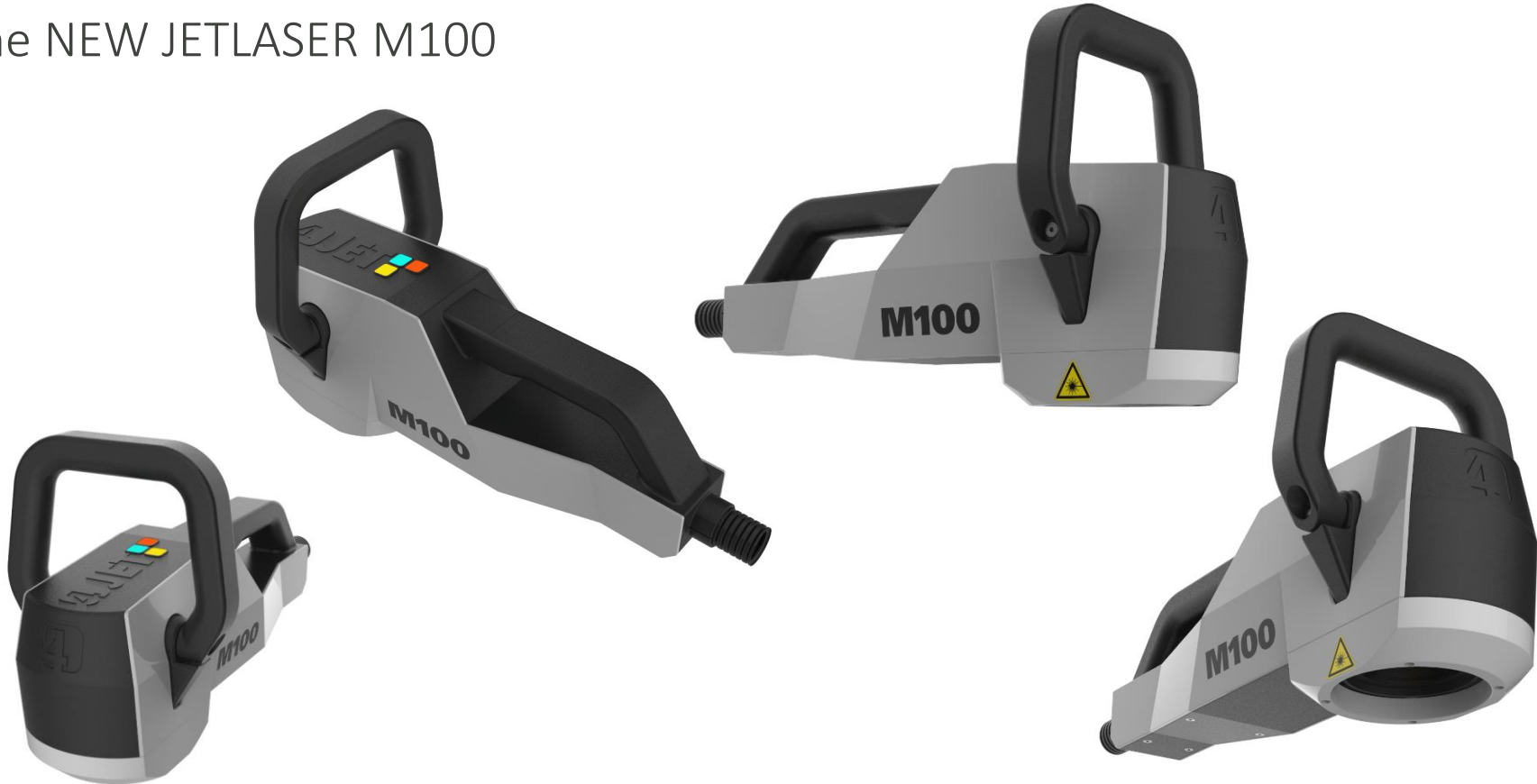


## The NEW JETLASER M100



# The NEW JETLASER M100



## M100 Technical Highlights

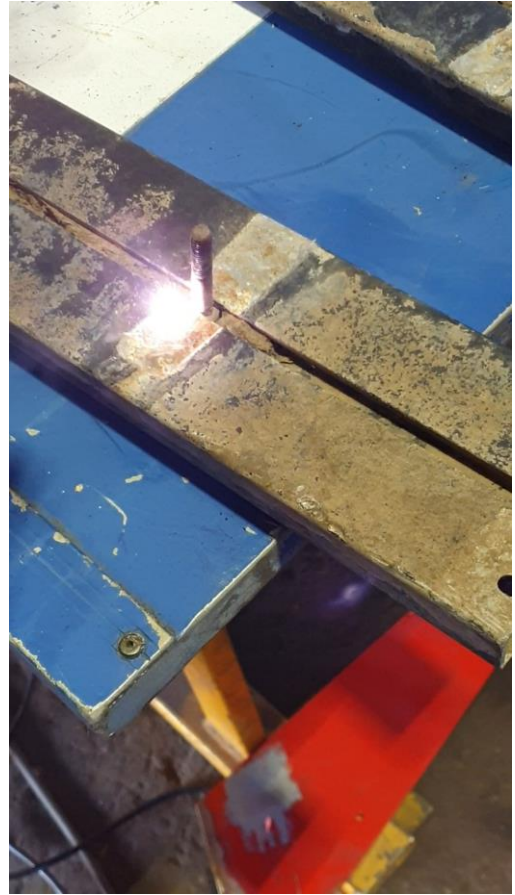
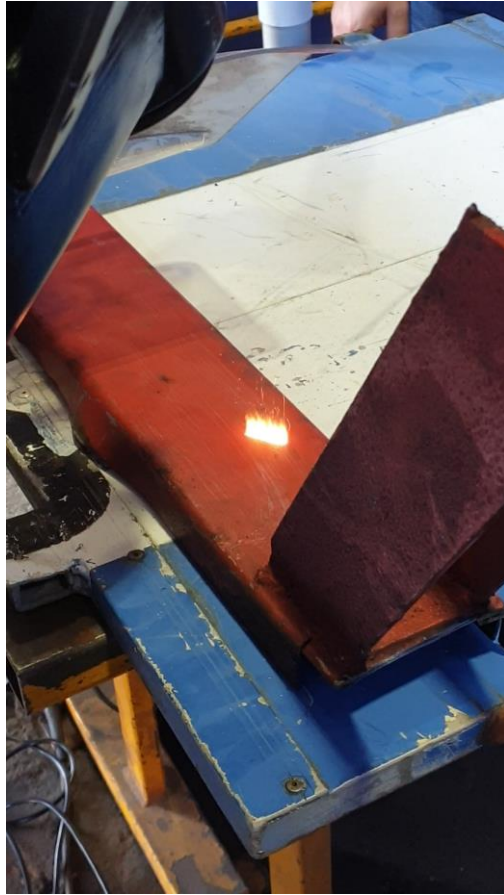
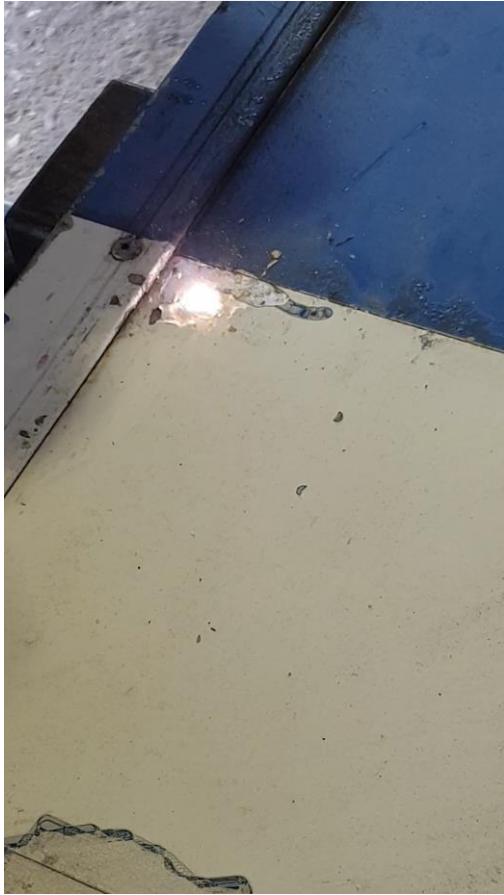
### Specs

- 100 W laser power
- Weight handpiece: < 5 kg
- Compact supply wagon including safe storage for handpiece
- 5 m fiber cable
- Air cooled, no water-chiller needed
- Power supply 110/230 V, 16 A

### Key features

- Light weight (< 80 kg)
- 2D laser scanner
- Rotatable handle
- Ergonomic two hand operation

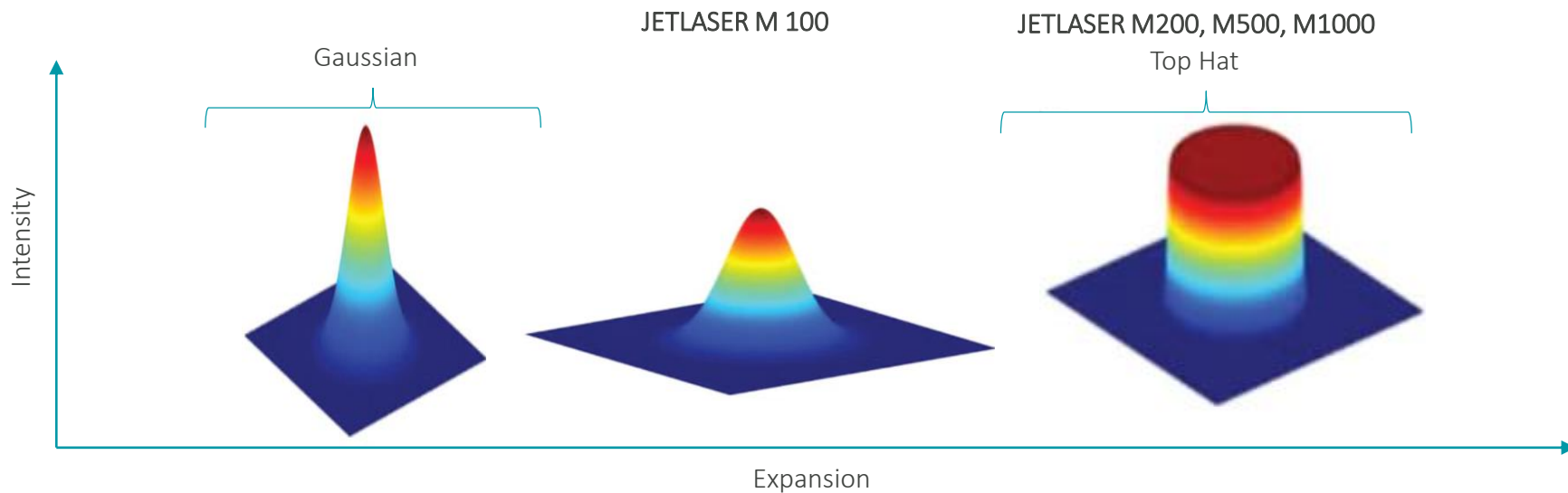








## Different Beam Shapes.



Gaussian Beam:

- perfect beam  $M^2=1$
- typically  $M^2<2$

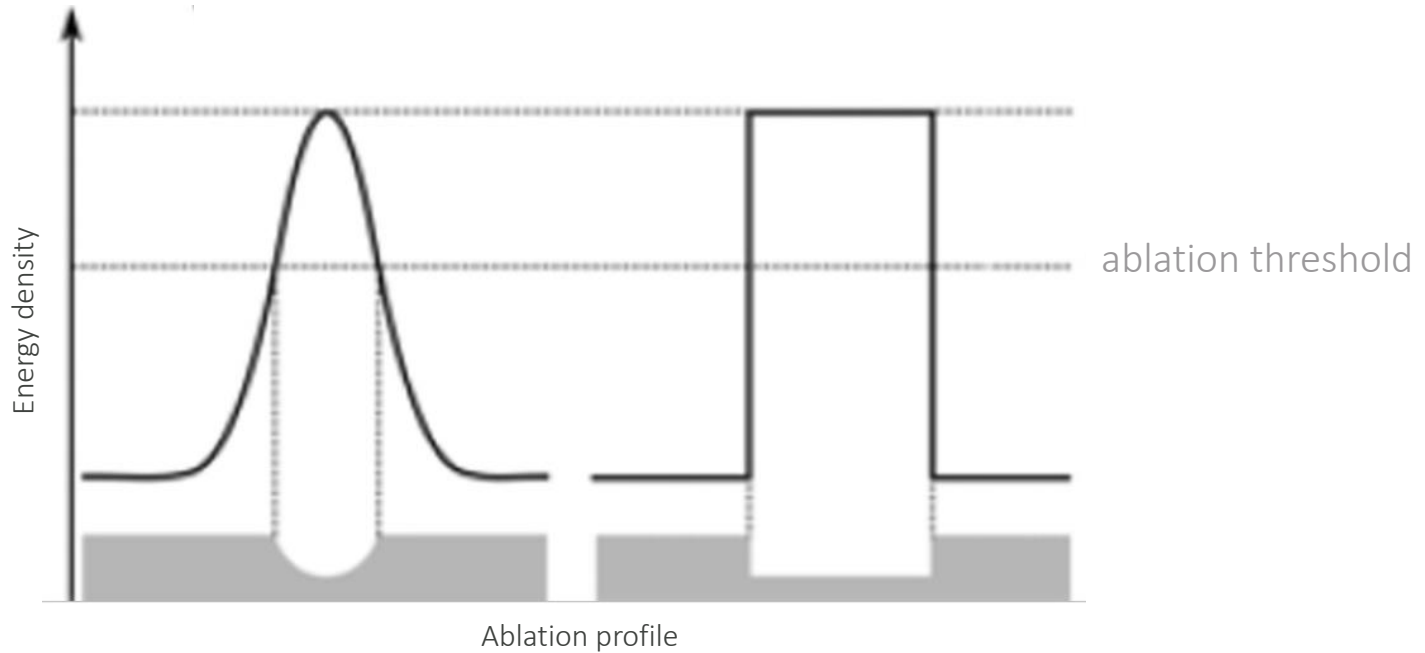
M100:

- $M^2=6-8$

Top Hat:

- $M^2 \gg 2$
- M200  $M^2=20$
- M500  $M^2=70$

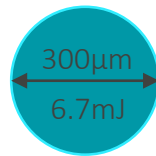
Fluence profile and corresponding ablation topography.



## What is the Energy Density?

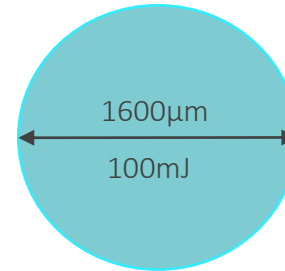
- **Energy Density** – also called fluence – is the pulse energy per beam spot which is generated in the beam spot of the laser light hitting the layer.

JETLASER M 100  
254 mm lens



$$\frac{\text{Pulse energy}}{\text{Beam spot}} \quad \equiv \quad 9.7 \text{ J/cm}^2$$

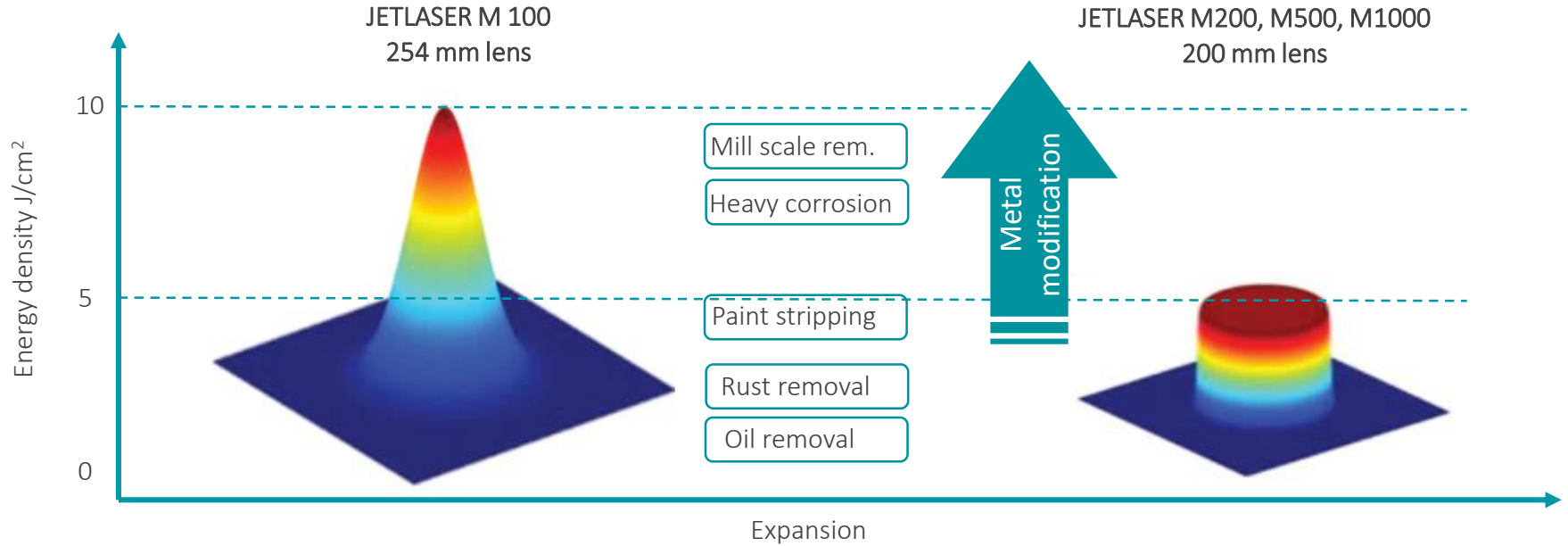
JETLASER M500  
200 mm lens



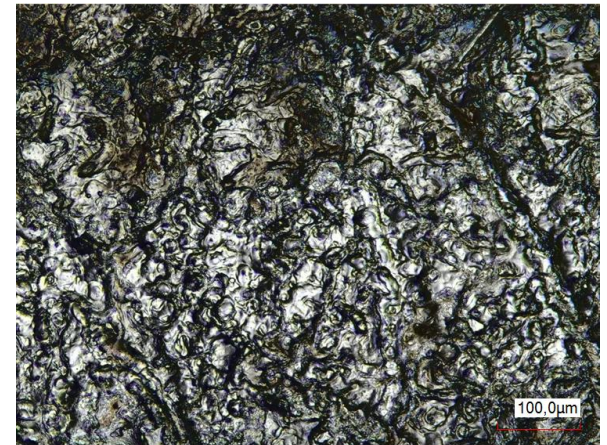
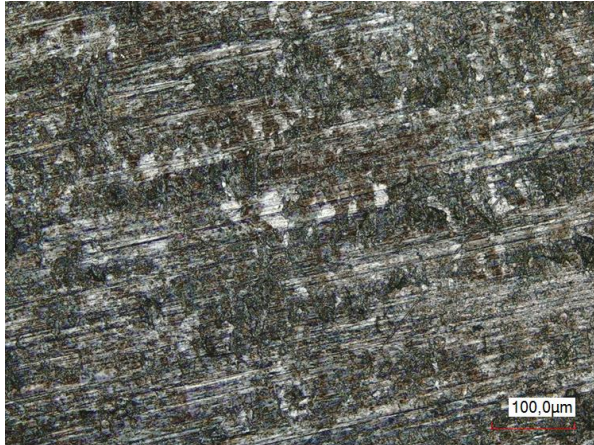
$$\frac{\text{Pulse energy}}{\text{Beam spot}} \quad \equiv \quad 5.1 \text{ J/cm}^2$$



# Maximal Achievable Energy Density.



## Influence of Energy Density to Al Surface.



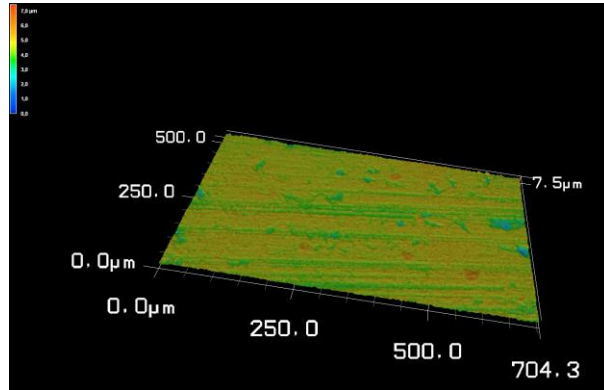
Initial

4.5 J/cm<sup>2</sup>

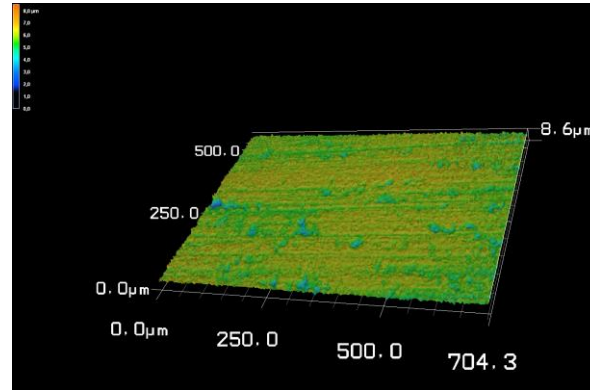
9.7 J/cm<sup>2</sup>

Energy density J/cm<sup>2</sup>

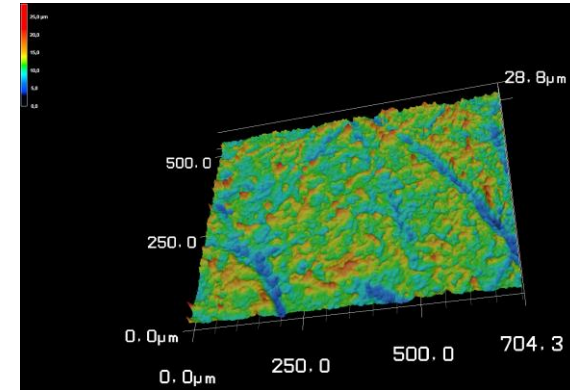
# Influence of Energy Density to Al Surface.



Initial



4.5 J/cm<sup>2</sup>



9.7 J/cm<sup>2</sup>

Energy density J/cm<sup>2</sup>

# M100 Technical Specs

	Description	Unit	Value
Power supply	Voltage supply	V	110 - 230
	Frequency	Hz	50-60
	Conductors		L/N/PE
	Max. power	kW	1.5

	Laser Model	Unit	M100
Laser	Laser class		Class 4
	Laser Power	W	100
	Pulse duration	ns	90 – 130 @ 15kHz
	Pulse frequency	kHz	15 - 200
	Nominal frequency	kHz	15
	Pulse energy	mJ	6.7
	Wavelength	nm	1064 ±5
	Length laser fiber	m	5



## M100 Technical Specs - Optics

### Lens

- The System comes with one f-theta lens
- Lens is covered by protective window which can be exchanged in case of damage
- Standard focal length 254 mm
- Working distance  $287\pm 10$  mm

### Changing the lens

- The lens can be changed to an other focal distance to enlarge the range of application



JETLASER M100 6.7 mJ			
Focal Length	Working Distance [mm]	Energy Density	Scanfield
160 mm	176±4	24.7 J/cm <sup>2</sup>	100 x 100 mm <sup>2</sup>
210 mm	232±7	14.3 J/cm <sup>2</sup>	100 x 100 mm <sup>2</sup>
254 mm	287±10	9.8 J/cm <sup>2</sup>	100 x 100 mm <sup>2</sup>
290 mm	324±14	7.5 J/cm <sup>2</sup>	100 x 100 mm <sup>2</sup>
380 mm	414±24	4.3 J/cm <sup>2</sup>	100 x 100 mm <sup>2</sup>
420 mm	467±29	3.6 J/cm <sup>2</sup>	100 x 100 mm <sup>2</sup>

## M100 Technical Specs – Safety first!



### Safety features of the System

- Safety PLC controlled
- Interfaces with Performance level D
- Laser Ready – Key switch
- Emergency STOP button
- Password secured user levels

### Interface for Customer including:

- Safe input for external safety circuit
- Safe output of internal emergency STOP
- Safe input for (door-) interlock
- Output for laser warning light

... and additional material, e.g. laser safety curtains





## M100 Optional Equipment



Laser safety goggles according to DIN EN 207



Laser safety curtain according to DIN EN 12254



Laser safety kit including:

- External laser warning lamp
- External emergency stop
- Door intelock system



Mobile vakuüm system for laser dust

# M100 Software Optimized for 2D Scanner

The screenshot displays the 4JET M100 software interface. At the top, it shows the date (25.06.2021), the title 'Main', a UK flag, and a 'Logout 4Jet (10)' button. A red status bar indicates 'Manual mode' and 'ID[9] No[1] - ErrorCode[1] RTC-Card - Not connected'. The main area features a large blue circle representing the scanning area. On the left, there are control panels for 'Recipe' (Article: 12), 'Selected lens' (Lens: 254), 'Contour' (Stadium), and 'Fill function' (Fill: off). Below these are sliders for 'Contour dimensions' (Height and Width, both at 40,000 mm). On the right, 'Laser parameters' are shown, including Pulse energy (3.330 mJ), Pulse overlap (33.330%), Power (50.000 W), Mark speed (3.003 m/s), and Pulse frequency (15.015 kHz). A 'Reset' button is located next to these parameters. At the bottom, a 'System status' panel shows indicators for 'Marking head', 'PLC connection', 'Release switch', 'Emergency stop button', 'Laser active', 'Laser ready', and 'Laser Overtemp'. The bottom navigation bar includes icons for 'Main', 'System', 'Article', 'DataLog', and 'Setup', along with 'Faults' and 'Exit' buttons.

Recipe

Selected lens

Contour

Fill function

Contour dimensions

System status

Laser parameters

# M100 Software Optimized for 2D Scanner

The screenshot displays the 4JET M100 software interface, which is optimized for a 2D scanner. The interface is organized into several sections:

- Top Bar:** Shows the date (25.06.2021), the mode (Manual mode), and the language (UK flag). A red status bar indicates "ID[88] No[1], EmrCode[1] RTC-Card, Not connected". A "Logout 4Jet (10)" button is also present.
- Left Panel:** Contains configuration options for the article (Article: 12, Lens: 254), contour (Contour: Rectangle), and dimensions (Height: 40.000 mm, Width: 40.000 mm). There are "Save" and "Save as" buttons.
- Center Workspace:** A large blue rectangle is displayed on a dark grey background, representing the 2D scanner's field of view or the current marking area.
- Right Panel:** Features sliders and controls for marking parameters: Pulse energy (3.330 mJ), Pulse overlap (33.330 %), Power (50.000 W), Mark speed (3.003 m/s), and Pulse frequency (15.015 kHz). Each parameter has a "Lock" toggle switch.
- Bottom Status Bar:** Displays machine health indicators: Marking head (red), PLC connection (red), Release switch (white), Emergency stop button (green), Laser active (white), Laser ready (white), and Laser Overtemp (white).
- Navigation Menu:** Located at the bottom, it includes icons for Main, System, Article, DataLog, Setup, Faults, and Exit.

# M100 Software Optimized for 2D Scanner

The screenshot displays the M100 software interface with the following components:

- Header:**
  - Date: 25.06.2021
  - Mode: Manual mode
  - Status: ID[98] No[1] - ErrCode[1] RTC-Card, Not connected
  - Language: UK Flag
  - Logout: 4Jet (10)
  - Color calibration bar
- Left Panel (Parameters):**
  - Article: 12 (dropdown)
  - Save / Save as buttons
  - Lens: 254 (dropdown)
  - Contour: Stadium (dropdown)
  - Fill:
  - Height: 40.000 mm (slider)
  - Width: 100.000 mm (slider)
- Center:**
  - Large blue oval representing the marking area.
- Right Panel (Adjustments):**
  - Pulse energy: 3.330 mJ (slider) with Lock
  - Pulse overlap: 33.330 % (slider) with Lock
  - Power: 50.000 W (slider) with Lock
  - Mark speed: 3.003 m/s (input field)
  - Pulse frequency: 15.015 kHz (input field)
  - Reset button with circular arrow icon
- Status Indicators (Bottom Right):**
  - Marking head:
  - Release switch:
  - Emergency stop button:
  - Laser active:
  - Laser ready:
  - Laser Overtemp:
- Footer (Navigation):**
  - Main (Home icon)
  - System (Gears icon)
  - Article (List icon)
  - DataLog (Document icon)
  - Setup (Tool icon)
  - Faults button
  - Exit button

# M100 Software Optimized for 2D Scanner

The screenshot displays the M100 software interface with the following components:

- Header:**
  - Date: 25.06.2021
  - Mode: Manual mode
  - Status: ID[98] No[1] - ErrorCode[1] RTC-Card: Not connected
  - Language: UK Flag
  - Logout: 4Jet (10)
- Left Panel (Parameters):**
  - Article: 12
  - Lens: 254
  - Contour: Figure 8
  - Fill:
  - Height: 40.000 mm
  - Width: 100.000 mm
- Center:**
  - Diagram of a blue 8-shaped contour.
- Right Panel (Laser Settings):**
  - Pulse energy: 3.330 mJ
  - Pulse overlap: 33.330 %
  - Power: 50.000 W
  - Mark speed: 3.003 m/s
  - Pulse frequency: 15.015 kHz
  - Lock status: All three are locked (indicated by blue circles).
- Bottom Panel (Status & Navigation):**
  - Marking head:
  - PLC connection:
  - Release switch:
  - Emergency stop button:
  - Laser active:
  - Laser ready:
  - Laser Overtemp:
  - Navigation: Main, System, Article, DataLog, Setup
  - Buttons: Faults, Exit

# M100 Software Optimized for 2D Scanner

The screenshot displays the 4JET M100 software interface, which is optimized for a 2D scanner. The interface is organized into several sections:

- Top Bar:** Shows the date (25.06.2021), the current mode (Manual mode), and a red error message: "ID[98] No[1], ErrorCode[1] RTC-Card, Not connected". It also includes a UK flag and a "Logout 4Jet (10)" button.
- Left Panel:** Contains configuration options for "Article" (set to 12), "Lens" (set to 254), and "Contour" (set to Circle). A "Fill" function is highlighted with a callout box and a blue line pointing to a "Fill" checkbox.
- Center:** A large green circular area representing the scanner's field of view.
- Right Panel:** Features sliders and controls for "Pulse energy" (3.330 mJ), "Pulse overlap" (33.330%), "Power" (50.000 W), "Mark speed" (3.003 m/s), and "Pulse frequency" (15.015 kHz). Each parameter has a "Lock" toggle.
- Bottom Panel:** Displays status indicators for "Marking head", "PLC connection", "Release switch", "Emergency stop button", "Laser active", "Laser ready", and "Laser Overtemp".
- Navigation Bar:** Located at the bottom, it includes icons for "Main", "System", "Article", "DataLog", and "Setup", along with "Faults" and "Exit" buttons.

Fill function



# M100 Software Optimized for 2D Scanner

The screenshot displays the 4JET M100 software interface. At the top, the status bar shows the date 25.06.2021, the mode Manual mode, and a red error message: ID[98] No[1]. ErrorCode[1] RTC Card Not connected. The interface is in English, as indicated by the UK flag.

The main configuration area includes:

- Article:** 12 (with Save and Save as buttons)
- Lens:** 254
- Contour:** Rectangle
- Fill function:** A checkbox labeled 'Fill' is checked and highlighted by a callout box.
- Dimensions:** Height and Width are both set to 100.000 mm.
- Parameters:**
  - Pulse energy: 3.330 mJ (Lock: ON)
  - Pulse overlap: 33.330% (Lock: ON)
  - Power: 50.000 W (Lock: ON)
  - Mark speed: 3.003 m/s
  - Pulse frequency: 15.015 kHz

The bottom status bar shows:

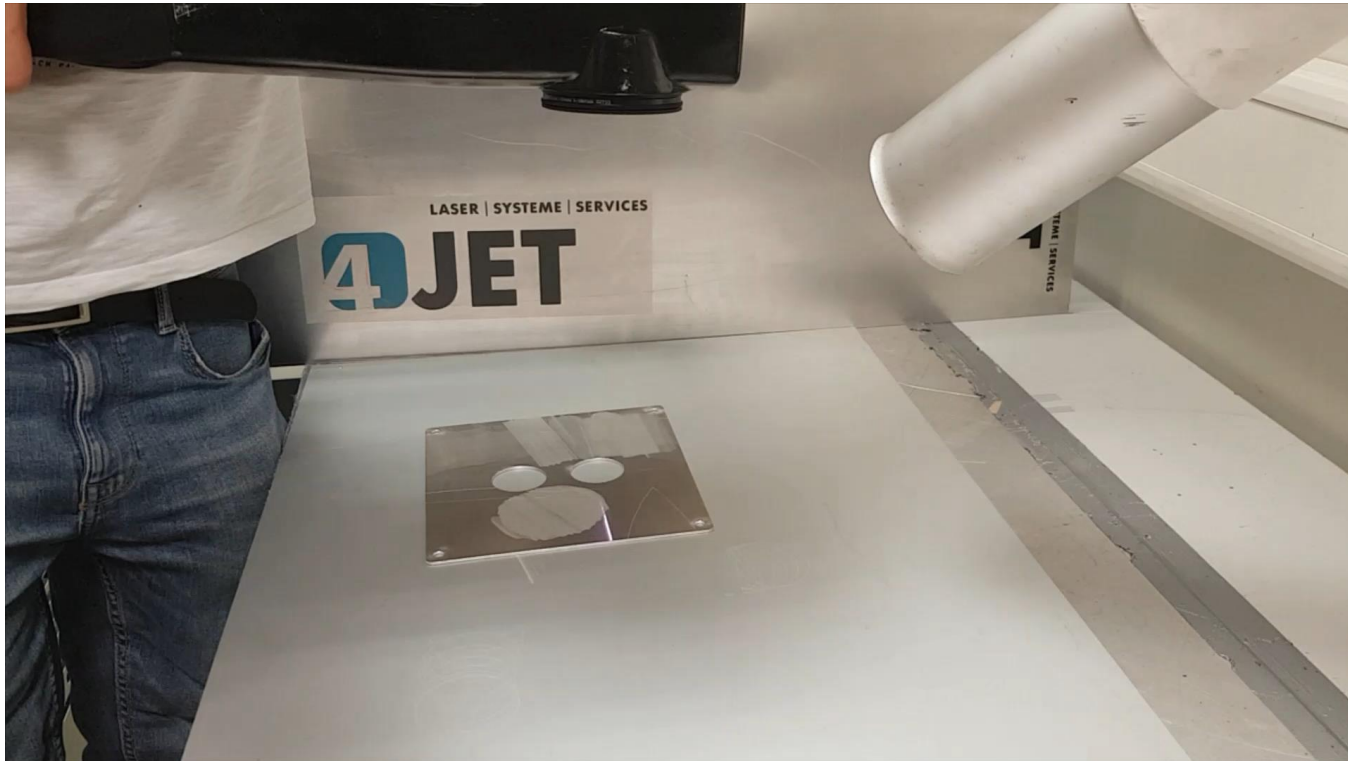
- Marking head: ON (Red indicator)
- PLC connection: ON (Red indicator)
- Release switch: OFF (White indicator)
- Emergency stop button: OFF (Green indicator)
- Laser active: OFF (White indicator)
- Laser ready: OFF (White indicator)
- Laser Overtemp: OFF (White indicator)

The navigation bar at the bottom contains icons for Main, System, Article, DataLog, Setup, Faults, and Exit.

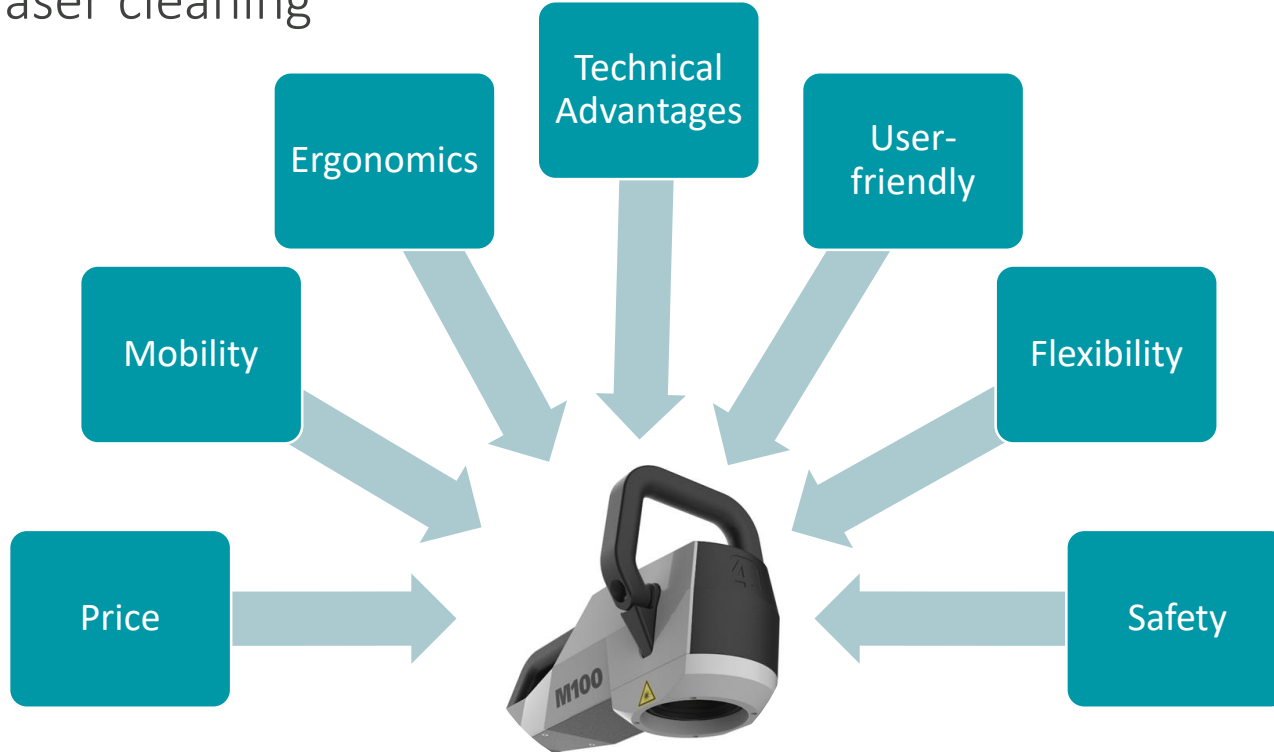
## M100 Software Optimized for 2D Scanner



## M100 Software Optimized for 2D Scanner



M100 JETLASER is the most competitive premium product for low-power laser cleaning



## JETLASER M100 allows for easy transportation and opens up new possibilities for cleaning applications

- Transportation in a small box-wagon possible
  - Including laser safety equipment
  
- Small footprint allows:
  - Working on heights (scaffolds, lifting platforms)
  - Working in confined spaces



Source: <https://www.autobild.de/artikel/kangoo-berlingo-tourneo-combo-test-5163162.html>



Source: <https://www.britannica.com/technology/scaffold-construction>

JETLASER M100 is designed for ergonomics and comfort



- Flexible handle allows easy operation from multiple positions
- Light weight makes operation easy
- Support system (Balancer) available for weightless movement in long cleaning operations



## JETLASER M100 offers different Technical Advantages

- 2D Scanner offers additional flexibility
- No three phase current -> can be connected to any socket, even in a private housing environment
- No pressurized air -> no need for a compressor which leads to less noise and lower energy consumptions
- No water chiller needed -> less maintenance, no changing of filters / DI water



## JETLASER M100 is designed for a user-friendly working experience

- **Simple operation:** safe and easy to operate due to a trigger system
- Only **short training period** required: easy and intuitive operation, operator soon gets a „feeling for the system“
- **Intuitive Software:** Software optimized for 2D Scanner operation, easy to operate.



## JETLASER M100 offers the necessary Flexibility for a Variety of Applications

- **Gaussian beam** opens up new fields of applications: surface roughening, pre-treatment for bonding / welding
- But the M100 can also be used in „**traditional JETLASER Applications**“ like rust or paint removal (at a slower cleaning speed)
- M100 has a **big impact** despite of the lower power



JETLASER M100 compels with the highest safety standards and improves the working environment

- No dirt emissions due to the lack of cleaning media and a suitable aspiration system
- Reduced noise emissions for more operator safety
- Less CO2 emissions due to reduced energy consumption



## Service Concept for the M100 – what happens when the laser stops working?

1. Call 4JET Service Hotline (24/7):
  - Support from service colleagues
  - Get help via remote servicing
2. Remote Service unsuccessful → Send JETLASER back to 4JET HQ **by using 4JET packaging**
  - During warranty: repair for free, customer has cover shipment costs
  - Service Contract for replacement lasers available

