since 2008

Laboratory of Construction and Technology

Terms and Conditions for Using the Laser Cutting Machine

The Construction and Technology Laboratory of EAUM is equipped with a laser cutting and engraving machine with a maximum working area of 1800 x 1500 mm, provided with a laser CO2 tube of 80W. This equipment is commonly used to speed up the model making process.

1. General operating rules

Instructions for use

- The equipment works always under the supervision of a technician.
- It is convenient that the design includes a minimum margin of 5 mm from the edges of the material to cut.
- The material should be provided by the user. The plates should be cut perfectly straight and flat.
- Irregular plates could damage the machine and the technician has the right to refuse to cut them.
- It is recommended that the user provide some extra plate(s) for eventual errors.

Recommended materials:

- Paper and Cardboard Bristol / duplex
- Pressboard and wood card (max. 3 mm thick)
- Corrugated cardboard (max. 10 mm thick)
- MDF, Plywood and Cork (max. 6 mm thick)
- Balsa wood (max. 10 mm thick)
- Extruded and Casted Acrylic (max. 8 mm thick)

Materials that can be etched but not cut:

- Glass
- Ceramic tiles
- Stone

Forbidden materials:

It is forbidden the use of materials whose toxicity can cause breathing problems, or could damage the CO2 laser tube. The following materials cannot be used:

- PVC
- Polycarbonate with chlorine
- ABS
- Polystyrene Foam
- Polypropylene Foam
- Fiberglass
- Coated Carbon Fibre
- Metals
- Mirrored Surfaces

2. Opening hours

Since the technician responsible for operating the laser cutting machine performs other functions in the LCT related with research activities, the use of the laser equipment is restricted to the following period: between 14:00 and 17:30 from Monday to Friday.

3. Request

The request for a cutting session should take place three working days before the desired date. For this purpose the applicant must complete the form available at LCT web page and send it to the email lct@arquitectura.uminho.pt, specifying the scope of the work and the material to be cut. To be able to make an estimation of the time required to complete the work and the correspondent budget the applicant should attach a CAD file (*.dxf* format) with 2D model to cut.

The answer to the request will be sent by e-mail indicating whether it has been accepted, the scheduled period assigned and the necessary material. The material should be delivered in the LCT on the previous working day.

4. CAD file

The CAD file should contain only 2D vector information, and preferably of the type *.dxf*. The unit of measure the model should be millimetres (mm).

In the file preparation it should be taken into account the following aspects:

- The file can be produced in any CAD program, since exportable in *.dxf* and compatible with AutoCAD 2013 or earlier.
- The LCT provides an example with the base configuration for the use of the machine.
- The drawing elements to cut and etch should be in different layers with different settings (example for AutoCAD):

Function	Name of the layer	Colour	Line type	Thickness
Cut	CORTA	BLUE (5)	continuous	0,00
Etch	GRAVA	RED (1)	continuous	0,00

When drawing all the elements the applicant should take into account the following points:

- Lines, arcs and continuous curves should be merged as polylines (in AutoCAD it can be used the *JOIN* command);
- There should be no overlapped lines and polylines (in AutoCAD it can be used the command *OVERKILL* to delete collinear elements);
- All the drawing elements should be at level 0 (in AutoCAD it can be used the command *FLATTEN* to plan every drawing lines and curves in Z = 0);
- All text should be converted to vector format (lines and curves). In AutoCAD it can be used the TXTEXP command. This command has better results in the conversion of types of letter *.shx* (dim.shx, simplex.shx, monotxt.shx, ...);
- The minimum recommended spacing between the lines to cut is 1 mm and 0.5 mm between lines to etch. These distances may vary depending on the material, i.e. MDF allows smaller tolerances than cardboard.

5. Prices and Payment

The minimum cost corresponds to one hour. After the first hour the costs is accounted in half an hour fractions.

The following prices will be charged to professors, researchers or students of EAUM, academic and research works:

- € 10.00 for the 1st hour;
- € 15.00 for the 2nd hour;
- € 25.00 for the 3rd hour.

Exceptionally and upon availability it may be allowed more time-consuming works, being charged the following prices in academic and research works:

- € 40.00 for the 4th hour;
- € 60.00 for the 5th hour;
- € 85.00 for the 6th hour;
- € 110.00 for the 7th hour;
- € 140.00 for the 8th hour.

For projects outside the academic and research scope, the prices to be charged are twice the above.

In calculating the cost it will be considered accumulated time by the applicant in the current academic year.

Examples:

First work taking:

- 10 minutes: 10,00 €
- 40 minutes: 10,00 €
- 80 minutes: 10,00 € + ½ × € 15.00 = € 17.50
- 100 minutes: € 10.00 + € 15.00 = € 25.00
- 3 hours and 10 minutes: € 10.00 + € 15.00 + € 25.00 + ½ × € 40.00 = € 70.00

Second work of 20 minutes of an applicant with the accumulated time of:

- 60 minutes: ½ × € 15.00 = € 7.50
- 90 minutes: ½ × € 15.00 = € 7.50
- 2 hours: ½ × € 25.00 = € 12.50
- 3 hours: ½ × € 40.00 = € 20.00

Second work of 50 minutes of an applicant with the accumulated time of:

- 60 minutes: 15,00 €
- 90 minutes: ½ × ½ × € 15.00 + € 25.00 = € 20.00
- 2 hours: 25,00 €
- 3 hours: 40,00 €

The work may only be delivered after a valid payment.

Payment will be made through the “coin acceptor”. For that purpose the user should address the EAUM secretariat having a budget in the “coin acceptor” equal to greater to the price previously reported by the LCT technician in order to charge this value and notify LCT.

The non-accomplishment of the procedures and deadlines established in this rules will lead to the non-acceptance of future requests of that user and may result in other penalties.