

UniFuse™ 316L 50µm 400W Performance

· Laser Powder Bed Fusion 3D printing

Chemical composition:

Elements	Fe [wt.-%]	Cr [wt.-%]	Mn [wt.-%]	C [wt.-%]	Si [wt.-%]	Ni [wt.-%]	N [wt.-%]	S [wt.-%]	P [wt.-%]
Min	Bal. / Rest	16	0.00	0.00	0.00	10	0.00	0.00	0.00
Max	Bal. / Rest	18	2	0.030	1	14	0.10	0.03	0.045

Powder Properties:

Density (g/cm³)

Tap Density	6.08 g/cm ³ ± 0.15
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Typical properties at nominal density and nominal composition:

Coupon type: ASTM E8-21

Material properties ¹⁾	Symbol	As built
Density [g/cm ³] ²⁾	ρ	7.99 – 8.0
Density [%] ²⁾	%	99.9 – 100.0
Porosity [%] ²⁾	p	0.0 – 0.1
Ultimate Tensile Strength [MPa] ^{3) 4)}	R_m xy-bar	700 ± 23
	R_m z-bar	675 ± 26
Yield Strength [MPa] ^{3) 4)}	$R_{p0.2}$ xy-bar	550 ± 18
	$R_{p0.2}$ z-bar	503 ± 22
Young's Modulus [GPa] ^{3) 4)}	E	175 ± 18
Fracture Elongation [%] ^{3) 4)}	A xy-bar	47 ± 5
	A z-bar	45 ± 6
Surface roughness in z-direction	R_a	8.6 ± 1.8

Remarks:

1) Properties are given for the laser melted product printed at 50µm layers. Auxiliary operations may influence the displayed properties. Auxiliary operations like e.g. heat treatments or surface modifications by coating processes, bead blasting, etc. performed at Uniformity Labs or the customer will affect mechanical and physical properties.

2) The indicated density limits are valid for the mean density of a component. For complex and geometrically unfavorable shapes the local segment density can deviate from these limits and therefore materials properties may be affected.

3) Materials properties stated in the table above have been determined on the basis of ASTM E8-21.

4) All mechanical characteristics are typical mean values valid only for the indicated nominal density level, and will vary from printer to printer.

5) Roughness measurement according to microscopy in accordance with DIN EN ISO 4287.

6) Surface roughness value is dependent on the gasflow characteristic of the machine.