AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 5370

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Revised

STEEL CASTINGS, PRECISION INVESTMENT, CORROSION AND HEAT RESISTANT 19.5Cr - 10Ni (Low Carbon)

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

2. APPLICATION: Primarily for small parts requiring both corrosion and heat resistance up to 800 F, especially where such parts are welded during fabrication. Parts requiring oxidation resistance up to 1500 F, but useful at that temperature only when stresses are low. Parts requiring resistance to fuming nitric acid.

3. COMPOSITION: Castings shall conform to the following:

Carbon	0.050 max
Manganese	1.0 - 2.0
Silicon	1.0 max
Phosphorus	0.04 max
Sulfur	0.03 max
Chromium	18.0 - 21.0
Nickel	8.0 - 11.0
Molybdenum	0.5 max
Copper	0.5 max

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. CONDITION: Solution heat treated free from continuous carbide network, unless otherwise specified.

6. TECHNICAL REQUIREMENTS:

6.1 Solution Heat Treatment: Castings shall be solution heat treated by heating to 2000 F ± 50, holding at heat for not less than 30 min., and cooling in air.

6.2 Hardness: Castings shall have hardness not higher than Rockwell B 86 or equivalent.

6.3 Embrittlement: Castings shall be capable of meeting the following test:

6.3.1 Test specimens, after being heated at 1200 F + 10 for 2 hr and air cooled, shall withstand immersion for 48 hr in a boiling aqueous solution containing 100 g of $CuSO_4.5H_2O$ and 100 ml of H_2SO_4 (sp gr 1.84) per liter of solution under a reflux condenser, without evidence of intercrystalline surface attack when examined microscopically.

7. QUALITY:

7.1 Castings shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external defects 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.

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

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

7.4 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 defects, is established for each part number, and of production castings as necessary to ensure maintenance of satisfactory quality.

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

8. REPORTS:

8.1 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. 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.

8.2 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 supplier of castings, part number, and quantity. When castings for making parts are produced or purchased by the parts vendor, that vendor shall inspect castings from each master heat or master heat lot represented, 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.

9. IDENTIFICATION: Unless otherwise specified, each casting shall be identified as to part number and master heat or master heat lot number or code symbol. Methods of applying identifying characters shall be as agreed upon by purchaser and vendor. Marking materials shall have no deleterious effects on the castings or their performance.

10. APPROVAL:

10.1 To assure uniformity of quality, sample castings from new or reworked master patterns shall be approved by purchaser, unless such approval be waived.