

ADDITIVE MANUFACTURING BY LASER METAL DEPOSITION (LMD)

Laser Metal Deposition is an additive manufacturing process which uses the technology of laser cladding. A component is cladded layer by layer. The result is a near net-shape component with almost 100 % density and a property profile which meets the specifications of wrought or cast material, or even exceeds them. The size of the components is only limited by the used handling system. The LMD-process offers the possibility to produce new material concepts e.g. grading of bulk properties or build-up of hybrid components consisting of a variety of different metals without joining technology. Typical applications are the production of functional prototypes and small batch parts. In addition it is possible to modify manufactured components.

The Process

In LMD a powdery filler material is fed onto the work piece by an inert carrier gas (e. g. Ar) and is completely melted with the laser beam. Simultaneously, the laser beam melts a thin surface layer of the previous layer and a metallurgical fused composite bond is formed. Typically, each layer measures a thickness of 0.3 - 1 mm.

By simultaneously feeding two different filler materials the chemical composition can be changed from layer to layer leading to a graded component. This allows a layer-by-layer adaptation of e. g. ductility in the bulk and a high hardness near the surface. Moreover the property profile can be adapted by a post heat treatment.

Today a build-up-rate between 2.5 mm³/s to 7 cm³/min is feasible. The geometry of the components is only restricted regarding closed hollow bodies.

Advantages of LMD

- Near net-shape manufacturing with less finishing effort
- Utilization of serial materials (metals)
- In principle no restriction of the build-up size
- Build-up of graded and hybrid material
- High flexibility in changing the component design

Our Services

- Feasibility studies
- Adaptation of LMD to your materials and components
- Customer-specific integration of LMD
- Technical and economic evaluation

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1 Additive manufactured example geometry
(hollow body, aluminium).

2 Additive manufactured example geometries
(hollow body, steel material).