



Material data sheet

DirectMetal 20 material for EOSINT M 250 Xtended

DirectMetal (DM 20) is available for use with EOSINT M 250 xtended systems, offering a broad range of e-Manufacturing applications. DirectMetal (DM 20) material was developed and optimised especially for Direct Metal Laser-Sintering (DMLS) on EOSINT M systems and are suitable for manufacturing moulds and tool inserts using the DirectTool process as well as functional prototypes using the DirectPart process.

This document provides brief descriptions of the most commonly used material and their principle applications, and a table of technical data.

Laser-sintered parts made from DM 20 can be welded, machined, micro shot-peened, polished and coated if required. Unexposed powder can be reused without restriction or refreshing.

Description, Application

DirectMetal 20

DirectMetal 20 is a very fine grained bronze-based metal powder. The resulting parts offer good mechanical properties combined with excellent detail resolution and surface quality. The surfaces can be easily post-processed by shot-peening and can be polished with very little effort. The specially developed powder mixture contains different components which expand during the laser-sintering process, partially compensating for the natural sintering shrinkage and thereby enabling a very high accuracy to be achieved.

This material is ideal for most prototype injection moulding tooling applications and for many functional metal prototype applications (DirectPart). It offers the highest building speed so is particularly suitable for larger tools and parts. It also offers a very broad window of usable process parameters, e.g. a wide range of achievable mechanical properties and build speeds. Standard parameters use 20 µm layer thickness for the skin and 60 µm layers for the core, but for faster building the entire part can be built in 40 µm layers for the skin and 80 µm layers for the core, or even 60 µm layer thickness for skin and core. Using standard skin parameters the mechanical properties are fairly uniform in all directions, which is especially beneficial for many DirectPart applications. Parts built from DirectMetal 20 also have good corrosion resistance.



Typical applications:

- injection moulds and inserts for moulding up to a few tens of thousands of parts in all standard thermoplastics using standard injection parameters
- direct manufacture of functional metal prototypes.

Material composition

After laser-sintering DirectMetal 20
bronze-base matrix, containing

General process data

	DirectMetal 20
Minimum recommended layer thickness (μm)	20
Typical achievable part accuracy (μm)	± 50
Accuracy specification for qualification	$\pm (0.07 \% + 50)$
Min. wall thickness (mm)	0.6

Mechanical properties of laser sintered parts DirectMetal 20

Density in skin areas (g/cm^3)	7.6
Density in core areas (g/cm^3)	6.3
Remaining porosity (min., %)	8
Tensile strength (MPa, MPIF 10)	up to 400
Yield strength (MPa)	200
Young's Modulus (GPa)	80

Thermal properties of laser sintered parts

Coefficient of thermal expansion ($10^{-6}/\text{K}$)	18
Thermal conductivity (W/mK)	30
Maximum operating temp. ($^{\circ}\text{C}$)	400