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400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 5363D

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Superseding AMS 5363C

STEEL CASTINGS, SAND AND CENTRIFUGAL, CORROSION AND HEAT RESISTANT 18.5Cr - 10.5Ni - 0.90(Cb+Ta) Solution Heat Treated

UNS J92641

1. SCOPE:

1.1 Form: This specification covers a corrosion and heat resistant steel in the form of sand or centrifugal castings.

1.2 Application: Primarily for parts requiring corrosion and heat resistance up to 800°F (425°C), especially when such parts are welded during fabrication, and for parts requiring oxidation resistance up to 1500°F (815°C) but useful at that temperature only when stresses are low.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2360 - Room Temperature Tensile Properties of Castings
AMS 2635 - Radiographic Inspection
AMS 2645 - Fluorescent Penetrant Inspection
AMS 2694 - Repair Welding of Aerospace Castings
AMS 2804 - Identification, Castings

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2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM A262 - Detecting Susceptibility to Intergranular Attack in Stainless Steels
ASTM A370 - Mechanical Testing of Steel Products
ASTM E353 - Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys
ASTM E446 - Reference Radiographs for Steel Castings Up to 2 in. (51 mm) in Thickness

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Specifications:

MIL-H-6875 - Heat Treatment of Steel, Process for

2.3.2 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E353 or by spectrochemical or other analytical methods approved by purchaser:

	min	max
Carbon	--	0.10
Manganese	--	2.00
Silicon	--	1.50
Phosphorus	--	0.04
Sulfur	--	0.04
Chromium	17.00	20.00
Nickel	9.00	12.00
Columbium + Tantalum	10xC	1.35
Molybdenum	--	0.75
Copper	--	0.75

3.2 Condition: Solution heat treated free from continuous carbide network.

3.3 Casting: A melt shall be the metal poured from a single furnace charge of 15,000 lb (6800 kg) or less. A lot shall be all castings of the same part number poured from a single melt in not more than eight consecutive hours and solution heat treated together as a batch.

3.4 Test Specimens: Chemical analysis specimens shall be of any convenient size, shape, and form.

3.5 Heat Treatment: Castings shall be solution heat treated by heating to 1950°F ± 50 (1065°C ± 30), holding at heat for 60 min. per inch (25 mm) of maximum cross-section but in no case less than 30 min., and cooling as required. Furnace surveys and calibration of temperature controllers and recorders shall be in accordance with MIL-H-6875 or with a survey and calibration program certified by the vendor as meeting the intent of MIL-H-6875.

3.6 Properties: Castings shall conform to the following requirements; hardness and tensile testing shall be performed in accordance with ASTM A370:

3.6.1 Hardness: Shall be not higher than 180 HB, or equivalent.

3.6.2 Embrittlement: Specimens cut from castings, after sensitizing treatment, shall pass the copper/copper sulfate/sulfuric acid test in accordance with ASTM A262, Practice E.

3.6.3 Tensile Properties: When specified on the drawing or when agreed upon by purchaser and vendor, tensile specimens as in 4.3.3 conforming to ASTM A370 shall be machined from locations indicated on the drawing from a casting or castings selected at random from each lot. Property requirements for such specimens shall be as shown on the drawing or as agreed upon by purchaser and vendor and may be defined as specified in AMS 2360.

3.7 Quality:

3.7.1 Castings, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the castings.

3.7.1.1 Castings shall have smooth surfaces and shall be well cleaned. Metallic shot or grit shall not be used for final cleaning.

3.7.2 Castings shall be produced under radiographic control. This control shall consist of radiographic examination of castings in accordance with AMS 2635 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.

3.7.3 When specified, castings shall be subjected to fluorescent penetrant inspection in accordance with AMS 2645.

3.7.4 Radiographic, fluorescent penetrant, and other quality standards shall be as agreed upon by purchaser and vendor. ASTM E446 may be used to define radiographic acceptance standards.

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

3.7.5.1 When permitted in writing by purchaser, defects in castings may be removed and the castings repaired by welding in accordance with AMS 2694.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of castings shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the castings conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1), hardness (3.6.1), quality (3.7), and, when specified, tensile properties of specimens cut from castings (3.6.3) are classified as acceptance tests and shall be performed on each melt or lot as applicable.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for embrittlement (3.6.2) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.2.3 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed prior to or on the first-article shipment of a casting to a purchaser, when a change in material, processing, or both requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.3.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling: Shall be in accordance with the following:

4.3.1 Two chemical analysis specimens in accordance with 3.4 from each melt or a casting from each lot.

4.3.2 Two preproduction castings in accordance with 4.4.1 of each part number.

4.3.3 One or more castings from each lot when properties of specimens machined from castings are required. Size, location, and number of specimens machined from castings shall be as specified on the drawing or as agreed upon by purchaser and vendor. When size, location, and number of specimens are not specified, not less than two tensile specimens, one from the thickest section and one from the thinnest section, shall be cut from a casting or castings from each lot.

4.4 Approval: