# LASER CUTTER

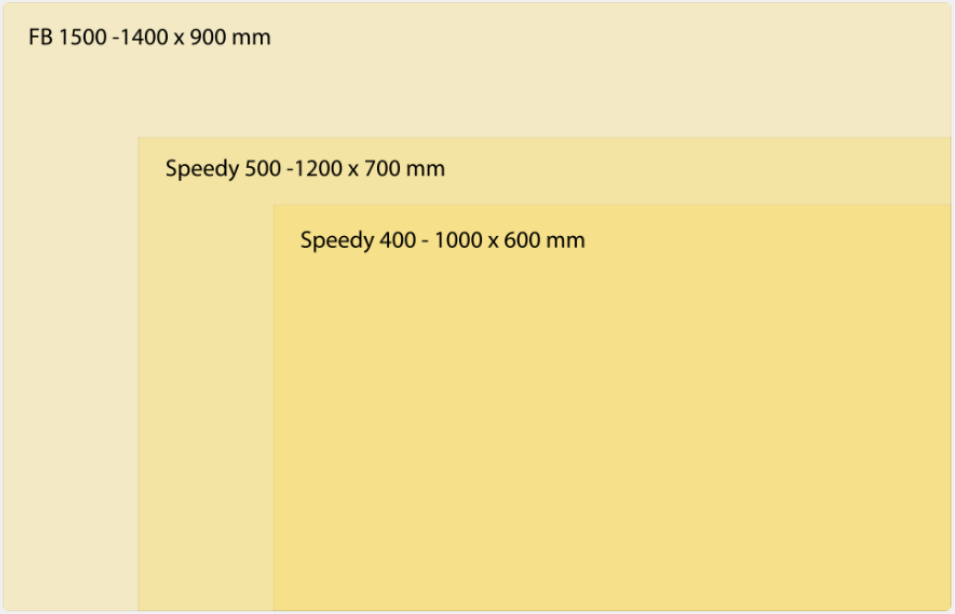
**and references**

# Laser Cutter Resources

- LCF TECHNICAL RESOURCES

FAB LAB

# Laser Cutter Bed




Download

Laser Cutting Blank Template

Illustrator Template

# Material Checklist

| MATERIALS | THICKNESS | Engrave | Score | Cut |
|---|---|---|---|---|
| Wood | | | | |
| Hardwoods | 0.5mm-6mm | Y | Y | Y |
| Softwoods | 0.5mm-6mm | Y | Y | Y |
| MDF | 3mm-6mm | Y | Y | Y |
| MDF | 9mm-25mm | Y | Y | N |
| Shutter Plywood | 18mm-21mm | Y | Y | N |
| Birch Faced Plywood | 3mm-25mm | Y | Y | N |
| Laser Plywood | 3mm-6mm | Y | Y | Y |
| Wood Veneers | 0.4mm-6mm | Y | Y | Y |
| Plastic | | | | |
| ABS | Imm-3mm | N | Y | Y |
| Acrylic | 0.5mm-12mm | Y | Y | Y |
| HIPS (Styrene) | 0.5mm-2mm | N | Y | Y |
| HIPS (Styrene) | 2mm-3mm | N | Y | N |
| PETg | 0.5mm-2mm | N | Y | Y |
| PETg | 2mm-3mm | N | Y | N |
| PP (Polypropylene) | 0.5mm -1.5mm | N | Y | Y |
| PP (Polypropylene) | 2mm-3mm | N | Y | N |
| PVC | 0.5mm-3mm | N | N | N |
| Card & Paper | | | | |
| Paper | 80-300 gsm | Y | Y | Y |
| Card | 300-800gsm | Y | Y | Y |
| Corrugated card | 2mm-6mm | Y | Y | Y |
| Foam Board | 3mm-10 mm | Y | Y | Y |
| Fiber | | | | |
| Calico | This is just a small example of some of the materials we have been asked to cut, many more weights and thicknesses have been tested. If you are unsure bring us a sample to test | Y | Y | Y |
| Canvas | | Y | Y | Y |
| Chiffon | | Y | Y | Y |
| Cotton | | Y | Y | Y |
| Damask | | Y | Y | Y |
| Denim | | Y | Y | Y |
| Fur | | Y | Y | Y |
| Faux Fur | | Y | Y | Y |
| Jersey | | Y | Y | Y |
| Jute | | Y | Y | Y |
| Latex | | N | N | N |
| Leather | | Y | Y | Y |
| Faux Leather | | N | N | N |
| Linen | | Y | Y | Y |
| Lycra | | N | Y | Y |
| Nylon | | Y | Y | Y |
| Organza | | Y | Y | Y |
| Polyester | | Y | Y | Y |
| PVC vinyl | | N | N | N |
| Satin | | Y | Y | Y |
| Silk | | Y | Y | Y |
| Synthetic | | Y | Y | Y |
| Wool | | Y | Y | Y |

# HEALTH AND SAFETY

# CAUTION

- Do not leave the machine unattended at any time – fire risk!
- There must be a member of staff in the room and you must ask permission before using the laser
- The laser gives off infra-red radiation - do not let your eyes or skin be exposed to it
- Never stare at the red laser dot, main beam or flash back
- Some materials produce hazardous gases - you must always know the fibre content/coating of your material (check with supplier)
- Never remove or disconnect any of the safety devices

# SAFETY DEVICES

There are 3 safety devices that protect the operator from the laser beam:

- Polycarbonate safety cover.
- The safety cover operates a electromechanical interlock. There is a red indicator light that show us that the cover is properly shut and the cutter is online. **The laser will not work if the cover is not shut.**
- Emergency stop button on control panel.

# Precautions

- LEV: cutter has an extraction system.
- Fire : there is a carbon dioxide fire extinguisher located next to the door.
- Training: staff and students must attend an induction before being able to book or use the laser cutting machine.
- Cutting materials: you must always make sure the material is suitable to be cut and does not produce toxic gases. Use 4D model shop for appropriate materials. **No Perspex ordered from amazon.**
- Extraction system: you must ensure the extraction is working properly and there are no blockages. You can hear a sound when this is running properly.

# Open Illustrator

- Go to ‘File’ > ‘New’
- Set ‘Number of Artboards’ to ‘1’
- Select the size of artboard from the pre-sets, or type in the exact height and width you require. You can set your artboard to be the size of your material if you wish
- In the ‘Advanced’ tab, set **‘Colour Mode’ to ‘RGB’**
- Press ‘OK’

# Preparing your Design

**How to prepare the file**

**Save as Ai.**

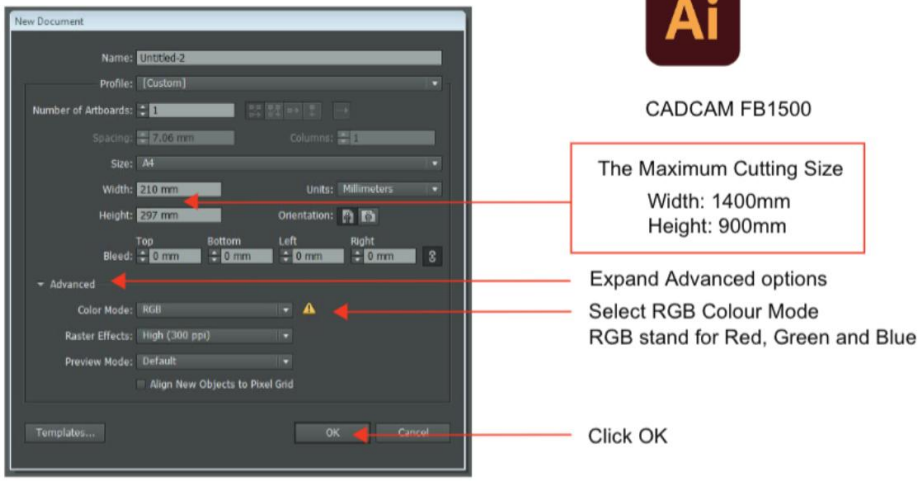
**Step 1**
Click **File / New** to create a New Document in Adobe Illustrator

**Step 2**
Set up the **Size**
Please note the Maximum Cutting size
Width: 1400mm
Height: 900mm

For example: A4 Size 297mm x 210mm
We have to leave a margin of 30mm
Set your file size
Width: 297-30= 267mm
Height:  210-30= 180mm

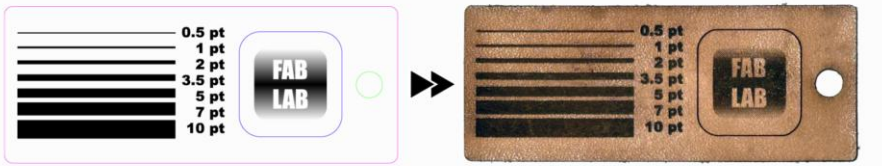
**Step 3**
**Colour mode: RGB**

**Step 4**
Click **OK**



# Cutting/ Engraving

1:1 Scale Vector Line Drawing in Adobe Illustrator




Area Engraving / Line Scoring / Cutting: Interior shapes / Exterior shapes

Fill in Greyscale Colours
Stroke is none

Fill is none
Stroke is Blue

Fill is none
Stroke is Green / Magenta



Blue

**Blue- R:0 G:0 B:255**

Blue is used to produce score lines on the surface of a material.
It can be only be thickness of laser which is 0.25mm. It can be any shape or length. The depth is assigned and depend-ent on the thickness of the fabric.



Green

**Green- R:0 G:255 B:0**

Green is used to cut through the material.
The cut line is approximately 0.25mm thick. This is the first of two cutting processes. This first one is for interior shapes to be cut before the exterior shapes.



Magenta

**Magenta- R:255 G:0 B:255**

Magenta is used to cut through the material. The cut is approximately 0.25mm thick.
This is the second of two cutting processes, and should be used for exterior shapes.



Black

**Black- R:0 G:0 B:0**

Black is used for engraving, where the material is burned away to assigned depth. This can be any pattern, text or shape and can be of any thickness.

# Engraving from and Image

- Import your image by clicking on ‘File’ > ‘Place’ selecting your image and clicking ‘Place’
- Scale your image to the correct size by dragging the corners of the image – hold down ‘Shift’ as you drag to keep the image in proportion
- Check the width (W) and height (H) in the top right of the screen – you can type in the size you want here too
- Click on ‘Embed’ in the horizontal tool bar
- Click on ‘Edit’ > ‘Edit Colours’ > ‘Convert to Greyscale’
- Click on ‘Edit’ > ‘Edit Colours’ > ‘Adjust Colour Balance’ to make the image lighter or darker

# Stroke + Uploading Files to Fab-lab

**The Path Settings**

Please Check the following path settings:

No Fill, Stroke only
Stroke thickness 0.05pt
Select Uniform and basic stroke style




- Click on ‘File’ > ‘Save As’, name your design and save onto OneDrive or a personal USB stick.
- **Save as Ai.** so FabLab can make amendments to your design.
- This will be uploaded onto form below for approval from FabLab.
- You will be given a timeslot once file has been checked and approved.

Upload Files for approval here

Upload files to Fab Lab

# Bookings

**The Booking Workflow**

You'll need to complete the in-person laser induction and Laser Cutting Assessment before proceeding with the booking workflow.

1. Create a CAD file of your design, ensuring it is formatted correctly.
2. Submit the CAD file for approval via the Forms.
   - Provide the desired date and time for your appointment.
   - Include a brief description of the material you will be using.
3. If your file is approved, the technician will confirm your booking time slot.

   The technician will inform you of the price and the estimated duration of the laser cutting process.

   If your file does NOT pass approval, the technician will provide feedback for improvements via email. You will need to resubmit the file for approval.
4. Complete the laser cutting fee payment through the UAL e-store.

   *You will need your order number for self check-in.
5. Prepare your material, ensuring it is in a block shape and remains flat.

   Arrive on time for your appointment. If you cannot make it, please inform us as soon as possible.

Please save the Order Number after payment.
[UAL000000]

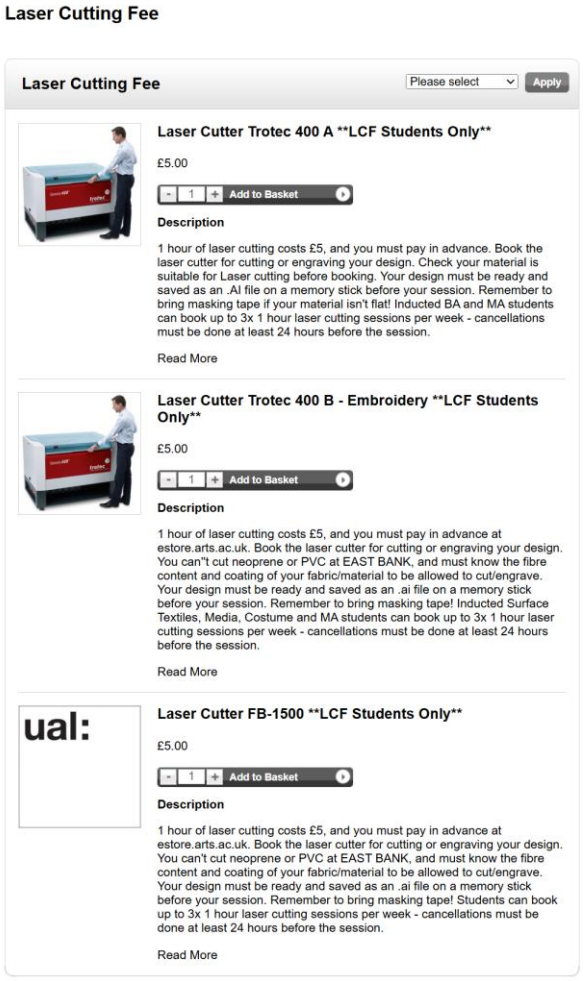
Start Laser Cutting Assessment here

15 min Induction Assesment

# Estore Link (UAL Order Number)

[Estore]

3 hour bookings per week



# Bookings

Booking on the Day

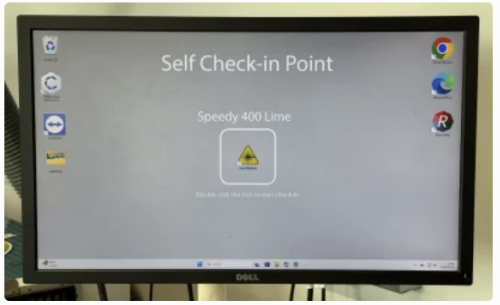
1. Upon arrival, check in at the designated check-in point.

   Make sure to have your laser cutting fee Order Number [UAL000000] ready.

2. Prepare your material and set up the laser cutter.

   Wait for supervision from the FabLab Technician.

3. Start the laser cutting process, but stay nearby to monitor the entire process.

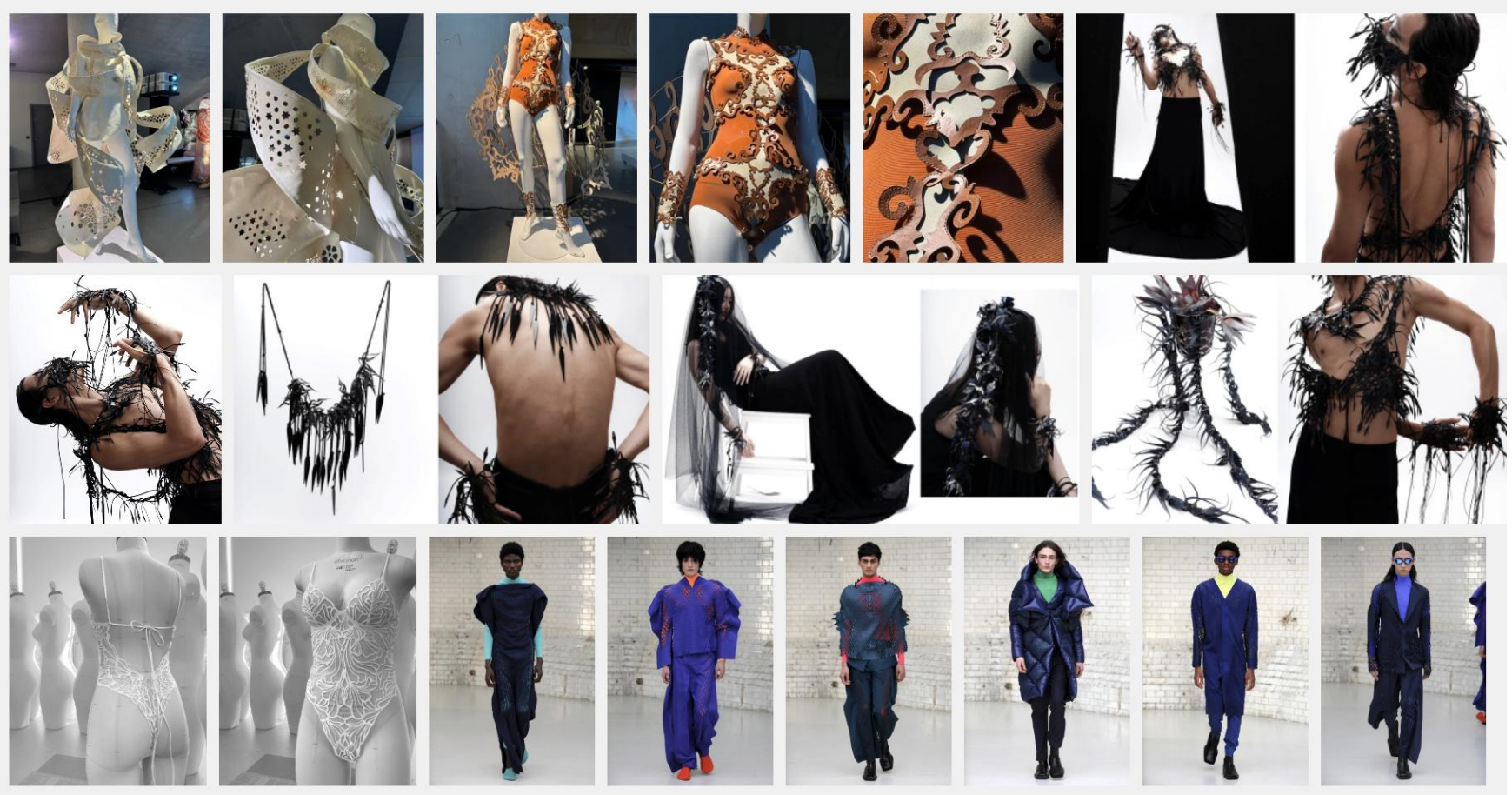



Please use a correct computer to check-in.

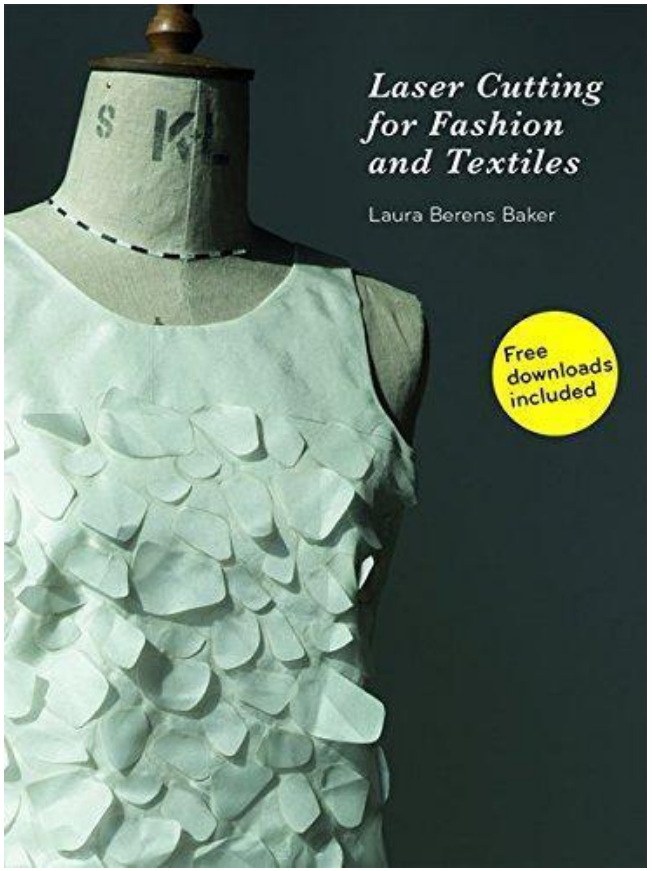
Self check-in point:

Speedy 400 Lime
Speedy 400 Gold
Speedy 500
FB 1500

# Past Students Work

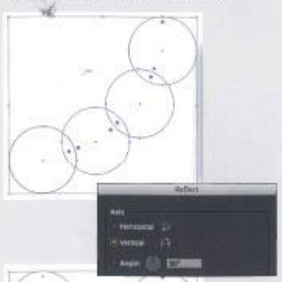


# Library Resources

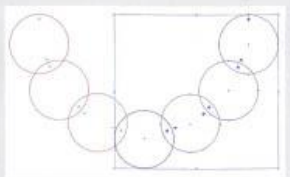


## Step 4

Now duplicate and mirror all the green and magenta circles to create the second side of your pendant.
**Select > All**
Hold down the Control key, click the mouse to bring up a menu and select Transform > Reflect. In the Reflect dialogue box, select Vertical and an angle of 90 degrees. Tick Preview and then click Copy.

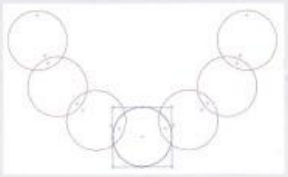



Using the Selection tool, drag the second set of circles to the right, positioning the centre circles on top of each other to create a semicircular shape.

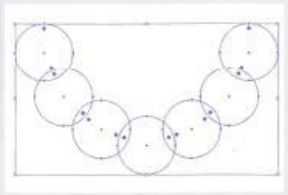


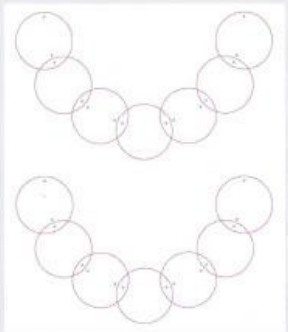
Step 4 (continued)

Select the centre circle and **Edit > Cut** to remove the extra intersecting circle.



Next create a second semicircle. **Select > All** and then, holding down the Alt key, select the group of circles with the Selection tool and drag the new set beneath the first. Click outside the circles.

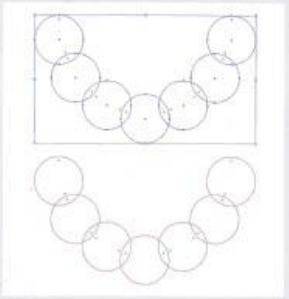






## Step 5

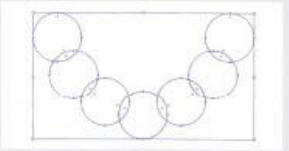
Now you need to remove the intersecting points to create a set of shapes that will fit next to each other rather than overlapping.
Select the top left-hand magenta circle from the first semicircular shape and then, holding down the Shift key, select the other magenta circles, avoiding the green circles.



To remove the intersecting areas, choose **Window > Pathfinder** and then click Divide from Pathfinders in the Pathfinder panel.

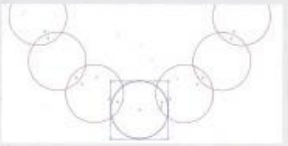



Double-click on path around the top left-hand circle. Layer 1 <Group> will appear at the top left of the screen.

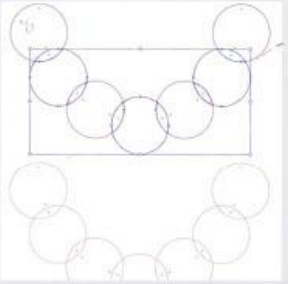


Step 5 (continued)

Select the centre circle and **Edit > Cut** to remove the extra intersecting circle.



Select circles 2, 4 and 6 (every other circle) with the Selection tool.



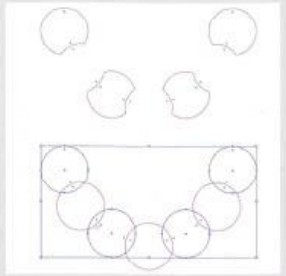
Holding down the Shift key, click on the path of each shape that you want to remove. Then select **Edit > Cut** to remove these three circles and the intersections with the other four circles.

Step 5 (continued)

Finally, click once on the arrow (Back one level) on the top left of the screen, and then click again to Exit Isolation Mode.




Now hold down the Shift key and select circles 1, 3, 5 and 7 from the second semicircular shape.

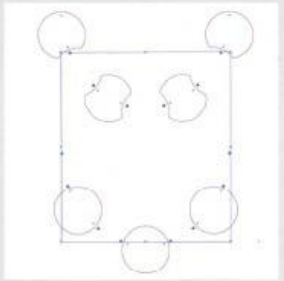


Select **Edit > Cut** to delete, leaving three circles that will fit in the spaces left in the first semicircular shape.

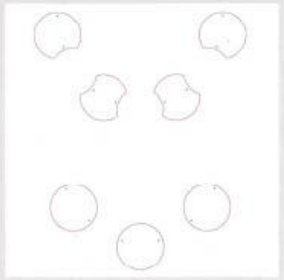


Step 5 (continued)

Once again, hold down the Shift key and select all the green circles outside the magenta circles.



Select **Edit > Cut** to delete them, leaving just the green circles inside the magenta circles through which you can thread jewellery chain links to join the remaining shapes together. (Links can be bought from a specialist supplier or craft shop.)



Finally, **Select > All** and change the stroke weight of the circles to 0.05 pt in the Control panel to create a finer cutting line for the laser-cutting machine. Save the file as circle_necklace.ai. **File > Save As**






## *Making instructions*

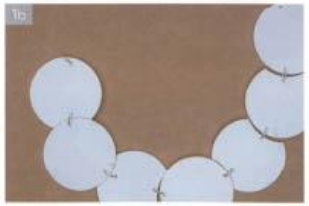
**Step 1**
Laser cut your pieces from acrylic and join them together with your chosen metal links.

**Step 2**
Remove the backing from the acrylic pieces.

**Step 3**
Insert the final link into the last acrylic circle and attach the chain to finish your pendant necklace.

**Note**
Experiment to identify the correct length of chain to achieve the best fall of the necklace. You can use an adjustable chain with a small button or ring near the clasp that allows you to make it longer or shorter. The positioning of the links must be accurate in order for the pieces to hang in a smooth curve.












# Viktor & Rolf





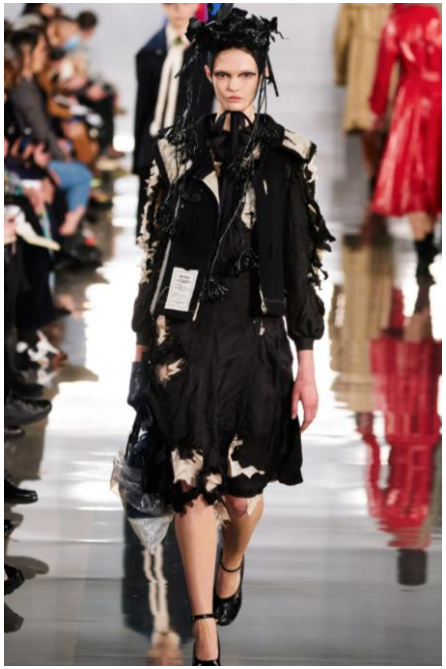




# Comme Des Garsons



# Maison Margiela









# Chanel



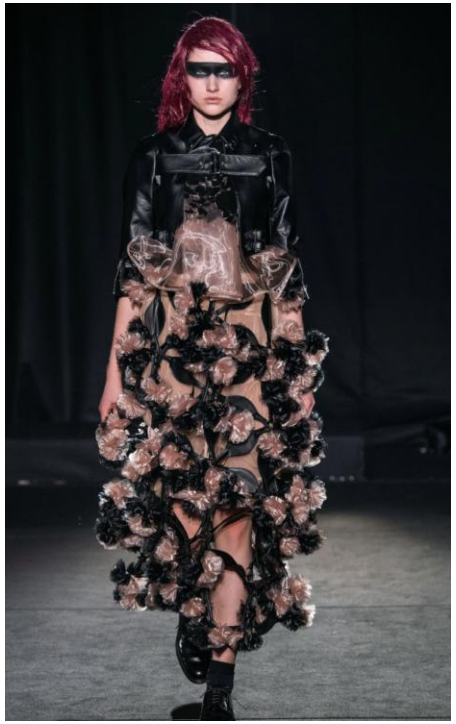






# Noir Kei Ninomiya



# Dries Van Noten









# Irish Van Herpen







