

ART + DESIGN FLAB – LASER ENGRAVER FILE SET UP GUIDELINES

Start your project by consulting with your instructor for advice about the best way to plan your project.

Our laser is a 60 watt [Universal VLS4.60](#). This is a mid-range laser in terms of power (range=12-130). The laser system can't cut everything. Some materials can be cut, engraved, and etched, and others can only be engraved and etched, while others cannot be used with this laser. Please see the list of approved materials. You are required to read and comply with the Art + Design FLAB Procedures, Policies and Guidelines for use of the laser.



How to build your file: Use the Template

Use the Adobe Illustrator CC laser cutter template file ("AI Laser Template CC.ait") that is available in the FLAB (bring a flash drive and the FLAB assistant will give it to you!) from your instructor or on the School of Art + Design website (coming soon). This template file has the correct laser color swatches and is formatted to the necessary 24"x 18" Document Size. The template also has a separate layer for each color and if used, can help you more easily correct problem objects. Plan for 1/4 inch margins of unused material for all laser projects. Be aware that your material may warp causing cut distortion. Try to plan your file with room for a margin of error. The cutter bed is 18" tall by 24" wide, but the laser cannot cut materials all the way to the edge of the bed. Your Illustrator document's "lasering" area cannot exceed 17.75" tall by 23.75" wide.

Your file's colors and stroke weight "tell" the laser cutter what to do – cut/engrave (vector) or etch (raster). Colors that the laser understands are broken down into three driver settings: Power + Speed + Laser Pulses per inch. Stroke width values and thicknesses of shapes tell the laser cutter that the job is either a "Raster" or "Vector" command.

There are four specific colors that interface and "drive" the laser cutter in a specific order:

1 st	BK	Black	Raster Shallow "Shape" Etch - removes a small amount of material from the surface.
2 nd	BL	Blue	Vector Line Engraving - useful for making rapid "score" and line based surface marks.
3 rd	RD	Red	Vector Line Cutting - the laser beam will cut all the way through the material sheet.

Photo images "Placed" in your Illustrator file are treated as varying levels of gray and interpreted as **Black Raster Etch**. Solidly filled objects, shapes, thick lines and text are always treated as Raster Etches. Raster etching takes a long time, because the lens must move incrementally back and forth to remove material from the surface.

Blue Vector Engraving and Red Vector Cutting commands generally take less time than etching. However, there is a significant difference in the total time it takes the laser cutter to complete the same file on thin paper than on thick plastic because thick materials generally require slower speeds and more power.

The Red-Blue-Green (RGB) colors currently used to "drive" laser functions are:

BLACK R=0, G=0, B=0 for Raster Shallow Area Etch (and all "photo" images)

BLUE R=0, B=255, G=0 for Vector Line Engrave

RED R=255, B=0, G=0 for Vector Line Cut

Colors must conform to these specific RGB colors or the laser cutter will produce unwanted results.

All Vector cutting and engraving **line weights should be .001 inch "Stroke"** width maximum with NO "Fill". Thicker Stroke weights may be interpreted as "raster" etch objects rather than "vector" cut lines. Important: "white" or color fills will cause errors when trying to vector cut.

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Materials:

General Rule - due to the “warp” factor (inherent to unstable materials like wood, cellulose-based boards and some plastics): cutting many small sheets produces better results than cutting everything from one large sheet.

SEE THE APPROVED MATERIALS LIST for details on what materials can be cut by our laser.

Laser Cutting Lightweight Materials / FIRE PREVENTION

Laser cutting lightweight materials like paper, film, cloth and leather is difficult because the exhaust system may lift the material from the bed.

The bad results include:

- Sheet moves from the original position causing incorrect cut
- Flapping material – can strike the moving lens carriage (bad for lens)
- Flapping material causes the laser to be out of focus (FIRE DANGER!)
- Material pieces get sucked into the exhaust (FIRE DANGER!)

This fire danger is an important reason why all jobs MUST be watched during the ENTIRE laser process, so any smoldering or flapping material can be extinguished.

Examples of light weight material includes: laser and inkjet papers; card stock, film, charcoal, drawing and watercolor papers, fabrics and leather. Consult first with a FLAB assistant before deciding which method is best for your project. **The final decision about whether or not your chosen method and material is acceptable to be attempted will be completely at the discretion of the FLAB assistant.**

Secure Your Materials

You must secure all light-weight materials – to keep the sheet flat and secure on the bed OR the file must be made so cut pieces won't come loose or strike the lens carriage as it moves above the project.

- Foreign materials (objects, metal, stone, etc) cannot be used as “weights” to hold down materials.
- Tape can be used to secure the edges of the material to the rulers.
- Tape is useful for retrieving multiple cut pieces when a job is finished. When the completed sheet is lifted, everything will stay in place for transport and pieces can be easily identified later. BYO TAPE – Tape is not provided by the FLAB.

Options for Securing Your Material:

1. LAYER IT - material placed between two heavier boards : Ok for cutting but surface can NOT be etched or engraved.
2. GLUE IT - material adhered to heavy board can be etched and engraved. Good for leather, fabric, or thin plastic. Material may stretch during or after gluing process.
3. BROKEN LINES in your Vector Drawing – Make tiny breaks (tabs) in your vector lines that can be easily cut with scissors or Xacto. Material is secured to bed by masking tape to rulers OR by a pre-made frame template.