



E's Small Car Tire



A. Revolve1.

Step 1. Click **New**  on the Standard toolbar, 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 **Corner Rectangle**  in the **Rectangle flyout**  on the Sketch toolbar.

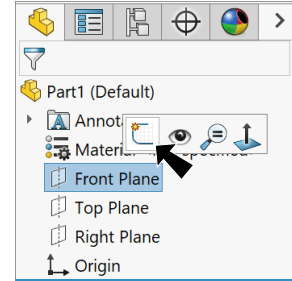





Fig. 1



Step 4. Sketch corner rectangle above **Origin** , **Fig. 2**.

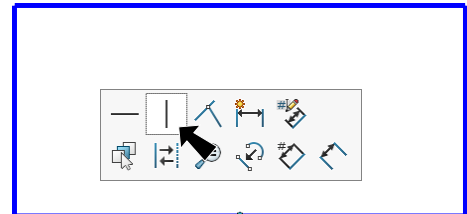
Step 5. **Unselect Rectangle tool**. To unselect, right click graphics area and click **Select**  from menu.



Step 6. **Ctrl click midpoint of Line and Origin**  to select both. Release Ctrl key and click **Make Vertical**  on the context toolbar, **Fig. 3**.


Origin 
Fig. 2

Step 7. Click **3 Point Arc**  (S) in the **Arc flyout**  on the Sketch toolbar.



Step 8. Sketch arc across rectangle with radius tangent  with top line, **Fig. 4**.

Ctrl click midpoint and Origin 
Fig. 3

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

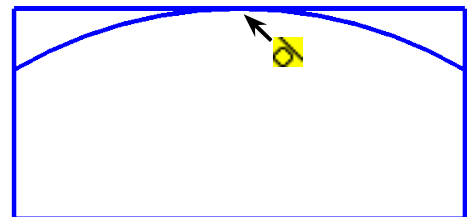

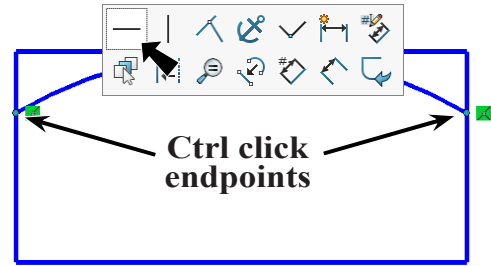





Fig. 4

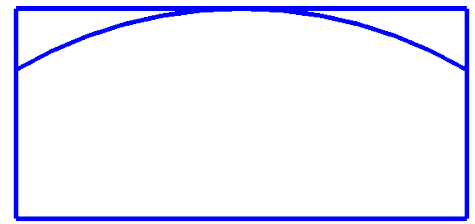
Step 10. **Ctrl click both arc endpoints** to select both. Release Ctrl key and click **Make Horizontal**  on the context toolbar, **Fig. 5**.



Step 11. Click **Centerline**  in the **Line flyout**  on the Sketch toolbar.

Step 12. Sketch **horizontal centerline from Origin** , **Fig. 6**.

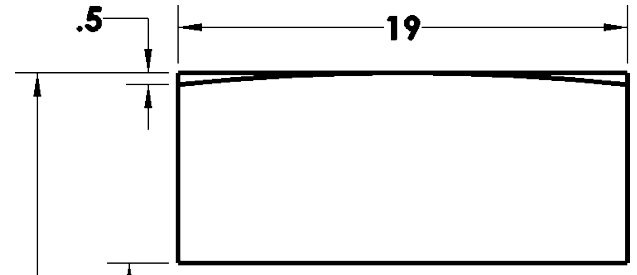
Fig. 5



Step 13. Click **Smart Dimension**  (S) on the Sketch toolbar.

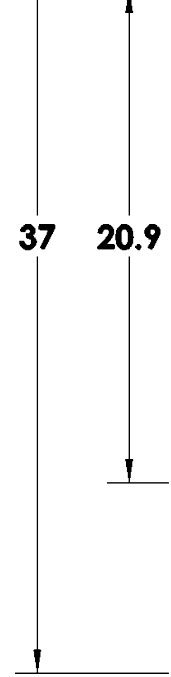
Step 14. Add dimensions, **Fig. 7**. Dimension **double distance** ID and OD last. To double distance dimension, click centerline and inside horizontal line, move the cursor to left and click. Key-in 10.35 in the Modify box and press ENTER. Double distance 18.5 dimension.

Fig. 6





Step 15. Click **Features**  on the Command Manager toolbar.

Fig. 7



Step 16. Click **Revolved Boss/Base**  on the Features toolbar.

Step 17. In the Revolve Property Manger set:

- under Axis of Revolution  centerline is selected, **Fig. 8**
- uncheck **Thin Feature**
- under Selected Contours click the **contour**, **Fig. 9**
- click OK  .

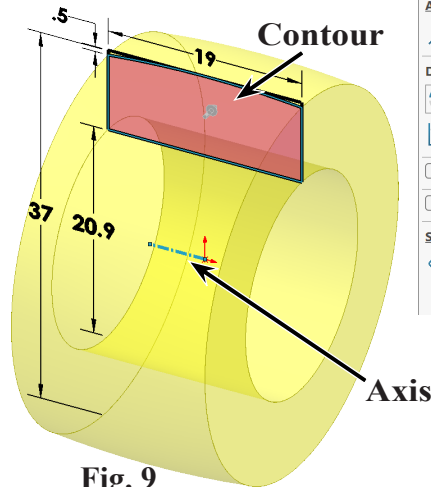


Fig. 9

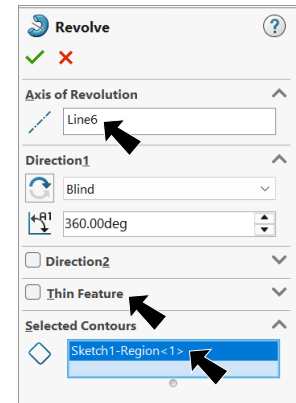




Fig. 8


B. Save as "TIRE".

Step 1. Click File Menu > Save As.


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

C. Revolve2.

Step 1. Click **Front Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 10**.

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

Step 3. Click **Convert Entities**  on the Sketch toolbar.

Step 4. In the Convert Entities Property Manager:
 under Entities to Convert, **Fig. 11**
 click **top silhouette edge and right edge**, **Fig. 12**
 click OK  .

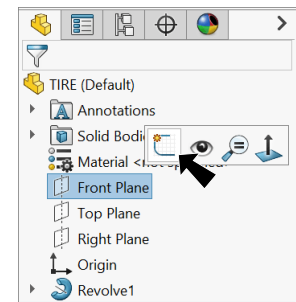


Fig. 10

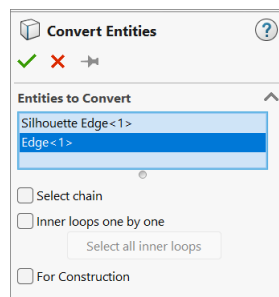


Fig. 11

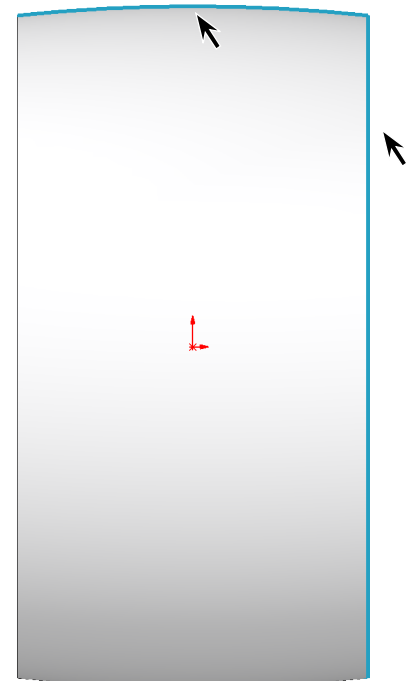




Fig. 12

Step 5. Click **Offset Entities**  on the Sketch toolbar.

Step 6. In the Offset Entities Property Manager set:
under Parameters, **Fig. 13**

- Distance**  1.2
- click **converted arc**, **Fig. 14**
- check **Reverse**
- uncheck **Select chain**
- uncheck **Bi-directional**
- yellow offset on inside**
- click **OK** .

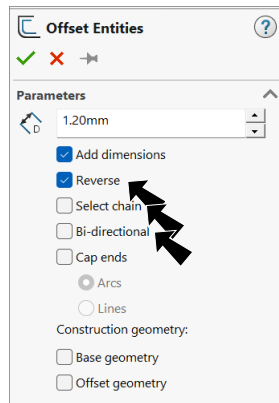


Fig. 13

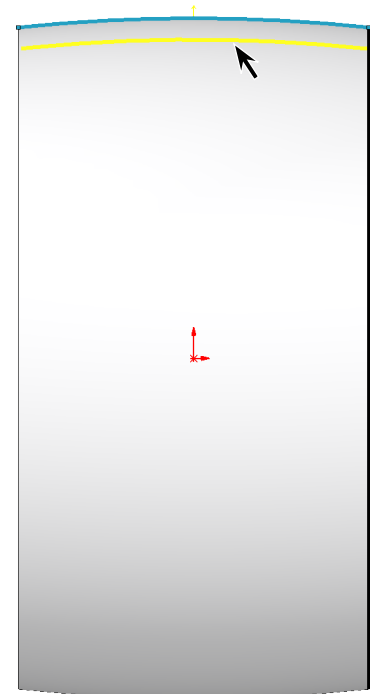


Fig. 14

Step 7. Grab the **right endpoint of offset arc** and drag to converted vertical edge line to start closing a contour, **Fig. 15** and **Fig. 16**.

Step 8. Click **Line**  (L) on the Sketch toolbar.



Step 9. Sketch vertical line between arcs to close contour, **Fig. 17**.


Step 10. Click **Smart Dimension**



(S) on the Sketch toolbar.

Step 11. Add 8 dimension, **Fig. 18**.

Step 12. Click **Centerline**  in the **Line flyout**  on the Sketch toolbar.

Step 13. Sketch **horizontal centerline from Origin** , **Fig. 19**.

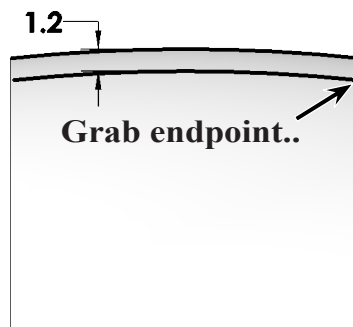


Fig. 15

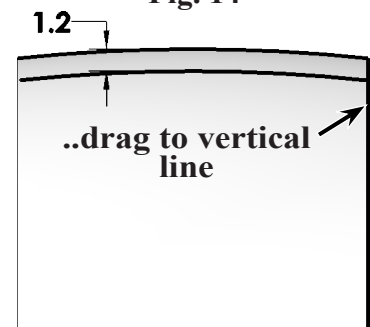


Fig. 16

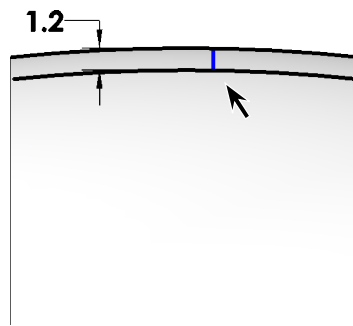


Fig. 17

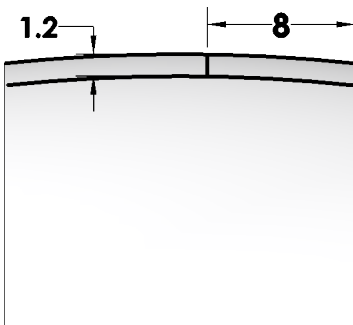
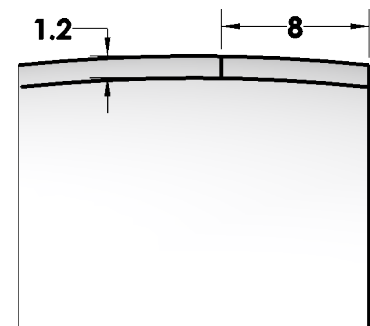


Fig. 18

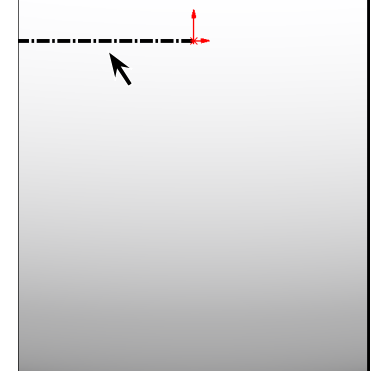




Fig. 19

Step 14. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)

Step 15. Click **Features**  on the Command Manager toolbar.

Step 16. Click **Revolved Boss/Base**  on the Features toolbar.

Step 17. In the Revolve Property Manger set:

under Axis of Revolution , Fig. 20

centerline is selected

under Direction 1

Revolve Type  **Mid Plane**

Direction 1 Angle  **10.4**

uncheck **Merge result**

uncheck **Thin Feature**

under Selected Contours
click the **contour**, Fig. 21

click OK .

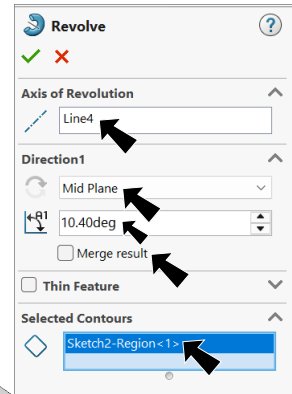
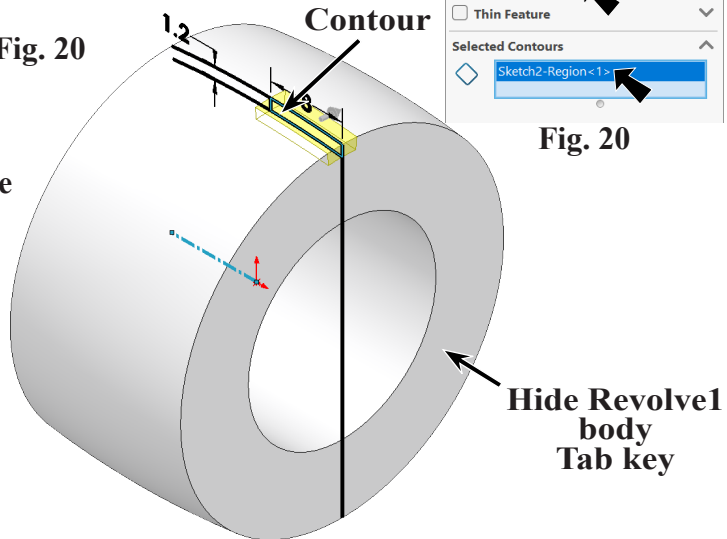



Fig. 20

Fig. 21

Step 18. Save  (Ctrl-S).

D. Fillet1.

Step 1. **Hide Revolve1**  body, Fig. 21. To hide, move the cursor over the body in graphics area and press **Tab** key to hide.

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

Step 3. In the Fillet Property Manager set:

① select **FilletXpert**, Fig. 22

Radius  **.4**

click **both left vertical edges**, Fig. 23

click OK .

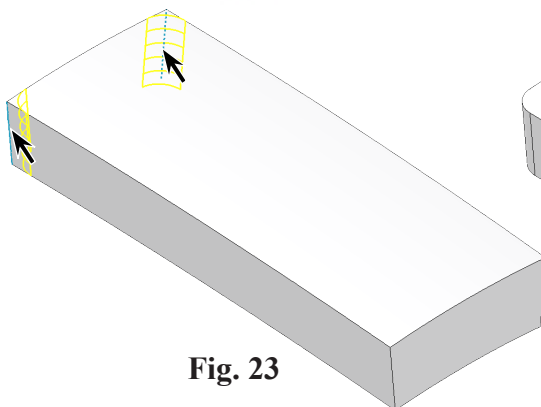


Fig. 23

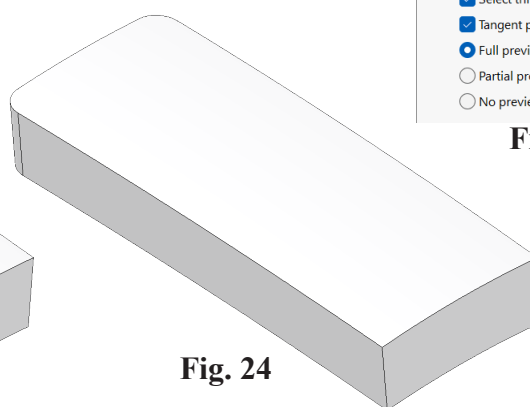


Fig. 24

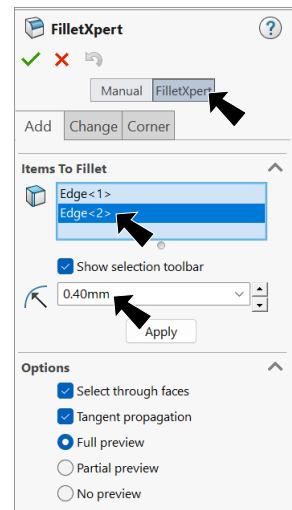



Fig. 22

E. Fillet2 Asymmetric.

Step 1. **Show Revolve1**  body, **Fig. 26**. To show, move cursor over the body in graphics area and press **Shift - Tab**.

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

Step 3. In the Fillet Property Manager set:
 ② select **Manual**, **Fig. 25**
 under Fillet Type

select **Constant Size Fillet** 
 under Fillet Parameters
 Fillet Method **Asymmetric**

Distance 1  **1.2**

Distance 2  **1.8**

under Items To Fillet

click **both outside circular edges of Tire (2)**, **Fig. 26**
 confirm the **short distance (1.2)** is on the **vertical side** of
 the Tire.

If opposite, click **Reverse Direction** 
 click **OK** .

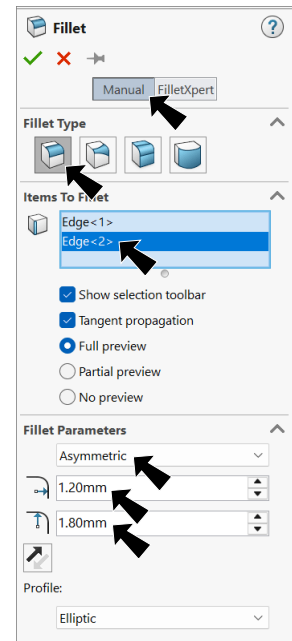


Fig. 25

Step 4. Save  (**Ctrl-S**).

**Show Revolve1
 body
 Shift-Tab keys**

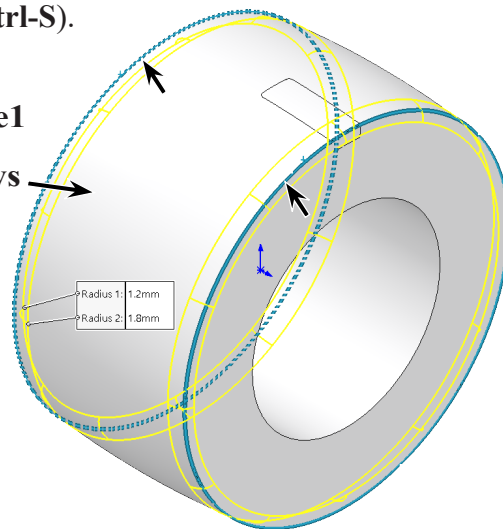


Fig. 26

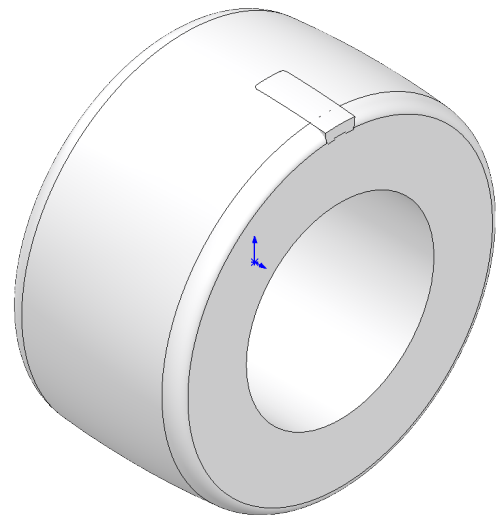


Fig. 27

F. Mirror Body.

Step 1. Expand Solid Bodies folder in the Feature Manager. **Ctrl click Fillet1 body and Right Plane** to select Body and Plane, **Fig. 28**.

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

Step 3. In the Mirror Property Manager click OK.

Step 4. Save (Ctrl-S).

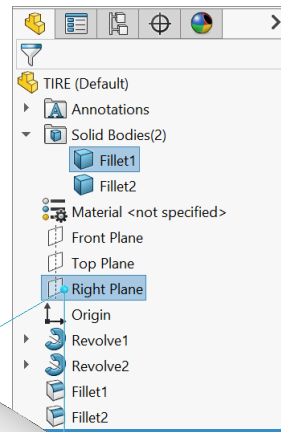


Fig. 28

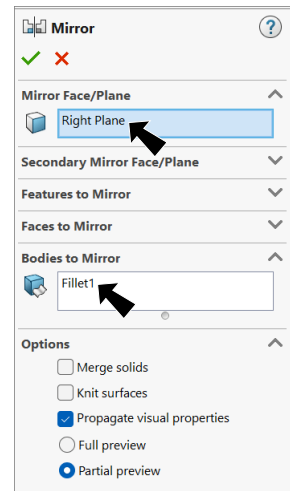
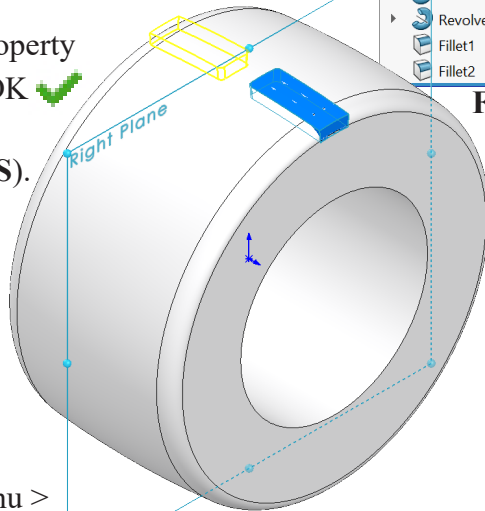


Fig. 29



G. Move Body.

Step 1. Click Insert Menu > Features > Move/Copy.

Step 2. In the Move/Copy Body Property Manager set:
 under Bodies to Move/Copy, **Fig. 31**
 click **Mirror1**, **Fig 32**
 uncheck **Copy**
 under Rotate
 click in the Rotation Reference box

click **Origin**

X Rotation Angle

11.25°

click OK.

Step 3. Save (Ctrl-S).

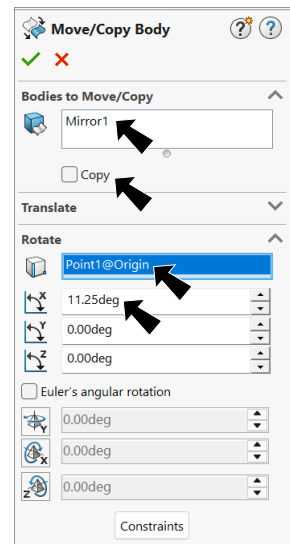


Fig. 31

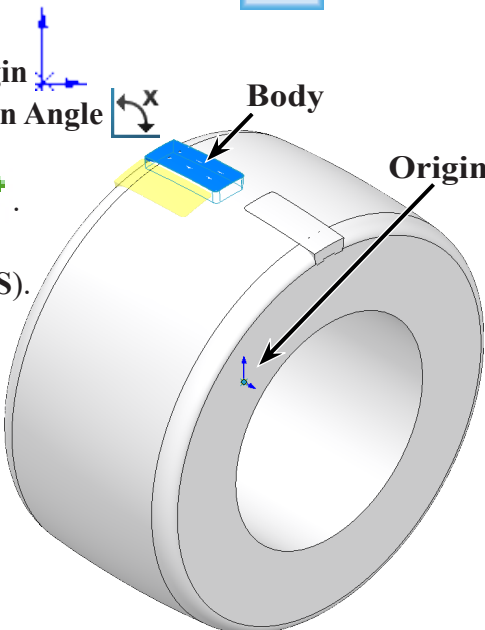


Fig. 32

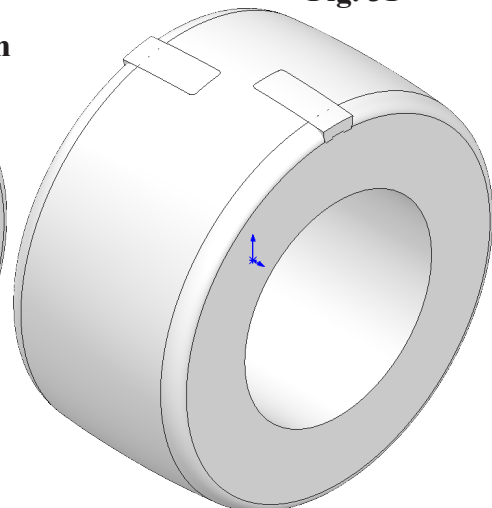
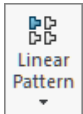


Fig. 33

H. Circular Pattern.

Step 1. Click **Circular Pattern**  in the **Linear Pattern**

flyout  on the Features toolbar.

Step 2. In the Circular Pattern Property Manager set:

under Direction 1, **Fig. 34**

click in Pattern Axes  box

click a **cylindrical face**, **Fig. 35**

select **Equal spacing**

Total Angle  **360°**

Number of Instances  **16**

under Bodies

click **Fillet1** and

Body-Move/Copy1

click OK .

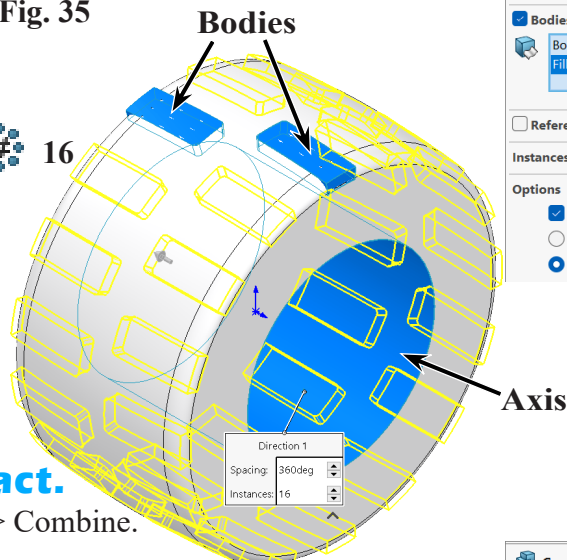


Fig. 34

Step 3. Save  (Ctrl-S).

I. Combine Bodies Subtract.

Step 1. Click Insert Menu > Features > Combine.

Step 2. In the Combine Property Manager:

under Operation Type, **Fig. 36**

select **Subtract**

under Main Body

click **Fillet2** (main body in graphics area), **Fig. 37**

under Bodies to Subtract

drag a selection to select all

click OK .

Step 3. Save  (Ctrl-S).

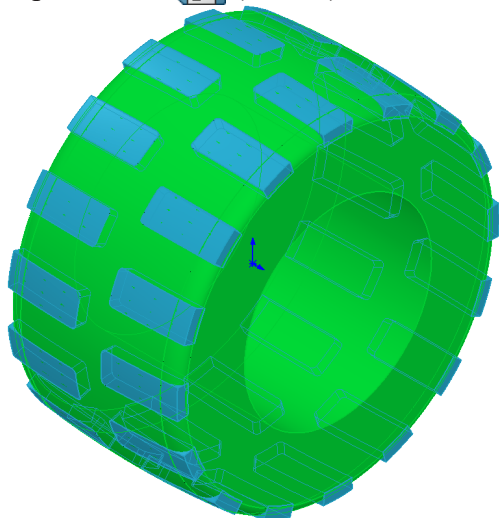


Fig. 37

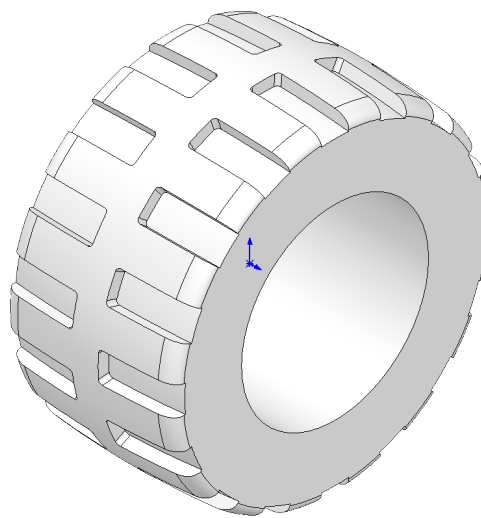


Fig. 38

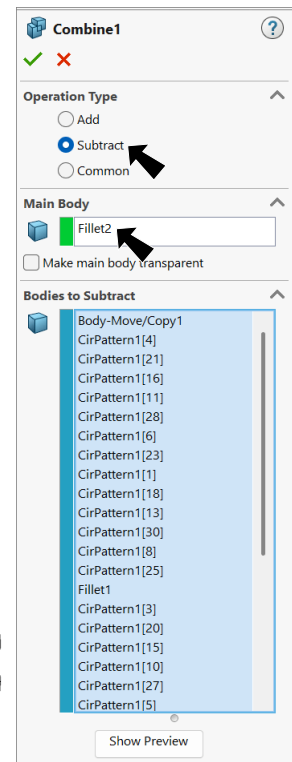
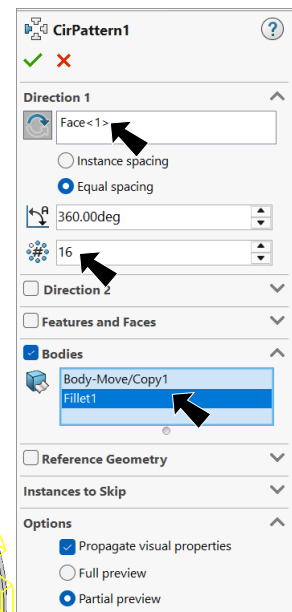


Fig. 36

J. Appearance: Rubber.

Step 1. Click the part to select part, click **Appearances**

Callout  on the context toolbar and click **TIRE** , Fig. 39.

Step 2. In the Appearances Task pane, expand **Rubber**, click **Matte** and in the lower pane select **matte rubber**, Fig. 40.

Step 3. In the Appearances Property Manager click OK .

Step 4. Save  (Ctrl-S).

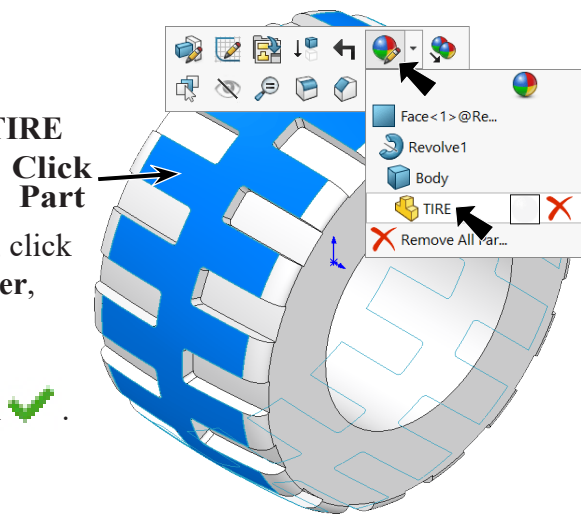


Fig. 39



Fig. 42

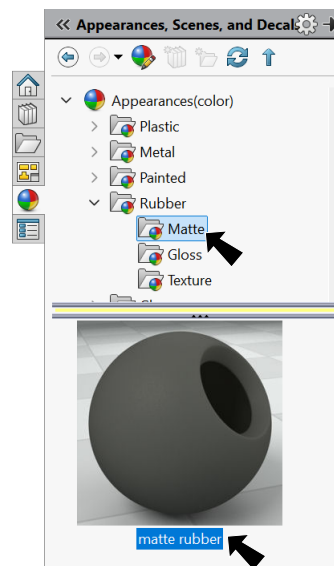


Fig. 40

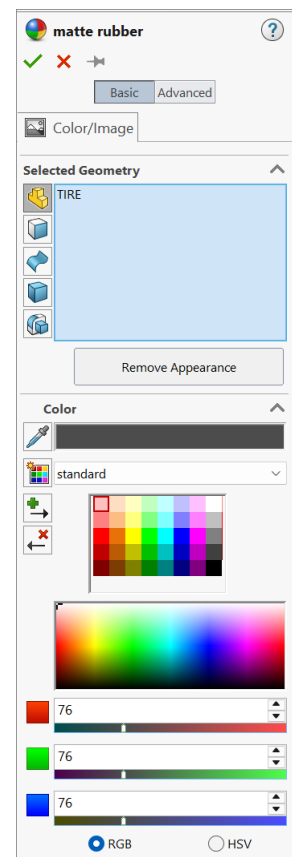


Fig. 41