

Render Settings | GI Tab

This page provides an overview of the GI tab of the V-RayRenderer node.

Overview

Global Illumination (or GI) is the illumination in a scene that comes from reflected (or bounced) light as opposed to coming directly from a light source. This enables more naturalistic and accurate lighting solutions.

The indirect illumination controls in V-Ray are divided into two types: *primary diffuse bounces* and *secondary diffuse bounces*.

- A primary diffuse bounce occurs when a shaded point is directly visible by the camera, or through specular reflective or refractive surfaces.
- A secondary bounce occurs when a shaded point is used in GI calculations.

More Information on how V-Ray calculates indirect Illumination can be found on the [Indirect Illumination Reference](#) page.

UI Path: ||Select V-RayRenderer|| > **Properties Panel** > **GI tab**

Parameters



On – Enables/disables global illumination.

Reflective Caustics – Allows indirect light to be reflected from specular objects (mirrors, etc). Note that this is not the same as Caustics, which represent direct light going through specular surfaces. This option is disabled by default because reflective GI caustics usually contribute little to the final illumination, while often they produce undesired subtle noise.

Refractive Caustics – Allows indirect light to pass through transparent objects (glass, etc). Note that this is not the same as Caustics, which represent direct light going through transparent objects. You need refractive GI caustics to get skylight through windows, for example.

Primary Engine – Specifies the method to be used for the initial diffuse bounces.

Brute Force – Selects the brute force method (direct computation) for primary diffuse bounces. *For more information on the Brute Force engine, please see the [Brute Force Information](#) page.*

Light Cache – Selects the light cache method as the primary GI engine. *For more information on the Light Cache engine, please see the [Light Cache Information](#) page.*

Multiplier – Determines the degree to which primary diffuse bounces contribute to the final image's illumination. Note that the default value of 1.0 produces a physically accurate image. Other values are possible, but not physically accurate.

Secondary Engine – Specifies the method to be used for additional diffuse bounces.

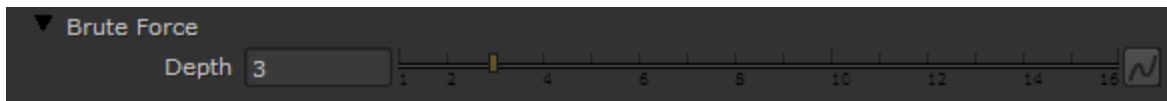
Brute Force – Selects the brute force method (direct computation) for secondary diffuse bounces. *For more information on the Brute Force engine, please see the [Brute Force Information](#) page.*

Light Cache – Selects the light cache method as the secondary GI engine. *For more information on the Light Cache engine, please see the [Light Cache Information](#) page.*

Multiplier – Determines the effect of secondary diffuse bounces on the scene illumination. Values close to 1.0 might wash out the scene, while values around 0.0 might produce a dark image. Note that the default value of 1.0 produces physically accurate results. While other values are possible, they are not physically accurate.

Brute Force

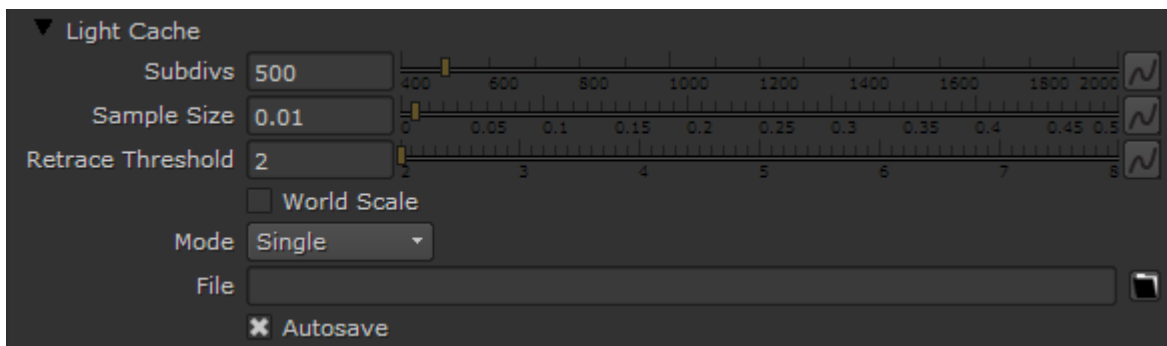
The parameters in this rollout will only activate when using Brute Force as a **Secondary Engine**, due to the Primary bounce only accounting for the first bounce. For more information on how the Brute Force engine works, see the [Brute Force Information](#) page.



Depth – Controls the number of light bounces that will be computed for secondary bounces.

Light Cache

The following parameters are visible from the Light cache rollout when it is selected as a **Primary engine** or **Secondary engine** in the Global Illumination Tab of the [VRayRenderer](#) node. For more information on how the Light Cache engine works, see the [Light Cache Information](#) page.



Subdivs – Determines how many paths are traced from the camera. The actual number of paths is the square of this value. The default value of 1000 subdivs mean that 1,000,000 paths will be traced from the camera. *For more information, see the [Subdivs Parameter example](#) below.*

Sample Size – Controls the size of the individual light cache samples. *For more information, see the [Sample Size example](#) below.*

Retrace Threshold – Increase to improve the precision of global illumination in cases where the light cache will produce too large an error. This is especially obvious near corners where light leaks might be possible because of the light cache interpolation. For glossy reflections and refractions, V-Ray dynamically decides whether to use the light cache or not based on the surface glossiness and the distance from it so that the errors due to the light cache are minimized. Note that large values increase render time.

World Scale – Determines the units of the **Sample size**. When enabled, the sizes are fixed in world units everywhere, and this can affect the quality of the samples. For instance, samples that are close to the camera will be sampled more often and will appear smoother, while samples that are far away will be noisier. Enabling this option might work better for fly-through animations since it will force constant sample density everywhere.

Mode – Determines the rendering mode of the light cache:

Single frame – Computes a new light cache for each frame of an animation.

Fly-through – Computes a light cache for an entire fly-through animation, assuming that the camera position/orientation is the only thing that changes. The movement of the camera in the active time segment only is taken in consideration. Note that it may be better to enable the **World Scale** option for fly-through animations. The light cache for the entire animated sequence is computed only at the first rendered frame and is reused without changes for subsequent frames.

From file – The light cache is loaded from a file. The light cache file does not include the prefiltering of the light cache; prefiltering is performed after the light cache is loaded, so that you can adjust it without the need to recompute the light cache.



Note: Using **Fly-through** mode will work only when the scene is exported through the [VRayTranslator](#) node and rendered in V-Ray Standalone.

File – Specifies the location where the light cache will be saved for later reuse. When the **Mode** is set to **From file** the light cache will be loaded from this location.

Autosave – When enabled, the Light cache file will be automatically saved to the location set in the **File** parameter.

Example: Subdivs Parameter

The **Subdivs** parameter controls the number of rays that are shot into the scene and the noise quality of the light cache samples.

Here is a scene rendered with different settings for the **Subdivs** parameter. All other settings are the same.

As we add more samples, the noise is reduced, but the render times increase. When the **Subdivs** parameter is doubled, the light cache takes approximately four times longer to calculate.



Subdivs = 500



Subdivs = 1000



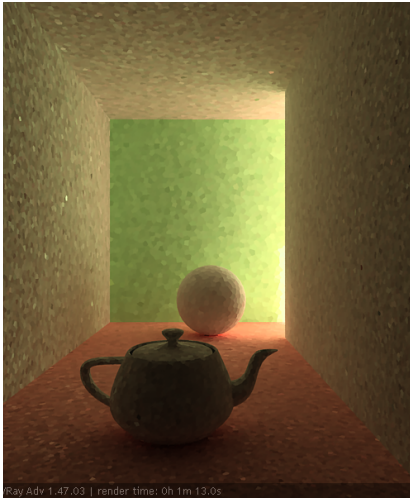
Subdivs = 2000

Example: Sample Size

The **Sample size** parameter controls the size of the individual light cache samples. Smaller values produce a more detailed lighting solution, but are noisier and take more RAM. Larger values produce less detail, but take less RAM and may be faster to calculate.

Here is a scene rendered with different values for the **Sample size** parameter. All other values are the same.

Note the light leak from the wall on the right in the last image. This happens because samples from the other side of the wall are quite large and end up being used on the side facing the camera. Also note the difference in the noise level between the samples.



Sample size = 0.01



Sample size = 0.02



Sample size = 0.0

