

METAL SOLUTIONS

EOS NickelAlloy IN718

Material Data Sheet

EOS NICKELALLOY IN718

High Temperature Strength and Corrosion Resistance

EOS NickelAlloy IN718 is a precipitation-hardening nickel-chromium alloy that is characterized by having good tensile, fatigue, creep and rupture strength at temperatures up to 700 °C (1290 °F). Parts built from EOS NickelAlloy IN718 can be easily post-hardened by precipitation-hardening heat treatments.

EOS NickelAlloy IN718 is a nickel alloy powder intended for manufacturing parts on EOS metal systems with EOS DMLS processes.

MAIN CHARACTERISTICS

- Good tensile, fatigue, creep and rupture strength at temperatures up to 700 °C (1 290 °F)
- Parts are easily precipitation hardened
- Parts can be machined, spark-eroded, welded, micro shot-peened, polished and coated in both as-built and age-hardened states

TYPICAL APPLICATIONS

- Gas turbine components
- Instrumentation parts
- Power industry parts
- Process industry parts

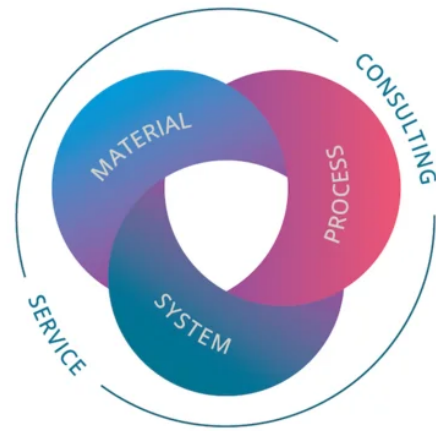
The EOS Quality Triangle

EOS uses an approach that is unique in the AM industry, taking each of the three central technical elements of the production process into account: the system, the material and the process. The data resulting from each combination is assigned a Technology Readiness Level (TRL) which makes the expected performance and production capability of the solution transparent.

EOS incorporates these TRLs into the following two categories:

- Premium products (TRL 7-9): offer highly validated data, proven capability and reproducible part properties.
- Core products (TRL 3 and 5): enable early customer access to newest technology still under development and are therefore less mature with less data.

All of the data stated in this material data sheet is produced according to EOS Quality Management System and international standards



POWDER PROPERTIES

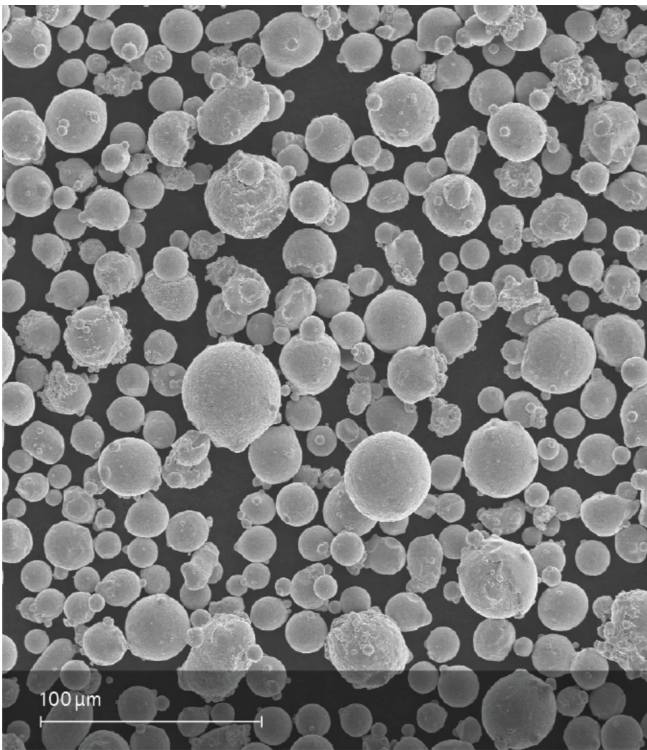
The chemical composition of EOS NickelAlloy IN718 is in compliance with UNS N07718, AMS 5662, AMS 5664, W.Nr 2.4668, DIN NiCr19Fe19NbMo3.

Powder Chemical Composition (wt.-%)

Element	Min.	Max.
Fe		Balance
Ni	50	55
Cr	17	21
Nb	4.75	5.5
Mo	2.8	3.3
Ti	0.65	1.15
Al	0.2	0.8
Co	-	1
Cu	-	0.3
Si	-	0.35
Mn	-	0.35
Ta	-	0.05
C	-	0.08
S	-	0.015
P	-	0.015
B	-	0.006
Pb	-	0.0005
Se	-	0.002
Bi	-	0.00003

Powder Particle Size

GENERIC PARTICLE SIZE DISTRIBUTION	20 - 55 µm
------------------------------------	------------



SEM micrograph of EOS NickelAlloy IN718 powder

HEAT TREATMENT

Description

Heat treatment procedure conform to Aerospace Material Specification AMS 2774 and AMS 5662. As manufactured microstructure for additively manufactured IN718 consists of gamma phase (γ). Heat treatment for IN718 is required to produce desired microstructure and part properties (gamma double prime precipitates, γ''). Heat treatment is also used to relieve stresses

Steps

Step 1: Solution Annealing: hold at 954 °C (1 750 °F) for 1 hour per 25 mm (0.98 inch) of thickness, air (/argon) cool

Step 2: Ageing Treatment: hold at 718 °C (1 325 °F) 8 hours, furnace cool to 621 °C (1 150 °F) and hold at 621 °C (1 150 °F) for total precipitation time of 18 hours, air (/argon) cool

HEADQUARTERS

EOS GmbH
Electro Optical Systems

Robert-Stirling-Ring 1
82152 Krailling / Munich
Germany

Tel.: +49 89 893 36-0
Email: info@eos.info
URL: www.eos.info

This powder has not been developed, tested or certified as a medical device according to Directive 93/42/EEC (MDD) or Regulation (EU) 2017/745 (MDR) and is not intended to be used as a medical device, in particular for the purposes specified in Art. 2 No. 1 MDR. Insofar as you intend to use the powder as raw material for the manufacture of pharmaceutical products or medical devices (e.g. as raw material which as a material must meet the requirements of Annex 1, Chapter II MDR), the responsibility and liability for all analyses, tests, evaluations, procedures, risk assessments, conformity assessments, approval and certification procedures as well as for all other official and regulatory measures required for this purpose shall lie solely with you both with regard to the pharmaceutical product and/or medical device manufactured by you and with regard to the properties, suitability, testing, evaluation, risk assessment, other requirements for use of the powder as raw material. In this respect, the limitations of liability pursuant to our General Terms and Conditions and the system sales or material contracts shall apply.

Part properties are provided for information purposes only and EOS makes no representation or warranty, and disclaims any liability, with respect to actual part properties achieved. Part properties are dependent on a variety of influencing factors and therefore, actual part properties achieved by the user may deviate from the information stated herein. This document does not on its own represent a sufficient basis for any part design, neither does it provide any agreement or guarantee about the specific properties of a material or part or the suitability of a material or a part for a specific application.

The achievement of certain part properties as well as the assessment of the suitability of this material for a specific purpose is the sole responsibility of the user. Any information given herein is subject to change without notice.

Status as of 19.05.2024. Subject to technical modifications. EOS is certified according to ISO 9001.

EOS®, Additive Minds®, Alumide®, AMQ®, CarbonMide®, DirectMetal®, DMLS®, EOSAME®, EOSINT®, EOSIZE®, EOSPACE®, EOSPRINT®, EOSTATE®, EOSTYLE®, FORMIGA®, LaserProFusion®, PA 2200®, PrimeCast® and PrimePart® are registered trademarks of EOS GmbH Electro Optical Systems in some countries. For more information visit www.eos.info/trademarks.