

CASSWORKS

Laser Cutting guide for TROTEC

The TROTEC Laser cutter is used to support student projects, for demonstrations and to support Academic programmes.

The student operated service is available Monday to Friday on the 1st floor in the Metropolitan Works building, the link for more information is:

There are three types of process possible on the laser cutters:

Cut: Cut right through the material, along drawn vector lines.

Score: In this case the strength of laser power is set low so that it marks the material but does not cut through, again along vector lines.

Raster engraving: The material is etched away to a small depth over wider areas. The drawing for this will show a filled area.

Capacities and Materials:

The small laser (Universal) has a bed size of 600 x 450mm. It is good for cutting all cards, papers, fabrics, and for acrylic up to 5mm thick.

Walnut and other non-resinous woods up to 4mm.

Laser cutting grade plywood up to 3mm.

No mdf on this machine.

The large laser (Trotec) has a cutting area of 1200 x 700mm.

Bed Size 1420 x 820 mm

All cards, papers and fabric. A very nice card to use is 'HD' or High Density card – it cuts very cleanly. Also Finn board is good if you need something thicker.

It can cut acrylic up to 10mm, but it gets rather slow above 6mm.

Plywood – must be laser cutting grade – up to 12mm in theory, but again gets very slow above 6mm. Thicker than that is only practicable for simple shapes of not great size.

MDF - as for ply.

Real wood up to 6mm.

Other possible materials:

Foam – must be polyethylene. Polystyrene and foam board are not possible.

Leather, Rubber, Felt.

Both machines will hold much thicker pieces if is just scoring or raster engraving that is required.

Material need to lay flat on the laser bed so that the laser stays in focus. Slightly warped card and thinner ply can usually be taped or weighted down, but seriously bent and thicker ply can be a problem, or impossible to deal with. You should consider leaving a margin of 25mm or ore to put weights on if you think your material may be a problem in this regard.

Drawings:

Software:

The small laser is driven from ACAD 2004 or Corel Draw Version 12.

The large laser is driven from ACAD 2010 or Corel Draw Version 15.

File types:

From CAD programs .dxf or .dwg files are required. If using anything other than Autocad then .dxf is probably safest.

For maximum compatibility save as Acad 2007 or 2004.

If using Rhino, be sure to 'export as' rather than 'save as' and select 'natural, R12' for the dxf version.

Otherwise use .ai or .cdr (Corel Draw), and pdf files generated from Illustrator also work.

Lines, Layers and Colours:

In ACAD on the Trotec, lines cannot be plotted if they are closer than 4mm from the material edge, so leave a margin of at least 4mm.

Cad drawings should use at least two layers. Put all lines to be scored on one layer, any internal cuts on another, and the external cuts around the periphery of the component in a third layer.

Score lines should be coloured red, internal cuts blue, external cuts cyan, but if arranged properly in layers, appropriate colours can be set on the laser's computer.

Colours should be plain colours in RGB, not compound colours.

Vector lines should be the thinnest possible.

Anything to be raster engraved can be black (or white if using dark background).

Please join up components if possible – e.g. if you are making a number of identical rectangles, then draw one big rectangle divided up into small ones. This can save a considerable amount of cutting time, as well as being more economic with your material. In that case, put all of the vertical lines on one layer and all of the horizontal ones on another.

Make sure there are not two or more lines in the same place – the laser will follow both lines so that you material is cut twice. This usually causes charred, sooty marks on your work (and wastes time).

Scaling:

Please have your parts drawn at the scale they are to be made, with dimensions in mm. For example, do not come with a drawing of a full-sized house or chair and tell me it is 20:1 or similar. Make sure that you know the actual size of some of the model parts – so that we can check they are at the right scale here before cutting.

You should think before you arrive about the model you are making; the full-sized object is not of interest here. So if you are scaling down details, check the size of the model objects – are those glazing bars in your windows going to be only 0.2mm wide? They will disappear in a puff of smoke!

You may need to make some elements out-of-scale in order for them to remain, or do without them. Also you should consider reducing the amount of detail on, for e.g., a house facade – will all those tiny lines really add to your model, or just look too fussy? Too much detail can take a very long time to score or cut.