AEROSPACE
MATERIAL SPECIFICATIONS

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

AMS 5751A

Issued 6-30-60
Revised 6-30-64

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

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter 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 (870 C) and oxidation resistance to 1800 F (980 C).

4. COMPOSITION:

	min	max
Carbon	--	0.15
Manganese	--	0.75
Silicon	--	0.75
Sulfur	--	0.015
ø Chromium	15.00	20.00
Cobalt	13.00	20.00
Molybdenum	3.00	5.00
Titanium	2.50	3.25
Aluminum	2.50	3.25
Boron	0.003	0.010
Iron	--	4.00
Copper	--	0.15
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. Round bars over 0.25 in. ø diameter shall be hot finished and centerless ground or turned, unless otherwise specified.

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

5.3 Forging Stock: As order by the forging manufacturer.

Printed in U. S. A.

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 (1079.4 C ± 14), holding at heat for 4 hr, and air cooling, and shall then be stabilization heat treated by heating to 1550 F ± 25 (843.3 C ± 14), holding at heat for 24 hr, and air cooling, and then precipitation heat treated by heating to 1400 F ± 25 (760 C ± 14), holding at heat for 16 hr, and air cooling.

6.1.2 Tensile Properties at 1200 F (648.9 C): Tensile test specimens cut from the product, heated to 1200 F ± 10 (648.9 C ± 5.6), held at 1200 F ± 10 (648.9 C ± 5.6) for 30 min. before testing, and tested at 1200 F ± 10 (648.9 C ± 5.6) at a rate of approximately 0.005 in. per in. per min. to the 0.2% yield strength, 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 2 in. or 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 (898.9 C): 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 (898.9 C ± 2.8) 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 the issue of ASTM E112 listed in the latest issue of AMS 2350.

7. QUALITY: Material shall be produced by multiple melting, using consumable electrode practice in the remelt cycle, or shall be induction melted under vacuum, unless otherwise permitted. The product 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 all applicable requirements of the latest issue of AMS 2261.