

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

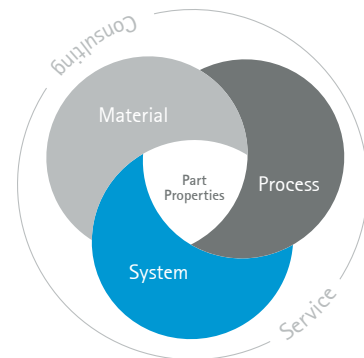
The EOS Quality Triangle

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

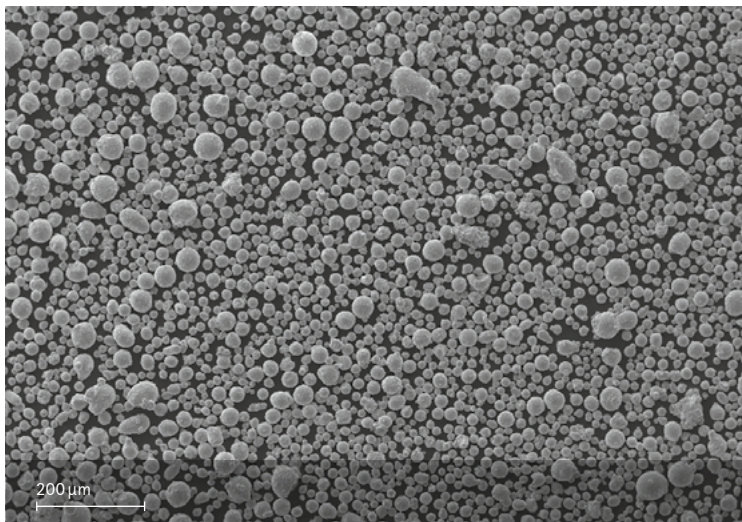
Powder and built part compositions meet the chemical composition requirements of UNS N05500.

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
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SEM image of powder

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

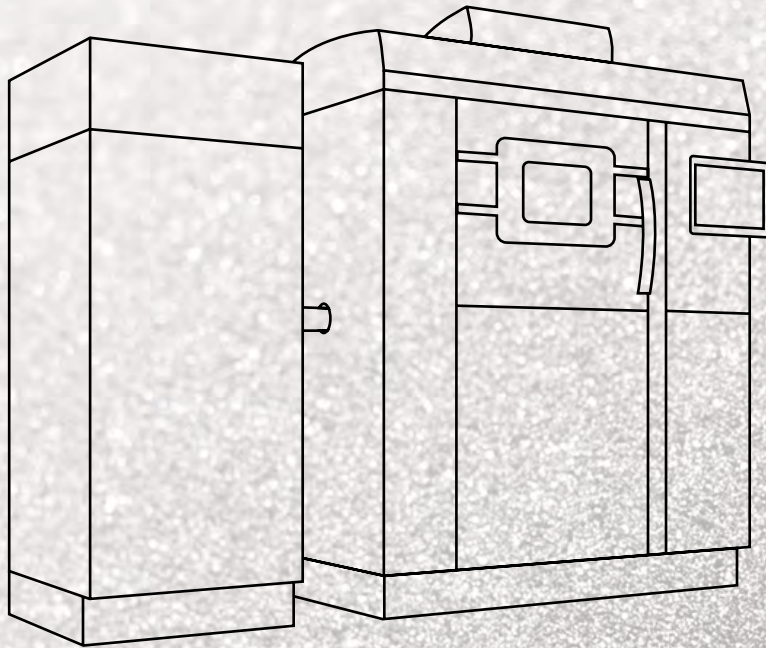
Hold at 595 °C measured from the part for 2 h in argon atmosphere, followed by slow air cooling.

Coefficient of thermal expansion

Standard

ASTM E228

Temperature	25-100 °C	25-200 °C	25-300 °C	25-400 °C	25-500 °C	25-600 °C
CTE	13.7*10 ⁻⁶ /K	14.4*10 ⁻⁶ /K	14.9*10 ⁻⁶ /K	15.2*10 ⁻⁶ /K	15.0*10 ⁻⁶ /K	15.1*10 ⁻⁶ /K



EOS NickelAlloy K500 for EOS M 290 | 60 μm

Process Information

Chemical and Physical Part Properties

Additional Data

EOS NickelAlloy K500 for EOS M 290 | 60 µm

Process Information

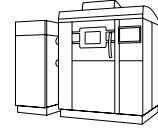


System set-up	EOS M 290
EOSPAR name	K500_060_CoreM291_100
Software requirements	EOSPRINT 2.13 or newer EOSYSTEM 2.17 or newer
Powder part no.	9030-0019
Recoater blade	HSS
Nozzle	grid
Inert gas	Argon
Sieve	90 µm

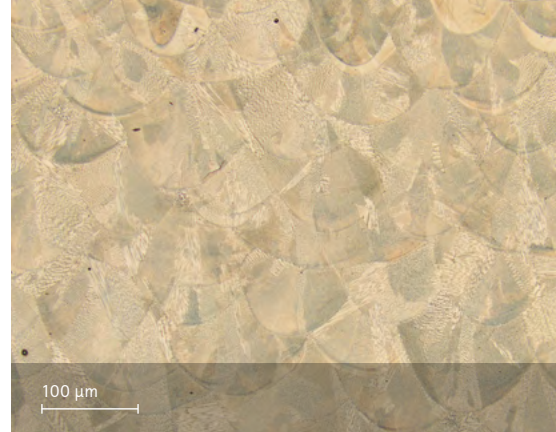
Additional information

Layer thickness	60 µm
Volume rate	6.0 mm ³ /s

Chemical and Physical Properties of Parts



Defects	Result
Average defect percentage	0.04 %



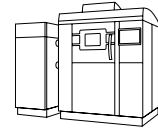
As manufactured microstructure. Etched with ASTM E407 recipe #40.

Mechanical properties

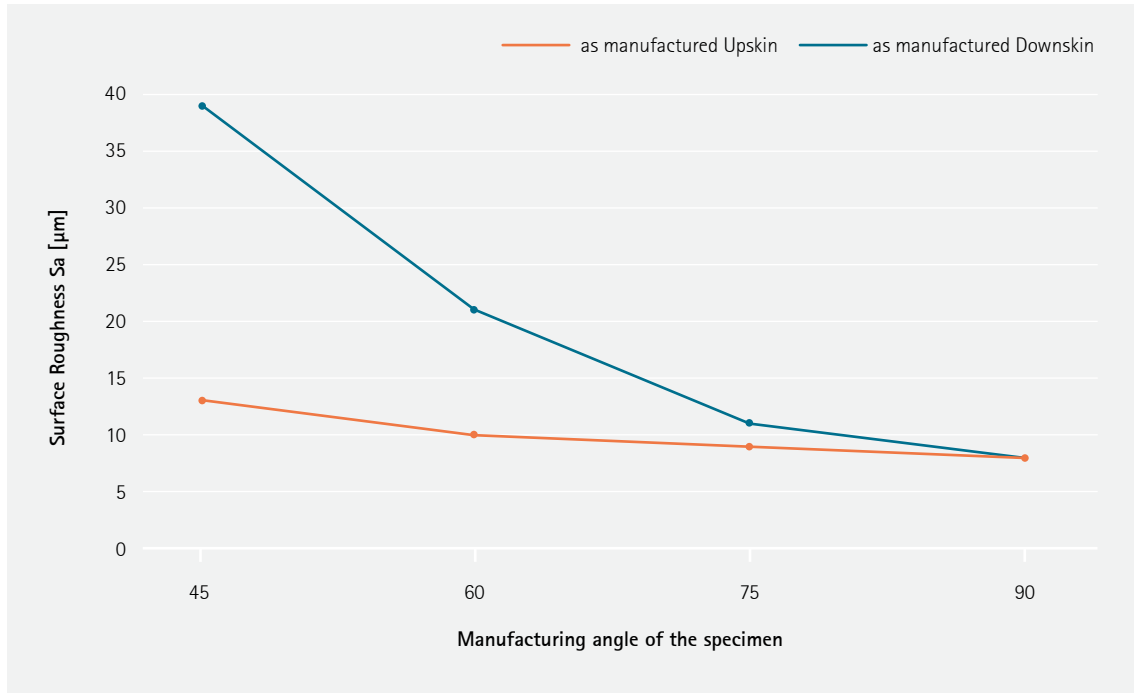
Heat treated	Yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation at break A [%]
As manufactured Horizontal	540	755	32
As manufactured Vertical	495	710	35
Heat treated Horizontal	840	1095	21
Heat treated Vertical	810	1030	27

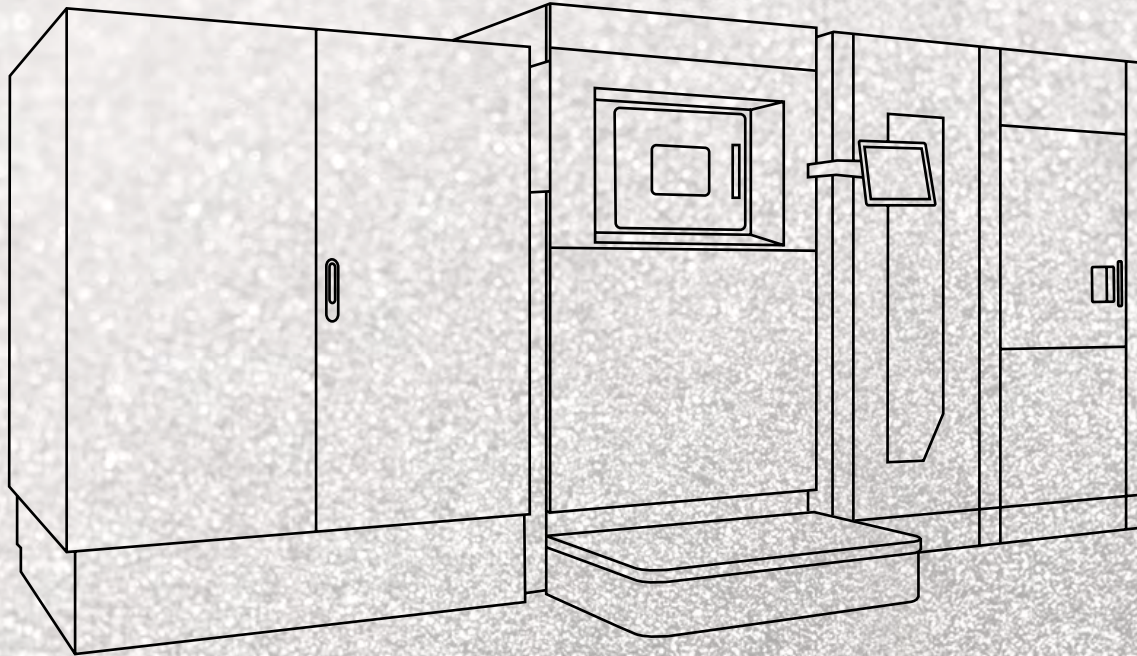
Tensile testing as per ISO 6892-1.

Additional Data



Surface Roughness





EOS NickelAlloy K500 for EOS M 400-4 | 60 μm

Process Information

Chemical and Physical Part Properties

Additional Data

EOS NickelAlloy K500 for EOS M 400-4 | 60 µm

Process Information

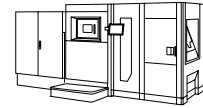


System set-up		EOS M 400-4
EOSPAR name	K500_060_CoreM404_100	
Software requirements	EOSPRINT 2.13 or newer EOSYSTEM 2.17 or newer	
Powder part no.	9030-0019	
Recoater blade	HSS	
Nozzle	Aerospike	
Inert gas	Argon	
Sieve	90 µm	

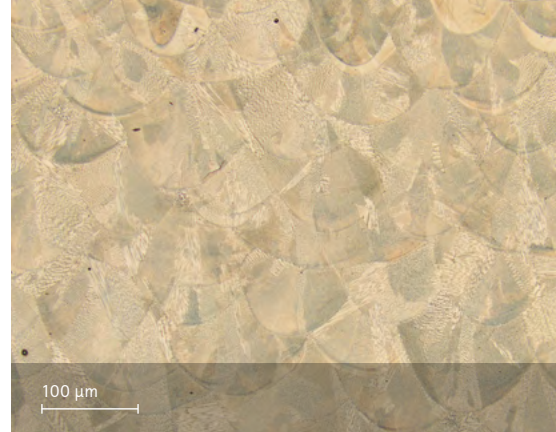
Additional information

Layer thickness	60 µm
Volume rate	6.0 mm ³ /s

Chemical and Physical Properties of Parts



Defects	Result
Average defect percentage	0.05 %



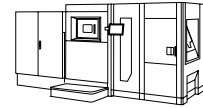
As manufactured microstructure. Etched with ASTM E407 recipe #40.

Mechanical properties

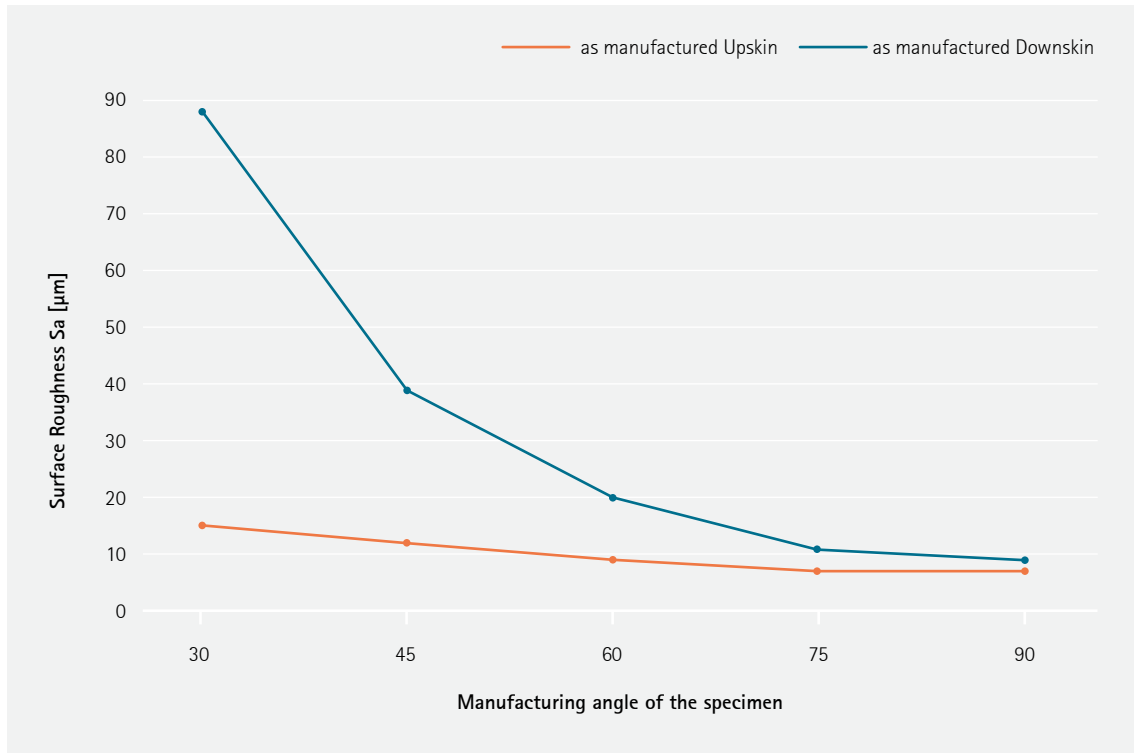
Heat treated	Yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation at break A [%]
As manufactured Horizontal	535	755	33
As manufactured Vertical	475	705	38
Heat treated Horizontal	840	1085	22
Heat treated Vertical	785	1020	28

Tensile testing as per ISO 6892-1.

Additional Data



Surface Roughness



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#responsiblemanufacturing

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Status 01/2025

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Cover: This image shows a possible application.

Important Note

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