

## Datasheet 1.4542

### Description

1.4542 is a pre-alloyed stainless steel in fine powder form. This type of steel is characterized by high corrosion resistance, good mechanical properties, and, in particular, excellent ductility without further post-treatment. It is widely used in industrial applications.

This material is ideal for many component manufacturing applications such as functional parts, small series, one-offs, or replacement parts. Standard parameters cause the material to melt completely throughout the entire component at a layer thickness of 20 µm. To speed up the manufacturing process, it is also possible to use the shell/core construction method. With standard parameters, the mechanical properties are approximately identical in all directions. Components made of 1.4542 can be machined, wire and die-sunk, welded, microblasted, polished, and coated. Unexposed powder can be reused.

### Properties & Application

- Good mechanical properties, excellent ductility
- For functional prototypes, small series, series parts, mechanical engineering, medicine, one-off items, or spare parts

#### Chemical Composition (in wt.-%)

<b>Cr</b>	15,0 - 17,5	<b>Ni</b>	3,0 - 5,0
<b>Cu</b>	3,0 - 5,0	<b>Mn</b>	≤ 1,0
<b>Si</b>	≤ 1,0	<b>Mo</b>	≤ 0,50
<b>Nb</b>	0,15 - 0,45	<b>C</b>	≤ 0,07
<b>Fe</b>	Remaining		

#### Physical Properties

<b>relative density</b>	ca. 100%
<b>density</b>	7,8 g/cm <sup>3</sup>

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### Mechanical properties of components at room temperature

<b>tensile strength [N/mm<sup>2</sup>]<sup>1</sup></b>	<b><u>as built</u></b>
horizontal direction (XY)	min 850 MPa, typ. 930 ± 50 MPa
vertical direction (Z)	min 850 MPa, typ. 960 ± 50 MPa
<b>lower yield strength R<sub>eL</sub> [N/mm<sup>2</sup>]</b>	
horizontal direction (XY)	min 530 MPa, typ. 586 ± 50 MPa
vertical direction (Z)	min 530 MPa, typ. 570 ± 50 MPa
<b>upper yield strength R<sub>eH</sub> [N/mm<sup>2</sup>]</b>	
horizontal direction (XY)	min 595 MPa, typ. 645 ± 50 MPa
vertical direction (Z)	min 580 MPa, typ. 630 ± 50 MPa
<b>elongation at break [%]</b>	
horizontal direction (XY)	min 25 %, typ 31 ± 5 %
vertical direction (Z)	min 25%, typ 35 ± 5 %
<b>modulus of elasticity [kN/mm<sup>2</sup>]</b>	170 ± 30 GPa, typ. 180 GPa
<b>Vickers hardness</b>	approx. 230 ± 20 HV1

<sup>1</sup>tensile test according to ISO 6892/ASTM EBM

#### **Note:**

The specified material properties depend on the machine, powder material, parameter settings, and other factors such as the anisotropy of the components.

They therefore do not provide a sufficient basis for component design. These specifications are for reference purposes only.