s.r.o. Misan
Obráběcí stroje a nástroje

CONCEPTLASER

Series in Aerospace and Medical AM + Quality Management

Dr. Jan Hudec

Series in Aerospace and Medical AM + Quality Management

- Founded in 2000
- Renowned producer of laser melting systems
- LaserCUSING® technology development

- Technological support and servicing in Czech rep. and Slovakia provided by Misan s.r.o.

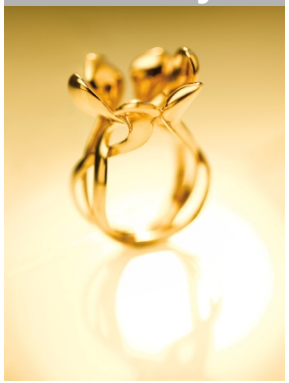
Concept Laser – Industries

Medical

Dental

Mould

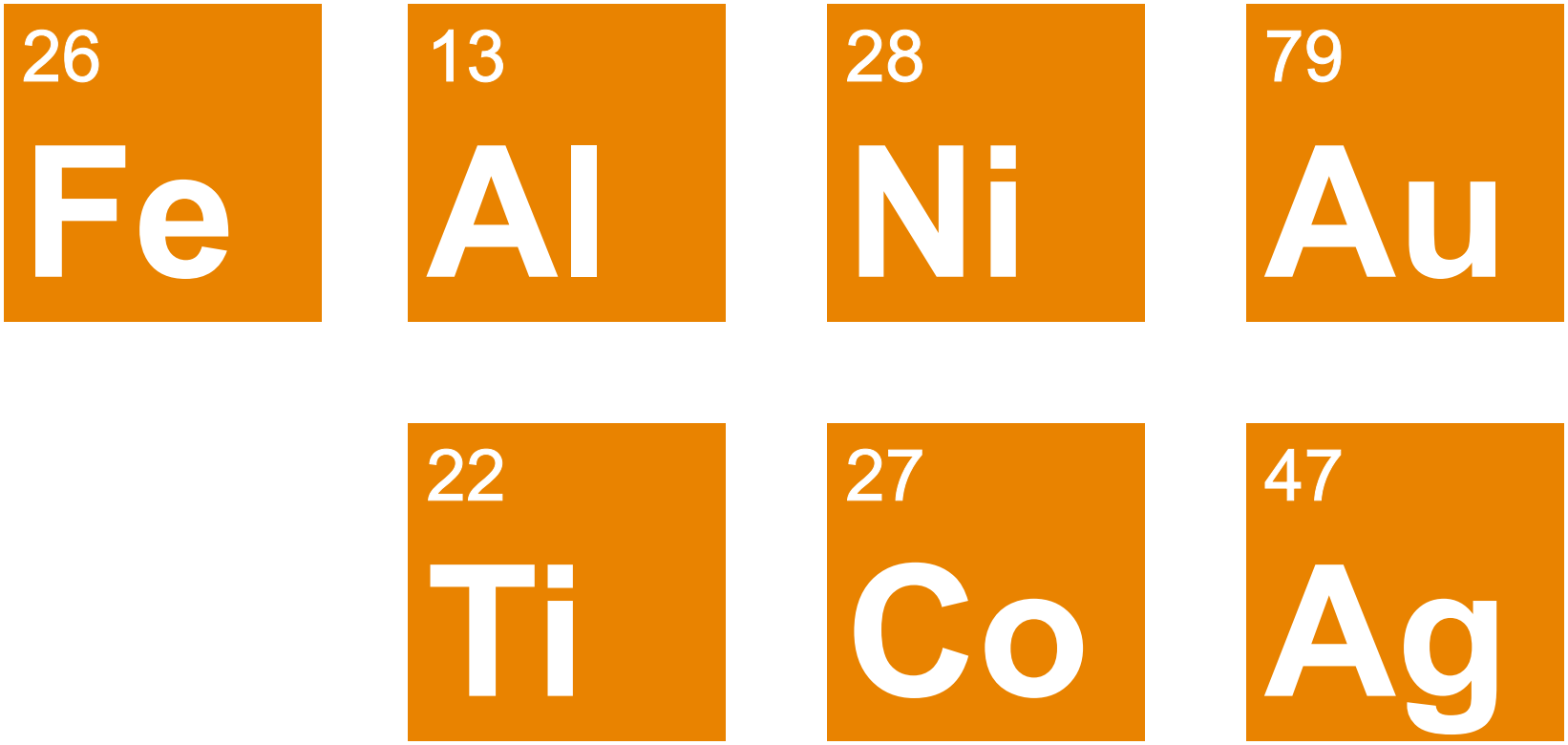
Jewelry



Automotive

Aerospace

LaserCUSING® Materials



Machines


CONCEPTLASER
m1


CONCEPTLASER
m1


CONCEPTLASER
m2
2 DUAL LASER


CONCEPTLASER
X line 1000R


CONCEPTLASER

AM Technology Adoption Assessment

… in aerospace and medical industry

1. Can I change a production method?
2. Can I change the part geometry or develop completely new design?
3. Will the new method improve quality or properties of final part?
4. Can it reduce production cost?
5. Is it possible to produce parts in required amounts?
6. Can I really have the process under control?

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Machines

Regular size

2 DUAL LASER

M1 cusing

Target group: non-reactive materials
Build envelope: 250 x 250 x 250 mm
Laser system: 200 watt / 400 watt

M2 cusing

Target group: + reactive materials
Build envelope: 250 x 250 x 280 mm
Laser system: 200 watt / 400 watt
1 or 2 lasers

Machines

Small factor

Mlab cusing

Target group: small parts, non-reactive materials
Build envelope: 90 x 90
70 x 70
50 x 50 x 80 mm
Laser system: 100 watt

Mlab cusing R

Target group : + reactive materials
Build envelope: 90 x 90
70 x 70
50 x 50 x 80 mm
Laser system: 100 watt

Machines

The biggest

…on Earth

X LINE 2000R

Target group: XXL parts - Al, Ti, Ni alloys
Build envelope: 800 x 400 x 500 mm
Laser system: 2 x 1000 watt

2 DUAL LASER

AM Machine Design

… standalone systems

Single Production Units

- Suitable for development projects + small batches
- High flexibility – material exchange

- Too slow for series
- Downtimes – in process
  - Powder coating
- Downtimes - manipulation
  - Job unpacking
  - Powder sieving
  - Dose chamber refill
  - Machine setup
  - Maintenance

Solutions for Series Production

- Accelerate the build process
- Minimize downtimes

- More lasers
- Larger build platform
- More effective coating
- No build process blocking by manipulation and preparation
- Automatic material recycling
- Easy production capacity upgrade
- Small footprint

Solutions for Series – M LINE FACTORY

Modular system

- Production unit
- Processing unit
- Mobile modules for material transport
- Tunnel concept for module movement

Technical data

- Established M2 cusing safety features
- Approve M2 cusing materials
- Established QM modules

Solutions for Series – M LINE FACTORY

- Various combinations of Production Stations and Processing Stations possible
- Module movement possible at any time, even during build process
- Separation of set-up and dismantling
- Concurrence of work processes
- No downtime (24/7 production)
- Easy to upgrade
- Easy access to all machine parts
- Highest footprint efficiency

Production Unit

Specifications

- Build chamber: 400 x 400 x >400 mm
- Laser, gas flow and filter integrated
- Approx. 2100 x 2400 x 2200 mm

Technical Data

- Layer thickness 20 – 80 µm
- Focus diameter 50 – 500 µm

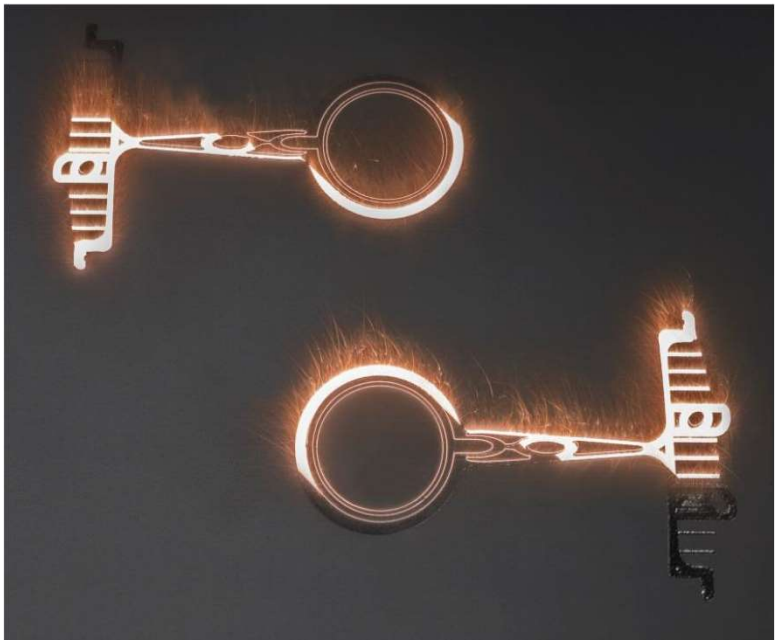
Advantages

- Large build chamber combined with small footprint
- No manual interference to start process

Production Unit

Optics

- Multilaser options: 1 – 4 lasers (400 – 1000 W)
- 3D scan system: real time adjustment of laser spot diameter
- 100 % coverage of the plate
- Redundancy of plate coverage



Advantages

- Increased build rates
- Detailed features as well as high productivity in one machine
- High reliability of production

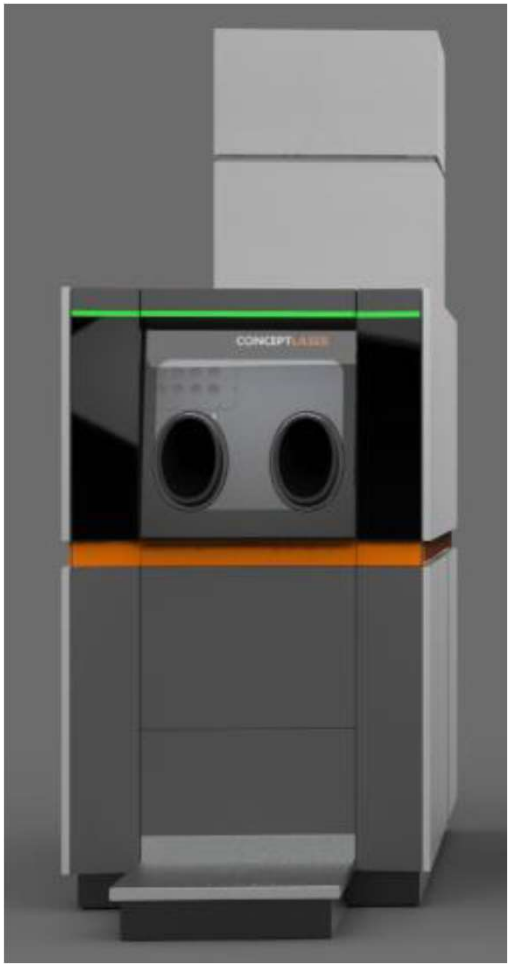
Processing Unit

Specifications

- Integrated Sieving Unit
- Powder Management
- Build job set-up and dismantling
- Approx. 1200 x 3000 x 2200 mm

Advantages

- No containers needed for powder handling
- Separated from build process
- No contact of operator with powder
- Set-up, unpacking and sieving in one unit



Modules

Specifications

- 3 different flexible modules
  - Dose module
  - Build module
  - Over Flow module
- Outside measurements: 500 x 500 mm² x various z-heights

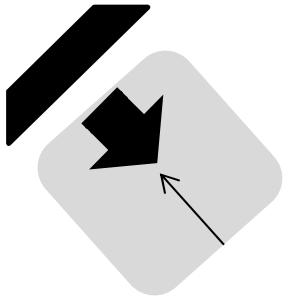
Advantages

- No tubes or hoses between Process Station and Production Station
- Safe handling
- High volume rate for powder transport
- Full flexibility for powder and production management
- Full traceability

Coating system

Specification

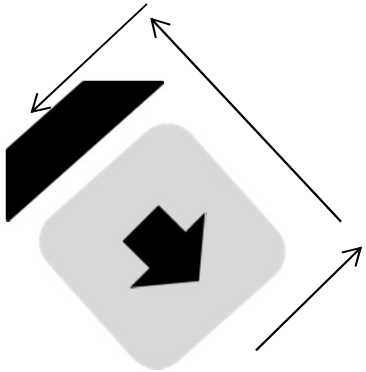
- Powder feed from dose module (not from the top)
- Coater stays in Process Station
- Coating in one direction
- Coater blade magazine



Coating in one direction

New innovative concept:

- 2-axis coating system
- Exposure is possible while coater returns

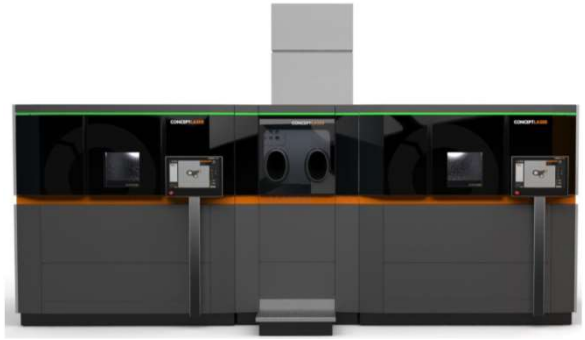


Coater returns during laser operation

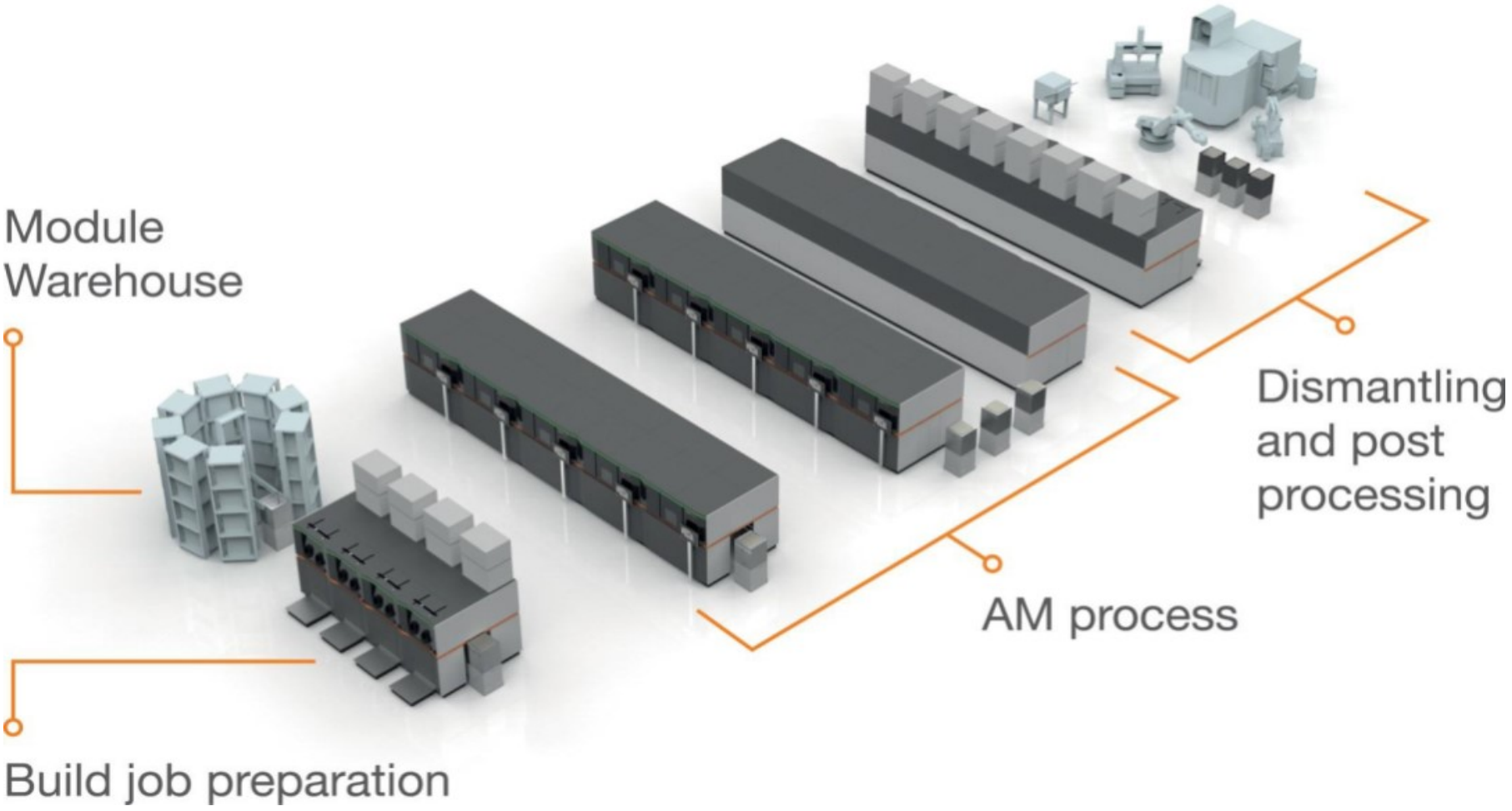
Advantages

- Robust approach, exact dosing, independent from powder flowability
- Removal of pollution and weld spatter from powder bed
- Eliminating non-productive time

Machine Combination Scenarios



Flexible AM system for series



REVOLUTIONARY DESIGN

- Full utilization of additive technologies advantages

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Quality Assurance

Concept Laser – Quality Management Systems

- QM RT meltpool — Real time in-situ process monitoring of meltpool emission
- QM RT laser — Online-laser-status and -power control
- QM RT atmosphere — Redundant analysis and control of oxygen concentration in process gas
- QM RT atmosphere — Analysis of filter status and flow rate
- QM RT coating — Automatic coating control and regulation
- QM documentation — Software module to generate build job reports
- QM powder — Inspection of new powder material, maintenance of powder material in-use by an external sieving machine
- QM RT live view — Build process on-line video stream

Quality Assurance

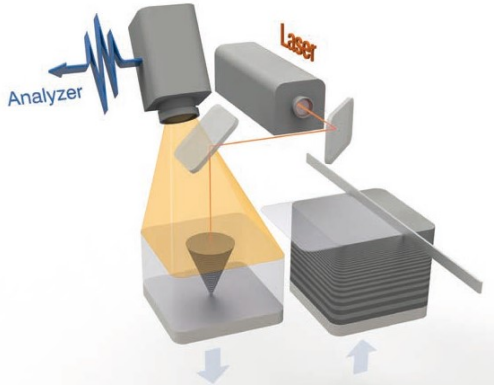
QM Meltpool 3D

QM RT meltpool

- Real time build process monitoring
- Correlation of meltpool emissions to corresponding coordinates on the build platform by IR camera
- High sample rates enable correlation within the dynamic process
- 3D visualization of the build parts directly after build process
- Comparable with CT Scan
- System awarded by IAMA in 2016

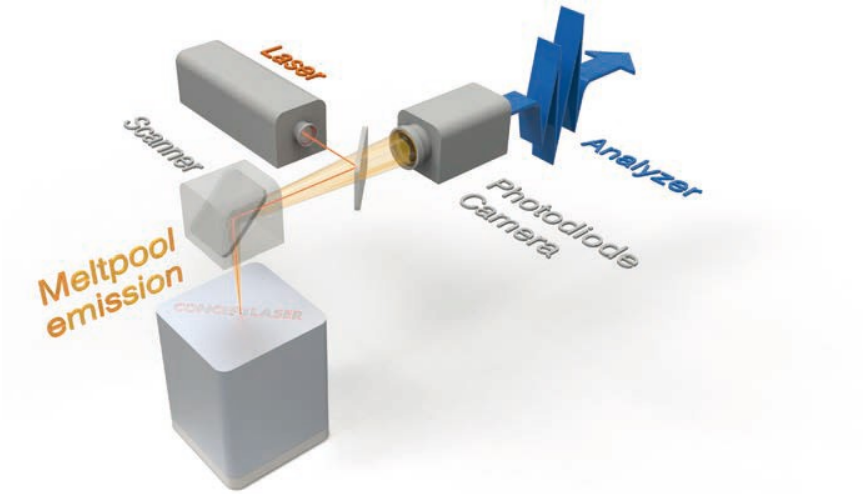
Quality Assurance

Conventional monitoring system



QM RT meltpool

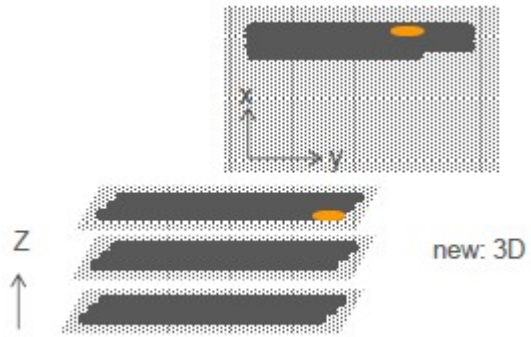
QM Meltpool 3D

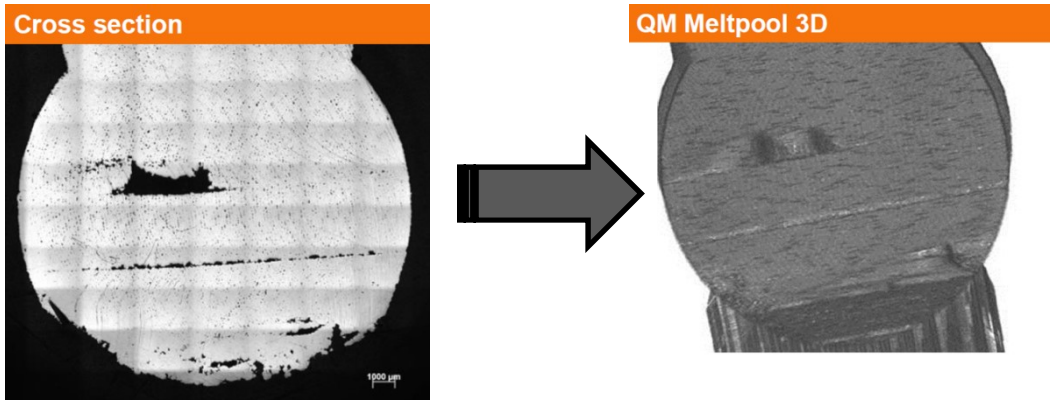


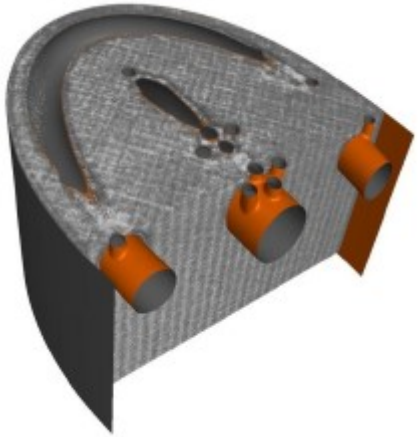
Quality Assurance

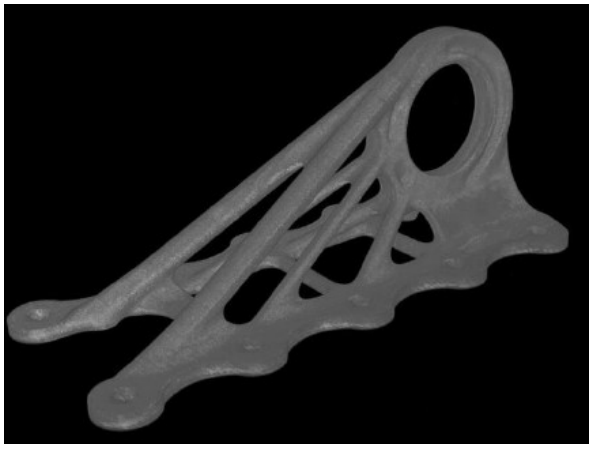
QM RT meltpool

QM Meltpool 3D









Thank you for your attention

We will be happy to answer any further questions you may have

See our small system Mlab cusing R running tomorrow!

Or you also can visit us at our showroom in Lysá nad Labem.

Misan s.r.o.

Ke Vrutici 1795

CZ 28922 Lysá nad Labem

T +420 325 551 440

F +420 325 551 062

lysa@misan.cz

is exclusive reseller of:

Concept Laser GmbH

An der Zeil 8

D 96215 Lichtenfels

T +49 (0) 9571 / 1679-200

F +49 (0) 9571 / 1679-299