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# AEROSPACE MATERIAL SPECIFICATION

AMS 5728B

Issued 12-1-51  
Revised 10-1-82

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

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of 10-29-68. It is recommended, therefore, that this specification not be specified for new designs.

This cover sheet should be attached to the "B" revision of the subject specification.

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This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of 10-1-82. By this action, subject specification number and title will be deleted from the active specification index of Aerospace Material Specifications.

This specification is under the jurisdiction of AMS Committee "F".

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# AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
40 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AMS 5728B

Issued 12-1-51  
Revised 6-30-57

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

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. FORM: Ingots, forgings, and forging stock.
3. APPLICATION: Primarily for parts and assemblies, such as turbine wheels and discs, for use at temperatures up to 1350 F.
4. COMPOSITION:

|            |               |
|------------|---------------|
| Carbon     | 0.08 max      |
| Manganese  | 2.00 max      |
| Silicon    | 1.00 max      |
| Phosphorus | 0.030 max     |
| Sulfur     | 0.030 max     |
| Chromium   | 15.00 - 17.50 |
| Nickel     | 24.00 - 27.00 |
| Molybdenum | 5.50 - 7.00   |
| Nitrogen   | 0.10 - 0.20   |
| Copper     | 0.50 max      |

- 4.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2240.

5. CONDITION:

- 5.1 Ingots, billets, or shapes for forging shall be supplied in the condition and finish ordered by the forging manufacturer. Shapes for forging may be produced from ingot by extruding, pressing, or hammering.
- 5.2 Unless otherwise specified, shapes shall be hot forged and the resulting forgings hot-cold worked and stress relieved as follows:
  - 5.2.1 Hot forging of shapes into required configuration 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 1600 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 such as small cracks or seams, which would not affect the final hot-cold working operation or use of the forging for service requirements, may be removed by grinding or other suitable means.

- 5.2.3 The forging shall be hot-cold worked as follows: It shall, in a period of 4 - 6 hr, be heated uniformly throughout to a temperature of 1225 - 1260 F and then worked to finished size in suitable dies either by pressing or hammering.
- 5.2.4 Forgings shall be stress relieved by heating to 1200 - 1220 F, holding at  $\emptyset$  heat for not less than 10 hr, and cooling in still air, unless otherwise agreed upon by purchaser and vendor.

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 in. in 2 in. Extension Under Load ( $E = 29,500,000$ ), psi | 60,000 min  |
| Elongation, % in 4D                                                                                    | 10 min      |
| Reduction of Area, %                                                                                   | 15 min      |

- 6.2 Hardness: Unless otherwise specified, forgings shall have hardness of Brinell 235 - 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  $\pm$  3 while an axial stress of 40,000 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 stress or increasing the stress to not over 45,000 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:

- 7.1 Material shall be multiple melted using the Hopkins electric arc melting process with flux cover in the final melting and shall be uniform in quality and  $\emptyset$  condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.
- 7.2 Inspection standards and procedures shall be as agreed upon by purchaser and vendor.

8. REPORTS:

- 8.1 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 ingot lot in the shipment and the results of tests on each ingot lot to determine conformance to the technical requirements of this specification.  $\emptyset$  This report shall include the purchase order number, part number or size, ingot lot number, serial number of each forging when required, ingot number, and position of forging stock in ingot when such information is available, material specification number, and quantity from each ingot lot. Ingot lot number is a number applied to a multiple melted ingot or a group of multiple melted ingots made from one master melt of material.