AM INC718 by f3nice

Applicable Standards

- ASTM F3055 (API 6ACRA), NORSOK M-630: *Properties of INC-718 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 INC718 by f3nice presents a chemical composition in accordance with ASTM F3055. API 6ACRA UNS N07718 can be provided, depending on clients' needs.

Chemical Composition

Element	**Ni [%]**	**Cr [%]**	**Nb [%]**	**Mo [%]**	**Ti [%]**	**Al [%]**
Min	50.00	17.0	4.75	2.8	0.65	0.20
Max	55.00	21.0	5.5	3.3	1.15	0.80

Element	**Co [%]**	**Cu [%]**	**Mn [%]**	**Si [%]**	**C [%]**	**B [%]**
Min	-	-	-	-	-	-
Max	1.00	0.30	0.35	0.35	0.08	0.006

Element	**P [%]**	**S [%]**	**Fe [%]**	**N [%]**	**O [%]**
Min	-	-	balance	n/a	n/a
Max	0.015	0.015			

[1] Refer to ASTM F3055 for Product Analysis Tolerance on the powder Chemistry.

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

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

Typical Flowability and Density properties

Size Range [µm]	Flowability [s]	Apparent Density [g/cm³]	Tap Density [g/cm³]
0 – 20	n/a	-	-
15 – 53	15.5 ± 1.5	4.2 ± 0.5	5.2 ± 0.5
53 – 150	15.0 ± 1.5	4.2 ± 0.4	5.1 ± 0.4

[2] 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	630 ± 70
	Horizontal direction	770 ± 70
Ultimate Strength [MPa]	Vertical direction	920 ± 100
	Horizontal direction	1˙050 ± 100
Elongation at Break [%]	Vertical direction	26 ± 6
	Horizontal direction	20 ± 8
Reduction of Area [%]	Vertical direction	-
	Horizontal direction	-
Elastic Modulus [GPa]	Vertical direction	135 ± 20
	Horizontal direction	150 ± 30
Hardness [HB]	Vertical direction	290 ± 20
	Horizontal direction	310 ± 20

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

[4] Mechanical Properties data collected on specimens in the **as-built state.**