

WSU SCHOOL OF DESIGN AND CONSTRUCTION

GUIDELINES FOR UNIVERSAL LASER SYSTEMS LASER CUTTERS (X-660 and ILS 9.150D)

- **Students are allowed no more than 1 hour laser time per day, and no more than 3 hours per week. This includes reserved time, walk-in time, or a combination of both.**
- All files must be on USB or portable hard drives—make sure your file is easy to find! No emailed or Dropbox files.
- Avoid stacked or double lines—they cut twice and burn materials. The commands 'Join' and 'Selectduplicate' in Rhino or 'Overkill' in AutoCAD may help. Your file **will** be rejected on the basis of double lines.
- Colors **must** be assigned by layer (cyan layer, magenta layer, etc.). **See “Line and Color Assignments” below.** Turn off layers that will not be cutting. Simple files with fewer layers are easier to work with!
- Only materials on the Approved Material List may be cut or engraved.
- Students are responsible for clearing away and disposing of waste material
- **Maximum cutting area of the X-660 is 32" wide by 18" high (landscape), and 36" x 24" for the ILS. When possible, prepare your file for the smaller cutter.**
- **All files must be properly prepared by the student or they will not be cut.** Employees of the shop are not AutoDesk, Rhino, or Adobe instructors.
- **Autocad file format (.dwg) is strongly preferred.** These files can be generated in AutoCAD, Rhino, Adobe Illustrator, or other vector-based design programs. Vector cutting is also possible with **editable** .pdf or .ai files. Raster cutting must be approved in advance.
- Files created in Rhino and exported as a .dwg need to be verified by you before you bring them in for cutting. Check lineweights, colors, view orientation, etc. Be certain that you are presenting a 2D file for cutting! Export your Rhino files as 2D .dwg.
- Draw a box in your model space that represents the size of material that you will be using so that you are certain that the parts all fit on your material.
- The line bounding this box should be black or white. The box will need to be in scale. The laser cutter leaves an uncut area of 1/4" around the edge of the material.
- **Use of the online reservation system is strongly encouraged <http://fablabwsu.youcanbook.me> Missed appointments still count against your laser time for the day/week—frequently missing appointments (without canceling) may result in loss of shop privileges.**
- Outside of reservable hours, there is always a sign-up sheet/waiting list for laser cutting. Sign the list when you want to use the machine. We will cut only your files. No grouping up.
- The Universal Laser cutter is for academic projects only. Anyone attempting to engrave gift items, personal items or other non-academic projects will lose shop privileges for a month.
- Lines for vector cutting or engraving must be drawn in .000 lineweight or they will not work at all. "Default" line weights simply will not work.
- Vector engraving is used for engraving lines, such as brick pattern onto the surface of the material. It is also used for small text, numbers, or other markings used to identify parts.
- **Files presented for cutting within 30 minutes of closing time may be rejected based upon the judgment of the shop tech.**

LINE WEIGHT AND COLOR ASSIGNMENTS (cutting order):

| ORDER | COLOR | CUTTING STYLE | DESIGN REQUIREMENTS |
|-----------------|---------|---------------------------------------|---|
| ∅ | Black | Layout lines (do not cut) | ∅ |
| ∅ | White | Layout lines (do not cut) | ∅ |
| 1 st | Red | Vector engraving - (light "etch") | lineweight → .000 ONLY! |
| 2 nd | Green | Vector engraving - (deeper "etch") | lineweight → .000 ONLY! |
| 3 rd | Yellow | Vector cutting - interior cuts | lineweight → .000 ONLY! |
| 4 th | Blue | Vector cutting - final perimeter cuts | lineweight → .000 ONLY! |
| 5 th | Magenta | Raster engraving - (light engraving) | use for solid hatching, fill or larger text ONLY! |
| 6 th | Cyan | Raster engraving - (deeper engraving) | use for solid hatching, fill or larger text ONLY! |

APPROVED MATERIALS FOR USE WITH UNIVERSAL LASER SYSTEMS LASER CUTTERS

(Note: Materials in **red** may be purchased from the shops using your Cougar Card. The materials we sell are optimized for laser cutting, and usually less expensive than other sources.)

These are the most commonly cut/engraved materials:

- **1/16" Chipboard** (or thinner). We can cut 1/8" chipboard, but discourage it unless absolutely necessary. Cuts in 1/8" are much slower, and edges tend to burn.
- **1/16" Mat Board/Museum Board** (or thinner).
- **1/32"-1/16" Task Board**. This material cuts well, with minimal burning. It is also a little less expensive than mat board, and can be damp-formed into permanent curves.
- **Basswood**, up to 1/8" thick. The shop hopes to have some sizes for sale in the near future.
- Plywood, up to 1/8" thick.
- **Acrylic sheet (Plexiglas), up to 1/4" thick**. 1/8" cast acrylic sheet (best for laser engraving) is stocked in the shop; 1/4" acrylic is available with advanced notice.
- **Most papers (watercolor paper, milk carton paper, Bristol board, etc)**. Thin papers (eg, printer paper) can be difficult to hold down.

These are materials we usually can cut/engrave, but check first (you will need to allow extra time and material to test cut settings):

- **Polypropylene sheet**, up to 1/16" thick.
- **Laser-engrivable sign plastic**.
- **Cloth, leather, cork, solid woods other than basswood**. Most of these materials can be cut with no problems, but check with us first.
- **Mirrored Plexiglas**. Cuts from non-reflective back side.
- **Corrugated cardboard**, up to 1/4" thick. This material is potentially flammable and requires careful monitoring. For the time being (and on a case-by-case basis), we are willing to cut it, but it may be a banned material in the future.

We DO NOT/ CANNOT cut the following:

- Styrene plastics, including Styrofoam and foamcore.
- Any reflective material.
- Any metal (some metals can be engraved, but require special procedures).
- Polycarbonate plastic (unless you understand and accept the poor quality of cut).
- Glass, stone, etc.
- Any other material that creates a safety hazard, risks damage to the laser cutters, or unnecessarily slows shop procedures. This judgment will be made by the Fabrication Labs Manager, or shop technician on duty.