

.process monitoring

CONCEPTLASER

Achieve the highest possible quality in series production thanks to LaserCUSING®



CONCEPT

QUALITY MANAGEMENT FOR LaserCUSING® SYSTEMS

Our QM modules allow you to monitor different system conditions such as laser power, atmosphere and ensure powder quality. At the same time, inline modules for monitoring critical process factors are also required to ensure the repeatability and quality of processes.

QM MODULES FOR SYSTEM STATUS MONITORING

QM^{RT}
live view

QM Live View: Remote monitoring of the entire build platform.

QM^{RT}
atmosphere

QM Atmosphere: Redundant monitoring and control of oxygen concentration in process gas, monitoring of filter condition and automatic cleaning via differential pressure measurement.

QM
powder
QM
powder S

QM Powder and QM Powder S: Monitoring of the powder source material with regard to chemical composition and grain size distribution. Quality control of the powder in circulation: External sieving station, high throughput with fine sieving mesh, can be inerted.

QM
fiber power

QM Fibre Power: Continual documentation of the laser system power during the build process. (Only available for single laser systems)

QM
cusing power

QM Cusing Power: Measurement of the laser power before or after the build process directly at the powderbed.

QM
documentation

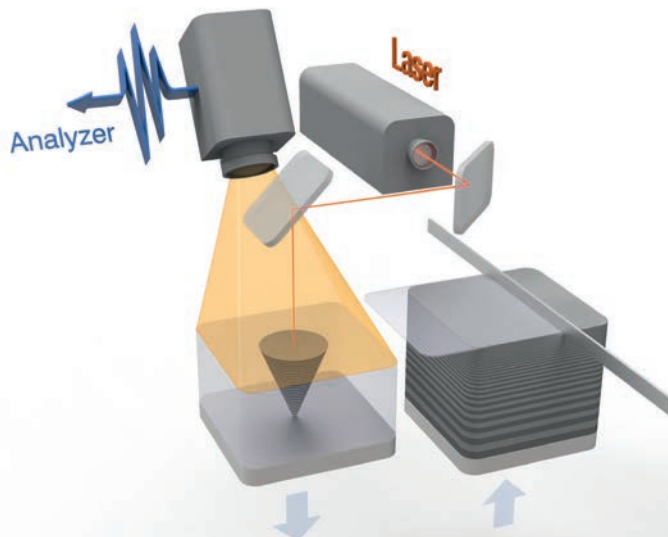
QM Documentation: Software module for analytics and reporting after the build process. Includes access to all data from real-time QM modules.

QM MODULES FOR INLINE PROCESS MONITORING

QM^{RT}
coating

QM Coating:

This module controls the dose factor of the metal powder during the build process automatically. It is integrated into the process flow and analyzes the application of each layer. Depending on whether sufficient powder was applied, the powder dose factor is increased, reduced or new coating are applied.



Advantages of QM Coating

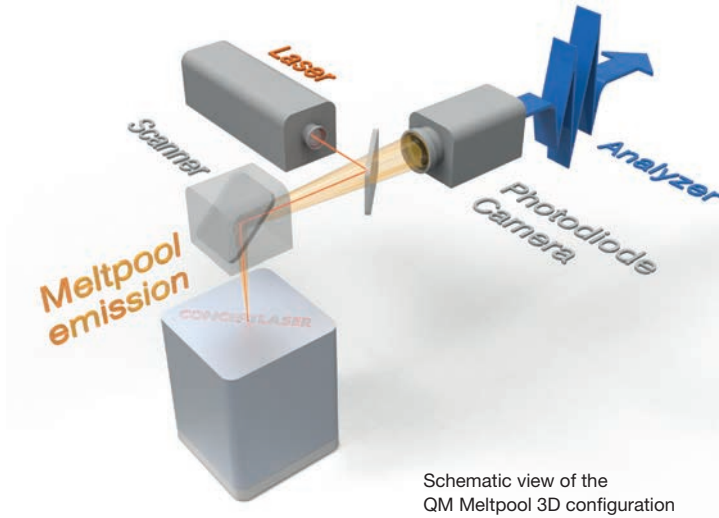
- . Real-time monitoring of the dose factor
- . Ensures optimal coating during the entire build process
- . Reduces setup times and saves powder
- . Saves money
- . Enables high-volume build jobs without powder refills

Schematic view of the QM Coating configuration



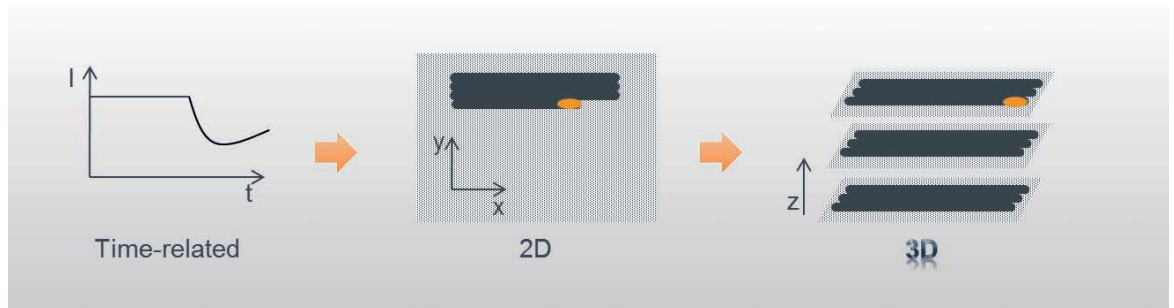
QM Meltpool 3D:

QM Meltpool 3D is a melt pool monitoring module that detects the decisive step in the LaserCUSING® process. This monitoring module uses coaxial sensors to detect melt pool emissions that are created during the LaserCUSING® process in the form of infrared radiation. The melt pool size and intensity are also determined and can be visualized in 3D.

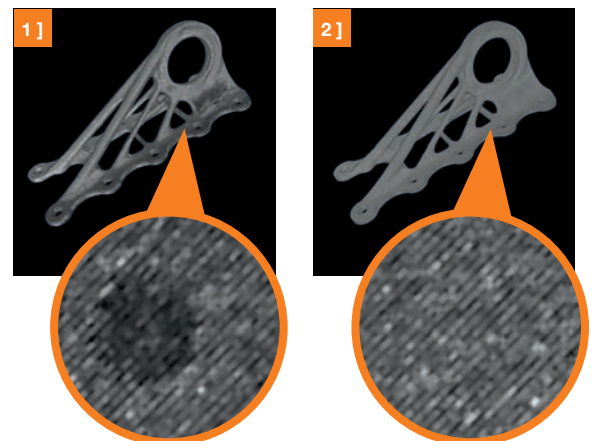


Advantages of QM Meltpool 3D

- . Real-time analysis
- . High resolution (35 µm in 3D view)
- . High sampling rate (>10 kHz)
- . Data is available immediately after the build process
- . Detection of possible process flaws
- . Goal: minimize downstream process monitoring
- . Important for different industries with high quality requirements



Further information can be found on our YouTube channel



Resolution: 35 µm x 35 µm per pixel

Defect of variation of laser power. Example of a bracket used in the Airbus A350 XWB:

The defect is not visible to the naked eye although the parts on the build plate were created using different laser power levels. However, the defect was captured by the QM Meltpool 3D process data.

Figure 1) shows the part with low laser power, Figure 2) shows the part with standard laser power.

.aerospace
.automotive
.medical
.dental
.jewelry
.mold

DIFFERENT INDUSTRIES – DIFFERENT REQUIREMENTS

Thanks to high scanning speeds and laser power levels, LaserCUSING® is an extremely dynamic process that is influenced by a wide range of process factors.

This makes process quality monitoring absolutely essential, especially in quality-driven industries with demanding applications. Examples include the medical technology and aerospace industries, where parts must meet exacting quality standards that are defined by strict safety regulations.



TECHNOLOGY TRENDSETTER

Since the year 2000, Concept Laser GmbH, which is based in Lichtenfels in the German region of Upper Franconia, has been regarded as a pioneer in the field of additive metal laser melting technology and is **one of the leading suppliers in the world**. The company's portfolio includes standard machines and customer-specific machine concepts for the Laser-CUSING® of metals as well as general services and development work. Research and further development are continuously reducing the unit costs of the additive process. **Concept Laser GmbH boasts many years of experience and know-how and is synonymous with process-reliable and cost-effective solutions. As the perfect high-tech partner, satisfied customers provide us with the best references.**

THE ISLAND PRINCIPLE – A UNIQUE STRATEGY

The special thing about the LaserCUSING® machines is the **stochastic exposure strategy** in line with the „island principle“. The segments of each individual layer – so-called „islands“ – are worked through insuccession. The patented process ensures a **significant reduction in stresses within the part**, which allows solid and large-volume parts to be generated.

TRAINING & SERVICE

We provide you with comprehensive practical and theoretical support with **machine training** courses. We attach the highest priority to **integrating the machine** at your company's premises. You can learn how to operate our machines at our technical center in Lichtenfels. You can get further support and assistance from our application specialists who will visit you at your business premises. We will be happy to help you to devise a **maintenance concept** which is tailored to the needs of your company. Do you have any questions about applications? Our team will be happy to offer you practical advice and assistance.

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