Departamento de Computação

PROJETO E MANUFATURA ASSISTIDOS POR COMPUTADOR 27260 A

AULA 03 – SWEPT FEATURES

Departamento de Computação
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Departamento de Computação

Aula 03

Two important Swept Features (Extrude and Revolve) are introduced here using a practical example which is the continuation of the lower casing of the impeller.

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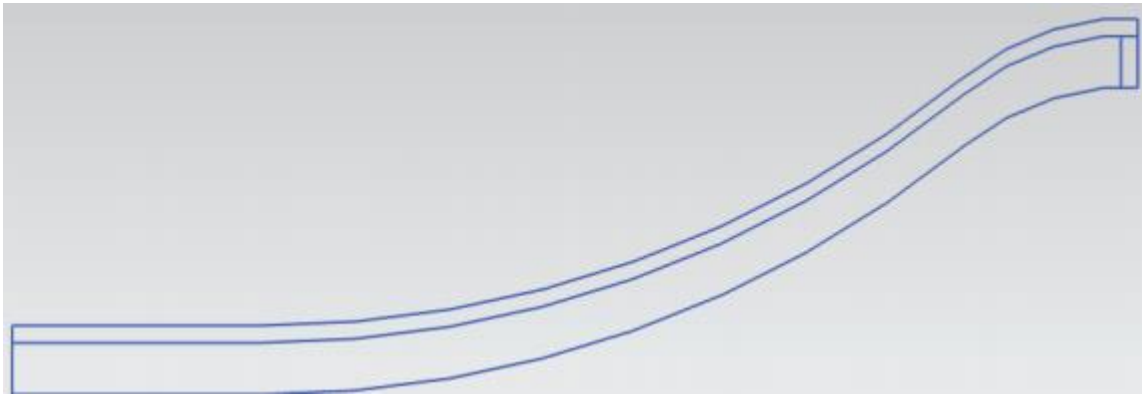
1. Open the **Impeller_lower_casing.prt**



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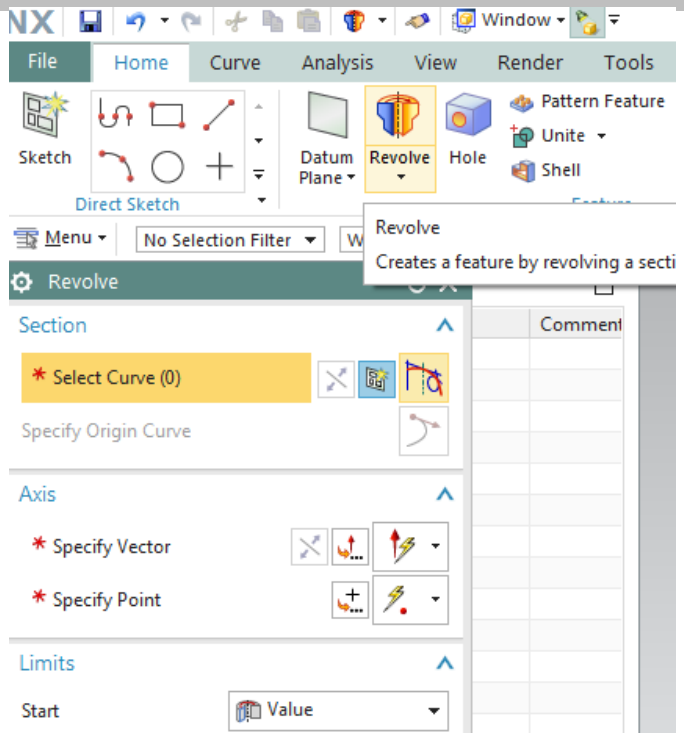
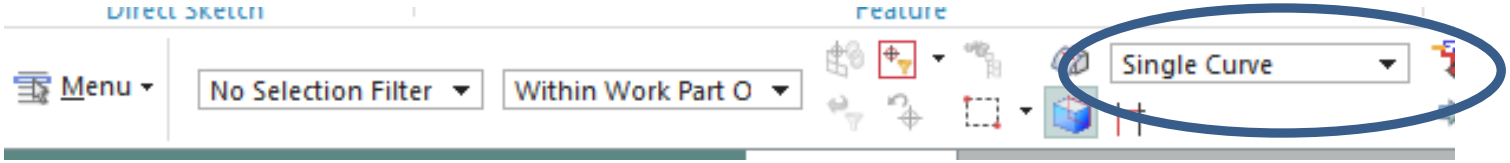
2. Click on **Insert →Design Feature →Revolve**



3. Make sure that the *Selection Filter* is set to *Single Curve* as shown below on the *Selection Filter Toolbar*



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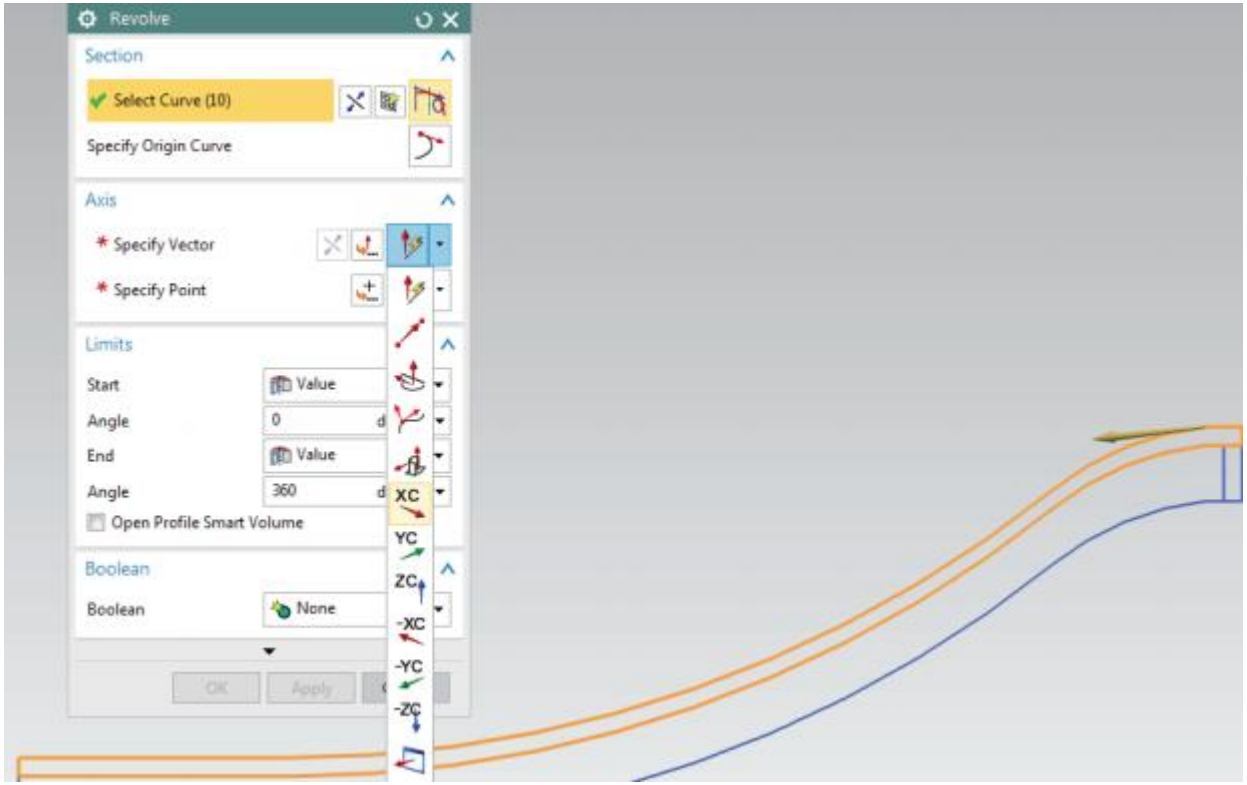
4. Click on **each of the 10 curves** as shown in the next figure

5. In the **Axis** dialog box , in the **Specify Vector** option choose the **Positive XC-direction**



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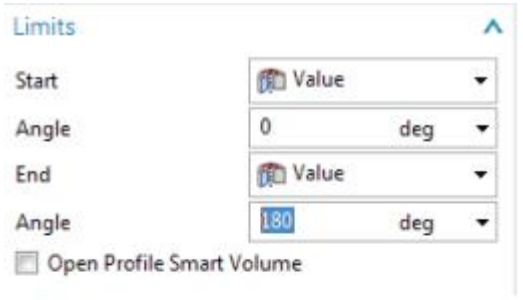
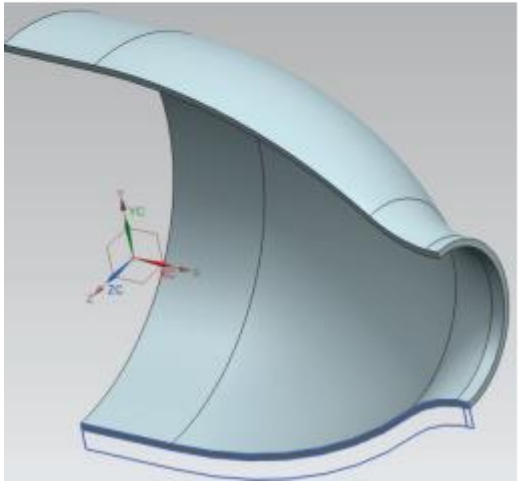
6. In the **Specify Point** option, enter the coordinates **(0, 0, 0)** so the curve revolves around XC-axis with respect to the origin
7. Keep the **Start Angle** as **0** and enter **180 deg** as the value for the **End Angle**
8. Click **OK**

The solid is shown on the right. Now, we will create edges.





9 Click on **Insert** →**Design Feature** →**Extrude**

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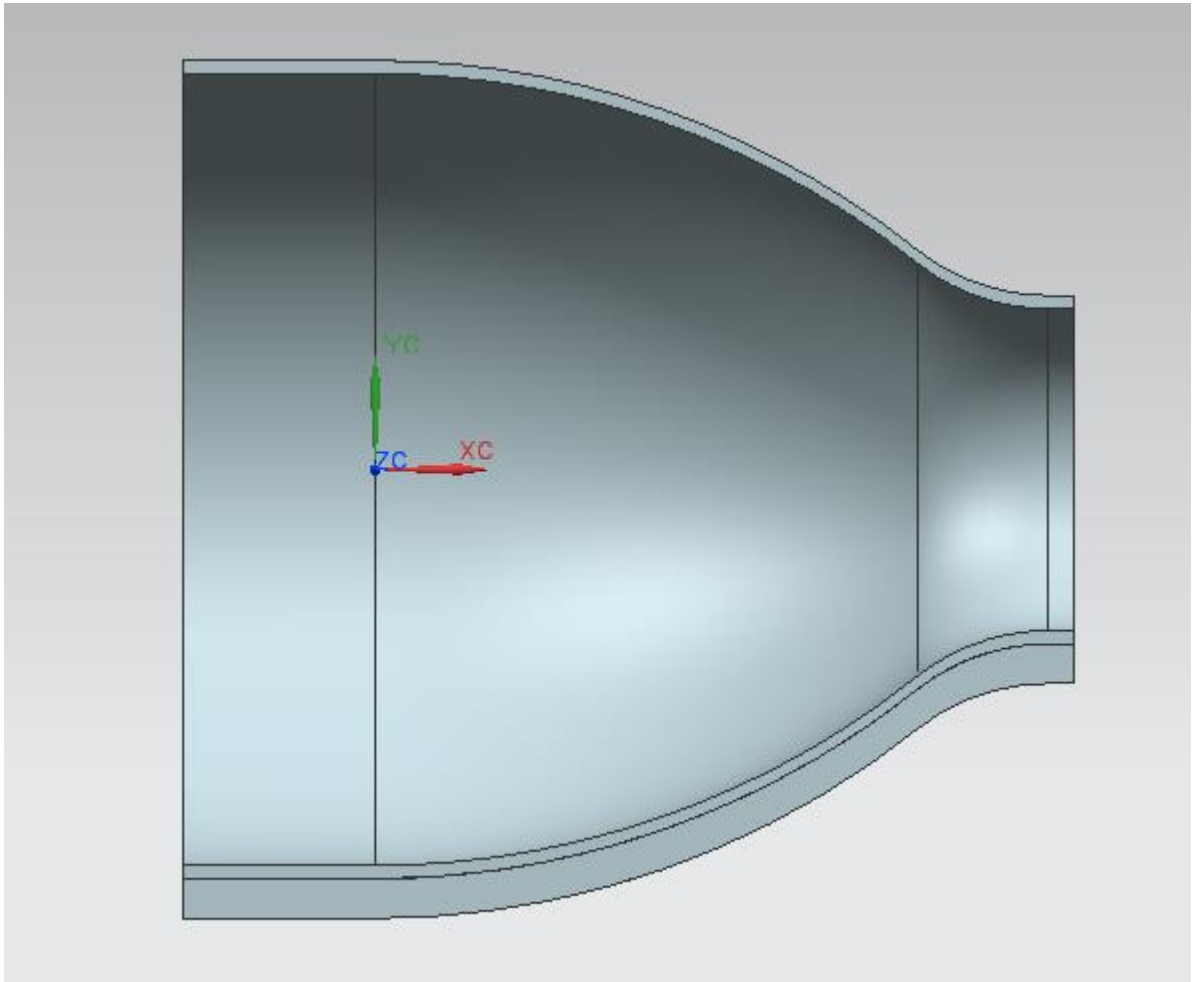

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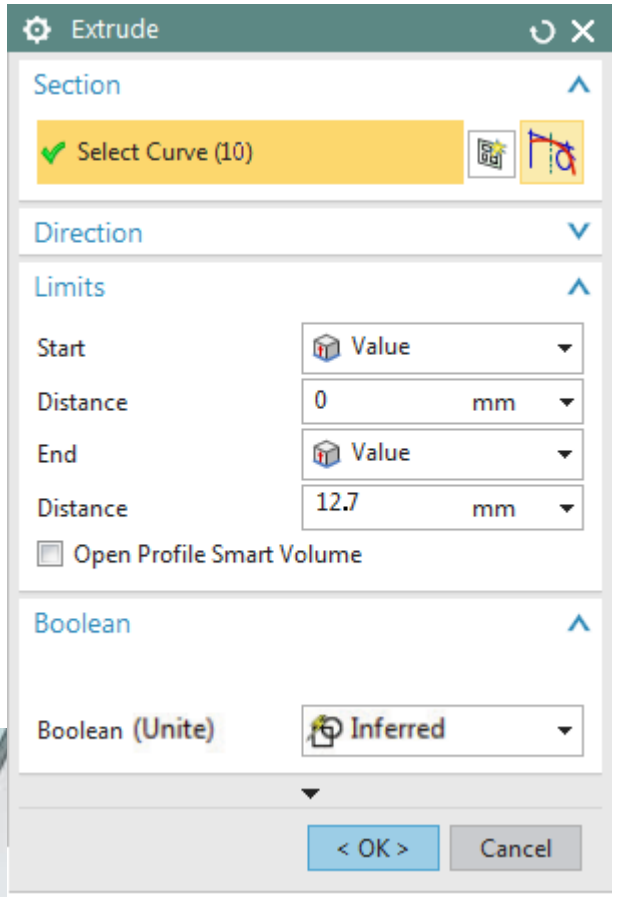
10. Select the outer curve of the casing as shown in the figure below (again make sure that the **Selection Filter** is set to **Single Curve**).

- Note: In case you are not able to select the proper lines, left-click and hold the mouse button and you will see a dialog box pop-up as shown which will provide you the options of which curve to select



11. Extrude this piece in the **negative Z-direction** by **12.7 mm**

The final solid will be seen as follows.

We will now use the Mirror option to create an edge on the other side.

12. Choose **Edit** →**Transform**

13. Select the solid edge as shown. For this you will have to change the Filter in the dialog box to **Solid Body**

14. Click **OK**

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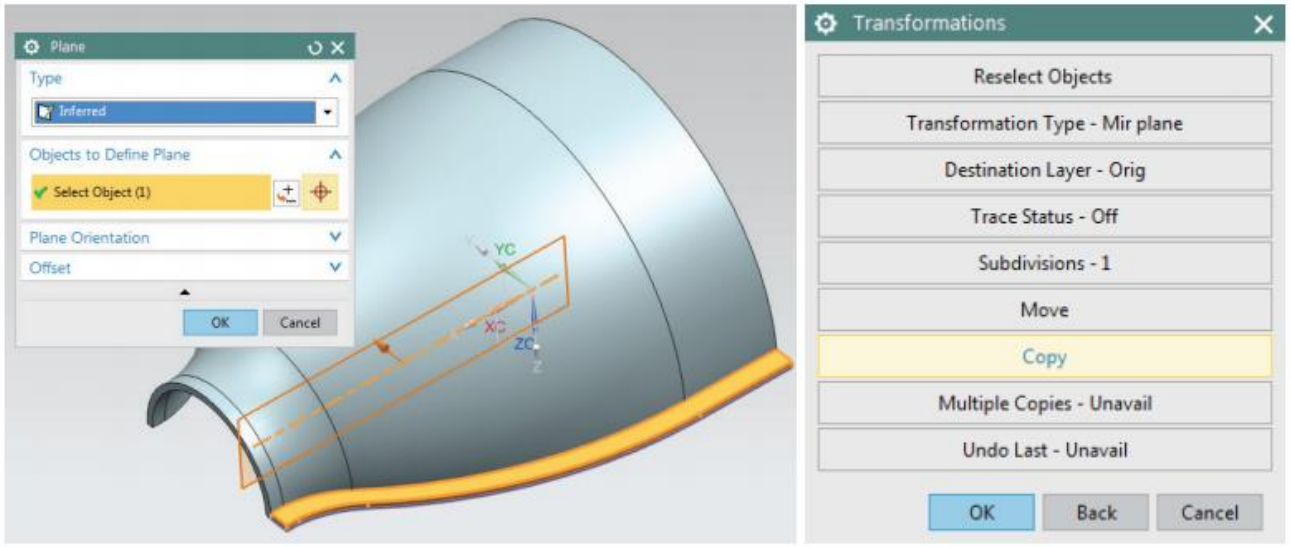
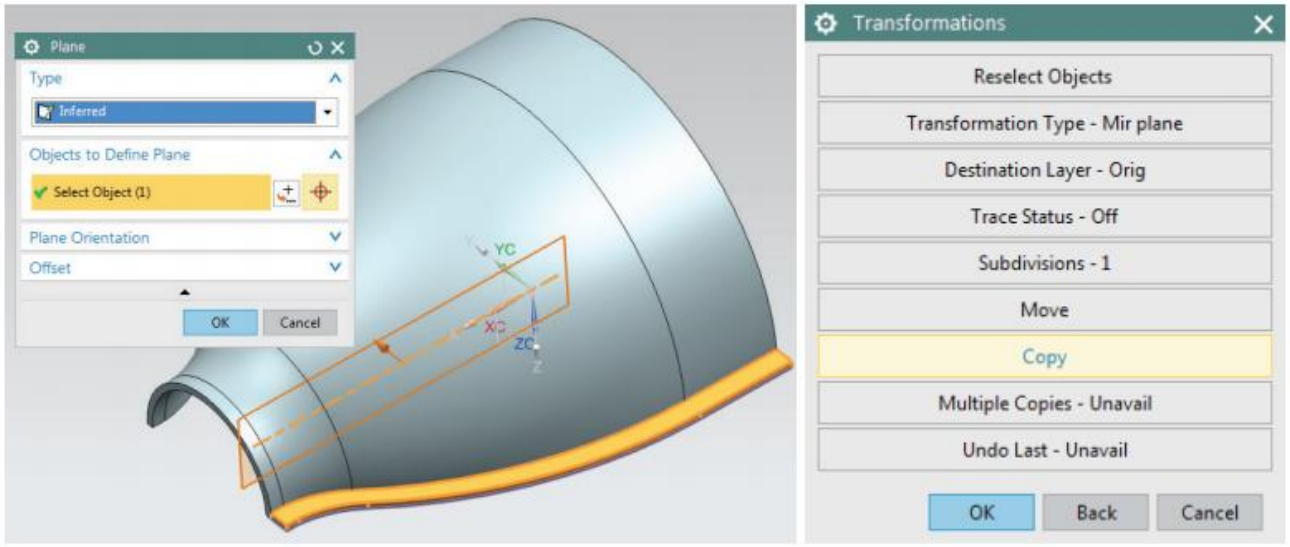
15. Choose **Mirror Through a Plane**
16. Select the **Center Line** as shown below
17. Click **OK**
18. Select **Copy**
19. Click **Cancel**



The edge will be mirrored to the other side as shown below.

Aula 03

15. Choose **Mirror Through a Plane**
16. Select the **Center Line** as shown below
17. Click **OK**
18. Select **Copy**
19. Click **Cancel**



The edge will be mirrored to the other side as shown below.

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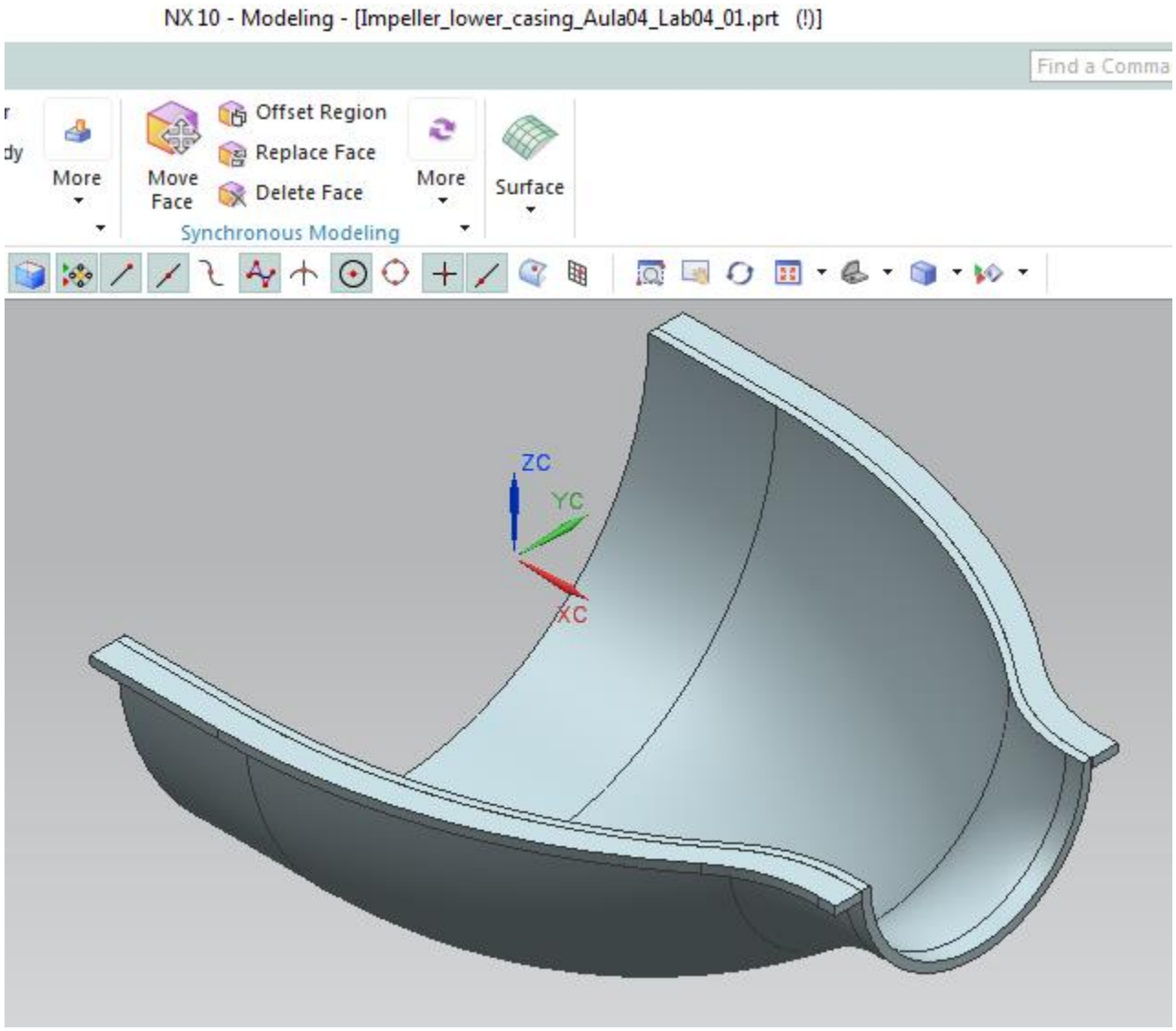
The edge will be mirrored to the other side as shown beside.



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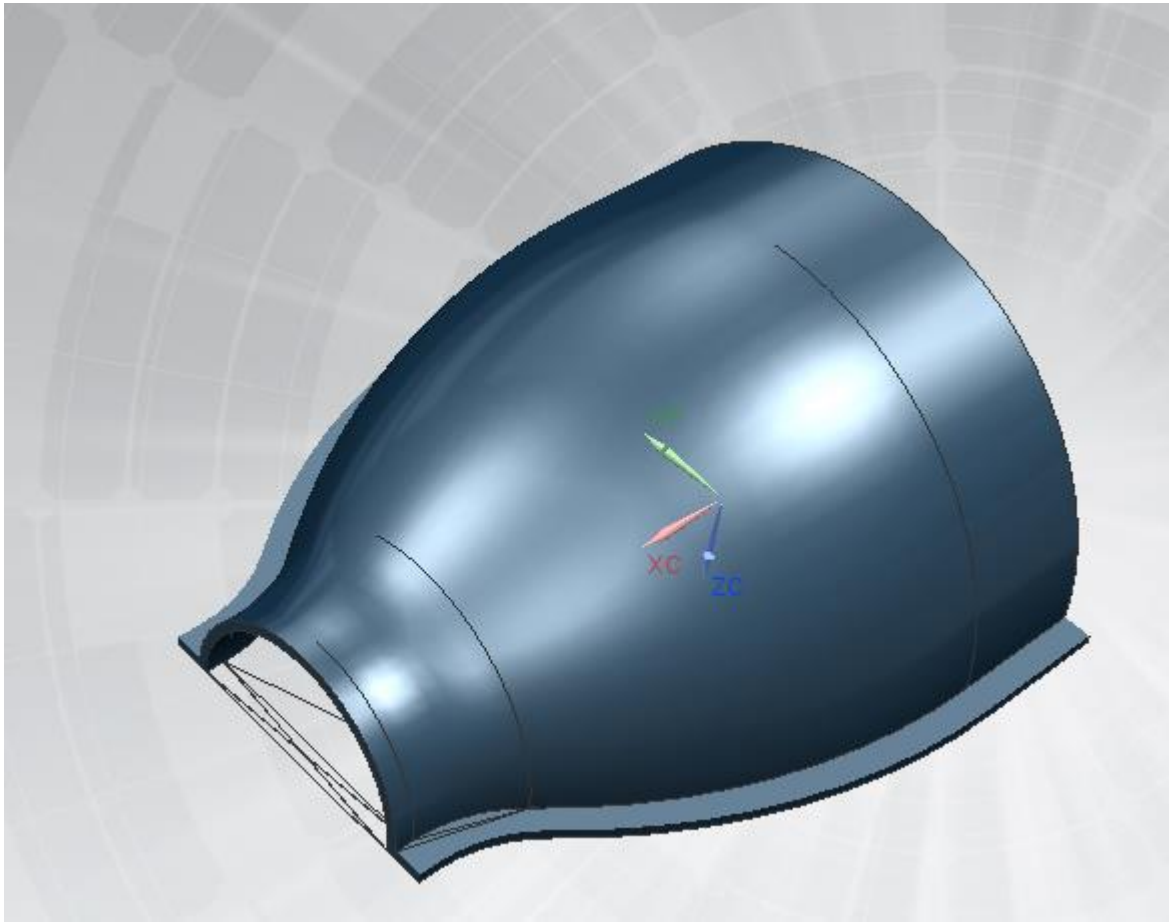

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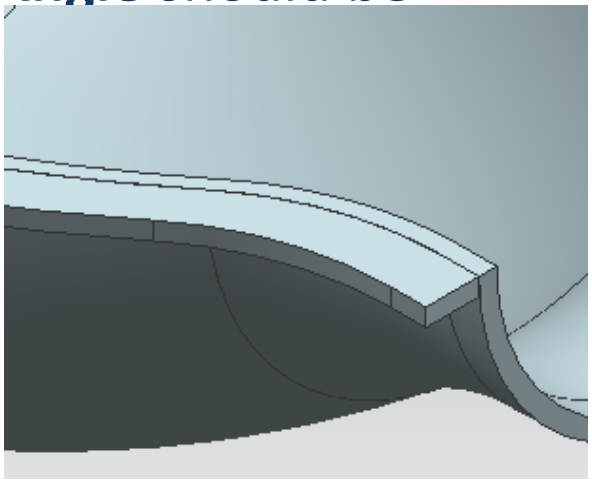
We will now create a flange at the smaller opening of the casing as shown.

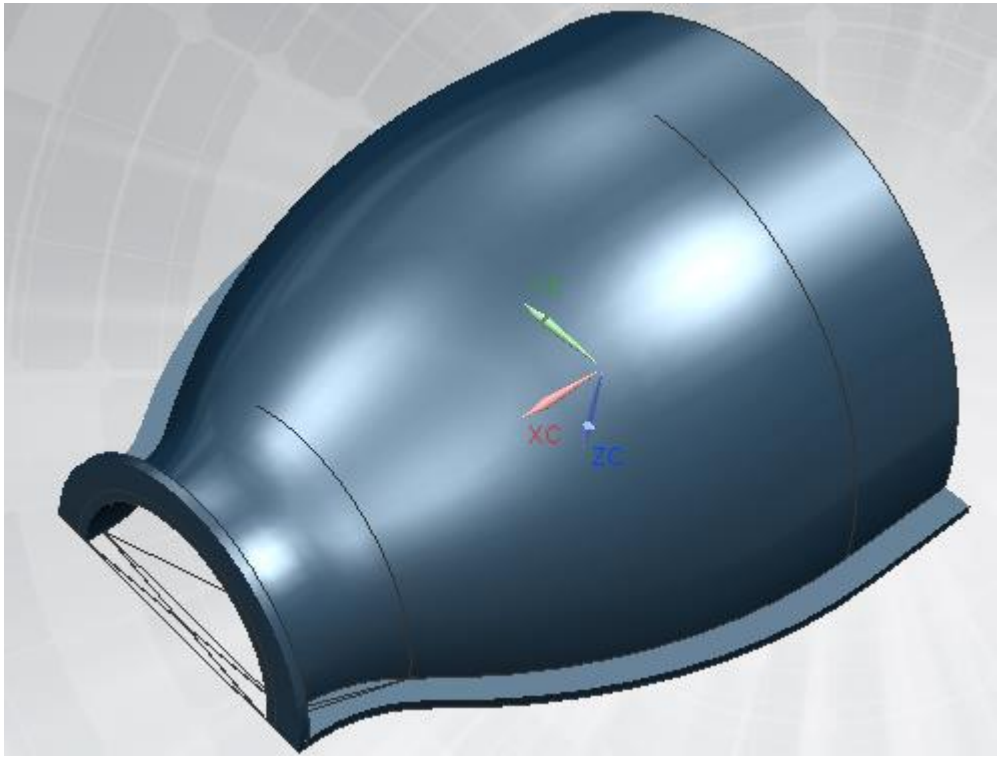
20. Click on **Insert** →**Design Feature** →**Revolve** Again make sure that the *Selection Filter* is set to *Single Curve.* The default *Inferred Curve* option will select the entire sketch instead of individual curves.

21. Revolve this rectangle in the positive **XC-direction** relative to the **Origin** just like for the casing. The **End Angle** should be **180** This will form the edge as shown below.



This will form the edge as shown below.

The lower casing is complete. Save the model



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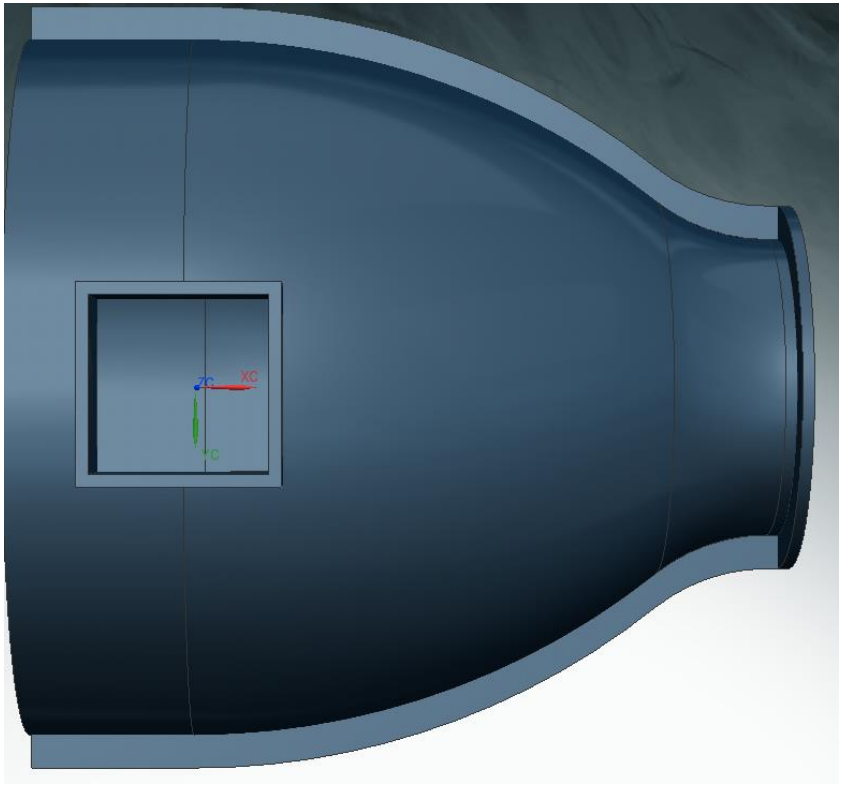
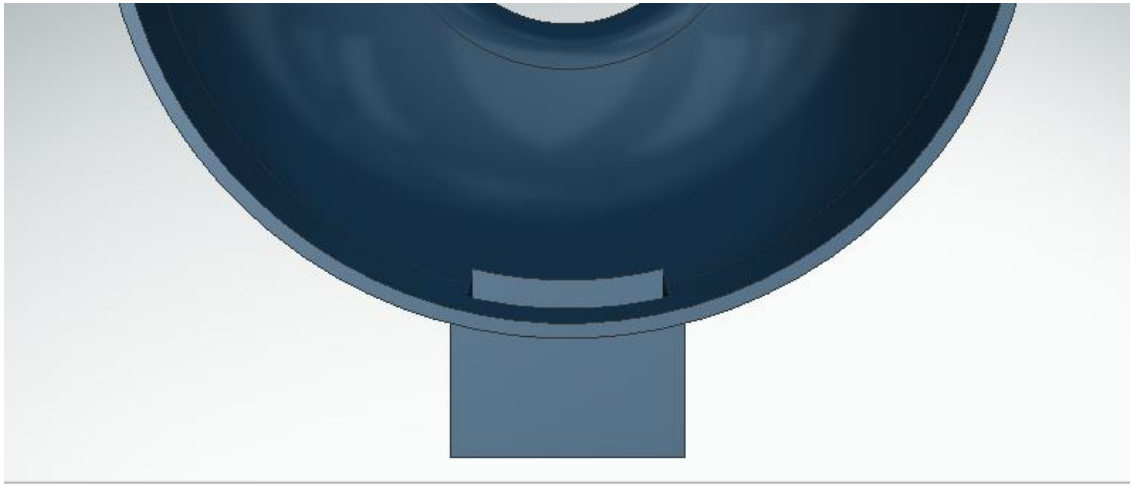
Exercise

3.1 Open the file Impeller_lower_casing.prt and save as file Impeller_upper_casing.prt

3.2 Model the upper casing of the Impeller as shown below.



3.3 The dimensions of the upper casing are the same as for the lower casing, which is described in the previous exercise in detail. The dimensions for the manhole should be such that impeller blades can be seen and a hand can fit inside to clean the impeller.



This will form the edge as shown below.

The lower casing is complete. Save the model