



AEROSPACE MATERIAL SPECIFICATION

AMS5383™**REV. F**

Issued 1966-09
Revised 2018-08
Reaffirmed 2023-11

Superseding AMS5383E

Nickel Alloy, Corrosion and Heat-Resistant, Investment Castings
52.5Ni - 19Cr - 3.0Mo - 5.1Cb(Nb) - 0.90Ti - 0.60Al - 18Fe
Vacuum Melted
Homogenization and Solution Heat Treated
(Composition similar to UNS N07718)

RATIONALE

AMS5383F updates the default NDT acceptance requirement (3.7.3.1), prohibits unauthorized exceptions (3.8), updates reports (4.5.5), and results from a Five-Year Review and update of this specification.

AMS5383F 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 nickel alloy in the form of investment castings.

1.2 Application

These castings have been used typically for structural parts requiring strength up to 1300 °F (704 °C) and oxidation resistance up to 1800 °F (982 °C), but usage is not limited to such applications.

1.3 Classification

Castings conforming to this specification are classified as follows:

Class 1 Trace element limits conforming to AMS2280-1

Class 2 Trace element limits conforming to AMS2280-2

Class 3 Trace element limits do not apply

1.3.1 Castings shall conform to Class 3 unless Class 1 or Class 2 is specified by purchaser.

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 referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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<https://www.sae.org/standards/content/AMS5383F/>

Documents
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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
AMS2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys
AMS2280	Trace Element Control, Nickel Alloy Castings
AMS2360	Room Temperature Tensile Properties of Castings
AMS2362	Stress-Rupture Properties of Castings
AMS2694	In-Process Welding of Castings
AMS2750	Pyrometry
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 E8/E8M	Tension Testing of Metallic Materials
ASTM E18	Rockwell Hardness of Metallic Materials
ASTM E139	Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials
ASTM E140	Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness
ASTM E354	Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys
ASTM E1417/E1417M	Liquid Penetrant Testing
ASTM E1742/E1742M	Radiographic Inspection

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 E354, 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	--	0.08
Manganese	--	0.35
Silicon	--	0.35
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	17.00	21.00
Nickel	50.00	55.00
Molybdenum	2.80	3.30
Columbium (Niobium)	4.75	5.50
Titanium	0.65	1.15
Aluminum	0.40	0.80
Titanium + Aluminum	--	1.75
Cobalt	--	1.00
Boron	--	0.006
Copper	--	0.30
Iron	remainder	

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 Trace Elements

Shall conform to AMS2280, Class 1 or Class 2, when specified by purchaser.

3.1.3 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

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.

3.2.1.1 The metal for castings and specimens shall be melted and poured under vacuum without loss of vacuum between melting and pouring. When authorized by purchaser (see 8.2.6), protective atmosphere may be used in lieu of vacuum for pouring of castings.

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.

3.2.3 If melts (see 8.2.4) are modified by replenishment (see 8.2.7), producer shall have a written procedure acceptable to 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 homogenized and solution heat treated 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, producer shall have a written procedure acceptable to purchaser. Control factors of 4.4.2.2 shall apply.

3.4.2 Each master heat shall be qualified by evaluation of chemical, room temperature tensile, and stress-rupture specimens.

3.4.2.1 If replenishments are made at remelt as in 3.2.3, the frequency of sampling and testing used by the producer for qualification to 3.4.2 shall be acceptable to purchaser.

3.4.2.2 Tensile and stress-rupture tests of 3.4.2 are not required if these tests are conducted using integrally-cast specimens (4.3.3.2) or specimens machined-from-casting (4.3.3.3).

3.4.3 Chemical Analysis Specimens

Shall be of any convenient size and shape.

3.4.4 Tensile and Stress-Rupture Specimens

Shall be of standard proportions in accordance with ASTM publications referenced in 3.6.

3.4.4.1 Separately-cast and integrally-cast tensile specimens may be either cast to size 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 purchaser and producer (see 8.2.9 and 8.6).

3.5 Heat Treatment

Castings and representative tensile and stress-rupture specimens shall be heat treated as specified in 3.5.1 and 3.5.2. Pyrometry shall be in accordance with AMS2750.

3.5.1 Castings and Specimens

3.5.1.1 Homogenization Heat Treatment

Heat in a suitable protective atmosphere to 2000 °F ± 25 °F (1093 °C ± 14 °C), hold at heat for 1 to 2 hours, and cool at a rate equivalent to an air cool or faster to 900 °F (482 °C). Any convenient rate may be used below 900 °F (482 °C).

3.5.1.2 Solution Heat Treatment

Heat in a suitable protective atmosphere to a temperature within the range of 1750 to 1800 °F (954 to 982 °C), hold at the selected temperature within ± 25 °F (± 14 °C) for not less than one hour, and cool at a rate equivalent to an air cool or faster.

3.5.2 Response to Heat Treatment

After homogenization and solution heat treatment to 3.5.1, specimens, and castings when required, shall be heat treated in accordance with the following for subsequent testing to determine response to heat treatment:

3.5.2.1 Precipitation Heat Treatment

Heat to 1325 °F ± 15 °F (718 °C ± 8 °C), hold at heat for 8 hours -0 +30 minutes, furnace cool to 1150 °F ± 15 °F (621 °C ± 8 °C) at an average rate of 100 °F ± 15 °F (55 °C ± 8 °C) per hour, hold at 1150 °F ± 15 °F (621 °C ± 8 °C) for 8 hours -0 +30 minutes and cool at a rate equivalent to air cool.

3.5.3 Tensile and stress-rupture specimens used for master heat qualification may be heat treated separately from castings.