



AEROSPACE MATERIAL SPECIFICATION

AMS5397™**REV. F**

Issued 1965-02
Reaffirmed 2014-04
Revised 2021-06

Superseding AMS5397E

Nickel Alloy Castings, Investment, Corrosion and Heat-Resistant
50Ni - 9.5Cr - 15Co - 3.0Mo - 4.8Ti - 5.5Al - 0.015B - 0.95V - 0.06Zr
Vacuum Melted, Vacuum Cast
As Cast

(Composition similar to UNS N13100)

RATIONALE

AMS5397F prohibits unauthorized exceptions (3.8, 4.5.3, 8.4) allows prior revisions (8.3), moves definitions (2.3), removes redundant AMS definitions (2.3), aligns quality and reports with standard casting specifications (3.7, 4.5), requires a preproduction casting (4.3.4), updates purchase order and control factors (4.4.2.2, 8.5), and is the result of a Five-Year Review and update of the specification.

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 products have been used typically for small parts, such as turbine blades, requiring high strength and oxidation resistance up to 1800 °F (982 °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

AMS2269 Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys

AMS2360 Room Temperature Tensile Properties of Castings

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Documents
Document Sharing Hub

AMS2362	Stress-Rupture Properties of Castings
AMS2694	In-Process Welding of Aerospace Castings
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 E139	Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials
ASTM E192	Reference Radiographs of Investment Steel Castings for Aerospace Applications
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 Examination

2.3 Definitions

Terms used in AMS are clarified in ARP1917 and as follows:

2.3.1 PURCHASER

The cognizant engineering organization responsible for casting design and fitness for use, or the designee of this engineering organization.

2.3.2 MELT

All castings poured from a single furnace charge. Also referred to as remelt, submelt, heat, or subheat.

2.3.3 MASTER HEAT

Refined metal (see 2.3.7) of a single furnace charge that may be poured directly into castings and/or converted into ingot for remelting in accordance with 3.2. One or more melts can be poured from a master heat. Qualification of a master heat is described in 3.4.2.

2.3.4 REPLENISHMENT

Virgin element and/or master alloy additions introduced to the furnace during the final stage of melting as necessary to bring the melt or master heat into conformance with the specified composition.

2.3.5 INTEGRALLY CAST SPECIMEN

An attached specimen that is cast in the mold. The casting drawing may identify a specific location for the attachment of each integrally cast specimen.

2.3.6 LOT

For room temperature tensile and stress-rupture testing, a lot shall consist of all castings of the same part number, poured from consecutive melts of a single master heat. For visual and nondestructive testing, an inspection lot shall consist of castings of the same part number, manufactured under the same process control parameters of 4.4.2.2, and submitted for those tests in a single group.

2.3.7 REFINED METAL

Metal derived from raw materials in the form of virgin elements, master alloy, and/or revert melted in any combination, replenished as needed, fluxed for non-metallics, and degassed as necessary. Melting of revert creates a new master heat.

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, or by other analytical methods acceptable to purchaser (see 2.3):

Table 1 - Composition

Element	Min	Max
Carbon	0.15	0.20
Manganese	--	0.10
Silicon	--	0.10
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	8.00	11.00
Cobalt	13.00	17.00
Molybdenum	2.00	4.00
Titanium	4.50	5.00
Aluminum	5.00	6.00
Titanium + Aluminum	10.00	11.00
Boron	0.01	0.02
Vanadium	0.70	1.20
Zirconium	0.03	0.09
Iron	--	1.00
Other Elements (3.1.1)	--	--
Nickel	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.

3.1.2 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 of a master heat, or directly from a master heat (see 3.4.2 and 2.3).

3.2.1 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 2.3), protective atmosphere may be used in lieu of vacuum for pouring of castings.