

Some Early Tips for How to Vector Design for the Glowforge Software Interface:

Marion (*marmak3261*) asked me to work up a simple design that replicated the effect of the Celtic knot below, without duplicating the knot itself for his **Pre-Release** testing.

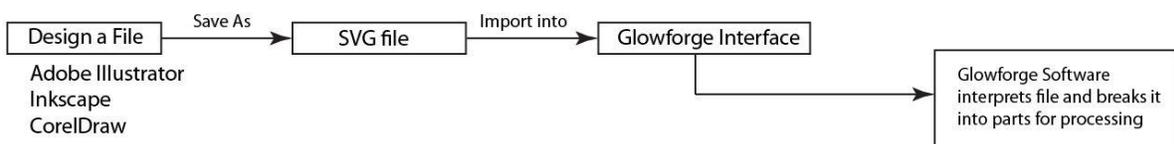


So I happily popped into AI and promptly fell down a rabbit hole. Twenty -two versions of the file later, I finally understand what is going on with the Interfaces that we will be working with.... I think. 😊

I'm going to give a little overview, and then just list the things we discovered first, which should be enough for the experienced designers to pick up on pretty quickly.

*(Afterwards I'll go into more detail of what I tried that **didn't** work, for those who are less familiar with vector and raster work. Eventually I hope to post a couple of Quick Start Guides for use by those just getting started in vector work, but I'd like to actually work with the Glowforge interface to do those.)*

This is what happens:



This file can have:

1. Vectors - paths, strokes, shapes or lines defined by points with lines connecting them. (Connect the dots.)
These can be **Filled** with color if the shape is closed, or **Unfilled**, which is essentially just a line.
2. Raster Images - Thousands of dots (pixels) of color. No defining lines associated with them. (bitmaps, jpegs, png files)
3. Text - text can require special treatment, it's infinitely scalable like a vector without losing definition, but it generally has no vector path associated with it unless we add one first. It exists as a fill without a stroke.
4. Some combination of the above. Each item is best treated separately, because they have different characteristics.

We achieved the successful result below by following the guidelines listed here for design. The file was saved as an SVG (*by me, using a couple of different source programs*), and then sent to Marion.

He imported it into the Glowforge interface for interpretation and lasering on MakForge.



Preliminary Design Guidelines:

1. Use different **colors** for the different operations that you want performed on the file. (Ex: If you have two vector paths in a file and you want to score one and cut the other, use clearly defined colors like red and blue or black for the different operations.)
2. If you want to do a vector engrave on a filled shape, do not set a stroke color for that shape. (*Create an unfilled stroke on another layer if you want to use it as a Score line.*)
3. If you have an island type situation in your engraved area, do not use layering of white filled shapes over colored shapes to create your design. You need to punch out the island areas using either **Minus Back** in **AI** or **Difference** in **Inkscape**. In both cases, the island shapes are placed on the layer **below** or **above** the colored overlay, and they punch the shape **out** through the surface, leaving an **Unfilled shape** inside of a colored area. (*demo on that later in the writeup*)
4. Vectorized White Fill is considered an **engrave color** in the Glowforge software.
5. Text must (*currently*) be converted into a path for the Glowforge interface to see it.
6. Adobe Illustrator exports SVGs as a single layer. The Glowforge software will pick up **different colors** and interpret them as different parts, even from a single layer SVG.
7. If the file that has been exported as an SVG contains a true raster image, (pixels), the raster is ignored by the Glowforge software unless it has been embedded, and must be re-imported into the file and placed using the camera. (Visual alignment.) Vectorized images will be recognized within the original SVG file as needing to be engraved without re-importing. (*ie: Fill without a Stroke.*)
8. You can import raster images to overlay on an open vector file in the Glowforge interface, but you cannot import and overlay another vector file.
9. **Current** file types recognized by the Glowforge software are SVG, PDF, PNG, and JPG.

10. What the Glowforge software sees:

For Raster file types – it gives you the option of Engraving, or creating a vector path around the raster as an outline. The line can be made to Cut through or Shallow/Medium/Deep Engrave. *(So the Glowforge software will essentially Auto-Trace and vectorize a raster for you.)*

For Gradient Fill – it will give the option to vary the depth of the Engraving based on the color of the Fill shown. The darkest parts will be the deepest engravings, with white being untouched. *(This is how the 3D Engraving happens.)*

For Vector paths – It offers several options to Cut, Engrave, Ignore.

Focusing is automatic for both **Proofgrade** and outside materials, and there is a **Manual Override** option if you want to fine-tune your speed and power settings or try something different with your engravings.

Please note: The guidelines above are subject to change...this is a summary of the current status of the design software, as viewed from a Pre-Release machine (12/16). They are not complete yet. They should still be useful as a general starting point.

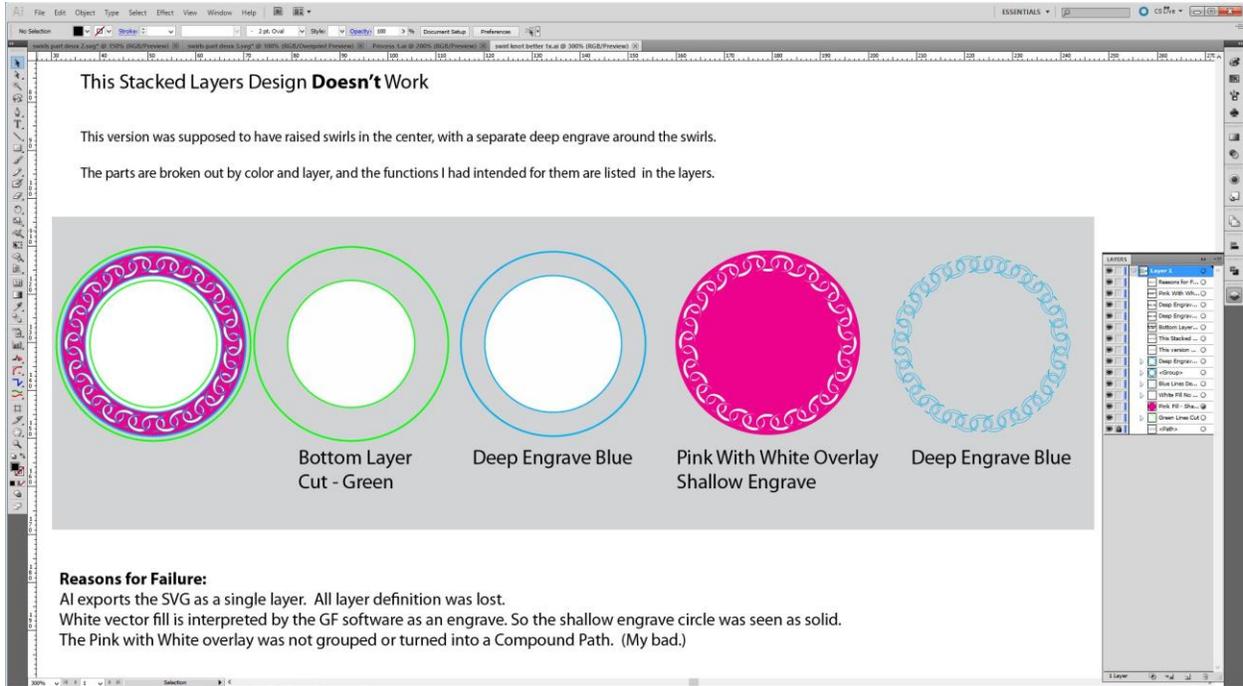
And now....to quote the late, great Paul Harvey....."The Rest of the Story....."

The main problem that I had with replicating the design that Marion chose, *(aside from the fact that he and I were using different design software that had different terminology and totally different ways of handling things)*, was that this particular design has an "island engrave". Meaning there are areas **inside** of the engraved area that are not to be touched. (We wanted to recess the engraving around certain areas that would still stick out.)

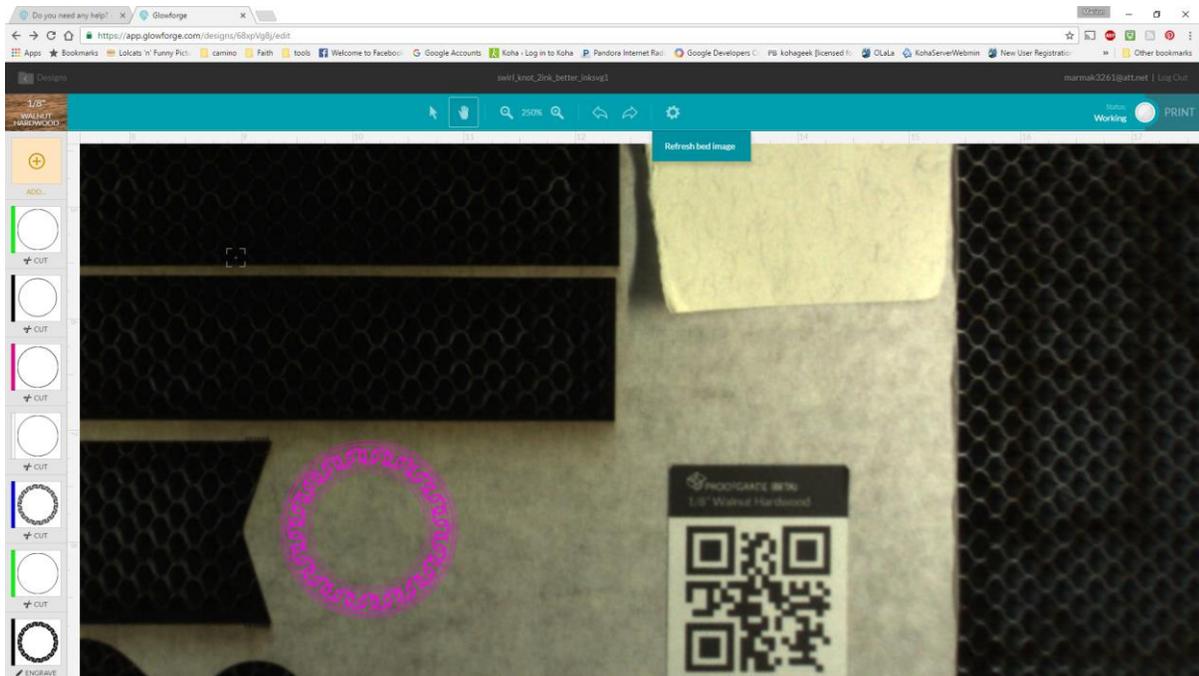
He had specified the size of the circle that he wanted, so the initial file was designed to fit into that, and it was really small.

Design Tip: Any time you can.....design larger than you need, and then shrink it down in your design software to fit the specific measurement that you want after you are done. We eventually wound up doing that, but should have done it up front....just makes life a whole lot easier.

The first file I worked up for him looked like this....it was designed in Adobe Illustrator, with layers of color overlapping each other to create the design, because that's the way I'm used to designing in AI. (Zoom in to read.)



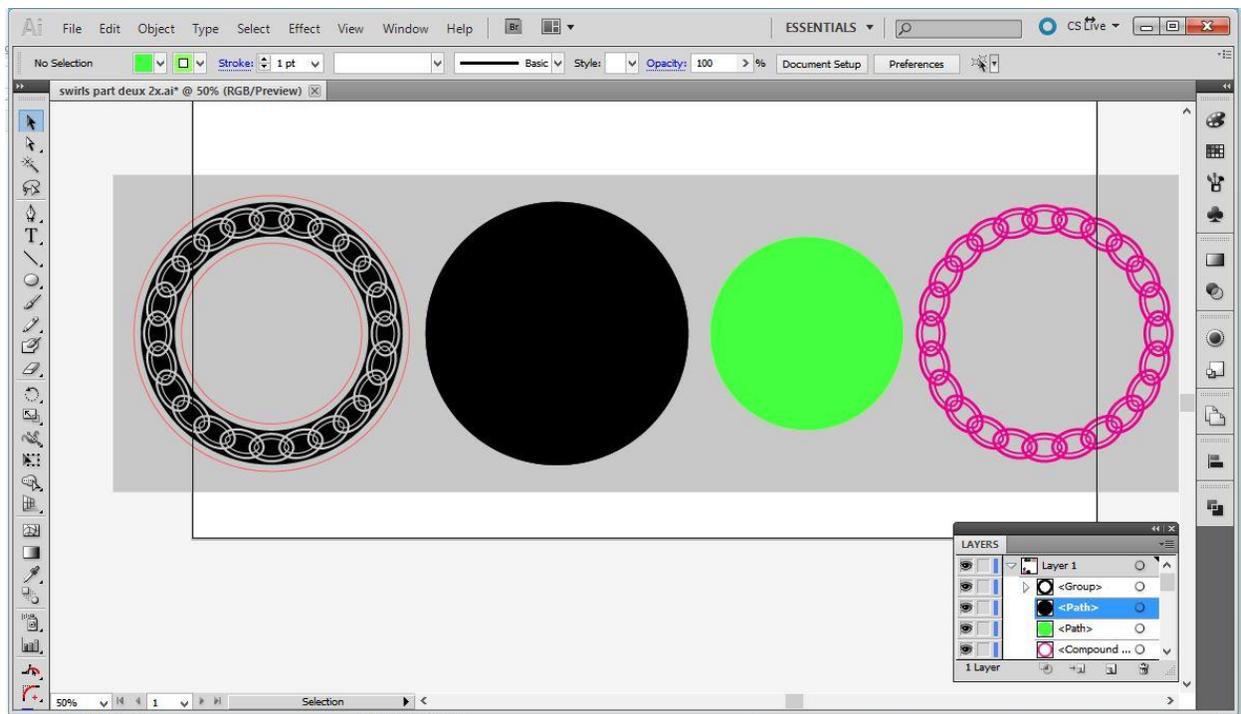
We struggled back and forth with that file for several iterations, tested masking and clipping paths, took it into **Inkscape** and tried it there, and none of that mattered because the Glowforge software kept seeing this:



Trying to cut that would result in confetti, so we didn't even try. The one Engrave function offered was a line engrave. It was not seeing the pink Fill color.

I reworked the file to make it larger and get something we could see a little bit better, and that one we finally got to work. Along the way, we discovered the points listed in the **Preliminary Guidelines** at the front of the write up, so I'm not going to go into that again here, it is fairly self-explanatory.

The final file is on the left, with the parts that make it up next to it.



First we did a simple line engrave to see what it looked like:

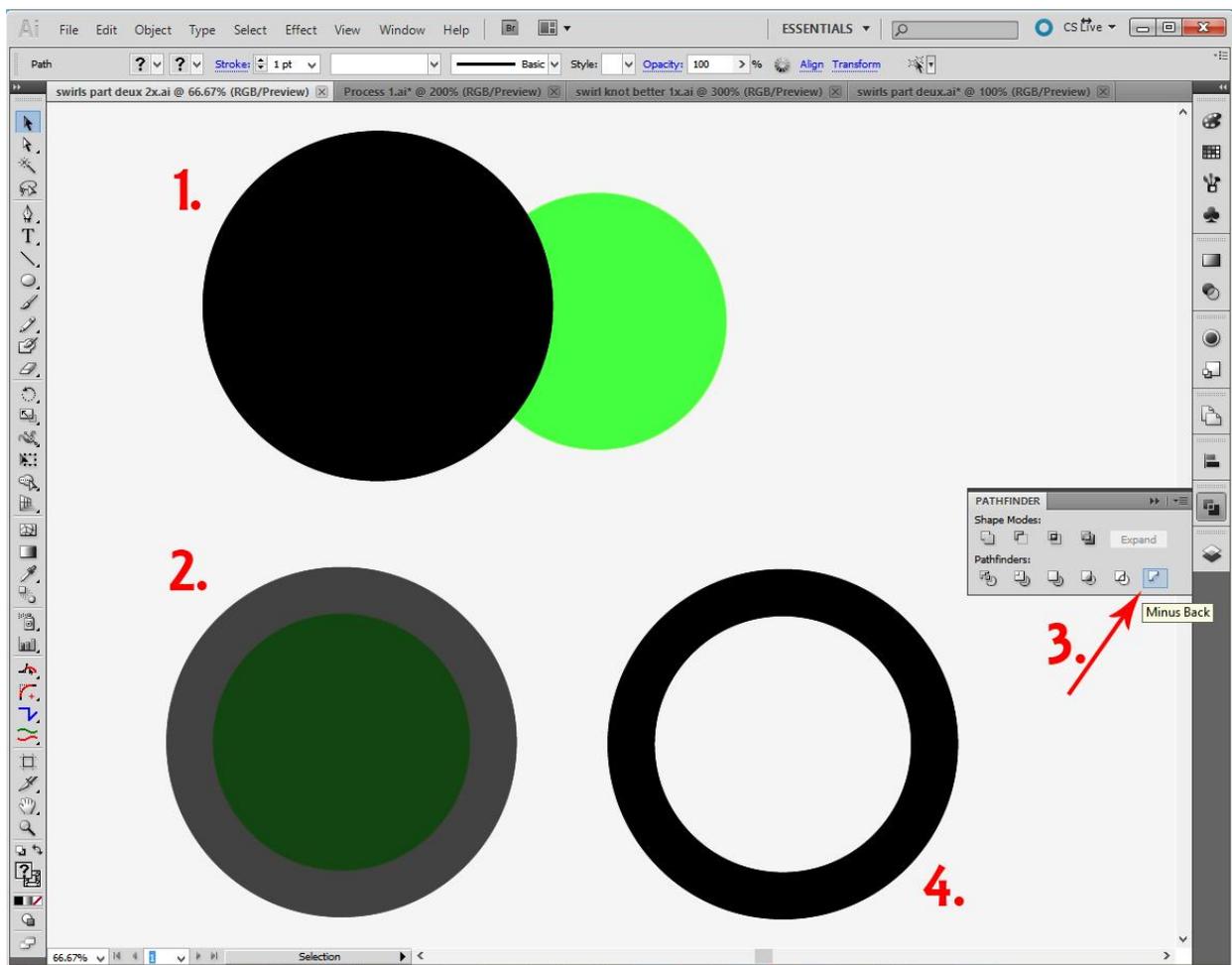


This was accidentally cut all the way through, but you had two complete newbies working with this from two different states via PMs back and forth, so that was to be expected. Still looked pretty cool, I think, and the rings were intact, which was neat.

I do want to do a quick demo of how to set up for dealing with the islands in the fill, since that turned out to be the main bit that was tripping us up all along.

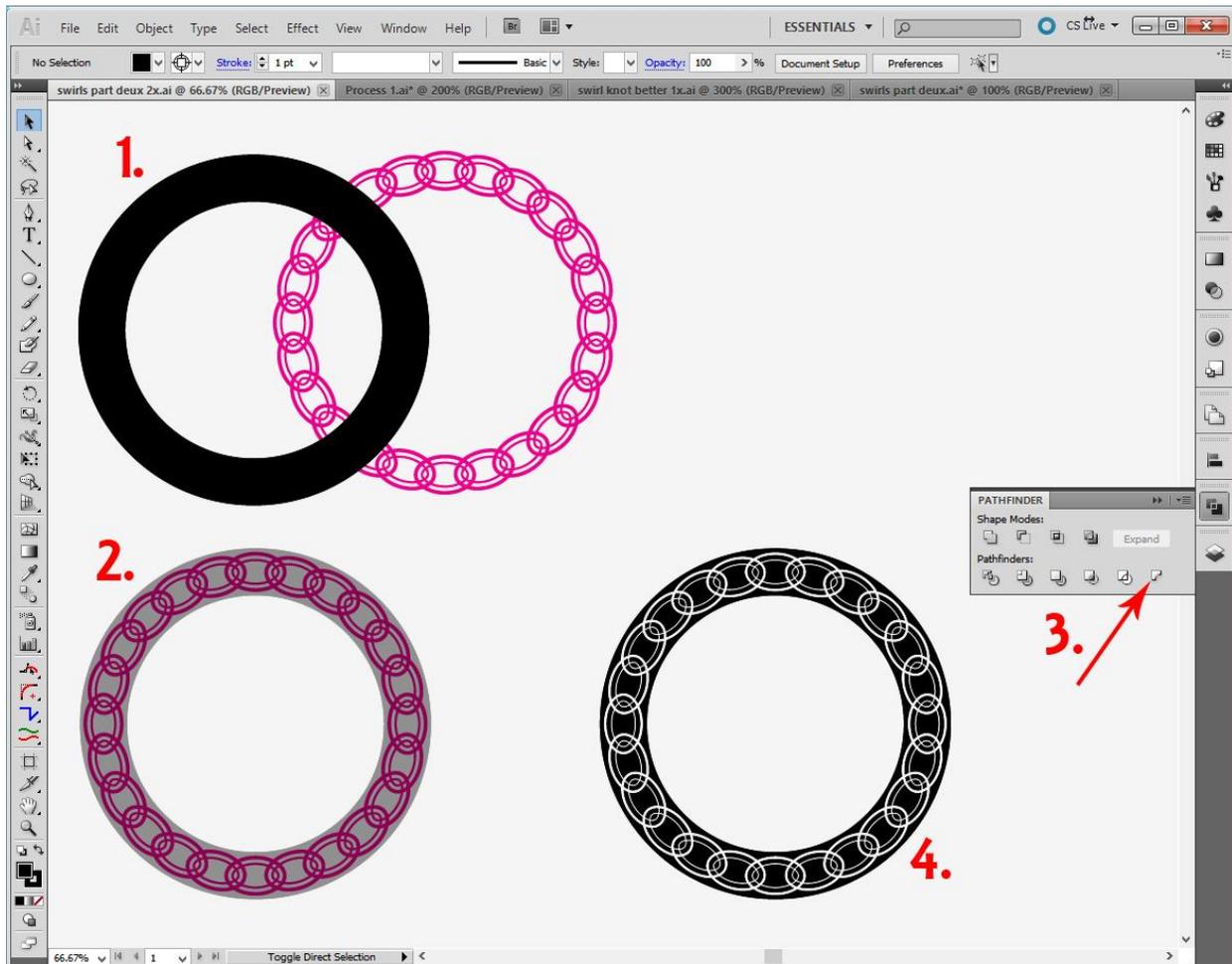
In **Adobe Illustrator**, the steps look like this to correctly create that Engrave Fill for the ring:

First you create your solid ring:



1. Create a filled Black circle with (any color) filled smaller circle behind it in the Layer lineup.
2. Align and Center the circles. (*Top circle has opacity reduced here so you can see it.*)
3. Select both circles and choose **Minus Back** from the **Pathfinder** palette, to punch up through the top circle with the bottom circle.
4. And you've got your ring, with an unfilled hole in the center.

Do the same thing to punch the decorative design out of the ring.

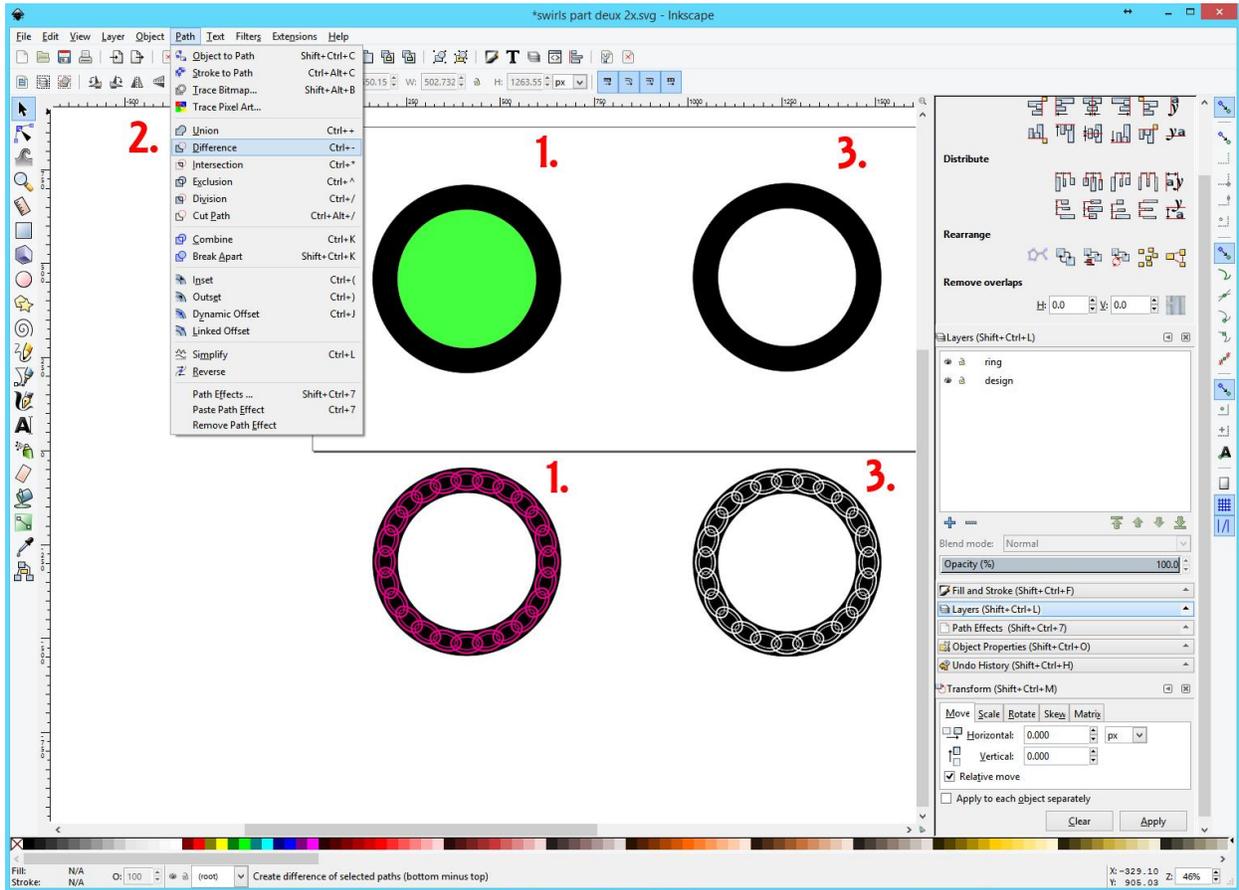


1. Put your filled design behind your ring in the Layer lineup.
2. Align and Center the rings.
3. Select both rings and choose **Minus Back** from the **Pathfinder** palette, to punch up through the top ring with the bottom decoration.
4. And you've got your final decorated ring, with unfilled islands where you want them.
5. Select everything and turn off the stroke color if it has any showing, to prep it for the GF interface. (*Null stroke*). The black areas will be engraved.

One other note about Illustrator - creation of a **Compound Path** should create the correct unfilled shapes that are needed. This one had to be built up manually for demonstration purposes, but using the **Compound Path** option is going to be what you normally do, it's a lot quicker. The pink decorative design for the ring above is just a Compound Path, and it worked perfectly as a punch.

In addition, if you want to punch **down** instead of up, you can use the **Trim** function in the **Pathfinder** palette, but you will need to **Ungroup** to move the tools out of the way, delete them, and then regroup the remnant before moving it. (*Either way works...the one demonstrated is a couple fewer steps.*)

In **Inkscape**, the same functions are performed, and by using the **Difference** tool, the top shape is punched down through the bottom shape. (*The tools still need to be moved out of the way and deleted.*)



And that worked. 😊

The Glowforge software interpreted it the way we wanted it to.

Designing for this is going to involve making it easy for the **GF** software to interpret our designs correctly. Most are **not** going to be this tricky. "Islands in the Fill" is a special case, so this is one way to deal with it.