

HVAC Tutorial

Design HVAC Equipment



Version 2014



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SESSION 2

Design HVAC Equipment

Objective

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

- Design HVAC equipment in a model.

Before Starting this Procedure

- Smart 3D Overview
- Smart 3D Common Sessions
- Smart 3D Equipment Sessions

Overview

HVAC equipment is a custom assembly that contains members such as HVAC nozzles, shapes, and equipment components. Using the Equipment and Furnishings task, you can select HVAC equipment from the Smart 3D Catalog and position them in a 3D model. You can also create HVAC equipment in the model. In this case, you must select a type definition from the Catalog for the HVAC equipment. The type definition determines the property set associated with the HVAC equipment. The software builds the graphical representation of this HVAC equipment using primitive shapes. These equipment are called designed equipment.

In this session, you will learn the steps to design the following HVAC equipment:

- Air Handling Unit (AHU)
- Rectangular and round diffusers
- Grill
- Register

Before starting the HVAC tutorial sessions, define your workspace to include all objects in the **U06** system.

1. Start Smart 3D by clicking **Start > All Programs > Intergraph Smart 3D > Smart 3D**.
2. In the **New** dialog box, select the **EnglishUnits** or **MetricUnits** template, and then click **OK**.
3. Click **File > Define Workspace**.
4. Select **More** from the **Filter** list on the **Define Workspace** dialog box.
5. Select **U06** under **Plant Filters** or **Training Filters** on the **Select Filter** dialog box.
6. Click **OK** on the **Select Filter** dialog box.
7. Activate **PinPoint**, and set the active coordinate system to **Global**.
8. Click **Edit > Paste from Catalog** on the main menu.
9. Expand the **Modules** hierarchy until you see the **Modules > HVAC > HV Grids** folder.

10. Select **HVAC_CS**, and click **OK**.

*The **Place Macro** dialog box displays.*

11. Keep the parent system for the grid objects as **Grids**, and click **OK**.

12. Type **0 ft** for **E**, **0 ft** for **N**, and **0 ft** for **EI**. Then, click in the graphic view.

13. Click **View > Fit** on the main menu.

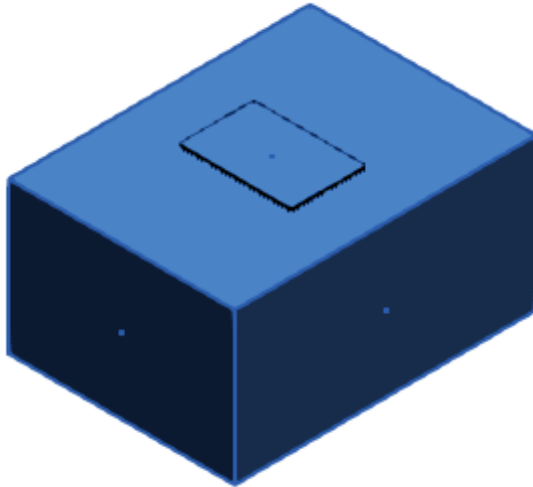
Design an AHU

Design an AHU named **AHU-01** under the **HVAC** system in the **Workspace Explorer** using the following specifications:

Type	Specifications	Values	
Design Equipment	Name	AHU-01	
	Equipment type	Variable Volume Air Distribution Assembly	
	Equipment Classification 0	HVAC equipment	
	Equipment Classification 1	Air Handling Unit	
	Shape	RectangularSolid 001	
	Shape Properties	8 ft for A, 6 ft for B, 4 ft for C	
Nozzle	Specifications	Nozzle 1	Nozzle 2
	Port Type	HVAC Port	HVAC Port
	Thickness	0.25 in	0.25 in
	Flange Width	0	0
	Flow Direction	Flow leaves this port	Flow enters this port
	Nozzle Length	1 in	1 in
	Port Depth	0	0
	Name	SP-01	RT-01
	Width	3 ft	2 ft

	Depth	2 ft	2ft
	Cross Section Shape	Rectangle	Rectangle
	Placement Type	Radial	Axial
	N1	4 ft	8 ft 1 in
	N2	2 ft 1 in	0
	OR1	270 deg	0
	OR2	0	0

Place the designed AHU in Unit U06 with active coordinate system **HVAC_CS** at the coordinates **31 ft** for **E**, **4 ft** for **N**, and **2 ft** for **EI**.



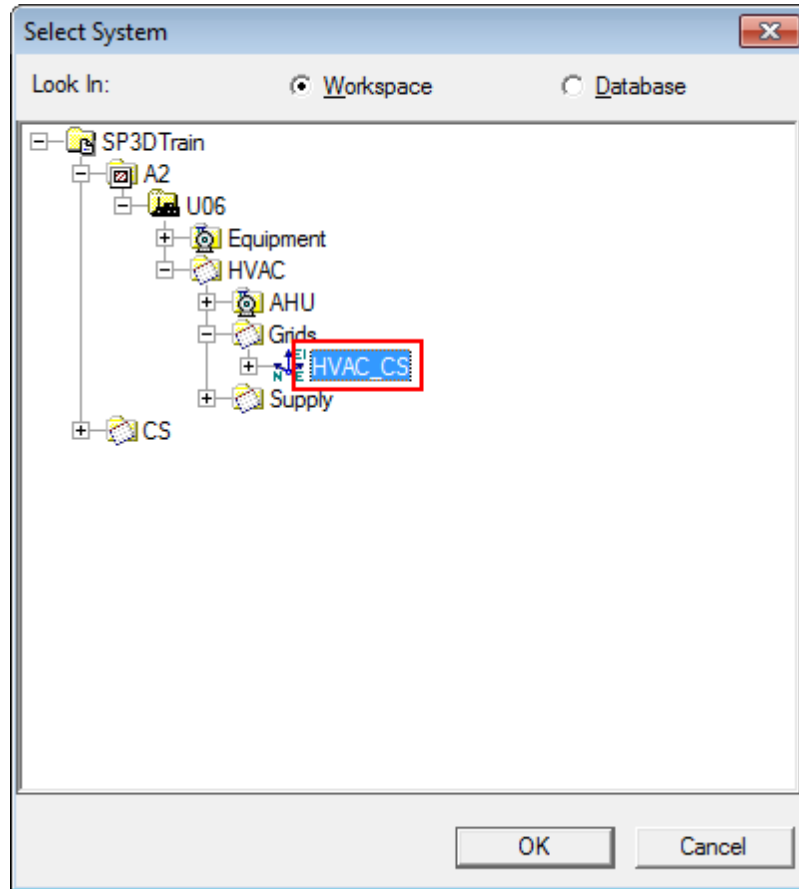
Activate the Equipment and Furnishings environment by clicking **Tasks > Equipment and Furnishings**. Set the Active Permission Group to **HVAC**.

1. Select **More** from the **Coordinate system** list on the **PinPoint** ribbon.

*The **Select Coordinate System** dialog box displays.*

2. In the dialog box, expand **A2 > U06 > HVAC > Grids**, and select **HVAC_CS**.

- Click **OK** to set the active coordinate system as **HVAC_CS**.



- Click **Set Target to Origin** on the **PinPoint** ribbon to set the origin of the active coordinate system as the target.

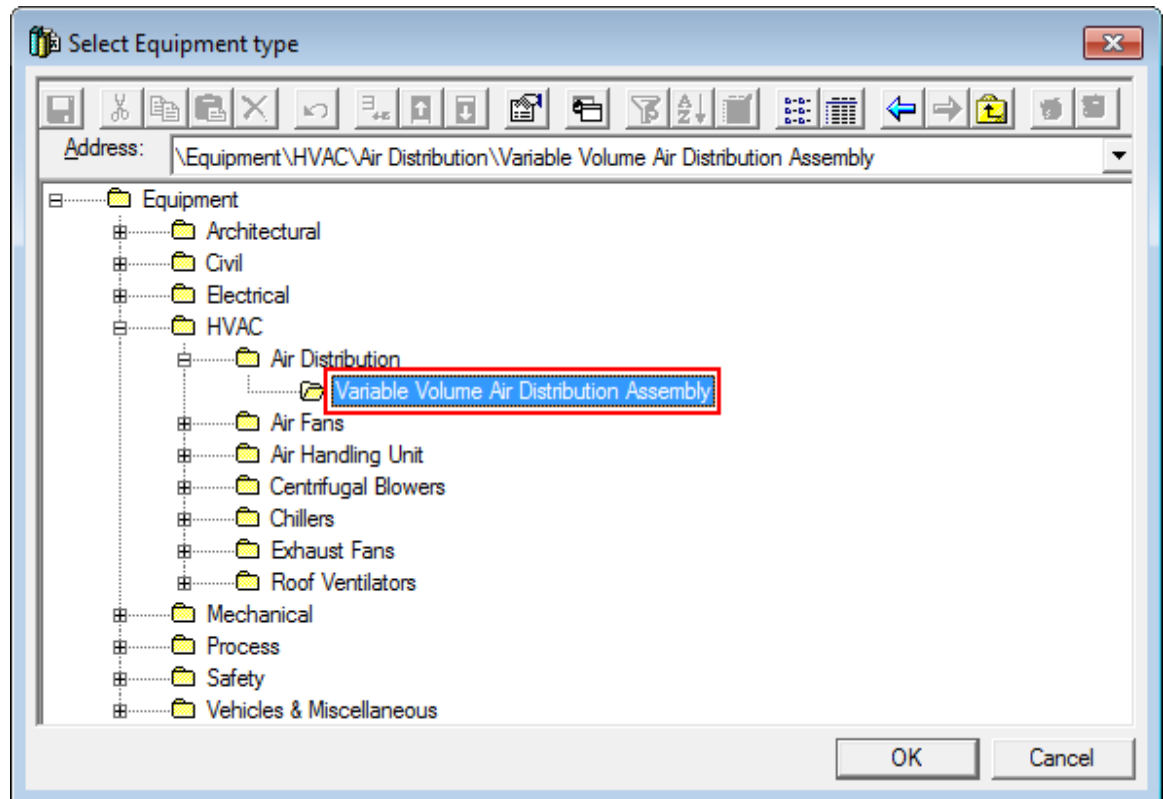


- Click **Place Designed Equipment**  on the vertical toolbar.



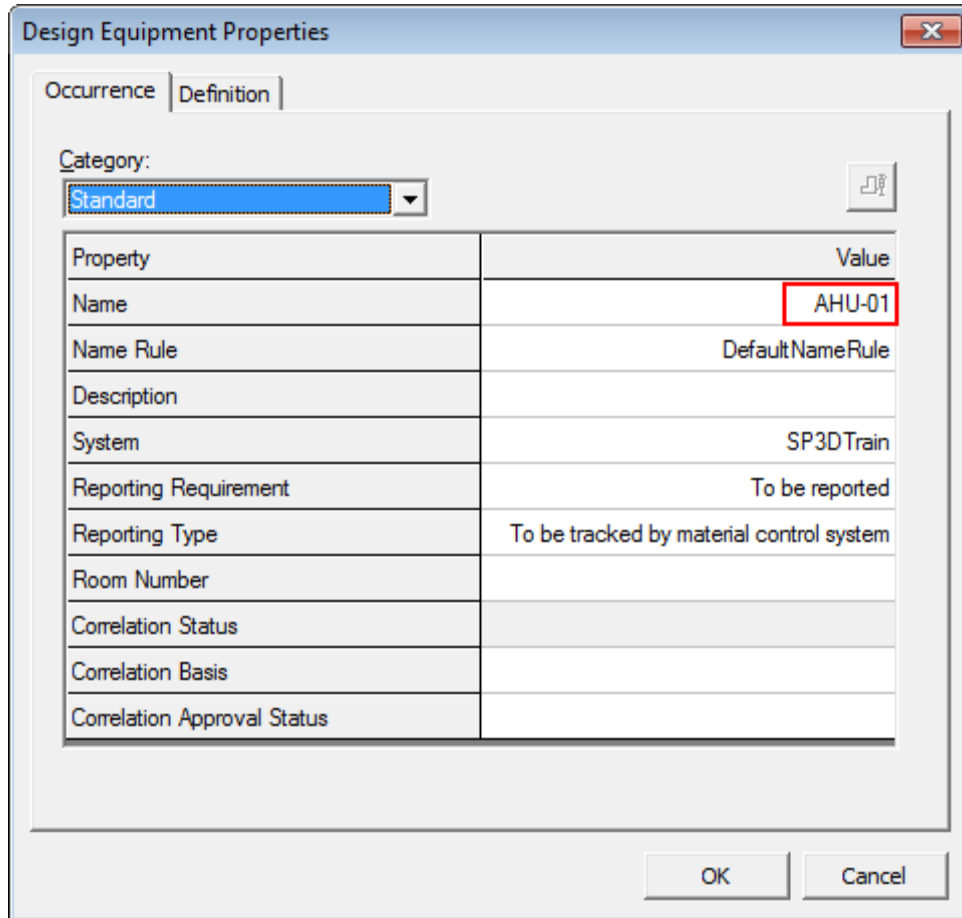
The **Select Equipment type** dialog box displays.

- Expand **Equipment > HVAC > Air Distribution > Variable Volume Air Distribution Assembly** to select the required design equipment.



- Click **OK**.
- The **Design Equipment Properties** dialog box displays.

9. Type **AHU-01** in the **Name** box to name this equipment.

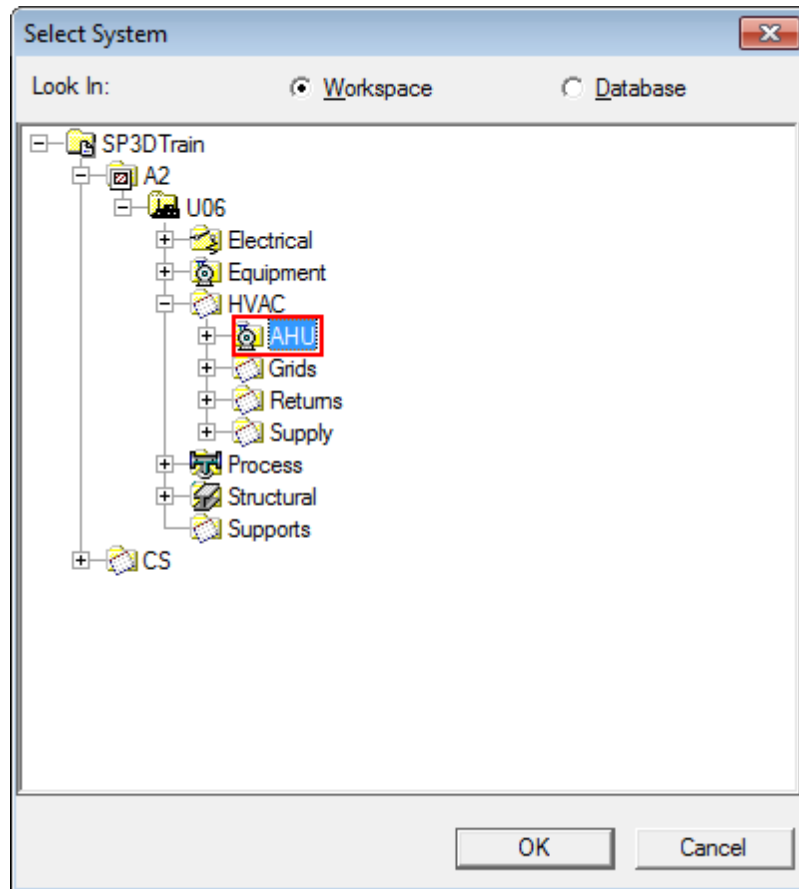


The image shows a 'Design Equipment Properties' dialog box with two tabs: 'Occurrence' and 'Definition'. The 'Definition' tab is active. At the top, there is a 'Category:' label and a dropdown menu showing 'Standard'. Below this is a table with two columns: 'Property' and 'Value'. The 'Name' property is highlighted with a red box and contains the text 'AHU-01'. Other properties include 'Name Rule' (DefaultNameRule), 'Description', 'System' (SP3DTrain), 'Reporting Requirement' (To be reported), 'Reporting Type' (To be tracked by material control system), 'Room Number', 'Correlation Status', 'Correlation Basis', and 'Correlation Approval Status'. At the bottom right are 'OK' and 'Cancel' buttons.

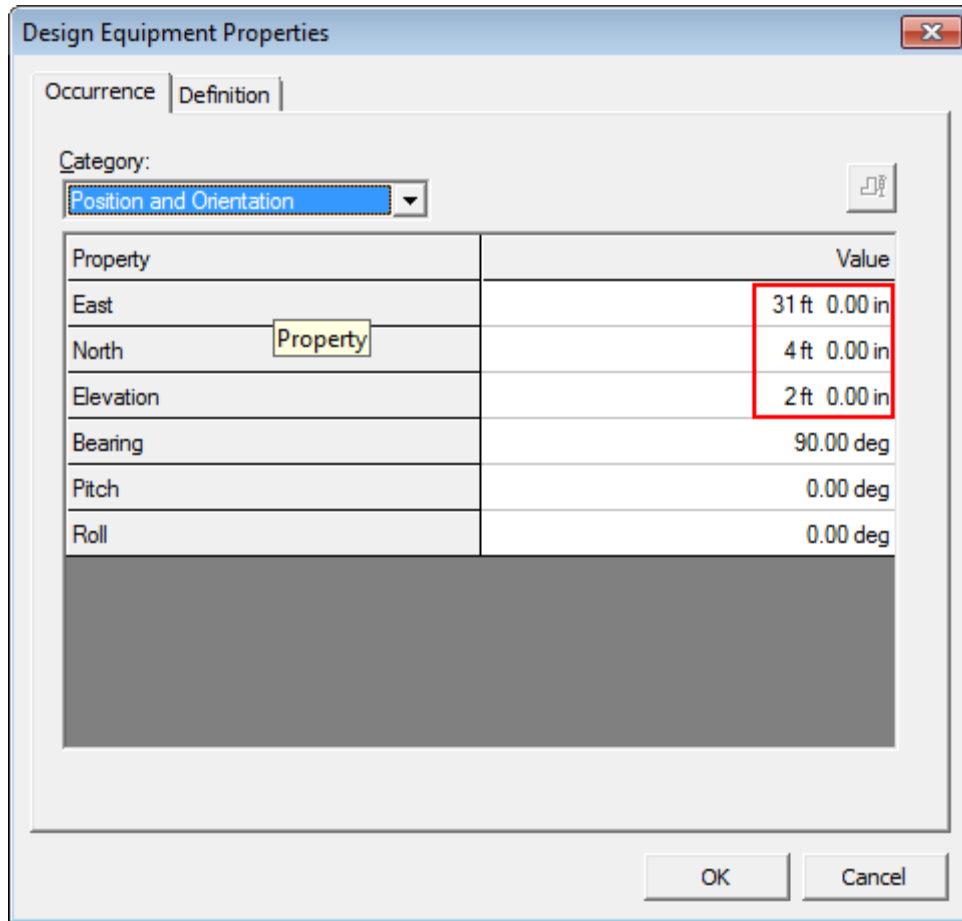
Property	Value
Name	AHU-01
Name Rule	DefaultNameRule
Description	
System	SP3DTrain
Reporting Requirement	To be reported
Reporting Type	To be tracked by material control system
Room Number	
Correlation Status	
Correlation Basis	
Correlation Approval Status	

10. Select **More** from the **System** list.
*The **Select System** dialog box displays.*

11. In the dialog box, expand **A2 > U06 > HVAC > AHU** to select the required system, and click **OK**.



12. Select the **Position and Orientation** option in the **Category** list on the **Occurrence** tab to specify the position of the equipment. Type the values **31 ft** for **East**, **4 ft** for **North**, and **2 ft** for **Elevation**, as shown in the following figure:



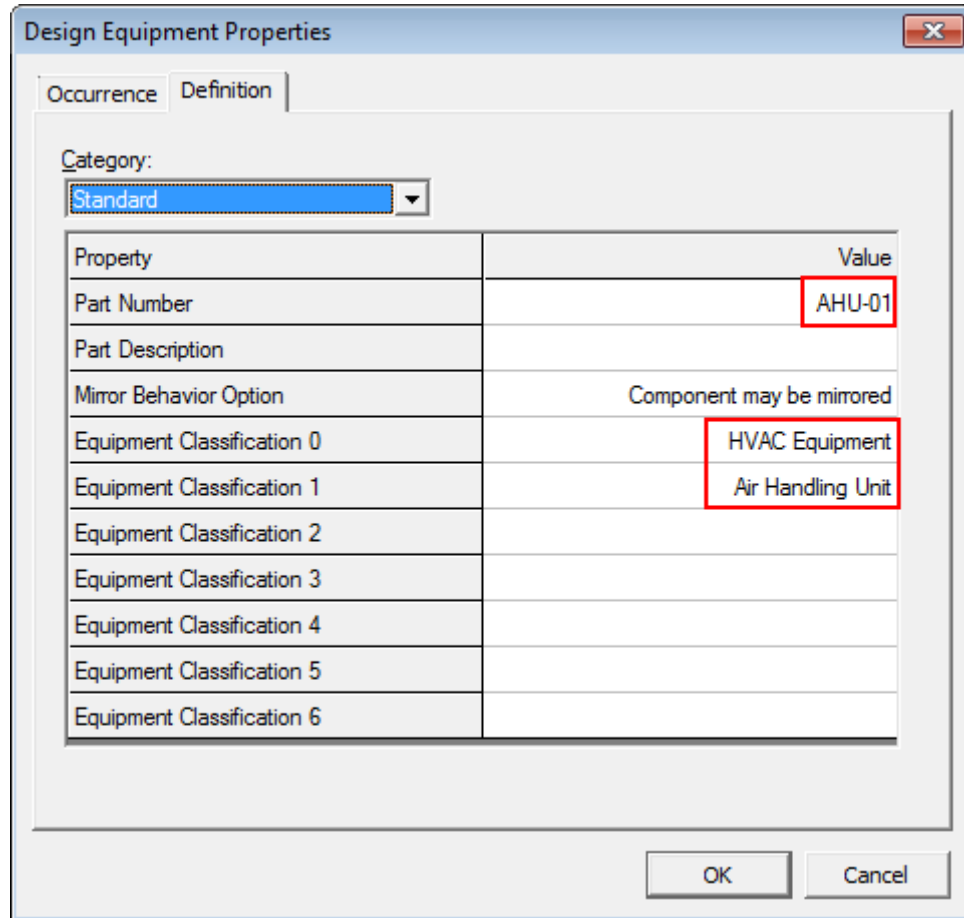
The image shows the 'Design Equipment Properties' dialog box with the 'Occurrence' tab selected. The 'Category' dropdown is set to 'Position and Orientation'. A table lists properties and their values, with the values for East, North, and Elevation highlighted in red. The 'North' property has a yellow 'Property' label next to it. The 'Definition' tab is also visible.

Property	Value
East	31 ft 0.00 in
North	4 ft 0.00 in
Elevation	2 ft 0.00 in
Bearing	90.00 deg
Pitch	0.00 deg
Roll	0.00 deg

OK Cancel


13. Click the **Definition** tab, and type **AHU-01** in the **Part Number** box.
14. Select **HVAC Equipment** from the **Equipment Classification 0** list.

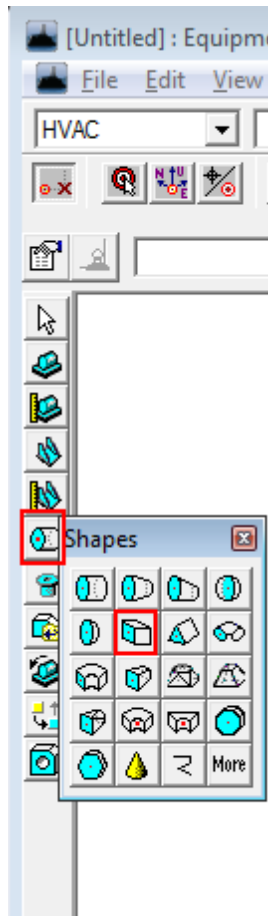
15. Ensure that the **Equipment Classification 1** value is set to **Air Handling Unit**, and click **OK**.



The image shows a software dialog box titled "Design Equipment Properties". It has two tabs: "Occurrence" and "Definition", with "Definition" currently selected. Below the tabs is a "Category:" label followed by a dropdown menu showing "Standard". The main area contains a table with two columns: "Property" and "Value". The table lists various properties, with "Part Number" set to "AHU-01", "Mirror Behavior Option" set to "Component may be mirrored", and "Equipment Classification 1" set to "Air Handling Unit". The values for "Part Number", "Equipment Classification 0", and "Equipment Classification 1" are highlighted with red boxes. At the bottom right are "OK" and "Cancel" buttons.

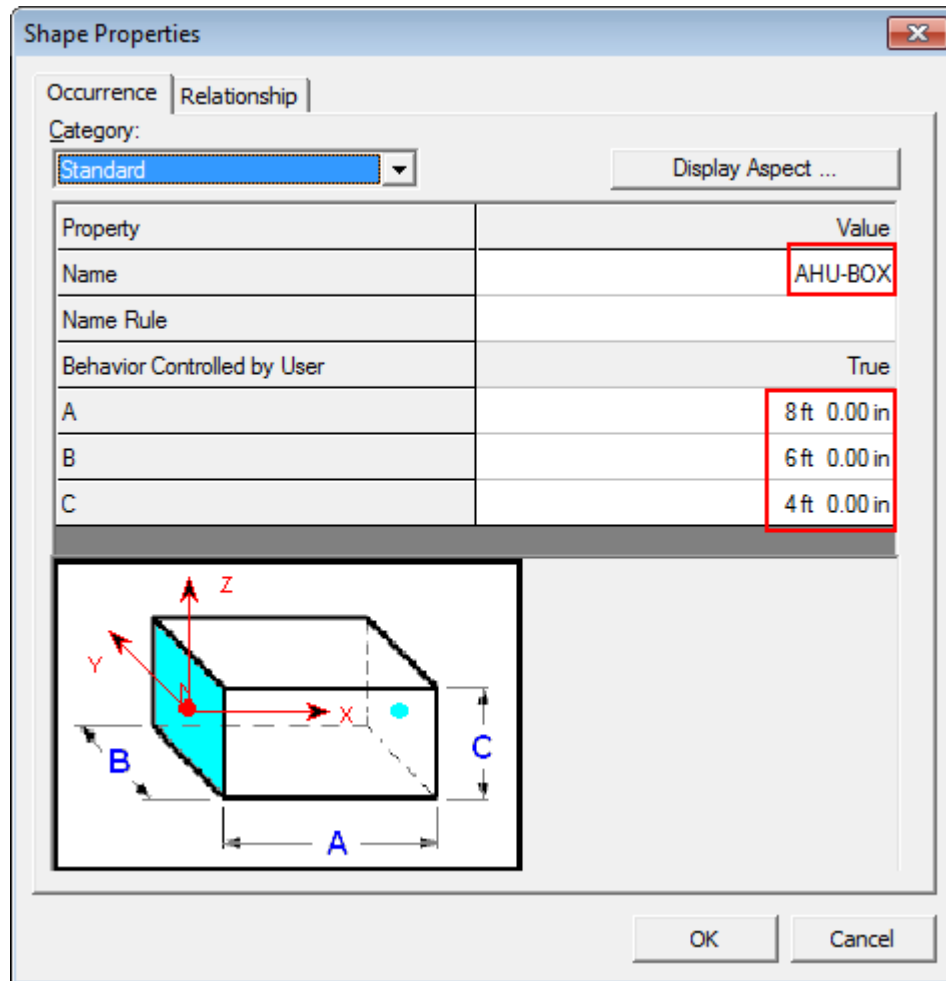
Property	Value
Part Number	AHU-01
Part Description	
Mirror Behavior Option	Component may be mirrored
Equipment Classification 0	HVAC Equipment
Equipment Classification 1	Air Handling Unit
Equipment Classification 2	
Equipment Classification 3	
Equipment Classification 4	
Equipment Classification 5	
Equipment Classification 6	

16. If prompted, select equipment **AHU-01** in the **Workspace Explorer**. Click **Place Shape** , and select **RectangularSolid 001** to specify the shape of the design equipment.

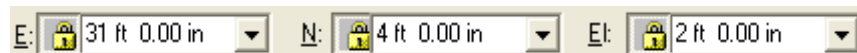


The **Shape Properties** dialog box displays.

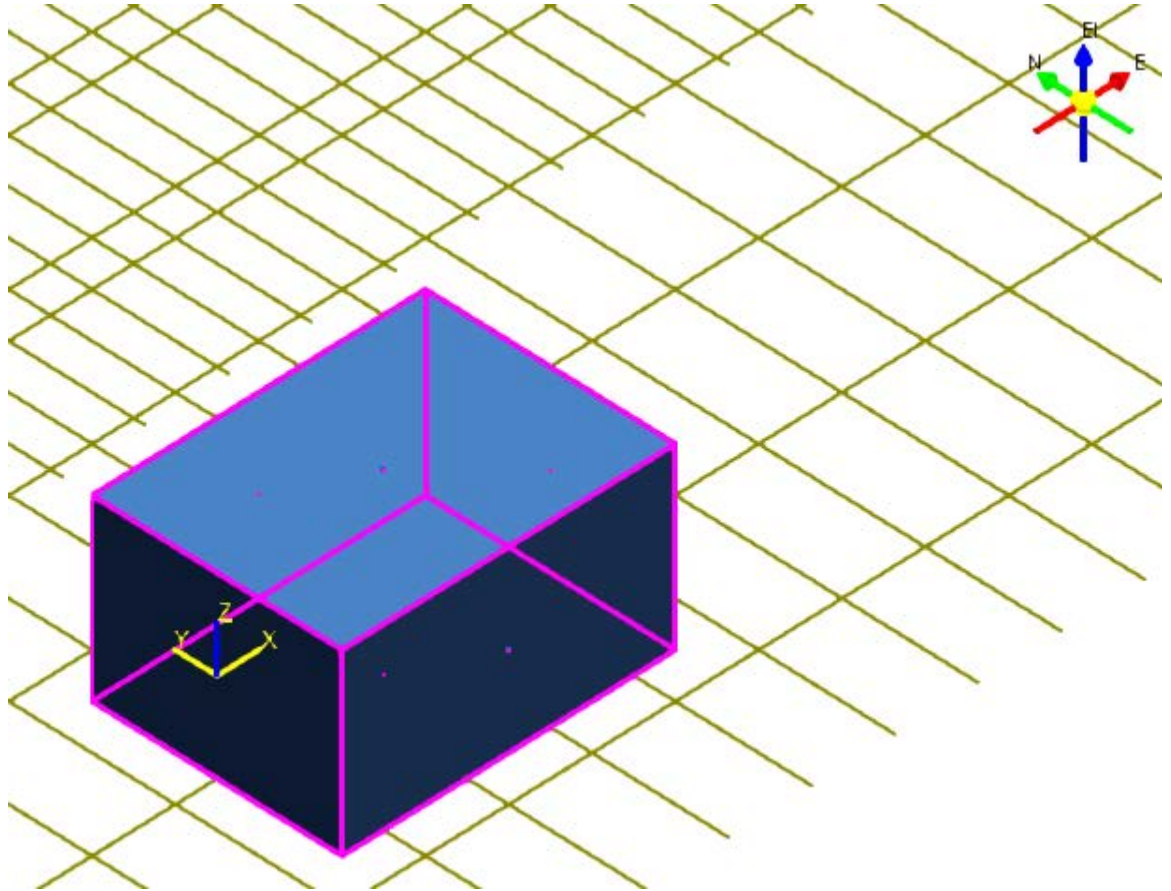
17. Change the name of the shape to **AHU-BOX**, and type the values **8 ft** for **A**, **6 ft** for **B**, and **4 ft** for **C**, as shown in the following figure:




18. Click **OK** to close the **Shape Properties** dialog box.
19. Type **31 ft** for **E**, **4 ft** for **N**, and **2 ft** for **El** on the **PinPoint** ribbon, and click in the graphic view to place the unit.

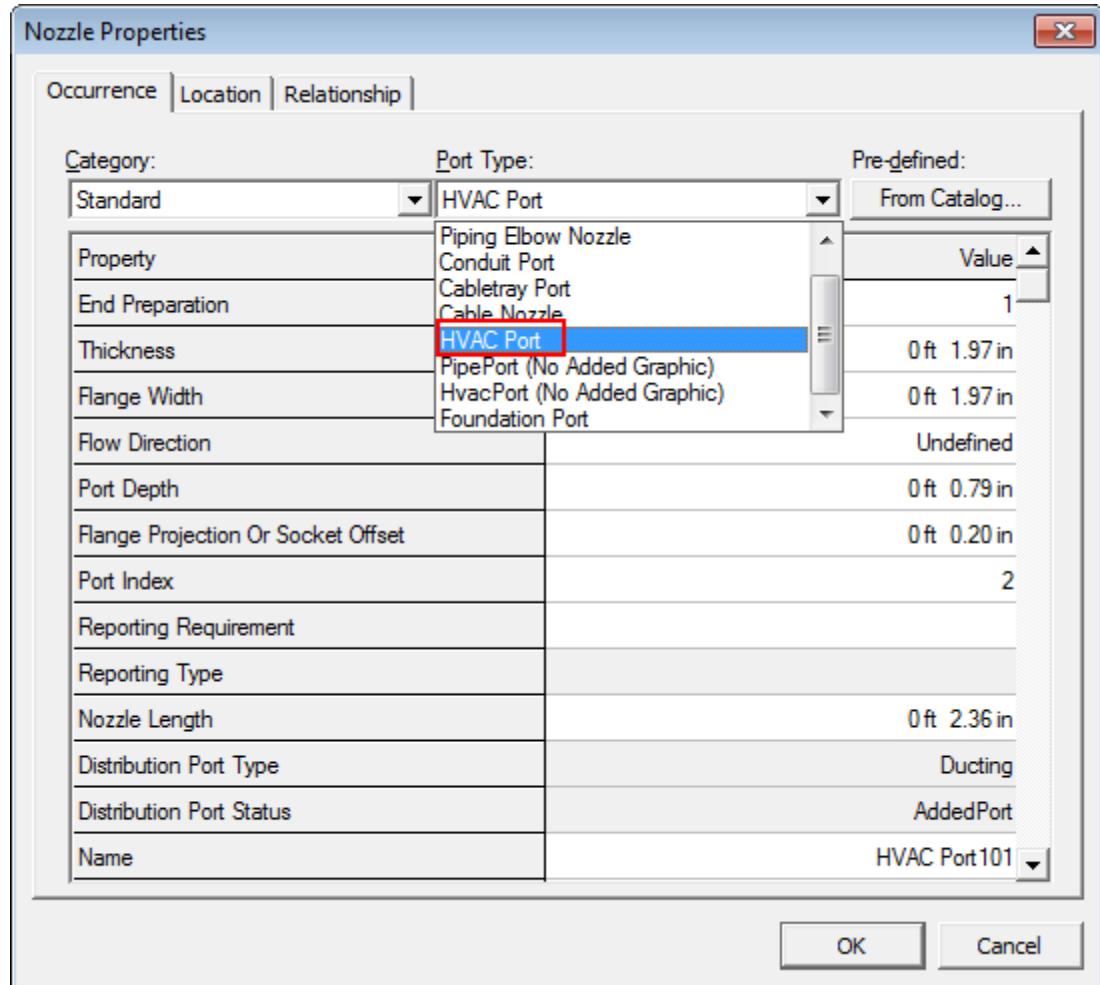


The designed AHU displays.



20. Click **Place Nozzle**  to place HVAC nozzles on this equipment.
21. If prompted, select **AHU-BOX** shape graphically or in the **Workspace Explorer**.
*The **Nozzle Properties** dialog box displays.*

22. Select **HVAC Port** from the **Port Type** list.



The screenshot shows the 'Nozzle Properties' dialog box with the 'Port Type' dropdown menu open. The 'HVAC Port' option is highlighted with a red box. The 'Pre-defined' dropdown is set to 'From Catalog...'. The 'Value' column shows various dimensions and settings for the selected port type.

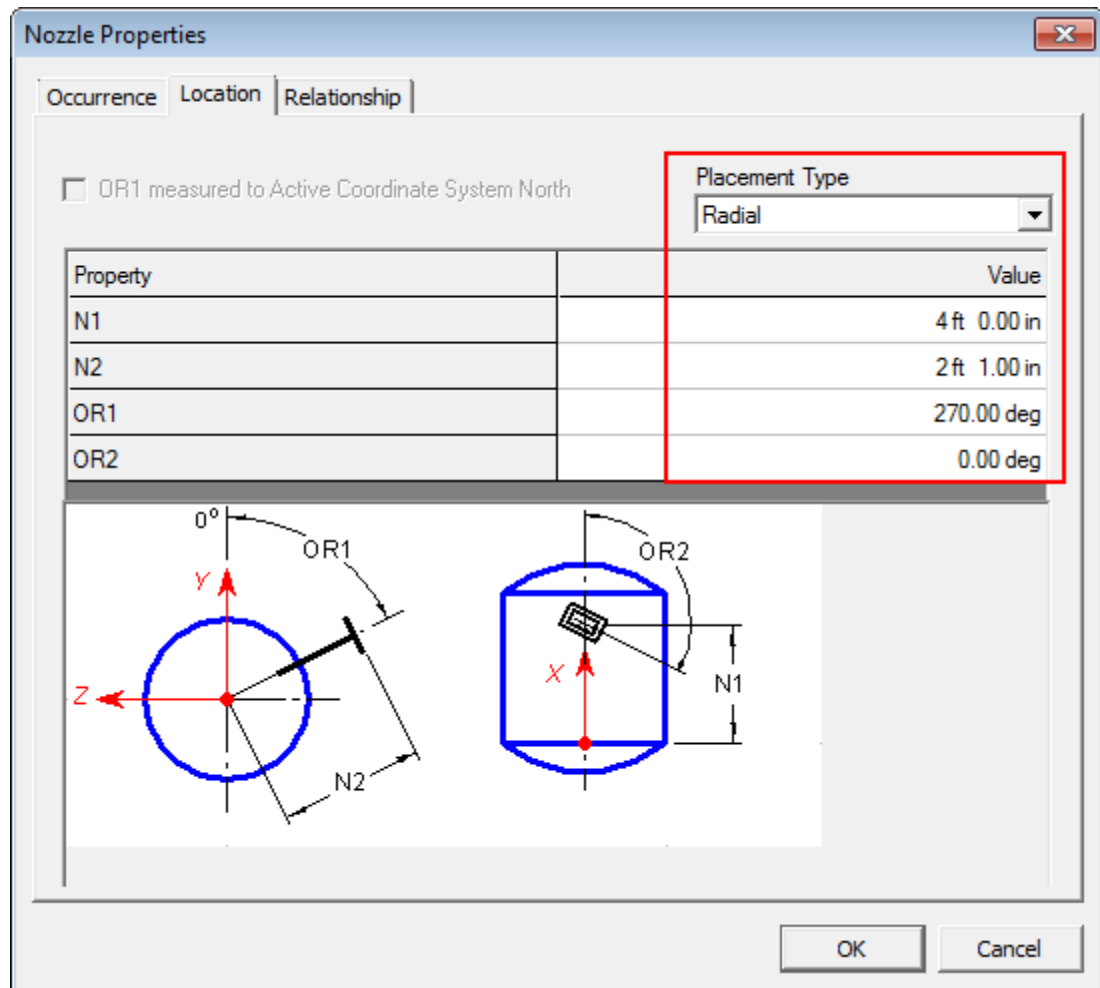
Property	Value
End Preparation	1
Thickness	0 ft 1.97 in
Flange Width	0 ft 1.97 in
Flow Direction	Undefined
Port Depth	0 ft 0.79 in
Flange Projection Or Socket Offset	0 ft 0.20 in
Port Index	2
Reporting Requirement	
Reporting Type	
Nozzle Length	0 ft 2.36 in
Distribution Port Type	Ducting
Distribution Port Status	AddedPort
Name	HVAC Port101

23. Click the **Occurrence** tab, and set the nozzle properties as highlighted in the following figure:

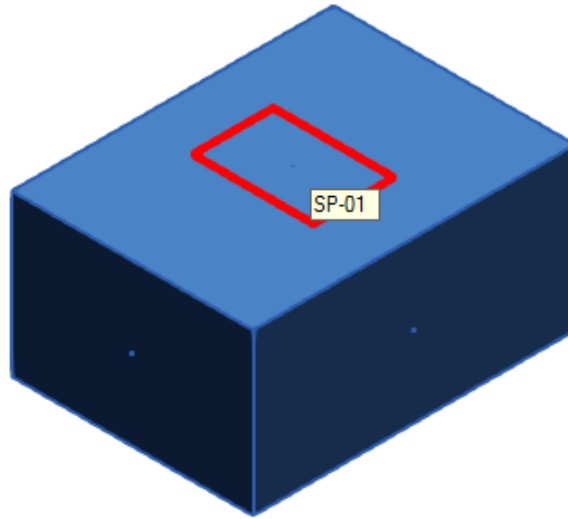
The image shows the 'Nozzle Properties' dialog box with the 'Occurrence' tab selected. The 'Category' is set to 'Standard' and the 'Port Type' is 'HVAC Port'. The 'Pre-defined' button is labeled 'From Catalog...'. The 'Property' list on the left includes 'End Preparation', 'Thickness', 'Flange Width', 'Flow Direction', 'Port Depth', 'Flange Projection Or Socket Offset', 'Port Index', 'Reporting Requirement', 'Reporting Type', 'Nozzle Length', 'Distribution Port Type', 'Distribution Port Status', 'Name', 'Width', 'Depth', 'ComerRadius', 'Dimension Base Outer', 'Cross Section Shape', and 'Behavior Controlled by User'. The 'Value' column on the right contains the following values: '1', '0 ft 0.25 in', '0 ft 0.00 in', 'Flow leaves this port', '0 ft 0.00 in', '0 ft 0.00 in', '1', '0 ft 1.00 in', 'Ducting', 'AddedPort', 'SP-01', '3 ft 0.00 in', '2 ft 0.00 in', '0 ft 0.00 in', 'True', 'Rectangle', and 'True'. The values '0 ft 0.25 in', '0 ft 0.00 in', 'Flow leaves this port', '0 ft 0.00 in', '0 ft 0.00 in', '1', '0 ft 1.00 in', 'SP-01', '3 ft 0.00 in', '2 ft 0.00 in', '0 ft 0.00 in', 'True', and 'Rectangle' are highlighted in red boxes. The 'OK' and 'Cancel' buttons are at the bottom right.

Property	Value
End Preparation	1
Thickness	0 ft 0.25 in
Flange Width	0 ft 0.00 in
Flow Direction	Flow leaves this port
Port Depth	0 ft 0.00 in
Flange Projection Or Socket Offset	0 ft 0.00 in
Port Index	1
Reporting Requirement	
Reporting Type	
Nozzle Length	0 ft 1.00 in
Distribution Port Type	Ducting
Distribution Port Status	AddedPort
Name	SP-01
Width	3 ft 0.00 in
Depth	2 ft 0.00 in
ComerRadius	0 ft 0.00 in
Dimension Base Outer	True
Cross Section Shape	Rectangle
Behavior Controlled by User	True

24. Click the **Location** tab, and select **Radial** from the **Placement Type** list.



The nozzle displays as highlighted in the following figure.

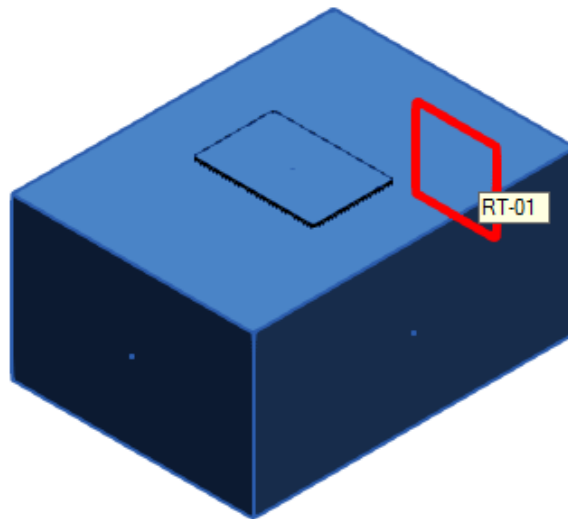


25. Repeat the previous steps to place the second nozzle with the following properties:

Occurrence tab	
Thickness	0.25 in
Flange Width	0
Flow Direction	Flow enters this port
Port Depth	0
Flange Projection	0
Port Index	2
Nozzle Length	1 in
Name	RT-01
Width	2 ft
Depth	2 ft
CornerRadius	0
Dimension Base Outer	True
Cross Section Shape	Rectangle

Location tab	
Placement Type	Axial
N1	8 ft 1 in
N2	0
OR1	0 deg
OR2	0 deg

The second nozzle displays.



Design Diffusers

Just as you designed AHU-01 in the previous activity, you design diffusers by using existing shapes in the Catalog and then modifying the required properties. You then appropriately name the designed equipment.

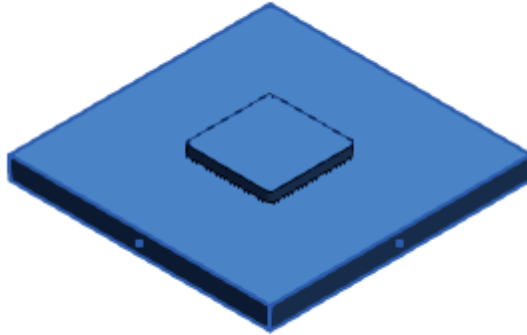
Design rectangular and round diffusers under the **Supply Devices** system in the **Workspace Explorer** with the following specifications:

Specifications for Rectangular Diffuser

Type	Specification	Values
Design Equipment	Name	D24X24REC8
	Equipment type	Generic Aides

	Equipment Classification 0	HVAC Equipment
	Equipment Classification 1	Air Moving Devices and Components
	Equipment Classification 2	Diffuser
	Shape	D-BOX
	Shape Properties	2 in for A, 2 ft 0 in for B, 2 ft for C
Nozzle	Port Type	HVAC Port
	Thickness	0
	Flange Width	0
	Flow Direction	Flow enters this port
	Nozzle Length	1 in
	Port Depth	0
	Name	Neck
	Width	8 in
	Depth	8 in
	Cross Section Shape	Rectangle
	Placement Type	Axial
	N1	-1 in
	N2	0
	OR1	0
	OR2	0

Place the designed rectangular diffuser in **Unit U06** at coordinates **20 ft** for **E**, **-20 ft** for **N**, and **0 ft** for **EI**. The diffuser looks like the following figure after you place it.

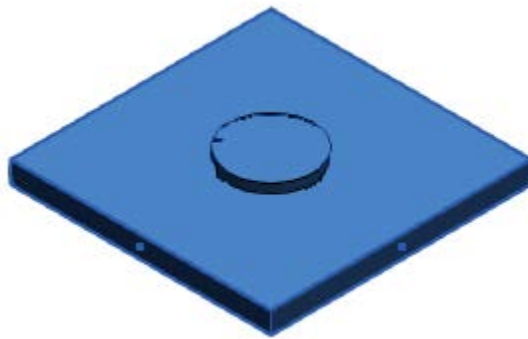


Specifications for Round Diffuser


Type	Specification	Values
Design Equipment	Name	D24X24RND8
	Equipment Type	Generic Aides
	Equipment Classification 0	HVAC Equipment
	Equipment Classification 1	Air Moving Devices and Components
	Equipment Classification 2	Diffuser
	Shape	D-BOX
	Shape Properties	A=2 in, B=2 ft, C=2 ft
Nozzle	Port Type	HVAC Port
	Thickness	0
	Flange Width	0
	Flow Direction	Flow enters this port
	Nozzle Length	1 in
	Port Depth	0

Type	Specification	Values
Design Equipment	Name	D24X24RND8
	Equipment Type	Generic Aides
	Name	Neck
	Width	8 in
	Depth	8 in
	Cross Section Shape	Round
	Placement Type	Axial
	N1	-1 in
	N2	0
	OR1	0
	OR2	0

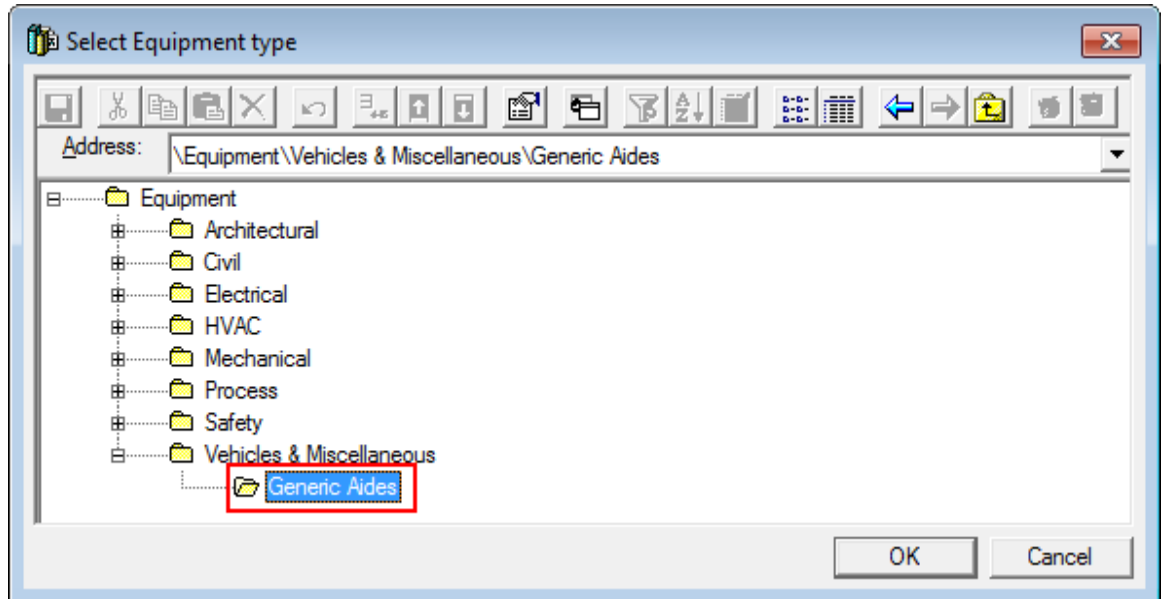
Place the designed round diffuser in **Unit U06** at coordinates **23 ft** for **E**, **-20 ft** for **N**, and **0 ft** for **EI**.



Designing the Rectangular Diffuser

1. Click **Place Designed Equipment**  on the vertical toolbar.
The **Select Equipment type** dialog box displays.

2. In this dialog box, expand **Equipment > Vehicles and Miscellaneous > Generic Aides**, and click **OK**.

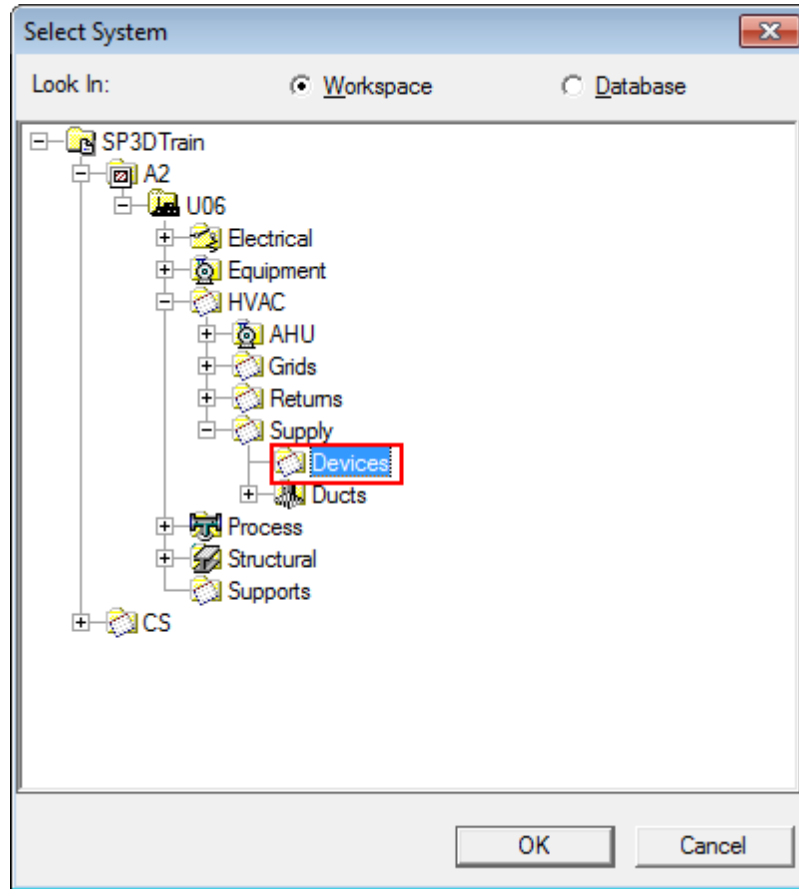


The **Design Equipment Properties** dialog box displays.

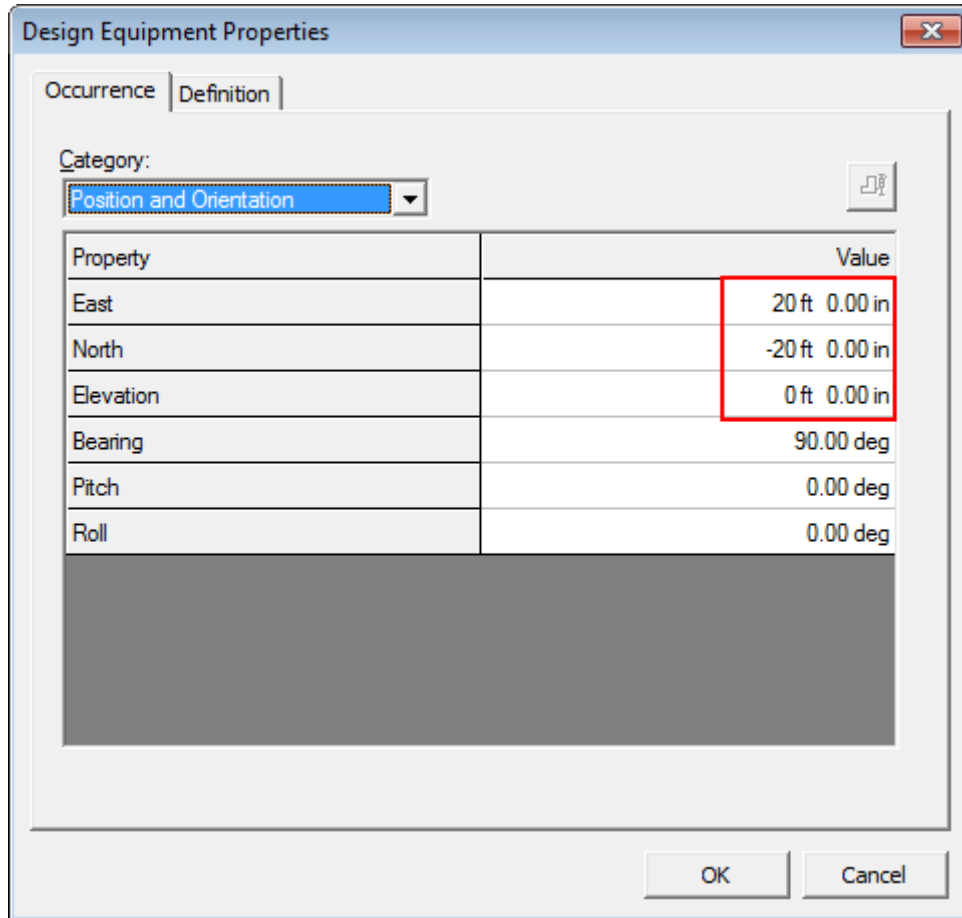
3. Change the name to **D24X24REC8**.

Design HVAC Equipment

4. Expand **A2 > U06 > HVAC > Supply > Devices in the System** to select the appropriate system.



5. Switch to the **Position and Orientation** category, and type **20 ft** for **East**, **-20 ft** for **North**, and **0 ft** for **Elevation**.

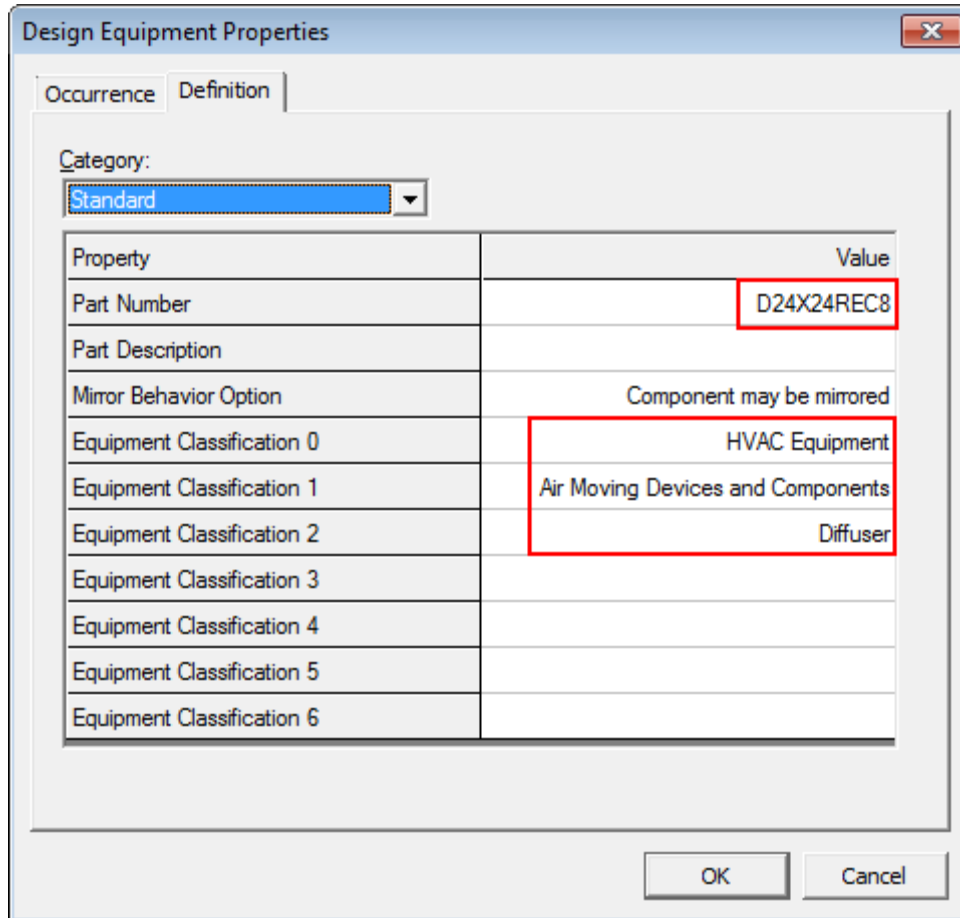


The image shows a software dialog box titled "Design Equipment Properties". It has two tabs: "Occurrence" and "Definition". The "Definition" tab is selected. Under the "Category:" label, a dropdown menu shows "Position and Orientation". Below this is a table with two columns: "Property" and "Value". The table contains the following data:

Property	Value
East	20 ft 0.00 in
North	-20 ft 0.00 in
Elevation	0 ft 0.00 in
Bearing	90.00 deg
Pitch	0.00 deg
Roll	0.00 deg

The values for East, North, and Elevation are highlighted with a red box. At the bottom of the dialog are "OK" and "Cancel" buttons.

6. Click the **Definition** tab, make the changes shown in the following figure, and click **OK**.



The image shows the 'Design Equipment Properties' dialog box with the 'Definition' tab selected. The 'Category' dropdown is set to 'Standard'. A table lists various properties and their values, with several cells highlighted by red boxes.


Property	Value
Part Number	D24X24REC8
Part Description	
Mirror Behavior Option	Component may be mirrored
Equipment Classification 0	HVAC Equipment
Equipment Classification 1	Air Moving Devices and Components
Equipment Classification 2	Diffuser
Equipment Classification 3	
Equipment Classification 4	
Equipment Classification 5	
Equipment Classification 6	

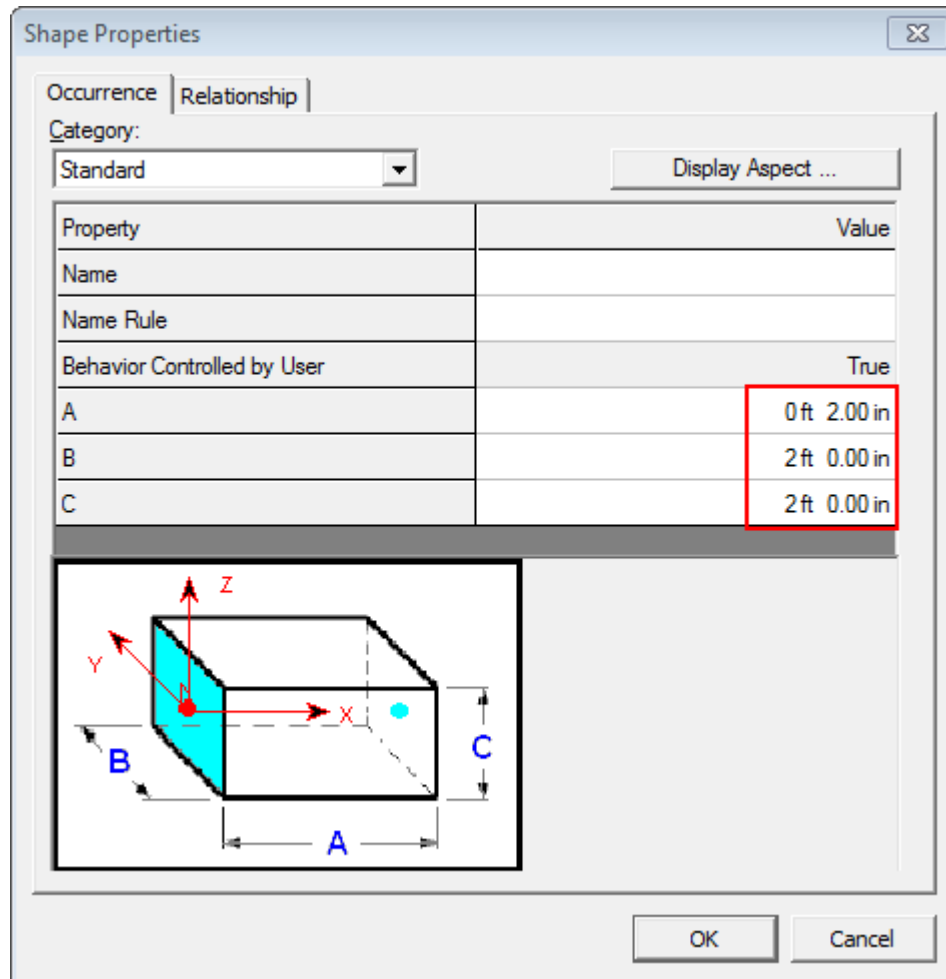
The local coordinate system for the design equipment displays in the graphic view.



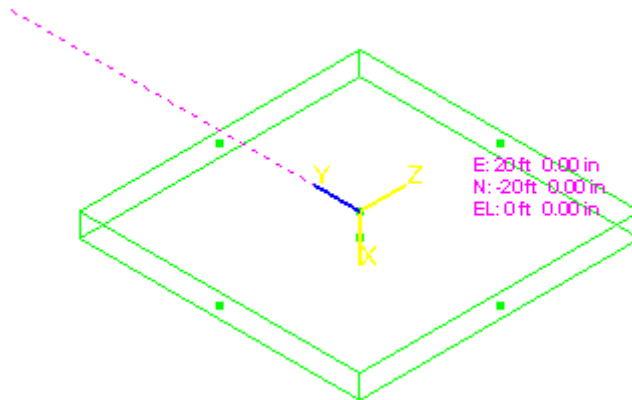
- Click **Window > Tile Horizontally** to set the active view. Press the UP arrow key to change the axis of rotation to the Y-axis (blue color). Then, press the LEFT arrow key to rotate the triad so that X-axis is pointing downwards as shown in the following figure.



- Click **Place Shape** .
*The **Shapes** dialog box displays.*
- Select the **RectangularSolid 001** shape in the dialog box.
*The **Shape Properties** dialog box displays.*
- Type the values **2 in** for **A**, **2 ft** for **B**, and **2 ft** for **C**, and click OK.




- On the **PinPoint** ribbon, type the values **20 ft** for **E**, **-20 ft** for **N**, and **0 ft** for **EL**. Click in the graphic view to place the shape.



- Rename the shape as **D-BOX** in the **Name** field on the ribbon.

Name	Equipment
D-BOX	D24X24REC8

- Click **Place Nozzle** , and select the **D-BOX** shape as the nozzle parent.

*The **Nozzle Properties** dialog box displays.*

- Select **HVAC Port** from the **Port Type** list.
- Change the properties as specified:

Occurrence tab	
Thickness	0
Flange Width	0
Flow Direction	Flow enters this port
Port Depth	0
Flange Projection	0
Port Index	1
Nozzle Length	1 in
Name	Neck
Width	8 in
Depth	8 in

Cross Section Shape	Rectangle
----------------------------	-----------

Location tab

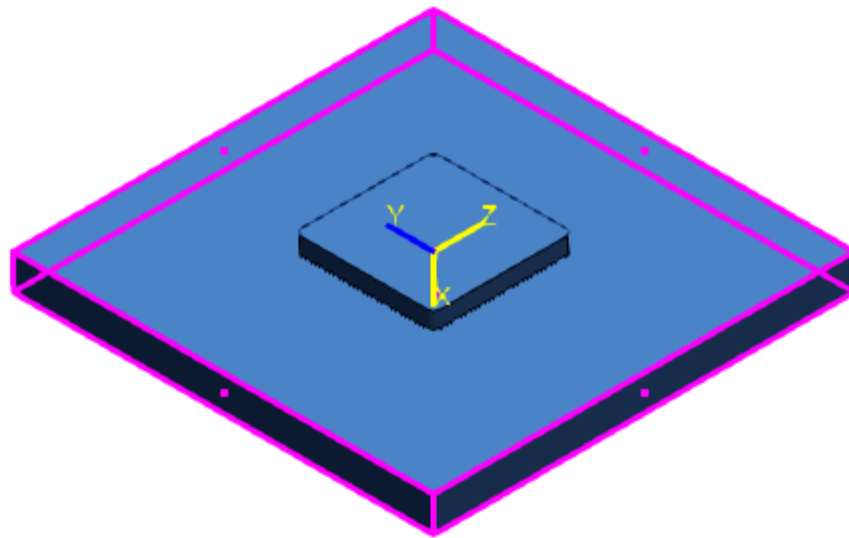
Placement Type Axial

N1 -1 in

N2 0

OR1 0 deg

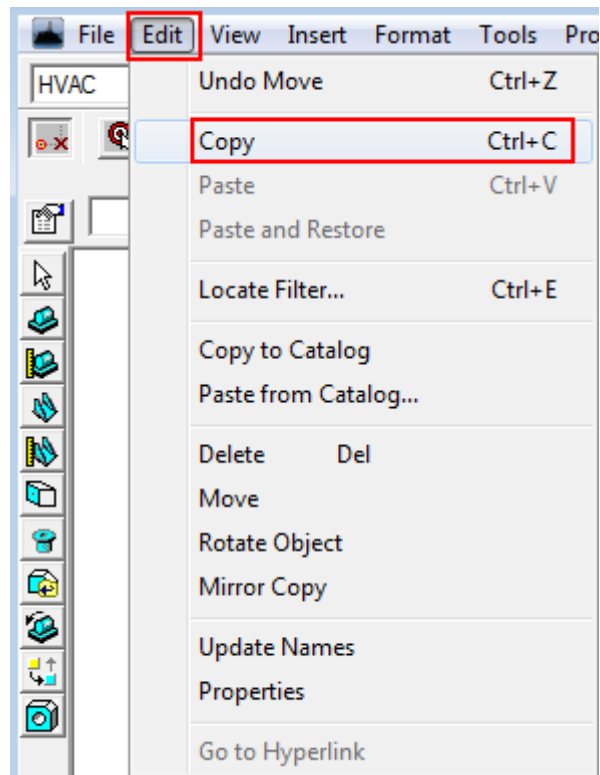
OR2 0 deg



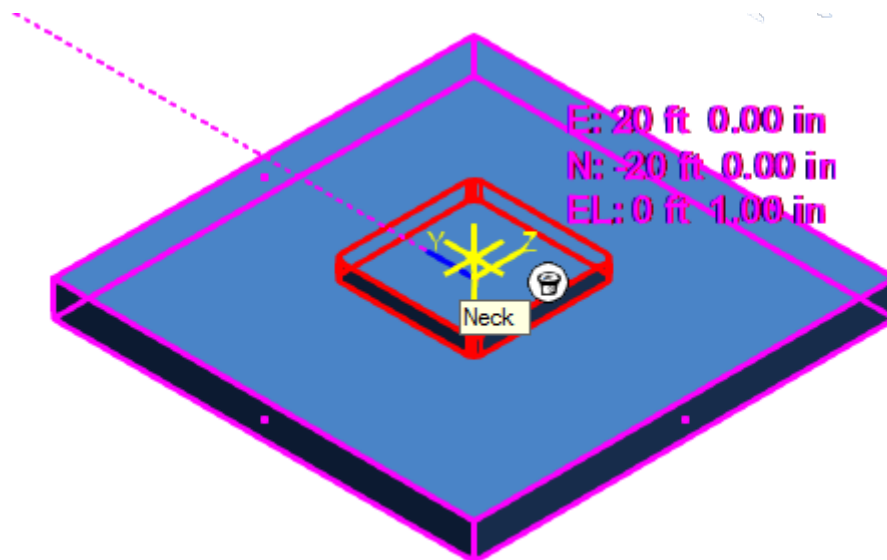
For designing a round diffuser, you copy the rectangular diffuser placed in the previous activity and paste the diffuser at the specified location. You then modify the specifications and properties of the diffuser to design it as required. Finally, you name the designed round diffuser.

Designing the Round Diffuser

1. Select the designed equipment **D24X24REC8**. Click **Edit > Copy**.

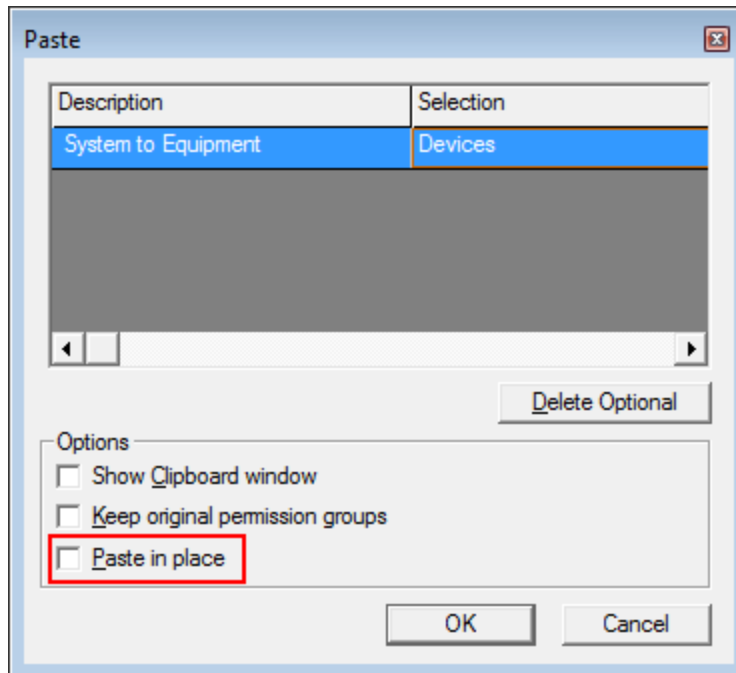


2. Click to select the center of the port as a reference point.

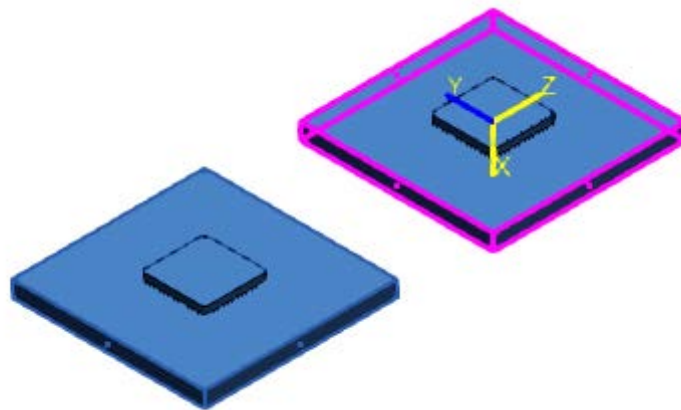


3. Click **Edit > Paste**.
*The **Paste** dialog box displays.*

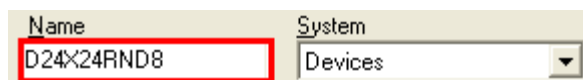
- Keep the parent system for designed equipment as **Devices**. Ensure that the **Paste in place** check box is cleared, and click **OK**.



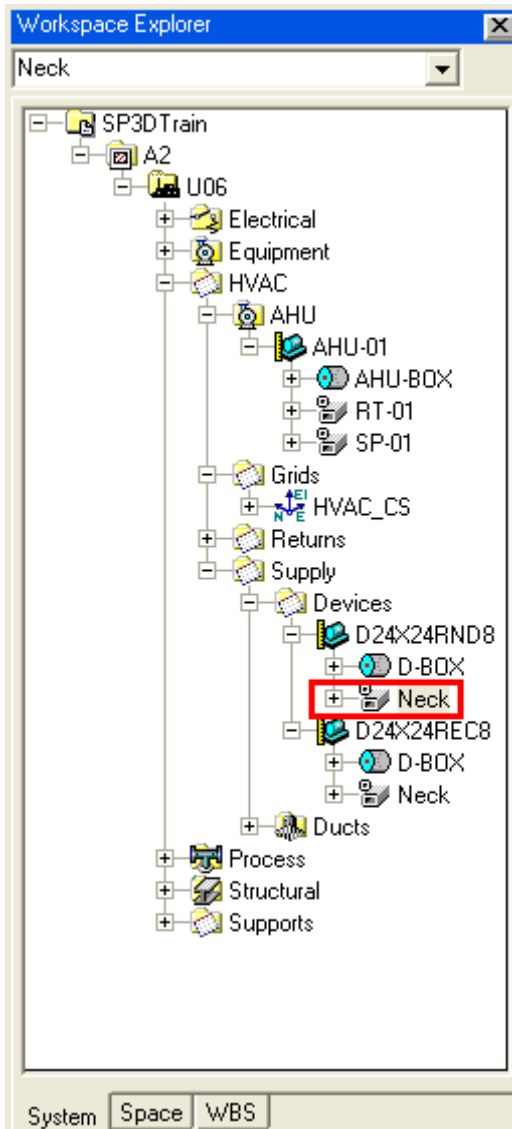
- Type **23 ft** for **E**, **-20 ft** for **N**, and **0 ft** for **EI** on the ribbon, and click to place the equipment as highlighted in the following figure.




- Type **D24X24RND8** in the **Name** box for the new shape.



7. Select **HVAC Nozzle** from the **Locate Filter** list. Select the nozzle **Neck** under **D24X24RND8** in the **Workspace Explorer**.



8. Click **Properties**  on the ribbon to open the **HVAC Nozzle Properties** dialog box. Change the **Cross Section Shape** to **Round**. Click **OK** to accept the change.

Hvac Nozzle Properties

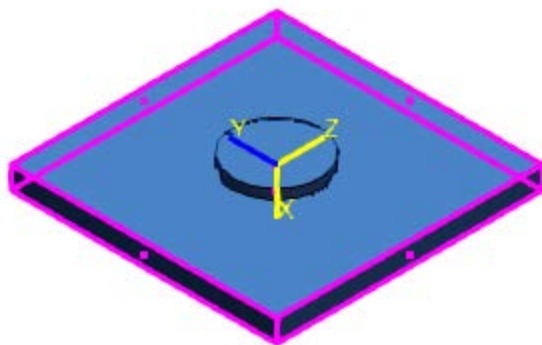
Occurrence | Location | Relationship | Configuration

Category: Standard Port Type: HVAC Port Pre-defined: From Catalog...

Property	Value
Port Index	1
Reporting Requirement	
Reporting Type	
Nozzle Length	0 ft 1.00 in
Distribution Port Type	Ducting
Distribution Port Status	AddedPort
Name	Neck
Width	0 ft 8.00 in
Depth	0 ft 8.00 in
ComerRadius	0 ft 0.39 in
Dimension Base Outer	True
Cross Section Shape	Rectangular
Behavior Controlled by User	Rectangular FlatOval Round

OK Cancel Apply

The round diffuser displays.



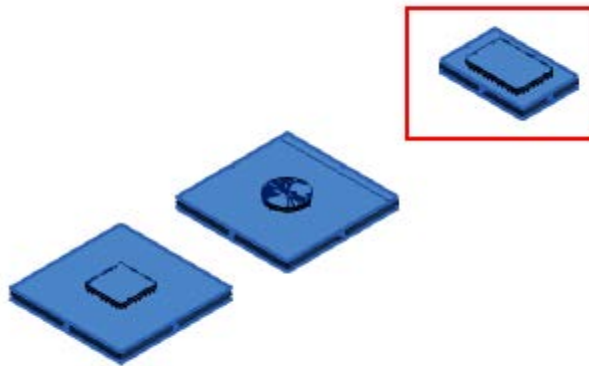
Design a Grill

Design a grill **G18X12REC12X8** under the **Return Devices** system with the following specifications:

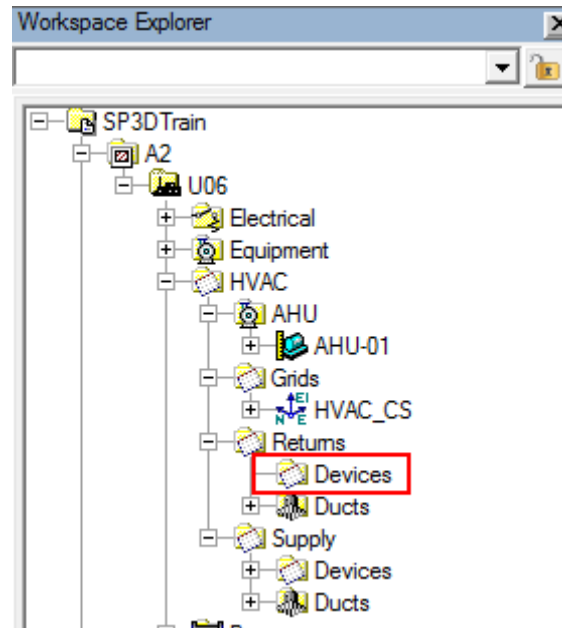
Type	Specification	Values
Design Equipment	Name	G18X12REC12X8
	Equipment Type	Generic Aides
	Equipment Classification 0	HVAC Equipment
	Equipment Classification 1	Air Moving Devices and Components
	Equipment Classification 2	Grills
	Shape	G-BOX
	Shape Properties	2 in for A, 1 ft 6 in for B, 1 ft for C
Nozzle	Port Type	HVAC Port
	Thickness	0
	Flange Width	0
	Flow Direction	Flow leaves this port
	Nozzle Length	1 in
	Port Depth	0
	Name	Neck
	Width	1 ft
	Depth	8 in
	Cross Section Shape	Rectangle
	Placement Type	Axial
	N1	-1 in

	N2	0
	OR1	0
	OR2	0

Place the grill in Unit **U06** at coordinates **27 ft** for **E**, **-20 ft** for **N**, and **0 ft** for **EI**.



1. Copy and paste the diffuser **D24X24REC8** and place the diffuser under the **Return Devices** system in the **Workspace Explorer**.




Design HVAC Equipment

2. Type the coordinates as **27 ft** for **E**, **-20 ft** for **N**, and **0 ft** for **EI** on the ribbon, and click to place the equipment.

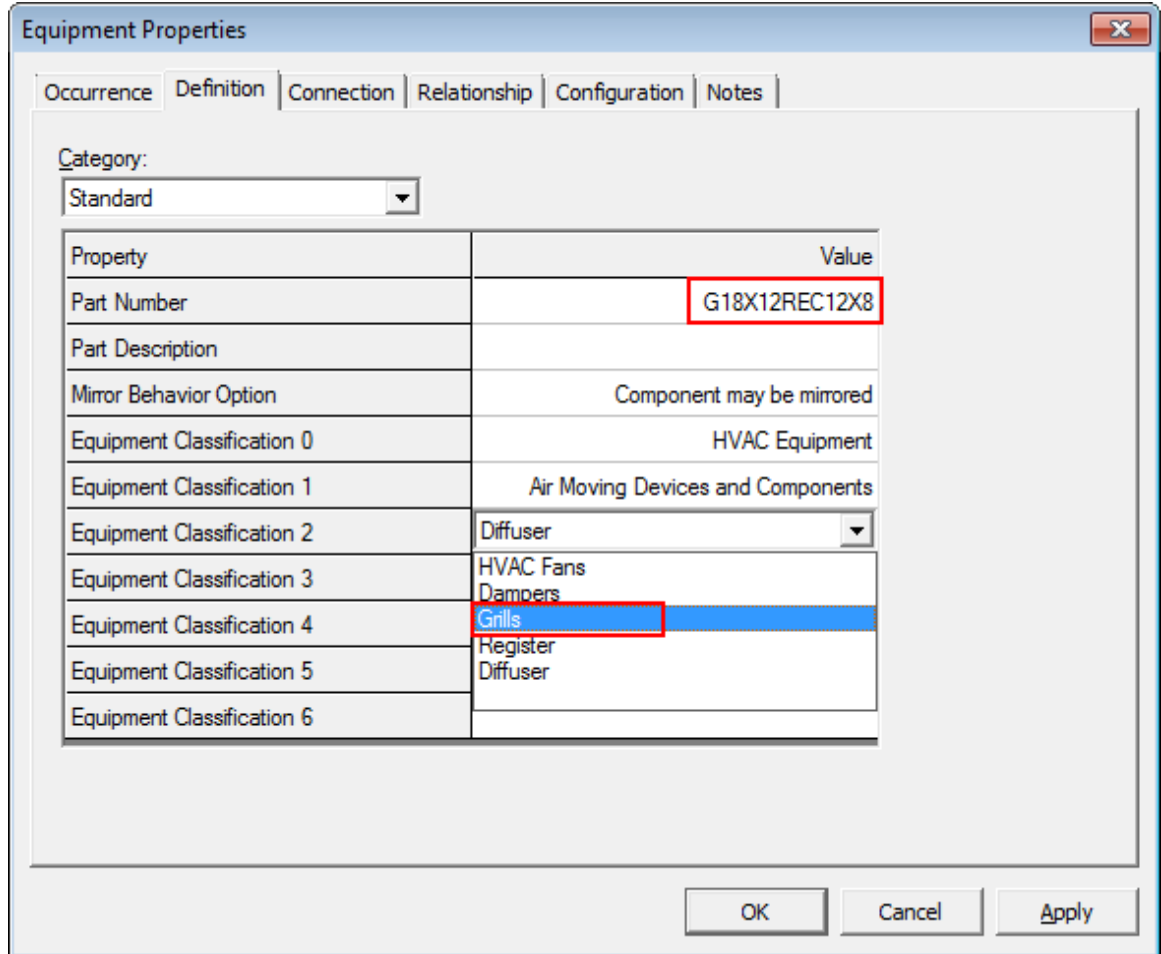


3. Rename the equipment as **G18X12REC12X8**.

Name	System
G18X12REC12X8	Devices

4. Click **Properties**  to display the **Equipment Properties** dialog box for **G18X12REC12X8**.

- Click the **Definition** tab on the **Equipment Properties** dialog box, change **Equipment Classification 2** to **Grills**, **Part Number** to **G18X12REC12X8**, and click **OK**.




Equipment Properties

Occurrence | Definition | Connection | Relationship | Configuration | Notes

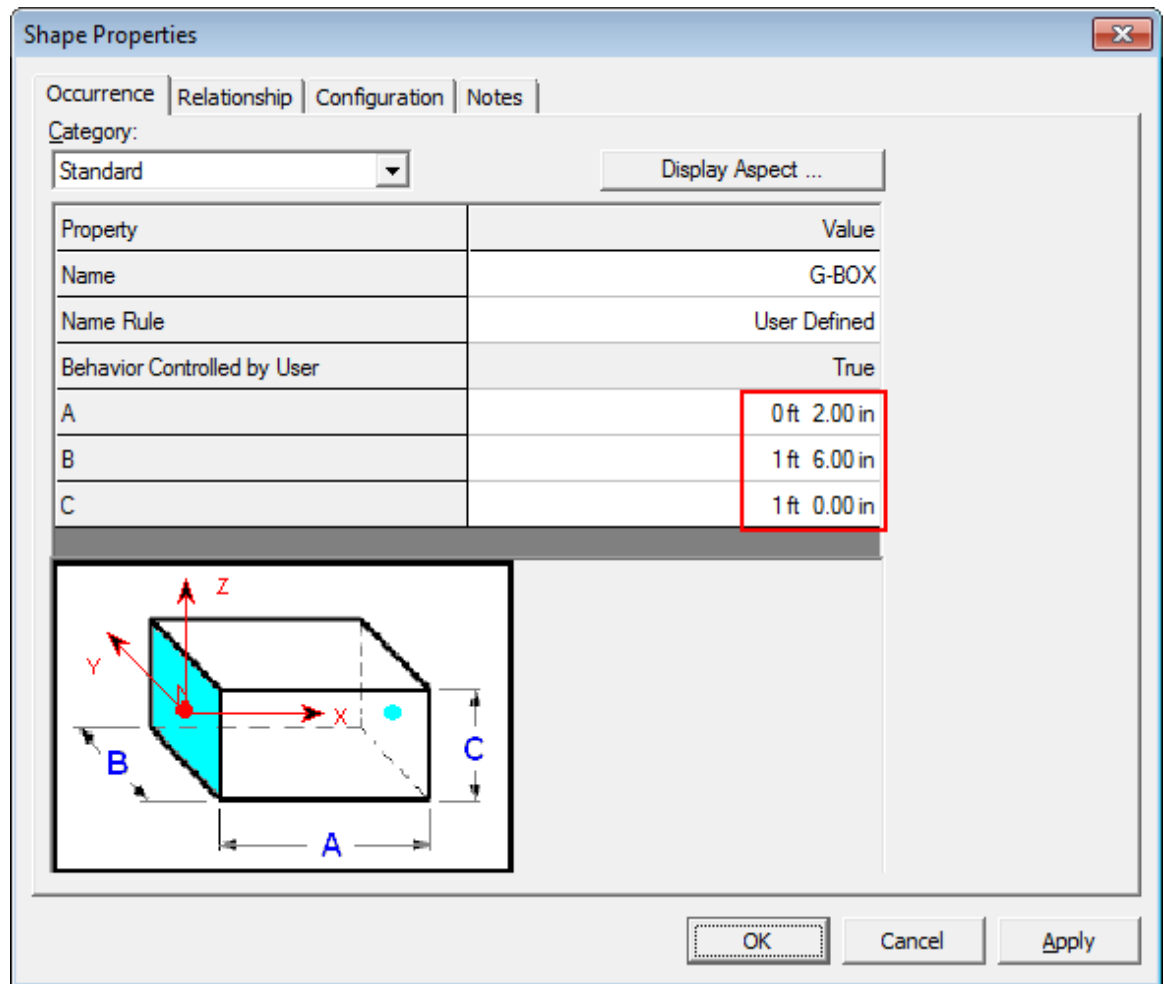
Category: Standard

Property	Value
Part Number	G18X12REC12X8
Part Description	
Mirror Behavior Option	Component may be mirrored
Equipment Classification 0	HVAC Equipment
Equipment Classification 1	Air Moving Devices and Components
Equipment Classification 2	Diffuser
Equipment Classification 3	HVAC Fans
Equipment Classification 4	Dampers
Equipment Classification 5	Grills
Equipment Classification 6	Register
	Diffuser

OK Cancel Apply

- Select **Shape** from the **Locate Filter** list.
- Select **D-BOX** under **G18X12REC12X8** in the **Workspace Explorer**, and change the name to **G-BOX**.
- Click **Properties**  on the ribbon to display the **Properties** dialog box for **G-BOX**.

9. Type **2 in** for **A**, **1 ft 6 in** for **B**, and **1 ft** for **C**, and click **OK**.



10. Select **HVAC Nozzle** from the **Locate Filter** list. Select **Neck** (HVAC port) under **G18X12REC12X8** in the **Workspace Explorer**, and open the **HVAC Nozzle Properties** dialog box. Change the **Width** to **1 ft** and **Depth** to **8 in**.

Hvac Nozzle Properties

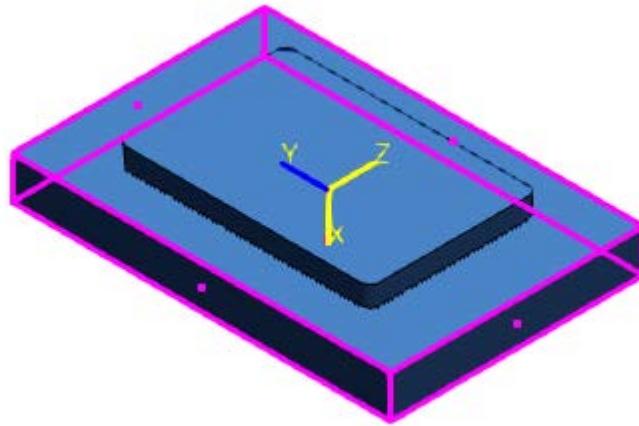
Occurrence | Location | Relationship | Configuration

Category: Standard Port Type: HVAC Port Pre-defined: From Catalog...

Property	Value
Port Index	1
Reporting Requirement	
Reporting Type	
Nozzle Length	0 ft 1.00 in
Distribution Port Type	Ducting
Distribution Port Status	AddedPort
Name	Neck
Width	1 ft 0.00 in
Depth	0 ft 8.00 in
ComerRadius	0 ft 0.39 in
Dimension Base Outer	True
Cross Section Shape	Rectangle
Behavior Controlled by User	True

OK Cancel Apply

The grill displays.



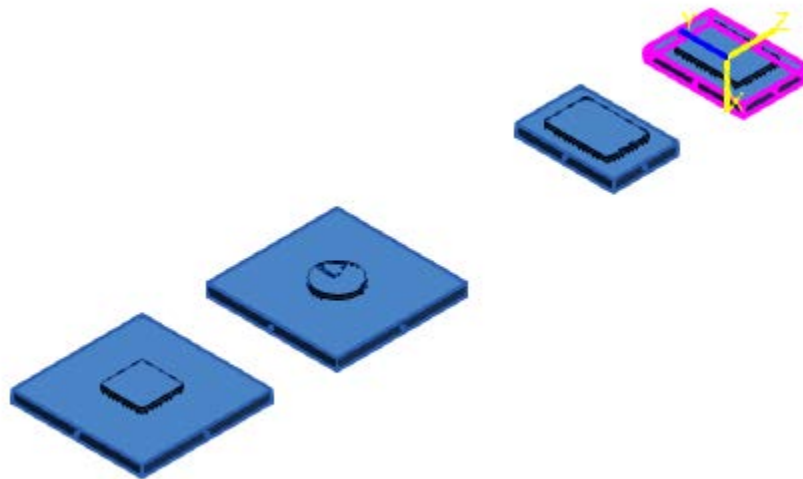
Design a Register

Design a register **R18X12REC12X8** under the **Return Devices** system in the **Workspace Explorer** with the following specifications:


Type	Specification	Values
Design Equipment	Name	R18X12REC12X8
	Equipment type	Generic Aides
	Equipment Classification 0	HVAC Equipment
	Equipment Classification 1	Air Moving Devices and Components
	Equipment Classification 2	Register
	Shape	R-BOX
	Shape Properties	2 in for A, 1 ft 6 in for B, 1 ft for C
Nozzle	Port Type	HVAC Port
	Thickness	0
	Flange Width	0

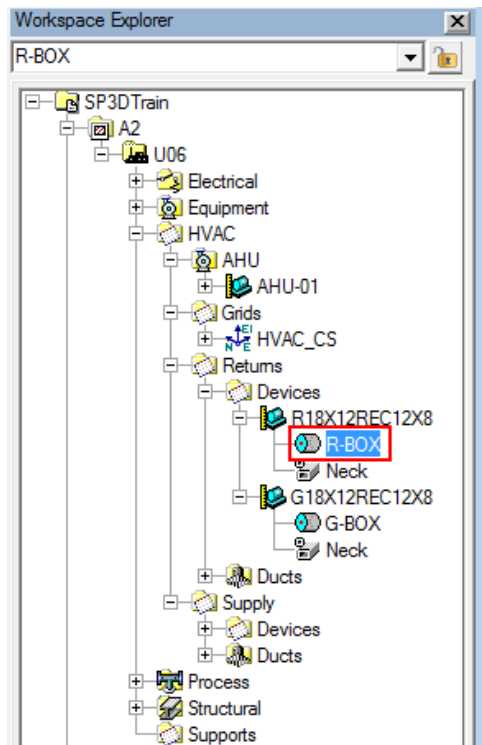
	Flow Direction	Flow leaves this port
	Nozzle Length	1 in
	Port Depth	0
	Name	Neck
	Width	8 in
	Depth	8 in
	Cross Section Shape	Rectangle
	Placement Type	Axial
	N1	-1 in
	N2	0
	OR1	0
	OR2	0

Place the register in **Unit U06** at coordinates **29 ft** for **E**, **-20 ft** for **N**, and **0 ft** for **EI**.



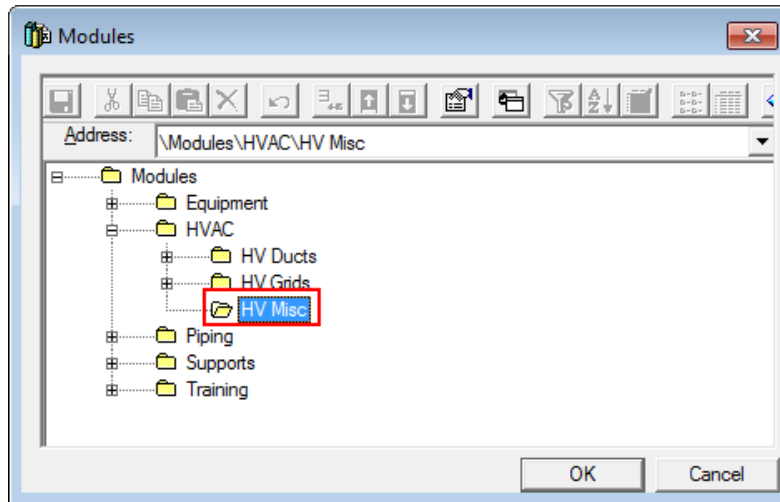
1. Copy and paste the grill **G18X12REC12X8**, and place the grill under the **Return Devices** system in the **Workspace Explorer**.
2. Type the coordinates as **29 ft** for **E**, **-20 ft** for **N**, and **0 ft** for **EI** on the ribbon, and click to place the register.
3. Name the HVAC equipment as **R18X12REC12X8**.

4. Click **Properties**  on the ribbon to display the **Equipment Properties** dialog box for **R18X12REC12X8**. On the **Definition** tab, change **Equipment Classification 2** to **Register**, **Part Number** to **R18X12REC12X8**, and click **OK**.
5. Select **Shape** from the **Locate Filter** list. Select the shape **G-BOX** under **R18X12REC12X8** in the **Workspace Explorer**, and change the name to **R-BOX**.

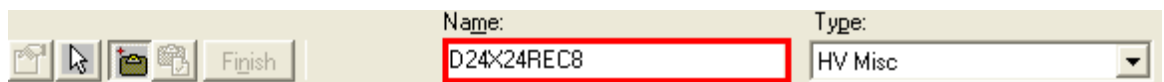


Copy to the Catalog

1. Select **Equipment** from the **Locate Filter** list.
2. Select the diffuser **D24X24REC8** in the Workspace Explorer.
3. Click **Edit > Copy to Catalog**.
4. Select **More** from the **Type** list. Then, click **HVAC > HV Misc** to add the diffuser to the miscellaneous folder. Click **OK**.



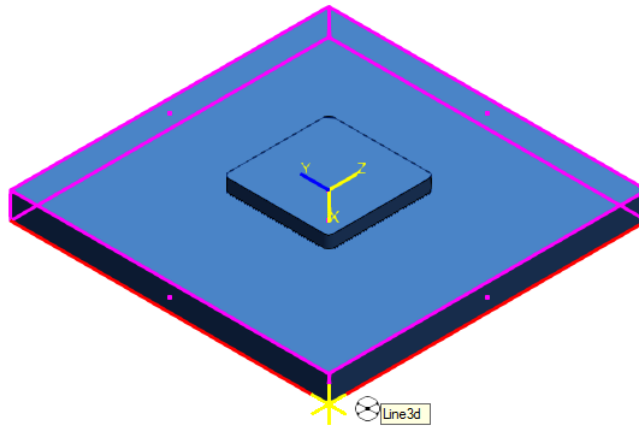
5. Type **D24X24REC8** in the **Name** field, and press ENTER.



Smart 3D prompts you for the placement point.

6. Select **Bottom SW** as the placement point.

TIP A center point is the most logical point for placement. However, we will use grid line intersections for placement, so the corner point is more useful. The following figure shows the center point selected and highlighted.



7. Click **OK** on the **Define Prompts** dialog box, and click **Finish** to complete adding the equipment to the Catalog.
8. Repeat the same steps to copy all other equipment to the Catalog.

For more information related to routing a duct, see **HVACUsersGuide.pdf**.