

# SOFTWARE TRAINING GUIDE

**MATRIXGOLD<sup>®</sup>**



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# USER INTERFACE

## Navigating MatrixGold™

Becoming familiar with the layout can help users become more efficient modelers. In this section we will cover the general navigation practices used inside the MatrixGold software.

### Main Menu

At the top left is the main menu. Here you can find all of the possible methods of saving a file, add any additional windows that you may be missing, or find a way to get into the preferences.

**New** creates a new document and allows you to start from the very beginning.

**Open** allows you to open a previous document that you might have saved from outside of your job bags.

**Save** allows you to save the file in its previous location if you opened it from another location.

**Save Small**, saves only the objects and does not keep any Parametric History in your document.

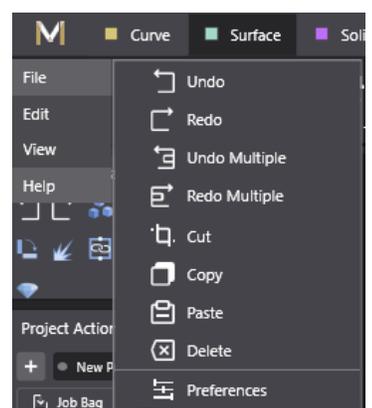
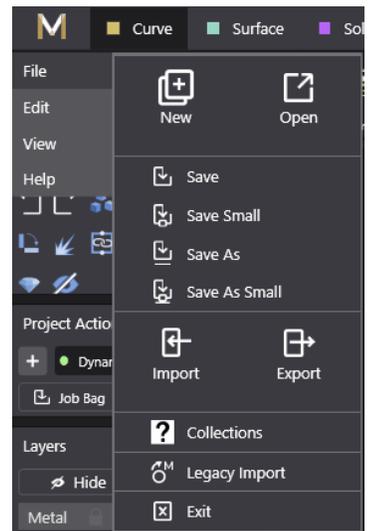
**Save As** allows you to save it in any folder and allows you to rename your project.

**Save As Small** is a combination of Save As, and Save As Small, in that it allows you to save a document in any folder with only the geometry and no Parametric History.

**Import** allows you to open any file in your current document for all [file types supported by Rhino](#).

**Export** allows you to create a file with all of the selected geometry and change it to another file type that is supported by Rhino. This is useful if you are in need of a specific file type. **Collections** allows you to get quick access to your Collections without the need to navigate through your Project Actions or Projects window.

The **Edit** tab allows you to make any changes such as undo, redo, copy and paste, and these are very similar functions to any document and allow you to make changes as you are drawing your model.



The **View** tab houses all of the available windows that you can move and dock wherever you see fit.

**Primary** and **secondary** numbers at the top will allow you to toggle between different layouts that you have created. You do not need to save any changes, the program will remember what your layout was in each of the layouts and will change accordingly.

**Dynamic Commands** hold all of the commands that you have used to create a model with Parametric History. You will see a list of them as you create them with the most recent one at the top.

**Display modes** allow you to change one or all of your viewports to a given display mode, left-clicking on the icon changes the active viewport, which is indicated with a lighter gray color on will change the viewport to that given display mode. Right-clicking on the display mode will make that change to all of your viewports.

**Dynamic Groups** allows you to group your objects into a group before doing any more commands do that you can organize your document.

**Gem Report**, opens a window that tells you information about the selected gem or gems.

**Layers** shows you all of the available layers that you can assign objects in your document to keep you organized all of the Dynamic Commands will also produce objects on those layers.

**Metals weights** will give you the weight in grams (g) or pennyweights (dwt), these changes can be made by toggling between the two weights.

**Projects** shows you your current list of job bags, where all of the projects you have worked on will be available for future use.

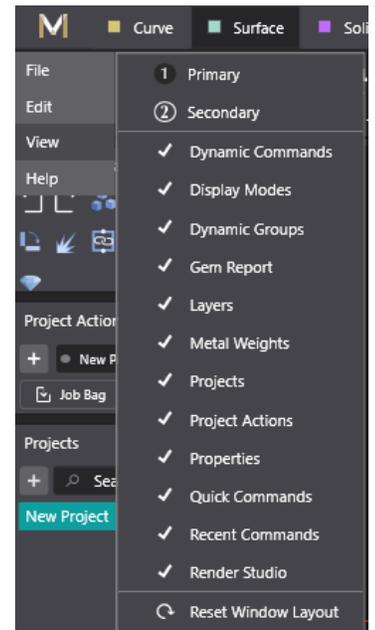
**Project Actions** is a more condensed version of the Projects window that allows you to do either a Full Save or just a Job Bag, a Full save will include all hidden objects if you have any, and a Job Bag will only save what you have selected.

**Properties** will tell you at a quick glance what the object you have selected it, it will tell you the object type, how many, the layer that the objects are on, the material, and the weight.

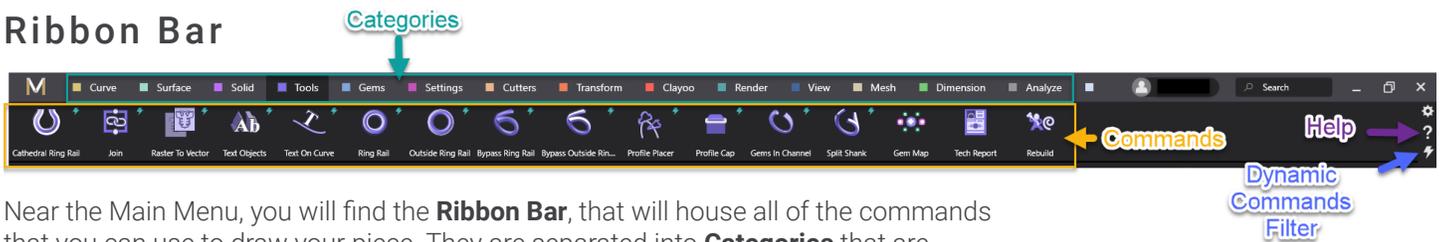
**Quick Commands** show you the most commonly used tools that will assist you in modeling, you can customize it to your liking, if you drag any commands to and from the Quick Commands.

**Recent Commands** shows you a running list of all previous commands that were used to create any geometry.

**Render Studio** opens up the window to assign materials of objects in your document.



## Ribbon Bar



Near the Main Menu, you will find the **Ribbon Bar**, that will house all of the commands that you can use to draw your piece. They are separated into **Categories** that are distinguished by the type of objects they create.

Some **Commands** will have a small triangle located at the bottom right-hand corner of the icon, this indicates that there are variations of the command that can be used and will assist you in getting to a command quicker instead of changing it in the command line.

At the top right, there is a **search** bar that will search for any commands in the program. To search for any, type in any keywords, such as 'trim' or 'boolean' and then press enter and the program will filter out all other commands and keep those that contain those keywords.

If you want to know what a command does, you can click on the **Help** icon, and then left-click on a command to open in a web page to find out what the command does. Currently, this is not an option for Dynamic Commands, but you can refer to this manual to see what the Dynamic commands do.

You can also filter out to just have access to the **Dynamic Commands** by left-clicking on the blue lightning bolt  to display only Dynamic Commands.

**Note:** If you are ever in a pinch and made changes you don't like to your menu and windows, you can always go to Main Menu, View, then left-click on **Reset Window Layout**.

## Bottom UI



At the bottom left of the program there is the **current version** that you are using, then the job bag that you are in, and the title of the current project.

To the right there are **options for toggling modeling aids**, such as Auto-Hide which will only hide geometry with Parametric History.

**Grid Snaps** which will allow you to snap to the grid plane at the specified intervals.

**Ortho**, which will force the object you are manipulating to only go to move your object in 45° increments.

**Planar** toggled on in a planar viewport helps you keep your curves on the

same plane. **Osnaps** helps you model my magnetizing your selection to a specific point of an object. **End** goes to an endpoint, near gets you onto any point on the object, **Point** brings you to a created point, **Mid** brings you to the half-way point of an object,  **Cen** goes to the object's center, **Int** goes to where two objects intersect, **Perp** goes to a point that is perpendicular to the object, **Tan** goes to the tangent of the object, and it will intersect only at one point, **Quad** goes to a maximum at the x or y axis of an object, **Knot** which snaps to points on the object where they are used to create the existing geometry, **Vertex** lets you snap to vertices of a mesh object, and **Project** brings all created objects over to the

current viewport's construction plane. Project In the modeling aids does the same projection from the Osnaps.

**SmartTrack** allows you to move your mouse over to an Osnap and you can use it as a reference to go to another intersection. **Gumball** toggles the gumball so you can use it to move, scale, and rotate your objects. **Record History** records all history that is tied to your objects.

The **Context Menu** button opens the Context Menu.

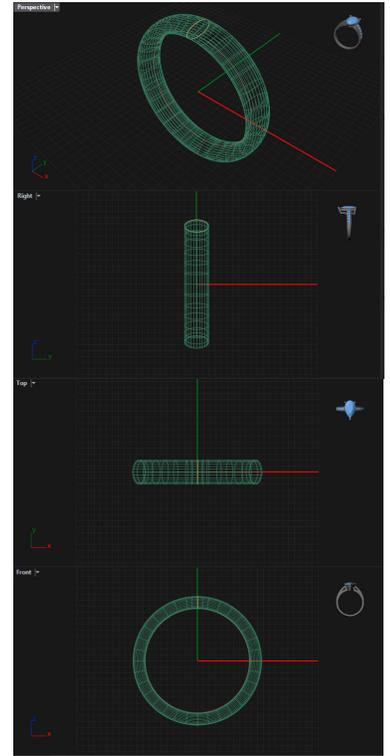
To the right of that is the **scaling slide** bar for the user interface, increasing this value will make the UI appear larger.

# Viewports

At the center of the program are the **viewports**, each of these give you look at the model that you are working on. At first glance, the viewports may remind you of your geometry class, this is the familiar Cartesian coordinate plane that you may have drawn once or twice. At the center is world center or 0,0,0. from there, we can create objects from any of the points that are available on the real number line. The **Top**, **Front**, and **Right** viewports show you planar viewports, in that there will only be two axes for you to interact with, these axes are indicated by the bottom left corner. The **Perspective** viewport, lets you view your object in all three dimension. In this instance, we refer to the positive axes as to the 'right' for the x-axis, the 'back' for the y-axis, and 'up' for the z-axis.

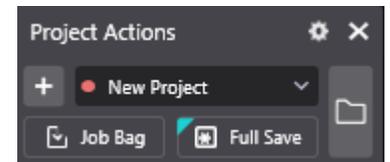
Each of the gridlines in represent 1 millimeter. The gridlines exist on the construction plane, and each viewport has a different construction plane, except for Top and Perspective, which share the same construction plane. Having the Project modeling aid on will bring all objects that you create to the construction plane.

Holding down the right mouse button will allow you to pan in the planar viewports (Top, Front, and Right), doing so in the Perspective will rotate your view. In order to pan in the Perspective viewport, hold down shift and the right mouse button and move your mouse to make any movemnets around your model. You can also zoom into your model using your scroll weel and scroll away from you to bring the model closer, and scroll toward you to zoom away from your model. The location of your mouse will determine where you will zoom in or out, so if you know you want to move to an area over your model, be sure to hover your mouse cursor over the location and zoom in or out.



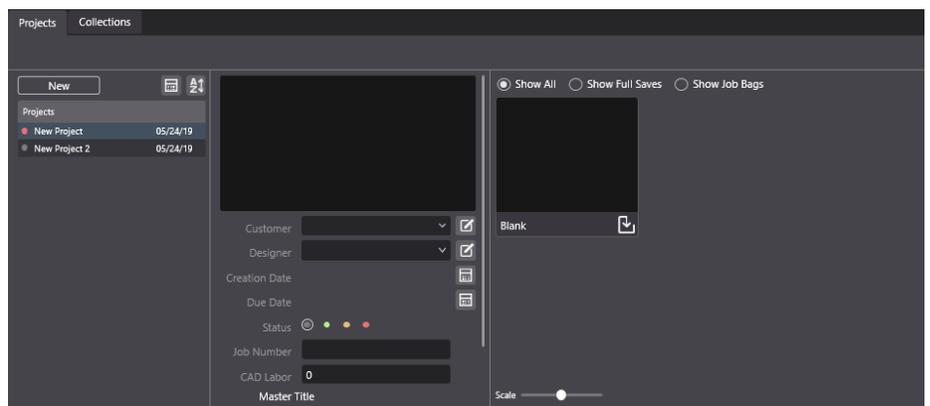
# Project Actions

The **Project Actions** window is a window used to help you stay organized with your work. It also allows you to quickly create a job bag and save all of your projects. Whether it be with a **Job Bag**, which will only save what you have selected and allows you to place it into any new projects, or doing a full save which will save the entire project and open it and delete the current project you are working on. Left-clicking on the folder on the right of the window will open up the content manager there, you can make any changes to the **Job Bags** and **Full Saves** that you have created. In the **Content Manager**, you can make any changes to the current project that you are working on.



In the **Content Manager**, at the top is a tab for your Projects and for your Collections. In Collections, you can create a list of models that you can organize and then use for a new project, in the **Collections** tab, you can store things like a signature head setting or elements that you have created.

On the left is a list of the projects that have been created, if you need to make a new one you can. You can also



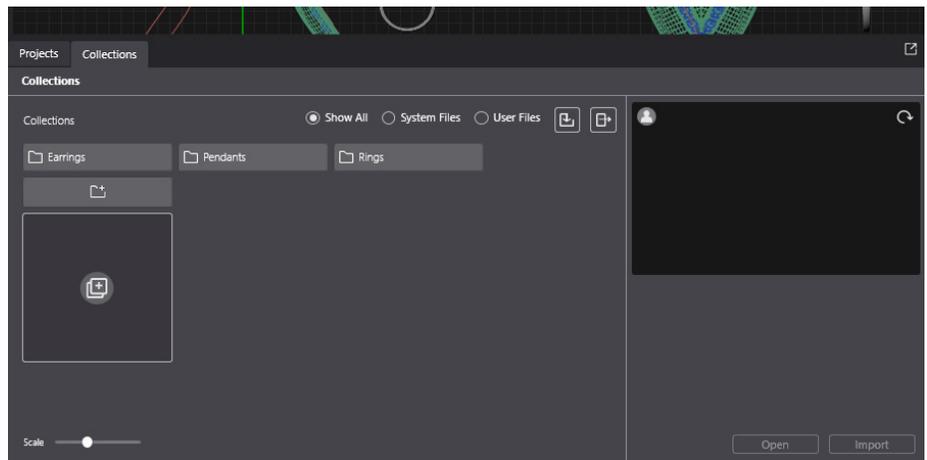
organize it based on the date it was created or by alphabetical order. You can also get a quick preview of the master project if you designate it by using the kabob menu at the top right of the icon of the Job Bag. Under the **Master Job Bag**, you will find the **Customer** list. You can enter the customer information and you can use the drop down menu to select a pre-existing customer's information. A designer can also be selected underneath the Customer. Under the designer is the progress of the project, you can select a color at the bottom to determine what the colors mean and what each indicates your project's status. The status will also show in the Project Actions window.

There is also a number box for a job number for you to use internally. A CAD labor box is also under the Job number for you log in any time spent on the model. The right houses all of the Job Bags and Full Saves that you have created for the project, and any of the job bags can be set as the Master project so that you can see the thumbnail of the project.

## Collections

The **Collections** tab houses all of the previous projects that you want to use for new projects. Your Collections can be organized in any folder you want. In order to move any previous projects over, you can click on the icon with a folder and a plus sign in it and navigate to any directory that houses your projects, by default the directory is:

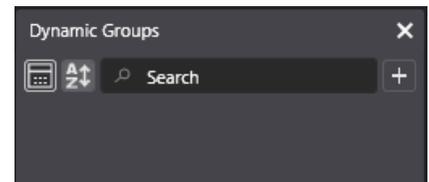
C:\Users\CurrentUser\Documents\  
MatrixGold\Projects



## Dynamic Groups

**Dynamic Groups** allow you to be organized when working with tools in the program and keep it all in track. This is useful if you want to extract an isocurve from a Booleaned object.

To add any objects into a Dynamic Group, select all objects in the document in the viewports and then left-click on the plus sign at the right in order to add the selected objects into a group.



## Dynamic Commands

In the **Dynamic commands**, you'll find that there are the list of commands that are used to create the current design. As more Dynamic commands are used, the list will show the most recently used commands at the top. In order to find where the command is in the design, you can hover your mouse over the Dynamic command and you will see that the object will be highlighted with a cyan color.

Left-clicking on the three vertical dots, i.e. the kabob menu, with the builder active will bring up more options:

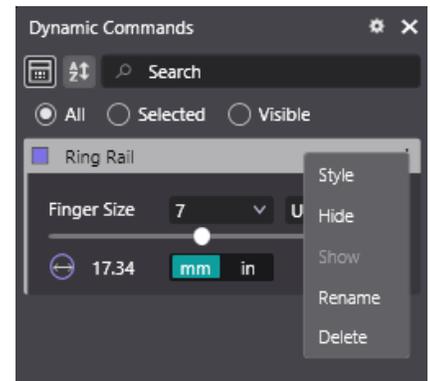
**Style** allows you to save this current style to a Stylesheet or load a previous style to the current builder.

**Hide** hides the current object.

**Show** will show any geometry that was hidden before.

**Rename** allows you to name the Dynamic command into something more recognizable.

**Delete** will remove all of the geometry that was created by the Dynamic command.



**Note:** If you wish to make changes to an existing Dynamic command, be sure to click on Edit in the command, or you can select the object and press F5.

## Layers

**Layers** helps you stay organized and makes selection of your objects easier. If you need more layers, you can left-click on **Show Additional Layers**, and the window will expand.

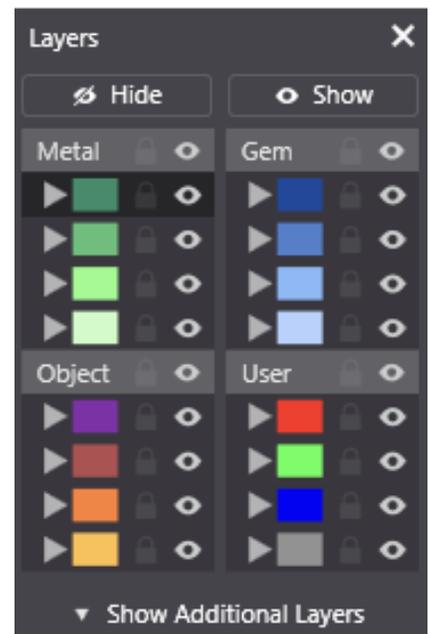
If you want to assign an object a new layer, select the object in the viewport, then left-click on the **triangle** next to the layer color that you want to assign to the object.

Left-clicking on the **padlock** next to the color will lock that layer and prevent any interaction with that layer color.

Left-clicking on the **eyeball** will hide all objects on the current layer.

Left-clicking on the layer color will make all objects that you create on that layer color, note that you cannot lock any objects on the active layer that you are on.

If you want to select all objects of a layer, right-click on the layer color box and all objects of the layer selected will be added to the selection.



# INTRO TO DYNAMIC COMMANDS

## Powerful tools to create and modify your designs

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All commands in this subcategory exhibit Parametric History when used. Parametric History allows you to make changes to a design that will automatically update all dynamic commands that are tied to it.

### There are two main ways of adjusting parameters of Dynamic Commands.

- 1  Viewport Control Handles, represented in this manual by this symbol
- 2  Adjust within the Dynamic Command Window, represented in this manual by this symbol

All commands used in any design will be listed in the **Dynamic Commands window**.

Most command's parameters can be adjusted live in the viewport, using the viewport control handles, but in some cases where finer tuning is required, you can adjust settings within the Dynamic Command window.

When creating a model with **Parametric History**, it is important to think of it as a tree. There is a base object that you are working with, and any changes that you make to the base object will affect the other commands that are tied to the base object.

**Note:** All commands have available StyleSheets. Using StyleSheets, you will have the ability to save a particular set of changes that you have made to a command, and you can reuse those settings it in the future to apply to all objects that share the same object type.

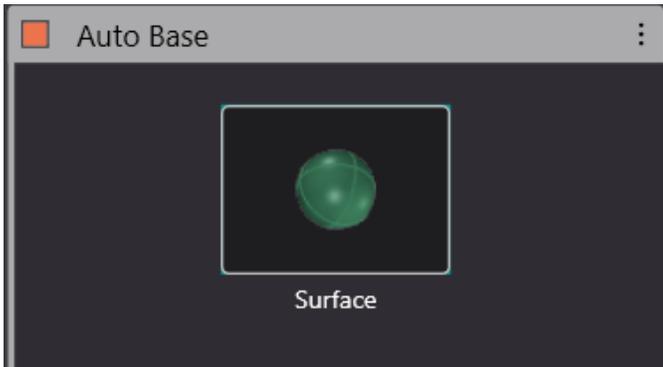


# AUTO BASE

Creates a planar surface that can be used for [Smart Flow](#)

Command: *gvAutoBase*

 **Transform Category**



When starting the command it will ask for a surface, this will need to be a singular surface, if using a polysurface the results may not be what is expected.

If you want to use a surface from the polysurface you will need to use the `ExtractSrf` command.



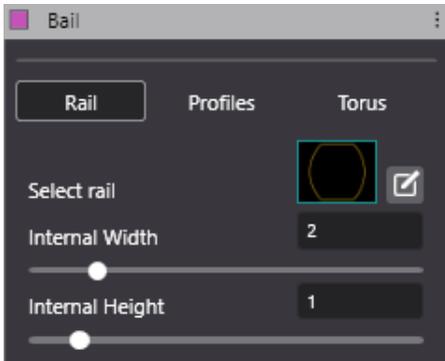
# BAIL

Creates a bail with a jump ring

Command: *gvBail*

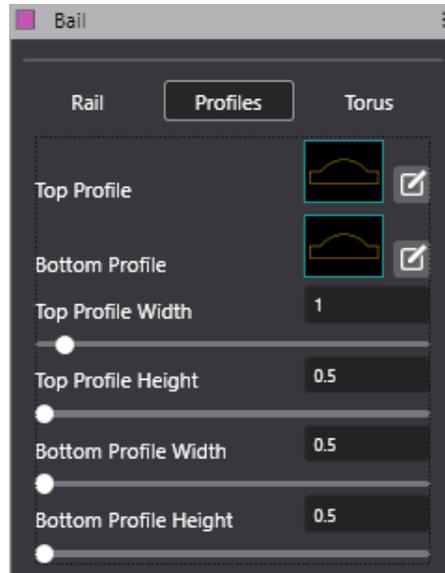
Settings Category

## Rail



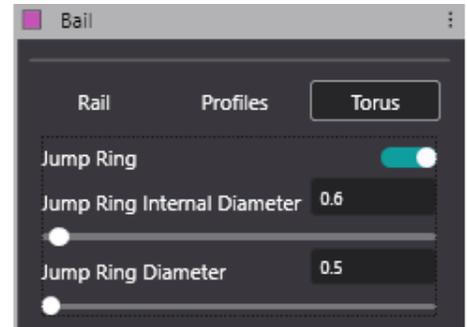
- ↗ ⚙️ **Select Rail:** shows the profile that the two profiles are sweeping on.
- ↗ ⚙️ **Internal Width:** sets the width along the y-axis.
- ↗ ⚙️ **Internal Height:** sets the height in the z-axis.

## Profiles



- ↗ ⚙️ **Top Profile:** selects the top profile being used to sweep the bail.
- ↗ ⚙️ **Bottom Profile:** selects the bottom profile being used to sweep the bail.
- ↗ ⚙️ **Top Profile Width:** sets width of the top profile being swept.
- ↗ ⚙️ **Top Profile Height:** sets the height of the top profile being swept this determines the length of it in the x-axis.
- ↗ ⚙️ **Bottom Profile Width:** sets width of the bottom profile being swept.
- ↗ ⚙️ **Bottom Profile Height:** sets the height of the bottom profile being swept this determines the length of it in the x-axis.

## Torus



- ↗ ⚙️ **Jump Ring Toggle:** turns the jump ring on or off.
- ↗ ⚙️ **Jump Ring Internal Diameter:** sets the diameter of the jump ring.
- ↗ ⚙️ **Jump Ring Diameter:** sets the diameter of the jump to determine its thickness.



# BEZEL

Creates a bezel on a gem

Command: gvBezel

Settings Category



**Gem/Curve Input Box:** shows the gem that is being used to build the bezel.

**Curve Input:** when a curve is in the input box, there are more options that will show.

**Flip Curve:** allows you to change the orientation of the bezel.

**Rebuild Curve Toggle:** allows you to rebuild the curve.

**Rebuild Count:** allows you to set the amount of control points for the curve. The more there are the smoother the bezel will be.

**Select Profile:** selects the profile that is on the outside of the bezel.

**Girdle Offset:** sets the distance of the bezel and the gem.

**Position:** sets the distance of the bezel relative to the girdle of the gem.

**Angle:** sets the angle of the profile of the bezel.

**Height:** sets the total height of the gem.

**Top Thickness:** sets the distance of the seat height to the profile of the bezel.

**Bottom Thickness:** sets the distance of the bottom profile of the bezel to the inside of the bottom of the bezel.

**Seat Angle:** sets the angle inside of the bezel and where it will be holding the gem.

**Seat Height:** sets the initial point of the seat angle.

**Seat Length:** pulls down the seat toward the cult of the gem.

**Dome:** sets the roundedness of the top of the bezel.

Can be adjusted with Viewport Control Handles

Can be adjusted within the Dynamic Command Window

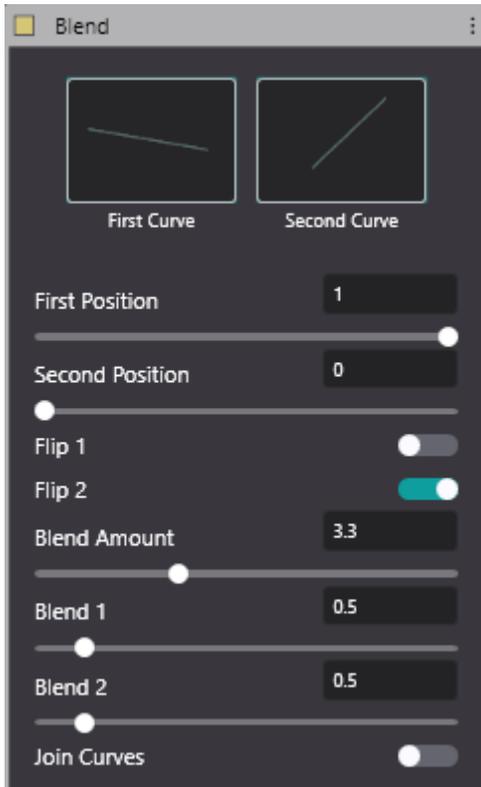


# BLEND CURVES

Blends curves with more control available for more flexibility

Command: `gvBlendCurves`

Curves Category



- ↔ **First Curve Input Box:** shows the first curve that is being blended.
- ↔ **Second Curve Input Box:** shows the second curve that is being blended.
- ↗ ↔ **First Position:** controls the beginning of the blend on the first curve, this value is a percentage.
- ↗ ↔ **Second Position:** controls the beginning of the blend on the second curve, this value is a percentage.
- ↔ **Flip 1:** flips the direction of the blend from the first curve.
- ↔ **Flip 2:** flips the direction of the blend from the second curve.
- ↔ **Blend Amount:** determines how rounded you want the blend to be. The greater the value, the more rounded the blend will be.  
**Note:** if you are blending too much it will cause the blend to self-intersect.
- ↔ **Blend 1:** sets the start of the blend amount from the first curve.
- ↔ **Blend 2:** sets the start of the blend amount from the second curve.
- ↔ **Join Curves:** joins the curves into one component that will have parametric history.  
**Note:** make changes to the curves used to create the blend to maintain parametric history.

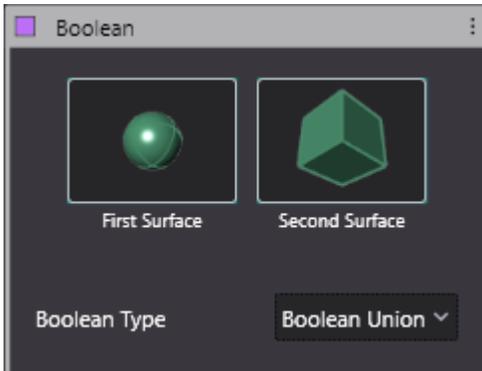


# BOOLEAN

Command: *gvBoolean*

Moves a series of objects through Boolean union, difference, and intersection

 **Solid Category**



**First Surface Input Box:** shows the first object, this is important for doing a Boolean difference, this is the object to be subtracted from.

**Second Surface Input Box:** shows the second object, when doing a Boolean difference, this is the object that is subtracting from the first object.

**Boolean Type:** changes the Boolean operation being performed

**Boolean Union:** joins the pieces together into one complete solid.

**Boolean Intersection:** keeps wherever the objects are overlapping.

**Boolean Difference:** trims the first surface with the second surface and removes the second surface.

 Can be adjusted with Viewport Control Handles

 Can be adjusted within the Dynamic Command Window

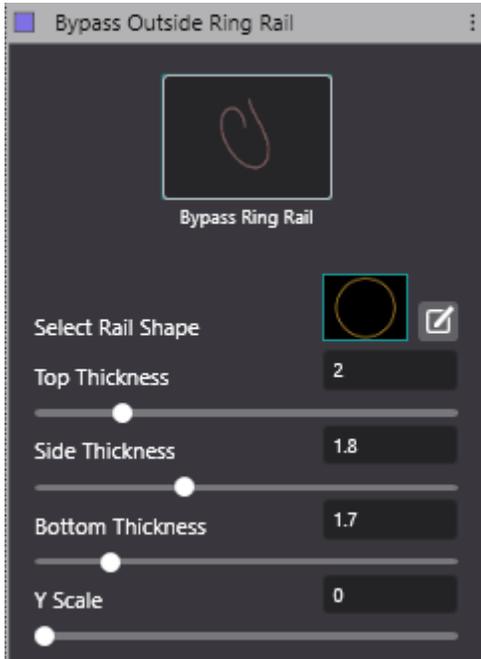


# BYPASS OUTSIDE RING RAIL

Command: `gvBypassOutsideRingRail`

Creates a ring rail that follows a bypass ring rail with a given thickness

 **Tools Category**



-  **Bypass Ring Rail Input Box:** shows the bypass ring rail that is being offset to make the outside ring rail.
-  **Select Ring Rail Shape:** allows you to select the shape of the outside ring rail.
-  **Top Thickness:** sets the thickness at the 12 o'clock position.
-  **Side Thickness:** sets the thickness at the 3 and 9 o'clock position.
-  **Bottom Thickness:** sets the thickness at the 6 o'clock position.
-  **Y Scale:** offsets the bypass portion of the outside curve away from the bypass ring rail.

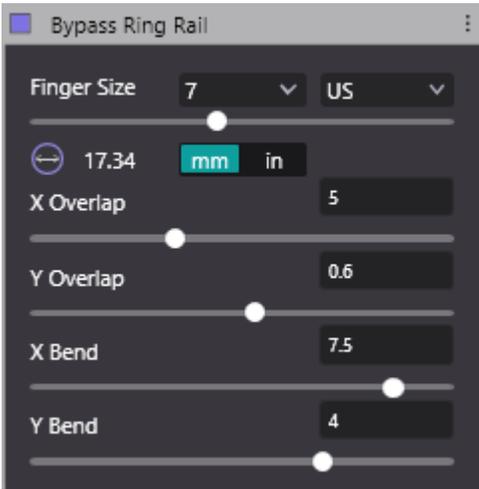


# BYPASS RING RAIL

Creates a split bypass ring rail

Command: `gvBypassRingRail`

 **Tools Category**



 **Finger Size:** finger sizes and regions that are available follow the [Ring Rail parameters](#).

  **X Overlap:** sets the gap between the two bypasses in the x-axis.

  **Y Overlap:** sets the gap between the two bypasses in the y-axis.

  **X Bend:** sets the lend and how evenly it blends from the shank to the end in the x-axis.

  **Y Bend:** sets the lend and how evenly it blends from the shank to the end in the y-axis.

 Can be adjusted with Viewport Control Handles

 Can be adjusted within the Dynamic Command Window

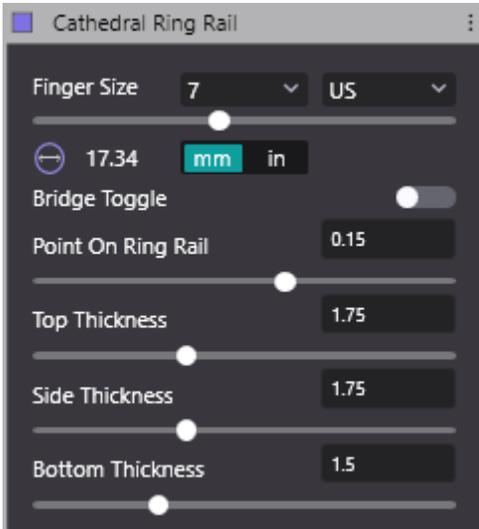


# CATHEDRAL RING RAIL

Command: `gvCathedralRingRail`

Produces a cathedral style ring rail and an outside rail

Tools Category



- Finger Size:** finger sizes and regions that are available follow the [Ring Rail parameters](#).
- Bridge Toggle:** toggles a curve to blend from the Point on Ring Rail to a mirrored point across the Ring Rail.
- Point on Ring Rail:** sets the blend target on the inside ring rail to the gumball located at the top of the cathedral ring rail.
- Top Thickness:** sets the thickness at the apex of the cathedral ring rail.
- Side Thickness:** sets the thickness at the 3 and 9 o'clock position.
- Bottom Thickness:** sets the thickness at the 6 o'clock position.
- Gumball:** using the controls on the gumball, you can make any adjustments to the how the Point on Ring Rail will blend to the gumball, you can adjust the height, and the angle of which the blend occurs.

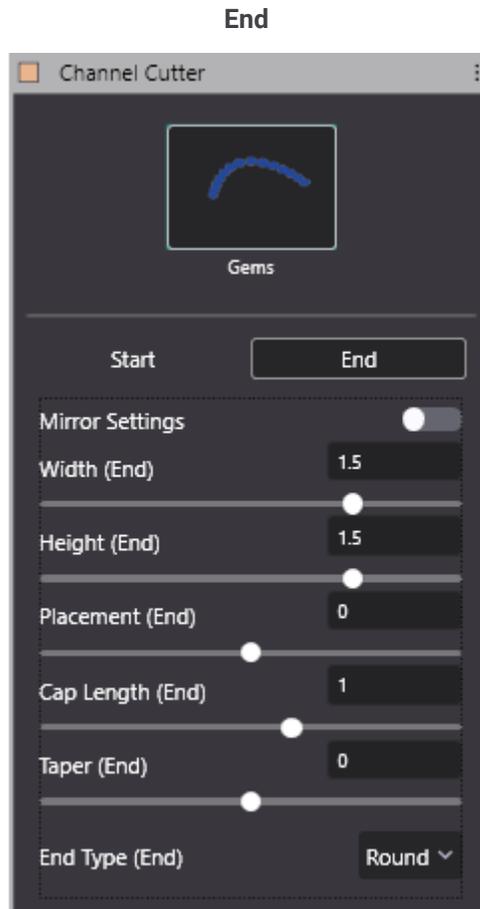
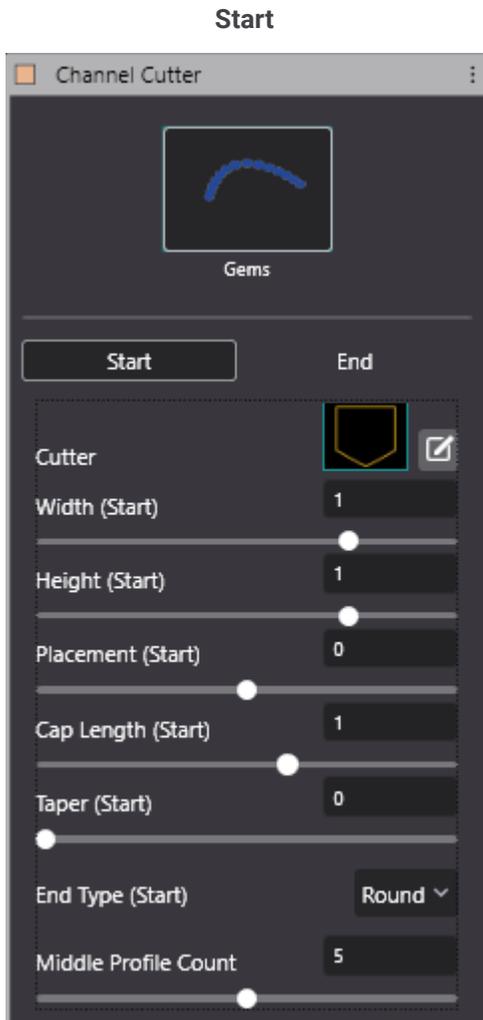


# CHANNEL CUTTER

Creates geometry along a line of gems

Command: `gvChannelCutter`

**Cutters Category**



**End**  
**Mirror Settings:** toggles settings on or off for mirroring the start of the channel to the end. If toggled off there will be controls for the end of the channel. The other parameters are the same as the start parameters.

## Start

- Width (Start):** sets the width of the cutter based off the percentage of the diameter of the girdle of the gems.
- Height (Start):** sets the height of the cutter based off the percentage of the total depth of the gems, but the height increases from the tables of the gems.
- Placement:** determines where the cutter is relative to the gems.
- Cap Length (Start):** sets how long the cap for the cutter is.
- Taper (Start):** tapers the bottom of the cutter from the top of the cap to the bottom of the cap.
- End Type (Start)**
  - Capped:** creates a planar cap that does not encompass the entire end gems.  
**Note:** Once set to Capped, the Cap Length cannot be adjusted.
  - Round:** creates a rounded cap at the end of the cutter.
  - Flat:** creates a flat surface that is an extension of the channel.
  - Sharp Corner:** creates a pointed edge that can be extended.
- Middle Profile Count:** rebuilds the surface being made with fewer or more profiles.

Can be adjusted with Viewport Control Handles    Can be adjusted within the Dynamic Command Window

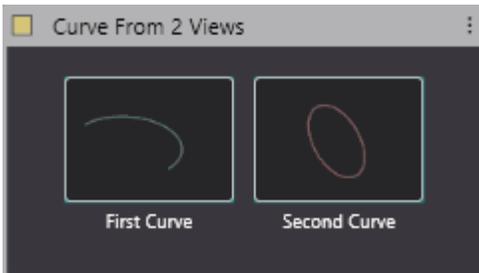


# CURVE FROM 2 VIEWS

Command: *gvCurveFrom2Views*

Creates a new curve from two curves that are planar in two different construction planes

 **Curves Category**



**Curve Input Boxes:** show the two curves that are being used to create the third curve.

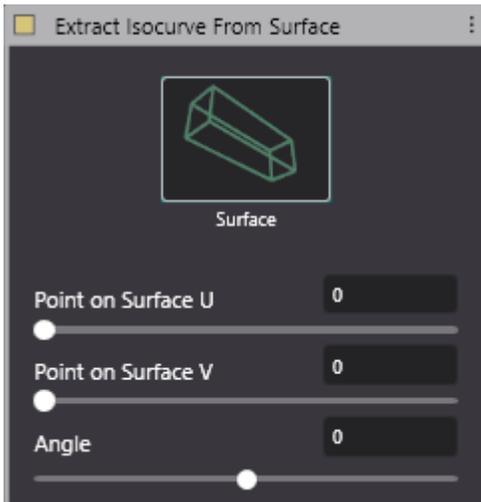


# EXTRACT ISOCURVE FROM SURFACE

Command:  
*gvExtractIsoCurveFromSurface*

Extract IsoCurve from Surface allows you to pull a curve from a surface and change the angle that it is positioned on the surface

Curves Category



-  **Surface input box:** shows the selected surface where the isocurve is being extracted from.
-  **Point on Surface U:** sets the point where the isocurve is to be extracted in the x-axis.
-  **Point on Surface V:** sets the point where the isocurve is to be extracted in the y-axis.
-  **Angle:** changes the direction of the isocurve relative to the surface.

 Can be adjusted with Viewport Control Handles  Can be adjusted within the Dynamic Command Window

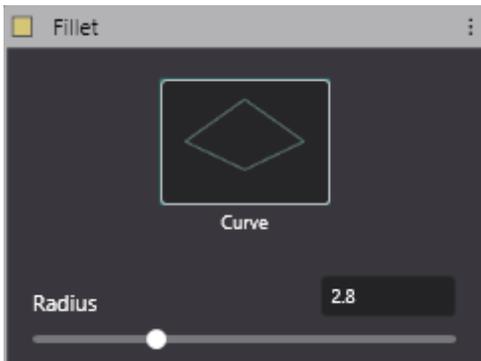


# FILLET

Fillets a continuous curve's corners into a rounded corner

Command: *gvFillet*

 Curves Category



- ☰ **Curve Input Box:** shows the curve being filleted.
- ☰ **Radius:** sets the radius of the tangent arc located at the corners of the curve.

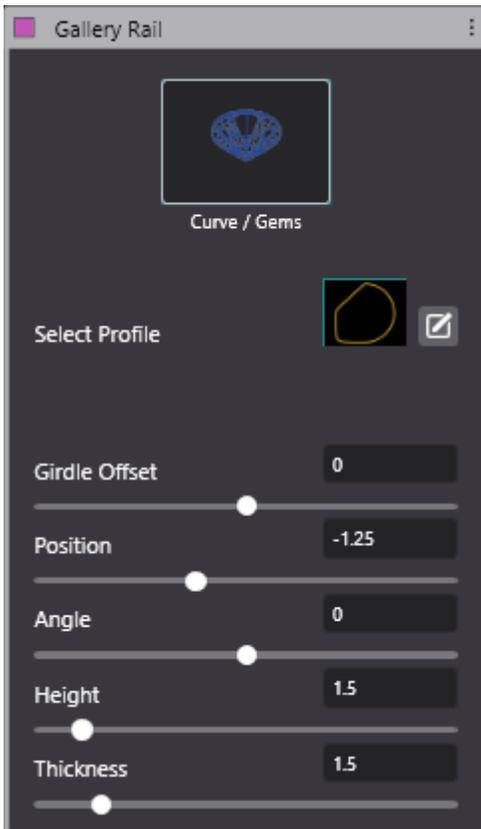


# GALLERY RAIL

Creates a gallery rail under a gem

Command: `gvGalleryRail`

Settings Category



## Gem/Curve Input Box:

**Curve Input:** when a curve is in the input box, there are more options that will show.

**Flip Curve:** allows you to change the orientation of the gallery rail.

**Rebuild Curve Toggle:** allows you to rebuild the curve.

**Rebuild Count:** allows you to set the amount of control points for the curve. The more there are the smoother the gallery rail will be.

 **Select Profile:** selects the profile used to create the gallery rail.

 **Girdle Offset:** sets the distance of the gallery rail and the gem.

 **Position:** sets the distance of the top of the gallery rail relative to the girdle of the gem.

 **Angle:** sets the angle of the overall profile of the gallery rail.

 **Height:** sets the overall height of the gallery rail.

 **Thickness:** sets the inside thickness of the gallery rail.

 Can be adjusted with Viewport Control Handles

 Can be adjusted within the Dynamic Command Window

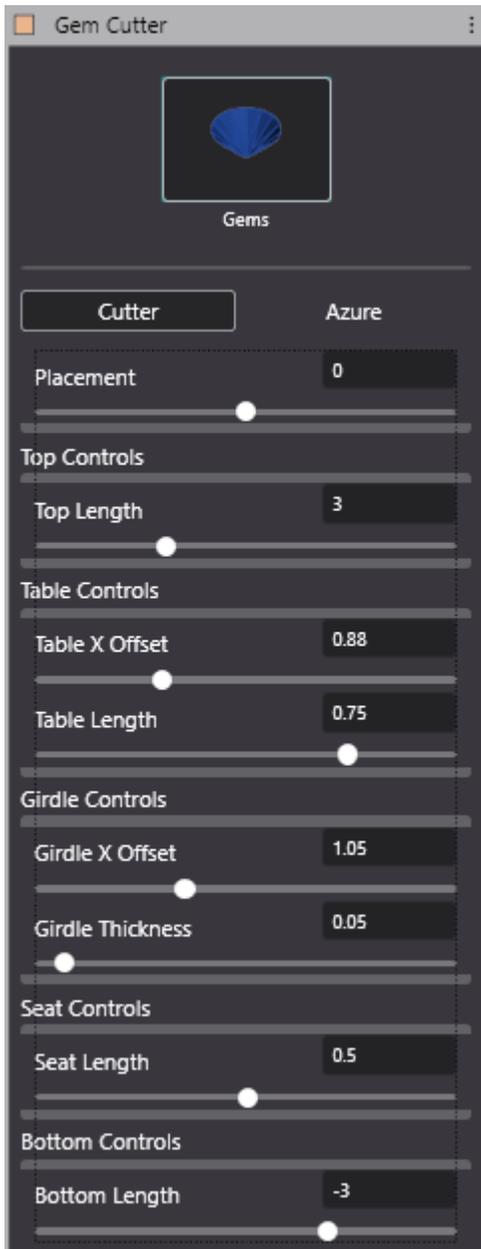


# GEM CUTTER

Creates a gem cutter from a gem

Command: `gvGemCutter`

**Cutters Category**



- Gem Input Box:** shows the gem that has the cutter placed around it.
- Placement:** sets the distance of the center of the cutter and the gem.
- Top Length:** sets the distance of the cutter from the table of the gem.
- Table X Offset:** determines how wide the cutter is at the girdle of the gem.
- Girdle Thickness:** sets the thickness of the cutter at the girdle.
- Seat Length:** sets the distance that the seat sits relative to the gem.
- Bottom Length:** sets the distance from the seat to the cutter.

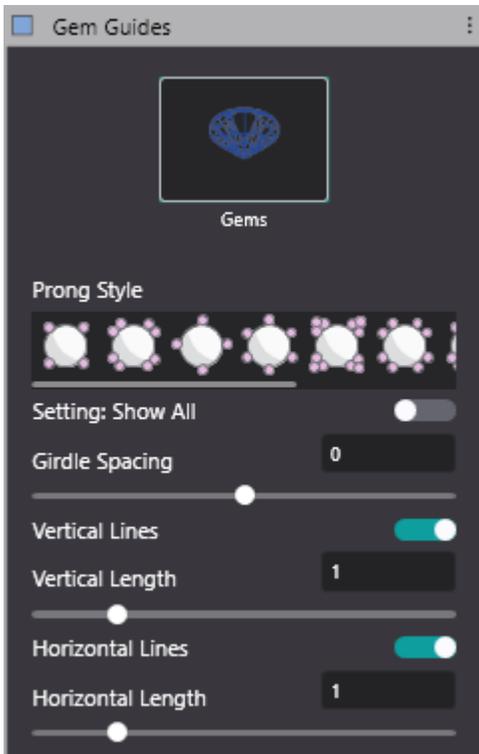


# GEM GUIDES

Command: `gvGemGuides`

Creates vertical and horizontal lines that can be offset from the girdle of a gem or a base of a cabochon.

**Gems Category**



-  **Gem Input Box:** shows the selected gem that will have gem guides.
-  **Prong Style:** shows where the gem guides will appear on the stone.  
**Note:** Some styles may be redundant with the position of the stones and does not add more gem guides.
-  **Settings:** Show All Toggle: shows all possible gem guides available to the stone.
-  **Girdle Spacing:** sets the length of how far away the gem guides are in mm from the girdle of the gem  
**Vertical Lines Toggle:** turns the vertical lines on or off for the gem.
-  **Vertical Length:** sets the length of the vertical gem guides in mm.  
**Horizontal Lines Toggle:** turns the horizontal lines on or off for the gem.
-  **Horizontal Length:** sets the length of the horizontal gem guides in mm.

 Can be adjusted with Viewport Control Handles

 Can be adjusted within the Dynamic Command Window

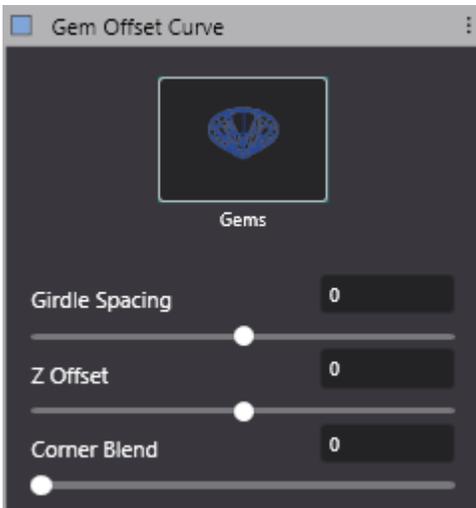


# GEM OFFSET CURVE

Command: `gvGemOffsetCurve`

Creates a curve that follows the girdle of a gem and the base of a cabochon.

 **Gems Category**



**Gem Input Box:** shows the gem that is being used.

 **Girdle Spacing:** sets how far away the curve is from the girdle of the gem.

 **Z Offset:** sets how far away the curve is positioned from the girdle of the gem in the z-axis.

 **Corner Blend:** sets the fillet radius for sharp corners in the offset.

**Note:** This will only be useful for gem shapes that have vertices, such as princess, pear, marquise, radiant, etc.

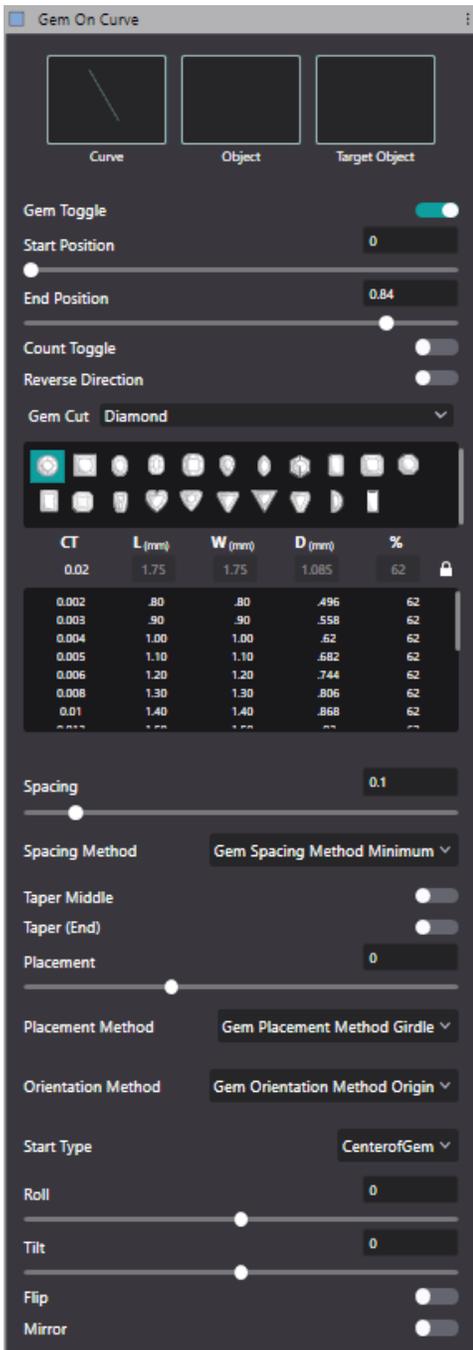


# GEMS ON CURVE

Places gems of a given size on a curve

Command: `gvGemsOnCurve`

Gems Category



- Curve Input Box:** shows the curve at the gems are placed on
- Target Object Input Box:** shows the target gem that has the gems' culets positioned to it
- Gems Selection Menu:** sets what kind of gems are following the curve, for a full list of controls for the gems refer to the [Gem command](#).
- Gem Toggle:** toggles the gems to gems.
- Start Position:** determines where the start of the array along the curve.
- End Position:** determines the end of the array along the curve.
- Count Toggle:** toggled on, it can be used to have a certain amount of gems being arrayed.
- Reverse Direction:** allows for the gems to be inside or outside of the intervals given with the start and end points.
- Start Size:** determines the initial size of the gem.
- Spacing:** sets the amount of millimeters between the gems.
- Spacing Method**
  - Minimum:** sets the spacing to be at least value from Spacing.
  - Minimum Scaled:** sets the spacing to be at least the value from Spacing, and will scale gems accordingly.
  - Fixed:** keeps the spacing at the value from Spacing.
- Note:** Keeping gems at a Fixed Spacing will not have the gems line up with the end point.
- Taper Middle:** toggles a middle gem size to allow tapering.
- Tapered (End):** toggles an end gem size to allow tapering.
- Placement:** sets the position of the gem relative to the curve.
- Orientation Method**
  - Origin:** points the bottoms of the gems toward the origin.
  - Y-axis:** points the bottoms of the gems toward the y-axis.
  - Down:** points the bottoms of the gems parallel to the negative z-axis.
- Start Type**
  - Center:** sets the center of the gem to be the start of the array.
  - Edge:** sets the edge of the gem to be the start of the array.
- Roll:** changes the angle of the gem planar with the curve.
- Tilt:** changes the angle of the gem perpendicular to the curve.
- Flip:** flips the tops of the gems to be at the bottom.
- Mirror:** mirrors the gems using the start position as the mirror plane.

Can be adjusted with Viewport Control Handles

Can be adjusted within the Dynamic Command Window



# GEM ON RING RAIL

Sets a gem on a ring rail with specified dimensions

Command: `gvGemOnRingRail`

■ Gems Category

| CT    | L (mm) | W (mm) | D (mm) | %  |
|-------|--------|--------|--------|----|
| 0.979 | 6.40   | 6.40   | 3.968  | 62 |
| 0.002 | .80    | .80    | .496   | 62 |
| 0.003 | .90    | .90    | .558   | 62 |
| 0.004 | 1.00   | 1.00   | .62    | 62 |
| 0.005 | 1.10   | 1.10   | .682   | 62 |
| 0.006 | 1.20   | 1.20   | .744   | 62 |
| 0.008 | 1.30   | 1.30   | .806   | 62 |
| 0.01  | 1.40   | 1.40   | .868   | 62 |
| 0.013 | 1.50   | 1.50   | .93    | 62 |

- ☰ **Ring Rail Input Box:** shows the current ring rail that the gem is on
- ☰ **Gems Selection Menu:** sets what kind of gems are following the curve, for a full list of controls for the gems refer to the [Gem command](#).
- ☰ **Count:** sets the number of gem that are on the ring rail.
- ↗ ☰ **Spacing:** if there is more than one gem on the ring rail you can set the spacing between them.
- ↗ ☰ **Z Offset:** determines how far the gem is from the ring rail in the z-axis.
- ↗ ☰ **Y Offset:** determines how far the gem is from the ring rail in the y-axis.
- ☰ **Y Offset Mirror:** if using multiple gems, this allows you to make a mirrored rotation of the gems.
- ☰ **Tilt:** if using multiple gems, this allows you to change the position of gems' culets to any angle up to having it be parallel with the y-axis.
- ☰ **Angle:** sets the angle that the gem sits relative to the wearer. Rotation: rotation adjusts the position of the gem's north orientation.
- ☰ **Rotation Mirror:** sets the side stones to be mirror images of each other.
- ☰ **Placement Method:** sets the origin point for the gem where the y and z offset references.

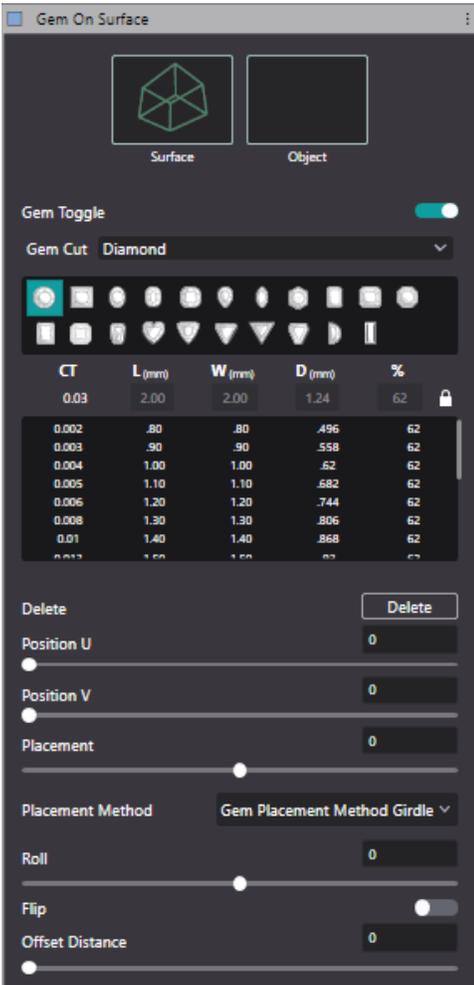


# GEM ON SURFACE

Command: gvGemOnSurface

Places gems of a given size on a given surface

Gems Category



**Surface Input Box:** shows the surface that is being used to place gem on.

**Object Input Box:** shows the object that the culets of the gems are pointing to.

**Gem Toggle:** toggles between gems and objects.

**Gems Selection Menu:** sets what kind of gems are following the curve, for a full list of controls for the gems refer to the [Gem command](#).

**Delete:** deletes the selected gem.

**Position U:** adjusts the position of the reference gem in the U direction.

**Position V:** adjusts the position of the reference gem in the V direction.

**Placement:** sets the height of the selected gem from the surface.

**Placement Method:** changes the start of the placement based of the table, girdle, or culet.

**Roll:** turns the selected gem at an angle.

**Flip:** flips the orientation of the gems from the point at indicated in the viewports.

**Offset Distance:** creates an offset curve from the girdle of the stone.

- 1 Select the surface you want to place gems on. If there is only one closed polysurface or a single surface the command will automatically pick that one surface.
- 2 Then there will be a reference gem at the beginning of the surface. Here you can make changes so that the next gems that are laid out will have the same positioning. So take this time to have the perfect gem to lay out. Also take this time to set the Offset Distance to half of the planned spacing that you will have for these gems.
- 3 Use your mouse to then find the next location for another gem. Looking at the Offset Gem curve as you move your mouse cursor over the surface helps you position the next gem with spacing.
- 4 If you need to make any adjustments to any gems placed on the surface, click on the dot inside of the gem, viewport control handles will pop up on the gem, and you can change the positioning, or in the builder click on the Delete button.
- 5 Once complete with the gems, press Enter.

Can be adjusted with Viewport Control Handles

Can be adjusted within the Dynamic Command Window

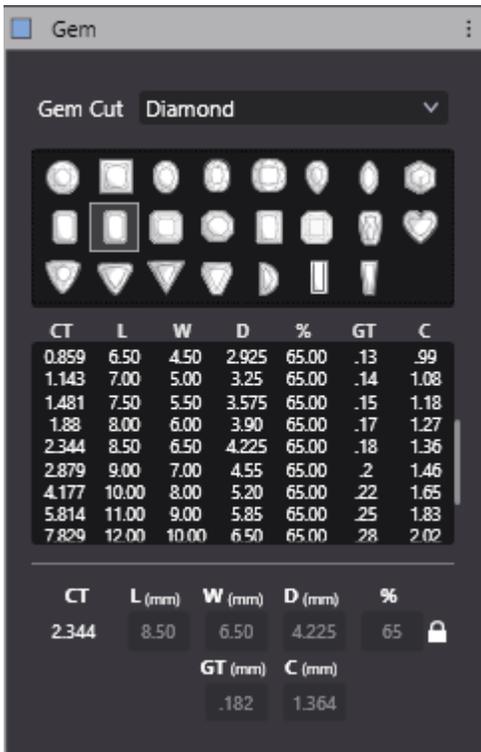


# GEM

Creates a gem

Command: gvGem

Gems Category



**Gem Cut:** a drop down menu that changes the type of cut the gem is available cuts are:

**Cabochon** - creates a gem with the gem shape and a domed top.

**Diamond** - creates a faceted gem with the gem shape.

**Gem** - creates a faceted gem with a flat top with the girdle following the gem shape.

**Pearl** - creates a pearl with a given diameter

**Gem Shape Selector:** selects the gem cut, for cabochons this is the base of the gem, for diamonds and gems this is the girdle of the gem. Hovering your mouse over the previews of the gem shapes will show a tooltip of the gem shape.

**Manual Gem Sizer:** clicking on the lock enables you to manually input the dimensions of the gem and it will estimate the carat weight of the gem.

**L(mm)** - controls the length of the gem in the y-axis in millimeters.

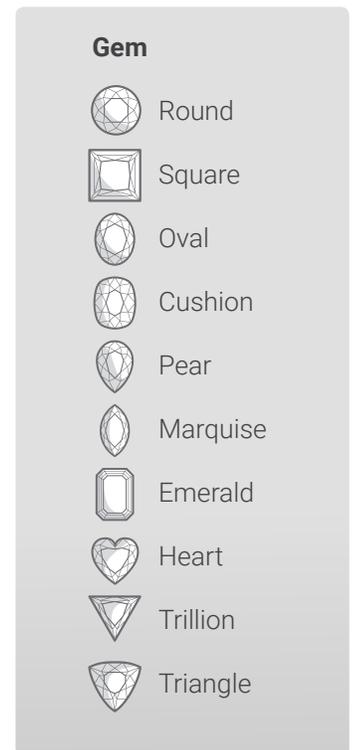
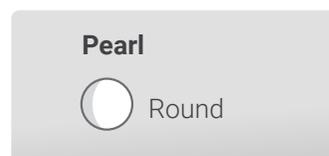
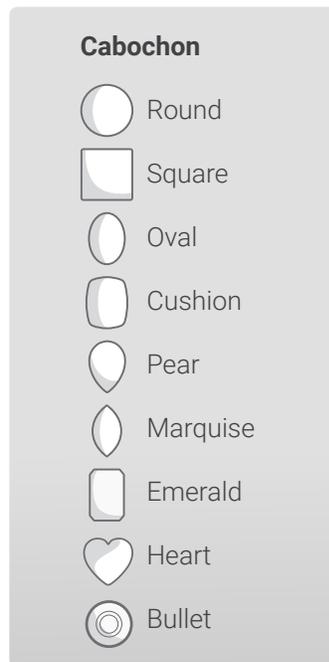
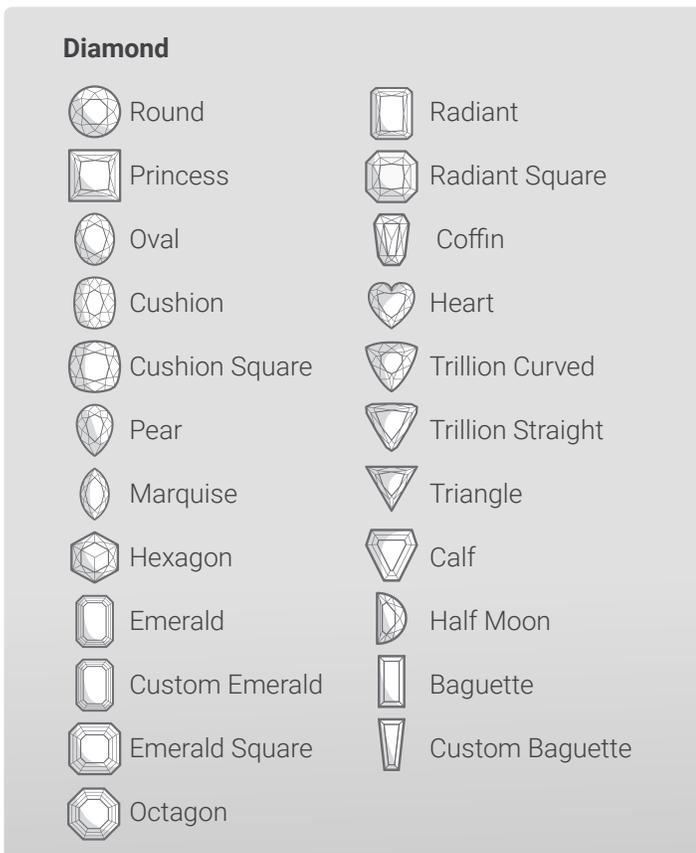
**W(mm)** - controls the width of the gem in the x-axis in millimeters.

**D(mm)** -controls the depth of the gem in the z-axis in millimeters.

**%** - sets the percentage relation of the depth of the gem to its width. this value is the depth of the gem divided by the width.

**Note:** The padlock must be greyed out in order to enable manual sizing. If it is activated click on the padlock to toggle manual sizing.

**Preset Gem Size List:** in this list there are a list of preset gems with a set carat weight, length, width and depth.





# HALO

Creates a halo around a gem

Command: *gvHalo*

**Gems Category**

## Cluster

|       | 0.012 | 1.25 | 1.25  | 938 | 75 |
|-------|-------|------|-------|-----|----|
| 0.021 | 1.50  | 1.50 | 1.125 | 75  |    |
| 0.034 | 1.75  | 1.75 | 1.313 | 75  |    |
| 0.05  | 2.00  | 2.00 | 1.50  | 75  |    |
| 0.072 | 2.25  | 2.25 | 1.688 | 75  |    |
| 0.098 | 2.50  | 2.50 | 1.875 | 75  |    |
| 0.131 | 2.75  | 2.75 | 2.063 | 75  |    |
| 0.17  | 3.00  | 3.00 | 2.25  | 75  |    |
| 0.216 | 3.25  | 3.25 | 2.438 | 75  |    |

| CT    | L (mm) | W (mm) | D (mm) | %  |
|-------|--------|--------|--------|----|
| 0.012 | 1.25   | 1.25   | .938   | 75 |

## Halo

### Cluster

**Gems Selection Menu:** sets what kind of gems are following the curve, for a full list of controls for the gems refer to the [Gem command](#).

**Note:** Round and Princess cut stones are currently the only gems that can be placed in the halo.

- Spacing From Center:** sets the distance of the inner channel wall of the halo to the gem's girdle.
- Gem Height Offset:** sets how tall the side gems are from the halo.
- Halo Placement:** sets the overall height of the halo relative to the gem.
- Gem Spacing:** sets the spacing of the gems in the halo.
- Spacing Tolerance:** determines the spacing between the gems and how absolute they must be.
- Halo Angle:** sets the angle of the stones and halo.
- Gem Rotation:** determines the orientation of the gems.
- Gem Position:** sets the distance between the culet of the gems to the halo.
- Corner Style Toggle:** toggle on to disable corner gems, toggle off for corner gems.
- Even Toggle:** sets the number of gems in the halo to be even when it is turned on.

### Halo

- Metal Toggle:** toggles the metal that makes up the halo.
- Channel Toggle:** toggles the channel around the gems to be on or off.
- Select Halo Profile:** selects the profile being used to make the halo.
- Height:** determines the total height of the halo.
- Enable Shape Corner Blend:** enables controls for softening sharp corners in based of the center gem shape.
- Inner Blend Radius:** sets the inside fillet radius for the sharp corners for the inside of the halo.
- Outer Blend Radius:** sets the outside fillet radius for the sharp corners of the fillet.
- Blend Offset Percentage:** determines the blend of the outside portion of the halo

*(continued, next page)*

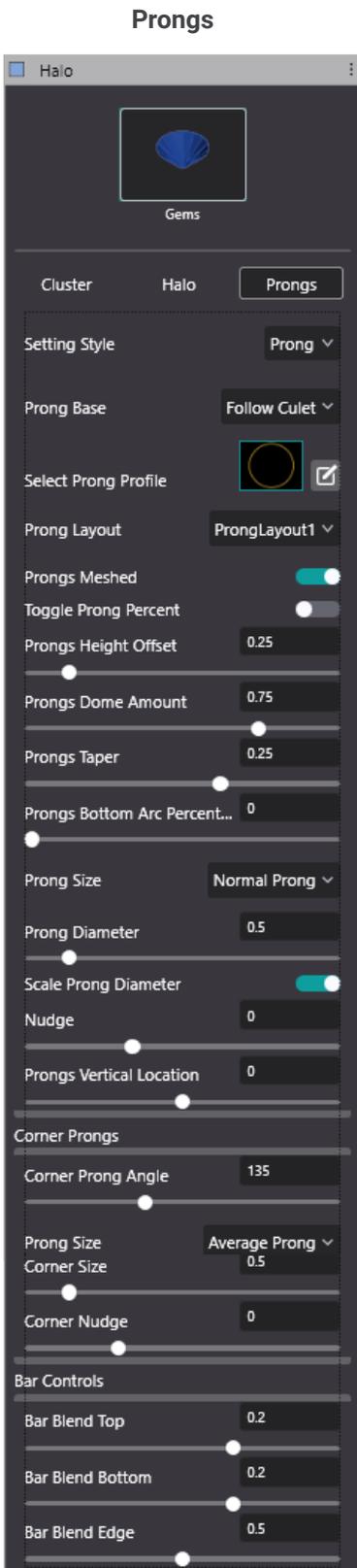
Can be adjusted with Viewport Control Handles

Can be adjusted within the Dynamic Command Window



# HALO *(continued)*

Creates a halo around a gem



## Halo *(continued)*

### Channel Controls

- ↗ ⇨ **Inner Channel Wall Thickness:** determines the thickness of the channel closest to the center gem.
- ↗ ⇨ **Outer Channel Wall Thickness:** determines the thickness of the channel farthest from the center gem.
- ↗ ⇨ **Channel Spacing:** sets the spacing between all gems in the halo.
- ↗ ⇨ **Channel Wall Height:** sets how tall the channel walls are.
- ⇨ **Channel Corner Blend Radius:** rounds out the channel walls and where they meet at the base of the channel.
- ⇨ **Channel Bottom Offset:** sets the bottom portion of the channel to follow the culet of the stone.

### Prongs

#### ⇨ Setting Style:

- Prong** - sets the prongs to be prongs that follow the profile.
- Bar** - sets the prongs in a bar setting.
- Auto** - automatically sets the sets with the preferred **Off**

**Prong Base:** sets the location of the bottoms of the prongs.

↗ ⇨ **Select Prong Profile:** selects the profile that is being used to create the prongs.

⇨ **Prong Layout:** determines the layout of the prongs.

⇨ **Prongs Meshed:** toggles between mesh and NURBS prongs.

**Note:** when finished with the Halo Dynamic Command, ensure to toggle this off to be able to do Booleans later.

⇨ **Toggle Prong Percent:** toggles to switch the prongs to follow a percentage of the gems.

**Toggle Percent Slider:** sets the prongs as a percentage of the gems, where 100% is the table and 0% is the culet.

↗ ⇨ **Prongs Height Offset:** sets the height of the prongs above the culet.

↗ ⇨ **Prongs Dome Amount:** sets how rounded the prongs are at the top.

↗ ⇨ **Prongs Taper:** sets the prongs to taper at the bottom and increase in size at the bottom with a value greater than 0.

⇨ **Prongs Bottom Arc Percentage:** sets the prongs to be set to rounded at the bottom.

⇨ **Prong Size:** determines the prongs height based off the smallest, average, or largest prong.

⇨ **Prong Diameter:** sets the top diameter of the prongs.

⇨ **Scale Prong Diameter:**

**Nudge:** moves the prongs closer to each other to facilitate intersection with the gems.

↗ ⇨ **Prongs Vertical Location:** set the base of the prongs to be at a numerical value.

#### ⇨ Corner Prongs

⇨ **Corner Prong Angle:** adds prongs based on the angle, the greater the angle, the more prongs are added.

⇨ **Prong Size:** determines the prongs height based off the smallest, average, or largest prong.

⇨ **Corner Size:** sets the top diameter of the top of the corner prongs.

⇨ **Corner Nudge:** moves the corner prongs in closer to the corner gems.

#### ⇨ Bar Controls

⇨ **Bar Blend Top:** rounds off the tops of the bar prongs.

⇨ **Bar Blend Bottom:** rounds off the bottoms of the bar prongs.

⇨ **Bar Blend Edge:** rounds off the vertical edges of the bar prongs.



# HEAD

Places a head setting on a gem

Command: `gvHead`

Settings Category

**Gem Input Box:** shows the gem that is being used to build the head setting.

## Level 1

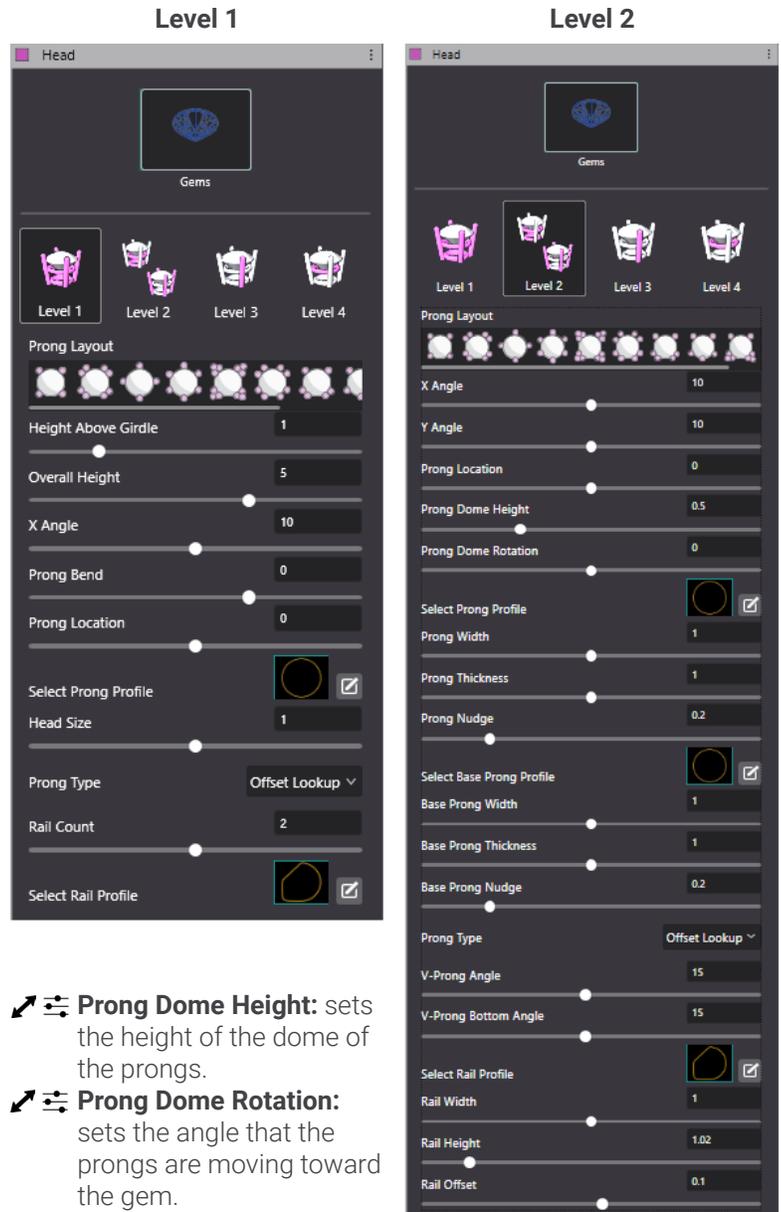
All controls in this level will make changes to the head as a whole.

- Prong Layout:** sets the orientation and number of prongs that are laid around the gem.
- Height Above Girdle:** sets the height of the prongs above the girdle of the gem.
- Overall Height:** sets the height of the bottom gallery rail and the tip of the prongs.
- X Angle:** changes the angle of the position of the prongs relative to the girdle of the gem.
- Prong bend:** sets the amount of bend from the bottom of the prong to the top.
- Prong Location:** moves peripheral prongs closer to the positive and negative y-axis, which ever is closer.
- Select Prong Profile:** selects the prong profiles used for all prongs.
- Head Size:** sets the diameter of the prongs and gallery rails.
- Prong Type**
  - Profile:** uses the profiles selected to create the prongs.
  - Offset Lookup:** automatically selects the best set of prongs for the selected stone.
  - Force:** creates bar prongs for the head.
- Base Style**
  - HeadBuilderProngHead:** sets the base of the prongs to be default.
  - HeadBuilderProngHeadPoint:** moves the base of the prongs to touch at the bottom.
  - HeadBuilderProngHeadCutToPoint:** moves the base of the prongs to have their centers intersect at the projected culet of the gem.
- Rail Count:** sets the number of gallery rails.
- Select Rail Profile:** selects the gallery rail profiles used for all gallery rails.

## Level 2

Allows for controls over all prongs or for all gallery rails.

- X Angle:** sets the angle for the prongs in the x-axis, relative to the girdle.
- Y Angle:** sets the angle for the prongs in the y-axis, relative to the girdle.
- Prong Location:** orients the prongs to towards the y-axis.



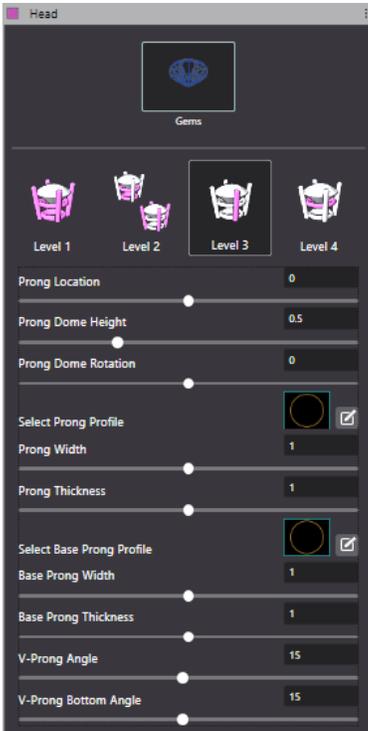
- Prong Dome Height:** sets the height of the dome of the prongs.
  - Prong Dome Rotation:** sets the angle that the prongs are moving toward the gem.
  - Select Prong Profile:** selects the profile for all prongs at the top of the prongs.
  - Prong Width:** sets the width of the prongs at the tops of the prongs.
  - Prong Thickness:** sets the overall thickness of the tops of the prongs.
  - Prong Nudge:** sets the amount of overlap of prongs and the gem at the near the top of the prongs.
  - Select Base Prong Profile:** selects the profile for all prongs at the bottom of the prongs.
- (continued next page)



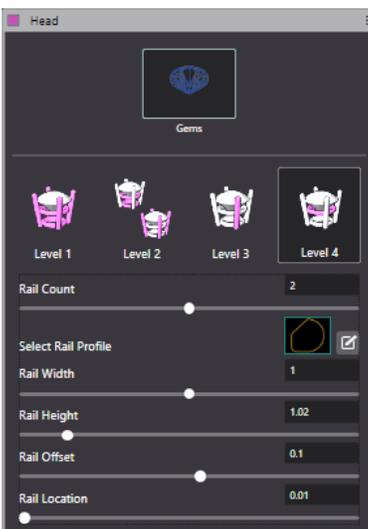
# HEAD *(continued)*

Places a head setting on a gem

## Level 3



## Level 4



## Level 2 *(continued)*

- ↗ ⇄ **Base Prong Width:** sets the width of the prongs at the bottoms of the prongs.
- ↗ ⇄ **Base Prong Thickness:** sets the overall thickness of the bottoms of the prongs.
- ↗ ⇄ **Base Prong Nudge:** sets the amount of overlap of prongs and the gem at the bottom.
- ⇄ **Prong Type:**
  - Profile:** uses the profiles that are selected in order to produce the prongs.
  - Offset Lookup:** the prongs will be automatically be set as the profile or have v-prongs based on the gem.
  - Force:** creates bar prongs, regardless of the gem shape.
- ↗ ⇄ **V-Prong Angle:** when using Prong Type=Force, you can adjust the amount of metal that covers the girdle of the gem at the top of the prongs.
- ↗ ⇄ **V-Prong Bottom Angle:** when using Prong Type=Force, you can adjust the amount of metal that covers the girdle of the gem at the bottom of the prongs.
- ↗ ⇄ **Select Rail Profile:** selects the profile for all gallery rails
- ↗ ⇄ **Rail Width:** sets the width of all gallery rails.
- ↗ ⇄ **Rail Height:** sets the height of all gallery rails.
- ↗ ⇄ **Rail Offset:** sets the distance between the gallery rails and the stone.

## Level 3

Allows for control over the prongs individually.

**Note:** In order to make any changes to another prong, you will need to click on the white sphere in any of the viewports in order to make changes to that prong.

- ⇄ **Prong Location:** moves the prong toward or away from the y-axis.
- ↗ ⇄ **Prong Dome Height:** sets the dome height of the prong.
- ↗ ⇄ **Prong Dome Rotation:** sets the angle that the prongs are moving toward the gem.
- ↗ ⇄ **Select Prong Profile:** selects the profile of the prongs at the top.
- ↗ ⇄ **Prong Width:** sets the width of the prong.
- ↗ ⇄ **Prong Thickness:** sets the thickness of the prong overall.
- ↗ ⇄ **Select Base Prong Profile:** selects the profile of the prongs at the top.
- ↗ ⇄ **Base Prong Width:** sets the width of the prong at the bottom.
- ↗ ⇄ **Base Prong Thickness:** sets the thickness of the prong at the bottom.
- ↗ ⇄ **V-Prong Angle:** when using Prong Type=Force, you can adjust the amount of metal that covers the girdle of the gem at the top of the prongs.
- ↗ ⇄ **V-Prong Bottom Angle:** when using Prong Type=Force, you can adjust the amount of metal that covers the girdle of the gem at the bottom of the prongs.

## Level 4

Allows for control over the gallery rails individually.

**Note:** In order to make any changes to another gallery rail, you will need to click on the white sphere in any of the viewports in order to make changes to that gallery rail.

- ⇄ **Rail Count:** sets the number of gallery rails.
- ↗ ⇄ **Select Rail Profile:** selects the profile the gallery rail.
- ↗ ⇄ **Rail Width:** sets the rail width.
- ↗ ⇄ **Rail Height:** sets the rail height.
- ↗ ⇄ **Rail Offset:** sets the distance between the rail and the gem.
- ↗ ⇄ **Rail Location:** sets the rail location relative to the prongs.

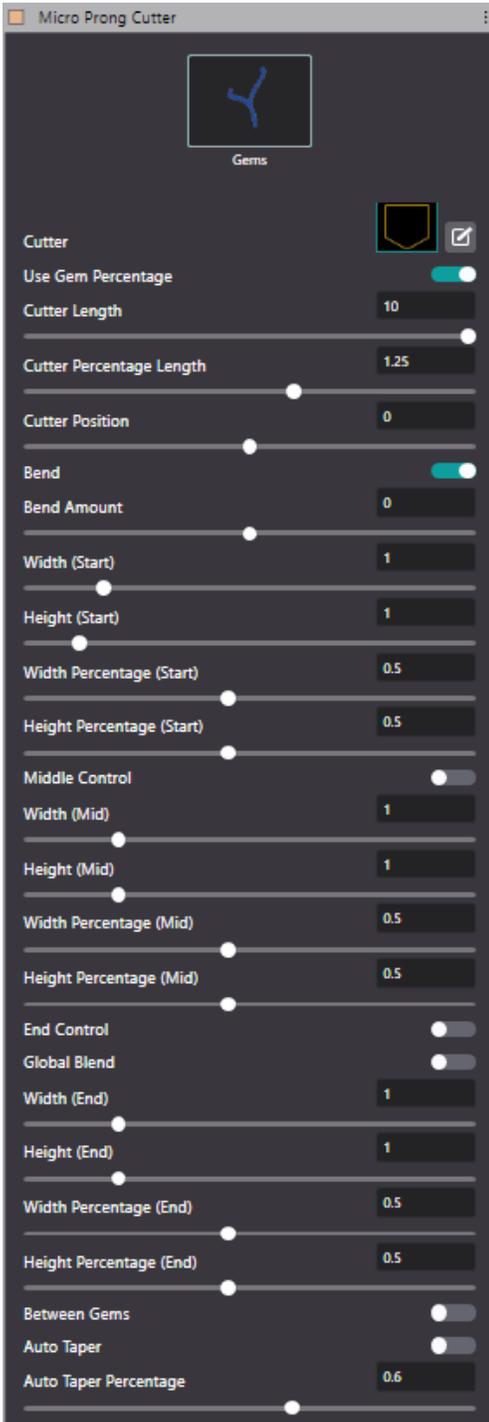


# MICRO PRONG CUTTER

Command: *gvMicroProngCutter*

Places geometry to be used to cut out microprongs for a line of gems

**Transform Category**



- Gems Input Objects:** shows the gems that are used to lay out the cutters.
- Cutter Profile:** selects the profile that is being used to create the microprong cutter.
- Cutter Percentage Length:** sets the length of how much overlap there is for the cutter relative to the gems.
- Cutter Position:** determines where the cutters are relative to the gems' center.
- Bend Toggle:** toggle to turn on controls for the bend of the cutter.
- Bend Amount:** sets the amount of bend that is produced by the cutter.
- Width Percentage (Start):** sets the width of the cutter at the start of the cutters.  
**Note:** the cutters will be created uniformly if the middle and end controls are off.
- Height Percentage (Start):** sets the height of the cutter at the start of the cutters.  
**Note:** the cutters will be created uniformly if the middle and end controls are off.
- Middle Control:** enables controls for the middle width and height.
- End Control:** enables controls for the end width and height.
- Between Gems Toggle:** places the cutters between the gems.
- Auto Taper Toggle:** sets the cutters to scale with the gem sizes.

Can be adjusted with Viewport Control Handles

Can be adjusted within the Dynamic Command Window

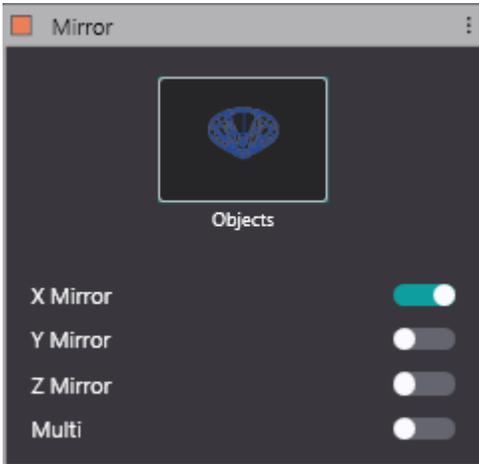


# DYNAMIC MIRROR

Allows dynamic objects to be mirrored and maintains parametric history among them

Command: `gvDynamicMirror`

 Transform Category



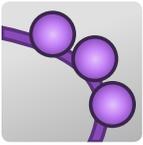
 **X Mirror Toggle:** Sets the objects to mirror over the x-axis.

 **Y Mirror Toggle:** Sets the objects to mirror over the y-axis.

 **Z Mirror Toggle:** Sets the objects to mirror over the z-axis.

 **Multi:** Creates an object for each axis.

**Note:** NOT turning on Multi will result with an object that is oriented over two axes.



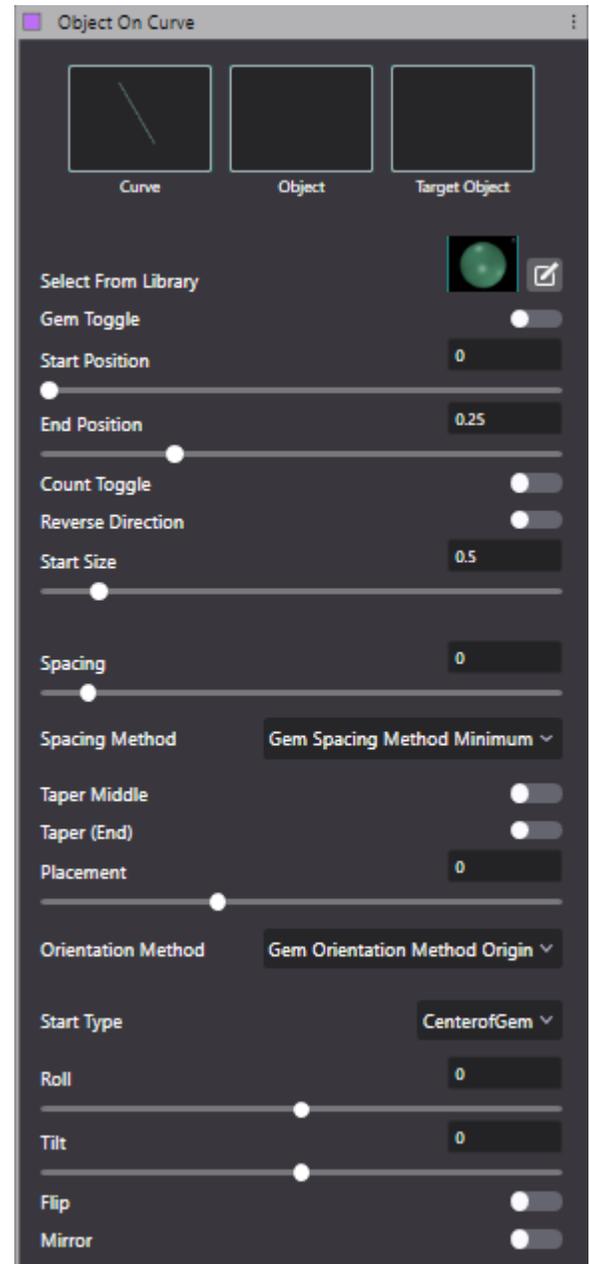
# OBJECT ON CURVE

Command: `gvObjectOnCurve`

Places an object along a curve with controlled spacing

 Solid Category

-  **Curve Input Box:** shows the curve that is being arrayed upon.
-  **Object Input Box:** shows the object being arrayed.
-  **Target Object Input Box:** orients the bottoms of the object towards the target object.
-  **Select from Library:** opens the Library for objects that be used with this builder.
-  **Gem Toggle:** toggles the objects to gems.
-   **Start Position:** determines where the start of the array along the curve.
-   **End Position:** determines the end of the array along the curve.
-  **Count Toggle:** toggled on, it can be used to have a certain amount of objects being arrayed.
-  **Reverse Direction:** allows for the objects to be inside or outside of the intervals given with the start and end points.
-   **Start Size:** determines the initial size of the object.
-   **Spacing:** sets the amount of millimeters between the objects.
-  **Spacing Method**
  - Minimum:** sets the spacing to be at least value from Spacing.
  - Minimum Scaled:** sets the spacing to be at least the value from Spacing, and will scale objects accordingly.
  - Fixed:** keeps the spacing at the value from Spacing.
  - Note:** Keeping objects at a Fixed Spacing will not have the objects line up with the end point.
-  **Taper Middle:** toggles a middle object size to allow tapering.
-  **Tapered (End):** toggles an end object size to allow tapering.
-   **Placement:** sets the position of the object relative to the curve.
-  **Orientation Method**
  - Origin:** points the bottoms of the objects toward the origin.
  - Y-axis:** points the bottoms of the objects toward the y-axis.
  - Down:** points the bottoms of the objects parallel to the negative z-axis.
-  **Start Type**
  - Center:** sets the center of the object to be the start of the array.
  - Edge:** sets the edge of the object to be the start of the array.
-   **Roll:** changes the angle of the object planar with the curve.
-   **Tilt:** changes the angle of the object perpendicular to the curve.
-  **Flip:** flips the tops of the objects to be at the bottom.
-  **Mirror:** mirrors the objects using the start position as the mirror plane.



 Can be adjusted with Viewport Control Handles

 Can be adjusted within the Dynamic Command Window

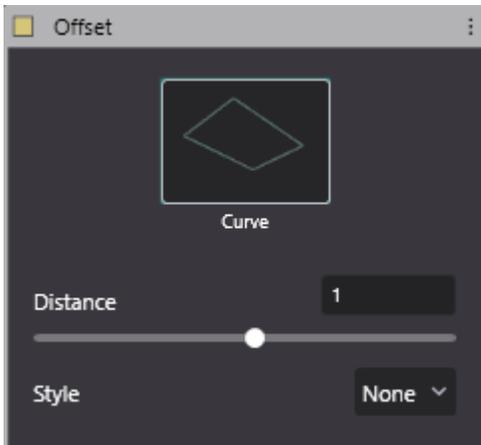


# OFFSET

Dynamically offsets object used with other dynamic commands

Command: *gvOffset*

Curves Category



**Curve Input Box:** shows the curve that is being offset.

**Distance:** sets the distance in millimeters of the curve offset

**Style**

**None:** at vertices and corners, there will be no form of blending.

**Sharp:** the curves produced are continuous and will be following and will meet at sharp corners.

**Round:** the curves produced will be filled with arc segments at the corners.

**Smooth:** the curved produced will be filled with blended segments and will have a finer smoothness to the corners.

**Chamfer:** the corners of the offset curves will be filled with a straight line between the endpoints.



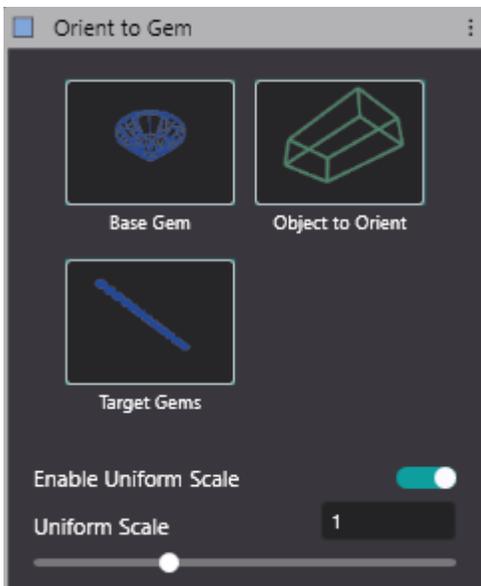
# ORIENT TO GEM

Move objects onto target gems from a base gem

Command: `gvOrientToGem`

 Gems Category

## Uniform Scale Enabled

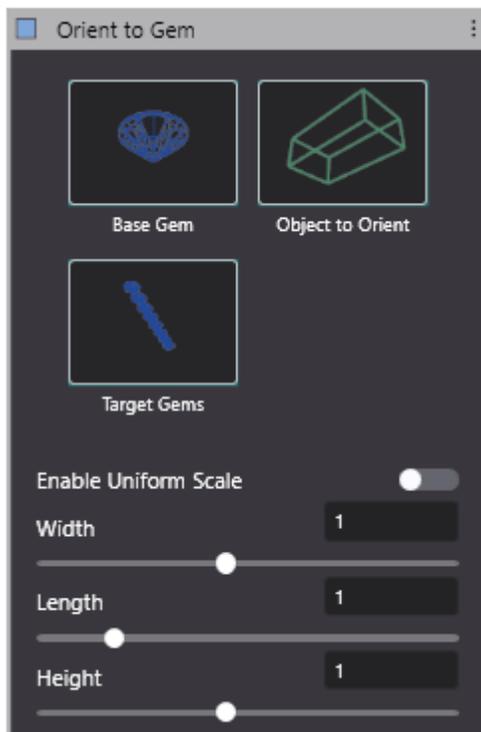


- 1 When starting the command, the command line will ask for a base gem. Select the base gem.
- 2 Then the command line will ask for all objects you want to orient onto your gems. Once you have selected all of your objects, press Enter.
- 3 Then the command line will ask for all gems you want to have the target object to orient to.

4 Once the command is complete there is a builder that allows you to make any adjustments to the objects that you have, you can scale them in all three dimensions at once, or you can toggle Uniform scale off to make changes in any of the three dimensions.

5 Making changes to the original objects that are being oriented will have those changes reflect on the target gems.

## Uniform Scale Disabled



 Can be adjusted with Viewport Control Handles

 Can be adjusted within the Dynamic Command Window

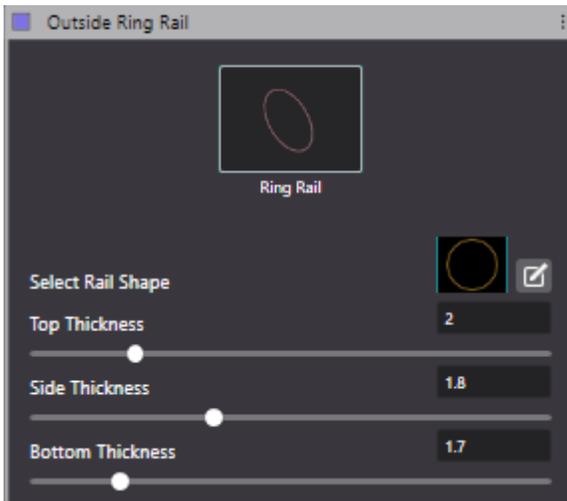


# OUTSIDE RING RAIL

Command: *gvOutsideRingRail*

Sets an offset of an existing ring rail with given dimensions

 **Tools Category**



-  **Ring Rail Input Box:** shows the ring rail that the outside ring rail is referencing.
-  **Top Thickness:** sets the distance of the outside ring rail from the reference ring rail in mm at the 12 o'clock position.
-  **Side Thickness:** sets the distance of the outside ring rail from the reference ring rail in mm at the 3 and 9 o'clock position.
-  **Bottom Thickness:** sets the distance of the outside ring rail from the reference ring rail in mm at the 6 o'clock position.

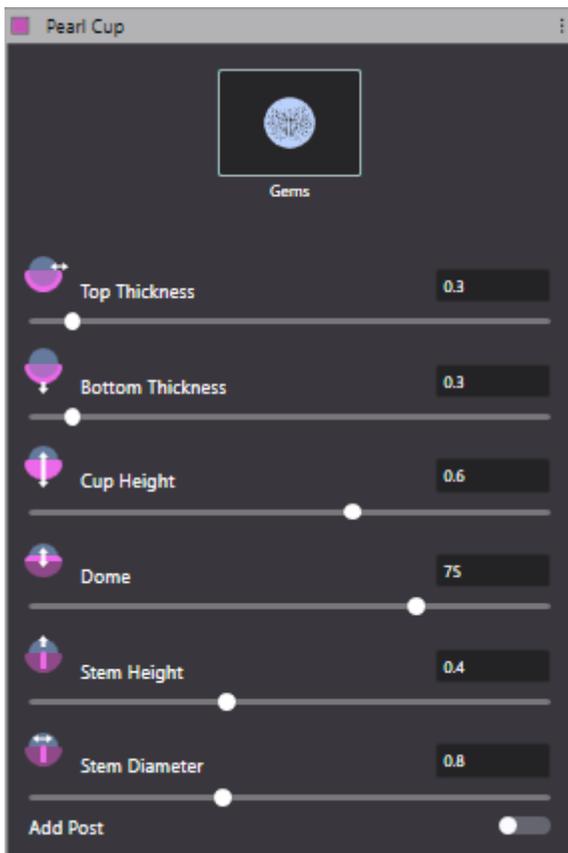


# PEARL CUP

Creates a cup and stem for a pearl

Command: `gvPearlCup`

**Settings Category**



-  **Gem Input Box:** shows the pearl that is getting the pearl cup setting.
-  **Top Thickness:** determines the thickness at the top of the pearl cup.
-  **Cup Height:** sets the percentage of coverage of the cup by the stone.
-  **Dome:** sets the total dome appearance at the top of the cup.
-  **Stem Height:** sets the height of the stem that is inside of the cup. This value is a percentage of the diameter of the pearl.
-  **Stem Diameter:** sets diameter of the stem in millimeters.
-  **Add Post:** adds a post behind the cup that can be used for an earring.

 Can be adjusted with Viewport Control Handles

 Can be adjusted within the Dynamic Command Window

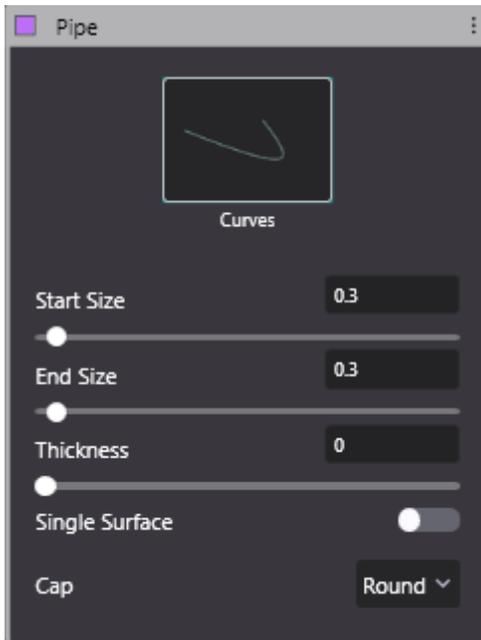


# PIPE

Creates a pipe around a curve

Command: *gvPipe*

 Solid Category



 **Curve Input Box:** shows the curve that is being piped.

 **Start Size:** sets the radius of the pipe at the beginning of the curve

 **End Size:** sets the radius of the pipe at the end of the curve.

**Note:** to find the start and end of a curve, select the curve use the command *CrvStart* and *CrvEnd*.

 **Thickness:** offsets a surface from the created pipe with a given value.

 **Cap:** determines the cap at the start and end of the pipe

**None:** no cap is present

**Flat:** a flat cap is present and will cap the offset surface as well.

**Round:** rounds off the caps with a hemisphere.

**Note:** the round cap will not work if the offset surface is present.

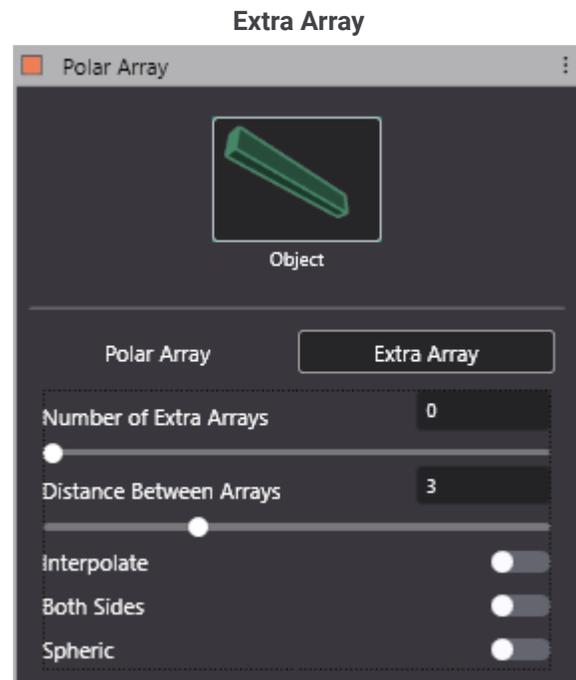
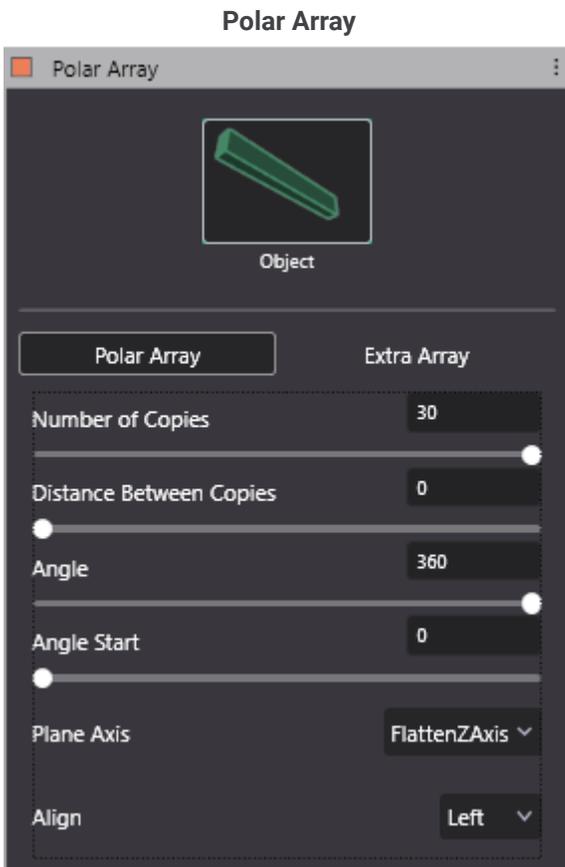


# POLAR ARRAY

Arrays objects in a circular formation around an axis

Command: `gvPolarArray`

 Transform Category



## Polar Array

-  **Number of Copies:** sets the number of copies around the polar array
-  **Distance Between Copies:** determines the distance between the objects
- Angle:** sets the angle where the polar array will stop.
-  **Angle Start:** sets the angle where the polar array will begin.
-  **Plane Axis**
  - FlattenZAxis:** sets z-axis is the center of the polar array.
  - FlattenYAxis:** sets y-axis is the center of the polar array.
  - FlattenXAxis:** sets x-axis is the center of the polar array.
-  **Align**
  - Left:** starts the polar array to be counterclockwise.
  - Middle:** starts the polar array at the center of the Angle and Angle Start.
  - Right:** starts the polar array to be clockwise.
-  **Justified:** starts the polar array at the start location and evenly spaces out the objects.

## Extra Array

-  **Number of Extra Arrays:** adds additional polar arrays along the Plane Axis.
-  **Distance Between Arrays:** sets the distance between the polar arrays.
-  **Interpolate:** staggers the extra polar arrays.
-  **Both Sides:** adds polar arrays to the top and bottom. Must maintain an even number of extra arrays in order to have the same amount of extra arrays in both directions.
-  **Spheric:** orients the polar arrays toward the world center (0,0,0)

**Note:** the object being polar arrayed will not be produced in the polar array depending on the alignment and angle start of the array.

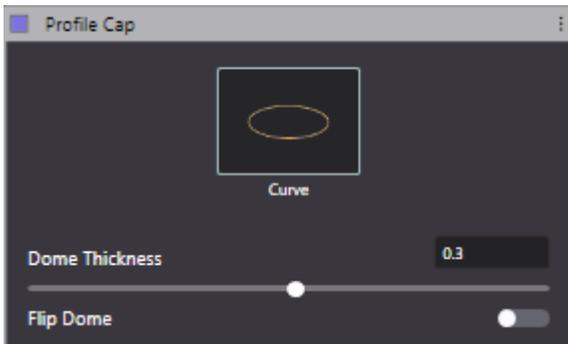


# PROFILE CAP

Creates a domed cap for a profile from [Profile Placer](#).

Command: *gvCommand*

 **Tools Category**



-  **Dome Thickness:** sets the length of the dome from the profile.
-  **Flip Dome:** changes the direction of the dome.



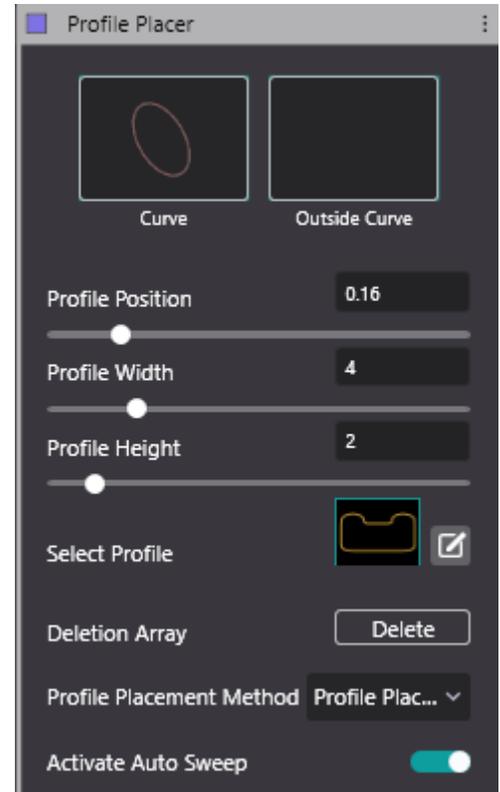
# PROFILE PLACER

Command: `gvProfilePlacer`

Sets a profile or a mirror of it on a curve. Used to create cross-section curves on rings.

Tools Category

- ☰ **Curve Input Box:** shows the selected curve where the base of the profile will rest.
- ☰ **Outside Curve Input Box:** shows the selected curve where the top of the profile will rest.
- ☞☰ **Profile Position:** sets the profile to a position from 0-100% based on the entire curve.
- ☞☰ **Profile Width:** sets the profile width, this is perpendicular to the curve.
- ☞☰ **Profile Height:** sets the profile height, this starts from the curve.
- ☞☰ **Select Profile:** selects the profile that is to be placed on the curve.
- ☞☰ **Profile Editor:** allows changes to the current profile to be made by changing control points
- ☰ **Profile Placement Method:** orients the profile to a given direction
  - Profile Placer To Center** - sets the base of the profile to the center of the curve.
  - Profile Placer To 0Y0** - sets the base of the profile to orient towards global center (0,0,0 or F4)
  - Profile Placer Up** - sets the profile top to face in the positive z-axis direction.
  - Profile placer In Rail Plane** - sets the profile to be perpendicular with the curve's orientation.
  - Profile Placer In Rail Plane Flat** - sets the profile to be parallel with the curve's orientation.
  - Profile Placer Down** - sets the profile top to face in the negative z-axis direction.
  - Profile Placer Out Y** - sets the profile top to face in the positive y-axis direction.
  - Profile Placer In Rail Plane Force Up** - sets the profile to face in the positive z-axis and sets the base to be on the curve.
  - Profile Placer Horizontal Curve Up** - sets the profile to have its width follow the length of the curve.
- Note:** when using an outside curve, there will be instances where these placement methods will not work.
- ☰ **Deletion Array:** deletes the selected profile.
- ☰ **Activate Auto Sweep:** previews the profiles in a closed sweep along the curve.



## Placing Multiple Profiles

- 1 Moving your mouse over the curve from the Curve Input Box, will allow you to preview where your profiles will be positioned.
- 2 Left-clicking on the curve will place your profile on the curve.
- 3 In order to make any changes on your curve, you will need to click on the sphere at the base of the curve in order to have the viewport control handles show up on the profile, then you can make adjustments. The gumball can still be used to move the profile away from the curve and the autosweep will adjust accordingly.
- 4 Press Enter when done with changes.

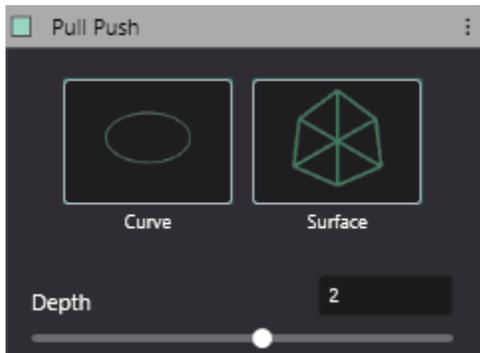


# PULL PUSH

Uses a closed planar curve to emboss or deboss a surface

Command: *gvPullPush*

 **Surface Category**



 **Depth:** sets the curve to emboss with a positive number and deboss with a negative number.

**Note:** the curve must be on the surface in order to begin the Pull Push.



# SWEEP 1

Creates a surface from a series of profiles and a ring rail

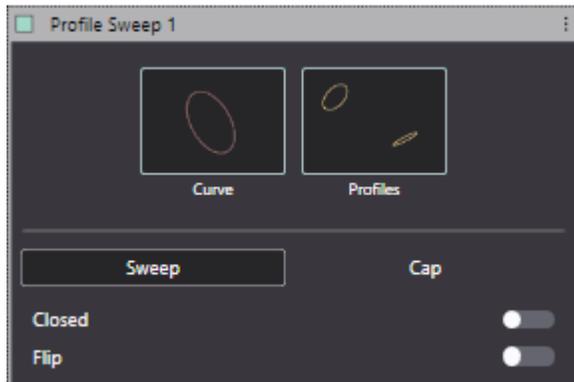
Command: `gvProfileSweep1`

■ Surface Category

☛ **Curve Input Box:** shows the curve that the profiles will sweep along.

☛ **Profiles:** shows the profiles being used for the sweep.

## Sweep

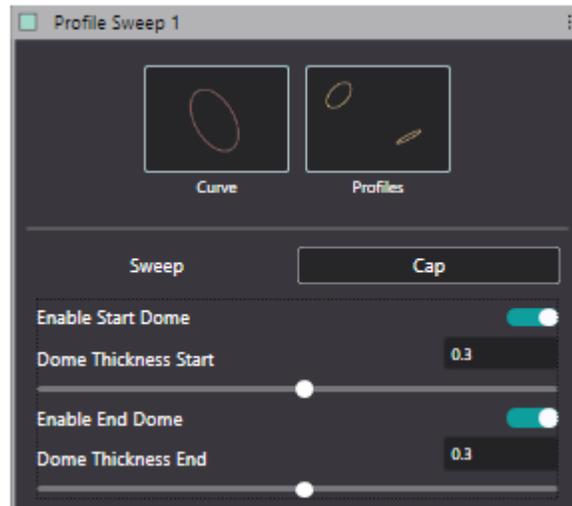


### ☛ Sweep

☛ **Closed:** toggles to have the sweep completely encompass the ring rail

☛ **Flip:** if the sweep is open, this allows you to change the start and stop of the sweep.

## Cap



### ☛ Cap

**Enable Start Dome:** toggle to turn on profile cap for the first profile selected.

☛ **Dome Thickness Start:** sets dome length for first profile cap.

**Enable End Dome:** toggle to turn on profile cap for the last profile selected.

☛ **Dome Thickness End:** sets dome length for last profile cap

☛ Can be adjusted with Viewport Control Handles

☛ Can be adjusted within the Dynamic Command Window



# SWEEP 2

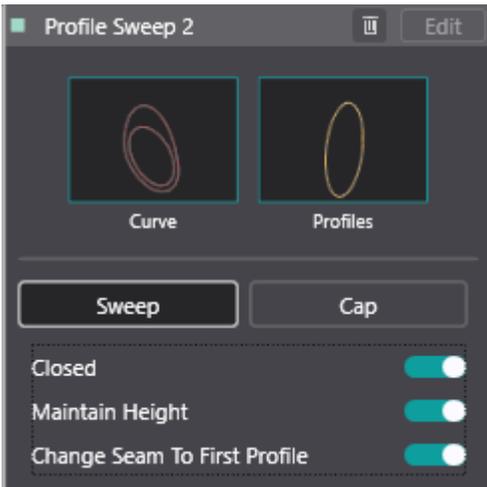
Command: *gvProfileSweep2*

Creates a surface from a series of profiles and two rail curves

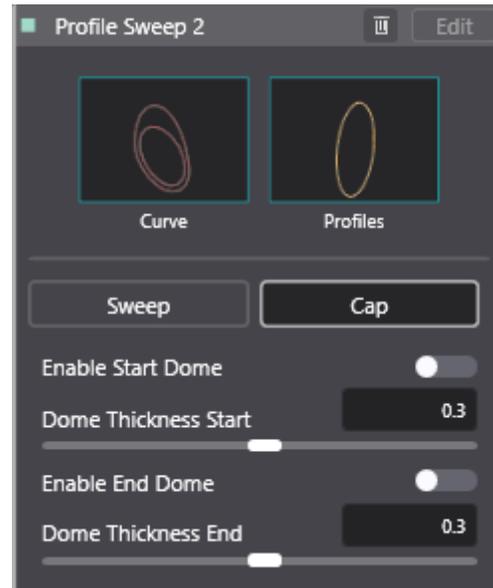
  Surface Category

- ☰ **Curve Input Box:** shows the curve that the profiles will sweep along.
- ☰ **Profiles:** shows the profiles being used for the sweep.

Sweep



Cap



## ☰ Sweep

- Closed:** toggle for the sweep to be completely around the rails
- Maintain Height:** toggle to keep evenness on among the profiles that are used for the sweep.
- Change Seam to First Profile:** if doing a closed sweep with two separate profiles, this will change where the sweep will meet up

## ☰ Cap

- ☰ **Enable Start Dome:** toggle to turn on profile cap for the first profile selected.
- ↗ ☰ **Dome Thickness Start:** sets dome length for first profile cap.
- ☰ **Enable End Dome:** toggle to turn on profile cap for the last profile selected.
- ↗ ☰ **Dome Thickness End:** sets dome length for last profile cap.

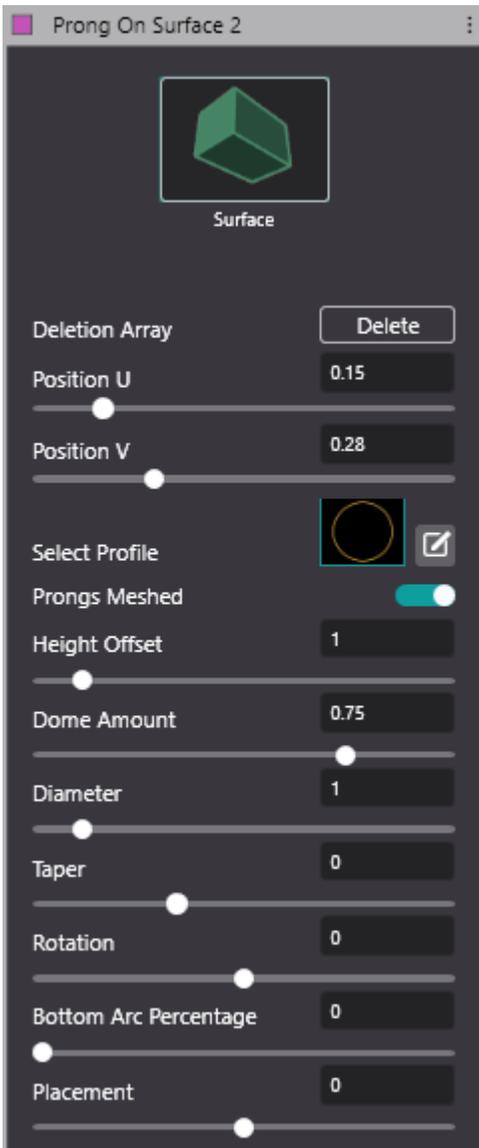


# PRONG ON SURFACE

Command: *gvProngOnSurface*

Places prongs of a given dimension on a surface

Settings Category



- Surface Input Box:** shows the surface that is being used to place prongs on.
- Delete Array:** deletes the selected prong.
- Position U:** adjusts the position of the reference prong in the U direction.
- Position V:** adjusts the position of the reference prong in the V direction.
- Select Profile:** selects the profile of the prongs.
- Prongs Meshed:** toggles prongs from meshes to NURBS.  
**Note:** turn this toggle off when you are ready to complete the command.
- Height Offset:** sets the total height of the prong.
- Dome Amount:** rounds off the tops of the prong.
- Diameter:** sets the diameter of the prong.
- Taper:** tapers the prong to have either a wider or thinner base.
- Rotation:** rotates the prong
- Bottom Arc Percentage:** rounds off the bottoms of the prong.
- Placement:** sets the base of the prong a distance in or out of the surface.

- 1 Start the command, and the command line will prompt you to select a surface, select a surface.
- 2 Once a surface is selected, there will be a reference prong at the beginning of the surface. Make any changes to the prongs that you plan on laying out on the surface.
- 3 Moving your mouse over the surface will display an outline of the prong that will be placed. Once you find where you want to place the prong, left-click on the surface to place the prong.
- 4 If there are any unwanted prongs, click on the white ball at the base, and click Delete in the builder to remove it.
- 5 You can also go back and make any changes to previously placed prongs by left- clicking on the white ball, and move on ny pressing Enter or placing another prong.

Can be adjusted with Viewport Control Handles

Can be adjusted within the Dynamic Command Window



# PRONG PLACER

Set prongs on a group of gems in an array

Command: `gvProngPlacer`

Settings Category

☰ **Gem Input Box:** shows the gems that are being used.

## Main

☰ **Setting Style:** sets the as a prongs from the profile, creates bar prongs, or automatically detects the gem and creates the prongs.

**Note:** setting the prongs to Auto will best select the prong style based on the gems.

☰ **Prong Base:** sets the prongs' base to the largest gem or to the culet of all gems in the group.

☰ **Toggle Prong Percent:** sets the percent of the prongs that are removed from the base.

↗ ☰ **Select Profile:** selects the profile used for the top of the prongs.

☰ **Prong Layout:** sets how the prongs are positioned on the gems.

**Prong Layout 1** - creates shared prongs between the gems

**Prong Layout 2** - creates a singular shard prong between gems.

**Prong Layout 3** - creates a pair of prongs that holds the stone in place with not shared prongs.

**Prong Layout 4** - creates four prongs for each gem.

**Prong Layout 5** - creates a staggered formation for the prongs leading from the bottom of gems to the top.

**Prong Layout 6** - creates a staggered formation in the opposite direction of Prong Layout 5.

☰ **Prongs Meshed:** toggles the prongs to be created as meshes or NURBS

**Note:** toggle the prongs to NURBS before doing any Booleans.

↗ ☰ **Height Offset:** sets the height of the prongs beyond the table of the gems.

↗ ☰ **Dome Amount:** sets the dome of the prongs, a higher value creates a more domed look.

↗ ☰ **Taper:** sets the bottom radius for the prongs to taper toward.

☰ **Bottom Arc Percentage:** rounds out the bottom of the prongs.

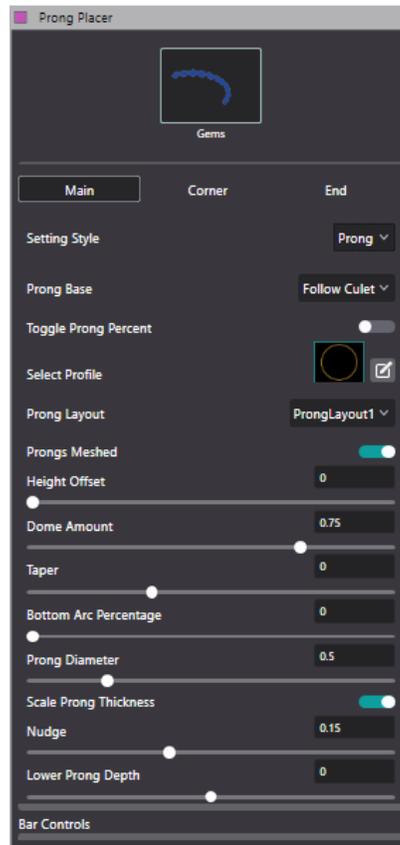
↗ ☰ **Prong Diameter:** sets the diameter of the prongs in millimeters.

## Scale Prong Thickness:

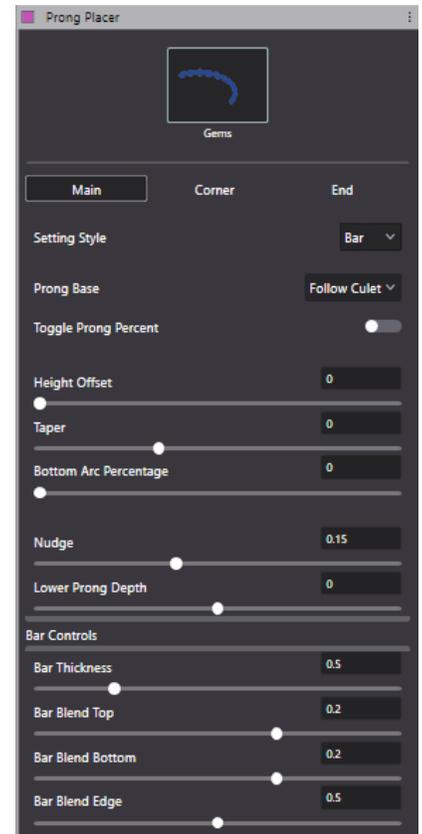
↗ ☰ **Nudge:** determines the distance from the prongs to the center of the gems.

↗ ☰ **Lower Prong Depth:** sets the end point of where the base of the prongs.

## Main (Prong Setting)



## Main (Bar Setting)



If the Setting Style is set to Bars the following controls will show and override some prong controls.

↗ ☰ **Bar Thickness:** determines the overall thickness of the bar prongs.

↗ ☰ **Bar Blend Top:** rounds out the tops of the bar prongs.

↗ ☰ **Bar Blend Bottom:** rounds out the bottoms of the bar prongs.

↗ ☰ **Bar Blend Edge:** rounds out the edges of the bar prongs.

*(continued, next page)*

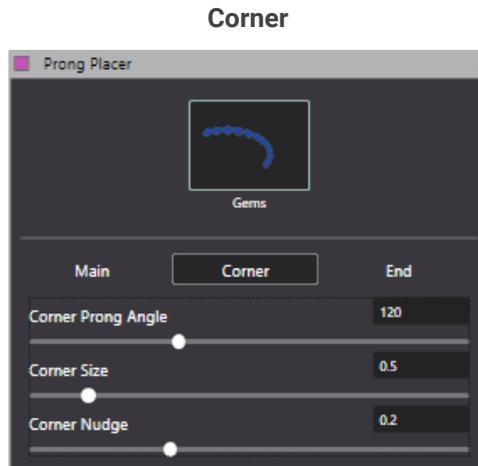


# PRONG PLACER *(continued)*

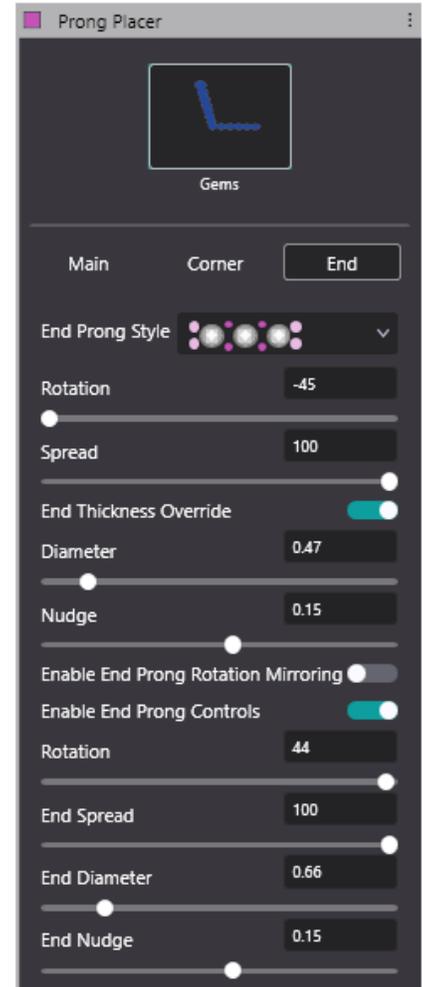
## Corner

These adjustments will only affect prongs that are in any corner from other gems that have a prong.

- ↔ **Corner Prong Angle:** sets how many prongs there are based on the angle of the curve.
- ↔ **Corner Size:** determines the size of the corner prong.
- ↔ **Corner Nudge:** sets how close the prong will be to the corner gem.



## End



## End

- ↔ **End Prong Style:** sets the position of the end prongs Rotation: turns the prongs around the center of the end gem.
- ↔ **Spread:** sets the angle between the end prongs.  
**Note:** this will only work with prongs that have two large End Prong Styles. These are indicated by large pink prongs.
- ↔ **End Thickness Override:** when toggled on allows you to make changes to the end prong size.
- ↔ **Nudge:** moves the prongs closer to the gems.
- ↔ **Enable End Prong Rotation Mirroring:** toggles end prong mirroring to be a mirror or a duplicate.
- ↔ **Enable End Prong Controls:** when toggled on this turns on more controls for the prong where the end gem is.

**Rotation:** turns the prongs around the end gem.

**End Spread:** sets the angle between the end prongs.

**End Diameter:** sets the diameter of the end prongs.

**End Nudge:** moves the end prongs closer to the end gem.

↗ Can be adjusted with Viewport Control Handles

↔ Can be adjusted within the Dynamic Command Window

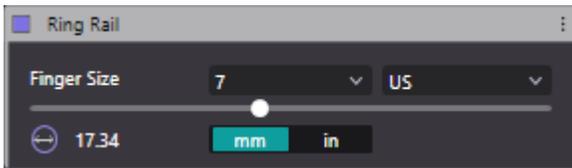


# RING RAIL

Sets a ring rail at the center

Command: *gvRingRail*

 **Tools Category**



1 The first drop down menu changes the current finger size.

2 The second drop down menu changes the region.

Current regions and measurements are:

- US (United States)
- UK (United Kingdom)
- CH (China)
- DE (German) | EU (Europe) | FI (Finland)
- FR (France)
- HK (Hong Kong)
- JP (Japan)
- PT (Portugal)
- TW (Taiwan)
- Diameter millimeters
- Diameter inches
- Circumference millimeters
- Circumference inches

The slider can also be used to make any changes to finger size.



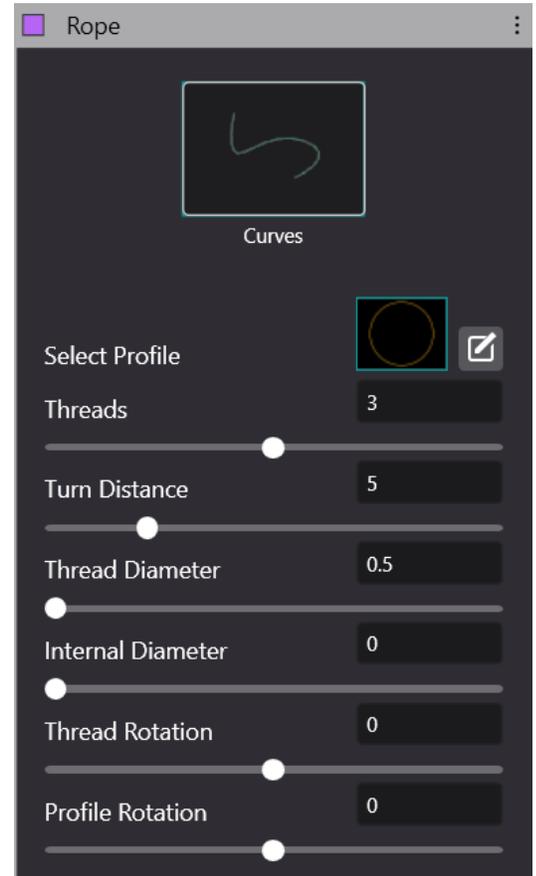
# ROPE

Creates a twisted rope with a profile

Command: *gvRope*

Solid Category

- Curve Input Box:** shows the curve that is at the center of the rope.
- Select Profile:** sets the profile for the ropes
- Profile Editor:** allows you to change the control points of the profile.
- Threads:** sets the amount of threads within the rope.
- Turn Distance:** sets the distance of the amplitude of the threads.
- Thread Diameter:** sets the profile width of the threads.
- Thread Rotation:** sets the orientation of the threads of the rope and how they are positioned.
- Internal Diameter:** sets the spacing of the profiles and the threads of the rope.
- Profile Rotation:** sets the orientation of the profiles in the rope.



Can be adjusted with Viewport Control Handles

Can be adjusted within the Dynamic Command Window

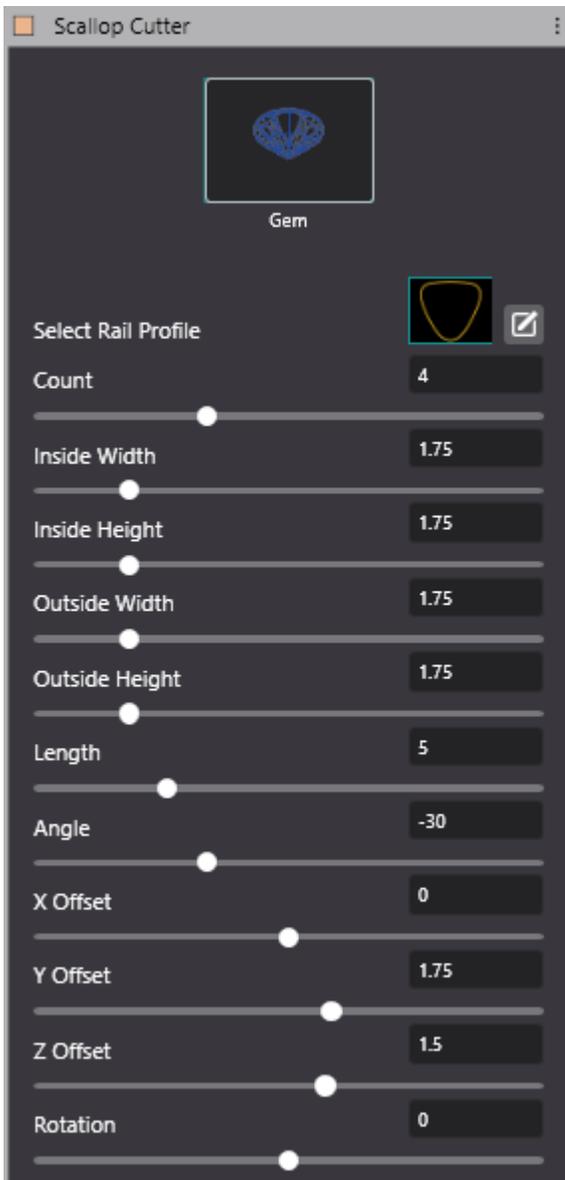


# SCALLOP CUTTER

Creates geometry to allow you to cut into a bezel to make a scalloped bezel

Command: `gvScallopCutter`

Cutters Category



- **Gem Input Box:** shows the gem that is being used.
- **Select Rail Profile**
- **Count:** sets the number of cutters for the scallop cutter.
- **Inside Width:** sets the inside width of the cutter, this is the side of the cutter that is closest to the gem.
- **Inside Height:** sets the inside height of the cutter, this is the side of the cutter that is closest to the gem.
- **Outside Width:** sets the outside width of the cutter, this is the side of the cutter that is farthest to the gem.
- **Outside Height:** sets the outside height of the cutter, this is the side of the cutter that is farthest to the gem.
- **Length:** sets the length of the cutter.
- **Angle:** determines how deep or shallow you want the cutter to be positioned relative to the stone.
- **X Offset:** sets an offset in the x-axis that places the cutter to another point.  
This value follows the girdle of the gem.
- **Y Offset:** sets an offset in the y-axis that places the cutter to another point. This value follows the girdle of the gem.
- **Z Offset:** sets an offset in the z-axis that places the cutter to another point.  
This value follows the culet and the table of the gem.
- **Rotation:** allows you to turn the cutters relative to the gem, this will follow the girdle of the gem.

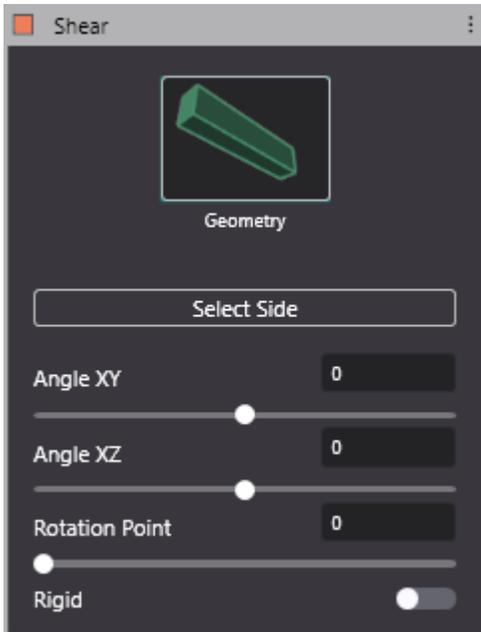


# SHEAR

Skews objects in two planes by moving one side of the objects

Command: *gvShear*

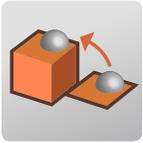
 Transform Category



-  **Geometry Input Box:** show the objects being sheared.
-  **Select Side:** allows you to select the side that is being moved to produce the shear.
-  **Angle XY:** repositions the selected side in the XY plane.
-  **Angle XZ:** repositions the selected side in the XZ plane.
-  **Rotation Point:** sets the point that the two previous angle points are referencing.
-  **Rigid:** toggles to have the objects deform.

 Can be adjusted with Viewport Control Handles

 Can be adjusted within the Dynamic Command Window

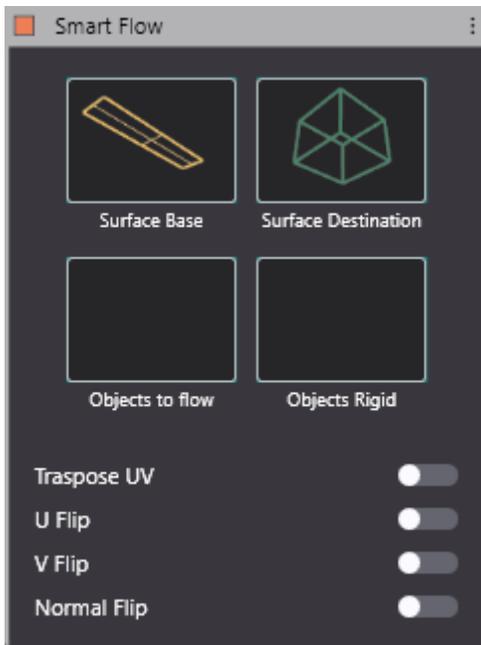


# SMART FLOW

Command: *gvSmartFlow*

Uses a base planar surface and flows the objects onto the target surface

**Transform Category**



- ☞ **Surface Base Input Box:** shows the base surface created from Auto Base.
- ☞ **Surface Destination Input Box:** shows the surface that is being smart flowed upon.
- ☞ **Objects to flow:** shows the objects being flowed, this will deform objects around corners.
- ☞ **Objects Rigid:** shows objects being flowed on with no changes made to them.
- ☞ **Transpose UV:** flips the U and V directions.
- ☞ **U Flip:** flips the U direction of the destination surface.
- ☞ **V Flip:** flips the V direction of the destination surface.
- ☞ **Normal Flip:** flips the normals of the destination surface.



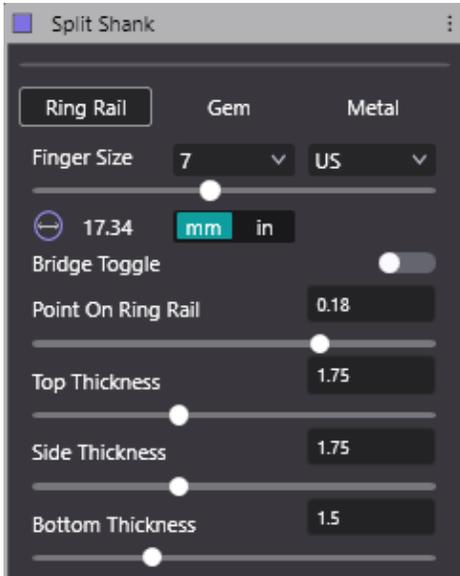
# SPLIT SHANK

Creates a split shank with gems in a channel

Command: *gvSplitShank*

Tools Category

## Ring Rail



### Ring Rail

Creates half of the split shank and mirrors it over the x-axis. This uses the [Cathedral Ring Rail controls](#), and you can make adjustments with the gumball at the top to adjust your Ring Rail.

## Gem



### Gem

**Gem Selection:** sets the gem size that follows along the shank.

**Mirror:** toggles to mirror the split shank over the y-axis.

**Gem Split Start:** sets the point where the gems start at the from the split.

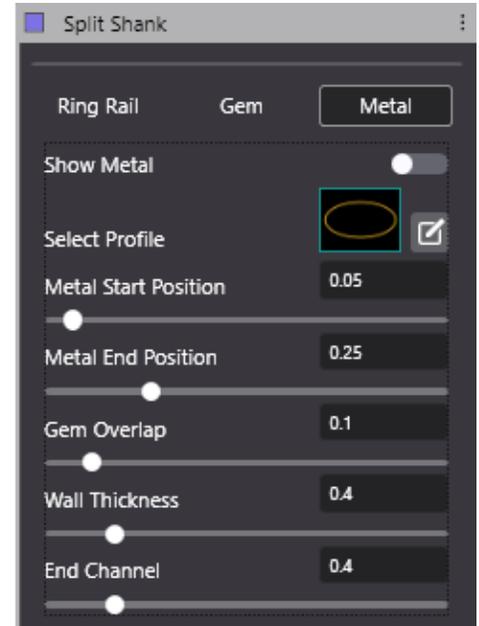
**Gem Channel End:** sets the end point of the gems at that bottom of the shank.

**Z Offset:** determines the distance the gems are from the outside ring rail.

**Gem Spacing:** determines the overall spacing of the gems.

**Gem Spacing at Split:** determines the spacing of the gems from the blend point to the Gem Split Start.

## Metal



### Metal

**Show Metal Toggle:** toggles to show or hide the metal.

**Select Profile:** selects the profile used to sweep to produce the metal.

**Metal Start Position:** determines the start position of the metal.

**Metal End Position:** determines the end position of the metal.

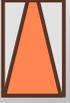
**Gem Overlap:** sets the distance of the metal overlapping the girdles of the gems.

**Wall Thickness:** sets the thickness of the walls from the end of Gem Overlap.

**End Channel:** sets the length of the channels that are created at the ends of the gems.

Can be adjusted with Viewport Control Handles

Can be adjusted within the Dynamic Command Window



# TAPER

Tapers objects to a selected side

Command: *gvTaper*

 Transform Category



-  **Geometry Input Box:** shows the object being tapered.
-  **Select Side:** allows you to select the side to produce the taper.
-  **Length:** this sets the offset distance inside of the selected side and tapers the object toward that side.
-  **Enable Second Length:** toggles a second length for the taper.
-  **Second Length:** sets the offset distance of the side perpendicular to the first length.
-  **Initial Point:** sets the initial point of the taper.
-  **Final Point:** sets the final point of the taper.
-  **Infinite Axis:** toggles a smooth or straight taper to the selected side.
-  **Preserve Structure:** keeps the objects as close to the original and does not rebuild the objects.
-  **Rigid:** toggles to not have the objects deform.

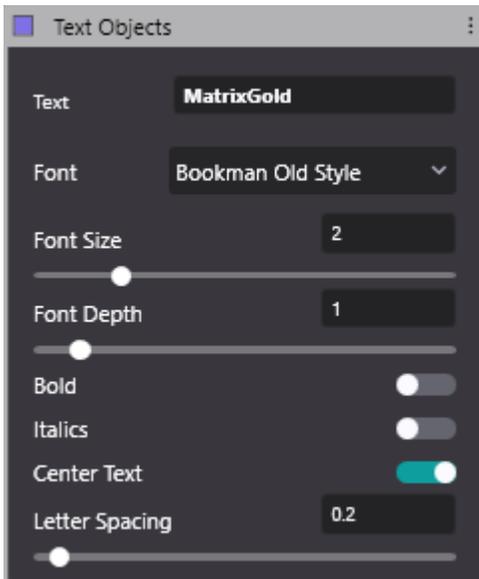


# TEXT OBJECTS

Creates solid text

Command: `gvTextObjects`

 **Tools Category**



-  **Text:** shows the words that are being typed.
-  **Font:** shows you all available fonts in the builder.
-  **Font Size:** determines the font size in millimeters.
-  **Font Depth:** sets how long the extrusion is.
-  **Bold:** toggle on to make the font bold.
-  **Italics:** toggle on to make the font italic.
-  **Center Text:** toggles on to set the center of the Text Objects to be in the center of the document.
-  **Letter Spacing:** sets the spacing between the letters in millimeters.

 Can be adjusted with Viewport Control Handles

 Can be adjusted within the Dynamic Command Window

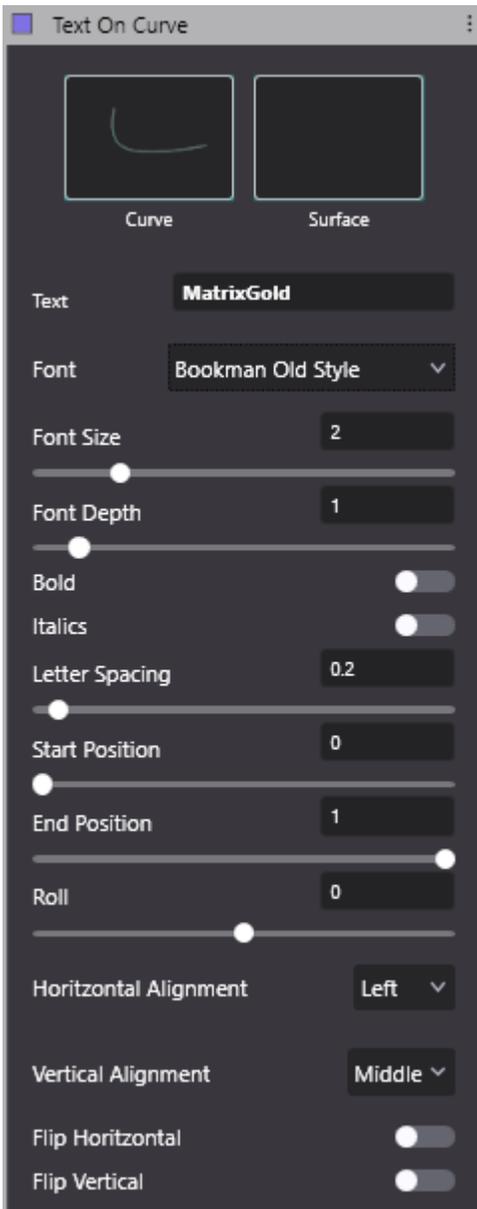


# TEXT ON CURVE

Creates extruded text and sets it to flow along a curve

Command: `gvTextOnCurve`

Tools Category



- Curve Input Box:** shows the curve that has the solid text being flowed onto.
- Surface Input Box:** orients the base of the solids to the surface.
- Text:** shows the words that are being typed.
- Font:** shows you all available fonts in the builder.
- Font Size:** determines the font size in millimeters.
- Font Depth:** sets how long the extrusion is.
- Bold:** toggle on to make the font bold.
- Italics:** toggle on to make the font italic.
- Letter Spacing:** sets the spacing between the letters in millimeters.
- Start Position:** sets where the text begins on the curve.
- End Position:** sets where the text begins on the curve.
- Roll:** rolls the text along the curve to angle it.
- Horizontal Alignment**
  - Left:** leans all of the letters to the Start Position.
  - Middle:** sets all of the letters to be at the middle of the Start and End Position.
  - Right:** leans all of the letters to the End Position.
  - Justified:** evenly spaces the letters starting with the Start Position and the End Position.
- Vertical Alignment**
  - Middle:** sets the middle of the letters to line up with the curve.
  - Top:** sets the bottom of the letters to line up with the top of the curve.
  - Bottom:** sets the tops of the letters to line up with the bottom of the curve.

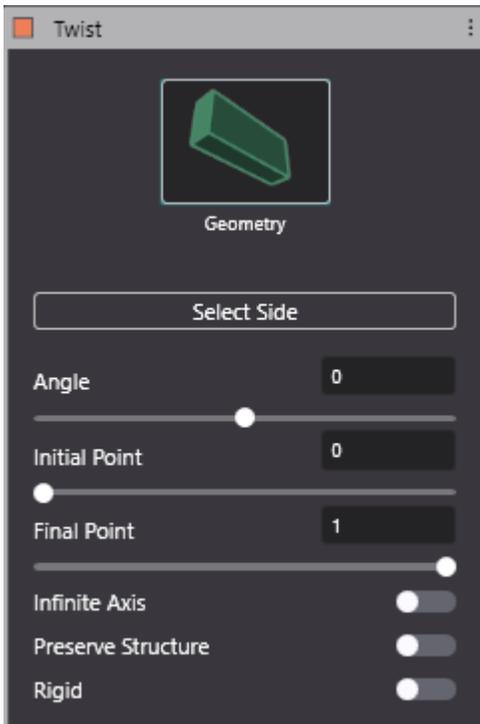


# TWIST

Creates twists in objects using a side that rotates

Command: *gvTwist*

 **Transform Category**



-  **Geometry Input Box:** shows the objects being twisted.
-  **Select Side:** allows you to select the side that is being moved to produce the shear.
-   **Angle:** rotates the objects in a specified angle to make the twists.
-   **Initial Point:** sets the start of the twist.
-   **Final Point:** sets the end of the twist.
-  **Infinite Axis:** smooths the twist at the initial and final point.
-  **Preserve Structure:** keeps the objects as close to the original and does not rebuild the objects.
-  **Rigid:** toggles to not have the objects deform

 Can be adjusted with Viewport Control Handles

 Can be adjusted within the Dynamic Command Window

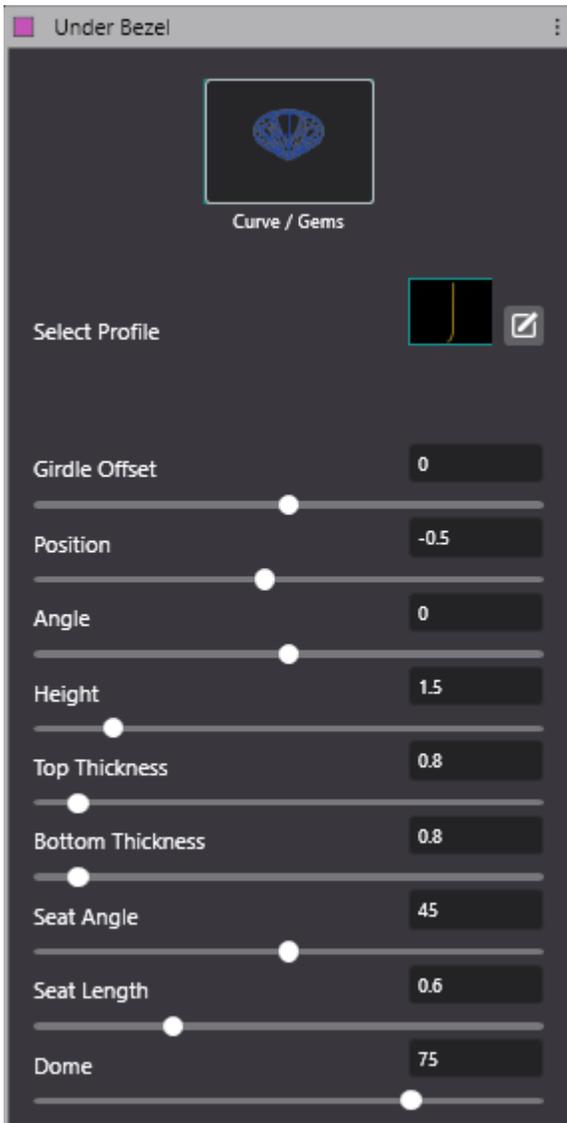


# UNDER BEZEL

Creates an under bezel on a gem

Command: `gvUnderBezel`

Settings Category



- Gem/Curve Input Box:** shows the gem or curve that is being used to build the bezel.
- Curve Input:** when a curve is in the input box, there are more options that will show.
  - Flip Curve:** allows you to change the orientation of the under bezel.
  - Rebuild Curve Toggle:** allows you to rebuild the curve.
  - Rebuild Count:** allows you to set the amount of control points for the curve. The more there are the smoother the under bezel will be.
- Select Profile:** selects the profile that is on the outside of the bezel.
- Girdle Offset:** sets the distance of the bezel and the gem.
- Position:** sets the distance of the bezel relative to the girdle of the gem.
- Angle:** sets the angle of the profile of the bezel.
- Height:** sets the total height of the gem.
- Top Thickness:** sets the distance of the seat height to the profile of the bezel.
- Bottom Thickness:** sets the distance of the bottom profile of the bezel to the inside of the bottom of the bezel.
- Seat Angle:** sets the angle inside of the bezel and where it will be holding the gem.
- Seat Height:** sets the initial point of the seat angle.
- Seat Length:** pulls down the seat toward the cult of the gem.
- Dome:** sets the roundedness of the top of the bezel.

# USEFUL HOTKEYS

Below is a list of useful shortcuts that can be used to smooth out your work flow:

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**F4:** global center, it is the same as typing in 0,0,0

**F5:** allows you to edit an object that currently has Parametric History. F6: opens the Context Menu.

**F7:** toggles grid lines.

**Ctrl+F1:** mirrors over the y-axis. Ctrl+F2: mirrors over the x-axis.

**Ctrl+A:** Select all objects in the drawing.

**Ctrl+C:** Copy all objects currently selected to a clipboard.

**Ctrl+V:** Pastes all objects that were recently placed in the clipboard

**Ctrl+X:** Cut all objects currently selected to a clipboard. Ctrl+Y: Redo

**Ctrl+Z:** Undo

# TERMS TO KNOW

Glossary of common CAD terms and some terms unique to MatrixGold

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A **Term 1**  
Definition for Term 1.

B **Term 2**  
Definition for Term 2.

C **Term 3**  
Definition for Term 3.