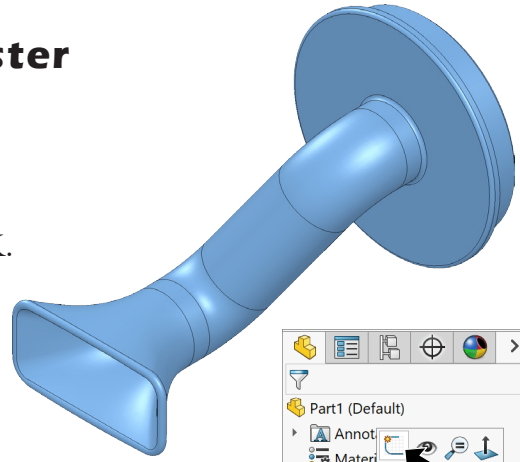




The Watermaster In Pipe



A. Extrude1 Sketch1.

Step 1. Click File Menu > New, click **Part Metric** and OK.


Step 2. Click **Front Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 1**.

Step 3. Click **Circle**  on the Sketch toolbar.

Step 4. Sketch **two circles** at the Origin , **Fig. 2**.

Step 5. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 6. Dimension **diameters 21 and 6**, **Fig. 2**.

Step 7. Click **Features**  on the Command Manager toolbar.

Step 8. Click **Extruded Boss/Base**  on the Features toolbar.

Step 9. In the Boss-Extrude Property Manager set:

under Direction 1, **Fig. 3**

End Condition **Blind**

Depth  **.8**

click OK .

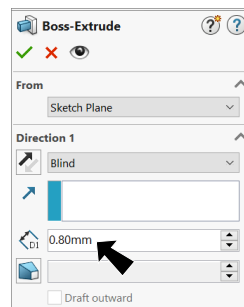


Fig. 3

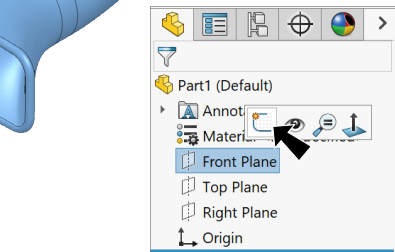


Fig. 1

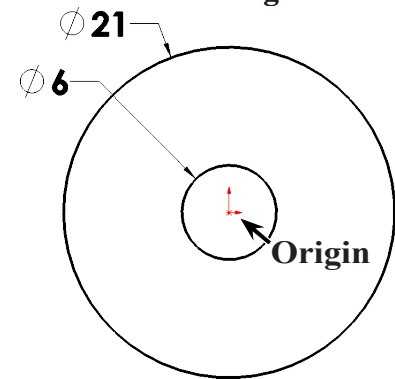


Fig. 2

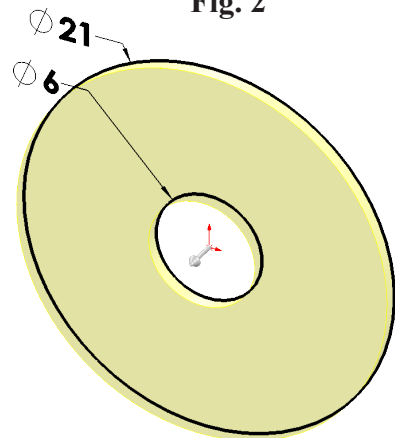



Fig. 4

B. Save as "IN PIPE".

Step 1. Click File Menu > Save As.

Step 2. Key-in **IN PIPE** for the filename and press ENTER.

C. Extrude2 Sketch2.

Step 1. Click **Front Plane**  in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 5**.

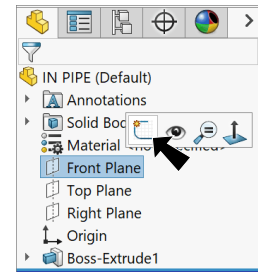



Fig. 5

Step 2. Click **Normal To**  on the Standard Views toolbar. (**Ctrl-8**)

Step 3. Click **Circle**  on the Sketch toolbar.

Step 4. Sketch **two circles** at the Origin , **Fig. 6**.

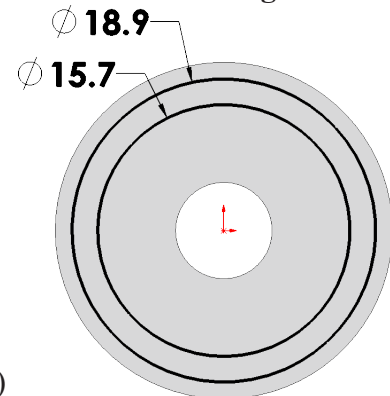



Fig. 6

Step 5. Click **Smart Dimension**  (**S**) on the Sketch toolbar.

Step 6. Dimension **diameters 18.9 and 15.7**, **Fig. 6**.

Step 7. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 8. Click **Features** **Features** on the Command Manager toolbar.

Step 9. Click **Extruded Boss/Base**  on the Features toolbar.

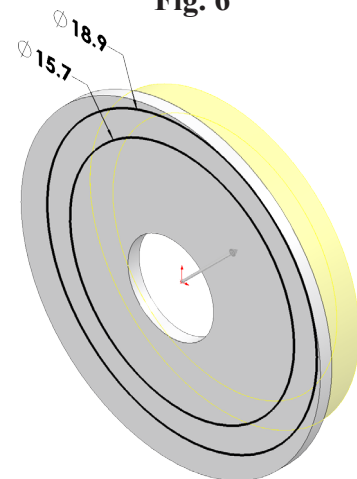


Fig. 8

Step 10. In the Boss-Extrude Property Manager set:
under Direction 1, **Fig. 7**

End Condition **Blind**

Depth  **3**

Reverse Direction 

click OK .

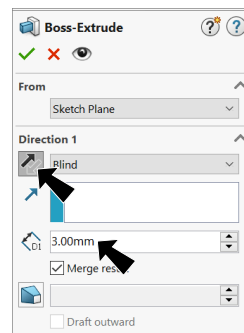


Fig. 7

Step 11. Save  (**Ctrl-S**).

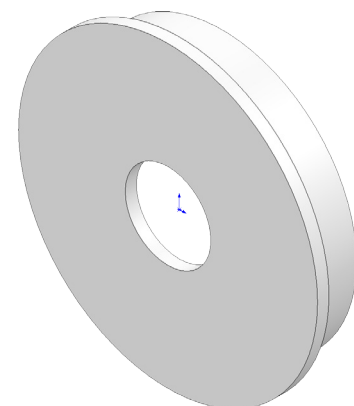


Fig. 9




D. Sweep 3DSketch 1 Path.

Step 1. Click **Sketch**  on the Command Manager toolbar.

Step 2. Click **3D Sketch**  in the **Sketch flyout**  on the Sketch toolbar.

Step 3. Click **Right**  on the Standard Views toolbar. (Ctrl-4)

Step 4. Click **Line**  (L) on the Sketch toolbar.

Step 5. Starting from the Origin  sketch **three short lines (along Z), Fig. 10. First and third lines horizontal**  along Z , second line at down angle.

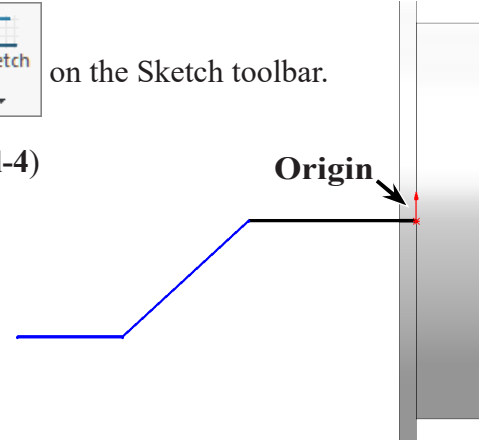



Fig. 10

Step 6. **Unselect Line tool.**
To unselect, **right click graphics area** and click **Select**  from menu.

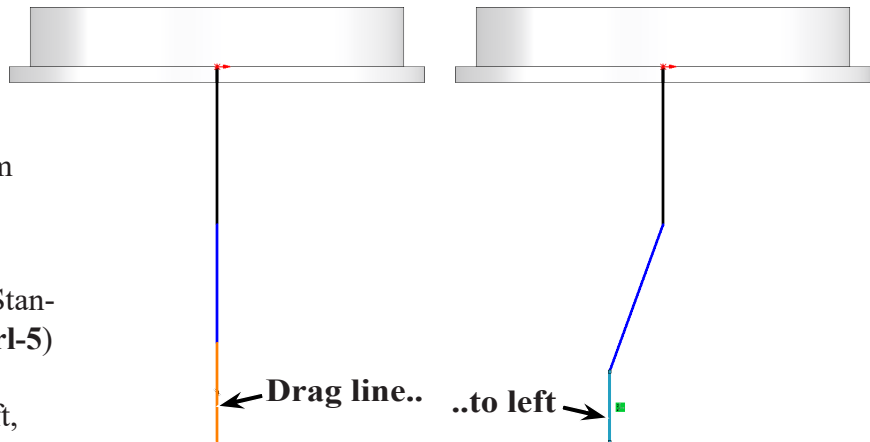



Fig. 11

Fig. 12


Step 7. Click **Top**  on the Standard Views toolbar. (Ctrl-5)


Step 8. Drag the third line to left, **Fig. 11** and **Fig. 12**.



Step 9. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)


Step 10. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 11. Add dimensions:
Dimension the 6 and 5, Fig. 13.

To **dimension the 7.9**, click the Origin  and forward endpoint of the third line and press **Tab key**

one time to dimension along the **X**  axis, **Fig. 14**. Click to place dimension.

To **dimension the 13**, click the Origin  and forward endpoint of the angled line and press **Tab key twice** to dimension along the **Y**  axis, **Fig. 15**. Click to place dimension.

To **dimension the 6**, click the angled line and press **Tab key 3 times** to dimension along the **Z**  axis, **Fig. 16**. Click to place dimension.

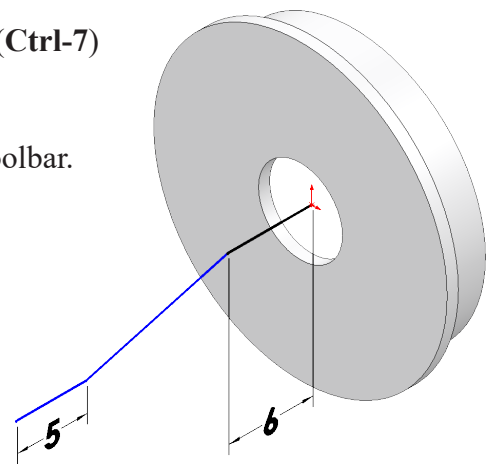


Fig. 13

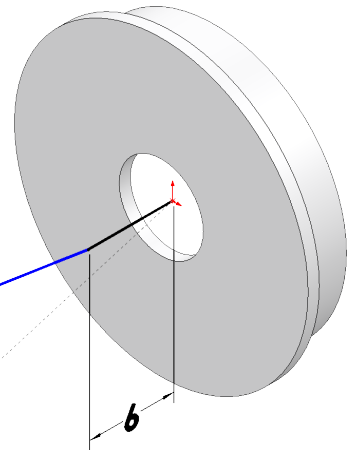


Fig. 14

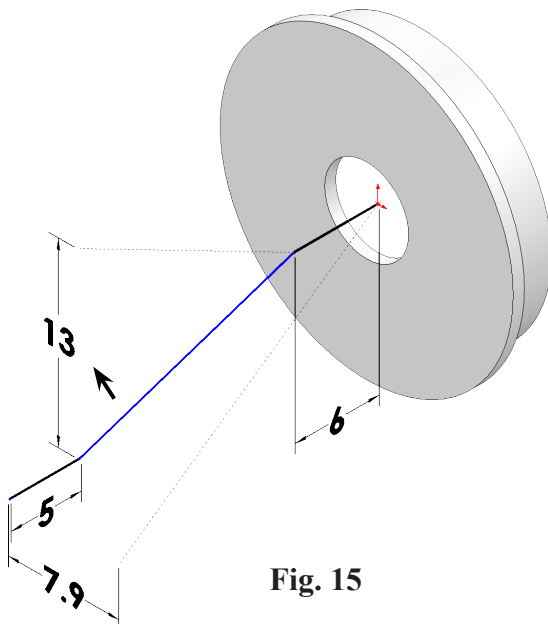


Fig. 15

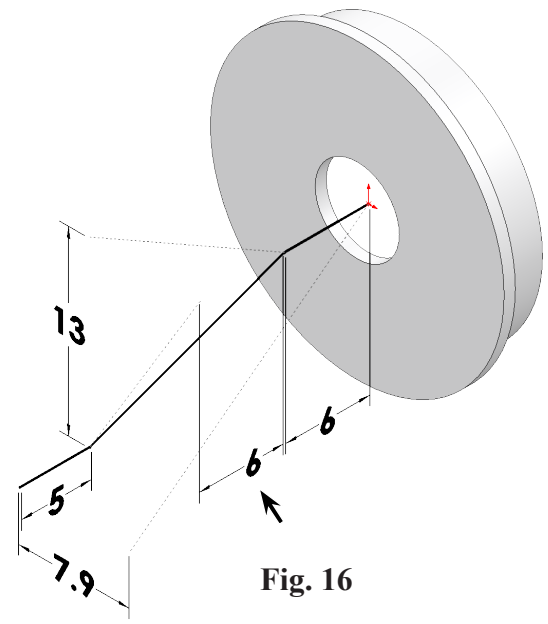


Fig. 16

Step 12. Click **Sketch Fillet**  on the Sketch toolbar.

Step 13. In the Sketch Fillet Property Manager set:
under Fillet Parameters, **Fig. 17**

Radius  **5**

click corners at angled line,
Fig. 18

click OK  twice.

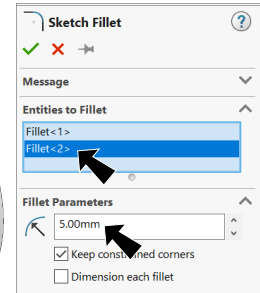
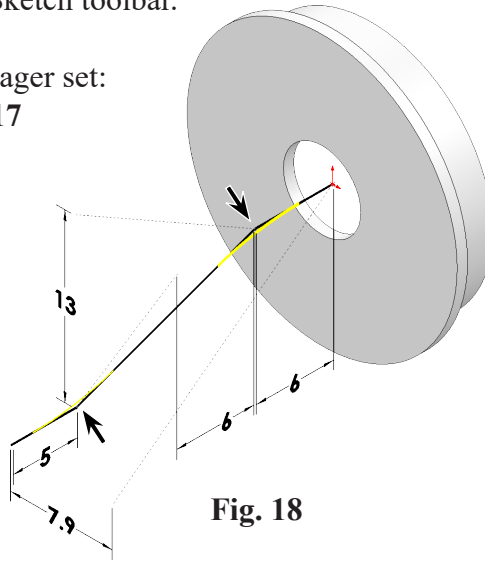


Fig. 17

Step 14. Click **Features**  on the Command Manager toolbar.

Step 15. Click **Swept Boss/Base**

 **Swept Boss/Base** on the Features toolbar.

Step 16. In the Swept Boss/Base Property Manager:
under Profile and Path, **Fig. 19**

select **Circular Profile**

Diameter  **6.7**

Path  click 3D Sketch, **Fig. 20**

under Options
uncheck **Merge result**
click OK .

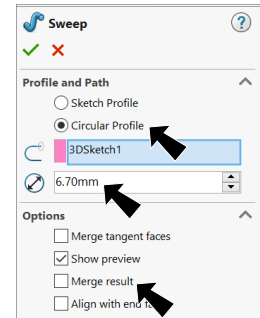
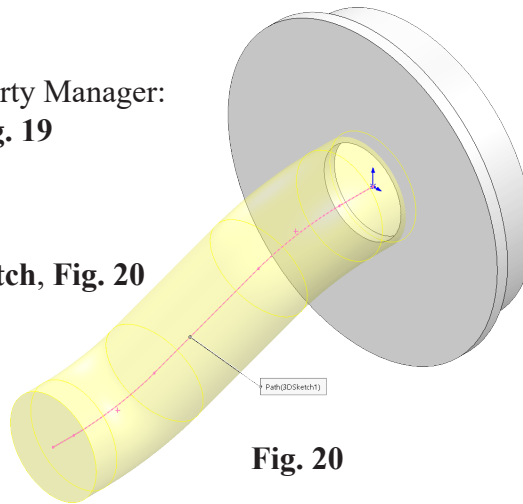



Fig. 19

Step 17. Save  (Ctrl-S).

E. Create Plane.

Step 1. Click **Front Plane**  in the Feature Manager to display Plane in graphics area, **Fig. 21**. Note the 2 solid bodies.

Step 2. In graphics area **Ctrl drag Front plane to front** and release, **Fig. 22**.

Step 3. In the Plane Property Manager set: under First Reference, **Fig. 23**

Distance  **25**
and press **ENTER**.

The new plane should be towards front, **Fig. 22**.

Click **OK** .

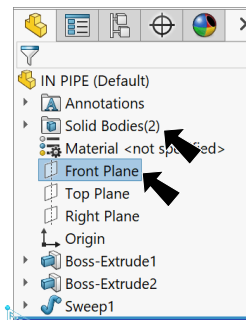


Fig. 21

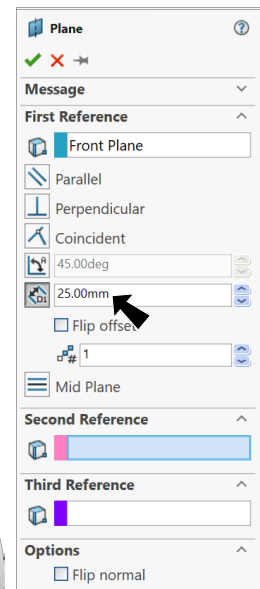


Fig. 23

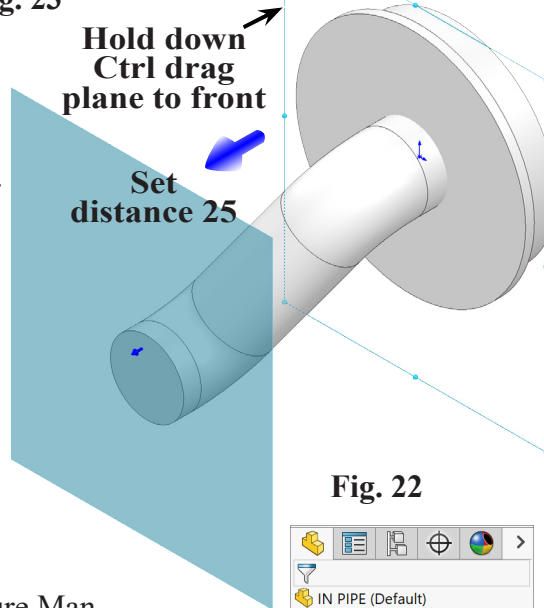







Fig. 22

F. Loft Profile.

Step 1. **Hide Plane1** . To hide, click **Plane1**  in the Feature Manager and **Hide**  on the context toolbar, **Fig. 24**.

Step 2. Click **Plane1**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 25**.

Step 3. Click **Normal To**  on the Standard Views toolbar. (**Ctrl-8**)

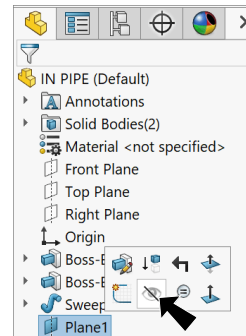


Fig. 24

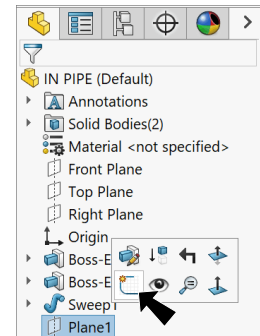



Fig. 25

Step 4. Click **Convert Entities**  on the Sketch toolbar.

Step 5. In the Convert Entities Property Manager: under Entities to Convert, **Fig. 26** click **front edge of Sweep**, **Fig. 27** click **OK** .

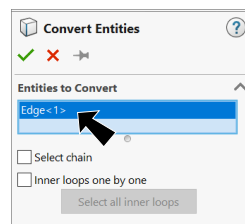


Fig. 26

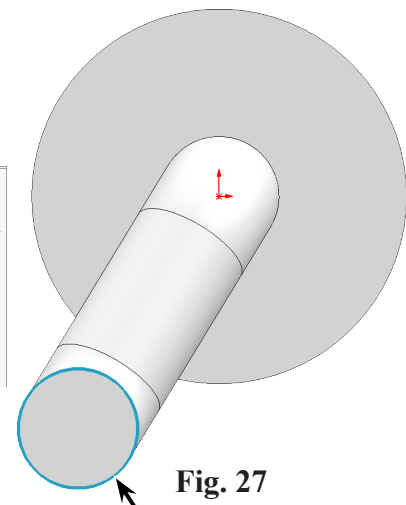




Fig. 27

Step 6. Click the converted circle and click **Construction Geometry**  on the context toolbar, **Fig. 28**.

Step 7. Click **Corner Rectangle**  in the **Rectangle** flyout  on the Sketch toolbar.

Step 8. Sketch corner rectangle, **Fig. 29**.

Step 9. **Unselect Rectangle too.** To unselect, **right click graphics area and click Select**  from menu.

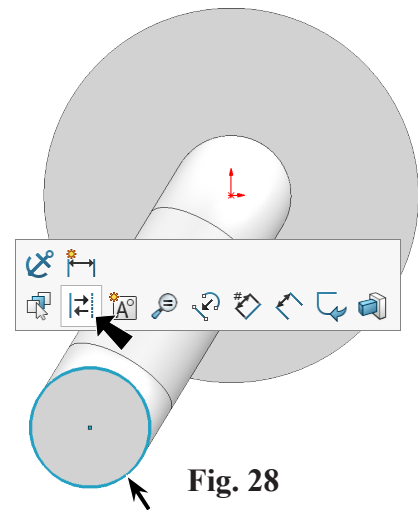



Fig. 28

Step 10. **Ctrl click midpoint of a horizontal line and centerpoint of construction circle to select both.** Release Ctrl key and click **Make Vertical**  on the context toolbar, **Fig. 30**.

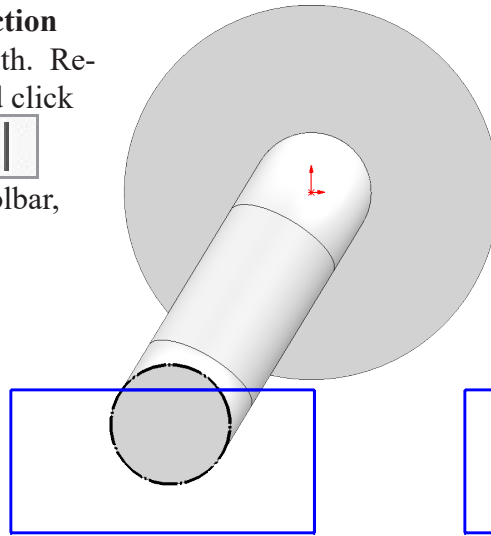


Fig. 29

Step 11. **Ctrl click top horizontal line and construction circle to select both.** Release Ctrl key and click **Make**

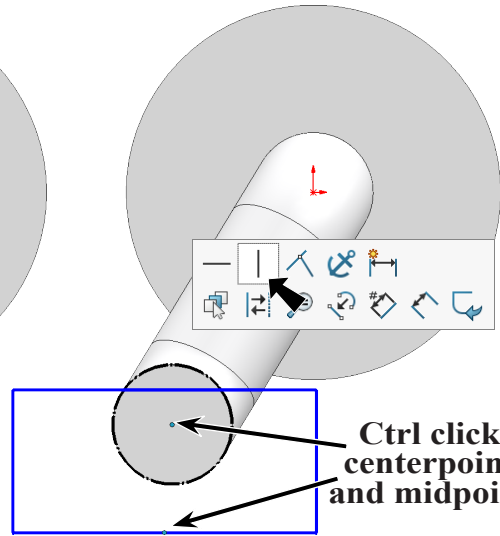



Fig. 30

Ctrl click centerpoint and midpoint

Tangent  on the context toolbar, **Fig. 31**.

Step 12. Click **Smart Dimension**  (S) on the Sketch toolbar.

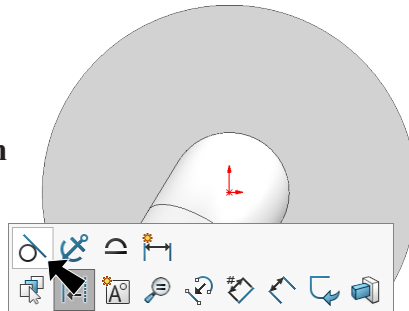


Fig. 31

Step 13. Add dimensions, **Fig. 32**.

Ctrl click converted edge and line

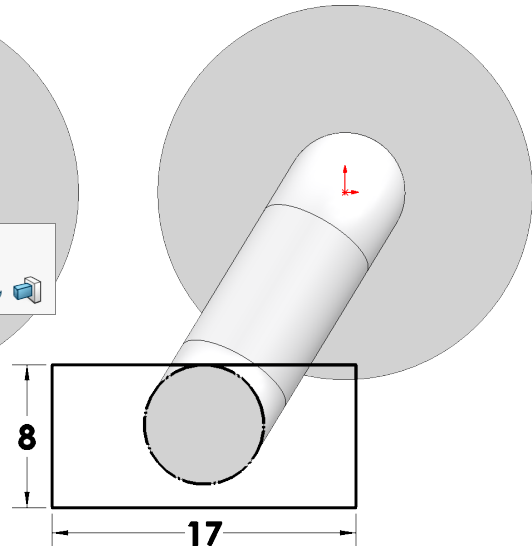




Fig. 32

Step 14. Click **Sketch Fillet**  on the Sketch toolbar.

Step 15. In the Sketch Fillet Property Manager set:
under Fillet Parameters, **Fig. 33**

Radius  **2**
drag a selection to select all,
Fig. 34
click Yes twice
click OK .

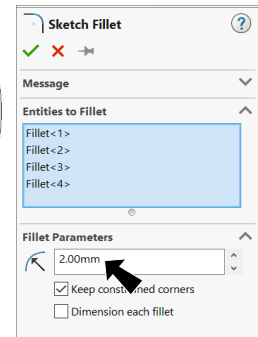


Fig. 33

Step 16. Click **Exit Sketch**  on the Sketch toolbar.

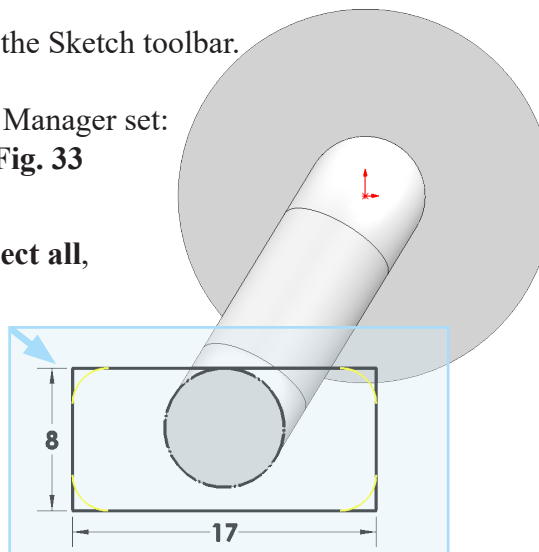



Fig. 34


G. Loft.

Step 1. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)

Step 2. Click **Features**  on the Command Manager toolbar.

Step 3. Click **Lofted Boss/Base**  on the Features toolbar.

Step 4. In the Surface-Loft Property Manager set:
under Profiles, **Fig. 35**

click **front face of Sweep**, **Fig. 36**
click **Sketch3**
under Start/End Constraints
Start Tangency Type
Normal To Profile
click **OK** .

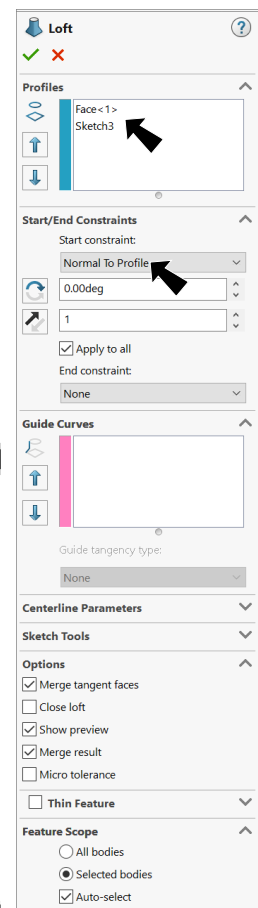



Fig. 36

Step 5. **Hide Boss-Extrude2**  **body**, **Fig. 37**. To hide, move the cursor over the component in graphics area and press **Tab** key to hide.

Step 6. Save  (Ctrl-S).

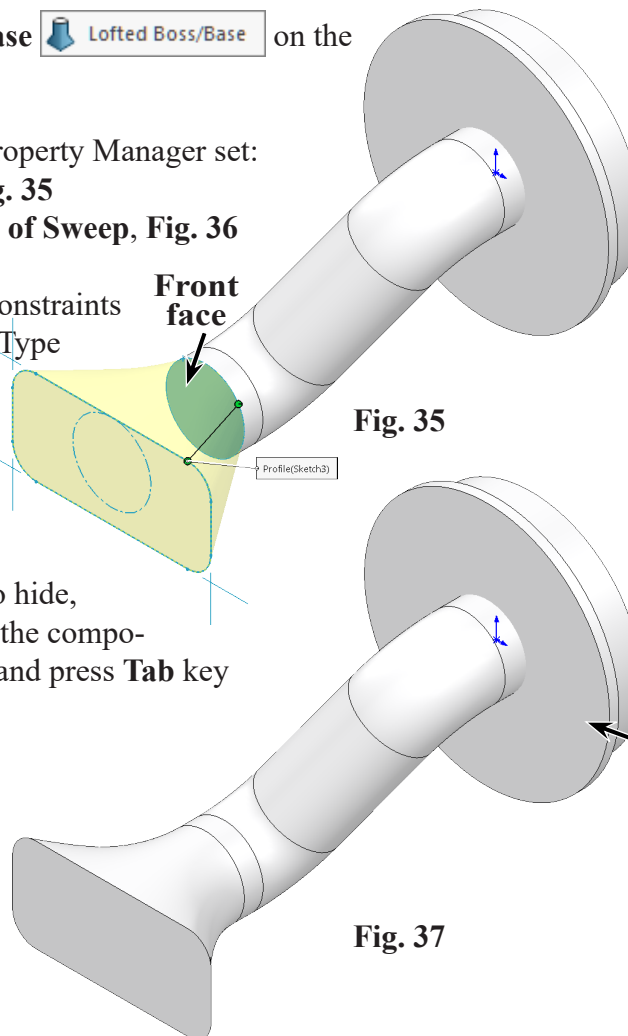


Fig. 37

H. Shell.

Step 1. Click **Shell**  on the Features toolbar.

Step 2. In the Shell Property Manager set:
under Parameters, **Fig. 38**

Distance  .7

click in Faces to Remove box 
click **front face of Loft**, **Fig. 39**

Rotate view to view rear face of Sweep, **Fig. 40**. To rotate, use

Right  on the Standard Views toolbar (Ctrl-4), then

Left Arrow key  **once and Down Arrow key**  **once.**

Click **rear face of Sweep**, **Fig. 40**

check **Show preview**

click **OK** .

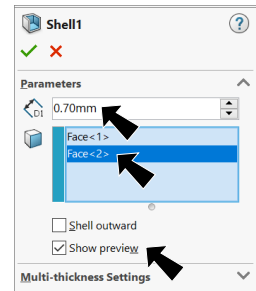


Fig. 38

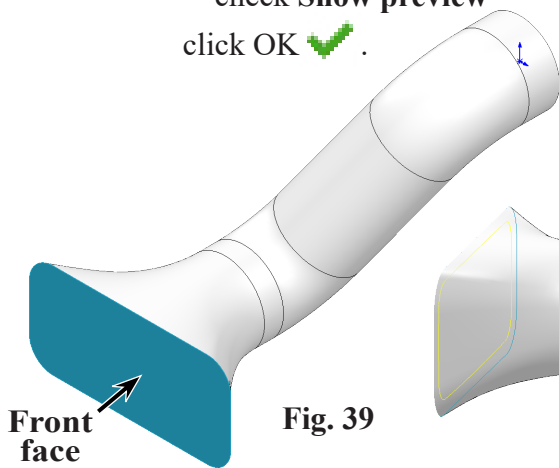


Fig. 39

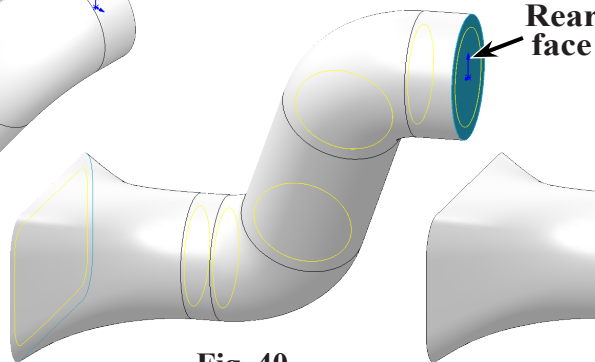


Fig. 40

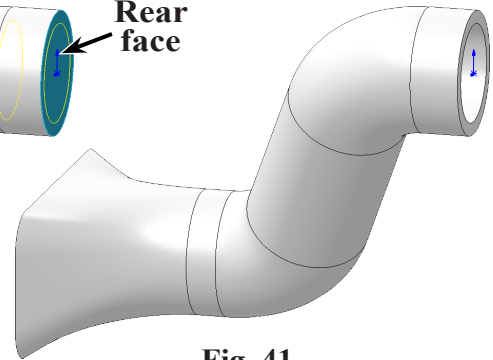



Fig. 41

I. Combine Bodies.

Step 1. **Show Boss-Extrude2**  **body**, **Fig. 43**. To show, move cursor over the component in graphics area and press **Shift - Tab**.

Step 2. Click Insert Menu > Features > Combine.

Step 3. In the Combine Property Manager:
under Operation Type, **Fig. 42**

select **Add**
drag a selection to
select all or
Ctrl-A, **Fig. 43**
click **OK** .

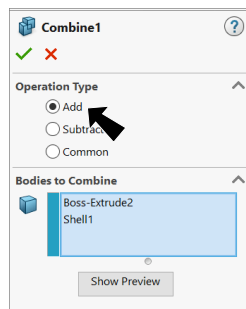


Fig. 42

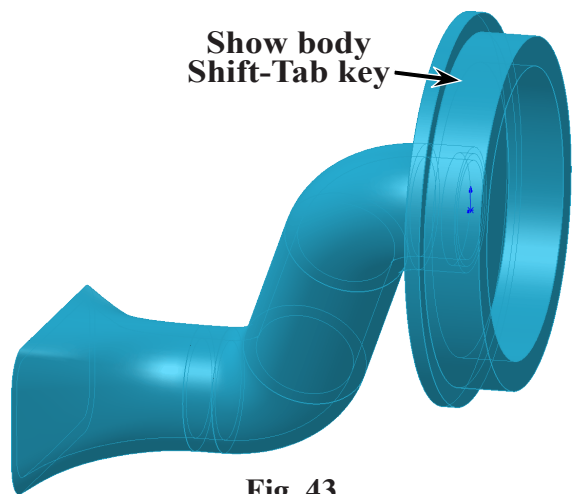
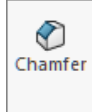


Fig. 43

Step 4. Save  (Ctrl-S).

J. Chamfer.

Step 1. Click **Chamfer**  on the Features toolbar.

Step 2. In the Chamfer Property Manager set:
under Chamfer Type, **Fig. 44**

select **Angle Distance** 

click **both rear circular edges of Extrude2**, **Fig. 45**

under Chamfer Parameters

Distance  .4

Angle  45°

click OK .

Step 3. Save  (Ctrl-S).

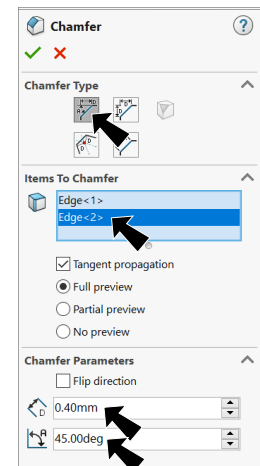


Fig. 44

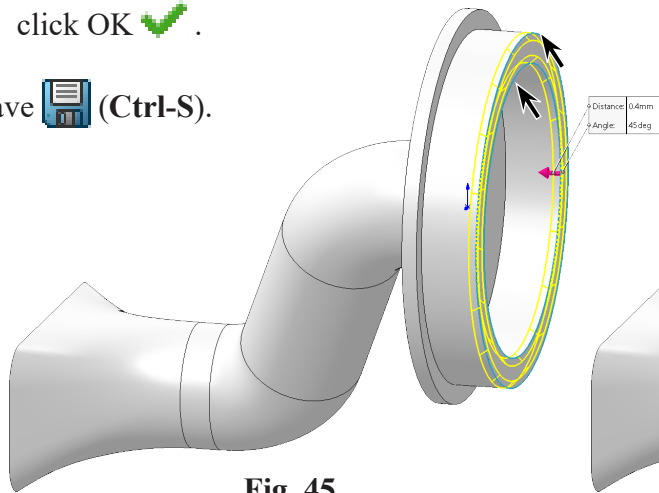


Fig. 45

Fig. 46

K. Fillet Edges.

Step 1. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)

Step 2. Click **Fillet**  on the Features toolbar.

Step 3. In the Fillet Property Manager set:
select **FilletXpert**, **Fig. 47**

① **Radius**  .3

click **front circular edge of Extrude1**
and edge at Extrude1 and Sweep,
Fig. 48

click **Apply**.

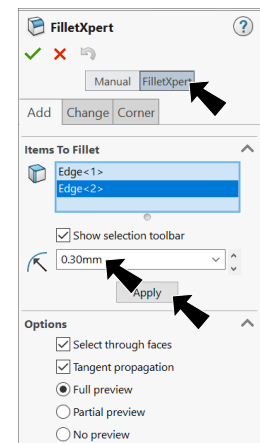


Fig. 47

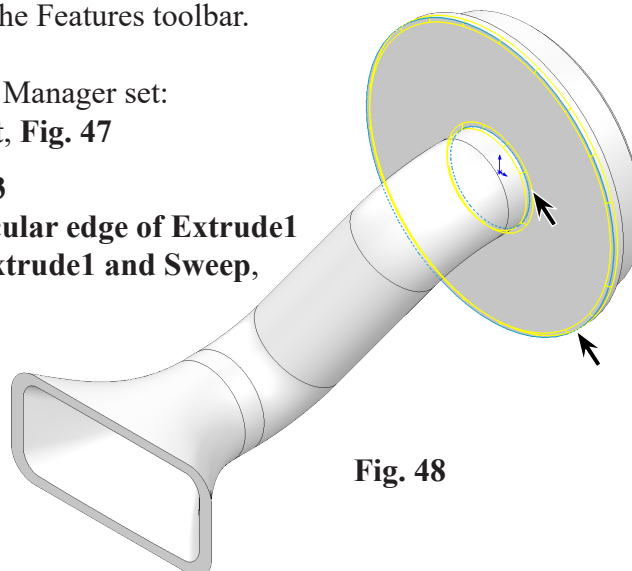


Fig. 48

L. Full Round Fillet2 Loft Face.

Step 1. In the Fillet Property Manager set:
select **Manual**, Fig. 49
under Fillet Type

select **Full Round Fillet**



click in **Side Face Set 1** box
click **outside face of Loft**, Fig. 50

Tip: Right click in graphics area to advance cursor to next selection in Property Manager or...

click in **Center Face Set** box, Fig. 49
click **Front face of Loft**, Fig. 17

click in **Side Face Set 2** box
click **inside face of Loft**

click OK

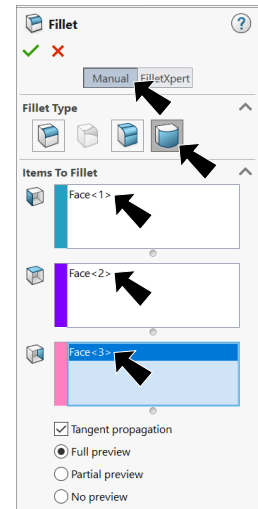


Fig. 49

Step 2. Save (Ctrl-S).

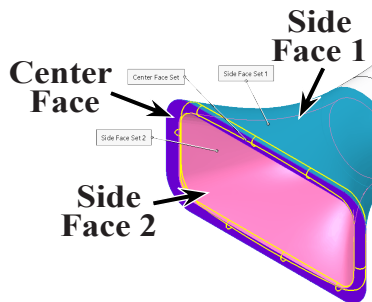


Fig. 50

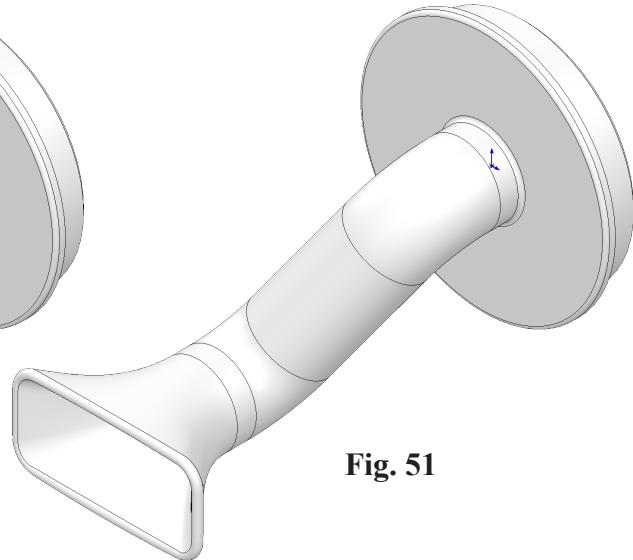



Fig. 51

M. Appearance: Blue.

Step 1. Click part, click **Appearance Callout**  on the context toolbar and click **IN PIPE** , Fig. 52.

Step 2. In Appearances Property Manager:
under Color, Fig. 53
set **RGB** values to:
R 145
G 190
B 234
click **OK** .

Step 3. Save  (Ctrl-S).

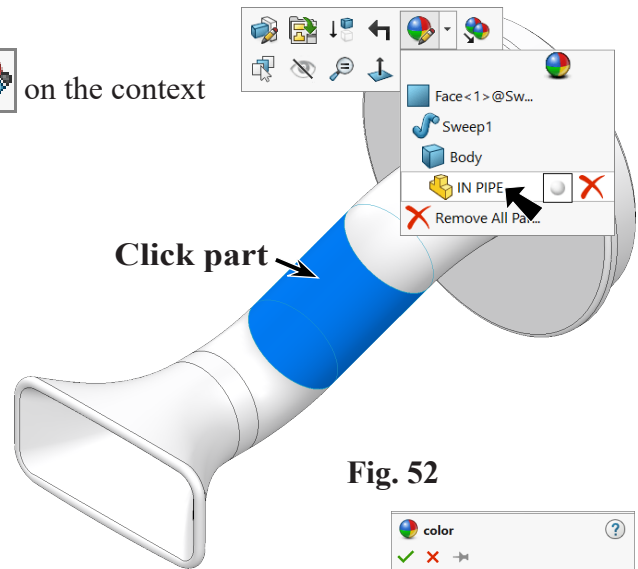


Fig. 52

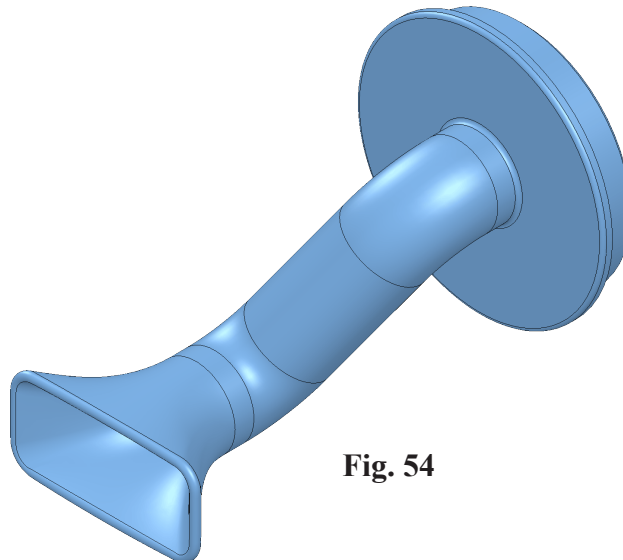


Fig. 54

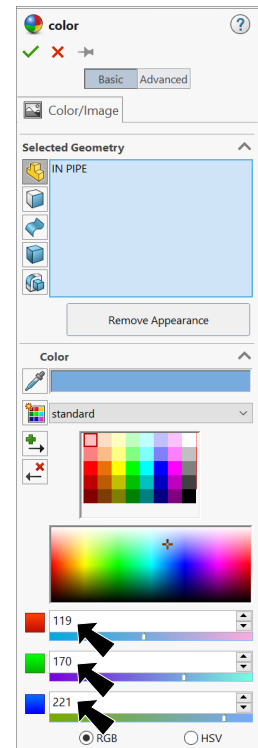


Fig. 53