DIRECT METAL LASER SINTERING

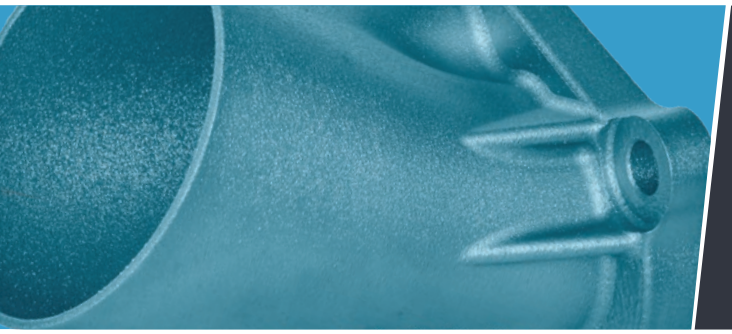
INCONEL 718
PRODUCT SPECIFICATIONS

PRODUCT DESCRIPTION:

Protolabs' Inconel material is used in our DMLS process. Inconel is a high strength, corrosion resistant nickel chromium superalloy used at temperatures of -252 ° C to 704 ° C. Its high-temperature strength is derived from its ability to create a thick, stable passivating oxide layer at high temperatures, protecting the material from further attack. Inconel also has good tensile, fatigue, creep and rupture strength. It is available in both high and normal resolution and can be used for parts as large as 245 x 245 x 300 mm in size.

APPLICATIONS:

Inconel is an excellent choice for rocket engine components and related equipment exposed to extreme environments.



KEY PRODUCT BENEFITS

- High strength
- Excellent High-temperature and corrosion resistance
- Good tensile, fatigue, creep and rupture strength

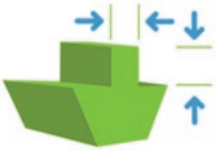
CHEMICAL COMPOSITION:

According AMS 5662, AMS 5664, 2.4668 and DIN NiCr19Fe19NbMo3

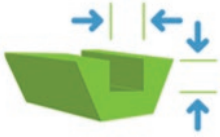
Ni (50 - 55 Gew.-%)
Cr (17,0 - 21,0 Gew.-%)
Nb (4,75 - 5,5 Gew.-%)
Mo (2,8 - 3,3 Gew.-%)
Ti (0,65 - 1,15 Gew.-%)
Al (0,20 - 0,80 Gew.-%)
Co (≤ 1,0 Gew.-%)
Cu (≤ 0,3 Gew.-%)
C (≤ 0,08 Gew.-%)
Si, Mn (je ≤ 0,35 Gew.-%)
P, S (je ≤ 0,015 Gew.-%)
B (≤ 0,006 Gew.-%)
Fe (Rest)

GEOMETRICAL LIMITS:

Min Wall thickness 1.00 mm - Min. Feature Size 1.00 mm



Min. embossed details 0.5 mm high and wide and 0.8 mm for readable text and clear images



Min. engraved details 0.5 mm deep and 0.6 mm wide; 1.0 mm wide for readable text and clear images

PROPERTIES:

Heat Treatment	Tensile Strength MPa	Yield Strength 0.2% MPa	Elongation %	Hardness HRC	Density
/	960 MPa +/- 50 MPa	600 MPa +/- 50 MPa	30% +/- 5%	Ca. 30HRC	>99.95%
Heat Treatment	**Tensile Strength MPa**	**Yield Strength 0.2% MPa**	**Elongation %**	**Hardness HRC**	**Density**
annealed	980 MPa +/- 50 MPa	630 MPa +/- 50 MPa	30% +/- 5%	Ca. 30HRC	>99.95%
Heat Treatment	**Tensile Strength MPa**	**Yield Strength 0.2% MPa**	**Elongation %**	**Hardness HRC**	**Density**
annealed & age hardened	>1240 MPa	>940 MPa	>12%	Ca. 47HRC	>99.95%

RESOLUTION:

	Layer Thickness	Build Envelope	Min. Feature Size
High Resolution	0.05 mm	245x245x300 mm	1.00 mm
Normal Resolution	0.06 mm	245x245x300 mm	1.00 mm

SURFACE:

	0 °	45 ° bottom	45 ° top	90 °
High Resolution	Ra 6.5 µm Rz 35 µm	Ra 7.5 µm Rz 37 µm	Ra 7.5 µm Rz 37 µm	Ra 5.7 µm Rz 31 µm
Normal Resolution	Ra 6.5 µm Rz 35 µm	Ra 9.5 µm Rz 45 µm	Ra 9.5 µm Rz 45 µm	Ra 9 µm Rz 42 µm

High Resolution 50 µm

Normal Resolution 60 µm

STANDARD TOLERANCES:

Typically, for well-designed parts, with a designated build direction, tolerances of +/- 0.1 mm to +/- 0.2 mm + 0.005 mm / mm are expected and achieved.

Certain geometries may cause distortions due to internal stress which may lead to higher deviations.