

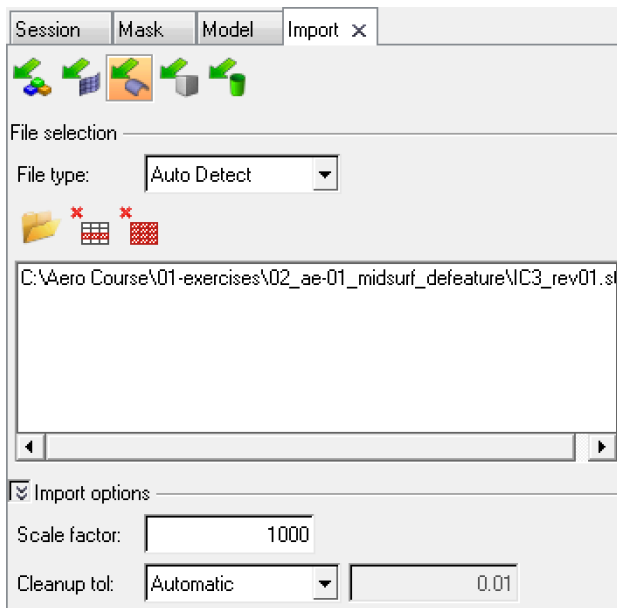
Midsurface and De-feature

A part shall be replaced in the main model, by a new version of the structure (rev01). This new geometry comes as solid geometry in step-format. In a first step it will be extracted to a midsurface, then the geometry will be simplified. In a next tutorial the part will be meshed.

Step 1: Import Geometry with Scaling

The Geometry was modeled in meters, on import the scaling factor is used to scale it to mm.

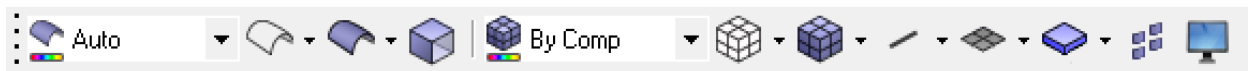
1. Import the file into a new, empty model: **File > New > Model**.
2. **File > Import > Geometry**: Select **IC3_rev01.stp**, set the **Scale factor (1)** to **1,000**.



3. Click **Import** to import the model.

Step 2: View Geometry colored by Topology, Comps, and Mixed


1. In Visualization Toolbar (**View > Toolbars > HyperMesh > Visualization**), switch to **Shaded View**.
2. Use **Geometry Display Mode** to view geometry in modes **By Topo**, **By Comp**, and **Mixed**.



Step 3: Create and Review Midsurface

1. Open the **Midsurface** panel using **Geometry > Create > Midsurfaces > Auto**.
2. With the selector button on **surfs**, click on one surface in the display (see that all surfaces are automatically selected)
3. Click **extract** to extract the midsurface.

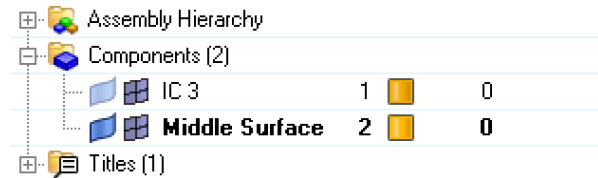
The newly created midsurface is sorted into a new component collector (Middle Surface) by default and the collector with original geometry is turned to transparent. The Transparency

button  can be used to increase transparency and check visually that the midsurface was created correctly.



Step 4: Defeature Pinholes

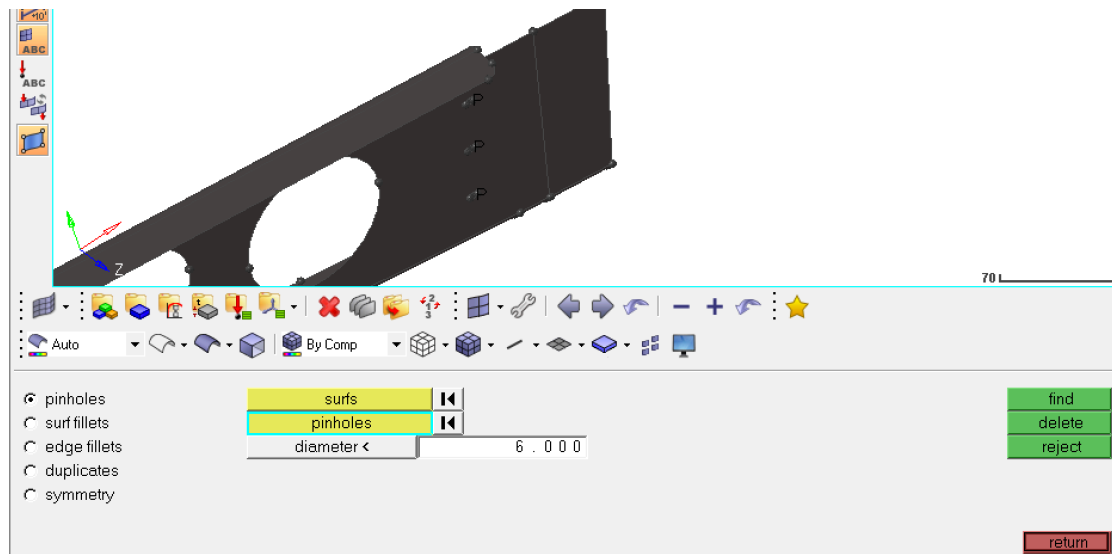
1. Turn off geometry display of the **IC 3** component.



The defeaturing functionalities shown in steps 4, 5 and 6 work in two steps. The first step is to select the surfaces which you want to check for features. In the second step, the features that were found are selected and can be removed. Before removing you can still deselect features that you want to keep or select additional features.

2. Open the **Defeature** panel using **Geometry > Defeature > Pinholes**.
3. Select all surfaces of the **Middle Surface** collector.
4. Enter 6.0 for the diameter.
5. Click **find** to find the holes with a diameter less than 6.

Note that the three small holes are found and marked with a P.



6. Remove these holes by clicking the **delete** button.

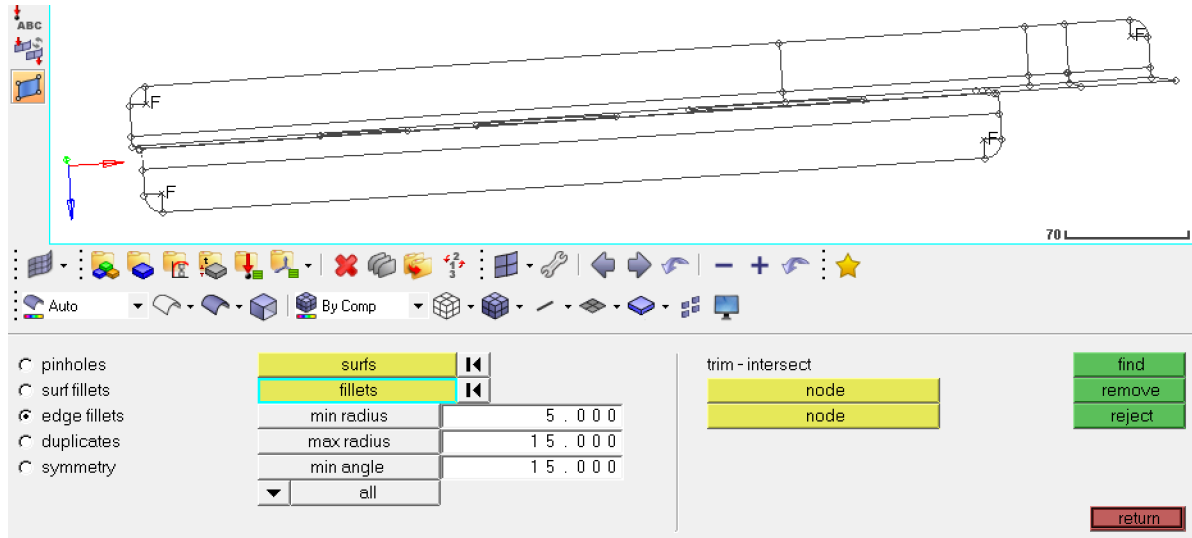
Note that a fixed point remains in the center of each hole.

Step 5: Defeature Edge Fillets

1. Select the **edge fillets** sup-panel.
2. In the left column of the panel, select **all** surfaces of the **Middle Surface** collector.
3. Enter 15.0 for **max radius**.
4. Click **find** to locate the edge fillets with a radius under 15.

Note that four edge fillets are marked with an F.

- Switch to wireframe display of the geometry so that the symbols are not hidden behind surface shading.

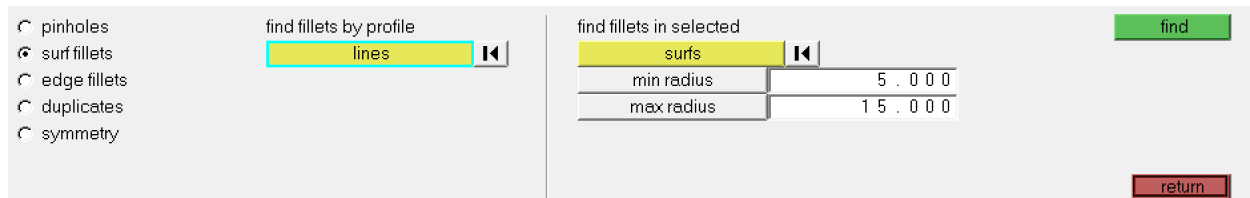


- Click **remove** to delete the marked edge fillets.

Note that fixed points remain at the tangent end of each edge fillet.

Step 6: Defeature Surface Fillets

- Select the **surf fillets** sub-panel to open it.
- In the right column of the panel, select **all** surfaces of the Middle Surface collector.
- Leave **min** and **max radius** at 5.0 and 15.0 respectively.



- Click **find** to find the fillets with a minimum radius of 5 and a maximum radius of 15.

Note that the panel switches to a next stage, where you could select or deselect fillets that were found or not found and give more details for detection of fillets in case removal does not show the desired result.

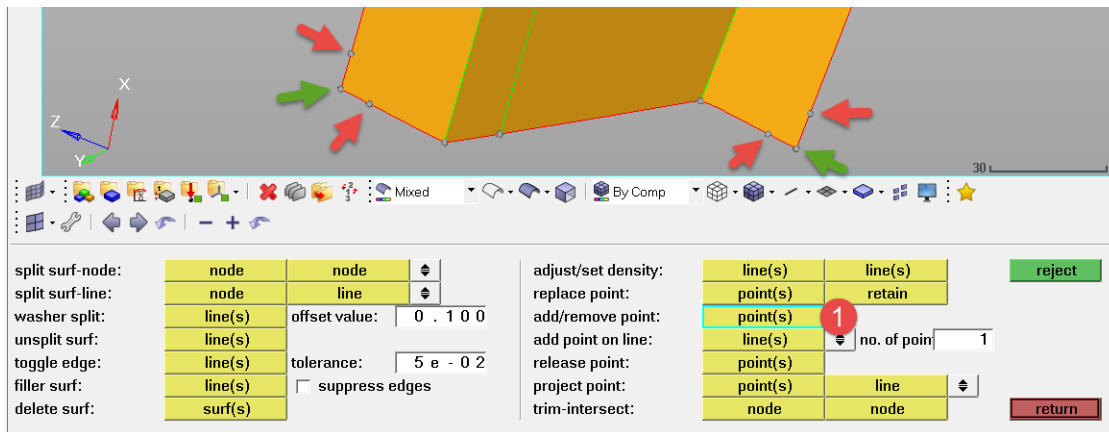
- Click **remove** to delete the marked surface fillets and extend the attached surfaces to their imaginary tangential intersection edge.

Step 7: Remove fixed points

By removing the edge fillets in step 5, fixed points were placed at the tangent end of the original fillets. Now they can be removed but keeps the fixed point at the corner—the latter makes sure a node will be placed in that corner when meshing the surface.

- Open the **Quick Edit** panel using **Geometry > Quick Edit (F11)**.
- Activate the **add/remove point:** function by clicking the yellow **point(s)** button.

Now you can add fixed points by clicking the LMB and remove the points with the RMB. For removing the points, you may also hold the SHIFT button down and draw a window with the RMB over the points to be removed.



Step 8: Save the model