



AEROSPACE MATERIAL SPECIFICATION

AMS7074™

Issued

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Aluminum Alloy Powder 1.1Zr-1.0Fe Ahead CP1
(Composition similar to AA8A61.50, Al-Zr-Fe)

RATIONALE

To provide a technical specification for procurement of Al-Zr-Fe Ahead CP1 (Aluminum Association 8A61.50) metal powder feedstock for use in additive manufacturing of aerospace parts.

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of pre-alloyed powder.

1.2 Application

This powder has been 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 and apparent density is specified as follows:

Class A: Maximum oxygen concentration of 0.10% (1000 ppm). No apparent density requirement.

Class B: Maximum oxygen concentration of 0.15% (1500 ppm).

Class C: Maximum oxygen concentration of 0.10% (1000 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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Full document details: SAE AMS7074

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<https://www.sae.org/standards/content/AMS7074/>

Documents

Standard Sharing Hub

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.

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	Standard Test Methods for Flow Rate of Metal Powders Using the Hall Flowmeter Funnel
ASTM B243	Standard Terminology of Powder Metallurgy
ASTM B329	Standard Test Method for Apparent Density of Metal Powders and Compounds Using the Scott Volumeter
ASTM B417	Standard Test Method for Apparent Density of Non-Free-Flowing Metal Powders Using the Carney Funnel
ASTM B703	Standard Test Method for Apparent Density of Metal Powders and Related Compounds Using the Arnold Meter
ASTM B822	Standard Test Method for Particle Size Distribution of Metal Powders and Related Compounds by Light Scattering
ASTM B923	Standard Test Method for Metal Powder Skeletal Density by Helium or Nitrogen Pycnometry
ASTM B964	Standard Test Methods for Flow Rate of Metal Powders Using the Carney Funnel
ASTM D7191	Standard Test Method for Determination of Moisture in Plastics by Relative Humidity Sensor
ASTM E203	Standard Test Method for Water Using Volumetric Karl Fischer Titration
ASTM E1019	Determination of Carbon, Sulfur, Nitrogen and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Fusion Techniques
ASTM E1251	Standard Test Method for Analysis of Aluminum and Aluminum Alloys by Spark Atomic Emission Spectrometry
ASTM E1409	Standard Test Method for Determination of Oxygen and Nitrogen in Titanium and Titanium Alloys by Inert Gas Fusion
ASTM E1447	Standard Test Method for Determination of Hydrogen in Titanium and Titanium Alloys by Inert Gas Fusion Thermal Conductivity/Infrared Detection Method
ASTM E2792	Standard Test Method for Determination of Hydrogen in Aluminum and Aluminum Alloys by Inert Gas Fusion

ASTM E3061 Standard Test Method for Analysis of Aluminum And Aluminum Alloys by Inductively Coupled Plasma Atomic Emission Spectrometry

ISO/ASTM 52900 Additive manufacturing - General principles - Terminology

2.3 ISO Publications

Copies of these documents are available online at www.iso.org/store.

ISO 13322-2 Particle size analysis - Image analysis methods - Part 2: Dynamic image analysis methods

2.4 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-PRF-23950 Aluminum Powder, Spherical

2.5 Definitions

Terms used in AMS are defined in AS7766. Definitions of terms used in AMS7074 are presented in ASTM B243, AMS7002, and ISO/ASTM 52900. The order of precedence 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

Shall conform to the percentages by weight shown in Tables 1 and 2, determined by chemical analysis in accordance with ASTM E1251, ASTM E3061, or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Zirconium	0.90	1.35
Iron	0.8	1.20
Silicon	-	0.30
Titanium	-	0.10
Oxygen	-	see Table 2
Other Elements, each (see 3.1.1 and 8.6)	-	0.08
Other Elements, total (see 3.1.1 and 8.6)	-	0.25
Aluminum		remainder

3.1.1 Other Elements

Determination not required for routine acceptance with the exception of Ni, Cu, V, Mg, Cr, Zn, Mn, and Sn (see 8.12), which shall be measured but reported collectively as "Other Elements, total." Determination of Be, Co, Ga, Li, Pb, and Sr is not required for routine acceptance. However, analysis for these elements may be performed when specified in the purchase order or upon agreement between the manufacturer and the CEO or purchaser, in accordance with 8.12.

3.1.2 Interstitial Gases

Shall conform to the percentages by weight shown in Table 2, determined by a test method or methods approved by the CEO (see 8.6.1). See 8.6.1.1 for discussion on the recognized gap for hydrogen limits.