AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 5733

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Revised

STEEL, CORROSION AND HEAT RESISTANT
13.5Cr - 26Ni - 3Mo - 1.8Ti

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

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

3. APPLICATION: Primarily for parts and assemblies, such as bolts, dowels, fittings, turbine discs and turbine nozzle assemblies, requiring high strength up to 1250 F.

4. COMPOSITION:

		Check Analysis Under Min or Over Max	
Carbon	0.08 max	--	0.01
Manganese	0.60 - 1.00	0.03	0.03
Silicon	0.60 - 1.00	0.05	0.05
Phosphorus	0.040 max	--	0.005
Sulfur	0.030 max	--	0.005
Chromium	12.00 - 15.00	0.15	0.15
Nickel	24.00 - 28.00	0.20	0.20
Molybdenum	2.50 - 3.50	0.10	0.10
Titanium	1.50 - 2.00	0.05	0.05
Aluminum	0.35 max	--	0.05
Copper	0.50 max	--	0.03

5. CONDITION:

5.1 Bars and Forgings: Solution and precipitation heat treated.

5.1.1 Bars 1.25 in. and under in diameter or distance between parallel sides shall be cold drawn with not less than 15% reduction of cross-sectional area.

5.1.2 Bars over 1.25 in. in diameter or distance between parallel sides shall be cold drawn with not less than 15% reduction of cross-sectional area or shall be hot rolled with finishing temperature not higher than 1800 F.

5.2 Forging Stock and Heading Stock: As ordered.

6. TECHNICAL REQUIREMENTS:

6.1 Heat Treatment: Unless otherwise specified, material shall be solution heat treated by heating to not lower than 1750 F but not higher than 1900 F, holding at heat for not less than 1 hr, and quenching in oil or water. It shall then be precipitation heat treated by heating to not lower than 1250 F but not higher than 1400 F, holding at heat for not less than 5 hr, cooling slowly in not less than 5 hr. to 1200 F, holding at 1200 F ± 15 for not less than 20 hr and cooling in air.

6.2 Tensile Properties:

	Bars	Forgings
Tensile Strength, psi	130,000 min	125,000 min
Yield Strength at 0.2% Offset, psi	85,000 min	80,000 min
Elongation, % in 4D	15 min	10 min
Reduction of Area, %	20 min	12 min

6.3 Stress-Rupture Test at 1200 F: Specimens taken from bars and forgings shall be capable of meeting both of the following requirements; however only the test outlined in 6.3.1 shall be performed unless otherwise agreed upon by purchaser and vendor:

6.3.1 A tensile test specimen, maintained at 1200 F ± 3 while an axial load of 60,000 psi is applied continuously, shall not rupture in less than 10 hours. The test shall be continued, after the 10 hr, until rupture occurs. The elongation after rupture, measured at room temperature, shall be not less than 5% in 4D.

6.3.2 A tensile test specimen with 60 degree V notch, with area at root of Vee approximately equal to half the area of the full section of specimen and ratio of radius of curvature at base of notch to full specimen diameter approximately equal to 0.02, maintained at 1200 F ± 3 while an axial load of 60,000 psi is applied continuously, shall not rupture in less than 23 hours.

6.4 Hardness: Brinell 248-302 or equivalent.

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 shall conform to the latest issue of AMS 2241 as applicable and as specified below:

8.1 All hexagons and other bars 2.75 in. and under in diameter or distance between parallel sides - Table I.

8.2 Bars, other than hexagons, over 2.75 in. in diameter or distance between parallel sides - Table II.