# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

**AMS 5620B**

Issued 7-1-45
Revised 6-15-52


## 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, forgings, and forging stock.

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 |

4.1 *Selenium may be absent, but in such case sulfur shall be 0.15-0.35% with check analysis 0.02% under min or over max.

5. CONDITION:

5.1 Bars: Free-machining, cold drawn or hot rolled, having hardness not higher than Brinell 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 at heat for 25 min. and cooled in still air to 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 specified 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 Inch | 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, 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.

6.2.4.1 When determining the depth of decarburization, it is permissible to disregard local areas provided the decarburization of such areas does not exceed the above limits by more than 0.005 in. and the width is 0.065 in. or less.

7. QUALITY: Material shall be uniform in quality and condition, clean, 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 shall conform to the latest issue of AMS 2241 as applicable. Thickness tolerances for all hexagons shall conform to Table 1.

9. REPORTS:

9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of areport 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.