



AEROSPACE MATERIAL SPECIFICATION

AMS7075™

Issued

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Nickel Alloy, Corrosion- and Heat-Resistant,
Powder for Additive Manufacturing,
50Ni - 20Co - 17Cr - 3.1W - 2.3Ti - 2.1Al - 2.1Mo - 1.8Cb(Nb) - 1.5Ta - 0.04C - 0.005B

RATIONALE

To provide a specification that will allow Alloy 900-AM to be procured in the aerospace supply chain for use in additive manufacturing.

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant nickel alloy in the form of pre-alloyed powder.

1.2 Application

This powder is used typically as feedstock in additive manufacturing of components. Material properties are influenced by the additive manufacturing process and subsequent heat treatment; see the final material specification for application guidance.

1.3 Classification

Maximum oxygen concentration is specified as follows:

Class A: Maximum oxygen concentration of 0.020% (200 ppm).

1.4 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards that may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

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.

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Documents

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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.

AMS2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys
AMS7002	Process Requirements for Production of Metal Powder Feedstock for Use in Additive Manufacturing of Aerospace Parts
AMS7025	Metal Powder Feedstock Size Classifications
AS7766	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 B212	Apparent Density of Free-Flowing Metal Powders Using the Hall Flowmeter
ASTM B213	Flow Rate of Metal Powders Using the Hall Flowmeter
ASTM B214	Sieve Analysis of Granular Metal Powders
ASTM B243	Standard Terminology of Powder Metallurgy
ASTM B527	Standard Test Method for Tap Density of Metal Powders and Compounds
ASTM B822	Particle Size Determination of Metal Powders by Light Scattering
ASTM B923	Standard Test Method for Metal Powder Skeletal Density by He or Nitrogen Pycnometry
ASTM B964	Flow Rate of Metal Powder Using the Carney Funnel
ASTM E1019	Determination of Carbon, Sulfur, Nitrogen and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Fusion Techniques
ASTM E1097	Standard Guide for Determination of Various Elements by Direct Current Plasma Atomic Emission Spectrometry
ASTM E1834	Standard Test Method for Analysis of Nickel Alloys by Graphite Furnace Atomic Absorption Spectroscopy
ASTM E2465	Analysis of Ni-Base Alloys by Wavelength Dispersive X-ray Fluorescence Spectrometry
ASTM E2594	Analysis of Nickel Alloys by Inductively Coupled Plasma Atomic Emission Spectrometry
ASTM E2823	Analysis of Nickel Alloys by Inductively Coupled Plasma Mass Spectrometry
ASTM E3047	Standard Test Method for Analysis of Nickel Alloys by Spark Atomic Emission Spectroscopy
ISO/ASTM 52900	Additive Manufacturing - General Principles - Fundamentals and Vocabulary

2.3 Definitions

Terms used in AMS are defined in AS7766. Definitions of terms used in AMS7075 are presented in ASTM B243, AMS7002, and ISO/ASTM 52900. The priority of definitions, unless otherwise stated is: (1) this document, (2) AMS7002, (3) AS7766, (4) ISO/ASTM 52900, and (5) ASTM B243.

3. TECHNICAL REQUIREMENTS

3.1 Composition

The composition shall conform to the percentages by weight shown in Tables 1 and 2, determined by chemical analysis in accordance with ASTM E1834, ASTM E2465, ASTM E2594, ASTM E2823, ASTM E3047, or by other analytical methods acceptable to the purchaser. Carbon, sulfur, oxygen, and nitrogen content shall be determined by ASTM E1019.

Table 1 - Composition

Element	Min	Max
Carbon	0.02	0.07
Manganese	--	0.05
Silicon	--	0.05
Phosphorus	--	0.01
Sulfur	--	0.002
Chromium	16.50	17.50
Cobalt	19.50	20.50
Tungsten	2.90	3.30
Molybdenum	1.90	2.30
Niobium	1.60	2.00
Titanium	2.10	2.50
Aluminum	1.80	2.40
Tantalum	1.30	1.70
Boron	0.003	0.007
Zirconium	--	0.05
Lead	--	0.0005 (5 ppm)
Bismuth	--	0.00005 (0.5 ppm)
Hydrogen	--	0.005
Nitrogen	--	0.0200
Other Elements, each (3.1.1, 8.9)	--	0.10
Other Elements, total (3.1.1, 8.9)	--	0.50
Nickel	--	remainder

Table 2 - Oxygen limits based on powder classification

Class	Percent Maximum
A	0.0200 (200 ppm)

3.1.1 Other Elements

Determination not required for routine acceptance with the exception of Cu, Fe, Hf, Mg, Si, and V, (see 8.8), which shall be measured but reported collectively, with any other measured elements, as "Other Elements, Total."

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

3.2 Powder Production

Powder shall be manufactured in accordance with AMS7002, with the additional requirements defined in 3.2.1.