AERONAUTICAL MATERIAL SPECIFICATION

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

AMS 5668D

Issued 12-1-47
Revised 12-1-53

ALLOY, CORROSION AND HEAT RESISTANT
Nickel Base - 15.5Cr - 7Fe - 2.5Ti - 1(Cb+Ta) - 0.7Al

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, and forging stock.

3. APPLICATION: Primarily for parts, such as bolts and turbine blades or buckets, requiring oxidation resistance and high strength at 1250-1500 F.

4. COMPOSITION:

	Carbon	0.08 max
	Manganese	1.0 max
	Silicon	0.5 max
ø	Sulfur	0.01 max
	Chromium	14.0 - 17.0
	Nickel + Cobalt	70.0 min
	Cobalt, if determined	1.0 max
	Columbium + Tantalum	0.7 - 1.2
	Titanium	2.25 - 2.75
	Aluminum	0.40 - 1.0
	Iron	5.0 - 9.0
	Copper	0.5 max

5. CONDITION:

5.1 Bars: Hot finished and fully heat treated, unless otherwise specified.

5.1.1 Round bars shall be ground or turned.

5.2 Forgings: Fully heat treated, unless otherwise specified.

5.3 Forging Stock: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS:

6.1 Heat Treatment: Bars and forgings shall be fully heat treated by heating to 2100 F ± 25, holding at heat for 2-4 hr followed by air cooling, then by ø heating to 1550 F ± 25, holding at heat for 24 hr followed by cooling to 1300 F or lower in 2 hr or less either in air or in the furnace, and then by heating to, or continuing at, 1300 F ± 25, holding at heat for 20 hr followed by air cooling.

6.2 Hardness: Bars and forgings shall have hardness of Brinell 262-341 or equivalent.

6.3 Stress-Rupture Test at 1350 F: Specimens taken from bars, and from forging stock heat treated as in 6.1, shall meet the following requirement:

6.3.1 A tensile test specimen, maintained at a temperature of 1350 F ± 5 while an axial load of 45,000 psi is applied continuously, shall not rupture in less than 100 hours. The test shall be continued, after the 100 hr, until the specimen ruptures, either maintaining the same load or increasing the load to not over 70,000 psi as necessary to produce rupture. In either case, the elongation after rupture, measured at room temperature, shall be not less than 5% in 4D.

7. QUALITY: Material shall be uniform in quality and condition, clean, 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 shall conform to the latest issue of AMS 2261 as applicable and as specified below:

8.1 Diameter: Table VI.

8.2 Width and Thickness: Table IV.

Ø 8.3 Straightness: Rounds, 6.4. Other than rounds, 6.3.

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 of tests to determine conformance to the requirements of Section 6. 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.

10. IDENTIFICATION:

10.1 Bars: Individual pieces or bundles shall have attached a metal tag stamped with the purchase order number, AMS 5668D, nominal size, and heat number, or shall be boxed and the box marked with the same information. In addition to the above identification, bars 0.5 in. and over in diameter or distance between parallel sides shall be stamped with the heat number within 2 in. of one end.

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