

AEROSPACE

MATERIAL SPECIFICATIONS

AMS 5638

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

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Revised

STEEL BARS AND FORGINGS, CORROSION RESISTANT
18Cr - 9.5Ni - 0.5Mo - 0.8Al
FREE MACHINING

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: Parts on which the amount of machining warrants use of a free machining grade of steel requiring corrosion resistance similar to the 18-8 type of steel but not subjected to temperatures exceeding 700 F (370 C) during fabrication or in service.

4. COMPOSITION:

Carbon	0.15 max
Manganese	2.00 max
Silicon	1.00 max
Phosphorus	0.040 max
Sulfur	0.11 - 0.16
Chromium	17.00 - 19.00
Nickel	8.50 - 10.50
Molybdenum	0.40 - 0.60
Aluminum	0.60 - 1.00
Copper	0.50 max

- 4.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2248.

5. CONDITION:

- 5.1 Bars and Forgings: Solution heat treated free from continuous carbide network.

5.1.1 Unless otherwise specified, all hexagons, and other bars 2.75 in. and less in diameter or distance between parallel sides shall be cold finished.

5.1.2 Forgings shall not be supplied except when specified on the drawing or purchase order.

- 5.2 Forging Stock: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS:

- 6.1 Hardness:

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 intent 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."

- 6.1.1 Bars: Shall have hardness as follows or equivalent when taken approximately midway between surface and center.

Nominal Diameter or Distance Between Parallel Sides Inches	Hardness, Brinell
Up to 0.75, incl	170 - 255
Over 0.75	140 - 241

- 6.1.2 Forgings: Shall have hardness not higher than Brinell 187 or equivalent.

7. QUALITY: Material shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections, consistent with the type of steel involved, detrimental to fabrication or to performance of parts.

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

- 8.1 For all hexagons, and other bars 2.75 in. and less in diameter or distance between parallel sides, Table I shall apply to diameter or thickness.

- 8.2 For bars, other than hexagons, over 2.75 in. in diameter or distance between parallel sides, Table II shall apply to diameter or thickness.

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. 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 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 statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

10. IDENTIFICATION:

- 10.1 Bars: Individual pieces or bundles shall have attached a metal or plastic tag embossed with the purchase order number, AMS 5638, nominal size, and heat number, or shall be boxed and the box marked with the same information. In addition to the above identification, flats 2 x 1 in. and larger and other bars 1 in. and over in diameter or distance between parallel sides shall be stamped with the heat number within 2 in. of one end.

- 10.2 Forgings: Shall be identified in accordance with the latest issue of AMS 2808.