Doctor Walt's™

KEYCREATOR®

Tips & Tricks

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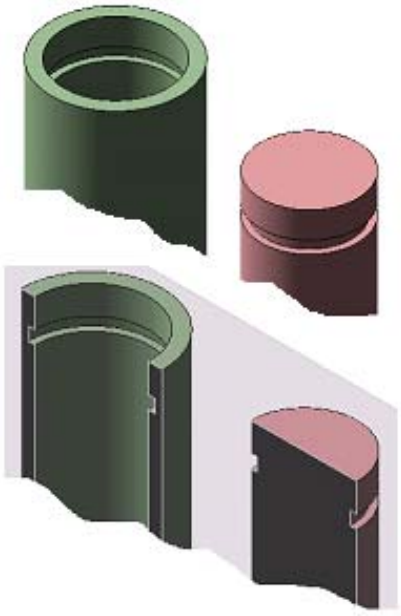
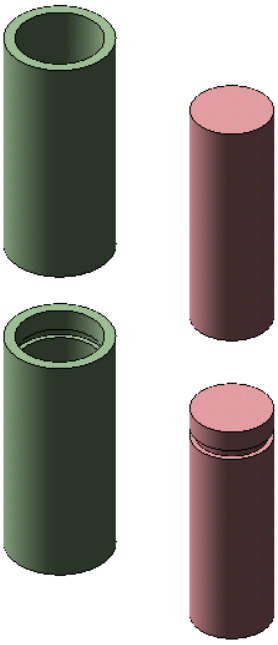
Tips & Tricks #74
Creating a Retaining Ring Groove

I'm often asked in training classes to create a groove for a retaining ring either on the outer surface of a shaft or the internal surface of a tube. I've illustrated the grooves to the right with accompanying cross-section images.



There are several ways to quickly make this feature. In this exercise we'll look at a quick approach that is very effective and closely matches what actually happens when you machine the groove in the shop.

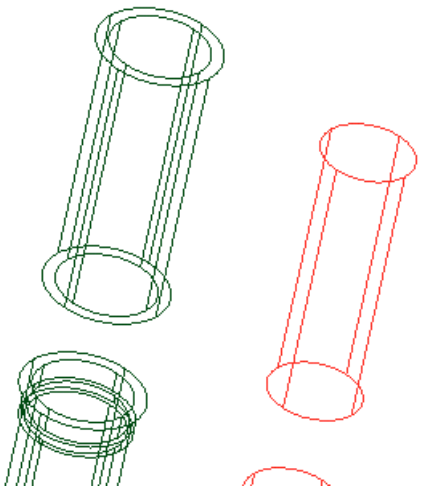
The file TubeAndShaft1 is available for download and it contains two tubes and two shafts. The lower ones have completed grooves and the upper ones are ready for you to machine!



If you open the file your screen should look like this:

Switch to Wireframe Render and use the DYNAMIC ROTATION Icon to move the parts slightly out of true Isometric view so the tiebars are all visible.

Your screen should look like this:



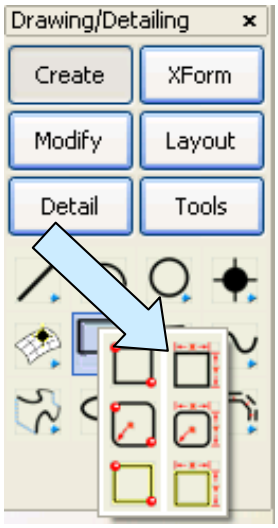
Select a unique Construction Color that contrasts with the colors on the screen.

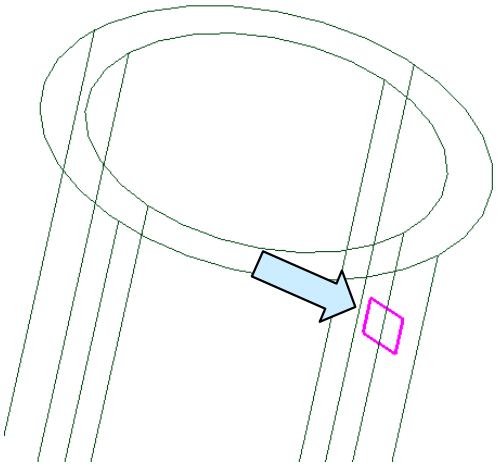
Next, click on the CONSTRUCTION PLANE Icon and type 2 for the CPlane. (This will give you a vertical construction plane aligned with the front view.)

Let's suppose that we want to make a groove that is 0.188 wide by 0.094 deep in both the inner wall of the tube and the outer wall of the shaft.

Click on the RECTANGLE BY WIDTH HEIGHT Icon and select the MidCtr Anchor Option.

Type 0.188 for the width and height.

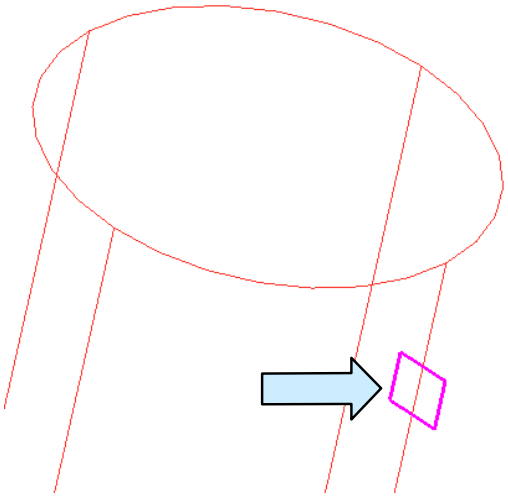


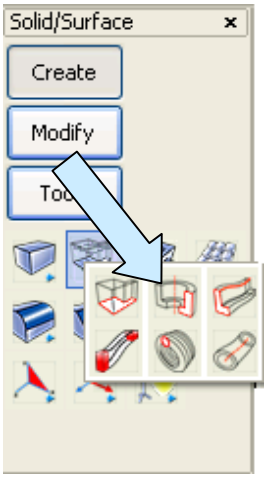


Next, select the AlongE Option on the Conversation Bar.

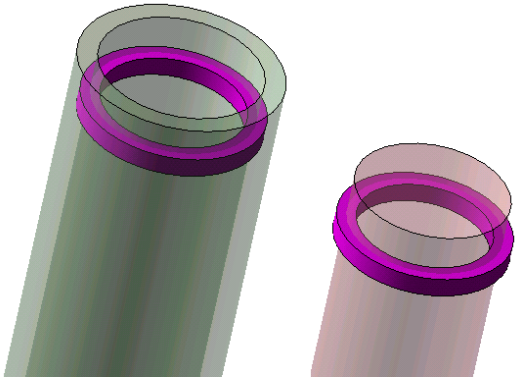
Click on the top end of the inner Tiebar on the right side of the tube and type 0.5 for the distance. This places the center of the profile 0.5 inches from the top end of the tube.

Using the AlongE Option again, place a second 0.188 x 0.188 profile 0.5 inches down from the top end of the right tiebar on the shaft.

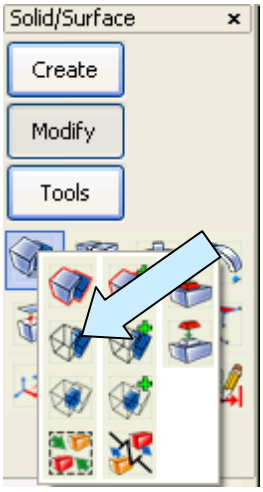




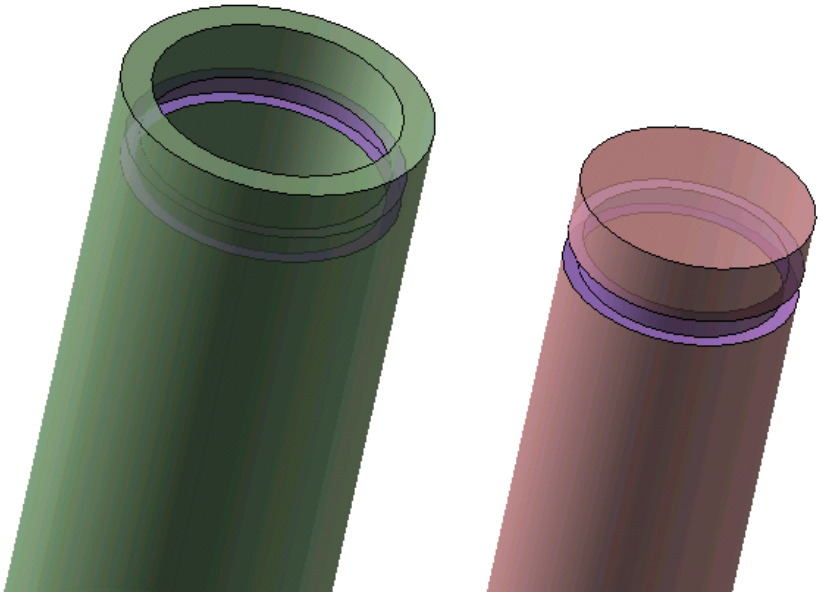
Now, use the REVOLVE Function with 360 degrees to revolve each profile (One at a time.) Use the centers of the top and bottom of the tube and again of the shaft to define the axis for each operation.



The solid objects that are created represent the cutting paths of tools that would be used on a lathe to make the grooves. (I've made the tube and shaft semi-transparent in this illustration.)



Now, use the BOOLEAN SUBTRACT Tool to subtract the ring solid from the tube and to subtract the ring solid from the shaft.



This gives you a perfect retaining ring groove on each part!