

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 5354A

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STEEL CASTINGS, INVESTMENT, CORROSION RESISTANT 13Cr - 2Ni - 3W

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 parts, such as compressor blades and vanes, housings, and valves, for use at temperatures up to 1000 F. Strength and resistance to tempering at the higher temperatures are greater than those of AMS 5350, and ductility is better than that of AMS 5352 but with some sacrifice of hardness.
3. COMPOSITION: Castings shall conform to the following:

Carbon	0.12 - 0.20
Manganese	1.0 max
Silicon	1.0 max
Phosphorus	0.04 max
Sulfur	0.03 max
Chromium	12.0 - 14.0
Nickel	1.8 - 2.2
Tungsten	2.5 - 3.5
Molybdenum	0.50 max
Copper	0.50 max

4. CONDITION: As cast, unless otherwise specified.

5. TECHNICAL REQUIREMENTS:

- 5.1 Castings: Castings shall be poured either from remelted master heat metal or directly from a master heat. A master heat is previously refined metal of a single furnace charge. Gates, sprues, risers, and rejected castings shall not be remelted directly, without refining, for pouring of castings; they may be used in preparation of master heats. 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.

- 5.2 Test Specimens:

- 5.2.1 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. Center gating may be used but, if specimens are so gated, the gate shall be completely removed before testing. If the metal for castings is given any treatment such as fluxing or cooling and reheating, metal for the specimens shall be so treated.

Section 7C of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no obligation to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report, in formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

- 5.3 Hardenability: Castings shall be capable of developing hardness not lower than
 ⌀ Rockwell C 45 after being heated to 1750 F \pm 10, held at heat for 1 hr per inch of maximum section, and cooled in air.
- 5.4 Properties After Heat Treatment: Tensile test specimens produced in accordance with 5.2.1 shall conform to the following requirements after being heated to
 ⌀ 1300 F \pm 10, held at heat for 1 hr, and cooled in air. 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	90,000 min
Yield Strength at 0.2% Offset or at 0.0042 in. in 1 in. Extension Under Load (E = 29,000,000), psi	65,000 min
Elongation, % in 4D	3 min
Hardness, Rockwell C	36 max

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 permitted, 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 defects.
- 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, without written permission from purchaser.

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 at least one casting from each master heat or master heat lot represented, and a statement that the castings conform to the requirements of this specification. This report shall include the purchase order number, master heat or master heat lot number (and code symbol if used), material specification number, part number, and quantity from each heat.