AERONAUTICAL MATERIAL SPECIFICATION

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

AMS 5642A

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STEEL, CORROSION AND HEAT RESISTANT
18Cr - 11Ni - Cb
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: Rods, bars, billets, and forgings.

3. APPLICATION: Parts on which the amount of machining warrants use of a free-machining grade of steel, requiring corrosion resistance similar to the 18-8 types of steel and which will be subjected to high temperatures during fabrication or in service, except that it is not intended for parts to be fusion welded.

4. COMPOSITION:

		Check Analysis Under Min	or Over Max
Carbon	0.08 max	--	0.01
Manganese	2.00 max	--	0.04
Silicon	1.00 max	--	0.05
Phosphorus	0.11 - 0.17	0.010	0.010
Sulfur	0.030 max	--	0.005
Chromium	17.00 - 19.00	0.20	0.20
Nickel	9.00 - 12.00	0.15	0.15
Columbium	10xC - 1.00	0.05	0.05
Selenium	0.15 - 0.35	0.03	0.03
Molybdenum	0.50 max	--	0.03
Copper	0.50 max	--	0.03

5. CONDITION:

5.1 Unless otherwise specified, the product shall be solution heat treated free from continuous carbide network.

5.2 Unless otherwise specified, all hexagons, and other shapes of rods and bars up to and including 2.75 in. in diameter or distance between parallel sides shall be cold-finished.

5.3 Forging stock shall be supplied as ordered by the forging manufacturer.

5.4 Forgings shall not be supplied except when specified on the drawing or purchase order.

6. TECHNICAL REQUIREMENTS:

6.1 Hardness: Rods and bars shall have hardness as follows when taken midway between center and surface:

6.1.1 Rods and bars up to and including 0.75 in. in diameter or distance between parallel sides shall have hardness of Brinell 170-255 or equivalent.

6.1.2 Rods and bars over 0.75 to 1.50 in., incl. in diameter or distance between parallel sides shall have hardness of Brinell 163-255 or equivalent.

6.1.3 Rods and bars over 1.50 in. in diameter or distance between parallel sides shall have hardness of Brinell 140-241 or equivalent.

6.2 Embrittlement: Unless otherwise specified, the product shall be capable of meeting the following test:

Embrittlement test specimens, after being heated at 1200 F for 2 hr and air cooled, shall withstand immersion for 48 hr in a boiling aqueous solution containing 100 g of $CuSO_4.5H_2O$ and 100 ml of H_2SO_4 (sp gr 1.84) per liter of solution under a reflux condenser, without evidence of inter-crystalline surface attack. After such immersion, the specimens shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to the thickness of the specimen.

7. QUALITY: The product 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 following:

8.1 Rods and Bars: Shall conform to the latest issue of AMS 2241 as applicable and as specified below:

8.1.1 Diameter or thickness of all hexagons, and other shapes of rods and bars 2.75 in. and less in diameter or distance between parallel sides, shall conform to Table I.

8.1.2 Diameter or thickness of rods and bars, other than hexagons, over 2.75 in. in diameter or distance between parallel sides shall conform to Table II.

9. REPORTS:

9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a notarized 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 notarized 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 certification that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

10. IDENTIFICATION: