

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 5756

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

Issued 6-30-60
Revised

ALLOY, CORROSION AND HEAT RESISTANT
Nickel Base - 19Cr - 10Co - 10Mo - 1Al - 2.5Ti
Vacuum Melted, Solution Treated

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. FORM: Bars, forgings, flash welded rings, and stock for forging, flash welded rings, and heading.
3. APPLICATION: Primarily for parts such as turbine shafts, buckets, bolts, dowels, and fittings requiring high strength up to 1500 F and oxidation resistance up to 1800 F.

4. COMPOSITION:

Carbon	0.10 - 0.20
Manganese	0.75 max
Silicon	0.75 max
Phosphorus	0.015 max
Sulfur	0.015 max
Chromium	18.0 - 20.00
Cobalt	9.00 - 11.00
Molybdenum	9.00 - 11.00
Titanium	2.25 - 3.00
Aluminum	0.75 - 1.30
Boron	0.003 - 0.010
Iron	5.00 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 and Flash Welded Rings: Solution heat treated and descaled, unless otherwise specified. Bars 2.75 in. and less in diameter or distance between parallel sides shall be cold finished, unless otherwise specified.
- 5.1.1 Flash welded rings shall not be supplied unless specified on purchaser's part drawing. When supplied, they shall be manufactured in accordance with the latest issue of AMS 7490, unless otherwise specified.
- 5.2 Forgings: Solution heat treated and descaled, unless otherwise specified.
- 5.3 Stock For Forgings, Flash Welded Rings, or Heading: As ordered by the forging, flash welded ring, or heading manufacturer.



Documents

Document Sharing Hub

6. TECHNICAL REQUIREMENTS:6.1 Bars, Forgings, and Flash Welded Rings:

6.1.1 Heat Treatment: The product shall be solution heat treated by heating to $1950\text{ F} \pm 25$, holding at heat for 4 hr, and quenching in oil, water, or air.

6.1.2 Properties After Precipitation Heat Treatment: Material shall conform to the following requirements after being heated to $1400\text{ F} \pm 25$, held at heat for 15 hr, and cooled in air.

6.1.2.1 Tensile Properties: Tensile test specimens cut from bars and forgings and from parent metal of flash welded rings and tested at room temperature shall conform to the following requirements:

Tensile Strength, psi	165,000 min
Yield Strength at 0.2% Offset or at 0.0110 in. in 2 in. Extension Under Load ($E = 31,500,000$), psi	110,000 min
Elongation, % in 4D	15 min
Reduction of Area, %	18 min

6.1.2.1.1 When tensile test specimens are machined tangentially, from approximately the center of large disc forgings (over 50 sq in. cross sectional area), the elongation may be as low as 10% and the reduction of area as low as 12%. Specimens machined in other directions from this location are not required.

6.1.2.2 Hardness: Shall be Brinell 321 - 363 or equivalent.

6.1.2.3 Stress Rupture Test at 1500 F: A combination smooth and notched test specimen, machined from bars and forgings and from parent metal of flash welded rings to the dimensions shown in Figure 1 and Table I, maintained at $1500\text{ F} \pm 3$ while an axial stress of 40,000 psi is applied continuously, shall not rupture in less than 25 hours. The test shall be continued to rupture, with fracture occurring in the smooth section.

6.1.2.3.1 As an alternate procedure, separate smooth and notched specimens, machined from adjacent sections of the same piece, with gage sections conforming to the respective dimensions of Table I, may be tested individually under the above conditions. The notched specimen shall not rupture in less time than the companion smooth specimen.

6.1.2.4 Grain Size: Unless otherwise specified, grain size shall be predominantly 3 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.

6.2 Stock For Forgings, Flash Welded Rings, or Heading: When a sample of stock is forged to a test coupon and heat treated as in 6.1.1 and 6.1.2, specimens taken from the heat treated coupon shall conform to the requirements of 6.1.2.1, 6.1.2.2, and 6.1.2.3. If specimens taken from the stock after heat treatment as in 6.1.1 and 6.1.2 conform to the requirements of 6.1.2.1, 6.1.2.2, and 6.1.2.3, the tests shall be accepted as equivalent to tests of the forged coupon.