

Laser Parameters

Modified on: Wed, 8 Apr, 2020 at 5:54 PM

In this article we explain step by step the **laser parameters for cutting and engraving** with Mr Beam software. In our material library you will find various materials with according laser parameters which have been thoroughly tested by our team. Despite this, it is likely that your materials are going to differ from ours, either in thickness, colour or composition. So at some point you will probably need to adjust the laser parameters to your specific material and test them. This is why we are going to have a closer look at each parameter and explain how to get the best lasercutting result through specific adjustments.

The quality of engraving and lasercutting depends on the ability of a material to absorb the energy of laser light, which leads to a precise scorch or vaporization of the material. This ability to absorb light energy can be influenced by adjusting the combination of **three parameters: intensity, speed** and amount of **passes**. If you are aiming for a deeper lasercutting or a greater engraving effect, you can either increase intensity, decrease speed or turn up the number of passes.

To get to the laser parameters open our **Mr Beam software app** in your browser and place a laser file in the working area on top of your material. Click on the **"Laser"** button to get to material library and choose your material. After this you can scroll down to check our recommended laser parameters. You will find more in-depth information about each of the parameters below:

1. Intensity

2. Speed

3. Passes

4. Compressor

5. Line colour spacing

6. Pierce time

7. Line spacing

8. Engraving time optimization mode

9. Dithering



Material

Lasereinstellungen

Überspringen

Ziehe Schneide- oder Graviersymbole auf diese Zeile, um sie zu überspringen.



Gravieren

Intensitätsbereich 0 100 %
Geschwindigkeitsbereich 1500 1150 mm/min



Schneiden 1

Intensität 100 %
Geschwindigkeit 600 mm/min
Durchläufe 3 x

+ Ziehe ein Schneidesymbol hierher um einen weiteren Block anzulegen +

☐ erweiterte Einstellungen anzeigen

Abbruch

Start

1. Intensity:



Gravieren

Intensitätsbereich 0 100 %
Geschwindigkeitsbereich 1500 1150 mm/min

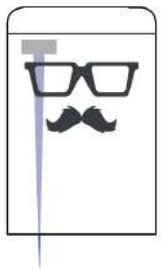


Schneiden 1

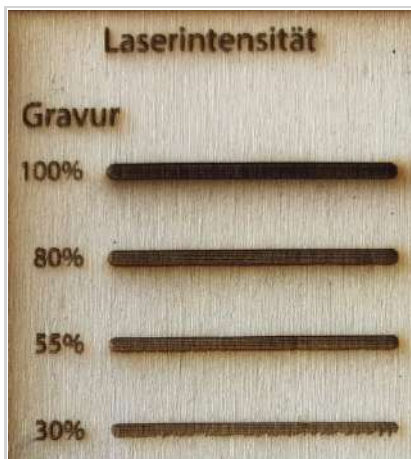
Intensität 100 %
Geschwindigkeit 600 mm/min
Durchläufe 3 x



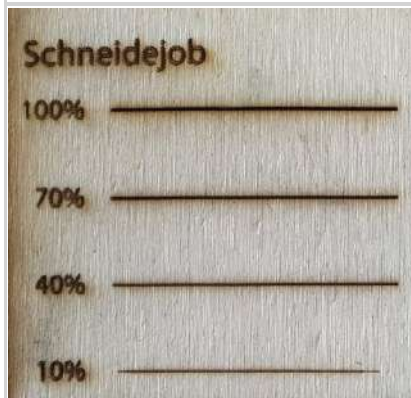
0% 100%



Intensity defines the power of the laser source, similar to a dimmer for room lightning. The values range between 0% (no laser light) and 100% (max. laser light). To cut or engrave **hard and thick materials** please set laser intensity to 100%. If you are working with **sensitive or thin materials** (e.g. thin paper), try setting the intensity to 10%. If you are engraving a **raster graphic** (<https://support.mr-beam.org/en/support/solutions/articles/43000545534-vector-vs-raster-how-to-choose-the-right-file-format->), you can adjust the intensity for various grey scale values.

**ENGRAVING**

Intensity range: 100% / 80% / 55% / 30%. Please note the insufficient quality of border engraving at 30%.

**LASERCUTTING**

Intensity: 100% / 70% / 40% / 10%. A burned effect around the line at 100% is common.

(Plywood sample (poplar wood), 3mm thick)

2. Speed:



Gravieren

Intensitätsbereich
0
100
%

Geschwindigkeitsbereich
1500
1150
mm/min

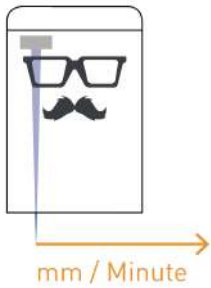


Schneiden 1

Intensität
100
%

Geschwindigkeit
600
mm/min

Durchläufe
3
x



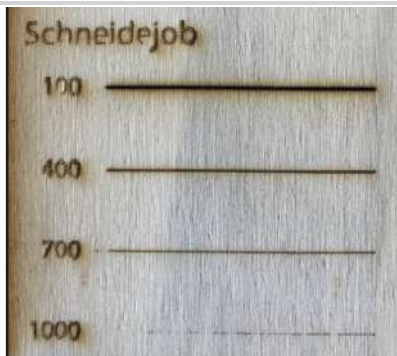
The laser speed defines the amount of millimeters per minute, which the laser head is covering while moving across the working area. **(min. 100 - max. 2000)**. A lower laser speed increases the time, during which the laser beam is staying at one point and has therefore more time to scorch the material. This also means a longer laserjob duration overall. **Attention:** a low laser speed (under 100) can be dangerous when working with easily inflammable materials like thin paper!

To cut or engrave **thick or hard materials**, we recommend choosing a **lower speed**. To cut **sensitive or thin materials** like thin paper, we recommend to start with **high speed** and if necessary decrease it in the next test run.



ENGRAVING

Speed range: 600 / 1000 / 1500 / 2000mm/min.



CUTTING

Speed: 100 / 400 / 700 / 1000mm/min. A higher speed causes inaccurate cutting and engraving surfaces.

(Plywood sample (poplar wood), 3mm thick)

3. Passes:



Gravieren

Intensitätsbereich 100 %

Geschwindigkeitsbereich 1150 mm/min

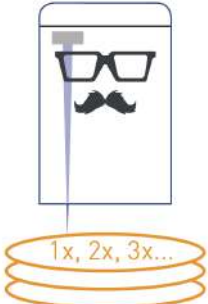


Schneiden 1

Intensität %

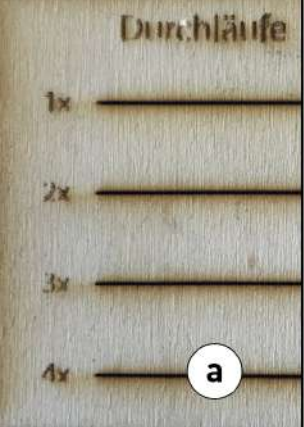

Geschwindigkeit mm/min

Durchläufe x



Passes define how many times the laser head is repeating the cut, following the same outline.

More passes mean a deeper cut, but also a longer laser job duration. To cut and engrave **hard or thick materials** you should choose more passes. To cut **sensitive or thin materials** one pass should be enough.

CUTTING

Passes: 1x, 2x, 3x and 4x. The laser has been able to cut through the material at 4 passes (line (a)).

(Plywood sample (poplar wood), 3mm thick)

4. Compressor: *(starting from Mr. Beam dreamcut model)*

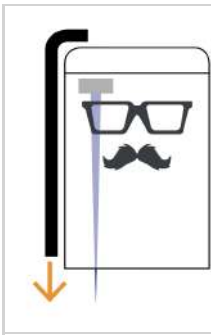
Schneiden 1

Intensität %

Geschwindigkeit mm/min

Kompressor

Durchläufe x



On one side of the laser head there is a tube which is channeling air directly to the focal point and improves the laser cutting power. In the software you can adjust the **power of the compressor**. The default setting is always at maximum. We recommend to adjust this setting only when you are working with very **light** materials (like thin paper) which could be displaced by the airflow.

5. Line mapping:

Gravieren

Intensitätsbereich 0 100 %

Geschwindigkeitsbereich 1500 1150 mm/min

Kompressor min max

Schneiden 1

Intensität 100 %

Geschwindigkeit 600 mm/min

Kompressor min max

Durchläufe 3 x

Gravieren

Intensitätsbereich 0 100 %

Geschwindigkeitsbereich 1500 1150 mm/min

Zuordnung der Linienfarben

In general, only the **grey scale values** are relevant for engraving. So if a laser file includes colour line which are meant for engraving, mr beam software will automatically convert them into grey scale values. However, you can **assign each colour their specific grey value**. In the example above the red vector line will be interpreted and engraved darker as the green one.

Advances Settings:

In the following we explain advances setting, which you can access by ticking of the box in the lower left corner. Please note that you will probably need those in a special case.

Lasereinstellungen

Überspringen

Ziehe Schneide- oder Graviersymbole auf diese Zeile, um sie zu überspringen.



Gravieren

Intensitätsbereich

0 100 %

Geschwindigkeitsbereich

1500 1150 mm/min



Schneiden 1

Intensität

100 %

☐ erweiterte Einstellungen anzeigen

6. Pierce time:



Gravieren

Intensitätsbereich

0 100 %

Geschwindigkeitsbereich

1500 1150 mm/min

Einstichzeit

0 ms

Linienabstand

0,15 mm

Gravurzeitoptimierung

Empfohlen

Schnell

Basic

Bildvorverarbeitung

Dithering

☐ Dithering



Schneiden 1

Intensität

100 %

Geschwindigkeit

600 mm/min

Durchläufe

3 x

Einstichzeit

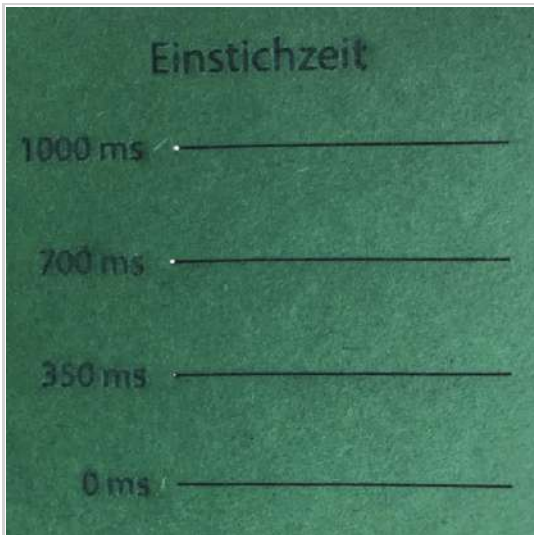
0 ms

Pierce time defines the time during which the laser head stays at the starting point of each cut. This is especially helpful when working with light surfaces, as it prevents incomplete cuts in the beginning of each path (as shown on the picture below).

To cut **light materials**, choose a pierce time **up to 20ms**. If you are working with **dark materials**, you won't need additional pierce time in most of the cases.

<https://support.mr-beam.org/en/support/solutions/articles/43000562372-laser-parameters>

7/10



CUTTING & ENGRAVING

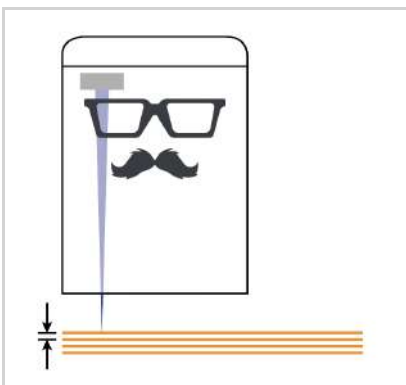
Pierce time: 1000 ms / 700 ms / 350 ms / 0 ms

(Green paper sample, 0,2 mm thick)

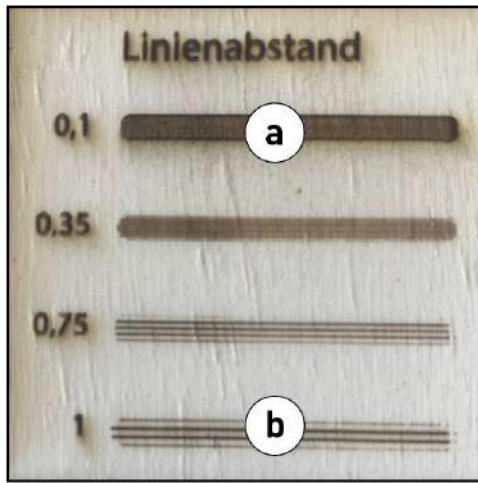
Example: Laser cutting result with insufficient pierce time on a white surface.



7. Line distance:



The **line distance** refers to the density of engraved lines in relation to each other, when engraving a **raster graphic** (<https://support.mr-beam.org/en/support/solutions/articles/43000545534-vector-vs-raster-how-to-choose-the-right-file-format->).



Line distance: 0,1 mm (a), 1 mm (b). A **smaller line distance** results in **finer engravings**, but takes longer to get the job done.

Plywood sample (poplar wood), 3mm thick

8. Engraving time optimization mode:



Gravieren

Intensitätsbereich 0 100 %

Geschwindigkeitsbereich 1500 1150 mm/min

Einstichzeit 0 ms

Linienabstand 0,15 mm

Gravurzeitoptimierung **Empfohlen** Schnell Basic

Bildvorverarbeitung

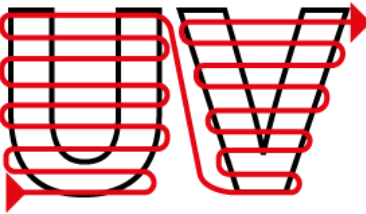
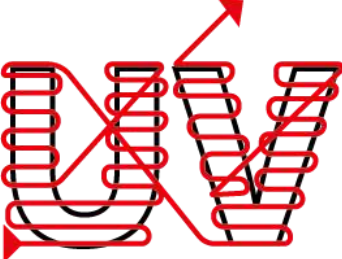

Dithering ☐ Dithering

All engravings are processed line by line, from bottom to top. The system may cluster objects and process them separately from each other to **improve overall job duration** by reducing 'empty runs' where the laser stays off while moving around.

All engravings are processed line by line from bottom to top. The system may cluster objects and process them separately from each other to **improve overall job duration by reducing 'empty rides'** where the laser stays off.

- **Recommended (default):** Clusters are processed successively and each cluster is processed line by line. This option reduces 'empty rides' moderately and **gives the best precision**.
- **Fast:** Aggressive clustering also of smaller objects to reduce 'empty rides' as much as possible. The higher speed might compromise the precision of some engravings, but **works well with text or clip-art design**.
- **Basic:** No clustering at all, the engravings are processed line by line. In this mode the laserhead may have a lot of 'empty rides' making it slower, but the precision is not compromised. **Use this option as fallback** if you're experiencing issues with the other options.

* Some designs, as photos or long texts, **always** use basic mode.

	<p>Recommended (default): Clusters are processed successively and each cluster is processed line by line. This option reduces 'empty runs' while giving the best precision.</p>
	<p>Fast: Aggressive clustering, including small objects, to reduce 'empty runs' as much as possible. The higher speed might compromise the precision of some engravings but works well with text or clip-art designs.</p>
	<p>Basic: No clustering at all, the engravings are processed line by line. In this mode the laserhead may have many 'empty runs' making the overall duration longer, but the precision is not compromised. Use this option as a fallback if you are experiencing issues with the other options. Always use basic mode for designs like photographs or long texts.</p>

9. Dithering:



Gravieren

Intensitätsbereich %
 Geschwindigkeitsbereich mm/min
 Einstichzeit ms
 Linienabstand mm
 Gravurzeitoptimierung

Bildvorverarbeitung

☒ Dithering ☐ Dithering



Dithering converts the laser file in **black and white pixels** (not in grey scale values!). We recommend using this option for materials which **cannot be engraved in grey scale.**

We recommend to dither your file with the mr beam software and not with your own graphic program, otherwise you won't be able to scale it without destroying the dithering effect.