

AERONAUTICAL MATERIAL SPECIFICATION

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

AMS5362^A

Issued 12/1/47

Revised 3/1/49

STEEL CASTINGS, PRECISION INVESTMENT, CORROSION AND HEAT RESISTANT
19Cr - 12Ni - Cb

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Small parts, such as exhaust couplings, stator vanes, and turbine nozzle vanes, for use at temperatures up to 1500 F and where welding during fabrication may be required.
3. **COMPOSITION:** Castings shall conform to the following:

Carbon	0.12 max
Manganese	2.00 max
Silicon	1.00 max
Phosphorus	0.04 max
Sulfur	0.03 max
Chromium	18.00 - 19.50
Nickel	10.00 - 14.00
Columbium	10xC - 1.50
Molybdenum	0.50 max
Copper	0.50 max
4. **CASTING:** 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 only be used in preparation of master heats but shall not be remelted directly, without refining, for pouring of castings.
5. **CONDITION:** Solution heat treated, unless otherwise specified.
6. **TECHNICAL REQUIREMENTS:**
 - 6.1 **Hardness:** Castings shall have hardness not higher than Brinell 175 or equivalent.
 - 6.2 **Embrittlement:** Material in the solution heat treated condition shall be capable of meeting the following test:
 - 6.2.1 Test specimens, after being heated to 1200 F for 2 hr and air cooled, shall withstand immersion for 48 hr in a boiling aqueous solution containing 100g of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ 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.
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.

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