars shall form a portion of the metal so treated. The metal for the test bars and castings may be separated into lots for pouring, but the variation in temperature between the lots in the pouring ladles shall not exceed 20°F at the time the final temperature reading is made, which shall be immediately before pouring into the molds. The mold shall be made with the regular foundry mix of green sand without using chills.

5. HEAT TREATMENT: (a) The test bars, together with the castings which they represent shall be heated uniformly to 960° - 970°F, held at heat for not less than 6 hours, then removed from the furnace and allowed to cool in air.

(b) The test bars, together with the castings which they represent, shall be reheated uniformly to approximately 550°F, held at heat for not less than 2 hours and cooled in air. The temperature may be varied to produce the hardness specified.

6. HARDNESS: (a) Castings as supplied for machining shall have a hardness within the limits of Brinell 70 - 85, using 500 Kg load and the 10 mm ball, or the equivalent, or Brinell 75 - 90, using 1000 Kg load and the 10 mm ball.

(b) Assembled cylinder heads shall have a hardness within the limits of Brinell 60 - 75, using 500 Kg load and the 10 mm ball, or the equivalent, or Brinell 65 - 80, using 1000 Kg load and the 10 mm ball. (This does not apply to rough castings as purchased).

(c) The spot for the Brinell shall be indicated on the drawing.