AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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New York City

AMS 6407

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Revised

STEEL
1.2Cr - 2Ni - 0.45Mo (0.27-0.33C)

1. ACKNOWLEDGMENT: A vendor shall mention this specification number 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:

		Check Analysis Under Min	or Over Max
Carbon	0.27 - 0.33	0.02	0.02
Manganese	0.60 - 0.80	0.03	0.03
Silicon	0.40 - 0.70	0.05	0.05
Phosphorus	0.025 max	--	0.005
Sulfur	0.025 max	--	0.005
Chromium	1.00 - 1.35	0.05	0.05
Nickel	1.85 - 2.25	0.07	0.07
Molybdenum	0.35 - 0.55	0.03	0.03

4.1 If size is over 100 sq in. in cross sectional area, the chemical composition shall be as agreed upon by purchaser and vendor.

5. CONDITION:

5.1 Bars: In a machinable condition having hardness not higher than Brinell 241 or equivalent, except that, if ordered finished, hardness may be as high as Brinell 248 or equivalent.

5.2 Tubing: Unless otherwise specified, in a machinable condition.

5.3 Forgings: As ordered.

5.4 Forging Stock: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS:

6.1 Hardenability: The 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 ± 10 and the test specimen austenitized at 1550 F ± 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: Five or finer, ASTM E19, method a. A heat of steel predominantly five or finer with grains as large as three is permissible.

6.3 Impact Strength: The Izod impact value shall be not less than 20 ft-lb when tested at room temperature in accordance with ASTM E23 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 ± 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 Decarburization:

6.4.1 Bars or tubing ordered ground, turned, or polished shall be free from decarburization on such ground, turned or polished surfaces. Inside decarburization of such tubing shall not exceed the maximum depth specified in 6.4.4.

6.4.2 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.

6.4.3 Decarburization of bars to which 6.4.1 or 6.4.2 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

6.4.4 Decarburization of all tubing to which 6.4.1 or 6.4.2 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

6.4.5 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 specimens. Depth of decarburization, when measured by a hardness method, is defined as the distance measured from the nearest original surface to the point at which no increase in hardness is found.

6.4.5.1 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. Material shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

8. TOLERANCES: Unless otherwise specified, tolerances shall conform to the following:

8.1 Bars: The latest issue of AMS 2251 as applicable. Diameter or thickness tolerances for cold finished bars and all hexagons shall conform to Table I, column headed "over 0.28 to 0.55 incl".

8.2 Tubing: The latest issue of AMS 2253 as applicable to Mechanical Type.

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, grain size, and impact value 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 and Tubing: Individual pieces or bundles shall have attached a metal tag stamped with the purchase order number, AMS 6407, 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.

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