

AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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Revised

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

1. ACKNOWLEDGMENT: A vendor shall mention this specification number 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 800 F, but useful at the higher temperatures only when stresses are moderately low.
4. COMPOSITION:

		Check Analysis	
		Under Min	or Over Max
Carbon	0.30 - 0.40	0.02	0.02
Manganese	1.00 max	--	0.03
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	0.50 max	--	0.03

5. CONDITION:

- 5.1 Bars: All hexagons, and other bars 2.75 in. and less in diameter or distance between parallel sides shall be cold finished. All bars shall have hardness not higher than Brinell 241 or equivalent.
- 5.2 Forgings: As ordered.
- 5.3 Forging Stock: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS:

- 6.1 Hardenability: Material 0.5 in. and less in thickness and 0.5 in. thick specimens cut from larger bars and forgings shall be capable of meeting the following test:
 - 6.1.1 Specimens shall be heated to 1825 F \pm 10, held for 25 min. and cooled in air. 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.

Section 7C of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

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	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, 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 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.