Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 1000

AEROSPACE MATERIAL SPECIFICATION

AMS 5622

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Revised

STEEL BARS, FORGINGS, TUBING AND RINGS, CORROSION RESISTANT
17Cr - 4.0Ni - 4.0Cu
Consumable Electrode Melted

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.

2. FORM: Bars, wire, forgings, mechanical tubing, flash welded rings, and stock for forging or flash welded rings.

3. APPLICATION: Primarily for parts requiring corrosion resistance and high strength at service temperatures up to 600 F (316 C). For applications where stress corrosion cracking is a possibility, such as threaded parts, the material should be precipitation heat treated at not lower than 1025 F (552 C) for 4 hours.

4. COMPOSITION:

	min	max
Carbon	--	0.07
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.025
Sulphur	--	0.025
Chromium	15.50	17.50
Nickel	3.00	5.00
Columbium + Tantalum	0.15	0.45
Copper	3.00	5.00
Molybdenum	--	0.50

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, Wire, Forgings, Mechanical Tubing, and Flash Welded Rings: Solution heat treated as in 6.1.1.

5.1.1 Bars:

5.1.1.1 Rounds: Centerless ground after solution heat treatment.

5.1.1.2 Hexagons: Cold drawn after solution heat treatment and descaling.

5.1.1.3 Squares and Flats: Hot finished before solution heat treatment and descaling.

5.1.2 Wire: Cold drawn after solution heat treatment and descaling.

5.1.3 Forgings: Descaled after solution heat treatment.

5.1.4 Mechanical Tubing: Cold drawn after solution heat treatment and descaling.

5.1.5 Flash Welded Rings: Descaled after solution heat treatment.

5.1.5.1 Flash welded rings shall not be supplied unless specified or permitted on the purchaser's part drawing. When supplied, they shall be manufactured in accordance with the latest issue of AMS 7490.

5.2 Stock for Forging or Flash Welded Rings: As ordered by the forging or flash welded ring manufacturer.

6. TECHNICAL REQUIREMENTS:

6.1 Bars, Wire, Forgings, Mechanical Tubing, and Flash Welded Rings:

6.1.1 Heat Treatment: The product shall be solution heat treated by heating to 1900 F ± 25 (1037.8 C ± 14) and cooling as required to below 90 F (32 C).

6.1.1.1 Flash welded rings may be solution heat treated twice as in 6.1.1.

6.1.2 Hardness:

6.1.2.1 Bars: Shall have hardness not higher than Brinell 363 or equivalent when taken midway between surface and center.

6.1.2.2 Forgings, Tubing, and Flash Welded Rings: Shall have hardness not higher than Brinell 363 or equivalent.

6.1.3 Tensile Strength of Wire: Shall be not higher than 175,000 psi.

6.1.4 Properties After Precipitation Heat Treatment: Specimens taken from the product shall conform to the following requirements after being heated to 900 F ± 10 (482.2 C ± 5.6), held at heat for 1 hr, and air cooled.

6.1.4.1 Tensile Properties:

Nominal Diameter or Distance Between Parallel Sides Inches	Orientation	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at 0.0159 in. in 2 in. Extension Under Load (E = 28,500,000) psi, min	Elongation % in 2 in. or 4D min	Reduction of Area % min
Up to 3.00, incl	Longitudinal	190,000	170,000	11	42
Over 3.00 to 8.00, incl	Longitudinal	190,000	170,000	11	38
Over 3.00 to 8.00, incl	Transverse	190,000	170,000	5	12

6.1.4.1.1 Longitudinal test requirements apply to specimens taken parallel to the direction of rolling or drawing from bars, wire, and tubing, to specimens taken approximately parallel (± 10 deg) to the flow lines of forgings, and to specimens taken in the circumferential direction from parent metal of flash welded rings; transverse test requirements apply to all other specimens.

6.1.4.2 Hardness: Bars, forgings, tubing, and flash welded rings shall have hardness of Brinell 375 - 461.

6.1.5 Other Precipitation Heat Treatments: Properties after precipitation heat treatments other than as in 6.1.4 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 6.1.4, specimens taken from the heat treated coupon shall conform to the requirements of 6.1.4.1 and 6.1.4.2. If specimens taken from the stock after heat treatment as in 6.1.1 and 6.1.4 conform to the requirements of 6.1.4.1 and 6.1.4.2, the tests shall be accepted as equivalent to the tests of the forged coupons.

6.3 Stock for Flash Welded Rings: A sample of stock heat treated as in 6.1.1 and 6.1.4 shall conform to the requirements of 6.1.4.1 and 6.1.4.2.

7. QUALITY: Material shall be multiple melted using consumable electrode practice in the remelt cycle and shall conform to the latest issue of AMS 2300. The product shall be uniform in quality and condition, 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 shall conform to all applicable requirements of the following:

8.1 Bars and Wire: The latest issue of AMS 2241. For sizes not covered by AMS 2241, the tolerances shall be as agreed upon by purchaser and vendor.

8.2 Tubing: The latest issue of AMS 2243.

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 and AMS 2300 frequency-severity rating of each heat in the shipment and for tensile properties and hardness of each size from each heat. A heat shall be the consumable electrode remelted ingots produced from steel originally melted in a single furnace charge. When permitted by purchaser, a heat may be the consumable remelted product of individual melts of similar composition produced from the same lots of controlled raw material and having the same average composition as agreed upon by purchaser and vendor. 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, precipitation heat treatment conditions if different from those of 6.1.4, 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, Wire, and Tubing:

10.1.1 Each straight bar and tube 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 5622, 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.

10.1.2 Straight bars, wire and tubes less than 0.500 in. in OD or least width of flat surface shall be securely bundled and identified by a metal or plastic tag embossed with the purchase order number, AMS 5622, heat number, nominal size, and manufacturer's identification and attached to each bundle or shall be boxed and the box marked with the same information.

10.1.3 Coiled bars and wire shall be securely bundled and identified by a metal or plastic tag embossed with the purchase order number, AMS 5622, heat number, nominal size, and manufacturer's identification and attached to each coil or shall be boxed and the box marked with the same information.

10.2 Forgings: Shall be identified in accordance with the latest issue of AMS 2808.

10.3 Flash Welded Rings: Shall be identified as agreed upon by purchaser and vendor.