AERONAUTICAL MATERIAL SPECIFICATION

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

AMS 5728

Issued 12-1-51
Revised

STEEL, CORROSION AND HEAT RESISTANT
16Cr - 25Ni - 6Mo
Kellogg Electric Ingot Process

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

2. FORM: Forgings

3. APPLICATION: Primarily for turbine wheels and discs, for use up to 1350 F.

4. COMPOSITION:

		Check Analysis Under Min	Check Analysis Over Max
Carbon	0.12 max	---	0.01
Manganese	2.00 max	---	0.04
Silicon	1.00 max	---	0.05
Phosphorus	0.030 max	---	0.005
Sulfur	0.030 max	---	0.005
Chromium	15.00 - 17.50	0.20	0.20
Nickel	24.00 - 27.00	0.20	0.20
Molybdenum	5.50 - 7.00	0.10	0.10
Nitrogen	0.10 - 0.20	0.03	0.03
Copper	0.50 max	---	0.03

5. CONDITION:

5.1 Ingots for forging stock shall be prepared as ordered by the forging manufacturer.

5.2 Unless otherwise specified, ingots shall be hot forged, and resulting forgings hot-cold worked and stress relieved as follows:

5.2.1 Hot forging of ingots into required shape for subsequent hot-cold working shall be done by pressing or hammering. The temperature to which stock for pressing or hammering shall be heated shall not exceed 2000 F and stock shall be thoroughly and uniformly heated throughout the sections before any working is done. The temperature at which hot working shall cease shall be not lower than 1780 F.

5.2.2 When a forging has been finished to desired hot shape, it shall be cooled in still air to room temperature and inspected for surface imperfections. Imperfections of such a nature as small cracks or seams, may be removed by grinding or other suitable means.

5.2.3 The forging shall be hot-cold worked as follows: Heat uniformly throughout to a temperature not higher than 1260 F and then work to finished size in suitable dies, either by pressing or hammering.

5.2.4 Forgings shall be stress-relieved by heating at 1200-1220 F, holding at temperature not less than 4 hr per inch of maximum cross section, followed by air cooling.

6. TECHNICAL REQUIREMENTS:

6.1 Tensile Properties: Unless otherwise specified, specimens cut from forgings with the axis approximately parallel to the forging flow lines shall conform to the following requirements:

Tensile Strength, psi	100,000 min
Yield Strength at 0.2% offset or at 0.0096 inch in 2 in. extension under load (Based on E=28,500,000), psi	80,000 min
Elongation, % in 4D	10 min
Reduction of Area, %	15 min

6.2 Hardness: Brinell 241-293 or equivalent.

6.3 Stress-Rupture Test at 1200 F: Specimens cut from forgings with the axis approximately parallel to the forging flow lines shall be capable of meeting the following requirements:

6.3.1 A tensile test specimen, maintained at 1200 F ± 3 while an axial load of 44,000 psi is applied continuously, shall not rupture in less than 100 hours. The test shall be continued, after the 100 hours, until the specimen ruptures, either maintaining the same load or increasing the load to not over 50,000 psi as necessary to produce rupture. In either case, the elongation after rupture measured at room temperature shall be not less than 15% in 4D.

7. QUALITY:

7.1 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.

7.2 Unless otherwise specified, ingots for forging stock shall be inspected by such processes as may be agreed upon by purchaser and vendor, to determine the fitness of the material for making finished forgings.

7.3 Inspection standards and procedures for finished forgings shall be as agreed upon by purchaser and vendor.

8. REPORTS:

8.1 Unless otherwise specified, the vendor of forgings shall furnish with each shipment three copies of a report of the results of tests for chemical composition and tensile properties. This report shall include the purchase order number, part number or size, serial number of each forging when required, ingot number, and material specification number.