

# AEROSPACE

## MATERIAL SPECIFICATIONS

# AMS 5743B

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

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### STEEL BARS AND FORGINGS, CORROSION AND MODERATE HEAT RESISTANT 15.5Cr - 4.5Ni - 2.9Mo - 0.10N

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **FORM:** Bars, forgings, and forging stock.
3. **APPLICATION:** Primarily for parts and assemblies requiring high strength and oxidation resistance up to 800 F (425 C) and where parts require welding during fabrication.
4. **COMPOSITION:**

	min	max
Carbon	0.10	0.15
Manganese	0.50	1.25
Silicon	--	0.50
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	15.00	16.00
Nickel	4.00	5.00
Molybdenum	2.50	3.25
Nitrogen	0.07	0.13

- 4.1 **Check Analysis:** Composition variations shall meet the requirements of the latest issue of AMS 2248.
5. **CONDITION:** Unless otherwise specified, material shall be supplied in the following condition:
  - 5.1 **Bars and Forgings:** Solution heat treated, equalized, over-tempered, and descaled,  $\emptyset$  except as specified below.
    - 5.1.1 **Round Bars:** Shall be ground, turned, or polished after heat treatment.
    - 5.1.2 **Squares, Hexagons, and Octagons:** Shall be cold finished prior to heat treatment.
    - 5.1.3 **Flats:** Shall be hot finished prior to heat treatment.
  - 5.2 **Forging Stock:** As ordered by the forging manufacturer.
6. **TECHNICAL REQUIREMENTS:**

Section 8.3 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 issuing technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the reports are responsible for protecting themselves against liability for infringement of patents."

6.1 Heat Treatment: Unless otherwise specified, the product shall be solution treated by heating to  $1900\text{ F} \pm 25$  ( $1037.8\text{ C} \pm 14$ ), holding at heat for 1 - 3 hr, and quenching in water; cooled to not higher than  $-100\text{ F}$  ( $-74\text{ C}$ ), held at this temperature for not less than 3 hr, and warmed in air to room temperature; equalized by heating to  $1425\text{ F} \pm 50$  ( $773.9\text{ C} \pm 28$ ), holding at heat for not less than 3 hr, and cooling in air to not higher than  $80\text{ F}$  ( $26\text{ C}$ ); and overtempered by heating to  $1075\text{ F} \pm 25$  ( $579.4\text{ C} \pm 14$ ) holding at heat for not less than 3 hr, and cooling in air.

∅ 6.2 Hardness: Shall be not higher than Brinell 363 or equivalent.

6.3 Properties After Austenite Conditioning, Sub-Zero Cooling, and Tempering: Material heat treated as in 6.1 shall conform to the following requirements when heat treated as follows: Austenite condition by heating to  $1750 \pm 10$  ( $954.4\text{ C} \pm 5.6$ ), holding at heat for not less than 10 min. but not more than 1 hr, and quenching in water or otherwise cooling as rapidly as possible to room temperature; cooled to not higher than  $-100\text{ F}$  ( $-74\text{ C}$ ), held at this temperature for not less than 3 hr, and warmed in air to room temperature; and tempered by heating to  $1000\text{ F} \pm 25$  ( $537.8\text{ C} \pm 14$ ), holding at heat for not less than 3 hr, and cooling in air.

6.3.1 Tensile Properties (Longitudinal Direction Only):

Tensile Strength, psi	170,000 min
Yield Strength at 0.2% Offset or at 0.0147 in. in 2 in. Extension Under Load ( $E = 29,000,000$ ), psi	155,000 min
Elongation, % in 4D	12 min
Reduction of Area, %	25 min

∅ 6.3.2 Hardness: Rockwell C 37 - 44 or equivalent.

7. QUALITY: Material shall be multiple melted using consumable electrode practice in the remelt cycle, unless otherwise permitted. The product shall be uniform in quality and condition, essentially free of grain boundary carbides, 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 all applicable requirements of the latest issue of AMS 2241.

9. REPORTS:

9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat in the shipment and the results of tests on each size from each heat to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, material specification number, heat number, size, and quantity from each heat. If forgings are supplied, serial number of each forging when required and size of stock used to make the forgings shall also be included.