

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 4893

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

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Revised

ALLOY CASTINGS, SAND AND CENTRIFUGAL, CORROSION AND HEAT RESISTANT
Nickel Base - 29.5Cu - 4Si
Solution Treated

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. APPLICATION: Primarily for parts requiring resistance to wear and galling under light to medium loads against dissimilar materials of higher hardness, and retention of hot hardness up to 1000 F, where improved machinability or grinding over as-cast material is desired.
3. COMPOSITION:

Nickel + Cobalt	60.0	min
Copper	27.0	- 31.0
Silicon	3.5	- 4.5
Iron	2.5	max
Manganese	1.5	max
Cobalt (if determined)	1.0	max
Carbon	0.25	max
Sulfur	0.015	max

4. CONDITION: Solution heat treated, unless otherwise specified.
 - 4.1 Centrifugal castings shall be rough turned and bored, unless otherwise specified.
 - 4.2 Sand cast solid round bars shall be rough turned, unless otherwise specified.
5. TECHNICAL REQUIREMENTS:
 - 5.1 Heat Treatment: Material shall be solution heat treated by heating to 1600 - 1650 F, holding at heat for 1 hr per in. of thickness for sections 1 in. or less plus an additional 1 hr per inch of cross section thicker than 1 in., rapid furnace cooling to, or transferring to another furnace held at, 1200 - 1300 F, holding at heat for 1/2 hr or until uniform temperature has been attained, and quenching in low-sulfur oil. For complicated sections, parts should be charged into a furnace which is at a temperature not higher than 600 F.
 - 5.2 Hardness: Shall be not higher than Brinell 270 or equivalent.
 - 5.3 Properties After Precipitation Heat Treatment: Material solution heat treated as in 5.1 shall be capable of meeting the following requirements after heating to 1100 F $\pm$ 25, holding at heat for 4 - 6 hr, and air or furnace cooling.
 - 5.3.1 Hardness: Shall be not lower than Brinell 300 or equivalent.

6. QUALITY:

- 6.1 Castings 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. Castings shall have smooth surfaces and shall be well cleaned. Unless otherwise specified, metallic shot or grit shall not be used for final cleaning.
- 6.2 When castings are broken for fracture test, the fracture shall have uniform color and be substantially free from oxides and other imperfections.
- 6.3 Radiographic and other quality standards shall be as agreed upon by purchaser and vendor.
- 6.4 Unless otherwise specified, castings shall be produced under radiographic control. This shall consist of radiographic examination of castings until proper foundry technique, which will produce castings free from harmful internal imperfections, is established for each part number, and of production castings as necessary to ensure maintenance of satisfactory quality.
- 6.5 Castings shall not be repaired by plugging, welding, or other methods.

7. REPORTS:

- 7.1 Unless otherwise specified, the vendor of castings shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat represented and a statement that the castings conform to the requirements of this specification. This report shall include the purchase order number, heat number (and code symbol if used), material specification number, part number, and quantity from each heat.
- 7.2 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 castings, part number, and quantity. When castings for making parts are produced or purchased by the parts vendor, that vendor shall inspect each lot of castings to determine conformance to the requirements of this specification, and shall include in the report a statement that the castings conform, or shall include copies of laboratory reports showing the results of tests to determine conformance.

8. IDENTIFICATION: Castings shall be identified in accordance with the latest issue of AMS 2804. Marking materials shall have no deleterious effects on the castings or their performance.

9. APPROVAL:

- 9.1 To assure uniformity of quality, sample castings from new or reworked patterns or molds shall be approved by purchaser, unless such approval be waived.
- 9.2 Vendor shall use the same foundry practices and the same heat treating procedures for production castings as for approved sample castings. If necessary to make any change, vendor shall notify purchaser prior to the first shipment of castings incorporating such change.