Ansys Fluent Getting Started
(New Fluent Experience)

Workshop: Named Selections and BOIs

Release 2021 R1

Overview

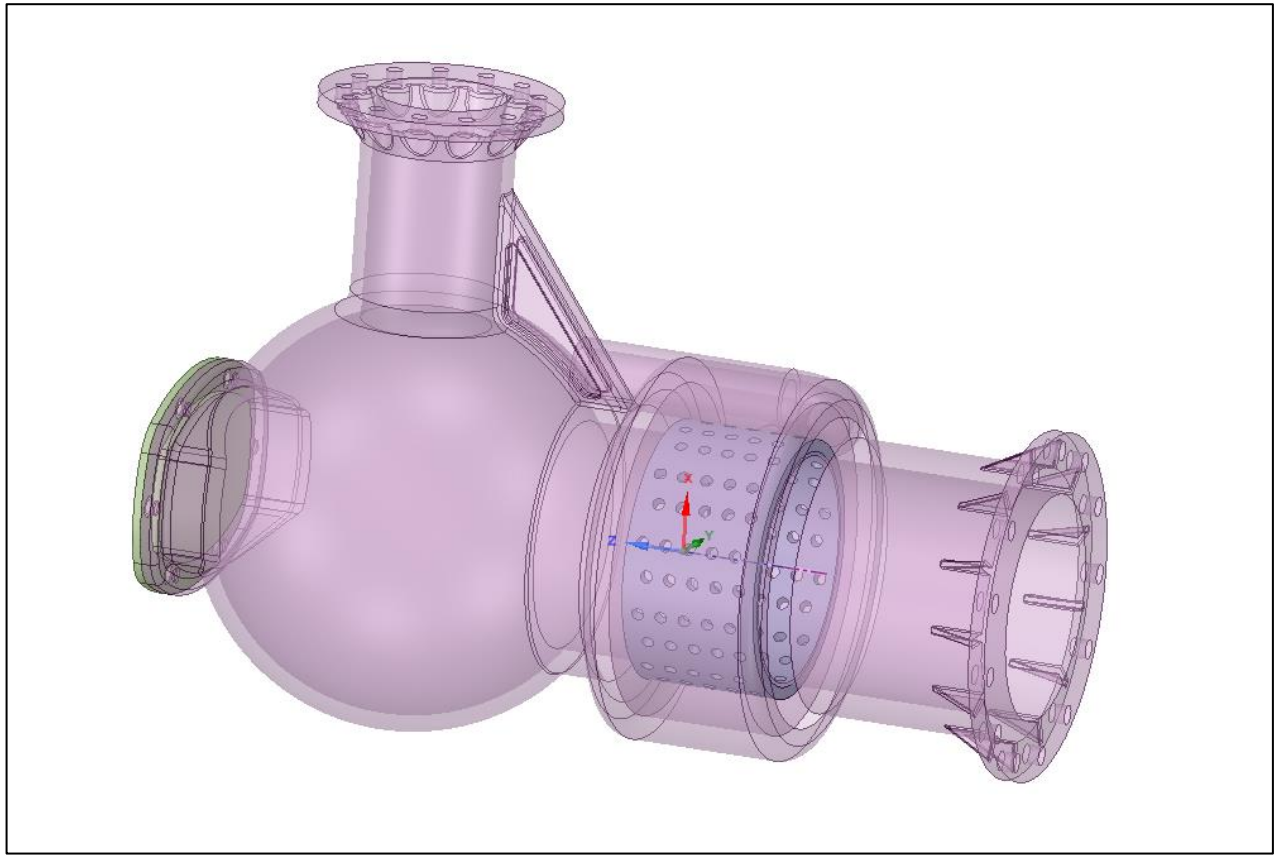
- Completion of this workshop involves:
  - Creation of Named Selections
  - Creation of a BOI to control the mesh in FLUENT Meshing

Objectives

- Goals:
  - Create named selections
  - Create a BOI
  - Share topology for the geometry parts while excluding the BOI from being shared

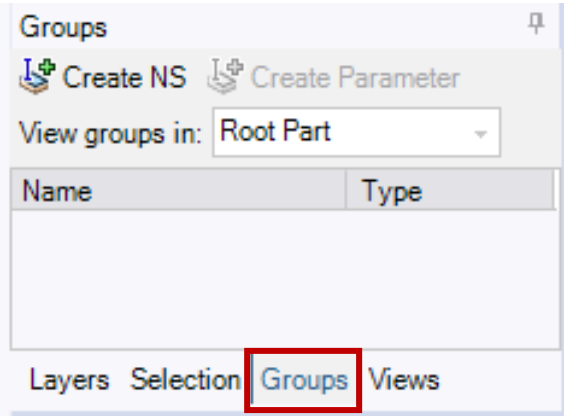
Importing the Geometry

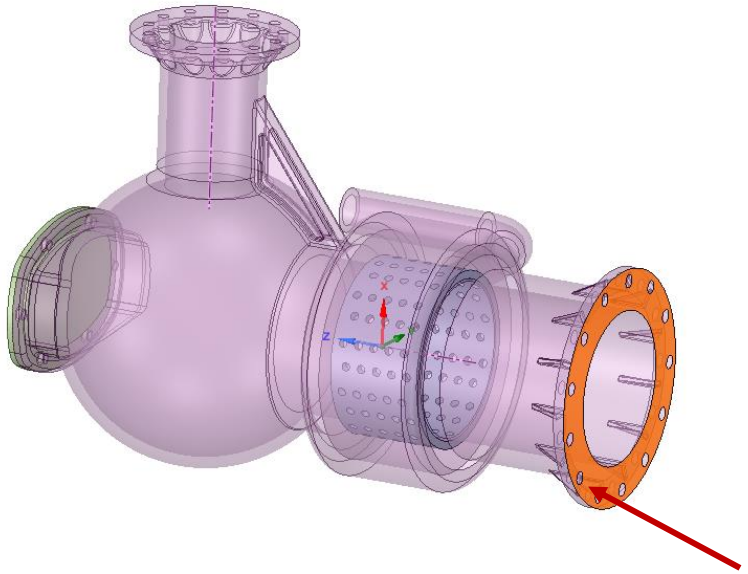
- Opening Document
  - Open mixer-orig.scdoc from the workshop input files

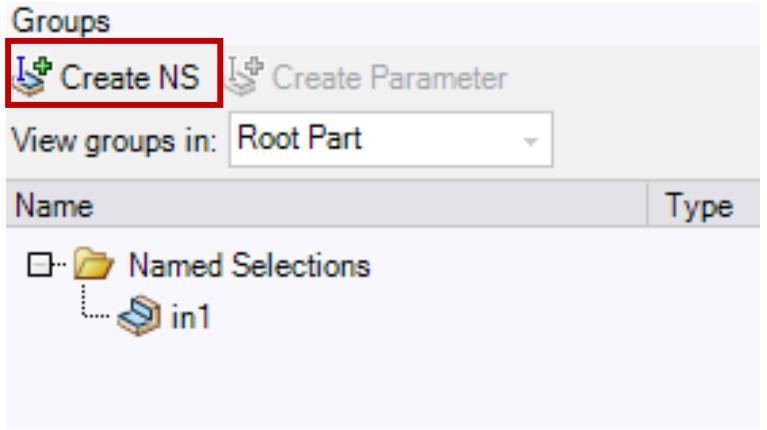


Creating Named Selections (1)

- Groups Panel
  - Under the structure tree (left side) there are a few tabs of which Groups is one
  - Click the Groups tab to switch to that panel
  - Select the annular surface at the low Z end of the geometry as shown
  - Click the Create NS button on the Groups panel and enter in1 for the name. This will create in1 in the Named Selections folder.
  - Named selections will be transferred with the geometry to FLUENT Meshing as labels

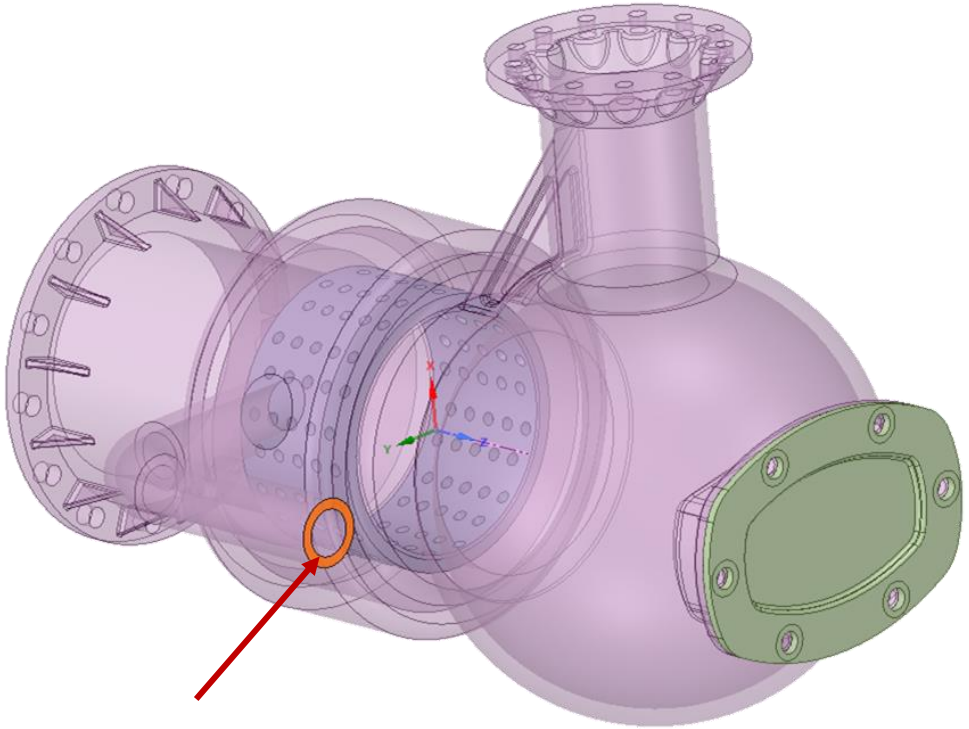


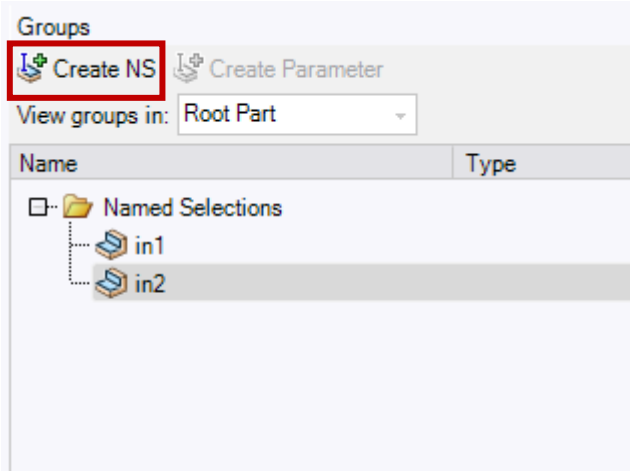




Creating Named Selections (2)

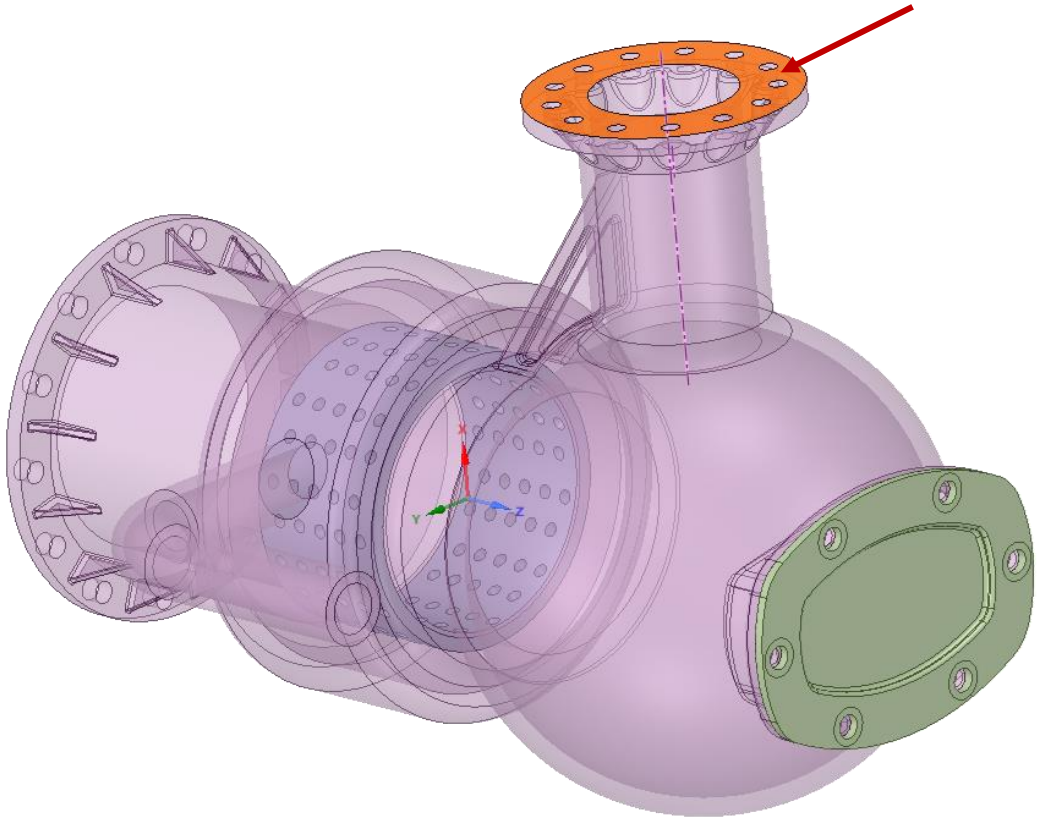
- Groups Panel
  - Rotate the model so that you can clearly see the elbow that enters on the high y side of the geometry
  - Select the annular surface at the high Z end of the elbow as shown
  - Click the Create NS button on the Groups panel and enter in2 for the name.

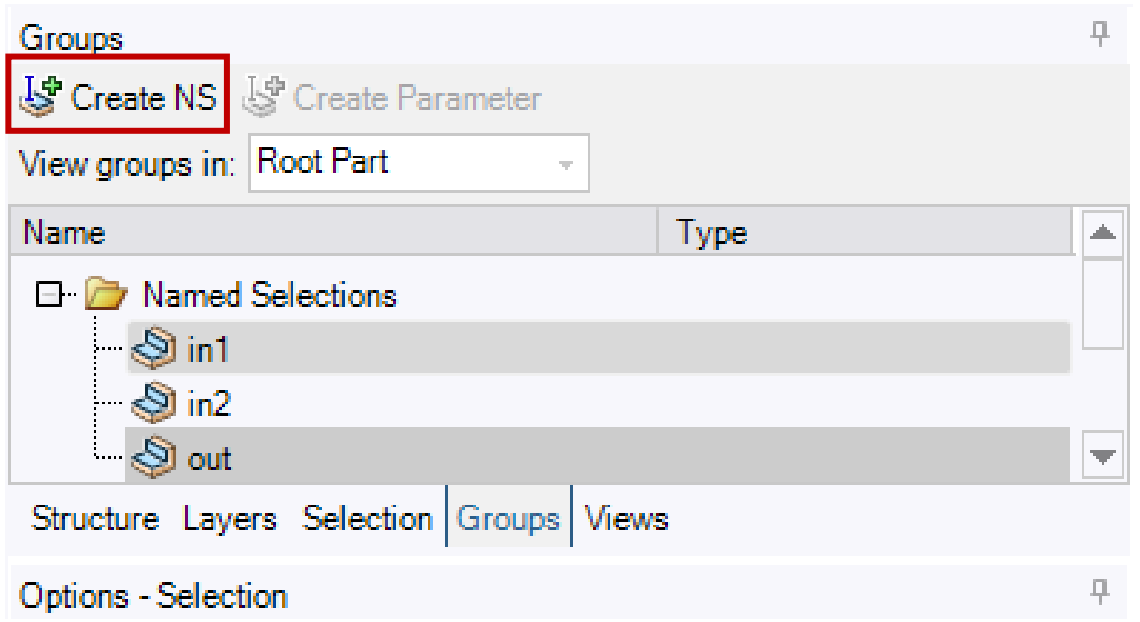




Creating Named Selections (3)

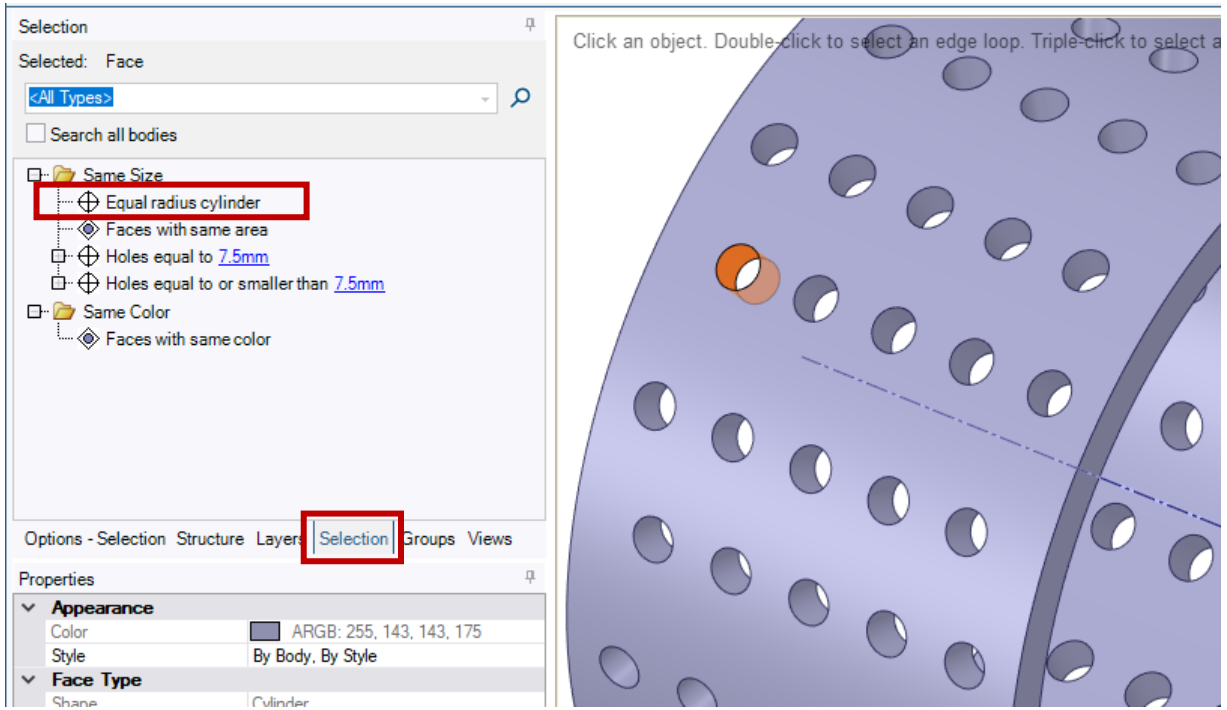
- Groups Panel
  - Select the annular surface at the top (high X) of the geometry as shown
  - Click the Create NS button on the Groups panel and enter out for the name.
  - The three named selections you created will be used to create flow boundaries in FLUENT

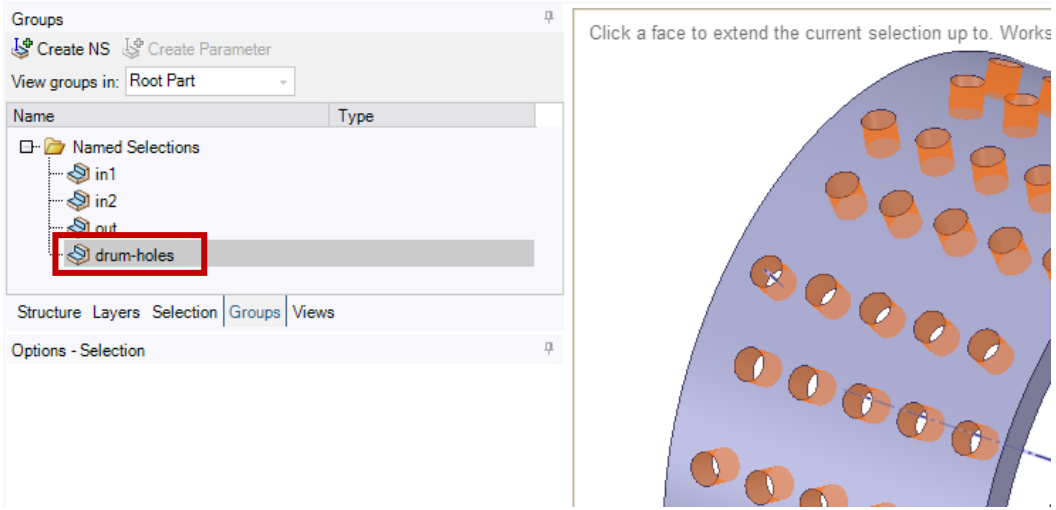




Creating Named Selection for a Mesh Control

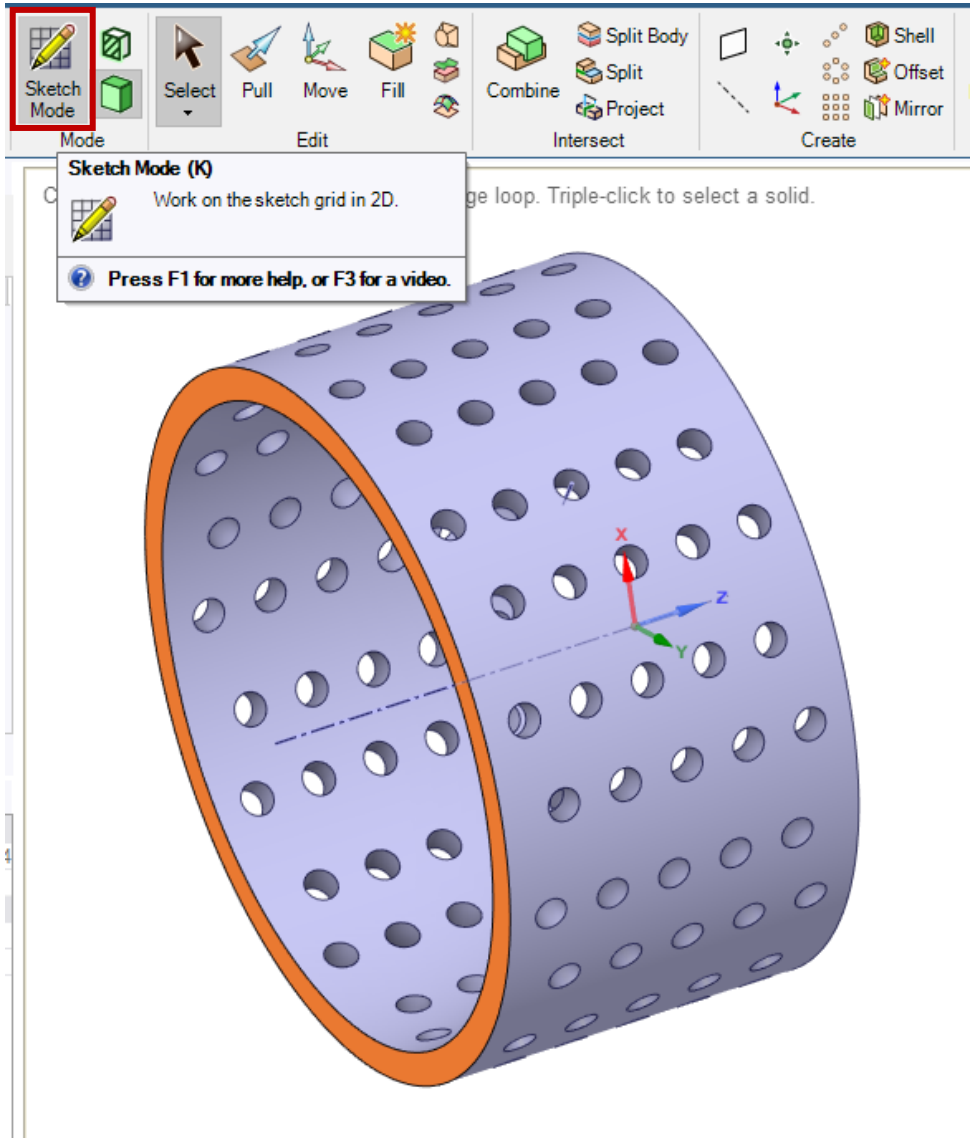
- You can also used Named Selections in FLUENT Meshing as labels to assign local mesh sizings
  - Hide the lock and mixer bodies leaving just the drum body visible (Structure tab)
  - Select one of the drum holes. Then switch to the Selection tab and select Equal radius cylinder. This should select all the holes
  - Switch back to the Groups tab and select Create NS and enter the name drum-holes





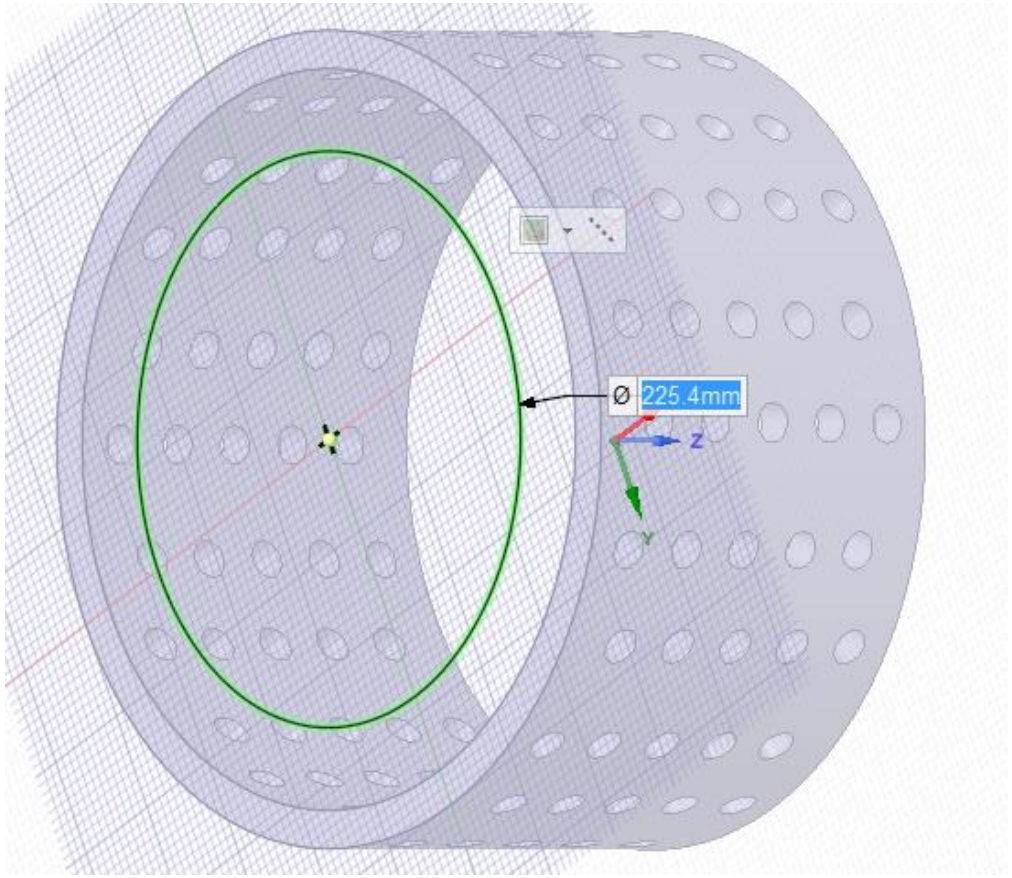
Creating a Body of Influence (1)

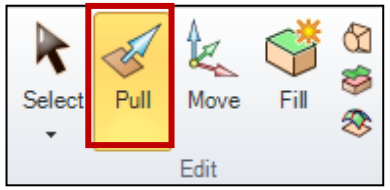
- You can create bodies in SpaceClaim that are not part of the structure but rather serve as a region to define a local mesh size. These are called Bodies of Influence.
- You will create a cylinder inside and extending beyond the drum region to refine the mesh where the two inlet streams meet and mix
  - Hide the lock and mixer leaving only the drum visible. Make sure you are on the Design Tab and select the annular face at the low Z end of the drum as shown
  - Select the icon to switch to Sketch Mode

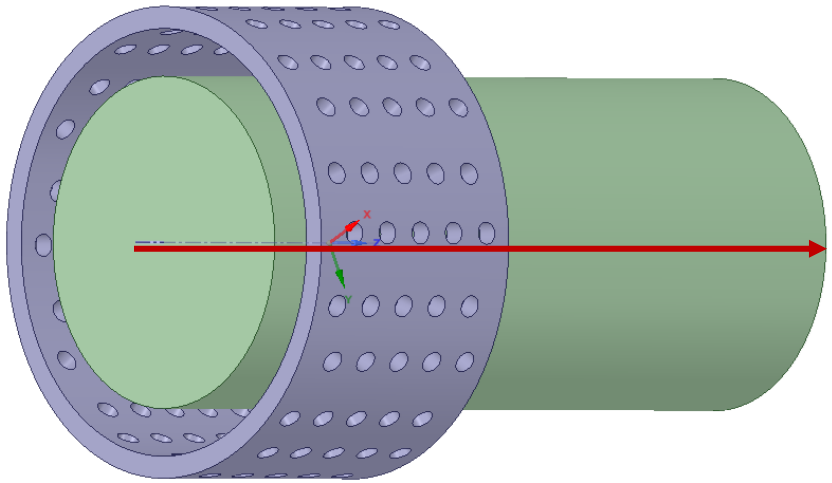


Creating a Body of Influence (3)

- Click the icon to draw a circle
  - Center the circle at the center of the plane and give it a diameter of 225.4 mm.
  - End sketch editing and activate the Pull tool
  - Select the round surface on the left side of the part
  - Pull the circular surface you created for 500 mm in the +Z direction



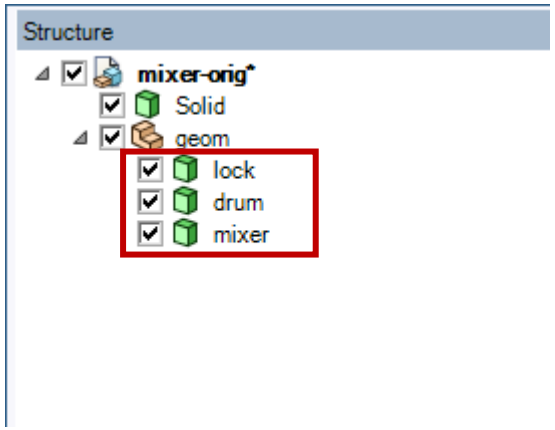




500 mm

Shared Topology Considerations for BOIs

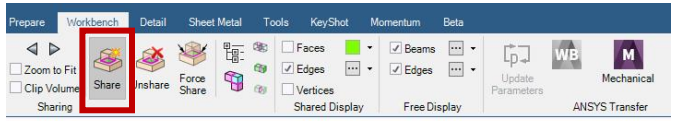
- When a model is being prepared for use in the Watertight Geometry Workflow in ANSYS Fluent
  - Bodies used as BOIs, such as the newly created “Solid”, must not share topology with any other bodies in the model
  - For assemblies such as this one which include multi-body parts, Share Topology should be performed before importing in ANSYS Fluent (next page)
  - For models which include BOIs *and* multi-body parts
    - The BOI bodies must be excluded from the Share Topology operation
    - The recommended procedure is to place all BOI bodies in the uppermost assembly as independent parts and place all other parts in a separate component
      - In this case these are “lock”, “drum” and “mixer”, which are located in their own component (here “geom” but any name will work)
      - Full details are given in the “FM_Overview” lecture
  - Make all bodies in the “geom” component visible before sharing topology in the next slide

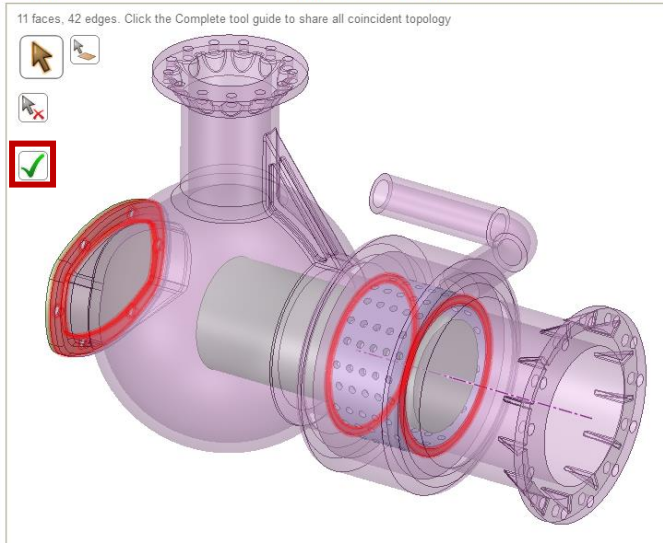


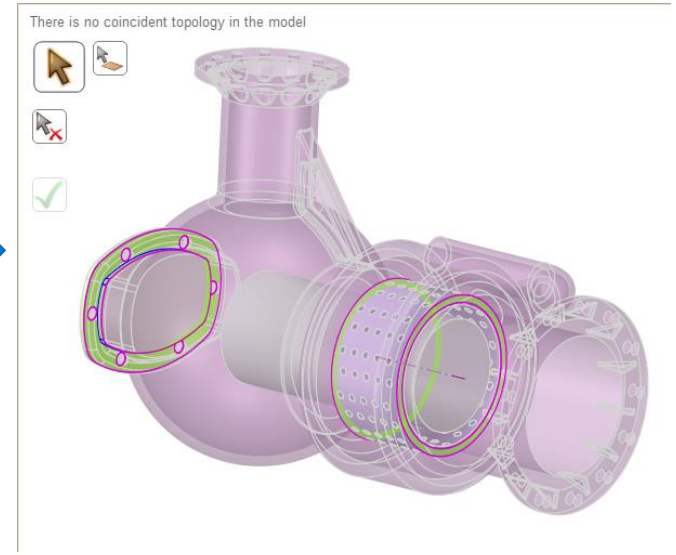
Optional: rename “Solid” to e.g. "boi-body" for easier identification in Fluent

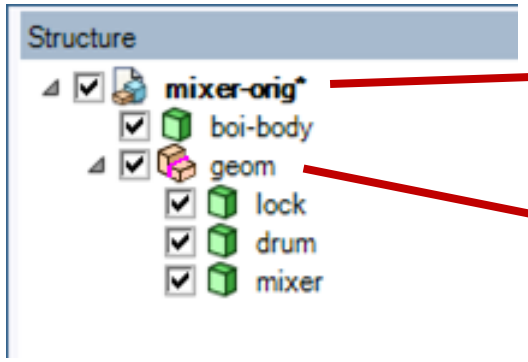
Shared Topology

- Click Share in the Workbench tab
  - Faces to be shared are highlighted in red
- Click the green check mark to complete shared topology
  - Edges of shared topology change color
- Shared topology is indicated by the pink stripe on the “geom” component in the structure tree
  - There should only be a pink stripe on the component, not on the upper level assembly







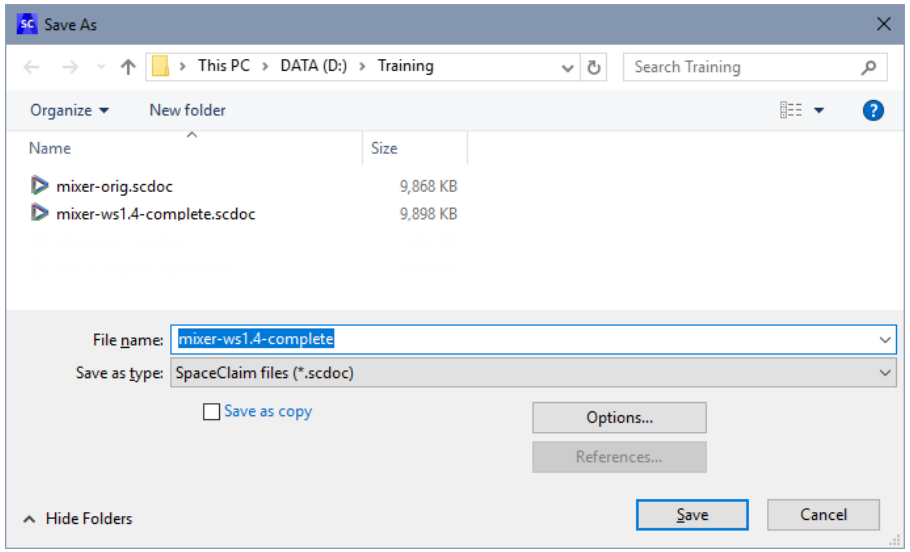


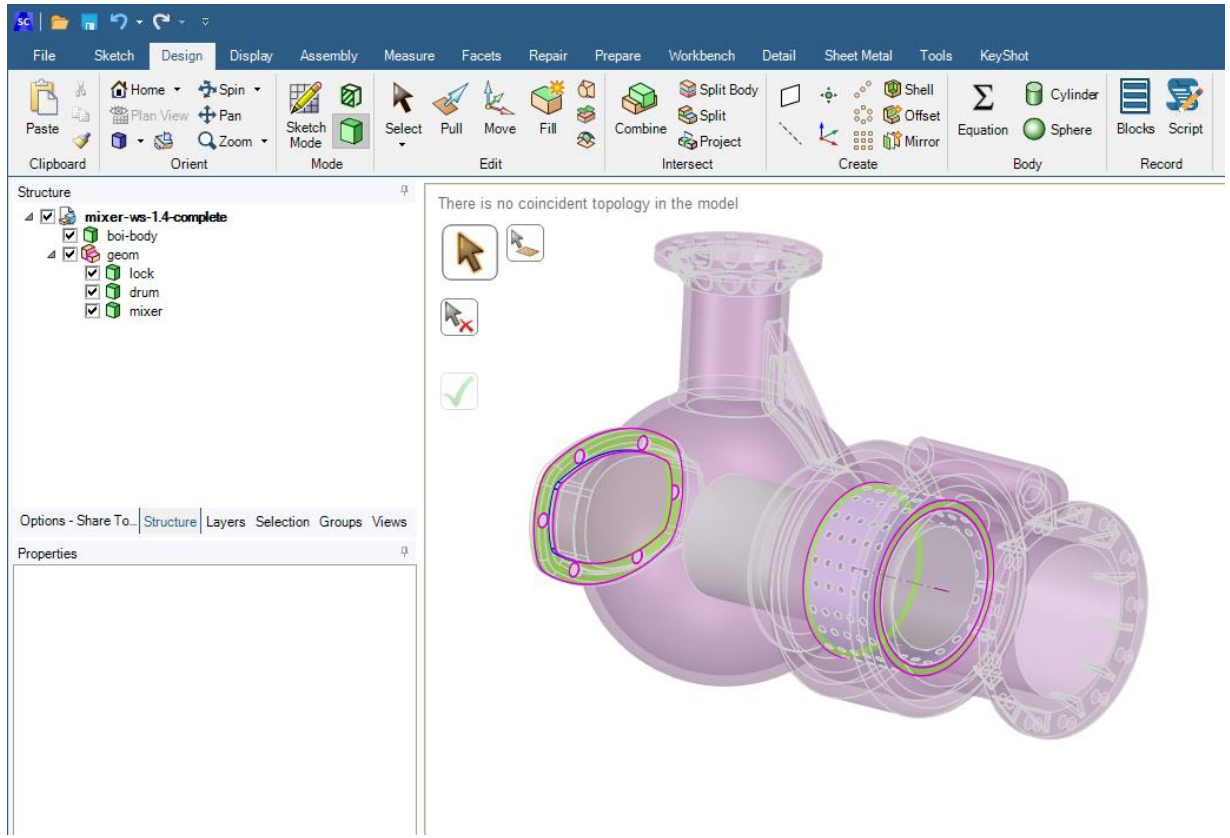
No pink stripe: parts in the assembly, but outside the “geom” component do not have shared topology

Pink stripe: parts under the component have shared topology

Save the Model

- Click File/Save as and save the file as a SpaceClaim file named mixer-ws1.4-complete.scdoc
  - You could use this file as the input for the static mixer workshop in the Fluent section of this course





End of presentation