Material
Data Sheet

EOS NickelAlloy K500

Versatile alloy for highly corrosive environments

EOS NickelAlloy K500

Main Characteristics:

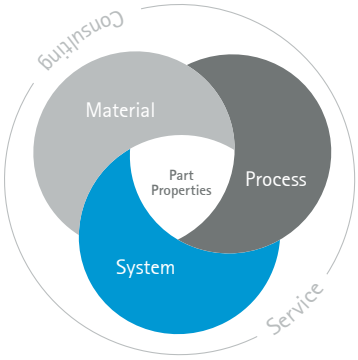
- Good mechanical strength also in elevated temperatures
- Excellent corrosion resistance
- Moderate conductivity (about two times the conductivity of commonly used nickel superalloys)

Typical Applications:

- Aerospace
- Marine
- Industrial applications

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

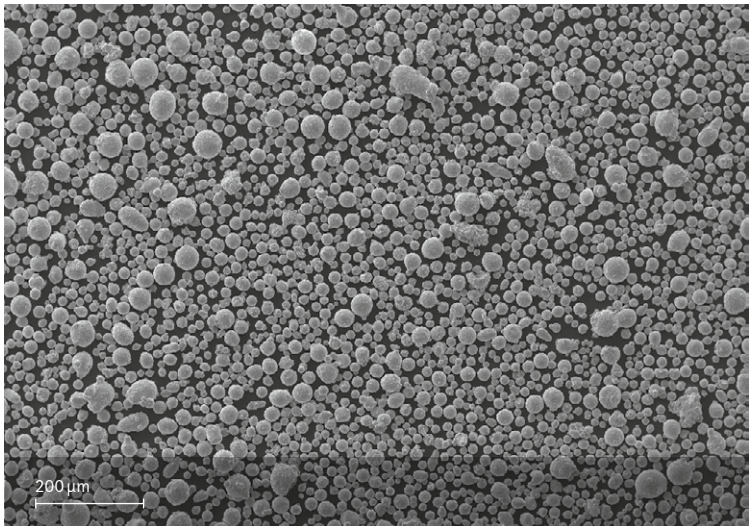
Powder and built part compositions meet the chemical composition requirements of UNS N05500.

Powder chemical composition (wt.-%)

Element	Min.	Max.
Ni	63.0	
Cu	27.0	33.0
Al	2.30	3.15
Fe		2.0
Mn		1.5
Ti	0.35	0.85
Si		0.5
C		0.25
S		0.01

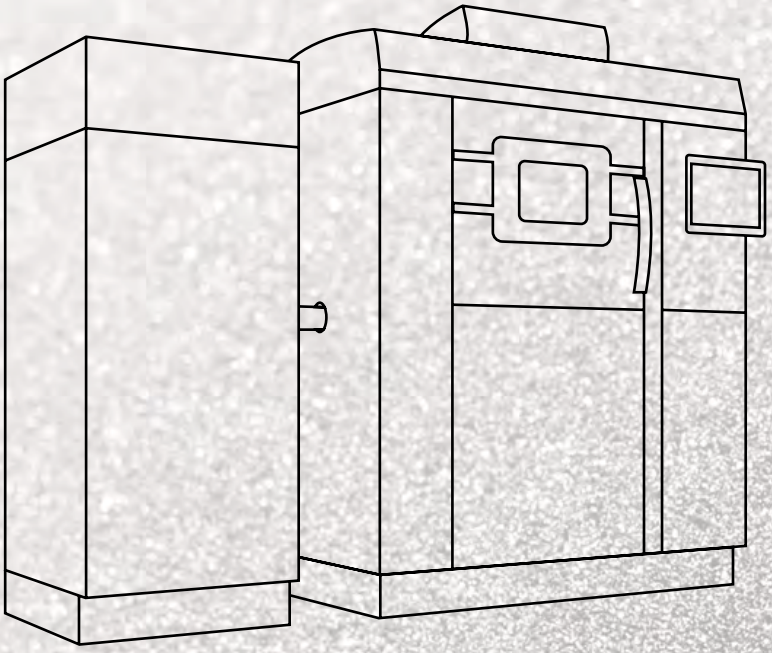
Powder particle size

Generic particle size distribution	15-75 µm



SEM image of powder

TRL 3
Core



EOS NickelAlloy K500
for EOS M 290 | 60 µm

Process Information
Chemical and Physical Part Properties
Heat treatment
Additional Data

EOS NickelAlloy K500 for EOS M 290 | 60 µm
Process Information

TRL 3
Core

System set-up	EOS M 290
EOSPAR name	K500_060_CoreM291_100
Software requirements	EOSPRINT 2.13 or newer EOSYSTEM 2.17 or newer
Powder part no.	9030-0019
Recoater blade	HSS
Nozzle	grid
Inert gas	Argon
Sieve	90 µm

Additional information	
Layer thickness	60 µm
Volume rate	6.0 mm³/s

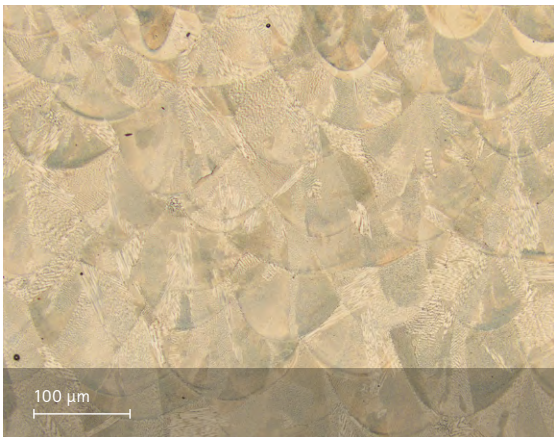
Heat Treatment

EOS NickelAlloy K500 is a precipitation strengthened alloy. The strength of the material can be tailored using heat treatment. An ageing heat treatment directly after printing is recommended for applications where strength is the primary concern.

Direct Aging
Hold at 595 °C measured from the part for 2 h in argon atmosphere, followed by slow air cooling.

Chemical and Physical Properties of Parts[1]

Defects	Result
Average defect percentage	0.05 %



As manufactured microstructure. Etched with ASTM E407 recipe #40.

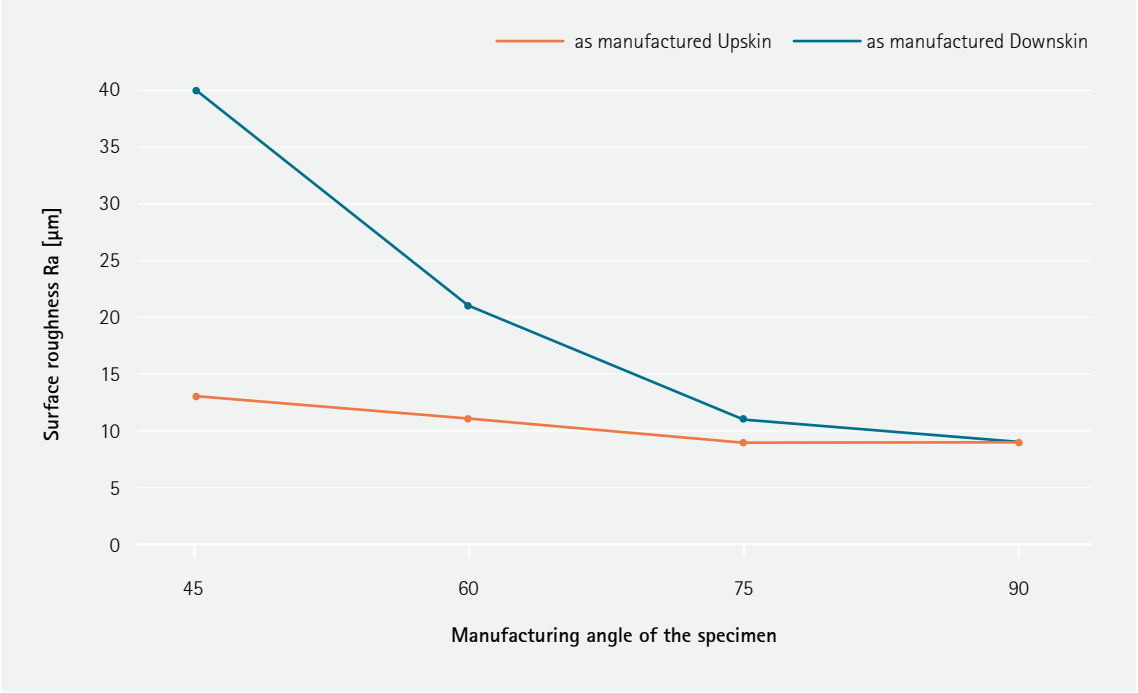
Mechanical properties

Heat treated	Yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation at break A [%]
As manufactured Horizontal	545	765	30
As manufactured Vertical	480	715	35
Heat treated Horizontal	840	1090	20
Heat treated Vertical	790	1000	25

Tensile testing as per ISO 6892-1.

Additional Data[1]

Surface Roughness



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Cover: This image shows a possible application.

Important Note
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