

FeneTech, Inc.

FeneVision® Display Object Reference



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Display Object Reference Manual

Introduction & Scope

This document is a reference for the base display objects of FeneVision®. With the ObjectViewer technology, virtually any shape or window model may be configured. The ObjectViewer has been configured to draw images for the base objects outlined in this document. These base objects are included in FeneVision® and are displayed in various locations such as the order entry module. Examples of base objects are: DES-AWNING, DES-CASEMENT, DES-DOUBLE/SINGLE HUNG and DES-PICTURE WINDOW.

This document will describe the base objects and how to configure them. (See the FeneVision ObjectViewer Manual for more information on how to modify/script a display object.) The ObjectViewer can be accessed in CORE by navigating to Setup, Products, Display Objects. The Configure tab displays the object list and configuration.

The screenshot shows the 'Display Object Setup' window with the 'Configure' tab selected. The window is divided into three main sections:

- Left Panel:** A tree view under 'ALL OBJECTS' listing various display objects with their IDs in parentheses. The list includes objects like DES-AWNING (20000), DES-CASEMENT (20001), DES-SCREEN (20002), DES-DOUBLE/SINGLE HUNG (20003), DES-END VENT (20004), DES-HALF ROUND (20005), DES-HOPPER (20006), DES-PATIO DOOR (20007), DES-PICTURE WINDOW (20008), DES-QUARTER ROUND (20009), DES-SLIDER (20010), DES-CENTER VENT (20011), DES-FRAME (20012), DES-FULL EYEBROW (20013), DES-HALF EYEBROW (20014), DES-TRAPEZOID (20015), DES-PENTAGON (20016), DES-OCTAGON (20017), DES-FILLER (20020), DES-PATTERN TOP DOUBLE/SINGLE (20023), DES-TILT AND TURN (20024), DES-CIRCLE (20025), DES-TRIANGLE (20026), DES-HEXAGON (20027), DES-CHOPPED TRAPEZOID (20028), DES-FLAT GLASS (20029), DES-INSULATED GLASS (20030), DES-CATHEDRAL (20033), DES-HALF OCTAGON (20035), DES-QUARTER OCTAGON (20036), DES-QUARTER HEXAGON (20037), DES-RACETRACK (20038), and TEST- DOUBLE/SINGLE HUNG (20039) | (20039).
- Center Panel:** A table titled 'Objects' with three columns: 'id', 'description', and 'initialize'. It lists the same objects as the left panel, showing their initialization functions, which are mostly 'Function v() As Variant'. Some rows are separated by lines of asterisks.
- Right Panel:** A large, empty gray area, likely a preview or configuration workspace.

At the bottom of the window, there is a status bar showing 'Current Cell: 'Objects.id' ID: 20000', a 'Debug' button, and a 'Character Count: 5'.

Configuring Base Display Objects

While base objects can only be modified by FeneTech personnel, they can be configured to give a good visual representation of the user's window series' and configurations.

The base objects use tags and parameters when drawing the objects. These tags and parameters are configurable, allowing the user to adjust the base objects so they accurately depict the ordered part.

Tags link the base object to specific option codes and options questions, like those for color, grid, and glass. An example of a tag would be <002TAN> for the color tan. Setting up the object tags ensures the object will be displayed correctly based on the options selected. Some option codes have option values that are also needed by the ObjectViewer to display the image properly. In most cases where option values are used, the value must be entered in a unique format. Appendix A gives more information on option value format.

Each base object has parameters that may affect the visual representation of the image. An example of a parameter would be *frame* used to designate the thickness of the frame. The result of parameter setup is objects that look less generic and more closely reflect the actual product being manufactured.

More detailed information on how to setup tags and parameters will occur in the next sections. A complete list of base objects and their associated tags and parameters is found in the Base Display Objects section.

Configuring Display Object Tags

This section is where the user created options are assigned to tags in the ObjectViewer. The ObjectViewer is accessed by selecting the Setup tab, Products and then Display Objects. The ObjectViewer is the software that creates the drawings during order entry and displays them on the screen. The software was configured with certain codes for colors, grids, glass and other options. Tag setup can be accessed by selecting Setup, Tags in the ObjectViewer.



Below is where the user can attach orderable part options to the options available in the system. It works like a cross reference.

Tag	Value
<001CEV>	
<001CMRB>	
<001CMRL>	
<001CMRR>	
<001CMRT>	
<001COTTAGE>	
<001EQUAL>	
<001ORIEL>	
<001QHQ>	
<001RO>	
<002BRNZ>	
<002CUST>	
<002CUSTEXT>	
<002CUSTINT>	
<002CWG>	
<002DOWG>	
<002LOWG>	
<002TAN>	
<003BZ>	
<003BZS>	
<003CLR>	
<003CLRS>	
<003GLASSBYSASH>	
<003GRY>	
<003GRYS>	
<003LE>	
<003LES>	
<003OB>	
<003OBS>	
<004BURSTBARL>	
<004BURSTBARL>	

The  Option Tags tab shows all the values for the option tags which are framed by <>. The system tags are displayed under the Tag column. These tag names are hard coded and cannot be changed by the user, but the Value column can be assigned. If the option code for tan was entered as TN, then the value TN will need to be assigned to the Tag <002TAN>.

As shown below, the user would enter TN into the Value field. This assigns the user created option code TN to the tag <002TAN>.

Tag Setup

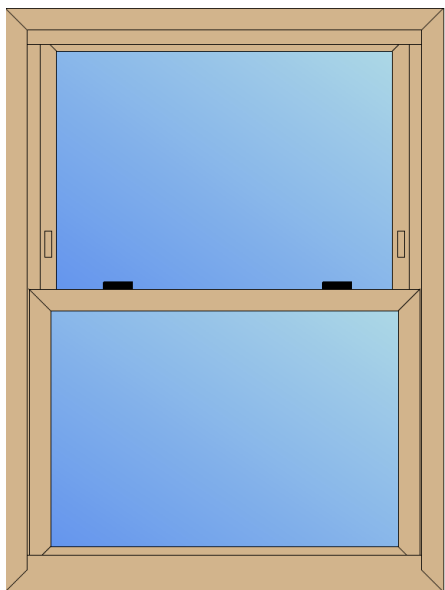
Display Object Filter:
<ALL OBJECTS>

Option Tags | Question Tags

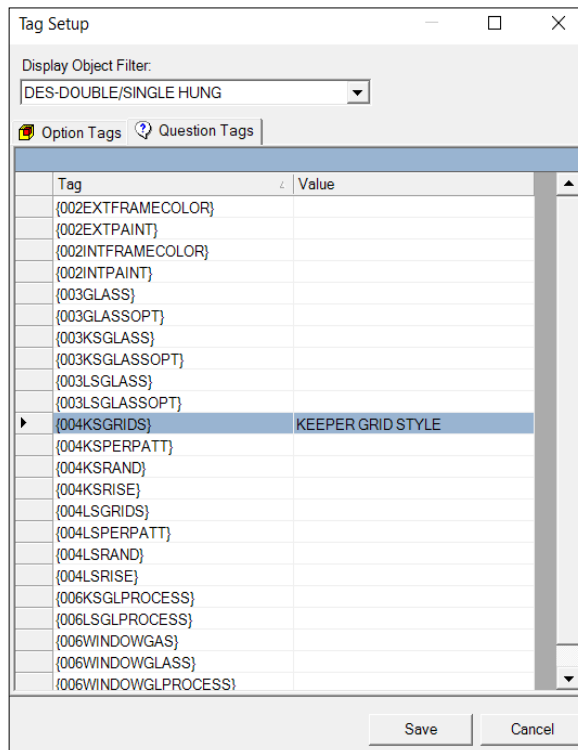
Tag	Value
<001EQUAL>	EQUAL
<001ORIEL>	ORIEL
<001QHQ>	
<001RO>	
<002BRNZ>	BRZ
<002CUST>	
<002CUSTEXT>	
<002CUSTINT>	
<002CWG>	CH/WHT
<002DOWG>	DO/WHT
<002LOWG>	LO/WHT
<002TAN>	TAN
<003BZ>	
<003BZS>	
<003CLR>	
<003CLRS>	
<003GLASSBYSASH>	
<003GRY>	
<003GRYS>	
<003LE>	
<003LES>	
<003OB>	
<003OBS>	
<004BURSTBARL>	
<004BURSTBARLS>	
<004BURSTL>	
<004BURSTLS>	
<004CATH>	CATH
<004CATHBURST>	
<004CATHBURSTS>	
<004CATHS>	CATHS

Save Cancel

White is the default drawing color, so no tag setup is required to draw the color white. Setting up the color tags ensures the correct color will be displayed for the image based on the color option selected.

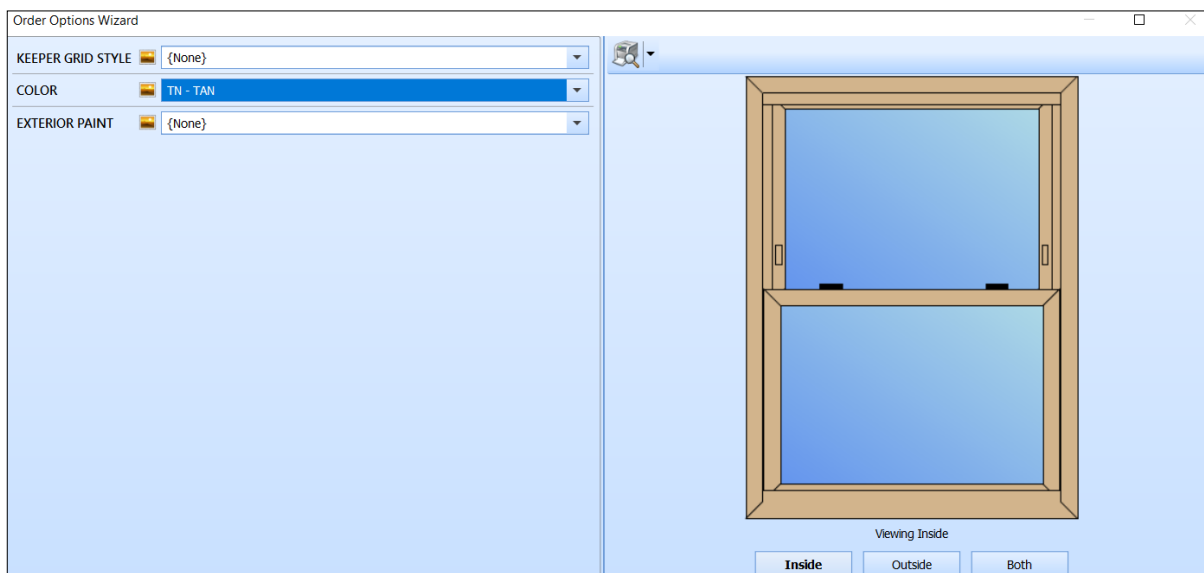


The  **Question Tags** tab shows question tag values which are framed by {}.



In the picture above, the user created a question on the double hung that asks the question during order entry “KEEPER GRID STYLE” and assigned it to the question tag {004KSGRIDS}. The system refers to the keeper sash grid style as {004KSGRIDS}. This allows the user to word the questions in any manner. **Care should be taken to enter the question in the value column exactly as it was configured in Part Setup.** Any missed letters, spaces, upper- and lower-case letters, punctuation or symbols will result in the object not being drawn correctly.

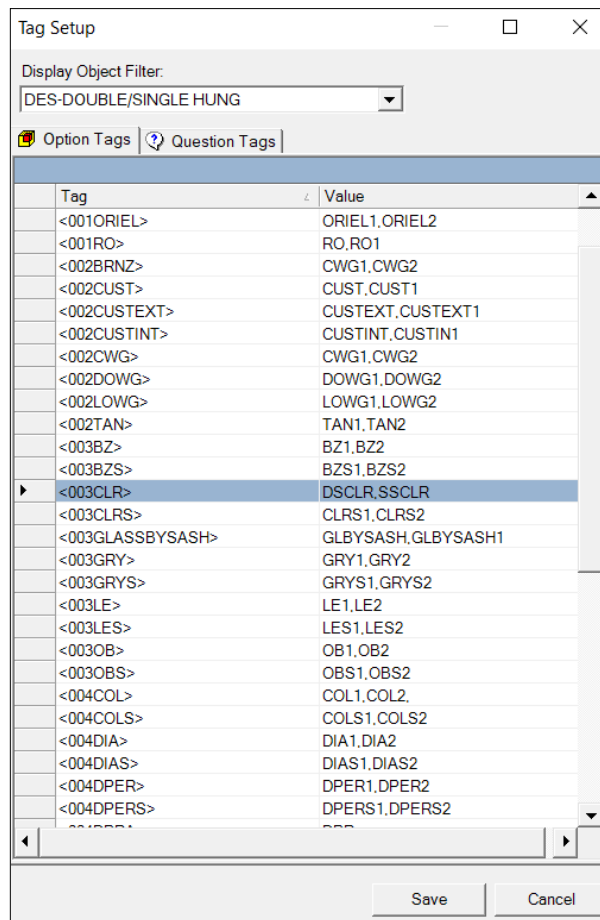
The picture below shows the “KEEPER GRID STYLE” option question.



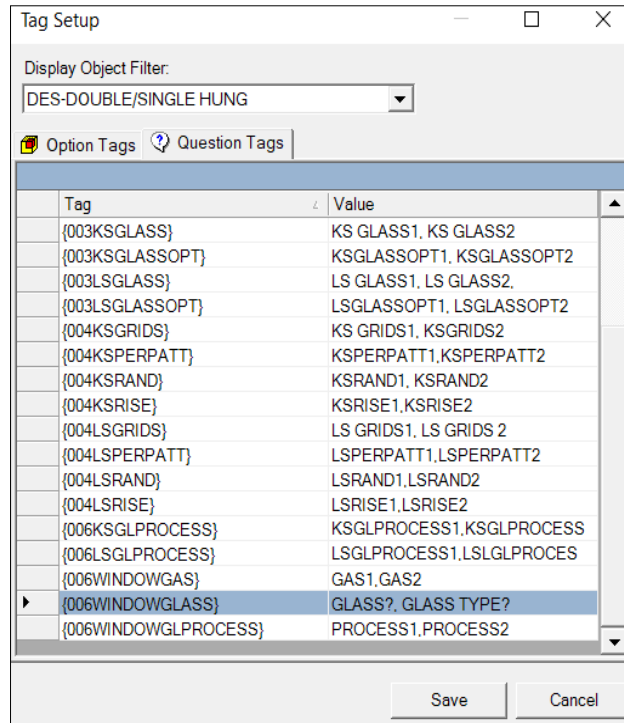
NOTE: It is important to note that sash and window option codes must be unique in order for the display objects to function properly. If COL is the option code for ordering colonial grids by window, then COLS could be the option code for ordering colonial grids by sash. COL cannot also be used for ordering colonial grids by sash.

CSV Tag Feature

You can assign a tag to multiple option codes using a comma separate variable (CSV) list. If you have multiple variations of a glass type to offer, like double strength clear and single strength clear, a comma separated list of option codes for these glass types can be assigned to the clear glass tag. In the picture below, both option codes DSCLR and SSCLR are assigned to tag <003CLR> and the codes are separated by a comma.

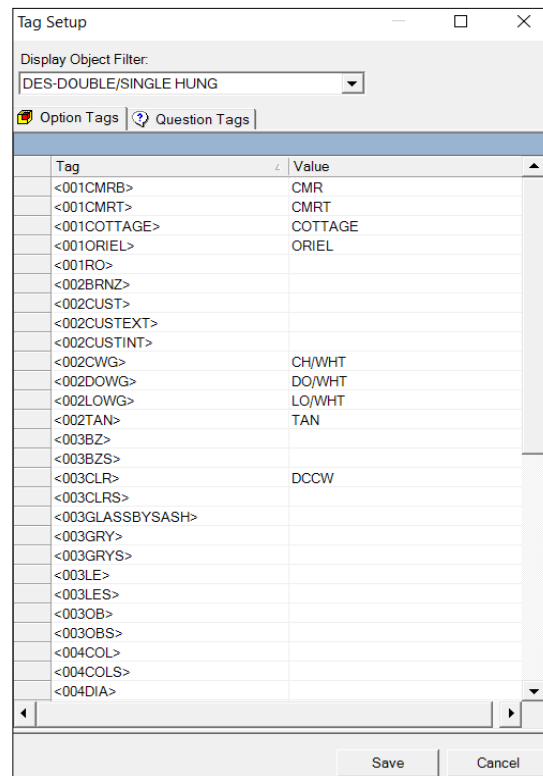


Multiple questions can be assigned to question tags. In the picture below, the {006WINDOWGLASS} tag is set to GLASS?, GLASSTYPE?. ObjectViewer will search for glass options under both of these questions in a part's option structure.



Display Object Filter

You may filter the tag view by selecting an object from the Display Object Filter combo box. Below the tags shown are only those used by the DES-Double/Single Hung object. This can make it easier to setup and test an object. **Keep in mind that objects share tags.** For example, all objects use the <002TAN> color tag. If you change the value of <002TAN> from TN to BG for the DES-Double/Single Hung object, you are changing the value of <002TAN> for all objects to BG.



Adding a Tag to a Display Object

It might be assumed that adding a new option or question tag would be accomplished via Display Object Setup->Setup-Tags. Instead, tags are added by simply using them in the display object script. For example, if you added this code into a display object:

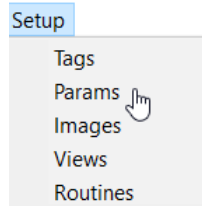
```
If OptionExists("<HELLO>") Then  
    MsgBox("hi")  
End If
```

Then after adding the above code go into Setup-Tags, you would see a new tag, <HELLO>, in Tag Setup. Any string enclosed in <> is an option tag shown on the Option Tag tab of Tag Setup. Any string enclosed in {} is a question tag shown on the Question Tag tab of Tag Setup. When you open the Tag Setup dialog, it searches the current display object's scripting for strings in <> and {} and displays them. This is the only way to add a new tag.

See the FeneVision ObjectViewer Manual for more information on how to modify/script a display object.

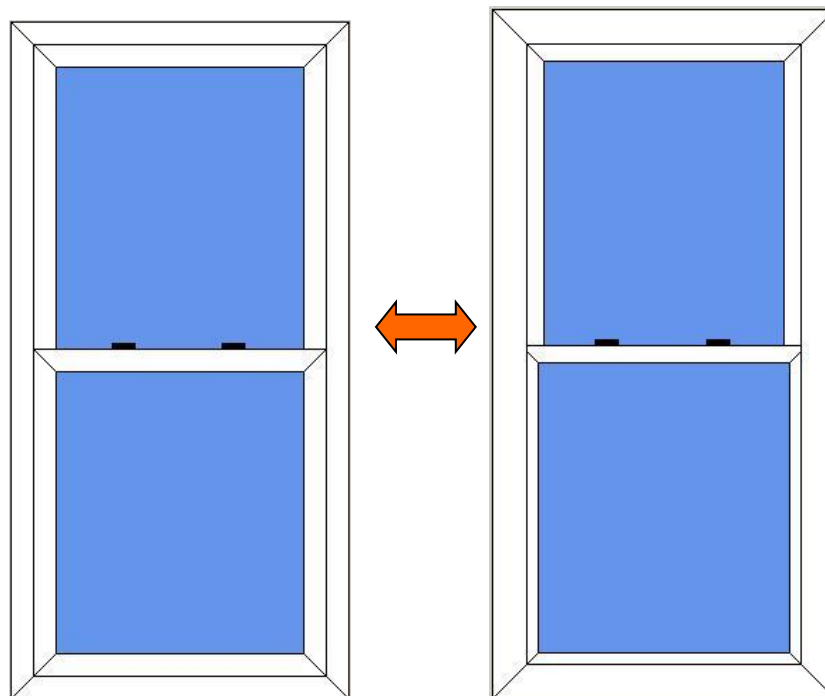
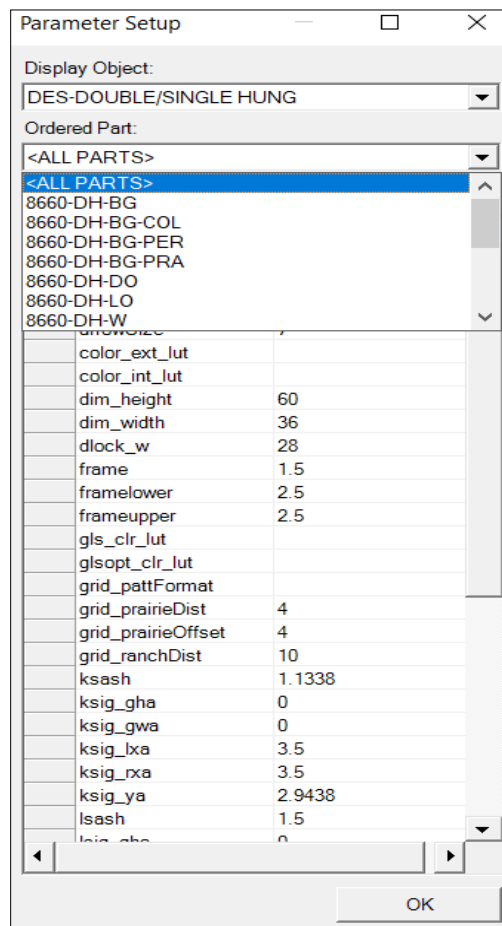
Configuring Display Object Parameters

ObjectViewer parameters can be accessed through the ObjectViewer by clicking the



menu item. The parameters setup screen allows the user to modify each dimension of a given object for every part that it's assigned to. By changing the values for each parameter, the visual appearance of the display object will change.

From the Parameter setup menu, the user can edit parameters for any display object and any orderable part the object is assigned to. The Display Object pull down allows the user to select the display object whose parameters they want to configure. The picture below shows parameters for the DES-DOUBLE/SINGLE HUNG base object. The Ordered Part pull down allows the user to select <ALL PARTS> or one of the parts DES-DOUBLE/SINGLE HUNG is assigned to in Part Setup, like 8660-DH-BG. Changing parameter values under <ALL PARTS> will change the value for all parts DES-DOUBLE/SINGLE HUNG is assigned to. Assigning parameters to individual parts, like 8660-DH-BG, will override parameters set under <ALL PARTS>; i.e. for all the parts DES- DOUBLE/SINGLE HUNG is assigned to in Part Setup. The result of parameter setup is objects that look less generic and more accurately depict the actual product being manufactured.



In the example shown above, both pictures use the DES-DOUBLE/SINGLE HUNG base object, but by editing the parameters (left example) the dimensions of the frame and sash have changed (right example).

Edit Parameter

Both the paramname and paramvalue data can be changed in the Parameter Setup dialog by simply typing in the field. Press OK to save your changes. Be aware that changing the parameter name can break the object script where it references the parameter name. For this reason, the paramname field cannot be edited on base objects except by FeneTech personnel. The paramvalue field on base objects can be edited by any user.

Add Parameter

To add a new parameter, enter the paramname and paramvalue data on the last line of the Parameter Setup dialog marked by an asterisk. Press OK to save your changes. On base objects, this operation can only be performed by FeneTech personnel.

Delete Parameter

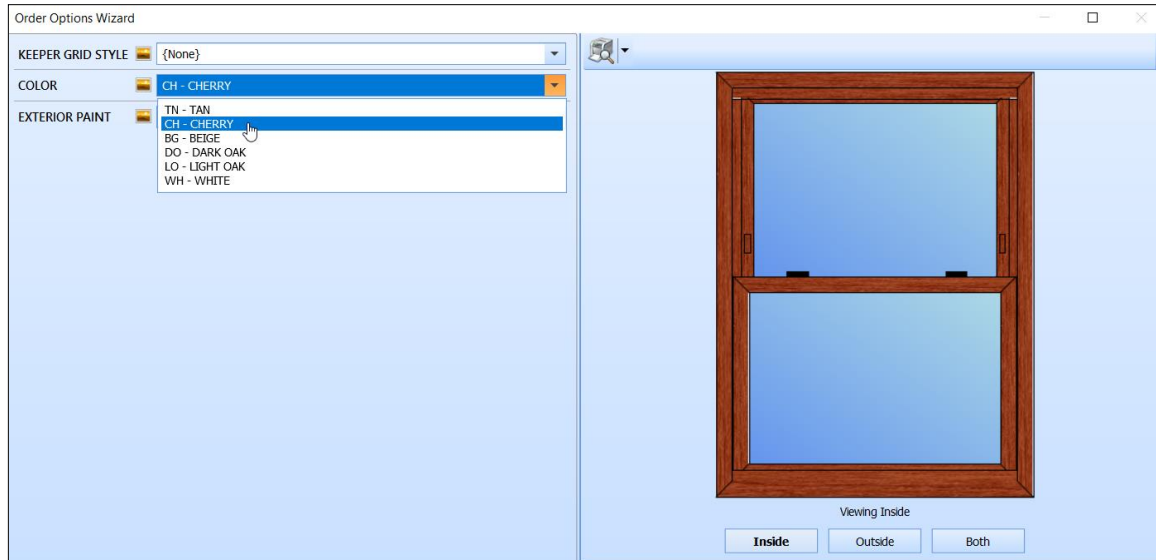
To delete a parameter, highlight the parameter you wish to delete and press the DELETE key on your keyboard. On base objects, this operation can only be performed by FeneTech personnel.

Metric System Measurement

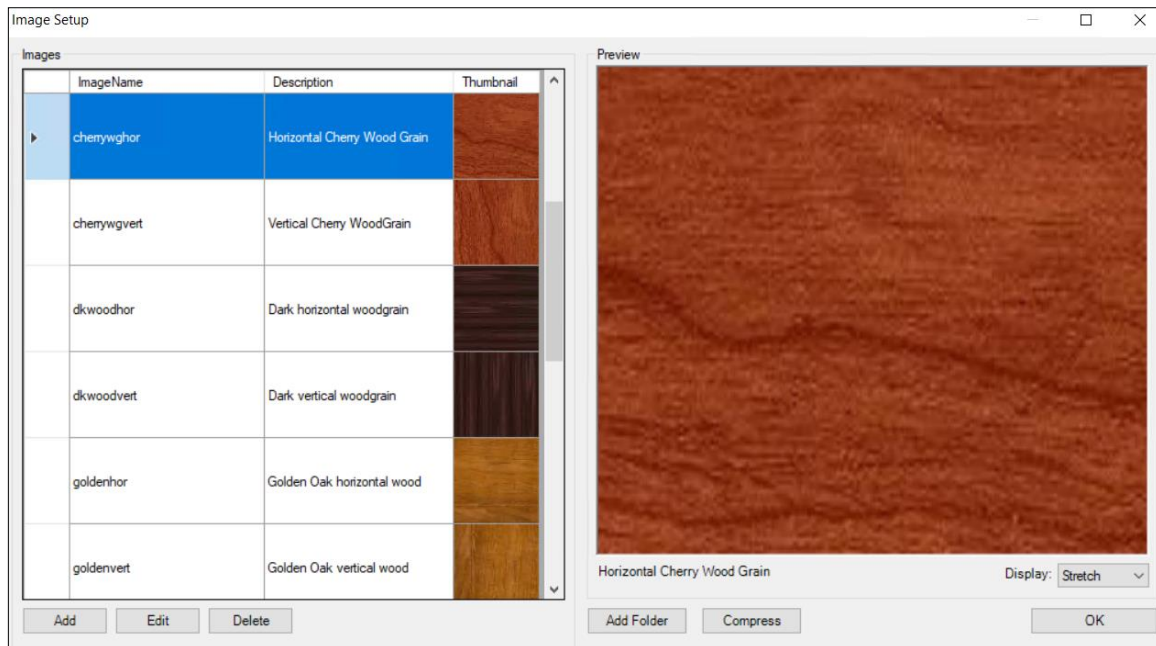
If your system measurement type is Metric, be sure your parameters are entered in Metric. Likewise, use Imperial values for parameters when your system measurement type is Imperial.

Configuring Display Object Images

The ObjectViewer can load and store images referenced by the display objects. These images can be used as a fillcolor instead of specifying a system color name like “white”. The picture window below references a loaded image to display a cherry wood grain frame.



Select Setup / Images from the main menu to bring up the Image Setup screen. The image named “cherrywghor” is selected and shows a horizontal cherry wood grain. The image below it named “cherrywgvert” is a vertical cherry wood grain.

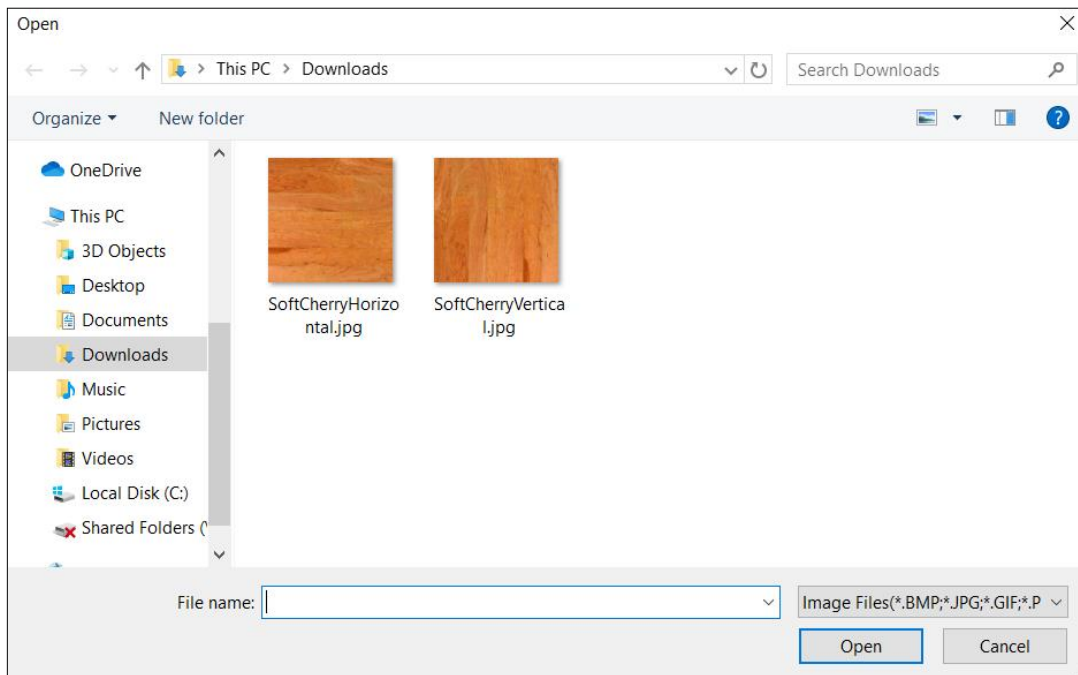


To get the cherry wood grain appearance for window frames in the base display objects, the name of the image “cherrywghor” is entered as the fillcolor for horizontal pieces (like the sill) and “cherrywgvert” is entered as the fillcolor for vertical pieces (like the jambs). Other images used by the base objects are: “darkwghor” and “darkwgvert” for dark wood grain, “lightwghor” and “lightwgvert” for light wood grain.

You could delete these images and replace them with others to change the appearance.

Add

Add a new image into ObjectViewer. When you press the Add button, the Open dialog will appear so you can select an image to import into ObjectViewer.



Once you have selected an image to import, enter the image name and description. Press OK to leave the Image Setup screen.

Edit

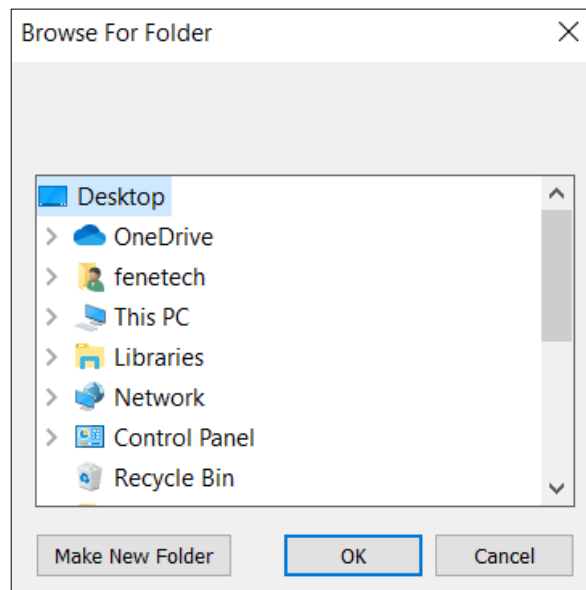
Use Edit to change the name of the image or its description.

Delete

Use Delete to remove an image from ObjectViewer. Highlight the image you wish to delete, press the Delete button, and confirm that you want to remove the image.

Add Folder

Use the Add Folder button to import all the images in a folder. When you press Add Folder a dialog appears requesting you to select a folder.



After selecting a folder and pressing ok, all the images in that folder will be imported into ObjectViewer. The filename is used as the name of the image in ObjectViewer.

Compress

Use Compress to shrink the size of an image to save storage space.

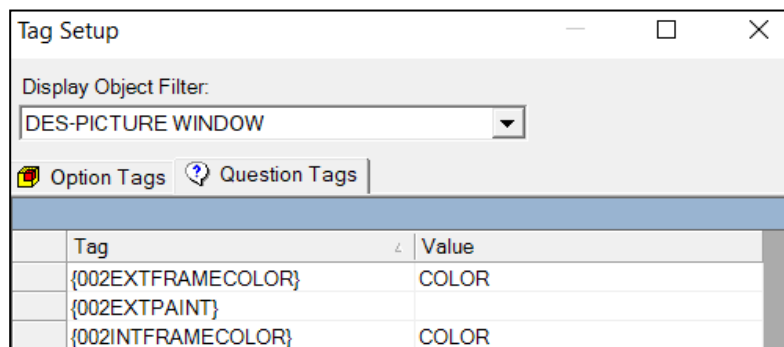
Display

Selecting Stretch will fill the object dimensions with the image. Tile and Normal are additional selections available.

Interior/Exterior Color Lookup Table

There is functionality that is built into each display object that allows custom interior/exterior colors to be placed in a lookup table. The colors that are in the table must be HTML colors – they can be entered in by the color name or HEX code as seen below. There is also capability to utilize an image name that's been uploaded to Object Viewer. Reference [Configuring Display Object Images](#) for more information. Below are steps to properly configure these tables.

Set the Question Tags for {002EXTFRAMECOLOR} and {002INTFRAMECOLOR} to the COLOR question that you have in the option structure. In the example below, there is one question that determines the interior and exterior color



Create a lookup table with the same columns that are listed in the image below. A table will need to be created for Interior Color and Exterior Color.

Lookup Tables							
Tables: Interior Color		   					
ROW	COL	Description	ColorH	ColorV	ColorStyle	DefaultGrid...	
WH		White	White	White	0	White	
TP		Taupe	Tan	Tan	0	Tan	
GRN		Green	#FF217A35	#FF217A35	0	#FF217A35	
WH/BZ		White	White	White	0	White	
KH/WH		Khaki	#FFFFEBCD	#FFFFEBCD	0	#FFFFEBCD	
WDDK		Dark Wood	HDarkWood	VDarkWood	6	Sepia	

If a HEX code is being used, you must add "FF" to the beginning to make the color opaque.

ROW: The option codes for colors that are listed in your option structure.
Make your option key the same as your option code in the option code setup screen.

Description: This is your description of the option code. This does **NOT** have to be the same information that is in the ColorH and ColorV columns. This is simply informational.

ColorH: This is the HTML color, HEX code or image name for the horizontal frame and sash pieces of the display object.

ColorV: This is the HTML color, HEX code or image name for the vertical frame and sash pieces of the display object.

ColorStyle: This should be set to 0 if you are using a standard HTML color or HEX code. This can be set to 6 if utilizing an image that is uploaded to Object Viewer.

DefaultGridColor: If grids are selected in the option structure, this is what determines the default grid color.

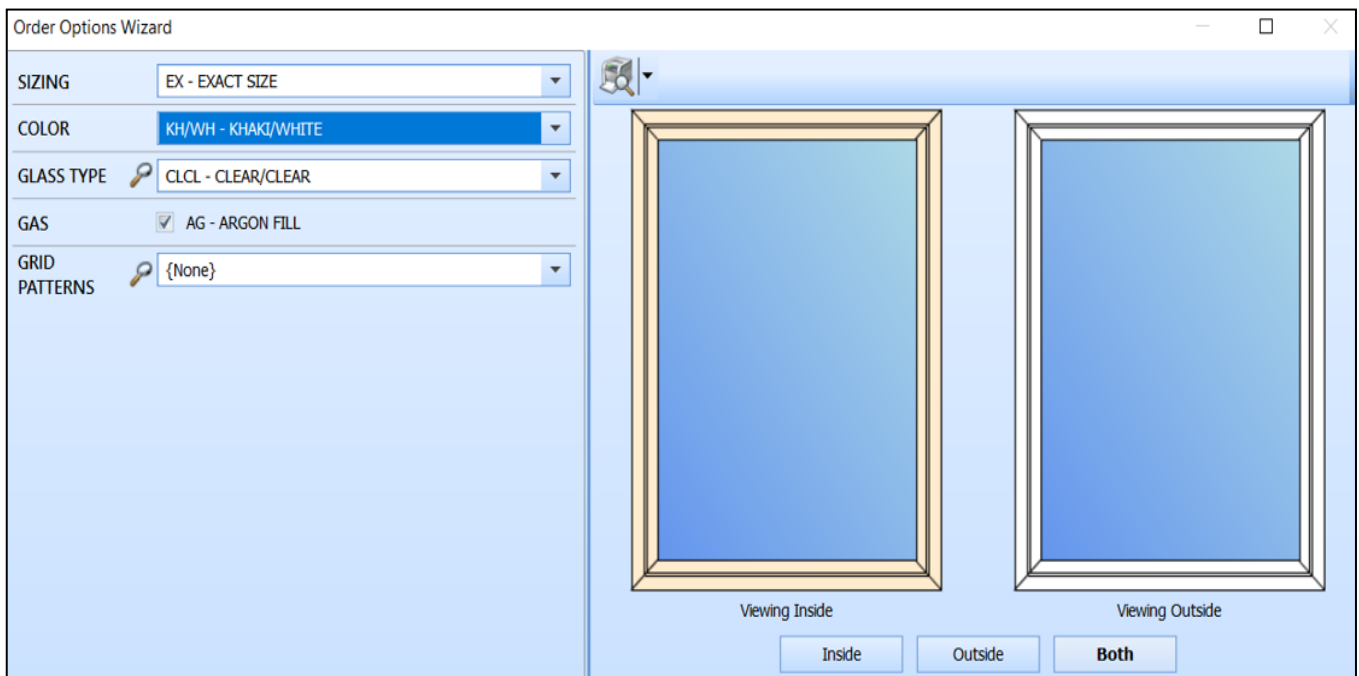
Color codes that include a “/” signify that it is a two-tone color. For these option codes – you will enter in different color codes for the interior and exterior look up tables. An example of the “Exterior Color” look up table is below.

Lookup Tables

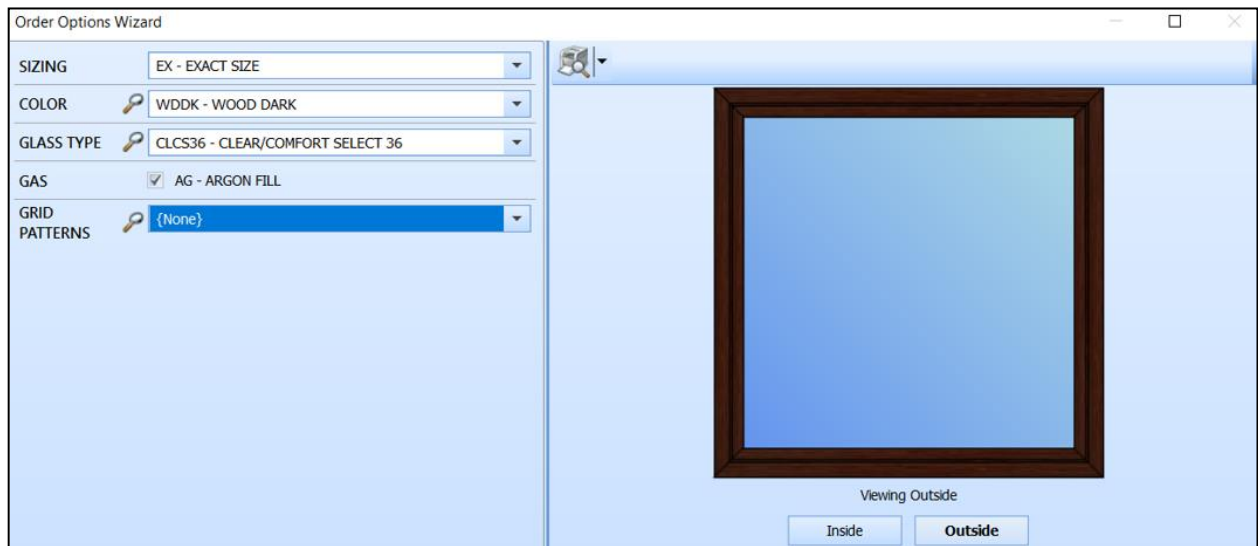
Tables: Exterior Color

ROW	COL	Description	Colorh	Colorv	ColorStyle	DefaultGridColor
WH		White	White	White	0	White
TP		Taupe	Tan	Tan	0	Tan
GRN		Green	#FF217A35	#FF217A35	0	#FF217A35
WH/BZ		Bronze	Bronze	Bronze	0	Bronze
KH/WH		White	White	White	0	White
WDDK		Dark Wood	HDarkWood	VDarkWood	6	Sepia

The image below shows what the display object will look like when a two-tone color is selected. **Note** that the interior view is khaki, and the exterior view displays white. This was accomplished with the “KH/WH” option code. The Interior Color look up table has the HEX code of #FFFFEBCD and the Exterior Table has the HTML color code of white.

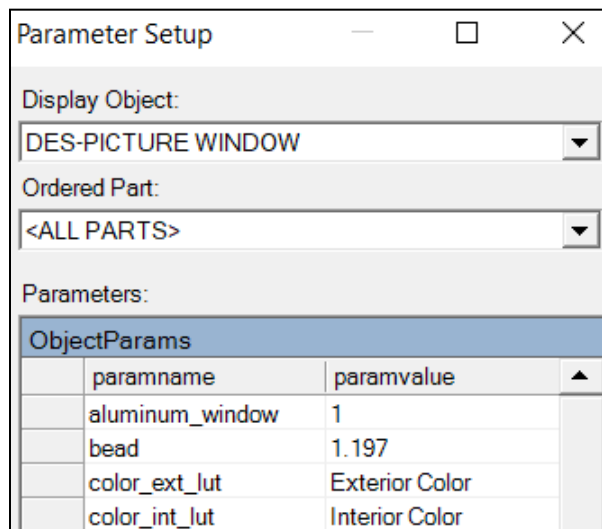


The image displayed below is an example of a dark wood window that is using an uploaded image and a color style of 6.



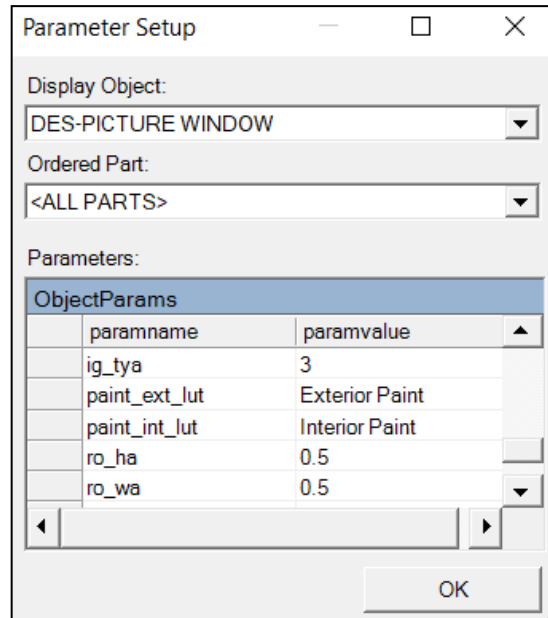
Once both the lookup tables have been created, the “color_ext_lut” and “color_int_lut” parameters need to be set to the lookup table name **Note:** This is case sensitive. In the example shown above, the lookup table names are “Exterior Color” and “Interior Color”.

Below is an example of what the parameter setup screen should look like:



Interior/Exterior Paint Lookup Table

The Interior/Exterior Paint Lookup Table has similar functionality to the [Interior/Exterior Color Lookup Table](#). Reference this section for more detail. The main differences are the parameters, question tags and the lookup tables that are used. Two new lookup tables need to be created and the parameters that need set to these lookup tables are “paint_int_lut” and “paint_ext_lut”. An example of this is shown below.



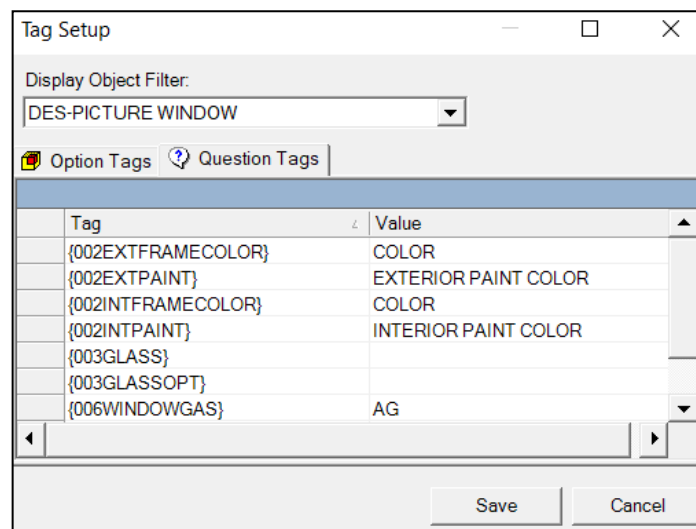
The Parameter Setup dialog box is shown with the following settings:

- Display Object: DES-PICTURE WINDOW
- Ordered Part: <ALL PARTS>
- Parameters: ObjectParams

paramname	paramvalue
ig_tya	3
paint_ext_lut	Exterior Paint
paint_int_lut	Interior Paint
ro_ha	0.5
ro_wa	0.5

OK

{002EXTPAINT} AND {002INTPAINT} are the required question tags. These need to be set to the paint questions in the option structure. An example of this is shown below.



The Tag Setup dialog box is shown with the following settings:

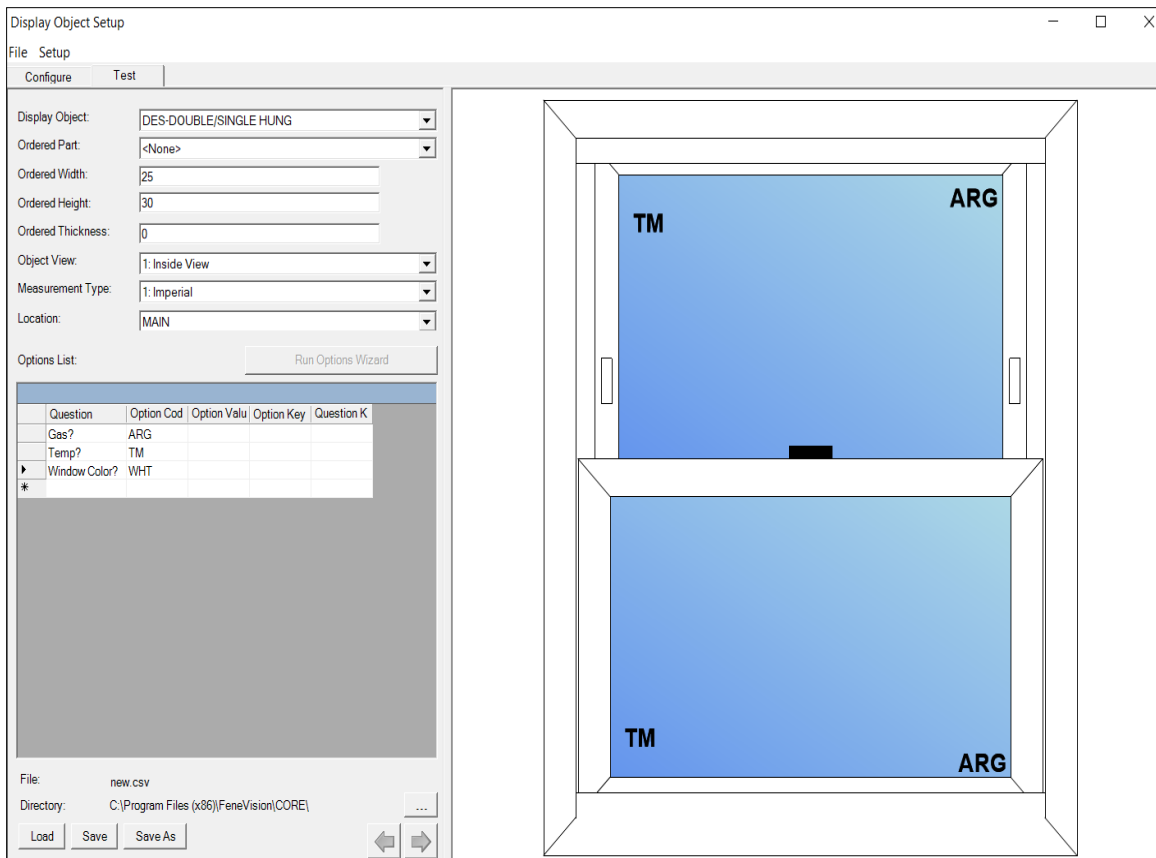
- Display Object Filter: DES-PICTURE WINDOW
- Option Tags
- Question Tags

Tag	Value
{002EXTFRAMECOLOR}	COLOR
{002EXTPAINT}	EXTERIOR PAINT COLOR
{002INTFRAMECOLOR}	COLOR
{002INTPAINT}	INTERIOR PAINT COLOR
{003GLASS}	
{003GLASSOPT}	
{006WINDOWGAS}	AG

Save Cancel

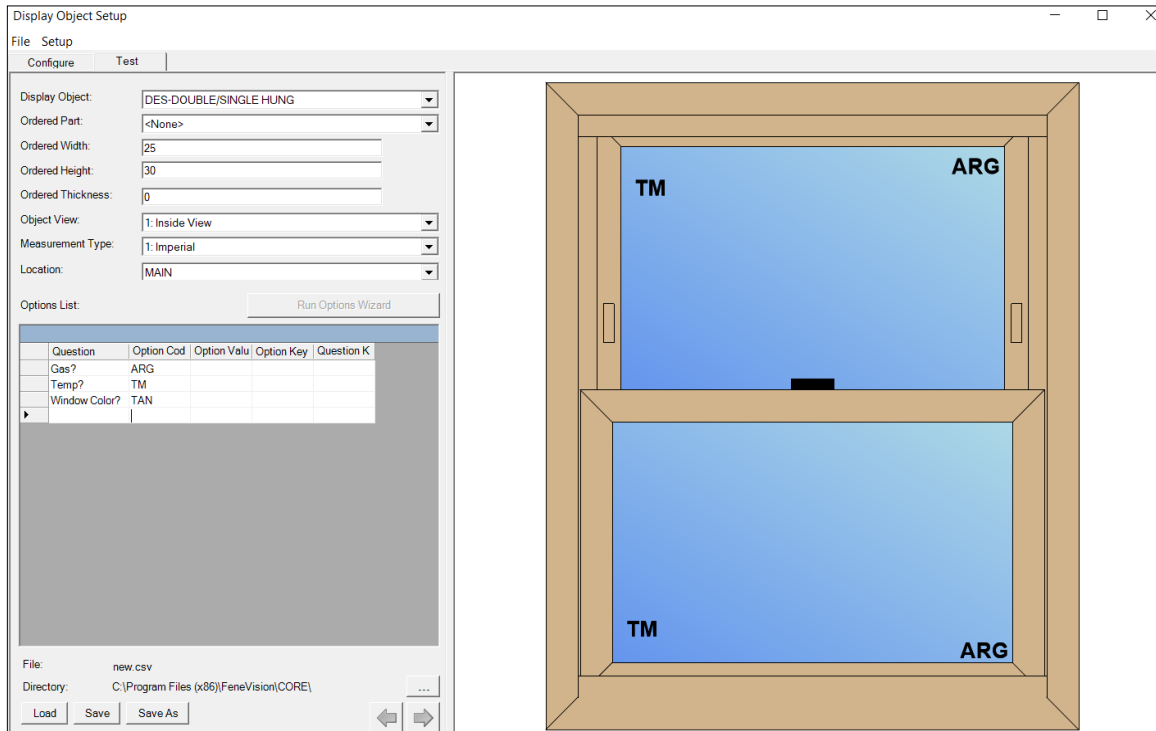
Testing Base Objects

The Test tab (next to the configure tab) can be used to test display objects. The Display Objects pull down selects the desired object for testing. The Ordered Part pull down selects the specific part for testing, or none. Remember that parameters can be assigned for specific parts, so you may want to test those parameters by selecting the specific part here. If a specific part is selected, you may run the options wizard to choose options. The chosen options will appear in the Options List on the left and the image on the right will be drawn based on those options.



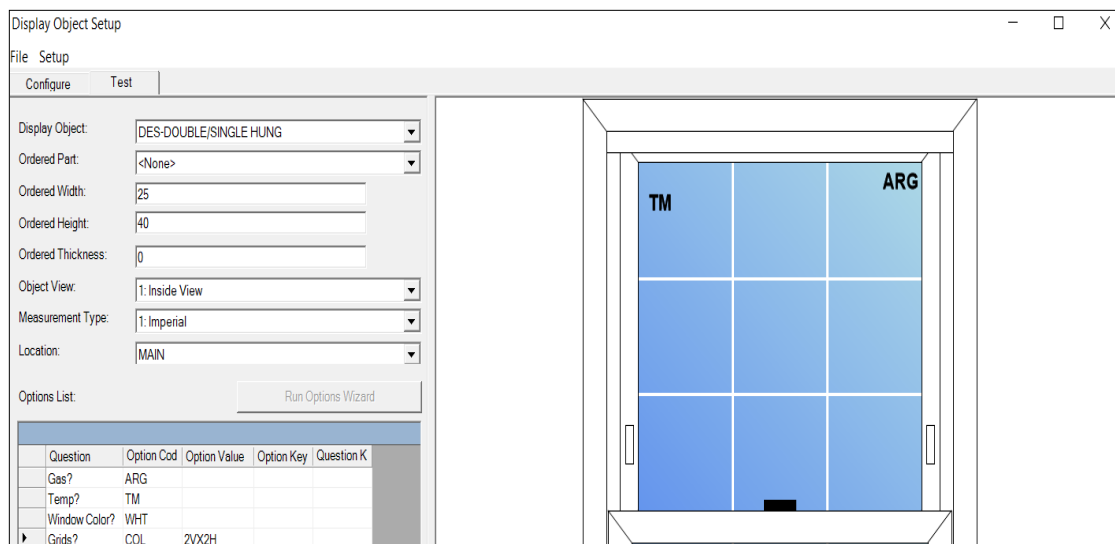
Notice the tempered glass and gas options are reflected in the image text.

You may also change the chosen options in by typing them in the Option List. In the picture below, the Window Color was changed to TAN, which is the tag value for the tan color.

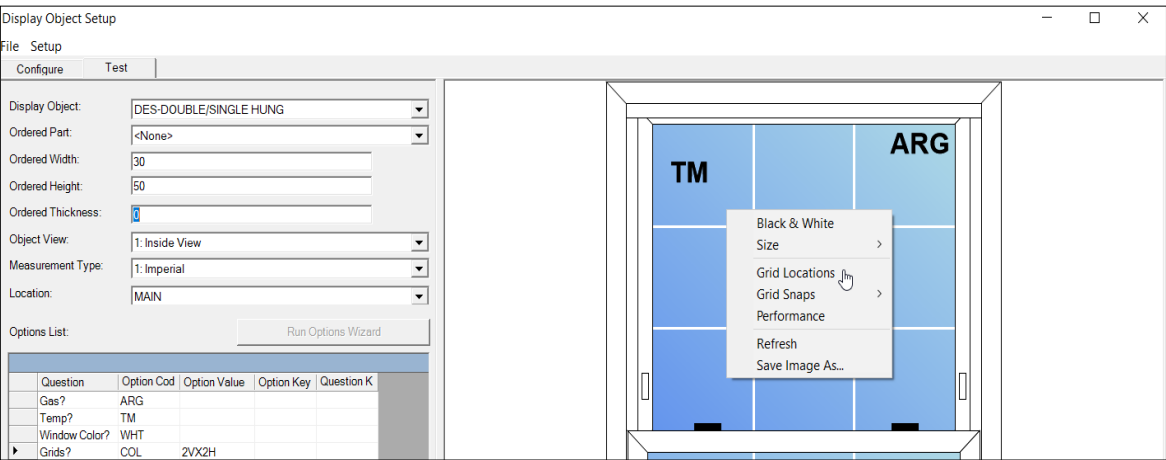


Option values may also be entered in the Options List. In most cases where option values are used, the value must be entered in a unique format. In the example below, the Colonial Grid Style value is entered as '2VX2H' which designates two vertical and two horizontal bars in the grid pattern.

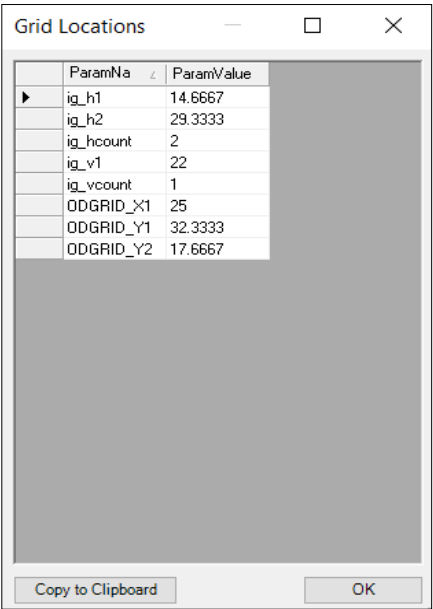
Grid Locations



While in the test tab view, right click on the image to bring up the pop-up menu and select the Grid Locations menu item.



This brings up the Grid Locations dialog which shows the notch positions for the horizontal and vertical bars. The values `ig_h#` show the horizontal bar locations, and the numbers `ig_v#` show the vertical bar locations. These are calculated from the lower left corner of the `ig`. The `ODGRID_X#` and `ODGRID_Y#` locations are calculated from the lower left corner of the window. The `ODGRID` values are used when aligning grids between two windows.



ObjectViewer stores notch locations with respect to visible glass. To account for tuckback you would use the `ig_gwa` and `ig_gha` parameters. Here is a brief example for `ig_gwa` (and it is the same idea for `ig_gha`).

Consider a picture window whose glass is 18.5 inches wide. The tuckback is .25 on each side, so the visible glass is 18 inches wide.

The customer wants grids with 3 vertical panes by 3 horizontal panes.

For the sake of keeping the example simple, pretend grid thickness is 0. (Also, at this time the base display objects do not support grid thickness.)

How do you place your grids on the glass? How do you determine notch location?

If you want your panes to be even in the visible glass, you would divide 18 by 3 and your notch locations in respect to the entire glass would be 6.25 and 12.25.

Some manufacturers just divide the entire glass by 3 to set their notch locations. So, 18.5 divided by 3 results in notch locations of 6.167 and 12.333.

FeneVision ObjectViewer divides up the visible glass when it sets notch locations, and does not add in the tuckback. So it saves the notch locations as 6 and 12 (since the visible glass is 18). So the value of `ig_v1` is 6 and `ig_v2` is 12 in the database. You can access these values within your BOM. If you are happy with setting notch locations based on visible glass, then you merely need to add the .25 tuckback to `ig_v1` and `ig_v2` (in your BOM) to get 6.25 and 12.25 respectively.

If you prefer to divide the entire glass into panes, then you need to enter an `ig_gwa` value. Then, objectviewer will adjust the notch locations to how the window is truly manufactured. In this case, you would enter .5 for `ig_gwa`. Still, objectviewer saves notch locations with respect to visible glass, so it will store 5.9167 and 12.0833. Again, add the .25 tuckback to `ig_v1` and `ig_v2` (in your BOM) to get 6.167 and 12.333 respectively.

Black & White Image Display

The pop-up menu, you may choose the Black & White option. This displays the image in black and white so that you can see what the image will look like on black and white reports.

Image Size

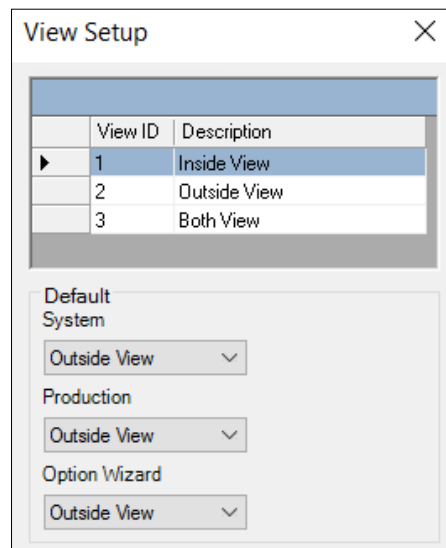
The Size option on the pop-up menu gives you the ability to see what the image will look like at various stages in the FeneVision® software. The size choices are: Auto, Options Wizard, Acknowledgement, and Tracking. Auto is the default view shown in the ObjectViewer of the image. Options Wizard shows what the image will look like while Options Wizard is running. Acknowledgement shows the size of the image on the Order Acknowledgement report. Tracking shows what the image will look like during Tracking.

Saving the Image

The Save Image As... selection on the pop-up menu allows you to save the image to a file.

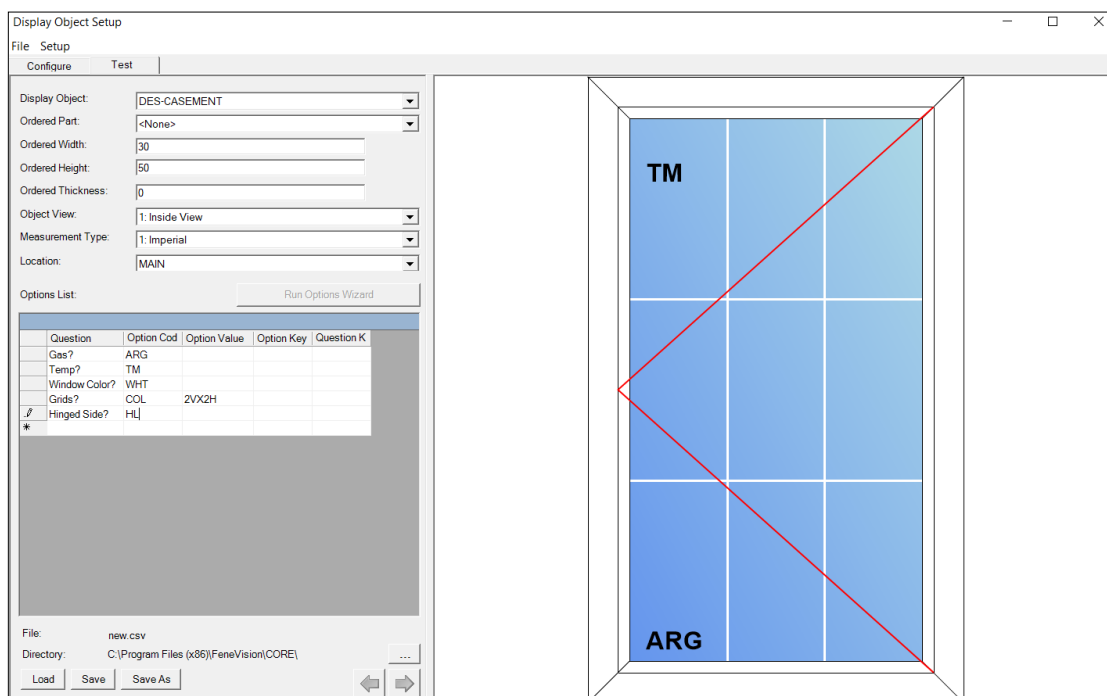
Inside and Outside View

The default view for your system can be configured via the View Setup dialog. Access this dialog by selecting Setup / Views from the main menu. When Inside View is selected for System, this is how your window objects will be viewed throughout the system (reports, etc.). If you prefer to view your window objects from the outside view, this can also be selected. The view that is defaulted for Production and Option Wizard can also be modified.

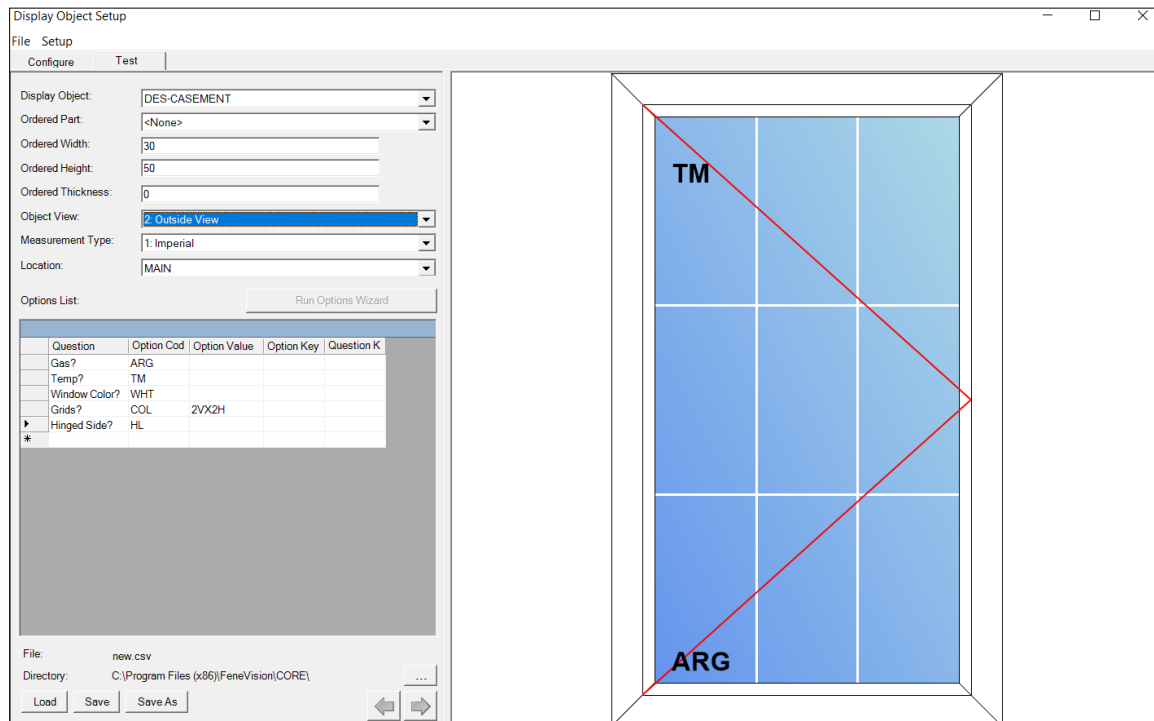


The FeneVision glass shape library represents the outside view of the glass. Glass manufacturers will want to set their system view to Outside View.

The casement window below is displayed with Inside View as the default view. The hinge location is on the left.



When testing the object, you may want to see what the object looks like from the outside view. You can toggle the view with the Object View dropdown selection near the upper left corner of the screen. Unlike the default view setting described earlier, this temporarily toggles the view within ObjectViewer only. The outside view of the casement window appears below.



Base Display Objects

This section describes the base display objects available and their associated tags and parameters.

To make it easier to find tags, they are grouped into categories. For example, option tags prefixed by 002, as in <002BRNZ>, pertain to window colors. Option tag categories are:

Option Tag Prefix	Category
001	Window Options
002	Color
003	Glass Type
004	Grid Type
005	Grid Options
006	Glass Options
008	Operation / Miscellaneous
009	Glass Offsets

Question tags are also grouped into categories. For example, question tags prefixed by 004, as in {004KSGRIDS}, pertain to grid type. Question tags prefixed by 004 are used with option tag category 004 Grid Type. Question tag categories are:

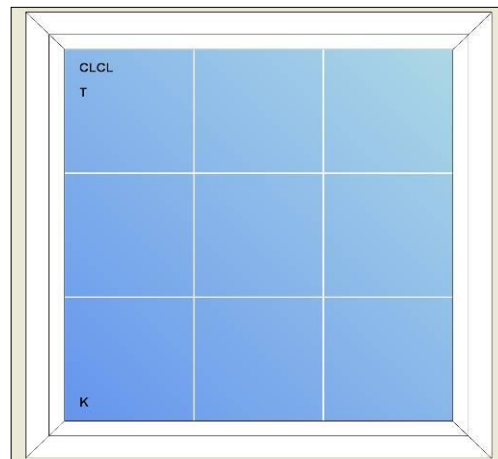
Question Tag Prefix	Category	Used with Option Tag Category
003	Glass Type	003 Glass Type
004	Grid Type	004 Grid Type
006	Glass Options	006 Glass Options

This section also shows a diagram of the Grid Locations associated with each base object. Grid Locations were explained earlier in the Testing Base Objects section.

To ensure base objects are not changed inadvertently, base objects can only be modified (other than tag and parameter configuration) by FeneTech personnel. A base object can be viewed in the ObjectViewer, but the records will be “locked down” to prohibit editing.

Windows

DES-PICTURE WINDOW



NAME	SUPPORTED OPTIONS
DES-PICTURE WINDOW	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas.

PICTURE WINDOW OPTION TAGS

The picture window uses tags in the following categories:

001 Window Options

The ObjectViewer uses this category to display the window option Rough Opening.

Tag	Definition	Option Value
<001RO>	Rough Opening sizing option code(s).	N/A. The rough opening deducts will be determined by the parameters ro_wa and ro_ha for the width and height respectively.

002 Color

The color tags tell the ObjectViewer what color to use when drawing the frame, sashes, and grids (grid color can also be affected by tags in the 005 Grid Options category described later). These tags should be set to correspond with the color option codes you entered in CORE. White is the default drawing color, so no tag setup is required to draw the color white. The chart below shows the inside and outside view colors that will be drawn for each tag:

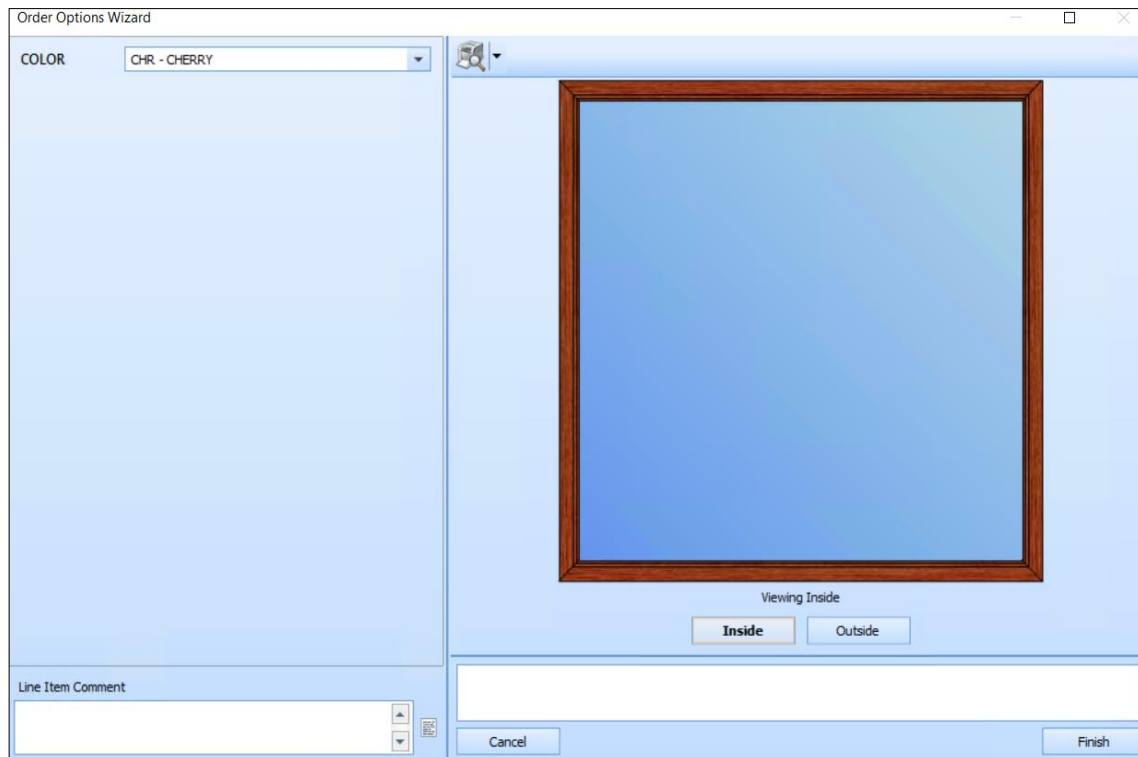
Tag	Inside Color	Inside Image Name*	Outside Color
<002TAN>	Tan	None	Tan
<002BRNZ>	Saddle brown	None	Saddle brown
<002LOWG>	Light oak wood grain	lightwgvert, lightwghor	White
<002DOWG>	Dark oak wood grain	darkwgvert, darkwghor	White
<002CWG>	Cherry wood grain	cherrywgvert, cherrywghor	White
None (default)	White	None	White

*To get the wood grain appearance for window frames in the base display objects, an image is used when specifying the color instead of a system color name (like white). The name of the images used for the wood grain colors are listed in the Inside Image Name column. You can change these images to get a different appearance. See the [Configuring Display Object Images](#) section for more details about loading and using images in ObjectViewer.

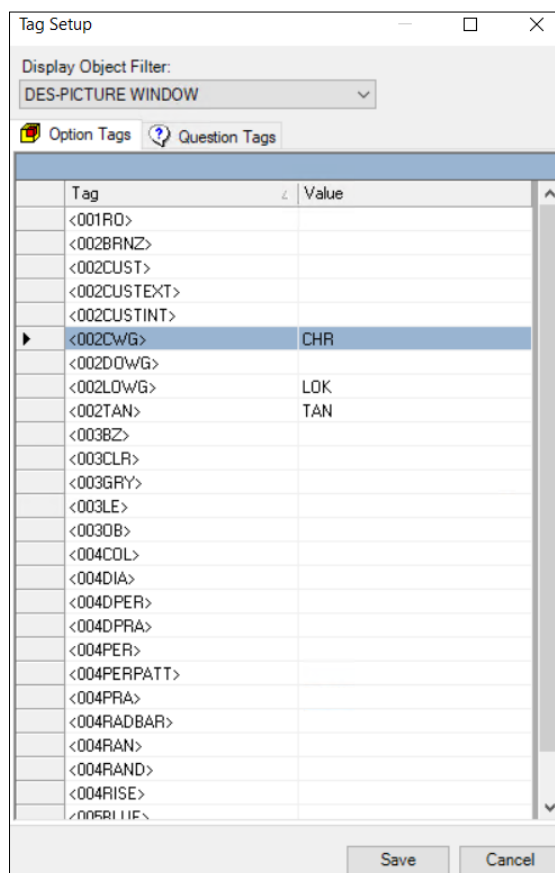
The user also has the ability to override the above colors with a custom color. The custom color must be a valid system color, such as chocolate, silver, royalblue. The custom color can affect both the interior and exterior (<002CUST>) or just one view.

Tag	Option Value	Inside Color	Outside Color
<002CUST>	Valid system color.	System color entered.	System color entered.
<002CUSTEXT>	Valid system color.	No change.	System color entered.
<002CUSTINT>	Valid system color.	System color entered.	No change.

The picture window below has the color options cherry, light oak, tan and white. White does not have to be associated with a tag since it is the default color drawn. However, cherry, tan and light oak need to be associated in Tag Setup.



Since the option code for cherry was entered as CHR in Option Code Setup, then the value CHR needs to be assigned to the Tag <002CWG> in Tag Setup as shown below. Now the ObjectViewer knows to draw the cherry wood grain color when the option code CHR is selected during Options Wizard. Tag <002TAN> is assigned to option code TAN for tan and tag <002LOWG> is assigned to option code LOK for light oak.



003 Glass Type

The glass tags tell the ObjectViewer what color to draw the glass in and what glass text to display. More specifically, the glass option tags drive the color while the glass question tags drive the text. Possible glass types are bronze, clear, low-e, obscure, and gray. If none of the tags are setup, the default glass color is blue.

Option Tag	Definition	Display Color
<003BZ>	Bronze by window.	Bronze
<003CLR>	Clear by window.	Blue
<003LE>	Low-e by window.	Sea Green
<003OB>	Obscure by window.	Light Blue
<003GRY>	Gray by window.	Gray

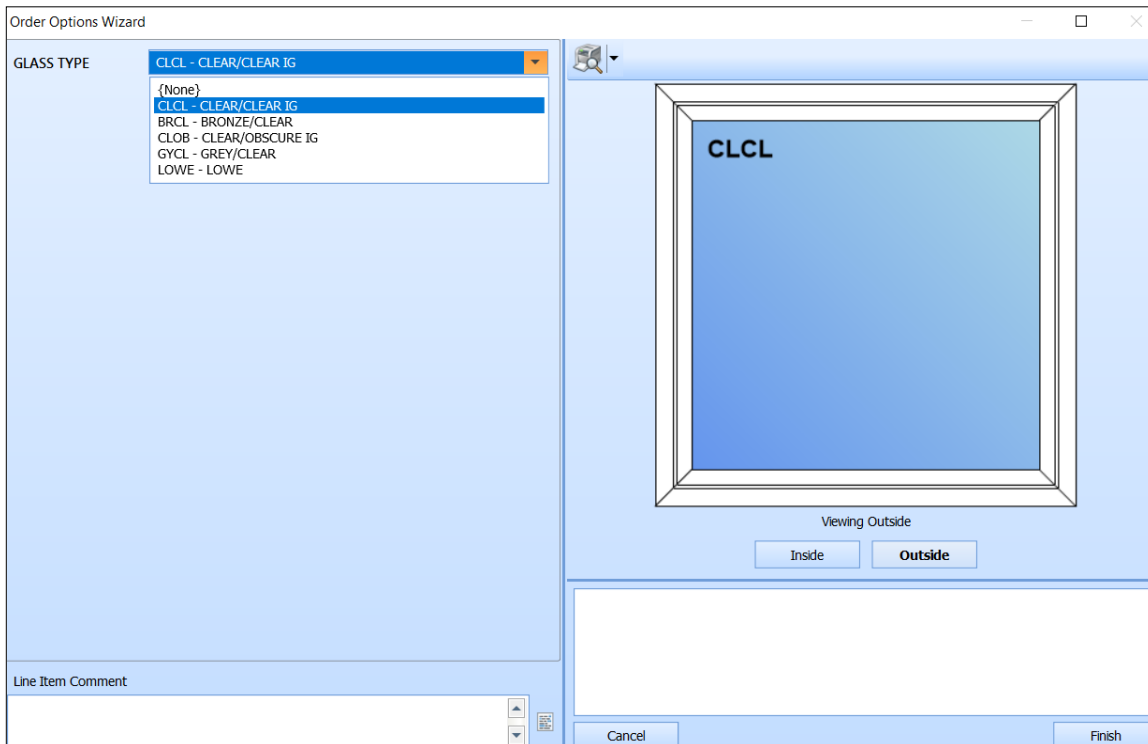
You may have multiple variations of each glass type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <003BZ> can be assigned to option codes BZ1 and BZ2 by placing BZ1, BZ2 in the value column of Tag Setup for the tag <003BZ>

Question tags associated with 003 Glass Type Option Tags used by the above tags:

Question Tag	Definition	Used With Option Tags:
{006WINDOWGLASS}	Glass type by Window. Used when displaying glass type in text on image when ordered by window.	Glass type option tags. <003BZ>, <003CLR>, <003LE>, etc.

You may have multiple questions pertaining to glass type, so a comma separated list of option codes can be assigned to one question tag. For example, {006WINDOWGLASS} can be assigned to questions GLASS and WINGLASS by placing GLASS, WINGLASS in the value column of Tag Setup for the question tag {006WINDOWGLASS}. Then ObjectViewer will look for the existence of glass type options under both questions.

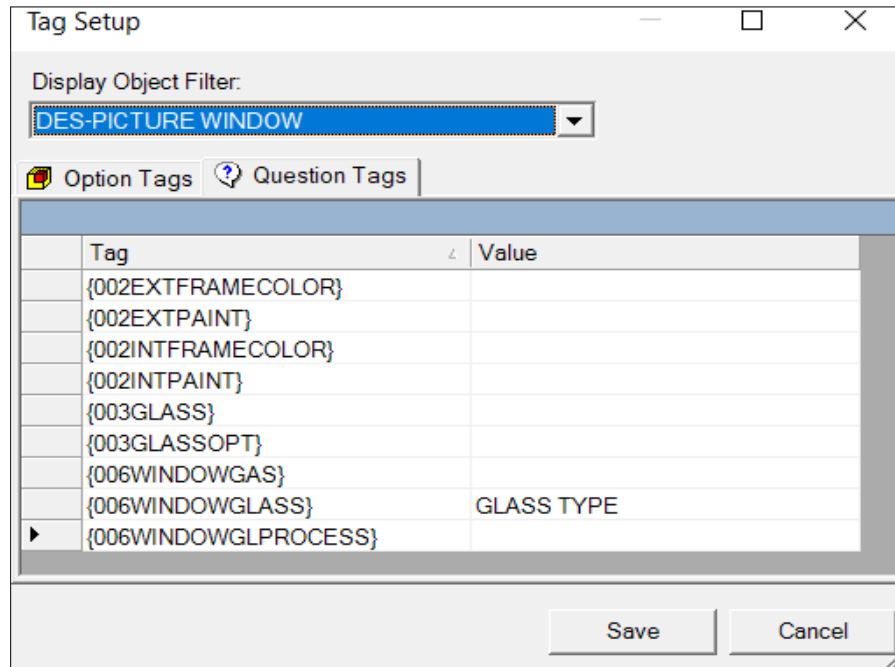
The picture window below has the glass types CLCL – CLEAR-CLEAR, BRCL-BRONZE-CLEAR, etc. under the GLASS TYPE question. These options and the GLASS TYPE question need to be associated to tags so that ObjectViewer knows what color in which to display the glass and what glass text to display. Notice the option code CLCL for the glass type highlighted is displayed in text on the image.



Let's set the glass options to the following tags in Tag Setup by entering the Tag Value below for each Option Tag listed:

Option	Option Tag	Tag Value	Display Color
CLCL – CLEAR/CLEAR	<003CLR>	CLCL	Blue
GYCL – GREY/CLEAR	<003GRY>	GYCL	Gray
BRCL – BRONZE/CLEAR	<003BZ>	BRCL	Bronze
CLOB – CLEAR/OBSCURE	<003OB>	CLOB	Light Blue
LOWE – LOW E	<003LE>	LOWE	Sea Green

We noted the glass text “CLCL” displayed in the picture window image earlier. Enabling the glass text requires configuration of the {006WINDOWGLASS} question tag. It must be associated with the GLASS TYPE question which the glass type options appear under in Options Wizard.



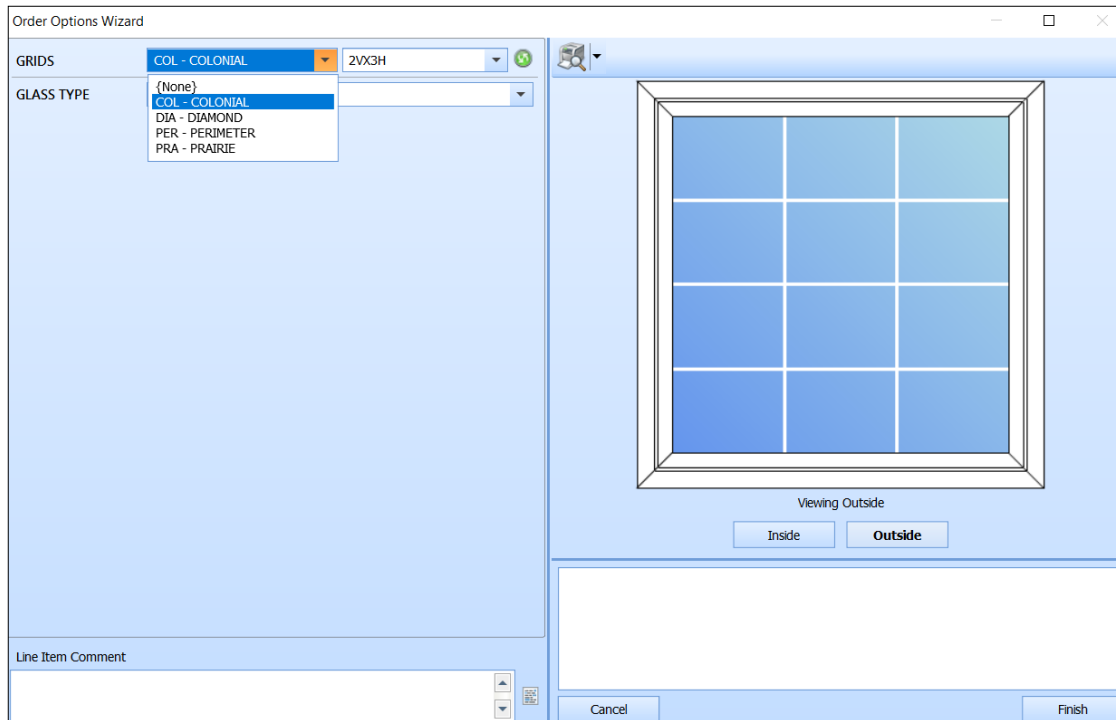
004 Grid Type

The Grid Type tags tell the ObjectViewer how to draw the grids. Possible grid types for the picture window are colonial, diamond, prairie, double prairie, perimeter, double perimeter, and ranch.

Option Tags	Definition
<004COL>	Colonial by window.
<004DIA>	Diamond by window.
<004DPER>	Double perimeter by window.
<004DPRA>	Double prairie by window.
<004PER>	Perimeter by window.
<004PERPATT>	Perimeter pattern. See Appendix B.
<004PRA>	Prairie by window.
<004RADBAR>	Radius crossbar by window. Option value contains edge offset. See Appendix B.
<004RAN>	Ranch by window.
<004RAND>	Distance from top of the window to the bottom horizontal bar of the ranch grids.
<005RISE>	The rise of the arc for the radius crossbar grid pattern. See Appendix B.

You may have multiple variations of each grid type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <004DIA > can be assigned to option codes DIA1 and DIA2 by placing DIA1, DIA2 in the value column of Tag Setup for the tag <004DIA>.

The picture window below has the grid types COL –COLONIAL GRIDS, PER- PERIMETER GRIDS, etc. under the GRIDS question. These options need to be associated to tags so that ObjectViewer knows what grid pattern to display.



Let's set the grid options to the following tags in Tag Setup by entering the Tag Value below for each Option Tag listed:

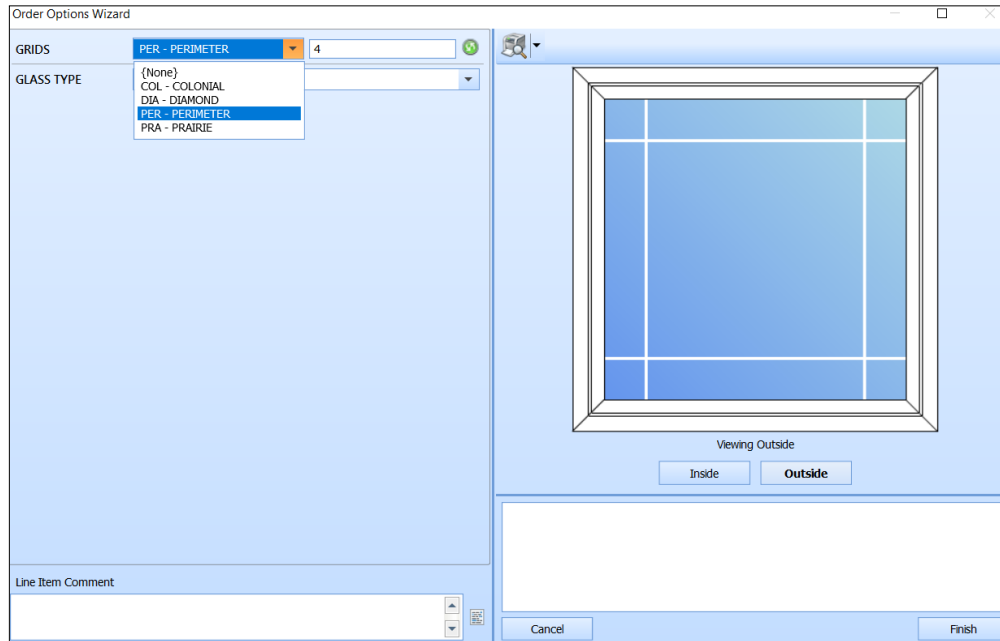
Option	Option Tag	Tag Value
COL- COLONIAL GRID	<003COL>	COL
DIA- DIAMOND GRIDS	<003DIA>	DIA
PER - PERIMETER	<003PER>	PER
PRA- PRAIRIE GRIDS	<003DPRA>	PRA

Note: if multiple options of the same grid exist, they can be associated by a comma delimited list assigned to the option tag.

For example- If we have three variations of the colonial grids (COL1,COL2,COL3) then the option tag <003COL> would COL1, COL2, COL3.

For grids to appear in the ObjectViewer, the grid pattern will need to be given in the correct format as an option value for the selected type of grids. All grid option values and necessary formats are explained in Appendix A. Colonial grids can accept grid patterns in the form of “_Vx_H” or “_Vx_HP” or “_Vx_HC” where the _ denotes an integer number, the ‘P’ denotes that the number of panes is specified, and the ‘C’ denotes that the number of components are specified. In the picture above, the colonial pattern was entered as “2Vx3H”.

If perimeter grids are chosen, the user needs to specify the edge offset in inches as the perimeter option value.



In addition, there are different perimeter patterns that can be used, the user can specify which perimeter pattern they desire. See Appendix B.

To relate the perimeter pattern to ObjectViewer, assign the <004PERPATT> tag to the option code for perimeter pattern. In the picture above, PERPAT is the name of the option code.

Option	Option Tag	Tag Value	Option Value
PERPAT–PERIMETER PATTERN	<004PERPATT>	PERPAT	Numerical value indicating the perimeter pattern. See Appendix B.

005 Grid Options

The grid option tags further control the visual representation of grids in ObjectViewer.

Option Tag	Definition
<005GOLD>	Changes the color of the grids to gold. This could be used to indicate brass grids.
<005BLUE>	Changes the color of the grids to blue. This could be used to indicate v-groove grids.

If the previous picture window grid example had also configured the following tags, the grid color would be affected. Without this configuration, the grids would appear in the same color as the window frame. The other grid options in the example (COL-COLONIAL GRIDS, PER - PERIMETER, etc.) will continue to appear in the same color as the window frame.

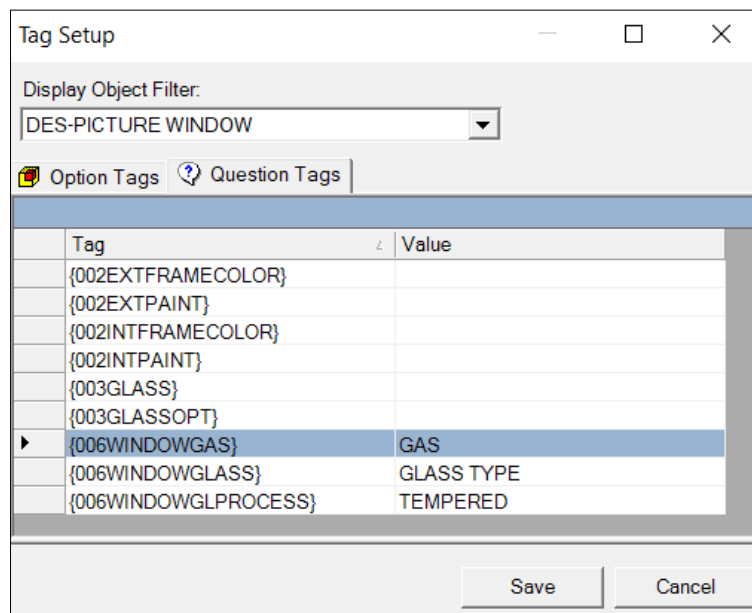
006 Glass Options

Text can be added to the IG portion of windows to display glass process (like tempering) and gas types.

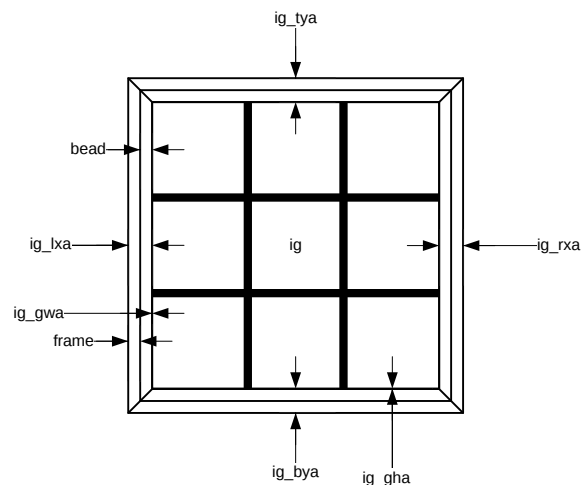
Question Tag	Definition	Used With Option Tags
{006WINDOWGLPROCESS}	Display the glass process option code (in text) associated with this question.	None
{006WINDOWGAS}	Display the gas option code (in text) associated with this question.	None

Tempered can be shown for an entire window by setting the {006WINDOWGLPROCESS} tag to the question under which the tempered option resides in your option structure (TEMPERED for example). When the temper option (named TM) is selected, "TM" will appear on each IG in the object. This works for all glass processes under the {006WINDOWGLPROCESS} question.

Argon gas can be shown for an entire window by setting the {006WINDOWGAS} tag to the question under which the argon gas option resides in your option structure (Gas for example). When the argon gas option (named ARG) is selected, "ARG" will appear on each IG in the object. This works for all gas options listed under the {006WINDOWGAS} question.



PICTURE WINDOW PARAMETERS



frame	The thickness of the frame.
bead	The thickness of the bead.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid

	patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

Parameter Setup

Display Object: DES-PICTURE WINDOW

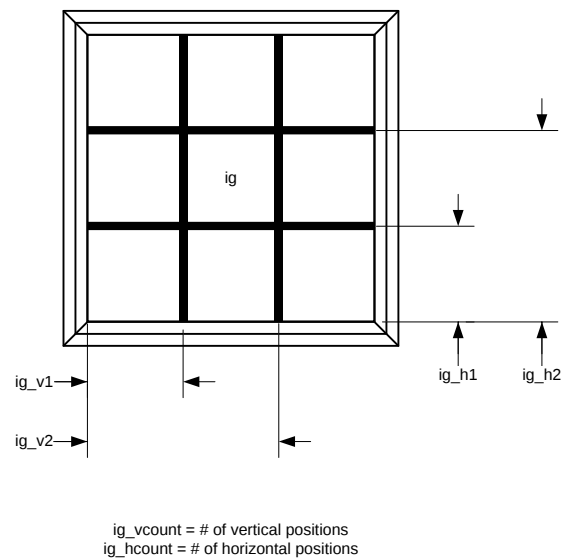
Ordered Part: <ALL PARTS>

Parameters:

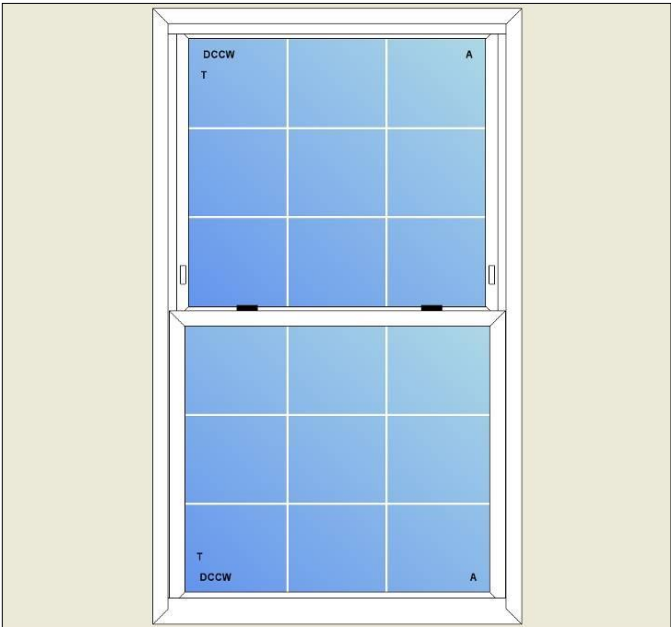
ObjectParams	
paramname	paramvalue
▶ bead	1.197
frame	1.5
ig_bya	3
ig_gha	1
ig_gwa	1
ig_lxa	3
ig_rxa	3
ig_tya	3
*	

OK

PICTURE WINDOW GRID LOCATIONS



DES-DOUBLE/SINGLE HUNG



NAME	SUPPORTED OPTIONS
DES-DOUBLE/SINGLE HUNG	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove

	• Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Window Options - Supports a custom Center Meeting Rail location. This is set with the <001CMRB> tag for setting the location in reference to the bottom of the frame or <001CMRT> for setting the location in reference to the top of the frame. Supports ORIEL and COTTAGE options. • Operation/Misc. - Supports Single or Double Locks.
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DOUBLE/SINGLE HUNG OPTION TAGS

The double/single hung window uses tags in the following categories:

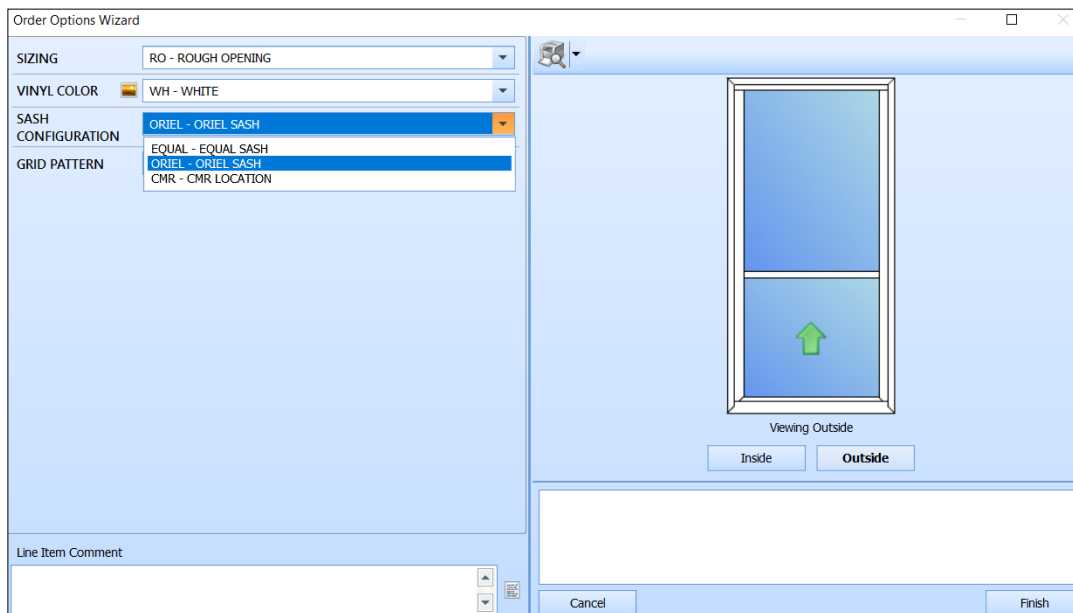
001 Window Options

The ObjectViewer uses this category to display the window options Oriel, Cottage, Custom Center Meeting Rail and rough opening.

Tag	Definition	Option Value
<001CMRB>	Center Meeting Rail Bottom offset adjustment.	Requires a numerical value that designates the number of inches from the middle of the center meeting rail to the bottom edge of the frame in multi-sash units.
<001CMRT>	Center Meeting Rail Top offset adjustment.	Requires a numerical value that designates the number of inches from the middle of the center meeting rail to the top edge of the frame in multi-sash units.
<001COTTAGE>	Adjusts the size of the keeper sash. As a default the keeper sash will be assigned 40% of the window height while the lock sash is assigned 60%.	Requires a numerical value that designates the percentage size of the keeper sash.
<001ORIEL>	Adjusts the size of the lock sash. As a default the lock sash will be assigned 40% of the window height while the keeper sash is assigned 60%.	Requires a numerical value that designates the percentage size of the lock sash.

<001RO>	Rough Opening sizing option code(s).	Does not apply. The rough opening deducts will be determined by the parameters ro_wa and ro_ha for the width and height respectively.
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The double/single hung window below has the Oriel option selected. It requires a user input value specifying the percentage size of the lock sash, which was entered as 35 (percent).



Notice the lock sash is smaller than the keeper sash in the image. This is because the ORIEL option was assigned to the tag <001ORIEL>. The ORIEL option tag makes the lock sash 40% of the overall height and the keeper sash 60% of the overall height.

Option	Option Tag	Tag Value
ORIEL – ORIEL	<001ORIEL>	ORIEL

002 Color

The color tags tell the ObjectViewer what color to use when drawing the frame, sashes, and grids (grid color can also be affected by tags in the 005 Grid Options category described later). These tags should be set to correspond with the color option codes you entered in CORE. White is the default drawing color, so no tag setup is required to draw the color white. The chart below shows the inside and outside view colors that will be drawn for each tag:

Tag	Inside Color	Inside Image Name*	Outside Color
<002TAN>	Tan	None	Tan
<002BRNZ>	Saddle brown	None	Saddle brown
<002LOWG>	Light oak wood grain	lightwgvrt, lightwghor	White

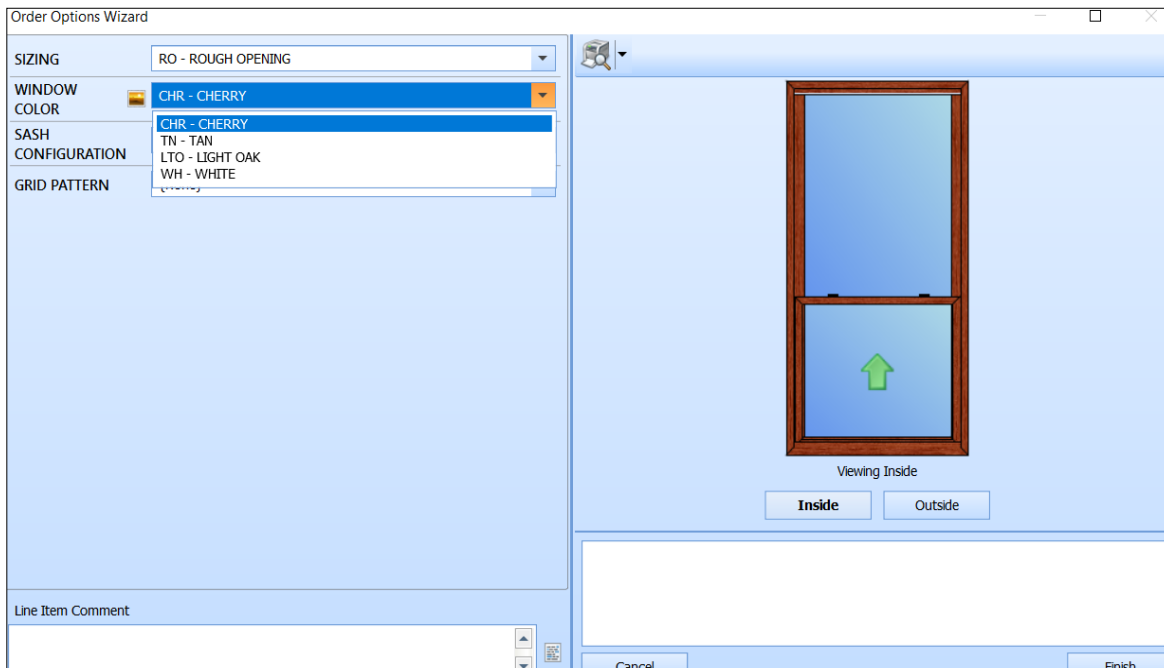
<002DOWG>	Dark oak wood grain	darkwgvert, darkwghor	White
<002CWG>	Cherry wood grain	cherrywgvert, cherrywghor	White
None (default)	White	None	White

*To get the wood grain appearance for window frames in the base display objects, an image is used when specifying the color instead of a system color name (like white). The name of the images used for the wood grain colors are listed in the Inside Image Name column. You can change these images to get a different appearance. See the [Configuring Display Object Images](#) section for more details about loading and using images in ObjectViewer.

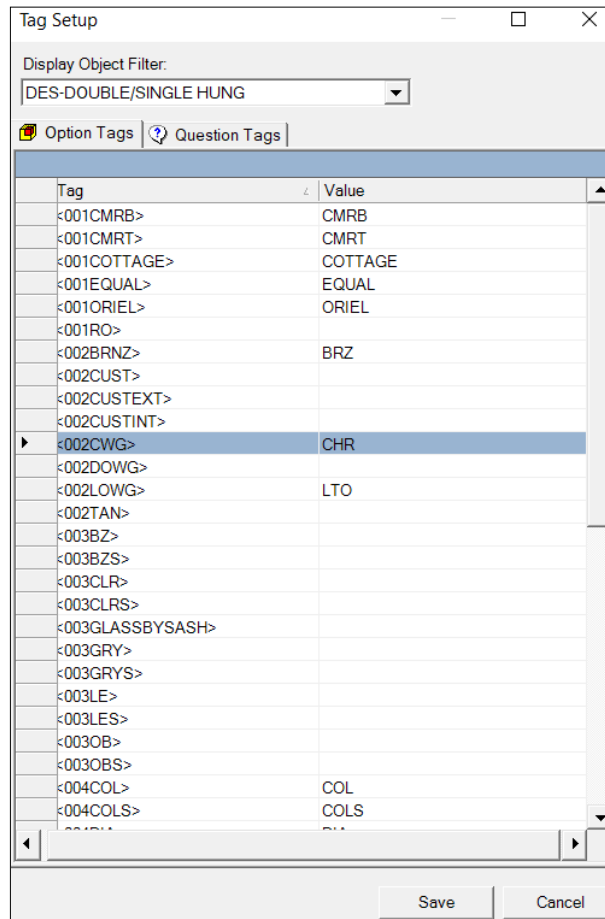
The user also has the ability to override the above colors with a custom color. The custom color must be a valid system color, such as chocolate, silver, royal blue. The custom color can affect both the interior and exterior (<002CUST>) or just one view.

Tag	Option Value	Inside Color	Outside Color
<002CUST>	Valid system color.	System color entered.	System color entered.
<002CUSTEXT>	Valid system color.	No change.	System color entered.
<002CUSTINT>	Valid system color.	System color entered.	No change.

The double/single hung window below has the color options cherry, light oak, tan and white. White does not have to be associated with a tag since it is the default color drawn. However, cherry, tan and light oak need to be associated in Tag Setup.



Since the option code for cherry was entered as CHR in Option Code Setup, then the value CHR needs to be assigned to the Tag <002CWG> in Tag Setup as shown below. Now the ObjectViewer knows to draw the cherry wood grain color when the option code CHY is selected during Options Wizard. Tag <002TAN> is assigned to option code TN for tan and tag <002LOWG> is assigned to option code LTO for light oak.



003 Glass Type

The glass tags tell the ObjectViewer what color to draw the glass in and what glass text to display. More specifically, the glass option and question tags drive the color while the glass question tags also drive the text. Possible glass types are bronze, clear, low-e, obscure, and gray. If none of the tags are setup, the default glass color is blue.

Option Tag	Definition	Display Color
<003BZ>	Bronze by window.	Bronze
<003BZS>	Bronze by sash.	Bronze
<003CLR>	Clear by window.	Blue
<003CLRS>	Clear by sash.	Blue
<003LE>	Low-E by window.	Sea Green
<003LES>	Low-E by sash.	Sea Green

<003OB>	Obscure by window.	Light Blue
<003OBS>	Obscure by sash.	Light Blue
<003GRY>	Gray by window.	Gray
<003GRYS>	Gray by sash.	Gray

You may have multiple variations of each glass type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <003BZ> can be assigned to option codes BZ1 and BZ2 by placing BZ1, BZ2 in the value column of Tag Setup for the tag <003BZ>

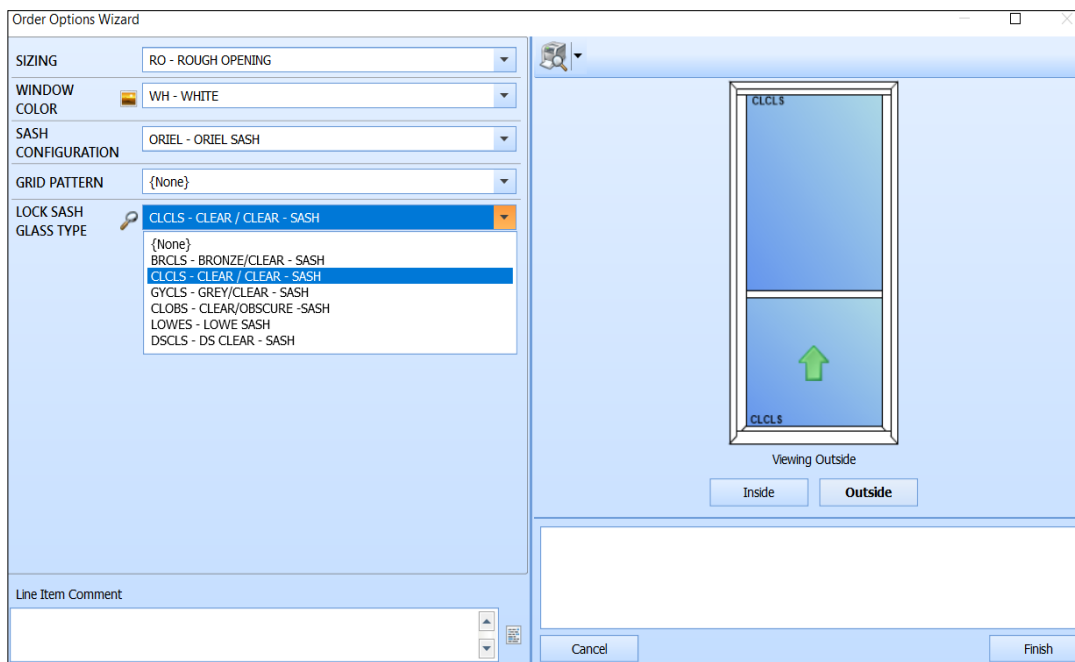
Glass may be ordered by window or by sash. Tags with an 'S' suffix are tags relating to order by sash. For example, <003BZS> relates to bronze glass options ordered by sash. These must be used with the individual sash glass question codes.

Question tags associated with 003 Glass Type Option Tags used by the above tags:

Question Tag	Definition	Used With Option Tags
{006WINDOWGLASS}	Glass by Window Used when displaying glass type in text on image when ordered by window.	<003BZ>, <003CLR>, <003LE>, etc.
{003KSGGLASS}	Keeper Sash Glass Type Also used when displaying keeper sash glass type in text on image.	<003BZS>, <003CLRS>, <003LES>, etc.
{003LSGLASS}	Lock Sash Glass Type Also used when displaying lock sash glass type in text on image.	<003BZS>, <003CLRS>, <003LES>, etc.

You may have multiple questions pertaining to glass type, so a comma separated list of option codes can be assigned to one question tag. For example, {006WINDOWGLASS} can be assigned to questions GLASS and WINGLASS by placing GLASS, WINGLASS in the value column of Tag Setup for the question tag {006WINDOWGLASS}. Then ObjectViewer will look for the existence of glass type options under both questions.

The picture window section described how to configure tags to order glass options by window. This next example shows how to setup glass options by sash. The double/single hung window below has the glass types CLCLS – CLEAR-SASH, GYCL – GREYCLEAR - SASH, etc. under the Lock Glass Type question. These options and the Lock Glass Type question need to be associated to tags so that ObjectViewer knows what color in which to display the glass and what glass text to display. Notice the option code DO1S for the glass type hi-lighted is displayed in text on the image.



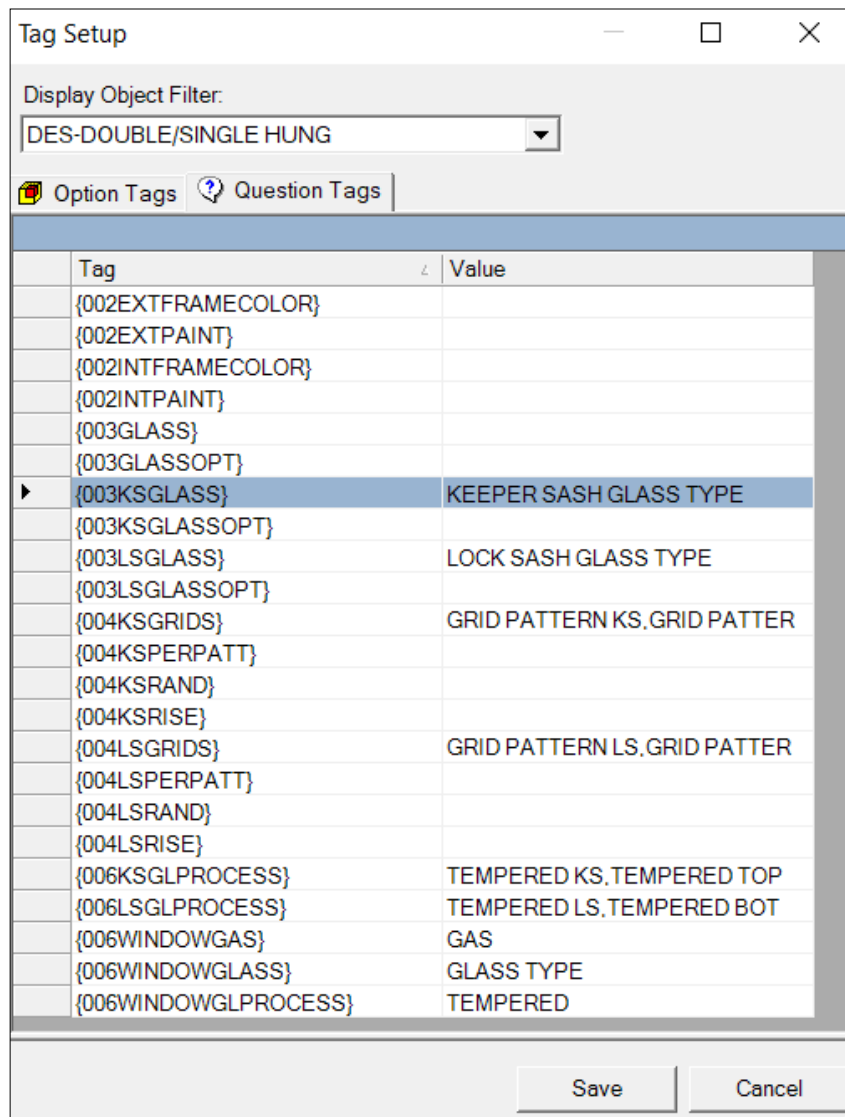
Let's set the glass options to the following tags in Tag Setup by entering the Tag Value below for each Option Tag listed:

Option	Option Tag	Tag Value, Display Text	Display Color
CLCLS – CLEAR-CLEAR– SASH DSCLS- DS CLEAR - SASH	<003CLRS>	CLCLS, DSCL	Blue
GYCLS–GREY/CLEAR-SASH	<003GRYS>	GYCLS	Gray
BRCLS-BRONZE/CLEAR– SASH	<003BZS>	BRCLS	Bronze
CLOBS-CLEAR/OBSCURE -SASH	<003OBS>	CLOBS	Light Blue
LOWES – LOW E - SASH	<003LES>	LOWES	Sea Green

Notice multiple clear window options exist and they were associated with the <003CLRS> tag which is displayed in blue color. The only gray window option was associated with the <003GRYS> tag, which is displayed in gray color, and so on for the remaining options. Generating the correct glass color also requires setting up the following question tags for each sash:

Options	Question Tag	Question Tag Value
CLCLS, DSCLS, GYCLS, BRCLS, CLOBS, LOWES	{003KSGGLASS}	Keeper Sash Glass Type
CLCLS, DSCLS, GYCLS, BRCLS, CLOBS, LOWES	{003LSGLASS}	Lock Sash Glass Type

We noted the glass text “CLCLS” displayed in the double/single hung window image earlier. Enabling the glass text by sash requires configuration of the {003KSGGLASS} and {003LSGLASS} question tags. They must be associated with the Keeper Sash Glass Type and Lock Sash Glass Type questions, respectively, which the glass type options appear under in Options Wizard.



004 Grid Type

The Grid Type tags tell the ObjectViewer how to draw the grids. Possible grid types for the double/single hung window are colonial, diamond, prairie, double prairie, perimeter, double perimeter, and ranch.

Option Tags	Definition
<004COL>	Colonial by window.
<004COLS>	Colonial by sash.
<004DIA>	Diamond by window.
<004DIAS>	Diamond by sash.
<004DPER>	Double perimeter by window.
<004DPERS>	Double perimeter by sash.
<004DPRA>	Double prairie by window.
<004DPRAS>	Double prairie by sash.

<004PER>	Perimeter by window.
<004PERS>	Perimeter by sash.
<004PERPATT>	Perimeter pattern. See Appendix B.
<004PRA>	Prairie by window.
<004PRAS>	Prairie by sash.
<004RADBAR>	Radius crossbar by window. Option value contains edge offset. See Appendix B.
<004RADBARS>	Radius crossbar by sash. Option value contains edge offset. See Appendix B.
<004RAN>	Ranch by window.
<004RANS>	Ranch by sash.
<004RAND>	Distance from top of the window to the bottom horizontal bar of the ranch grids.
<005RISE>	The rise of the arc for the radius crossbar grid pattern. See Appendix B.

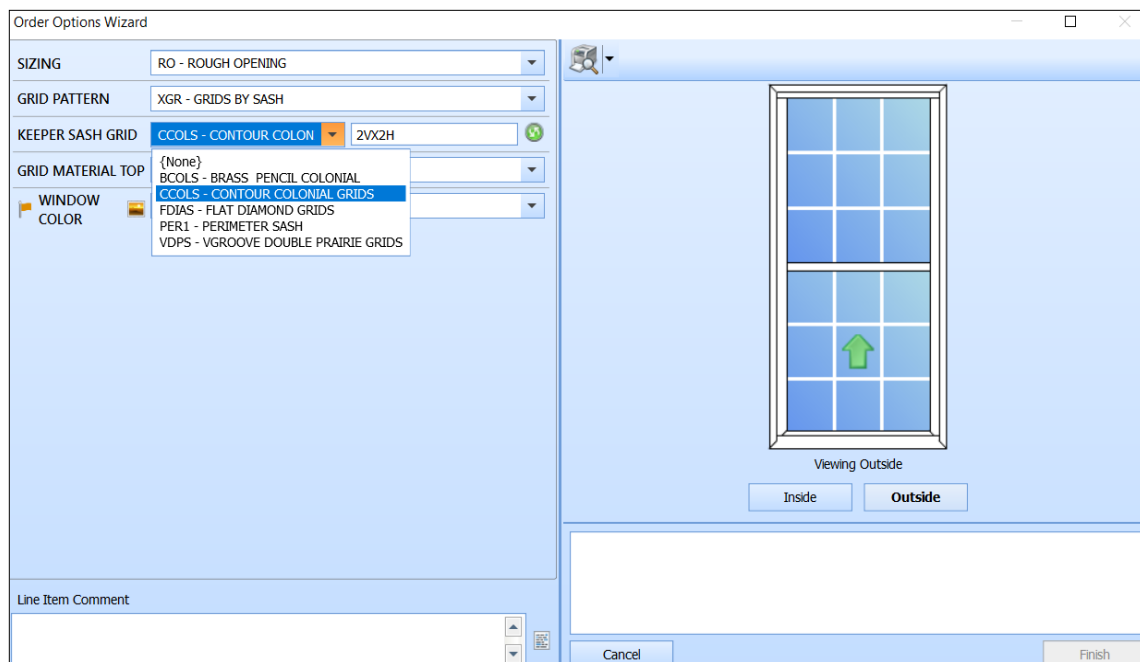
You may have multiple variations of each grid type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <004DIA > can be assigned to option codes DIA1 and DIA2 by placing DIA1, DIA2 in the value column of Tag Setup for the tag <004DIA>.

Grids may be ordered by window or by sash. Tags with an 'S' suffix are tags relating to order by sash. For example, <004DIAS> relates to diamond grid options ordered by sash. These must be used with the individual sash grid question codes.

Question tags associated with 004 Grid Type Option Tags used by the above tags:

Question Tag	Definition	Used With Option Tags
{004KSGRIDS}	Keeper Sash Grid	<004COLS>,<004DIAS>,<004DPERS>, etc.
{004LSGRIDS}	Lock Sash Grid	
{004KSPERPATT}	Keeper Sash Perimeter Pattern	<004PERPATT>
{004LSPERPATT}	Lock Sash Perimeter Pattern	

The picture window section described how to configure tags to order grids by window. This next example shows how to configure tags to order grids by sash. The double/single hung window below has the grid types BCOLS – BRASS PENCIL COLONIAL GRIDS - SASH, CCOLS – CONTOUR COLONIAL GRIDS - SASH, etc. under the KEEPER SASH GRID question. These options need to be associated to tags so that ObjectViewer knows what grid pattern to display.



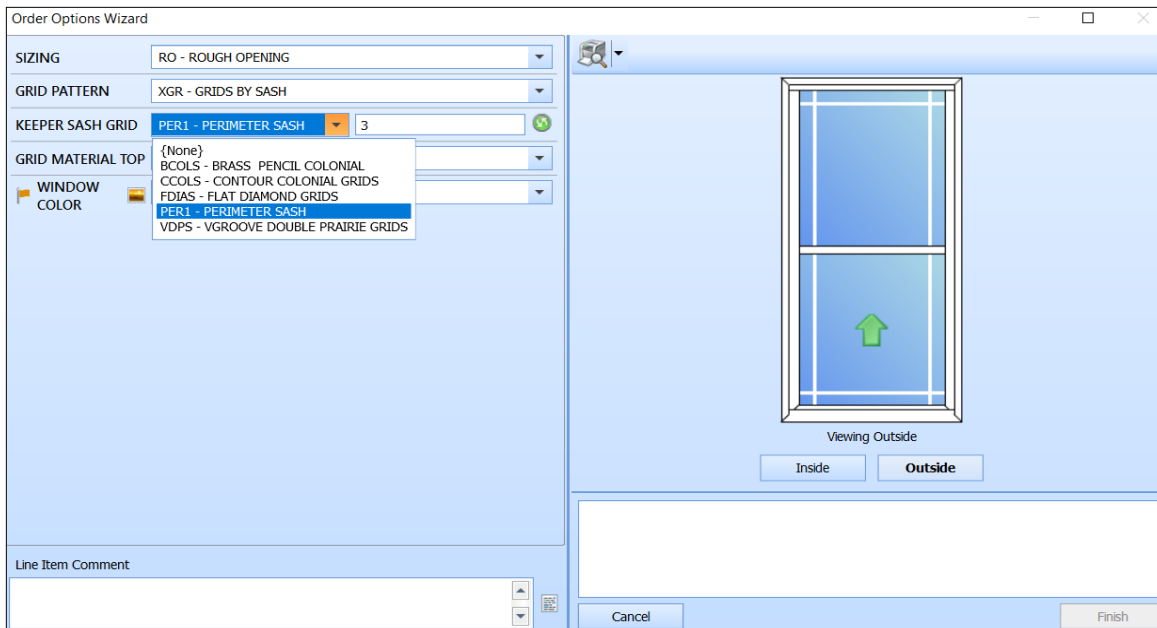
Let's set the grid options to the following tags in Tag Setup by entering the Tag Value below for each Option Tag listed:

Option	Option Tag	Tag Value
BCOLS – BRASS PENCIL COLONIAL GRIDS – SASH and CCOLS – CONTOUR COLONIAL GRIDS - SASH	<003COLS>	BCOLS, CCOLS
FDIAS – FLAT DIAMOND GRIDS - SASH	<003DIAS>	FDIAS
PER1 – PERIMETER SASH	<003PERS>	PER1
VDPS – VGROOVE DOUBLE PRAIRIE GRIDS - SASH	<003DPRA1S>	VDPS

Notice multiple colonial grid options exist and they were associated with the <003COLS> tag. The only diamond grid option was associated with <003DIAS> and so on for the remaining options.

For grids to appear in the ObjectViewer, the grid pattern will need to be given in the correct format as an option value for the selected type of grids. All grid option values and necessary formats are explained in Appendix A. Colonial grids can accept grid patterns in the form of “_Vx_HP” or “_Vx_HC” where the _ denotes an integer number, the ‘P’ denotes that the number of panes is specified, and the ‘C’ denotes that the number of components are specified. In the picture above, the colonial pattern was entered as “2Vx2H” which is equivalent to “2Vx2HC” .

If perimeter grids are chosen, the user needs to specify the edge offset in inches as the perimeter option value. In the example below, a value of 3 was entered.



To relate a different perimeter pattern to ObjectViewer, assign the <004PERPATT> and tag to the option code for perimeter pattern.

Option	Option Tag	Tag Value	Option Value
PERPAT-PERIMETER PATTERN	<004PERPATT>	PERPAT	Numerical value indicating the perimeter pattern. See Appendix B.

In addition, the keeper and sash perimeter pattern question tags must be configured to match the pattern questions in Options Wizard.

Option	Question Tag	Question Tag Value
PERPAT	{004KSPERPATT}	KEEPER SASH GRID
PERPAT	{004LSPERPATT}	LOCK SASH GRID

005 Grid Options

The grid option tags further control the visual representation of grids in ObjectViewer.

Option Tag	Definition
<005GOLD>	Changes the color of the grids to gold. Ordered by window. This could be used to indicate brass grids.
<005GOLDS>	Changes the color of the grids to gold. Ordered by sash. This could be used to indicate brass grids.
<005BLUE>	Changes the color of the grids to blue. Ordered by window. This could be used to indicate v-groove grids.
<005BLUES>	Changes the color of the grids to blue. Ordered by window. This could be used to indicate v-groove grids.

Question tags associated with 005 Grid Option Tags used by the above tags:

Question Tag	Definition	Used With Option Tags
{004KSGRIDS}	Keeper Sash Grid	<005BLUES>, <005GOLDS>
{004LSGRIDS}	Lock Sash Grid	<005BLUES>, <005GOLDS>

If the previous double/single hung window grid example had also configured the following tags, the grid color would be affected. Without this configuration, the grids would appear in the same color as the window frame. The other grid options in the example (CCOLS – CONTOUR COLONIAL GRIDS - SASH, FDIAS – FLAT DIAMOND GRIDS - SASH, and PER1 – PERIMETER SASH) will continue to appear in the same color as the window frame.

Option	Option Tag	Tag Value	Color
BCOLS – BRASS PENCIL COLONIAL GRIDS	<005GOLD1S>	BCOLS	Gold
VDPS – VGROOVE DOUBLE PRAIRIE GRIDS	<005BLUE1S>	VDPS	Blue

Option	Question Tag	Question Tag Value
BCOLS, VDPS	{004KSGRIDS}	KEEPER SASH GRID
BCOLS, VDPS	{004LSGRIDS}	LOCK SASH GRID

006 Glass Options

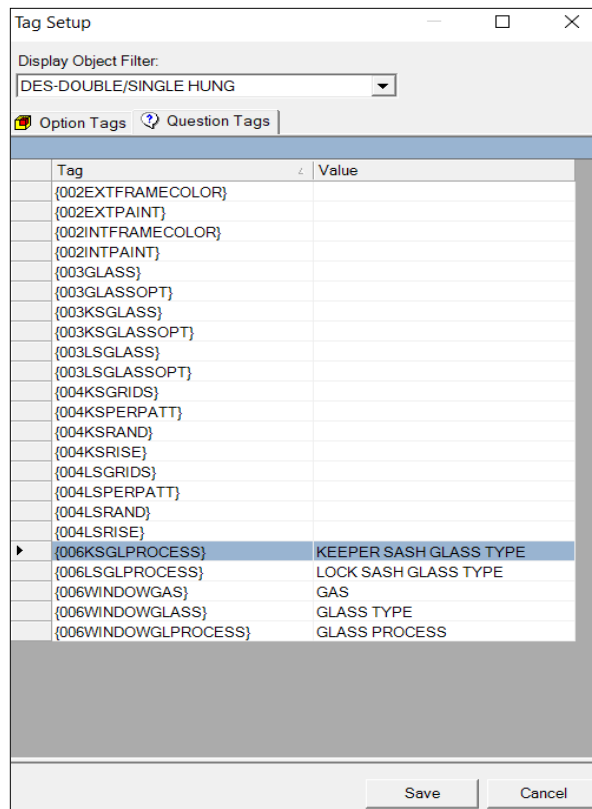
Text can be added to the IG portion of windows to display glass process (like tempering) and gas types.

Question Tag	Definition	Used With Option Tags
{006WINDOWGLPROCESS}	Display the glass process option code (in text) associated with this question. Ordered by window.	None
{006KSGLPROCESS}	Display the glass process option code (in text) associated with this question. Ordered by sash.	None
{006LSGLPROCESS}	Display the glass process option code (in text) associated with this question. Ordered by sash.	None
{006WINDOWGAS}	Display the gas option code (in text) associated with this question. Ordered by window.	None

Argon gas can be shown for an entire window by setting the {006WINDOWGAS} tag to the question under which the argon gas option resides in your option structure (GAS for example). When the argon gas option (named ARG) is selected, “ARG” will appear on each IG in the object. This works for all gas options listed under the {006WINDOWGAS} question.

Tempered can be shown for an entire window by setting the {006WINDOWGLPROCESS} tag to the question under which the tempered option resides in your option structure (GLASS PROCESS for example). When the tempered option (named TM) is selected, “TM” will appear on each IG in the object. This works for all glass processes under the {006WINDOWGLPROCESS} question.

Tempered can be shown for the keeper sash by setting the {006KSGLPROCESS} tag to the question under which the keeper temper option resides in your option structure (Keeper Sash Glass Type for example). Temper can be shown for the lock sash by setting the {006LSGLPROCESS} tag to the question under which the lock temper option resides in your option structure (Lock Sash Glass Type for example). When the tempered option (named TM) is selected, “TM” will appear on the IG in the object. This works for all glass processes under the {006KSGLPROCESS} and {006LSGLPROCESS} questions.

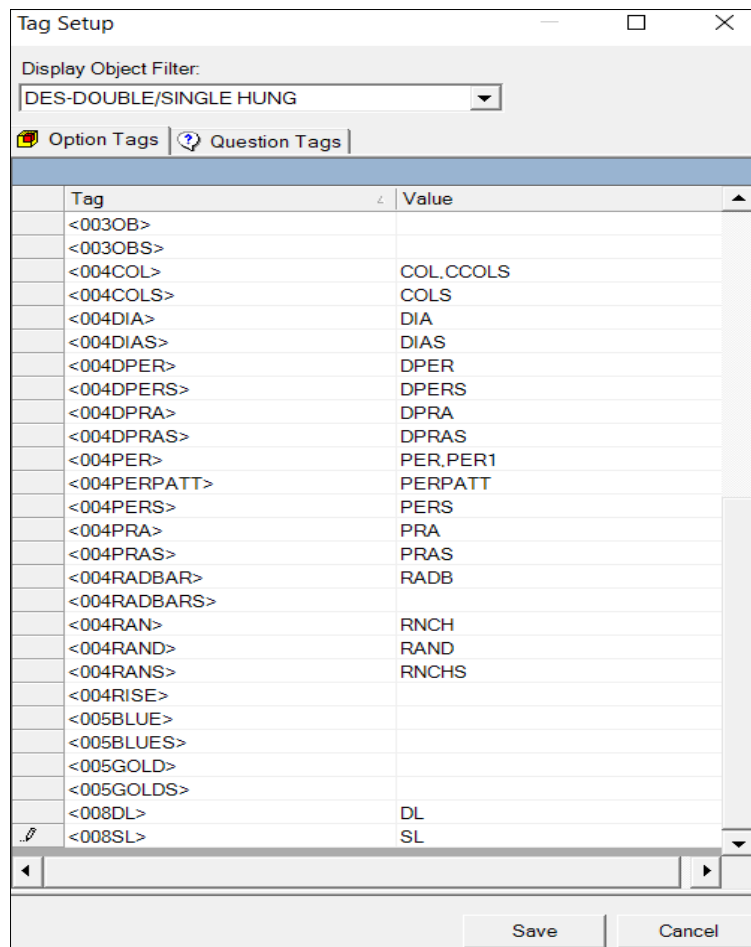


008 Operation/Miscellaneous

Drawing of single versus double locks is controlled by the <008DL> and <008SL> tags along with the dlock_w parameter.

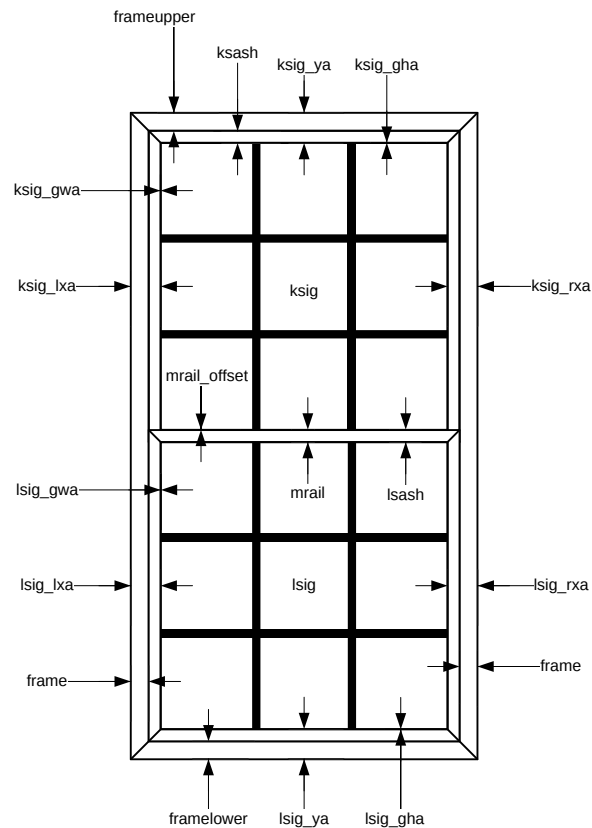
Option Tag	Definition
<008DL>	Implements Double Locks when 1) the window width is greater than the dlock_w parameter and <008SL> is not selected or 2) <008DL> is selected.
<008SL>	Display single locks when 1) the window width is less than or equal to the dlock_w parameter and <008DL> is not selected or 2) <008SL> is selected.

Assign the lock tags to your single and double lock option codes.



When the <008DL> and <008SL> tags are not configured, the display of single or double locks will be controlled by the dlock_w parameter. When the window width is greater than the dlock_w parameter value, double locks are drawn in the image. Otherwise a single lock is displayed. <008DL> and <008SL> tags take precedence over this parameter.

DOUBLE/SINGLE HUNG PARAMETERS

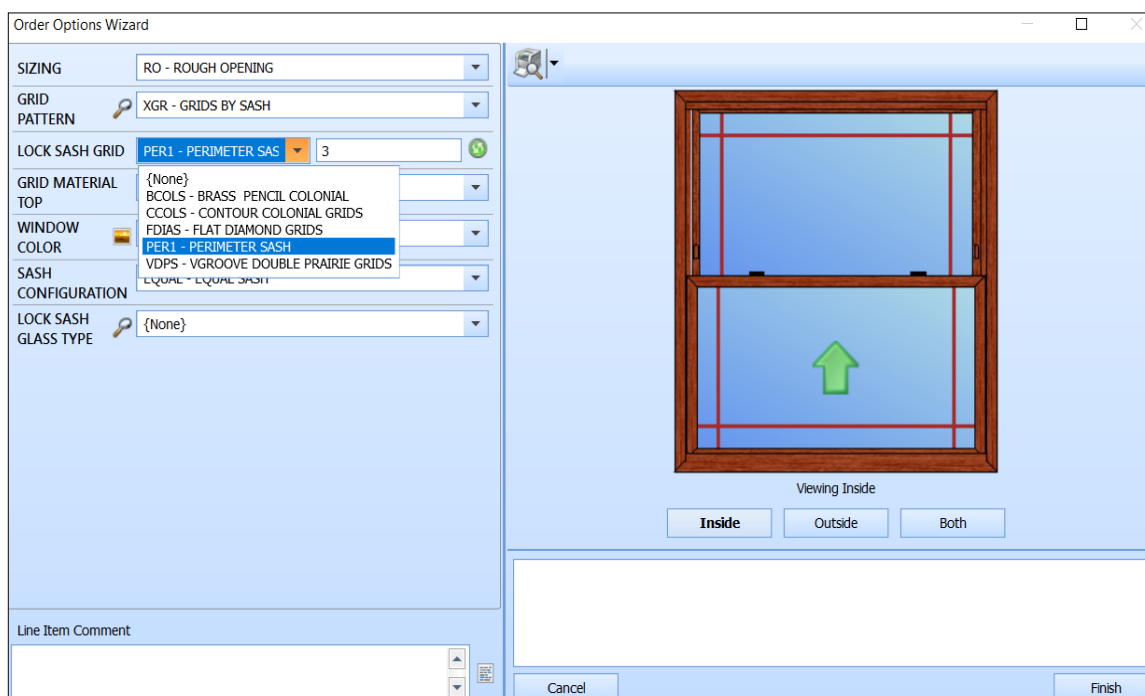


frame	The thickness of the frame.
frameupper	The thickness of the frame header.
framelower	The thickness of the frame sill.
mrail	The visible thickness of the meeting rail between two sashes.
mrail_offset	On a unit with multiple sashes, the meeting rail might not be in the exact center of the unit. Enter a plus or minus value to move the meeting rail in one direction or the other. A positive number moves the meeting rail down while a negative number moves the meeting rail up.
mrail_snapOffset	Allows adjustment to the custom snap point at the meeting rail. The custom snap point is used during grid alignment, to indicate the location where a neighboring window should align a grid bar at the meeting rail. A positive value moves the snap point down from the top of the window, while a negative value does the reverse.

mrail_snapType	The custom snap point is used during grid alignment, to indicate the location where a neighboring window should align a grid bar at the meeting rail. When mrail_snapType is set to 0, the snap point occurs at the top of the meeting rail PLUS half of the ksash parameter. When mrail_snapType is set to 1, the snap point occurs at the top of the meeting rail PLUS half of the mrail parameter. In most cases, mrail_snapType should be set to 1.
dlock_w	The maximum window width for displaying a single lock. When the window width is greater than this parameter number, double locks are drawn in the image. <008DL> and <008SL> tags override this parameter.
ksash	The thickness of the keeper sash.
lsash	The thickness of the lock sash.
ksig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass on the keeper sash.
lsig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass on the lock sash.
ksig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass on the keeper sash.
lsig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass on the lock sash.
ksig_ya	The distance between the top outer edge of the frame to the top edge visible glass.
lsig_ya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ksig_gwa	*Grid width adjustment value for the keeper IG. ½ of this value applied to each side.
lsig_gwa	*Grid width adjustment value for the lock IG. ½ of this value applied to each side.
ksig_gha	*Grid height adjustment value for the keeper IG. ½ of this value applied to the top and ½ to the bottom.
lsig_gha	*Grid height adjustment value for the lock IG. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
arrowDisplay	Controls display of sash movement arrow indicator. Set to 1 to show the bottom sash movement (single hung). Set to 2 to show both top and bottom sash movement (double hung). Set to 0 to turn off the sash movement indicator.

arrowSize	Controls the size of the sash movement arrow indicator. A typical value is 7. Set to 0 to turn off the sash movement indicator.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the keeper sash IG is smaller than the lock IG for your double/single hung window object, you may want to adjust the grid placement, so the vertical bars line up. Notice this is the situation we have below, and the vertical bars do not line up.



If you look at the parameters for this double/single hung object, you can see that the keeper left and right IG edge distances (ksig_lxa and ksig_rxa) are greater than those for the lock IG (lsig_lxa and lsig_rxa). So, the visible keeper IG is smaller than the visible lock IG.

Parameter Setup

Display Object:
DES-DOUBLE/SINGLE HUNG

Ordered Part:
TEST-SH

Parameters:

ObjectPartParams	
paramname	paramvalue
frame	1.5
framelower	2.5
frameupper	2.5
gls_clr_lut	
gls_opt_clr_lut	
grid_pattFormat	
grid_prairieDist	
grid_prairieOffset	
grid_ranchDist	
ksash	1.1338
ksig_gha	0
ksig_gwa	0
ksig_lxa	3.5
ksig_rxa	3.5
ksig_ya	2.9438
lsash	1.5
lsig_gha	0
lsig_gwa	0
lsig_lxa	3.106
lsig_rxa	3.106
lsig_ya	3.106

OK

The keeper grid width adjustment (ksig_gwa) is currently set to 0. This needs to be changed to .788 (the difference in the keeper and lock visible size) so ObjectViewer will line up the vertical bars.

Parameter Setup

Display Object:

DES-DOUBLE/SINGLE HUNG

Ordered Part:

TEST-SH

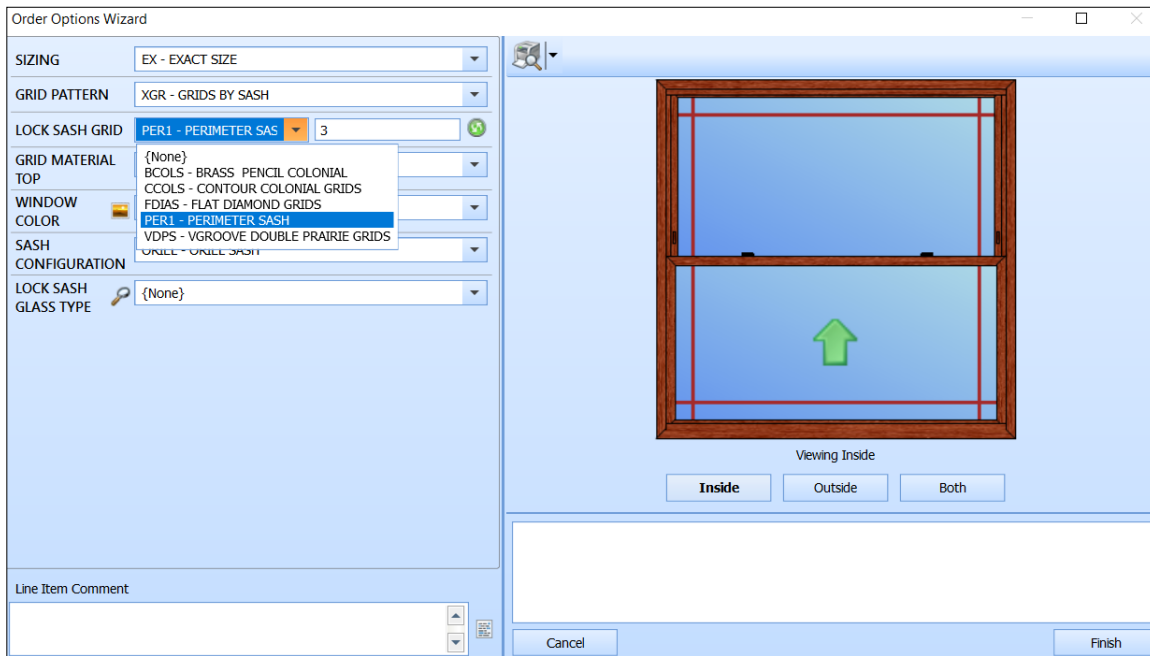
Parameters:

ObjectPartParams

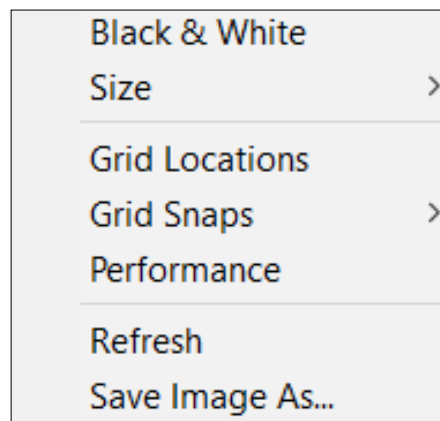
paramname	paramvalue
frame	1.5
framelower	2.5
frameupper	2.5
gls_clr_lut	
glsopt_clr_lut	
grid_pattFormat	
grid_prairieDist	
grid_prairieOffset	
grid_ranchDist	
ksash	1.1338
ksig_gha	0
ksig_gwa	.788
ksig_lxa	3.5
ksig_rxa	3.5
ksig_ya	2.9438
lsash	1.5
lsig_gha	0
lsig_gwa	0
lsig_lxa	3.106
lsig_rxa	3.106
lsig_ya	3.106

OK

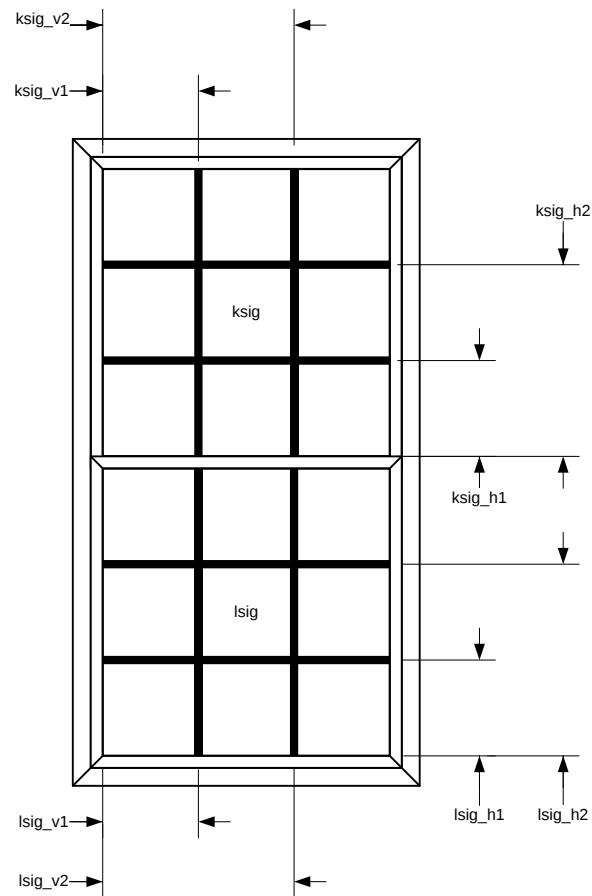
The ObjectViewer applies half the grid width adjustment to each side of the keeper IG. So, ObjectViewer subtracts $\frac{1}{2}$ of the ksig_gwa (.394) from the perimeter edge offset on the keeper IG to draw the left vertical bar, and again for the right vertical bar. This makes the left and right outer panes smaller on the keeper sash so the vertical bars line up. (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)



Another solution would have been to add a value of $-.788$ into `lsig_gwa` instead of entering a nonzero value into `ksig_gwa`. Then ObjectViewer subtracts $-.394$ from the perimeter edge offset of 3 ($3 - (-.394)$) on the keeper sash to draw the left vertical bar, and again for the right vertical bar. This actually adds $.394$ to the outer panes on the lock sash so the vertical bars line up. You can see the difference in the keeper and lock IG grid locations in the Grid Locations dialog. The `lsig_v1` value is $.394$ greater than the perimeter edge offset of 3. As shown below, the grid locations can be found by right clicking on the display object and selecting "Grid Locations".

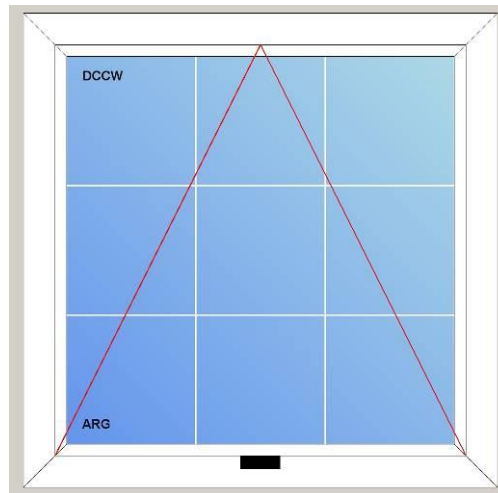


DOUBLE/SINGLE HUNG GRID LOCATIONS



ksig_vcount = # of vertical positions
 ksig_hcount = # of horizontal positions
 lsig_vcount = # of vertical positions
 lsig_hcount = # of horizontal positions

DES-AWNING



NAME	SUPPORTED OPTIONS
DES-AWNING	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc.– operation

AWNING OPTION TAGS

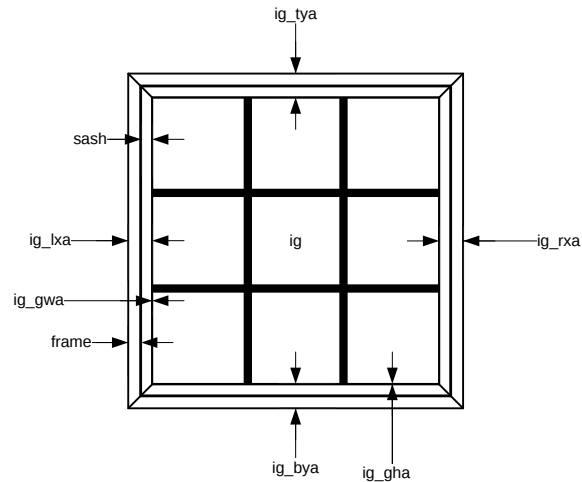
The awning window uses the same tags as the picture window (see the [picture window](#) section for details and configuration examples) except it also has a tag to control operation.

008 Operation/Miscellaneous

The awning also has the ability to change the operation. By default, the hinge is on the top so the window opens from the bottom as shown in the picture at the beginning of this section. Use the <008INVOP> tag to draw the window opening from the top.

Option Tags	Definition	Option Value
<008INVOP>	Window opens from the top (opening from the bottom is default).	N/A

AWNING PARAMETERS

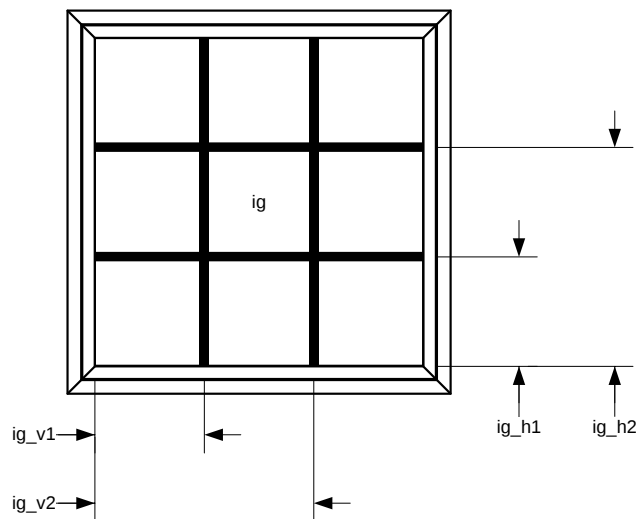


frame	The thickness of the frame.
sash	The thickness of the sash.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The

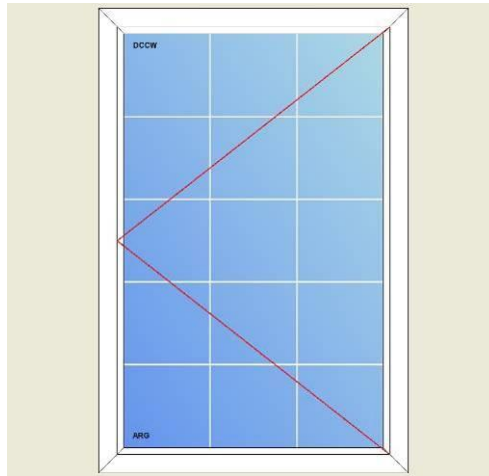
ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

AWNING GRID LOCATIONS



ig_vcount = # of vertical positions
ig_hcount = # of horizontal positions

DES-CASEMENT



NAME	SUPPORTED OPTIONS
DES-CASEMENT	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. - hinge location

CASEMENT OPTION TAGS

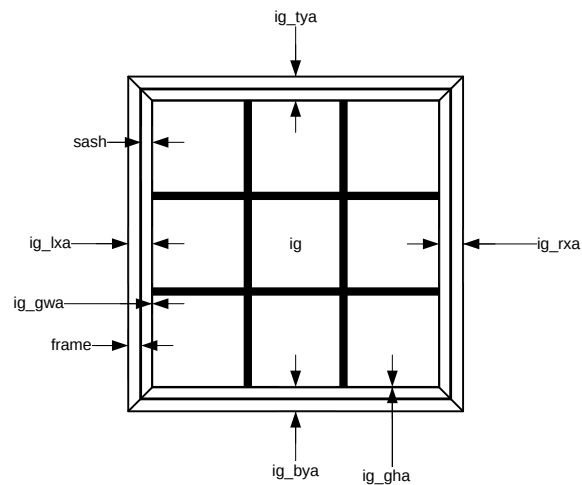
The casement window uses the same tags as the picture window (see the [picture window](#) section for details and configuration examples) except it also has a tag to control hinge location.

008 Operation/Miscellaneous

The casement has the ability to change the location of the hinge. By default, the hinge is on the left as shown in the picture at the beginning of this section (based on inside view). Use the <008HR> tag to draw the hinge on the right (relative to your default view).

Option Tags	Definition	Option Value
<008HR>	Hinge location on the right, relative to your default view.	N/A

CASEMENT PARAMETERS

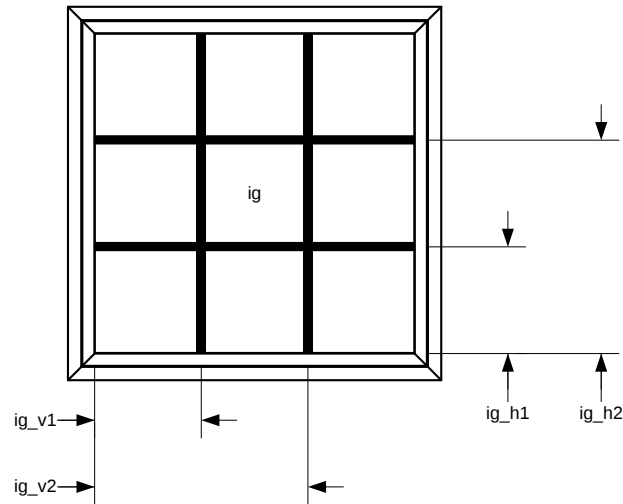


frame	The thickness of the frame.
sash	The thickness of the sash.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The

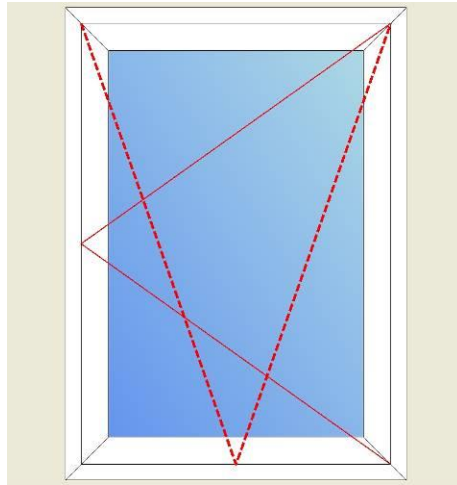
ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

CASEMENT GRID LOCATIONS



ig_vcount = # of vertical positions
ig_hcount = # of horizontal positions

DES-TILT AND TURN



NAME	SUPPORTED OPTIONS
DES-TILT AND TURN	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – hinge location

TILT AND TURN OPTION TAGS

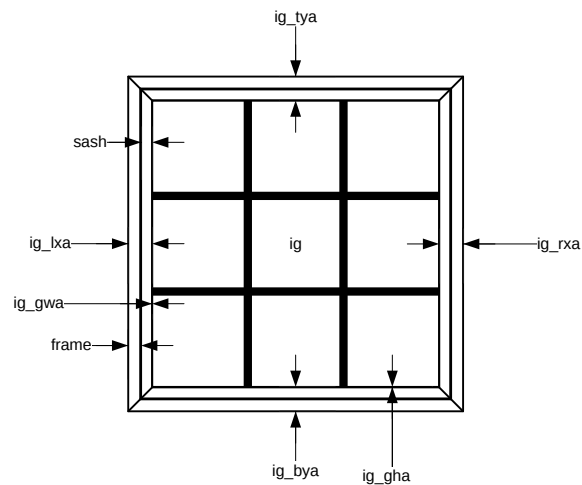
The tilt and turn window uses the same tags as the picture window (see the [picture window](#) section for details and configuration examples) except it also has a tag to control hinge location.

008 Operation/Miscellaneous

The tilt and turn has the ability to change the location of the hinge. By default, the hinge is on the left as shown in the picture at the beginning of this section. Use the <008HR> tag to draw the hinge on the right (relative to your default view).

Option Tags	Definition	Option Value
<008HR>	Hinge location on the right, relative to your default view.	N/A

TILT AND TURN PARAMETERS

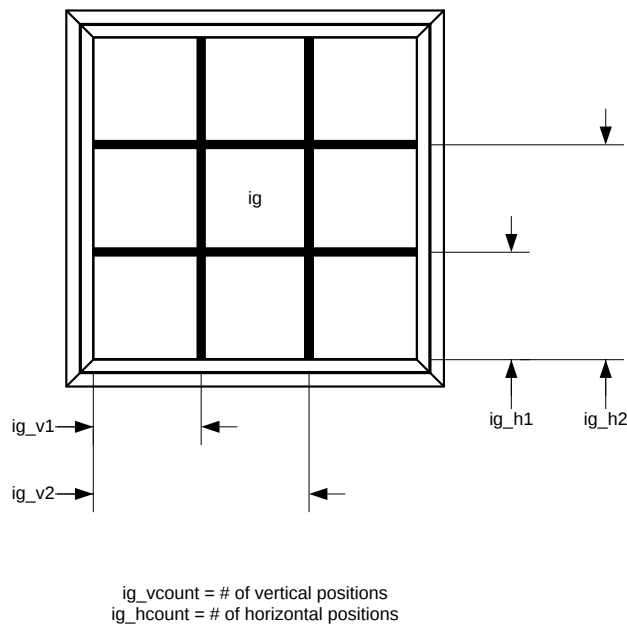


frame	The thickness of the frame.
sash	The thickness of the sash.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

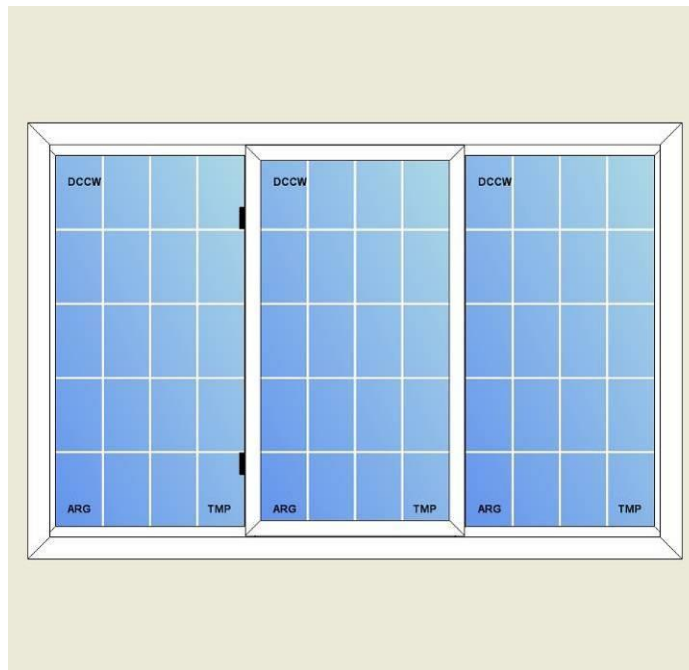
**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The

ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

TILT AND TURN GRID LOCATIONS



DES-CENTER VENT



NAME	SUPPORTED OPTIONS
DES-CENTER VENT	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Window Options – Supports a custom meeting rail location. This is set with the <001CEV> tag for setting the location in reference to the outer edge of the frame. Supports quarter/half/quarter option where the lock sash is half the ordered width. • Operation/Misc. - Supports Single or Double Locks.

CENTER VENT OPTION TAGS

The center vent window uses the same tags as the [single/double hung window](#) (see the single/double hung window section for details and configuration examples) except it has different tags to control the center meeting rail location and the single/double lock options work off the window height.

001 Window Options

The ObjectViewer uses this category to display the window options Quarter/Half/Quarter and Custom Meeting Rail location.

Tag	Definition	Option Value
<001CEV>	Meeting Rail offset adjustment.	Requires a numerical value that designates the number of inches from the middle of the meeting rail to the outer edge of the frame. Applies to each keeper sash.
<001QHQ>	Adjusts the size of each keeper sash to 25% of the ordered width. Adjusts the size of the lock sash to 50% of the ordered width.	None

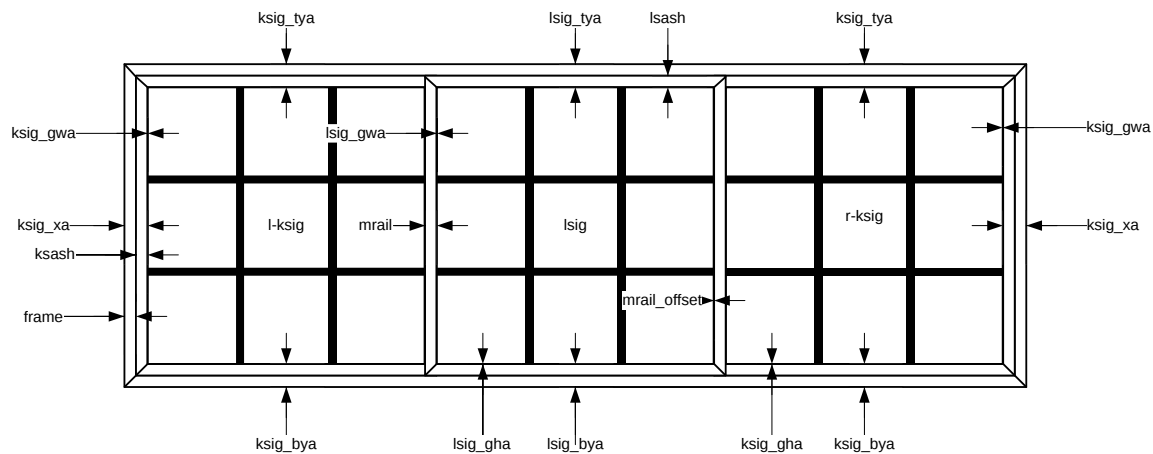
008 Operation/Miscellaneous

Drawing of single versus double locks is controlled by the <008DL> and <008SL> tags along with the dlock_h parameter.

Option Tag	Definition
<008DL>	Implements Double Locks when 1) the window height is greater than the dlock_h parameter and <008SL> is not selected or 2) <008DL> is selected.
<008SL>	Display single locks when 1) the window height is less than or equal to the dlock_h parameter and <008DL> is not selected or 2) <008SL> is selected.

When the <008DL> and <008SL> tags are not configured, the display of single or double locks will be controlled by the dlock_h parameter. When the window width is greater than the dlock_h parameter value, double locks are drawn in the image. Otherwise a single lock is displayed. <008DL> and <008SL> tags take precedence over this parameter.

CENTER VENT PARAMETERS

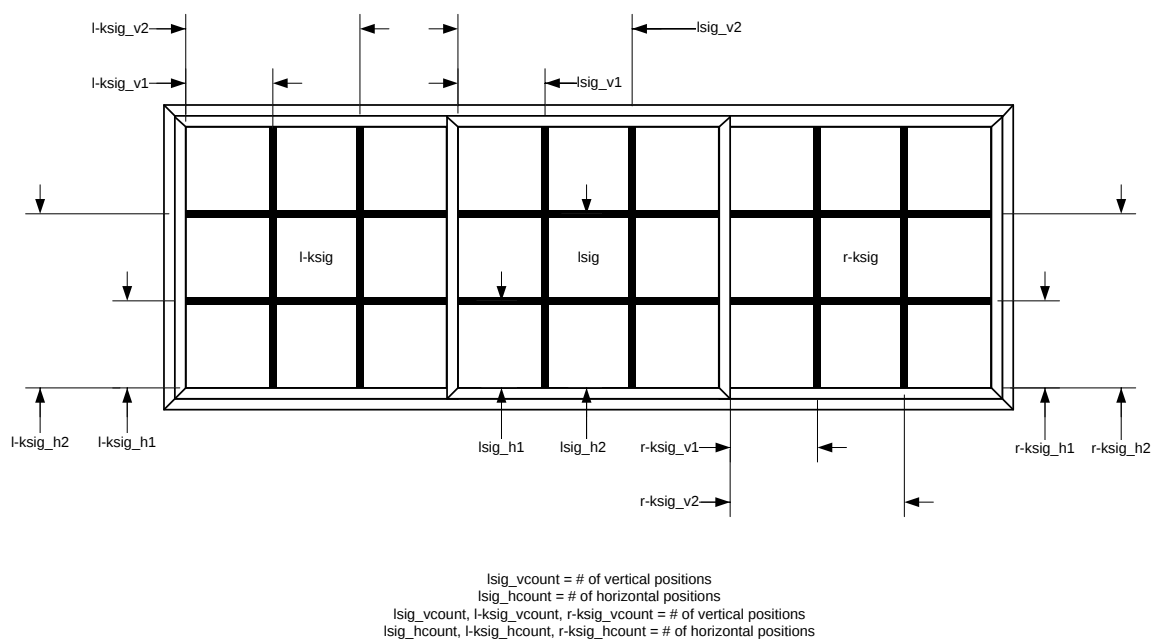


frame	The thickness of the frame.
mrail	The visible thickness of the meeting rail between two sashes.
mrail_offset	On a unit with multiple sashes, the meeting rail might not be in the exact center of the unit. Enter a plus or minus value to move the meeting rail in one direction or the other. A positive number moves the left meeting rail to the right, relative to your default view. The right meeting rail moves to the left in this case so both keeper sashes are the same width.
dlock_h	The maximum window height for displaying a single lock. When the window height is greater than this parameter number, double locks are drawn in the image. <008DL> and <008SL> tags override this parameter.
ksash	The thickness of the keeper sash.
lsash	The thickness of the lock sash.
ksig_xa	The distance between the outer edge of the frame to the edge of the visible glass on the keeper sash (left and right side).
ksig_tya	The distance between the top outer edge of the frame to the top edge visible glass on the keeper sash.
ksig_bya	The distance between the bottom outer edge of the frame to the bottom edge visible glass on the keeper sash.
lsig_tya	The distance between the top outer edge of the frame to the top edge of the visible glass on the lock sash.

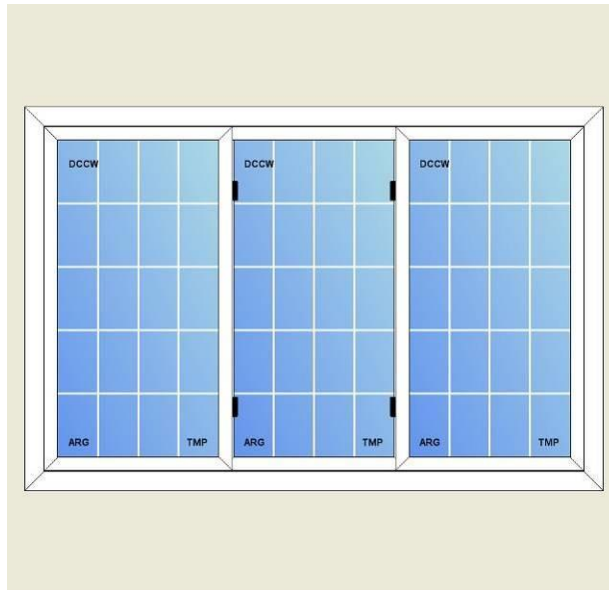
lsig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass on the lock sash.
ksig_gwa	*Grid width adjustment value for the keeper IG. ½ of this value applied to each side.
lsig_gwa	*Grid width adjustment value for the lock IG. ½ of this value applied to each side.
ksig_gha	*Grid height adjustment value for the keeper IG. ½ of this value applied to the top and ½ to the bottom.
lsig_gha	*Grid height adjustment value for the lock IG. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
arrowSize	Controls the size of the sash movement arrow indicator. A typical value is 7. Set to 0 to turn off the sash movement indicator.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the keeper sash IG is smaller than the lock IG for your slider window object, you may want to adjust the grid placement using the ksig_gha or lsig_gha parameter so the horizontal bars line up. The grid adjustment parameters do not change the size of the visible IG.

CENTER VENT GRID LOCATIONS



DES-END VENT



NAME	SUPPORTED OPTIONS
DES-END VENT	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Window Options – Supports a custom meeting rail location. This is set with the <001CEV> tag for setting the location in reference to the outer edge of the frame. Supports quarter/half/quarter option where the keeper sash is half the ordered width. • Operation/Misc.- Supports Single or Double Locks.

END VENT OPTION TAGS

The end vent window uses the same tags as the [single/double hung window](#) (see the single/double hung window section for details and configuration examples) except it has different tags to control the center meeting rail location and the single/double lock options work off the window height.

001 Window Options

The ObjectViewer uses this category to display the window options Quarter/Half/Quarter and Custom Meeting Rail location.

Tag	Definition	Option Value
<001CEV>	Meeting Rail offset adjustment.	Requires a numerical value that designates the number of inches from the middle of the meeting rail to the outer edge of the frame. Applies to each lock sash.
<001QHQ>	Adjusts the size of each lock sash to 25% of the ordered width. Adjusts the size of the keeper sash to 50% of the ordered width.	None

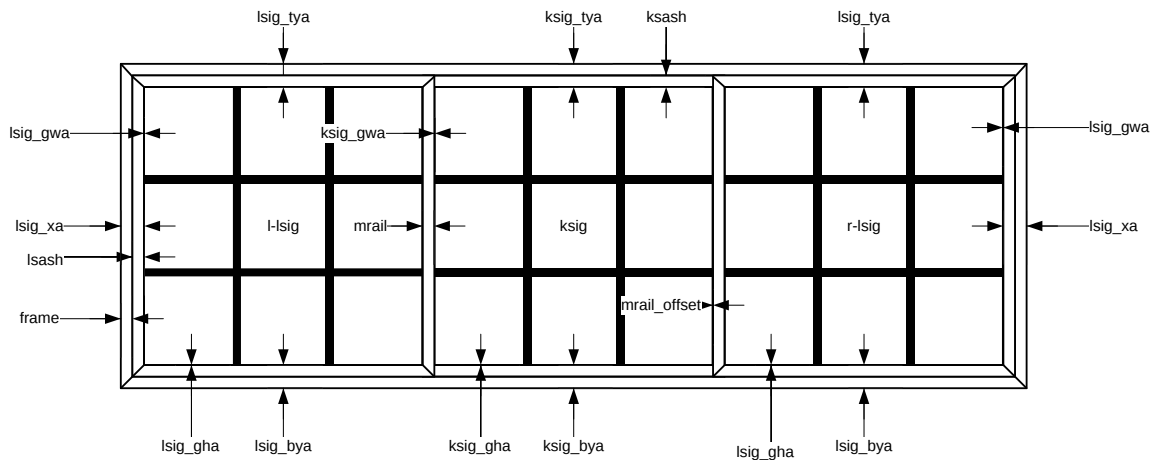
008 Operation/Miscellaneous

Drawing of single versus double locks is controlled by the <008DL> and <008SL> tags along with the dlock_h parameter.

Option Tag	Definition
<008DL>	Implements Double Locks when 1) the window height is greater than the dlock_h parameter and <008SL> is not selected or 2) <008DL> is selected.
<008SL>	Display single locks when 1) the window height is less than or equal to the dlock_h parameter and <008DL> is not selected or 2) <008SL> is selected.

When the <008DL> and <008SL> tags are not configured, the display of single or double locks will be controlled by the dlock_h parameter. When the window width is greater than the dlock_h parameter value, double locks are drawn in the image. Otherwise a single lock is displayed. <008DL> and <008SL> tags take precedence over this parameter.

END VENT PARAMETERS

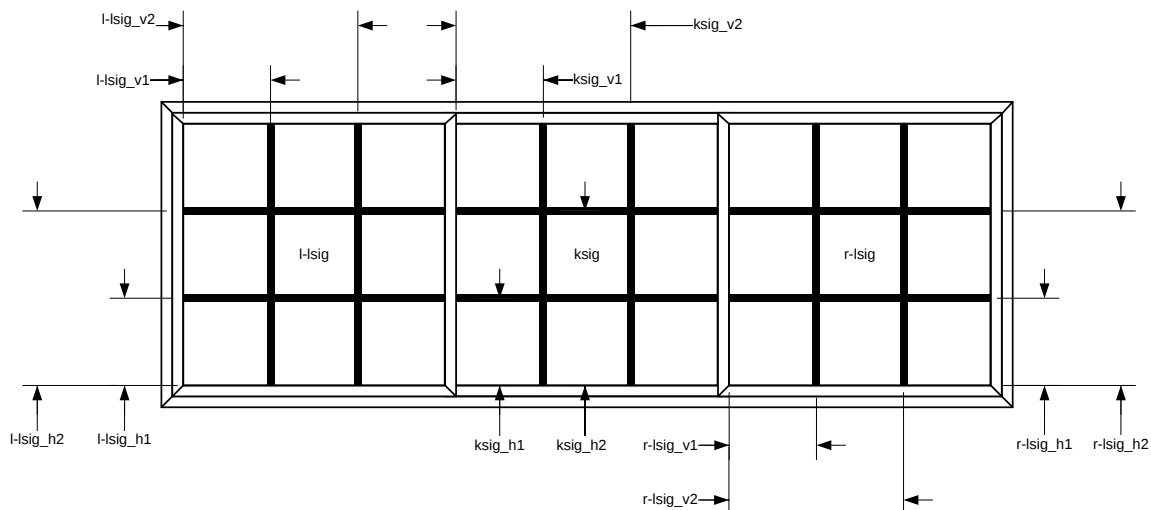


frame	The thickness of the frame.
mrail	The visible thickness of the meeting rail between two sashes.
mrail_offset	On a unit with multiple sashes, the meeting rail might not be in the exact center of the unit. Enter a plus or minus value to move the meeting rail in one direction or the other. A positive number moves the left meeting rail to the right, relative to your default view. The right meeting rail moves to the left in this case so both lock sashes are the same width.
dlock_h	The maximum window height for displaying a single lock. When the window height is greater than this parameter number, double locks are drawn in the image. <008DL> and <008SL> tags override this parameter.
ksash	The thickness of the keeper sash.
lsash	The thickness of the lock sash.
lsig_xa	The distance between the outer edge of the frame to the left edge of the visible glass on the lock sash.
ksig_tya	The distance between the top outer edge of the frame to the top edge visible glass on the keeper sash.
ksig_bya	The distance between the bottom outer edge of the frame to the bottom edge visible glass on the keeper sash.
lsig_tya	The distance between the top outer edge of the frame to the top edge of the visible glass on the lock sash.
lsig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass on the lock sash.
ksig_gwa	*Grid width adjustment value for the keeper IG. ½ of this value applied to each side.

lsig_gwa	*Grid width adjustment value for the lock IG. ½ of this value applied to each side.
ksig_gha	*Grid height adjustment value for the keeper IG. ½ of this value applied to the top and ½ to the bottom.
lsig_gha	*Grid height adjustment value for the lock IG. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
arrowSize	Controls the size of the sash movement arrow indicator. A typical value is 7. Set to 0 to turn off the sash movement indicator.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the keeper sash IG is smaller than the lock IG for your slider window object, you may want to adjust the grid placement using the ksig_gha or lsig_gha parameter so the horizontal bars line up. The grid adjustment parameters do not change the size of the visible IG.

END VENT GRID LOCATIONS



ksig_vcount = # of vertical positions
ksig_hcount = # of horizontal positions
ksig_vcount, l-sig_vcount, r-sig_vcount = # of vertical positions
ksig_hcount, l-sig_hcount, r-sig_hcount = # of horizontal positions

DES-FILLER

<u>NAME</u>	<u>SUPPORTED OPTIONS</u>
DES-FILLER	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain.

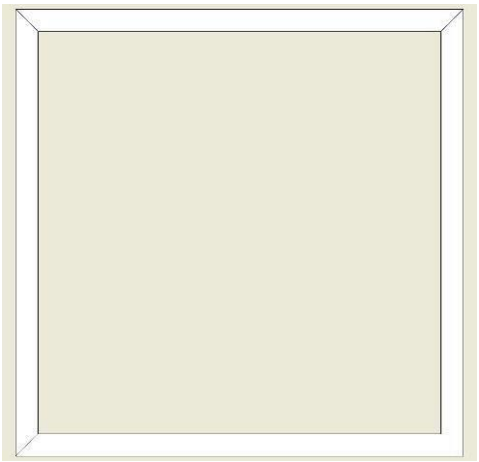
FILLER OPTION TAGS

The filler only uses the color tags found in the picture window section.

FILLER PARAMETERS

The filler base object does not have any parameters.

DES-FRAME

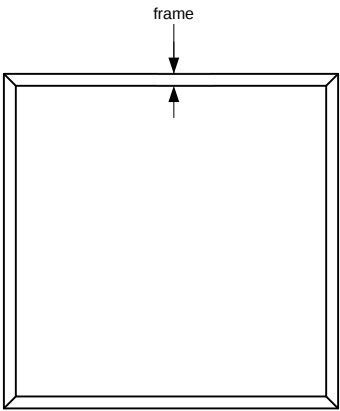


<u>NAME</u>	<u>SUPPORTED OPTIONS</u>
DES-FRAME	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain.

FRAME OPTION TAGS

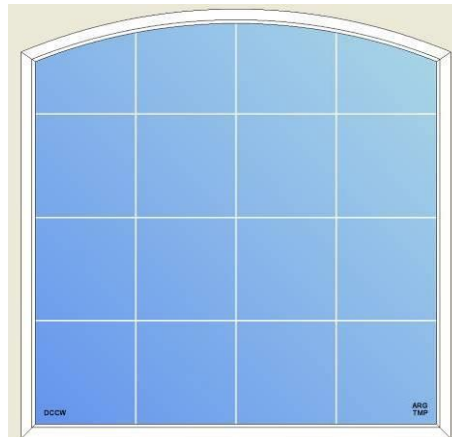
The frame only uses the color and the rough opening tags found in the picture window section.

FRAME PARAMETERS



frame	The thickness of the frame.
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DES-FULL EYEBROW



NAME	SUPPORTED OPTIONS
DES-FULL EYEBROW	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – cathedral, colonial, diamond, gothic, single/double prairie, single/double perimeter, perimeter cathedral, prairie cathedral, ranch, spokes, sunstar, 2 hub sunstar, sunburst, 2 hub sunburst, sunstar over colonial, sunburst over colonial, spoke over colonial, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc.– leg and rise specification.

FULL EYEBROW OPTION TAGS

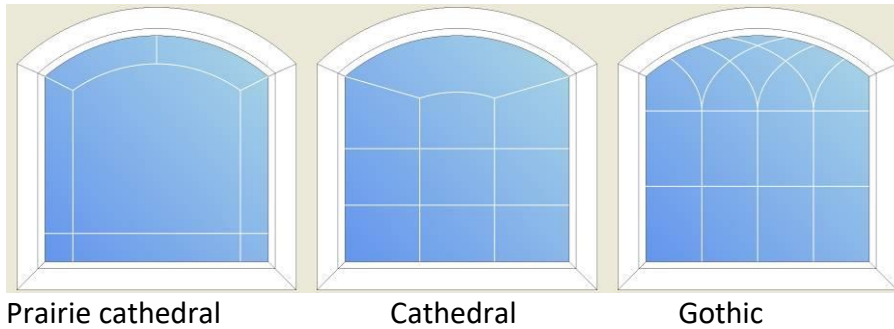
The full eyebrow uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has a tag to control the leg height and tags for additional grids.

004 Grid Type

The Grid Type tags tell the ObjectViewer how to draw the grids. Possible grid types for the full eyebrow are cathedral, colonial, diamond, gothic, prairie, double prairie, perimeter, double perimeter, perimeter cathedral, prairie cathedral, ranch, spoke, sunstar, sunstar with 2 hubs, sunburst, and sunburst with 2 hubs, sunstar over colonial, sunburst over colonial, spoke over colonial.

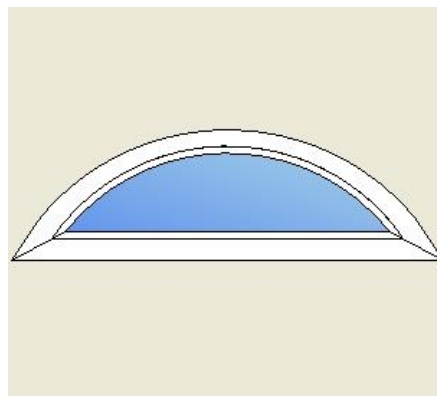
Option Tags	Definition
<004BURSTL>	Sunburst over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004CATH>	Cathedral by window, for eyebrows with leg. The bars are drawn by dividing the height and width evenly into panes. The distance from the top edge of the IG to the top of the arc on the grid bar is the height of one pane.
<004CATHBURST>	Cathedral Sunburst by window, for eyebrows with leg. The bars are drawn by dividing the height and width evenly into panes. The distance from the top edge of the IG to the top of the arc on the grid bar is the height of one pane.
<004COL>	Colonial by window.
<004DIA>	Diamond by window.
<004DPER>	Double perimeter by window.
<004DPRA>	Double prairie by window.
<004GOTHIC>	Gothic by window (over colonial for extended leg). The bars are drawn by dividing the height and width evenly into panes. The distance from the top edge of the IG to the top horizontal bar is the height of one pane.
<004NUMSPOKES>	Designates number of spokes for sunburst over colonial, sunstar over colonial, and spoke over colonial grid types.
<004PER>	Perimeter by window. If desired, use <004PERPATT> with value 1 to hide bottom bar.
<004PERCATH>	Perimeter cathedral by window, for eyebrows with leg. If desired, use <004PERPATT> with value 1 to hide bottom bar.
<004PERPATT>	Perimeter pattern. See Appendix B.
<004PRA>	Prairie by window.
<004PRACATH>	Prairie cathedral by window, for eyebrows with leg.
<004RAN>	Ranch by window.
<004RAND>	Distance from top of the window to the bottom horizontal bar of the ranch grids.
<004SPO>	Spoke by window.
<004SPOKEL>	Spoke over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004STARL>	Sunstar over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004SUN>	Sunstar by window.
<004SUN2HB>	Sunstar with 2 hubs by window.
<004SUNB>	Sunburst by window.
<004SUNB2HB>	Sunburst with 2 hubs by window.

Some eyebrow grid pattern examples:



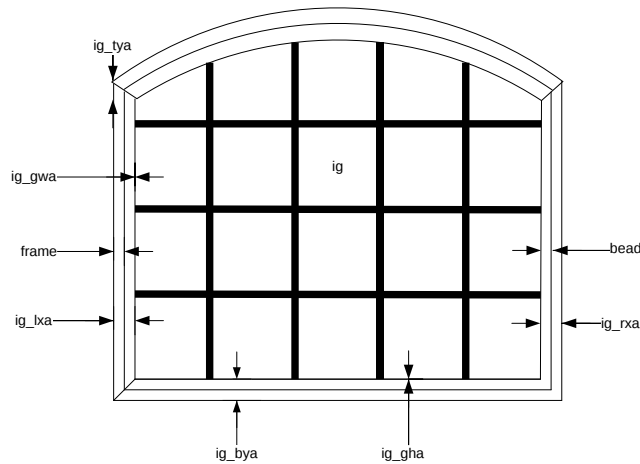
008 Operation/Miscellaneous

The full eyebrow also has the ability to change the leg height. Use the <008LEG> tag to specify the height of the leg. Or you can use the <008RISE> tag to specify the height of the rise. If neither tag is assigned, then the default object is drawn (shown below). If the <008LEG> option is selected but the option value for leg height is 0, then an eyebrow with no leg is drawn. If the <008RISE> option is selected but the option value for rise is the same as the ordered height, then an eyebrow with no leg is drawn.



Option Tags	Definition	Option Value
<008LEG>	Leg height.	Numerical value indicating the length of the leg extended from the arch.
<008RISE>	Rise height	Numerical value indicating the rise of the arch.
<008TOPBAR>	Top bar offset for grid patterns on eyebrow with leg.	Numerical value indicating the distance the top horizontal bar will be moved from the leg height (leg height at outer edge of the frame).

FULL EYEBROW PARAMETERS

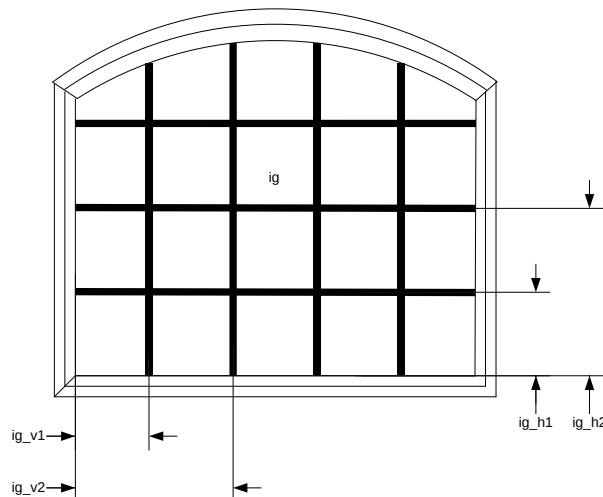


frame	The thickness of the frame.
bead	The thickness of the bead.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. $\frac{1}{2}$ of this value applied to each side.
ig_gha	*Grid height adjustment value. $\frac{1}{2}$ of this value applied to the top and $\frac{1}{2}$ to the bottom.
topBarAtLeg	Specifies whether or not the top bar in the gothic grid pattern is set at the IG leg height. Set to 1 to set the top bar at IG leg height. Set to 0 and all horizontal bars will be evenly spaced in the IG. <008TOPBAR> tag has precedence over this parameter.
topBarOffsetType	Values: 1 = offset from top of window, 2 = offset from shoulder/leg of window. Used with sunburst, sunstar, gothic, spoke grid patterns with leg. Along with the <008TOPBAR> option or topBarPercent parameter, allows the user to adjust the top horizontal grid bar.
topBarPercent	Percentage of ordered height which will be used to adjust the top horizontal bar position. Used in conjunction with topBarOffsetType. <008TOPBAR> has priority over this parameter.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.

grid_pattColonial	By default, the sunburst/sunstar/sunburstbar/spoke over colonial grid patterns add a dividing horizontal bar between the colonial area and the decorative pattern at the top. So, if the grid pattern is 2VX2H, 3 horizontal bars are displayed. If this parameter = 1, then the top horizontal dividing bar is not displayed.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

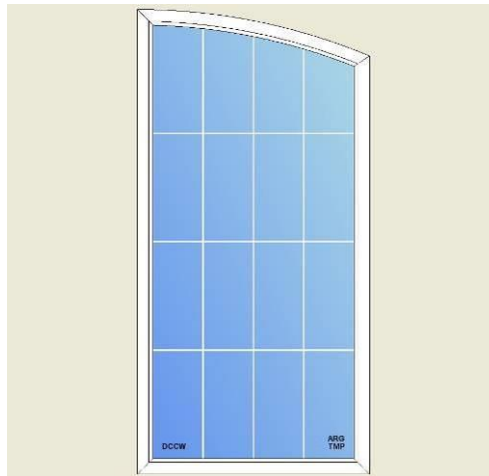
**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

FULL EYEBROW GRID LOCATIONS



ig_vcount = # of vertical positions
ig_hcount = # of horizontal positions

DES-HALF EYEBROW



NAME	SUPPORTED OPTIONS
DES-HALF EYEBROW	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid –cathedral, colonial, diamond, gothic, single/double prairie, single/double perimeter, ranch, spoke, sunstar, 2 hub sunstar, sunburst, 2 hub sunburst, sunburst over colonial, sunstar over colonial, spoke over colonial, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc.– radius, leg and rise specification, left/right operation, center height distance.

HALF EYEBROW OPTION TAGS

The half eyebrow uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has tags to control the leg height, radius of arch, and left and right operation.

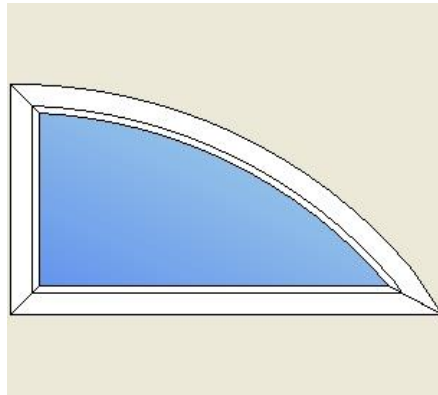
004 Grid Type

The Grid Type tags tell the ObjectViewer how to draw the grids. Possible grid types for the half eyebrow are cathedral, colonial, diamond, gothic, prairie, double prairie, perimeter, double perimeter, ranch, spoke, sunstar, sunstar with 2 hubs, sunburst, and sunburst with 2 hubs, sunstar over colonial, sunburst over colonial, spoke over colonial.

Option Tags	Definition
<004BURSTL>	Sunburst over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004CATH>	Cathedral by window, for eyebrows with leg. The bars are drawn by dividing the height and width evenly into panes. The distance from the top edge of the IG to the top of the arc on the grid bar is the height of one pane.
<004CATHBURST>	Cathedral Sunburst by window, for eyebrows with leg. The bars are drawn by dividing the height and width evenly into panes. The distance from the top edge of the IG to the top of the arc on the grid bar is the height of one pane.
<004COL>	Colonial by window.
<004DIA>	Diamond by window.
<004DPER>	Double perimeter by window.
<004DPRA>	Double prairie by window.
<004GOTHIC>	Gothic by window (over colonial for extended leg). The bars are drawn by dividing the height and width evenly into panes. The distance from the top edge of the IG to the top horizontal bar is the height of one pane.
<004NUMSPOKES>	Designates number of spokes for sunburst over colonial, sunstar over colonial, spoke over colonial grid types.
<004PER>	Perimeter by window. If desired, use <004PERPATT> with value 1 to hide bottom bar.
<004PERPATT>	Perimeter pattern. See Appendix B.
<004PRA>	Prairie by window.
<004RAN>	Ranch by window.
<004RAND>	Distance from top of the window to the bottom horizontal bar of the ranch grids.
<004SPO>	Spoke by window.
<004SPOKEL>	Spoke over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004STARL>	Sunstar over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004SUN>	Sunstar by window.
<004SUN2HB>	Sunstar with 2 hubs by window.
<004SUNB>	Sunburst by window.
<004SUNB2HB>	Sunburst with 2 hubs by window.

008 Operation/Miscellaneous

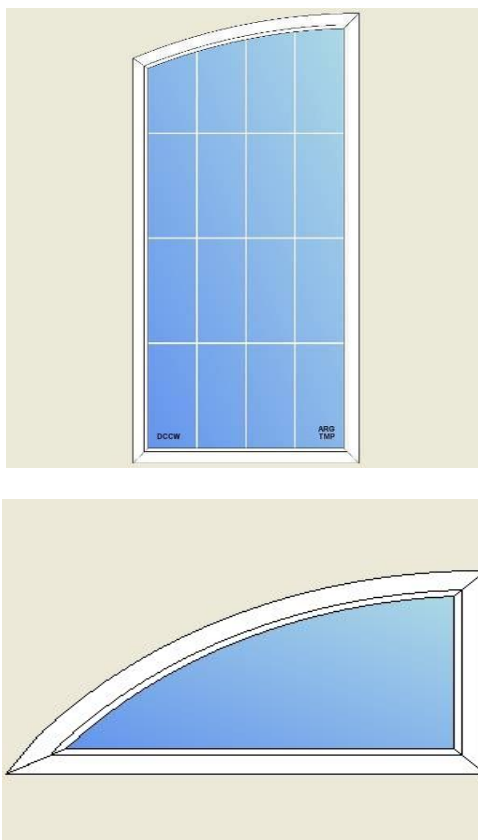
The half eyebrow also has the ability to change the leg height. Use the <008LEG> tag to specify the height of the leg. Or you can use the <008RISE> tag to specify the height of the rise. If neither tag is assigned, then the default object is drawn (shown below). If the <008LEG> option is selected but the option value for leg height is 0, then a half eyebrow with no leg is drawn. If the <008RISE> option is selected but the option value for rise is the same as the ordered height, then a half eyebrow with no leg is drawn.



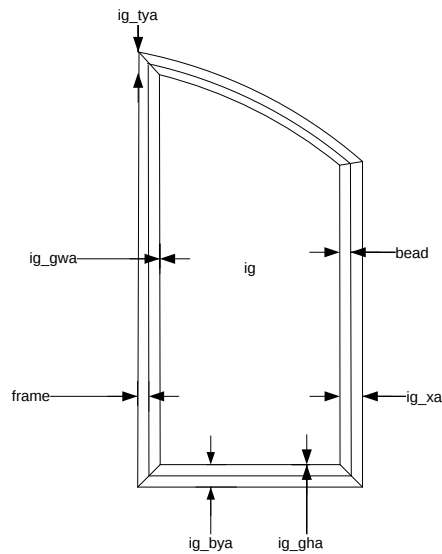
Option Tags	Definition	Option Value
<008CHD>	Center height distance. This is the height of the window at the midpoint of the width. This option is used to alter the radius of the arc. The 008RAD option has precedence over this option.	Positive numerical value indicating the center height distance at the midpoint of the width.
<008LEG>	Leg height.	Numerical value indicating the length of the leg extended from the arch.
<008RISE>	Rise height	Numerical value indicating the rise of the arch.
<008RAD>	Option code used to specify the radius of the arc. Needed for continuous arch functionality. This option code is not required. The display object will auto-calculate a regular arc based on height and width when this <008RAD> is not in use.	Positive numerical value specifying the radius of the arc.

<008CHD>	Center Height Distance. This is the height of the window at the midpoint of the width. This option value alters the radius of the arch. The <008RAD> tag has precedence over <008CHD>.	Positive numerical value indicating the height of the window at the midpoint of the width (at width/2).
<008LEFT>	Direction of the arch relative to your default view. Default direction is right.	None
<008TOPBAR>	Top bar offset for grid patterns on eyebrow with leg.	Numerical value indicating the distance the top horizontal bar will be moved from the leg height (leg height at outer edge of the frame).

The <008RAD> tag is used to control the radius of the arch. This is needed for continuous arch functionality used in OpeningDesigner. Use <008LEFT> to specify the direction of the arch relative to your default view. The picture below shows the left direction, while the picture at the beginning of the section shows the default right direction.



HALF EYEBROW PARAMETERS

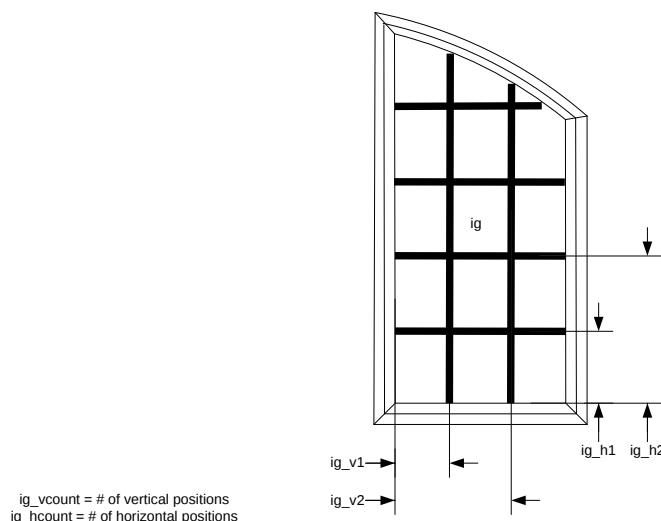


frame	The thickness of the frame.
bead	The thickness of the bead.
ig_xa	The distance between the outer edge of the frame to the edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
topBarAtLeg	Specifies whether or not the top bar in the gothic grid pattern is set at the IG leg height. Set to 1 to set the top bar at IG leg height. Set to 0 and all horizontal bars will be evenly spaced in the IG. <008TOPBAR> tag has precedence over this parameter.
topBarOffsetType	Values: 1 = offset from top of window, 2 = offset from shoulder/leg of window. Used with sunburst, sunstar, gothic, spoke grid patterns with leg. Along with the <008TOPBAR> option or topBarPercent parameter, allows the user to adjust the top horizontal grid bar.

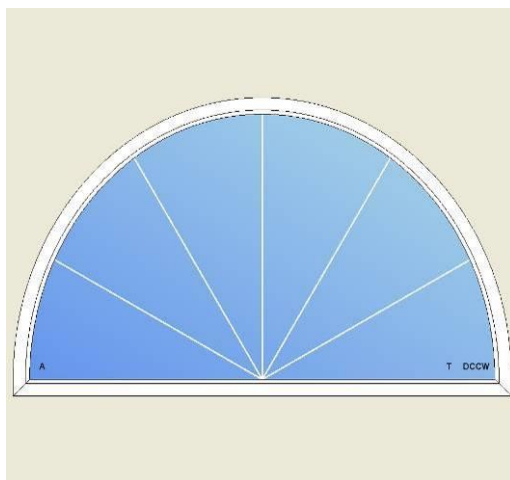
topBarPercent	Percentage of ordered height which will be used to adjust the top horizontal bar position. Used in conjunction with topBarOffsetType. <008TOPBAR> has priority over this parameter.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
grid_pattColonial	By default, the sunburst/sunstar/sunburstbar/spoke over colonial grid patterns add a dividing horizontal bar between the colonial area and the decorative pattern at the top. So, if the grid pattern is 2VX2H, 3 horizontal bars are displayed. If this parameter = 1, then the top horizontal dividing bar is not displayed.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

HALF EYEBROW GRID LOCATIONS



DES-HALF ROUND



NAME	SUPPORTED OPTIONS
DES-HALF ROUND	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, gothic, single/double prairie, single/double perimeter, ranch, spokes, sunstar, 2 hub sunstar, sunburst, 2 hub sunburst, sunburst over colonial, sunstar over colonial, spoke over colonial, radius crossbar, sunburstbar, 2 hub sunburst bar, single/double perimeter bar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – extended leg

HALF ROUND OPTION TAGS

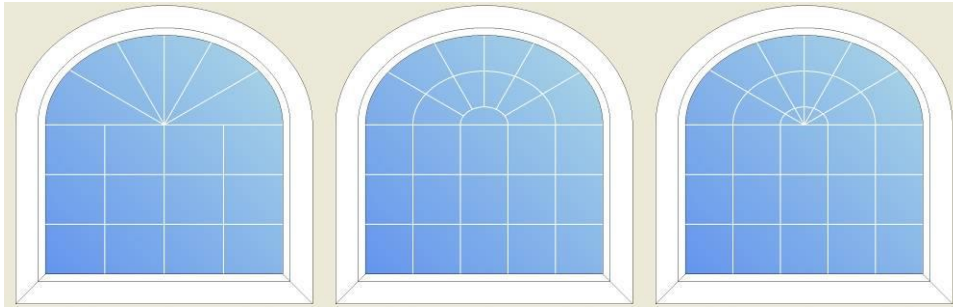
The half round uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it includes additional grid types and an extended leg operation.

004 Grid Type

The Grid Type tags tell the ObjectViewer how to draw the grids. Possible grid types for the half round are colonial, diamond, gothic, prairie, double prairie, perimeter, double perimeter, ranch, spoke, sunstar, 2 hub sunstar, sunburst, and 2 hub sunburst, sunburst over colonial, sunstar over colonial, spoke over colonial. This section describes grid types that were not previously described in the picture window section.

Option Tags	Definition
<004BURSTL>	Sunburst over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004COL>	Colonial by window.
<004DIA>	Diamond by window.
<004DPER>	Double perimeter by window.
<004DPERBAR>	Double perimeter with bars.
<004DPRA>	Double prairie by window.
<004GOTHIC>	Gothic by window (over colonial for extended leg). The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004NUMSPOKES>	Designates number of spokes for sunburst over colonial, sunstar over colonial, spoke over colonial grid types.
<004NUMBARS>	Designates the number of bars in extended leg for single/double perimeter grids. The bars are evenly spaced in the leg. A percentage can also be entered and then the bars will be evenly placed in the lower percentage of the leg. Format #bars/%, like 2/50.
<004PER>	Perimeter by window. If desired, use <004PERPATT> with 1 to hide bottom bar.
<004PERBAR>	Perimeter with bars. Valid only with extended leg half round.
<004PERPATT>	Perimeter pattern. See Appendix B.
<004PRA>	Prairie by window.
<004RAN>	Ranch by window.
<004RAND>	Distance from top of the window to the bottom horizontal bar of the ranch grids.
<004SPO>	Spoke by window.
<004SPOKEL>	Spoke over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004STARL>	Sunstar over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004SUN>	Sunstar by window.
<004SUN2HB>	Sunstar with 2 hubs by window.
<004SUNB>	Sunburst by window.
<004SUNB2HB>	Sunburst with 2 hubs by window.
<004SUNBBAR>	Sunburst bar.
<004SUNBBAR2HB>	Sunburst bar with 2 hubs.

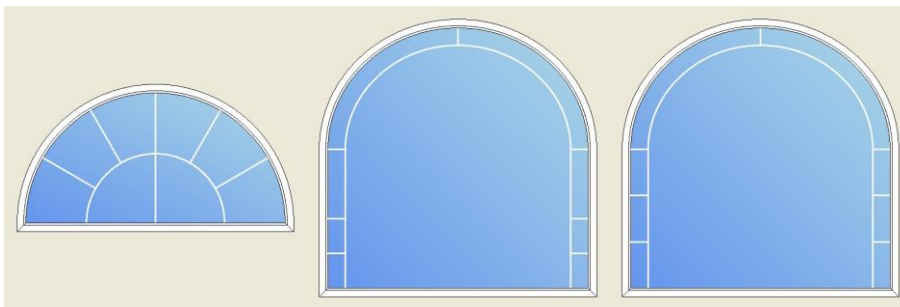
Some half round grid pattern examples:



Spoke over colonial

Sunburst over colonial

Sunstar over colonial



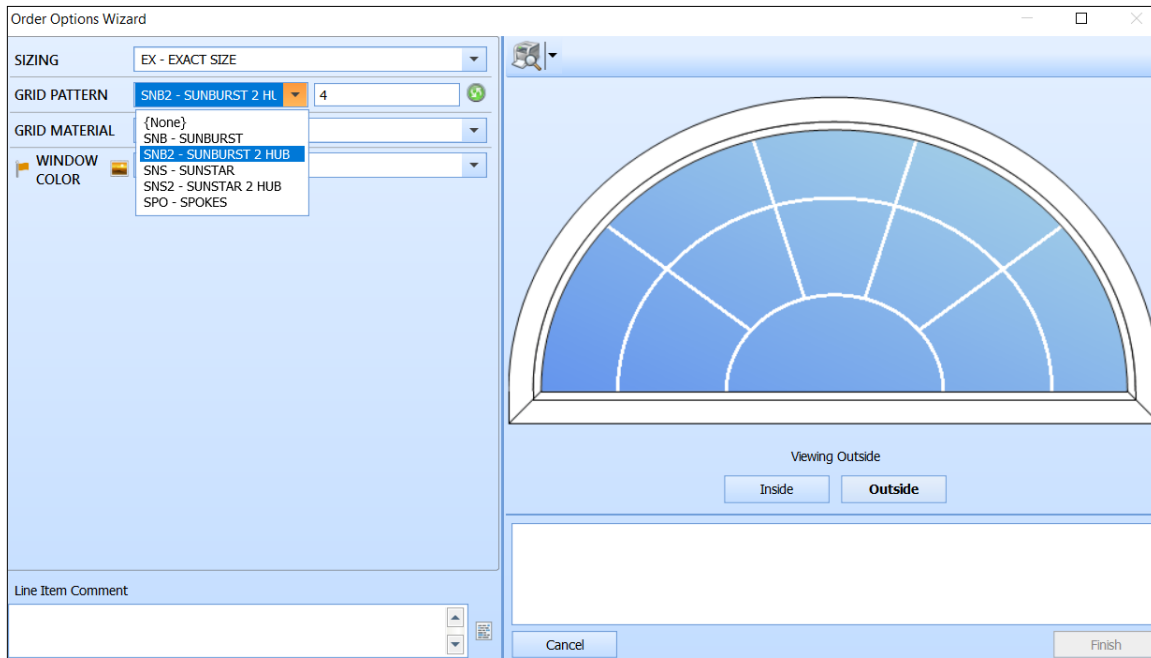
Sunburst Bar

Perimeter Bar

Perimeter Bar

You may have multiple variations of each grid type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <004SPO > can be assigned to option codes SPO1 and SPO2 by placing SPO1, SPO2 in the value column of Tag Setup for the tag <004SPO>.

The half round below has the grid types SUNB2 – 2 HUB SUNBURST, SNS2 – 2 HUB SUNSTAR, etc. under the GRIDS question. These options need to be associated to tags so that ObjectViewer knows what grid pattern to display.



Let's set the grid options to the following tags in Tag Setup by entering the Tag Value below for each Option Tag listed:

Option	Option Tag	Tag Value
SNB2–2 HUB SUNBURST	<004SUNB2HB>	SNB2
SNS2 – 2 HUB SUNSTAR	<004SUN2HB>	SNS2
SPO – SPOKE GRID	<004SPO>	SPO
SNB - SUNBURST	<004SUNB>	SNB
SNS2 - SUNSTAR	<004SUN>	SNS2

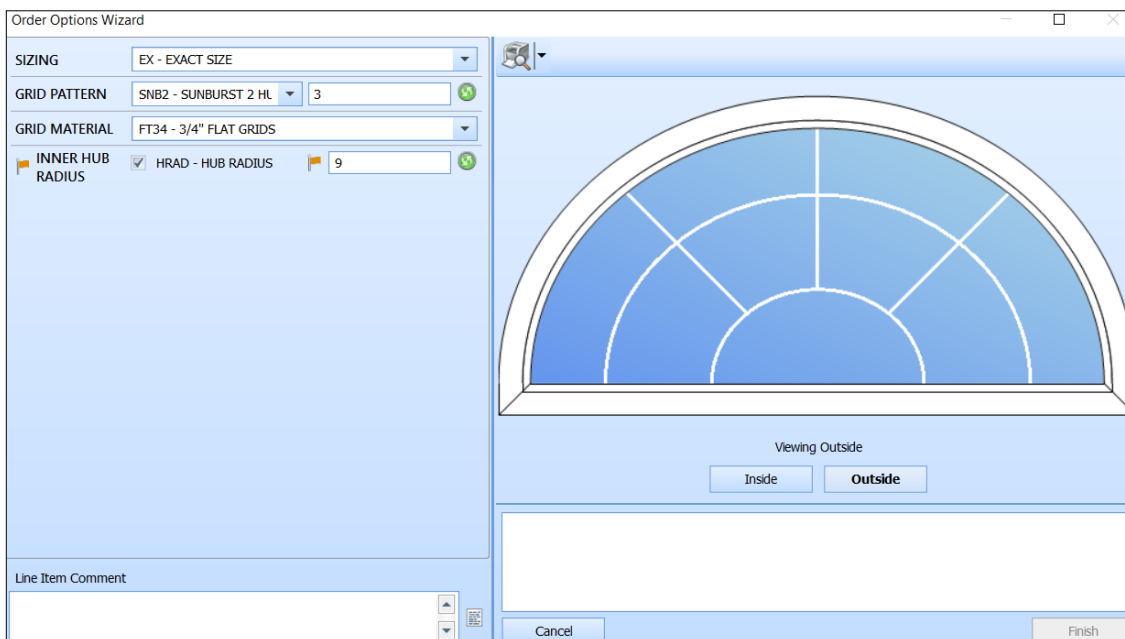
For grids to appear in the ObjectViewer, the grid pattern will need to be given in the correct format as an option value for the selected type of grids. All grid option values and necessary formats are explained in Appendix A. The 2 hub sunburst requires the number of spokes, entered as 4 above.

005 Grid Options

The Grid Options category further controls the drawing of grids.

Option Tags	Definition	Option Value
<005HUBRAD>	Internal hub radius required by sunstar, 2 hub sunstar, sunburst, and 2 hub sunburst grids.	Numerical value representing the internal hub radius. The outer hub radius is two times the internal hub radius.
<005HUBRAD2>	Outer hub radius. Works with sunburst bar only.	Numerical value representing the outer hub radius.

In the previous example, the user must also specify the internal hub radius, entered as 9 below. The outer hub radius will be drawn at two times the internal hub radius.

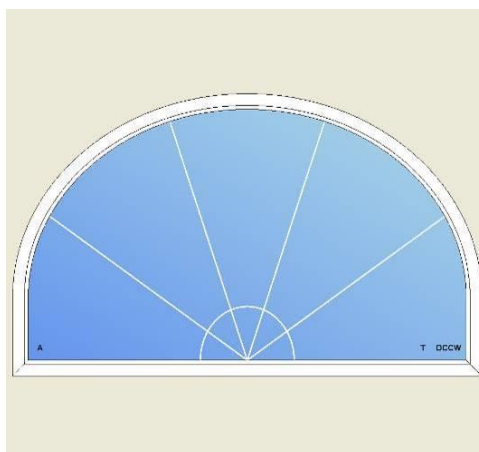


To relate the internal hub radius to ObjectViewer, assign the <005HUBRAD> tag to the option code for internal hub radius. In the picture above, HUBRAD is the name of the option code.

Option	Option Tag	Tag Value	Option Value
HRAD – INTERNAL HUB RADIUS	<005HUBRAD>	HRAD	Numerical value indicating the internal hub radius.

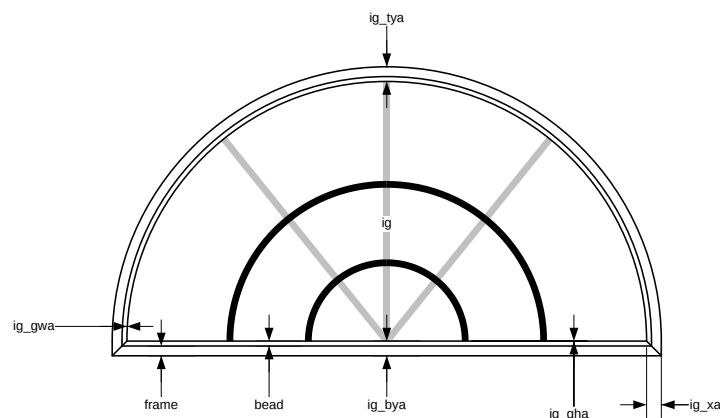
008 Operation/Miscellaneous

The half round also has the ability to draw an extended leg. The extended leg option requires a numerical value designating the length of the leg. Below is a half round window with the extended leg option.



Option Tags	Definition	Option Value
<008LEG>	Extended leg.	Numerical value indicating the length of the leg extended from the arch.
<008TOPBAR>	Top bar offset for grid patterns on half round with leg.	Numerical value indicating the distance the top horizontal bar will be moved from the leg height (leg height at outer edge of the frame).

HALF ROUND PARAMETERS

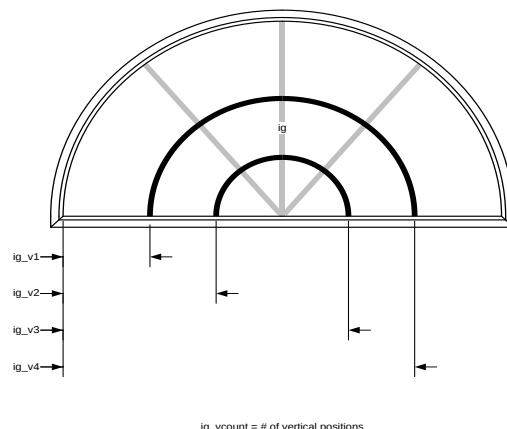


frame	The thickness of the frame.
bead	The thickness of the bead.
ig_xa	The distance between the outer edge of the frame to the edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
topBarOffsetType	Values: 1 = offset from top of window, 2 = offset from shoulder/leg of window. Used with sunburst, sunstar, gothic, spoke grid patterns with leg. Along with the <008TOPBAR> option or topBarPercent parameter, allows the user to adjust the top horizontal grid bar.
topBarPercent	Percentage of ordered height which will be used to adjust

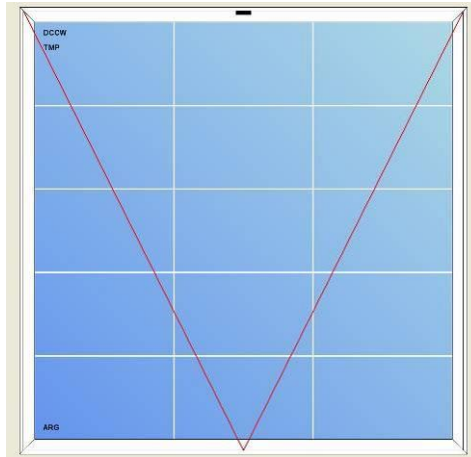
	the top horizontal bar position. Used in conjunction with topBarOffsetType. <008TOPBAR> has priority over this parameter.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
grid_pattColonial	By default, the sunburst/sunstar/sunburst bar/spoke over colonial grid patterns add a dividing horizontal bar between the colonial area and the decorative pattern at the top. So, if the grid pattern is 2VX2H, 3 horizontal bars are displayed. If this parameter = 1, then the top horizontal dividing bar is not displayed.
legPercent	Automatically sets an extended leg. Designates the leg height as a percentage of ordered height. If the window is 100" and legPercent is 45, then the leg height will be 45". Set this value to 0 when you do not want an automatic extended leg.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

HALF ROUND GRID LOCATIONS



DES-HOPPER



NAME	SUPPORTED OPTIONS
DES-HOPPER	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – Inverse operation.

HOPPER OPTION TAGS

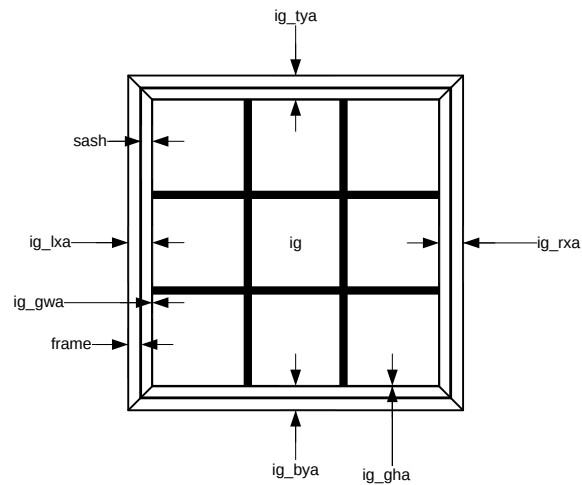
The hopper window uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has a tag to control operation.

008 Operation/Miscellaneous

The hopper also has the ability to change the operation. By default, the hinge is on the bottom, so the window opens from the top as shown in the picture at the beginning of this section. Use the <008INVOP> tag to draw the window opening from the bottom.

Option Tags	Definition	Option Value
<008INVOP>	Window opens from the bottom (opening from the top is default).	none

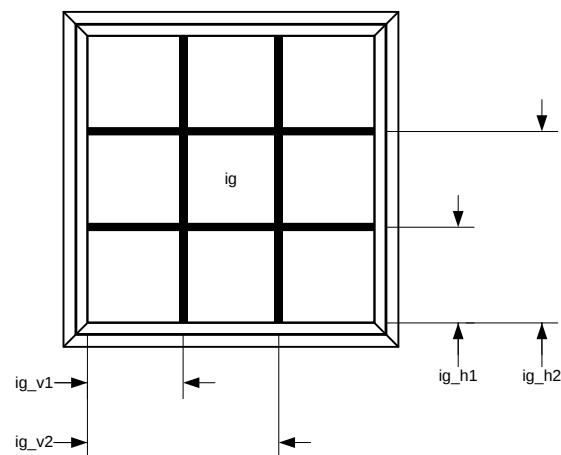
HOPPER PARAMETERS



frame	The thickness of the frame.
sash	The thickness of the sash.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. $\frac{1}{2}$ of this value applied to each side.
ig_gha	*Grid height adjustment value. $\frac{1}{2}$ of this value applied to the top and $\frac{1}{2}$ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

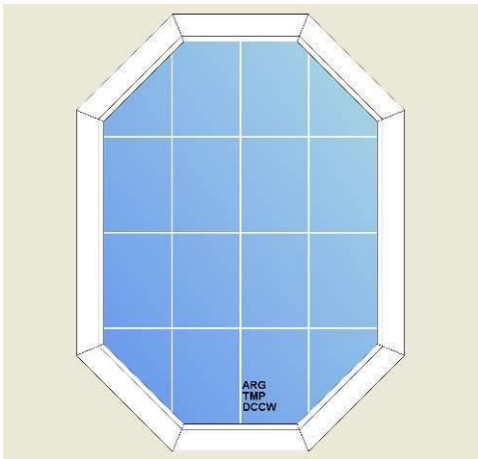
**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by $\frac{1}{2}$ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

HOPPER GRID LOCATIONS



ig_vcount = # of vertical positions
ig_hcount = # of horizontal positions

DES-OCTAGON



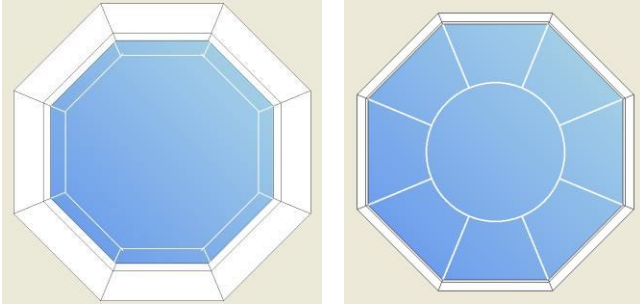
NAME	SUPPORTED OPTIONS
DES-OCTAGON	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single prairie, double perimeter, ranch, radius crossbar, sunburst wheel (1 and 2 hubs). • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – special shape dimensions.

OCTAGON OPTION TAGS

The octagon uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has a tag to control special shape dimensions.

004 Grid Type

Among other grid types, the octagon supports perimeter grids for the true octagon shape (no extended sides) and a sunburst wheel pattern.



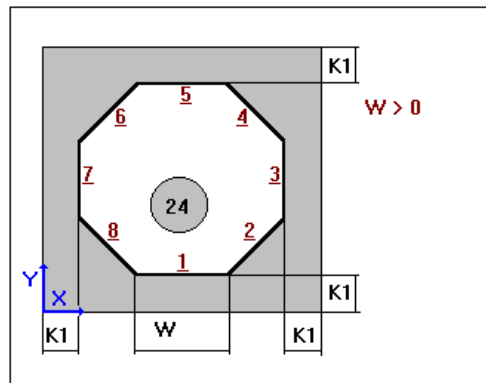
The <005HUBRAD> tag can be used to control the internal hub radius for the sunburst wheel pattern. The outer hub radius will be twice the internal hub radius unless the <005HUBRAD2> tag is used to set the outer hub radius for the sunburst wheel pattern.

008 Operation/Miscellaneous

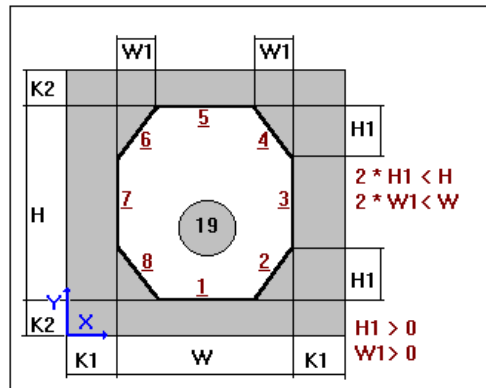
The octagon has the ability to draw special shapes. Use the <008SHPDIM> tag to specify the shape dimensions.

Option Tags	Definition	Option Value
<008SHAPEDIM>	Shape dimensions.	Comma delimited string containing shape dimensions in specified format for the object.

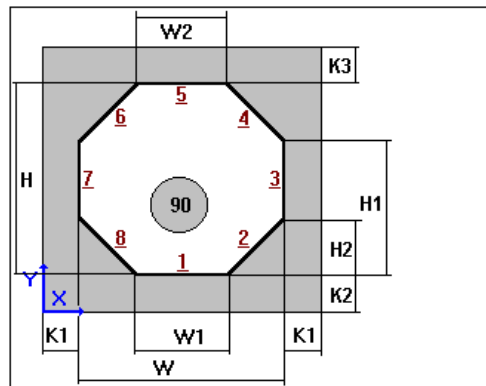
The <008SHPDIM> tag requires a string value containing shape dimensions. The pictures below show the shapes available and their shape dimension format.



Shape #24 is the default octagon. It does not require the <008SHPDIM> tag. The picture at the beginning of this section shows a #24 octagon whose ordered height is greater than the ordered width.

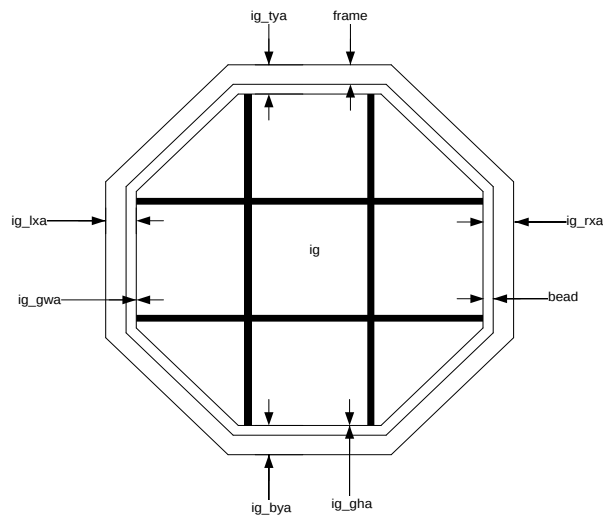


Shape #19 can be drawn using the <008SHPDIM> tag and specifying the H1 and W1 dimension in the format H1=##, W1=## where ## is a number. The comma is required when entering multiple dimensions into the <008SHPDIM> option value.



Shape #90 can be drawn using the <008SHPDIM> tag and specifying the W1, W2, H1, and H2 dimensions in the format H1=##, H2=##, W1=##, W2=## where ## is a number. The comma is required when entering multiple dimensions into the <008SHPDIM> option value.

OCTAGON PARAMETERS

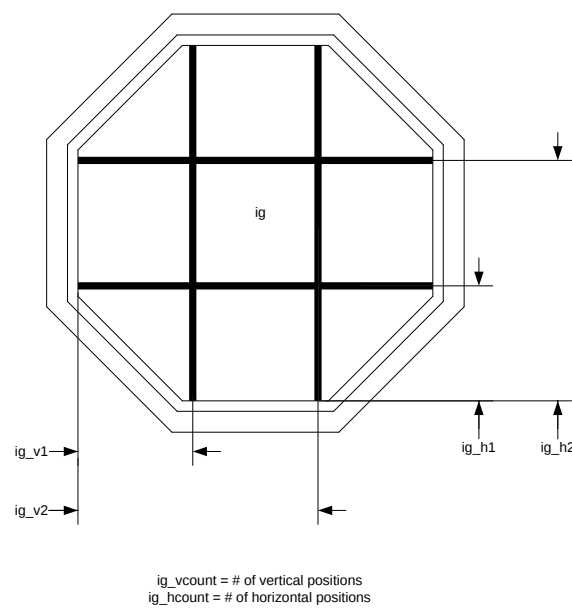


frame	The thickness of the frame.
bead	The thickness of the bead.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and

width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

OCTAGON GRID LOCATIONS



DES-HALF OCTAGON



NAME	SUPPORTED OPTIONS
DES-HALF OCTAGON	- Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. - Grid – colonial, diamond, ranch, radius crossbar, spokes, sunstar, 2 hub sunstar, sunburst, 2 hub sunburst. - Grid Options – bronze, v-groove - Glass Type – clear, low-e, bronze, obscure, gray. - Glass Options – glass process, gas. - Operation/Misc. – optional leg dimension.

HALF OCTAGON OPTION TAGS

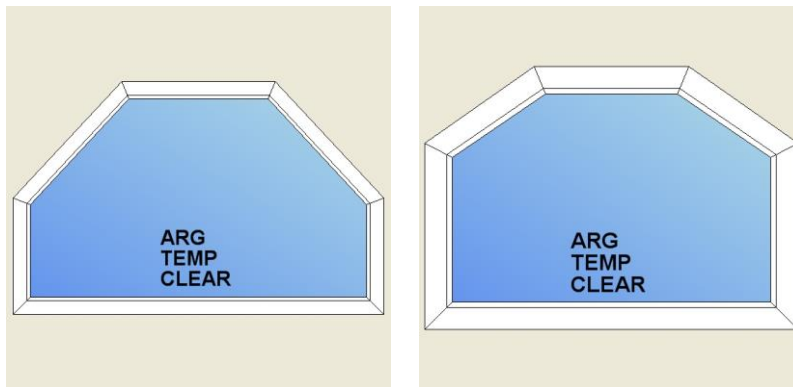
The octagon uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has an optional tag to control leg dimension.

008 Operation/Miscellaneous

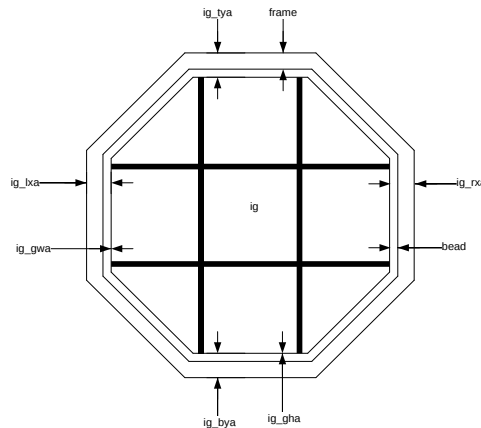
The octagon dimensions can be adjusted with the <008LEG> tag. If the leg dimension is not used, the object draws using regular octagon dimensions based on the ordered width.

Option Tags	Definition	Option Value
<008LEG>	Leg dimension.	Positive numerical value indicating the length of the left and right vertical sides of the half octagon.

The pictures below show the half octagon with various leg values:



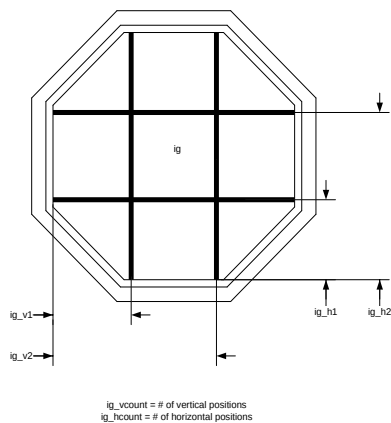
HALF OCTAGON PARAMETERS



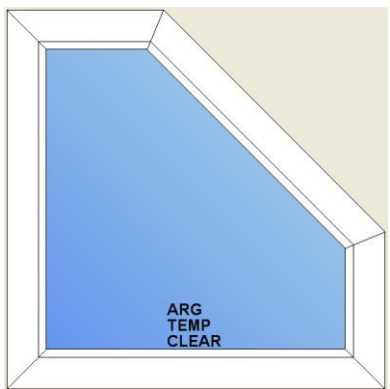
frame	The thickness of the frame.
bead	The thickness of the bead.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

HALF OCTAGON GRID LOCATIONS



DES-QUARTER OCTAGON



NAME	SUPPORTED OPTIONS
DES-QUARTER OCTAGON	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, ranch, radius crossbar, spokes, sunstar, 2 hub sunstar, sunburst, 2 hub sunburst. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – optional leg dimension, left/right direction.

QUARTER OCTAGON OPTION TAGS

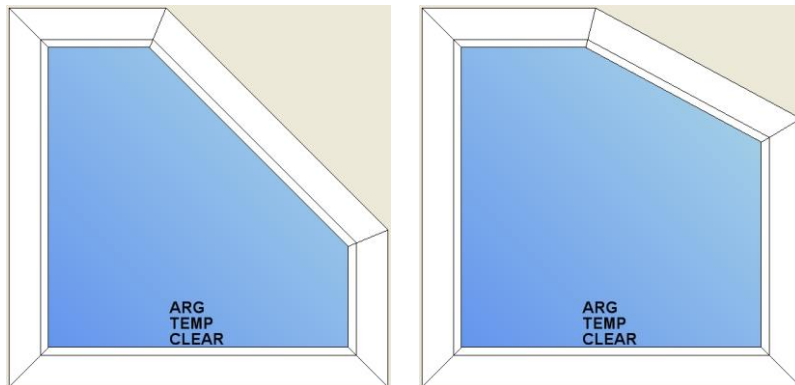
The octagon uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has optional tags to control leg dimensions.

008 Operation/Miscellaneous

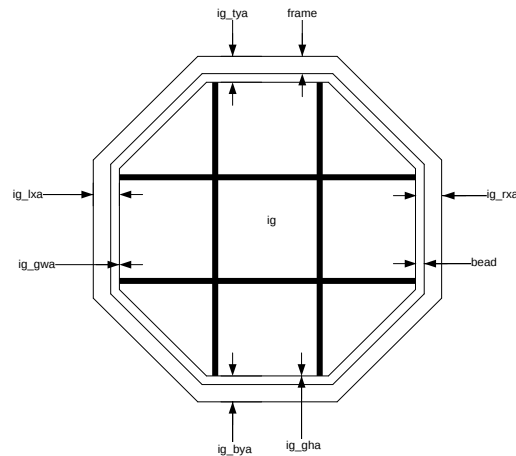
The quarter octagon dimensions can be adjusted with the <008LEG> and <008HORIZLEG> tags. If the leg dimensions are not used, the object draws using regular octagon dimensions based on the ordered width.

Option Tags	Definition	Option Value
<008LEG>	Vertical leg dimension.	Positive numerical value indicating the length of the short vertical side of the quarter octagon.
<008HORIZLEG>	Horizontal leg dimension.	Positive numerical value indicating the length of the top horizontal side of the half octagon.
<008LEFT>	Direction of the short side relative to your default view.	

The pictures below show the quarter octagon with various leg values:



QUARTER OCTAGON PARAMETERS

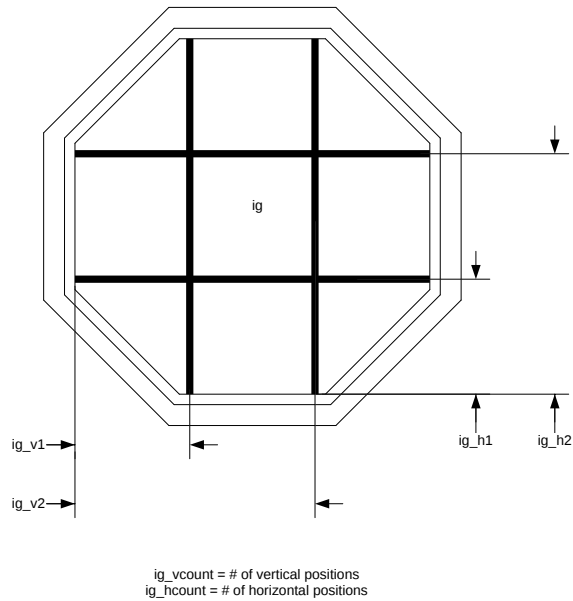


frame	The thickness of the frame.
bead	The thickness of the bead.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. $\frac{1}{2}$ of this value applied to each side.
ig_gha	*Grid height adjustment value. $\frac{1}{2}$ of this value applied to the top and $\frac{1}{2}$ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

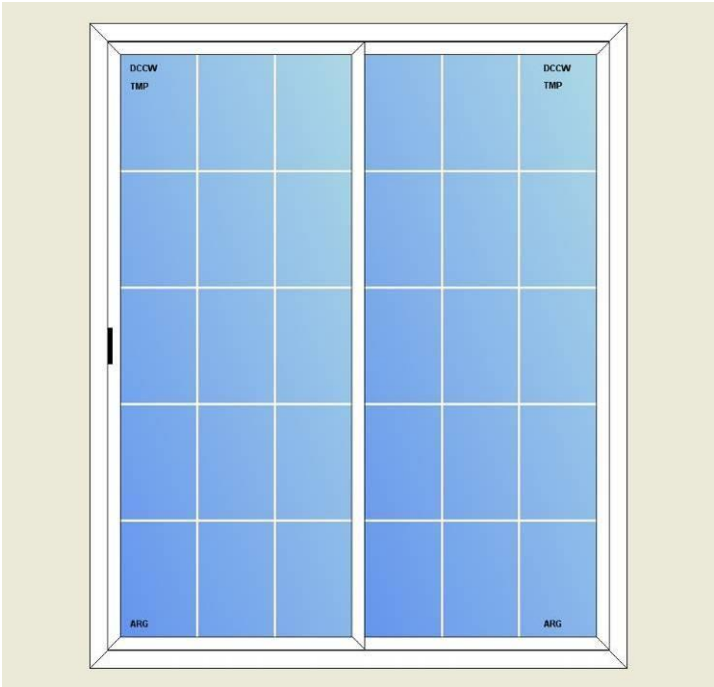
**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by $\frac{1}{2}$ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the

visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

QUARTER OCTAGON GRID LOCATIONS



DES-PATIO DOOR



NAME	SUPPORTED OPTIONS
DES-PATIO DOOR	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. - Supports 3 light and 4 light options and various options for specifying operation.

PATIO DOOR OPTION TAGS

The patio door uses the same tags as the [single/double hung window](#) (see the single/double hung window section for details and configuration examples) except it has tags to support 3 light and 4 light options and various tags to control operation.

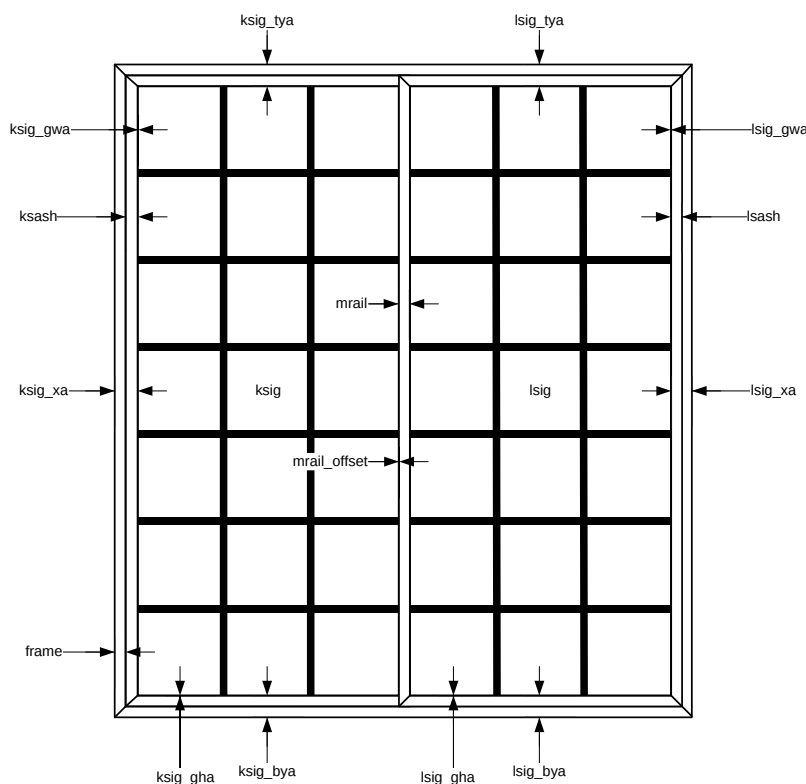
008 OPERATION/MISCELLANEOUS

The ObjectViewer uses these tags to control operation and 3 light and 4 light options.

Option Tag	Definition
<0083LITE>	Use this tag to tell ObjectViewer to draw a 3 light patio door.

<0084LITE>	Use this tag to tell ObjectViewer to draw a 4 light patio door.
<008OX/O>	Applies to the 3 light patio door. The lock sash is in the center with the handle on the right, relative to you default view.
<008O/XO>	Applies to the 3 light patio door. The lock sash is in the center with the handle on the left, relative to you default view.
<008XOO>	Applies to the 3 light patio door. The lock sash is on the left, relative to your default view. A 3 light patio door is drawn in this manner by default.
<008OOX>	Applies to the 3 light patio door. The lock sash is on the right, relative to your default view.
<008XO>	Applies to the 2 light patio door. X marks the location of the lock sash relative to your default view. Lock sash is on the left as default.
<008OX>	X marks the location of the lock sash relative to your default view. Lock sash is on the left as default. Use this tag to move the lock sash to the right side of the patio door.

PATIO DOOR PARAMETERS



frame	The thickness of the frame.
mrail	The visible thickness of the meeting rail between two sashes.

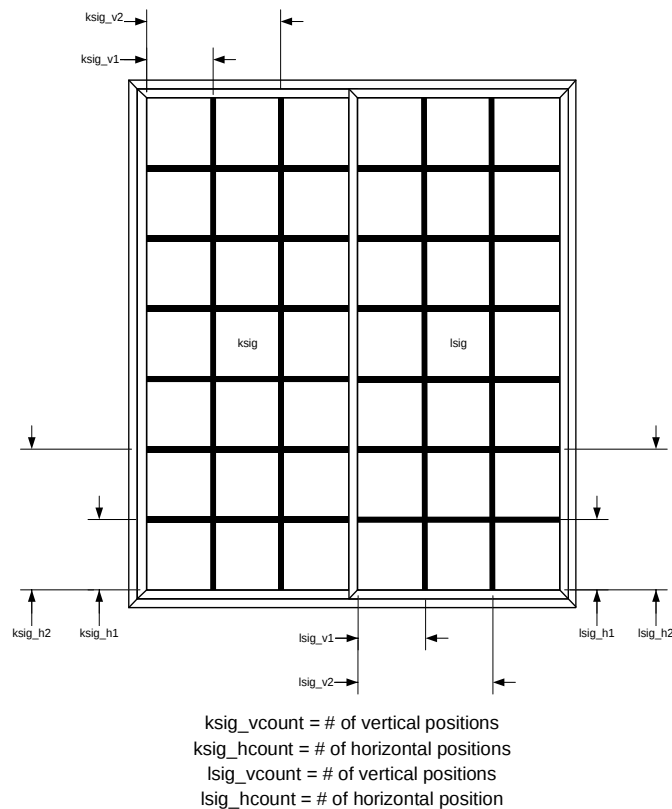
mrail_offset	On a unit with multiple sashes, the meeting rail might not be in the exact center of the unit. Enter a plus or minus value to move the meeting rail in one direction or the other. A positive number moves the meeting rail to the right, relative to your default view. A negative number moves the meeting rail to the left. Note: On 3 light patio doors whose lock sash is in the center and 4 light patio doors, the left meeting rail is moved to the right with a positive value and the right meeting rail is moved to the left so the door is symmetrical.
dlock_h	The maximum window height for displaying a single lock. When the window width is greater than this parameter number, double locks are drawn in the image. <008DL> and <008SL> tags override this parameter.
ksash	The thickness of the keeper sash.
lsash	The thickness of the lock sash.
ksig_xa	The distance between the outer edge of the frame to the left edge of the visible glass on the keeper sash.
lsig_xa	The distance between the outer edge of the frame to the left edge of the visible glass on the lock sash.
ksig_bya	The distance between the bottom outer edge of the frame to the edge of the visible glass on the keeper sash.
lsig_bya	The distance between the bottom outer edge of the frame to the edge of the visible glass on the lock sash.
ksig_tya	The distance between the top outer edge of the frame to the top edge visible glass on the keeper sash.
lsig_tya	The distance between the top outer edge of the frame to the top edge of the visible glass on the lock sash.
ksig_gwa	*Grid width adjustment value for the keeper IG. ½ of this value applied to each side.
lsig_gwa	*Grid width adjustment value for the lock IG. ½ of this value applied to each side.
ksig_gha	*Grid height adjustment value for the keeper IG. ½ of this value applied to the top and ½ to the bottom.
lsig_gha	*Grid height adjustment value for the lock IG. ½ of this value applied to the top and ½ to the bottom.
3lite	Width dimension. Once the ordered width of the patio door is greater than this amount, the object will draw a 3 lite patio door.
4lite	Width dimension. Once the ordered width of the patio door is greater than this amount, the object will draw a 4

	lite patio door.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
arrowSize	Controls the size of the sash movement arrow indicator. A typical value is 7. Set to 0 to turn off the sash movement indicator.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

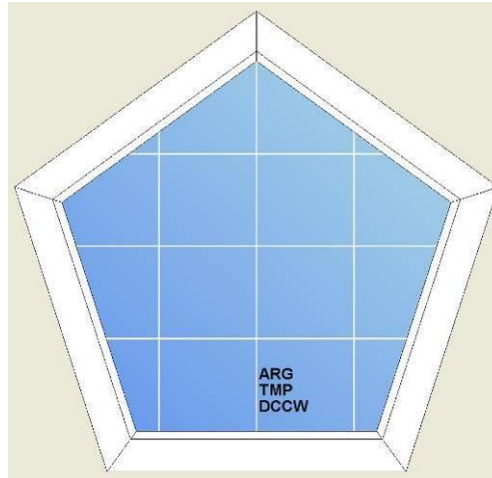
Keeper sash parameters (ksigxxx) are used for both keeper sashes in a 3 lite patio door. Lock sash parameters (lsigxxx) are used for both lock sashes in a 4 lite patio door.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the keeper sash IG is smaller than the lock IG for your slider window object, you may want to adjust the grid placement using the ksig_gha or lsig_gha parameter so the horizontal bars line up. The grid adjustment parameters do not change the size of the visible IG.

PATIO DOOR GRID LOCATIONS



DES-PENTAGON



NAME	SUPPORTED OPTIONS
DES-PENTAGON	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – special shape dimensions, doghouse selection.

PENTAGON OPTION TAGS

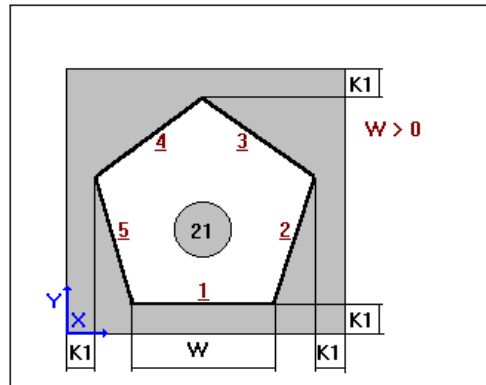
The pentagon uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has a tag to control special shape dimensions and a tag to select a doghouse window.

008 Operation/Miscellaneous

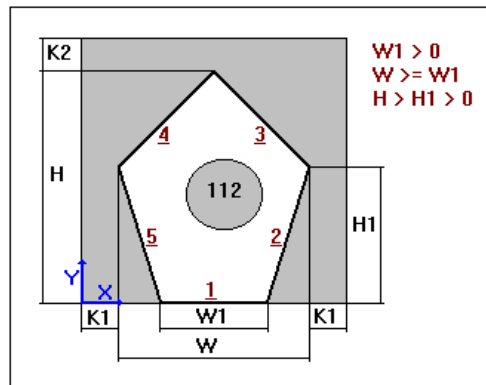
The pentagon has the ability to draw special shapes. Use the <008SHPDIM> tag to specify the shape dimensions.

Option Tags	Definition	Option Value
<008SHAPEDIM>	Shape dimensions.	Comma delimited string containing shape dimensions in specified format for the object.
<008DOGHSE>	Doghouse Pentagon	Leg Height - Required.

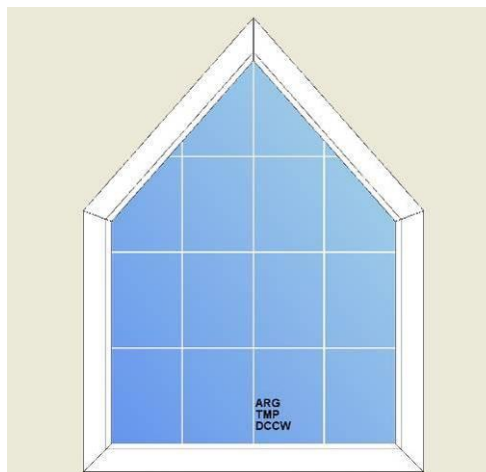
The <008SHPDIM> tag requires a string value containing shape dimensions. The pictures below show the shapes available and their shape dimension format.



Shape #21 is the default pentagon. It does not require the <008SHPDIM> tag. The picture shown above is a #21 pentagon.

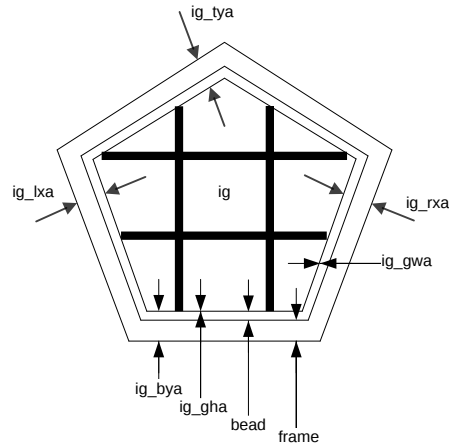


Shape #112 can be drawn using the <008SHPDIM> tag and specifying the H1 and W1 dimensions in the format H1=##, W1=## where ## is a number. The comma is required when entering multiple dimensions into the <008SHPDIM> option value. A “doghouse” window can be ordered by specifying the W1 parameter equal to the ordered width.



The <008DOGHSE> will also cause a doghouse window to be drawn. This tag requires an option value containing the leg height. Set the doghouse parameter to 1 if you want the object to always appear as a doghouse, instead of the true pentagon shape. If a true pentagon is desired, the doghouse parameter must be set to 0.

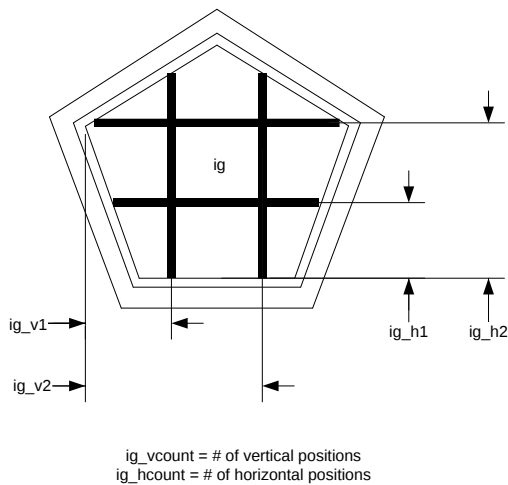
PENTAGON PARAMETERS



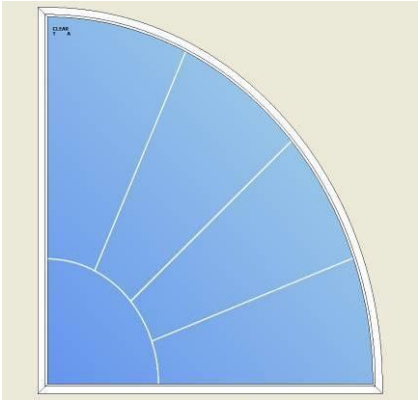
frame	The thickness of the frame.
bead	The thickness of the bead.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
dog_house	Dog House Draw Parameter: Set to 1 to always draw a “Dog House” pentagon Set to 0 to default draw a true pentagon.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

PENTAGON GRID LOCATIONS



DES-QUARTER ROUND



NAME	SUPPORTED OPTIONS
DES-QUARTER ROUND	- Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. - Grid – colonial, diamond, gothic, single/double prairie,

	single/double perimeter, ranch, spoke, sunstar, 2 hub sunstar, sunburst, 2 hub sunburst, sunburst over colonial, sunstar over colonial, spoke over colonial, radius crossbar, single/double perimeter bar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – extended leg, left
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QUARTER ROUND OPTION TAGS

The quarter round uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it includes additional grid types and an extended leg operation.

004 Grid Type

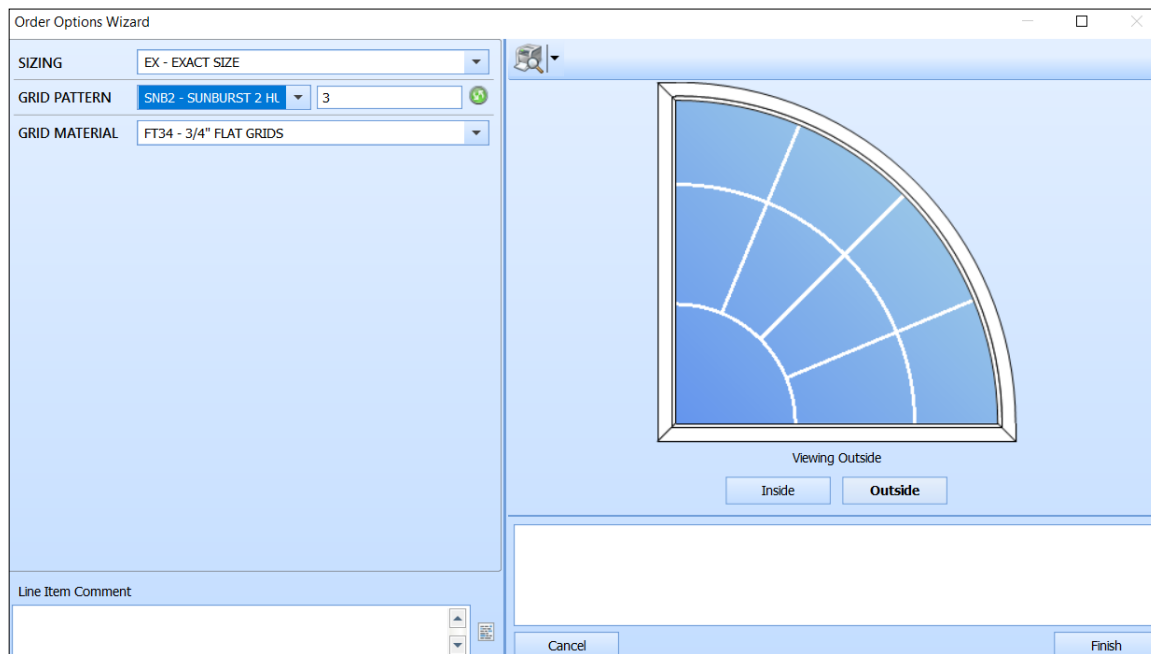
The Grid Type tags tell the ObjectViewer how to draw the grids. Possible grid types for the quarter round are colonial, diamond, gothic, prairie, double prairie, perimeter, double perimeter, ranch, spoke, sunstar, 2 hub sunstar, sunburst, and 2 hub sunburst, sunburst over colonial, sunstar over colonial, spoke over colonial. This section describes grid types that were not previously described in the picture window section.

Option Tags	Definition
<004BURSTL>	Sunburst over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004COL>	Colonial by window.
<004DIA>	Diamond by window.
<004DPER>	Double perimeter by window.
<004DPRA>	Double prairie by window.
<004GOTHIC>	Gothic by window (over colonial for extended leg). The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004NUMSPOKES>	Designates number of spokes for sunburst over colonial, sunstar over colonial, spoke over colonial grid types.
<004PER>	Perimeter by window.
<004PERPATT>	Perimeter pattern. See Appendix B.
<004PRA>	Prairie by window.
<004RAN>	Ranch by window.
<004RAND>	Distance from top of the window to the bottom horizontal bar of the ranch grids.
<004SPO>	Spoke by window.
<004SPOKEL>	Spoke over colonial by window. The top horizontal bar is set at

	the leg height. The rest of the IG is divided evenly into panes.
<004STARL>	Sunstar over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004SUN>	Sunstar by window.
<004SUN2HB>	Sunstar with 2 hubs by window.
<004SUNB>	Sunburst by window.
<004SUNB2HB>	Sunburst with 2 hubs by window.
<004PERBAR>	Perimeter bar pattern valid with extended leg only. Draws perimeter pattern #1 (see Appendix B) with additional short horizontal bars in the leg. Use <004NUMBARS> to specify the number of bars drawn evenly spaced in the leg (or bars can be drawn in a designated lower percentage of the leg).
<004DPERBAR>	Same as <004PERBAR> with double perimeter grids.
<004NUMBARS>	Designates the number of bars used with perimeter bar and double perimeter bar patterns which are available with extended leg only. In addition, an optional suffix can be added to the option value to specify a percentage of the lower leg that the bars should be drawn in. A value of 3/50 will draw 3 short horizontal bars in the lower half of the leg.
<004RADBAR>	Radius crossbar.
<004RISE>	Designate rise of crossbar.

You may have multiple variations of each grid type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <004SPO > can be assigned to option codes SPO1 and SPO2 by placing SPO1, SPO2 in the value column of Tag Setup for the tag <004SPO>.

The quarter round window below has the grid types SNB2 – 2 HUB SUNBURST, SNS2 – 2 HUB SUNSTAR, etc. under the GRID PATTERN question. These options need to be associated to tags so that ObjectViewer knows what grid pattern to display.



Let's set the grid options to the following tags in Tag Setup by entering the Tag Value below for each Option Tag listed:

Option	Option Tag	Tag Value
SNB2 – 2 HUB SUNBURST	<004SUNB2HB>	SNB2
SNS2 – 2 HUB SUNSTAR	<004SUN2HB>	SNS2
SPO – SPOKE GRID	<004SPO>	SPO
SNB - SUNBURST	<004SUNB>	SNB
SNS - SUNSTAR	<004SUN>	SNS

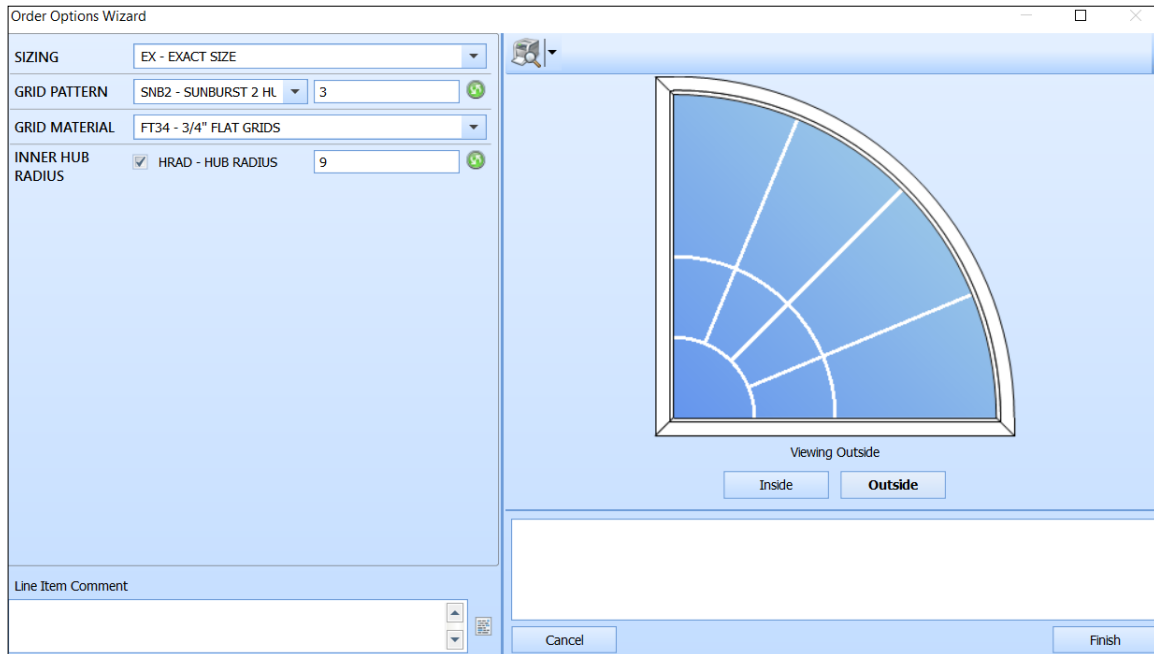
For grids to appear in the ObjectViewer, the grid pattern will need to be given in the correct format as an option value for the selected type of grids. All grid option values and necessary formats are explained in Appendix A. The 2 hub sunburst requires the number of spokes, entered as 3 above.

005 Grid Options

The Grid Options category further controls the drawing of grids.

Option Tags	Definition	Option Value
<005HUBRAD>	Internal hub radius required by spoke, sunstar, 2 hub sunstar, sunburst, and 2 hub sunburst grids.	Numerical value representing the internal hub radius. The outer hub radius is two times the internal hub radius.

In the previous example, the user must also specify the internal hub radius, entered as 9 below. The outer hub radius will be drawn at two times the internal hub radius.



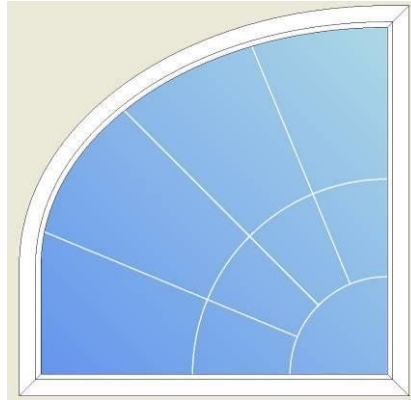
To relate the internal hub radius to ObjectViewer, assign the <005HUBRAD> tag to the option code for internal hub radius. In the picture above, HUBRAD is the name of the option code.

Option	Option Tag	Tag Value	Option Value
HRAD – INTERNAL HUB RADIUS	<005HUBRAD>	HRAD	Numerical value indicating the internal hub radius.

008 Operation/Miscellaneous

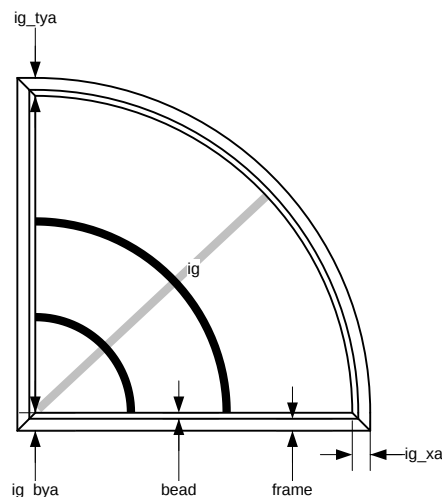
The quarter round also has the ability to draw an extended leg. The extended leg option requires a numerical value designating the length of the leg.

You may designate left or right operation for the quarter round. Right operation is the default. Left operation is specified with the <008LEFT> option tag. Below is a quarter round with the left and extended leg options.



Option Tags	Definition	Option Value
<008LEG>	Extended leg.	Numerical value indicating the length of the leg extended from the arch.
<008LEFT>	Direction of the arch relative to your default view.	none
<008TOPBAR>	Top bar offset for grid patterns on eyebrow with leg.	Numerical value indicating the distance the top horizontal bar will be moved from the leg height (leg height at outer edge of the frame).

QUARTER ROUND PARAMETERS

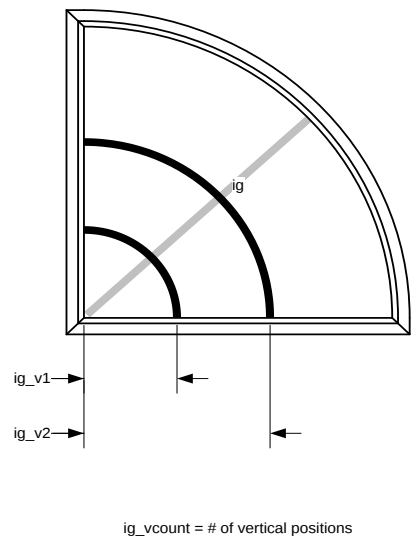


frame	The thickness of the frame.
bead	The thickness of the bead.
ig_xa	The distance between the outer edge of the frame to the edge of the visible glass.

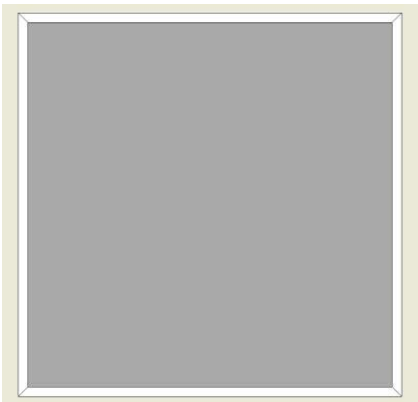
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
topBarOffsetType	Values: 1 = offset from top of window, 2 = offset from shoulder/leg of window. Used with sunburst, sunstar, gothic, spoke grid patterns with leg. Along with the <008TOPBAR> option or topBarPercent parameter, allows the user to adjust the top horizontal grid bar.
topBarPercent	Percentage of ordered height which will be used to adjust the top horizontal bar position. Used in conjunction with topBarOffsetType. <008TOPBAR> has priority over this parameter.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
grid_pattColonial	By default, the sunburst/sunstar/sunburstbar/spoke over colonial grid patterns add a dividing horizontal bar between the colonial area and the decorative pattern at the top. So, if the grid pattern is 2VX2H, 3 horizontal bars are displayed. If this parameter = 1, then the top horizontal dividing bar is not displayed.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

QUARTER ROUND GRID LOCATIONS



DES-SCREEN



NAME	SUPPORTED OPTIONS
DES-SCREEN	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Operation / Misc. – Optional spreader bar.

SCREEN OPTION TAGS

The screen uses the color tags as described in the picture window section plus it has a tag for including a spreader bar and tags for controlling the location of the spreader bar.

001 Window Options

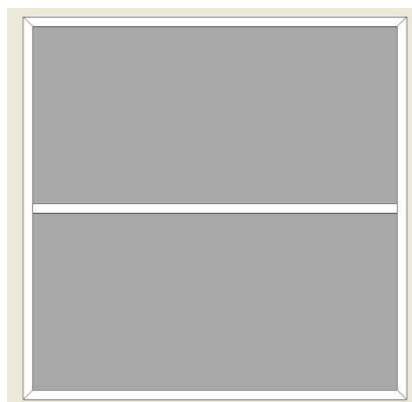
The ObjectViewer uses this category to display the window options Oriel, Cottage and Custom Center Meeting Rail.

Tag	Definition	Option Value
<001CMRB>	Center Meeting Rail Bottom offset adjustment.	Requires a numerical value that designates the number of inches from the middle of the center meeting rail to the bottom edge of the frame in multi-sash units.
<001CMRT>	Center Meeting Rail Top offset adjustment.	Requires a numerical value that designates the number of inches from the middle of the center meeting rail to the top edge of the frame in multi-sash units.
<001COTTAGE>	Adjusts the size of the keeper sash. As a default the keeper sash will be assigned 40% of the window height while the lock sash is assigned 60%.	Requires a numerical value that designates the percentage size of the keeper sash.
<001ORIEL>	Adjusts the size of the lock sash. As a default the lock sash will be assigned 40% of the window height while the keeper sash is assigned 60%.	Requires a numerical value that designates the percentage size of the lock sash.

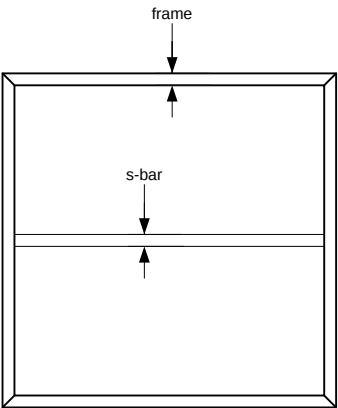
008 Operation/Miscellaneous

The screen has the ability to draw a spreader bar which is centered vertically in the screen. Use the <008SPREADER> tag to turn on/off the spreader bar.

Option Tags	Definition	Option Value
<008SPREADER>	Draw the spreader bar.	none

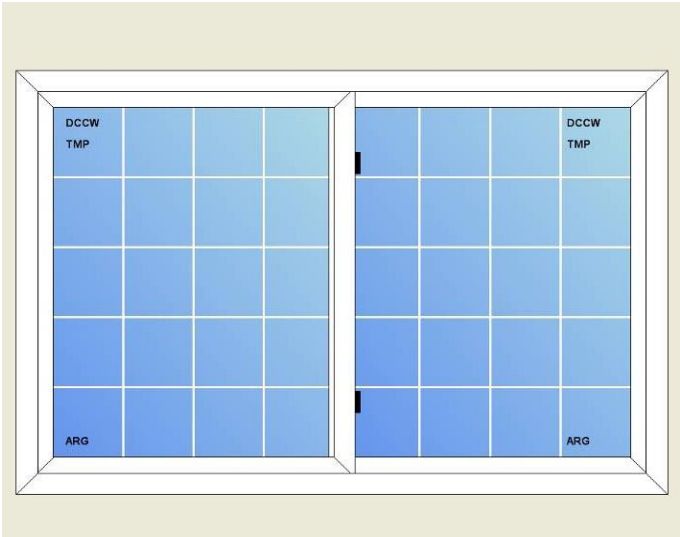


SCREEN PARAMETERS



frame	The thickness of the frame.
s-bar	The thickness of the spreader bar.

DES-SLIDER



NAME	SUPPORTED OPTIONS
DES-SLIDER	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Window Options - Supports a custom Center

	Meeting Rail location. This is set with the <001CMRL> tag for setting the location in reference to the left outer edge of the frame or <001CMRR> for setting the location in reference to the right outer edge of the frame. Supports ORIEL and COTTAGE options. • Operation/Misc. - Supports Single or Double Locks. Supports left or right operation relative to your default view.
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SLIDER OPTION TAGS

The slider window uses the same tags as the [single/double hung window](#) (see the single/double hung window section for details and configuration examples) except it has different tags to control the center meeting rail location and also includes left and right operation.

001 Window Options

The ObjectViewer uses this category to display the window options Oriel, Cottage and Custom Center Meeting Rail.

Tag	Definition	Option Value
<001CMRL>	Center Meeting Rail Left offset adjustment.	Requires a numerical value that designates the number of inches from the middle of the center meeting rail to the left outer edge of the frame in multi-sash units.
<001CMRR>	Center Meeting Rail Right offset adjustment.	Requires a numerical value that designates the number of inches from the middle of the center meeting rail to the right outer edge of the frame in multi-sash units.
<001COTTAGE>	Adjusts the size of the keeper sash. As a default the keeper sash will be assigned 40% of the window height while the lock sash is assigned 60%.	Requires a numerical value that designates the percentage size of the keeper sash.
<001ORIEL>	Adjusts the size of the lock sash. As a default the lock sash will be assigned 40% of the window height while the keeper sash is assigned 60%.	Requires a numerical value that designates the percentage size of the lock sash.

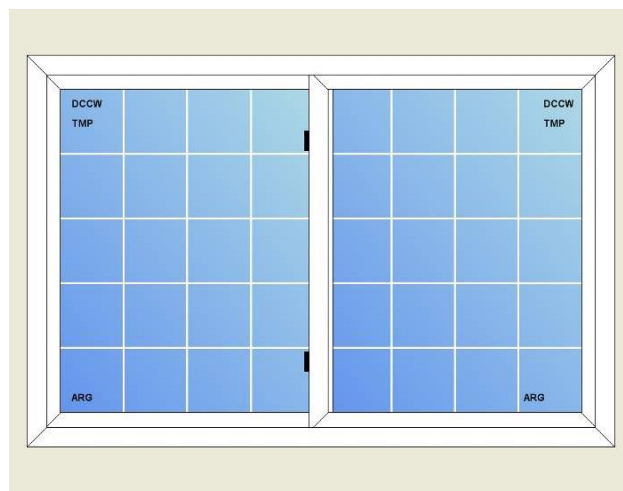
008 Operation/Miscellaneous

Drawing of single versus double locks is controlled by the <008DL> and <008SL> tags along with the dlock_h parameter.

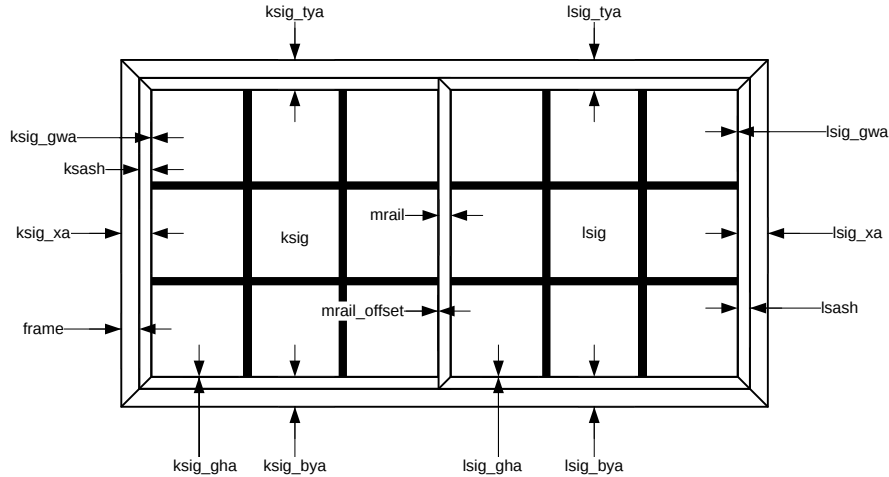
Option Tag	Definition
<008DL>	Implements Double Locks when 1) the window height is greater than the dlock_h parameter and <008SL> is not selected or 2) <008DL> is selected.
<008SL>	Display single locks when 1) the window height is less than or equal to the dlock_h parameter and <008DL> is not selected or 2) <008SL> is selected.
<008OX>	X marks the location of the lock sash relative to your default view. Lock sash is on the left as default. Use this tag to move the lock sash to the right side.

When the <008DL> and <008SL> tags are not configured, the display of single or double locks will be controlled by the dlock_h parameter. When the window width is greater than the dlock_h parameter value, double locks are drawn in the image. Otherwise a single lock is displayed. <008DL> and <008SL> tags take precedence over this parameter.

The picture at the beginning of this section shows a slider whose lock sash is on the left which is the default. Use the <008OX> tag to show the lock sash on the right as shown below.



SLIDER PARAMETERS

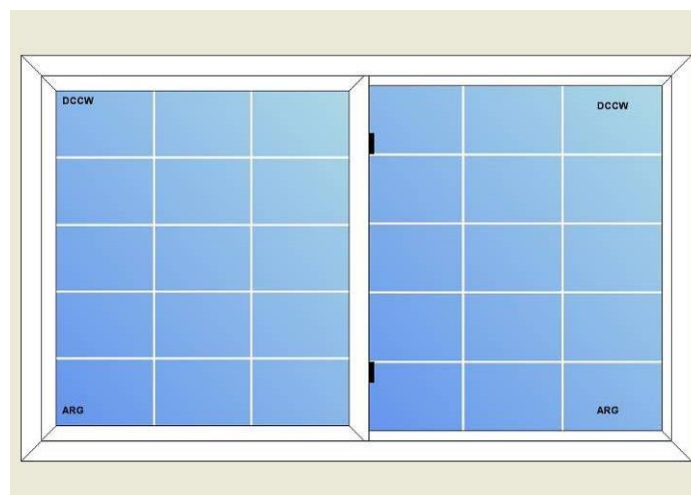


frame	The thickness of the frame.
mrail	The visible thickness of the meeting rail between two sashes.
mrail_offset	On a unit with multiple sashes, the meeting rail might not be in the exact center of the unit. Enter a plus or minus value to move the meeting rail in one direction or the other. A positive number decreases moves the meeting rail to the right while a negative number moves the meeting rail to the left, relative to your default view.
dlock_h	The maximum window height for displaying a single lock. When the window width is greater than this parameter number, double locks are drawn in the image. <008DL> and <008SL> tags override this parameter.
ksash	The thickness of the keeper sash.
lsash	The thickness of the lock sash.
ksig_xa	The distance between the outer edge of the frame to the left edge of the visible glass on the keeper sash.
lsig_xa	The distance between the outer edge of the frame to the left edge of the visible glass on the lock sash.
ksig_bya	The distance between the bottom outer edge of the frame to the edge of the visible glass on the keeper sash.
lsig_bya	The distance between the bottom outer edge of the frame to the edge of the visible glass on the lock sash.
ksig_tya	The distance between the top outer edge of the frame to the top edge visible glass on the keeper sash.
lsig_tya	The distance between the top outer edge of the frame to the top edge of the visible glass on the lock sash.
ksig_gwa	*Grid width adjustment value for the keeper IG. ½ of this value applied to each side.

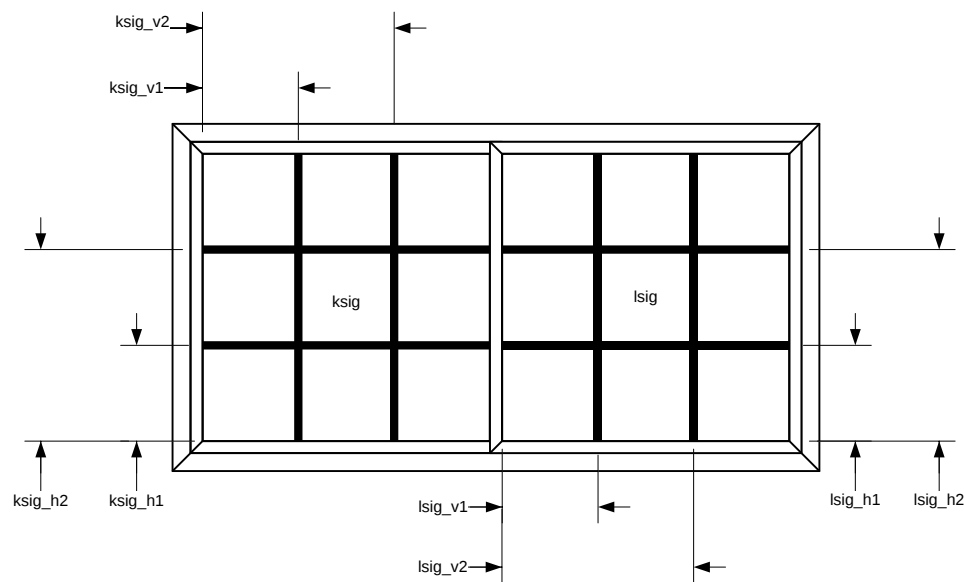
lsig_gwa	*Grid width adjustment value for the lock IG. ½ of this value applied to each side.
ksig_gha	*Grid height adjustment value for the keeper IG. ½ of this value applied to the top and ½ to the bottom.
lsig_gha	*Grid height adjustment value for the lock IG. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
arrowDisplay	Controls display of sash movement arrow indicator. Set to 1 to show the lock sash movement (single slider). Set to 2 to show both lock and keeper sash movement (dual slider). Set to 0 to turn off the sash movement indicator.
arrowSize	Controls the size of the sash movement arrow indicator. A typical value is 7. Set to 0 to turn off the sash movement indicator.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the keeper sash IG is smaller than the lock IG for your slider window object, you may want to adjust the grid placement using the ksig_gha or lsig_gha parameter so the horizontal bars line up. The grid adjustment parameters do not change the size of the visible IG.

If you offer a slider with only one moving sash, you can decrease the keeper sash thickness and increase the ksig_bya, ksig_tya, ksig_xa parameters to make the DES-SLIDER object appear as if it only has one moving sash as shown below. Remember that parameter setup can be changed for just one part, so you can still use the DES-SLIDER object for a two light slider.

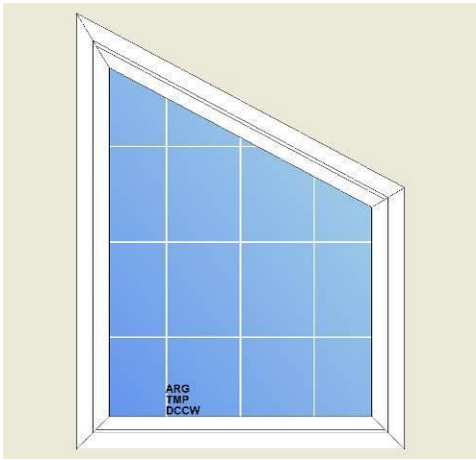


SLIDER GRID LOCATIONS



ksig_vcount = # of vertical positions
ksig_hcount = # of horizontal positions
lsig_vcount = # of vertical positions
lsig_hcount = # of horizontal positions

DES-TRAPEZOID



NAME	SUPPORTED OPTIONS
DES-TRAPEZOID	- Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. - Grid – colonial, diamond, ranch, radius crossbar. - Grid Options – bronze, v-groove - Glass Type – clear, low-e, bronze, obscure, gray.

	• Glass Options – glass process, gas. • Operation/Misc. – leg specification, left/right operation, special shape dimensions.
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TRAPEZOID OPTION TAGS

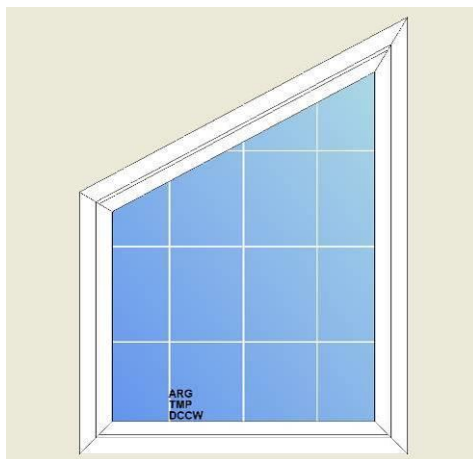
The trapezoid uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has tags to control the leg height, special shape dimensions, and left and right operation.

008 Operation/Miscellaneous

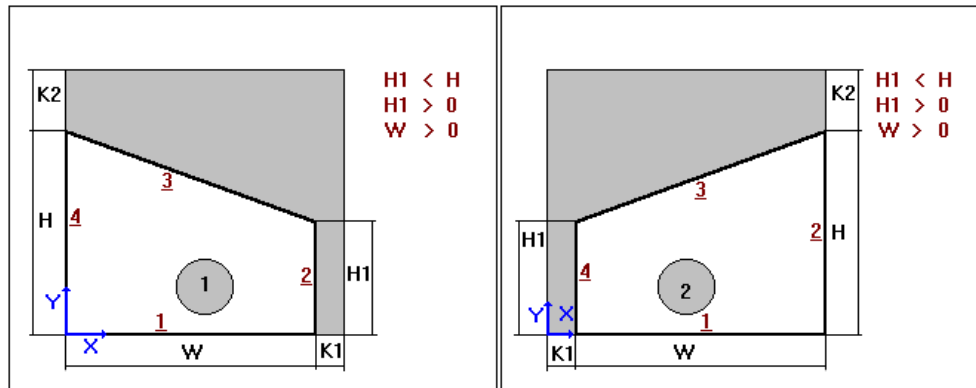
The trapezoid has the ability to change the leg height. Use the <008LEG> tag to specify the height of the leg.

Option Tags	Definition	Option Value
<008LEG>	Leg height.	Numerical value indicating the length of the leg extended from the arch.
<008SHAPEDIM>	Shape dimensions.	Comma delimited string containing shape dimensions in specified format for the object.
<008LEFT>	Direction of the trapezoid relative to your default view. Default direction is right. If the trapezoid has a short leg, the short leg will be on the right.	None

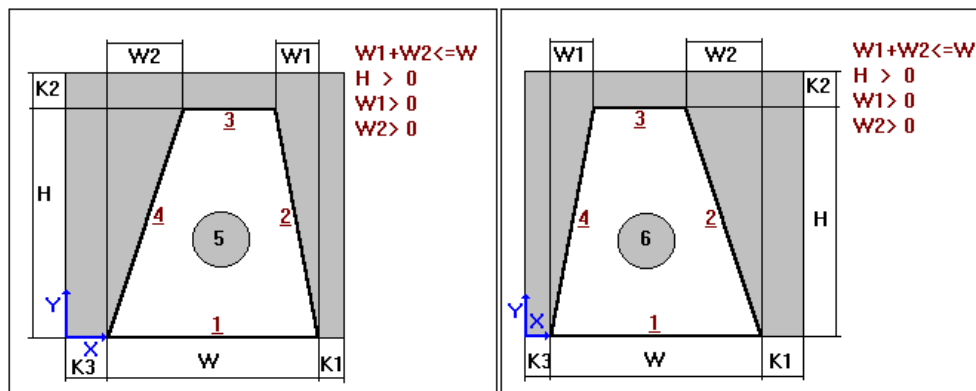
Use <008LEFT> to specify the direction of the trapezoid relative to your default view. The picture below shows the left direction, while the picture at the beginning of the section shows the default right direction.



The <008SHPDIM> tag requires a string value containing shape dimensions. The pictures below show the shapes available and their shape dimension format.

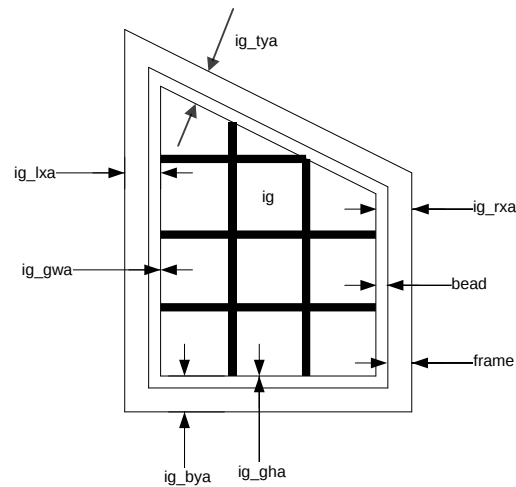


Shape #1 and #2 can be drawn with the <008LEG> tag which specifies the length of the leg, shown as $H1$ in the pictures. Or these shapes can be drawn using the <008SHPDIM> tag and specifying the $H1$ dimension in the format $H1=##$ where $##$ is a number indicating the leg height, for example $H1=20$. Use the <008LEFT> tag to designate shape #2.



Shape #5 and #6 can be drawn using the <008SHPDIM> tag and specifying the $W1$ and $W2$ dimensions in the format $W1=##, W2=##$ where $##$ is a number. The comma is required when entering multiple dimensions into the <008SHPDIM> option value. Use the <008LEFT> tag to designate shape #5.

TRAPEZOID PARAMETERS

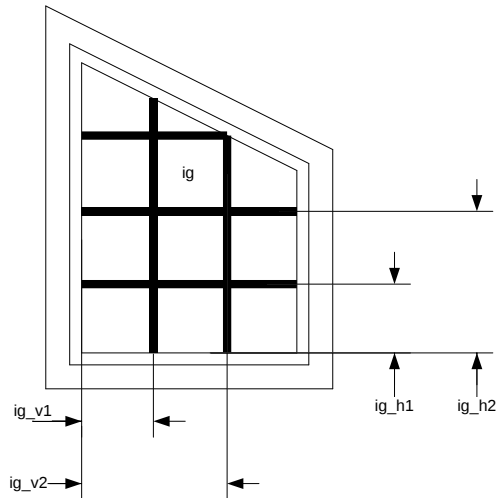


frame	The thickness of the frame.
bead	The thickness of the bead.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. $\frac{1}{2}$ of this value applied to each side.
ig_gha	*Grid height adjustment value. $\frac{1}{2}$ of this value applied to the top and $\frac{1}{2}$ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by $\frac{1}{2}$ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the

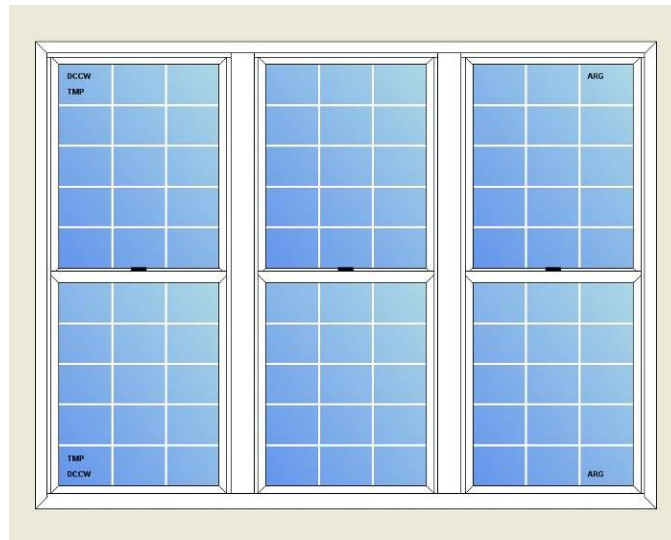
outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

TRAPEZOID GRID LOCATIONS



ig_vcount = # of vertical positions
ig_hcount = # of horizontal positions

DES-TRIPLE DOUBLE/SINGLE HUNG

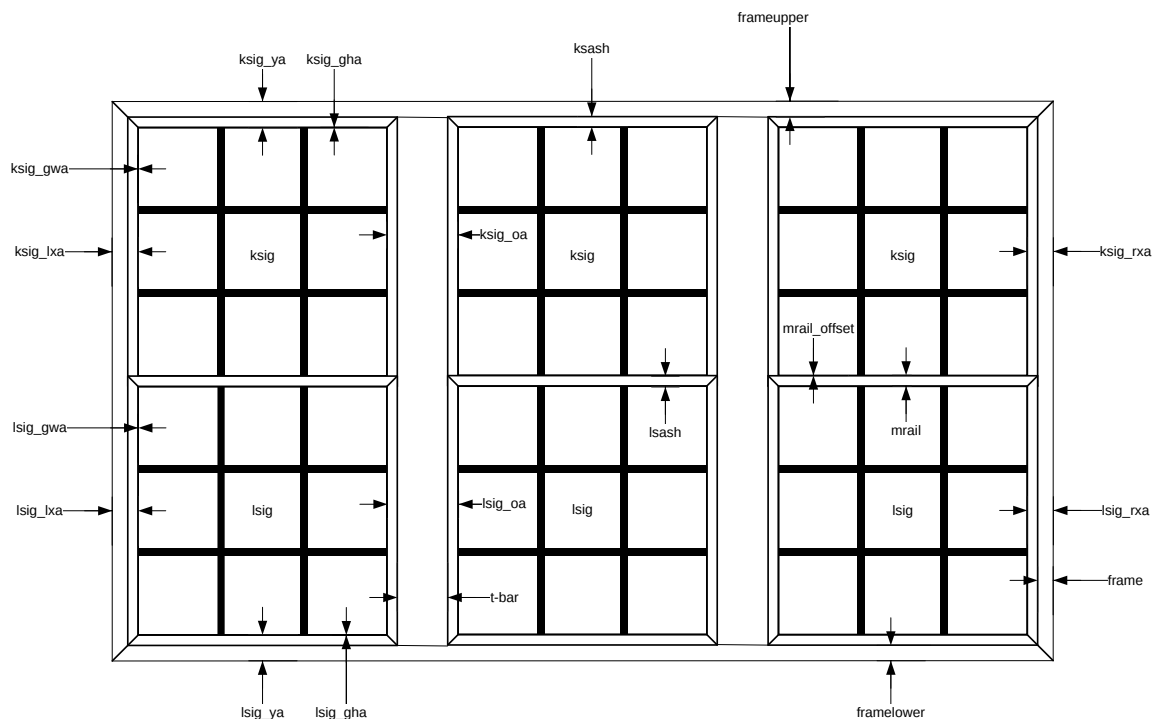


NAME	SUPPORTED OPTIONS
DES- TRIPLE DOUBLE/SINGLE HUNG	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Window Options - Supports a custom Center Meeting Rail location. This is set with the <001CMRB> tag for setting the location in reference to the bottom of the frame or <001CMRT> for setting the location in reference to the top of the frame. Supports ORIEL and COTTAGE options. • Operation/Misc. - Supports Single or Double Locks.

TRIPLE DOUBLE/SINGLE HUNG OPTION TAGS

The triple double/single hung uses the same tags as the [single/double hung window](#) (see the single/double hung window section for details and configuration examples).

TRIPLE DOUBLE/SINGLE HUNG PARAMETERS

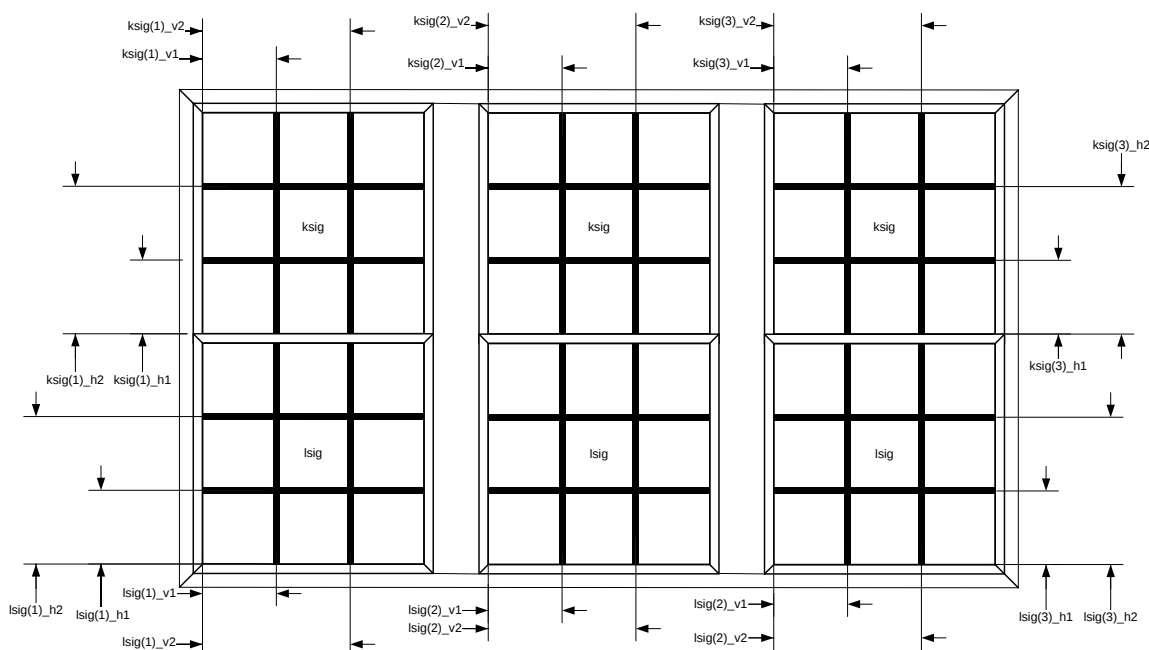


frame	The thickness of the frame.
frameupper	The thickness of the frame header.
framelower	The thickness of the frame sill.
mrail	The visible thickness of the meeting rail between two sashes.
mrail_offset	On a unit with multiple sashes, the meeting rail might not be in the exact center of the unit. Enter a plus or minus value to move the meeting rail in one direction or the other. A positive number moves the meeting rail down. A negative number moves the meeting rail up.
dlock_w	The maximum window width for displaying a single lock. When the window width is greater than this parameter number, double locks are drawn in the image. <008DL> and <008SL> tags override this parameter.
ksash	The thickness of the keeper sash.
lsash	The thickness of the lock sash.
ksig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass on the keeper sash.
lsig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass on the lock sash.
ksig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass on the keeper sash.
lsig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass on the lock sash.
ksig_ya	The distance between the top outer edge of the frame to the top edge visible glass.
lsig_ya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ksig_gwa	*Grid width adjustment value for the keeper IG. ½ of this value applied to each side.
lsig_gwa	*Grid width adjustment value for the lock IG. ½ of this value applied to each side.
ksig_gha	*Grid height adjustment value for the keeper IG. ½ of this value applied to the top and ½ to the bottom.
lsig_gha	*Grid height adjustment value for the lock IG. ½ of this value applied to the top and ½ to the bottom.
ksig_oa	Overall adjustment for the keeper sash. This is the distance between the keeper sashes.
lsig_oa	Overall adjustment for the lock sash. This is the distance between the lock sashes.
t-bar	Thickness of the t-bar.

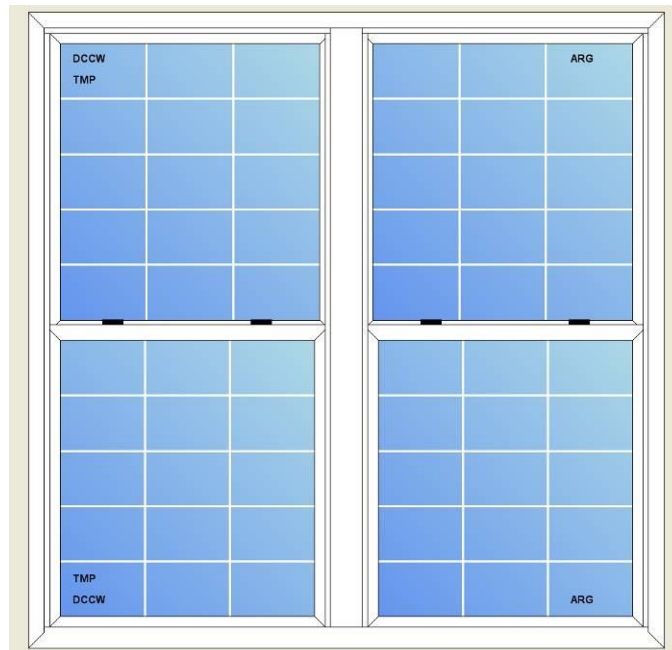
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
arrowDisplay	Controls display of sash movement arrow indicator. Set to 1 to show the bottom sash movement (single hung). Set to 2 to show both top and bottom sash movement (double hung). Set to 0 to turn off the sash movement indicator.
arrowSize	Controls the size of the sash movement arrow indicator. A typical value is 7. Set to 0 to turn off the sash movement indicator.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the keeper sash IG is smaller than the lock IG for your double/single hung window object, you may want to adjust the grid placement so the vertical bars line up. The grid adjustment parameters do not change the size of the visible IG.

TRIPLE DOUBLE/SINGLE HUNG GRID LOCATIONS



DES-TWIN DOUBLE/SINGLE HUNG

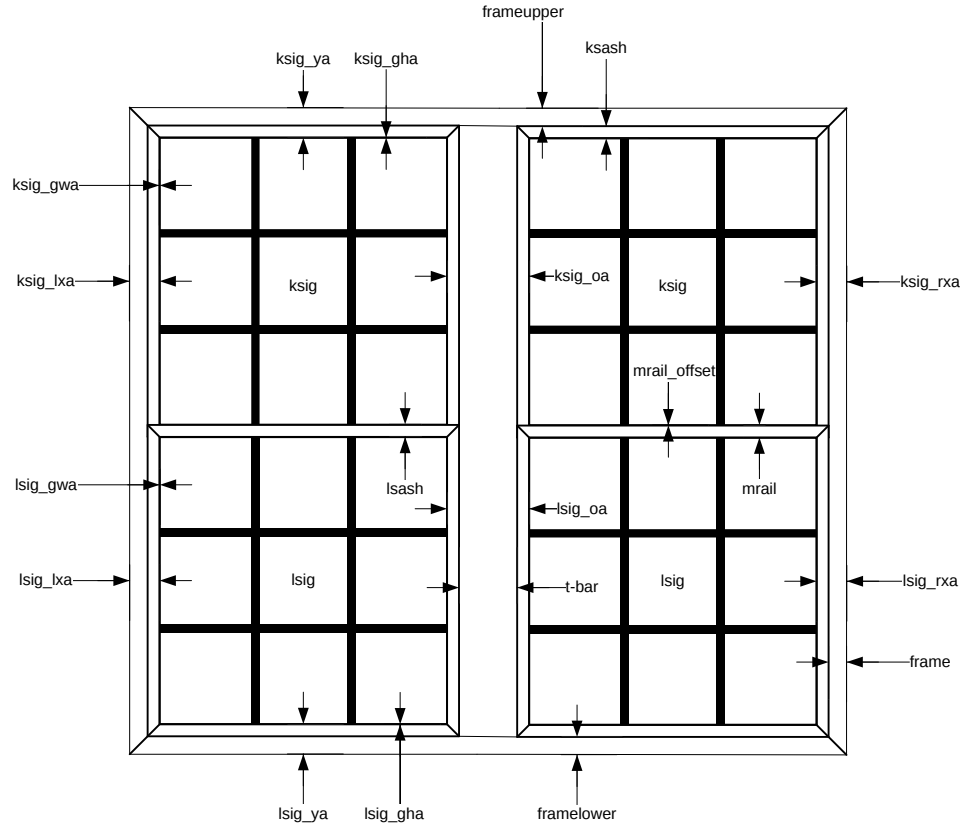


NAME	SUPPORTED OPTIONS
DES- TWIN DOUBLE/SINGLE HUNG	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Window Options - Supports a custom Center Meeting Rail location. This is set with the <001CMRB> tag for setting the location in reference to the bottom of the frame or <001CMRT> for setting the location in reference to the top of the frame. Supports ORIEL and COTTAGE options. • Operation/Misc. - Supports Single or Double Locks.

TWIN DOUBLE/SINGLE HUNG OPTION TAGS

The twin double/single hung uses the same tags as the [single/double hung window](#) (see the single/double hung window section for details and configuration examples).

TWIN DOUBLE/SINGLE HUNG PARAMETERS

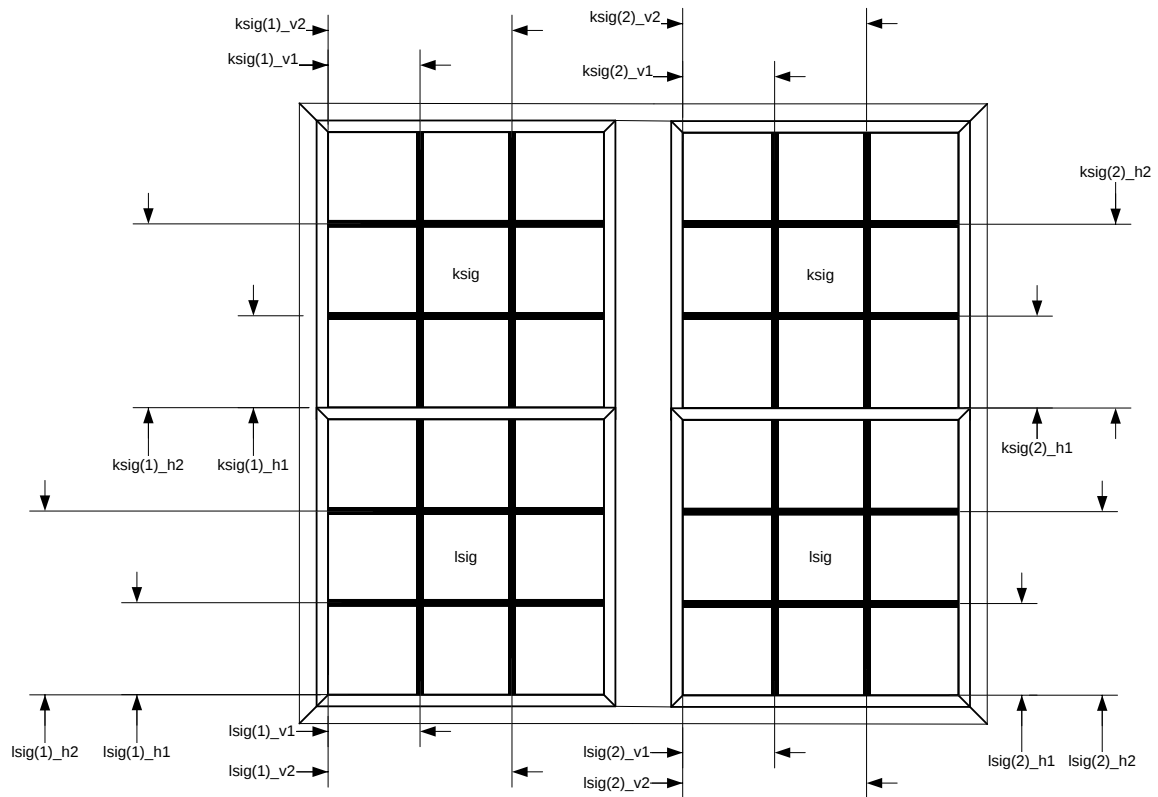


frame	The thickness of the frame.
frameupper	The thickness of the frame header.
framelower	The thickness of the frame sill.
mrail	The visible thickness of the meeting rail between two sashes.
mrail_offset	On a unit with multiple sashes, the meeting rail might not be in the exact center of the unit. Enter a plus or minus value to move the meeting rail in one direction or the other. A positive number moves the meeting rail down. A negative number moves the meeting rail up.
dlock_w	The maximum window width for displaying a single lock. When the window width is greater than this parameter number, double locks are drawn in the image. <008DL> and <008SL> tags override this parameter.
ksash	The thickness of the keeper sash.
lsash	The thickness of the lock sash.
ksig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass on the keeper sash.
lsig_lxa	The distance between the left outer edge of the frame

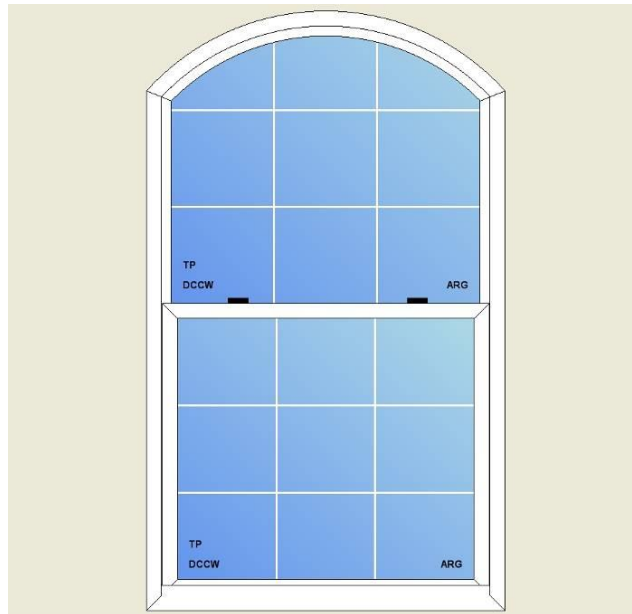
	to the left edge of the visible glass on the lock sash.
ksig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass on the keeper sash.
lsig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass on the lock sash.
ksig_ya	The distance between the top outer edge of the frame to the top edge visible glass.
lsig_ya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ksig_gwa	*Grid width adjustment value for the keeper IG. $\frac{1}{2}$ of this value applied to each side.
lsig_gwa	*Grid width adjustment value for the lock IG. $\frac{1}{2}$ of this value applied to each side.
ksig_gha	*Grid height adjustment value for the keeper IG. $\frac{1}{2}$ of this value applied to the top and $\frac{1}{2}$ to the bottom.
lsig_gha	*Grid height adjustment value for the lock IG. $\frac{1}{2}$ of this value applied to the top and $\frac{1}{2}$ to the bottom.
ksig_oa	Overall adjustment for the keeper sash. This is the distance between the keeper sashes.
lsig_oa	Overall adjustment for the lock sash. This is the distance between the lock sashes.
t-bar	Thickness of the t-bar.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
arrowDisplay	Controls display of sash movement arrow indicator. Set to 1 to show the bottom sash movement (single hung). Set to 2 to show both top and bottom sash movement (double hung). Set to 0 to turn off the sash movement indicator.
arrowSize	Controls the size of the sash movement arrow indicator. A typical value is 7. Set to 0 to turn off the sash movement indicator.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the keeper sash IG is smaller than the lock IG for your double/single hung window object, you may want to adjust the grid placement so the vertical bars line up. The grid adjustment parameters do not change the size of the visible IG.

TWIN DOUBLE/SINGLE HUNG GRID LOCATIONS



DES-PATTERN TOP DOUBLE/SINGLE HUNG



NAME	SUPPORTED OPTIONS
DES-PATTERN TOP DOUBLE/SINGLE HUNG	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Pattern Tops – trapezoid, full eyebrow, half eyebrow, half round, quarter round, pentagon. • Grid – cathedral, colonial, diamond, gothic, single/double prairie, single/double perimeter, ranch, prairie cathedral, perimeter cathedral, radius crossbar, cathedral sunburst, sunstar over colonial, spoke over colonial, sunburst over colonial, sunburst bar over colonial. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Window Options - Supports a custom Center Meeting Rail location. This is set with the <001CMRB> tag for setting the location in reference to the bottom of the frame or <001CMRT> for setting the location in reference to the top of the frame. Supports ORIEL and COTTAGE options. • Operation/Misc. - Supports Single or Double Locks. Supports full eyebrow, half eyebrow, trapezoid, half round and quarter round pattern tops.

PATTERN TOP DOUBLE/SINGLE OPTION TAGS

The pattern top double/single hung uses the same tags as the [single/double hung window](#) (see the single/double hung window section for details and configuration examples) except it has an additional tag used to control the pattern top and has additional grid options.

004 Grid Type

The Grid Type tags tell the ObjectViewer how to draw the grids. A variety of grid types are available.

Option Tags	Definition
<004BURSTL>	Sunburst over colonial by window.
<004BURSTLS>	Sunburst over colonial by sash. Allowed in the keeper/top sash.
<004BURSTBARL>	Sunburstbar over colonial by window. Valid for half round and full eyebrow only.
<004BURSTBARLS>	Sunburstbar over colonial by sash. Allowed in the keeper/top sash. Valid for half round and full eyebrow only.
<004CATH>	Cathedral by window. The bars are drawn by dividing the height and width of the keeper sash IG evenly into panes. The distance from the top edge of the IG to the top of the arc on the grid bar is the height of one pane. For eyebrows only.
<004CATHS>	Cathedral by sash.
<004CATHBURST>	Cathedral Sunburst by window. The bars are drawn by dividing the height and width of the keeper sash IG evenly into panes. The distance from the top edge of the IG to the top of the arc on the grid bar is the height of one pane. For eyebrows only. For eyebrows only.
<004CATHS>	Cathedral Sunburst by sash.
<004COL>	Colonial by window
<004COLS>	Colonial by sash.
<004DIA>	Diamond by window.
<004DIAS>	Diamond by sash.
<004DPER>	Double perimeter by window.
<004DPERS>	Double perimeter by sash.
<004DPRA>	Double prairie by window.
<004DPRAS>	Double prairie by sash.
<004GOTHIC>	Gothic over colonial by window.
<004GOTHICS>	Gothic over colonial by sash.
<004NUMSPOKES>	Designates number of spokes for sunburst over colonial, sunstar over colonial, and spoke over colonial grid types.

<004PER>	Perimeter by window.
<004PERS>	Perimeter by sash.
<004PERPATT>	Perimeter pattern. See Appendix B.
<004PERCATH>	Perimeter cathedral by window. If desired, use perimeter pattern 1 to hide bottom horizontal bar.
<004PERCATHS>	Perimeter cathedral by sash. If desired, use perimeter pattern 1 to hide bottom horizontal bar.
<004PRA>	Prairie by window.
<004PRAS>	Prairie by sash.
<004PRACATH>	Prairie cathedral by window.
<004PRACATHS>	Prairie cathedral by sash.
<004RAN>	Ranch by window.
<004RANS>	Ranch by sash.
<004RAND>	Distance from top of the window to the bottom horizontal bar of the ranch grids.
<004SPO>	Spoke by window.
<004SPOS>	Spoke by sash.
<004SPOKEL>	Spoke over colonial by window.
<004SPOKELS>	Spoke over colonial by sash. Allowed in the keeper/top sash.
<004SUN>	Sunstar by window.
<004SUNS>	Sunstar by sash.
<004SUN2HB>	Sunstar with 2 hubs by window.
<004SUN2HBS>	Sunstar with 2 hubs by sash.
<004SUNB>	Sunburst by window.
<004SUNBS>	Sunburst by sash.
<004SUNB2HB>	Sunburst with 2 hubs by window.
<004SUNB2HBS>	Sunburst with 2 hubs by sash.
<004STARL>	Sunstar over colonial by window.
<004STARLS>	Sunstar over colonial by sash. Allowed in the keeper/top sash.

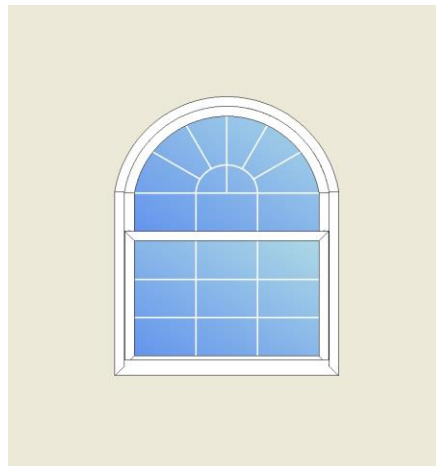
You may have multiple variations of each grid type to offer, so you can assign multiple options to a tag. For example, DIA1 and DIA2 are diamond grid options ordered by window. They can both be assigned to the tag <004DIA> by placing DIA1, DIA2 in the Value column for the <004DIA> tag.

Grids may be ordered by window or by sash. DIAS1 and DIAS2 are both diamond grid options ordered by sash. They can both be assigned to the tag <004DIAS> by placing DIAS1, DIAS2 in the Value column for the <004DIA> tag. These tags must be used with the individual sash grid question codes.

Question tags associated with 004 Grid Type Option Tags used by the above tags:

Question Tag	Definition	Used With Option Tags
{004KSGRIDS}	Keeper Sash Grid Type	<004COLS>, <004DIAS>, <004DPERS>, etc.
{004LSGRIDS}	Lock Sash Grid Type	<004COLS>, <004DIAS>, <004DPERS>, etc.
{004KSPERPATT} {004LSPERPATT}	Keeper Sash Perimeter Pattern Lock Sash Perimeter Pattern	<004PERPATT>
{004KSNUMSPOKES} {004LSNUMSPOKES}	Keeper Sash Number of Spokes Lock Sash Number of Spokes	<004NUMSPOKES>

Sunburstbar Over Colonial Grid Pattern:



008 Operation/Miscellaneous

Drawing of the pattern top is controlled by the <008PATTOP> tag. Height of the pattern top is controlled by the <008RISE> or <008LEG> tag.

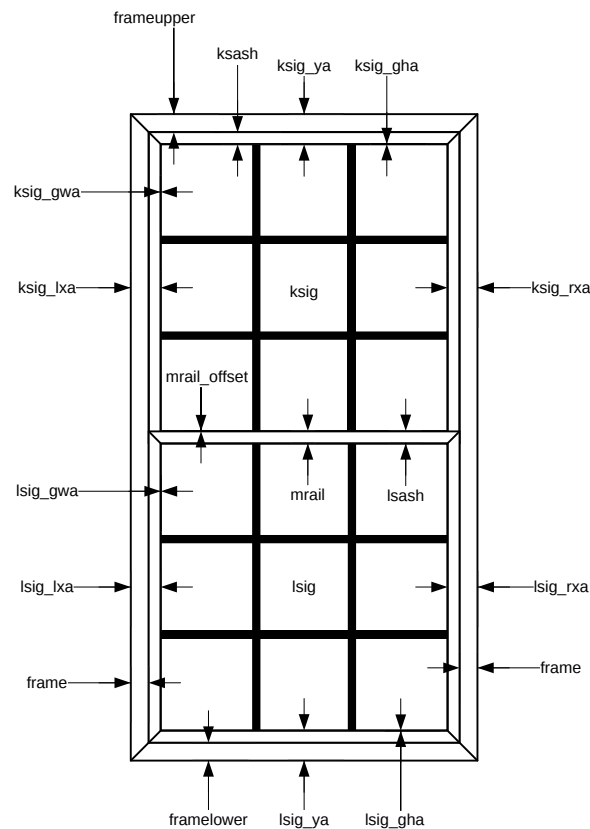
Drawing of single versus double locks is controlled by the <008DL> and <008SL> tags along with the dlock_w parameter.

Option Tag	Definition	Option Value
<008DL>	Implements Double Locks when 1) the window width is greater than the dlock_w parameter and <008SL> is not selected or 2) <008DL> is selected.	
<008SL>	Display single locks when 1) the window width is less than or equal to the dlock_w parameter and <008DL> is not selected or 2) <008SL> is selected.	

<008LEG>	Leg height.	Numerical value indicating the length of the leg extended from the arch.
<008RISE>	Rise height	Numerical value indicating the rise of the arch.
<008PATTOP>	Type of pattern top.	String value indicating the type of pattern top. Possible values are: TRAP, FEB, HEB, HR, QR, and PENT.
<008TRAP>	Trapezoid Pattern Top	None
<008PENT>	Pentagon Pattern Top	None
<008FEB>	Full Eyebrow Pattern Top	None
<008HEB>	Half Eyebrow Pattern Top	None
<008HRND>	Half Round Pattern Top	None
<008QRND>	Quarter Round Pattern Top	None
<008LEFT>	Direction of the pattern relative to your default view. Default direction is right.	None
<008TOPBAR>	Top bar offset for grid patterns on eyebrow with leg.	Numerical value indicating the distance the top horizontal bar will be moved from the leg height (leg height at outer edge of the frame).
<008RAD>	Option code used to specify the radius of the arc – valid in half eyebrow pattern top only. Needed for continuous arc functionality. This option code is not required. The display object will auto-calculate a regular arc based on height and width when this <008RAD> is not in use.	Positive numerical value specifying the radius of the arc.
<008CHD>	Center Height Distance – valid for half eyebrow pattern top only. This is the height of the window at the midpoint of the width. This option value alters the radius of the arc. The <008RAD> tag has precedence over <008CHD>.	Positive numerical value indicating the height of the window at the midpoint of the width (at width/2).

Assign the lock tags to your single and double lock option codes. When the <008DL> and <008SL> tags are not configured, the display of single or double locks will be controlled by the dlock_w parameter. When the window width is greater than the dlock_w parameter value, double locks are drawn in the image. Otherwise a single lock is displayed. <008DL> and <008SL> tags take precedence over this parameter.

PATTERN TOP DOUBLE/SINGLE PARAMETERS



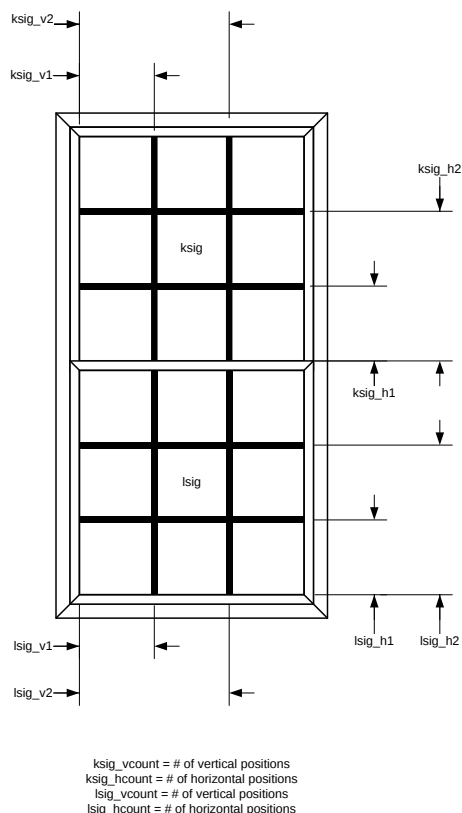
frame	The thickness of the frame.
frameupper	The thickness of the frame header.
framelower	The thickness of the frame sill.
mrail	The visible thickness of the meeting rail between two sashes.
mrail_offset	On a unit with multiple sashes, the meeting rail might not be in the exact center of the unit. Enter a plus or minus value to move the meeting rail in one direction or the other. A positive number moves the meeting rail down while a negative number moves the meeting rail up.
mrail_IsPercentLeg	This parameter allows the user to set the lock sash height as a percentage of the leg height of the

	window. For example, a value of 50 sets the lock sash height to 50 percent of the window leg height. This allows the user to adjust for the fact that the lock sash cannot be raised to the top of the window due to the pattern top. The parameter mrail_offset is still applied after the parameter mrail_IsPercentLeg, to allow for further adjustment of the meeting rail due to material profile, etc. Parameter mrail_IsPercentLeg must be a positive number.
dlock_w	The maximum window width for displaying a single lock. When the window width is greater than this parameter number, double locks are drawn in the image. <008DL> and <008SL> tags override this parameter.
ksash	The thickness of the keeper sash.
lsash	The thickness of the lock sash.
ksig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass on the keeper sash.
lsig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass on the lock sash.
ksig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass on the keeper sash.
lsig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass on the lock sash.
ksig_ya	The distance between the top outer edge of the frame to the top edge visible glass.
lsig_ya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ksig_gwa	*Grid width adjustment value for the keeper IG. ½ of this value applied to each side.
lsig_gwa	*Grid width adjustment value for the lock IG. ½ of this value applied to each side.
ksig_gha	*Grid height adjustment value for the keeper IG. ½ of this value applied to the top and ½ to the bottom.
lsig_gha	*Grid height adjustment value for the lock IG. ½ of this value applied to the top and ½ to the bottom.
shape	This parameter may be set to the default shape you would like displayed in order entry. The base object ships with this parameter set to FEB. Available values are: TRAP, FEB, HEB, HR, QR, PENT
topBarOffsetType	Values: 1 = offset from top of window, 2 = offset from shoulder/leg of window. Used with sunburst, sunstar, gothic, spoke grid patterns with leg. Along with the

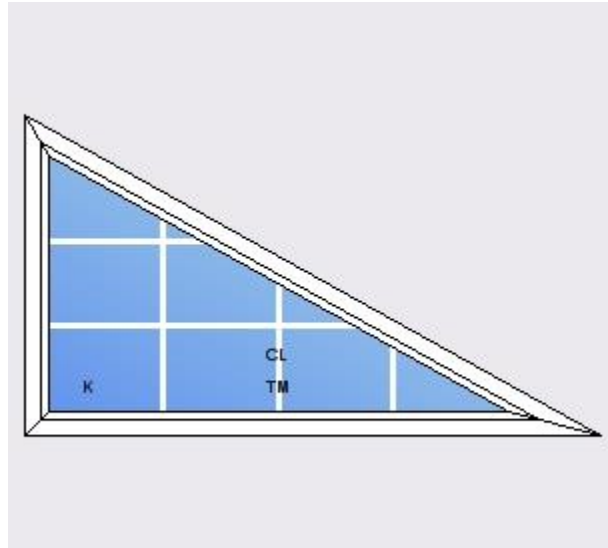
	<008TOPBAR> option or topBarPercent parameter, allows the user to adjust the top horizontal grid bar.
topBarPercent	Percentage of ordered height which will be used to adjust the top horizontal bar position. Used in conjunction with topBarOffsetType. <008TOPBAR> has priority over this parameter.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
grid_pattColonial	By default, the sunburst/sunstar/sunburstbar/spoke over colonial grid patterns add a dividing horizontal bar between the colonial area and the decorative pattern at the top. So, if the grid pattern is 2VX2H, 3 horizontal bars are displayed. If this parameter = 1, then the top horizontal dividing bar is not displayed.
arrowSize	Controls the size of the sash movement arrow indicator. A typical value is 7. Set to 0 to turn off the sash movement indicator.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the keeper sash IG is smaller than the lock IG for your double/single hung window object, you may want to adjust the grid placement, so the vertical bars line up.

PATTERN TOP DOUBLE/SINGLE GRID LOCATIONS



DES-TRIANGLE



NAME	SUPPORTED OPTIONS
DES-TRIANGLE	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, radius crossbar, spoke, sunstar, 2 hub star, sunburst, 2 hub sunburst. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – special shape dimensions.

TRIANGLE OPTION TAGS

The triangle uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has a tag to control special shape dimensions.

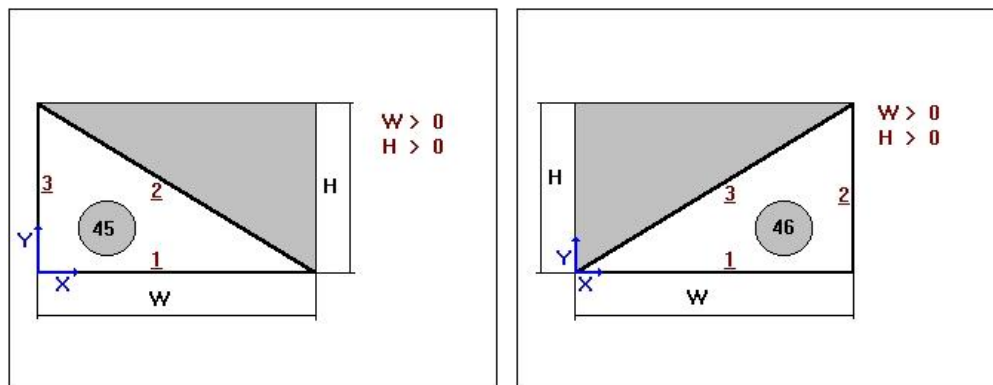
008 Operation/Miscellaneous

The triangle has the ability to draw special shapes. Use the following tags to change the triangle's shape.

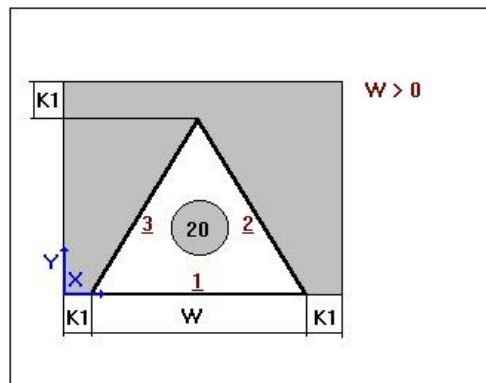
Option Tags	Definition	Option Value
<008ISOT>	Creates an isosceles triangle	None
<008LEFT>	Direction of the arch relative to your default view. Default direction is right.	None

<008CTRL>	Custom Triangle	Number indicating the distance from the top of the triangle to the right side of the triangle.
<008SHAPEDIM>	Shape dimensions.	Comma delimited string containing shape dimensions in specified format for the object.

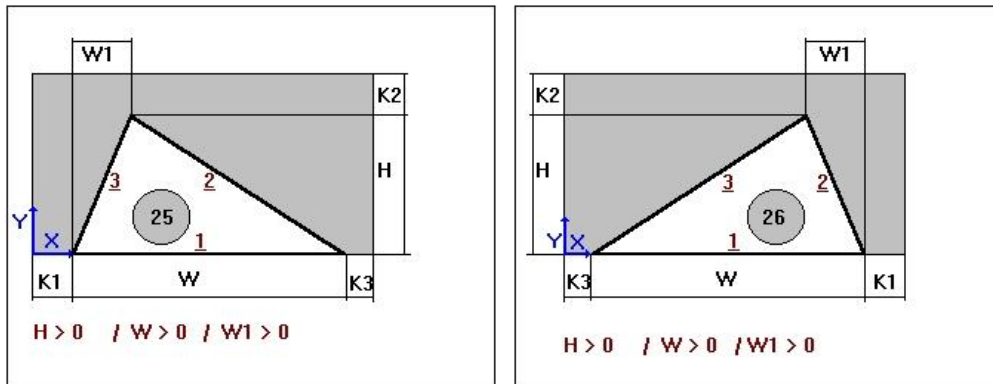
The <008SHPDIM> tag requires a string value containing shape dimensions. The pictures below show the shapes available and their shape dimension format.



Shape #46 is the default triangle. It does not require the <008SHPDIM> tag. To get shape #45 use the <008LEFT> tag.

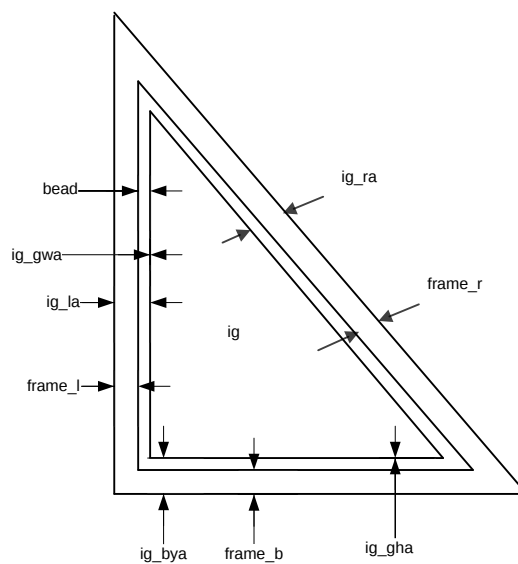


Shape #20 is an isosceles triangle. It does not require the <008SHPDIM> tag. To get shape #45 use the <008ISOT> tag.



Shape #26 can be drawn using the <008SHPDIM> tag and specifying the W1 dimension in the format W1=## where ## is a number. To draw shape # 26, use both the <008SHPDIM> tag and the <008LEFT> tag.

TRIANGLE PARAMETERS

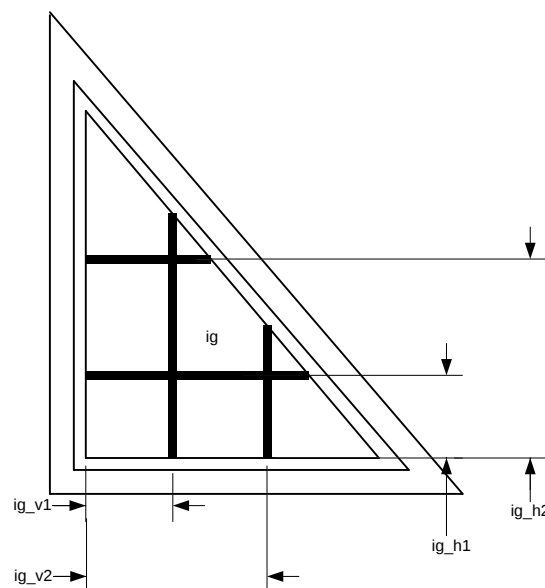


frame_l	The thickness of the frame, on the left side	Typically, the same
frame_r	The thickness of the frame, on the right side	
frame_r	The thickness of the frame, on the bottom	
bead	The thickness of the bead.	
ig_la	The distance between the left outer edge of the frame to the left edge of the visible glass.	
ig_ra	The distance between the right outer edge of the frame to the right edge of the visible glass.	
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.	

ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
tri_type	Triangle Type Lockout: Set to “1” to force Isosceles
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

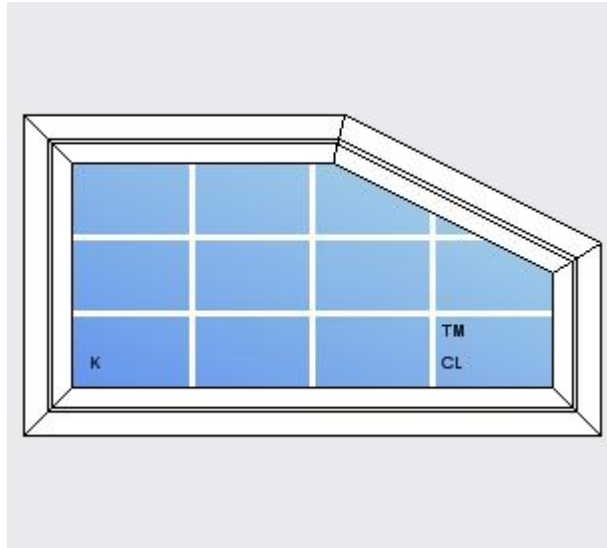
**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

TRIANGLE GRID LOCATIONS



ig_vcount = # of vertical positions
ig_hcount = # of horizontal positions

DES-CHOP TRAPEZOID



NAME	SUPPORTED OPTIONS
DES-CHOP TRAPEZOID	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, single/double prairie, single/double perimeter, ranch, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – special shape dimensions.

CHOP TRAPEZOID OPTION TAGS

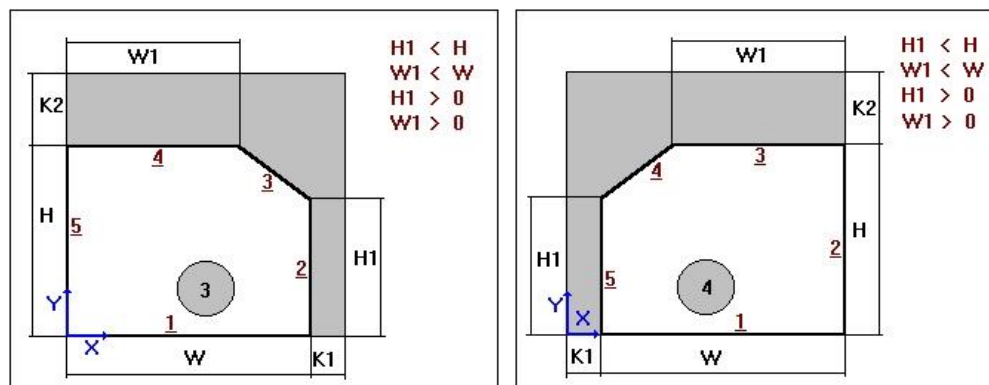
The Chop Trapezoid uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has a tag to control special shape dimensions.

008 Operation/Miscellaneous

The Chop Trapezoid has the ability to draw special shapes. Use the following tags to change the Chop Trapezoid's shape.

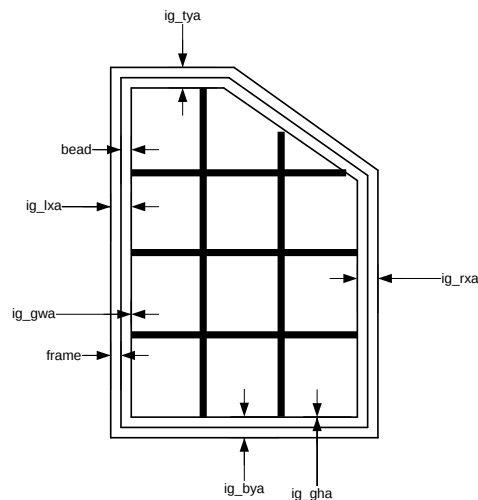
Option Tags	Definition	Option Value
<008LEFT>	Direction of the arch relative to your default view. Default direction is right.	None
<008LEG>	Leg Height	Number indicating the short leg height
<008ARM>	Arm Length	Number indicating the short arm height
<008SHAPEDIM>	Shape dimensions.	Comma delimited string containing shape dimensions in specified format for the object.

The <008SHPDIM> tag requires a string value containing shape dimensions. The pictures below show the shapes available and their shape dimension format.



Shape #3 can be drawn using the <008SHPDIM> tag and specifying the $W1$ dimension in the format $W1=##$ where $##$ is a number. To draw shape #4, use both the <008SHPDIM> tag and the <008LEFT> tag. Alternatively, the options <008LEG> and <008ARM> can be used to specify $H1$ and $W1$ respectively.

CHOP TRAPEZOID PARAMETERS

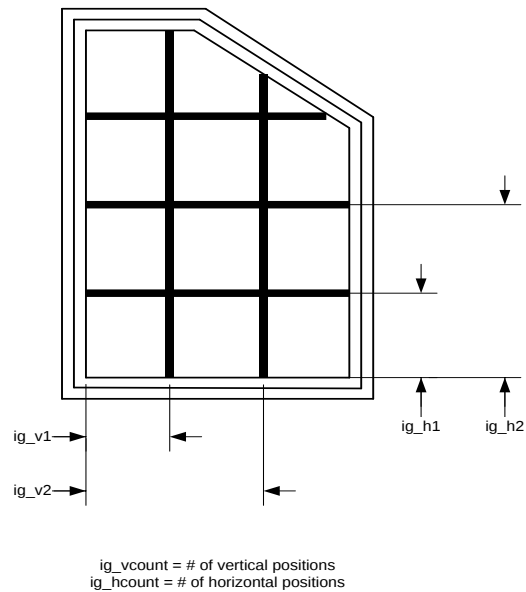


frame	The thickness of the frame
bead	The thickness of the bead.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

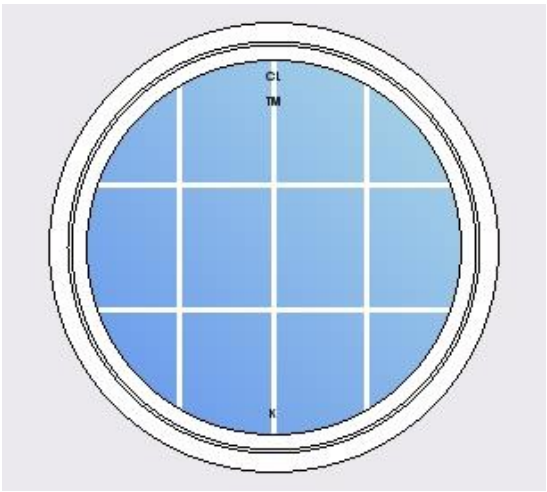
**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the

visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

CHOP TRAPEZOID GRID LOCATIONS



DES-CIRCLE



NAME	SUPPORTED OPTIONS
DES-CIRCLE	- Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. - Grid – colonial, diamond, single/double prairie, single/double perimeter, radius crossbar, spokes, sunburst, Sunstar, 2 hub sunburst, 2 hub sunstar, sunburst wheel (1 and 2 hubs), sunburst bar (1 and 2 hubs).

	• Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas.
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CIRCLE OPTION TAGS

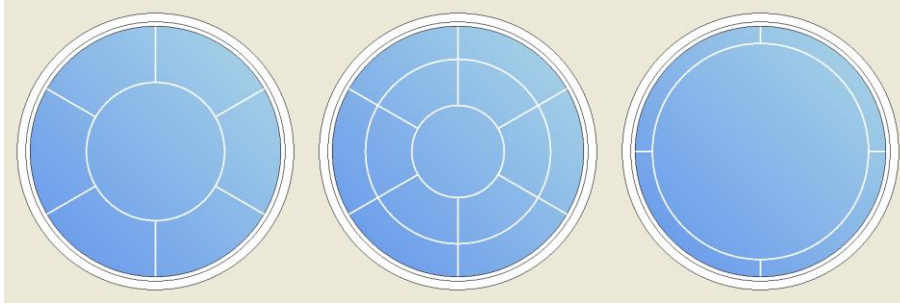
The circle uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it includes additional grid types.

004 Grid Type

The Grid Type tags tell the ObjectViewer how to draw the grids. Possible grid types for the circle are colonial, diamond, prairie, double prairie, perimeter, double perimeter, sunburst (1 and 2 hub), sunburst bar (1 and 2 hub), and sunburst wheel (1 and 2 hub). This section describes grid types that were not previously described in the picture window section.

Option Tags	Definition	Option Value
<004COL>	Colonial.	Pattern as described in Appendix A.
<004DIA>	Diamond.	Pattern as described in Appendix A.
<004DPER>	Double perimeter.	Distance from edge as described in Appendix A.
<004DPRA>	Double prairie.	Distance from edge as described in Appendix A.
<004PER>	Perimeter.	Distance from edge.
<004PRA>	Prairie.	Distance from edge.
<004RADBAR>	Radius crossbar.	Distance from top.
<004SPO>	Spoke.	Number of spokes.
<004SUN>	Sunstar.	Number of spokes.
<004SUN2HB>	Sunstar with 2 hubs.	Number of spokes.
<004SUNB>	Sunburst.	Number of spokes.
<004SUNB2HB>	Sunburst with 2 hubs.	Number of spokes.
<004SUNBW>	Sunburst Wheel.	Number of spokes.
<004SUNBW2HB>	Sunburst Wheel with 2 hubs.	Number of spokes.
<004SUNBBAR>	Sunburst Bar.	Number of spokes.
<004SUNBBAR2HB>	Sunburst Bar with 2 hubs.	Number of spokes.

Some circle grid pattern examples:



Sunburst Wheel

Sunburst Wheel 2 Hub

Perimeter

You may have multiple variations of each grid type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <004SPO> can be assigned to option codes SPO1 and SPO2 by placing SPO1, SPO2 in the value column of Tag Setup for the tag <004SPO>.

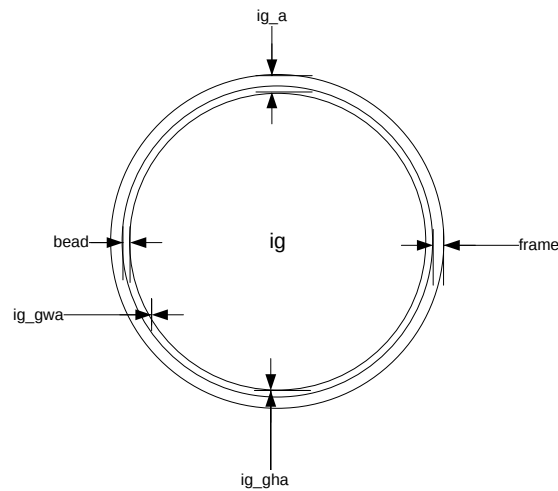
For grids to appear in the ObjectViewer, the grid pattern will need to be given in the correct format as an option value for the selected type of grids. All grid option values and necessary formats are explained in Appendix A.

005 Grid Options

The Grid Options category further controls the drawing of grids.

Option Tags	Definition	Option Value
<005HUBRAD>	Internal hub radius required by sunstar, sunburst, sunburst bar and sunburst wheel	Numerical value representing the internal hub radius. The outer hub radius is two times the internal hub radius unless <005HUBRAD2> is used.
<005HUBRAD2>	Outer hub radius required by sunburst, sunburst bar and sunburst wheel grids only.	Numerical value representing the outer hub radius. The outer hub radius is two times the internal hub radius.
<005BLUE>	Grid color which can be used to represent v-groove.	N/A
<005GOLD>	Grid color which can be used to represent brass.	N/A

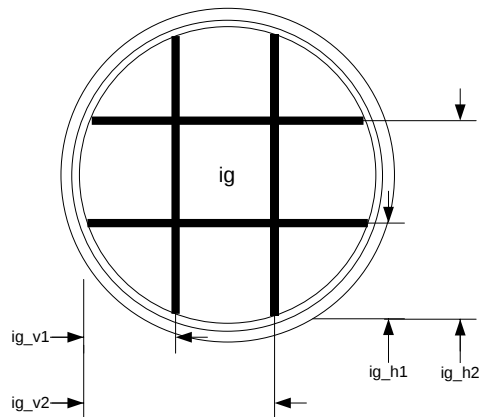
CIRCLE PARAMETERS



frame	The thickness of the frame.
bead	The thickness of the bead.
ig_a	The distance between the outer edge of the frame to the edge of the visible glass.
ig_gwa	*Grid width adjustment value. $\frac{1}{2}$ of this value applied to each side.
ig_gha	*Grid height adjustment value. $\frac{1}{2}$ of this value applied to the top and $\frac{1}{2}$ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

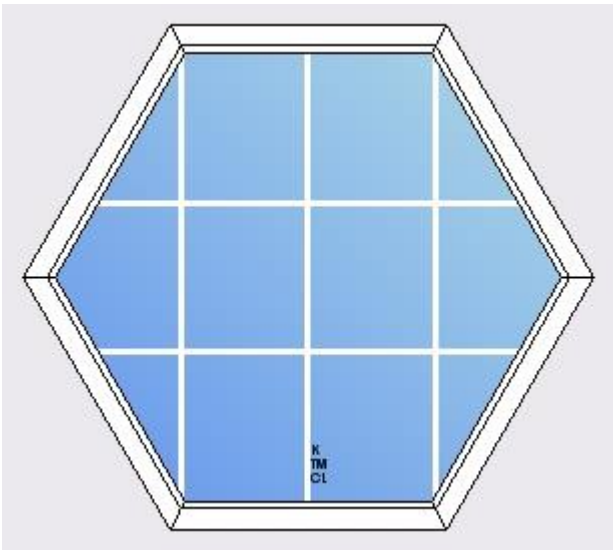
**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by $\frac{1}{2}$ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

CIRCLE GRID LOCATIONS



ig_vcount = # of vertical positions
ig_hcount = # of horizontal positions

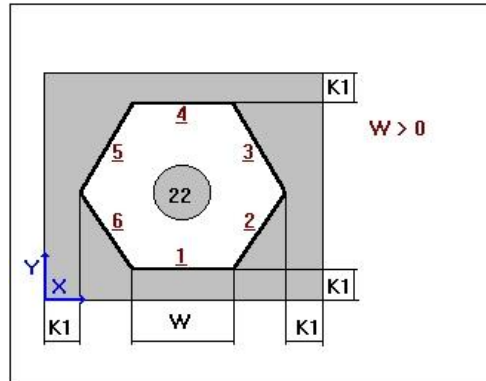
DES-HEXAGON



NAME	SUPPORTED OPTIONS
DES-HEXAGON	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, radius crossbar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – special shape dimensions.

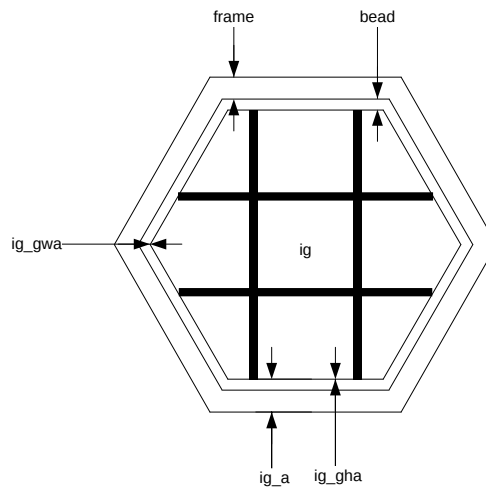
HEXAGON OPTION TAGS

The hexagon uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples).



Shape #22 is the default hexagon. The picture at the beginning of this section shows a #22 hexagon.

HEXAGON PARAMETERS

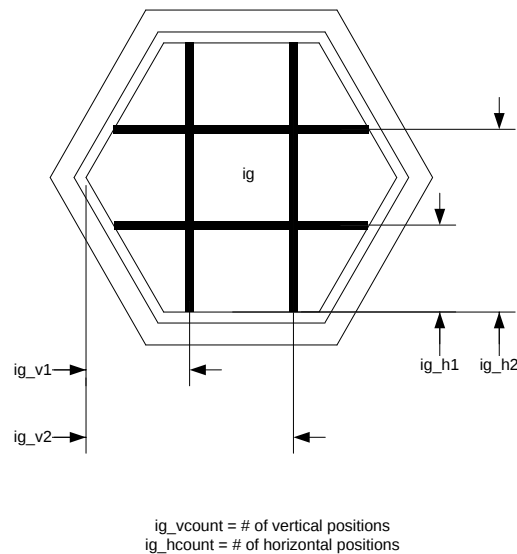


frame	The thickness of the frame.
bead	The thickness of the bead.
ig_a	The distance between the outer edge of the frame to the edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.

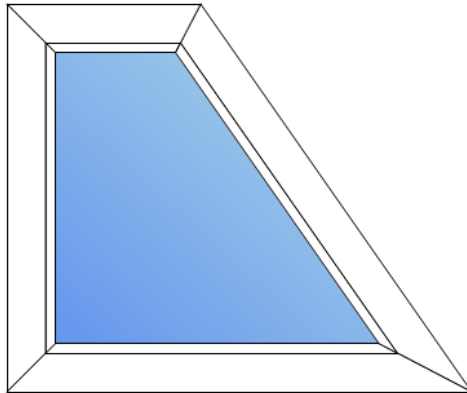
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

HEXAGON GRID LOCATIONS



DES-QUARTER HEXAGON



NAME	SUPPORTED OPTIONS
DES-QUARTER HEXAGON	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, ranch, radius crossbar, spokes, sunstar, 2 hub sunstar, sunburst, 2 hub sunburst. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – optional leg dimension, left/right direction.

QUARTER HEXAGON OPTION TAGS

The quarter hexagon uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it also has optional tags to control leg dimensions.

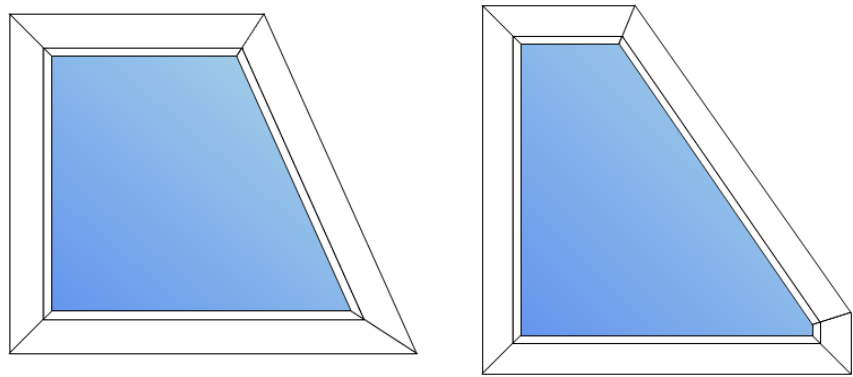
008 Operation/Miscellaneous

The quarter hexagon dimensions can be adjusted with the <008LEG> and <008HORIZLEG> tags. If the leg dimensions are not used, the object draws using regular hexagon dimensions based on the ordered width.

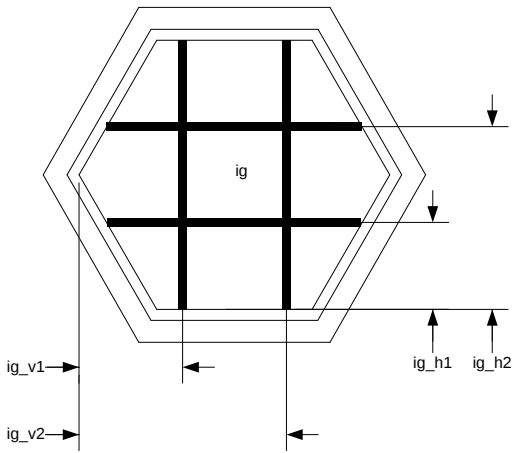
Option Tags	Definition	Option Value
<008LEG>	Vertical leg dimension for extended leg.	Positive numerical value indicating the length of the short vertical side of the quarter hexagon.
<008HORIZLEG>	Horizontal leg dimension.	Positive numerical value indicating the length of the top horizontal side of the half hexagon.

<008LEFT>	Direction of the short side relative to your default view.	
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The pictures below show the quarter hexagon with various leg values, including an optional extended vertical leg.



QUARTER HEXAGON PARAMETERS



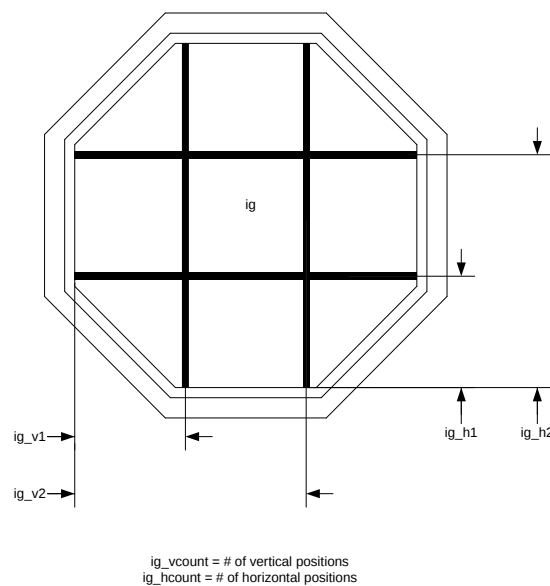
ig_vcount = # of vertical positions
ig_hcount = # of horizontal positions

frame	The thickness of the frame.
bead	The thickness of the bead.
dim_height	Default height when no ordered height is specified.
dim_width	Default width when no ordered width is specified.
ig_lxa	The distance between the left outer edge of the frame to the left edge of the visible glass.
ig_rxa	The distance between the right outer edge of the frame to the right edge of the visible glass.
ig_tya	The distance between the top outer edge of the frame to the top edge

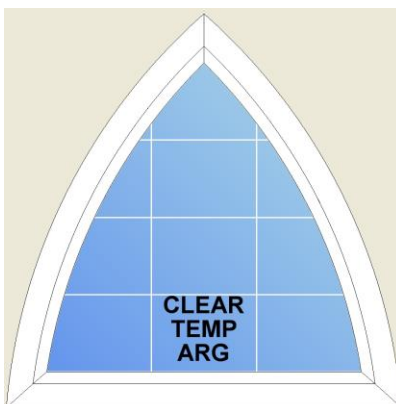
	visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.
grid_prairieDist	Default double perimeter/prairie distance between bars.
grid_prairieOffset	Default perimeter/prairie offset from edge.
grid_ranchDist	Default ranch distance from top of window to bottom horizontal bar on ranch grids.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

QUARTER HEXAGON GRID LOCATIONS



DES-CATHEDRAL



NAME	SUPPORTED OPTIONS
DES-CATHEDRAL	• Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – colonial, diamond, gothic, single/double prairie, single/double perimeter, spokes, spoke over colonial, sunstar, 2 hub sunstar, sunstar over colonial, sunburst, 2 hub sunburst, radius crossbar, single/double perimeter bar. • Grid Options – bronze, v-groove • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas. • Operation/Misc. – extended leg

CATHEDRAL OPTION TAGS

The cathedral uses the same tags as the [picture window](#) (see the picture window section for details and configuration examples) except it includes additional grid types, peak arc radius, and an extended leg operation.

004 Grid Type

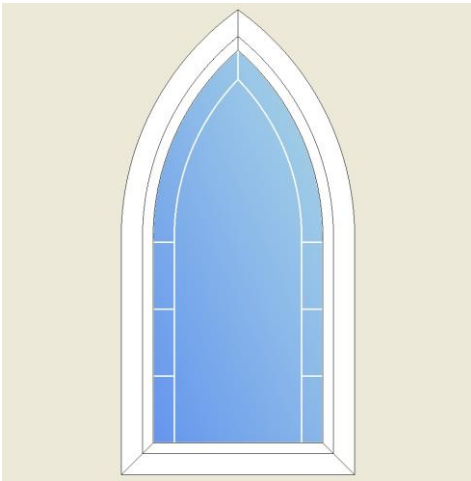
The Grid Type tags tell the ObjectViewer how to draw the grids. Possible grid types for the cathedral are colonial, diamond, gothic, prairie, double prairie, perimeter, double perimeter, ranch, spoke, sunstar, 2 hub sunstar, sunburst, 2 hub sunburst, perimeter bar and double perimeter bar. This section describes grid types that were not previously described in the picture window section. See Appendix A for option values required for grid tags.

Option Tags	Definition
<004BURSTL>	Sunburst over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004COL>	Colonial by window.
<004DIA>	Diamond by window.
<004DPER>	Double perimeter by window.
<004DPRA>	Double prairie by window.
<004GOTHIC>	Gothic by window (over colonial for extended leg). In the case of over colonial, the top horizontal bar is set at the leg height and the rest of the IG is divided evenly into panes.
<004NUMSPOKE S>	Designates number of spokes for sunburst over colonial, sunstar over colonial, spoke over colonial grid types.
<004PER>	Perimeter by window. If desired, use <004PERPATT> with 1 to hide bottom bar.
<004PERPATT>	Perimeter pattern. For the cathedral window, perimeter pattern #1 can be used to remove the bottom bar while #14 can be used to show only the bottom bar. See Appendix B.
<004PRA>	Prairie by window.
<004RADBAR>	Radius crossbar. See Appendix A.
<004RISE>	The rise of the radius crossbar grid.
<004SPO>	Spoke by window.
<004SPOKEL>	Spoke over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004STARL>	Sunstar over colonial by window. The top horizontal bar is set at the leg height. The rest of the IG is divided evenly into panes.
<004SUN>	Sunstar by window.
<004SUN2HB>	Sunstar with 2 hubs by window.
<004SUNB>	Sunburst by window.
<004SUNB2HB>	Sunburst with 2 hubs by window.
<004PERBAR>	Perimeter bar pattern valid with extended leg only. Draws perimeter pattern #1 (see Appendix B) with additional short horizontal bars in the leg. Use <004NUMBARS> to specify the number of bars drawn evenly spaced in the leg (or bars can be drawn in a designated lower percentage of the leg).
<004DPERBAR>	Same as <004PERBAR> with double perimeter grids.
<004NUMBARS>	Designates the number of bars used with perimeter bar and double perimeter bar patterns which are available with extended leg only. In addition, an optional suffix can be added to the option value to specify a percentage of the lower leg that the bars should be drawn in. A value of 3/50 will draw 3 short horizontal bars in the lower half of the leg.

Some cathedral grid pattern examples:



Perimeter Bar with <004NUMBARS> = 2/50



Perimeter Bar with <004NUMBARS> = 3

008 Operation/Miscellaneous

The cathedral has the ability to draw an extended leg. The extended leg option requires a numerical value designating the length of the leg. Below is a cathedral window with the extended leg option.



The parameter legPercent can be used to automatically set an extended leg. It designates the leg height as a percentage of ordered height. If the window is 100" and legPercent is 45, then the leg height will be 45". Set this value to 0 when you do not want an automatic extended leg.

Option Tags	Definition	Option Value
<008LEG>	Extended leg.	Numerical value indicating the length of the leg extended from the arch.

<008TOPBAR>	Top bar offset for grid patterns on half round with leg.	Numerical value indicating the distance the top horizontal bar will be moved from the leg height (leg height at outer edge of the frame).
<008HUBRAD>	Designates the internal hub radius for sunburst and sunstar grid patterns.	Positive numerical value indicating the internal hub radius. The outer hub is twice the size.
<008RAD>	Designates the radius of the peak arcs of the window.	Positive numerical value indicating the peak arc radius. If this option is not used, the object will generate a default peak.

The cathedral will generate a default peak based on ordered height and ordered width. To specify a radius, use the <008RAD> tag which requires a positive numerical value as an option value.

CATHEDRAL PARAMETERS

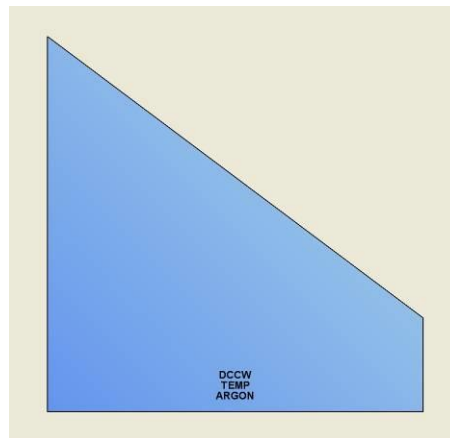
frame	The thickness of the frame.
bead	The thickness of the bead.
ig_xa	The distance between the outer edge of the frame to the edge of the visible glass.
ig_bya	The distance between the bottom outer edge of the frame to the bottom edge of the visible glass.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
topBarOffsetType	Values: 1 = offset from top of window, 2 = offset from shoulder/leg of window. Used with sunburst, sunstar, gothic, spoke grid patterns with leg. Along with the <008TOPBAR> option, allows the user to adjust the top horizontal grid bar.
topBarOffsetType	Values: 1 = offset from top of window, 2 = offset from shoulder/leg of window. Used with sunburst, sunstar, gothic, spoke grid patterns with leg. Along with the <008TOPBAR> option, allows the user to adjust the top horizontal grid bar.
grid_pattFormat	Alternative method for entering colonial style grid patterns. See appendix A.

legPercent	Automatically sets an extended leg. Designates the leg height as a percentage of ordered height. If the window is 100" and legPercent is 45, then the leg height will be 45". Set this value to 0 when you do not want an automatic extended leg.
ro_ha	A positive value that will be subtracted from the ordered height when the rough opening option is chosen.
ro_wa	A positive value that will be subtracted from the ordered width when the rough opening option is chosen.

**adjustment values* – An adjustment value may be placed on the width or height of an IG unit. For example, if the IG tucks into the bead by ½ inch on each side you may wish to adjust the grid placement if you want your grid notch spacing to be based on the total width of the IG. To do this you would assign the width adjust value to a total of 1 inch. The height adjust value would also be 1 inch. Enter these values into the Parameter Setup dialog. The ObjectViewer will decrease the size of the outer panes when it draws the image. If you want your grid notch spacing to be determined by the visible IG only (you want all panes to be the same size), you do not need to use the grid height and width adjustment (their values should be 0). (Note that the grid width and grid height adjustments do not affect the size of the visible IG.)

Glass

DES-FLAT GLASS



NAME	SUPPORTED OPTIONS
DES-FLAT GLASS	• Many glass shapes. • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas, pattern, logo. • DXF files. • Lamination Layers with Glass Offset. • Silk Screen

FLAT GLASS OPTION TAGS

Glass Type

The glass tags tell ObjectViewer what color to draw the glass in and what glass text to display. More specifically, the glass option tags drive the color while the glass question tags drive the text. Possible glass types are bronze, clear, low-e, obscure, and gray. If none of the tags are setup, the default glass color is blue.

Option Tag	Definition	Display Color
<COLOR_BRONZE>	Bronze.	Bronze
<COLOR_CLEAR>	Clear.	Blue
<COLOR_LOWE>	Low-e.	Sea Green
<COLOR_OBSCURE>	Obscure.	Light Blue
<COLOR_GRAY>	Gray.	Gray
<COLOR_PATTERN>	Image	Shows image loaded into Display Object Setup, whose name is the same as the option code or option key value.

You may have multiple variations of each glass type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <COLOR_BRONZE> can be assigned to option codes BZ1 and BZ2 by placing BZ1, BZ2 in the value column of Tag Setup for the tag <COLOR_BRONZE>.

The <COLOR_PATTERN> tag is unique in that it shows an image instead of a color. In preparation, the image is loaded into Display Object Setup (see Configuring Display Object Images section). The name of the image in Display Object setup must exactly match the option code assigned to the <COLOR_PATTERN> tag or match the key value assigned to the option code. The display object uses the option code or option code key value to retrieve the image in the database, and then it displays the image. This is useful if you would like to show rain glass, bubble glass, etc.

The {TEXT_GLASS} question tag is used to display the glass option code text in the glass object.

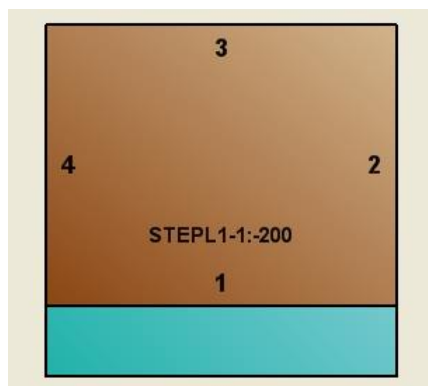
Question Tag	Definition
{TEXT_GLASS}	Glass type. Used when displaying glass type in text on the image.

Glass Type Option Key Values

The glass type tags provide additional support for option key values. You may have option codes that represent glass thickness, such as A14 for ¼” annealed glass and A18 for 1/8” annealed glass. Then in the option value, you would like to specify lowe, bronze, gray, etc. If this is the case, use Option Code Setup to enter option values with key values for your A14 and A18 option codes. The key values for A14 option code might be A14LOWE, A14CLR, A14BRZ corresponding to option values lowe, clear, bronze respectively. The key values for A18 option code might be A18LOWE, A18CLR, A18BRZ. To show lowe color in the display object, set the tag <003LE> to LOWE in Tag Setup. The display object will search for the substring LOWE in the selected option code key. If it finds LOWE, as it would when A14LOWE or A18LOWE is the key value selected, the Sea Green color is displayed. If no option key value is found, the display object will determine the color by using the option code.

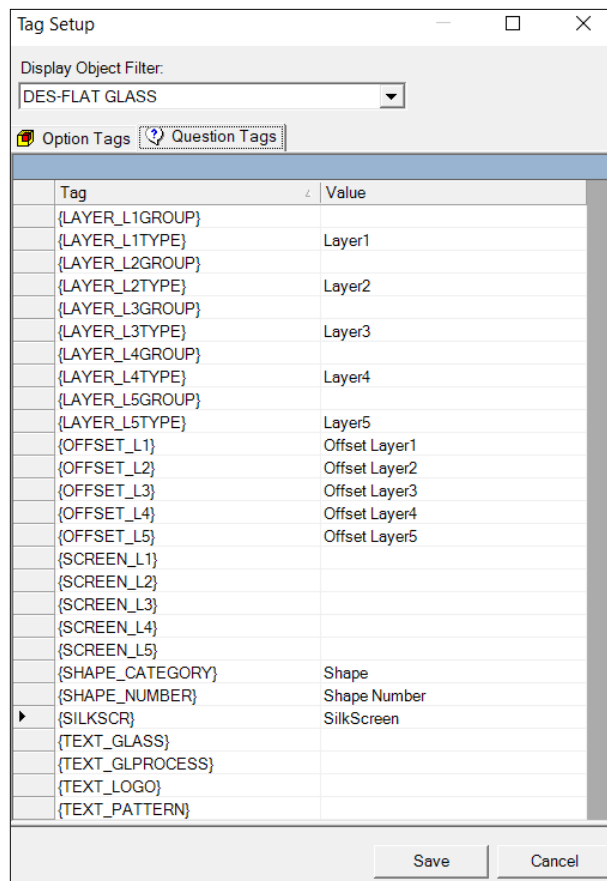
Glass Type for Lamination Layers

For laminated glass, you have the option of showing different colors for each lamination layer, depending on the layer’s glass type. This is most useful if you will also be showing glass offsets in your image, because an offset can potentially “uncover” a lamination layer beneath the top layer, as shown in the image below. Layers are shown in numerical order, with layer 1 on top. Layer 1 represents the outside layer of glass.



Question Tag	Definition	Used With Option Tags:
{LAYER_L1TYPE}, {LAYER_L2TYPE} ... {LAYER_L5TYPE}	Glass type for layer 1 through 5.	Glass type option tags. <COLOR_BRONZE>, <COLOR_CLEAR>, <COLOR_LOWE>, etc.

The screenshot below shows possible glass type question tag assignments for lamination layers in Tag Setup. For example, {LAYER_L1TYPE} controls the glass type for lamination layer 1, and it is assigned the question “Layer1”. All the possible glass types for lamination layer 1 would be placed under the question “Layer1” in the option structure.



The color tags may be assigned option key values (as described in Glass Type Option Value Keys section) when working with lamination layers.

Glass Groups

Your part may have so many glass types that you want to group the glass into categories. For example, you may have an option structure with questions *Layer1* and *Layer2*. Beneath each of these questions are the option codes **A14** (1/4" glass) and **A18** (1/8" glass). Once the option code **A14** is selected, then question *Layer1 A14* appears next in options wizard with specific glass types available (like **A14CLR**).

Layer1

A14

Layer1 A14

A14CLR

A14LE

A14BRZ

A14GRAY

A18

Layer1 A18

A18CLR

A18LE

A18BRZ

A18GRAY

```

Layer2
  A14
    Layer2 A14
      A14CLR
      A14LE
      A14BRZ
      A14GRAY

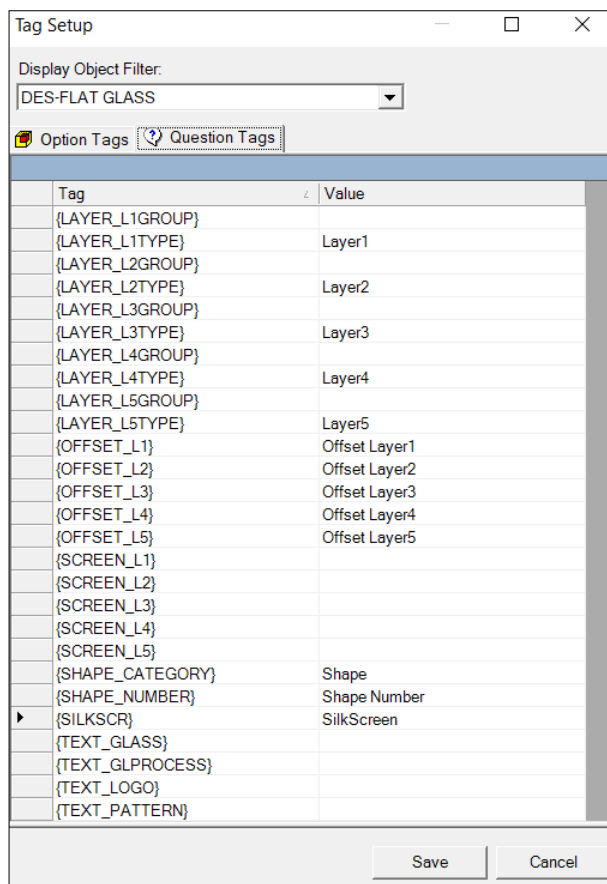
  A18
    Layer2 A18
      A18CLR
      A18LE
      A18BRZ
      A18GRAY

```

In this situation, the *Layer1* and *Layer2* questions concern two different groups of glass, **A14** and **A18**. These questions should be assigned to the {LAYER_L#GROUP} question tags. The display object will concatenate the selected glass group option code to the glass group question to get the next level of glass question. So, if the user selects **A18** for question *Layer1*, the object will look for the specific glass type in question *Layer1* A18. So, the {LAYER_L#TYPE} tags remain unassigned when you are using the {LAYER_L#GROUP} tags. This allows you to divide your glass into groups when you have many glass types.

Question Tag	Definition	Used With Option Tags:
{LAYER_L1GROUP} ... {LAYER_L5GROUP}	Glass group for layer 1 through 5. The option code selected for this question tag is concatenated to the question to determine the specific glass type question.	Glass type option tags. <COLOR_BRONZE>, <COLOR_CLEAR>, <COLOR_LOWE>, etc.

The question tag setup for the given example is shown below.

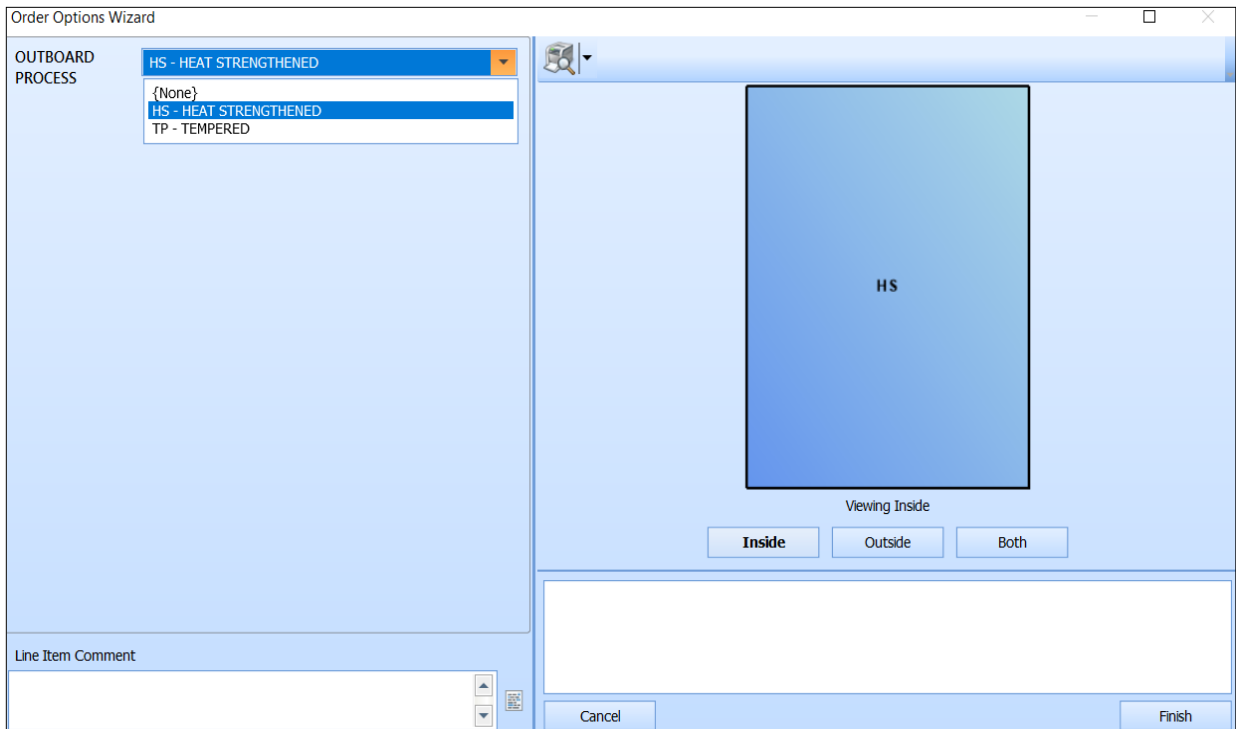


Glass Options

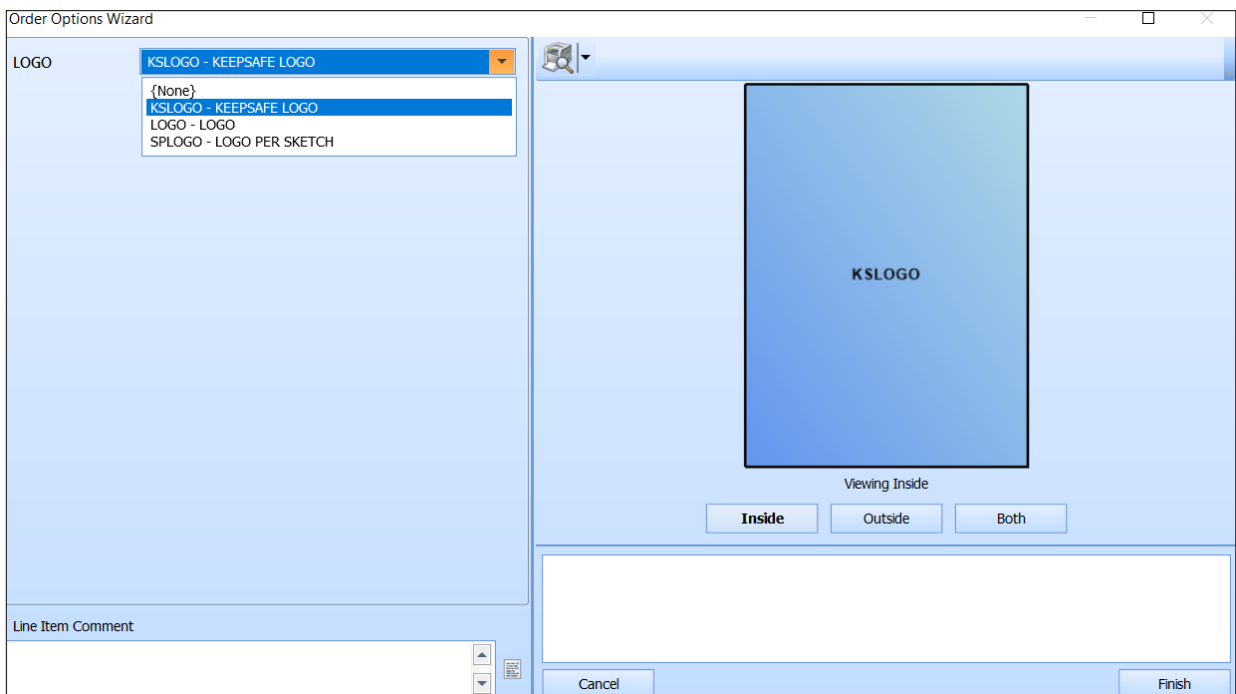
Text can be added to display glass process (like tempering, heat strengthened), pattern, and logo.

Question Tag	Definition
{TEXT_GLASS}	Display the glass option code.
{TEXT_GLPROCESS}	Display the glass process (like tempering, heat strengthened) option code (in text) associated with this question.
{TEXT_LOGO}	Display the logo option code (in text) associated with this question. This may represent the logo code for the customer's company logo.
{TEXT_PATTERN}	Display the pattern option code (in text) associated with this question. This may represent the template code for a special hand cut pattern.

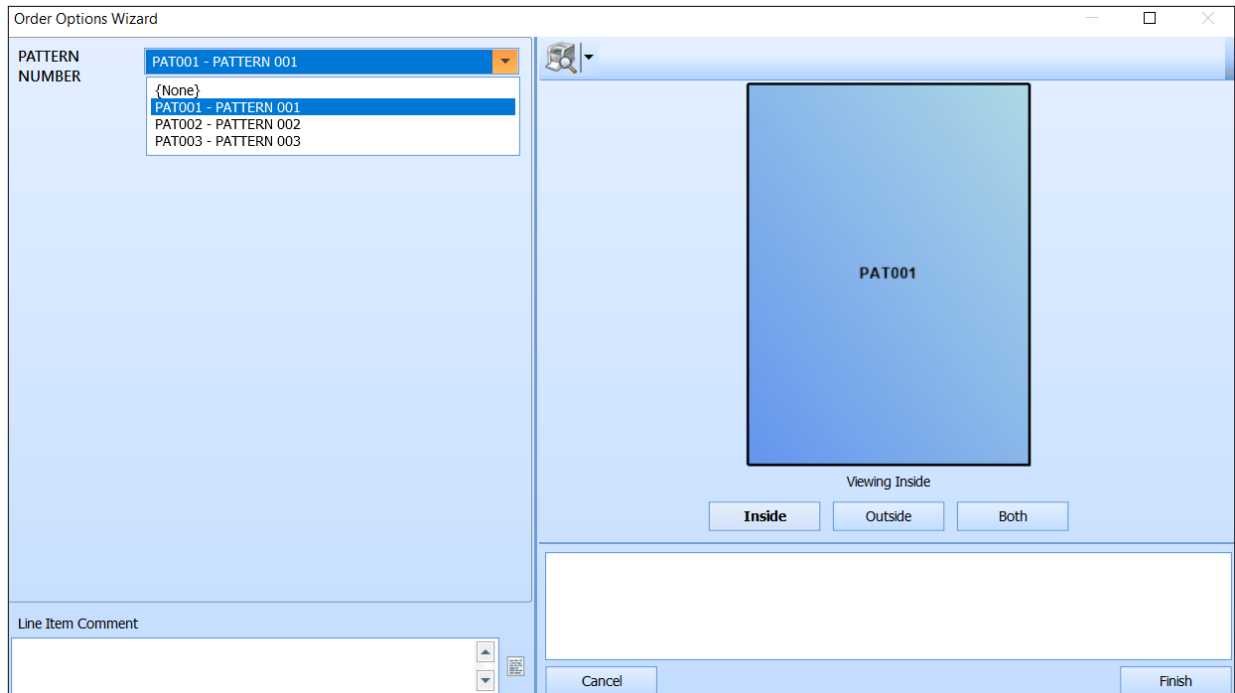
In the screenshot below, we are showing shape 000, or the rectangle. This is also the default shape shown when no shape id is selected. When the {TEXT_GLPROCESS} tag is set to the question OUTBOARD PROCESS, the glass process option code is displayed in the object. In this case, the object shows HS for heat strengthened since HS was the option selected.



When the {TEXT_LOGO} tag is set to the question LOGO (shown in the screenshot below), the logo option code is displayed in the object. A glass manufacturer may want to select the customer's logo to place on the glass, and the logo code selected can be shown on the display object. In this case, the object shows KSLOGO for keepsafe logo since KSLOGO was the option selected.

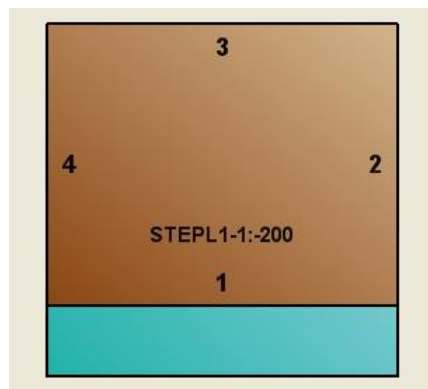


When the {TEXT_PATTERN} tag is set to the question PATTERN NUMBER (shown in the screenshot below), the pattern option code is displayed in the object. The pattern option code might represent the template used to hand cut a pattern. In this case, the object shows PAT001 for the glass pattern since PAT001 was the option selected.



Glass Offset

Because DES-FLAT GLASS can also show lamination layers, it also can display step offsets for the various layers of glass. In the image below, layer 1 is stepped by -200 (metric value).



There is a tag to represent each side of the glass. For four-sided shapes, side 1 is the bottom side, side 2 is the right side, side 3 is the top side, and side 4 is the left side (from the outside view). Each offset tag requires an option value, which is the offset dimension. The offset dimension should be a numerical value. A positive value increases the glass size; a negative value decreases the glass size.

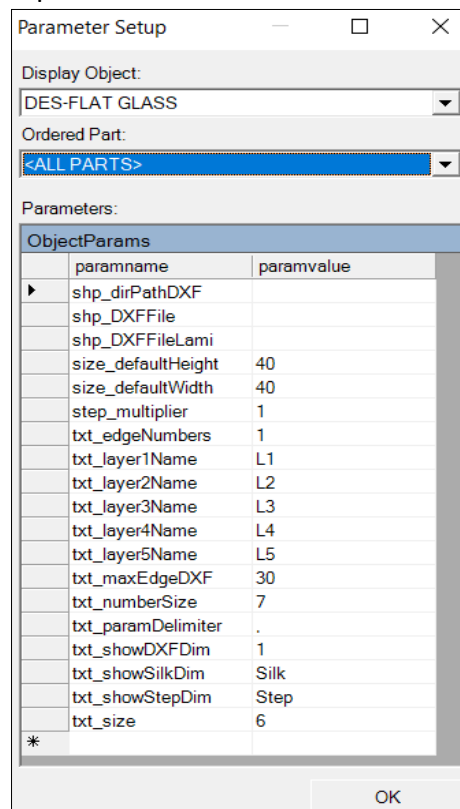
Option Tag	Definition	Option Value
<OFFSET_S1>, <OFFSET_S2>... <OFFSET_S8>	Offset for each side, up to 8. <OFFSET_S1> is side 1 (bottom).	Numerical value of the offset dimension.

The Glass Offset Option Tags require the following Question Tags.

Question Tag	Definition	Used With Option Tag
{OFFSET_L1}, {OFFSET_L2}... {OFFSET_L5}	Glass offset question for each layer of glass. {OFFSET_L1} is layer 1, which is shown on top in the Options Wizard.	< OFFSET_S1> to < OFFSET_S8>

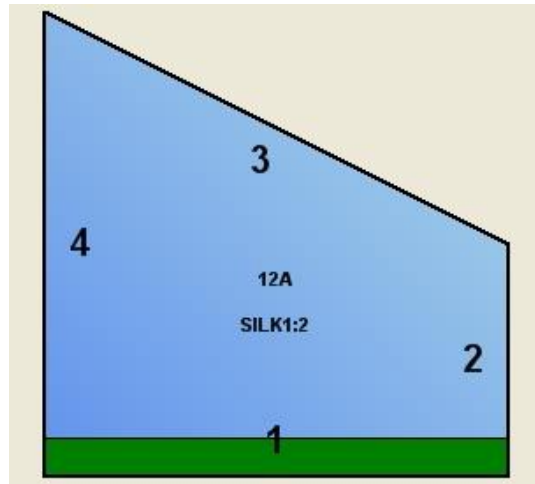
There are several parameters associated with glass offsets. The parameter `step_multiplier` will be multiplied with the glass offset step dimension to get the final step amount. By default, is it set to 1 so there is no actual effect on the dimension. Some customers have set this value to -1 to because all of their offsets are negative, but they do not want to require that the user enter the minus sign.

The `txt_showStepDim` parameter should be unassigned if you do not want to show the step dimension in text in the image. If you do want to show text, then set `txt_showStepDim` to a label name for the dimension. The `txt_layer#Name` parameters are text labels used to identify in which layer the step offset occurs.



Silk Screen

DES-FLAT GLASS can also show silk screen on the designated shape side. In the image below, side 1 has 2 inches of silk screen.



There is a tag to represent each side of the glass. For four-sided shapes, side 1 is the bottom side, side 2 is the right side, side 3 is the top side, and side 4 is the left side (as viewed in options wizard). Each offset tag requires an option value, which is the silk screen dimension. The offset dimension should be a positive numerical value.

Option Tag	Definition	Option Value
<SILKSCR_S1>, <SILKSCR_S2>... <SILKSCR_S8>	Offset for each side, up to 8. <SILKSCR_S1> is side 1 (bottom).	Positive numerical value of the silk screen dimension.

The Silk Screen Option Tags require the following Question Tag.

Question Tag	Definition	Used With Option Tag
{SILKSCR}	Silk Screen question.	<SILKSCR_S1> to < SILKSCR_S8>

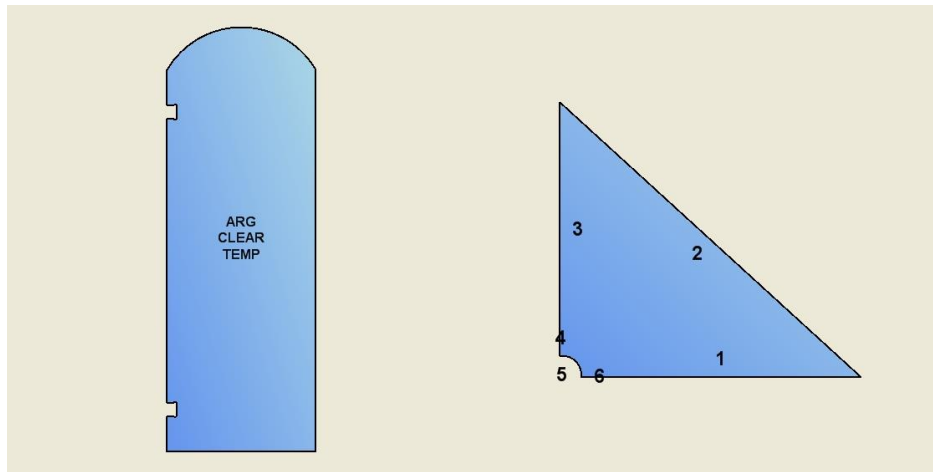
The txt_showSilkDim parameter should be unassigned if you do not want to show the silk screen dimension in text in the image. If you do want to show text, then set txt_showSilkDim to a label name for the dimension.

DXF Support

The flat glass object supports the display of DXF files. The DXF option tag <SHAPE_DXF> is required. Your DXF option code must be assigned to <SHAPE_DXF> in Display Object Tag Setup to enable this feature. The DXF file name and directory path is required as an option value for this option.

Option Tag	Definition	Option Value
<SHAPE_DXF>	Display DXF file.	String value containing DXF path and file name. Just the file name can be entered here if the parameter shp_dirPathDXF is used.

The parameter shp_dirPathDXF may be set to a global directory path containing all DXF files. If this parameter is assigned directory path, then the user would merely enter the file name of the DXF in the option value for <SHAPE_DXF>. Below are examples of DXF images.



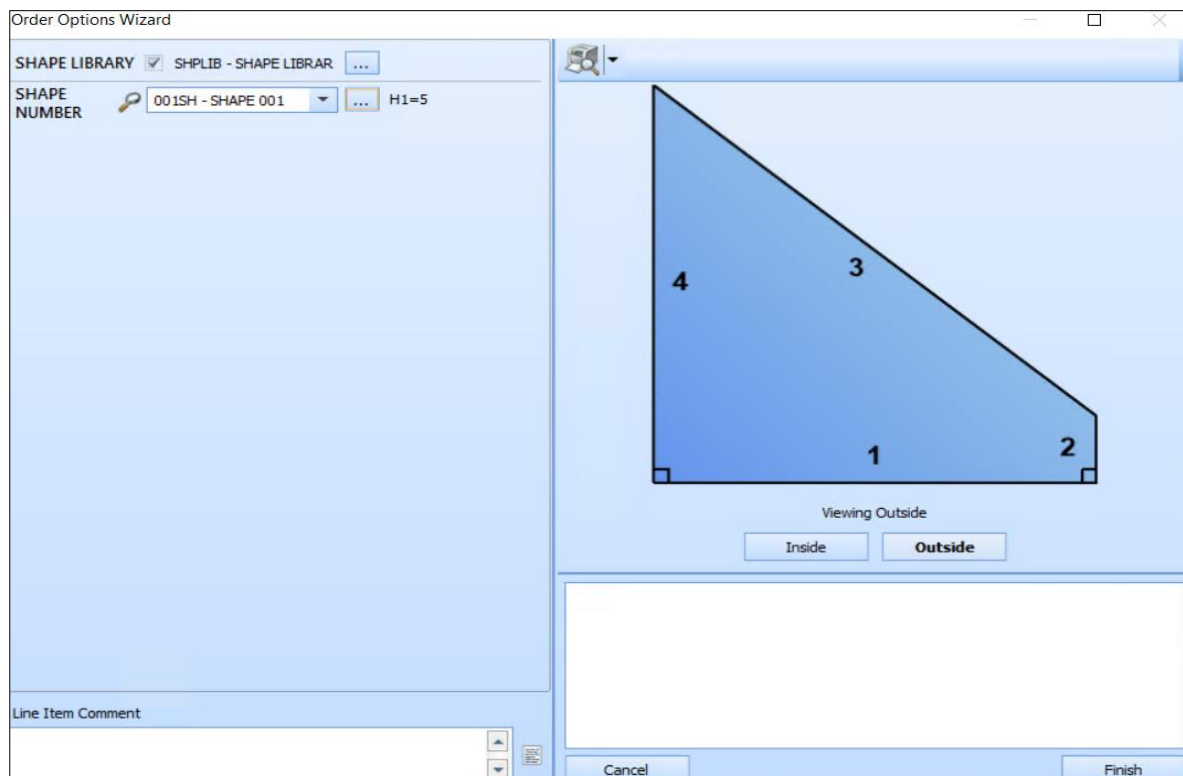
The parameter txt_maxEdgeDXF is used to control whether or not edge numbers are displayed for a DXF shape. This parameter must contain the max number of sides a DXF shape can have before edge numbers are no longer displayed. Edge numbers can become hard to read when a DXF shape contains many notches. Set this parameter to 0 if you never want to show edge numbers for DXF shapes. The image on the right above shows edge numbers, while the image on the left does not.

Shapes

The flat glass object supports many shapes. Some shapes require further user input to display the shape. The display object will show a rectangle by default. Even if a template of some specialized shape was selected for the part. The {SHAPE_CATEGORY} tag is important if you are working with silk screening and laminated glass offsets, since the display object will only show these features for rectangles and FeneVision shape library shapes. It cannot show these features for custom templates, or other unknown shapes. Typical options for {SHAPE_CATEGORY} are SHAPE, DXF, and TEMPLATE. If this question does not exist (no option is selected for the question), then the object assumes it is working with an actual rectangle (and not a custom template) - and so it will display silk screening and glass offsets. Of course, if the display object finds the {SHAPE_NUMBER} tag or the <SHAPE_DXF> tag, it will display the appropriate shape.

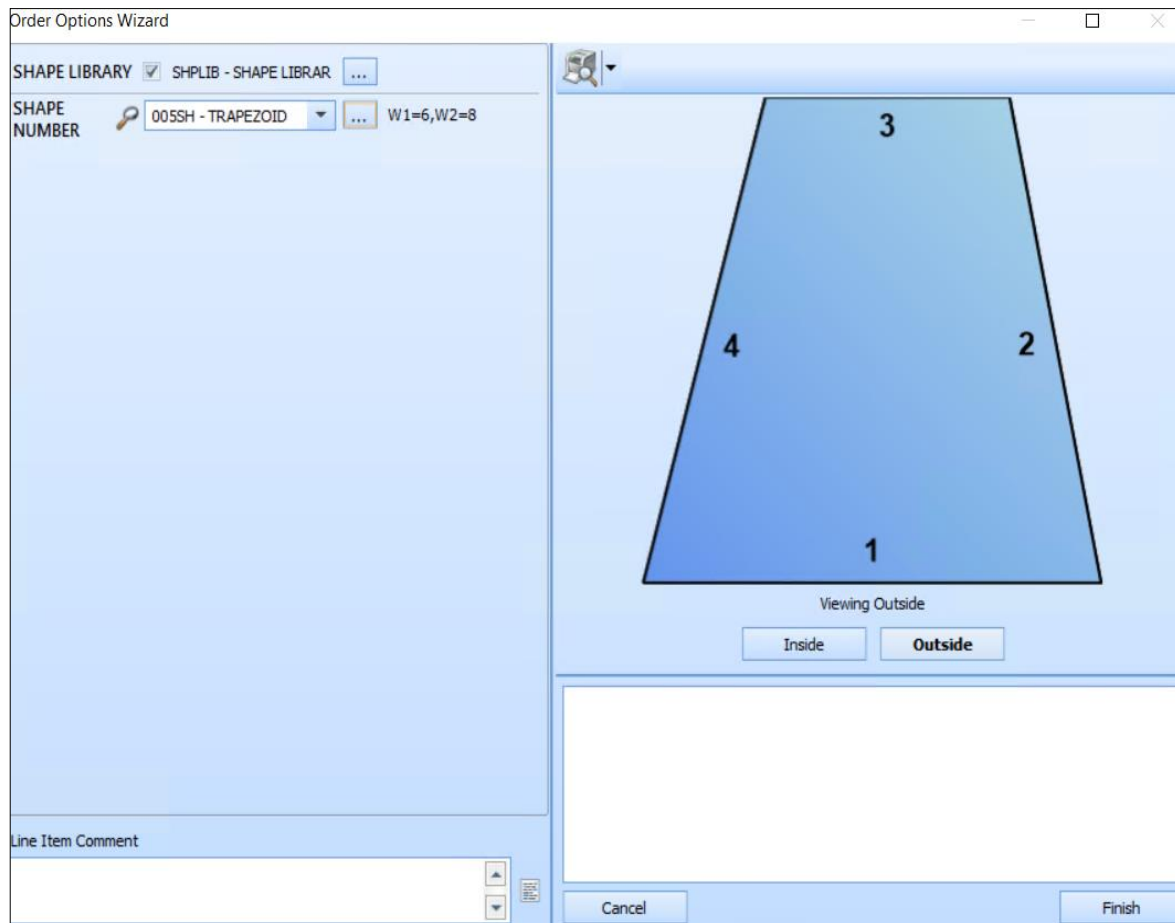
Question Tag	Definition
{SHAPE_CATEGORY}	The object uses this question to distinguish between non-shape library shapes, rectangle, shapes, or DXF. If this question does not exist, then the object assumes it is working with a rectangle. If it finds the {SHAPE_NUMBER} tag, the object will display the appropriate shape. If it finds the <SHAPE_DXF> tag, it will display the DXF.
{SHAPE_NUMBER}	Display the shape associated with the option code selected for this question.

If you look at the screen below, these shapes can be drawn by assigning the {SHAPE_NUMBER} question tag to the SHAPE NUMBER question. The user selects the shape option code they desire, like 001SH below to draw a trapezoid. The right 3 characters of the shape option codes must represent a shape number: SHP001 AND SH001 would also be fine, but SHP01 would not work. The glass object retrieves the option code selected for the {006SHAPE} question and converts the right 3 characters to a number. This number designates the shape which will be drawn. In the picture below, SH001 is selected so shape number 1 will be drawn. Prior to selecting a shape number, the DES-FLAT GLASS object draws a rectangle as default (shape 000 is a rectangle).



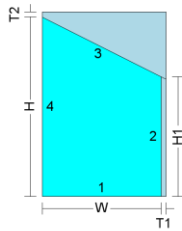
In the screen shot above you can also see the Option Value entered: H1=5. This is because shape number 1 requires a leg (or H1) dimension.

Some shapes require multiple dimensions. If a shape requires W1 and W2 dimensions, they would be entered as: W1=##, W2=## where ## is a number. The comma is used at the delimiter between multiple dimensions. This is shown in the picture below. It is possible to use a different delimiter than comma between multiple dimensions. Use the txt_paramDelimiter to indicate the delimiter you prefer. This is required for those regions where the comma is used instead of the decimal point.

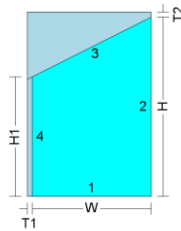


The following shows a picture of each shape supported by the flat glass object with the expected user input. None of the T# dimensions are required and do not need to be entered as option values. In most cases, the H and W parameters are based off the ordered height and width and do not need to be entered as option values. The FeneVision glass shape library represents the outside view of the glass. Glass manufacturers will want to set their system view to Outside View (see Inside and Outside View section).

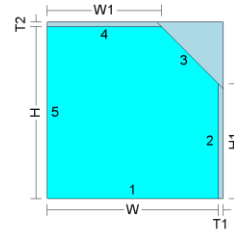
Shape 1



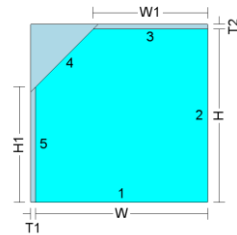
Shape 2



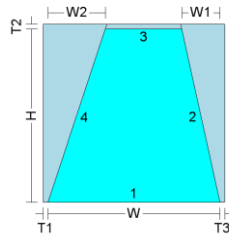
Shape 3



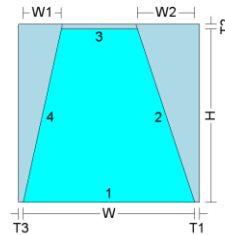
Shape 4



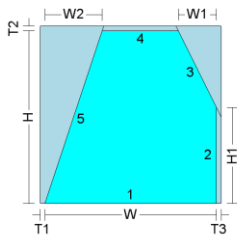
Shape 5



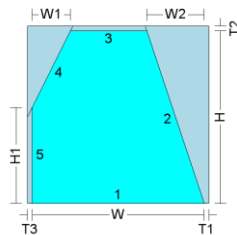
Shape 6



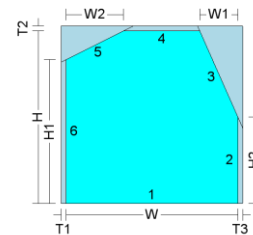
Shape 7



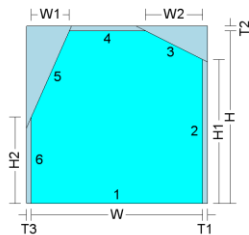
Shape 8



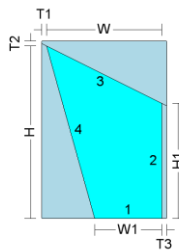
Shape 9



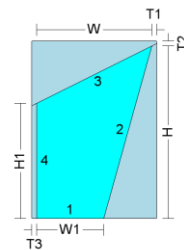
Shape 10



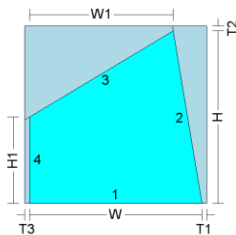
Shape 11



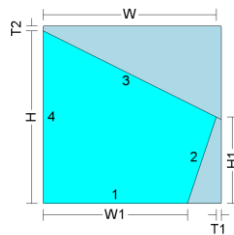
Shape 12



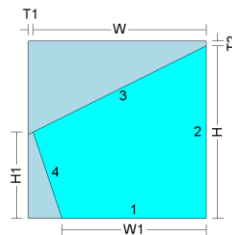
Shape 13



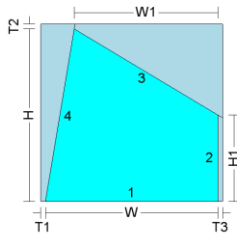
Shape 14



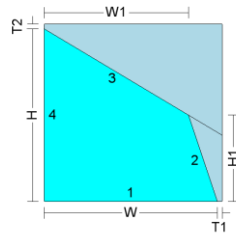
Shape 15



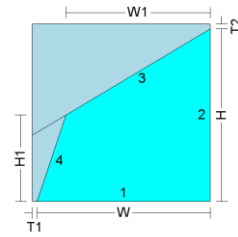
Shape 16



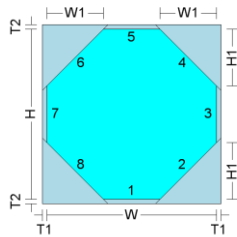
Shape 17



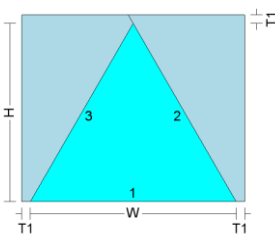
Shape 18



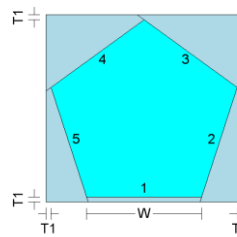
Shape 19



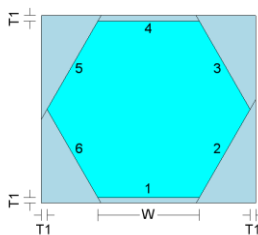
Shape 20



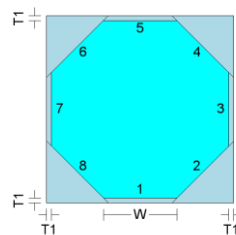
Shape 21



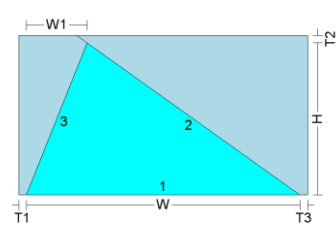
Shape 22



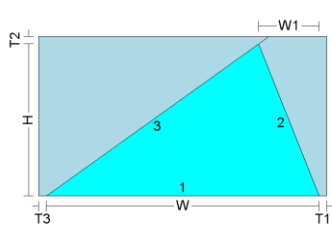
Shape 24



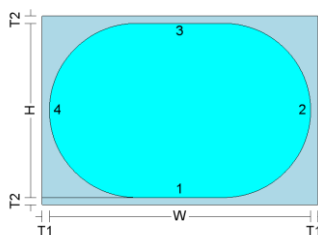
Shape 25



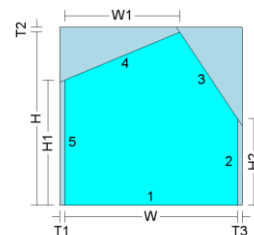
Shape 26



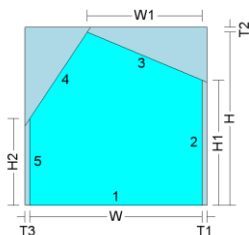
Shape 29



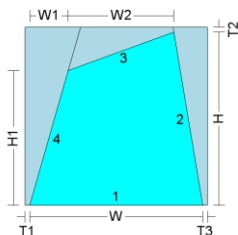
Shape 37



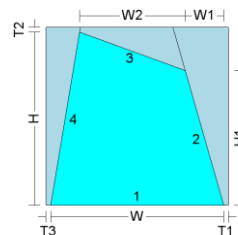
Shape 38



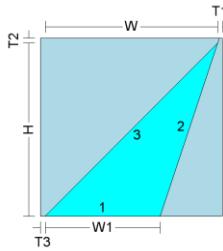
Shape 39



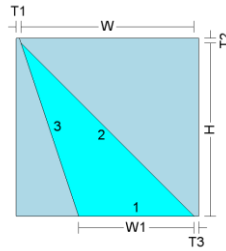
Shape 40



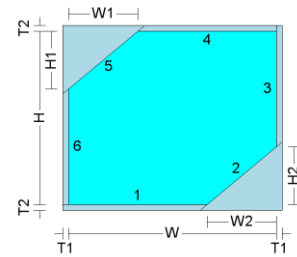
Shape 41



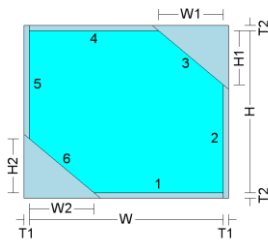
Shape 42



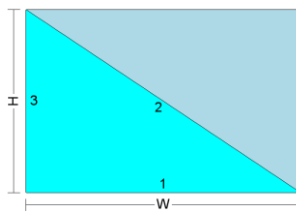
Shape 43



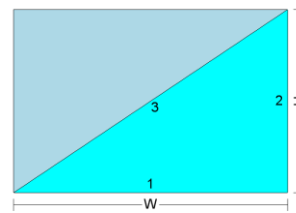
Shape 44



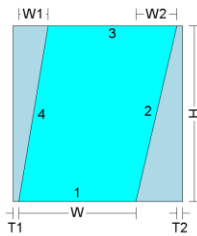
Shape 45



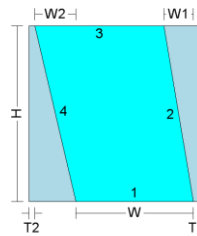
Shape 46



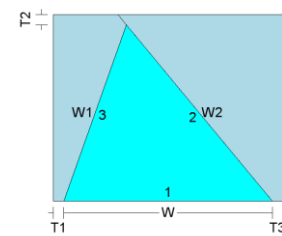
Shape 47



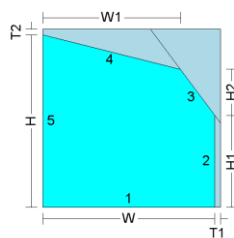
Shape 48



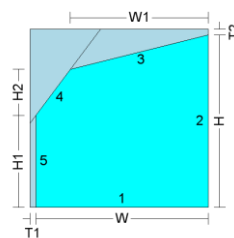
Shape 51



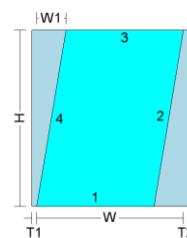
Shape 53



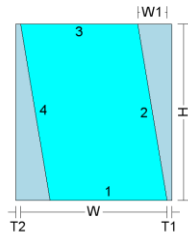
Shape 54



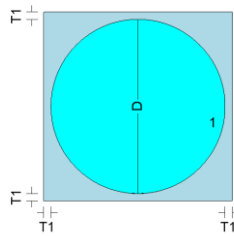
Shape 57



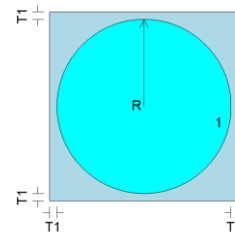
Shape 58



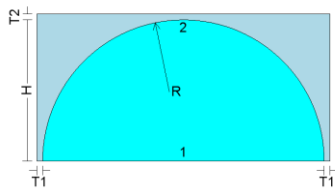
Shape 60



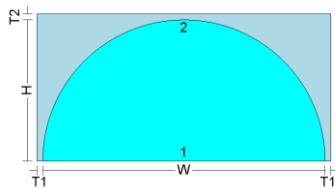
Shape 61



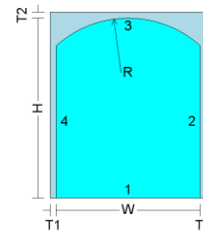
Shape 62



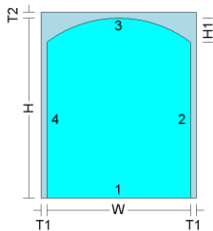
Shape 63



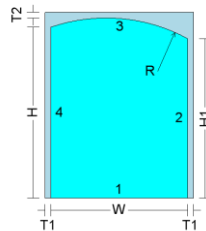
Shape 64



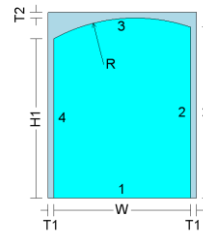
Shape 65



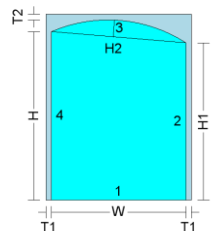
Shape 66



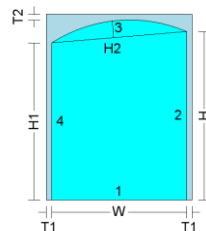
Shape 67



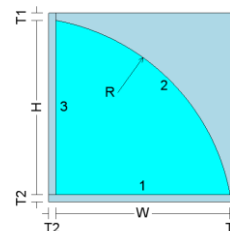
Shape 68



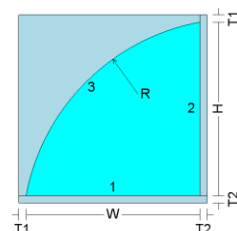
Shape 69



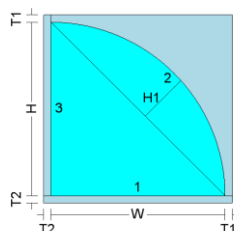
Shape 70



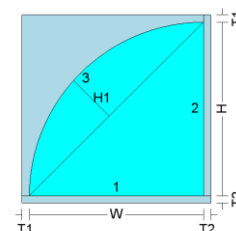
Shape 71



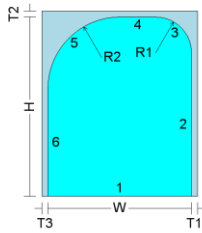
Shape 72



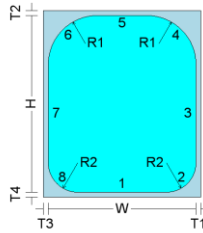
Shape 73



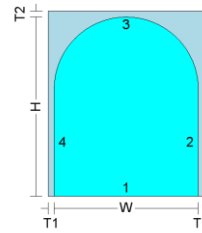
Shape 74



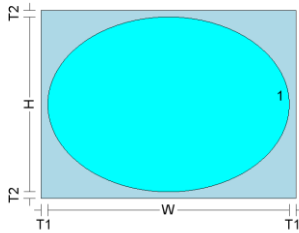
Shape 75



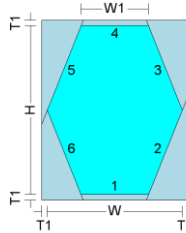
Shape 78



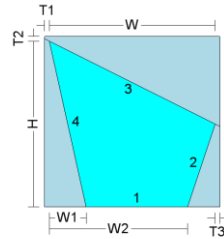
Shape 81



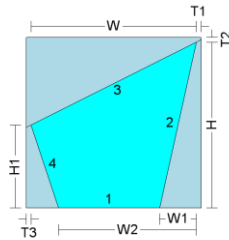
Shape 91



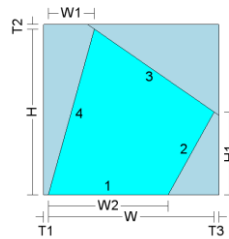
Shape 92



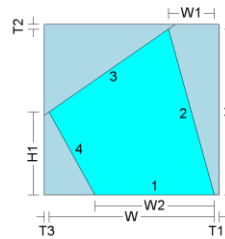
Shape 93



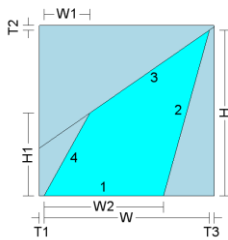
Shape 94



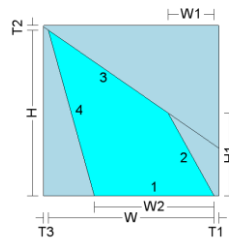
Shape 95



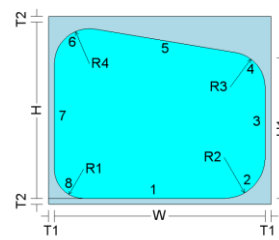
Shape 96



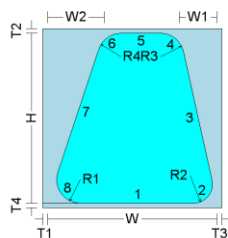
Shape 97



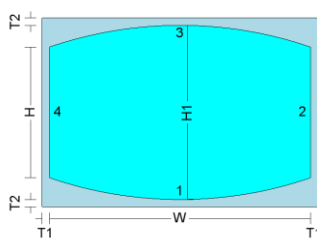
Shape 103



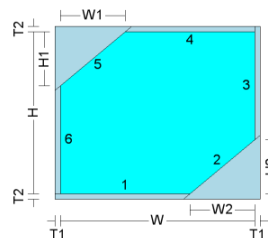
Shape 113



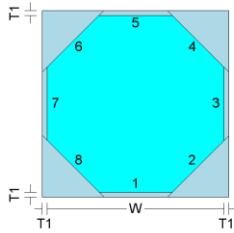
Shape 119



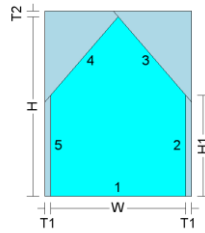
Shape 157



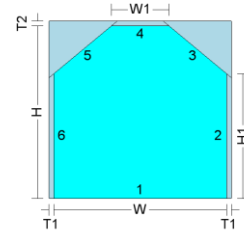
Shape 162



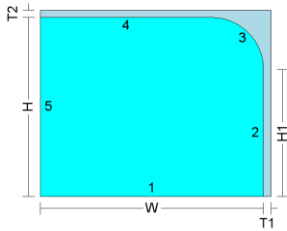
Shape 215



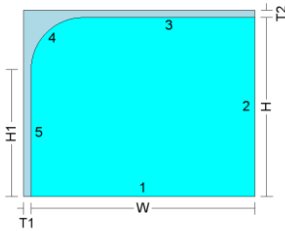
Shape 238



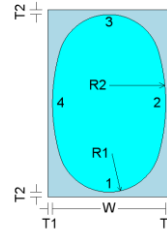
Shape 254



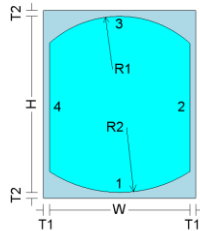
Shape 255



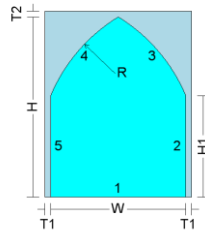
Shape 261



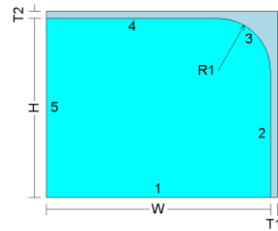
Shape 262



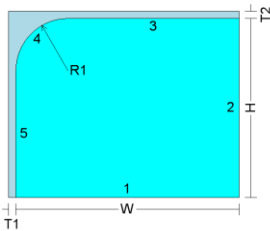
Shape 272



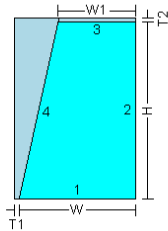
Shape 277



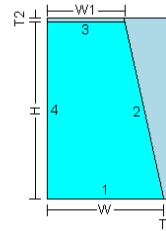
Shape 278



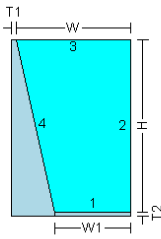
Shape 301



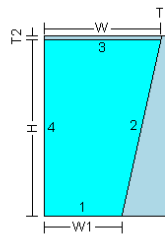
Shape 302



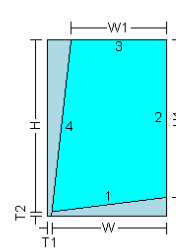
Shape 303



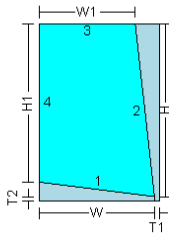
Shape 304



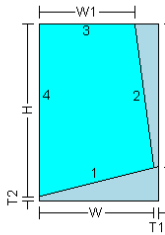
Shape 305



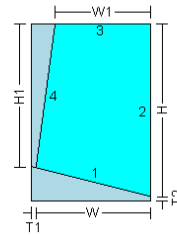
Shape 306



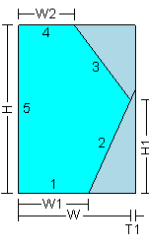
Shape 307



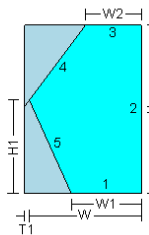
Shape 308



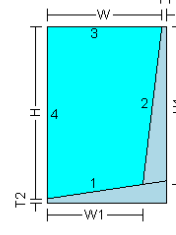
Shape 309



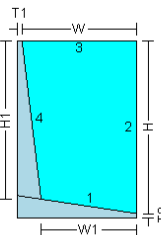
Shape 310



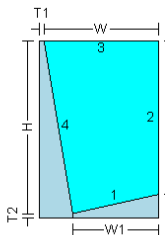
Shape 311



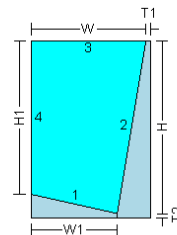
Shape 312



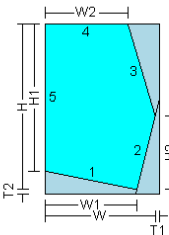
Shape 313



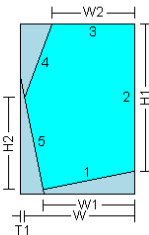
Shape 314



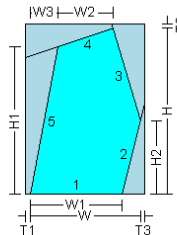
Shape 315



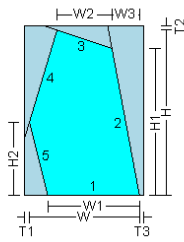
Shape 316



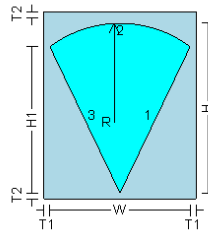
Shape 317



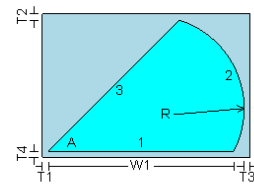
Shape 318



Shape 401



Shape 402

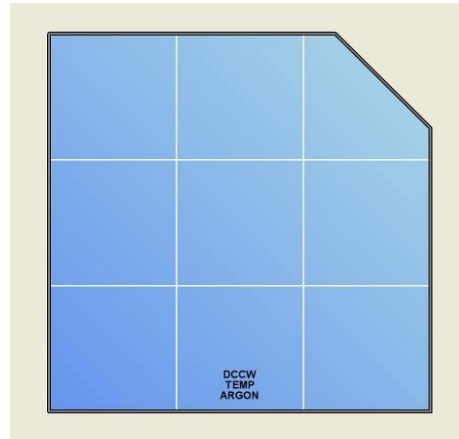


FLAT GLASS PARAMETERS

shp_optionLabel	Alpha character prefix or suffix for the shape options. For example, set shp_optionLabel to SH if your shape option code is SH001 or 001SH. This is used to remove the alpha characters to get the numeric shape number.
shp_dirPathDXF	This parameter can contain the directory path where DXF files are located when using the DXF option with the <SHAPE_DXF> tag.
shp_DXFFile	Name for the CAD DXF file exported into the order attachments directory. Used for monolithic glass.
shp_DXFFileLami	Prefix for the name of the CAD DXF file exported into the order attachments directory. Used for laminated glass. The display object appends a number for each layer to retrieve the file from the order attachments directory. So, if the file names are CAD-LAMI1.DXF, CAD-LAMI2.DXF, CAD-LAMI3.DXF, CAD-LAMI4.DXF, CAD-LAMI5.DXF enter CAD-LAMI for this parameter. Also, the assembled operation file CAD-LAMI will be displayed by the display object if it exists in the order attachments directory AND if at least one layer dxf file exists in the order attachment directory.
size_defaultHeight	The size_defaultHeight value will be used to draw the object when an ordered height is not available. Part Setup is an example where size_defaultHeight is used to draw the object.
size_defaultWidth	The size_defaultWidth value will be used to draw the object when an ordered width is not available. Part Setup is an example where size_defaultWidth is used to draw the object.
step_multiplier	The parameter step_multiplier will be multiplied with the glass offset step dimension to get the final step amount. By default, is it set to 1 so there is no actual effect on the dimension.
txt_edgeNumbers	If this value is 1, edge numbers will be displayed with the display object. Edge numbers will not be displayed when this value is 0.
txt_layer#Name	The parameters represent a text label for each lamination layer. The labels are used when showing dimensions in the image in text, as with glass step offsets.
txt_maxEdgeDXF	This parameter must contain the max number of sides a DXF shape can have before edge numbers are no longer

	displayed. This parameter is used in conjunction with the DXF option with the <SHAPE_DXF> tag.
txt_numberSize	Percentage value required: Controls text height for the edge numbers displayed on each side of the shape. This parameter is a percentage of the height and width so that the text is readable for various height and width dimensions entered. The size of the text is calculated by taking $((\text{width} * \text{height}) / 2) * (\text{txt_numberSize} / 100)$. To enter a value of 7 percent (which is a typical value), enter 7 in the paramvalue column in the Parameter Setup dialog for paramname txt_numberSize.
txt_paramDelimiter	This character is used as the delimiter between multiple shape dimensions. The default value is a comma. However, this will not work in regions where the comma is already used as the decimal point. In these regions, another delimiter must be chosen. The delimiter must be one character only, and it cannot be a blank. If the delimiter entered is invalid, comma will be used by default. Also, do not use a character that is a numeric symbol in the region. Poor choices are -\$()%.
txt_showSilkDim	The txt_showSilkDim parameter should be unassigned if you do not want to show the silk screen dimension in text in the image. If you do want to show text, then set txt_showSilkDim to a label name for the dimension
txt_showStepDim	The txt_showStepDim parameter should be unassigned if you do not want to show the step dimension in text in the image. If you do want to show text, then set txt_showStepDim to a label name for the dimension.
txt_showDXFDim	The txt_showDXFDim parameter should be set to 0 if you do not want to show the DXF dimension in text in the image. If you do want to show DXF dimensions, then set txt_showDXFDim to 1.
txt_size	Percentage value required: Controls text height for the text displayed in the shape. This parameter is a percentage of the height and width so that the text is readable for various height and width dimensions entered. The size of the text is calculated by taking $((\text{width} * \text{height}) / 2) * (\text{txt_size} / 100)$. To enter a value of 6 percent (which is a typical value), enter 6 in the paramvalue column in the Parameter Setup dialog for paramname txt_size.

DES-INSULATED GLASS



<u>NAME</u>	<u>SUPPORTED OPTIONS</u>
DES-INSULATED GLASS	• Many glass shapes. • Frame (Grid) Color – white, tan, saddle brown, light oak wood grain, dark oak wood grain, cherry wood grain. • Grid – Colonial, Diamond, Single/Double Prairie, Single/Double Perimeter, Ranch, Spoke, Sunstar, 2 Hub Sunstar, Sunburst, 2 Hub Sunburst, Radius Crossbar, Gothic, Gothic over Colonial, Sunstar over Colonial, Sunburst over Colonial, Spoke over Colonial. The Cathedral and Perimeter Cathedral grids patterns are supported for full eyebrow with leg shapes only. • Grid Options – gold, blue, etc. • Glass Type – clear, low-e, bronze, obscure, gray. • Glass Options – glass process, gas, pattern, logo. • Operation/Misc. – spacer color specification. • DXF File support. • Multiple Panes of Glass with Glass Offset. • Silk Screen • Edge Angle (Miter)

INSULATED GLASS OPTION TAGS

Frame Color

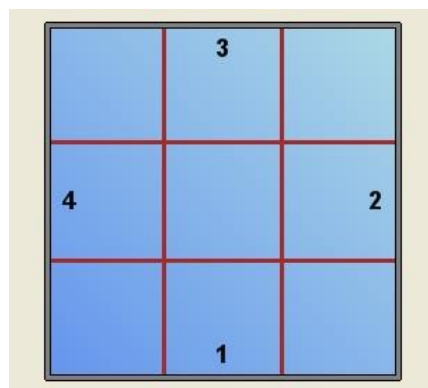
The frame color tags tell the ObjectViewer what color to use when drawing grids (grid color can also be affected by tags in the Grid Options category described later). These tags should be set to correspond with the color option codes you entered in CORE. White is the default drawing color, so no tag setup is required to draw the color white. The chart below shows the inside and outside view colors that will be drawn for each tag:

Tag	Inside Color	Outside Color
<FRMCOLOR_TAN>	Tan	Tan
<FRMCOLOR_BRNZ>	Saddle brown	Saddle brown
<FRMCOLOR_LOWG>	Light oak wood grain	White
<FRMCOLOR_DOWG>	Dark oak wood grain	White
<FRMCOLOR_CWG>	Cherry wood grain	White
None (default)	White	White

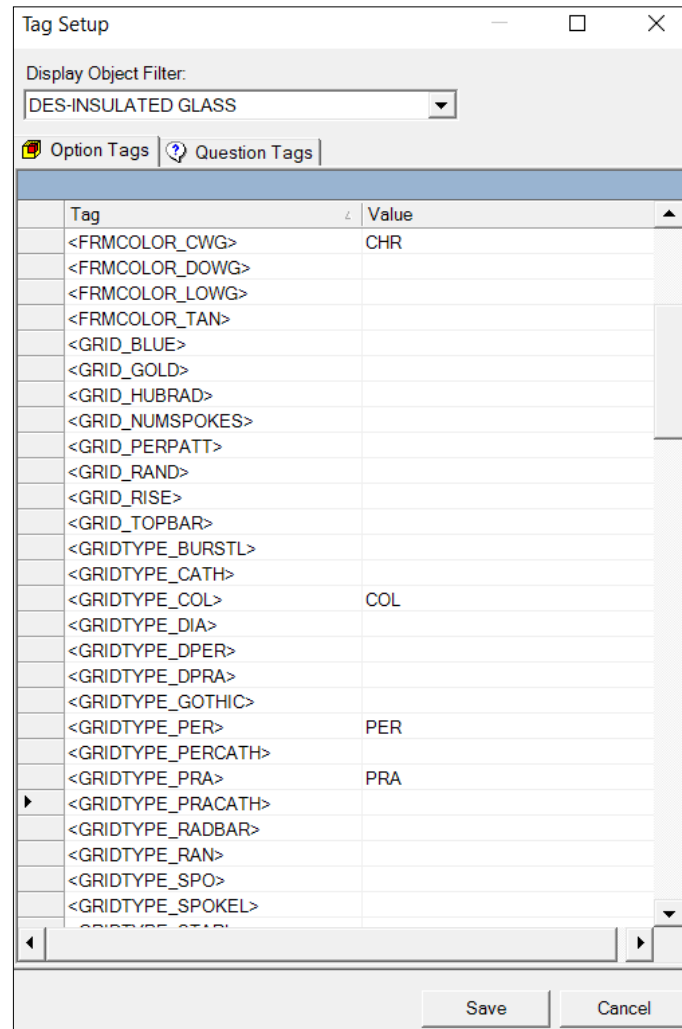
The user also has the ability to override the above colors with a custom color. The custom color must be a valid system color, such as chocolate, silver, royalblue. The custom color can affect both the interior and exterior (<FRMCOLOR_CUST>) or just one view.

Tag	Option Value	Inside Color	Outside Color
<FRMCOLOR_CUST>	Valid system color.	System color entered.	System color entered.
< FRMCOLOR_CUSTEXT>	Valid system color.	No change.	System color entered.
< FRMCOLOR_CUSTINT>	Valid system color.	System color entered.	No change.

The glass below shows colonial grids in cherry wood grain color.



If the option code for cherry is CHR, then the <FRMCOLOR_CWG> tag must be setup with a value of CHY in Tag Setup as shown below. Now the ObjectViewer knows to draw the cherry wood grain color when the option code CHY is selected during Options Wizard.



Grid Type

The Grid Type tags tell the ObjectViewer how to draw the grids. The insulated glass object supports many grids types.

In the previous section, Frame Color, we showed colonial grids in cherry color. The Tag Setup screenshot showed that the <GRIDTYPE_COL> tag was assigned to COL. This means when the option code COL is selected in Options Wizard, colonial grids will be displayed.

Some grid types require additional tag assignments and option values. See Appendix A for more information.

Option Tags	Definition
<GRIDTYPE_BURSTL>	Sunburst over colonial. The top horizontal bar is set via the <GRID_TOPBAR> tag described in the Grid Options section. The rest of the IG is divided evenly into panes. (Required: Used in conjunction with <GRID_TOPBAR> tag.)
<GRIDTYPE_CATH>	Cathedral, for eyebrows with leg. The bars are drawn by dividing the height and width evenly into panes. The distance from the top edge of the IG to the top of the arc on the grid bar is the height of one pane.
<GRIDTYPE_CATHBURST>	Cathedral Sunburst, for eyebrows with leg. The bars are drawn by dividing the height and width evenly into panes. The distance from the top edge of the IG to the top of the arc on the grid bar is the height of one pane.
<GRIDTYPE_COL>	Colonial.
<GRIDTYPE_DIA>	Diamond.
<GRIDTYPE_DPER>	Double perimeter.
<GRIDTYPE_DPRA>	Double prairie.
<GRIDTYPE_GOTHIC>	Gothic. Specify 0 horizontal bars (like 2VX0H) when you do not want the colonial pattern beneath the gothic pattern. (You can choose whether or not to use the <GRID_TOPBAR> tag when specifying 0 horizontal grid bars. <GRID_TOPBAR> controls where the arc begins in the pattern. Gothic by window over colonial. Specify grid pattern in the format: 2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc. The bars are drawn by dividing the height and width evenly into panes. (Required: Used in conjunction with <GRID_TOPBAR> tag described in the Grid Options section.)
<GRIDTYPE_PER>	Perimeter.
<GRIDTYPE_PERCATH>	Perimeter cathedral, for eyebrows with leg. If desired, use <GRID_PERPATT> with value 1 to hide bottom bar.
<GRIDTYPE_PRA>	Prairie.
<GRIDTYPE_PRACATH>	Prairie cathedral, for eyebrows with leg.
<GRIDTYPE_RADBAR>	Radius crossbar. Option value contains edge offset. See Appendix A.
<GRIDTYPE_RAN>	Ranch.

<GRIDTYPE_SPO>	Spoke.
<GRIDTYPE_SUN>	Sunstar.
<GRIDTYPE_SUN2HB>	Sunstar with 2 hubs.
<GRIDTYPE_SUNB>	Sunburst.
<GRIDTYPE_SUNB2HB>	Sunburst with 2 hubs.
<GRIDTYPE_SPOKEL>	Spoke over colonial. The top horizontal bar is set via the <GRID_TOPBAR> tag described in the Grid Options section. The rest of the IG is divided evenly into panes. (Required: Used in conjunction with <GRID_TOPBAR> tag.)
<GRIDTYPE_STARL>	Sunstar over colonial. The top horizontal bar is set via the <GRID_TOPBAR> tag described in the Grid Options section. The rest of the IG is divided evenly into panes. (Required: Used in conjunction with <GRID_TOPBAR> tag.)

Grid Options

The grid option tags further control the visual representation of grids in ObjectViewer.

Option Tag	Definition	Option Value
<GRID_GOLD>	Changes the color of the grids to gold. This could be used to indicate brass grids.	None.
<GRID_BLUE>	Changes the color of the grids to blue. This could be used to indicate v-groove grids.	None.
<GRID_HUBRAD>	Hub radius.	See Appendix A.
<GRID_RISE>	The rise of the arc for the radius crossbar grid pattern.	See Appendix A.
<GRID_RAND>	Distance from top of the window to the bottom horizontal bar of the ranch grids.	See Appendix A.
<GRID_NUMSPOKES>	Designates number of spokes for sunburst over colonial, sunstar over colonial, and spoke over colonial grid types.	See Appendix A.
<GRID_PERPATT>	Perimeter by window. If desired, use <004PERPATT> with value 1 to hide bottom bar for eyebrow shapes. Rectangular shapes support more perimeter patterns as described in Appendix B.	See Appendix B.
<GRID_TOPBAR>	Top bar offset for grid patterns shown over a colonial pattern, like sunburst over	Numerical value indicating the

	colonial. This tag is required in order to show a grid pattern over a colonial pattern (in most cases no grids will be drawn without it).	distance the top of the glass to the top horizontal bar. See Appendix A.
--	--	--

Typically, the grids appear in the same color as the frame. This behavior can be overridden using the <GRID_GOLD> and <GRID_BLUE> tags. When these tags are assigned to option codes which are selected in Options Wizard, they turn the grids gold and blue, respectively, which can be used to indicate brass and v-groove grids.

IG Type

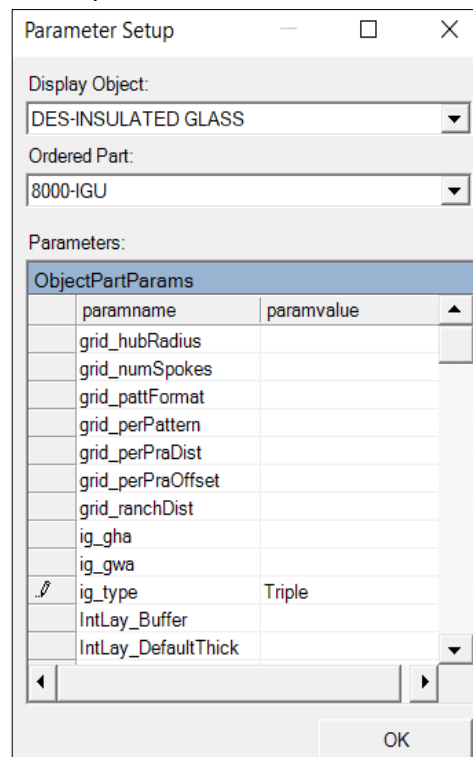
The insulated glass object supports dual and triple IGs. If you have a part that supports both dual and triple IGs, use the <IG_TYPE> tag to allow the user to select the IG type. The option value for tag <IG_TYPE> must be “Dual” or “Triple”.

Option Tags	Definition	Option Value
<IG_TYPE>	Specifies the IG type.	Dual or Triple

The <IG_TYPE> tag may be used with the {IG_TYPE} question tag, but it is not required.

Question Tags	Definition
{IG_TYPE}	Specifies the IG type question.

The ig_type parameter can also be used to specify the IG type. It is useful when each of your parts represent only one IG type, dual or triple. The screenshot below shows that the orderable part 8000-IGU is a Triple IG.



The <IG_TYPE> tag has precedence over the ig_type parameter. If neither the <IG_TYPE> option or the ig_type parameter is specified, then DES-INSULATED GLASS defaults to a dual IG.

Previous versions of DES-INSULATED GLASS did not support multiple panes of glass, step offsets and silk screen. To run in this mode, set the parameter ig_type to 0. Likewise, to enable the new functionality, make sure this parameter is blank or set to Dual or Triple (or use the <IG_TYPE> option).

Glass Type

The glass tags tell ObjectViewer what color to draw the glass in and what glass text to display. More specifically, the glass option tags drive the color while the glass question tags drive the text. Possible glass types are bronze, clear, low-e, obscure, and gray. If none of the tags are setup, the default glass color is blue.

Option Tag	Definition	Display Color
<COLOR_BRONZE>	Bronze.	Bronze
<COLOR_CLEAR>	Clear.	Blue
<COLOR_LOWE>	Low-e.	Sea Green
<COLOR_OBSCURE>	Obscure.	Light Blue
<COLOR_GRAY>	Gray.	Gray
<COLOR_PATTERN>	image.	Shows image loaded into Display Object Setup, whose name is the same as the option code or option key value.

You may have multiple variations of each glass type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <COLOR_BRONZE> can be assigned to option codes BZ1 and BZ2 by placing BZ1, BZ2 in the value column of Tag Setup for the tag <COLOR_BRONZE>.

The <COLOR_PATTERN> tag is unique in that it shows an image instead of a color. In preparation, the image is loaded into Display Object Setup (see Configuring Display Object Images section). The name of the image in Display Object setup must exactly match the option code assigned to the <COLOR_PATTERN> tag or match the key value assigned to the option code. The display object uses the option code or option code key value to retrieve the image in the database, and then it displays the image. This is useful if you would like to show rain glass, bubble glass, etc.

The {TEXT_GLASS} question tag is used to display the glass option code text in the glass object.

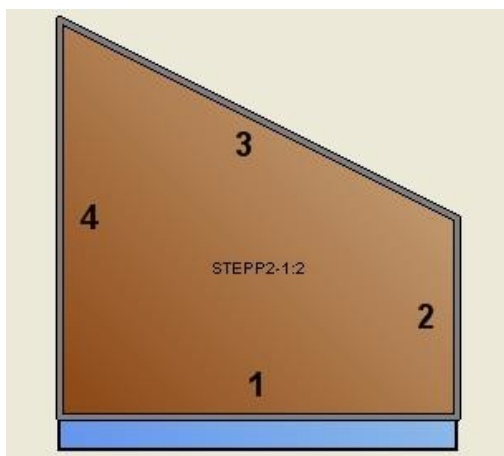
Question Tag	Definition
{TEXT_GLASS}	Glass type. Used when displaying glass type in text on the image.

Glass Type Option Key Values

The glass type tags provide additional support for option key values. You may have option codes that represent glass thickness, such as A14 for ¼" annealed glass and A18 for 1/8" annealed glass. Then in the option value, you would like to specify lowe, bronze, gray, etc. If this is the case, use Option Code Setup to enter option values with key values for your A14 and A18 option codes. The key values for A14 option code might be A14LOWE, A14CLR, A14BRZ corresponding to option values lowe, clear, bronze respectively. The key values for A18 option code might be A18LOWE, A18CLR, A18BRZ. To show lowe color in the display object, set the tag <003LE> to LOWE in Tag Setup. The display object will search for the substring LOWE in the selected option code key. If it finds LOWE, as it would when A14LOWE or A18LOWE is the key value selected, the Sea Green color is displayed. If no option key value is found, the display object will determine the color by using the option code.

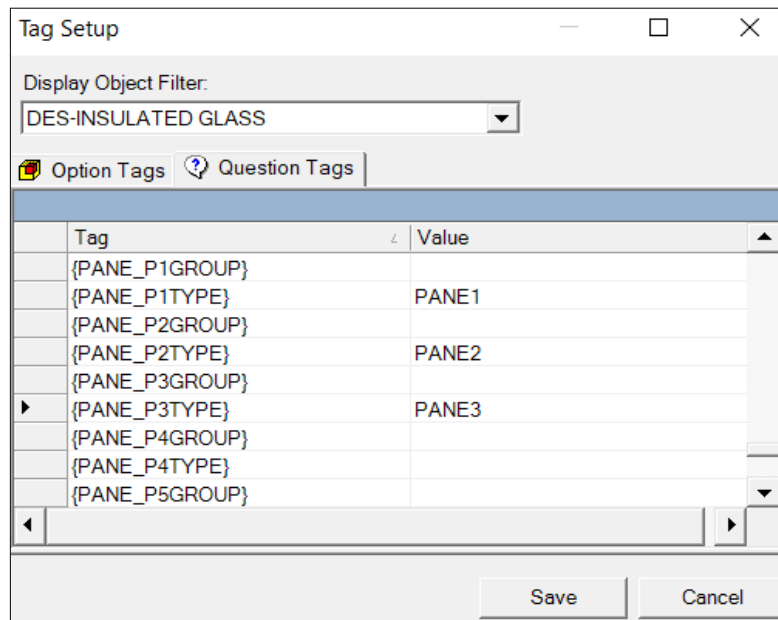
Glass Type for Multiple Panes

There are 2 panes of glass in a dual IG, and 3 panes of glass for a triple IG. You have the option of showing different colors for each pane, depending on the pane's glass type. This is most useful if you will also be showing glass offsets in your image, because an offset can potentially "uncover" a pane beneath the top pane, as shown in the image below. Panes are shown in numerical order, with pane 1 on top. Pane 1 represents the outside pane of glass.



Question Tag	Definition	Used With Option Tags:
{PANE_P1TYPE}, {PANE_P2TYPE}, {PANE_P3TYPE}	Glass type for pane 1 through 3. Note: if you refer to your glass as outer/center/inner instead of pane 1/pane 2/pane 3, enter inner glass questions into pane 3 (P3) question tags – even for a dual IG. Also, make sure parameter pane_123 is set to 0 (see Insulated Glass Parameters section).	Glass type option tags. <COLOR_BRONZE>, <COLOR_CLEAR>, <COLOR_LOWE>, etc.

The screenshot below shows possible glass type question tag assignments for panes in Tag Setup. For example, {PANE_P1TYPE} controls the glass type for pane 1, and it is assigned the question “Pane1”. All the possible glass types for pane 1 would be placed under the question “Pane1” in the option structure.



The color tags may be assigned option key values (as described in Glass Type Option Value Keys section) when working with panes.

Glass Groups

Your part may have so many glass types that you want to group the glass into categories. For example, you may have an option structure with questions *Pane1* and *Pane2*. Beneath each of these questions are the option codes **A14** (1/4" glass) and **A18** (1/8" glass). Once the option code **A14** is selected, then question *Pane1 A14* appears next in Options Wizard with specific glass types available (like **A14CLR**).

Pane1

A14

Pane1 A14

A14CLR

A14LE

A14BRZ

A14GRAY

A18

Pane1 A18

A18CLR

A18LE

A18BRZ

A18GRAY

Pane2

A14

Pane2 A14

A14CLR

A14LE

A14BRZ

A14GRAY

A18

Pane2 A18

A18CLR

A18LE

A18BRZ

A18GRAY

In this situation, the *Pane1* and *Pane2* questions concern two different groups of glass, **A14** and **A18**. These questions should be assigned to the {PANE_P#GROUP} question tags. The display object will concatenate the selected glass group option code to the glass group question to get the next level of glass question. So, if the user selects **A18** for question *Pane1*, the object will look for the specific glass type in question *Pane1 A18*. So, the {PANE_P#TYPE} tags remain unassigned when you are using the {PANE_P#GROUP} tags. This allows you to divide your glass into groups when you have many glass types.

Question Tag	Definition	Used With Option Tags:
{PANE_P1GROUP} ... {PANE_P3GROUP}	Glass group for pane 1 through 3. The option code selected for this question tag is concatenated to the question to determine the specific glass type question.	Glass type option tags. <COLOR_BRONZE>, <COLOR_CLEAR>, <COLOR_LOWE>, etc.

The question tag setup for the given example is shown below.

Tag	Value
{PANE_P1GROUP}	PANE1
{PANE_P1TYPE}	
{PANE_P2GROUP}	PANE2
{PANE_P2TYPE}	
{PANE_P3GROUP}	PANE3
{PANE_P3TYPE}	

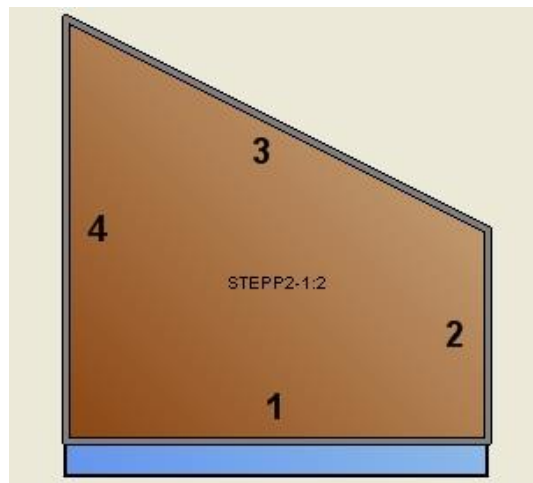
Glass Options

Text can be added to display glass process (like tempering, heat strengthened), gas types, pattern, and logo. These tags are further explained in the DES-FLAT GLASS section.

Question Tag	Definition
{TEXT_GAS}	Display the gas option code.
{TEXT_GLASS}	Display the glass option code.
{TEXT_GLPROCESS}	Display the glass process (like tempering, heat strengthened) option code (in text) associated with this question.
{TEXT_LOGO}	Display the logo option code (in text) associated with this question. This may represent the logo code for the customer's company logo.
{TEXT_PATTERN}	Display the pattern option code (in text) associated with this question. This may represent the template code for a special hand cut pattern.

Glass Offset

DES-INSULATED GLASS can display step offsets for the various panes of glass. In the image below, pane 2 is stepped by 2 inches at side 1.



There is a tag to represent each side of the glass. For four-sided shapes, side 1 is the bottom side, side 2 is the right side, side 3 is the top side, and side 4 is the left side (from the outside view). Each offset tag requires an option value, which is the offset dimension. The offset dimension should be a numerical value. A positive value increases the glass size; a negative value decreases the glass size.

Option Tag	Definition	Option Value
<OFFSET_S1>, <OFFSET_S2>... <OFFSET_S8>	Offset for each side, up to 8. <OFFSET_S1> is side 1 (bottom).	Numerical value of the offset dimension.

The Glass Offset Option Tags require the following Question Tags.

Question Tag	Definition	Used With Option Tag
{OFFSET_P1}, {OFFSET_P2}, {OFFSET_P3}	Glass offset question for each pane of glass. {OFFSET_P1} is pane 1, which is shown on top in Options Wizard.	< OFFSET_S1> to < OFFSET_S8>

There are several parameters associated with glass offsets. The parameter `step_multiplier` will be multiplied with the glass offset step dimension to get the final step amount. By default, it is set to 1 so there is no actual effect on the dimension. Some customers have set this value to -1 because all of their offsets are negative, but they do not want to require that the user enter the minus sign.

The `txt_showStepDim` parameter should be unassigned if you do not want to show the step dimension in text in the image. If you do want to show text, then set `txt_showStepDim` to a label name for the dimension. The `txt_pane#Name` parameters are text labels used to identify in which pane the step offset occurs.

The option structure for the above tags might look like:

```

    Pane1 Step?
        Side1
        Side2
        Side3          (User selects side 1, 2, 3 or 4)
        Side4
    Pane2 Step?
        Side1
        Side2
        Side3
        Side4

```

Another set of tags is available for step offset. This gives you an alternate method of setting up your option structure.

Option Tag	Definition	Option Value
<OffsetP1>... <OffsetP3>	Offset for pane 1 through 3.	Positive numerical value of the offset dimension.

The Glass Offset Option Tags require the following Question Tags.

Question Tag	Definition	Used With Option Tag
{OFFSET_S1}...	Glass offset question for side 1 through 8.	<OffsetP1>...
{OFFSET_S8}		<OffsetP3>

The option structure for the above tags might look like:

```

Side1 Step?
    Pane1
    Pane2
    Pane3      (User selects pane 1, 2, or 3)
Side2 Step?
    Pane1
    Pane2
    Pane3
Side3 Step?
    Pane1
    Pane2
    Pane3
Side4 Step?
    Pane1
    Pane2
    Pane3
  
```

This tag structure was added to allow easy combination with the Glass Edge Angle option structure which uses the same question tags. To choose this option structure, set the Step_Method parameter to "Miter" (without the quotes).

Glass Edge Angle

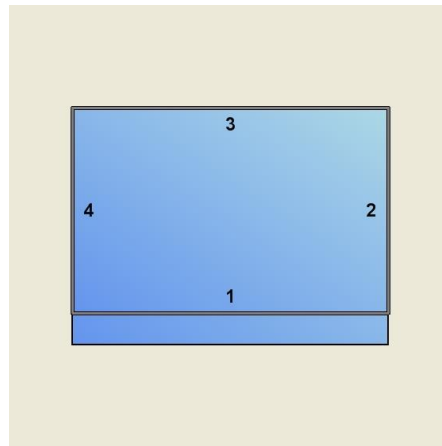
The edge of the glass could be angled (mitered), and the IG Cross Section can display this. There is a tag to represent whether the angle is facing in or out. The IG Cross Section can only show the step offset for the top and bottom side of the shape, since it is a two-dimensional object drawing. Each edge angle tag requires an option value, which is the degree of the angle. The angle dimension should be a numerical value greater than 0 and less than or equal to 90.

Option Tag	Definition	Option Value
<EDGEANGLEFACINGIN>	Edge angle facing in.	Positive numerical value of the degree of angle.
<EDGEANGLEFACINGOUT>	Edge angle facing out.	Positive numerical value of the degree of angle.

The Glass Offset Option Tags require the following Question Tags.

Question Tag	Definition	Used With Option Tag
{EDGEANGLE_S1}... {EDGEANGLE_S8}	Edge angle question for sides 1 through 8.	<EDGEANGLEFACINGIN> <EDGEANGLEFACINGOUT>

The object displays edge angles in a similar manner to glass step offset. The screenshot below shows an edge angle on side 1 facing out. Since it is facing out, the outer pane, which is on top, is shorter than the inner pane.



Glass Thickness

The glass thickness tags and parameters are required in order to support the Glass Edge Angle feature only. These tags are described in the DES-IG CROSS SECTION display object section. Typically, you will setup these tags and parameters for your cross section, and therefore they are already setup for DES-INSULATED GLASS.

Spacer Thickness

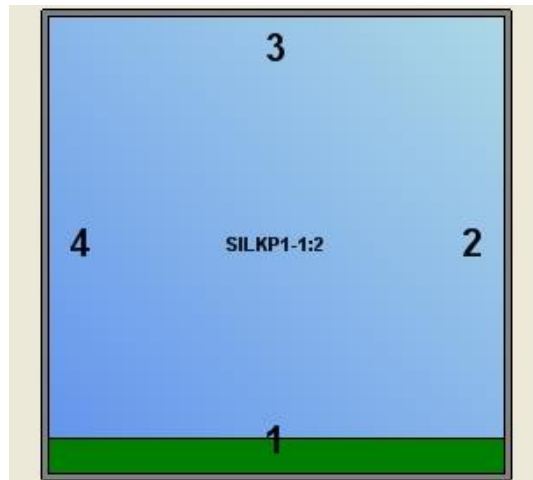
The spacer thickness tags and parameters are required in order to support the Glass Edge Angle feature only. These tags are described in the DES-IG CROSS SECTION display object section. Typically, you will setup these tags and parameters for your cross section, and therefore they are already setup for DES-INSULATED GLASS.

Internal Layer Thickness

The internal layer and internal layer thickness tags and parameters are required in order to support the Glass Edge Angle feature only. These tags are described in the DES-IG CROSS SECTION display object section. Typically, you will setup these tags and parameters for your cross section, and therefore they are already setup for DES-INSULATED GLASS.

Silk Screen

DES-INSULATED GLASS can show silk screen on the designated shape side. In the image below, side 1 has 2 inches of silk screen on pane 1.



There is a tag to represent each side of the glass. For four-sided shapes, side 1 is the bottom side, side 2 is the right side, side 3 is the top side, and side 4 is the left side (as viewed in options wizard). Each offset tag requires an option value, which is the silk screen dimension. The offset dimension should be a positive numerical value.

Option Tag	Definition	Option Value
<SILKSCR_S1>, <SILKSCR_S2>... <SILKSCR_S8>	Offset for each side, up to 8. <SILKSCR_S1> is side 1 (bottom).	Positive numerical value of the silk screen dimension.

The Silk Screen Option Tags require the following Question Tag.

Question Tag	Definition	Used With Option Tag
{SILKSCR_P1}, {SILKSCR_P2}, {SILKSCR_P3}	Silk Screen question for each pane of glass.	<SILKSCR_S1> to < SILKSCR_S8>

The txt_showSilkDim parameter should be unassigned if you do not want to show the silk screen dimension in text in the image. If you do want to show text, then set txt_showSilkDim to a label name for the dimension.

DXF Support

The DES-INSULATED GLASS object supports DXF files as described in the DES-FLAT GLASS object section.

Shapes

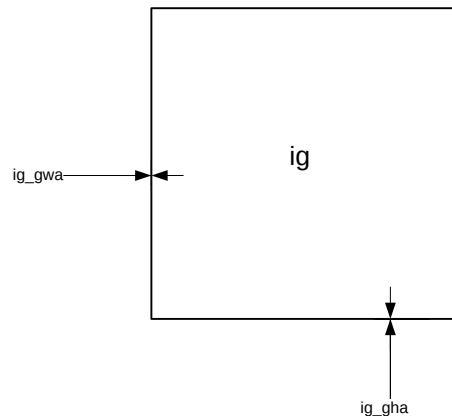
The DES-INSULATED GLASS object supports the same shapes described in the DES-FLAT GLASS object section.

Spacer Color

The insulated glass object also has the ability to change the spacer color. The color is gray by default, so no tag setup is required to draw a gray spacer.

Option Tags	Definition	Option Value
<SPACER_SPBRN>	Specifies the color brown.	None
<SPACER_SPLGY>	Specifies the color light gray.	None
<SPACER_SPWHT>	Specifies the color white.	None

INSULATED GLASS PARAMETERS



grid_hubRadius	The default hub radius used when drawing grid patterns with hub like sunstar, sunburst.
grid_numSpokes	The default number of spokes used when drawing grids that display spokes, such as sunburst grids.
grid_perPattern	The default perimeter pattern displayed when drawing perimeter grids (see appendix B).
grid_perPraDist	The default distance between grid bars used when drawing double perimeter and double prairie grids.
grid_perPraOffset	The default edge offset (distance from visible IG edge to grid bar) used when drawing perimeter and prairie grid patterns.
grid_ranchDist	The default distance from top of the window to the bottom horizontal grid bar of the ranch grids.
ig_gha	*Grid height adjustment value. ½ of this value applied to the top and ½ to the bottom.
ig_gwa	*Grid width adjustment value. ½ of this value applied to each side.
ig_type	Set this to 0 if you are not working with multiple panes of glass. Otherwise, set this to Dual for a dual IG or Triple for Triple IG.
pane_123	In a triple IG, some customers refer to panes of glass as

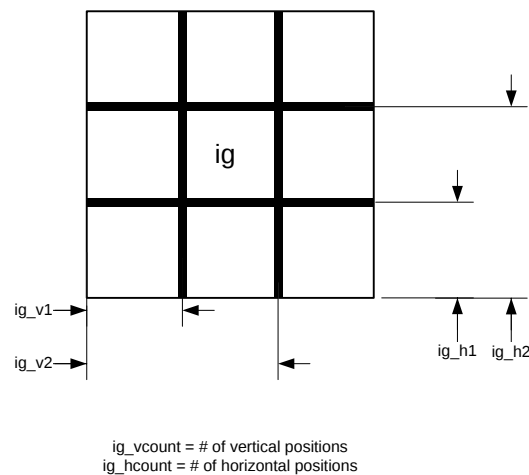
	pane 1, pane 2, pane 3. If this is how you identify your glass, set this parameter to 1. If you identify your glass by outer glass, center glass, inner glass, set this parameter to 0. When this parameter is 0, enter all inner glass questions into pane 3 (P3) question tags, even for a dual IG.
shp_dirPathDXF	This parameter can contain the directory path where DXF files are located when using the DXF option with the <SHAPE_DXF> tag.
shp_DXFFileP1	Name of the CAD DXF file exported into the order attachments directory. For laminated glass, a layer number is appended to this parameter value. So, if CAD-PANE1 is entered for this parameter, the display object will retrieve any laminated dxf files if they exist, as in: CAD-PANE11.DXF, CAD-PANE12.DXF, CAD-PANE13.DXF, CAD-PANE14.DXF, CAD-PANE15.DXF. Also, the assembled operation file CAD-PANE1 will be displayed by the display object if it exists in the order attachments directory.
shp_DXFFileP2	Name of the CAD DXF file exported into the order attachments directory. For laminated glass, a layer number is appended to this parameter value. So, if CAD-PANE2 is entered for this parameter, the display object will retrieve any laminated dxf files if they exist, as in: CAD-PANE21.DXF, CAD-PANE22.DXF, CAD-PANE23.DXF, CAD-PANE24.DXF, CAD-PANE25.DXF. Also, the assembled operation file CAD-PANE2 will be displayed by the display object if it exists in the order attachments directory.
shp_DXFFileP3	Name of the CAD DXF file exported into the order attachments directory. For laminated glass, a layer number is appended to this parameter value. So, if CAD-PANE3 is entered for this parameter, the display object will retrieve any laminated dxf files if they exist, as in: CAD-PANE31.DXF, CAD-PANE32.DXF, CAD-PANE33.DXF, CAD-PANE34.DXF, CAD-PANE35.DXF. Also, the assembled operation file CAD-PANE3 will be displayed by the display object if it exists in the order attachments directory.
size_defaultHeight	The size_defaultHeight value will be used to draw the object when an ordered height is not available. Part Setup is an example where size_defaultHeight is used to draw the object.
size_defaultWidth	The size_defaultWidth value will be used to draw the object when an ordered width is not available. Part Setup is an example where size_defaultWidth is used to draw the object.

step_multiplier	The parameter step_multiplier will be multiplied with the glass offset step dimension to get the final step amount. By default, is it set to 1 so there is no actual effect on the dimension.
step_method	Specifies tag structure used for glass step offsets (see Glass Step Offset section). Default value is "Offset" for use with question tags {Offset_P#}. Set to "Miter" to use with question tags {Offset_S#}.
txt_customGridsDXF	When drawing DXF shapes, grids cannot be drawn. Use this parameter to instead display text, like "Cust Grids", indicating grids were ordered for the glass. Keep in mind there is not much room to display text in the glass image, so it is best to keep the string assigned to this parameter short.
txt_edgeNumbers	If this value is 1, edge numbers will be displayed with the display object. Edge numbers will not be displayed when this value is 0.
txt_maxEdgeDXF	This parameter must contain the max number of sides a DXF shape can have before edge numbers are no longer displayed. This parameter is used in conjunction with the DXF option with the <SHAPE_DXF> tag.
txt_numberSize	Percentage value required: Controls text height for the edge numbers displayed on each side of the shape. This parameter is a percentage of the height and width so that the text is readable for various height and width dimensions entered. The size of the text is calculated by taking $((width * height)/2) * (txt_numberSize / 100)$. To enter a value of 7 percent (which is a typical value), enter 7 in the paramvalue column in the Parameter Setup dialog for paramname txt_numberSize.
txt_pane#Name	These parameters represent a text label for each pane of glass. The labels are used when showing dimensions in the image in text, as with glass step offsets.
txt_paramDelimiter	This character is used as the delimiter between multiple shape dimensions. The default value is a comma. However, this will not work in regions where the comma is already used as the decimal point. In these regions, another delimiter must be chosen. The delimiter must be one character only, and it cannot be a blank. If the delimiter entered is invalid, comma will be used by default. Also, do not use a character that is a numeric symbol in the region. Poor choices are -\$()%.
txt_showSilkDim	The txt_showSilkDim parameter should be unassigned if

	you do not want to show the silk screen dimension in text in the image. If you do want to show text, then set txt_showSilkDim to a label name for the dimension
txt_showStepDim	The txt_showStepDim parameter should be unassigned if you do not want to show the step dimension in text in the image. If you do want to show text, then set txt_showStepDim to a label name for the dimension.
txt_size	Percentage value required: Controls text height for the text displayed in the shape. This parameter is a percentage of the height and width so that the text is readable for various height and width dimensions entered. The size of the text is calculated by taking $((width * height)/2) * (txt_size / 100)$. To enter a value of 6 percent (which is a typical value), enter 6 in the paramvalue column in the Parameter Setup dialog for paramname txt_size.

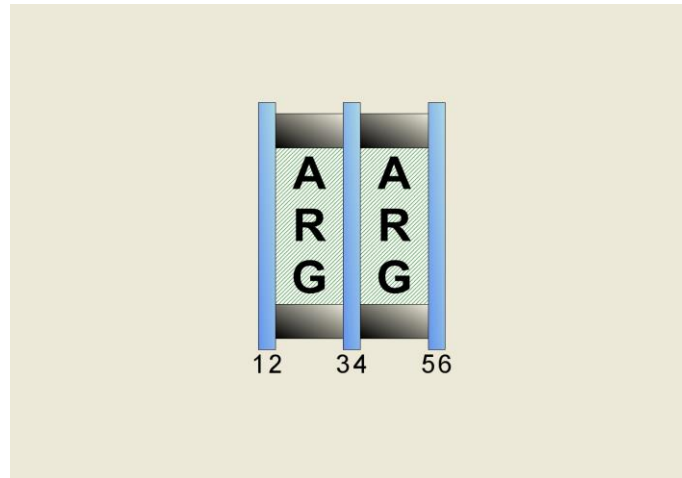
**adjustment values* – for glass objects, adjustment values are not accurate and should not be used for production.

INSULATED GLASS GRID LOCATIONS



Note: Grid notch locations stored in the FeneVision database for the DES-INSULATED GLASS object are not accurate and should not be used for production.

DES-IG CROSS SECTION



The IG Cross Section object shows the side view of the IG. In the picture above, the outer pane (pane 1) is on the left, then the center pane (pane 2), with the inner pane (pane 3) on the right. The surfaces of the panes are numbered on the bottom. The spacers are shown between the panes. This particular IG contains Argon gas.

NAME	SUPPORTED OPTIONS
DES-IG CROSS SECTION	• Lamination layers. • Internal layers (PVB). • Glass Type/Color – clear, low-e, bronze, obscure, gray. Glass type can be specified per pane and per layer (as in laminated glass). • Gas – indicates gas type. • Glass Offset –allows the user to specify an offset for each side of any pane. • Glass Thickness – the thickness of each pane and each layer. Also allows the user to enter thicknesses for each internal layer (as in PVB). • Spacer Thickness – spacer thickness specification • Spacer Color – spacer color specification. • Pattern Location – allows the user to indicate the pane/layer location of a pattern. • Coating Location – allows the user to indicate the pane/layer location of a coating. • Silk Screen Location – allows the user to indicate the pane / layer location of silk screen. • Edge Angle (Miter)

DES-IG CROSS SECTION TOP VIEW

The DES-IG CROSS SECTION TOP VIEW object has the same tag setup and performs the same functionality as DES-IG CROSS SECTION with one main difference: it shows the top view. Therefore, while the DES-IG CROSS SECTION shows edgework (step offset and edge angle) on the top and bottom sides (sides 1 and 3 of a four-sided shape), DES-IG CROSS SECTION TOP VIEW gives you a view of edgework on the left and right sides (sides 2 and 4 of a four-sided shape). This portion of the display object reference manual is written from the point of view of the DES-IG CROSS SECTION.

IG CROSS SECTION OPTION TAGS

IG Type

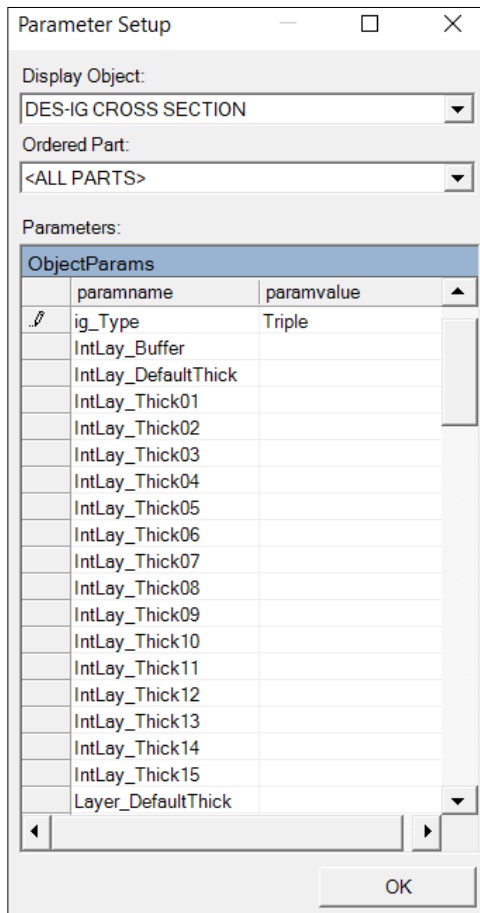
The IG Cross Section object supports dual and triple IGs. If you have a part that supports both dual and triple IGs, use the <IG_TYPE> tag to allow the user to select the IG type. The option value for tag <IG_TYPE> must be “Dual” or “Triple”.

Option Tags	Definition	Option Value
<IG_TYPE>	Specifies the IG type.	Dual or Triple

The <IG_TYPE> tag may be used with the {IG_TYPE} question tag, but it is not required. Another means to select triple IG is by using {IG_TRIPLE}. If any option code under this question is selected, then the object draws a triple IG.

Question Tags	Definition
{IG_TYPE}	Specifies the IG type question.
{IG_TRIPLE}	Specifies the IG triple question. If this group exists, then IG type is triple.

The ig_type parameter can also be used to specify the IG type. It is useful when each of your parts represent only one IG type, dual or triple. The screenshot below shows that the Triple IG.



The {IG_TRIPLE} tag has precedence over the <IG_TYPE> tag. The <IG_TYPE> tag has precedence over the ig_type parameter. If none of these are specified, then DES-IG CROSS SECTION defaults to a dual IG.

Glass Type

The glass type tags indicate to ObjectViewer the number of lamination layers per pane. If these tags are not defined, then each pane is displayed with one layer by default. Either the pane is not laminated, or the user does not want to show individual lamination layers. If the glass type options exist, then each layer is represented in the drawing.

Note: If your option structure refers to your glass as outer/center/inner instead of pane 1/pane2/pane 3, enter inner glass questions into pane 3 (P3) question tags – even for a dual IG. Also, make sure parameter pane_123 is set to 0 (see IG CROSS SECTION Parameters Section).

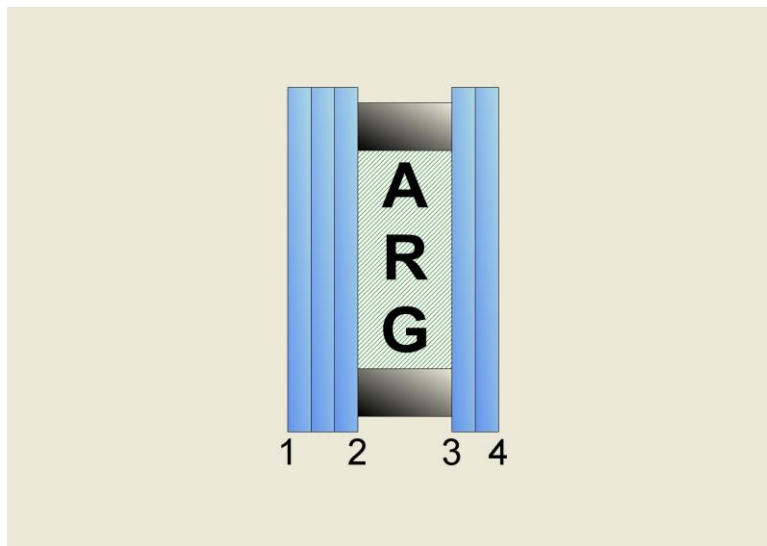
Option Tag	Definition
<PANE_P1L2LAYERLAMI>	If this option exists, there are 2 layers in pane 1.
<PANE_P1L3LAYERLAMI>	If this option exists, there are 3 layers in pane 1.
<PANE_P1L4LAYERLAMI>	If this option exists, there are 4 layers in pane 1.
<PANE_P1L5LAYERLAMI>	If this option exists, there are 5 layers in pane 1.
<PANE_P2L2LAYERLAMI>	If this option exists, there are 2 layers in pane 2.

<PANE_P2L3LAYERLAMI>	If this option exists, there are 3 layers in pane 2.
<PANE_P2L4LAYERLAMI>	If this option exists, there are 4 layers in pane 2.
<PANE_P2L5LAYERLAMI>	If this option exists, there are 5 layers in pane 2.
<PANE_P3L2LAYERLAMI>	If this option exists, there are 2 layers in pane 3.
<PANE_P3L3LAYERLAMI>	If this option exists, there are 3 layers in pane 3.
<PANE_P3L4LAYERLAMI>	If this option exists, there are 4 layers in pane 3.
<PANE_P3L5LAYERLAMI>	If this option exists, there are 5 layers in pane 3.

Question tags associated with Glass Type Option Tags:

Question Tag	Definition	Used With Option Tags
{PANE_P1TYPE}	Glass type question for pane 1.	<PANE_P1L#LAYERLAMI>
{PANE_P2TYPE}	Glass type question for pane 2.	<PANE_P2L#LAYERLAMI>
{PANE_P3TYPE}	Glass type question for pane 3.	<PANE_P3L#LAYERLAMI>

The picture below shows a dual pane IG, each with 3 lamination layers in pane 1 (outer pane) and 2 lamination layers in pane 2.



Glass Color

The glass color tags tell ObjectViewer what color to draw the glass in. Possible glass types are bronze, clear, low-e, obscure, and gray. If none of the tags are setup, the default glass color is blue.

Option Tag	Definition	Display Color
<COLOR_BRONZE>	Bronze	Bronze
<COLOR_CLEAR>	Clear	Blue
<COLOR_LOWE>	Low-e	Sea Green
<COLOR_OBSCURE>	Obscure	Light Blue
<COLOR_GRAY>	Gray	Gray

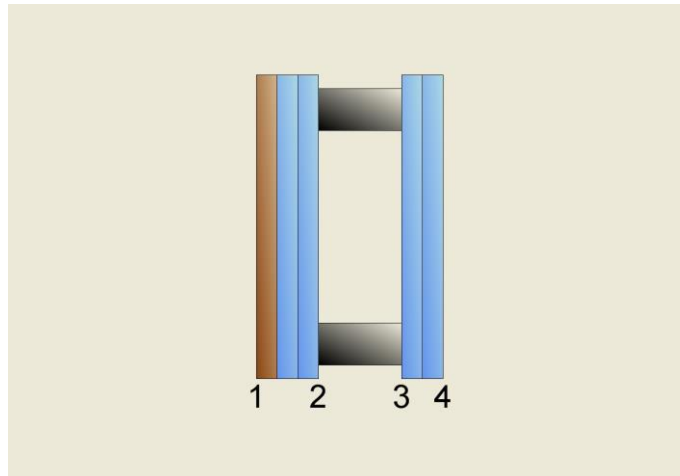
You may have multiple variations of each glass type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <COLOR_BRONZE > can be assigned to option codes BZ1 and BZ2 by placing BZ1, BZ2 in the value column of Tag Setup for the tag <COLOR_BRONZE>.

Glass Color Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{LAYER_P1L#TYPE}	Glass type question for pane 1, layer #.	<COLOR_BRONZE>, <COLOR_CLEAR>, etc.
{LAYER_P2L#TYPE}	Glass type question for pane 2, layer #.	<COLOR_BRONZE>, <COLOR_CLEAR>, etc.
{LAYER_P3L#TYPE}	Glass type question for pane 2, layers #.	<COLOR_BRONZE>, <COLOR_CLEAR>, etc.

You may have multiple questions pertaining to glass type, so a comma separated list of option codes can be assigned to one question tag. For example, {Layer_P1L1Type} can be assigned to questions OUTER GLASS LAYER1? and OUTER GLASS L1? by placing OUTER GLASS LAYER1?, OUTER GLASS L1? in the value column of Tag Setup for the question tag {Layer_P1L1Type}. Then ObjectViewer will look for the existence of glass type options under both questions. The options assigned to <COLOR_BRONZE>, <COLOR_CLEAR>, etc. would appear under these questions in options wizard.

The picture below shows an IG with layer1 of the pane 1 in bronze. The remaining layers are clear.



Glass Type Option Key Values

The glass color tags provide additional support for option value keys. You may have option codes that represent glass thickness, such as A14 for 1/4" annealed glass and A18 for 1/8" annealed glass. Then in the option value, you would like to specify lowe, bronze, gray, etc. If this is the case, use Option Code Setup to enter option values with key values for your A14 and A18 option codes. The key values for A14 option code might be A14LOWE, A14CLR, A14BRZ corresponding to option values lowe, clear, bronze respectively. The key values for A18 option code might be A18LOWE, A18CLR, A18BRZ. To show lowe color in the display object, set the tag <COLOR_LOWE> to LOWE in Tag Setup. The display object will search for the substring LOWE in the selected option code key. If it finds LOWE, as it would when A14LOWE or A18LOWE is the key value selected, then the Sea Green color is displayed. If no option key value is found, the display object will determine the color by using the option code.

Glass Groups

Your part may have so many glass types that you want to group the glass into categories. For example, you may have an option structure with questions *Pane1* and *Pane2*. Beneath each of these questions are the option codes **A14** (1/4" glass) and **A18** (1/8" glass). Once the option code **A14** is selected, then question *Pane1 A14* appears next in Options Wizard with specific glass types available (like **A14CLR**).

Pane1

A14

Pane1 A14

A14CLR

A14LE

A14BRZ

A14GRAY

A18*Pane1 A18***A18CLR****A18LE****A18BRZ****A18GRAY***Pane2***A14***Pane2 A14***A14CLR****A14LE****A14BRZ****A14GRAY****A18***Pane2 A18***A18CLR****A18LE****A18BRZ****A18GRAY**

In this situation, the *Pane1* and *Pane2* questions concern two different groups of glass, **A14** and **A18**. These questions should be assigned to the {PANE_P#L#GROUP} question tags. The display object will concatenate the selected glass group option code to the glass group question to get the next level of glass question. So, if the user selects **A18** for question *Pane1*, the object will look for the specific glass type in question *Pane1 A18*. So, the {PANE_P#L#TYPE} tags remain unassigned when you are using the {PANE_P#L#GROUP} tags. This allows you to divide your glass into groups when you have many glass types.

Question Tag	Definition	Used With Option Tags:
{PANE_P1L#GROUP} ... {PANE_P3L#GROUP}	Glass group for pane 1 through 3, layer #. The option code selected for this question tag is concatenated to the question to determine the specific glass type question.	Glass type option tags. <COLOR_BRONZE>, <COLOR_CLEAR>, <COLOR_LOWE>, etc.

Gas

Text can be added to the IG portion of windows to display glass process (like tempering) and gas types.

Option Tag	Definition
<GAS_FILL>	Display the gas fill indicator between panes.

In order to display the gas option code in text, the <GAS_FILL> tag requires the question tag {GAS_FILL}.

Question Tag	Definition	Used With Option Tags
{GAS_FILL}	Display the gas option code (in text) associated with this question.	<GAS_FILL>

The picture below shows the IG with gas fill indicator and option text, then without gas.



Glass Offset

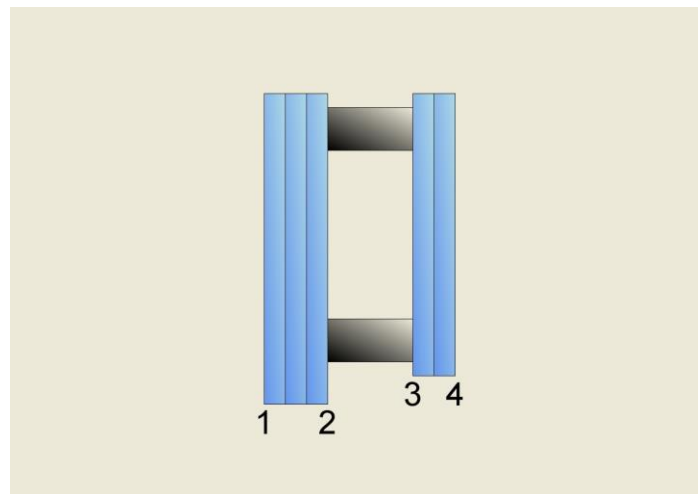
The panes could have a step offset, and the IG Cross Section can display this. There is a tag to represent each side of the glass. The IG Cross Section can only show the step offset for the top and bottom side of the shape, since it is a two-dimensional object drawing. Each offset tag requires an option value, which is the offset dimension. The offset dimension should be a numerical value greater than 0. The step offsets for the center pane must all match the inner pane offsets or the outer pane offsets.

Option Tag	Definition	Option Value
<OffsetS1>... <OffsetS8>	Offset for side 1 through 8.	Positive numerical value of the offset dimension.

The Glass Offset Option Tags require the following Question Tags.

Question Tag	Definition	Used With Option Tag
{OFFSET_P1}... {OFFSET_P3}	Glass offset question for Pane 1 through 3.	<OffsetS1>... <OffsetS8>

The picture below shows an IG with an offset on side 1 of the outer pane.



The option structure for the above tags might look like:

```

Pane1 Step?
  Side1
  Side2
  Side3      (User selects side 1, 2, 3 or 4)
  Side4
Pane2 Step?
  Side1
  Side2
  Side3
  Side4
  
```

Another set of tags is available for step offset. This gives you an alternate method of setting up your option structure.

Option Tag	Definition	Option Value
<OffsetP1>...	Offset for pane 1 through 3.	Positive numerical value of the offset dimension.
<OffsetP3>		

The Glass Offset Option Tags require the following Question Tags.

Question Tag	Definition	Used With Option Tag
{OFFSET_S1}...	Glass offset question for side 1 through 8.	<OffsetP1>...
{OFFSET_S8}		<OffsetP3>

The option structure for the above tags might look like:

```

Side1 Step?
    Pane1
    Pane2
    Pane3          (User selects pane 1, 2, or 3)
Side2 Step?
    Pane1
    Pane2
    Pane3
Side3 Step?
    Pane1
    Pane2
    Pane3
Side4 Step?
    Pane1
    Pane2
    Pane3

```

This tag structure was added to allow easy combination with the Glass Edge Angle option structure which uses the same question tags. To choose this option structure, set the Step_Method parameter to "Miter" (without the quotes).

Glass Edge Angle

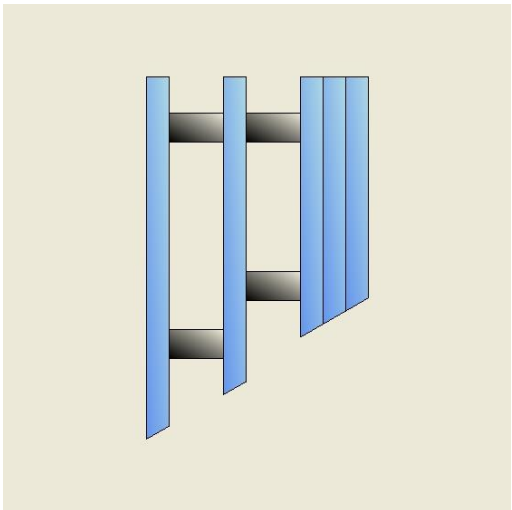
The edge of the glass could be angled (mitered), and the IG Cross Section can display this. There is a tag to represent whether the angle is facing in or out. The IG Cross Section can only show the step offset for the top and bottom side of the shape, since it is a two-dimensional object drawing. Each edge angle tag requires an option value, which is the degree of the angle. The angle dimension should be a numerical value greater than 0 and less than or equal to 90.

Option Tag	Definition	Option Value
<EDGEANGLEFACINGIN>	Edge angle facing in.	Positive numerical value of the degree of angle.
<EDGEANGLEFACINGOUT>	Edge angle facing out.	Positive numerical value of the degree of angle.

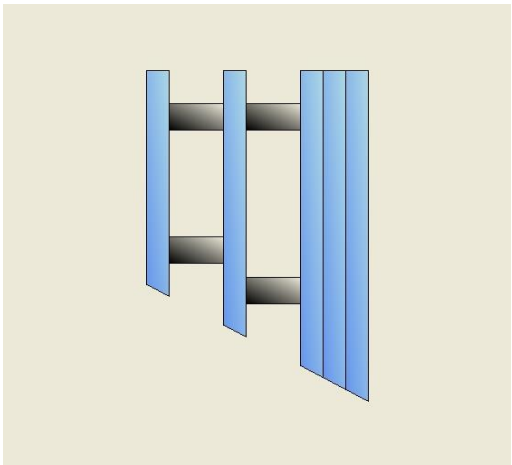
The Glass Offset Option Tags require the following Question Tags.

Question Tag	Definition	Used With Option Tag
{EDGEANGLE_S1}... {EDGEANGLE_S8}	Edge angle question for sides 1 through 8.	<EDGEANGLEFACINGIN> <EDGEANGLEFACINGOUT>

The picture below shows an IG with an edge angle facing in on side 1.



The picture below shows an IG with an edge angle facing out on side 1.



Glass Thickness

Each pane, and even each layer can be varying thicknesses. The IG Cross Section can display thickness. Up to 15 different thicknesses can be represented by the tags <Layer_Thick01>, <Layer_Thick02>, etc. Each thickness tag requires parameter setup, which is the thickness dimension. The thickness dimension should be a numerical value greater than 0. For example, the <Layer_Thick01> tag will retrieve its thickness dimension from the Layer_Thick01 parameter.

Option Tag	Definition	Requires Parameter Setup
<LAYER_THICK01>, <LAYER_THICK02>... <LAYER_THICK15>	Thickness. Up to 15 different thicknesses can be handled by the object.	The parameters Layer_Thick01, Layer_Thick02 ... Layer_Thick15 correspond to the thickness option tags.

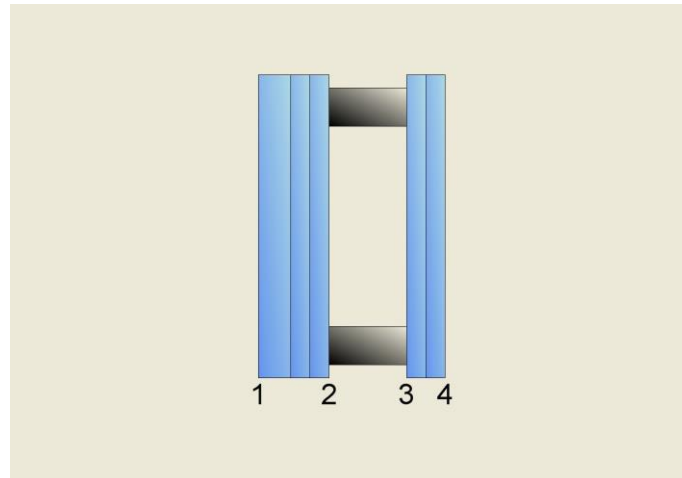
The Glass Thickness Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{LAYER_P1L#THICK}	Glass thickness question for Pane 1, layer #.	<Layer_Thick01>to <Layer_Thick15>
{LAYER_P2L#THICK}	Glass thickness question for Pane 2, layer #.	<Layer_Thick01>to <Layer_Thick15>
{LAYER_P3L#THICK}	Glass thickness question for Pane 3, layer #.	<Layer_Thick01>to <Layer_Thick15>

The thickness can also be controlled by parameters. The Layer_DefaultThick parameter is used when no other thickness value is found for the layer. The remaining thickness parameters take precedence over the thickness tags. So, if the Layer_P1L1Thick parameter contains a correct value in Parameter Setup, then its value will be used even if there is a question and option in the option structure pertaining to pane 1 / layer 1 thickness.

Parameter	Definition	Parameter Value
Layer_DefaultThick	This thickness will be used for a layer which does not have its thickness parameter (Layer_P1L1Thickness for example) setup and does not have its thickness tags setup ({Layer_P1L1Thick} and <Layer_Thick01> for example). It will also be used if the thickness value entered for its thickness parameter or thickness tag is invalid.	Positive numerical thickness dimension.
Layer_P1L#Thick	Glass thickness for the Pane 1, Layer #.	Positive numerical thickness dimension.
Layer_P2L#Thick	Glass thickness for the Pane 2, Layer #.	Positive numerical thickness dimension.
Layer_P3L#Thick	Glass thickness for the Pane 2, Layer #.	Positive numerical thickness dimension.

The picture below shows a greater thickness on layer 1 of pane 1.



Spacer Thickness

The IG Cross Section can display spacer thickness. Up to 15 different thicknesses can be represented by the tags <Spacer_Thick01>, <Spacer_Thick02>, etc. Each thickness tag requires parameter setup, which is the thickness dimension. The thickness dimension should be a numerical value greater than 0. For example, the <Spacer_Thick01> tag will retrieve its thickness dimension from the Spacer_Thick01 parameter

Option Tag	Definition	Parameter Setup
<Spacer_Thick01>, <Spacer_Thick02> ... <Spacer_Thick15>	Spacer Thickness. Up to 15 different thicknesses can be handled by the object.	The parameters Spacer_Thick01, Spacer_Thick02 ... Spacer_Thick15 correspond to the thickness option tags.

The Spacer Thickness Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{Spacer_Thickness}	Spacer thickness question.	<Spacer_Thick01> to <Spacer_Thick15>

Spacer Color

The IG Cross Section can display spacer color.

Option Tag	Definition	Display Color
<SpacerColor_Black>	Spacer color black.	black
<SpacerColor_Bronze>	Spacer color bronze.	saddlebrown
<SpacerColor_Grey>	Spacer color grey.	gray
<SpacerColor_Mill>	Spacer color mill.	silver

The Spacer Color Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{Spacer_Color}	Spacer color question.	<Spacer_Black>, <Spacer_Bronze, etc.

Pattern Location Indicator

The IG Cross Section can display the location of a pattern on the outer and inner panes.

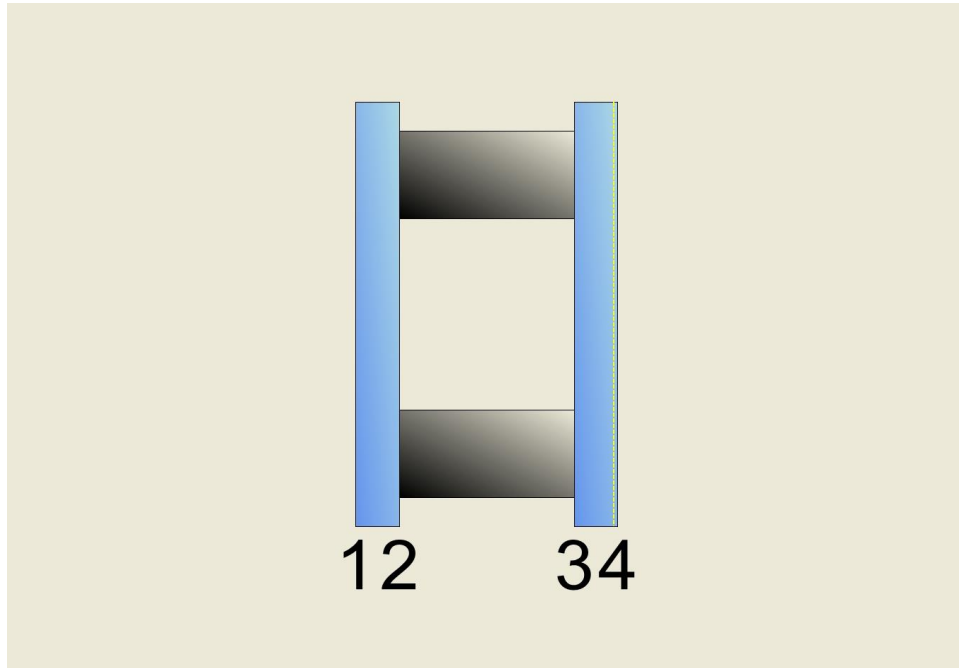
Option Tag	Definition	Option Value
<LAYER_PATTERN>	Set to pattern option code(s).	Numerical value representing surface where pattern is located.

The Pattern Location Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tag
{LAYER_P1L#PATTERN}	Pattern location question for Pane 1, Layers 1 #.	<Layer_Pattern>
{LAYER_P2L#PATTERN}	Pattern location question for Pane 2, Layers 1 #.	<Layer_Pattern>
{LAYER_P3L#PATTERN}	Pattern location question for Pane 3, Layers 1 #.	<Layer_Pattern>

The Layer_Numbering parameter controls how the option value is interpreted for the <Layer_Pattern> tag. It has three possible values, IG, LAYER, and 1OR2. If this parameter is set to IG, then the option value is the surface number shown at the bottom of the object. This method is valid only for non-layered (non-laminated) glass. If the glass is laminated, you must set the Layer_Numbering pattern to LAYER or 1OR2. If you choose LAYER, then specify the <Layer_Pattern> option value by layer surface number. The layer surfaces are numbered 1 to 15 from left to right, on each pane. If you choose 1OR2, then specify the <Layer_Pattern> option value by entering a 1 or a 2. In this case, for every layer, the left surface is 1 and the right surface is 2.

The picture below shows the pattern location on the inner pane /surface 4. The glass is non-laminated so the option value could be specified by pane surface number.



Coating Location Indicator

The IG Cross Section can display the location of a coating on the outer and inner panes.

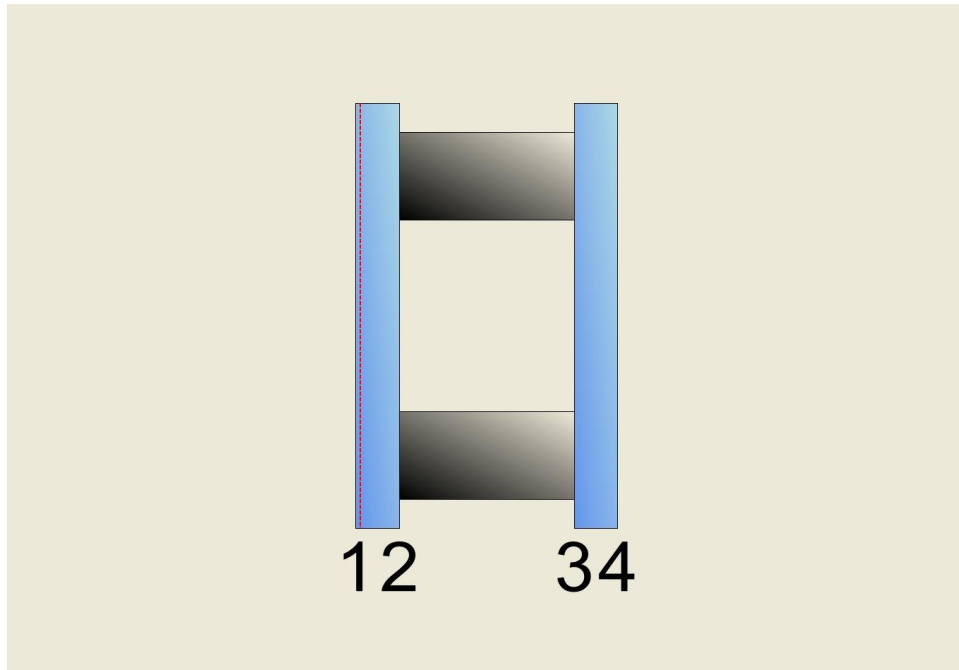
Option Tag	Definition	Option Value
<LAYER_COATING>	Set to coating option code(s).	Numerical value representing surface where coating is located.

The Pattern Location Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{LAYER_P1L#COATING}	Coating location question for Pane 1, Layers 1 #.	<Layer_Coating>
{LAYER_P2L#COATING}	Coating location question for Pane 2, Layers 1 #.	<Layer_Coating>
{LAYER_P3L#COATING}	Coating location question for Pane 3, Layers 1 #.	<Layer_Coating>

The Layer_Numbering parameter controls how the option value is interpreted for the <Layer_Coating> tag. This is described in the previous section, Pattern Location Indicator.

The picture below shows the coating location on the pane 1 / surface 1. The glass is non-laminated so the option value could be specified by pane surface number.



Silk Screen Location Indicator

The IG Cross Section can display the location of a silk screen on any lamination layer

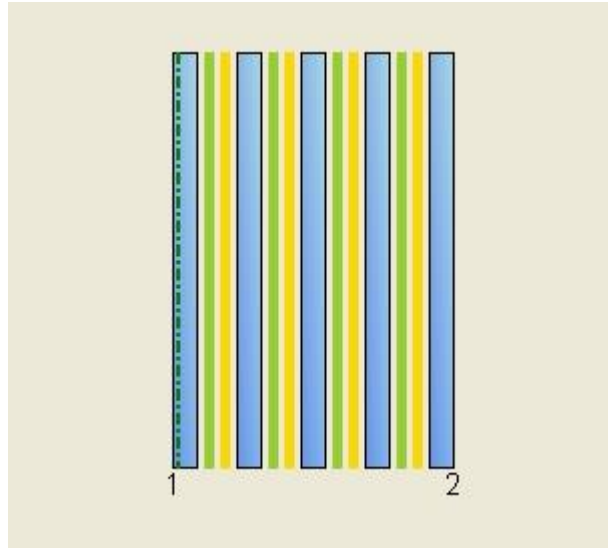
Option Tag	Definition	Option Value
<SILKSCR_LAYER1>... <SILKSCR_LAYER5>	Set to silk screen layer option code(s).	
<SILKSCR_SURFACE>	Set to silk screen option code(s).	Numerical value representing surface where silk screen is located.

The Pattern Location Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{SILKSCR_LAYER}	Silk Screen location question for Layer #.	<SILKSCR_LAYER#>
{SILKSCR_SURFACE}	Silk Screen surface question for Layer #.	<SILKSCR_SURFACE>

The Layer_Numbering parameter controls how the option value is interpreted for the <SILKSCR_SURFACE> tag. This is described in the previous section, Pattern Location Indicator.

The picture below shows the silk screen location on layer 1 / surface 1.



Internal Layers

The IG Cross Section can display up to five internal layers (for example PVB) between every set of lamination layers.

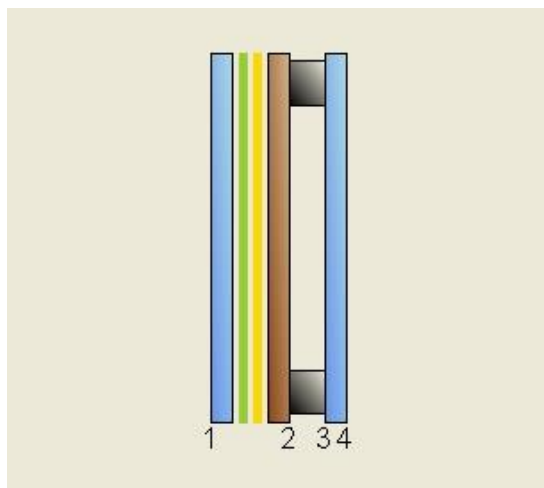
The <INTLAYERNUM> option tag indicates internal layers are needed. Its option value indicates the number of internal layers.

Option Tag	Definition	Option Value
<INTLAYERNUM>	Internal layer option code.	Numerical value representing the number of internal layers.

The Internal Layer Option Tag requires the following Question Tags.

Question Tag	Definition	Use With Option Tags
{LAYER_P1L#NUMINTLAY}	Internal layer question for Pane 1, Layer # .	<INTLAYERNUM>
{LAYER_P2L#NUMINTLAY}	Internal layer question for Pane 2, Layer #.	<INTLAYERNUM>
{LAYER_P3L#NUMINTLAY}	Internal layer question for Pane 3, Layer #.	<INTLAYERNUM>

Internal layers for lamination 1 will appear to the right of lamination layer 1. There are no internal layers to the right of rightmost lamination layer in a pane. The image below shows two internal layers (indicated in green and gold) between the lamination layers in pane 1.



The IntLay_Buffer parameter controls the amount of white space in each side of the internal layers.

Internal Layer Thickness

Internal layers can have varying thicknesses. Up to 15 different thicknesses can be represented by the tags <IntLayer_Thick01>, <IntLayer_Thick02>, etc. Each thickness tag requires parameter setup, which is the thickness dimension. The thickness dimension should be a numerical value greater than 0. For example, the <IntLayer_Thick01> tag will retrieve its thickness dimension from the IntLayer_Thick01 parameter.

Option Tag	Definition	Requires Parameter Setup
<INTLAYER_THICK01>, <INTLAYER_THICK02>... <INTLAYER_THICK15>	Thickness. Up to 15 different thicknesses can be handled by the object.	The parameters IntLayer_Thick01, IntLayer_Thick02 ... IntLayer_Thick15 correspond to the thickness option tags.

The Internal Layer Thickness Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{INTLAYER_P1L#I#THICK}	Internal layer thickness question for Pane 1, layer #; internal layer #.	<IntLayer_Thick01>to <IntLayer_Thick15>
{INTLAYER_P2L#I#THICK}	Internal layer thickness question for Pane 2, layer #; internal layer #.	<IntLayer_Thick01>to <IntLayer_Thick15>
{INTLAYER_P3L#I#THICK}	Internal layer thickness question for Pane 3, layer #; internal layer #.	<IntLayer_Thick01>to <IntLayer_Thick15>

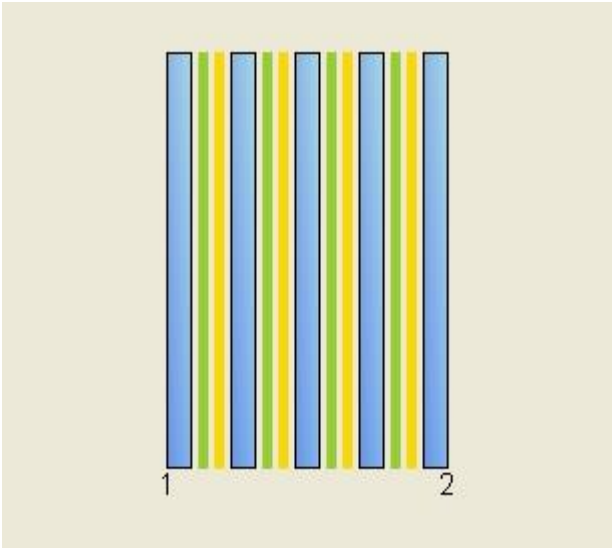
The IntLay_DefaultThick parameter is used for internal layer thickness when no other thickness value is found for the internal layer.

IG CROSS SECTION PARAMETERS

Coating_IndLoc	Used to adjust the placement of the coating indicator. A positive value will move the indicator away from the edge of the surface, as shown in the picture above. Requires a positive numerical value.
Pattern_IndLoc	Used to adjust the placement of the pattern indicator. A positive value will move the indicator away from the edge of the surface, as shown in the picture above. Requires a positive numerical value.
SilkScr_IndLoc	Used to adjust the placement of the silk screen indicator. A positive value will move the indicator away from the edge of the surface, as shown in the picture above. Requires a positive numerical value.
Ig_Height	Percentage value required: The object height is based on the object width (which is based on pane and spacer thicknesses). This parameter, ig_height, is a percentage of the object width used to calculate the object height. The cross section typically looks better and is more readable when it is taller than it is wide. So, a good percentage value is around 150.
Ig_Type	Set to Dual for dual IGs, and Triple for triple IGs.
Layer_P#G##Thick	Where # determines the pane and ## determines the layer. These parameters are described in the Glass Thickness section above.
Layer_Thick##	These parameters are described in the Glass Thickness section above.
Layer_DefaultThick	This parameter is described in the Glass Thickness section above.
Layer_Numbering	This parameter is described in the coating indicator section above. Value values are IG, LAYER or 1OR2.
ScalingFactor	ScalingFactor is applied to the object width. To calculate the object width, the thicknesses of all the pane layers, internal layers, and spacers are added together to get a total thickness. These thicknesses tend to be small values, making the object unreadable. So, ScalingFactor is multiplied by the total thickness to get the object width. A typical value is 20.
Spacer_Height	Percentage value required: The Spacer_Height indicates a percentage which is applied to the object height to get the height of the spacer. (See Ig_Height parameter for more information concerning object height.) A typical value is 11.
Spacer_Inset	Percentage value required: Controls the distance from the top/bottom of the IG to the spacer. This percentage is applied to the object height to get the inset. (See Ig_Height parameter for more information concerning object height.) A typical value is 2.
Spacer_Thick##	Spacer thickness values relating to the <SPACER_THICK##> tags.
Spacer_DefaultThick	The default thickness of the spacer if no other spacer thickness is found via the spacer thickness parameters and tags.

TextHeight_Gas	Percentage value required: Controls text height for the gas option code. This parameter is a percentage of the spacer thickness. A typical value is 100.
TextHeight_Pane	Percentage value required: Controls text height for the surface number displayed at the bottom of the IG. This parameter is a percentage of the height and width so that the text is readable for various height and width dimensions entered. The size of the text is calculated by taking $((\text{width} * \text{height})/2) * (\text{TextHeight_Pane}/100)$. To enter a value of 10 percent (which is a typical value), enter 10 in the paramvalue column in the Parameter Setup dialog for paramname TextHeight_Pane.
IntLay_Buffer	Controls the amount of white space in each side of the internal layers.
IntLay_DefaultThick	This parameter is described in the Internal Layer Thickness section above.
IntLay_Thick##	These parameters is described in the Internal Layer Thickness section above.
Pane_123	Valid values are 1 or 0. Informs the object how the panes are identified in the option structure. Some option structures are setup in the manner Glass 1, Glass 2, Glass 3 and in this case Pane_123 must be set to 1. Other option structures are setup in the manner Outer, Center, Inner and in this case Pane_123 must be set to 0. When set to 0, outer glass questions must be assigned to Pane 1 tags, Center glass questions must be assigned to Pane 2 tags, and Inner glass questions must be assigned to Pane 3 tags.
Step_Multiplier	This value is multiplied by glass step offset option values.
Step_Method	Specifies tag structure used for glass step offsets (see Glass Step Offset section). Default value is "Offset" for use with question tags {Offset_P#}. Set to "Miter" to use with question tags {Offset_S#}.
View_Flip	When View_Flip is set to 0, the cross section objects do NOT change when the View button in Options Wizard is pressed. When View_Flip is set to 1, the cross section objects flip from right to left, otherwise known as horizontal mirror. When View_Flip is set to 2, the object performs a vertical mirror. When View_Flip is set to 3, both a horizontal and vertical mirror is performed which accomplishes a 180 degree rotate. When not using a value of 0, typically you will want to use 1 for the side cross section and 3 for the top cross section.

DES-LAMI CROSS SECTION



The LAMI Cross Section object shows the side view of laminated glass. The picture above shows 5 lamination layers with two internal layers between. The surfaces of the panes are numbered on the bottom.

NAME	SUPPORTED OPTIONS
DES-LAMI CROSS SECTION	• Lamination layers. • Internal layers (PVB). • Glass Type/Color – clear, low-e, bronze, obscure, gray. Glass type can be specified per pane and per layer (as in laminated glass). • Glass Offset –allows the user to specify an offset for each side of any lamination layer. • Glass Thickness – the thickness of each layer. Also allows the user to enter thicknesses for each internal layer (as in PVB). • Pattern Location – allows the user to indicate the pane/layer location of a pattern. • Coating Location – allows the user to indicate the pane/layer location of a coating. • Silk Screen Location – allows the user to indicate the pane / layer location of silk screen.

LAMI CROSS SECTION OPTION TAGS

Glass Type/Color

The glass color tags tell ObjectViewer what color to draw the glass in. Possible glass types are bronze, clear, low-e, obscure, and gray. If none of the tags are setup, the default glass color is blue.

Option Tag	Definition	Display Color
<COLOR_BRONZE>	Bronze	Bronze
<COLOR_CLEAR>	Clear	Blue
<COLOR_LOWE>	Low-e	Sea Green
<COLOR_OBSCURE>	Obscure	Light Blue
<COLOR_GRAY>	Gray	Gray

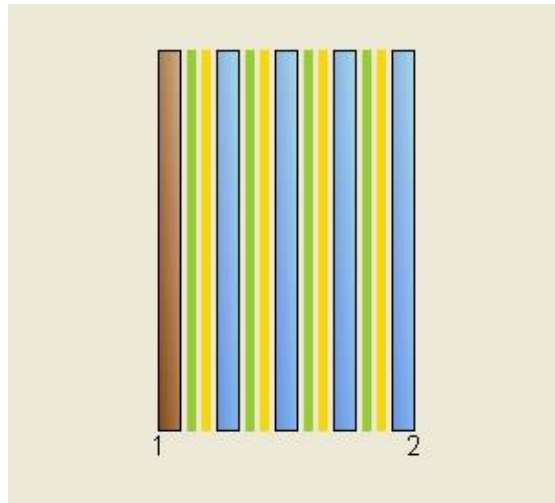
You may have multiple variations of each glass type to offer, so a comma separated list of option codes can be assigned to one tag. For example, <COLOR_BRONZE > can be assigned to option codes BZ1 and BZ2 by placing BZ1, BZ2 in the value column of Tag Setup for the tag <COLOR_BRONZE>.

Glass Color Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{LAYER_L#TYPE}	Glass type question for layer #.	<COLOR_BRONZE>, <COLOR_CLEAR>, etc.

You may have multiple questions pertaining to glass type, so a comma separated list of option codes can be assigned to one question tag. For example, {Layer_L1Type} can be assigned to questions GLASS LAYER1 and GLASS L1 by placing GLASS LAYER1, GLASS L1 in the value column of Tag Setup for the question tag {Layer_L1Type}. Then ObjectViewer will look for the existence of glass type options under both questions. The options assigned to <COLOR_BRONZE>, <COLOR_CLEAR>, etc. would appear under these questions in options wizard.

The picture below shows laminated glass with layer1 in bronze. The remaining layers are clear.



Glass Type Option Key Values

The glass color tags provide additional support for option value keys. You may have option codes that represent glass thickness, such as A14 for 1/4" annealed glass and A18 for 1/8" annealed glass. Then in the option value, you would like to specify lowe, bronze, gray, etc. If this is the case, use Option Code Setup to enter option values with key values for your A14 and A18 option codes. The key values for A14 option code might be A14LOWE, A14CLR, A14BRZ corresponding to option values lowe, clear, bronze respectively. The key values for A18 option code might be A18LOWE, A18CLR, A18BRZ. To show lowe color in the display object, set the tag <COLOR_LOWE> to LOWE in Tag Setup. The display object will search for the substring LOWE in the selected option code key. If it finds LOWE, as it would when A14LOWE or A18LOWE is the key value selected, then the Sea Green color is displayed. If no option key value is found, the display object will determine the color by using the option code.

Glass Groups

Your part may have so many glass types that you want to group the glass into categories. For example, you may have an option structure with questions *Layer1* and *Layer2*. Beneath each of these questions are the option codes **A14** (1/4" glass) and **A18** (1/8" glass). Once the option code **A14** is selected, then question *Layer1 A14* appears next in Options Wizard with specific glass types available (like **A14CLR**).

Layer1

A14

Layer1 A14

A14CLR

A14LE

A14BRZ

A14GRAY

A18
 Layer1 A18
 A18CLR
 A18LE
 A18BRZ
 A18GRAY

Layer2
A14
 Layer2 A14
 A14CLR
 A14LE
 A14BRZ
 A14GRAY

A18
 Layer2 A18
 A18CLR
 A18LE
 A18BRZ
 A18GRAY

In this situation, the *Layer1* and *Layer 2* questions concern two different groups of glass, **A14** and **A18**. These questions should be assigned to the {PANE_P#L#GROUP} question tags. The display object will concatenate the selected glass group option code to the glass group question to get the next level of glass question. So, if the user selects **A18** for question *Layer 1*, the object will look for the specific glass type in question *Layer 1 A18*. So, the {LAYER_L#TYPE} tags remain unassigned when you are using the {LAYER_L#GROUP} tags. This allows you to divide your glass into groups when you have many glass types.

Question Tag	Definition	Used With Option Tags:
{LAYER__P1L#GROUP}	Glass group for layer #. The option code selected for this question tag is concatenated to the question to determine the specific glass type question.	Glass type option tags. <COLOR_BRONZE>, <COLOR_CLEAR>, <COLOR_LOWE>, etc.

Glass Offset

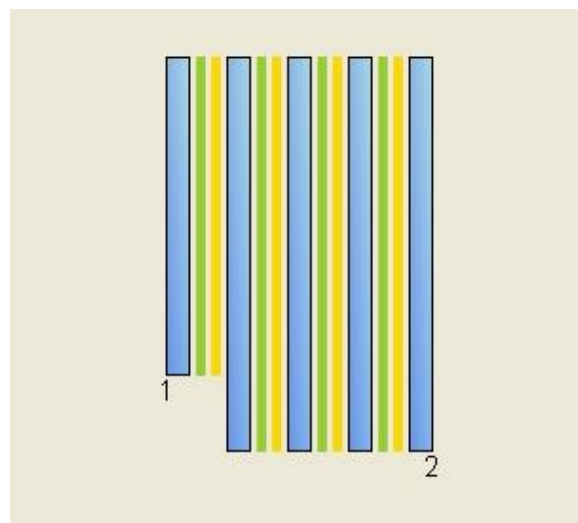
The lamination layers could have a step offset, and the LAMI Cross Section can display this. There is a tag to represent each side of the glass. The IG Cross Section can only show the step offset for the top and bottom side of the shape, since it is a two-dimensional drawing. Each offset tag requires an option value, which is the offset dimension. The offset dimension should be a numerical value. The step offsets for the center pane must all match the inner pane offsets or the outer pane offsets.

Option Tag	Definition	Option Value
<OffsetS1>... <OffsetS8>	Offset for side 1 through 8.	Numerical value of the offset dimension.

The Glass Offset Option Tags require the following Question Tags.

Question Tag	Definition	Used With Option Tag
{OFFSET_L1}... {OFFSET_L5}	Glass offset question for layer 1 through 5.	<OffsetS1>... <OffsetS8>

The picture below shows an offset on side 1 of the outer layer.



Glass Thickness

Layers can have varying thicknesses. The LAMI Cross Section can display thickness. Up to 15 different thicknesses can be represented by the tags <Layer_Thick01>, <Layer_Thick02>, etc. Each thickness tag requires parameter setup, which is the thickness dimension. The thickness dimension should be a numerical value greater than 0. For example, the <Layer_Thick01> tag will retrieve its thickness dimension from the Layer_Thick01 parameter.

Option Tag	Definition	Requires Parameter Setup
<LAYER_THICK01>, <LAYER_THICK02>... <LAYER_THICK15>	Thickness. Up to 15 different thicknesses can be handled by the object.	The parameters Layer_Thick01, Layer_Thick02 ... Layer_Thick15 correspond to the thickness option tags.

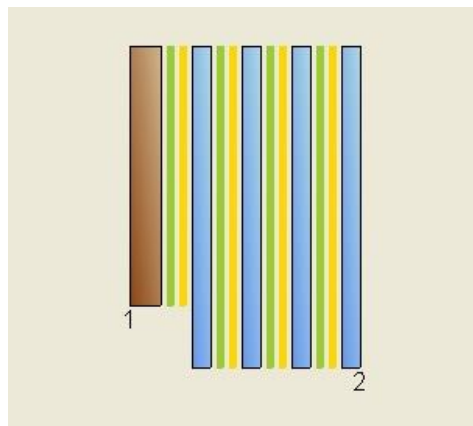
The Glass Thickness Option Tags require the following Question Tags:

Question Tag	Definition	Use With Option Tags
{LAYER_L#THICK}	Glass thickness question for layer #.	<Layer_Thick01>to <Layer_Thick15>

The thickness can also be controlled by parameters. The Layer_DefaultThick parameter is used when no other thickness value is found for the layer. The remaining thickness parameters take precedence over the thickness tags. So, if the Layer_L1Thick parameter contains a correct value in Parameter Setup, then its value will be used even if there is a question and option in the option structure pertaining to layer 1 thickness.

Parameter	Definition	Parameter Value
Layer_DefaultThick	This thickness will be used for a layer which does not have its thickness parameter (LayerL1Thickness for example) setup and does not have its thickness tags setup ({Layer_P1L1Thick} and <Layer_Thick01> for example). It will also be used if the thickness value entered for its thickness parameter or thickness tag is invalid.	Positive numerical thickness dimension.
Layer_L#Thick	Glass thickness for the Pane 1, Layer #.	Positive numerical thickness dimension.

The picture below shows a greater thickness on layer 1.



Pattern Location Indicator

The IG Cross Section can display the location of a pattern on the outer and inner panes.

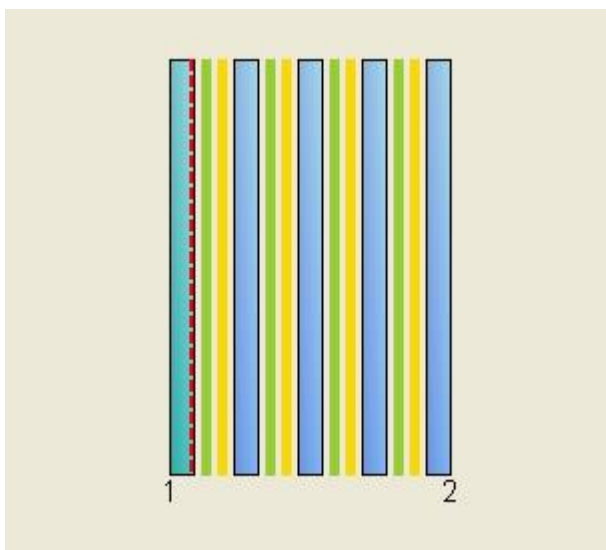
Option Tag	Definition	Option Value
<LAYER_PATTERN>	Set to pattern option code(s).	Numerical value representing surface where pattern is located.

The Pattern Location Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tag
{LAYER_L#PATTERN}	Pattern location question for Layer #.	<Layer_Pattern>

The Layer_Numbering parameter controls how the option value is interpreted for the <Layer_Pattern> tag. It has three possible values, IG, LAYER, and 1OR2. If this parameter is set to IG, then the option value is the surface number shown at the bottom of the object. This method is valid only for non-layered (non-laminated) glass. If the glass is laminated, you must set the Layer_Numbering pattern to LAYER or 1OR2. If you choose LAYER, then specify the <Layer_Pattern> option value by layer surface number. The layer surfaces are numbered 1 to 10 from left to right, on each pane. If you choose 1OR2, then specify the <Layer_Pattern> option value by entering a 1 or a 2. In this case, for every layer, the left surface is 1 and the right surface is 2.

The picture below shows the pattern location on the layer1 surface 2.



Coating Location Indicator

The IG Cross Section can display the location of a coating on the outer and inner panes.

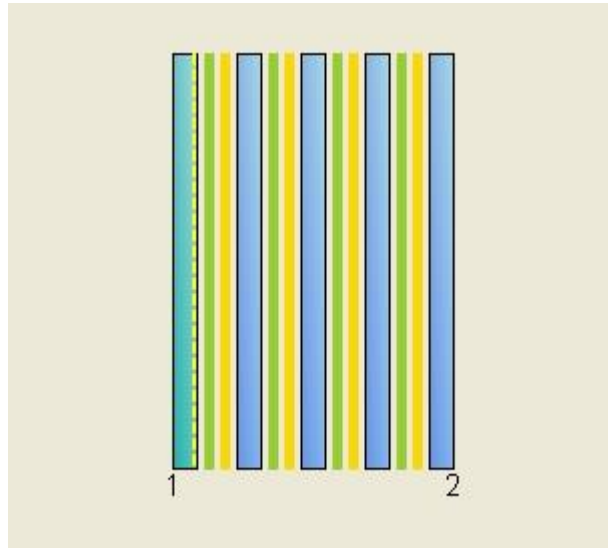
Option Tag	Definition	Option Value
<LAYER_COATING>	Set to coating option code(s).	Numerical value representing surface where coating is located.

The Pattern Location Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{LAYER_L#COATING}	Coating location question for Layer #.	<Layer_Coating>

The Layer_Numbering parameter controls how the option value is interpreted for the <Layer_Coating> tag. This is described in the previous section, Pattern Location Indicator.

The picture below shows the coating location on the layer 1 / surface 2. The glass is non-laminated so the option value could be specified by pane surface number.



Silk Screen Location Indicator

The IG Cross Section can display the location of a silk screen on any lamination layer

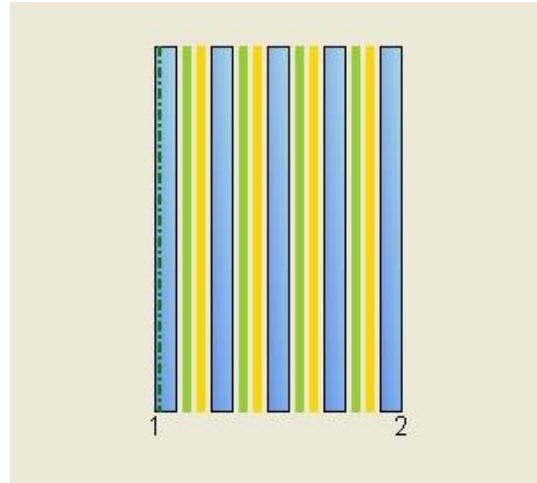
Option Tag	Definition	Option Value
<SILKSCR_LAYER1>... <SILKSCR_LAYER5>	Set to silk screen layer option code(s).	
<SILKSCR_SURFACE>	Set to silk screen option code(s).	Numerical value representing surface where silk screen is located.

The Pattern Location Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{SILKSCR_LAYER}	Silk Screen location question for Layer #.	<SILKSCR_LAYER#>
{SILKSCR_SURFACE}	Silk Screen surface question for Layer #.	<SILKSCR_SURFACE>

The Layer_Numbering parameter controls how the option value is interpreted for the <SILKSCR_SURFACE> tag. This is described in the previous section, Pattern Location Indicator.

The picture below shows the silk screen location on layer 1 / surface 1.



Internal Layers

The LAMI Cross Section can display up to five internal layers (for example PVB) between every set of lamination layers.

The <INTLAYERNUM> option tag indicates internal layers are needed. Its option value indicates the number of internal layers.

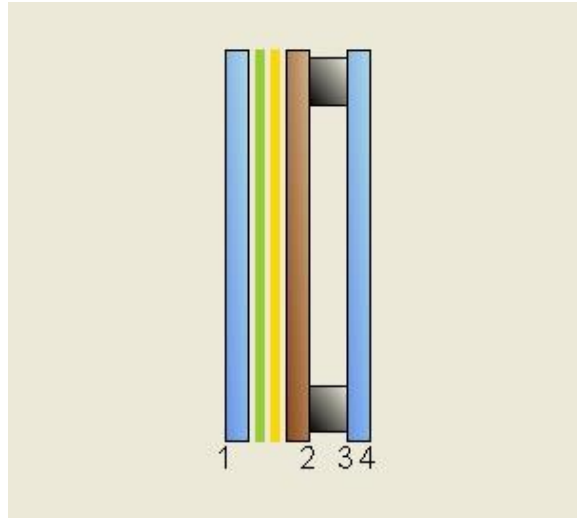
Option Tag	Definition	Option Value
<INTLAYERNUM>	Internal layer option code.	Numerical value representing the number of internal layers.
<INTLAYERS#>	Number of internal layers option code, where # is the number of internal layers.	None

Alternatively, use the <INTLAYERS1>, <INTLAYERS2> up to 5 internal layers tags. Set each tag to an option code representing the number of internal layers. For example, set <IntLayers1> to FILM1 for one internal layer, <IntLayers2> to FILM2 for two internal layers, etc.

The Internal Layer Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{LAYER_L#NUMINTLAY}	Internal layer question Internal layer #.	<INTLAYERNUM> <INTLAYERS#>

Internal layers for lamination 1 will appear to the right of lamination layer 1. There are no internal layers to the right of rightmost lamination layer in a pane. The image below shows two internal layers (indicated in green and gold) between the lamination layers in pane 1.



The IntLay_Buffer parameter controls the amount of white space in each side of the internal layers.

Internal Layer Thickness

Internal layers can have varying thicknesses. Up to 15 different thicknesses can be represented by the tags <IntLayer_Thick01>, <IntLayer_Thick02>, etc. Each thickness tag requires parameter setup, which is the thickness dimension. The thickness dimension should be a numerical value greater than 0. For example, the <IntLayer_Thick01> tag will retrieve its thickness dimension from the IntLayer_Thick01 parameter.

Option Tag	Definition	Requires Parameter Setup
<INTLAYER_THICK01>, <INTLAYER_THICK02>... <INTLAYER_THICK15>	Thickness. Up to 15 different thicknesses can be handled by the object.	The parameters IntLayer_Thick01, IntLayer_Thick02 ... IntLayer_Thick15 correspond to the thickness option tags.

The Internal Layer Thickness Option Tags require the following Question Tags.

Question Tag	Definition	Use With Option Tags
{INTLAYER_L#THICK}	Internal layer thickness question for internal layer #.	<IntLayer_Thick01>to <IntLayer_Thick15>

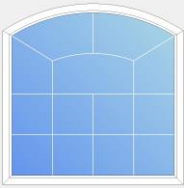
The IntLay_DefaultThick parameter is used for internal layer thickness when no other thickness value is found for the internal layer.

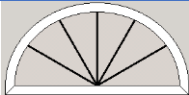
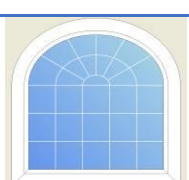
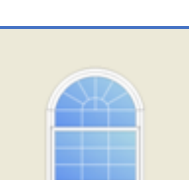
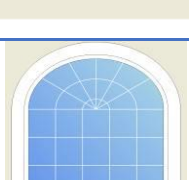
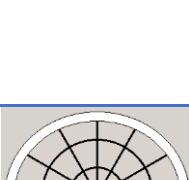
LAMI CROSS SECTION PARAMETERS

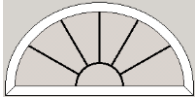
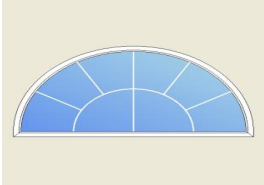
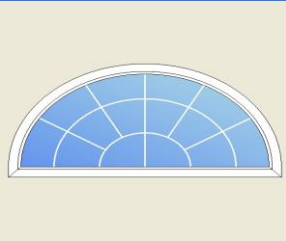
Coating_IndLoc	Used to adjust the placement of the coating indicator. A positive value will move the indicator away from the edge of the surface, as shown in the picture above. Requires a positive numerical value.
Pattern_IndLoc	Used to adjust the placement of the pattern indicator. A positive value will move the indicator away from the edge of the surface, as shown in the picture above. Requires a positive numerical value.
SilkScr_IndLoc	Used to adjust the placement of the silk screen indicator. A positive value will move the indicator away from the edge of the surface, as shown in the picture above. Requires a positive numerical value.
Layer_Height	Percentage value required: The object height is based on the object width (which is based on pane and spacer thicknesses). This parameter, layer_height, is a percentage of the object width used to calculate the object height. The cross section typically looks better and is more readable when it is taller than it is wide. So, a good percentage value is around 150.
Layer_L#Thick	Where # determines the layer. These parameters are described in the Glass Thickness section above.
Layer_Thick##	These parameters are described in the Glass Thickness section above.
Layer_DefaultThick	This parameter is described in the Glass Thickness section above.
Layer_Numbering	This parameter is described in the coating indicator section above. Value values are IG, LAYER or 1OR2.
ScalingFactor	ScalingFactor is applied to the object width. To calculate the object width, the thicknesses of all the pane layers, internal layers, and spacers are added together to get a total thickness. These thicknesses tend to be small values, making the object unreadable. So, ScalingFactor is multiplied by the total thickness to get the object width. A typical value is 20.
TextHeight_Layer	Percentage value required: Controls text height for the surface number displayed at the bottom of the IG. This parameter is a percentage of the height and width so that the text is readable for various height and width dimensions entered. The size of the text is calculated by taking $((\text{width} * \text{height})/2) * (\text{TextHeight_Pane}/100)$. To enter a value of 10 percent (which is a typical value), enter 10 in the paramvalue column in the Parameter Setup dialog for paramname TextHeight_Pane.
IntLay_Buffer	Controls the amount of white space in each side of the internal

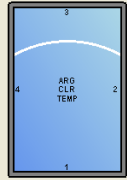
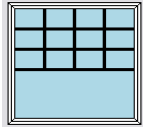
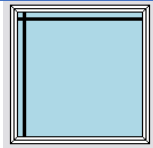
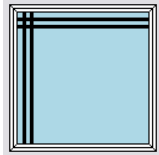
	layers.
IntLay_DefaultThick	This parameter is described in the Internal Layer Thickness section above.
IntLay_Thick##	These parameters is described in the Internal Layer Thickness section above.
Step_Multiplier	This value is multiplied by glass step offset option values.

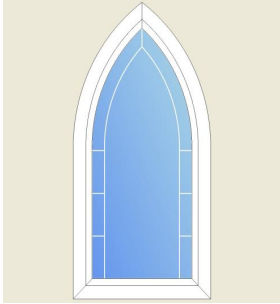
Appendix A Grid Types

Grid Type	Example	Option Value
Cathedral		Grid pattern in the format: 2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc. Integer value designating number of spokes with the <004NUMSPOKES> tag. Corner spokes required.
Cathedral Sunburst		Grid pattern in the format: 2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc. Integer value designating number of spokes with the <004NUMSPOKES> tag. Corner spokes required.
Colonial		Grid pattern in the format: 2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc.
Diamond		Grid pattern in the format: 2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc.
Gothic		Grid pattern in the format: 2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc.
Prairie		Numerical value that returns the edge offset.
Double Prairie		Numerical value that returns the edge offset.

Prairie Cathedral		Numerical value that returns the edge offset.
Spoke		Numerical value that returns the number of spokes.
Spoke over Colonial		Grid pattern in the format: 2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc. Integer value designating number of spokes with the <004NUMSPOKES> tag.
Sunburst over Colonial		Grid pattern in the format: 2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc. Integer value designating number of spokes with the <004NUMSPOKES> tag.
Sunburstbar over Colonial		Grid pattern in the format: 2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc. Integer value designating number of spokes with the <004NUMSPOKES> tag.
Sunstar over Colonial		Grid pattern in the format: 2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc. Integer value designating number of spokes with the <004NUMSPOKES> tag.
Sunstar		Numerical value that returns the number of spokes. Numerical value that returns internal hub radius
Sunstar 2 Hub		Numerical value that returns the number of spokes. Numerical value that returns internal hub radius. Outer hub radius two times internal radius.

Sunburst		Numerical that returns the number of spokes. Numerical that returns internal hub radius
Sunburst 2 Hub		Numerical value that returns the number of spokes. Numerical value that returns internal hub radius. Outer hub radius two times internal radius.
Sunburst Bar		Numerical value that returns the number of spokes. <008HUBRAD> Numerical value that returns internal hub radius. Valid in half round and circle only.
Sunburst Bar 2 Hub		Numerical value that returns the number of spokes. <008HUBRAD> Numerical value that returns internal hub radius. <005HUBRAD2> Numerical value that returns outer hub radius. Sunburst Bar 2 Hub valid in half round and circle only.
Sunburst Wheel		Numerical value that returns the number of spokes. <008HUBRAD> Numerical value that returns internal hub radius. Valid in octagon and circle only.

Sunburst Wheel 2 Hub		Numerical value that returns the number of spokes. <008HUBRAD> Numerical value that returns internal hub radius. <005HUBRAD2> Numerical value that returns outer hub radius. Sunburst Wheel 2 Hub valid in octagon and circle only.
Radius Crossbar		Numerical value that returns the edge offset, from top of glass. Numerical value representing the arc rise with the <004RISE> tag (or <GRID_RISE> tag for glass objects). An alternative is to return both the edge offset and rise in the <004RADBAR> option value in the format offset/rise. Example: 8/6 where 8 is the offset and 6 is the rise.
Ranch		Script or static value that returns the grid pattern (2Vx3HC, 2Vx3HP, 2H2V, 1V1HP, etc.)
Perimeter		Numerical that returns the edge offset. Integer value that returns the perimeter pattern number (See Appendix B)
Double Perimeter		Numerical value that returns the edge offset. Numerical value that returns the spacing between bars. Integer value that returns the perimeter pattern number (See Appendix B).

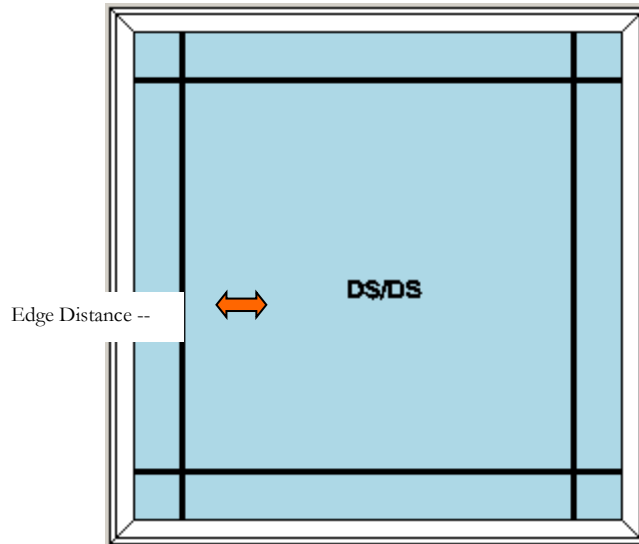
Perimeter Cathedral		Numerical value that returns the edge offset. Integer value designating perimeter pattern – may use pattern 1 to hide bottom bar. Useful when mulling window.
Perimeter Bar		Numerical value that returns the edge offset. Valid in the cathedral, half round, quarter round with extended leg. Draws perimeter pattern without bottom bar with additional short horizontal bars in the leg possible. Use <004NUMBARS> to specify the number of bars drawn evenly spaced in the leg (or bars can be drawn in a designated lower percentage of the leg). A value of 3 / 50 will draw 3 bars in the lower half of the leg. A value of 3 will draw 3 bars evenly spaced in the leg.
Double Perimeter Bar		Numerical value that returns the edge offset. Valid in the cathedral, half round, quarter round with extended leg. Draws double perimeter pattern without bottom bar with additional short horizontal bars in the leg possible. Use <004NUMBARS> to specify the number of bars drawn evenly spaced in the leg (or bars can be drawn in a designated lower percentage of the leg). A value of 3 / 50 will draw 3 bars in the lower half of the leg. A value of 3 will draw 3 bars evenly spaced in the leg.

- **Grid Patterns**

For grids to appear in the ObjectViewer, the grid pattern will need to be given as an option value for the selected type of grids. There are several acceptable formats for grid patterns (depending on which pattern is selected). A breakdown of the correct format for each grid type is shown below.

1. Prairie, and Perimeter Grids.

These types of grids require the user to specify the distance that the grids set from the edge of the IG. This value should be in either decimal or integer form. Perimeter grids can also accept input for the perimeter pattern using the <004PERPATT> tag (see appendix B). The half round, quarter round, full eyebrow, half eyebrow support hiding the bottom horizontal bar(s) only (perimeter pattern 1). The circle and octagon shapes are not able to hide any bars.



2. Perimeter Bar Grids.

These types of grids require the user to specify the distance that the grids set from the edge of the IG. This value should be in either decimal or integer form. These grids are supported in the cathedral, half round and quarter round windows only.

Use <004NUMBARS> to specify the number of short horizontal bars drawn evenly spaced in the leg (or bars can be drawn in a designated lower percentage of the leg). Enter the number of bar as a positive integer. A value of 3 will draw 3 bars evenly spaced in the leg. Optionally, add a percentage of the lower leg you want the bars evenly spaced in. The number of bars and percentage are separated by a "/". Enter the percentage as a positive number. A value of 3 / 50 will draw 3 bars in the lower half of the leg.

3. Double Prairie, Double Perimeter Grids and Double Perimeter Bar Grids.

These types of grids require the user to specify the distance that the grids set from the edge of the IG, for both sets of bars. It is entered in the format “4/8” where the first set of bars are 4 inches from the edge of the IG and the second set of bars are 8 inches from the edge of the IG. Each edge offset value should be in either decimal or integer form separated by a “/”.

4. Spoke, Sunstar w/ Single Hub, Sunstar w/ Double Hub, Sunburst w/ Single Hub, Sunburst w/ Double Hub

These grid patterns require the user to enter an integer into the option value which specifies the number of spokes. The User may also enter an internal hub radius for the sunstar and sunburst grids. To do this, the user must enter an integer hub radius into the option value for the <005HUBRAD> tag.

5. Sunburst over Colonial, Sunstar over Colonial, Spoke over Colonial, Gothic, Sunburstbar over Colonial.

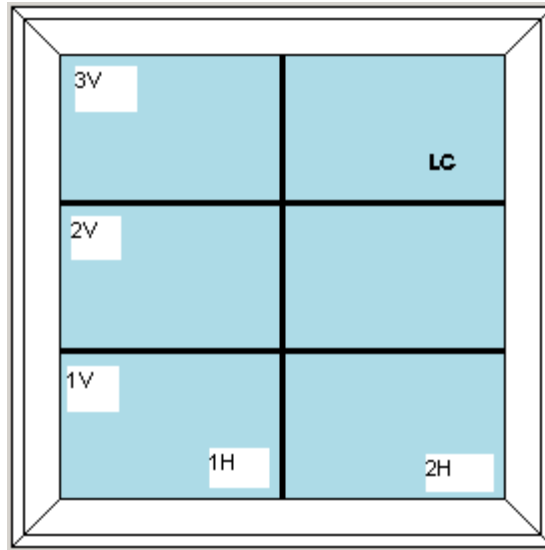
These types of grids can accept input for the number of spokes via the <004NUMSPOKES> tag.

6. Colonial, Sunburst over Colonial, Sunstar over Colonial, Spoke over Colonial, Gothic, Diamond and Ranch Grids*.

These types of grids can accept grid patterns in the form of “_Vx_HP” or “_Vx_HC” where the _ denotes an integer number, the ‘P’ denotes that the number of panes is specified, and the ‘C’ denotes that the number of components are specified. Each of these pattern formats is explained further in the following text.

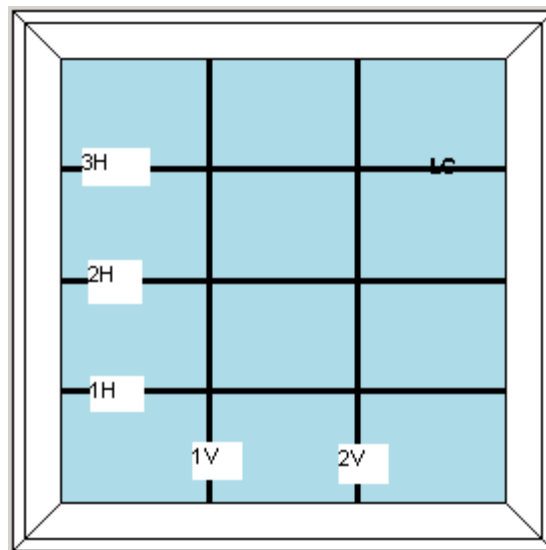
- **Panes**

The necessary pattern format for panes is “_Vx_HP”, where the “_” signifies an integer value, and the “P” specifies the pattern as a pane pattern. For instance, if the user desires a colonial pattern that is three panes of glass stacked on top of each other, and two panes laid next to each other, the pattern would be “3Vx2HP” and the result would look something like this:



- **Components**

The format for Component grid patterns is only slightly different from panes. For components, the pattern is “_Vx_HC” where the “_” is an integer value, and the “C” specifies the pattern as a component pattern. For example, if the user wants a component pattern of two vertical and three horizontal, then the pattern will be “2Vx3HC” and the result would look something like this:



- * **Special Config for Ranch grids.**

For ranch grids, the user can specify the distance that the grids fall from the top of the IG to the bottom horizontal grid. This is done as a two-part setup requires the user to both input the value for the grid pattern (as shown above) and also to input grid distance (as a separate option value in a separate question).

The tags used for the setup of these grids are:

<u>Use</u>	<u>Tag</u>
Option Code for Distance	<005RAND>

- **Formatted Grid Pattern**

An alternative format for specifying grid patterns is available in display objects. This affects grid types colonial, diamond, ranch, sunburst over colonial, spoke over colonial, sunstar over colonial, sunburstbar over colonial, cathedral, and gothic. Traditionally grid patterns were entered in the format 2VX3HP, 2VX3HC or 2VX3H (which is the same as 2VX3HC). C stands for components (grid bars) while P stands for panes of glass. 2V, 2VP, 3H, 3HP format is also allowed when there are only vertical or only horizontal grid bars. An alternative is to enter 2X3 or 2 by using a new display object parameter, grid_pattFormat. (The old format is still available.)

Valid values for grid_pattFormat are: empty string/blank, HVP, HVC, VHP, VHC, P, C, VH, HV.

HV and VH are assumed to be HVC and VHC respectively.

P is assumed to be VHP.

C is assumed to be VHC.

Grid pattern is deciphered in the old manner if grid_pattFormat is empty or invalid.

P instructs the display object to assume the P specification.

Otherwise, C is assumed.

HV instructs the display object to assume the first number (or only number) is a Horizontal specification.

VH instructs the display object to assume the first number (or only number) is a Vertical specification.

If the user enters a complete grid pattern (like 2VX3HP) in an option value, this will override display object parameter grid_pattFormat.

Appendix B Perimeter Patterns

A picture of each perimeter pattern and its number are shown below. This number must be entered as the option value for the perimeter pattern option code. The tag for the perimeter pattern option code is <004PERPATT>. To relate the perimeter pattern to ObjectViewer, assign the <004PERPATT> tag to the option code for perimeter pattern. The quarter round, half round, eyebrow, half eyebrow objects support perimeter pattern 1 and 11. In the insulated glass object, non-rectangular perimeter grids support perimeter pattern 1 and 11 only.

