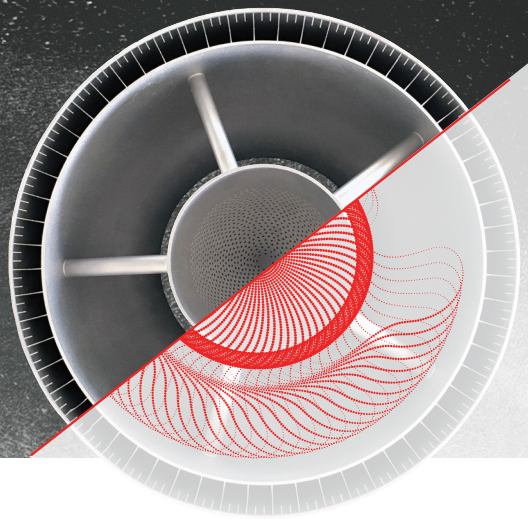
oerlikon
am

Additive Manufacturing
718 Nickel Alloy



Designed for Processing in Laser Powder Bed Fusion (PBF-LB), Electron Beam Powder Bed Fusion (PBF-EB) or Directed Energy Deposition (DED) Systems

MetcoAdd™ 718 is a family of nickel-based superalloy powders with chemistry similar to AMS 5662 bar material.

Room temperature static properties of PBF-LB processed and heat treated material coupons have been shown to be comparable to those of AMS 5662.

For reference purposes Oerlikon has processed MetcoAdd 718C using fixed parameters and 40 µm layer thickness to provide data below. Additional testing has been performed by an extensive network of consortia and customer partners on a broader range of machine types. Properties may be optimized based on application specific requirements.

Applications

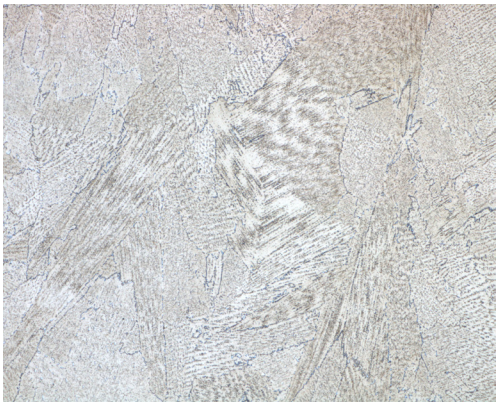
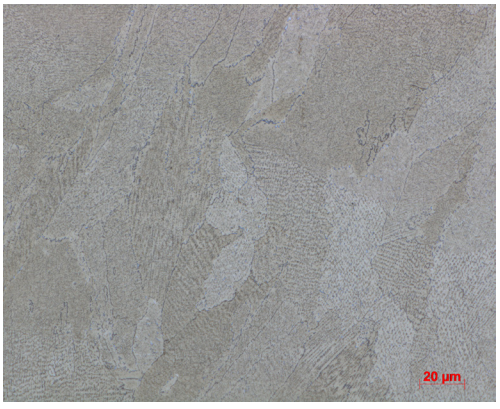
- Aerospace: Engine components
- Power Generation: Gas turbine components
- Oil & Gas: Sensors
- Industrial: Various

Typical Post Heat Treatment Properties (718C) [1] [2] [3] [4]

	Concept Laser M2 Cusing	EOS M290	Test Method
Ultimate Tensile Strength (MPa), XY/Z	1522±10 / 1415±16	1491±28 / 1380±7	ASTM E8
Yield Strength (MPa), XY/Z	1258±46 / 1186±18	1237±27 / 1172±6	
Elongation at break %, XY/Z	15±1 / 17±3	15±1 / 19±1	
Hardness (VHN_{300g})	471±9	474±7	ASTM E384-17
Relative Density %	>99.9%	>99.9%	Internal Spec.

[1] Disclaimer: All data published in this datasheet has been shared for reference purposes only and is not sufficient to design or certify parts. No warranty or guarantee is made against these results.
[2] Bounds are based on one standard deviation of each population with ten samples per orientation and machine. Test specimens were 6.35 mm diameter round bars machined from coupons (75x75x13mm). Direction XY data is an average of both X and Y horizontal build orientations.
[3] Heat treatment was performed in accordance with AMS 5662. Solutionize coupons at 1750°F (954°C). Hold for 1 hr and air cool. Age at 1325°F (718°C) for 8 hrs. Furnace cool to 1150°F (621°C) for total precipitation time of 18 hrs. Air cool.
[4] The process parameters and heat treatments of AM builds produced with other powder cuts (718-E, F, G, etc) and or AM processes (DED and PBF-EB) may be optimized based on application specific requirements.

Post Heat Treatment Microstructure (x 50 magnification, Vertical Build Direction)

	Concept Laser M2 Cusing	EOS M290
MetcoAdd 718C		

Chemical Composition

	Weight Percent (nominal)							
	Ni	Cr	Fe	Nb+Ta	Mo	Al	Ti	Other
MetcoAdd 718C / 718E / 718F / 718G	Balance	18	18	5	3	0.6	1	< 0.5

Particle Size Distribution and Hall Flow

	Nominal Range [µm]	D90 [µm]	D50 [µm]	D10 [µm]	Hall Flow [s/50 g]
MetcoAdd 718C	-45 +15	46	30	18	< 18
MetcoAdd 718E	-63 +20	62	43	29	< 16
MetcoAdd 718F	-106 + 45	-	-	-	-
MetcoAdd 718G	-90 + 45	-	-	-	-

For the nominal range, particle size analysis 45 µm or above measured by sieve (ASTM B214), analysis below 45 µm by laser diffraction (ASTM C 1070, Microtrac). | Fractional analysis (D90, D50, D10) are nominal values by laser diffraction. Hall flow (ASTM B213) | MetcoAdd 718E is a coarser version which allows for higher build rates where application and process permit. MetcoAdd 718E is a coarser version which allow for higher PBF-LB build rates where application and process permit. MetcoAdd 718F and 718G are typically used in the DED process.

Product Information

Classification	Superalloys, Nickel Base
Chemistry	NiCrMo[Fe](Nb+Ta)AlTi
Manufacture	Gas atomized (Argon)
Morphology	Spheroidal
Apparent Density	4 to 5 g/cm^3 (typical, 718C)
Solidus	1260 ± 10 °C (2300 ± 18 °F)
Liquidus	1340 ± 10 °C (2444 ± 18 °F)
Process	Laser Powder Bed Fusion (PBF-LB) Electric Beam Powder Bed Fusion (PBF-EB) Directed Energy Deposition (DED)
Safety Data Sheet	50-1957 www.oerlikon.com/metco
Package size	718C: 2.25 kg / 5 lb approx. (stock) 718E: 4.5 kg / 10 lb approx. (special order) 718F: 4.5 kg / 10 lb approx. (stock) 718G: 4.5 kg / 10 lb approx. (stock)
Distribution	Global
Order No.	718C: 1096973 718E: 1100779 718F: 1305326 718G: 1305327

Usage Recommendations

- Blend contents prior to use to prevent segregation
- Keep in the original container, or an approved alternative, tightly closed when not in use
- Powder from previously opened containers should be stored in a humidity-controlled environment

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28 Ni Nickel | 27 Co Cobalt | 26 Fe Iron | 22 Ti Titanium

AM Metal Powder Portfolio

Check our full portfolio at https://www.oerlikon.com/am/en/offerings/metal-powders or contact us at am@oerlikon.com

We have a broad range of existing alloys, supported by ongoing development. We also know that current off-the-shelf solutions in AM cannot answer every production need. Our R&D teams can rapidly design, optimize, and produce new and custom alloy chemistries for pilot atomization and AM validation in our production facilities.