

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 5745

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

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Revised

STEEL, CORROSION AND MODERATE HEAT RESISTANT
16.5Cr - 4.5Ni - 2.9Mo - 0.1N

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. **FORM:** Bars, forgings, forging stock, or as ordered.
3. **APPLICATION:** Primarily for parts and assemblies, such as compressor wheels, blades, and structural members, requiring high strength and oxidation resistance up to 800 F.

4. **COMPOSITION:**

		Check Analysis	
		Under Min	or Over Max
Carbon	0.08 - 0.12	0.01	0.01
Manganese	0.50 - 1.25	0.04	0.04
Silicon	0.50 max	--	0.05
Phosphorus	0.040 max	--	0.005
Sulfur	0.030 max	--	0.005
Chromium	16.00 - 17.00	0.20	0.20
Nickel	4.00 - 5.00	0.07	0.07
Molybdenum	2.50 - 3.25	0.10	0.10
Nitrogen	0.07 - 0.13	0.01	0.01

5. **CONDITION:**

5.1 **Bars:**

- 5.1.1 **Rounds:** Equalized, and ground, turned, or polished.
- 5.1.2 **Shapes:** Cold drawn, equalized, and descaled.
- 5.1.3 **Flats:** Hot finished, equalized, and descaled.

5.2 **Forgings:** Equalized and descaled.

5.3 **Forging Stock:** As ordered by the forging manufacturer.

6. **TECHNICAL REQUIREMENTS:**

- 6.1 **Heat Treatment:** Unless otherwise specified, material shall be equalized by heating to $1400\text{ F} \pm 50$, holding at heat for not less than 3 hr, and air cooling, and then heating to $1100\text{ F} \pm 25$, holding at heat for not less than 3 hr, and air cooling.
- 6.2 **Hardness:** Shall be not higher than Brinell 363 or equivalent except that bars 0.625 in. and under in diameter may have hardness not higher than Brinell 375 or equivalent

Section 7C of the SAE Technical Board rules provides that: "All technical reports, including standards 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 infringement of patents."

6.3 Properties After Conditioning, Precipitation Hardening, and Tempering: Material conditioned by heating to $1710\text{ F} + 25$, holding at heat for not less than 1 hr per in. of cross section, and cooling rapidly to room temperature in water, oil, or air, as required, heated to $1375\text{ F} + 25$, held at heat for not less than 1 hr, cooled in air to room temperature, heated to $850\text{ F} + 25$, held at heat for not less than 3 hr, and cooled in air, shall be capable of meeting the following requirements:

6.3.1 Tensile Properties:

Tensile Strength, psi	165,000 min
Yield Strength at 0.2% Offset or at 0.0130 in. in in 2 in. Extension Under Load ($E = 30,000,000$), psi	135,000 min
Elongation, % in $4D$	10 min
Reduction of Area, %	20 min

6.3.2 Hardness: Shall be Rockwell C 36 - 46 or equivalent.

6.4 Properties After Conditioning, Sub-Zero Cooling, and Tempering: Material conditioned by heating to $1710\text{ F} + 25$, holding at heat for not less than 1 hr per in. of cross section, and cooling rapidly to room temperature in water, oil, or air, as required, cooled to not higher than -100 F , held at this temperature for not less than 3 hr, warmed in air to room temperature, heated to $850\text{ F} + 25$, held at heat for not less than 3 hr, and cooled in air, shall be capable of meeting the following requirements:

6.4.1 Tensile Properties:

Tensile Strength, psi	185,000 min
Yield Strength at 0.2% Offset or at 0.0140 in. in 2 in. Extension Under Load ($E = 30,000,000$), psi	150,000 min
Elongation, % in $4D$	10 min
Reduction of Area, %	20 min

6.4.2 Hardness: Shall be Rockwell C 38 - 48 or equivalent.

7. QUALITY: Material 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 following:

8.1 Bars: The latest issue of AMS 2241 as applicable and as specified below:

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

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