

Color Mapping

This page provides information on the Color Mapping rollout under the [Globals tab](#) in V-Ray's [Render Settings](#).

Overview

Color mapping (sometimes also called tone mapping) dictates which color operations are performed between the user interface inputs and the values rendered and the way the rendered pixels are displayed through the VFB on the user monitor.

V-Ray default Color Mapping settings ensure a 1:1 mapping of all the user operations and the final result. For example, doubling a light's intensity exactly doubles its contribution to the final pixel, and cutting a shader's light reflectance in half cuts its contribution to the final pixel in half. This approach corresponds to Linear Workflow.

Changing the Color Mapping settings might be desirable for artistic purposes, but doing so will deviate from the linear correspondence between user actions and the rendered result, and will also veer away from physical accuracy in the scene.

To ensure the most accurate results, it's best to leave the Color Mapping settings at their default values and perform artistic color transformations during post-production. This will also ensure repeatability, consistency, and a very accurate rendered solution.

UI Paths

||Properties Editor|| > **Render** > **Globals** tab > **Color Mapping** rollout

Parameters

Mode – Selects the transformation type.

Color Mapping Only – Only color mapping is burned into the final image and not gamma correction. This is the default option. V-Ray will still proceed to sample the image as though both color mapping and gamma are applied, but will only apply the color correction (Linear, Reinhard, etc.) to the final result.

Don't Affect Colors – Neither color mapping nor gamma are burned into the final image. However, V-Ray will proceed with all its calculations as though color mapping and gamma are applied (e.g. the noise levels will be corrected accordingly). This can be useful, for example, if you know that you will apply some color correction to the image later on, but wish to keep the rendering itself in linear space for compositing purposes.

Color Mapping & Gamma – Both color mapping and gamma are burned into the final image. This corresponds to Don't affect colors (adaptation only) set to off in previous V-Ray versions.

Type – Selects the type of the Color Mapping.

Linear – Multiplies the final image colors based on their brightness without applying any changes.

Exponential – Saturates the colors based on their brightness. This can be useful to prevent burn-outs in very bright areas (for example, around light sources, etc.). This mode clamps colors so that no value exceeds (255, or 1 in floating point value).

HSV Exponential – This mode is very similar to the Exponential mode, but it also preserves the color hue and saturation, instead of washing out the color towards white.

Intensity Exponential – Similar to the Exponential one, but it preserves the ratio of the RGB color components and only affects the intensity of the colors.

Gamma Correction – Applies a gamma curve to the colors. In this case, the Dark multiplier is a general multiplier for the colors before they are gamma-corrected. The Bright multiplier is the inverse of the gamma value (i.e. for gamma 2.2, the Bright multiplier must be 0.4545). **This is a deprecated mode, do not use it.**

Intensity Gamma – Applies a gamma curve to the intensity of the colors, instead of each channel (RGB) independently. **This is a deprecated mode, do not use it.**

Reinhard – his mode is a blend between exponential-style color mapping and linear mapping. If the Burn value is 1.0, the result is linear color mapping and if the Burn value is 0.0, the result is exponential-style mapping.

Multiplier – A general multiplier for the colors before they are corrected when **Mode** is set to **Gamma Correction**, **Intensity Gamma**, or **Reinhard**.

Burn value – Available when **Type** is set to **Reinhard**. If this value is 1.0, the result is the same as setting **Type** to **Linear Multiply**. If this value is 0.0, the result is the same as **Exponential**. Values between 0.0 and 1.0 blend the two types.

Dark multiplier – Specifies the multiplier applied to dark colors when **Mode** is set to **Linear Multiply**, **Exponential**, **HSV Exponential**, or **Intensity Exponential**. The default value is 1.0.

Bright multiplier – Specifies the multiplier applied to bright colors when **Mode** is set to **Linear Multiply**, **Exponential**, **HSV Exponential**, or **Intensity Exponential**. The default value is 1.0.

Inverse gamma – The inverse of the gamma value when **Mode** is set to **Gamma Correction** or **Intensity Gamma**. For example, for a **Gamma** value of 2.2, this value is 1/2.2, or 0.4545.

Gamma – Controls the gamma correction for the output image regardless of the color mapping mode. Note that the value here is the inverse of the one used for the Gamma correction color mapping type. For example, to correct the image for a 2.2-gamma display, you should set the Gamma parameter simply to 2.2.

Use Input Gamma – Enables the **Input Gamma** parameter.

Input Gamma – Specifies the gamma of the textures within the scene.

Sync With CM Gamma – When enabled sets Blender's "Color Management" Gamma to 1.

Use For Preview – When enabled, Color Mapping settings are used for preview renders (Material Preview)

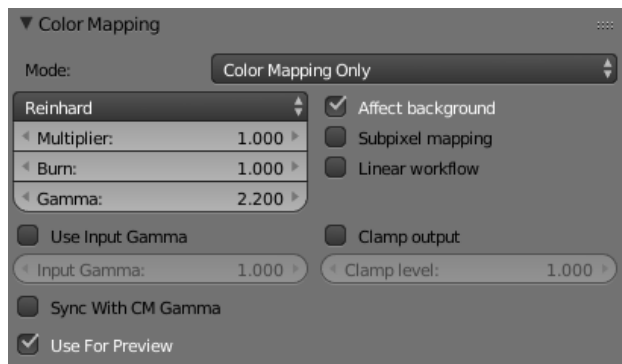
Affect background – If this is off, color mapping does not affect colors belonging to the background.

Subpixel mapping – Determines whether color mapping is applied to the final image pixels or to the individual sub-pixel samples. In older versions of V-Ray, this option was always assumed to be on, however its default value is now off as this produces more correct renderings, especially if you use the universal settings approach.

Linear Workflow – When this option is checked V-Ray automatically applies the inverse of the Gamma correction that you have set in the Gamma field to all **VRmat** materials in your scene. **Please note that this option is deprecated and will be removed in future versions of V-Ray.** It is intended to be used only for quickly converting old scenes which are not set up with proper linear workflow in mind. This option is not a replacement for a proper linear workflow.

Clamp output – If this is on, colors are clamped after color mapping. In some situations, this may be undesirable. For example, if you want to antialias HDR parts of the image as well, it is better to keep clamping off.

Clamp level – Specifies the level at which color components is clamped if the Clamp output option is on.

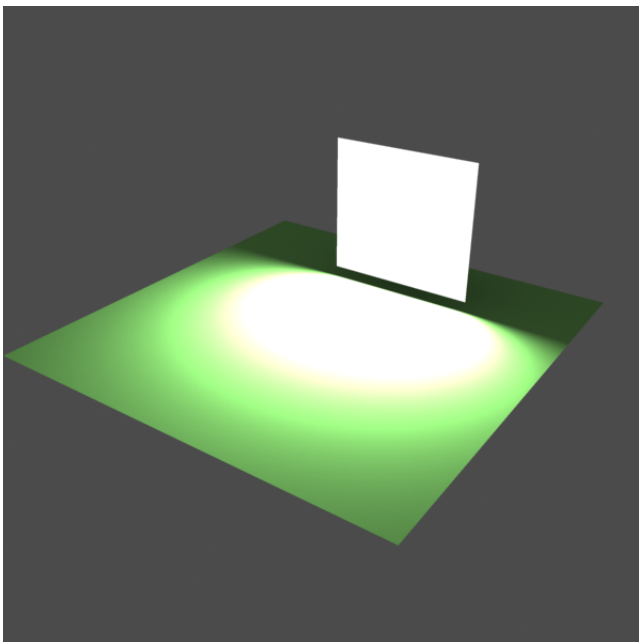


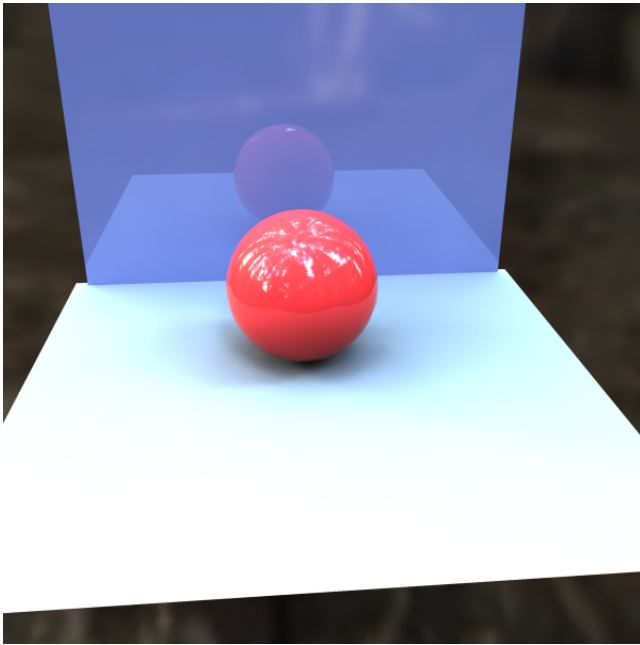
Example: Color Mapping Types

This example demonstrates the differences between some of the color mapping types.

Note: The Sibenik Cathedral model was created by Marko Dabrovic (<http://www.rna.hr/>) and was one of the models for the CGTechniques Radiosity competition.

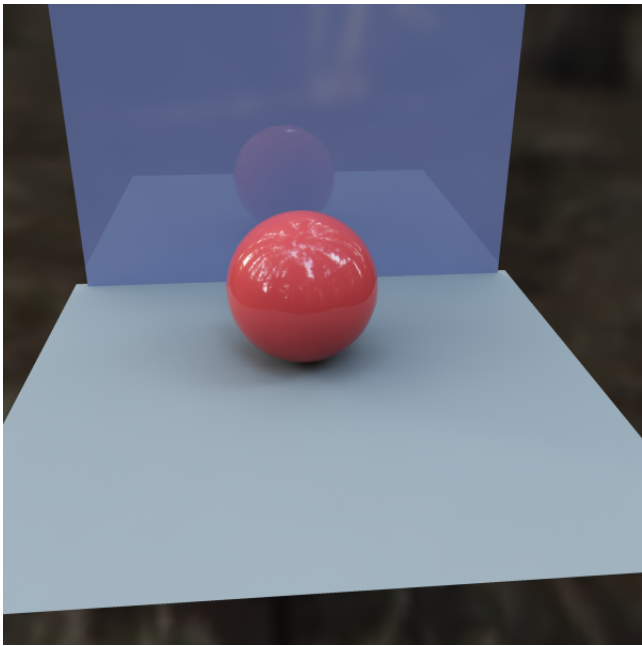
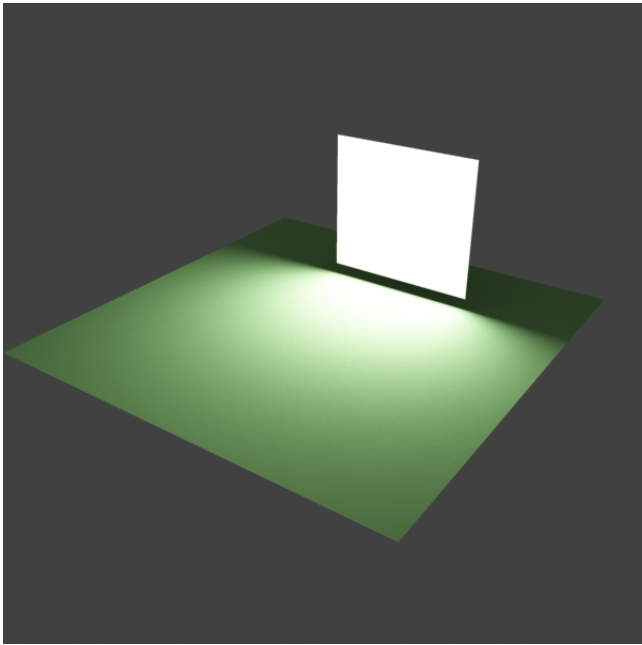
Linear multiply color mapping





Linear multiply color mapping

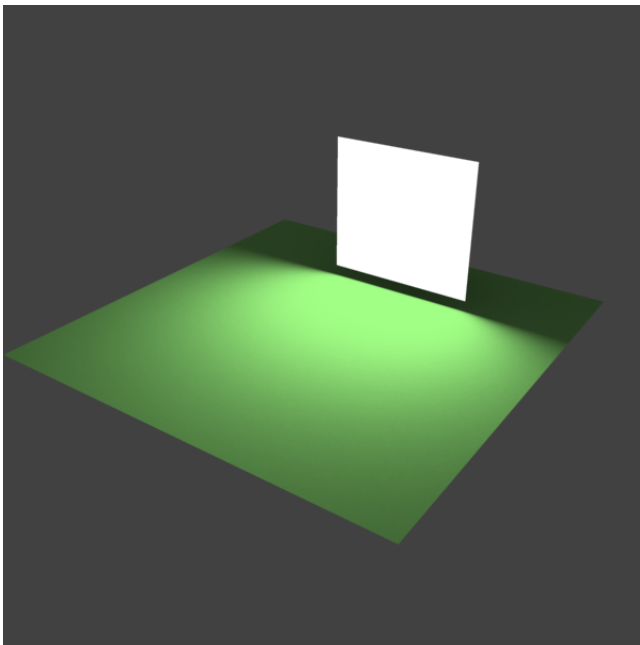
Exponential color mapping

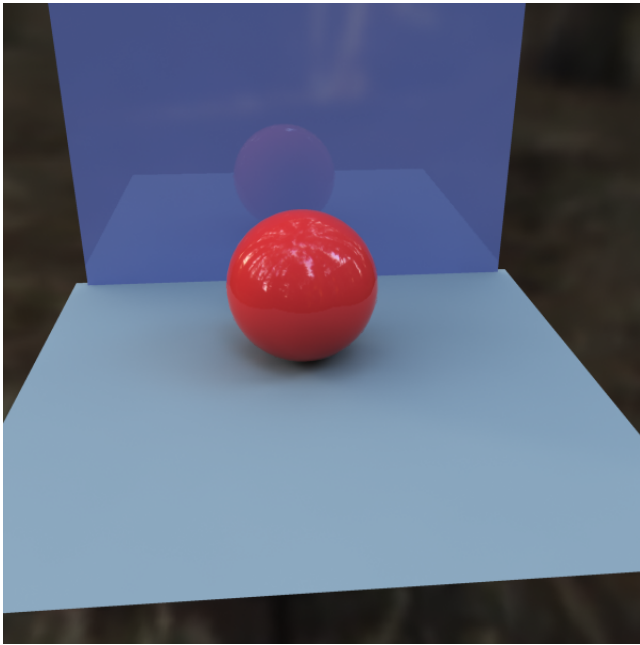




Exponential color mapping

HSV exponential color mapping





HSV exponential color mapping

As visible in the above images, the **Linear Multiply** mapping method clamps bright colors to white, causing bright parts of the image to appear "burnt out". Both the **Exponential** and **HSV Exponential** types avoid this problem. While **Exponential** tends to wash out the colors and desaturate them, **HSV Exponential** preserves the color hue and saturation.

Example: Linear Workflow

This example shows the same image rendered with 3 different settings for **Gamma** and **Linear Workflow**.



Gamma = 1; Linear Workflow = Off



Gamma = 2.2; Linear Workflow = Off



Gamma = 2.2; Linear Workflow = On

There are different ways to approach a proper linear workflow. The simplest and most effective approach is to leave all gamma-related settings in Blender and V-Ray at their default values.