RhinoGold®

Training Guide – Level 1

September 2009

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Forum
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On this section, there are the most frequent questions from the users. We recommend you to visit this section.
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Notes:

Lesson 1 – Getting Started

Notes:

Getting Started

After installing RhinoGold, the next icon will appear on the Desktop:

Clicking on the icon, the RhinoGold Welcome:

It offers two possibilities: Start as a Rhino User or as a RhinoGold User.

There are no technical differences between both. Each mode fits to a User Profile.

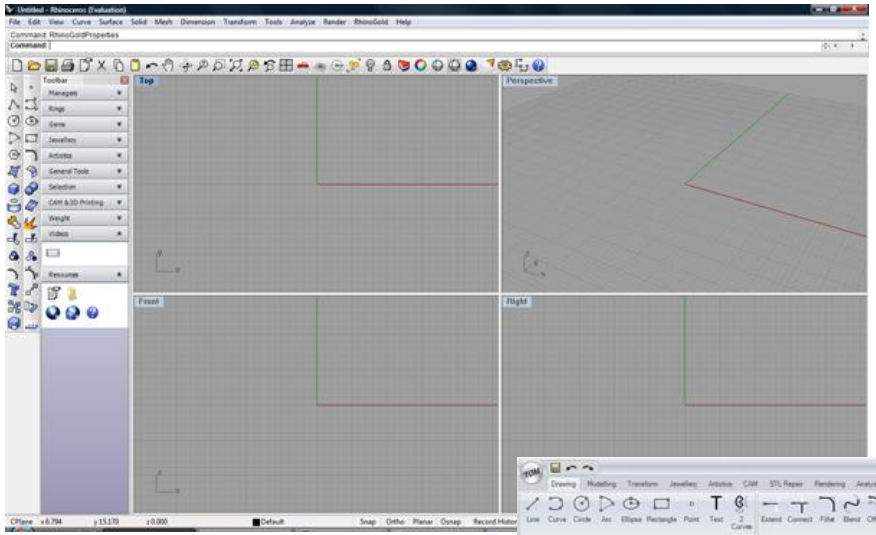
If you currently use Rhinoceros, it will be much easier to learn RhinoGold in Rhinoceros Mode. However, if you don't use Rhinoceros, RhinoGold Mode it's a specific interface designed by the jewelry world, reordering Rhino Tools and adding new ones.

It allows that the learning curve is smoother, allowing the new users to learn faster and agile. Middle and Expert Users reduce their designing time and get higher quality.

Notes:

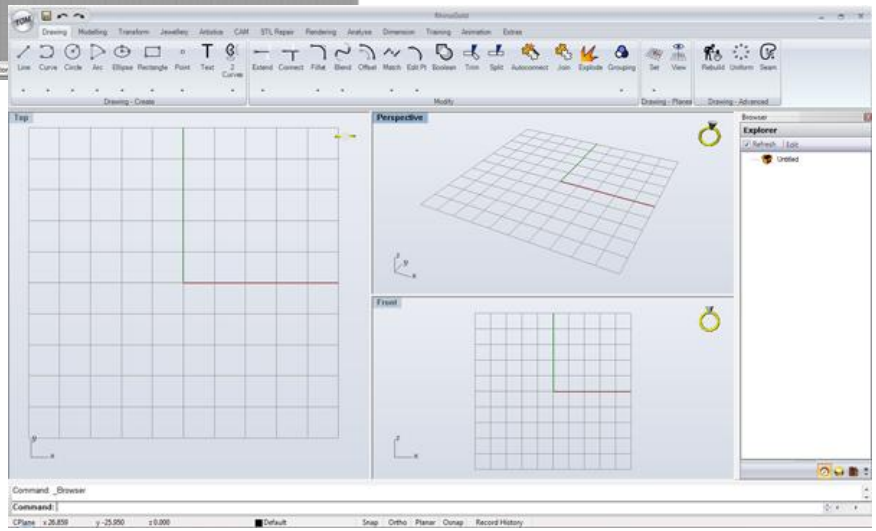
Starting as a Rhino User

Clicking on Start as a Rhino User, Rhinoceros will be opened and RhinoGold will appear as a Plug-in. As you will see, it's the same than Rhinoceros, adding a menu, and a Toolbar, with the different tools in.



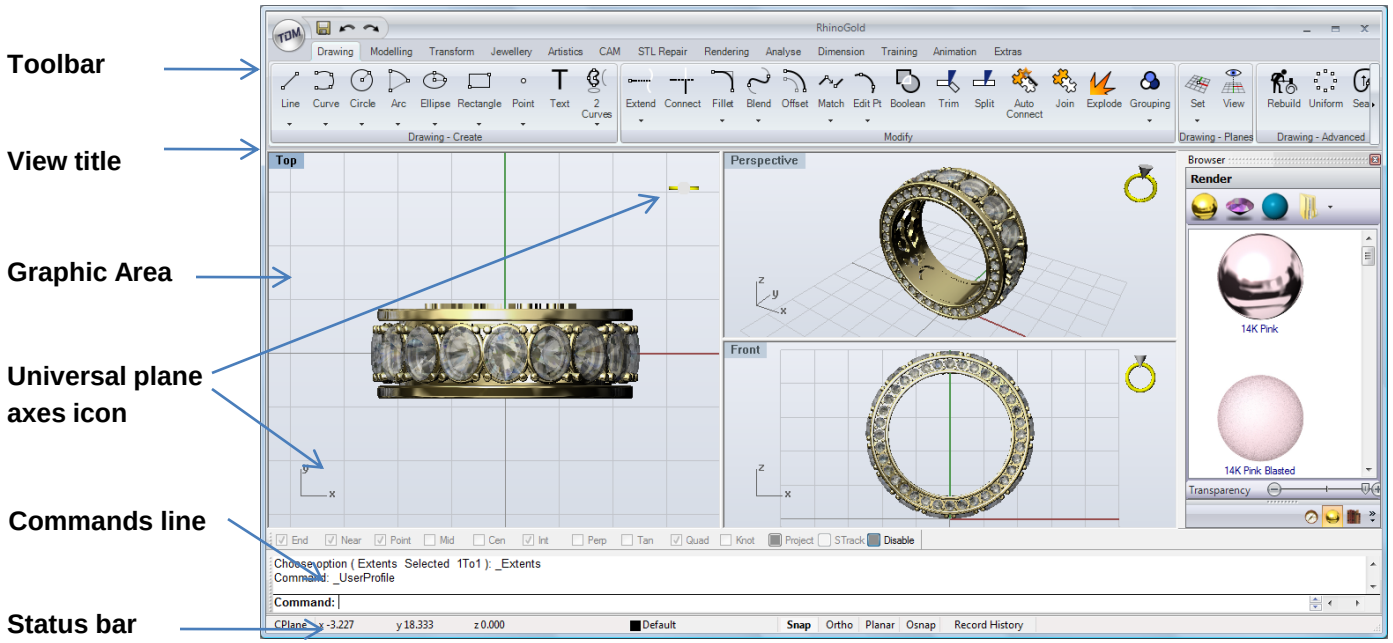
Starting as a RhinoGold User

Clicking on Start as a RhinoGold User, RhinoGold mode will be opened.



Notes:

RhinoGold interface



Most of the RhinoGold commands can be found in the menus.

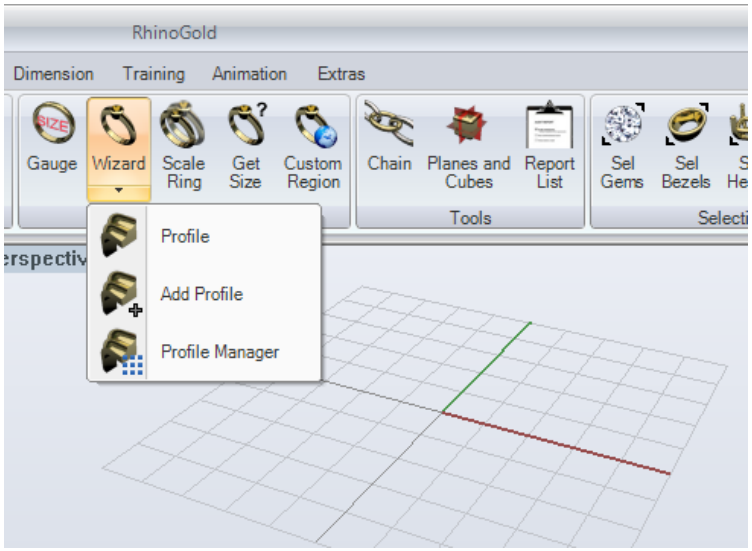
Start up RhinoGold in the standard toolbar attached to the top part of the graphic area. More icons can be included in the menus, as when RhinoGold is started up, if you go to the TDM icon in the User profile option you can then change the different **user profiles** and see more or fewer icons, depending on the RhinoGold user experience.

Notes:

Optional buttons

A button on the toolbar can include other buttons with commands in a toolbar with optional buttons. As a rule the optional toolbars contain changes in the basic command. After selecting a button on the optional toolbar, the toolbar disappears.

The buttons on the optional toolbars have a small black triangle at the bottom of them.
To open the optional toolbar, left click with the mouse on the small black triangle.



Example of an optional toolbar. After opening the optional toolbar, select any of the buttons on the toolbar to execute a command

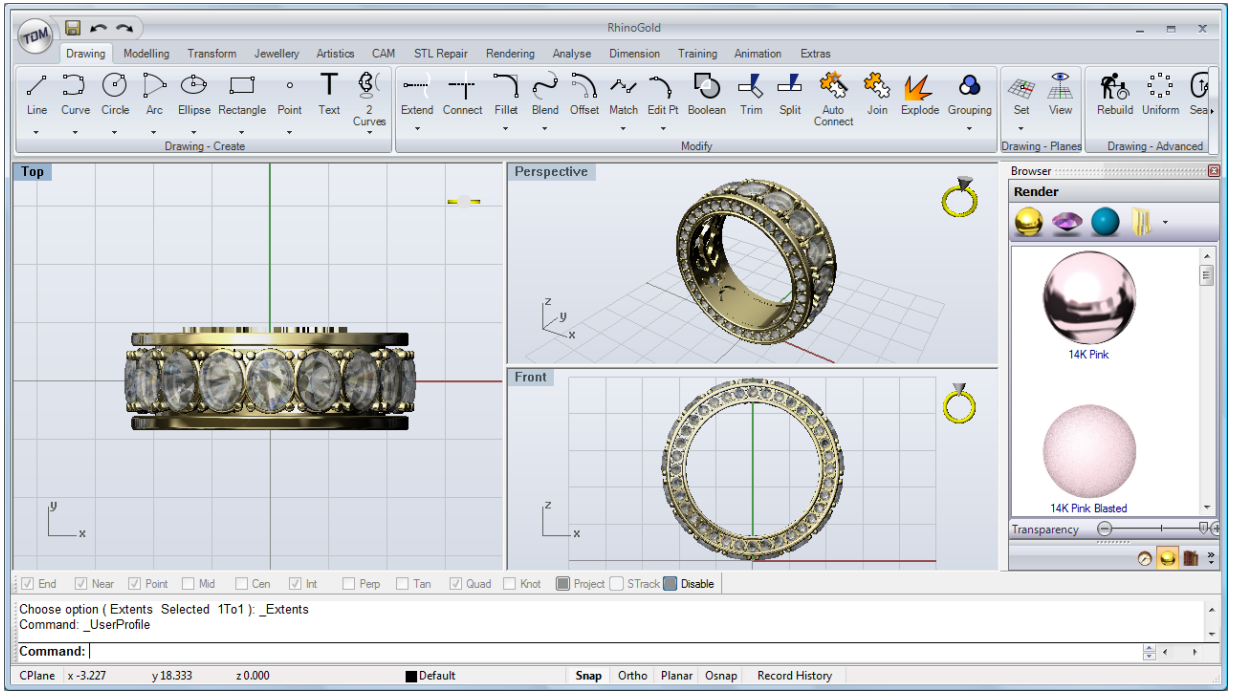
Graphic area

The RhinoGold graphic area can be customized to adapt it to your preferences.
The layout of the views can be configured in different ways.

Notes:

Views

The views are windows in the RhinoGold graphic area that show different views of the model. The size of the view can be moved or changed by dragging the bar of the title or the edges. It is also possible to create new views, change the names of the views and use predefined configurations. Each view has its own construction drawing on which the cursor moves, and a planning mode.



By default, there are three views, but we can change to four views doing a click.

Notes:

Enter commands

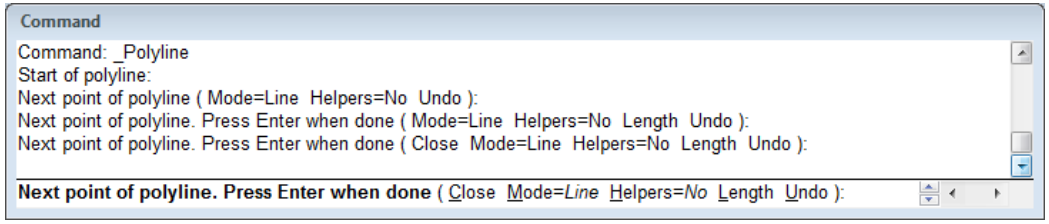
Use the commands line to enter commands, options, coordinates, distances, angles, radii, abbreviated keyboard methods and to see the command requests.

To enter the data in the command line, press Enter, the space bar or right click with the mouse on a view.
Note: The Enter key and the space bar exercise the same function in RhinoGold.

The abbreviated methods are combinations of customizable keys. You can program the function keys and key combinations with Ctrl for executing RhinoGold commands.

One-click options

To use the commands options, click on the commands lines or enter the underlined letter of the option and press Enter. (The block capitals inside are not important).



Repeat commands

To repeat the last command, right click on a view or press Enter or the space bar. To repeat previous commands, right click on the commands line window and select the commands from the list.

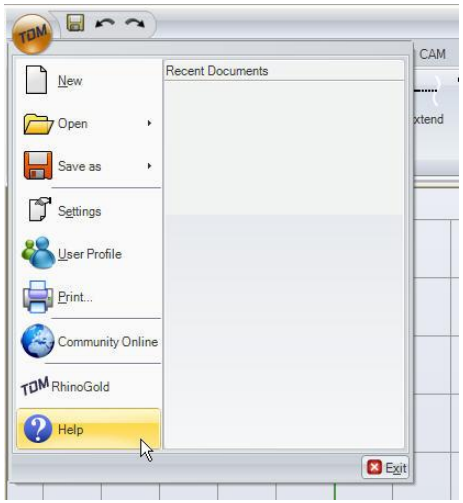
Cancel commands

To cancel a command press Esc or enter a new command using a button or menu.

Notes:

Self-completion of command names

Write the first letters of the command to activate the self-completion commands. When enough letters of the command have been entered for it to be the only one, the command name will be completed in the commands line. Press Enter to activate the command when the full command name appears. When entering the command names, the list of self-completed commands will appear. As you write the letters, the list will be reduced to the possible commands. Left click on the command in the list to execute it.



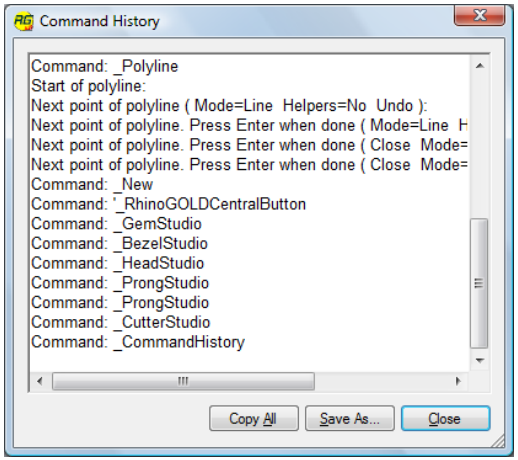
Help

To execute the RhinoGold help function, go at any time to the **TDM** icon and execute the help function. It will open up and display the RhinoGold commands. You can also access the Rhino help for consulting information about a specific command just by pressing the command and then pressing **F1**.

Notes:

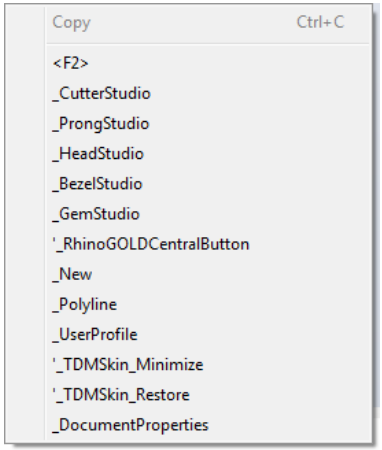
View the commands line history

The commands line history shows the last 500 lines of the commands in the current RhinoGold sessions.
Press **F2** to see the commands line history.



View recent commands

Right click on the commands line to see the most recent commands. To repeat the command, select it in the pop-up menu. The number of commands listed is defined in the RhinoGold Options. The predefined limit is 20 commands. From command 21 the first disappears from the list.



Notes:

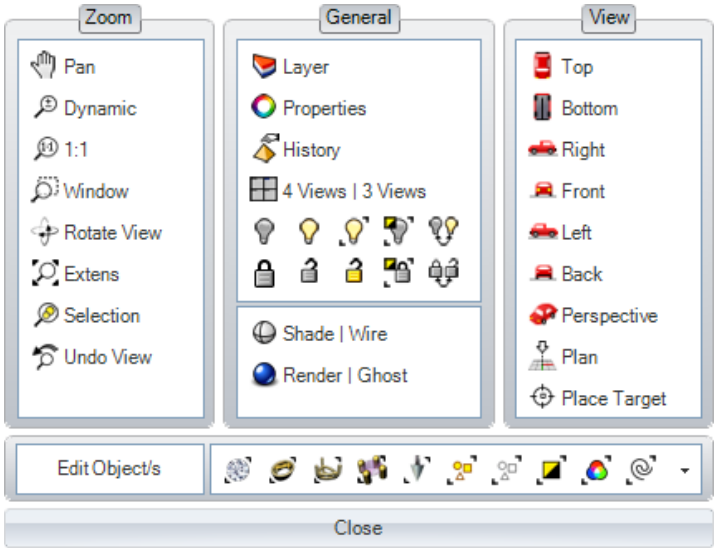
Central button options

Click on the central button and a functions window will pop up, divided up into 4 blocks. **Zoom, General, View, Edit and Selection tools.**

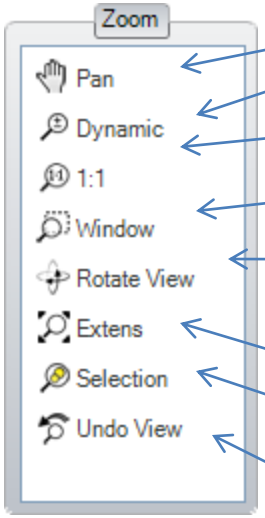
In the Zoom menu you will find tools such as Pan, the dynamic zoom, window zoom, rotate view zoom, selection zoom and the tools for performing the zoom function on the model, and options for moving around in the model.

In the General Menu you will find tools such as layers for the layer management functions, properties of the objects selected, the past record for dividing the environment up into more views, hiding and showing objects, the tools for shading the elements and rendering them and selection tools for selecting the objects you are interested in using the buttons.

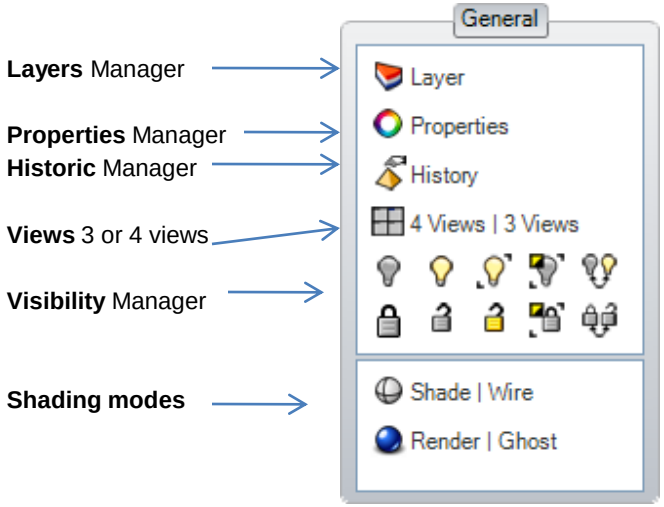
In the View Menu you will find all the tools you need for changing the views, if necessary.



Notes:



Pan: Drag with the mouse.
Dynamic Zoom: This zoom is activated with the mouse wheel.
1:1 zoom This generates a zoom that automatically activates it to the real scale.
Window zoom: you can perform the zoom through a window.
Rotate view: This dynamically rotates the views, and has the same function as the right hand button of the mouse.
Extension zoom: This activates a zoom that will zoom all the objects drawn on the plane.
Selection zoom: this creates a zoom through a selection of elements.
Undo view



Layers Manager

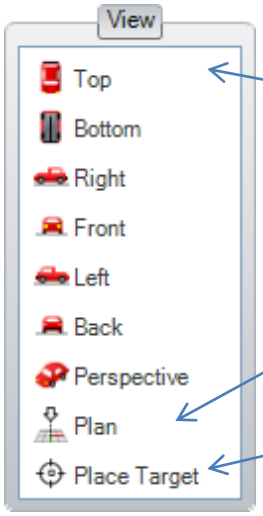
Properties Manager
Historic Manager

Views 3 or 4 views

Visibility Manager

Shading modes

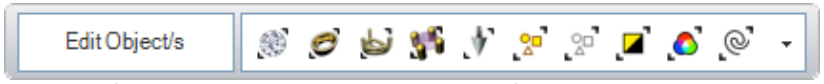
Notes:



View Manager

Plan: Sets the active view aligned to the negative z-direction of construction plane at 0,0, and sets the viewport projection to parallel.

Define the camera target



Edit Object button

Selection tools

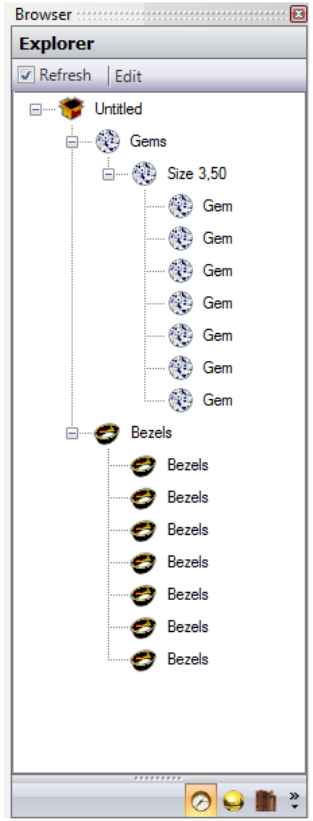
Notes:

Browser: Explorer

The main function is to show all the parametrical and editable objects of our document. As keep creating, automatically objects will be added.
All objects are group by type, and for gems, also in dimensions. The main function is to select objects and edit them.

Important Points

1. We cannot select objects of different types to edit at the same time. However, you can select objects of the same type as much as you want to.
2. The predominant object is the Gem. It means that when we create a Bezel, Head, prongs, cutters,...they all know in which gem they belong in.



Exist the option to freeze this connection and for a while, elements won't be updated. For that, deactivate the Refresh option. Immediately after activating, connection will be working again.

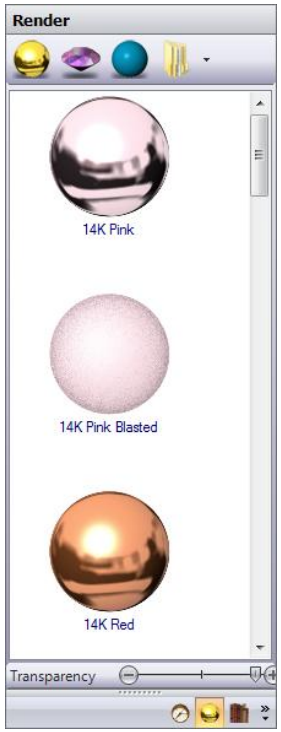
All properties belong to objects, it allows us to create Components Library, and use it in several designs without losing properties. In other words, if we like a Bezel, is not necessary to be saved with some types of gems and different sizes. Just with one, we can edit the gem in the future, keeping dimensions, angles, thickness,...

You can EDIT!!

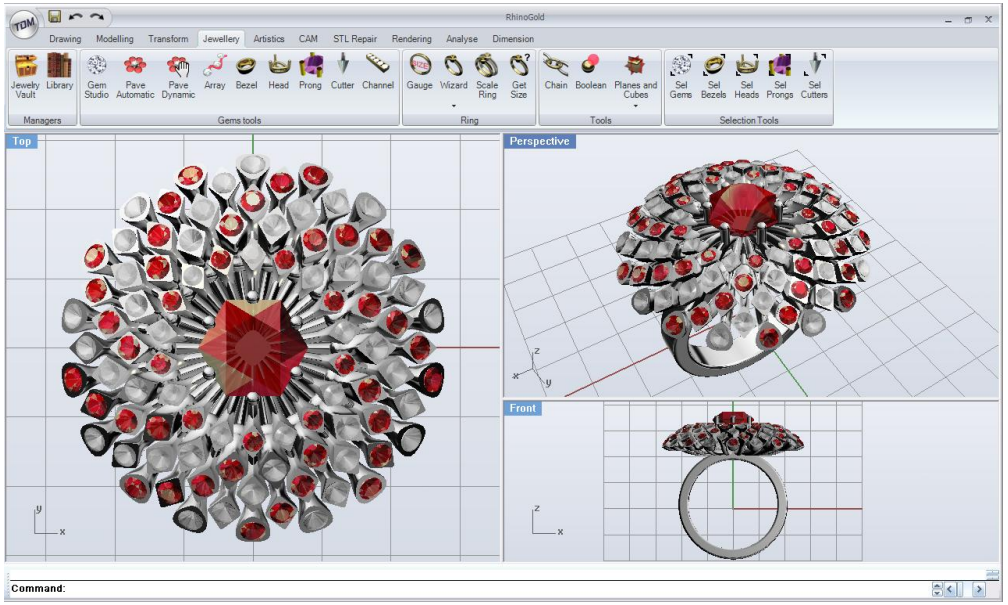
Notes:

Browser: Real time Render

Includes a library of materials library, divided in: Metals, gems and enamel. Also includes the possibility to create our own materials easily. Easy to use, simply select the objects and click on the material to apply on. Immediately it appears. Materials as well as the scene are saved automatically on our file, and it allows exporting images to standard formats as JPG, BMP, TIFF, … as well as capturing those images to paste them on any Windows application like Microsoft Word, PowerPoint,…or directly to your email software.

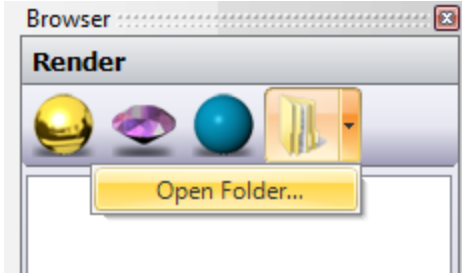


Gold Sphere Icon shows the Real Time Render

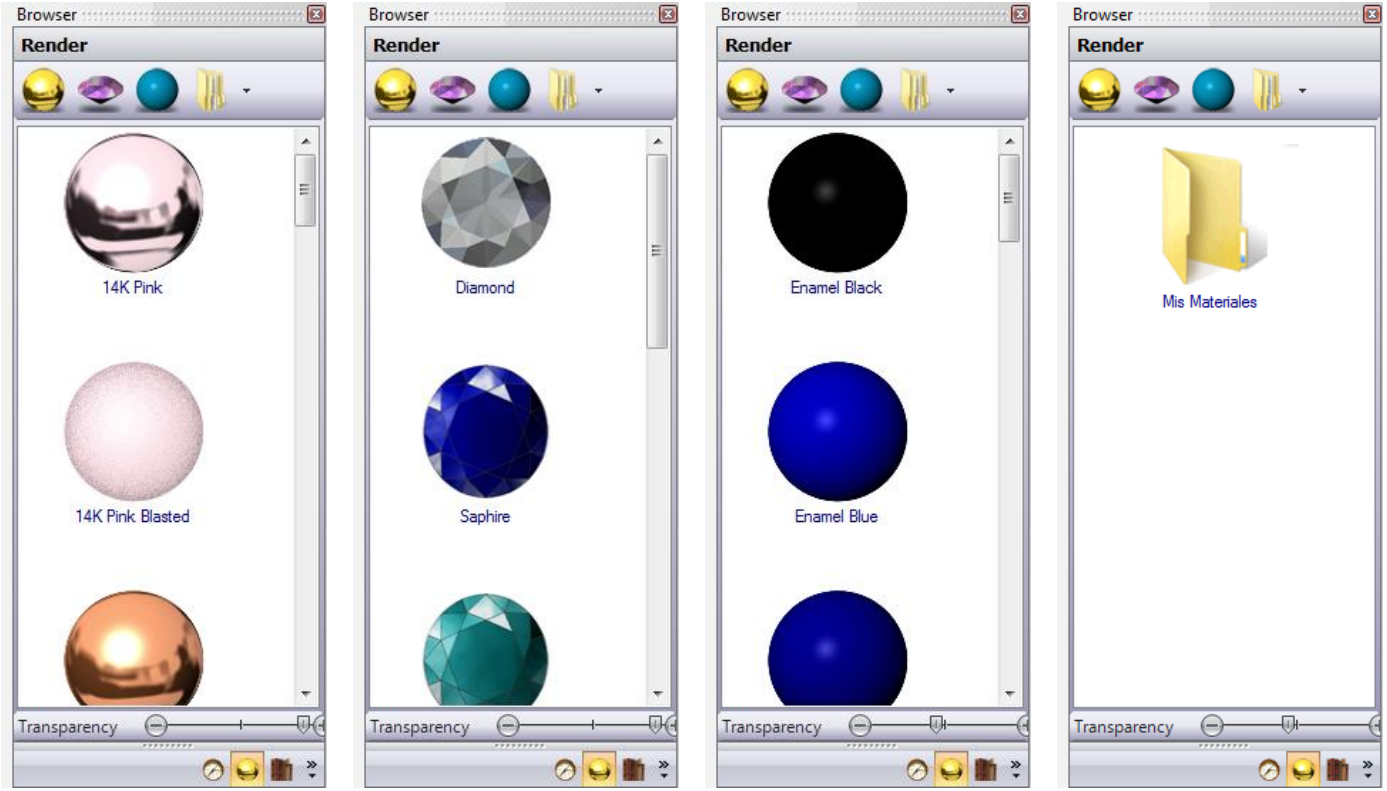


How can I add my own materials?

1. Click on the scroll down menu:
2. Create a new folder, and right click: Create folder (it's from Windows)
3. Copy your own images / pictures in this folder in JPG. format. If the materials are not shown on the list, click on Folder icon to refresh the material list.

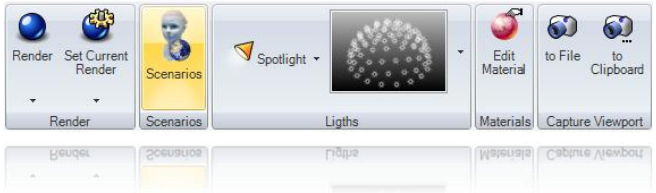


Notes:



To apply the materials, select the object or objects and click on the material. By default, the material has no transparency, but we can define it using the transparency slider.

In **Rendering tab**, we can add scenarios for rendering. In capture **View Port**, we can create an image file or copy of Clipboard.



Notes:

Browser: Library

Library allows us to manage our models easily. The user may create his own libraries of components, to may reuse in future designs.

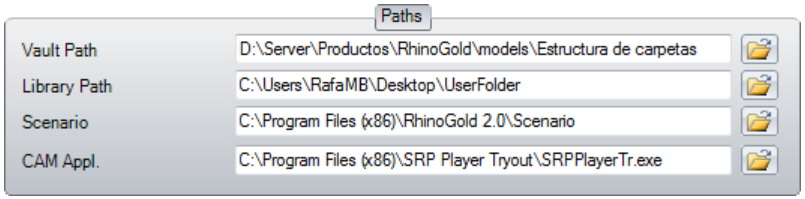
Is faster and more agile to navigate from the lateral window. It allows us to move folder to folder of our Library, and insert our models in just one click.

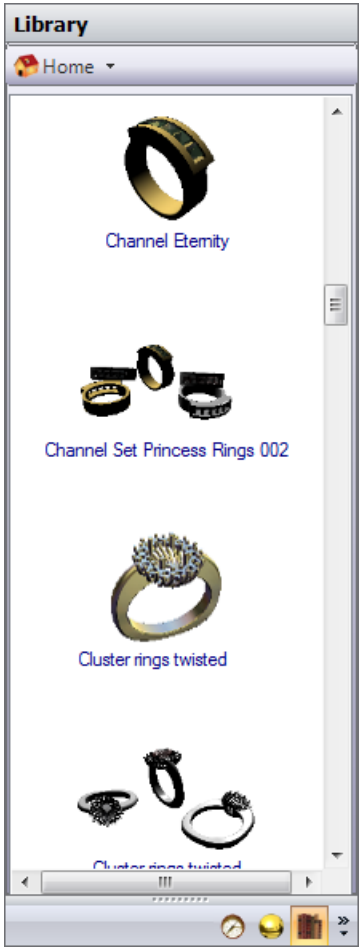
Important

Objects are added to the Browser automatically and they are editable. Don't keep thousand of file, just edit it! You can EDIT them.

How define my library folder?

It is really easy, just go to User profile or RhinoGold Properties, click on the Folder icon (Library Path) and select the folder where you have the files.





The third icon shows the **Library**.

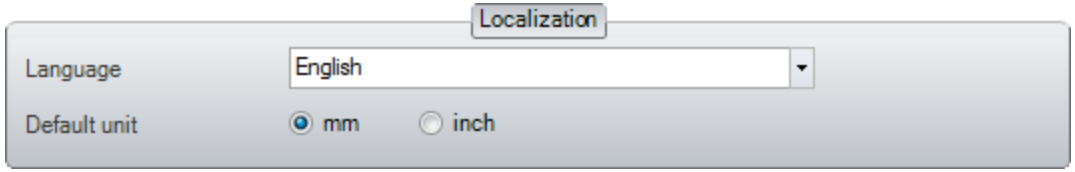
Notes:

User Profile

It allows us to define several parameters to adapt RhinoGold functionalities to our needs or experiences.

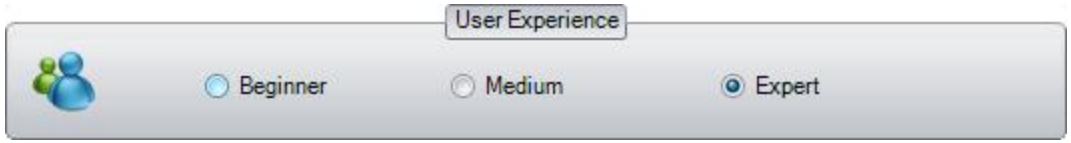
Localization

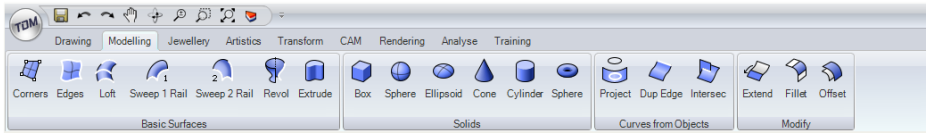
We may Define the language and the units (mm or inch)



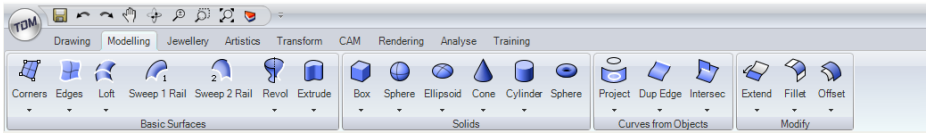
User's experience

Define your experience on the 3D modeling software use. It shows more or less functionalities. The aim is that beginners users do not have all the tools, only the basic ones, making the learning time easier.

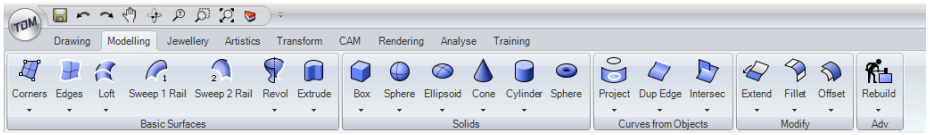




Beginners



Medium

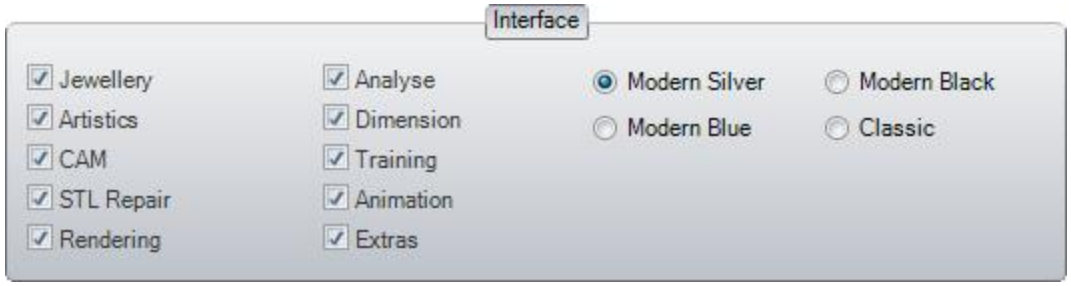


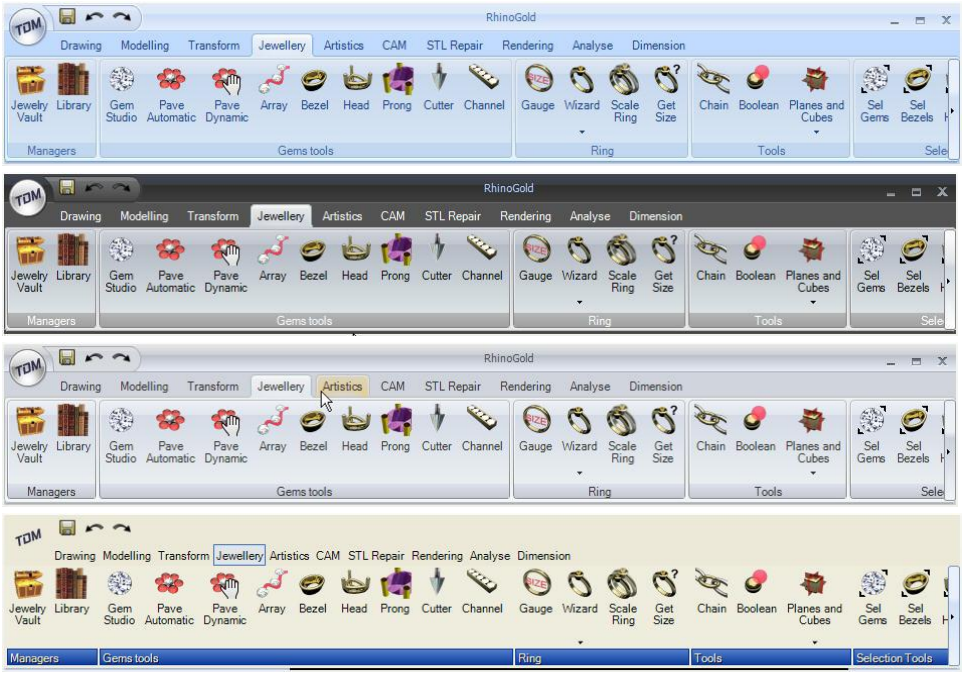
Experts

Notes:

Interface

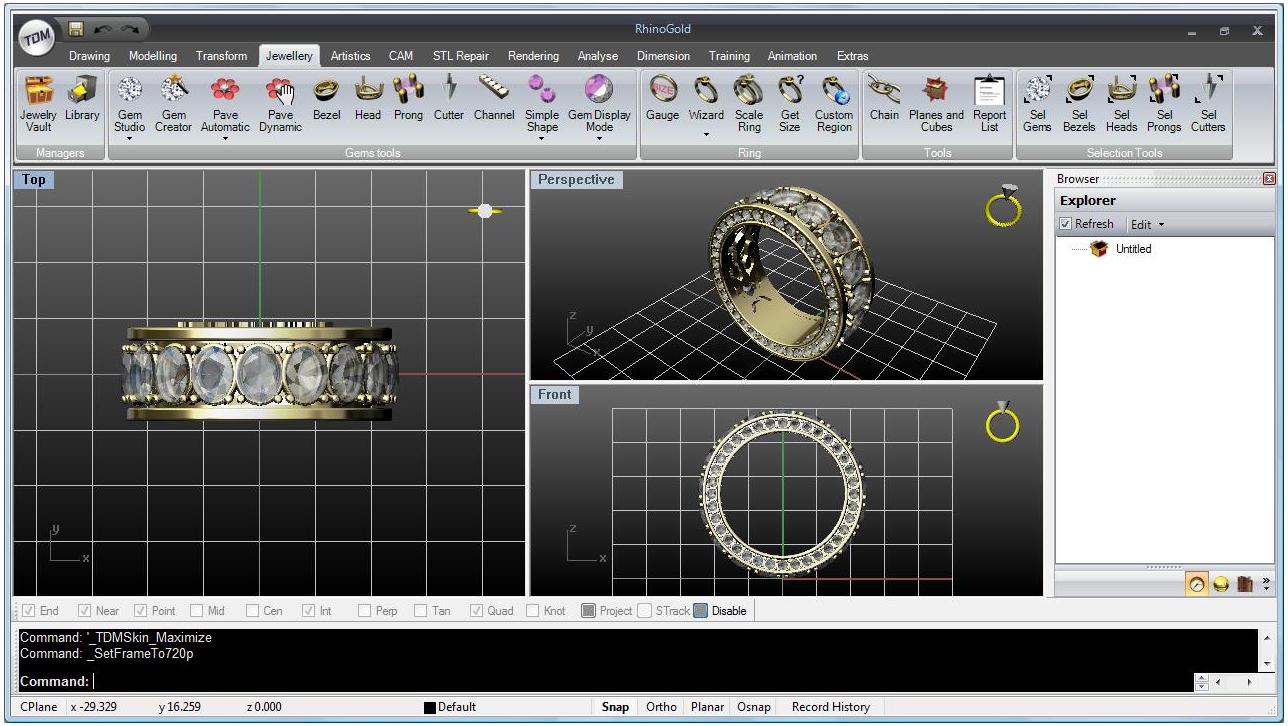
We may hide and show the Tabs. For example, if we have a CNC milling solution, we can hide the STL Repair Tab. Modern Silver, Modern Black, Modern Blue, and Classis, allow changing the colors.





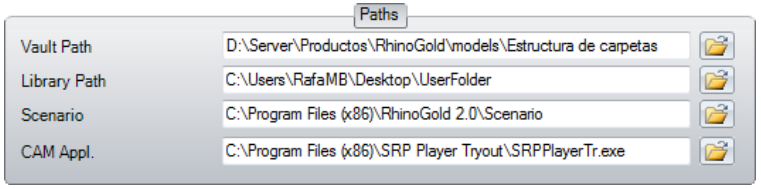
Notes:

Interface in Black



Directories

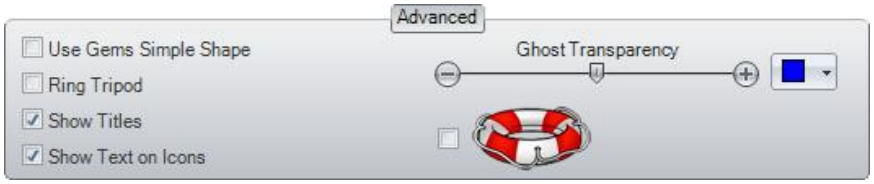
Allows us to define work directories, as well as the preferred CAM application.



Notes:

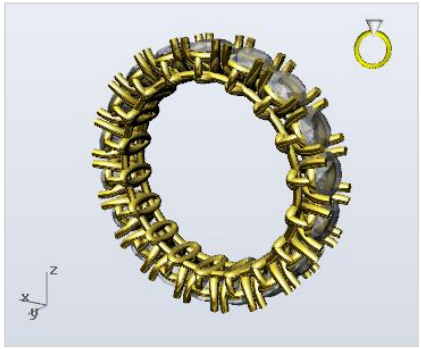
Advanced

Allows us to define the advanced parameters.



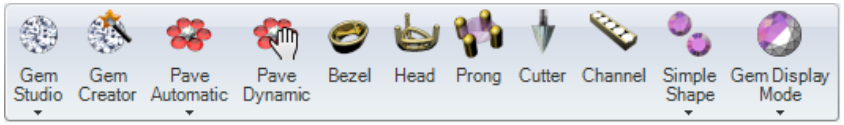
Use gems in simple form: By default, create gems in simple form.

Ghost Transparency: Allow to define the color and the transparency. It is used in commands as Bezel Studio, Cutter Studio, Head Studio…



Ring Orientation: It shows or hides the ring orientation.

Showing titles: shows or hides the titles:



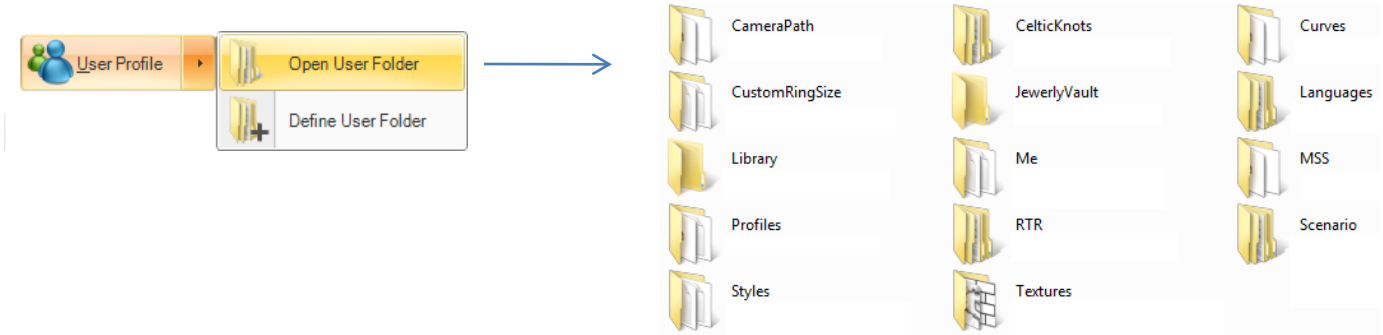
Showing Text in Icons: shows or hides texts in icons.

Float: allows creating automatic copies of our work.

Notes:

User Folder

The user folder is a folder where you save the RhinoGold files customized by the user and customized region, Render Materials, Templates, Libraries curves, ... You can open this folder, inside TDM menu -> User Profile -> Open User Folder or from the RhinoGold menu in Rhino mode.



Where is my User folder?

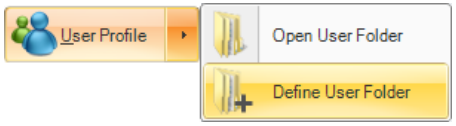
By default, this folder is created in the folder of Roaming user:
C:/Users/Username/AppData/Roaming/TDMSolutions/RhinoGold/2.0

Why is in the Roaming folder by default?

This is the Roaming User Profiles, either with or without Active Directory on domains. It allows users to have their own settings whichever computer they log onto. Just leave it, even if you are using a single

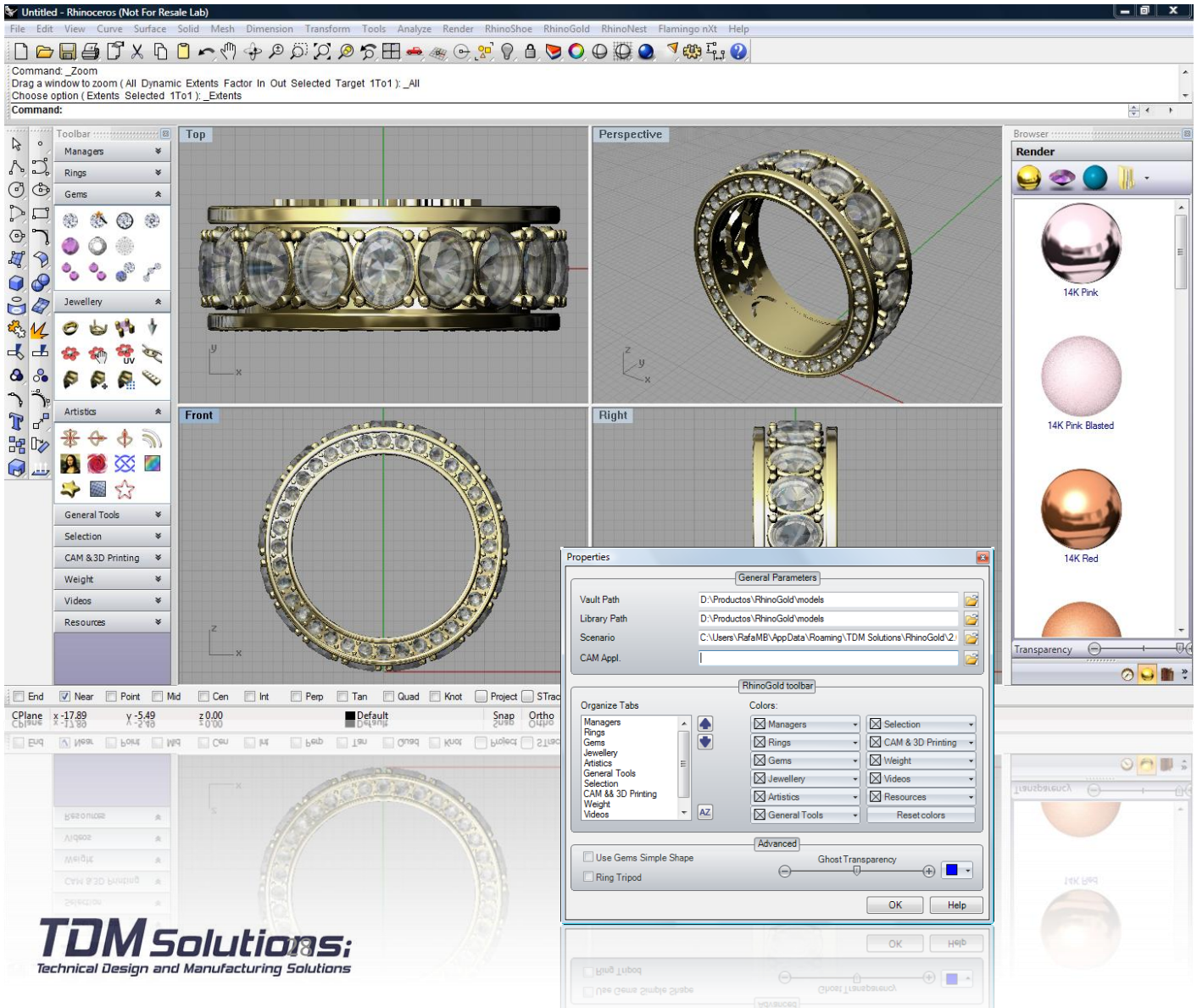
How to create the folder in another location?

Click on Define User Folder and choose or create the new folder. It is not necessary for the user to create the folder because it is done by RhinoGold. In Rhino mode, you can execute the command RhinoGoldDefineUserFolder.



Notes:

Rhinoceros Interface

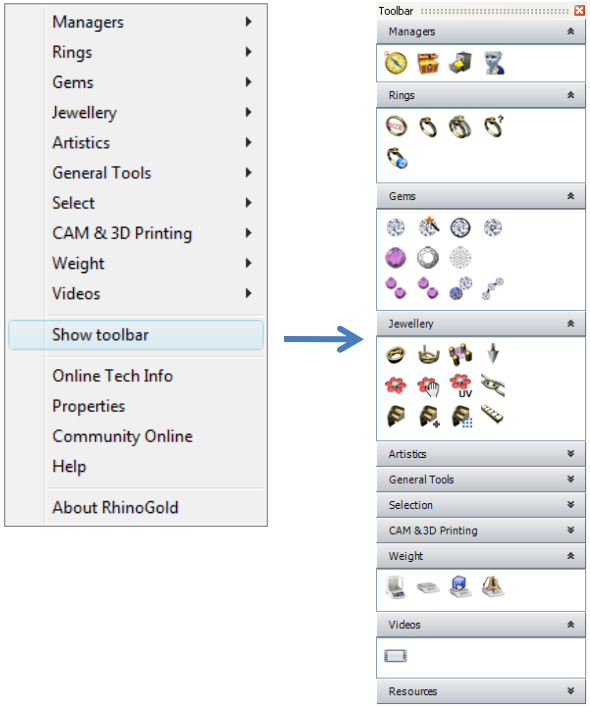


Notes:

Rhinoceros Interface

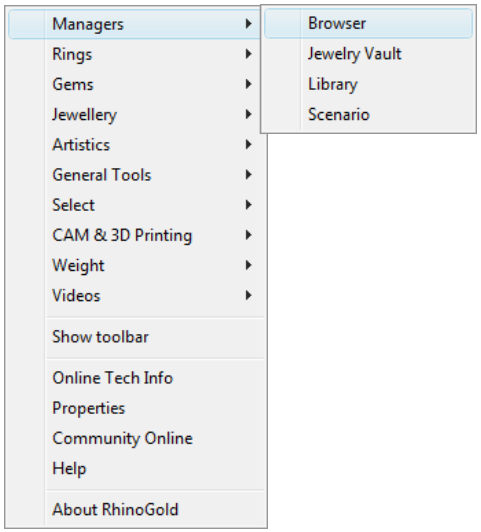
How I can show the RhinoGold toolbar?

Click Show toolbar item on the RhinoGold menu.



How I can show the Browser?

Click Browser item inside Managers menu or from the RhinoGold toolbar.



Are compatible the files create in RhinoGold mode in Rhino?

It absolutely does! In both directions, RhinoGold works with 3DM format as Rhino, and also is possible copy-paste models from both applications.

Notes:

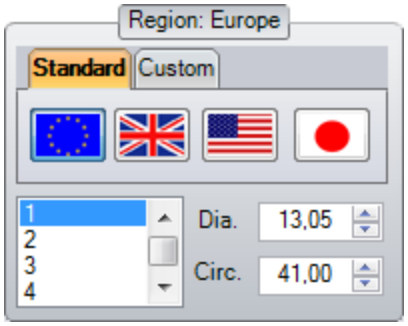
Lesson 2 – Ring Design

Notes:

Ring Wizard – Getting Started

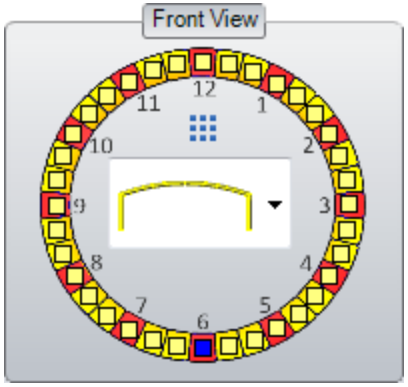
This command it's a wizard to create rings. It's easy for new users, and really useful for expert users.

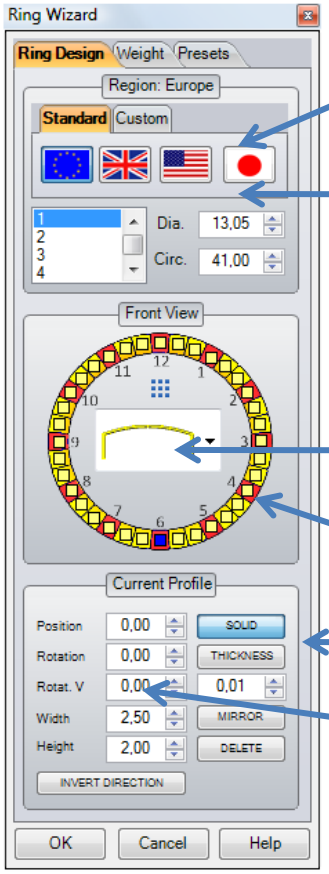
1. Define the area
2. Define the size



In this version we have added the possibility to create our own sizes for those countries that use their own standard ones.

Imagine we are looking at the ring from the front. We have the option to define until 38 sections. The idea is, to click on the ring and Define the section, size, ... We can modify every section independently, allowing us to define different types of thickness.





Define the **area**

Define the standard **size** or **create your own ones**

Define the **profile**

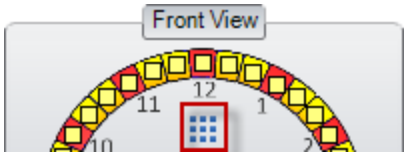
There are **38 sections**.

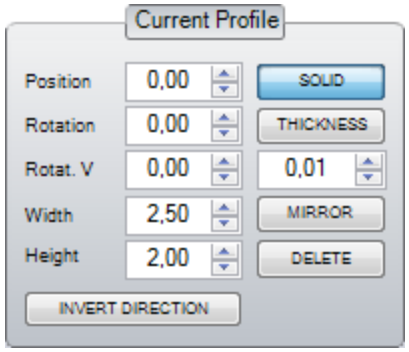
Solid / Thickness

Current Profile
Define position, Vertical Rotation, Height and Width

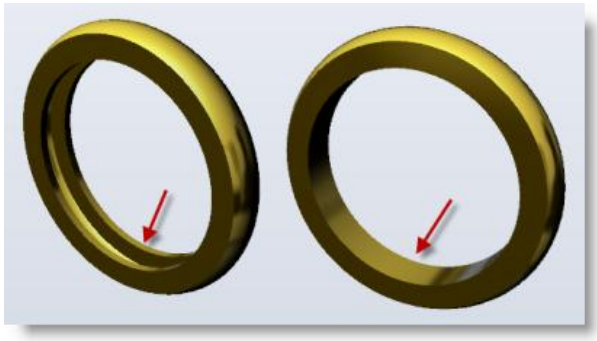
Notes:

By default, appears the inferior section selected. Profiles are fully editable. Clicking on the icon, appears the Manager Profile. More information available in the help.





3. Define position, rotation, vertical rotation, height and width.
Position: Define the position of the profile.
Rotation: Turn the profile on the curve.
Vertical Rotation: The profile on the curve has to be turned vertically.
Height and Width: Define the sizes of the profile.
Solid: Define the solid profile.
Thickness: Define a thickness of the material.



This image shows the difference between defining by thickness profile or solid. You can define thickness or solid independently for each profile.

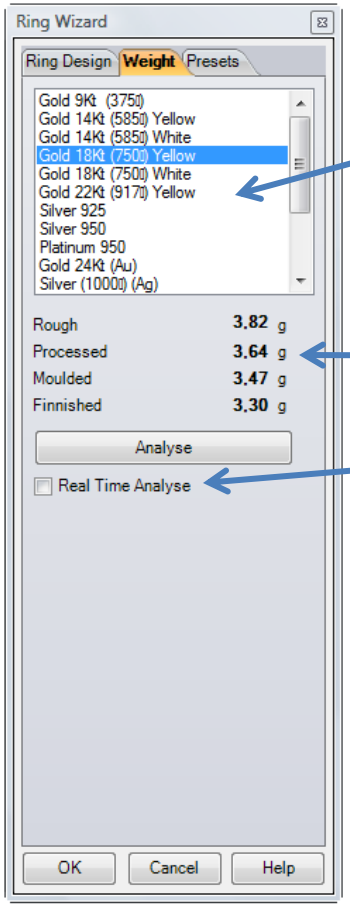
4. Define the section as you need. You can delete the current section clicking on Delete, and, to do symmetry of the profile in the ring, click on **Mirror** button.

5. Invert direction may be used when the section created Add Profile appears bent.

Notes:

Ring Wizard - Weight

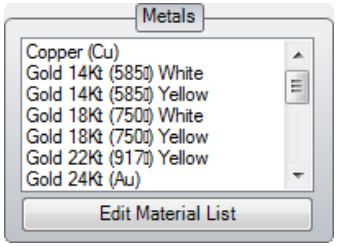
In **Weight**, we can analyze the weight of our ring. This is very simple, select in material and click on Analyze.



List of materials: After choosing the material (Gold, Silver…), RhinoGold compute the weight

Weight: RhinoGold shows you the ring weight as well as it allows us to define a percentage for the manufacturing process. Of course, it is just indicative.

Real Time Analyze: clicking on it, allows seeing the weight of your ring while you are editing it, giving you the opportunity to edit the ring to the exact weight you want for it.



You can edit the material list from Metal Weight command. You will find more information in Analyze lesson.

How does it work?

Analyze the weight of the ring. This is very simple, select in material and click on **Analyze**. There's the possibility to analyze **the weight in real time**, it allows us to know the weight every time we change some parameters of our ring. The weight will be on top window: **Ring Wizard – 3. 82g**

Notes:

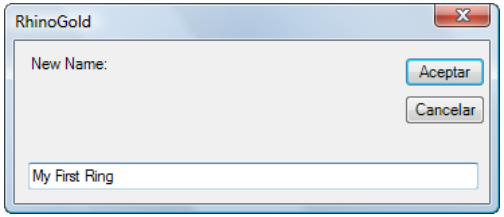
Ring Wizard - Presets

In **Presets** we can create, modify and manage our ring templates. It will show us the template list we have created.

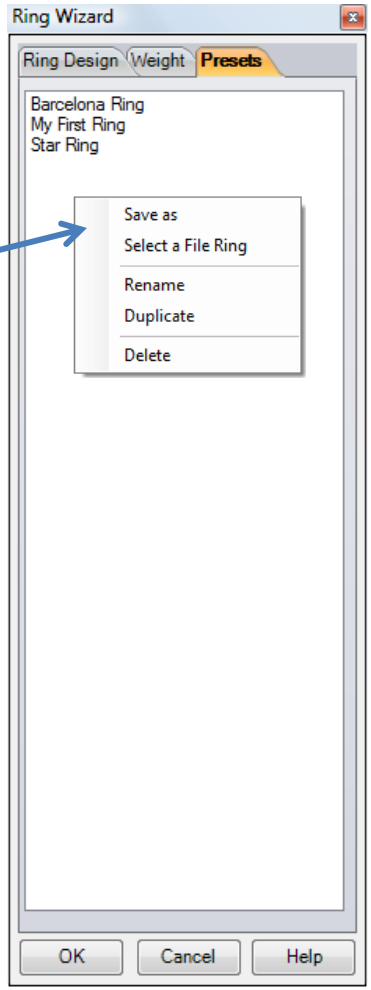
How to save?

Once the ring is created, click on the third tab **Presets**.

User has to right click on the list and click on **Save as…**. Write a name for the new ring and then it appears on the list.



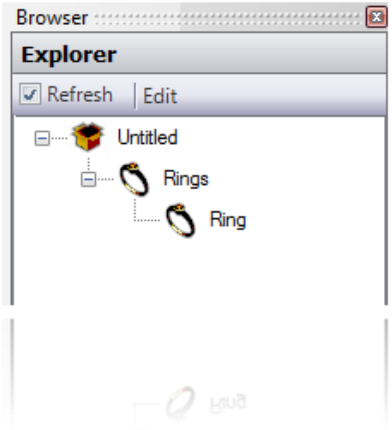
Sample of a new ring and the window to save your model.



Important

It is possible to save as many designs as you want to.

Once the ring is created, it will be shown in the **Browser**. Remember, we can edit double clicking on the Ring Icon.



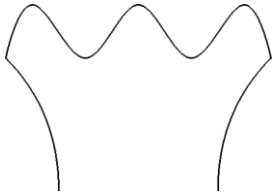
Notes:

Creating Profiles

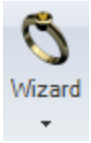
By default, RhinoGold has 20 different profiles, but we can create our own ones.

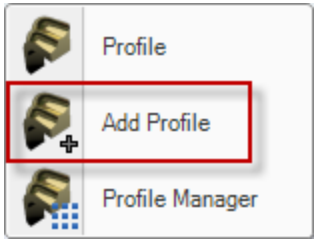
Exercise

1. First, draw a curve as in the image. The size is not important. The profile must be a curve, if you model more than one, remember to join them. You can use the **AutoConnect** command.

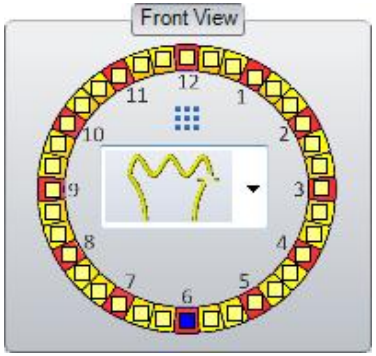


2. Click on **Jewelry tab** and click on **Add Profile**
3. Select the curve we have previously drawn.
4. Write a name for your profile (if you don't write any name, RhinoGold would define one automatically).





5. You have saved your profile and now, it's in the Ring Wizard. Try to do the next ring.

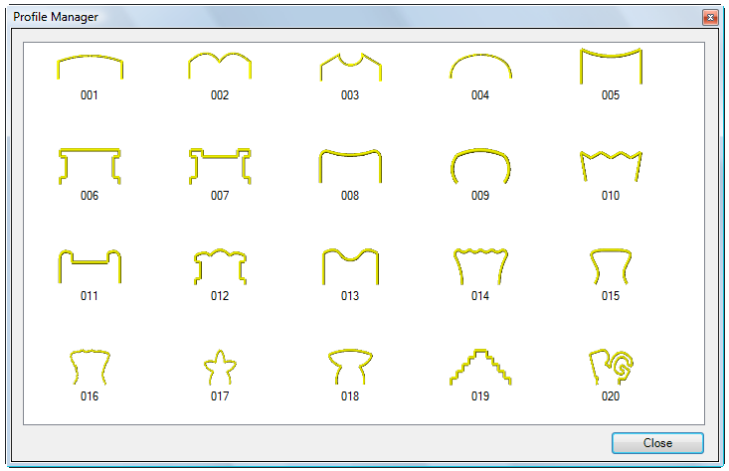


Notes:

Managing Profiles

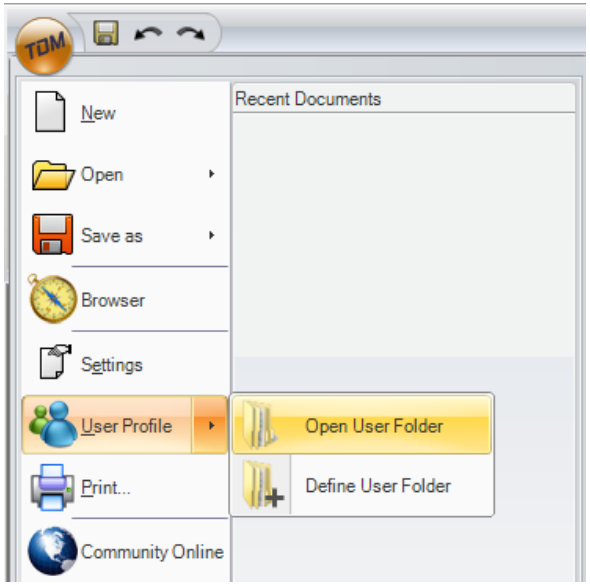
Allows managing our profiles as well as delete or rename them.

1. Select the profile to edit:



2. Right clicking on the profile, it will appear the next menu:

Delete option, will delete our profile, and Rename option, will ask you back the new name.



Important

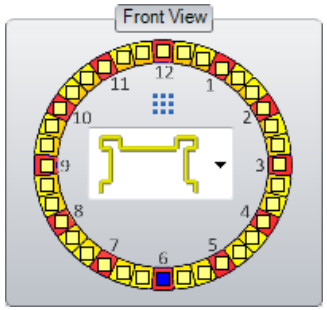
Remember that profiles are 3dm files who are in the Profiles folder from you User folder. You may share with other users.

Notes:

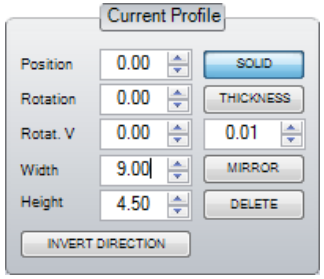
Ring Wizard - Saarikorpi Design

See an easy example of the possibilities that Ring Wizard offers without any complexity and obtaining a great result.

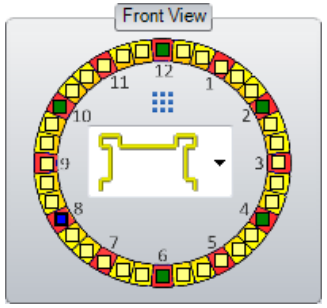
1. Execute the **Ring Wizard** command
2. Select the region **Europe** and the **size 16**.
3. In **Front View**, we have selected by default the bottom profile. Select the next curve:



4. In **Current Profile**, define the **Width** as **9mm** and **Height** as **4.5mm**.

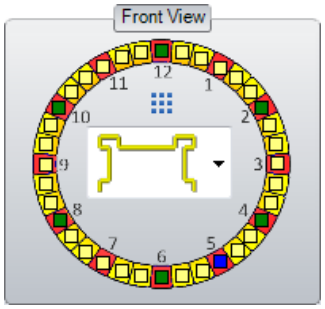


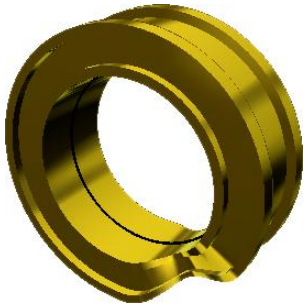
5. Now in **Front View** select the **position 4, 2, 12, 10 and 8.**



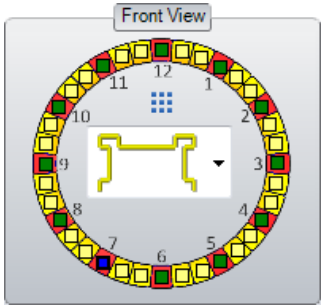
Notes:

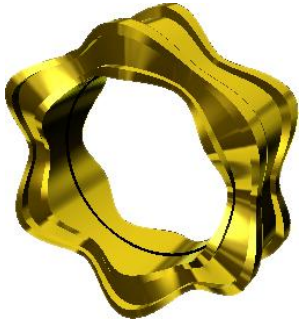
6. In **Front View** select the position **5**, and change the **Width** .





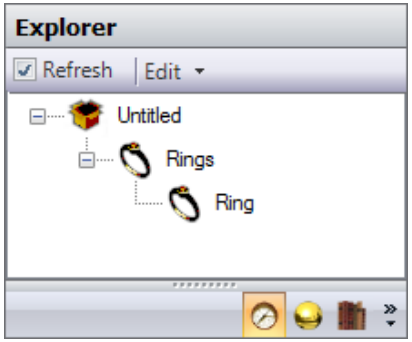
7. In **Front View**, click on **3, 1, 11, 9 and 7**.





8. Click on **OK** button.

9. Now, your ring is in the tree. Double click on the icon, and change **the size to 18**.

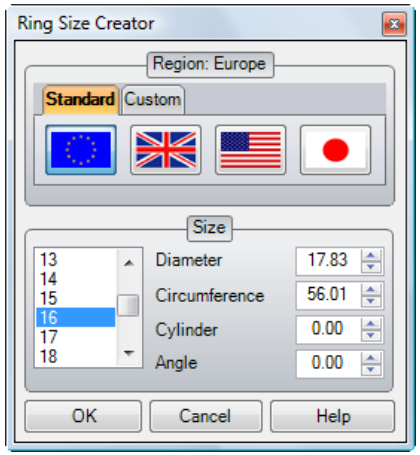


Part of a design by Saarikorpi Design (Finland)

Notes:

Ring Size Creator: Gauge

This tool allows us to create a base circle to start creating the ring, using standard measures from Europe, UK, USA and Japan. In this version we have added the possibility to create our own sizes for those countries with their own standards.



Area and Size:
There are the standard regions, and you can customize your own one as well.

Diameter: It allows us to display and modify the circle, using diameter values or the circumference length.

Cylinder: Create a cylinder with the size selected. It's so helpful to delete those zones that interfere in, as bezels, head...

Angle: It allows us to create open circles.

Dynamic Profile

Allows using our section library to move them, rotate them and change the size. Very helpful to create any type of complement in a matter of seconds. Profiles are editable by the user.

Exercise

We will see how create this ring. It is really easy.

Gauge

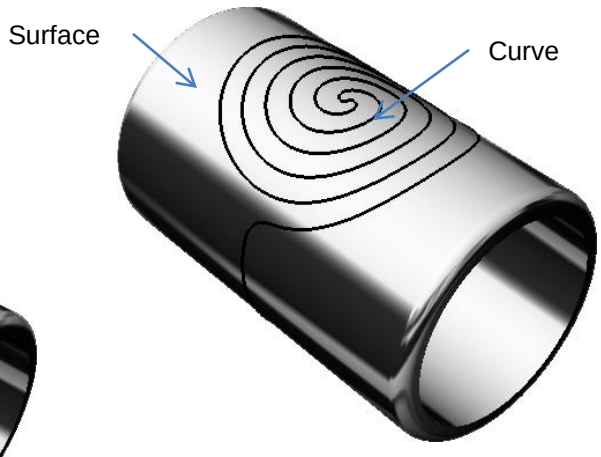
Profile

Notes:

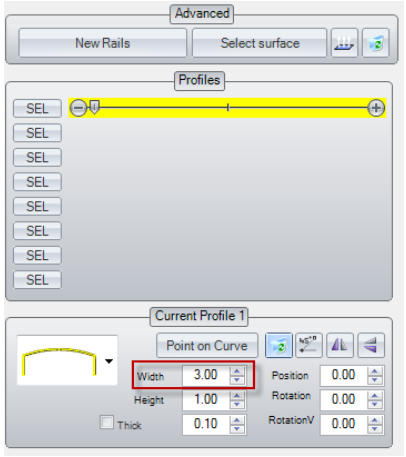
Dynamic Profile

Open the **Dynamic Profile.3dm** file.

1. Execute the **Dynamic Profile** command.
2. Click on **New Rail** button and select the curve
3. Click on **Surface** button and click on the cylinder surface. If the orientation is flipped, please click on **Flip** icon. 

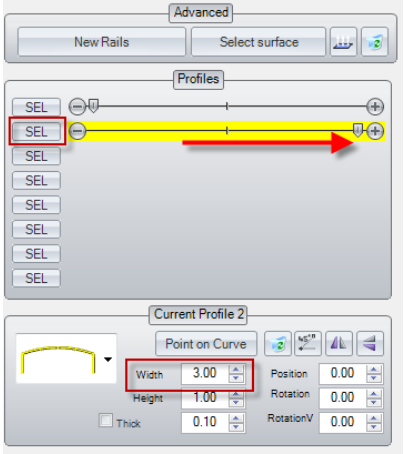


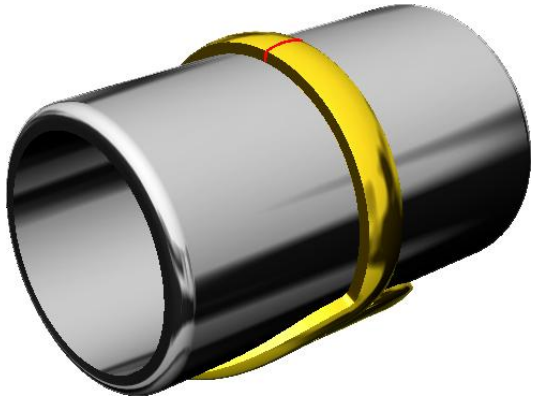
4. Now we are in the first profile. Please change the width to **3mm**.



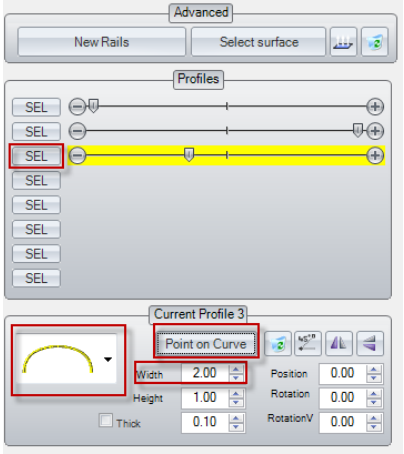
Notes:

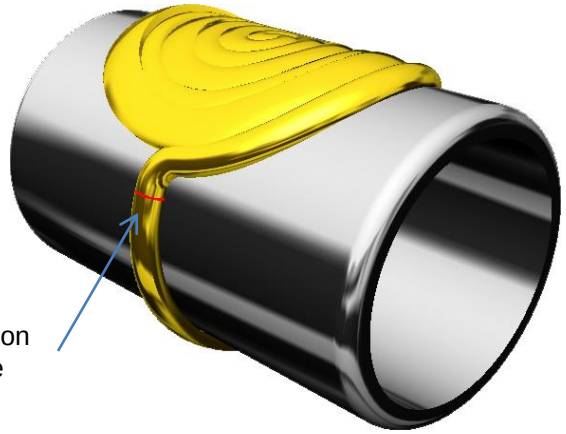
5. Activate the second profile clicking on Sel (2nd position) and move the slider to the right. And define a **Width**.





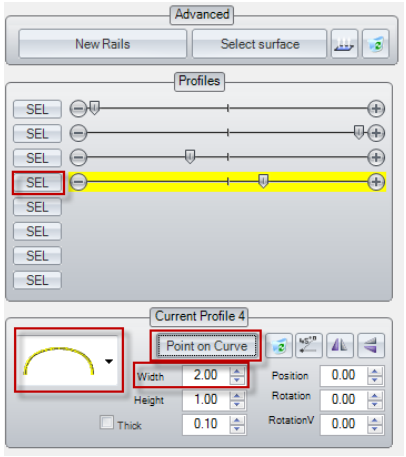
6. Now we have the same profile at the start and at the end point on the rail. Activate the 3rd Profile . Change the curve, change the **Width** to **2mm** and click the **Point on Curve** button, and click a point on the rail curve as you can see on the picture:

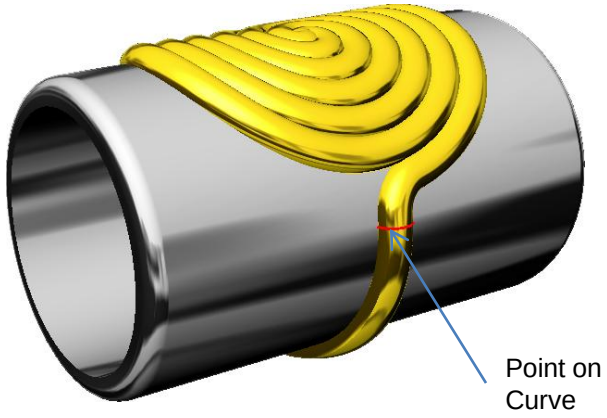




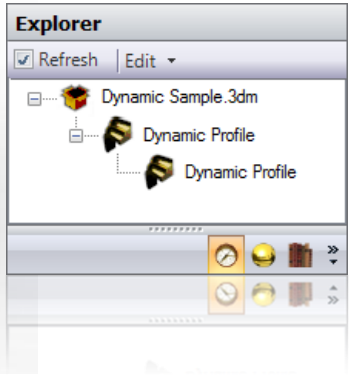
Notes:

7. Activate the 4th profile clicking on Sel (4th position). Change the curve, change the **Width** to **2mm** and click the **Point on Curve** button, and click a point on the rail curve as you can see on the picture:.





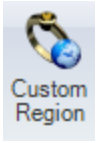
8. Click on **OK** button, and you will see in the tree, there is the dynamic profile, and of course, you can edit it!



Notes:

How to create a custom region?

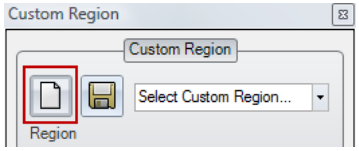
Custom region allows us to create your own ring sizes. By default, there are 4 standard sizes (Europe, UK, USA and Japan), but there are countries who use their own sizes.

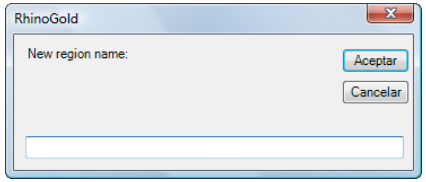


Notes:

Steps to create a region

1. Click on **New** icon and type the region name.





2. In the table, define the name or number of the size and the diameter.
3. Click on **Save** icon.

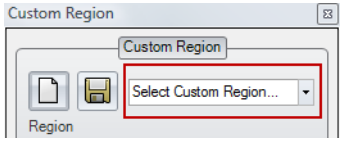
Size	Diameter
A	12
B	13
C	14
D	15
E	16
F	17
G	18

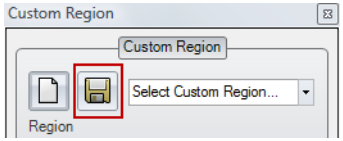
Steps to modify a region

1. Select the region of the list

2. Modify the values of the table, may adding more values, writting on the last line, and may deleting clicking on **Supr**.

3. Click **Save** to save the modifications.





Important Note

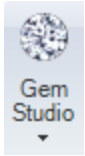
Each own region is saved in a file with its name. Those files are saved in the User Folder. Remember, you may open the User Folder, clicking on the submenu from Users Profile in RhinoGold Mode, as well as the menu in Rhinoceros Mode.

Lesson 3 – Jewelry Tools I

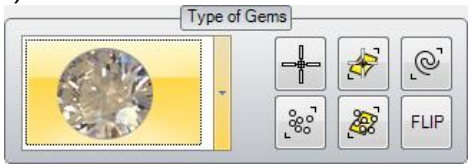
Notes:

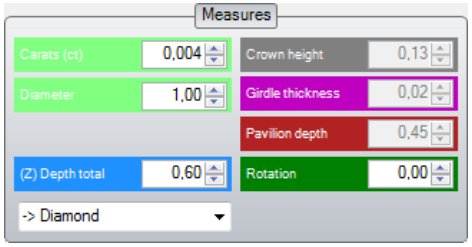
Gem Studio

Gem Studio allows us to place different stone cuts in our models in accordance with GIA (Gemological Institute of America) and custom sizes.



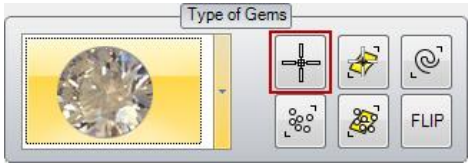
1. Select a gem cut:



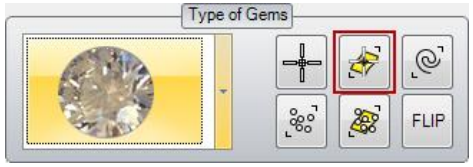


2. Define the measures of the stones and components. We can make it by measures or by weight.

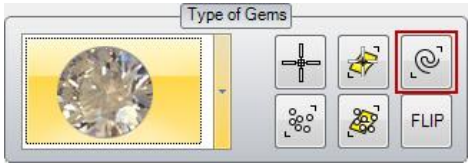
3. Insert gem in our design by some methods:



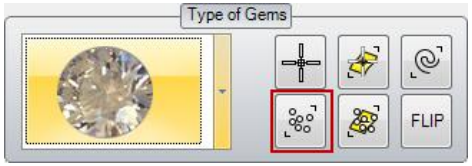
Select by Points: Them most used. You have to select points, may using the Reference to Objects, and the orientation is defined by the current CPlane.



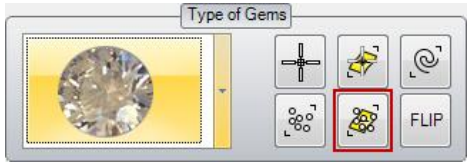
Select by Points on Surface: You have to select a surface and pick points on it. The points will be the base of the stone and the stone will be oriented by the surface.



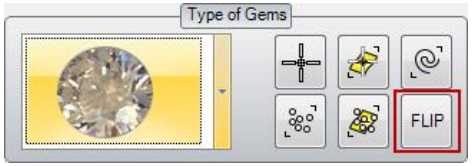
Select by Normal: You have to select a line (or curve) and its defines the gem orientation, and the base point of the gem will be the initial point of the curve.



Select by Object Points: You have to select object points, and the orientation is defined by the current CPlane.



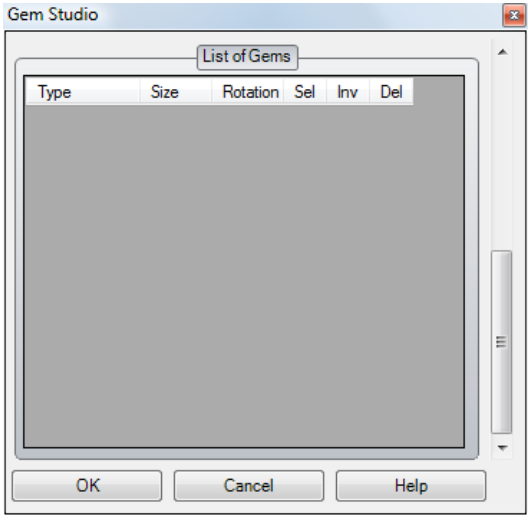
Select by Point Objects on Surface: you can select a surface and select points on this one. The selected points will be the gem base, and the normal surface will define the direction



There's the option to invert the gem before being inserted. So useful if our surface or our CPlane are inverted.

Notes:

4. All the inserted gems are added automatically on the gems list: This list allows us to manage the gems. You can select them, invert the direction and delete them.



Important Note

While we are executing the command, we can see our gems, but those ones are not attached on the document. For that, we have to click on the OK button. Once the gems have been added on our documents, they will appear on the Explorer tree, being editable.

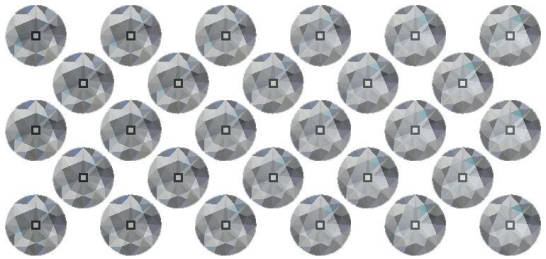
Another important thing, is that you can export your gems and add them in the library. It allow us to use and modify them,... in the future. You can also add bezels and heads,...

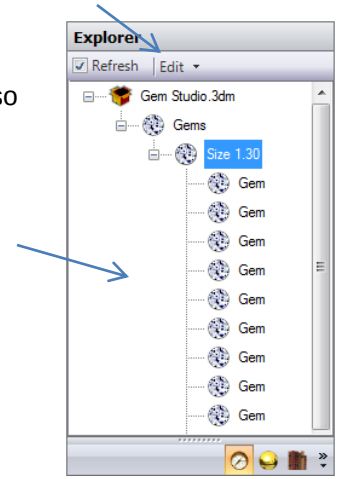
Exercise

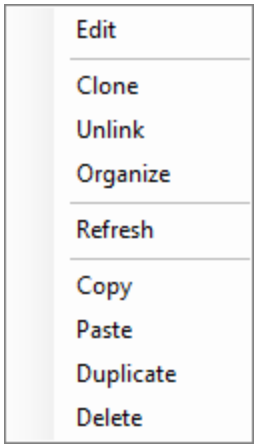
Open the **Gem Studio.3dm** file and try to place the gems.

Notes:

These stones are parametric, it means we can modify them.
5. Go to the tree and select the stones, you can do it by size, also we have the option to select them directly as is usual.



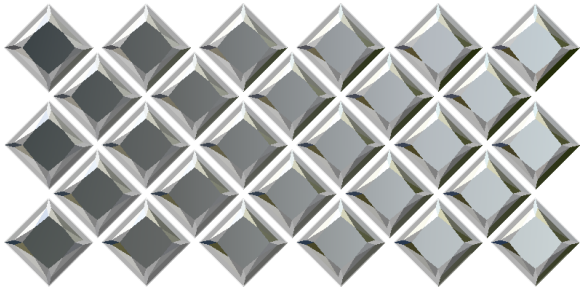


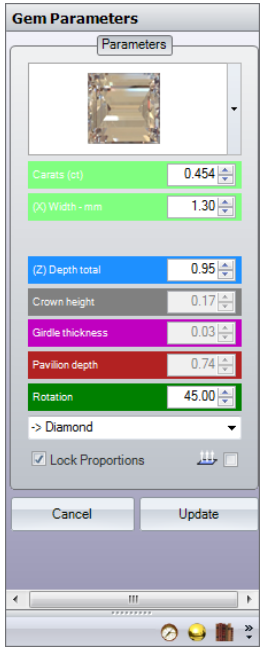


6. To edit, you have three ways. All of the is exactly the same.
   1) Right button on the white area and click on **Edit** in the menu
   2) Click on **Edit** button
   3) Press **middle mouse** button and click on **Edit Object**.

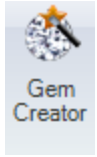
7) Change the gem cut to Princess cut, and in Rotation type 45 degrees.

8) Press **Update** button to update the gems.





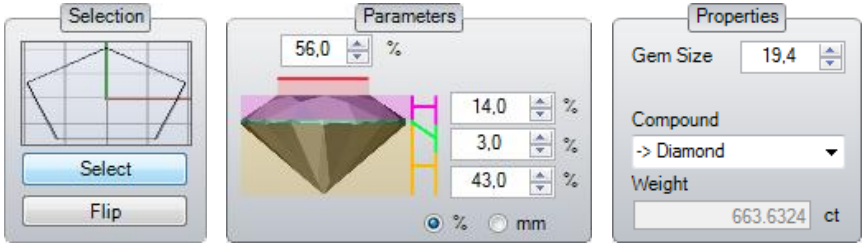
Notes:



Gem Creator

Gem creator allows us to create gems from using a curve. It allows us to create any type of gem.

1. Select a plane and closed curve clicking on the **Select** button. In case the Gem doesn't appear "lay face-down", we can click on the **Flip** button.



2. In **Parameters**, we can define the gem's values, being by percentages or by measures.

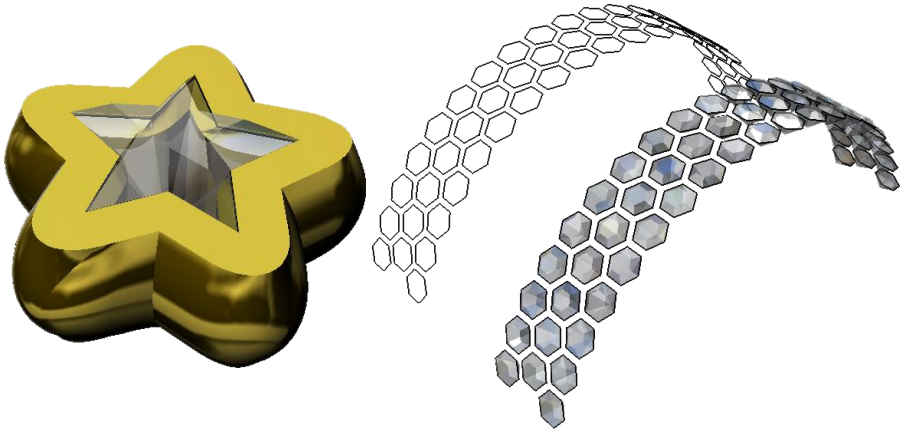
3. In **Properties**, we can define the gem size and composed, and analyze the weight of itself.

Important Note

While we are executing the command, we can see our gems, but not those ones added at the document. To see them, click on the OK button. Once they have been added to our document, they will appear in the Explorer tree, being editable. Check the Explorer to see how it works.
You can export gems and them at the library. This allows us to use and modify them in the future. Also, with bezels and heads...

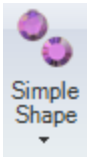
Exercise

Open the **Gem Creator.3dm** file, and try to create one or all of them in one time.



Notes:

Convert to simple shape – Convert to real shape



By default, gems used are real form, it means that each one of our gems has more the 100 faces. These gems are more realistic to work, but, when we have a big number of gems in our document, our computer runs slower. Because of that, with a single click we can simplify the gems form. This process is reversible.

Exercise

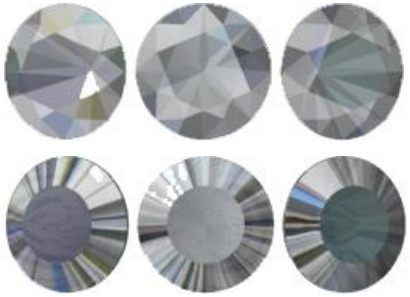
Open the **Convert to simple shape.3dm** file.

1. Click **Simple Shape** icon, and select the gems to convert. Is not necessary you just select gems, you can select all the object and it will convert just the gems.

Real Shape

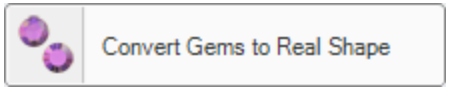
Simple Shape

Real Shape



Simple Shape

2. Click **Convert Gems to Real Shape** and select the gems to convert.

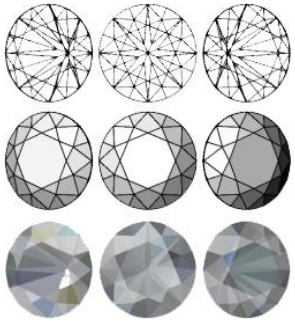


Important Note

We can define the tools to create gems in a simple shape. In **User Profile** in RhinoGold Mode or in **RhinoGold Properties** in Rhino Mode.

Gem Display Mode

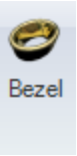
It allows us to define the Gem Display Mode. This functionality is very recommendable if we have a graphic card to download the assistance or where our document would have a lot of gems.



Notes:

Bezel Studio

Bezel Studio allows us to create our own parametric and editable bezels.

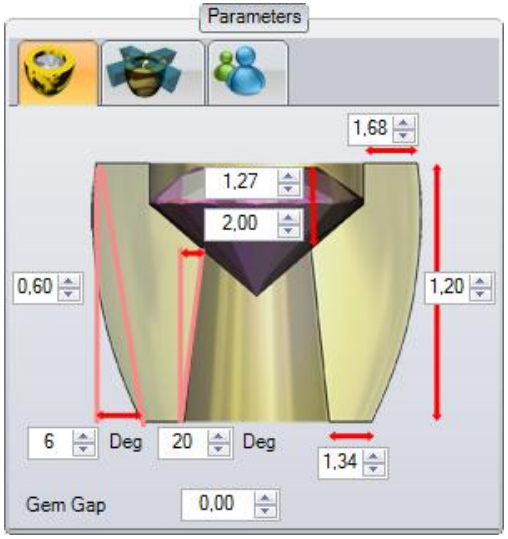


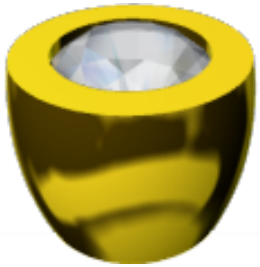
Exercise

1. Create a brilliant using **Gem Studio**.
2. Execute the **Bezel Studio** command.
3. Select the gem, clicking on Select button.

It will show us a standard bezel. Can select similar stones or all the stones. Similar means "the same shape".

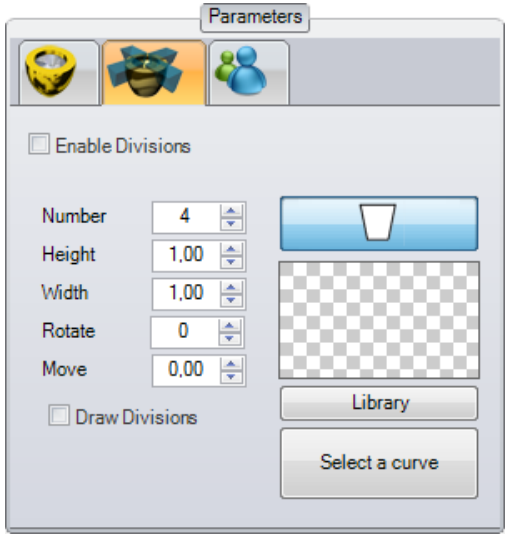
The possibility to display in Ghost Transparent Mode available, it allows us to display the internal part of the bezel, as well as the gem settlement. The color of the transparency as well as its level are possible to define them in the User Profile in RhinoGold Mode, or in RhinoGold Properties in Rhino Mode.



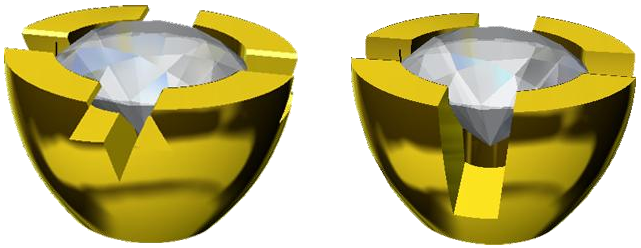


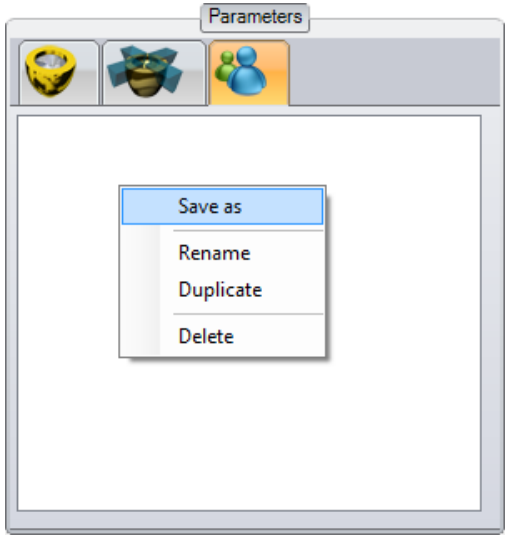
In the first tab in **Parameters**, we must define the bezel measures.

Notes:



In the second tab, we define division: By default, it has a rectangular form, but we can select a curve of our library as well as a plane closed curve from our documents.





In the third tab, we can save our bezel templates, to use them in the future. By default, in the RhinoGold installation appears an empty list. If we right click on the white area, it will show us a Contextual Menu where we can save the current bezel, rename it and delete it.
Once it has been saved, it appears the name on the list. To select it, just click on the name.

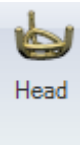
Important Note

Once the bezel has been created, it will show us the bezel Icon in the Explorer. Remember we can edit with a double click on the icon. Check the Explorer to see more details of edition.

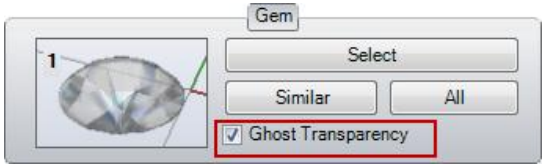
Notes:

Head Studio

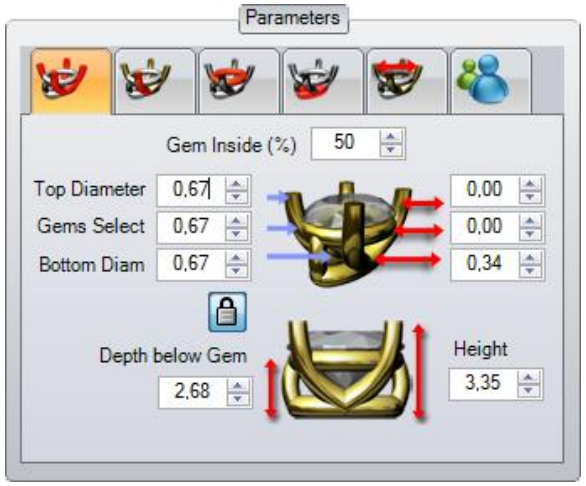
Head Studio allows us to create our own parametric and editable Head.



1. Create a brilliant using **Gem Studio**.
2. Execute the **Bezel Studio** command.
3. Select the gem, clicking on **Select** button. It will show a standard bezel. You can select similar stones or all the stones of the document using the buttons below.

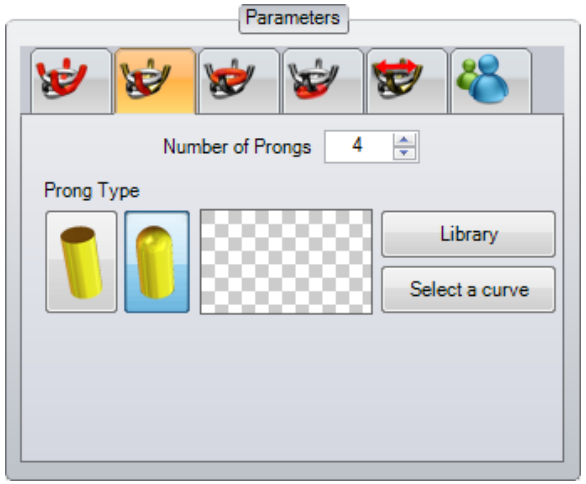


The possibility to display in Ghost Transparent Mode available, it allows us to display the internal part of the bezel, as well as the gem settlement The color of the transparency as well as its level are possible to define them in the Users Profile in RhinoGold Mode, or in RhinoGold Properties in Rhino Mode.



In the first tab in **Parameters**, we define the bezel measures: Prongs diameters, Gem Inside, Height, Depth below Gem…

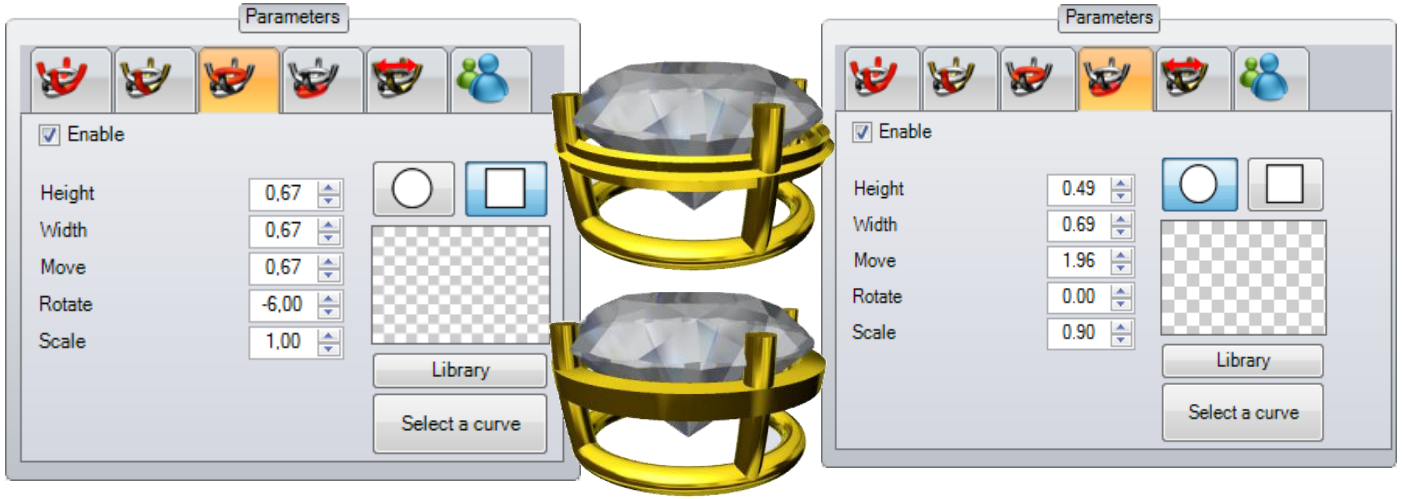
Notes:



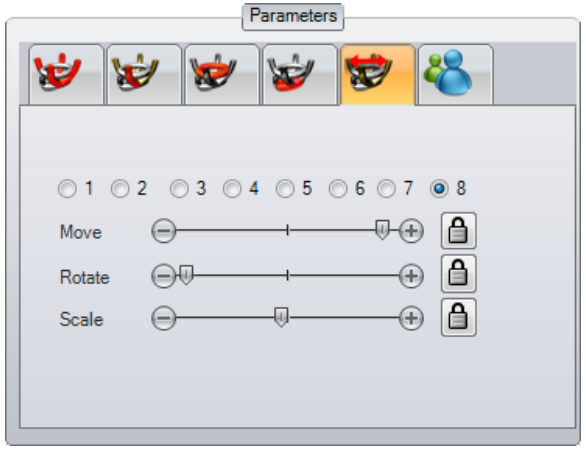
In the second tab, we define the number and the form of the prong.

By default is in cylindrical form, but we can change it, and use our curves from the library or pick it from the document,

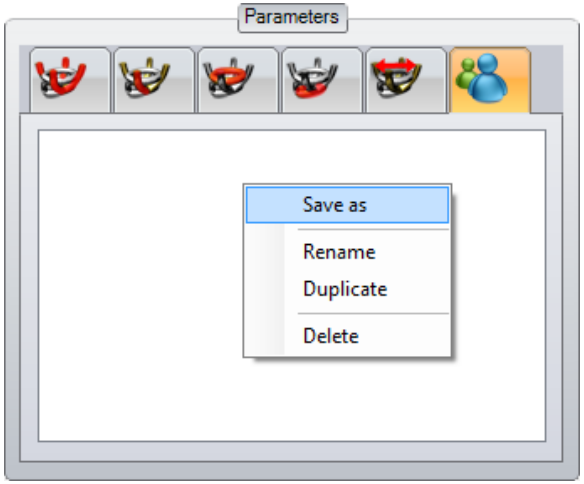
In the third and fourth tab, we modify higher and lower rails. By default, both are activated and with cylindrical shape, but we can change, for example, to a rectangular shape. There's a curves library, where we can modify and add our own ones.



Notes:



In the fifth tab, we define the position, rotation and scale of the prongs individually. If we click on the **Lock**, the modification affect to all of them.

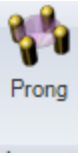


In the sixth tab of the **Parameters**, we can save our head templates to use them in the future. By default, in RhinoGold installation it will appear an empty list. If we right click on the white area, it will show us a contextual menu, where we may save the current bezel, as well as rename it, duplicate it or delete it. Once saved, it will appear the list name. To select, just click on the name.

Important Note

Once has been created, our head will be shown as icon at the Browser. Remember, you may edit double clicking on the icon. Check the Explorer to see more details of edition.

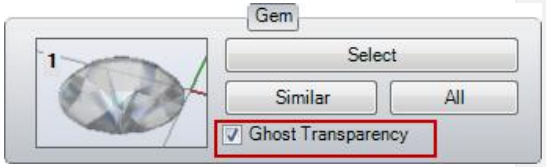
Notes:



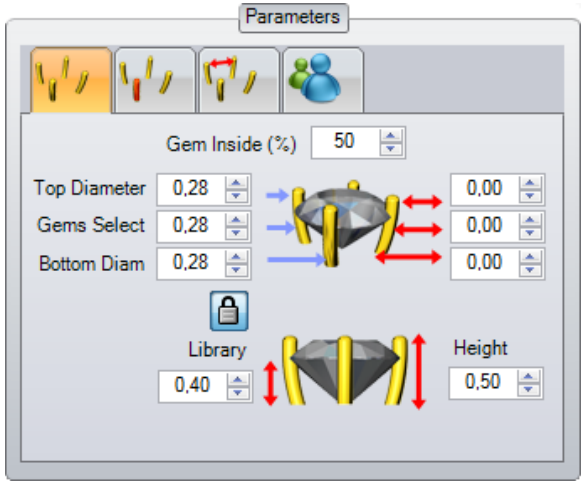
Notes:

ProngStudio
Prong Studio allows us to create our own parametric and editable prongs.

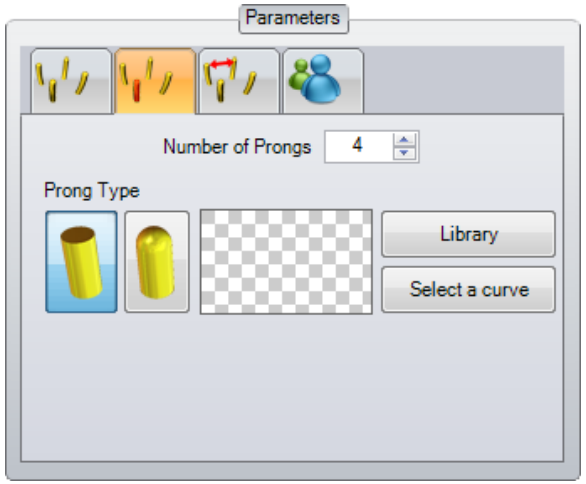
1. Create a brilliant using **Gem Studio**.
2. Execute the **Prong Studio** command.
3. Select the gem, clicking on **Select** button. It will show a standard prong. You can select similar stones or all the stones of the document using the buttons below.



The possibility to display in Ghost Transparent Mode available, it allows us to display the internal part of the bezel, as well as the gem settlement The color of the transparency as well as its level are possible to define them in the Users Profile in RhinoGold Mode, or in RhinoGold Properties in Rhino Mode.

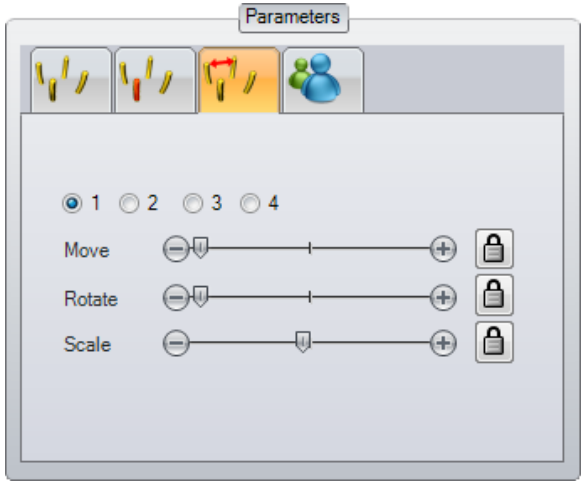


In the first tab in **Parameters**, we define the bezel measures: Prongs diameters, Gem Inside, Height, Depth below Gem…



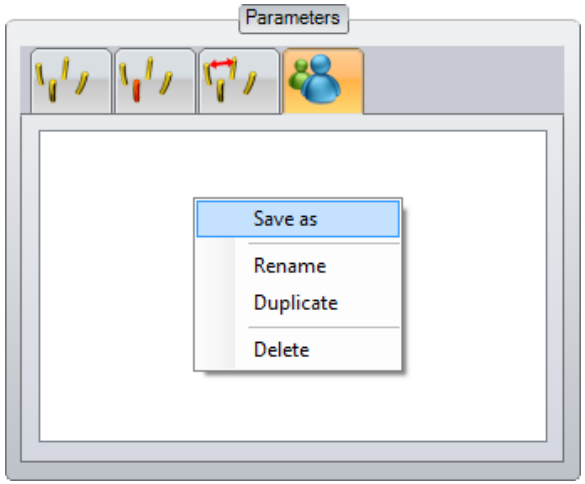
In the second tab, we define the number and the form of the prong.

By default is in cylindrical form, but we can change it, and use our curves from the library or pick it from the document,



In the third tab, we define the position, rotation and scale of the prongs individually. If we click on the **Lock**, the modification affect to all of them.

Notes:



In the fourth tab of the **Parameters**, we can save our head templates to use them in the future. By default, in RhinoGold installation it will appear an empty list. If we right click on the white area, it will show us a contextual menu, where we may save the current bezel, as well as rename it, duplicate it or delete it. Once saved, it will appear the list name. To select, just click on the name.

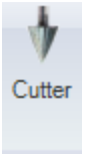
Important Note

Once has been created, our head will be shown as icon at the Browser. Remember, you may edit double clicking on the icon. Check the Explorer to see more details of edition.

Notes:

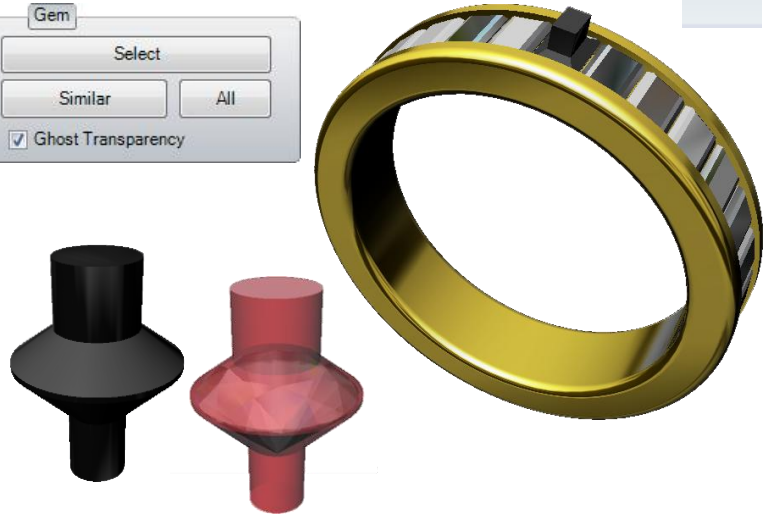
Cutter Studio

Cutter Studio allows us to create our own parametric and editable cutter.

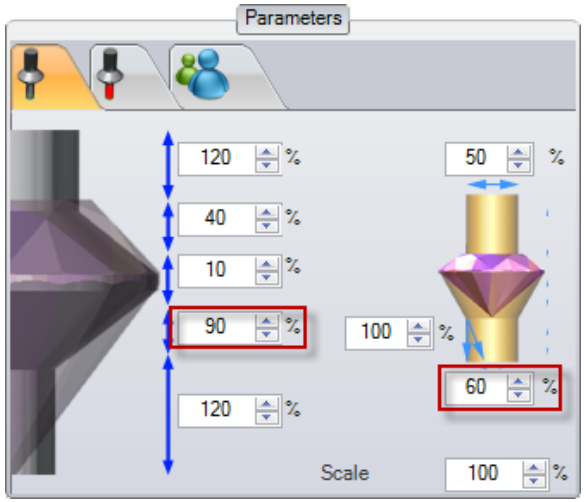


Exercise

Open the **Cutter Studio.3dm** file.
1. Execute the **Prong** command.
2. Select one gem, clicking on **Select** button. It will show a standard cutter.

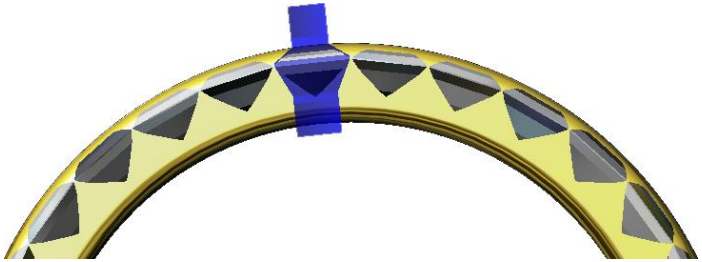


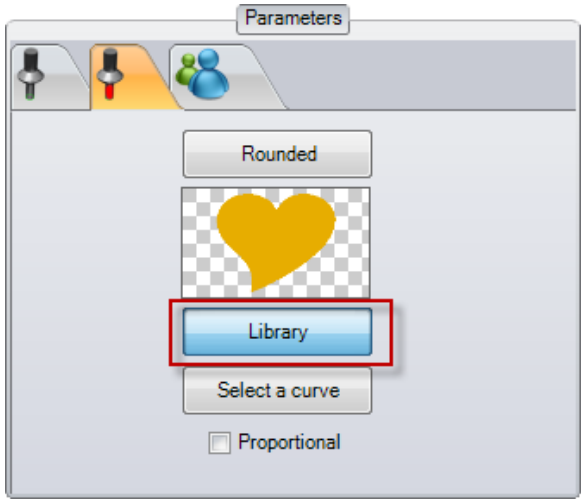
The possibility to display in Ghost Transparent Mode available, it allows us to display the internal part of the bezel, as well as the gem settlement The color of the transparency as well as its level are possible to define them in the Users Profile in RhinoGold Mode, or in RhinoGold Properties in Rhino Mode.



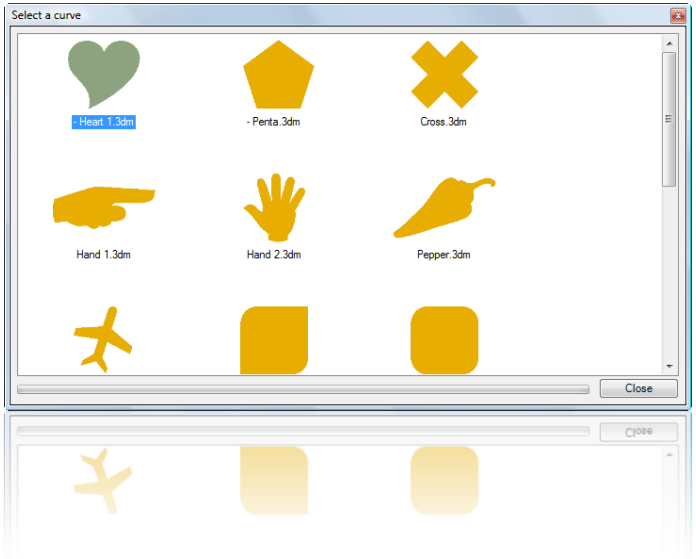
In the first tab in **Parameters**, we define the general cutter dimensions. In this case we use percentages to allow working with multiple gems sizes.

3. Define the two values as you can see in the picture.

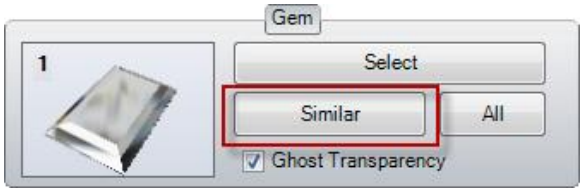




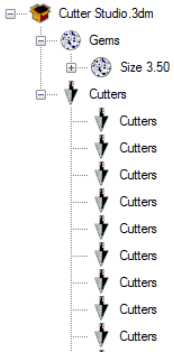
In the second tab, we can define the inferior cutter part.
4. Click on **Library** button and select the Heart Shape



Notes:

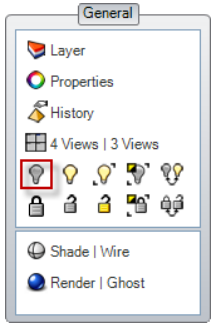


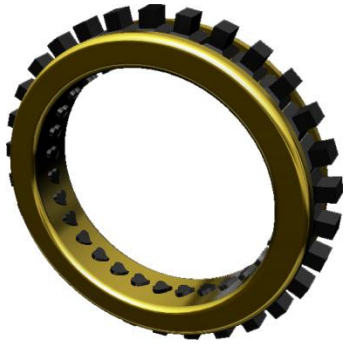
5. Click on **Similar** button. And the cutter will be created in similar gems as you can see on the picture.



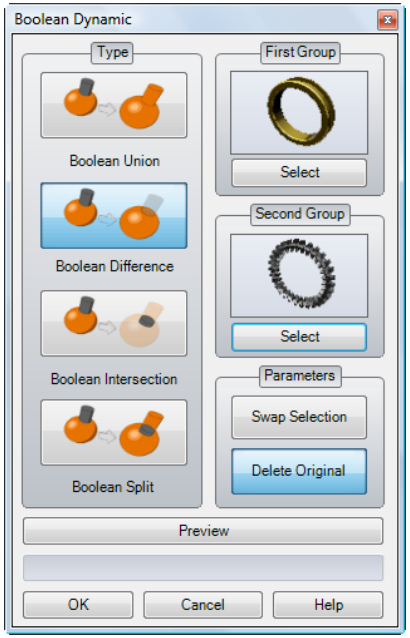
6. Click on **OK** button, and the cutters will be on the tree.

7. Select all the stones and hide them. To select you can select directly in Gems node to select all or use command **Select gems**.





8. Execute the **Dynamic Boolean** command.



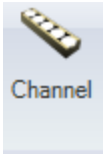
9. Click on **Boolean Difference**, and in **First Group** select the ring, and the **Second Group** the prongs.

10. Click on **Preview** button, and click **OK**.

Notes:

Lesson 4 – Jewelry Tools II

Notes:



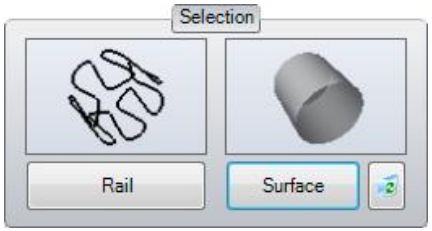
Channel Studio

Channel Studio allows us to create channels from the curves.

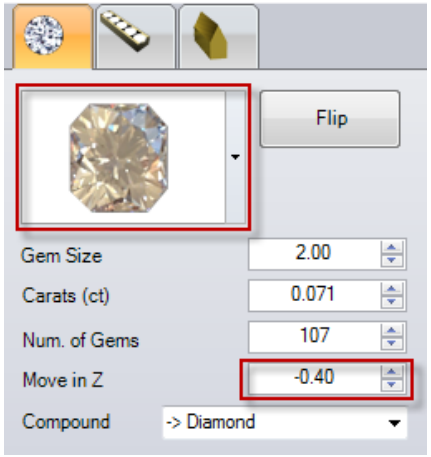
Exercise

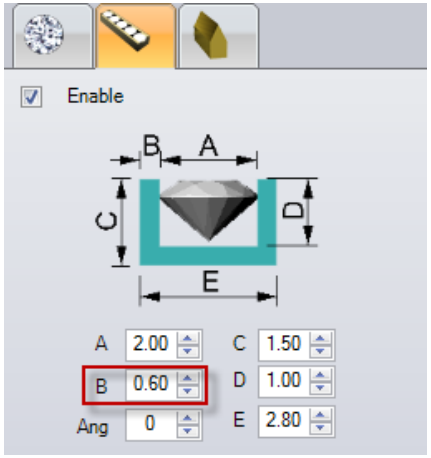
Open the **Channel.3dm** file.

1. Execute the **Channel** command.
2. Click on **Rail** button and select the curve.
3. Click on **Surface** button and select the cylinder. The surface orient the stones. If the stones are flipped, please click to **Flip** button.



4. Select the gem cut **Flanders**, **Move in Z -0.40**
5. In the second tab, change the value **B** to **0.60**





6. Click in **OK** button to add the channel to the document.

Notes:

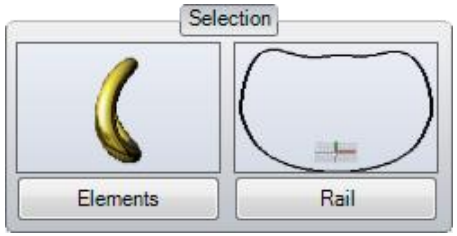
Chain Studio

Chain Studio allows us to create Chains so easily.

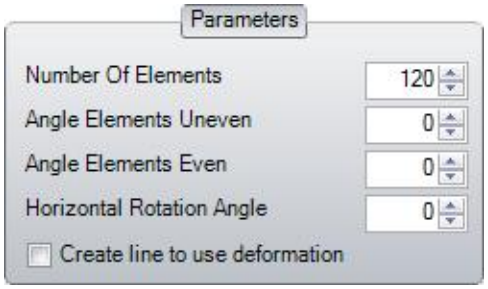
Exercise

Open the **Chain.3dm** file.

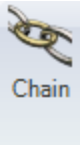
1. Execute the **Chain** command.
2. Click on **Elements** button and select the link.
3. Click on **Rail** button and select the curve.



4. In **Parameters**, **Number of Elements** type **120**.
5. We have the possibility to define a rotation angle for the elements (uneven and even) creating a realism effect.



6. Click **OK** button to add the chain to the document.

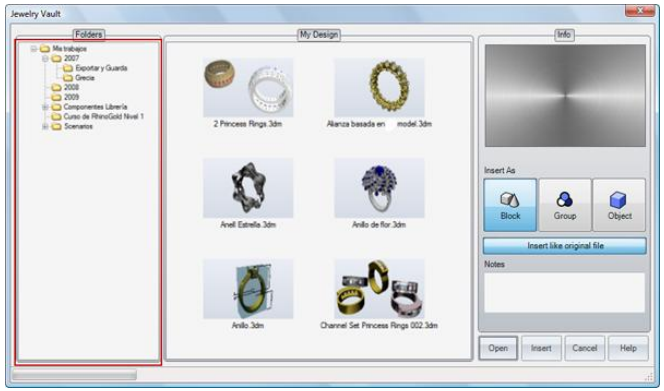


Notes:

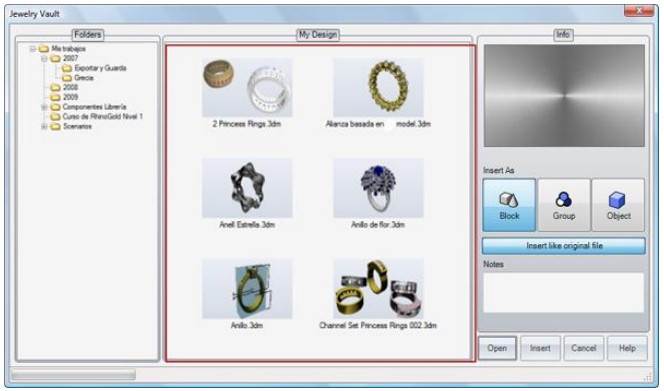
Jewelry Vault

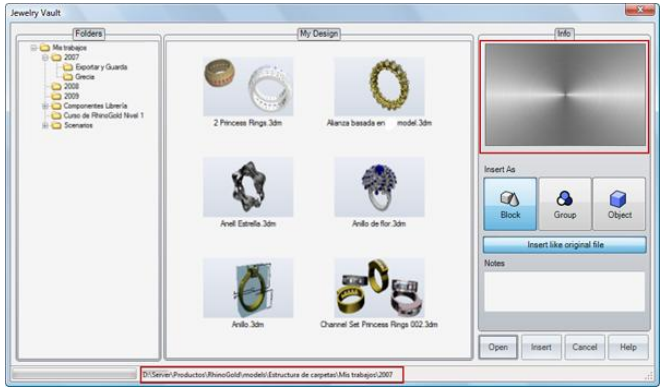
Jewelry Vault makes it easy for us to manage our different models. The objective of this tool is to save the finished models, not components. The files are in RhinoGold and Rhinoceros format (.3dm).

1. Select a folder:

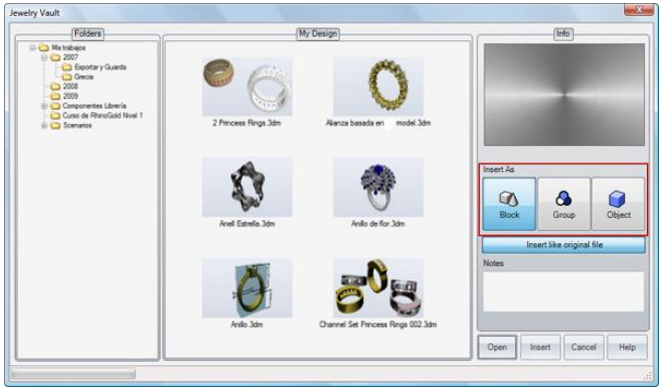


2. Select a file:



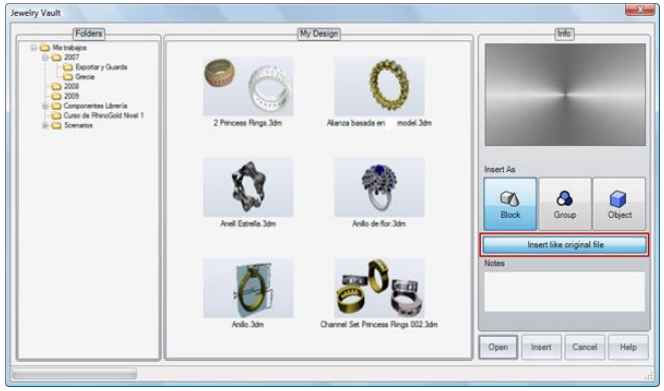


3. On selecting the file, a preview, notes and the file size are all displayed.



4. You can open or insert your model. In Open just close the current document and open the model document. If you select Insert, keep the current model and you can define different ways of inserting the file; by Block, Group or Objects.

Notes:



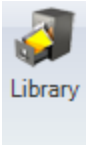
Block Instance: Inserts the model as a block instance.
Group: Inserts the model as a group.
Objects: Inserts the model as individual geometry objects.

5. On inserting the model, you are allowed to define a basic point, orientation and scale (the same as with the Insert command), or you also have the option of inserting it in the same position, orientation and scale as the original. To do this, select the option Insert like original file:

6. Then click on **Insert**

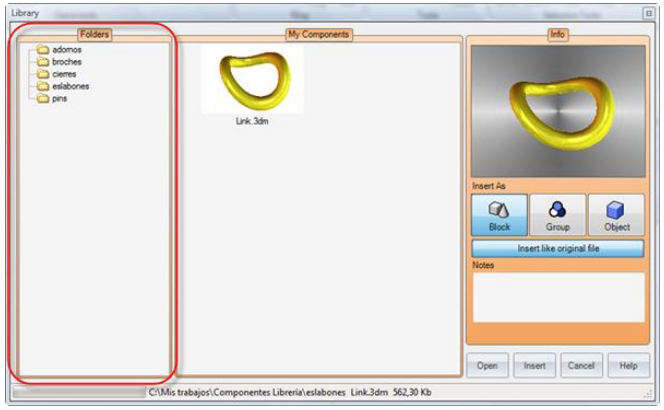
Notes:

Library

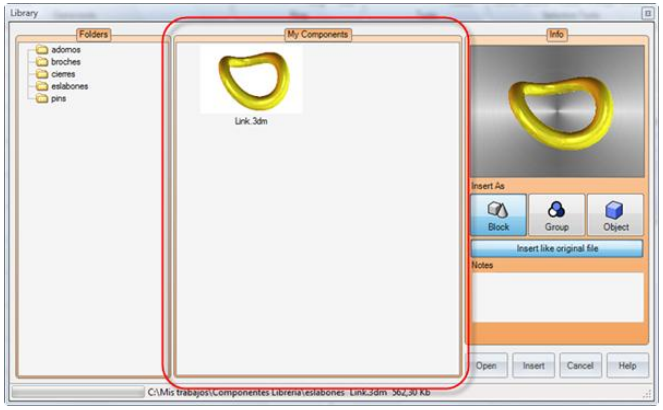


Library allows us to manage our models easily. The user may create his own libraries of components, to may reuse in future designs.

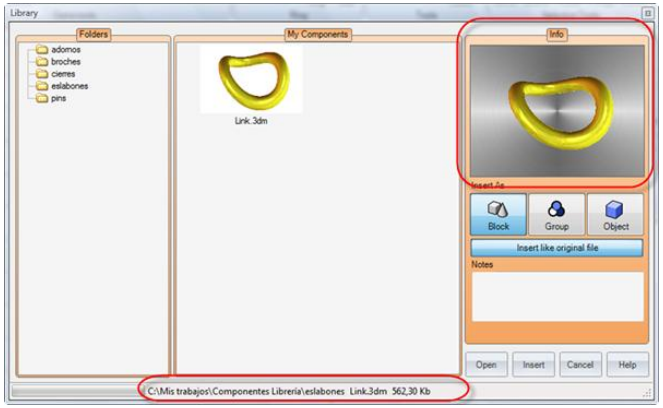
1. Select a folder:



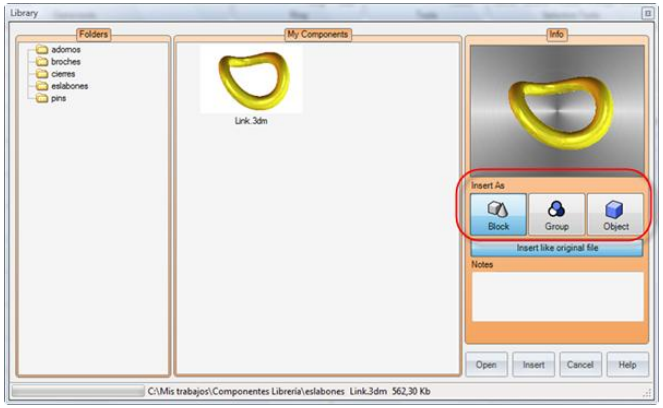
2. Select a file:



3. After selecting the file, it will show us the preview, notes and size of itself.

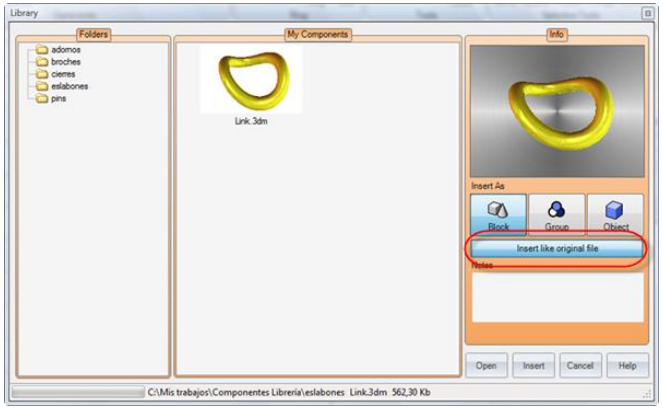


4. We can define different modes of inserting files: by Blocks, Groups or Objects.

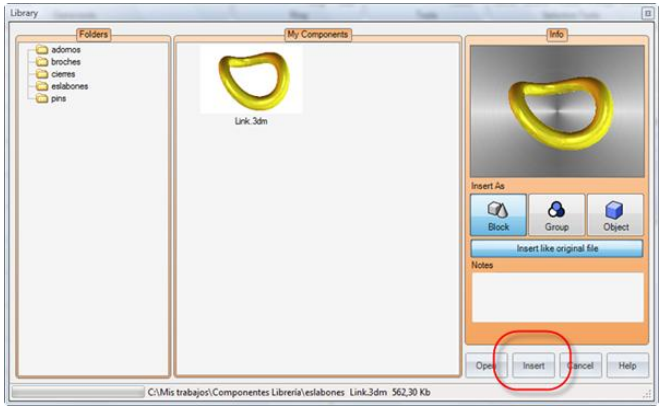


Block: Insert the model as a Block.
Group: Insert the model as a group.
Objects: Insert the model as independent objects.

5. Once the model is inserted, it allows us to define a point base, orientation and scale (same as Insert Command), or we can insert it in the same position, orientation and scale than the original one. For that, we select the option: Insert like original file



6. Click on **Insert**



Notes:

Automatic Pave

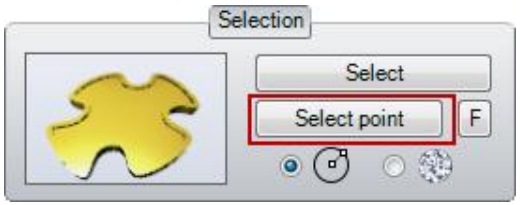
This tool allows us to create paves automatically.

Exercise

Open the **Automatic Pave.3dm** file.

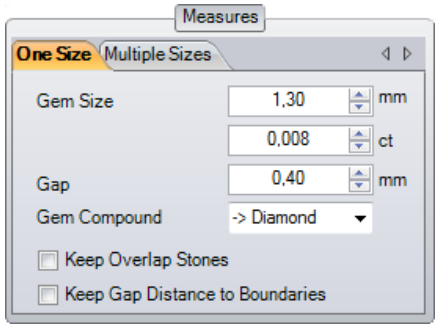
1. Click on **Select** button and select the surface where we want to create the pave and it will show us a display where it will start to create the pave.

By default in the center of the surface, but we can define another point clicking on **Select Point**:



Gem Size

We have two options to create a pave: using the same size of the gem or defining until three sizes and quantities. Just one size:



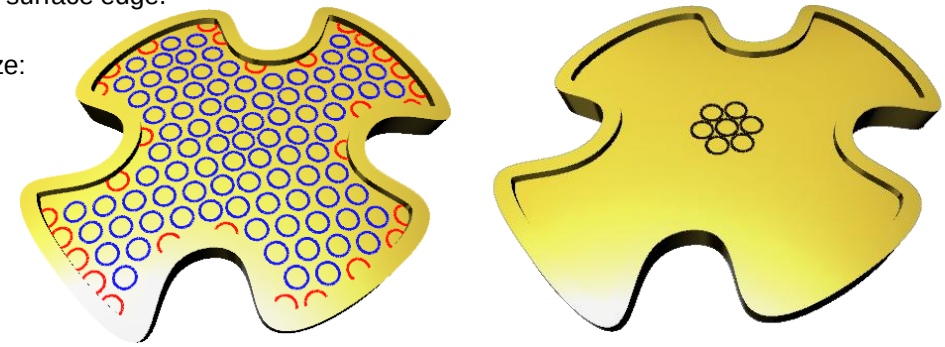
In this section, we can define the gem size or its weight, as well as the distance between them.

We have two options really interesting: Keep the gems overlap and keep the distance at the edges.

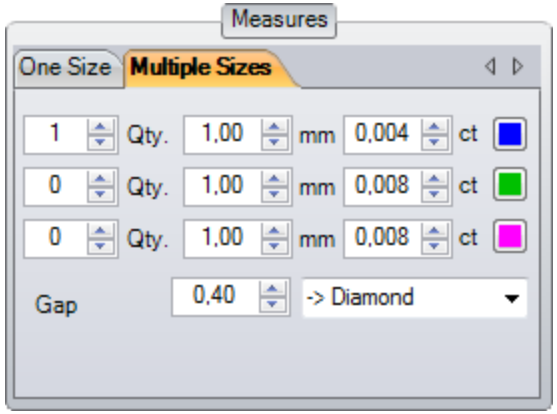
Keep the gems overlap (red circles in the next image), do not delete the overlap gems. That's interesting, because once created we can edit and change the sizes

Keep the distance between the edge, allows us to respect the distance at the surface edge.

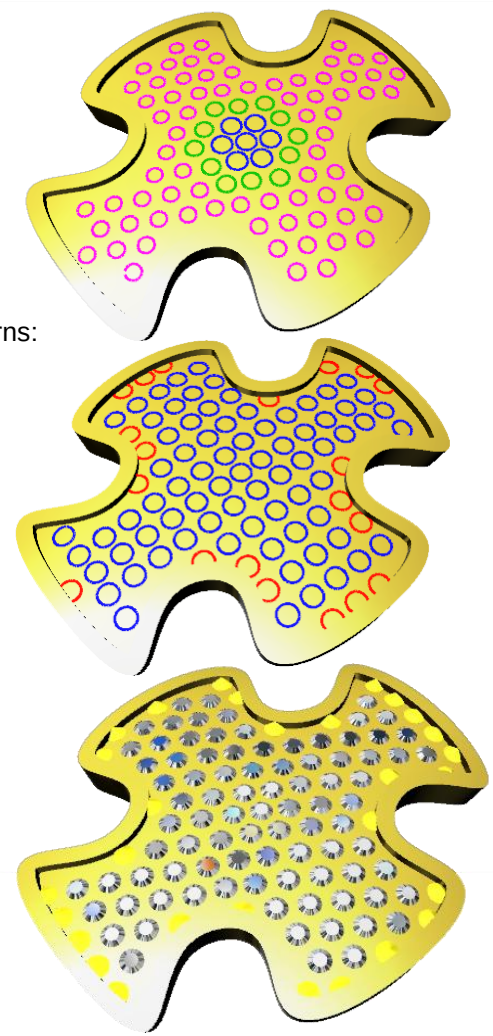
In case of just one size:



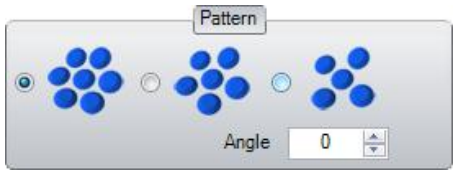
Notes:



In this option, we can define which sizes and how many we want to use in our pave, as well as the distance between their self.



In **Pattern** we can define hexagonal, pentagonal and rectangular patterns:



We have two algorithm of calculations of pave: Mathematic and Natural: The Mathematical one uses the surface typology without caring the cutting. The Natural one cares the cutting for the calculations.

To make the calculation and display faster, it shows us the gems as circles by default. But, we have the option to display them in Gem Mode:

Notes:

2. Click on **OK** to add gems on the document.

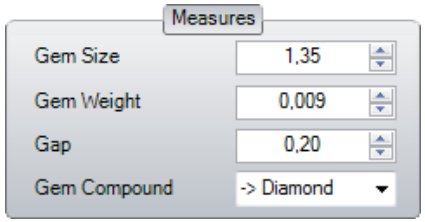
Important Note

Once the pave created, gems will be added automatically on the **Explorer** Tree, and are fully parametrical and editable.
It's really interesting to complement this pave with the **Dynamic Pave** for those zones that we are interested to create by yourself.

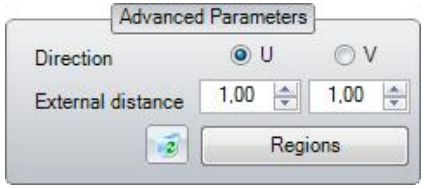
Pave UV

This tools allows us to create paves automatically following the U direction and V surface. This tool is very helpful, also, with geometrical shapes.

1. Select gems to use clicking on **Select**. It will show us a real time pave.

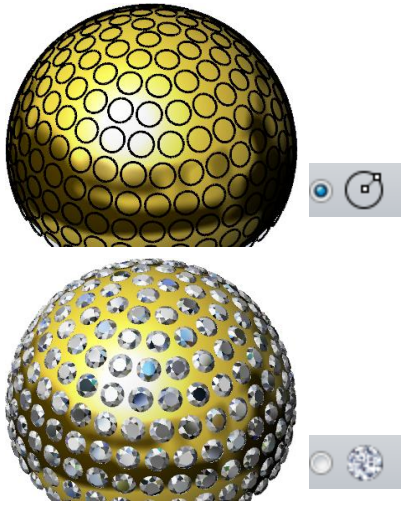


2. In **Dimensions**, we define the gems dimensions, as well as the distance between them.



3. In **Advanced Parameters**, we define the priority direction of the Pave in U or in V. It depends of geometrical shape. The direction is important, try both and choose the one you preferred.

4. Click on **OK** to add the gems on the document.



Exterior Distance is the margin that gems respect with the surface edges. In Region, we can define closed curves:

Once is created, gems will be added automatically on the **Browser** tree, and are fully parametric and editable. It's really interesting to complement this pave with the Dynamic Pave for those zones where we are interested to create our style.

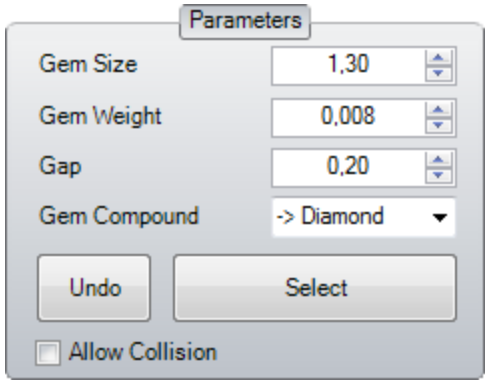
Notes:

Pave Dynamic

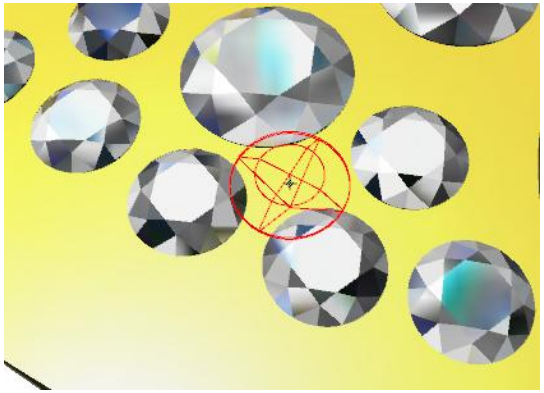
This tool allows us to create manually. This allows creating paves more natural and less mathematical. Useful to complement automatic paves.

1. Select the surface clicking on **Select**:

2. In **Parameters** we can define the size, weight and the distance between gems.



By default the gem display will be in blue, except when this one is in collision with others, than will change to red:



3. Clicking on **Select** in **Parameters**, allows us to add gems you want to.

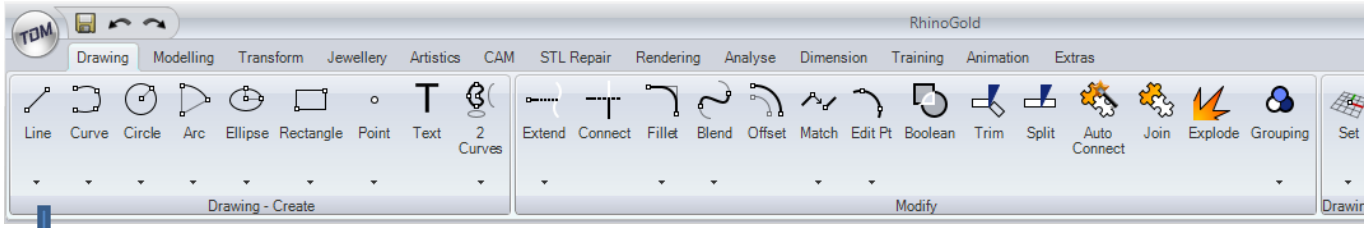
We can disable the option to detect collision ,clicking on **Allowing Collision** Once is created, gems will be added automatically in the **Explorer** tree, and are fully parametrical and editable.

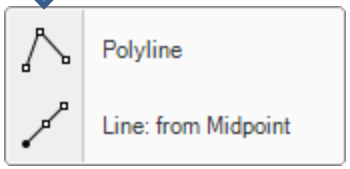
Notes:

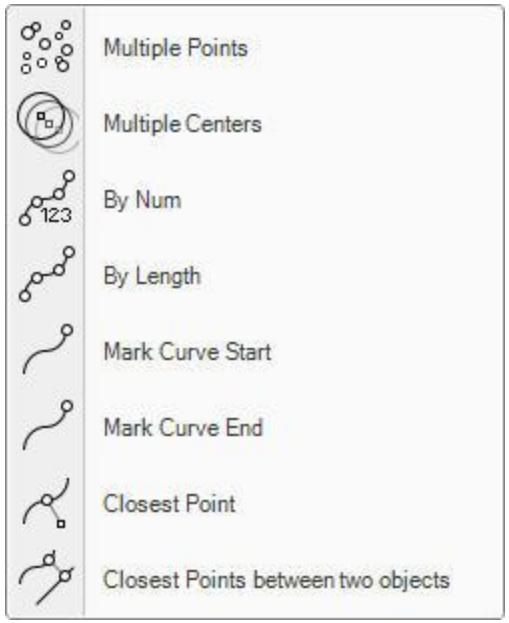
Lesson 5 – Drawing

Notes:

Drawing Tools I - Drawing Lines







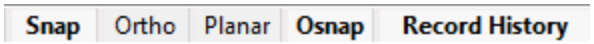
Drawing lines I

The **Line**, **Line: from midpoint** and **Polyline** commands draw straight lines. The **Line from the midpoint** command draws only a line segment. The **Line: From the Midpoint** command draws several line segments from one end to the other. The **Polyline** command draws several straight segments joined together (a single lineal curve with several segments).

Notes:

Modeling Aids

The modes are modelling aids that can be activated or deactivated simply by pressing an abbreviate method key, entering a letter or pressing a button.
Click on the **Snap**, **Ortho** and **Planar** or record history boxes on the status bar to activate and deactivate these modelling aids.



Snap
This forces the cursor to move over the intersections of the grid.
You can also active / deactivate Snap by pressing F9 or entering the letter S and pressing Enter.

Ortho
This restricts the movement of the cursor at the points in a specific angle from the last point created. The predefined angle is 90 degrees.
You can also activate / deactivate the Ortho mode by pressing F8.

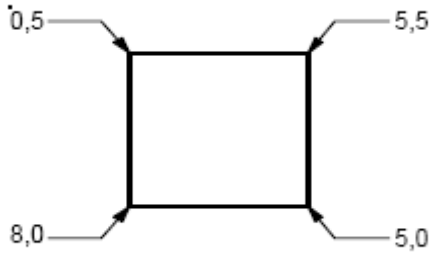
Planar
This modelling aid is similar to the Ortho mode. It facilitates the modelling of flat objects by forcing a plane parallel to the construction plane that passes through the last point selected.
You can also activate / deactivate the Planar mode by entering the letter P and pressing Enter.

Record History
This saves the historic record and updates the objects with the historic record. With the historic record saving and updating options activated, a transition surface can be changed by editing the entrance curves.

Notes:

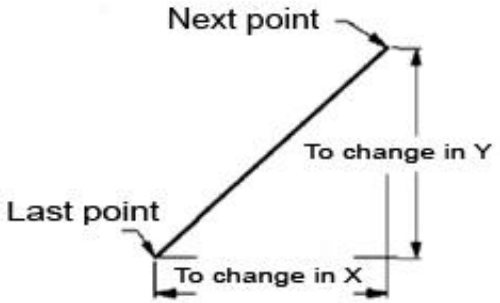
Relative coordinates

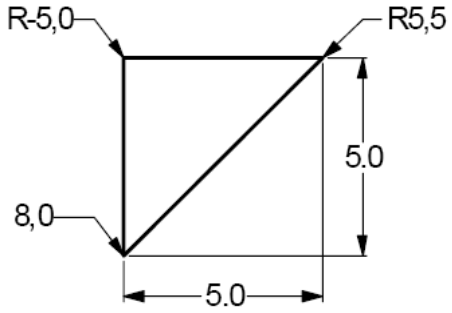
The absolute coordinates may be slow and uncomfortable but they work very well. In most cases the relative coordinates are easier to use.
Every time you select a point RhinoGold saves that point as the last point.
Relative coordinates are based on the last point and not on the point of origin (0,0,0) of the construction plane.
To work with relative coordinates, the X, Y and Z coordinates must be preceded by an R.



Absolute coordinates

The first type of coordinate used is called an **absolute coordinate. Absolute coordinates are** exact points on the X, Y and Z axes.

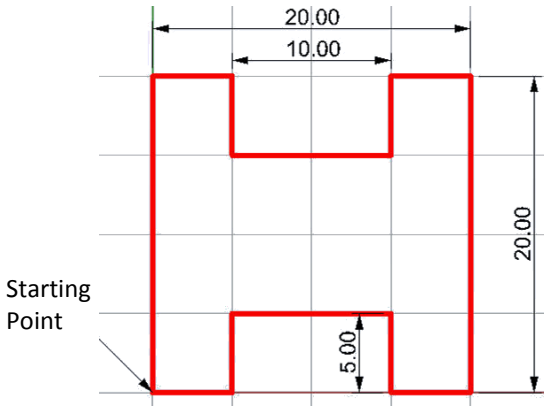


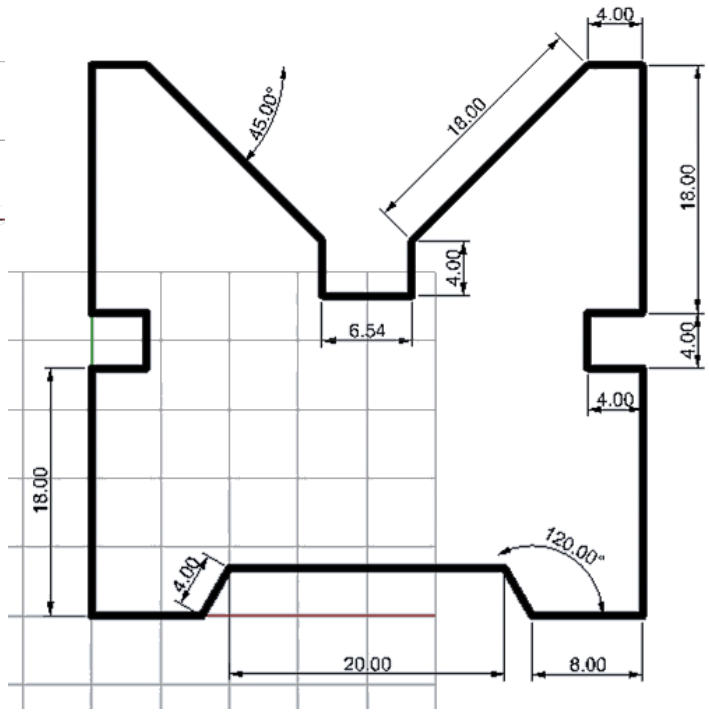


Notes:

Exercise

Create a shape for these figures with coordinates.





Optional Exercice

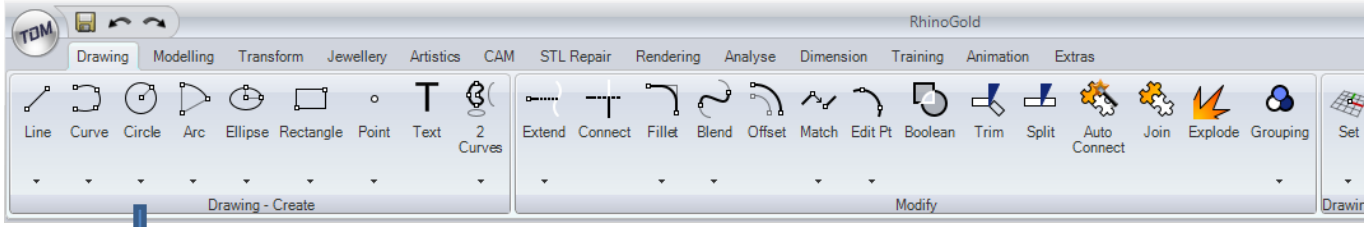
Notes:

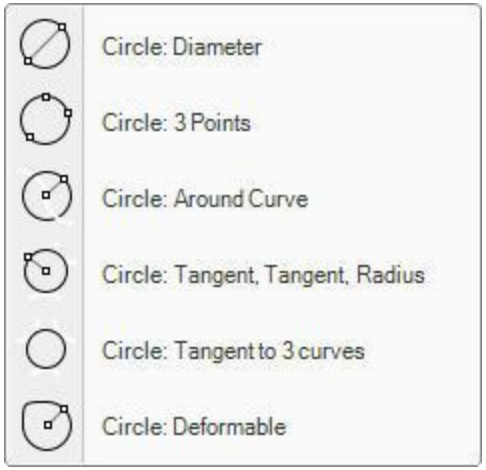
Object Snap (Osnap)

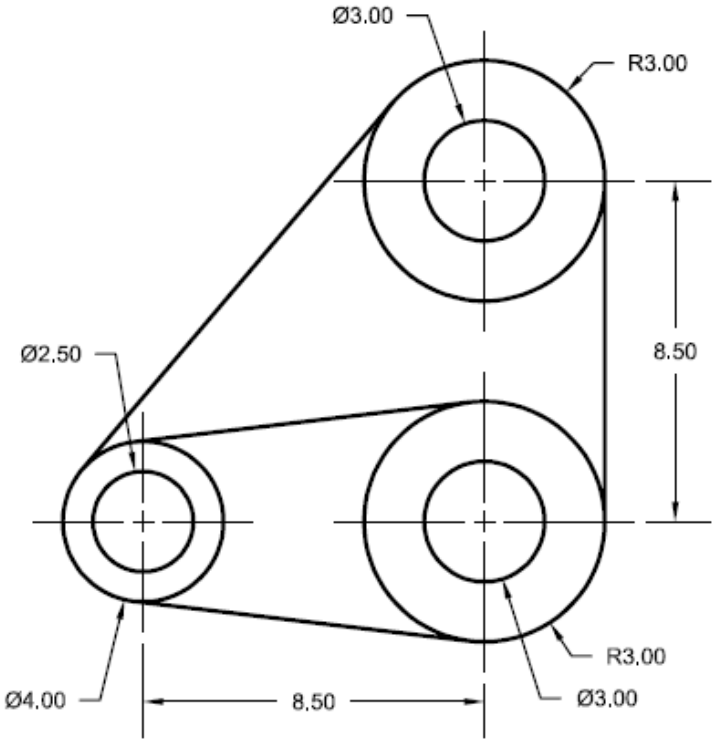
Command	Button	Description
End		Restricts the cursor at the end of a curve, the corner of a surface edge or the end of a polyline segment.
Near		Restricts the cursor to the point nearest an existing curve.
Point		Restricts the cursor to a control point.
Med		Restricts the cursor to the midpoint of a curve or surface edge.
Cen		Restricts the cursor to a point at the centre of a curve. This works better with circles and arches.
Int		Restricts the cursor to a point at the intersection of two curves.
Perp		Restricts the cursor to a point on the curve that perpendicular to the last point selected. It does not work on the first point that a command requests to designate.
Tan		Restricts the cursor to a point on a curve that is tangential to the last point selected. It does not work on the first point that a command requests to designate.
Quad		Restricts the cursor to the quadrant point. The quadrant point is the maximum or minimum direction of a curve in the X or Y direction of the construction plane.
Knot		Restricts the cursor to control points in curves or surface edges.
Plan		Projects the selection point to the construction plane.
SmartTrack		SmartTrack is a system of temporary lines and points of reference that are drawn in the Rhino view using implicit ratios between different 3D points, another spatial geometry and the directions of the coordinate axes.
Deactivate		Temporarily deactivates the references to permanent objects, saving the options.

Notes:

Optional Exercise

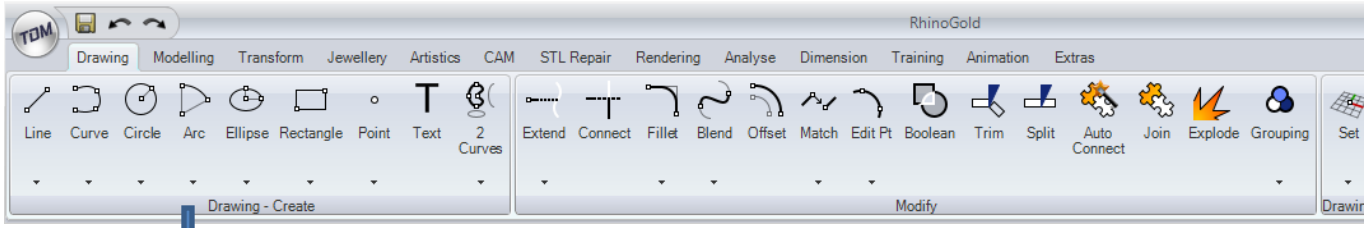


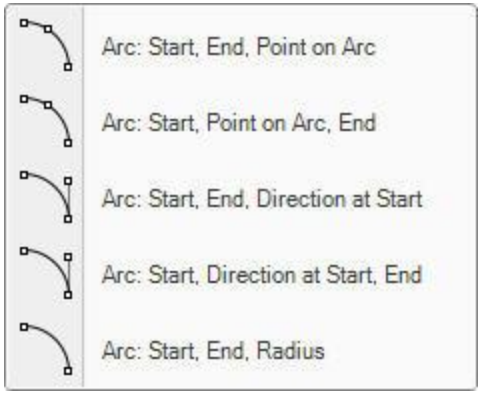


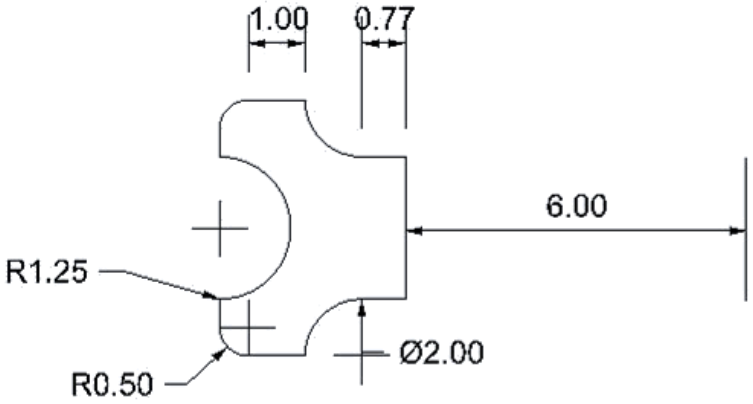


Notes:

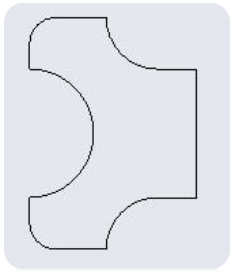
Arc - Exercise







Create the following figure with Lines and Arcs. After creating the figure, create the axis, as shown in the drawing, create a revolution. The **Revolve** command is in the **Modeling tab**.



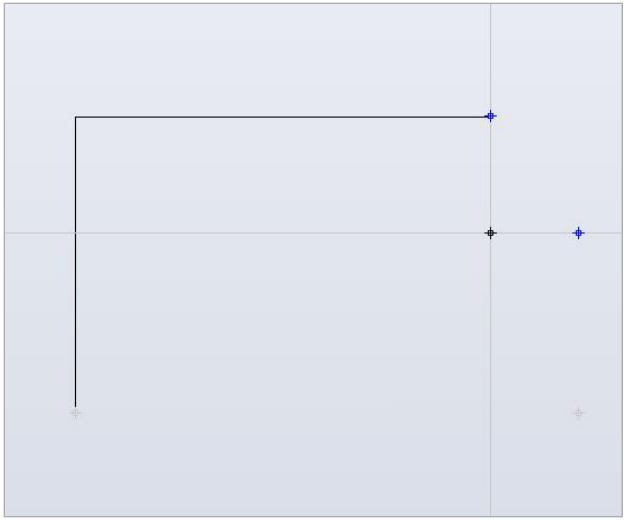
Notes:

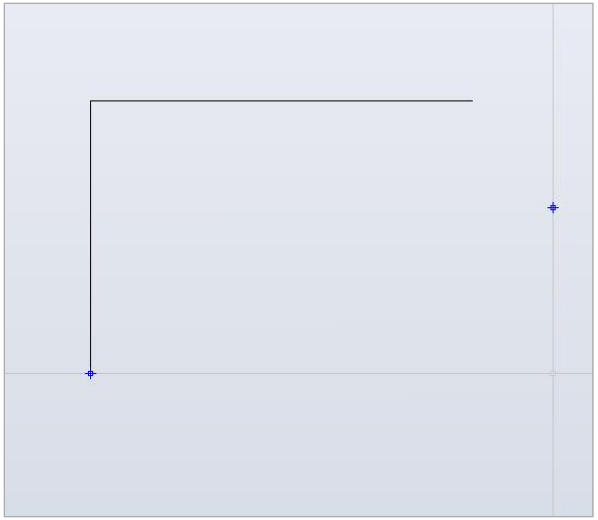
Smart Track

SmartTrack™ is a system of temporary lines and points of reference that are drawn in the RhinoGold view using implicit ratios between different 3D points, another spatial geometry and the directions of the coordinate axes.

The temporary infinite lines (dragging lines) and points (intelligent points) are available for references to objects as if they were real lines and points. It can restrict the cursor to intersections of dragging lines, perpendicular lines and directly to the intelligent points, as well as the intersections of dragging lines and real curves. The tracking lines and intelligent points are shown during the command.

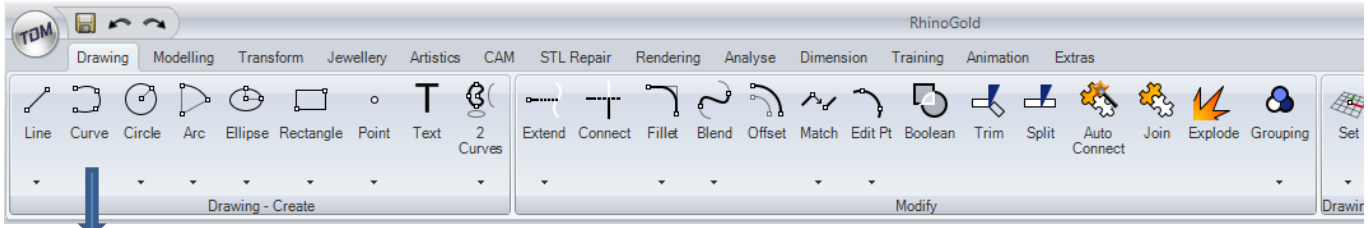
It can add or “capture” new points as necessary, up to the current maximum. When the maximum is reached, the oldest intelligent points disappear and new ones are added. The intelligent points captured can be erased at any time if they are not useful.

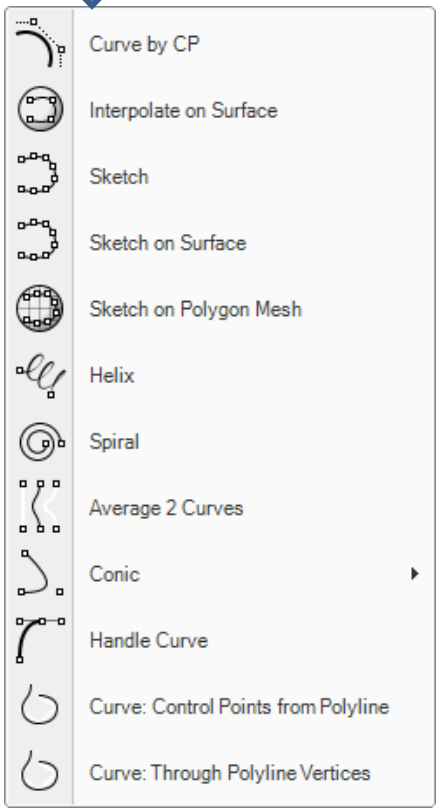




Notes:

Curve



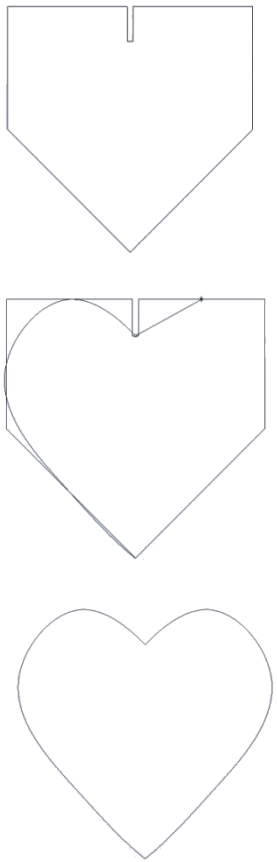


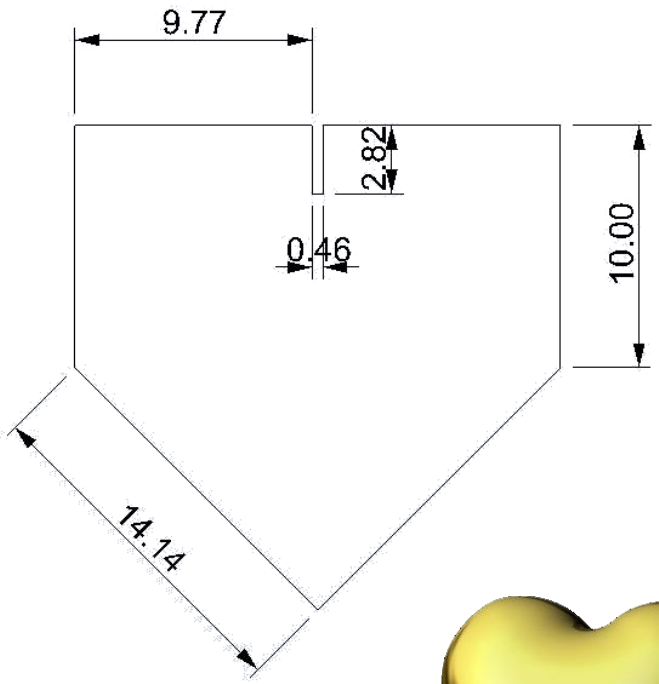
Command	Description
Curve	Creates a curve that passes through specific interpolated points. These points remain on the curve and determine its curvature.
Curve by CP	A curve by means of control points creates a curve with specified control points. The control points are not on the curve but they determine its curvature.
Interpolate on Surface	Draws a curve through selected locations on a surface.
Sketch	Draws a curve by dragging the mouse.
Sketch on Surface	Sketches a curve on a surface.
Sketch on Polygon Mesh	Sketches a curve on a polygon mesh.
Helix	Draws a helical curve.
Spiral	Draws a spiral curve
Average 2 Curves	Makes a curve half-way between two input curves.
Conic	Draws a conic section curve.
Handle Curve	Draws illustration-program-style chained Bézier curves.
Curve: Control Points from Polyline	The curve's control points are placed at the vertices of the polyline
Curve: Through Polyline Vertices	The curve passes through the vertices of the polyline.

Notes:

Exercise

Create a primitive shape with the **polyline** to create the heart base. Once the base has been created, which is the polyline, create the curves, as shown in the image, with the aid of **Osnap**.
When the curves of the heart have been created, hide the original polyline created at the start.

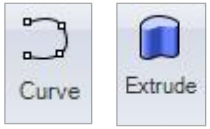


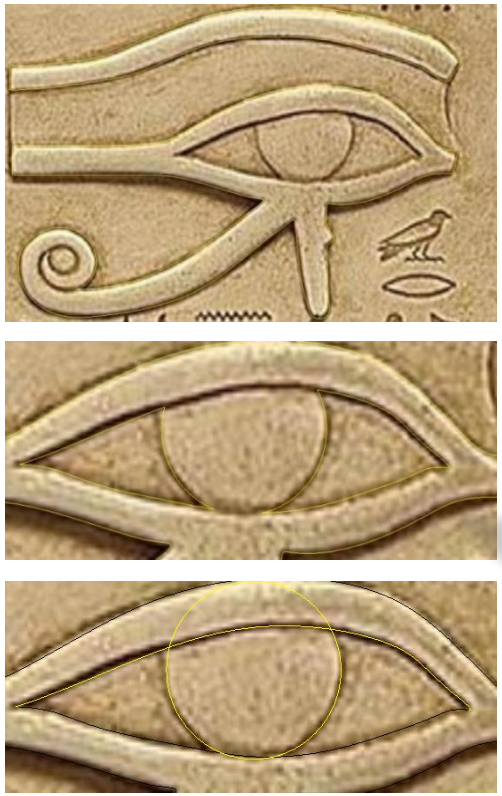


Notes:

Exercise

1. Open the **Trace.3dm** file.
2. Plot the course of a **Curve** interpolated by points, following the image of the eye.
3. Extrude the curve after plotting it.

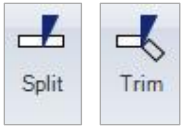




Notes:

Trim and Split

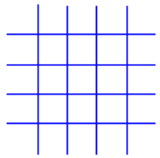
This command cuts and erases parts of an object to make it end exactly at the intersection.

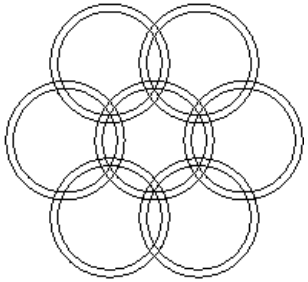


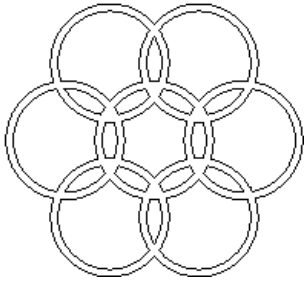
Exercise 5

Open the **Trim and Split.3dm** file of the RhinoGold models.

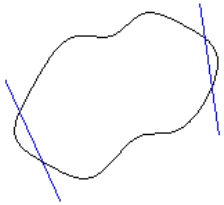
Trim

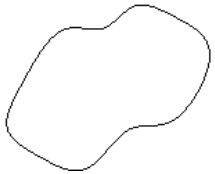


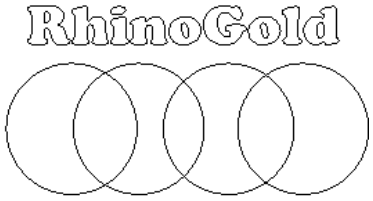


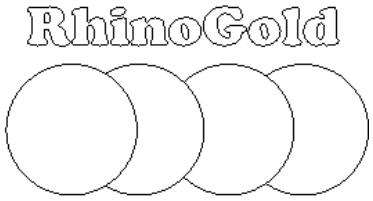


Split









Notes:

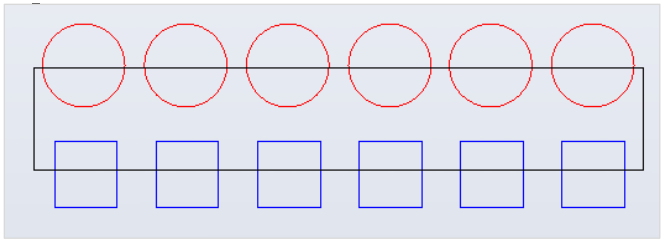
Curve Booleans

This command joins the parts of an object to make it end in the exact shape you want.

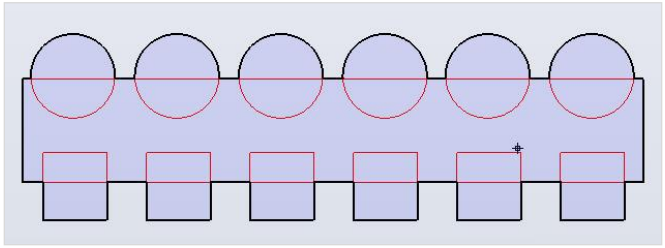
Exercise

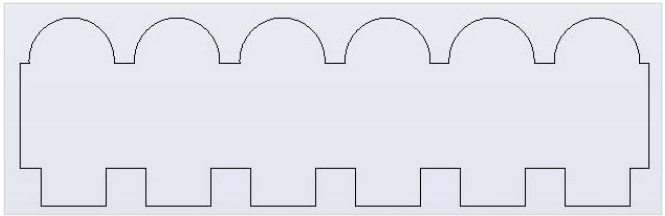
Open the **Boolean curve.3dm** file of the RhinoGold models.

1. Select the **Boolean curve** command in the **Drawing tab**.
2. The commands line will ask you to select all the curves. You can select **DeleteInput=All** to delete the curves after use it.



3. Select the areas to create a new curve.





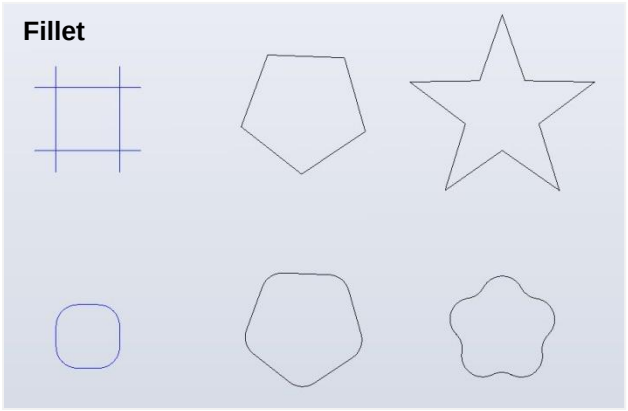
Notes:

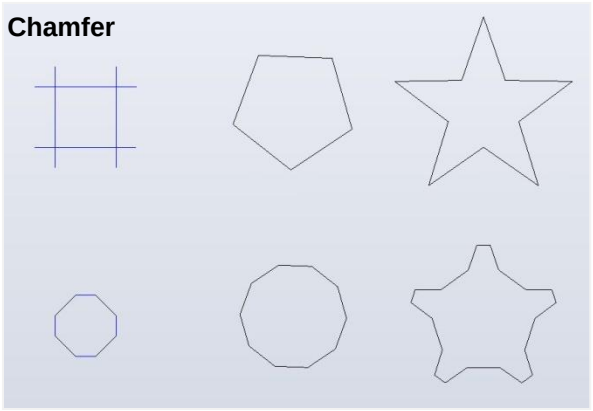
Fillet and Chamfer

This command connects two lines, arcs, circles or curves by extending or shortening them so that they touch each other or are joined with a circular arc.

Exercise

Open the **Fillet and Chamfer.3dm** file of the RhinoGold models.



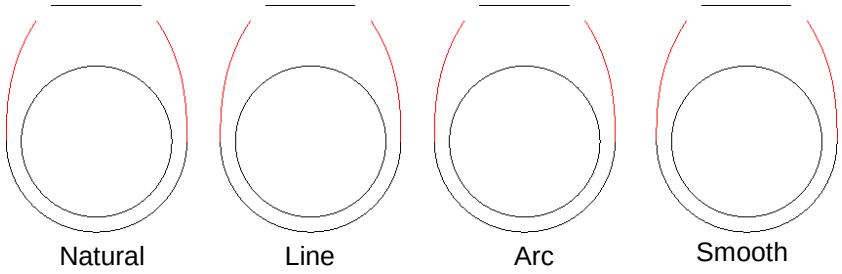


Extend curves

The Extend command lengthens an object to make it end precisely at the intersection with another object.
It is also possible to lengthen an object, even if there is no intersection.

Exercise

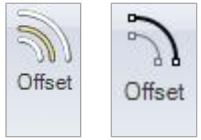
Open the **Extend curve.3dm** file of the RhinoGold models.
Please try the four types: **Natural**, **Line**, **Arc** and **Smooth**. And take a look to **Point** and **Center** option!



Notes:

Offset

The Offset command creates an object that is parallel or concentric with another object. Offset is used to create special copies such as parallel lines, concentric circles and concentric arcs through specific points or at predefined distances.

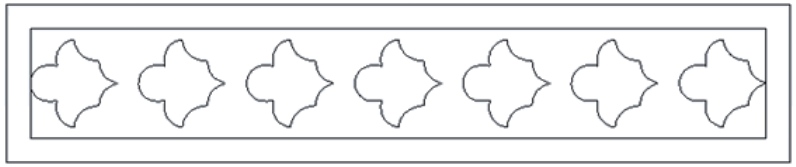


Exercise

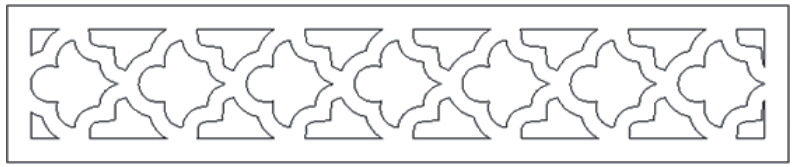
Open the **Offset in-out.3dm** file of the RhinoGold models.

1. Offset the central figures of the rectangle, the **offset** allows you to offset all the curves at one time.
2. After creating the **offset** execute the **Trim** command to leave the element ready.

Starting Drawing



End Drawing



Notes:

Editing Control Points

The control points or editing points of an object can be viewed to adjust the shape of the object instead of having to manipulate the whole object. This is called **editing control points**.
The points can be edited in meshes, curve and surfaces but not on polysurfaces or solids.
The RhinoGold curves are shown internally through rational non-uniform B-splines (NURBS). The shape of a NURBS curve is determined by three factors:

- A list of points known as **control points**
- Degree
- A list of numbers known as **nodes**

If any of these elements is modified, the shape of the curve will be changed.

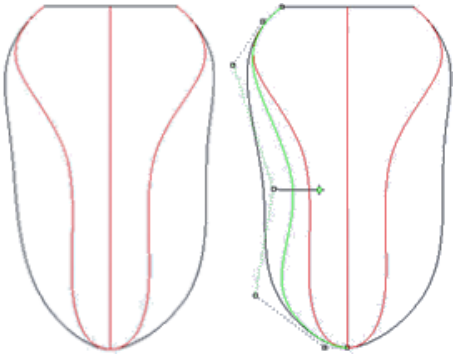
Observations on the control points, editing points and nodes

- The control points do not have to be on the curve.
- The editing points are always on the curve.
- RhinoGold allows you to edit curves and surfaces by moving the control and editing points.
- The nodes are parameters (i.e., numbers and not points).
- Adding nodes to a curve or surface allows you to control the movement of the object while editing the control points.

Exercise

Open the **Edit control points.3dm** file of the RhinoGold models. Adjust the curve in black and adapt it to the red curve, using the control points. The control points are activated in the **Drawing tab**, in the **Edit Pt** sub-menu. After adapting the curve, the next step is to **hide** the red curve with the **central hide button**

The other part of the exercise is optional, since the instructions will be brief: How to create the ring: Create a Network surface using the **Network** in the **Modeling tab**, in the **Loft sub-menu**.Create a caliber with the cylinder. Perform the **Boolean Difference** operation.



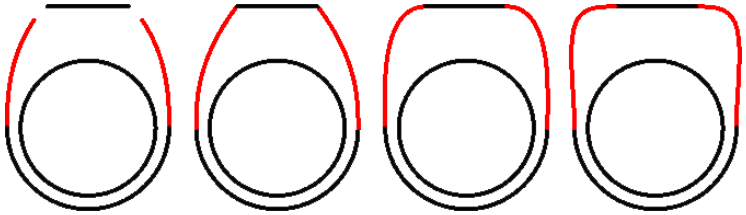
Notes:

Match

This command allows you to make on curve equal to another, joining them by searching for the position, tangency or curvature of the curves.

Exercise

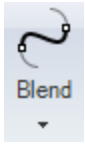
Open the **Match curves.3dm** file of the RhinoGold models . Please see the difference between the position, tangency and curvature.



Original Position Tangency Curvature

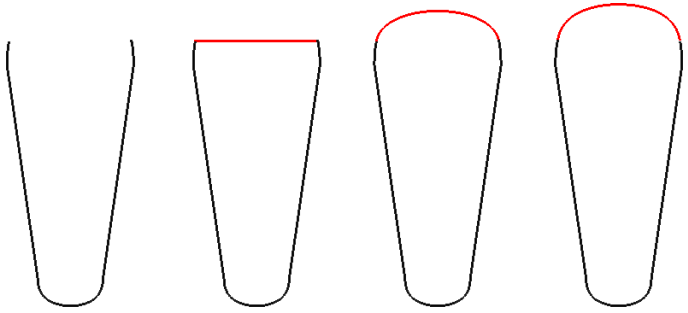
Blend Curve and Blend Adjustable Curve

Creates a blend curve between curves and/or surface edges with control over the blend continuity.

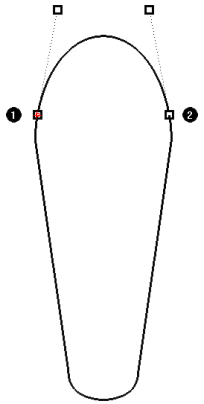


Exercise

Open the **Blend curves.3dm** file of the RhinoGold models . Please see the difference between the position, tangency and curvature. The difference between commands is the Adjuntable allows to draw and drop the points.



Original Position (G0) Tangency (G1) Curvature (G2)



Adjustable

Notes:

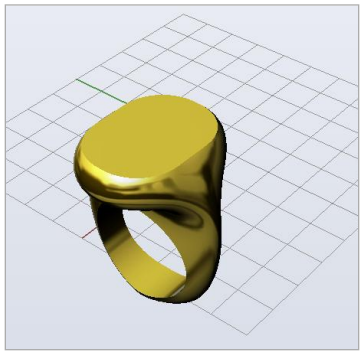
CPlane

The CPlane is a grid of the construction plane where you will create all your elements, and can even change their location on the axes.

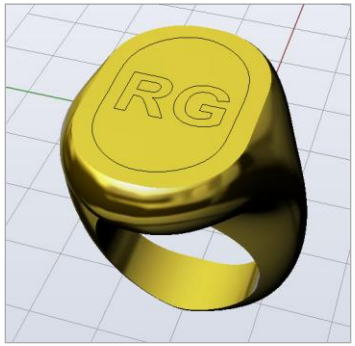
Exercise

Open the CPlane.3dm file of the RhinoGold models.

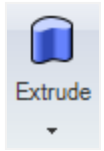
1. On the **Drawing tab**, click on **CPlane Set.**
2. There are several options between brackets for selecting the way to position the **CPlane**. **Select Object** option and click on the top surface.
3. The **CPlane** will be placed at the top of the ring thereby enabling you to work on this part of the ring, like the example shown in the images, with the curved tool, for example.



4. Create **Text** is in the **Drawing tab**, when creating the text create it in Curves and position it using the Move, Rotate and 2D scale tools until it looks like the one in the image.



5. Create an extrusion of the curve created and the letters in negative, at a distance of **-0.5**. In **Modeling tab**, there is the **Extrude** command:



6. In the **Modeling tab** of the **Boolean Difference** Union sub-menu. In the case of the **Boolean** tool first select the group that will not be eliminated, in that case the group that will remain intact is the ring. As the second group, select the extrusion.

Notes:

Lesson 6 – Modeling

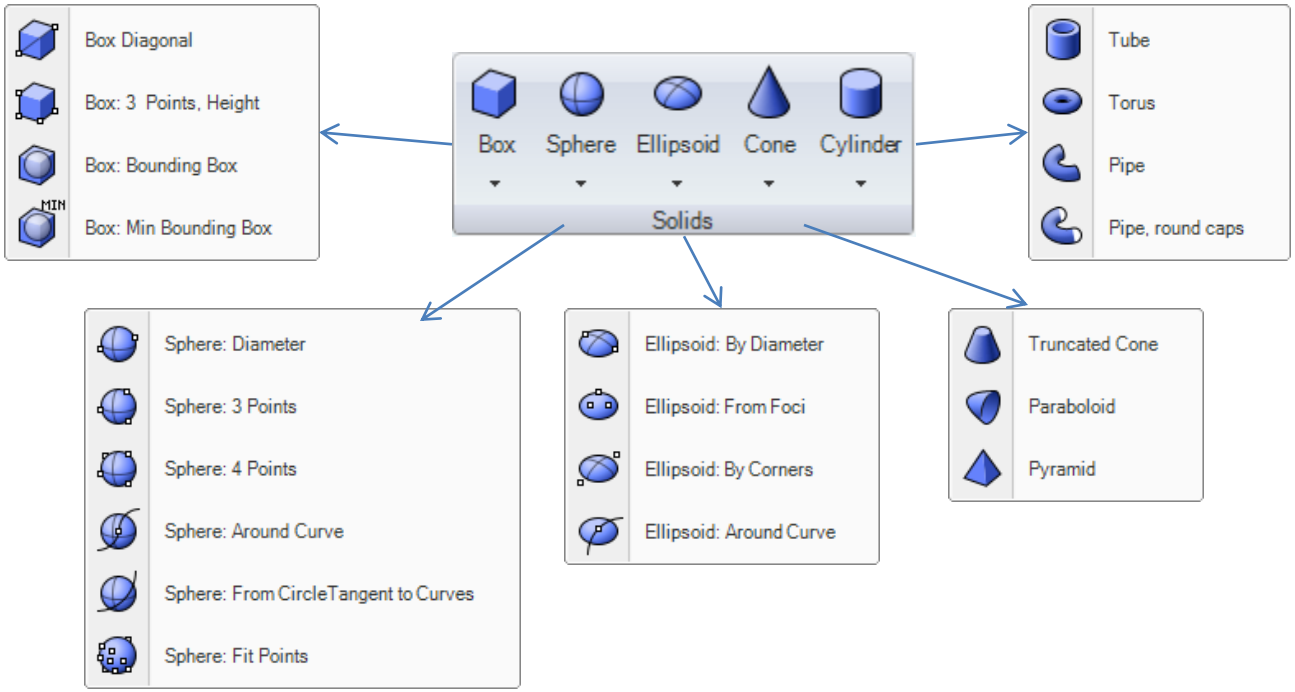
Notes:

Modelling Solids

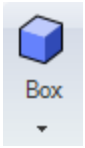
It is easy to model solids in RhinoGold. There are several commands that allow you to create and edit solid objects. Solids in RhinoGold are closed surfaces or polysurfaces enclosing a volume.

Some of the original solids surfaces are simple closed surfaces whose edges coincide completely, and others are polysurfaces.

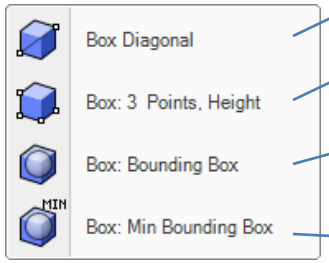
The RhinoGold Polysurface objects can be deformed using the new UDT (Universal Deformation Technology) tools. Surfaces can also be extracted and deformed by editing the control points, as in the last exercise. This part of the course offers a description of how to create solids, separate parts, make changes and join parts to make a solid.



Notes:



Draws a rectangular box using the corners



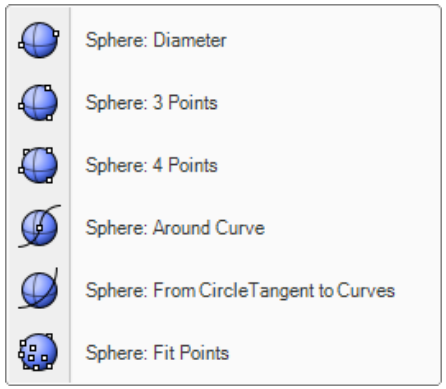
Draws a rectangular box using two diagonal corners and a height.

Draws a box using two adjacent corners, a point on the edge at the other side and a height

Draws a rectilinear bounding box object (polyline or polysurface) that encloses the objects.

Draws the minimum Bounding Box of one or several objects. This command has multiple applications, enhancing that one that searches the best position to save materials in the prototyping.

Draws a sphere box using center point and the radius/diameter value



Draws a sphere using the two ends of its diameter.

Draws a sphere using three points on the surface.

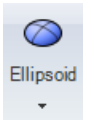
Draws the base circle through three points and uses a fourth point to determine the sphere's size.

Draws a sphere perpendicular to a curve.

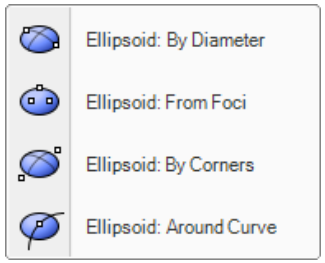
Draws a sphere tangent to three curves.

Draws a sphere by fitting to selected point objects.

Notes:



Creates a solid ellipsoid with options for from the corners of a bounding box, axis endpoints, from foci, and around a curve.

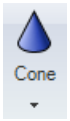


Draws an ellipse around a curve.from the diameter

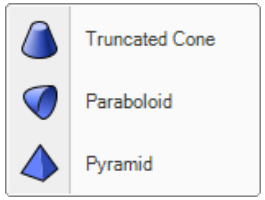
Draws an ellipse from focus points and a point on the curve.

Draws an ellipsoid from the corners of an enclosing rectangle.

Draws an ellipse around a curve.



Draws a solid cone

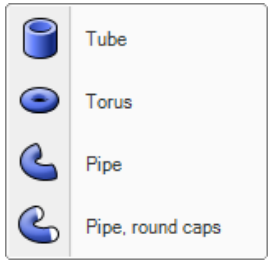


Draws a solid cone whose apex is truncated by a plane.

Draws a parabolic surface from the focus or vertex locations.

Draws a solid pyramid from a polygon base and a height.

Draws a solid cylinder



Draws a closed cylinder with a concentric cylindrical hole.

Draws a solid torus (donut shape).

Draws a surface with a circular profile around a curve.

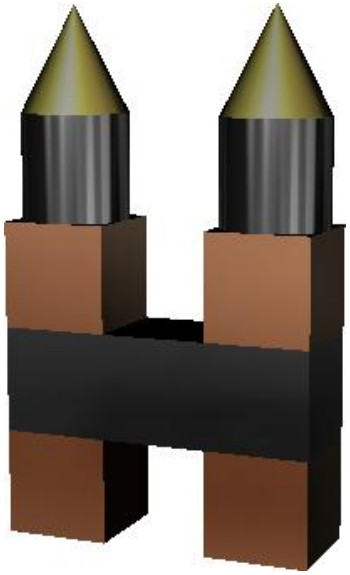
Draws a surface with a circular profile around a curve. Cap with hemispherical surface.

Notes:

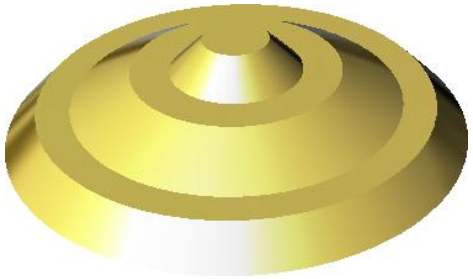
Exercise

Save the file as **Create Solid.3dm** in the RhinoGold models, and try to model these pictures. The sizes are not important. Remember the **Osnap**, it will helps you in this exercise.

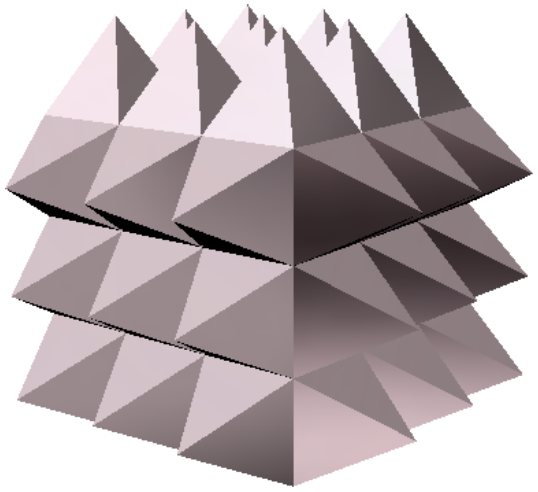
Castle



Concentrical trucated cones



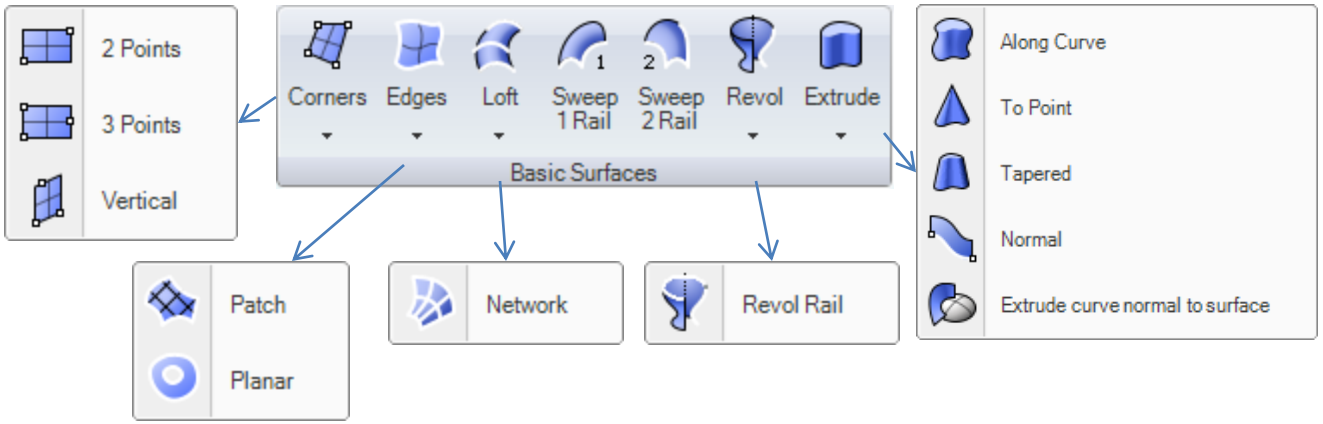
Piramids on a cube

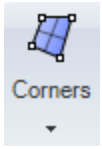


Notes:

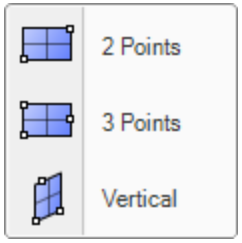
Modelling Surfaces

The surface modeling is one of the principal advantages of RhinoGold. These surfaces also known as NURBS, Non-Uniform Rational B-Splines, are mathematical representations of 3-D geometry that can accurately describe any shape from a simple 2-D line, circle, arc, or curve to the most complex 3-D organic free-form surface or solid. Because of their flexibility and accuracy, NURBS models can be used in any process from illustration and animation to manufacturing.





Creates a surface from specified corner points.

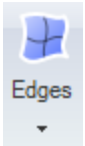


Draws a rectangular planar NURBS surface from specified corner locations

Draws a rectangular planar NURBS using two adjacent corner locations and a location on the opposite side.

Draws a rectangular planar NURBS perpendicular to the construction plane.

Notes:



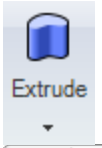
Creates a surface from specified corner points.

Fits a surface through selected curves and point objects.

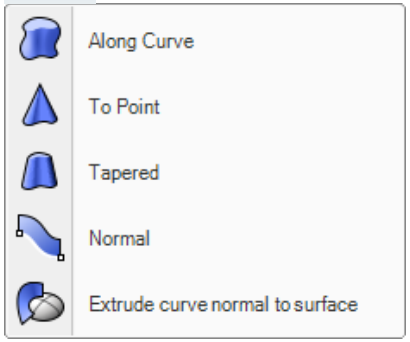
Creates a planar surface from planar curves that define the surface edges.

Creates a surface by revolving a profile curve that defines the surface shape around an axis.

Creates a surface by revolving a profile curve that defines the surface shape around a rail curve that defines the surface edge.



Creates a surface or solid by driving a curve in a straight line perpendicular to the construction plane.



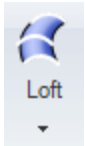
Extrudes a curve along a path curve.

Creates a surface or solid by driving a curve to a pointed surface.

Creates a surface or solid by extruding a curve to a tapered polysurface.

Creates a surface by offsetting a curve and creating a ruled surface in the area between the two curves.

Creates a surface by extruding a curve on a surface, normal to the surface.



Creates a surface fit through selected profile curves that define the surface shape.

Creates a surface from a network of curves.

Creates a surface through profile curves that define the surface shape and one curve that defines a surface edge.

Creates a surface through profile curves that define the surface shape and two curves that define the surface edges.

Notes:

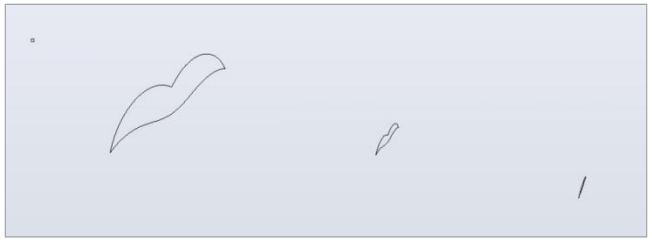
Loft Surface

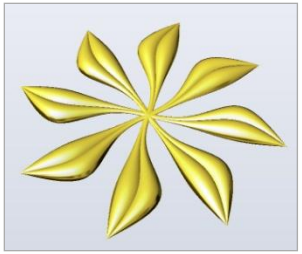
Create a surface using shape curves; the normal, loose and adjusted options create a surface without folds when it passes through curved shapes.

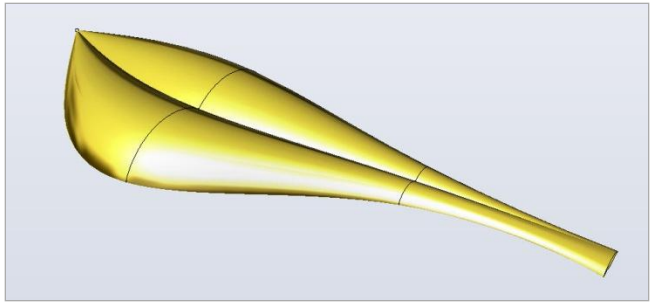
The Straight sections option creates a surface with folds in each curved shape and straight sections between the curved shapes.

Exercise

Open the **Loft.3dm** file in the RhinoGold models.







Notes:

Sweep 1 Rail

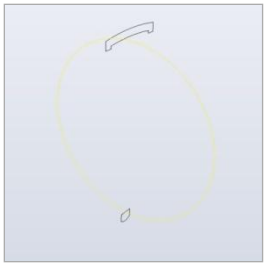
Creates a surface through profile curves that define the surface shape and one curve that defines a surface edge.

Notes:

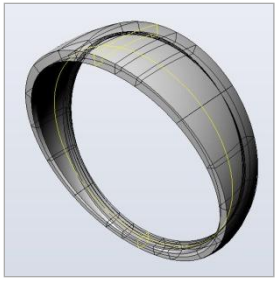
Exercise

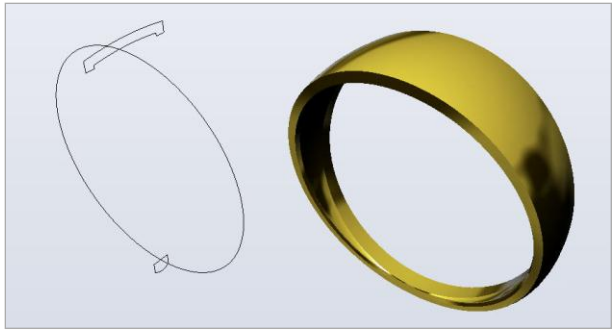
Open the **Sweep 1 rail.3dm** file of the RhinoGold models.

1. On the **Modeling** menu, click on **Sweep 1 rail**.
2. First of all select the **rail curve**.



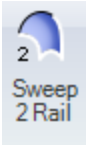
3. Select the **2 cross sections**.





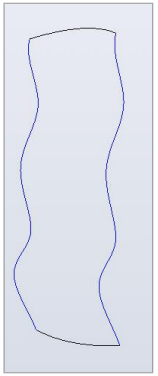
Sweep 2 Rails

Create a surface using curved shapes that follow two paths defining the edges of the surface.

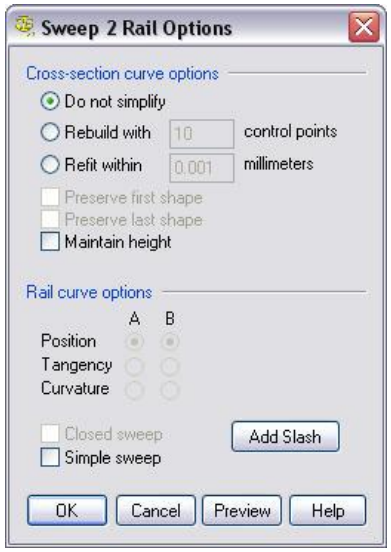


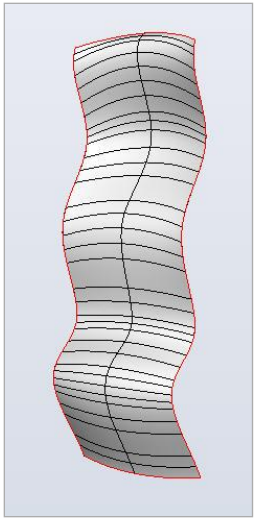
Exercise

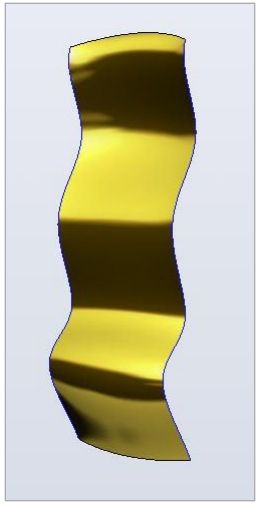
Open the **Sweep 2 rails.3dm** file of the RhinoGold models.



1. On the **Modeling** tab, click on Sweep 2 rail.
2. Select the two blue rail curves.
3. Select the cross section curves. (black curves)
4. Press **Enter**.
5. In the **Sweep to 2 rail dialog**, click on **Accept**. A surface will be created in which the edges coincide with the path curves.



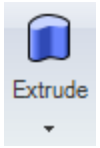




Notes:

Extrude

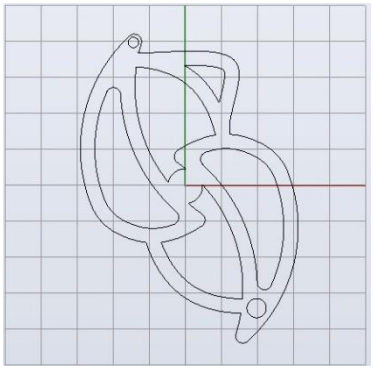
Extrude a curve (or more) perpendicular to the construction plane with the option of tapering the surface with the de-molding angle.



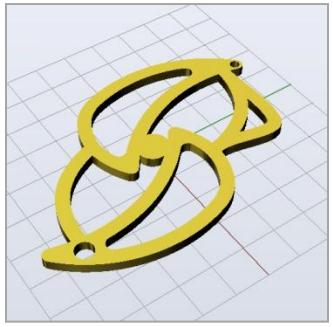
Exercise

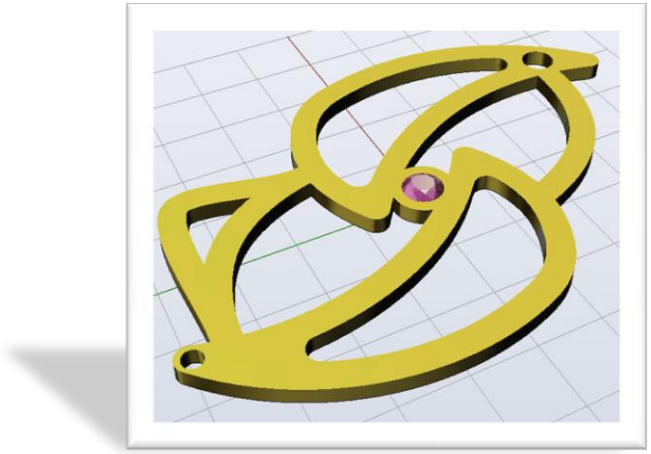
Open the **Extrusion.3dm** file in the RhinoGold models.

1. On the **Modeling tab**, click on **Extrude**.
2. Select the curve freely.



3. Enter the value **1.3** in the command line.





4. After creating the part, position the gem in the middle of the element.

Notes:

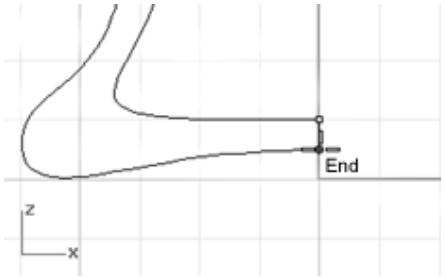
Revolve Surface

Revolves a curve around an axis to create a surface.

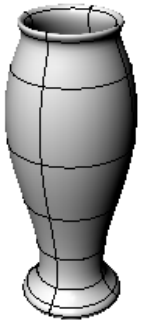
Exercise

Open the **Revolution.3dm** file in the RhinoGold models.

1. On the **Modeling tab**, click on **Revol**.
2. Select the curve freely.
3. Select an end of the curve to define a rotation axis.



4. Select the other end of the curve.
5. The command line will ask you for a revolution angle and a series of options. Select **FullCircle**.

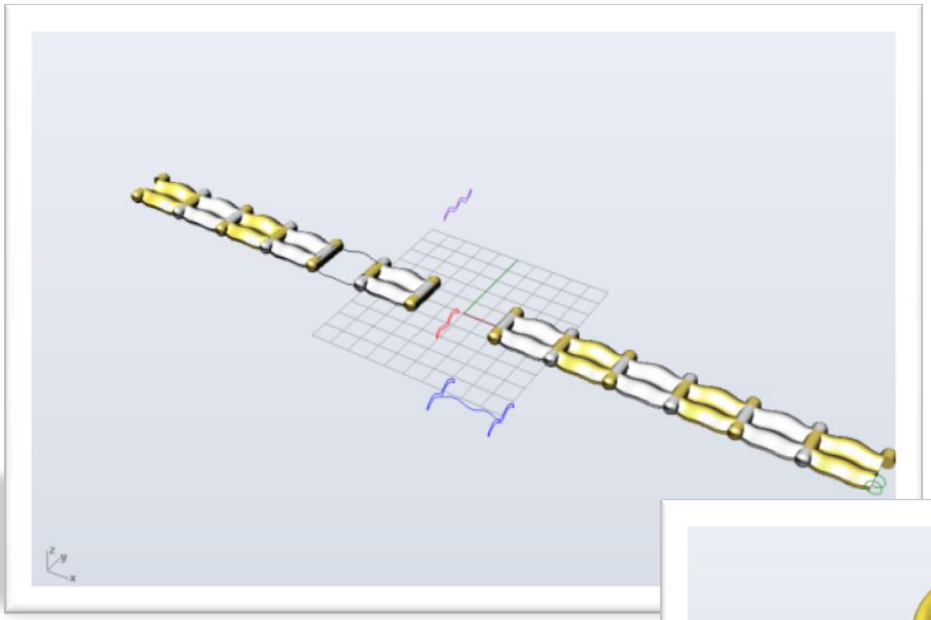


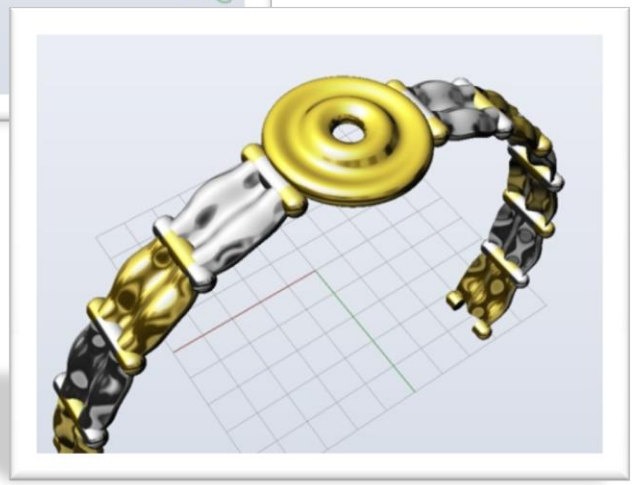
Notes:

Practising surfaces

Exercise

Open the **Surfaces.3dm** file of the RhinoGold models. In this exercise the aim is to make different types of surfaces and execute the surfaces indicated in the same file.





Notes:

Notes:

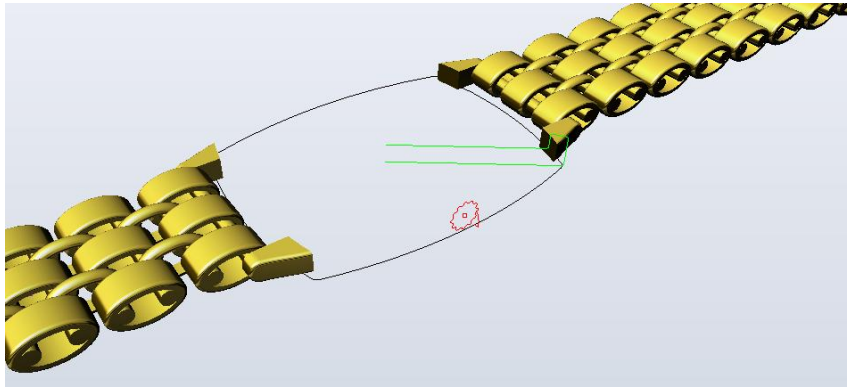
Revolve by Rail

This revolves a curved figure by attaching an end along a track. This command is useful for adding soft edges to irregular surfaces.

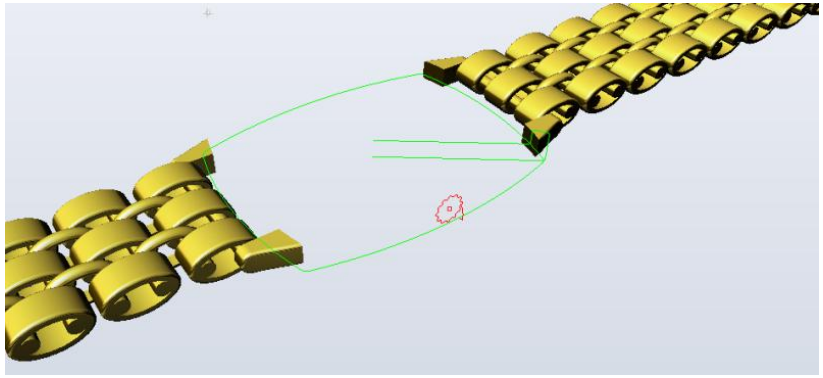
Exercise

Open the **Rail Revolve.3dm** file of the RhinoGold models.

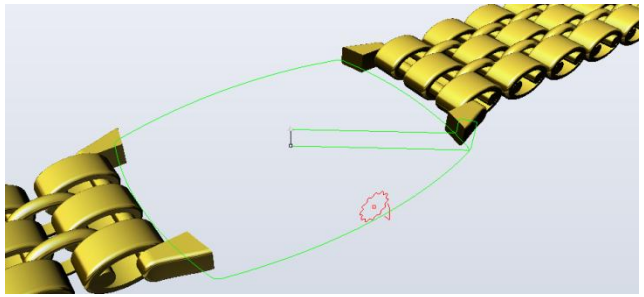
1. In the **Modeling** tab of the **Revolve sub-menu**, execute the **Revolve Rail** command.
2. Select the section curve.



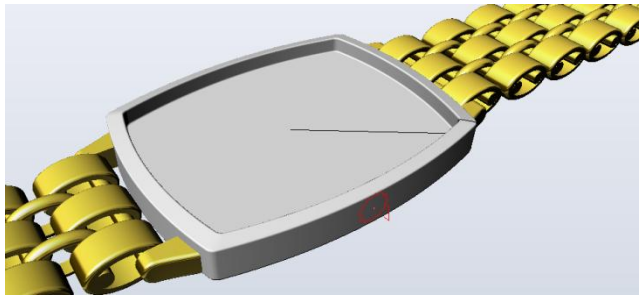
3. Select the rail curve



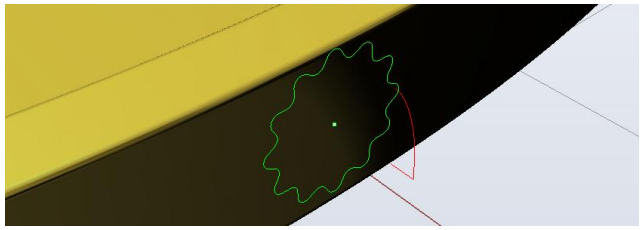
4. Define the axis using the end points of the profile curve

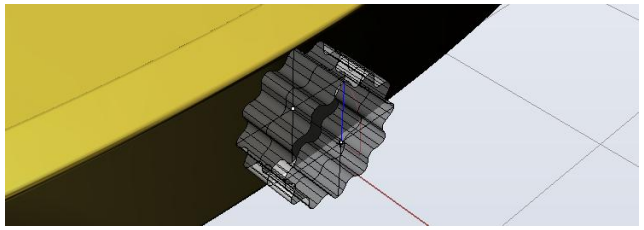


The command will create the result:

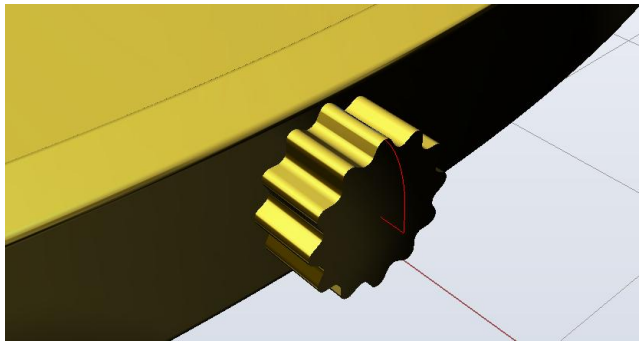


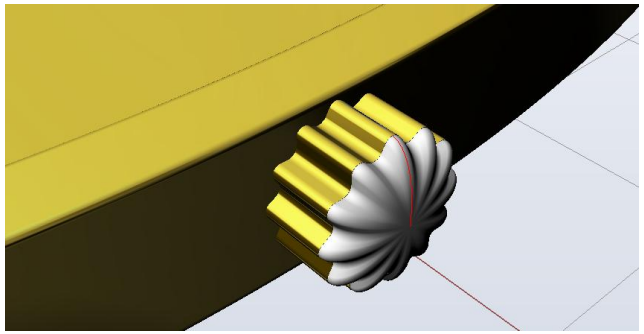
5. Extrude the curve to the red curve:





6. Revolve by Rail the red curve. Remember you can use the extruded surface border as rail





Notes:

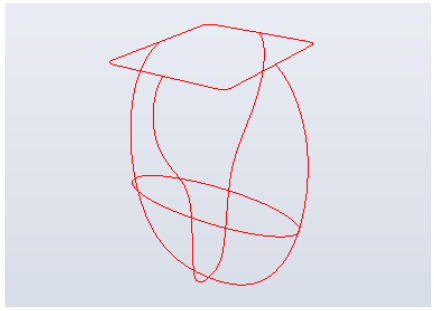
Network Surface

The Network surface allows you to create a surface using curves or sections that are joined together, i.e., touching each other, as these curves are not connected and do not make up the surface; in the exercise one can see how a Network surface is created from 5 curves.

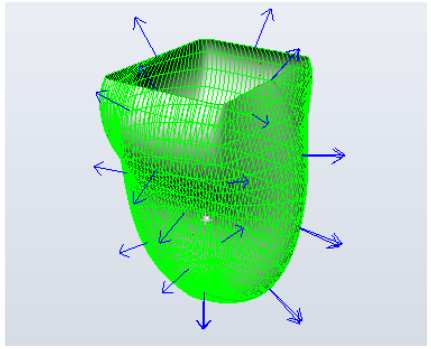
Exercise

Open the **Network surface.3dm** file of the RhinoGold models.

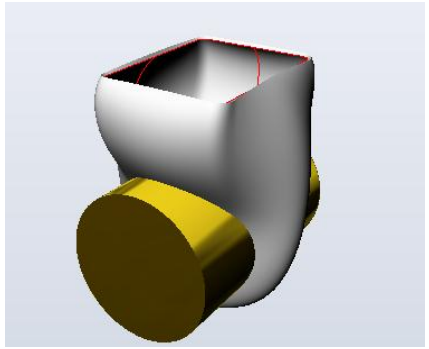
1. In the **Modeling tab**, click on the **Loft sub-menu** and then click on **Network**.
2. Select the curves freely.

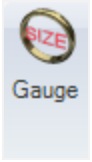


3. On the **Modeling tab**, click on **Offset**.
4. Select the surface to be offset, the offset must be at a distance of **0.5** towards the exterior and with the option **Solid** in the command line activated.



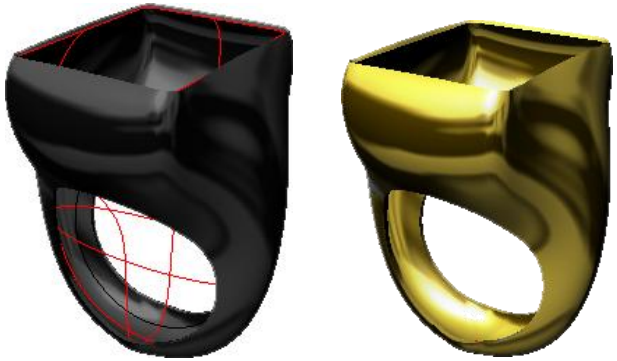
5. On the **Jewelry tab**, click on **Gauge**
6. Select a **European Region**, **size 14**, and in the cylinder field put the value **21** and click on **OK** button.



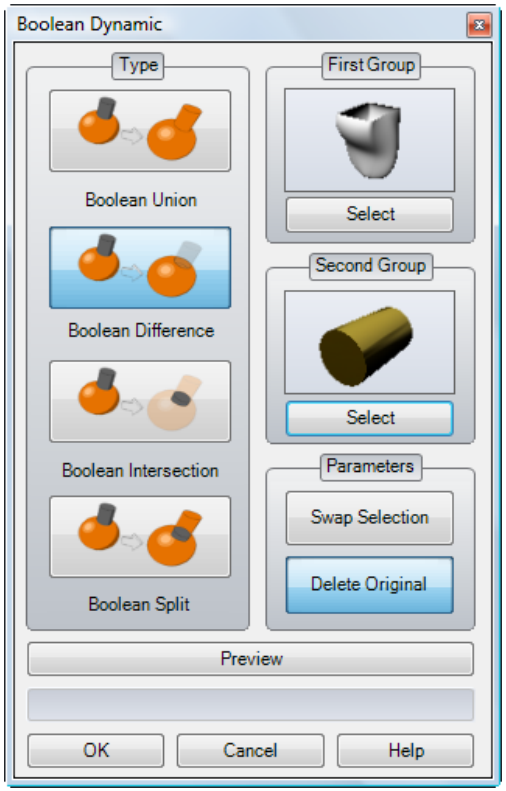


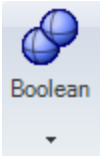
Notes:

7. In the **Modeling tab**, click on **Boolean**.
8. Click on **Boolean Difference** button
9. In **First Group**, click on **Select** button and select the ring solid
10. In **Second Group,** click on **Select** and select the cylinder
11. Click on **Preview** to see how will be the result

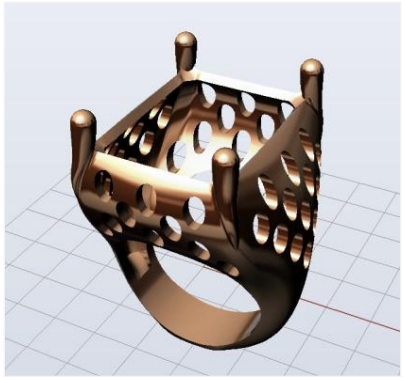


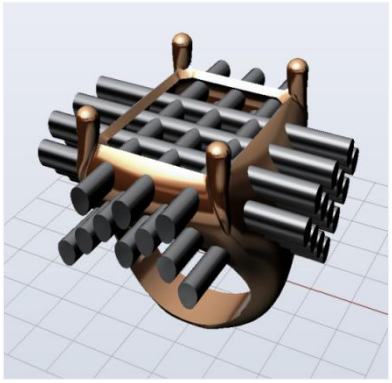
12. Click on **OK** button to add the object to the document





Please, open the file **Boolean Ring.3dm** and test the Boolean operations.





Notes:

Variable Fillet and Variable Chamfer

Variable fillet and variable chamfer allows you to select edge in elements or surfaces that are joined to make a variable rounded shape with different specific radii that are marked by you and in the case of a beveled edge, a distance marked by you.

Concept

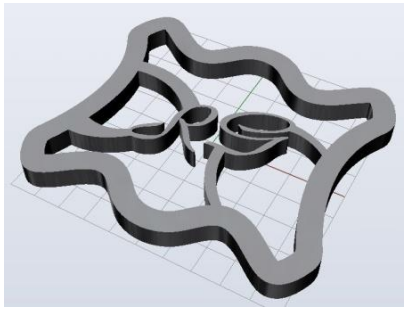
Chamfer

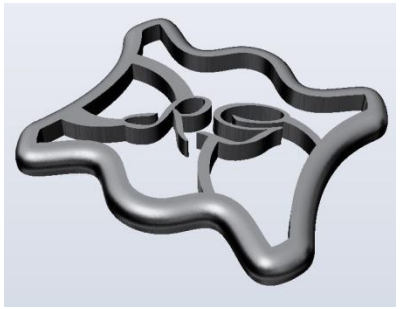
Fillet

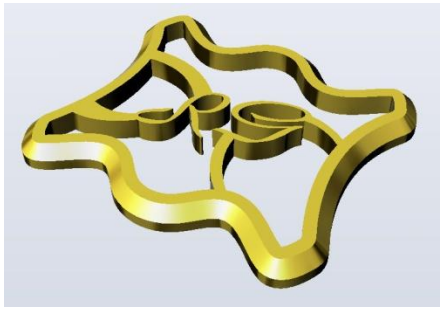
Exercise

Open the **Fillet and Chamfer 3D.3dm** file of the RhinoGold models.

1. In the **Modeling tab**, click on the **Fillet sub-menu** and then click on **Variable fillet**.
2. Select the outer edge of the silver element to create the joining radius with **value 3 mm**.
3. Select the outer edge of the gold element and proceed in the same way but with a **Chamfer** edge **of 2 mm**.



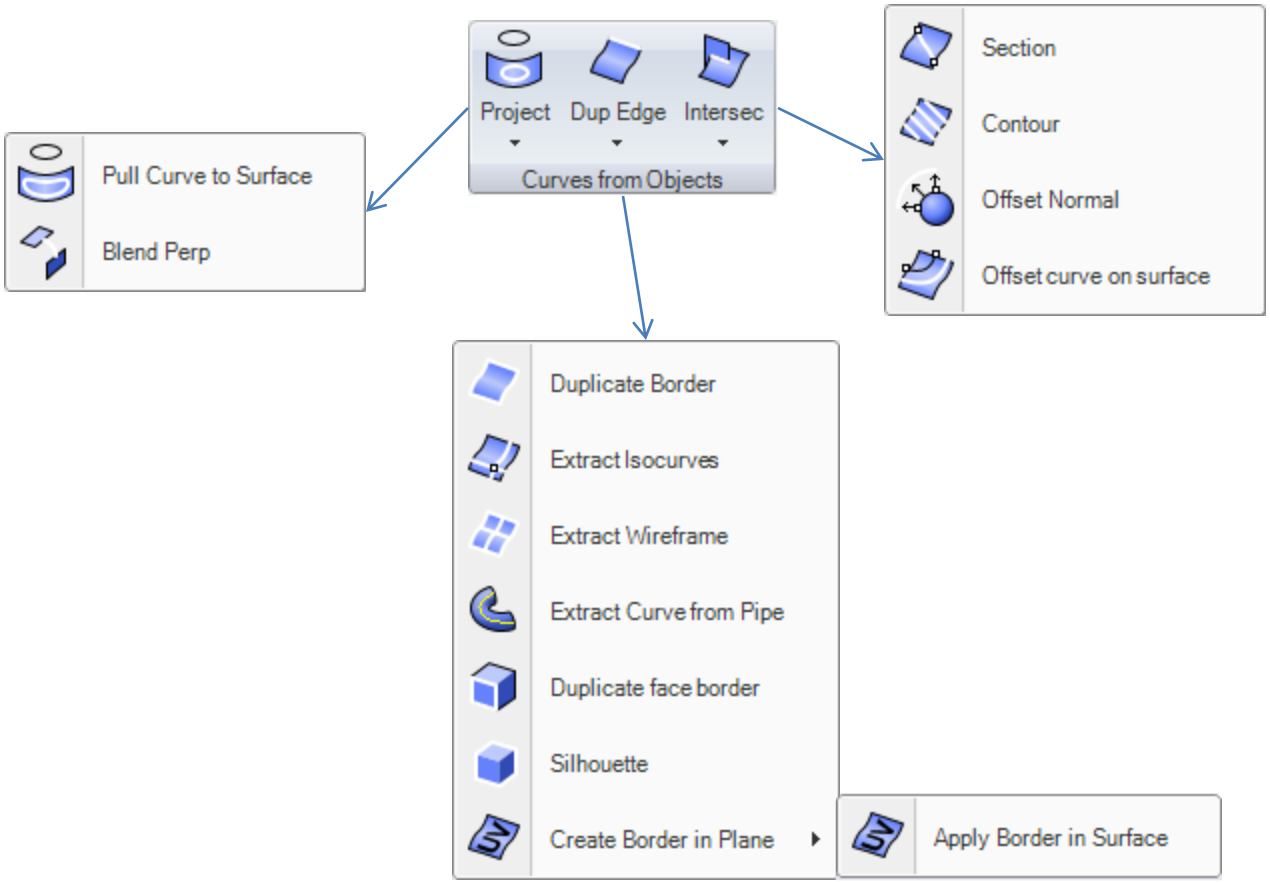




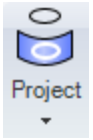
Notes:

Curves from Objects

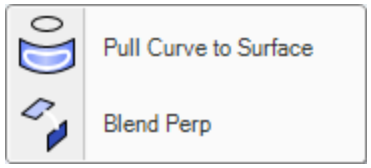
These tools allow to create curves from a surface and solids. Tools as Intersect, Project, Section, Duplicate border are really used each day for the modelers.



Notes:

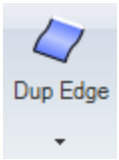


Creates curves or points on a surface that are the intersections of the surface and curves or points projected toward the construction plane.

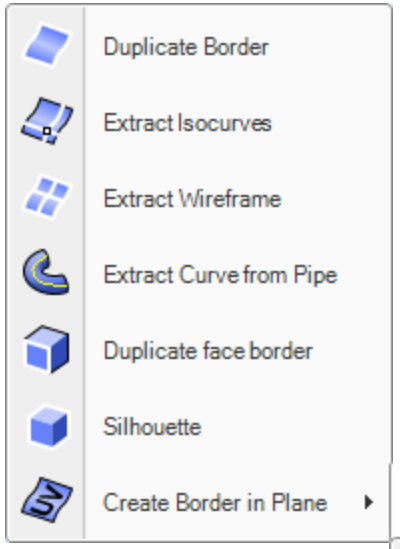


Creates curves and points on a surface that are the intersections of curve or points pulled toward a surface in the surface normal direction.

Draws a curve that blends between two curves keeping continuity with the curves.



Creates a curve that duplicates a surface edge.



Creates a curve that duplicates a surface, polysurface, or mesh border.

Creates curves that duplicate surface isoparametric curves at specified locations on the surface.

Creates curves that duplicate surface or polysurface isoparametric curves displayed in the wireframe view.

Create a center curve from a pipe.

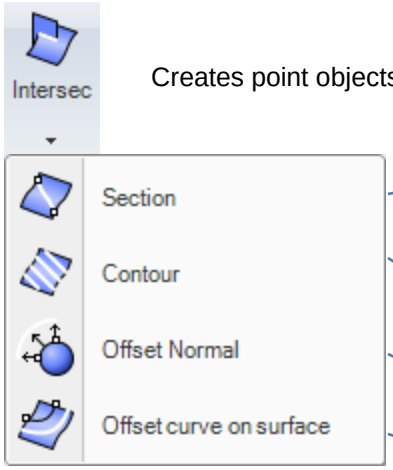
Creates a curve that duplicates a polysurface face border.

Creates outline curves from a selected surface or polysurface.

Creates curves that duplicate the untrimmed boundary and trim curves of a surface as planar curves onto the world x-y plane.

Wraps a curve onto a surface.

Notes:



Creates point objects or curves at the intersection of curves and surfaces.

Creates a planar curve or points resulting from the intersection of a defined cutting plane through curves, surfaces, polysurfaces, or meshes.

Creates a spaced series of planar curves and points resulting from the intersection of a defined cutting planes through curves, surfaces, polysurfaces, or meshes.

Copies a curve on a surface in the normal direction of the surface so that all locations on the copied curve are a specified distance from the original curve.

Copies a curve on a surface so that all locations on the copied curve are a specified distance from the original curve and lie on the surface.

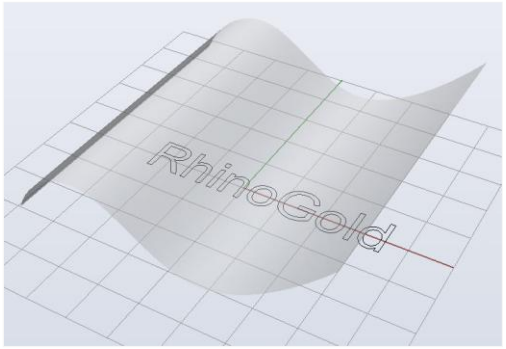
Project

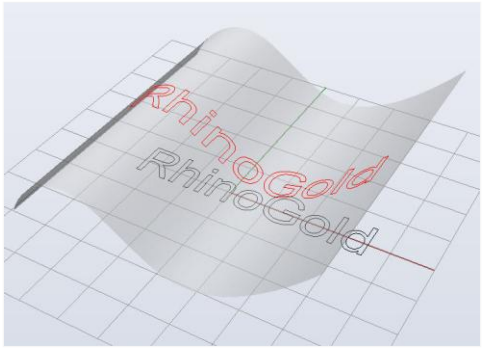
Creates curves or points on a surface that are the intersections of the surface and curves or points projected toward the construction plane.

Exercise

Open the **Project.3dm** file of the RhinoGold models.

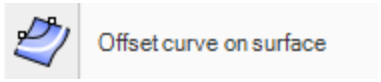
1. On the **Modeling** tab, click on **Project**.
2. Select the text to project onto the surface.
3. Select the surface.





Notes:

Offset curve on surface



Copies a curve on a surface so that all locations on the copied curve are a specified distance from the original curve and lie on the surface.

Exercise

Open the **Offset Curve on Surface.3dm** file.

1. Execute the command **Offset Curve on Surface**
2. Select the curve to offset
3. Select the surface
4. Type **0.5** as **Offset Distance**. You will see the arrows about the offset direction. You can flip the direction clicking on **Flip** option.

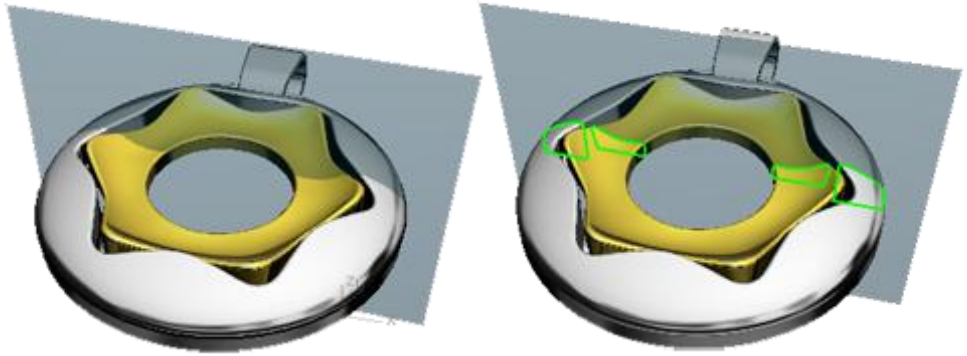
Intersect

Creates point objects or curves at the intersection of curves and surfaces.

Exercise

Open the **Intersect.3dm** file,

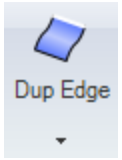
1. Execute the command **Intersect**
2. Select the objects to intersect



Notes:

Dup Edge

Creates a curve that duplicates a surface edge.

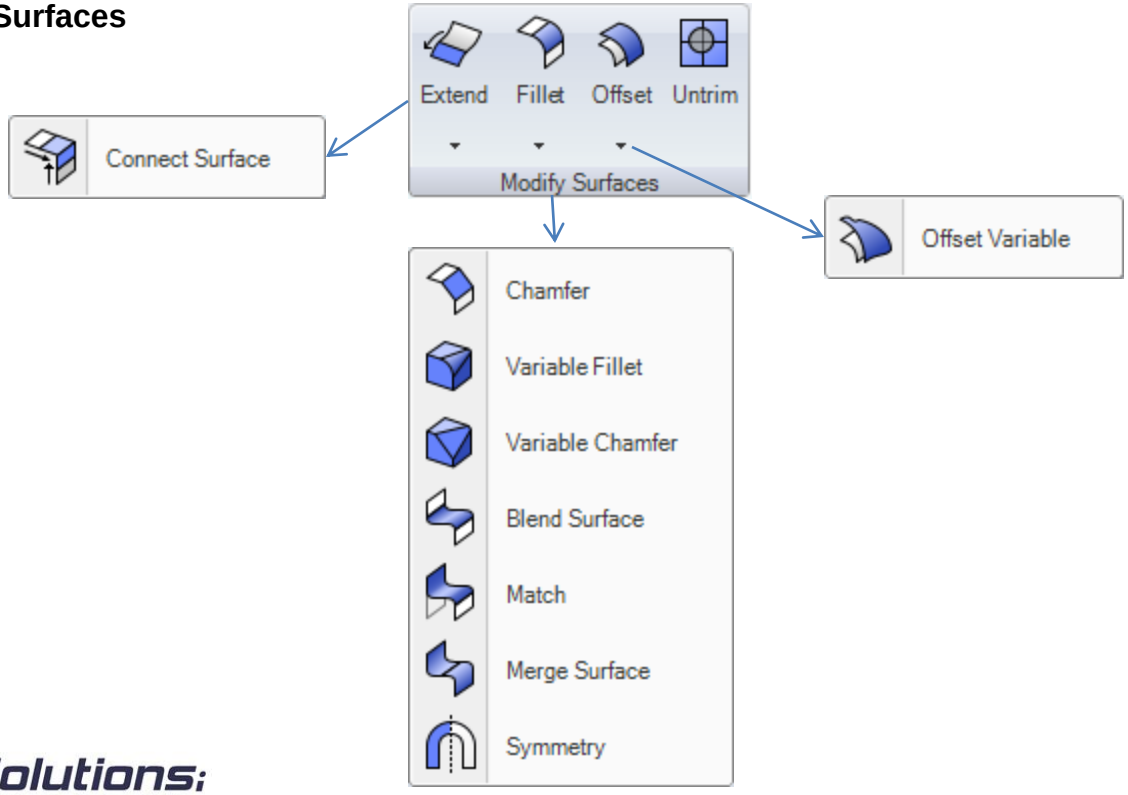


Exercise

Open the **Duplicate Edge.3dm** file,

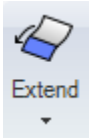
1. Execute the command **Dup Edge**
2. Select edges to duplicate

Modify Surfaces



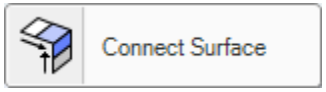
Notes:

Modify Surfaces



Extends the surface smoothly curving from the edge.

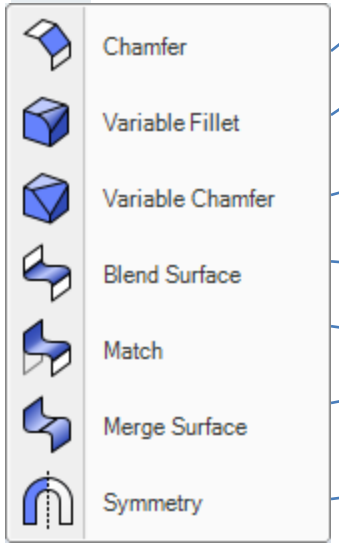
Copies a surface so that locations on the copied surface are the same specified distance from the original surface.



Extends surface edges to meet and trims the surfaces to each other.

Copies a surface so that all locations at the corners of the copied surface are specified distances from the original surface.

Creates a tangent surface between two surface edges with constant radius profile and extends or trims the original surfaces to it.



Places a ruled surface as a bevel between two surface edges.

Creates a tangent surface between multiple polysurface edges with varying radius values, trims the original faces, and joins the fillet surfaces to them.

Creates a ruled surface between multiple polysurface edges with varying chamfer distances, trims the original faces, and joins the chamfer surfaces to them.

Creates a continuous blend surface between two surfaces.

Adjusts the edge of a surface to have position, tangent, or curvature continuity with another surface.

Combines two surfaces into one surface at untrimmed edges.

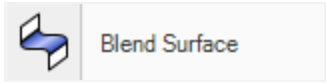
Mirrors curves and surfaces, makes the mirrored half tangent to the original, and then when the original object is edited, the mirrored half updates to match the original.

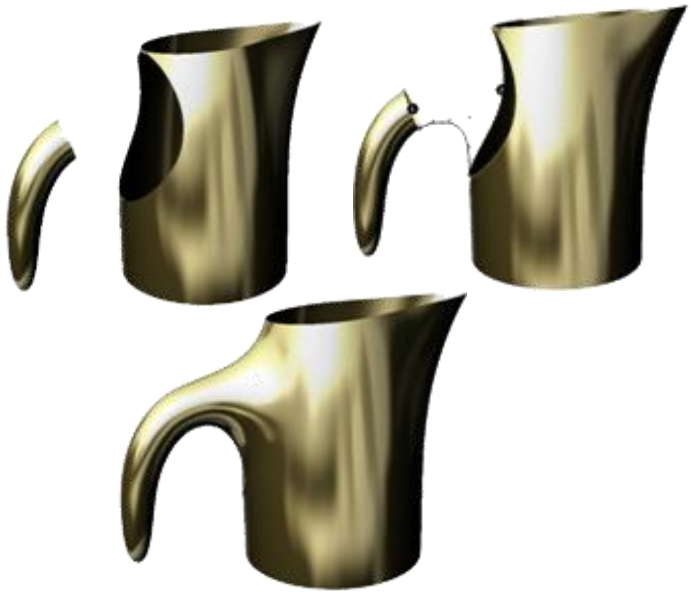
Removes trims and surfaces joined at the trim curves from a surface.

Notes:

Blend Surfaces

Blend surfaces allows you to create an intermediate surface between 2 surfaces, and play with the continuity.





Exercise

Open the **Blend Surfaces.3dm** file of the RhinoGold models.To create the combination surface between the body and handle:

1. In the **Modeling** tab, click on the **Fillet sub-menu** and then click on **Blend surface**.
2. Select the edge of the handle.
3. Select the edge of the body.
4. In the command prompt: Adjust curve seams, Press Enter.
5. In the command prompt, select **Continuity 1 = G2 Continuity 2 = G2**
6. Click **OK** in the dialog.

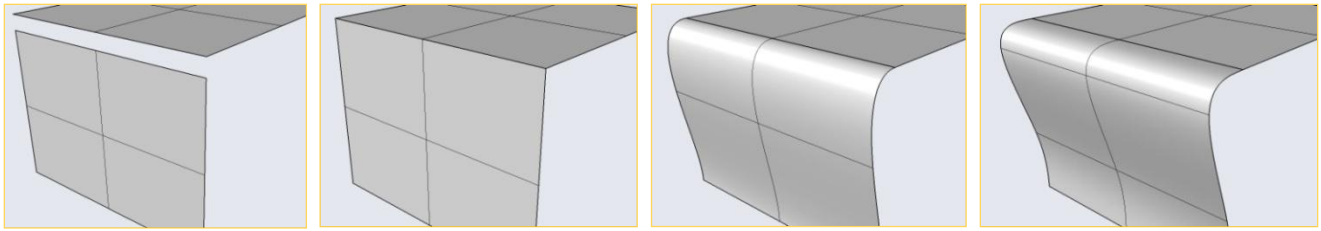
Match Surface

Match is a tool used for joining open edges, either in a tangency position or curvature.

Exercise

Open the **Match surfaces.3dm** file of the RhinoGold models. Try the three possibilities:

Concept



Original | Position (G0) | Tangency (G1) | Curvature (G2)

Notes:

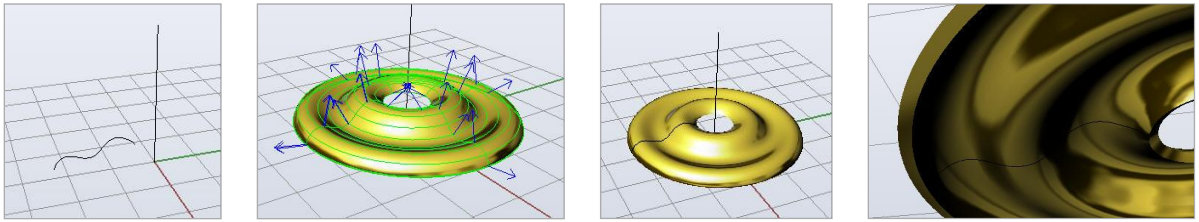
Offset

Offset means creating an equidistant from the surface to a specific distance that is marked. Variable offset also exists, which performs the same function but the distance of the equidistance can be increased or reduced at the required points.

Exercise

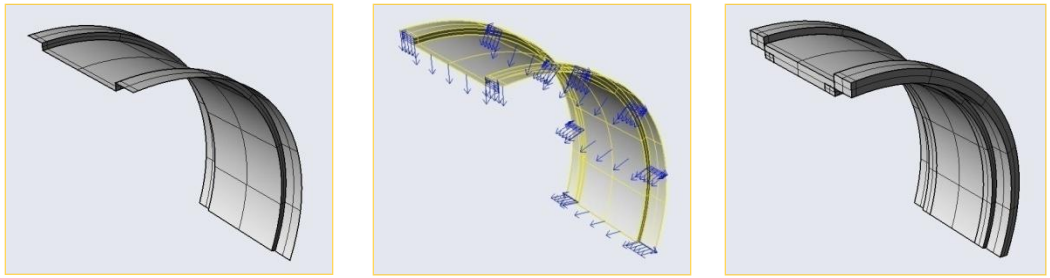
Open the **Offset surface.3dm** file in the RhinoGold models.

1. Execute the **Revolve** command using the curve and axis.



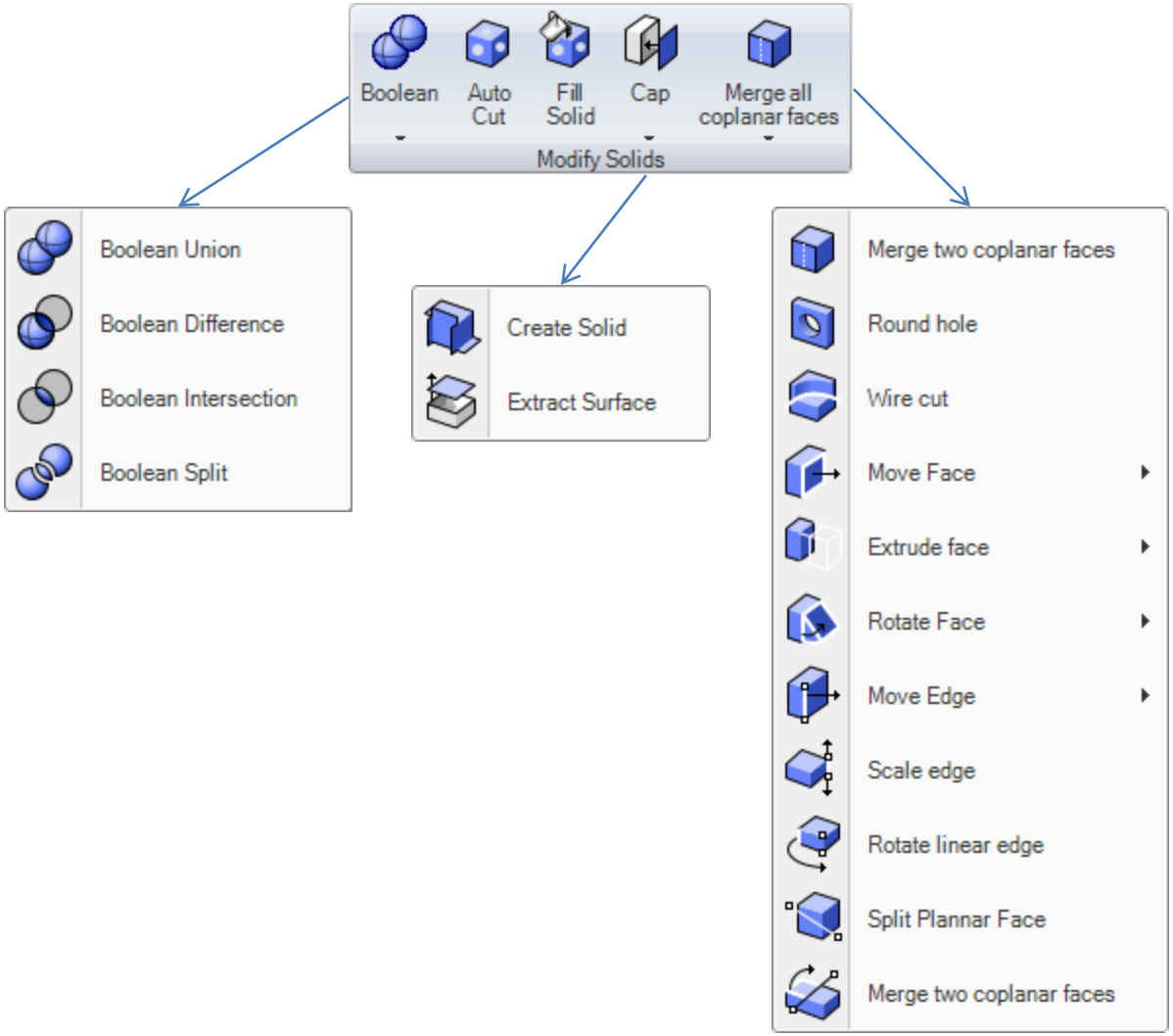
2. After creating the surface perform the Offset at a distance of **0.5 mm in Solid**.

Concept

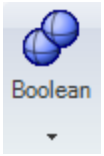


With the option Solid in the commands line, if executing shift, the walls of the element with which it will form a sold are also created.

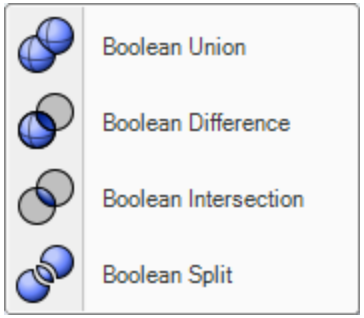
Notes:

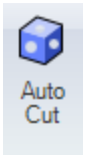

Boolean
Auto Cut
Fill Solid
Cap
Merge all coplanar faces
Modify Solids
Boolean Union
Boolean Difference
Boolean Intersection
Boolean Split
Create Solid
Extract Surface
Merge two coplanar faces
Round hole
Wire cut
Move Face
Extrude face
Rotate Face
Move Edge
Scale edge
Rotate linear edge
Split Plannar Face
Merge two coplanar faces

Notes:



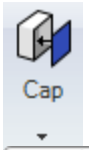
Allows us to create boolean operations of Union, Difference, Intersection and Split.



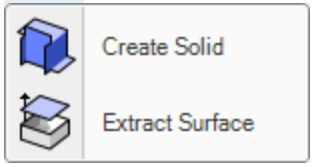


Cut solids and surfaces from the planar curves, following their own directions

Fill solids and surfaces

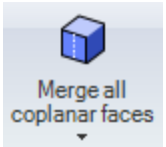


Capping surfaces appear on planar holes of the objects.

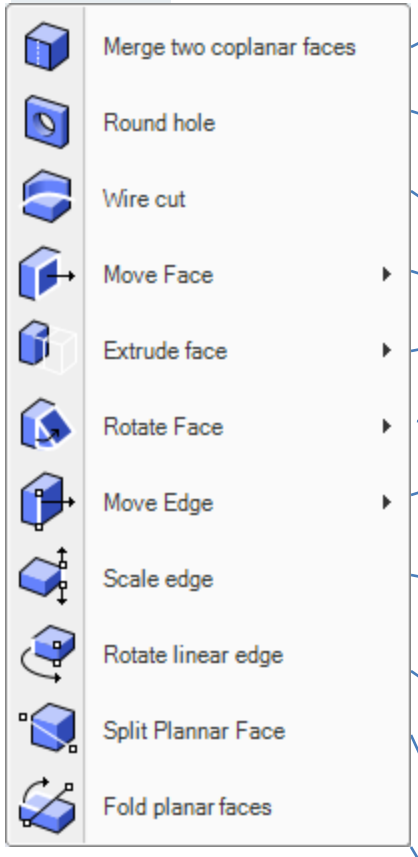


Creates a closed polysurface from selected surfaces and polysurfaces that bound a region in space.

Separates or copies a surface or a copy of a surface from a polysurface.



Combines all co-planar polysurface faces that share at least one edge into one surface.



Combines two co-planar surfaces in a polysurface into one surface.

Creates circular holes in surfaces or polysurfaces.

Trims a polysurface with a curve similar to cutting foam with a heated wire.

Moves a polysurface face.

Creates a solid by driving a surface in a straight line.

Rotates a polysurface face around an axis.

Moves a polysurface edge.

Changes the length of planar surface or polysurface face edges.

Rotates edges of a surface or polysurface around a center axis.

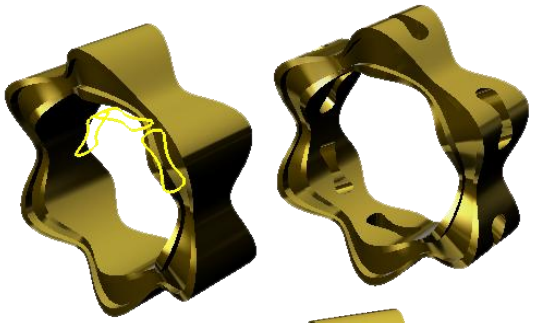
Divides a planar face of a polysurface with line or an existing curve.

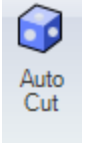
Rotates selected polysurface faces around an axis line.

Notes:

AutoCut

Cut solids and surfaces from the planar curves, following their own directions





Exercise

Open the **AutoCut.3dm** file,
1. Execute the command **AutoCut**
2. Select the planar curves and press **Enter**
3. Select the ring solid and press **Enter**

Fill Solid

Fill the holes of the solids.

Exercise

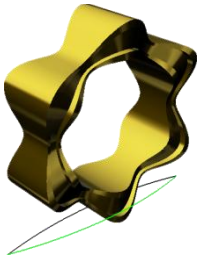
Open the **Fill Solid.3dm** file,
1. Execute the command **Fill Solid**
2. Select the holes to fill

Wire Cut

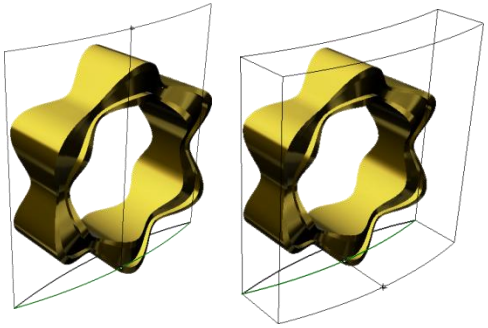
Trims a polysurface with a curve similar to cutting foam with a heated wire.

Exercise

Open the **Wire Cut.3dm** file,
1. Execute the command **Wire cut**
2. Select one of the curves and select the solid:



3. Select first cut depth point, and the second depth point:

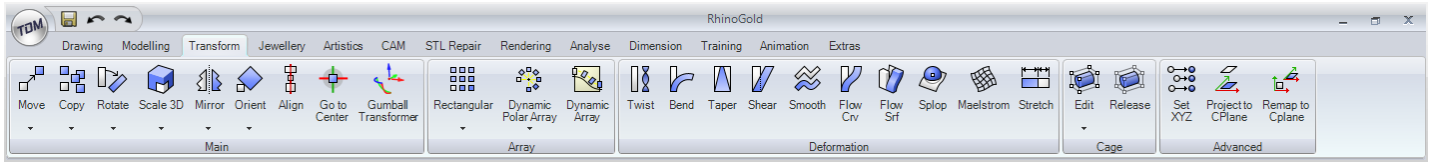


4. **KeepAll=Yes** and repeat the same process using the second curve

Notes:

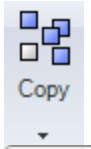
Lesson 7 – Transform

Notes:



Moves objects from one specified location to another.

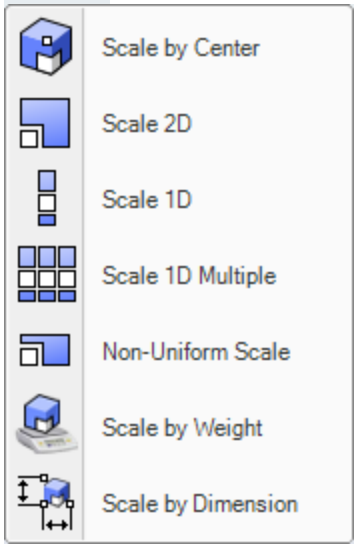
Moves objects relative to a center of move with a falloff curve.



Makes duplicates of the selected objects.

Copy any object from a gem to others. It's really helpful to design complex prongs in paves, as other functionalities.

Changes the size of selected objects uniformly in the x-, y-, and z-directions.



Scale several objects from the center.

Changes the size of selected objects in two directions.

Changes the size of selected objects in one direction.

Scale several objects in 1D. This direction defines the normal one of a surface.

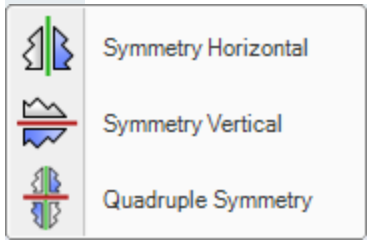
Changes the size of selected objects in three directions using different lengths for each direction.

Allows scaling objects by weight. It allows us to adapt a design in a specific weight.

Scale objects by dimension.

Notes:

Creates a mirror-image copy of objects.



Create the symmetry according the Y axe (green).

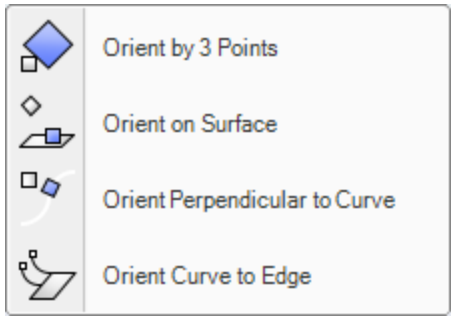
Create the symmetry according to X axe (red).

Create a symmetry according with the axes of CPlane

Rotates objects around an axis perpendicular to the current construction plane.

Rotates objects around a specified axis in 3-D space.

Moves or copies, rotates, and scales objects using two reference and two target points.



Moves or copies and rotates objects using three reference and three target points.

Moves or copies, rotates, and scales objects on a surface

Moves or copies and rotates objects along a curve using the curve direction for orientation.

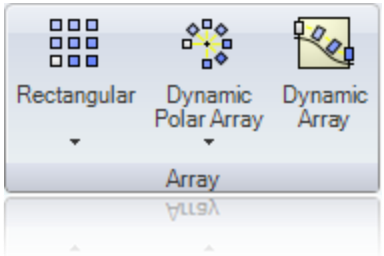
Copies and aligns a curve to a surface edge.

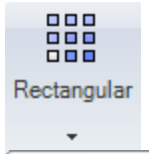
Lines up object's bounding boxes at their bottom, horizontal center, left, right, top, or vertical center.

Move one or several objects to the center of CPlane

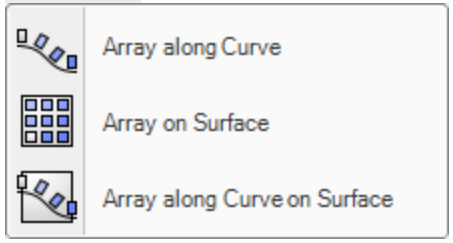
Allows moving, scaling and rotating objects by dynamical form, offering us an interesting touch of the deformities.

Notes:





Lays out copies of objects in a specified number rows and columns.

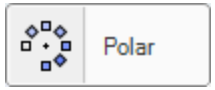


Lays out copies of objects spaced and rotated along a curve.

Lays out copies of objects in a specified number rows and columns on a surface, using the surface normal to orient the objects.

Lays out copies of objects spaced and rotated along a curve on a surface using the surface normal to determine the orientation of the arrayed objects.

Copy in a polar form one or several objects. The copy direction it's defined by the CPlane of the active view.



Lays out copies of objects in a circle around a central point.

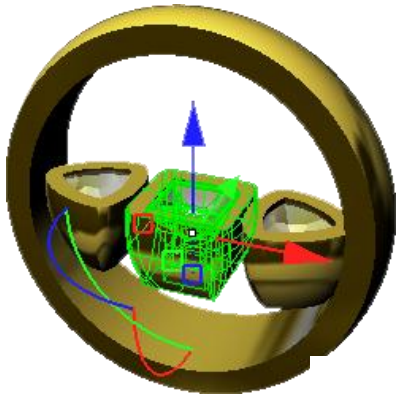
Copy one or several objects in a really powerful and controlled way.

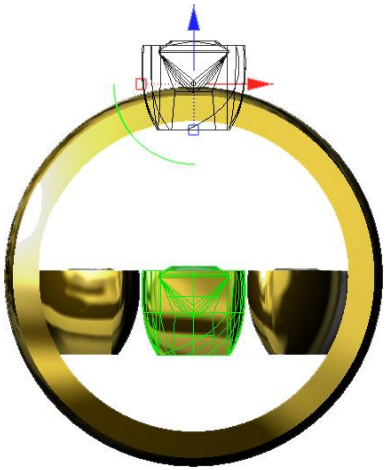
Notes:

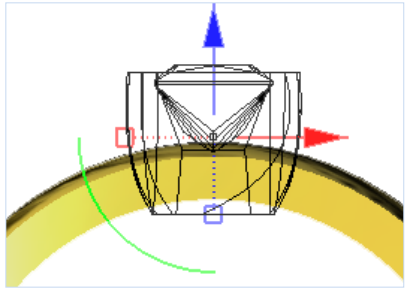
Exercise

Open the **Gumball transformer. 3dm** file.

1. Execute the command **Gumball Transformer**, and select the middle gem and bezel.
2. Change to the **Front View** to work easily.
3. Drag and drop the gem using the blue arrow.

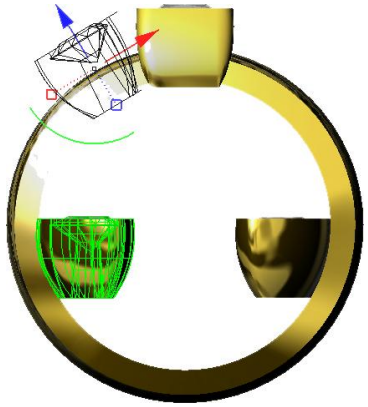


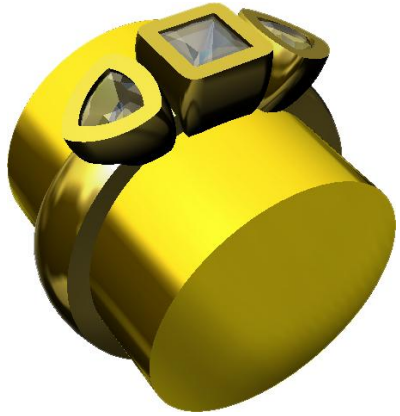




4. Now, repeat the process with the others gems and bezels. Remember you can use the Green Arc to rotate it.

5. Use **Gauge** command in **Jewelry tab,** and create a cylinder **European 15**. We will use it to do the **Boolean Difference** and remove the bottom part of the bezels.





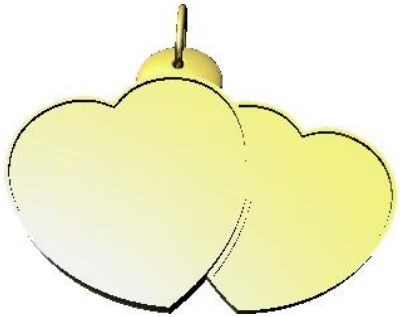
Additional note: If you move just the gem, RhinoGold will detect the bezel and will move it too.

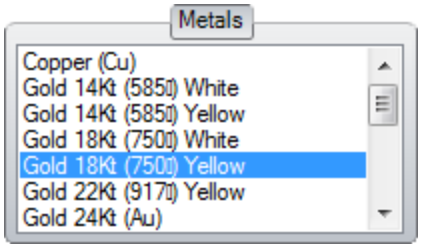
Notes:

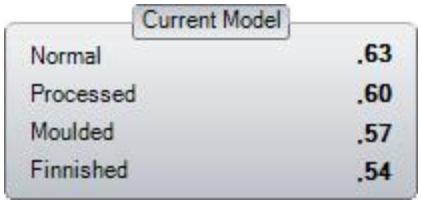
Exercise

Open the **Scale by Weight.3dm** file.

1. Execute the command **Scale by Weight** in the **sub-menu Scale** and select all the objects.
2. This model is in Gold 18 Yellow, then please select it in **Metals** list, and automatically will show the weight of 0.63 grams.

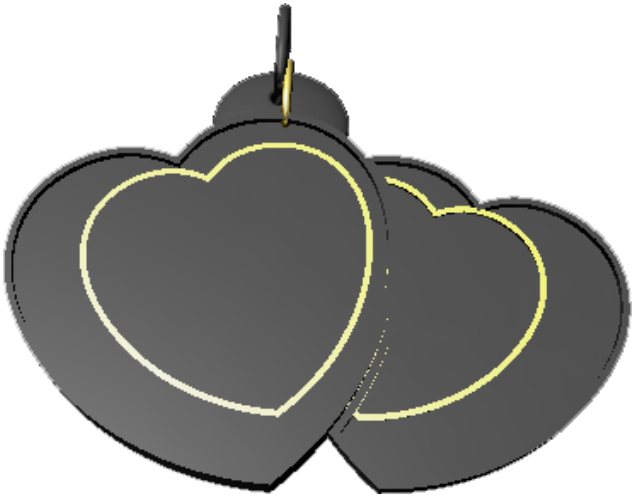






3. We want to change the weight to **1.5 grams**. Then change the value to 1.5. You can do it using the wheel mouse, the arrows or type in it.

4. Click on **OK** button to accept the modification and close the dialog.



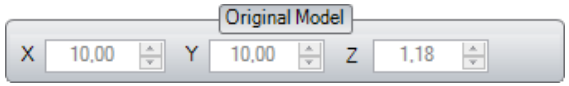
While you are changing the values, you will see the new objects in grey.

Notes:

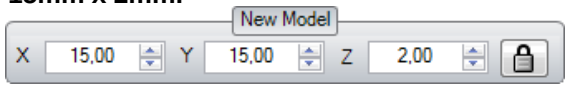
Exercise

Open the **Scale by Dimension.3dm** file.

1. Execute the command **Scale by Dimensions** in the **sub-menu Scale** and select all the objects..



2. As you can see, this model is 10mm x 10mm x 1.18mm. Our objective is define the size **15mm x 15mm x 2mm.**

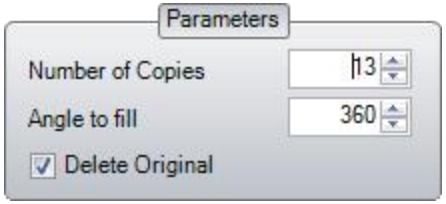


You can see in real time how will be the new model.

3. Click on the button **Delete Original**, and click **OK** button to accept the command and close the dialog.

Exercise

Open the **Dynamic Polar Array.3dm** file.



1. Execute the command **Dynamic Polar Array** and click on **Select** button and select the gem and the bezel.
2. In **Number of Copies**, type the value **13**. You can use the mouse wheel to see the different results.
3. In **Angle to fill**, by default is 180, but you can modify it to **360** or click on **Justify** icon.
4. Click on **OK** button.

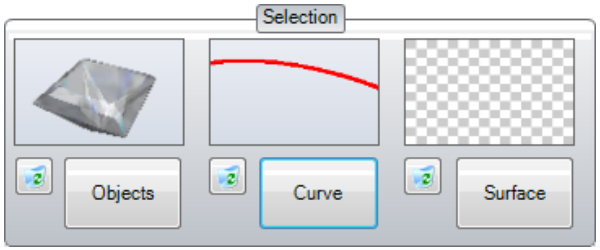
As option, you can create a cylinder using **Gauge** to remove the bottom part of the bezels.

Notes:

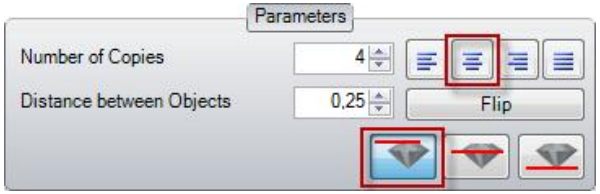
Exercise

Open the **Dynamic Array.3dm** file.

1. Execute the command **Dynamic Array.**
2. Click on **Object** button and select the **Princess** gems, and click on **Rail** button and select the red curve:

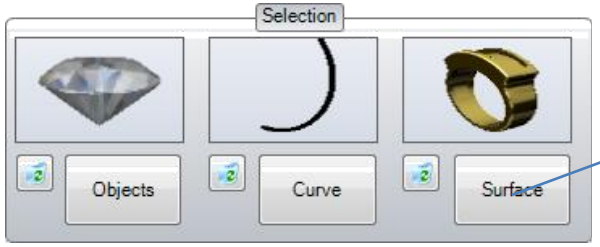


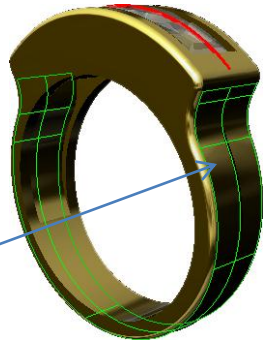
3. In **Parameters**, in **Number of Copies** define **4** and **Distance between Objects 0.25**, click on Center icon and in vertical align, click on **Align Top** icon.



4. Click on **OK** button.
5. Execute the command **Dynamic Array** again, now we will work on the side.

As **Object** select the brilliant, as **Curve** the black curve and click on **Surface** button and click the side surface to orient the stones.

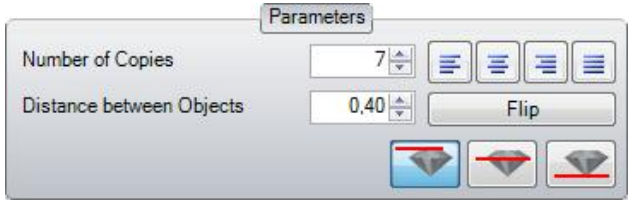


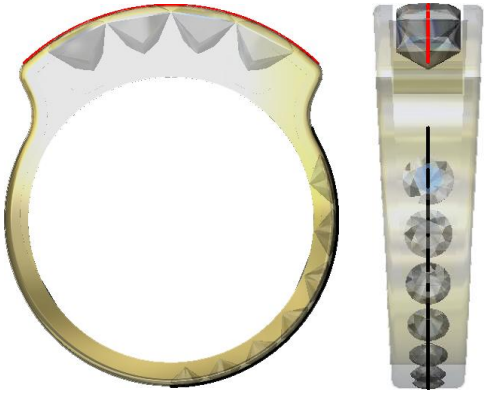


Notes:

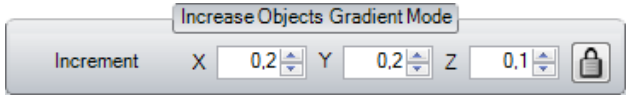
6. In **Parameters**, in **Number of Copies** define **7** and **Distance between Objects 0.40**, in vertical align, click on **Align Top** icon.

Important: To flip the gems click on **Flip** button.





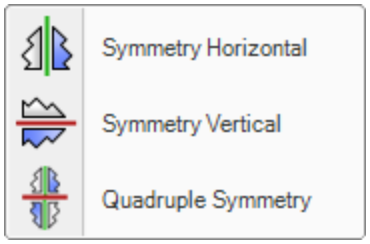
7. In **Increase Objects Gradient Mode**, define the increments :**0.2** in X, **0.2** in Y and **0.1** in Z



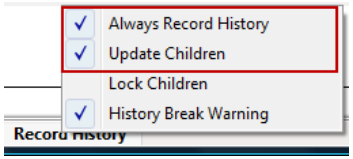
8. Click on **OK** button.

Symmetry Commands

These commands allow to do a symmetry just clicking a button. Select the object and click the icon.



One of the advantage of this tool is that can be used as a Record. It allows us to modify the copied object at any time. To Save Record, right click on Save Record, and activate the first two options

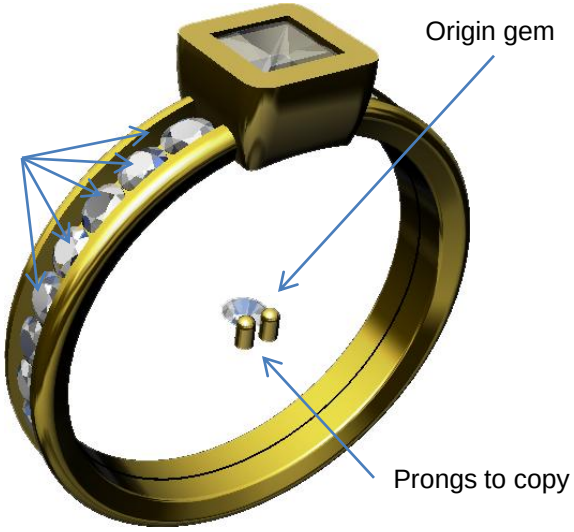


Notes:

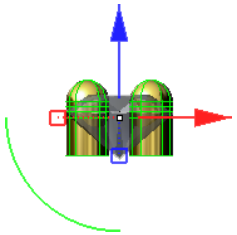
Exercise

Open the **Copy by Gems.3dm** file. The objective is place the prongs in all gems.

1. Activate **Always Record History** and **Update Children**.
2. Execute the command **Copy by Gems.**
2. Select the origin gem.
3. Select the target gems.
4. Select the prongs to copy.



5. Take a look. The prongs are too much high. Please use the Gumball transformer to move the original prongs a little bit down, and all the design will be updated.



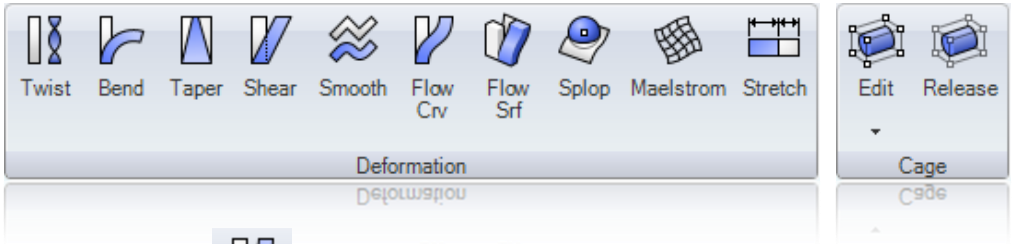
As optional, you can create the prongs and do the Boolean difference!

Notes:

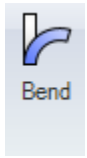
Lesson 8
Universal Deformation Tools

Notes:

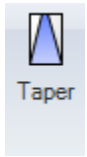
Universal Deformation Tools



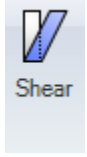
Deforms objects by rotating the object around an axis.



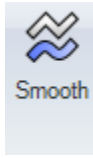
Deforms objects by bending along a spine arc.



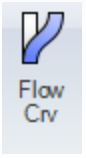
Deforms an object by moving its control points toward a specified axis.



Deforms an object by shifting it at a specified angle parallel to the construction plane.

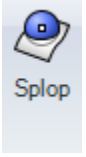


Averages the positions of curve and surface control points and mesh vertices in a specified region.



Re-aligns an object or group of objects from a base curve to a target curve.

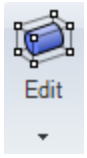
Morphs objects from a source surface to a target surface.



Copies, rotates, scales, and wraps objects on a surface, like pottery sprigging or appliqué.

Deforms objects in a spiral as if they were caught in a whirlpool.

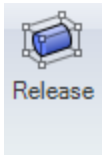
Deforms an object by scaling selected portions in one direction.



Deforms complex object smoothly using one-, two-, and three-dimensional cages with simple control point structures.

Selects captive objects set up using the CageEdit command.

Selects control objects set up using the CageEdit command.



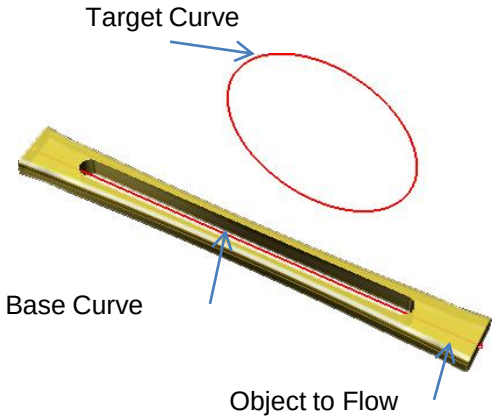
Removes selected objects from the influence of a control object set up by the CageEdit command.

Notes:

Exercise

Open the **Flow by Curve.3dm** file. The objective of this exercise is deform an object from a curve to other.

1. Activate **Always Record History** and **Update Children**.
2. Execute the command **Flow by Curve.**
2. Select the object to flow.
3. Select the base curve.
4. Click on **Stretch=No** to change it to **Stretch=Yes**.
5. Select the target curve (the circle).



Why the seam is on the top? I would like to have it on the bottom!

A lot of users ask about it. It depens of the seam of the target curve.

6. In **Drawing tab**, click on **Seam** and select the circle. You will see an arrow. Click on the base point of the arrow and move it to the bottom part. Remember **Osnap**, **Mid** or **Quad** will help you.

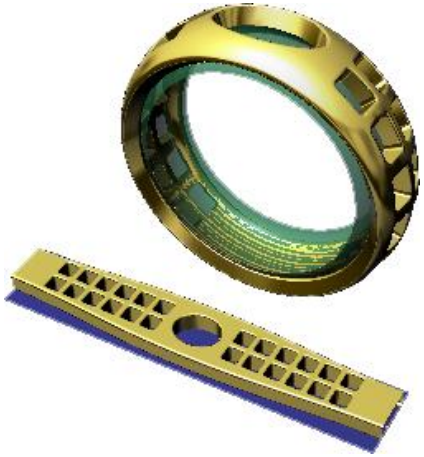
Important Note: We have the option to define **Rigid=Yes**. It deform the position of the object, but NOT the objects. It is great for gems deformations.

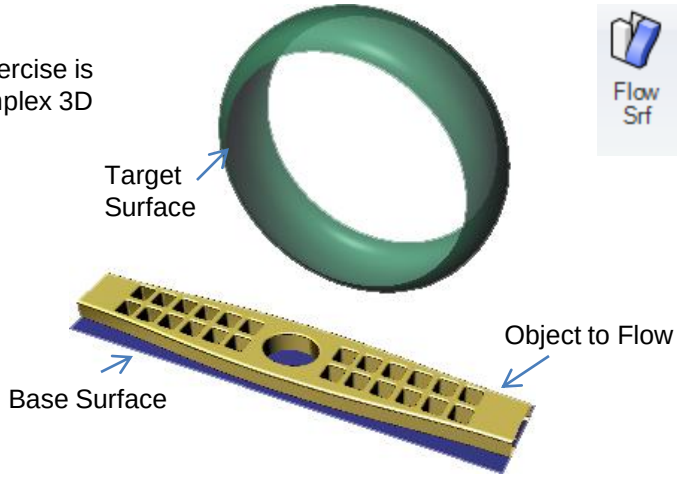
Notes:

Exercise

Open the **Flow by Surface.3dm** file. The objective of this exercise is deform an object from a surface to other. It helps a lot to complex 3D designs. We can created in flat and flow it.

1. Activate **Always Record History** and **Update Children**.
2. Execute the command **Flow by Surface.**
2. Select the object to flow.
3. Select the base surface (blue)
4. Select the target surface (green).





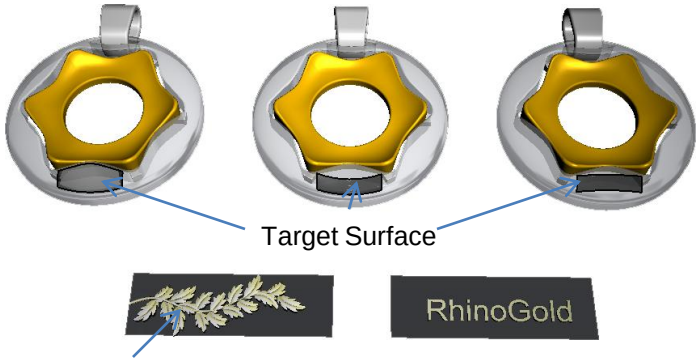
Important Note: We have the option to define **Rigid=Yes**. It deform the position of the object, but NOT the objects. It is great for gems deformations.

Notes:

Exercise

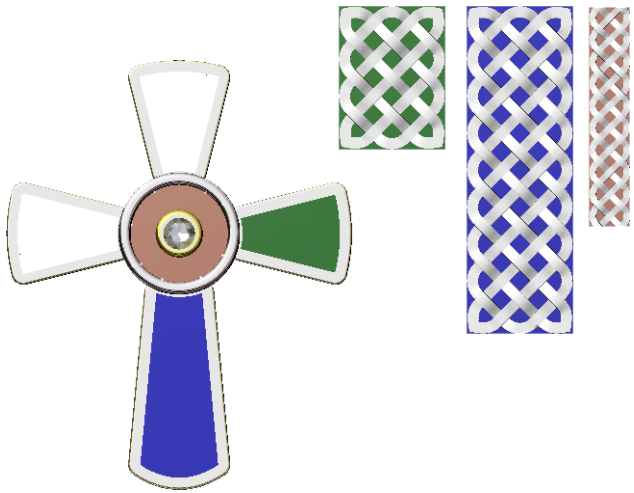
Open the **Flow on the Pendant.3dm** file. The objective of this exercise is deform an object from a surface to other. It helps a lot to complex 3D designs. We can created in flat and flow it. Also we can use one design to apply to others.

1. Activate **Always Record History** and **Update Children**.
2. Execute the command **Flow by Surface.**
2. Select the object to flow (leaf)
3. Select the base surface (rectangular)
4. Select the target surface (black on the pendant).



Exercise

Open the **Celtic Cross.3dm** file. The objective of this exercise is to see more examples about Flow by Surface. Take a look to the surface colors.

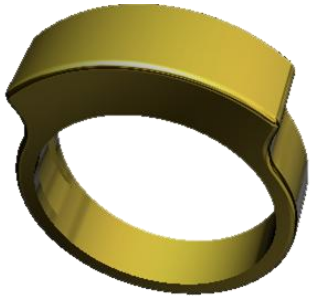


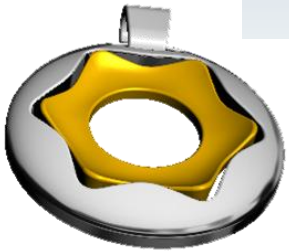
Notes:

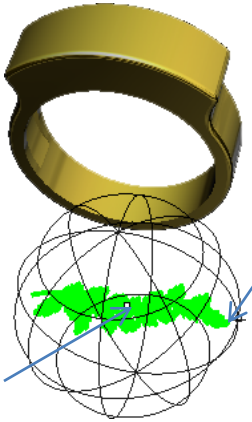
Exercise

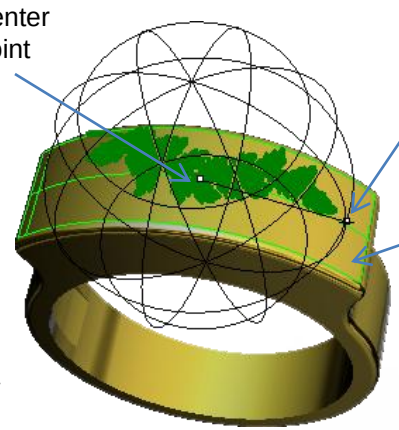
Open the **Splop.3dm** file. The objective of this exercise is deform an object using the command **Splop**. Basically the difference between the others deformation commands is the deformation is define it using two spheres.

1. Activate **Always Record History** and **Update Children**.
2. Execute the command **Splop.**
2. Select the object to splop (leaf)









3. Click the center point of the reference sphere, and a second point to define the radius.

4. Select surface to splop on, pick the center point of the new sphere and the radius point. You can repeat this process without leave the command.

Please test to place the leaf and the RhinoGold text on different places.

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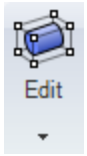
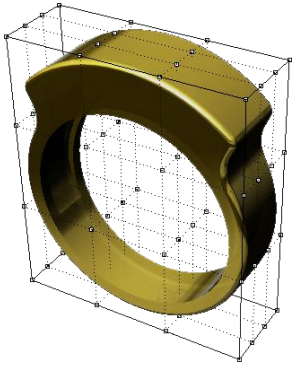
Notes:

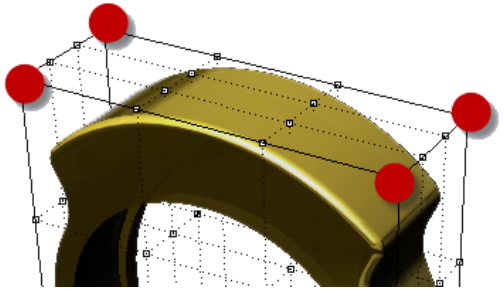
Exercise

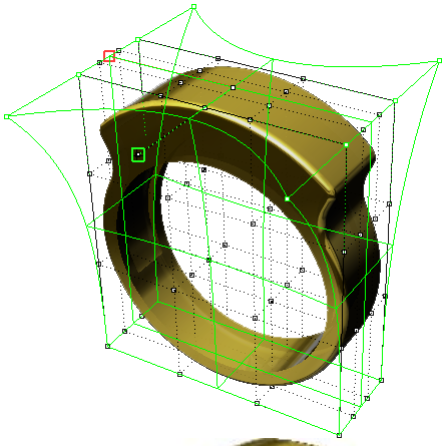
Open the **Cage.3dm** file. The objective of this exercise is deform an object using the command Cage. Basically deforms complex object smoothly using one-, two-, and three-dimensional cages with simple control point structures. In other words, we define basic shapes as box, rectangle, line to modify complex shapes.



1. Execute the command **Edit Cage.**
2. Select the captive objects. In this case we will select the ring.
3. In Select control object click on Bounding Box, and Coordinate system World.
4. This step look complex, but it is really simple. Just define how many points you want to use in this box. As XPointCount, YPointCount and ZPointCount define 4, and the degree always is one less than the point coint. In this case XDegree, YDegree and Zdegree must be 3.
5. In **Region to Edit**, select **Global**.







Now you will see a box with the control points. The concept is, if you modify the control points, it will affect to the ring shape. For example, select the top corner points as you can see in the picture. Activate the **Gumball** and scale them.

Can you imagine how many possibilities offer you this command? Play a little bit with it and you will see the results.

Notes:

Notes:

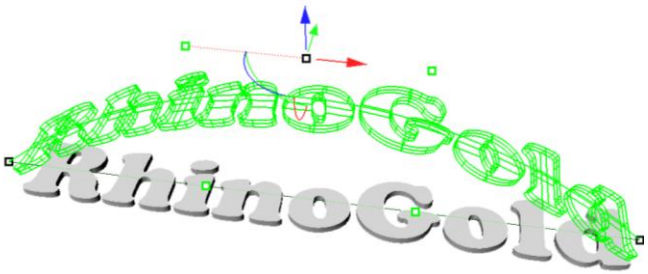
Exercise

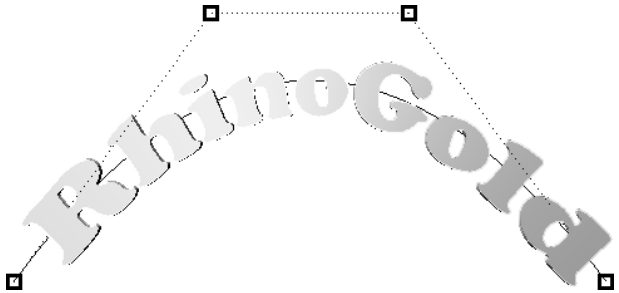
Open the **Text Cage.3dm** file. Now we will apply the cage command but we will use a line instead of a bounding box.

1. Execute the command **Edit Cage.**
2. Select the captive objects. In this case we will select the RhinoGold text..
3. In **Select control** object click on **Line**.
4. Select the start and the end point of the line as you can see in the picture:

5. In **NURBS parameter**, define **Degree=3**, **PointCount = 4**. In other words, we want to have 4 control points to edit the text. As we commented in Cage Edit Bounding Box, the degree always is one less than the PointCount.

6. In **Region to Edit**, click on **Global**.
7 Select the two central control points and click on **Gumball Transformer**. Please drag and drop this points in Z (blue arrow).

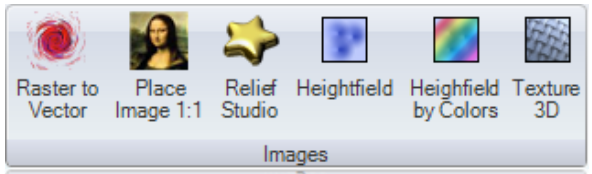


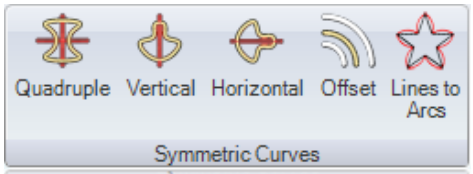


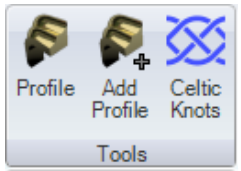
You can play moving the control points in different directions. In this sample we use 4 control points, but you can define more if you need more control.

Lesson 9 – Artistics

Notes:







Command	Description
Raster to Vector	Convert images and hand drawings to graphic vectors, useful for 3D design, milling and engraving
Place Image 1:1	Place drawings or scanned photos at scale 1:1.
Relief Studio	Create 3D reliefs from 2D curves.
Heightfield	Creates a NURBS surface based on grayscale values of the colors in an image file.
Heightfield by Colors	Creates heightfield indentifying the colors of the image.
Texture 3D	Create 3D textures. These textures are geometrical, allowing us to use for production. We can manufacture our prototypes with real textures.
Quadruple Symmetric Curves	Create a curve by control points, creating at the same time a symmetrical point on X and Y axes.
Vertical Symmetric Curves	Create a curves by points, creating at the same time a symmetrical point on Y axe.
Horizontal Symmetric Curves	Create a curve by control points, creating at the same time a symmetrical point on X axe.
Offset In/Out	Offset multiple curves, defining an offset value (in and out)
Lines to Arcs	Create Arcs from lines
Dynamic Profile	Allows using our section library to move them, rotate them and change the size. Very helpful to create any type of complement in a matter of seconds. Profiles are editable by the user.
Add Profile	Add our own profiles in the Profiles Library.
Celtic Knots	This tool allows us to design celtic knots, in 2D and 3D.

Notes:

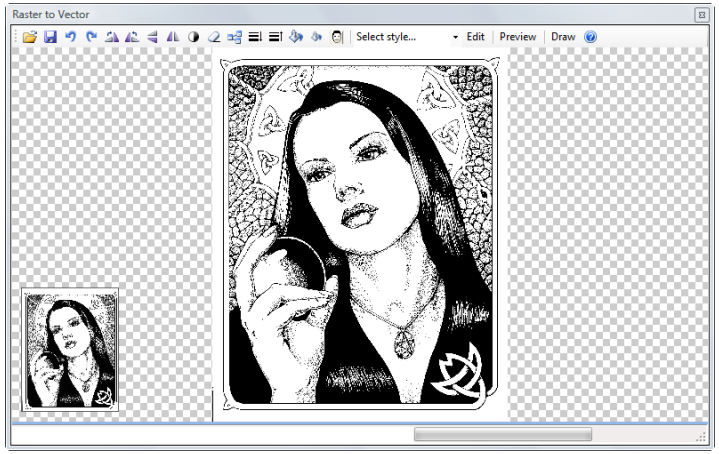
Raster to Vector

Convert images and hand drawings to graphic vectors, useful for 3D design, milling and engraving.

Exercise

1. Execute the command **Raster to Vector** in **Artistic tab**.

2. Click on **Open** icon and select the file **Raster to Vector.jpg**

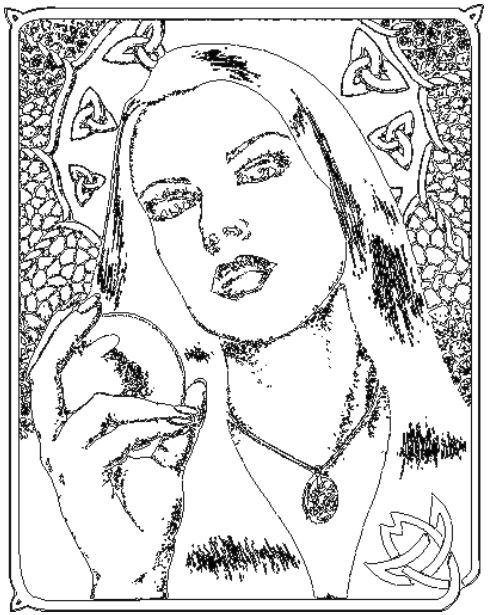


3. In **Select style…** select **Outlines**, and click on **Preview**.

There are a lot of small curves because the image has a lot of shadows. You can clean it using the button **Clean**.

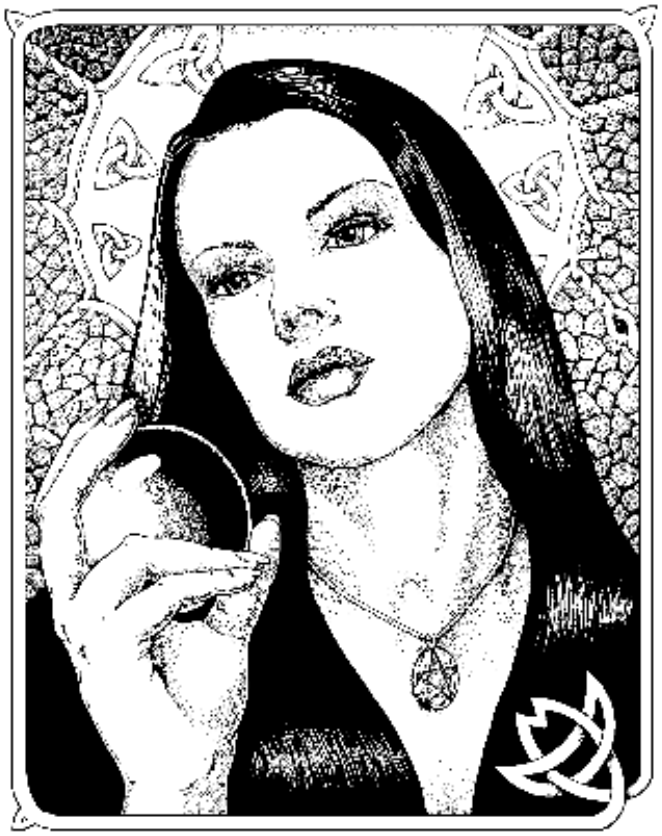
Repeat the clean, all the times that you need.

Original Image



Preview in curves RhinoGold

Notes:



Original Picture

Clean Picture

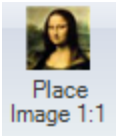
4. If you execute the command Clean, click on **Preview** to see the results.

5. Click on **Draw** to add the curves to RhinoGold. Now you can use these curves as RhinoGold curves.

Notes:

Place Image 1:1

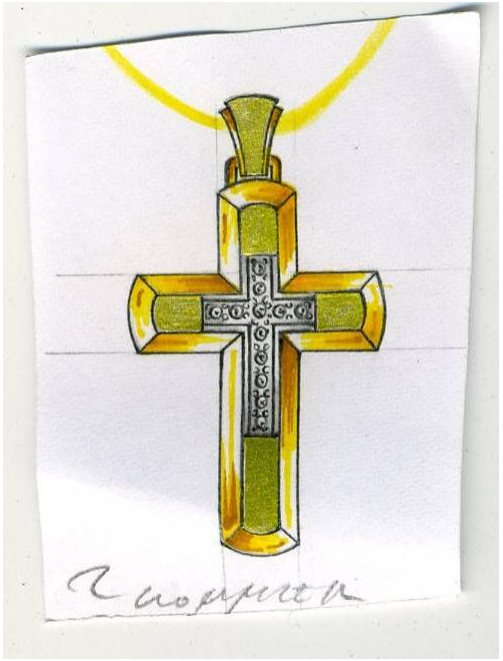
Place drawings or scanned photos at scale 1:1.



Exercise

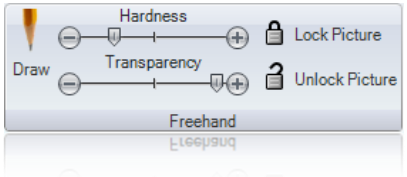
In this exercise we will see how important is use our hand drawings to model our 3D models easily.

1. Execute the command **Place Image 1.1** in **Artistic tab**, and select the **Hand Drawing.jpg** file.



The image will be place it on our document, and in the command prompt we can see the real size in the paper:
The size result is 189.44 in horizontal and 231.78 in vertical

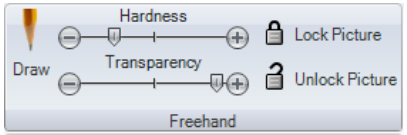
3. To work more comfortable we can modify the transparency of the picture, really important to see better the curves, and Lock the picture .

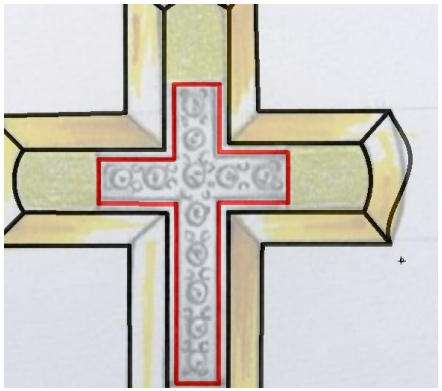


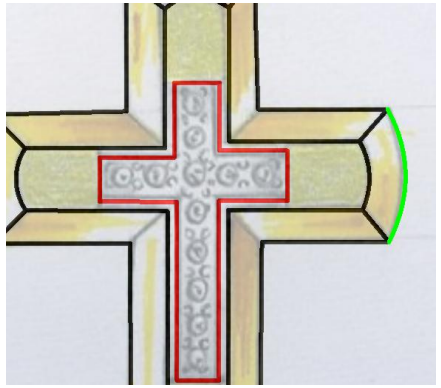
4. Use the drawing commands to redraw the image. You can use curve, line,…

Notes:

Other interesting tool is the hand drawing. It is really useful because we can control the hardness. This is a sample. After we draw the curve of hands, automatically repair the curve.







As more low will be the Hardness more smooth will be the curve.

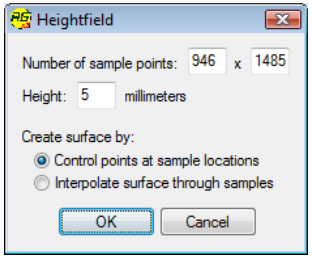
We can use this command with the mouse or connect a table.

Heightfield

Creates a NURBS surface based on grayscale values of the colors in an image file.

Exercise

In this exercise we will see how create a relief using a gray scale picture. We can use color pictures and this command will convert to grey scale. If the objective is a low relief (less than 2-3 mm) we can use directly the picture. If we want an excellent result in relief higher than 2-3 mm we recommend use an image editor.



1. Execute the command **Heightfield** and select the **Virgin.bmp** file.
2. Pick two points to define the corners of the rectangle. Also you can use coordinates, for example: **0,0 for the first point, and 50,50 for the second point.**
3. Define as Number of sample point: 946x1485 (pixels of the image) and **Height 5** millimeters. And click on **OK** button. This process needs a couple of minutes depending of the performance of your computer. You can reduce the points to 200x200

Notes:

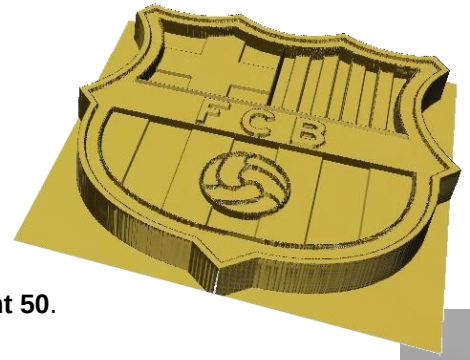
Heightfield by Colors

Creates heightfield indentifying the colors of the image.

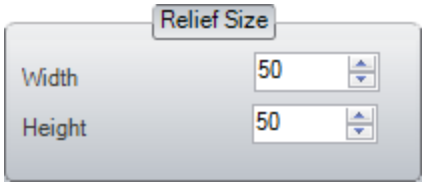
Exercise

In this exercise we will see how create a relief using a color image. It is really useful because we can define a height for each color.

1. Execute the command **Heightfield by Color**.
2. Click on **Open Image** button and select the file **Barça.png**
3. You will see the list of the color available in this image, please define as the image:



4. In **Relief Size**, define **Width 50** and **Height 50**.



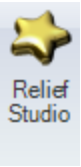
5. Click on **Create Relief** button to preview the 3D.
If you want to change any value, click on Create Relief button to update.
6. Click **OK** button to add the 3D to the document.

Use the Splop (Universal Deformation Tools) and Ring Wizard to create the follow model.

Notes:

Relief Studio

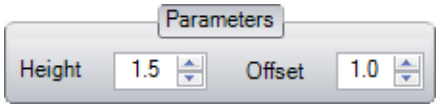
Create 3D reliefs from 2D curves.

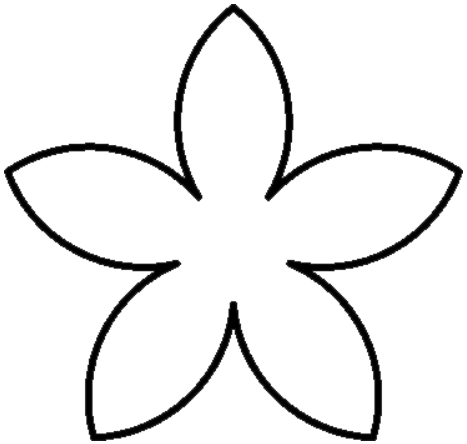


Exercise

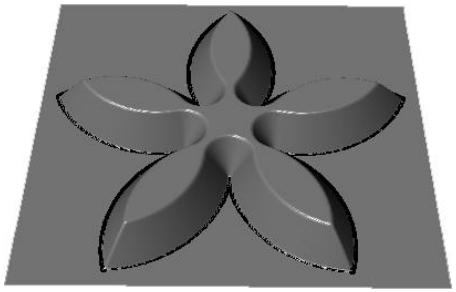
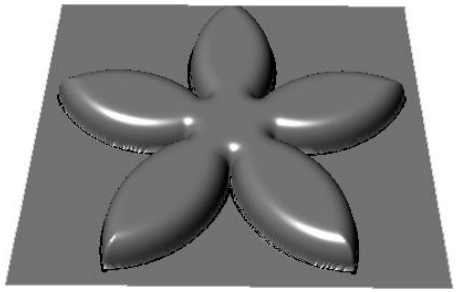
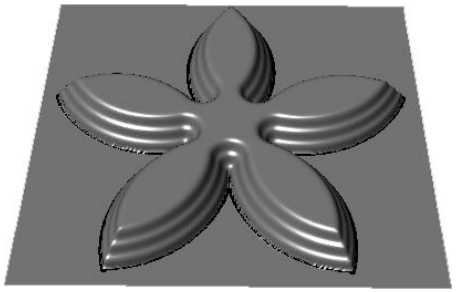
In this exercise we will see how create a relief using curves.
Open the **Relief.3dm** file.

1. Execute the command **Relief**.
2. Click on Select button and select a curve to relief
3. Define the parameters as you can see in the picture:

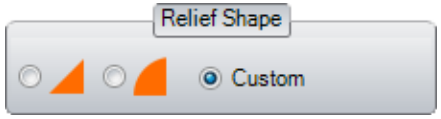




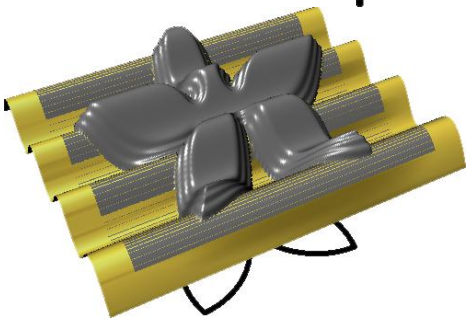
4. As **Quality** select **100**. As more quality the computation spend more time, but the result is better.

5. We have different option to define the Relief Shape. Here a comparison using in Ramp, Round or a custom shape. Please test the three possibilities.

6. We have the option to create the relief on a geometry.




Please play with this command to create different reliefs.

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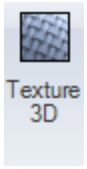
Notes:

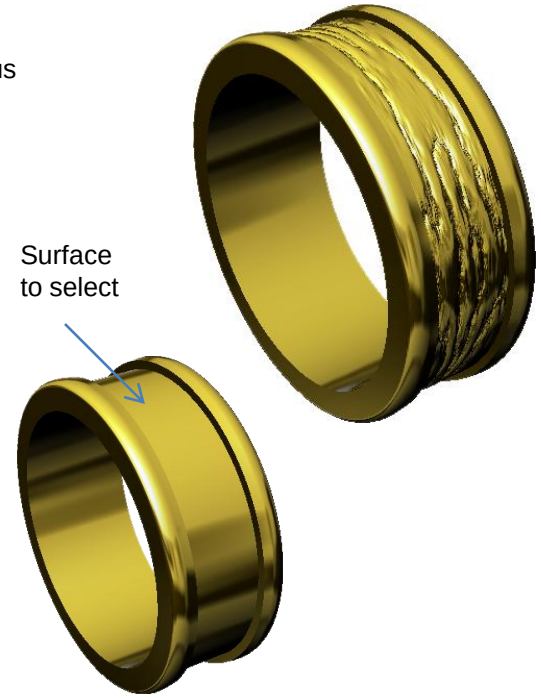
Texture 3D

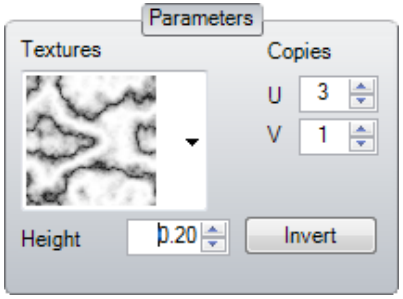
Create 3D textures. These textures are geometrical, allowing us to use for production. We can manufacture our prototypes with real textures.



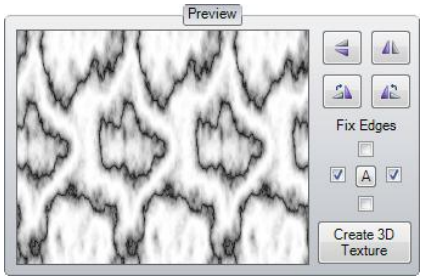
Exercise

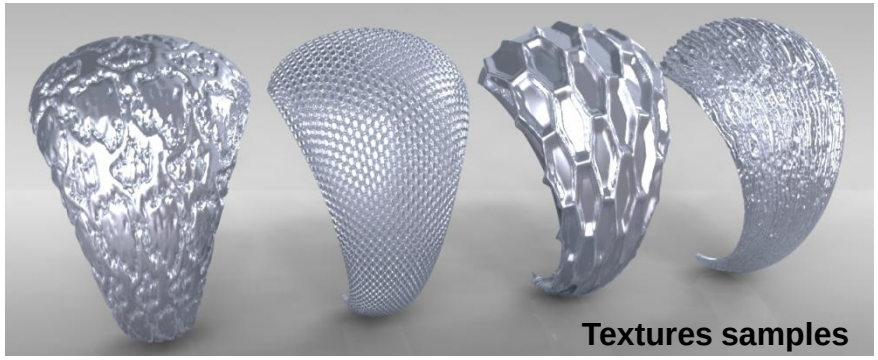
In this exercise we will see how create a texture on a ring.
Open the **Texture 3d.3dm** file.
1. Execute the command **Texture 3D**.
2. Click on **Select** button and select the surface on create the relief.
3. Define the parameters as you can see in the picture:





4. Click on the checkbox (Fix Edges) to fix the edges to the original surface, and click on **Create 3D Texture**. And RhinoGold will start to create the texture. This computation is complex. Don't worry if the computer spend some seconds or minutes (depending the copies). If you like it, click on **OK** button.





Notes:

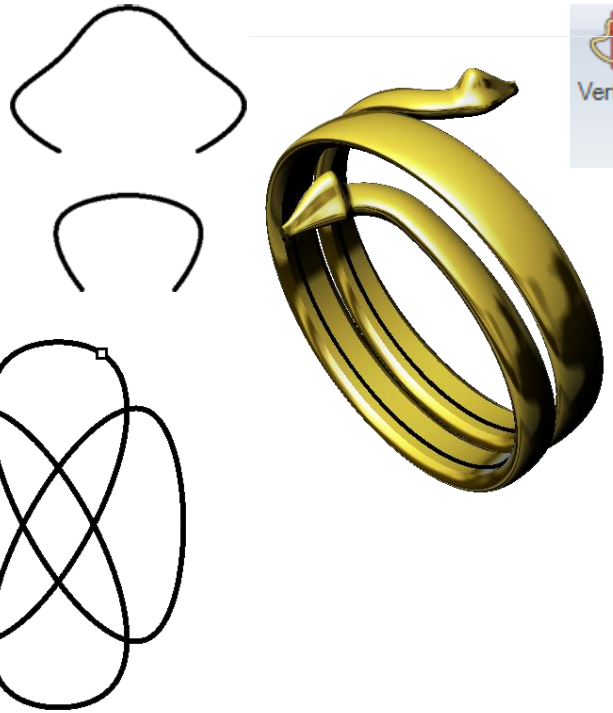
Symmetric Curves

Create a curves by points, creating at the same time a symmetrical point on Y axe, X axe or Y and X axe

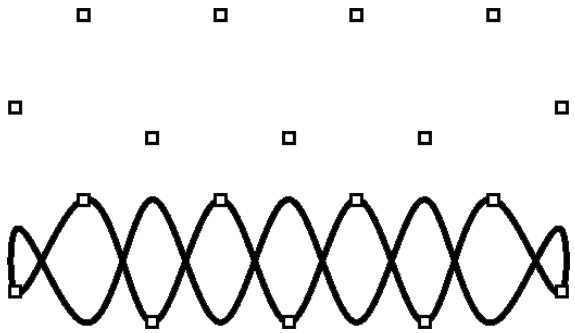
Exercise

Open the **Symmetric Curve.3dm** file.

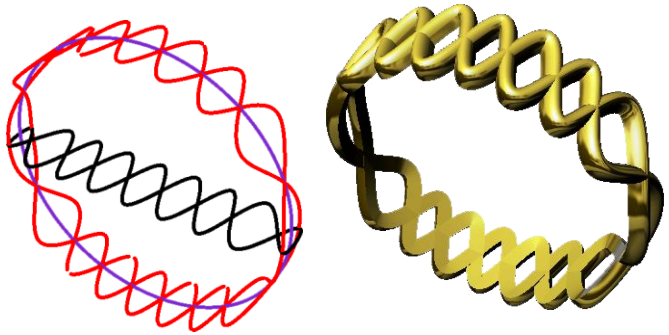
1. Execute the command **Symmetric Curve Vertical** and try to reproduce the next curves:
2. Define these curves as profile and enjoy create creating the snake ring using **Dynamic Profile**
3. Execute the **Quadruple Symmetric Curve** and try to reproduce the follow curve:



4. Execute the **Symmetric Curve Horizontal** and try to reproduce the curve following the points. Modify the option **Close=Yes**.



You can combine the 2D Curve with a circle with the command 2 Curve in **Drawing tab** to create interesting shapes.



Notes:

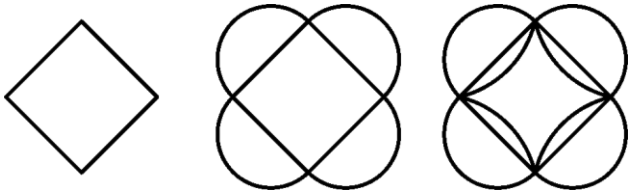
Lines to Arcs

Create Arcs from lines. It creates really interesting results.

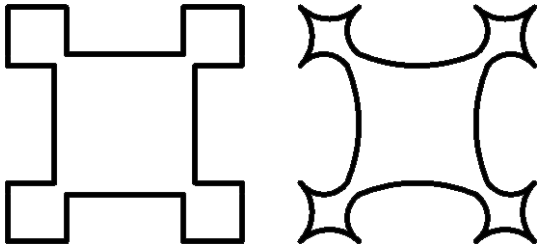
Exercise

Open the **Lines to Arcs.3dm** file.

1. Execute the command **Lines to Arc** and click on Select button and select the square.
2. Define **Distance as 3.5**. Click **OK** to accept.
3. Repeat the process but now we will use the value -1.

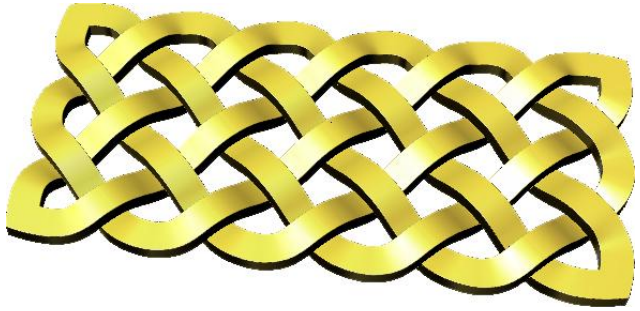


4. Try to create this shape using this polyline:



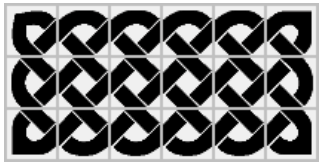
Celtic Knot Studio

This tool allows us to design Celtic knots, in 2D and 3D.



Exercise

1. Execute the command **Celtic Knot** and draw the next pattern:

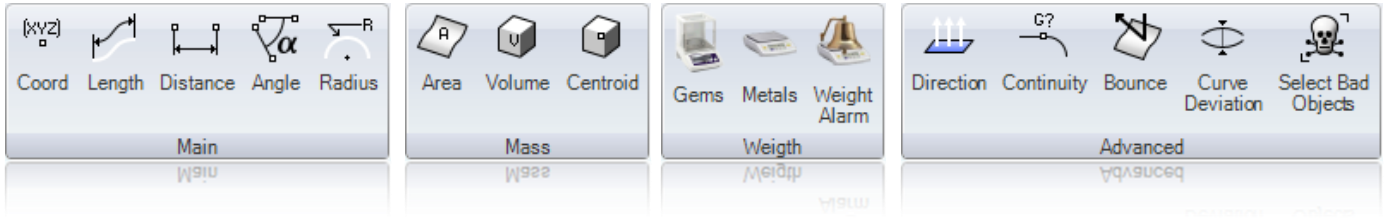


2. **Select Style Solid Square**, click **OK** button and select a point on the CPlane. Just a point, you can save and load your patterns. In the RhinoGold exercises folder there is a sample file to load it: Celtic Knot Sample.

Notes:

Lesson 10 – Analyze

Notes:

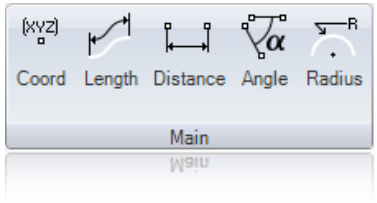


Command	Description
Coord	Reports the world and construction plane coordinates of a selected location in space.
Length	Measures and reports the length of curves or edges.
Distance	Measures the distance between two points.
Angle	Measures and reports the radius of a curve at a specified point.
Radius	Measures and reports the angle between two lines.
Area	Calculates the surface area of closed planar curves, surfaces, polysurfaces, or meshes.
Volume	Calculates and reports the volume of a closed surfaces, polysurfaces, or meshes.
Centroid	Calculates and reports the volume centroid.
Gem Weight	Calculate the Gem weight
Metal Weight	Calculate the metal weight
Weight Alarm	This tool allows analizing in real time the weight of different object and show an alarm when the maximun weight is exceeded.
Direction	Displays an object's normal direction and allows you to change it.
Continuity	Analyzes and reports the geometric continuity between two curves.
Bounce	Shoots a ray at a collection of surfaces and creates a polyline path.
Curve Deviation	Measures and reports the maximum and minimum distances between two curves.
Select Bad Objects	Select all objects that do not pass Check.

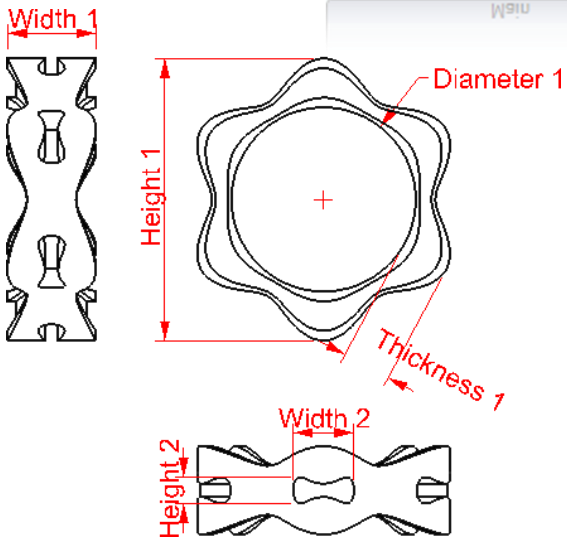
Notes:

Exercise

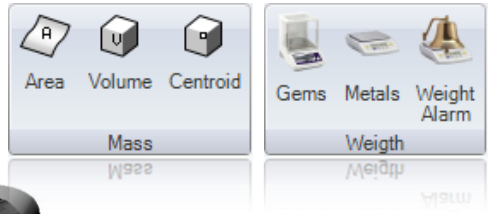
In this exercise, we analyze the dimensions of the objects.
Open the **Analyse.3dm** file,
1. Select the **Analyse Tab** and analyze dimensions of this objects, and write the results on the table.



Dimension	Value
Diameter 1	
Height 1	
Width 1	
Thickness 1	
Height 2	
Width 2	



2. Using the 3D ring, analyze the volume, the area, the metal weight in Gold 24k and Silver, and write the results on the table:



Dimension	Value
Volumen	
Area	
Gold 24K	
Silver	

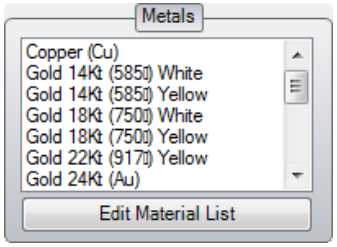
Notes:

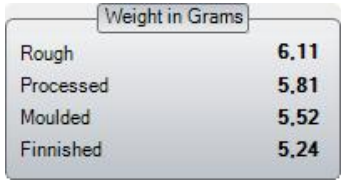
Exercise

In this exercise, we analyze the weight of the metals and the stones. Open the **Weight.3dm** file,

1. Execute the command **Metal Weight**.
2. Select objects to analyze. In this case, select the ring metal.
3. Select the metal type **Gold 18 (750) White**.

In **Weight**, you will see the total weight. If you want to see each weight, click on the **Dot (1)**, but in this case there is one object.





In **Parameters**, we may Define a percentage of Processing, Milling and Finished as well as defining units, editing the material list and the precision.

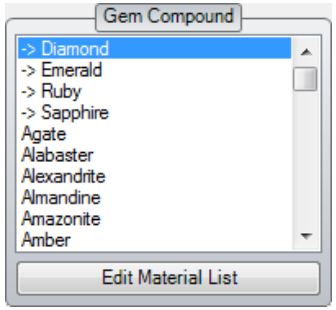
The rough weight is 6.11grams.

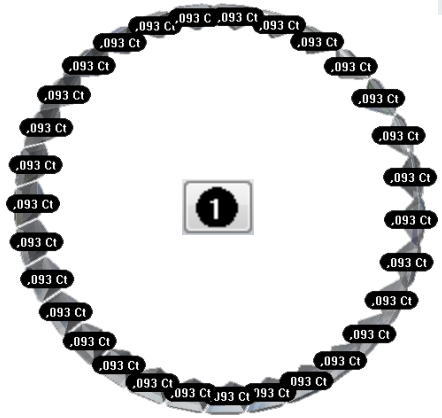
Now, we will analyze the stones weight

4. Press the mouse middle button and click on **Select Gems** icon.
5. Now, the gems are selected. Click on **Gem Weight**.
6. Select the **Gem Compound ->Diamond**

The total weight is 2.786Ct.

If you click on Dot (1) icon to see the weight for each gem. (0,093Ct)

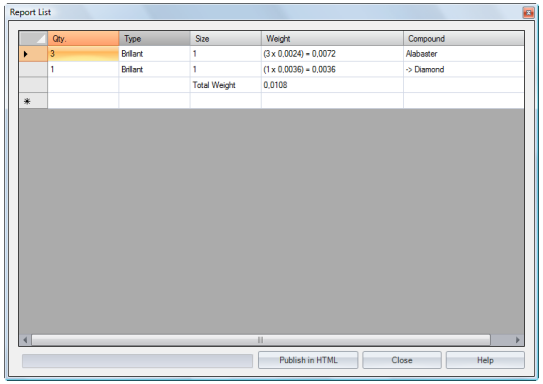


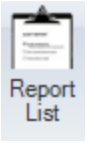


Notes:

Report

Creates a report of all the gems from de document.

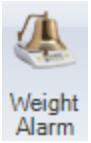




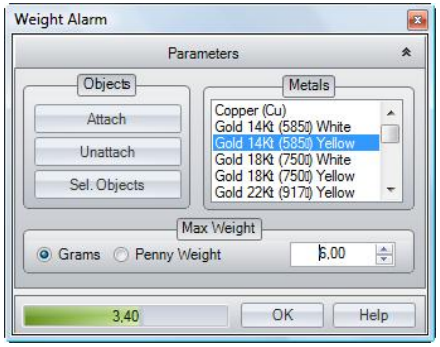
The report shows by gem's type and dimensions. As well as Weight for Gem, Weight for gem and size, and total weight. The option to publish it in HTML available, allowing printing, modifying...

Weight Alarm

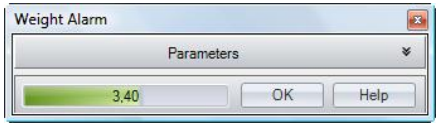
This tool allows analyzing in real time the weight of different object and show an alarm when the maximum weight is exceeded.



1. Click on **Attach** and select the objects to analyze.



2. Select the objects material and the maximum weight.
You can work on the object while this command is working, and reduce the size, clicking on Contract icon.

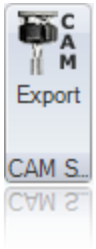


Material List is fully editable from the Analyze Metal Weight command.

Notes:

Lesson 11
Manufacturing CAM and STL

Notes:

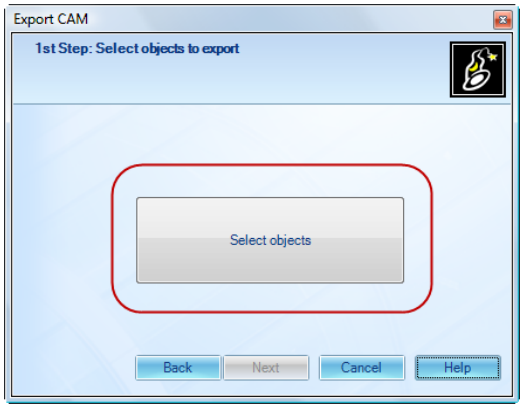


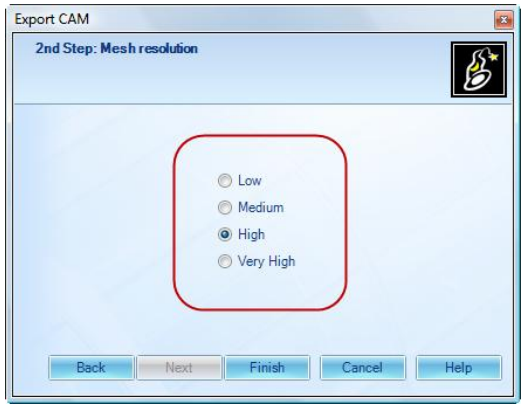
Export CAM

Export several objects to a CAM system.

Exercise

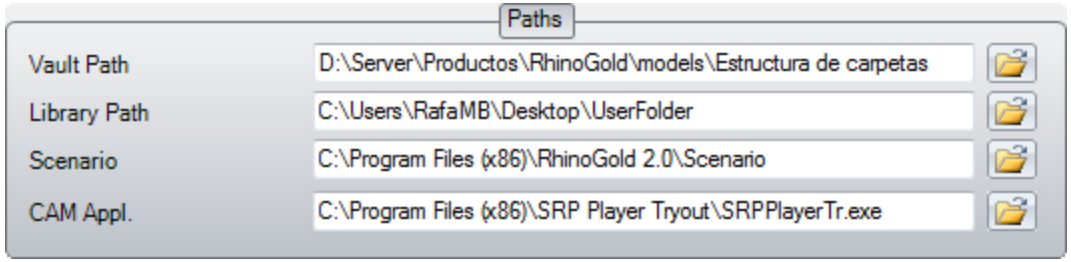
1.On Welcome page click on Next and click on Select Objects button and select the objects to export to your CAM System





2. Select the mesh resolution and click on **Finished**. The mesh resolution affect directly to the piece quality.

You may define your CAM application in the RhinoGold properties or in User Profile. Just click on the folder icon and select the executable file of the CAM Application.



Notes:

Milling Support Structures

Milling Support Structures

Allows creating and/or inserting milling structures. These structures are really important to support our model while the CNC machine mills it.

Modes

There are three ways to create structures. Ring Structures, Personalized Structures and User Structures.

Ring Structures:

1. Define the material parameters.
2. Define the prongs parameters.
3. Click on OK.

The structure's orientation depends of the active view. You may change the active view from this command. The modification will appear when some parameters changes.

Personalized Structures:

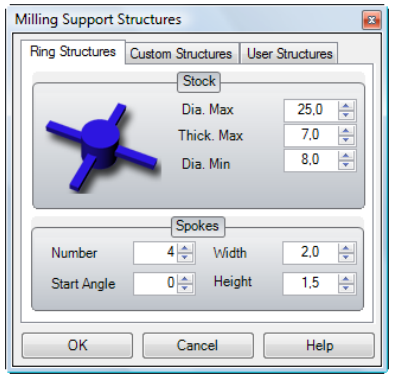
1. Select an exterior curve
2. Select an internal curve
3. Define the material parameters.
4. Define the prongs parameters.
5. Click on OK.

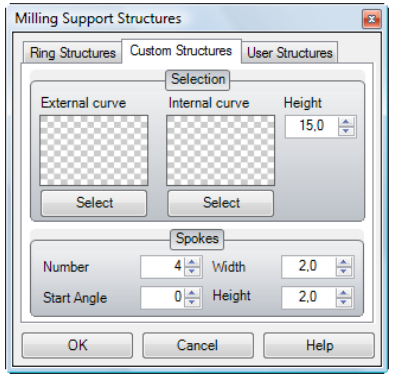
User Structures:

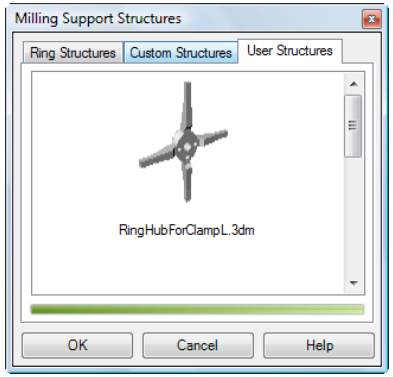
1. Select the milling structure.
2. Click on OK or double clicking on the image.

Important Note:

To add our own structures, just copy the 3DM file in the MSS folder inside our User Folder.



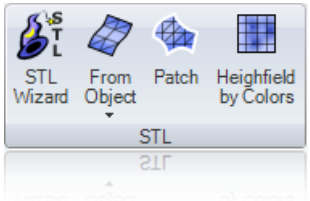




Notes:

STL Wizard

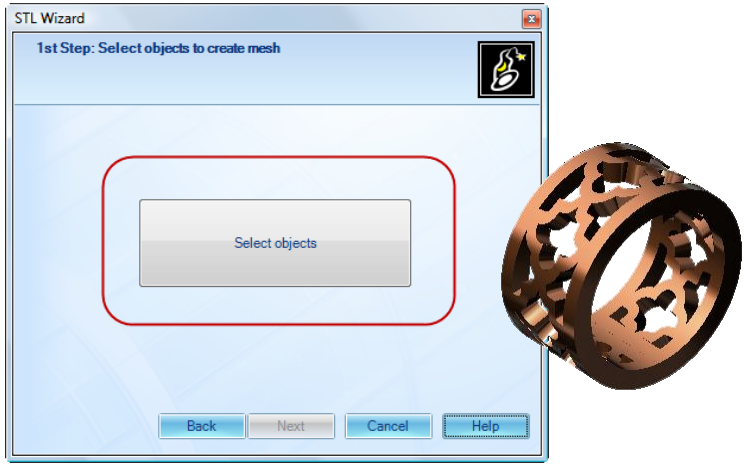
Wizard to repair and export geometry to STL for 3D Printers.



Exercise

Open the **STL Wizard.3dm** file

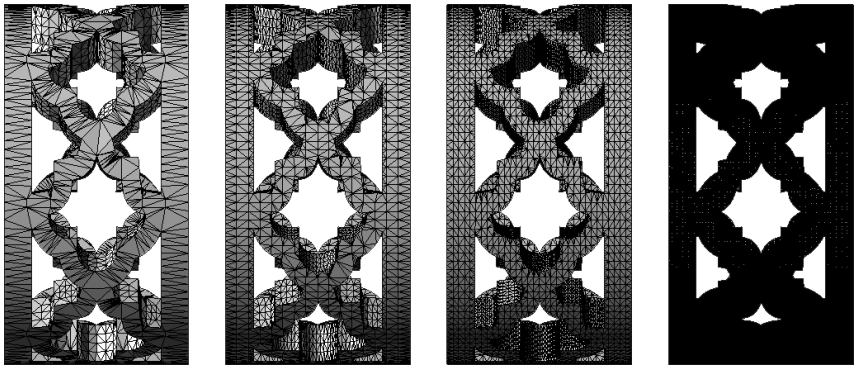
1. Execute the command **STL Wizard**.
2. Click on **Next**, and click on **Select objects** button, and select the model:



3. Select the Mesh resolution High

Quality:	Polygons	File Size
Low Resolution	11608	0.5 Mb
Medium Resolution	22640	1.0 Mb
High Resolution	57436	2.7 Mb
Very High Resolution	761674	36.3 Mb

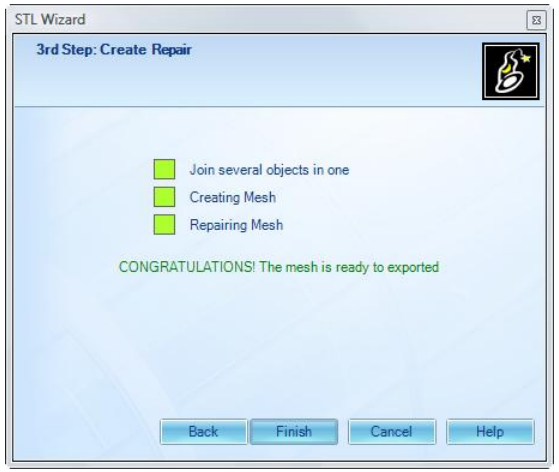
We recommend you to use Medium or High resolution.



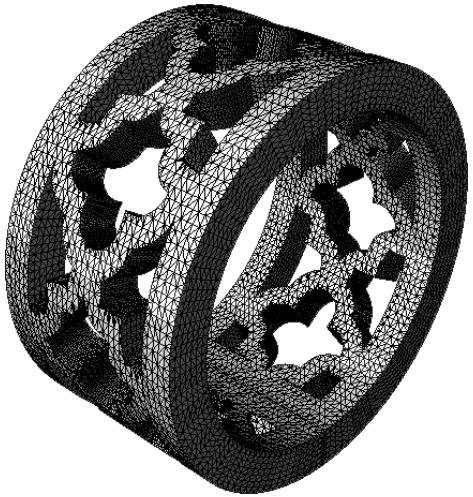
Low | Medium | High | Very High

Notes:

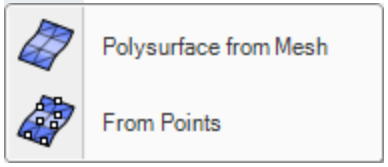
4. Click on Next. If the mesh is correctly created, the next message will appear: Congratulation! The mesh is ready to be exported. If not, it will show in which point is the mistaken.



5. Automatically will shows a Save as dialog to type the file name:



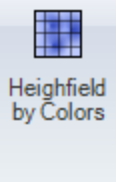
Creates polygon meshes from NURBS surfaces or polysurfaces.



Convert each polygon in a polygon mesh into a NURBS surface.

Creates a polygon mesh from point objects.

Creates a mesh from curves and points.

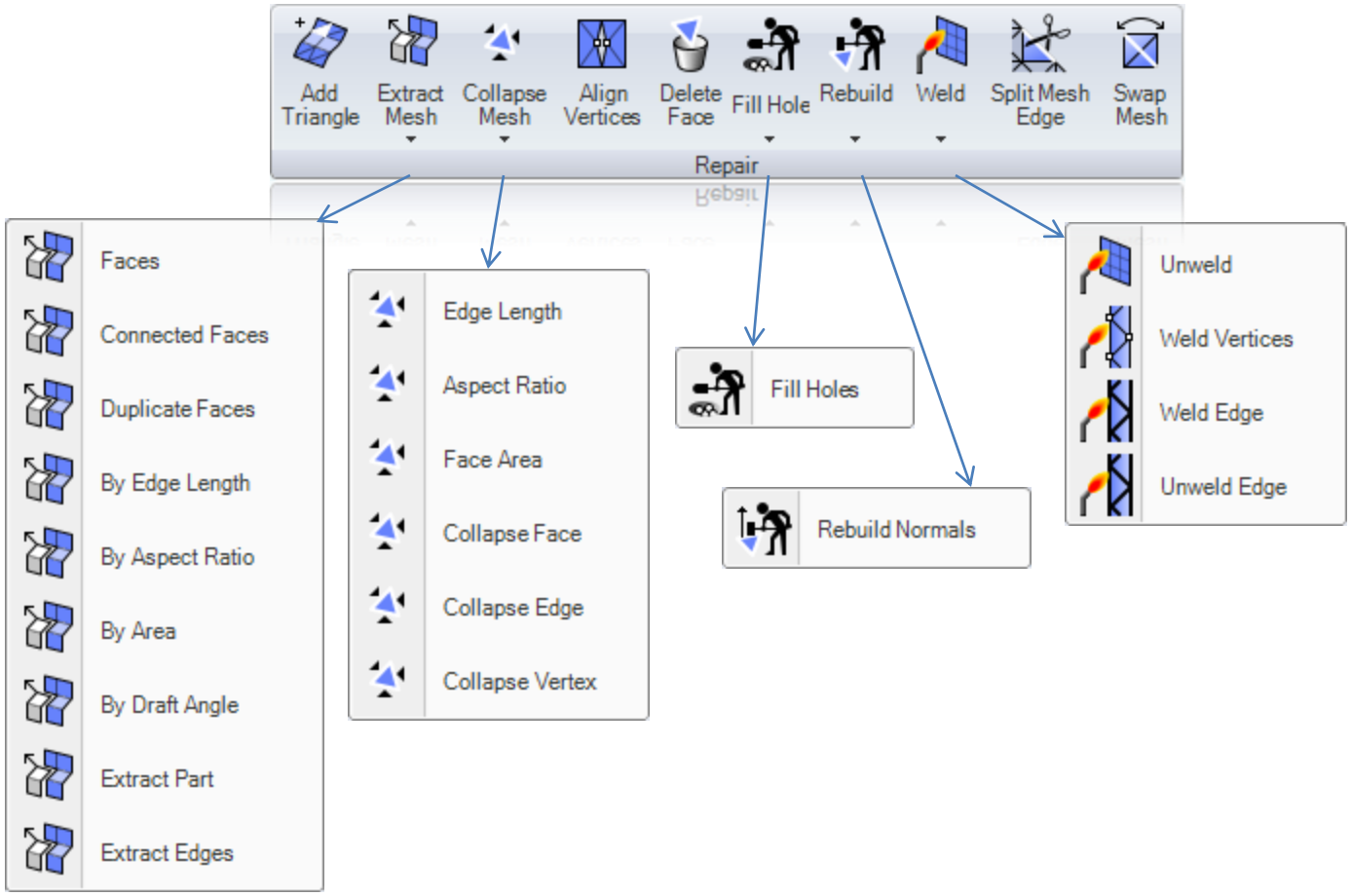


Creates a mesh based on hue, saturation, value and RGB numbers of the colors in an image file. The mesh object retains the colors in the image file.

Notes:

Repair STL Manually

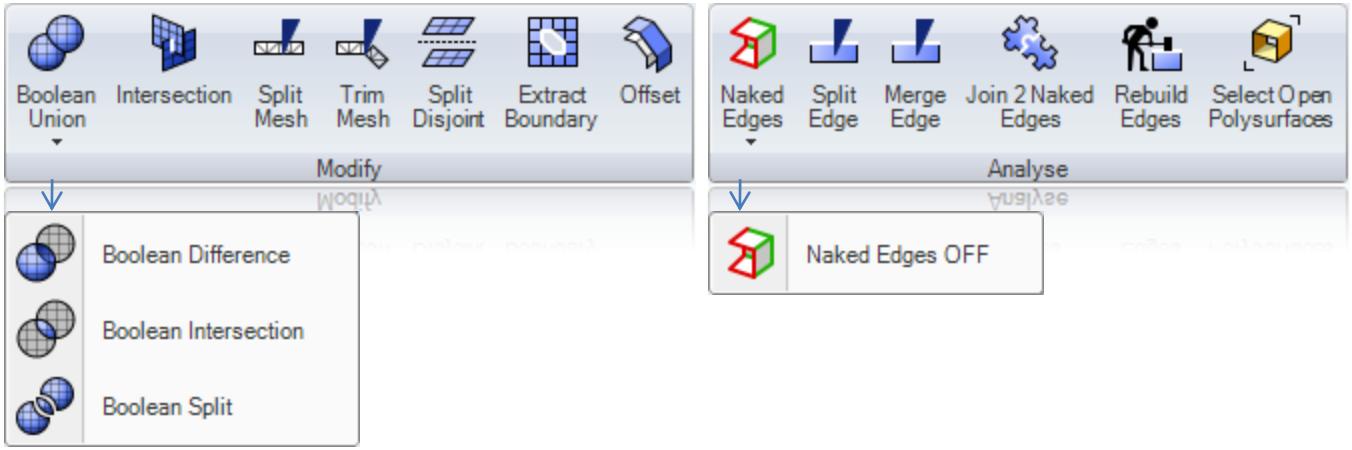
In some cases, when our model is wrong, we have the option to modify and fix the mesh problems manually. These set of tools are really powerful. We will talk deeper in the level II.



Notes:

Command	Description
Add Triangle	Fills a mesh hole with a single mesh face, which helps clean up, repair, and close mesh
Extract Mesh	
Faces	Extract faces of a mesh
Connected Faces	Separates from the parent mesh those faces connected to a selected face where the angle between the connected faces is within defined limits.
Duplicate Faces	Separates identical faces in a single mesh from the parent mesh.
By Edge Length	Separates faces from the parent mesh that have an edge length greater or less than a specified value.
By Aspect Ratio	Separates faces from the parent mesh that are greater than the specified aspect ratio limit.
By Area	Separates faces from the parent mesh that are within a specified range of area.
By Draft Angle	Separates faces from the parent mesh based on the angle of the faces to the view.
Extract Part	Separates faces from the parent mesh based on the angle of the faces to the view.
Extract Edges	Separates faces from the parent mesh based on the angle of the faces to the view.
Collapse Mesh	
Edge Length	Moves the vertices of mesh edges that are greater or less than a specified length to a single vertex
Aspect Ratio	Moves the vertices of mesh faces that are greater than a specified ratio of length to width to a single vertex
Face Area	Moves the vertices of mesh faces that are greater than a specified ratio of length to width to a single vertex
Collapse Face	Moves the vertices of a mesh face to a single vertex,
Collapse Edge	Moves the vertices of a mesh edge to a single vertex
Collapse Vertex	Moves a selected mesh vertex to the location of an adjacent mesh vertex
Align Vertex	Forces mesh vertices within a specified distance to the same location.
Delete Face	Removes selected mesh faces from the parent mesh creating a hole
Fill Hole	Fills a hole in the mesh selected by picking the hole edge.
Fill Holes	Fills all holes in a polygon mesh object with triangular faces
Rebuild	Strips texture coordinate, vertex colors, surface curvatures and surface parameters from a mesh and recreates only the face and vertex normals
Rebuild Normals	Removes mesh normals and reconstructs the face and vertex normals based on the orientation of the faces
Weld	Removes creases by merging coincident mesh vertices.
Unweld	Adds texture mapping coordinate information to each shared mesh vertex
Weld Vertices	Removes texture mapping coordinate information from each selected mesh vertex.
Weld Edge	Removes texture mapping coordinate information from each selected mesh vertex.
Unweld Edge	Adds texture mapping coordinate information to each shared mesh vertex
Split Mesh Edge	Divides a mesh edge to create two or more triangles
Swap Mesh	Transposes the corners of mesh triangles that share an edge

Notes:



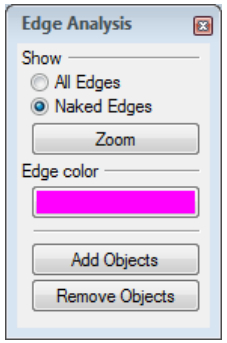
Command	Description
Boolena Union	Cuts away the shared areas of selected meshes, polysurfaces , or surfaces and creates a single mesh from the unshared areas.
Boolean Difference	Cuts away the shared areas of selected meshes, polysurfaces , or surfaces with another set of meshes, polysurfaces, or surfaces.
Boolean Intersection	Cuts away the unshared areas of selected meshes, polysurfaces , or surfaces.
Boolean Split	Cuts away shared areas of selected meshes, polysurfaces , or surfaces and creates separate meshes from the shared and unshared parts.
Intersection	Creates a polyline at the intersection of mesh objects.
Split Mesh	Divides meshes into parts with another object.
Trim Mesh	Deletes selected portions of a mesh inside or outside where they are intersected with another object.
Split Disjoint	Divides into separate mesh objects meshes that do not connect, but are still one object
Extract Boundary	Creates a polyline that duplicates the boundary of a mesh hole.
Offset Mesh	Copies a mesh so that all vertices on the copied mesh are a specified distance from the original mesh vertices.
Naked Edges	Highlights edges of surfaces and polysurfaces.
Naked EdgesOff	Hide the highlights edges of Naked Edges command.
Split Merge	Copies a mesh so that all vertices on the copied mesh are a specified distance from the original mesh vertices.
Merge Edge	Combines adjacent edges of the same simple surface into one edge.
Join 2 Naked Edges	Join two naked edges that are out of tolerance.
Rebuild Edges	Restores original 3-D surface edges that have been forced away from the surface through editing.
Select Open Polysurface	Select the open polysurfaces

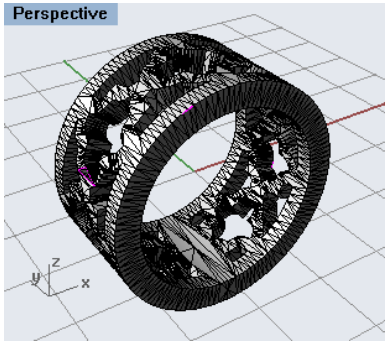
Notes:

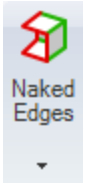
Exercise

Open the **Repair STL Manually.3dm** file

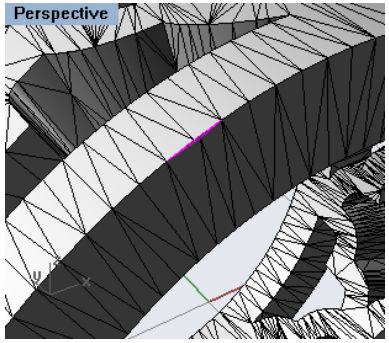
1. Execute the command **Naked Edges** and in the dialog, click on **Naked Edges** options. Take a look to the model, you will see this model has three problems.

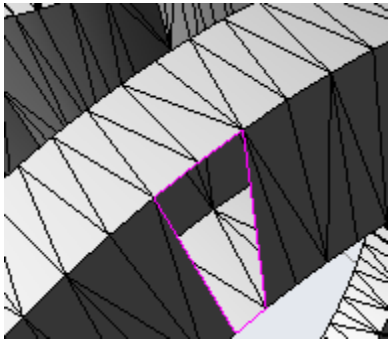


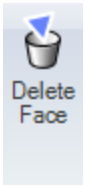




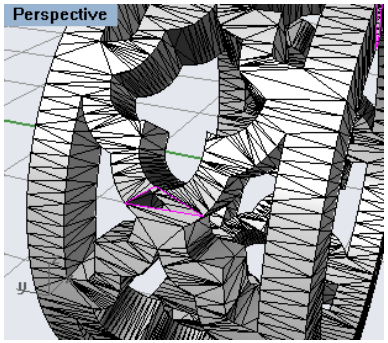
2. As you can see, there is a problem in this edge. We will use the command **Delete Face** to remove the bad faces:

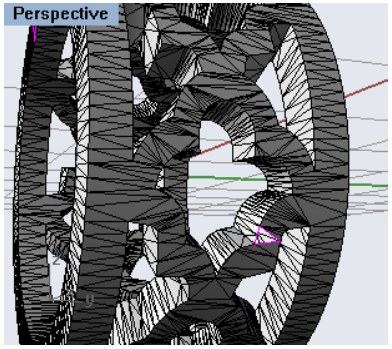






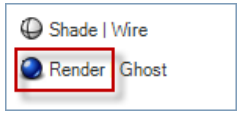
3. Take a look all the model, and you will see there are two holes on the mesh. It is not good for 3D printers. Execute the command **Fill Holes** (**sub-menu Fill Hole**) to fix the holes.

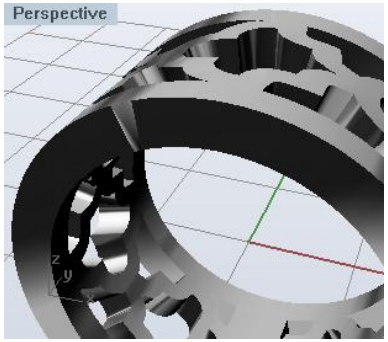


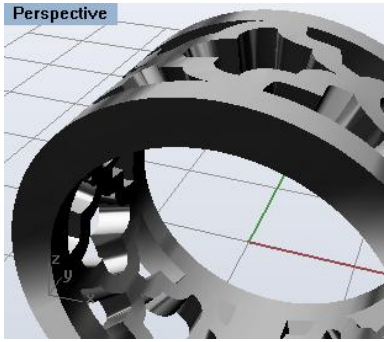


Notes:

4. The model is near to be ready. Before to export to STL, change the view mode to **Rendered**.







There is a problem of Normal. Execute the command **Rebuild Normal**.

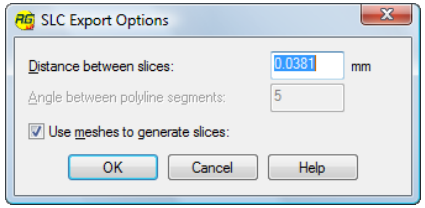
Now your model is ready to prototype. Click on **TDM logo > Save As** STL file.

What is the SLC format and what are the advantages?

This is a 2 1/2 dimension file describing slices (contours) through a solid model typically for rapid prototyping applications such as stereolithography. It was created by 3D Systems around 1994.

The SLC file format is a 2 ½D contour representation of a CAD model. It consists of successive cross-sections taken at ascending Z intervals in which solid material is represented by interior and exterior boundary polylines. SLC data can be generated from various sources, either by conversion from CAD solid or surface models or more directly from systems that produce data arranged in layers.

The main advantage is not required to fix the 3D objects: Do booleans, fix naked edges,… to print in 3D.



To export your model from RhinoGold, go to TDM logo -> Save as…. Define a line of the printing direction, usually in Z, and define the distance between slice, it depends of the machine resolution.

Notes:

Lesson 12 – Communication, Animation and Render

Notes:

It's really worth to communicate our designs to our work team or customers. For this reason, RhinoGold is compatible with all the renders available for Rhinoceros, as Flamingo, Brazil, Hypershot, VRay,...

Other interesting improvement of 2.0 is the new **Animation Studio**. This functionality allows to create videos easily.

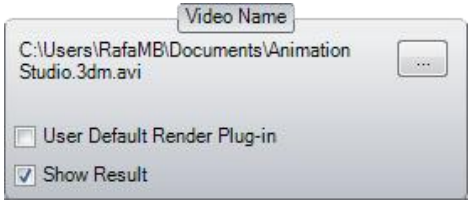
Exercise

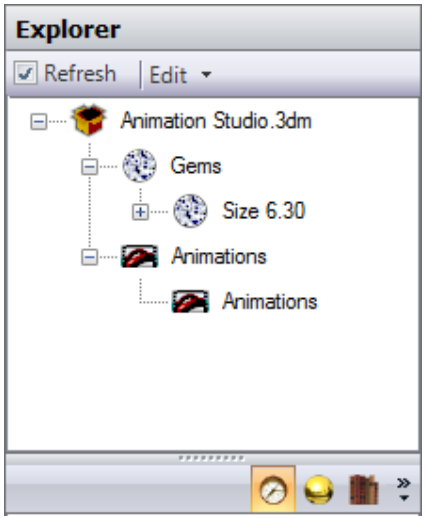
Open the **Animation Studio.3dm** file.

1. Select a circle for the camera.

2. Select the camera's point of sight. Selecting objects of the camera's point of view.
3. In **Parameters**, Define the video duration. In this case, we define **10 seconds**.
4. In quality we define the Email, Web or DVD quality. It defines FPS (Frames per second). Define **Web** quality.

5. In **Video Name** define the video's title. By default is the document's title. We have the option to use the Rendering to create videos, as Flamingo. It's very important that the plug-in supports batch Rendering.





To preview the animation, click on **Preview** button.

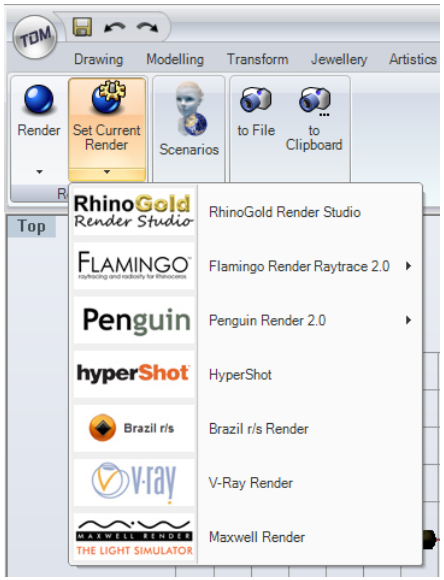
6. Click on **Create Animation** to create the video. Next, shows a dialogue with the video Codecs available on our computer. It allows us to create videos of in high quality using less memory, very worth to send by email.

Once the animation is created, it will show the icon on the **Explorer**. Remember we may edit it just double clicking on it.

Notes:

How to select the preferred Rendering?

On the **Rendering Tab**, click on the black triangle to show the rendering list. Obviously, you have to install the chosen render. For all of them, you can render clicking on Render Icon.



Using Flamingo 2.0

After selecting Flamingo, all the Flamingo 2.0 commands will be added. To know more about Flamingo, check the Flamingo's User Guide.

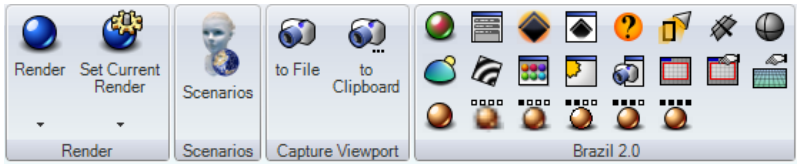
RhinoGold includes a library of specific jewelry materials to be used in Flamingo. Please, visit www.rhinogold.com

Using HyperShot

After selecting HyperShot, it will appear a library with all the materials for this render.
RhinoGold includes a library of specific jewelry materials to be used in HyperShot. Please, visit www.rhinogold.com.

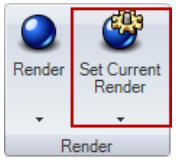
Using Brazil

After selecting Brazil, it will appear all the command for this render. RhinoGold includes a library of specific jewelry materials to be used in Brazil. Please, visit www.rhinogold.com



How to use a render out from the list?

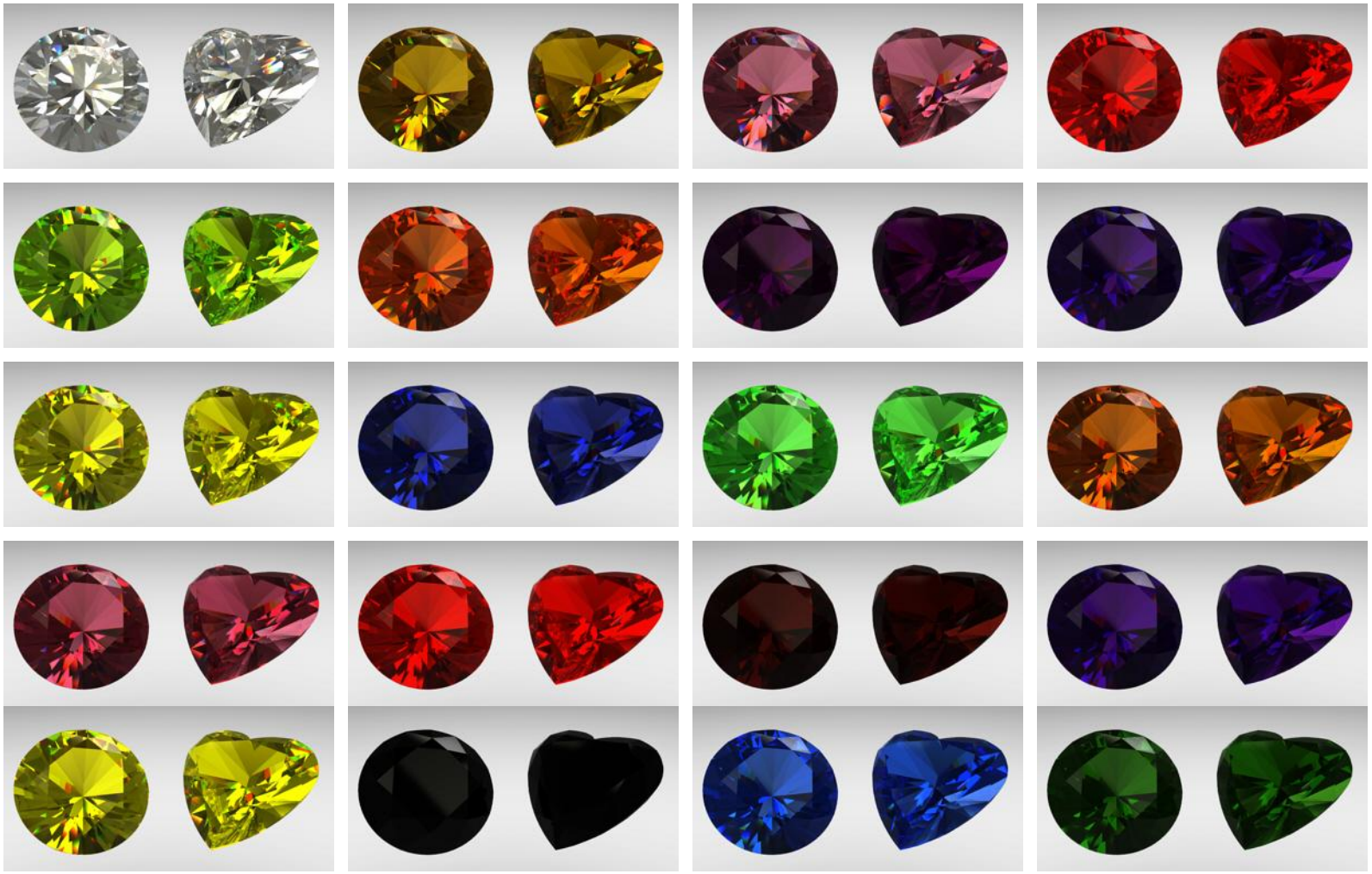
Click on Select Render icon, and write the rendering plug-in name.



Notes:

RhinoGold Material Library

Visit www.rhinogold.com and download the RhinoGold Material Library . This library is available for Flamingo, Brazil and HyperShot, and includes, Stones, Metals, and much more…



RhinoGold Material Library Just a few previews of RhinoGold Metal Library

Notes:

Do you need more training material?
Visit www.rhinogold.com/en/howtolearn.htm

TDM Solutions: