

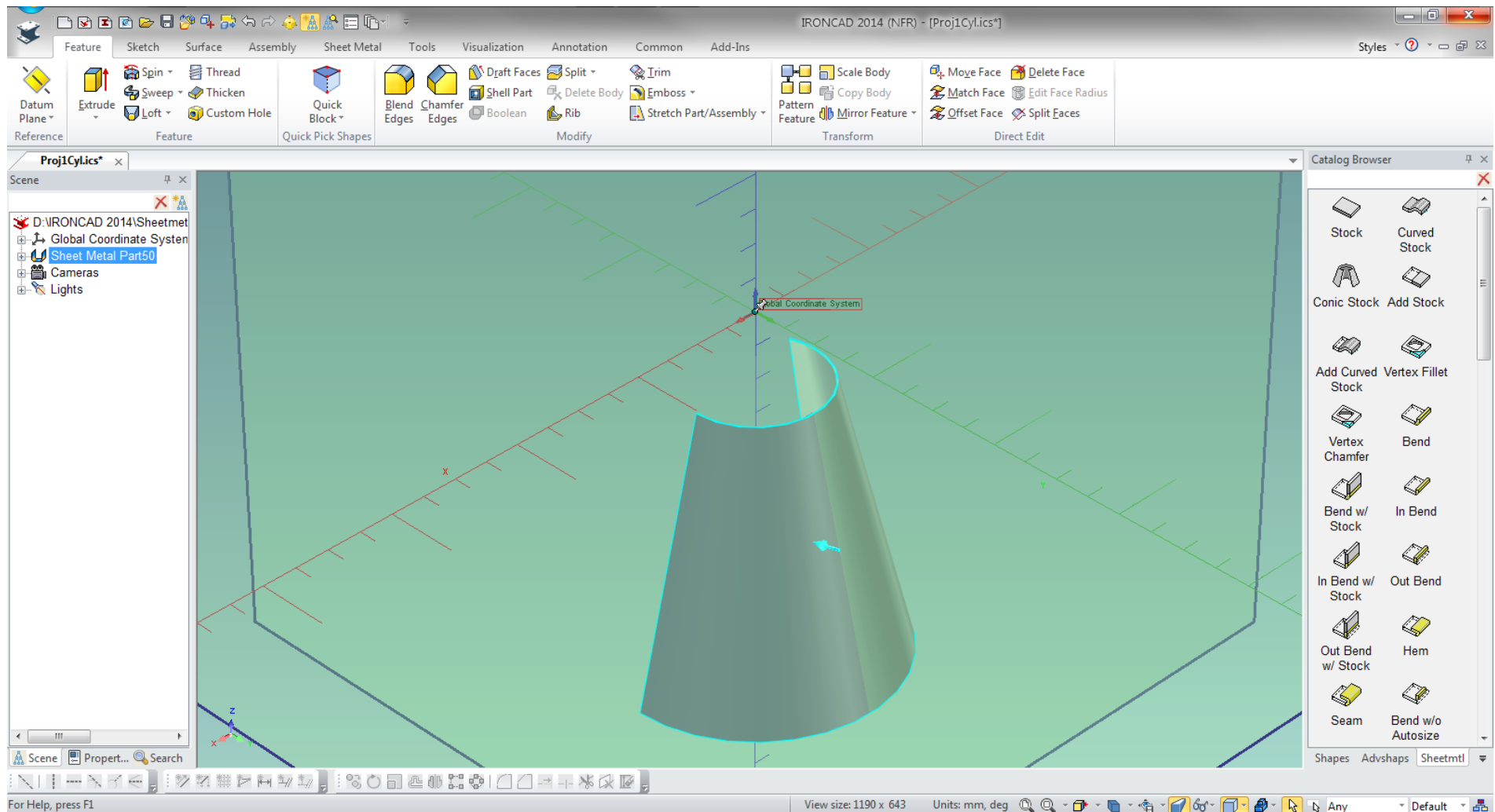
Cylinder Sheet Metal Guide

Utilizing IRONCAD'S sheet metal catalog contents can help create rolled sheet of metal or other pliable material needed for the task. You can drag and drop a Conic Stock or a Bend on scene and with a change in values in the IntelliShape Properties, it can produce a rolled cylinder that can unfolded (unrolled) as flat sheet patterns.

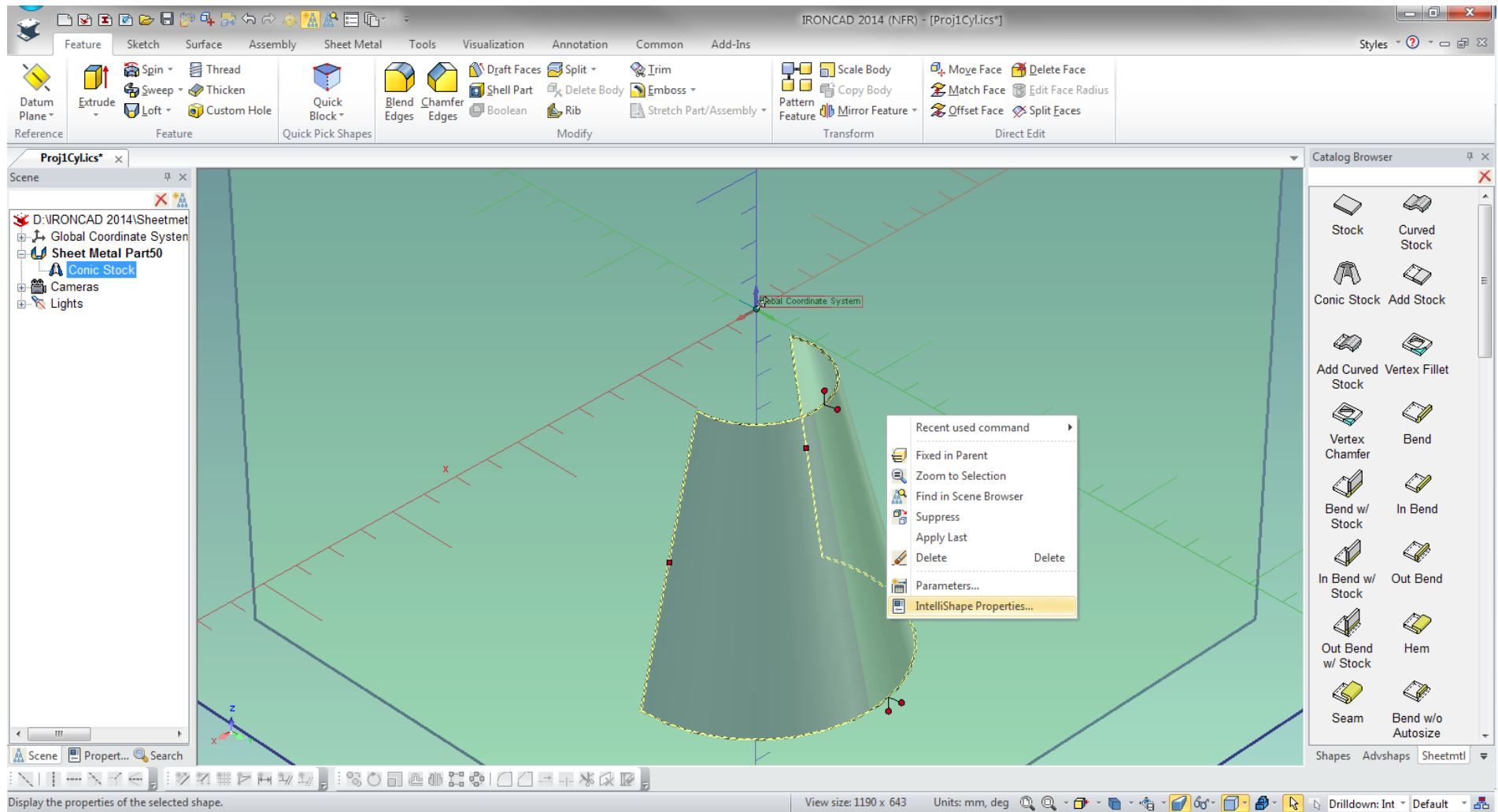
Special thanks to Mike Walls, Jonas Bryntesson and Cary O'Connor for their insights and guidance on this article.



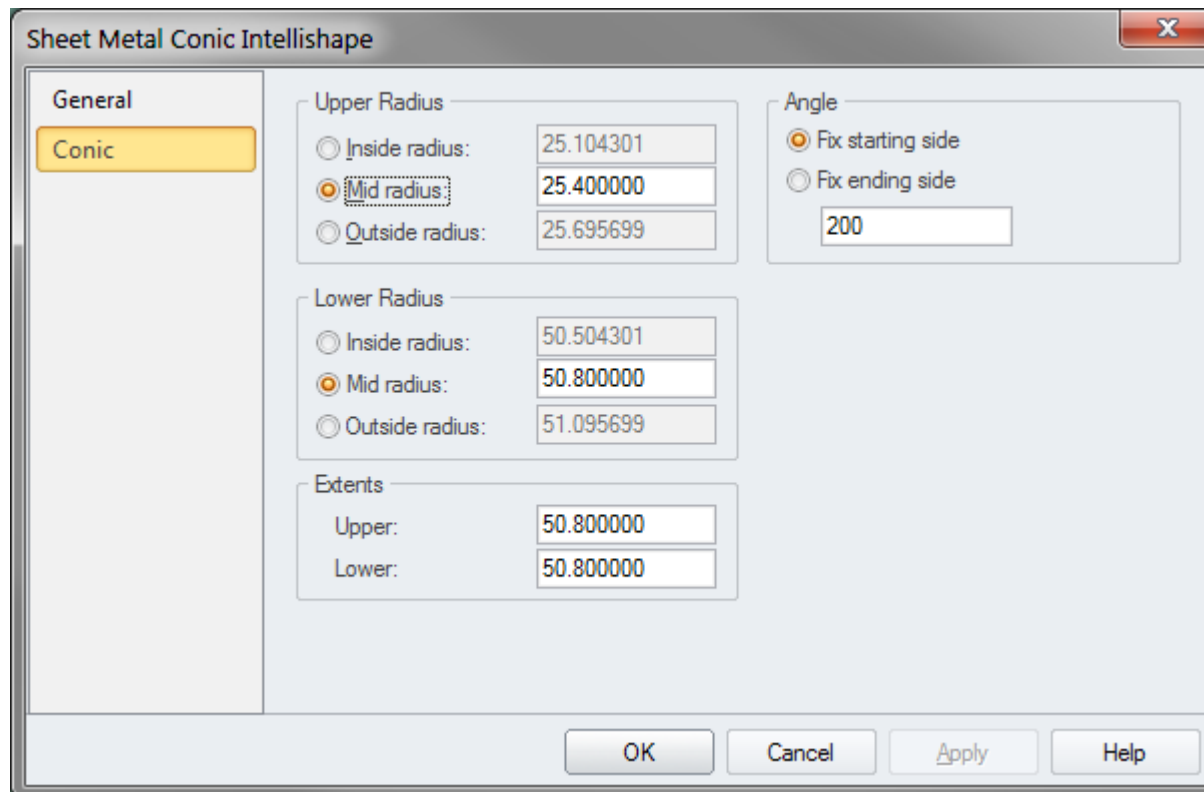
First drag and drop Sheet metal catalog content we are using is the Conic Stock. The metric Blue Datum scene is used for this as it provides the reference position of the IntelliShape anchor. This practice provides an accurate position control of a Custom Profile used on the Conic Stock IntelliShape when applying Smart Dimensions as reference for the design or as a constraint when the Sheet Metal part is unfolded (unrolled).



LMB click the part to change mode to an IntelliShape. RMB click and select IntelliShape Properties to modify the Conic Stock dimensions.

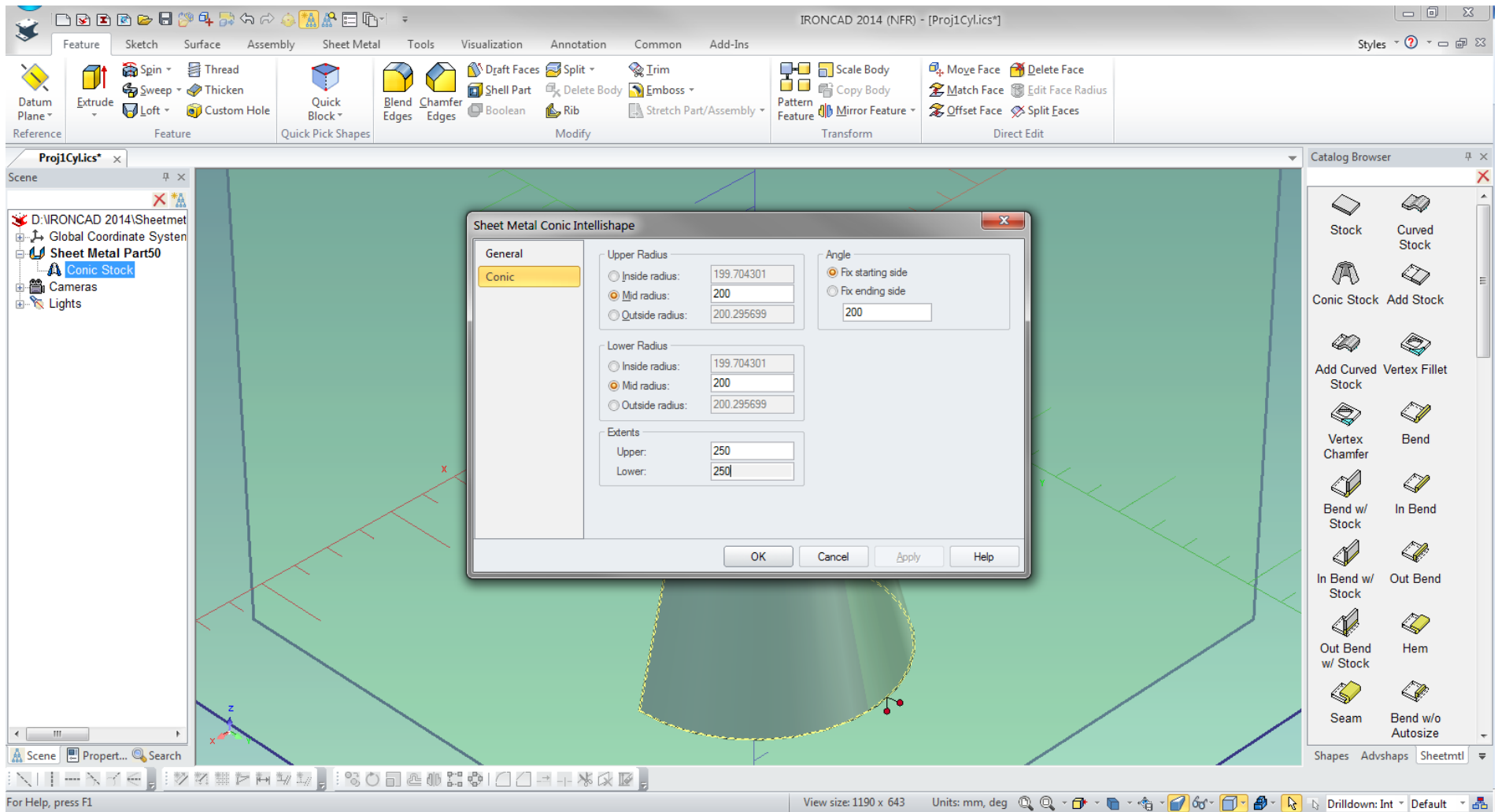


To change the Conic Stock proportion, change the value on the Upper Radius Mid radius and the Lower Radius Mid radius to an exact same value as shown on the next page.

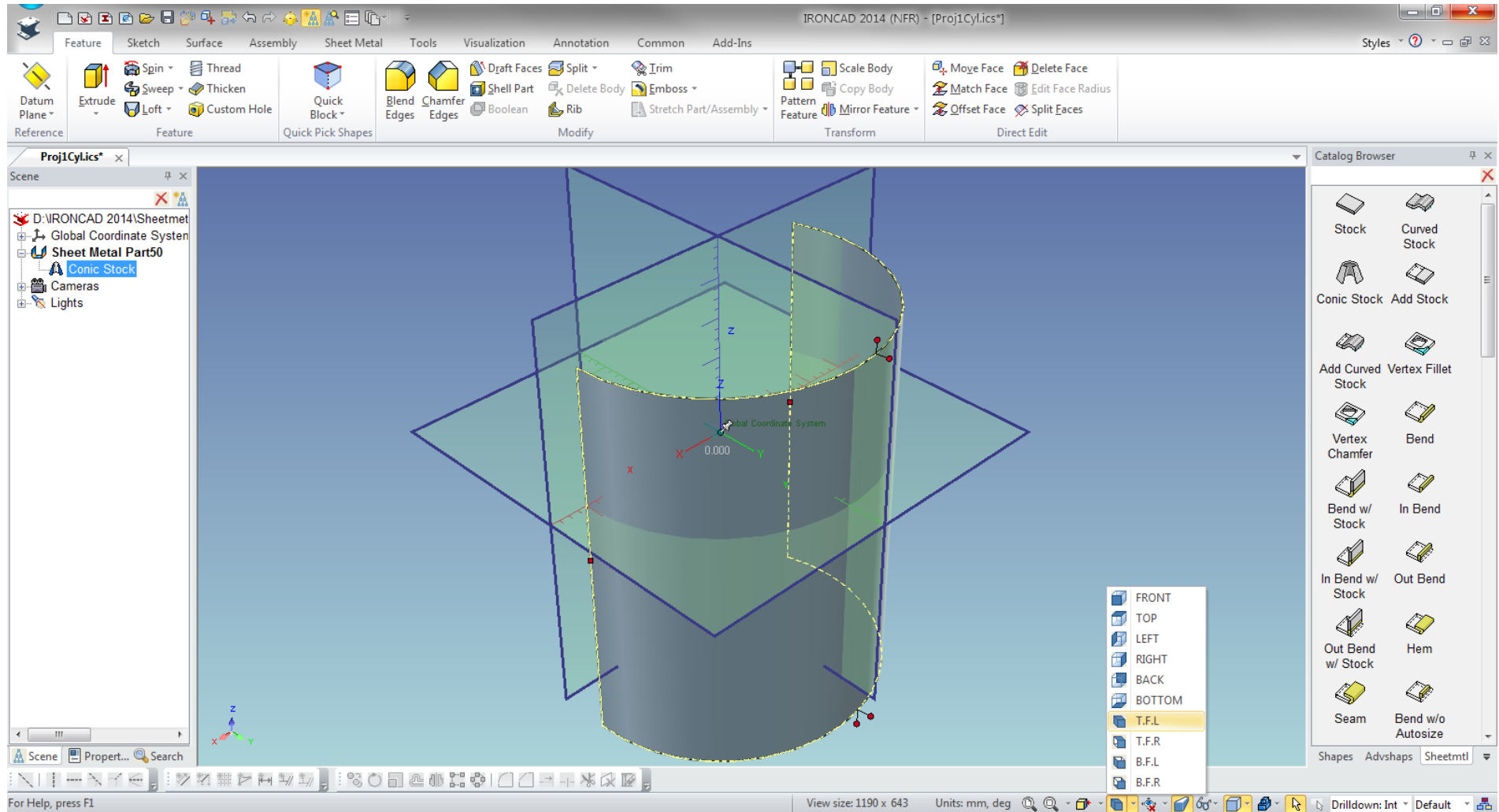


The image shows a software dialog box titled "Sheet Metal Conic Intellishape". It has a sidebar on the left with two tabs: "General" and "Conic", with "Conic" being the active tab. The main area is divided into several sections: "Upper Radius" with three radio buttons (Inside radius, Mid radius, Outside radius) and corresponding text boxes; "Lower Radius" with the same three radio buttons and text boxes; "Angle" with two radio buttons (Fix starting side, Fix ending side) and a text box; and "Extents" with two text boxes labeled "Upper:" and "Lower:". At the bottom are four buttons: "OK", "Cancel", "Apply", and "Help".

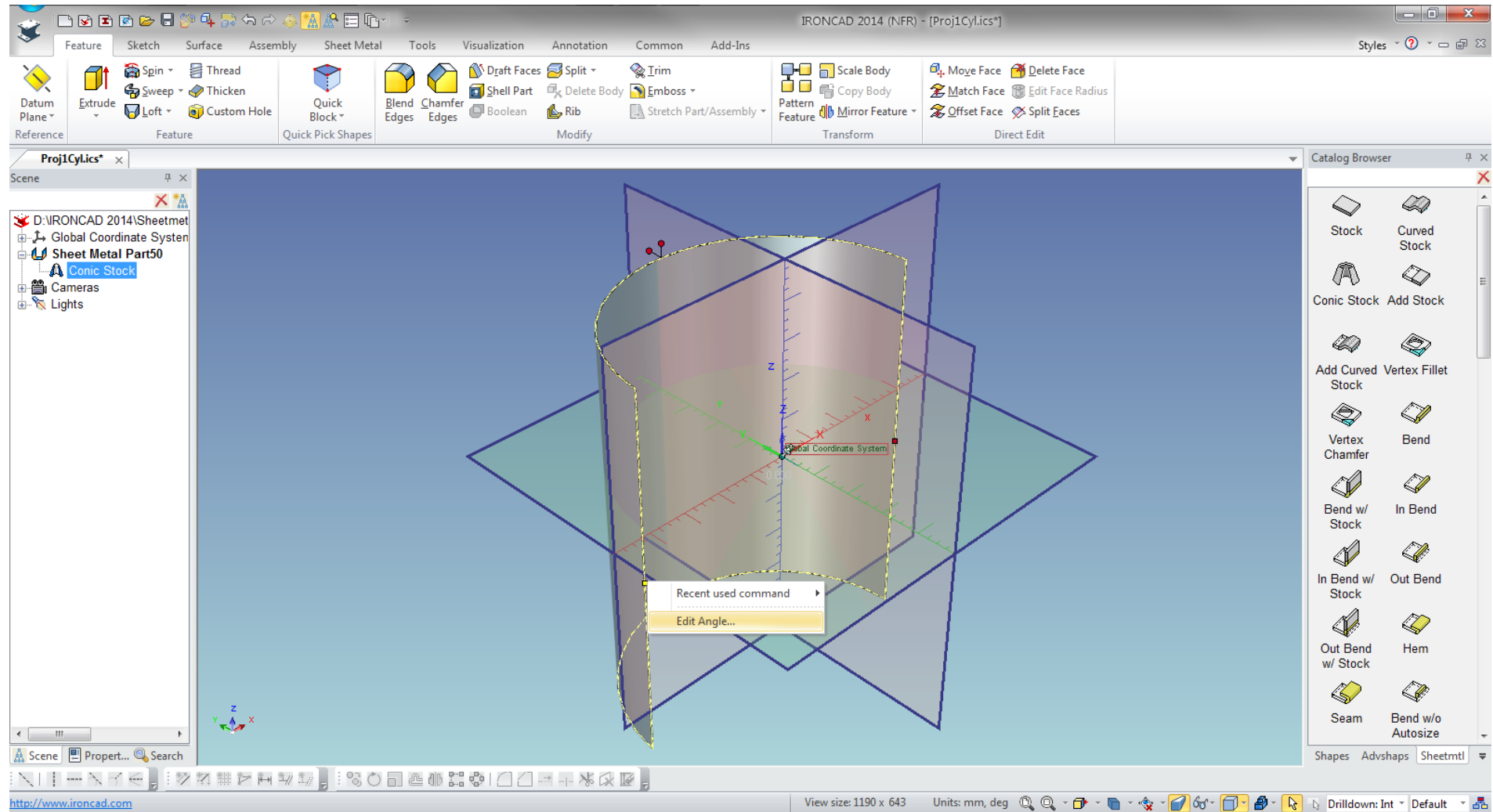
Section	Option	Value
Upper Radius	Inside radius:	25.104301
	Mid radius:	25.400000
	Outside radius:	25.695699
Lower Radius	Inside radius:	50.504301
	Mid radius:	50.800000
	Outside radius:	51.095699
Extents	Upper:	50.800000
	Lower:	50.800000
Angle	Fix starting side	200



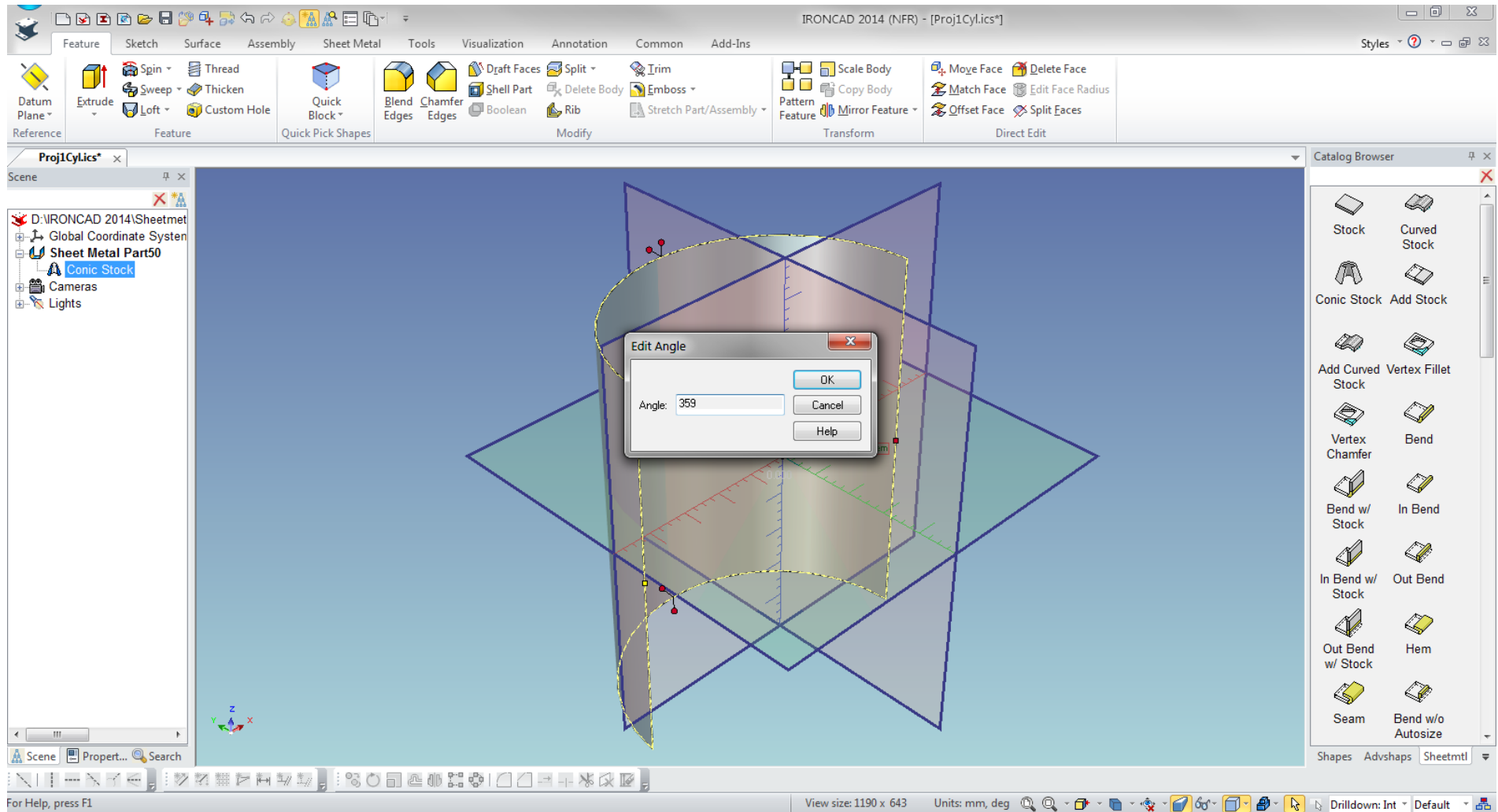
The stock is shown as a half cylinder. Change the camera view to T.F.L for the next stop



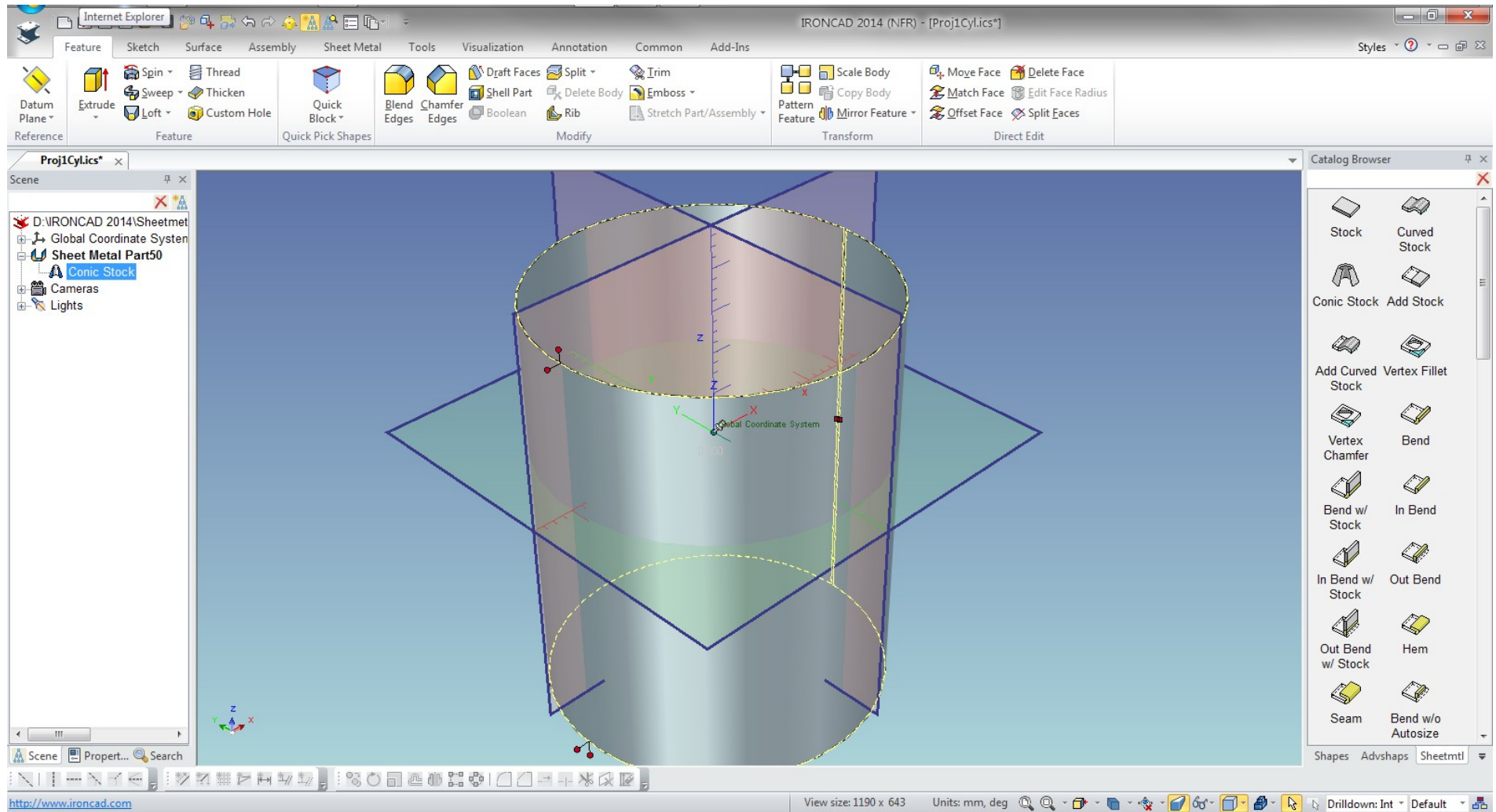
On the IntelliShape mode, RMB the handle as shown to Edit Angle of rotation.



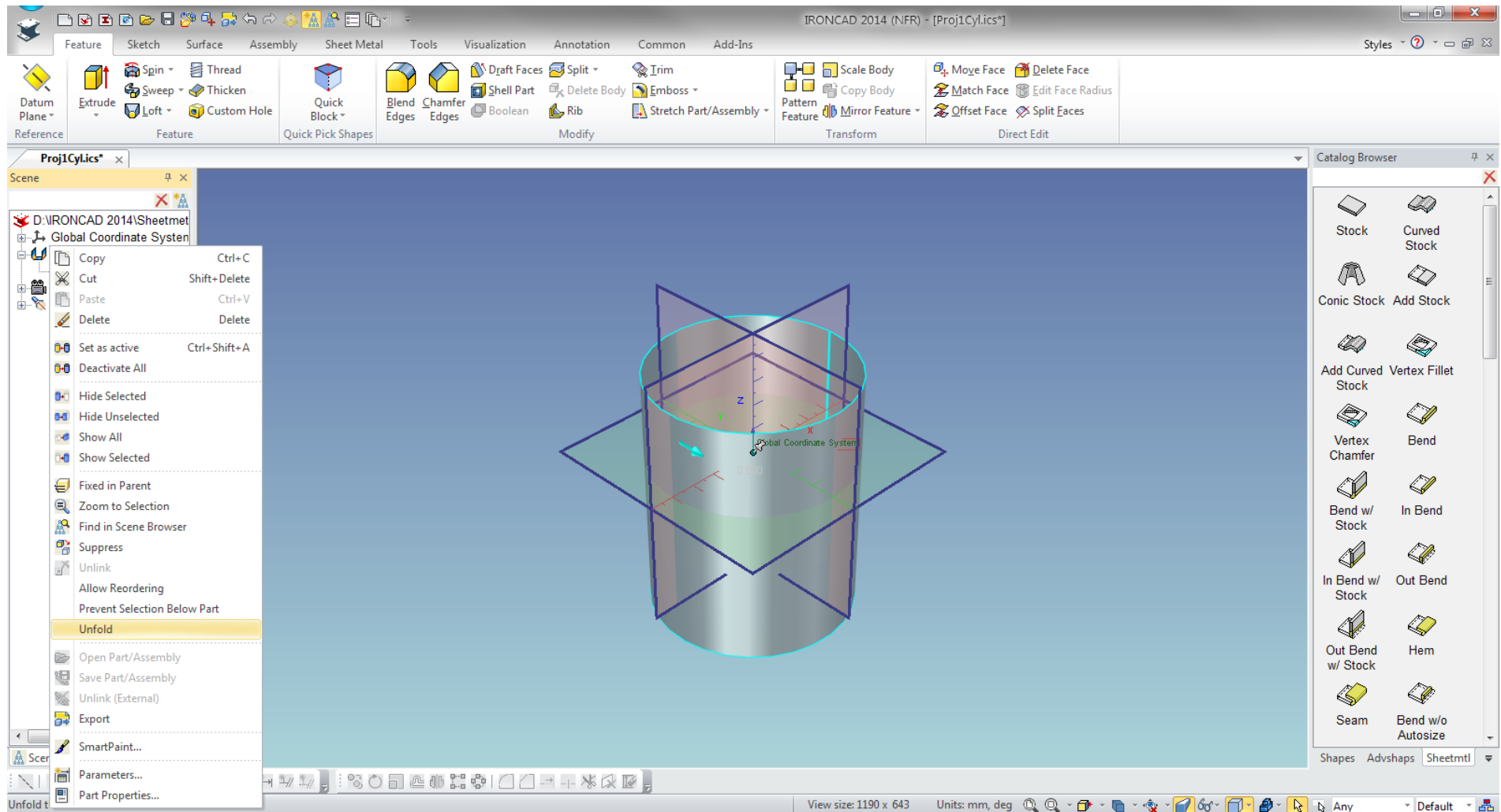
As shown change value to 359 or 360 degrees as a full circular profile



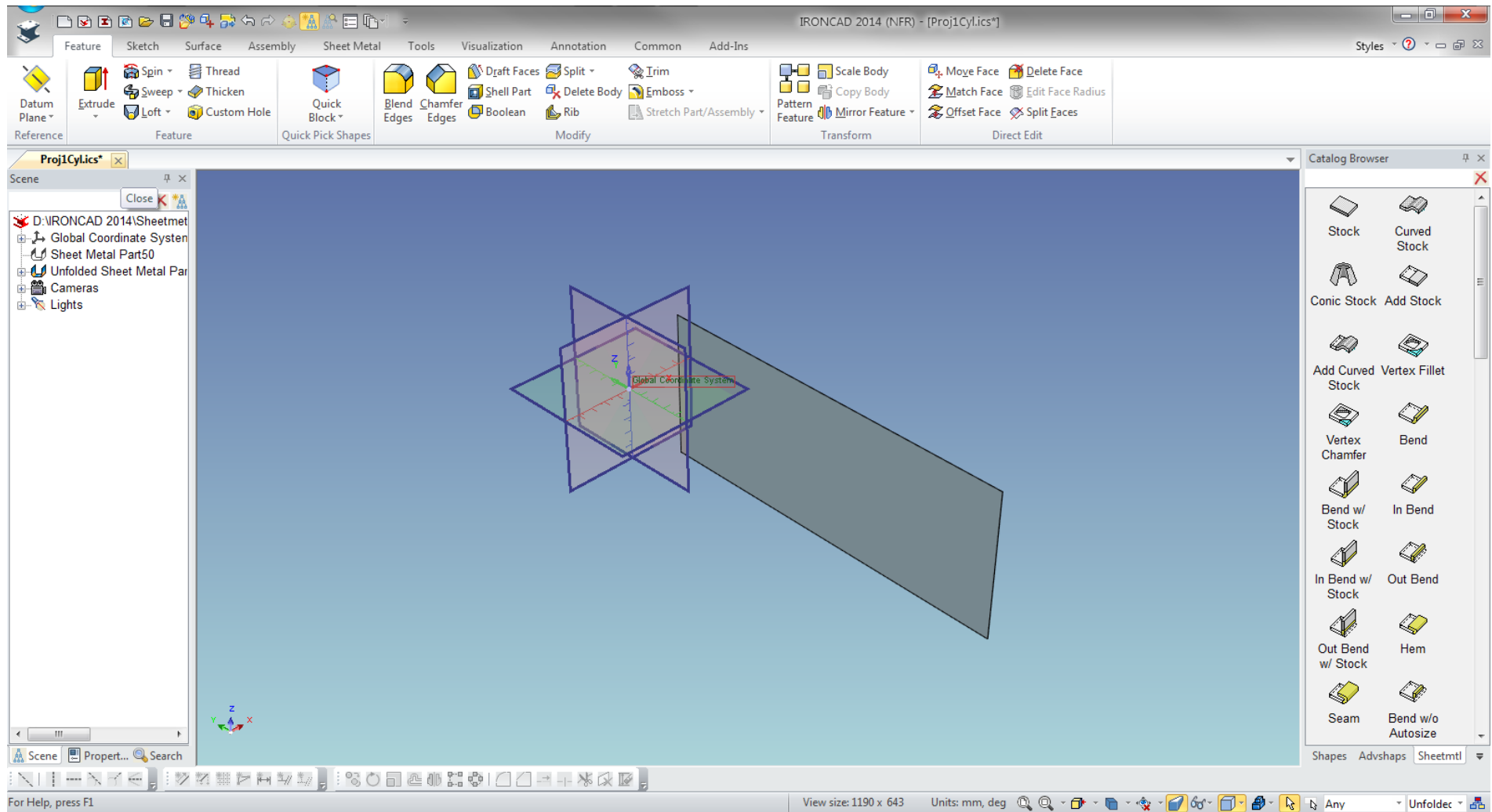
The 359 degrees rotation leaves a reference seam.



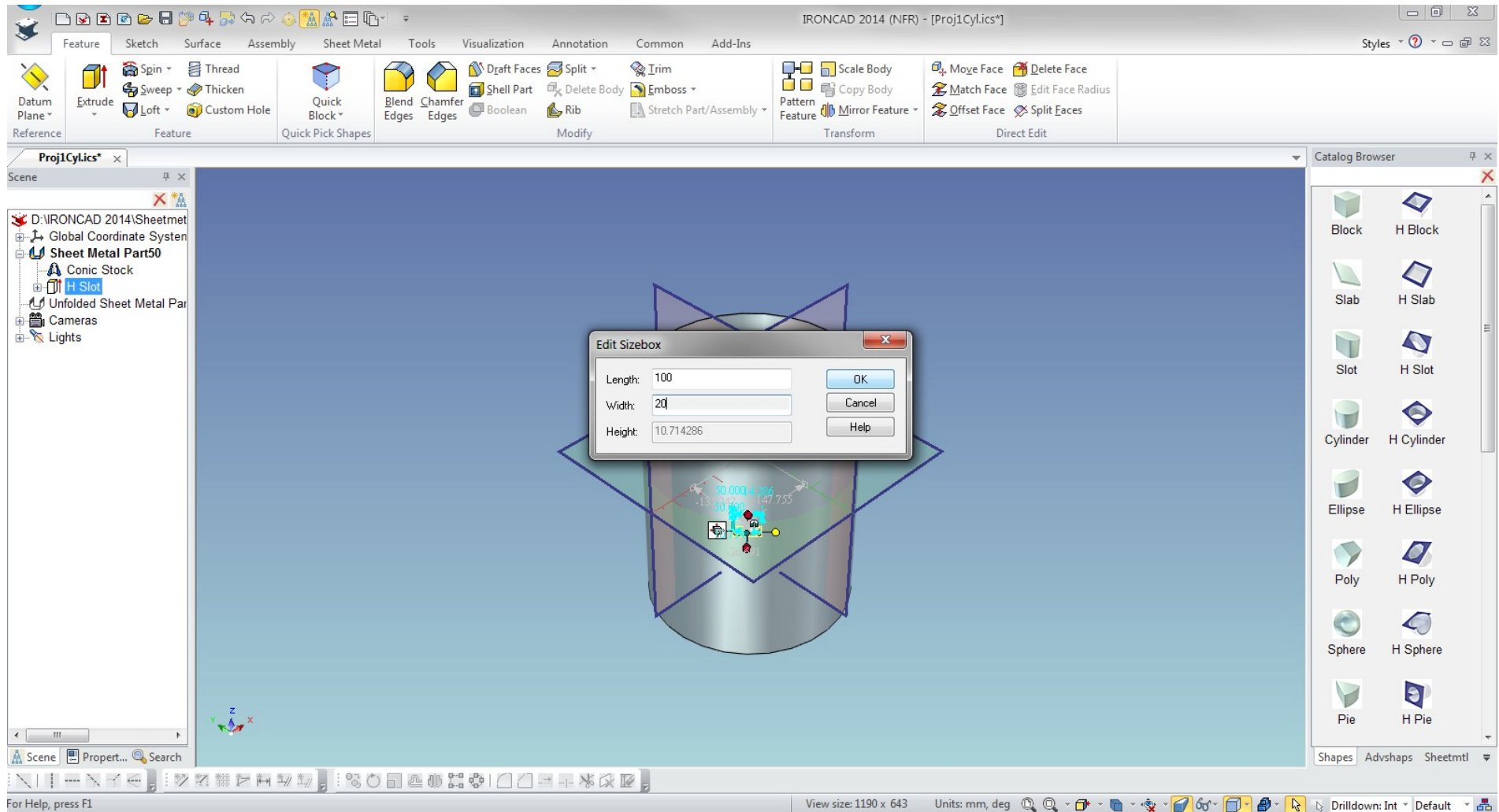
LMB click to select the part from the Scene browser or tree and RMB click to display the list and select Unfold.



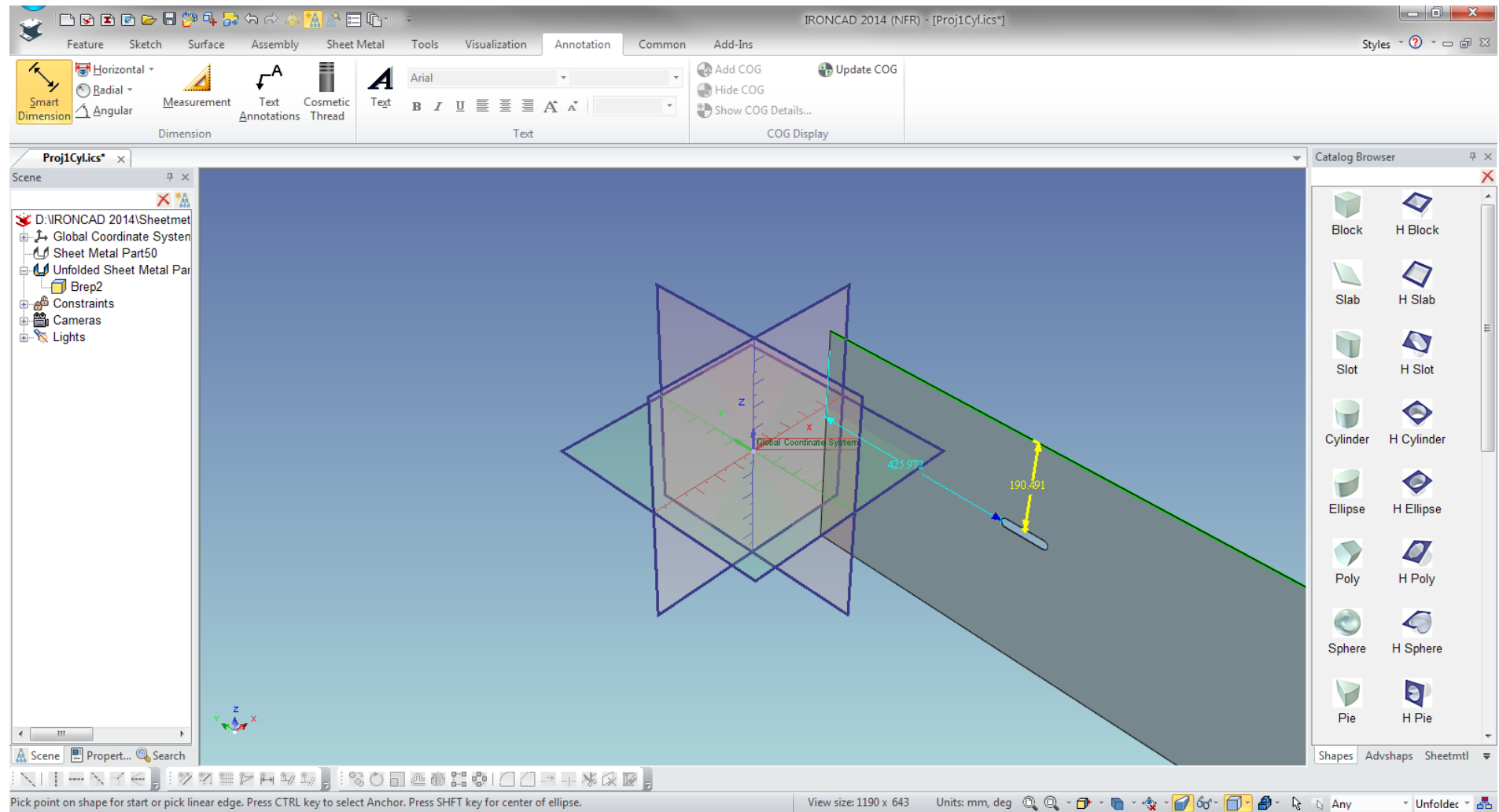
Use the F8 key to fit the view. Notice that the unfolded (unrolled) cylinder left edge is along on the X axis.



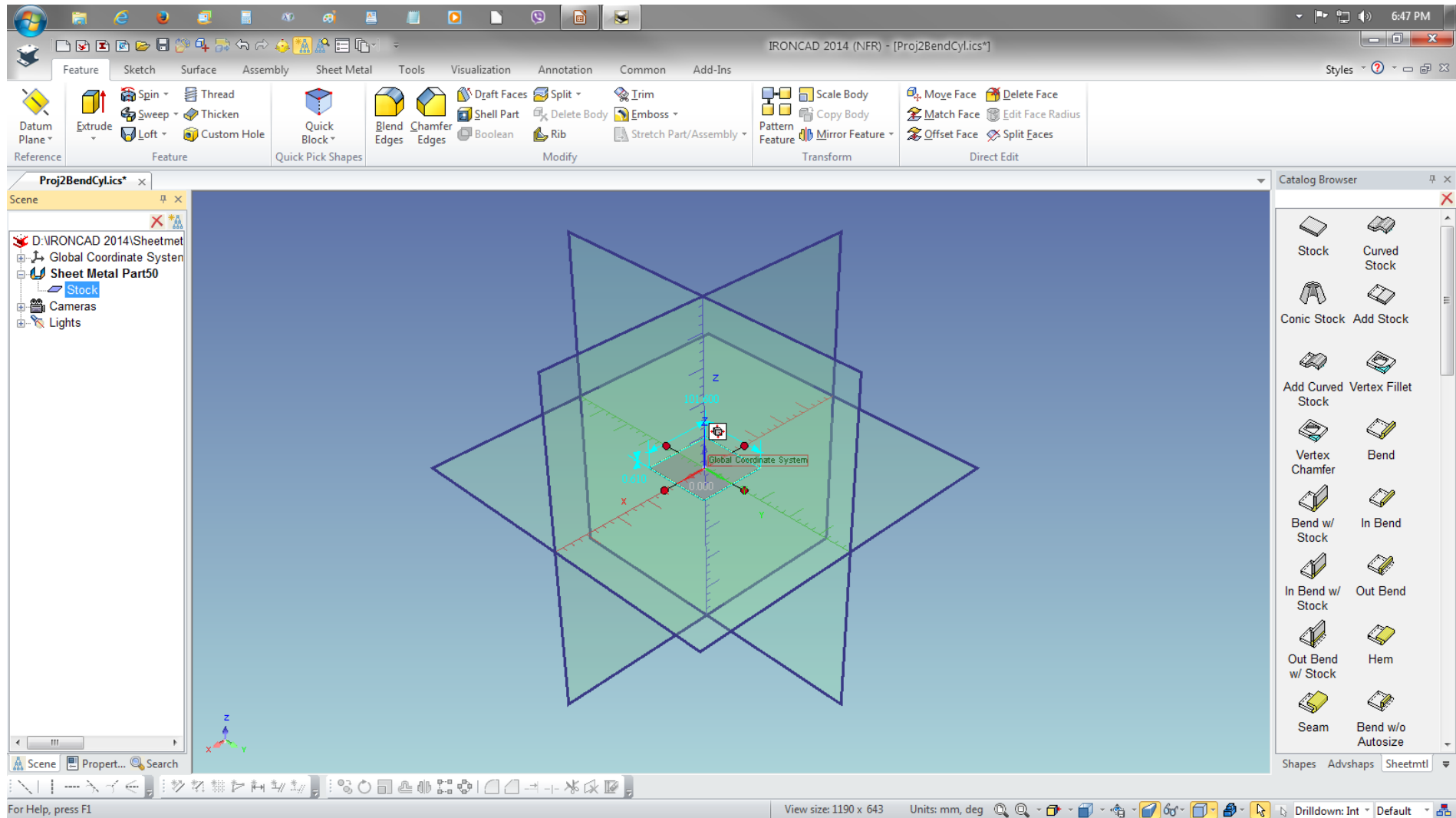
Fold (Roll) back the flat sheet to a cylinder. The cylinder from the Conic Stock get better H subtractions from the Shapes Catalog since it has a deeper draw than the hole punches from the Sheetmetal as it is for the flat surface subtraction.



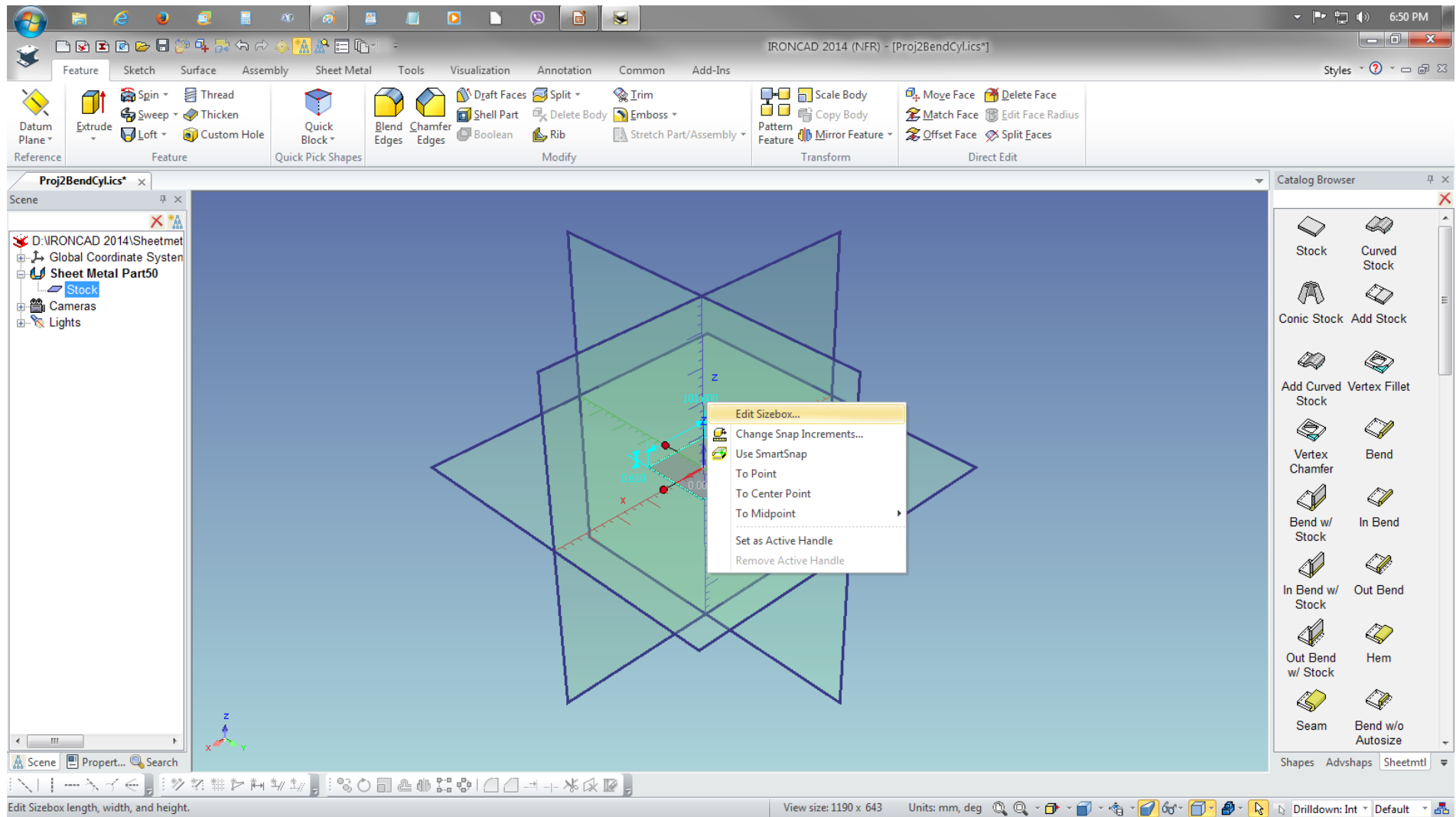
Smart dimension from the Annotation tools can plot the position of H subtractions. Any change from the position of the H subtraction on the cylinder will reflect the change in values displayed.



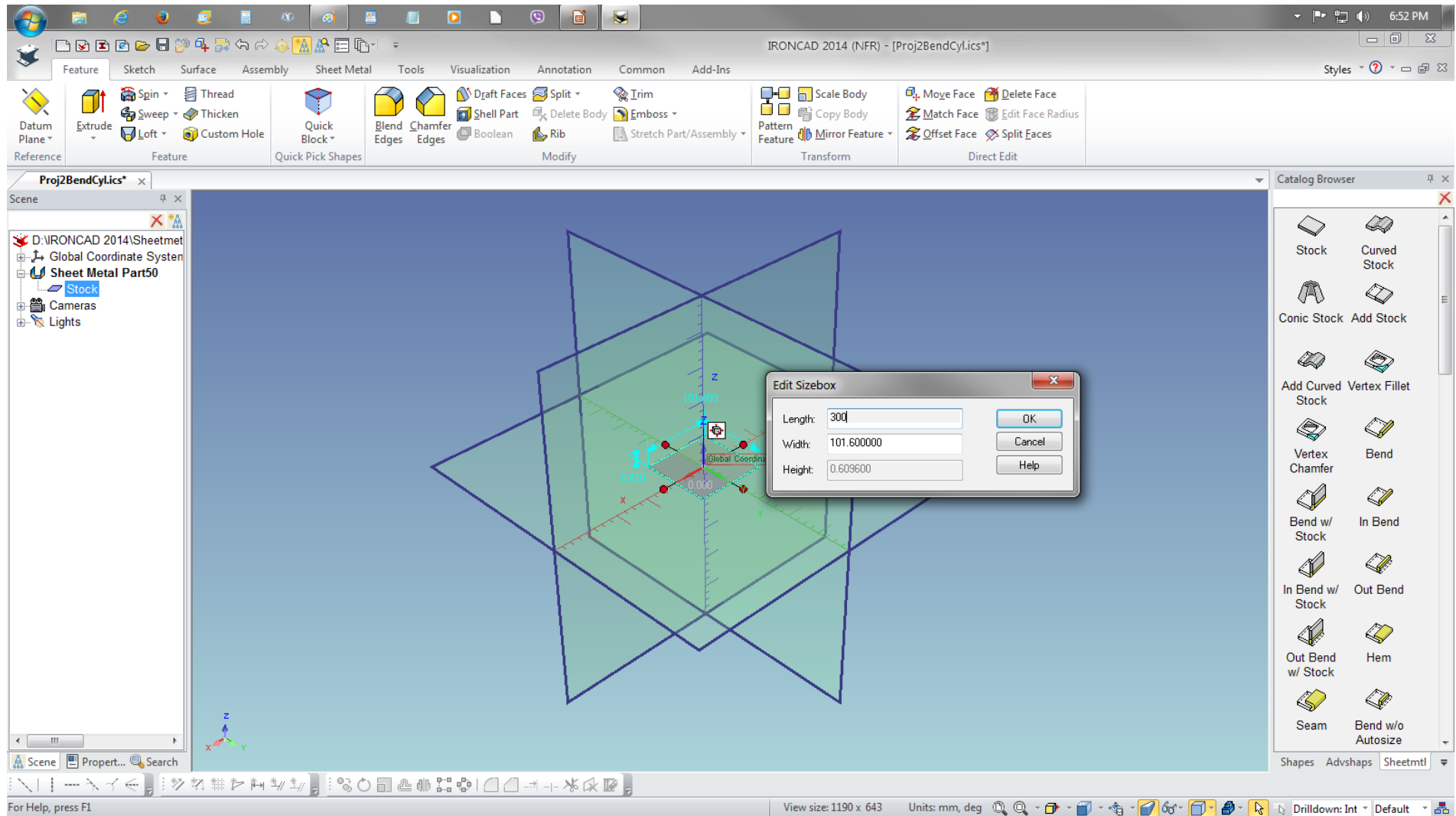
The other way of creating a cylinder sheet metal is by dropping a Stock. This process allows you to use the Custom Profile in the Sheetmtl Catalog item



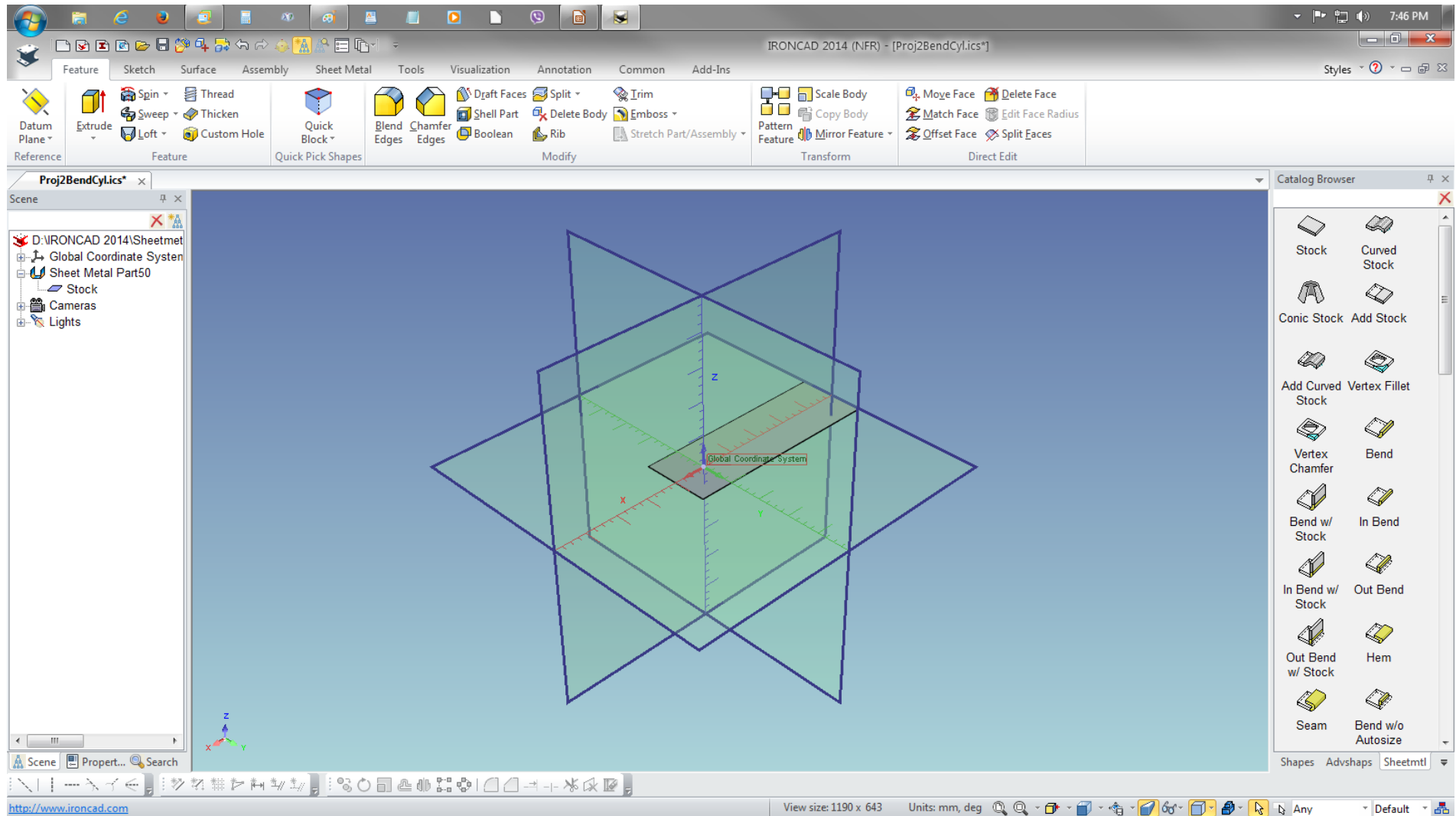
Edit the size of the Stock by RMB click the IntelliShape Stock from the Scene Browser and LMB select Edit Sizebox.



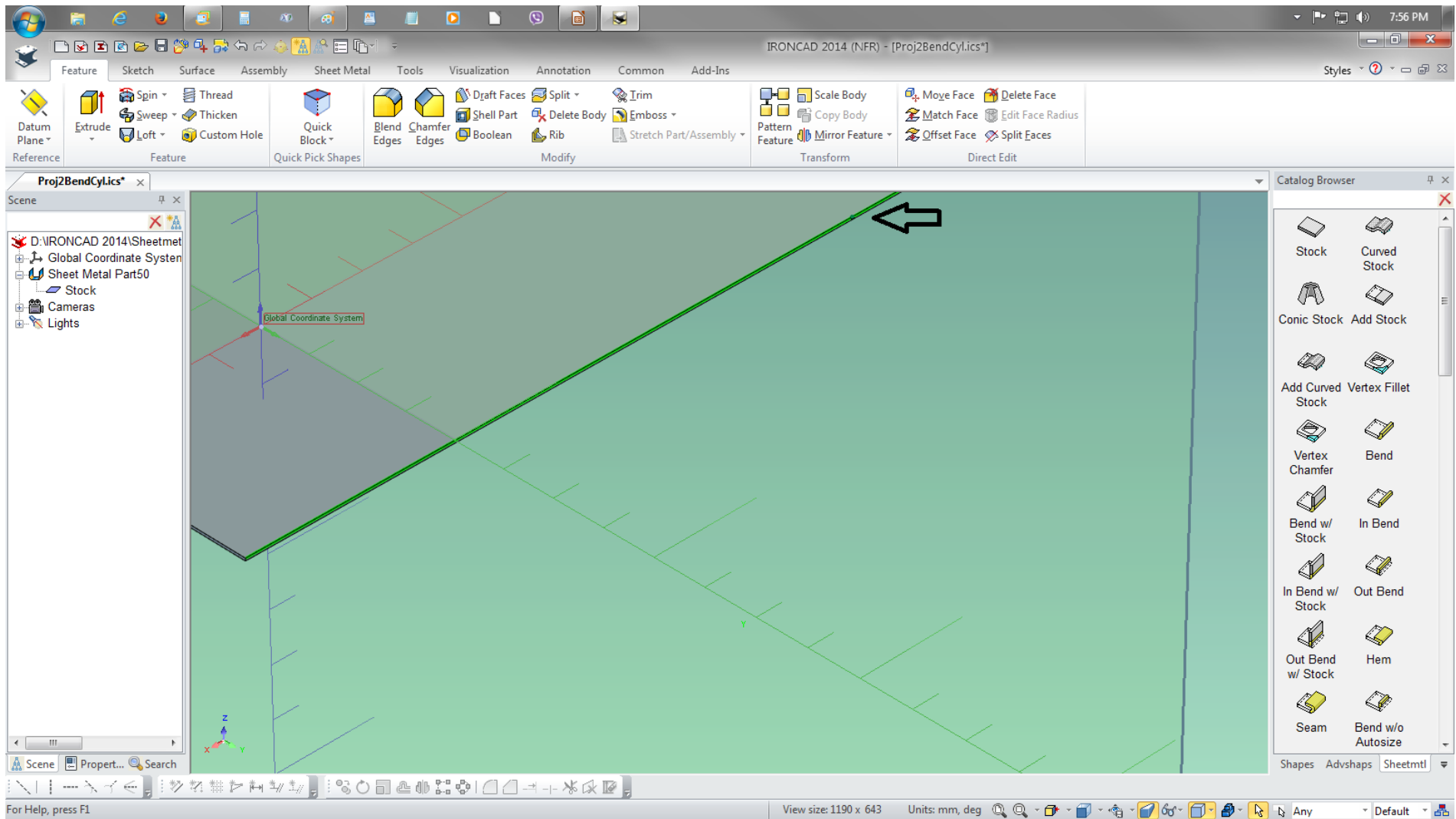
Change the default Length to your specified requirement



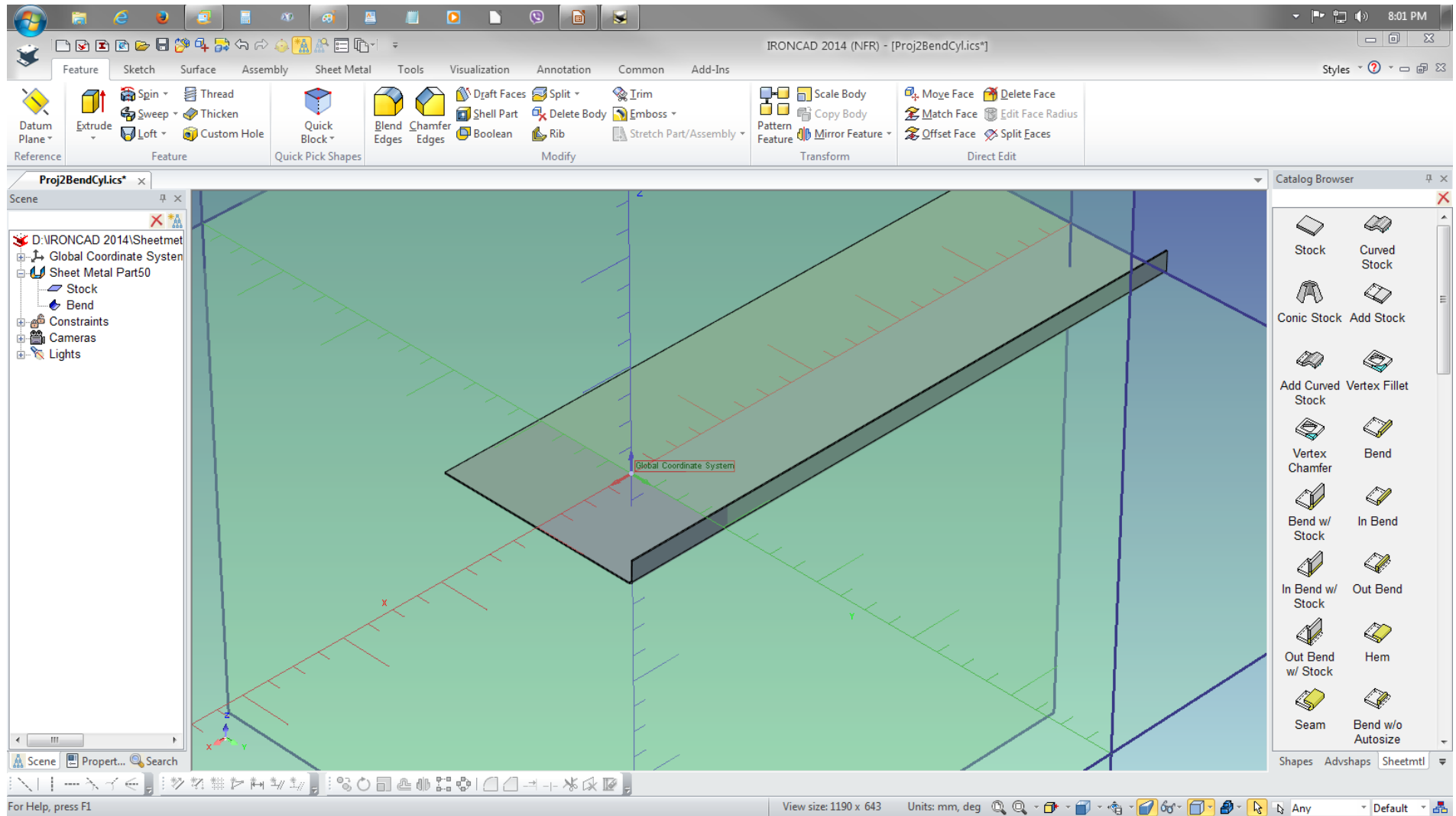
Display shows the new length of the stock.



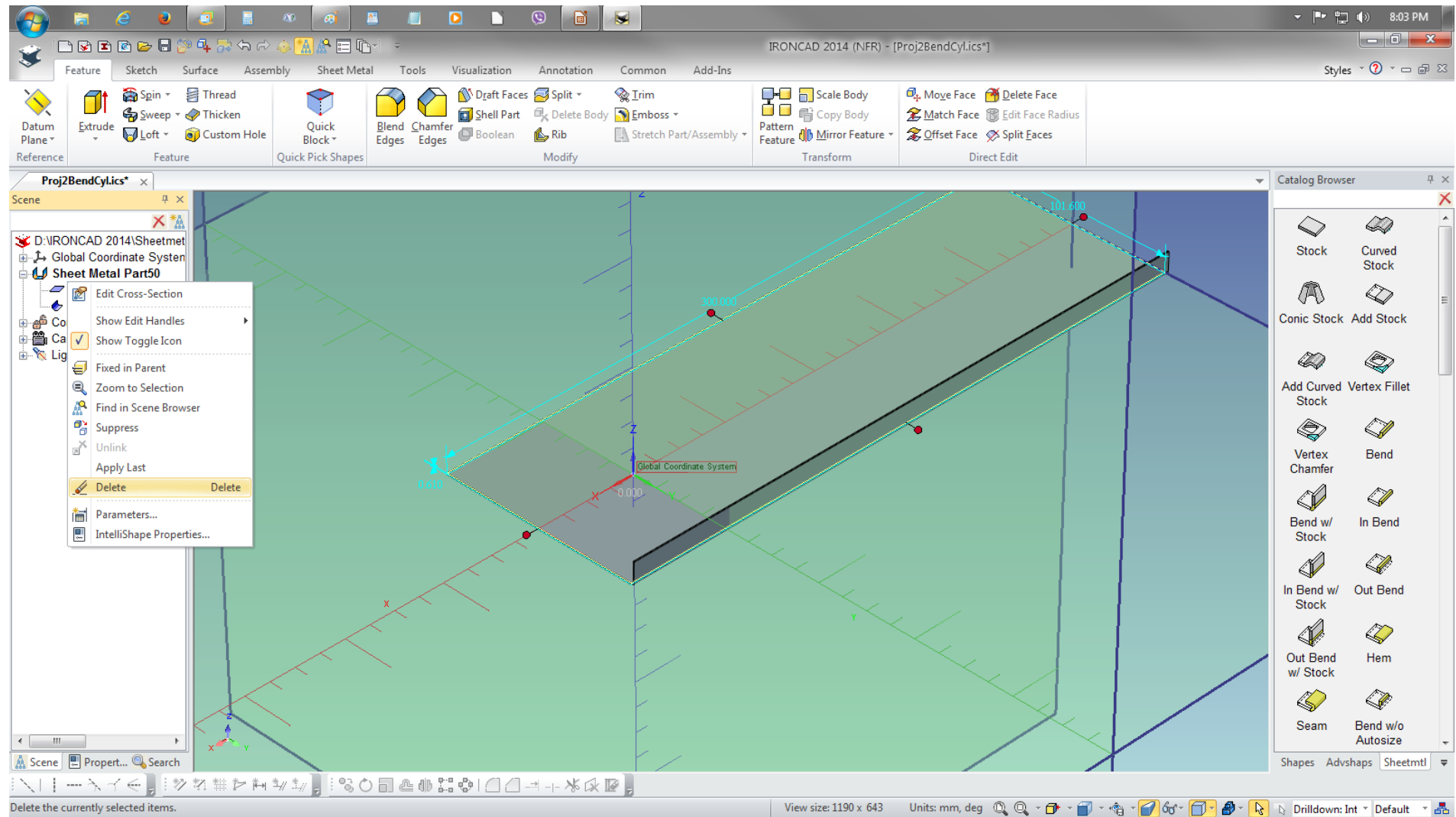
Scroll the mouse wheel to zoom and drag and drop a Bend from the Sheetmtl Catalog item to point from the Stock.



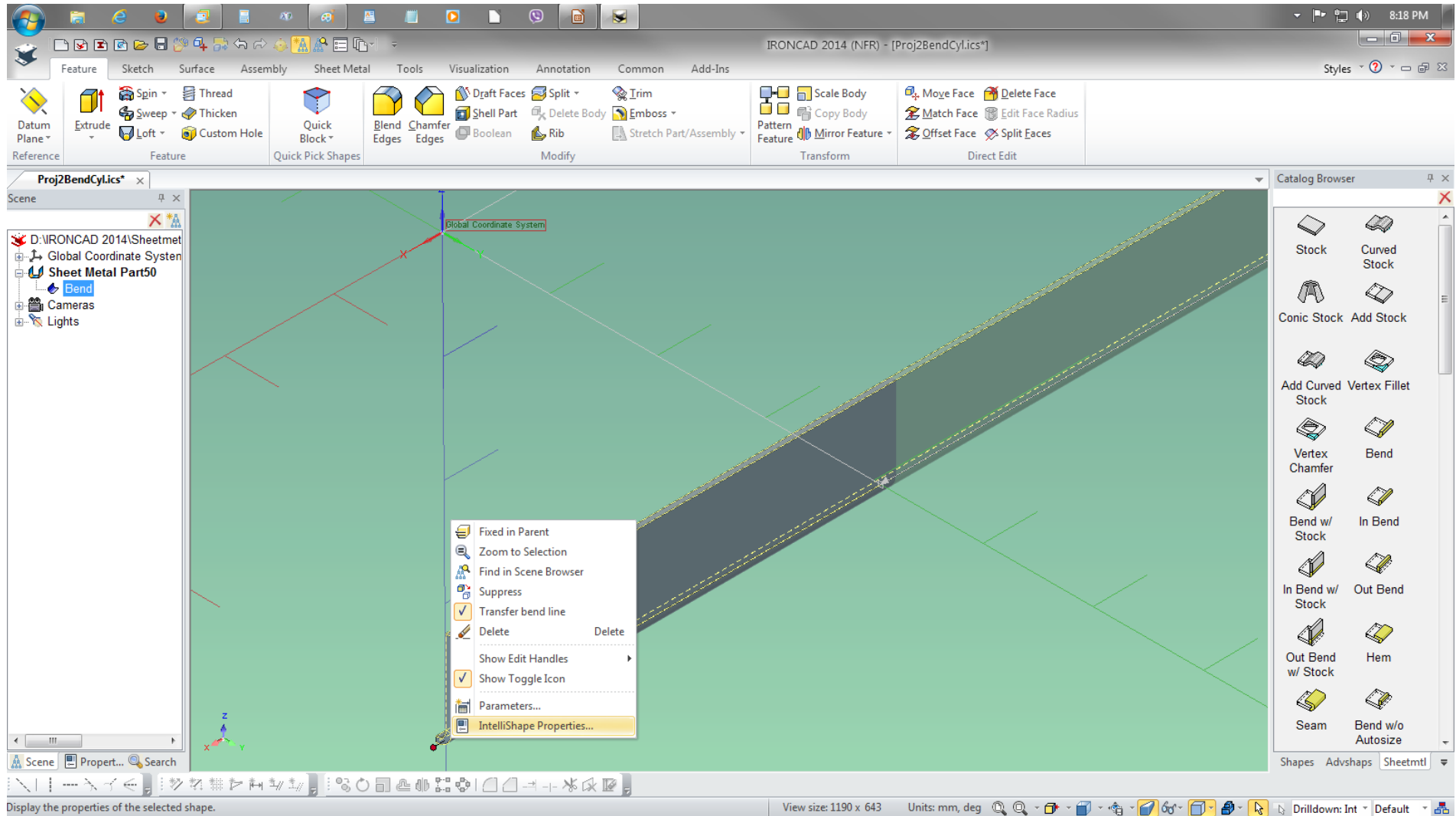
Bend on the Stock along the length.



This method of creating a Sheet Metal cylinder uses the Bend IntelliShape, it is necessary to delete the Stock by selecting it from the Scene browser.



Use the RMB click/select th Bend IntelliShape from the Scene browser and LMB click IntelliShape Properties to edit shape.



Change the Bend Inside radius

Sheet Metal Bend Intellishape

General
Bend
Reliefs

Radius
☒ Use minimum bend radius of part
☒ Inside radius: 1.219200
☐ Outside radius: 1.828800

First Bend Stock
☐ Display handle
Length: 0

Second Bend Stock
☒ Display handle
Length: 9.525000

☒ Maintain unfolded length when changing angle.
☐ Show Formulas

Bend allowance
☒ Use k-factor formula Show rule...
☒ Use k-factor of part
k-factor: 0.333000
☐ Specify custom value
Unfolded length: 2.233982

Width
Above: 149.475538
Below: 150.524462

OK Cancel Apply Help

Sheet Metal Bend Intellishape

General
Bend
Reliefs

Radius
☐ Use minimum bend radius of part
☒ Inside radius: 359
☐ Outside radius: 1.828800

First Bend Stock
☐ Display handle
Length: 0

Second Bend Stock
☒ Display handle
Length: 9.525000

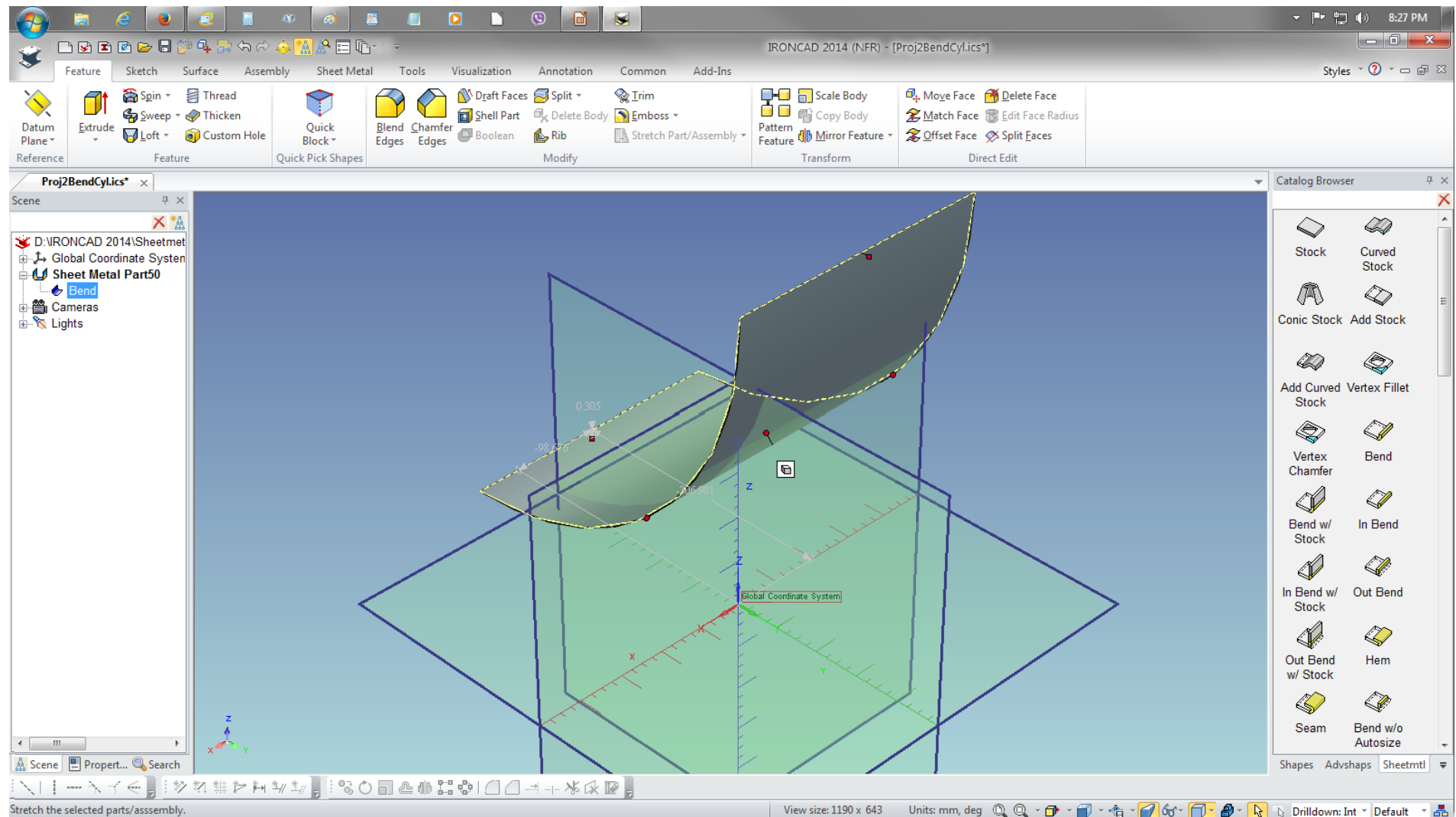
☒ Maintain unfolded length when changing angle.
☐ Show Formulas

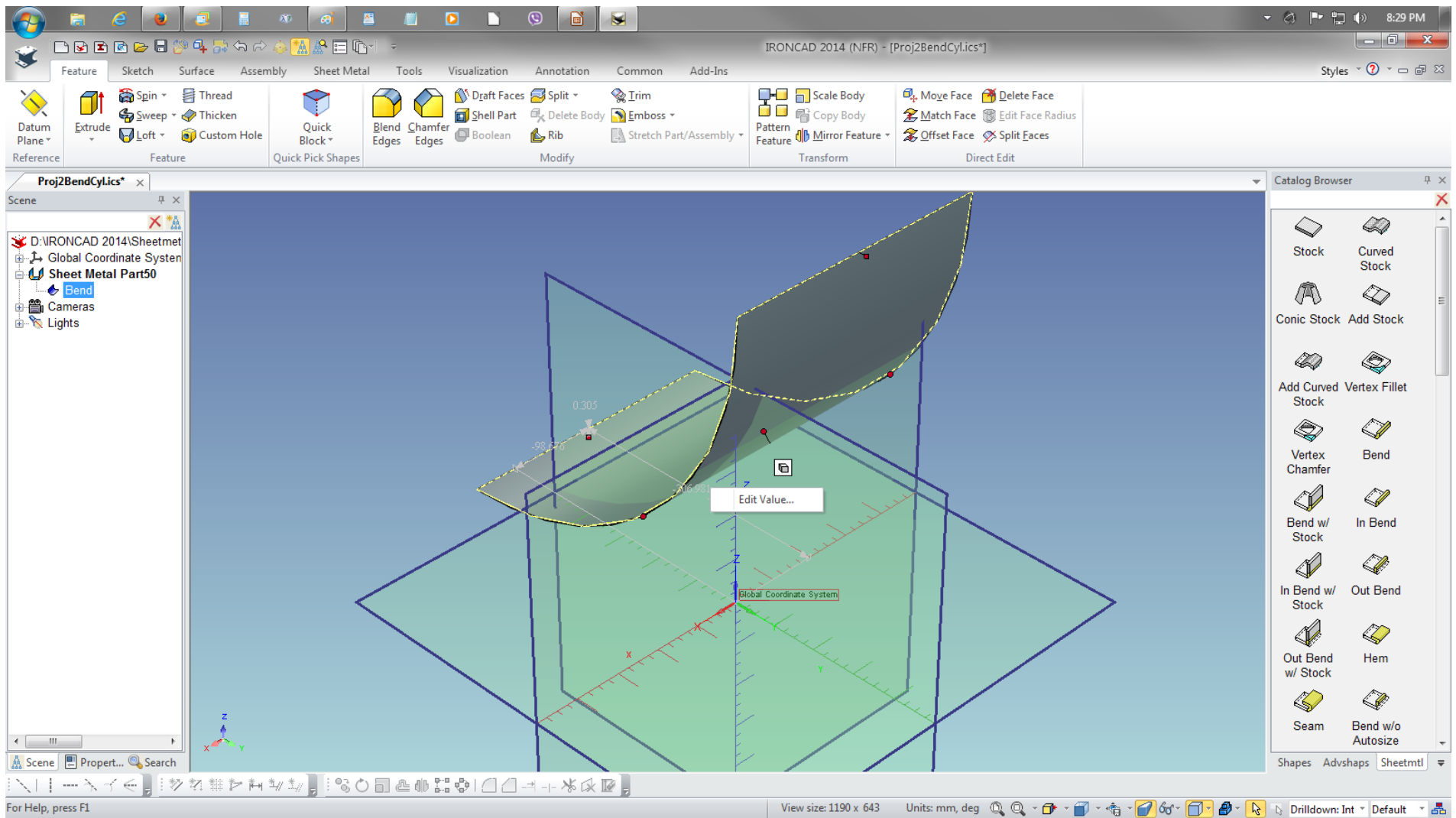
Bend allowance
☒ Use k-factor formula Show rule...
☒ Use k-factor of part
k-factor: 0.333000
☐ Specify custom value
Unfolded length: 2.233982

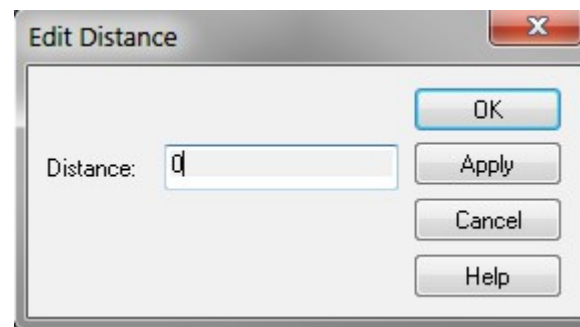
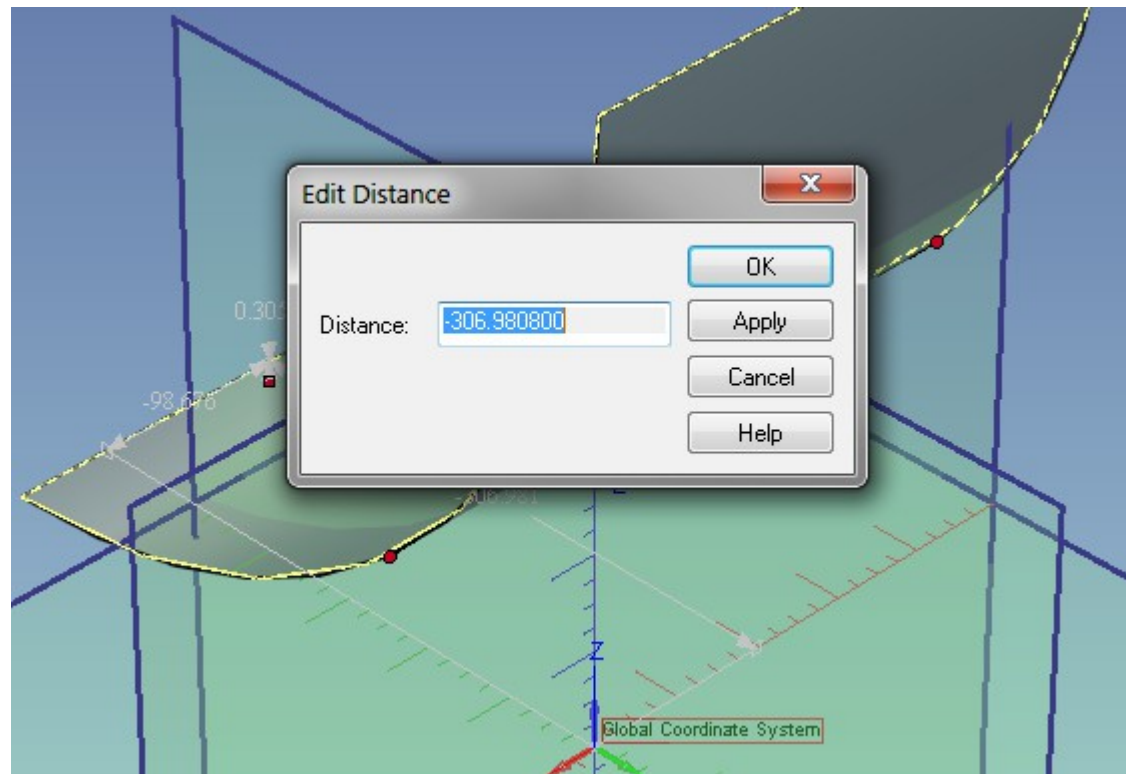
Width
Above: 149.475538
Below: 150.524462

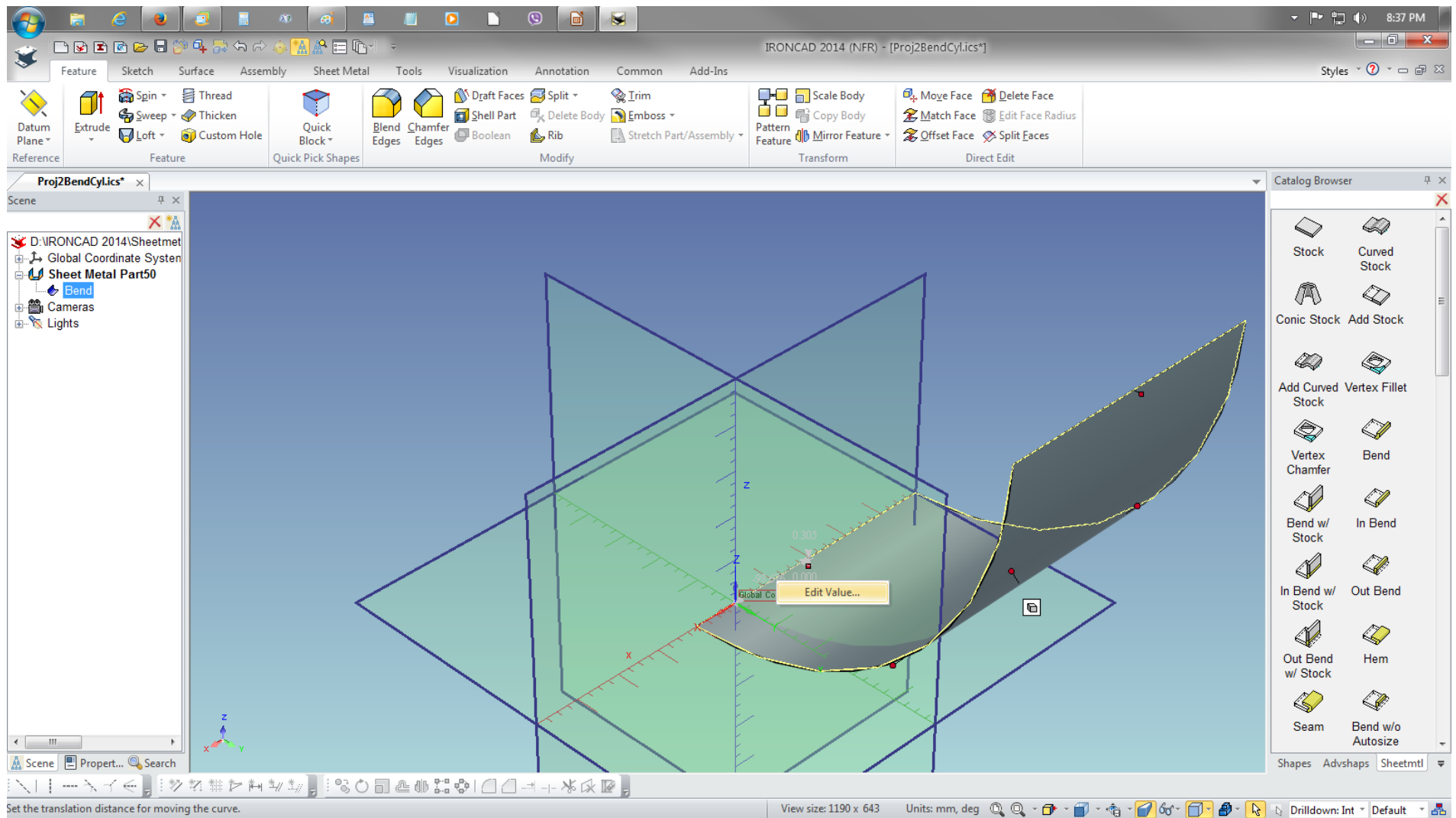
OK Cancel Apply Help

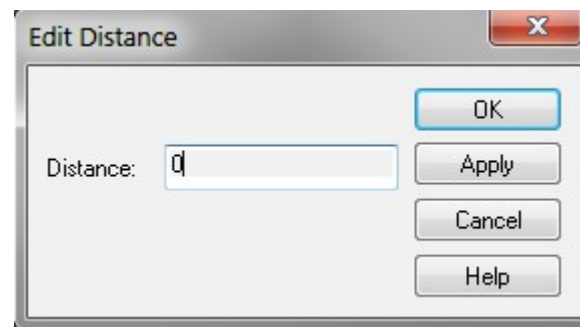
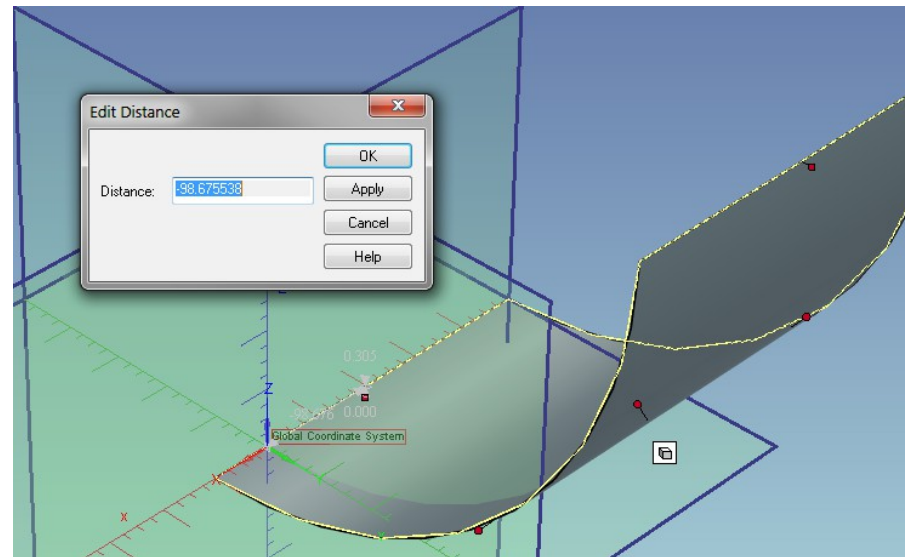
This is how it look after changing the Bend radius. Note the position of the IntelliShape from the origin of the Coordinate system. It is a good practice to set the IntelliShape position as it will be shown in the succeeding pages/slides.

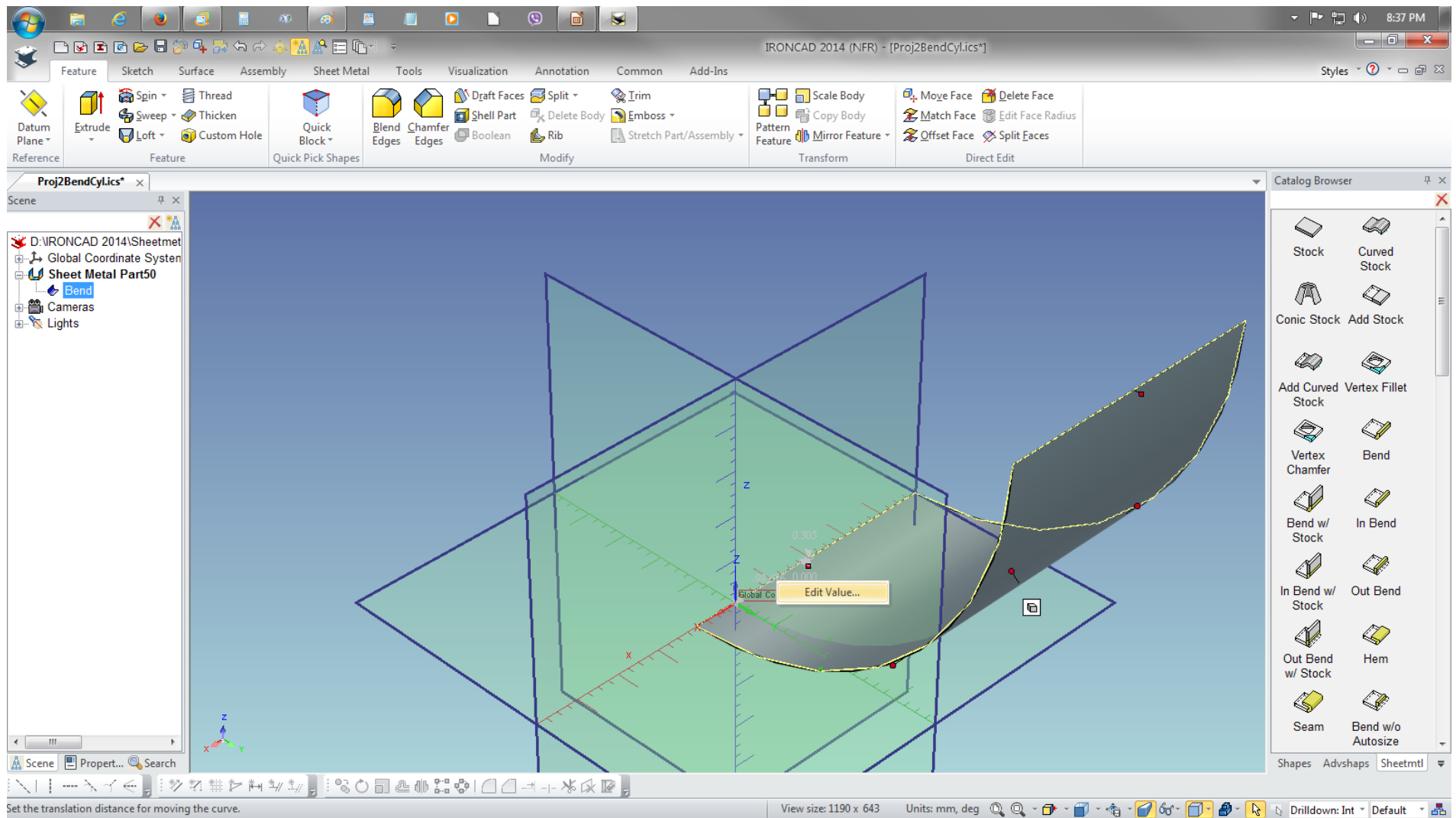


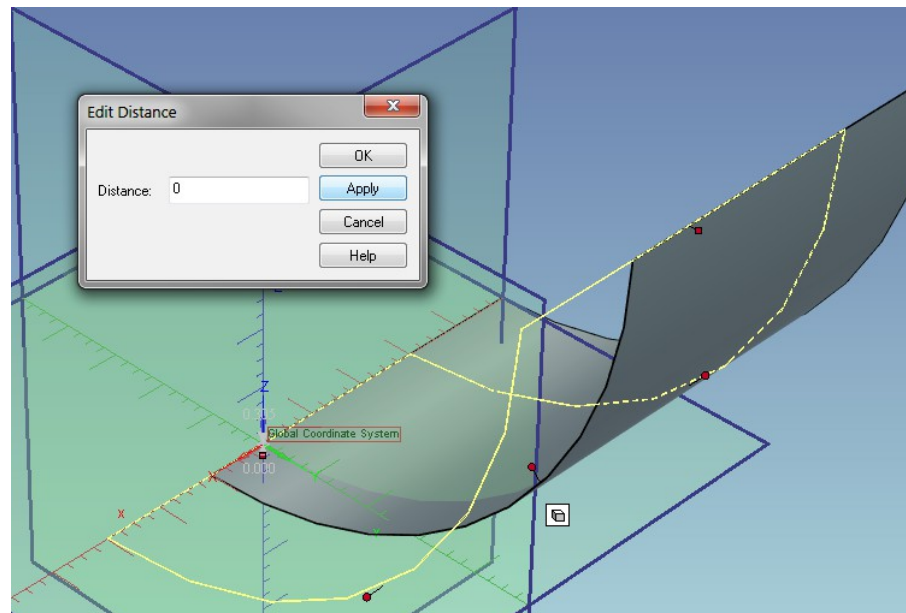
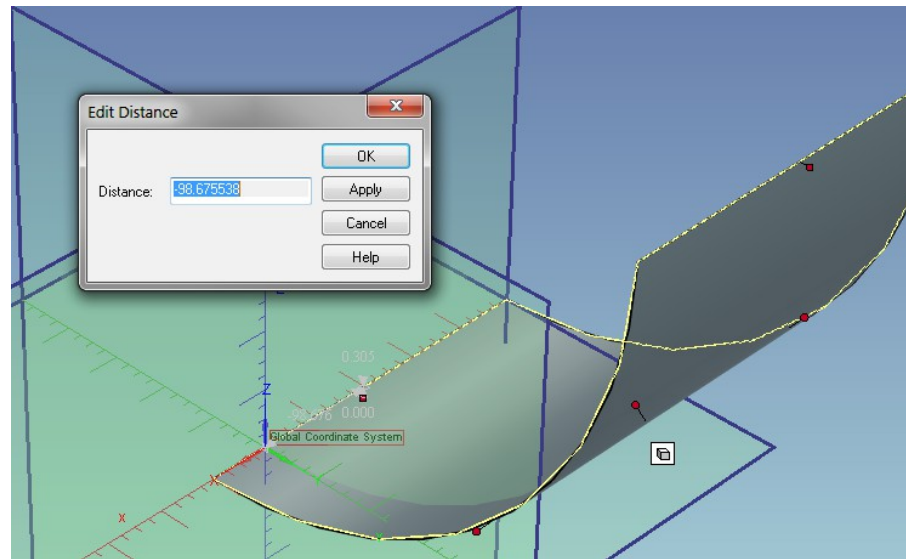




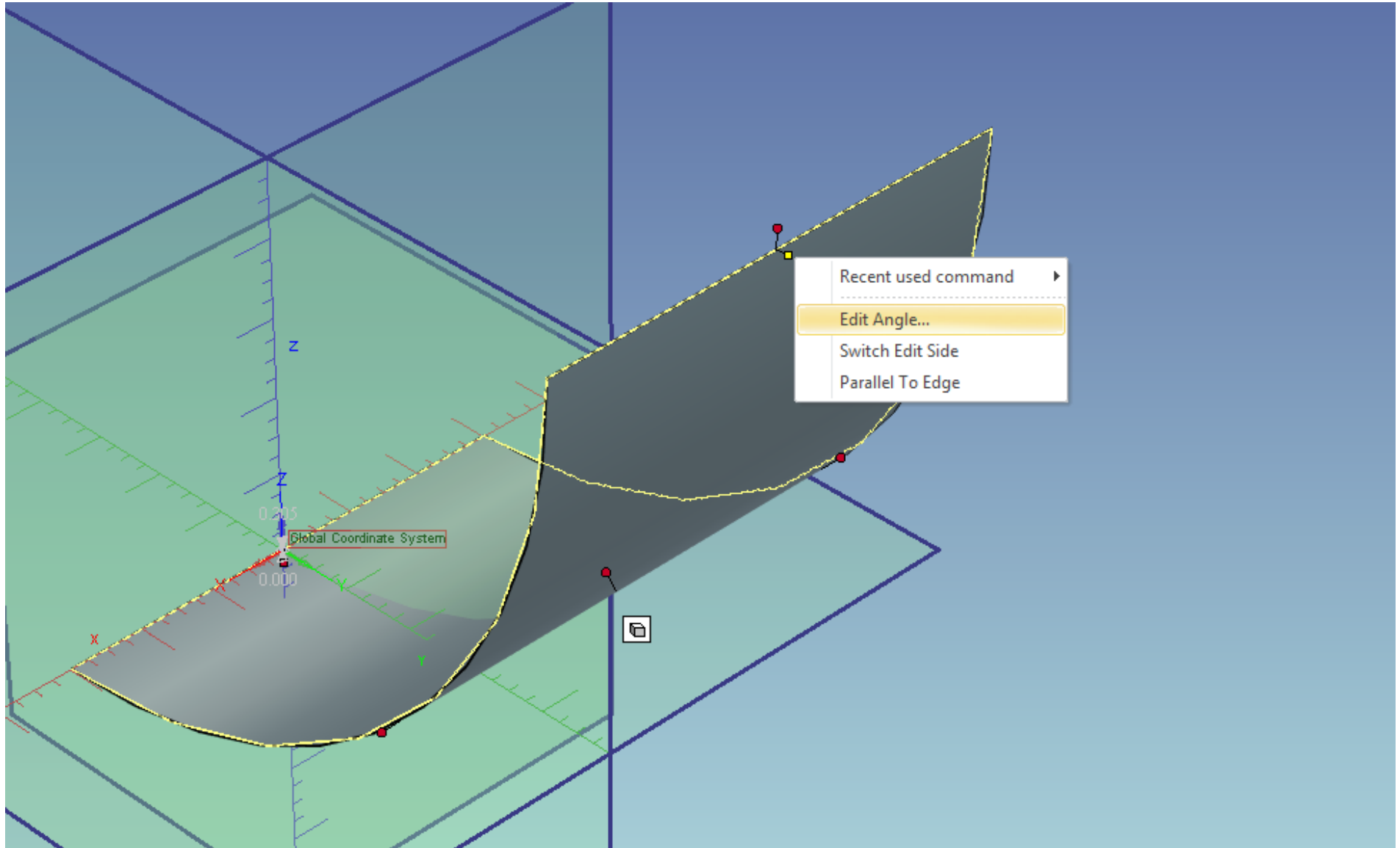




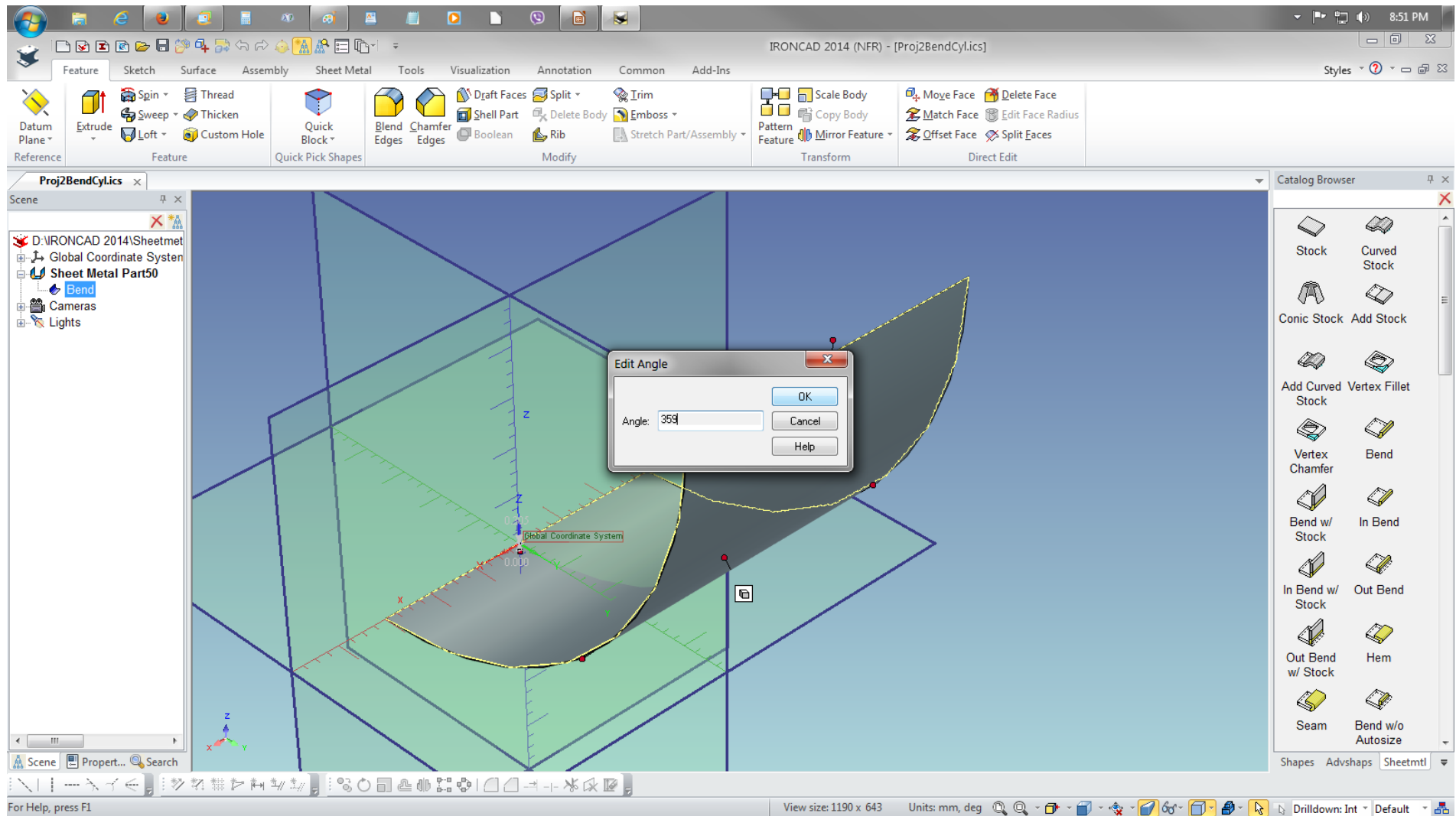




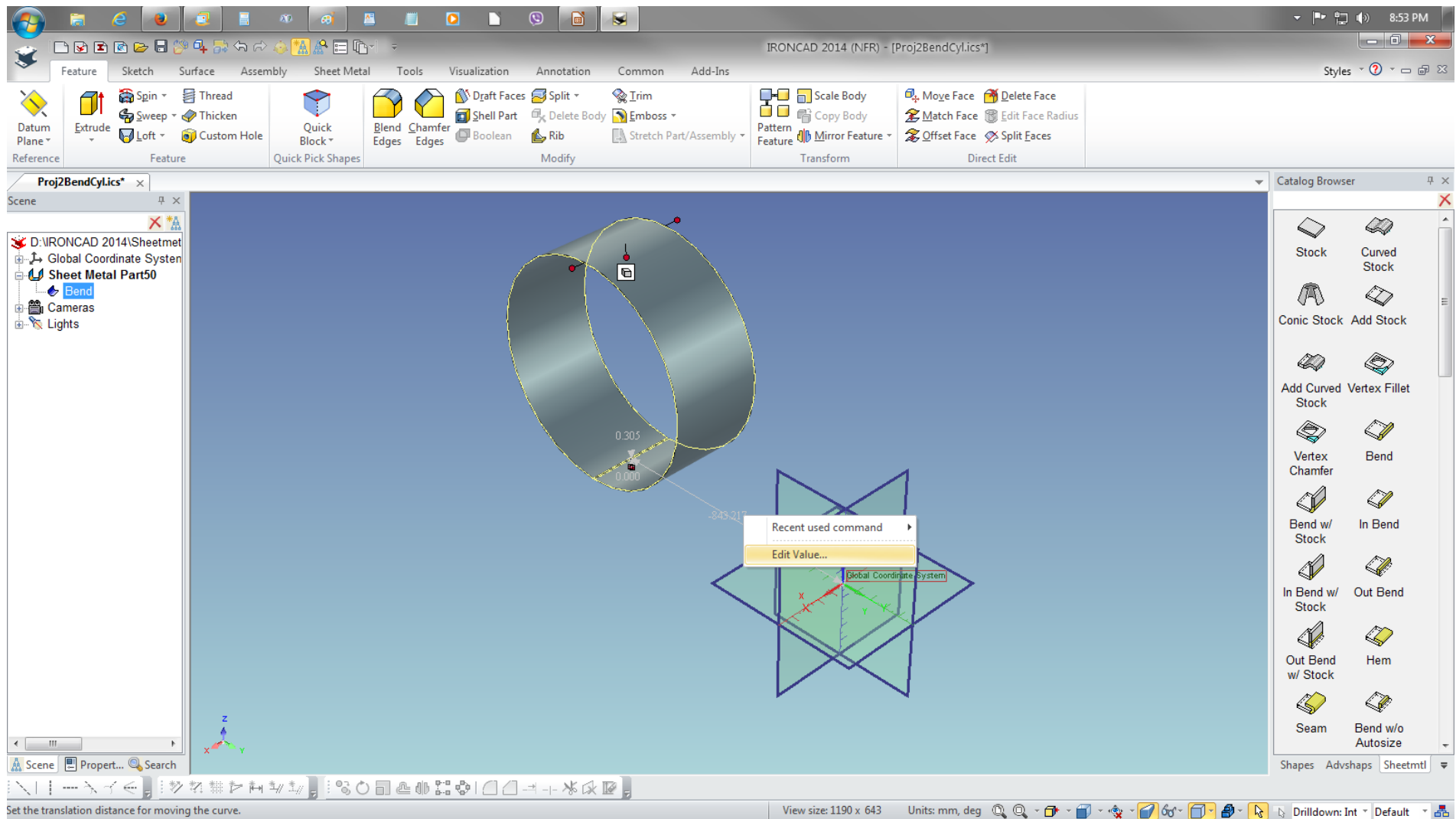
To form this IntelliShape, point the cursor on this handle and RMB click and select Edit Angle

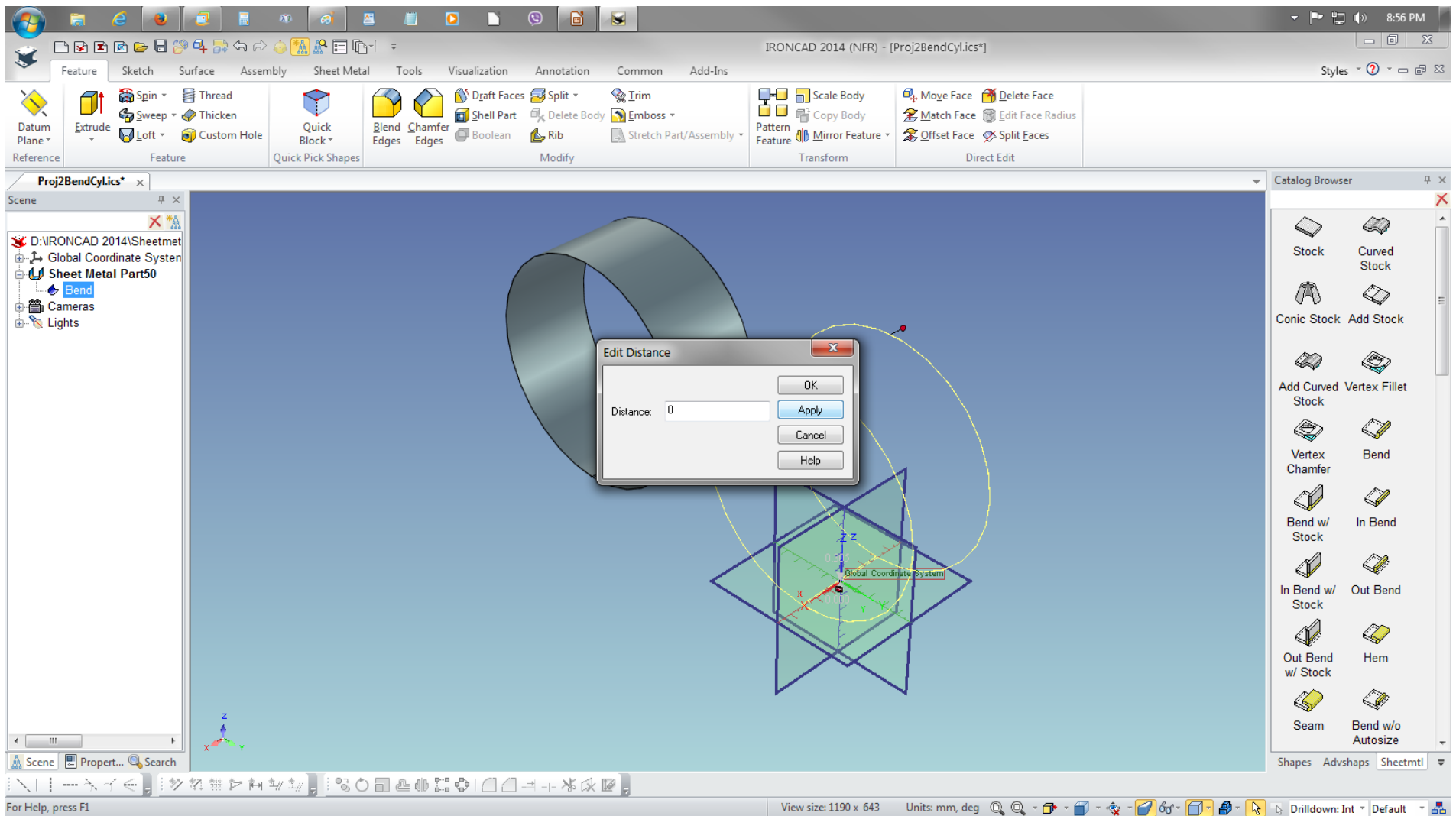


Enter the Angle value to 359 degrees to leave a small seam on the IntelliShape.

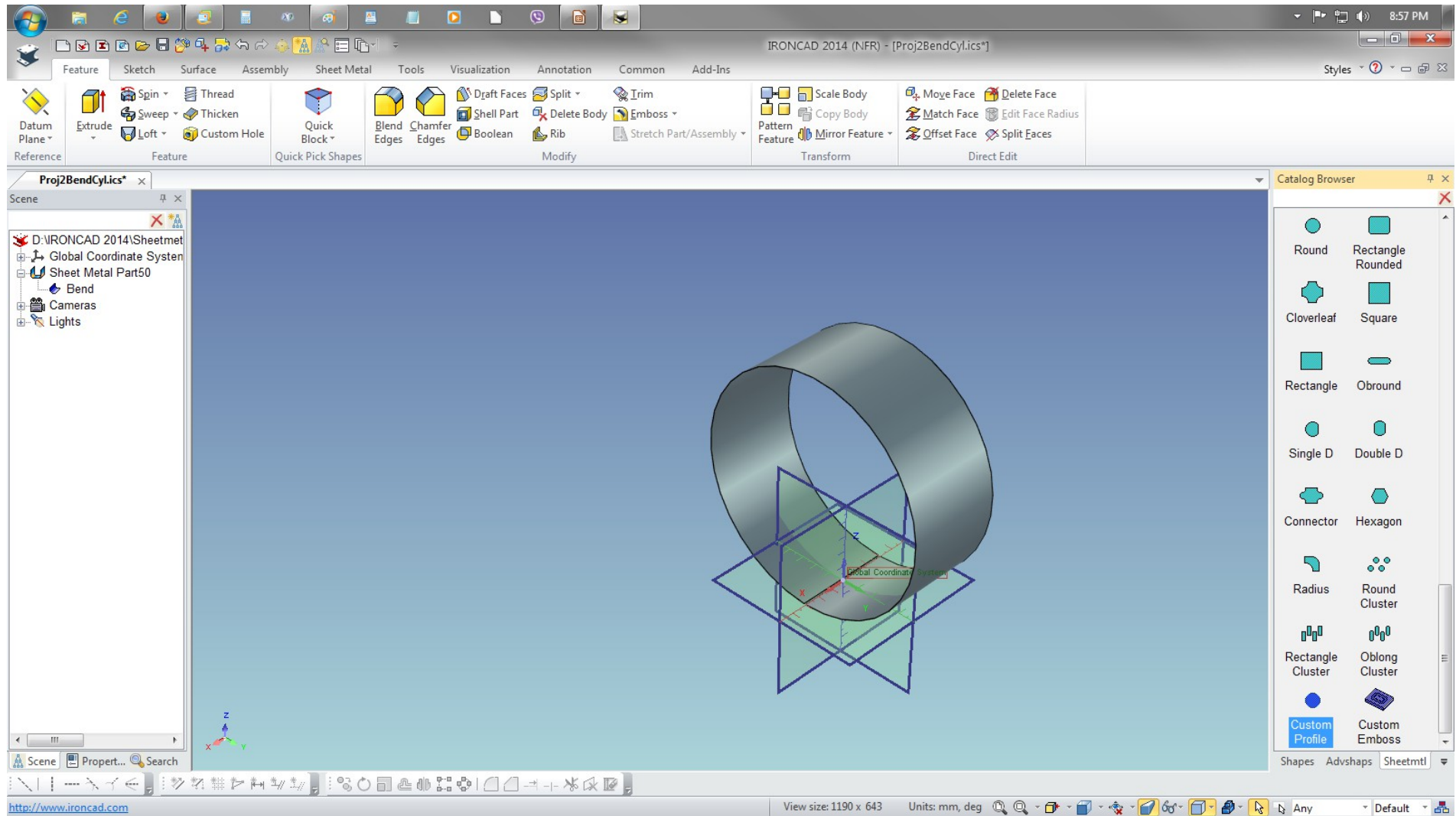


This forms the the whole cylinder. RMB click the Position Dimensions and change the value to 0 so to position a the origin of Coordinate System.

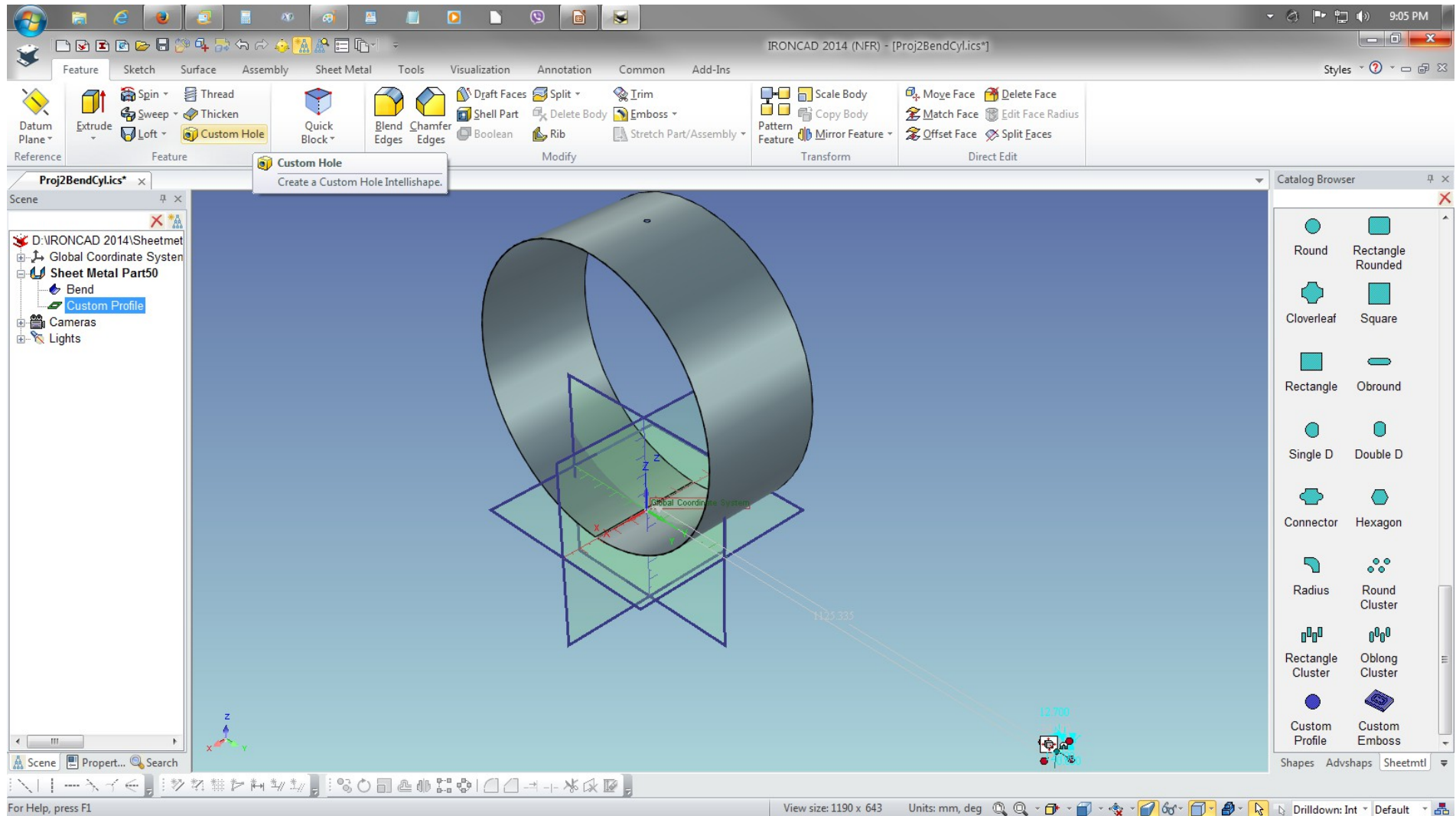




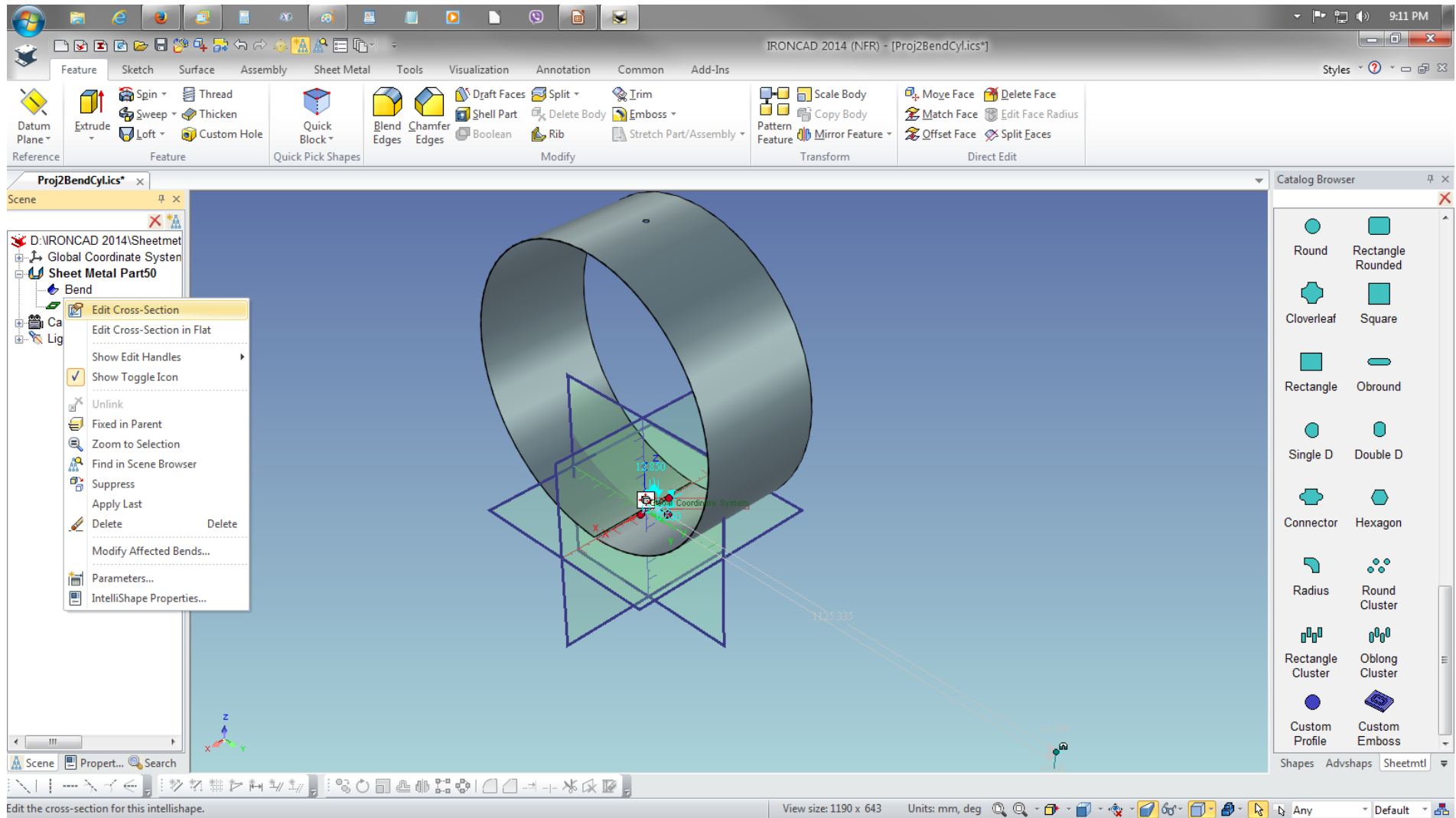
Select the Custom Profile and drag to the cylinder to create a hole to the cylinder.



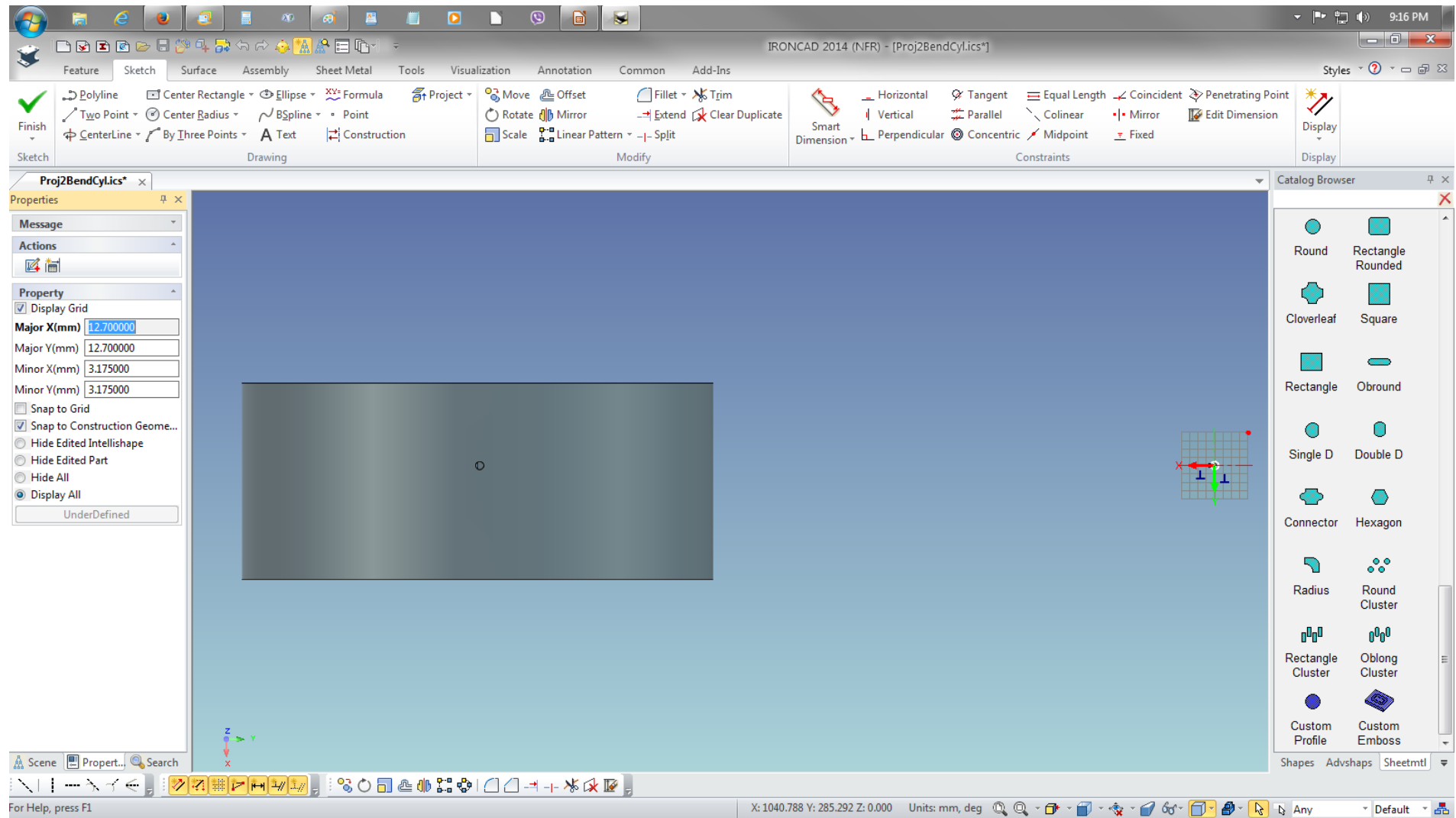
Notice the position of the Custom Profile on the Coordinate System. If the Sheet Metal Part was not position at origin of the Coordinate System, the unfolded (unrolled) sheet and the Custom Profile will be measured between the distance placement from the Coordinate System 3D space and not from the edge of sheet metal part.



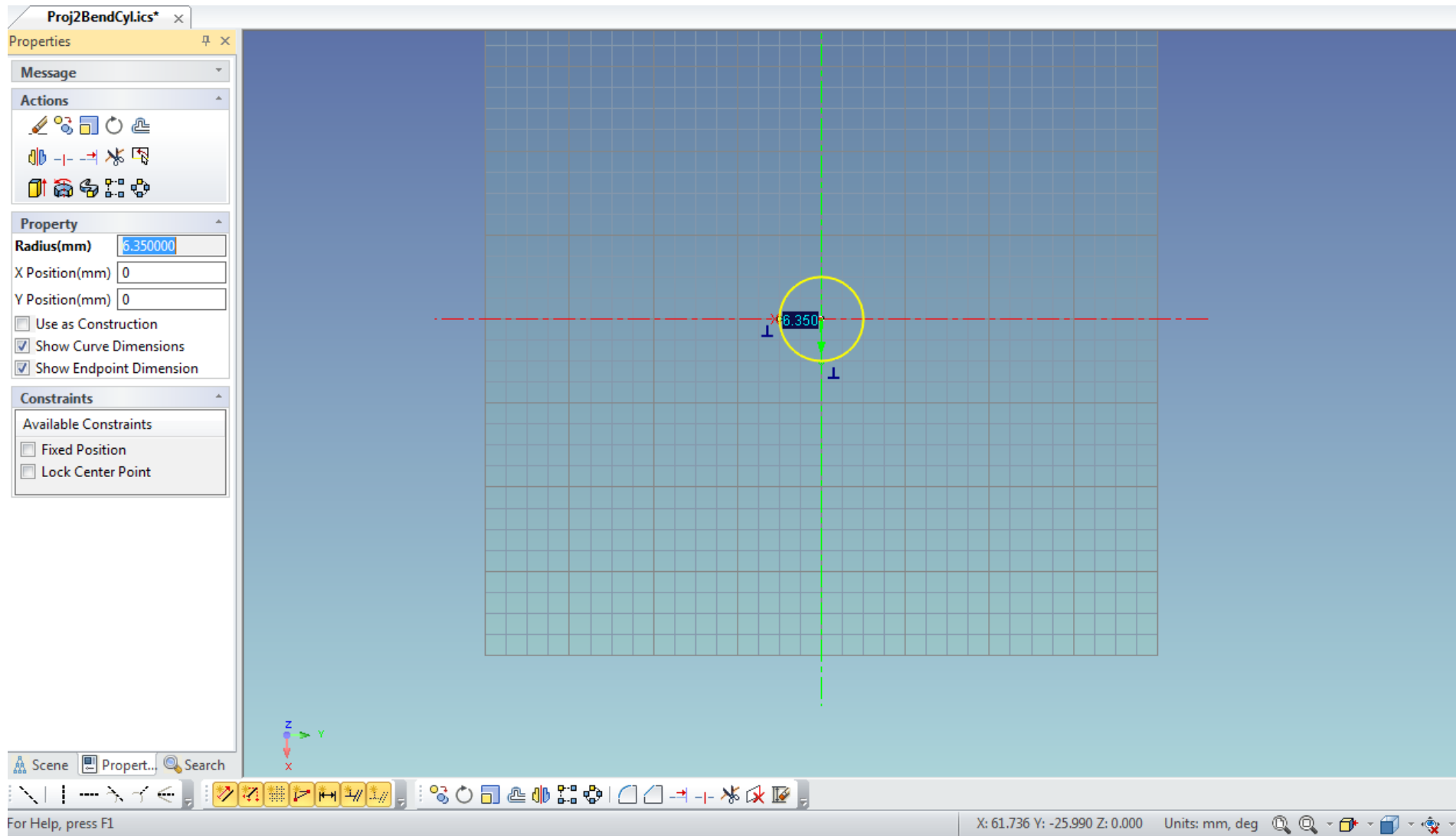
To edit the the size of the hole or shape of the Custom Profile, LMB select from the Scene browser and RMB click and select Edit Cross-Section as Edit-Cross Section in Flat doesn't work for rolled sheet metal.

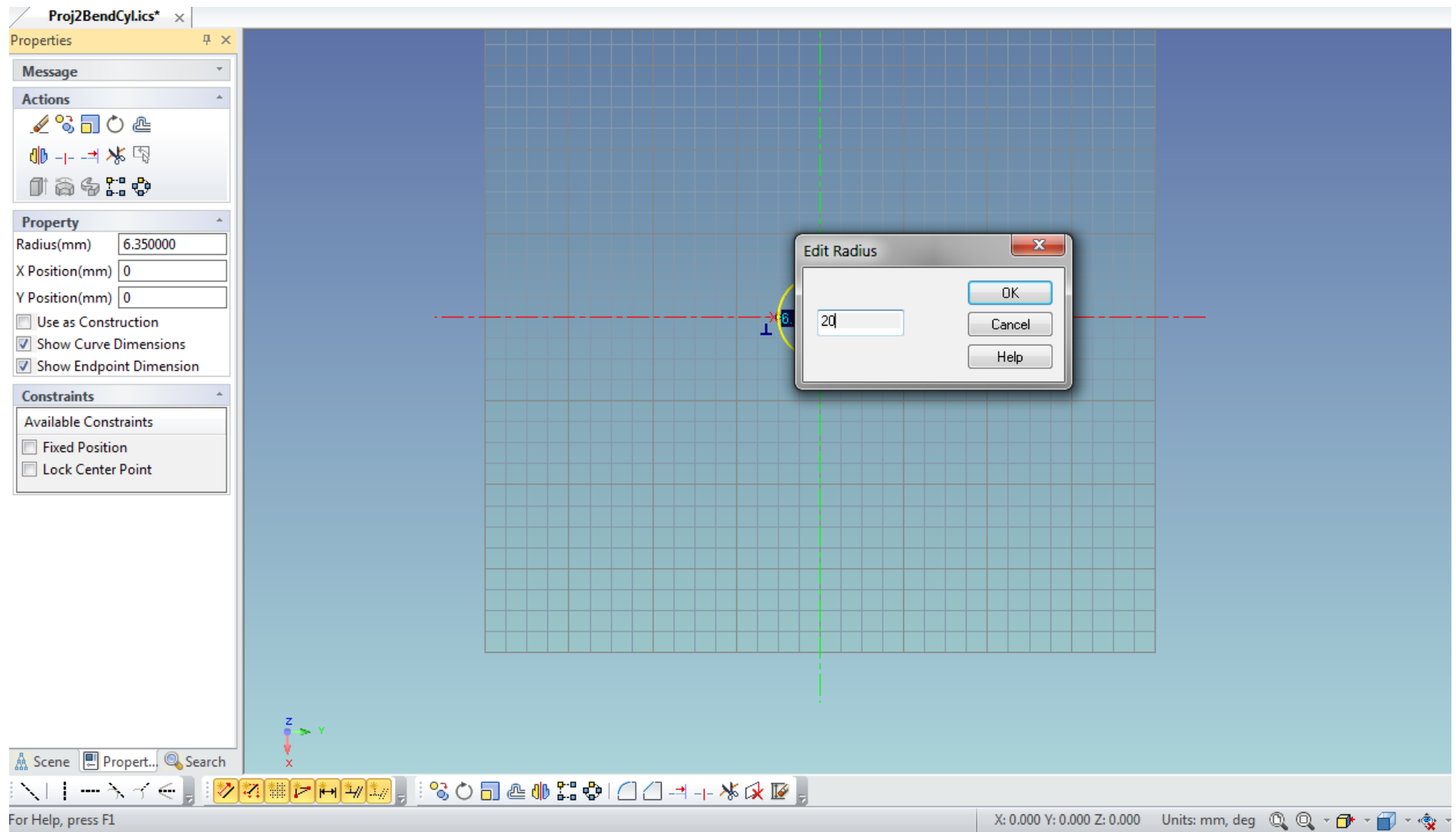


Zoom in or use the mouse scroll wheel to zoom on the cross-section of the Custom Profile.

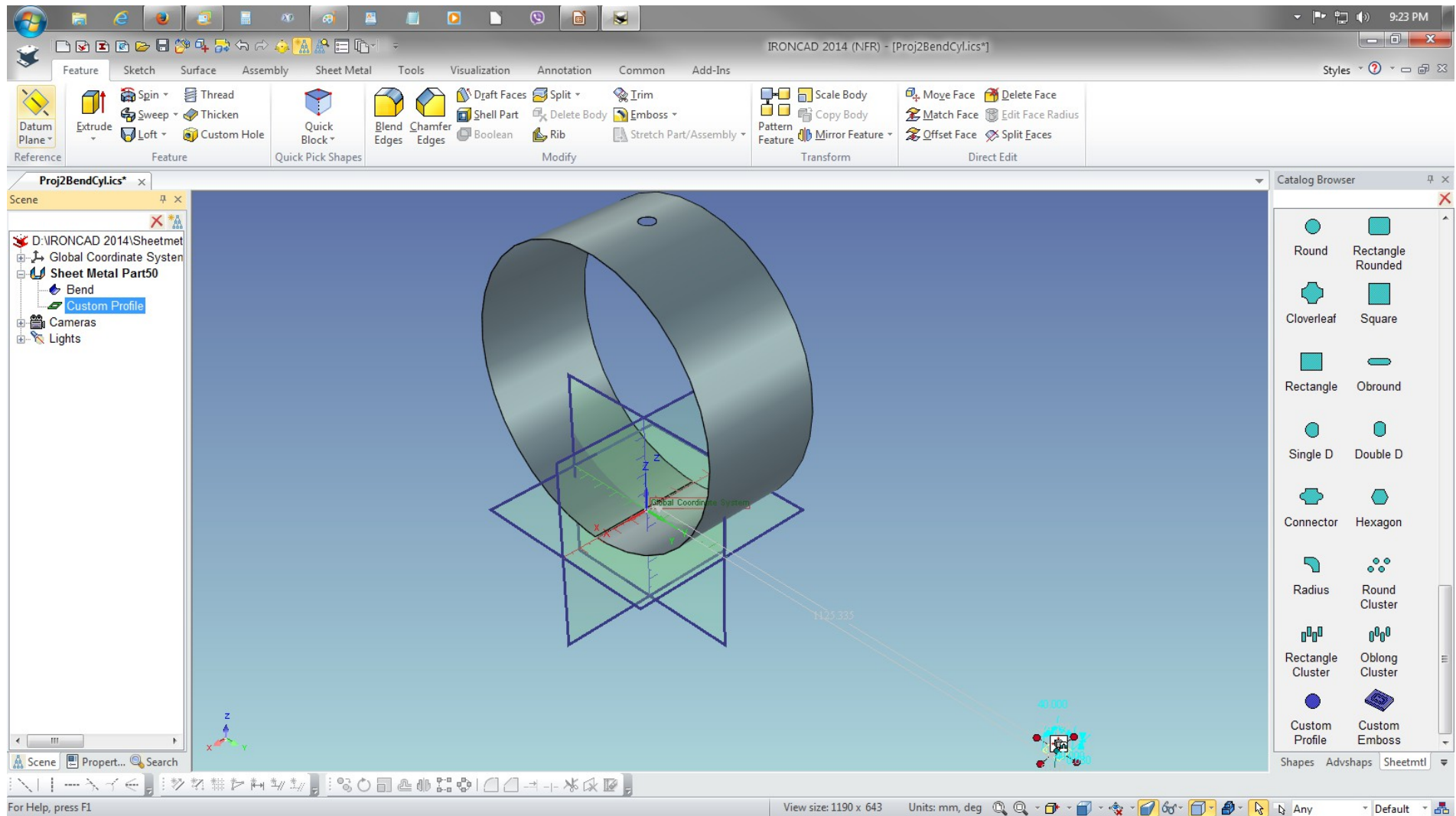


Change the radius on the circle by RMB click on radius dimension to edit.

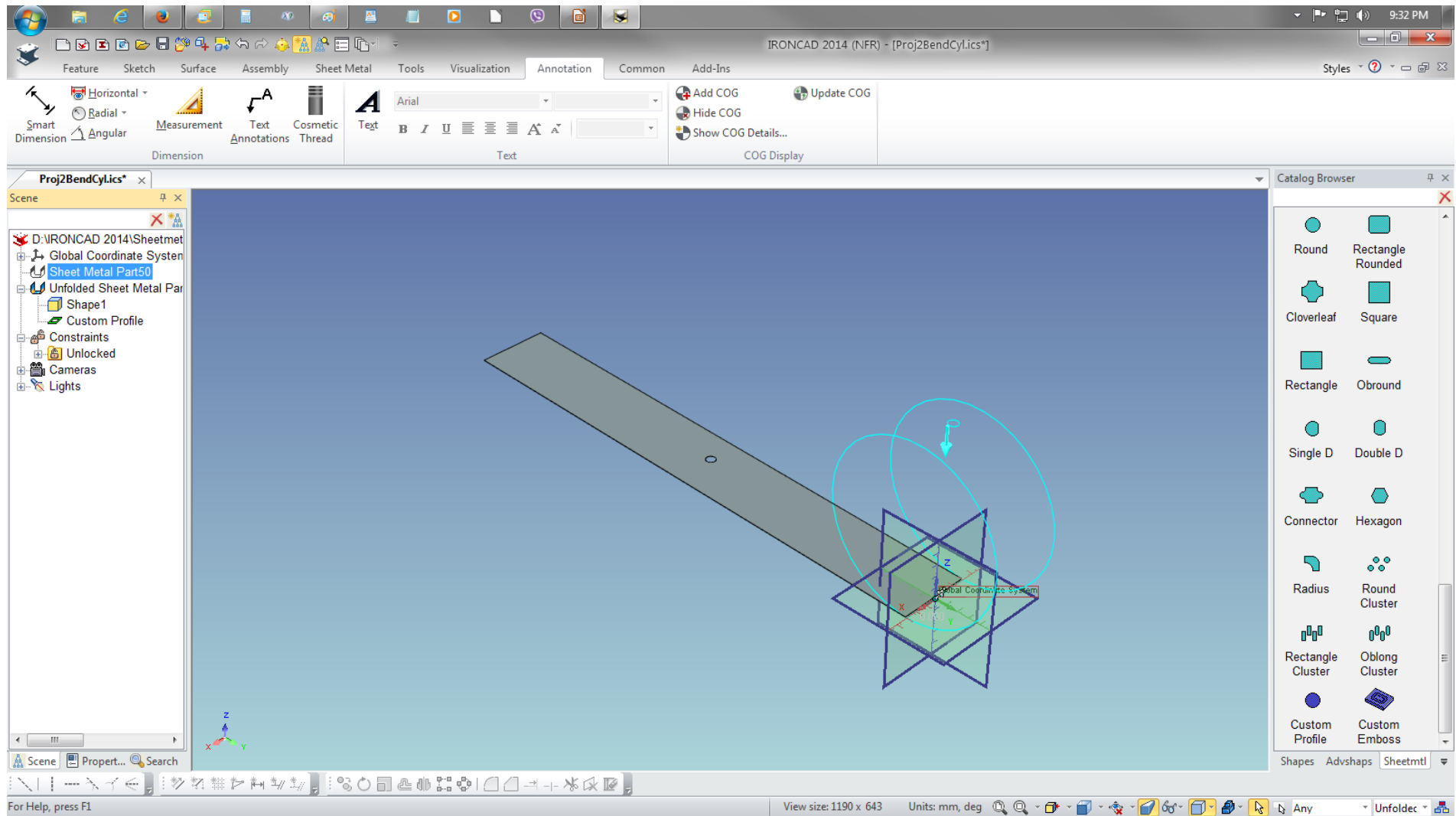




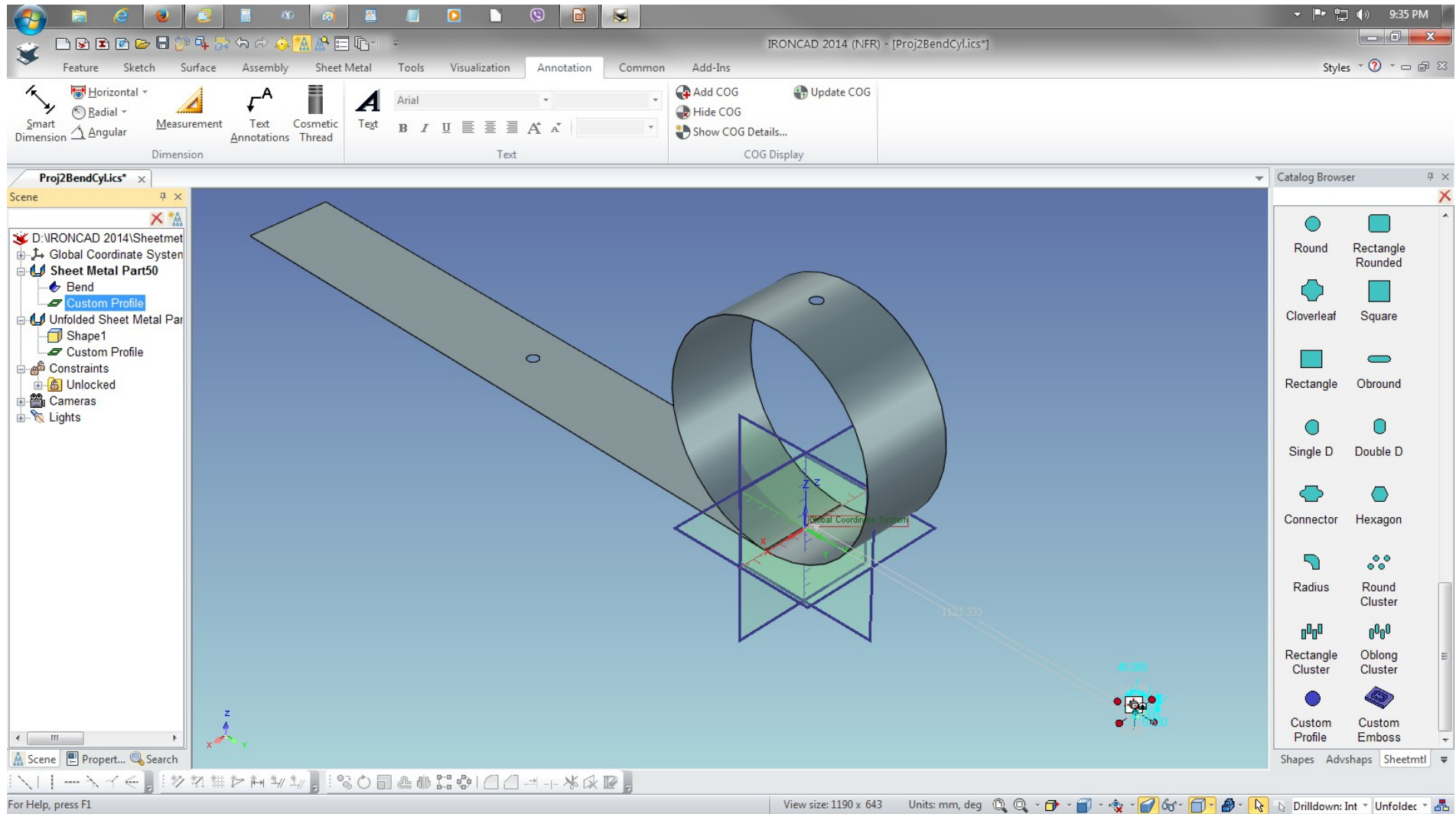
The radius value change is shown on the view.



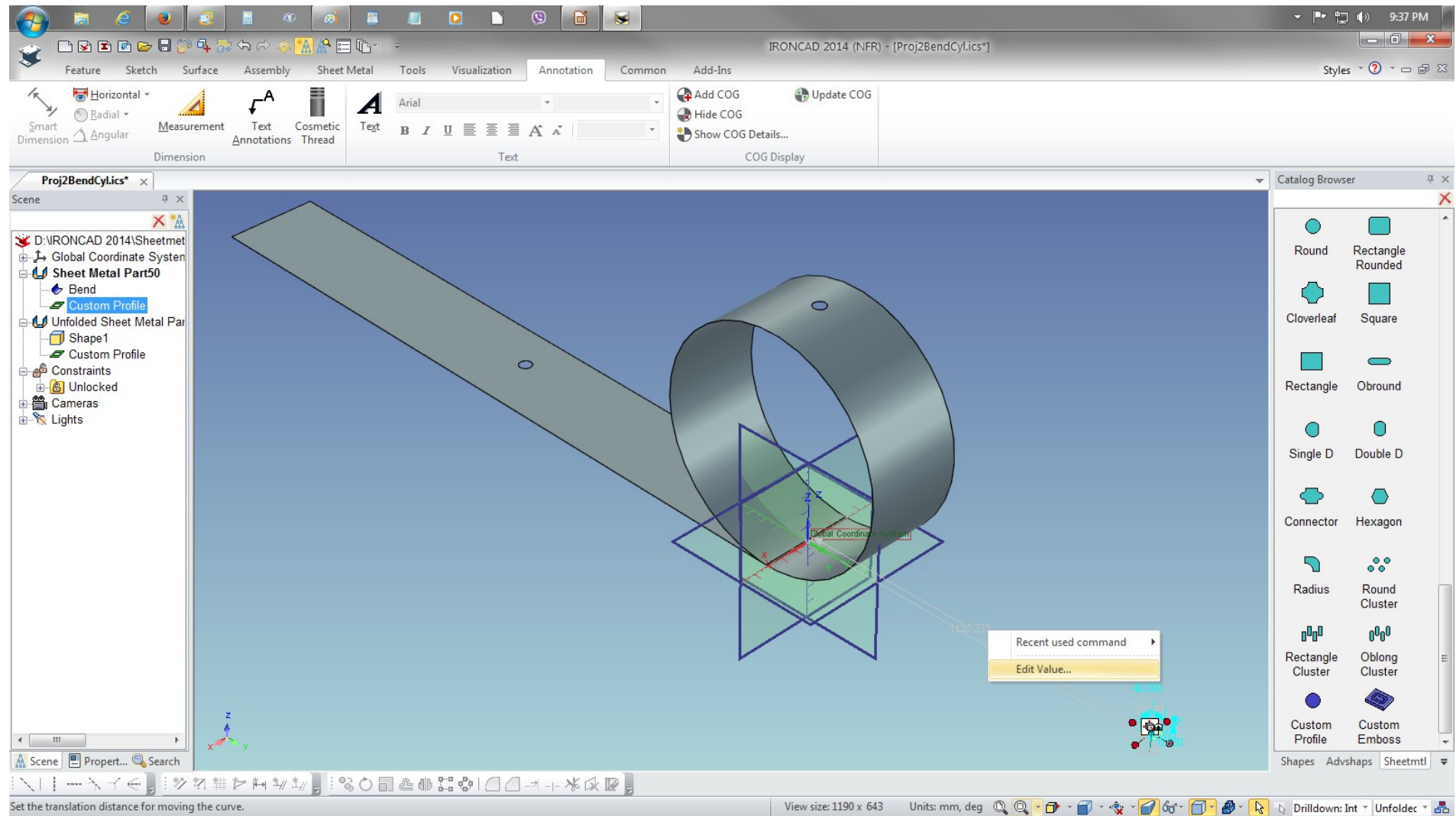
Unfolded (unrolled), the flat sheet displays the hole on the center of the length but not on the center of the width.



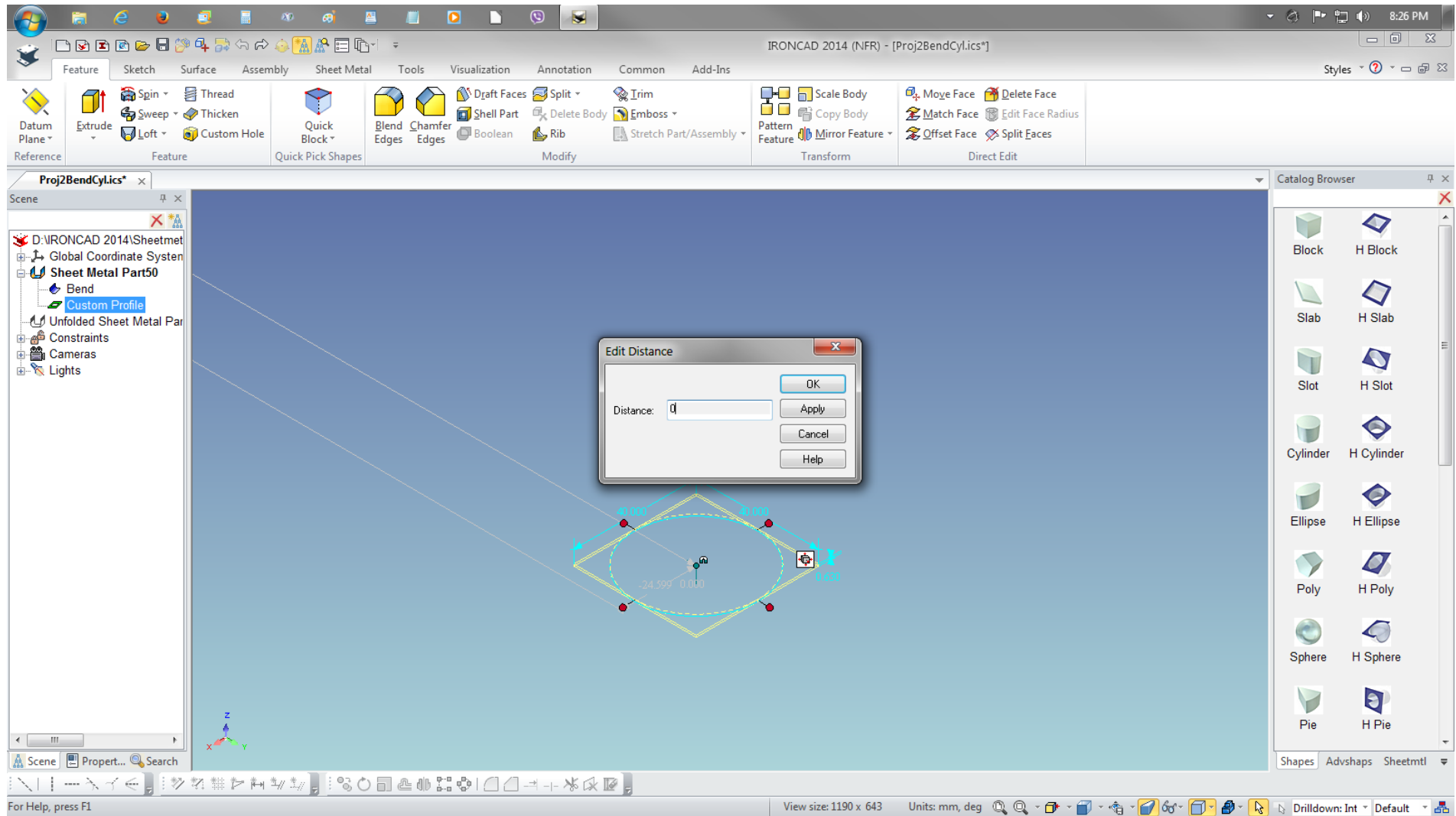
Both Sheet Metal Part and Unfolded Sheet Metal Part are both displayed.



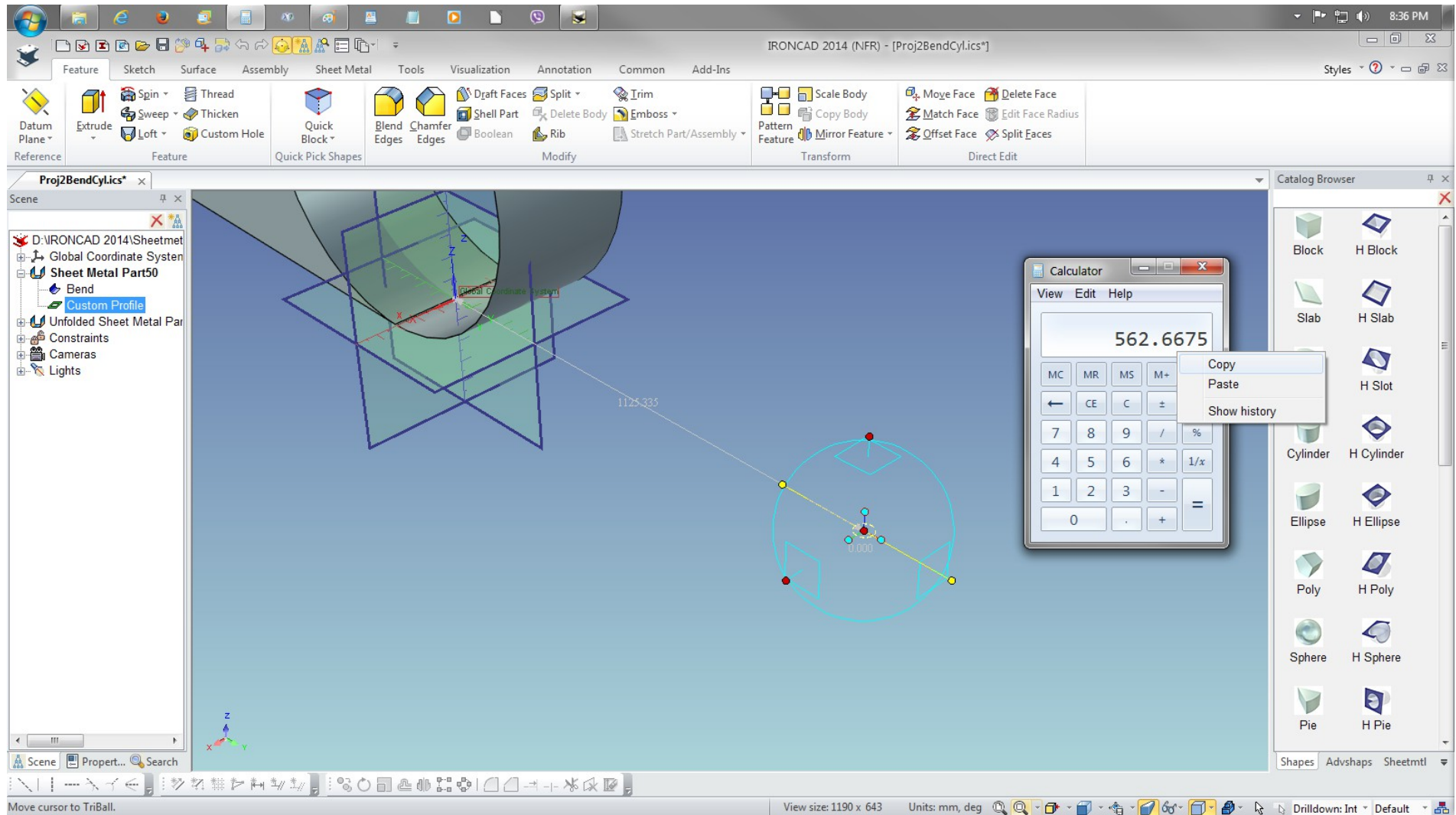
LMB select the Custom Profile and RMB click to position to the center of the width.



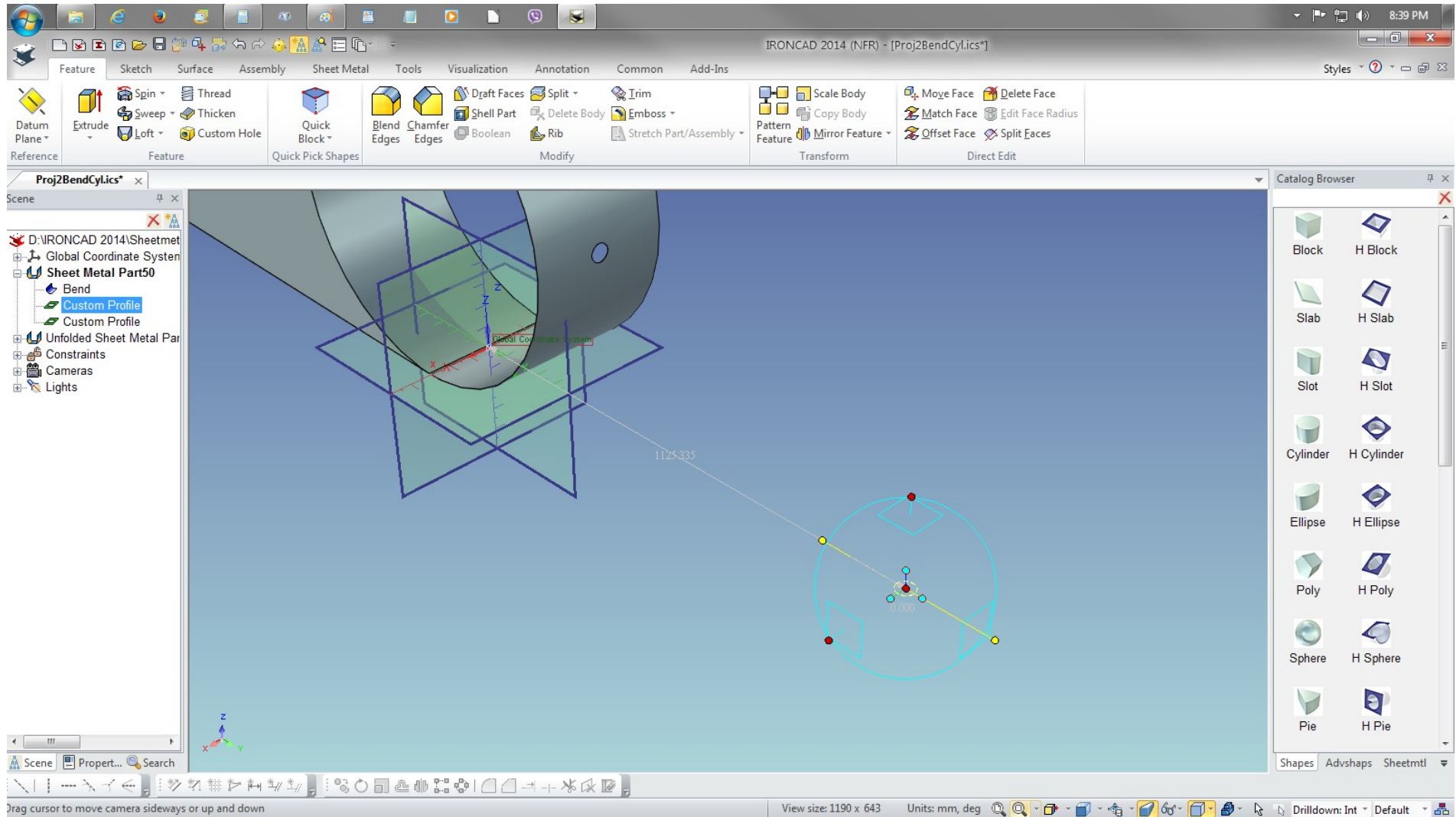
Set the Distance to 0.



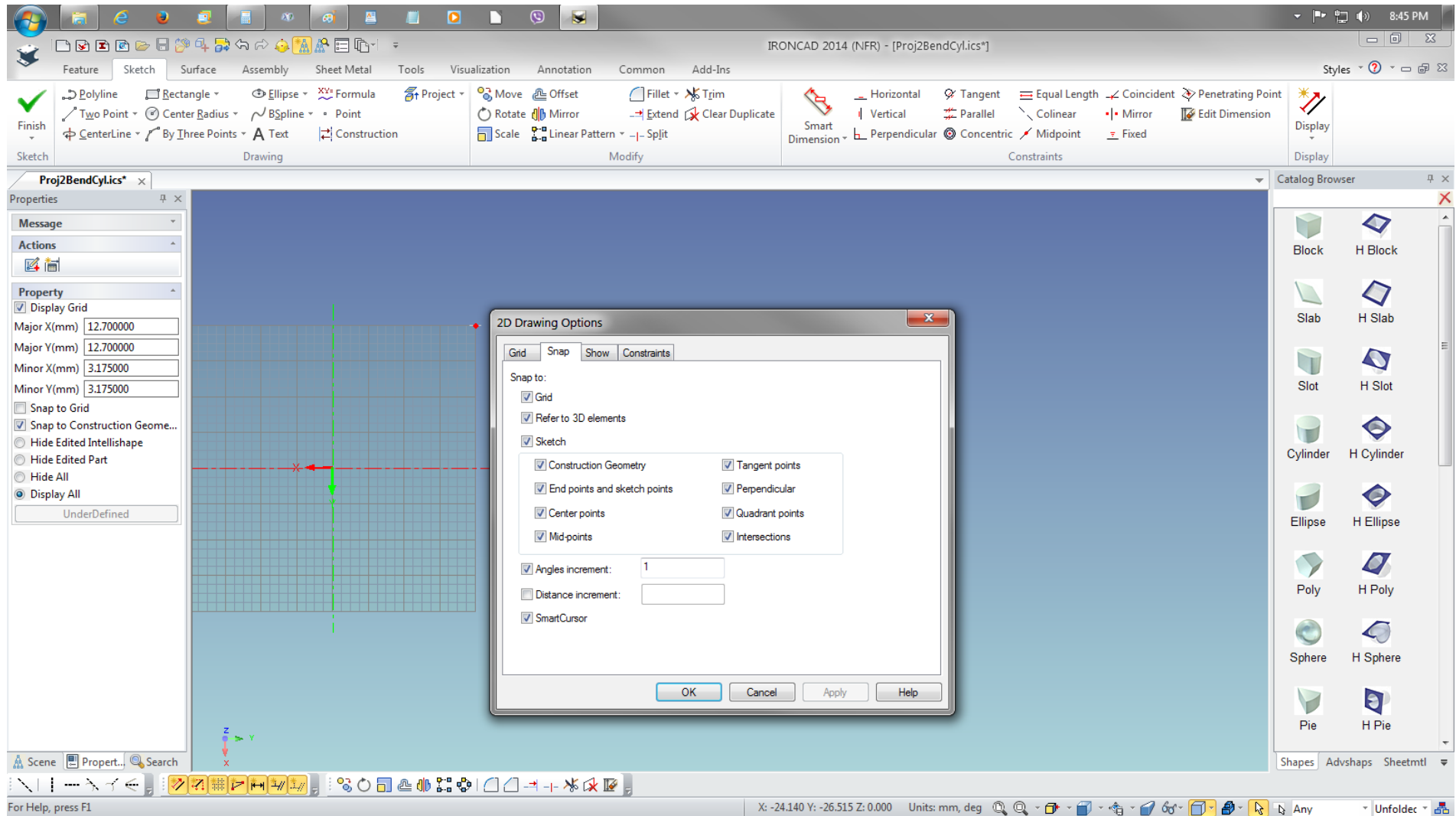
Use the TriBall to copy and position the Custom Profile between the center an on the edge.



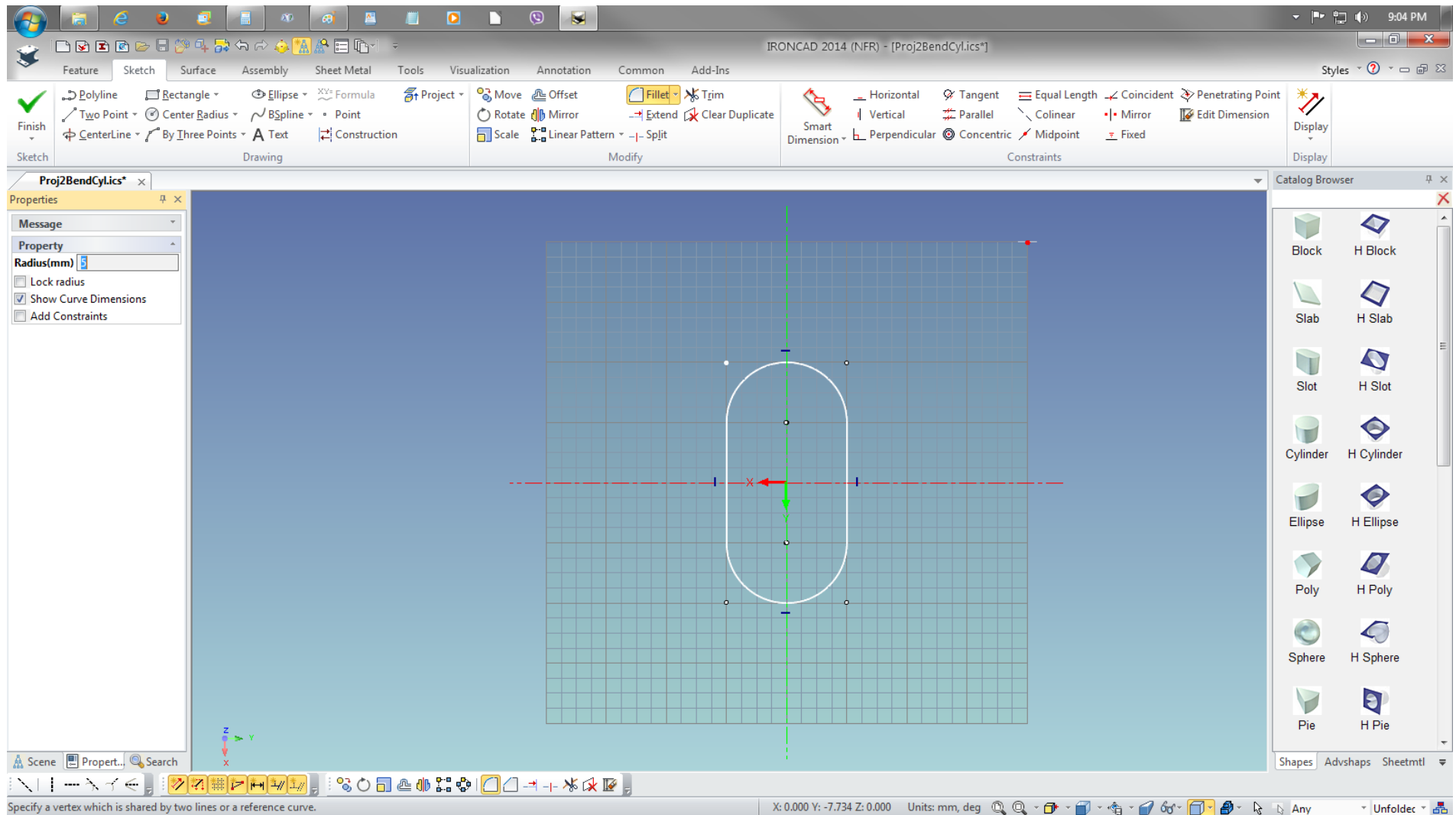
Displayed is the copy of the Custom Profile. Deactivate the TriBall (F10) and LMB select the second Custom Profile IntelliShape from the Scene browser and RMB click to Edit Cross-Section to change the shape of the default Custom Profile.



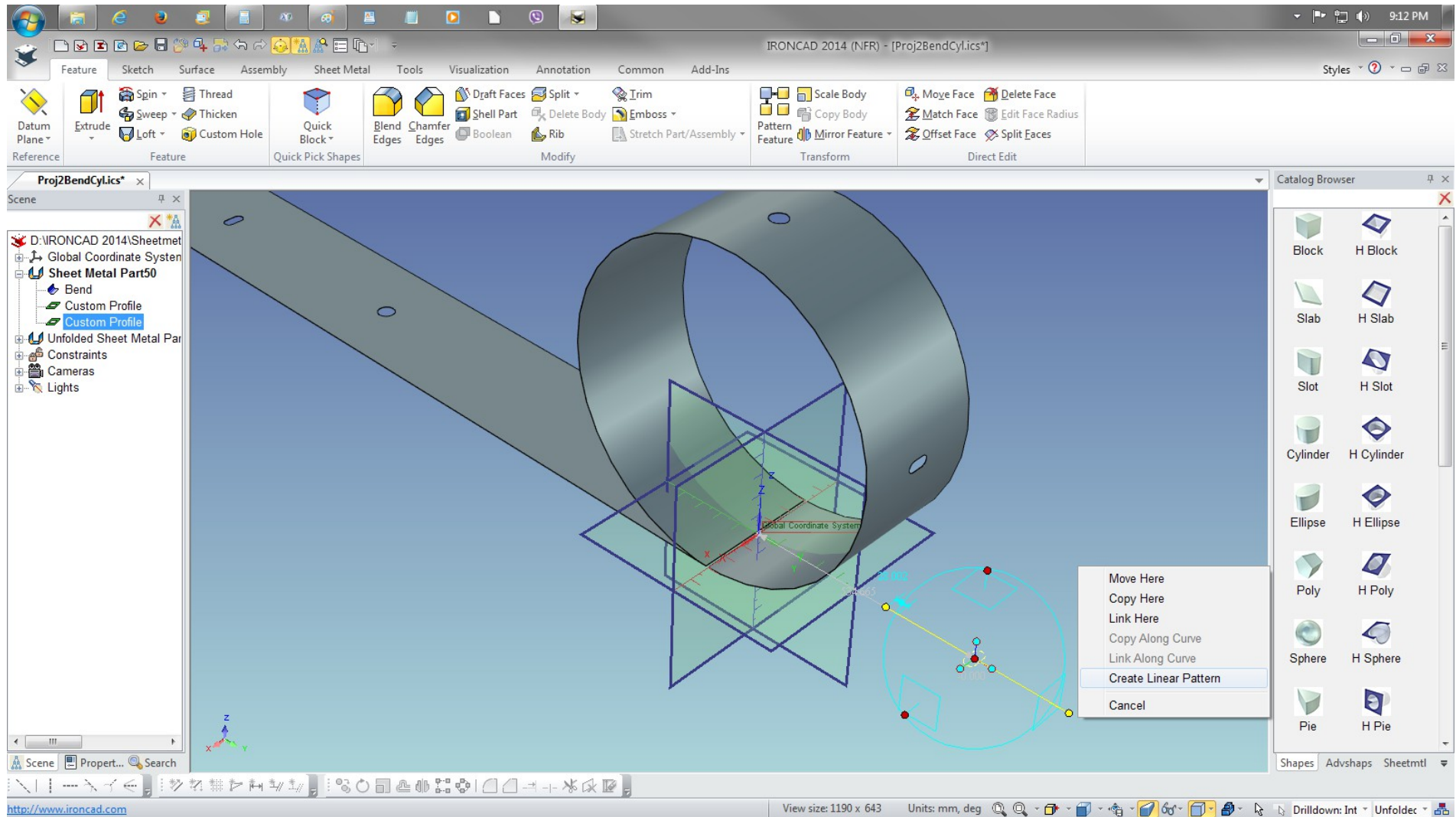
Zoom to view the Cross-Section grid, RMB click to select Snap features.



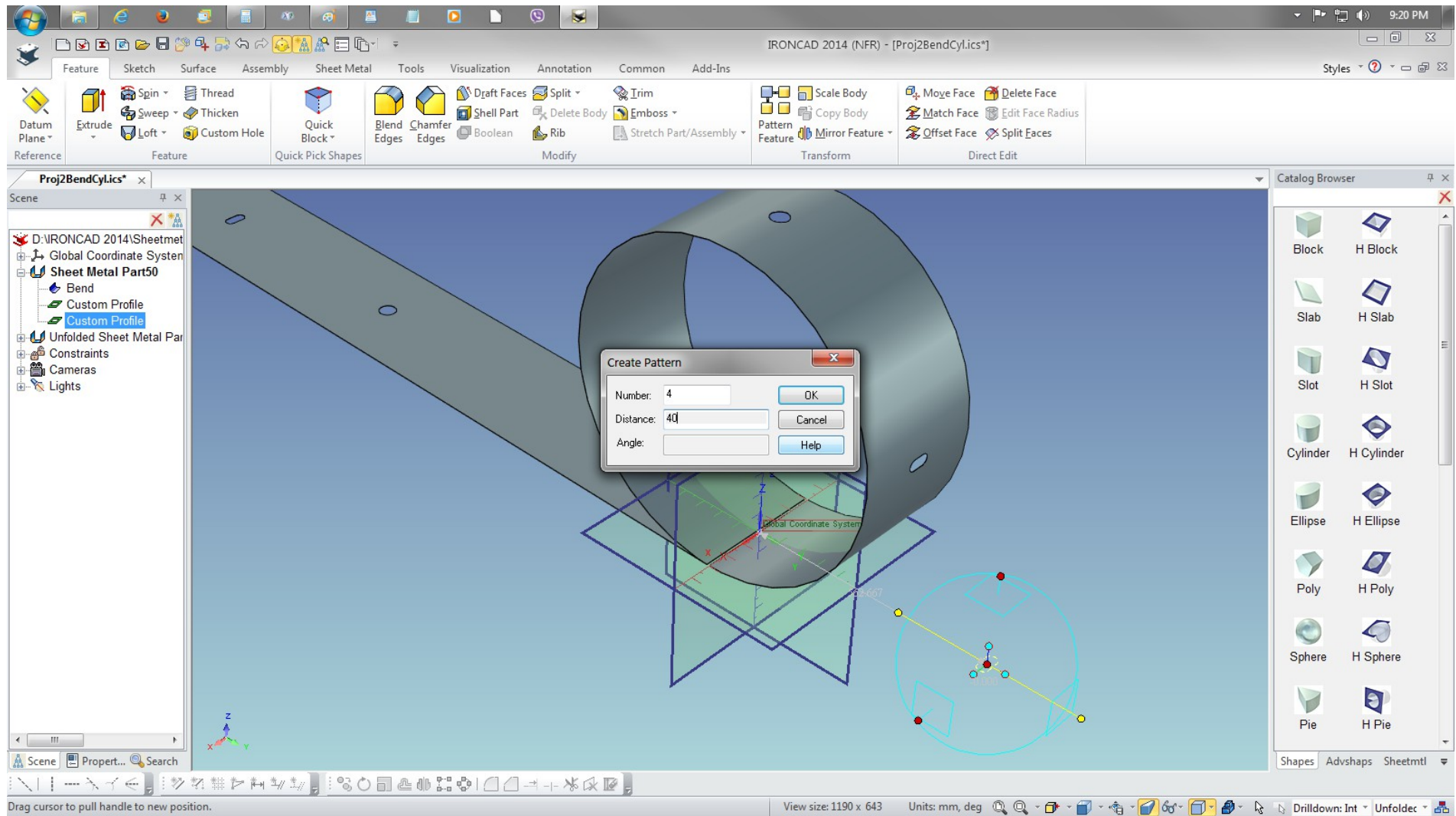
Delete the existing circle 2D drawing and replace with a vertical drawn rectangle. Deselect the Rectangle drawing tool and LMB depress and select the rectangle drawing and apply the fillet to produce the slot. You may use the Construction Line as guide if you require are to draw a non-symmetrical drawing.



The slot shape Custom Profile is now shown on both parts. Select this Custom Profile again and press F10 to activate the TriBall. RMB click the y axis handle to display TriBall options and Select Linear Pattern for this slot.



On the Create Pattern, enter the required values and click OK.



You can use Smart Dimension to check the positions of the Custom Profile the flat sheet and change position by selecting the Custom Profile or Pattern 4 from the Scene browser the using the TriBall. The Custom Profile objects and Smart Dimension will be updated on the flat sheet when set to refold/unfold operation.

