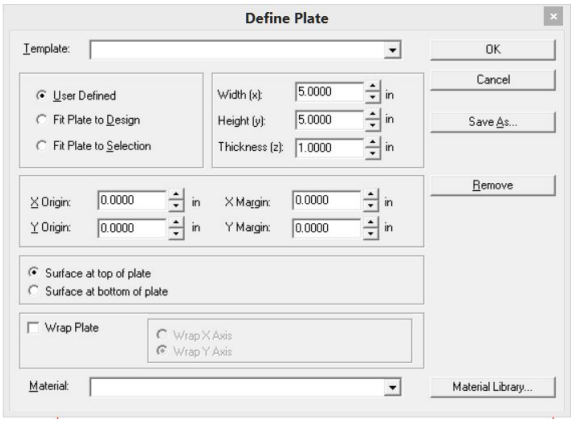
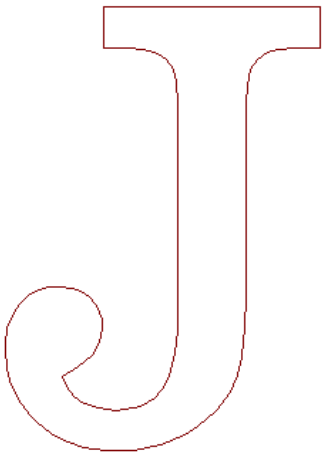
Engrave Lessons

Each of the tutorials in the EnRoute Step-by-Step Series provides instructions for creating a piece using a single concept. Our goal is to provide examples that are relatively easy to follow and to accomplish, and that demonstrate an interesting element of EnRoute. We keep the design elements quite simple so that the focus is on the concept and not the design. This lesson however, will show you several different ways to use the engrave functions in EnRoute.

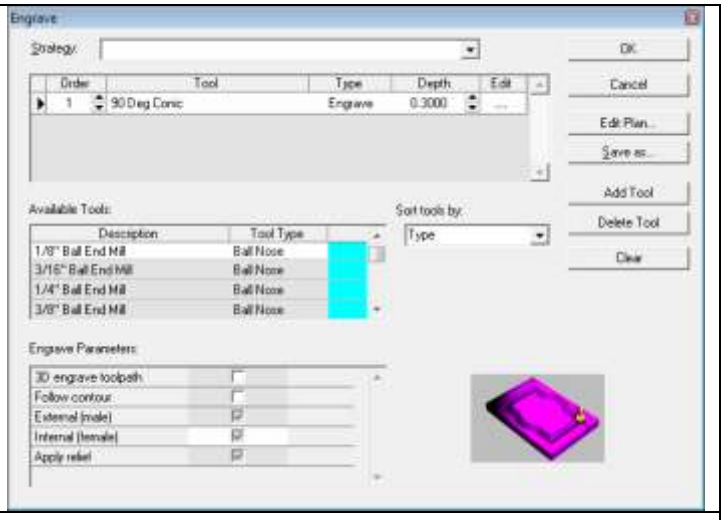
There are many different looks that you can get using the Engrave tools and the Conic tools. In the following examples, we will demonstrate several different ways to achieve these designs. Some are demonstrations of the way you may not want your Engrave projects to look. Our hope is to show you just how easy it is to get the design that you want with just subtle changes to the strategies and parameters.

1. Define the Plate – Enter these parameters and click OK. Width 5.00 Height 5.00 Thickness 1.00 Surface at the top of Plate.	
2. Most often the Engrave Strategy is used with text. We have chosen just one letter to use for these demonstrations.	

2D Engrave

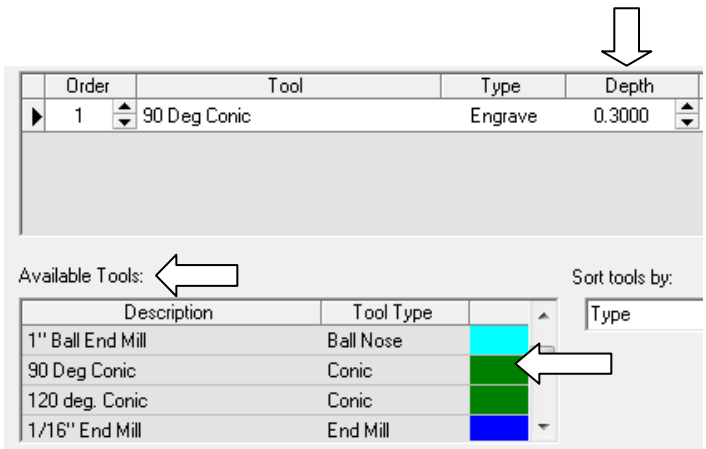
3. The first example is showing a 2D Engrave. Select the contour and then click on the Engrave Icon to open the Engrave strategy.

   We will be using just a couple of tools to demonstrate the differences that can be achieved with the different settings and strategy types.



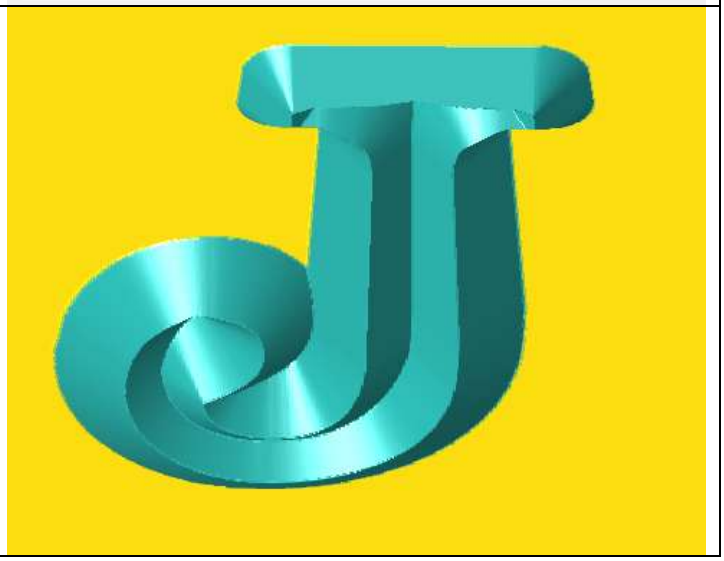
4. Go to the **Available Tools** area of the dialog and scroll down to locate the tool. Double click on the 90 Degree Conic tool.
   Enter the **depth** of the cut by typing in the depth or using the arrows to select the depth desired.

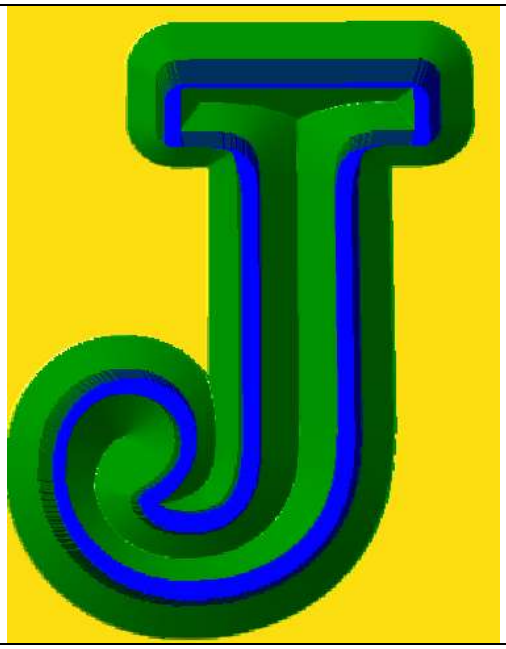
   We have set the depth of cut at .30.



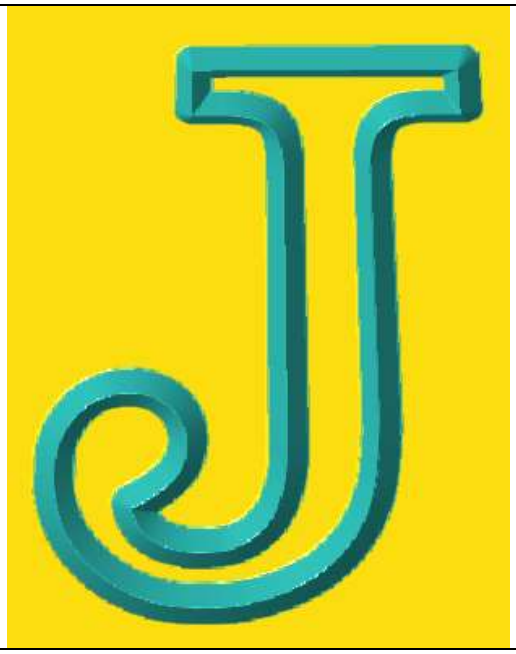
5. Click OK to process the toolpaths.

   This is a rendered view of the Engrave toolpaths for the letter J. Setting the depth down to .30 allowed the tool to come to a point at the top of the letter. This creates a nice pyramid look to the letter.



6. We then applied a Routing Offset Strategy to the contour to cut out the letter. We used a 1/8 End Mill tool to cut it out of the material.	

2D Engrave

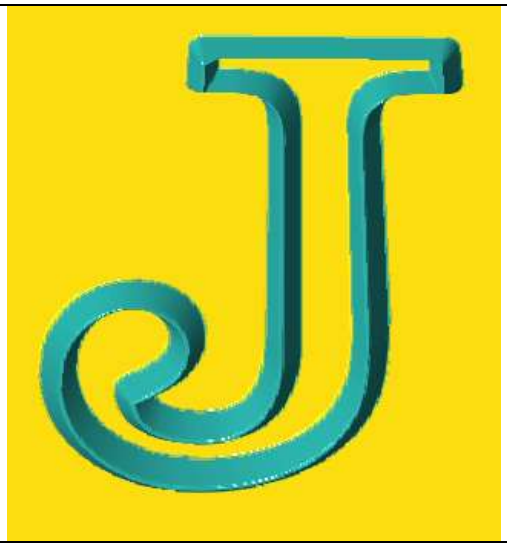
7. This example shows the same 90 degree tool, but the depth was set to .10. You can see that it put a nice beveled edge to the letter.	

2D Engrave

8. This example shows the Engrave strategy, but we made two simple changes to the toolpath parameters.

   The size of the tool was changed to .02 engrave tool, and the depth was set at .15.

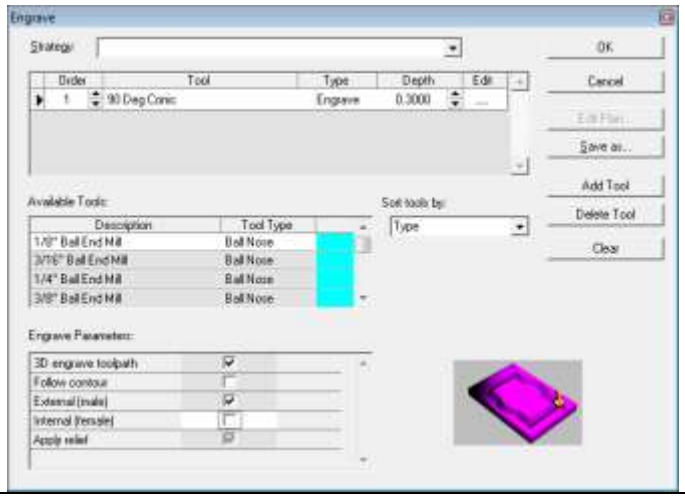
   If you compare the results, you will see that similar results can be achieved with two different tools.



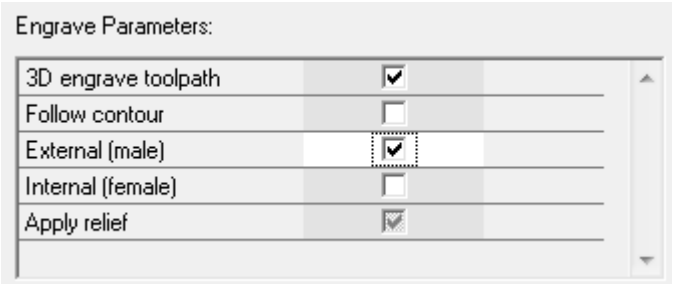
3D Engrave - External

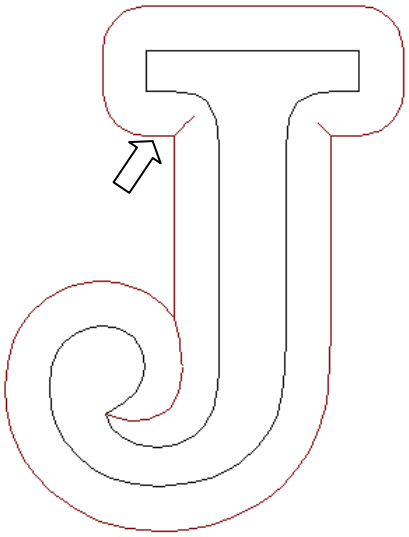
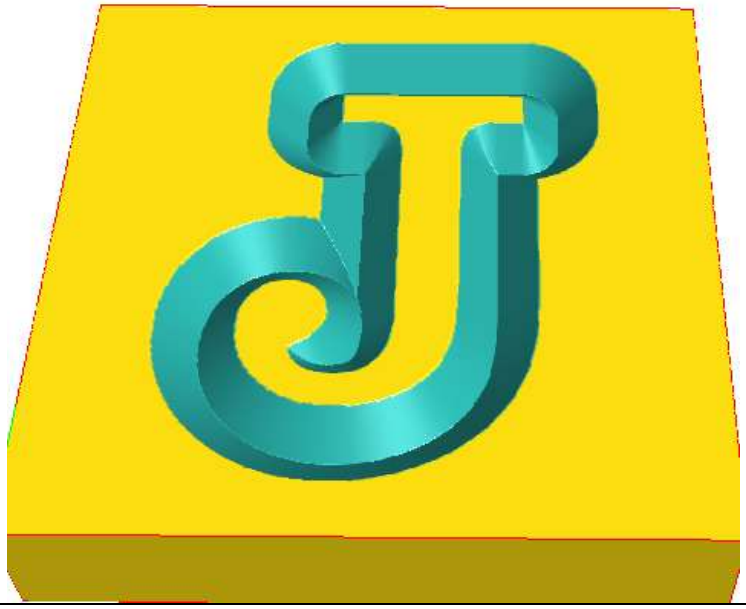
9. The next example will show a 3D Engrave with the External parameter.
   Click on the contour and then click on the Engrave Icon to open the Engrave strategy.

   The last strategy that you used in this session will still be loaded in the dialog.

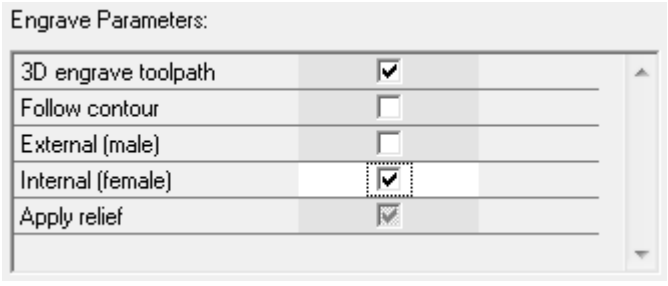


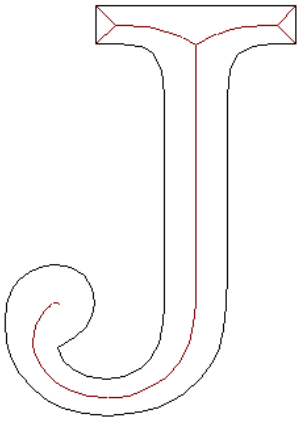
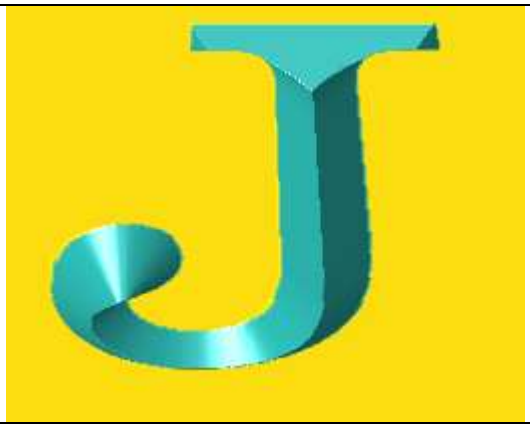
10. Place a check in the 3D engrave toolpath parameter and the External parameter. These parameters are located at the bottom of the Engrave dialog.



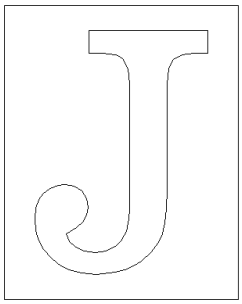
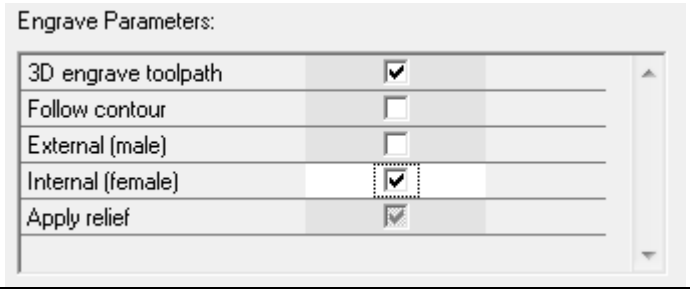
11. This image shows the 3D toolpath on the exterior of the contour. You will notice that at the corners the tool actually lifts up into the corner to form a sharp corner.	
12. This is the rendered view of the 3D Engrave external toolpaths.	

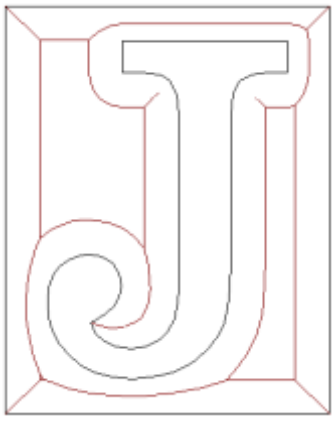
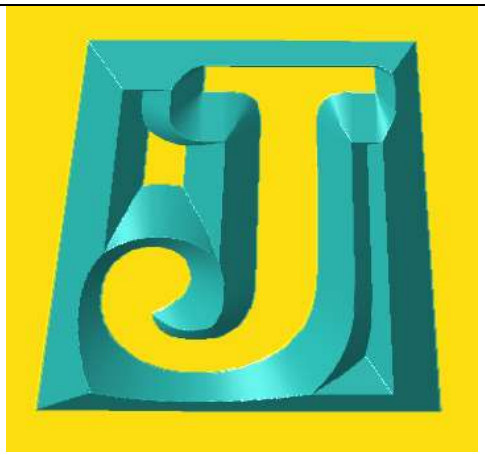
3D Engrave - Internal

13. The next example that we will show you is the 3D Engrave with the internal parameters selected. Click the Engrave Icon to open the dialog.  At the bottom of the strategy in the Engrave Parameters, the 3D Engrave toolpath and the Internal parameters should be checked. Click OK to process the toolpaths.	

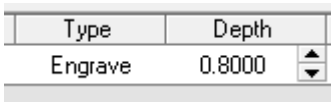
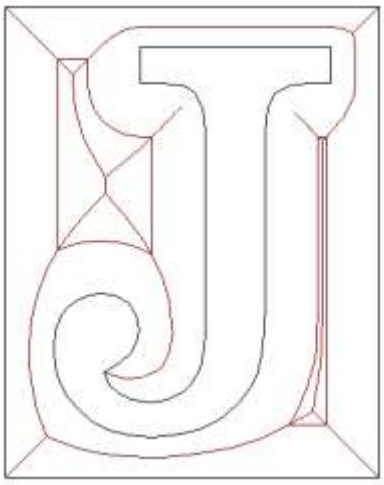
14. This is an image of the 3D Engrave Interior toolpaths. Notice the sharp corners. The tool actually lifts up into the corners to give it that hand carved look.	
15. This is a rendered view of the toolpaths. Notice that the tool has stayed to the inside of the contour.	

3D Engrave inside a boundary

16. The next example that we will show you is the 3D Engrave with a border around the outside of the contour. Select both the border contour and the contour for the letter J. Click the Engrave Icon to open the dialog. At the bottom of the strategy in the Engrave Parameters, the 3D Engrave toolpath and the Internal parameters should be checked. Click OK to process the toolpaths.	 

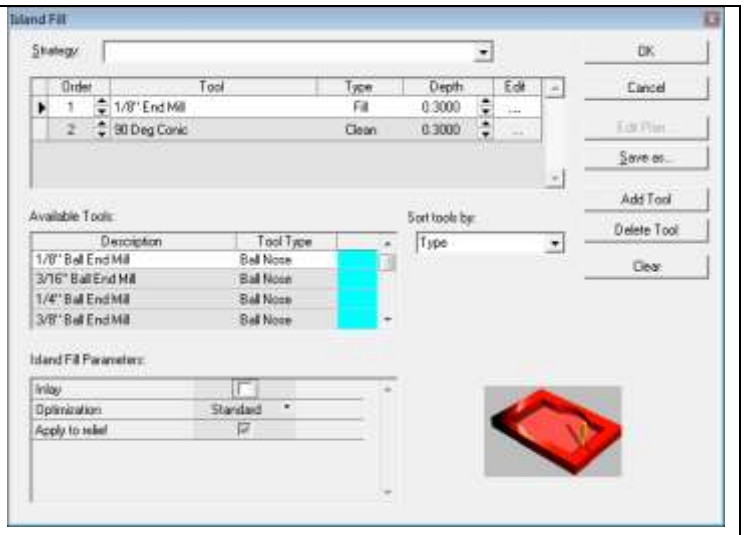
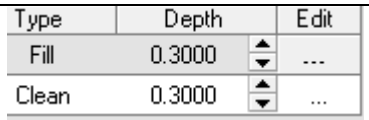
17. These are the 3D Engrave toolpaths with a border. You will notice that the tool does not go deep enough to mill out the entire background area.	
18. This is the rendered view. This is an example of a toolpath that you would most likely not want to do in this situation. It does do a nice job of the engrave around the letter and the border, but it does not mill out the rest of the material in the background.	

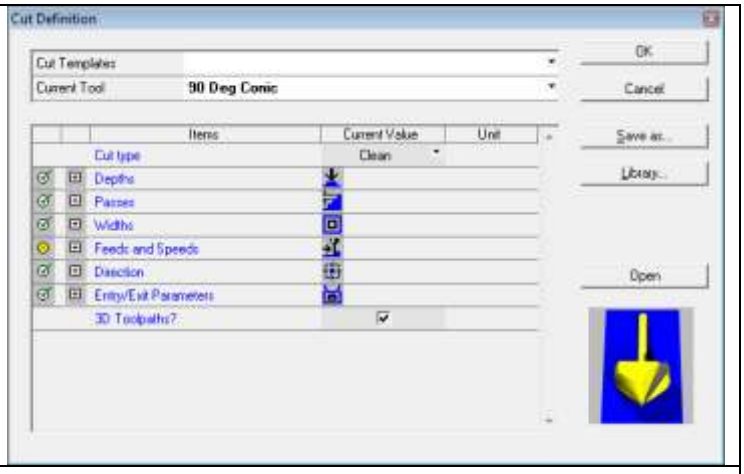
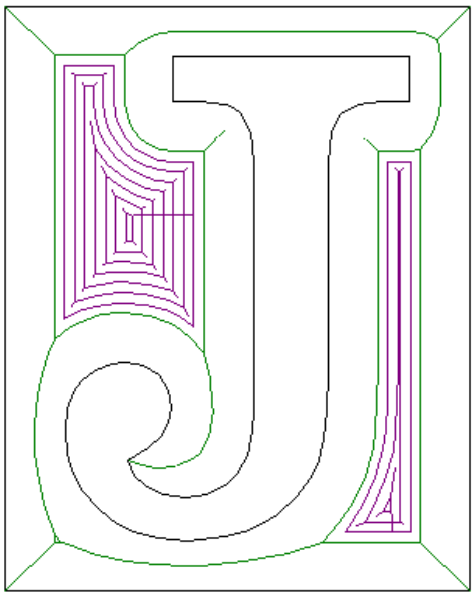
3D Engrave inside a boundary with increased depth

19. The next example is the same example but the depth is set just a bit deeper.	
20. Select both the border contour and the contour for the letter J. Click the Engrave Icon to open the dialog.  Set the depth of the cut to .80 At the bottom of the strategy in the Engrave Parameters, the 3D Engrave toolpath and the Internal parameters should be checked. Click OK to process the toolpaths. Notice that the toolpaths now meet at the bottom of the engrave angle.	

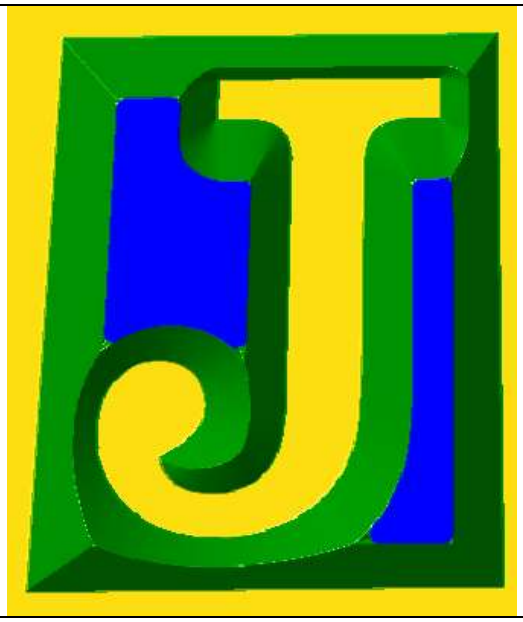
21. This is the rendered view of the toolpaths. Notice that the conic tool now goes deep enough to mill out all of the background within the boundary area.	

Hatch Fill Strategy with a 3D Clean Pass

22. If you want to have the background milled out but you don't have the depth in the material you can use one of the Fill Strategies with a 3D clean pass using a conic tool. Click on the Island Fill icon to open the strategy.  Go to the Available Tools section and double click on the 1/8 End Mill to use as a Fill and then double click on the 90 Degree conic tool to use as the 3d Clean pass. Change the depth to .30.	
23. Click on the Edit box next to the 90 Degree Conic tool to open the Cut Definition dialog.	

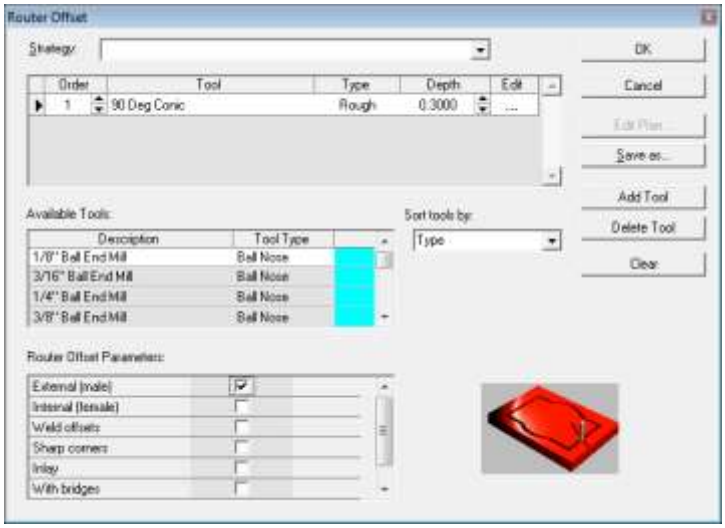
24. In the cut definition dialog, make sure that the 90 degree conic tool is listed as a Clean tool. This information can be found in the Cut type section. The next important thing to check is to make sure the 3D Toolpaths box is checked. Set the feeds and speeds parameters and then Click OK. This will bring you back to the Island Fill Strategy. Click Ok again to calculate the toolpaths.	
25. This image shows the toolpaths. The Island Fill is shown in purple. The 3D Clean Pass is shown in the green. The Island Fill toolpaths are calculated to mill out the material within the border that the conic tool does not reach when it makes the pass around the letter. This will give you a nice flat look for the background area of the design, allowing the letters to be dominant in the design	

26. This is a rendered view of the toolpaths. You can see that the fill toolpaths show in blue and the 3D clean toolpaths show in green.



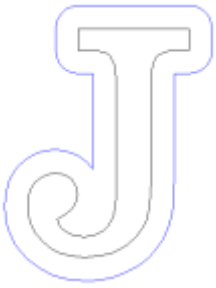
Routing Offset Strategy with 90 Degree Conic Tool

27. In the next example we will show how using the 90 degree conic tool along with the Routing Offset strategy can give you a nice engraved look as well.
    Select the letter contour and then click on the Routing Offset icon to open the dialog.
    Load the 90 degree conic tool as shown in the first example.
    Set the depth to .30.
    Click OK to process the toolpaths.



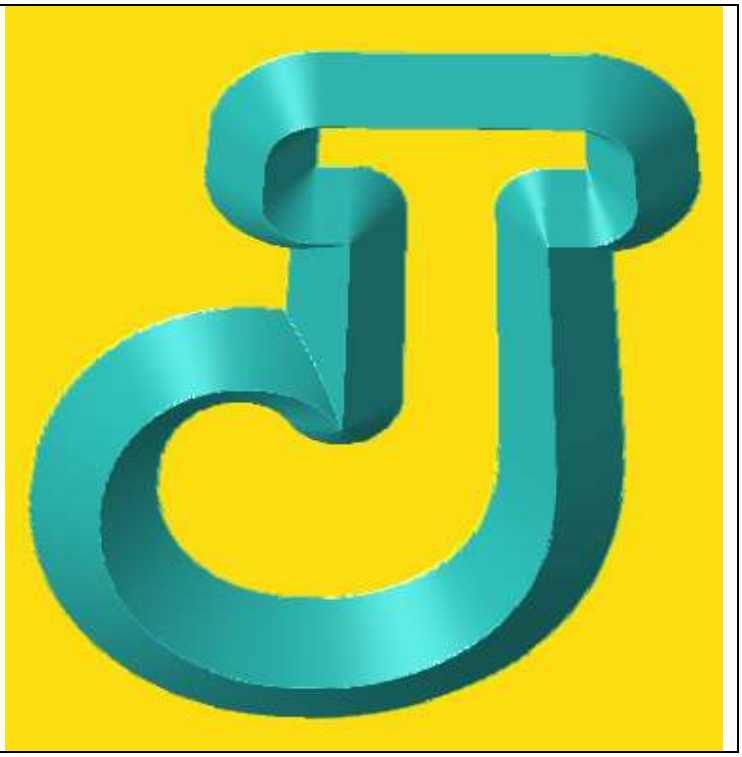
28. The image shows the toolpaths for the Routing Offset strategy with the 90 degree conic tool.

    One of the differences that you can see is that it does not lift up into the corners the way a 3D toolpath does.



29. Using the Routing Offset Strategy does give a nice angle to the sides of the contour. It does not however, get into the corners of the letter in the same way that the 3D Engrave toolpaths do.

    The tool will simply follow the contour at the depth that you have specified.



We have demonstrated several options for creating engrave toolpaths.