

DMLS Material

Direct Metal Laser Sintering (DMLS)

We can convert your CAD files into 3D objects, dimensionally accurate very fast, using Direct Metal Laser Sintering (DMLS). Inconel 718 nickel alloy models can be built up to 10" x 10" x 8" (250mm x 250mm x 200mm). Parts can be machined, micro-blasted, polished, and coated.

Accuracy is $\pm 40 - 60\mu\text{m}$, small parts $\pm 1.6 - 2.4 \times 10^{(3)}$ inch and large parts $\pm 0.2\%$.

Process Direct Metal Laser Sintering

Product:	Inconel 718 Nickel Alloy as built
Recommended minimum layer thickness:	20 μm - 1.6 mil
Smallest wall thickness:	$\pm 16 - 24$ mil
Surface roughness - After shot-peening:	Ra 4 - 6,5 μm , Ry 20 - 50 μm Ra 0.16 – 0.25, Rz 0.78 – 1.95 mil
Surface roughness - After polishing:	Rz up to < 0.5 μm - Rz up to < 0.02 mil (can be very finely polished)
Yield Point (Rp 0.2 %) in horizontal direction (XY):	typ. 725 MPa \pm 50 MPa (105ksi \pm 7 ksi)
In vertical direction (Z):	typ. 615 MPa \pm 50 MPa (89 ksi \pm 7 ksi)
Elongation at break as built in horizontal direction (XY):	typ. 35 % \pm 5 %
Elongation at break as built in vertical direction (Z):	typ. 42% \pm 5 %
Hardness as built:	approx. 30 HRC (287 HB)
Applications:	Direct manufacture of functional metal prototypes.

Material composition: Ni (balance, ³ 58.00), Cr (20.00-23.00 wt-%), Mo (8.00-10.00 wt-%), Nb (3.15-4.15 wt-%), Fe (\leq 5.00 wt-%), Ti (\leq 0.40 wt-%), Al (\leq 0.40 wt-%), Co (\leq 1.0 wt-%), C (\leq 0.10 wt-%), Ta (\leq 0.05wt-%), Si, Mn (each \leq 0.50 wt-%), P, S (each \leq 0.015 wt-%)

Disclaimer: All tolerance specifications reflect the approximate range of a process's capabilities and should be viewed only as a guide. Actual capabilities are dependent upon manufacturing, equipment, material, and part requirements.