

Grid Texture

This page provides information on the Phoenix Grid Texture (PhoenixFDTexture).

Overview

The Phoenix **Grid Texture** loads and exposes a **Grid Channel** of a selected Phoenix [Simulator](#) as a procedural texture, which can then be used to shade the simulation wherever colors are needed. It can be created from the **Hypershade**.

For example, this texture can be plugged into the texture slots of a material as color or opacity, and used to shade the surfaces of liquids or meshes in general, that were exported with an **RGB Grid Channel**. If you want to mix together liquids, for example, with multiple RGB colors emitted from different [Liquid Sources](#), the Grid Texture can be used to read and transfer the RGB colors to the Liquid mesh's material for shading.

The technique of mixing colored liquids and rendering their colors is demonstrated in the [Paints Quick Setup](#) preset.

The Grid Texture can also be plugged into the Simulator's **volumetric options**, in order to modulate the opacity of Fire and Smoke, or to color the Fire and Smoke, using any of the simulator's Grid Channels as a basis (Smoke, Speed, RGB, etc.).

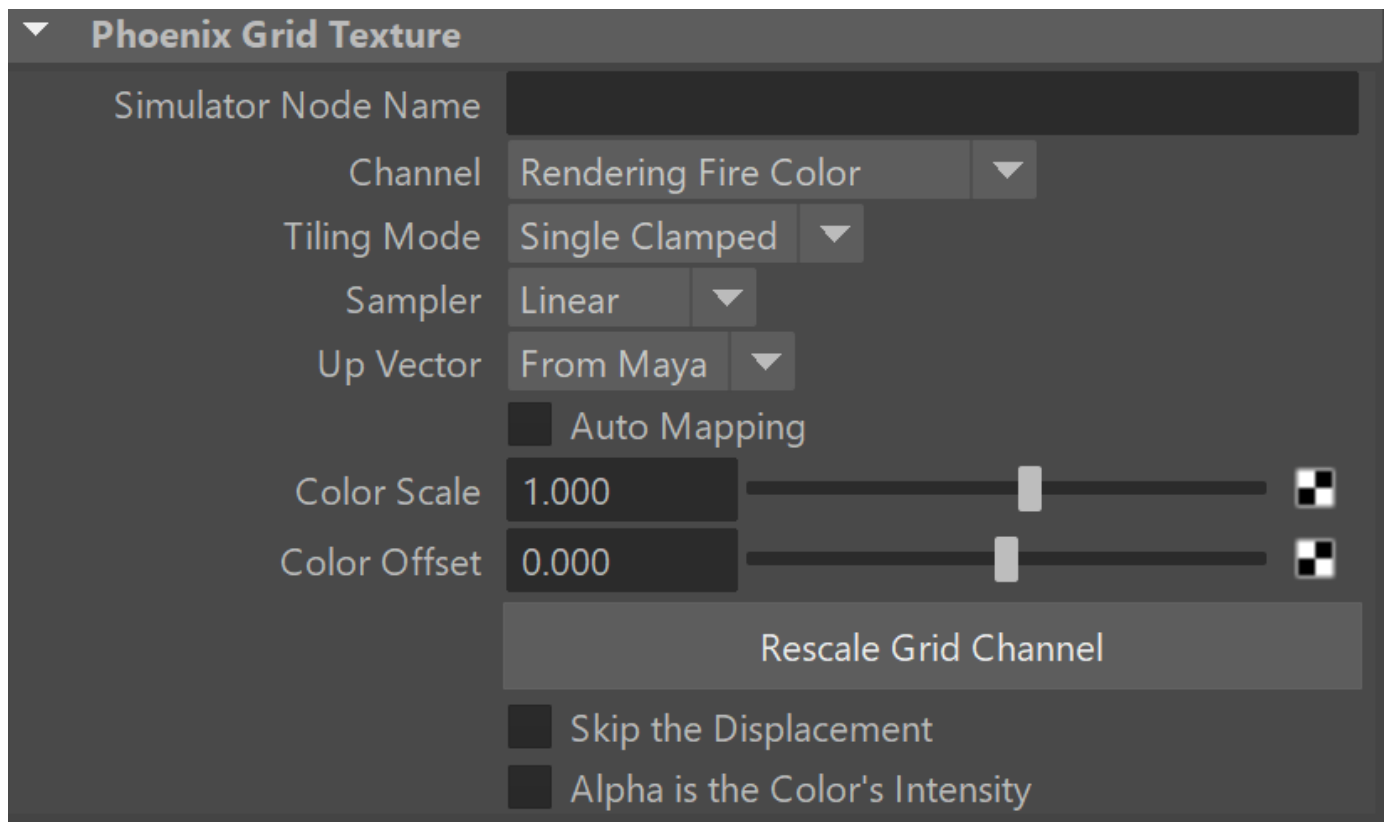
You could also use it as a blending mask, as described in the [Milk & Chocolate tutorial](#). For example, the Grid Texture can be used to read the RGB color of a simulator, which can then be used as a blending factor between two different materials.

Another use of the Grid Texture is for rendering via an external volumetric shader, such as the **V-Ray Environment Fog**. See the External Volumetric Shader section on the Tips and Tricks page for more information.

UI Path: ||Hypershade|| > **Create panel > Maya section > 3D Textures**

UI Path: ||Create Render Node|| > **Maya section > 3D Textures**

Parameters



Simulator Node | *simNode* – Allows you to specify the [PhoenixFDSimulator](#) node.

Channel | *channel* – Specifies the channel retrieved from the Phoenix node:

Rendering Fire Color - Returns the resulting color for the Fire, as specified in the Rendering Fire tab of the Phoenix Simulator.

Rendering Smoke Color - Returns the resulting color for the Smoke, as specified in the Rendering Smoke tab of the Phoenix Simulator.

Rendering Smoke Opacity - Returns the resulting Smoke Opacity, as specified in the Rendering Smoke Opacity tab of the Phoenix Simulator.

Channel Speed - Returns the contents of the Speed simulation channel. [Speed Grid Channel Output](#) has to be enabled on the Phoenix Simulator for this to work.

Channel Velocity - Returns the contents of the Velocity simulation channel. [Velocity Grid Channel Output](#) has to be enabled on the Phoenix Simulator for this to work.

Channel RGB - Returns the contents of the RGB simulation channel. [RGB Grid Channel Output](#) has to be enabled on the Phoenix Simulator for this to work.

Channel Temperature/Liquid - Returns the contents of the Temperature/Liquid simulation channel. [Temper./Liquid Grid Channel Output](#) has to be enabled on the Phoenix Simulator for this to work.

Channel Smoke - Returns the contents of the Smoke simulation channel. [Smoke Grid Channel Output](#) has to be enabled on the Phoenix Simulator for this to work.

Channel Fuel - Returns the contents of the Fuel simulation channel. [Fuel Grid Channel Output](#) has to be enabled on the Phoenix Simulator for this to work.

Channel Viscosity - Returns the contents of the Viscosity simulation channel. [Viscosity Grid Channel Output](#) has to be enabled on the Phoenix Simulator for this to work.

When doing Liquid simulations, Phoenix populates the grid **Velocity** channel only for cells / voxels inside the liquid volume - empty (air) voxels contain no velocity information. To generate velocity information for the empty voxels, enable **Simulate Air Effects** under the Dynamics rollout of the simulator and re-run the simulation.

Tiling | *tiling* – Specifies how to handle sampling outside of the simulator box (when **Auto Mapping** is enabled) or the place3dTexture box otherwise.

Single – The texture will not be tiled and the region outside the simulator box will be just black.

Single Clamped – The texture will not be tiled but its edges will be clamped, thus "stretching" the edge pixels.

Wrap – Tiles the texture by repeating it infinitely.

Mirror – Tiles the texture by flipping it back and forth infinitely.

Sampler | *samplerType* – Determines the blending method between adjacent grid cells.

Box – Displays cells as cubes. There is no blending between neighbor cells. This is the fastest mode.

Linear – Linear blending occurs between neighbor cells to smooth out the fluid's look. Sometimes this mode may unveil the grid-like structure of the fluid. Up to 20-30% faster than the **Spherical** option.

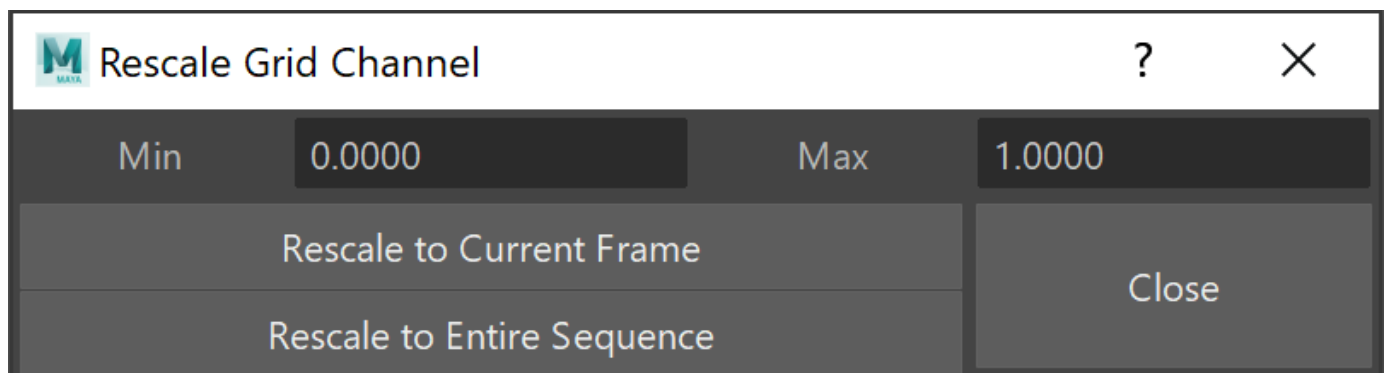
Spherical – Uses special weight-based sampling for the smoothest looking fluid. With increasing resolution, the visual advantage between this method and the **Linear** method becomes less noticeable.

Up Vector | *upVector* – Allows you to manually specify the up vector of the simulator (for example, if it was created in 3ds Max).

Auto Mapping | *autoMapping* – Allows automatic 3D mapping to the simulator's box, ignoring the place3dTexture node. Note that if the **Grid Texture** is plugged into a [Particle Shader](#)'s **Color Map** slot and **Auto Mapping** is enabled, **Liquid Simulator** should also be enabled and connected in the **Particle Shader**, otherwise the **Grid Texture** wouldn't know how to get mapped because the **Particle Shader** has no grid box like the [Phoenix Simulator](#).

Color Scale | *output_scale* – Multiplies the color output values of the Grid Texture.

Color Offset | *output_offset* – Multiplies the color output values of the Grid Texture. The values are first scaled by **Color Scale** and then the **Color Offset** is added.



Rescale Grid Channel – Rescales the output values of a Grid Channel to a certain range. The colors you get from the Grid Texture can be meaningful when data that is read from the Simulator is in the 0-1 range. But in case the grid data is negative, the Grid Texture will return black color, or if the data has very large values, like e.g. the Grid Speed which can go up to several hundred, the color returned by the Grid Texture will be pure white. In such cases this data should be rescaled to meaningful color values, which usually means rescaling it to the 0-1 range. You can find out more info about the Phoenix Grid Channel Ranges [here](#).

Rescaling using this helper simply measures the data range of the selected **Channel** and changes the **Color Scale** and **Color Offset** options. If you are familiar with the Phoenix channel ranges, you can directly set the **Color Scale** and **Color Offset** to the values you desire.

If you simulate new cache files, or if you load a new cache sequence in the Simulator, you will need to do this rescaling again to make sure the Grid Texture values are still in the **Min-Max** range. Note that rendering channels such as the **Fire Color** and **Smoke Color/Opacity** cannot be rescaled. Rescaling is especially useful when you are reading channels such as **Channel Speed** or **Channel Temperature** which can range up to several hundred or a few thousand, and you want to use them as color or opacity. With such channels, you need to scale them down between 0-1, which would require you to set a very small Color Scale multiplier - 0.001 or even smaller.

Min – Sets the minimum value you want for the Grid Texture output.

Max – Sets the maximum value you want for the Grid Texture output.

Rescale to Current Frame – Rescales the Grid Channel based on the **Channel** values only for the current frame. If the **Channel** changes its range for other timeline frames, the Grid Texture will output values outside the **Min-Max** range or smaller than that range.

Rescale to Entire Sequence – Rescales the channel based on the lowest and highest values of the **Channel** in the entire cache sequence. This will make sure that the values output by the Grid Texture will not exceed **Max** or go below **Min** for any frame of the cache sequence.

Skip Displacement | *skipDispl* – When enabled, the content is sampled without adding Phoenix displacement.

Alpha is the Color's Intensity | *alphaIntens* – When enabled, the alpha for the texture will be based on the color's intensity. When disabled the alpha will be solid.