AEROSPACE MATERIAL SPECIFICATIONS

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

AMS 6342D

Superseding AMS 6342C

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STEEL BARS, FORGINGS, AND TUBING
0.80Cr - 1.0Ni - 0.25Mo (0.38 - 0.43C) (SAE 9840)

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

Ø 2. FORM: Bars, forgings, mechanical tubing, and forging stock.

3. APPLICATION: Primarily for parts which require hardenability and mechanical properties between those of AMS 6322 and AMS 6415. The hardenability of this steel is approximately the same as that of AMS 6412 but for highly stressed parts the latter, with its lower carbon and higher nickel contents, is preferred.

4. COMPOSITION:

	min	max
Carbon	0.38	0.43
Manganese	0.70	0.90
Ø Silicon	0.20	0.35
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	0.70	0.90
Nickel	0.85	1.15
Molybdenum	0.20	0.30
Copper	--	0.35

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

5. CONDITION: Unless otherwise ordered, the product shall be supplied in the following condition:

5.1 Bars: In a machinable condition and hot finished having hardness not higher than Brinell 229 or equivalent, except that bars ordered cold finished may have hardness as high as Brinell 248 or equivalent.

5.2 Forgings: As ordered.

5.3 Mechanical Tubing: In a machinable condition and cold finished, having hardness not higher than Ø Rockwell C 25 or equivalent, except that tubing ordered hot finished shall be furnished in a machinable condition having hardness not higher than Rockwell B 99 or equivalent.

5.4 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: The hardenability shall be J50=11 min and J45=18 min when determined on the standard end-quench test specimen in accordance with the Method of Determining Hardenability published in the latest issue of the SAE Handbook, except that the steel shall be normalized at 1700 F ± 10 (926.7 C ± 5.6) and the test specimen austenitized at 1500 F ± 10 (815.6 C ± 5.6). The hardenability test is not required on a product which will not yield a suitable specimen but the steel from which the product is made shall conform to the hardenability specified.

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

6.3 Decarburization:

6.3.1 Bars and tubing ordered ground, turned, or polished shall be free from decarburization on the ground, turned, or polished surfaces. Inside decarburization of such tubing shall not exceed the maximum depth specified in 6.3.4.

6.3.2 Allowable decarburization of bars, billets, and tubing 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	0.010
Over 0.375 to 0.500, incl	0.012
Over 0.500 to 0.625, incl	0.014
Over 0.625 to 1.000, incl	0.017
Over 1.000 to 1.500, incl	0.020
Over 1.500 to 2.000, incl	0.025
Over 2.000 to 2.500, incl	0.030
Over 2.500 to 3.000, incl	0.035
Over 3.000 to 4.000, incl	0.045

6.3.3.1 Limits for depth of decarburization of bars over 4.000 in. in nominal diameter or distance between parallel sides shall be as agreed upon by purchaser and vendor.

6.3.4 Decarburization of all tubing to which 6.3.1 or 6.3.2 is not applicable shall be not greater than the following:

Nominal Wall Thickness Inches	Depth of Decarburization, Inch	
	ID	OD
Up to 0.109, incl	0.008	0.015
Over 0.109 to 0.203, incl	0.010	0.020
Over 0.203 to 0.400, incl	0.012	0.025
Over 0.400 to 0.600, incl	0.015	0.030
Over 0.600 to 1.000, incl	0.017	0.035
Over 1.000	0.020	0.040

6.3.5 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. 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. Such measurements shall be far enough away from any adjacent surface to be uninfluenced by any decarburization or lack of decarburization thereon.

6.3.5.1 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 from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.