

forAM® TS-CF1 15-45 VG

Tool steel powder for Additive Manufacturing

forAM TS-CF1 is a novel cobalt free tool steel composition designed specifically for additive manufacturing. The powder is vacuum induction melted and argon gas atomized with good sphericity and flowability.

This steel has high corrosion resistance and achieves hardness levels up to 52HRC. Material is suitable for direct aging and reaches high strength and hardness after a thermal heat treatment, making it suitable for tooling applications.

In the as-printed condition the material has good ductility and possesses good machinability.

For more information on forAM product line and other of Höganäs products, please contact your local sales representative.



Powder properties

Chemical composition, (typical values)			
Element	Content, %		
Cr	13		
Ni	9		
AI	1.1		
Мо	0.6		
Nb	0.5		
Ti	0.3		
Mn	0.5		
Si	0.5		
Fe	Balance		



ganäsAB 10.0kV x200 SE 2021-07-20

Typical powder properties					
Nominal particle range	15-45 µm (max 5% over and under size)	MPIF05, ASTM B214, ISO4497			
Hall flow	16 s/50 g	MPIF03, ASTM B213, ISO4490			
Apparent density	4.1 g/cm ³	MPIF04, ASTM B212, ISO3923/1			

Mechanical properties

Surface condition is machined					
Heat treatment	As printed ⁽¹⁾	Heat treated ⁽²⁾			
Printed in Z-direction – Build direction					
UTS (MPa)	940	1,620			
YS (MPa)	670	1,590			
Elongation (%)	5.2	7.5			

Heat treatment	As printed (1)	Heat treated ⁽²⁾		
Printed in X/Y-direction – Perpendicular				
UTS (MPa)	970	1,600		
YS (MPa)	820	1,560		
Elongation (%)	14	9		
Hardness (HV5)	310	513		
Hardness (HRC)		50		

(1) No heat treatment

(2) Direct aging at 500 °C for a duration of 3 h in air

(3) The alloy can also be solutionized at 1000 °C prior to aging

Standard packaging:

30 kg (6x5 kg, 2.5 L PE bottles packed in cardboard box)

200 kg / 500 kg Flexbag

(Other tailored particle sizes and packaging are available under conditions)





Etched – As printed

As polished



Etched – Aged condition

Höganäs 🖽 www.hoganas.com

At Höganäs, we have designed our high-quality 3D printing metal powders for the special requirements of additive manufacturing. Manufacturers all over the globe achieve optimal results with our products and value them for the following characteristics: excellent flowability, good spherical shape, controlled oxygen and nitrogen content, full and high packing density and perfect reproducibility.