ADDITIVE TECHNOLOGIES
ADDITIVE MANUFACTURING
Reinvent Your Metal Production

LASERTEC 12 SLM
LASERTEC 30 SLM 2nd Gen.
LASERTEC 30 DUAL SLM
LASERTEC 65 3D
LASERTEC 65 3D hybrid
LASERTEC 125 3D hybrid
LASERTEC 4300 3D hybrid

OPTOMET – FIRST TIME RIGHT
Software for parameter optimization

NEW
NEW
**LASERTEC SLM**

Additive Manufacturing through Selective Laser Melting (SLM) in the powder bed

**LASERTEC 3D**

Directed Energy Deposition with a coaxial powder nozzle

**LASERTEC 3D hybrid**

Combination of technologies on one machine. Directed Energy Deposition with coaxial powder nozzle combined with 5-axis milling and turning for Additive Manufacturing in finished part quality
ADDITIVE TECHNOLOGIES

Full-Liner with end-to-end process knowledge

PLANNING
Design for Additive Manufacturing

PREPARATION
Print job data and simulation

PRODUCTION
Powder Nozzle, Powder Bed and CNC machining technology from a single source

MONITORING
Machine and Process Monitoring Solutions

SERVICE
> 3,000 experts and 5 Additive Manufacturing Excellence Centers for worldwide service, training and application support

157 sales and service locations, 14 production factories, as well as 6 Additive Manufacturing Excellence Centres for optimal support worldwide.

ADDITIVE INTELLIGENCE Consulting

Software solutions for CAM programming and machine control

Additive Manufacturing Ramp-Up Production

Qualified partners for powder procurement and peripherals

Global Training Academy

Global Footprint

WORLDWIDE SUPPORT

AMEC Bielefeld, Germany

AMEC Pfronten, Germany

AMEC Shanghai, China

AMEC Tokyo, Japan

AMEC Iga, Japan

AMEC Chicago, USA
ADDITIVE INTELLIGENCE – Start now and use the full potential of Additive Manufacturing!

The DMG MORI Academy supports companies with the introduction and use of Additive Manufacturing with a new comprehensive portfolio.

OUR SERVICES

+ Additive Manufacturing Quick Check for the identification of your specific Additive Manufacturing components
+ Redesign of your components for Additive Manufacturing
+ Engineering and design of new components and groups
+ Simulation and topology optimization
+ Production of prototypes and small series of your components
+ Courses and training for management, design and manufacturing departments
+ Consulting for the strategy from design optimisation, through to your Additive Manufacturing production
YOUR BENEFITS

+ Faster to market
+ Better products
+ Everything from a single source
+ Reduced obstacles to investment
+ Build-up of knowledge during entry in the technology

BEST PRACTICE COOLANT RING

Sector: Mechanical engineering
Material: Aluminum
Quantities: 20 p.a.

Challenges
+ Guidance of coolant
+ Interfering contours due to ULTRASONIC holder
+ Compact design

Added value
+ Targeted supply of coolant
+ Cooling efficiency significantly improved
+ Optimised chip removal
DMG MORI ACADEMY – ADDITIVE INTELLIGENCE

Quick check as the perfect start for your design

2-DAY ON-SITE WORKSHOP AT THE CUSTOMERS

Aim: Development of basic knowledge and identification of components with Additive Manufacturing potential.

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<td>+ Sighting of first component ideas from your company</td>
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<td>+ Concepts for redesign</td>
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</tbody>
</table>

Target group: The ADDITIVE MANUFACTURING Quick Check is intended for developers and design engineers. Number of participants: 4 – 10 people

Technical suitability

- Powder nozzle holder
  LASERTEC 65 3D
  after redesign for Additive Manufacturing
  + Functional integration
  + Reduction of production costs
  + Enhanced cooling efficiency
  + 60% lighter
  + 95% fewer components
BEST PRACTICE MIX TUBE

**Client:** IAB – Institut für angewandte Bauforschung gGmbH

**Material:** Stainless Steel

**Challenges**
+ Optimized Mixing
+ Cleanability
+ Minimum Adhesions

**Added value**
+ Pipe-in-pipe concept
+ Optimized mixing geometry
+ Perfect cleanability

“ADDITIVE MANUFACTURING requires a new mindset. Together, we refine your additive parts and develop the full potential.”

Ra = 0.5 μm | 0.00002 in:
Possible thanks to high-precision selective laser beam melting and additional flow grinding

27% LIGHTER
65% BETTER MIXING
Design for Additive Manufacturing

Additive Manufacturing requires innovative thinking in design. We help your development team to the next level!

**Task**

**Traditional design**

**Additive design**

Lens holder for the LASERTEC 30 SLM

Technology-driven:
Which material do I have to **remove**?

Function-driven
Which material do I have to **add**?

**DESIGN TRAINING COURSES**

1. Design for Additive Manufacturing **Basic**
   - Knowledge: CAD Basics

2. Design for Additive Manufacturing **Advanced**
   - Prior knowledge: Basic training
     - **Duration:** 4.5 days each
     - **Number of participants:** Max. 8 Persons
     - **Target group:** Specialists and managers in the field of development and design
     - **Course starting times:** On-going, several times a year

We help you with the introduction of the technology!
TRADITIONAL DESIGN
12 SEPARATE PARTS

ADDITIVE DESIGN
1 FINISHED PART

Functional integration

Optimized
Coolant Flow

Fully customizable for different grinding wheel sizes

BEST PRACTICE GRINDING NOZZLE

Sector: Mechanical engineering
Material: Aluminum
Quantities: 120 p. a.

Challenges
+ Guidance of coolant
+ Compact design

Added value
+ Supply of coolant over a large area
+ Optimized flow conditions

Serial component
DMU 80 P duoBLOCK

56 % LIGHTER
30 % FASTER PRINT
60 % CHEAPER
ADDITIVE TECHNOLOGIES

Unique – Global full line of products for Additive Manufacturing with powder nozzle and powder bed from a single source

Selective Laser Melting (SLM)

LASERTEC 12 SLM
LASERTEC 30 SLM 2nd Gen.
LASERTEC 30 DUAL SLM

+ Additive Manufacturing in a powder bed with integrated powder recycling
+ Max. workpiece dimensions:
  125 x 125 x 200 / 300 x 300 x 300 mm
  4.92 x 4.92 x 4.92 / 11.81 x 11.81 x 11.81 in
Directed Energy Deposition combined with milling

Additive Manufacturing with a powder nozzle and integrated 5-axis milling in finished part quality.

**LASERTEC 65 3D hybrid**

- Max. workpiece dimensions:
  - ø500 x 400 mm, 600 kg
  - ø19.69 x 15.75 in, 1,323.0 lbs

Directed Energy Deposition combined with turning/milling

**LASERTEC 4300 3D hybrid**

- Additive Manufacturing with a powder nozzle and integrated 6-sided turn & mill machining
- Max. workpiece dimensions:
  - ø660 x 1,500 mm, 1,700 kg | ø25.98 x 59.06 in, 3,748.5 lbs

**LASERTEC 125 3D hybrid**

- Max. workpiece dimensions:
  - ø1,250 x 745 mm, 2,000 kg
  - ø49.21 x 29.33 in, 4,410.0 lbs

Directed Energy Deposition

**LASERTEC 65 3D**

- First special powder nozzle machine based on a CNC machine
- Max. workpiece dimensions:
  - ø650 x 560 mm, 600 kg | ø25.59 x 22.05 in, 1,323.0 lbs
GLOBAL FULL LINE OF PRODUCTS FOR ADDITIVE MANUFACTURING

Four process chains for end to end Additive Manufacturing

Selective Laser Melting (SLM)

ADDITIVE MANUFACTURING IN A POWDER BED
Component size
max. 300 × 300 × 300 mm | 11.81 × 11.81 × 11.81 in

METAL-CUTTING MACHINING

Directed Energy Deposition (DED)

ADDITIVE MANUFACTURING WITH POWDER NOZZLE
Component size
max. ø 650 mm | ø 25.59 in,
height 560 mm | 22.05 in

ADDITIVE MANUFACTURING WITH POWDER NOZZLE IN COMBINATION WITH:
MILLING – LASERTEC 65/125 3D hybrid:
Component size max.: ø 1,250 × 745 mm | ø 49.21 × 29.33 in

TURN & MILL – LASERTEC 4300 3D hybrid:
Component size max.: ø 660 × 1,500 mm | ø 25.98 × 59.06 in
Finished part

Grinding nozzle
Bone plate (Wrist)
Blow mold
Knee implant
PKD Milling head
Valve housing
Laser head console
Turbine casing
Diecast core
Heat exchanger
Rocket nozzle

METAL-CUTTING MACHINING

ADDITIVE MANUFACTURING IN A POWDER BED
Component size
max. 300 × 300 × 300 mm
max. 11.81 × 11.81 × 11.81 in
REALIZER GMBH

Pioneer of the powder bed process with more than 20 years application experience: Selective Laser Melting

FUNCTIONAL PRINCIPLE:
BUILDING A PART LAYER BY LAYER

1. Applying a layer of powder
2. Selectively melting the powder using laser light
3. After melting, the platform is lowered by the respective thickness of the layer
4. Applying a new powder layer
HIGHLIGHTS

+ Highly complex components with functional integration
+ Internal conformal cooling channels
+ Topology-optimised components
+ Simultaneous build-up of different designs
+ Weight optimisation due to lattice and honeycomb structures
+ Functional prototypes made of common materials

Topography optimized wheel carrier

LASERTEC 30 DUAL SLM

NEW

40% LIGHTER
Applications and industries

**PKD MILLING HEAD**
- Material: Tool Steel
- Weight-optimized design
- Internal cooling channels
- No support structures – Directly printed on a HSK 63 tool holder

**Automotive**
Quick, and near production quality, functional prototypes, made from aluminium, titanium or steel. Complex parts with multiple free-form surfaces, as individual items or in small batches.

**Aerospace**
Customised applications made from aluminium and titanium, e.g. blades with integrated cooling channels and high-efficiency heat exchangers.

**Medical**
Implants such as joint or bone prostheses made from titanium. Customised, tailor-made implants. Complex lattice structures, e.g. for hip and knee implants.

**Dental**
Custom-fit dental implants such as ligaments, crowns or bridges made from cobalt chrome or titanium.

**Tool/mould making**
Production of tooling inserts with conformal cooling channels. Manufacturing of prototypes and small batches.

**General Mechanical Engineering**
Economical production of prototypes and small series with functional integration.

**Wheel carrier**

**Blade**

**Knee implant**

**Dental applications**

**Blow mold**

**Coolant ring nozzle**
New design freedom

**POWDER NOZZLE HOLDER LASERTEC 65 3D**

1. **Functional integration**: Enhanced cooling performance via complex interior ducts and a larger surface.

2. **Production of non-assembly modules** by combining standard components with sealing and connecting elements.

3. **Lightweight design**: Integrated honeycomb structure.

4. **Complex geometries**: Virtually limitless construction freedom.

5. **Flexible product development** via fully digital process chain.

6. **Work scheduling**: Perfect interaction between parameter optimization and machines via the in-house developed RDesigner software.

7. **Significant reductions** in production costs through tool-less production.

95% LESS PARTS
80% higher productivity: LASERTEC 30 DUAL SLM

**HIGHLIGHTS**

+ Additive Manufacturing in a powder bed with a build volume of 300 × 300 × 300 mm | 11.81 × 11.81 × 11.81 in
+ **2 × 600 W DUAL-laser system** for build rates up to 90 cm³/h | 5.49 in³/h (optional: 2 × 1,000 W)
+ **High-precision optics module** with variable focus diameter (50 µm – 300 µm | 0.00197 in – 0.01181 in) and active cooling
+ **100% overlap of the scan fields** with fully digital control
+ Variable definition of scan strategies for **maximum efficiency in the printing process**
+ **Actively cooled build cylinder** for reduced set-up times
+ **rePLUG** – The powder module for maximum work safety and fast material changeover < 2 hours
+ **CELOS: Consistent software solution** from CAM programming with the RDesigner through to machine control

**NEW: Permanent filtration system**

+ Filter lifetime > 3,000 hours
+ Material-independent operation
+ No consumables
+ Automatic passivation of metal dusts for highest work safety
100% OPEN SYSTEM

Individual adjustment of all machine settings and process parameters as well as unrestricted choice of material suppliers.

Unique precision for minimal wall thicknesses and finest lattice structures

rePLUG:
MATERIAL CHANGE
<2h

Argon Gas

70 µm
0.00276 in
Industrial Standard

50 µm
0.00197 in
LASERTEC 30 DUAL SLM
LASERTEC SLM

LASERTEC 30 SLM 2nd Gen.

HIGHLIGHTS

+ Additive Manufacturing in a powder bed with a build volume of 300 × 300 × 300 mm | 11.81 × 11.81 × 11.81 in
+ Application-specific fibre laser sources of 600 W as standard and up to 1,000 W optional
+ Dynamic adjustment of the focus diameter between 70 and 200 µm | 0.00276 and 0.00787 in for maximum productivity
+ rePLUG – The powder module for maximum occupational safety and fast material changeover < 2 hours
+ CELOS: Consistent software solution from CAM programming through to machine control
+ 100 % open system: Individual adjustment of all machine settings and process parameters
rePLUG reSEARCH

The additional powder module developed especially for material and process parameter development before series production.
High-precision Selective Laser Melting: LASERTEC 12 SLM

HIGHLIGHTS

+ Additive Manufacturing in a powder bed with a build volume of 125x125x200 mm | 4.92x4.92x7.87 in
+ Application-specific fibre laser sources of 200 W as standard and up to 400 W optional
+ 35 µm | 0.00138 in focus diameter for maximum precision
+ rePLUG – The powder module for maximum occupational safety and fast material changeover <2 hours
+ CELOS: Consistent software solution from CAM programming with the RDesigner through to machine control
+ 100% open system: Individual adjustment of all machine settings and process parameters

Unique precision for minimal wall thicknesses and finest lattice structures
OPTOMET – FIRST TIME RIGHT

Expert knowledge at your fingertips – OPTOMET software enables the development of process parameters for new materials within minutes.
rePLUG – The powder module for fast material changeover

HIGHLIGHTS

+ Automated powder handling and powder storage under inert gas atmosphere
+ One material per rePLUG – expansion of the material range at will thanks to modular changeover system
+ Change between different materials without contamination in < 2 hours
+ Safe powder handling due to integrated periphery and closed material cycle
+ Increased efficiency thanks to integrated powder recycling
+ High process reliability thanks to efficient double filter system* [filter can be changed without interrupting the building process] and a large powder reservoir [no manual refilling during the process]

Optional: rePLUG reSEARCH
The additional powder module developed especially for material and process parameter development before series production.

*when using the rePLUG for LASERTEC 12 SLM and LASERTEC 30 SLM 2nd Gen.
FULLY COMPATIBLE

Use the same rePLUG and rePLUG reSEARCH on LASERTEC SLM machines without any adaptation.

MATERIAL CHANGE

< 2h
POWDER RANGE

+ 1.2709 (Tool Steel)
+ 1.4404 (Stainless Steel)
+ AlSi10Mg0.5 (Aluminium)
+ CoCr ASTM F75 (Cobalt-Chrome)
+ CoCr (Starbond CoS)
+ Inconel 625
+ Inconel 718
+ Scalmalloy®
+ Ti6Al4V/3.7165 (Titanium)

READY-TO-USE
Supply of material and process parameters

DELIVERY
within 3 days (inside EU)

QUALIFIED
Compliance with all required QS standards Powder acceptance on a LASERTEC SLM
LASERTEC SLM WITH rePLUG
The powder module for fast material change and automated powder handling

MATERIAL CHANGE < 2h

EASY ORDER ONLINE
Complete powder assortment available in our DMG MORI Online Shop: shop.DMGMORI.com

OPTOMET – FIRST TIME RIGHT
Software for parameter optimization in the powder bed process
CELOS ensures an efficient flow of information on the shop floor and provides the machine operator with all relevant job information in real time. Touchscreen and APPs ensure intuitive operation of the machine, while various monitoring tools enable a clear view of the current process at all times.

CONTROL AND PROGRAMMING

CELOS: CAM programming and machine control from a single source

CELOS APPS

- **RDesigner**: CAM programming
- **WATCHER**: Camera-based process monitoring and documentation of each individual layer
- **MATERIAL MANAGEMENT**: Management of material data and parameter editor
- **STATUS MONITOR**: Visualisation of the machine status in real time
- **MANUAL CONTROL**: Machine setup for process preparation
- **NETservice**: Online error analysis and technical support directly on the machine control
- **JOB CONTROL**: Machine control
- **SETTINGS**: Machine settings
- **JOB HISTORY**: Job management
SOFTWARE FOR PARAMETER OPTIMIZATION

OPTOMET: Automatic calculation of process parameters

+ Parameter development for new and existing materials within minutes instead of days
+ Up to 50% more efficiency with OPTOMET Max. Power*
+ Advance calculation of mechanical properties for selected materials
+ 70% shorter material development cycles with unrestricted choice of the material supplier
+ Better after every print job – “Machine learning” with integrated database

*R:Exclusive function for LASERTEC SLM

RANGE OF FUNCTIONS

Parameter development

Automatic process parameter calculation and optimization for new and existing Additive Manufacturing materials incl. advance calculation of the material properties and mechanical properties for OPTOMET standard materials:

+ Aluminum AlSi10Mg0.5
+ Stainless steel 1.4404
+ Stainless steel 17-4 PH
+ Tool steel 1.2709
+ Inconel 625
+ Inconel 718
+ Cobalt chrome
+ Titanium Ti64

INDIVIDUAL PARAMETER ADJUSTMENT FOR MAXIMUM FLEXIBILITY

+ Change of layer thickness
+ Adaptation of mechanical properties like density or hardness
+ Parameter correction for recycling powder
+ Switching to new powder suppliers for an unrestricted choice of material manufacturers

Create your own parameter sets by mouse click!

Automatic calculation of:
1. Laser power
2. Scan speed
3. Hatch-Spacing

Each for:
+ Hatch
+ Up-/Downskin
+ Top-Skin
+ Outer-/Inner-Contour

CREATING YOUR OWN PARAMETER SETS!
COMPONENT QUALITY

First time right

Consideration of powder and machine properties for perfect results

+ Chemical composition
+ Powder flowability
+ Powder density
+ Layer thicknesses for support and component
+ Focus diameter (min./max.)
+ Build platform temperature (max.)

EXCLUSIVE FUNCTIONS FOR LASERTEC SLM

OPTOMET Max. Power and Temperature Control

50 % increased efficiency with unchanged component quality

+ Optimized exposure strategies by using the full laser power and adjusting the scan speed as well as hatch spacing
+ Optimum utilization of the machine performance with up to 50 % higher build-up rates

OPTOMET Temperature Control

Reduced residual stresses in the component due to active control of the build platform temperature for constant conditions at process level

"Machine learning"

The integrated material database can be extended with the results of each material test and thus creates the basis for a self-learning machine, which keeps getting better with each print job.

Advance calculation of the material properties and mechanical properties for selected materials*

1. Density
2. Surface hardness
3. Tensile strength
4. Yield point
5. Elongation at break
6. Impact strength

*Currently only for OPTOMET standard materials

Supplier A

Fresh powder

Supplier B

20 recycling loops

Supplier C

Material properties and mechanical properties for selected materials

1. Density
2. Surface hardness
3. Tensile strength
4. Yield point
5. Elongation at break
6. Impact strength

*Currently only for OPTOMET standard materials

Product Line

Additive Intelligence

SLM Machines

DED Machines

DMG MORI Service

Technical Data
Create your own parameter sets!
OPTOMET Advanced: Choice of any alloy compositions* by mouse click based on the periodic table

HARDWARE: rePLUG reSEARCH

70% shorter material development cycles

**WITHIN DAYS INSTEAD OF MONTHS!**

OPTOMET Advanced + rePLUG reSEARCH
+ Perfectly coordinated software and hardware particularly for the material development
+ Minimization of required material tests and machine runtime
+ Optimized for small material quantities with cleaning times < 1 day
+ Parameter development on the series system

OPTOMET VERSIONS

OPTOMET Basic and Advanced

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<th>Range of functions / material selection</th>
<th>Basic</th>
<th>Advanced</th>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Individual parameter adjustment and optimization</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Advance calculation of mechanical properties*</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>OPTOMET Max. Power function**</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>OPTOMET Temperature Control**</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Machine Learning: Feedback of the measuring results to the local OPTOMET material database</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>OPTOMET standard materials</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Aluminum AlSi10Mg0.5, Stainless steel 1.4404, Stainless steel 17-4 PH, Tool steel 1.2709, Inconel 625, Inconel 718, Cobalt chrome, Titanium Ti64</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Material development for any alloy compositions***</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Selection of material components via the periodic table</td>
<td>−</td>
<td>✓</td>
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</table>

*Weldable materials within the chemical and physical limits / only in connection with OPTOMET Advanced Version

*Currently only for OPTOMET standard materials  **Exclusive function for LASERTEC SLM machines
***Weldable materials within the chemical and physical limits

+ Perfectly coordinated software and hardware particularly for the material development
+ Minimization of required material tests and machine runtime
+ Optimized for small material quantities with cleaning times < 1 day
+ Parameter development on the series system
Programming and control

RDesigner

CAM programming
+ Starts with a pure CAD model (STL)
+ Orientation/Positioning
+ Support
+ Slicing
+ Hatching
+ Copying
+ Generation Process Control File

Heat Calculation
+ Advance calculation of mass distribution
+ Automatic adaptation of all laser parameters for top component quality
+ Integration in RDesigner

JOB CONTROL
+ At a glance: All relevant machine and job parameters
+ Camera-based check of the build-up and coating quality
+ Automatic machine stop at error detection
**STATUS MONITOR**

- Visualisation of the machine status in real time
- Graphic display of all sensors
- Definition of favoured sensors

**MANUAL CONTROL**

- Summary of the machine status
- Machine setup
- Process preparation
- Fault diagnostics
- Manual control of scanner, lens, valves and drives

**MATERIAL MANAGEMENT**

- Management of material data (Process Control Files)
- Grouping of available materials
- Definition of user-defined machining strategies
- Simple import and export of material data
SLM PROCESS CHAIN

Process understanding from the drawing to the finished part, with end to end process knowledge of DMG MORI

Additive Manufacturing → Milling

Maximum component accuracy and top surfaces guaranteed –
Post-processing on milling machines from DMG MORI

DMU 50 3rd Gen.

HIGHLIGHTS

+ 5-axis machining with up to 20,000 rpm
+ Swivel rotary table for 5-axis simultaneous machining
+ Tool magazine with 30 pockets as standard and optionally up to 120 magazine pockets
+ Integrated cooling concept for top long-term precision
+ Direct-driven ball screw drive for the best possible accuracy
+ Direct measuring system in all axis
**Milling → Additive Manufacturing**

**Full flexibility** – Milling of the base before the Additive Manufacturing process does away with the need for support structures and leads directly to the finished part!

**Application example:**
**Basic tibia plateau**

- **Material:** Ti6Al4V
- **Machining time milling:** 12 min./unit
- **Machining time additive manufacturing:** 9 hours (9 parts)
- **Layer thickness:** 50 µm | 0.00197 in
- **Dimensions:** 75 × 57 × 53 mm | 2.95 × 2.24 × 2.09 in

**DIRECTLY TO THE FINISHED PART!**

+ **No post-processing**
+ **No support structures**
Directed Energy Deposition (DED) Laser Deposition Welding

FUNCTIONAL PRINCIPLE:
TRACK-FOR-TRACK BUILDING IN LAYERS

1. The powder is transported by an inert carrier gas to the coaxial powder nozzle
2. Laser melts the metal powder to a high-strength and high-density weld
3. Individual tracks become one layer
4. Layers become the 3D component

HIGHLIGHTS

+ 5-sided additive process
+ Addition of additive features to existing parts
+ Coating and repair of existing parts
+ Targeted buildup of specific materials to enhance the workpiece function or enlarge the tool life.
+ Large honeycomb structures for weight reduction
+ Combination of multiple materials in one part
+ Building near-net semi-finished products
+ High-quality welding
Applications
- New parts / complete build up
- Build-up on semi-finished products
- Also for Repair and coating
- Multi materials and graded materials

Materials
- Dense and high-strength materials up to 65 HRC without heat treatment
- Raw material Particle size 50 – 120 μm | 0.00197 – 0.00472 in
- No reactive materials (e.g. Ti, Al)
- Titanium possible (Ti-6Al-4V)
- Particle size 45 – 200 μm | 0.00177 – 0.00787 in

Post-processing
- The parts must be post-processed on a separate machine
- Post-processing in a single setup on the same machine, based on 5-axis milling
- Hybrid machine with 5-axis milling (optionally with mill-turn function)
- Post-processing in a single setup on 5-axis milling
- Hybrid machine with 5-axis milling (no turn function)
- Post-processing in a single setup on a lathe
- Hybrid machine 6-sided machining: Turning / milling

Build volume
- Max. 600 kg 1,323.0 lbs
- ø 650 mm 25.59 in
- ø 500 mm 19.69 in
- ø 400 mm 15.75 in
- Max. 2,000 kg 4,410.0 lbs
- Ø 1,250 mm | ø 49.21 in
- Ø 1,000 mm | ø 39.37 in
- Ø 745 mm | ø 29.33 in
- Max. 1,300 kg 2,880 lbs
- Ø 800 mm | ø 31.5 in
- Ø 660 mm | ø 26.0 in
- Ø 500 mm | ø 19.69 in
- Max. 1,000 kg 2,205 lbs
- Ø 660 mm | ø 26.0 in
- Ø 500 mm | ø 19.69 in
- Max. 600 kg 1,323.0 lbs
- Ø 400 mm | ø 15.75 in
- Ø 320 mm | ø 12.6 in
- 27 m³ 959.84 ft³
- 50 m³ 1,759.53 ft³
- 9.4 m³ 33.06 ft³
- 6.3 m³ 221.36 ft³
- 1.6 m³ 56.46 ft³
- 2.7 m³ 94.23 ft³
- 3.2 m³ 111.84 ft³
- 5.4 m³ 189.21 ft³

Footprint
- 1,620 mm 63.78 in
- 1,700 mm 67.0 in
- 2,017 mm 79.4 in
- 2,030 mm 79.7 in
- 2,017 mm 79.4 in
- 2,017 mm 79.4 in
- 4,505 mm 177.0 in
- 4,380 mm 172.5 in
- 4,000 mm 157.5 in
- 3,700 mm 146.1 in
- 3,200 mm 125.9 in
- 6,700 mm 263.78 in
- 5,000 mm 196.85 in
- 5,300 mm 208.66 in
- 3,200 mm 125.9 in
- 2,700 mm 106.3 in
- 2,017 mm 79.4 in
- 1,620 mm 63.78 in
- 1,410 mm 55.5 in
- 1,200 mm 47.2 in
- 800 mm 31.5 in
- 630 mm 24.8 in

FROM PROTOTYPE TO SERIES PRODUCTION

World premiere of the LASERTEC 65 3D hybrid as a prototype
Start of series production of the LASERTEC 65 3D hybrid
World premiere of the LASERTEC 65 3D as a pure laser processing machine for Additive Manufacturing using a powder nozzle
World premiere of the LASERTEC 125 3D for workpieces up to 1,250 mm | ø 49.21 in and up to 2,000 kg | 4,410.0 lbs workpiece weight
LASERTEC 3D/3D hybrid

Directed Energy Deposition Materials

MATERIALS

- Stainless steel 316L (X2CrNiMo17-12-2, 1.4404)
- Stainless steel 17-4 PH (X5CrNiCuNb17-4-4, 1.4548)
- Tool steels X35CrMoMn7-2
- High-speed steel M2 (S6-5-2, 1.3343)
- Nickel-based alloys 625 and 718
- Cobalt alloys 6 and 21
- Copper alloys CuSn10 and CuAl10
- MMC coating (WC in nickel-based matrix)

Typical Mechanical Properties

<table>
<thead>
<tr>
<th></th>
<th>316L</th>
<th>17-4 PH</th>
<th>X35CrMoMn7-2</th>
<th>Ni 625</th>
<th>Ni 718</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield point [R_p0.2] Mpa</td>
<td>390</td>
<td>1,053</td>
<td>1,346</td>
<td>538</td>
<td>1,089</td>
</tr>
<tr>
<td>Tensile strength [R_m] Mpa</td>
<td>563</td>
<td>1,134</td>
<td>1,561</td>
<td>844</td>
<td>1,268</td>
</tr>
<tr>
<td>Elongation at break [%]</td>
<td>36.6</td>
<td>7.6</td>
<td>4.7</td>
<td>28.9</td>
<td>17.7</td>
</tr>
<tr>
<td>Impact strength [J] J</td>
<td>105</td>
<td>17</td>
<td>16</td>
<td>52</td>
<td>45</td>
</tr>
</tbody>
</table>

MULTI-MATERIAL

Combination of two different materials in one component (e.g. material bond stainless steel/bronze). Two individually selectable powder feeders allow the combination of various materials, even the building of “Sandwich” workpieces.

GRADED MATERIALS

Targeted control of the transition between two materials. This results in graded materials, which show a fluent transition of different material properties. This way, the hardness and toughness of the material can be regulated for example in the build-up process, and optimally adapted to the specific requirements of the area of application.
Directed Energy Deposition Applications

**Production**
- Heat exchanger
- Laser head console
- Bell
- Tool
- Impeller
- Moulding tool
- Valve housing
- Die cast core
- Moulding tool (bottom)
- Blisk/Blades

**Repair & Maintenance**
- Drill head
- Forging die

**Coating**
- Cutting knife
- Flange
- Bearing block
Hybrides CAD/CAM – module for additive programming

1: Customer CAD/CAM data; CAD model separation into additive and subtractive areas; slicing of the individual workpiece sections

2: Generation of the NC paths for the laser process and milling; output by post processor; definition of programming order

3: 3D simulation for collision protection with consideration of the integrated laser head

4: Directed Energy Deposition and milling combined on the LASERTEC 65 3D hybrid / LASERTEC 125 3D hybrid / LASERTEC 4300 3D hybrid (flexible changeover possible)

Dual channel heat exchanger
Plant engineering
Material: CuAL10/316L
Dimension: ø200 × 250 mm | ø 7.87 × 9.84 in
Cycle time: 22 h

HIGHLIGHTS

+ One software package for the complete process (design, programming, simulation)
+ Unique SAUER LASERTEC build-up module – fully integrated into CAD/CAM software
+ The part can be programmed in several steps, while flexibly switching between Laser Deposition Welding and milling operations in only one programming set-up

APPLICATION EXAMPLE

1: Start of the additive buildup
2: Additive buildup of the heat exchanger housing with two different materials
3: Intermediate milling of the flange connection
4: Additive buildup of the flange connection with same material as inner core
5: Milling of the outer flange connections to finished size
6: Finishing of the bottom part after rechucking and measuring
“Graded Materials”
+ Automatic interpolation between two parameter sets along a defined trajectory
+ Also usable for complex geometries
+ Fast programming possible with the NX material database

“Tube Additive Buildup”
+ Build-up of curved geometries (filled, thick or thin wall)
+ Automatic generation of the tool path based on the component curve
+ Increased flexibility in production

“Merge”
+ Simultaneous build-up of individually programmed operations
+ Prevention of collisions due to parallel setup of features
+ Combined setup of features with different parameters, materials or geometries

“3D Freeform”
+ Build-up on complex, existing surfaces
+ Coatings, thin walls and full components
+ Flexibility with regard to programming

“Build on parts”
+ This is based on an existing part (build-up by Additive Manufacturing or with an alternative production process)
+ “Flanging” of an additional 3D contour onto the existing part

“3D-Coating”
+ Deposition of partial or complete coatings for corrosion protection and wear resistance, “3D coating” on 3D parts as a material coating or a repair
LASERTEC 3D/3D hybrid

AM Assistant for a holistic process data capture and regulation

HARDWARE COMPONENTS

Adaptive process control

Distance control

Working room observation

Powder calibration

SOFTWARE COMPONENTS

AM Analyser

AM Guard

Nozzle adhesion detection
**HIGHLIGHTS**

+ Visualization of relevant process data (for example, melt pool size, powder mass flow) as a digital 3D model and over time
+ Detailed analysis of process data
+ Direct comparison of processes for quality assurance
+ Creation of part reports

**CUSTOMER BENEFITS**

+ Simplification of process development
+ Support in quality control
+ Enables individual analysis and work up of process-relevant data
+ Easy retrofitting of the software within the AM-Analyzer product package (Existing software can still be used)

---

**LASERTEC 3D/3D hybrid**

**AM Evaluator for process data analysis and comparison**

**NEW**

**Machine type:**
LASERTEC 65 3D | LASERTEC 65 3D hybrid | LASERTEC 125 3D hybrid

**Control system:** CELLOS mit SIEMENS

Detailed analysis of process data using 3D digital models

Overview of process-relevant data and comparison of different data sets
LASERTEC 65 3D

Uncompromising 5-axis buildup of additive parts by powder nozzle

HIGHLIGHTS

+ Directed Energy Deposition based on a machine tool with CNC control
+ 5-Axis building of large additive 3D metal parts up to ø 650 mm | ø 25.59 in,
  560 mm | 22.05 in in Z (max. 600 kg | 1,323 lbs)
+ Laser head integrated into the headstock
+ Programmable realisation of different track widths (ø 1.8 – 3.6 mm | 0.07 – 0.14 in)
+ Complete hybrid CAD/CAM process chain with interface for subtractive post-processing
+ Customised automation solutions available for best utilisation in production
Lasertec 65 3D

Automation and process chain:
Custom-made solutions for your production

+ Synchronized interaction of additive and subtractive technologies
+ Optimal operator accessibility to both machines
+ Well suited solution for series production
+ Quick and cost-efficient production of large number of pieces

Application benefits
+ Better part performance due to multi material use
+ Buildup of new features on existing 3D parts
+ Repair by directed energy deposition
Directed Energy Deposition and 5-axis milling in finished part quality

**HIGHLIGHTS**

+ Flexibility of additive manufacturing combined with the precision of milling
+ Laser buildup of the workpiece with intermediate milling operation
+ High building-rates with coaxial powder nozzle
+ Buildup of parts without support geometries due to 5-axis deposition process
+ New AM Assistant for best process reliability and comprehensive traceability
APPLICATION BENEFITS

- Better part performance due to multi material use
- Buildup of new features on existing parts
- Complete part repair
  - Repair preparation by milling
  - Repair by laser deposition welding
  - Finishing by milling
  - All in one clamping

1. Milling spindle
2. Automatic tool changer
3. Laser head change shuttle
4. GGG 60 cast
Directed energy deposition combined with 5-axis milling, for building and repairing of high-value metal parts

MACHINE FEATURES

- Parts up to 1,250 mm | 49.21 in building diameter, 745 mm | 29.33 in height and 2,000 kg | 4,410.0 lbs weight
- High metal building rate
- Graded and multi-material building
- 5-axis simultaneous milling with coolant
- New AM Assistant for best process reliability and comprehensive traceability

Product Line
Additive Intelligence
SLM Machines
DED Machines
DMG MORI Service
Technical Data
APPLICATION BENEFITS

+ Better part performance due to multi material use
+ Buildup of new features on existing parts
+ Complete part repair
  – Repair preparation by milling
  – Repair by laser deposition welding
  – Finishing by milling
  – All in one clamping

1-4: Automatic change of the laser head, deposition outside the machining room
5: Automatic powder calibration
6: Twin powder feeder for different materials
7: Media supply for laser head
Directed Energy Deposition with integrated turning/milling

The LASERTEC 4300 3D hybrid expands the range of hybrid machines with a turn/mill machine for the ideal manufacture of rotational parts. The main and sub-spindles allow 6-sided machining of parts, including the welding of pipes by automated sub-spindle handling.

**HIGHLIGHTS**

- Combined Laser Deposition Welding and turning/milling operations on the LASERTEC 4300 3D hybrid
- Large parts up to ø660 mm | 25.98 in, 660 mm | 25.98 in in Z (axial) or ø545 mm | 21.46 in, 1,500 mm | 59.04 in in Z (rotational)
- Max. workpiece weight 1,700 kg | 3,748.5 lbs
- Top surface quality and precision due to the integrated 6-axis turning machine
- Additive manufacturing of metals and reactive materials such as Ti-6Al-4V (optional)
- Complete hybrid CAD/CAM process chain
ADDITIVE AND SUBTRACTIVE MACHINING ON MAIN AND SUB-SPINDLE

- Complete 6-sided machining of parts
- Build-up of parts on main and sub-spindle with subsequent welding of built-up parts
- Automated way to weld to separate parts together on the main and sub spindles

FOOTPRINT

BUILD VOLUME

LASERTEC 4300 3D hybrid

- 63 m³ | 678.13 ft³
- 9.400 mm | 370.08 in
- 6,400 mm | 251.97 in
- 5,300 mm | 208.66 in
- 3,200 | 125.98 in

LASERTEC 125 3D hybrid

- 50 m³ | 538.2 ft³
- 5,000 mm | 196.85 in
- 4,000 mm | 157.48 in
- 5,300 mm | 208.66 in
- 3,200 | 125.98 in

LASERTEC 65 3D

- 16 m³ | 172.23 ft³
- 4,000 mm | 157.48 in
- 2,000 mm | 78.74 in
- 1,250 mm | 49.21 in

LASERTEC 65 3D hybrid

- 16 m³ | 172.23 ft³
- 4,000 mm | 157.48 in
- 2,000 mm | 78.74 in
- 1,250 mm | 49.21 in

LASERTEC 125 3D hybrid

- 27 m³ | 295.63 ft³
- 5,300 mm | 208.66 in
- 3,200 | 125.98 in
- 400 mm | 15.75 in

- 2,000 kg | 4,410 lbs
- 745 mm | 29.33 in
- ø 650 mm | ø 25.59 in

- 500 kg | 1,102 lbs
- 375 mm | 14.76 in
- ø 500 mm | ø 19.69 in
**DMG MORI SERVICE**

**Worldwide Service**

[Diagram showing the process of contacting DMG MORI 24/7 Hotline leading to solution in the hotline and problem resolved.

**NETservice – YOUR ACCESS TO DIGITAL SERVICE**

- **Shorter waiting times** due to routing directly to the next free employee
- **Higher resolution rate** due to access to CELOS, IPC and NC
- **Maximum data security**
- **Optional connection of the SERVICEcamera**: More efficient problem resolution due to livestream (video/audio/image) from the machine directly to the DMG MORI Hotline
- **Recording of all service activities**
- **Direct transfer of document updates**
- **Multi-user conference**: Interconnection of different DMG MORI skilled workers for joint faster problem resolution
- **Intuitive operation**
- **Individual user profiles** and rights
- **Also for existing machines** thanks to the Retrofit-Kit

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**ONLINE SUPPORT MINIMIZES MACHINE DOWN TIMES AND SERVICE COSTS.**

We solve more than 60% of the problems with our NETservice due to qualified online diagnosis and help very crucial doing your machines back in operation as fast as possible. Via direct remote communication with the DMG MORI service our expert knowledge is available immediately.
SERVICEcamera-LIVESTREAM FOR THE NETservice

+ **Plug-and-play connection** without preconfiguration between SERVICEcamera and NETservice (IoTconnector)
+ **Faster problem identification and resolution**
+ A description of the problem by phone is often superfluous
+ **Faster problem identification and resolution**
+ **Integrated lighting and laser pointer**
+ **Photo and video storage** on the camera and IoTconnector for subsequent use

REMOTE SUPPORT WITH CAMERA AND MULTI-USER CONFERENCE

The new NETservice enables several parties to be interconnected in a multi-user process. This allows operators, service experts, service technicians or other employees from machine manufacturing plants to work together.

+ Faster problem solving due to communication network
+ Immediate access to professional expertise

**Participants**
Operators, service experts, service technicians and, where necessary, experts from the plant can work together within the communication network to provide maintenance and support.

**SERVICEcamera**
Targeted support for the operation and maintenance of your machine made possible by real-time transmission.

**Whiteboard**
The whiteboard is a digital sketch paper for conference participants. Together, they can work on photos, screenshots and circuit diagrams (e.g. marking, circling or underlining).

**Text conference**
In the chat session, all text messages are immediately sent to conference participants via instant messaging.
LASERTEC 30 DUAL SLM

Floor plans

Front view

Top view

- Coolant, Inlet and outlet
- Electrical connection
- Electrical supply
- Inert gas supply
- Coolant supply and return

---

Product Line
Additive Intelligence
SLM Machines
DED Machines
DMG MORI Service
Technical Data

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### LASERTEC 30 DUAL SLM

## Technical data

### Connections

#### Electrical connection
- **Mains connection**: 3N/PE
- **Nominal voltage**: V 400V / 230V ±10%
- **Frequency**: Hz 50 / 60
- **Power consumption**: kVa 20.3
- **Required mains fuse**: A 35
- **Required short-circuit power**: kVa 250

#### Inert gas connection
- **Inert gas**: Argon
- **Purity**: 4.6 or higher
- **Minimum consumption per build (floods and large parts)**: l | gal 1,000 | 264.20
- **Average consumption**: l/h | gal/h 150 | 39.63
- **Min. Pressure**: bar | psi 6 – 8 | 87.02 – 116.03

#### Network connection
- **Connection type**: RJ-45

#### Compressed air supply
- **Min. Pressure**: bar | psi 6 – 8 | 87.02 – 116.03

### Build data

- **Build volume (X × Y × Z)**: mm | in 300 × 300 × 300 | 11.81 × 11.81 × 11.81
- **Layer thicknesses**: µm | in 20 – 100 | 0.00079 – 0.00394
- **Focus diameter**: µm | in 50 – 300 | 0.00197 – 0.01181
- **Laser type**: Fibre laser
- **Laser power (depending on version)**: W 2 × 600; 2 × 1,000 [optional 1 × 600; 1 × 1,000]
- **Material**: Tool steel, stainless steel, cobalt chrome alloys, titanium, aluminium
- **Software**: CELOS / RDesigner
- **Integrated powder extraction**: Yes [in rePLUG powder module]
- **Integrated sieving unit**: Yes [in rePLUG powder module]

### Machine weight
- **Machine**: kg | lbs 1,400 | 3,087.0
- **rePLUG powder module (without powder)**: kg | lbs 600 | 1,323.0
LASERTEC 12 SLM / LASERTEC 30 SLM 2nd GEN.

Floor plans

Front view

Top view

Identical for LASERTEC 12 and LASERTEC 30 SLM 2nd Gen. / LASERTEC 12 SLM does not have an external cooler
# LASERTEC SLM

## Technical data

<table>
<thead>
<tr>
<th>Connections</th>
<th>LASERTEC 30 SLM 2nd Gen.</th>
<th>LASERTEC 12 SLM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical connection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mains connection</td>
<td>[3N/PE]</td>
<td>[3N/PE]</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>V</td>
<td>400 V / 230 V ± 10%</td>
</tr>
<tr>
<td>Frequency</td>
<td>Hz</td>
<td>50 – 60</td>
</tr>
<tr>
<td>Power consumption</td>
<td>kVA</td>
<td>17.3</td>
</tr>
<tr>
<td>Required mains fuse</td>
<td>A</td>
<td>32</td>
</tr>
<tr>
<td>Required short-circuit power</td>
<td>kVA</td>
<td>250</td>
</tr>
<tr>
<td><strong>Inert gas connection</strong></td>
<td></td>
<td></td>
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<tr>
<td>Inert gas</td>
<td>Argon</td>
<td>Argon</td>
</tr>
<tr>
<td>Purity</td>
<td>Argon</td>
<td>Argon</td>
</tr>
<tr>
<td>Minimum consumption per build (floods and large parts)</td>
<td>l / gal</td>
<td>1,000</td>
</tr>
<tr>
<td>Average consumption</td>
<td>l/h</td>
<td>72</td>
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<tr>
<td>Min. Pressure</td>
<td>bar / psi</td>
<td>6</td>
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<tr>
<td>Gas connection</td>
<td>Connector D 10 mm</td>
<td>0.39 in</td>
</tr>
<tr>
<td><strong>Network connection</strong></td>
<td></td>
<td></td>
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<tr>
<td>Connection type</td>
<td>RJ-45</td>
<td>RJ-45</td>
</tr>
<tr>
<td><strong>Build data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build volume (X×Y×Z)</td>
<td>mm / in</td>
<td>300 x 300 x 300</td>
</tr>
<tr>
<td>Layer thicknesses</td>
<td>µm / in</td>
<td>20 – 100</td>
</tr>
<tr>
<td>Focus diameter</td>
<td>µm / in</td>
<td>min. 70</td>
</tr>
<tr>
<td>Laser type</td>
<td>Fibre laser</td>
<td>Fibre laser</td>
</tr>
<tr>
<td>Laser power (depending on version)</td>
<td>W</td>
<td>600 – 1,000</td>
</tr>
<tr>
<td>Material</td>
<td>Tool steel, stainless steel, cobalt chrome alloys, titanium, aluminium</td>
<td>Tool steel, stainless steel, cobalt chrome alloys, titanium, aluminium</td>
</tr>
<tr>
<td>Software</td>
<td>CELOS / RDesigner</td>
<td>CELOS / RDesigner</td>
</tr>
<tr>
<td>Integrated powder extraction</td>
<td>Yes (in rePLUG powder module)</td>
<td>Yes (in rePLUG powder module)</td>
</tr>
<tr>
<td>Integrated sieving unit</td>
<td>Yes (in rePLUG powder module)</td>
<td>Yes (in rePLUG powder module)</td>
</tr>
<tr>
<td><strong>Machine weight</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine</td>
<td>kg / lbs</td>
<td>1,200</td>
</tr>
<tr>
<td>rePLUG powder module (without powder)</td>
<td>kg / lbs</td>
<td>540</td>
</tr>
</tbody>
</table>
# LASERTEC 65 3D

## Technical data

<table>
<thead>
<tr>
<th>Work area/Drives</th>
<th>mm</th>
<th>in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel in X/Y/Z</td>
<td></td>
<td>735/650/560</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work table/workpieces</th>
<th>mm</th>
<th>in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Workpiece dimensions</td>
<td></td>
<td>ø 650 × 560</td>
</tr>
<tr>
<td>Max. Workpiece weight (NC swivel/rotary table)</td>
<td>kg</td>
<td>lbs</td>
</tr>
<tr>
<td>Rotary axis [C-axis]</td>
<td>Grad</td>
<td>360</td>
</tr>
<tr>
<td>Swivel range [A-axis]</td>
<td>Grad</td>
<td>-120 to +120</td>
</tr>
<tr>
<td>P&lt;sub&gt;max&lt;/sub&gt; under VDI/DGQ 3441 (C-axis/A-axis)</td>
<td>Ws</td>
<td>7/9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Laser source</th>
<th>Watt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber guided diode laser</td>
<td>3,000</td>
</tr>
<tr>
<td>Focal distance (fixed)</td>
<td>mm</td>
</tr>
<tr>
<td>Laser spot diameter 1 (standard)</td>
<td>mm</td>
</tr>
<tr>
<td>Laser spot diameter 2 (optional)</td>
<td>mm</td>
</tr>
<tr>
<td>Build-up rate (depending on material)</td>
<td>kg/h</td>
</tr>
<tr>
<td>Linear axes (X/Y/Z)</td>
<td>mm</td>
</tr>
<tr>
<td>Rapid traverse speed</td>
<td>40/40/40</td>
</tr>
<tr>
<td>Max. acceleration X/Y/Z</td>
<td>m/sec&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>P&lt;sub&gt;max&lt;/sub&gt; per VDI/DGQ 3441</td>
<td>mm</td>
</tr>
<tr>
<td>Machine data</td>
<td></td>
</tr>
<tr>
<td>Width × depth × height (basic machine)</td>
<td>mm</td>
</tr>
<tr>
<td>Machine weight</td>
<td>kg</td>
</tr>
</tbody>
</table>
LASERTEC 65 3D

Floor plan

Front view

Top view
LASERTEC 65/125 3D hybrid

Technical data

<table>
<thead>
<tr>
<th>Work area/Drives</th>
<th>LASERTEC 65 3D hybrid</th>
<th>LASERTEC 125 3D hybrid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel in X/Y/Z</td>
<td>mm 735/650/560</td>
<td>mm 1,335/1,250/900</td>
</tr>
<tr>
<td></td>
<td>in 28.94/25.59/22.06</td>
<td>in 52.56/49.21/35.43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work table/workpieces</th>
<th>LASERTEC 65 3D hybrid</th>
<th>LASERTEC 125 3D hybrid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (NC swivel/rotary table)</td>
<td>mm</td>
<td>in 650</td>
</tr>
<tr>
<td>Max. Workpiece dimensions (Additive Manufacturing)</td>
<td>mm</td>
<td>in 500×400</td>
</tr>
<tr>
<td>Max. Workpiece weight (NC swivel/rotary table)</td>
<td>kg</td>
<td>lbs 600</td>
</tr>
<tr>
<td>Rotary axis (C-axis)</td>
<td>Grad 360</td>
<td>Grad 360</td>
</tr>
<tr>
<td>Swivel range (A-axis)</td>
<td>Grad −120 to +120</td>
<td>Grad −120 to +120</td>
</tr>
<tr>
<td>Pmax under VDI/DGQ 3441 (C-axis/A-axis)</td>
<td>Ws 7</td>
<td>Ws 7</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Milling spindle</th>
<th>LASERTEC 65 3D hybrid</th>
<th>LASERTEC 125 3D hybrid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Speed (standard/optional)</td>
<td>rpm 14,000</td>
<td>14,000</td>
</tr>
<tr>
<td>Output 40% DC/100% DC (standard/optional)</td>
<td>kW</td>
<td>hp 19/35</td>
</tr>
<tr>
<td>Torque 40% ED (standard/optional)</td>
<td>Nm</td>
<td>ft lbs 100/130</td>
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<tr>
<td>Tool holder Type</td>
<td>HSK-A63</td>
<td>HSK-A63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Laser source</th>
<th>LASERTEC 65 3D hybrid</th>
<th>LASERTEC 125 3D hybrid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibre laser diode Watt</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Laser spot diameter 1 (standard)</td>
<td>mm</td>
<td>in 3</td>
</tr>
<tr>
<td>Laser spot diameter 2 (optional)</td>
<td>mm</td>
<td>in 1.6</td>
</tr>
<tr>
<td>Build-up rate (depending on material) kg/h</td>
<td>lbs/h 1</td>
<td>2.2</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Linear axes (X/Y/Z)</th>
<th>LASERTEC 65 3D hybrid</th>
<th>LASERTEC 125 3D hybrid</th>
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</thead>
<tbody>
<tr>
<td>Rapid traverse speed</td>
<td>mm</td>
<td>in 40/40/40</td>
</tr>
<tr>
<td>Max. acceleration X/Y/Z</td>
<td>m/sec</td>
<td>g 6/6</td>
</tr>
<tr>
<td>Pmax under VDI/DGQ 3441</td>
<td>mm</td>
<td>in 0.008</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Tool change system</th>
<th>LASERTEC 65 3D hybrid</th>
<th>LASERTEC 125 3D hybrid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tools Standard/Option Number</td>
<td>30/60</td>
<td>30/60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Machine data</th>
<th>LASERTEC 65 3D hybrid</th>
<th>LASERTEC 125 3D hybrid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width × depth × height (basic machine)</td>
<td>mm 4,180×3,487×2,884</td>
<td>mm 5,674×7,625×4,203</td>
</tr>
<tr>
<td></td>
<td>in 164.57×137.28×113.54</td>
<td>in 223.29×300.20×165.47</td>
</tr>
<tr>
<td>Machine weight</td>
<td>kg</td>
<td>lbs 13,000</td>
</tr>
</tbody>
</table>
Additionally: Gas bundle argon or central supply by customer
# Technical data

<table>
<thead>
<tr>
<th><strong>General</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine weight (standard)</td>
<td>kg</td>
</tr>
<tr>
<td>Footprint</td>
<td>mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Tool spindle (Turret 1)</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear axes X / Y / Z</td>
<td>mm</td>
</tr>
<tr>
<td>Spindle angle (B-axis)</td>
<td>°</td>
</tr>
<tr>
<td>Rapid traverse (tool spindle)</td>
<td>m/min / ft/min</td>
</tr>
<tr>
<td>Max. workpiece weight</td>
<td>kg</td>
</tr>
<tr>
<td>Tool spindle motor (10 min. / cont.)</td>
<td>kW / hp</td>
</tr>
<tr>
<td>Spindle angle (B-axis)</td>
<td>°</td>
</tr>
<tr>
<td>Tool spindle torque (10% DC / cont.)</td>
<td>Nm / ft lbs</td>
</tr>
<tr>
<td>Chuck Type</td>
<td>Capto C6 [BT 40] [HSK-A63] [CAT40]</td>
</tr>
<tr>
<td>Tools (optional)</td>
<td>#</td>
</tr>
<tr>
<td>Max. tool weight</td>
<td>kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Main spindle 1 + 2</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. turning diameter</td>
<td>mm</td>
</tr>
<tr>
<td>Rotary axis (C-axis)</td>
<td>°</td>
</tr>
<tr>
<td>Max. spindle speed / chuck (spindle 1 + 2)</td>
<td>min⁻¹</td>
</tr>
<tr>
<td>Spindle motor power (30 min. / cont.)</td>
<td>kW / hp</td>
</tr>
<tr>
<td>Spindle motor torque (30 min. / cont.)</td>
<td>Nm / ft lbs</td>
</tr>
<tr>
<td>Clamping diameter</td>
<td>mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Turret 2</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Transversal axes X2 / Z2</td>
<td>mm</td>
</tr>
<tr>
<td>Rapid traverse (Turret 2)</td>
<td>m/min / ft/min</td>
</tr>
<tr>
<td>No. of tools (Turret 2)</td>
<td>#</td>
</tr>
<tr>
<td>Max. milling spindle speed (Turret 2)</td>
<td>rpm</td>
</tr>
<tr>
<td>Turret 2 milling spindle motor power (5 min. / cont.)</td>
<td>kW / hp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Powder build-up</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Stainless steel / maraging steel / inconel®625 / 718 / Stellite® / copper / titanium</td>
</tr>
<tr>
<td>Build-up rate (depending on material)</td>
<td>kg/h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Laser</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibre diode laser, coupled (optional)</td>
<td>Watt</td>
</tr>
<tr>
<td>Focal length (fixed)</td>
<td>mm</td>
</tr>
<tr>
<td>Laser spot 1</td>
<td>mm</td>
</tr>
<tr>
<td>Additive Manufacturing tool change</td>
<td>Automatic Additive Manufacturing tool changer and turret</td>
</tr>
<tr>
<td>Laser beam / powder nozzle rotation</td>
<td>Tangential guide</td>
</tr>
</tbody>
</table>
LASERTEC 4300 3D hybrid

Building space for Additive Manufacturing

LASERTEC 4300 3D hybrid

Floor plan
Global number 1 for Additive Manufacturing in metal!

With our six Additive Manufacturing Technology Centres in Bielefeld, Pfronten, Shanghai, Tokyo, Iga and Chicago we can be close to our customers in the most important markets. There we can develop technology and material needs locally, as well as handling customer part requests and training enquiries.

157 sales and service locations, 14 production factories, as well as 6 Additive Manufacturing Excellence Centres worldwide.