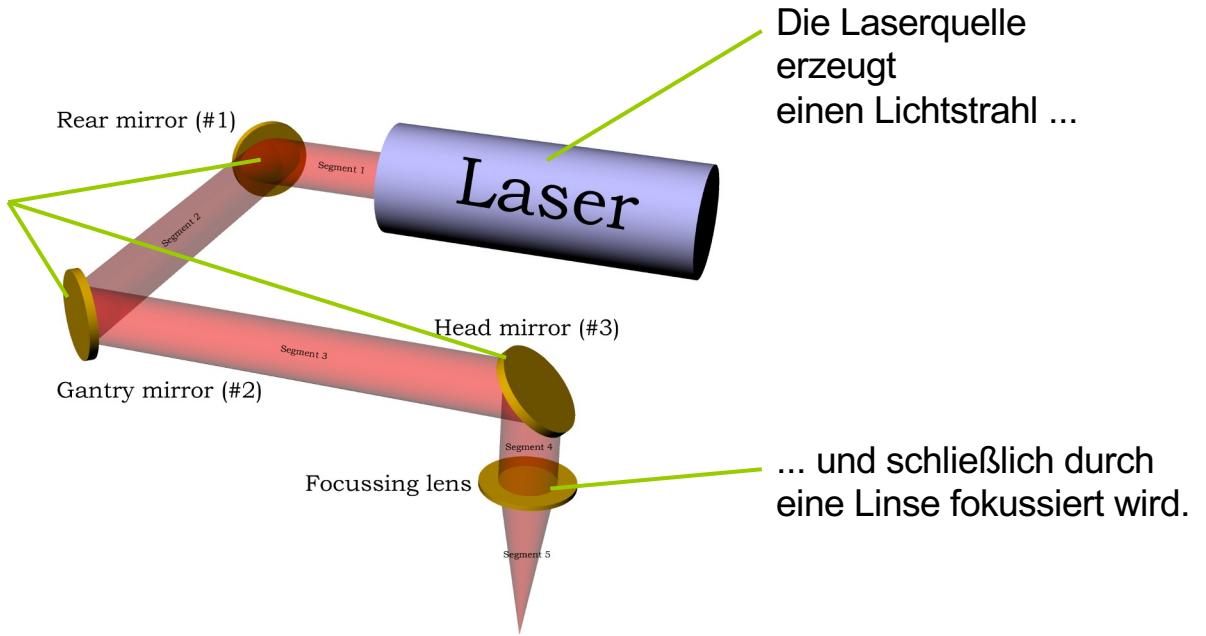
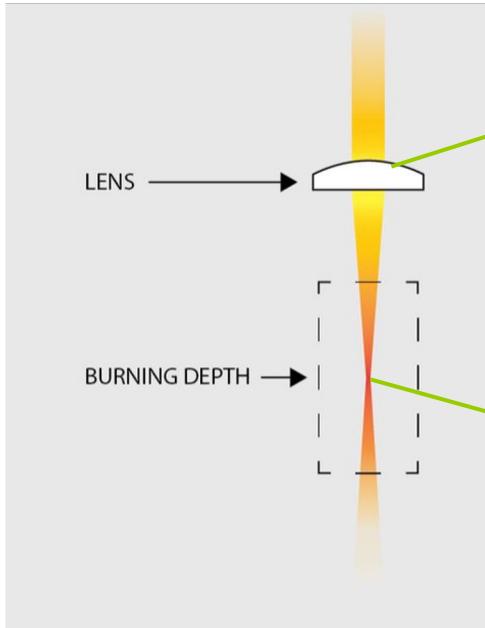


# Lasercutting workshop

..., der durch Spiegel auf den Schneidkopf geleitet ...





Fokus-Linse ...

... fokussiert den Laser nach unten ...

... zu einem dünnen und konzentrierten Strahl

schneiden



gravieren



gravieren & markieren



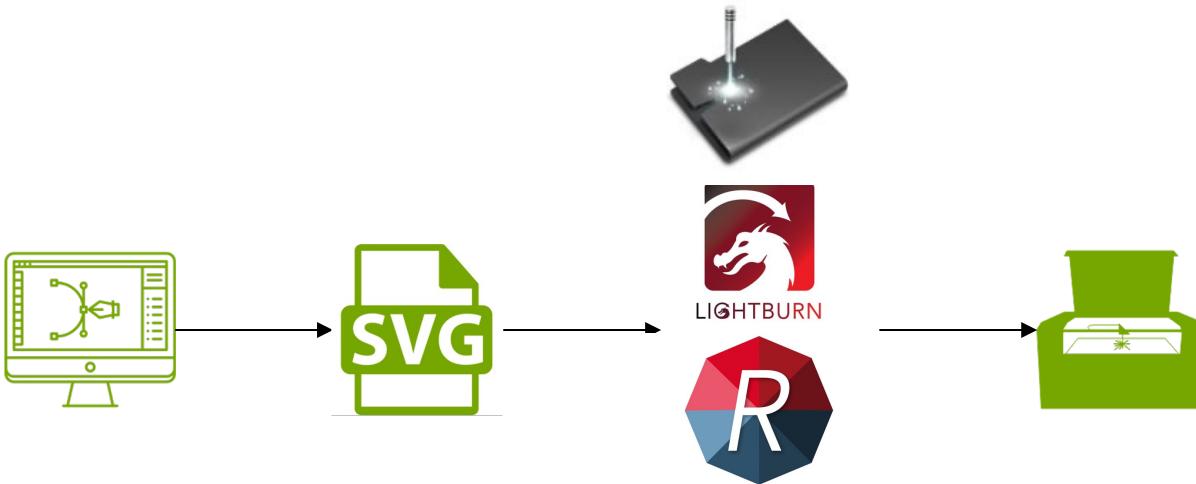
markieren



Reducing DPI can speed up jobs significantly.

full speed + full power allows to reduce DPI to 125 for light engraving and 250 for darker engraving. DPI has a linear relation to cutting time. Half the DPI half the time.





Erstellen einer  
Vektordatei  
+ .ai .pdf .dxf

Exportformat  
.svg

Einrichten mit  
CNC-Software

Schnitt- und  
Gravur-Prozess

Luftunterstützung und Vacuair müssen immer eingeschaltet sein.

Bleibe während des Schnitt- und Gravurvorgangs bei der Maschine und überprüfe regelmäßig, ob alles in Ordnung ist.

STOPP bei konstanter Flammenbildung



Im Falle eines Vorfalls wende dich bitte an einen Werkstattleiter.



CAUTIO

NI

Lasse den gesamten Rauch aus dem Schneideraum absaugen bevor du den Deckel öffnest.

Power: **0,1–100 %**



Geschwindigkeit: **0,1–100 %**



Frequenz **0-5000hz**

Laser folgt Vektoren mit **hoher Leistung** und  
mittlerer Geschwindigkeit

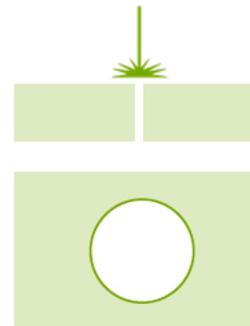
→ Durchtrennen des Materials



High Power



Medium Speed



Laser folgt Vektoren mit mittlerer Leistung  
und hoher Geschwindigkeit

→ Anschnitt der Oberfläche



Medium Power      High Speed



Geschwindigkeit verringern und/oder  
die Leistung erhöhen.



Anzahl der Laserpulse pro Sekunde von 1 bis 5 000 Hz

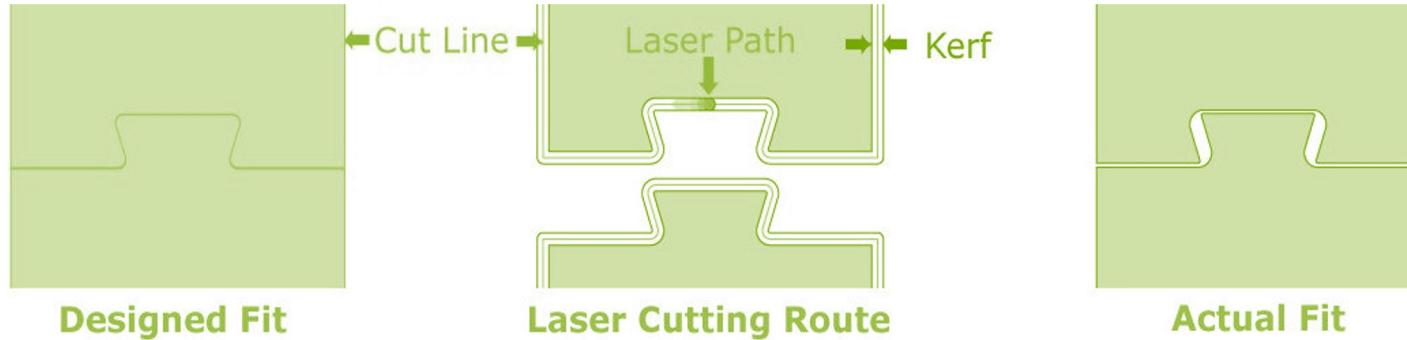
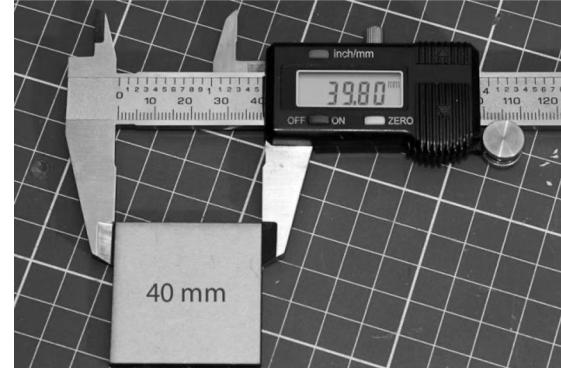


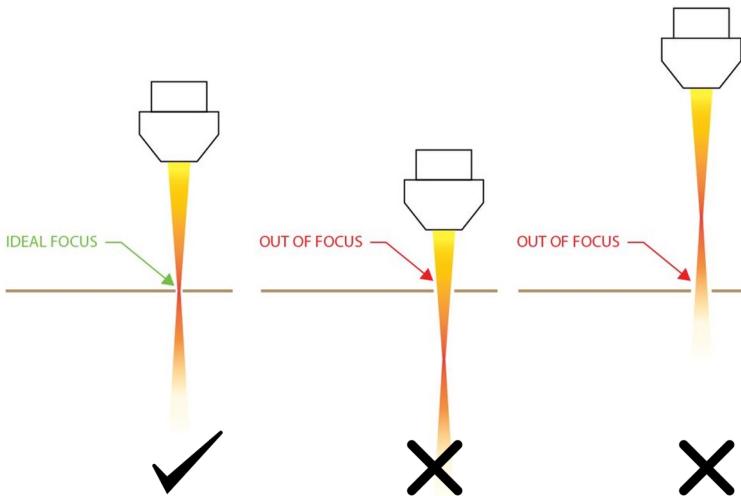
Verbrennende Materialien (Holz, Papier):  
**Niedrige Frequenz, 500 Hz**



Schmelzende Materialien (Kunststoffe):  
**Hohe Frequenz, 5000 Hz**

Abhängig von Materialeigenschaften  
ca. 0,10–0,30 mm





### Idealer Fokus

dünner Laserstrahlauschnitt  
auf der Oberfläche des Materials

### Defokussiert

Schneidet nicht durchs Material  
dicke Schnittlinien



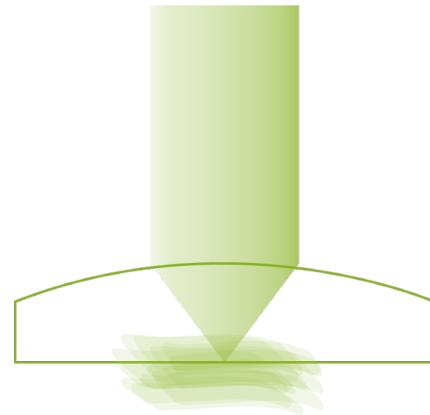
Guter Fokus



Schlechter Fokus

Beim Laserschneiden entstehen Rauch und Staub und die Linse wird **verschmutzt**.

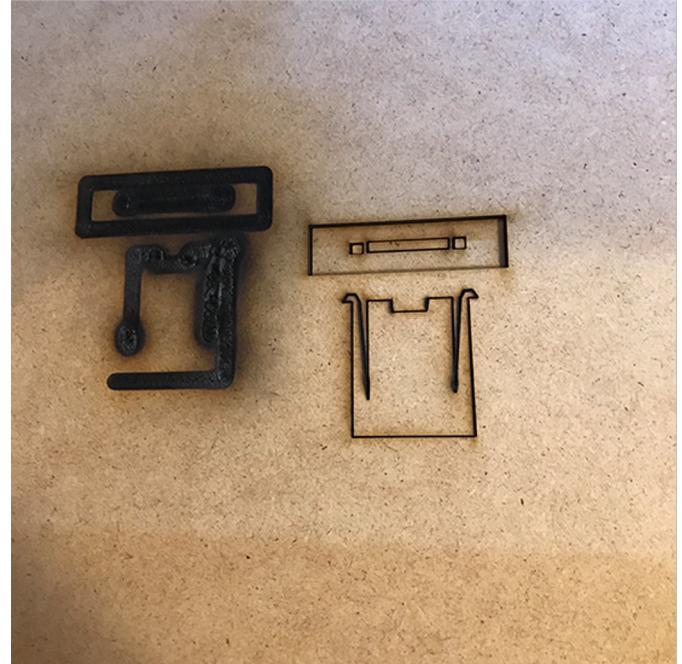
Bei zu starker Verschmutzung fokussiert der Laserstrahl auf die Linse und verbrennt sie.



- Sieht schlecht fokussiert aus
- Flammen und Rauch
- Schneidet nicht durch
- Dicke und verschmutzte Schnittlinien

**Sofort anhalten**

Frage die Werkstattleitung nach  
einer Linsenreinigung.



Beginne immer mit einem Test in der Ecke deines Materials,  
um die richtigen Einstellungen zu finden.



**Zu dunkel oder verbrannt:**

Leistung verringern  
Geschwindigkeit erhöhen

**Schneidet Material nicht vollständig durch:**

Leistung erhöhen  
Geschwindigkeit verringern

Erzeugen toxische Gase



Beschädigen die Maschine



Entflammungsgefahr



# Verbotene Materialien

brennbare Stoffe,  
z.B. Schaumstoffe fangen leicht Feuer  
und sind i.d.R. verboten.

Metalle

Reflektierende Oberflächen

Materialien, deren Bestandsstoffe nicht zu ermitteln  
sind

Vinyl  
Polyvinyl Chloride (PVC)  
Polyvinyl Butyral (PVB)  
Polytetrafluorethylene PTFE (Teflon)  
Neoprene (CR)  
Kevlar, Nomex (PPTA, PMPI)  
Polystyrene/ Polystyrol (PS)  
Polycarbonate (PC)  
Polycarbonate (PC)  
Polyurethane (PUR)  
Polyethylene (PE)  
FPM / FKM (Viton®, Tecnoflon®, Fluorel®, Daiel®)  
Bakelite  
Synthetic leather  
Acrylonitrile butadiene styrene (ABS) Styrene

Caoutchouc  
Latex

Beryllium oxide  
Glass Fiber  
Carbon or Carbon Fiber  
Printed Circuit Board (PCB)

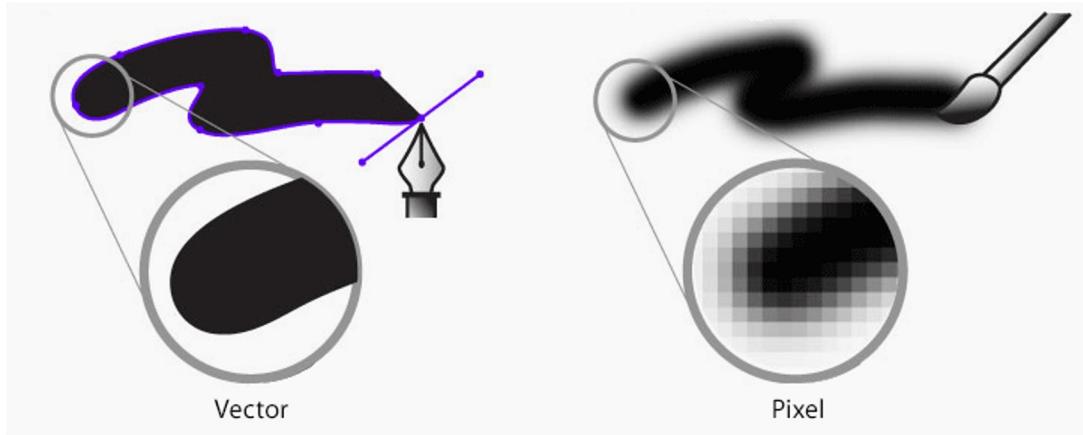
Farbmodus  
RGB



Abmessungen

Illustrator  
Corel Draw  
Autocad  
Inkscape (free)  
GravitDesigner (free)





Schneiden, Markieren und  
Gravieren möglich

Nur Gravieren möglich

Graviert **jeden einzelnen Punkt** einer Fläche

→ Flächiges Abtragen des Materials



Medium Power    High Speed





150 DPI



300 DPI



400 DPI



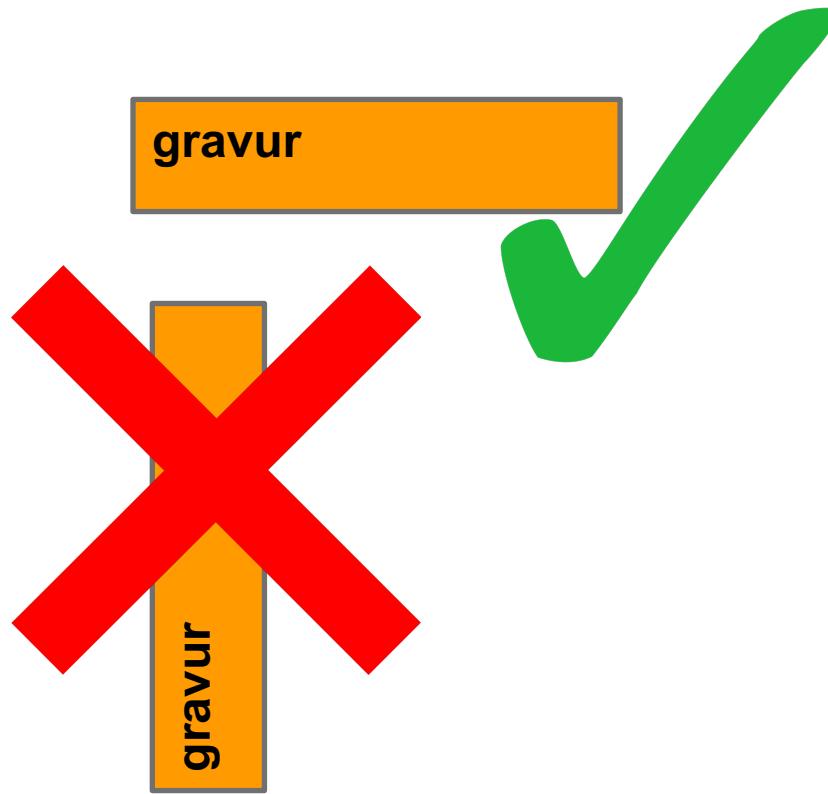
600 DPI

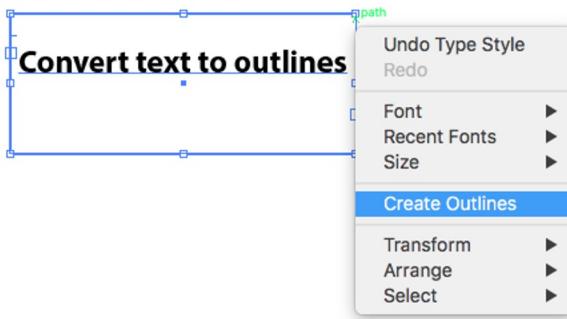
→ höhere Auflösung

längere Gravurzeit

höherer Detailgrad

- Gravuren entlang X-Achse anordnen





## Convert text to outlines

Convert text to outlines

R R

Bridges  
recommended for  
text cutting out

*metroplex laser*

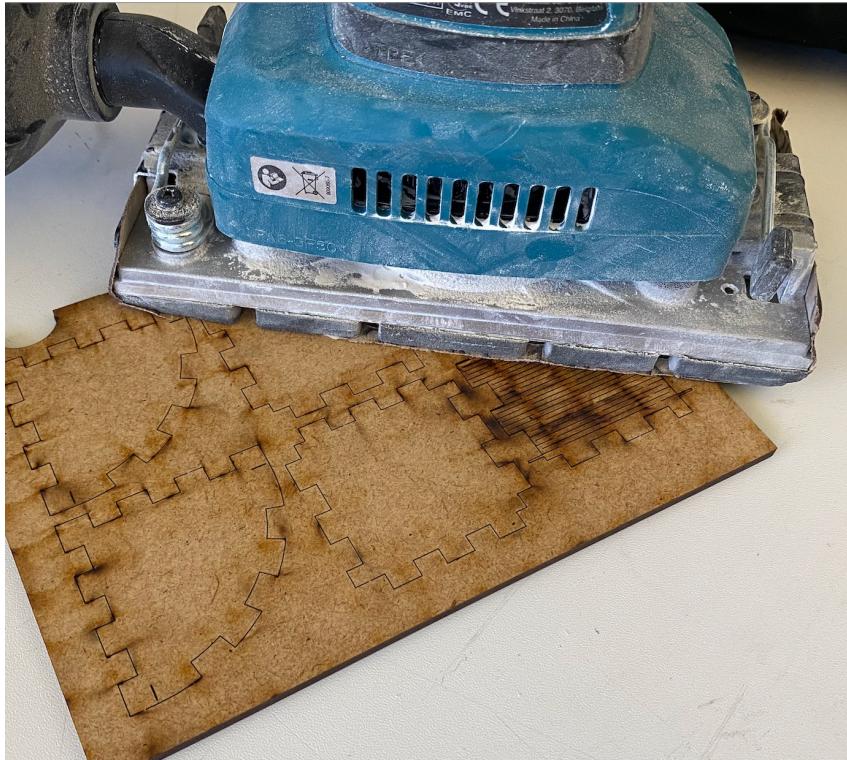
or use laser cutting  
fonts

preventing  
burning  
(David)

## **Prevent burning:**

- Clean lens
- Focus correctly
- Make sure Air Assist is on
- Choose a setting that cuts through the material but is not overpowered.
- To prevent burnmarks from the metal grid, lifting the pieces is an option
- Potentially tape the material prior to cutting
- Apply water prior to cutting

## Remove burn



Sand the whole plate while pieces are still in place.  
It's quick and allows to remove heavy burn.

Sanding burn at  
any later stage is harder.

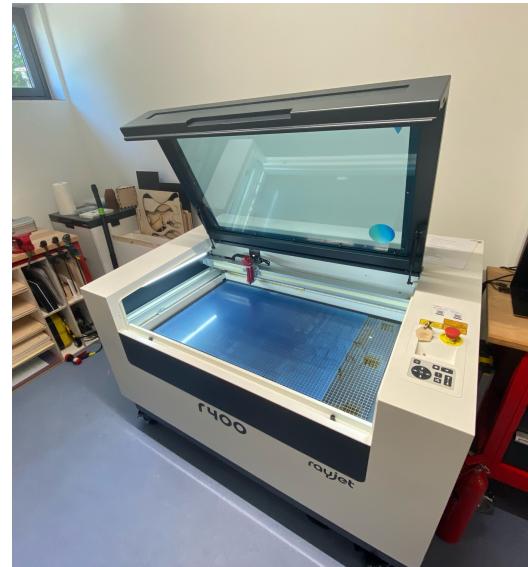
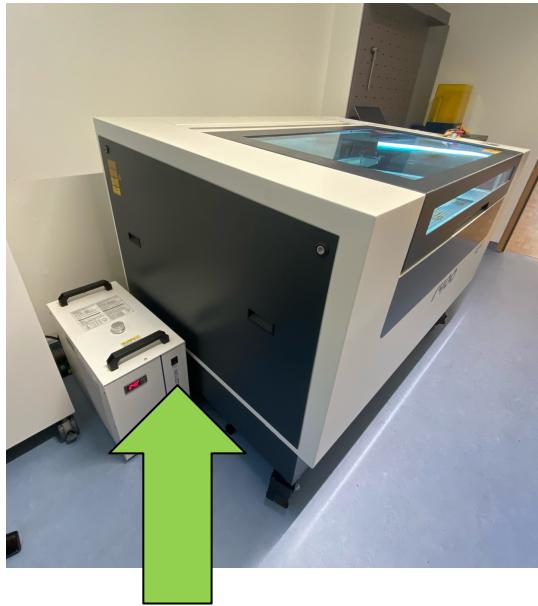
## Remove burn on engravings



Use a soft wire brush to carefully remove burn on engravings

# Starting the laser

# Starting the laser



- 1) Switch on water cooling
- 2) Turn on laser with key
- 3) Open & Close lid and wait for homing  
(laser will approach endstops on all axis)

## Manual focus:

Attach focus gauge



Move Z-axis up until gauge falls down



Using ruby

software

# Working with Ruby

Import files on first tab

A screenshot of a web-based application interface for managing files. The interface includes a header bar with various icons and a search bar. Below the header is a navigation menu with 'trotec' and tabs for 'Designs' and 'Jobs'. The main area displays a list of items with columns for Name, Created, and actions. A modal window titled 'Lasers' is open, showing a preview of a file named 'X36-0356' and a message 'New job 4291'. A large green arrow points from the top left towards the '+' button in the toolbar. Another green arrow points from the top right towards the 'Lasers' tab. A curved orange arrow points from the bottom left towards the 'New design' row.

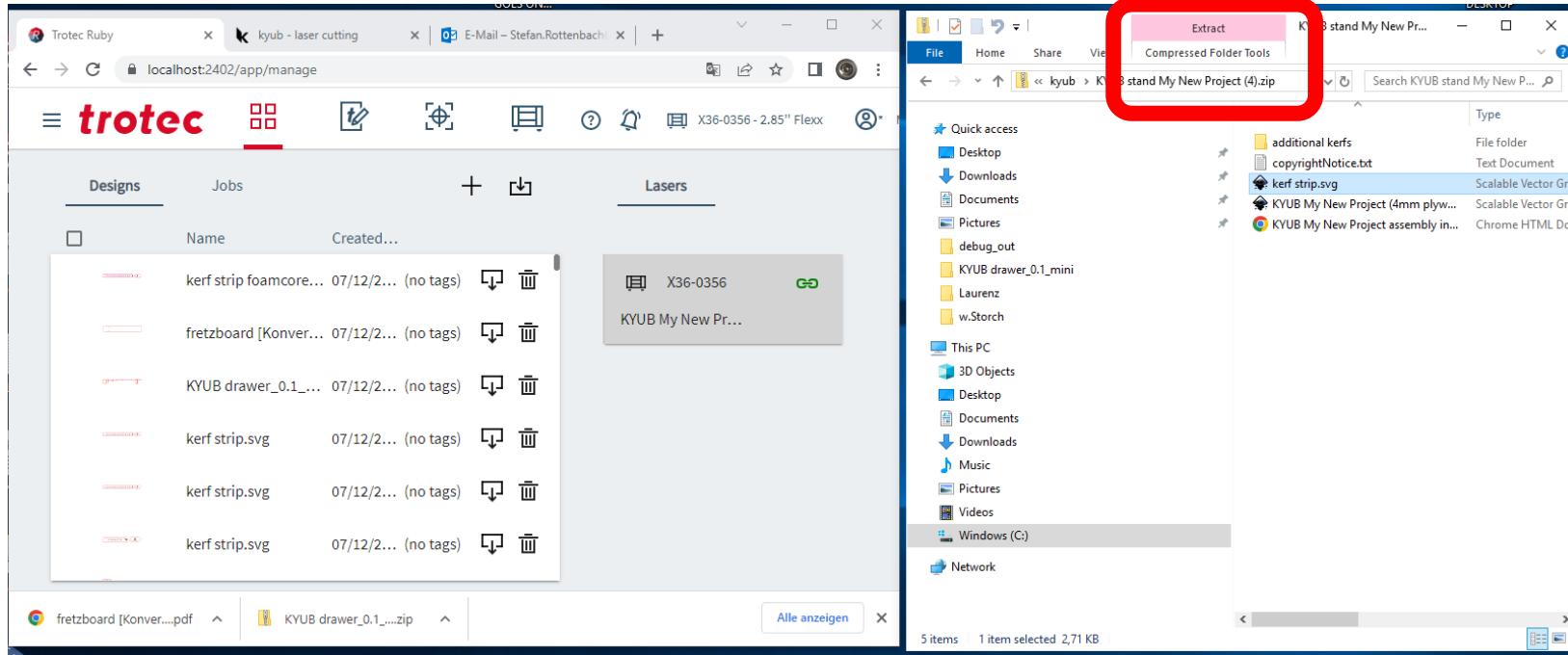
Name	Created	Actions
kerf strip.svg	07/12/20...	[Download] [Delete]
KYUB My New Project (...	07/12/20...	[Download] [Delete]
KYUB My New Project ...	07/12/20...	[Download] [Delete]
kerf strip.svg	07/12/20...	[Download] [Delete]
KYUB My New Project (...	07/12/20...	[Download] [Delete]
KYUB My New Project (...	07/12/20...	[Download] [Delete]
KYUB My New Project (...	07/12/20...	[Download] [Delete]
KYUB My New Project (...	07/12/20...	[Download] [Delete]
New design 4110	07/12/20...	[Download] [Delete]

By file dialog, or



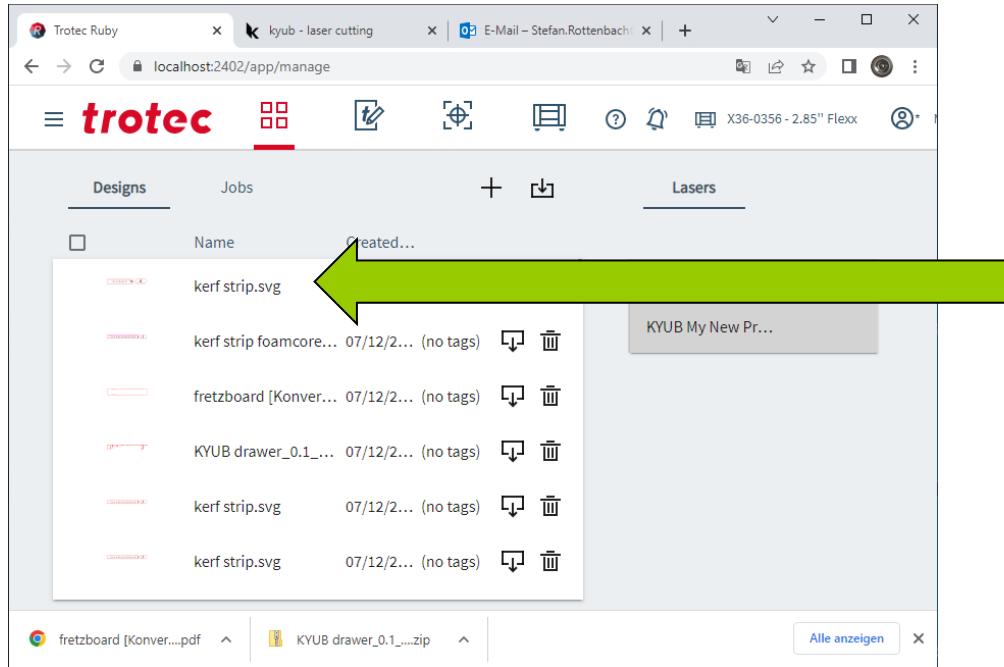
Drag and drop

# Working with Ruby



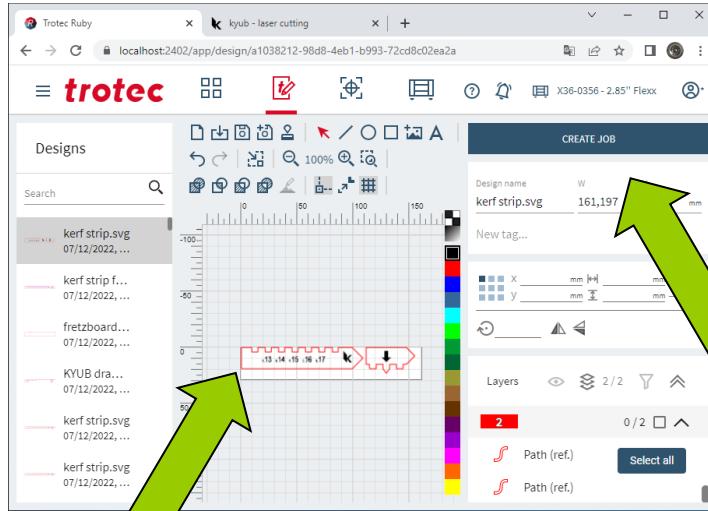
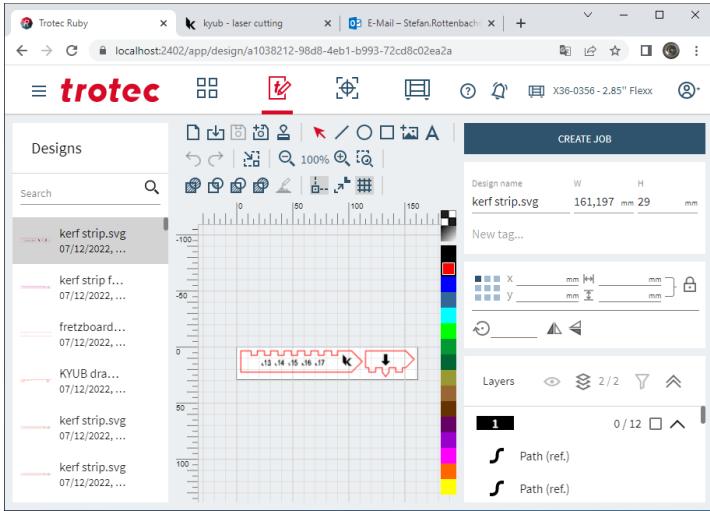
Dragging from a doubleclicked KYUB export zip file wont work.  
**Extract files first in order to drag them.**

# Working with Ruby



Doubleclick file to move  
to the next tab

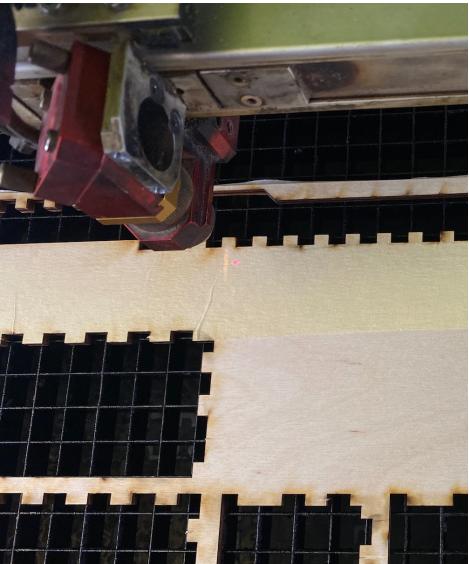
# Working with Ruby



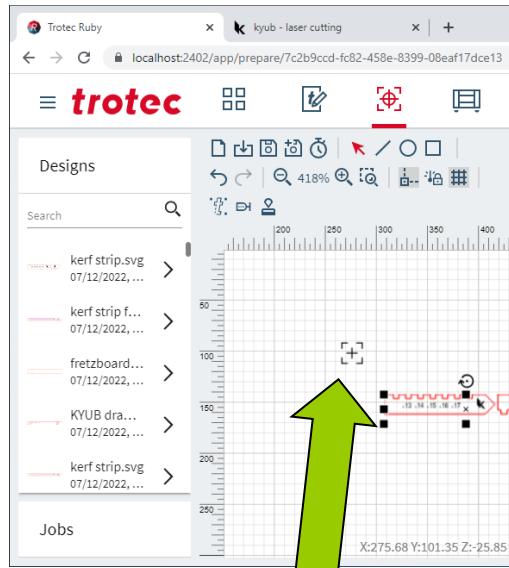
For precise alignment it's usefull  
to move the file to the artboard boundary

After arranging press  
„create job“

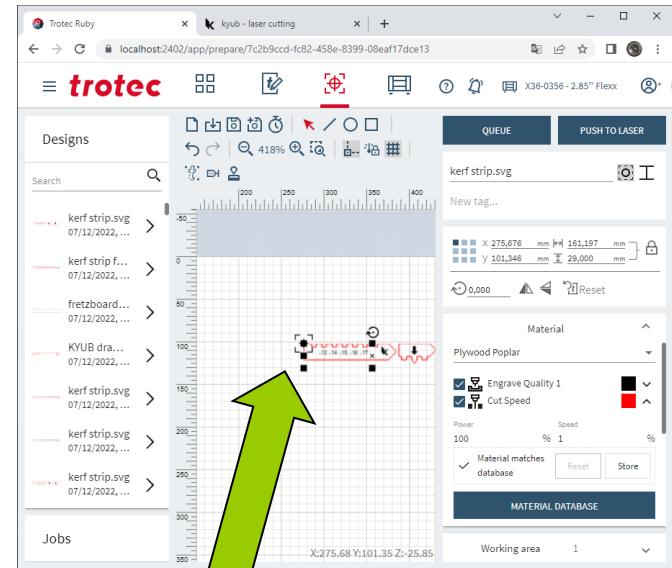
# Working with Ruby



Move laser (red dot) to desired cutting area

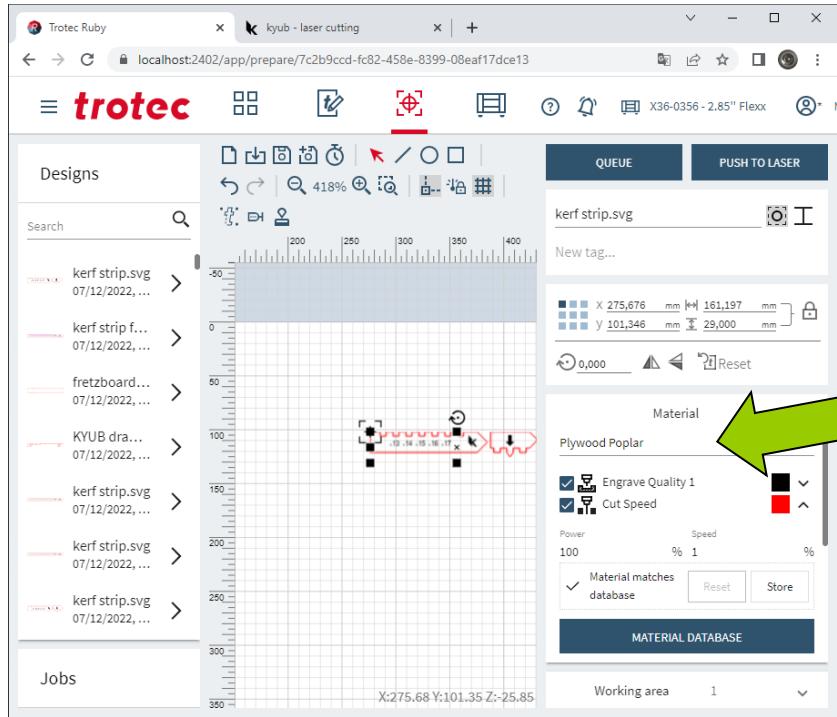


Crosshair represents  
position of laser



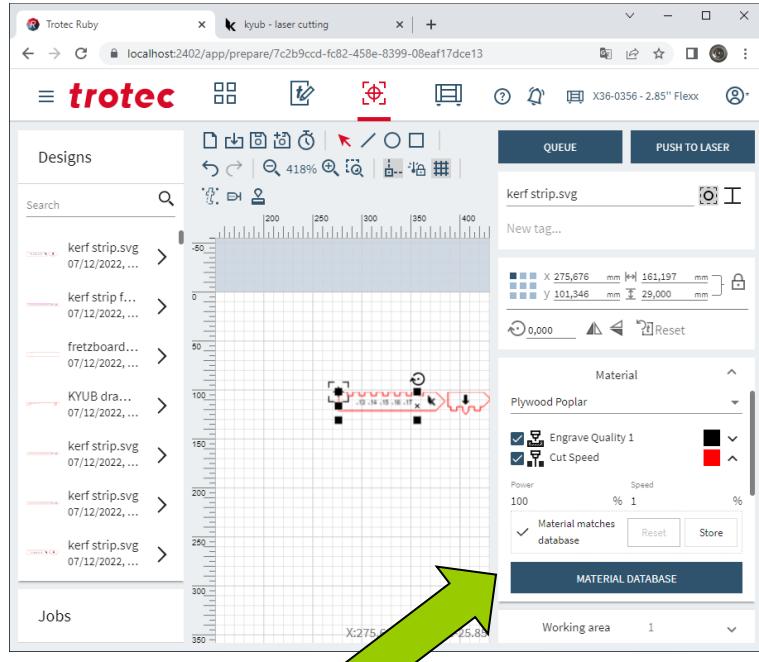
Align file with crosshair  
(magnetic snap)

# Working with Ruby

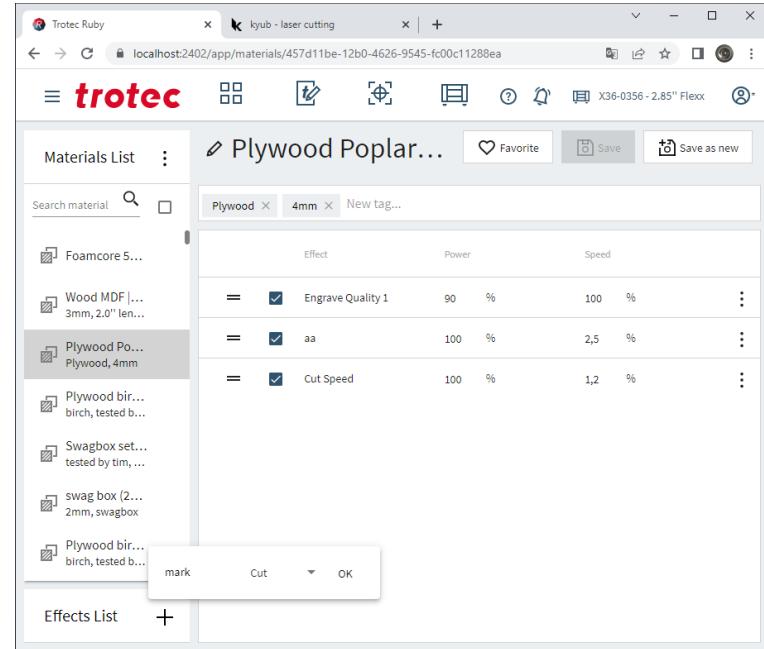


Select material here,  
edit settings if needed

# Working with Ruby

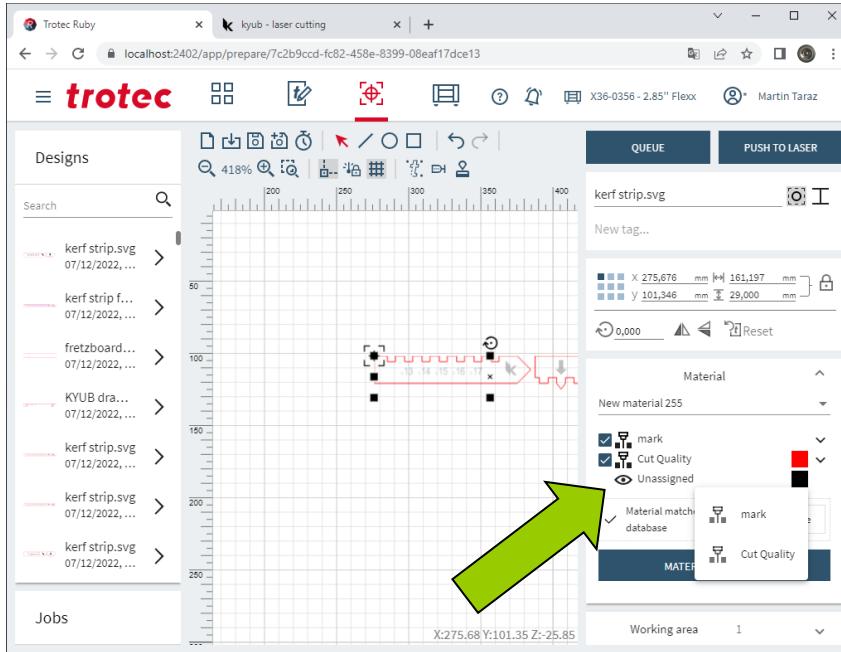


For all editing options jump to „material database“

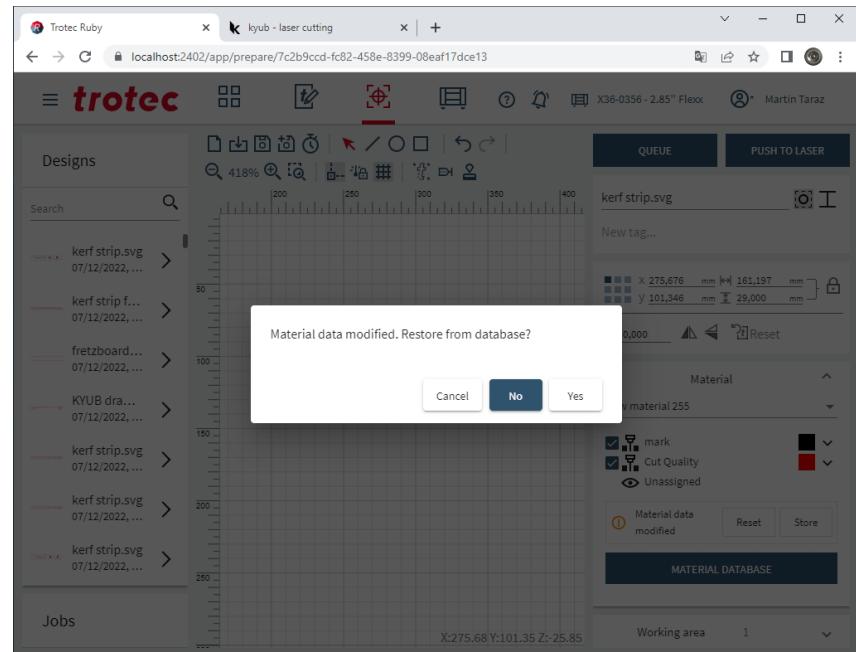


Here you can save new materials and rename them

# Working with Ruby

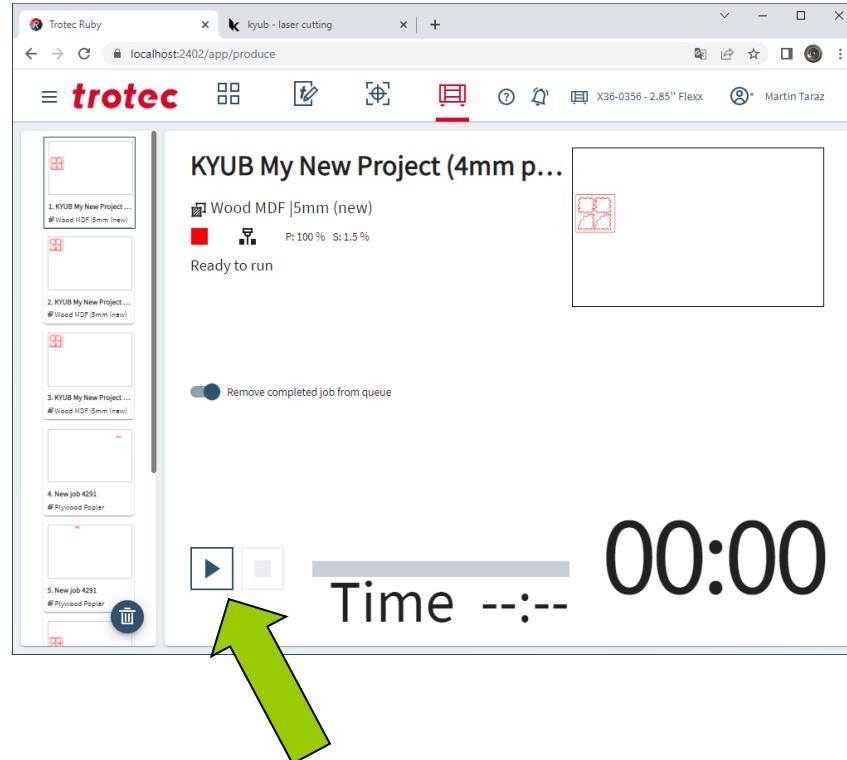


Assign colors to the predefined process here (right click on color)



If you made changes do not restore the defaults from database

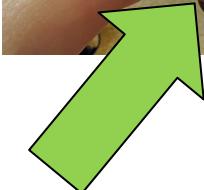
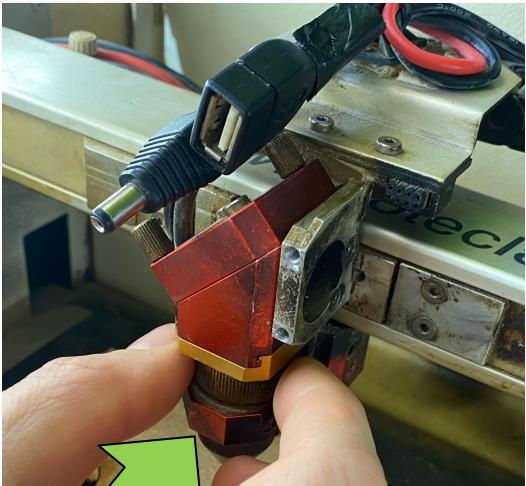
# Working with Ruby



You reached the final tab,  
Hit play to cut!

Laser  
maintenance

## Before cutting: Check lens & clean if required



- 1) Unscrew below lens,
- 2) Remove lens and check



3) it's dirty



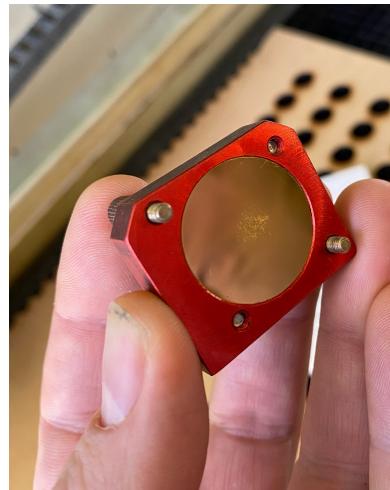
- 4) Apply 1 drop of cleaning fluid
- 5) Gently wipe with lens cleaning paper
- 6) insert lens and screw **tightly**



## Before cutting: Check mirror & clean if required



- 1) Unscrew mirror
- 2) Remove mirror and check



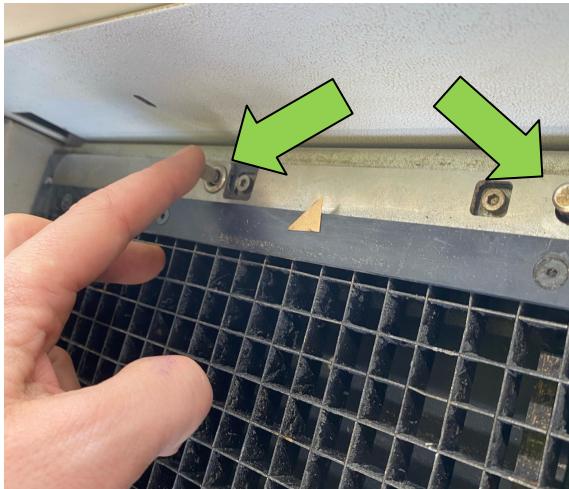
3) it's dirty



- 4) Apply 1 drop of cleaning fluid
- 5) Gently wipe with lens cleaning paper



## Clean work table / remove grid



- 1) Move x-carriage to top
- 2) Click locking bolts to open
- 3) Remove **carefully**,  
do **not** hit the lens unit



- 4) Clean table with handbrush or vacuum.  
It's important to do it regularly  
because leftovers can easily burn.