

Drawing Creation Tutorial

Additional Volume Placement Methods



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SESSION 4

Additional Volume Placement Methods

Objective

By the end of this session, you will be able to:

- Place a drawing volume along a single segment path (for non-rectangular volume)
- Place drawing volume by selection (growing to include newly selected objects)
- Place drawing volumes by plane and offset (an example multiple volume placement in a single operation)

Overview

Smart 3D allows you to place volumes that can be associated with drawings with a few methods. Some methods allow you to place volumes one at a time while others allow placement of multiple volumes with a single operation. You can use coordinates to place a volume with the 'volume by two points' method. You can create a volume by selecting objects in the model – the volume will grow to include all selected objects. You can place a volume with a non-rectangular cross section along a single-segment path to exclude objects that cannot be easily excluded by other means, such as by filters or direct exclusion. You can also place multiple volumes with 'volumes by plane and offset.' This is useful if you want to place volumes along a set of grid planes in a structure.


Smart 3D allows you to copy and paste views in a composed drawing. Copying and pasting a view lets you reuse a large number of properties that may be common between views, and change properties specific to the view being pasted.

In this session, we will learn various volume placement methods. The first task will have us placing a drawing volume along-side a single-segment path, otherwise known as placing a "non-rectangular" volume. The second procedure will cover placing drawing volumes by selection, by plane, and by offset. Then we will look at copying and pasting a placed drawing volume to a new location.

Define Workspace

1. Click **File > Define Workspace**.
*The **Define Workspace** dialog box displays.*
2. Select **More** from the **Filter** list.
*The **Select Filter** dialog box displays.*
3. Select the filter **Drawings Creation Filters\04\U01** and **U01 2 Points** on the **Select Filter** dialog box.
4. Click **OK** on the **Select Filter** dialog box.
5. Click **OK** on the **Define Workspace** dialog box.

The software populates the workspace with modeled objects.

- When the workspace query completes, click **Fit**  on the **Common** toolbar.

The software fits all the objects into the graphic view.

Place Non-rectangular Volume

- Click **Place Volume Along Path**  on the vertical toolbar.

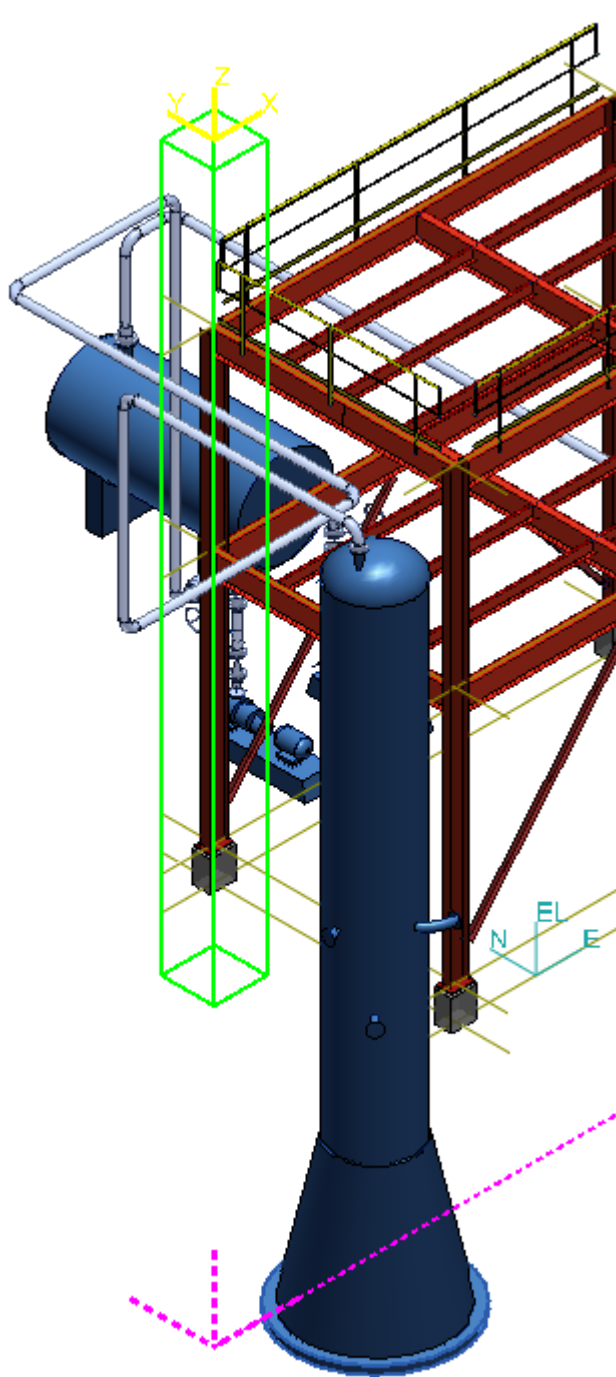
*The **Place Volume Along Path** ribbon displays.*



TIP The path is simply a vertical line.


- Type **20** in the **E** field on the **PinPoint** ribbon. Press TAB.
*The field displays **20 ft 0.00 in** and is locked.*
- Type **20** in the **N** field on the **PinPoint** ribbon. Press TAB.
*The field displays **20 ft 0.00 in** and is locked.*
- Type **45** in the **EI** field on the **PinPoint** ribbon. Press TAB.
*The field displays **45 ft 0.00 in** and is locked.*
- Click anywhere in the graphic window to complete placement of the first point of the path.
- Type **20** in the **E** field on the **PinPoint** ribbon. Press TAB.
*The field displays **20 ft 0.00 in** and is locked.*
- Type **20** in the **N** field on the **PinPoint** ribbon. Press TAB.
*The field displays **20 ft 0.00 in** and is locked.*
- Type **0** in the **EI** field on the **PinPoint** ribbon. Press TAB.
*The field displays **0 ft 0.00 in** and is locked.*
- Click anywhere in the graphic view to place the second point of the path.

10. Click **Finish** on the **Place Volume Along Path** ribbon to complete the placement of the path and place a tentative volume along the path with a rectangular cross-section.

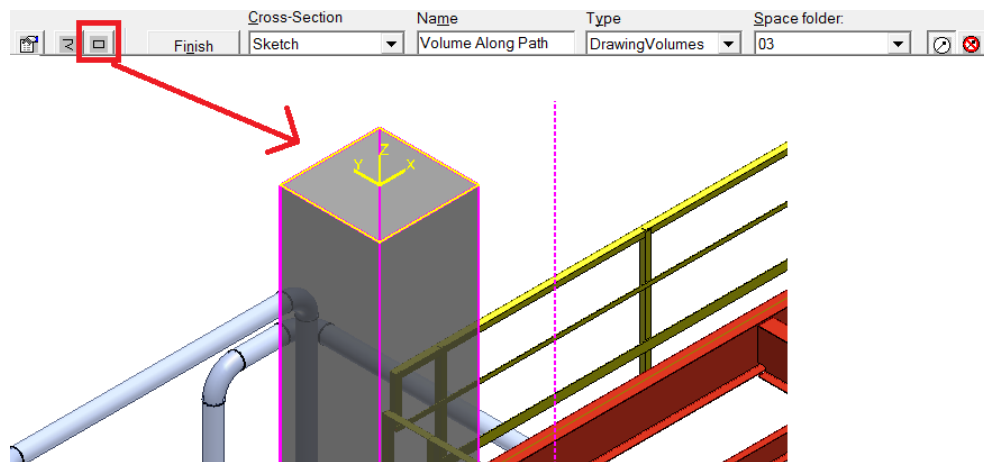


TIP The local coordinate system of the volume by path is located at the first point of the path.

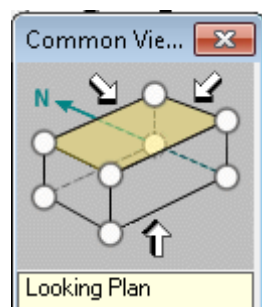
The **Place Volume Along Path** ribbon contains new fields **Cross-Section**, **Name**, **Type**, and **Space Folder**. The **Type** and **Space Folder** fields should already be populated with the values from the placement of the two-point volume.



11. Double-click the **Name** field on the **Place Volume Along Path** ribbon to highlight its contents. Type **Volume Along Path**.
12. Select **More** from the **Space Folder** list.
13. Expand **Drawings Creation Labs**, highlight **03**, and click **OK**.
14. Click **Finish** to complete the volume.
15. Select the volume that was just created.
16. Select **Sketch** from the **Cross-Section** list.
17. Click **Cross-Section**  to highlight the cross-section of the volume at the first point of the path.


The ribbon changes again to a set of commands to sketch a new cross-section.



18. On the **Common Views** dialog box, select the face that changes the look direction to **Looking Plan**.

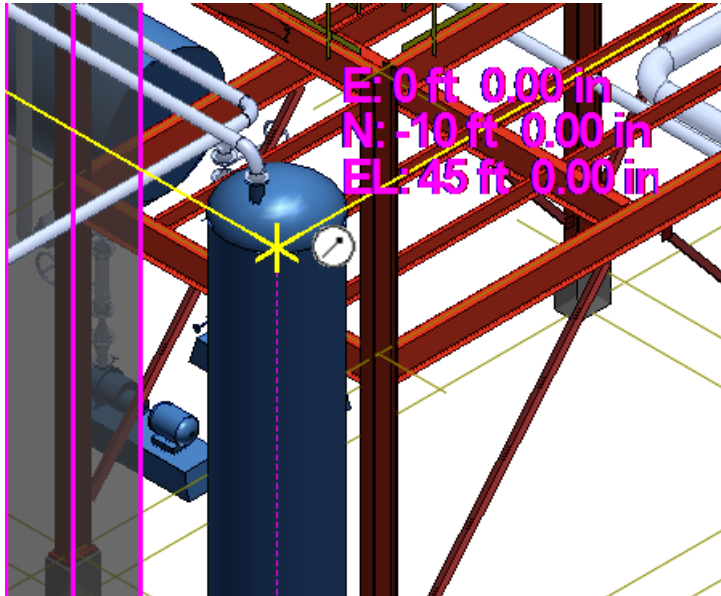


19. Click **Zoom Area** . Then, drag a rectangle around **Volume Along Path**.
20. Right-click to exit **Zoom Area**.
21. Press CTRL, and select the four segments highlighted in yellow.
22. Click **Delete Selected Items**  on the **Place Volume Along Path** ribbon to delete the original cross-section elements.

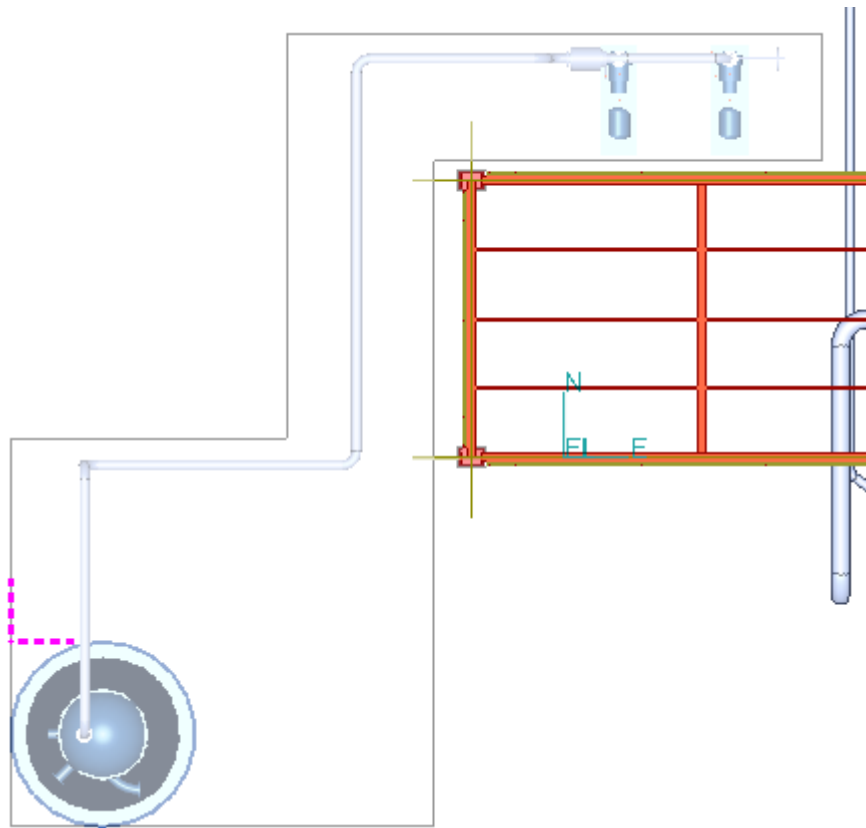
23. Click **Fit** .
24. Sketch the new cross-section. Type **0** in the **E** field on the **PinPoint** ribbon. Press TAB.
*The field displays **0 ft 0.00 in** and is locked.*
25. Type **-10** in the **N** field on the **PinPoint** ribbon. Press TAB.
*The field displays **-10 ft 0.00 in** and is locked.*
26. Click anywhere in the graphic view to complete placement of the first point of the cross-section.
27. Type **0** in the **E** field on the **PinPoint** ribbon. Press TAB.
*The field displays **0 ft 0.00 in** and is locked.*
28. Type **11** in the **N** field on the **PinPoint** ribbon. Press TAB.
*The field displays **11 ft 0.00 in** and is locked.*
29. Click anywhere in the graphic view to complete placement of the second point of the cross-section.
30. Type **15** in the **E** field on the **PinPoint** ribbon. Press TAB.
*The field displays **15 ft 0.00 in** and is locked.*
31. Type **11** in the **N** field on the **PinPoint** ribbon. Press TAB.
*The field displays **11 ft 0.00 in** and is locked.*
32. Click anywhere in the graphic view to complete placement of the third point of the cross-section.
33. Type **15** in the **E** field on the **PinPoint** ribbon. Press TAB.
*The field displays **15 ft 0.00 in** and is locked.*
34. Type **33** in the **N** field on the **PinPoint** ribbon. Press TAB.
*The field displays **33 ft 0.00 in** and is locked.*
35. Click anywhere in the graphic view to complete placement of the fourth point of the cross-section.
36. Type **44** in the **E** field on the **PinPoint** ribbon. Press TAB.
*The field displays **44 ft 0.00 in** and is locked.*
37. Type **33** in the **N** field on the **PinPoint** ribbon. Press TAB.
*The field displays **33 ft 0.00 in** and is locked.*
38. Click anywhere in the graphic view to complete placement of the fifth point of the cross-section.
39. Type **44** in the **E** field on the **PinPoint** ribbon. Press TAB.
*The field displays **44 ft 0.00 in** and is locked.*
40. Type **26** in the **N** field on the **PinPoint** ribbon. Press TAB.
*The field displays **26 ft 0.00 in** and is locked.*
41. Click anywhere in the graphic view to complete placement of the sixth point of the cross-section.

Additional Volume Placement Methods

42. Type **23** in the **E** field on the **PinPoint** ribbon. Press TAB.
*The field displays **23 ft 0.00 in** and is locked.*
43. Type **26** in the **N** field on the **PinPoint** ribbon. Press TAB.
*The field displays **26 ft 0.00 in** and is locked.*
44. Click anywhere in the graphic view to complete placement of the seventh point of the cross-section.
45. Type **23** in the **E** field on the **PinPoint** ribbon. Press TAB.
*The field displays **23 ft 0.00 in** and is locked.*
46. Type **-10** in the **N** field on the **PinPoint** ribbon. Press TAB.
*The field displays **-10 ft 0.00 in** and is locked.*
47. Click anywhere in the graphic view to complete placement of the eighth point of the cross-section.
48. To complete the last entry, move the cursor to the first point placed until the keypoint glyph appears.

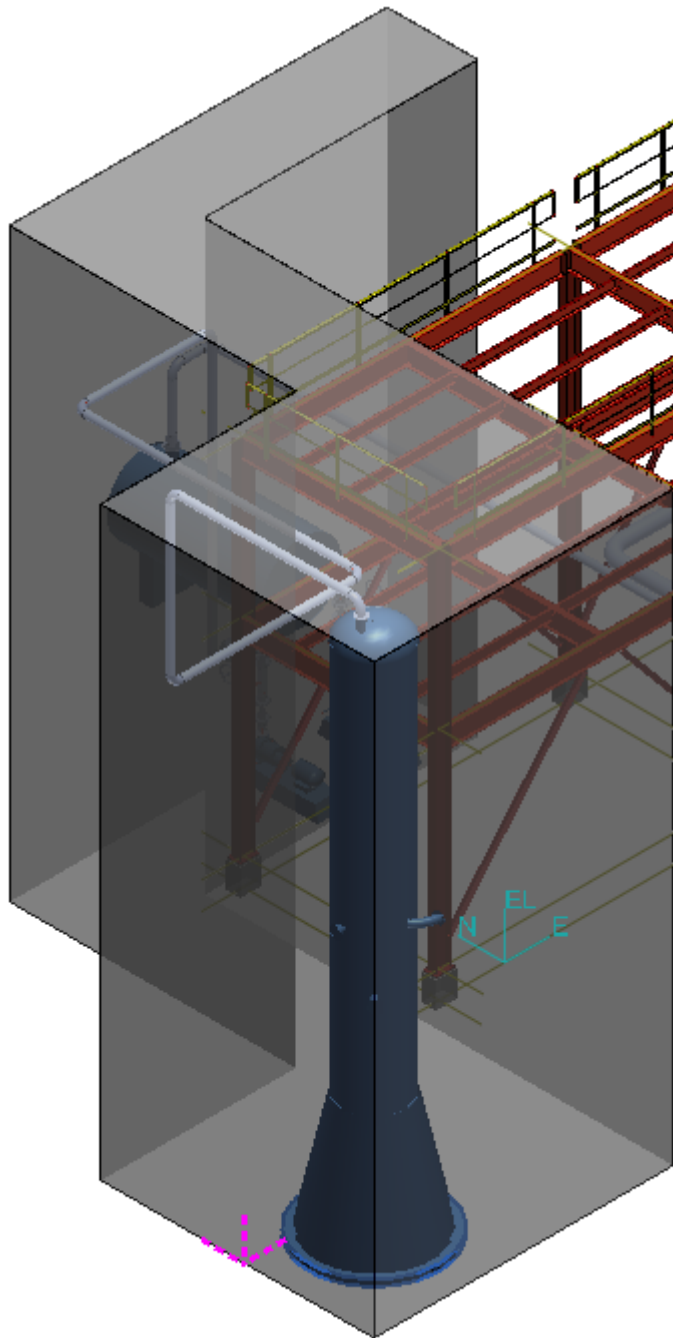


49. Click to complete placement of the cross-section.




50. Click **Finish** on the **Place Along Path** ribbon to complete the sketch path.

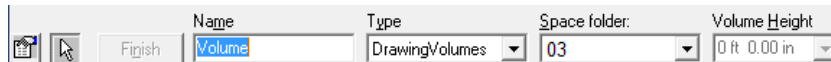
51. Click **Finish** again on the **Place Along Path** ribbon to complete the volume placement.



52. Click **Select**  to exit **Place Volume Along Path**.

Place Volume by Selection

1. On the **Common Views** dialog box, select the node that changes the look direction to **Looking NE and Down**.
2. Click **Place Volume by Selection**  on the vertical toolbar to display the **Place Volume by Selection** ribbon.

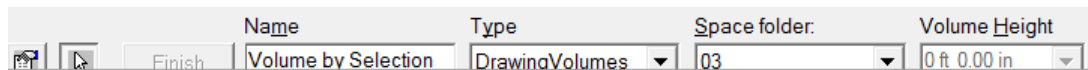


Name	Type	Space folder:	Volume Height
Volume	DrawingVolumes	03	0 ft 0.00 in

TIP The **Type** and **Space Folder** fields have preserved the values used from the previous volume placement commands.

3. Type **Volume by Selection** the **Name** field on the **Place Volume by Selection** ribbon.

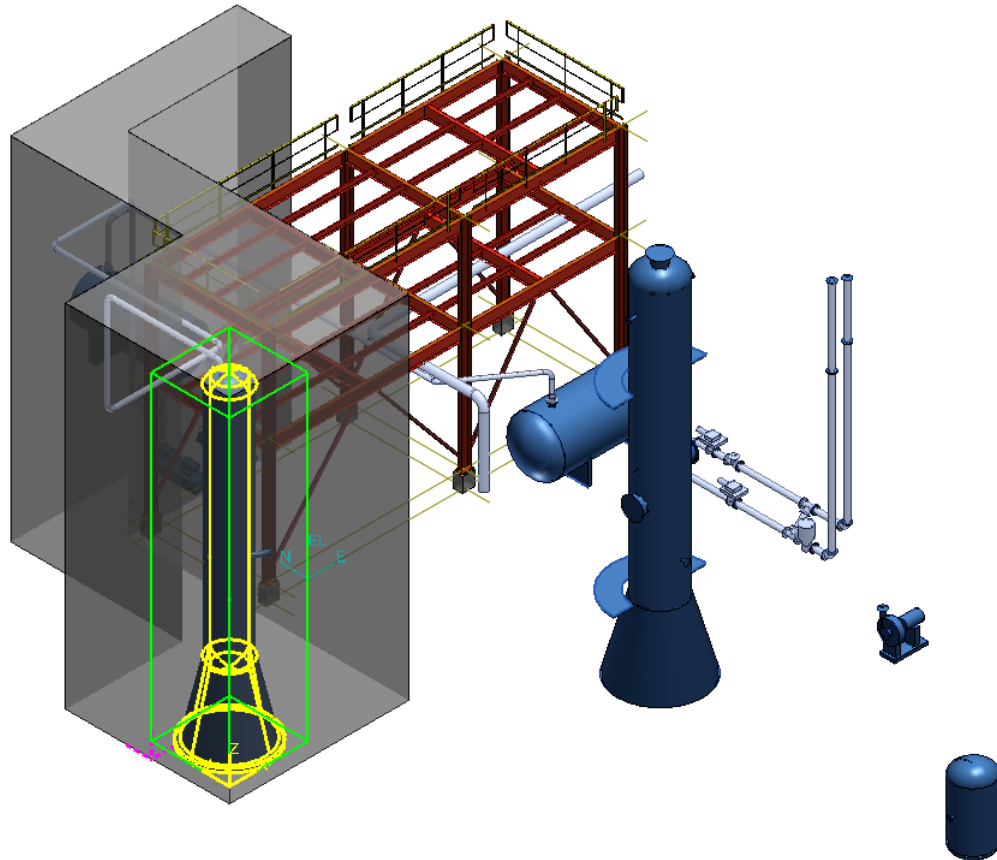
The ribbon should appear as in the following picture:



Name	Type	Space folder:	Volume Height
Volume by Selection	DrawingVolumes	03	0 ft 0.00 in

4. Click the **System** tab of the **Workspace Explorer**.
5. Expand the **A2**, **U02**, and **Equipment** nodes on the **System** tab of the **Workspace Explorer**.
6. Click the equipment **VS-102** on the **System** tab of the **Workspace Explorer**.

In the graphic window, a box with a green outline surrounds the range of the equipment.



TIP During initial creation of the volume, objects can be removed from the collection by clicking them a second time. After the volume by selection is created, the collection of objects used to create the volume is not persisted in the database. Therefore, the volume cannot be resized by modifying the collection after it is created.

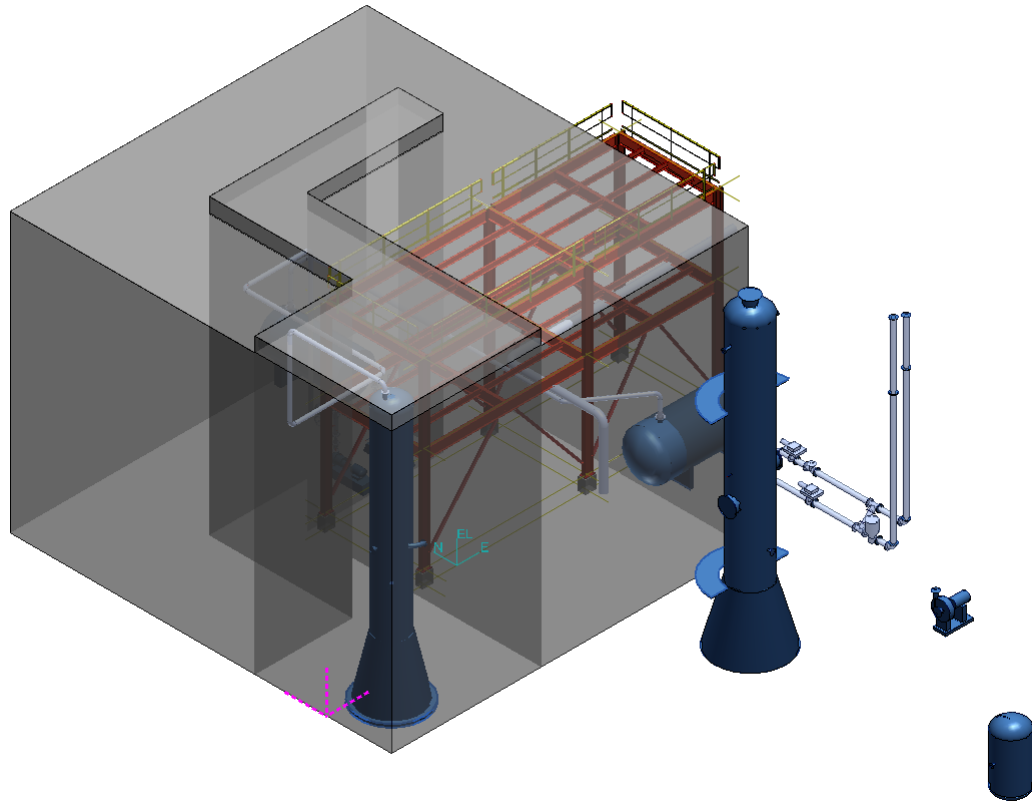
7. Select equipment **PUS2-02** in the **Workspace Explorer**.

The box increases in size to encompass the range of both pieces of equipment.

8. Expand the **Process** and **2001-P** nodes on the **System** tab of the **Workspace Explorer**.
9. Click the pipe run **U02-6-P-0002-1C0031** on the **System** tab of the **Workspace Explorer**.

The box increases in size to encompass the range of both pieces of equipment as well as the pipe run.


- Click **Finish** on the **Place Volume by Selection** ribbon to complete the volume placement.



- Press ESC to exit **Place Volume by Selection**.

Place Volumes by Plane and Offset

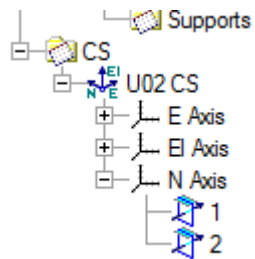
- Right-click **Volume by Selection**, and select **Hide** in the graphic window.
The volume no longer displays.
- Right-click **Volume Along Path**, and select **Hide** in the graphic window.
The volume no longer displays.

- Click **Place Volume by Plane and Offset**  on the vertical toolbar.
*The **Place Volumes by Plane and Offset** ribbon displays.*

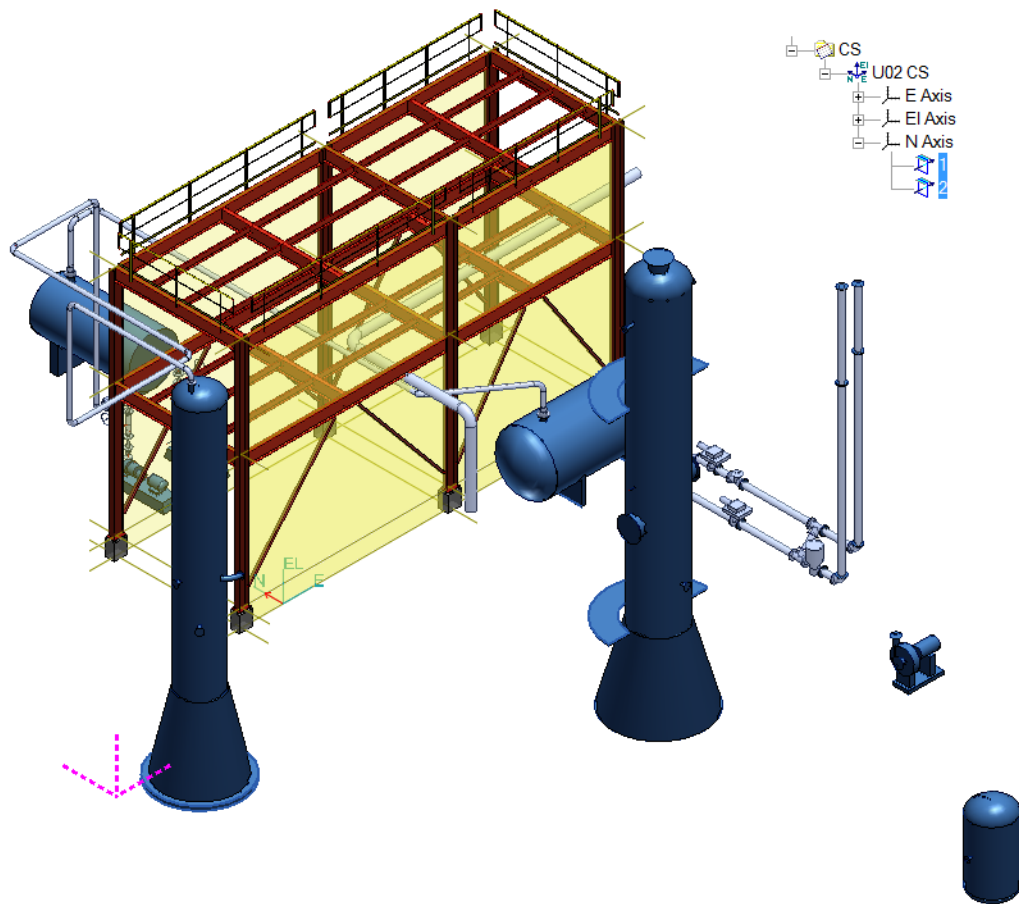


- Type **Volumes by Plane and Offset** in the **Name** field on the **Place Volumes by Plane and Offset** ribbon.
*The status bar displays **Select Plane(s)**.*

- Expand the nodes **CS**, **U02 CS**, and **N Axis** on the **System** tab of the **Workspace Explorer**.



- Click on planes **1** and **2** to highlight them in the model.




- Click **Accept** ☒ on the **Place Volumes by Plane and Offset** ribbon to complete the selection of planes.
Select Three Points ☐ becomes available on the **Place Volumes by Plane and Offset** ribbon.
- Type **1** in the **Offset 1** field, and press TAB.
The field displays 1 ft 0.00 in.

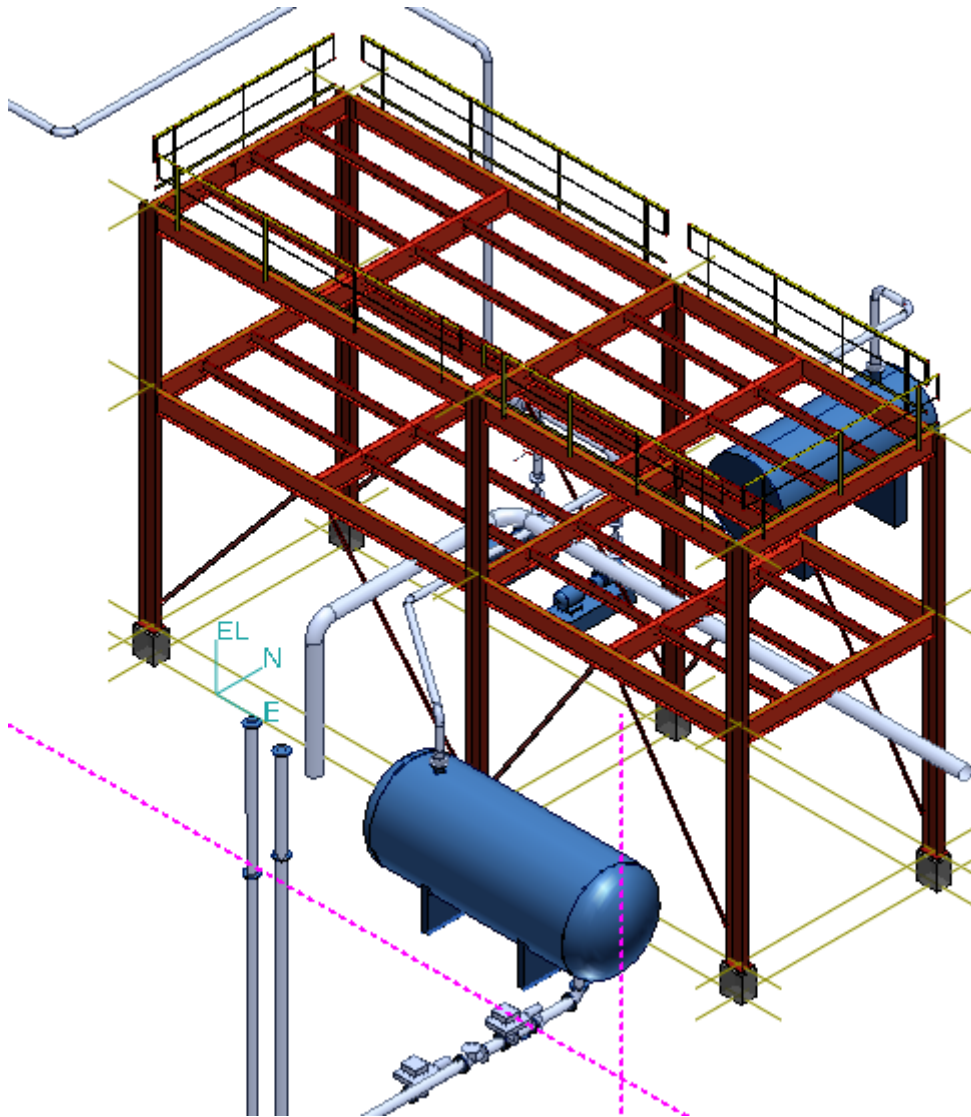
9. Type **-1** in the **Offset 2** field, and press TAB.

*The field displays **-1 ft 0.00 in.***

TIP The offset values determine the depth of each volume that you create as measured from the selected planes. The value of **Offset 1** must exceed the value of **Offset 2**.

*The status bar displays **Enter First Point**. The purpose of the next steps is to draw the volume cross-section that you will then project onto each selected plane.*

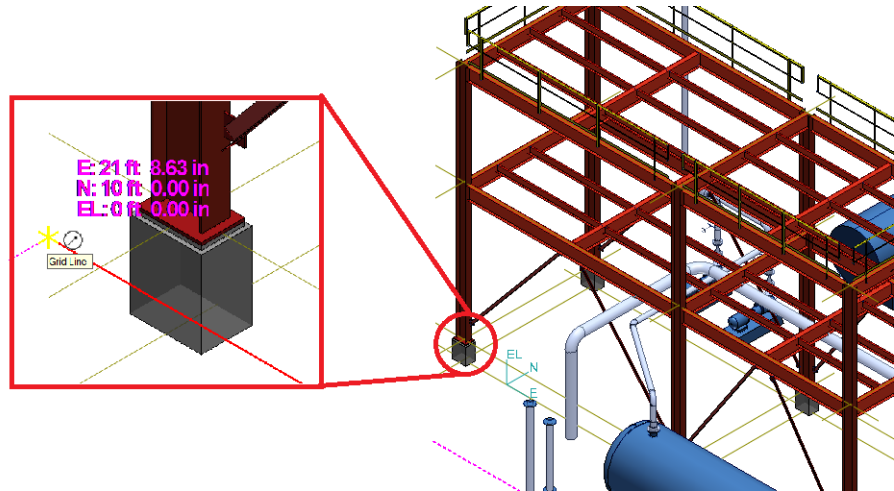
10. On the **Common Views** dialog box, select the node that changes the look direction to **Looking NW and Down**.
11. Click **Zoom Area** . Then, drag a rectangle around the structural rack to get a closer look.



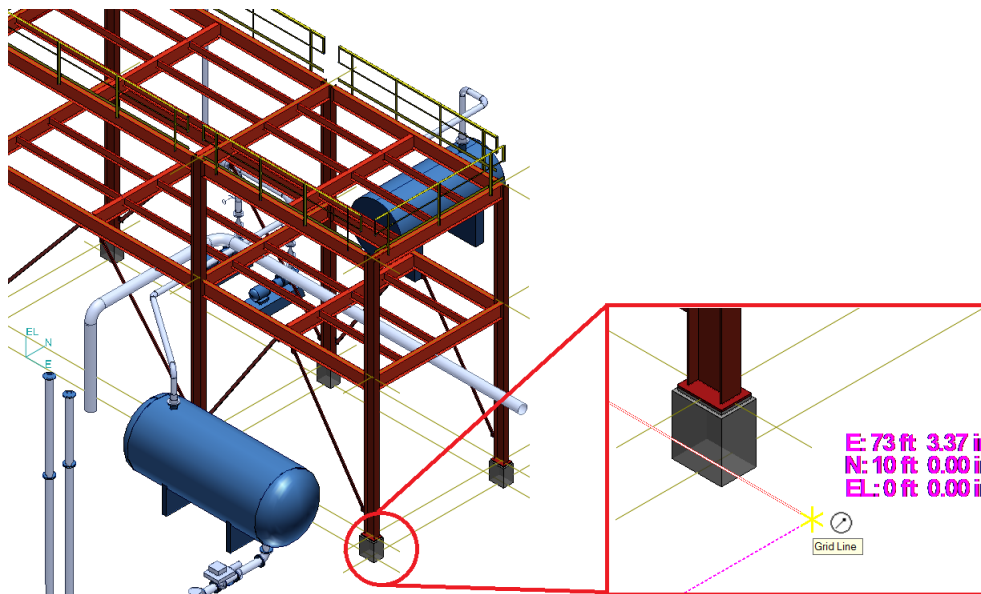
12. Right-click to exit **Zoom Area**.

Additional Volume Placement Methods

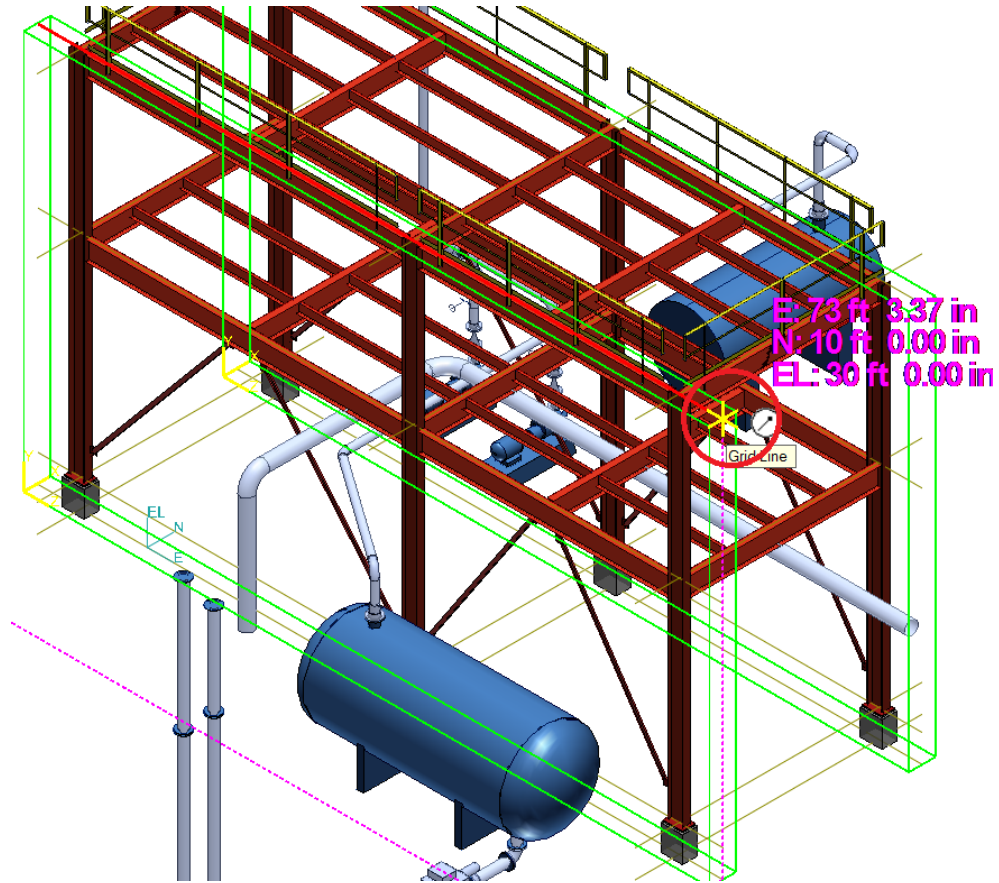
13. For point 1 of the cross-section, click at the end point of the lowest grid line in the southwest corner of the rack, as shown in the following picture:



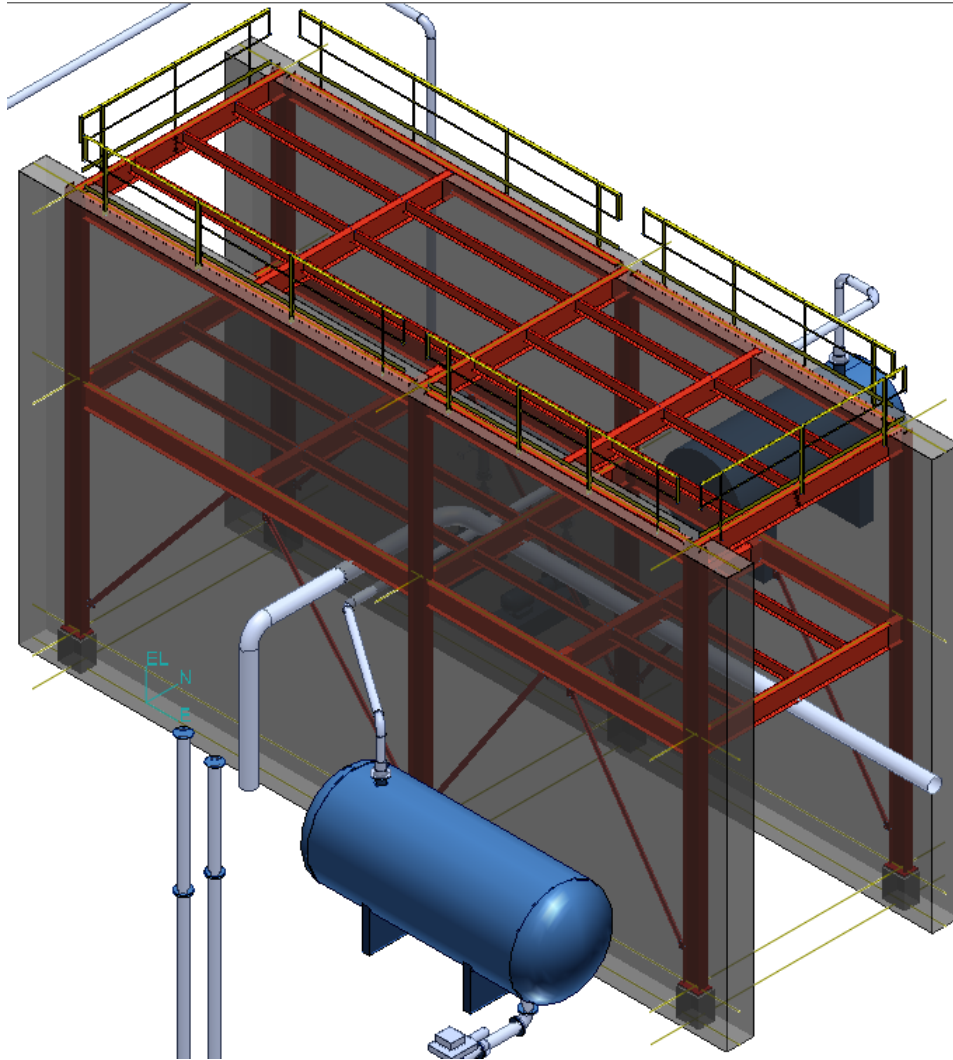
14. For point 2 of the cross-section, click at the end point of the lowest grid line in the southeast corner of the rack, as shown in the following picture:



15. For point 3 of the cross-section, click at the end point of the highest grid line in the southeast corner of the rack, as shown in the following picture:



- Click **Finish** on the **Place Volumes by Plane and Offset** ribbon to complete the creation of the volumes.





- Press ESC to exit **Place Volumes by Plane and Offset**.

Create New Drawing

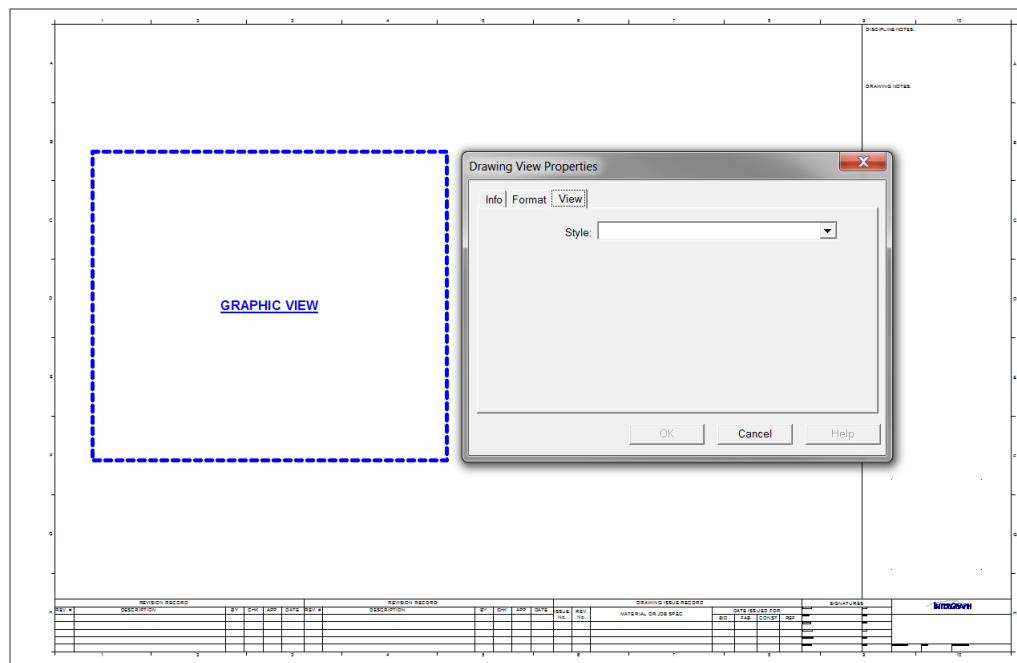
- Switch to the **Drawing Console** window.
- Right-click the **Creation Labs\03\Piping** node, and select **New Drawing**.
*The **Drawing Sheet General Properties** dialog box displays.*
- Type **Piping Plan02** in the **Name** field on the **Drawing Sheet General Properties** dialog box.
TIP The **Layout Template** and **Border Template** fields remain populated, so you do not need to edit them.
- Click **OK** on the **Drawing Sheet General Properties** dialog box.


The software opens the new drawing in a **SmartSketch Drawing Editor** window.

Place and Copy/Paste Drawing View

1. Maximize the drawing window in **SmartSketch Drawing Editor**.
2. Click **Fit** .
3. Click **Place View** .
4. Drag a rectangle approximately centered on the left half of the border area.

The **Drawing View Properties** dialog box displays when placement completes.



5. Select **More** from the **Style** list on the **Drawing View Properties** dialog box.
The **Select View Style** dialog box displays.
6. Select **OrthographicPiping Plan Style2** on the **Select View Style** dialog box.
7. Click **OK** on the **Select View Style** dialog box.
8. Type **Piping Plan View02** in the **Name** field.
9. Select **Architectural Scales** from the **Scale Family** list.
10. Select **1/8 in: 1 ft** from the **User Selected Scale** list.
11. Click **OK** on the **Drawing View Properties** dialog box to complete the view definition.
12. Click the view, and then click **Copy and Paste View** .

TIP The purpose of **Copy and Paste View** is to copy and paste certain graphic views within the same drawing.

Report, detail, and sections views are not supported by this command.

An outline of the selected view attaches to the cursor.

- Click within the border area to place the new view on the right side of the sheet.

*The **Paste** dialog box displays.*

Property	Value
Name	Copy Of Piping Plan View02
Annotation Coordinate System	
View Direction Coordinate System	<Use Object CS>
Scale Family	Architectural Scales
User Selected Scale	1/8 in: 1 ft
Margin Top	0' 0"
Margin Bottom	0' 0"
Margin Left	0' 0"
Margin Right	0' 0"
Look Direction	Looking Plan
Description	
View Style Type	SP3D View Style
View Offset	0' 0 1/16"
Flush Threshold	
VHL Precision	

TIP The fields at the top of the **Paste** dialog box are identical to those on the **Drawing View Properties** dialog box. There are some additional options on the lower section of the dialog box that specify how to handle the associated inputs and manual edits.

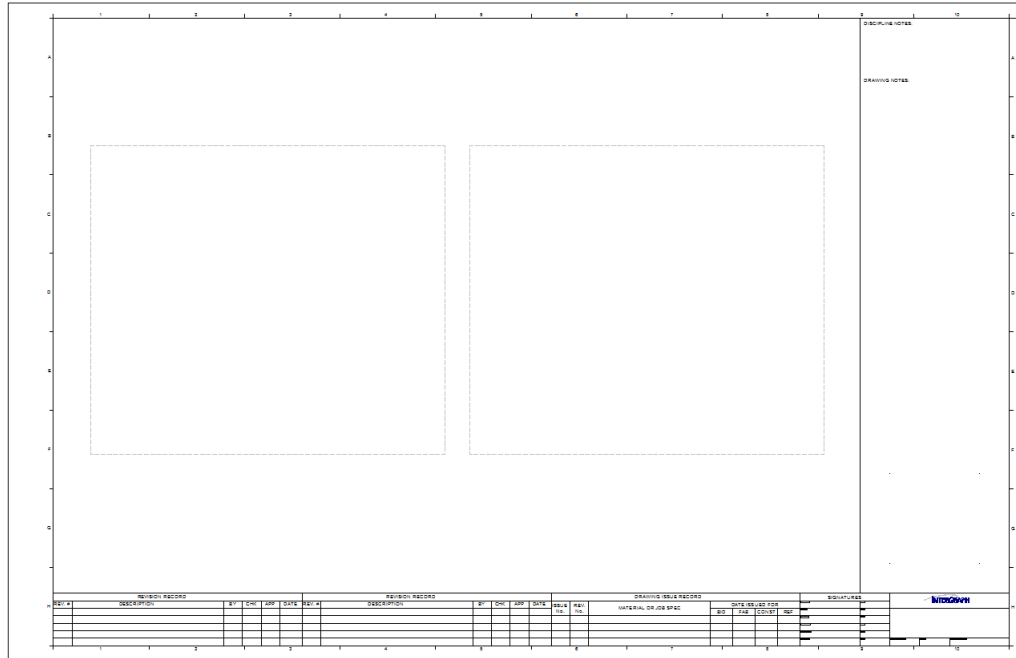
The **Associate Inputs** set of controls is disabled because the original view has not been associated to a volume.

The default view settings for the pasted view are identical to the original, except for **Name**.


- Type **Piping Plan View03** in the **Name** field on the **Paste** dialog box.
- Click **OK** on the **Paste** dialog box to place the new view.

A second view attaches to the cursor so that you can place it.

16. Right-click to exit **Copy and Paste View**.



Associate Drawing Views to Volumes

1. Press CTRL, and click on both view boundaries so that they are selected.
2. Click **Associate Objects to View** .

TIP You can select multiple views when clicking **Associate Objects to View**. The **Select View** list on the **Associate Objects to View** ribbon in the modeling environment contains each view in the select set. The views in the select set, however, must be of the same type.

3. Switch to the **Smart 3D** window.

*The **Associate Objects to View** ribbon displays in the modeling environment.*

4. Select **Piping Plan View02** from the **Select View** list on the **Associate Objects to View** ribbon, if it is not already displayed.
5. Select **More** from the **Filter** list on the **Associate Objects to View** ribbon.

*The **Select Filter** dialog box displays.*

6. Expand the **Drawings Creation Filters** folder and the **03** folder on the **Select Filter** dialog box.
7. Select the **U02 Drawing** filter, and click **OK**.

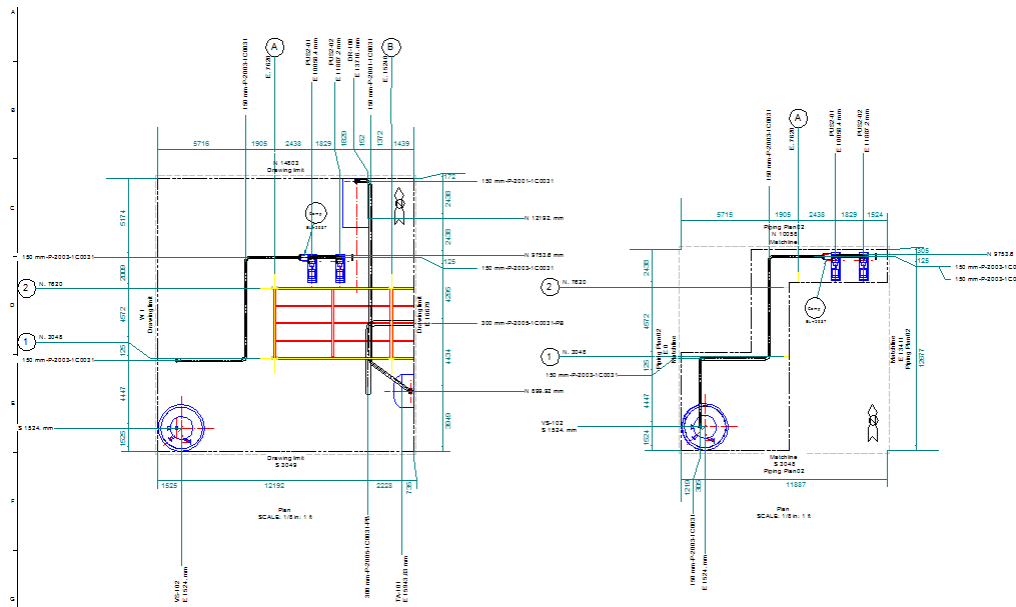
*The software populates the **Filter** field on the **Associate Objects to View** ribbon.*

8. Click the **Space** tab in the **Workspace Explorer**.
9. Click on the volume **Volume by Selection** under **Drawing Creation Labs\03** in the **Workspace Explorer**.

TIP After the view is associated to a volume, the next unassociated view appears in the **Select View** field on the **Associate Objects to View** ribbon.

10. Select **U02 Drawing** in the **Drawings Creation Filters\03** folder from the **Filter** list on the **Associate Objects to View** ribbon.
11. Click **Volume Along Path** in the **Workspace Explorer**.
12. Switch back to the **SmartSketch Drawing Editor** window.
13. Press ESC once to exit **Associate Objects to View**.
14. Press ESC again to clear the selection from the views.
15. Right-click the left view boundary, and select **Update View**.
16. When the update completes, right-click the right view boundary, and select **Update View**.

When update of the right view completes, the results should look like the picture below:



17. Click **File > Exit** to exit **SmartSketch Drawing Editor**. You do not need to save the drawing because the software automatically saved during the update of the view.

Create New Drawing



1. Switch to the **Drawing Console** window.
2. Right-click **03\Structure**, and select **New Drawing**.
*The **Drawing Sheet General Properties** dialog box displays.*
3. Key-in **Structural Elevation01** in the **Name** field on the **Drawing Sheet General Properties** dialog box.

TIP The **Layout Template** and **Border Template** fields remain populated, so you do not need to edit them.

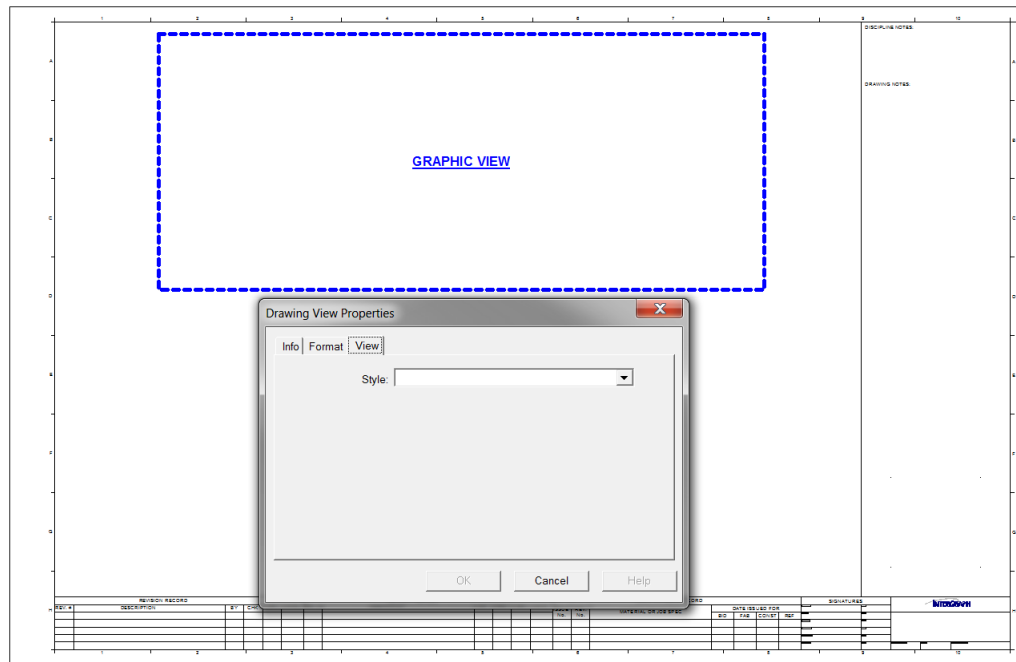
4. Click **OK** on the **Drawing Sheet General Properties** dialog box.

The software opens the new drawing in a **SmartSketch Drawing Editor** window.

Place and Copy/Paste Drawing View

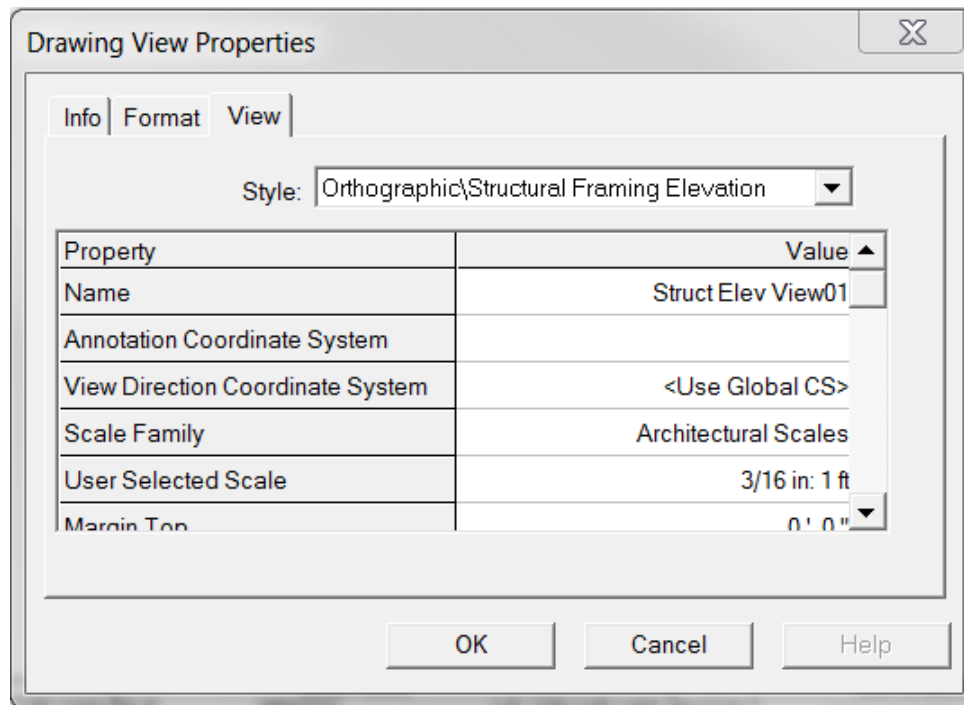
1. Maximize the drawing window in **SmartSketch Drawing Editor**.
2. Click **Fit** .
3. Click **Place View** .
4. Drag a rectangle approximately centered on the top half of the border area.


The **Drawing View Properties** dialog box appears when placement is completed.




5. Select **More** from the Style field on the **Drawing View Properties** dialog box.
The **Select View Style** dialog box displays.
6. Select **Orthographic\Structural Framing Elevation** on the **Select View Style** dialog box:
7. Click **OK** on the **Select View Style** dialog box.
8. Type **Struct Elev View01** in the **Name** field.
9. Select **<Use Global CS>** from the **In the View Direction Coordinate System** list.
10. Select **Architectural Scales** from the **Scale Family** list.
11. Select **3/16 in: 1 ft** from the **User Selected Scale** list.
12. Select **Looking North** from the **Look Direction** list,

13. Click **OK** on the **Drawing View Properties** dialog box to complete the view definition.



14. Click the view, and then click **Copy and Paste View** .
15. Click below the original to place the new view approximately centered in the bottom half of the border area.
- The **Paste** dialog box displays.*
16. Type **Struct Elev View02** in the **Name** field on the **Paste** dialog box.
17. Click **OK** on the **Paste** dialog box to place the new view.
- A second view is attached to the cursor and ready to place.*
18. Right-click to exit **Copy and Paste View**.

Associate Drawing Views to Volumes

1. Drag a fence around both view boundaries so that they are selected, and click **Associate Objects to View** .
2. Select **Drawings Creation Filters\03\U02 Drawing** from the **Filter** list on the **Associate Objects to View** ribbon.
3. Click one of the volumes placed with **Place Volumes by Plane and Offset** in the graphic window.
4. Select **Drawings Creation Filters\03\U02 Drawing** from the **Filter** list on the **Associate Objects to View** ribbon.
5. Click the other volume placed with the **Place Volumes by Plane and Offset** command in the graphic window.
6. Switch to the **SmartSketch Drawing Editor** window.
7. Press ESC to exit **Associate Objects to View**.
8. Press ESC again to clear the selection from the views.
9. Right-click the top view boundary, and select **Update View**.
10. When the update completes, right-click the bottom view boundary, and select **Update View**.

