

Laser Metal Melting – in Series in a 48h Supply Chain

Frank Hagemeyer *BEGO Medical GmbH*

Keywords RP

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1. Description

The BEGO Medical is the first established service provider for the production of metal parts in the Selective Laser Melting (SLM) Technology. SLM parts are produced from a metal powder that is melted with a laser beam and sequentially build up in thin layers.

A big variety of alloys are actually processed at BEGO Medical: biocompatible CoCr- and Au-alloys for medical applications, aluminum, titanium, copper, tool steel (1.2343) and stainless steel (1.4404) for industrial and individual parts.

The production technology suits especially the requirements of fast prototype production and limited-lot production. A typical application beside prototyping and small lot production is rapid tooling. SLM allows the optimized process oriented positioning of the cooling conduits in the mould (“conformal cooling”).

Another big advantage beside the high density and big variety of available alloys is the entire freedom of creation. Due to the layer-wise build up of parts, it is possible to build e.g. a hollow bowl – undercut is a foreign word in SLM. This characteristic qualifies the SLM for the production of innovative light construction components. After leaving the SLM machine the produced parts usually have a surface finish of $R_z = 10 - 30 \mu\text{m}$. This can be improved by blasting or polishing the surface after laser melting up to a mirror like surface

The maximum size of the parts is 230 mm in height with a diameter of 130/250 mm.

2. Maintenance and Operations

Our production line comprises three Laser Melting Machines TRUMAFORM 250. Additionally our Engineering department uses two F&S machines (now MCP HEK) for process and material engineering. With our medical device production in the background we possess all established surface treatment technologies in-house.

3. Quality Assurance

As we produce medical products and implants we assure product and process quality on highest level. The dimensional accuracy is guaranteed by Scanning each part after the production and comparing the scan data to the CAD data.

The stability is assured by producing and tearing tensile bars with each production lot.

4. Innovative aspects

In comparison to already known Rapid Technologies, SLM assures

- the use of serial metal alloys
- a nearly 100 % density
- isotropic material behaviour
- (if required) the controlled build up of local porous structures.

5. Main advantages

Selective Laser Melting at BEGO Medical allows the production of

- metal parts in serial alloys
- in a big variety: CoCr, Au, Al, Ti, Cu, tool steel (1.2343), stainless steel (1.4404)
- based on the STL-/IGES-file that can be exported by every CAD-Software
- with a density of more than 99,5 %
- with surfaces from $Rz = 10 - 30 \mu\text{m}$ to mirror like
- with an entire 'freedom of creation'
- with a delivery time beginning at 48h.

6. Market Application Highlights

BEGO Medical practices for more than three years now the distribution of medical devices

- scanned in own 3D-Scanners
- designed in own CAD
- produced in the Selective Laser Melting (SLM) process

More than 1000 units per month pass through this SLM process chain. New markets for SLM generated metal parts are

- aerospace industries
- medical industries
- process engineering
- automotive industries.

7. Kontaktangaben

Frank Hagemeister
BEGO Medical GmbH
Wilhelm-Herbst Strasse 1
28359 Bremen
+49 (0)421 2028 180
Fax: +49 (0)421 2028 44180
Email: hagemeister@bego.com
WEB: www.bego.com

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