



AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 5761

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Revised

STEEL BARS, FORGINGS, AND RINGS, CORROSION RESISTANT 15Cr - 20Co - 2.75Mo

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. FORM: Bars, forgings, flash welded rings, and stock for forgings or flash welded rings.
3. APPLICATION: Primarily for parts requiring corrosion resistance and high strength at temperatures up to 1000 F (537 C).
4. COMPOSITION:

	min	max
Carbon	--	0.03
Manganese	--	0.10
Silicon	--	0.10
Phosphorous	--	0.015
Sulfur	--	0.015
Chromium	14.50 - 16.00	
Cobalt	19.00 - 21.00	
Molybdenum	2.50 - 3.00	
Nickel	--	0.20
Iron	remainder	

- 4.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2248.
5. CONDITION: Unless otherwise ordered, the product shall be supplied in the following condition:
 - 5.1 Bars, Forgings, and Flash Welded Rings: Solution heat treated as in 6.1.1 and descaled, having hardness not higher than Rockwell C 35 or equivalent.
 - 5.1.1 Bars shall be hot finished; round bars shall be ground or turned.
 - 5.1.2 Flash welded rings shall not be supplied unless specified or permitted on purchaser's part drawing. When supplied, they shall be manufactured in accordance with the latest issue of AMS 7490, unless otherwise specified.
 - 5.2 Stock for Forgings or Flash Welded Rings: As ordered by the forging or flash welded ring manufacturer.
6. TECHNICAL REQUIREMENTS:
 - 6.1 Bars, Forgings, and Flash Welded Rings:
 - 6.1.1 Heat Treatment: The product shall be solution heat treated by heating to 1700 F $\pm$ 25 (926.7 C $\pm$ 14), holding at 1700 F $\pm$ 25 (926.7 C $\pm$ 14) for 30 min., and rapidly quenching in oil or water:

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6.1.2 Properties After Precipitation Heat Treatment: The product shall conform to the following requirements after being precipitation heat treated by heating to $1025\text{ F} \pm 15$ ($551.7\text{ C} \pm 8.3$), holding at heat for 4 hr, and cooling in air.

6.1.2.1 Tensile Properties at Room Temperature:

Tensile Strength, psi	225,000 min
Yield Strength at 0.2% Offset or at 0.0169 in. in 2 in. Extension Under Load ($E = 31,000,000$), psi	200,000 min
Elongation, % in 2 in. or 4D	10 min
Reduction of Area (round specimens), %	50 min

6.1.2.2 Hardness: Rockwell C 46 - 50 or equivalent.

6.1.3 Other Precipitation Heat Treatment: Properties after precipitation heat treatment at temperatures other than $1025\text{ F} \pm 15$ ($551.7\text{ C} \pm 8.3$) shall be as agreed upon by purchaser and vendor.

6.2 Forging Stock: When a sample of stock is forged to a test coupon and heat treated as in 6.1.1 and 6.1.2, specimens taken from the heat treated coupon shall conform to the requirements of 6.1.2.1 and 6.1.2.2. If specimens taken from the stock after heat treatment as in 6.1.1 and 6.1.2 conform to the requirements of 6.1.2.1 and 6.1.2.2, the tests shall be accepted as equivalent to tests of the forged coupon.

6.3 Stock for Flash Welded Rings: Specimens taken from stock heat treated as in 6.1.1 and 6.1.2 shall conform to the requirements of 6.1.2.1 and 6.1.2.2.

7. QUALITY: Material shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

8. TOLERANCES: Unless otherwise specified, tolerances for bars shall conform to all applicable requirements of the latest issue of AMS 2241.

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 and for tensile properties and hardness of each size from each heat after specified precipitation heat treatment. 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 direct supplier of material, precipitation heat treatment conditions if different from those of 6.1.2, 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.

10. IDENTIFICATION: Unless otherwise specified, the product shall be identified as follows:

10.1 Bars:

10.1.1 Each straight bar 0.500 in. and over in OD or least width of flat surface shall be marked in a row of characters recurring at intervals not greater than 3 ft with AMS 5761, heat number, and manufacturer's identification. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be capable of being removed in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the material or its performance and shall be sufficiently stable to withstand normal handling.