AERONAUTICAL MATERIAL SPECIFICATIONS

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

AMS 5657

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Revised

STEEL, CORROSION AND MODERATE HEAT RESISTANT
15Cr - 7.1Ni - 2.5Mo - 1.1Al

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 requiring high strength and oxidation resistance up to 700 F, and where such parts may require welding during fabrication.

4. COMPOSITION:

Carbon	0.09 max
Manganese	1.00 max
Silicon	1.00 max
Phosphorus	0.040 max
Sulfur	0.030 max
Chromium	14.00 - 16.00
Nickel	6.50 - 7.75
Molybdenum	2.00 - 3.00
Aluminum	0.75 - 1.50

4.1 Check Analysis: Unless otherwise specified, composition variations shall meet the requirements of the latest issue of AMS 2248.

5. CONDITION:

5.1 Bars: Solution heat treated at 1950 F ± 25 and water quenched, having hardness as indicated below when tested midway between center and surface.

5.1.1 Rounds: Ground, turned, or polished, having hardness not higher than Brinell 269 or equivalent.

5.1.2 Hexagons: Cold drawn for size after solution treatment, having hardness not higher than Brinell 321 or equivalent.

5.1.3 Flats: Hot finished, solution heat treated, and descaled, having hardness not higher than Brinell 269 or equivalent.

5.2 Forgings: Unless otherwise specified, solution treated at 1950 F ± 25 and water quenched, having hardness not higher than Brinell 321 or equivalent.

5.3 Forging Stock: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS:

6.1 Properties After Transformation and Precipitation Hardening: Material shall conform to the following requirements after heating to 1400 F ± 25, holding at heat for 90 min., cooling to 55 F ± 5 within 1 hr, holding at this temperature for not less than 30 min., heating to 1050 F ± 10, holding at heat for 90 min., and cooling in air.

6.1.1 Bars:

6.1.1.1 Tensile Properties: Applicable to sizes 6 in. and under in diameter or distance between parallel sides.

Tensile Strength, psi	180,000 min
Yield Strength at 0.2% Offset or at 0.0150 in. in 2 in. Extension Under Load (E = 29,000,000), psi	160,000 min
Elongation, % in 4D	8 min
Reduction of Area, %	25 min

6.1.1.1.1 Tensile test specimens shall be taken parallel to the direction of rolling and midway between center and surface where size permits.

6.1.1.2 Hardness: Not lower than Brinell 375 or equivalent.

6.1.2 Forgings:

6.1.2.1 Hardness: Not lower than Brinell 375 or equivalent.

6.2 Properties After Austenite Conditioning, Sub-Zero Transformation and Precipitation Hardening: Material shall conform to the following requirements after heating to 1750 F ± 15, holding at heat for 10 min., and rapidly cooling to room temperature, cooling within 24 hr to -100 F ± 10, holding at this temperature for not less than 8 hr, warming in air to room temperature, heating to 950 F ± 10, holding at heat for 1 hr, and cooling in air.

6.2.1 Bars:

6.2.1.1 Tensile Properties: Applicable to sizes 6 in. and under in diameter or distance between parallel sides.

Tensile Strength, psi	200,000 min
Yield Strength at 0.2% Offset or at 0.0161 in. in 2 in. Extension Under Load (E = 29,000,000), psi	175,000 min
Elongation, % in 4D	7 min
Reduction of Area, %	25 min

6.2.1.1.1 Tensile test specimens shall be taken parallel to the direction of rolling and midway between center and surface where size permits.

6.2.1.2 Hardness: Not lower than Brinell 415 or equivalent.

6.2.2 Forgings:

6.2.2.1 Hardness: Not lower than Brinell 415 or equivalent.