

## High strength, stainless, austenitic steel for Additives Manufacturing

### GENERAL INFORMATION

The newly developed Medidur® is characterized by the following properties:

- Good processability with LPBF.
- Medidur® is produced without the alloying element nickel. As a result, the safety regulations during the processing of the powder are significantly reduced.
- The Medidur® can be used for medical purposes as an allergic reaction to nickel is avoided.
- Significantly increased yield strength, tensile strength and hardness compared to typical austenitic steels (like e.g. 316L).
- High corrosion resistance (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 Medidur® is the ideal choice for medical applications.

Our production is certified according to DIN EN ISO 9001 (quality management systems) and IATF 16949 (quality management automotive). In combination with the certification of our production according to DIN EN ISO 13485 (quality management for medical products) Medidur® is the first choice for applications in medical engineering.

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 [weight-%]

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

*\*Patent applied*

#### Powder characterization<sup>1</sup>

| Bulk density          | Flow characteristics |
|-----------------------|----------------------|
| 4.3 g/cm <sup>3</sup> | 16.8 s/50g           |

<sup>1</sup> The properties were determined in the particle size distribution of 10 - 53 µm.

### ADDITIVE MANUFACTURING<sup>2</sup>

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

<sup>2</sup> 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<sup>3</sup>

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 <sub>p0,2</sub> | 915 MPa  |
| R <sub>m</sub>    | 1120 MPa |
| A <sub>5,65</sub> | 30 %     |
| A <sub>v</sub>    | 50 J     |
| HRC               | 35       |

<sup>3</sup> 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 Medidur® is characterized by an 99 % austenitic microstructure. As a result, the material is non-magnetic ( $\mu_r < 1.01$ ).

### CORROSION RESISTANCE

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

We reserve us the right to change/ remove and/or edit the content of our technical datasheets in any time. Errors and missprints reserved.

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