AEROSPACE
MATERIAL SPECIFICATIONS

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AMS5393C
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ALLOY IRON CASTINGS, SAND, CORROSION AND HEAT RESISTANT 2Cr - 20Ni

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 low-stressed parts, such as valve housings, requiring moderate corrosion and heat resistance up to 1200 F (649 C).

3. COMPOSITION:

	min	max
Carbon	2.4	2.8
Manganese	0.8	1.6
Silicon	1.5	2.8
Phosphorus	--	0.30
Sulfur	--	0.12
Chromium	1.7	2.4
Nickel	18.0	22.0
Copper	--	0.5
Lead (1)	--	0.003

(1) Determination not required for routine acceptance.

3.1 If castings have sections less than 3/4 in. thick, carbon and silicon may each be as high as 3.0.

4. CONDITION: Stress relieved, unless otherwise specified.

5. TECHNICAL REQUIREMENTS:

5.1 Casting: A melt shall be the metal poured from a single ladle of 5000 lb or less.

5.2 Test Specimens:

5.2.1 Tensile Test Coupons: Shall be standard keel blocks as shown in Fig. 1, unless purchaser permits use of "Y" blocks as shown in Fig. 2. Coupons shall be cast with each melt of metal for castings and, when requested, shall be supplied with the castings. Coupons shall be cast in open molds made of suitable core sand, shall be poured directly after pouring the castings, and shall be left in the mold until black. Metal for the coupons shall be part of the melt which is used for the castings. Molding practice, and the coupon size when use of "Y" blocks is permitted, shall, insofar as practicable, be such that cooling rates of castings and coupons are substantially the same.

5.2.2 Chemical Analysis Specimens: For carbon determinations performed on the melt, a chilled pencil type specimen is preferred, but other type samples of proven accuracy are acceptable. For carbon determinations performed on castings, a solid sample cut from the casting shall be used.

5.3 Heat Treatment: All castings and tensile test specimens representing them shall be stress relieved as follows, unless otherwise specified.

5.3.1 Castings and tensile test coupons shall be heated to temperatures not lower than 1400 F (760 C) which will produce substantially the same hardness in castings and test coupons, held at heat for 1 hr per inch of cross-section, and air cooled. When section sizes of castings and test coupons are such that the same stress relieving temperature is used for both, at least one set of tensile test specimens shall be put into a batch-type furnace with each load of castings or into a continuous furnace at intervals of not longer than 3 hours.

5.4 Tensile Properties:

5.4.1 Ø Tensile Test Specimens: Standard tensile test specimens (0.357 in. diameter at the reduced parallel section from 1/2 in. "Y" block, 0.505 in. diameter at the reduced parallel section from other tensile test coupons) cut from the coupons as shown in Figs. 1 and 3 shall conform to the following requirements:

5.4.1.1 Composition As In Section 3:

Ø	Tensile strength, psi,	30,000 min

5.4.1.2 Composition As In 3.1:

Ø	Tensile strength, psi	25,000 min

5.4.2 Castings: When tensile properties of actual castings are determined, tensile properties of specimens cut from sections of castings shall conform to the following requirements:

Tensile strength, psi	30,000 min

5.5 Ø Hardness: Castings and test coupons shall have hardness of Brinell 131 - 170 using 3000 kg load, or Rockwell B 74 - 87.

5.6 Microstructure: Austenite matrix with uniformly distributed graphite flakes. Parts shall be capable of being cooled to -75 F (-59.4 C) without the austenite transforming to martensite; parts so cooled shall, after returning to room temperature, be sufficiently nonmagnetic to prevent a small steel magnet from adhering to the casting.

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 each melt and for tensile properties of the test coupons representing each melt. This report shall include the purchase order number, melt number, material specification number, part number, and quantity from each melt.

7.2 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 direct 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 melt represented to determine conformance to the requirements of this specification, 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.

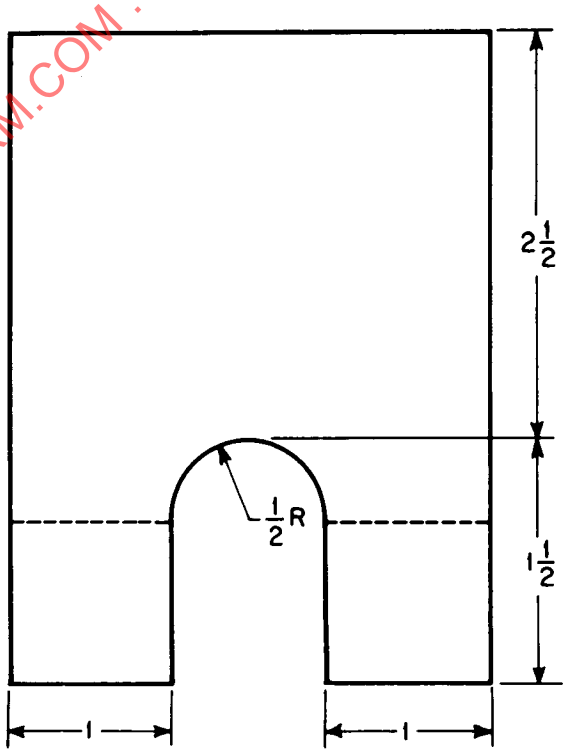
8. IDENTIFICATION: Castings shall be identified in accordance with the latest issue of AMS 2804. Marking materials shall have no deleterious effects on the castings or their performance.

9. APPROVAL:

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

9.2 Vendor shall use the same foundry practices and the same heat treating procedures for production castings as for approved sample castings. If necessary to make any change in processing which could unfavorably affect any characteristics of the castings, vendor shall obtain written permission from purchaser prior to the first shipment of castings incorporating such change.

10. REJECTIONS: Castings not conforming to this specification or to authorized modifications will be subject to rejection.



Length of Block shall be 6 in. Figure 1