

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 6407A

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

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STEEL

1.2Cr - 2Ni - 0.45Mo (0.27 - 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, forging stock, and mechanical tubing.
3. APPLICATION: Primarily for parts requiring high tensile strength and good ductility with relatively high impact strength and hardness.
4. COMPOSITION:

Carbon	0.27 - 0.33
Manganese	0.60 - 0.80
Silicon	0.40 - 0.70
Phosphorus	0.025 max
Sulfur	0.025 max
Chromium	1.00 - 1.35
Nickel	1.85 - 2.25
Molybdenum	0.35 - 0.55

- 4.1 If size of product is over 100 sq in. in cross sectional area, the chemical composition shall be as agreed upon by purchaser and vendor.
- 4.2 Check Analysis: Composition variations shall conform to the requirements of the latest issue of AMS 2259, paragraph titled "Low Alloy Steels".
5. CONDITION:
 - 5.1 Bars: In a machinable condition 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 Mechanical Tubing: In a machinable condition, unless otherwise specified.
 - 5.3 Forgings: As ordered.
 - 5.4 Forging Stock: As ordered by the forging manufacturer.
6. TECHNICAL REQUIREMENTS:
 - 6.1 Hardenability: Shall be J48 = 4 min and J47 = 20 min when determined by the standard end-quench test specimen in accordance with the SAE Method of Determining Hardenability published in the latest issue of the SAE Handbook, except that the steel shall be normalized at 1700 F $\pm$ 10 and the test specimen austenitized at 1550 F $\pm$ 10. 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 in this paragraph.

- 6.2 Grain Size: Predominantly 5 or finer with occasional grains as large as 3 permissible as determined by comparison of a polished and etched specimen with the chart in ASTM E112-58T.
- 6.3 Impact Strength: The Izod impact value shall be not less than 15 ft-lb when tested at room temperature in accordance with ASTM E23-56T using a V-notched specimen. Specimens, before test, shall have hardness not lower than Rockwell C 46 after being quenched in oil from 1600 F $\pm$ 10 and tempered at not lower than 400 F. Before heat treatment, specimens shall be to size or approximately to size, except for the notch. Specimens shall be longitudinal and taken from sections rolled or forged, from full cross section in the case of section sizes 8 x 8 in. or smaller, or from quartered sections for section sizes over 8 x 8 in., to not over 2 in. round or square. The impact test is not required for tubing from which standard impact specimens cannot be made.
- 6.4 Inclusion Rating: Material shall be subject to inclusion rating requirements as determined by magnetic particle inspection methods in accordance with the latest issue of AMS 2301, unless such inspection be waived.
- 6.5 Decarburization:
- 6.5.1 Bars or tubing ordered ground, turned, or polished shall be free from decarburization on such ground, turned, or polished surfaces. Inside decarburization on such tubing shall not exceed the maximum depth specified in 6.5.4.
- 6.5.2 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.
- 6.5.3 Decarburization of bars to which 6.5.1 or 6.5.2 is not applicable shall be not greater than the following:

Nominal Diameter or Distance Between Parallel Sides Inches	Depth of Decarburization Inch
0.375 and under	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	0.040

- 6.5.4 Decarburization of all tubing to which 6.5.1 or 6.5.2 is not applicable shall be not greater than the following:

Nominal Wall Thickness Inches	Depth of Decarburization, Inch	
	Inside	Outside
0.109 and under	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