



OctaneRender™ for Autodesk® AutoCAD® Plugin Manual

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<http://render.otoy.com>

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Installation and Overview

Software and Hardware 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). If you do install Standalone Edition, it does not need to be the same Octane version as the plugin – since they operate separately.

The plugin requires Autodesk AutoCAD 2014, 2015 or 2016 to be installed. It runs under Windows 32 or 64 bit.

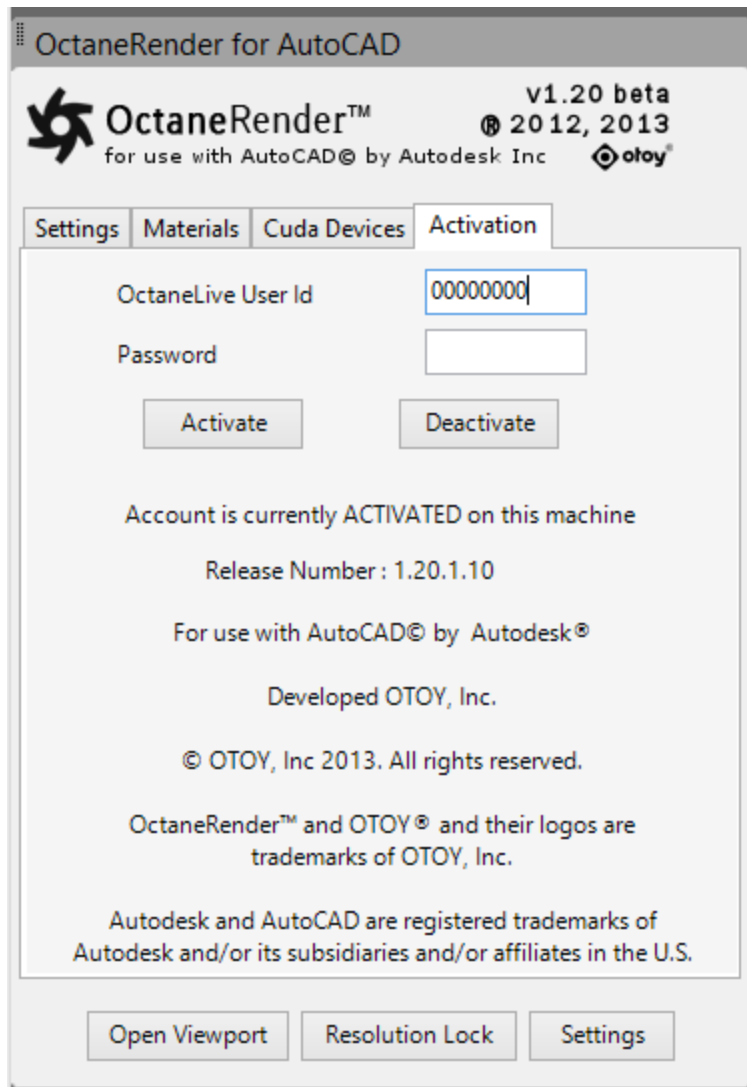
It is also highly recommended that you use your on-board graphics or a second graphics card for the Windows display adapter. If you do not have an on-board or second graphics card, use the Low Priority Render Priority described in "GPU Settings" on page 4.

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

Internet Access

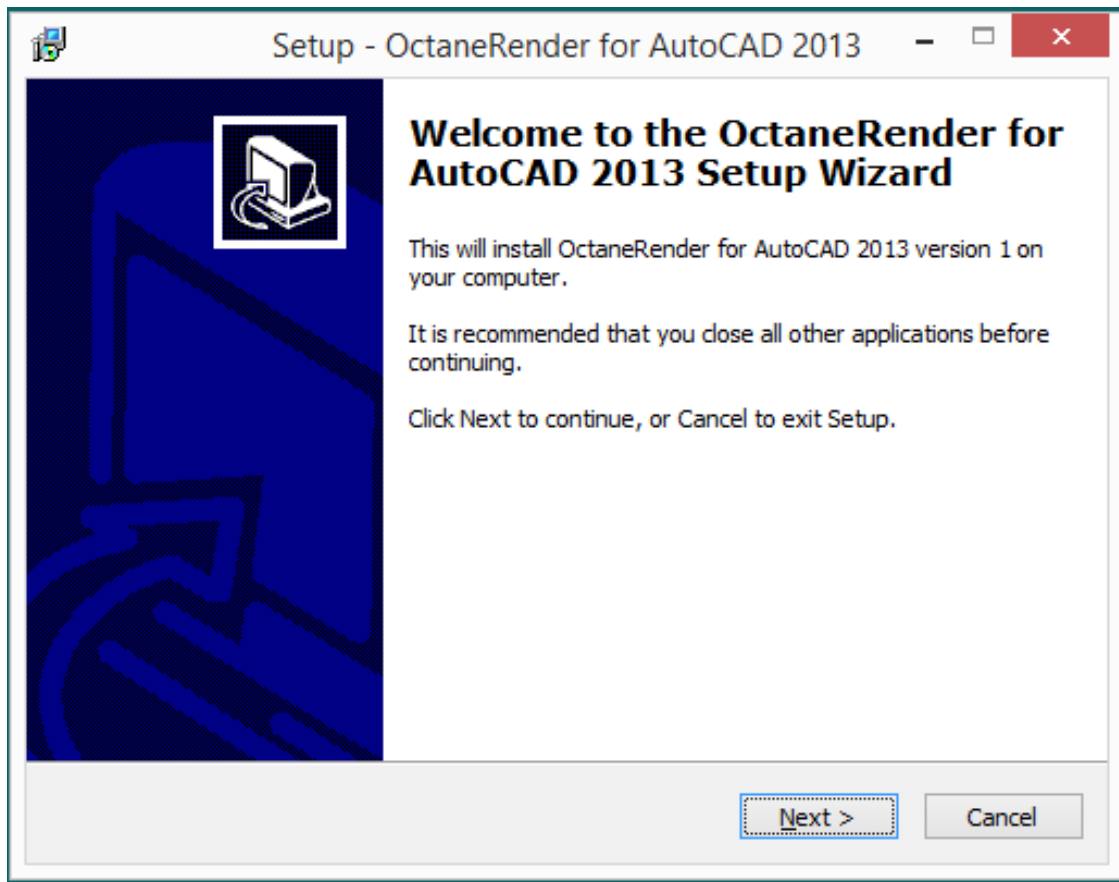
The OctaneRender™ for AutoCAD plugin requires internet access to launch the first time. Internet access is not required to use both OctaneRender™ and OctaneRender™ for AutoCAD plugin.

When no internet access is present, the Live Database will not be accessible. Upon launching the plugin for the first time, the user will need to log in to their OctaneLive™ account which associated with their forum log-in information. This information can be found in the customer section of the OctaneRender™ website.

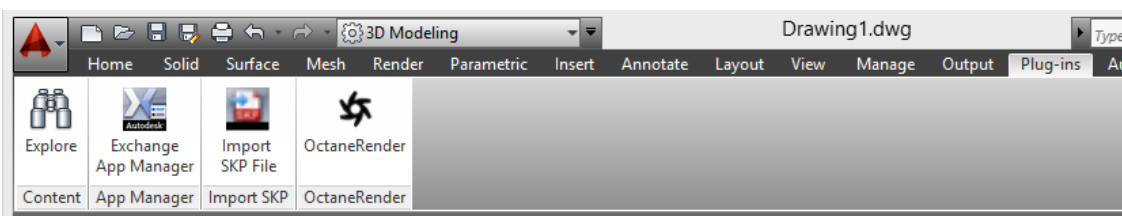


Installation of the Plugin into AutoCAD

Ensure AutoCAD is not currently running on your PC, and then run the provided installation file (eg. OctaneRender_for_AutoCAD_2014_64bit_Setup_1.20.1_Beta.exe). The installer will copy all the plugin files into the default plugin folder for AutoCAD (C:\ProgramData\Autodesk\Application\Plugins\OctaneRender for AutoCAD.bundle).



Once installed, when you next run AutoCAD, the plugin will be available from the Plug-ins Tab.



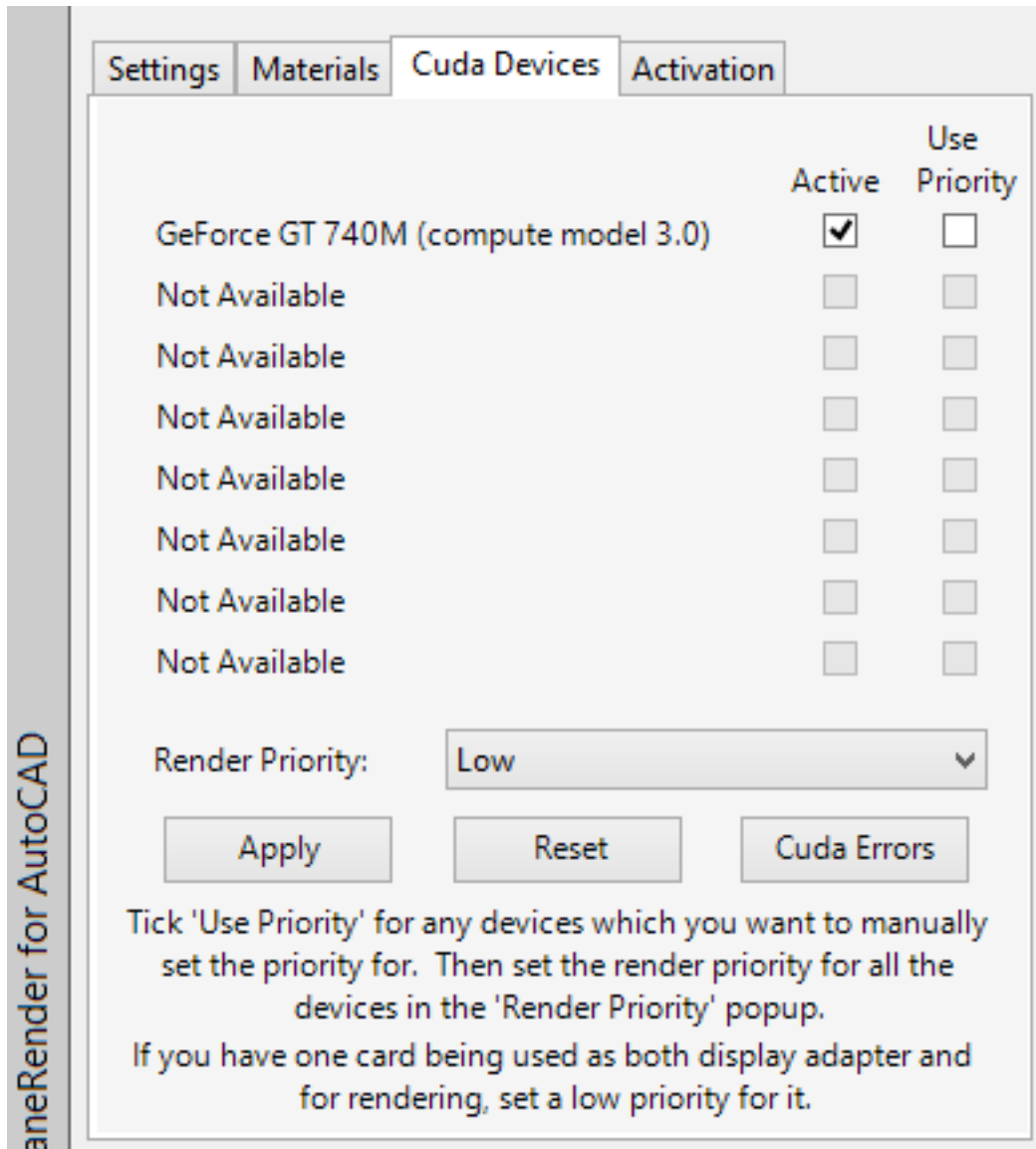
You will need to activate the plugin prior to using it for the first time. Open the plugin, and enter your OctaneLive User ID and Password in the Activation tab, and click the Activate button. Once activated, the other tabs (ie "Settings", "**Materials**¹", etc) will be selectable and you can start using the plugin to render.

¹A set of attributes or parameters that describe surface characteristics.

You can also run the plugin via the OCTANERENDER AutoCAD command.

GPU Settings

The Cuda Devices tab will display the following window:



You can enable or disable your Cuda Devices from this window. If for some reason you need to reset the Cuda devices, use the Reset button.

You can also specify particular cards render at the currently selected Render Priority. To do this, tick the Use Priority checkbox, and then select High, Medium or Low as the Render Priority. If you are using a single card for both Cuda rendering and as your Windows display adapter, it is recommended that you select the Low Priority. Remember to click Apply to apply a changed Render Priority to your video card.

IMPORTANT!!!

1. If you have an on-board graphics card (or second graphics card), use it as your Windows display adapter
2. If you do NOT have an on-board graphics or 2nd graphics card to use as your Windows display adapter, set the Render Priority of your card to Low (as described above).
3. If you get an Nvidia driver crash, this is due to a time-out. In the case, install Octane Standalone (since the installer will change the Nvidia time-out settings), and set the Render Priority of your card to Low (as described above).

In the unlikely event that you get a Cuda error from your video card, click the Cuda Errors button to display specific details on the error.

For troubleshooting problems, refer to the OctaneRender™ Standalone Edition User Manual.

Rendering Performance and Quality

A render is not finished when the "kernel"->"maxsamples" are reached. It is finished when the Viewport image quality is free of noise and all details have been rendered to a fine level. For some simple scenes, this will be after 500 samples. For some complex scenes it may take 10,000 samples.

Tips to increase render speed (by increasing sample/sec or reducing the samples required to finish the render):

- Use the "directlighting" kernel. This may provide a lower quality output but is much faster than "pathtracing" and "pmc". Only use this option if the reduction in render quality is acceptable.
- Minimise the use of SSS ("diffuse"->"scatter")
- Set "imager"->"hotpixel_removal" to 0. This eliminates most 'fireflies'
- Increase "kernel"->"caustic_blur" (to whatever level needed – even '1'). This smooths out the noise in the render
- Use a higher-powered graphics card, or add additional graphics cards to your system
- If the light illuminating the scene has come through a specular (glass) material, using "pmc" rather than "pathtracing". In this situation you can also reduce "kernel"->"direct_light_importance" to give the light that has passed through the glass more priority. Also, you can let more direct light through the glass by reducing the glass material's opacity (from 1 to say 0.2).
- If illuminating the scene by emitters, make sure those emitters have as few polygons as possible, and are as large as possible. If using emitters, it is highly recommended that you use an IES¹ file in the "distribution" pin to direct the light as required.

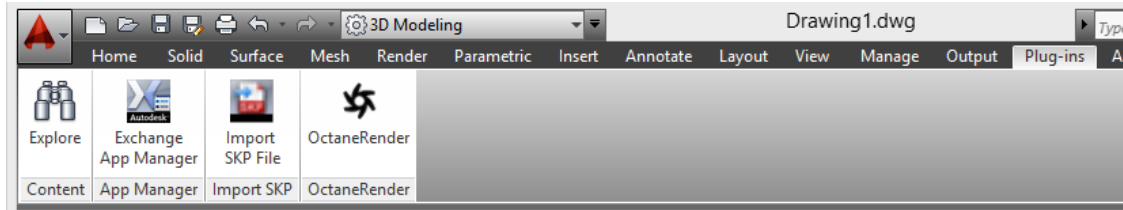
¹An IES light is the lighting information representing the real-world lighting values for specific light fixtures. For more information, visit <http://www.ies.org/lighting/>.

IMPORTANT: Remember to adjust "kernel" -> "rayepsilon" for each scene. The "rayepsilon" will be smallest for close-up renders, and increase as the camera moves further away from the subject.

For very small scenes (millimeters) or very large scenes (spanning many kilometers) you may not be able to get the "rayepsilon" small or large enough. In this case, set the scene scale in the Configuration accordingly (mouseover the scale field for guidance on this).

OctaneRender Setup Window

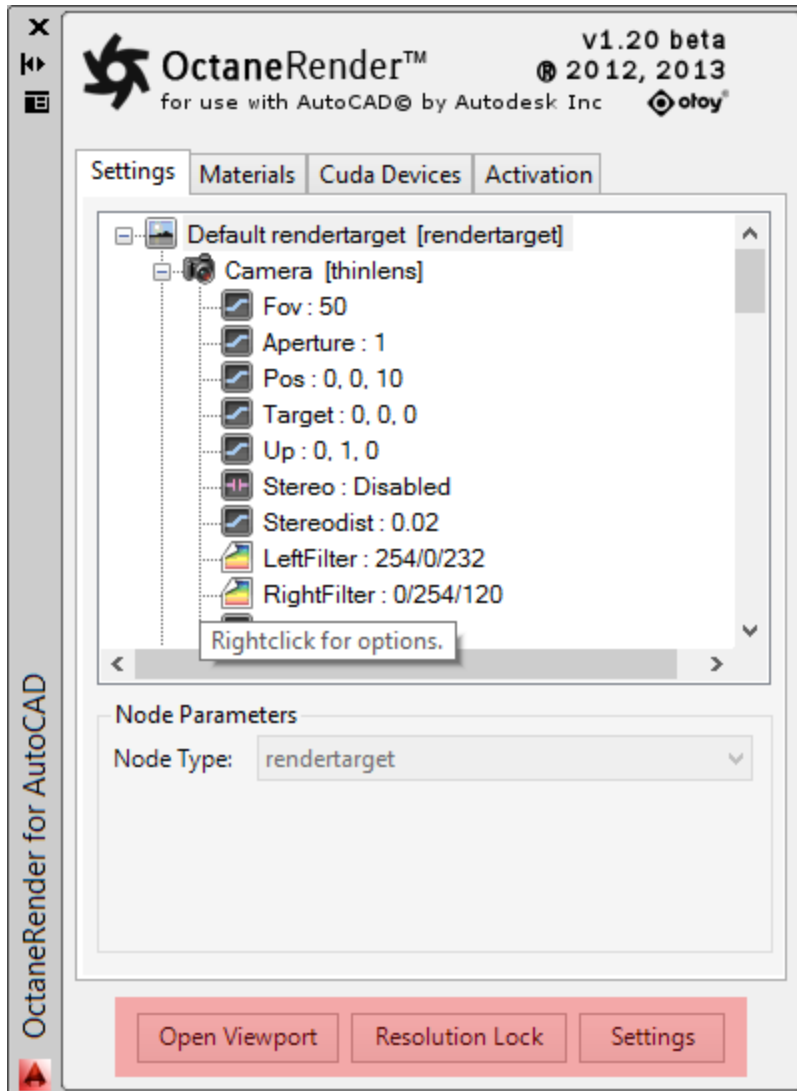
To open the Setup Window, select the OctaneRender icon from the Add-ins ribbon.



Once the Setup window has authenticated your credentials, the main plugin setup screen will display, with five tabs:

- **Settings** – The Octane rendertarget settings
- **Materials¹** – The Octane materials used in the scene
- **Cuda Devices** – The available rendering devices
- **Activation** – Your OctaneLive account credentials

¹A set of attributes or parameters that describe surface characteristics.



Each Tab contains the following controls:

Open Viewport

Opens the OctaneRender Viewport window and commences rendering (see OctaneRender Viewport).

Resolution Lock

If this button is ON, then the resolution of the render is controlled by the Settings Tab resolution settings. If it is OFF, then the render resizes to the Viewport size (and you can resize the Viewport by stretching the window).

Settings

This button opens the configuration settings window (See Configuration).

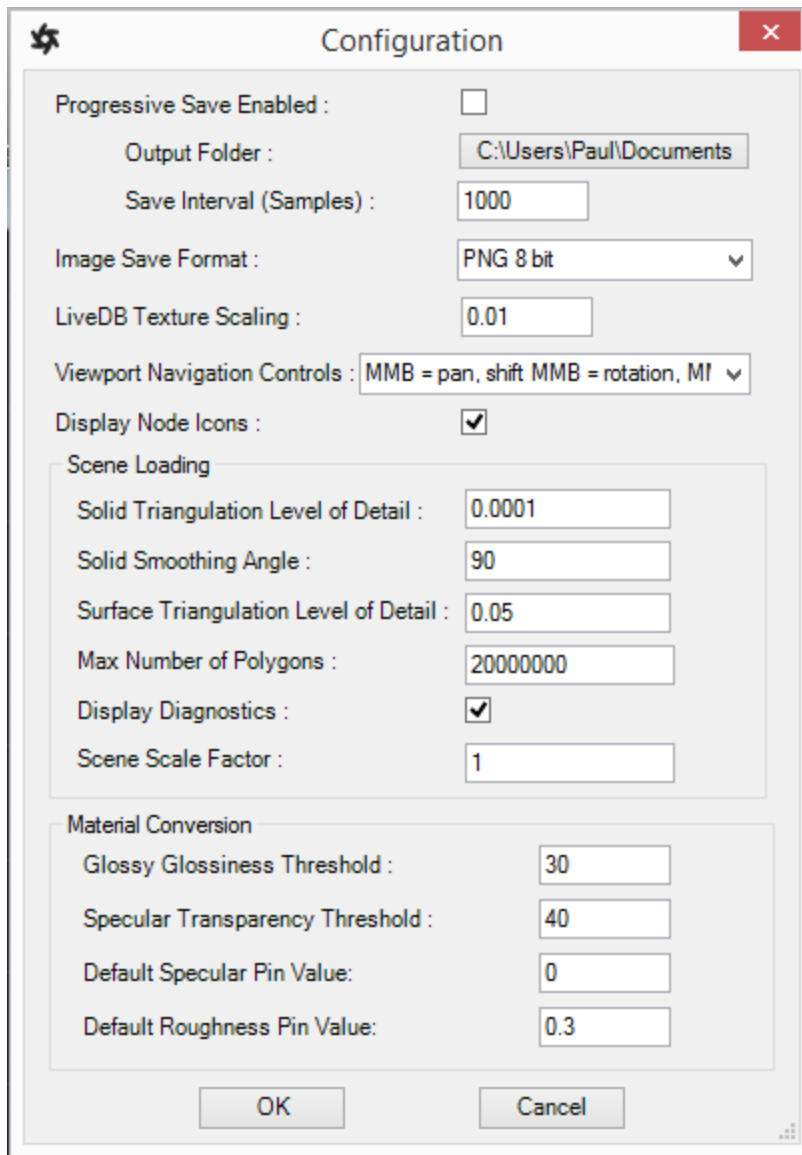
Configuration

In the Settings tab of the OctaneRender Setup Window is a Configuration button. The OctaneRender for AutoCAD plugin does all the conversion of the AutoCAD scene to Octane for you. However, there are some settings which you can tune to speed up your workflow. Mouseover each of the settings for more details.

In summary:

- **Progressive Save Enabled** – Tick to have the plugin save the render every “Save Interval” samples. Useful for analysis to determine how many samples are required for a render to be finished.
- **Image Save Format** – the format that the Viewport image will be saved as when you click the Save button on the Rendering tab.
- **Solid Triangulation Level of Detail** – Specifies the Level of Detail for Solids that get loaded into Octane. Smaller numbers give a finer level of granularity, but slower load times.
- **Solid Smoothing Angle** – Specifies the smoothing angle (in degrees) for Solids.
- **Surface Triangulation Level of Detail** – Specifies the Level of Detail for Surfaces that get loaded into Octane. Smaller numbers give a finer level of granularity, but slower load times.
- **Max Number of Polygons** – The maximum number of polygons that can be loaded into the Octane scene. Larger numbers require more memory to load.
- **Display Diagnostics** -Enables printing of scene load diagnostic messages when the Viewport is opened.
- **Scene Scale Factor** – Scales the entire scene by this value. Scale ‘mm/inches’ scenes up by 10-100 and ‘kilometers/miles’ scenes down by 10-100 if you are getting self-shadowing render artifacts
- **Material¹ Conversion** – these parameters are unlikely to need to be changed, however you can mouse-over each parameter for more information.

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



Settings Tab

The Settings Tab tree contains all the Octane nodes defining the scene rendering parameters (ie. All nodes connected to the "rendertarget" node EXCEPT the mesh pin). Click on any of the settings to enable the edit options in the Node Parameters window.

The main rendertarget pins are:

Camera – Position, target, aperture, etc

Resolution – The output render resolution

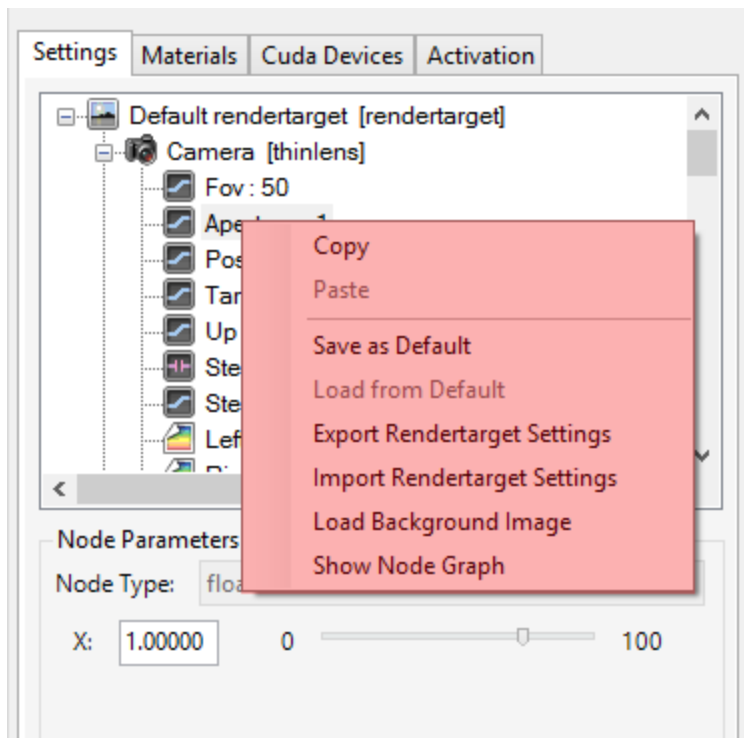
Environment – Scene lighting (IBL or daylight)

Imager – Post-work functions which can be changed without restarting the render

Kernel – The core rendering method

Postproc – Additional post-processing functions which can be changed without restarting the render

Rightclick the rendertarget tree for additional options:



Copy – Copies the currently selected node into the plugin clipboard. Only one node can be in the clipboard at any given time.

Paste – Pastes the clipboard node into the currently selected tree node. The Paste option will only be available when the clipboard node is compatible with the currently select node pin.

Load/Save as Default – allows you to save the current rendertarget as the “default” to be used on all new scenes.

Import/Export Rendertarget Settings – save the current rendertarget to disk for re-loading in other scenes. Very useful for saving image based lighting setups so they can be quickly reloaded.

Load Background Image – If you have ENABLED “Rendertarget” -> “Kernel” -> “Alphachannel”, load a background image with this option.

Clear Background Image – Clears a previously loaded background image.

Octane Camera

All Octane camera controls are under the “rendertarget” tree in the Settings tab of the plugin.

The Octane camera “pos” and “target” are taken from the current AutoCAD view camera position and view direction, and are always kept in sync. Panning, zooming and rotating the AutoCAD camera will result in the same movement in the Octane camera. So to move the Octane camera, simply move the AutoCAD camera.

To have the Octane camera sync to the AutoCAD camera, it is important to:

1. Use perspective mode
2. Use WCS, not UCS
3. Set the Octane “fov¹” to the Autocad current view “fov”

The Octane camera “fov”, “aperture”, “up” vector and “lensShift” are NOT connected to the AutoCAD camera. These parameters can be adjusted in the plugin Settings tab under “camera”. The default AutoCAD **field of view²** is approximately 50 degrees, so the plugin also defaults to 50.

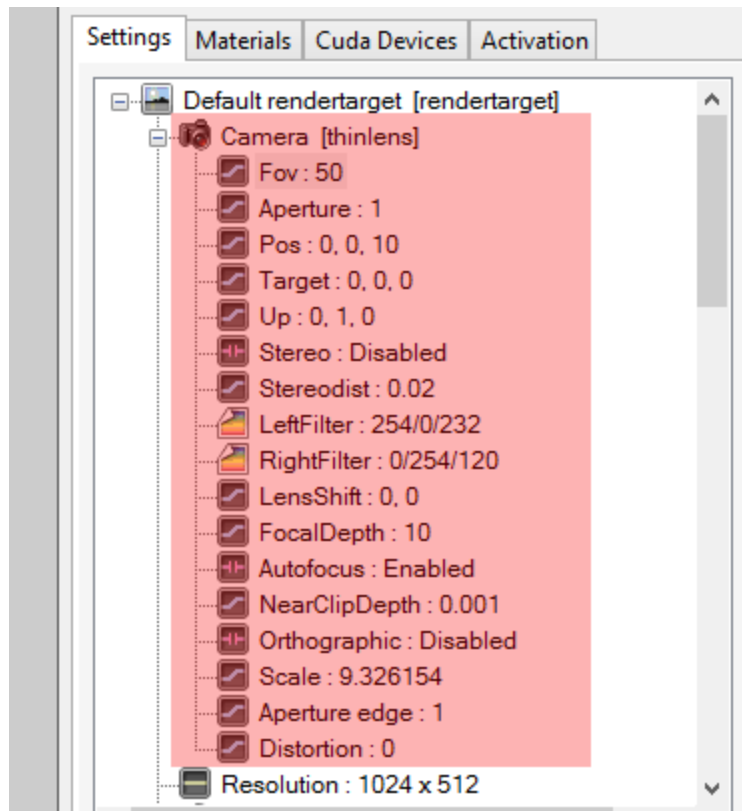
If the “A/F” button (focus pick) is enabled on the Viewport, you can click in the Octane Render Viewport to set the Octane “focalDepth” pin to the element distance that you clicked on. Doing so will also disable the “auto-focus” pin.

For interior renders, there may be situations where the camera is positioned inside a wall. In this case, increase the “nearClipDepth” to remove the wall from the rendered geometry.

It is not recommended that you adjust the “scale” pin unless you are in “orthographic” mode, since the “fov” value will override the “scale”.

¹The 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.

²The 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.

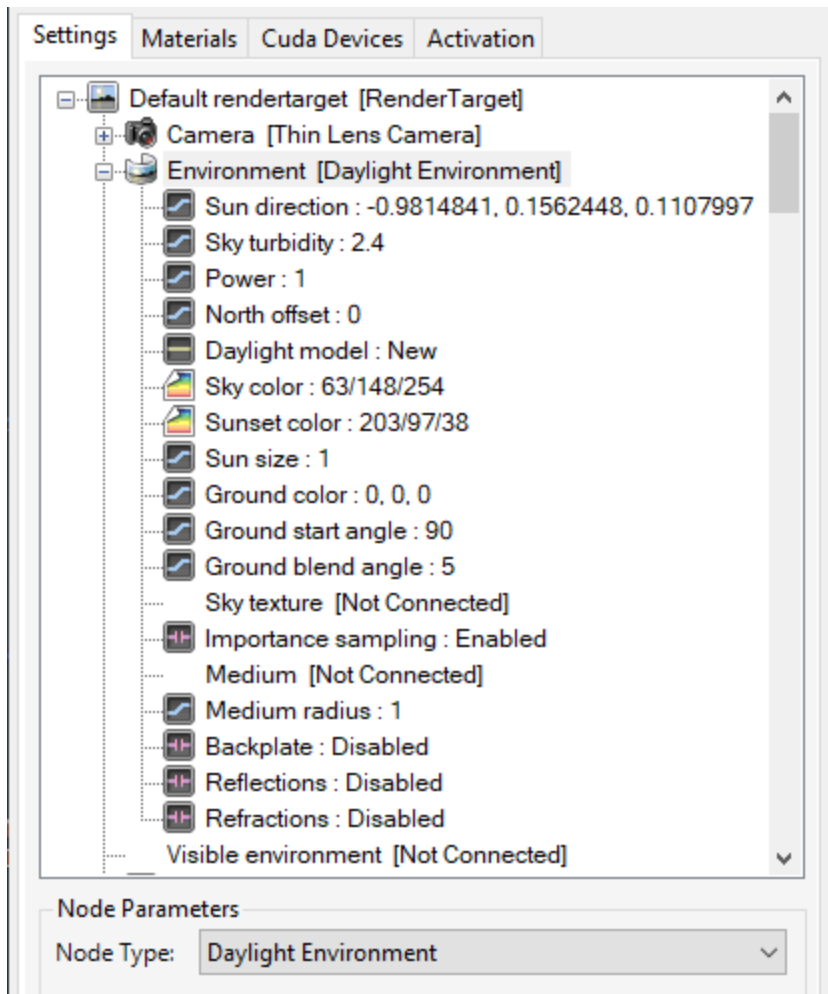


Octane Daylight, Emitters, and IBL

Octane Daylight

Go to the environment tree item under the rendertarget item in the Render Options List on the Settings tab, and change the default "texture environment" to "daylight". When the "environment" is set to "daylight", the sun position is set by the AutoCAD sun direction if the AutoCAD sun is ON, or the Octane "environment"->"subdir" node sliders if the AutoCAD sun is OFF.

The Octane "daylight" settings are as follows:



“power” sets the sun power and for exterior renders should be in the range 0.8-1.2. For interior renders you can increase the “power” substantially to illuminate the interior from sun light through windows.

“model” selects between the Old Octane daylight model and the New model. The New model is the recommended model to use.

“turbidity” and “sun_size” can be used to adjust the sharpness of the sunlights and shadows. A low value creates sharp shadows (like on a sunny day) and a higher value diffuses the shadows similarly to a cloudy day.

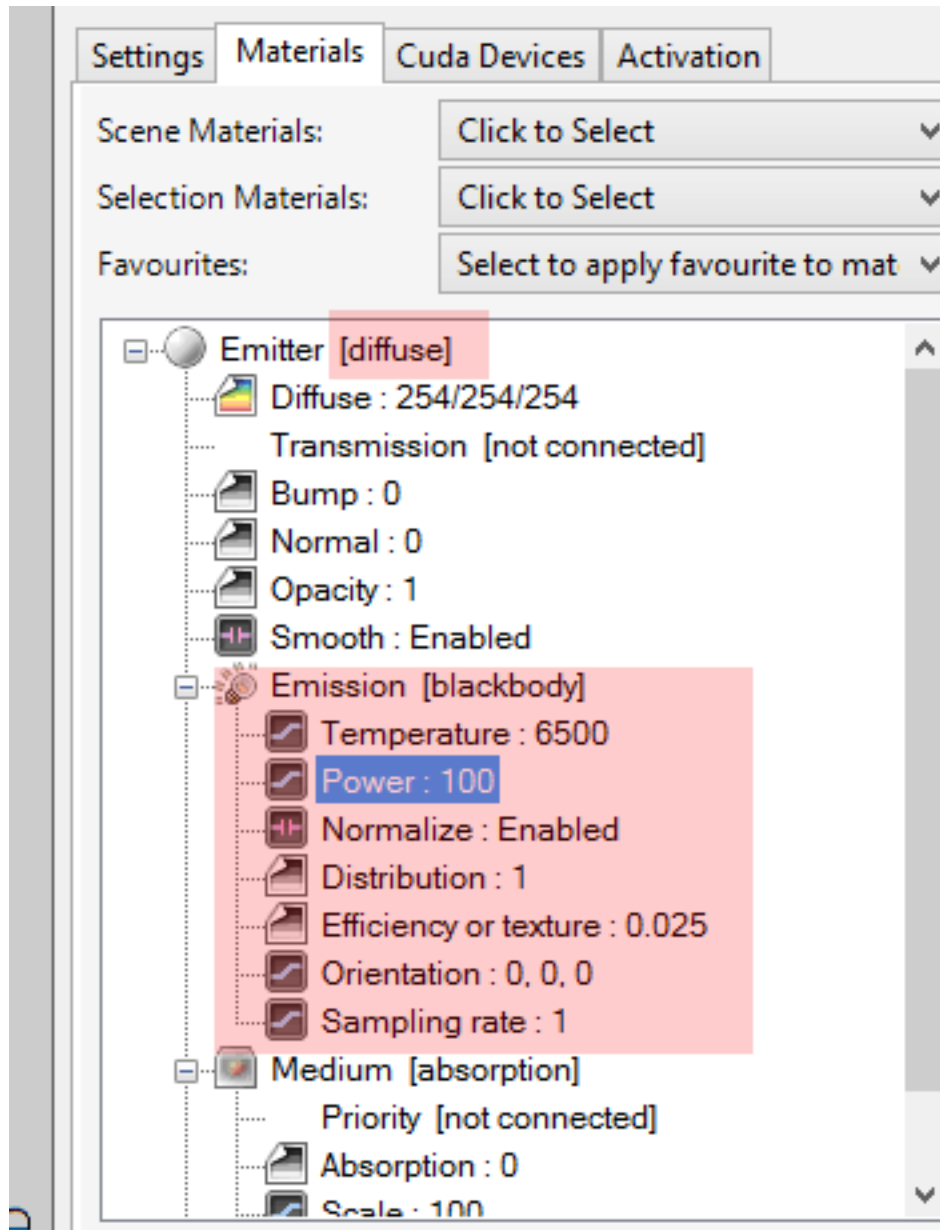
“sky_color” and “sunset_color” control the sky color at various times of the day.

“sky_color”, “sunset_color” and “sun_size” are only used with the New “model”.

I.

Emitters

Whilst IBL and daylight modes are the preferred methods for illuminating outdoor scenes, for indoor scenes you will need to create emitter geometry. This is best done by adding geometry to the scene and assigning a new material to it which you setup as an Octane diffuse emitter.



Emitters must be Octane “**Diffuse**¹” materials, and have a Blackbody or Texture Emission assigned to the Emission pin.

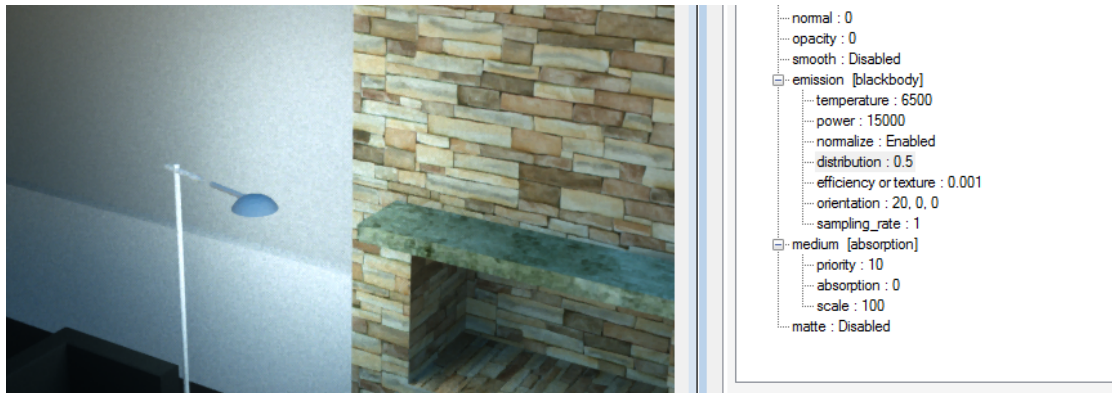
The emitter can be visible in the scene (set the opacity to 1), or invisible (set the opacity to 0).

Any emitters in your scene should be as low-polygon as possible (ie. not high density meshes).

IES² Lighting

It is highly recommended that all emitter materials be setup with an IES distribution. This allows the emission of light to be distributed to certain parts of the scene. IES files can be downloaded from various sources, including [this](#) link and [this](#) link.

With no IES file plugged into the “distribution” pin, the light spreads equality in all directions from the lamp.



With an IES distribution file plugged into the “distribution” pin (as an “image” node), the light now only goes down. The direction of light can be controlled by the “orientation” pins.

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.

²An 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/>.

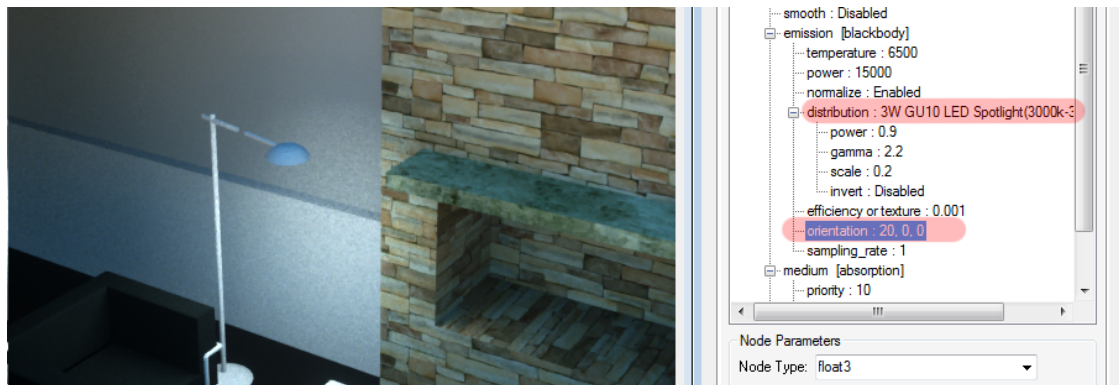
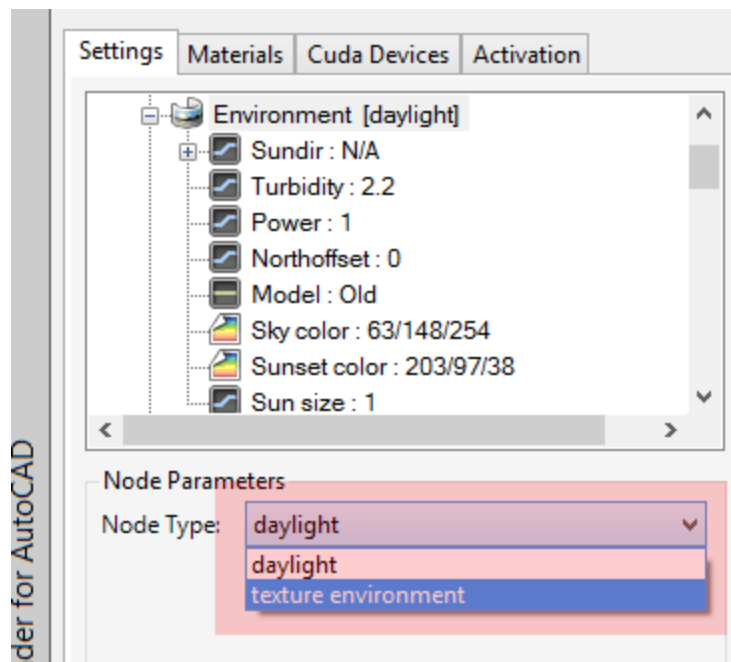
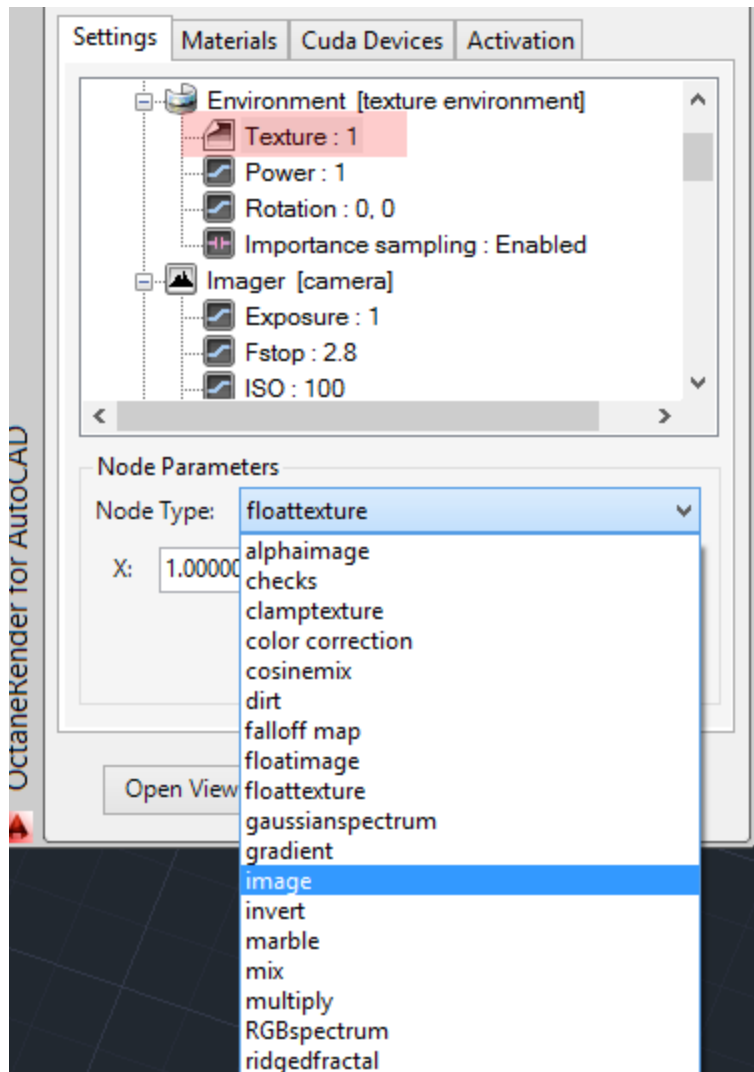


Image Based Lighting

To setup Image Based Lighting for a scene, select the “environment” pin from the Settings tree and change the node type to “texture environment”.

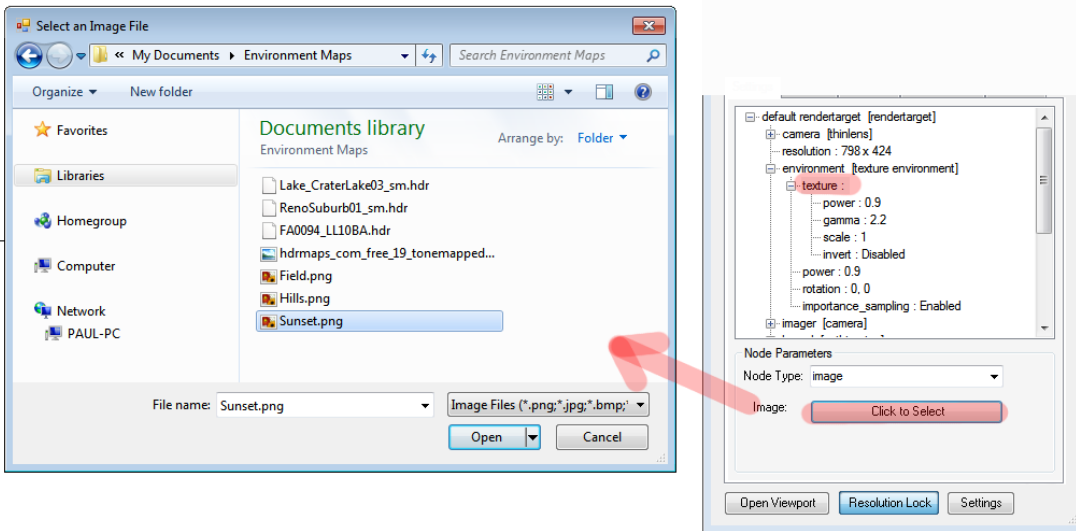


Then select the “texture” pin of the “environment” node, and change it’s node type to “image”.



Then select the **HDRI**¹ you wish to use to illuminate the scene.

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



Once the new image map is loaded, open the Viewport and adjust the scene lighting levels by changing the “power” slider in the “environment” node. Once you have the right light level, it is recommended that you export the rendertarget so that if you need to re-use that image in the future, you can simply import the render-target rather than selecting the image and finding the right power levels again. To do this, rightclick the tree and select “Export Rendertarget Settings” from the popup menu.

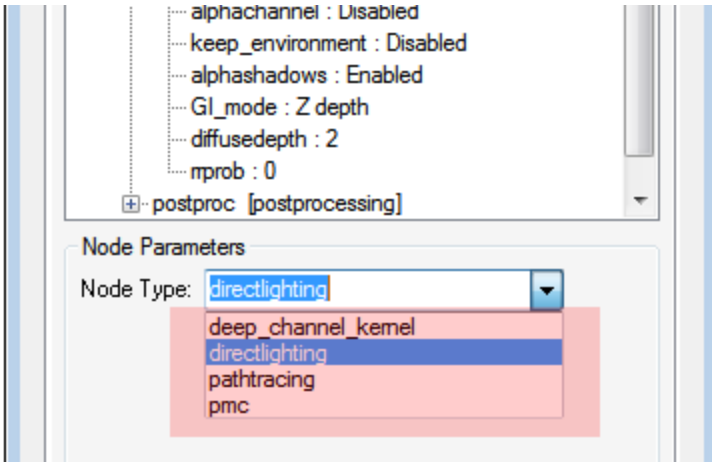
Note: Octane currently supports lat/long HDRI maps.

Rendering Kernels

There are four major rendering kernels in OctaneRender™ : Direct Lighting, Path Tracing and PMC and Deep Channel.

They are switchable by changing the type in the Node Type combo box.

In general, “directlighting” is used for drafts (although can be used for final copy), “pathtracing” and “pmc” are used for high quality rendering, and “deep_channel_kernel” is used for analytical output.



Post Processing

To add and adjust post processing effects, select:

rendertarget ->postproc

On/Off (on_off)

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 concentration of light is at the highest to add a glare effect to the rendered image.

Glare Ray Amount

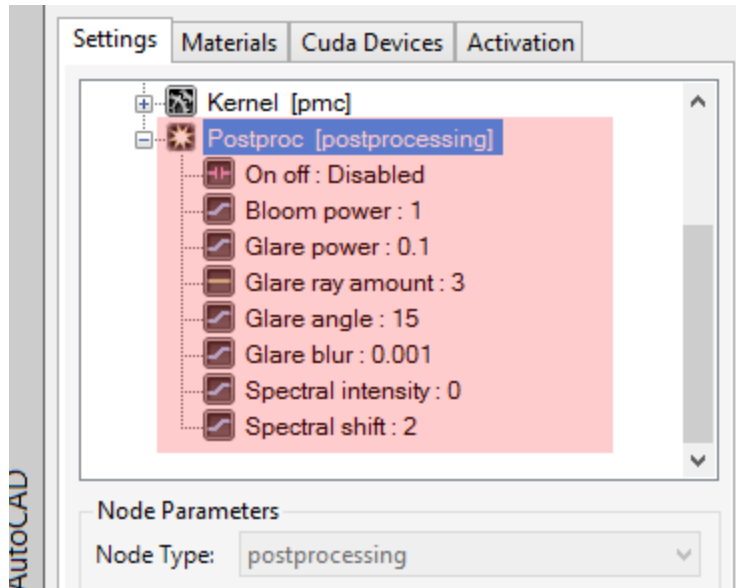
Controls the number of visible rays radiated or reflected.

Glare Angle

This is used to adjust the direction 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.



Materials Tab

The **Materials**¹ Tab displays a list of all the AutoCAD materials, along with the Octane node structure that those materials were converted to.

Material² Conversion

The first time an AutoCAD material is selected from the plugin, the plugin will convert that AutoCAD material to an Octane material. Once this happens, the Octane material should be the “master copy” of that material, since changing the AutoCAD material will not automatically change the Octane material. If you need to at any point, you can re-convert the AutoCAD material to an Octane material by rightclicking the material tree and selecting “Re-Convert From AutoCAD”.

NOTE: If an AutoCAD object has its material “ByLayer”, the plugin will create an Octane material for that layer.

Material Tab Controls

Scene Materials – This combo box contains a list of all AutoCAD materials in the scene. Selecting a material from this box will present the Octane material for that AutoCAD material in the tree structure.

¹A set of attributes or parameters that describe surface characteristics.

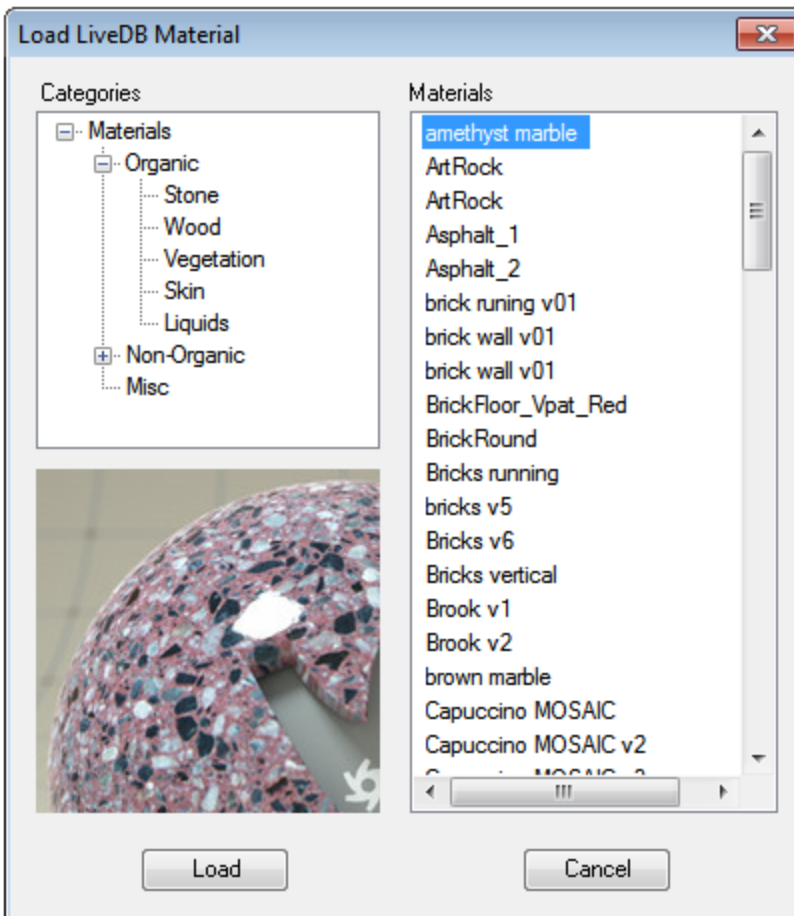
²The representation of the surface or volume properties of an object.

Selection Materials – This popup box contains a list of all AutoCAD materials for the elements that are currently selected in AutoCAD. Selecting a material from this box will present the Octane material for that AutoCAD material in the tree structure.

Favourites – Provides access to assign the current material with your “favourite” nodes setups (saved via the “Save as Favourite” menu option).

Material editing tree – each tree item represents an Octane node pin. Click on any item, and the edit options for that pin will appear in the Node Parameters box. You can change the node type by selecting a different node type in the Node Type popup control (only node types compatible with the selected Octane node pin will be available).

Rightclick the tree for additional options:



Copy – Copies the currently selected node into the plugin clipboard. Only one node can be in the clipboard at any given time.

Paste – Pastes the clipboard node into the currently selected tree node. The Paste option will only be available when the clipboard node is compatible with the currently select node pin.

LiveDB – This option allows you to load a material from the Octane LiveDB database into the currently selected material. To select from the LiveDB, select the category from the Categories tree, and then selecting Materials will fill the preview window. Click OK once you have the required material.

livedb

Re-Convert From AutoCAD – Select this option to reconvert the selected AutoCAD material to an Octane material.

Load/Save as Default – If you save this Octane material as a default, when this AutoCAD material next needs to be converted for a scene, the saved default will be used. It is highly recommended that you save all materials as a default as you edit them in order to minimise the amount of effort required to edit Octane material for each new scene. Defaults are saved in the Users[username]AppDataLocalOctaneRender for AutoCADDefaults folder (on Windows 7).

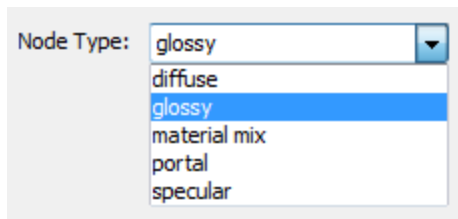
Import/Export Material – Allows you to save and load materials into the currently selected Octane material. Material exports are saved in the Users[username]AppDataLocalOctaneRender for AutoCADExport folder (on Windows 7).

Save as Favourite – Adds the current Octane material node setup to the “Favourites” combobox.

Save All Materials To Defaults – This option saves all the converted (and modified) materials from the AutoCAD scene as Octane default materials, so they will be next used on a new scene.

Materials

OctaneRender™ has 5 basic materials.



Diffuse Material

Diffuse¹ materials do not reflect light, and have the following parameters to adjust:

Bump / Normal

The Diffuse value gives the material its color.

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.

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.

Opacity

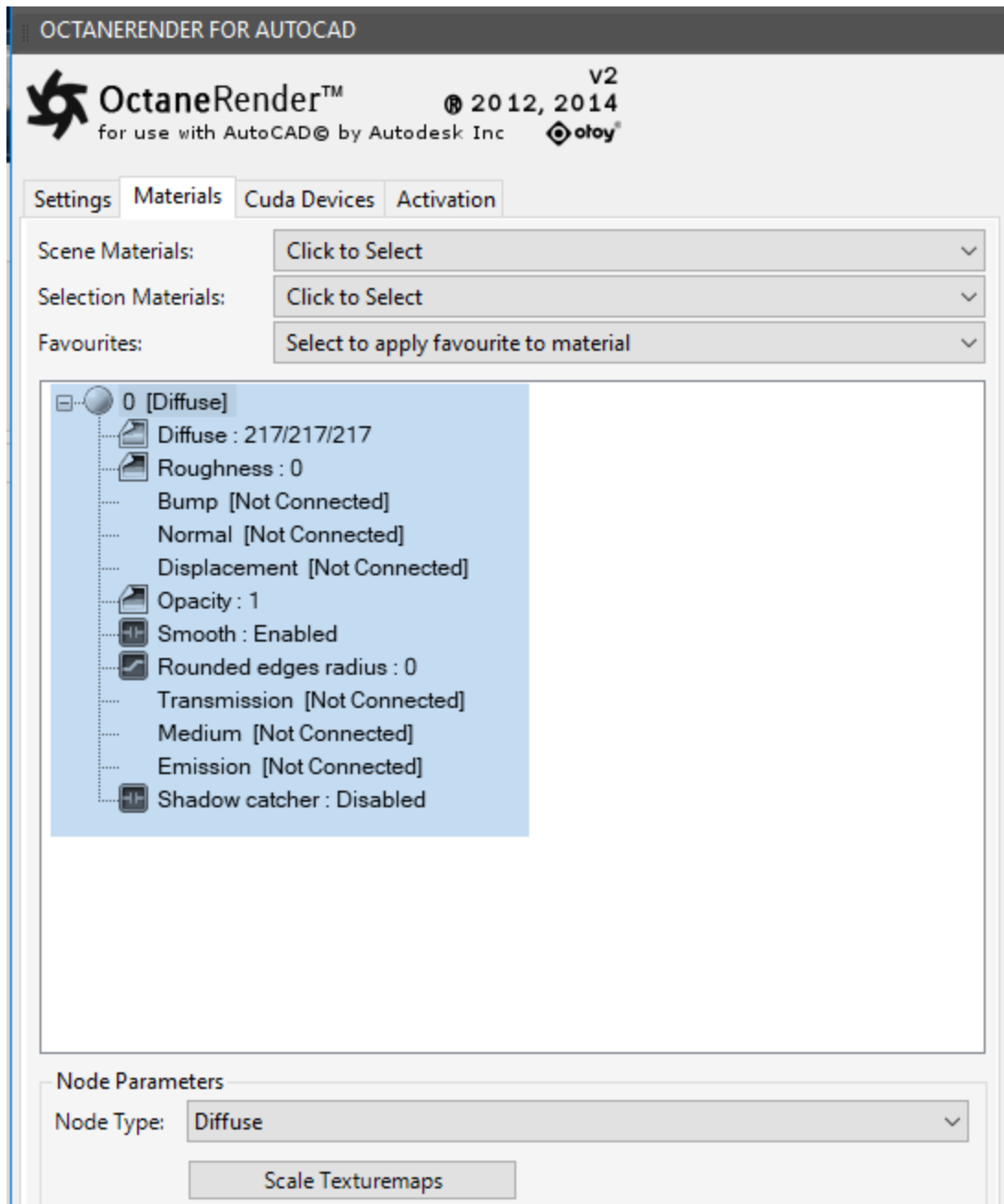
Opacity sets the transparency of the material. Set the data type to alphaimage(if the image has an alpha channel) or floatimage (for black/white images) to load an image to set the transparency (use the Invert checkbox if necessary to adjust whether black or white regions are considered transparent).

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.

Emission

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



Glossy Material

Glossy¹ materials have some light reflection, and have the following parameters to adjust:

Diffuse² (diffuse)

The value gives the material its color.

Specularity (specular)

The value determines the amount of specularity on the mesh.

Film Width (filmwidth)

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

Film Index (filmindex)

This controls the Index of Refraction of the thin film.

Roughness

The roughness determines the amount of reflection that will be present. A low roughness value will create blurry reflections and a high value will produce a mirror like reflection.

Bump / Normal

Both the Bump and Normal channels can load images to control the amount of bump mapping and normal mapping (respectively). 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.

Opacity

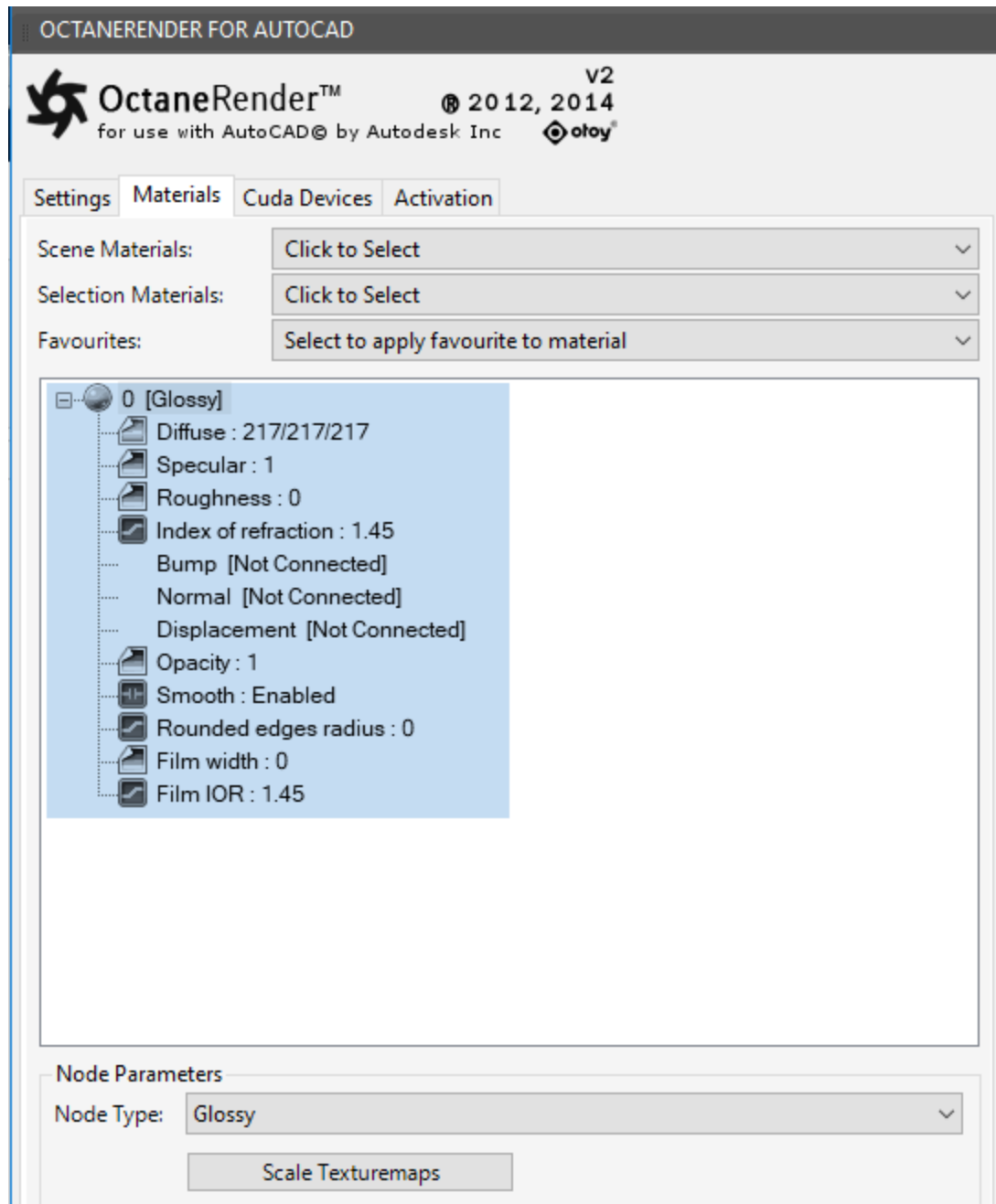
Opacity sets the transparency of the material. Set the data type to alphaimage(if the image has an alpha channel) or floatimage(for black/white images) to load an image to set the transparency (use the Invert checkbox if necessary to adjust whether black or white regions are considered transparent).

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.

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.



Specular Material

Specular¹ materials are transparent surfaces (ie. glass) and have the following parameters to adjust:

Reflection

The Reflection value determines the glossiness of the mesh.

Transmission²

The Transmission value gives the base color to the mesh.

Index

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.

Film Width (filmwidth)

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

Film Index (filmindex)

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 (respectively). 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.

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).

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.

Dispersion Coefficient (dispersion_coefficient_B)

The dispersion in OctaneRenderTM 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.

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.

²A surface characteristic that determines if light may pass through a surface volume.

Absorption¹

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.

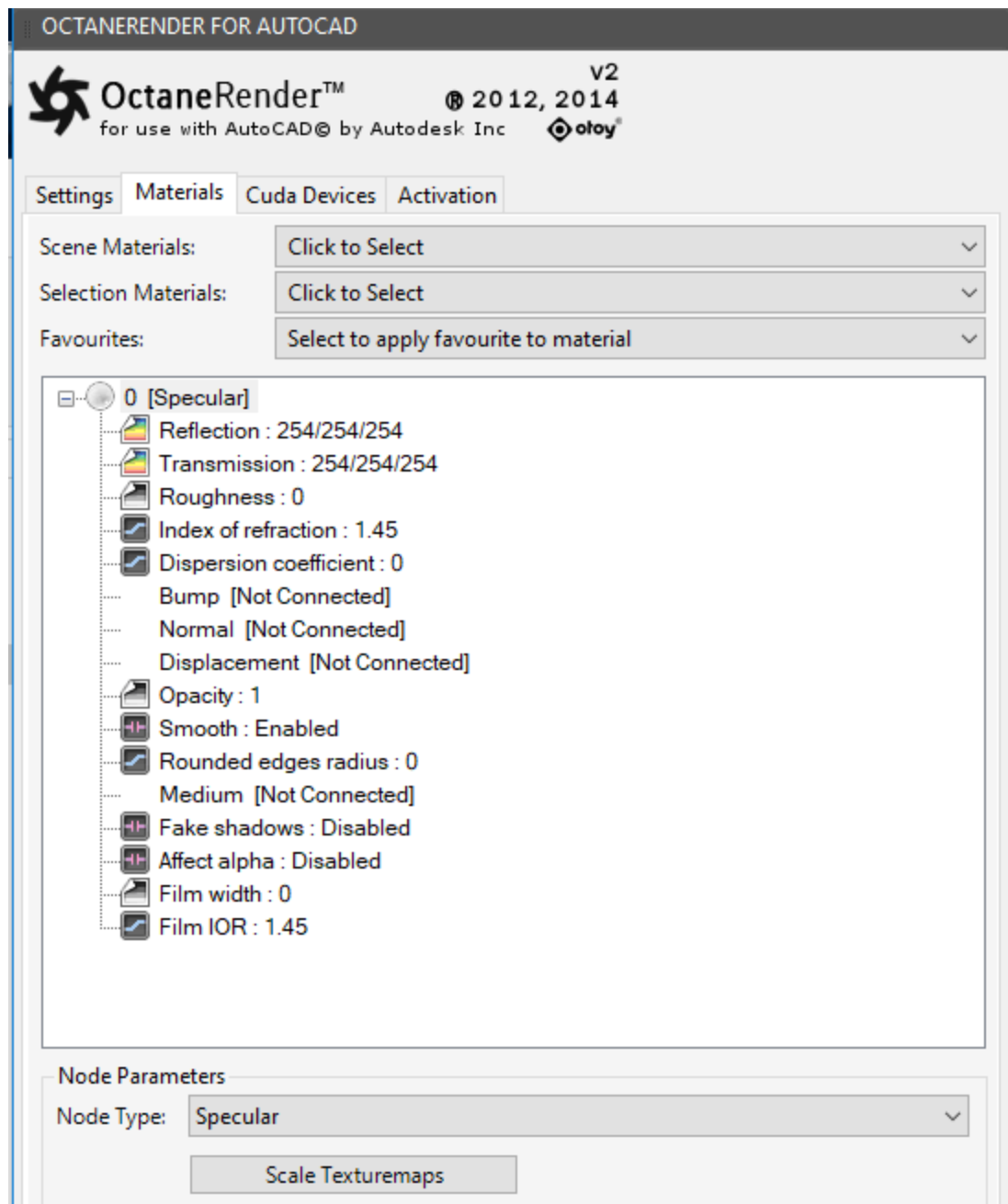
Absorption Color (absorption_color)

The absorption color gives the spectrum remaining from white light after traveling through the material for a certain distance. Only constant colors are supported correctly.

Depth of Absorption (depth_of_absorption)

The Depth of Absorption specifies the aforementioned distance (in meters). The smaller this distance, the stronger the absorption will be.

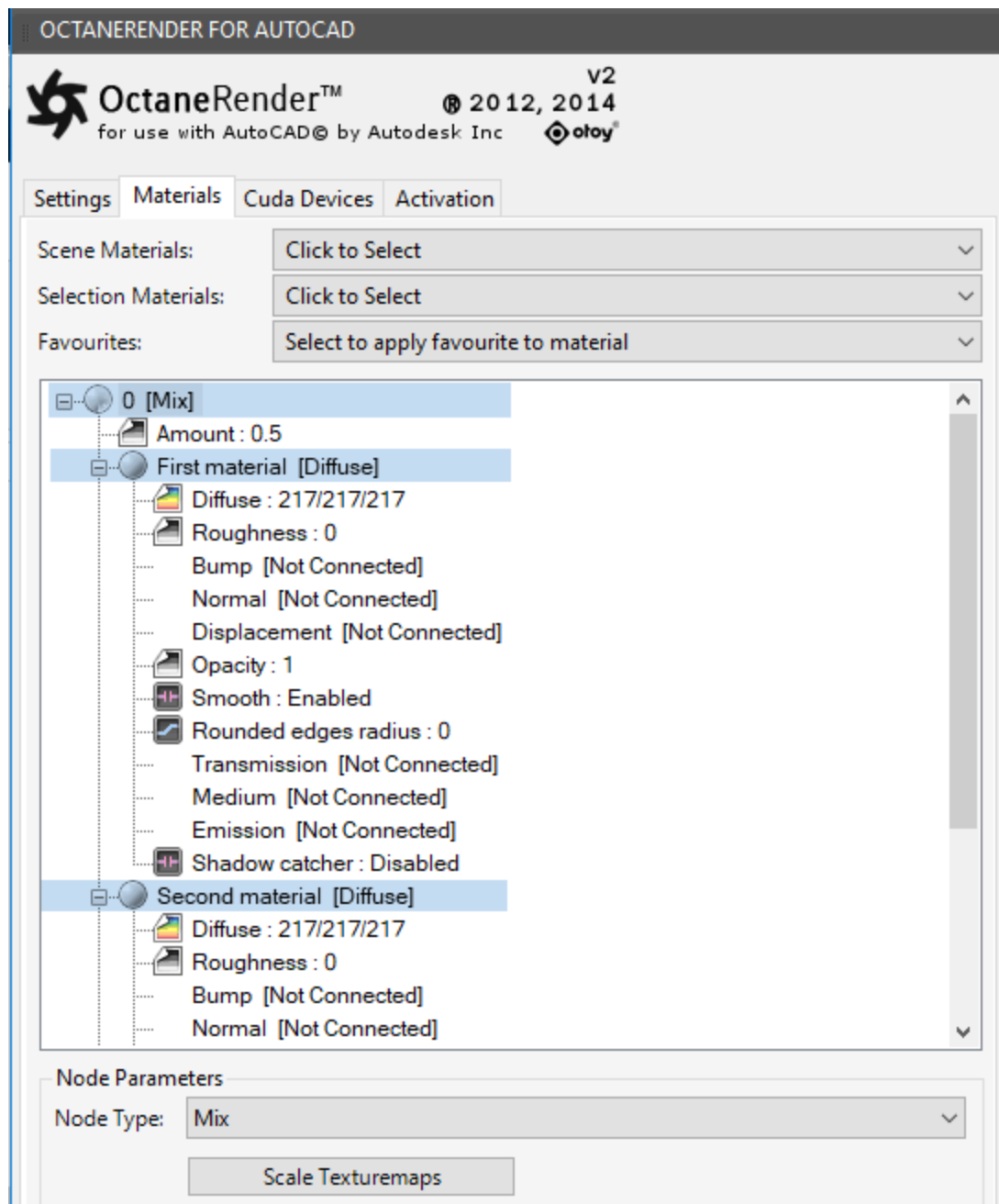
¹Defines how fast light is absorbed while passing through a medium.



Mix Material

The **Material**¹ Mix option is used to combine two different materials. It accepts any two material nodes and a texture to control the mix. In the example below, a white glossy material is mixed with a red specular material. A checks texture node is used to control the mixing of the two materials.

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

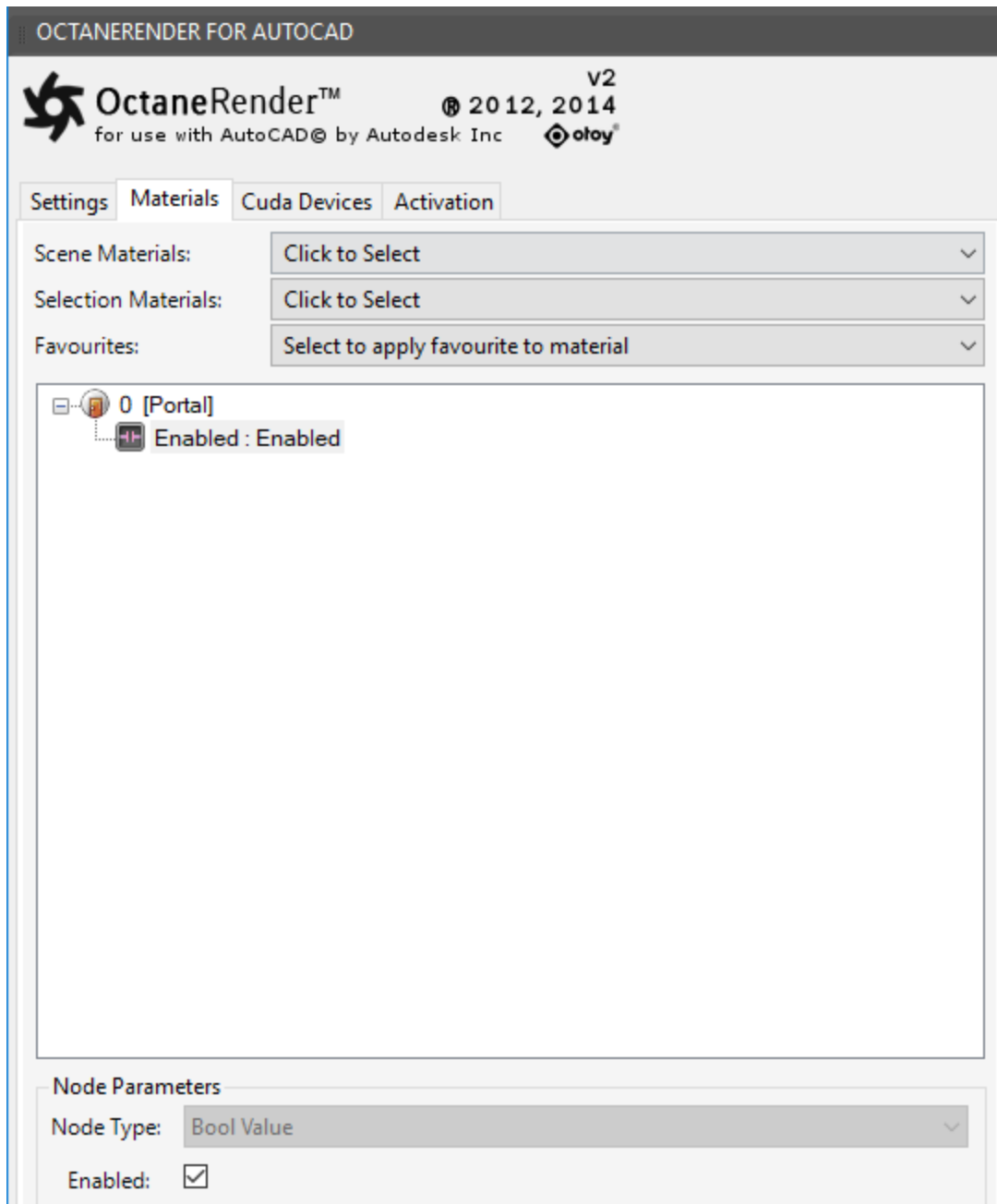


Portal Material

The **Portal**¹ **Material**² option is used in pathtracing type kernels, eg "pathtracing" and "pmc". (not direct-lighting/ambient occlusion). Please refer to the Otoy forum "Resources and Sharing" for a tutorial on using portals.

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.

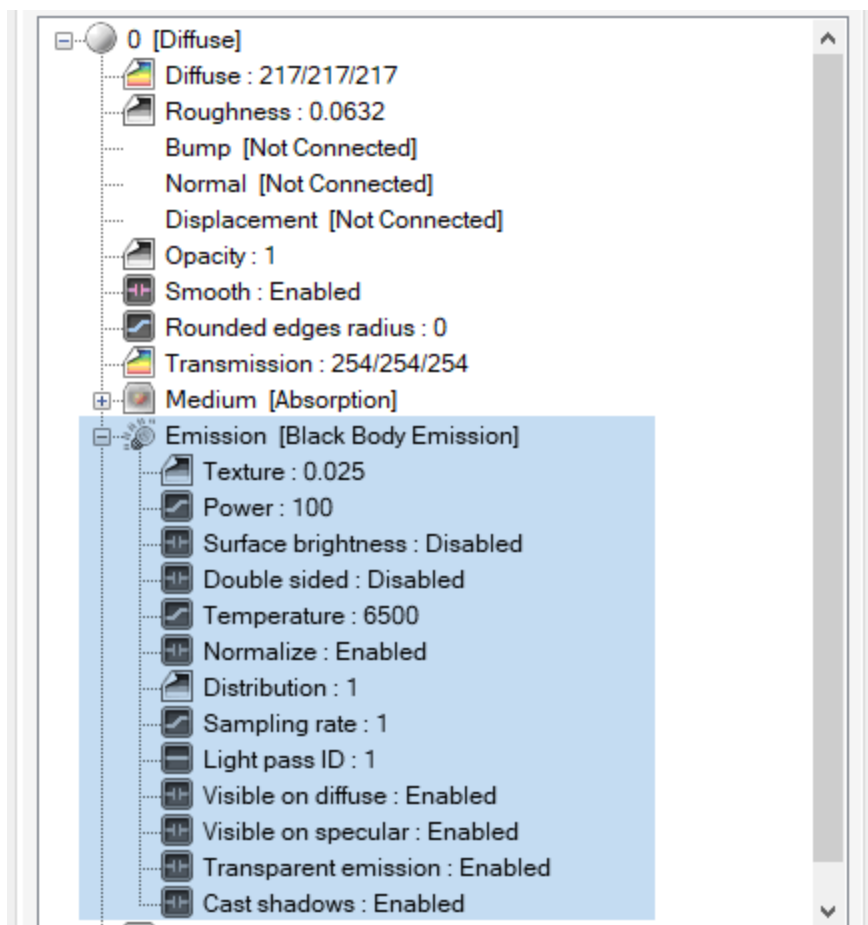
²The representation of the surface or volume properties of an object.



Emissions

In order to use a mesh as a light source, it needs to be changed to a **Diffuse material**¹ type. The Emission parameter has two different options: "blackbody" and "texture emission".

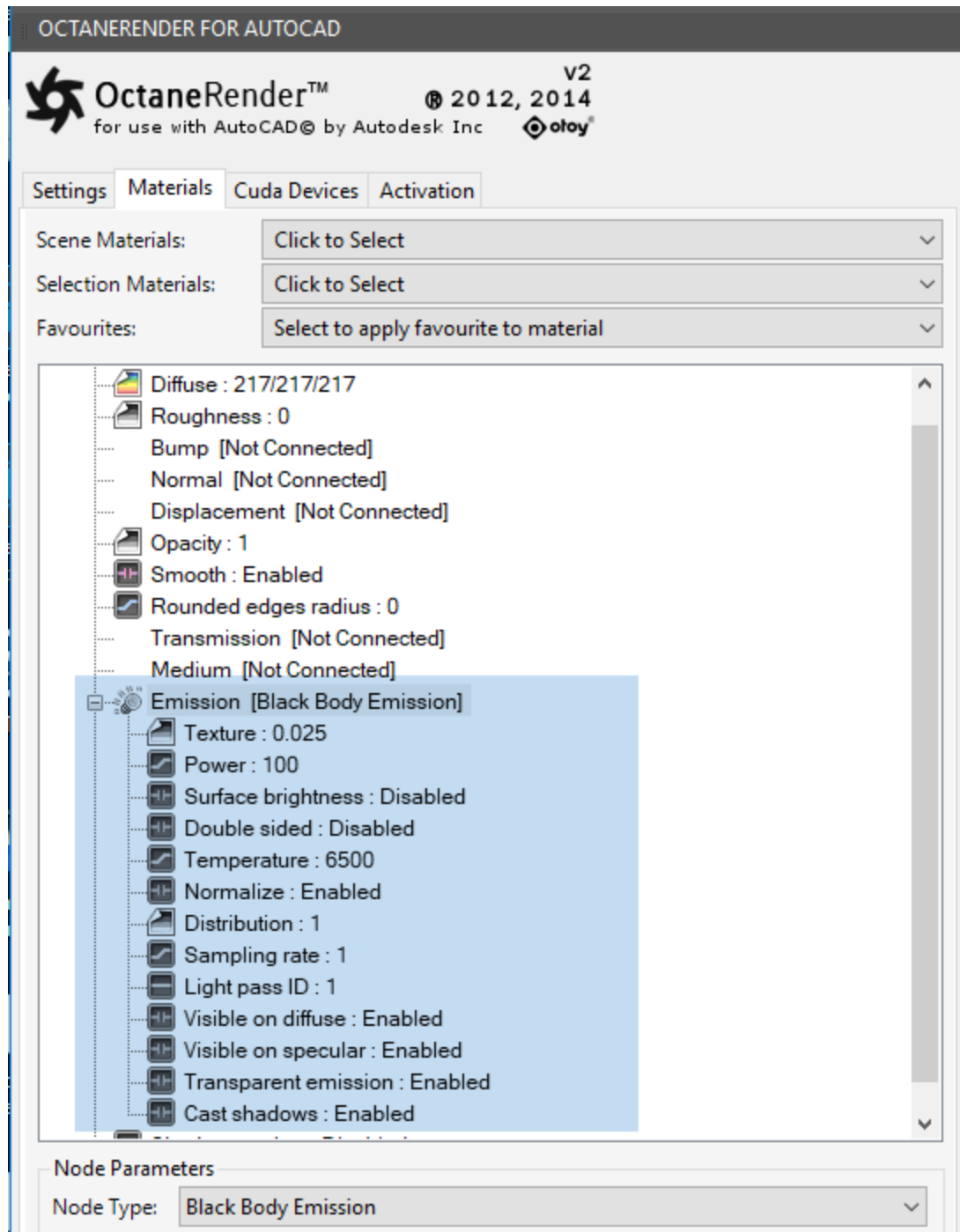
By default the "emission" pin is not connect to either "blackbody" or "texture emission" nodes, and is in a "not connected state".



Blackbody Emission

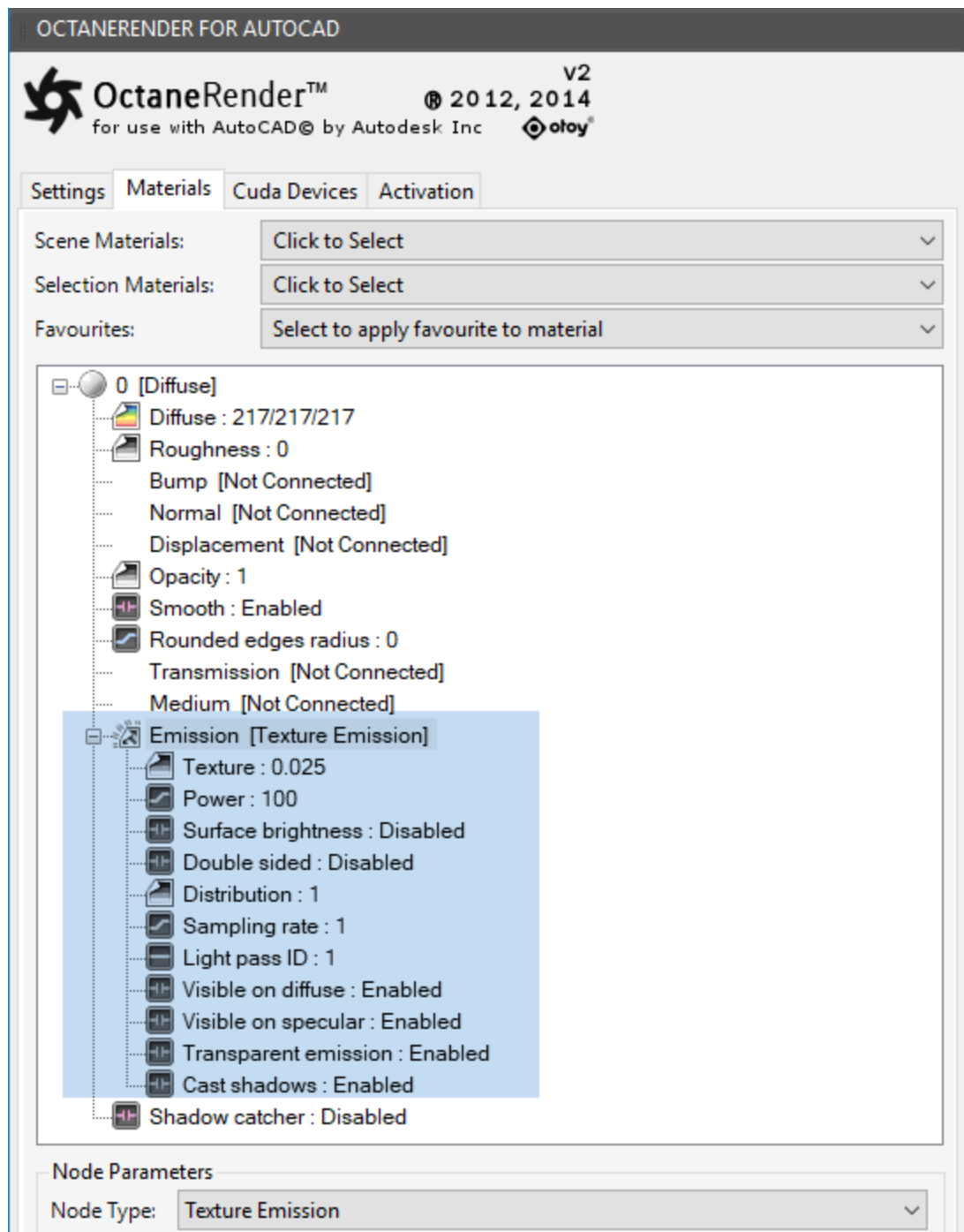
The Blackbody Emission type uses Colour Temperature (in Kelvin) and Power to control the colour and intensity of the light.

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



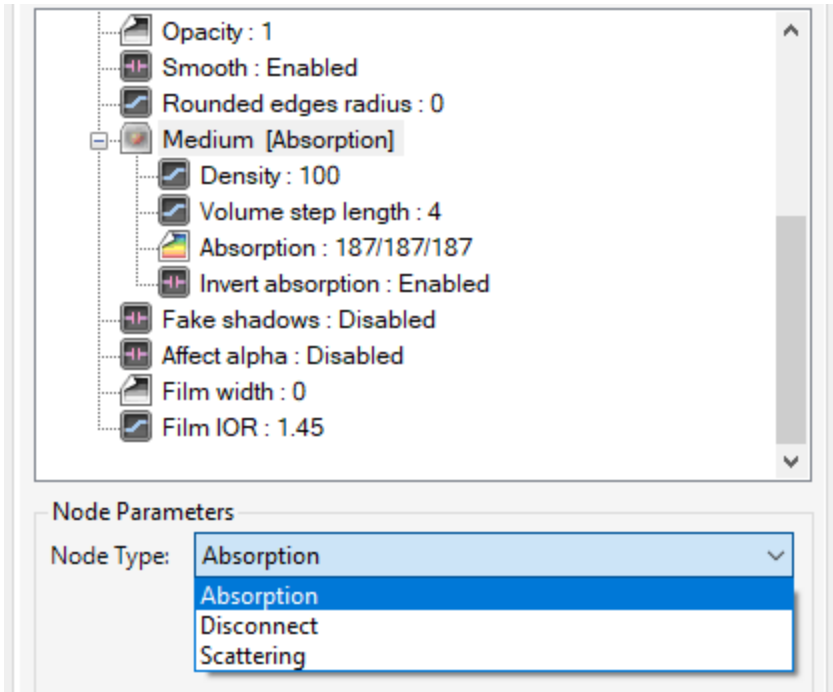
Texture Emission

This allows any valid texture type to set the light intensity. This can be used to create neat effects such as TV screens by using an Image Texture as the source (i.e., set the "Efficiency or texture" pin to an "image" node).



Mediums

OctaneRender™ has two types of mediums: **Absorption**¹ and **Scattering**². These medium can only be connected to **Diffuse**³ and **Specular**⁴ materials (ie. they cannot be connected to **Glossy**⁵ materials).



Absorption Medium

Absorption⁶ 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

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

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

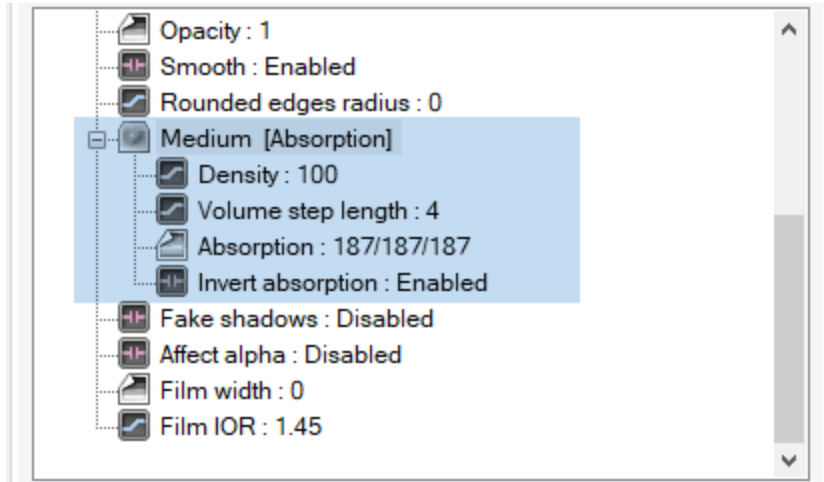
³Amount of diffusion, or the reflection of light photons at different angles from an uneven or granular surface. Used for dull, non-reflecting materials or mesh emitters.

⁴Amount of specular reflection, or the mirror-like reflection of light photons at the same angle. Used for transparent materials such as glass and water.

⁵The 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.

⁶Defines how fast light is absorbed while passing through a medium.

get lighter, and if the absorption is colored it will get more desaturated. It works in a subtractive way, so you need to configure the inverted colour instead to get an absorption colour desired.



Scattering Medium

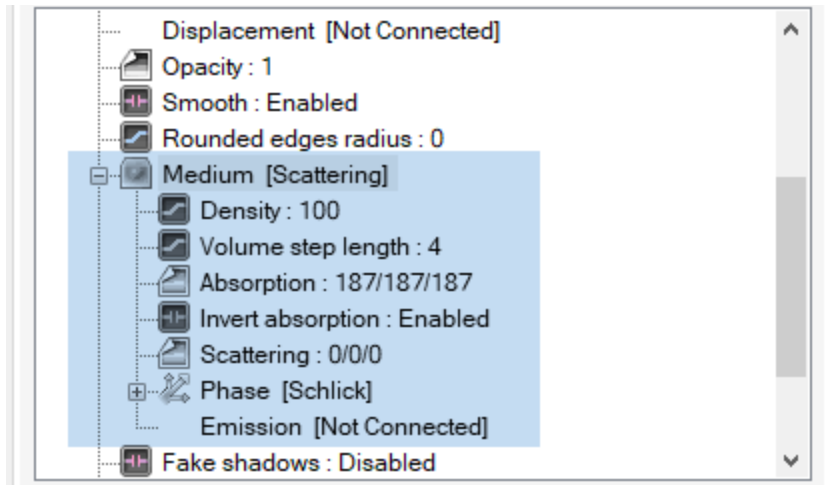
This is a medium with single-scattering SSS, and also absorption. To use this medium you need to create a volume, it will not work correctly on simple surfaces.

You can use it to create true unbiased SSS (although not multiple-scattering yet), using various parameters, including scattering texture, emission texture and various other parameters.

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

Important: In order for the "**Scattering**¹" node to work, the kernel must be set to "pathtracing" or "pmc" and a node **MUST** be plugged into the "transmission" pin. Also, "scattering" is only available for "diffuse" and "specular" materials.

¹Defines how fast light gets scattered when traveling through the medium.



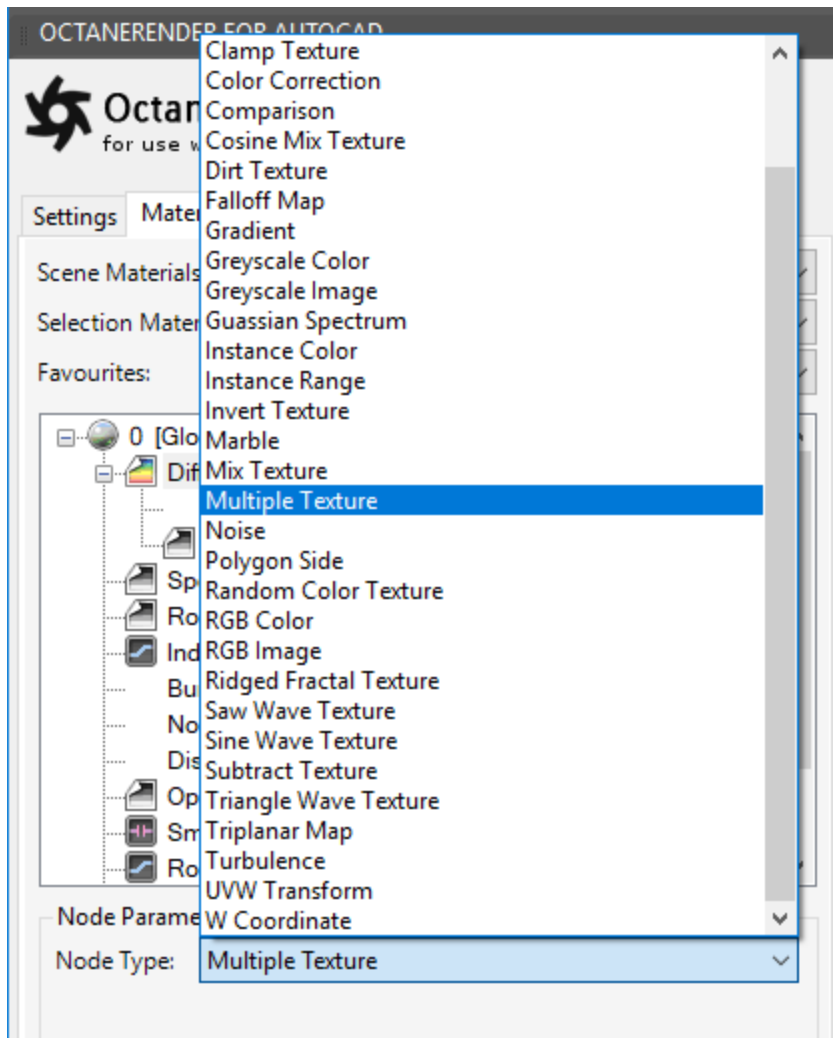
Textures

The Texture types allow for creating very flexible materials.

These 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**¹ memory.

It is therefore advantageous to explore creating materials using these textures before resorting to image based textures.

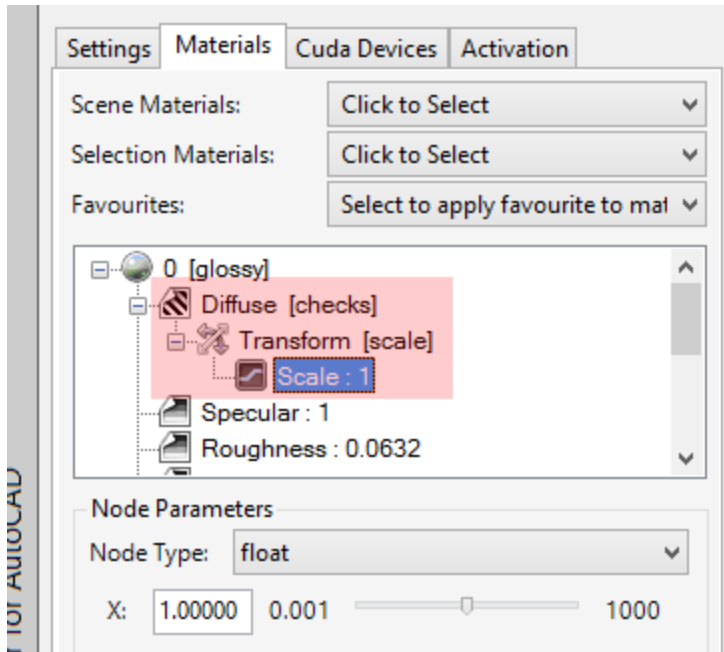
¹The GPU is responsible for displaying graphical elements on a computer display. The GPU plays a key role in the Octane rendering process as the CUDA cores are utilized during the rendering process.



Checks Mix Texture

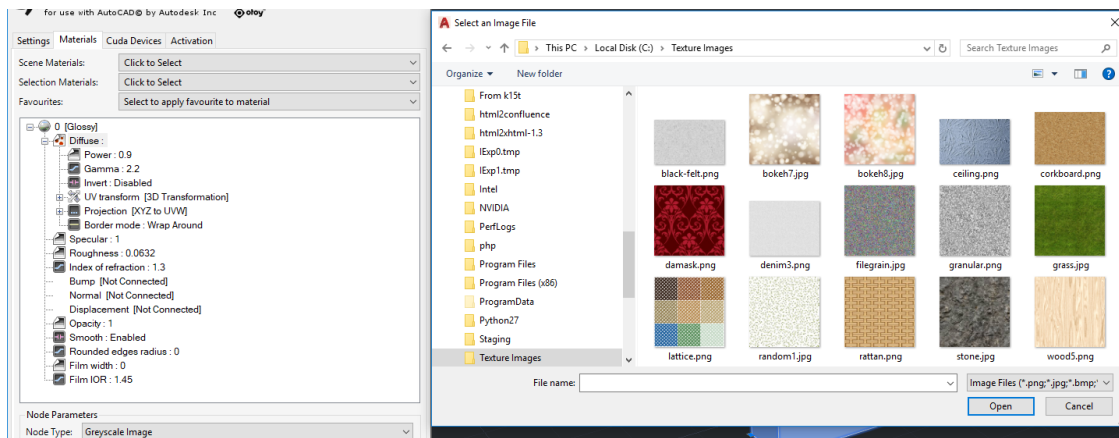
The Check procedural texture is useful for making stripes, checker board and grid patterns. It is controlled by a float3 value. It is most useful when mixed with other textures.

Change the "scale" pin from "float" to "float2" or "float3" to control the different dimensions of the checks pattern.



FloatImage (Gray Scale)

The image is interpreted as gray scale even if it is a full colour image, thus saving **GPU¹** RAM. The Invert checkbox can be used to invert the image (useful for bump and opacity maps).

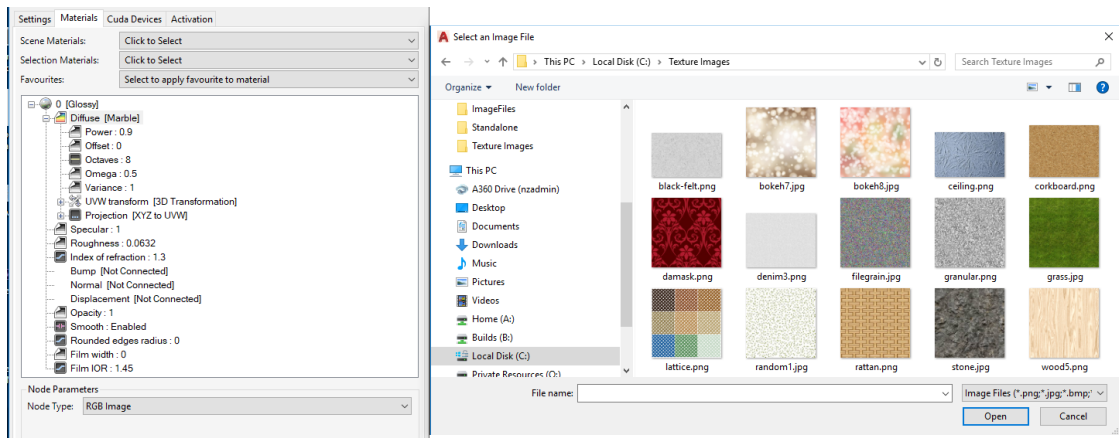


¹The GPU is responsible for displaying graphical elements on a computer display. The GPU plays a key role in the Octane rendering process as the CUDA cores are utilized during the rendering process.

Image (Color Image)

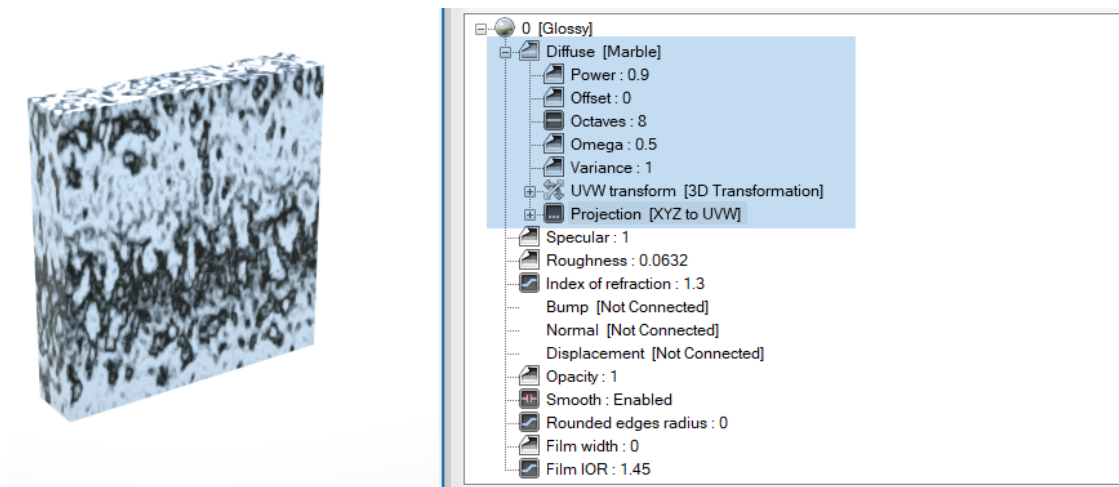
Image textures use image files to create the texture.

The image is interpreted as being full colour even if it is a grey scale image, and therefore take up more **GPU**¹ memory.



Marble Texture

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

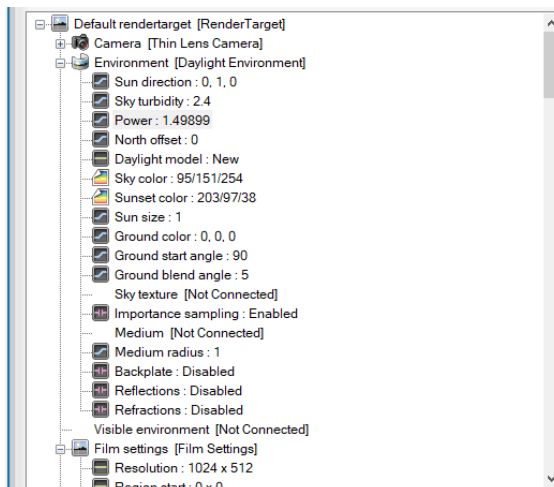
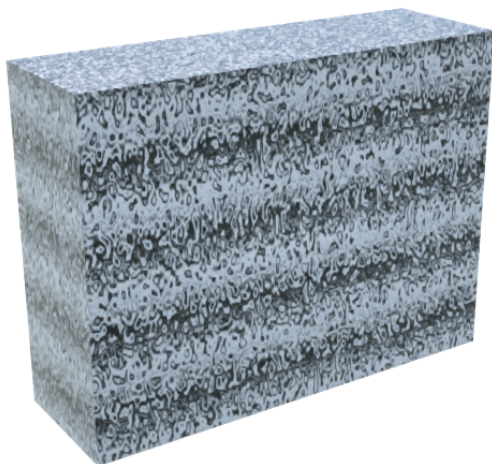


¹The GPU is responsible for displaying graphical elements on a computer display. The GPU plays a key role in the Octane rendering process as the CUDA cores are utilized during the rendering process.

Mix Texture

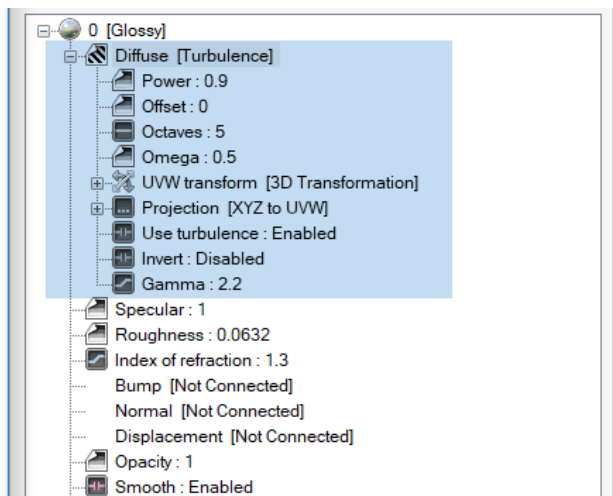
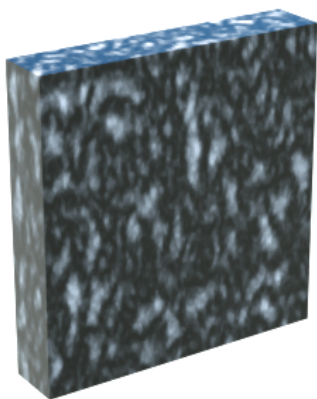
The Mix textures are used for mixing two textures together (either linearly or according to a cosine wave).

For example, you place a Checks Mix combined with a Trianglewave.



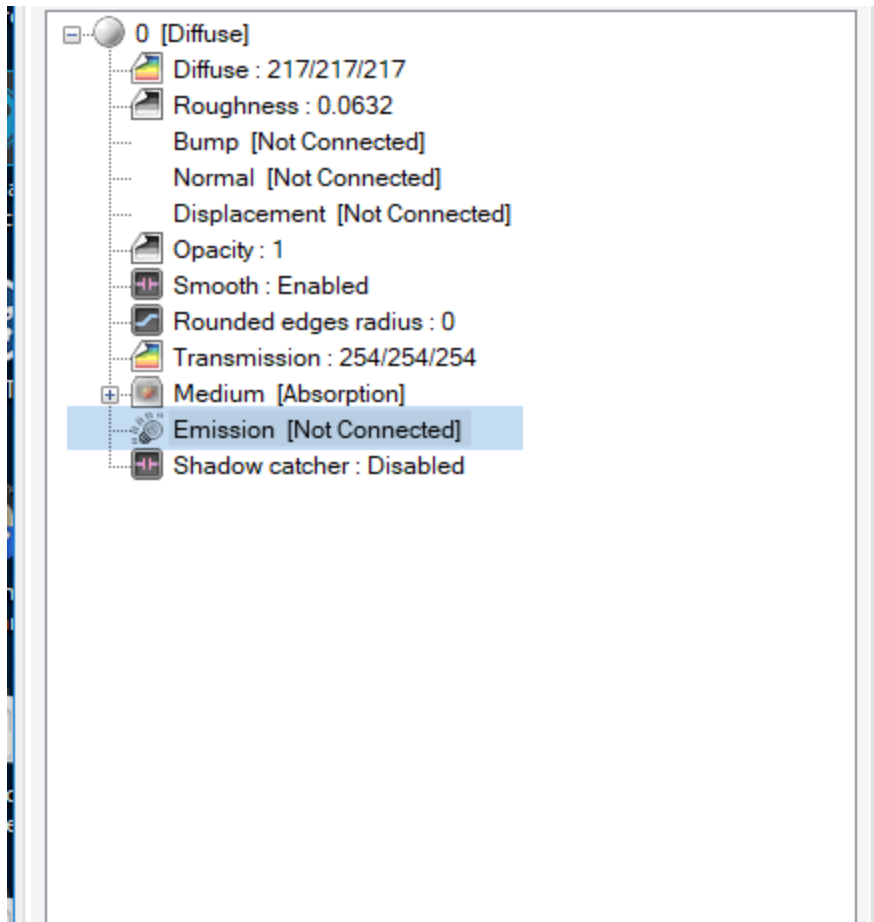
Turbulence Texture

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.



Connecting and Disconnecting Nodes

The default Emission and **Transmission**¹ pins of a “diffuse” material node will be unplugged (i.e., have no node connection).



Favourites

The **Materials**² tab of the plugin contains a Favourites combobox. You can now save a material as a “Favourite” by rightclicking the material tree and select the “Save as Favourite” menu option and entering a Favourite material name. That material will then be available in the Favourites combobox, and can be quickly applied to the current material by simply selected it from that combo box.

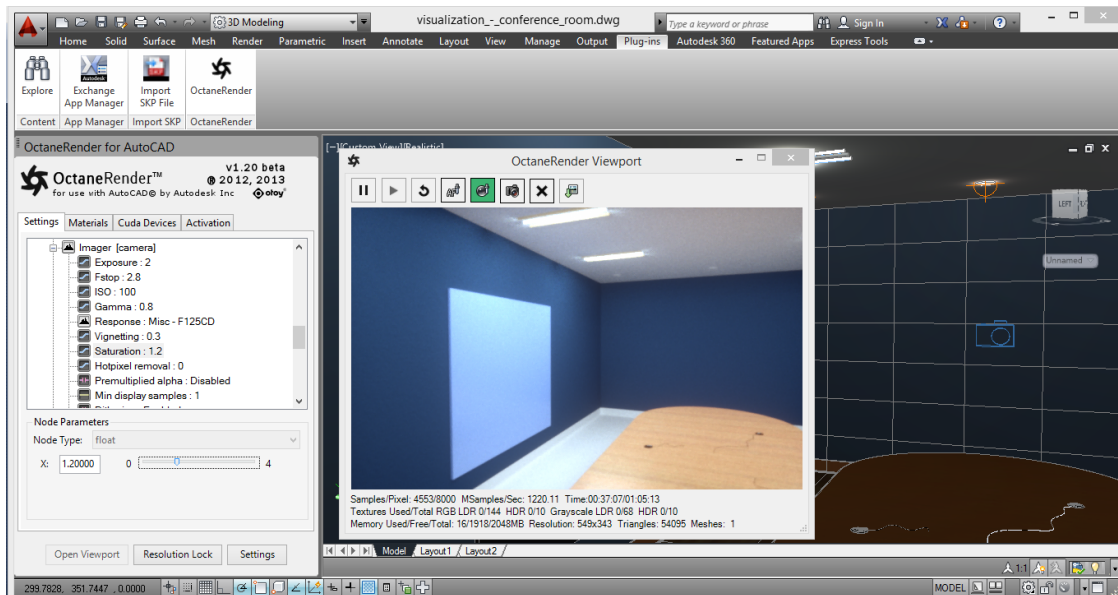
¹A surface characteristic that determines if light may pass through a surface volume.

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

Where a Favourite (which is an xml material export file) contains image/alphaimage/floatimage files with NO FOLDER specified, the image file will be loaded from the Favourites folder (i.e., "C:\Users\[user-name]\AppData\Local\OctaneRender for AutoCAD\Favourites"). This allow users to put together and distribute "Favourites" material libraries – where the XML and image files are stored in the Favourites folder.

OctaneRender Viewport

To display the OctaneRender™ Viewport, click the “Open Viewport” button in the main plugin Setup window. This will open a new window, load the scene geometry into Octane, and start rendering the scene in the Viewport.



Whilst rendering the scene in the Viewport, you can move the AutoCAD camera around, and this will be immediately reflected in the Viewport. To keep the AutoCAD and Octane camera in sync, ensure you are in Perspective mode, WCS and set the Octane “fov¹” from the current AutoCAD fov.

The Viewport contains the following button at the top of the window:

Pause

Pauses the render.

Continue

Continues the render (after it has been paused).

¹The 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.

Refresh

Reloads all scene geometry and materials from AutoCAD to OctaneRender. This is used after changing elements in the AutoCAD scene.

Focus Pick (AF)

Click the toggle button to enable the setting of the Octane camera focal depth by clicking on an item or elements in the Viewport.

Material¹ Pick (AF)

Click the toggle button to enable the selecting of the Octane material by clicking on an item or elements in the Viewport.

Lock Scene (X button)

Clicking this toggle button will mean that NO changes to the scene, camera position or Octane node setup will propagate to the Viewport (means the render will continue whilst you work on the underlying scene). NOTE. Imager and Postprocessing settings changes will not be applied whilst the Lock Scene button is ON.

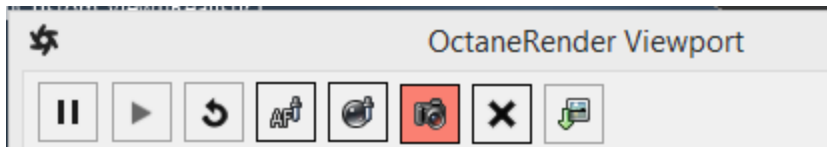
Save

Saves the current render in the Viewport to file. The file type is determined by the Image Save Format in the Configuration screen.

The Viewport contains a range of render metrics at the bottom of the window, including render time (elapsed and estimated), memory usage and texturemap usage.

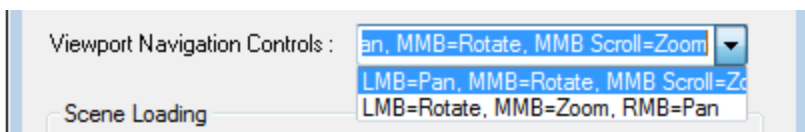
Viewport Navigation

Clicking the “Viewport Navigation” button will put the plugin in a mode where the AutoCAD camera is no longer used to position the Octane camera. Instead, navigation via the mouse buttons in the viewport.



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

The mouse controls are set in the Configuration.



In both navigation system above, scrolling the mouse wheel with Zoom.

The scene position 0, 0, 0 will be used as the center of rotation.

Once the Viewport is in Viewport Navigation mode, you can save the rendertarget to the view to retain the current (Octane) camera position.

Geometry Conversion

When the Viewport is opened (or the Refresh button pressed), the plugin extracts geometry from the AutoCAD scene as follows:

Solids

All 3D solids are transferred into Octane, including Box, Cylinder, Sphere, Polysolid, Wedge, Cone, Pyramid, Torus and Region. All vertices and normals from these objects are transferred, however for some objects UV coordinates do not match AutoCAD in direction due to limitations in the AutoCAD API. Solids which have Nurbs curved surfaces in them may not have UV coordinates scaled correctly.

Surfaces

All surfaces should be transferred into Octane, with UV's scaled as per Solids (i.e., scale should be correct, but the direction may not be).

Meshes

Mesh vertices are transferred into Octane, but no normal or UV information is available from the AutoCAD API, so there are no UV's, and normals are calculated (assumes a rounded body).

Due to the way AutoCAD supplies vertex and polygon data for Polyface Mesh objects, normals are NOT calculated, so DISABLE Smoothing on all materials for these objects.

AEC Objects

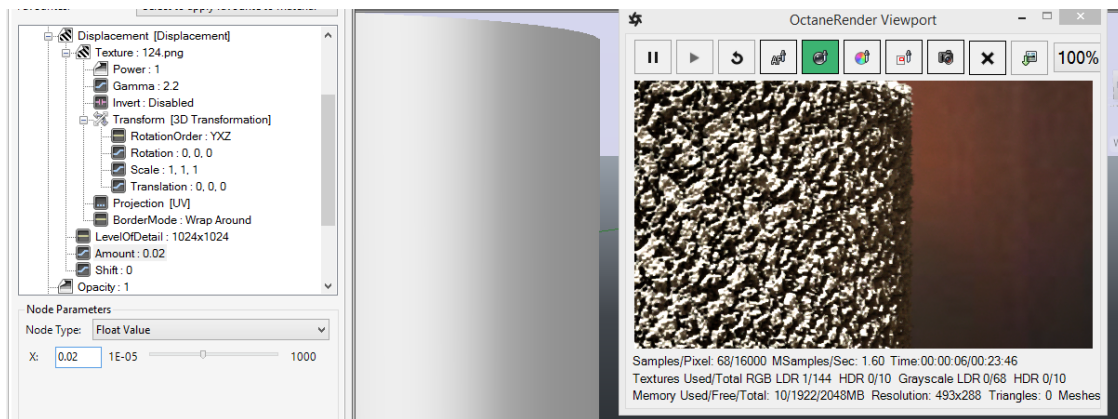
These need to be converted to Solids in order to be rendered with the plugin.

Octane 2.0 Features

Displacement¹ Mapping

This is a new pin on each Octane **Material**² type. Change the Displacement pin type to Displacement and assign a Grayscale Image node to the Texture pin and load the displacement map. Use caution when setting thing displacement amount – since high amounts may cause a video card error. It is highly recommended that you use 16 bit displacement maps (since 8 bit maps do not provide the granularity required for high quality renders).

NOTE: You may need to adjust the Kernel->Ray Epsilon to ensure there is no self-shadowing from displacement geometry.



Network Rendering³

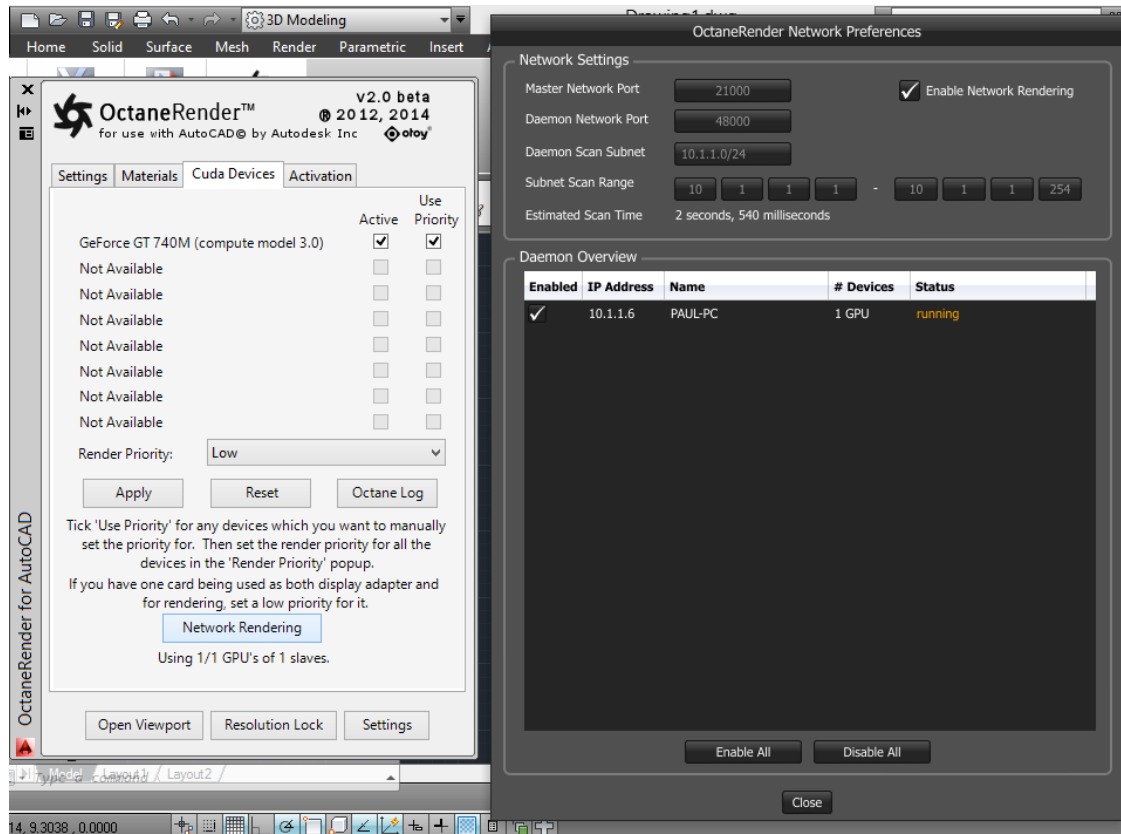
Fully supported, and available from the Device tab of the plugin (Network Rendering button). Setup the Slave PC as per the Octane Standalone instructions, the activate in the Network Render window. To do this, untick Enable Network Rendering, select the appropriate Daemon Scan Subnet (may only be one option), tick Enable Network Rendering, then tick the Slave PC which is found on the network that you want to use. Subsequent rendering in the plugin will use that slave PC.

IMPORTANT: The Octane version for the Slave must be the same version as the plugin you are using (ie. if you are using version 2.0.10.x of the plugin, you must run the slave for Octane 2.0.10).

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.

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

³The utilization of multiple CPUs or GPUs over a network to complete the rendering process.



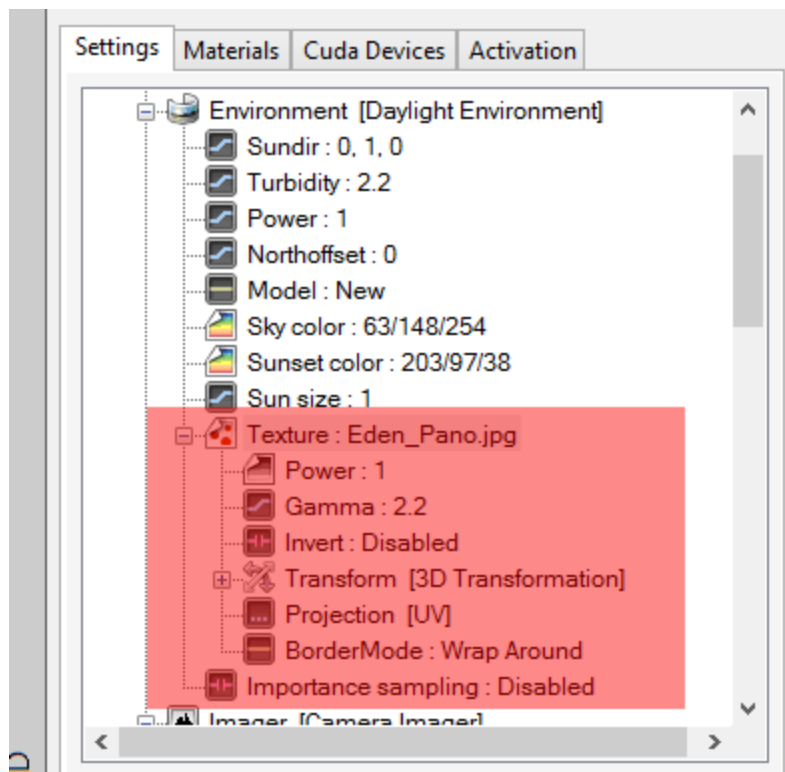
Random Color Texture

Not useable – since the AutoCAD plugin does not support Octane scattering.

HDRI¹ & Sun

This is supported through the Octane Daylight Environment node. Connect an IBL texturemap to the "Texture" pin to enable this option.

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



Ambient Occlusion

This is a new render type in the Info Channel Kernel. If using this, enable the AlphaChannel pin.

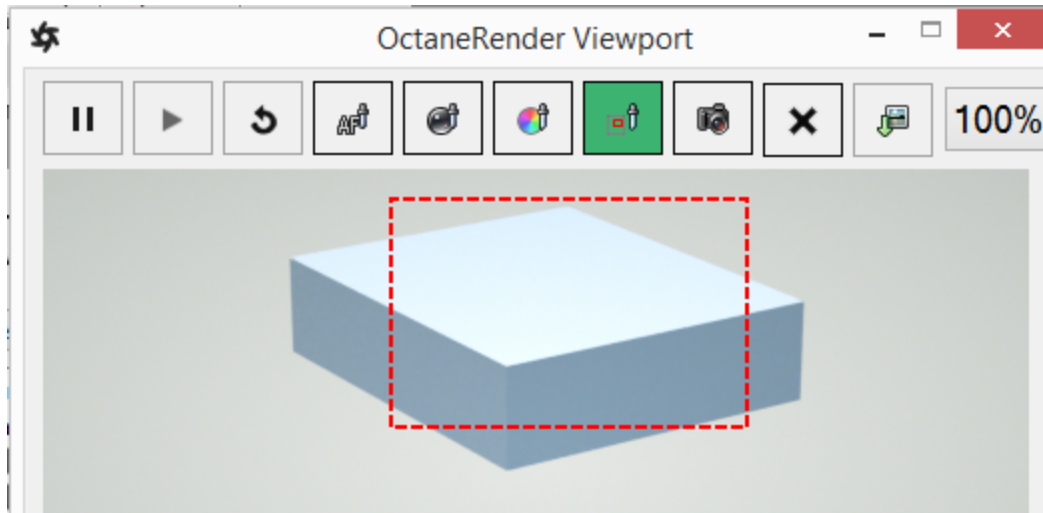
Normal Space Position Type

This is a new Position Type that is used for **IES**¹ lighting – which when used, directs the IES light in the direction of the normal of the emitter geometry. For best results with IES lights, use a Spherical Projection, and set the Position Type to Normal Space.

Render Region

Enable the selection (via mouse dragging in the Viewport) of a render region by clicking the Render Region button. All other pick functions (focus, material, white balance) are disabled whilst Render Region is enabled.

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/>.



Perspective Correction

Enabling this camera option renders vertical lines parallel. This requires the Octane Camera Up Vector to be directly “up”, so you will need to manually override the Camera “Up” pin to be 0, 1, 0. Moving the AutoCAD camera will reset the Up vector to match the AutoCAD Viewport.

Edge Rounding

Not currently supported – since AutoCAD does not provide welded vertices on geometry items.

Strand Hair

Not currently supported – since AutoCAD does not support vertex strand geometry items.

Subdivision

Not currently supported – since AutoCAD does not provide welded vertices on geometry items.

Object **Motion Blur**¹

Not currently supported – since AutoCAD does not have an object animation system.

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.

Limitations

- Rendering animations from within the AutoCAD is not currently supported.
- To have the Octane camera follow the AutoCAD camera, ensure the AutoCAD view is in Perspective mode, is in WCS, and set the Octane "**fov**¹" from the current AutoCAD fov.
- Loading geometry from AutoCAD is as per the guidelines in the "Geometry Conversion" on page 51 topic.
- Opening scenes with **Materials**² created with AutoCAD 2012 or earlier may result in the converted Octane material not having the directory reference to the Autodesk material library texturemaps, due to an issue with the AutoCAD API. These can be manually corrected.
- Rendering of AEC objects (created in AutoCAD MEP or AutoCAD Architecture) is not supported, due to limitations in the AutoCAD API. These objects will need to be converted to Solids in order to be rendered in the plugin.

¹The 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.

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

FAQ

1. Should I be enabling "smooth" on materials or not?

In general, due to the nature of the way AutoCAD constructs surface geometry, the majority of materials should have "smooth" ENABLED.

2. Windows becomes unresponsive when rendering large scenes.

This is due to using the same card for Octane rendering and for your Windows display adapter. It is highly recommend to have a separate card as your Windows display adapter (your on-board graphics card for example).

If you are using one card, set the Render Priority to Low.

For reference, Otoy has recommended registry settings that you should use:

In cases of the Windows Vista/7 "[Timeout Detection and Recovery](#)", settings can be changed using Regedit. The recommended setting for Octane are registry setting HKLMSys-temCurrentControlSetControlGraphicsDrivers, TdrLevel = 3, TdrDelay = 10. If these settings are not already there, right-click the right panel -> New -> DWORD. Reboot after changing these settings.

3. I am an experienced OctaneRender Standalone user and would like to access the node graph in the AutoCAD plugin.

The AutoCAD plugin does not have a node graph. Instead it uses a tree structure which enables macro type functions (copy, paste, import, export, etc.) which is more efficient and much better matches the AutoCAD workflow.

4. Can I import a material from an OCM file exported from Octane Standalone?

Not at this stage, but it is planned.

5. How many texturemaps can I fit in my card?

The GTX 500 series cards have a limit of 64 **LDR**¹ (8 bit) RGBA, 32 LDR (8 bit) greyscale, 4 HDR (16 bit) RGBA and 4 HDR (16 bit) greyscale texturemaps. The GTX 600 series cards have a limit of 144 LDR (8 bit) RGBA, 68 LDR (8 bit) greyscale, 10 HDR (16 bit) RGBA and 10 HDR (16 bit) greyscale texturemaps.

6. If I get 2 graphics cards, do I double the memory available?

No, the memory available will be the memory capacity of the smallest card in your system. If you have a 1Gb and a 2Gb card, and need over 1Gb of memory for your scene, turn off the 1Gb card in the Cuda Devices tab of the plugin.

¹Image formats that have 8 bits per color channel such as the common image formats JPEG, PNG, GIF among others.

7. Is Octane “**Instancing**”¹ supported?

No.

8. Can texture map have their tiling disabled, be offset, or rotated?

At this stage texture map scaling is implemented, however Octane does not currently support texture map offsets or rotations, nor disabling of tiling. To use these effects in your renders, manually adjust the texture maps in your image editing program.

9. What does “Error searching for missing texturemap...You do not have read access to that folder” mean?

When a Rhino scene is loaded which has Octane materials, the plugin checks to ensure the texturemap files for each Octane RGB Image node actually exist on your hard disk. If they do not, the plugin requests the user select a search path for locating the missing texturemap. If you “Cancel” at this point, searching for missing texturemaps is aborted (and if you open the Viewport, Octane will report an error for the missing texturemap, but the Viewport will still open and the render will still start). However, if you do not Cancel, and instead specify a search path, the plugin will search all folders inside that search path for the missing file(s). If the plugin encounters a folder within the search path for which the users does not have read access to (ie. the plugin cannot read the files in that folder), the message “You do not have read access to that folder” is displayed. If you get this error, refine the search path so that it is searching a folder which you do have access to.

¹Instancing 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.

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/>.

IFL

(Image File List) file is an ASCII file that constructs an animation by listing single-frame bitmap files to be used for each rendered frame. When you assign an IFL file as a bitmap, rendering steps through each specified frame, resulting in an animated map. (reference: <https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2017/ENU/3DSMax/files/GUID-CA63616D-9E87-42FC-8E84-D67E1990EE71-htm.html>)

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

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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.

Proxy Server

A Proxy Server, also known as an application-level gateway, is an intermediary server between the local network and the external servers from which a client is requesting a service. The external servers will only see the network proxy server's IP address thus providing some degree of security and privacy. There are various kinds of proxies, the most common are Web Proxies.

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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