



AEROSPACE MATERIAL SPECIFICATION

AMS5339™**REV. H**

Issued	1969-11
Reaffirmed	2012-04
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Stabilized	2022-06

Superseding AMS5339G

Steel, Maraging, Investment Castings
17Ni - 10Co - 4.6Mo - 0.30Ti - 0.06Al
Vacuum Melted
Homogenized, Overaged, and Solution Heat Treated
(Composition similar to UNS J93010)

RATIONALE

AMS5339H has been declared "STABILIZED" by AMS Committee E. This document will no longer be updated and may no longer represent standard industry practice. This document was stabilized because it contains mature technology that is not expected to change and thus no further revisions are anticipated.

NOTE: Previously, this document was revised. The last technical update of this document occurred in March, 2017. Users of this document should refer to the cognizant engineering organization for disposition of any issues with reports/certifications to this specification, including exceptions listed on the certification. In many cases, the purchaser may represent a sub-tier supplier and not the cognizant engineering organization.

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AMS5339H has been declared "STABILIZED" by SAE AMS AMS E Carbon and Low Alloy Steels Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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Documents

Document Sharing Hub

1. SCOPE

1.1 Form

This specification covers an alloy steel in the form of investment castings.

1.2 Application

These castings have been used typically for heat treated parts of intricate design requiring ultra-high strength up to 600 °F (315 °C), 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 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 Analysis Check 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
- 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 A370 Mechanical Testing of Steel Products
- 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 E353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys
- ASTM E1417 Liquid Penetrant Testing
- ASTM E1444 Magnetic Particle Testing
- ASTM E1742 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 E353, by spectrochemical methods, or by other analytical methods acceptable to purchaser (see 8.3.1 and 8.3.2).

Table 1 - Composition

Element	Min	Max
Carbon	--	0.03
Manganese	--	0.10
Silicon	--	0.10
Phosphorus	--	0.010
Sulfur	--	0.010
Nickel	16.00	17.50
Cobalt	9.50	11.00
Molybdenum	4.40	4.80
Titanium	0.15	0.45
Aluminum	0.02	0.10

3.1.1 Producer may test for any element not otherwise listed in Table 1 and include this analysis in the report (see 4.5). Limits of acceptability may be specified by purchaser (see 8.3.3).

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 casting producer's facility either from a melt (see 8.3.4) or directly from a master heat (see 3.4.2 and 8.3.5).

- 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 8.3.6).
- 3.2.3 If melts are modified by replenishment (see 8.3.7), producer shall have a written procedure acceptable to purchaser that 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, overaged, and solution heat treated condition (see 3.5).

3.4 Test Specimens

Specimens shall be separately-cast, integrally-cast (see 8.3.8), 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 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 A370 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 and specimens machined-from-casting are specified, specimen size and location shall be as agreed upon by purchaser and producer (see 8.3.9 and 8.5).

3.4.5 Hardness Specimens for Response to Heat Treatment

May be a representative specimen or a casting.

3.5 Heat Treatment

To produce the condition in castings for delivery, heat treat as specified in 3.5.1 to conform to hardness of 3.6.2.1. Pyrometry shall be in accordance with AMS2750.