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

AMS 5338

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Revised

STEEL CASTINGS, PRECISION INVESTMENT
0.95Cr - 0.2Ho (0.35 - 0.45C)

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

2. APPLICATION: Primarily for small structural parts of intricate design.

3. COMPOSITION: Castings shall conform to the following:

Carbon	0.35 - 0.45
Manganese	0.75 - 1.0
Silicon	1.0 max
Phosphorus	0.04 max
Sulfur	0.04 max
Chromium	0.8 - 1.1
Molybdenum	0.15 - 0.25

4. CONDITION: Normalized and tempered, unless otherwise specified.

5. TECHNICAL REQUIREMENTS:

5.1 Casting: Castings shall be poured either from remelted master heat metal or directly from a master heat. Controlled additions may be made to each melt for deoxidation and for correction of melting losses. 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.

5.2 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.

5.3 Normalizing and Tempering: Castings shall be normalized by heating to 1650 - 1700 F, holding at heat for not less than 1 hr, and cooling at a rate equivalent to that obtained in still air, and shall be tempered at not lower than 900 F.

5.4 Properties After Heat Treatment: Tensile test specimens produced in accordance with 5.2 and 5.3 shall be capable of meeting the following requirements when properly heated to 1550 F ± 10, held at heat for 30 min., quenched in oil, and tempered at not lower than 900 F.

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5.4.1 Tensile Properties:

Tensile Strength, psi	175,000 min
Yield Strength at 0.2% Offset or at 0.0075 in. in 1 in. Extension Under Load (E = 29,000,000), psi	160,000 min
Elongation, % in 4D	3 min
Reduction of Area, %	6 min

5.4.2 Hardness: Shall be Rockwell C 38 - 43 or equivalent.

5.5 Decarburization: The carbon content shall be within the specification limits throughout the casting, except that within 0.003 in. of the surface the carbon content may be lower than specified in Section 3. Unless otherwise agreed upon by purchaser and vendor, the heat treatments specified in 5.3 and 5.4 may be performed in a protective atmosphere to accomplish the carbon control required.

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, 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.