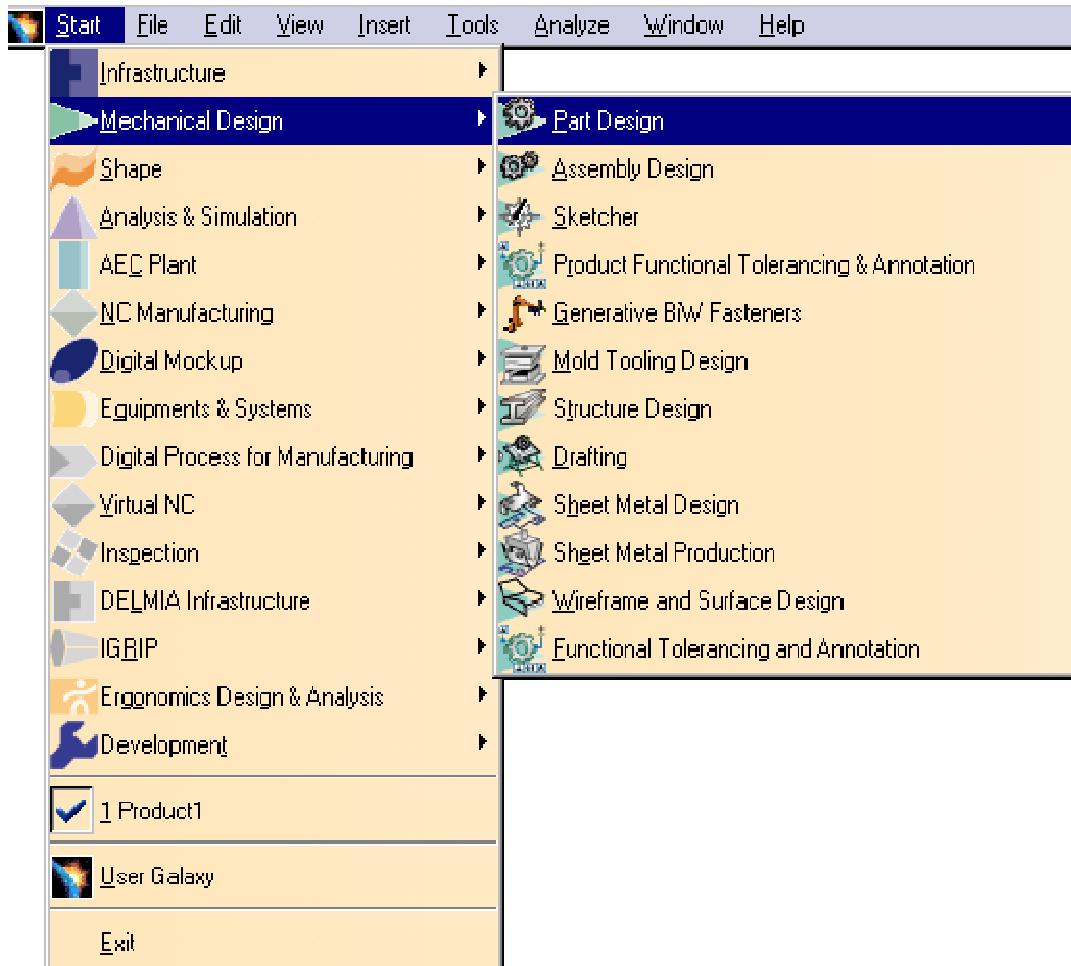


# Piston

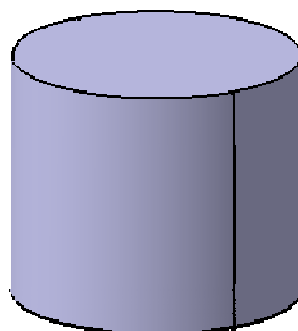
We will design this Piston to practice the various ways of using both the **Sketcher** and **Part Design** workbenches for designing parts.

Load the starting piston part from the companion, and if necessary, activate **Start + Mechanical Design + Part Design** (DO NOT DO IT IF YOU ARE ALREADY IN THE PART DESIGN WORKBENCH)



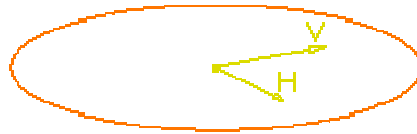
## Creating the Main Pad

In this section, we are going to build the main pad

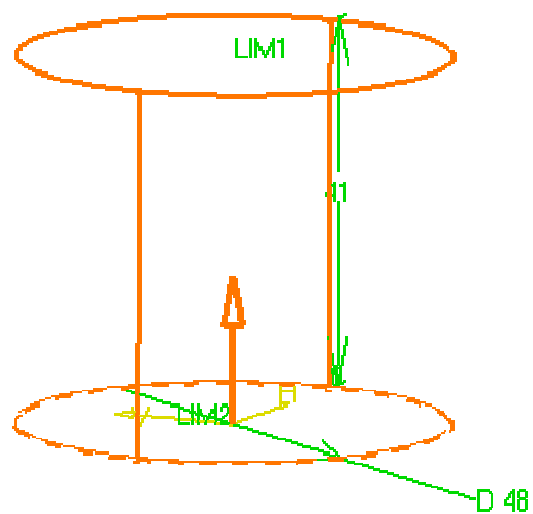


Now, let us do it !

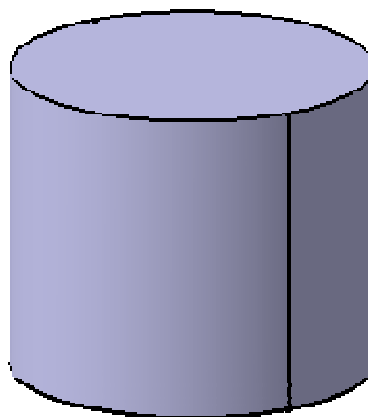
1. Select the Pad icon .
2. Select the sketch to be extruded.



3. Enter the following parameters in the dialog box, and then select OK.

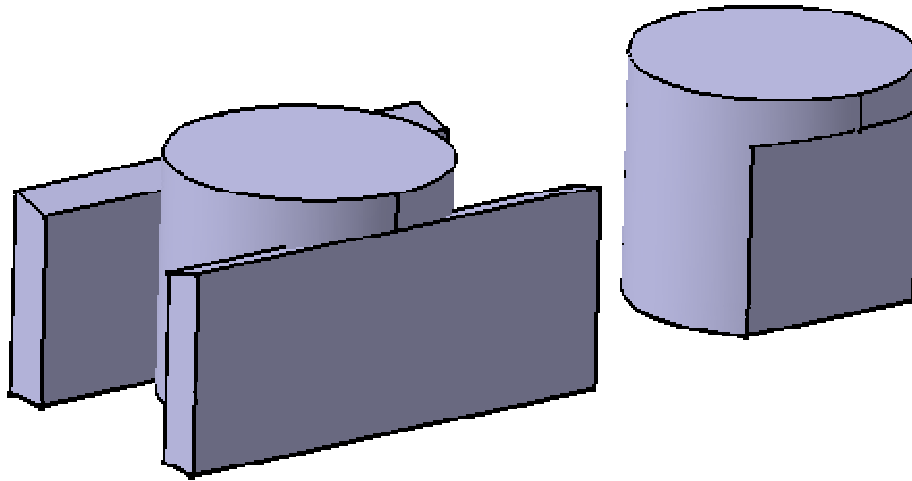


You get:



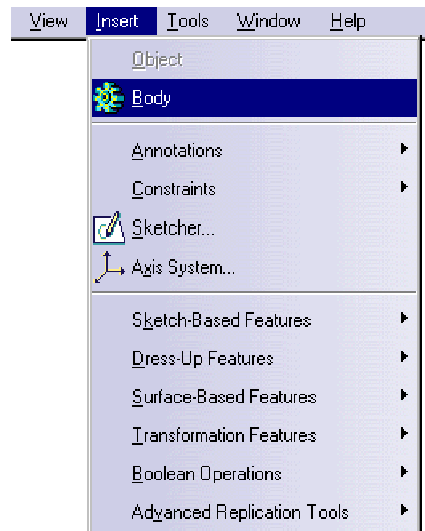
# Creating the Symmetrical Cut-out

In this section we are going to build the symmetrical cut-out.



We are going to insert a body in which we are going to create a pad and its symmetric.

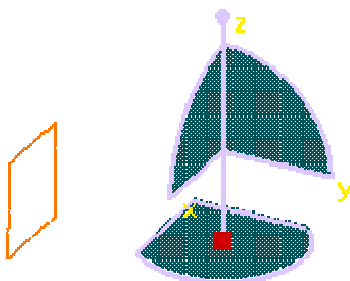
4. Select Insert + Body



5. Select the Sketcher icon



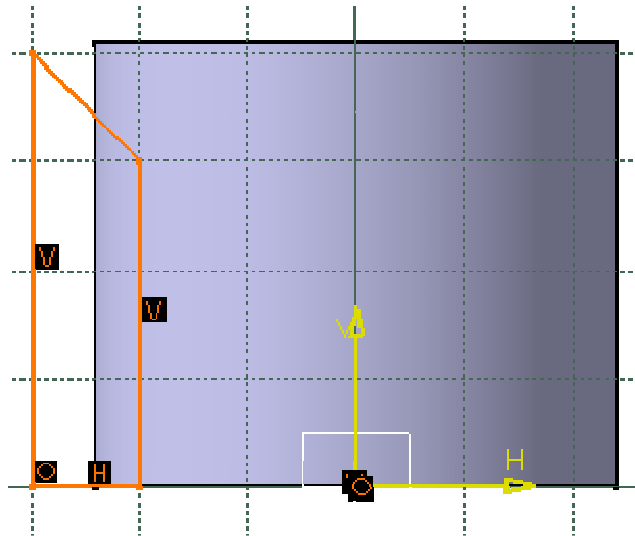
6. Select the ZX plane.



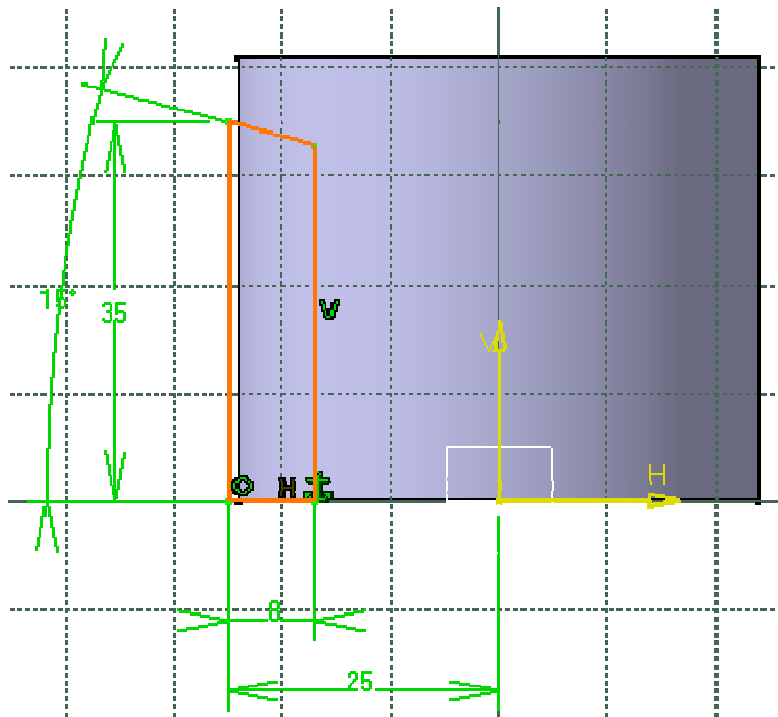
7. Select the Profile icon



8. Sketch approximately the following profile.

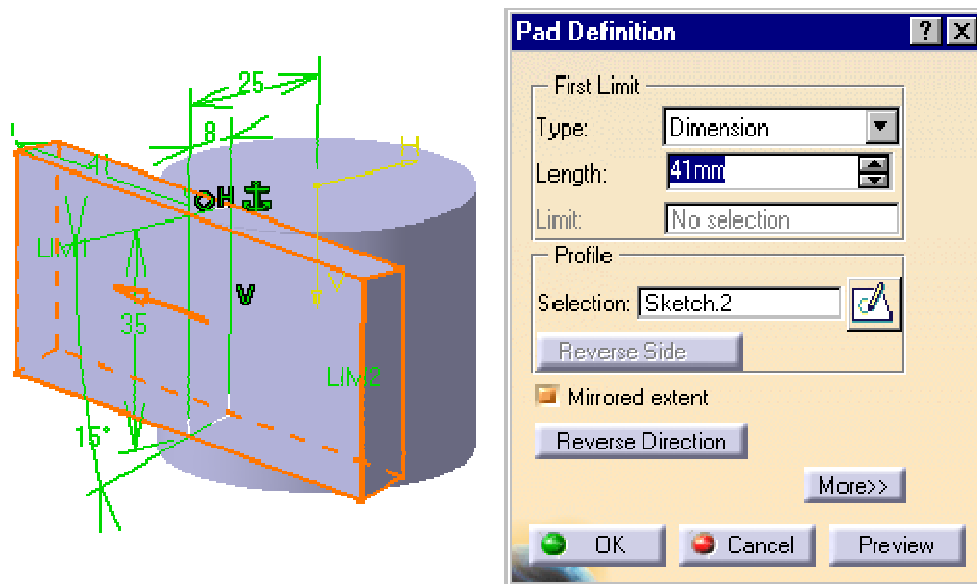


9. Using the constraint icon, constrain the profile as shown here after.

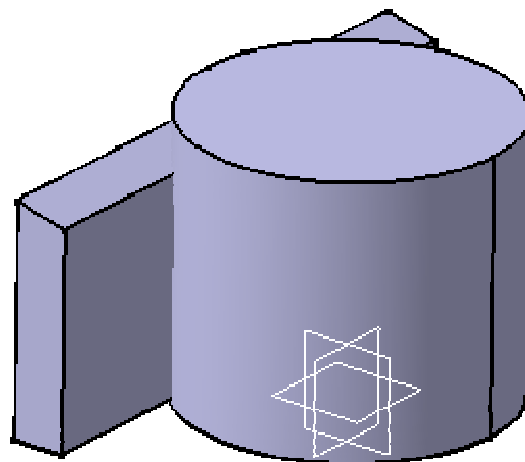


10. Select the Exit icon to leave the Sketcher .

11. Using the Pad icon, create a pad with the following parameters.



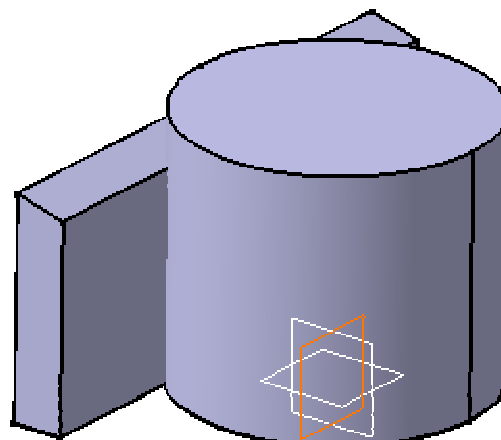
You get:



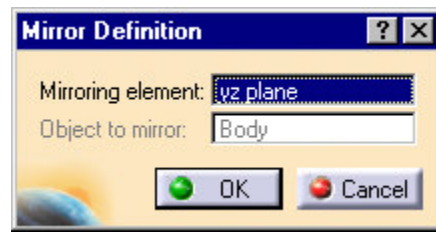
12. In order to get the symmetrical pad, select the Mirror icon



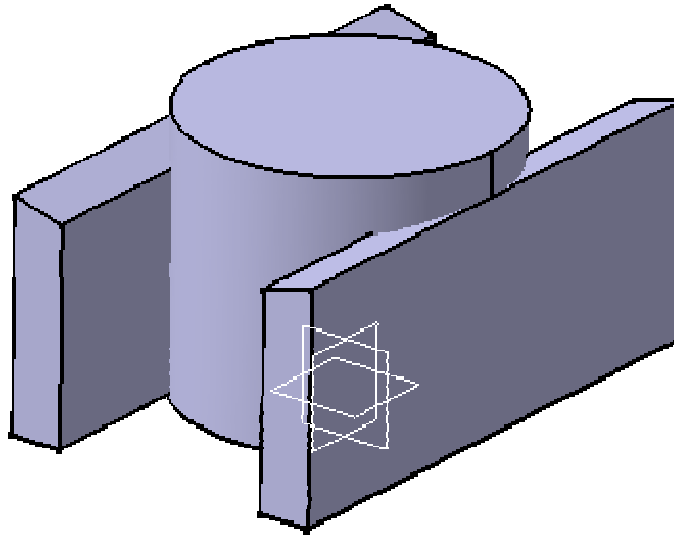
13. Select the YZ plane.



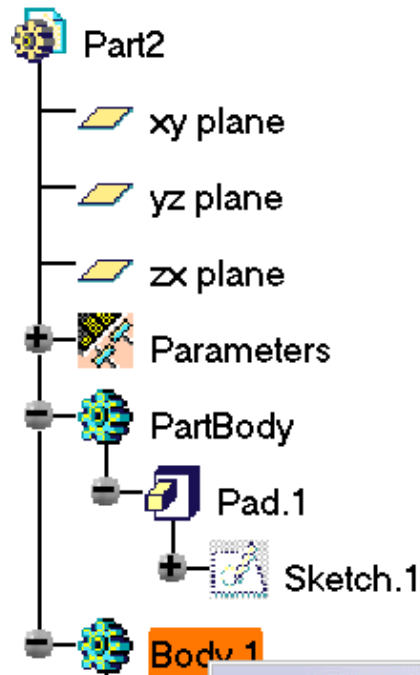
14. Select OK in the dialog box.



You get:



15. Now, we are going to Remove Body 1 from the main body. Place the cursor on Body 1 then select **Remove** from the contextual menu.



Center Graph

Reframe On

Parent/Children...

Define In Work Object

Cut Ctrl+X

Copy Ctrl+C

Paste Ctrl+V

Paste Special...

Delete Del

Replace...

Local update

Properties Alt+Enter

Selection Sets...

Define Selection Set

Hide/Show

Body.1 object

Assemble...

Add...

Remove...

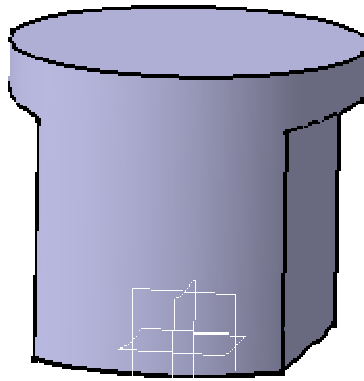
Intersect...

Union Trim...

Remove Lump...

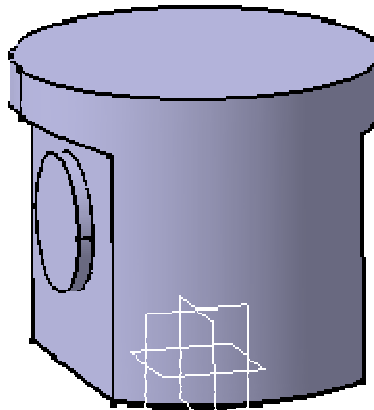
Reset Properties

You get:

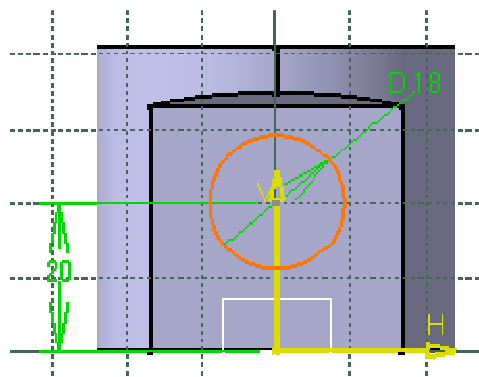


## Creating the Cylindrical Boss

In this section, we are going to create the following bosses.

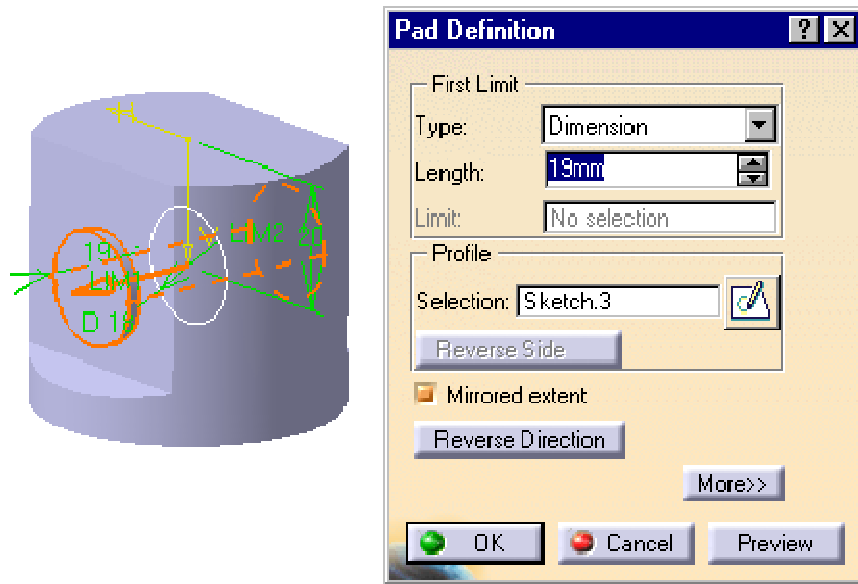


1. On the YZ plane, sketch and constrain the following circle

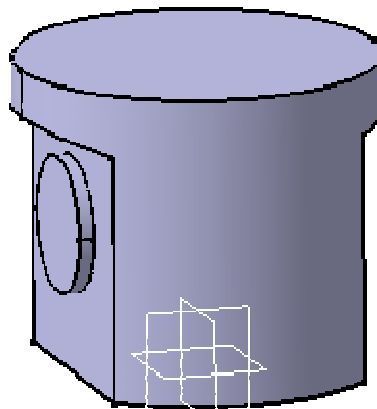


2. Once you have left the sketcher, create a pad (with the previously created circle) with the following parameters.



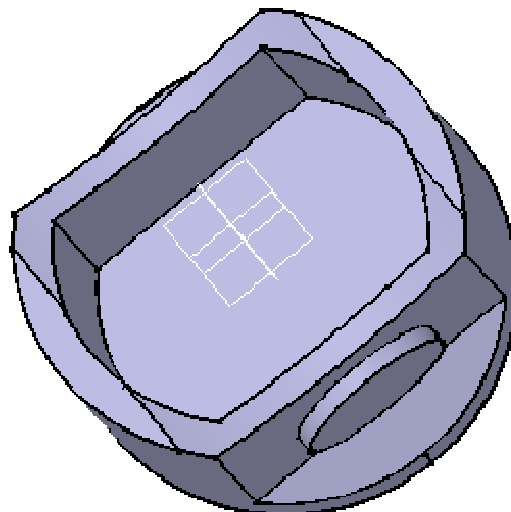


You get:

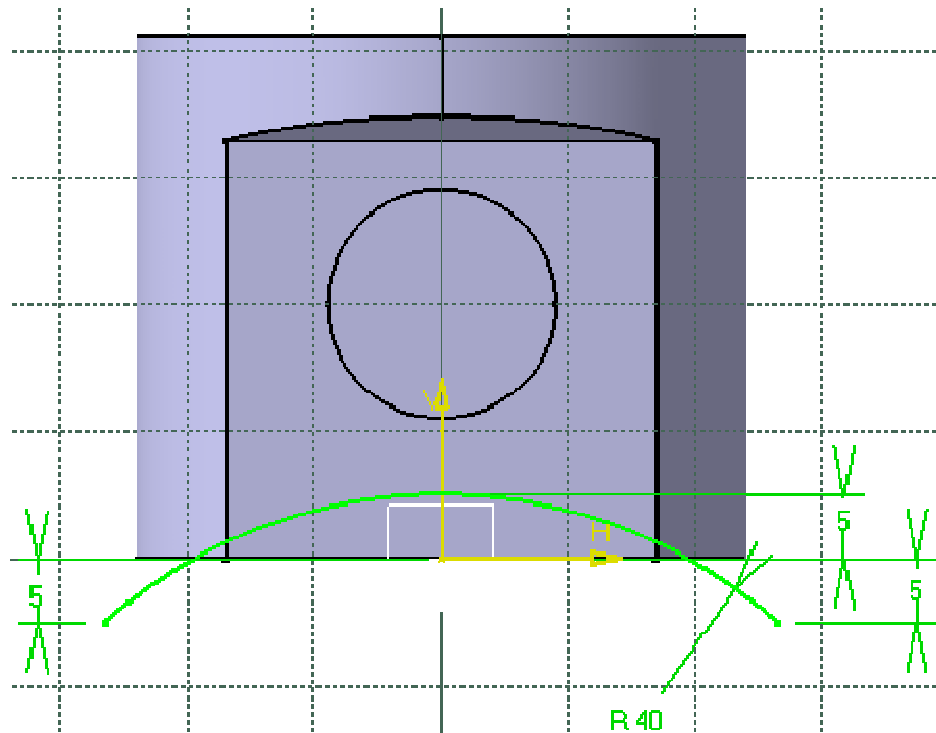


## Creating Pockets

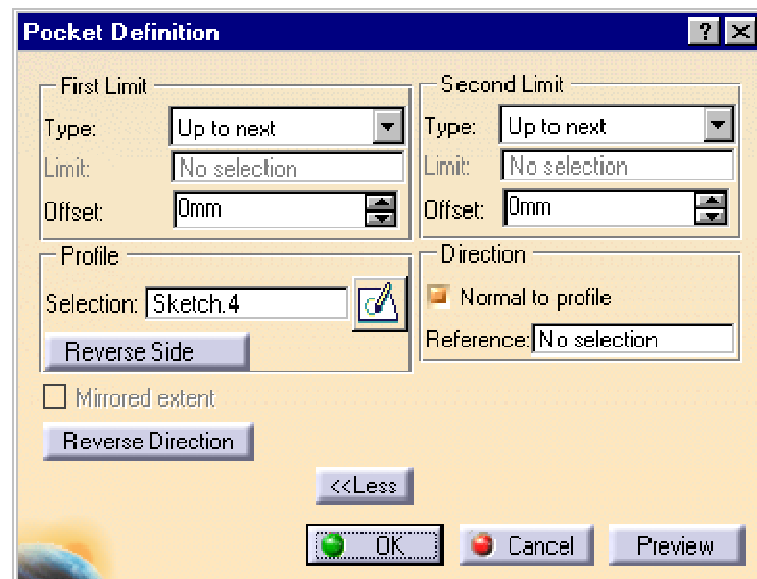
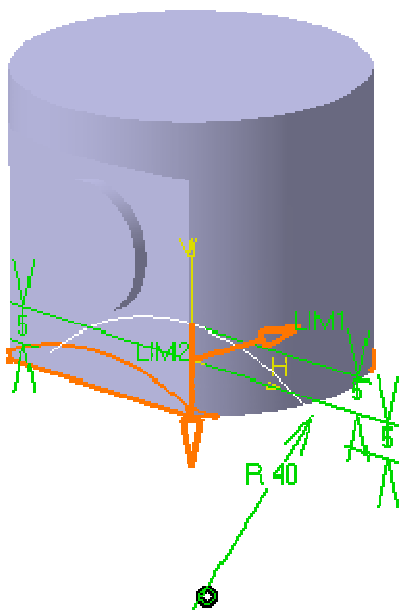
In this section, we are going to create the following pockets.



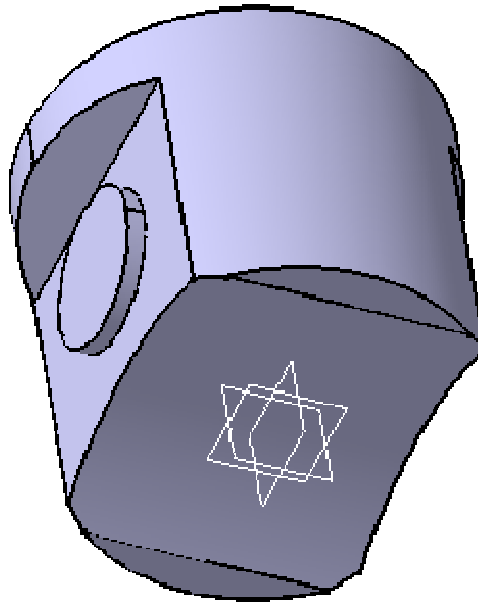
1. On the YZ plane create and constrain the following arc.



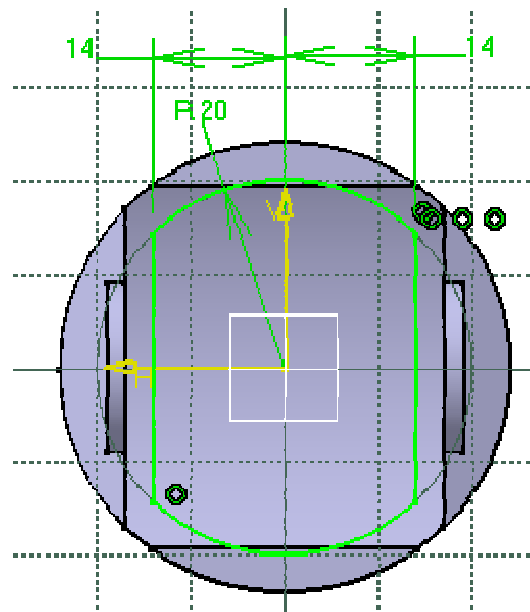
2. Once you have left the sketcher, create a pocket (With the previously created arc) with the following parameters.



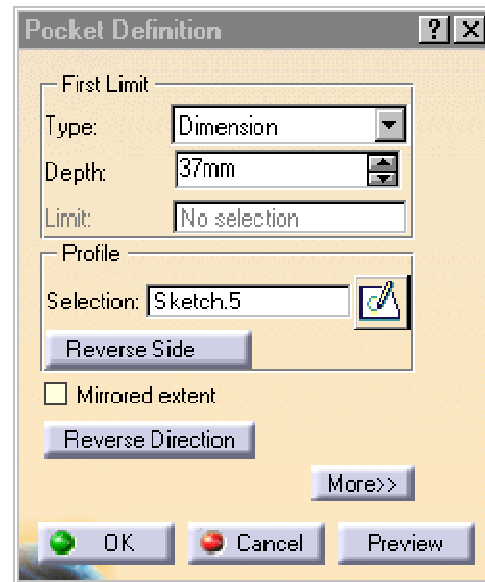
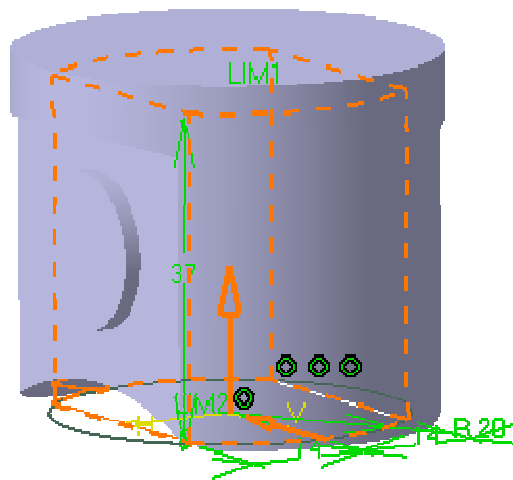
You get:



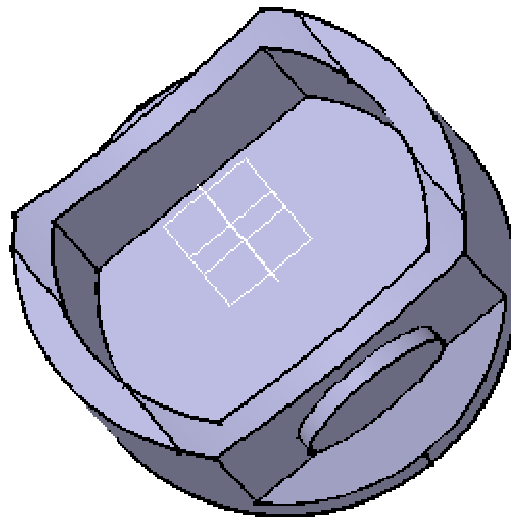
3. On the XY plane create and constrain the following profile.



4. Once you have left the sketcher, create a pocket (With the previously created profile) with the following parameters.

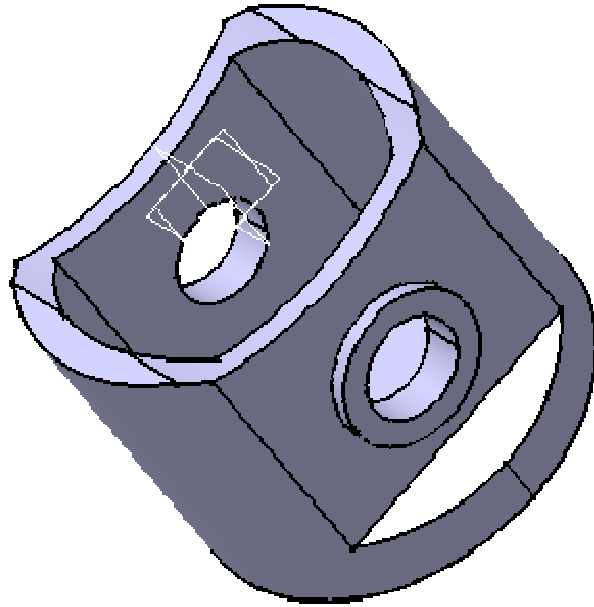


You get:

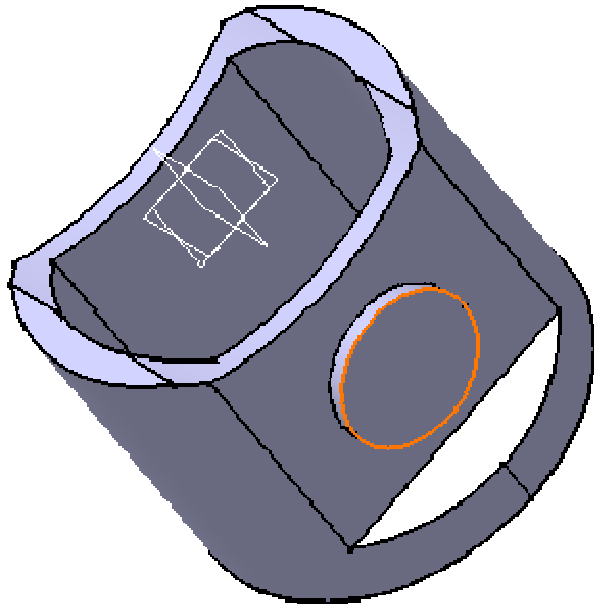


## Creating a Through Hole

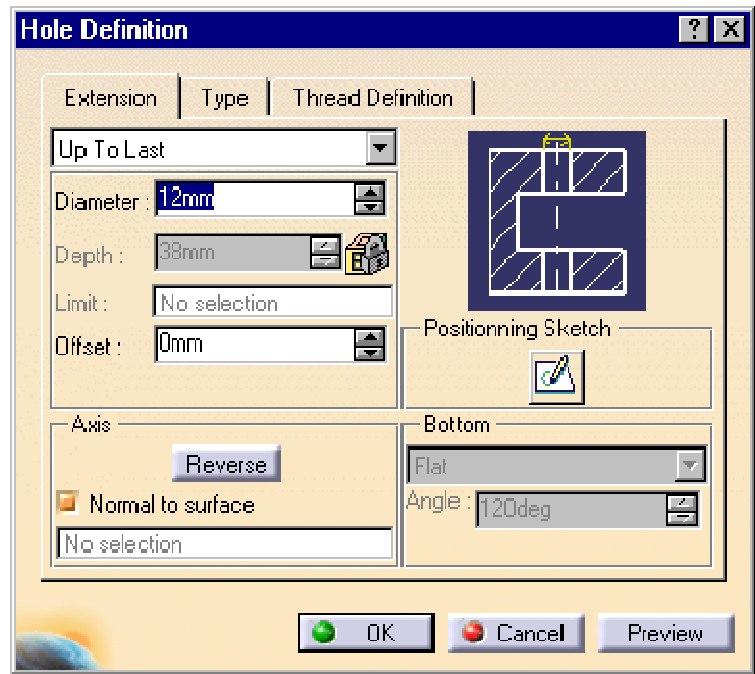
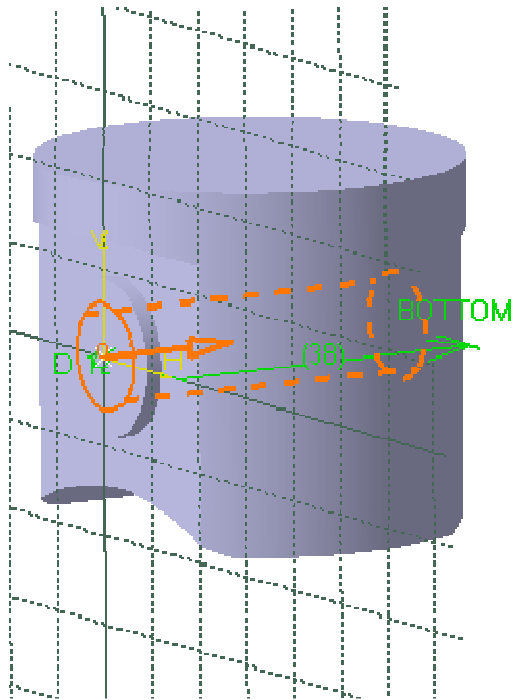
In this section, we are going to create the following hole.



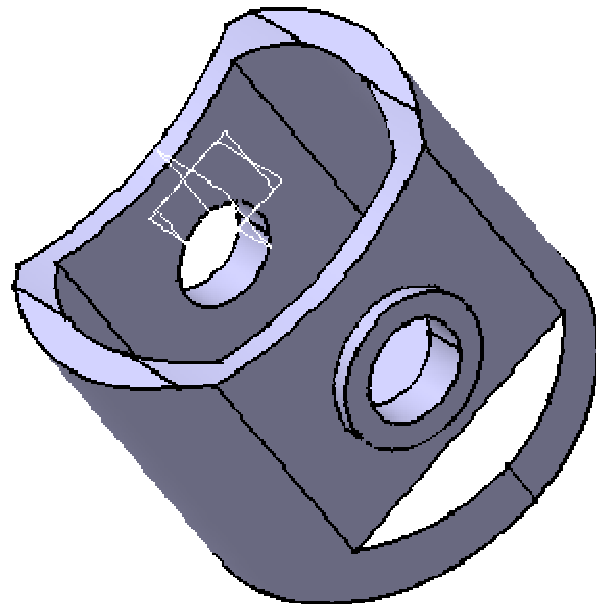
1. Select the Hole icon .
2. Select the following face.



3. Create a hole with the following parameters.

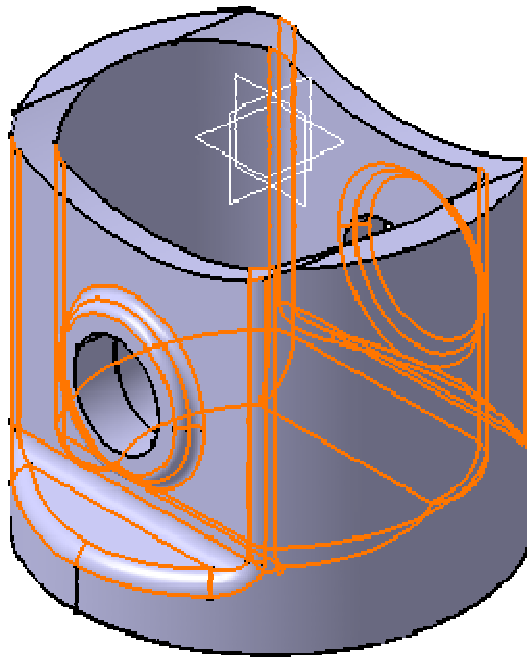


You get:

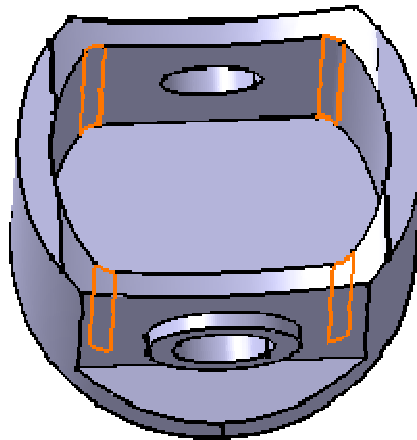


## Creating Fillets

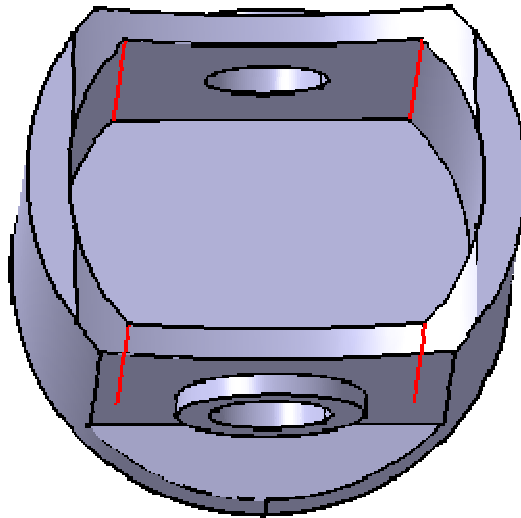
In this section, we are going to create the following fillets.



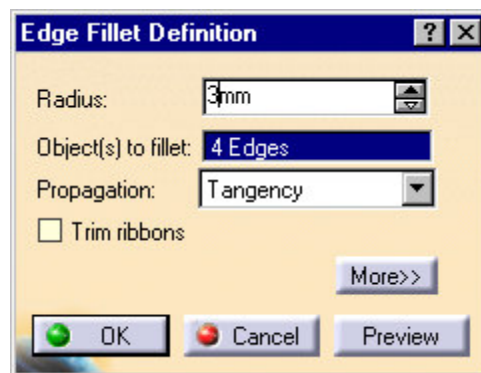
1. We are going to create first the following fillet. So select the Edge Fillet icon



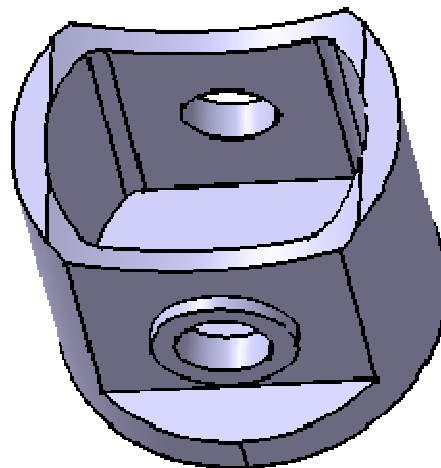
2. Select the four following edges.



3. Enter 3 in the Radius field of the dialog box, then select OK.

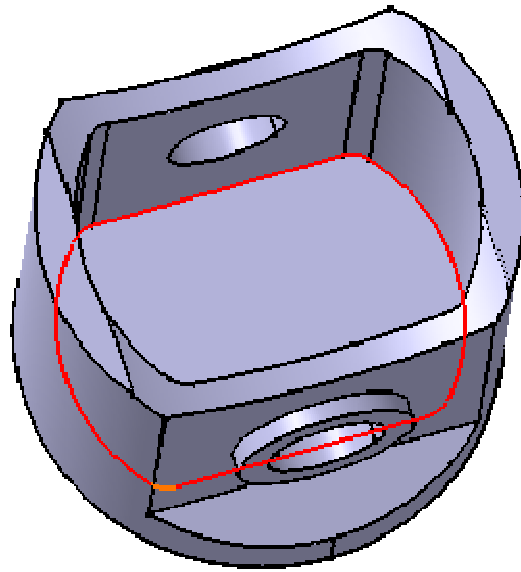


You get:

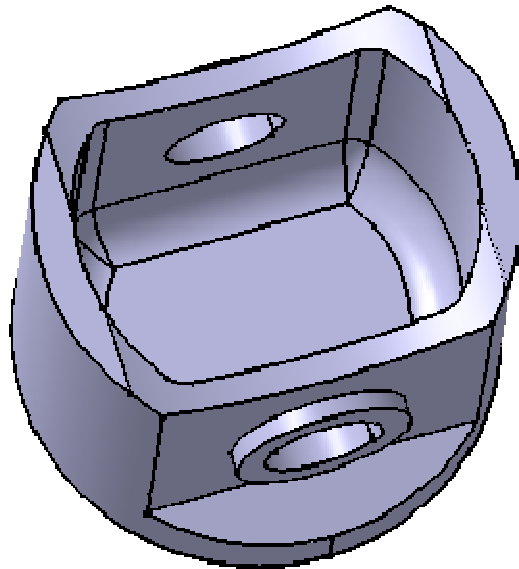


4. Using the same method, create an edge fillet with a radius of 5 at the following location.

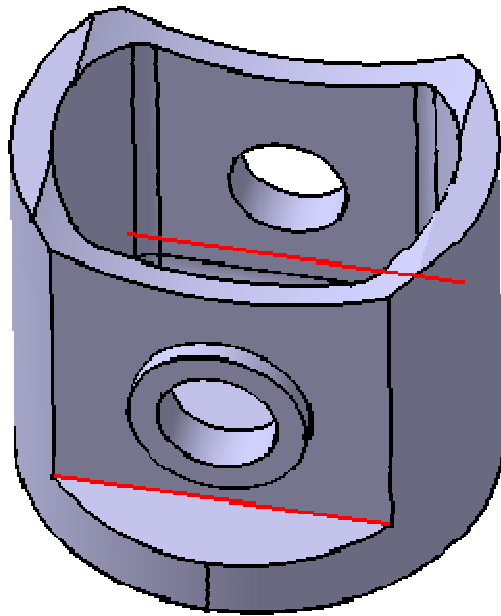




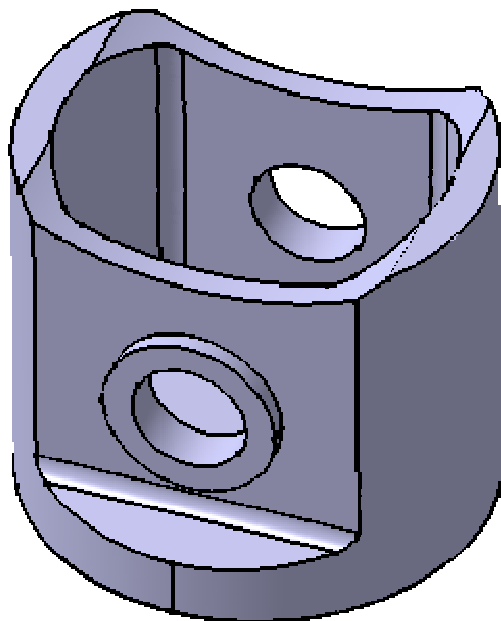
You get:



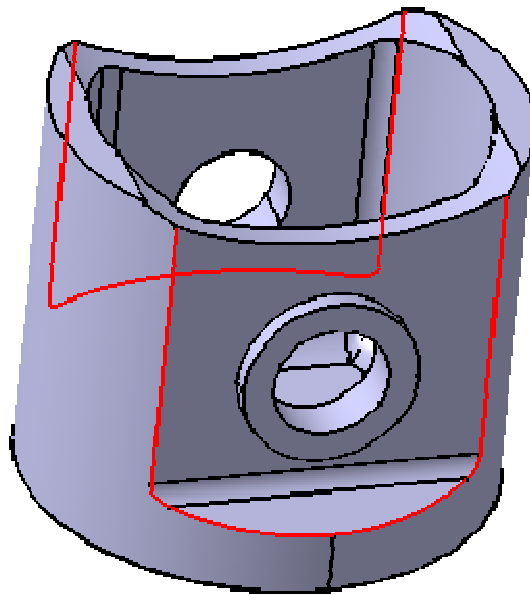
5. Using the same method, create an edge fillet with a radius of 2 at the following location.



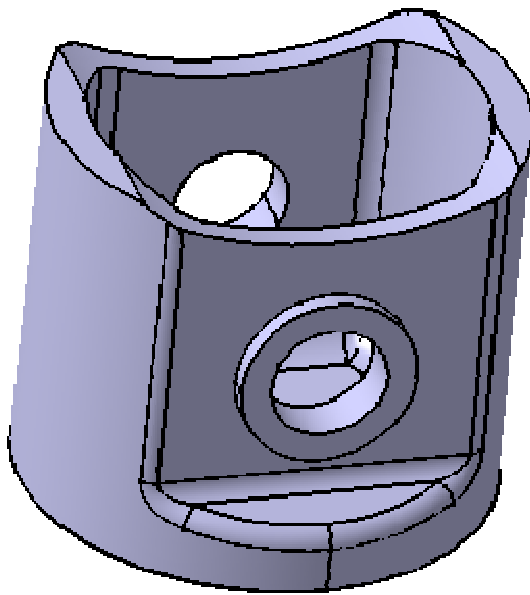
You get:



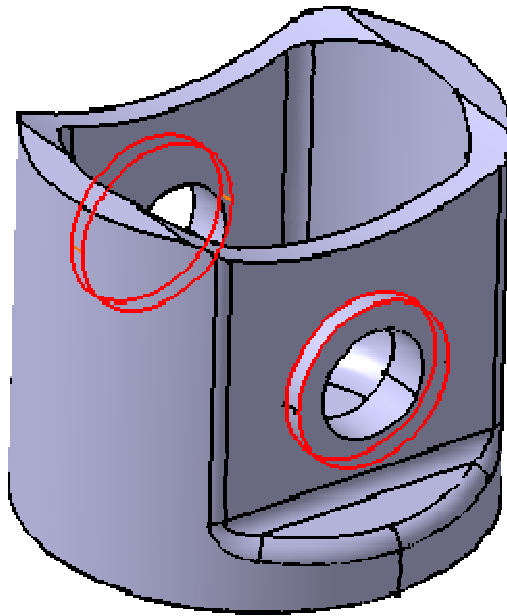
6. Using the same method, create an edge fillet with a radius of 2 at the following location.



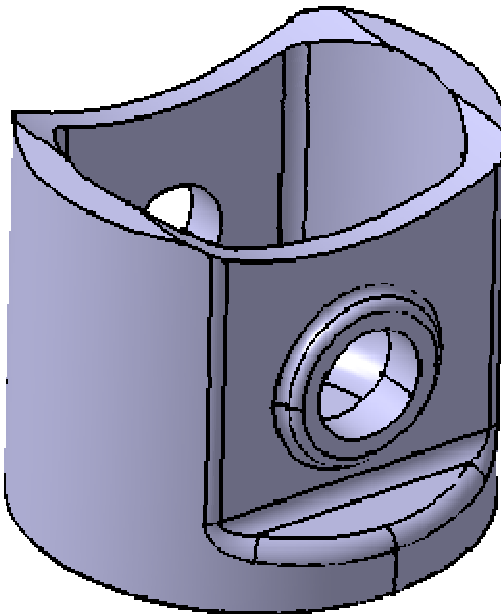
You get:



7. Using the same method, create an edge fillet with a radius of 1 at the following location.



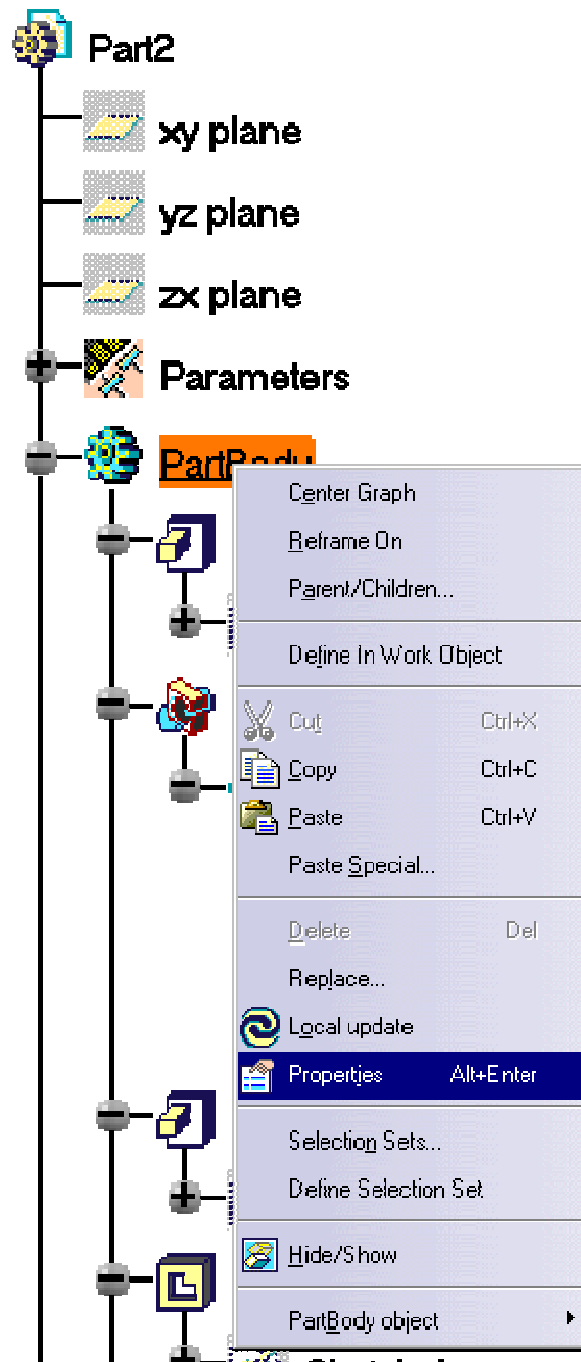
You get:



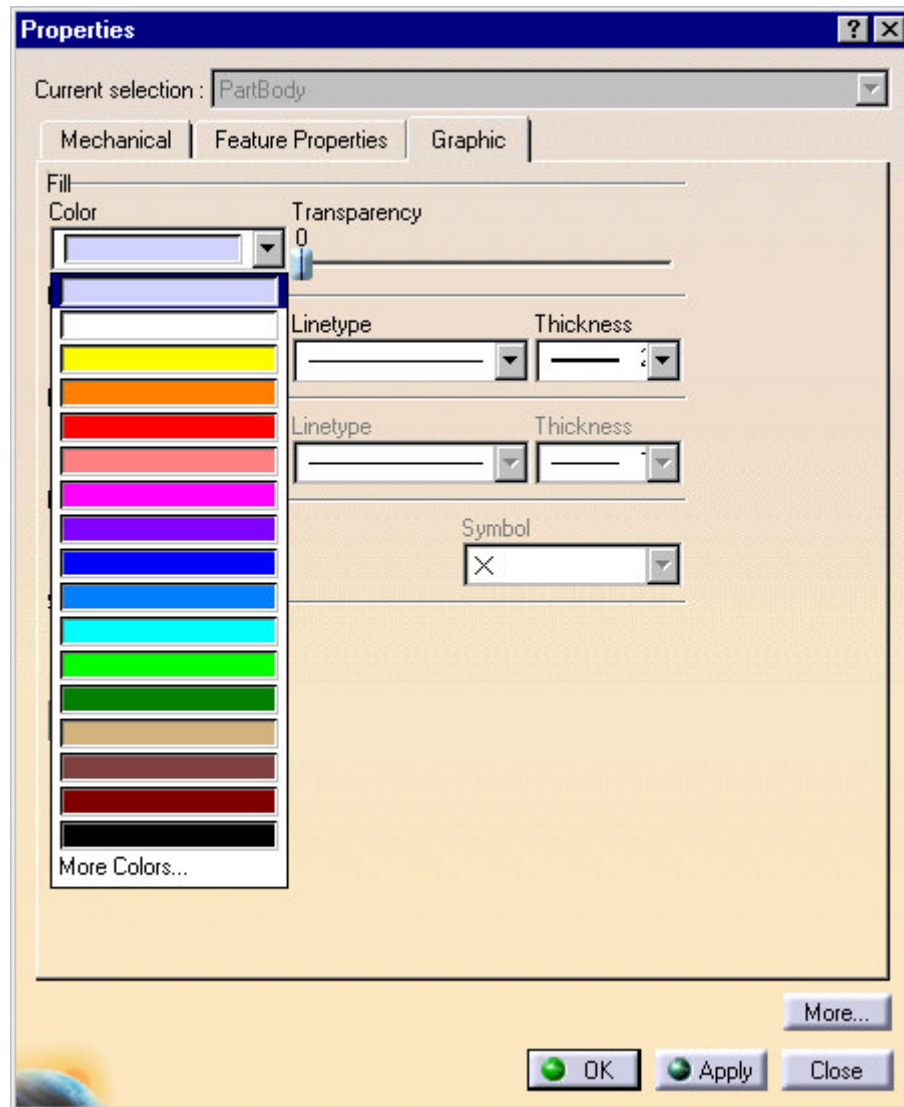
## Changing the color

In this section, we are going to change the piston color.

1. Place the cursor onto PartBody, then select properties from the contextual menu (MB3).



2. Select a color in the Fill combo, then select OK.



You get:

