AEROSPACE MATERIAL SPECIFICATIONS

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York, N.Y. 10017

AMS 5759C

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ALLOY BARS, FORGINGS, AND RINGS, CORROSION AND HEAT RESISTANT
Cobalt Base - 20Cr - 10Ni - 15W

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, flash welded rings, and stock for forgings or flash welded rings.

3. APPLICATION: Primarily for parts and assemblies requiring high strength up to approximately 1500 F (816 C) and oxidation resistance up to 2000 F (1093 C).

4. COMPOSITION:

	min	max
Carbon	0.05	0.15
Manganese	1.00	2.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	19.00	21.00
Nickel	9.00	11.00
Tungsten	14.00	16.00
Iron	--	3.00
Cobalt	remainder	

4.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2248 except that check analysis limits for tungsten shall be 0.10 under min or over max and for iron shall be 0.010 over maximum.

5. CONDITION:

5.1 Bars, Forgings, and Flash Welded Rings: Solution heat treated, unless otherwise specified.

5.1.1 Bars shall be hot rolled.

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 2250 F ± 25 (1232.2 C ± 14), holding at heat for not less than 15 min., and either quenching in water or rapid air cooling.

6.1.2 Hardness:

6.1.2.1 Bars: Shall have hardness not higher than Brinell 275 or equivalent when taken approximately midway between surface and center.

6.1.2.2 Forgings and Flash Welded Rings: Shall have hardness not higher than Brinell 248 or equivalent.

6.1.3 Tensile Properties: Specimens taken from bars and forgings, and from parent metal of flash welded rings shall conform to the following requirements:

Tensile Strength, psi	125,000 min
Yield Strength at 0.2% Offset or at 0.0066 in. in 2 in. Extension Under Load (E = 34,200,000), psi	45,000 min
Elongation, % in 2 in. or 4D	30 min

6.1.4 Stress-Rupture Test at 1500 F (815.6 C): Specimens taken from bars and forgings, and from parent metal of flash welded rings, shall be capable of meeting the following requirements:

6.1.4.1 A tensile specimen maintained at 1500 F ± 5 (815.6 C ± 2.8) while an axial stress of 24,000 psi is applied continuously, shall not rupture in less than 24 hours. The test shall be continued, after the 24 hr, until the specimen ruptures. Elongation after rupture, measured at room temperature, shall be not less than 10% in 4D.

6.1.4.1.1 The test of 6.1.4.1 may be conducted at a stress higher than 24,000 psi but stress shall not be changed while test is in progress, unless otherwise permitted. Time to rupture and elongation requirements shall be as specified in 6.1.4.1.

6.2 Stock for Forging and Flash Welding: When a sample of stock is forged to a test coupon and heat treated as in 6.1.1, specimens taken from the heat treated coupon shall conform to the requirements of 6.1.2.2, 6.1.3, and 6.1.4. If specimens taken from the stock after heat treatment as in 6.1.1 conform to the requirements of 6.1.2.2, 6.1.3, and 6.1.4, the tests shall be accepted as equivalent to tests of the forged coupon.

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 2261.

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 the results of tests on each size from each heat to determine conformance to the tensile property requirements of this specification. 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 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.