

# Bainidur® AM

## Bainitic steel for Additive Manufacturing

### GENERAL INFORMATION

DEW meet the demands of Additive Manufacturing and serial production with the established special steels Bainidur® 1300 and Bainidur® 7980 CN. The new bainitic steels don't only expand the large-scale production via electric arc furnace but also with Bainidur® AM (= Additive Manufacturing) the portfolio of metal powder.

Bainidur® AM is a specially designed modified AM-version of Bainidur® 1300 and Bainidur® 7980 CN.

There are currently only a few low- and medium-alloy steels available on the market which can be processed by Additive Manufacturing. Bainidur® AM, on the other hand, meets this need because it allows initial samples to be printed quickly and efficiently, which also exhibits the later component properties. Heat treatment and thermochemical surface treatments can be tested and optimized with the same material as in the serial production. Even spare parts, when the forging dies no longer exist, can be produced by Additive Manufacturing with the same properties as the original. This is supported by its good transformation behavior into the bainite structure. This makes the material easy to handle during powder production and printing.

The newly developed Bainidur® AM is characterized by the following properties:

- Good processability with LPBF.
- High strength and toughness.

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<sup>1</sup> [weight-%]

| C    | Si  | Mn  | Mo  | Cr  |
|------|-----|-----|-----|-----|
| 0.22 | 0.8 | 1.4 | 1.0 | 1.0 |

<sup>1</sup> This is a simplified chemical composition, also additions are added.

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

Bainidur® AM can be processed on LPBF systems. 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 in as built condition. The used system was an EOS M290 with a layer thickness of 60 µm.

|                   |          |
|-------------------|----------|
| R <sub>p0.2</sub> | 1220 MPa |
| R <sub>m</sub>    | 1500 MPa |
| A <sub>5.65</sub> | 10 %     |
| A <sub>V</sub>    | 40 J     |
| HRC               | 44       |

<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 Bainidur® AM is characterized by a nearly 100 % bainitic microstructure.

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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