AERONAUTICAL MATERIAL SPECIFICATION

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STEEL BARS AND FORGINGS
1Ni-.8Cr-.25Mo (.38-.43C)

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

2. FORM: Bars, billets, and forgings.

3. APPLICATION: For parts which require hardenability and physical properties between 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:

		Check Analysis Under Min or Over Max
Carbon	0.38 - 0.43	0.02
Manganese	0.70 - 0.90	0.03
Phosphorus	0.040 max	0.005
Sulfur	0.040 max	0.005
Silicon	0.20 - 0.35	0.02
Nickel	0.85 - 1.15	0.05
Chromium	0.70 - 0.90	0.03
Molybdenum	0.20 - 0.30	0.02

5. CONDITION: (a) Unless otherwise ordered, bars shall be supplied in a machinable condition with hardness of not higher than Brinell 229, except that if cold-drawn bars are ordered, hardness as high as Brinell 241 is permissible.

(b) Stock ordered for forging shall be supplied as ordered by the forging manufacturer.

(c) Forgings shall be supplied as ordered.

6. HARDENABILITY: The hardenability shall be J50=11 min and J45=18 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 1525 F±10.

7. GRAIN SIZE: Five or finer, ASTM E19-39T, method a, unless otherwise specified. A heat of steel predominantly five or finer with grains as large as three is permissible.

8. DECARBURIZATION: (a) Bars ordered ground, turned, or polished shall be free from decarburization.

(b) Allowable decarburization of bars ordered for redrawing or for forgings, or to specified microstructural requirements, shall be as agreed between purchaser and vendor.

(c) Decarburization of all bars to which (a) or (b) above is not applicable shall be not greater than the following:

Diameter or Distance Between Parallel Sides Inches	Maximum 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 1.00 , incl	0.017
Over 1.00 to 1.50 , incl	0.020
Over 1.50 to 2.00 , incl	0.025
Over 2.00 to 2.50 , incl	0.030
Over 2.50 to 3.00 , incl	0.035
Over 3.00	0.040

(d) Unless otherwise agreed between 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 quenched specimens. Depth of decarburization is defined as the distance measured from the nearest original surface to the point at which no increase in hardness is found.

9. QUALITY: (a) Steel shall be aircraft quality. It shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts. Steel in which defects are revealed during fabrication will be subject to rejection.

(b) Steel and parts shall be subject to inspection by any method which will reveal defects.

10. TOLERANCES: Unless otherwise specified, tolerances shall conform to 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 "Mean of Carbon .45% and less."

11. REPORTS: (a) Unless otherwise specified, the vendor of the product shall furnish three copies of a notarized report of the results of tests for chemical composition, hardenability, and grain size of each heat in each shipment. This report shall include the purchase order number, heat number, material specification number, size, and quantity in each heat. If forgings are supplied, the part number and size of steel used to make the forgings shall also be included.