

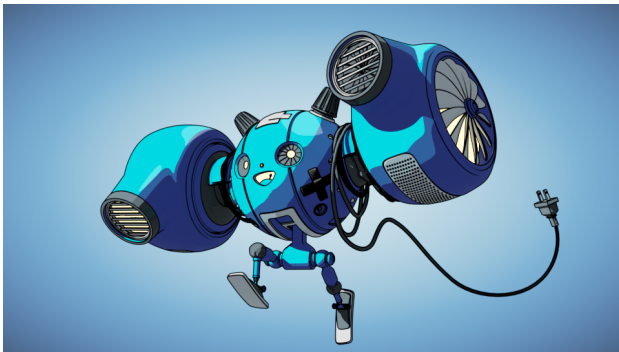
# V-Ray Toon Material

This page provides information on the V-Ray BRDFToonMtl node.

## Overview

2D cel and cartoon effects can easily be achieved with the V-Ray Toon Material. Use this material to make your scene get that hand-drawn look. Controlling the shadows and lights received by the material in combination with material transparency, gotten from Object or Material IDs, allows for fine-tuning the result. You can take advantage from the other standard V-Ray material options such as reflection, refraction, anisotropy, subsurface scattering and bump/normal mapping to set up the render to your liking.

Combine with the [Toon atmospheric effect](#) to add custom outlines for inky effect.



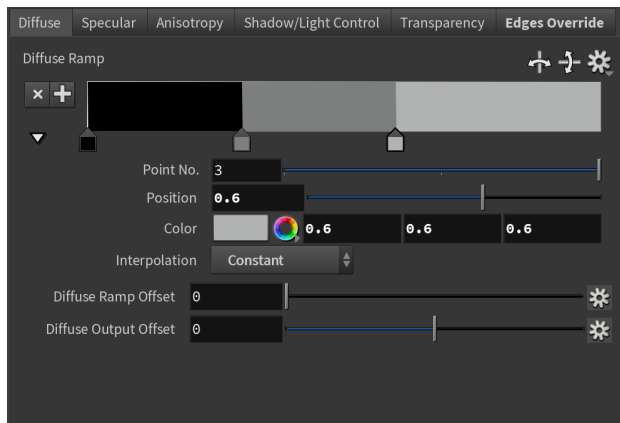
## Toon

### Diffuse

The **Diffuse Ramp** controls the diffuse color based on the amount of light received. Position *0.0* maps to light intensity *0.0*, position *1.0* maps to light intensity *1.0* and above. See the [Diffuse Ramp example](#) below.

### Specular

The **Specular Ramp** controls the specular color based on the amount of light received. Position *0.0* maps to light intensity *0.0*, position *1.0* maps to light intensity *1.0* and above.



## Anisotropy

**Highlight Type** – Offers two modes to set the anisotropy highlight:

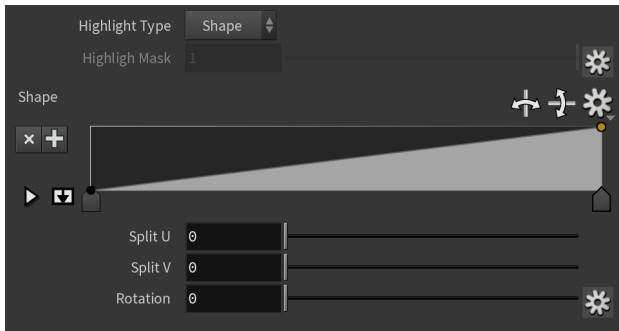
**Shape** – Using a curve and points to set the highlights.

**Texture** – Textured highlight allows a greater degree of control over the final look. It uses the same V-Ray Material highlight anisotropy UV space to map a texture over the highlight.

**Highlight Mask** – When the Highlight Type is set to Texture, this parameter becomes active. Select a texture to use as a mask for the highlight.

**Split U/Split V** – Amount for highlight splitting in the U/V tangent direction.

**Highlight Rotation** – Amount for highlight rotation. A value of 0 means no highlight rotation and a value of 1 results in 360 degree rotation.



## Shadows/Light Control

The Shadows/Light Control parameters control the shadow received by the material and not the shadow cast from the material.

**Shadow Blend On** – When disabled, the shadow is considered as negative light amount and used by the diffuse ramp for color selection. When enabled, the shadow is rendered separately and can be blended with the diffuse color.

**(Shadows) Color** – Texture that modifies the shadow color.

**(Shadows) Opacity** – Strength of the shadow when blending with the diffuse color. A value of 0 means completely transparent shadow (or no shadow), while a value of 1 gives full shadow result.

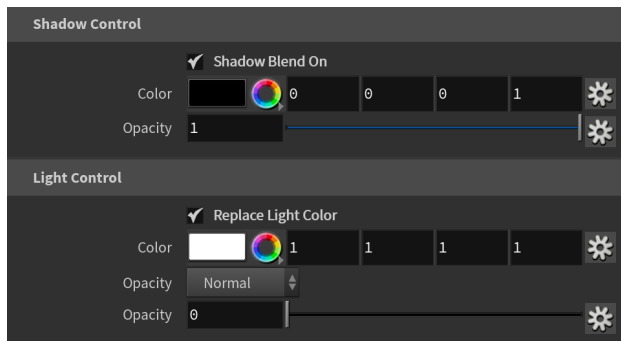
**Replace Light Color** – When enabled, the color for all lights illuminating an object with the current material is replaced by light Color.

**(Light) Color** – Replacement color for the original light color.

**(Light) Opacity** – Mode for blending the original light with the diffuse color.

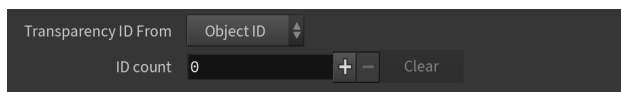
None  
Normal  
Over  
Add  
Subtract  
Multiply  
Lighten  
Darken  
Saturate  
Desaturate  
Illuminate

**Opacity** – Amount for blending the original light and the diffuse color. A value of 0 results in no light blending, while a value of 1 results in full light blending. A texture map can be used here.



## Toon Transparency

**Transparency ID From** – Source for IDs used by the material transparency list. Currently supported sources are *Object ID* and *Material ID*.



## Edges Override

This tab gives you the option to override the V-Ray Toon effect. Note that controlling the parameters works only if the object has assigned V-Ray Toon node in combination with V-Ray Toon material.

**Enabled** – Enables the Toon Edges Override effect. See the [Toon Edges Override example](#) below.

**Priority** – The Priority is taken into consideration when two edges overlap. If the two objects come with the same priority, for each part of the edge overlapping the object, V-Ray looks into the edge's corresponding settings. However, if any of the objects has its priority set higher, the whole edge is drawn with its settings. All materials other than V-Ray Toon material have their priority set to 0.

**Line Color** – The color of the outlines.

**Line Width** – Scales the global toon effect line width multiplying it with a value from the range of 0 to 1. A value of 0 removes the outlines and a value of 1 renders the original line width specified in the V-Ray Toon. You can connect a texture map here to control the line width.

**Inner Line Control** – Enable this option to get control over the inner edges.

**Inner Line Color** – The color of the inner edges' outlines. A texture map can be connected to this parameter.

**Inner Line Width** – Scales the global width of the inner edges' outlines multiplying it with a value from the range of 0 to 1. A texture map can be connected to this parameter.

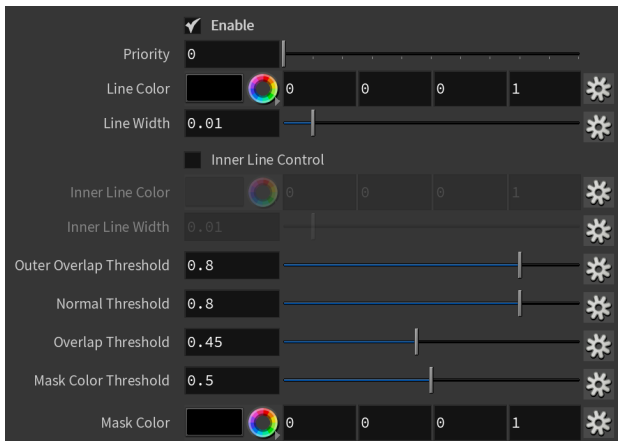
**Outer Overlap Threshold** – Determines when outlines are created for overlapping parts of one and the same object. Lower values reduce the outer overlapping lines, while higher values produce more overlap outer lines.

**Normal Threshold** – Determines at what point lines are created for parts of the same object with varying surface normals (for example, at the inside edges of a box). Lower values mean that only sharper normals generate an edge, while a value of 0.5 means that 90 degrees or larger angles generate internal lines. Higher values mean that smoother normals can also generate an edge. Don't set this value to pure 1.0 as this fills curved objects completely.

**Overlap Threshold** – Determines when outlines are created for overlapping parts of one and the same object. Lower values reduce the internal overlapping lines, while higher values produce more overlap lines. Don't set this value to pure 1.0 as this fills curved objects completely.

**Mask Color Threshold** – Sets a threshold for the mask color. The range is between a value of 0, where there are no outlines created and 1 where there are many outlines created.

**Mask Color** – Uses a texture as a mask creating more outlines depending on the **Mask Color Threshold** value.



## Diffuse

**Color** – Base texture blended with the color from the diffuse ramp. *See the [Diffuse Color with Diffuses Ramp example](#) below.*

**Roughness** – Used to simulate rough surfaces or surfaces covered with dust (for example, skin, or the surface of the Moon).

**Roughness Model** – Specifies the Roughness model.

**Oren-Nayar** – A reflectivity model for diffuse reflection from rough surfaces that has been shown to accurately predict the appearance of a wide range of natural surfaces. We recommend using this roughness model.

**Gamma Based** – The roughness model used in previous versions of V-Ray. This is not the recommended option.

**Opacity** – Assigns opacity to the material where 1.0 is completely opaque and 0.0 is completely transparent.

**Opacity Mode** – Controls how the opacity map works.

**Normal** – The opacity map is evaluated as normal: the surface lighting is computed and the ray is continued for the transparent effect. The opacity texture is filtered as normal.

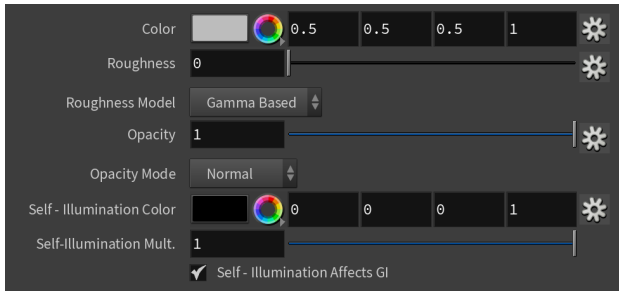
**Clip** – The surface is shaded as either fully opaque or fully transparent depending on the value of the opacity map (i.e. without any randomness). This mode also disables the filtering of the opacity texture. This is the fastest mode, but it might increase flickering when rendering animations.

**Stochastic** – The surface is randomly shaded as either fully opaque or fully transparent so that on average it appears to be with the correct transparency. This mode reduces lighting calculations but might introduce some noise in areas where the opacity map has gray-scale values. The opacity texture is still filtered as normal.

**Self-Illumination** – The self-illumination color of the material.

**Self-Illumination Mult.** – A multiplier for the self-illumination of the material.

**Self-Illumination Affects GI** – When enabled, the self-illumination color affects GI computations.

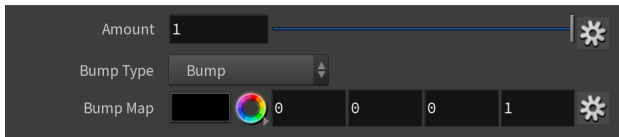


## Bump

**Amount** – A multiplier for the bump map effect.

**Bump Type** – Determines how the **Bump Map** parameter is interpreted.

**Bump Map** – Selects a texture for the bump or normal map. Leaving this unconnected turns off bump/normal mapping.



## Reflection

**BRDF Type** – Determines the type of BRDF (the shape of the highlight and glossy reflections). This parameter has an effect only if the **Reflection Color** is different from black and **Reflection Glossiness** is different from *1.0*.

**Phong** – Phong highlight/reflections

**Blinn** – Blinn highlight/reflections

**Ward** – Ward highlight/reflections

**Microfacet GTR (GGX)** – GGX Microfacet highlight/reflections

**GGX Tail Falloff** – Controls the transition from highlighted areas to non-highlighted areas when the **BRDF Type** is set to **GGX**.

**Color** – The reflection color dims the diffuse surface color.

**Glossiness** – Controls the sharpness of reflections. A value of *1.0* means perfect mirror-like reflection; lower values produce blurry or glossy reflections. Use the **Subdivs** parameter below to control the quality of glossy reflections

**Lock Highlight Glossiness to Reflection Glossiness** – When disabled, you can enter different values for the **Highlight Glossiness** and **Reflection Glossiness**. However this does not produce physically correct results.

**Highlight Glossiness** – Determines the shape of the highlight on the material. Normally this parameter is locked to the **Reflection Glossiness** value in order to produce physically accurate results.

**Use Fresnel** – When enabled, makes the reflection strength dependent on the viewing angle of the surface. Some materials in nature (glass, etc.) reflect light in this manner. Note that the Fresnel effect depends on the index of refraction (IOR) as well.

**Glossy Fresnel** – When enabled, uses glossy fresnel to interpolate glossy reflections and refractions. It takes the Fresnel equation into account for each "microfacet" of the glossy reflections, rather than just the angle between the viewing ray and the surface normal. The most apparent effect is less brightening of the grazing edges as the glossiness is decreased. With the regular Fresnel, objects with low glossiness may appear to be unnaturally bright and "glowing" at the edges. The Glossy Fresnel calculations make this effect more natural.

**Lock Fresnel IOR to Refraction IOR** – Unlocks the **Fresnel IOR** parameter for finer control over the reflections. When this is enabled, the **Fresnel IOR** is locked to the **Refraction IOR**.

**Fresnel IOR** – The IOR to use when calculating Fresnel reflections. Normally this is locked to the **Refraction IOR** parameter, but you can unlock it for finer control.

**Subdivs** – Controls the quality of glossy reflections. Lower values render faster, but the result is more noisy. Higher values take longer, but produce smoother results.

**Anisotropy** – Determines the shape of the highlight. A value of *0.0* means isotropic highlights. Negative and positive values simulate "brushed" surfaces.

**Rotation** – Determines the orientation of the anisotropic effect in a float value between *0* and *1* (where *0* is 0 degrees and *1* is 360 degrees).

**UV Vectors Derivation** – Specifies the method for deriving anisotropy axes:

**Local Axis** – Uses a local axis for the anisotropy effect.

**UVW Generator** – Assigns a UVW Generator for the anisotropy effect.

**Axis** – Specifies a local object axis for the anisotropy effect when **UV Vectors Derivation** is set to **Local Axis**.

**Trace Reflections** – Enables reflections for the material.

**Exit Color** – If a ray has reached its maximum reflection depth, this color is returned without tracing the ray further.

**Max Depth** – The number of times a ray can be reflected. Scenes with lots of reflective and refractive surfaces may require higher values to look correct.

**Enable Dim Distance** – Enables the **Dim Distance** parameter which allows you to stop tracing reflection rays after a certain distance.

**Dim Distance** – Specifies a distance after which the reflection rays are not traced.

**Dim Fall-off** – A fall off radius for the dim distance.

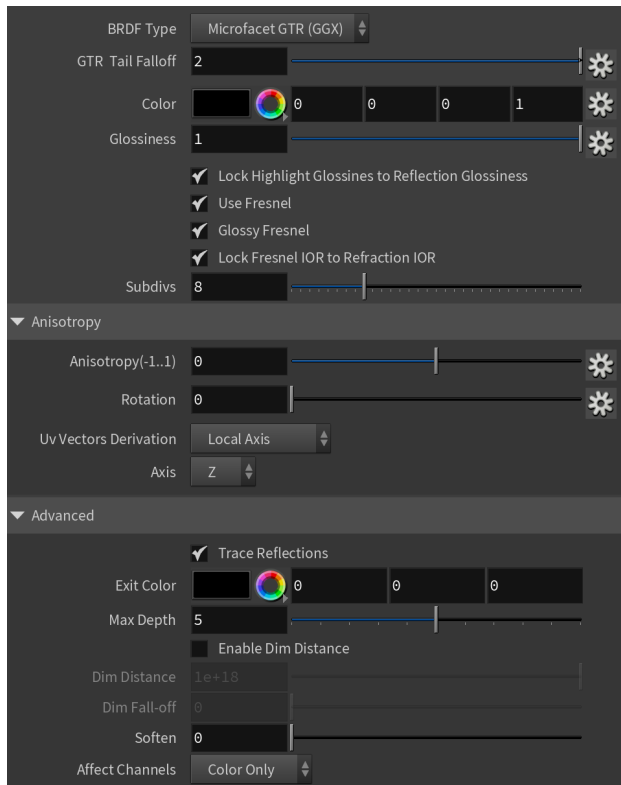
**Soften** – Softens the edge of the BRDF at light/shadow transitions

**Affect Channels** – Specifies which channels are going to be affected by the reflectivity of the material.

**Color Only** – The reflectivity affects only the RGB channel of the final render.

**Color+alpha** – Causes the material to transmit the alpha of the reflected objects, instead of displaying an opaque alpha.

**All channels** – All channels and render elements are affected by the reflectivity of the material.



## Refraction

**Color** – Refraction color. Note that the actual refraction color depends on the **Reflection Color** as well.

**Glossiness** – Controls the sharpness of refractions. A value of *1.0* means perfect glass-like refraction; lower values produce blurry or glossy refractions. Use the Refraction **Subdivs** parameter below to control the quality of glossy refractions.

**Index of Refraction** – Index of refraction for the material, which describes the way light bends when crossing the material surface. A value of *1.0* means the light does not change direction.

**Subdivs** – Controls the quality of glossy refractions. Lower values render faster, but the result is more noisy. Higher values take longer, but produce smoother results.

**Fog Color** – The attenuation of light as it passes through the material. This option helps simulate the fact that thick objects look less transparent than thin objects. Note that the effect of the fog color depends on the absolute size of the objects and is therefore scene-dependent.

**Fog Multiplier** – The strength of the fog effect. Smaller values reduce the effect of the fog, making the material more transparent. Larger values increase the fog effect, making the material more opaque.

**Fog Bias** – Changes the way the fog color is applied. Negative values make the thin parts of the objects more transparent and the thicker parts more opaque and vice-versa (positive numbers make thinner parts more opaque and thicker parts more transparent).

**Dispersion** – Enables the calculation of true light wavelength dispersion.

**Abberation** – Increases or decreases the dispersion effect. Lowering it widens the dispersion and vice versa.

**Affect Shadows** – Causes the material to cast transparent shadows to create a simple caustic effect dependent on the **Refraction Color** and the **Fog Color**. For accurate caustic calculations, *disable* this parameter and instead enable **Caustics** in the V-Ray Renderer. Simultaneous usage of both **Caustics** and **Affects Shadows** can be used for artistic purposes but does not produce a physically correct result.

**Trace Refractions** – Enables refractions for the current material.

**Use Exit Color** – Enables the use of **Exit Color**.

**Exit Color** – If a ray has reached it's maximum depth this color is returned instead of tracing the ray further

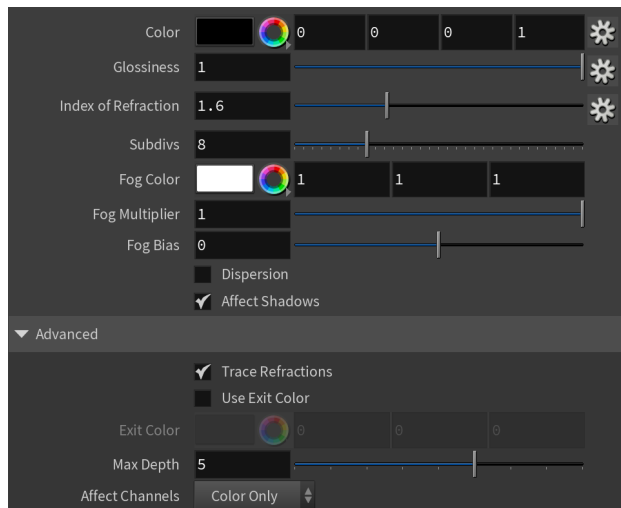
**Max Depth** – The number of times a ray can be refracted. Scenes with lots of refractive and reflective surfaces may require higher values to look correct.

**Affect Channels** – Specifies which channels are going to be affected by the transparency of the material

**Color Only** – The transparency affects only the RGB channel of the final render.

**Color+alpha** – This causes the material to transmit the alpha of the refracted objects, instead of displaying an opaque alpha.

**All channels** – All channels and render elements are affected by the transparency of the material.



## Options

**Cutoff** – A threshold below which reflections/refractions are not traced. V-Ray tries to estimate the contribution of reflections/refractions to the image, and if it is below this threshold, these effects are not computed. Do not set this to 0.0 as it may cause excessively long render times in some cases.

**Double-sided** – When enabled, V-Ray flips the normals for back-facing surfaces with this material assigned. Otherwise, the lighting on the "outer" side of the material is computed always. Can be used to achieve a fake translucent effect for thin objects like paper.

**Reflect On Back Side** – When disabled, V-Ray calculates reflections for the front side of objects only. Checking it makes V-Ray calculate the reflections for the back sides of objects too.

**Use Irradiance map** – When enabled, the irradiance map is used to approximate diffuse indirect illumination for the material. If disabled, Brute Force GI is used in which case the quality of the Brute Force GI is determined by the **Subdivs** parameter of the **Irradiance Map**. This can be used for objects in the scene which have small details that are not approximated very well by the irradiance map.

**Fix Dark Edges** – When enabled, fixes the dark edges that sometimes appear on objects with glossy materials.



**Energy Preservation** – Determines how the diffuse, reflection, and refraction color affect each other. V-Ray tries to keep the total amount of light reflected off a surface to less than or equal to the light falling on the surface (as in the real life). For this purpose, the following rule is applied: the reflection level dims the diffuse and refraction levels (a pure white reflection remove any diffuse and refraction effects), and the refraction level dims the diffuse level (a pure white refraction color remove any diffuse effects). This parameter determines whether the dimming happens separately for the RGB components or is based on the intensity:

**Monochrome** – Causes dimming to be performed based on the intensity of the diffuse/reflection/refraction levels.

**Color** – Causes dimming to be performed separately on the RGB components. For example, a pure white diffuse color and pure red reflection color yield a surface with a cyan diffuse color (because the red component is already taken by the reflection).

**Glossy Rays As GI** – Specifies on what occasions glossy rays are treated as GI rays:

**Never** – Glossy rays are never treated as GI rays.

**GI Rays** – (Default) Glossy rays are treated as GI rays only when GI is being evaluated. This can speed up rendering of scenes with glossy reflections.

**Always** – Glossy rays are always treated as GI rays. A side effect is that the Secondary GI engine is used for glossy rays.

**Refl. Gloss. Interpretation** – Controls how Reflection **Glossiness** is interpreted:

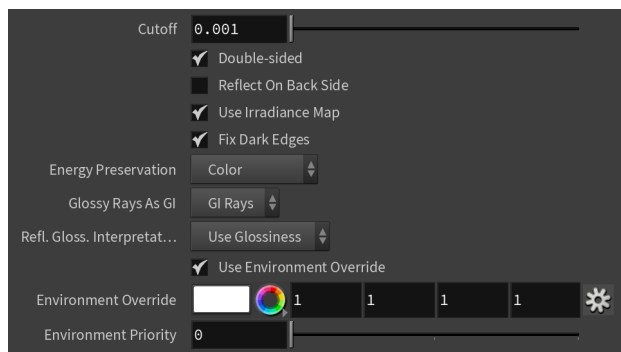
**Use Glossiness** – The **Glossiness** value is used as is, and a high **GI ossiness** value (such as *1.0*) results in sharp reflection highlights.

**Use Roughness** – The Reflection **Glossiness** inverse value is used. For example, if Reflection **Glossiness** is set to *1.0* and **Use Roughness** is selected, this results in diffuse shading. Conversely, if **Glossiness** is set to *0.0* and **Use Roughness** is selected, this results in sharp reflection highlights. Note that the **Roughness** parameter itself has no bearing on the results of this option.

**Use Environment Override** – Enables the use of the **Environment Override** color.

**Environment Override** – A color or texture that is used as an environment for the material.

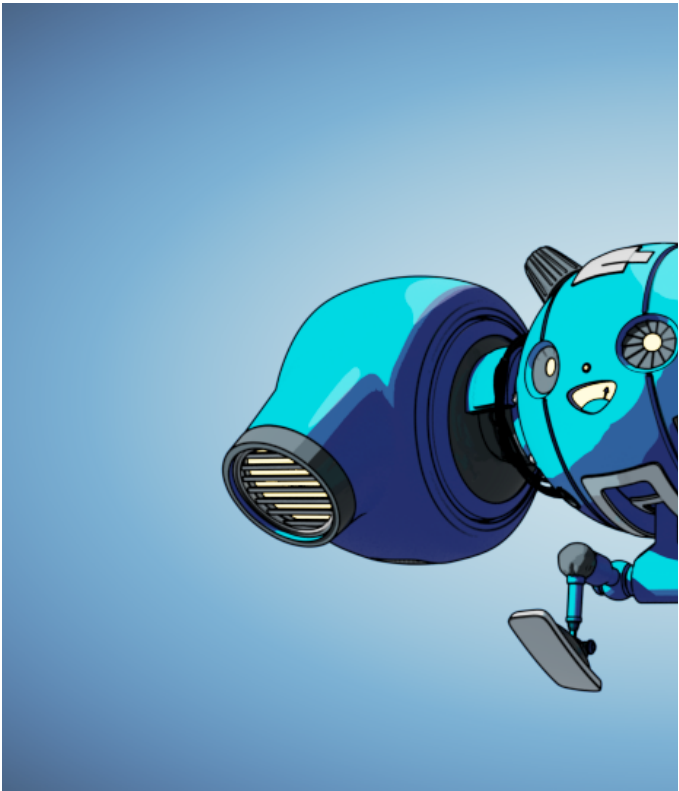
**Environment Priority** – Specifies the environment override priority when several materials override it along a ray path.



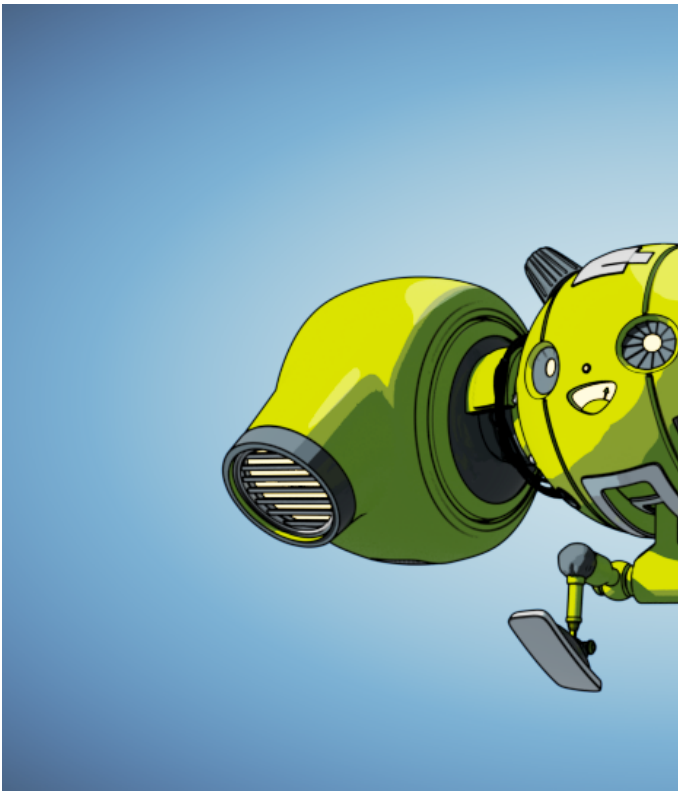
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## Example: Diffuse Ramp

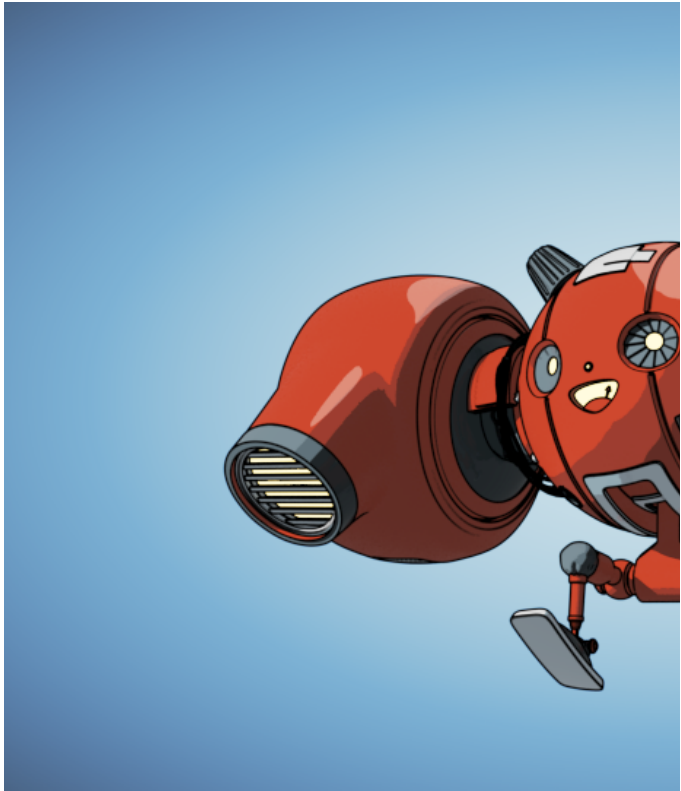
This examples shows the effect of the **Diffuse Ramp**. Note that the V-Ray Toon Effect is also used for a stronger toon effect.



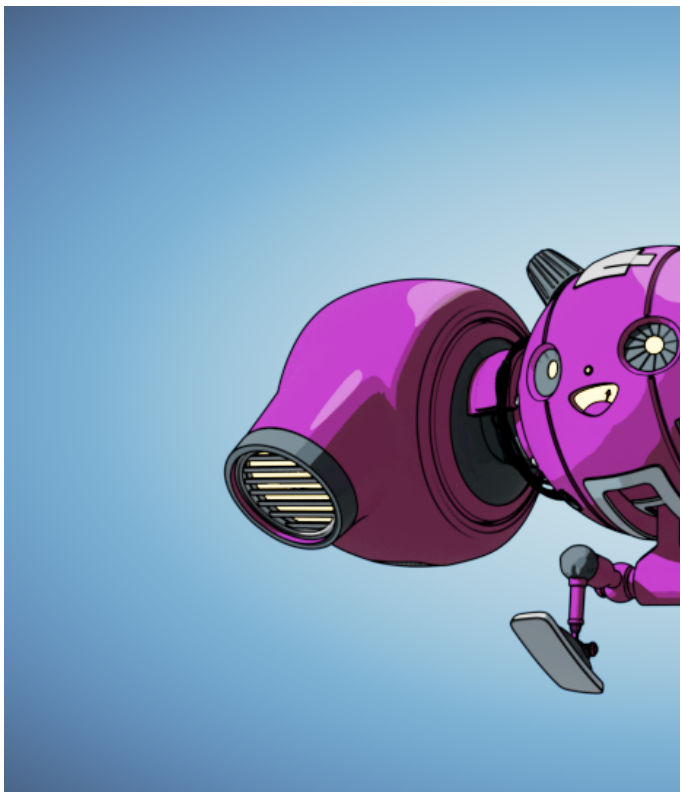
Diffuse Ramp with blue colors



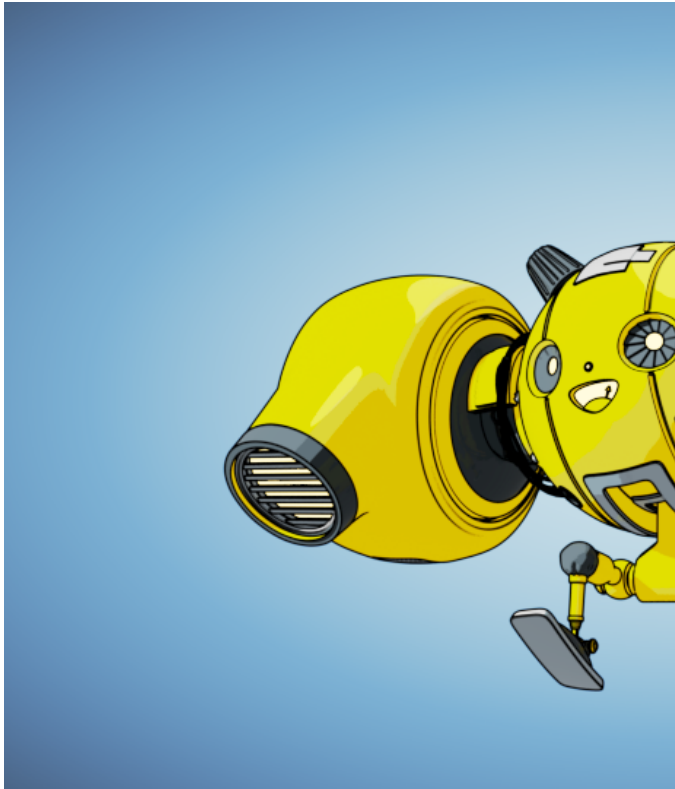
Diffuse Ramp with light green colors



Diffuse Ramp with red colors



Diffuse Ramp with purple colors



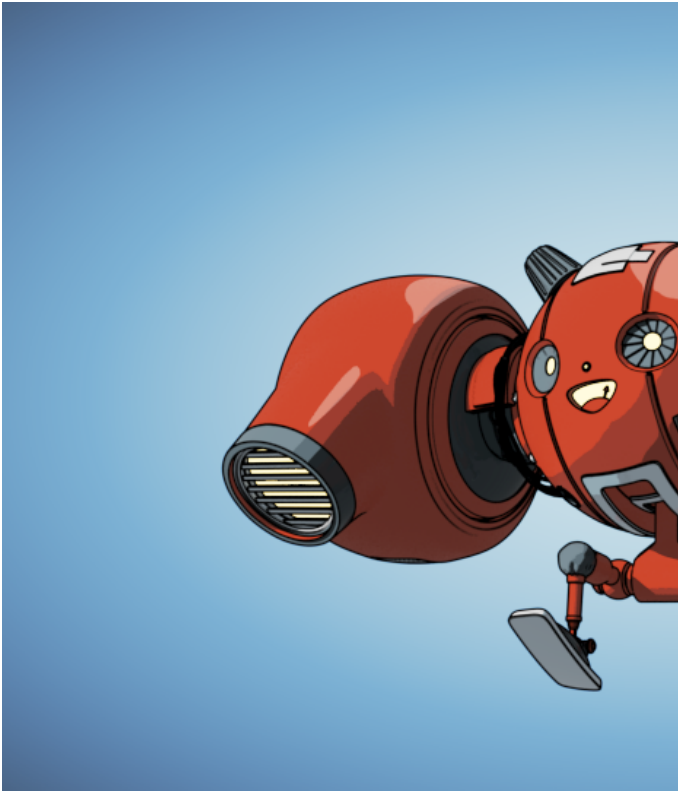
Diffuse Ramp with yellow colors

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### Example: Edges Override

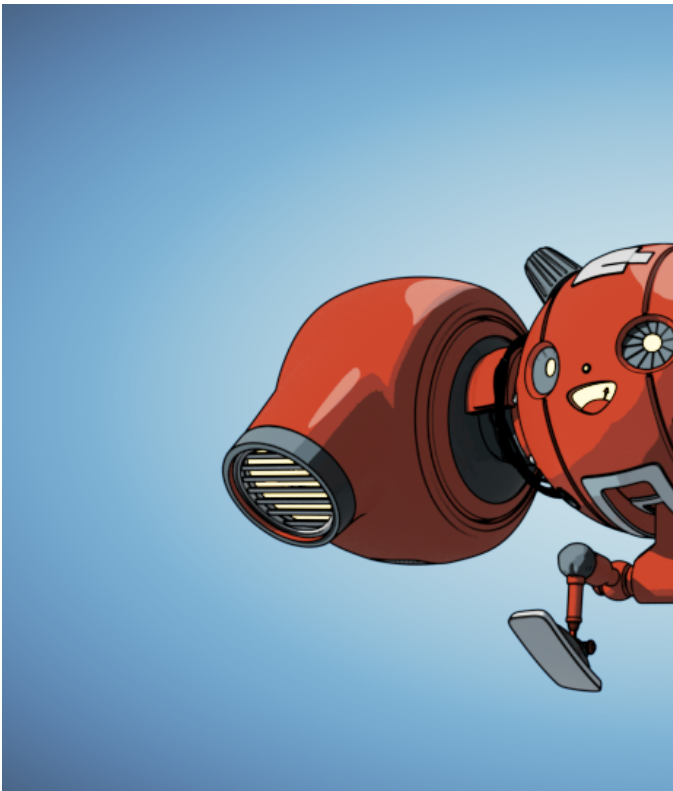
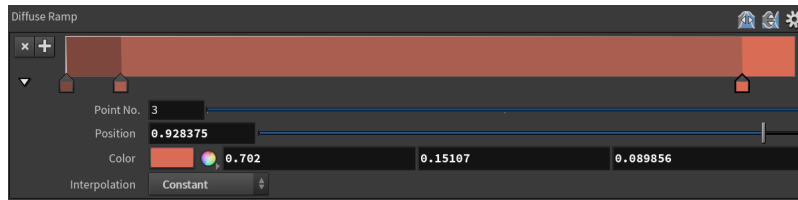
This examples shows the effect of the **Edges Override** parameter. Note that the V-Ray Toon Effect is also used for a stronger toon effect.

off  
on

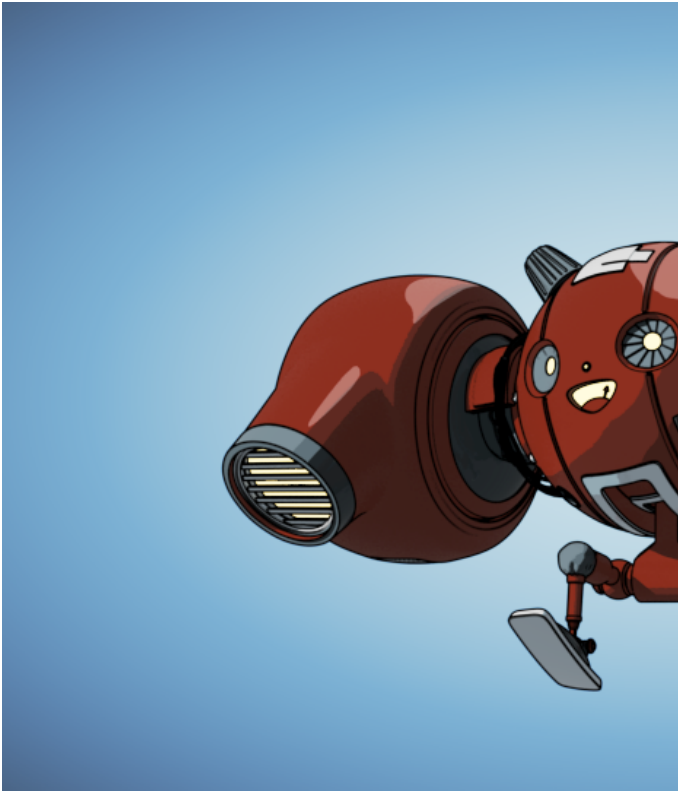


## Example: Diffuse Color with Diffuse Ramp

This example shows the effect of the **Diffuse Color** when used with a **Diffuse Ramp**. Note that the V-Ray Toon Effect is also used for a stronger toon effect.



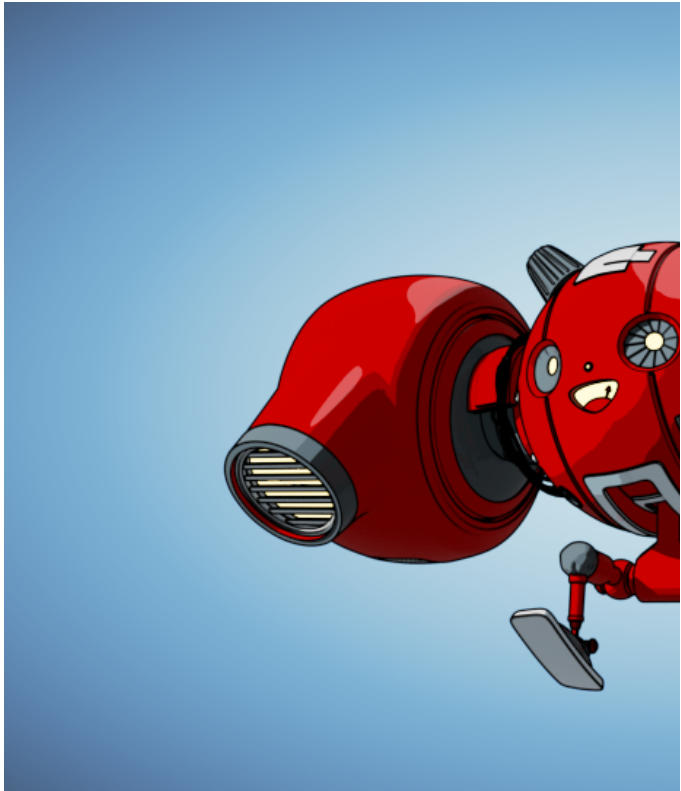
Diffuse Color = white



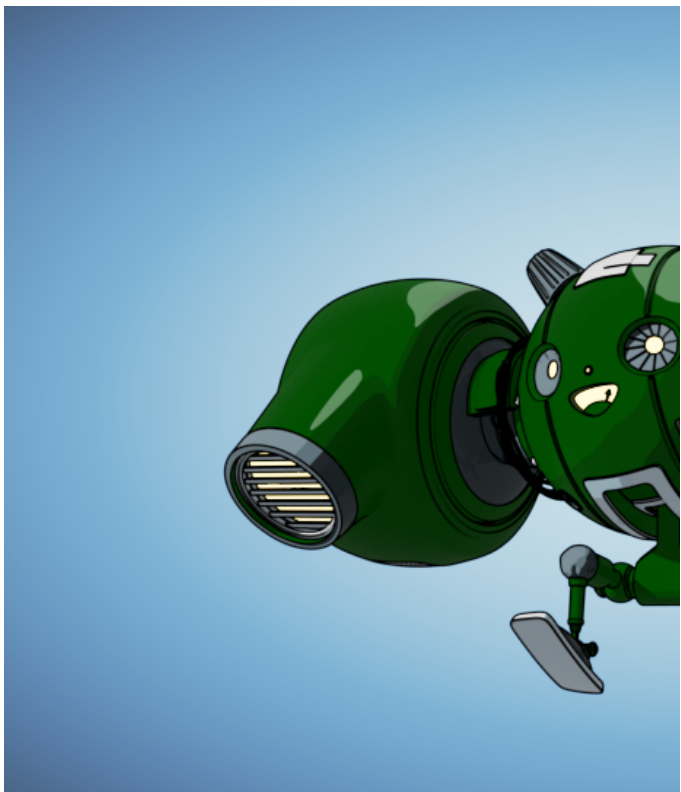
Diffuse Color = grey



Diffuse Color = black



Diffuse Color = red



Diffuse Color = green