

**AEROSPACE
MATERIAL
SPECIFICATION**



AMS 5409A

Issued
Cancelled

1984-07
AUG 2002

Alloy Casting, Investment, Corrosion and Heat Resistant
61Ni - 16Cr - 8.5Co - 1.8Mo - 2.6W - 0.8Cb - 3.4Ti - 1.8Ta - 3.4Al - 0.010B - 0.06Zr
(0.03 - 0.08C)
Vacuum Melted, Vacuum Cast
As Cast

CANCELLATION NOTICE

This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of August 19, 2002 and has been superseded by AMS 5410. The requirements of the latest issue of AMS 5410 shall be fulfilled whenever reference is made to the cancelled AMS 5409. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Materials Specifications noting that it is superseded by AMS 5410.

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1. SCOPE:

1.1 Form:

This specification covers a corrosion and heat resistant nickel alloy in the form of investment castings.

1.2 Application:

Primarily for parts, such as turbine blades or vanes, requiring good strength and hot corrosion resistance up to 1800°F (980°C).

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

- AMS 2268 - Chemical Check Analysis Limits, Cast Nickel and Nickel Alloys
- AMS 2350 - Standards and Test Methods
- AMS 2360 - Room Temperature Tensile Properties of Castings
- AMS 2362 - Stress-Rupture Properties of castings
- AMS 2635 - Radiographic Inspection
- AMS 2645 - Fluorescent Penetrant Inspection
- AMS 2804 - Identification, Castings

2.2 ASTM Publications:

Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

- ASTM E8 - Tension Testing of Metallic Materials
- ASTM B139 - Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials
- ASTM B192 - Reference Radiographs of Investment Steel Castings for Aerospace Applications
- ASTM B354 - Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

2.3 U.S. Government Publications:

Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards: Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards: MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E354, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	0.03	- 0.08
Manganese	--	0.20
Silicon	--	0.30
Sulfur	--	0.015
Chromium	15.70	- 16.30
Cobalt	8.00	- 9.00
Molybdenum	1.50	- 2.00
Tungsten	2.40	- 2.80
Columbium	0.60	- 1.10
Titanium	3.20	- 3.70
Tantalum	1.50	- 2.00
Aluminum	3.20	- 3.70
Aluminum + Titanium	6.50	- 7.20
Boron	0.005	- 0.015
Zirconium	0.03	- 0.08
Iron	--	0.50
Lead	--	0.0005 (5 ppm)
Bismuth	--	0.00005 (0.5 ppm)
Nickel	remainder	

3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2268.

3.2 Condition: As cast.

3.3 Casting:

3.3.1 The metal for castings shall be melted and poured under vacuum without loss of vacuum between melting and pouring.

3.3.2 Castings shall be poured either from remelted metal from a master heat or directly from a master heat. In either case, metal for casting shall be qualified as in 3.4.