

Lab Manager is: Judy Kreiger (jlkreiger@bsu.edu)

You will need to be approved for laser cutter use before you will be able to schedule laser time.

Have the Laser Room Monitor assist you the first few times you use the laser cutters and any time you have questions.

Mistakes can damage equipment.

The lab has laser cutters with two different bed sizes:
1 x (18 inches x 24 inches) 3 x (18 inches x 32 inches)

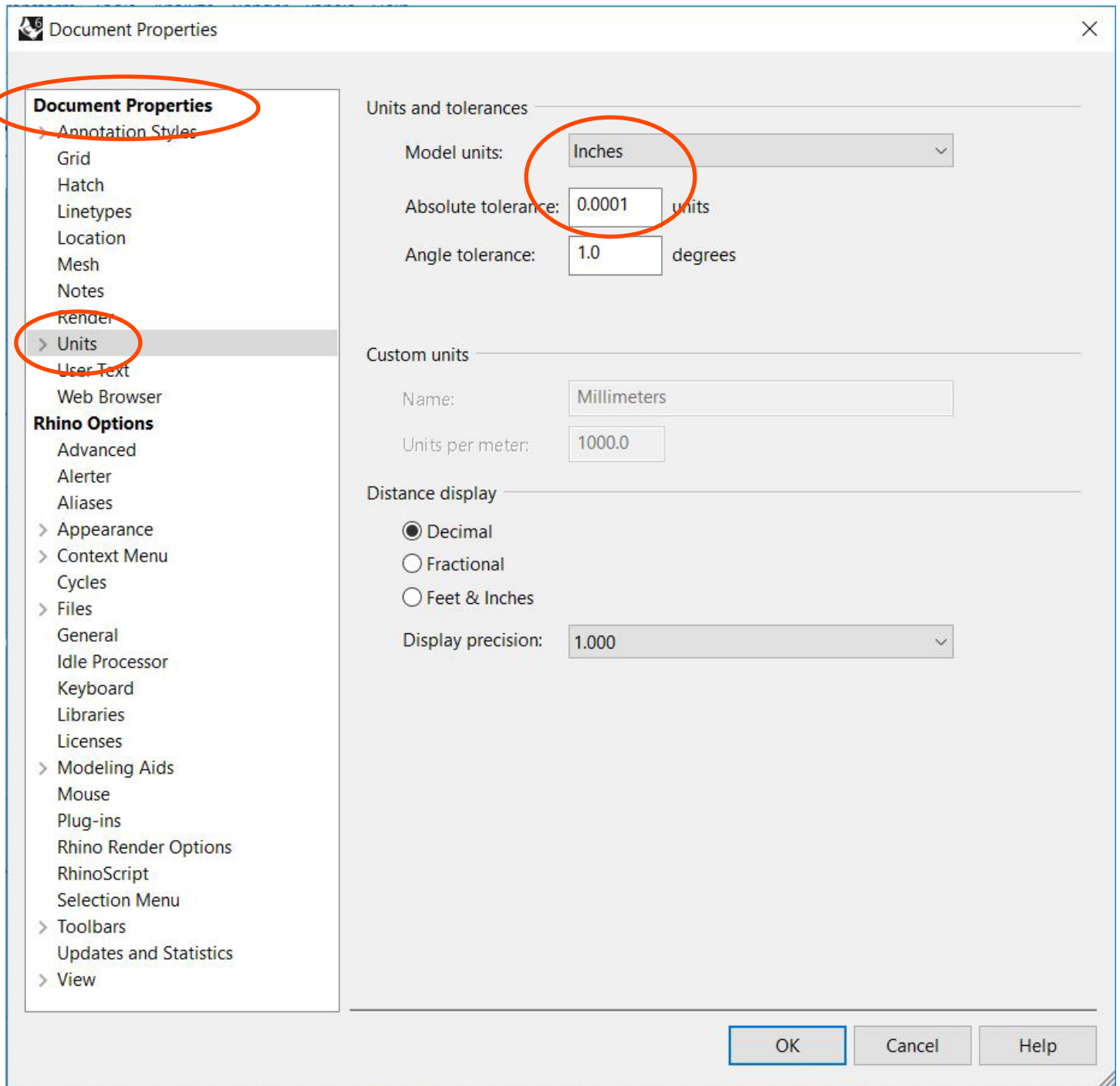
Make note of this when planning your cut sheets.

These notes assume you are using the *Rhino Laser Cutting Template File* to set up your cut sheets.



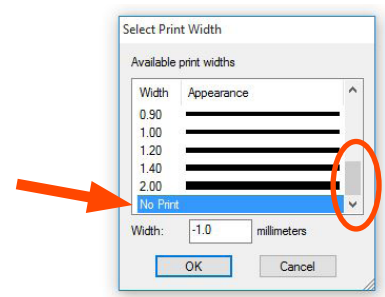
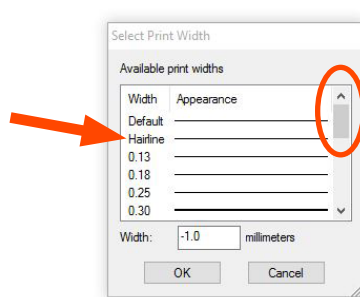
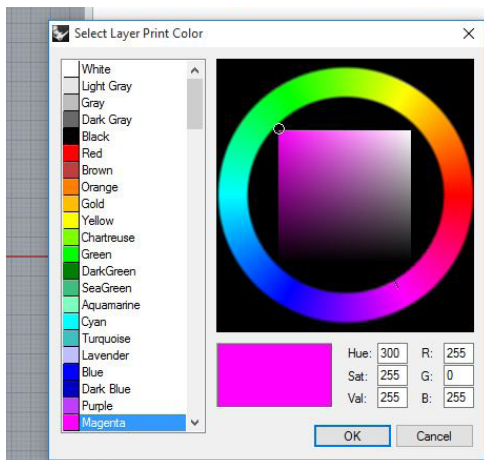
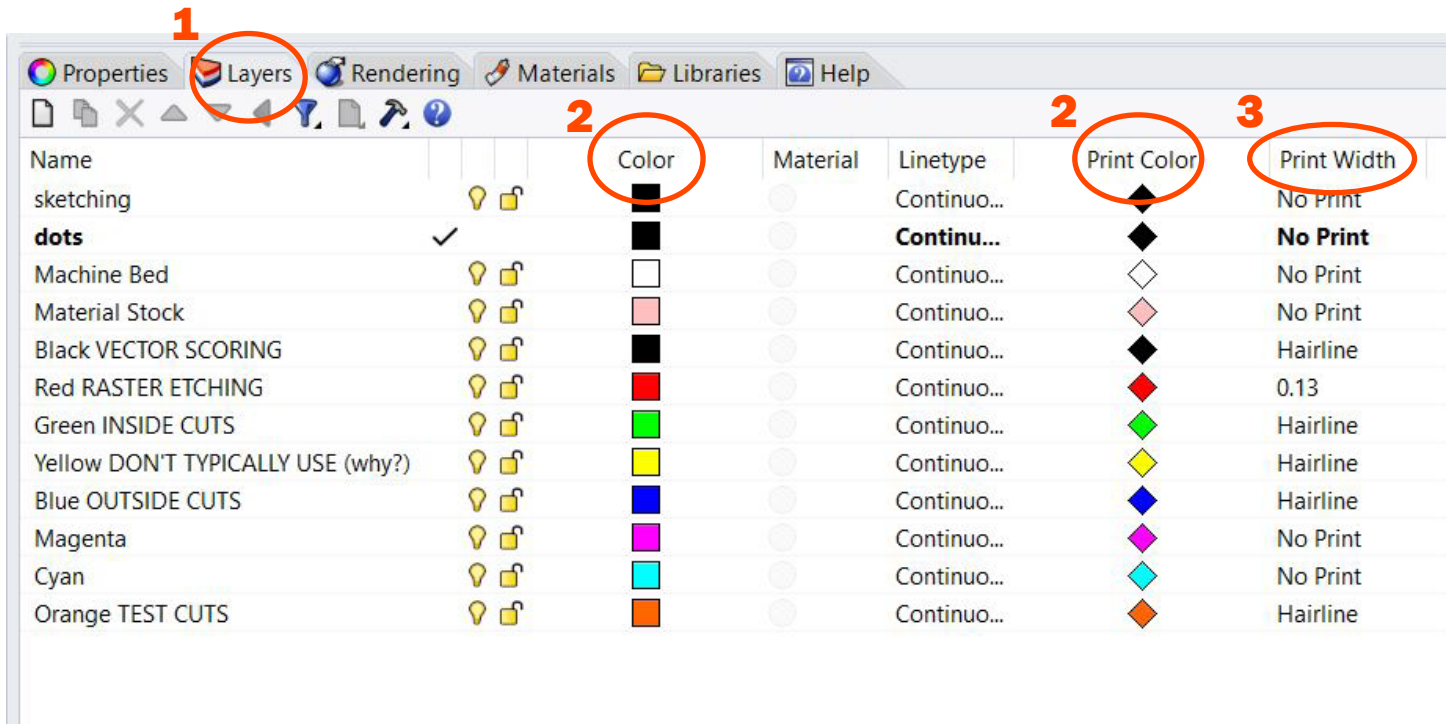
STEP 01

Make sure your units are INCHES in Rhino.
Use the command "Units" to verify.



STEP 02

Make sure your LAYER COLORS and LINE WEIGHTS are correct.



Double-click on the "Print Width" column.

The layer must be set to "Hairline" for vector cuts or scores.

Layer	Red	Green	Blue
Black	0	0	0
Red	255	0	0
Green	0	255	0
Yellow	255	255	0
Blue	0	0	255
Magenta	255	0	255
Cyan	0	255	255
Orange	255	102	0

"No Print" allows you to leave useful layers on, such as "Machine Bed" without them cutting.

Layer colors need to be a specific RGB for the laser cutter to read them.

STEP 03

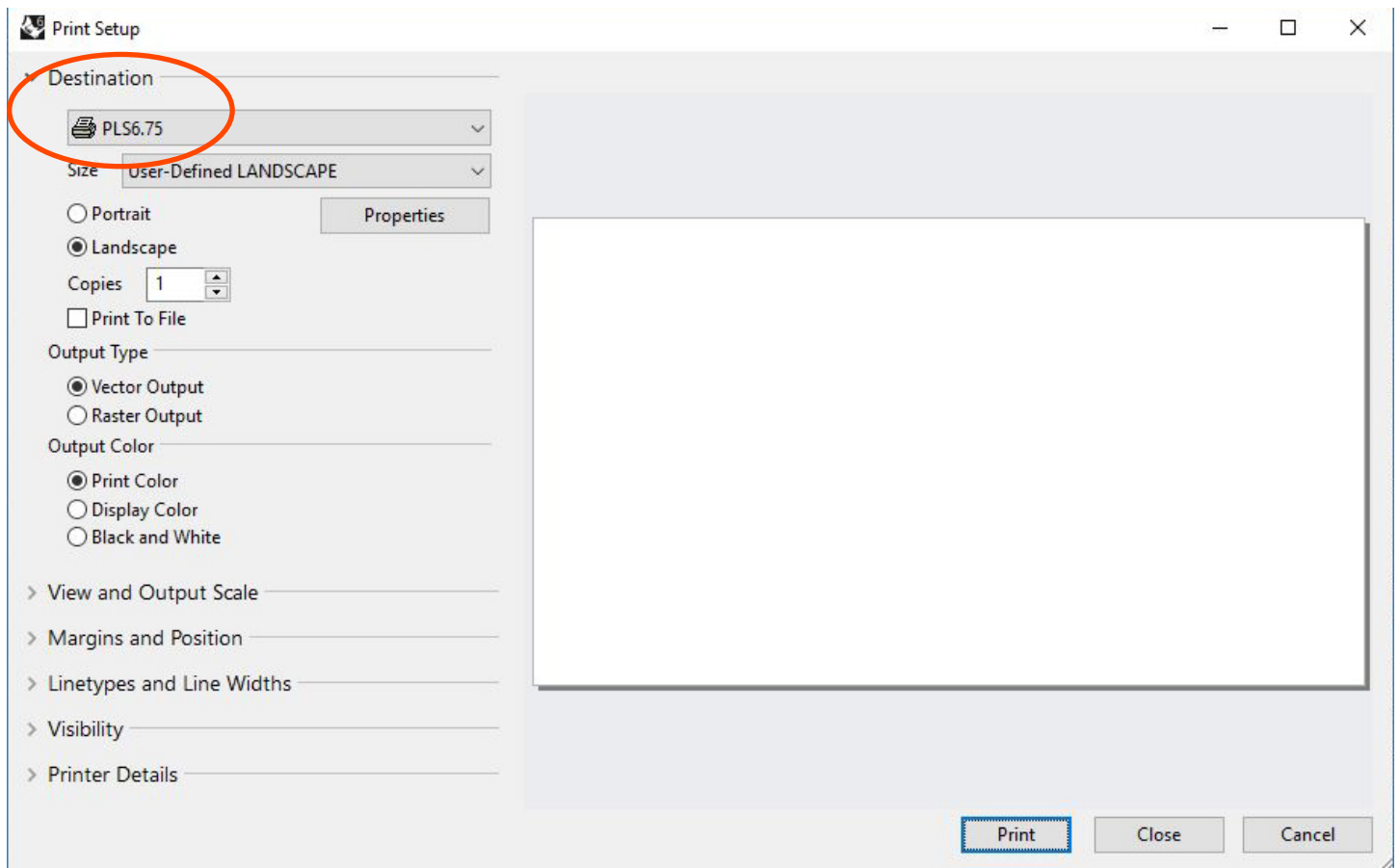
In the laser cutting lab:

Make sure the station computer is connected to the laser cutter and both are on. Load your file onto this computer.

“Print” will open the Print Set up window.

Make sure “Destination” is set to the laser cutter.

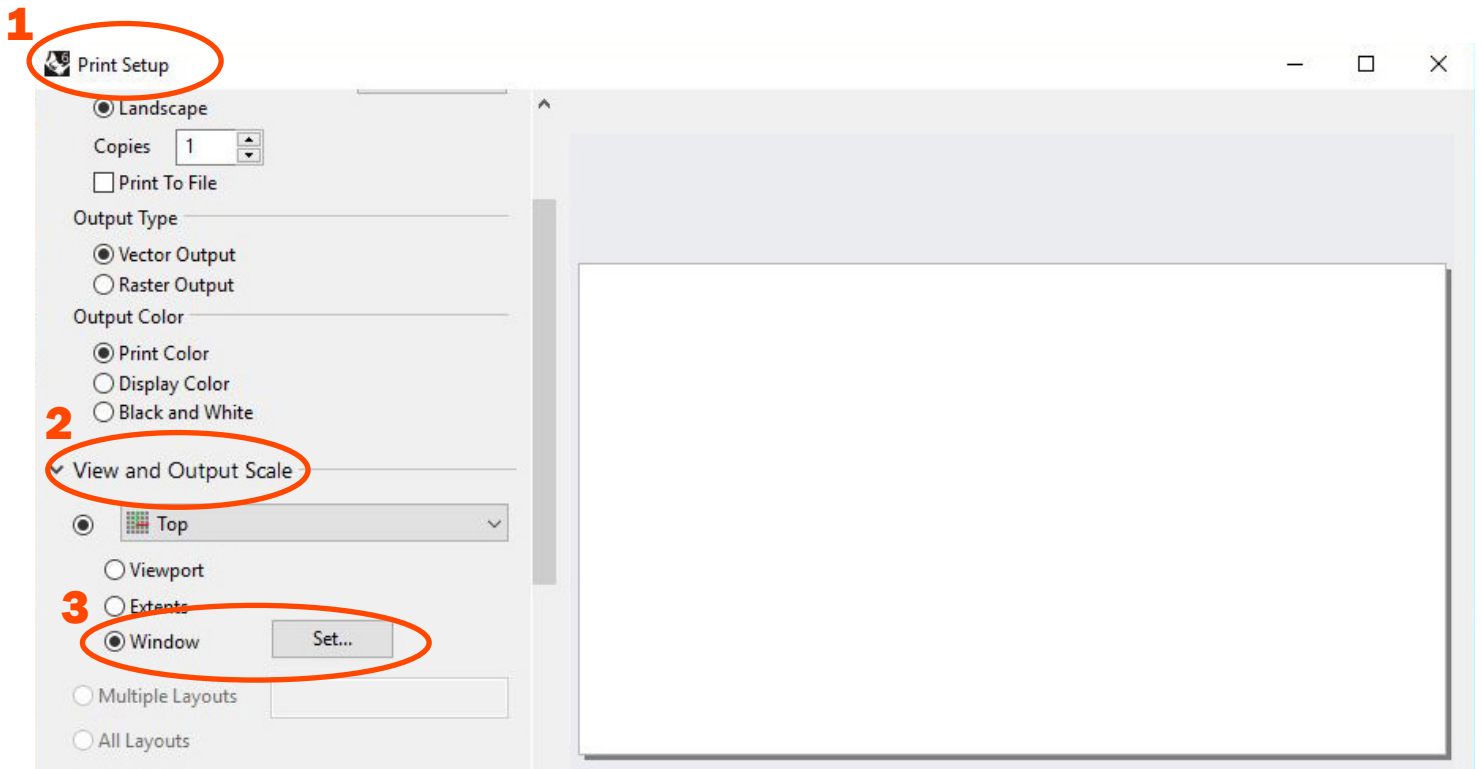
Typically it is named “PLS” + a number.



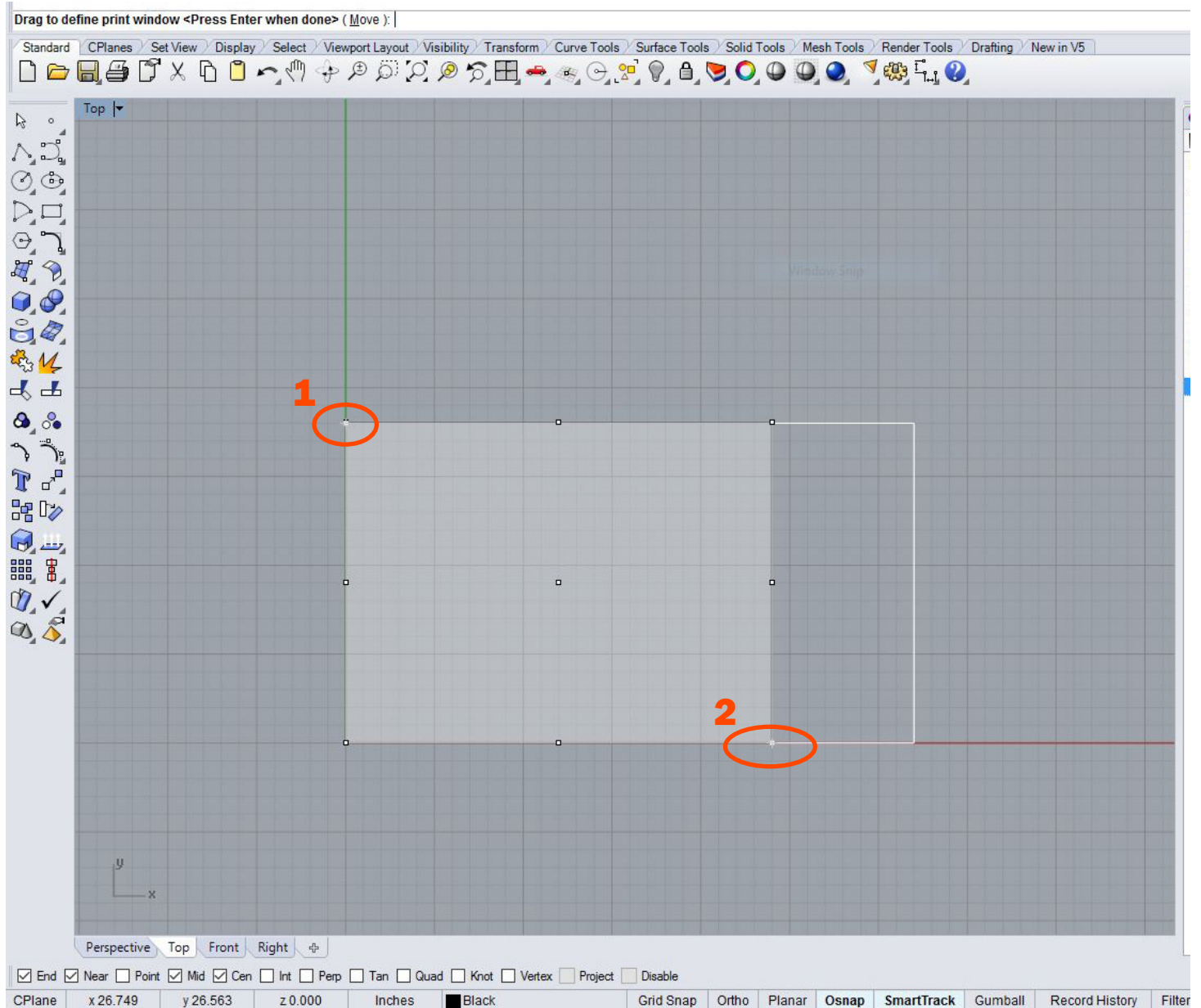
STEP 04

Make sure your SCALE is set correctly.

In "View and Output Scale" use "Window > Set" to set your scale from the TOP view.



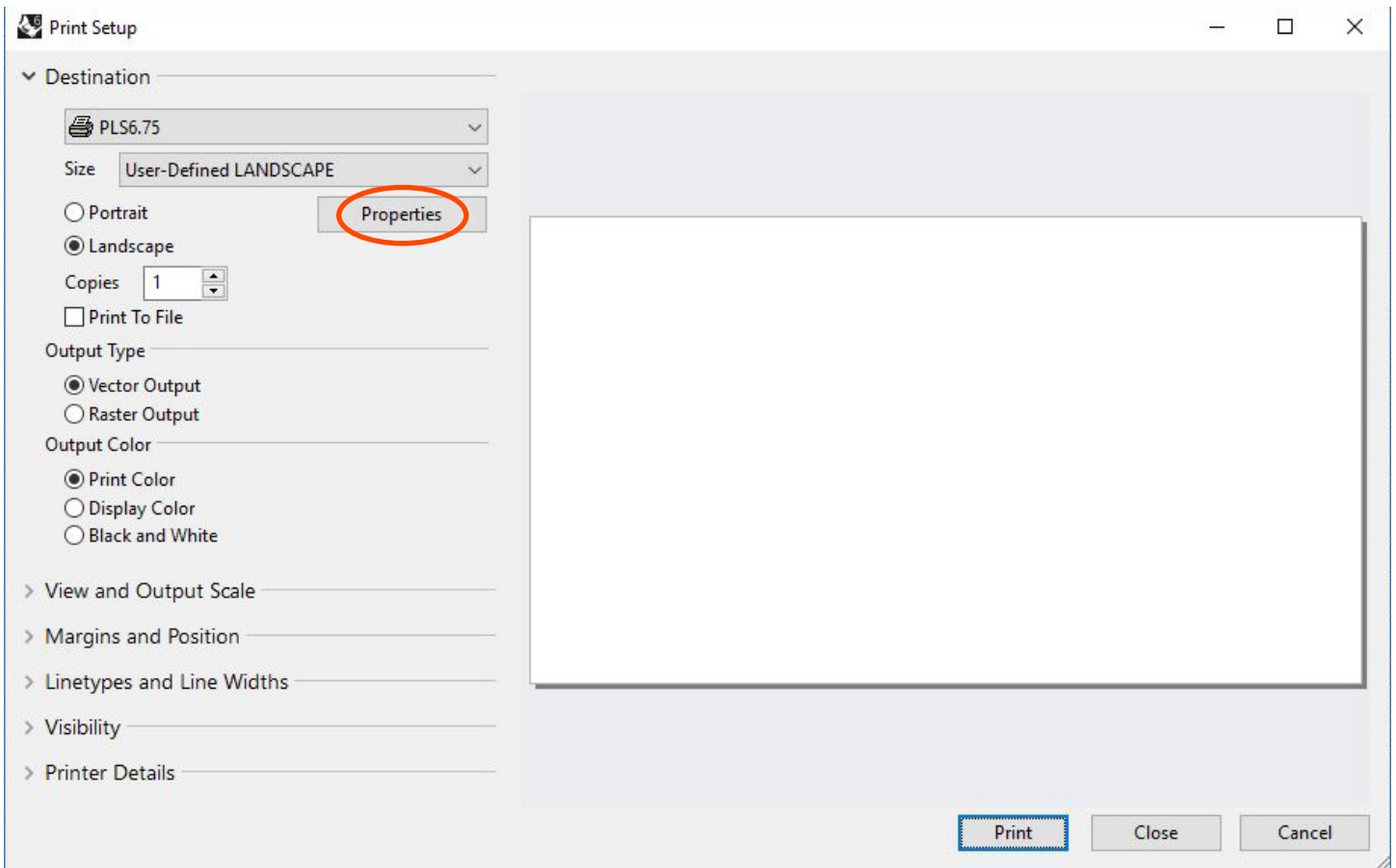
STEP 04 (continued)



Using the "End Point Osnap" set the gray rectangle to either the 18 x 24 or the 18 x 32 Machine Bed. Depending on which laser cutter you are on, the gray rectangle will have different proportions. Hit "ENTER" when done.

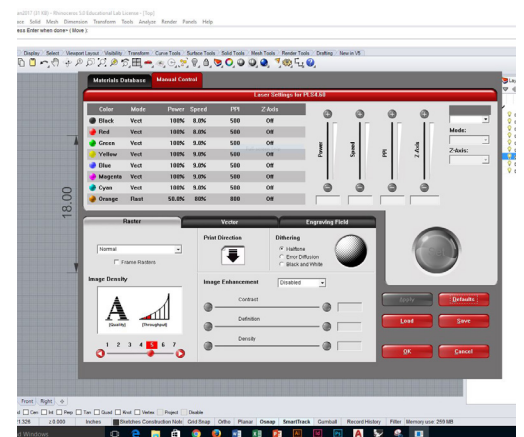
STEP 05

Make sure your LASER PROPERTIES are set correctly.



“Properties” will open the standard laser window where you set:

POWER, SPEED, and PPI.



STEP 05 (continued)

Color	Mode	Power	Speed	PPI	Z-Axis
Black	Vect	100%	7.0%	1000	Off
Red	Vect	35.0%	75%	500	Off
Green	Skip	0.0%	0.1%	0	Off
Yellow	Skip	0.0%	0.1%	0	Off
Blue	Skip	0.0%	0.1%	0	Off
Magenta	Skip	0.0%	0.1%	0	Off
Cyan	Skip	0.0%	0.1%	0	Off
Orange	Skip	0.0%	0.1%	0	Off

Index cards located at each machine will give you guidelines for that machine and the operation you want to perform.

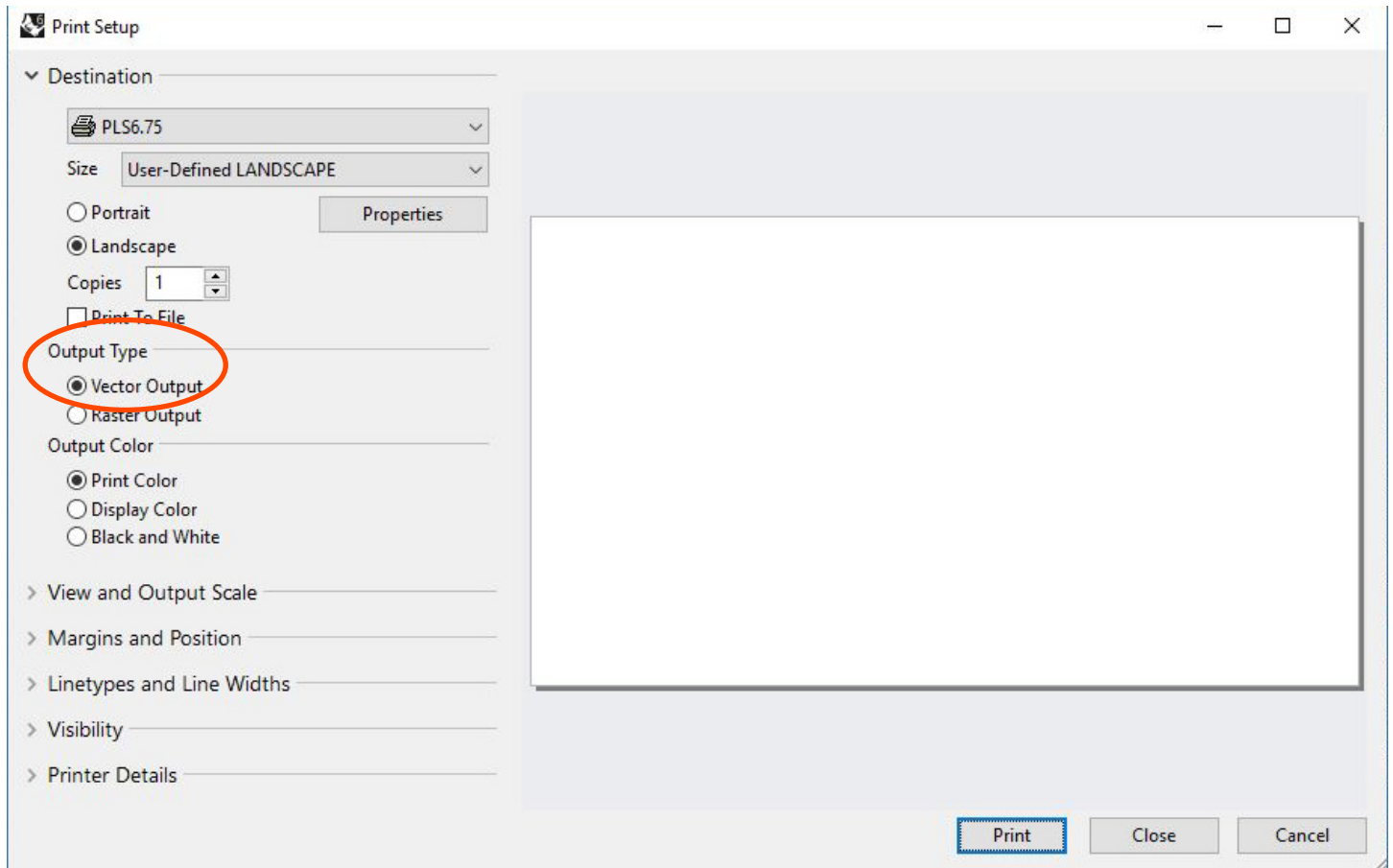
POWER, SPEED, and PPI.



STEP 06

"Output Type" can affect whether the laser cutter will recognize geometry and/or whether it will distort a raster image.

It is typically set to "vector."



STEP 07

Select "Print" to send the file to the laser cutter.

STEP 08

After a few seconds, you should see your filename on the screen on the control panel of the laser cutter in a format like "301 OF 301 MY CLASS PROJECT." If you do not, ask a staff member for help.



STEP 09

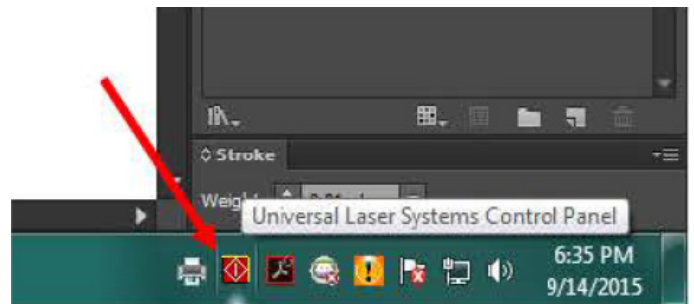
Open the lid of the laser fully, making sure it does not drop when you let go of it, and place your material in the bed of the laser, making sure:

- That it lines up with the steel rulers on the top and left sides of the bed,
- That the height of your material will not interfere with the nose cone of the laser,
- That it does not hump up in the middle of the sheet or curl up sharply on the edges.

All of these situations will cause the nose cone to catch on your material and ruin your work.

STEP 10

Click the Universal Laser Systems Control Panel icon in the lower right corner of the screen to open the Control Panel.

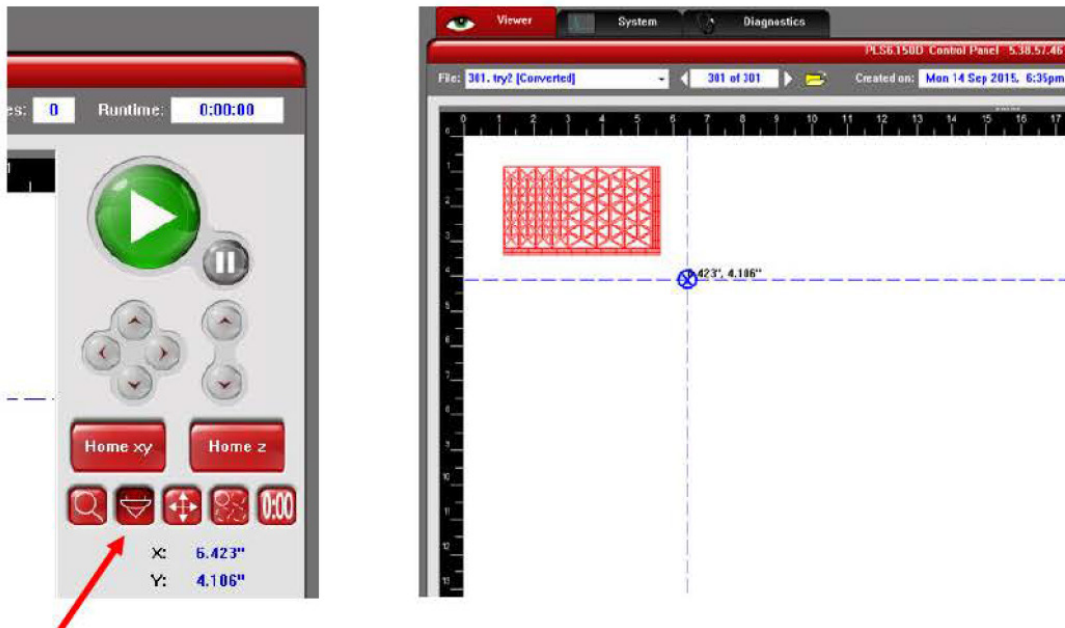


The Control Panel displays a virtual view of the laser cutter bed and allows for calibration and cut control.



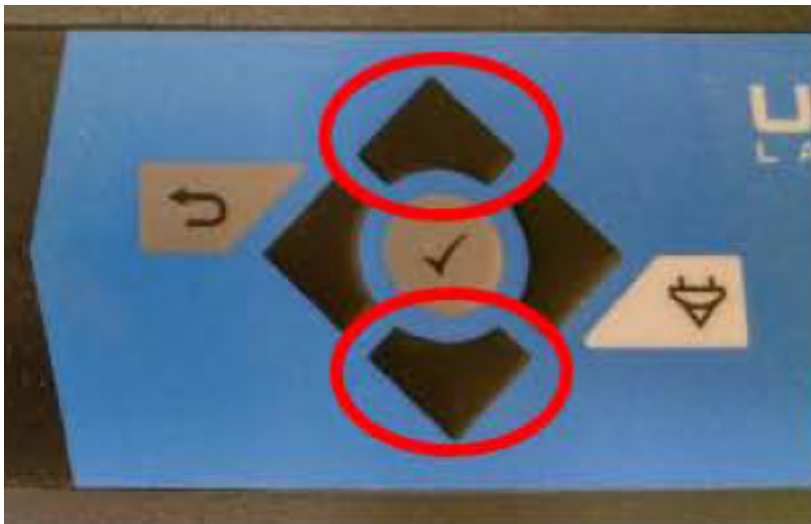
STEP 11

Click the Focus icon on the right hand side of the screen, then click on a location over your material. The laser focus carriage will move toward the location you clicked.



STEP 13

Place the focus tool on top of the material, near the laser focus carriage. Raise or lower the bed using the UP and DOWN buttons on the machine so that the notch at the top of the white part of the tool rests against the side of the focus carriage.



STEP 14

Slowly raise the bed until the beveled edge on the focus tool touches the bottom edge of the focus carriage and you see the top of the focus tool start to tilt away from the focus carriage. Move the bed back down slightly until the tool sits perfectly flush with the carriage.

Press the Select (checkmark) button on the machine to change move increment per press of the UP and DOWN buttons.



STEP 15

Close the lid of the laser cutter and press the green Play button when ready.



STEP 16

If you need to examine your work or clear loose debris or dust from your sheet while the file is cutting, press the Pause button on the machine firmly or use the Pause button in the Laser Control Panel on the computer. It will sometimes take a second or two, but the laser will stop cutting and park in the top right corner. You may now raise the lid of the laser and inspect your work. Take care not to shift the sheet of material you are cutting, or the rest of the file will be misaligned. When ready to finish cutting, close the lid and press the Play button, and the laser will pick up precisely where it left off.



MISC

- 1) **Have a monitor assist you with focusing the machine and placing your material until you've developed competence.**
- 2) Leave the paper on the bottom side of acrylic to protect it from smoke and scratches.
- 3) Always do test cuts on scrap areas of your material to verify settings.
- 4) Work inside-to-the-outside when planning your cut order.
 - First: All rastering
 - Second: Vector scoring
 - Third: Vector interior cuts
 - Fourth: Vector outside cuts (always cut the part out last)

TIPS

- If you send a file and nothing happens or nothing shows up on the Control Panel screen, check your color mode, check your stroke weight, and check your line colors. This fixes 90% of such problems.
- Don't forget that you can score with vectors as well as through-cut. This is usually much faster than scoring with rasters.
- Recall that the lasers will always cut all your rasters first, and then all your vectors. Recall also that if you have, say, several vector cuts, the laser will cut them in order of color from black to yellow, just like in your LASER RGB color swatch. Use this to organize your drawing so that you cut your scores first and your through-cuts last. This will help keep you from losing small pieces and snagging your sheet on the nose cone.
- Remember to leave yourself enough time to cut your file. Bear in mind that the more complex your design, the lower your speed settings are, or the more rastered artwork you have, the longer you will need to cut your file.
- If you have a huge file that you know will take a long time to run, such as a sheet with hundreds or thousands of parts, you can divide it into several areas with a margin in between each, and output them as separate files. Doing this will allow you to pull your sheet off the laser while only partially complete and come back to finish your work later without having to throw your material away and start over.
- If you have very tiny pieces you worry might blow away or fall through the honeycomb, you can put "tabs" or "bridges" on them: tiny gaps in the outlines of your pieces that leave them connected to your skeleton. The easiest way to do this in Illustrator is to simply make very small rectangles or circles with white fills and no stroke and position them over the perimeters of each shape in one or two spots. The laser will "see" a gap in your vector. As an added benefit, this allows you to quickly pick up your whole sheet and trim pieces off as you need them at your desk. This works very well for paper and cardstock, which is the biggest offender, but is slightly trickier when cutting acrylic.
- If unsure about your settings, or still becoming comfortable with the laser cutter, make a small test cut either on a part of your sheet you will not need, or on a separate piece of scrap of the same material you're using for your finished file.