

VDM® Powder 718

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VDM® Powder 718 is the powder variant of an age-hardenable nickel-chrome-iron-molybdenum alloy for use in additive manufacturing. Hardenability is achieved by means of admixtures of niobium, titanium and aluminum.

VDM® Powder 718 is characterized by:

- Spherical particles
- High purity
- Low oxygen content

Designations and standards (based on VDM® Alloy 718)

Standard	Material designation
EN	2.4668 - NiCr19Fe19Nb5Mo3
ISO	NiCr19Nb5Mo3
UNS	N07718
AFNOR	NC19FeNb

Table 1 – Designations and standards

Chemical composition

	Ni	Cr	Fe	C	Mn	Si	Cu	Mo	Co	Nb	Ta	Al	Ti	B	P	S	Pb	SE	Bi
Min.	50	17	bal.					2,8		4,75		0,2	0,65						
Max.	55	21		0,08	0,35	0,35	0,3	3,3	1	5,5	0,05	0,8	1,15	0,006	0,015	0,015	5 ppm	3 ppm	0,3 ppm

Table 2 – Chemical composition (%) based on ASTM and SAE AMS

Depending on the use conditions, stricter analysis limits apply to certain alloy elements. This is true in particular for carbon and niobium, but to a lesser extent also for aluminum and titanium. The purpose of this limitation is to optimize the microstructure and mechanical properties with regard to the intended use. Accordingly, for example, alloys with carbon and niobium concentrations near the upper limit according to ASTM are best suited for high-temperature applications, while lesser carbon and niobium concentrations result in material microstructures that conform better to the requirements of corrosive use conditions. VDM® Powder 718 contains low amounts of oxygen of up to 0.03%.

Physical properties

Density	Melting range
8,26 g/cm ³ at 20 °C	1.257-1.342 °C
0,04 lb/in ² at 68° F	2,2945-2,448° F

Microstructural properties

VDM® Powder 718 has an austenitic microstructure where different phases can occur. By means of different heat treatments, graduated mechanical properties of the material can be achieved. The excellent mechanical properties of VDM® Powder 718 result from the γ'' -formation during precipitation hardening.

Applications

VDM® Powder 718 can be used for many demanding applications. Originally, it was developed and used for static and rotating components in aircraft turbines such as housings, mounting elements and turbine disks.

The material can also be used for static and rotating components in stationary gas turbines, rocket drives and spacecraft, motor vehicle turbo chargers, high-strength screws, springs and mounting elements, and for heat-resistant tools in forgeries, extruders and separating shearers.

The variant VDM® Powder 718 CTP, which is designed specifically for the requirements of the oil and gas industry, is more and more often being used in drilling equipment and pump shafts.

Availability

According to the AM process requirements of our customers, VDM® Powder 718 is available in a wide range of particle fractions from 15 to 250 µm.

Standard particle fractions

Particle size distribution	Oxygen content	Porosity < 10µ (pore area)
µm	%	%
15-53	< 0,03	< 0,5
53-150		

Additional particle fractions are available on request. Please contact us.

Legal notice

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Disclaimer

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