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

AMS 6302A

Issued 6-15-53
Revised 1-31-64

STEEL BARS AND FORGINGS, LOW ALLOY HEAT RESISTANT
0.65Si - 1.25Cr - 0.50Mo - 0.25V (0.28 - 0.33C)

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 turbine and compressor wheels and bolts for use at temperatures up to 1000 F (540 C).

4. COMPOSITION:

	min	max
Carbon	0.28	0.33
Manganese	0.45	0.65
Silicon	0.55	0.75
Phosphorus	--	0.040
Sulfur	--	0.040
Chromium	1.00	1.50
Molybdenum	0.40	0.60
Vanadium	0.20	0.30

4.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2259, paragraph titled "Low Alloy Steels".

5. CONDITION:

5.1 Bars: In a machinable condition and hot finished having hardness not higher than Brinell 241 or equivalent, except that bars ordered cold finished may have hardness as high as Brinell 248 or equivalent.

5.2 Forgings: Unless otherwise ordered, annealed having hardness not higher than Brinell 241 or equivalent.

5.3 Forging Stock: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS: When ASTM methods are specified for determining conformance to the following requirements, tests shall be conducted in accordance with the issue of the ASTM method listed in the latest issue of AMS 2350.

6.1 Hardenability: Material shall be capable of meeting the following requirements:

6.1.1 Test Specimens: Test specimens, before heat treatment, shall be not shorter than twice the diameter or distance between parallel sides or not shorter than 4 in., whichever is less, and shall have full cross section of the material from which they were cut.

6.1.2 Heat Treatment: Test specimens shall be heated to 1750 F ± 15 (954.4 C ± 8.3), held at heat for 1 - 1.5 hr, and cooled in still air. Specimens shall then be heated to 1100 F ± 10 (593.3 C ± 5.6), held at heat for 6 hr, and cooled in air.

6.1.3 Hardness: Hardness at the center of the test specimen after heat treatment as in 6.1.2 shall be not lower than Brinell 331 or equivalent for sections 2 in. and under, and not lower than Brinell 302 or equivalent for larger sections.

6.2 Grain Size: Predominantly 5 or finer with occasional grains as large as 3 permissible, determined in accordance with ASTM E112, Appendix III, Section A1, Treatment (1) (McQuaid-Ehn Test) or Section A2 Treatment (2) or Treatment (3) if desired.

6.3 Decarburization:

6.3.1 Bars ordered ground, turned, or polished shall be free from decarburization on such ground, turned, or polished surfaces.

6.3.2 Allowable decarburization of bars or billets ordered for redrawing or forging, or to specified microstructural requirements, shall be as agreed upon by purchaser and vendor.

6.3.3 Decarburization of bars to which 6.3.1 or 6.3.2 is not applicable shall be not greater than the following:

Nominal Diameter or Distance Between Parallel Sides Inches	Depth of Decarburization Inch
Up to 0.375, incl	0.015
Over 0.375 to 0.500, incl	0.017
Over 0.500 to 0.625, incl	0.019
Over 0.625 to 1.000, incl	0.022
Over 1.000 to 1.500, incl	0.025
Over 1.500 to 2.000, incl	0.030
Over 2.000 to 2.500, incl	0.035
Over 2.500 to 3.000, incl	0.040
Over 3.000 to 4.000, incl	0.045

6.3.4 Unless otherwise agreed upon by purchaser and vendor, decarburization shall be measured by the microscopic method, or by Rockwell Superficial 30-N scale hardness method, or equivalent hardness testing method, on hardened but untempered specimens protected during heat treatment to prevent changes in surface carbon content.

Ø Depth of decarburization, when measured by a hardness method, is defined as the perpendicular distance from the surface to the non-decarburized depth under that surface below which there is no further increase in hardness. Measurements shall be far enough away from any adjacent surface to be uninfluenced by any decarburization or lack of decarburization thereon.

6.3.4.1 When determining the depth of decarburization, it is permissible to disregard local areas provided the decarburization of such areas does not exceed the limits above by more than 0.005 in. and the width is 0.065 in. or less.

7. QUALITY: Steel shall be aircraft quality and shall conform to the latest issue of AMS 2301. The product shall be uniform in quality and condition, clean, sound, and free
Ø 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 2251; for all hexagons, tolerances for cold finished shall apply.

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, hardenability,
Ø grain size, and cleanliness rating 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 6302A, 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 in. and larger in both dimensions and other bars 2 in. and over in diameter or distance between parallel sides shall be stamped with the heat number within 2 in. of one end.