



GE Additive

Repeatability at scale

# Concept Laser M2 Series 5

Now available with  
GE's Amp™ Software

M2 Series 5

# Concept Laser M2 Series 5

## Enabling repeatability at scale

### Designed for high-quality builds at scale

The M2 Series 5 can unlock your company's manufacturing potential. The new system provides an elevated level of productivity and repeatability by minimizing the effects of process variations. The result: fast builds that help lower your company's cost.

The powerful dual-laser system—available in both 400 W and 1kW—combined with 3D optics enables 100% coverage per laser, meaning that both optical systems have full build-field overlap. A dedicated thermal control of the optics further leads to improved thermal and optical stability, accuracy, and best-in-class stitching. Due to the small but variable spot size, the system provides the user with more flexibility that enables both fine features and enhanced productivity.

The flow-optimized build chamber of the M2 Series 5 now allows for a more constant gas flow. Additionally, the new optimized gas flow design eliminates recirculation and reduces variation by 25% over the entire build field.

New part vectorization allows for additional flexibility to part parameter design, enabling new geometries and ensuring part quality, especially with increased part complexity. The pre-calculation helps to save time and boost productivity. In combination with multiple internal sensors, this ensures a more tightly controlled build environment, resulting in significantly better part quality and consistency. These are the key drivers for success in safety-relevant industries like aerospace and medical and other industries looking at scaled production.

### Machine highlights

- Bigger build volume: 245 x 245 x 350 mm
- 400W or 1kW dual-laser system with full overlap
- Improved gas flow system
- 3D optics with 70 – 500 µm spot size
- Inert sieving and powder exchange
- Maximized machine uptime
- Pre-calculation software, saving time when building complex parts
- Designed for usability and maintainability
- QuickStart functionality

### Offering maximum usability, maintainability and safety

The M2 Series 5 features a unique safety system that promotes safety and efficient handling of reactive materials. This is made possible by the physical separation of the process chamber and a material handling side, connected with a movable build module. Additionally, all powder handling processes are performed under inert gas to prevent oxidation and safety hazards. The integrated glovebox system enables safe, non-contact handling of reactive or harmful materials and enables the dust-protected removal of parts. Together with the

newly optimized water-floodable filter modules, the M2 Series 5 offers maximum protection for the machine operators, while extending the filter life and reducing operating costs.

The system is designed to maximize usability and maintainability. All functionalities of the machine have been optimized for easy access and handling. The new software of the M2 Series 5 helps you save time before, during and after the build process.

# Software suites

## PROCESS MANAGEMENT

### Amp™, GE's software platform

Results matter, so the process matters. Developed exclusively for GE machines, Amp™ integrates the tools engineers need to manage, process and manufacture metal additive parts on one integrated platform—built on GE's expertise and experience. From development to print production, Amp offers a flexible, streamlined workflow so manufacturers can improve part production and significantly reduce trial and error needed to develop print-ready parts. [LEARN MORE](#)

#### Print Model

Print model is designed to enhance the additive manufacturing effectiveness of the M2 Series 5 through a secure, intuitive tool that reduces design iterations and speeds up the time to print a good part, according to the design intent.

#### Automate manual tasks

- Based on real-world best practices
- Simplified process to print parts

#### Track pedigree

- Relationships captured between various inputs
- Audit history of printed parts

#### Leverage CAD model

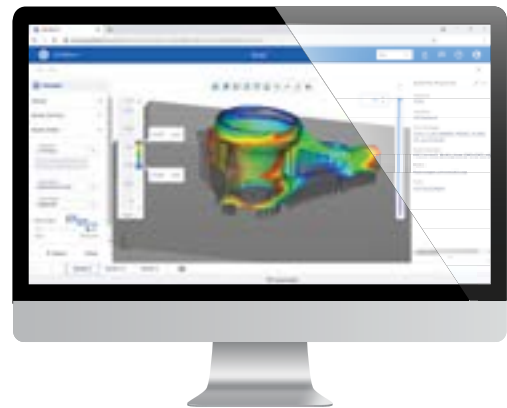
- Clean data, no need for STL, no healing

#### Experience a single data-centric process

- No saving out to other software tools
- No learning separate interfaces
- Everything in one place

#### Conduct quality checks

- Identify build risks before sending to print



#### Simulation & Compensation

Simulation & Compensation adds predictive capability to the M2 Series 5 builds by anticipating distortions, residual stresses, recoater interference and defects before manufacturing and applying corrections before launching production, reducing build trials.

#### Add Simulation to your additive process

- Easy-to-use tools for design/manufacturing engineers
- Reduced barrier for non-simulation experts

#### A unified user experience

- Seamless flow from build preparation to sim/comp
- All interactions saved for future needs

#### Save time

- Digital iterations until your design intent is achieved
- Reduce manual processes and wasted resources from trial builds

#### Save money

- Reduce costs associated with material and manpower
- More opportunities to use additive on new parts
- Get more parts through development and into production
- Maximize number of possible applications to print



**DECREASE** time and cost of part development



**IMPROVE** part yield



**MAXIMIZE** number of possible applications to print



**ENHANCE** accessibility and collaboration

## MACHINE MANAGEMENT

Software features like pre-calculation enable an off-machine scan path generation. This eliminates calculation delays between layers for complex parts. A new dose profile also helps to further reduce powder consumption for builds with changing geometries.

The additional optical sensors help to monitor the optics temperature to ensure a more stable process and better part quality.

Furthermore, part segmentation and vector tool path support optimized exposure strategies, while the thin wall segmentation enables ultra-fine feature resolution within the part.

### CL WRX Parameter 2.x

CL WRX Parameter 2.x is a software application which allows users to create and optimize parameters for their materials. The software enables users to access the full parameter definition (open parameter). The starting point is typically a GE Additive parameter that can be tailored to meet the needs of the application requirements. Additionally, this software can be used to create parameter sets for user developed materials.



### CL WRX Control 2.x

The CL WRX Control 2.x software is supplied with all our DMLM machines. It is installed on the machine industrial PC to provide control of the machine axes and tool path. WRX Control allows for a complete calculation of the exposure vectors.

## MONITORING AND ANALYTICS

### Build Explorer

Build Explorer is a process-monitoring software from GE Additive that enables a user to understand the layer-by-layer performance of a build job as the build is happening. It is a machine health and process-monitoring software solution that provides a common user experience. It offers operators and process engineers layer-wise machine sensor and quality information for use real-time during the printing process and for post-build analysis.

Build Explorer gives users the ability to detect real-time machine health trends that can affect build part quality before the quality of a part is affected. Users will then have information that will allow them to take immediate action to minimize cost of poor quality

### QM Meltpool 3D

QM Meltpool 3D<sup>®</sup> is an optional quality management system which is integrated into the optical path of the M2 system. It provides tracking of the ongoing build process via two optical sensors per scanner unit. These sensors are directed at the local emissions of the melt pool to provide high frequency raw intensity and area meltpool data. The system allows analysis of relevant data of the melting path, including full documentation and high resolution mapping (35 µm/Pixel) the melting pool data. GE Additive is taking active steps to develop future real time fault detection and control, reducing downstream testing procedures and qualification of part parameters.

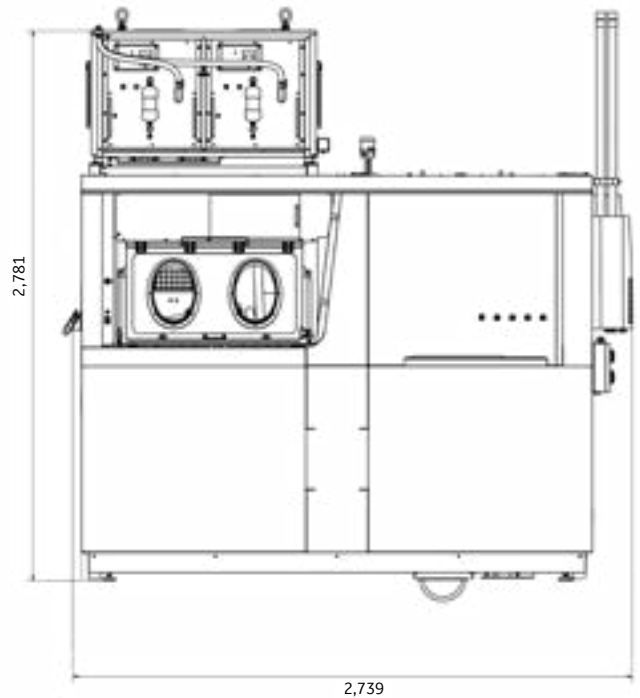
# Concept Laser M2 Series 5

## Technical Data

<b>Build envelope</b>	245 x 245 x max 405* mm (x, y, z)
<b>Layer thickness</b>	25 - 120 µm
<b>Production speed</b>	Productivity rates and material portfolio available on <a href="#">website</a>
<b>Laser system options</b>	Fibre Laser 2x1kW (cw), Fibre Laser 2 x 400 W (cw), optional 1 x 400 W (cw)
<b>Scanning speed</b>	Max 4.5 m/s with variable focus adjustment
<b>Focus diameter</b>	70-500 µm
<b>Spot Size range</b>	61 - 72 µm
<b>Heating System</b>	Available
<b>Reference clamping system (optional)</b>	EROWA, others on request
<b>Connected loads</b>	Approx. power consumption 28A Power supply 3/N/PE AC 400V, 32A connector, compressed air 6-10bar 2 gas connections provided N2 generator external (optional)
<b>Inert gas supply</b>	5l / min < 1 m³/h
<b>Inert gas consumption</b>	
<b>Filtering system</b>	Integrated, with a 20 m2 filter surface
<b>Dimensions</b>	2,739 x 2,050 x 2,781 mm (W x D x H)
<b>Weight</b>	Approx. 2,500 kg
<b>Operating conditions</b>	18 - 25°C

## Materials available\*\*

- Stainless Steel 316L
- Stainless Steel 17-4PH
- Maraging Steel M300
- Tool Steel H13
- Aluminium AlSi10Mg
- Aluminium A205
- Aluminium AlSi7Mg
- Nickel 718
- Nickel 625
- Nickel X
- Titanium Ti6Al4V ELI Grade 23
- Titanium cp-Ti
- Titanium Ti6242
- Cobalt CoCrMo
- Cobalt CoCrW



\*Build height dependent on build plate configuration and platform thickness (actual range is 405-313 mm)

\*\*Most parameters, data sheets and productivity rates can be found on the [M2 Series 5 website](#)

[ge.com/additive](http://ge.com/additive)



# CAPABILITY PACKAGES

The Concept Laser M2 Series 5 was designed to meet the most critical requirements by the highly regulated aerospace industry. But we believe that everyone, regardless of industry, region or where you are on your additive journey, should have access to these capabilities. As such, we now offer four capability packages to meet the needs of more customers and help more users adopt additive technology.

**Standard** – Ideal for entry-level users, standalone prototyping or low volume production

**Production** – Ideal for full production applications (available in 400W or 1kW)

**Regulated** – Ideal for high quality output, regulated industries, and stringent qualification requirements

✓ Included in machine price    + Can be purchased separately

Capability Packages	<b>S</b> STANDARD	<b>P</b> PRODUCTION		<b>R</b> REGULATED
Laser Power	2 x 400W	2 x 400W	2 x 1kW	2 x 400W
3D Optics	✓	✓	✓	✓
Build Plate Heating	✓	✓	✓	✓
QM Liveview	✓	✓	✓	✓
QM Coating	+	✓	✓	✓
Build Explorer	+	✓	✓	✓
Vacuum Port	+	✓	✓	✓
Offline Recoater Setup	+	✓	✓	✓
QM Meltpool		✓	✓	✓
External Supply Connector		+	+	✓
Advanced Calibration FFA				✓
Configuration & Quality Protocol				✓
Customer Witness (On Site / Remote)	+	+	+	✓
IQ – OQ – PQ   Protocol	+	+	+	✓
Installation Qualification (IQ)	+	+	+	✓

## Coming Soon:

Powder Handling Productivity				
Filter Life				
Thermal Management Package				
Optical Capability				

Amp™ Software Subscription				
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