AERONAUTICAL MATERIAL SPECIFICATIONS

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

AMS 5384

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Revised

ALLOY CASTINGS, INVESTMENT, CORROSION AND HEAT RESISTANT
Nickel Base, 18Cr - 18Co - 3 Ti - 3Al - 4Mo - 2Fe
Vacuum Melted And Cast, Solution And Precipitation Treated

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

2. APPLICATION: Primarily for parts such as turbine blades requiring high strength to 1700 F and oxidation resistance to 1800 F.

3. COMPOSITION: Castings shall conform to the following:

Carbon	0.10 max
Manganese	0.20 max
Silicon	0.30 max
Sulfur	0.015 max
Chromium	16.0 - 20.0
Cobalt	16.0 - 20.0
Molybdenum	3.0 - 5.0
Titanium	2.50 - 3.25
Aluminum	2.50 - 3.25
Boron	0.003 - 0.010
Iron	2.0 max
Copper	0.10 max
Nickel	remainder

4. CONDITION: Solution and precipitation heat treated, unless otherwise specified.

5. TECHNICAL REQUIREMENTS:

5.1 Casting: Castings shall be produced from master heat metal remelted and poured under vacuum without loss of vacuum between melting and pouring. A master heat is metal of a single furnace charge melted and cast into ingot under vacuum. Gates, sprues, risers, and rejected castings shall be used only in preparation of master heats; they shall not be remelted directly, without refining, for pouring of castings.

5.2 Test Specimens:

5.2.1 Tensile Test Specimen: Unless otherwise specified, tensile test specimens shall be cast to represent each master heat or master heat lot of metal in castings and, when requested, shall be supplied with the castings. The specimens shall be of standard proportions with 0.250 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 under the same vacuum conditions as the castings, and shall be cooled at approximately the same rate as the castings. If the metal for castings is given any treatment such as cooling and reheating, metal for the specimens shall be so treated.

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5.3 Heat Treatment: The castings, together with representative test specimens shall be solution heat treated by heating to 2100 F ± 25 in a suitable protective atmosphere, holding at heat for 4 hr, and air cooling, followed by heating to 1975 F ± 25, holding at heat for 4 hr, and air cooling. They shall then be precipitation heat treated by heating to 1400 F ± 15, holding at heat for 16 hr, and air cooling.

5.4 Tensile Properties at 1200 F: Tensile test specimens, produced in accordance with 5.2.1 and heat treated as in 5.3, when heated to 1200 F ± 10, held at 1200 F ± 10 for 30 min. before testing, and tested at 1200 F ± 10, at a rate of 0.045 - 0.062 in. per min. shall conform to the following requirements. If supplied tensile test specimens fail to meet requirements or are not available, suitable specimens may be prepared from castings for test.

Tensile Strength, psi	120,000 min
Elongation, % in 4D	7 min

5.5 Stress Rupture Strength: Tensile test specimens produced in accordance with 5.2.1 and maintained at 1700 F ± 5, while an axial load of 25,000 psi is applied continuously, shall not rupture in less than 35 hours. The test shall be continued, after the 35 hr, until the specimen ruptures, either maintaining the same load or increasing the load to not over 30,000 psi as necessary to produce rupture. In either case the elongation after rupture, measured at room temperature, shall not be less than 5% in 4D.

5.6 Hardness: Shall be not lower than Rockwell C 30 or equivalent.

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. Unless otherwise permitted, metallic shot or grit shall not be used for final cleaning.

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

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

6.4 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 imperfections, is established for each part number, and of production castings as necessary to ensure maintenance of satisfactory quality.

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