



AEROSPACE MATERIAL SPECIFICATION

AMS5347™**REV. C**

Issued 1978-10
Reaffirmed 2014-04
Revised 2019-11

Superseding AMS5347B

Steel, Corrosion-Resistant, Investment Castings
15Cr - 4.6Ni - 0.22Cb (Nb) - 2.8Cu
Solution and Precipitation Heat Treated (H1000)
150 ksi (1034 MPa) Tensile Strength (15-5)
(Composition similar to UNS J92110)

RATIONALE

AMS5347C prohibits unauthorized exceptions (3.8), revises Composition analysis standards (3.1), Quality (3.7.4.1), Reports (4.5.5), and results from a Five-Year Review and update of this specification.

1. SCOPE

1.1 Form

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

1.2 Application

These castings have been used typically for parts requiring good corrosion resistance and strength up to 600 °F (316 °C), but usage is not limited to such applications (see 8.4).

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.

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

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Documents
Document Sharing Hub

- AMS2700 Passivation of Corrosion-Resistant Steels
- AMS2804 Identification, Castings
- AMS-H-6875 Heat Treatment of Steel Raw Materials
- 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 E18 Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
- ASTM E1417/E1417M Liquid Penetrant Testing
- ASTM E1444/E1444M Magnetic Particle Testing
- ASTM E1742/E1742M Radiographic Examination

3. TECHNICAL REQUIREMENTS

3.1 Composition

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

Table 1 - Composition

Element	Min	Max
Carbon	--	0.05
Manganese	--	0.60
Silicon	0.50	1.00
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	14.00	15.50
Nickel	4.20	5.00
Columbium (Niobium)	0.15	0.30
Copper	2.50	3.20
Nitrogen	--	0.05

- 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 applicable requirements of AMS2248.

3.2 Melting Practice

Castings and specimens shall be poured at the casting producer's facility either from a melt (see 8.2.4) of a master heat or directly from a master heat (see 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 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 solution treated and precipitation heat treated condition, except as specified in 3.3.1 or 3.3.2.

- 3.3.1 When specified by or when acceptable to purchaser, castings shall be solution heat treated twice and precipitation heat treated.
- 3.3.2 When specified by purchaser, castings shall be homogenization, solution, and precipitation heat treated.

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 and tensile 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 The tensile 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 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 cast oversize and subsequently machined to 0.250-inch (6.35-mm) diameter.
- 3.4.4.2 When integrally-cast specimens or specimens machined-from-casting are specified, specimen size and/or location shall be agreed upon by purchaser and producer (see 8.2.9 and 8.7).

3.5 Heat Treatment

Castings and representative tensile specimens shall be heat treated in accordance with AMS-H-6875 except as specified in 3.5.1.

3.5.1 Castings and Tensile Specimens

3.5.1.1 Homogenization Heat Treatment (When Specified)

Heat to 2100 °F ± 25 °F (1149 °C ± 14 °C), hold at heat for not less than 90 minutes, and cool as required.

3.5.1.2 Solution Heat Treatment

Heat to 1900 °F ± 25 °F (1038 °C ± 14 °C), hold at heat for 1 hour per inch (25-mm) of section thickness but not less than 30 minutes, and cool to below 90 °F (32 °C) at a rate equivalent to an air cool or faster.

3.5.1.3 Precipitation Heat Treatment

Heat to 1000 °F ± 15 °F (538 °C ± 8 °C), hold at heat for 4 hours ± 0.25 hours, and cool in air or inert gas.

3.5.2 Tensile specimens used for master heat qualification may be heat treated separately from castings.

3.6 Properties

Conformance shall be based upon testing of separately-cast specimens, unless purchaser specifies integrally-cast specimens or specimens machined-from-casting.

3.6.1 Room Temperature Tensile Properties

Shall be as specified in 3.6.1.1 or 3.6.1.2, determined in accordance with ASTM E8/E8M (see 8.3). Properties other than those listed may be defined as specified in AMS2360.

3.6.1.1 Separately-Cast Specimens

Shall be as shown in Table 2.

Table 2 - Minimum room temperature tensile properties of separately-cast specimens

Property	Value
Tensile Strength	150 ksi (1034 MPa)
Yield Strength at 0.2% Offset	130 ksi (896 MPa)
Elongation in 4D	8%
Reduction of Area	18%

3.6.1.2 Integrally-Cast Specimens or Specimens Machined-from-Casting

Shall be as shown in Table 3.

Table 3 - Minimum room temperature tensile properties of integrally-cast and specimens machined-from-casting

Property	Value
Tensile Strength	150 ksi (1034 MPa)
Yield Strength at 0.2% Offset	130 ksi (896 MPa)
Elongation in 4D	6%
Reduction of Area	15%

3.6.2 Hardness

Shall be as follows, determined in accordance with ASTM E18.