

## Powder Material

316L Stainless Steel is an austenitic stainless steel with high mechanical properties and high corrosion resistance. 316L or 1.4404 is used in a very broad field of applications. For example, in automotive, aerospace, and biomedical products. The parts can be further processed as built or in stress-relief annealed condition.

### Physical Properties

<b>Particle Size</b>	15 µm – 45 µm
<b>Density</b>	7.98 g/cm <sup>3</sup>
<b>Thermal conductivity</b>	21 W/mK
<b>Melting range</b>	1380 °C – 1410 °C
<b>Thermal expansion</b>	16 x 10 <sup>-6</sup> K <sup>-1</sup>

### Chemical Composition

<b>Fe</b>	Balance	<b>Cu</b>	< 0.50 %
<b>Cr</b>	17.5 - 18 %	<b>O</b>	< 0.10 %
<b>Ni</b>	12.5 - 13 %	<b>N</b>	< 0.10 %
<b>Mo</b>	2.25 - 2.5 %	<b>C</b>	< 0.03 %
<b>Mn</b>	2.00 %	<b>P</b>	< 0.025 %
<b>Si</b>	< 0.75 %	<b>S</b>	< 0.010 %

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VAT ID.: DE295160526 | Tax ID: 201/5940/4991  
Local Court Aachen: HRB18970

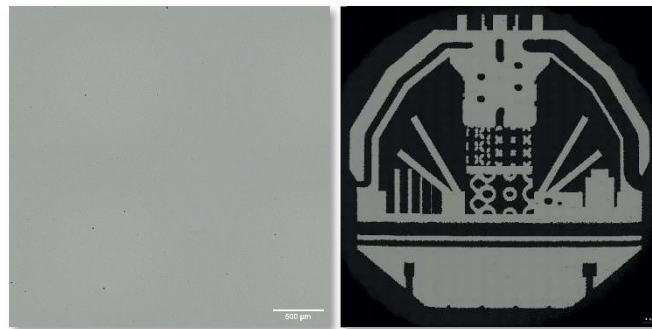
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Sparkasse Aachen  
IBAN: DE66 3905 0000 1070 1746 91 | BIC: AACSD33XXX

US-Dollar Account: 107877301 | Routing: 39070024  
Deutsche Bank PGK Aachen  
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*L-PBF Process*

<b>Layer Thickness</b>	30 µm
<b>Laser Power Classification</b>	200 W
<b>Theoretical Build-up Rate</b>	7.78 cm <sup>3</sup> /h

**Relative Density >99.5 %**



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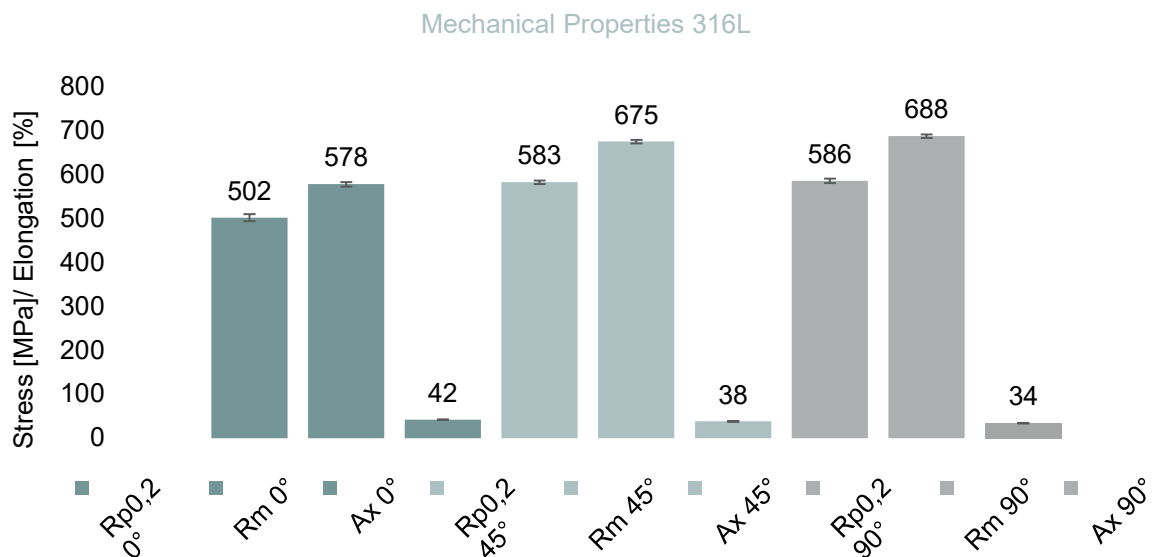
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## Mechanical Properties – As built

According to DIN EN ISO 6892-1

Orientation	Young's Modulus [GPa]	Yield Strength $R_{p0,2}$ [MPa]	Tensile Strength $R_m$ [MPa]	Elongation at Break $A_x$ [%]
0° (vertical)	188 ± 17	502 ± 5	578 ± 4	42 ± 1
45°	235 ± 25	583 ± 4	675 ± 4	38 ± 1
90° (horizontal)	206 ± 14	586 ± 8	688 ± 5	34 ± 1

Mechanical Properties – Heat Treated<sup>1</sup>

Orientation	Yield Strength $R_{p0,2}$ [MPa]	Tensile Strength $R_m$ [MPa]	Elongation at Break $A_x$ [%]
0° (vertical)	205 <sup>2</sup>	515 <sup>2</sup>	30 <sup>2</sup>

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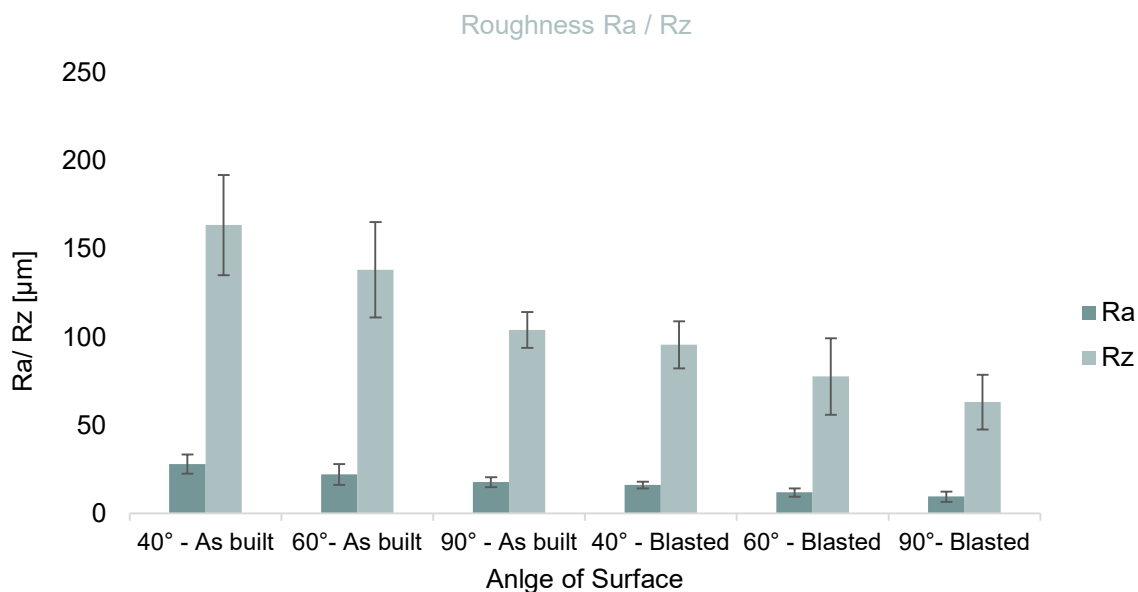
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## Surface Roughness

Condition	As Built			Sand Blasted			
	Orientation relative to platform	40°	60°	90°	40°	60°	90°
<b>Ra [µm]</b>		28 ± 5	22 ± 6	18 ± 3	16 ± 2	12 ± 2	10 ± 2
<b>Rz [µm]</b>		164 ± 28	138 ± 27	104 ± 10	96 ± 13	78 ± 22	63 ± 16
<b>Sa [µm]</b>		13 ± 1	10 ± 1	9 ± 1	4 ± 1	3 ± 1	3 ± 1
<b>Sz [µm]</b>		195 ± 29	140 ± 20	130 ± 32	90 ± 10	58 ± 9	63 ± 11



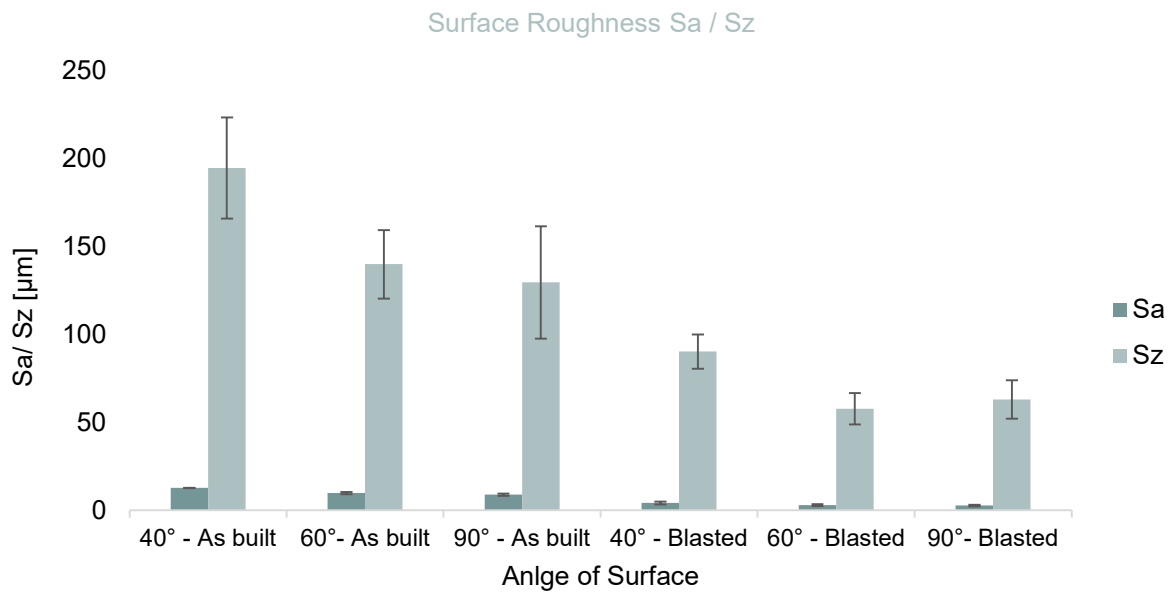
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All values are related to the standard process of Aconity3D and are subject to natural volatilities depending on applied powder material, process parameters and surrounding conditions. Changes in laser spot size and other process conditions might have an influence on the values.

<sup>1</sup> Classification A, according to ASTM F3184 – 16

<sup>2</sup> Minimum specifications according to ASTM F3184 – 16

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