



AM 316L by f3nice

Applicable Standards

- ASTM F3184 (ASTM F138), NORSOK M-630: *Properties of 316L by LB-PBF*
- ASTM B214, ASTM B822: *Particle Size Distribution (PSD)*
- ASTM B213, ASTM B212, ASTM B527: *Flowability and Density*
- ASTM E8, ASTM E10: *Mechanical Testing*

General Description

High quality powder produced by means of VIGA (Vacuum Inert Gas Atomization). VIGA process assures impurities levels below conventional techniques such as Water Atomization or open-furnace Inert Gas Atomization.

The AM 316L by f3nice presents a chemical composition in accordance with ASTM F3184, but with a higher content in terms of Ni%, Cr% and Mo% compared to traditional 316L, as per ASTM F318. The improved composition provides to the material a superior resistance towards aggressive chemical environments.

Chemical Composition

Element	C [%]	Mn [%]	P [%]	S [%]	Si [%]	Cr [%]
Min	-	-	-	-	-	16.0
Max	0.030	2.00	0.045	0.030	0.75	18.0
Element	Ni [%]	Mo [%]	Fe [%]	Cu [%]	N [%]	O [%]
Min	10.0	2.00	balance	n/a	n/a	n/a
Max	14.0	3.00				

¹ Refer to ASTM F3184 for Product Analysis Tolerance on the powder Chemistry.

² Cr% + 3.3 x Mo% ≥ 26.0 (see ASTM F318 for details).

Typical Particle Size Distribution (PSD)

Particle Size Analysis [µm]				Typical Application
Size Range	D10	D50	D90	
0 – 20	5 ± 2	11 ± 2	20 ± 2	BJT , MIM
15 – 53	18 ± 5	32 ± 5	50 ± 5	LB-PBF , Spraying
53 – 150	55 ± 10	90 ± 10	140 ± 10	DED , Laser Cladding

³ Other PSD ranges are available at request (e.g., 15 – 45, 20 – 63 or 53 – 105 µm).



Typical Flowability and Density properties

Size Range	Flowability	Apparent Density	Tap Density
[μm]	[s]	[g/cm^3]	[g/cm^3]
0 – 20	n/a	4.2 ± 0.4	5.1 ± 0.4
15 – 53	15.0 ± 1.5	4.2 ± 0.4	5.0 ± 0.4
53 – 150	14.5 ± 1.5	4.2 ± 0.4	5.0 ± 0.4

³ Other PSD ranges are available at request (e.g., 15 – 45, 20 – 63 or 53 – 105 μm).

Typical Mechanical Properties of Printed Parts (by LB-PBF)

Yield Strength [MPa]	Vertical direction	470 ± 15
	Horizontal direction	540 ± 20
Ultimate Strength [MPa]	Vertical direction	560 ± 15
	Horizontal direction	630 ± 20
Elongation at Break [%]	Vertical direction	45 ± 7
	Horizontal direction	35 ± 5
Reduction of Area [%]	Vertical direction	65 ± 5
	Horizontal direction	65 ± 5
Elastic Modulus [GPa]	Vertical direction	165 ± 10
	Horizontal direction	185 ± 15
Hardness [HB]	Vertical direction	205 ± 10
	Horizontal direction	210 ± 15

⁴ Typical Mechanical Properties measured on specimens printed by means of **LB-PBF technology**. Results are for reference only.

⁵ Mechanical Properties data collected on specimens in the **as-built state**.