AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS5380

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Revised

ALLOY CASTINGS, PRECISION INVESTMENT, CORROSION AND HEAT RESISTANT
Cobalt Base - 25Cr - 15Ni - 6Mo

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

2. APPLICATION: Primarily small parts such as turbine blades or buckets requiring high strength up to 1500F, and oxidation resistance up to 2000F.

3. COMPOSITION: Castings shall conform to the following:

Carbon	0.40-0.50
Manganese	1.00 max
Silicon	1.00 max
Chromium	24.00-28.00
Nickel	14.00-16.00
Molybdenum	5.50- 7.00
Iron	2.00 max
Cobalt	Remainder

4. CASTING: Castings shall be poured either from remelted master heat metal or directly from a master heat. A master heat is previously refined metal of a single furnace charge. Gates, sprues, risers and rejected castings shall only be used in preparation of master heats but shall not be remelted directly, without refining, for pouring of castings.

5. TEST SPECIMENS: (a) Tensile Test Specimens. - Unless otherwise specified, tensile test specimens shall be cast to represent each master heat of metal in castings and, when requested, shall be supplied with the castings. The specimens shall be of standard proportions with 0.25 in. diameter at the reduced parallel section, shall be cast to size in molds made of the same refractory and heated to the same temperature as the molds for castings, and shall be cooled at approximately the same rate as the castings. If the metal for castings is given any treatment such as fluxing or cooling and reheating, metal for the specimens shall be so treated and during such treatment 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

(b) Bend Test Specimens. - Three specimens at least 0.090 in. in diameter or thickness and approximately 2 in. in length shall be cast in each mold along with each cast part or parts.

6. CONDITION: As cast, unless otherwise specified.

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7. TECHNICAL REQUIREMENTS: (a) Hardness.-

(1) Castings as cast shall have hardness not exceeding Rockwell C30.

(2) Castings or specimens after being heated at approximately 1475F for 50 hours and cooled to room temperature shall have hardness not exceeding Rockwell C43.

(b) Tensile Properties.- Tensile test specimens produced in accordance with Section 5(a) heated to 1500F, held at 1500F for 30 minutes before testing, and tested at 1500F at a rate of 0.045-0.062 in. per minute shall conform to the following requirements:

Tensile Strength, psi	55,000 min
Elongation, % in 1 in.	10 min

(c) Bending.- At least two of the specimens cast in each mold in accordance with Section 5(b) shall withstand, without cracking, bending at room temperature, through an angle of 30 degrees around a 0.5 in. diameter. If more than one specimen from a mold fails to pass this test, the disposition of the castings from that mold may be determined by applying a similar test to an actual casting or specimens out from castings, gates or runners. Such specimens shall be not less than 0.090 in. diameter or thickness. Failure of any such additional specimens will be cause for rejection of the castings.

8. QUALITY: (a) 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 in which defects are revealed during fabrication will be subject to rejection. Castings shall have smooth surfaces and shall be well cleaned. Unless otherwise specified, metallic shot or grit shall not be used for final cleaning.

(b) When castings are broken for fracture test, the fracture shall have a uniform color and be substantially free from oxides and other defects.

(c) Unless otherwise specified, castings shall be produced under radiographic control.

(d) Inspection standards and procedures shall be as agreed upon by purchaser and vendor.

(e) Castings shall not be repaired by plugging welding or other methods without written permission from the purchaser.

9. REPORTS: (a) Unless otherwise specified, the vendor of castings shall furnish with each shipment three copies of a notarized report of the results of tests for chemical composition of each master heat represented, and a statement that the castings conform to the requirements of this specification. This report shall include the purchase order number, master heat number (and code symbol if used), material specification number, part number and quantity in each heat.

(b) Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a notarized report, showing the purchase order number, material specification number, contractor, or other direct supplier of castings, part number, and quantity. When castings for making parts are produced or purchased by the parts vendor, that vendor shall inspect castings from each master heat represented, and shall include in the report a certification that the castings conform, or shall include copies of laboratory reports showing the results of tests to determine conformance.