



RADEON PRO

SOFTWARE

Radeon ProRender add-in for SOLIDWORKS

User Guide v1.1

This document is a user and setup guide with tips and tricks on how to render photorealistic images in real-time, apply decals and create animations.

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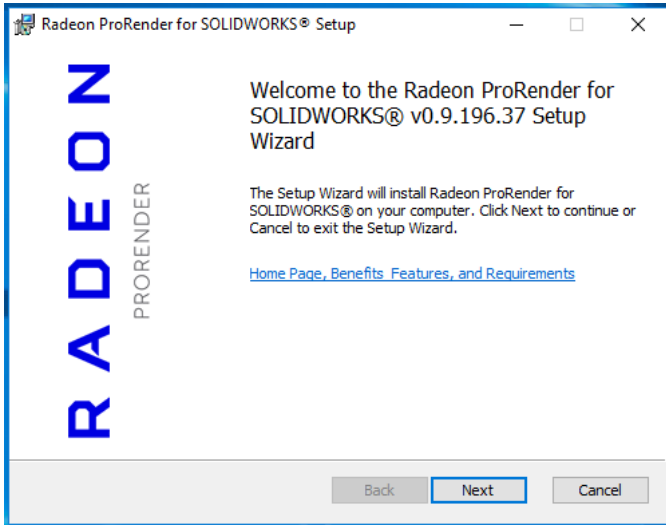
OVERVIEW

Radeon™ ProRender is a free un-biased rendering add-in for your design and manufacturing needs in Dassault Systèmes SOLIDWORKS®. Using physically accurate path-tracing technology, Radeon™ ProRender can produce stunning photorealistic images of your model and provides real-time interactive rendering and continuous effects adjustments to help create the perfect rendered image. Radeon™ ProRender supports real-time updates for changes that to the parts and assemblies within SOLIDWORKS, offering a continuous render preview.

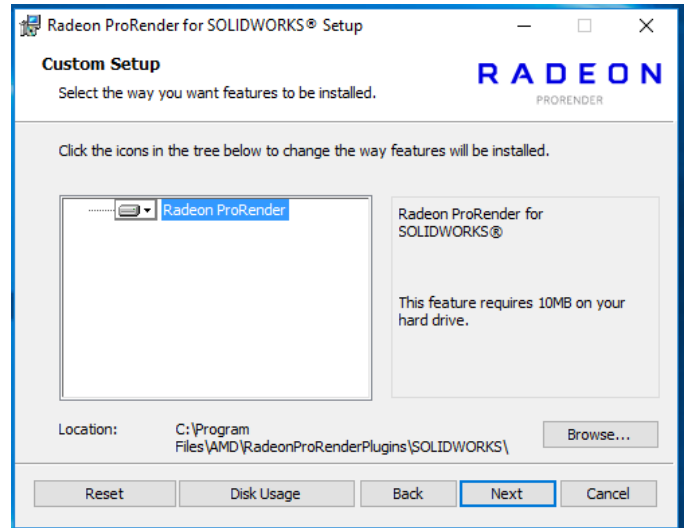
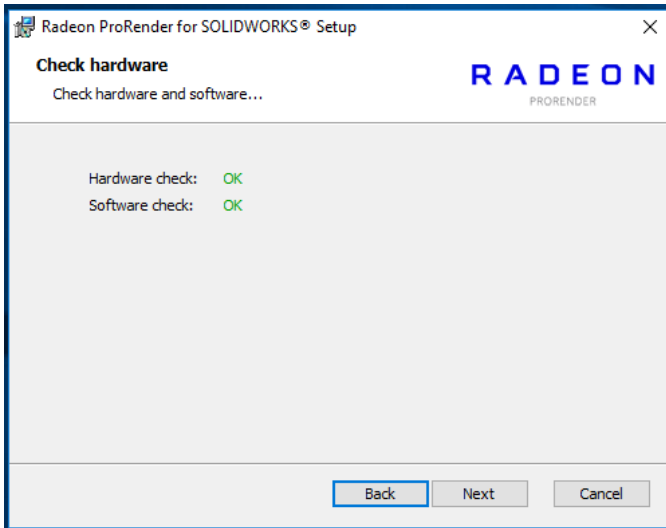
This user manual will describe how to setup Radeon™ ProRender for SOLIDWORKS and how to use it from adding decals through to the final save of the rendered image. This guide will also explain the additional features such as post render image adjustments, decal placement, generating rendered animation files from SOLIDWORKS motion studies, and how to incorporate Radeon™ ProRender into your design workflow.

Install Radeon ProRender add-in

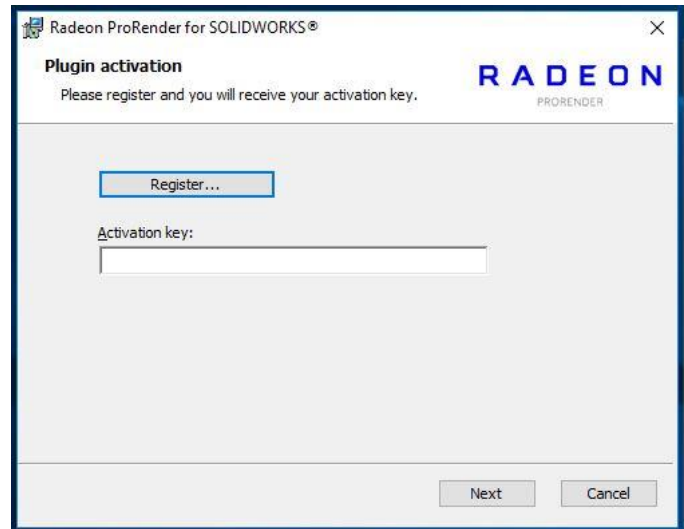
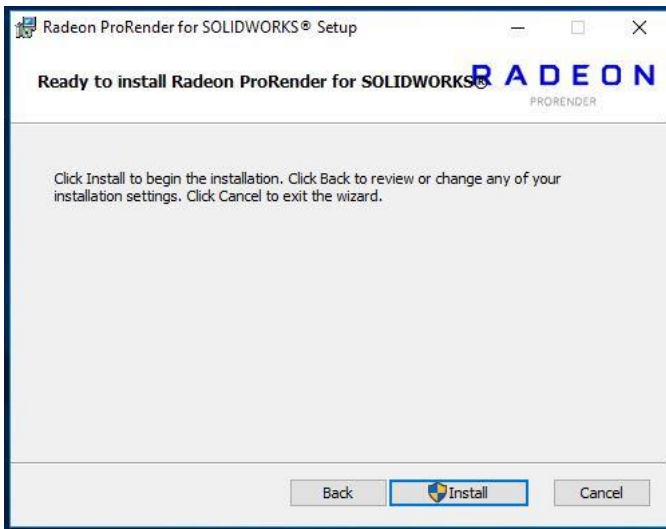
Download the Radeon™ ProRender add-in for SOLIDWORKS and launch the setup, agreeing to the license.



Radeon™ ProRender will check your hardware and software to ensure requirements and you can then choose where to install the add-in.



Install the Radeon™ ProRender Add-In. Then, click on **Register...** to get your activation key.



Register using your information. You will receive your activation key after clicking Request Download. Enter it into the installer and continue the installation.

AMD Developer: Radeon X

← → ↻ www.amdsurveys.com/se/5A1E27D258030607

AMD

Thank you for downloading the Radeon ProRender Add-in for Dassault Systèmes SOLIDWORKS®. Please provide the information requested below to download the add-in.

Contact Information

First Name
AMD

Last Name
ProRender

Email Address
design@amd.com

Country
CANADA

Please provide a brief description of the product or project where Radeon ProRender will be used
Want fast photo-realistic render of my design.]

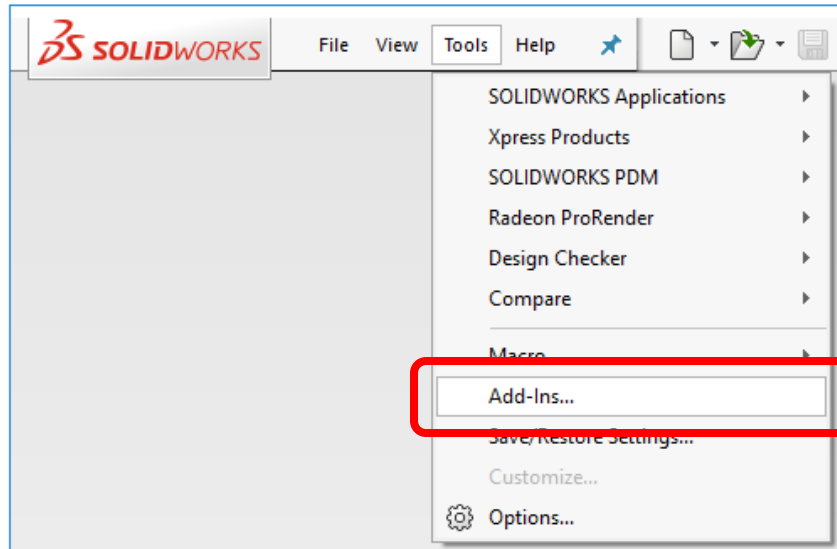
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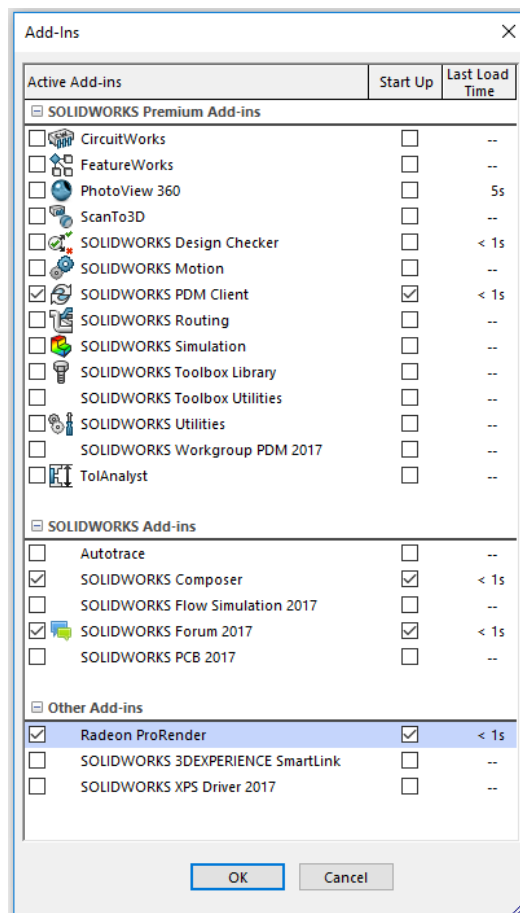
Request Download

Radeon ProRender Setup

Launch SOLIDWORKS 2016 or higher. Go to **Tools > Add Ins...** to enable the Radeon™ ProRender add-in.

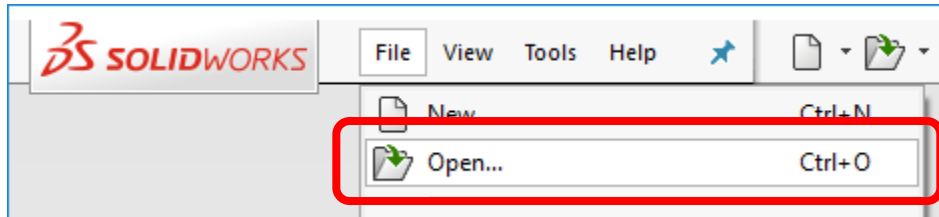


Verify that the Radeon™ ProRender line has both the active and start-up checkboxes checked.

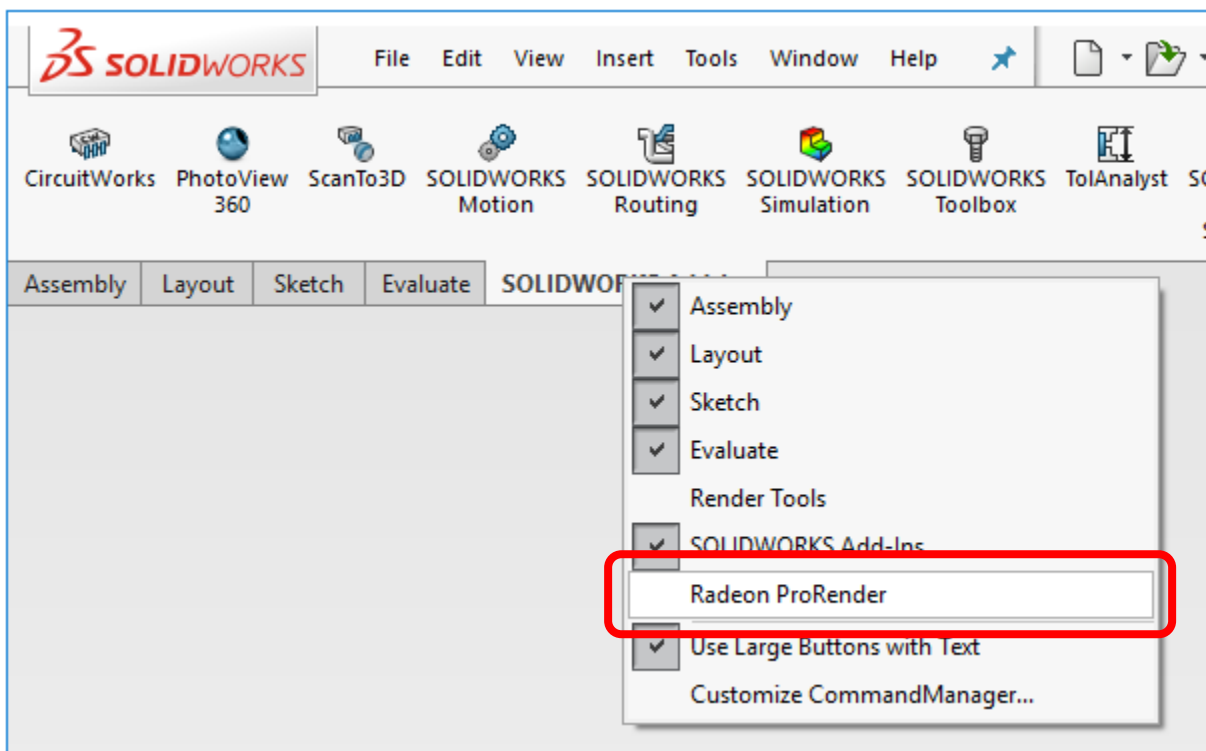


Radeon ProRender Start Up

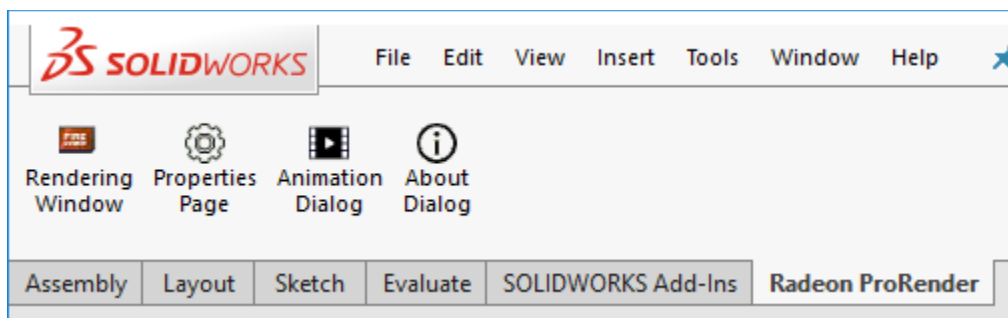
Go to **File > Open...** to import a model OR, go to **File > New** to start a new part or assembly.



Locate the top toolbar in the main SOLIDWORKS interface. If there is no **Radeon ProRender** tab, right-click any of the tabs (Assembly, Layout, Sketch...etc.) and enable the **Radeon ProRender** tab.



The **Radeon ProRender** tab should include the following buttons.

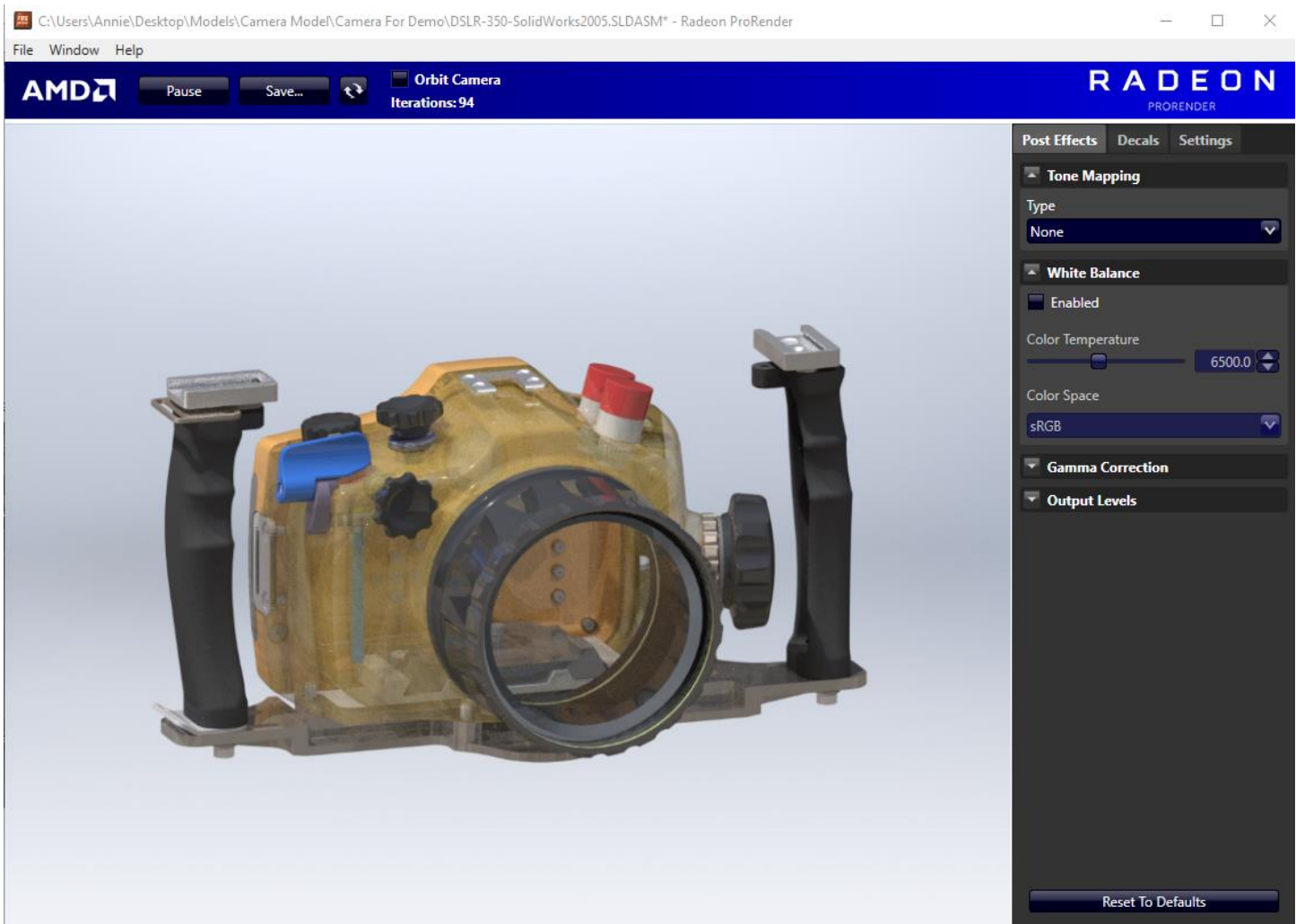


Rendering Window Overview



In the **Rendering Window**, you can:

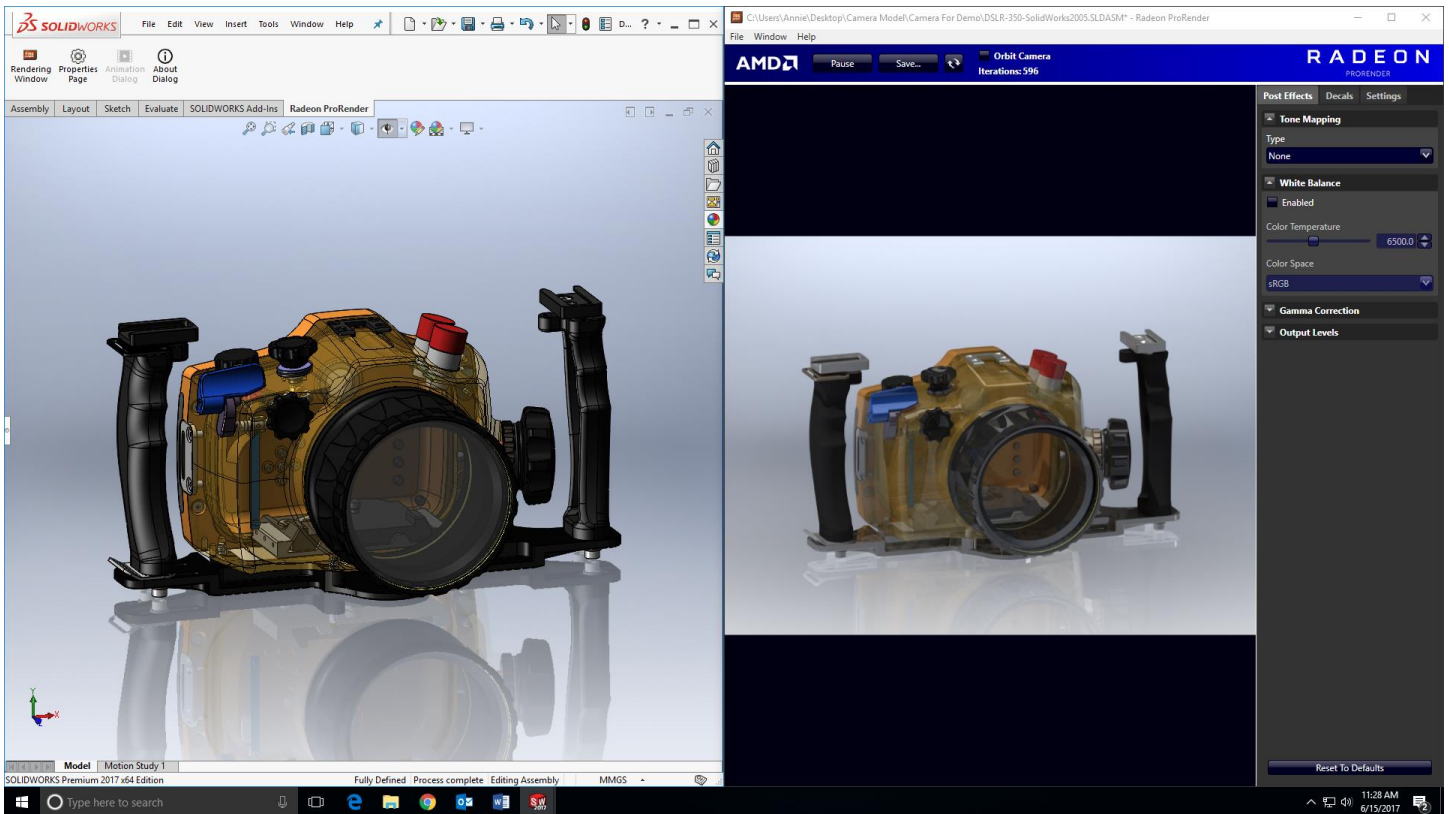
- view the number of rendering iterations for the current frame
- apply post effects
- apply decals
- change settings
- pause/continue/restart the render process
- save the image
- synchronize the render with changes you have made in SOLIDWORKS (if it does not refresh automatically)



By default, the rendering window will show the same view as the current window in SOLIDWORKS. Any changes that are made in SOLIDWORKS will be reflected in real-time in the Radeon™ ProRender window. This window is where post editing effects are applied to the rendered image.



Tip: The Radeon™ ProRender window floats above the SOLIDWORKS window, but you can place the two windows side by side.

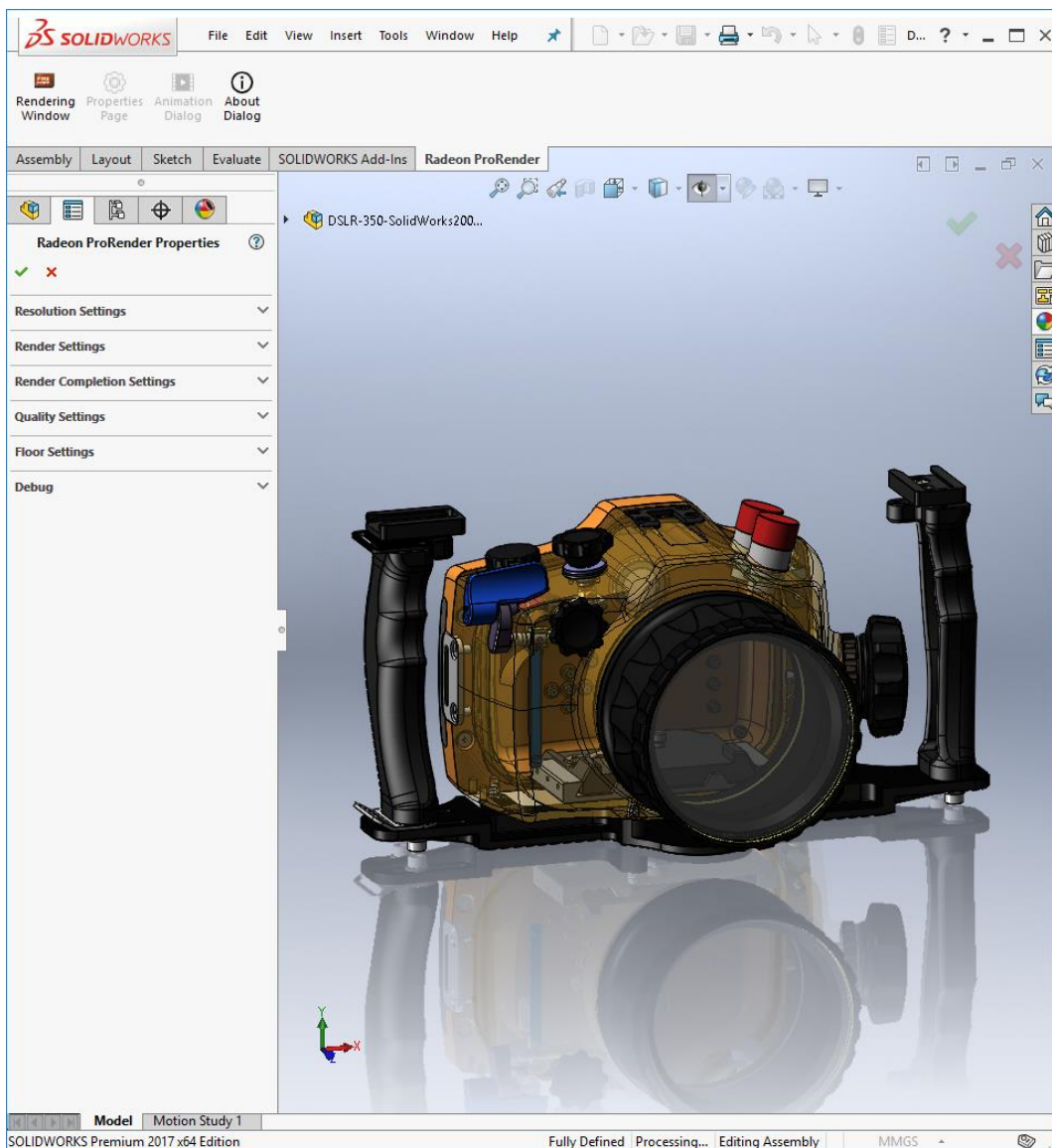


Properties Page Overview



The Properties Page is a standard SOLIDWORKS properties page and appears in the SOLIDWORKS window. In the **Properties Page**, you can:

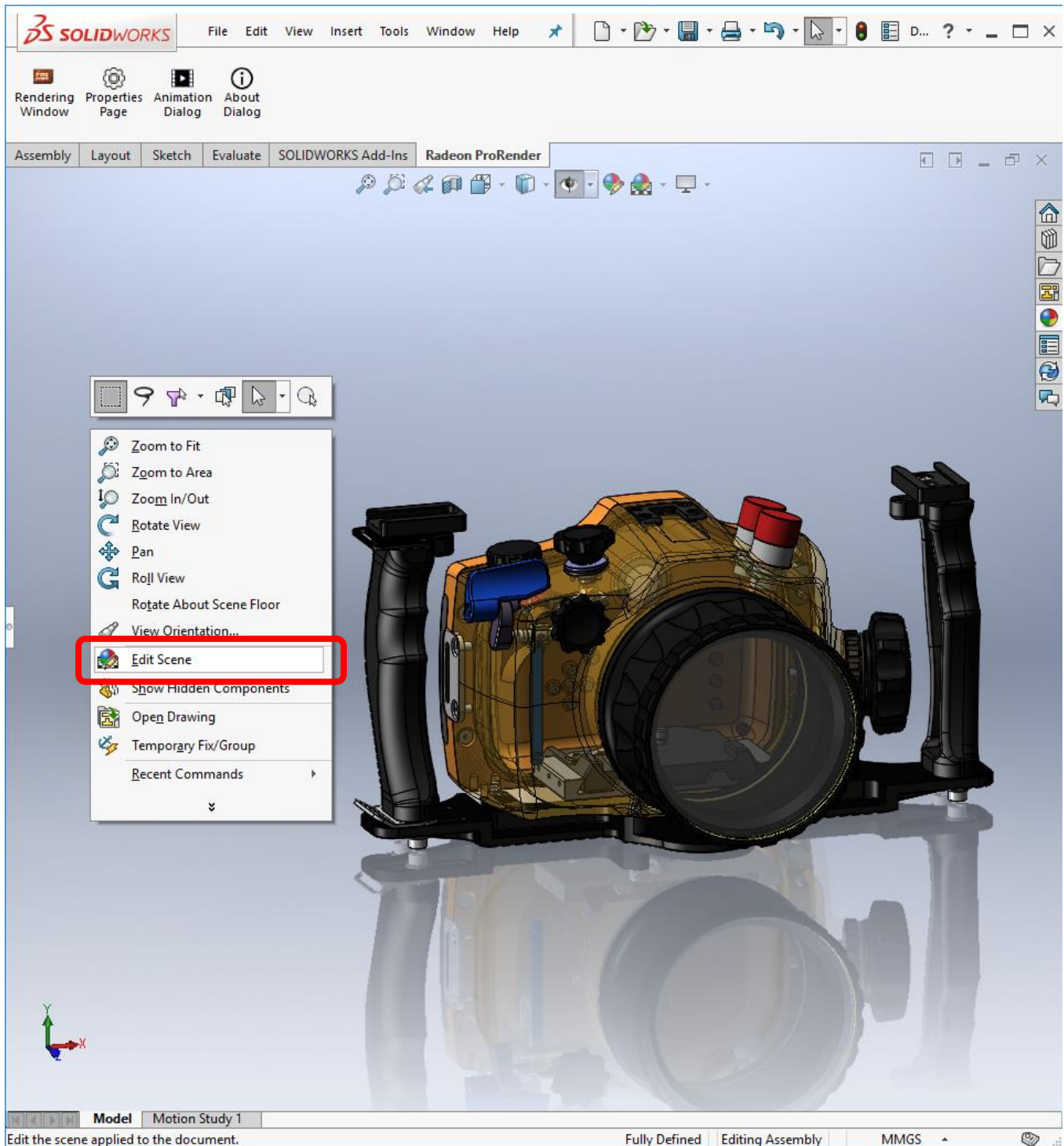
- adjust the output frame resolution and size
- select the render device(s)
- adjust when the rendered image is saved
- change the mesh quality and render quality
- adjust floor reflection/shadow settings
- enable debug options when working with AMD support



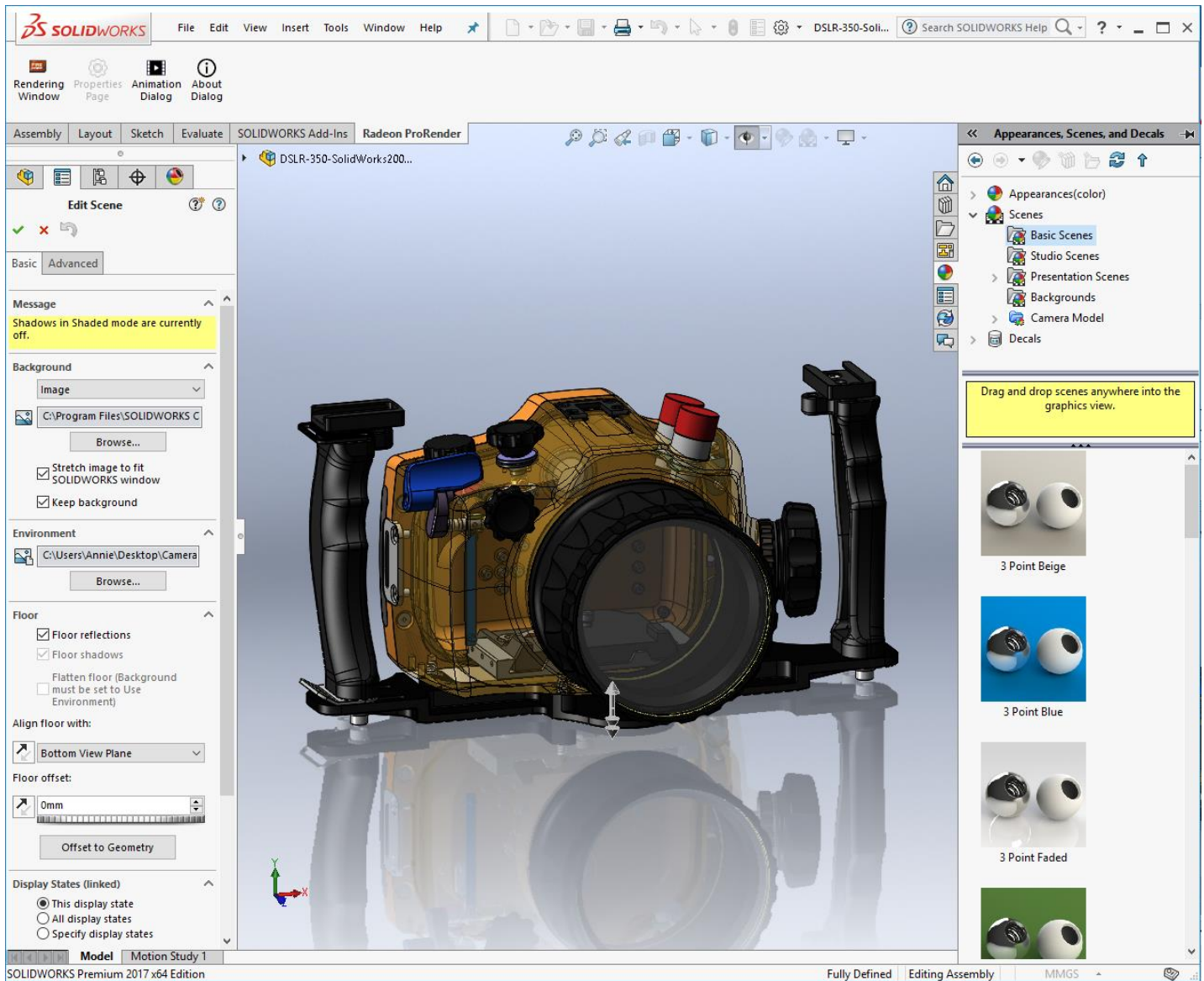
Model Setup

Background Setup in SOLIDWORKS

In SOLIDWORKS, left-click the background and then right-click to display the options. Click **Edit Scene**.

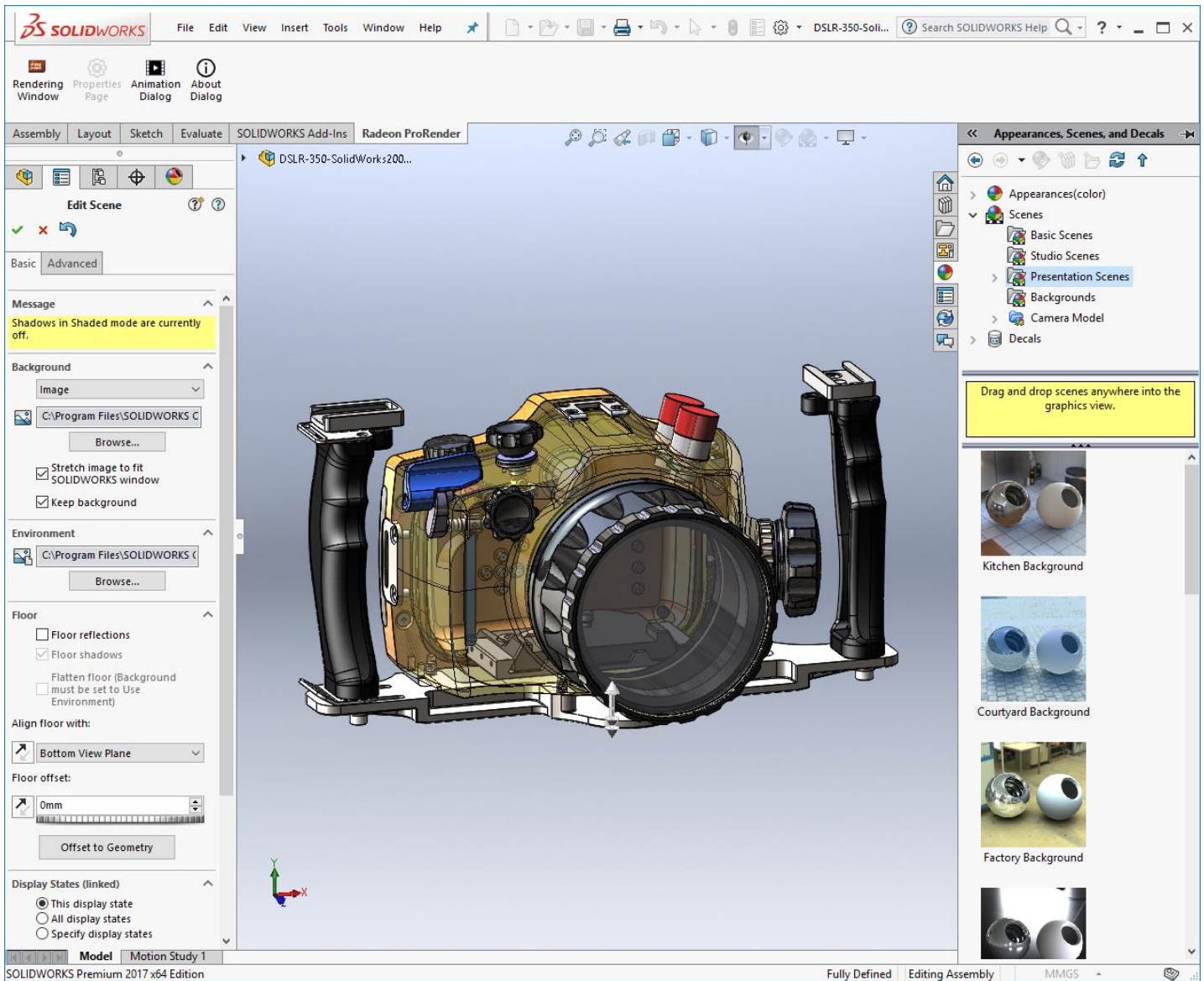


The SOLIDWORKS view should now have a Edit Scene task bar on the left, and a display of various scenes on the right.



Alternatively, you can click on the coloured ball  to display these built-in Appearances and Scenes.

For this guide, Presentation Scenes will be used, as they simulate a real-life background. Click on the scene to apply or drag the file into the area surrounding the model.

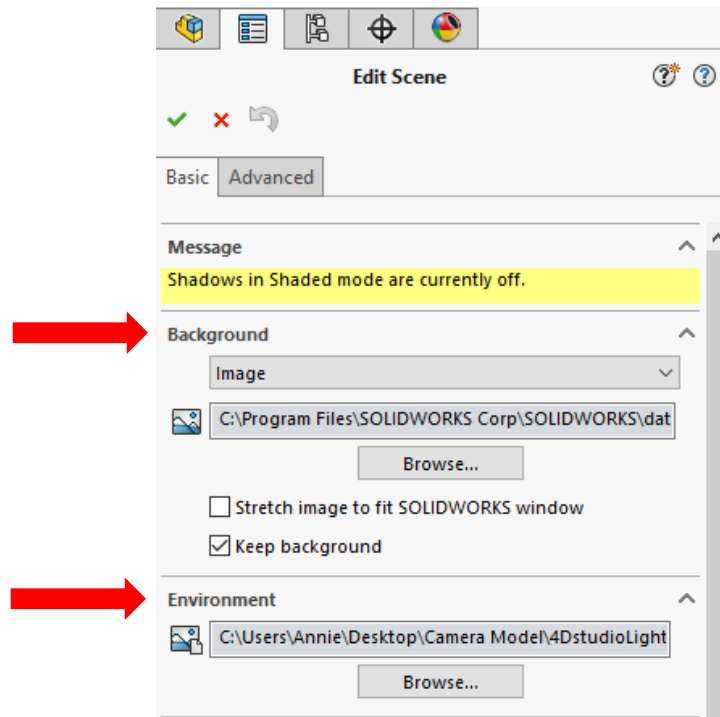


These files are **.hdr files** which display more information and contain a higher range of intensities than a regular image file, for example a .hdr file can contain fine grain detail in shadow areas inside an unlit room and also the fine grain details of the scene outside that visible through the windows.

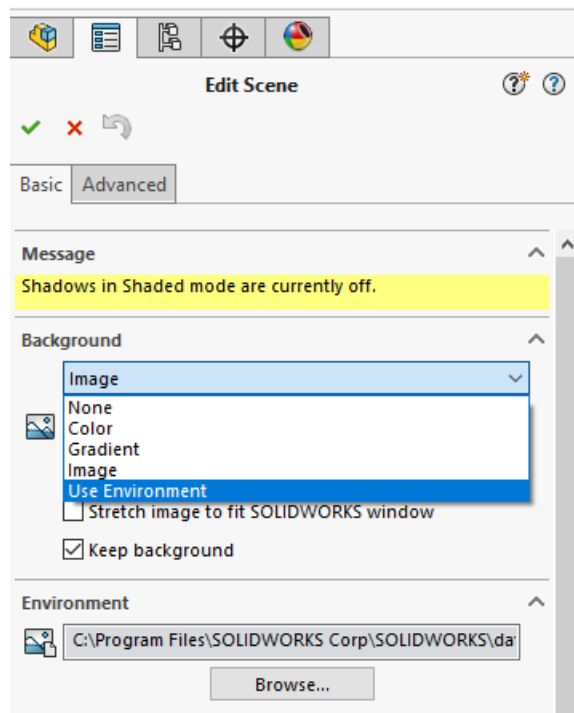


Cool fact: Importing .hdr files will allow the surrounding scene to simulate ambient lighting and contain more background details.

You may notice that the background does not change, but the lighting on the model does. This is because the lighting is determined by the Environment, whereas the Background is set independently.



The environment will determine the lighting, how it is reflected/refracted onto the surfaces of the model. The background is simply the “wallpaper” that is laid behind the model. You can use the Environment as the background image.



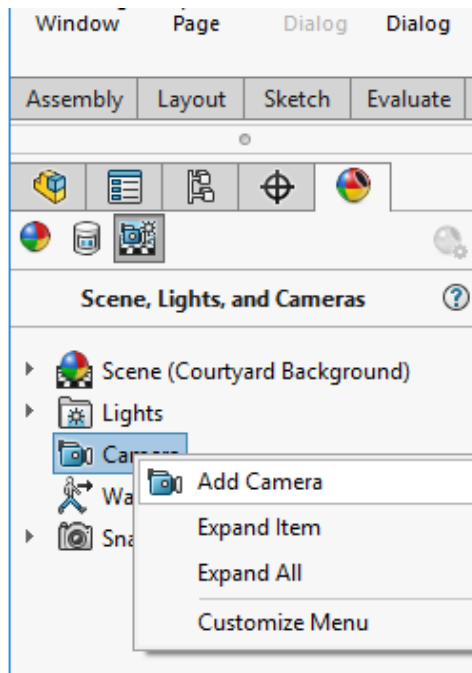
Open the **Rendering Window**. You should be able to see the current view of the SOLIDWORKS model.



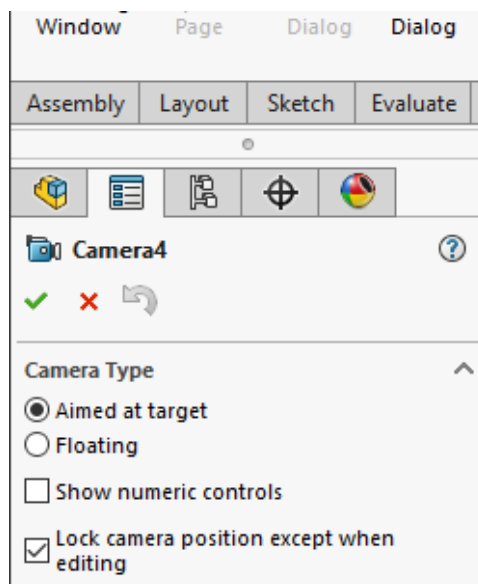
Note: You can set a camera in SOLIDWORKS or use the orbit camera setting in the Rendering Window. (More information related to this option later in the document)

Camera Setup in SOLIDWORKS

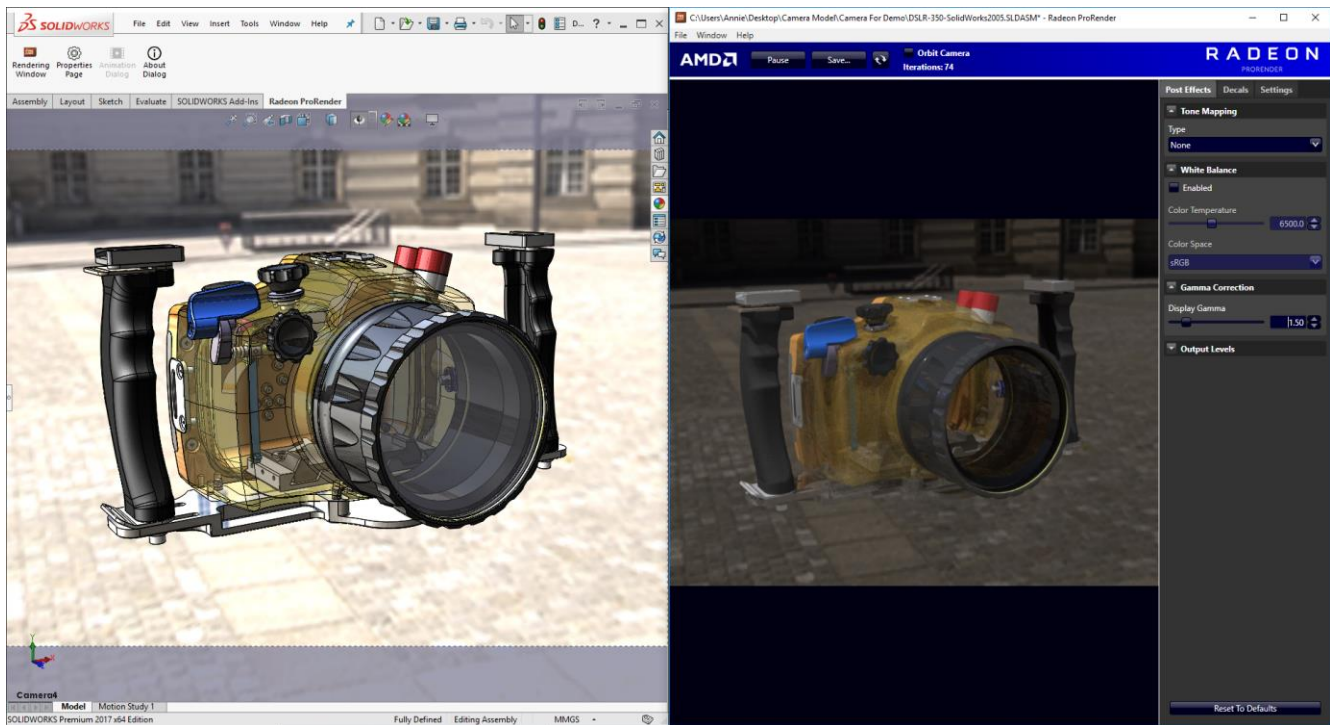
Right-click the Camera option and click Add Camera.



Uncheck the Lock Camera position except when editing to enable camera motion. Then click on the green arrow.



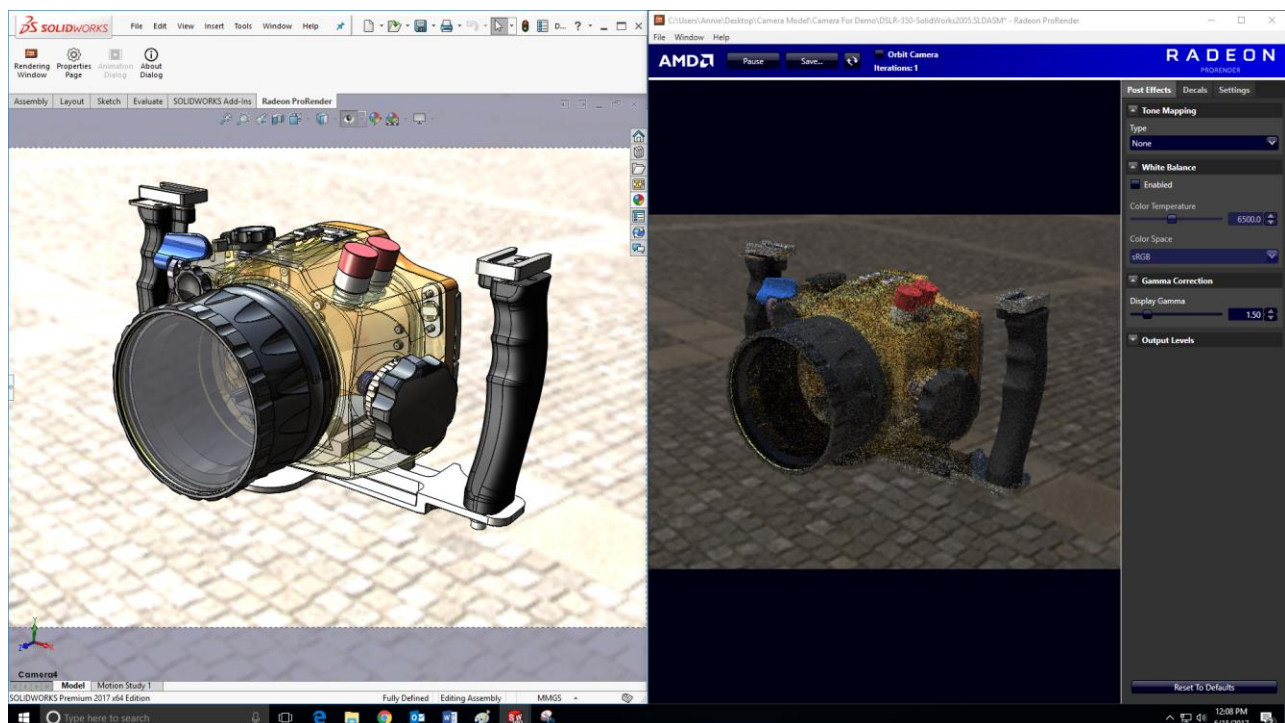
The output in the Render Window should be the same view as the SOLIDWORKS view of the model.



As the view changes in SOLIDWORKS, Radeon™ ProRender will continuously update the image in the Render Window.



Note: Every time the camera view is changed, Radeon™ ProRender restarts the render. The iteration count resets and the image appears to be coarser.



Camera View Setup

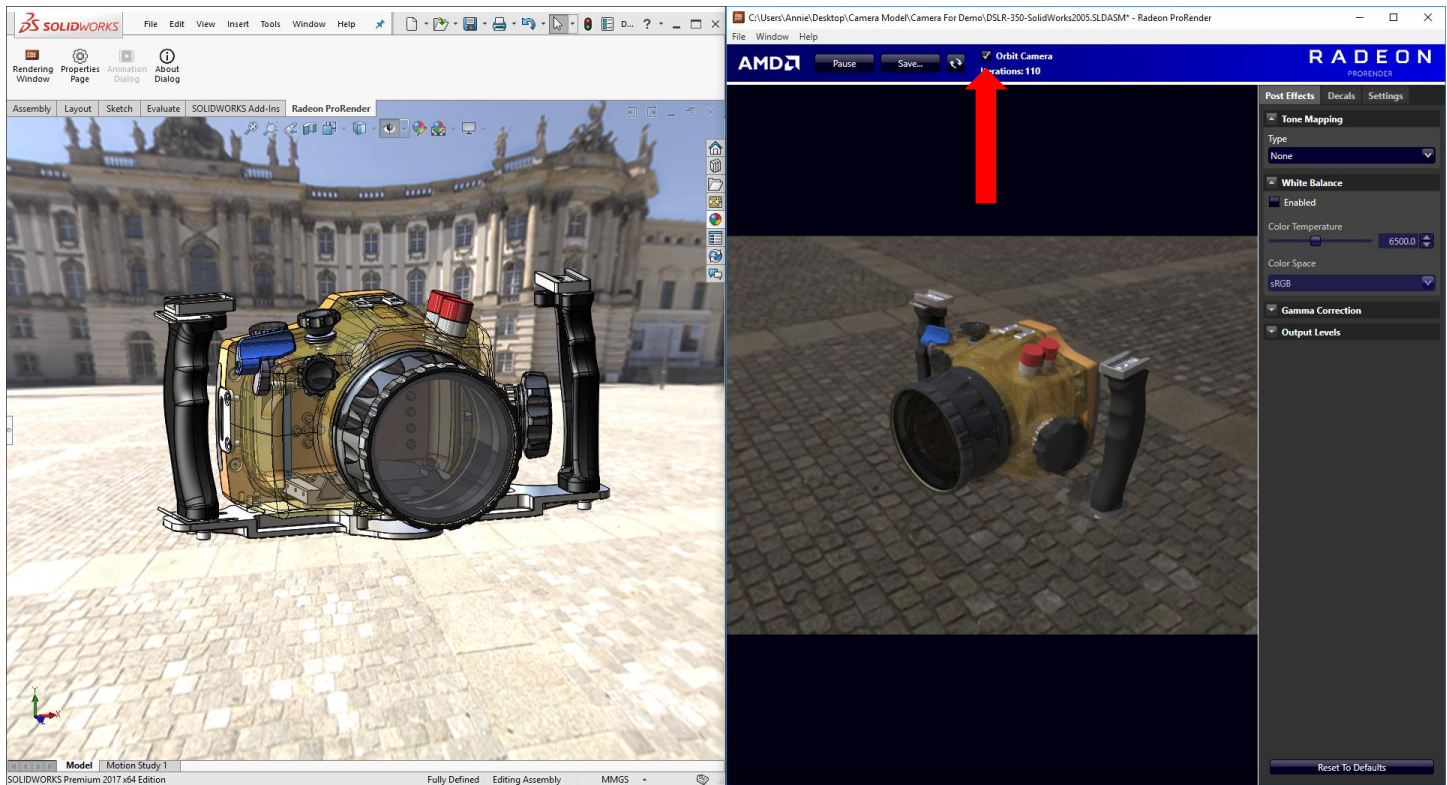
By default, the view of the model in the Radeon™ ProRender window is the same as the view in the currently active window in SOLIDWORKS.

Orbit Camera Setting

The Orbit Camera checkbox in Radeon™ ProRender enables you to override the camera view in the active SOLIDWORKS window and change it independently without affecting the SOLIDWORKS view. Once the checkbox is checked, the camera controls in Radeon™ ProRender are the same as the default ones in SOLIDWORKS.



Note: When Orbit Camera is enabled, and the camera is moved interactively, the render resolution is reduced to provide greater interactivity. Once interaction stops the render resolution and quality return to the selected settings.



Camera Controls

Zoom

Middle Scroll Wheel Scroll

Camera view moves closer or farther.



Pan

Ctrl + Middle Scroll Wheel Click + Drag

Camera view stays in place, and the model moves in X and Y relative to the render image.



Dolly

Shift + Middle Scroll Wheel Click + Drag

Background remains in place, while camera view moves closer or farther.



Focal Length Change

Alt + Middle Scroll Wheel Click + Drag

Model remains in place, while the focal length of the camera changes.



Image Output Settings

These settings are set in the Properties Page and are only reflected in the Rendering Window. It will not affect the actual model in SOLIDWORKS.



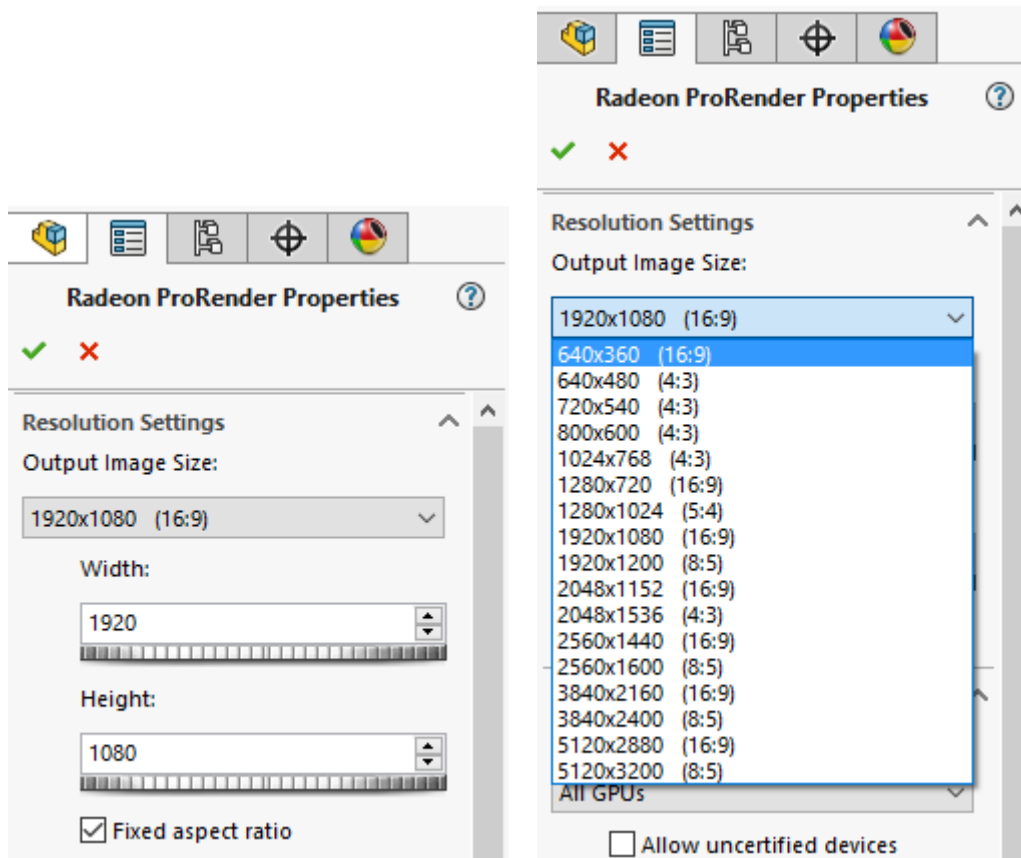
Tip: Remember to hit the green check mark or the settings will not update in Rendering Window!

Resolution Settings

In the Properties page, the output resolution and image size can be set. This will not change the model resolution in SOLIDWORKS but only in the Rendering Window. There are pre-set resolutions as well as standard sizes.



Tip: Increasing the resolution can dramatically increase both the frame render time and also the amount of graphics card memory required.

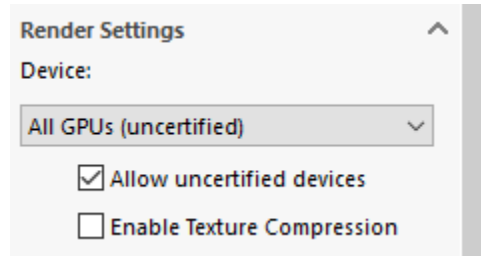


Render Settings

Choose the device for rendering (supports GPU and CPU).



Tip: Active real-time rendering using GPU is faster than CPU.

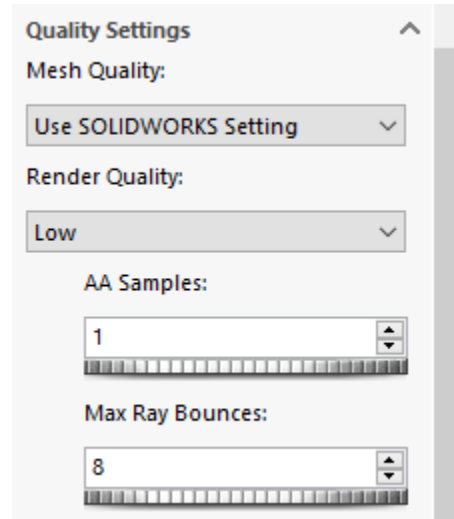


Quality Settings

The quality settings for rendering can be adjusted depending on the quality of the rendered image, the time and the complexity of the model.

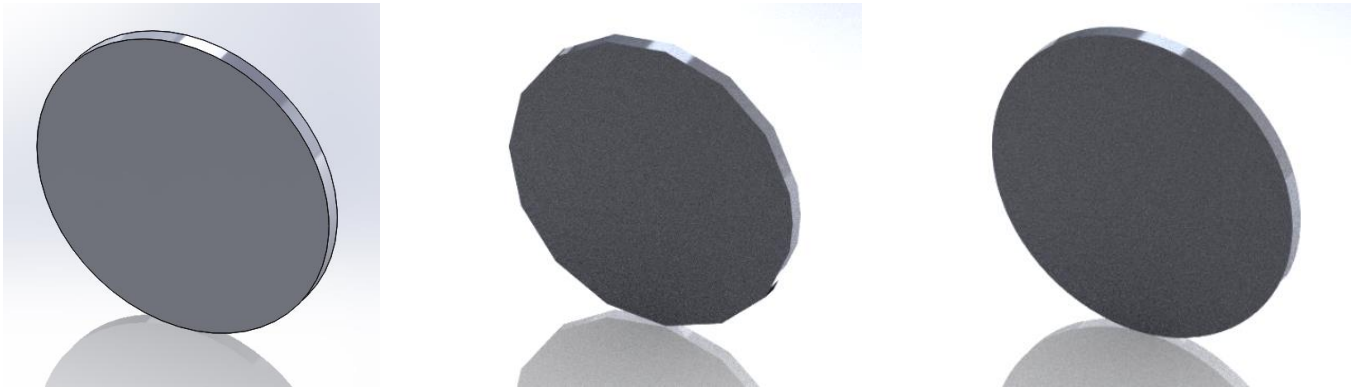


Tip: You can tune Radeon™ ProRender to be faster or slower by using a coarser model (i.e. low mesh quality) for real-time rendering. For a complicated model, it is recommended to start using lower quality settings until it is time to do a final render.



Mesh Quality

Mesh quality determines how SOLIDWORKS breaks the surface of models into triangles. When using a lower setting, the meshes are more complex and require more processing power as well as memory. As seen below, the curved surface in SOLIDWORKS renders into a model with more flat edges. At a high level, the rendered image appears to a continuous surface.



Render Quality

Render quality depends on AA Samples and Max Ray Bounces. AA Samples controls how many “shots” that Radeon™ ProRender takes at the scene before updating the image and Max Ray Bounces changes the number of times that a ray bounces off a surface to capture reflections.

Notice the image quality of the model when using number of ray bounces of 1 (left) and of 5 (middle) and of 20 (right). The transparency and colour of the model is improved with more ray bounces. In the left most photo, the inside of the model is black, since the surrounding light is unable to reach the inner surfaces due to a low ray bounce setting.



Tip: When using glass or other translucent appearances, use a high number of Ray Bounces to fully capture all reflections (generally, a good number is 6 unless there are complex, translucent parts).

Improved image quality comes at a cost to other factors. The right render took more time than the left render to produce qualitatively, the same image quality.

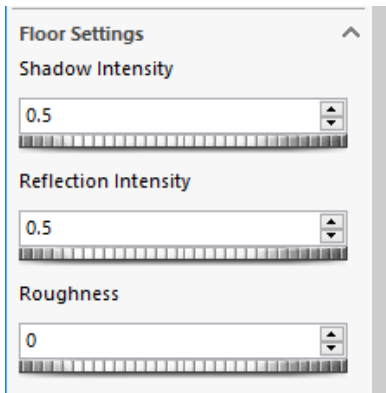




Tip: Consider using lower settings for preliminary renders (i.e. lower mesh and render quality) and changing to higher quality settings when you are near completion of design to ensure surface quality and colour.

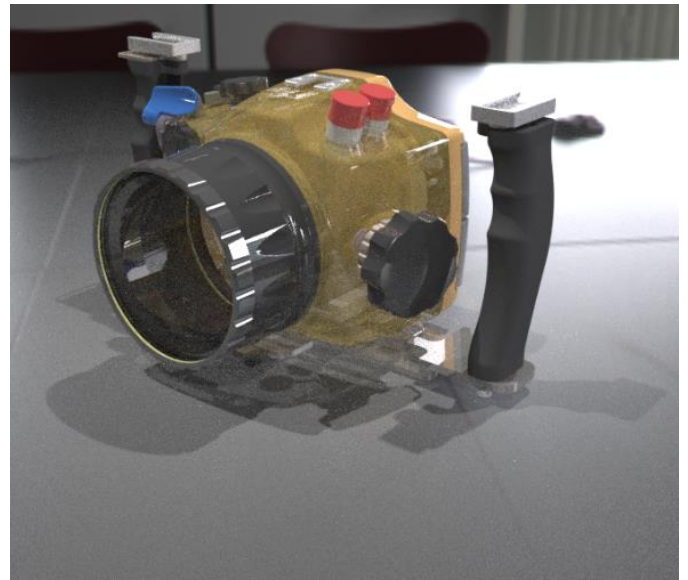
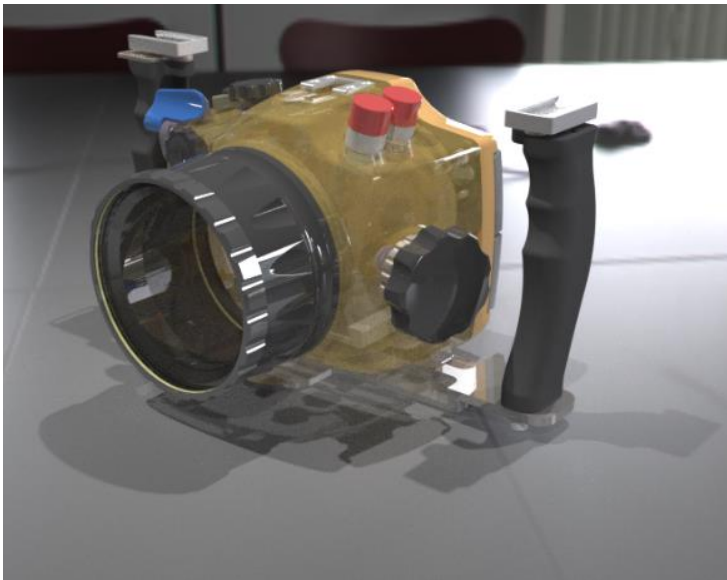
Floor Settings

The floor settings control the reflection of the model and its shadow on the floor.



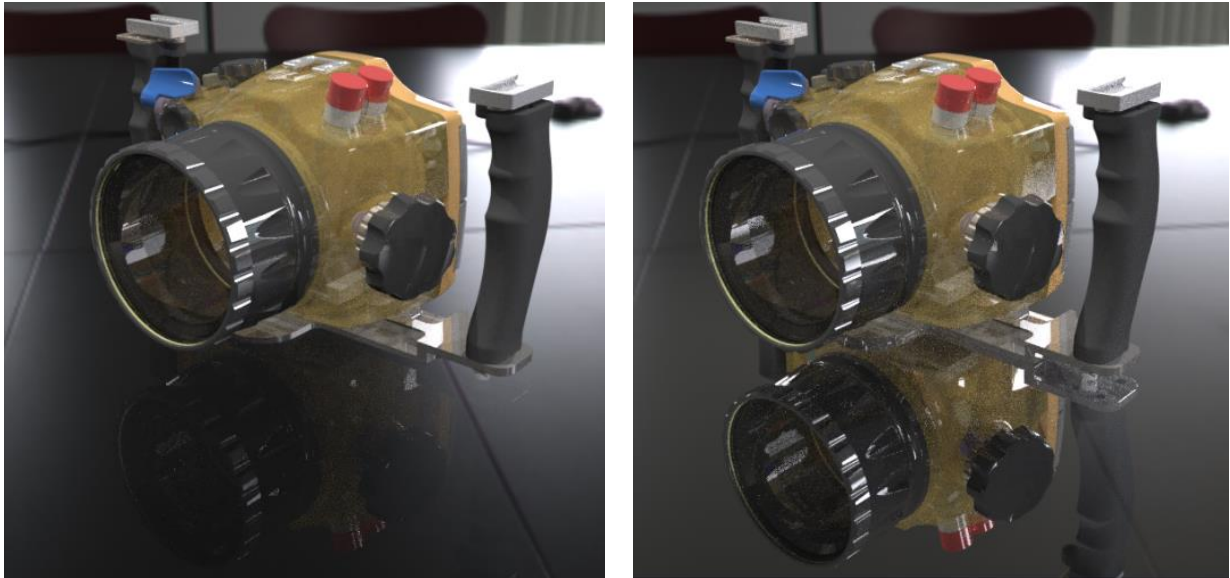
Shadow Intensity

Shadow intensity controls the transparency of the shadow. Left (0.1) Right (1)



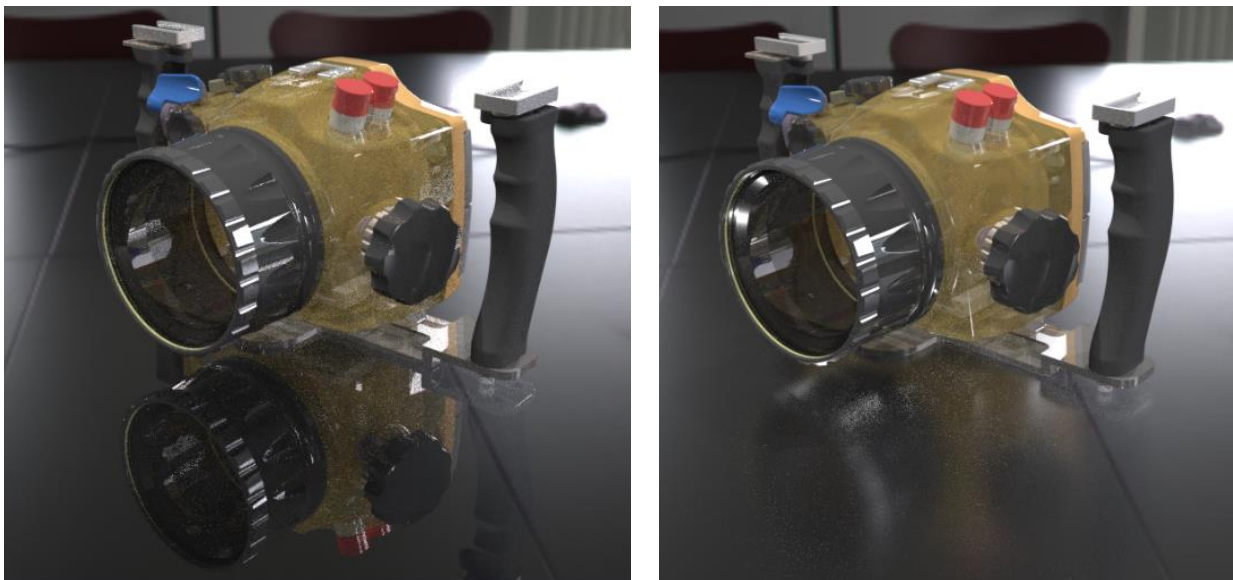
Reflection Intensity

Reflection intensity controls the transparency of the reflection. Left (0.1) Right (1)



Roughness

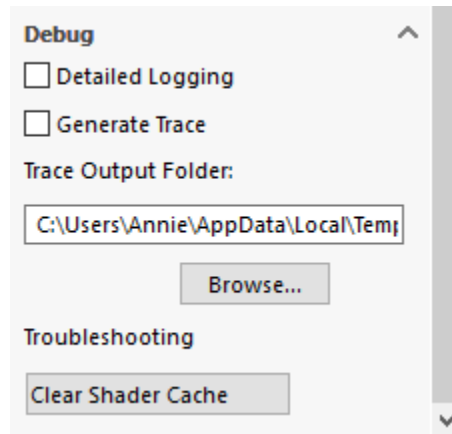
Reflections and shadows appear to be diffuse. Left (0.01) Right (0)



Tip: For more realistic shadows on rougher surfaces, increase roughness for more diffuse reflections.

Debug

The Debug feature should only be used with AMD support if issues are present. This includes a trace ability to capture the interactions for Radeon™ ProRender. These interactions are generated within a set of files showing the applied effects and the cause of error or bug.



Post Effects Tab

These effects are applied to the rendered image after rendering is done in the Rendering Window. These settings apply to the entire scene, including the model and its interactions with the light from the background.



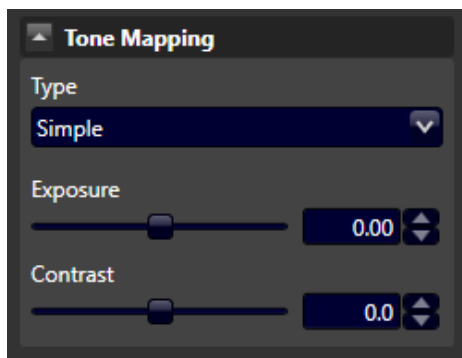
Tip: Adjusting post effects can tweak the scene without having to restart the rendering.

Tone Mapping

Tone mapping allows you to change the brightness of the scene to display more information or balance details.

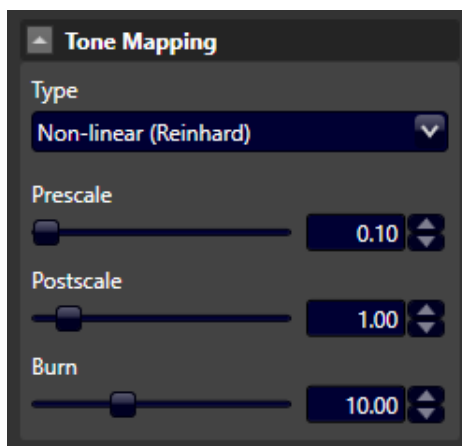
Simple

This is a simple exposure tweak and contrast option. You can brighten or darken the image by controlling the exposure, or having brighter or darker contrast.



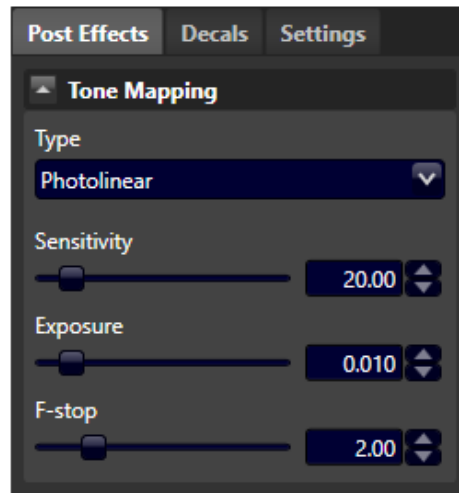
Non-linear (Reinhard)

Prescale controls the brightness of darker areas (shadows), post scale controls the brightness of the scene and burn controls the brightness of highlights and lighter areas.



Photolinear

Sensitivity is often related to the ISO setting and controls the camera's sensitivity to light, exposure is related to camera shutter speed which controls the time that the shutter is open to the exposed light and F-stop is related to the aperture that is related to how much light is exposed to the "film".

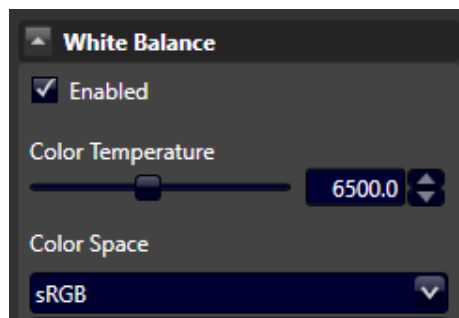


White Balance

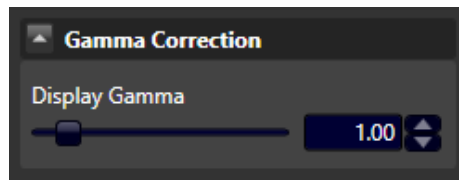
Check the checkbox to enable or disable.

This will tone the temperature of the scene to look warmer or cooler (i.e. more red or more blue).

Color Space: Adobe RGB, DCI-P3, Rec.2020, sRGB



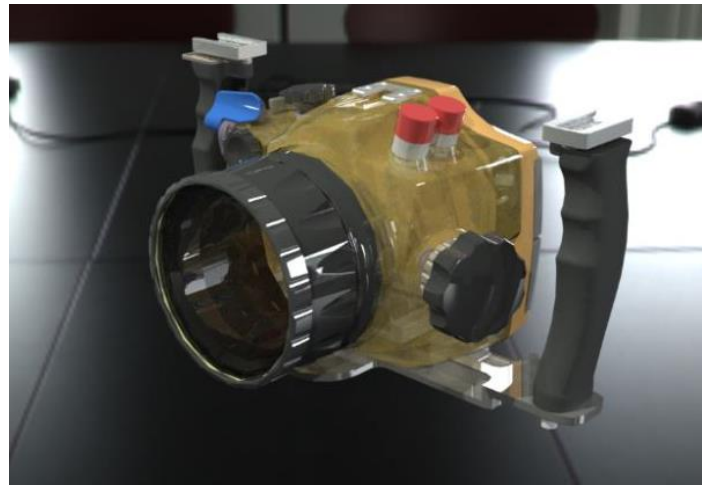
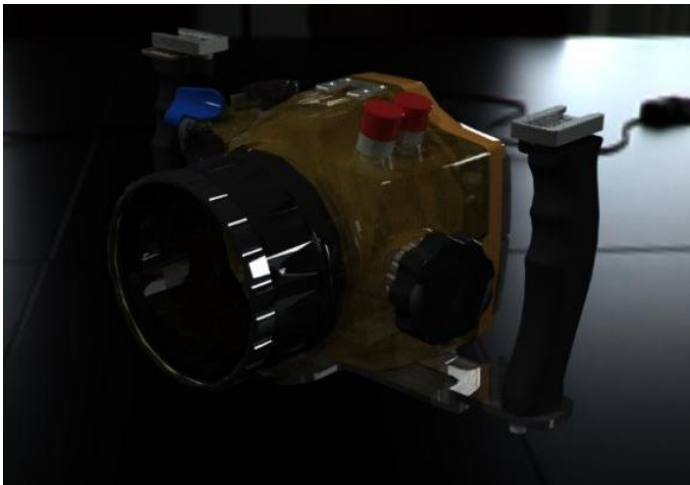
Gamma Correction





Tip: If the image is too dark, the first thing to adjust is the Gamma Correction.

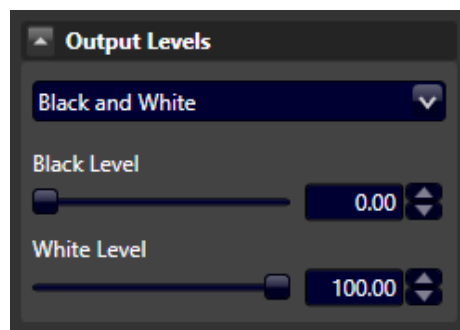
On the left, the rendered image is very dark. Increasing the Display Gamma brightens the scene and details are more visible. Left (1.00) Right (1.75)



Output Levels

Output levels controls the amount of colour that is shown.

Black and White



RGB

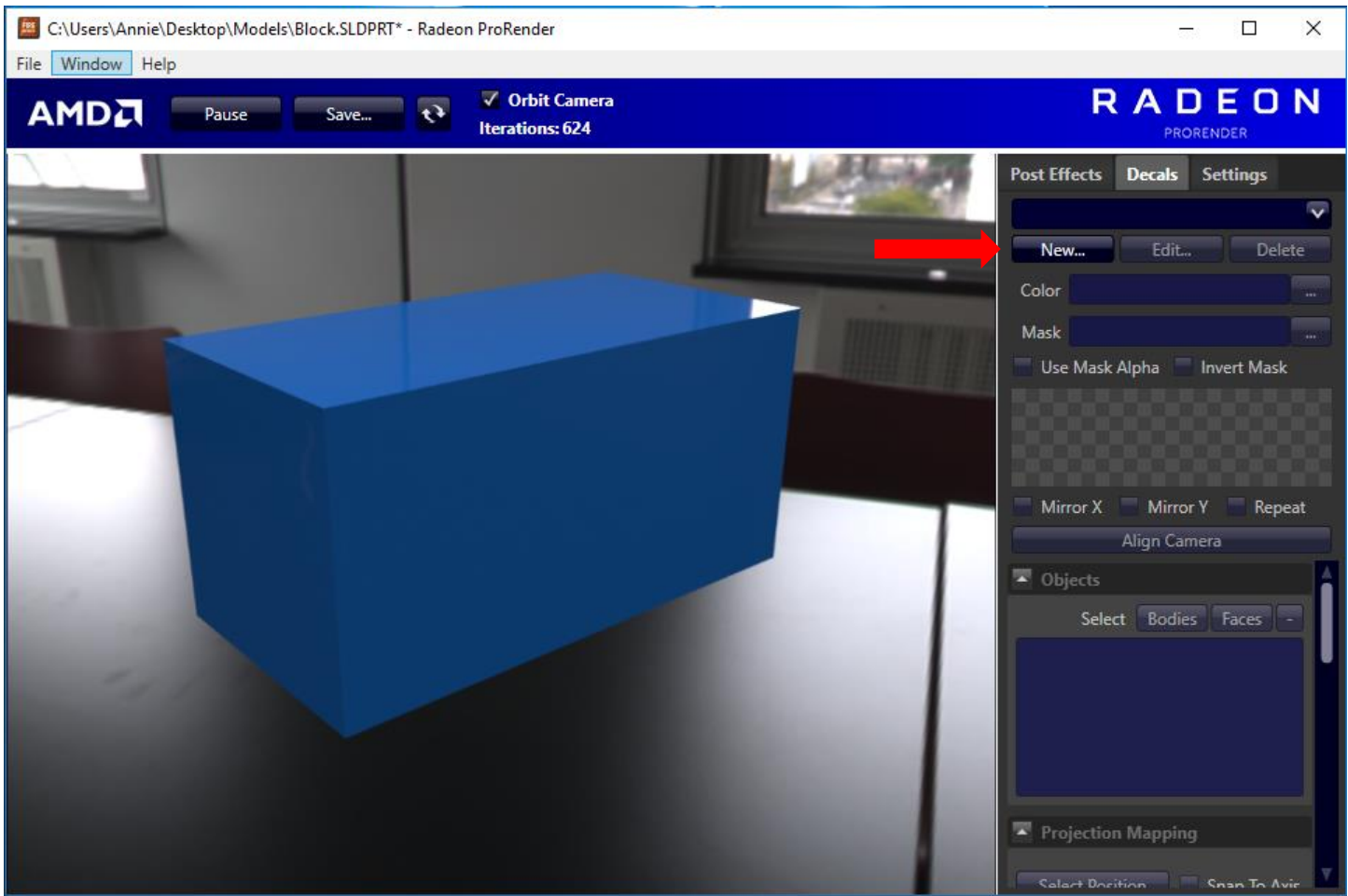


Decals Tab



Note: Changing the decal will also restart the render! Best to use low quality settings.

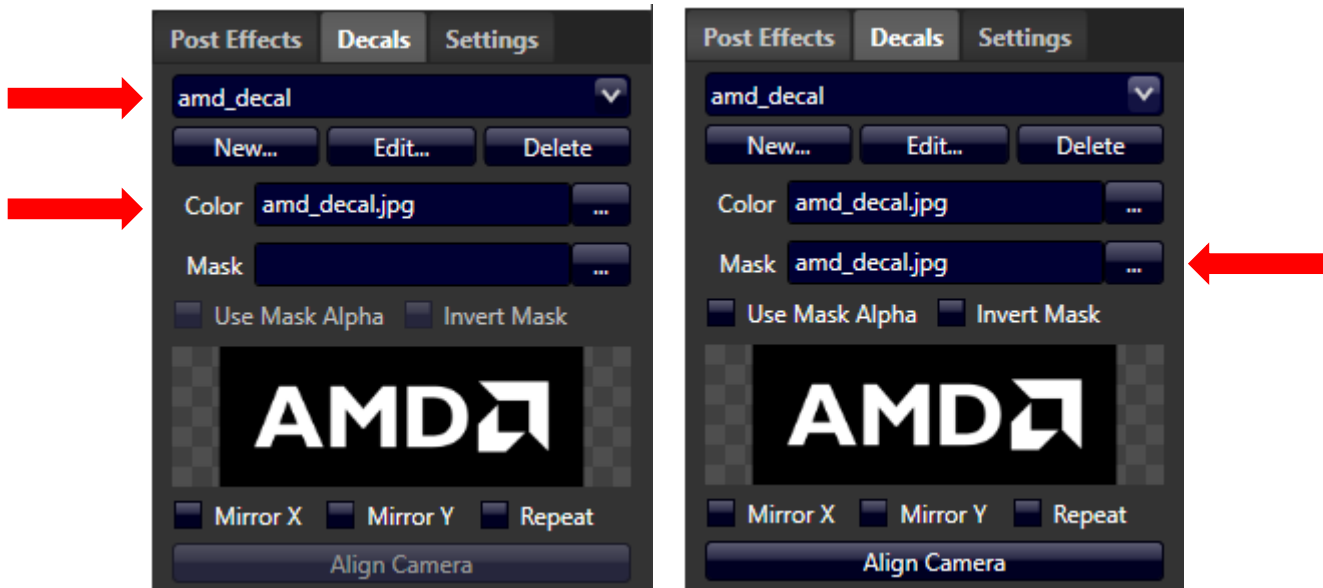
Go to the Decals tab and press **New...** to start applying a new decal.



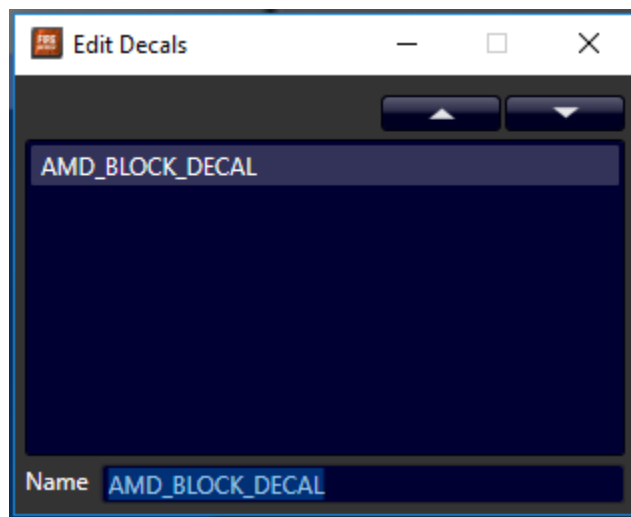
Note: Decal masks enables the background of the decal to be transparent. The image mask is a black and white image. Items in white remain in the decal whereas the black is removed.



After importing the decal, you can see the name and it acts as the color file. Click on ... button to select the file for the mask. For this purpose, the color and the mask will be the same file.



You can change the name by going to the **Edit...** and typing a new name. Press the X to exit.



Applying Decals

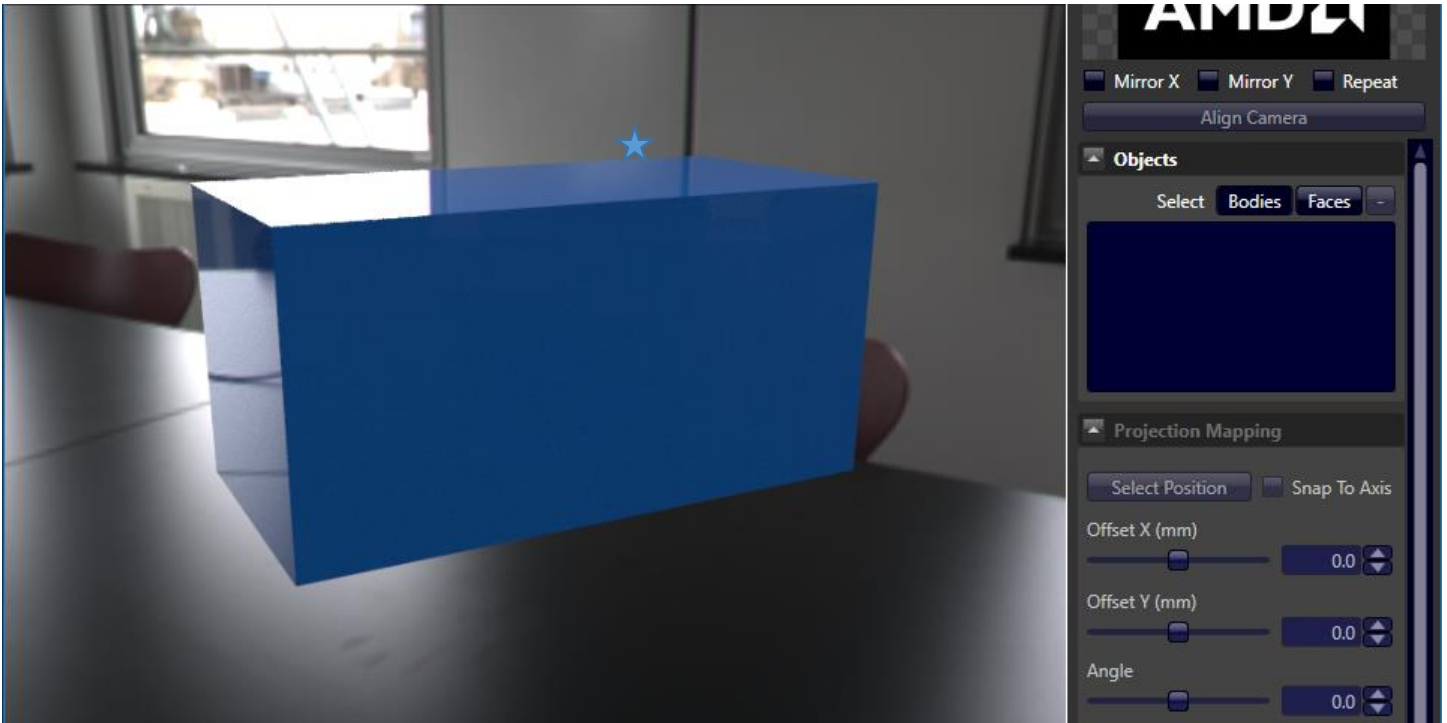
Decals are applied to the body, or a face on the body. Under Objects, either toggle bodies or faces.



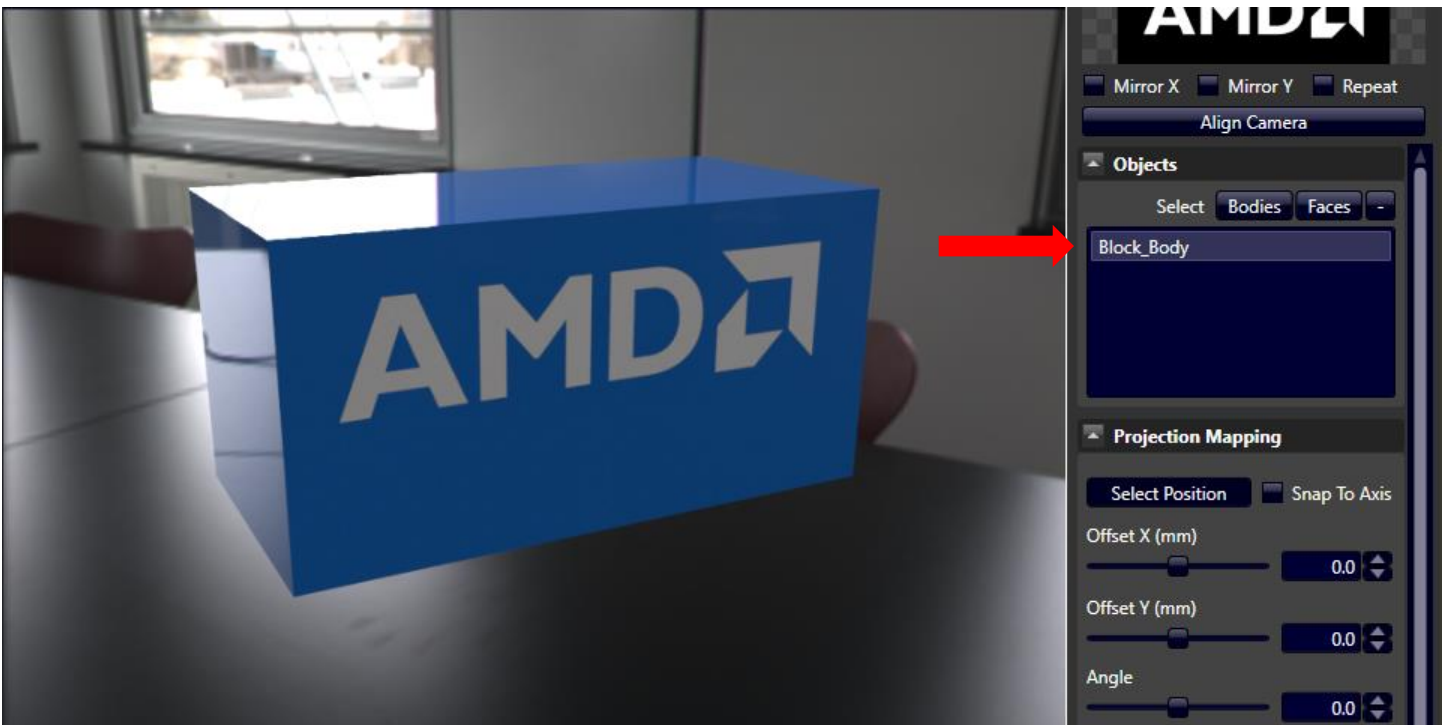
Tip: After importing the decal from **New...**, you can directly click on the surface you wish to apply the decal to – even without selecting a mask.

Bodies

Toggle the **Bodies** button, and click on the surface to apply the decal (the star). The decal's center will be placed there.



Click on the surface you want to apply the decal. The body will be listed on the right.



Applying the decal as a body will project through the entire body before it hits another surface. On the backside of the block, the decal is apparent.

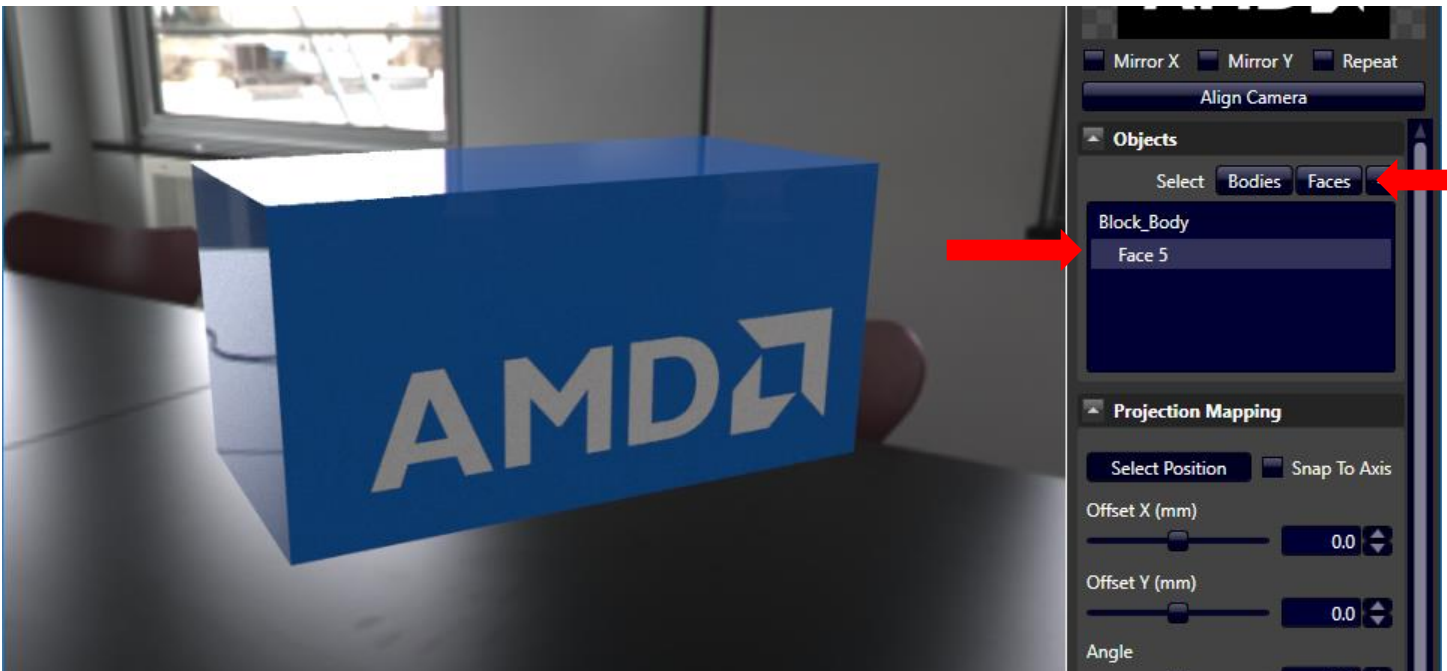


To place the decal on a single face, there are two options:

1. Apply decal using the faces toggle
2. Change the depth of the decal (discussed later)

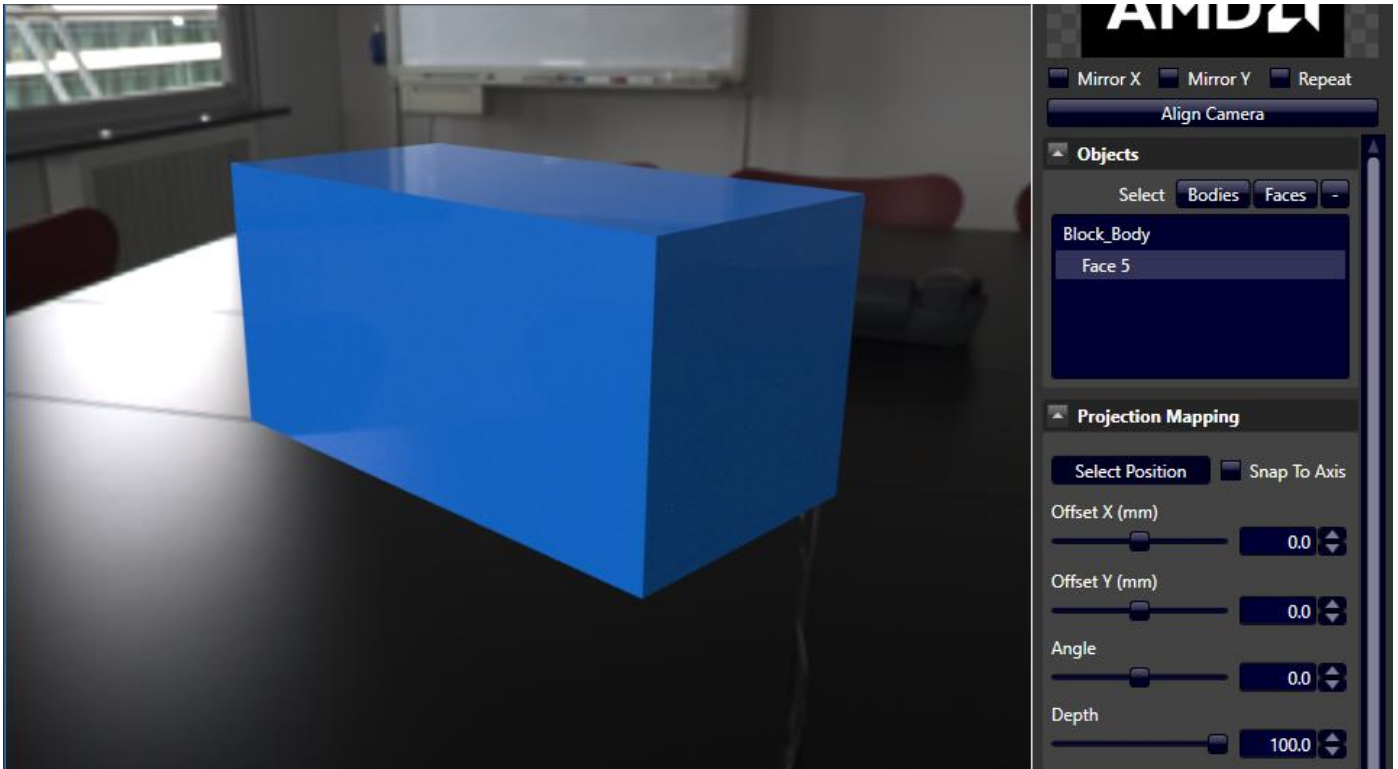
Faces

Toggle the **Faces** button and then click on the face to place the decal. After clicking on the face, the body and the face are listed on the right.



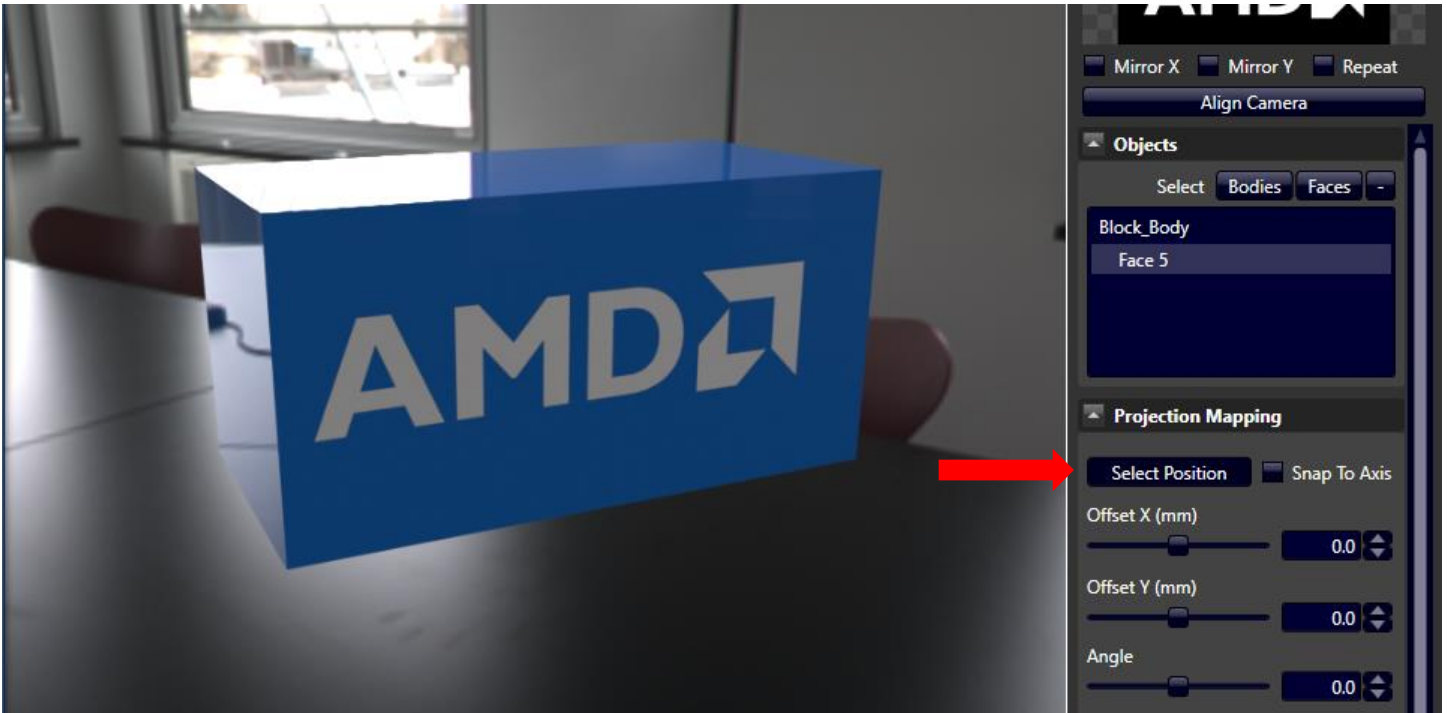


Note: When selecting solely a Face, the back of the block does not have the decal projecting through it.

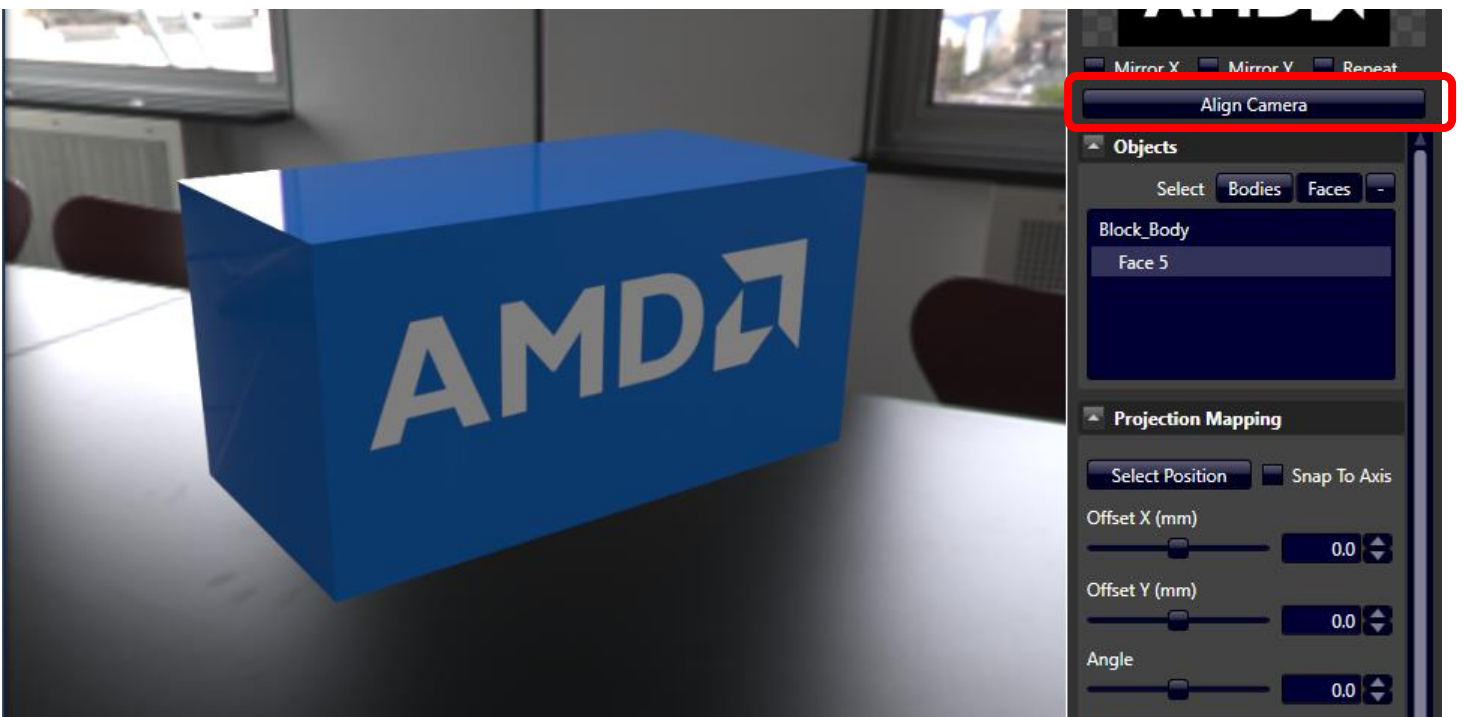


Projection Mapping

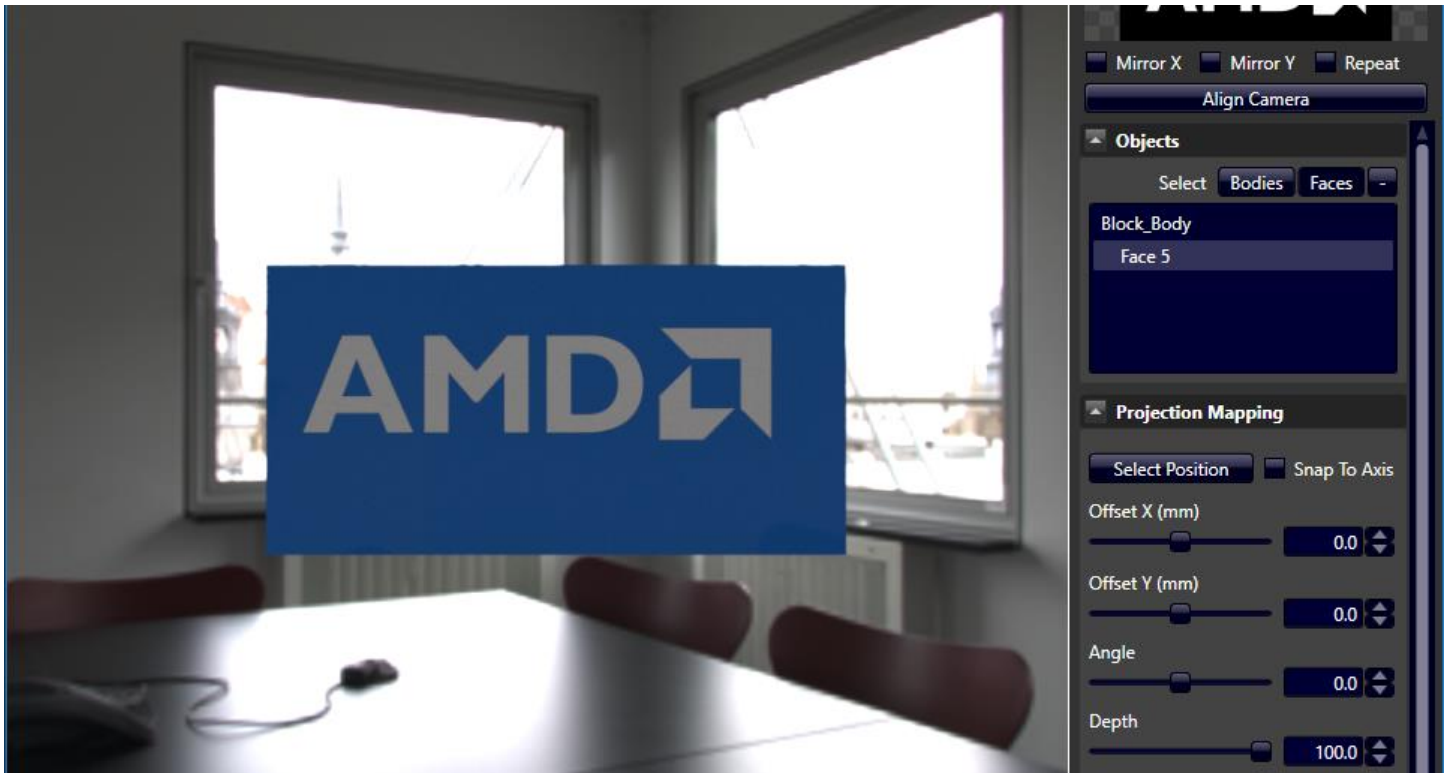
If you want to move the decal, toggle the **Select Position** button, and click to place the decal at another position on the blocks face. The decal is moved towards the center of the block.



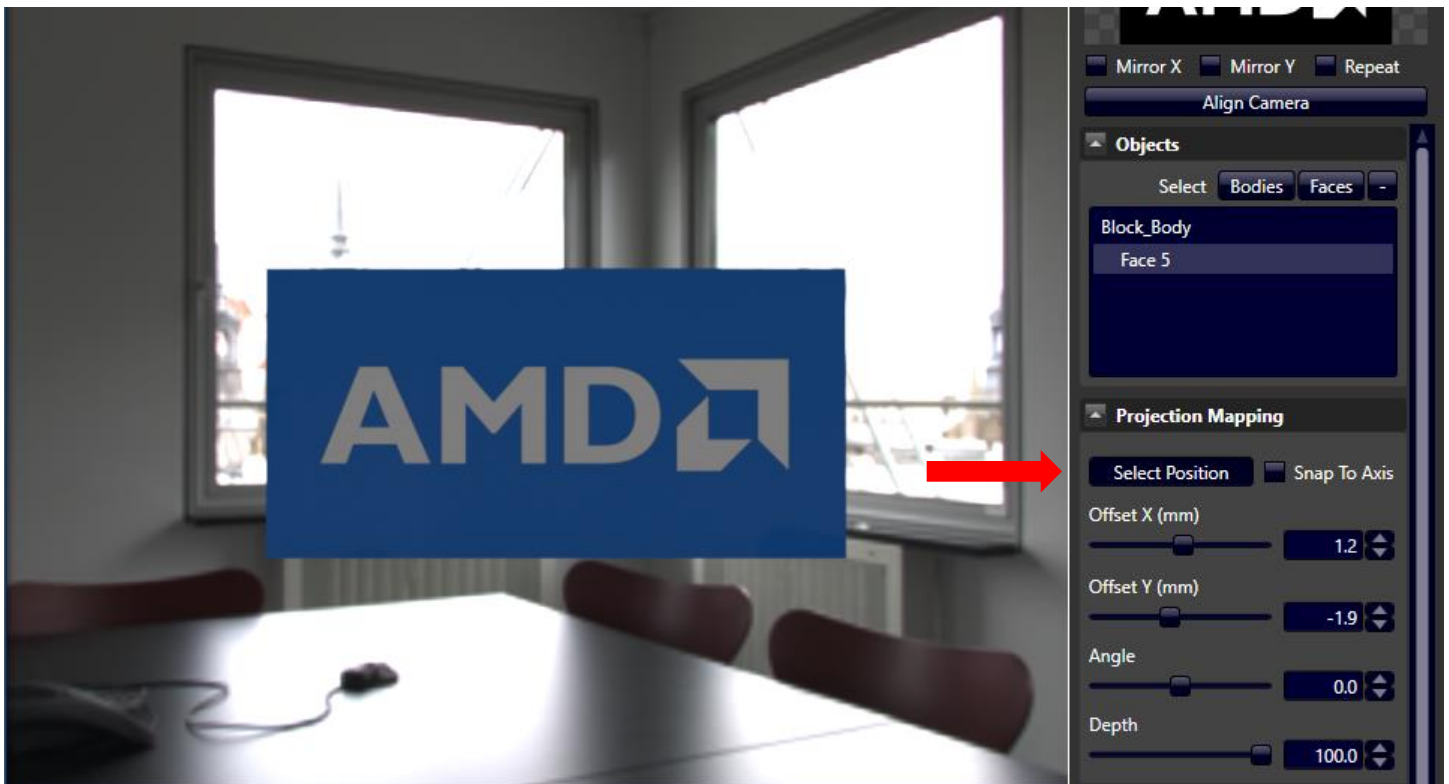
If the positioning still needs to be tweaked, first click on **Align Camera** to position yourself normal to the decal.



On an angle, the decal looked aligned but from the normal view, the decal is not in the middle.



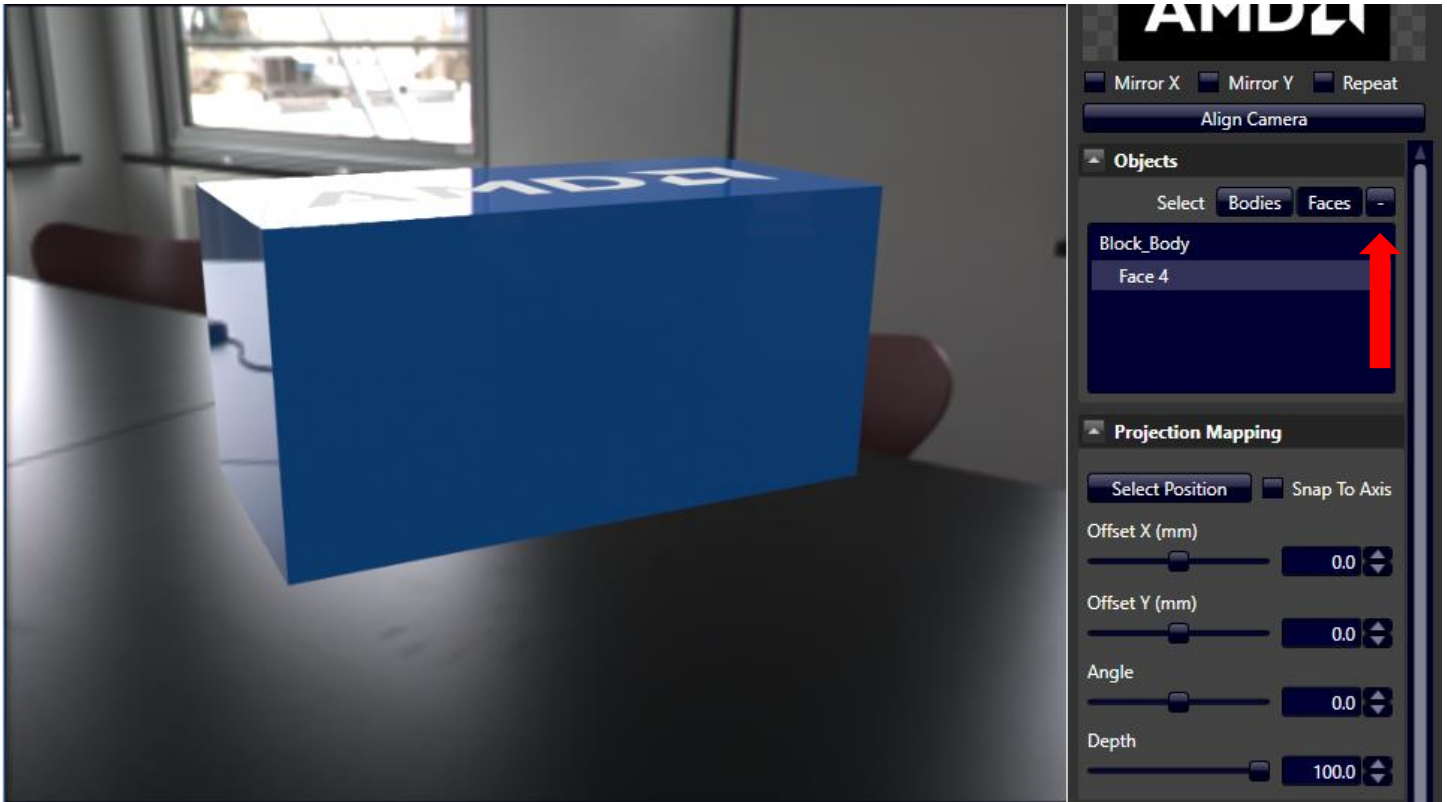
Enable the **Select Position** toggle, and slightly adjust the **Offset X** and **Offset Y** (The X and Y axis are relative to the decal).





Note: You can also change the angle of the decal, but the datum point will be where you first clicked to place your decal – NOT at the new decal center after the Offset X and Y.

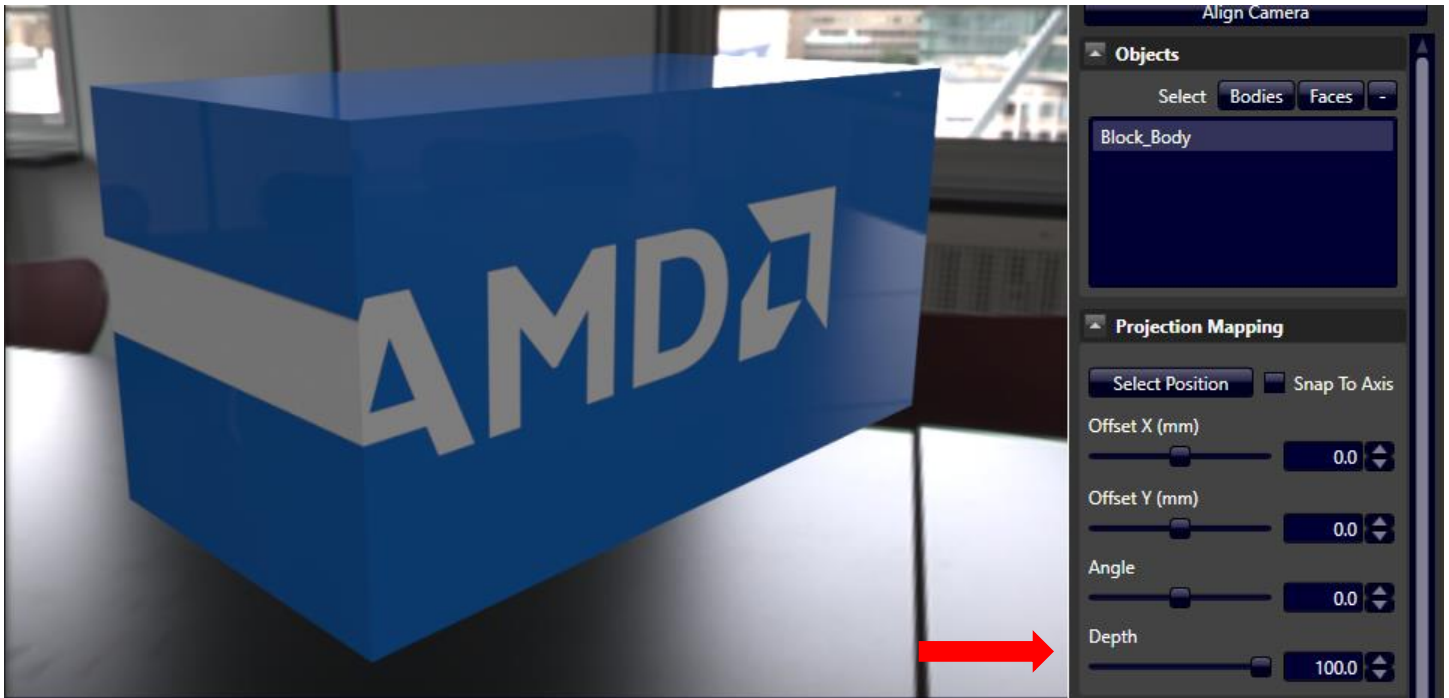
You can move the decal only on the surface/face that you selected (i.e. Face 5). If you want to move it to another face, first delete the selected face by clicking "-", then selecting the face that you want (i.e. Face 4).



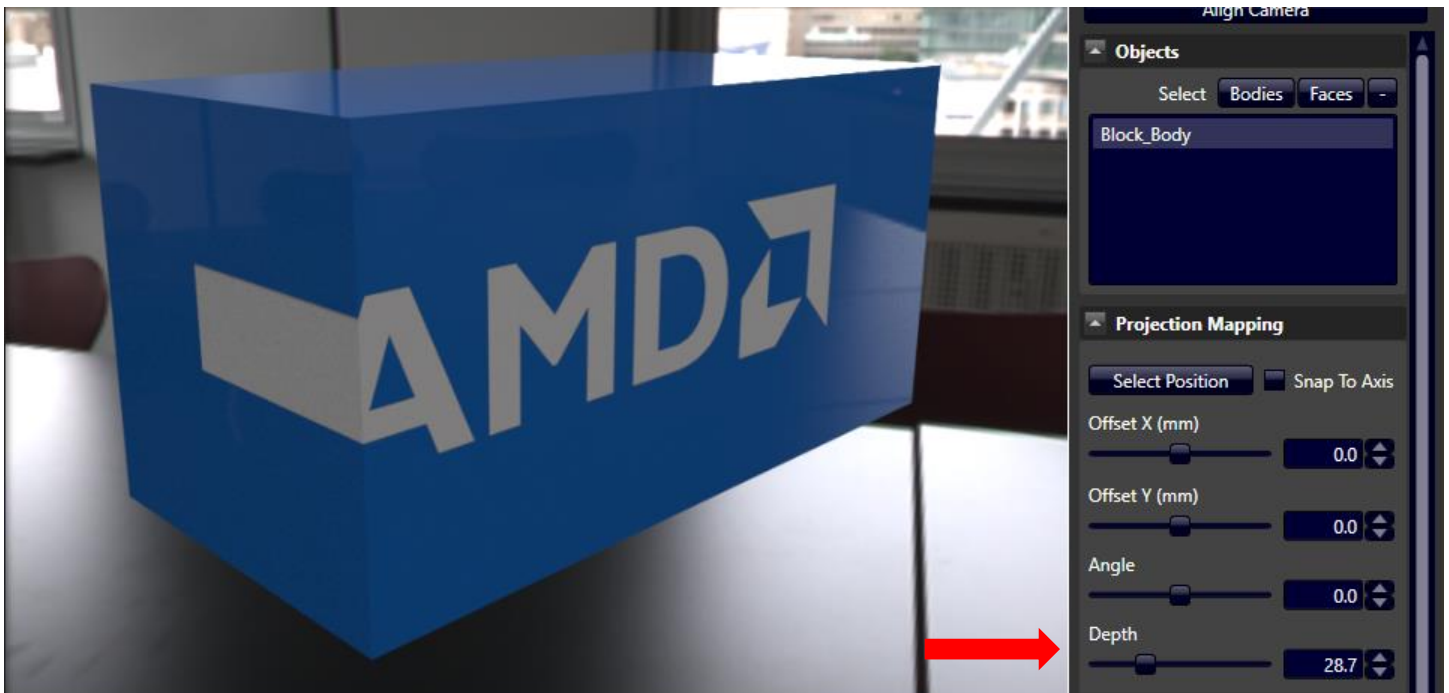
Depth

Depth applies to decals applied to surfaces on the body, not a face. Depth refers to how far the decal is projected throughout the entire body. Its scale is relative to the entire length of the body.

The decal also extends past its selected surface. Notice how it seems to drag onto the other side. Any pixels that extend past the edge of the applied surface are projected on the side. Depth is at 100.

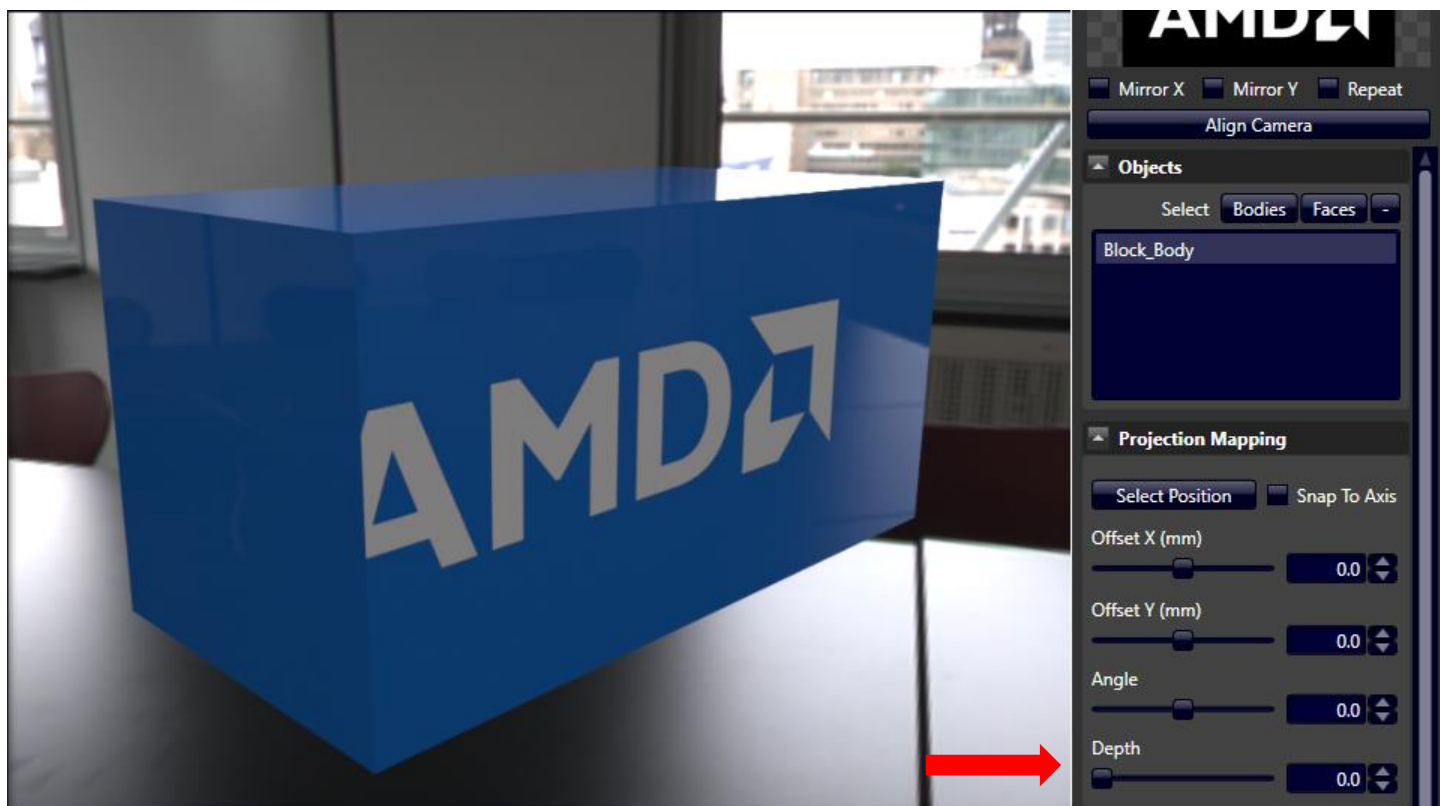


Decreasing the depth will shorten the decal projection throughout the block. Depth is 28.7.





Tip: Decreasing the depth to 0 will create a very “thin” projection of the decal on the surface and will not wrap the decal around the sides of the object. Similar to applying the decal to a Face instead of the entire Body.



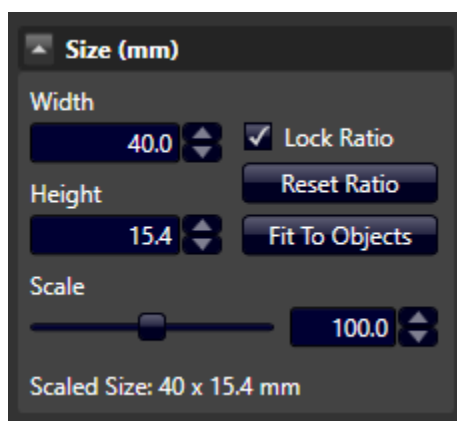
Size

Radeon™ ProRender will automatically detect the units of your model, and use the same units to adjust the size of the decal. When scale is set to 100, the decal displayed on the model is true to size.



Note: If you change the units in SOLIDWORKS, close and reload the Rendering Window.

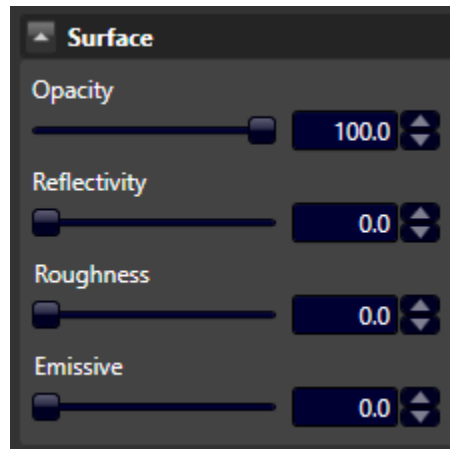
Tip: Best to set the units in SOLIDWORKS first before doing any render editing.





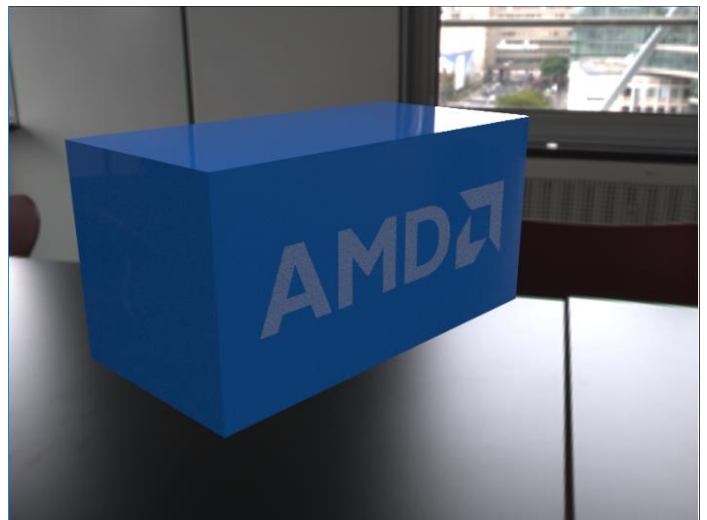
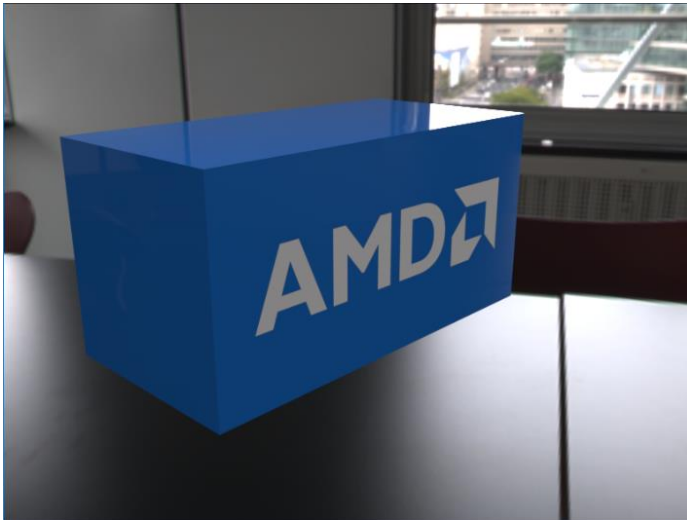
Tip: This is useful for seeing whether a sticker of a certain size would fit onto the model.

Surface



Opacity

Opacity adjusts the transparency of the decal. Left (100) Right (30)

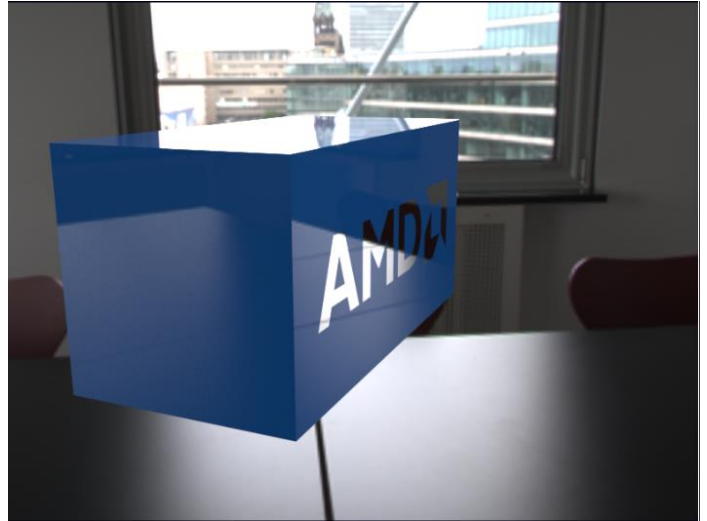


Reflectivity

The decal can show reflections of the surrounding environment. Left (50) Right (100).



Note: If reflectivity is 100 percent, the decal is essentially a mirror.



Roughness

Roughness diffuses the reflection. Left (0) Right (20)

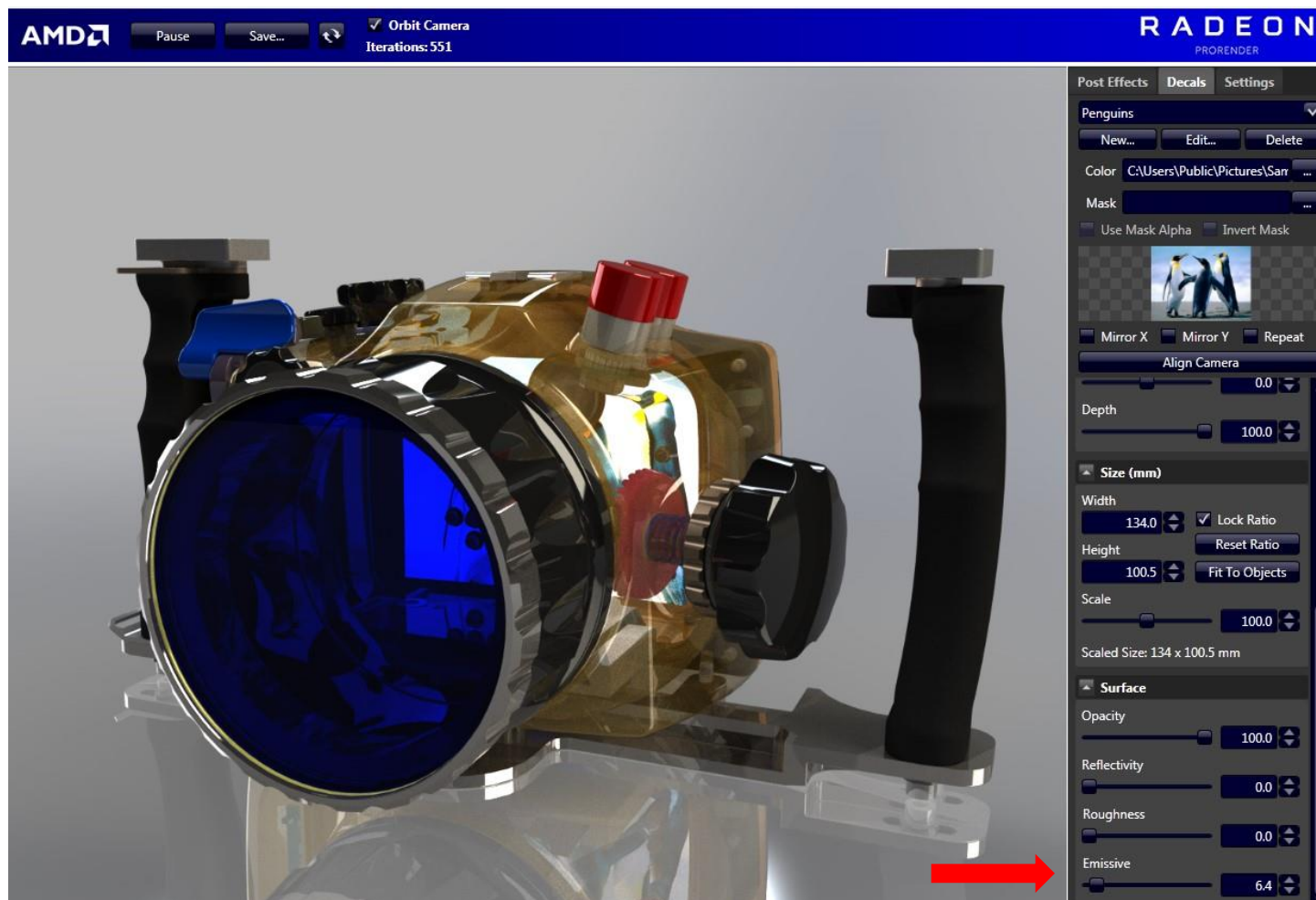


Emissive

The decal applied acts as an emissive image (i.e. and LCD screen). In the image below, the model is lit from inside by the decal.



Note: This will decrease performance and it is a computationally heavy feature.



Multiple Decals

To add multiple decals, click on **New...** and select another decal.

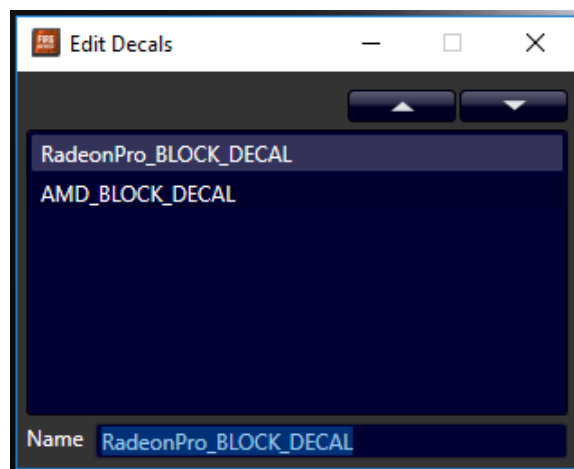


Tip: Remember to select color and mask!

The decal is applied to the same face with the first decal.

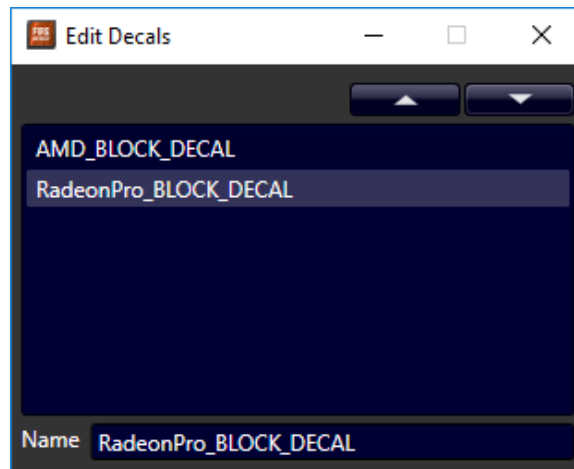


In **Edit...**, there are now two decals. You can also rename your decal if you wish.

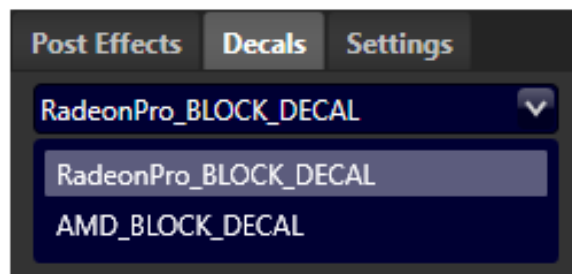


Note: In the list above, the RadeonPro decal will be laid on top of the AMD decal. To change the ordering of the layer, press the ▲ ▼.

In the list below, the AMD decal will be on top of the RadeonPro decal.



To adjust a particular decal, select the decal in the drop-down list at the top and adjust the settings for that decal.



Tip: Remember to toggle **Select Position** button to move the decal!

The same controls are used to move the different decals (i.e. the positioning, sizing and aligning of the camera).

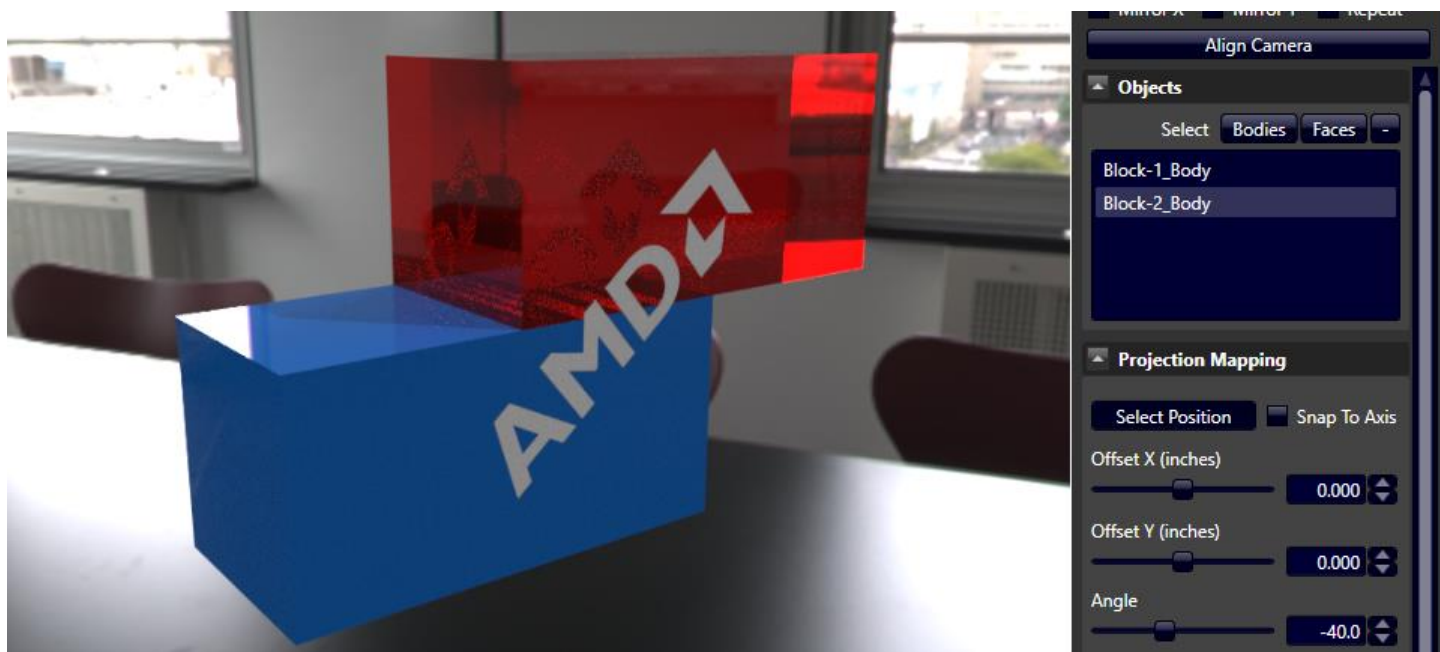


Multiple Bodies

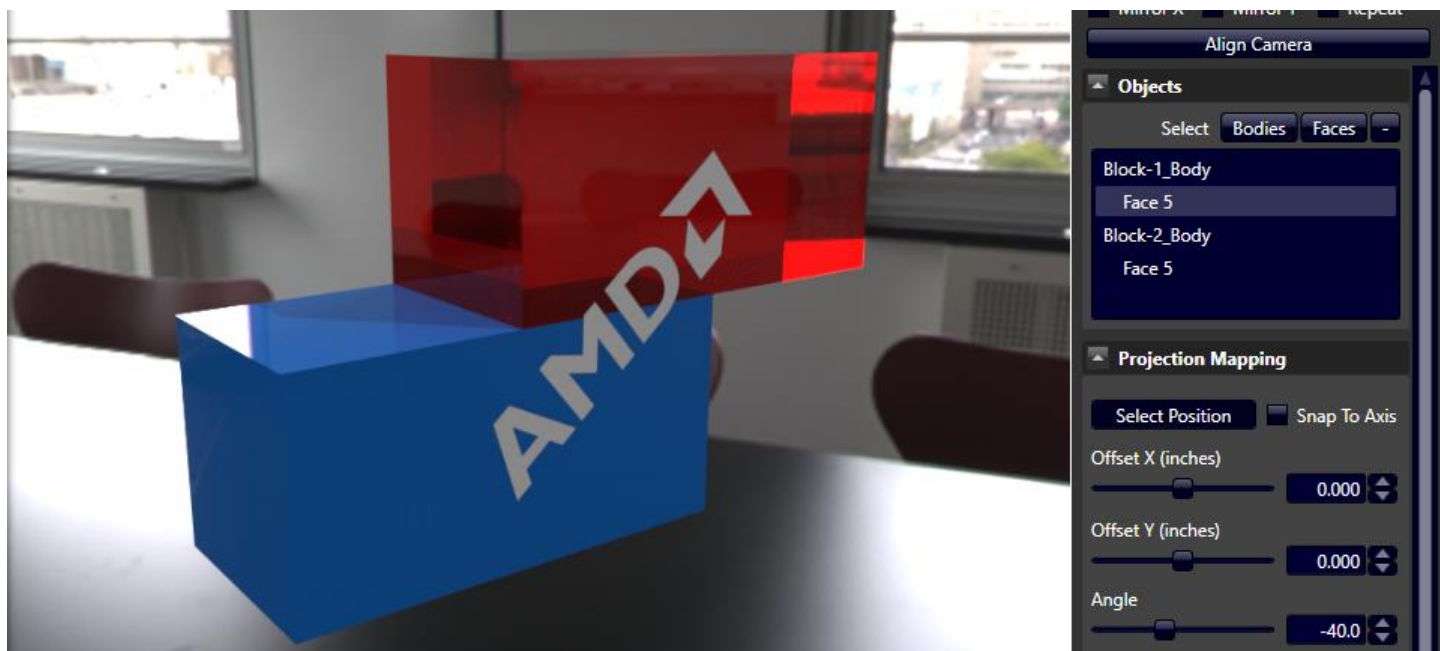
If your assembly has multiple bodies, you can apply the decal to multiple bodies and/or faces. Ensure the Bodies toggle is enabled, then click on the surfaces while holding CTRL key. On the right, there should be two bodies selected, and toggle the select position to drag the decal on the two bodies.



Tip: Place decals across the surfaces of bodies that are parallel for best results.



You can even do the same with selecting the faces to prevent the decal from projecting through the bodies.

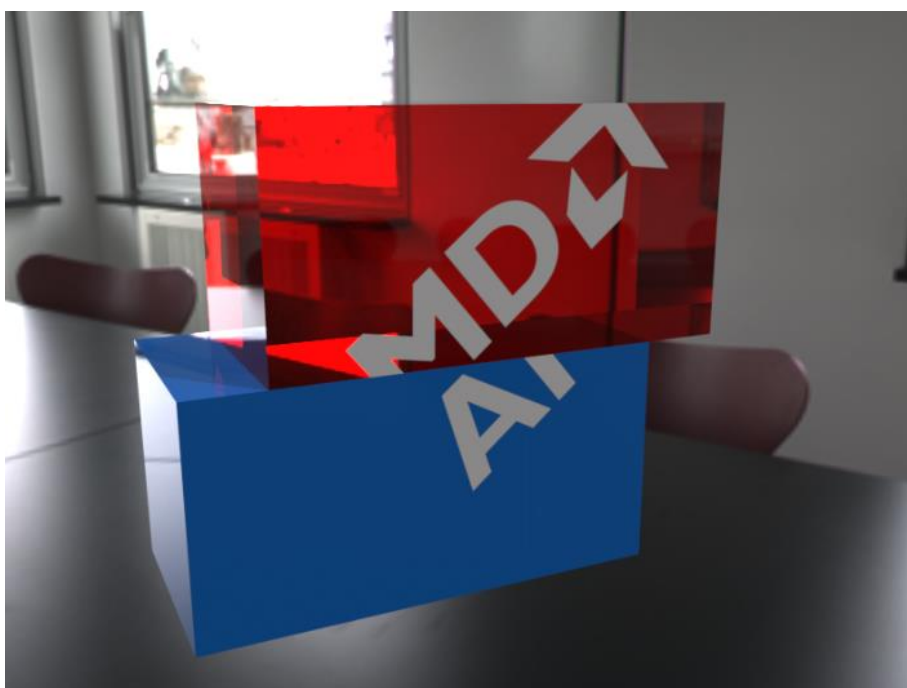


The part of the decal on each body will “stick” to that surface. If the model is moved in SOLIDWORKS, it will remain the same in Radeon™ ProRender.



Note: You are still able to change the size, position, scale...etc. Radeon™ ProRender will keep the decals on its respective surface.

In the image below, there is an offset in the X and Y direction, as well as an increase in scale. Notice how the decal still sticks to the two faces.



Curved Surfaces

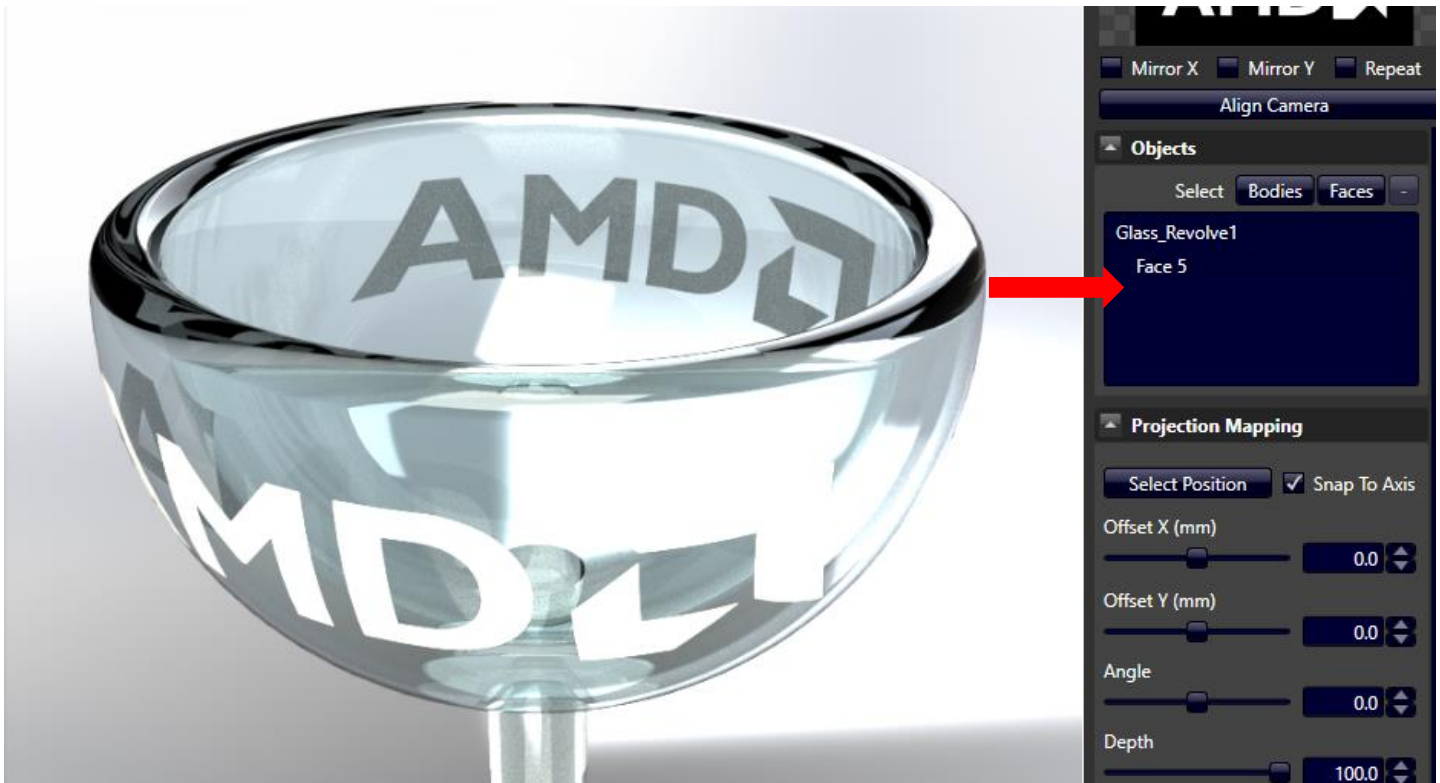
The decal is placed on the outer surface of the glass. Since the decal is applied as a projection, the decal that is applied on the lower part of the glass is projected. The decal is applied on the entire body, not just a face.



To fix the alignment on curved surfaces, enable the **Snap To Axis** checkmark.



If you want to prevent the decal from projecting through the glass, select the face by toggling the Face button and clicking the surface to apply the decal.



Then decrease the depth of the decal.



Decrease the depth until you can no longer see the decal extend to the other side, and only on the side you want.

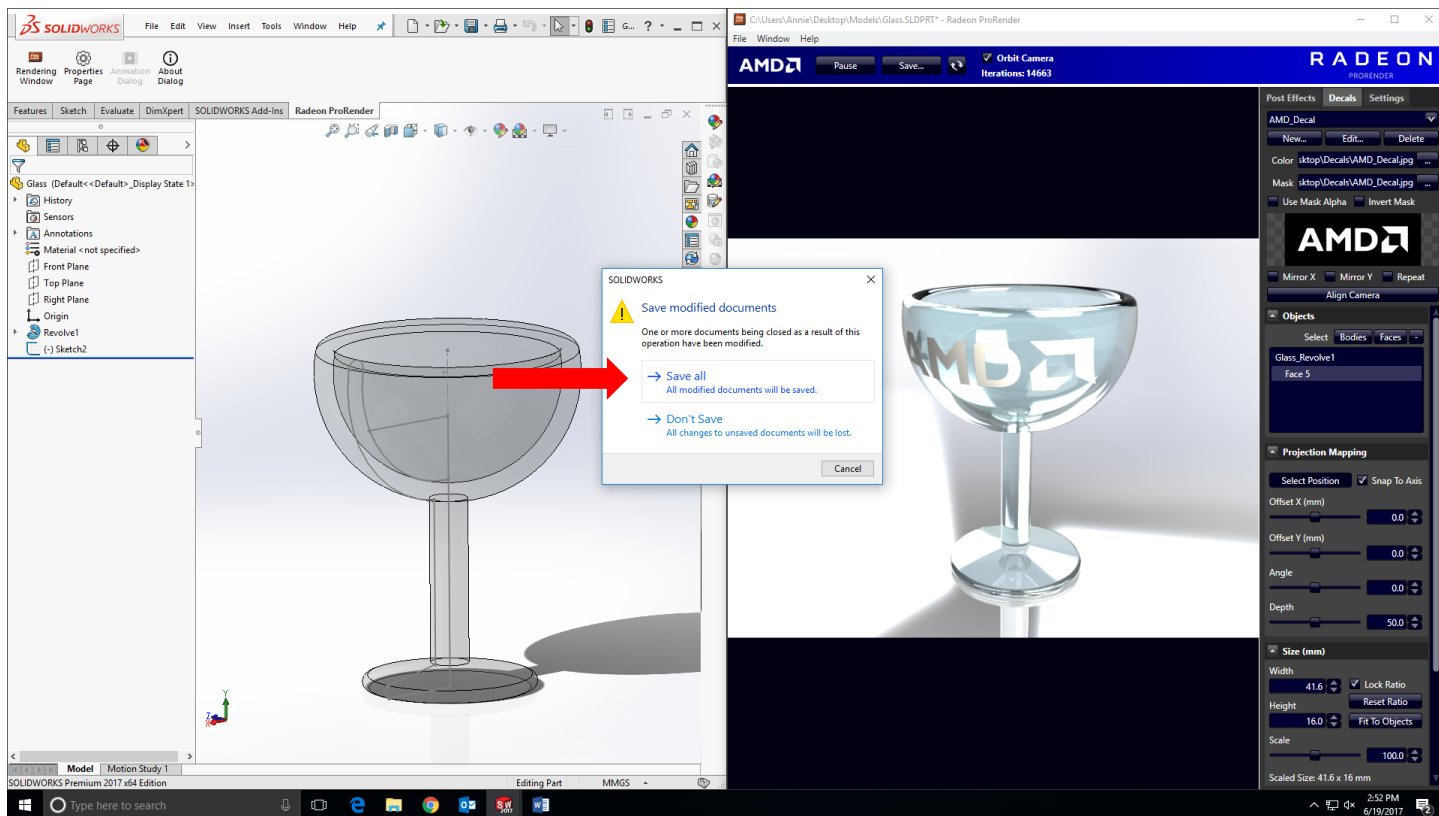


Final look at the decal on the curved surface.





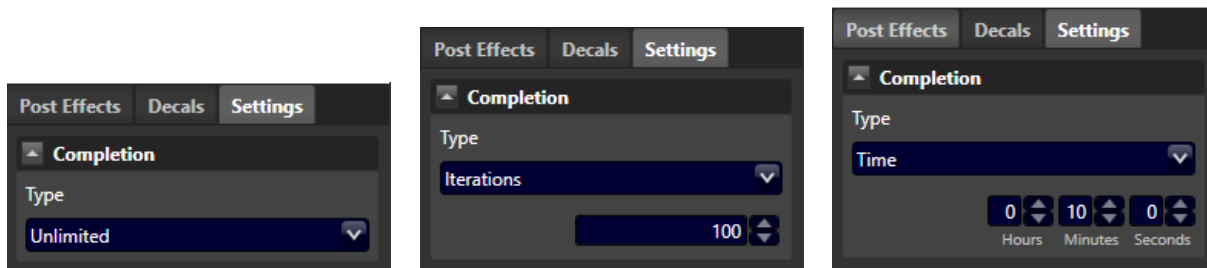
Note: When saving the file, the decal settings save within the SOLIDWORKS model! A pop-up box will appear even if you did not change the model in SOLIDWORKS.



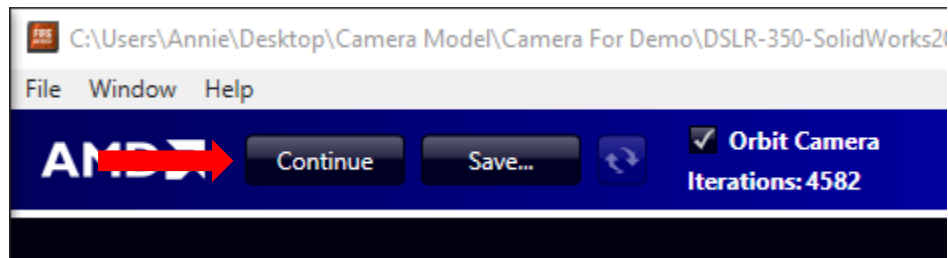
Settings Tab

Completion

Set when the rendering is completed by number of rendering iterations or time elapsed. If there are no limits set for time or iterations the render will keep rendering until the user cancels the render or closes the render window.



If you set iteration/time constraint and the render has finished and you wish to go back to rendering, set the Completion to Unlimited and press the Continue Button.



Lighting



Tip: Making any changes here will restart the iterations! It is best to set the lighting first.

Ambient Multiplier

By using an hdr file, the background contains enough information to display ambient lighting. The Ambient Multiplier is adjusted to make the surrounding light brighter or dimmer. When the ambient light multiplier is decreased, background details are more visible, but overall scene is darker.

Left (4.5) Right (0.5)



Emissive Multiplier

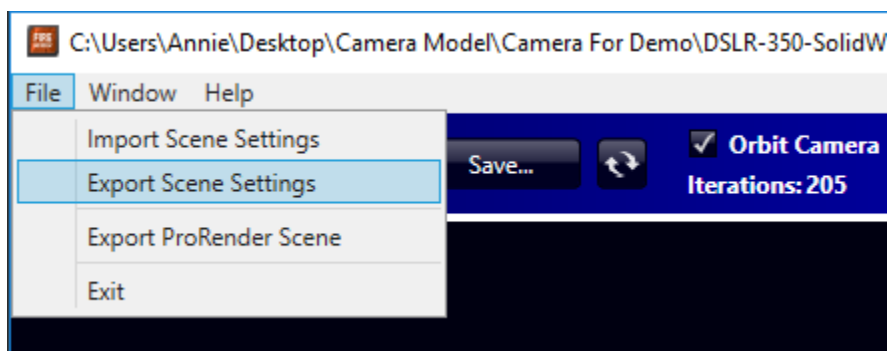
The Emissive Multiplier applies to objects have light emitting appearances (i.e. modelling a LED lamp). When increasing the emissive multiplier, the ball in the middle (which has an emissive appearance applied to it) seems to be brighter. Left (1.0) Right (5.0)



Final Render

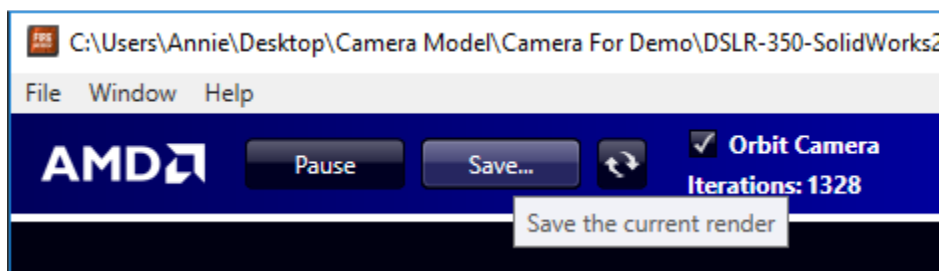
 **Tip:** To balance the amount of details shown, different effects must be adjusted. There are trade-offs to this, as changing the effects can show surface details, but make the overall scene look very bright or dark.

After editing the scene, you can export the scene settings to apply to another model. Go to **File > Export Scene Settings**. When opening the Rendering Window for another model, you can import those setting by going to File > Import Scene Settings.



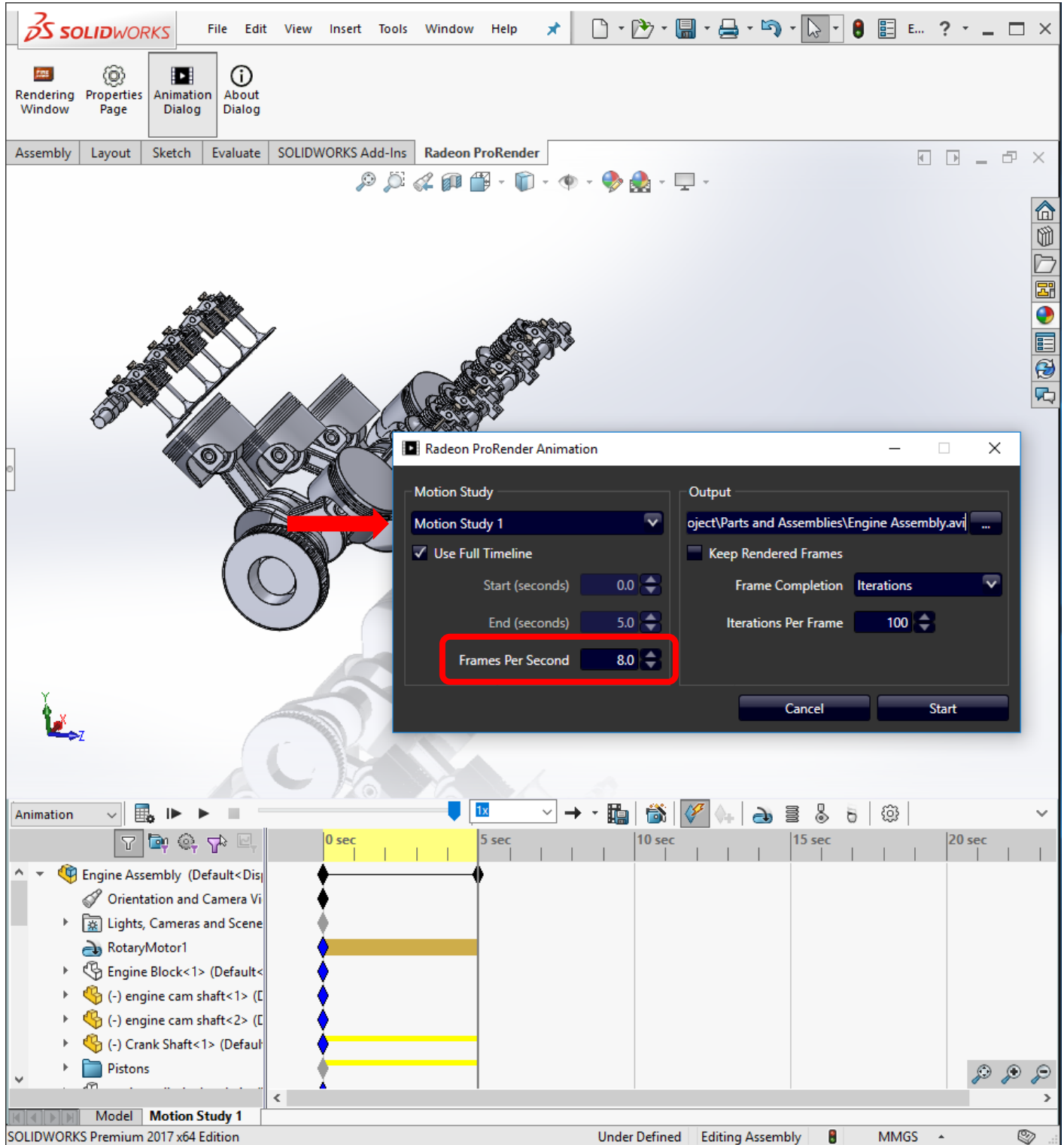
 **Tip:** Remember to set Render Setting to high quality in the Properties Page when you are nearing completion of the Render for optimal quality.

Click on **Save...** to export the current frame.

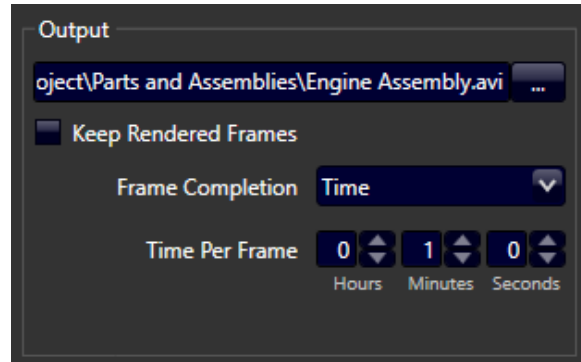
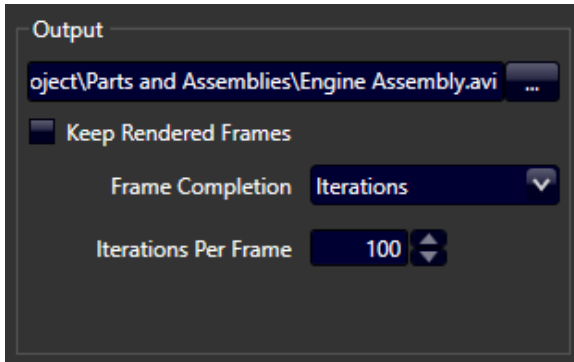


Animation

In SOLIDWORKS, click on the Animation Dialog. Select the motion study in SOLIDWORKS that you want to animate and specify the number of frames to render per second.



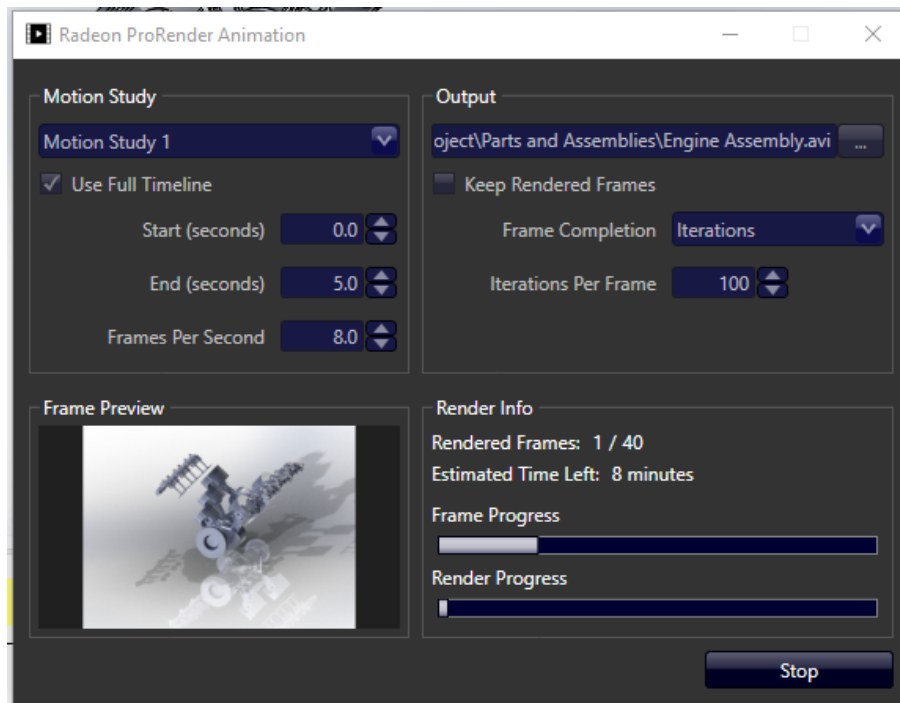
For each frame that will be rendered, specify the number of iterations or the time for rendering completion.



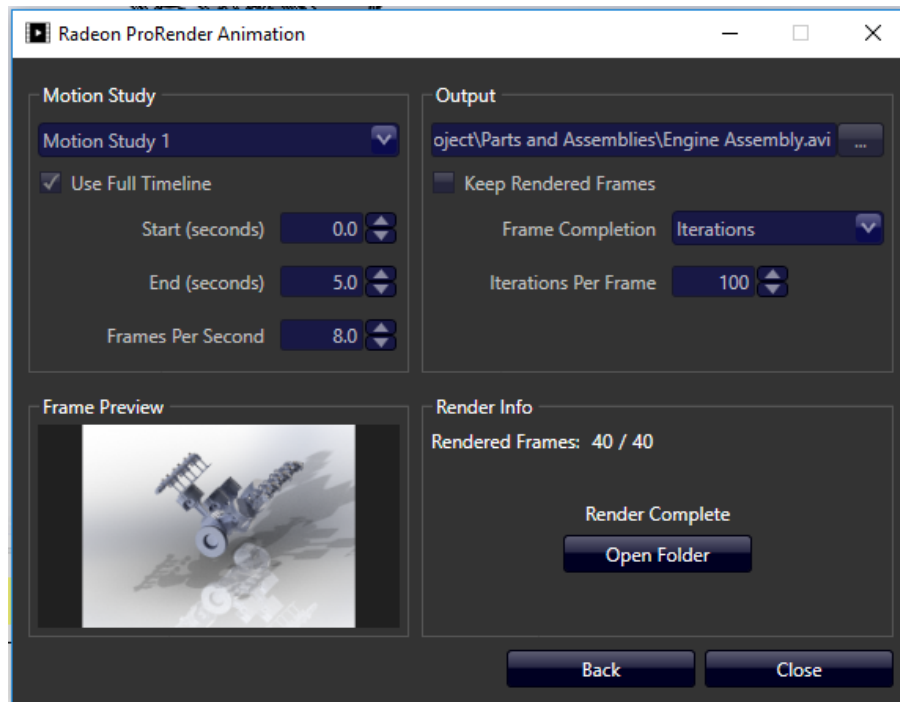
Tip: Remember that **every** frame is rendered – every single frame will need to have complete the specified number of iterations/time. Which adds up in time!

Upon starting the render, the animation dialog will show the number of frames that need to be rendered, the total estimated time, and the progress of the render.

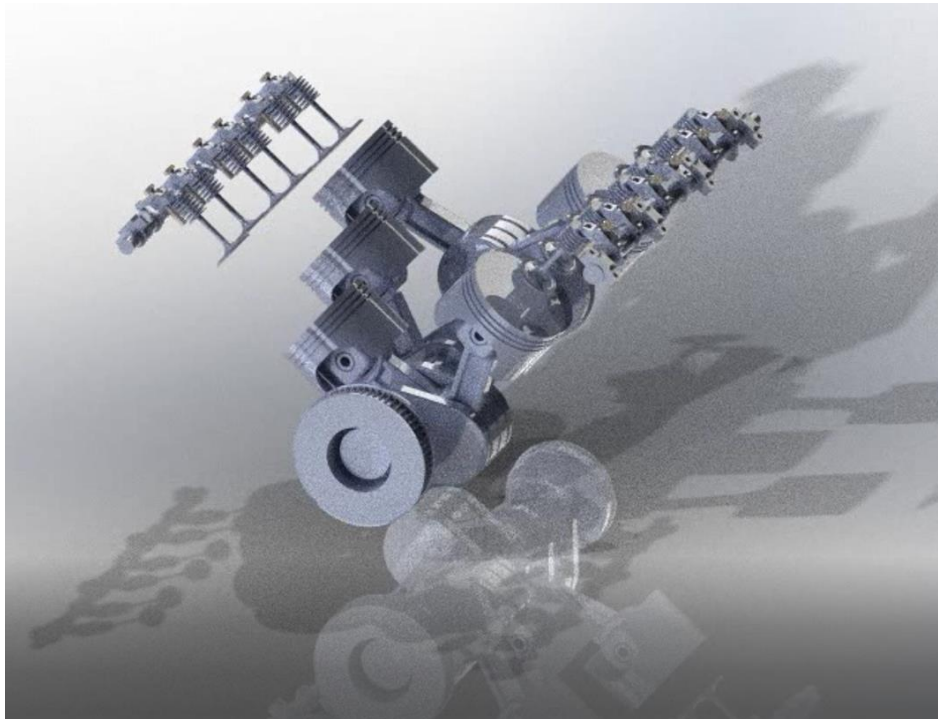
Radeon™ ProRender will create a video of the current view of the model in SOLIDWORKS.



Upon completion, Radeon™ ProRender will render the video in the folder that contains the model by default.



Screenshot of a single frame in the rendered video.





Radeon ProRender add-in for SOLIDWORKS

User Guide v1.1

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07/20/2017

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