

Blenderer

Rendering more realistic images and videos

Default

Default tab has the most important properties for rendering. You can simply open the Blenderer addon and hit render. However, the result will be most likely very dark and dull, so properties and features on the other tabs must be used for more desirable results.

Property	Default	Description
Output	...\My Commands\Blenderer\Output\Picture.png	File path to save the rendering result. Warning: Existing file will be overwritten
Samples	100	Number of light ray samples per each pixel. Higher value gives better, less noisy, result, but will increase rendering times.
Resolution	"<Custom>"	List of preset resolutions. Use custom for editing X and Y resolution manually. Higher resolution will require longer rendering time.
ResX	384	Horizontal resolution of the output image
ResY	216	Vertical resolution of the output image
Page	"Landscape"	Portrait setting will flip horizontal and vertical resolutions in the output image
Render		Calls to convert the scene in the Visual Components into Blender and rendering it with current settings.

Hint: use low sampling value and resolution for quick test renders.

Lights

The visual components scene is lit up with two default lights. These lights are not exported to Blender. The render engine will require special light sources that will define their type, color, size and strength. These light sources can be defined in the Visual Components scene with special components that will be converted to actual light sources in the render scene. Use the buttons on the Lights tab to create light components. Light components will be created to a current location of the camera. Light components won't have any effect on the lighting in the Visual Components scene. Light source components won't be visible in the scene, only the light they emit. However, light sources will be visible in the reflections and refractions.

Property	Default	Description
Add Point Light		Adds a point light to a current location of the camera (view). Point light emits light to all directions.
Add Area Light		Adds an area light to a current location of the camera (view) directed to the same direction as the camera. Area light emits light from one side of the area surface.
Add Spot Light		Adds a spotlight to a current location of the camera (view) directed to the same direction as the camera. Spot light emits light from a point like source to a direction defined by a cone.

Add Sun Light		Adds a sun light to a current location of the camera (view) directed to the same direction as the camera. The sun light emits one directional light. The location of the sun light has no effect. Only the orientation.
Default Strength	15000	The strength of the new light when it is added to a scene (strength of the sun light is the value divided by 10000 => defaults to 1.5) Strength value can be later edited as a component property of each light source component.

Hint: Rotate and navigate camera (view) to different locations around the scene and add light sources. Use e.g. 3 area lights to create a 3-point studio lighting.

Lights are custom components in the Visual Components scene that can be moved around and even attached to the moving nodes to record moving lights in animations. Select a light component in the Visual Components scene to access the component properties. The properties in the light components are explained below. Not all properties are found in every light source type.

- Size (Point / Spot / Area)
 - Size of the light source. The smaller the size, the sharper the casted shadows from this source.
 - Area light has SizeX and SizeY properties separately.
- Strength (Point / Spot / Area / Sun)
 - Intensity of the light source. Light source strength is usually in tens of thousands except for the sun light where e.g. value 2 is already pretty bright.
- R,G,B (Point / Spot / Area / Sun)
 - Color of the light can be defined as rgb values, red,green,blue
 - e.g. 255, 255, 255 represent perfect white
- Angle (Spot)
 - Angle of the spot cone can be defined with the Angle property in degrees.
- Falloff (Point / Spot / Area)
 - In real life, the intensity of the light as a function of the distance from the light source follows an inverse square relationship. So the intensity falls quite rapidly in function of distance. This can be modified to more easily light up bigger scenes with less light sources.
 - Options:
 - Quadratic: Physically accurate falloff with inverse square relationship
 - Linear: Light intensity falls linearly in function of distance
 - Constant: Light intensity doesn't depend on the distance (area and spot lights still emit to specific directions)
 - Sunlight doesn't have falloff option.

Advanced

More detailed rendering optimization or features can be configured on the advanced tab. Some of these properties may need a bit deeper understanding on ray tracing rendering engines to get the full benefit.

Property	Default	Description
Caustics	False	Enables refractive and reflective caustics rendering. Caustics give more realism when light is reflecting or refracting thru e.g. glass. Caustics will generate more noise to the scene and will require higher sampling values. You may need to disable Sample Clamping properties to see the effect and edit bounce values. It's recommended to disable this option in most scenes.
UseFreestyle	False	Enables freestyle rendering giving a cartoon like result. Hint: use only one point light source in the scene when using freestyle rendering.
CameraFovX	30	Camera Field of View angle (degrees) defines what angle the camera sees in the scene. Higher value will result in wider-angle image. The view in the Visual Components doesn't fully respect the framing in the result image. CameraFovX defines the horizontal angle of the image. <i>Hint: use low quality settings for quick test rendering to see the result image framing or the "ShowBorder" property.</i>
ShowBorder	False	Visualizes the current resolution and FOV setting in the 3d scene with a red wire frame.
OpenInBlender	False	When OpenInBlender is enabled and rendering is called on the Default or Animation tab, the converted scene is opened in Blender software. Useful feature for users familiar with the Blender user interface.
RenderDevice	"GPU"	Choose between CPU and GPU rendering. Rendering will be done with CPU even if the GPU is chosen if the GPU rendering is not set up in the Blender User Preferences inside the Blender user interface. Launch standalone Blender instance to edit the user preferences. Once setup is done the render device can be chosen for each render using this RenderDevice property. Usually GPU rendering is faster, but CPU rendering may support rendering of larger scenes if GPU memory is limited.

SampleClampDirect	2	Clamps the sample value for one single sample. This will reduce fireflies (bright noise) in the result image. Zero value disables clamping. Small non-zero values gives the most noticeable result but will make result image a bit darker and some details may be lost. <i>Hint: Use value 2 😊</i>
SampleClampIndirect	2	Clamps the sample value for one single sample. This will reduce fireflies (bright noise) in the result image. Zero value disables clamping. Small non-zero values gives the most noticeable result but will make result image a bit darker and some details may be lost. <i>Hint: Use value 2</i>
TransparentMaxBounces	2	Number of maximum light ray bounces thru transparent materials. <i>Hint: Use small value (0) if transparencies are not important in the scene. => Faster render</i> <i>Hint2: Use higher value if there are multiple transparent items in the scene that can be seen thru each other.</i>
TransparentMinBounces	0	See above. Minimum number of transparent bounces.
MaxBounces	4	Maximum amount of bounces per light ray. <i>Hint: with simple non-reflective and non-transparent materials this value can be lowered for faster render times.</i>
MinBounces	0	Minimum number of light ray bounces per sample.
DiffuseBounces	2	Number of bounces generated by a diffuse reflection.
GlossyBounces	2	Number of bounces generated by a specular glossy reflection.
TransmissionBounces	8	Number of bounces thru transparent glass like materials. Better result requires usually higher value than diffuse and glossy. <i>Hint: Set to zero for faster rendering if transparencies are not important in the scene.</i>
VolumeBounces	0	Number of bounces in volume. Most of the bounces in the scene happen on surfaces. If mist is enabled the light can also bounce inside the world volume.

		<i>Hint: Use higher value (e.g. 8) when using mist in the scene.</i>
AOBounces	0	After number of AOBounces the rays still continue to bounce but instead of using costly material shaders the bounces are calculated using the environment map in the scene. <i>Hint: Improve rendering times by setting this value to e.g. 2. Or by setting the global MaxBounces to 2</i>
Denoising	0.5	Denoising is a post processing procedure to reduce noise in the result image. Setting this value to 0 will skip denoising completely, allowing rendering faster and showing better image details, but with a cost of noise that must be reduced by higher sampling value. Denoising value must be between 0...1. <i>Hint: smaller denoising requires higher sampling count. Use denoising and use lower sampling for faster overall rendering time</i> <i>Hint: 0.5 is a good guess for most scenes.</i>
TileX	256	Image is rendered tile by tile. TileX is the resolution of each tile horizontally. <i>Hint: 256 or 512 gives a good performance for GPU rendering. Use e.g. 16 for CPU rendering</i>
TileY	256	Image is rendered tile by tile. TileY is the resolution of each tile vertically. <i>Hint: 256 or 512 gives a good performance for GPU rendering. Use e.g. 16 for CPU rendering</i> <i>Hint2: prefer values like 8,16,32,64,128,...</i> <i>Hint3: same values for x and y is optimal in most setups</i>
Materials	"Default"	With "Default" mode the scene materials are converted from Visual Components scene to Blender scene as is. With "Write To Table" mode the scene material values are written to a materials.csv file which is saved to the Blender command folder. With "Read From Table" mode the material definitions are read from a materials.csv file stored in the Blender command folder. Materials that are not defined in the

		<p>csv are converted directly from Visual Components scene as is.</p> <p><i>Hint: Set Materials property first to Write To Table mode and render the scene (when rendering begins it can be aborted. The file is already generated at this point). Then open the materials.csv file and edit the material definitions and save the file. Then Change the Materials property to Read From Table mode and render again with the materials defined in the csv file. This makes it easier and faster to edit the render materials without editing the materials in the Visual Components layout.</i></p> <p><i>Hint: CustomData supports currently adding noise displacement maps to materials. Use value: NOISE/<scale>/<strength> E.G: NOISE/300/5</i></p> <p><i>NOTE: image paths for textures are not fully supporter in the 2018_06_01 version of the plugin.</i></p>
TableDelimiter	“,”	<p>CSV delimiter for the materials.csv table.</p> <p><i>Hint: usually semi-colon on European Windows and comma on American/Asian Windows.</i></p>
DepthOfFieldNode	*Null*	<p>Camera depth of field can be focused to a center of a node. If set to *Null* the camera DOF is infinite (i.e. all objects are in focus).</p> <p><i>Hint: DepthOfFieldNode can be a moving node to create cool cinematographic effects in animations.</i></p>
DepthOfFieldRadius	50	<p>The smaller the value, the larger the depth of field area is. Greater value will make bigger area blurry.</p>
Mist	0	<p>Amount of mist (fog) in the scene. Increase volumetric bounces for better result. Mist will also cause more noise in the image, so sampling value may need to be higher.</p> <p>0 = no mist 1 = 100% mist (pitch black scene)</p> <p><i>Hint: Very small amount of mist usually gives the best result. Even less than 1% (i.e. 0.005)</i></p>

Animation

Animations can be also rendered. Animations are rendered to a series of image files that can be stitched together into a video with 3rd party software. Rendering animation requires recording the scene before calling rendering.

Workflow goes like this:

- Check RecAnimation checkbox
- Set start time (in seconds)
- Set end time (in seconds)
- Define StepSize (e.g. 0.04s => 25fps)
- Play simulation until RecAnimation check box is automatically disabled
- Hit “RenderAnimation”
- Animation is rendered frame by frame into image files. File path is defined on the Default tab. Animation frame images will get an ascending numeric post fix (e.g. Picture00001.png)

Property	Default	Description
RecAnimation	False	Set this True before running the simulation to record the scene for animation rendering.
Start	1s	Start time of the recording in seconds.
End	1.5s	End time of the recording in seconds.
StepSize	0.04s	Defines the animation frame rate. 0.04s => 25fps, 0.02s => 50fps <i>Warning: recording is executed on OnRender event in Visual Components. Don't change the simulation speed during recording and don't navigate the 3d world.</i>
RenderAnimation		Launch rendering by hitting this button after the recording is done. <i>Hint: Check the Output panel in Visual Components if any errors or warnings are printed</i>

Env

Environment map has two roles. It can show up in the rendered image as the background image and it can be used as a “light source” in the scene. Background can be set to be a plain RGB color or a HDRI environment map image (Google “HDRI map” for examples). Prefer very high resolution and high contrast maps for better results. The example map shipped with the Blenderer addon is quite poor quality both in contrast and in resolution.

Property	Default	Description
Background	Image	Choose between Image or ColorRGB. Depending on the selection either Image or ColorRGB property is shown.
Image	...\My Commands\Blenderer\Lights\Evn_room.bmp	Set an environment image map. Most commonly used image formats are supported including *.hdr. Environment image is wrapped around the scene with spherical projection so normal planar images are not applicable.
ColorRGB	Vector(1,1,1)	Color defined as RGB values between 0...1. Default value X1, Y1, Z1 represent white and can be understood as R=255 G=255 B=255
Strength	0.3	Strengthen of the light emitted from the map. Higher value lights up the scene more. Setting this to 0 will disable Env map as a light source
Visible	True	Show or hide background. Map can be used as a light source even if the map is not shown as the background in the output render.

Floor

In real life, light bounces from the floor. So even if the light sources in a room are usually in the ceiling, a lot of light is bounced back from the floor lighting the objects from below. So having a floor in the render scene is quite important for more realistic result. The default floor in the Visual Components scene is not converted to the render scene. Render scene floor can be easily configured on the floor tab.

Property	Default	Description
Visible	True	Disable this if the render scene floor is not needed. <i>Hint: If the floor already exists in the scene as 3d geometry it is better to disable the render scene floor completely</i>
BorderSize	2000mm	Floor size is automatically calculated from the scene contents so that the floor covers all the items in the scene. BorderSize defines how much the floor overshoots every direction around the items in the scene.
Style	ConcreteLight	Presets of floor styles. Changing this will overwrite the existing ColorTexture and BumpTexture property values. Custom floor style can be defined by simply setting any texture (image) files to the ColorTexture and/or BumpTexture files.
ColorTexture	...\My Commands\Blenderer\Textures\ConcreteLight.jpg	Image file for texturing the floor

BumpTexture	...\My Commands\Blenderer\Textures\ConcreteNormal.jpg	Image file for creating surface shape to the floor. Use normal map type bump map. Rgb values of the each pixel in the normal map defines a XYZ normal vector. Completely blue image (all pixels 0,0,1) represents completely flat surface.
TextureSize	1200mm	Size of the texture tile on the floor geometry. Texture is repeated on the floor. Prefer tileable textures.