AERONAUTICAL
MATERIAL SPECIFICATIONS

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

AMS 5751

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Revised

ALLOY, CORROSION AND HEAT RESISTANT
Nickel Base, 18Cr - 17Co - 3Ti - 3Al - 4Mo - 4Fe
Vacuum Melted, Solution, Stabilization, and Precipitation Treated

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

2. FORM: Bars, forgings, and forging stock.

3. APPLICATION: Primarily for parts such as turbine blades, bolts, and fittings requiring high strength to 1600 F and oxidation resistance to 1800 F.

4. COMPOSITION:

Carbon	0.15 max
Manganese	0.75 max
Silicon	0.75 max
Sulfur	0.015 max
Chromium	15.0 - 20.0
Cobalt	13.0 - 20.0
Molybdenum	3.0 - 5.0
Titanium	2.50 - 3.25
Aluminum	2.50 - 3.25
Boron	0.003 max
Iron	4.0 max
Copper	0.15 max
Nickel	remainder

4.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2269.

5. CONDITION:

5.1 Bars: Solution, stabilization, and precipitation heat treated. Bars 2.75 in. and less in diameter or distance between parallel sides shall be cold finished unless otherwise specified.

5.2 Forgings: Solution, stabilization, and precipitation heat treated, and descaled, unless otherwise specified.

5.3 Stock For Forgings: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS:

6.1 Bars and Forgings:

6.1.1 Heat Treatment: The product shall be solution heat treated by heating to 1975 F ± 25, holding at heat for 4 hr, and air cooling, and shall then be stabilization heat treated by heating to 1550 F ± 25, holding at heat for 24 hr and air cooling, and then precipitation heat treated by heating to 1400 F ± 25, holding at heat for 16 hr and air cooling.

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6.1.2 Tensile Properties at 1200 F: Tensile test specimens cut from the product, 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 approximately 0.005 in. per in. per min. to the 0.2% yield point shall conform to the following requirements:

Tensile Strength, psi	170,000 min
Yield Strength at 0.2% Offset, or at 0.0126 in. in 2 in. Extension Under Load (E = 25,700,000), psi	110,000 min
Elongation, % in 4D	6 min
Reduction of Area, %	10 min

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

6.1.4 Stress Rupture Test at 1650 F: Specimens taken from bars and forgings shall be capable of meeting the following requirements:

6.1.4.1 A tensile test specimen, maintained at 1650 F ± 5, while an axial load of 25,000 psi is applied continuously, shall not rupture in less than 24 hours. The test shall be continued, after the 24 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 be not less than 5% in 4D.

6.1.5 Grain Size: Shall be predominantly 2 or finer with occasional grains as large as 1 permissible, as determined by comparison of a polished and etched specimen with the chart in ASTM E112-58T.

7. QUALITY: Material shall be produced by vacuum induction melting or by double vacuum melting. It shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

8. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2261 as applicable.

9. REPORTS:

9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat in the shipment and the results of tests on each size from each heat to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, heat number, material specification number, size, and quantity from each heat. If forgings are supplied, the part number and size of stock used to make the forgings shall also be included.

9.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.