

# Laser Cutter Certification



**Student:** .....

**Trainer:** .....

**Date:** .....

**Version:** 1.0.0 - 2022-10-28

Certification required for: Laser Cutter (Digital Fab. and Electronics Lab)

## **Training Check-Off List:**

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### **Safety**

In order to be certified to use the GCC Spirit, you must communicate your understanding of the following procedures and rules:

#### **Fire Hazard**

Never place flammable materials or liquids on or in the Laser Cutter when it is on or in operation. Liquid acetone, alcohol, and other chemicals are, and can release vapors that are, flammable.

#### **Pinch Hazard**

When the printer is in operation do not put your fingers near any moving parts including belts, motors, or gears. Tie back long hair, jewelry, or clothing that can get caught in the moving parts of the machine.

#### **Blinding Hazard**

The GCC Spirit uses a CO2 laser to cut materials. The CO2 laser is not in the visible light spectrum, but can cause permanent damage to eyes. Do not disable any of the machine's safety features, designed to prevent its operation while doors are open. This can result in damage to eyes.

#### **Electrical Shock Hazard**

Don't attempt to service the machine while the power is on.

#### **Machine Venting**

Make sure to turn the fume extractor on during laser operation. If the fume extractor is not extracting, it could be clogged. Please contact the laser lead and do not operate the laser if this occurs.

#### **Material Safety**

Because the laser vaporizes/burns material to produce results its is important to never cut a material that releases caustic or poisonous gases. Refer to the Materials list for examples of what can and cannot be cut. If you are not sure what a material is that you wish to cut or your material does not appear on the list ask/contact a shop lead ([email protected] [/cdn-cgi/l/email-protection]).

The list does not include all materials or materials that have "Trade Names".

Never cut any variety of Vinyl or any material containing Chlorine.

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Material (such as resinous wood, some acrylics) may dirty the lens faster than others. Awareness of the laser's decline in performance as multiple cuts are performed is required. Do not increase power as performance declines. Stop and clean the lens or contact the shop lead.

### Lens Cleaning

High volume users of the laser cutter must be certified to clean the laser in order to use it. To maintain proper operation of this device, high volume users are required to perform periodic cleaning of this tool in accordance with the cleaning certification. If you are in doubt as to whether or not you are a high volume user, ask the shop lead. Non-high volume users can still receive the cleaning certification if they so desire.

### Air Assist

With the exception of some cardboard and paper materials, the air assist should be on for all cuts (this is done via software, not to be confused with the fume extractor switch above the laser cutter).

### Electrical Shock Hazard

Material (such as resinous wood, some acrylics) may dirty the lens faster than

### Emergency Stop

Do not use the emergency stop to turn off the machine. Please follow the correct machine shut down procedure. The emergency stop should only be used during an emergency.

### Anatomy of a Laser Cutter

In order to be certified to use the GCC Spirit, you must be able to identify the following parts of the machine:

- User Interface
- Power Switch
- Laser Switch
- Exhaust Switch
- USB Port
- Belts
- Stepper Motors
- Lead Screws
- Lens
- Mirrors
- Bed
- Gantry
- Air compressor
- Air supply line

### Operations Checklist

In order to be certified to use the GCC Spirit, you will cut out a tag engraved with your name (tag is to be 5" long and 1" high with a 1/4" hole at the end) to be hung in the laser area. You also must show that you:

- Understand how to sign out the laser for use

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- Are familiar with common materials that are safe to use
- Can prepare a file for printing using CorelDraw or another software and export the file for printing
- Confirm that your material is secured to the bed
- Can upload a file to the Printer
- Are able to focus the laser for a given material using the manual focus
- Understand the difference between fume venting and air assist
- Can start, pause, and stop a print
- Recognize irregular operation
- Know the location of the emergency shut off
- Know what to do in the event of a fire
- What parts need regular cleaning
- Who to contact if the laser isn't working as expected

### Pre-Operation

- What material are you using?
- How would you determine settings for speed/power for a material?
- What does the software mean by Raster and Vector?
- Is your material flat/secured to the bed?
- Are you performing multiple operations at once (raster and vector)?
- How do you turn on the air compressor (fume venting) and exhaust?
- If you're performing a Vector, are the line widths correctly set?
- In the event of a fire, what should you do?
- How do you clear the bed of debris after the cut is finished?

### Operation

- Is your material safe to cut?
- Is the Laser Focused?
- Is your material secured?
- Is the head in the correct starting position based on your settings?
- Do you have the correct speed and power levels for your process?
- Is the Exhaust on?
- Is the Compressor on?
- If you are using vector mode, are the line widths set correctly?
- Have you chosen the correct mode for your operation?
- Have you turn on air assist?
- Are you engraving or cutting?
- From what position will the cut commence?

### Post-Operation

- Did you wait for the machine to vent?
- Has the material been cut all the way through? If not, what do you do?

### Clean-Up

- Remove and put away any hold downs or jigs

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- Vacuum honeycomb to remove debris if necessary
- Determine if the lens / mirrors require cleaning?
  - Clean if certified
  - Contact shop lead if not

**Pass/Fail:** .....

**Comments:**

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**Student Signature:** ..... **Date** .....

**Certifier Signature:** ..... **Date** .....



Certifier: Please scan this QR Code to email [info@claremontmakerspace.org](mailto:info@claremontmakerspace.org), and include a list of students who have passed this test. Then, return this form to the front desk (even if the student failed!).