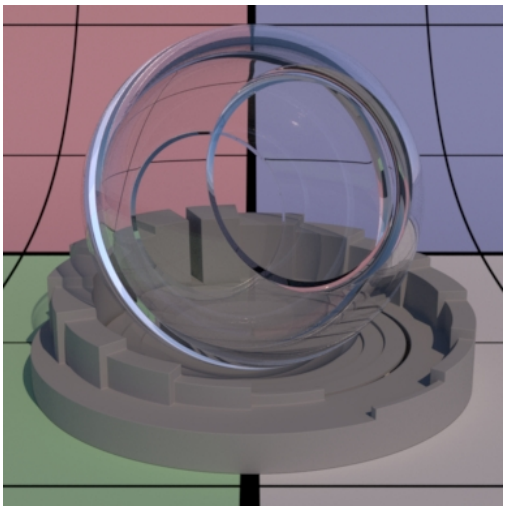
Glass Parameters

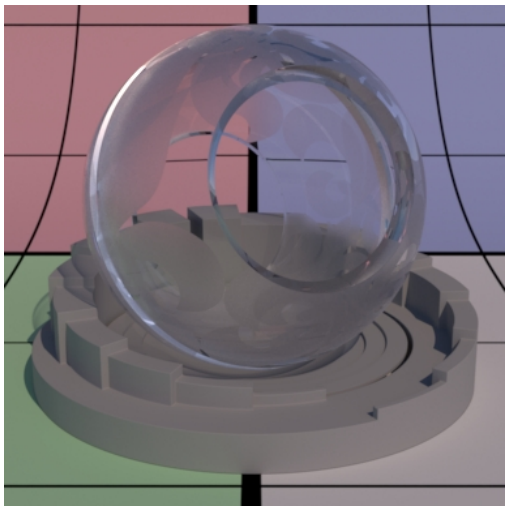
In the parameters below, some of them can be overridden by a PxrLayer when connected to the **Input Material** or through a PxrLayerMixer. PxrLayerSurface is designed to better illustrate which parameters are not able to be overridden in a layer by including only parameters that are global. We recommend this material when you know you will be layering. The results of these settings are unchanged.

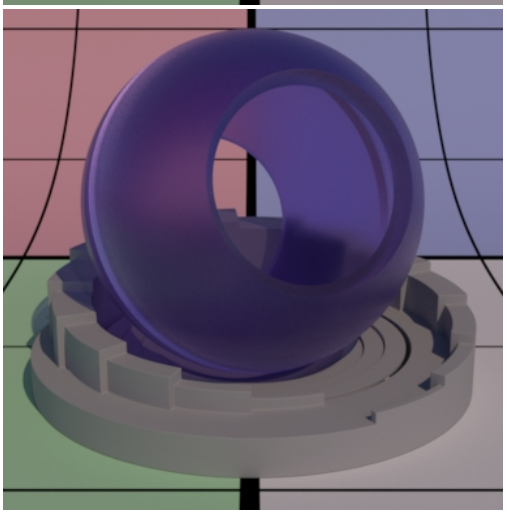
- **Bold Face** parameters are layerable, able to be overridden per layer.
- *Italicized* parameters are not able to be layered or overridden. These are globally obeyed for all layers. For example: Choosing GGX as a specular model will mean all layers will be GGX for that parameter.

Glass Parameters

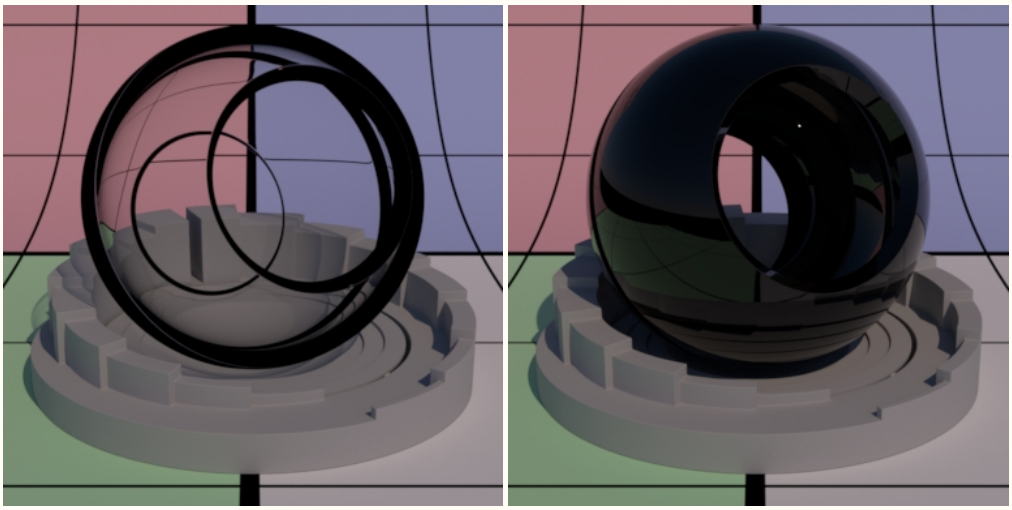
Glass parameters are meant to provide a single location for creating and manipulating a physically based glass result. Anything from clear to a colored glass with all levels of roughness and fog in-between are available.





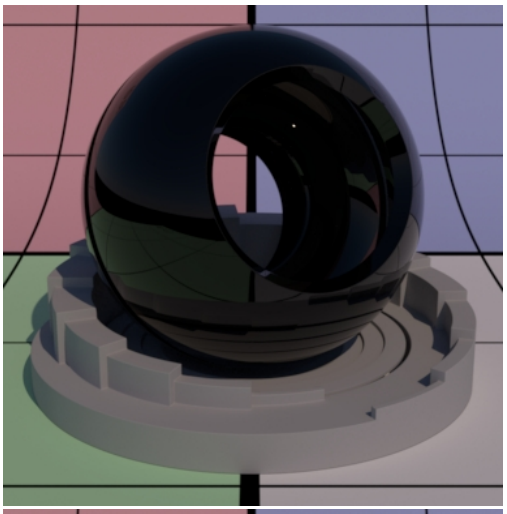


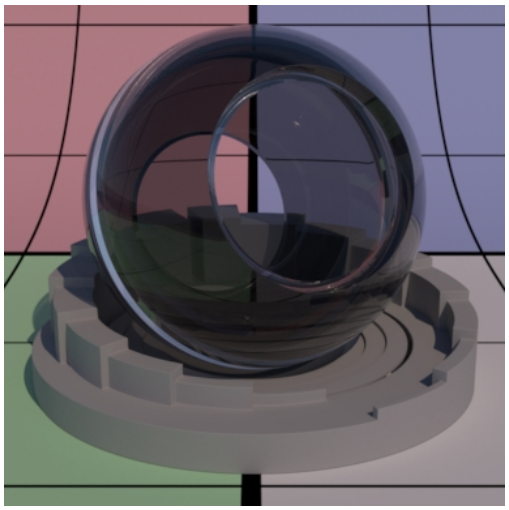
The Refraction and Reflection Gain controls are meant to work together. Using one or the other alone may result in interesting effects but isn't intended by design. Also note that when creating glass for the first time, you will find the default gain of 1.0 for Diffuse may interfere with your look. Turn the gain for Diffuse to 0.0 for pure glass.

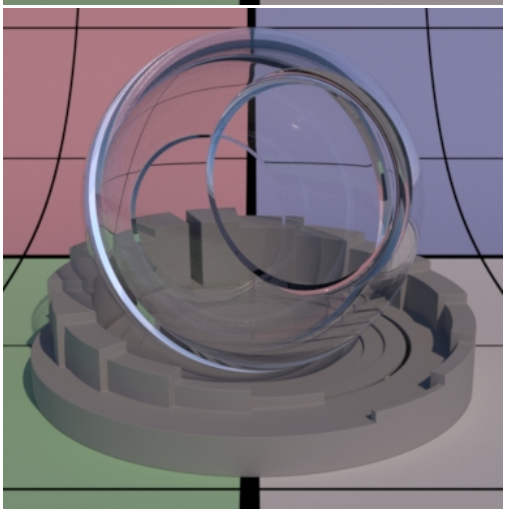


Refraction Gain

Refraction gain is a multiplier. Lower numbers result in less light making it through the object and might appear as dark tinted glass or simply black at 0.0.

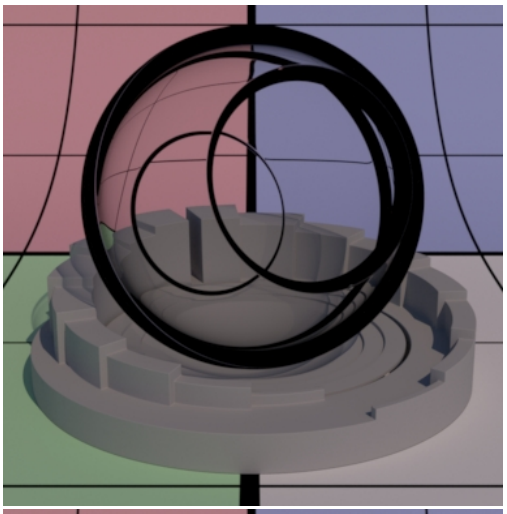
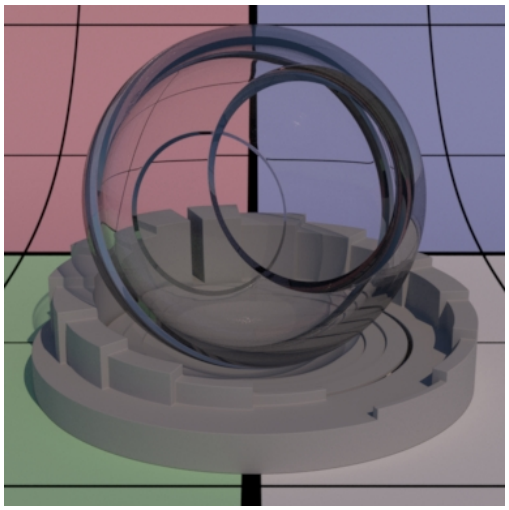
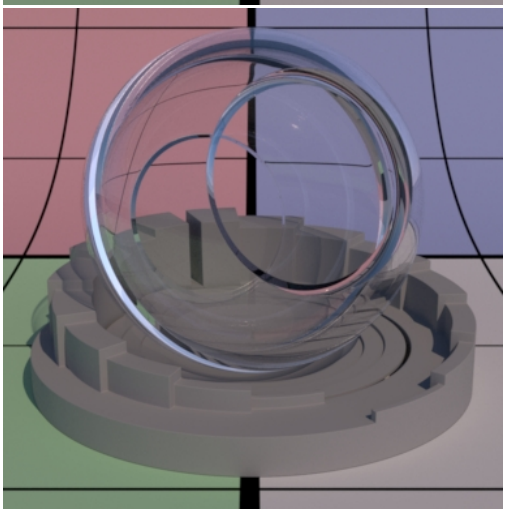






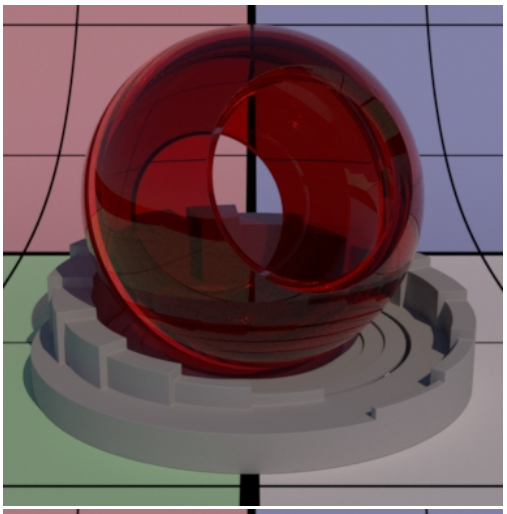
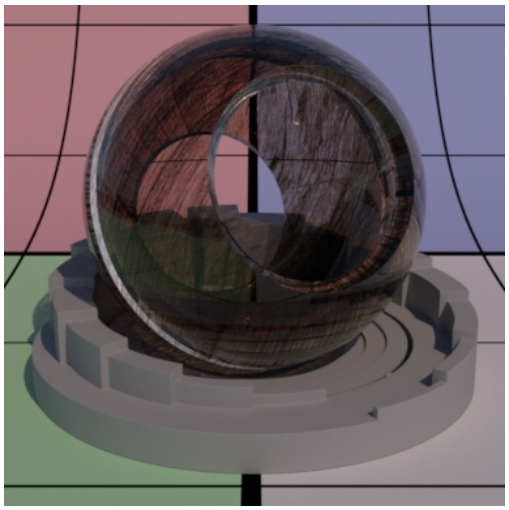
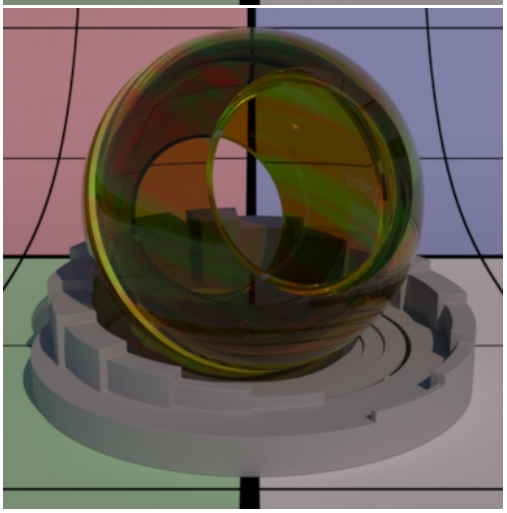
Reflection Gain

Reflection gain is a multiplier. Low numbers decrease the visible reflection result. A setting of 0.0 results in an unrealistic look as seen in the first image below.

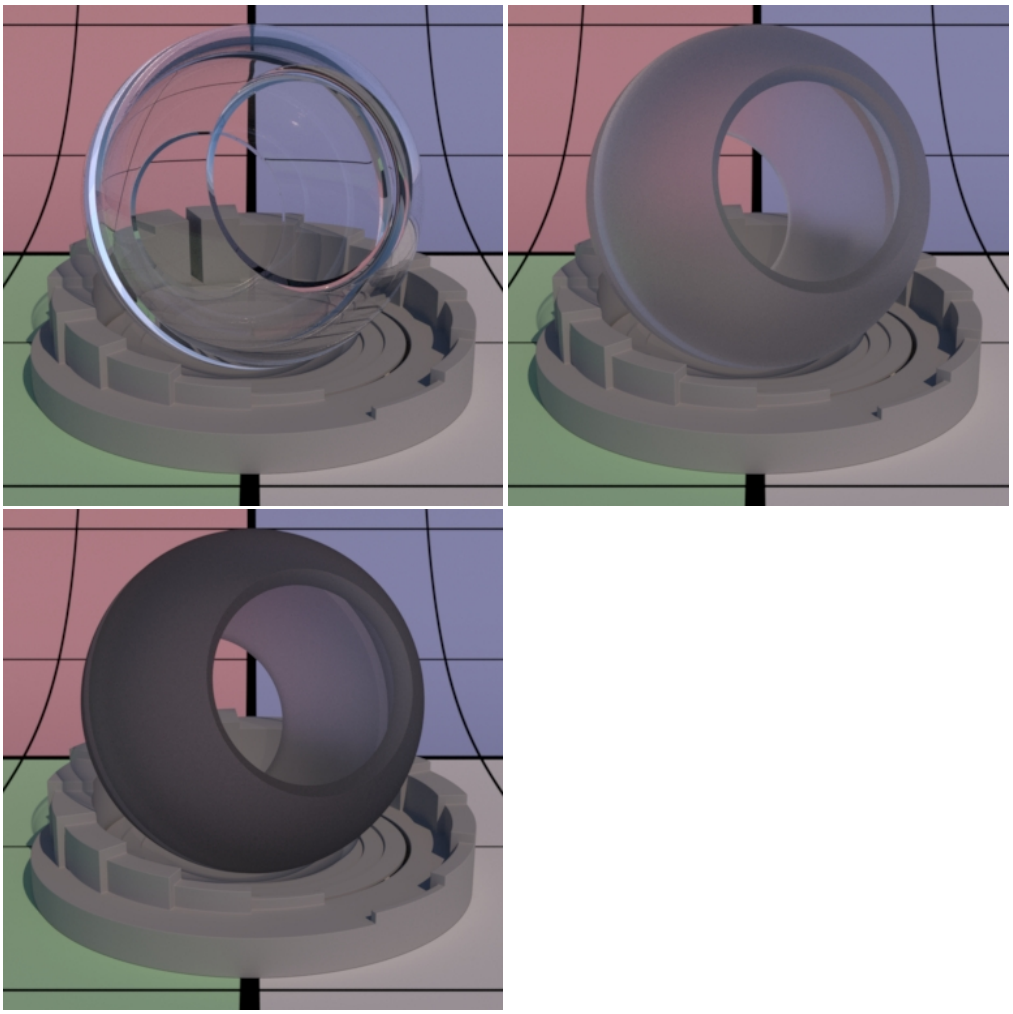
Refraction Color

Refraction color. This allows you to create objects that are realistically colored and have colored shadows just like real transmissive objects (note that Thin Shadows should be enabled on your lights).

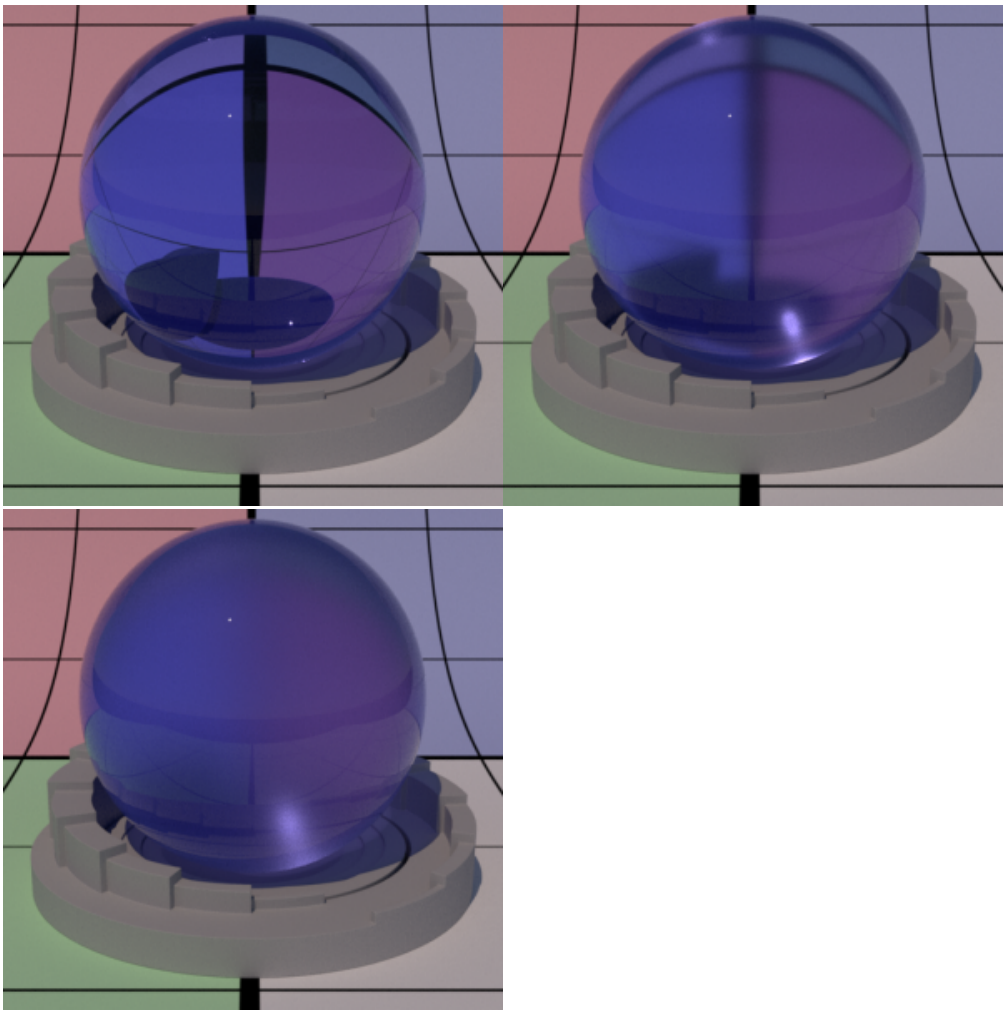
Roughness

Refraction and reflection roughness. Here is where you would simulate frosted or etched glass.



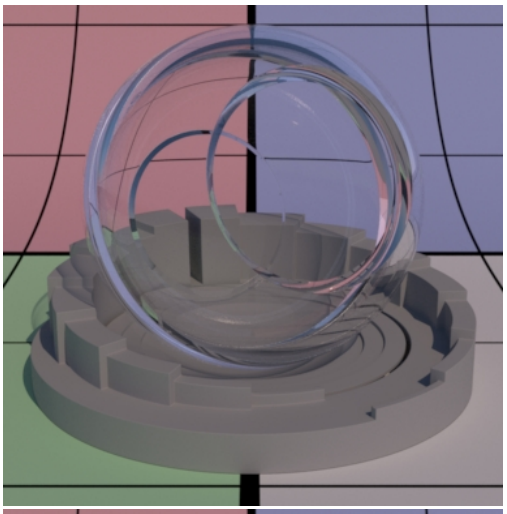
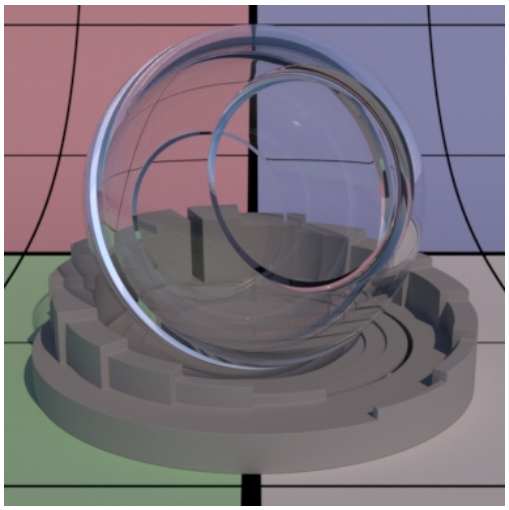
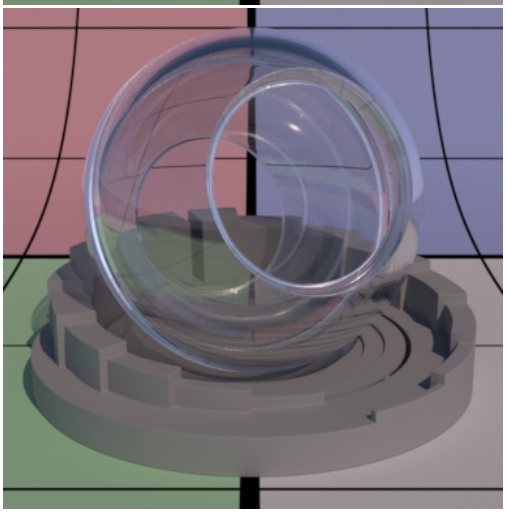
Refraction Roughness

When set to a non-negative number, allows the refraction roughness to be *different* than the reflection, which is controlled by the Roughness parameter above. Below the reflection is non-rough (0.0) while the refraction roughness increases slowly.



Refractive Index

Index of refraction. The default is 1.5 which is typical of glass. Online resources of Ior values can provide more useful settings. Higher Ior values bend rays more than low values. Use **Thin** if you want to avoid bending rays.

Enable Manifold Walk

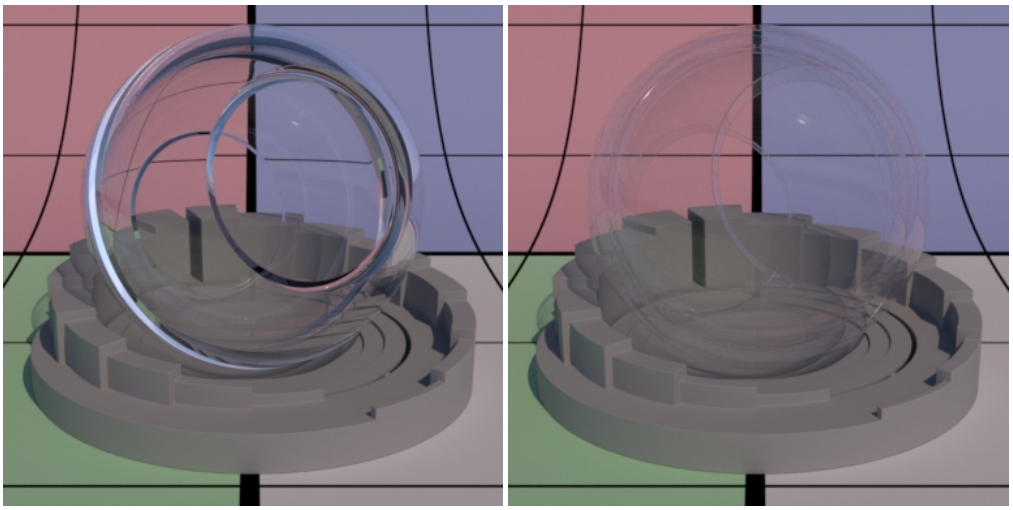
This sets the glass object to allow exploration for caustic light paths, used with PxrUnified integrator and the options for the Manifold Walk

Manifold Walk IOR

This allows the user to artistically override the refraction index set in the glass lobe for calculating caustic light paths in conjunction with the controls for Manifold Walk found in the PxrUnified integrator.

Thin

If on, correctly split energy according to Refractive Index between reflection and refraction, but do not bend the ray in refraction (simulating a double pane of glass with a single pane or maybe a hollow glass ornament). The below **interior** parameters are not meant to operate in this mode.



Ignore Accumulate Opacity

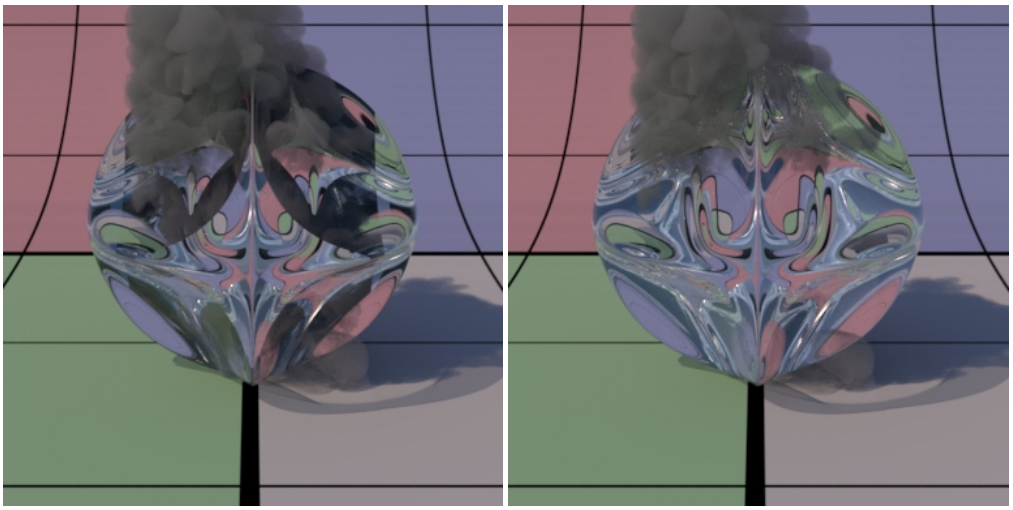
This ignores the setting in the integrator to collect alpha values based on glass opacity/refraction.

Ignore Fresnel Weighting

This turns off reflection but allows rendering pure refraction/transmission. This is useful for compositing.

Blocks Volumes

This setting omits or blocks volumes from rendering when they pass into the interior of the glass object. This also disables the interior settings for the glass lobe. The default is off (left) and on is shown on the right.



Interior Parameters

Single Scatter Albedo

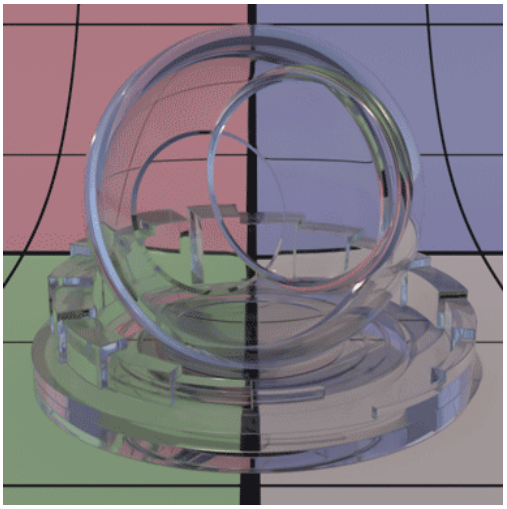
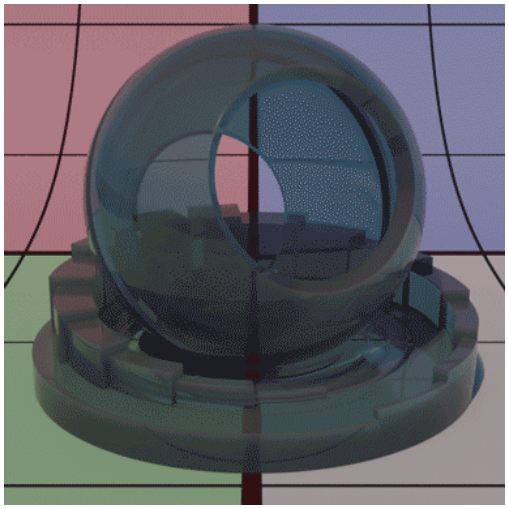
Single scatter albedo color, this creates a fog in the interior of the glass surface. This would be useful for containers of silty or dirty (homogeneous) water. *Extinction* should not be black or 0. These settings are used/available when Refraction Gain is non-zero. Texturing requires a 3D Manifold to work.

> ⚠ The Interior Parameters are designed to be convenient for use with PxrPathTracer. When using PxrVCM and Trace Light Paths in lights, for example, this effect will fail to render in the current version.

Extinction

Extinction color. This applies to the above Single Scatter Albedo. It should not be black for Single Scatter Albedo to work. This parameter selects the color that is most effected by extinction or combination of colors. Choosing pure red means red goes extinct but green and blue color combinations do not. Below there are two examples: Left is a monochromatic extinction color increased from 0 to 4.0 in RGB. Note we go beyond 1.0 here as the scale is scene-based. Right is a rotation of the color value for the effect, keep in mind since it's extinction, the resulting color is opposite the color wheel from the color chosen. High numbers also make the effect more thick or opaque, allow for the simulation of dirty water or maybe some orange juice. Again, values are based on scene scale so you may find yourself beyond 1.0

Open the images in a new window if the animation fails to play.

Scattering Directionality

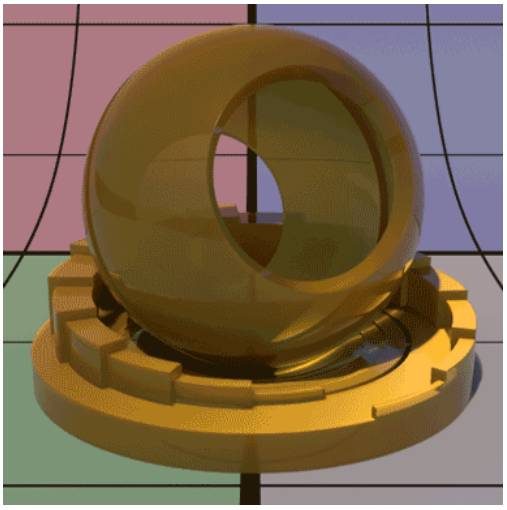
Controls the directionality of the scattering. In the animation below we rotate from -0.9 to 0.9 directionality. With the light source mostly behind us, it will appear more solid with the negative values as light is scattered back towards us.

0 : isotropic

1 : forward

-1 : backward

Open the image in a new window if the animation fails to play.



Multiscattering

Allows multiscatter effects, may may your volume brighter as more light bounces are calculated inside the volume.

Overlapping Volumes

Allows volumes internally and externally to overlap, as though passing through the object.

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