

Equipment Specific Safety Training

Epilog Laser Cutter Legend EXT36 120-Watt CO2

DARC 104A - Laser Cutter / Electronics Lab

Fire Warning!

The Laser Cutter system uses a high intensity beam of light that can generate extremely high temperatures when it comes into contact with the material being engraved, marked or cut. Some materials are extremely flammable and can easily ignite and burst into open flame setting the machine afire. This open flame is very dangerous and has the potential to destroy not only the machine, but the building in which it is housed.

Experience shows that vector cutting with the laser has the most potential to create an open flame. Many materials are susceptible to igniting, but acrylic, in all its different forms, has been shown to be especially flammable when vector cutting with the laser.

Operating the Laser Cutter:

- Turn on the exhaust. The switch is located on the wall next to the entrance to 104A. After flipping the switch, there is a short delay before you can hear it turn on. If the exhaust is not turned on the room will fill with smoke when cutting.
- After 6pm, an additional door to room 104 (the GradLab) must be propped open, since the HVAC system goes into low mode after 6pm.
- Sign-in using the Laser Cutter Log, and continue to update as your work progresses.
- Set up a simple piece of artwork. You can use Adobe Illustrator, CorelDraw, or Adobe Acrobat. Do not design your work on the laser cutter computer. This computer should only be used to run the file for laser cutting. All other work should be done on a separate computer so that other people can use the laser cutter in a timely matter.
- Bitmap / Raster images will be engraved. Vector graphics will cut through the materials as an outline, as long as the vector is a hairline or a thickness of .001 or less. Thicker vectors will be engraved.
- Turn on the power to your laser and wait for a “Beep” to note the machine is initialized.
- Turn on the air compressor under the counter.
- Place your sample material on the table in the upper left corner (make sure the table is low enough to accommodate the material).
- **Manually focus the machine.** (DO NOT USE AUTO FOCUS AS IT IS A FIRE RISK IF USED IMPROPERLY!) See page 62 of the manual (manual can be found in PDF format on the desktop of the computer and a printed copy on the counter next to the computer) to review detailed procedures for Manual Focusing. For manual focus, you will use the

triangular, metal focus gauge hanging on the wall to the right of the computer. It snaps in on top of the lens with two pegs and two magnets holding it in place. (Please return the gauge to it's home when you are done!)

- The focus distance is where the laser beam is at its sharpest point. To manually focus, place your material in the upper left corner of the table and press the Focus button on the front panel of the laser.
- When the Focus button is pressed, the carriage will move forward and to the right several inches (~ 50 mm) from its "Park" position in the upper-left corner.
- Then use the Up or Down key to raise or lower the table so that the tip of the focus gauge is just touching your material.
- If the surface of your material is uneven, set the manual focus gauge so that it touches the highest point on the material. Failure to do so may result in damage to the lens.
- Once you have focused, pressing the Reset button will move the carriage back to its park position, or you can begin engraving from the manual focus position. Neither position will affect the start position of your job.
- Remove the gauge when you are finished focusing.
- Close the door.
- From CorelDraw click on the File pull down menu to print.
- Select Print. Make sure your Printer Destination is the "Epilog Engraver Win32, or Legend EXT" and Click Properties to go to the Dashboard to set Speed, Power, etc., for the material you are using. (See the Speed and Power Recommendations section of this manual. Pg. 212). Printing in Adobe Illustrator requires a few extra steps.
- Click OK to exit out of the Dashboard driver with the settings in place.
- Before printing, check to make sure the printer origin is set to zero, and that the image size has been updated correctly.
- Click Print to print the page to your laser.
- The job you sent over most recently is shown in the LCD display on the Laser Cutter.
- Turn on the air assist valve. The valve is located on the right side of our laser cutter. Turn the bottom valve clockwise 45 degrees until you hear the air whistle.
- To run the job, press the GO button on the keyboard.
- To run a previous job, press the JOB Key on the keypad and then scroll through the sent jobs by pressing the UP Arrow key or the Down Arrow Key. The corresponding job names will be displayed in the LCD Display Panel. If more than one job of the same name is sent over, it is numbered after the word Job.
- Press GO when the job to be run is displayed in the LCD Display Panel. The job will now start.
- If there are any minor problems, you can push the stop button on the screen to discontinue the cut.
- If there is an emergency or fire, push the big red stop button on the front right side of the machine to shut down the laser.
- When you are finished, clean up any debris left behind and if the lens or mirror is visibly dirty, clean the optics with the ethyl alcohol and swabs found on the counter to the right

of the computer. See page 193 of the manual for more information on cleaning the optics.

- If requested to do so by your instructor, perform any additional maintenance, like cleaning lenses and mirrors, and returning the bed to a lower position.
- If you are the last person of the day to use the laser cutter, release the air pressure on the air compressor. You can also drain the compressor of any excess air by unscrewing the bottom reservoir screw, after all the air has been released. Clean up any water residue with a paper towel, then replace and tighten the screw by hand.
- **Make sure to sign and fill out the log sheet once you are finished with the laser cutter!**

Please read the following warnings and follow them closely at all times!

- NEVER let the laser system operate if it will be unattended. There is a significant risk of fire if the machine is set improperly, left unattended, or if the machine should experience a mechanical or electrical failure while operating. A tremendous amount of heat is applied to the material being cut. This build up of heat can cause significant fire risk and the machine should always be monitored.
- ALWAYS keep a properly maintained and inspected fire extinguisher on hand. Ours is mounted on the wall by the door. There is also a fire blanket, which should be used first, then the extinguisher if necessary.
- ALWAYS use air assist when cutting. The valve is located on the right side of our laser cutter. Use your ears to hear when air is flowing.
- BE CAREFUL when cutting. Many materials have the potential to burst suddenly into flames – even materials that may be very familiar to the user.
- KEEP YOUR LASER SYSTEM CLEAN – A build up of cutting and engraving residue and debris is dangerous and can create a fire hazard in its own right. Keep your laser system clean and free of debris. After finishing your laser cutting, please remove the vector grid to clean any small pieces that have fallen through the grid and replace the vector grid when finished.
- KEEP the area around the machine clean and free of clutter, combustible materials, explosives, or volatile solvents such as acetone, alcohol, or gasoline. There is space on the other end of the room to store materials.
- DO NOT disassemble the machine or remove any of its protective covers while the unit is plugged in.
- DO NOT attempt to defeat the door interlocks.
- DO NOT view directly into the beam of the Laser Diode Pointer (Red Dot Pointer). If the unfocused beam strikes a reflective surface, it could be directed out of the cabinet.
- DO NOT use auto-focus. We only manually focus our machine. Auto-focus has damaged the machine several times in the past. Don't do it!
- CAUTION - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

- The AC input power to the Epilog Model 9000 Laser System is potentially lethal and is fully contained within the cabinet.
- DO NOT open any of the machine's access panels while the unit is plugged in. Opening a panel may expose the operator to the unit's AC input power.
- NEVER operate with any of the covers or enclosures removed, and never modify the enclosure. The laser beam is invisible!
- DO NOT make or break any electrical connections to the system while the unit is turned on.
- NEVER operate the machine without a properly operating vent to the outside! Most material will only produce an irritating smoke when engraved. Some materials, including but not limited to paint, varnish, composition board and plastics, produce compounds that can be harmful if concentrated. Proper ventilation is the only way to ensure that problems do not occur.
- NEVER engrave or cut any material containing PVC or vinyl. When engraved, a corrosive agent is produced that will destroy the machine. If you do not know what the material is, do not cut it. Cutting restricted materials like ABS and fiberglass can create fumes containing acidic hydrogen chloride gas, cyanide gas, and chlorine gas, to name a few.