AEROSPACE
MATERIAL SPECIFICATIONS
SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York, N.Y. 10017

AMS 5397

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Revised

ALLOYS CASTINGS, INVESTMENT, CORROSION AND HEAT RESISTANT
Nickel Base - 10Cr - 15Co - 3Mo - 4.75Ti - 5.5Al - 0.95V
Vacuum Melted and Vacuum Cast

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

2. APPLICATION: Primarily for small parts, such as turbine blades requiring high strength and oxidation resistance up to 1800 F (982 C).

3. COMPOSITION: Castings shall conform to the following:

	min	max
Carbon	0.15	0.20
Manganese	--	0.10
Silicon	--	0.15
Sulfur	--	0.015
Chromium	8.00	11.00
Cobalt	13.00	17.00
Molybdenum	2.00	4.00
Titanium	4.50	5.00
Aluminum	5.00	6.00
Titanium + Aluminum	10.00	11.00
Vanadium	0.70	1.20
Boron	0.01	0.02
Iron	--	1.00
Zirconium	0.03	0.09
Nickel	remainder	

4. CONDITION: As cast, 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 for pouring of castings.

5.2 Test Specimens:

5.2.1 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 0.250 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 shall be cooled at approximately the same rate as the castings. If the metal for castings is given any treatment such as fluxing, cooling and reheating, or grain refining, metal for the specimens shall be so treated.

5.3 Hardness: Castings shall have hardness of Rockwell C 30 - 44 or equivalent.

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5.4 Tensile Properties: Tensile test specimens produced in accordance with 5.2.1 and tested at room temperature shall conform to the following requirements. Tensile test specimens cut directly from castings shall not be cause for rejection unless specifically agreed upon by purchaser and vendor. If specimens cut from castings are to be the basis of rejection, then properties to be obtained, and the location and size of specimens, shall be as agreed upon by purchaser and vendor.

Tensile Strength, psi	115,000 min
Yield Strength at 0.2% Offset or at 0.0052 in. in 1 in. Extension Under Load (E = 31,000,000), psi	95,000 min
Elongation, % in 1 in. or 4D	5 min

5.5 Stress Rupture Test at 1800 F (982.2 C): Test specimens produced in accordance with 5.2.1 and maintained at 1800 F ± 5 (982.2 C ± 2.8) while an axial load of 29,000 psi is applied continuously, shall not rupture in less than 23 hours. The test shall be continued until the specimen ruptures. Elongation after rupture, measured at room temperature, shall be not less than 4% in 4D. Test specimens cut directly from castings shall not be cause for rejection unless specifically agreed upon by purchaser and vendor. If specimens cut from castings are to be the basis of rejection, then properties to be obtained, and the location and size of specimens, shall be as agreed upon by purchaser and vendor.

5.6 Grain Size: Unless otherwise specified, castings shall have substantially uniform, equiaxed, non-columnar grains without pronounced segregation of fine and coarse grained areas. Actual grain size and method of measurement shall be in accordance with standards and procedures agreed upon by purchaser and vendor.

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 specified, 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.

7. REPORTS:

7.1 Unless otherwise specified, the vendor of castings shall furnish with each shipment three copies of a report of the results of tests for chemical composition of at least one casting from each master heat represented and the results of tests on each master heat to determine conformance to the technical 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 from each heat.