



AEROSPACE MATERIAL SPECIFICATION

AMS5397™**REV. G**

Issued 1965-02
Reaffirmed 2014-04
Revised 2026-04

Superseding AMS5397F

(R) Nickel Alloy Castings, Investment, Corrosion- and Heat-Resistant,
50Ni - 9.5Cr - 15Co - 3.0Mo - 4.8Ti - 5.5Al - 0.015B - 0.95V - 0.06Zr (IN-100),
Vacuum Melted, Vacuum Cast,
As-Cast
(Composition similar to UNS N13100)

RATIONALE

AMS5397G is the result of a Five-Year Review and update of the specification. The revision adds the common name (see Title and 8.4), clarifies the approval authority (throughout) - eliminating the need for EXC product designations (see 3.8, 4.5.3, and 8.4 Rev. F), updates composition testing (see 3.1), adds tensile test strain rate requirements (see 3.6.1.1.1), provides for alternative test methods (see 3.7.3), adds welding procedure to process control factors (see 4.4.2.2), and revises reporting (see 4.5).

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 (U.S. and Canada only) or +1 724-776-4970 (outside U.S. and Canada), www.sae.org.

AMS2175 Castings, Classification and Inspection of

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

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AMS2283	Composition Testing Methods for Nickel- and Cobalt-Based Alloys
AMS2360	Room Temperature Tensile Properties of Castings
AMS2362	Stress-Rupture Properties of Castings
AMS2694	In-Process Welding of Castings
AMS2804	Identification, Castings
AS7766	Terms Used in Aerospace Metals Specifications
HS-1086	Metals and Alloys in the Unified Numbering System

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 E1417/E1417M	Liquid Penetrant Testing
ASTM E1742/E1742M	Radiographic Examination

2.3 Definitions

Terms used in AMS are defined in AS7766 and as follows:

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.

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.

MASTER HEAT: Refined metal (see 2.3) 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.

MELT: All castings poured from a single furnace charge. Also referred to as remelt, sub-melt, heat, or sub-heat.

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 nonmetallics, and degassed as necessary. Melting of revert creates a new master heat.

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.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2283 or by other analytical methods acceptable to the cognizant engineering organization (CEO).

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 (see 3.1.1)	--	--
Nickel	remainder	

3.1.1 The 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 the CEO.

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 the casting producer's facility either from a melt of a master heat or directly from a master heat (see 2.3 and 3.4.2).

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 the CEO, protective atmosphere may be used in lieu of vacuum for pouring of castings.

3.2.2 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.

3.2.3 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 the CEO.

3.2.4 If melts are modified by replenishment (see 3.2), the producer shall have a written procedure acceptable to the CEO that defines the controls, tests, 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 as-cast condition.