



CO₂ Rail Car E E-Clip



A. Sketch Circles.

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

Step 2. Click **Right Plane**  in the Feature Manager and click **Sketch**  from the Context toolbar, **Fig. 1**.

Step 3. Click **Circle**  (S) on the Sketch toolbar.

Step 4. Sketch **three circles** starting at Origin , **Fig. 2**.

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

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

Step 7. Click **Zoom to Fit**  (F) on the View toolbar.

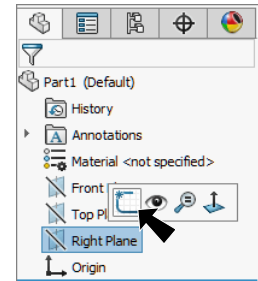


Fig. 1

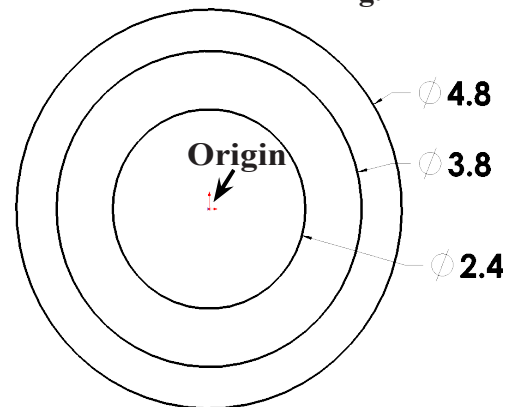




Fig. 2


B. Save as "E CLIP".

Step 1. Click File Menu > Save As.

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

C. Add Centerlines.

Step 1. Click **Centerline**  in the **Line flyout**  on the Sketch toolbar.

Step 2. Starting from the Origin  draw **two centerlines** out to the middle circle. Keep **one horizontal** and the other at angle, **Fig. 3**. To terminate chain, double click back on the line you have just drawn.

Step 3. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 4. Dimension angle **70°**, **Fig. 3**.

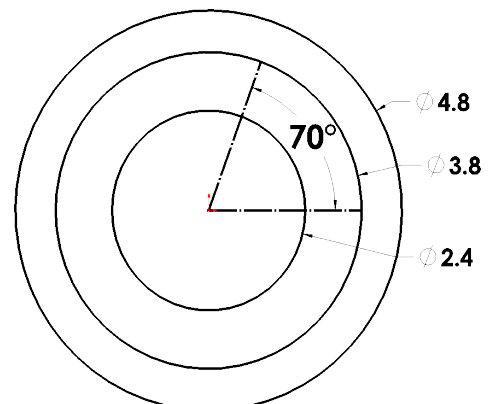


Fig. 3

D. Trim 1.

Step 1. Click **Trim Entities**  (S) on the Sketch toolbar.

Step 2. In the Trim Property Manger:

select **Trim to closest** ,

Fig. 4
click the **two arcs** to trim, **Fig. 5**
results shown in **Fig. 6**.

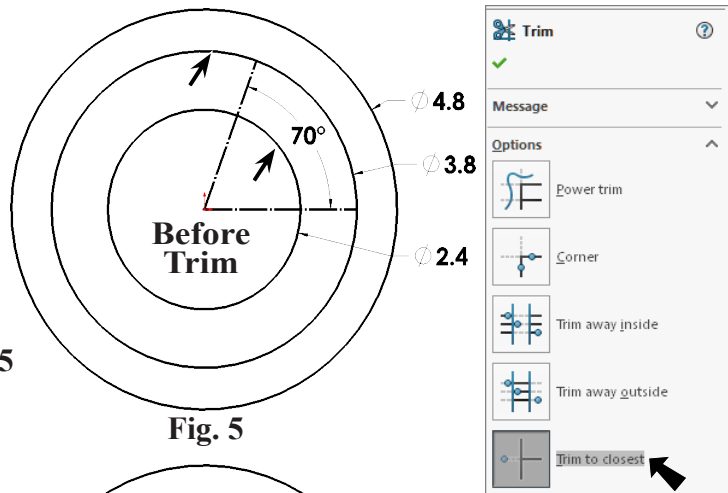





Fig. 5

E. Centerlines.

Step 1. Click **Centerline**  in the **Line flyout**  on the Sketch toolbar.

Step 2. Sketch a vertical centerline from

Origin  up to outside circle. Sketch a second centerline from top endpoint of middle circle at angle to outside circle, **Fig 7**.

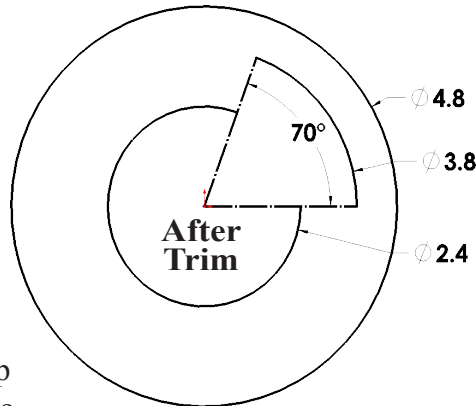


Fig. 6

Step 3. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 4. Dimension angle between centerlines **8°**, **Fig. 7**.

Step 5. Save. Use **Ctrl-S**.

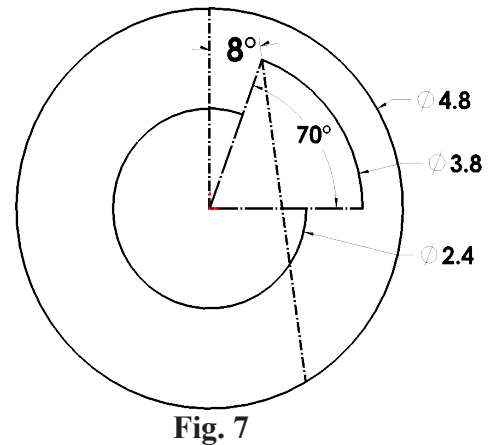




Fig. 7

F. Trim 2.

Step 1. Click **Trim Entities**  (S) on the Sketch toolbar.

Step 2. In the Trim Property Manger:

select **Trim to closest** , Fig. 8
click arcs to trim, Fig. 9
results shown in Fig. 10.

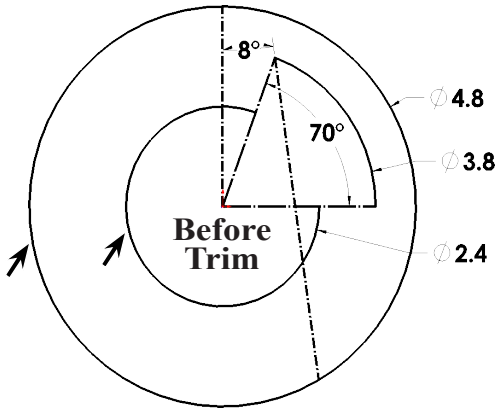


Fig. 9

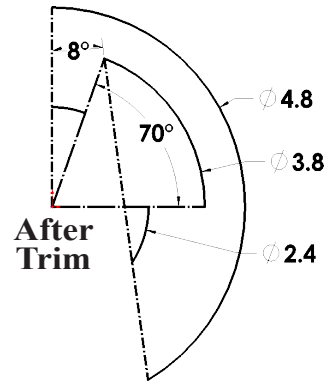


Fig. 10

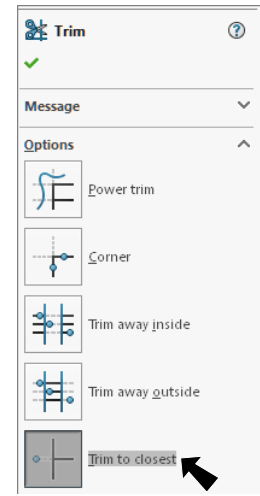


Fig. 8

G. Add Lines.

Step 1. Click **Line**  (L) on the Sketch toolbar.

Step 2. Draw **three lines** between arcs, Fig. 11.

Step 3. Save. Use **Ctrl-S**.

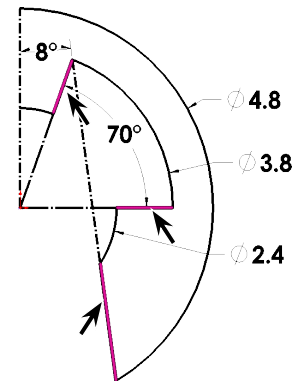





Fig. 11

H. Sketch Fillets.

Step 1. Click **Sketch Fillet**  on the Sketch toolbar.

Step 2. In the Sketch Fillet Property Manager set:
under Fillet Parameters, **Fig. 12**

Radius  **.3**
click **top two corners**, **Fig. 13**
click OK 

Radius  **.35**, **Fig. 14**
click **bottom corner**, **Fig. 15**
click OK  twice.

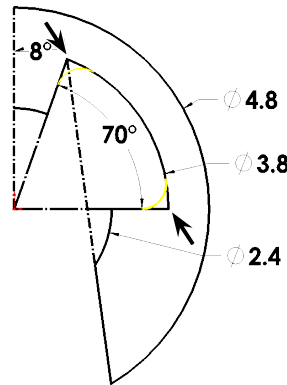


Fig. 13

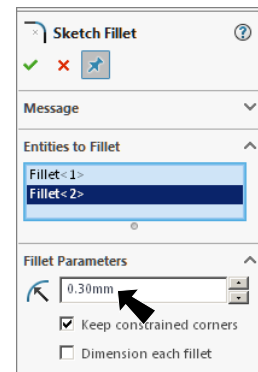


Fig. 12

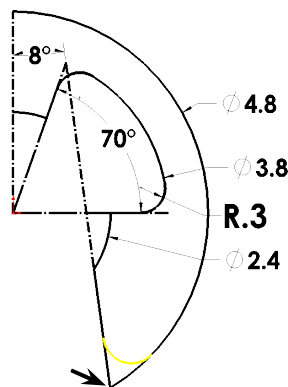


Fig. 15

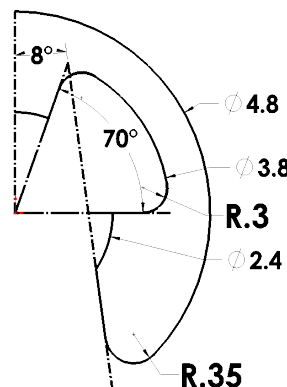


Fig. 16

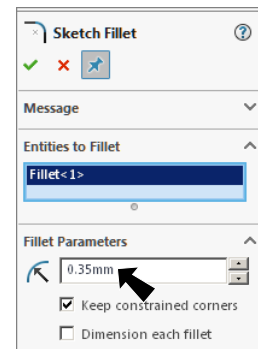


Fig. 14

I. Mirror.

Step 1. **Right click** an arc of the sketch and click **Select Chain** from the menu, **Fig. 17**.

Step 2. **Ctrl-click** vertical centerlines to add to selection, **Fig. 18**.

Step 3. Click **Mirror Entities**  on the Sketch toolbar, **Fig. 19**.

Step 4. Save. Use **Ctrl-S**.

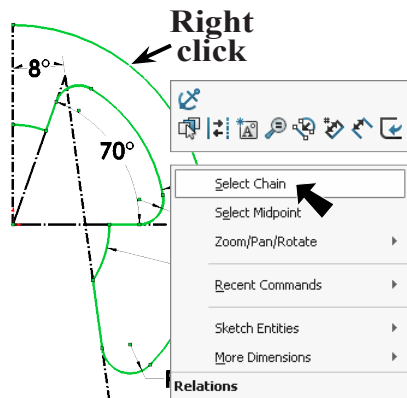


Fig. 17

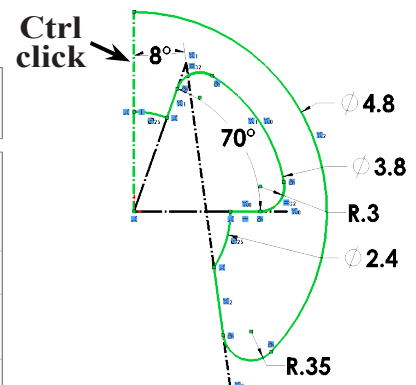


Fig. 18

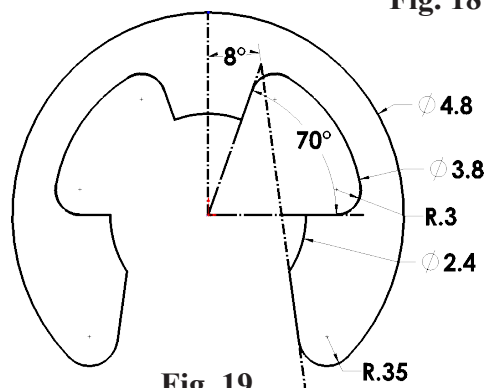


Fig. 19

J. Extrude.

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

Step 2. Click **Extruded Boss/Base**  on the Features toolbar.

Step 3. In the Property Manager set:
 under Direction 1, **Fig. 20**
 End Condition **Mid Plane**

Depth  **.25**
 click OK .

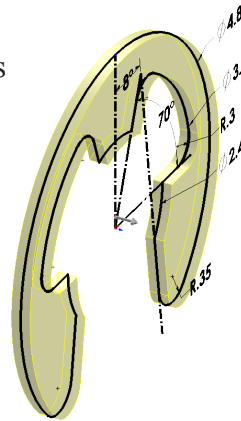


Fig. 21

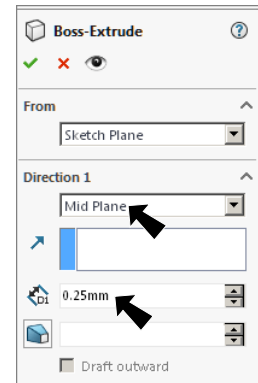



Fig. 20

K. Mate Reference.

Step 1. Click a **cylindrical face** to select it, **Fig. 22**.

Step 2. Click **Reference Geometry**  on the Features toolbar and **Plane** from the menu.

Step 3. In the Mate Reference Property Manager click OK , **Fig. 23**.

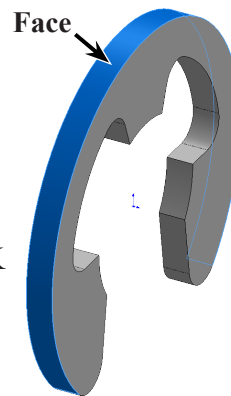


Fig. 22

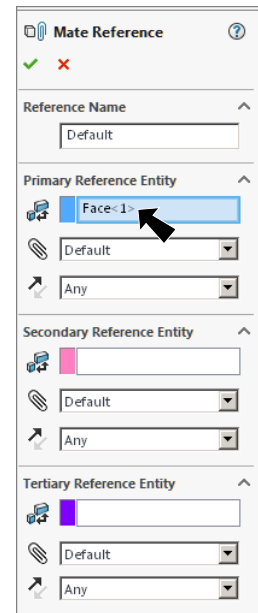


Fig. 23

L. Material Stainless Steel.

Step 1. **Right click** **Material**  in the Feature Manager and click **Edit Material**.

Step 2. **Expand Steel** in the material tree and select **AISI 316 Stainless Steel Sheet**. Click **Apply** and **Close**.

Step 3. Save. Use **Ctrl-S**.

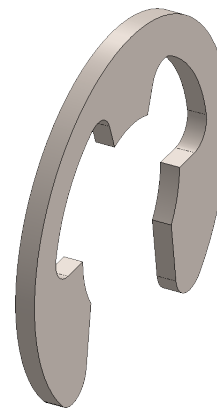


Fig. 24