SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York, N.Y. 10017

AEROSPACE MATERIAL SPECIFICATIONS

AMS 6303A
Superseding AMS 6303
Issued 3-1-55
Revised 4-15-67

STEEL BARS AND FORGINGS, LOW ALLOY HEAT RESISTANT
0.65Si - 1.25Cr - 0.50Mo - 0.85V (0.25 - 0.30C)

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. FORM: Bars, rods, forgings, and forging stock.

3. APPLICATION: Primarily for turbine and compressor wheels and bolts for use at temperatures up to 1050 F (566 C).

4. COMPOSITION:

	min	max
Carbon	0.25	0.30
ø Manganese	0.60	0.90
Silicon	0.55	0.75
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	1.00	1.50
Molybdenum	0.40	0.60
Vanadium	0.75	0.95
Nickel	--	0.50
Copper	--	0.50

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 ø Bars and Rods: 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 ø 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: Test specimens from bars, rods, and forging stock shall be capable of meeting the following requirements:

6.1.1 Test Specimens: Test specimens, before heat treatment, shall be not less than 4 in. long and have full cross section.

6.1.2 Heat Treatment: Heat to 1800 F ± 15 (982.2 C ± 8.3), hold at heat for 1 hr, and cool in still air; then heat to 1200 F ± 10 (648.9 C ± 5.6), hold at heat for 2 hr, and air cool.

6.1.3 Hardness: The hardness at the center of the test specimen after the above heat treatment shall be not lower than Brinell 293 for sections 2 in. and under and not lower than Brinell 277 for larger sections.

6.2 Grain Size: Predominantly 5 or finer with occasional grains as large as 3 permissible, ASTM E112, Ø McQuaid-Ehn test.

6.3 Decarburization:

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

6.3.2 Allowable decarburization of bars and rods 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 and rods 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 Ø surface carbon content. Depth of decarburization, when measured by a hardness method, is defined as the perpendicular distance from the surface to the nondecarburized 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 Ø 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 for bars and rods shall conform to all applicable requirements of the latest issue of AMS 2251.

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, grain size, and AMS 2301 frequency-severity Ø rating for 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.