AERONAUTICAL MATERIAL SPECIFICATION

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

AMS 5388 B

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ALLOY CASTINGS, PRECISION INVESTMENT, CORROSION AND HEAT RESISTANT
Nickel Base - 16Cr - 17Mo - 4.5W - 6Fe

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

2. APPLICATION: Primarily for small parts, such as nozzle guide vanes, requiring high strength up to approximately 1500 F and oxidation resistance up to 1800 F.

3. COMPOSITION: Castings shall conform to the following:

Carbon	0.15 max
Manganese	1.0 max
Silicon	1.0 max
Chromium	15.5 - 17.5
Cobalt, if determined	2.5 max
Molybdenum	16.0 - 18.0
Tungsten	3.75 - 5.25
Iron	4.5 - 7.0
Vanadium	0.20 - 0.60
Nickel + Cobalt	remainder

4. CASTING: Castings shall be poured either from remelted master heat metal or directly from a master heat. A master heat is refined metal of a single furnace charge. Gates, sprues, risers, and rejected castings shall be used only in preparation of master heats; they shall not be remelted directly, without refining, for pouring of castings. When permitted by purchaser, metal in the form of shot from more than one master heat may be uniformly blended together to form a master heat lot; the total weight of metal in a master heat lot shall not exceed 7000 pounds.

5. TEST SPECIMENS:

5.1 Tensile Test Specimens: Unless otherwise specified, tensile test specimens shall be cast to represent each master heat or master heat lot of metal in castings and, when requested, shall be supplied with the castings. The specimens shall be of standard proportions with 0.25 in. diameter at the reduced parallel section, shall be cast to size in molds made of the same refractory and heated to the same temperature as the molds for castings, and shall be cooled at approximately the same rate as the castings. If the metal for castings is given any treatment such as fluxing or cooling and reheating, metal for the specimens shall be so treated.

5.2 Bend Test Specimens: When arc melting is used for producing castings, three specimens at least 0.090 in. in diameter or thickness and approximately 2 in. in length shall be cast in each mold along with each cast part or parts.

6. CONDITION: As cast, unless otherwise specified.

Printed in U. S. A.

7. TECHNICAL REQUIREMENTS:

7.1 Tensile Properties: Tensile test specimens produced in accordance with 5.1, heated to 1500 F ± 10, held at 1500 F ± 10 for 30 min. before testing, and tested at 1500 F ± 10 at a rate of 0.045-0.062 in. per min. shall conform to the following requirements. If supplied tensile test specimens fail to meet requirements or are not available, suitable specimens may be prepared from castings for test.

Tensile Strength, psi	50,000 min
Elongation, % in 1 in.	10 min

7.2 Hardness:

7.2.1 Castings as cast shall have hardness not higher than Rockwell C 21 or equivalent.

7.2.2 Castings and specimens after being heated at 1475 F ± 10 for 50 hr and cooled to room temperature shall have hardness not higher than Rockwell C 42 or equivalent.

7.3 Bending: At least two of the specimens cast in each mold in accordance with 5.2 shall withstand, without cracking, bending at room temperature through an angle of 20 deg around a 0.5 in. diameter. If more than one specimen from a mold fails to pass this test, the disposition of the castings from that mold may be determined by applying a similar test to an actual casting or to Ø specimens cut from castings, gates, or runners, or by determining that the carbon content of the metal in the mold conforms to the requirements of Section 3. Bend specimens shall be not less than 0.090 in. in diameter or thickness. Failure of any such additional specimens will be cause for rejection of the castings. Unless otherwise specified, bend test shall be performed by producer of castings.

8. QUALITY:

8.1 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.

8.2 When castings are broken for fracture test, the fracture shall have uniform color and be substantially free from oxides and other imperfections.

8.3 Radiographic and other quality standards shall be as agreed upon by purchaser and vendor.

8.4 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.

8.5 Castings shall not be repaired by plugging, welding, or other methods, without written permission from purchaser.