



PART 6

DOORS - WINDOWS - OPENINGS - ASSEMBLIES

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1

Doors - Windows - Openings Access

Doors - Windows - Openings Toolbar

How do I get this toolbar?

You can also acquire access to these commands from the Design pull-down menu. From the **Design** pull-down menu, pick **Openings >, Doors >, Windows >** or **Window Assemblies >** and cascade to the right for commands.

Doors - Windows - Openings Pull-down Menus

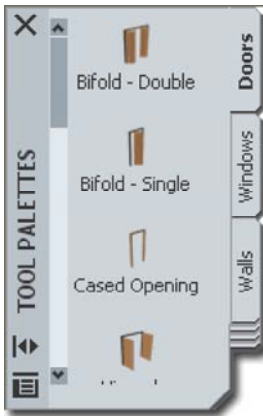
Alt. Menu **Design> Doors>, Windows>, Door/Window Assemblies> or Openings>**



Keyboard **DoorAdd, WindowAdd, DoorWinAssemblyAdd or OpeningAdd**

Mouse Select Wall, right-click to access menu illustrated below, right.

Links [Adjusting to the New Interface for AutoCAD and ADT Users](#) for how to activate the Design pull-down menu



The Primary Set of Wall Opening Objects can be categorized as consisting of Doors, Windows, Openings and Door/Window Assemblies. It is true that you can create Openings in Wall Objects with other entities but such solutions may not provide the best options for editing or presentation in Construction Documents.

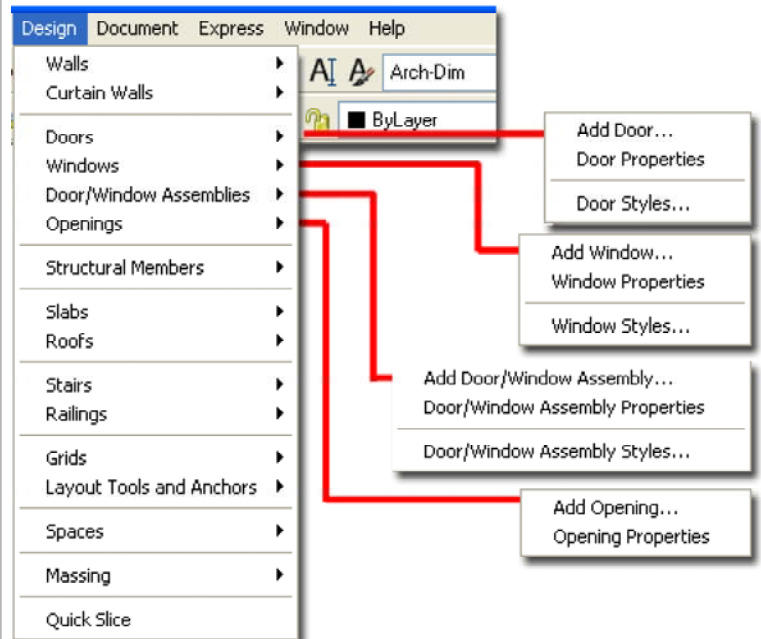
In this group, you should know that **Openings** are basically Polyline Based shapes that will cut through an entire Wall Object. They behave much like Doors and Windows but have no option for jambs, trim or other decorative elements. **Door/Window Assemblies** are basically Curtain Walls that

Anchor into Wall Objects and thus can offer more design options than just Door and Window Containers.

To **Add** any of these Objects you can take several routes depending upon your preference for working in Architectural Desktop. Remember that only the **Tool Palette** offers the option for Adding an Object Style that in not already in the current drawing file.

On the command line, you can type "Opening", "Door", "Window" and "DoorWinAssembly" to acquire access to these tools. For direct access to an option within the various opening command-line menus, you can type the primary command plus the option you want direct access to. For example, if you want to Add a Door, you can type "**DoorAdd**" or if you want to Modify a Window, you can type "**WindowProps**" or "**-WindowModify**" (notice the dash).

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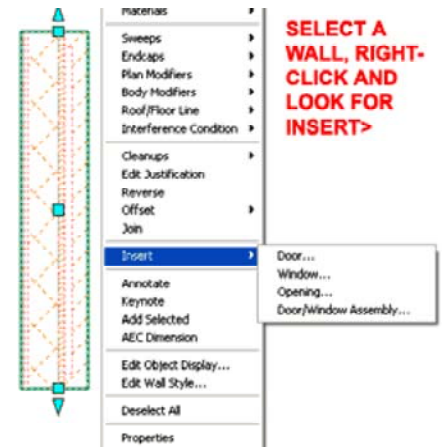


Command: **Opening**
Opening [Add/ Properties]:

Command: **Door**
Door [Add/ Properties/ Styles/ Hinge/ SWing]:

Command: **Window**
Window [Add/ Properties/ Styles/ Hinge/ SWing]:

Command: **DoorWinAssembly**
Window Assembly [Add/ Convert/ Properties/ Styles/ Interference]:



SELECT A WALL, RIGHT-CLICK AND LOOK FOR INSERT>

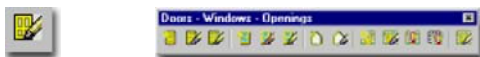
2

Doors, Windows & Assemblies Style Loading

2-6 DOORS - WINDOWS - OPENINGS - ASSEMBLIES

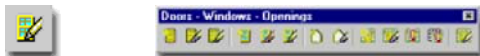
Opening a Door Style template file in Style Manager

Menu **Design> Doors> Door Styles...**



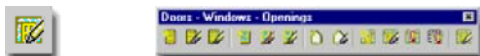
Keyboard **DoorStyle**

Menu **Design> Window> Window Styles...**



Keyboard **WindowStyle**

Menu **Design> Door/Window Assemblies> Door/Window Assembly Styles...**



Keyboard **DoorWinAssemblyStyle**

Links [Object Style Management](#) - for information on how to work with the Style Manager to load Styles.

[Copying Wall Styles in the Style Manager](#) - for example of copying a Style to the Tool Palette.



ADT comes with a rather extensive library of Door, Window and Door-Window Assembly Styles that go far beyond the basic set you will find on the default Tool Palettes so be sure to visit the Content Browser or go directly to these Object Styles through the Style Manager - illustrated to the right.

For local installations of ADT, you are likely to find

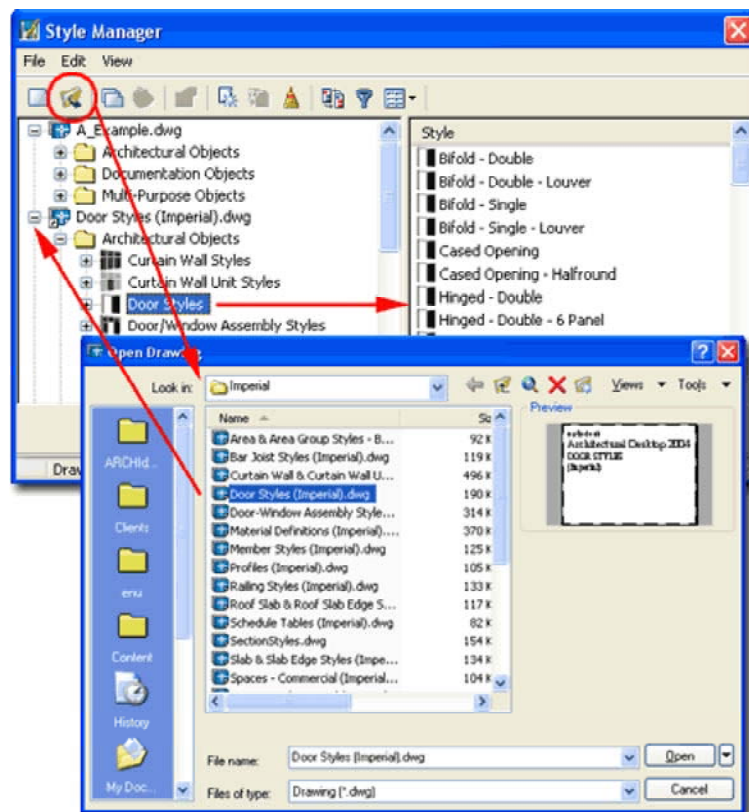
the **Imperial** or **Metric Wall Styles** in the **Styles Folder** as illustrated to the left. The full path to this location may vary but typically it is as illustrated. On a Network based installation of ADT, these Styles should be on a captured drive (like "G:\offices standards") or similar location with a folder name that indicates Styles. Consult your CAD or IT manager if you cannot locate the Styles Folder.

Imperial

Doors Styles (Imperial).dwg
Windows Styles (Imperial).dwg
Door-Window Assembly Styles (Imperial).dwg

Metric

Doors Styles (Metric).dwg
Windows Styles (Metric).dwg
Door-Window Assembly Styles (Metric).dwg



Illustrated above, I show how you use the **Style Manager** to access any of the various Object Style Files such as the Door Style (Imperial).dwg. Once Opened, you should find an extensive list of Style Types that you can Copy/Paste or Drag-n-drop right into your current drawing file. When you wish to bring these styles into your current drawing, be sure to use the Folders under your current drawing because you cannot simply drag the object style directly into your drawing - look for the Architectural Objects Folder for your current drawing file. If you find this difficult to understand, read up on how to use the Style Manager in **Part 1 - Display - Object Style Management**

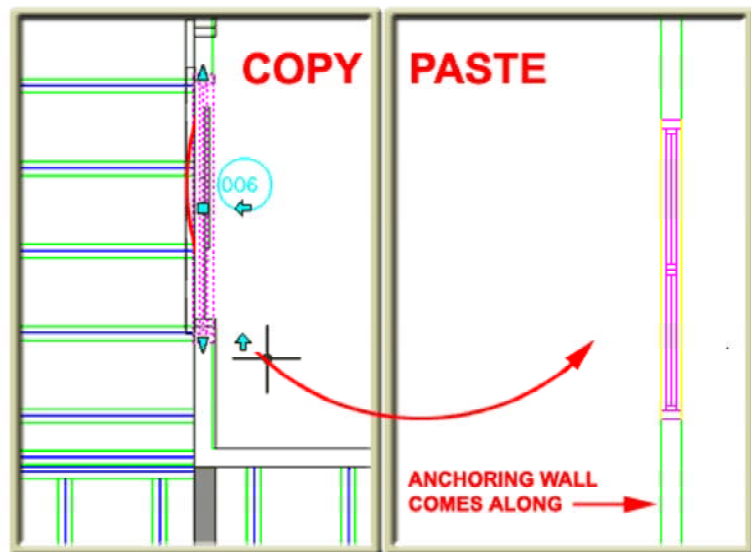
There are no Styles for Openings since they are basically geometric cuts in Walls. These files contain a set of standard Door or Window types that you can import into your current drawing file.

Copy / Paste for Style Loading

Many AutoCAD users love to Copy data between files by using the Copy/Paste technique and as long as you understand the consequences of applying this technique within ADT, you'll be fine.

Illustrated to the right I show how using the Copy tool from the Edit pull-down menu or Ctrl+C key has successfully transferred a Window Style from one Drawing File over to another. I also show that since Doors, Windows, Openings and Door-Window Assemblies are all objects that are Anchored to Walls, those Walls come along for the ride. This means that you will be adding additional Styles to a drawing when you use this technique. You should also make note of the fact that you could end up with redundant Walls if you attempt to Copy between design Versions where you already have those Walls. I've done this and it makes a nasty mess.

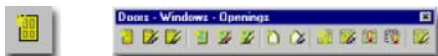
Keep in mind that you can always [Purge unwanted Object Styles](#) so don't be too concerned. Keep in mind that unique Display Characteristics may not transfer with this technique so you might notice that your object looks one way in the source file and another way in the target file.



3 Doors

Add Doors - Properties Palette

Alt.Menu **Design> Doors> Add Door...**



Keyboard **DoorAdd**

Mouse Select Wall, right-click, select **Insert >** and cascade over to Door...

As discussed under [Doors - Windows - Openings Pull-down Menus](#), you can Add Doors through several different techniques in Architectural Desktop but most of these bring up the same Door Properties Palette (illustrated to the right).

The **Door Properties Palette** has a fairly basic and somewhat intuitive set of options that you work with for every Door you Add. Because this Palette is large in size and slow to load, I find it best to use the Copy command and Copy existing Doors around to other Walls whenever possible. For Modifying existing Doors, you will find that the Palette is basically the same.

Description - use this note field to add text based notes about the Door if you find that it will help others. You could, for example, explain that the Door should be verified in the field when possible.

Style - drop-down list for selecting any Door Styles that are present in the current drawing file. Use the [Style Manager](#) or Door Palette to create or load others. Custom Shapes will be discussed below.

Standard Sizes - this drop-down list is tied to the [Standard Sizes tab](#) of the Door Style Properties dialog box and many tend to ignore this option so you may not find any predefined sizes.

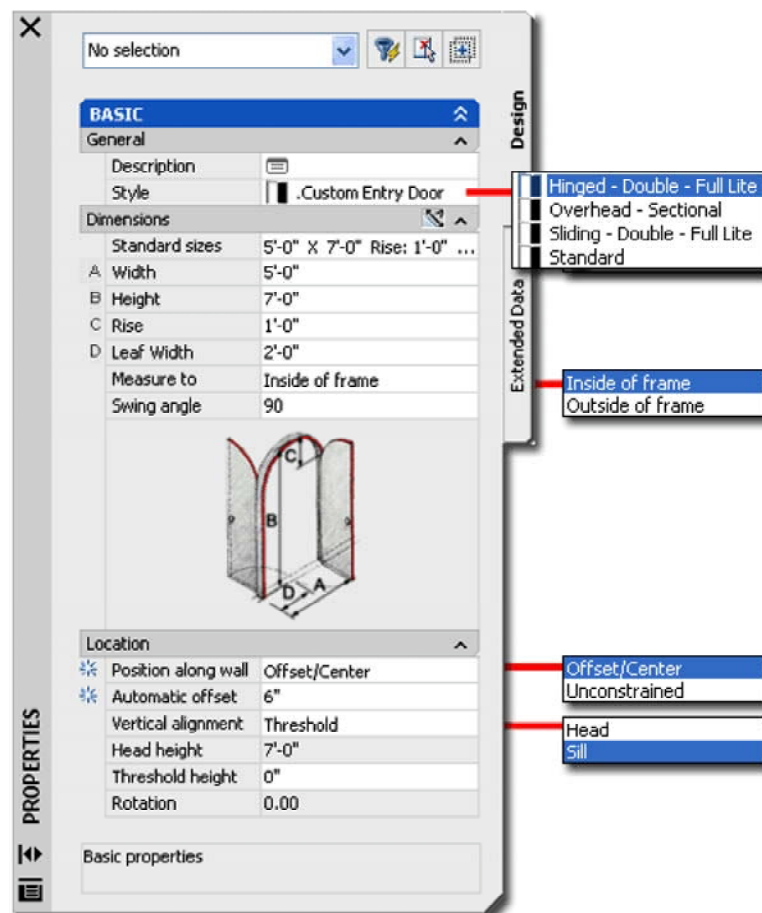
Width - this value field will accept numerical values for door widths and the measurement depends on the Measure to setting.

Height - this value field is similar to the Width value field.

Rise - this value field controls the height of Door Styles with an **Arch** or **Peak Shape** and is thus not always available.

Leaf Width - this value field controls the size of Doors Styles using the **Uneven Type** and is thus not always available.

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Automatic offset - this value field can be used to specify an amount of distance you want for a Door to be placed away from the next closest object, wall corner or other entities. **Position along wall** must be set to **Offset/Center** for this option to be available.

Vertical Alignment - this drop-down list offers the option for placing a Door in a Wall based upon the **Head** height or the **Threshold** height. I tend to use the Threshold option for my Doors since I always place them at the very base of my Walls.

Measure to - this drop-down list offers two settings: **Inside of frame** and **Outside of frame**. The drafting of Doors is usually based upon the actual size of the door as opposed to the frame opening and thus "**Inside of frame**" tends to be the default for Imperial and Metric. Be aware, however, that this is not always the preference in offices (particularly offices that specialize in commercial architectural) so confirm this before going too far with your work.

Swing angle - this value field allows you to specify the actual angle of opening for the door in Plan View; where zero (0) is equivalent to closed and 90 is equivalent to the standard 90 degree or 50% open used in most architectural drawings. This is not how doors display as closed in Isometric Views and open in Plan - see [Door Style's display properties](#) for how to control those unique display settings.

Position along wall - this drop-down list will provide you with the **Offset/Center** and **Unconstrained** options. **Offset/Center** - will offset from other objects or Wall Corners by the amount specified under the **Automatic offset** value field. When you approach the midpoint of a Wall Object, this option will automatically center a Door. **Unconstrained** - will deactivate the Automatic offset option and allow you to position a Door at any position within a Wall (not very desirable if you don't have points to OSNAP to).

Placing Doors in Walls

When **Adding Door Objects** to **Wall Objects**, you must first **Select the Wall** to **Anchor** the Door to. If you use the right-mouse button or **<Enter>** key on your keyboard to register an extra "enter", the Door will not be anchored to any Wall and will basically be a free-floating Block. "Free-floating" a Door may be useful when creating such things as garden or security gates.

Once a Door Object has been Anchored to a Selected Wall, you can Slide the Door back and forth over the Wall until you decide where you want to place it in the Wall. By reading the automatic temporary dimensions, you should be able to get a good sense of where the door will be cutting the wall. By **picking** with your **left-mouse button**, you will place the door and finish the work. Recall that the **Door Properties Palette** offers the **Automatic Offset** value to help place Doors more accurately and with less effort.

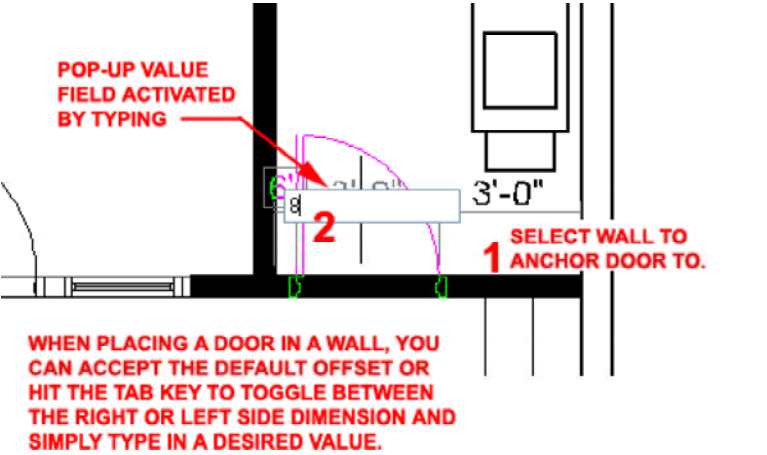
Illustrated to the right I show how ADT will present you with three automatic temporary dimensions when Adding a Door to a Wall. By using the **Tab key** on your keyboard, you can toggle between the right and left dimension. If you begin to type a number on your keyboard, you will see a rectangular pop-up value field in which you can now specify a desired dimension even if it is something other than the default offset value.

Head height - this value field will only be available if the Vertical Alignment has been set to Head. Any height specified here will control how a door is placed in a Wall relative to the top or header position. Too low a value will push a door below the Wall Base or Plate Line.

Threshold height - this value field will only be available if the Vertical Alignment has been set to Threshold. Any height specified here will control how a door is placed in a Wall relative to the base, threshold or sill of a Door.

Rotation - this value field is only available when Modifying an existing Door Object.

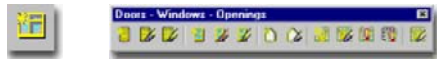
Note: Most of the settings on this Palette will become the default for all other Doors being Added so you may want to be careful about such settings as Measure to, Swing angle, Vertical alignment and Heights.



Note: With tight tolerances on door locations, I find it easiest to simply place the door near the location where I want it and then carefully Move it later. You may find that Doors sometimes "pop" over to adjacent Walls. For the worst case situations, you may want to use the **Anchor** option under the Location Category of the Modify Door Properties Palette.

Add Windows - Properties Palette

Alt.Menu Design> Windows> Add Window...



Keyboard WindowAdd

Mouse Select Wall, right-click, select Insert > and cascade over to Window...

Links Adding Skylights - for information on something that does not really work at this time.

As discussed under Doors - Windows - Openings Pull-down Menus, you can Add Windows through several different techniques in Architectural Desktop but most of these bring up the same Windows Properties Palette (illustrated to the right).

The Window Properties Palette has is almost identical to the Door Properties Palette. Read Section 3 - Doors for the full discussion of all the options and settings on this Palette. Below I discuss some of the options and settings that are a little different for Window than Doors.

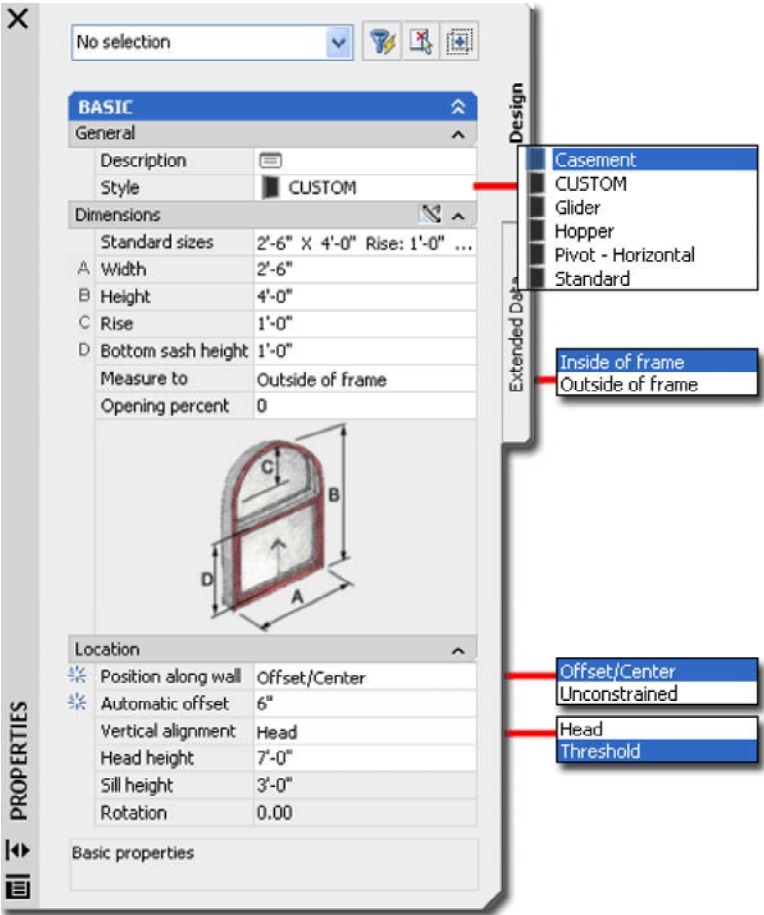
Rise - this value field controls the height of Windows Styles with an Arch or Peak Shape and is thus not always available.

Bottom sash height - this value field controls the height of the lower portion of Uneven Window Types and is thus not always available.

Measure to - this drop-down list offers two settings: Inside of frame and Outside of frame. The drafting of Windows is usually based upon the actual size of the window unit as opposed to the glazing component and thus "Outside of frame" tends to be the default for Imperial and Metric. Be aware, however, that this is not always the preference in offices.

Opening (percent) - shows the Window in open, partial open, closed or anywhere in between modes if the Window Style has operable components. 100 is for full open and 0 is for closed. There is another feature to Windows that will control how they behave in an elevation, for example; this is part of a Window's Style's display properties. See also pull-down menu - Change Opening Percent.

Vertical Alignment - this drop-down list offers the option for placing a Window in a Wall based upon the Head height or the Sill height. In residential architecture it is often a standard to measure Windows by their Head height to assure that they align with the top or header height of doors.



Add Opening - Properties Palette

Alt.Menu **Design> Openings> Add Opening...**



Keyboard **OpeningAdd**

Mouse Select Wall, right-click, select **Insert >** and cascade over to Opening...

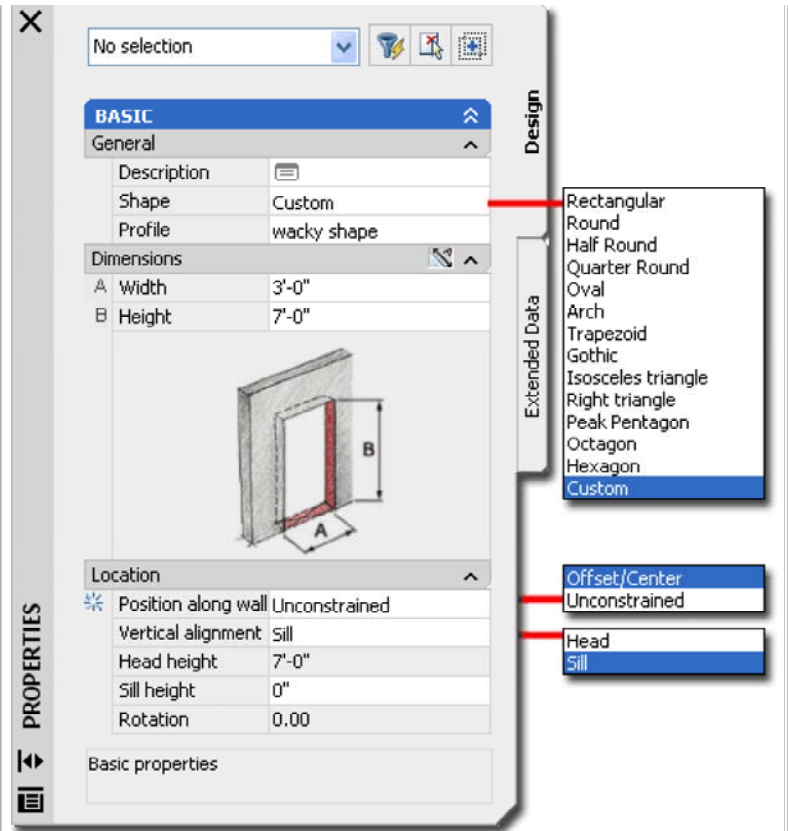
Links [Profile](#) - for information on how to convert a Closed Polyline into a Profile Definition that can be used as a Custom Shape for Openings.

The **Opening Object** can, at times, be a little enigmatic since it isn't as sophisticated as a Door or Window yet offers many of the same features. The primary difference is that there are no Opening Styles since there really is only one Type of Opening: a hole. This is why you find the Shape option on the Openings Properties Palette, illustrated right.

Read [Section 3 - Doors](#) for the full discussion of all the options and settings on this Palette. Below I discuss some of the options and settings that are a little different for Openings than Doors.

Shape - this drop-down list offers numerous predefined geometric shapes and the option to use "**Custom**" for any shape that you can draw as a Closed Polyline and define as a Profile Definition.

Profile - this drop-down list is only available when the Shape has been set to "Custom". Profile Definitions can be used to capture Closed Polyline shapes so they can be used as custom Openings - see [Part 25 - Blocks and Profiles](#).



Opening Display Properties

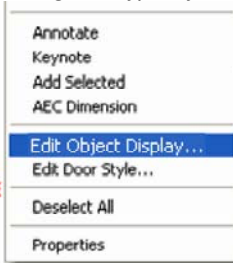
Keyboard **DisplayProps [Attach]**

Mouse Select Opening, right-click, select Edit Object Display...

Links [Door and Window Display Properties](#) - for the expanded discussion on this topic.
[Part 1 - Display - Object Display Properties Overview](#) - for more information on how to access the Display Properties of this Object.

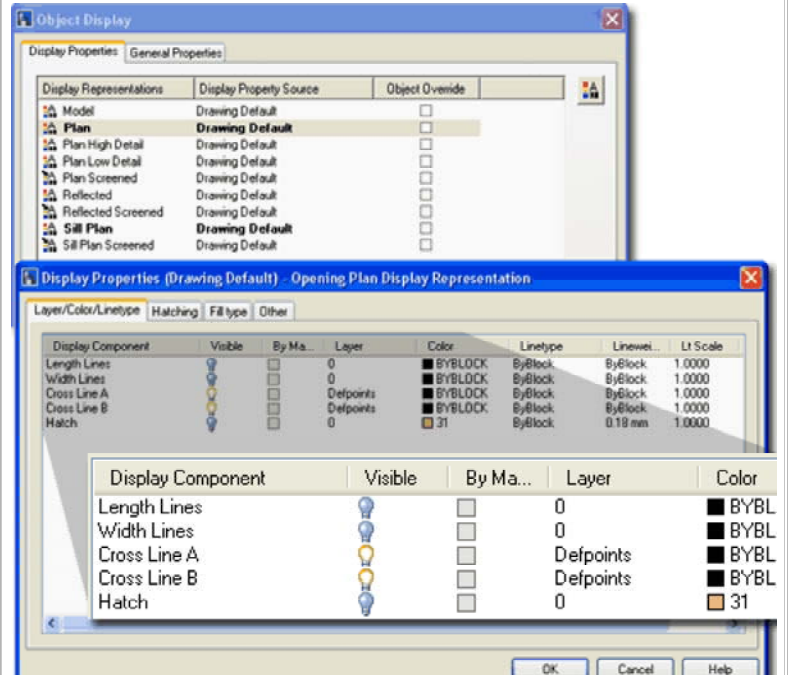
Since the **Opening Object** has no Styles, you can only make changes to its **Display Properties** by working with a Selected Opening Object or by using the **Display Manager**. I typically select one, right-click and select

YOU CAN ALSO ACCESS DISPLAY PROPERTIES BY SELECTING AN OBJECT, RIGHT-CLICKING ON YOUR MOUSE AND USE THIS POP-UP MENU OPTION



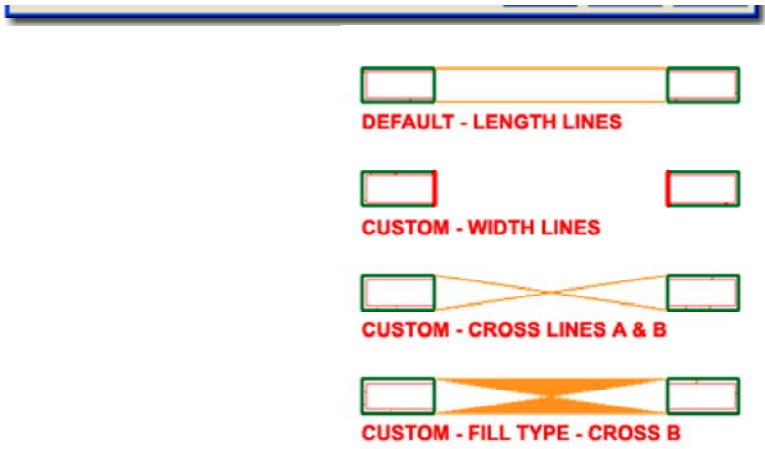
the **Edit Object Display...** option from the object specific pop-up menu since this technique gets to the heart of the problem rather quickly.

Illustrated to the right I show some of the **Display Representations** that come with the ADT Template Files and the **Display Properties**



for the **Plan Display Representation**. It's rather fascinating to see just how far the ADT team has come with options for how to present a simple thing like an Opening and yet I still can't find the perfect solution. For me, the main problem is that I don't want the Opening Object to display at all in my Construction Documents (except for the hole it makes) but since ADT uses objects, we need something there to Select when making Modifications. So far, what I have come up with is to use the **Cross Line A** and **Cross Line B Display Components** and then set them so they use **Layer "Defpoints"** which will never print.

Notice that the **Display Properties dialog** offers other **Tabs** for such options as **Hatching**, **Fill type** and **Other**. Illustrated below right I show a few of these options in Plan View. Notice also that Openings have a **Sill Plan Display Property** for which you can control the lines in Plan for Sills; much like you can for Doors and Windows.



6 Modifying Doors, Windows and Openings

Copying and Moving Doors across Wall Cleanup Groups

Alt. Menu **Design> Walls> Cleanup Group Definitions...**

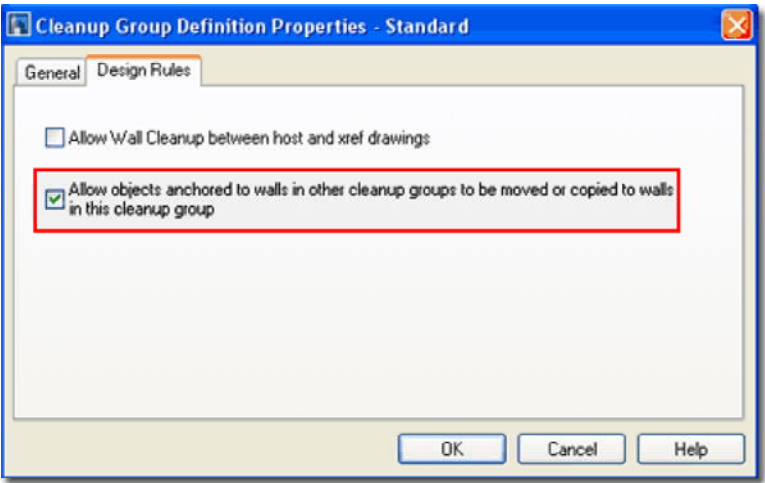


Keyboard **Wall <enter> CL**

Links [Wall Cleanup Group Definitions](#) - for more information on this subject and how to access this setting.

When you create **Wall Cleanup Group Definitions**, you should find that there is a setting on the **Design Rules** tab of each Cleanup Group Definition that will allow or disallow cross pollination of Anchored Objects. Typically this setting is on by default and you may not notice any problems when copying Doors, Windows, Openings and Door-Window Assemblies from one set of Walls to another but this was quite a problem in previous releases of ADT.

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Modify Doors, Windows and Openings - Properties Palette

Alt. Menu **Design> Doors> Door Properties**





- Keyboard **DoorProps, WindowProps and OpeningProps**
- Mouse Double Left Click on an Object to invoke the Properties Palette
- Links [Object Properties - Anchor tab - complex objects](#) - for explanation of Anchor tab options.
- See Doors, Windows or Openings for full information on the Properties Palette

The primary modification tool for Doors, Windows and Openings is the **Properties Palette**, illustrated to the right where you will find most of the options and settings for creating these objects. Illustrated to the right I show two options that are only available after the object has been Anchored to a Wall: Anchor and Endcaps.

The **Anchor dialog box** is a fantastic tool for fine-tuning the position of Doors, Windows and Openings in Walls and though most of these settings can be done with Grip work live on the Objects, I often find this a more comprehensive tool to reposition these objects.

The **Endcaps drop-down list** is really an Override option that affects the Wall. If you select another Endcap Style than that assigned within the Wall Style, the Override only applies to the specific Object Selected. This means that you can Select one Window or Door, for example, and assign a different Opening Endcap Style (which is actually four endcaps - one for each side of the opening). This can be a fantastic option or a nightmare depending upon the use and comprehension of how it creates an Override.

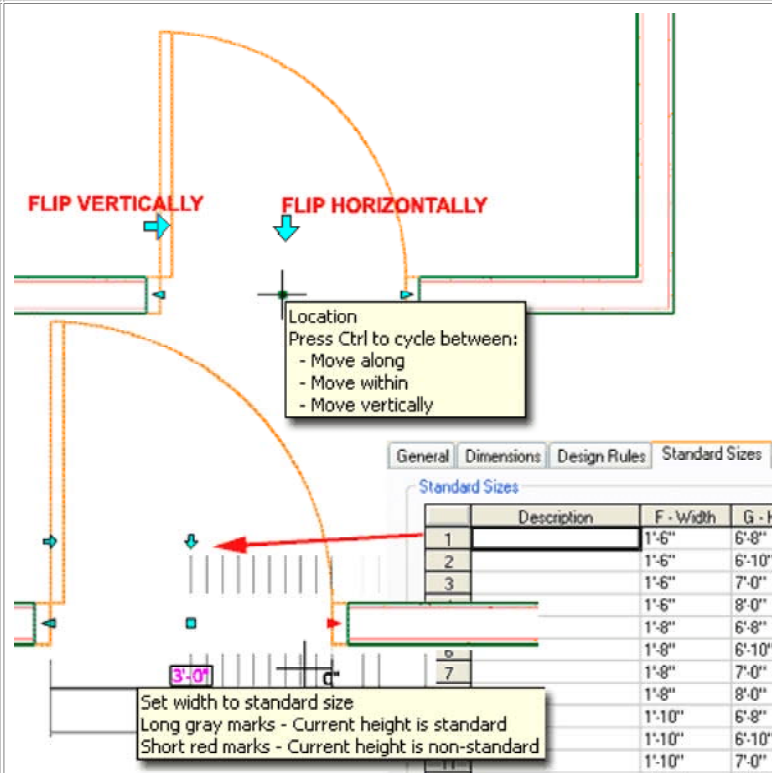
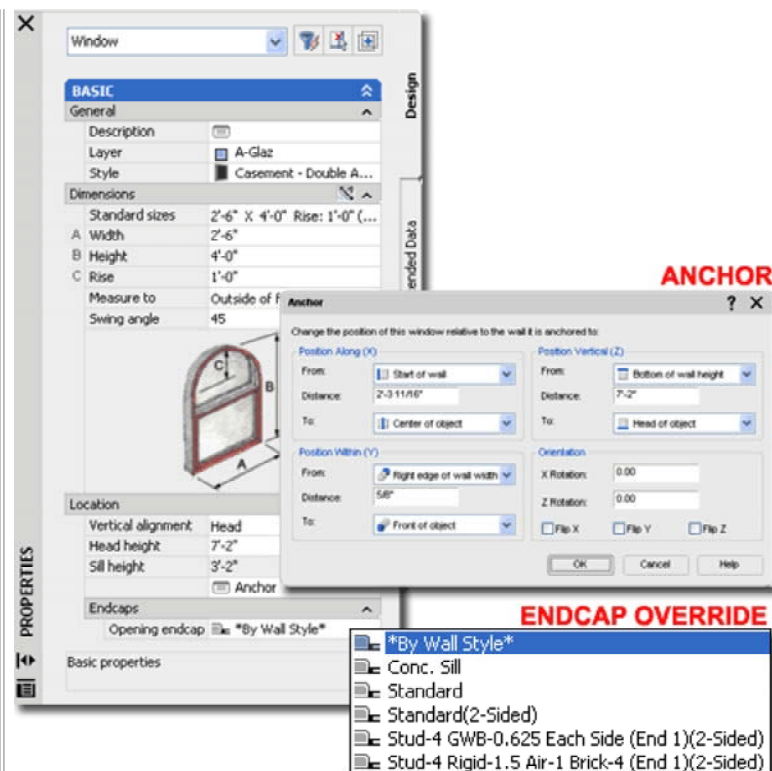
Using Grips to modify Doors

Doors, Windows and Openings all have similar Grip Controls with similar Ctrl-key sub-options that can be utilized to achieve some great modifications.

In the illustration to the right I use a Door example to show the **Flip Controls** that will alter the direction a Door will swing. The center Grip provides the option for Moving the Object with sub-options for Along, Within and Vertically. The Along option, the default, simply allows you to drag the Object along the length of the Wall with temporary Dimensions to assist in accuracy. The Within option allows you to slide the door perpendicular to the length providing a quick solution for situations where you don't want the Object centered in the Wall. The Vertically option allows you to move the Object up and down in the Z-axis and is best done in Isometric Views for better accuracy and control. The unfortunate aspect of the Move options is that architects generally know how far they want the edge or jamb of a Door or Window from another object, like a Wall and the center Grip does not offer this option (see discussion on Reposition Along Wall below).

The two **Edge Grips** allow you to resize a Door, Window or Opening simply by Stretching. Illustrated lower right I show that by hitting the Ctrl key after picking one of these Edge Grips, you can actually see all of the predefined Width Values as set under the Standard Sizes tab on the Object Style Properties dialog.

Reposition Along Wall



Reposition Along wall

Keyboard **RepositionAlong**
Mouse Select Object, right click, select Reposition Along Wall
Links

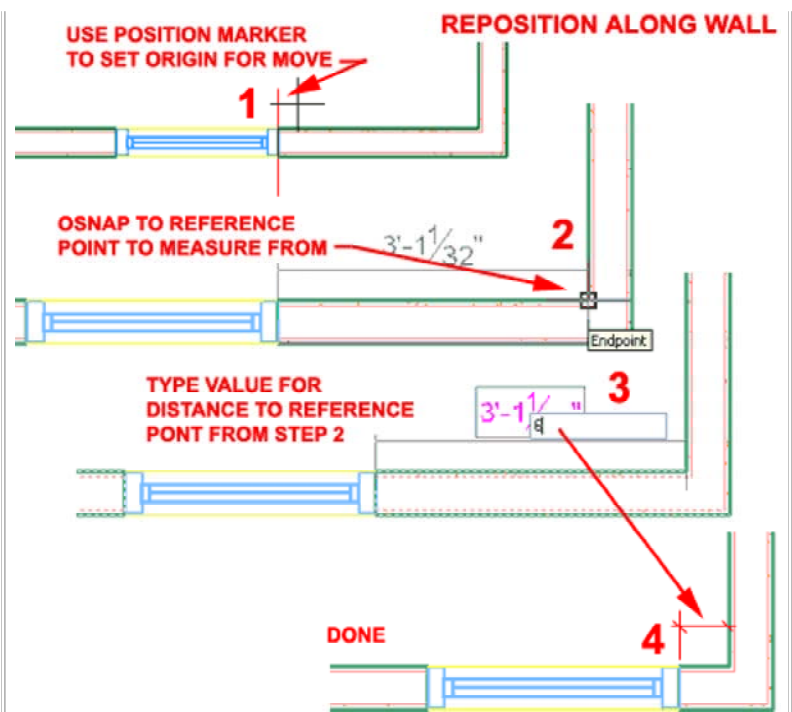
Because the center Grip control, discussed above, is actually a rather poor option for positioning Doors, Windows and Openings (unless you work with centerline positions), I decided to show a better solution.

Illustrated to the right I show how you can use the **Reposition Along Wall** tool to quickly set the distance from another point in space that you want a Door, Window or Opening located from. The unique **red-line marker** will pop up and allow you to choose one of three position points: right edge, center or left edge. Depending upon how you have your **Measure To** setting when creating Doors, Windows and Openings, the red-line marker may position itself on the inside or outside of Jambes.

Once you have picked the position you want to "**reposition**" your Door, Window or Opening **at**, you simply **OSNAP** to another point in space that you want to **measure** off of (**from**). The final step is to type the actual distance you want between the 1st point and the 2nd point and viola, the move is complete and accurate.

Note:

For Doors, you may need to consider the Width of the Frame and add that to your From distance so the rough opening comes out as desired.



7 Door and Window Style Properties

Style Manager

Alt.Menu **Design> Doors> Door Styles...**



Keyboard **DoorStyle**

Alt.Menu **Design> Window> Window Styles...**



Keyboard **WindowStyle**

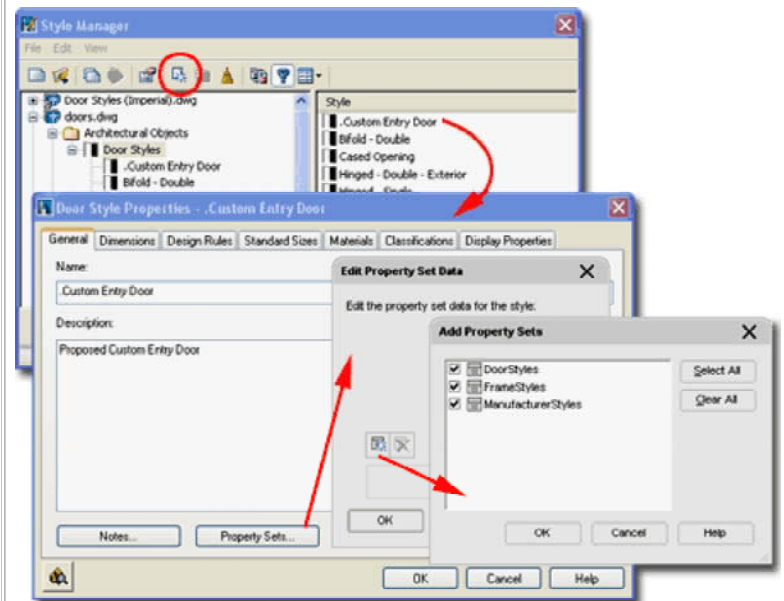
Links [Doors, Windows & Assemblies Style Loading](#)
[Object Style Management](#)

For Door and Window Objects, you can use the **Style Manager** to load, modify, delete and create new Door and Window Styles. The process for working with Door and Window Styles is almost identical so I will cover both in the following discussion.

Though you can easily create New Door and Window Styles from Scratch using the New button, you may want to use the **Copy/Paste** technique instead because it is far easier to Modify Settings of an existing Object Style than it is to create one from Scratch. In some cases, you may even miss specific settings that can come back to haunt you much farther down the road on a project - things like Display Representations or Data for Schedules.

Illustrated to the right, I show the process of creating a **New** Door Style (from scratch) that I have Named "**Custom Entry Door**". By **double-clicking** on this new style, I show that I have also activated the **Door Style Properties** dialog box where all of the custom settings can be made for the size, shape and look of this particular object style.

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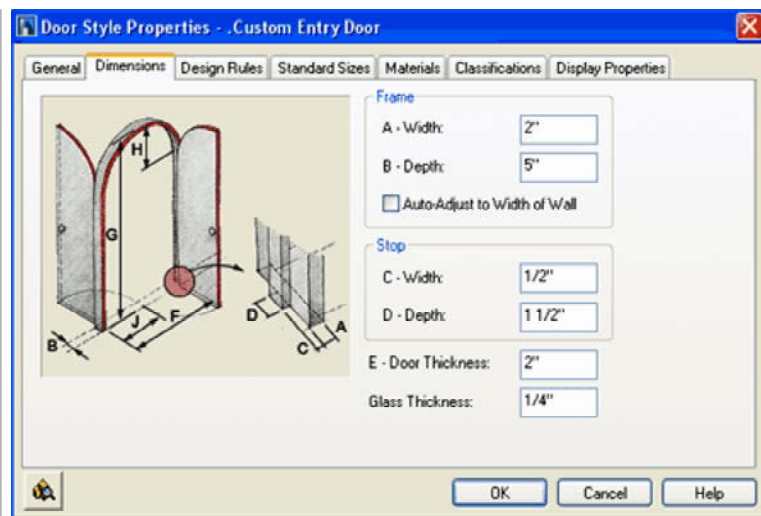
On the **General** Tab of the **Door Style Properties** dialog, you will find a place to modify the **Name**, add a **Description**, add **Notes...** and **Property Sets...** If you intend to use the Schedule Tags and Schedule Objects in ADT, you must use the Property Sets... button to Add the appropriate Property Data. For Doors, the minimum would be the DoorStyles Property Data Set and for Windows, the minimum would be the WindowStyle Property Data Set. Other Data can be added for expanded Schedules or additional Schedule Styles and you can even create new Data Sets but let's put that topic off to [Part 18 - Schedules](#).

Style Properties - Dimensions tab

On the **Dimensions** tab of the Door or Window Style Properties dialog box, you can input "real world" **Frame**, **Stop** and **Door Thickness** dimensions.

For designers in a rush, using the **Auto-Adjust to Width of Wall** checkbox can save a lot of time and is a setting that can always be unchecked later once specifications have been collected.

You can set values to zero and you can even set the Frame Width to negative values for unique results. If you don't want Frames at any time, setting them to a Width of zero is acceptable but the other components can actually be turned off under the Display Properties tab (see discussion farther down).



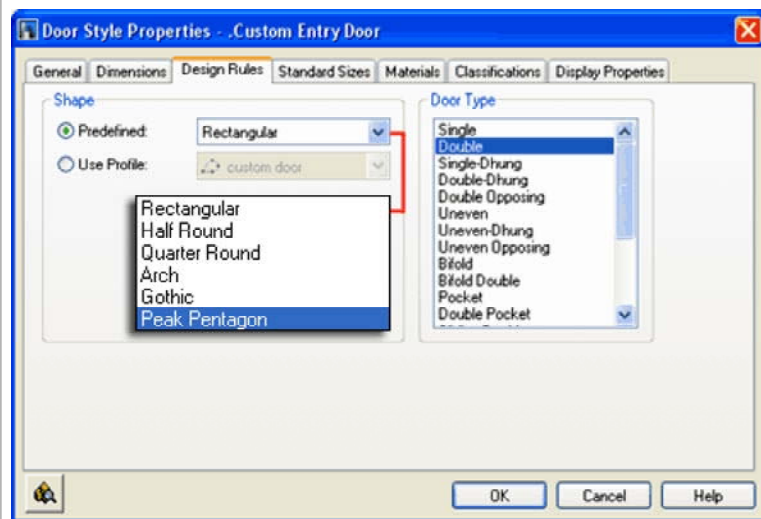
Style Properties - Design Rules tab

The **Design Rules** tab of the Door or Window Style Properties dialog box, holds the secret to creating a variety of **Door Types** and **Custom Shapes**.

To create a basic Door or Window shape, use the **Predefined** pull-down list in the Shape category. This list will provide you with some common shapes such as Rectangular, Half Round, Arch and so forth.

To create a more unique Door or Window shape, use the **Use Profile** drop-down list to select a **Profile**. Profiles are Pline outlines that have been saved as Profile Definitions within the Style Manager Window. To learn more about creating a custom Door or Window Shape, see [Customizing and Tricks](#) below.

The **Door Type** or **Window Type** list provides a fixed list of common types to base your design on. If you need another Type that is not listed here, like a Dutch Door, you may have to be incredibly inventive with other Objects. Some are finding that they can use a Door-Window Assembly to create things like Dutch Doors (one in the top cell and one in the bottom) but though this may look great in Plan or 3D, you may not like what the Schedules pick up.



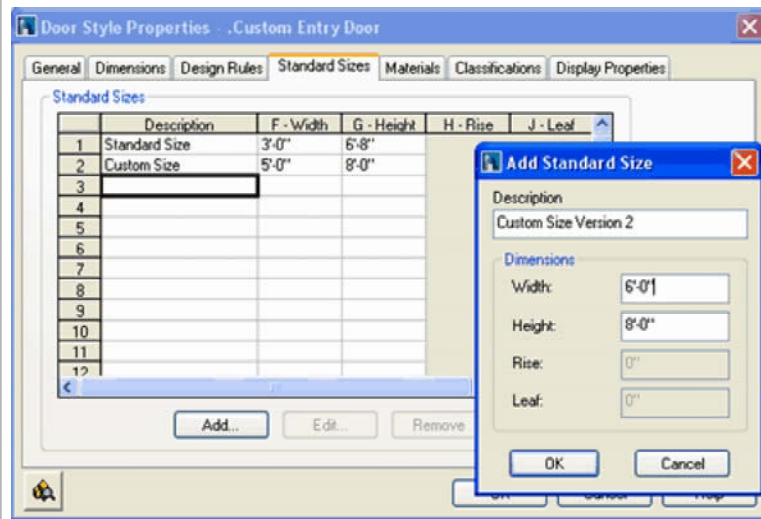
Style Properties - Standard Sizes tab

The **Standard Sizes** tab of the Door or Window Style Properties dialog box uses an Excel-like spread sheet to store preset sizes for quick access on the Size drop-down list of the Properties Palette. This part of a design is not required since you can input sizes on the Properties Palette when Adding them, but it can be helpful if working in Metric or if using odd (fractional) numbers that take too long to type.

The values input here can also be used when Modifying Doors and Windows using the Grips - see [Using Grips to Modify Doors](#).

Rise - available for Styles that have pitched or **peak Shapes**.

Leaf - available for **Types** that use **Uneven** pairs.



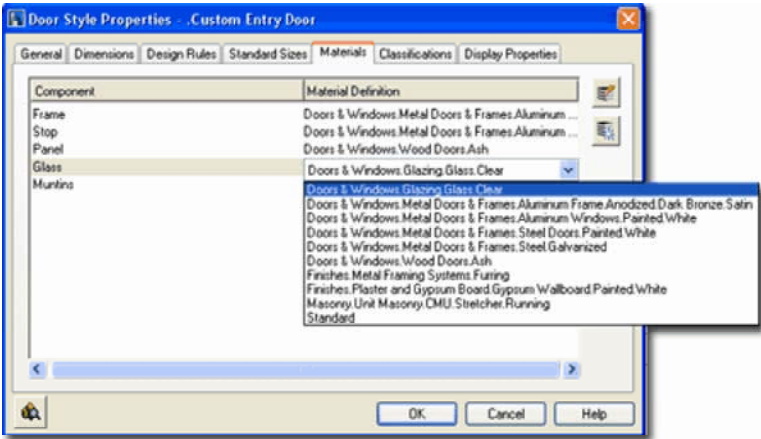
Style Properties - Materials

Links [Object Style Properties - Materials Overview](#) - for an expanded step-by-step explanation of Materials

The subject of **Materials** is one of the most expansive and confusing topics in Architectural Desktop because it requires a complete comprehension of the product in order to take full advantage of this feature; from object styles to display representations. This subject will be discussed under **Part 1 - Display** and in the Presentation eGuide.

Illustrated to the right I show that Doors and Windows will offer a predefined list of **Components** and that the **Material Definition** Names will all be set to "Standard" when you create a Style from scratch. If you have imported any of the Architectural Desktop Doors or Windows from the Object Style Library, you should find that you will be able to use the Material Definitions that come with those objects - as illustrated to the right.

Though you are not required to use Material Definitions in Architectural Desktop, you are likely to find it difficult to avoid using them since most of the predefined Styles use them. Materials have thrown a monkey-wrench into the whole Display System because they can actually take over control of how your linework appears in Plan View for Construction Documents (discussed below under Display Properties). The best thing to do when learning about Material Definitions is to match how most of the predefined Door and Window Styles have been configured; i.e., reverse engineer the ADT Styles.

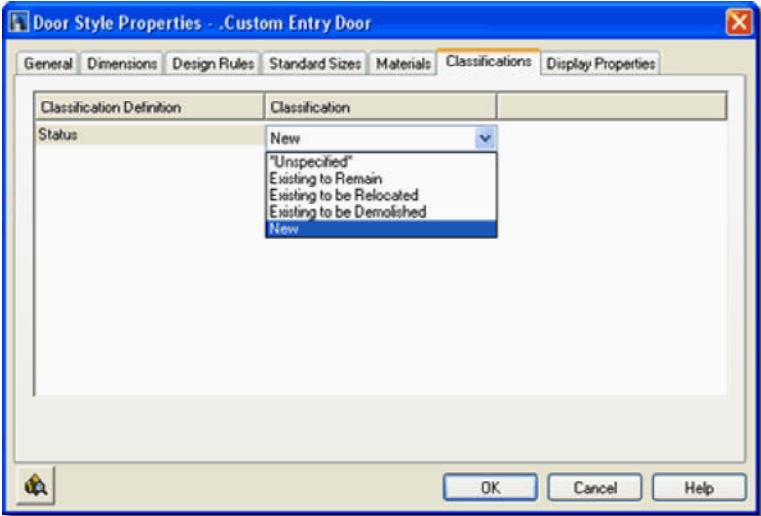


Style Properties - Classifications

Links [Object Style Properties - Classifications Overview](#) - for an expanded step-by-step explanation of Classifications

The subject of **Classifications** is thankfully no where near as complicated as that of Materials so the only real question you will need to consider is if you need to use them. Classifications offer another way to separate Object Styles into categories that can be used in **Schedules** and even in **Display Representation Sets** (as "Show" or "Hide").

Illustrated to the right I show that I have one **Classification Definition** (see **Format** pull-down menu) with a list of **Classification Names** or Types. Generally you will not have any options on this Tab but if you have created at least one Classification Style that has been set to "Apply To" Door or Window Object Styles, you will be able to use it here. The range of use is really up to your imagination but it is fairly obvious that Classifications can be quite handy in Schedules. This topic will be discussed further under Part 18 - Schedules. You can also read a bit more about how to create Classification Definitions in **Part 1 - Display**.



Style Properties - Display Properties tab

Links [Object Style Display Properties Overview](#) - for the full story on Display Properties for Style
[Object Display Property Overrides - Object and Style Based](#) - for an explanation of the differences between using Display Properties via the Styles versus the Edit Object Display... option.

The **Display Properties** tab of the Door or Window Style Properties dialog box, illustrated right, provides access to some of the most powerful options for these two objects. This is where the Door or Window is configured to look different in different Views and different plans. It is also where you can add amazing customized features such as hardware, awnings, stained glass and so forth.

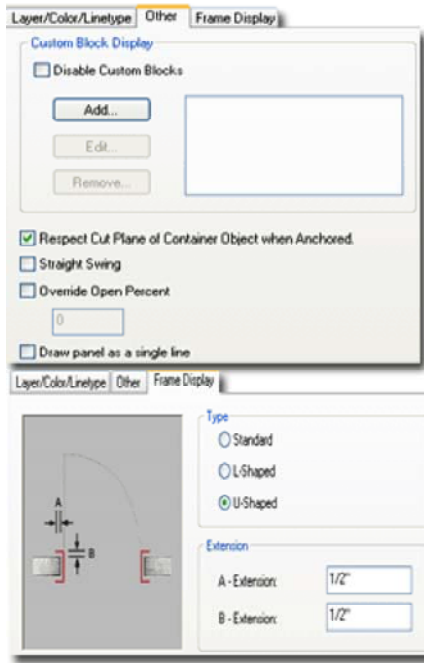
YOU CAN ALSO ACCESS DISPLAY PROPERTIES BY SELECTING AN OBJECT, RIGHT-CLICKING ON YOUR MOUSE AND USE THIS POP-UP MENU OPTION



Illustrated to the left, is another way to access the **Display Properties** tab; select the specific object, right click on your mouse to invoke the object-specific pop-up menu and select **Edit Object Display...** Just be aware that when you use this approach, you can actually set an Object Override as opposed to a Style Override.

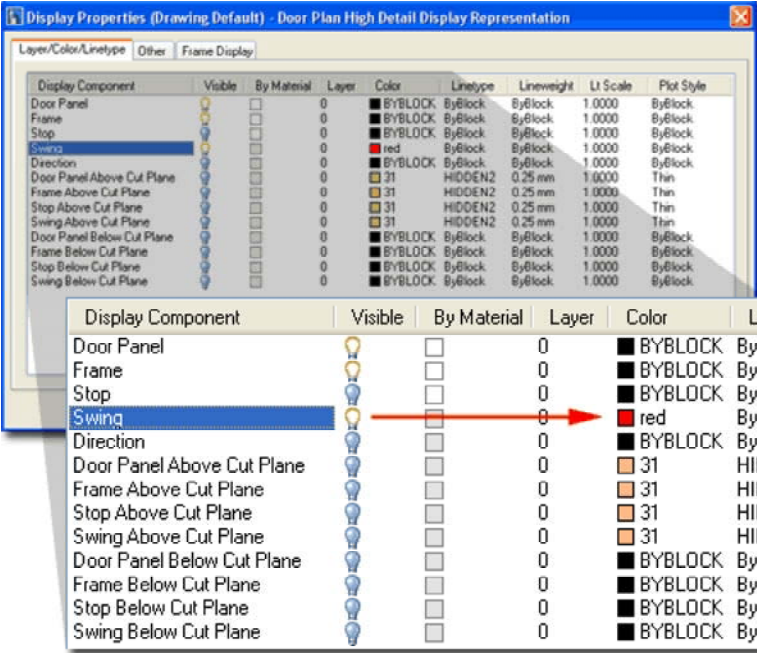
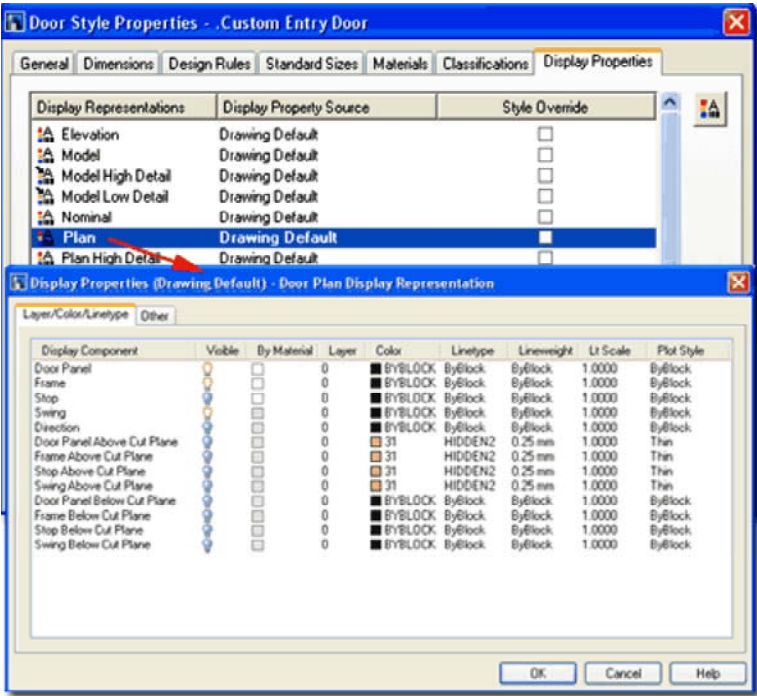
Object Overrides can be extremely useful because they allow you to add things like Sills or Thresholds to any object within a Style Family but they can also be problematic because they lock you out from more centralized, Style level, controls.

Display Properties (Drawing Default)



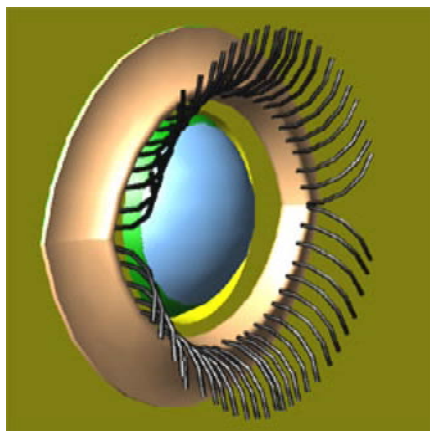
Doors and Windows have an amazing and almost unfathomable amount of options under the category of Display Properties so it is basically impossible for me to cover everything you can do. The good news is that there is a lot of redundancy in this matrix so once you get the general concepts down you can expand upon that knowledge to master the greater body of options. To be perfectly forthright, I don't use most of the options here since it takes way too much time to tinker with it all when I have more pressing demands to get Construction Documents out the door.

Illustrated to the right I show the **Layer/ Color/ Linetype** tab on the **Display Properties** dialog for the **Plan High Detail Display Representation** of a **Door Style**. You may notice that the number of Display Components for the Plan High Detail and Plan Display Representations are exactly the same and this reiterates some of that redundancy I alluded to earlier. However, you should notice that the Plan High Detail Display Representation does offer an extra **Tab** for **Frame Display** and more options on the **Other** **Tab** so there are differences that explain why this Display Representation was created.



In the illustration above I also show that I have changed the Color for the Swing Display Component of my example Door Style. Since I have not Attached a Style Override for the Display Representation of this Door Style, whatever changes I make here will also affect all other Door Styles that don't have any Style Overrides for this particular Display Representation. That means that since I am setting my Swing Display Component to Red, I should find that all Swings are now Red when I set my Display Configuration to "High Detail". I have provided this simple example so you can start with something equally basic before proceeding on to more elaborate and sophisticated settings.

Door and Window Display Property Overview

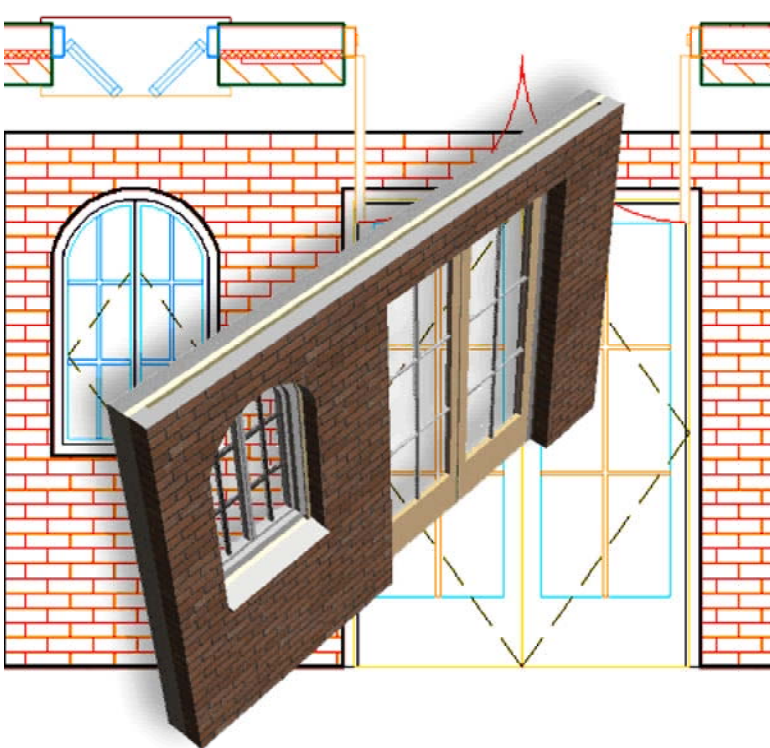


When it comes to the **Display Properties of Doors and Windows**, there's practically no limit to what and how you want information presented. If your desire is to create Doors and Windows that are completely out of this world, you can Attach your own Blocks to replace or expand the existing default linework for these objects.

In this section I will cover some of the primary options within the Display Properties

for these two Objects that I think may be of significant importance to your mastery of this product. For me, though I realize there are a lot of cool things that you can do here, my emphasis is always on the things that pay the bills so I will focus on Plans and Elevations.

Illustrated to the right I show three different Views of the same **Wall, Window and Doors**. In **Plan View** with the **Medium Detail Display Configuration** active, I show that I have used an Override on the Open Percent for an Arched Double Casement Window, Added Sills to both sides and increased the lineweight of the Frames. In Elevation View, I show that I have Added Muntins with the Parametric Muntin Builder and in a Perspective View, I show that I have set Materials for each of the items set in the Elevation.



Doors and Windows in Plan

Menu **Format> Display Manager...**



Keyboard **DisplayManager**

Keyboard **DisplayProps [Attach]**

Mouse Select Object, right-click, select Edit Door Style... or Edit Window Style... or Edit Object Display...

Links [Part 1 - Display - Object Display Properties Overview](#) - for more information on how to access the Display Properties of this Object.

Frame

A - Width: 2'

B - Depth: 5"

☒ Auto-Adjust to Width of Wall

Stop

C - Width: 5/8"

D - Depth: 2"

E - Door Thickness: 1 3/4"

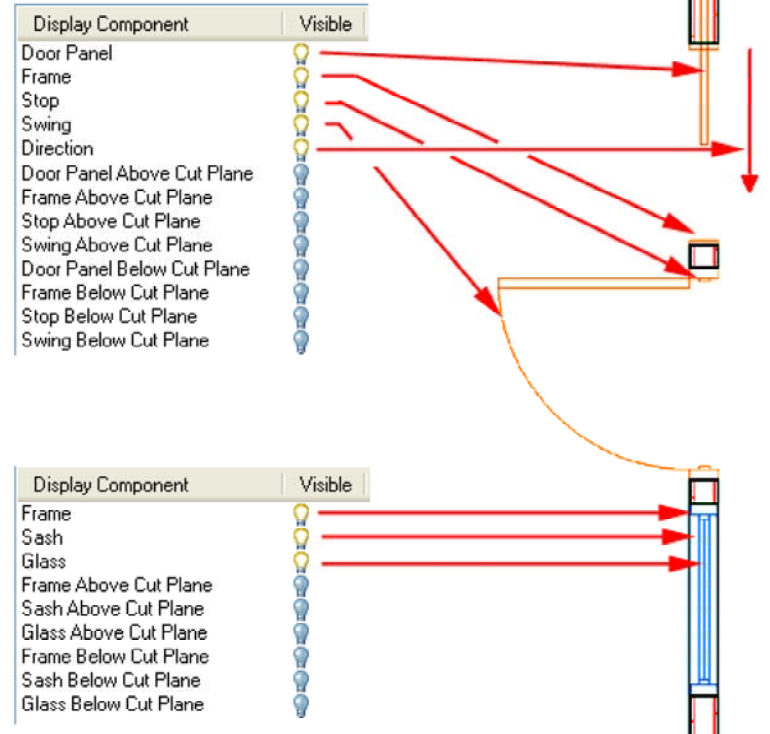
Glass Thickness: 3/16"

In my opinion, the **Plan View** for **Doors and Windows** is the most important one to focus on since that is the primary display we use to communicate information to planning departments, builders and so forth. Since Doors and Windows are **Anchored to Walls**, the Wall Object and Style also becomes integral to the subject of getting proper Display Properties in 2D Plan View.

There are quite a few different places that you can adjust settings that affect the display of Doors and Windows so you might want to make sure you are calm and relaxed before reading the rest of this sections.

At the most elementary level, you can affect the display of Doors and Windows through at least one **Layer**; like **A-Door** and **A-Glaz**, for example. At the **Style** level you have the physical dimensions for the various components - see illustration to the left. At the **Display Properties** level (accessed either through the Object, Object Style or the

PLAN



Keep in mind, however, that if you specify zero value Dimensions for Components they will always hold that value and thus you will not see these Components in Reflected Ceiling Plans, Elevations, Sections or 3D Views. In the case of the Frame though, you just can't win with this product so if you don't want to see it in Plan View, you will need to set the Width Dimension to zero. You might want to argue this point with me given that the default **"Low Detail" Display Configuration** clearly shows another solution, but if you study this solution you will find that it actually increases the size of the Door and the Swing (a potential liability issue).

Display Manager) you have Layer-like controls for the physical components (yep, once again) and for Components you may not even understand - see illustration to the right. And finally, just to make this really interesting, you have the **Wall** Object/Style to deal with which has all of these types of options as well (we'll look at this wall).

The best way to tackle all of this is to break it down by working with the **Display Configuration** you have decided to use for your Construction Documents. Illustrated to the right I show the default "**Medium Detail**" Display Configuration which uses the "**Plan**" **Display Representation** for most Objects. I made Visible a couple of extra Display Components that you may not find turned on in your file.

The first thing you need to decide on is what you want to see and what you don't and then begin to make the most logical changes that will produce those Display results. In the case of the Primary Components for Doors and Windows, you have **Panels, Frames, Stops, Sashes, Swing, Glass** and **Direction**. Though you can easily make these Components disappear by turning their **Visibility Off** under the Display Representations, you may not like the results. With Frames, for example, simply turning a Frame Off will not produce a plausible Door because the space it consumes will still be visible in the Wall - leaving the appearance of a floating Door. Instead, use the Dimensions Tab on the Door Style Properties dialog to set the Frame Width to zero (0). You can use this type of logic on many of the other Components.

Doors and Windows Above or Below the Cutting Plane

Links
[Part 1 - Display - Object Display Properties Overview](#) - for more information on how to access the Display Properties of this Object.
[Windows and Cut Planes - Wall Display Representations](#) - for more specific tips on dealing with Windows and Cut Planes.

Layer/Color/Linetype Other

Custom Block Display

☐ Disable Custom Blocks

Add... Edit... Remove...

☒ Respect Cut Plane of Container Object when Anchored.

☐ Override Open Percent

0

Generally speaking, you should find that getting Doors and Windows to display as you prefer in simple design scenarios is reasonable; especially with the knowledge of how to make basic changes as discussed above. However, when it comes to working with Doors and Windows that don't fall into a "normal" vertical position (within the default "cut-plane" range), you may find some frustrating surprises.

Illustrated to the right I show what will happen to a **Door** and a **Window** in **Plan View** using the "**Medium Detail**" **Display Configuration**. Since the Window is well above the Wall's Cut Plane it actually disappears so you can't even work on it. The Door, being well below the Wall's Cut Plane will also disappear but at least you see two jamb lines. This raises some serious questions, doesn't it?

In the Illustration to the right I show three examples of some fairly simple Display Representation Settings that you can work with to alter the Default Display of these two Objects.

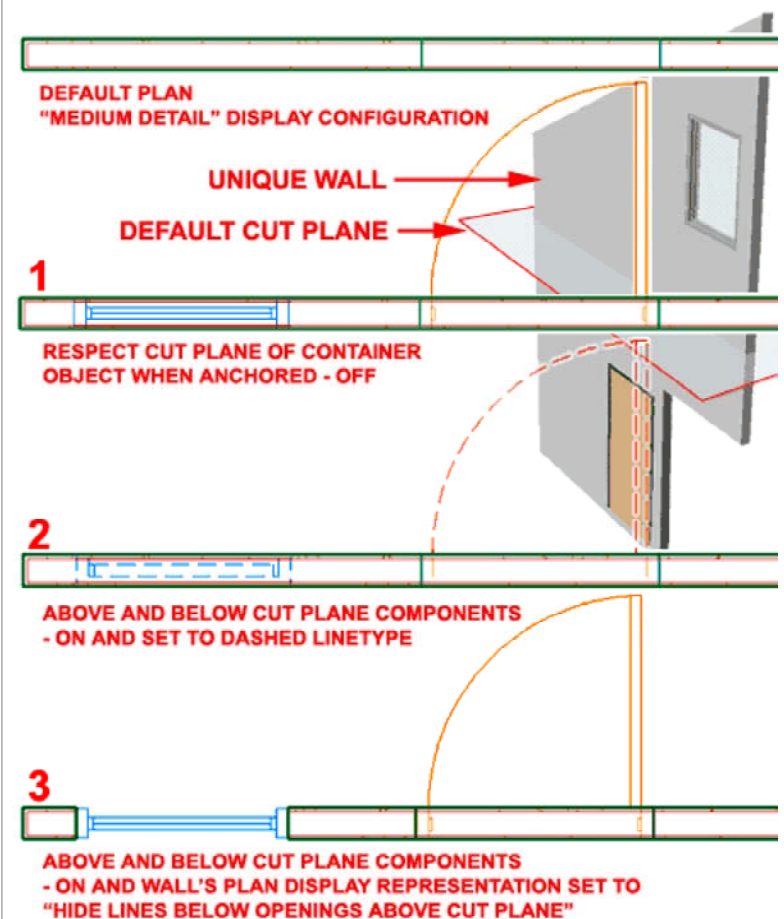
On **example 1**, I show that you can always deactivate the "**Respect Cut Plane of Container Object When Anchored**" setting on the **Other** Tab of the Display Properties for Doors and Windows (and even Openings). This keeps the Doors and Windows from ever disappearing because what you see is their internal cut-plane.

On **example 2**, I show that instead of deactivating the "Respect Cut Plane of Container Object When Anchored" setting as per example 1, you can take advantage of the [Above and Below Cut Plane Display](#)

Some Components, like Glass and Stops can be turned Off rather than set to a zero Dimension and I recommend that you employ this technique wherever possible because then you will always have the option to turn these Components On through other Display Representations and Display Configurations (like Model for 3D Views).

Tricks:

You can actually set the Frame Widths to negative values thus pushing them into the Walls. Some have used this technique to get the best of both worlds where it look a bit more simple in Plan while offering more detail in 3D. If you increase the Width to a value a bit more than your Wall Widths, the Frames can even appear as Trim or Molding.



On **example 3**, I show that you can use the information from example 1 or 2 and combine it with some changes to the **Wall Display Properties**. Here, I activated the "**Hide Lines Below Openings Above Cut Plane**" setting found on the Other Tab of a Wall Style's Plan Display Representation Properties.

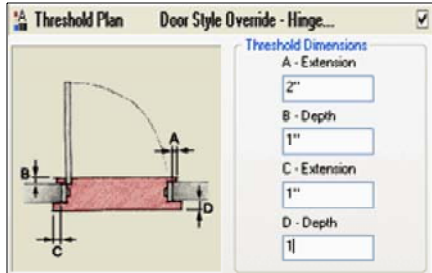
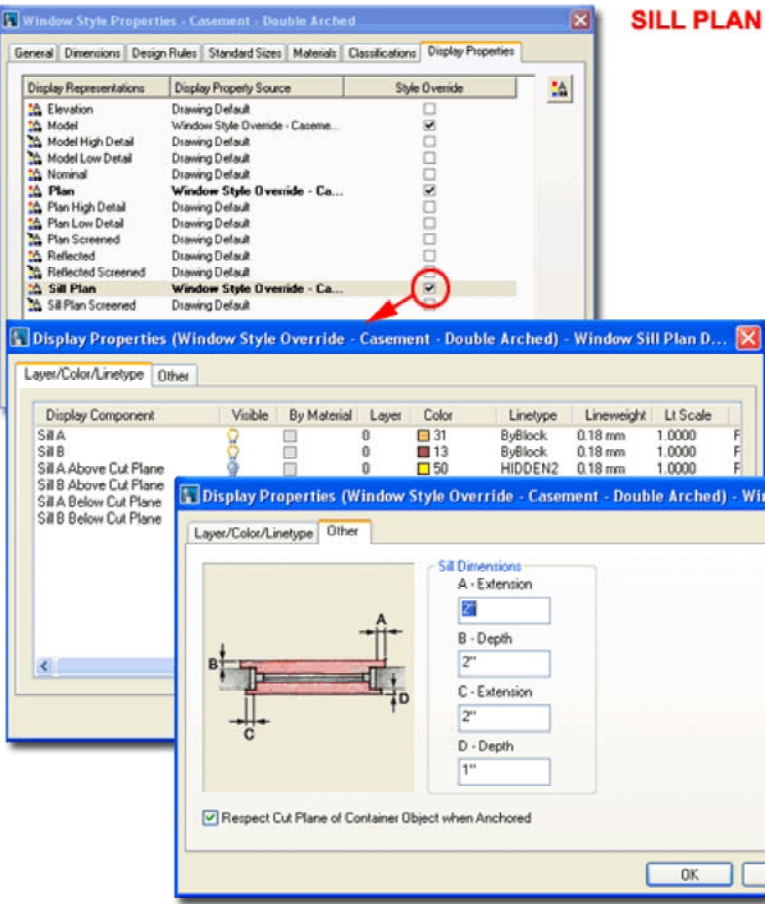
You can go a bit further and change the [Cut Plane Height of the Wall](#) to a point that cuts through the Door; something in the negative range. This would make the Plan View of this scenario appear as a normal Wall with a Window and Door at a normal position.

Components to turn **Components On** and alter their appearance to help indicate that they are above or below.

Doors and Windows with Thresholds and Sills

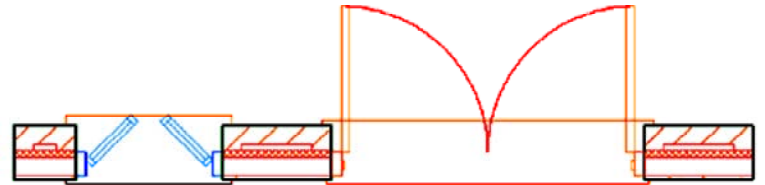
Both Windows and Doors have unique **Display Representation** for **Sills** and **Thresholds** so you can add extra linework for these items when you need to. Unfortunately, there are some limitations and one of the most disappointing discoveries you may soon find is that both Display Representations are only for **Plan View**; thus they do not offer anything for Elevations or 3D Views. One other little irritation I discovered with these Display Representation is that they don't Trim around Window or Door Panels so you will see a line running right through these objects when they are Open in Plan View (this is something I can live with but it is a little irritating).

Illustrated to the right I show an example **Window Style Properties** dialog box where I have used the **Style Override** option to set the **Sill Plan Display Properties** for the current Window Style. The reason I have chosen to use an Override is that I don't want to use the same Sill Display Properties for all of my Window Styles. By using the Override at the Style Level, you can control how the Sill Display Properties will appear for the current Style only rather than suddenly discovering that all of your Windows have Sills.



On the **Display Properties** dialog, also illustrated to the right, I show that I have turned on both **Sill A** and **Sill B** and set the **Dimensions** for these Sills on the **Other** Tab using the **Extension** and **Depth** value fields (as illustrated).

For **Door Styles**, you will find all of the same options and settings under the **Threshold Plan** Display Representation - see illustration, left.



Doors and Windows in Model and Elevation

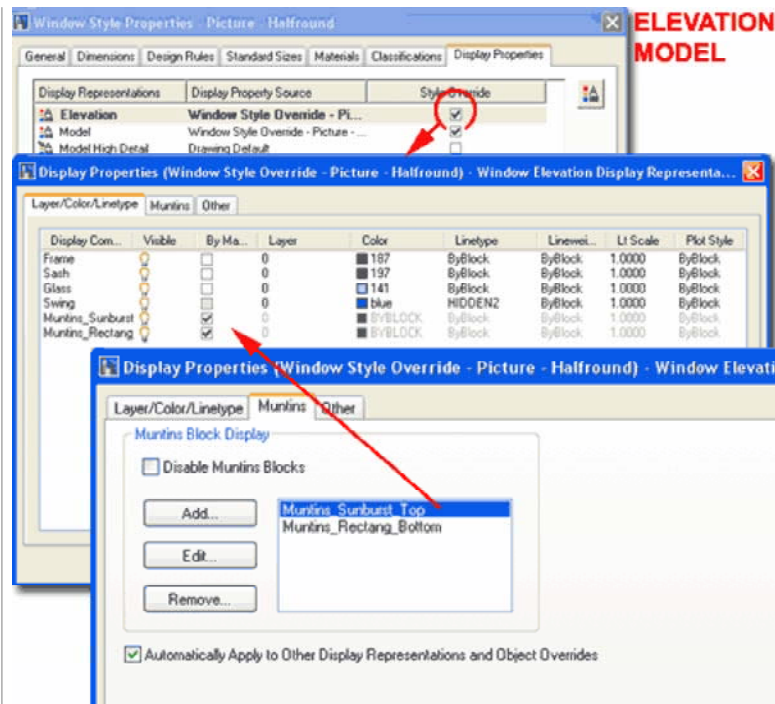
As discussed above, I feel that the Plan View is the most important area to focus on for Display Properties but once you begin to take advantage of Architectural Desktop's Elevations, Sections and 3D Views you will want to explore the **Elevation** and **Model Display Representations** to add things like Muntins.

Illustrated to the right I show the **Display Properties** tab for a Window Style that I am in the process of Adding Muntins to. You may notice that on the Window Style Properties dialog, I have used Style Overrides for both the Elevation and Model Display Representations and this is because I want Muntins for both Views. If you don't imply the Style Override, you will end up with the same Muntins on all Window Styles.

On the **Display Properties** dialog, accessed by checking the Override checkbox or by Modifying one of the Display Representations, I show that there are **new Display Components** for each Muntin I have Added on the Muntins Tab. This will allow you to control the Material, Color, Lineweight and so forth for the Muntins (a great option).

On the **Muntins** tab of the **Display Properties** dialog, illustrated lower right, I show that I have used **Add...** button to add two "**Muntin Blocks**". The reason I show two of these is to illustrate how you might create a Top Muntin Pattern that is different than the Bottom Muntin Pattern in a Double Hung Window Style, for example.

If you have one design or set of settings in mind for the Elevation Display Representation that will be different than the Model Display Representation, then you will need to repeat all of these steps for the other Display Representation - as I have shown here. Otherwise, you may be able to take advantage of the "Automatically Apply to Other Display Representations..." option at the bottom of the Muntins tab.



Automatically Apply to Other Display Representations - this option will display on the Muntins tab when no Override is being used. If you are unsure about the effects of this option, uncheck it before Adding and you will see a dialog with a list of other Display Representations that you can Apply to later. The concept is relatively simple: you use this option when you want the Muntins you create under the Elevation or Model Display Representation to be added to the other Display Representations that should also display the same Muntin Layout. Be aware that this option does not always produce the results you wish if you are using Overrides.

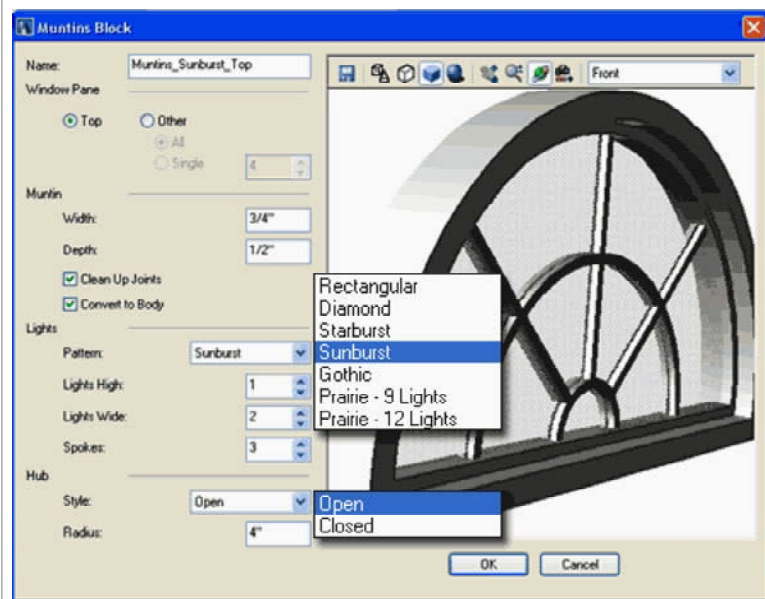
Automatically Apply to Other Display Representations and Object Overrides - this option will display on the Muntins tab when using an Override. It works as described above but with the added bonus of catching Objects that have Overrides at the Object Level instead of the Style Level.

Doors and Windows - Parametric Muntins - Patterns

After selecting the **Add...** button on the **Muntins** Tab for Window or Door Styles, you will be taken to the **Muntins Block** dialog box illustrated to the right. This tool is termed a "parametric tool" because its settings automatically adjust to whatever sizes you specify when creating the objects; e.g., if you specify 3 Muntins, you will always get just 3 Muntins of equal spacing.

Illustrated to the right, I show that I have specified a unique Name so that I can figure out which one to Edit in the future (if I have more than one, this can be really helpful). I also show that I have chosen to use the Top Window Pane to set a Sunburst Light Pattern that will be part of my Half round fixed Window Style. The fact that you don't see the Rectangular bottom portion of this Window Style appears to be a bug in the software since this was not a problem in previous releases. When you Add.. another Muntin Block for the bottom portion of this Window Style, it will continue to show the Arched Top so you'll have to pretend it is a rectangular shape. The final outcome will be okay.

The trick to getting all of the options illustrated to the right has to do with using a **Window Type** and **Window Shape** that allows you to use these options. The Window Style illustrated to the right is the **Picture Half Round** - which is a *Picture* Type with a *Half Round* Shape. You can thus mix and match several Types and Shapes. When you Modify the **Display Properties** for a custom Window Shape, such as this one, you will most likely need to use an **Override** because the default "Standard" Window Style is set to be a Rectangular Window Shape with Display Properties to match; i.e., no options for a Hub, etc.



Lights

Pattern - a drop-down list offering different muntin patterns and varies dramatically depending on what Window or Door Style you are working with; a "Picture Half Round" Style, shown below above, has many options. A standard double-hung window will only offer Rectangular and Diamond muntin patterns.

Name - automatically generated but you can type in your own and I highly recommend that you do when using multiples.

Window Pane - Top will automatically set you to the top pane in a multi-paned window (like the top in a double-hung window).

Other will allow you to specify what Pane you want; where **All** gets all panes and **Single** allows you to manually go to the specific pane number you want (in a double hung case, choosing number 2 would be equal to using the Top option).

Muntin - Width and Depth of the muntins themselves.

Clean Up Joints - creates a traditional architectural graphic look where the muntin intersections don't show any crossing lines; a clean look that I use but it's not reality - the other option is worse where all lines cross - hmmm, where's the next option as with Assemblies and Curtain walls?

Convert to Body - creates a 3-dimensional version of the muntins and adds detail to 3D Views. This is a great option but can put a heavy load on system resources and should thus be used sparingly and only when needed; i.e., it's not need in 2D Elevations and Sections.

Lights High - divides the selected Pane(s) into equal vertical numbers.

Lights Wide - divides the selected Pane(s) into equal horizontal numbers.

Spokes - divides a Style with an Arched top into equal polar numbers.

Hub

Style - a drop-down list offering either Open or Closed hub designs where Spokes are used. Closed simply fills the inner hub with a solid form and no glazing.

Radius - a value field that allows you to specify the Hub radius and consequent vertical lights.

Starburst / Sunburst / Gothic - Window Types:

Awning, Single Hopper, Single Transom, Vertical Pivot, Horizontal Pivot, Double Hung, Glider, Single Hung, Single Casement and Picture.

Starburst / Sunburst - Window Shapes:

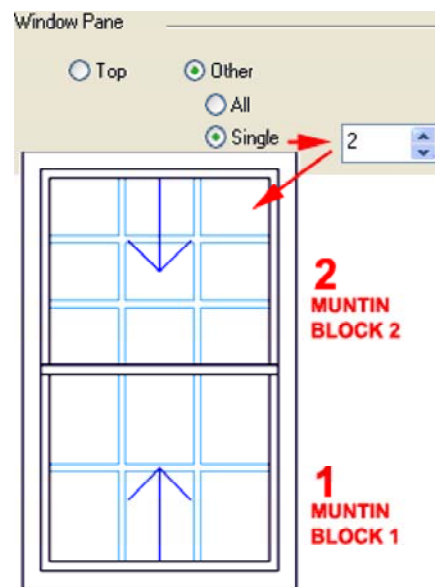
Round, Half Round and Quarter Round.

Gothic - Window Shapes:

Round, Half Round, Gothic, Peak Pentagon and Arch.

Note: You may find that while you are making changes, your graphics card stops delivering real-time changes in the preview area. To fix this problem, OK out of this dialog box and simply use the Edit... button to return. If the problem persists, OK back out further and return.

Doors and Windows - Parametric Muntins - Multiples

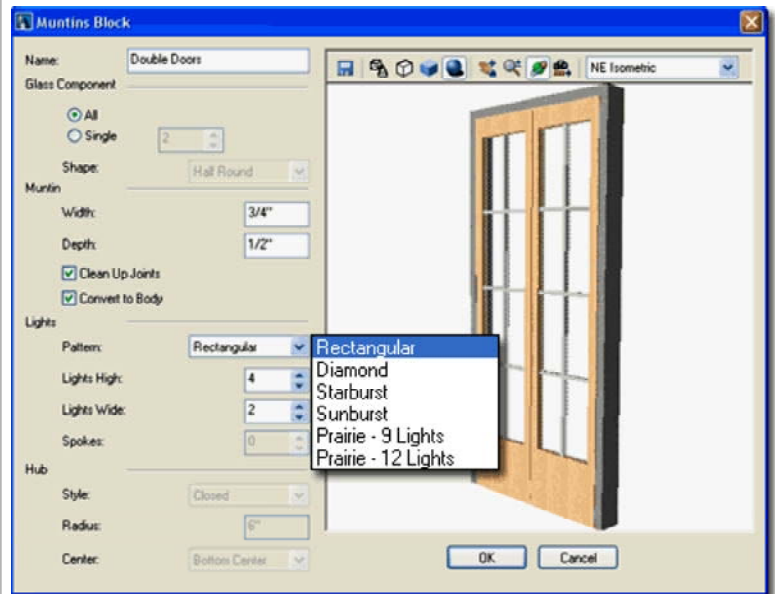


For the bottom portion of the Half round Picture Style discussed above and for numerous other Window and Door Styles that have **multiple Window Panes**, you can continue to Add... as many Muntin Blocks as you need for each Pane.

Illustrated to the left I show that I have used **two Muntin Blocks** to create two different Muntin Patterns; one for the **Top** and one for the **Bottom** of an example Double Hung Window Style. To specify which Pane you want to set the current Pattern for, use the **Other radio button** and set the **Single Pane number** to match the Preview area. Once you add Muntins, you

will instantly see which Pane you are affecting.

Illustrated to the right I show that I have used the **All radio button** for the **Glass Component** of an example Double Glazed Door Style to set the same Rectangular Lights Pattern for both Panes.



If you want to keep one Door or Window Style but have independent control over Muntin arrangements, you can use the **Edit Display Props...** object-specific pop-up menu choice and use Object Overrides to work on individual Window or Door Display Properties. The drawback to this technique is that rapid style changes cannot be achieved from a central Style change; instead, you will have to track down every door or window you modified uniquely and change their individual Display Properties. It's best to create individual Styles for each Muntin layout.

Doors and Windows - Other Tab

Links [Part X - Appendix](#) - to download door knob block to follow this example

The **Other Tab** on the **Display Properties dialog box**, illustrated to the right, is primarily designed to manage the attachment of unique **Blocks** for items that are not available for **Doors, Windows** and **Openings**. On this tab you will also find the option to **Override** the **Open Percent** and, for Doors, the option to display **Swings** as Straight lines.

Illustrated to the right I show that I have used the Add... button to attach a custom Block of a Door Knob. I have Added it twice because I wanted one on each side of the Door Panel.

Custom Blocks provide you with the option to add components to an ADT Object that isn't part of it's original design. In this example I am illustrating how to Add... door knobs but you can add just about anything you can think of. I have added two of the same because I want one door knob for each side of my door.

Straight Swing - a graphic swing line that is straight rather than arched.

Override Open Percent - a check box that allows you to control the percentage of the Door's Swing; zero (0") is closed and 100 percent is 180 degrees open. This is obviously necessary in cases where two adjacent doors need to be shown clearly and not overlapping or in cases where you need to show two-way swing doors.

Display Properties - Other - Custom Block

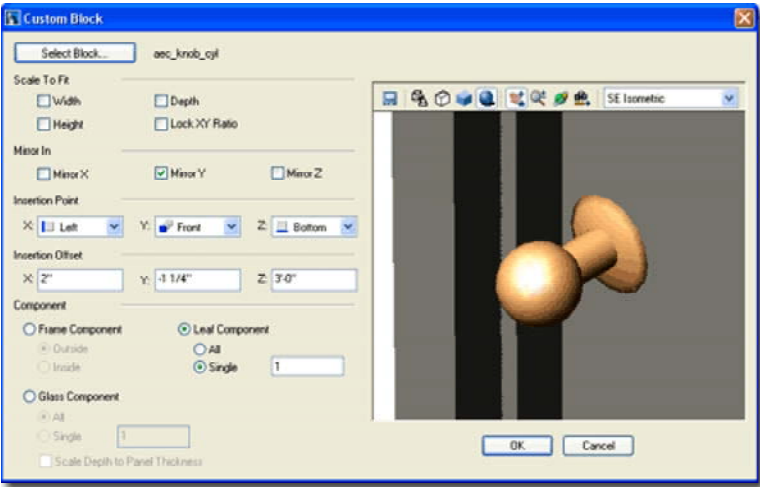
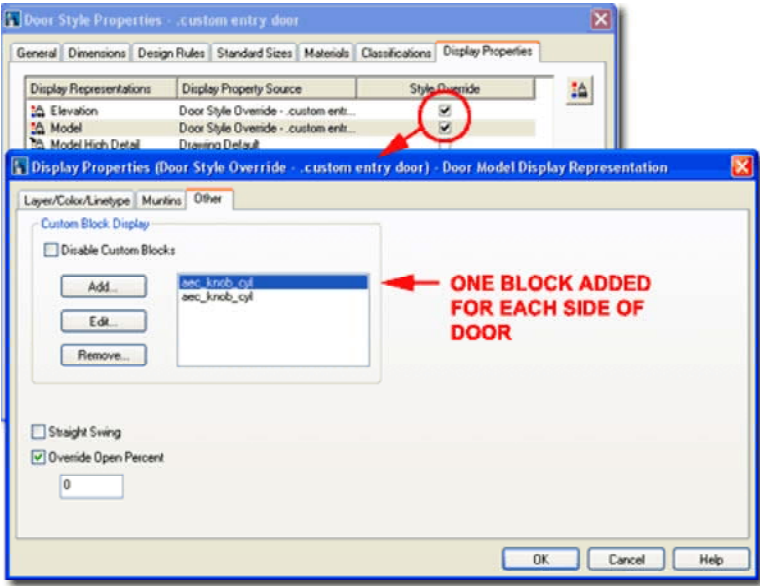
Once you pick on the **Add...** button on the **Other** tab of a Door Style's **Entity Properties** dialog box, you should see a large **Custom Block** dialog box as illustrated to the right.

In the illustration to the right, I have attached the same 2D "door_knob_plan" block that I created with the **Block** command. The insertion point was at the back center but you can choose just about any insertion point because the Custom Block dialog box provides **Insertion Point** and **Insertion Offset** setting options to allow you to massage your custom block to a point right where you want it.

Scale to Fit - these check box options provide controls to match component proportions of a door so that you can use the Custom Block in a fashion that is similar to parametrics. this may work well with ornamental designs, glazing and similar dynamic forms but it doesn't work with hardware that needs to stay a fixed size and shape.

Mirror In - these check boxes allow you to flip a block to match how you want it to appear with respect to the Door. These options become very valuable when you want to use on block, such as a door know, for each side of the same door.

Insertion Point and **Insertion Offset** values allow you to position your custom block base upon its insertion point.



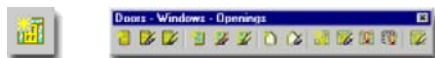
Frame Component Outside relates to the outer portion of you Door for the block attachment and position while **Inside** relates to any internal components such as a window or vent.

There are a number of problems with this technique, the worst one being that the object you attach and painstakingly locate does not rotate with a Door's Open Percent value so you can end up with door knobs in space if you choose to close it.

Note: You may find that while you are making changes, your graphics card stops delivering real-time changes in the preview area. To fix this problem, OK out of this dialog box and simply use the Edit... button to return. If the problem still exists, OK back out further and return.

Add Door/Window Assemblies Properties Palette

Alt. Menu **Design> Door/Window Assemblies> Add Door/Window Assembly...**



Keyboard **DoorWinAssemblyAdd**

Links [Doors, Windows & Assemblies Style Loading](#) - for information on where to load Door/Window Assembly Styles.

Door and Window Assemblies are basically mathematical grids within which you can associate other Objects like Doors and Windows to create a composite assembly of parts. These "Assemblies" are a derivative of the Curtain Wall Style but have been designed to Anchor to Wall Objects much like Doors, Windows and Openings do.

Once you have [loaded your Assembly Styles](#), you can begin to **Add** them. On the **Add Window Assemblies Properties Palette**, use the Style drop-down list to pick your style. Illustrated to the right I show just a portion of the predefined Styles that come with ADT.

DIMENSIONS

Length - input the overall out-to-out frame length of your Door/Window Assembly. Once you have placed your Door/Window Assembly, you can use the Properties Palette or Grips to modify this value.

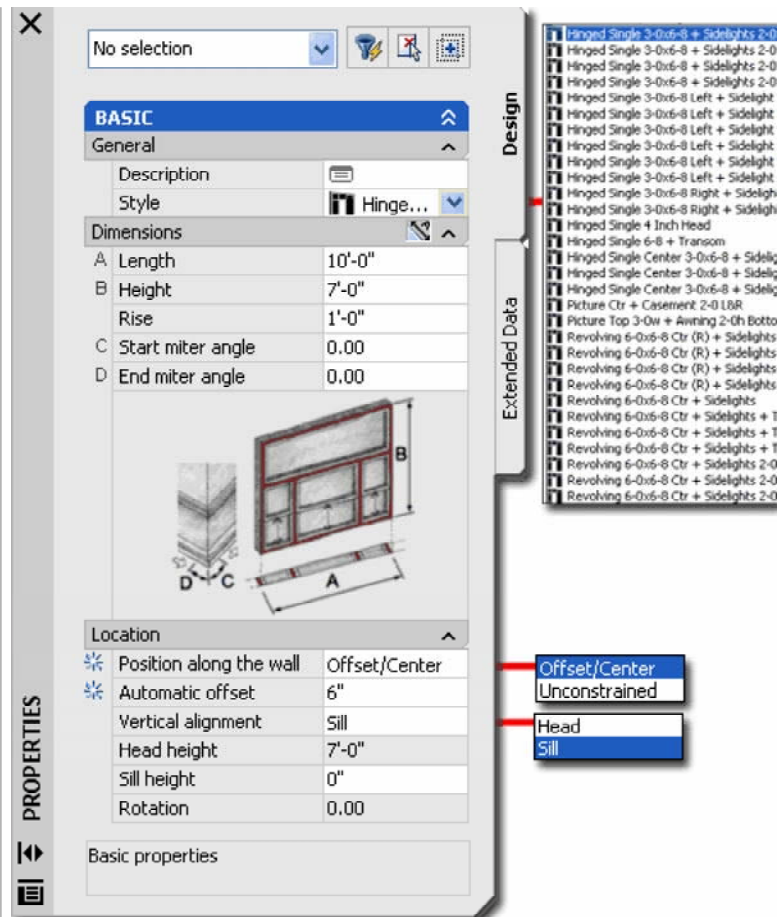
Height - depending on the design of the Door/Window Assembly this typically represents the finished floor to top of frame height so this height would be greater than a standard Door Height if you expect to insert a Standard Door into the Assembly; i.e., the height of the Door plus the frame height, for example.

Rise - is for Assemblies that have a pitched or arched top, much like a triangle or vault and can be set within the Door/Window Assembly Style; see Defaults tab - option 'C'



Start and End Miter Angles - angle settings for these two value fields only affect the top and bottom frame. Since you cannot create perfectly mitered corners within Walls using any of the default Door/Window Assembly Styles, this option is a bit misleading - especially the little graphic on this Palette.

Comment: [all link to miter discussion](#)



LOCATION

Position Along the Wall - this drop-down list offers the same two choices found for Doors, Windows and Openings. I find that using the **Offset/Center** with a well chosen Automatic Offset value works best. If you use the **Unconstrained** option, you can still come back with the Anchor dialog box and set a highly accurate position value.

Automatic Offset - this value field is only available when you use the Offset/Center option for Position along the Wall. Setting a value here will allow you to position your Door/Window Assembly at Center-points within Wall Objects or the specified Offset distance from Wall Ends, Wall Intersections or other Openings in the current Wall. Working on **Curved Walls** can prove to be difficult with this option and you may need to use an arbitrary location at first and then come back with the Anchor dialog box for more accurate positioning.

Vertical Alignment - this drop-down list offers two options for setting the vertical height of the Assembly: with respect to the **Sill** or the **Head**. Since Door/Window Assemblies are often placed as Doors, you may want to use the Sill option.

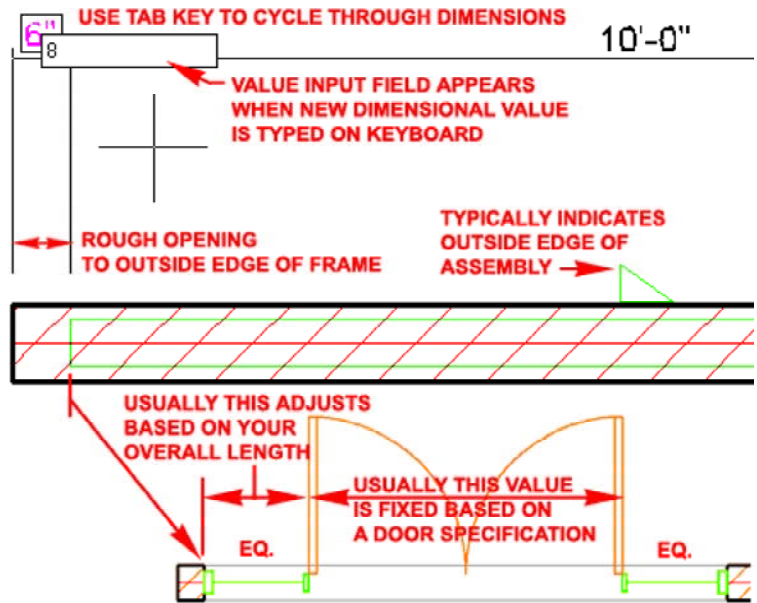
Head and Sill Height - depending upon the setting made for Vertical Alignment, you will either have a Head height or Sill height value field to set your height value for. If you want your Assembly to be placed at the base of a Wall, for example, you would most likely use the Sill option and set the height to zero.

Placing Door/Window Assemblies in Walls

Adding Door and Window Assemblies is very similar to Adding any of the other opening objects. After Selecting a Wall Object to Anchor your Assembly to, familiar Dimensional values should appear on your screen as illustrated to the right. By using the Tab key you can cycle through any of these temporary dimensions and type a new value as desired. From an Edge, the Door and Window Assembly is usually measured to the outside edge of the primary frame or grid as it is referred to in ADT.

Many of the predefined Door/Window Assembly Styles in ADT have a set of fixed and variable cells that allow you, for example, to Add a double entry door system with variable length sidelights. These Style can be designed to function in many different ways so make sure to read up on Door/Window Styles if you find that the default ones don't produce the results that you seek.

Should you, for whatever reason, want to use a Door and Window Assembly without Anchoring it to a Wall Object, you can Release an Existing one or hit the Enter Key when queried to Select a Wall. There is no simple solution for mitered corner glazing units. Though you can Anchor an Assembly to the very end of one Wall Object, you cannot Anchor both to the out ends at a corner unless you employ a trick like using different [Wall Cleanup Groups](#).



Convert Linework to Door/Window Assembly

Menu **N.A.**



Keyboard **DoorWinAssemblyConvert**

Tools Right-click over Door/Window Assembly Tool, select **Apply Tool Properties To** and cascade to **Elevation Sketch**

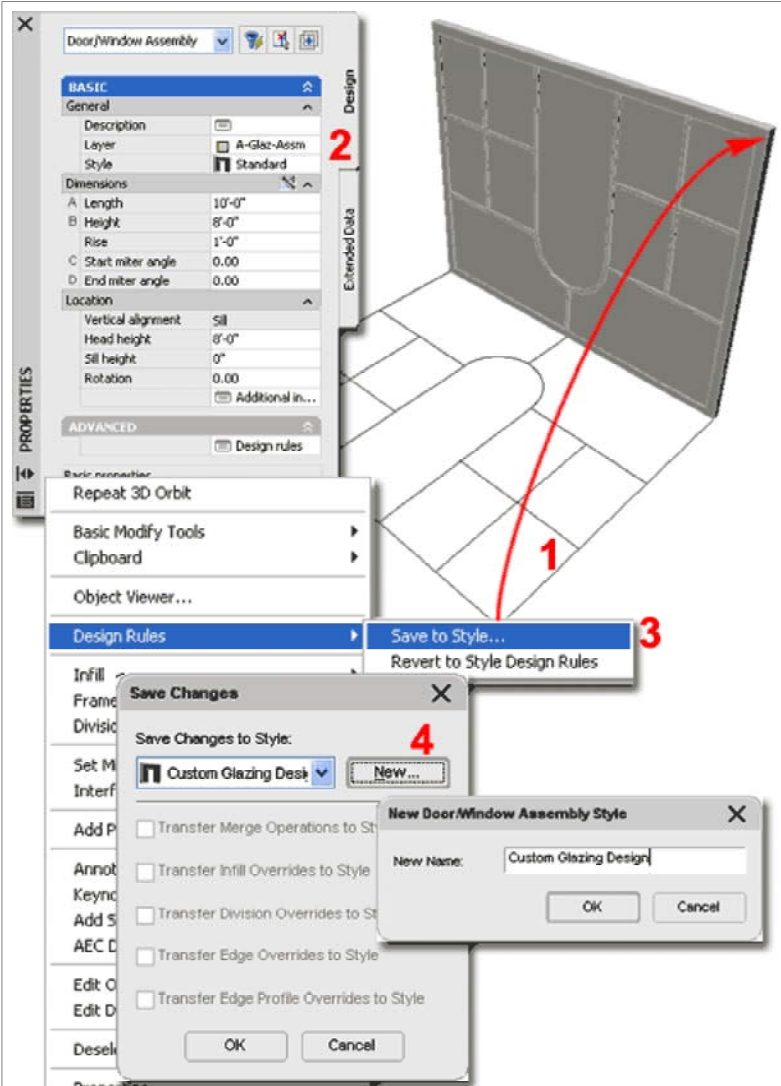
Links [Custom Window Assemblies](#) - for a lengthy article with all of the steps for creating a storefront assembly with doors and sidelights.

For a quick Door and Window Assembly design solution, you can use regular AutoCAD based **Lines, Arcs, Polylines** and **Circles** to "sketch" out your concept in 2D. The exterior linework will be converted into the Primary Grid or frame and will represent the exterior dimension while all interior linework will be converted to Mullions centered on the linework. Be aware that though this technique is very attractive, there are significant drawbacks when it comes to modifications. As a Style, you cannot modify the grid because it becomes a "Custom Grid" but at least you can modify Panels, Mullion Profiles and so forth. As an Object, however, you can use Edit-in-Place techniques to modify the Grid and the Mullion Positions so this is not too bad an option if you don't mind the limitations within the Style Manager.

Illustrated to the right I show an overview of the process and the tools involved in converting linework to a Door/Window Assembly Style. After creating your 2D grid design for the frame and mullions, use the **DoorWinAssemblyConvert** command and specify **Linework** when queried as follows: "**Convert [Linework/LayoutGrid]:**"

You can draw the linework in Plan (Top) View or in the Elevation View where you need it. The position of the X-axis on the UCS icon will determine the base unless you select another object as the "baseline".

Select your linework and hit the **Enter key (1)**. When queried to "**Select baseline or RETURN for default:**", hit the **Enter key** unless you want the Door/Window Assembly to match the Plane of the linework such as when converting linework drawn in Elevation View. My preference to draw in Plan View and Convert to an upright position as illustrated to the right. When queried to "**Erase layout geometry? [Yes/No] <No>:**", I find that it is best to keep the linework around in case I made mistakes.



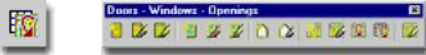
Command: **DoorWinAssemblyConvert**

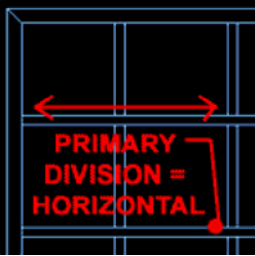
After the Conversion takes place, you should see a 3D Door/Window Assembly Object and the (2) **Properties Palette**. The default Style will be set to Standard until you use the Design Rules pop-up menu option to cascade over to (3) "**Save to Style...**" as illustrated to the right. On the (4) **Save Changes dialog**, you will need to use the **New...** button to type in a New Name for your custom Door/Window Assembly Style..

Once you have Converted your linework to the Door/Window Assembly Object, you are automatically put into something similar to an Edit-in-Place mode indicated by the "Design Rules are on the object..." reference you will see on the command line. You can modify the Assembly Object using the pop-up menu options before saving it to a Style. At any time after making Modifications, you can use the Save to Style... pop-up menu option to Save the Converted Assembly as a New Style to be used in Walls.

To use simply Add the New Style as you would other Door/Window Assembly Styles.

Convert Layout Grid to Door/Window Assembly

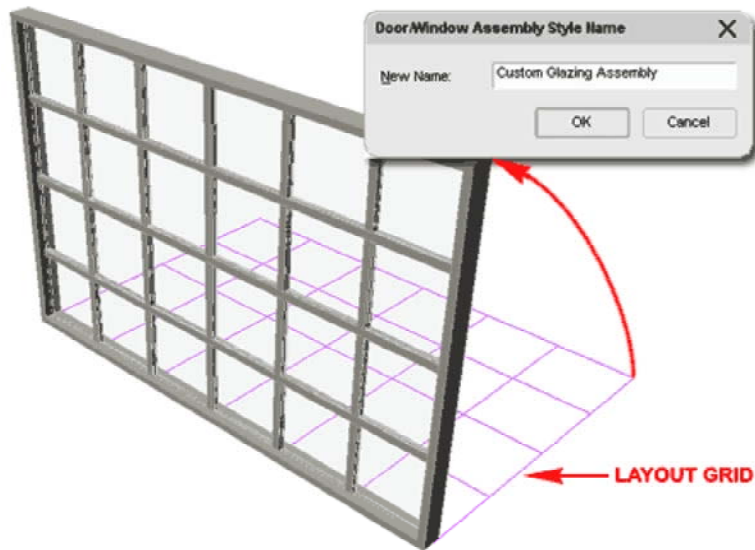
- MenuN.A.
- 
- KeyboardDoorWinAssemblyConvertGrid
- ToolsRight-click over Door/Window Assembly Tool, select **Apply Tool Properties To** and cascade to **Layout Grid**
- LinksConvert Linework to Door/Window Assembly
- 
- KeyboardLayoutGridAdd
- Links[Part 22 Layout Tools](#) - for information on using the Layout Tools



PRIMARY DIVISION = HORIZONTAL

The **DoorWinAssemblyConvertGrid** command is really just a direct path to an option under the **DoorWinAssemblyConvert** command discussed above. Because this option uses an ADT grid as the template for conversion, the process and the results are a lot easier to work with than that of converting linework. In fact, a Layout Grid translated directly to the Primary and Secondary Grid Divisions within the Door/Window Assembly Style dialog box so, among other things, you can modify the spacing between Mullions after conversion.

Convert [LInework/LAyloutGrid]: li
Select elevation linework: Specify opposite corner: 9 found
Select elevation linework:
Select baseline or RETURN for default:
Erase layout geometry? [Yes/No] <No>:
Design rules are on the object. Select Save Changes from the context menu to create a new style.
Convert [LInework/LAyloutGrid]:

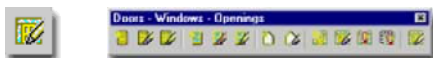


The only unusual question you will find when using this tool is the "**Primary Division [Vertical] <Horizontal>:**" query. This is simply an option to define a dominant Mullion direction in cases where you may have one that is dimensionally larger than the other - see illustration to the left.

Command: **DoorWinAssemblyConvertGrid**
Select a 2d layout grid:
Erase layout geometry? [Yes/No] <N>:
Primary Division [Vertical] <Horizontal>:

Modify Door/Window Assemblies Properties Palette

Alt. Menu **Design> Door/Window Assemblies> Door/Window Assembly Properties**



Keyboard **DoorWinAssemblyProps** or -DoorWinAssemblyModify

Mouse Double Left Click on an Object to invoke the Properties Palette

Links [Object Properties - Anchor tab - complex objects](#) - for explanation of Anchor tab options.

See [Add Door/Window Assemblies](#) for full information on the Properties Palette

For most conditions, you should find that the **Properties Palette** offers the same list of options as those found when Adding **Door and Window Assemblies**. However, once you explore advanced editing features, you may find new options under the "**Advanced**" section of the Properties Palette as illustrated to the right.

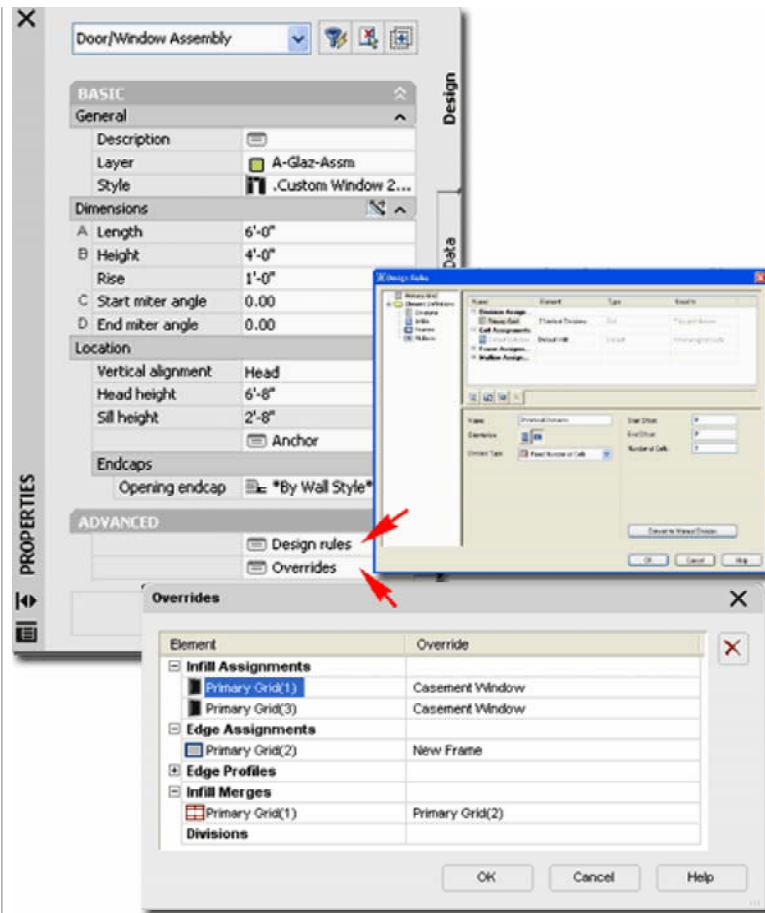
For information on the Basic list of features on the Properties Palette, see [Add Door/Window Assemblies Properties Palette](#) above.

LOCATION

Anchor - provides access to the Anchor dialog box which can be used for fine-tuning the position of Door/Window Assemblies in Walls and though most of these settings can be done with Grip work live on the Object, I often find this a more comprehensive tool to reposition this object.

ENDCAPS

Opening Endcap - this drop-down list is really an Override option that affects the Wall. If you select another Endcap Style than that assigned within the Wall Style, the Override only applies to the specific Object Selected. This means that you can Select one Assembly, for example, and assign a different Opening Endcap Style (which is actually four Endcaps - one for each side of the opening). This can be a fantastic option or a nightmare depending upon the use and comprehension of how it creates an Override.



ADVANCED

These options are only available when the Design Rules are governed by the Object instead of the Style. By working with the Context (object specific) pop-up menu, you can use the Design Rules> menu option to toggle between these two options.

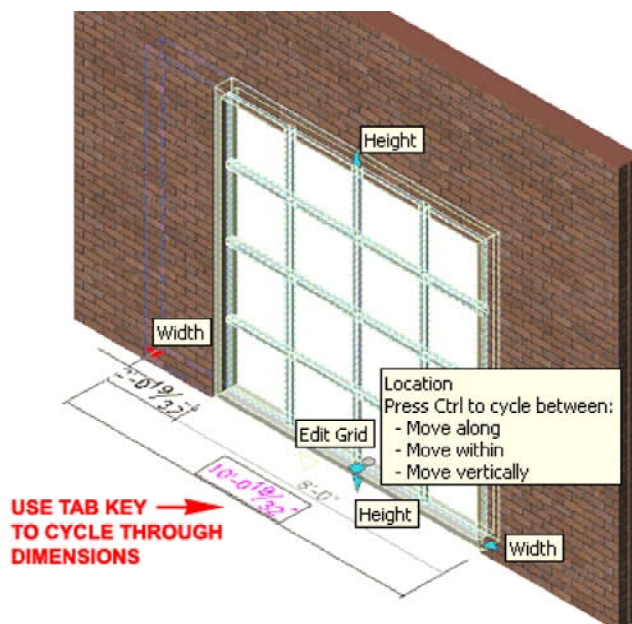
Design Rules - provides access to the Design Rules dialog box which is basically the tab of the same name from the Door/Window Assembly Style Properties dialog box. Since this is a type of Override, you are able to work on the dimensional proportions of a single Door/Window Assembly uniquely while still keeping other forms of Style control through its Style Settings.

Overrides - provides access to the Overrides dialog box where Edit-in-Place changes are stored. You can Remove or Change the Override Settings but you cannot Add them through this dialog box.

Door/Window Assembly Grip Points

Door and Window Assemblies have four primary **Grip Points** from which you can Stretch the **Width** and **Height**. As with most other Objects in ADT, you also have the **Location** Grip Point with options for **Move along, within** and **vertically**; all cycled through by using the Ctrl key. The last Grip Point, **Edit Grid**, activates the Edit-in-Place mode where you are queried to Select an Edge of the Assembly that represents the grid-direction that you wish to edit.

When you active the Grid for Editing in Place, you have actually activated the **Division pop-up menu option** - see discussion below for information on this subject and how to set Divisions to Manual control.



Door/Window Assembly Context pop-up menu options

Links [Assembly Style Properties - Overrides tab](#)

One of the more powerful and intuitive ways to work with existing Door/Window Assemblies is to use the Context or object-specific pop-up menu. The only problem with working on Assemblies "in-place" is that you will eventually need to decide on how those changes are saved. If you simply make changes such as Cell Merges on an Assembly and don't do anything else, the changes will only be stored under the Advanced section of the Properties Palette. If you use the Save to Style... option, you can push your changes back to the original Assembly Style or create a new permutation based on your changes.

Design Rules> - use this menu option to toggle between the default setting of Style based Design Rules and Object based Design Rules. When you use the "**Transfer to Object**" menu option, Overrides are transferred to the Object Level and can be accessed on the Properties Palette under the Advanced section. You can also use the Design Rules dialog box to modify all of the Design Rules Style Settings uniquely for the current Assembly. By using the **Save to Style...** menu option, you can Save Object-specific changes back to the original Assembly Style or to a **New...** Style based on the current form of the Assembly. You can also use the "**Revert to Style Design Rules**" menu option to return to the default configuration.

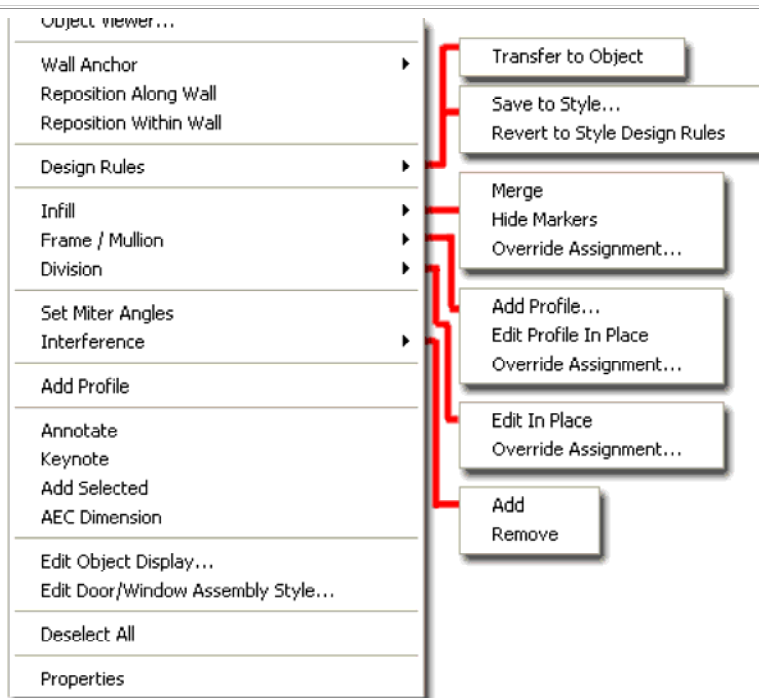
Infill> - use these menu options to work with Cell Infills directly on the Door/Window Assembly Object. By using the **Show Markers** toggle (which changes to Hide Markers as per illustration to the right), you can activate a square marker for all Cells so you can Select them for Merges or Assignment Overrides. Merging Cells is another way of eliminating a Division by uniting two adjacent Cells. The **Override Assignment...** option can be used to replace an existing Infill with any other Infill Definition within the current Assembly Style.

Frame / Mullion> - use these menu options to adjust the profile shape of Frames and/or Mullions. See discussion and examples below.

Division> - use these menu options to adjust the Horizontal or Vertical Division Spacing of Mullions. You can also go beyond the basic level of spacing control to a Manual mode where you can Add, Remove and randomly space Mullions. See discussion and example below.

Set Miter Angles - use this menu option to let ADT automatically calculate the Miter Angle between two adjacent Top and Bottom Frame Elements. See discussion and examples below.

Interference> - use this menu option to use any other ADT Object as an



Interference Object that will create a hole in the Assembly.

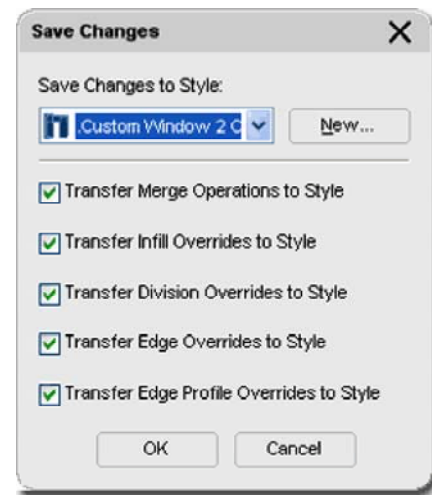
Add Profile - use this menu option to activate the **Add Door/Window Assembly Profile dialog** box to **Select** a predefined **Profile Definition** or to **Edit** the current Profile **"In-Place"**.

Door/Window Assembly Design Rules - Save to Style

If at some point in the modification process you decide that you want to Save your Assembly changes back to the original Door/Window Assembly Style or that you want to Save the changes to a New Door/Window Assembly Style Name, you can use the Design Rules pop-up menu option, set the state to **"Transfer to Object"** and Select **"Save to Style..."**

On the **Save Changes dialog box**, illustrated to the right, you can Select an Existing Door/Window Style Name to Save to or use the New... button to create a New Style Name. By using the checkbox options you can choose which changes to "Transfer" or Save to the Style. The final result of this work will be a Style that can reproduce the same design when using the Properties Palette to Add it to Walls. Be aware, however, that Overrides remain as Overrides even when you save them and you will find them on the Overrides Tab of the Door/Window Assembly Style dialog box. In the case of Divisions, for example, this can be a bit irritating since the grid layout may not actually be configured by the Division Values on the Design Rules tab but rather by the Override Settings on the Overrides tab - making it difficult to change and forcing you to always use this Edit-in-Place technique.

Overall, I prefer to design Door/Window Assemblies Styles directly with the Style dialog box rather than introduce Overrides but having the Override option can make difficult situations less time consuming.



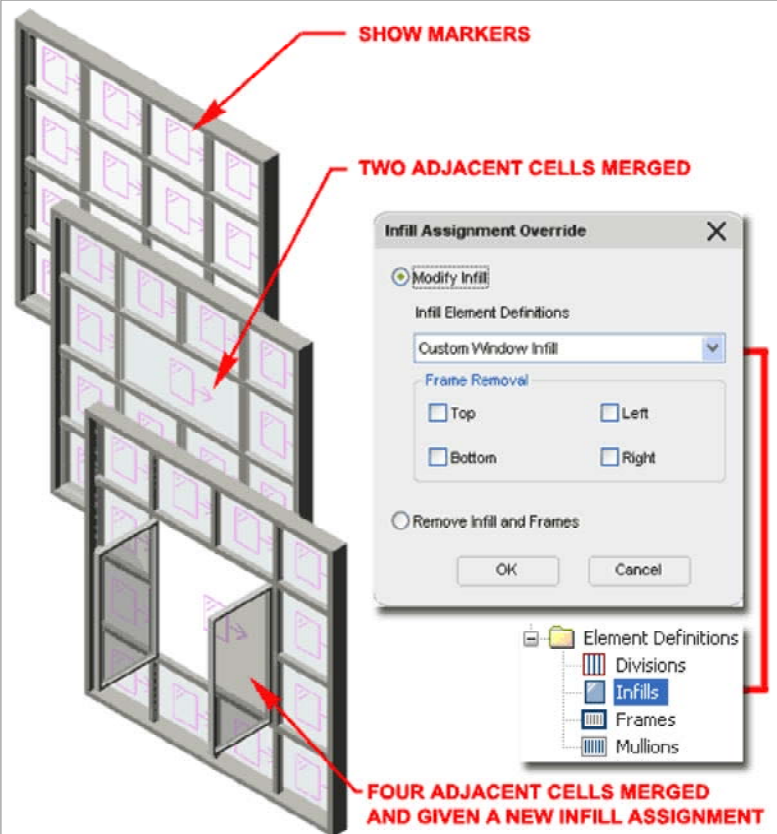
Door/Window Assembly Infill menu options

When using the Infill menu option, you should find three options to choose from: Merge, Show Markers and Override Assignment... The Show Markers option will change to Hide Markers when the Cell Marks have been turned on.

Cell Markers are very useful for identifying the Infills and in Selecting specific Infills for Merging and Overrides. You can change the Color and Size of Cell Markers on the Display Properties dialog box should you need to adjust them.

The **Merge** option will allow you to unite two adjacent cells by removing the Mullion between them and expanding the Infill of the Cell you select first.

The **Infill Assignment Override dialog box** can be used to replace any existing Infill with any other Infill that is defined within the Infills section of the Style's Element Definitions Folder. You can also use this dialog box to Remove any of the four outer Frames or just one Infill and a portion of the adjoining Frame which can be quite useful when creating openings that go to the floor.



Door/Window Assembly Frame/Mullion menu options

Links [Profiles - Edit in Place](#) - for more information on working with Profiles and Editing them in Place

When using the Frame / Mullion menu option, you should find three options to choose from but the **"Edit Profile in Place"** option will only work once a custom Profile has been assigned to a Frame or Mullion.

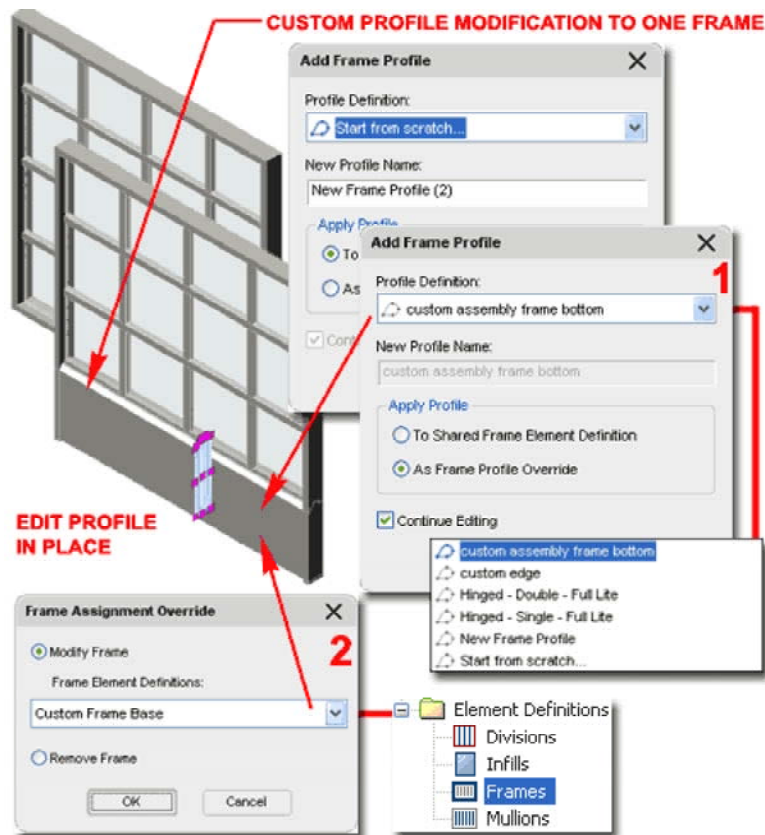
Illustrated to the right I show the two primary options you can employ to create custom Frame or Mullion changes.

The **Add Frame Profile dialog box** can either be used to transform the existing shape into a profile (**Start from scratch...**) or be used to Select an existing Profile Definition Name. For the Apply Profile options, the **"To Shared Frame Element Definition"** option will affect all connect frame or mullion elements while the **"As Frame Profile Override"** option will only affect the Selected Frame or Mullion.

The **Frame Assignments Override dialog box** offers a simple way to Replace a Selected Frame or Mullion with another as defined within the Frames section of the Style's Element Definitions Folder. You can also use this option to Remove a Frame or Mullion.

Note:

One of the easiest and fastest ways to create a custom Frame or Mullion Profile change is to use the Start from scratch... option on the Add Frame Profile dialog box. After typing in a Name for this new Profile and setting the Apply Profile radio button to "As Frame Profile Override", all you have to do is work with the default profile in the "Edit in Place" mode where you can Add or Remove Vertex points and employ numerous other tools.

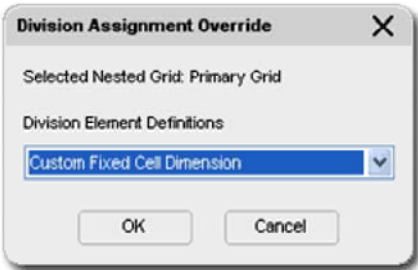


Door/Window Assembly Division menu options

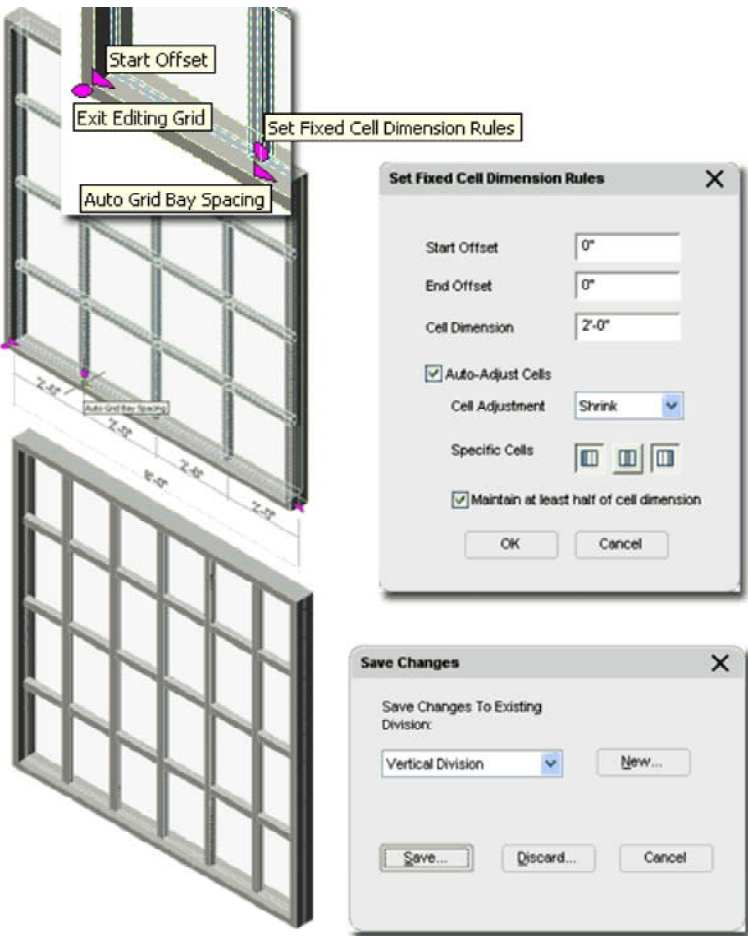
[Using Grips to modify Door/Window Assemblies](#) - for a quick way to access similar options and for information on setting Divisions to Manual Spacing.

When using the Division menu option, you should find two options to choose from: **Edit in Place** and **Override Assignment...** You can actually activate the Edit in Place mode directly by Selecting the Edit Grid Grip Marker.

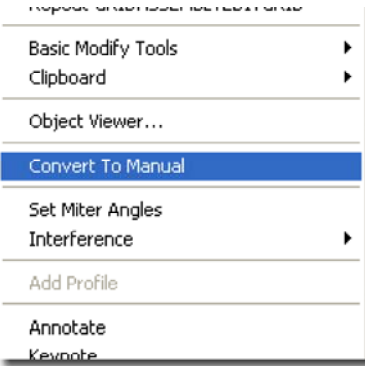
The **Edit in Place** mode will query for a grid-edge Selection and then activates the **In-Place Edit tool bar** and five special Grips as illustrated the right. When you Select a grid-edge, you are also setting the grid-direction that you want to edit since you cannot edit both directions at the same time. Once you see the Grip markers, as illustrated to the right, you can use the triangular Grips to Stretch or Move Frames and Mullion and the circular Grips to activate special dialog boxes. All of these Division controls have one thing in common and that is uniformity based on Rules such as even increments of distance between Mullions, for example. You cannot use these tools to set Divisions at Manual Points within the Frame.



The **Division Assignment Override dialog box** provides the option to select a predefined Grid Division Definition as set within the Assembly Style. This option is useful when working with permutations of a common Door/Window Assembly where you want to control the overall design through one Style but have variations on the Divisions within it. Be aware that the Grid Direction you Select to Override must match the direction of the Definition or you may find that you simply lose the whole Grid; i.e., Division Definitions are set to either Horizontal or Vertical.



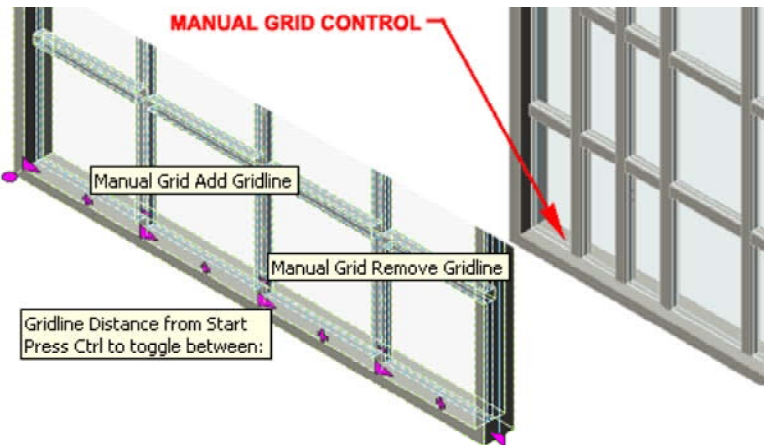
Door/Window Assembly Division menu options



If you have activated the **Edit-in-Place** mode for a Door and Window Assembly, you can **right click** to select the **Convert To Manual** menu option off of the Context pop-up menu as illustrated to the left.

By activating the Manual mode, you can use the little **Cross** (plus icon) **markers** to **Add new Grid Lines**, the little **Dash** (minus icon) **markers** to **Remove Grid Lines** and the **triangular makers**

to set unique **position** values that don't necessarily conform to any Design Rules. See illustration to the right.



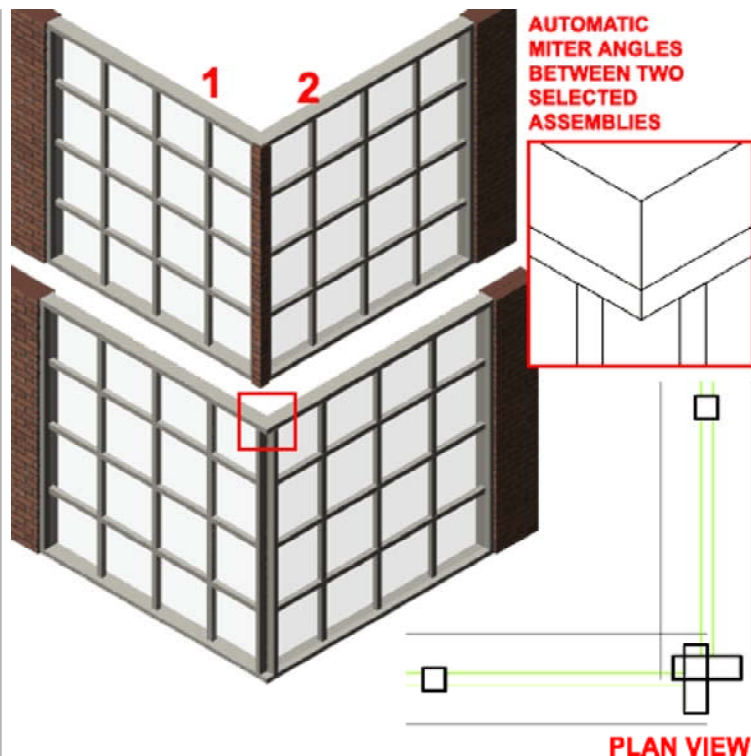
Door/Window Assembly Division Set Miter Angles

Though the Set Miter Angles pop-up menu option seems simple enough to use, getting to a point where you can actually use it is a whole different matter. Since this tool comes from the Curtain Wall suite of tools, it makes more sense there but illustrated to the right I show some of the tasks you are up against.

The first problem you might be faced with is getting two Door and Window Assemblies to butt up against each other in a corner. In order to get the result I show to the right, use the Anchor dialog box to push the Assemblies to the outer edge of the Walls. Because two Walls will want to Clean Up, you may want to change the Cleanup Group Definition of one Wall to something different than the other. This may solve one problem while creating another so confirm if this trick works for you.

Once your Assemblies are actually set to form an actual connecting corner, you can use the **GridAssemblySetMiterAngles** command to Select the two Assemblies that you want to Miter. The result of this action only affects the Top and Bottom Frames; it does not affect the Side Frame nor the Mullions that may also need to be Mitered. I think this tool is rather pathetic but if you have to use it here are more tips.

After getting a Miter result, you should find that the Plan View (Top) will require significant modifications in order to reflect an acceptable corner condition. For the Frames at the corner, you will need to use a new custom Profile Definition. For the Sill, I suggest you simply turn this Display Component Off since you cannot set it to display a Miter anyway. If you need to show the outline of the Sill or Frame, use the Below Display Component available under the Plan Display Representation for the Door/Window Assembly Style. And finally, if you want a Frameless corner where the Mullions and Glazing meet, you can remove the corner Frame and give it an Offset Value that will push the Infill and Mullion out far enough to meet the adjacent corner..

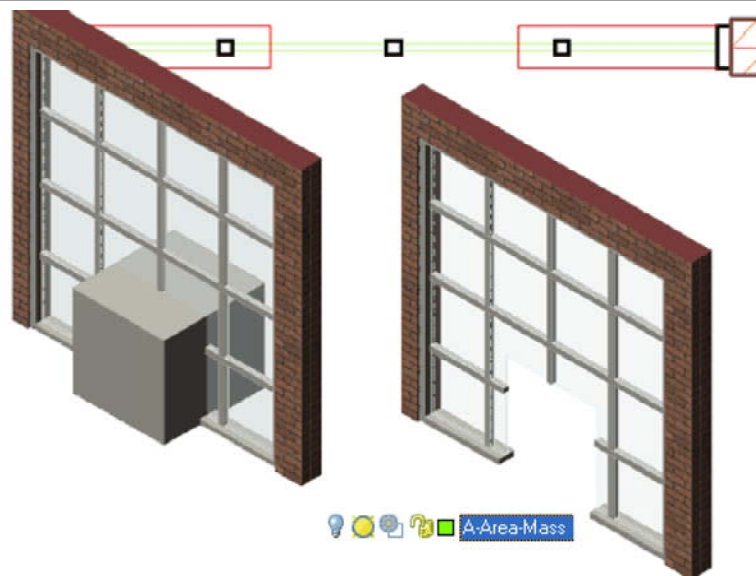


Door/Window Assembly Interference

The **GridAssemblyInterferenceAdd** command can be used to remove portions of Assemblies much like the Subtraction operation with Mass Elements or Solid Models. You can choose to "subtract" Infills, Frames and/or Mullions. The original Object must be kept and its position relative to the Assembly must remain as some form of Intersection.

Illustrated to the right I show the result of using a Mass Element as an Interference Object for the Infill, Frame and Mullions. By turning the A-Area-Mass Layer Off, the Assembly appears as if a hole has been punched through it. To remove the Interference, you can use the **GridAssemblyInterferenceRemove** command or simply Delete the Object.

Command: GridAssemblyInterferenceAdd
Select AEC objects to add: 1 found
Select AEC objects to add:
Apply to infill? [Yes/No] <Yes>:
Apply to frames? [Yes/No] <Yes>:
Apply to mullions? [Yes/No] <Yes>:
1 object(s) added as interference [237D]
Command:



Door/Window Assembly Add Profile

Menu N.A.



Keyboard **OpeningAddProfile**

Mouse Select Assembly, right-click, Select Add Profile

Links [Profiles - Edit In Place](#) - for more information on Editing Profiles in place

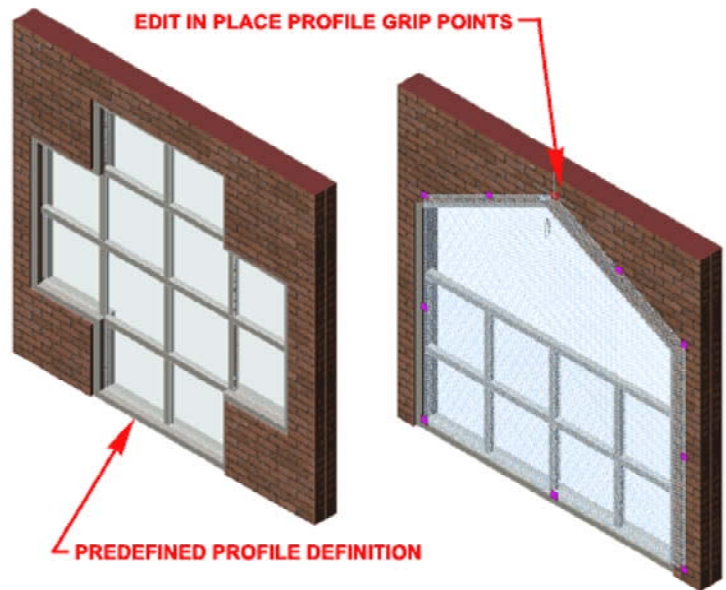


The **OpeningAddProfile** command activates the **Add Door/Window Assembly Profile** dialog box illustrated to the left. On this dialog box you can Select a predefined **Profile Definition Style** as a **new shape** for the Assembly or you can use the "**Start from scratch...**" option to turn the current shape into a New Profile Definition Name and activate the **Edit-in-Place** mode for this Profile.

Illustrated to the right I show the results of a predefined Profile Definition Style and how the default Rectangular Profile can be used as the basis for creating a new custom shape "In-Place".

Note:

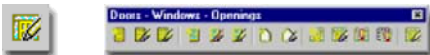
Dimensional conflicts with Mullion, Infill and Frame positions can cause unusual results such as missing Elements. To avoid such problems, try to design custom Profiles to work within the general dimensional proportions of the Assembly Style.



11 Assemblies - Styles and Properties

Style Manager - Door/Window Assemblies

Alt. Menu **Design> Door/Window Assemblies> Door/Window Assembly Styles...**



Keyboard **DoorWinAssemblyStyle**

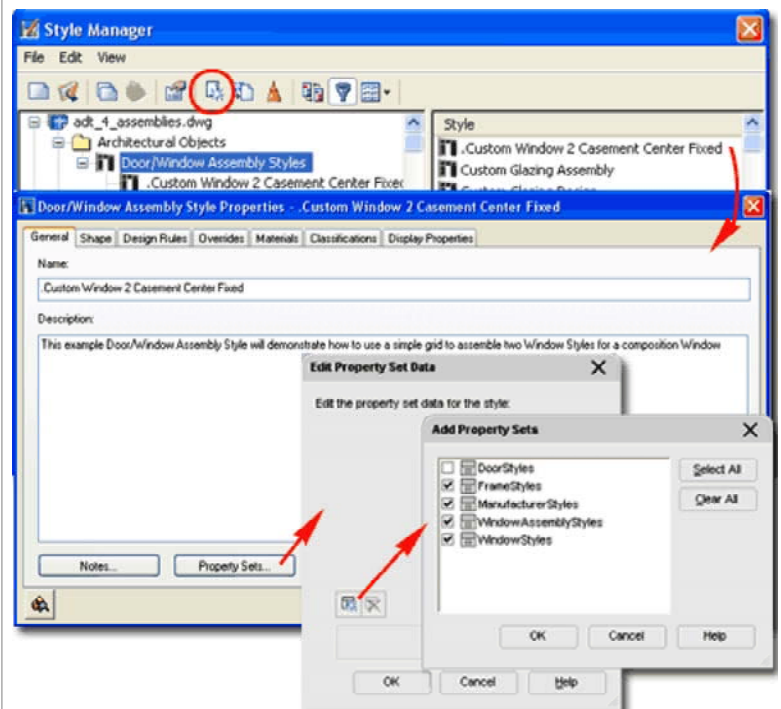
For Window Assembly Objects, you can use the **Style Manager** to load, modify, delete and create new Window Assembly Styles.

Illustrated to the right, I show the process of creating a **New Window Assembly Style** that I have Named "**Custom Assembly 9-0x8-0**". By **double-clicking** on this new style, you will invoke the **Window Assembly Style Properties** dialog box - as illustrated.

The **General** tab provides access to the **Name** and **Description** fields for a Style; plus access to the attachment of Notes and Property Sets.

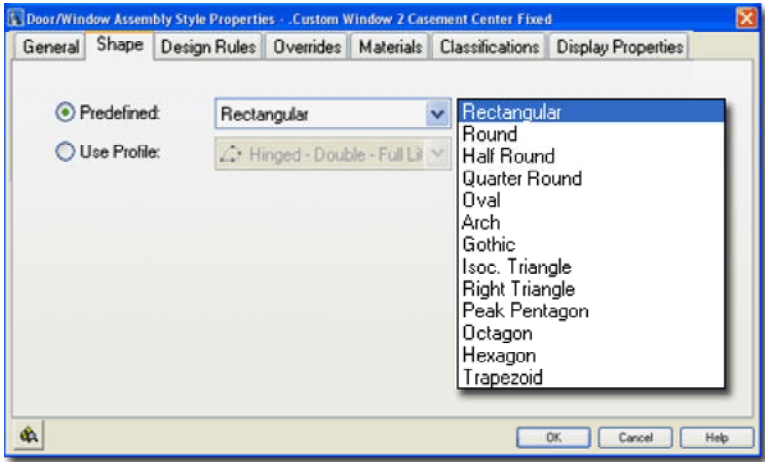
The **Defaults** tab, illustrated to the right, provides access to some basic default dimensions for a Window Assembly Style: **A - Width**, **B - Height** and **C - Rise**.

11-6 DOORS - WINDOWS - OPENINGS - ASSEMBLIES



Assembly Style Properties - Shape tab

The **Shape** tab of the **Window Assembly Style Properties** dialog box provides access to the **Predefined** opening shapes in ADT and the **Custom** shapes that are defined by the user base on **Profiles**.



Assembly Style Properties - Design Rules Terminology

This is one of the most complex tabs anywhere in ADT's dialog boxes. There is only one way to understand the structure and that is by breaking it down piece by piece. First we will look at the language and structure of this beast and then we will get into the depth of the individual pieces. To get a generalized image in your mind, think of Excel and image assigning an Excel spread sheet inside a single cell. Think of all the edges and the potential for "nesting" cells within cells. I hope that helps, forget that image if it makes you more confused.

Let's attempt to get the jargon or lingo down in plain English:

Design Rules - the system that defines how this ADT object will look and possibly behave.

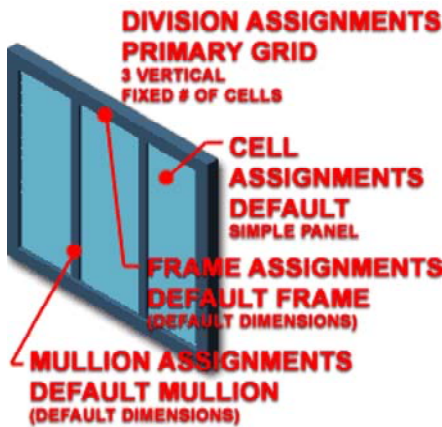
Primary Grid - the unit that defines the specific ADT object which may have default values and or Shapes as defined by the Defaults and Shape tabs. It's basically a rectangle unless you have specified another Shape. A Primary Grid is like an Excel Spread sheet; it's divided into Cells by the Division Assignment, Surrounded by a Frame and Divided with Mullions.

Division Assignment - How the Primary Grid is to be divided. These **Division Types** fall into three (3) categories (Fixed Dimension, Fixed Number and Manual), two **Orientations** (Horizontal and Vertical) and can have an unlimited number of names as determined by the user. It's basically the way you define Cells in the Grid. A Division can use another Grid, called a "nested Grid" within the Primary Grid.

Cell Assignments - What goes on within the Cells that are defined by the Divisions. You may have 3 Divisions and thus 3 Cells that can each have a unique infill.

Frame Assignments - The shape, proportions, dimensions and location of the Primary Grid's outer edge.

Mullion Assignments - The shape, proportions, dimensions and location of the Primary Grid's Divisions and/or Cell edges.



Assembly Style Properties - Design Rules tab

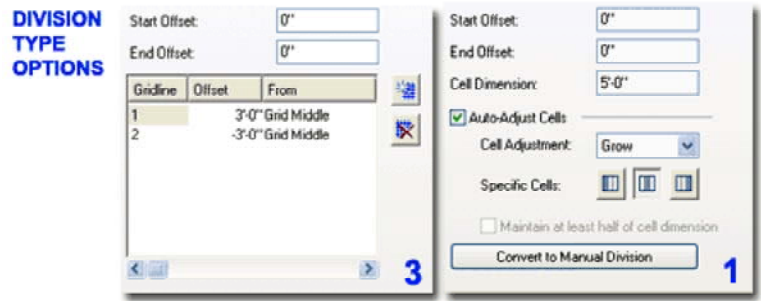
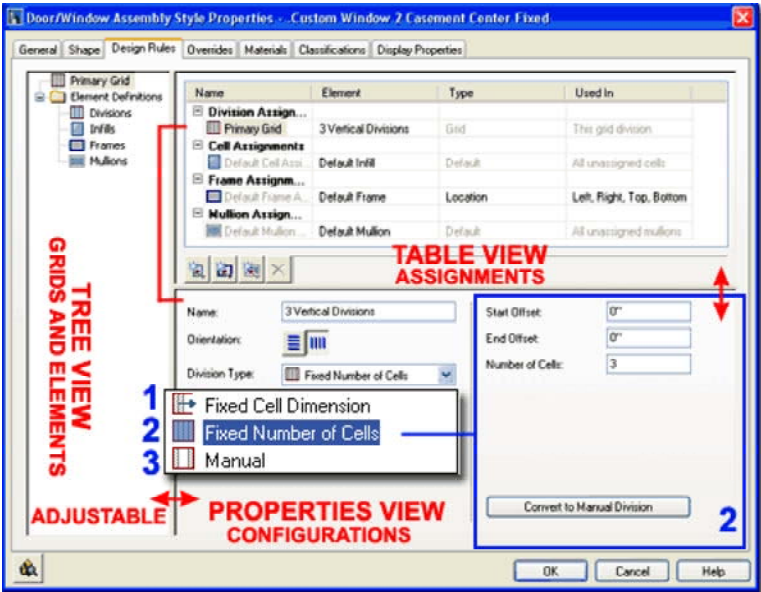
Illustrated to the right, I attempt to provide an understanding of the **Design Rules** tab interface. On the **left side** is a **Tree View** showing a **Grid** hierarchy, starting with a **Primary Grid** and a **folder** containing the **Element Definitions** that the Grids are comprised of. In the **upper right side**, is a **Table** (Column and Rows) of the current **Grid Assignments**. On the **lower right side**, is a **Properties** or Settings view for the specific configurations of the currently selected **Elements**.

When you **select** an Assignment, such as **Primary Grid**, you should find numerous configuration options in the Properties View area. The Primary Grid, for example, provides options for unique **Names**, **Orientation** of Cells, **Division Types** and corresponding options for these Division Types (see **1, 2, and 3**).

To create the simple Window Assembly Style illustrated above, right, the only non-default settings used on the Design Rules tab (for an Assembly started from New), are:

- Primary Grid ->**
- Orientation** = Vertical
- Division Type** = Fixed Number of Cells (see blue box labeled **2**)
- Number of Cells** = 3.

For more detail on the individual pieces of this tab, read below: [Section 9, Assemblies - Design Rules - Element](#) and [Section 10 - Assemblies - Advanced Editing](#).



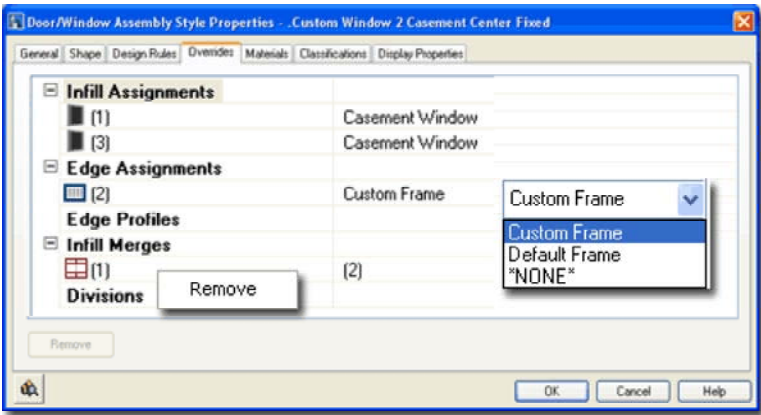
Assembly Style Properties - Overrides tab

Links [Window Assembly Pop-up menu options](#)

The **Overrides** tab will not offer anything other than the Override categories unless you have actually performed Override tasks and Saved them to the current Window Assembly Style.

Once you have made Override changes and used the Save Changes dialog box via the **Edit in Place** object-specific pop-up menu, then you will see those changes reflected here as illustrated to the right. Not only can you make more changes to overrides here, you can **Remove** them.

To find out about creating overrides, read [Section 10 - Assemblies - Advanced Editing](#).

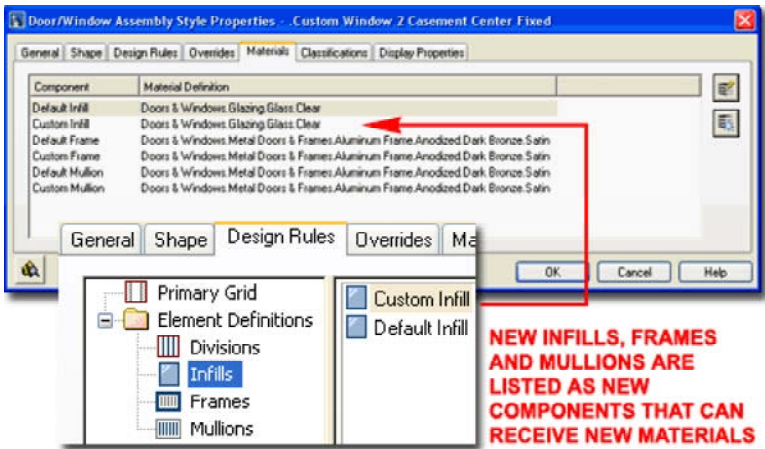


Assembly Style Properties - Materials tab

Links [Object Style Properties - Materials Overview](#) - for an expanded step-by-step explanation of Materials

Illustrated to the right I show that all Door and Window Assembly Styles offer three Default Components under the **Material** tab: Default Infill, Default Frame and Default Mullion. If you create New Infill, Frame and/or Mullion Element Definitions they will automatically be listed as new Components under the Materials tab. This means that should you need unique Material characteristics such as different Frame Materials for example, you can define New Frames for each side of the Assembly. You can also use this feature to create Infills that are Glazed, Metal, Wood or any other Material.

Since Materials can also be used to control line properties, you may want to use an existing Assembly Style as the source for any new ones you create.



Assembly Style Properties - Classifications tab

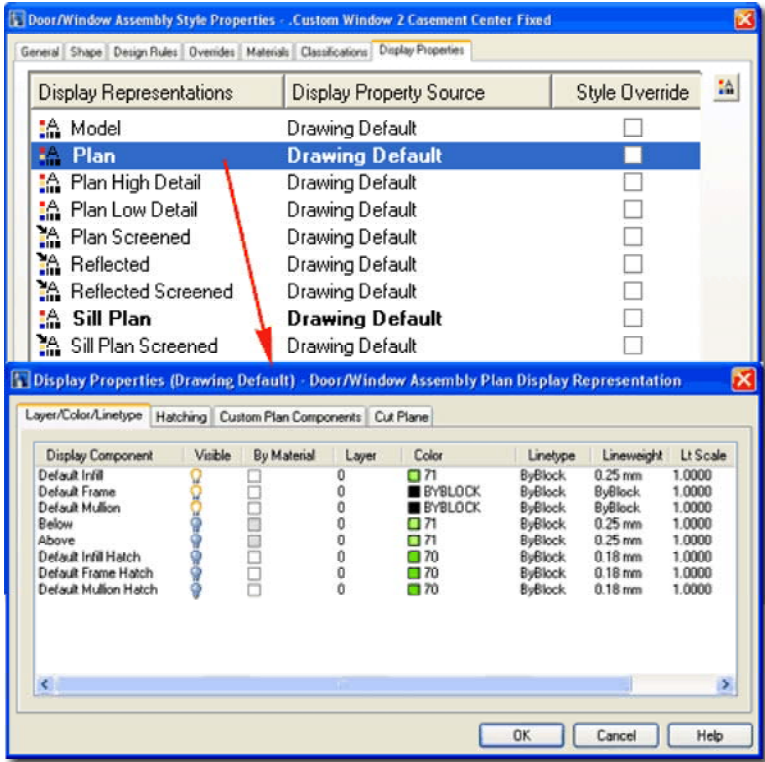
Links [Style Properties - Classifications](#) - for information on this subject and screen capture of dialog box tab.
[Object Style Properties - Classifications Overview](#) - for an expanded step-by-step explanation of Classifications

Door/ Window Assemblies have a Classifications tab that is identical to that for Doors and Windows. See discussion under Doors and Windows above.

Assembly Style Properties - Display Properties tab

Links [Object Style Display Properties Overview](#) - for the full story on Display Properties for Style
[Object Display Property Overrides - Object and Style Based](#) - for an explanation of the differences between using Display Properties via the Styles versus the Edit Object Display... option.

The **Display Properties** tab of the Door/Window Assembly Style Properties dialog box, illustrated right, provides access to a set of Display Representations similar to those found for Doors and Windows. Keep in mind that in addition to the Display Properties for the Assembly you can also control the Display Properties of the Objects you use as Infills by working with their own Style Properties. In other words, the Door/Window Assembly only provides control over its short list of Display Components (Infills, Frames and Mullions) while Doors and Windows are managed by their own Display Properties.



YOU CAN ALSO ACCESS DISPLAY PROPERTIES BY SELECTING AN OBJECT, RIGHT-CLICKING ON YOUR MOUSE AND USE THIS POP-UP MENU OPTION



Illustrated to the left, is another way to access the **Display Properties** tab; **select the specific object, right click** on your mouse to invoke the object-specific pop-up menu and select **Edit Object Display...** Just be aware that when you use this approach, you can actually set an Object Override as opposed to a Style Override.

Object Overrides can be extremely useful because they allow you to add things like Sills or Thresholds to any object within a Style Family but they can also be problematic because they lock you out from more centralized, Style level, controls.

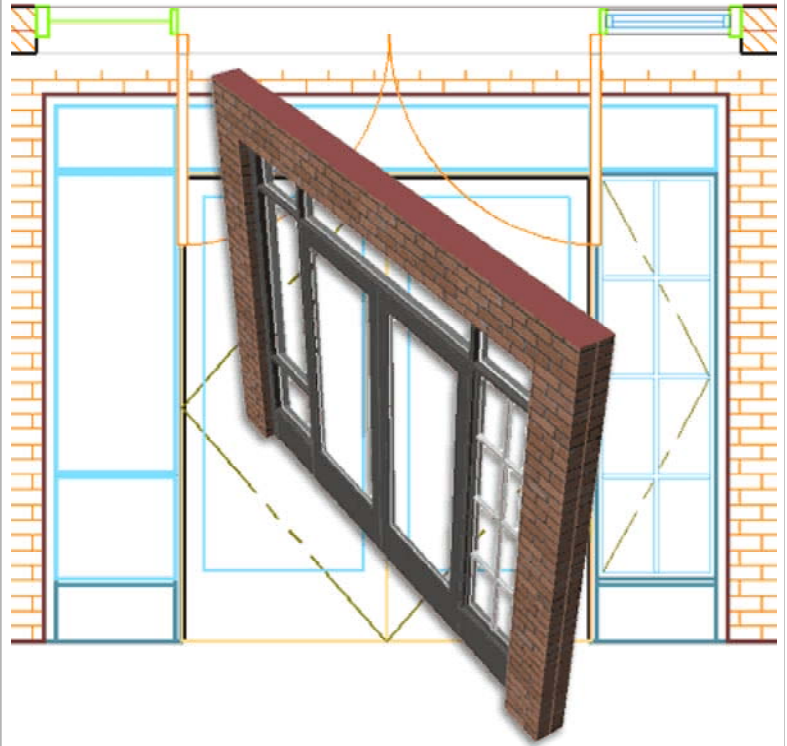
In **Plan** view, you have Layer controls for **Infill**, **Frame** and **Mullion**. You can also have these components filled with User Specified **Hatch** patterns controlled on the **Hatch** tab. The **Custom Plan Components** tab offers the ability to add custom features to the "generic" Assembly. The **Cut Plane** tab allows you to re-define where you want the cut made on your Door/Window Assemblies. This can be a valuable option if you introduce Interferences within your Door/Window Assemblies and wish to have those displayed or not displayed in plan view.

Door/Window Assembly Display Property Overview

The **Display Properties** of Door and Window Assemblies are actually quite simple since there are basically only three components to work with: Frames, Mullions and Infills. At the most rudimentary level you can think of Assemblies as containers of other Objects and those Objects can all be controlled by their own Display Properties. At a higher level, you can attempt to get as much graphical output of your Assemblies as possible without introducing other Objects but because there are so few Display Components, you may find that you are forced to use other Objects as Infills in order to get the Display characteristics that you need.

In this section I will cover some of the primary options within the Display Properties for these two Objects that I think may be of significant importance to your mastery of this product. For me, though I realize there are a lot of cool things that you can do here, my emphasis is always on the things that pay the bills so I will focus on Plans and Elevations.

Illustrated to the right I show three different Views of the same **Door and Window Assembly Style**. In **Plan View** I show that I have pushed the Assembly back inside the Wall by using the Anchor dialog box. I also show that the Sill Plan is being used and that there is a custom Infill on the right-hand side of the Assembly. In Elevation and Model View I show that the custom Window Infill on the right-hand side has no Frame but has Muntins that create another level of Divisions.

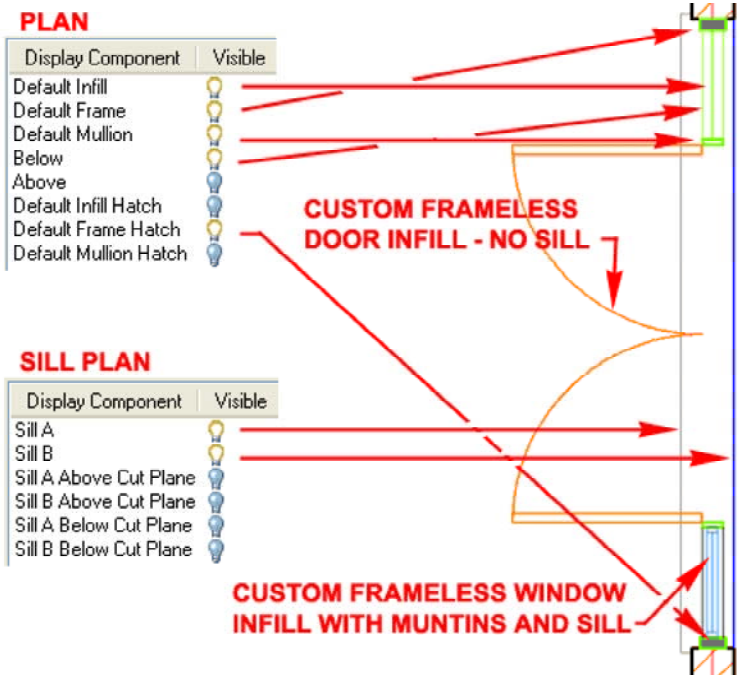


Door/Window Assemblies in Plan

As with Doors and Windows, I tend to focus on the Plan View display of Door and Window Assemblies for Construction Documents. Illustrated to the right I show a common Door/Window Assembly Object with two Sidelights and a pair of double doors in the middle.

The Display Properties only control the basic components of the Assembly and not the custom Objects you may have inserted as Infills. Therefore, for example, Doors and Windows can only be turned On or Off with the Default Infill Display Component but their other Display Properties such as Color, Sills and so forth are controlled by their own Style Properties.

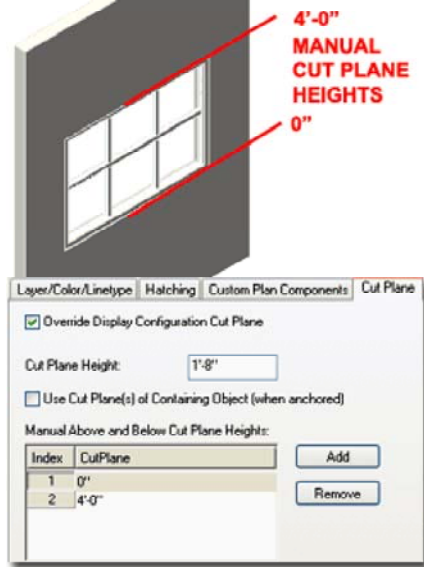
Illustrated to the right I show some of the basic Plan Display Components you can work with to produce varying results. Infills, Frames and Mullions correspond to their respective components as do the Hatch Patterns that you can apply within them. The Above and Below Display Components can be used to express linework that you may want to illustrate such as a Mullion outline below or a Transom Infill Above. By default, most of the Door/Window Assembly Styles that come with ADT come with the Sills turned On. Though Assemblies have no option for automatically adjusting to the Width of any Wall they are inserted into, you can use the Sill Display Component to draw lines that always match the Width of the Wall. In the illustration to the right, I show that I have set Sill A to appear more like the sill of a Door by setting Width and Depth values to this Component.



Door/Window Assemblies Above or Below the Cutting Plane

Generally, Door and Window Assemblies should not give you any problems in Plan View as long as the Assemblies pass through the Wall's default Cut Plane Height.

In the Illustration to the right I show how inserting an Assembly Above a Wall's default Cut Plane produces undesirable results in Plan View. For starters, you won't even see the Assembly so you will need to access it through the Style Manager Window or by Selecting the Assembly in a Model View. In the illustration to the right I turned the Visibility of the Above Display Component On so you can see the dashed outline. Notice

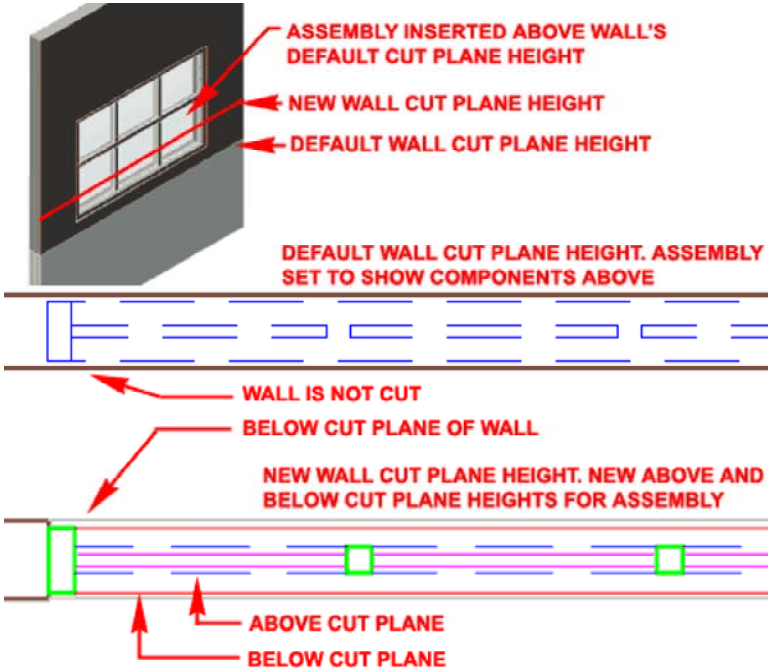


that the Wall is not Cut so this is the first task to perform.

You can change the **Wall Cut Plane Height** in several ways: by the Global Display Configuration Cut Plane, by the Wall Style or by the an Object Display Property Override. See [Wall Object Display Properties - Cut Plane](#) for more information on this topic.

Once you have set the Wall Cut Plane Height to cut through the Assembly, you should find that the display of the Assembly in Plan View is acceptable. By default, the Assembly should

have its Cut Plane set to "Use Cut Plane(s) of Containing Object (when anchored)" but you can use the "Override Display Configuration Cut Plane" check box to set your own cut plane height for the Assembly. To set your own cut plane height, think of the bottom of the Assembly, regardless of how high it sits in the Wall Object, as the zero plane. To control how the Above and Below Display Components appear, you can use the Add button on the Cut Plane tab to set where the Above and Below lines with display. Illustrated to the left I show the **Cut Plane** tab of the **Plan Display Representation**.



13 Assemblies - Design Rules - Elements

Design Rules - Division Assignment - Orientation

Links [Assembly Style Properties - Design Rules Terminology](#)
[Assembly Style Properties - Design Rules tab](#)

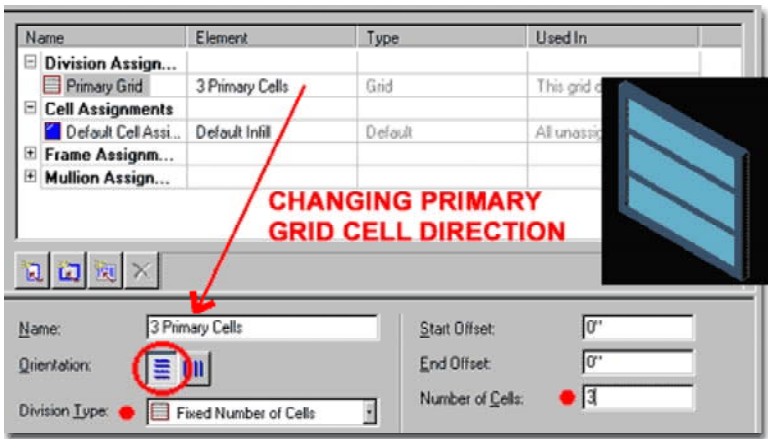
The two **Orientation** buttons for the Grid Assignment can be used at any point in the Window Assembly design process.

Division Type can also be changed at any point in the design process.

Illustrated to the right I show how easy it is to use the Fixed Number of Cells option to divide a Grid into 3 Number of Cells; or any number you might want.

Read the discussion on [Nested Cells](#) below, if you want to create an actual grid or if you want to divide a Cell up into more Cells.

13-6 DOORS - WINDOWS - OPENINGS - ASSEMBLIES

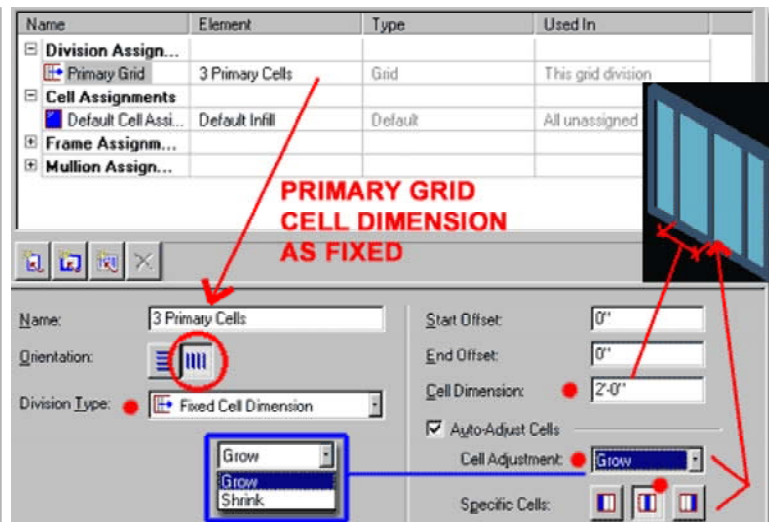


Design Rules - Division Assignment - Fixed Dimension

The **Fixed Cell Dimension** option for a **Grid** allows you to define the space between Cells in definite terms but also provides options for how adjacent cells may need to behave in situations where they cannot meet the fixed dimensional value; see the Auto-Adjust Cells check box.

Auto-Adjust Cells - controls the behavior of Cells with a fixed Dimension in situations where the Grid dimension does not accommodate the fixed dimensional value perfectly (which is probably most cases) ADT can, for example, start the fixed Cell dimension from the Middle, the Left or the Right and Grow or Shrink from that point out or in.

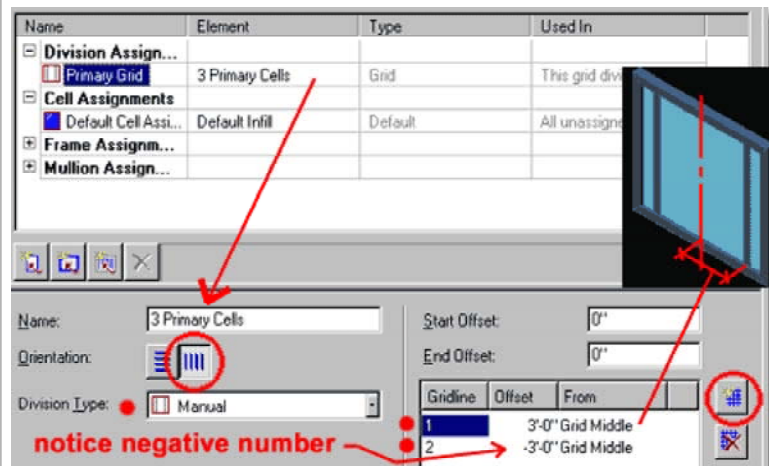
If you specify a Cell Dimension of 2'-0" (609.6 mm), for example, and set Auto-Adjust Cells to Shrink with the Specific Cells set to Middle, the Cells will start from both edges and shrink towards the middle of the Grid. This way, you may end up with a tiny or narrow cell in the middle.



Design Rules - Division Assignment - Manual

The **Manual Division Type** option for a Grid allows you to define exact locations for multiple Cell centerlines by using an **Offset** value and a **From** setting based on **Grid Start**, **Grid Middle**, **Grid End** or **Grid Top**, **Grid Middle**, **Grid Bottom**; depending upon Orientation.

To set up Manual Gridlines, use the Add Gridline button (see red circle, far right), input Offset distance and use the From drop-down list to choose a point-of-origin.



Design Rules - Cell Assignments

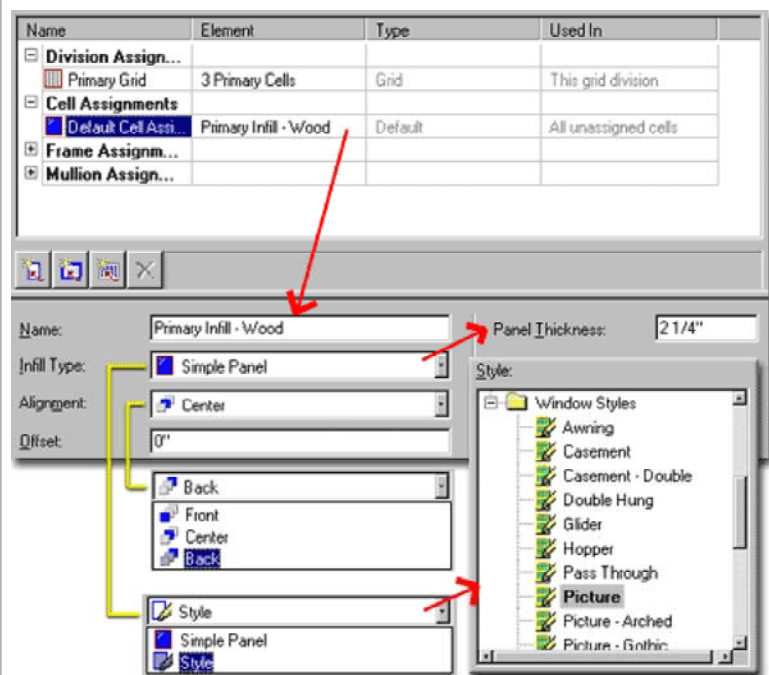
Using a Primary Grid with a Division Assignment of 3 Fixed Number of Cells, we can go to Cell Assignments and work on what goes into the Cells.

Illustrated to the right, I show some of the various possibilities for Cell Assignments. One of the most important things to do is Name it because the default name will automatically be used for all subsequent Infills and that can get confusing when you attempt to make design changes on them.



Generally, a simple panel may do the trick and you can use the Panel Thickness option for this Infill Type to make it thicker or thinner. The Alignment option works with the Offset option to allow you to position an Infill Type within the Frame of your Window Assembly so think of this in elevation or cross-section; i.e., infill is to the back or front of assembly with respect to it's face.

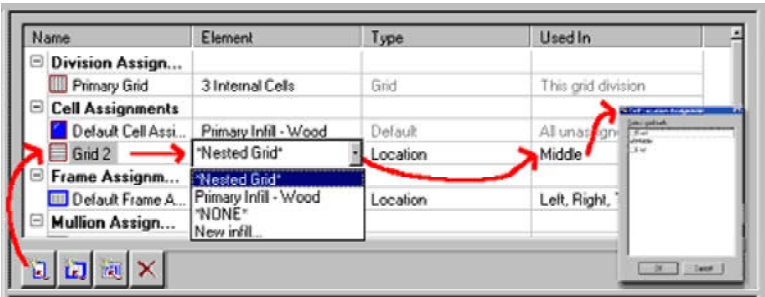
One of the more exciting options is to set the Infill Type to Style which thus allows you to select any currently loaded object Styles from the Style scroll list; as illustrated to the right - see also image to the left.



Design Rules - Cell Assignments - Nested Grids

Once you get ready to go beyond the basic Divisions and on to Divisions of existing Cells, you get into something called "Nested Grids". To me, it's really nothing more complex than thinking of Folders with sub-Folders.

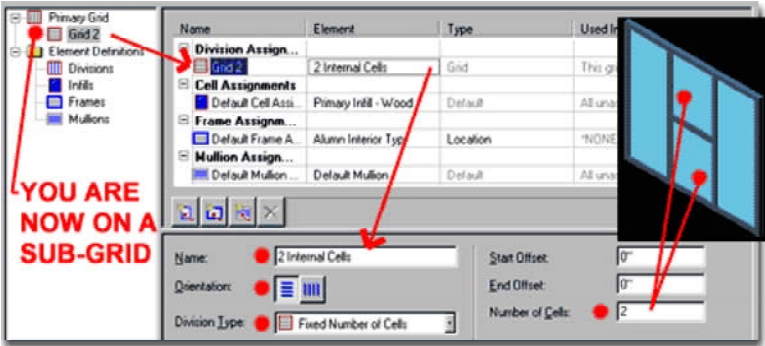
Illustrated to the right, I show the process of creating a Cell Assignment that is directed to a "Nested Grid" to be Used for the Middle Cell of a Primary Grid with 3 Fixed Cell Numbers. When you assign "Nested Grid" to a Cell, you are actually directing the Cell to a new Grid and that is where, if you recall, we get to assign the Divisions.



Design Rules - Cell Assignments - Nested Grids - Division Assignments

Once you assign a Cell a "Nested Grid" Element, you should immediately see a sub-Grid under Primary Grid in the Tree View. If you select the sub-Grid, as illustrated to the right, you should find that the sub-Grid has all of the same options as a Primary Grid; hence the term "nested"

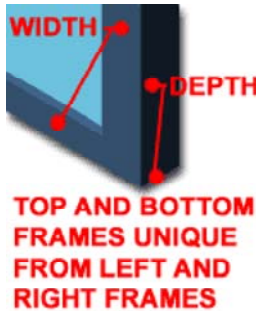
In the illustration to the right, I show that I have Renamed the sub-Grid "Grid 2" and assigned it a new Element that I called "2 Internal Cells". For this Element, I have set Orientation to Horizontal, Division Type to Fixed Number of Cells and Number of Cells to 2.



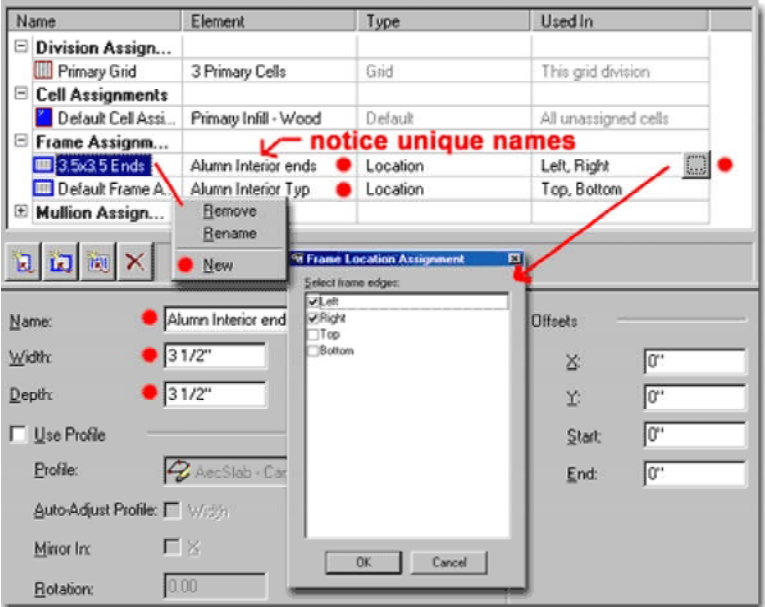
Note: Naming all Elements is almost paramount to success because ADT will simply use default names that are identical for every assignment and thus, if you change a value one place it affects the look of something somewhere else that you may not expect.

Design Rules - Frame Assignments

Frame Assignments provide access to options for the outer Grid Frame of a Window Assembly. As illustrated to the right, you can easily create four separate New Assignments with unique Element Names that correspond to the four sides of a basic rectangular Grid. This means that you have the power to design four distinct rails; even to the point of four unique profiles (as discussed below).



Illustrated to the right and left, I show how you might want unique Left and Right Frame dimensions that are different from the Top and Bottom Frame dimensions. To achieve this result, simply Name the Default Frame Assignment anything you want, create a New Frame Assignment, Name this Frame Assignment, provide Width and Depth values, Create a New Element, Name this Element something different than the other frame element, provide Width and Depth values, and then use the Used In pop-up dialog box to set the Locations (Top / Bottom and Left / Right).

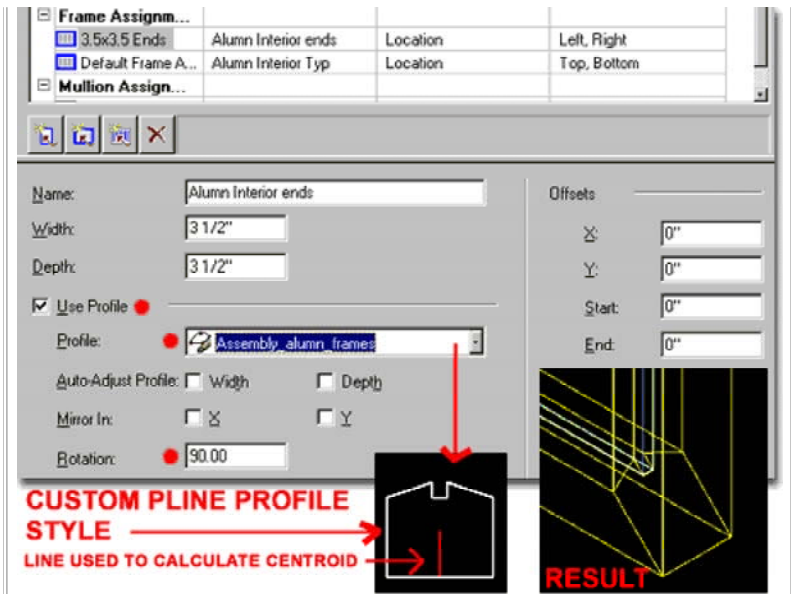


Design Rules - Frame Assignments - Using Profiles

If you really want to get fancy with Frame Assignments, you can use [Profiles](#) to create a more architecturally correct frame cross-section.

In the illustration to the right, I show how you might expand on the concept discussed above by using the Use Profile option to select your own custom frame profile. Depending on how you created your frame profile, you may also need to use the Profile options to help align it with your Window Assembly correctly. In my example, I show that I had to use a Rotation of 90 degrees to compensate for a Profile that was drawn as illustrated (straight up).

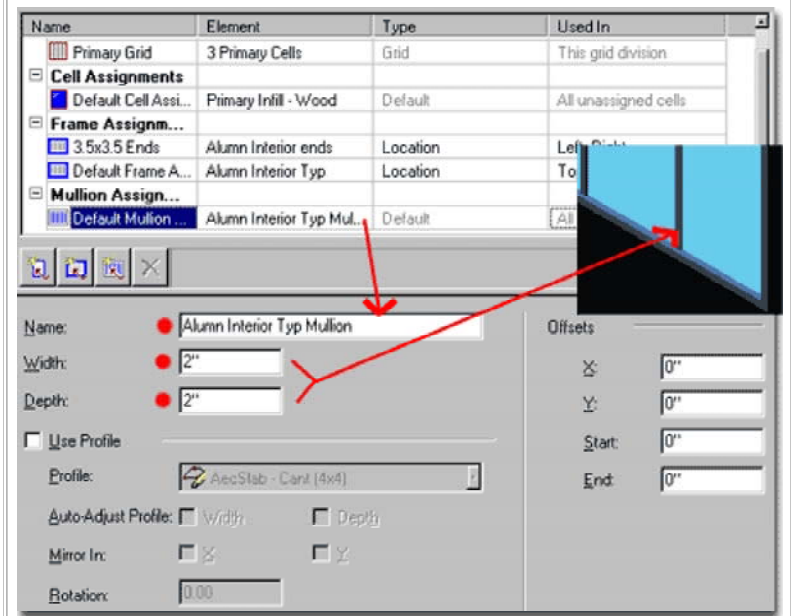
Note: The Centroid of a Profile created for a Window Assembly is more important than with other Profiles - see red line in Profile illustration to the right. In the Profile illustration to the right, I used a line to calculate the centroid that would match this frame with the glass.



Design Rules - Mullion Assignments

Mullion Assignments provide access to options for the inner Gridlines of a Window Assembly. As illustrated to the right, you can easily set a Width and Depth of Mullions to be less than that of the Frame.

Mullions can also be based on a custom cross-section just like Frames. For this, check the Use Profile option and assign a mullion profile from the Profile drop-down list - see discussion above [Design Rules - Frame Assignments - Using Profiles](#) for more information.



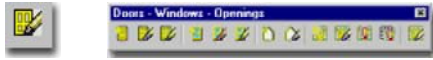
Creating a Custom Door Shape

Menu **Format> Profiles> Profile Definitions...**



Keyboard **ProfileDefine**

Alt. Menu **Design> Doors> Door Styles...**



Keyboard **DoorStyle**

Architectural Desktop has the capability to allow for nearly any custom Door or Window but if you want something beyond the basic architectural shapes, you will have to go through extensive steps using 3D modeling. This is how many of the styles in the **"Doors - Custom (Imperial).dwg"** and **"Windows - Custom (Imperial).dwg"** files were developed. By adding blocks of 3D models inside custom door or window Styles, users can get just about anything they may want as illustrated by our story ["The Walls have Eyes"](#) in the ARCHIdigm.com\lounge

Illustrated to the right I show the **3 basic steps** required to create a **custom Door Shape** for use within the Door Style Properties dialog box. The **first step** in creating a custom door shape is to **draw the shape with a Pline or Rectangle** and then **add interior Pline or Rectangular outlines** where you expect to have **glazing**. For double doors, you must draw a double door - however odd that might seem. For best results, draw the actual door as it would be used at the optimum size because ADT will simply scale the proportions equally for all other sizes; i.e., the door rails will not remain constant because there are no constraints on such items.

The **second step** in creating a custom door shape is to save the Plines and/or Rectangles as a **Profile Definition** (this is similar to Blocking the linework). On the **Style Manager**, filtered for Profiles, **Add a New Profile Definition Name** and then use the **Set From...** option to **Select the Outer Rectangle** for the door shape. When queried to **Add another ring?** [Yes/No], type **"Y"** for Yes and **select an Inner Rectangle** for the glazing. When queried to specify if **"Ring is a void area?** [Yes/No], type **"Y"** for Yes and continue adding rings as voids for all glazed areas. When queried for **"Insertion Point or <Centroid>**, simply use the default **"Centroid"** option since this really doesn't matter for Doors.



The **third step** in creating a custom door shape is to Apply the shape to a Door Style. Use the **DoorStyle** command to invoke the **Door Style**

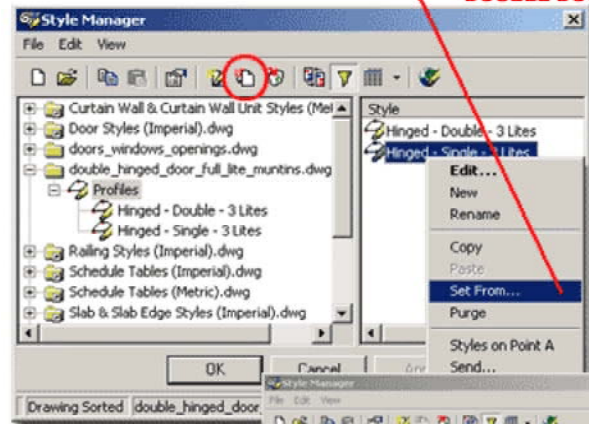
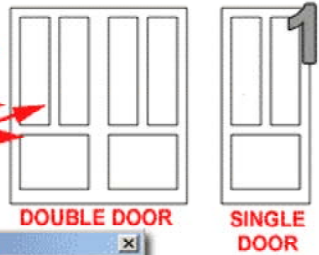
Properties dialog box, as illustrated to the right, and create a **New Custom Door Style Name**. On the **Design Rules** tab of this new custom door style, set the **Shape** radio button to **"Custom"** and use the adjacent **drop-down list** to select the **Profile Definition Name** created in step 2.

When you Add this door to your Walls, you should see your new custom door shape with glazing wherever you added Rings as Voids.

CREATING A CUSTOM DOOR SHAPE

DRAW THE SHAPE OF THE DOOR WITH PLINES. DRAW INNER RECTANGLES FOR GLAZED AREAS.

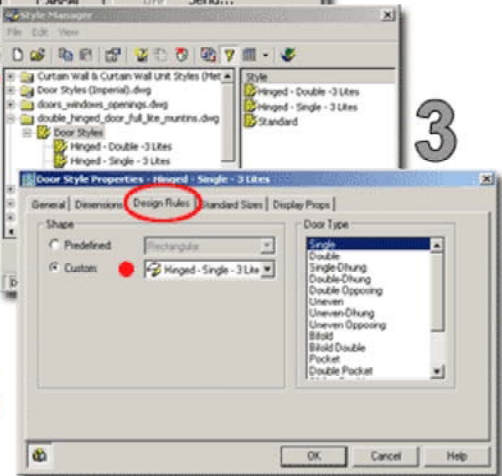
1ST SELECTION
OTHER SELECTIONS (RINGS)
AS VOIDS



USE PROFILE COMMAND TO CREATE A CUSTOM PROFILE DEFINITION. USE SET FROM... OPTION TO ADD OUTER PLINE AS DOOR AND INNER RECTANGLES (RINGS) AS VOIDS.

CREATE A NEW DOOR STYLE.

USE DOOR STYLE PROP. DIALOG TO SET PROFILE AS "CUSTOM" SHAPE



Below are the command line steps:

Command: **profile**
Profile [as Pline/Define]: **d**
Select a closed polyline:
Add another ring? [Yes/No] <N>: **y**
Select a closed polyline:
Ring is a void area? [Yes/No] <Y>: **y**
Add another ring? [Yes/No] <N>: **y**
Select a closed polyline:
(and the loop continues until you are done with your door)

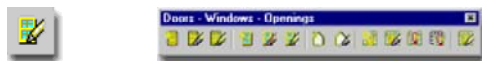
Creating a Custom Window Shape

Menu Desktop> Profiles> Profile Definitions...



Keyboard ProfileDefine

Menu Design>Window>Window Styles...



Keyboard WindowStyle

Links [Design Rules - Cell Assignments](#) - for information on how to Add common Window Styles to an Assembly as a means to have other custom shapes.



When you use **Profiles** for **Window Styles**, you might find that they work a little differently than for Door Styles. Follow the steps outlined above for a Custom Door Shape to create a Custom Window Shape. Be aware, however, that adding inner rings does not work with Windows so you are basically limited to the outer shape (a simple Pline form) . For more flexibility on custom Windows, consider using a Window Assembly and combine simple Window

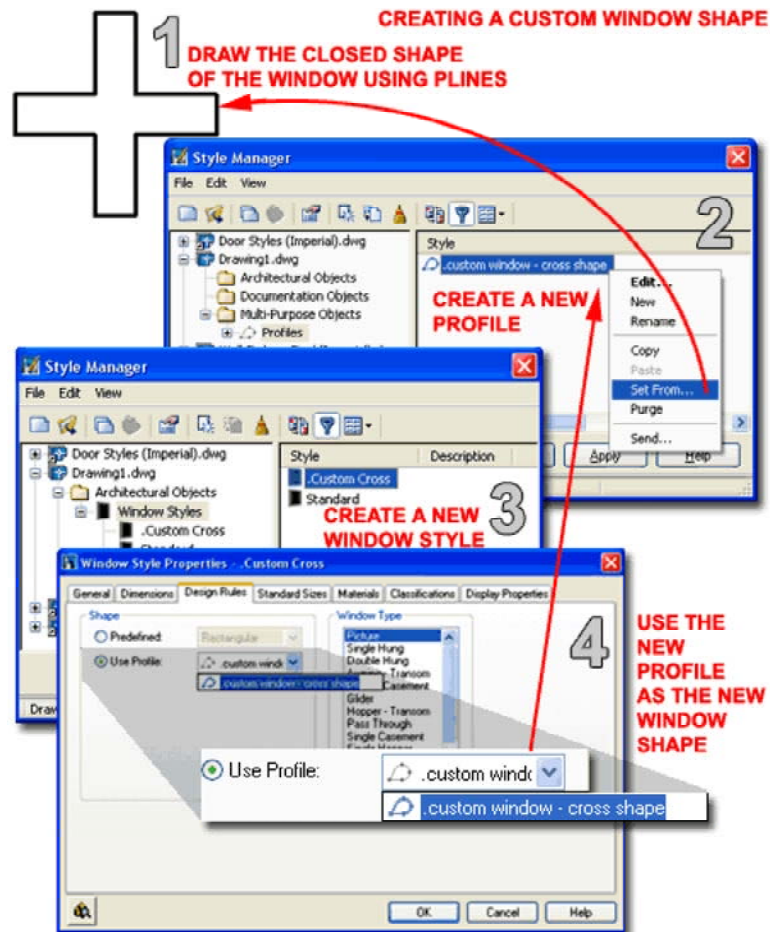
Shapes within a more complex matrix - this is how we create window clusters like two casements with a fixed in the middle.

Illustrated to the right, I show the steps required to create a custom Window Shape from a Closed Pline drawing. When creating a **New Profile Definition**, use the **Set From...** option to capture the **Pline** Shape. When creating a New Window Style, use the "Use Profile" radio button on the **Design Rules Tab** to choose the Profile Definition Name just created. Once again, for best results, try Copying an existing Window Style, Paste it, Rename it and then create your own from that Copy. This will assure that you get Materials, Property Set Data and Display Representations that work and it is far easier to adjust existing information than to create new stuff from scratch.

Windows and Cut Planes - Wall Display Representations

Links [Doors and Windows Above or Below the Cutting Plane](#) - for more information on this subject.

After doing some work on an unusual remodel where windows had been placed on the finished floor line, at normal header heights and above normal header heights, I quickly discovered some design flaws in ADT's Display Representation of Windows. I have to say, that I actually preferred how ADT 2.2.2 just put all Windows if you wanted it to. In



preferred now ADT 3 - 5.5 just cut all windows if you wanted it to. In ADT 4 new options were added to provide more flexibility in the display relative to cut planes but some of the options have not been fully thought through. Rather than discuss the options that should have been offered (like, remove all lines below all openings), let's look at what options we do have and how to make the best of them.

1 Illustrated to the right I show the default **Plan View** of a "Standard" **Wall Style** with three "Standard" **Window Styles** set at three different **Header Heights**. The **Display Configuration** has been set to "Medium **Detail**" which uses the "Plan" **Display Representation** for most objects. "A" marks the **global cut plane** as set by the "Medium **Detail**" **Display Configuration**. As you can see, only the Window that actually passes through the global cut plane is displayed correctly while the other two remain invisible.

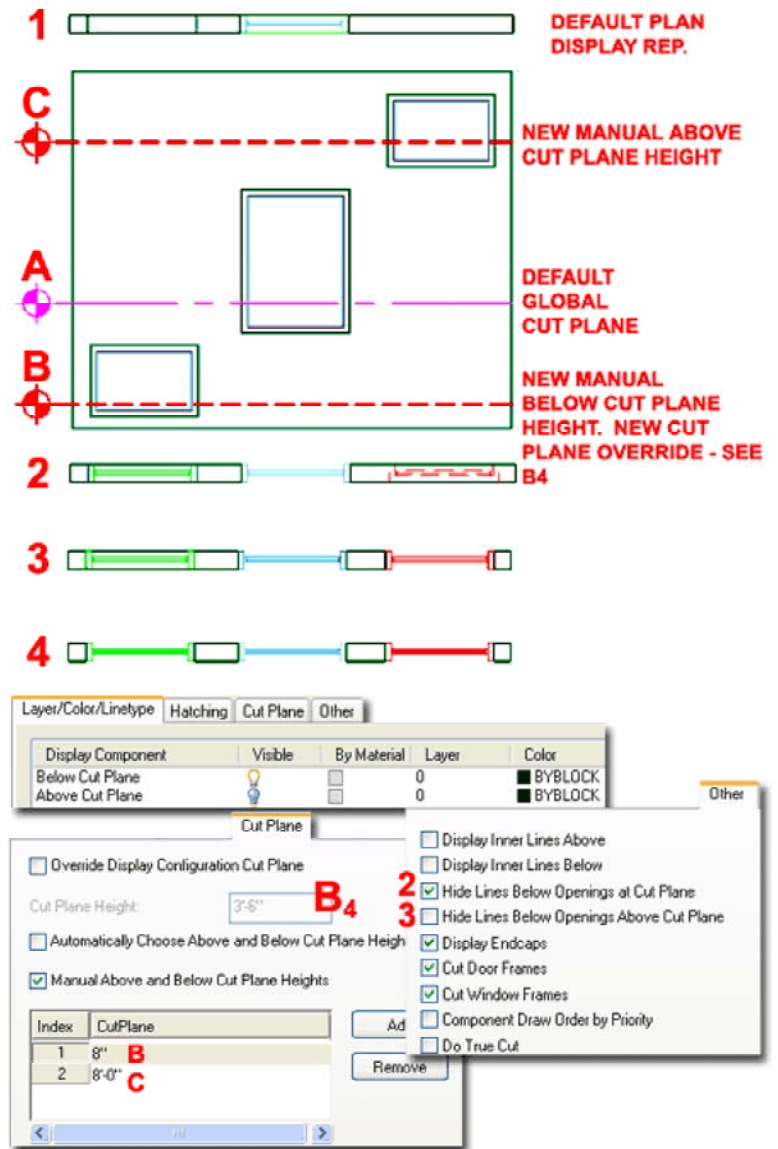
2 One of the first steps you can take to get Windows Above and Below the global cut plane to display is to change the **Display Representation of the Window Styles**. Window Style have several **Display Components** for **Frame**, **Sash** and **Glass Above and Below Cut Plane heights** so you can not only turn the **Visibility** of these Components **On** but also control their **Color**, **Linetype** and so forth. See the discussion on **Window Display Representations** directly below.

In the illustration to the right I show that I have set the **Window Display Components** to **Green** for **Below** and **Red-Dashed** for **Above**. To remove the Wall Lines Below Openings, I show that I checked the "Hide **Lines Below Openings at Cut Plane**" option on the **Other** tab of the **Wall Style Display Properties**. By using this option I do not turn off the visibility of Walls that lie below the global cut plane but just the linework under Openings. You may notice that using this option did not remove the linework from under the Windows Above or Below the global cut plane but only the Window that actually runs through the global cut plane. Also, this option actually removed the jamb line for the Window below the global cut plane but we'll address these problems next.

3 On Wall Example three, right, I show that I have used the "Hide **Lines Below Openings Above Cut Plane**" checkbox option on the **Wall Style Display Properties** dialog box to make the Window Above appear more like a traditional cut. I also changed the **Display Component Linetype** for the Window Styles so it would appear as a Continuous Linetype instead of the Dashed that I used in example 2. Now, to resolve the missing jamb lines for the Window Below the global cut plane I show that I have used the **Manual Above and Below Cut Plane Heights** option on the **Cut Plane** tab of the **Wall Style Display Properties** dialog to Add two planes that cut right through my lower and my higher windows - see **B** and **C**. This just leaves one last topic: removing the lines below the lower window.

4 On Wall Example 4, right, I show that I used the "Override **Display Configuration Cut Plane**" on the **Cut Plane** tab of the **Wall Style Display Properties** dialog box to set it low enough to include the lower Window in the primary cut - see **B4**. By doing this I will no longer need the **Manual Above and Below Cut Plane Heights** set for example 3 but they don't cause any problems either. By reducing the Wall's cut plane height low enough to read the lower window as running through the cut, all other windows are seen as above and we have already addressed the linework settings for those windows.

This option may produce the most desirable results for some situations but sets an override on the global cut plane height. If you make this change as a standard setting for all **Plan Display Representations** of the **Wall Style**, for example, it will affect the whole drawing and you may not like the lower cut plane results for other conditions. Therefore, if you truly must have this result, I recommend using an **Object Display Property Override** on just those Walls that have unique requirements.



Note:

These steps do not represent the only way to achieve similar results but attempt to produce the best results with the least amount of effect on the whole drawing. Avoiding overriding the global cut plane should be a high priority as is true of all global settings since they provide the greatest option for global change.

Also, though you may use one of these solutions for your project, keep in mind that this only addressed one **Display Configuration** and thus you will need to repeat the settings for all other **Display Representations** as they apply to other **Display Configurations** (a tedious bit of work indeed).

Windows and Cut Planes - Window Display Representations

Illustrated to the right I show the **Window Style Display Properties** that I used to produce the cut plane results discussed above. If you work with a variety of Window Heights there does not appear to be any detrimental reactions for turning all of the **Above** and **Below Display Components** On for all Windows so you may just want to set your defaults that way.

Also illustrated to the right I show that I have turned off the Sill Plan Display Components to help clarify the linework produced in the discussion above. Since Sill Plan Display is On by default, it can be rather confusing to decipher the source of linework that you may or may not want in your plans.

Display Representations	Display Property Set
Model High Detail	Drawing Default
Model Low Detail	Drawing Default
Nominal	Drawing Default
Plan	Drawing Default
Plan High Detail	Drawing Default
Plan Low Detail	Drawing Default
Plan Screened	Drawing Default
Reflected	Drawing Default
Reflected Screened	Drawing Default
Sill Plan	Drawing Default

Display Component	Visible	B..	Layer	Color
Frame	☒	☐	0	BY
Sash	☒	☐	0	BY
Glass	☒	☐	0	BY
Frame Above Cut Plane	☒	☐	0	red
Sash Above Cut Plane	☒	☐	0	red
Glass Above Cut Plane	☒	☐	0	red
Frame Below Cut Plane	☒	☐	0	gre
Sash Below Cut Plane	☒	☐	0	gre
Glass Below Cut Plane	☒	☐	0	gre

Display Component	Visible	B..	Layer	Color
Sill A	☒	☐	0	50
Sill B	☒	☐	0	50
Sill A Above Cut Plane	☒	☐	0	50
Sill B Above Cut Plane	☒	☐	0	50
Sill A Below Cut Plane	☒	☐	0	50
Sill B Below Cut Plane	☒	☐	0	50

IN THIS ILLUSTRATION
SILL DISPLAY HAS BEEN
TURNED OFF FOR CLARITY