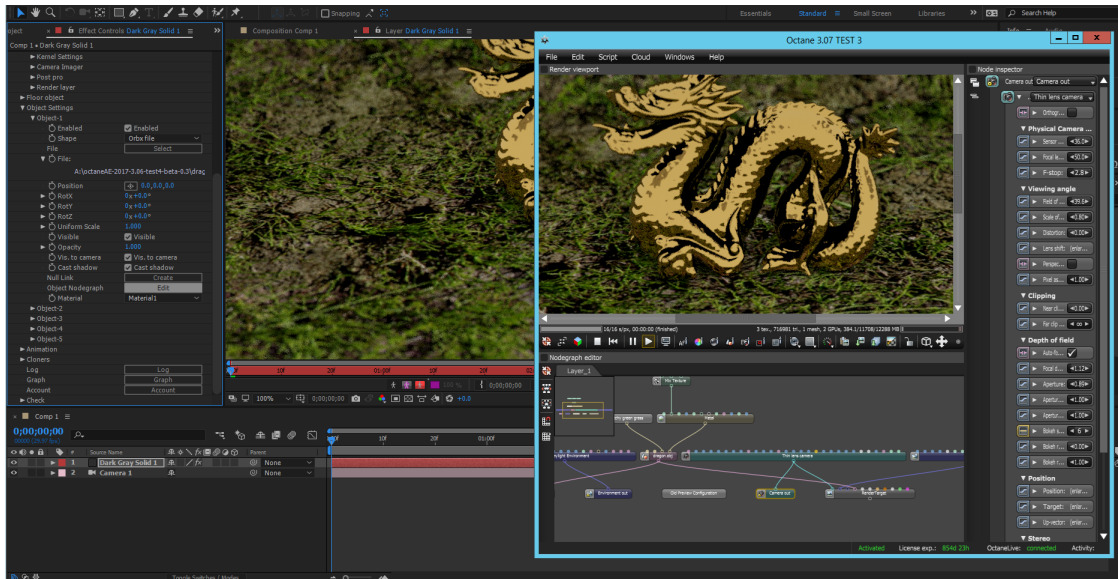




OctaneRender® for After Effects User Manual

Version 3.07 - R2 (Alpha) - Manual publication date: December 2017

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<http://render.otoy.com>

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Installation

- **Hardware**¹ and Software Requirements
- Installing the Plugin
- Authentication and Internet Access

¹Any physical device present in a computer system. A Nvidia GPU is a required hardware device for using the Octane Render engine.

Hardware and Software Requirements

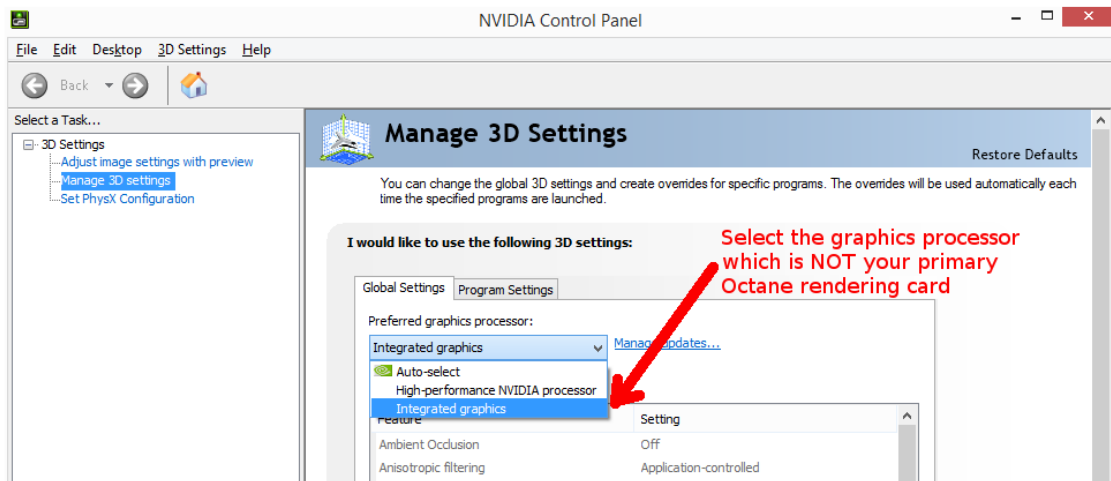
Hardware Requirements

Octane for After Effects requires a NVIDIA graphics card with support for [compute capability 2.0](#). The more CUDA cores available on the GPU¹, the faster renderings will be executed.

Recommended system requirements include:

- GPU: NVIDIA Kepler/Maxwell/Pascal GPU and 4 GB+ VRAM
- GTX 970 or higher recommended
- CPU: Intel i5
- Intel i7 recommended

Due to the high load that After Effects puts on GPU-enabled cards, it is highly recommended that you use your on-board graphics or a second graphics card as the Windows display adapter. When setting up the second card, After Effects may still use the primary Octane rendering card for its GPU processing. To stop this happening, set the Preferred Graphics Processor to the one that is NOT your primary Octane rendering card.



If you do not have an on-board or second graphics card, use the Low Priority Render Priority for rendering with Octane. You can set this on the plugin's Preferences dialog.

If you are running a GTX 690, or multiple graphics cards, it is important to disable SLI in the Nvidia control panel

¹The GPU is responsible for displaying graphical elements on a computer display. The GPU plays a key role in the Octane rendering process as the CUDA cores are utilized during the rendering process.

Drivers

OctaneRender™ is a **CUDA 8** application. It requires a current NVIDIA graphics driver (version 347.x or higher). For the latest drivers, please refer to the NVIDIA Driver Downloads [website](#).

Software Requirements

The plugin does not require OctaneRender™ Standalone Edition to be installed. However, you must own a license for Standalone Edition in order to use the plugin (your Standalone credentials will be requested when you activate the plugin).

- Operating System: Windows 7, 8, 10
- Internet Access for License Verification

Installing the Plugin

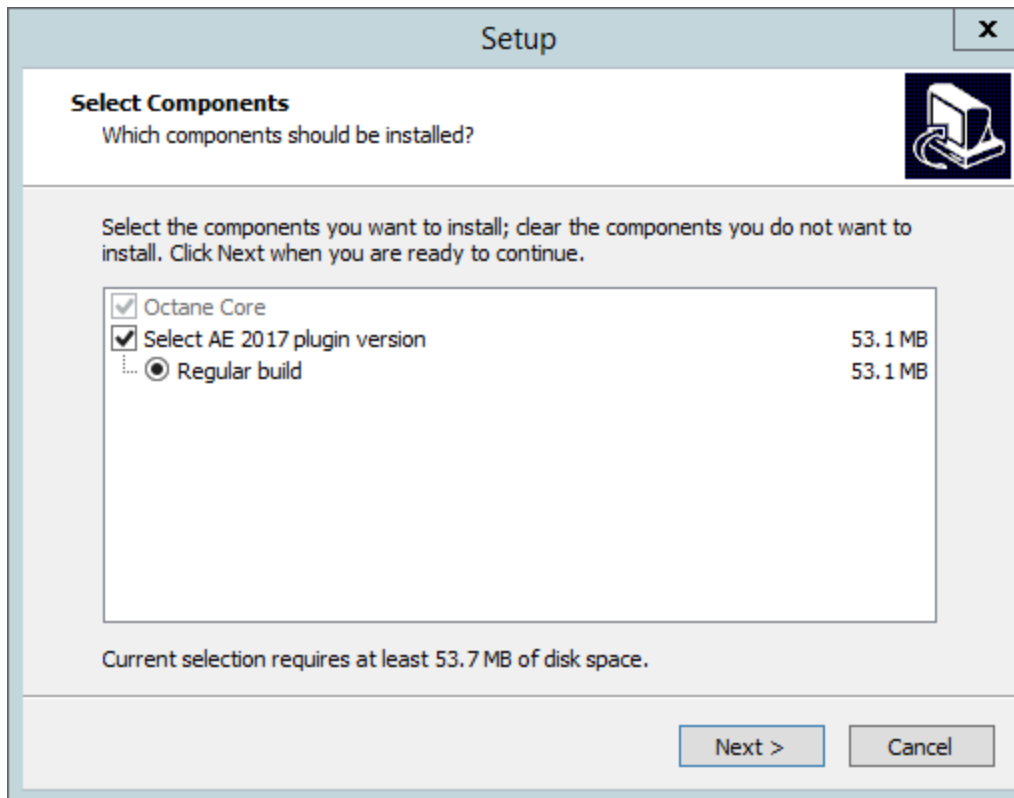
Using The Executable Installer

Once you have After Effects host application installed, you will need to download and install the Octane For After Effects plugin from the client area of the OctaneRender website.

Step 1: Use [this link](#) to access the download page. Ensure that After Effects is not currently running and run the installer.

Note: If you have installed After Effects in a protected location or as another user, you will need to provide administrator rights in order to install Octane For After Effects.

Step 2: The installer should ask for the location of the host application so enter the path to the After Effects application folder. Otherwise, the installer will use the default c:\program files (x86) folder. If the installer does not ask for this path, there may already be an earlier build of the plugin, the installer will overwrite the previous plugin installed.



Step 3: Reload After Effects.

Manual Installation

Step 1: Make sure to uninstall or remove the Octane for After Effects plugin files that are previously installed, if any.

Step 2: Unpack the archived file into a temporary folder. The unpacked contents should have a folder called "Support Files" folder with these contents:

Support Files	
Name	Type
Plug-ins	File folder
octane.dat	DAT File
octane.dll	Application extension
tbb.dll	Application extension
vcomp100.dll	Application extension

This corresponds to the "Support Files" under the host application After Effects installation folder. Copy the following four files into the C:\Program Files\Adobe\Adobe After Effects <version>\Support Files folder:

- octane.dat
- octane.dll
- tbb.dll
- vcomp100.dll

Note: You should make a backup of the original tbb.dll file in case you want to revert and remove the Octane for After Effects plugin.

Step 3: The "Support Files" folder should have a nested folder called "Plug-ins" which contains the "Octane" folder:

Support Files > Plug-ins	
Name	Type
Octane	File folder

Copy the entire "Octane" folder into the C:\Program Files\Adobe\Adobe After Effects <version>\Support Files\Plug-ins folder.

Authentication and Internet Access

Except for the demo versions, all OctaneRender™ editions require authentication with its designated license key and initially requires Internet access to launch. Upon launching OctaneRender™ V3 plugin, Octane will request your [OTOY credentials](#) and will attempt to retrieve an available license from the OctaneLive server.

With OctaneRender V3's sign-on licensing system, there is no need to deal with the actual license keys.

The plugin requires one available Standalone Edition license key plus one available license key for the After Effects plugin. Standalone licenses are bound to one machine, which means that the standalone license can be shared across multiple plugins running on that machine. Also, you may run multiple instances of standalone or a plugin on a single machine using the same license.

Licenses are released (deactivated) when the standalone edition or the plugin is closed, similar to a floating license scheme. In the case of Octane Standalone just the standalone license is released, while plugins will release both Standalone and their respective license. In either case, licenses are just released if there is not another instance of Octane 3.x Standalone or a plugin making use of that specific license. Note the distinctions below between just closing (or exiting) the applications as opposed to actually signing out of the applications.

	Exiting or closing the application	Signing Out
Standalone Edition	Releases the Standalone License Key, except when there is a plugin edition that is concurrently open and still bound to that Standalone License Key.	Releases ALL Octane License Keys bound on that machine. If there are other instances of Octane still running, the user will be asked to exit those before it can sign out and release all Octane Licenses.
Plugin Edition	Releases the License Keys that the plugin is bound to. This includes Standalone License Key, unless the Standalone Edition Application is currently open or if there are other plugins currently open and whose keys are still bound to the same Standalone License Key on the same machine.	Releases ALL Octane License Keys bound on that machine. If there are other instances of Octane still running, the user will be asked to exit those before it can sign out and release all Octane Licenses.

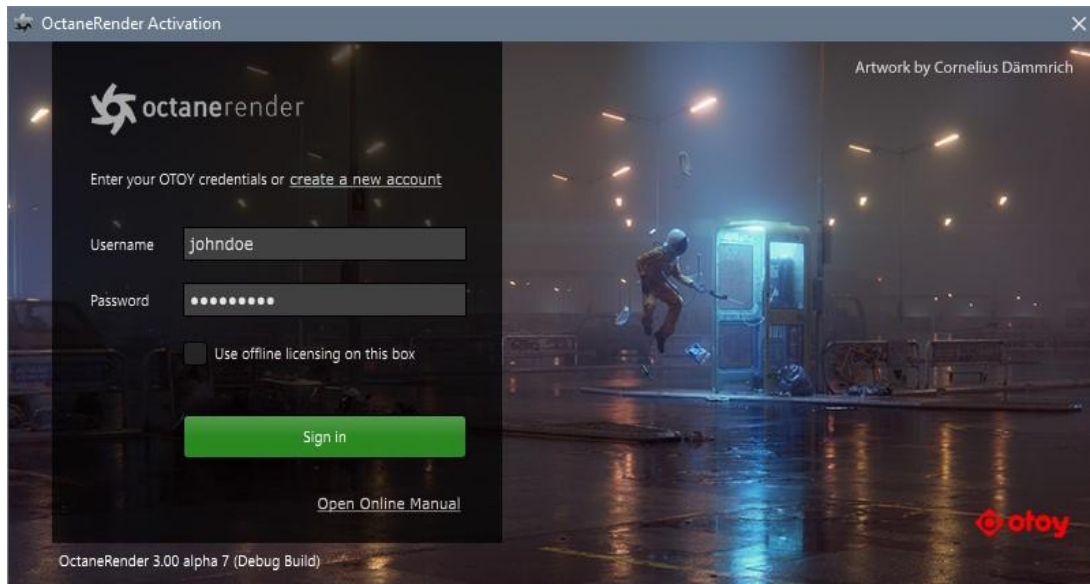
As indicated above, deactivation via [the Octane live licenses administration page](#) is not necessary as this is done automatically by the application. This allows you to use Octane somewhere else without explicitly releasing (deactivating) any licenses. Note that for licenses currently in use by older versions you will still see the 'Deactivate' option as they need to be explicitly released.

If the V3 application has closed abnormally and has not gone through the normal process of exiting, such as a crash, there is a chance that the releasing mechanism is skipped and the license ends up not getting released. If the same machine will be used subsequently to access the same keys, this is not a problem as the same keys are still bound. The problem only arises when the user tries to use Octane on another machine as the keys

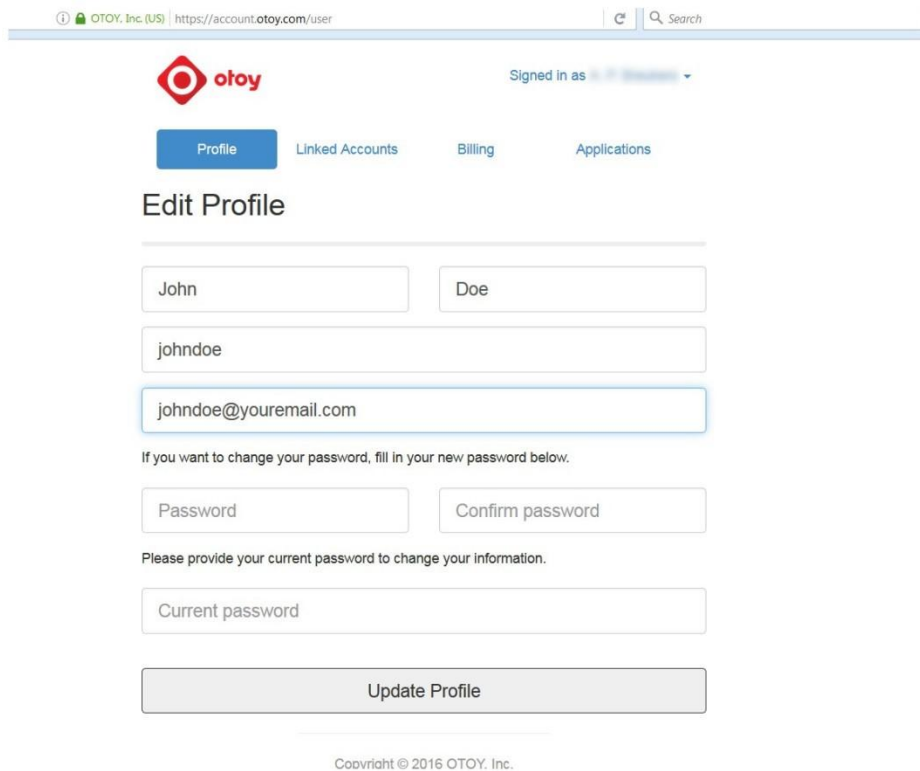
would still bound to the previous machine. In such cases, The Fail Safe Web Deactivation may be used to unbound the key/(s).

Sign-in

When you open Octane 3 for the first time you will be prompted with a sign in screen like this:



Your OTOY credential is the same one you use when you login to this page: https://account.otoy.com/sign_in



At this point, the single sign on and licensing system will pull a valid license key from your account on OTOY's secure server.

If Octane detects a connection problem, ensure that all communications via HTTPS (TCP port 443) are allowed for the following:

- Standalone Edition
- Standalone Edition Daemon
- Your After Effects Host Application

The above may require updating the firewall settings. If the issue persists it is also advisable to check your proxy settings. Please refer to the section on HTTP **Proxy**¹ Support on this reference manual.

¹An object saved as a separate file with the purpose of being reused in larger scenes. This is used to minimize any addition to the total polygon count in the scene, especially if the scene requires the same object to appear several times. If used in conjunction with instancing, Proxies help keep very large scenes from reaching polygon limits and also keeps the relative file size of the main project file manageable.

Upon successfully signing in, Octane will keep a session alive as long as there's a continuous usage of Octane or an Octane plugin, so in most of cases there should no need to re-login. This session will also allow users to link their local installation to other OTOY services such as ORC.

Sign-out

In order to close a session, the user may choose to sign out via the **Account** button on the **OctaneRender Effect controls**. This will close the current session and release all licenses bound to the current machine. If any plugin or a standalone instance are running at that time, they should be closed before continuing with the sign-out process.

Limitations

Here are the limitation in the alpha test versions:

- Please note that this version is in development and not yet fully supported for After Effects CC 2018.
- Objects accept only .orbx files.
- Under and Octane Render Effect, only object-1, object-2 are supported in the Node Graph Edit.
- The alpha test version is built against SDK 3.07, however, some 3.07 features are not yet implemented in the plugin.

Overview of Octane for After Effects

The integration of Octane in After Effects includes the following:

- Render **ORBX**¹ scenes created with Octane Standalone or any of the Octane plugins. Any animated geometry or camera data from the ORBX file (in an ABC Scene Node) is tied to the After Effects timeline, so scrubbing the timeline will move the Octane time to the relevant point.
- Edit Octane materials and render settings via the Octane NodeGraph editor window. Changes made in the NodeGraph window update immediately in the After Effects viewer.
- Live updating of other After Effects elements transform changes to the Octane scene (and the After Effects Viewer). So if you make changes on an After Effects element, Octane picks the change up immediately – no need for a scene refresh.
- Access all Octane **Render Passes**².
- Import Octane geometry (with embedded ABC and OBJ Mesh nodes) into the After Effects project scene for visualization purposes.
- Render animation sequences via the Octane node as you would with the After Effects Timeline.
- Focus, **Material**³ and White Balance are supported.

¹The ORBX file format is the best way to transfer scene files from 3D Authoring software programs that use the Octane Plug-in such as Octane for Maya, Octane for Cinema 4D, or OctaneRender Standalone. This format is more efficient than FBX when working with Octane specific data as it provides a flexible, application independent format. ORBX is a container format that includes all animation data, models, textures etc. that is needed to transfer an Octane scene from one application to another.

²Render passes allow a rendered frame to be further broken down beyond the capabilities of Render Layers. Render Passes vary among render engines but typically they allow an image to be separated into its fundamental visual components such as diffuse, ambient, specular, etc..

³The representation of the surface or volume properties of an object.

Octane For After Effects Interface Overview

Once Octane For After Effects is loaded, the Octane features become available on the Project Panel as an Octane Effect on a Solid Layer. The After Effects workspace may be customized to a layout that is most useful to the user.

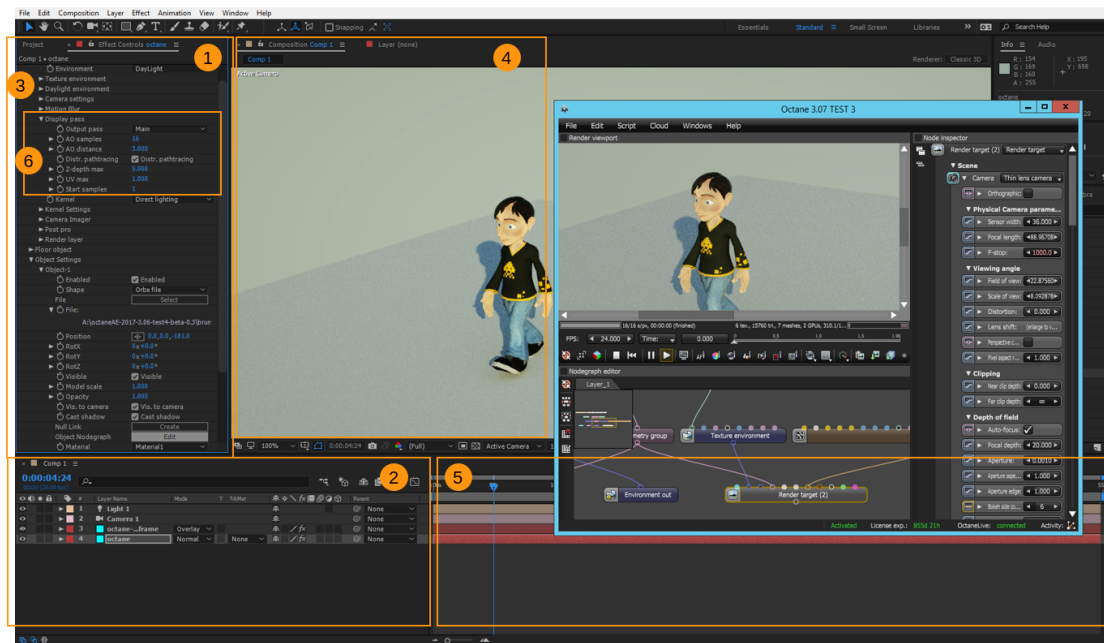


Figure 1: The After Effects interface with Octane For After Effects loaded.

Important areas in the After Effects interface when working with Octane For After Effects:

- **(1) Project Panel** — This shows the current project in an outline format and will also contain the Octane Effect Controls.
- **(2) Layer Panel** — This shows all the layers in the current composition.
- **(3) Effect Controls** — The Octane Render Target's parameters can be accessed here.
- **(4) Composition Panel** — The render is constantly updated in this Viewport window, which also displays the render's progress.
- **(5) Timeline** — Controls for working in the Viewport.

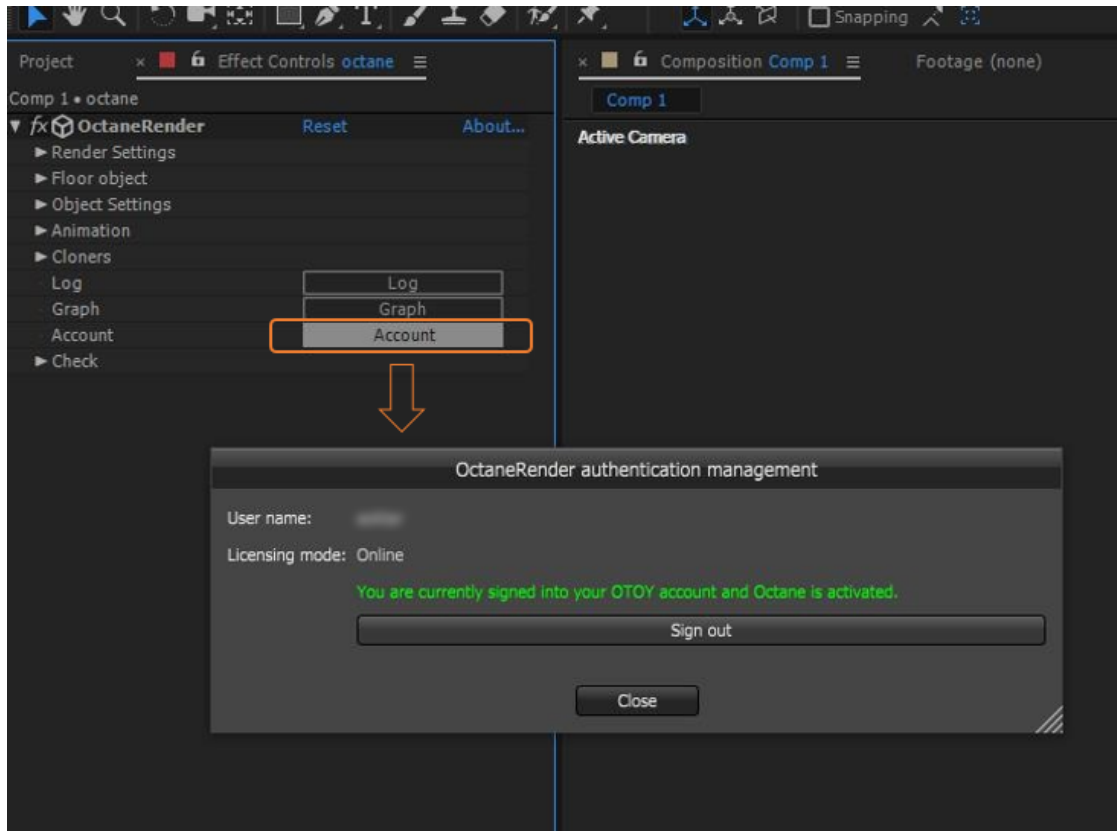
- **(6) Pass Selection** — If Octane **Render Layers**¹ and **Render Passes**² are enabled, each pass may be viewed through the drop down menu. Otherwise, only the beauty/main pass is shown by default.

¹Render layers allow users to separate their scene geometry into parts, where one part is meant to be visible and the rest of the other parts “capture” the side effects of the visible geometry. The layers allow different objects to be rendered into separate images where, in turn, some normal render passes may be applied. The Render layers are meant for compositing and not to hide parts of the scene.

²Render passes allow a rendered frame to be further broken down beyond the capabilities of Render Layers. Render Passes vary among render engines but typically they allow an image to be separated into its fundamental visual components such as diffuse, ambient, specular, etc..

Account

This provides the user access to the OctaneRender Authentication Management window.



The OctaneRender Authentication Management window allows the user to close the current session and release all licenses bound to the current machine.

The Octane Interface And The Octane Node Graph

The standalone OctaneVR application is prevalent in the current version of Octane For After Effects. The Octane Interface window contains the Octane **Nodegraph Editor** pane and the **Node Inspector** pane which is where Octane-specific materials can be edited. Furthermore, most Octane-specific assets added to an After Effects Object Setting can be edited in the Octane Nodegraph Editor as well.

Any changes made to the Octane scene are saved by the plugin.

The Octane Interface window can be accessed from the OctaneRender Effect Controls and clicking on the **Object Settings > Object > Object NodeGraph > Edit** button (Figure 1).

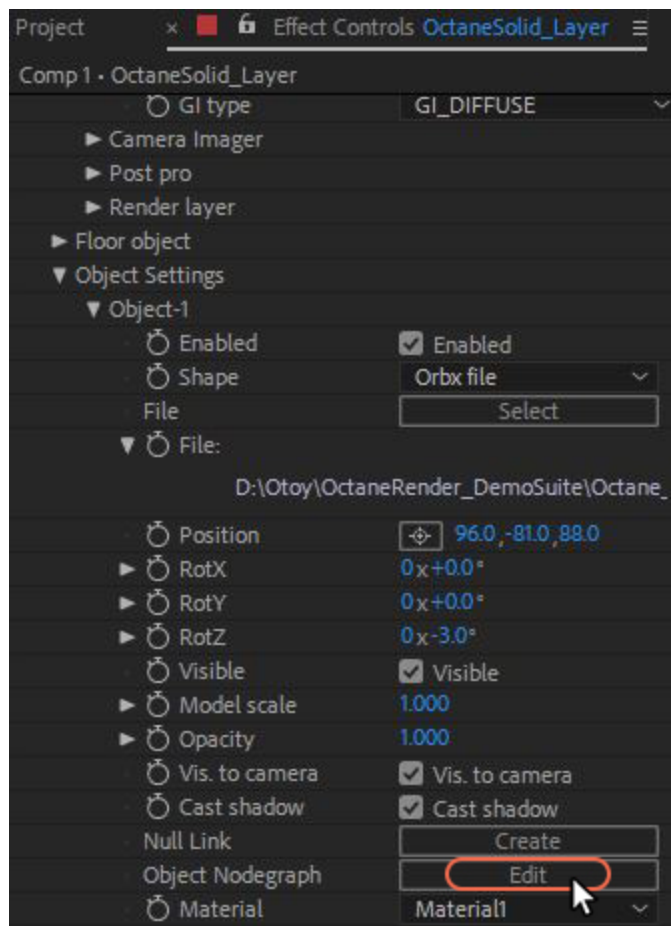


Figure 1: Accessing the Octane Interface window from the Octane Effect Controls.

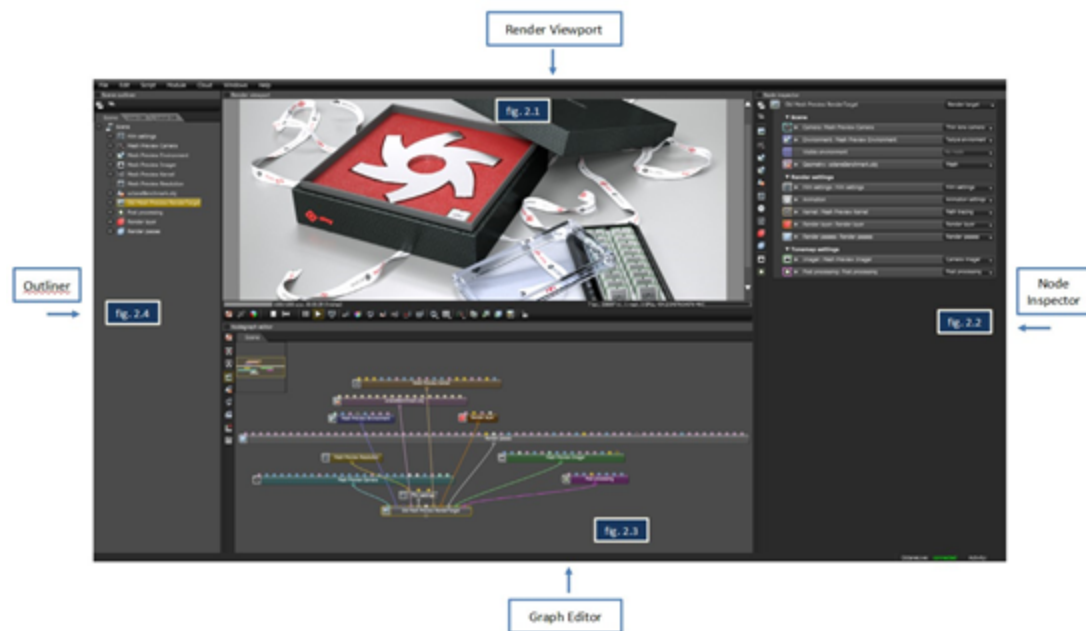
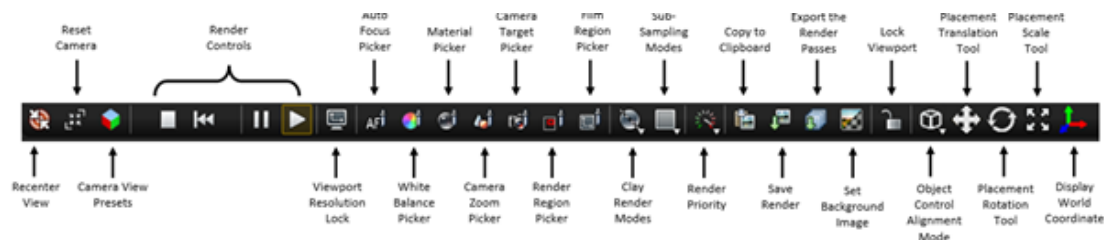


Figure 2: The OctaneVR¹ Interface.

The Render Viewport (fig. 2.1)

The render is constantly updated in the Render Viewport. The scene can be navigated in real-time. Adjustments to materials, lights, and camera can be made and viewed interactively.

The Render Viewport contains icons located at the bottom of the window that allow the user to control several aspects of the render process.



¹Immersively engaging and experiencing depth perception in a three dimensional scene through stereo vision goggles and head-mounted displays.

A thorough description of the functions of each Icon is found in the Standalone Edition User Manual under [Navigating the Viewport](#) section.

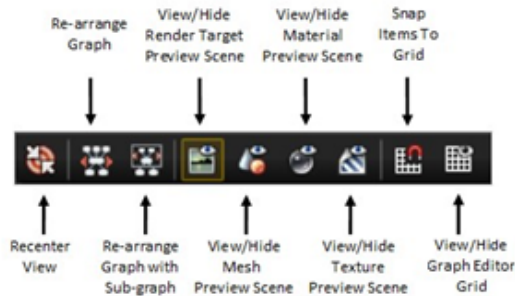
The Node Inspector (fig. 2.2)

The Node Inspector allows the user to make changes to the various settings in the scene, lighting, and material nodes.

The Graph Editor (fig. 2.3)

The scene and materials are represented by nodes in OctaneRender™. This allows for powerful material editing as well. Don't be scared if you don't know how to use nodes because great renders can still be produced without needing to use them.

The Node Graph Editor has buttons that allow the display of the internal material preview scene when a node is selected.



The Scene Outliner (fig. 2.4)

The Outliner allows the user to see an overview of all the elements in the scene and also allows them to use the local and online node databases.

For more information and a more thorough discussion on how to work in the Octane Interface window, refer to the [OctaneRender Standalone](#) documentation available on OTOY's website.

What is the ORBX Format

The **ORB¹** file format is the best way to transfer scene files from 3D Authoring software programs that use the Octane Plug-in such as Octane for Maya, Octane for Cinema 4D, or OctaneRender Standalone. This format is more efficient than **FB²** when working with Octane specific data as it provides a flexible, application independent format.

ORB is a container format that includes all animation data, models, textures etc. that are needed to transfer an Octane scene from one application to another. ORBX files can be imported via the Octane Effect Controls **Object Settings** (Figure 1).

¹The ORBX file format is the best way to transfer scene files from 3D Authoring software programs that use the Octane Plug-in such as Octane for Maya, Octane for Cinema 4D, or OctaneRender Standalone. This format is more efficient than FBX when working with Octane specific data as it provides a flexible, application independent format. ORBX is a container format that includes all animation data, models, textures etc. that is needed to transfer an Octane scene from one application to another.

².fbx (Filmbox) is a proprietary file format developed by Kaydara and owned by Autodesk since 2006. It is used to provide interoperability between digital content creation applications. As of Octane 3.07, a scene node will also be available as an FBX file, allowing for quick and easy transport of assets from industry standard DCC applications

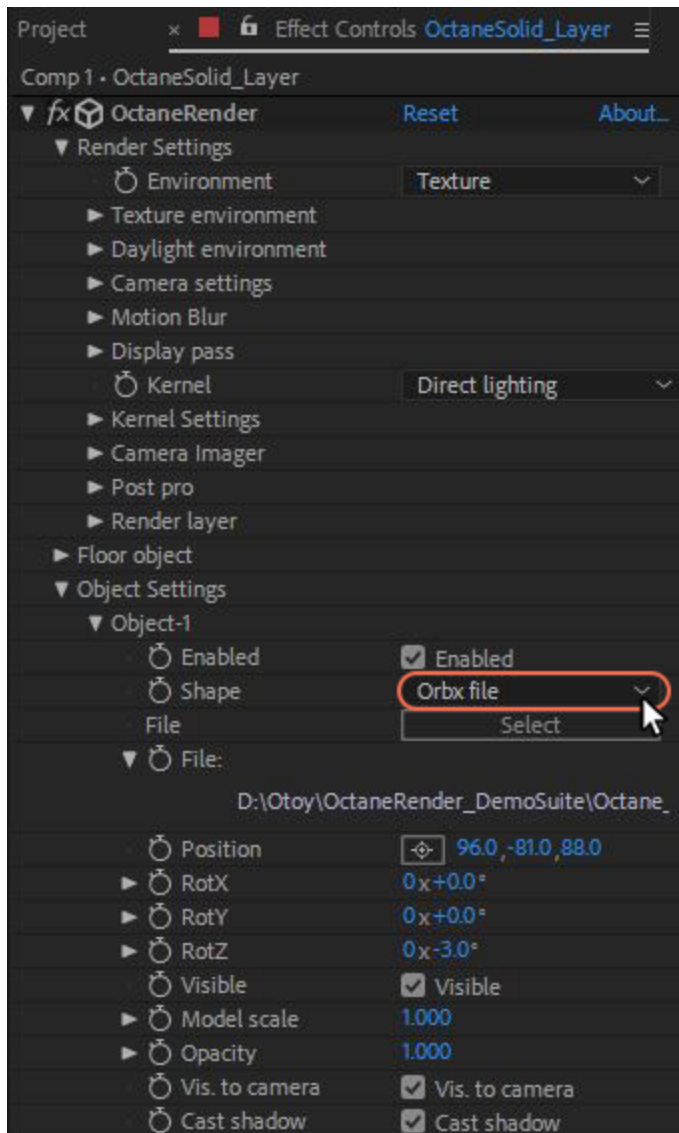


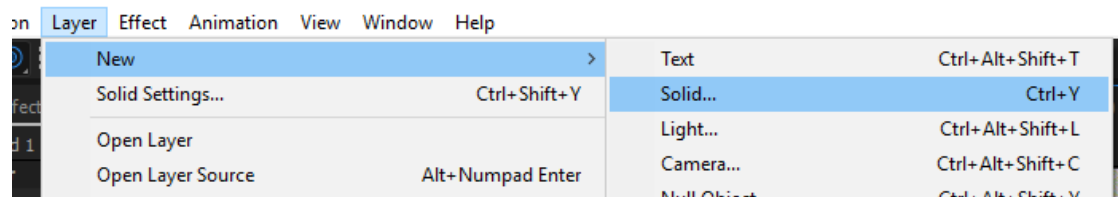
Figure 1: Adding an ORBX file via the Object Settings.

Importing an Octane Scene Into Your After Effects Project

On a current composition, all Octane elements including **ORBX**¹ packaged scenes can only exist in After Effects on a Solid Layer.

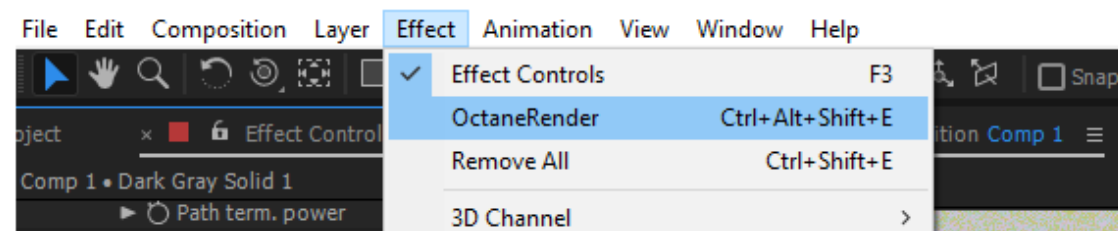
Step 1: Create a Camera on the current composition.

Step 2: Create a Solid Layer on the current composition.



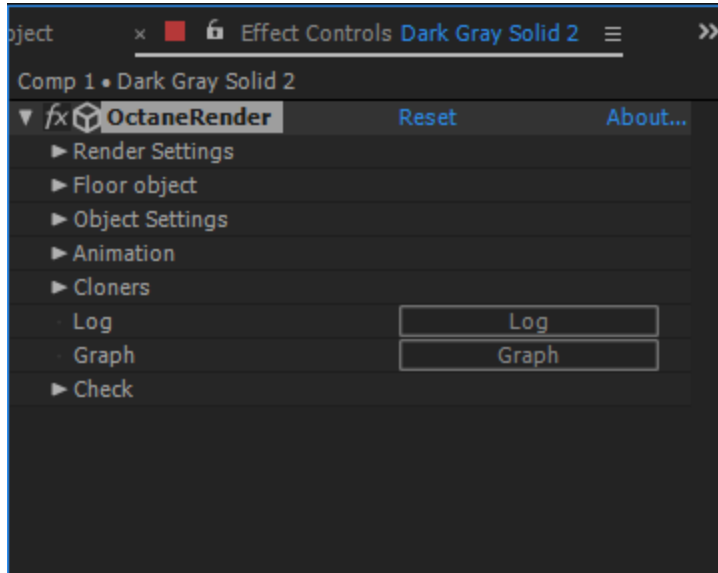
Note: You can use several OctaneRender Effects on different Solid Layers.

Step 3: Click anywhere on the Composition Panel to be able to access the Effects Controls, and create an OctaneRender Effect

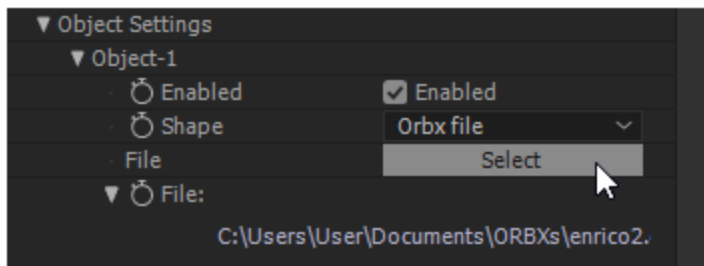
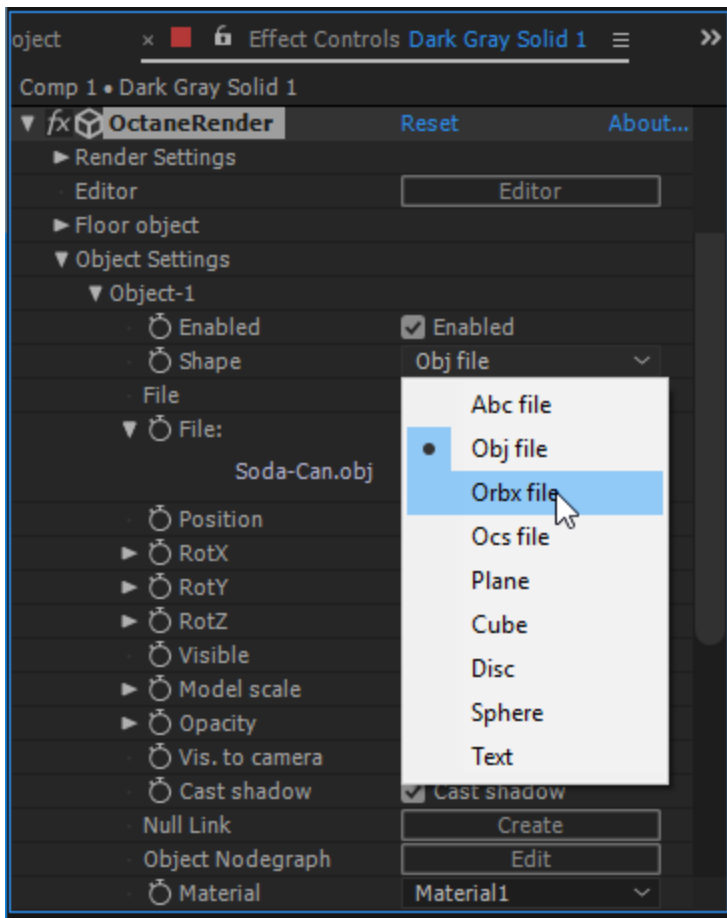


¹The ORBX file format is the best way to transfer scene files from 3D Authoring software programs that use the Octane Plug-in such as Octane for Maya, Octane for Cinema 4D, or OctaneRender Standalone. This format is more efficient than FBX when working with Octane specific data as it provides a flexible, application independent format. ORBX is a container format that includes all animation data, models, textures etc. that is needed to transfer an Octane scene from one application to another.

This provides access to most of the primary features and parameters related to the rendering process available for Octane in After Effects. These features and parameters will be covered in greater detail later on.

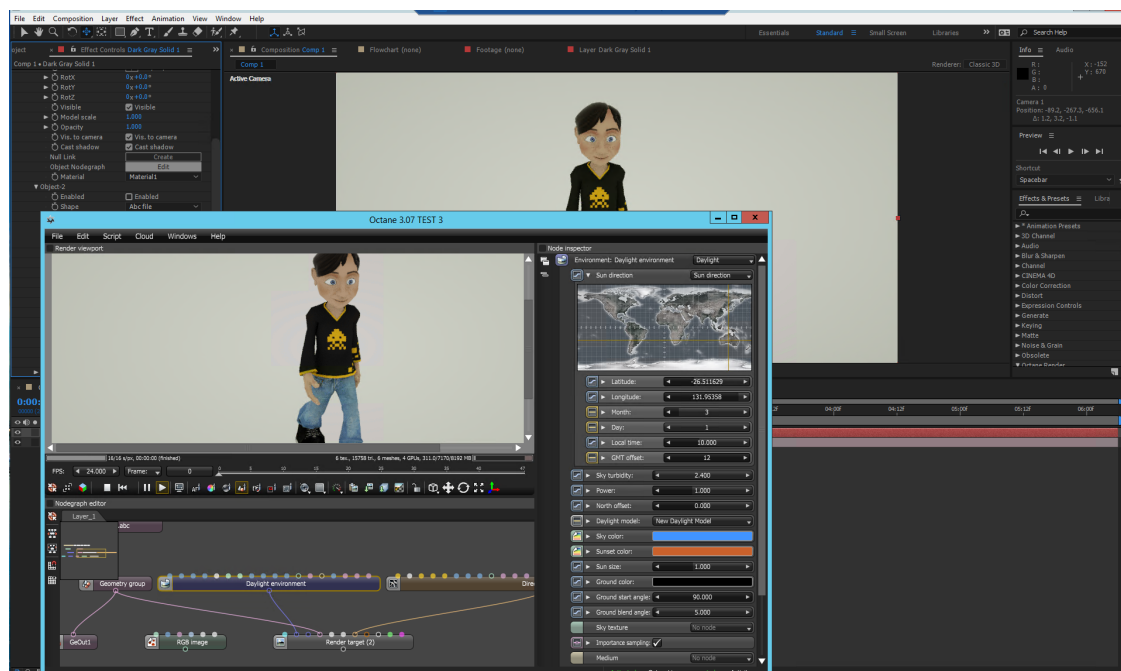
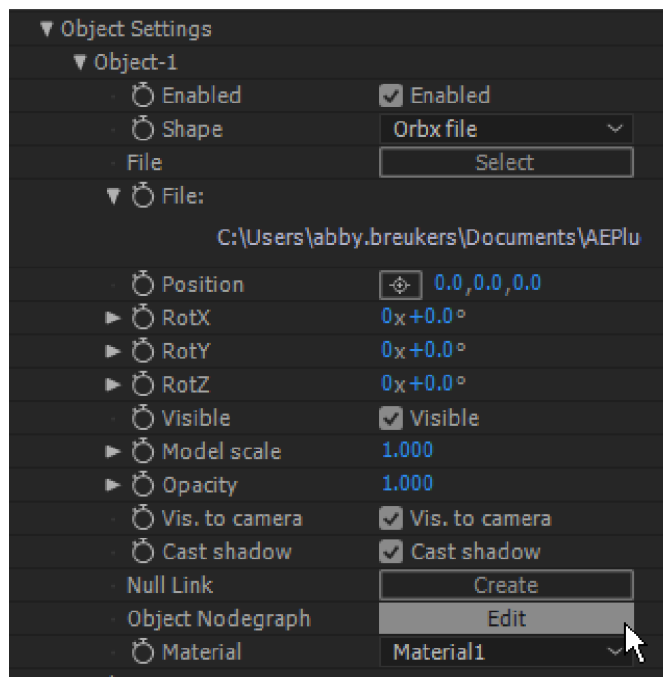


Step 4: Load an Octane packaged scene (.orbx) by specifying it as the respective Shape type of the object and then click on 'Select' to locate the scene file. There are also After Effects native objects available.

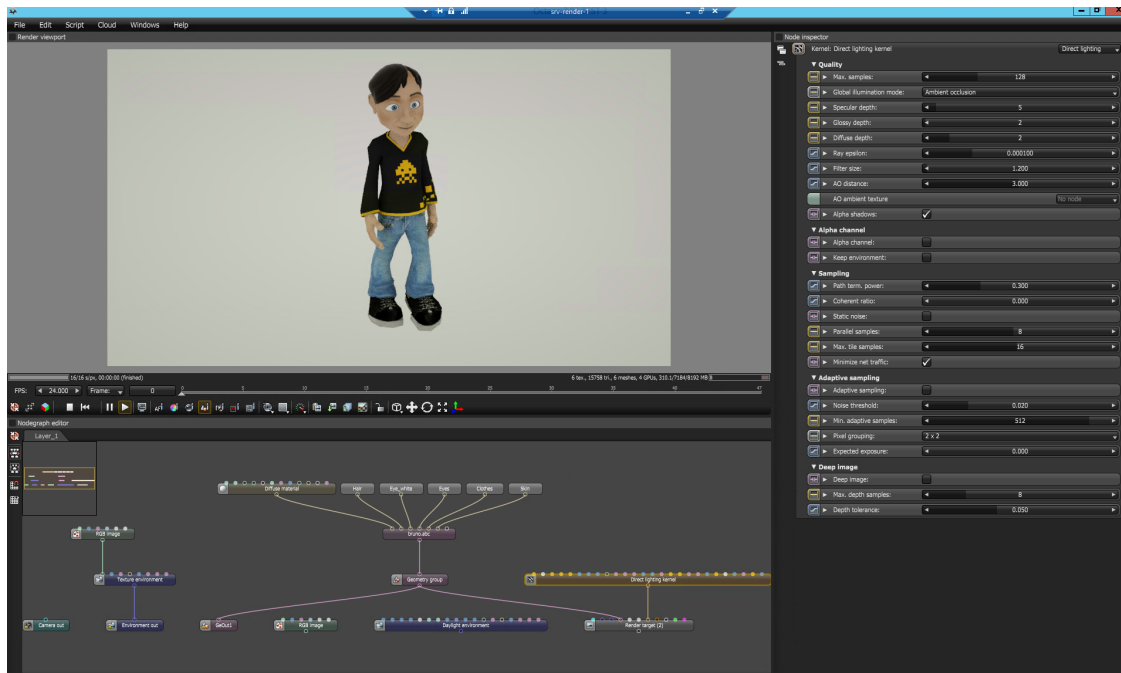


Step 5: As the scene is iteratively and continuously rendering with the OctaneRender engine on the Composition Panel, you can start compositing as usual in After Effects and also re-adjust Octane-specific attributes through the Octane Node Graph.

The Octane Node Graph can be accessed from the Object's **Object NodeGraph"> Edit** button.



Details and basic steps to setup Octane scenes within After Effects and other tools will be discussed in the subsequent sections of this manual.



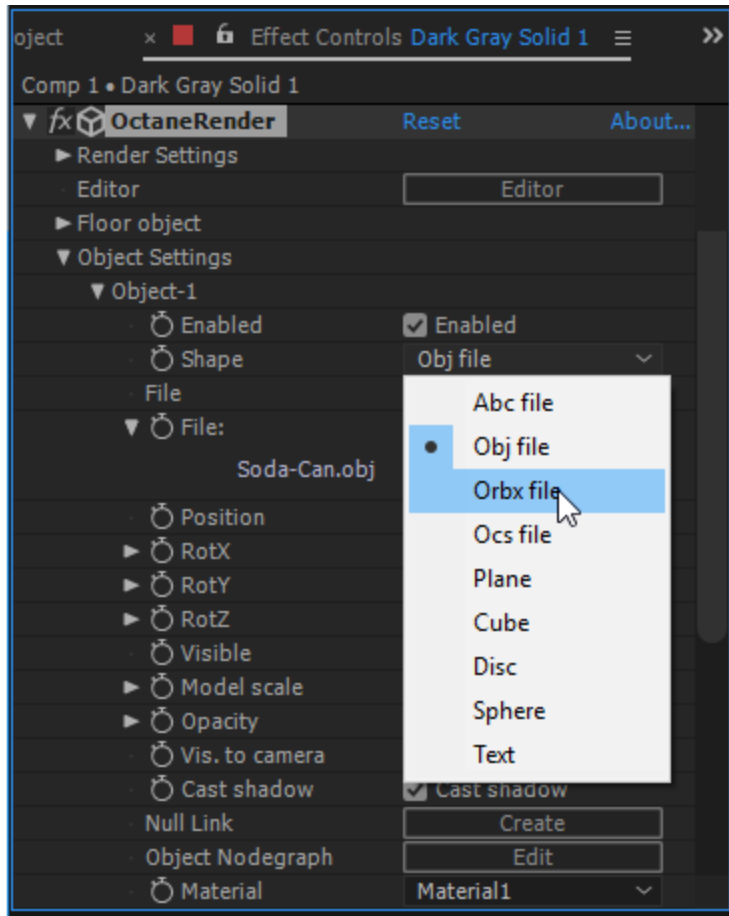


Figure 1: Importing and Exporting ORBX files is done by specifying the Octane Effect Controls **Object Settings > Object > Shape** and then locating the file through **Object Settings > Object > File Select** button.

Materials

Octane For After Effects integrates the OctaneVR Standalone Interface along with all its elements and materials, providing After Effects users the ability to harness the power of OctaneVR's node-based editing system.

There are five types of materials in Octane which can be applied to surfaces to achieve a variety of surface appearances and rendering effects.

- **Diffuse**¹ — Used for rough, non-reflecting materials, as well as light emitting meshes.
- **Glossy**² — Used for shiny materials such as plastics or metals.
- **Specular**³ — Used for transparent materials such as glass and water.
- **Mix** — Used to mix any two material types.
- **Portal**⁴ — Used to designate openings in scenes to allow the render kernel to better sample light from those areas.

¹Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

²The measure of how well light is reflected from a surface in the specular direction, the amount and way in which the light is spread around the specular direction, and the change in specular reflection as the specular angle changes. Used for shiny materials such as plastics or metals.

³Amount of specular reflection, or the mirror-like reflection of light photons at the same angle. Used for transparent materials such as glass and water.

⁴A technique that assists the render kernel with exterior light sources that illuminate interiors. In interior renderings with windows, it is difficult for the path tracer to find light from the outside environment and optimally render the scene. Portals are planes that are added to the scene with the Portal material applied to them.

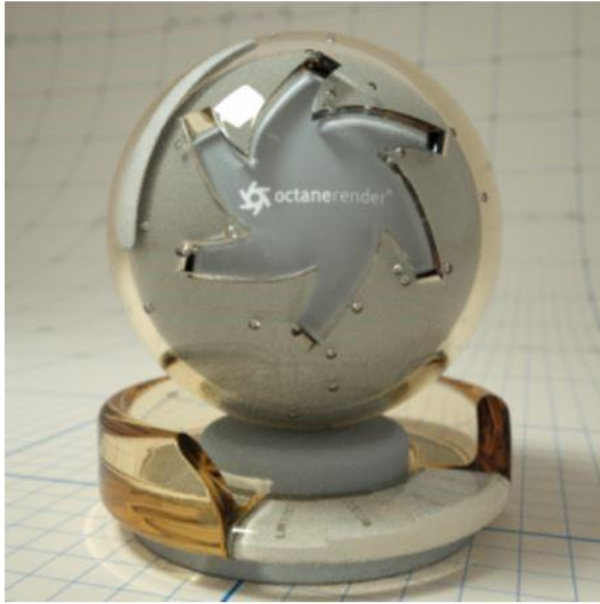


Figure 1: A sample render of the Octane *Specular material*¹.

Materials² can be accessed via the OctaneVR **Nodegraph Editor**.

Opening the Nodegraph via the Object Settings

This allows users to edit existing materials and also create new materials by working with the Octane node tree in the Octane Interface. To do this, click on **Object Settings > Object > Object Nodegraph > Edit** button (figure 2).

¹Used for transparent materials such as glass and water.

²A set of attributes or parameters that describe surface characteristics.

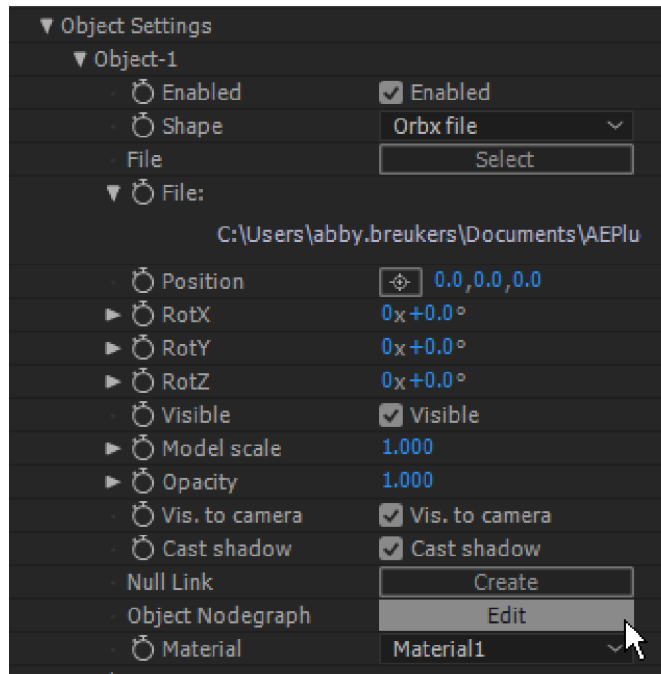


Figure 2: Access Materials via the Object Nodegraph.

Once the Octane Interface is opened, existing materials can be edited or new materials can be created. Right-click on an empty area in Octane’s **Nodegraph Editor** to invoke the context menu, hover on **Materials** to see the five Octane native materials available (figure 3).

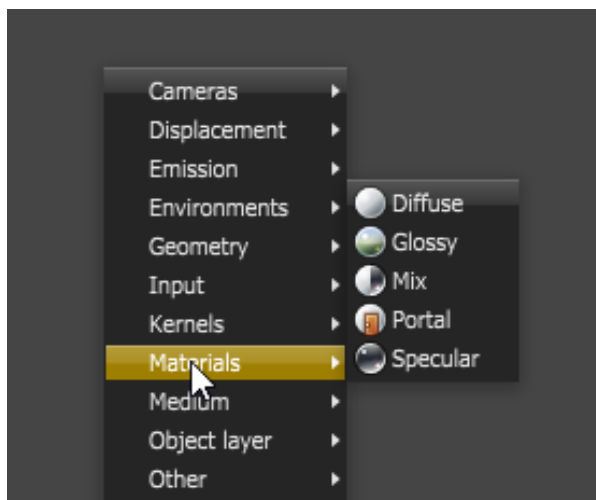
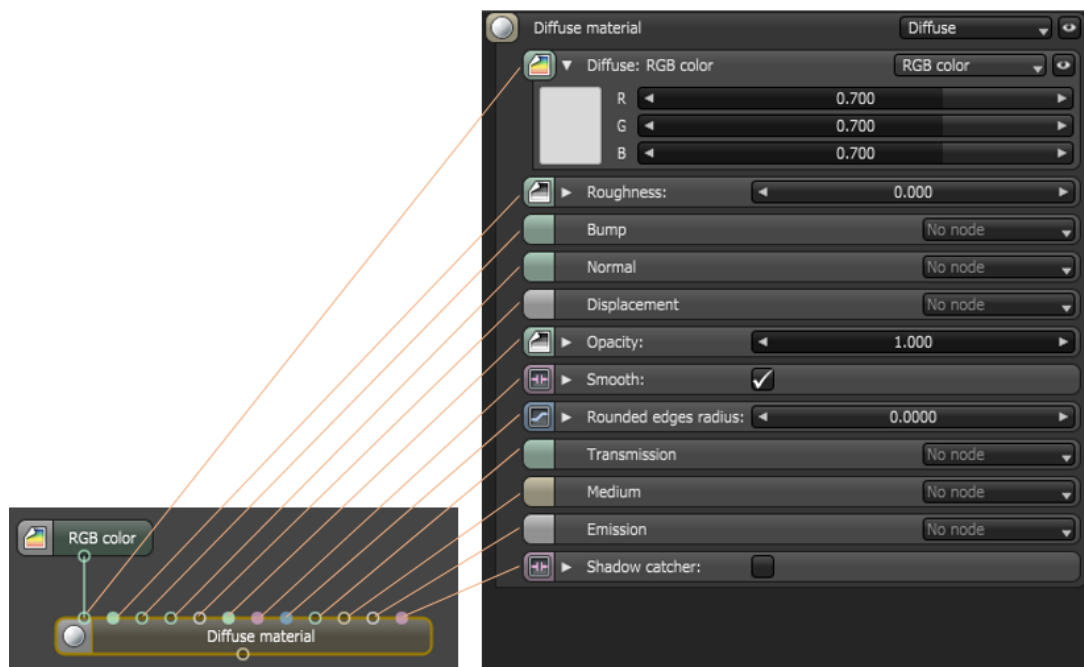


Figure 3: Accessing the Octane material types from the Nodegraph Editor.

Creating Octane Materials

An Octane **Material**¹ is basically a node with some inherent attributes and some textures attached to it. The number of attributes may differ for each type of basic material. For example, the attributes of a **Diffuse**² Material are shown below.

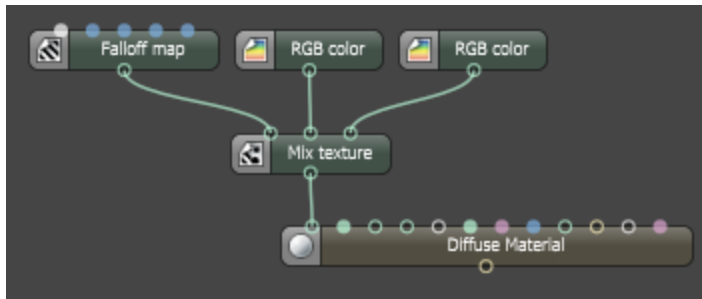


An input of the node can be an immediate value (e.g. RGB-texture or Float-texture as default if no connection to this attribute exists), or sub-texture. More complex materials can be created by applying an assembly of procedural textures and texture maps.

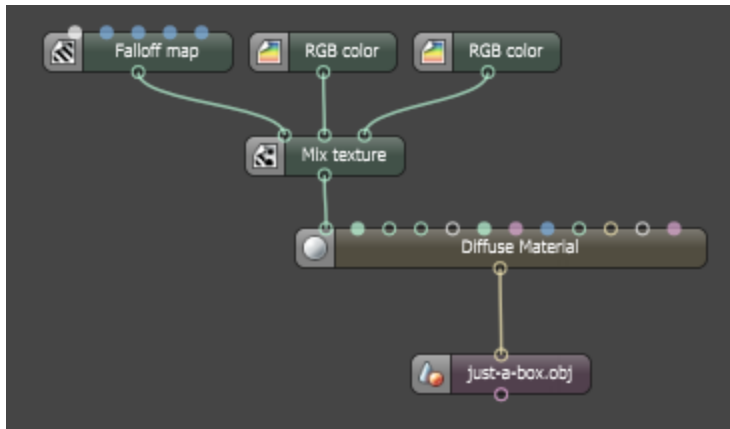
Example 1:

¹The representation of the surface or volume properties of an object.

²Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.



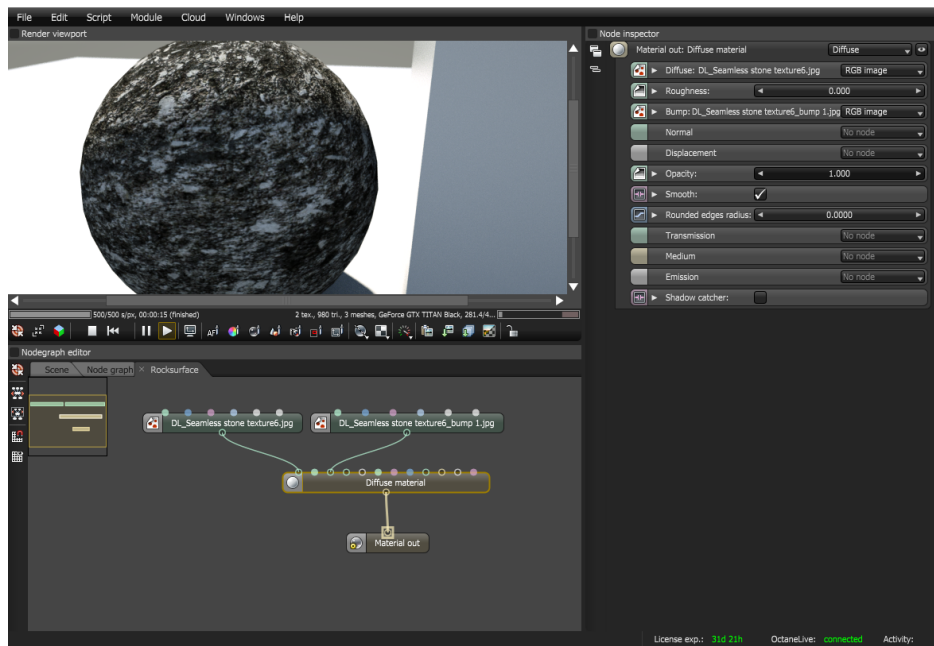
Connecting two RGB Color nodes to a Mix node which is then connected to the Diffuse input of a **Diffuse material**¹.



The material is then applied by connecting the node to the specific geometry.

Example 2

¹Used for dull, non-reflecting materials or mesh emitters.



Using an image texture for the Diffuse and a bump map to enhance some details.

Diffuse Material

The **Diffuse**¹ material is used for dull, non-reflecting materials or light emitting surfaces. The **Diffuse** material simulates a rough surface that reflects light back into the environment in all directions, thus specular highlights and reflections do not appear on diffuse surfaces.

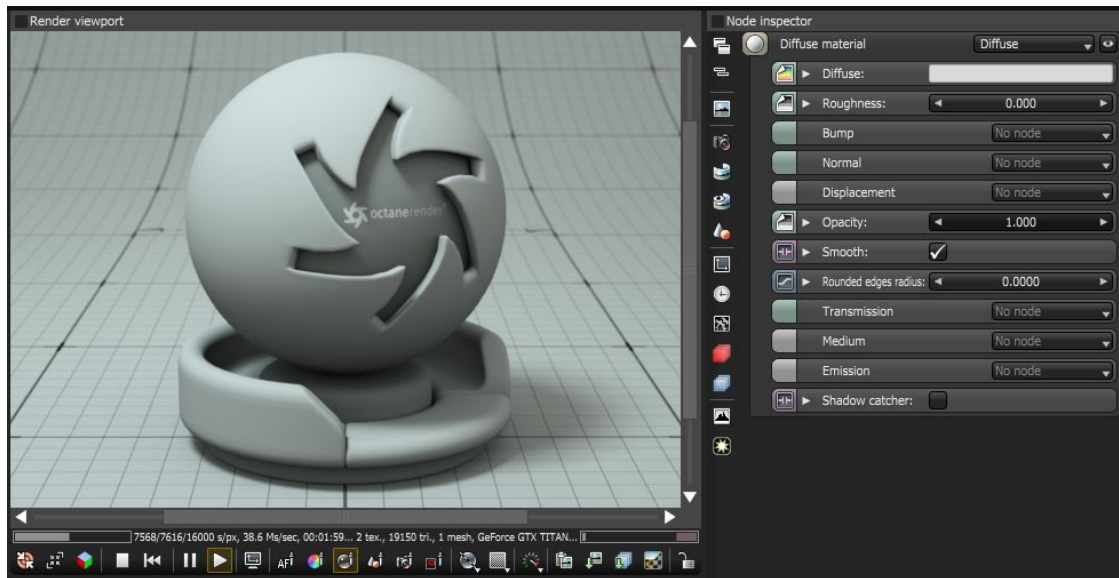


Figure 1: The Diffuse material² and its associated parameters.

Diffuse Materials³ have these parameters to adjust:

Diffuse

The Diffuse value gives the material its color.

Transmission⁴

The Transmission value gives the basic texture of the material.

¹Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

²Used for dull, non-reflecting materials or mesh emitters.

³A set of attributes or parameters that describe surface characteristics.

⁴A surface characteristic that determines if light may pass through a surface volume.

Bump / Normal

Both the Bump and Normal channels can load images to control the amount of bump mapping and normal mapping. The Bump channel is set to Greyscale Image to load a bump map. The Normal channel should be set to the image data type to load a full color normal map. The Bump channel simulates a relief using a greyscale texture interpreted as a height map while the Normal Channel distorts normals using an RGB image. Note that Normal maps take precedence over bump maps, therefore you cannot use both a normal map and a bump map at the same time.

Opacity

Opacity sets the transparency of the material. Set the data type to alphaimage (if the image has an alpha channel) or floatimage (for black/white images) to load an image to set the transparency (use the Invert checkbox if necessary to adjust whether black or white regions are considered transparent).

Smooth

Normal Smoothing is a Boolean value that sets whether to smooth the normals of all meshes sharing that material. When off, the materials can be faceted and polygonal.

Emission

The Emission setting controls whether the material acts as a light source.

Medium (**Absorption**¹ or **Scattering**²)

Octane has two types of mediums, absorption and scattering, which can be used to create translucent surfaces. To use these options the **Medium** input of a **Specular**³ material needs to be connected to either the **Absorption** or **Scattering** medium nodes. This sets the medium inside the material.

Absorption Medium

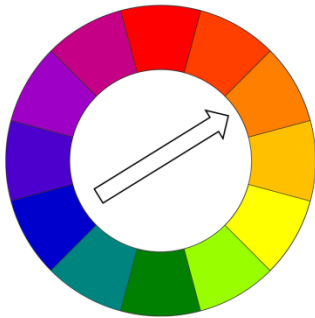
Absorption means that the material slightly absorbs light while passing through. The color resulting from this absorption is dependent on the distance light travels through the material. With increased distance it will get darker, and if the absorption is colored it will get more saturated. It works in a subtractive way, so users will need to configure the inverted color instead to get an absorption color desired.

¹Defines how fast light is absorbed while passing through a medium.

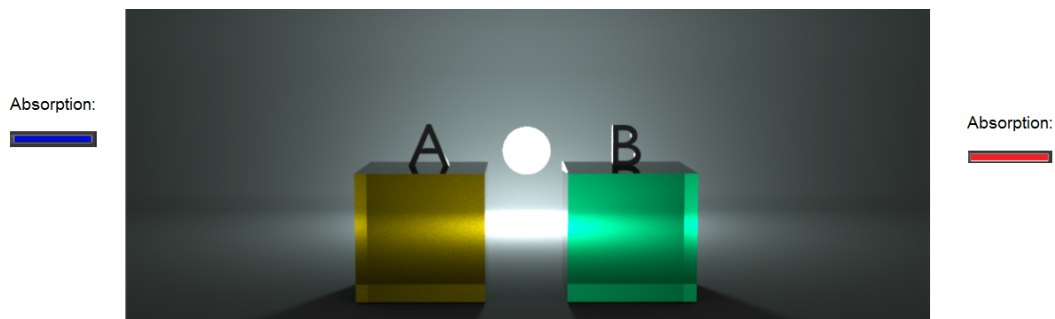
²Defines how fast light gets scattered when traveling through the medium.

³Amount of specular reflection, or the mirror-like reflection of light photons at the same angle. Used for transparent materials such as glass and water.

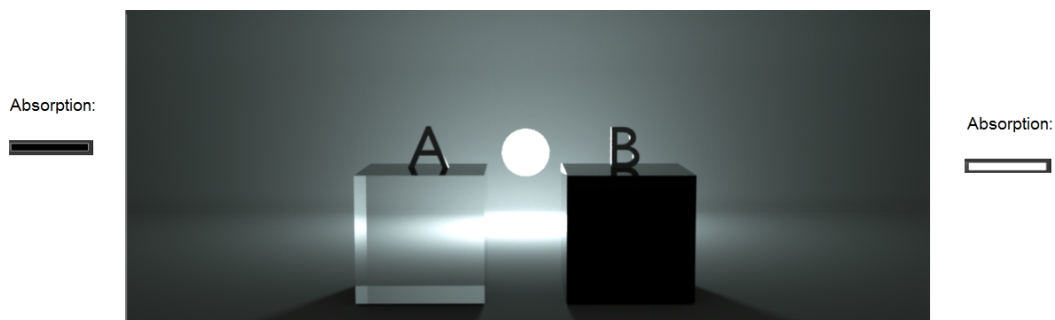
Absorption works in a subtractive way so if the absorption is colored and provided that the transmission value of the material is white (allowing all light to pass through), the resulting color of the material is the complementary color of the absorption node based on the color wheel:



Example 1: The absorption color used in Box A is blue, the absorption color used in Box B is red.



Example 2: The absorption used in Box A is black, the absorption used in Box B is white. Given that the transmission color of the material on both boxes is white, the material in Box B shows no transmission of light at all because this is subtracted entirely by the white absorption.



Scattering Medium

Similar to the absorption medium but with the option to simulate subsubsurface scattering. This is a medium with single-scattering SSS, and also absorption. To use this medium, a volume needs to be created and it will not work correctly on simple surfaces. Users can use it to create true unbiased SSS, using various parameters, including scattering texture, emission texture and various other parameters. Note that this is single-scattering SSS, not multiple-scattering. It is much faster than the latter, and much more practical, although it does not allow a few things such as volumetric caustics.

The scale parameter in both mediums multiplies the absorption texture, allowing a wide range of values to be set more easily.

For applying absorption, SubSurface Scattering, and Emission refer to section on [Medium Nodes](#) in the Standalone Manual.

Matte

This switches the material to a shadow catcher. The material will be transparent unless there is some (direct) shadow cast onto the material which will make it less transparent depending on the shadow strength.

Edges Rounding

This is the radius of the rounded edges that are rendered as a shading effect. The shading effect is created at render time that easily and efficiently round the sharp edges of geometric objects without modifying and reloading the geometry. The parameter is a float value and requires vertices to be welded prior to applying the round edge value. This is very useful to virtually bevel hard edges during render time especially when using low-polygon models.

Displacement¹

The displacement mapping allows the height of points on a surface to be adjusted based on an image value to give objects depth and detail. The displacement is a pin in the material nodes that needs to be connected to a displacement node. A displacement texture can be specified in the displacement node, as well as the amount of displacement (in meters), the offset (in meters) and the level of detail (i.e. the maximum resolution of the resampled displacement map). Image textures are supported and of RGBA images the red channel is used as height map.

Displacement only works with the texture image node over a mesh with an UV map. No other Octane nodes can be used for displacement.

¹The process of utilizing a 2D texture map to generate 3D surface relief. As opposed to bump and normal mapping, Displacement mapping does not only provide the illusion of depth but it effectively displaces the actual geometric position of points over the textured surface.

Roughness

This parameter allows users to simulate very rough surfaces like sandpaper or clay. It works similar to Oren-Nayer. Roughness is set to the minimum (0) by default.

Glossy Material

The **Glossy**¹ material is used for shiny materials such as plastics or metals.



Figure 1: The **Glossy material² and its associated parameters.**

Glossy materials have these parameters to adjust:

¹The measure of how well light is reflected from a surface in the specular direction, the amount and way in which the light is spread around the specular direction, and the change in specular reflection as the specular angle changes. Used for shiny materials such as plastics or metals.

²Used for shiny materials such as plastics or metals.

Diffuse¹

The value gives the material its color.

Roughness

The roughness determines the sharpness of the reflection that will be present on the surface of the specular material. The reflection becomes more blurry as the roughness value increases. The lowest value, 0.0, will produce the sharpest and mirror-like reflection.

Specularity

The value determines the amount of specularity on the mesh. Specularity contributes to the reflective attributes of the material which in turn is also largely affected by the Index of Refraction (index attribute) and its Roughness. For example a glossy node with a black diffuse, 0 roughness and an index 0, will produce a perfect mirror.

Film Width

This controls the thickness of a optical, thin film on the material. This is useful in creating rainbow or oil slick effects.

Film Index

This controls the Index of Refraction of the thin film.

Bump/Normal

Both the Bump and Normal channels can load images to control the amount of bump mapping and normal mapping. The Bump channel should be set to floatimage to load a bump map. The Normal channel should be set to the image data type to load a full color normal map. The Bump channel simulates a relief using a grey-scale texture interpreted as a height map while the Normal Channel distorts normals using an RGB image. Note that Normal maps take precedence over bump maps, therefore you can not use both a normal map and a bump map at the same time.

Opacity

Opacity sets the transparency of the material. Set the data type to alphaimage (if the image has an alpha channel), or floatimage (for black/white images) to load an image to set the transparency. Use the Invert checkbox if necessary to adjust whether black or white regions are considered transparent.

¹Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

Normal Smoothing

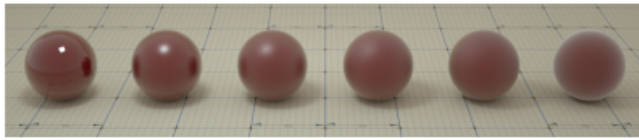
Normal Smoothing is a Boolean value that sets whether to smooth the normals of all meshes sharing that material. When off, the materials can be faceted and polygonal.

Index of Refraction

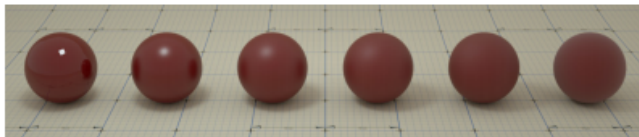
Index of refraction sets the fresnel effect applied on the glossy material. Setting a value smaller than 1.0 will disable the fresnel effect, so the glossy color will be the color in the glossy input pin, regardless of viewing angle. When selecting a value of 1.0 or bigger, the glossy reflection color will be modulated according to the fresnel law: at grazing angles the color will be the color set in the glossy input pin, at perpendicular angles it will be darker. Fresnel reflection produced becomes stronger as the index of refraction is set higher.

If a surface has a measured index of refraction, set the glossy color to 1.0.

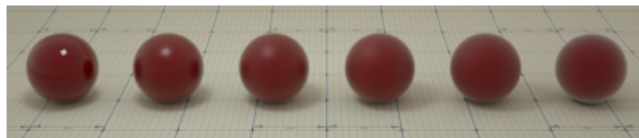
In the following examples, the six balls have roughness 0, 0.2, 0.4, 0.6, 0.8, 1.0 (left to right) and only the specular value and index of refraction have been modified for each rendered image:



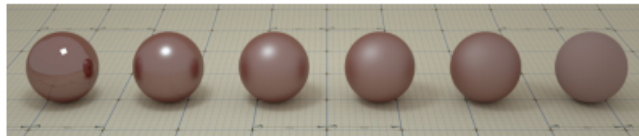
[Fig 5.5 A] specular = 1.0
index = 2.0 (strong Fresnel reflection)



[Fig 5.5 B] specular = 0.3
index = 3.0 (very strong Fresnel reflection)



[Fig 5.5 C] specular = 1.0
index = 1.5 (normal Fresnel reflection)



[Fig 5.5 D] specular = 0.3
index = 0.0 (no Fresnel reflection)



[Fig 5.5 E] specular = 1.0
index = 0.0 (no Fresnel reflection)

Edges Rounding

This is the radius of the rounded edges that are rendered as a shading effect. The shading effect is created at render time that easily and efficiently round the sharp edges of geometric objects without modifying and reloading the geometry. The parameter is a float value and requires vertices to be welded prior to applying the round edge value. This is very useful to virtually bevel hard edges during render time especially when using low-polygon models.

Displacement¹

The displacement mapping allows the height of points on a surface to be adjusted based on an image value to give objects depth and detail. The displacement is a pin in the material nodes that needs to be connected to a displacement node. A displacement texture can be specified in the displacement node, as well as the amount of displacement (in meters), the offset (in meters) and the level of detail (i.e. the maximum resolution of the resampled displacement map). Image textures are supported and of RGBA images the red channel is used as height map.

Displacement only works with the texture image node over a mesh with an UV map. No other Octane nodes can be used for displacement.

¹The process of utilizing a 2D texture map to generate 3D surface relief. As opposed to bump and normal mapping, Displacement mapping does not only provide the illusion of depth but it effectively displaces the actual geometric position of points over the textured surface.

Specular Material

The **Specular**¹ material is used for transparent surfaces such as glass and water.

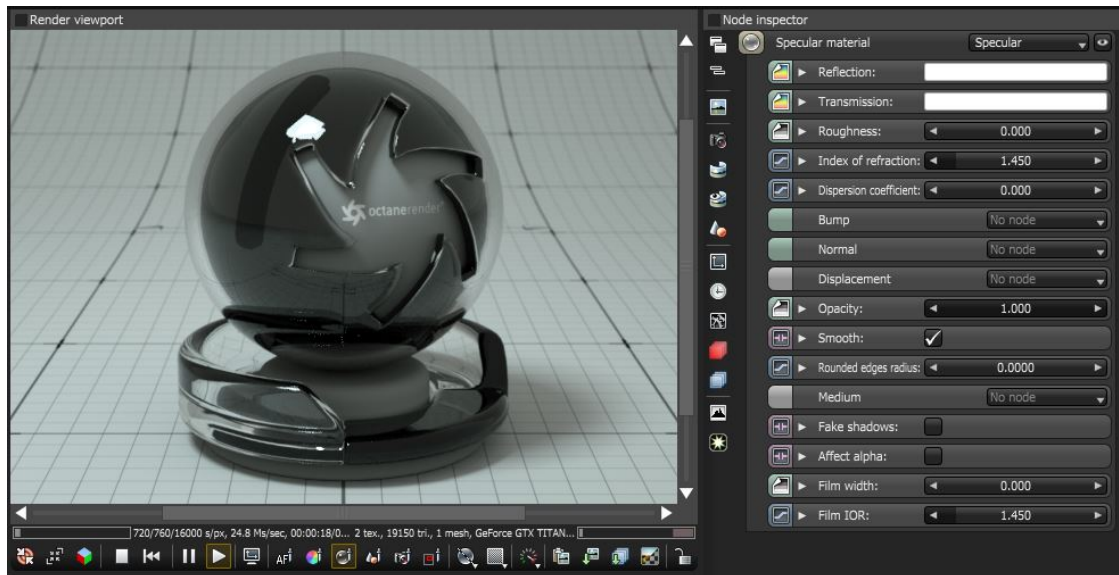


Figure 1: The **Specular material**² and its associated parameters.

Specular materials have these parameters to adjust:

Reflection

The Reflection value determines the glossy finish of the mesh. Reducing the reflectivity of a specular material will increase its transmissivity. Since OctaneRender is an unbiased **GPU**³ accelerated render engine, it can not selectively remove one object from the reflections as what is possible with biased CPU-based render engines. Reflectivity of specular materials is also largely affected by the Index of Refraction (index attribute), for example, take a specular node with a black transmission (0 specular) and an index 0 will produce a mirror:

¹Amount of specular reflection, or the mirror-like reflection of light photons at the same angle. Used for transparent materials such as glass and water.

²Used for transparent materials such as glass and water.

³The GPU is responsible for displaying graphical elements on a computer display. The GPU plays a key role in the Octane rendering process as the CUDA cores are utilized during the rendering process.

Roughness

The roughness determines the sharpness of the reflection that will be present on the surface of the specular material. The reflection becomes more blurry as the roughness value increases. The lowest value, 0.0, will produce the sharpest and mirror-like reflection. Simply put, this is the roughness of the surface and it affects both reflection and transmission.

Index of Refraction

The index of refraction controls the Fresnel effect of the reflection and refraction of light when it enters or exits the material. The Index represents the Index of Refraction of the material. Standard values of Index of Refraction (IOR) can be readily found via searching the internet. Glass typically has a value of 1.53 and water 1.33.

Transmission¹

The Transmission channel which controls the light passing through the surface of the material via refraction.

Film Width

This controls the thickness of a optical, thin film on the material. This is useful in creating rainbow or oil slick effects.

Film Index

This controls the Index of Refraction of the thin film.

Bump/Normal

Both the Bump and Normal channels can load images to control the amount of bump mapping and normal mapping. The Bump channel should be set to floatimage to load a bump map. The Normal channel should be set to the image data type to load a full color normal map. The Bump channel simulates a relief using a grey-scale texture interpreted as a height map while the Normal Channel distorts normals using an RGB image. Note that Normal maps take precedence over bump maps, therefore you can not use both a normal map and a bump map at the same time.

Opacity

Opacity channel controls the transparency of the material via a greyscale texture. Set the data type to alphaimage (if the image has an alpha channel) or floatimage (for black/white images) to load an image to set the transparency (use the Invert checkbox if necessary to adjust whether black or white regions are considered transparent).

¹A surface characteristic that determines if light may pass through a surface volume.

Normal Smoothing

Normal Smoothing is a Boolean value that sets whether to smooth the normals of all meshes sharing that material. When “off”, the normal interpolation will be disabled and the materials can be faceted and polygonal.

Affect Alpha

This is an option to have refractions affect the alpha channel, giving specular materials alpha transparency if the alpha channel is enabled in the kernel settings. This makes reflections opaque but refractions transparent and is used to set the clearness of the surface to alpha or not. The Affect Alpha attribute is used for special cases, as this will also affect the absorption, SSS and coloured specular transmission of the material. The Affect Alpha attribute is off by default.

Dispersion Coefficient

The dispersion in OctaneRender™ is based on Cauchy’s equation which has two terms: A which is the index of refraction and B which is the dispersion coefficient. Increasing the value increases the amount of coloration and dispersion in the object and in caustics.

Medium (**Absorption¹** or **Scattering²**)

Octane has two types of mediums, absorption and scattering, which can be used to create translucent surfaces. To use these options the **Medium** input of a **Specular** material needs to be connected to either the **Absorption** or **Scattering** medium nodes.

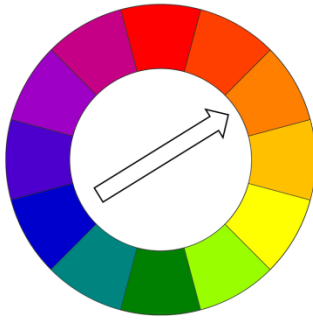
Absorption Medium

Absorption means that the material slightly absorbs light while passing through. The color resulting from this absorption is dependent on the distance light travels through the material. With increased distance it will get darker, and if the absorption is colored it will get more saturated. It works in a subtractive way, so users will need to configure the inverted color instead to get an absorption color desired.

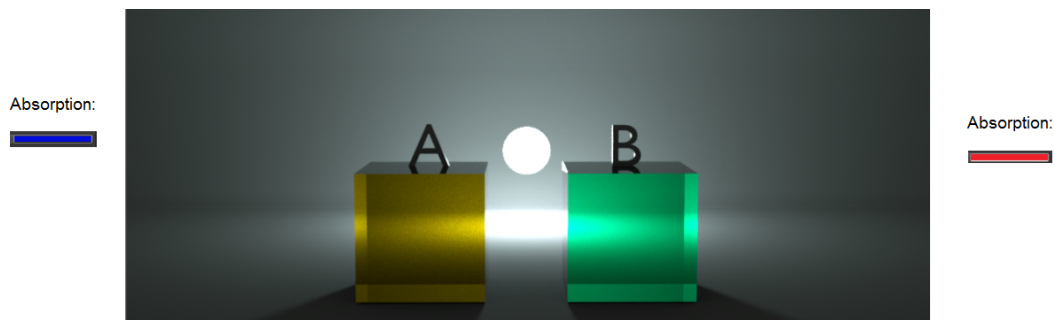
Absorption works in a subtractive way so if the absorption is colored and provided that the transmission value of the material is white (allowing all light to pass through), the resulting color of the material is the complementary color of the absorption node based on the color wheel:

¹Defines how fast light is absorbed while passing through a medium.

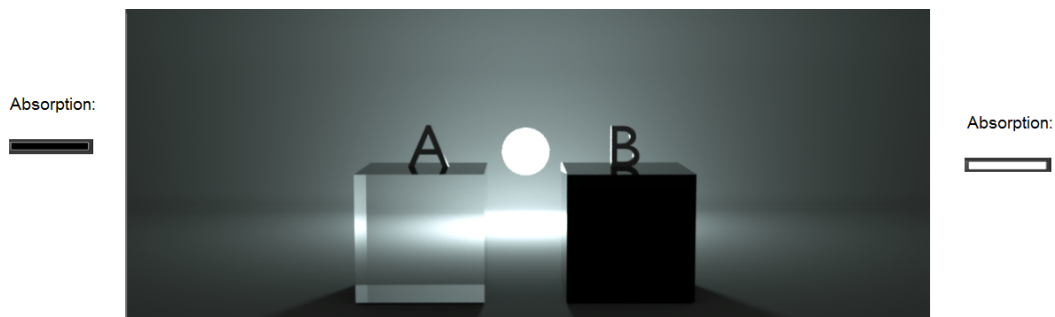
²Defines how fast light gets scattered when traveling through the medium.



Example 1: The absorption color used in Box A is blue, the absorption color used in Box B is red.



Example 2: The absorption used in Box A is black, the absorption used in Box B is white. Given that the transmission color of the material on both boxes is white, the material in Box B shows no transmission of light at all because this is subtracted entirely by the white absorption.



Scattering Medium

Similar to the absorption medium but with the option to simulate sub-surface scattering. This is a medium with single-scattering SSS, and also absorption. To use this medium, a volume needs to be created and it will not work correctly on simple surfaces. It can be used to create true unbiased SSS, using various parameters, including scattering texture, emission texture and various other parameters. Note that this is single-scattering

SSS, not multiple-scattering. It is much faster than the latter, and much more practical, although it does not allow a few things such as volumetric caustics.

The scale parameter in both mediums multiplies the absorption texture, allowing a wide range of values to be set more easily.

For applying absorption, SubSurface Scattering, and Emission refer to section on [Medium Nodes](#) in the Standalone Manual.

Fake Shadows

Fake Shadows is a Boolean value that sets the architectural glass option for all meshes sharing that material. This setting is off by default. When enabled, the specular material exhibits the characteristics of Architectural glass with its transparent feature allowing light to illuminate enclosed spaces or frame an exterior view.

Edges Rounding

This is the radius of the rounded edges that are rendered as a shading effect. The shading effect is created at render time that easily and efficiently round the sharp edges of geometric objects without modifying and reloading the geometry. The parameter is a float value and requires vertices to be welded prior to applying the round edge value. This is very useful to virtually bevel hard edges during render time especially when using low-polygon models.

Displacement¹

The displacement mapping allows the height of points on a surface to be adjusted based on an image value to give objects depth and detail. The displacement is a pin in the material nodes that needs to be connected to a displacement node. A displacement texture can be specified in the displacement node, as well as the amount of displacement (in meters), the offset (in meters) and the level of detail (i.e. the maximum resolution of the resampled displacement map). Image textures are supported and of RGBA images the red channel is used as height map.

Displacement only works with the texture image node over a mesh with an UV map. No other Octane nodes can be used for displacement.

¹The process of utilizing a 2D texture map to generate 3D surface relief. As opposed to bump and normal mapping, Displacement mapping does not only provide the illusion of depth but it effectively displaces the actual geometric position of points over the textured surface.

Mix Material

The **Mix** material is used to mix any two material types including other **mix materials**¹. It accepts any two material nodes as inputs and the mix amount may be controlled by a value, color, or texture. Figure 1 shows a white glossy material mixed with a red specular material using the default value of 0.5 (or 50%) an input for the **Amount** parameter.

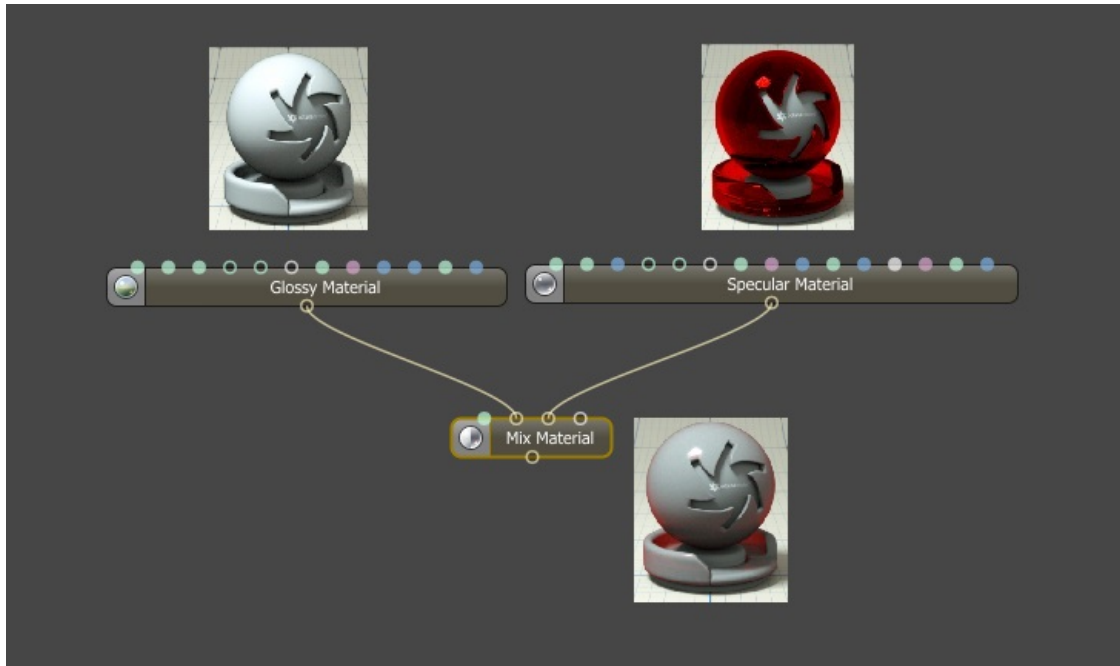


Figure 1: A Mix material is used to mix a glossy and specular materials together.

Figure 2 shows the result of the same **Mix Material**² setup with a **Checks** texture used an input for the **Amount** parameter.

¹Used to mix any two material types.

²The representation of the surface or volume properties of an object.

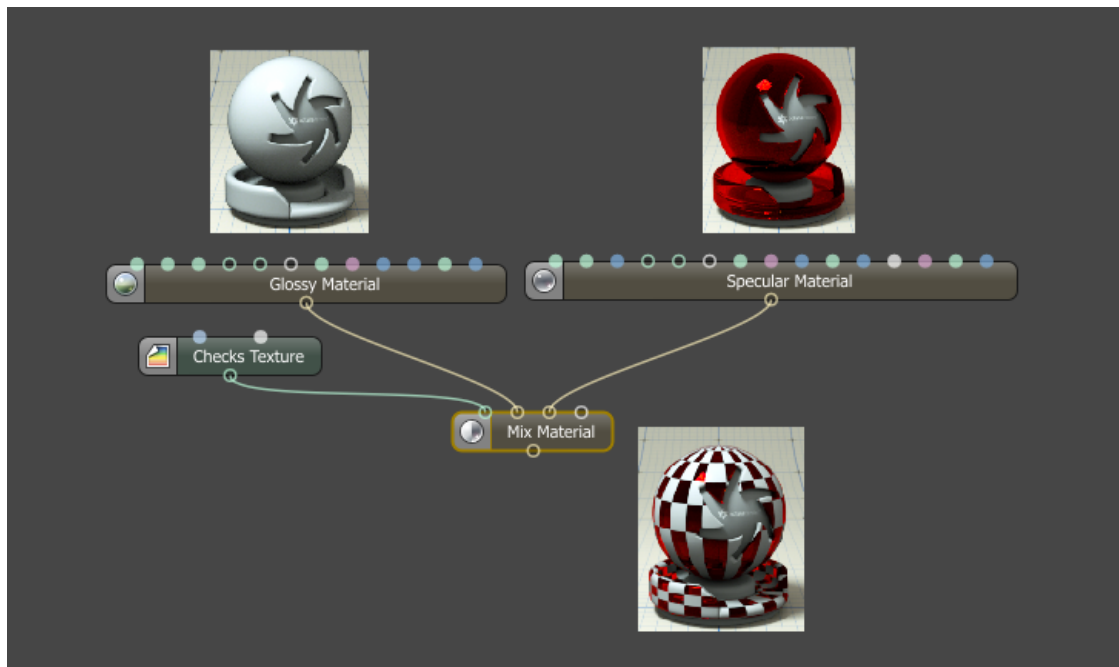


Figure 2: A Mix material is used to mix a glossy and specular materials together using a Checks texture to control the mix Amount.

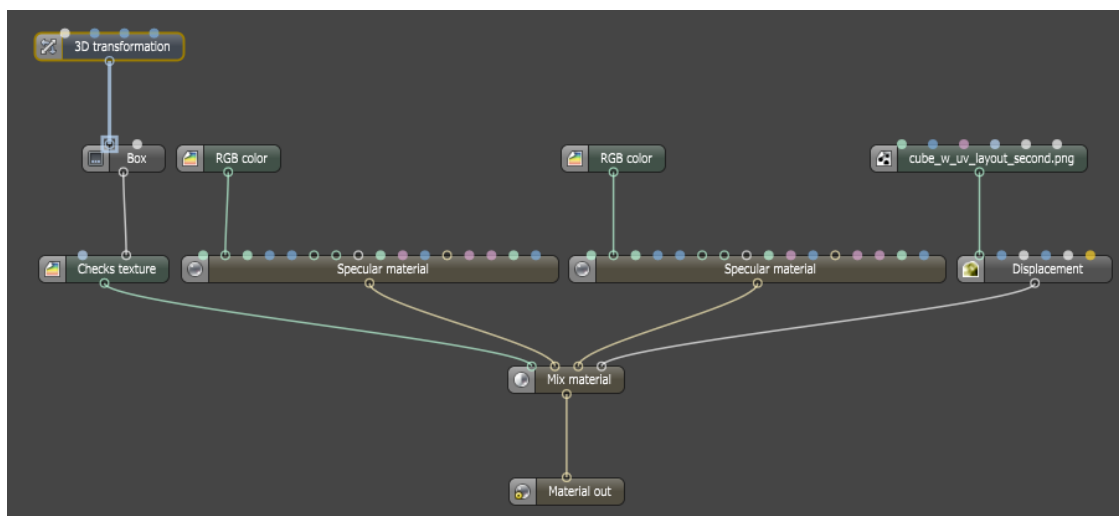
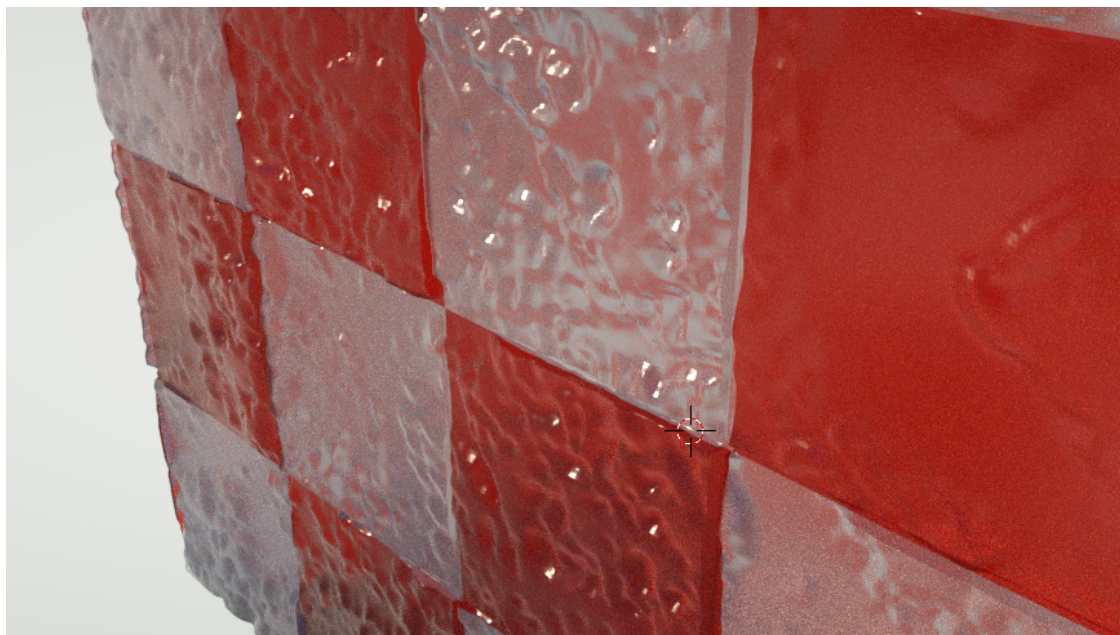
In the example below, a white **Glossy material**¹ is mixed with a red **Specular material**². A **Checks** texture node is used to control the mixing of the two materials.

The individual Displacements of the two materials are not used when these two materials are connected to a **Mix** Material node. Instead, The **Mix** Material node itself maps its own **Displacement**³, where an image texture may be plugged into, relative to the UV map for the object for which the mix is applied.

¹Used for shiny materials such as plastics or metals.

²Used for transparent materials such as glass and water.

³The process of utilizing a 2D texture map to generate 3D surface relief. As opposed to bump and normal mapping, Displacement mapping does not only provide the illusion of depth but it effectively displaces the actual geometric position of points over the textured surface.



Portal Material

Portal¹ Materials² are used to optimize the rendering of light sources, they accomplish this by helping the render kernel find important light sources in the scene. For example, in the case of interior scenes illuminated by an outside light source that comes in through windows, it can be difficult for the path tracer to optimize the light as it enters the interior environment. To help the path tracer find these light sources a polygon plane can be placed outside the window and then a Portal **Material³** can be applied to the plane, thus creating a “portal plane” (AKA Portals). This set-up will improve the quality of the light and increase the efficiency of the render.

In Figure 1 (modeled in Maya), a room is being prepared with a small, single window. This would be a difficult scene to light with a sun/sky or **HDRI⁴** file with no lighting on the interior of the room. A single plane was placed over the window (highlighted in green) with the normal for the plane facing into the room (yellow arrow).

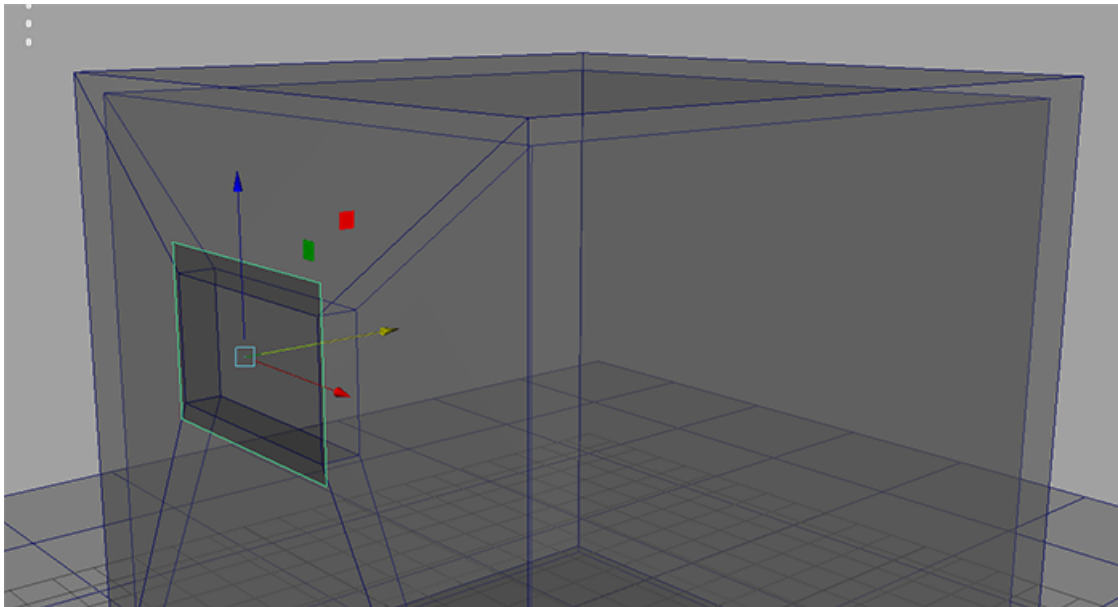


Figure 1: A plane is placed outside an opening in a polygon room, this plane will serve as a surface for the portal material.

¹A technique that assists the render kernel with exterior light sources that illuminate interiors. In interior renderings with windows, it is difficult for the path tracer to find light from the outside environment and optimally render the scene. Portals are planes that are added to the scene with the Portal material applied to them.

²A set of attributes or parameters that describe surface characteristics.

³The representation of the surface or volume properties of an object.

⁴An image which presents more than 8 bit per color channel unlike most common image formats.

Using Portals

Portal¹ nodes can be accessed by right-clicking in the **Nodegraph Editor** and navigating to the **Materials**² category then choosing **Portal**.

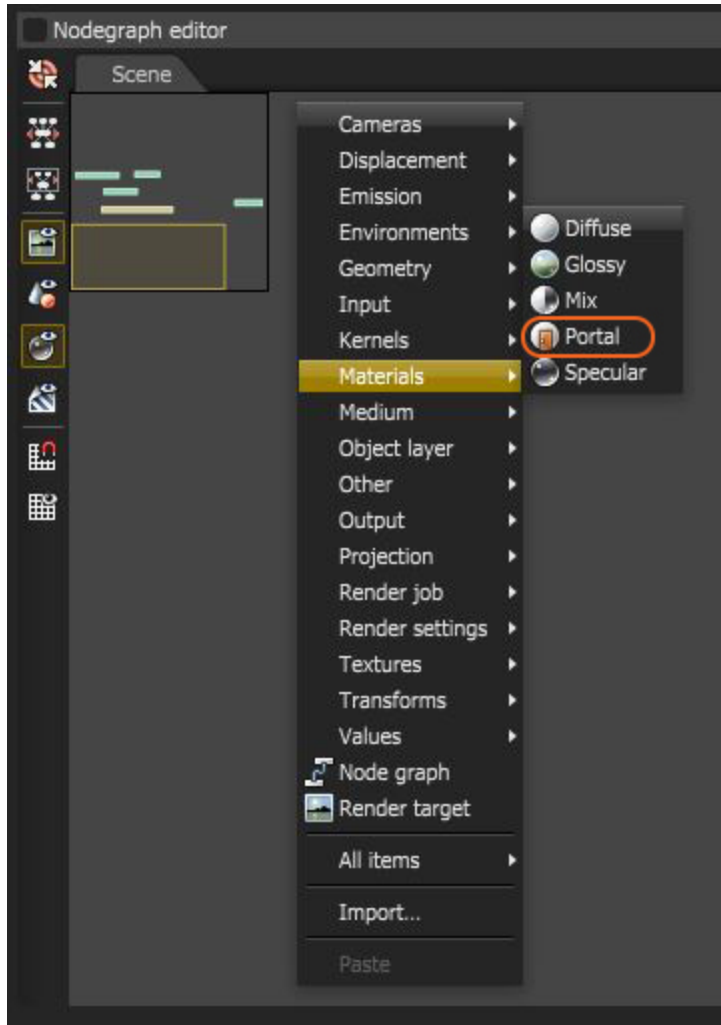


Figure 2: The Portal material is found in the Materials section of the pop-up window.

¹A technique that assists the render kernel with exterior light sources that illuminate interiors. In interior renderings with windows, it is difficult for the path tracer to find light from the outside environment and optimally render the scene. Portals are planes that are added to the scene with the Portal material applied to them.

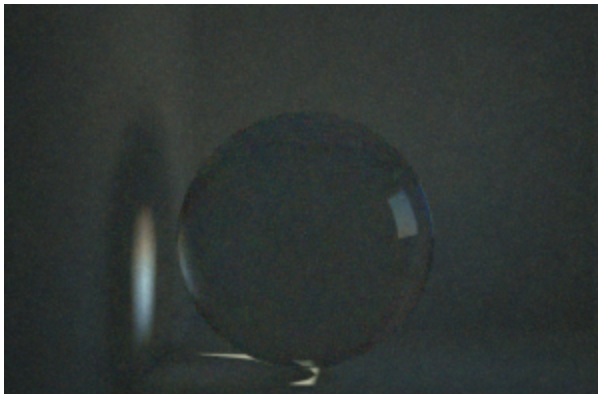
²A set of attributes or parameters that describe surface characteristics.

To set up a scene using **Portal Materials** it is important to make sure that every window or opening in the environment is covered by a portal plane. It will not work if only one window has a portal over it when all other windows do not have a portal over them. And the normal direction of the portal plane should be facing inwards towards the interior or the scene will not render properly. Portal planes should not be blocked by other geometry such as a glass surface. Objects with the Portal material applied will not be visible in the rendering as geometry.

It is best to try to use the least amount of geometry for portals, eg only a few simple rectangular planes are best, dense geometry used for portal planes can slow down rendering. It is possible to use a single piece of portal geometry to cover several openings such as multiple windows on a single wall however if the geometry is too large that can reduce rendering efficiency. Its important to strike a balance between coverage of openings and the size of the geometry that uses the portal material.

The **Portal Material**¹ option should be used with the **Pathtracing** and **PMC** kernels, it will not work when rendering with the Direct Light kernel.

The two images in Figure 3 show the results of rendering without and with a portal material. The scene shows a glass sphere rendered in a room lit by light coming through a window. The scene is rendered using 500 samples. Notice the first image, that does not have a portal plane placed over the opening, is noisier than the second image which does use a portal plane.



¹The representation of the surface or volume properties of an object.



Figure 3: Two images rendered without and with a portal plane. Notice that the second image has less noise thanks to the use of a portal plane.

Materials Databases

Octane provides two types of material databases. The **LiveDB** is an extensive database with pre-built materials available for download. The **LocalDB** is a place on a local system where materials can be stored for later use.

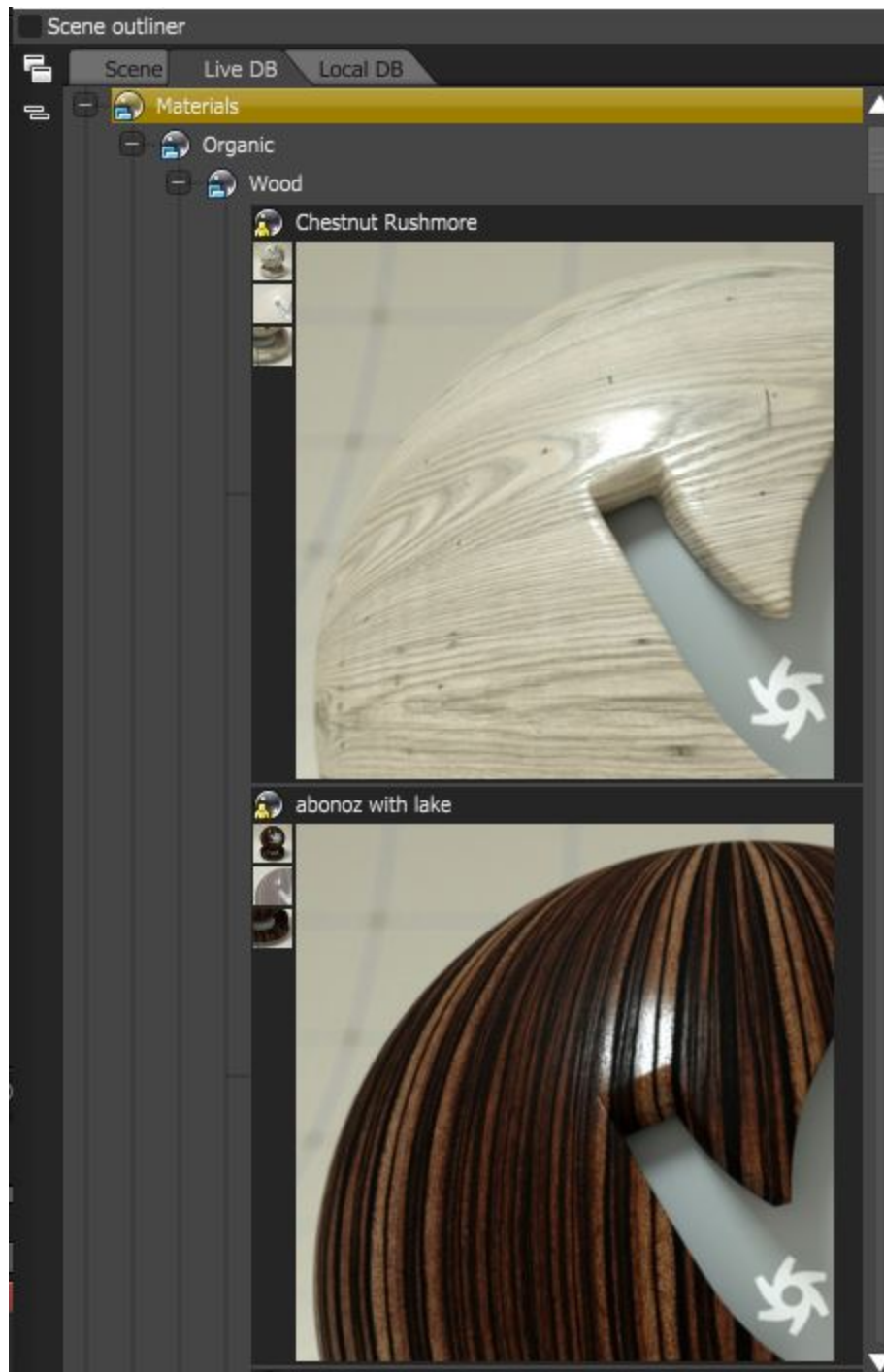


Figure 1: The LiveDB and LocalDB tabs in the Scene Outliner window.

LiveDB

The **LiveDB** is Octane's asset database. This stores not only materials but groups of nodes and even whole scenes shared by the Octane Community and the OctaneRender Team. The asset database makes it easier for moving groups of nodes, scenes and assets across a myriad of Octane plug-ins as well as Standalone scenes.

Most materials contain textures with images. The associated images are downloaded and saved to disk in a cache folder and the material name will be automatically added to the path.

The Octane **LiveDB** can be found in the Octane Interface's **Scene Outliner** as a tab (figure 1). To download one of the **LiveDB** assets, open the **LiveDB** tab in the **Scene Outliner**, right-click over the desired node and choose "**Copy**". Right-click in the node editor and choose "**Paste**" at the bottom of the pop-up menu to paste the node into your scene (figure 2).

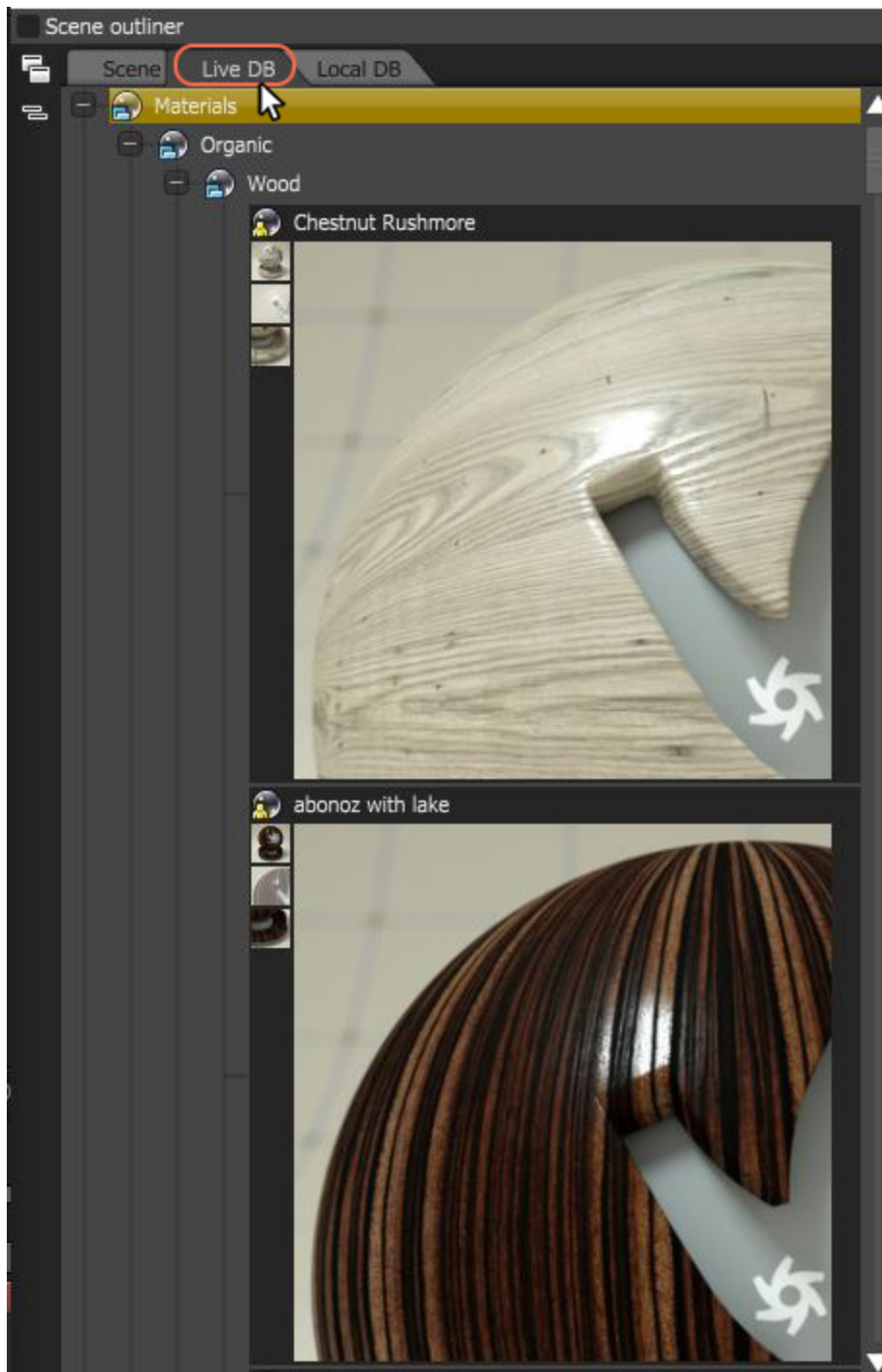


Figure 1: Accessing the LiveDB from the Scene Outliner window.

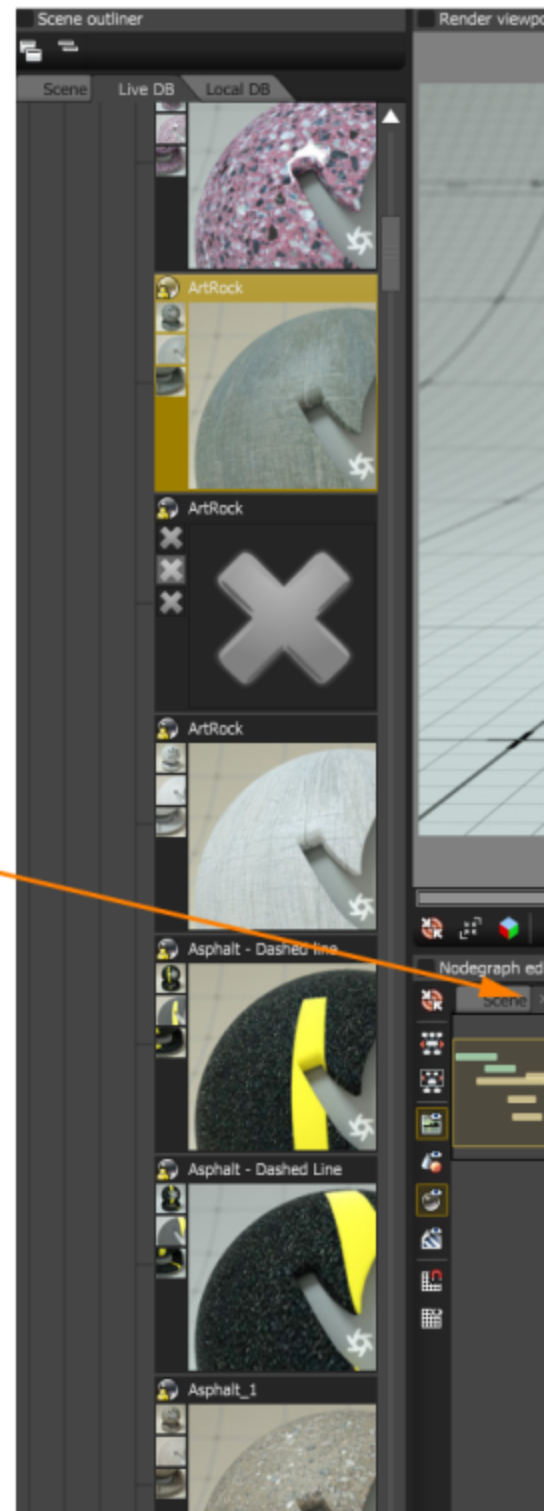
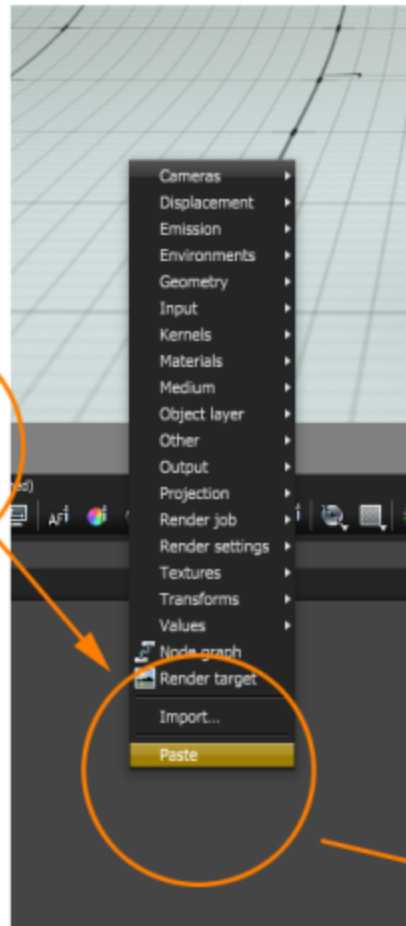
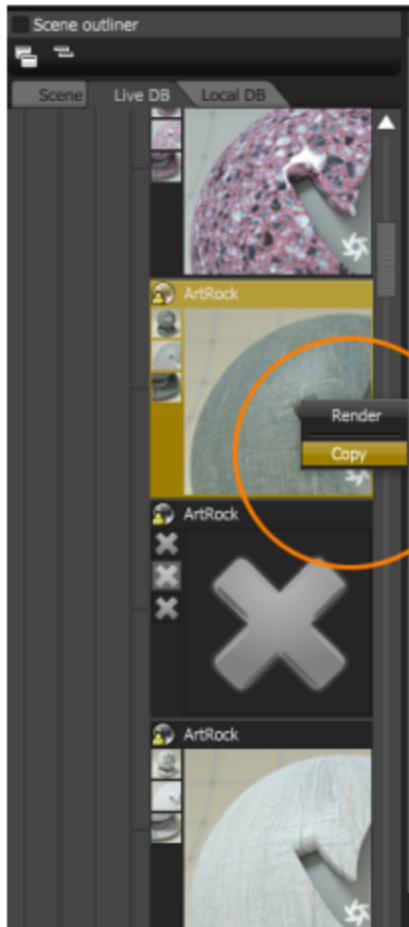


Figure 2: Copying and pasting a material from the LiveDB into the Nodegraph Editor.

LocalDB

Octane's **LocalDB** is similar to the LiveDB in that it can be accessed through the tab in the Outliner. Instead of storing the files on the cloud, **LocalDB** stores the files locally. To save an Octane Node Graph to the localDB, select it in the graph editor and choose "**Save...**" From the Pop-up menu choose **LocalDB** as the Location. You can set the other options such as category and description using this pop-up (Figure 1).



Figure 1: The LocalDB options.

To create a thumbnail image, right-click over the node in the **LocalDB** list and choose "**Make Thumbnail**". A pop-up will open with controls for customizing the thumbnail (Figure 2).

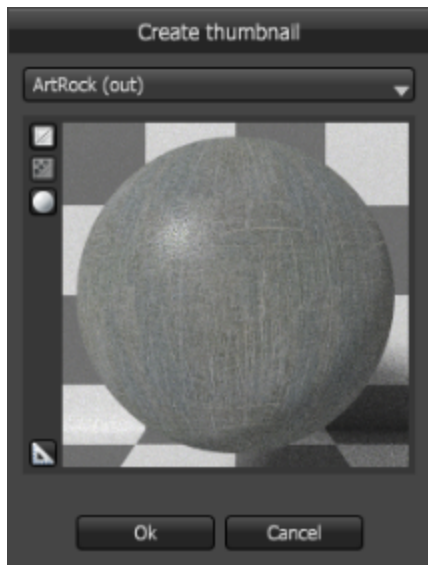


Figure 2: Create a thumbnail for LocalDB files.

The location of the LocalDB files can be set using the fields in the Applications tab of the Preferences (figure 3).

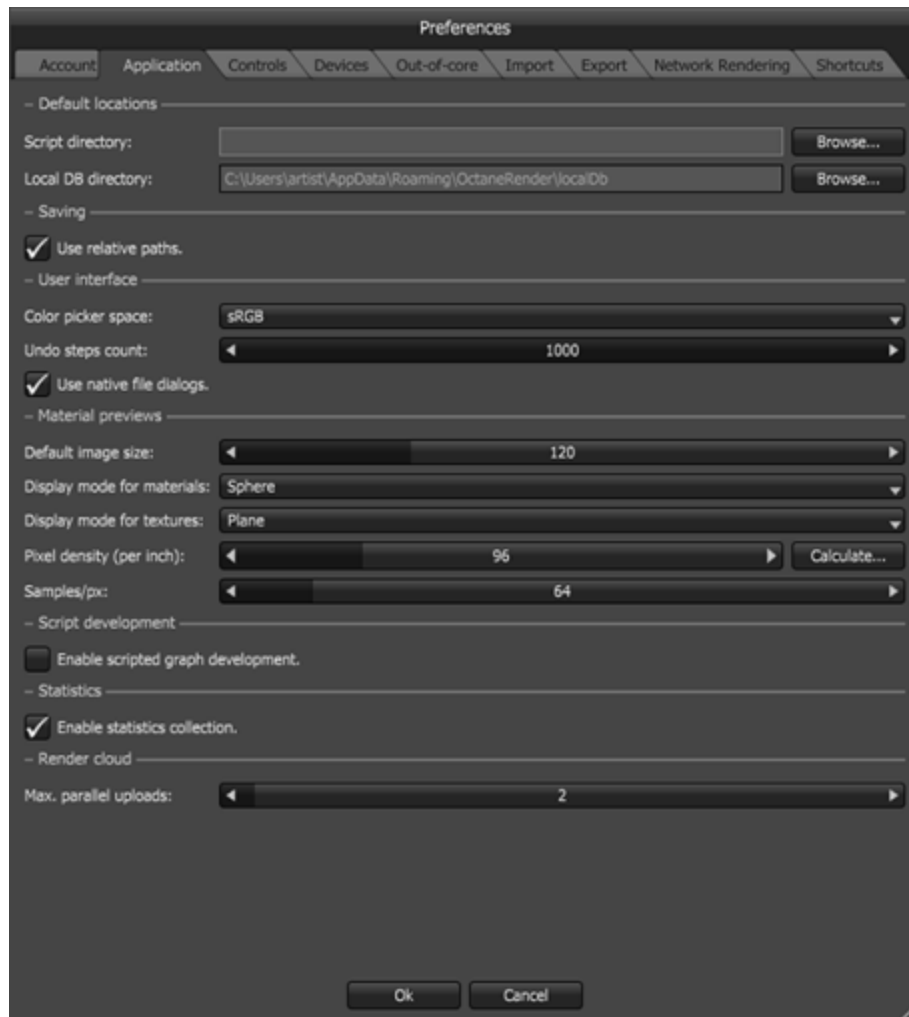
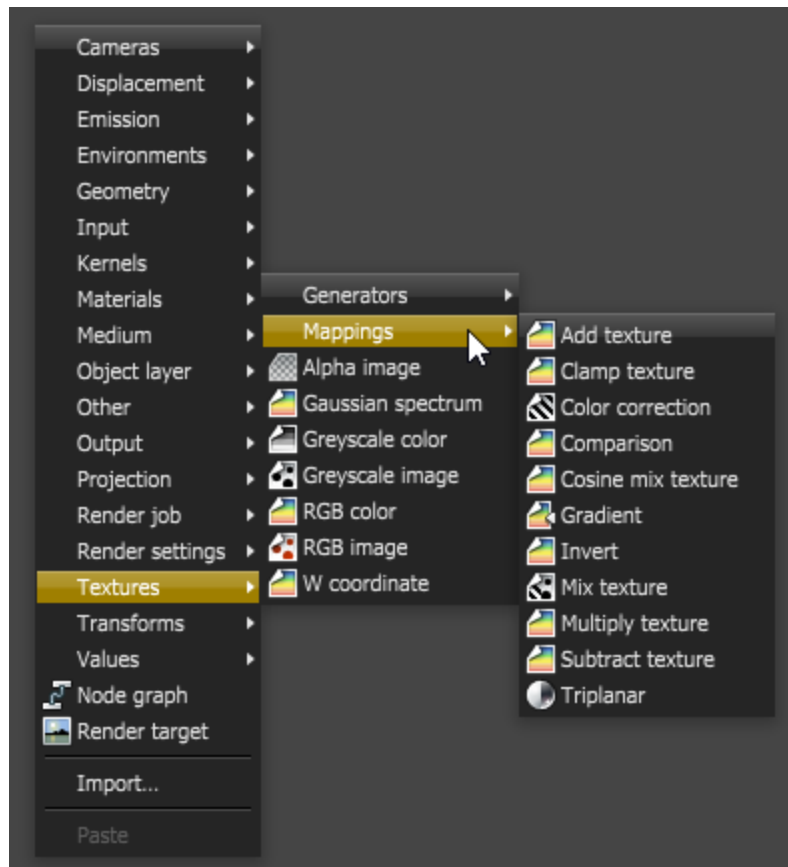


Figure 3: Set the location of the LocalDB in the Applications tab of the preferences.

Textures

Texture types allow for creating very flexible materials.





Textures¹ are used to create and manipulate the colour and appearance of the actual material.

Generators and Mapping textures are used to create patterns that can be used alone or in combination with the Mapping and Colour textures to create memory efficient, procedural textures that, in turn, can be used to create textures, bump maps and other advanced materials with minimal impact to **GPU**² memory.

- Add
- Alpha Image
- Checks
- Clamp
- Color Correct
- Compare
- Cosine
- Dirt

¹Textures are used to add details to a surface. Textures can be procedural or imported raster files.

²The GPU is responsible for displaying graphical elements on a computer display. The GPU plays a key role in the Octane rendering process as the CUDA cores are utilized during the rendering process.

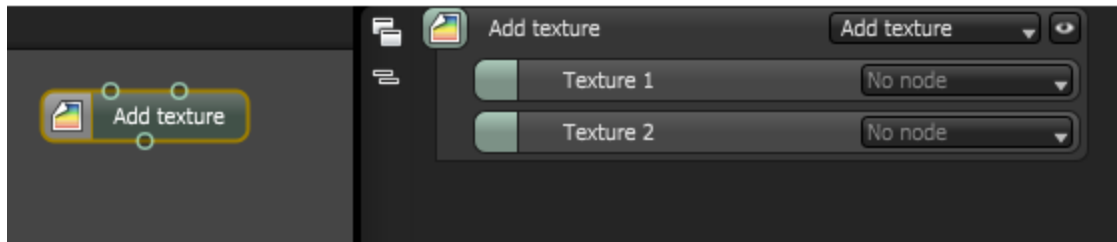
- **Displacement**¹
- Falloff
- Float
- Float Image
- Gaussian Spectrum
- Gradient
- Image
- Instance Color
- Instance Range
- Invert
- Marble
- Mix
- Multiply
- Noise
- Polygon Side
- Random Color
- RGBSpectrum
- Ridged Fractal
- Saw Wave
- Sine Wave
- Triangle Wave
- Triplanar
- Turbulence
- Subtract
- UVW Transform
- Volume Ramp
- Octane W

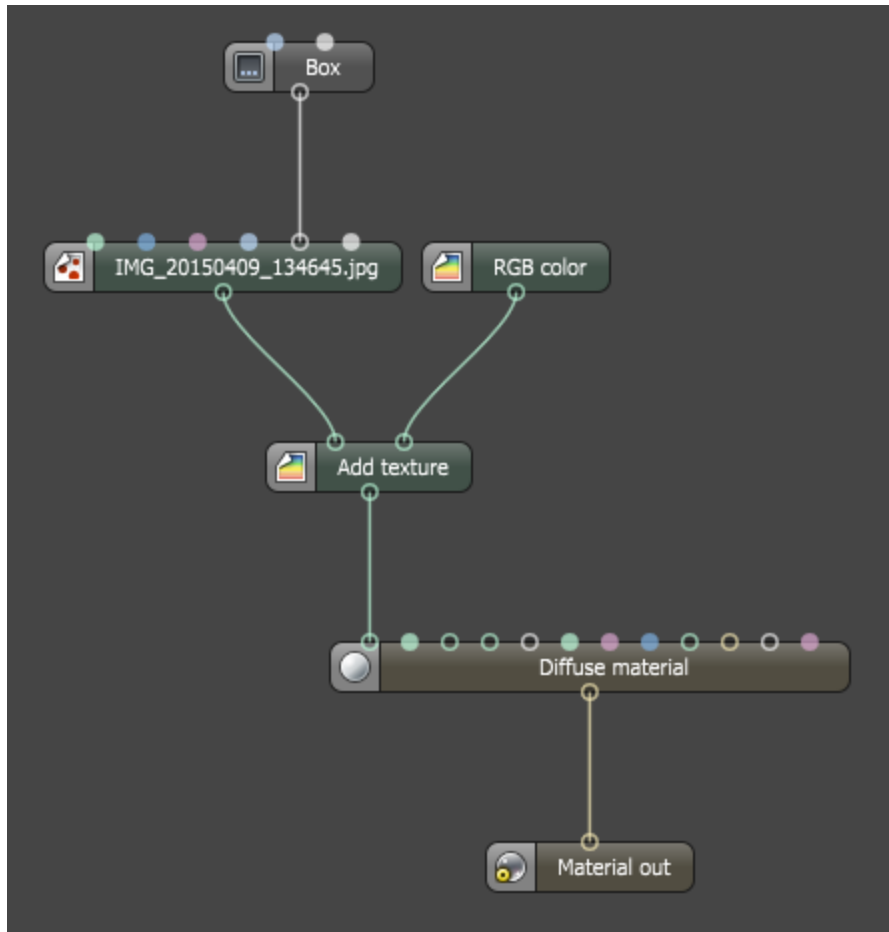
It is advantageous to explore creating materials using Generators and Mapping textures before resorting to Image-based textures.

¹The process of utilizing a 2D texture map to generate 3D surface relief. As opposed to bump and normal mapping, Displacement mapping does not only provide the illusion of depth but it effectively displaces the actual geometric position of points over the textured surface.

Add Texture

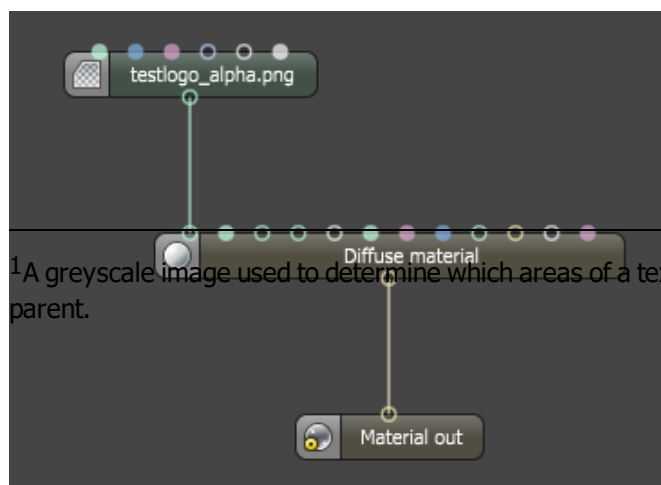
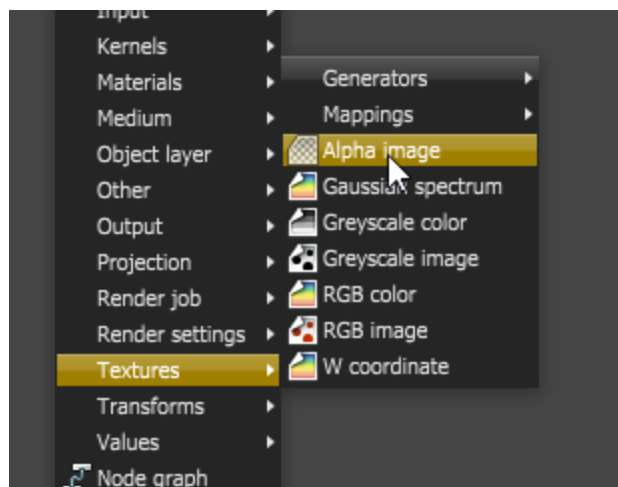
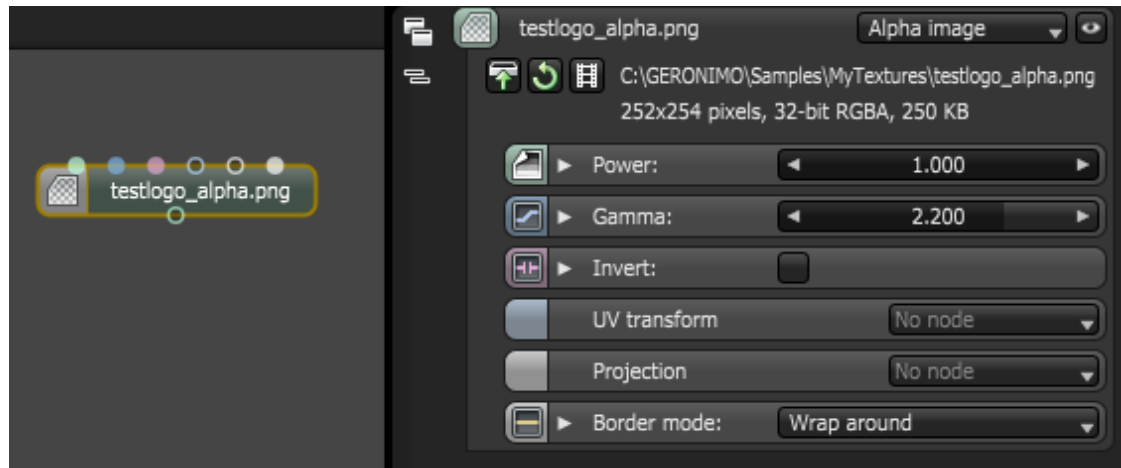
The Add Texture is useful for adding color or image textures as channels to a material.





Alpha Image Texture

An alpha image utilizes the image's native **Alpha Channel**¹ to provide transparency.

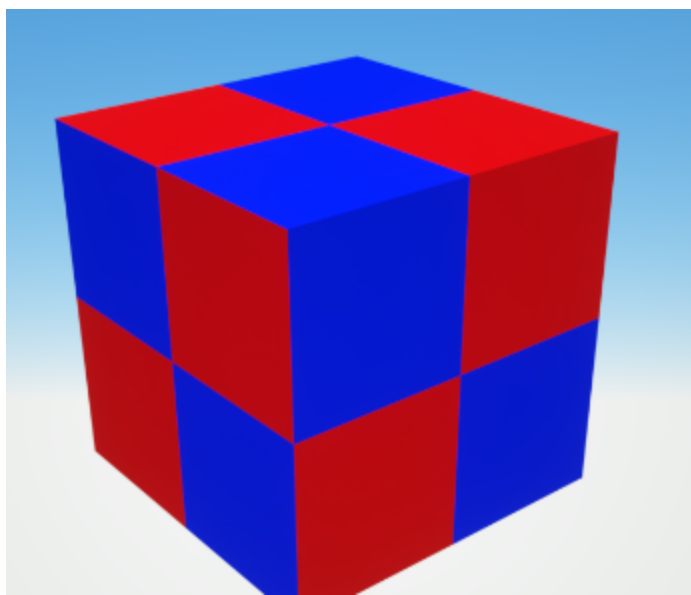
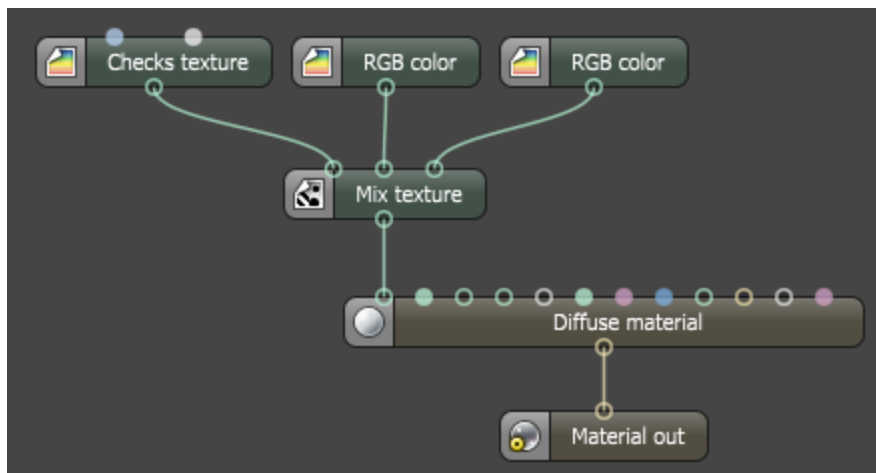
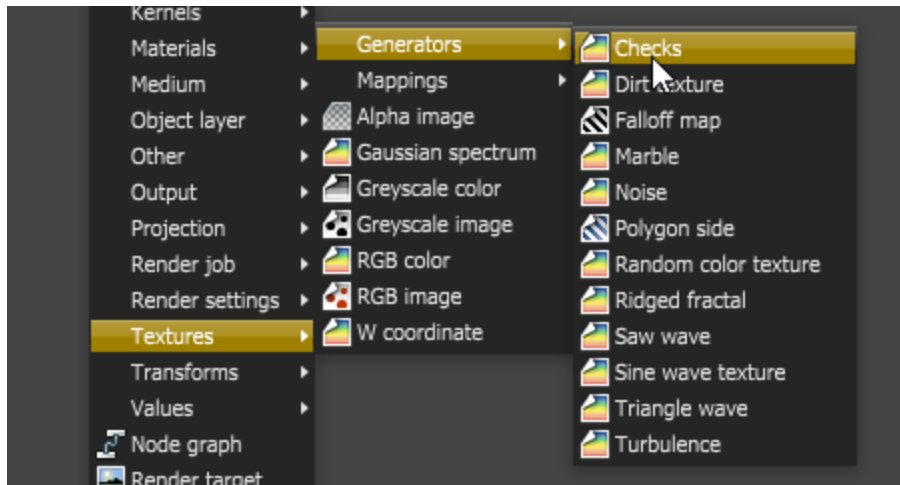


¹ A greyscale image used to determine which areas of a texture map are opaque and which areas are transparent.



Checks Texture

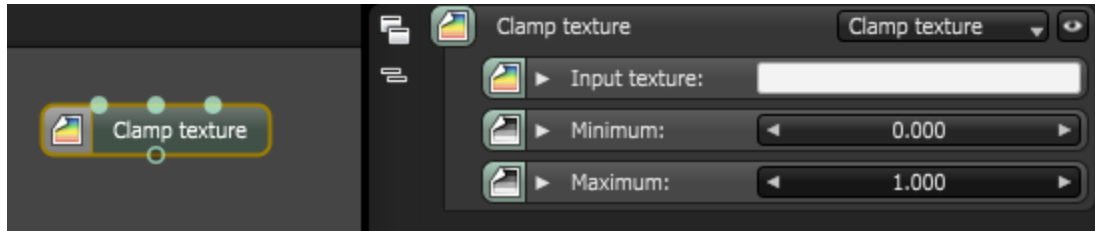
The Check procedural texture is useful for making stripes, checker board and grid patterns. It is controlled by a float3 value. It is most useful when mixed with other textures.



texture

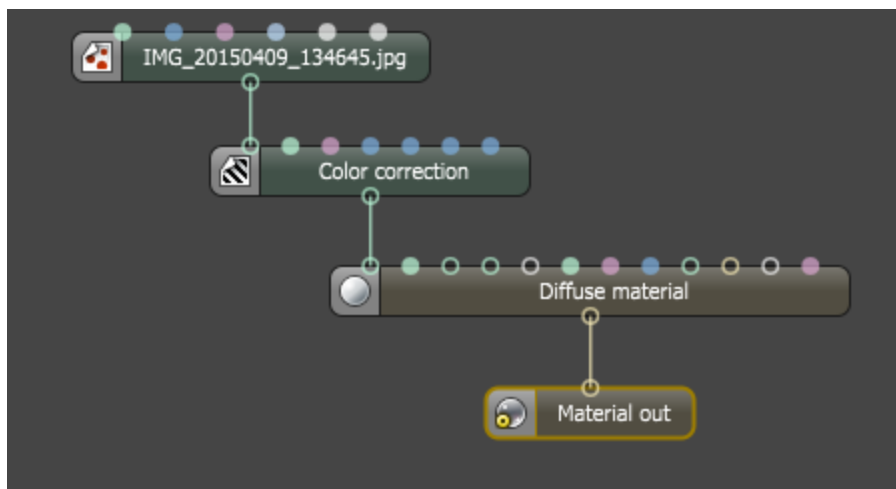
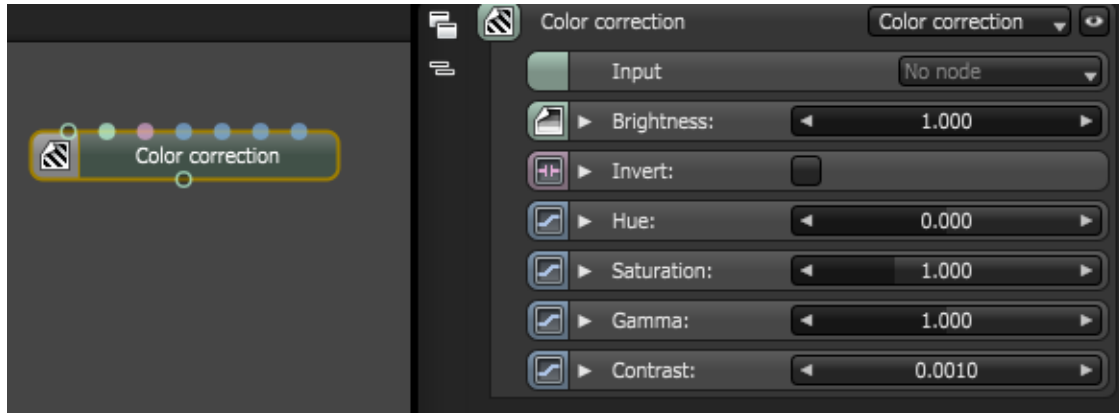
Clamp Texture

The Clamp Texture requires a texture input and then allows for the texture to be “clamped” with the minimum and maximum slider.



Color Correct

This is used for adjusting the attributes such as brightness, hue, saturation, gamma and contrast of image maps which likewise have values set by the third party modelling application.

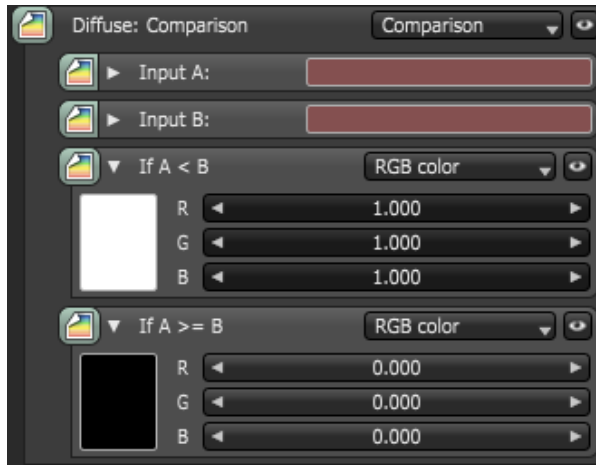




Comparison

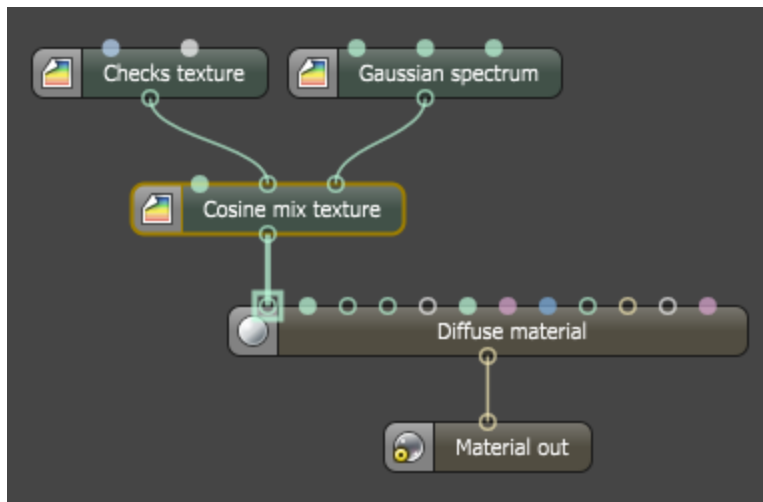
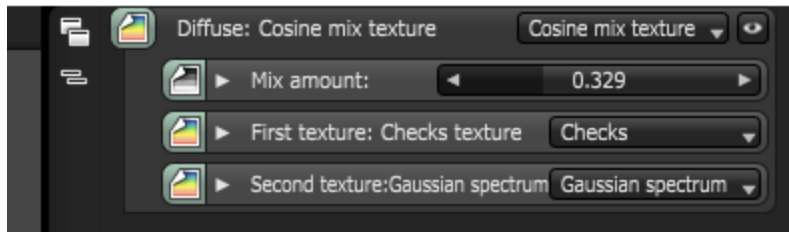
This is a conditional texture node for altering a given texture input A based on another texture input B. In its simplest form, the Comparison Texture is used to select between two alternative textures at render time.

In the example below, the result will be Black since inputs A and B are the same (equal) and it evaluates to true for the second condition.



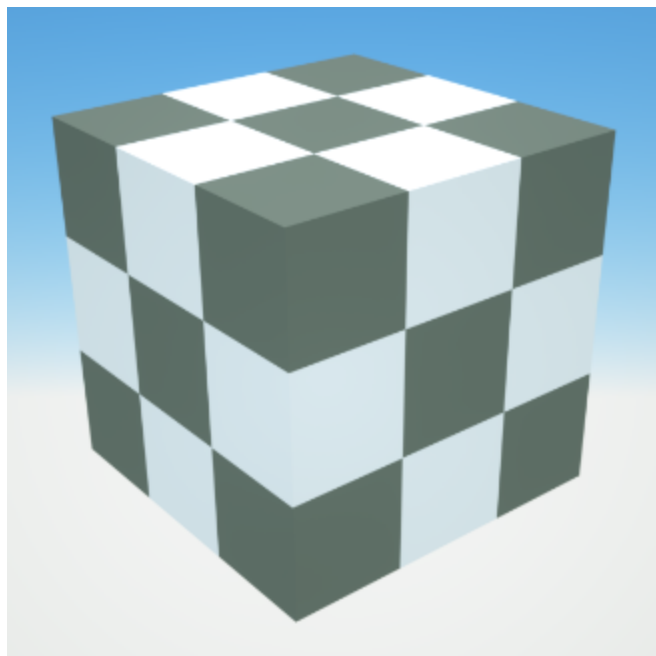
Cosine Mix Texture

This is for mixing two textures together according to a cosine wave. In the example below, a Checks Mix was combined with a GaussianSpectrum using a Cosine Mix Texture and connected to the **Diffuse**¹ channel of a **Diffuse material**².



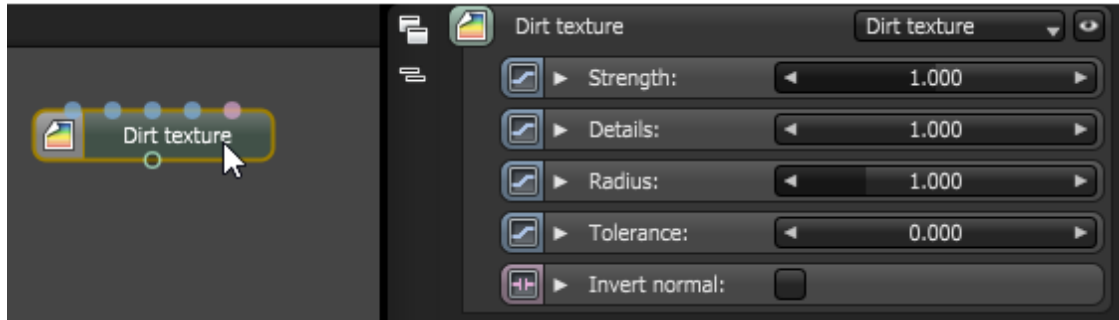
¹Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

²Used for dull, non-reflecting materials or mesh emitters.



Dirt Texture

The Dirt texture generator produces a Dirt Texture Node which is typically used to control the appearance of dirt, dust particles, or worn out effects overlaid on a material.



The Dirt texture parameters are:

Strength

This is the value/lightness (0.1 to 10) of the overlaying material spread across the map.

Details

This is the density (1 to 100) of the overlaying material at certain angles as tiny specs of it are closely distributed across the constrained areas along the surface of the normal.

Radius

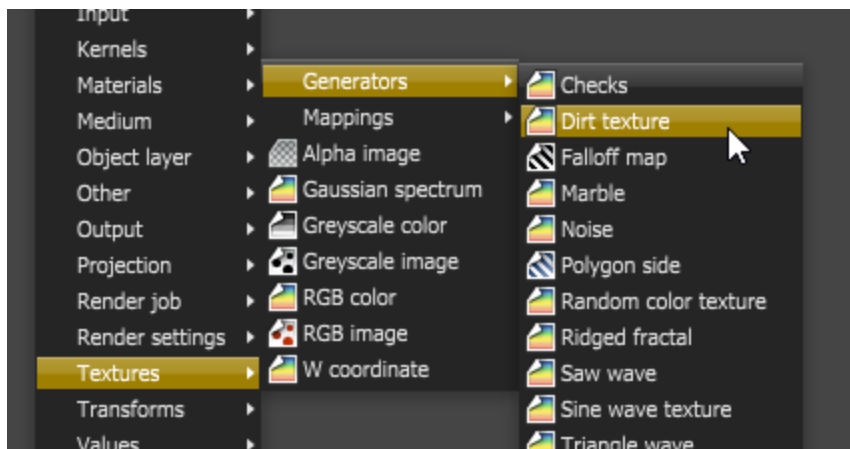
The relative size of the map set against the surface directly visible to the viewer. 100 will lead to almost complete coverage by the overlaying material.

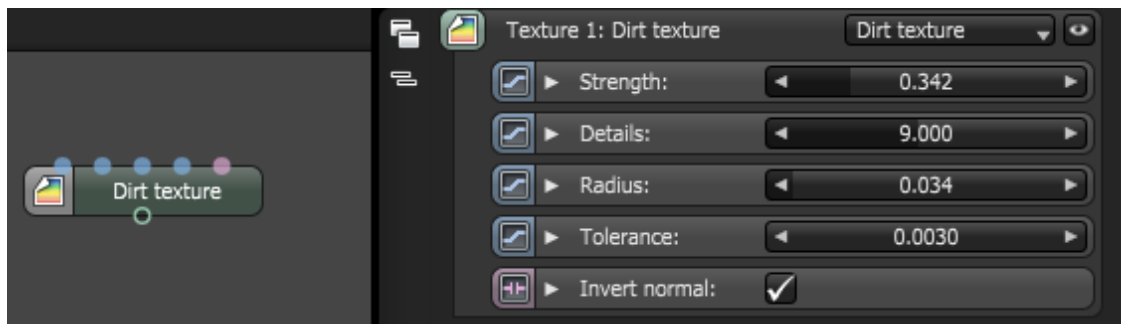
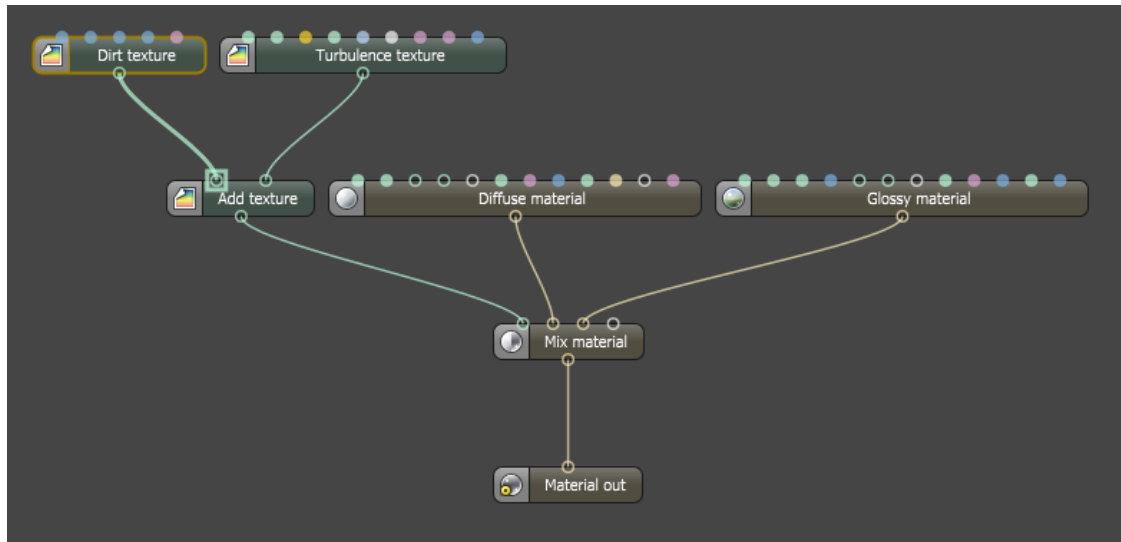
Tolerance

This setting can be used to avoid black edges on roughly tessellated meshes.

Invert Normal

An added option to invert the normal and overlaying material.

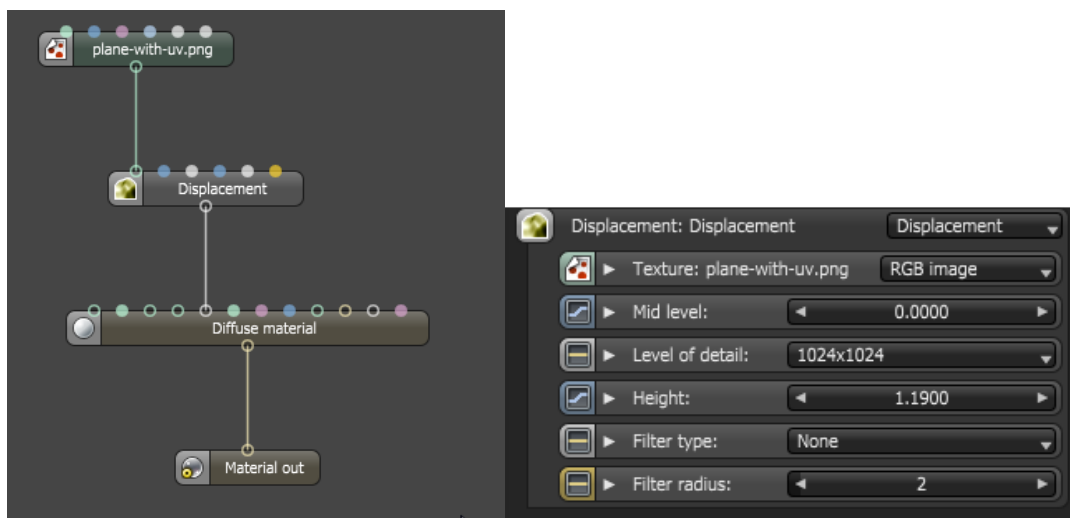




Displacement Texture

The displacement mapping allows the height of points on a surface to be adjusted based on an image value to give objects depth and detail. The displacement is a pin in the material nodes that needs to be connected to a displacement node. A displacement texture can be specified in the displacement node, as well as the amount of displacement (in meters), the offset (in meters) and the level of detail (i.e. the maximum resolution of the resampled displacement map). Image textures are supported and of RGBA images the red channel is used as height map.

Displacement¹ only works with the texture image node over a mesh with an UV map. No other Octane nodes can be used for displacement.



The UV map in the displacement texture is taken into account. The "shift" parameter in the displacement node has been replaced by a new option "mid-level". The old parameter defined the shift of the displacement in meters, while the new parameter defines it in texture value range. So if you for example have a Zbrush export that has 0-displacement defined at 0.5, you set the "mid-level" to 0.5 and can then scale the displacement height independently.

The Displacement parameters are:

Mid-Level

¹The process of utilizing a 2D texture map to generate 3D surface relief. As opposed to bump and normal mapping, Displacement mapping does not only provide the illusion of depth but it effectively displaces the actual geometric position of points over the textured surface.

This is the value in the image which corresponds to zero displacement. The range is always normalized to $[0,1]$. Mid-level sets the displacement geometry offset from zero level (for shifting the displacement). It also defines the shift in texture value range.

Level of details

Level of details. This controls the resolution of the internal displacement map.

Height

Height sets the displacement strength or the amount of displacement in meters.

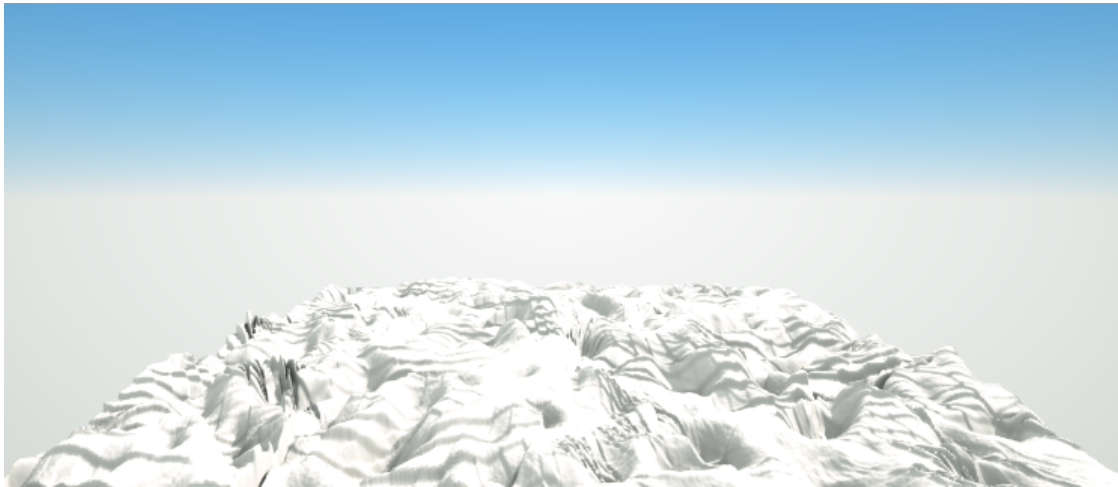
Filter Type

Specifies which filter type to use on displacement map texture.

Filter Radius

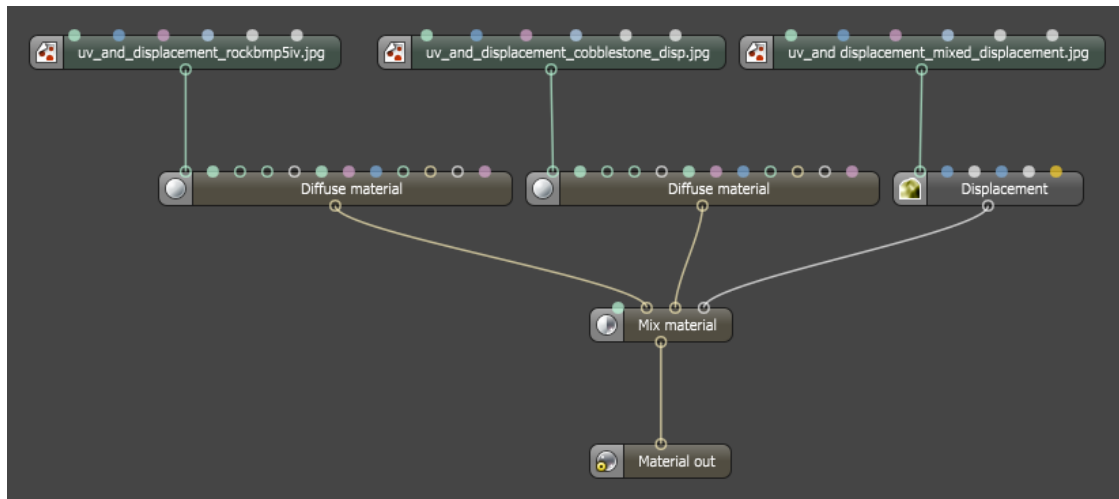
This is the number of nearest pixels to use for the filtering. The higher it is, the smoother the displacement map. This is only valid if a filter is enabled.

Currently the displacement in Octane is not compatible with bump/normal mapping – displacement cannot be used together with a normal map or a bump map on the same material. Rendering a material which has a normal map and bump map along that material that has the displacement will result in artifacts.



Displacement in **Mixed**¹ **Materials**²

The individual Displacement of the two materials are not used when two materials are connected to a Mix **Material**³ node. Instead, The **Mix Material**⁴ node itself maps its own Displacement, where an image texture may be plugged into relative to the UV map for the object for which the mix is applied.

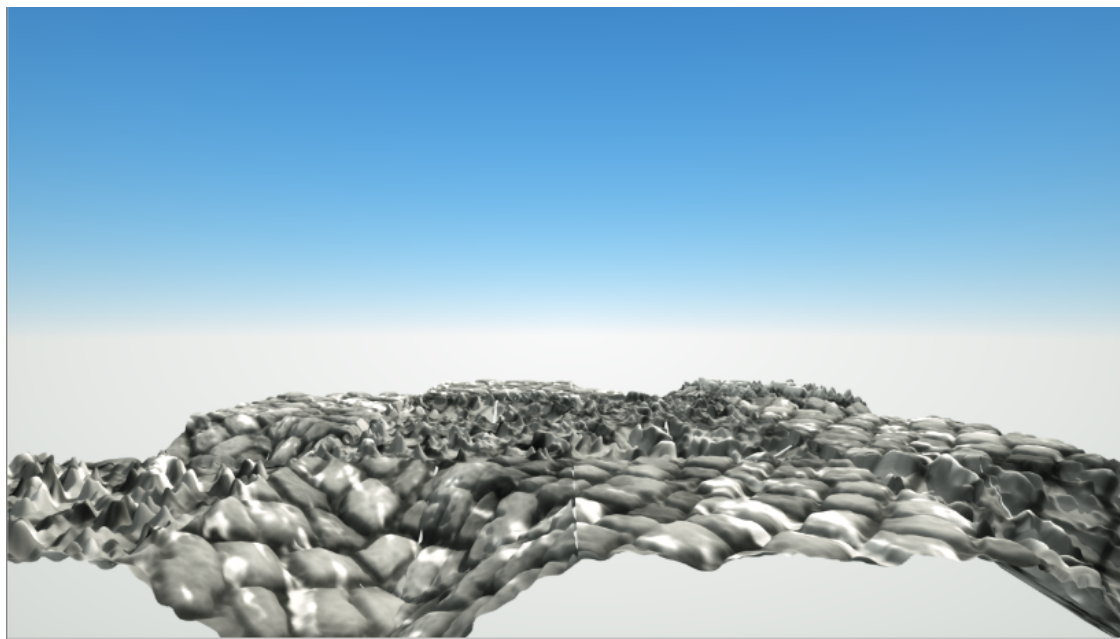


¹The ratio of diffuse and specular reflection.

²A set of attributes or parameters that describe surface characteristics.

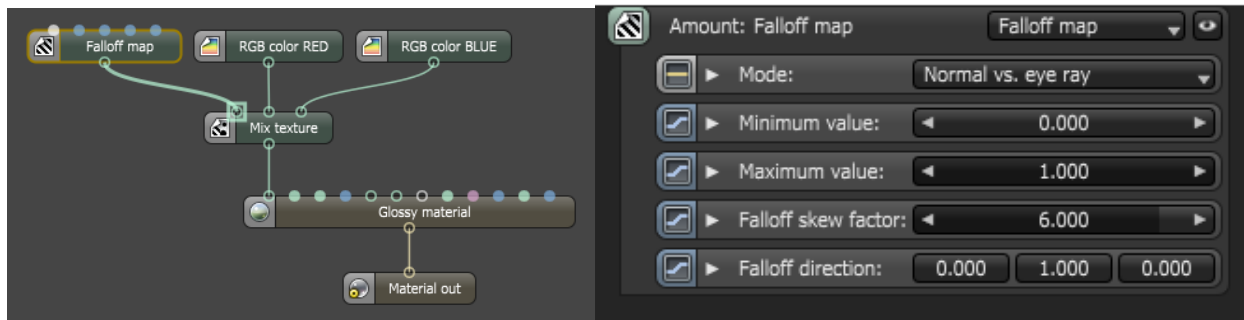
³The representation of the surface or volume properties of an object.

⁴Used to mix any two material types.



Falloff Texture

The fall off map is a texture node typically used to control the blend of two materials depending on the viewing angle of the materials geometry. The Falloff map may be used to control the blending amount of a mixed node. The mixed node can either be a Mix Texture or a Mix **Material**¹:

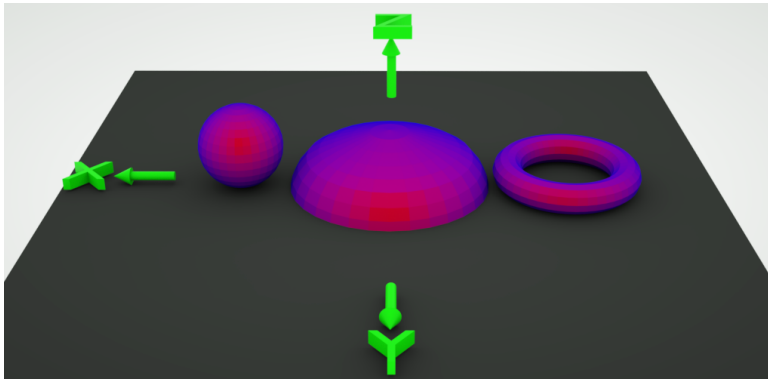


The angle between the eye ray and the shading normal is mapped from $[0^\circ, 90^\circ]$ to $[0, 1]$. For values larger than 1.0, the Falloff Node does a gamma correction using the skew factor as exponent. The skew factor is used to interpolate between the spectral shades resulting from the Minimum and Maximum values which are based on the first and second inputs of a mixed node.

Three modes of the Falloff Map

- **Normal vs Eye Ray:** This is the default mode where the falloff is calculated from the angle between the surface normal and the eye ray. This mode is more commonly used for reflections and the falloff color range affects faces directly in front of the view and gradually falls at angled faces towards the sides as it falls away from the straight on viewing angle therefore the Falloff Direction parameter does not apply.

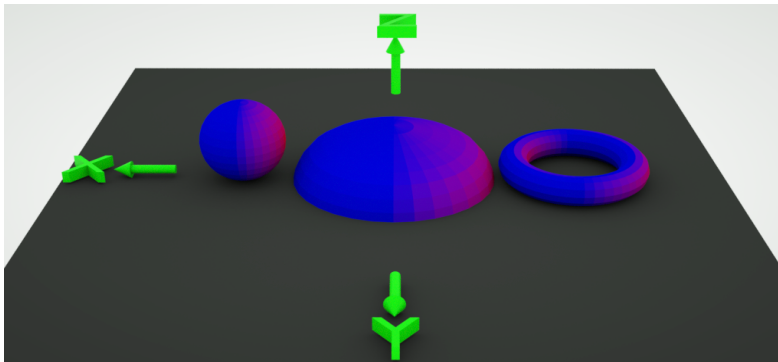
¹The representation of the surface or volume properties of an object.



apply)

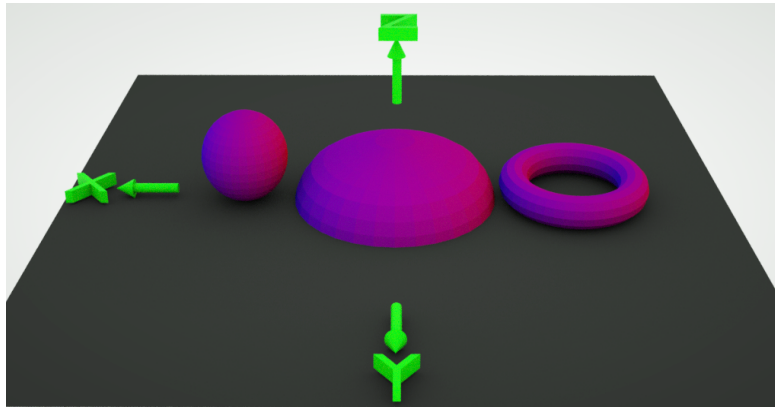
(Skew factor = 1; Direction does not

- **Normal vs. Vector 90deg:** The falloff is calculated from the angle between the surface normal and the specified direction vector maxing out at 90 degrees. This is similar to the default mode except that it maintains the effect of the color range according to the Falloff Direction x/y/z.



(Skew factor = 1; Direction x=1)

- **Normal vs. Vector 180deg:** The falloff is calculated from the angle between the surface normal and the specified direction vector maxing out at 180 degrees. This provides a wider color range from the minimum to the maximum values and maintains the effect of the color range according to the Falloff Direction x/y/z.



(Skew factor = 1; Direction x=1)

Minimum Value

This is the value if the angle between the two directions is 0. This is the value/lightness (0 to 1) of the map at straight on viewing angles. When used as an input to a mix node, the Minimum Value is the normal spectral shade value (color range) between the first and second input.

Maximum Value

This is the value if the angle between the two directions is at the maximum. This is the value/lightness (0 to 1) of the map at grazing angles. When used as an input to a mix node, the Minimum Value is the grazing spectral shade value (color range) between the first and second.

Falloff Skew Factor

The relative amount of the Minimum and Maximum values that are at an angle to the straight on view. 0.1 will lead to almost complete coverage by the grazing value regardless of viewing angle, whereas 15 will lead to almost complete coverage by the normal value. This parameter is set at a default skew factor of 6.

While the index value on glossy and specular nodes corresponds to a real world IOR (Index of Refraction) value on dielectric materials, like plastic and glass (metals are not supported yet and OctaneRender also does not support Bezier curves), the falloff node works differently because of this falloff skew factor.

If set to 1 then the value is proportional to the angle between the normal and the camera ray, i.e. if it is viewed from 45° then the value is 0.5.

If larger than 1, then it applies a power curve to the angle.

If smaller than 1, then it inverts the skew factor, and mirrors the power curve.

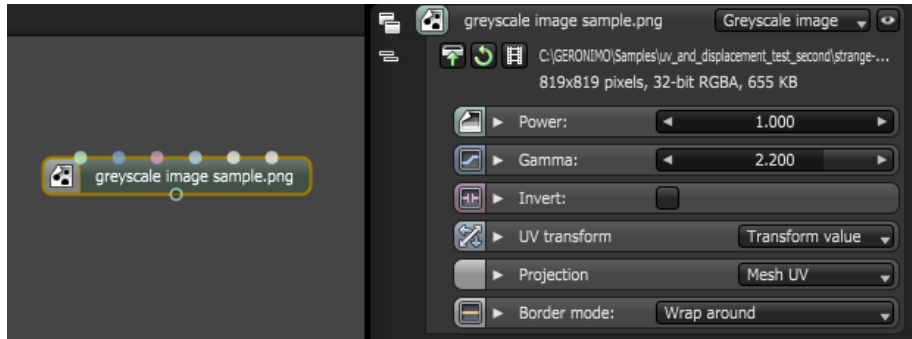
- $falloff \leq 1 : y = x^{falloff}$
- $falloff \geq 1 : y = 1 - (1 - x)^{(1 / falloff)}$

Falloff Direction

The direction vector that is used by the Normal vs. Vector 90deg and Normal vs. Vector 180deg modes. For most materials, the fresnel effect (the default mode) is usually correct while falloff direction is used for exceptional cases which can be adjusted relative to the camera. Changing the rotation of the object will not change the orientation of the falloff direction.

Grayscale Image (FloatImage)

The image is interpreted as gray scale even if it is a full colour image, thus saving **GPU**¹ ram. The Invert checkbox can be used to invert the image (useful for bump and opacity maps.) It can be scaled from white to black as a uniform color.



The Border Mode determines the texture lookup behavior when the texture coordinates fall outside [0,1].

- 0 = Wrap around
- 1 = Black Color
- 2 = White Color
- 3 = Clamp Value
- 4 = Mirror

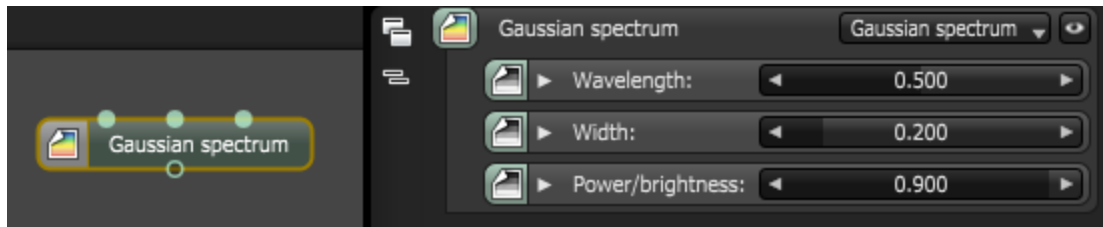
When to use Floatimage versus Image Data Type?

There are some parameters where full colour data is not used (or useful). If a full colour image is loaded, it can take much more memory in the GPU than a grey scale image, even though the user only really wants the grey scale data. Since memory management is very critical for GPU rendering, the Floatimage type allows a user to load a full colour texture but it will be interpreted as a grey scale image and therefore use less video ram. If the full colour data is needed then use the Image data type (normal maps, diffuse maps).

¹The GPU is responsible for displaying graphical elements on a computer display. The GPU plays a key role in the Octane rendering process as the CUDA cores are utilized during the rendering process.

Gaussian Spectrum

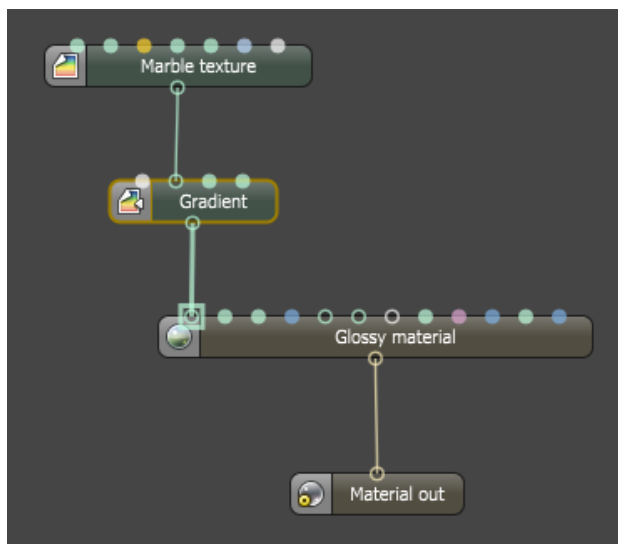
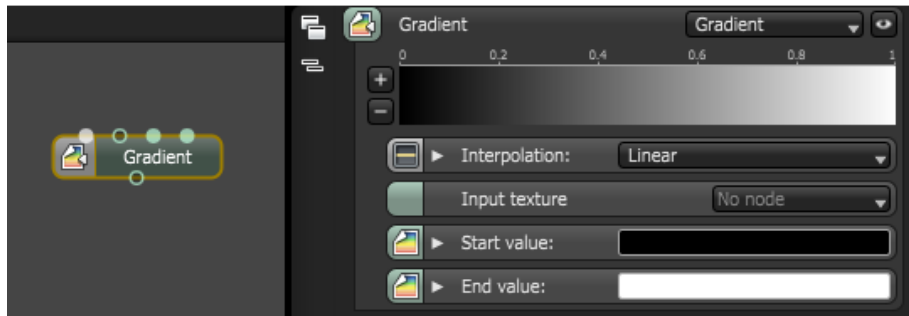
The texture is based on a Gaussian distribution spectrum (wavelength 0 -> 1, width 0 -> 1 and power 0 -> 1). The wavelength is used to set the center of the spectrum and the width is used to set how wide the curve is. The narrower the width, the more pure and saturated the colour.

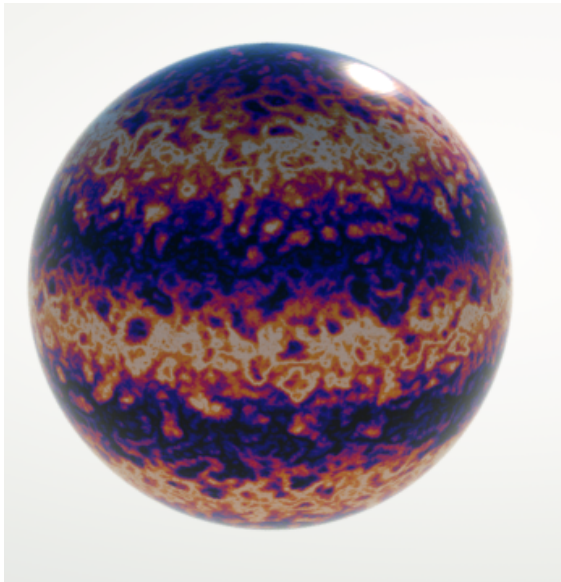


Octane actually converts classic RGB colours to Spectrum colors. The Gaussian Spectrum Texture eliminates the need for this conversion since it is already Spectrum-based. Spectrum-based color provides better results compared to RGB nodes, this is evident in Texture emission.

Gradient Texture

This is used to effect graded linear changes to denote slopes, depth, distance or color progressions to procedural texture maps.





RGB Image (Color Image)

RGB Image texture is used to connect an external image file to any material parameters that accept a texture map (Figure 1).

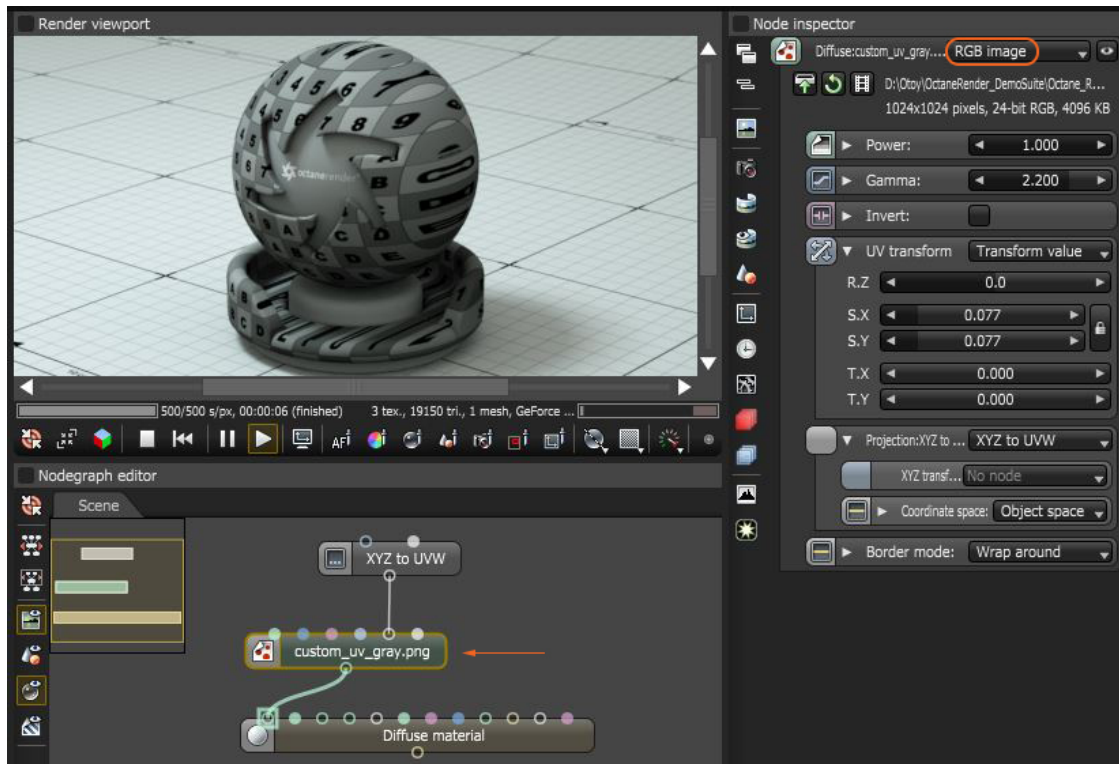


Figure 1: The RGB Image node is being used to import a PNG image into the **Diffuse¹** pin of a **Diffuse material²**.

To create an icon of the image click on the eyeball icon in the upper right. The drawer icon is used to replace the image, the circular arrow reloads the image and the filmstrip icon allows you to load an animated sequence.

¹Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

²Used for dull, non-reflecting materials or mesh emitters.

The **RGB Image** texture will convert all images to three channels including images that are greyscale. To use memory resource efficiently only use the **RGB Image** texture for color inputs. For greyscale channels such as bump use the **Greyscale Image** texture.

Parameters

Power

Controls the brightness of the image, lowering the value will cause the image to appear darker on the surface.

Gamma¹

Controls the luminance of the input image and can be used to tune the image or color correct the image if needed.

Transform

These settings can be used to position, rotation, and scale the texture on the surface.

Invert

Inverts the color values of the image.

Projection

Input accepts an Octane projection node. If nothing is connected to this input the image texture will use the surface's UV texture coordinates by default. Projection nodes are described in the Octane Projection node section of this manual.

Border Mode

Sets the behavior of the space around the image if the image does not cover the entire geometry. The default behavior is Wrap around, which means that the image is repeated in the areas outside of the images coverage. If set to white or black, the area outside the image will be white or black respectively.

¹The function or attribute used to code or decode luminance for common displays. The computer graphics industry has set a standard gamma setting of 2.2 making it the most common default for 3D modelling and rendering applications.

Instance Color

The **Instance Color** texture is used to hold an image and prepares each pixel of the image to be mapped to geometric instance IDs.

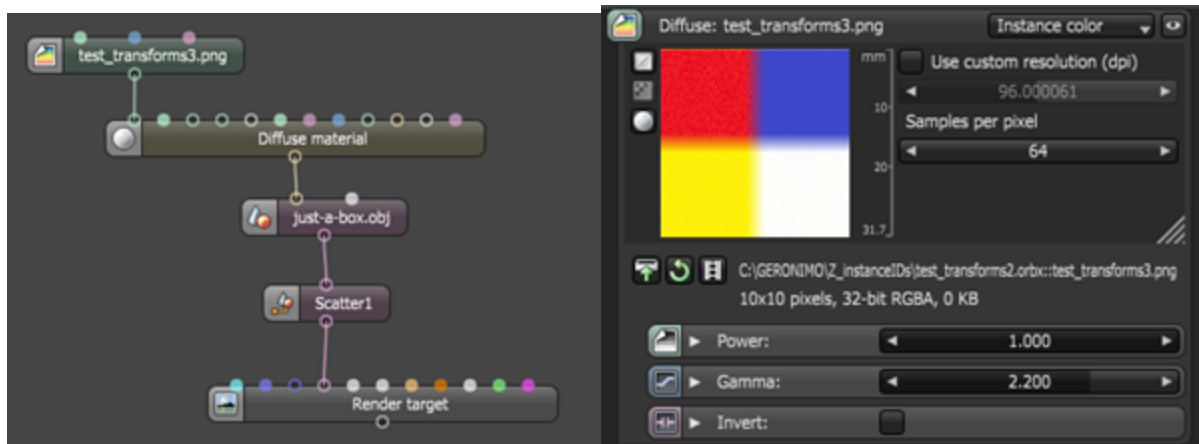
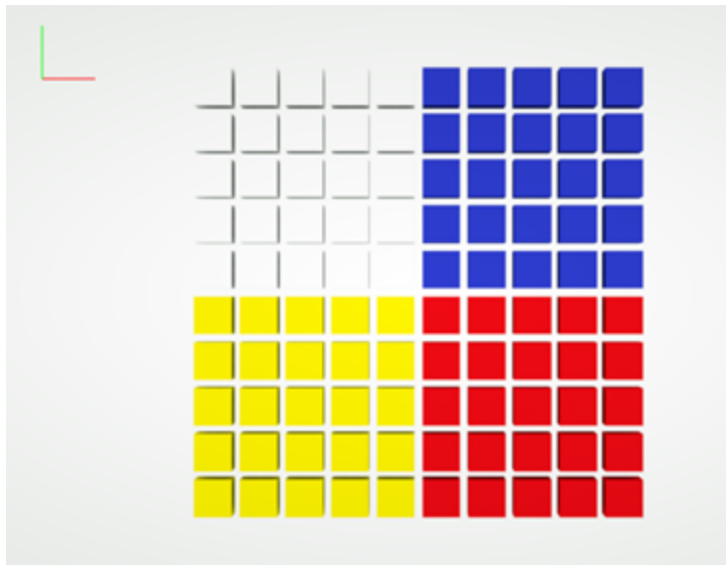
As a **Lua**¹ Script or any of the Octane Plugin Editions are able to generate instances of an object, these same processes can also assign an ID to each of the instances generated such that number of instances results in a grid instance IDs. Colors can then be assigned via texture to each instance ID, in this case with an image in the Instance Color texture, matching the IDs with pixels of the image starting at the bottom left in row major order up to the top right.

For the example below, there are 10 x 10 instances, and provided that a lua script was used to assign IDs to each instance there would be 100 IDs generated.

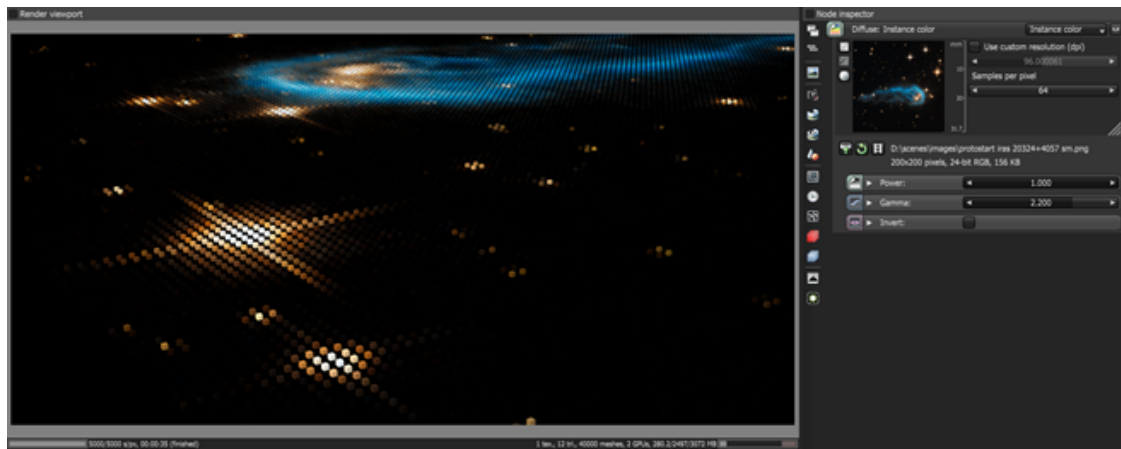


An image with 10x10 pixels may be plugged into the Instance Color texture to match these dimensions. And each pixel will be mapped and assigned to the instance IDs.

¹A scripting language that supports procedural, object-oriented, functional, and data-driven programming. It can be used to extend Octane's functionality. A scripting language that supports procedural, object-oriented, functional, and data-driven programming. It can be used to extend Octane's functionality.

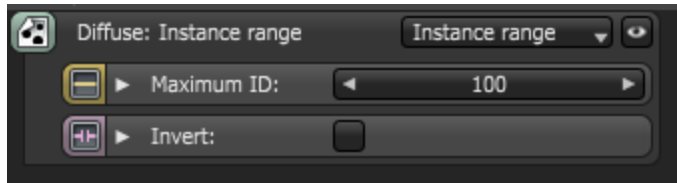


It could also be the other way around, as in the case where the dimensions of an existing image is used as basis for creating the creating the instances. Creating the instances and assigning an ID to each instance can be easily achieved by a LUA script, or provided by a plugin edition of Octane, or any other standard scatter plugins supported by Octane. Below is one example of the possibilities using explicitly defined IDs in conjunction with the Color Instance texture:

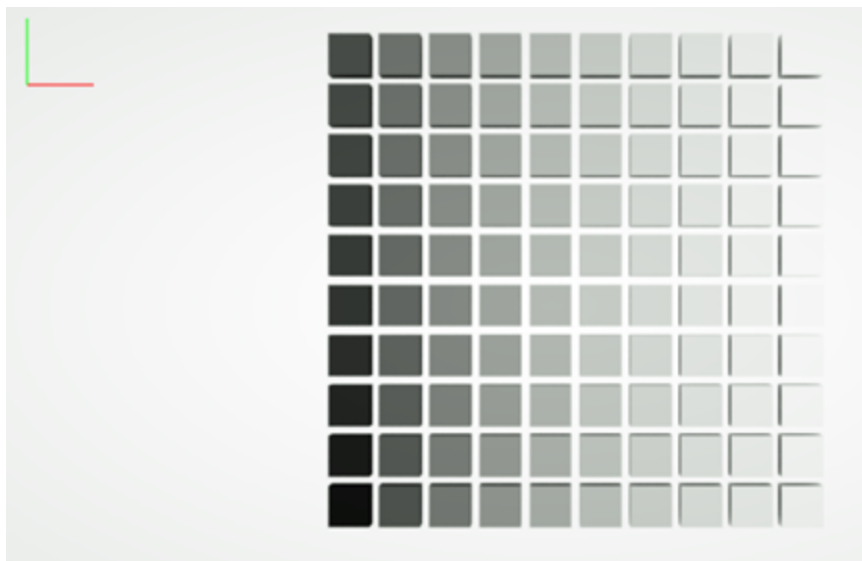


Instance Range

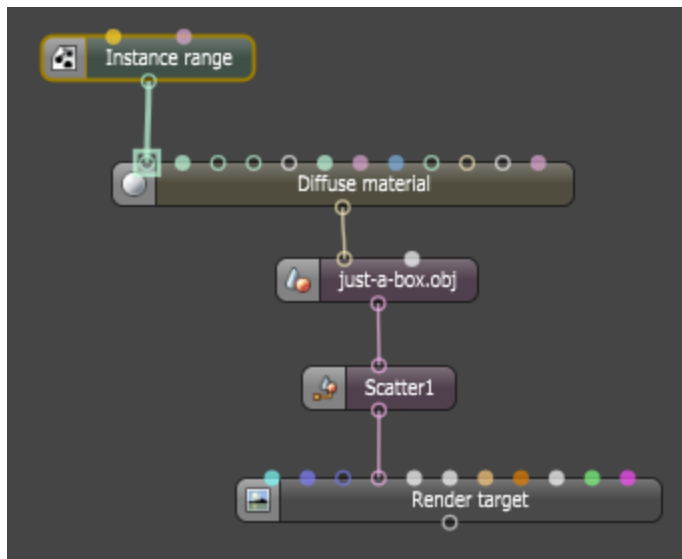
The **Instance Range** texture is used to hold a greyscale color with the range 0 – Maximum ID and prepares this range to be mapped to geometric instance IDs.



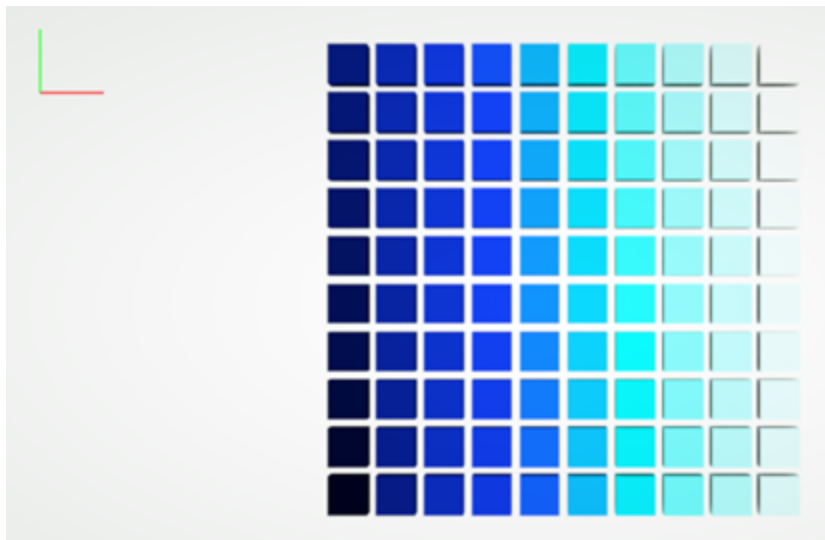
As a **Lua**¹ Script or any of the Octane Plugin Editions are able to generate instances of an object, these same processes can also assign an ID to each of the instances generated such that a grid of instances results in a grid instance IDs. Colors can then be assigned via textures to each ID matching it using the instance range. For the example below, there are 10 x 10 instances provided that a lua script was used to assign IDs to each instance, therefore 100 IDs are generated. To map the range, it's maximum ID attribute must match the number of IDs which was generated, in this case 100.

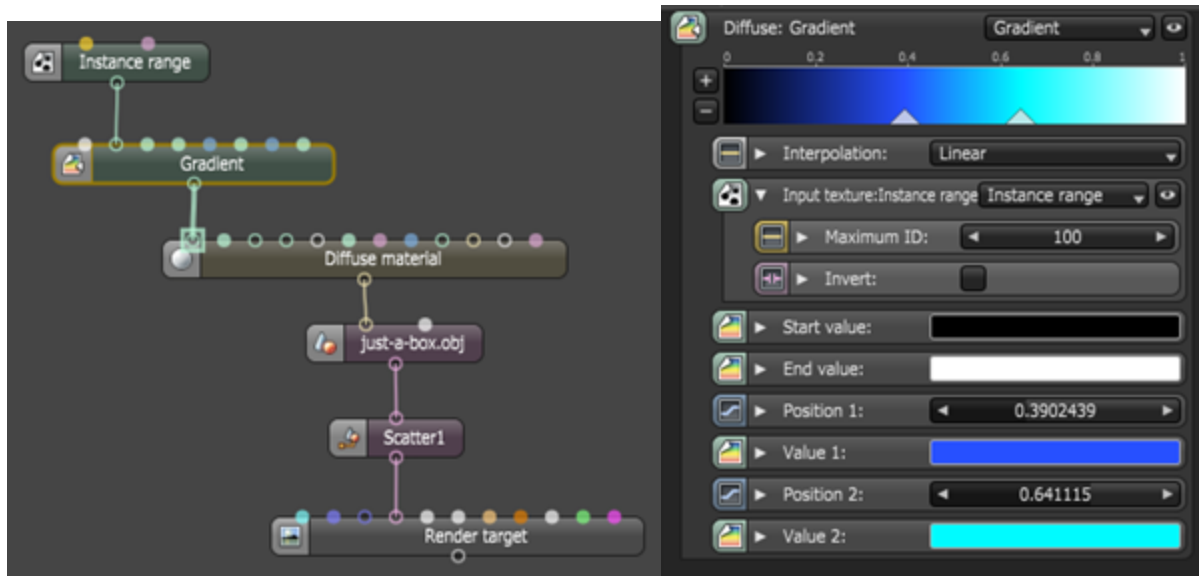


¹A scripting language that supports procedural, object-oriented, functional, and data-driven programming. It can be used to extend Octane's functionality. A scripting language that supports procedural, object-oriented, functional, and data-driven programming. It can be used to extend Octane's functionality.



You can further use other mapping textures such as Gradient texture in conjunction with the Instance Range to create some interesting variations.

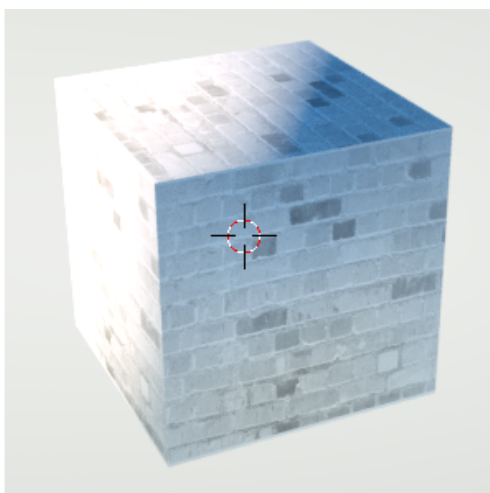
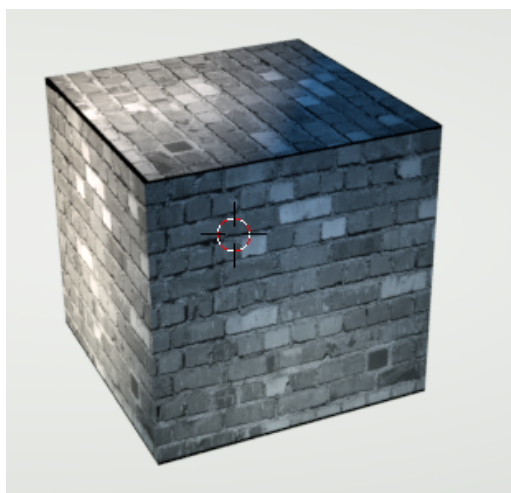
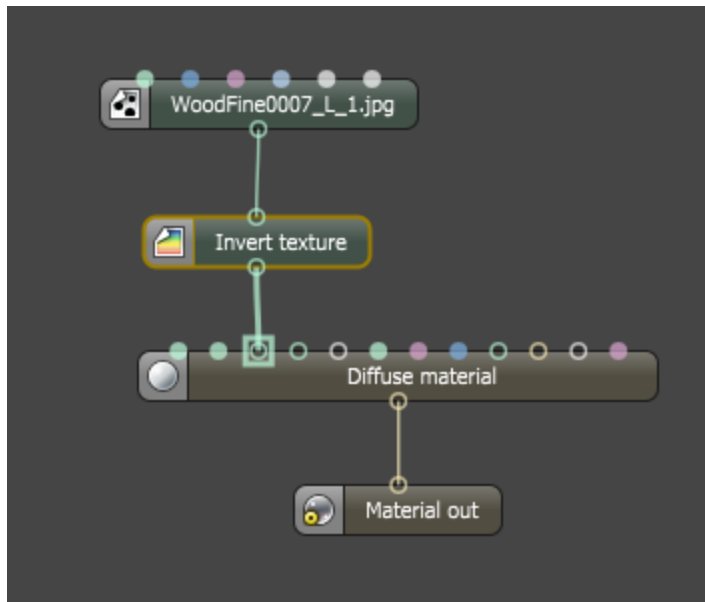
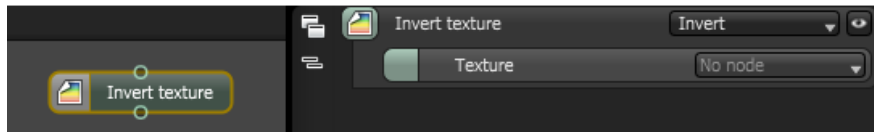




Since the colors are stored as a texture, this makes it more flexible in comparison to storing the colors directly with the geometry and thus allows users to specify more than one color per instance.

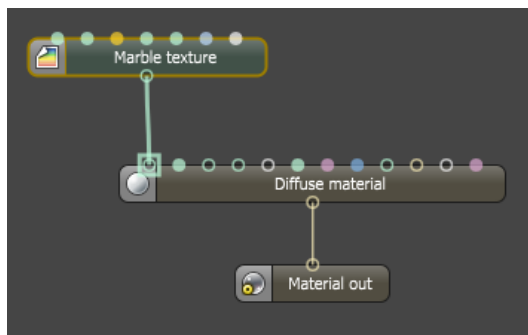
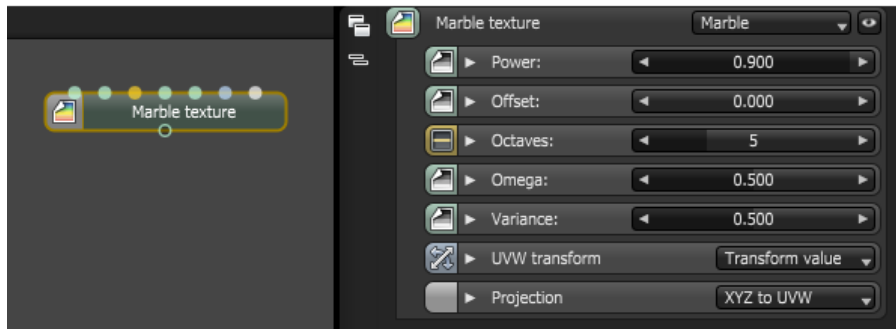
Invert Texture

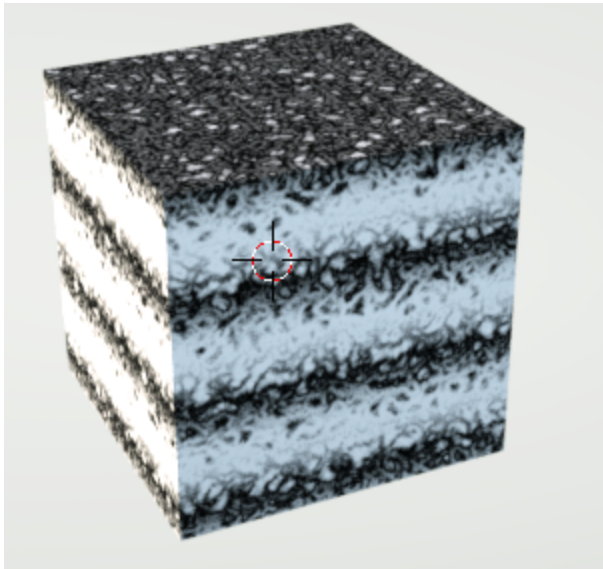
This inverts the floatimage textures for bump or opacity maps.



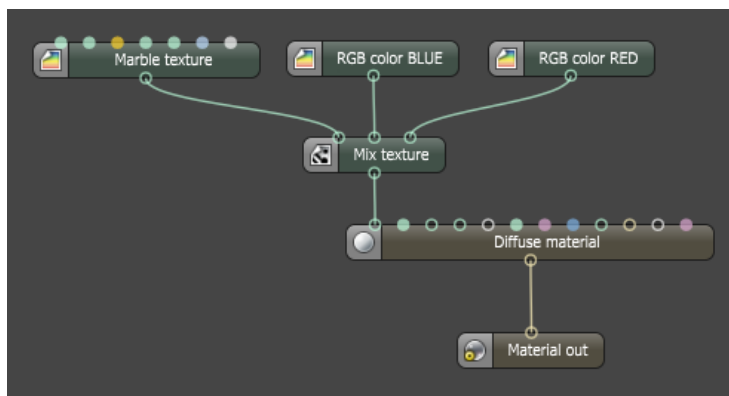
Marble Texture

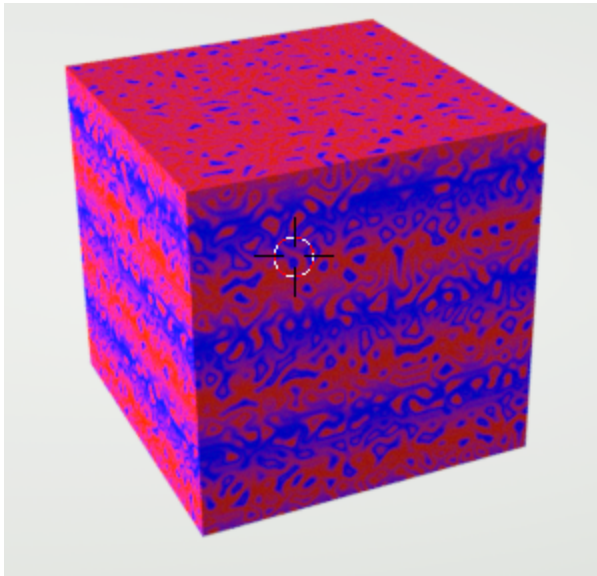
The **Marble** texture is a procedural texture that can be used to create marble-like noise. It is basically a grey-scale generator similar to a turbulence texture but more fine-tuned to create marble-like patterns.





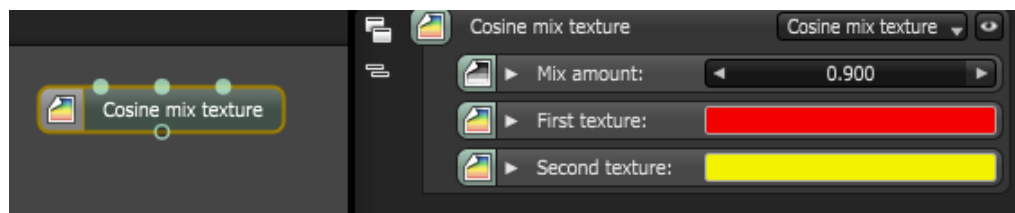
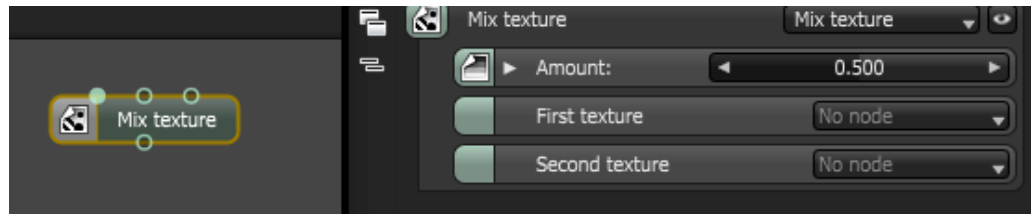
Colors and other procedural texture may be mixed together to generate a marble pattern.



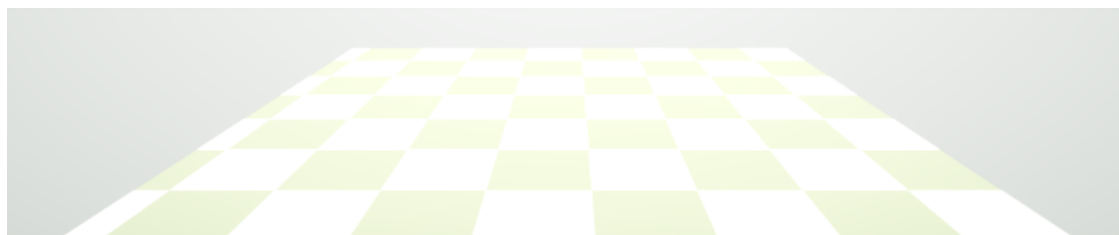
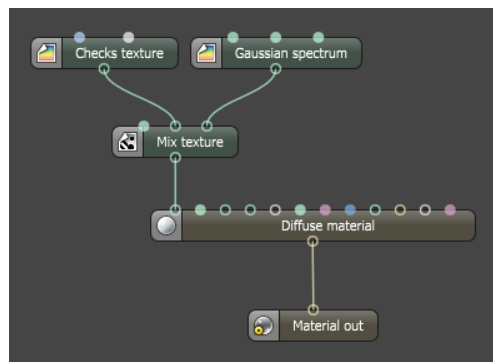


Mix/Cosine Mix Texture

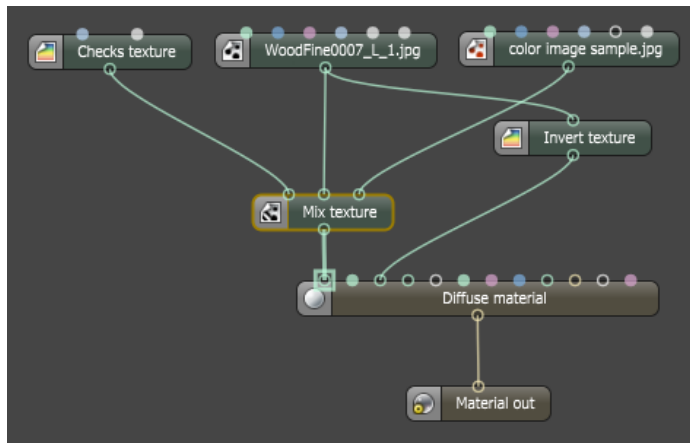
The **Mix** textures are used for mixing two textures together (either linearly or according to a cosine wave.)



For example, a Checks Mix combined with a GaussianSpectrum.

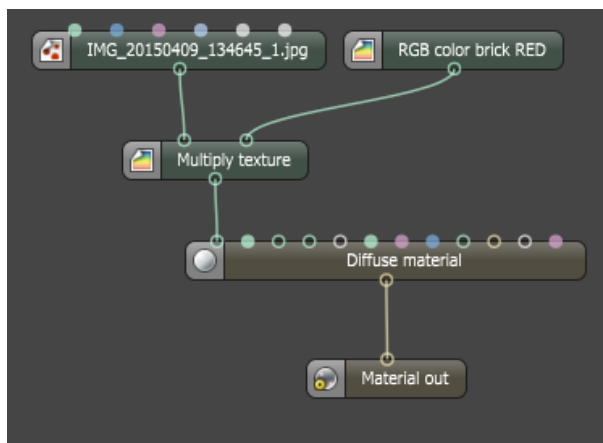
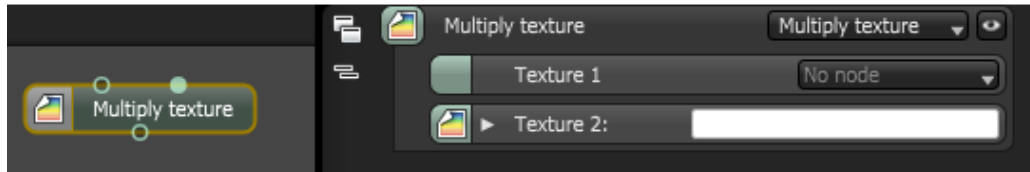


Example 2:



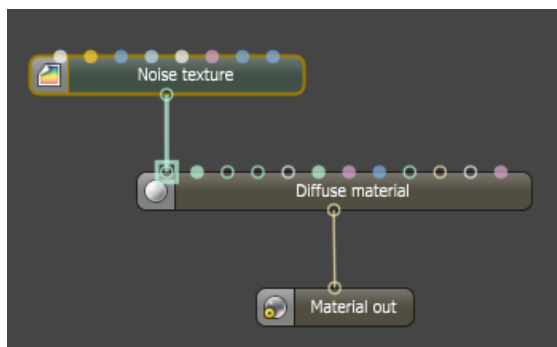
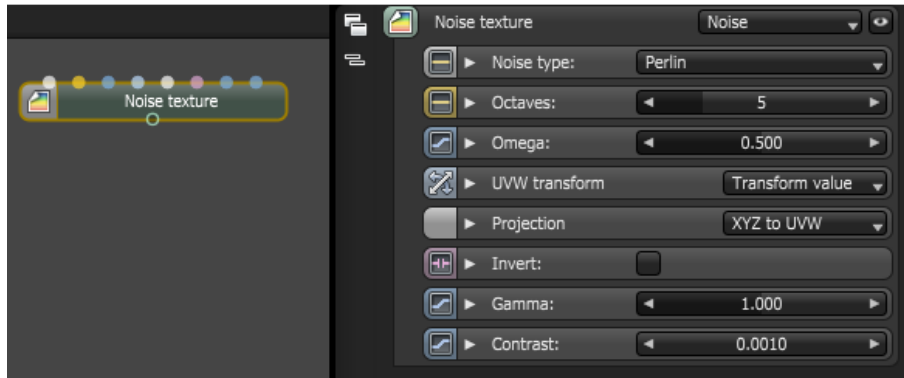
Multiply Texture

This is used to emulate a tint of one texture applied on another texture.



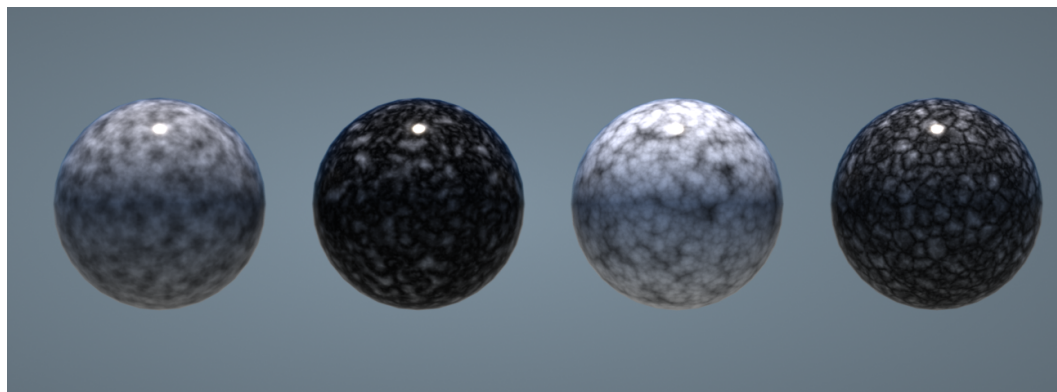
Noise Texture

The Noise procedural texture is useful for creating and controlling the appearance of intentional noise.



This currently has 4 noise types:

- **Perlin** - is like the turbulence node with "use turbulence" disabled.
- **Turbulence**- is like the turbulence node with "use turbulence" enabled.
- **Circular**- is a Worley noise.
- **Chips**- is a Voronoi noise.



Perlin

Turbulence

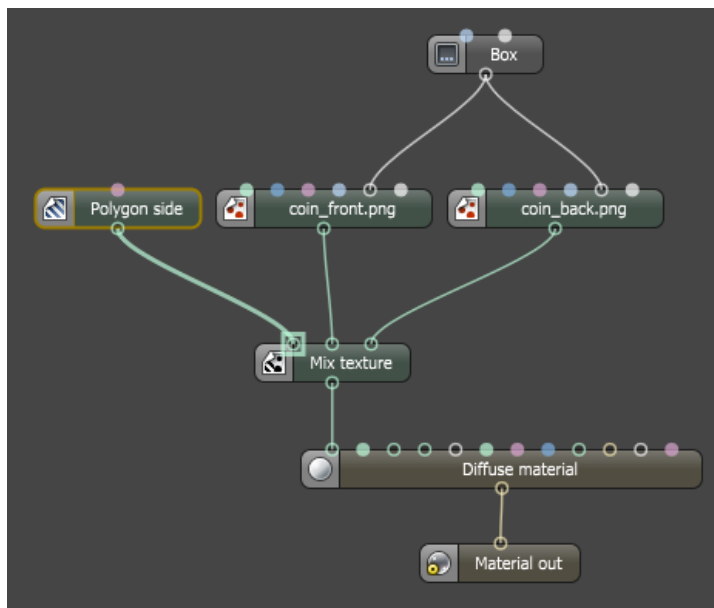
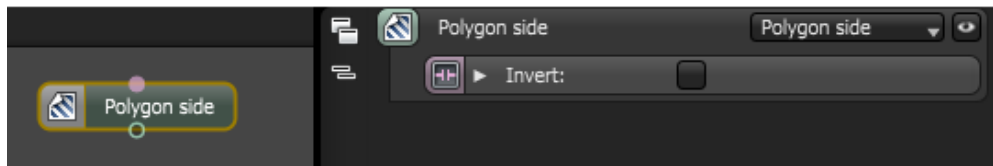
Circular

Chips

Polygon Side Texture

The **Polygon Side texture** generator produces a texture node that renders white on the front face and black on the backface of a polygon. This is useful for the following:

- backface culling by putting this texture into the opacity channel,
- allowing double-sided materials by placing it into a **mix material**¹, and
- textures by placing it into a mix texture).

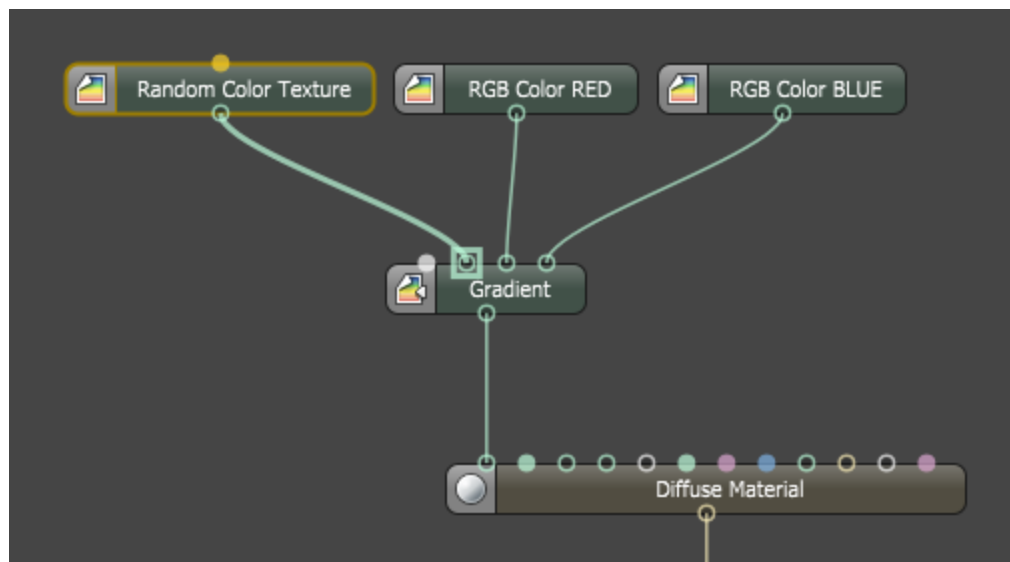
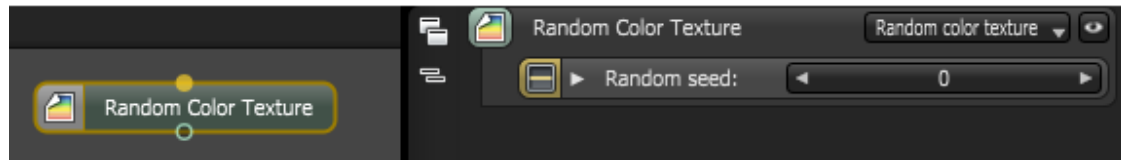


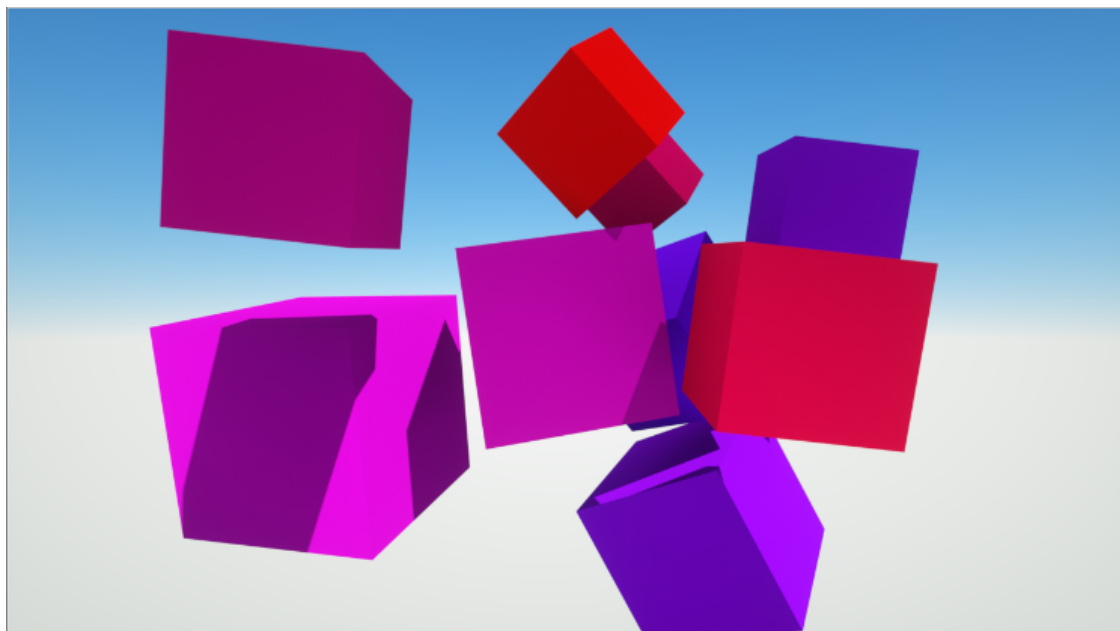
¹Used to mix any two material types.



Random Color Texture

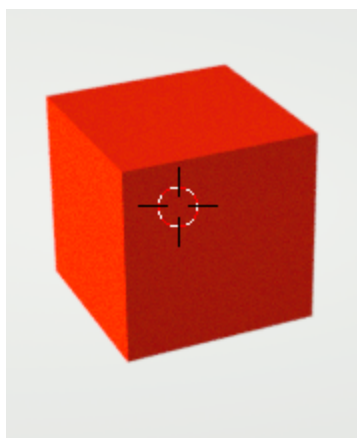
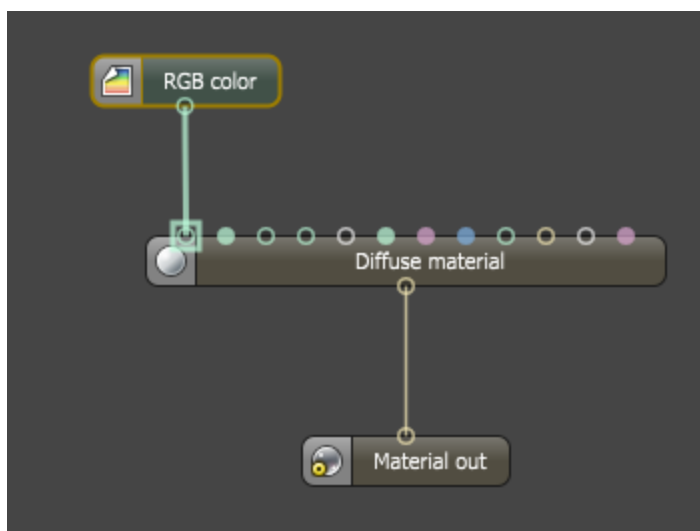
The **Random Color Texture** is a greyscale texture map which can be plugged into a Gradient Node to achieve random color variations. It works with object instances/groups.





RGB Color Texture

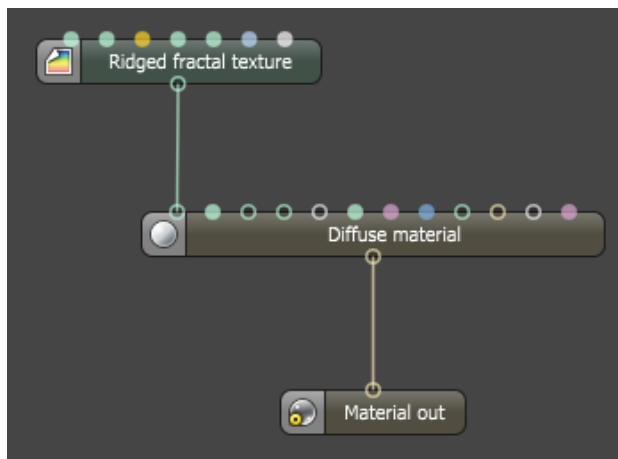
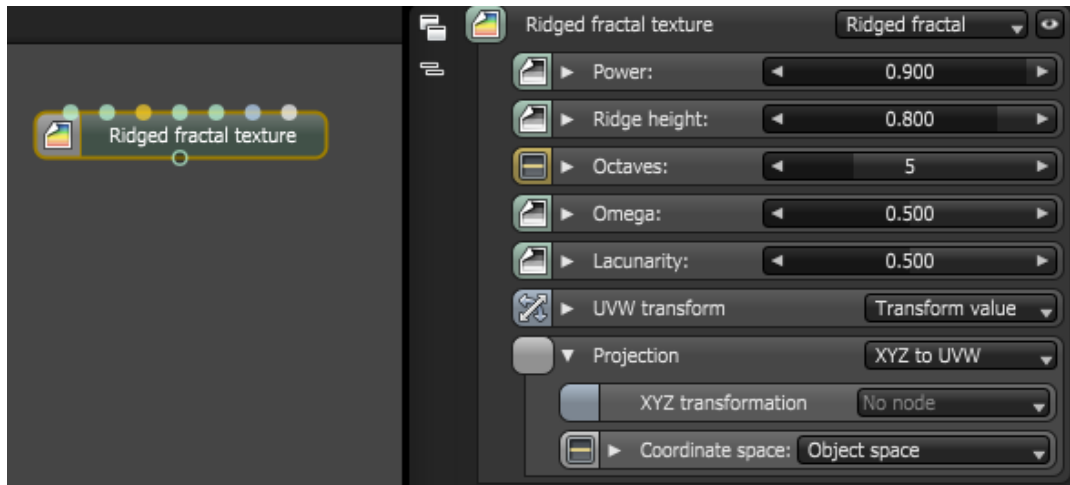
This is a color texture based on the RGB color that is selected.

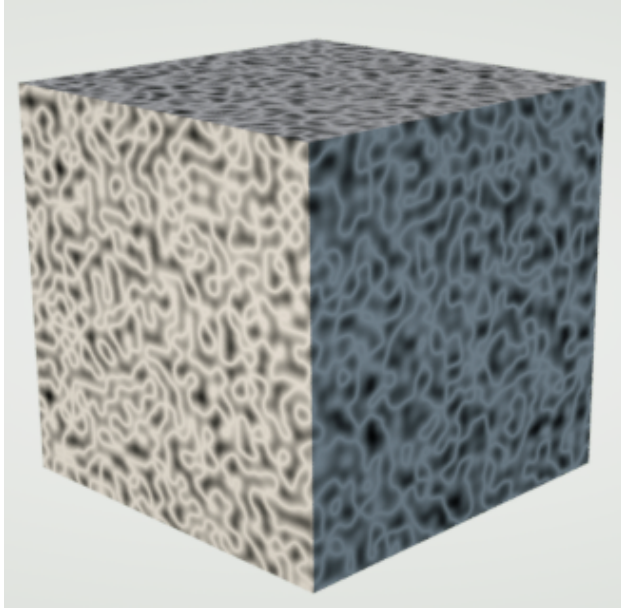


Ridged Fractal Texture

This will generate a memory-efficient texture with ridged waves and fractal patterns.

The **Ridged Fractal Texture** is a procedural texture that can be used to create ridged turbulence-like noise. It has a Lacunarity parameter to adjust the noise frequency scale factor per interval in the fractal pattern.

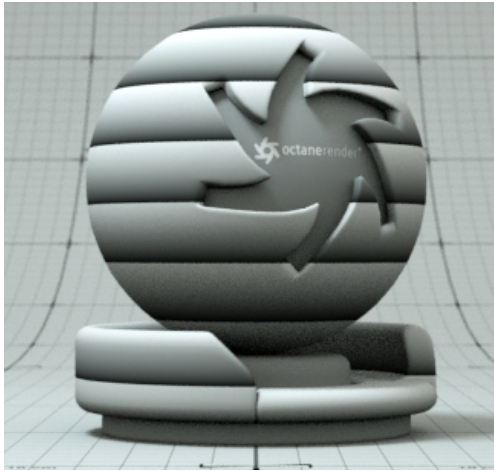




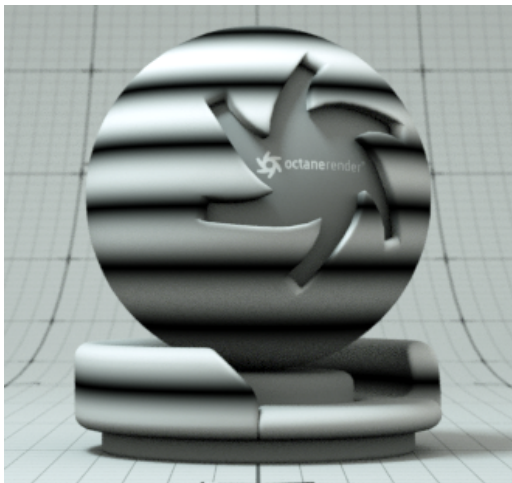
Saw/Sine/Triangle Wave Texture

These textures can be used to create various banding effects.

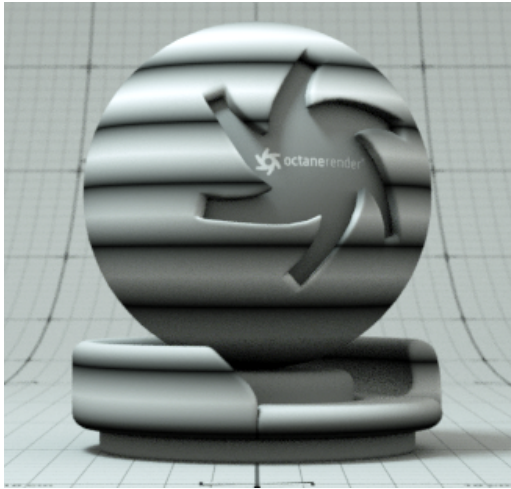
The Saw Wave Texture can generate a memory-efficient wave texture with sharp jagged-edged patterns good for wood.



The Sine Wave Texture can generate a memory-efficient texture with simple smoother wave patterns good for marble or wood.

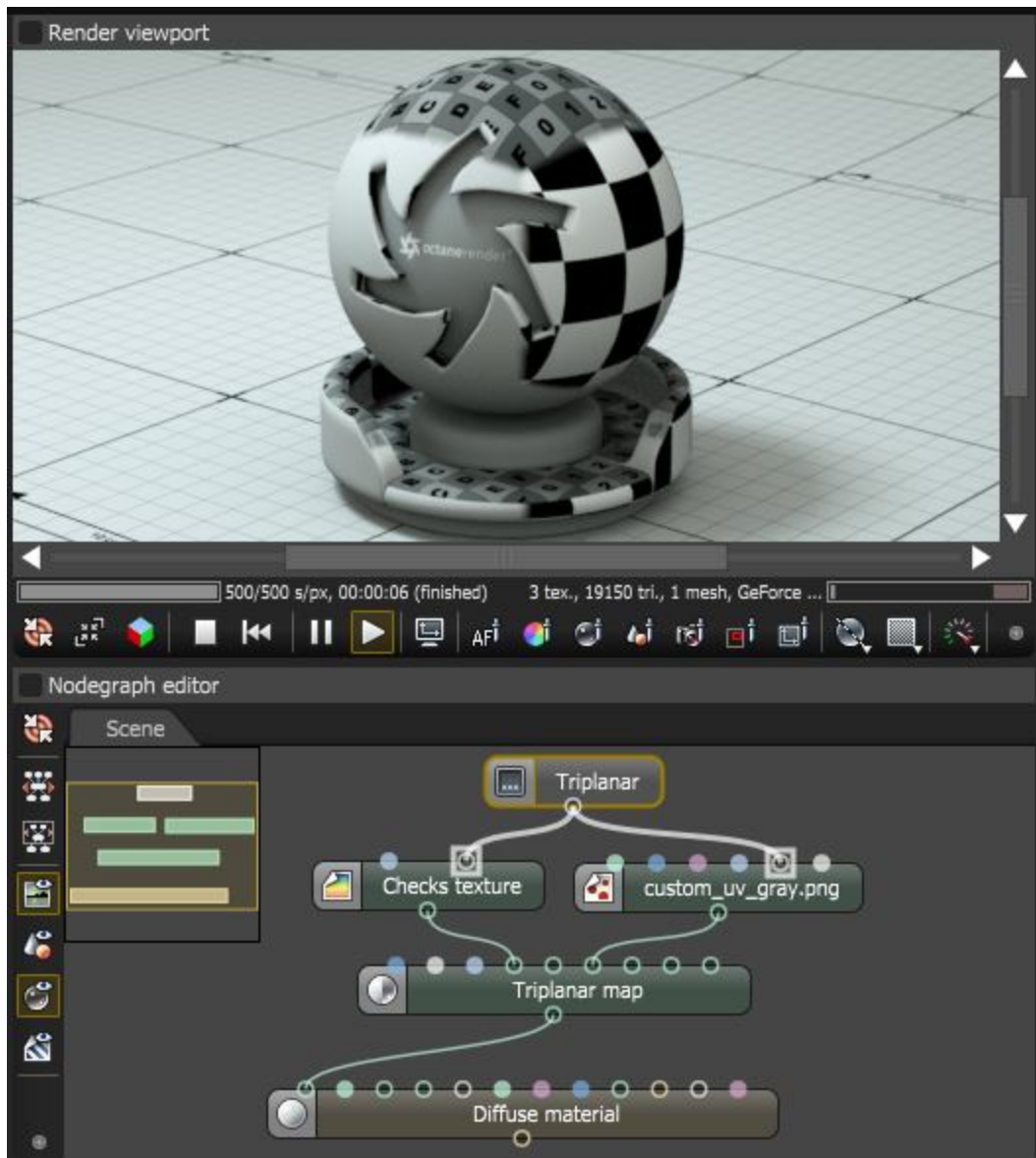


The Triangle Wave Texture generates a memory-efficient texture with sharp triangular wave patterns.



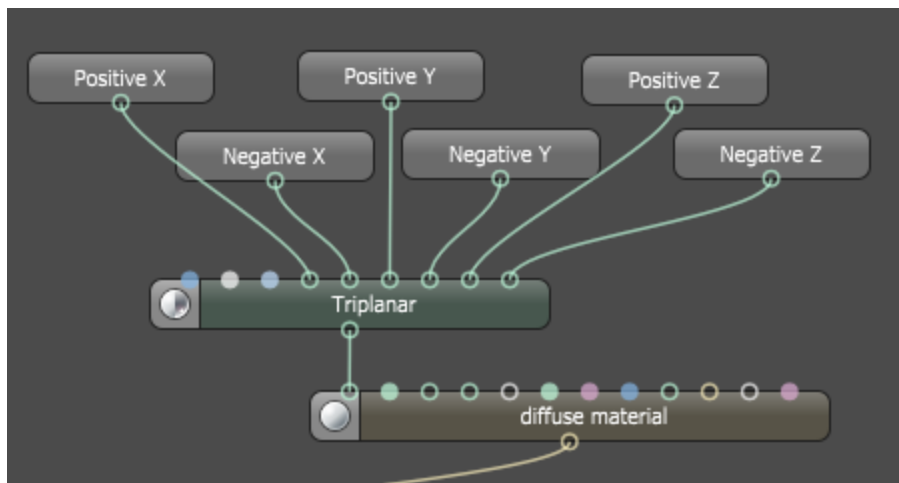
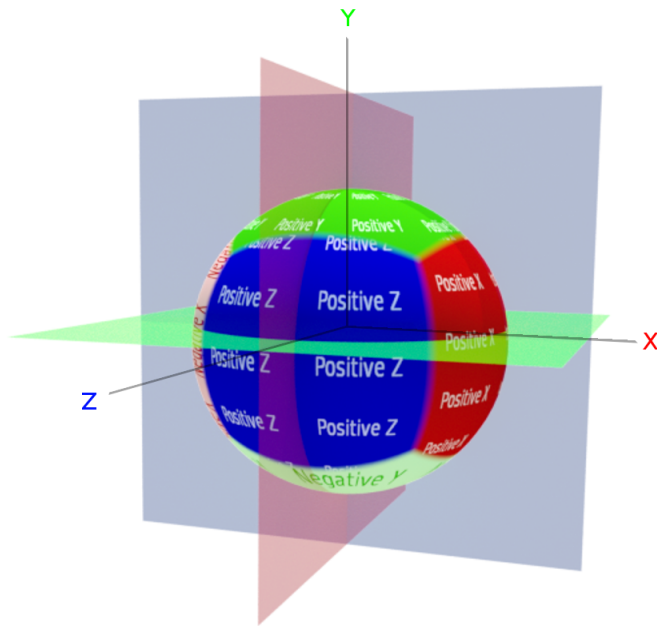
Triplanar Texture

The **Triplanar Projection** node is used in conjunction with a Triplanar Map Node. It takes the coordinates in world or object space and will pick the projection axis depending on the active axis of the **Triplanar Map** Node. This gives a quick way to map a texture on any object and presents the possibility for texture transforms local to each projection axis. The Triplanar Map node has six input pins representing the positive and negative X, Y, and Z planes. The same or different texture nodes can be mapped to each of these input pins).



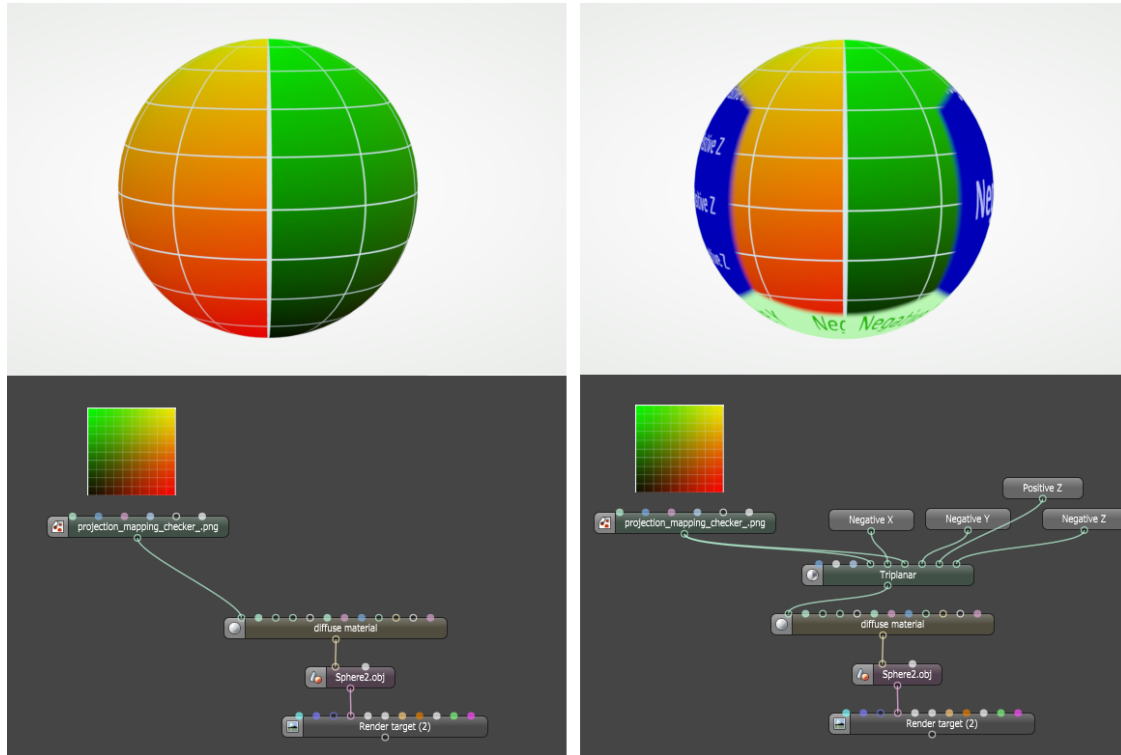
The Triplanar Map node and the Triplanar projection node are being used to map a Check texture and an imported texture to different projection planes of an object.

This texture is used for mapping the samples of multiple textures along three planes, x, y and z in world space or object space coordinates and blending them to create one seamless texture. In most cases and depending on the complexity of the model, it generally allow users to map textures without necessarily having a UV-mapped mesh.

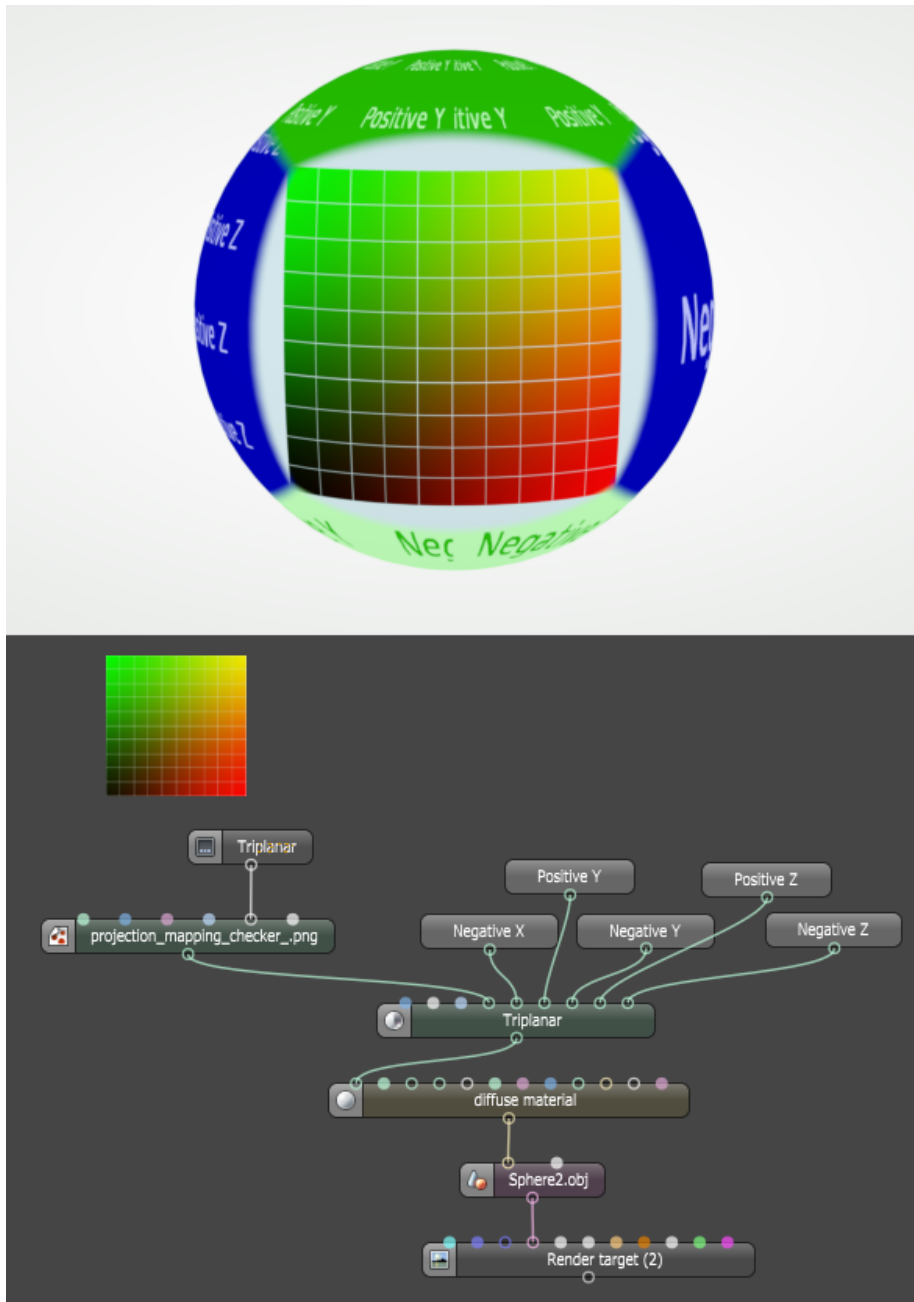


The **Triplanar Map** Node divides a material map into six areas corresponding to the x,-x,y,-y,z and -z axis. Initially, a texture would cover the entire surface of the object but the triplanar mapping confines visibility of

the texture map onto the corresponding axes that are active for that texture. The illustration below shows a comparison of an image without the triplanar mapping versus one that is plugged into the Positive X and Positive Y axis pins of a **Triplanar Map** Node:



The **Triplanar Map** Node may further depend on a **Triplanar Projection** Node which localizes the projection of the texture to a corresponding plane and allows texture UV transforms relative to that projection axis:



The **Triplanar** Texture has the blend angle and blend cube transform parameters which can be adjusted to soften the seams.

Turbulence Texture

The **Turbulence** texture can be used to create many different effects based on banded noise. This flexible texture can be used to create wood, marble, flesh, and many other useful textures.

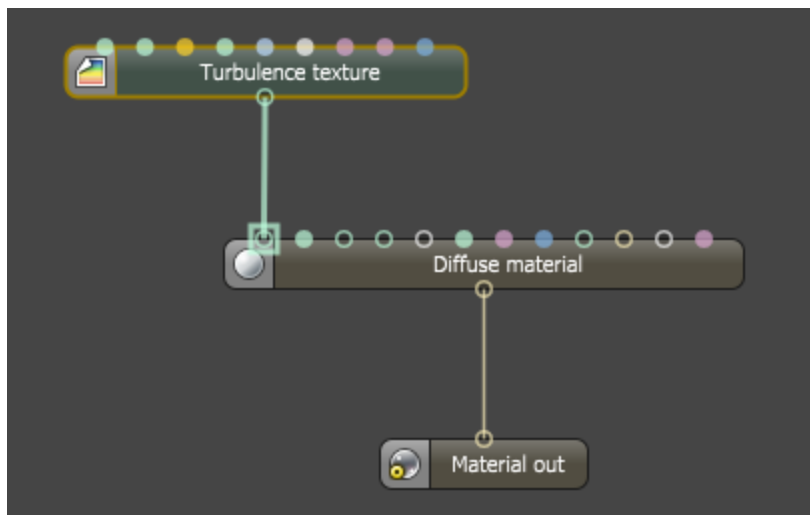
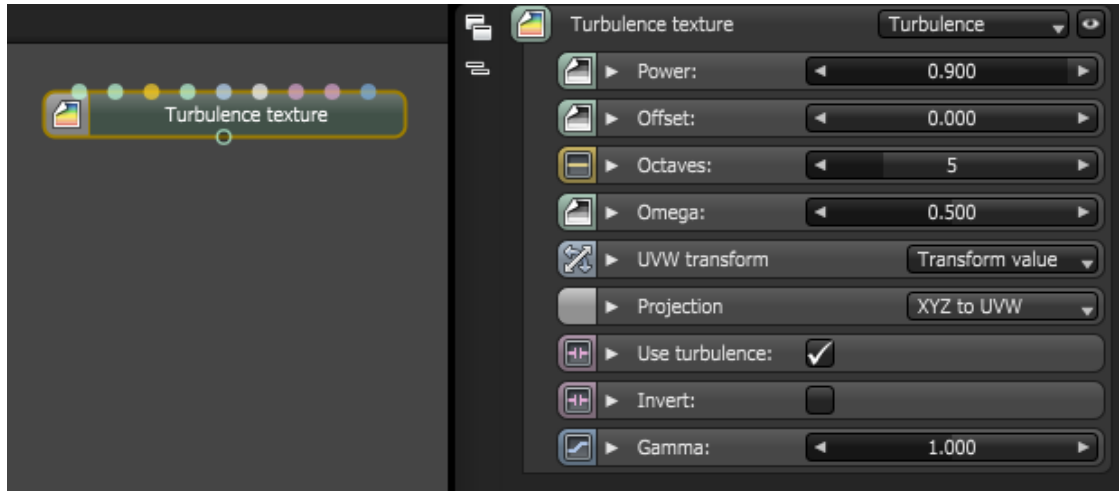


Figure 4.21 – Turbulence Example 1

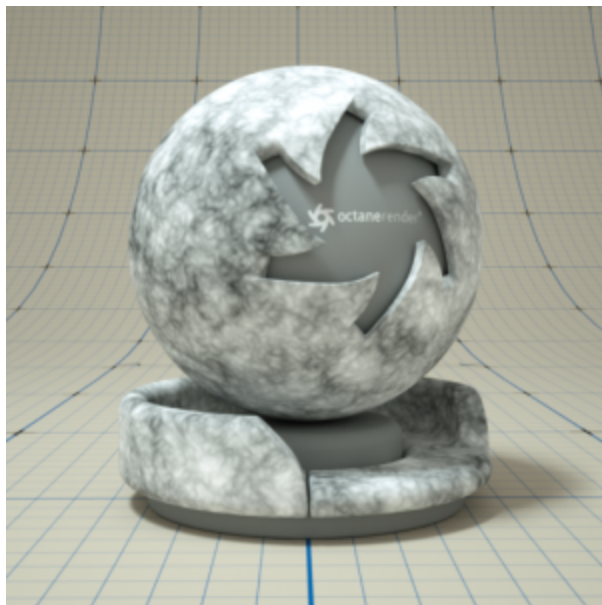


Figure 4.22 – Turbulence Example 2

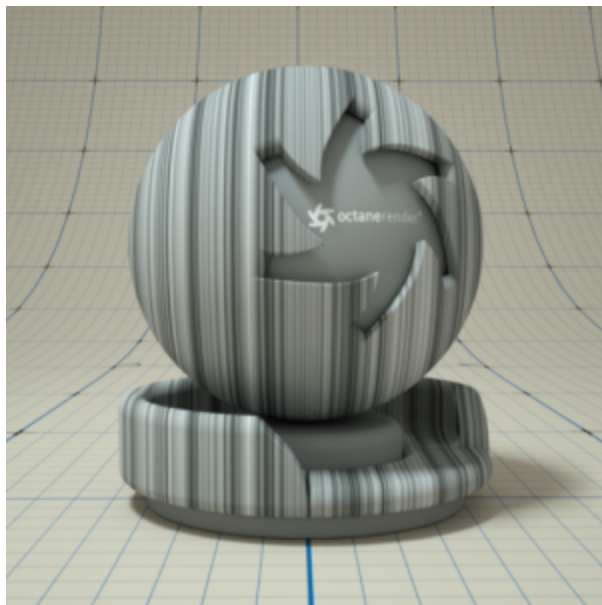
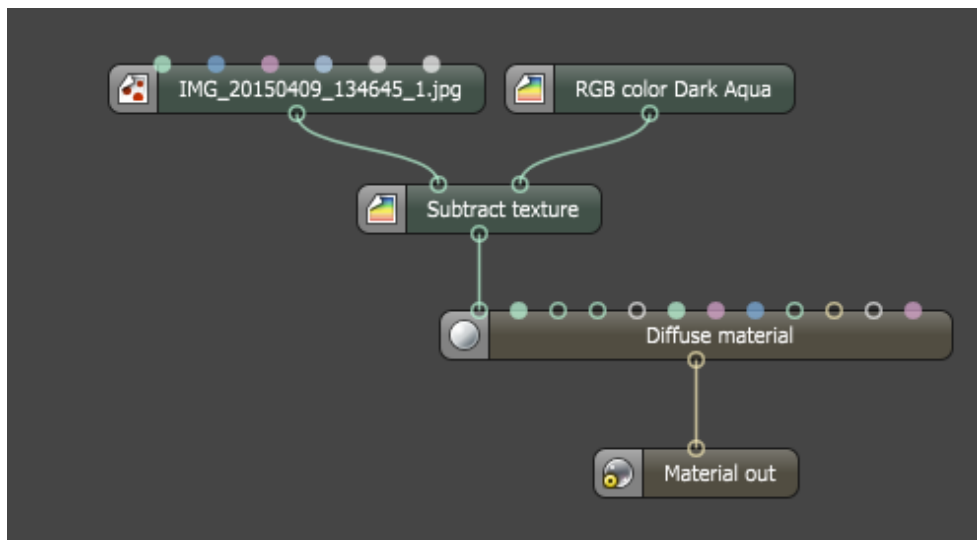
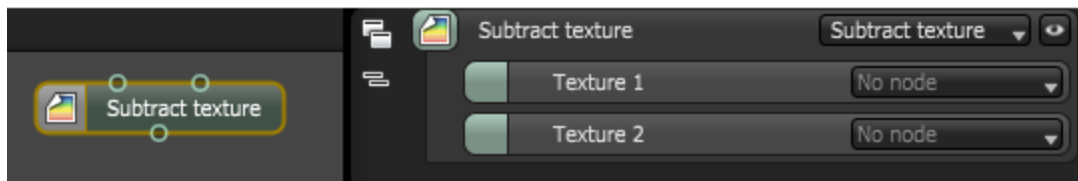


Figure 4.23 – Turbulence Example 3

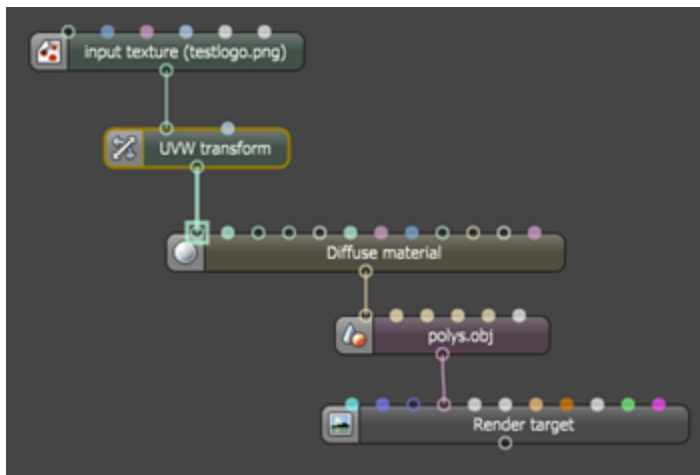
Subtract Texture

The **Subtract Texture** is useful for removing a color or procedural texture as a channel from another texture.

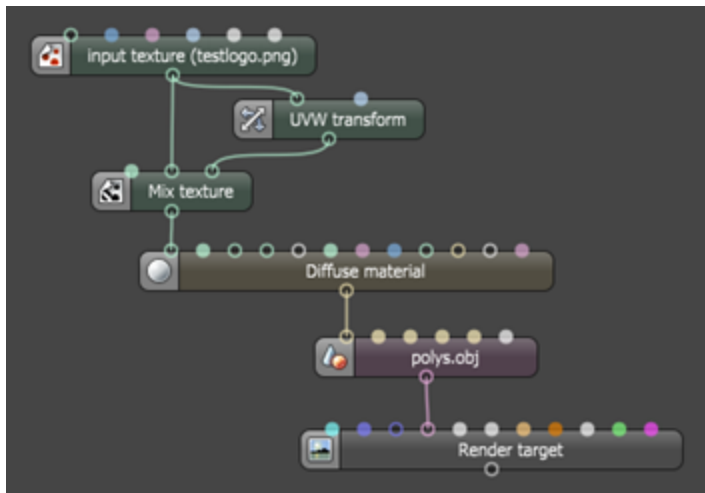


UVW Transform Texture

The **UVW Transform** Texture takes an input texture and applies a map to transform the input texture's UV layout on top of the input texture's own UV coordinate transformation.

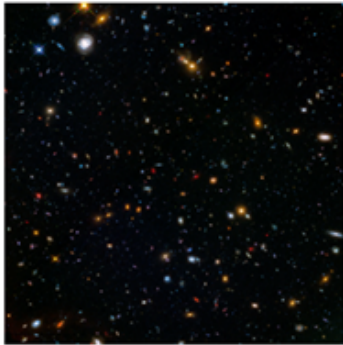


It is applied additionally to the input texture's UVW transform and this concept becomes more useful when used in conjunction with other mapping textures to combine different scales/orientations/translations of that same texture to create a larger detail range.

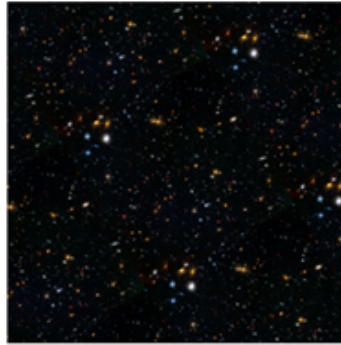


The **UVW Transform** Texture can be used in conjunction with other mapping textures like the Triplanar Map texture, Mix Texture, Cosine Mix Texture or the logical texture maps (Comparison) or arithmetic texture maps (Add, Subtract, Multiply).

Here is an example where there is a need to combine different scales/orientations/translations of the same texture to create a larger detail without creating obvious patterns:



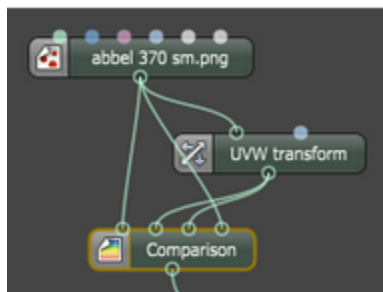
This is the original image texture.



The same image texture scaled down by a factor of 2 using the UVW transform texture map, however, this results in a repetitive pattern that is easy to spot

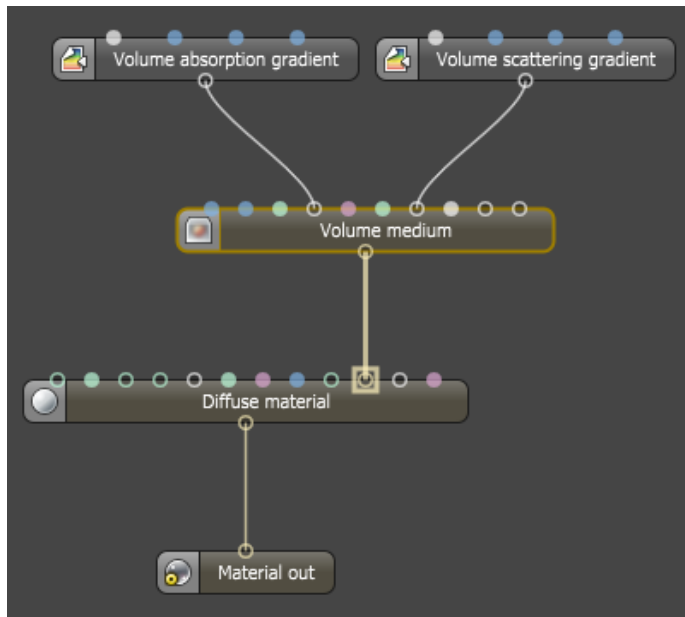
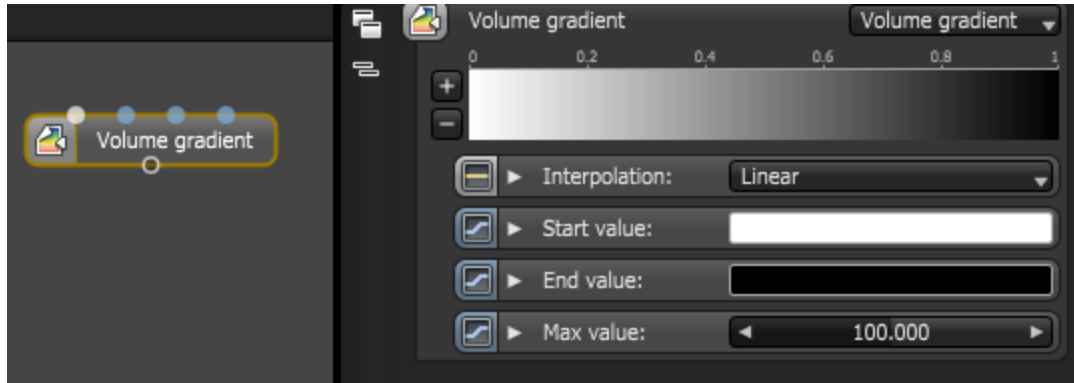


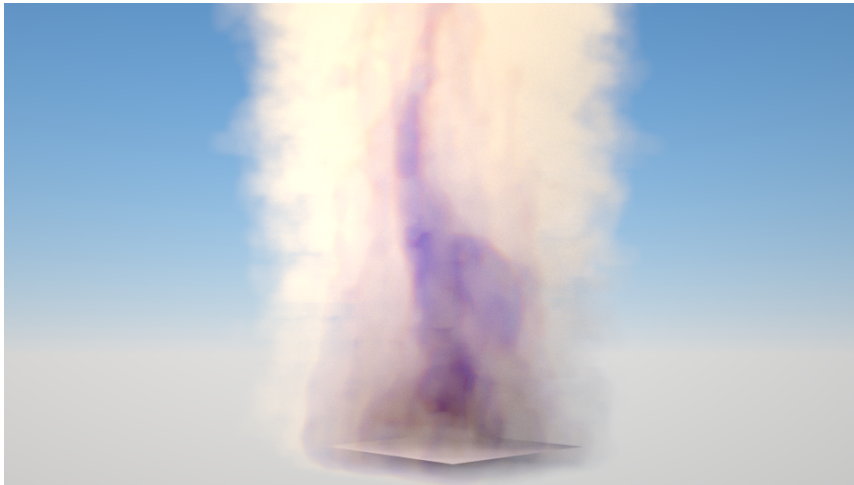
Overlaying these two with a Comparison texture makes the repetitive pattern less obvious



Volume Ramp

This is a special gradient node for Volumes like Smoke and Fire. It allows users to control the colour of a volume geometry (e.g., Flame) more precisely.





A **Volume Ramp** is connected to an Octane **Volume Medium**¹ which ports the **OpenVDB**² volume as an Octane Node. Without the Octane **Volume Medium**, the volume will not show in the render. The Octane **Volume Medium** is then applied to the smoke's Domain geometry.

The absorption ramp takes the grid value as input. In the colour gradient, the colors near "0" on the left are used for mapping low grid values to some custom colour (as in this case, the lowest values are mapped to white). Higher grid values are mapped to colours on the right of the color gradient. Bear in mind that less saturated colors will cause there to be less pronounced absorption. Emission and scattering ramps operate in the same way.

Please note that volume ramps are restricted to static colors for performance reasons (ie. it is not possible to attach a series of other texture mappings/generators to colours in the ramps).

There is an important consequence of volume animations specifically related to volume ramps: There is a "Max value" on the ramps, which you must set to a reasonable value. This value is used to scale grid values to between 0 and 1, so that the ramp can map these back to colors in the color gradient. This is needed because

¹A shading system designed to render volumes such as smoke and fog.

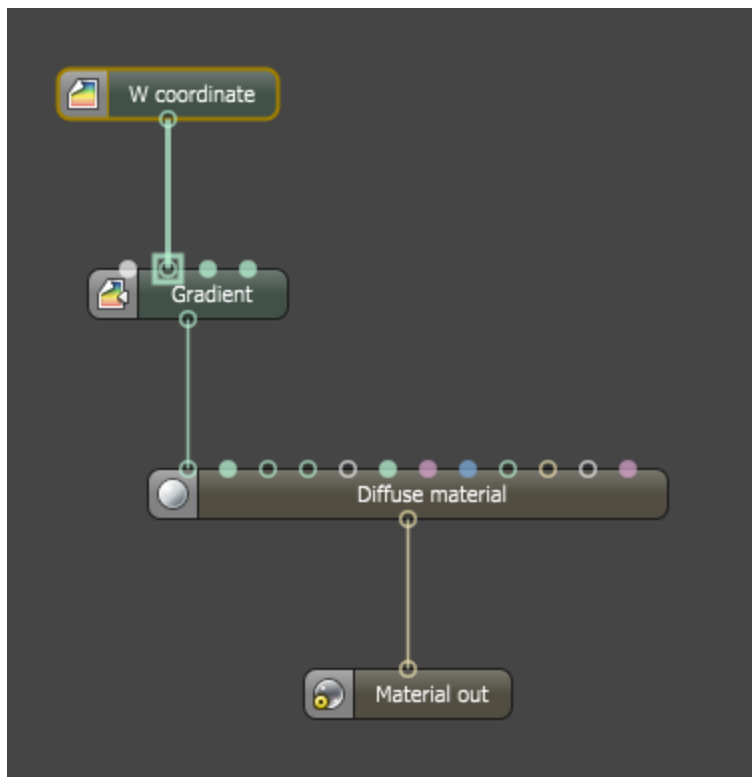
²Dreamworks' open-source C++ library housing the data structures and tools implementation for storing and manipulating volume data, like smoke and other amorphous materials. The purpose of OpenVDB is mostly to have an efficient way to store volumetric data in memory and on disk. It has evolved into a more general toolkit that also lets you accomplish other things, such as fracturing volumes, converting meshes to volumes and vice versa. However, it does not include a computational fluid dynamics solver, and therefore it cannot procedurally generate smoke or fire. OpenVDB is fully integrated as a library in OctaneRender. For more information about OpenVDB, check at <http://www.openvdb.org/>.

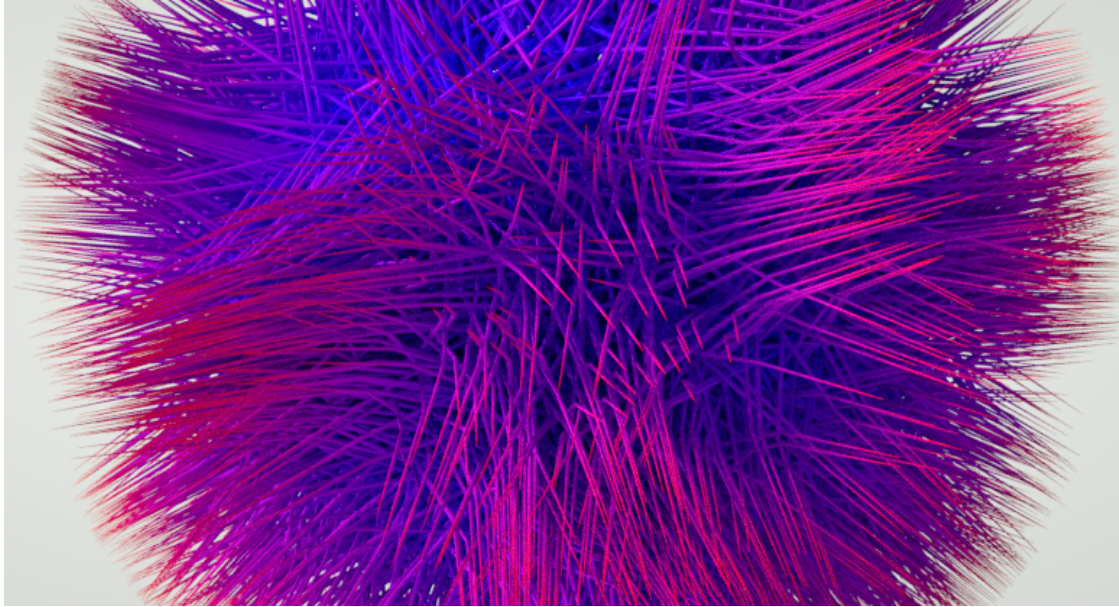
maximum values in the grids sometimes differ greatly throughout **VDB**¹ sequences. If you set a Max value too high or too low, this will still work, but you will only see a subset of the colors in the gradient that you specify. The maximum values for grids in the current VDB selected are now shown in the volume node's inspector pane. A good rule of thumb is to choose a value near to these, but you are free to customise as you like.

¹Dreamworks' open-source C++ library housing the data structures and tools implementation for storing and manipulating volume data, like smoke and other amorphous materials. The purpose of OpenVDB is mostly to have an efficient way to store volumetric data in memory and on disk. It has evolved into a more general toolkit that also lets you accomplish other things, such as fracturing volumes, converting meshes to volumes and vice versa. However, it does not include a computational fluid dynamics solver, and therefore it cannot procedurally generate smoke or fire. OpenVDB is fully integrated as a library in OctaneRender. For more information about OpenVDB, please see <http://www.openvdb.org/>.

W coordinate

This is a coordinate system used for mapping colored or greyscale gradient textures for hair geometry.





Lighting

Adding lights into a composition can be done by adding an After Effects **Light Layer** and deploying the usual HDR lighting from After Effects (figure 1).

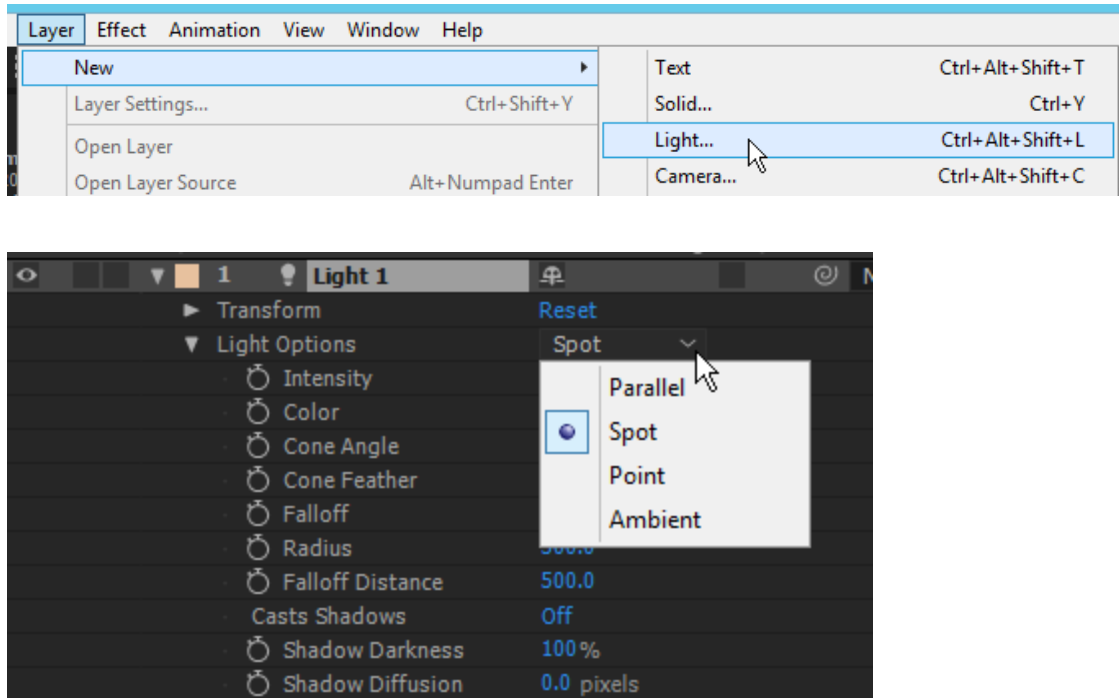


Figure 1: Using a native After Effects light.

Octane native lightts can also be used.

The Octane For After Effects plugin provides flexible lighting solutions directly After Effects and more complex solutions when invoking the power of the OctaneRender interface. There are several ways to light a scene with Octane, from mesh emitters to environments. Octane allows complex environment lighting with the use of the Octane **Daylight Environment**, a **Texture Environment**, or **Environment Maps** for Environment Lighting. Octane Lights and **IES**¹ Lights may also be constructed from mesh emitters.

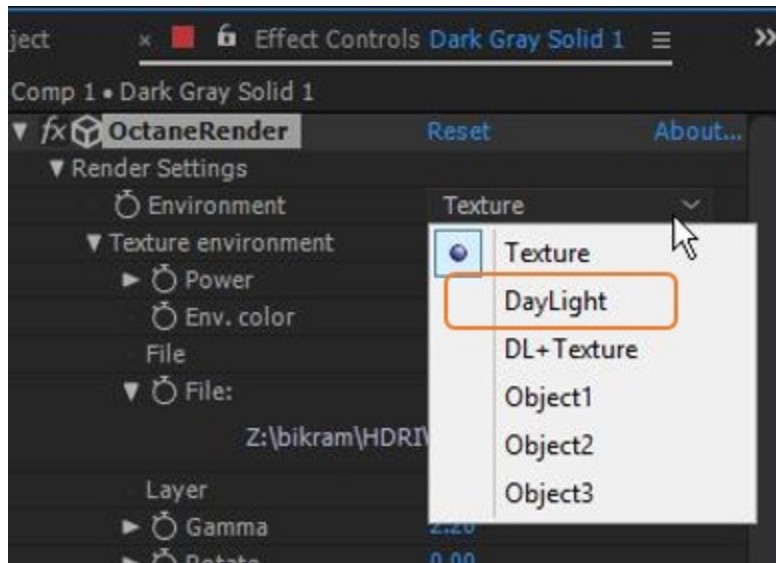
¹An IES light is the lighting information representing the real-world lighting values for specific light fixtures. For more information, visit <http://www.ies.org/lighting/>.



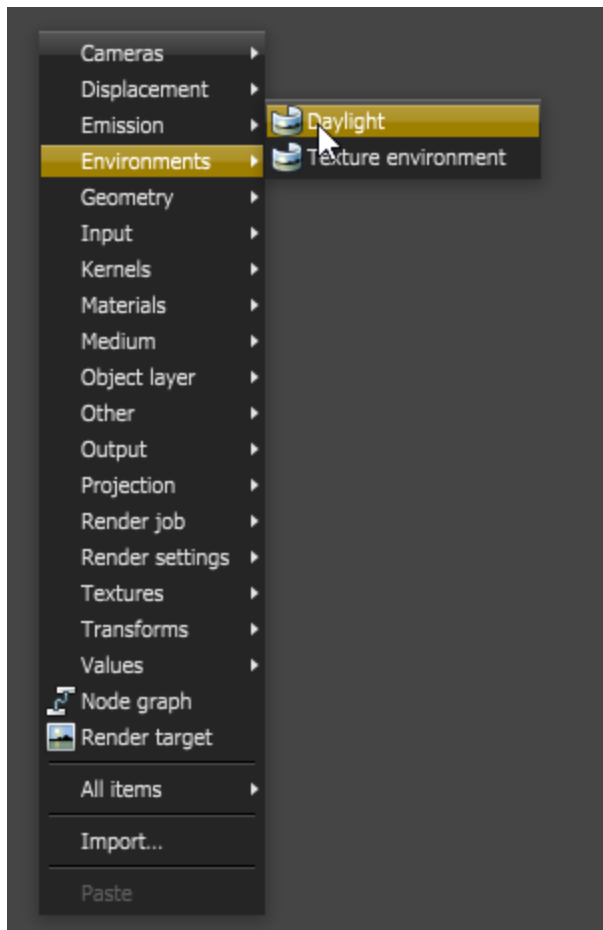
Figure 2: A Mesh emitter light.

Daylight Environment

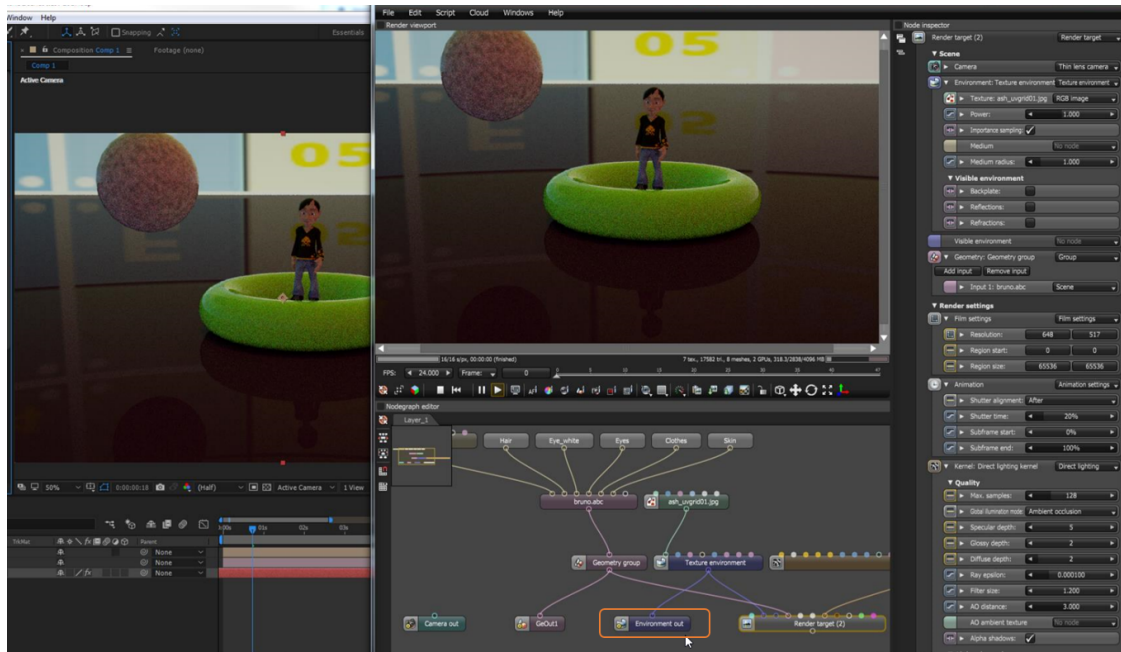
The Daylight Environment system simulates an outdoor lighting setup using real-world parameters. Daylight Environment lighting can be set through the **OctaneRender Effect > Render Settings > Environment:**



The Daylight Environment may also be set through the Octane Interface:



After adding the Daylight Environment node into the node tree, it is essential to tell After Effects that an Octane Node is being used for the environment. This is done by adding an Environment Out node and ensuring that the Daylight Environment node is connected to this and the Render Target node:



Daylight Environment specific parameters:

Sky Turbidity

Adjusts the sharpness of the sun light's shadows. A low value creates sharp shadows (like on a sunny day) and a higher value diffuses the shadows similarly to a cloudy day.

Power

Used to adjust the strength of the light. This can affect overall contrast and exposure level of the image.

North Offset

Used to adjust the actual North direction of the scene. This is useful for Architecture Visualization to ensure the direction of the sun is accurate to the scene.

Daylight Model

This specifies which daylight model to be used as the current environment. The old daylight model lights a scene with basic spectral radiance as the sun moves over the horizon at a relative distance from the object. The new daylight model is used to simulate full spectrum daylight as the sun moves along and bearing shorter rays as the sun moves closer to the normal plane.

Sky Color |

The base color of the sky, used by the New Daylight Model to customize the spectral shade of light. This can affect overall mood expressed by the image.

Sunset Color

The color of the sky and sun at sunset, used by the New Daylight Model to customize the spectral shade of light. This can affect overall mood expressed by the image.

Sun Size

Controls the sun radius in the daylight environment.

Ground Color

The base color of the ground, used by the New Daylight Model to customize the spectral shade of light. This can affect overall mood expressed by the image.

Ground Start Angle

The angle below the horizon where the transition to the Ground Color starts, measured in degrees.

Ground Blend Angle

The angle over which the sky color transitions to the Ground Color.

Sky Texture

This parameter accepts a texture map for the sky environment. This texture is the sky of the Daylight Environment.

Importance Sampling

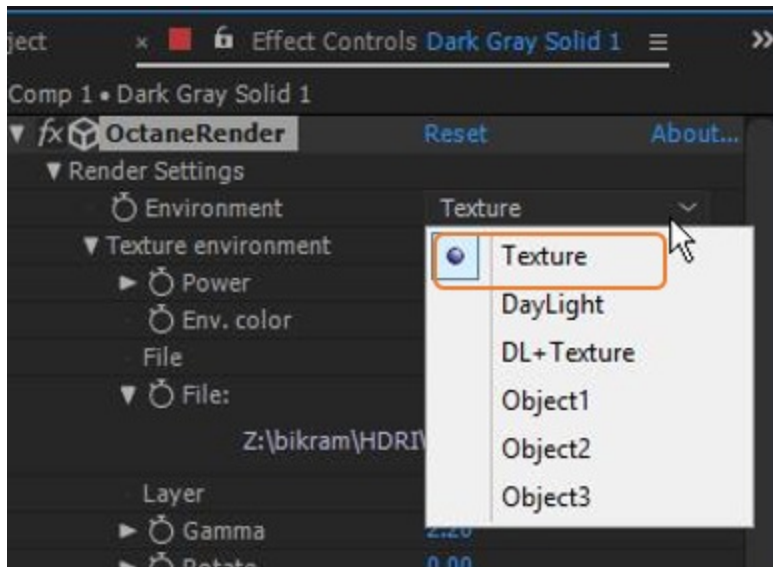
This toggles the importance sampling of the sky texture similar to the importance sampling in the texture environment.

Medium

The medium in the environment (free space). This attribute is ignored when this environment is used as the visible environment.

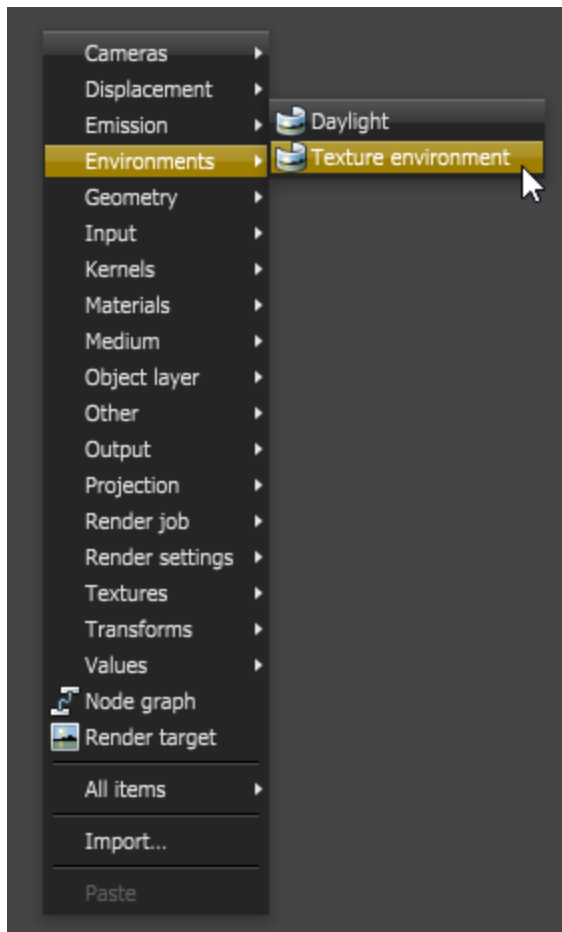
Texture Environment

The Texture environment affects the illumination and color of the environment. It can be used to add a **HDRI**¹ environment texture to a scene for illumination. Texture Environment lighting can be set through the **OctaneRender Effect > Render Settings > Environment**:

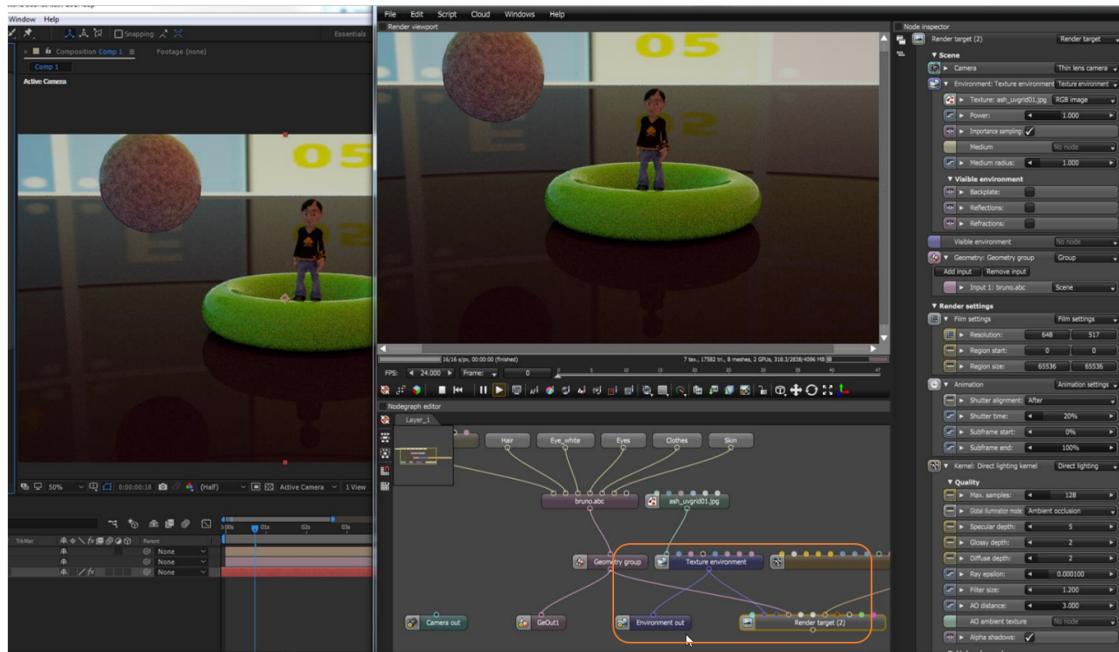


The Texture Environment may also be set through the Octane Interface:

¹An image which presents more than 8 bit per color channel unlike most common image formats.



After adding the Texture Environment node into the node tree, it is essential to tell After Effects that an Octane Node is being used for the environment. This is done by adding an Environment Out node and ensuring that the **Texture Environment node is connected to this and the Render Target node**:



The Texture parameter can accept a color (RGB), a value (Grayscale), or a texture map.

Other parameters associated with the Texture Environment:

- **Power** - Used to adjust the strength of the light. This can affect overall contrast and exposure level of the image.
- **Importance Sampling** - This toggles the importance sampling of the sky texture similar to the importance sampling in the texture environment.
- **Medium** - The medium in the environment (free space). This attribute is ignored when this environment is used as the visible environment.
- **Medium Radius** - Controls the radius of the "virtual" sphere created around the camera when an environment medium is used.

The Visible Environment

Environment Maps may be specified as either an environment for lighting and an environment for the background. Apart from having an HDR image to light the environment, users may also specify a different environment for the background and would most likely prefer to see that background also in reflections.

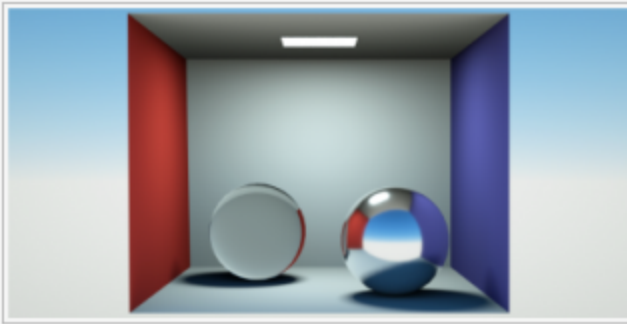
If specified, this environment is used for reflections, refractions and all camera rays that leave the scene and the regular environment is used only for the direct light calculation.

The visible environment overrides the normal environment in some specific use cases, giving more control over the final look of the render. If a medium is configured in the environment, the medium will be ignored when the environment is used as a visible environment.

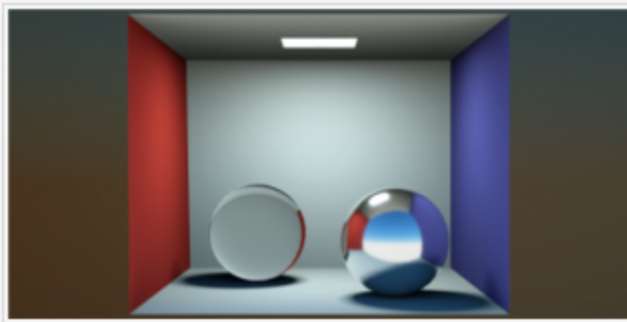
Environment nodes (both daylight and texture environment) have extra options controlling the behavior of the environment when used as the visible environment. When the node is used as a normal environment, these options are ignored.

- **Backplate:** The visible environment will be used as a backplate image.
- **Reflections:** The visible environment will override the normal environment when calculating reflections for specular and glossy materials.
- **Refractions:** The visible environment will override the normal environment when calculating refractions for specular materials.

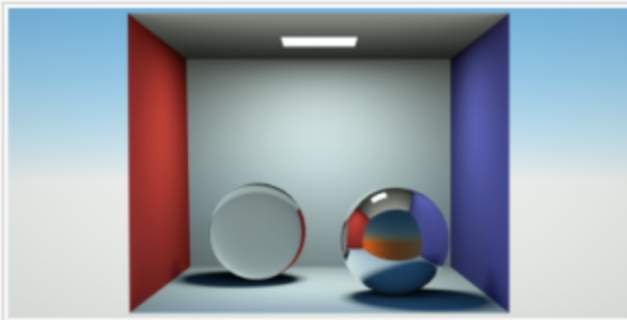
In the example renders below, the same daylight environment is used for both environments except that the normal environment is at noon while the visible environment is at sunset.



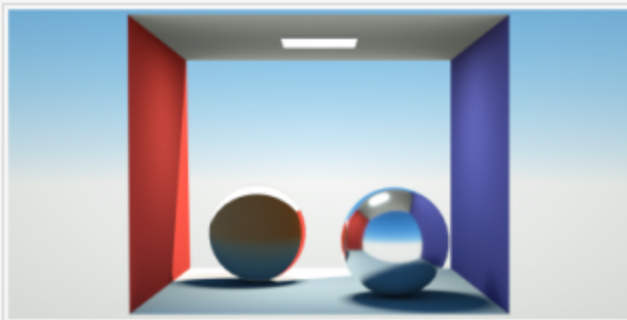
No visible environment is used.



The visible environment is used as the backplate.



The visible environment is now used to calculate the reflection in the right sphere.

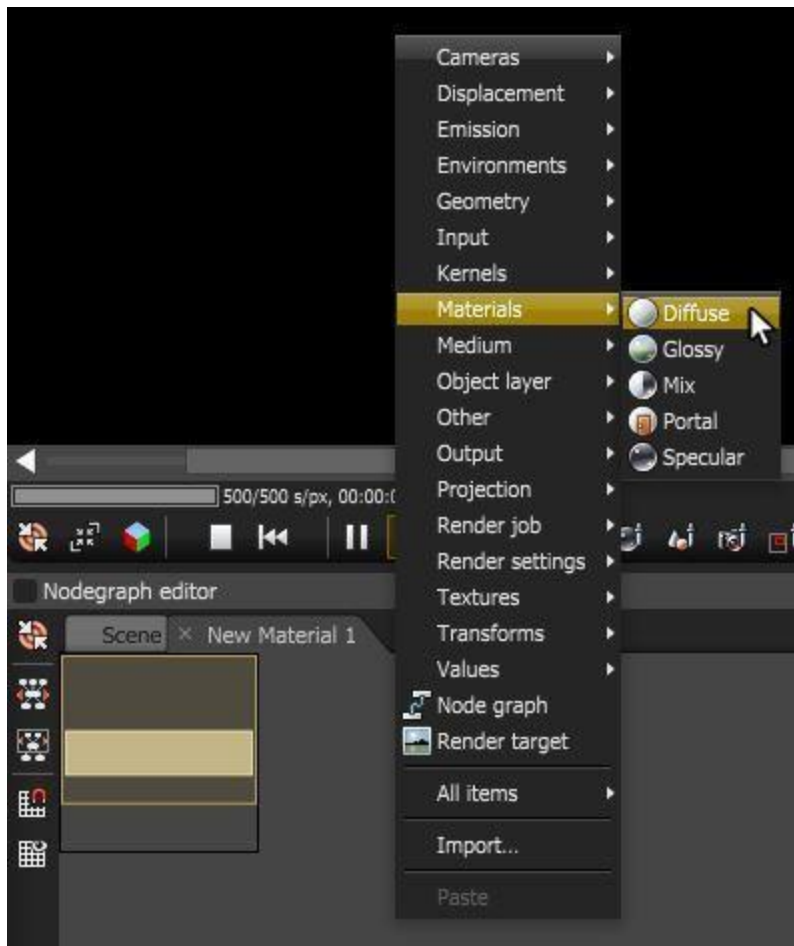


The visible environment is now used to calculate the refraction in the left sphere.

Mesh Emitters

Mesh Emitters¹ allow an object to be used as a light source. These can be used in conjunction with both the **Texture** and the **Daylight Environment** lighting systems. In the current release of Octane For After Effects, **Mesh Emitters** must be created and edited via the **Nodegraph Editor** in Octane Interface.

In order to use a mesh as a light source, it requires a **Diffuse**² material type (Figure 1). An **Emission** node can then be connected to the emission pin of the diffuse material (Figure2).



¹The ability for a surface to emit illumination usually described by a Black Body or Texture emission type.

²Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

Figure 1: Right-clicking in the Nodegraph Editor to add a *Diffuse material*¹.

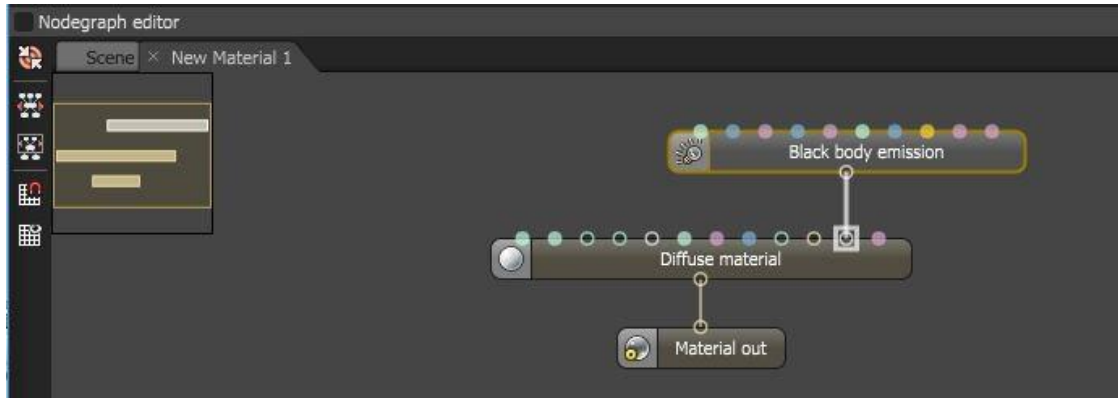


Figure 2: Connecting an Emission node to the Emission pin of a Diffuse material.

There are two types of Emission Nodes:

Blackbody Emission

The Blackbody Emission type uses Color Temperature (in Kelvin) and Power to control the color and intensity of the light

Texture Emission

This allows any valid texture type to set the light intensity. This can be used to create effects such as TV screens by using an Image Texture as the illumination source.

The Emission node parameters:

- **Texture** - Sets the efficiency of the light source. No light is 100% efficient at delivering the power at the specified wattage (a 100 watt light bulb does not actually deliver 100 watts of light.) The efficiency setting can be used to enter the real world values.
- **Power** - This is the wattage of the light source. Each light in the scene should be set to its real world wattage. This setting should not be used to balance the lighting power of the scene. Power gives the total power the light source is emitting (by default this is 100W). This power will be multiplied by the texture input, where 1.0 means 100% of the power (so by default 0.025 means 2.5% gives 2.5W of light).

¹Used for dull, non-reflecting materials or mesh emitters.

- **Surface Brightness** - If enabled, Power will now specify the brightness of the surface, and not the total emitted power. Enabling this option will cause emitters to keep the surface brightness constant independent of the emitter surface area.
- **Double Sided** - Enabling this option will allow the emitter to emit light from both the front and back sides.
- **Distribution** - The distribution controls the pattern of the light. This can be set to an Image (Grey-scale/RGB) so that an image texture or **IES**¹ file can be loaded, the orientation or direction of the light is then adjusted through the image texture's projection nodes.
- **Sampling Rate** - Controls how much weight is given to the emitter during the rendering process. The sampling rate determines which light sources will receive more samples.
- **Light Pass ID** - This is the ID of the light pass that captures the contribution of the emitter.
- **Visible on Diffuse** - This allows users to enable or disable the blackbody emission or texture emission light sources from casting illumination or shadows on diffuse objects. This is enabled by default. Disabling this option will disable emission, i.e. it won't be visible in diffuse reflections, but still be fully visible in specular reflections. It will also be excluded from the direct light calculation.
- **Visible on Specular**² - This is an option to enable the light source to be visible on specular surfaces. This is enabled by default. This allows users to hide emitters on specular reflections / refractions only.
- **Transparent Emission** - This is an option to allow the light source to cast illumination on diffuse objects even if the light source is on a transparent material.
- **Cast Shadows** - This is an option to enable the light source to cast light and shadows on diffuse surfaces and provides users the means to disable direct light shadows for mesh emitters. This option only has an effect if the emitter is actually included in the direct light calculation, i.e. the "sampling rate" is > 0. This option is enabled by default.

Most of the emission parameters are common between Texture **Emissions**³ and Blackbody Emissions. The main difference is whether the color comes from the Blackbody temperature or from the texture settings of the diffuse material.

Blackbody Emissions have the following additional parameters:

- **Temperature** - The temperature (in K) of the light emitted by the blackbody emission.
- **Normalize** - A Boolean value providing the option to ensure all the normal vectors have the same length for the blackbody emission in order to keep the luminance of the emitted light from a blackbody constant if the temperature varies. This normalizes the power of the blackbody emitter (i.e., make it independent of the temperature). This is enabled by default.

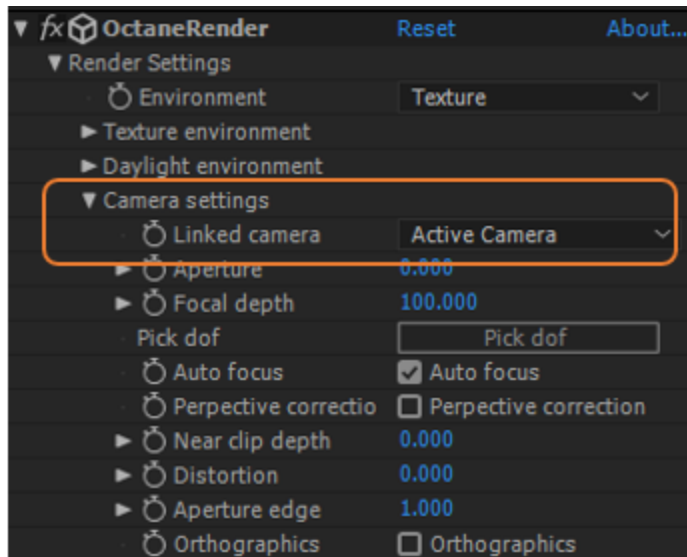
¹An IES light is the lighting information representing the real-world lighting values for specific light fixtures. For more information, visit <http://www.ies.org/lighting/>.

²Amount of specular reflection, or the mirror-like reflection of light photons at the same angle. Used for transparent materials such as glass and water.

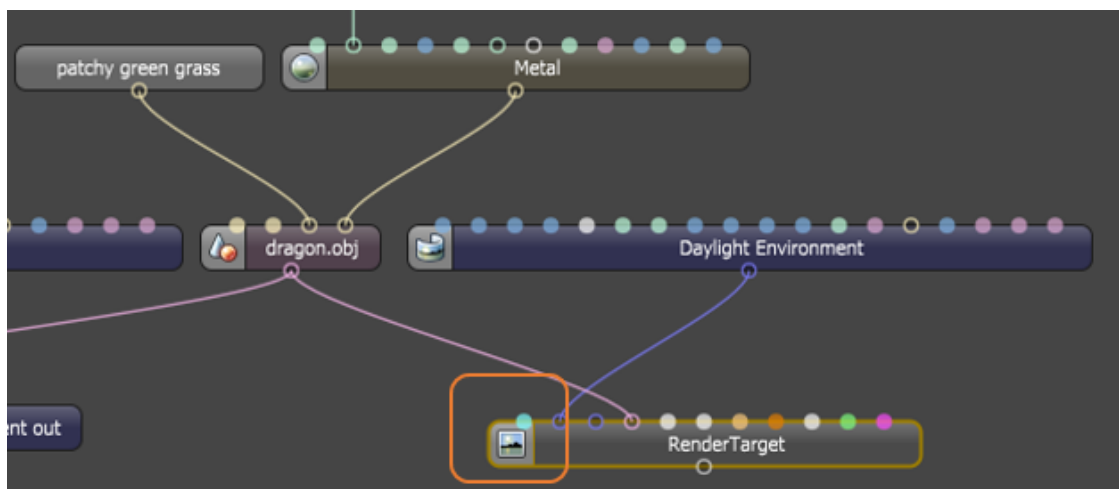
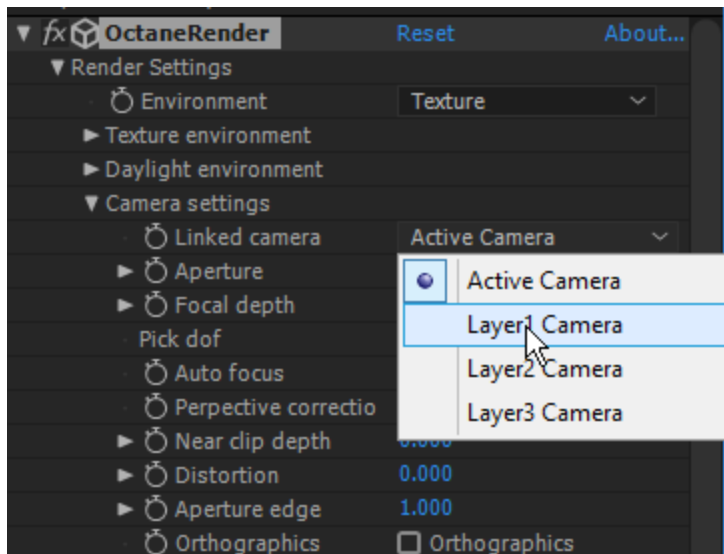
³The process by which a Black body or Texture is used to emit light from a surface.

Camera Settings

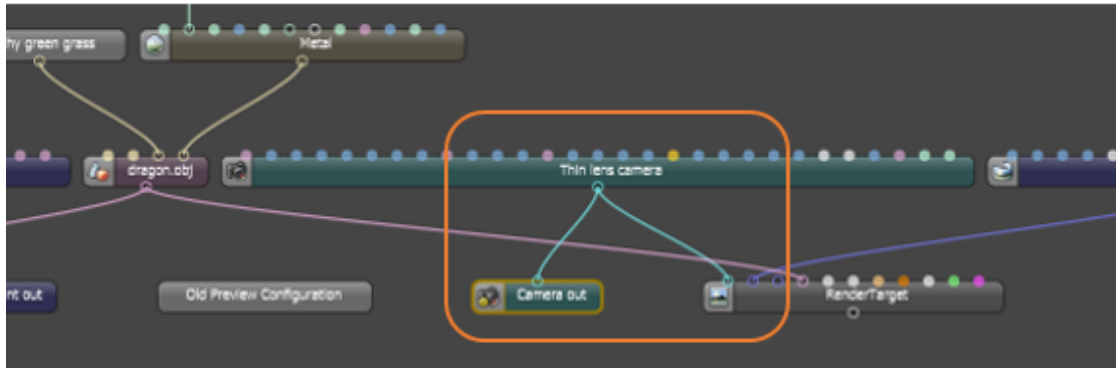
OctaneRender for After Effects interoperates with the After Effects Native Cameras. By default, the “Linked camera” in OctaneRender Effect Camera Settings will be set to the currently “Active Camera” which is the camera used in the After Effects camera layer.



However, from the **OctaneRender Effect > Camera Settings > Linked Camera**, an Octane native camera can be linked to any one of the other available cameras from the drop-down list in your project.



If you are working in the Octane Interface and creating an Octane native camera node, on Octane's Node Graph Editor make sure that the Octane native camera is connected to both a Render Target node and a Camera Output node:



The following attributes can be set from within OctaneRender Effect Camera Settings:

Aperture¹

The aperture is the radius of the lens opening of the camera used in the scene, measured in centimeters. Choosing a low value will have a wide **depth of field**² where everything is in focus. Choosing a high value will create a shallow depth of field (**DOF**³) where objects in the foreground and background will be out of focus.

Focal depth

The depth of the plane in focus, measured in meters. If you are having trouble seeing a result when you adjust this setting, double-check to make sure that Auto Focus is enabled. Auto-Focus will override the Focal Depth setting.

Auto focus

¹Determines how much light enters a camera lens. A large aperture produces a narrow depth of field and a small aperture produces a wide depth of field.

²The distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. Although a lens can precisely focus at only one distance at a time, the decrease in sharpness is gradual on each side of the focused distance, so that within the DOF, the unsharpness is imperceptible under normal viewing conditions. source: wikipedia (https://en.wikipedia.org/wiki/Depth_of_field)

³The distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. Although a lens can precisely focus at only one distance at a time, the decrease in sharpness is gradual on each side of the focused distance, so that within the DOF, the unsharpness is imperceptible under normal viewing conditions. source: wikipedia (https://en.wikipedia.org/wiki/Depth_of_field)

If enabled, the focus will be kept on the closest visible surface at the center of the image, regardless of the aperture, the aperture edge, and focal depth values.

Perspective correction

If Up-vector is vertical, enabling this option keeps vertical lines parallel.

Near clip depth

Distance from the camera to the near clipping plane, measured in meters.

Distortion

This adjusts the spherical and cylindrical distortion. The rendered image displays the entire sphere and uses equidistant cylindrical projection also known as lat-long projection.

Aperture edge

This controls aperture edge detection at all points within the aperture. The lower values will give more pronounced edges to out of focus objects affected by the a shallow depth of field (DOF) such as objects in the foreground and background. The aperture edge modifies the bokeh effect of the depth of field. A high value increases the contrast towards the edge.

Orthographics

If enabled, the camera will render an orthographic view. If disabled, the camera will show a perspective view.

Rendering

Most of the primary rendering controls for Octane are located in the OctaneRender Effect Control (Figure 1). Additional controls for camera and environment are also found here but covered in the Cameras and Lighting sections of this manual.

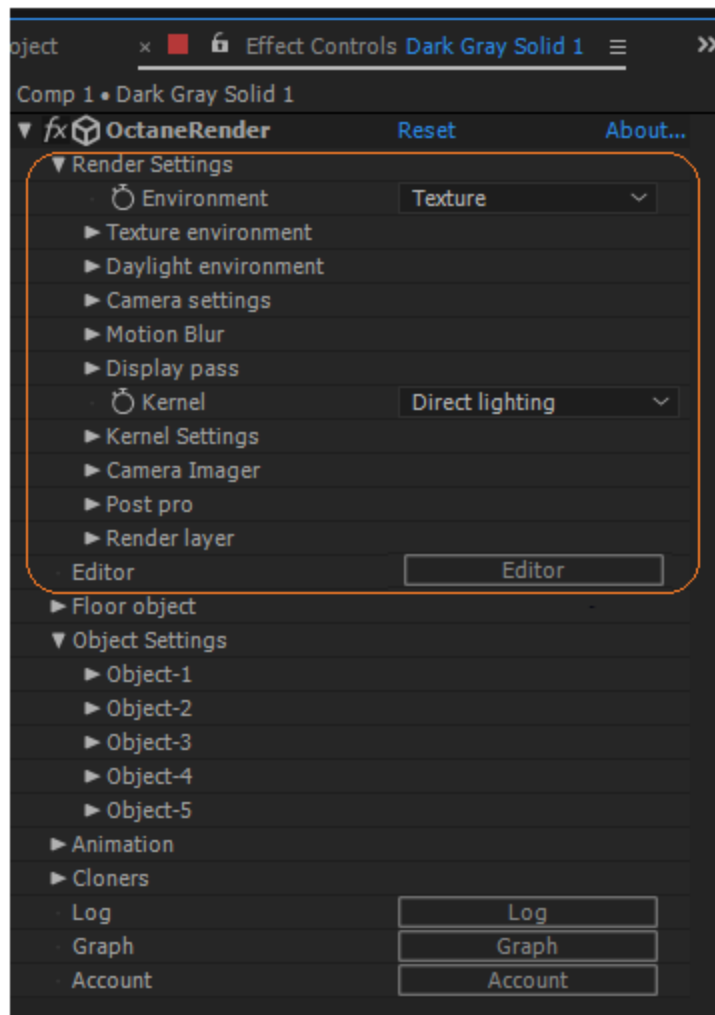


Figure 1: The Render Settings located in a OctaneRender Effect Control.

Kernels

A **kernel** in OctaneRender is the central part of the rendering engine that interfaces with the rendering hardware (e.g., graphics card). Octane For After Effects provides four rendering Kernel types. The **Kernels**¹ are located in the Octane Render Effect controls under the Kernel parameter (Figure 1).

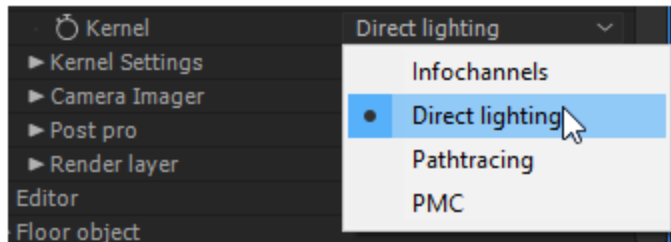


Figure 1: Accessing the Octane render Kernels.

¹By definition, this is the central or most important part of something. In Octane, the Kernels are the heart of the render engine.

Direct Lighting Kernel

Direct Lighting is used for faster preview rendering. Direct Lighting is not unbiased, and should not be used when you are aiming for photorealism. It is however useful when creating quick animations or renders (Figure 1).

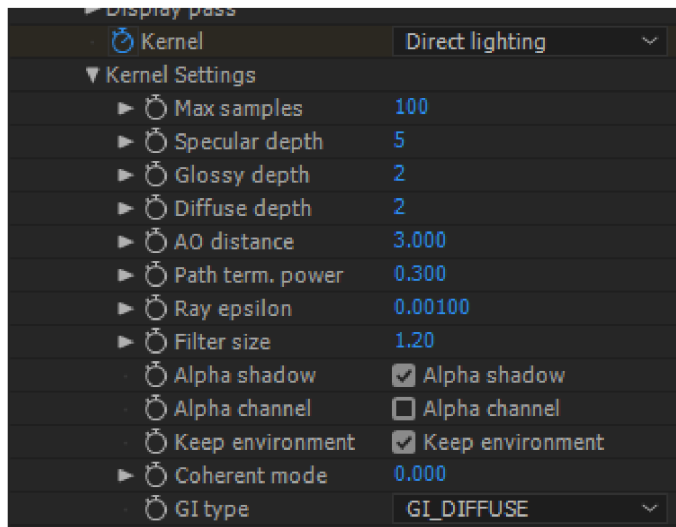


Figure 1: The Direct Lighting Kernel Parameters.

Direct Lighting Kernel parameters:

Maximum Samples - This sets the maximum number of samples per pixel before the rendering process stops. The higher the number of samples per pixel, the cleaner the render. For quick animations and scenes with predominantly direct lighting, a low amount of samples (500-1000) may suffice. In scenes with lots of indirect lighting and mesh lights, a few thousand samples may be required to obtain a clean render.

This sets the maximum number of samples per pixel before the rendering process stops. The higher the number of samples per pixel, the cleaner the render. For quick animations and scenes with predominantly direct lighting, a low amount of samples (500-1000) may suffice. In scenes with lots of indirect lighting and mesh lights, a few thousand samples may be required to obtain a clean render.

Specular¹ Depth

The maximum depth upon which rays (reflections/refractions) passing through specular objects are traced. This may be used to prevent transparent objects from causing dark outline in scenes.

Glossy² Depth

The same as diffuse depth but for low roughness surfaces like reflections or refractions.

Diffuse³ Depth -

Gives the maximum number of diffuse reflections if GI Mode is set to Diffuse.

AO Distance

The distance of the ambient occlusion in units. Always check if the amount is correct related to scene scale. For example you don't need an amount of "3" units if your object is a small toy. However, if your model is a house or something large, you can increase the value.

Path Termination Power

This parameter provides a system to tweak samples/second vs. convergence (how fast noise vanishes). Increasing this value will cause the kernels to keep paths shorter and spend less time on dark areas (which means they stay noisy longer) but may increase samples/second. Reducing this value will cause kernels to trace longer paths on average and spend more time on dark areas. In short, high values increases the render speed but may lead to higher noise in dark areas.

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¹Amount of specular reflection, or the mirror-like reflection of light photons at the same angle. Used for transparent materials such as glass and water.

²The measure of how well light is reflected from a surface in the specular direction, the amount and way in which the light is spread around the specular direction, and the change in specular reflection as the specular angle changes. Used for shiny materials such as plastics or metals.

³Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

Specular Depth - The maximum depth upon which rays (reflections/refractions) passing through specular objects are traced. This may be used to prevent transparent objects from causing dark outline in scenes.

Ray Epsilon

- The ray epsilon is the distance to offset new rays so they don't intersect with the originating geometry. If the scale of a scene is too large, precision artifacts in the form of concentric circles may appear. In that case, increasing the ray epsilon can make these artifacts disappear.

Filter Size -

This sets the pixel size for filtering the render. This can improve aliasing artifacts in the render. Noise can also be reduced this way, but if the filter is set too high, the image can become blurry.

Alpha Shadows

- This setting allows any object with transparency (specular materials, materials with opacity settings and alpha channels) to cast a proper shadow instead of behaving as a solid object.\

Caustic Blur - Used to approximate caustics on rough surfaces and increase or decrease the sharpness of caustic noise. A zero value provides the sharpest caustics and increasing this value increases the blurring effect to make caustics appear softer.

GI Clamp - Controls the bounces of indirect light and provides a facility to balance out global illumination and noise produced by scene caustics. Reducing the GI clamp lessens some noise contributed by strong light passing through clear or specular objects.

Alpha Channel¹

- This option removes the background and renders it as transparent (zero alpha). This can be useful to composite the render over another image without the background being present.

Keep Environment - This option is used in conjunction with the Alpha Channel setting. It allows the background to be rendered with zero alpha but is still visible in the final render. This allows even further flexibility in compositing images.

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Path Termination Power - This parameter provides a system to tweak samples/second vs. convergence (how fast noise vanishes). Increasing this value will cause the kernels to keep paths shorter and spend less time on dark areas (which means they stay noisy longer) but may increase samples/second. Reducing this

¹A greyscale image used to determine which areas of a texture map are opaque and which areas are transparent.

value will cause kernels to trace longer paths on average and spend more time on dark areas. In short, high values increases the render speed but may lead to higher noise in dark areas.

Coherent Ratio

- When Coherent mode is enabled either for Path Tracing or Direct Lighting the render becomes noise free faster but the downside is flickering when rendering animations. For stills and action-heavy animations, Coherent mode might save some time.

GI Type

There are three GI type to choose from; GI_Diffuse, GI_Ambient Occlusion, GI_None. This parameter is most useful when the Direct Lighting kernel is selected.

- **GI Diffuse** - Indirect diffuse, with a configuration to set the number of indirect diffuse bounces to include. This gives a GI quality that is in between direct/AO and pathtracing, without caustics and a decent realistic quality (much better than AO), but much faster than pathtracing/PMC. It is very good for quick finals and animations. It is similar in some ways to 'bruteforce' indirect GI in other engines.
- **GI Ambient Occlusion** - Provides a Standard ambient occlusion solution. This mode can often provide realistic images but offers no color bleeding.
- **GI_None** - Only direct lighting from area lights is included. The rest of the image areas receive no contribution, and will be black.

Path Tracing Kernel

Path Tracing is best used for realistic results. The render times are higher than Direct Lighting but the results can be photorealistic. It can have some difficulties with small light sources and proper caustics (Figure 1).

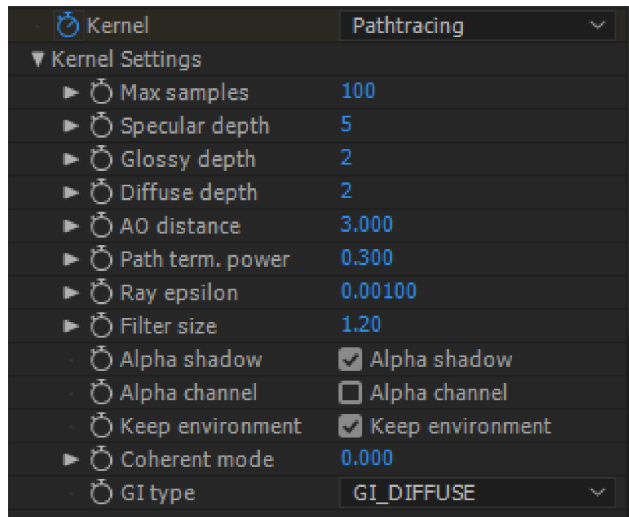


Figure 1: The Path Tracing Kernel Settings.

Path Tracing Kernel parameters:

Maximum Samples

This sets the maximum number of samples per pixel before the rendering process stops. The higher the number of samples per pixel, the cleaner the render. For quick animations and scenes with predominantly direct lighting, a low amount of samples (500-1000) may suffice. In scenes with lots of indirect lighting and mesh lights, a few thousand samples may be required to obtain a clean render.

Specular¹ Depth

The maximum depth upon which rays (reflections/refractions) passing through specular objects are traced. This may be used to prevent transparent objects from causing dark outline in scenes.

¹Amount of specular reflection, or the mirror-like reflection of light photons at the same angle. Used for transparent materials such as glass and water.

Glossy¹ Depth

The same as diffuse depth but for low roughness surfaces like reflections or refractions.

Diffuse² Depth

Gives the maximum number of diffuse reflections if GI Mode is set to Diffuse.

AO Distance

The distance of the ambient occlusion in units. Always check if the amount is correct related to scene scale. For example you don't need an amount of "3" units if your object is a small toy. However, if your model is a house or something large, you can increase the value.

Path Termination Power

This parameter provides a system to tweak samples/second vs. convergence (how fast noise vanishes). Increasing this value will cause the kernels to keep paths shorter and spend less time on dark areas (which means they stay noisy longer) but may increase samples/second. Reducing this value will cause kernels to trace longer paths on average and spend more time on dark areas. In short, high values increases the render speed but may lead to higher noise in dark areas.

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Ray Epsilon

The ray epsilon is the distance to offset new rays so they don't intersect with the originating geometry. If the scale of a scene is too large, precision artifacts in the form of concentric circles may appear. In that case, increasing the ray epsilon can make these artifacts disappear.

¹The measure of how well light is reflected from a surface in the specular direction, the amount and way in which the light is spread around the specular direction, and the change in specular reflection as the specular angle changes. Used for shiny materials such as plastics or metals.

²Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

Filter Size

This sets the pixel size for filtering the render. This can improve aliasing artifacts in the render. Noise can also be reduced this way, but if the filter is set too high, the image can become blurry.

Alpha Shadows

This setting allows any object with transparency (specular materials, materials with opacity settings and alpha channels) to cast a proper shadow instead of behaving as a solid object.\

Alpha Channel¹

This option removes the background and renders it as transparent (zero alpha). This can be useful to composite the render over another image without the background being present.

Keep Environment

This option is used in conjunction with the Alpha Channel setting. It allows the background to be rendered with zero alpha but is still visible in the final render. This allows even further flexibility in compositing images.

Coherent Ratio

When Coherent mode is enabled either for Path Tracing or Direct Lighting the render becomes noise free faster but the downside is flickering when rendering animations. For stills and action-heavy animations, Coherent mode might save some time.

GI Type

There are three GI type to choose from; GI_Diffuse, GI_Ambient Occlusion, GI_None. This parameter is most useful when the Direct Lighting kernel is selected.

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- **GI Ambient Occlusion** - Provides a Standard ambient occlusion solution. This mode can often provide realistic images but offers no color bleeding.
- **GI_None** - Only direct lighting from area lights is included. The rest of the image areas receive no contribution, and will be black.

¹A greyscale image used to determine which areas of a texture map are opaque and which areas are transparent.

PMC Kernel

PMC is a custom mutating unbiased kernel written for GPUs. It allows for complex caustics and lighting to be resolved (Figure 1).

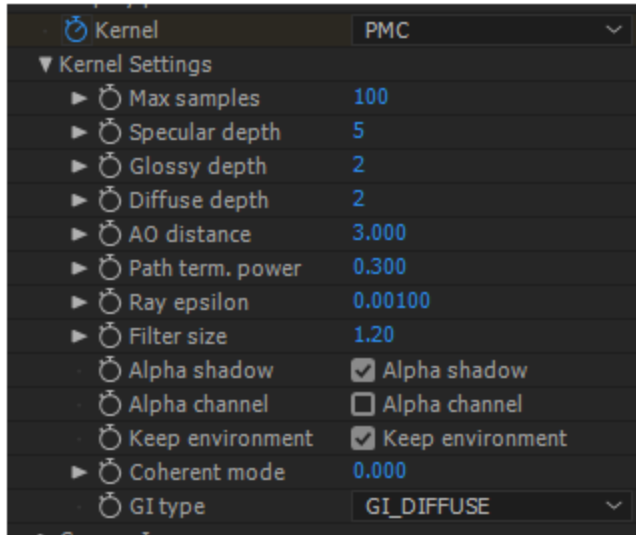


Figure 1: The PMC Kernel Settings.

PMC Kernel parameters:

Maximum Samples - This sets the maximum number of samples per pixel before the rendering process stops. The higher the number of samples per pixel, the cleaner the render. For quick animations and scenes with predominantly direct lighting, a low amount of samples (500-1000) may suffice. In scenes with lots of indirect lighting and mesh lights, a few thousand samples may be required to obtain a clean render.

This sets the maximum number of samples per pixel before the rendering process stops. The higher the number of samples per pixel, the cleaner the render. For quick animations and scenes with predominantly direct lighting, a low amount of samples (500-1000) may suffice. In scenes with lots of indirect lighting and mesh lights, a few thousand samples may be required to obtain a clean render.

Specular¹ Depth

The maximum depth upon which rays (reflections/refractions) passing through specular objects are traced. This may be used to prevent transparent objects from causing dark outline in scenes.

Glossy² Depth

The same as diffuse depth but for low roughness surfaces like reflections or refractions.

Diffuse³ Depth -

Gives the maximum number of diffuse reflections if GI Mode is set to Diffuse.

AO Distance

The distance of the ambient occlusion in units. Always check if the amount is correct related to scene scale. For example you don't need an amount of "3" units if your object is a small toy. However, if your model is a house or something large, you can increase the value.

Path Termination Power

This parameter provides a system to tweak samples/second vs. convergence (how fast noise vanishes). Increasing this value will cause the kernels to keep paths shorter and spend less time on dark areas (which means they stay noisy longer) but may increase samples/second. Reducing this value will cause kernels to trace longer paths on average and spend more time on dark areas. In short, high values increases the render speed but may lead to higher noise in dark areas.

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¹Amount of specular reflection, or the mirror-like reflection of light photons at the same angle. Used for transparent materials such as glass and water.

²The measure of how well light is reflected from a surface in the specular direction, the amount and way in which the light is spread around the specular direction, and the change in specular reflection as the specular angle changes. Used for shiny materials such as plastics or metals.

³Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

Specular Depth - The maximum depth upon which rays (reflections/refractions) passing through specular objects are traced. This may be used to prevent transparent objects from causing dark outline in scenes.

Ray Epsilon

- The ray epsilon is the distance to offset new rays so they don't intersect with the originating geometry. If the scale of a scene is too large, precision artifacts in the form of concentric circles may appear. In that case, increasing the ray epsilon can make these artifacts disappear.

Filter Size -

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Alpha Shadows

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Caustic Blur - Used to approximate caustics on rough surfaces and increase or decrease the sharpness of caustic noise. A zero value provides the sharpest caustics and increasing this value increases the blurring effect to make caustics appear softer.

GI Clamp - Controls the bounces of indirect light and provides a facility to balance out global illumination and noise produced by scene caustics. Reducing the GI clamp lessens some noise contributed by strong light passing through clear or specular objects.

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Keep Environment - This option is used in conjunction with the Alpha Channel setting. It allows the background to be rendered with zero alpha but is still visible in the final render. This allows even further flexibility in compositing images.

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Path Termination Power - This parameter provides a system to tweak samples/second vs. convergence (how fast noise vanishes). Increasing this value will cause the kernels to keep paths shorter and spend less time on dark areas (which means they stay noisy longer) but may increase samples/second. Reducing this

¹A greyscale image used to determine which areas of a texture map are opaque and which areas are transparent.

value will cause kernels to trace longer paths on average and spend more time on dark areas. In short, high values increases the render speed but may lead to higher noise in dark areas.

Coherent Ratio

- When Coherent mode is enabled either for Path Tracing or Direct Lighting the render becomes noise free faster but the downside is flickering when rendering animations. For stills and action-heavy animations, Coherent mode might save some time.

GI Type

There are three GI type to choose from; GI_Diffuse, GI_Ambient Occlusion, GI_None. This parameter is most useful when the Direct Lighting kernel is selected.

- **GI Diffuse** - Indirect diffuse, with a configuration to set the number of indirect diffuse bounces to include. This gives a GI quality that is in between direct/AO and pathtracing, without caustics and a decent realistic quality (much better than AO), but much faster than pathtracing/PMC. It is very good for quick finals and animations. It is similar in some ways to 'bruteforce' indirect GI in other engines.
- **GI Ambient Occlusion** - Provides a Standard ambient occlusion solution. This mode can often provide realistic images but offers no color bleeding.
- **GI_None** - Only direct lighting from area lights is included. The rest of the image areas receive no contribution, and will be black.

Info Channel Kernel

The **Info Channel** creates false-color images of the scene according to types that contain various information about the scene (Figure 1).

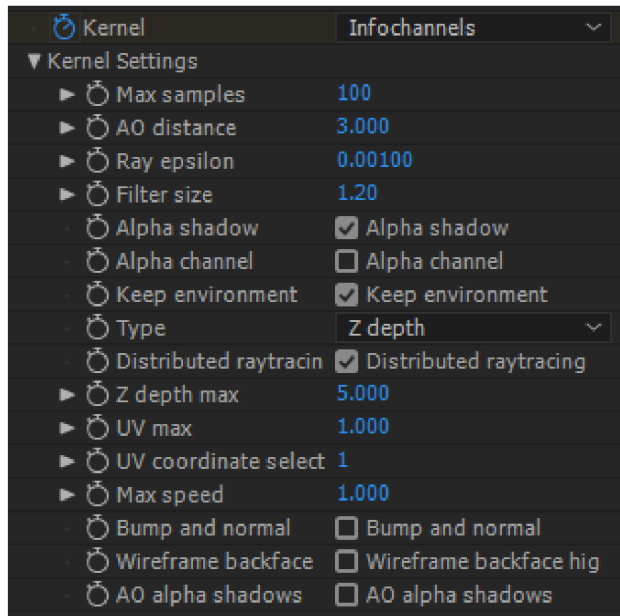


Figure 1: The Info Channel Kernel Settings.

The following Info channel types are available:

- Geometric normals: The vectors perpendicular to the triangle faces of the mesh.
- Interpolated Vertex Normals: Similar to shading normals preset but also strictly calculates the shading based on vertex normals provided by actual data in the mesh. This makes flawed normals resulting from stuffed vertices visible in the shading.
- Shading normals: The interpolated normals used for shading by calculating based on the face normals and discreetly fixes distortion to keep a smooth appearance. This does not take into account the bump map of the object. For objects without smoothing this is identical to the geometric normals.
- Tangent (local) normal
- Z-depth: The distance between the intersection point and the camera, measured parallel to the view vector.
- Position: The position of the first intersection point.
- Texture Coordinate
- Texture Tangent
- Motion Vector

- **Material**¹ ID: Every material pin is represented as a separate color.
- Object layer ID
- Object layer color
- Baking Group ID
- Light Pass ID
- Render layer ID
- Render Layer Mask
- Wireframe: Shows the mesh as represented by edges, vertices and surfaces
- Ambient Occlusion (AO)
- Opacity
- Roughness
- Index of Refraction (IOR)
- **Diffuse**² Filter
- Reflection Filter
- Refraction Filter
- **Transmission**³ Filter

Info Channel Kernel parameters:

Max. Samples

This sets the maximum number of samples per pixel before the rendering process stops. The higher the number of samples per pixel, the cleaner the render. For quick animations and scenes with predominantly direct lighting, a low amount of samples (500-1000) may suffice. In scenes with lots of indirect lighting and mesh lights, a few thousand samples may be required to obtain a clean render.

AO Distance

- The distance of the ambient occlusion in units.

Ray Epsilon

- The ray epsilon is the distance to offset new rays so they don't intersect with the originating geometry. If the scale of a scene is too large, precision artifacts in the form of concentric circles may appear. In that case, increasing the ray epsilon can make these artifacts disappear.

¹The representation of the surface or volume properties of an object.

²Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

³A surface characteristic that determines if light may pass through a surface volume.

Filter Size

This sets the pixel size for filtering the render. This can improve aliasing artifacts in the render. Noise can also be reduced this way, but if the filter is set too high, the image can become blurry.

Alpha Shadows

Opacity is now taken into account in the AO calculation and this may be used by render passes to specify if shadows cast by Ambient Occlusion should be rendered as transparent (zero alpha). This can be useful to composite the render over another image and does not want the AO shadows to be present.

Alpha Channel¹

- This option removes the background and renders it as transparent (zero alpha). This can be useful to composite the render over another image without the background being present.

Keep Environment - This option is used in conjunction with the Alpha Channel setting. It allows the background to be rendered with zero alpha but is still visible in the final render. This allows even further flexibility in compositing images.

Type

- This drop list contains the various Info Channel types specified previously.

Distributed Raytracing

- This option allows **Motion Blur²** and **DOF³** sampled.

Z-Depth⁴ Max

- Gives the maximum z-depth that can be shown.

¹A grayscale image used to determine which areas of a texture map are opaque and which areas are transparent.

²An optical phenomenon that occurs when a camera's shutter opens and closes too slowly to capture movement without recording a blurring of the subject.

³The distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. Although a lens can precisely focus at only one distance at a time, the decrease in sharpness is gradual on each side of the focused distance, so that within the DOF, the unsharpness is imperceptible under normal viewing conditions. source: wikipedia (https://en.wikipedia.org/wiki/Depth_of_field)

⁴A measure of object distances from the camera typically represented as a grayscale image.

UV Max

Gives the maximum value that can be shown for the texture coordinates.

UV Coordinate Selection

Determines which set of UV coordinates will be used.

Max Speed

Speed mapped to the maximum intensity in the motion vector channel. A value of 1 means a maximum movement of 1 screen width in the shutter interval.

Bump and Normal Mapping

- Option to calculate or not calculate the bump and normal maps.

Wireframe Backface Highlighting

Option to highlight backface in wireframe channel.

AO Alpha Shadows

Opacity is now taken into account in the AO calculation and this may be used by render passes to specify if shadows cast by Ambient Occlusion should be rendered as transparent (zero alpha). This can be useful to composite the render over another image and does not want the AO shadows to be present.

Render Layer

Render layers allow for scene geometry to be separated into parts, where one part is meant to be visible and the rest of the other parts “capture” the side effects of the visible geometry on it.

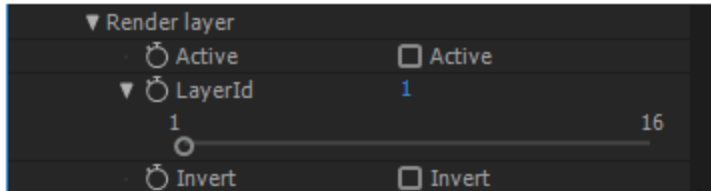


Figure 1: Specifying Render layer IDs in After Effects.

Setting up render layers is done in the OctaneVR window. An **Object Layer Map** node is added and connected to the input of the **GeOut** node. The scene geometry node (screws.obj in the following example) is also connected to the **Geometry** input on the **Object Layer Map** node. Finally, an **Object Layer** node is added and connected to the appropriate input on the **Object Layer Map** node (figure 2).

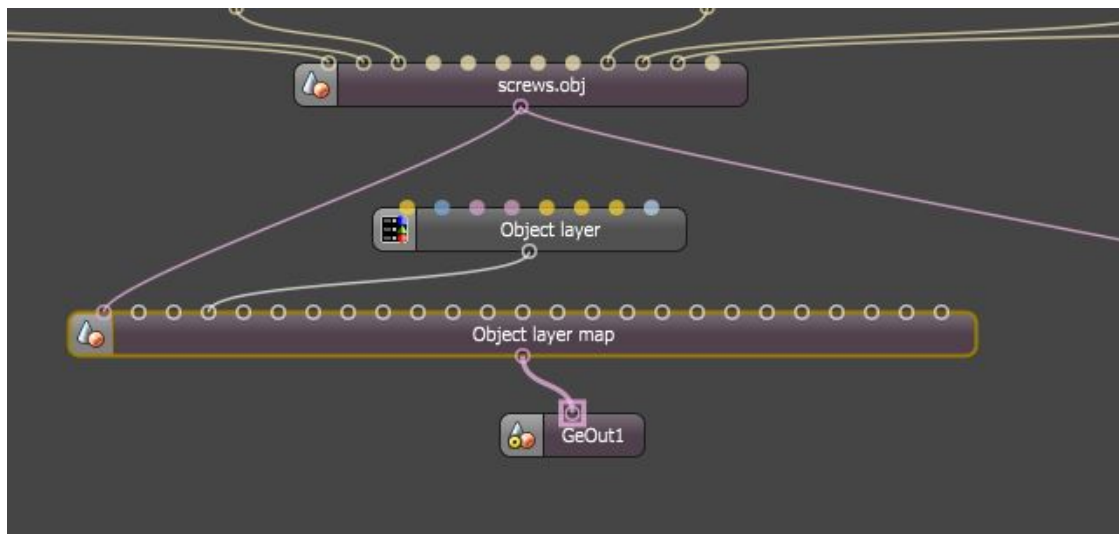


Figure 2: The node connections for a render layers setup.

Choose an appropriate **Render Layer ID** number in the **Object Layer** node (figure 3). When this ID is selected as the active layer in After Effects, this object will be the only object that renders (figure 4).

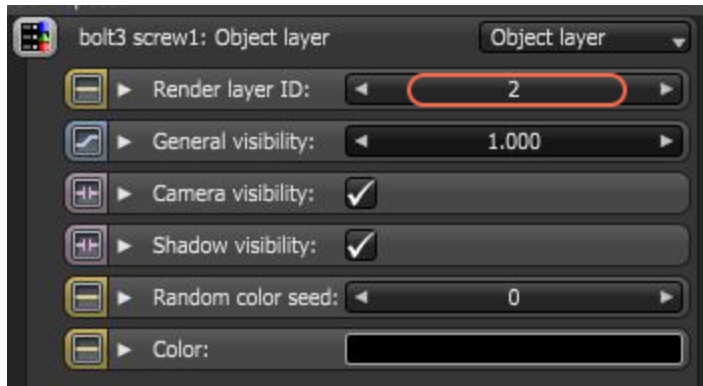


Figure 3: Selecting appropriate Render Layer ID in the Object Layer node.

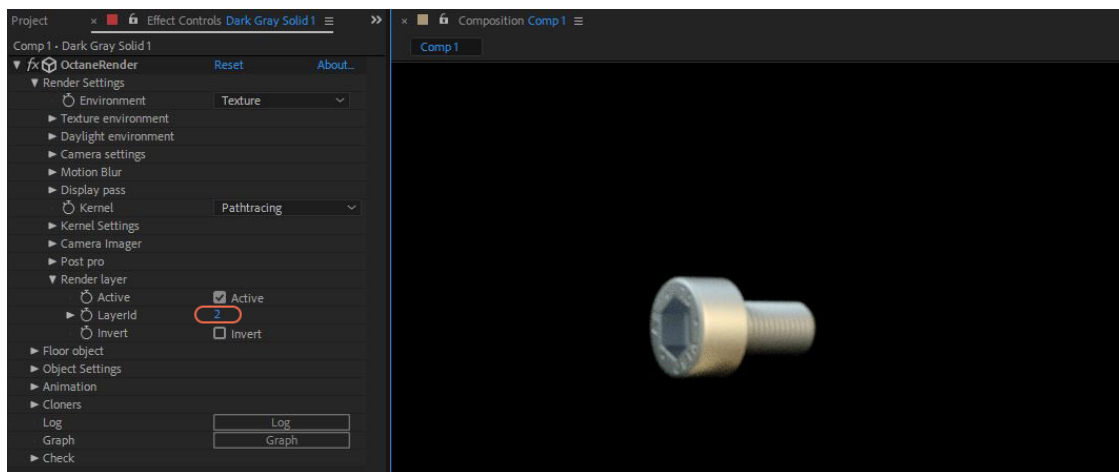
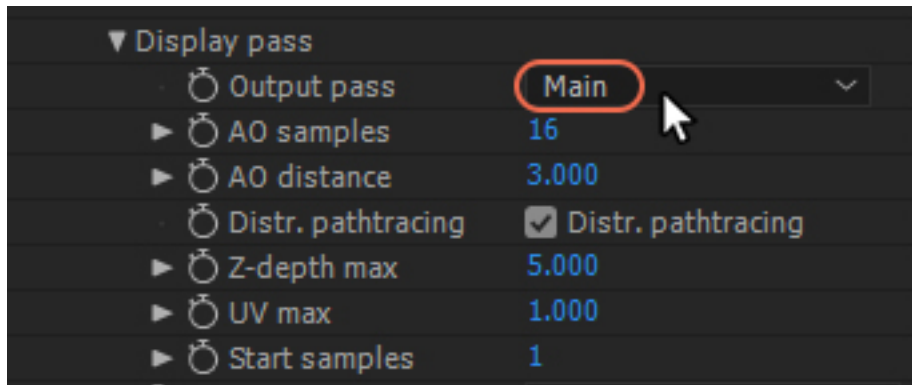


Figure 4: Selecting Render Layer IDs in After Effects.

Render Passes

Octane's **Render Passes** allow users to separate the different aspects of a scene, respectively rendering each aspect across multiple images. This is particularly useful in fine-tuning projects, compositing, and creating remarkably detailed and photo-realistic images. Render passes can be accessed from the **Display Pass** rollout under the **Render Settings** (figure 1). Note that each render pass needs to be selected and rendered manually.



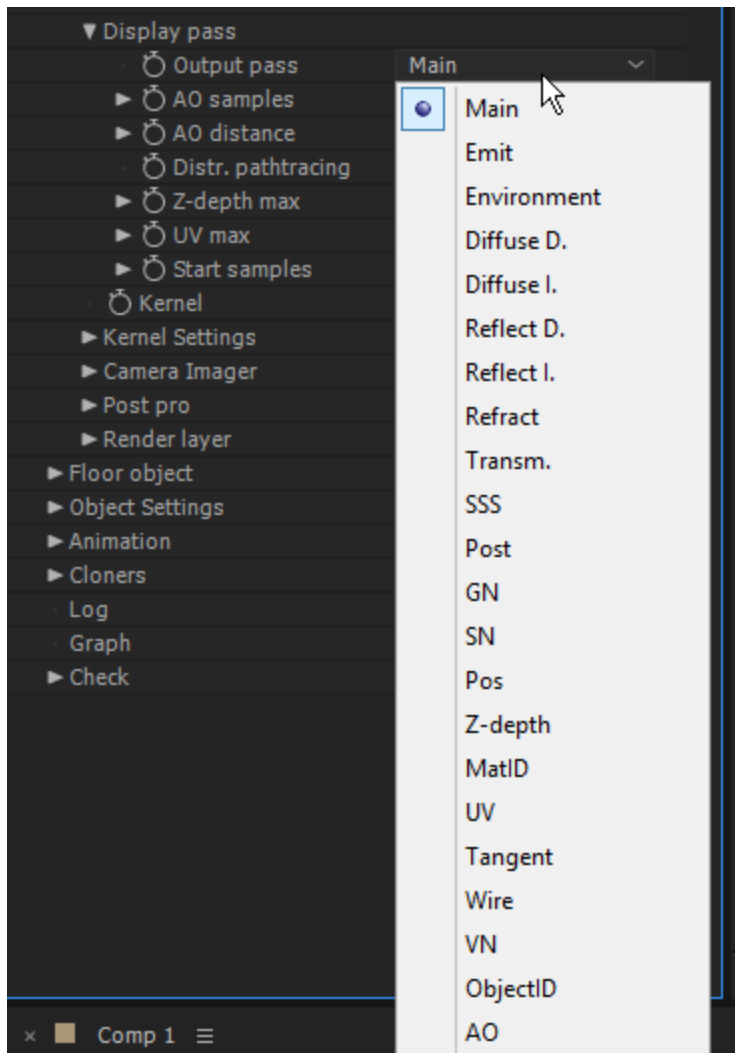


Figure 1: Accessing the render passes from the Display Pass rollout.

The passes are classified as either of the following:

- Beauty pass
- Post-Processing pass
- Render Layer pass
- Lighting pass
- Info pass

The classifications group together similar scene components for use in the compositing process.

Beauty Passes

The beauty passes provide a rendered view of the different aspects lighting the scene, such as shadows, highlights, reflections, illumination and color. Beauty passes are rendered together with the main beauty pass (the normal rendering). I.e. each one of these requires its own film buffer that needs to be stored additionally to the main film buffer on the device.

Post Processing¹ Passes

Post Processing passes provide a view of the post processing effects on the scene. If the post processing node is enabled and a post-processing effect is applied on the scene, the post processing render pass negates these effects and separates it from the main pass.

Render Layer Passes

These passes allow for further separation of scene assets that may have been placed on various render layers. Please see the **Render Layers²** section for more detail.

Lighting Passes

A light pass isolates the contribution of a light source. Each light pass behaves as if all the other lights in the scene are switched off. The individual light passes can be added together to recreate the original render in post or to further adjust the individual contributions of each light during post.

To use light passes in OctaneRender, each light emitter needs to be identified and mapped to the desired light pass. This can be done by assigning the Light Pass ID in each of the Emission nodes that are in the scene.

Info Passes

Info passes provide a view of the effects of the normals, UVs and geometric data provided in the scene. The info passes are rendered one by one using only one additional film buffer either at the end or when needed. This is to save **GPU³** memory and because they are fast to calculate. The maximum samples (Max samples) for Info passes can be adjusted without affecting the maximum samples set toward the final rendered image.

¹Effects such as Bloom and Glare that are applied after a scene has been rendered.

²Render layers allow users to separate their scene geometry into parts, where one part is meant to be visible and the rest of the other parts "capture" the side effects of the visible geometry. The layers allow different objects to be rendered into separate images where, in turn, some normal render passes may be applied. The Render layers are meant for compositing and not to hide parts of the scene.

³The GPU is responsible for displaying graphical elements on a computer display. The GPU plays a key role in the Octane rendering process as the CUDA cores are utilized during the rendering process.

Material¹ Passes

Material Passes include all characteristics associated with scene materials.

¹The representation of the surface or volume properties of an object.

Imager

The **Camera Imager** settings provide useful parameters for post-rendering adjustments.

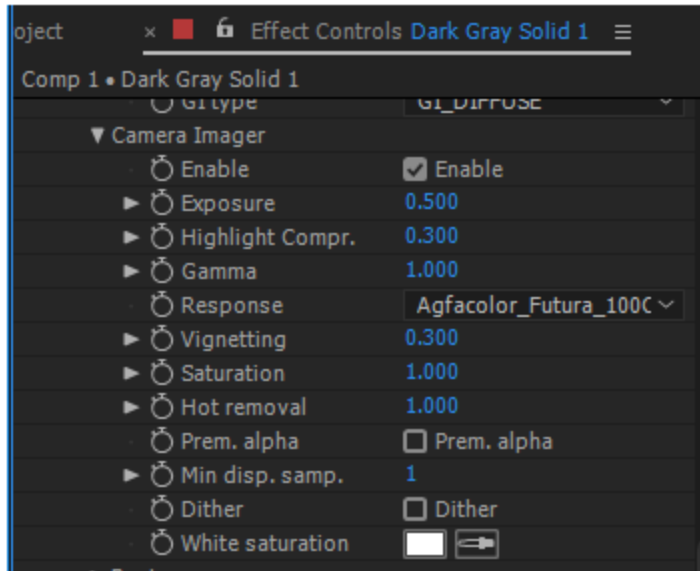


Figure 1: The Camera Imager parameters .

The Camera Imager parameters:

Exposure

Controls the exposure of the scene. Smaller values will create a dark scene while higher values will brighten the scene. Note also that exposure has no effect on any of the render layer passes.

Highlight Compression

This reduces burned out highlights by compressing them and reducing their contrast.

Response

A list of measured camera response curves can be selected from this drop menu.

Gamma¹

Adjusts the gamma of the render and controls the overall brightness of an image. Images that are not properly corrected can look either bleached out or too dark. Varying the amount of gamma correction changes not only the brightness, but also the ratios of red to green to blue.

Vignetting

Increases the amount of darkening in the corners of the render. Used sparingly, it can greatly increase the realism of the render. Note also that vignette is not applied to any of the beauty passes except the main pass.

Saturation

Adjusts the amount of color saturation of the render.

Hot Pixel Removal

The Hot Pixel Removal slider is used to remove the bright pixels (fireflies) during the rendering process. While many of the pixels can disappear if the render is allowed to progress, the Hot Pixel Removal feature allows the bright pixels to be removed at a much lower Sample per Pixel.

Pre-multiplied Alpha

Checking the Pre-multiplied Alpha button multiplies any transparency value of the output pixel by the pixels color.

Dithering

Adds random noise which removes banding in very clean images.

White Saturation

When the sun is too bright, it can create multicolored reflections. Increasing this value will change the colors to white. This is also applicable to all sources of light. Fully saturated parts of the render can be pushed towards pure white with this option. This helps avoid large patches of fully saturated colors caused by over-bright light sources such as very bright colored emitters or reflected sunlight off colored surfaces.

Minimum Display Samples

This is minimum amount of samples that is calculated before the image is displayed. This feature can

¹The function or attribute used to code or decode luminance for common displays. The computer graphics industry has set a standard gamma setting of 2.2 making it the most common default for 3D modelling and rendering applications.

significantly reduce the noise when navigating and is useful for real-time walkthroughs. When using multiple GPUs, it's recommended to set this value as a multiple of the number of available GPUs for rendering, e.g. if rendering with 4 GPUs, set this value at 4 or 8.

Post Processing

Post Processing¹ effects are used to add various post-rendered effects to a rendered image. The post effects available in Octane For After Effects include Bloom, Glare, and Spectral Intensity/Shift.

The Post Processing effects are located in the Post Processing roll out of an OctaneRender Effect (Figure 1).

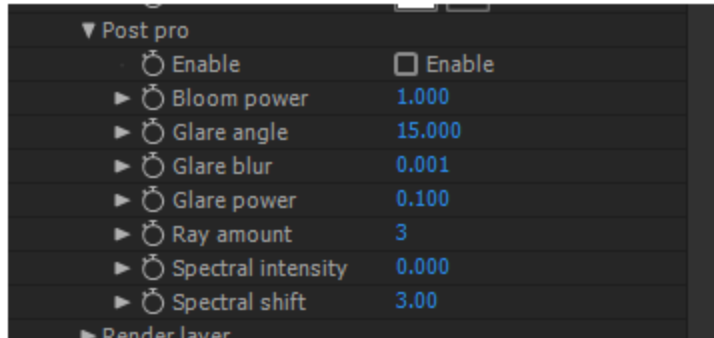


Figure 1: The Post Processing Parameters.

The Post Processing parameters:

Enable

This is a boolean value used to enable or disable post-processing effects on the resulting render. Post-processing is disabled by default.

Bloom Power

Controls the size of the glow originating from an emitter, the size of the halo of light originating from the sun, and/or concentrated light on reflective glossy materials - to add a bloom effect to the rendered image.

Glare Power

Controls the size of the visible rays originating from an emitter, the size of the glare originating from reflective glossy materials at a point where the concentration of light is at its highest - to add a glare effect to the rendered image.

¹Effects such as Bloom and Glare that are applied after a scene has been rendered.

Glare Ray Amount

Controls the number of visible rays radiated or reflected.

Glare Rotation Angle

This is used to adjust the rotation of the glare relative to the object. A glare angle of -90 and 90 results to one main horizontal glare, and a glare angle of 0 results to one main vertical glare.

Glare Blur

Controls the sharpness of the glare. Smaller values will result to a crisp linear glare and this is softened as the value is adjusted and set higher.

Spectral Intensity

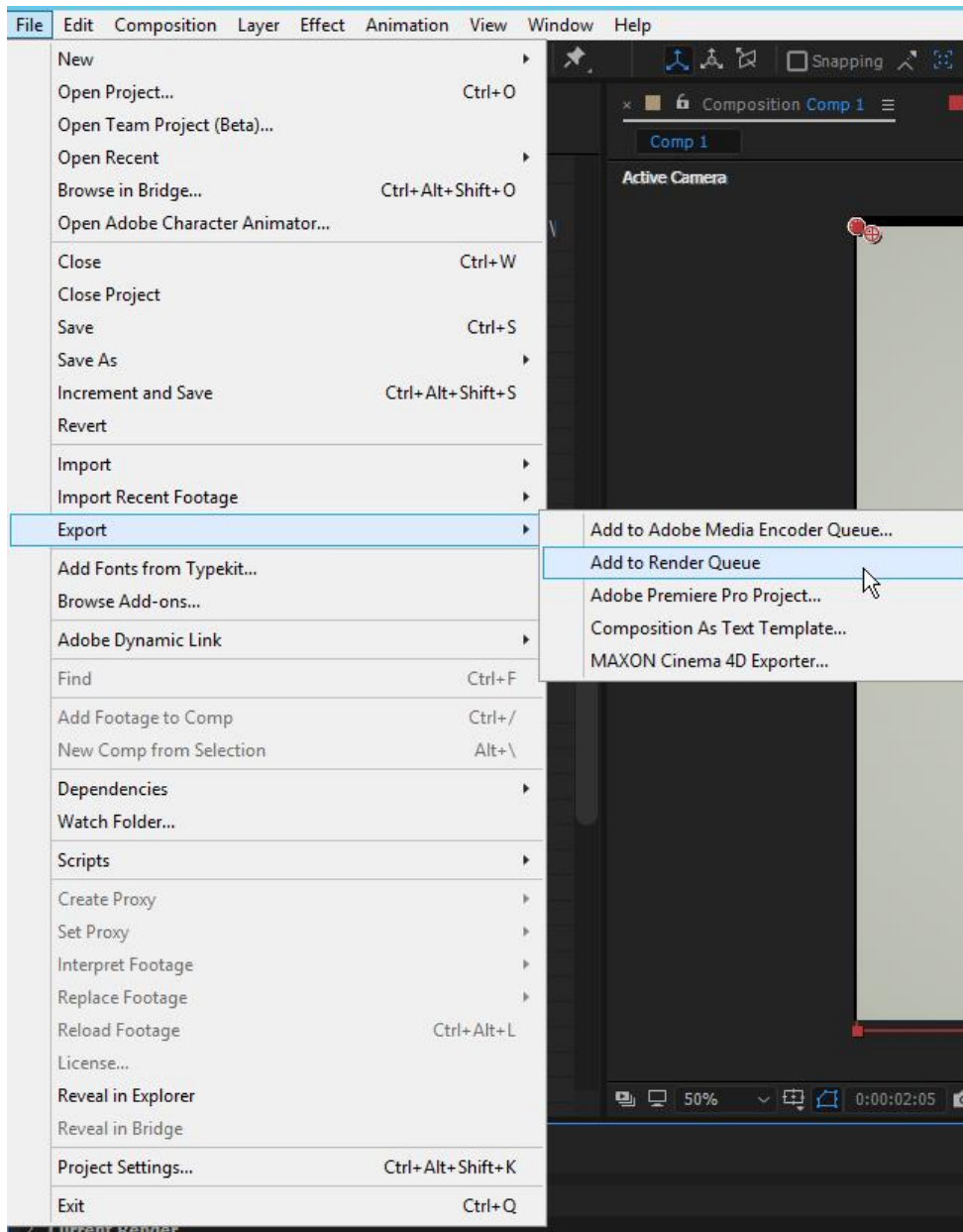
Used to adjust the intensity distribution of the rays across a source. This affects the strength or weakness (brightness) of the radiant energy.

Spectral Shift

Used to adjust the displacement of the spectrum as the frequency of light emitted from a source changes affecting the visible spectrum relative to the source on the scene. The shift is evident by a color change, similar to the Doppler Effect, as the distance traveled by the ray from its source increases or decreases.

Render Output

To render out the composition, go to **File > Export > Add to Render Queue**. You may also choose to send it to Adobe Premiere Pro as an Adobe Premiere Pro Project.

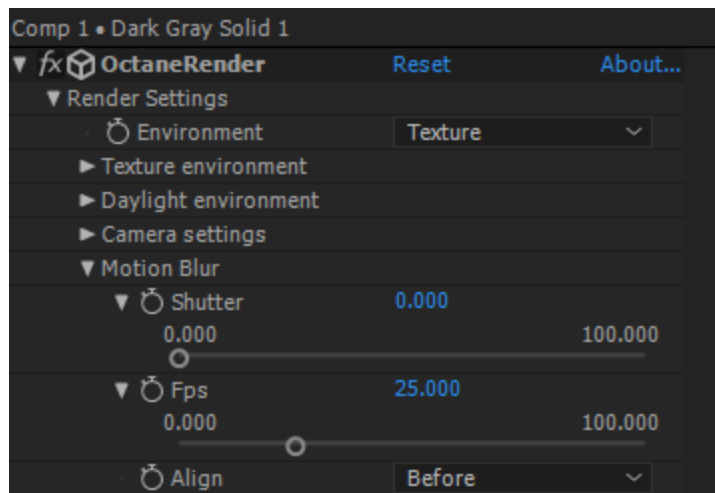


Motion Blur

Blurring is a phenomenon common in photography especially when capturing fast-moving objects, it may result either when the camera has moved thereby the focal point when the camera shutter opened is no longer the same by the time the shutter is closed (camera blur) or when the object is moving too fast that the camera's shutter speed is not fast enough to capture a sharp image of it (object motion blur).

In CG where objects are simply modelled and rendered, the images may be all sharp since the computer is actually able to generate all frames. Blurring effects are generally simulated through a variety of settings during the rendering.

In Octane for After Effects, blur effects are applied through **OctaneRender Effect > Render Settings > Motion Blur¹** and there needs to be animated geometry provided by alembic geometry within the .orbx scene.



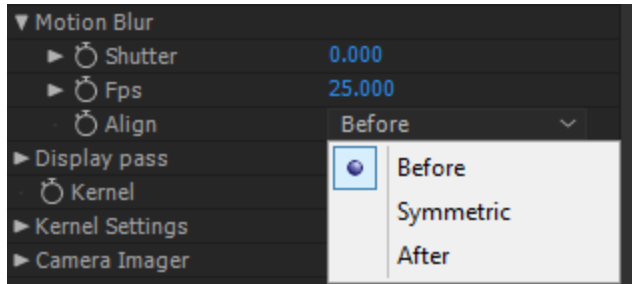
Shutter

This specifies the shutter time percentage relative to the duration of a single frame. It controls how much time the shutter stays open.

¹An optical phenomenon that occurs when a camera's shutter opens and closes too slowly to capture movement without recording a blurring of the subject.

Fps (Frame Rate)

This specifies the number of frames per second, where a frame is a rendered image each processed and shown consecutively to simulate motion within a scene.

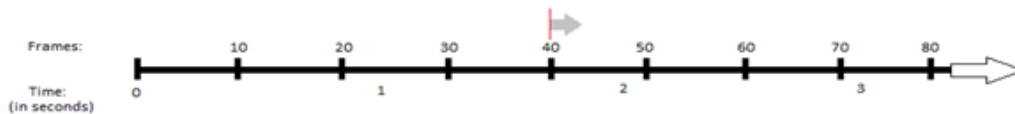


Shutter Alignment (Align)

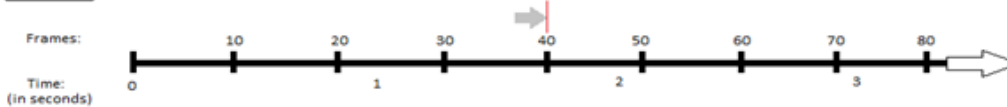
The shutter alignment specifies how the shutter interval is aligned to the current time.

This determines when the camera shutter is triggered. This can be before, symmetrical or after, and applicable to each frame thereafter relative to the given frame rate.

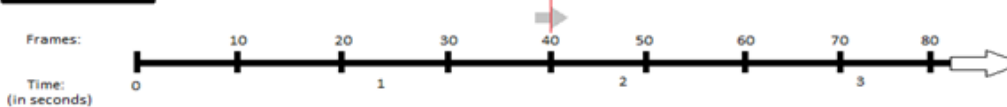
After



Before



Symmetrical



Glossary

A

Absorption

Defines how fast light is absorbed while passing through a medium.

Adaptive Sampling

A method of sampling that determines if areas of a rendering require more sampling than other areas instead of sampling the entire rendering equally.

Alembic

An open format used to bake animated scenes for easy transfer between digital content creation tools.

Alpha Channel

A greyscale image used to determine which areas of a texture map are opaque and which areas are transparent.

Anti-Ghosting

The automatic or manual correction involved in the merging a stack of images during the creation of a High Dynamic Range image. The process aims to correct the strange effect when objects that change position in the image set is partially visible (like a ghost) in the final HDR image.

Aperture

Determines how much light enters a camera lens. A large aperture produces a narrow depth of field and a small aperture produces a wide depth of field.

AR

Viewing a conceptual three dimensional scene in context to see how it might look in the real world.

Augmented Reality

Viewing a conceptual three dimensional scene in context to see how it might look in the real world.

B

Batch Rendering

The process of assigning sequential portions of frames to be rendered across multiple systems.

Black Body

An opaque object that emits thermal radiation. In Octane, this is used to designate illumination properties for mesh emitters.

D

Deep Image

Renders frames with multiple depth samples in addition to typical color and opacity channels.

Depth Buffer

A measure of object distances from the camera typically represented as a grayscale image.

Depth of Field

The distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. Although a lens can precisely focus at only one distance at a time, the decrease in sharpness is gradual on each side of the focused distance, so that within the DOF, the unsharpness is imperceptible under normal viewing conditions. source: wikipedia (https://en.wikipedia.org/wiki/Depth_of_field)

Diffuse

Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

Diffuse material

Used for dull, non-reflecting materials or mesh emitters.

Displacement

The process of utilizing a 2D texture map to generate 3D surface relief. As opposed to bump and normal mapping, Displacement mapping does not only

provide the illusion of depth but it effectively displaces the actual geometric position of points over the textured surface.

DoF

The distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. Although a lens can precisely focus at only one distance at a time, the decrease in sharpness is gradual on each side of the focused distance, so that within the DOF, the unsharpness is imperceptible under normal viewing conditions. source: wikipedia (https://en.wikipedia.org/wiki/Depth_of_field)

Drivers

Files that allow hardware devices to communicate with an operating system. In the case of Octane, the latest Nvidia drivers should be used.

E

Effective Focus Range

The distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. Although a lens can precisely focus at only one distance at a time, the decrease in sharpness is gradual on each side of the focused distance, so that within the DOF, the unsharpness is imperceptible under normal viewing conditions. source: wikipedia (https://en.wikipedia.org/wiki/Depth_of_field)

Emissions

The process by which a Black body or Texture is used to emit light from a surface.

EXR

Also known as OpenEXR. This image file format was developed by Industrial Light & Magic and provides a High Dynamic Range image capable of storing deep image data on a frame-by-frame basis.

F

FBX

.fbx (Filmbox) is a proprietary file format developed by Kaydara and owned by Autodesk since 2006. It is used to provide interoperability between digital content creation applications. As of Octane 3.07, a scene node will also be available as an

FBX file, allowing for quick and easy transport of assets from industry standard DCC applications

Field of View

The area that is visible to a camera lens usually measured in millimeters. A wide angle lens provides a larger field of view and a telephoto lens provides a narrow field of view.

Focus Range

The distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. Although a lens can precisely focus at only one distance at a time, the decrease in sharpness is gradual on each side of the focused distance, so that within the DOF, the unsharpness is imperceptible under normal viewing conditions. source: wikipedia (https://en.wikipedia.org/wiki/Depth_of_field)

FoV

The area that is visible to a camera lens usually measured in millimeters. A wide angle lens provides a larger field of view and a telephoto lens provides a narrow field of view.

G

Gamma

The function or attribute used to code or decode luminance for common displays. The computer graphics industry has set a standard gamma setting of 2.2 making it the most common default for 3D modelling and rendering applications.

Glossy

The measure of how well light is reflected from a surface in the specular direction, the amount and way in which the light is spread around the specular direction, and the change in specular reflection as the specular angle changes. Used for shiny materials such as plastics or metals.

Glossy material

Used for shiny materials such as plastics or metals.

GPU

The GPU is responsible for displaying graphical elements on a computer display. The GPU plays a key role in the Octane rendering process as the CUDA cores are

utilized during the rendering process.

Graphics Card

The GPU is responsible for displaying graphical elements on a computer display. The GPU plays a key role in the Octane rendering process as the CUDA cores are utilized during the rendering process.

H

Hardware

Any physical device present in a computer system. A Nvidia GPU is a required hardware device for using the Octane Render engine.

HDRI

An image which presents more than 8 bit per color channel unlike most common image formats.

High Dynamic Range Image

An image which presents more than 8 bit per color channel unlike most common image formats.

I

IES

An IES light is the lighting information representing the real-world lighting values for specific light fixtures. For more information, visit <http://www.ies.org/lighting/>.

Independent Software Vendor

An individual or business that builds, develops and sells consumer or enterprise software. Although ISV-provided software is consumed by end users, it remains the property of the vendor. An ISV is also known as a software publisher.

Instancing

Instancing an object means taking a single imported mesh object, such as an OBJ or an FBX and making multiple copies, each of which can be placed in different parts of the scene. This saves an enormous amount of computational resources because only a single object is loaded into the scene.

Interactive Photorealistic Rendering

Provides artists a quick preview of the image prior to the final render, and efficiently allows for adjusting some elements in the scene such as lights, shaders and textures interactively. An IPR image contains shading and lighting data including some for visibility, in addition to the software render.

IPR

Provides artists a quick preview of the image prior to the final render, and efficiently allows for adjusting some elements in the scene such as lights, shaders and textures interactively. An IPR image contains shading and lighting data including some for visibility, in addition to the software render.

ISV

An individual or business that builds, develops and sells consumer or enterprise software. Although ISV-provided software is consumed by end users, it remains the property of the vendor. An ISV is also known as a software publisher.

K

Kernels

By definition, this is the central or most important part of something. In Octane, the Kernels are the heart of the render engine.

L

LDR

Image formats that have 8 bits per color channel such as the common image formats JPEG, PNG, GIF among others.

Low Dynamic Range

Image formats that have 8 bits per color channel such as the common image formats JPEG, PNG, GIF among others.

Lua

A scripting language that supports procedural, object-oriented, functional, and data-driven programming. It can be used to extend Octane's functionality. A scripting language that supports procedural, object-oriented, functional, and data-driven programming. It can be used to extend Octane's functionality.

Lua Scripting

A scripting language that supports procedural, object-oriented, functional, and data-driven programming. It can be used to extend Octane's functionality. A scripting language that supports procedural, object-oriented, functional, and data-driven programming. It can be used to extend Octane's functionality.

M

Material

The representation of the surface or volume properties of an object.

Materials

A set of attributes or parameters that describe surface characteristics.

Mediums

The behavior of light inside a surface volume described by scatter, absorption, and transmission characteristics.

Mesh Emitters

The ability for a surface to emit illumination usually described by a Black Body or Texture emission type.

Mix material

Used to mix any two material types.

Mixed

The ratio of diffuse and specular reflection.

Motion Blur

An optical phenomenon that occurs when a camera's shutter opens and closes too slowly to capture movement without recording a blurring of the subject.

N

Network Rendering

The utilization of multiple CPUs or GPUs over a network to complete the rendering process.

NGE

Node Graph Editor

O

Open Shader Language

A shading language developed by Sony Pictures Imageworks. There are multiple render engines that utilize OSL as it is particularly suited for physically-based renderers.

Open SubDiv Surfaces

A set of open source libraries that implement high performance subdivision surface (subdiv) evaluation on massively parallel CPU and GPU architectures. This code path is optimized for drawing deforming surfaces with static topology at interactive framerates. Source: Pixar (<http://graphics.pixar.com/opensubdiv/docs/intro.html>).

OpenVDB

Dreamworks' open-source C++ library housing the data structures and tools implementation for storing and manipulating volume data, like smoke and other amorphous materials. The purpose of OpenVDB is mostly to have an efficient way to store volumetric data in memory and on disk. It has evolved into a more general toolkit that also lets you accomplish other things, such as fracturing volumes, converting meshes to volumes and vice versa. However, it does not include a computational fluid dynamics solver, and therefore it cannot procedurally generate smoke or fire. OpenVDB is fully integrated as a library in OctaneRender. For more information about OpenVDB, check at <http://www.openvdb.org/>.

ORBX

The ORBX file format is the best way to transfer scene files from 3D Authoring software programs that use the Octane Plug-in such as Octane for Maya, Octane for Cinema 4D, or OctaneRender Standalone. This format is more efficient than FBX when working with Octane specific data as it provides a flexible, application independent format. ORBX is a container format that includes all animation data, models, textures etc. that is needed to transfer an Octane scene from one application to another.

Out-of-Core

When scene assets become too large to load completely onto the system's GPU, Out-of-Core technology allows the render engine to utilize the CPU to assist in the rendering process.

P

PBR

A contemporary shading and rendering process that seeks to simplify shading characteristics while providing a more accurate representation of lighting in the real world.

Portal

A technique that assists the render kernel with exterior light sources that illuminate interiors. In interior renderings with windows, it is difficult for the path tracer to find light from the outside environment and optimally render the scene. Portals are planes that are added to the scene with the Portal material applied to them.

Post Processing

Effects such as Bloom and Glare that are applied after a scene has been rendered.

Projections

Methods for orienting 2D texture maps onto 3D surfaces.

Proxy

An object saved as a separate file with the purpose of being reused in larger scenes. This is used to minimize any addition to the total polygon count in the scene, especially if the scene requires the same object to appear several times. If used in conjunction with instancing, Proxies help keep very large scenes from reaching polygon limits and also keeps the relative file size of the main project file manageable.

R

RAW

In HDR imaging, this refers to minimally processed HDR image formats. Raw files can have 12 or 14 bits per color channel, although the available dynamic range might be cut down due to noise.

Render Layers

Render layers allow users to separate their scene geometry into parts, where one part is meant to be visible and the rest of the other parts "capture" the side effects of the visible geometry. The layers allow different objects to be rendered into separate images where, in turn, some normal render passes may be applied. The Render layers are meant for compositing and not to hide parts of the scene.

Render Passes

Render passes allow a rendered frame to be further broken down beyond the capabilities of Render Layers. Render Passes vary among render engines but typically they allow an image to be separated into its fundamental visual components such as diffuse, ambient, specular, etc..

S

Scattering

Defines how fast light gets scattered when traveling through the medium.

Shadow Catcher

The Shadow Catcher can be used to create shadows cast by objects onto the surrounding background imagery. The shadows cast are not limited to simply a ground plane but can be cast onto other surfaces of varying shapes.

Spectral Light Transport

A technique in which a scene's light transport is modeled with real wavelengths. Spectral rendering can also simulate light sources and objects more effectively, as the light's emission spectrum can be used to release photons at a particular wavelength in proportion to the spectrum. Source: Wikipedia (https://en.wikipedia.org/wiki/Spectral_rendering).

Specular

Amount of specular reflection, or the mirror-like reflection of light photons at the same angle. Used for transparent materials such as glass and water.

Specular material

Used for transparent materials such as glass and water.

T

Texture Baking

A process in which scene lighting is "baked" into a texture map based on an object's UV texture coordinates. The resulting texture can then be mapped back onto the surface to create realistic lighting in a real-time rendering environment. This technique is frequently used in game engines and virtual reality for creating realistic environments with minimal rendering overhead.

Textures

Textures are used to add details to a surface. Textures can be procedural or imported raster files.

TMO

Maps HDR images to standard displays which have a limited dynamic range. The more prominent TMOs are Mantiuk'06, Reinhard'02, Drago, and Durand.

Tone Mapping

A term referring to various methods of "converting" HDR images into a viewable format.

Tone Mapping Operator

Maps HDR images to standard displays which have a limited dynamic range. The more prominent TMOs are Mantiuk'06, Reinhard'02, Drago, and Durand.

Transformations

Tools used to rotate and position 2D and 3D texture maps onto 3D surfaces.

Transmission

A surface characteristic that determines if light may pass through a surface volume.

U

Unbiased Rendering

Unbiased rendering does not introduce any "errors" or shortcuts into the rendering process. It will calculate all scene data using real-world calculations. This type of rendering is known for producing exceptional render quality.

V

VDB

Dreamworks' open-source C++ library housing the data structures and tools implementation for storing and manipulating volume data, like smoke and other amorphous materials. The purpose of OpenVDB is mostly to have an efficient way to store volumetric data in memory and on disk. It has evolved into a more general toolkit that also lets you accomplish other things, such as fracturing volumes, converting meshes to volumes and vice versa. However, it does not include a computational fluid dynamics solver, and therefore it cannot procedurally generate smoke or fire.

OpenVDB is fully integrated as a library in OctaneRender. For more information about OpenVDB, please see <http://www.openvdb.org/>.

Virtual Reality

Immersively engaging and experiencing depth perception in a three dimensional scene through stereo vision goggles and head-mounted displays.

Volume Medium

A shading system designed to render volumes such as smoke and fog.

VR

Immersively engaging and experiencing depth perception in a three dimensional scene through stereo vision goggles and head-mounted displays.

Z

Z-Buffer

A measure of object distances from the camera typically represented as a grayscale image.

Z-Depth

A measure of object distances from the camera typically represented as a grayscale image.

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