

# ADDITIVE MANUFACTURING POWDER

## E185 AMPO / FE-BASED ALLOYS

### Application Segments

Additive Manufacturing Application

### Available Product Variants

15 - 45 µm

45 - 90 µm

### Product Description

The newly developed, patent pending, BÖHLER E185 AMPO is an AM powder, fulfilling the highest demands from various industries, ranging from motorsport to engineering components and any kind of prototype applications. This low alloyed steel with easy printability and the possibility for surface treatments (e.g. case hardening or nitriding) was developed especially for the demands of the 3D printing industry. The material shows an excellent combination of strength and toughness.

### Process Melting

VIGA

### Applications

- > 3D Printing - direct metal deposition
- > Automotive
- > General Components for Mechanical Engineering
- > Other Components
- > Wind Power
- > 3D Printing - selective laser melting
- > Motorsport industry
- > Industry gear boxes
- > Other Oil and Gas + CPI components
- > Powder for additive manufacturing
- > Civil and mechanical engineering
- > Mechanical Engineering
- > Tool Holders (milling, drilling, turning & chucks)

### Technical data

| Material designation |              |
|----------------------|--------------|
| BÖHLER patent        | Market grade |

### Chemical composition (wt. %)

| C    | Si   | Mn  | Cr   | Mo  | Ni   | V    |
|------|------|-----|------|-----|------|------|
| 0.19 | 0.22 | 0.3 | 0.95 | 0.2 | 1.25 | 0.15 |

## Powder Properties

### Particle Size Distribution 15-45µm\*

| Typical Values | D10   | D50   | D90   |
|----------------|-------|-------|-------|
| [µm]           | 18-24 | 29-35 | 42-50 |

\* Measurement of particle size distribution according to ISO 13322-2 (Dynamic image analysis methods);

Apparent density\*\* min. 3.5 g/cm<sup>3</sup>

\*\* Measurement of apparent density is based on ASTM B964 resp. DIN EN ISO 3923-1 and relates to our typical measured values

## Mechanical Properties

### As Printed

|   |                |
|---|----------------|
| Tensile strength (Rm) (MPa)               | 1,120 to 1,220 |
| Yield strength (RP <sub>0.2</sub> ) (MPa) | 1,000 to 1,100 |
| Elongation (%)                            | 13 to 17       |
| Hardness (HRc)                            | 36 to 38       |
| Impact Toughness (ISO-V)* (J)             | 130 to 150     |

\* Charpy-V samples at room temperature

### With according Heat Treatment

|   |                |
|---|----------------|
| Tensile strength (Rm) (MPa)               | 1,320 to 1,420 |
| Yield strength (RP <sub>0.2</sub> ) (MPa) | 1,080 to 1,220 |
| Elongation (%)                            | 12 to 14       |
| Hardness (HRc)                            | 43 to 45       |
| Impact Toughness (ISO-V)* (J)             | 75 to 95       |

\* Charpy-V samples at room temperature

### With according Heat Treatment and Case Hardening

|                           |            |
|---------------------------|------------|
| Surface Hardness* (HV)    | 730 to 770 |
| Case Hardening Depth (mm) | 0.8 to 0.9 |

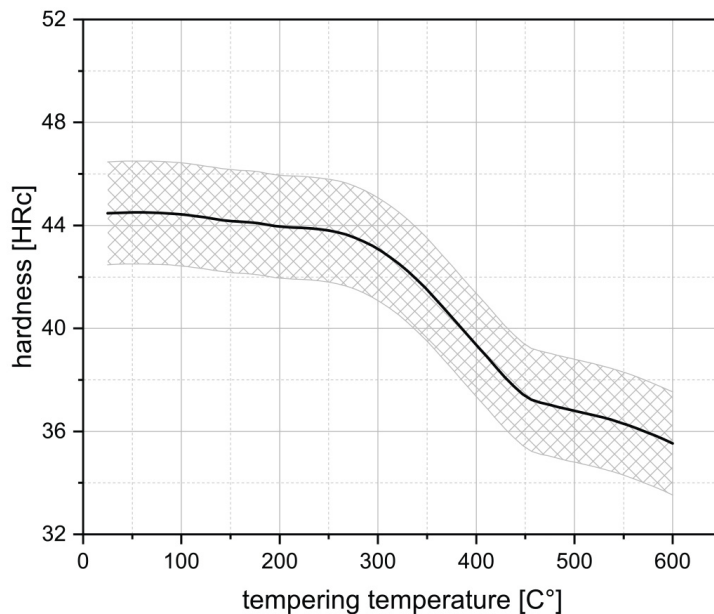
\* HV 30

## Heat treatment

### Hardening and Tempering

|             |        |  |
|-------------|--------|--|
| Temperature | 850 °C | 30 min.; Cool in water; Tempering: 200°C / 392 °F for 2 hours cool in air. |
|-------------|--------|--|

## Hardening - Tempering Curve



### Heat treatment

Hardening temperature 850°C  
Soaking time 30 min  
water quenched

Single tempering at mentioned temperatures for 2h / air cooling.  
After each heat treatment step the material has to cool down until room temperature.

If other available product variants are listed in addition to long products, please note that these may differ in terms of melting process, technical data, delivery and surface condition as well as available product dimensions. For mandatory technical specifications, other requirements and dimensions, please contact our regional voestalpine BÖHLER sales companies. The data contained in this brochure is merely for general information and therefore shall not be binding on the company. We may be bound only through a contract explicitly stipulating such data as binding. Measurement data are laboratory values and can deviate from practical analyses. The manufacture of our products does not involve the use of substances detrimental to health or to the ozone layer.

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ONE STEP AHEAD.