



# AEROSPACE MATERIAL SPECIFICATION

AMS5400™

REV. D

Issued 1979-01  
Revised 2022-02

Superseding AMS5400C

Steel, Corrosion-Resistant, Investment Castings  
15Cr - 4.6Ni - 0.22Cb - 2.8Cu  
Solution and Precipitation Heat Treated (H935)  
170 ksi (1172 MPa) Tensile Strength  
(Composition similar to UNS J92110)

## RATIONALE

AMS5400D prohibits unauthorized exceptions (3.8, 4.5.5, 8.5), updates composition requirements (3.1), revises heat treatment (3.5), adds minimum radiographic requirements (3.7.4.1, 8.7), allows prior revisions (8.6), and is the result of 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 8.2).

### 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), or [www.sae.org](http://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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SAE WEB ADDRESS:

For more information on this standard, visit  
<https://www.sae.org/standards/content/AMS5400D/>

AMS2700 Passivation of Corrosion Resistant Steels

AMS2761 Heat Treatment of Steel Raw Materials

AMS2804 Identification, Castings

## 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, or [www.astm.org](http://www.astm.org).

ASTM E8/E8M Tension Testing of Metallic Materials

ASTM E18 Rockwell Hardness of Metallic Materials

ASTM E751 Chemical Analysis of Steel Products

ASTM E1417/E1417M Liquid Penetrant Testing

ASTM E1444/E1444M Magnetic Particle Testing

ASTM E1742/E1742M Radiographic Inspection

## 3. TECHNICAL REQUIREMENTS

### 3.1 Composition

Castings shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM E751 or by other analytical methods acceptable to purchaser (see 8.3).

**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	0.15	0.30
Copper	2.50	3.20
Tantalum	--	0.05
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 8.3).

#### 3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

### 3.2 Melt Practice

Castings and specimens shall be poured at casting producer's facility either from a melt (see 8.3) of a master heat or directly from a master heat (see 8.3).

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 or 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 (see 8.3).

3.2.3 If modifications, such as alloy additions or replenishments, are made by the producer at remelt, 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 solution and precipitation heat treated, 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 8.3), or machined from 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 alloy additions or 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 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 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 or 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 location shall be agreed upon by purchaser and producer (see 8.3 and 8.5).

### 3.5 Heat Treatment

Castings and representative tensile specimens shall be heat treated in accordance with AMS2761 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