Printdur® HSA

High strength, stainless, austenitic steel for Additives Manufacturing

GENERAL INFORMATION

The newly developed Printdur® HSA is characterized by the following properties:

- Good processability with LPBF.
- Printdur HSA is produced without the alloying element nickel. As a result, the safety regulations during the processing of the powder are significantly reduced.
- Significantly increased yield strength, tensile strength and hardness compared to typical austenitic steels (like e.g. 316L).
- High corrosion restístance (Pitting Resistance Equivalent Number) PREN = 36 compared to typical austenitic steels (316L = 28).
- High tendency to work hardening.
- High resistance to cavitation.
- A subsequent heat treatment can increase the toughness.
- The properties of Printdur® HSA offer a wide range of applications in mechanical engineering, e.g. food and chemical industry, pump components, the power plant industry or the automotive industry.

Our production is certified according to DIN EN ISO 9001 (quality management systems) and IATF 16949 (quality management automotive). Thus, we can guarantee a constant high quality of our metal powder.

POWDER PROPERTIES

The powder is produced by gas atomization. This manufacturing process ensures spherical powder particles in combination with excellent flow characteristics.

Chemical Composition[1] [weight-%]

C+N	Mn	Cr	Mo	Ni	Fe
1.0	21.0	18.0	2.0	< 0.1	Basic

[1] ***Patent applied***

Powder characterization[2]

Bulk density	Flow characteristics
4.3 g/cm³	16.8 s/50g

[2] The properties were determined in the particle size distribution of 10 - 53 µm.

ADDITIVE MANUFACTURING[3]

Printdur® HSA can be processed on LPBF systems. The process parameters are similar to those of 316L. Please contact us for further information.

[3] Process parameters for LPBF systems have been developed for our alloys and can be supplied on request. Depending on the system, it may be necessary to deviate from these recommendations. We would be pleased to support you in the implementation.

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MECHANICAL PROPERTIES[4]

The mechanical properties listed below were achieved with a particle size distribution of 10 - 53 µm. The used system was an EOS M290 with a layer thickness of 40 µm.

$R_{p0,2}$	915 MPa
R_m	1120 MPa
$A_{5,65}$	30 %
A_V	50 J
HRC	35

[4] The mechanical properties were determined in vertical direction and thus represent the lower limit of the properties due to the component orientation / print orientation of the alloy. A different - e.g. horizontal - orientation of the specimens / components generally leads to higher mechanical properties.

MICROSTRUCTURE

In printed condition Prindur® HSA is characterized by an 99 % austenitic microstructure. As a result, the material is non-magnetic (μ_r < 1.01).

CORROSION RESISTANCE

In printed condition Prindur® HSA is corrosion resistant according to SEP 1877 Method II (intergranular corrosion resistance test) and ASTM G48 Method E (pitting corrosion resistance test).

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