AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 5620A

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STEEL, CORROSION AND MODERATE HEAT RESISTANT
13Cr (0.30 - 0.40C) (SAE 51420F)
Free-Machining

1. ACKNOWLEDGMENT: 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: Primarily for parts requiring hardness within the range of Rockwell C 40 - 50, with corrosion resistance and oxidation resistance up to 1000 F, but useful at the higher temperatures only when stresses are moderately low.

4. COMPOSITION:

		Check Analysis Under Min	Check Analysis Over Max
Carbon	0.30 - 0.40	0.02	0.02
Manganese	1.25 max	--	0.04
Silicon	1.00 max	--	0.05
Phosphorus	0.040 max	--	0.005
*Sulfur	0.030 max	--	0.005
Chromium	12.00 - 14.00	0.15	0.15
Nickel	0.50 max	--	0.03
Molybdenum or Zirconium	0.60 max	--	0.05
*Selenium	0.18 - 0.35	0.03	0.03

*Sulfur may be present in the range 0.15 - 0.35% if selenium is absent; in such case, check analysis for sulfur shall be 0.02% under min or over max.

5. CONDITION:

5.1 Bars: Free-machining, cold rolled or hot drawn, having hardness of Brinell 187-241 or equivalent, unless otherwise specified.

5.2 Forgings: As ordered.

5.3 Forging Stock: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS:

6.1 Hardenability: Material shall be capable of meeting the following test:

6.1.1 Specimens 1/2 in. thick, cut from a bar or forging, shall be heated to 1825 F + 10, held for 25 minutes and quenched in commercial paraffin oil (100 SUS at 100 F) at room temperature. Hardness of such specimens shall be not lower than Rockwell C 50.

6.2 Decarburization:

6.2.1 Bars ordered ground, turned or polished shall be free from decarburization.

6.2.2 Allowable decarburization of bars ordered for redrawing or forging, or to definite microstructural requirements, shall be as agreed upon by purchaser and vendor.

6.2.3 Decarburization of all bars to which 6.2.1 or 6.2.2 is not applicable shall be not greater than the following:

Nominal 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 1.000, 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

6.2.4 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 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.

7. QUALITY: Material shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external defects, consistent with the type of steel involved, detrimental to fabrication or to performance of parts.

8. TOLERANCES: Unless otherwise specified, tolerances for bars shall conform to the latest issue of AMS 2241 as applicable. Thickness tolerances for all hexagons shall conform to Table I.

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 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.