

AERONAUTICAL MATERIAL SPECIFICATION

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ALLOY, CORROSION AND HEAT RESISTANT
37Ni - 20Co - 18Cr - 3Mo - 2.9Ti

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. FORM: Bars, billets, and forgings.
3. APPLICATION: Parts, such as bolts, turbine wheels, discs, buckets, and blades, for high strength and oxidation resistance up to 1500 F when suitably heat treated.
4. COMPOSITION:

Carbon	0.08 max
Manganese	0.40 - 1.00
Silicon	0.50 - 1.50
Phosphorus	0.040 max
Sulfur	0.030 max
Chromium	16.00 - 20.00
Nickel	35.00 - 39.00
Cobalt	18.00 - 22.00
Molybdenum	2.50 - 3.50
Titanium	2.60 - 3.20
Aluminum	0.50 max
Iron	remainder

5. CONDITION: Unless otherwise specified, the product shall be supplied in the following condition:
 - 5.1 Bars (excluding forging stock): Cold finished and solution heat treated.
 - 5.2 Forgings: As ordered.
 - 5.3 Forging Stock: As ordered by the forging manufacturer.
6. TECHNICAL REQUIREMENTS:
 - 6.1 Bars (excluding forging stock):
 - 6.1.1 Solution Heat Treatment: Heated at 1800 F + 10 for a sufficient time to produce complete recrystallization and quenched in oil.
 - 6.1.2 Hardness as received: Not higher than Brinell 241, or equivalent.
 - 6.1.3 Properties after Aging: Bars shall be capable of developing hardness of Brinell 302-375 (Rockwell C 32-40) and average grain size of 6 or finer in accordance with Grain Size Chart in ASTM E19-46, when aged at 1350 F + 10 for 44 hr and air cooled.

on 7C of the SAE Technical Board rules provides that: "All technical reports, including those approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."



6.1.4 Properties after Reheat Treatment: Bars shall be capable of developing hardness of Brinell 262-341 (Rockwell C 26-36) and average grain size of 3 or finer in accordance with Grain Size Chart in ASTM E19-46, when solution heat treated by heating at 1950 F + 10 for 1 hr and oil quenching, aged at 1500 F + 10 for 4 hr and air cooled, and reaged at 1350 F + 10 for 20 hr and air cooled.

6.1.5 Properties after Reheat Treatment: Bars shall be capable of developing hardness of Brinell 241-311 (Rockwell C 23-33) and average grain size of 1 or finer in accordance with Grain Size Chart in ASTM E19-46, when solution heat treated by heating at 2100 F + 10 for 1 hr and oil quenching, aged at 1500 F + 10 for 20 hr and air cooled, and reaged at 1350 F + 10 for 20 hr and air cooled.

6.2 Bars (excluding forging stock) and Forgings:

6.2.1 Stress-Rupture Test at 1500 F: Bars and forgings, which have been solution heat treated by heating at 2100 F + 10 for 1 hr and oil quenching and aged at 1500 F + 10 for 20 hr and air cooled, shall be capable of meeting the following requirements:

A tensile test specimen, maintained at 1500 F + 10 while an axial load of 25,000 psi is applied continuously, shall not rupture in less than 40 hr. The test shall be continued, after the 40 hr, until the specimen ruptures, either maintaining the same load or increasing the load to not over 50,000 psi as necessary to produce rupture. In either case, the elongation after rupture, measured at room temperature, shall be not less than 8% in 4D.

7. QUALITY: Material shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

8. TOLERANCES: Unless otherwise specified, tolerances for bars shall conform to the latest issue of AMS 2241 as applicable to cold finished.

9. REPORTS:

9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a notarized report of the results of tests for chemical composition of each heat in the shipment, and the results of stress-rupture tests at 1500 F of each heat of stock used for making bars and forgings in the shipment. 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 notarized 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 certification that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.