



AEROSPACE MATERIAL SPECIFICATION

AMS5366™**REV. F**

Issued 1947-09
Revised 2018-08
Reaffirmed 2023-11

Superseding AMS5366E

Steel, Corrosion and Heat-Resistant, Investment Castings

25Cr - 20Ni (CK-20)

As-Cast

(Composition similar to UNS J94211)

RATIONALE

AMS5366F revises chemical analysis standards (3.1), deletes the prior paragraph 3.4.2.2 which was not relevant to chemical analysis specimens, updates the default NDT acceptance requirement (3.7.4.1), prohibits unauthorized exceptions (3.8), updates reports (4.5.5), and results from a Five-Year Review and update of this specification.

AMS5366F has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

1.1 Form

This specification covers a corrosion and heat-resistant steel in the form of investment castings.

1.2 Application

These castings have been used typically for welded parts, such as diaphragm vanes, requiring oxidation resistance up to 2000 °F (1093 °C) but useful at higher temperature only when stresses are low, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the reference document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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Full document details: SAE AMS5366F

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Documents

Document Sharing Hub

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2175	Castings, Classification and Inspection of
AMS2248	Chemical Check Analysis Limits, Corrosion and Heat-Resistant Steels and Alloys, Maraging and Other Highly Alloyed Steels, and Iron Alloys
AMS2360	Room Temperature Tensile Properties of Castings
AMS2694	In-Process Welding of Castings
AMS2700	Passivation of Corrosion Resistant Steels
AMS2804	Identification, Castings
ARP1917	Clarification of Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A751	Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
ASTM E8/E8M	Tension Testing of Metallic Materials
ASTM E1417E1417M	Liquid Penetrant Testing
ASTM E1742/E1742M	Radiographic Examination

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM A751, by spectrochemical methods, or by other analytical methods acceptable to purchaser (see 8.2.1 and 8.2.2).

Table 1 - Composition

Element	Min	Max
Carbon	--	0.18
Manganese	--	2.00
Silicon	0.50	1.50
Phosphorus	--	0.04
Sulfur	--	0.03
Chromium	23.00	26.00
Nickel	19.00	22.00
Molybdenum	--	0.75
Copper	--	0.75

3.1.1 Producer may test for any element not otherwise listed in Table 1 and include this analysis in the report of 4.5. Limits of acceptability may be specified by purchaser (see 8.2.3).

3.1.2 Check Analysis

Composition variations shall meet the requirements of AMS2248.

3.2 Melting Practice

Castings and specimens shall be poured at casting producer's facility either from a melt (see 8.2.4) of a master heat, or directly from a master heat (see 3.4.2 and 8.2.5).

- 3.2.1 Revert (gates, sprues, risers, and rejected castings) may be used only in the preparation of master heats; revert shall not be remelted directly without refining for pouring of castings. Melting of revert creates a new master heat.
- 3.2.2 Portions of two or more qualified master heats (see 3.4.2) may be melted together and poured into castings using a procedure authorized by purchaser (see 8.2.6).
- 3.2.3 If melts (see 8.2.4) are modified by replenishment (see 8.2.7), the producer shall have a written procedure acceptable to the purchaser which defines the controls, test, and traceability criteria for both castings and separately cast specimens. Control factors of 4.4.2.2 shall apply.

3.3 Condition

Castings shall be delivered in the as-cast condition.

3.4 Test Specimens

Specimens shall be either separately cast, integrally cast (see 8.2.8), or machined from a casting, and shall conform to 3.2.

- 3.4.1 If specimens are separately cast, the producer shall have a written procedure acceptable to the purchaser. Control factors of 4.4.2.2 shall apply.
- 3.4.2 Each master heat shall be qualified by evaluation of chemical analysis specimens.
 - 3.4.2.1 If replenishments are made at remelt as in 3.2.3, frequency of sampling and testing used by the producer for qualification to 3.4.2 shall be acceptable to purchaser.

3.4.3 Chemical Analysis Specimens

Shall be of any convenient size and shape.

3.4.4 Tensile Specimens

Room-temperature tensile properties are not required for qualification. If the purchaser requires these properties (see 3.6.1), tensile specimens shall be of standard proportions in accordance with ASTM E8/E8M (see 8.3) with 0.250-inch (6.35-mm) diameter at the reduced parallel gage section.

- 3.4.4.1 Separately-cast and integrally-cast specimens may be either cast to size and/or cast oversize and subsequently machined to 0.250-inch (6.35-mm) diameter.
- 3.4.4.2 When integrally cast specimens and/or specimens machined from casting are specified, specimen size and location shall be agreed upon by the purchaser and producer (see 8.2.9 and 8.5).

3.5 Heat Treatment

Not applicable (see 8.4).

3.6 Properties

3.6.1 Room Temperature Tensile Properties

May be specified by the purchaser in accordance with AMS2360.