Ansys Mechanical Getting Started

Module 01 Student Step-by-Step Guide: Introduction

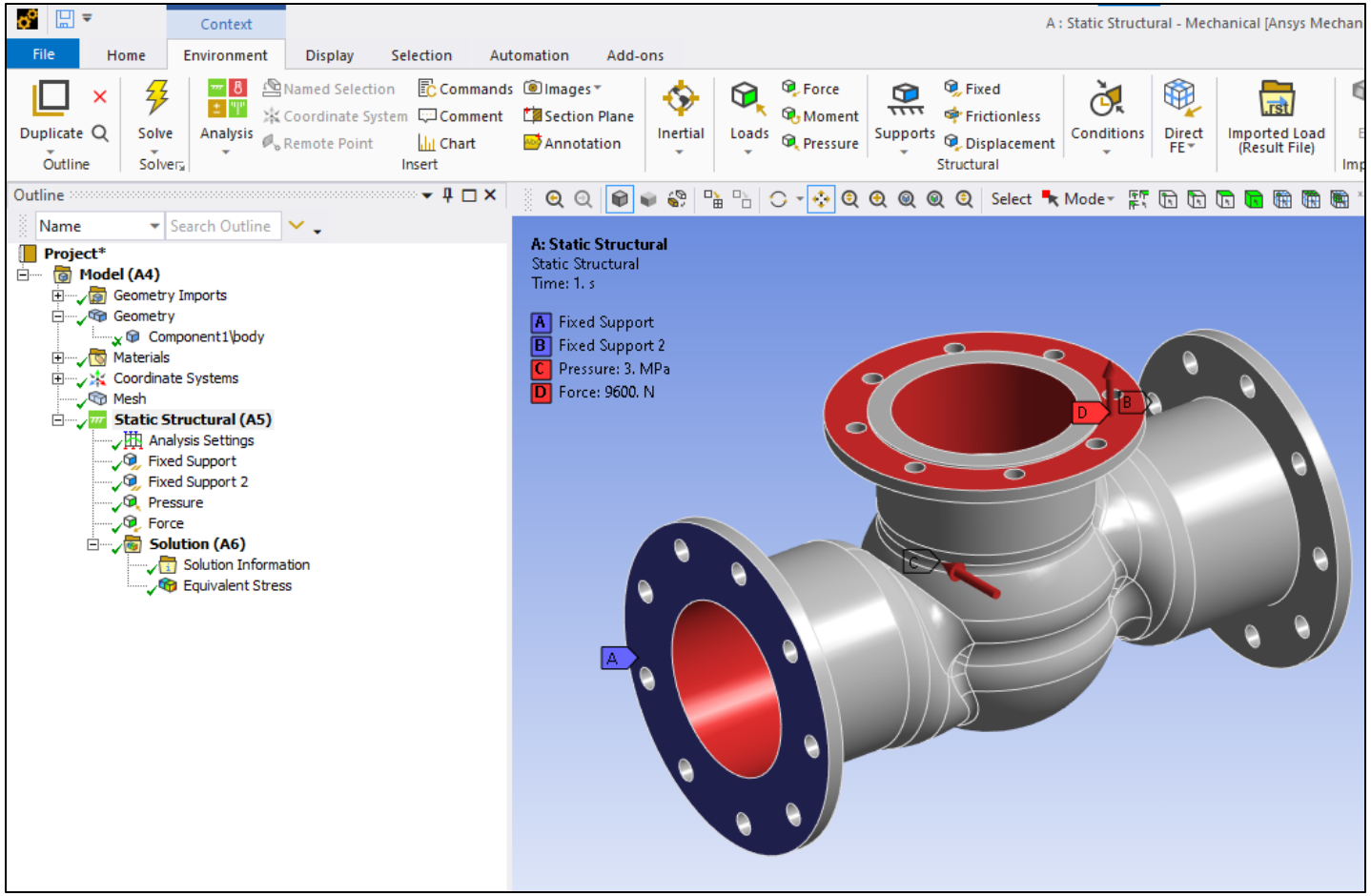
Release 2023 R1

Please note:

- These training materials were developed and tested in Ansys Release 2023 R1. Although they are expected to behave similarly in later releases, this has not been tested and is not guaranteed.
- The screen images included with these training materials may vary from the visual appearance of a local software session.

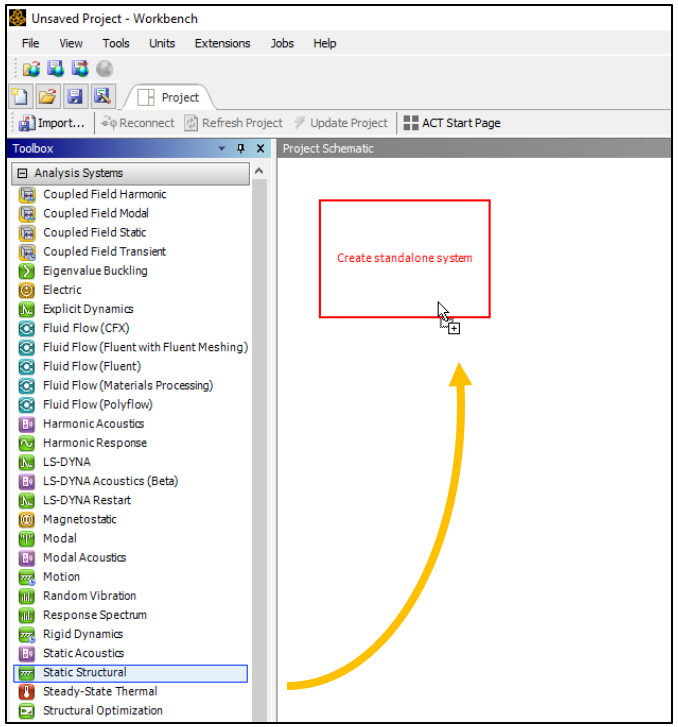
Step-by-Step Guide 01: Introduction

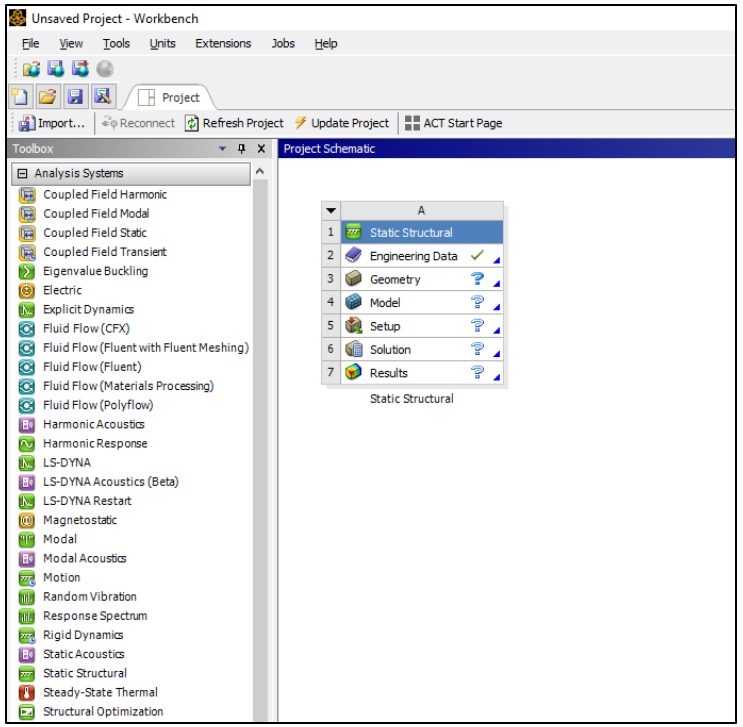
Use this guide to repeat the steps the instructor demonstrated in this module.



Step-by-Step Guide 01: Introduction

- Open ANSYS Workbench: Windows **Start Menu** button → Ansys → Workbench
- Under the Toolbox **Analysis Systems** category, click and drag analysis system **Static Structural** onto the Project Schematic, drop it on target **Create standalone system** (this will be the only target available)

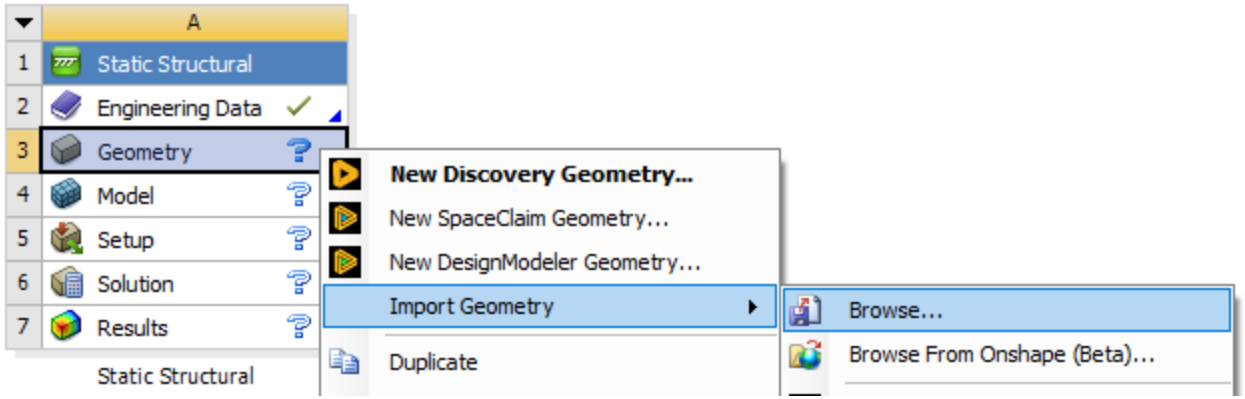


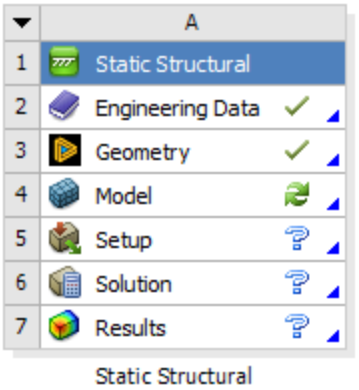


Step-by-Step Guide 01: Introduction

Import valve body geometry:

- **RMB—Geometry → Import Geometry → Browse… → valve_body_demo.scdoc → Open**

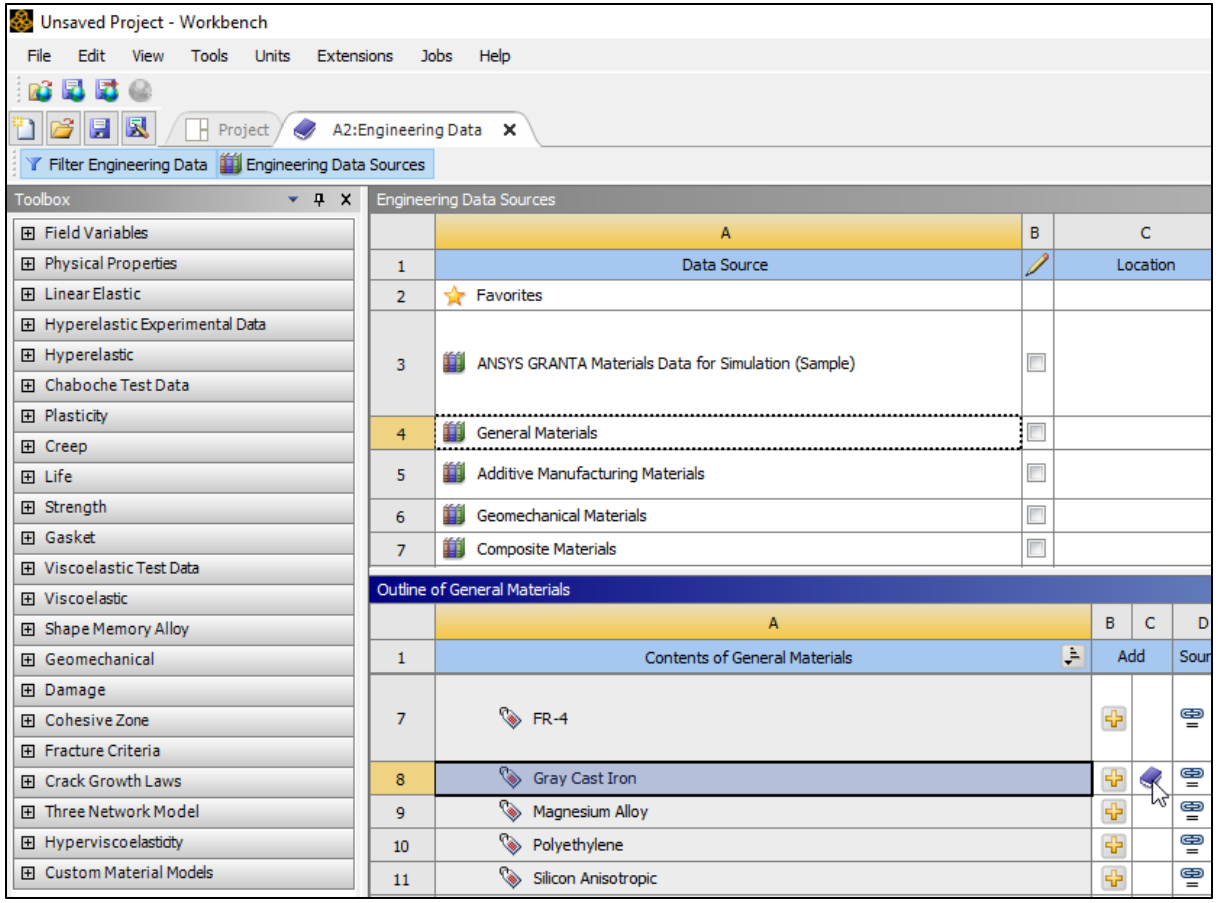




Step-by-Step Guide 01: Introduction

Add Gray Cast Iron to the Engineering Data for this project:

- **RMB—Engineering Data → Edit…**
- Toggle toolbar button **Engineering Data Sources** to “on”
- Click Data Source **General Materials**
- In table **Outline**, click + icon next to **Gray Cast Iron**



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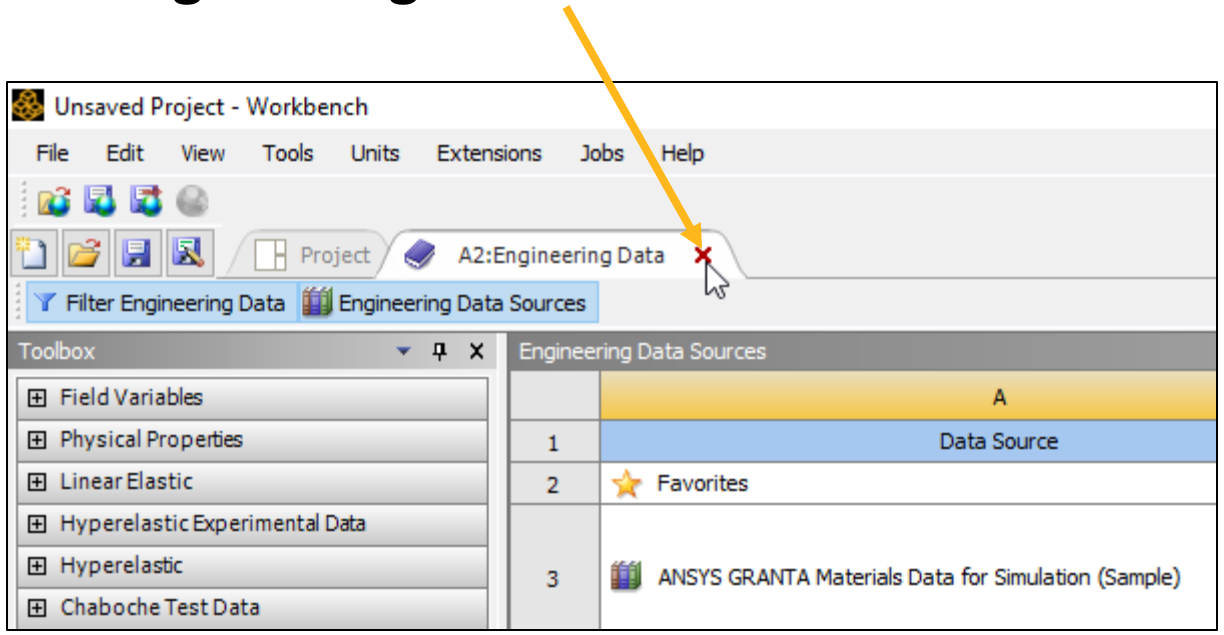
Exit Engineering Data application:

- Toggle toolbar button **Engineering Data Sources** to “off”
- Click small **x** on tab **A2:Engineering Data**



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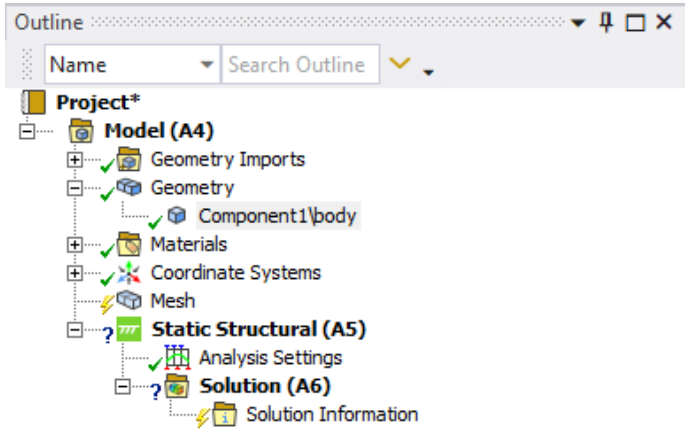
Assign Gray Cast Iron to Valve body:

- **RMB—Model → Edit…**
- Expand branch **Geometry**
- Select branch **Component1\body**
- In view Details, set **Material →Assignment** to **Gray Cast Iron** using drop-down menu



Details of "Component1\body"

Graphics Properties	
Definition	
Suppressed	No
ID (Beta)	21
Stiffness Behavior	Flexible
Coordinate System	Default Coordinate System
Reference Temperature	By Environment
Treatment	None
Material	
Assignment	Gray Cast Iron
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Bounding Box	
Properties	
Statistics	
CAD Attributes	
PartTolerance:	0.00000001
Color:175.143.175	

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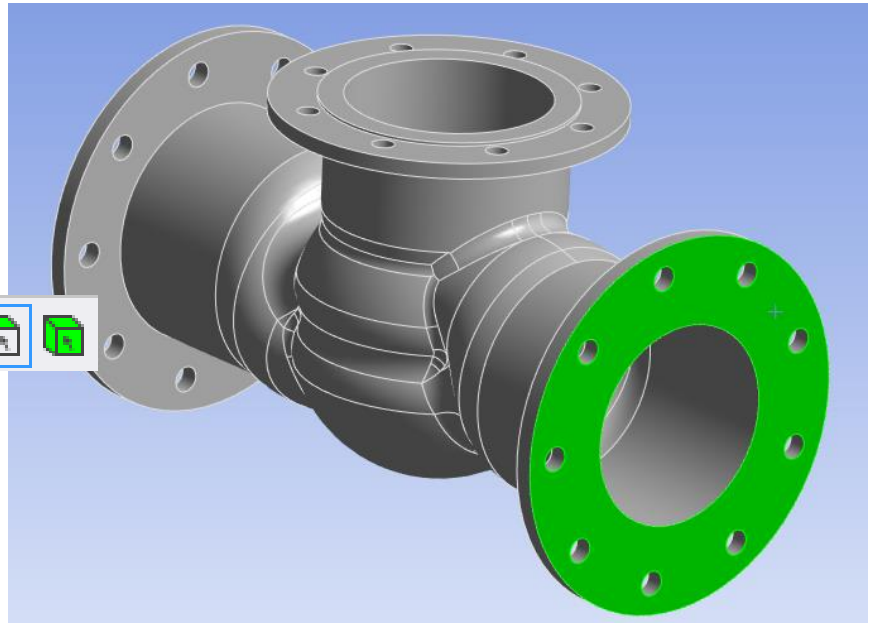
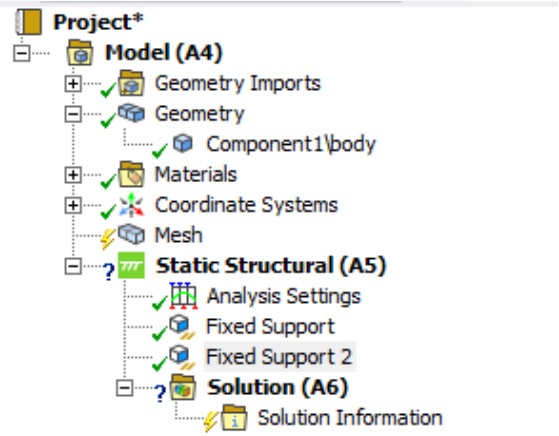
Apply support conditions to Valve body:

- Select branch **Static Structural**
- Select one end flange surface (activate the **Face** filter first if necessary)

- **RMB—Static Structural → Insert → Fixed Support**
- Select the opposite end flange surface
- **RMB—Static Structural → Insert → Fixed Support**





Step-by-Step Guide 01: Introduction

Shortcuts for graphics view control:

Click and drag middle mouse button for rotate
Shift-click and drag middle mouse button for zoom
Ctrl-click and drag middle mouse button for pan
Function key F7 for zoom-to-fit
RMB-Click and drag for window zoom

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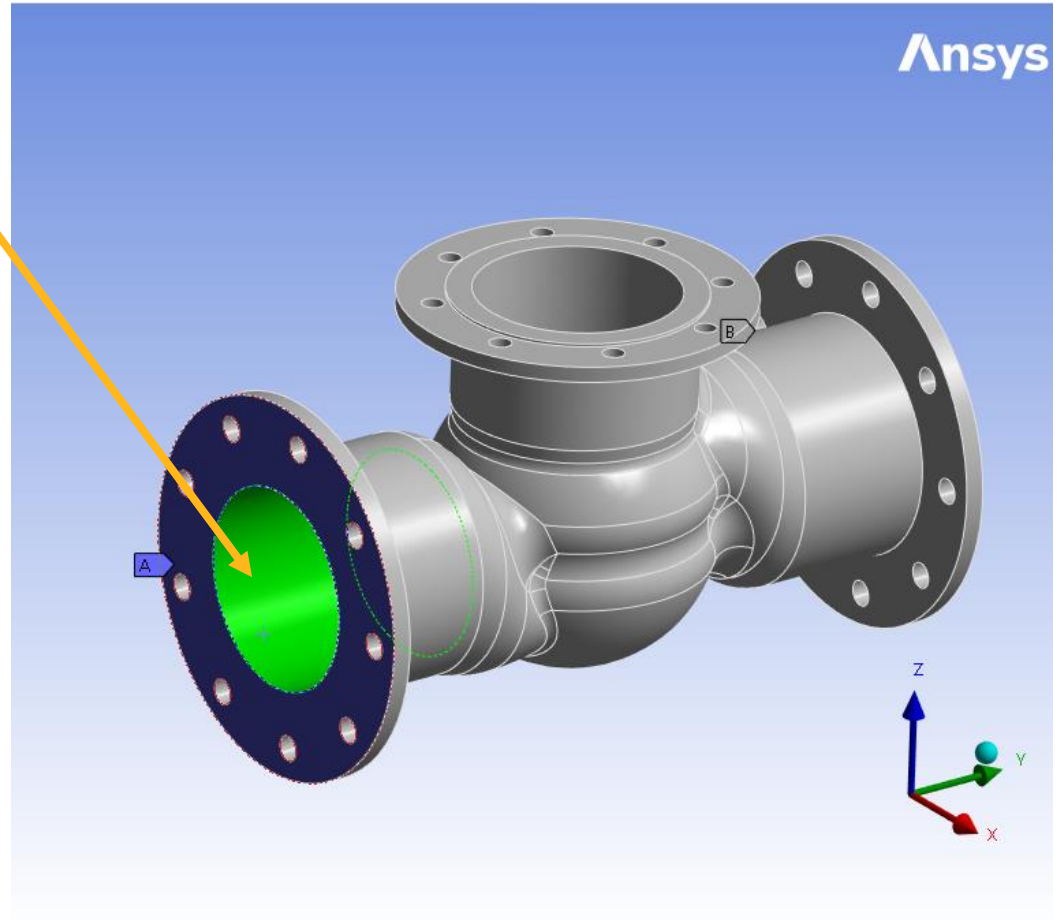
Select all internal surfaces—use the following procedure:

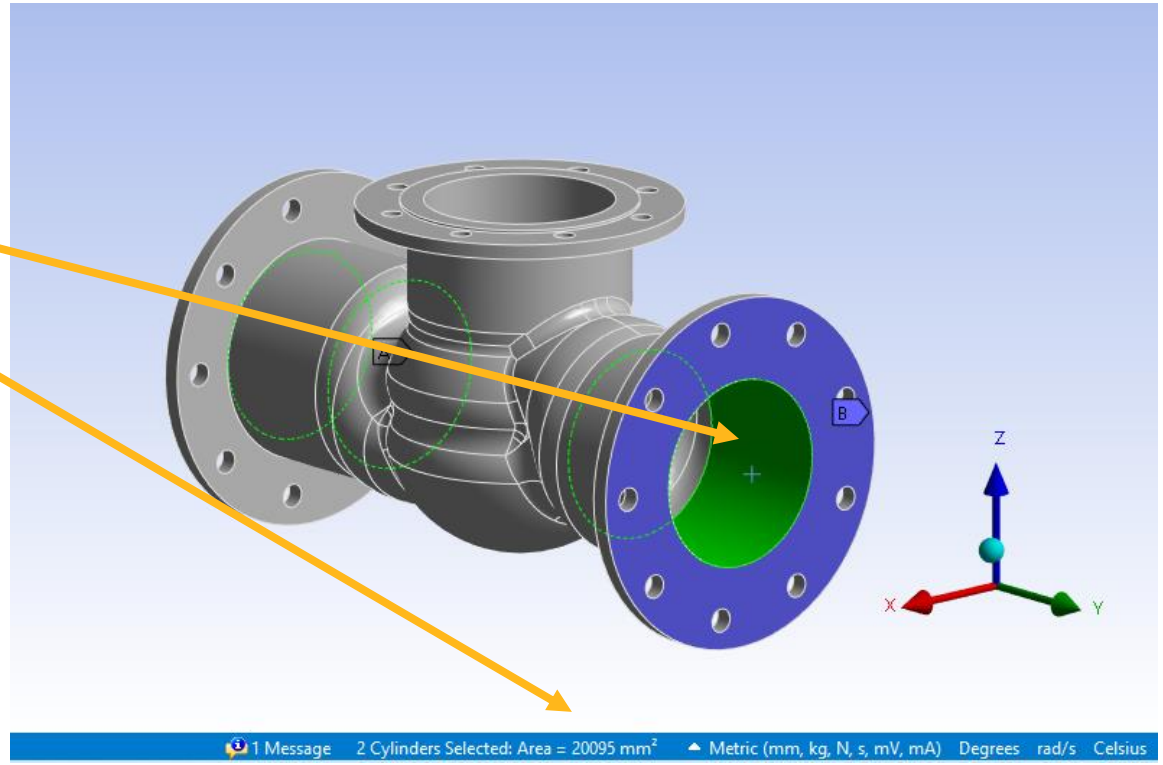
- Select one end surface



Step-by-Step Guide 01: Introduction

Select all internal surfaces (continued)

- Ctrl-select the opposite end surface
- Confirm that two surfaces are now selected



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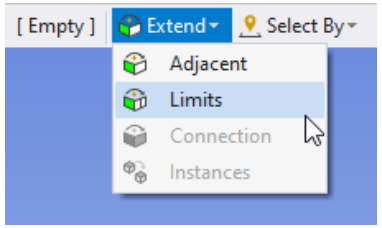
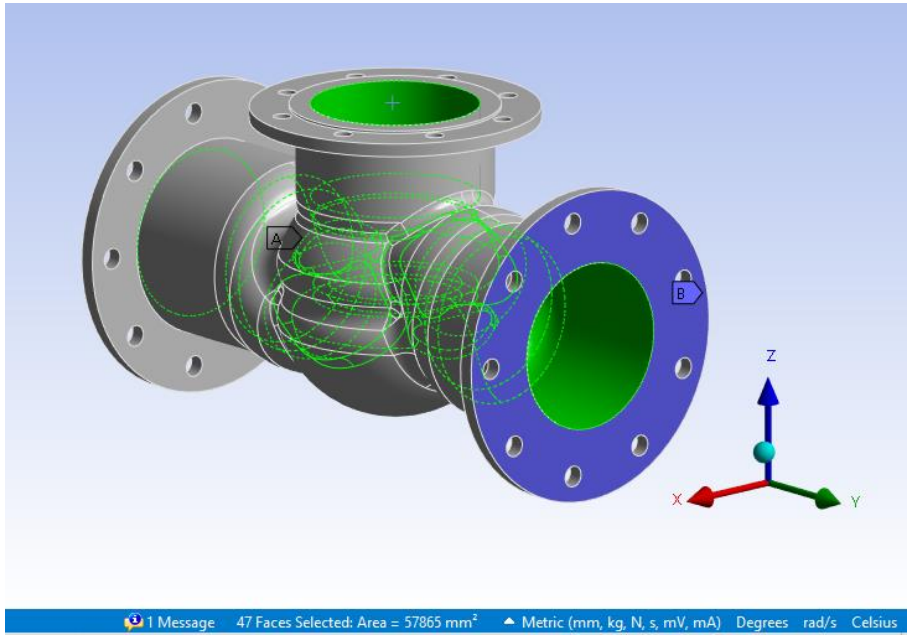
Select all internal surfaces (continued)

- From the drop-down menu on toolbar button in the Display tab **Extend Selection**, click **Extend to Limits**
- Confirm that **47** surfaces are now selected





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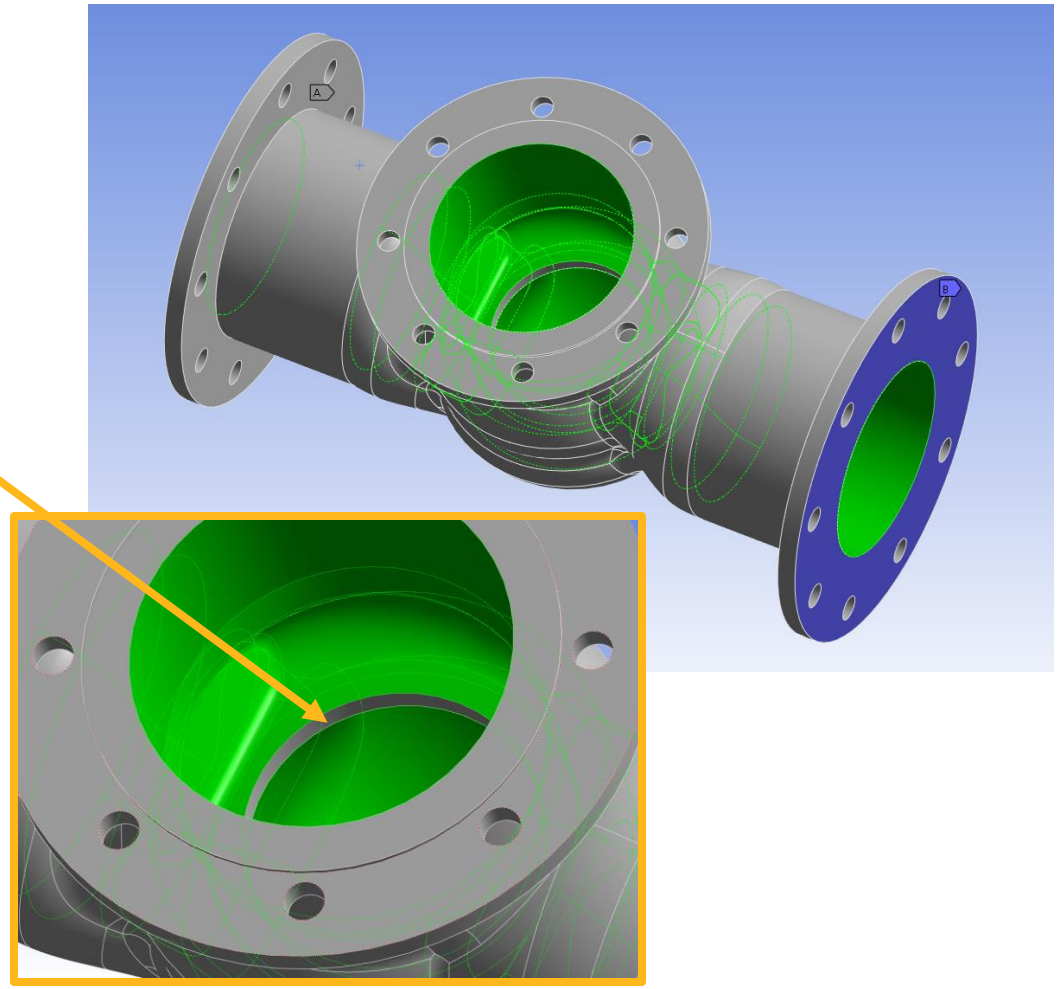
Select all internal surfaces (continued)

- Modify the view so that the small unselected cylindrical surface near the center of the globe is visible
- Ctrl-select the small cylindrical surface near the center of the globe
- Confirm that **48** surfaces are now selected



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Apply pressure to the internal surfaces of the Valve body:

- **RMB—Static Structural → Insert → Pressure**
- In view **Details**, set **Definition—Magnitude** to “3 MPa” (if necessary, use the Units menu to modify the current units system)

Details of "Pressure"	
Scope	
Scoping Method	Geometry Selection
Geometry	48 Faces
Definition	
ID (Beta)	33
Type	Pressure
Define By	Normal To
Applied By	Surface Effect
Loaded Area	Deformed
Magnitude	3. MPa (ramped)
Suppressed	No

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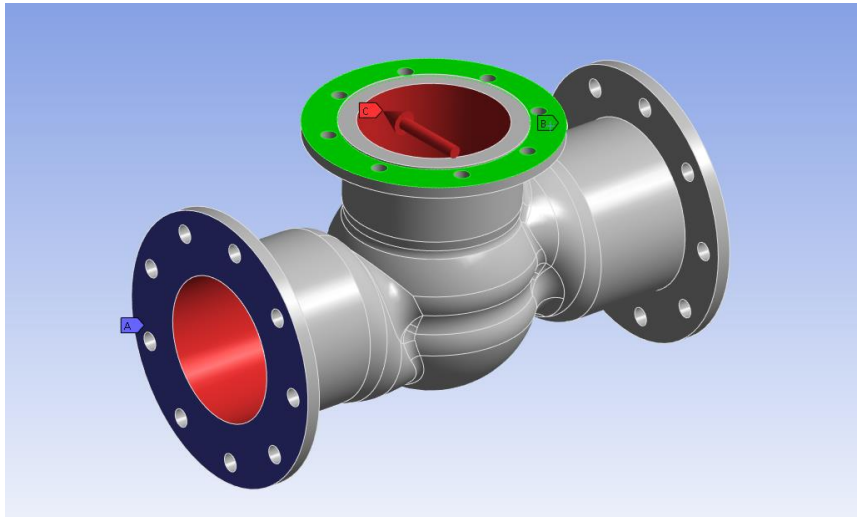
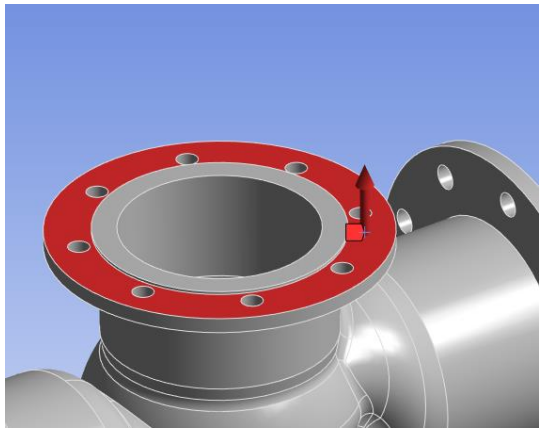


Apply blow-off force to the top flange surface:

- Select the top end flange surface
- **RMB—Static Structural → Insert → Force**
- In view **Details**, set **Definition—Magnitude** to “9,600 N”
- Confirm that the force is oriented in the +Z direction



Details of "Force"

Scope	
Scoping Method	Geometry Selection
Geometry	1 Face
Definition	
ID (Beta)	35
Type	Force
Define By	Vector
Applied By	Surface Effect
Magnitude	9600. N (ramped)
Direction	Click to Change
Suppressed	No

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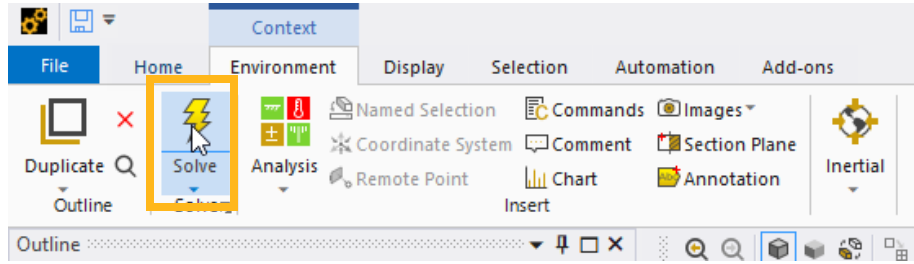
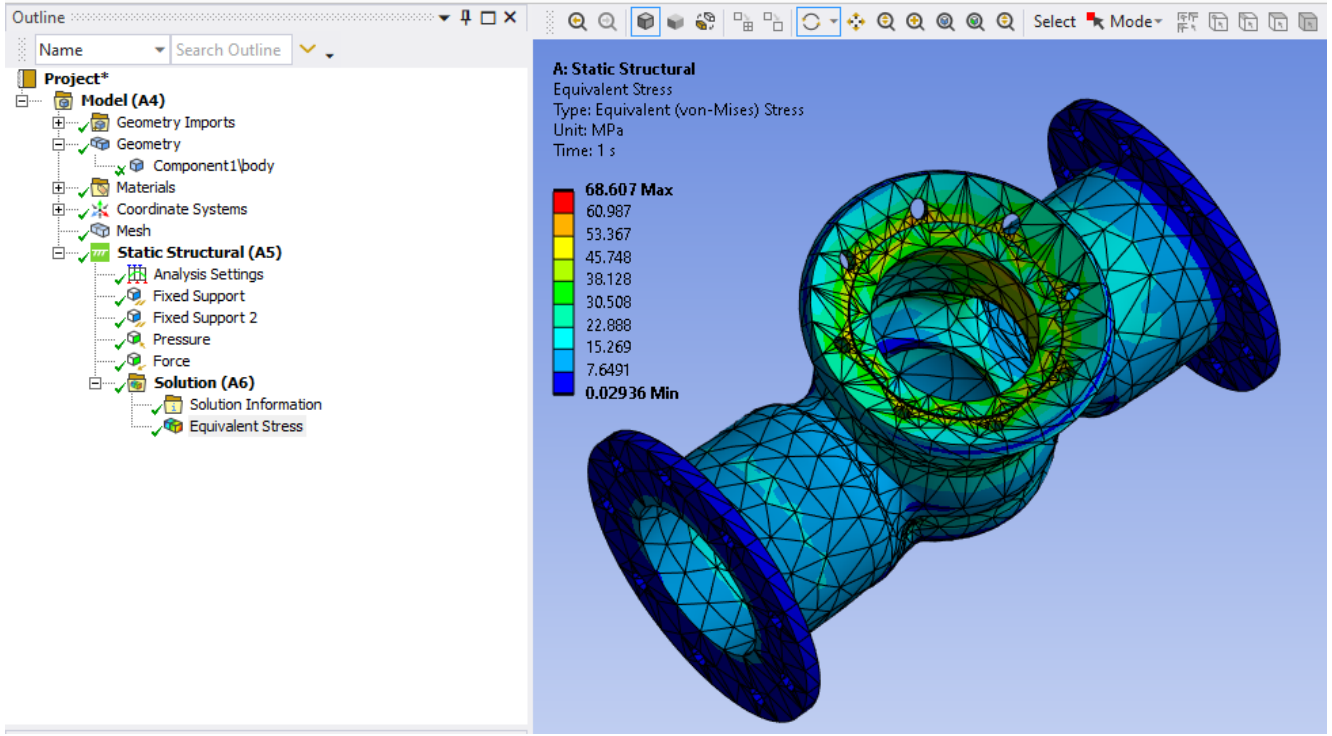
- **RMB—Solution → Insert → Stress → Equivalent (von-Mises)**
- **Solve**
- Select branch **Equivalent Stress**





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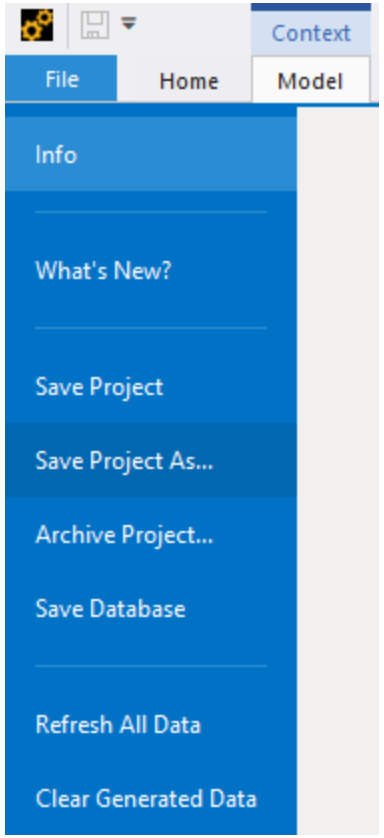
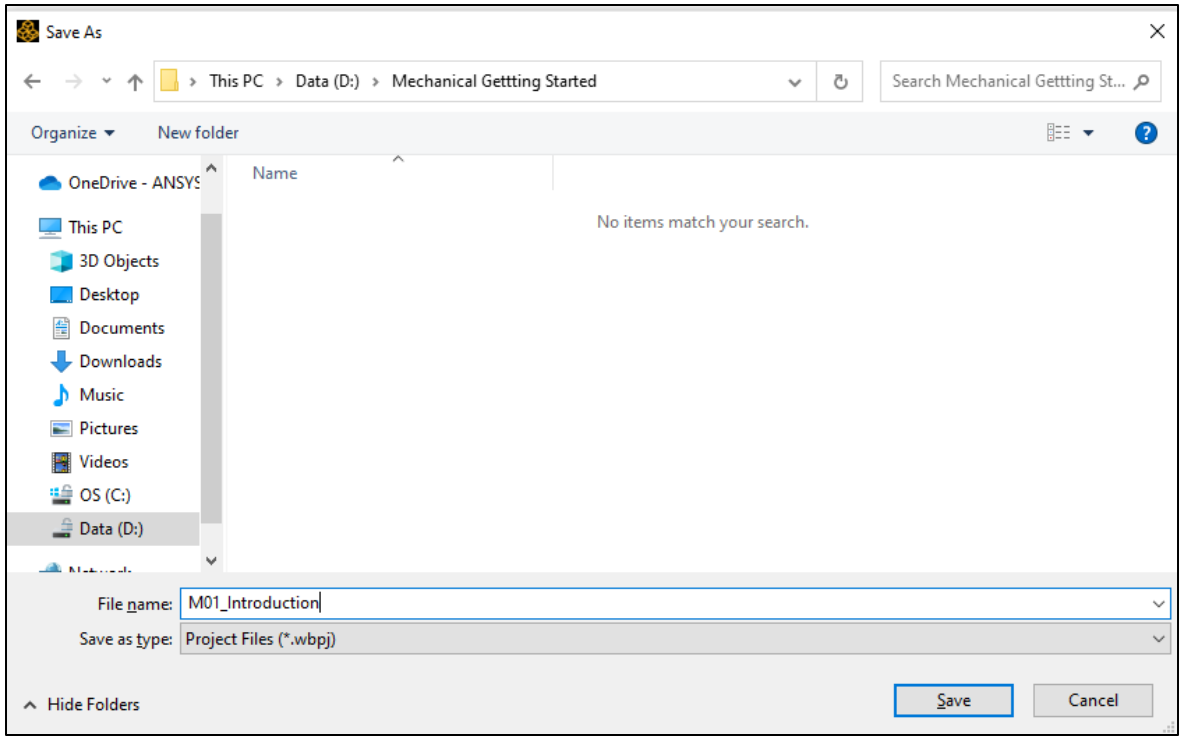
- Save the Project
- **File → Save Project to “M01.wbpj”**





End of presentation