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MORTAZAVI DESIGN ACADEMY

DESIGNING JEWELRY WITH COMPUTER BOOK

with MATRIXGOLD®

Vol.1

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DESIGNING JEWELRY WITH COMPUTER MATRIX GOLD VOL. 1

Written and published by Mohammad Mortazavi, this book is the only available step-by-step walkthrough for Gemvision Matrix Gold software providing the 3D jewelry designers with the most complete instructions of what they need to know while operating Matrix Gold...

Step-by-Step Instructions

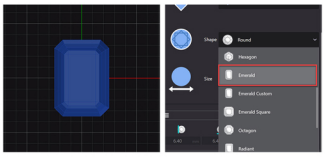
The tutorials explain everything a jewelry 3D designer needs to know about the modeling techniques in the most detailed and professional way plus full step-by-step tutorial of Matrix Gold functions, toll, abilities, etc.

Step-by-step

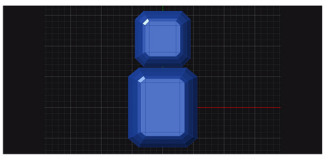
"Robot" Pendant Design

In this exercise, designing a robot-shaped pendant using the Gem command and non-standard dimensions will be taught. Additionally, to speed up your workflow during the design process, you will become familiar with the Match Attributes command.

1 To create a gemstone with non-standard dimensions, you must unlock the lock next to the Size List. Before doing this, click on the Shape option to open its dropdown menu. Then, click on Emerald to create an emerald-cut gemstone.



2 Run the Gem command again, and this time, select an Emerald Square gemstone from the Shape menu. Then, click on the Size lock again and enter the dimensions 9, 9, and 5.7 in order, then press Enter. After that, move it above the previous gem.



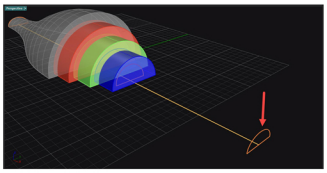
Fast and Simple Techniques

In addition to the details a 3D artist needs to know, there are several various simple techniques tutored in this book which will help the designers to model their jewels in the fastest and easiest possible ways.

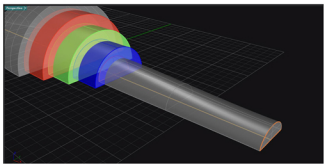
Complete Text-Visual Tutorials and more

Every exercise is completely detailed in both text and image, providing the artists with useful information not only about the 3D modeling subjects, but also about standards they need to perform in their career and much more.

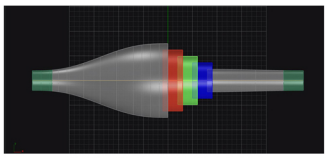
Select the small half-circle you made in third stage and used for Sweep2, and mirror it to the other side of the Curve on the C-Plane.



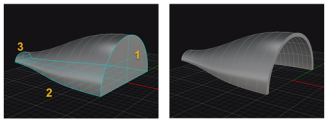
Now select the Curve on the C-Plane and run the Sweep1 command. Then select the last two half-circles you made as profiles and finish the command. Perform Cap Planar command on the created volume to make it a closed volume.



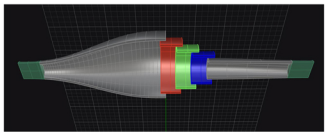
9 Go to the Top viewport and draw a vertical line by 4mm distance away from the endpoint of the Curve on C-Plane then mirror it in the same viewport.



10 perform shell command. According to the picture, select side and bottom surfaces of one of the grey volumes and shell them by 0.5mm thickness.

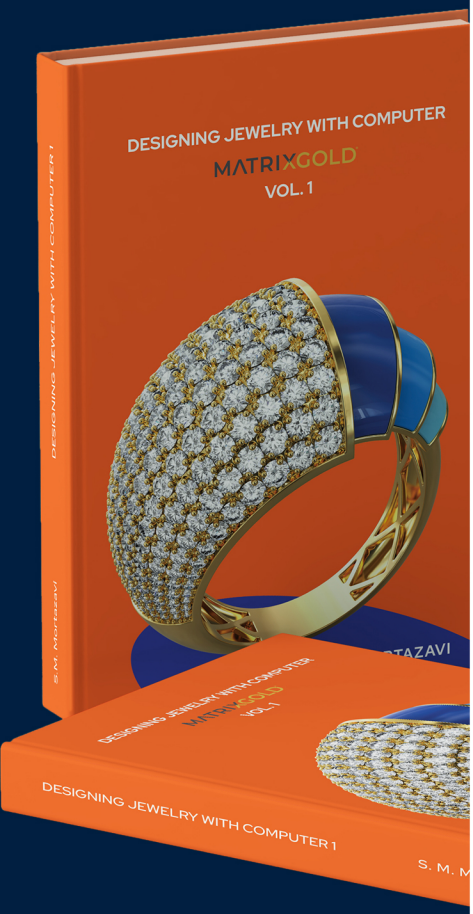


Do this with all the other volumes except the two small ones at the start and end of the model.



More details on what we present in MATRIXGOLD® Book Vol.1

The instructions provided in this document are not limited to 3D modeling; but they also include various methods of Gem settings and tend to different hints you need to keep in mind while trying to design models of high quality and standard. Every exercise comes with detailed steps so even the designers with no experience can follow.



Manufacturing Jewelry and Gem Setting

Introduction of different Gem Settings

Bead, Melee & Granite setting

Bead and prong setting is one of the most useful gem-setting methods for round gems, generally small and medium-sized. In this method, the gems are restrained and held by tiny cylinders, in the future referred to as «Bead» or «Prong».

There are two common ways to extract gems:

Bead Setting:

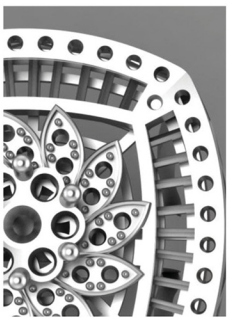
The setter pulls the prongs out of the gold surface and bends them on the gems using special setting tools. The thickness of the gold under the gems in this method should be at least 1mm or between 60 and 70 percent of the gem's diameter so that the setter can make the prongs from the surface of the gold. To design this style, the designer only has to create the holes under the gem in the computer, and the rest of the work is done by the setter.

Ready-Made Prong:

The prongs are made during the design process and are bent on the gems after construction by the setter. One of the advantages of this method is that it speeds up the gem setting process and reduces the gold deficit. In this method, there is more delicacy and precision, and as a result, the quality of the final work is higher. This method is much more useful than the bead setting method today. In this case, the cross-sectional shape of gold can be in two ways:

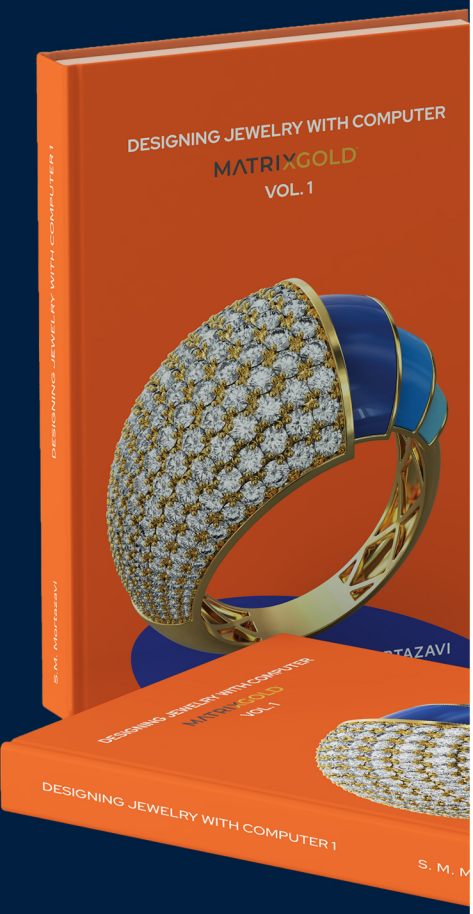
Without walls:

In this case, a row of gems is placed on a narrow band of gold that the width of the band is exactly the size of the gem's diameter or slightly wider. The size of the band width can be considered as 0.05 to 0.10mm more than the size of the gem; this amount is removed during the manufacturing process.



More details on what we present in MATRIXGOLD® Book Vol.1

Everything you need to perform during your design progress is explained in details with visual samples of every step to make sure that the students are not missing anything.



Prongs:

The number of prongs that must be created to restrain a gem is at least two, known as «Shared Prong». In this method, the setter can set the prongs on the gems in two ways:

The prongs are placed directly between the two gems, so each prong has the task of restraining two gems (Photo 1)

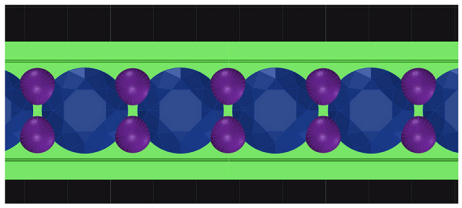
- The prongs are placed crosswise on each gem, so each prong has the task of restraining a gem (Photo 2).

1- «Shared Prongs» - setting each prong on two gems

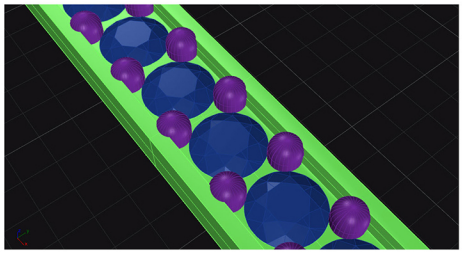
2- «Shared Prongs» - setting prongs crosswise

In this setting method (Shared Prong), distance between the gems should be 0.05 to 0.2mm.

The interference of gems and prongs is significant when designing with a computer. It should always be between 10% to 15% of the diameter of the prongs. If the amount of interference between the gem and the prong is high, the prong may be dislodged and destroyed during the setting, or it may force the setter to mount a smaller gem than the size considered in the design which damages the beauty of the model.



If the amount of gem and prong interference is low, the prongs may go into the side walls. The prongs should never go into the walls on either side, and there should be no-touch between the walls and the prongs so that the setter can easily bend the prongs on the gems.



In the photo above, the prongs went into the wall in some parts, and this causes many problems after making the initial model and the setter cannot bend the prongs on the gems; this way, the walls on both sides of the gem are damaged, and the appearance of the work is ugly and irregular. There should always be a distance of at least 0.05mm between the prongs and the walls on both sides of the work so that the prongs can be easily bent on the gems.

More details on what we present in MATRIXGOLD® Book Vol.1

The international standards of the measurements you must follow in your design are listed in charts and explained with tips and techniques of casting for better understanding.

Standard chart size of Prongs for natural gems

The table below has been prepared so with its help you can set the prongs diameter and height according to the desired gem size.

This table is only prepared for designing jewelries with natural gems.

GEM SIZE / GEM DIAMETER (millimeter)	PRONG DIAMETER (millimeter)	PRONG HEIGHT (millimeter)
1.00 - 1.30	0.45 - 0.50	0.50
1.30 - 1.50	0.50 - 0.55	0.55
1.50 - 1.70	0.55 - 0.65	0.60
1.70 - 2.00	0.65 - 0.75	0.65
2.00 - 2.20	0.75 - 0.80	0.75
2.20 - 2.50	0.80 - 0.90	0.85
2.50 - 2.80	0.90 - 1.00	0.90
2.80 - 3.00	1.00 - 1.10	1.00 - 1.05

-All sizes in of the 2 shared prongs table above can be changed up to 0.05 to 0.10mm depending on the type of work and production.

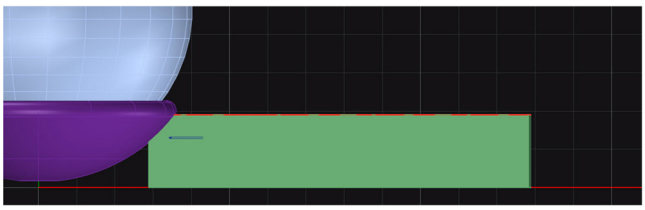
These sizes are intended for the 2 Shared Prong style which is the most widely used method in jewelry for round gems worldwide. As mentioned, for the 4 Prongs method, the size of the diameter of the prongs should be considered up to 20% smaller than the diameter in the standard prong method to keep the beauty and elegance of the work. Consider the height of the prongs in the two methods mentioned according to the table.

More Samples of MATRIXGOLD® Book Vol.1 Content

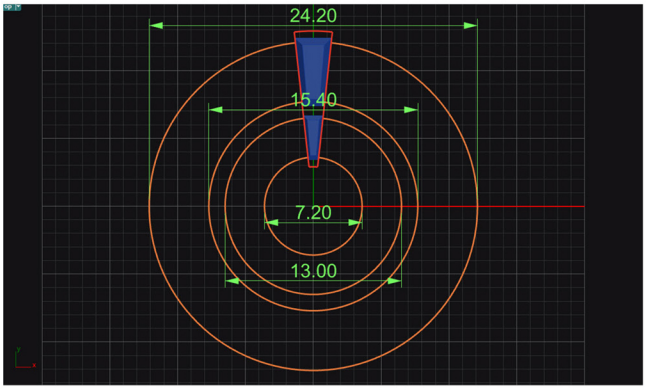
The progress of designing every model from easiest to the most complicated ones are detailed in measurements you need to maintain for manufacturing.

Now select the Curve around the gems and extrude it down to the C-Plane level by the same 1.9mm amount.

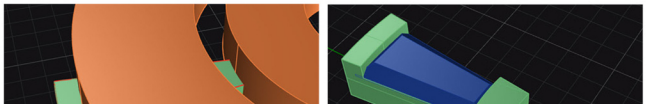
Also select the pearl and its cup, and move them towards the top until the cup end is located on the C-Plane level.

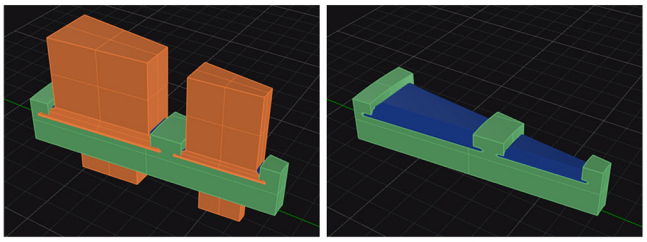


5 For the gems to reach out of the base, you need cutters. In this exercise, build this cutter manually; go to the top Viewport and draw 4 circles in order by the 7.2, 13, 15.4, and 24.2mm diameters. Then select them all and bring them up by 1.3mm vertically in Right or Front viewport. These created rings play the cutter role.

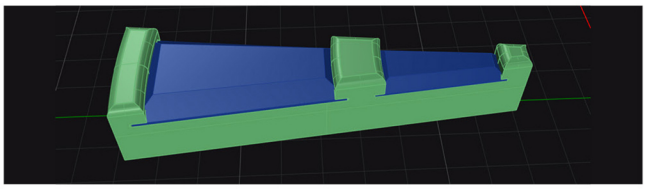


Select all the circles and extrude them to the top as much as they cross the base top and set the solid option to “Yes”; then Boolean Difference them from the volume which is containing the gem.

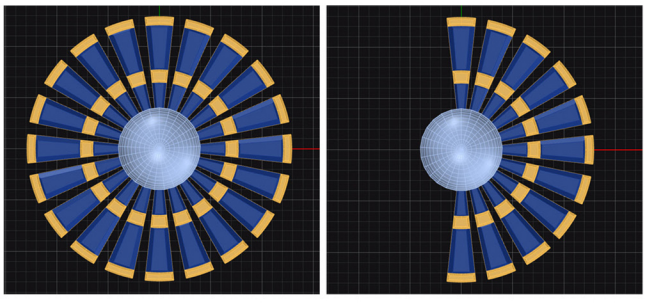




At the end of this stage, run Fillet Edge command and fillet the upper edges of this volume by 0.2 amount.



select the gems and the base under them and run the Polar Array command. Set the count to 20 and rotation axis on Z. after finishing the command, Ungroup the objects and delete half of them as the picture below. Remember that the cup and the bases should intersect with each other.

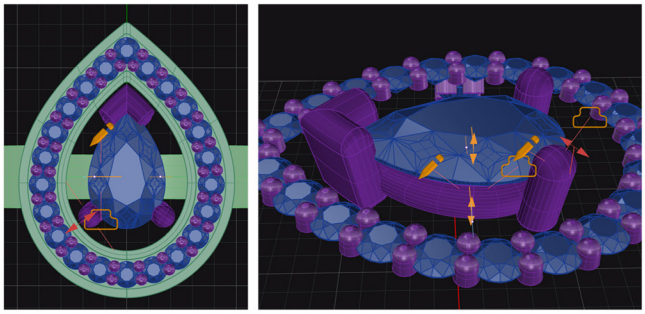


7 Bases should also be attached to each other. To do this, draw a circle with 6.4mm diameter from the Top viewport. Cut the half which is not covered by the bases. Then run the Pipe command on the remaining Curve, set its diameter to 0.6mm and then press Enter. Also move the pipe vertically so until its located in the middle of bases.

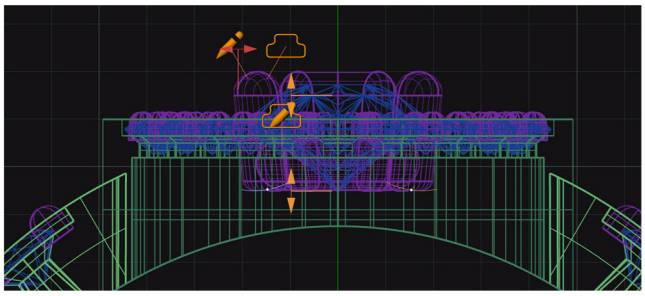
More Samples of MATRIXGOLD® Book Vol.1 Content

There are several exercises of various ring, pendant, earring, etc. models so students can learn and practice modeling of different jewelry types and face their challenges.

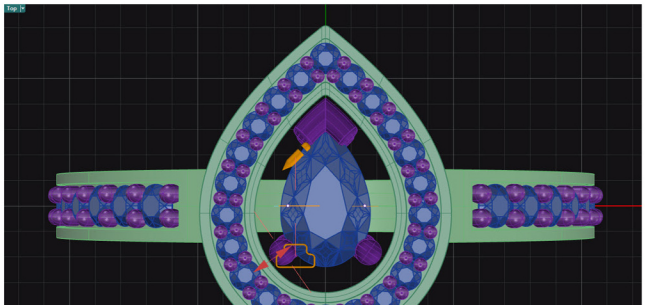
15 Here, to create the base prong (head builder) for the pear-shaped gemstone, select it and execute the “Head” command from the F6 menu. In the “Layout” section, set the number of prongs to three and reduce the number of bands under the gemfrom two to one in the “Rail Count” section.



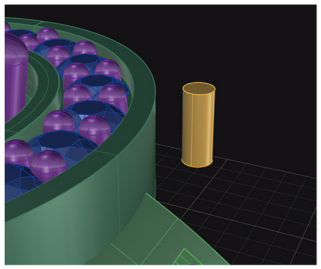
Then, using the “Overall Height,” raise the band under the gemso that it aligns with the walls of the ring’s crown and is positioned just below the surface of the gemstone’s pavilion.

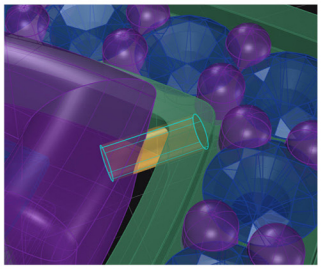


Note that the rail should not be visible from the top view.



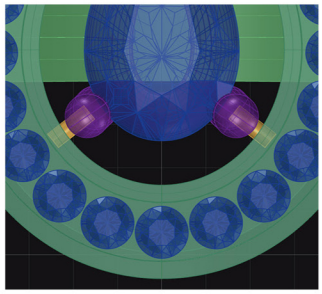
then use the extrude command to give it a volume of 2 to 3mm. the exact height is not very critical, and a range of 2 to 3mm is suitable. After that, move and rotate the created bridge to position it at the tip of the pear-shaped gemstone.

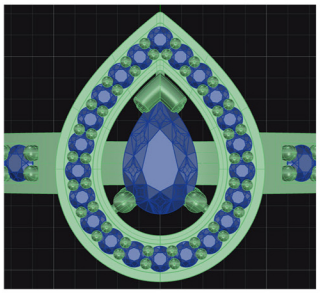




You can remove the excess material that extends into the gems area by either cutting it or using the “Scale1D” tool to reduce its length. Make sure that the created bridge should not extend above or below the work, nor should it enter the underside of the center of the gem.

Now, to create two more bridges, move the first wire from the “Top” window toward the other side of the gemstone, adjusting it as shown in the image below. Once the movement and adjustment are complete, mirror the bridge.

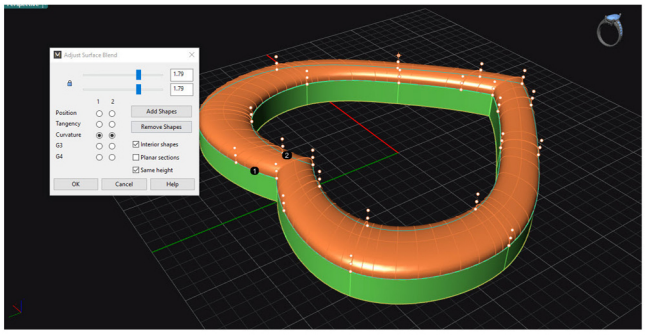




For easier setting of the pear-shaped gemstone, you can place a drill and reduce it from the base so that the space for the gem on the prongs is created. In the settings window, set the “Girdle X Offset” to 1 and the “Bottom Length” to 0, so that after performing the Boolean operation, the rail under the gem remains undamaged.

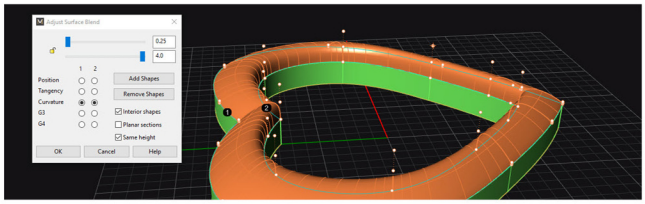
More Samples of MATRIXGOLD® Book Vol.1 Content

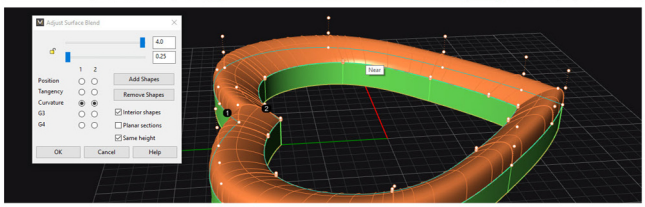
Every exercise will teach you some new sets of commands and help you practice the previous ones so you can model more complicated projects in the future by combining the tools and techniques you learn along the way.



In the first of the two previous images, the Same Height option is disabled, while in the second image, enabling this option ensures that the height remains uniform across both the narrow and wide sections of the model.

To adjust the curvature or height of the Blend, you can use the sliders in the settings window or enter a specific value in the number box on the right. Additionally, you can assign separate height values to the inner and outer sides, allowing you to control the curvature direction, whether inward or outward.

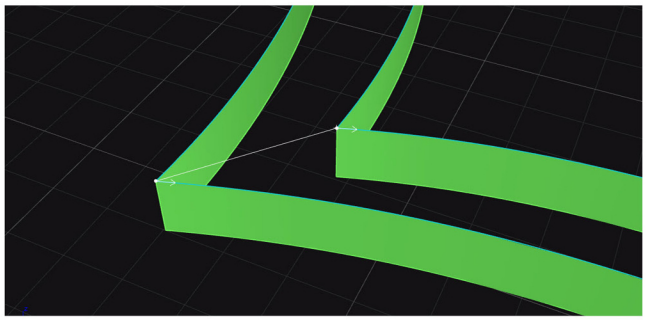


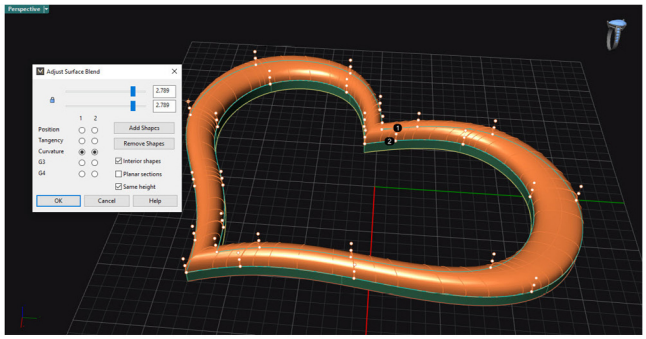


By clicking on the square icon to the left of the sliders, you can adjust the height of both sides of the Blend at the same time and equally.

3 Now, use the Blend Surface command to select the inner and outer heart edges in the specified order to create a smooth and domed volume on the pendant.

Make sure to move the Seam Points to one of the top or bottom corners of the heart and align their directions. After adjusting the Seam Points, press Enter to open the Adjust Surface Blend window, enable Same Height, set the Blend height to 0.5mm, and click OK to generate the volume.

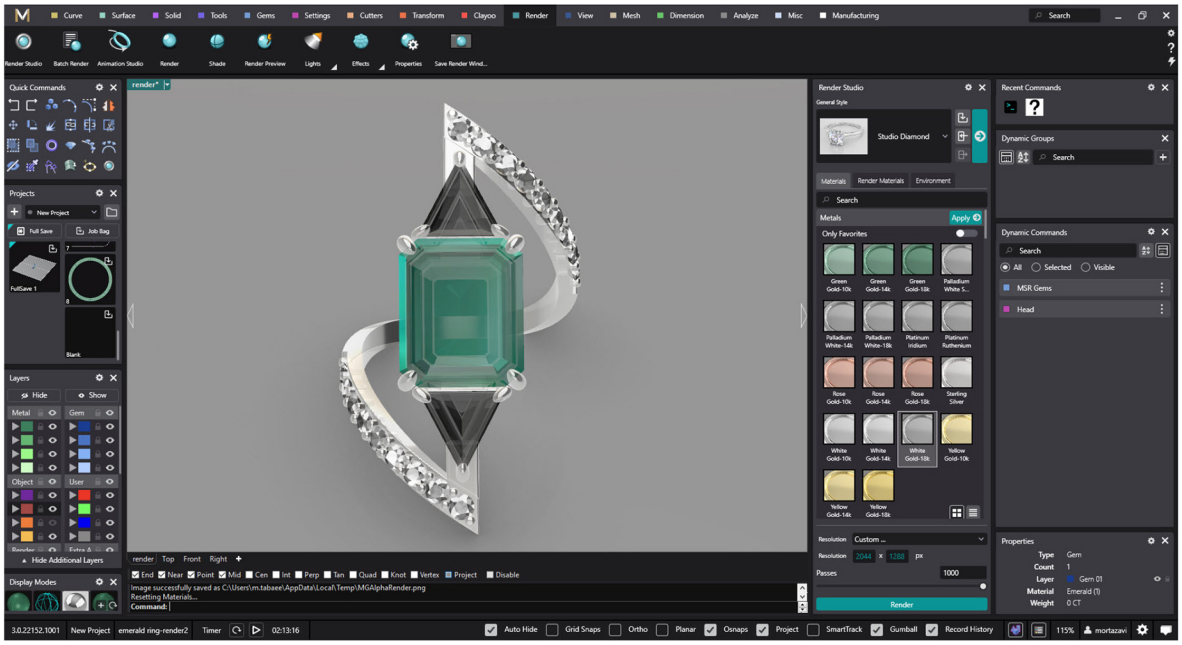




4 Join the created volume on the pendant with the side walls, then select the model and click on Cap Planar to close the bottom. As shown in the image below, after executing Cap Planar, the bottom of the pendant will be closed, turning it into a closed volume (Closed PolySurface).

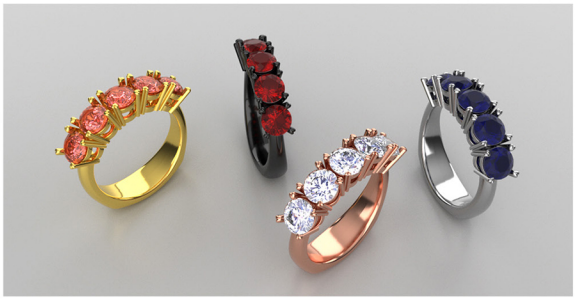
More Samples of MATRIXGOLD® Book Vol.1 Content

In Addition to all the modeling tutorials, a comprehensive instruction is provided for rendering with Cycles engine which is the latest engine in Matrix software.



Making order catalogs for jewelry manufacturing factories for taking orders of made and unmade models, art catalogs for jewelry expos and stores, banners and posters of models, are some of the uses of Rendering. Today, all of the world's huge jewelry designing companies are using rendering as a main element in the design, production and presentation process of their models to their customers.

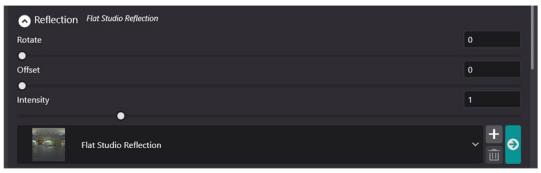
By using Rendering, you can take pictures of a model with different metal colors and various gems, and provide them to the customers without spending to much time and cost, so they can have more choices according to metal coloring and gem type variety.



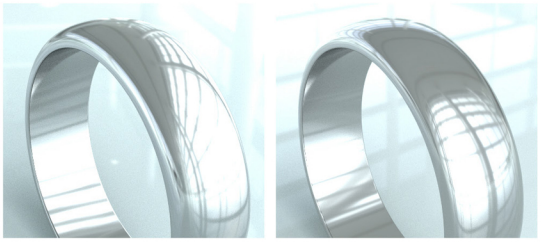
In Matrix Gold software, giving material to an object is easily possible due to the availability of a vast range of materials and resources for creating different metals and Gem types. Its only needed to right-click on the desired color and gem type and apply it to the object. You can also take very high-quality renders by choosing deferent lighting studios.

More Samples of MATRIXGOLD® Book Vol.1 Content

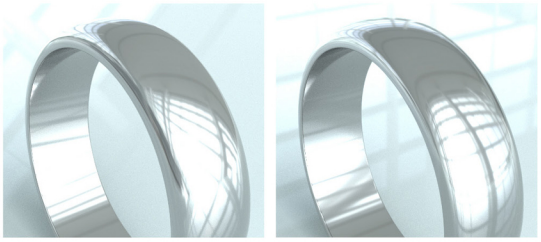
Rendering tasks are completely explained in full details including material types, the tutorial for every setting and configurations, camera angle, resolution, etc. so you can have the most realistic and professional render of your project following these instructions.



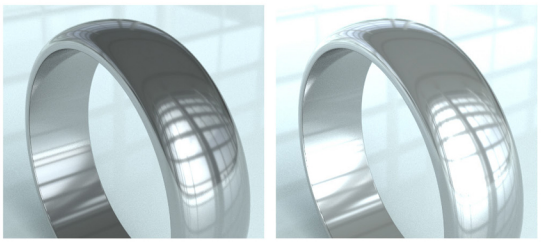
The first parameter in Reflection menu is Rotation. This option rotates the studio reflection on the object up to 360 degrees around it. look at the pictures below; in the right picture, the rotation amount is 0 and in the left picture, its set to 90 degrees.



The second parameter is called offset which moves the studio surface up and down according to the object's level.



The third parameter is Intensity which as its name shows, configures the reflection intensity. Look at the two rings below. In the right picture, the reflection intensity is set to 1. But in the left picture, the ring is darker by decreasing the Intensity amount since its reflecting less light.



Render Studio: Flat Studio
Rendering Time: 1min & 33s.

Render Studio: Interior
Rendering Time: 1min & 36s.

Render Studio: Nighttime Auditorium
Rendering Time: 1min & 27s.

About Mohammad Mortazavi

Award-winning jewelry designer, Instructor, and Author, S.Mohammad Mortazavi (also known as Saeed Mortazavi) started his career in jewelry industry in 2006.

In 2009, he won his first jewelry design award and since then he has won more than 12 jewelry design awards in the most prestigious international jewelry design awards in Hong Kong (IJDE), and A 'Design awards in Italy.

He is the Author of 4 jewelry design books of more than 1500 pages in total.

Saeed was a judging committee member in 7 jewelry design awards in Thailand, UAE, and Italy.

He established his Jewelry Design Academy in 2015 and has instructed more than 10000 students withing 15 years of his teaching experience.

He was a speaker and lecturer in first, second and third jewelry designer's forums in the Middle East in 2015 ,2018, and 2019 in the UAE. His Contemporary, Bold, and Avant-guard designs have been covered in many Medias, TV channels, Magazines like Vo +- Solitaire Magazine, Jewelry Review, Trend Book 2025, and many more medias.