

# VDM® Powder 718 CTP

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

VDM® Powder 718 CTP is characterized by:

- Spherical particles
- High purity
- Low oxygen content
- Excellent resistance to stress corrosion cracking and pitting in chloride-containing media
- Excellent resistance to stress corrosion cracking and sulfide stress cracking in sour (H<sub>2</sub>S-containing) oilfield environments

Designations (based on VDM® Alloy 718)

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

Table 1 – Designations

## Chemical composition

	Ni	Fe	C	Mn	Si	Cu	Al	Ti	P	S	Pb	Cr	Mo	Co	B	Se	Bi	Nb + Ta
Min.	50.0	balance	0.045	0.35	0.35	0.23	0.40	0.80	0.010	0.010	0.0010	17.0	2.80	1.00	0.0060	0.0005	0.00005	4.87
Max.	55.0						0.60	1.15				21.0	3.30					5.20

Table 2 – Chemical composition (%) according to API Standard 6ACRA, UNS number N07718

Depending on the use conditions, narrower analysis limits apply to certain alloy elements. This is true in particular for carbon and niobium, but to lesser extent also for aluminum and titanium. The purpose of this limitation is to optimize the structure and mechanical properties with regard to the intended use. VDM® Powder 718 CTP is characterized by limited levels of carbon and niobium that conform better to the requirements of corrosive use conditions. VDM® Powder 718 CTP contains low amounts of oxygen of up to 0.03 %.

# Physical properties

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**Density**8,26 g/cm<sup>3</sup> at 20 °C (68 °F)**Melting range**1,270-1,340 °C (2,318-2,444 °F)

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# Microstructural properties

VDM® Powder 718 CTP has an austenitic microstructure with multiple phases. By means of different heat treatments, graduated mechanical properties of the material can be achieved. The excellent mechanical properties of VDM® Powder 718 CTP result from the  $\gamma'$ -formation during the precipitation hardening.

# Corrosion resistance

As a result of the high chromium and molybdenum concentrations, conventionally manufactured VDM® Alloy 718 CTP has very good general corrosion resistance and pitting corrosion resistance in many environments. By virtue of its high nickel content, it also has good resistance against stress corrosion.

# Applications

Due to its excellent corrosion resistance and its good workability, VDM® Powder 718 CTP is versatile in use in the oil and gas industry, in the offshore industry and in marine engineering. The conventionally manufactured VDM® Alloy 718 CTP has proven itself well, especially for oilfield completion equipment in very demanding environments containing H<sub>2</sub>S, CO<sub>2</sub>, and high chlorides. The alloy has also proven itself for highly stressed oilfield components.

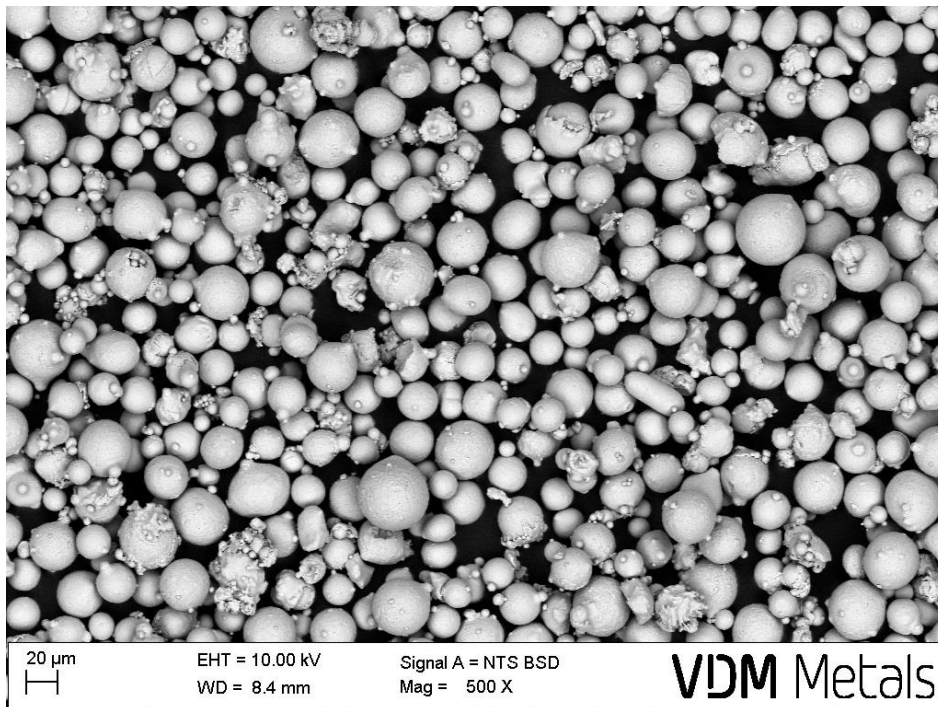
# Availability

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 µm	Oxygen content %	Porosity < 10µ (pore area) %
15-53	< 0.03	< 0.5
53-150		

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



The picture shows a typical micrograph of VDM® Powder 718 CTP as an example.

# Legal notice

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## **Publisher**

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