

version 1.3 for Unity 5

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Particle Shaders Volume 1 version 1.3 for Unity 5.2+

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Package contents

Particle Shaders Volume 1 consists three particle uber-shaders:

- Multi Light Lit
- Lit
- Unlit

All shaders are using custom uber-shader inspector similar to built-in Standard shader.

EM_Particles_Lit_Fallback is a special kind of shader file which is used only to generate shadow-casting pass for lit particles. It is hidden in material inspector so you won't accidentally use it. There are also three .cginc helper files:

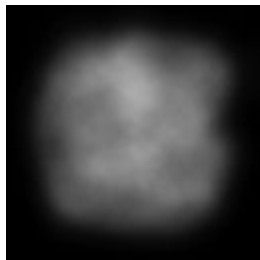
- EMParticleFunctions - contains shader functions for Lit and Unlit shader
- EMParticleLighting - contains lighting model for Lit shader
- EMParticleVariables - contains shader variables for Lit and Unlit shaders

Particle Shaders Volume 1 also contains six particle textures ready to use with your effects!



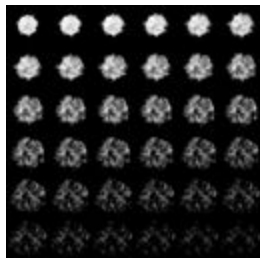
smoke_01

Works great with alpha erosion shaders.



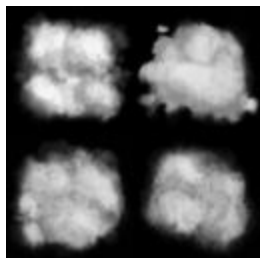
smoke_02

Looks best with Lit Alpha Blended shader. You should use it for very subtle and soft effects like dust rising from the ground.



smoke_03, smoke_03_clear, smoke_03_matted

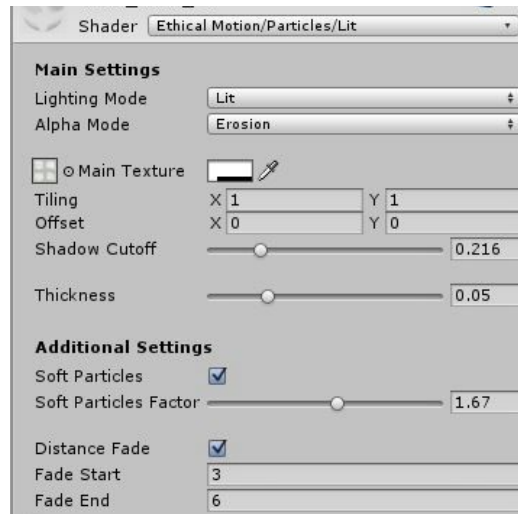
6x6 animated texture sheets which work nicely with all types of shaders. You may use them to create dust, extinguishers, smokes etc. Each version has slightly different appearance. Pick the one that suits your needs.



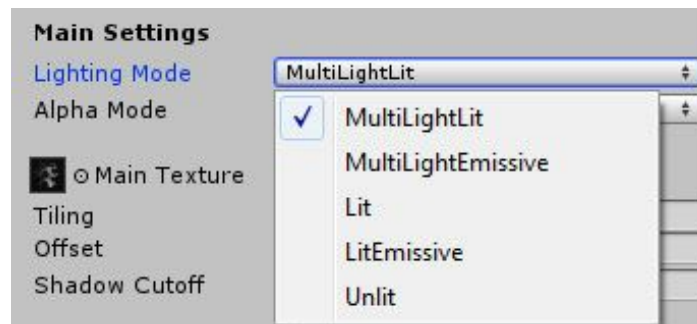
cloud_atlas_01

2x2 texture atlas designed to use with clouds. Cloud example included in the package is built with this atlas.

Features



Lighting Modes



Multi Light Lit

Multi Light Lit accepts all light types (directional, spot and point) and ambient light. Amount of maximum affecting lights is defined by [Pixel Light Count in Quality settings](#).

Multi Light Lit Emissive

Multi Light Lit accepts all light types (directional, spot and point) and ambient light. Amount of maximum affecting lights is defined by [Pixel Light Count in Quality settings](#). Emissive shaders have self-illuminating feature. It allows you to glow your particles in the dark. Imagine smoke coming out of a fireplace- you can add smoke illumination by using Lit Emissive shader.

Base (non-emissive) color is based on texture's color and **Tint Color** material property. Emissive color is driven by Shuriken color modules.

Color formula:

$$\text{texture_color} * \text{tint_color} + (\text{shuriken_color} * 2)$$

Lit

Same as Multi Light Lit but supports only the one strongest directional light and ambient light.

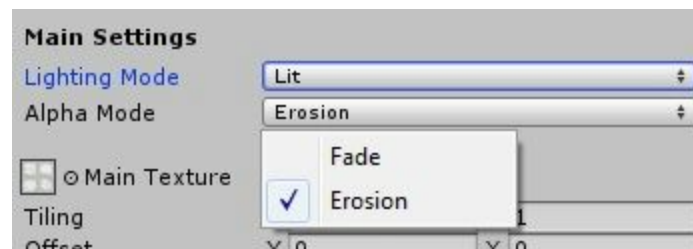
Lit Emissive

Same as Multi Light Emissive but supports only the one strongest directional light and ambient light.

Unlit

This Lighting Mode does not accept any light at all. It is the closest to built-in particle shaders but it offers additional functionalities such as Distance Fade, Soft Particles and alpha erosion. Compared to Lit and Lit Emissive, this is the only Lighting Mode which allows to pick blending type (Additive, Soft Additive, Alpha Blend).

Alpha Modes



Alpha Fade

Alpha is calculated based on material's alpha multiplied by Shuriken color modules. Alpha workflow is the same as with built-in shaders.

Alpha formula:

$$\text{texture_alpha} * \text{tint_color_alpha} * \text{shuriken_alpha}$$

Alpha Erosion

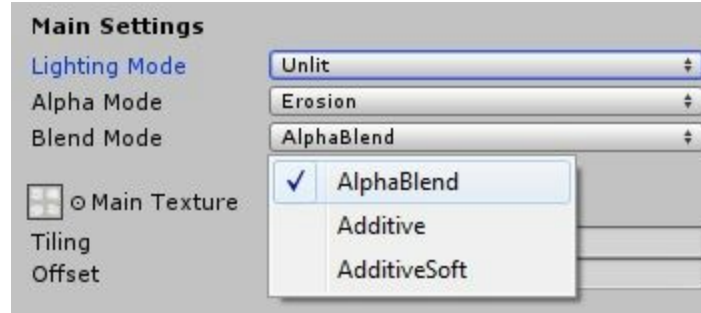
Alpha is calculated in a unique way - material's alpha is subtracted by Shuriken color modules. Particles appear to be "eaten away" rather than fading smoothly.

If you need to change the overall alpha simply reduce texture's alpha channel intensity or alpha value in material. Changing alpha value inside Shuriken will modulate erosion effect. Best results are achieved when texture's alpha has a lot of tonal diversity.

Alpha formula:

$\text{texture_alpha} * \text{tint_color_alpha} - \text{absolute}(1 - \text{shuriken_alpha})$

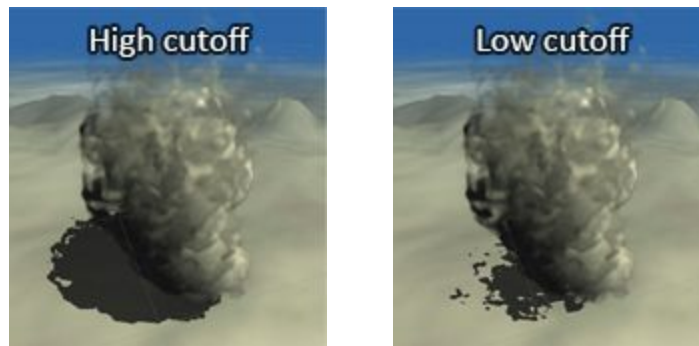
Blending Modes



Blending modes are available only for Unlit Lighting Mode. Please, take note that Additive and Additive Soft Blend Modes are not using alpha channel of the texture. Instead, texture's intensity is taken into account.

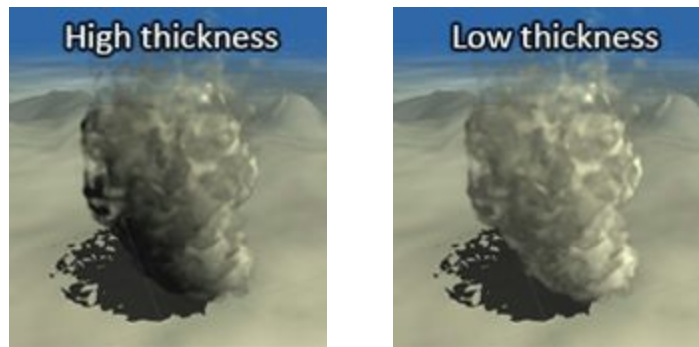
Shadow Cutoff

Determines how much the alpha channel of the particle is affecting its shadow.



Thickness Factor

Determines how strong self-shadowing is.



Soft Particles Factor

It samples scene depth and softens particles which intersect with geometry. Low factor results in soft edges. Please note that unlike built-in shaders, this package allows you to use Soft Particles in Forward Rendering path but that comes with extreme rendering cost. It is highly recommended to only use Soft Particles in Deferred Rendering Path. You can read more about rendering paths here: <http://docs.unity3d.com/Manual/RenderingPaths.html>

Distance Fade

This feature allows you to fade your particles according to their distance to the camera. There are two parameters to setup:

- Fade Start - the distance at which particles start to fade
- Fade End - the distance at which particles will be completely transparent

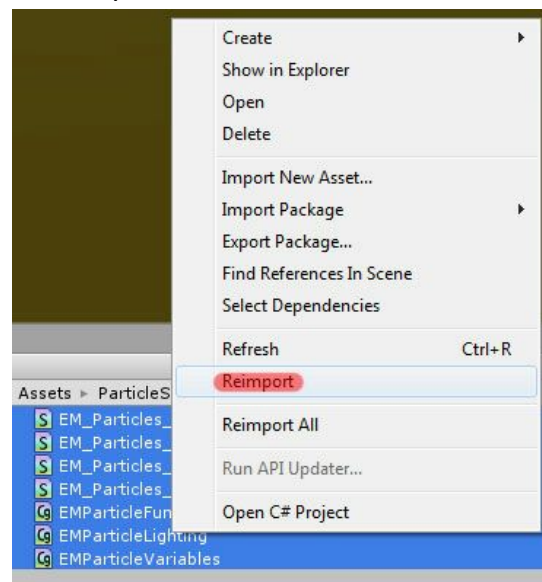
Distance is measured in Unity units

Consider Fade Start set to 10 and Fade End set to 1. Particles will start fading out when the camera will be 10 units away from particle and they will be completely gone at distance of 1. Negative values are allowed.

Setup & Upgrade notes

Upgrade guide

You may have to reimport shader files. In order to do this, select all provided shader files, right-click on them and select “reimport”.



Package files

You can delete “SampleSceneAssets” folder and it’s contents.

You cannot delete any of shader files from “Shader” directory. They can be moved but all need to be located inside the same folder.

You can leave EMMaterialInspector inside “Editor” folder or you can move it to your own “Editor” directory.

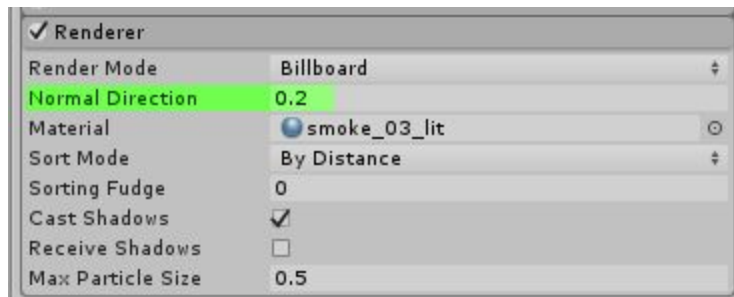
Lit Particles Setup

In order to properly use Lit particles you only need to do two things:

1. Create a material with proper shader
2. Define “Normal Direction” value in Shuriken

“Normal Direction” can be found in “Renderer” tab inside Shuriken Particle System.

By default, Shuriken’s particle normals are always facing the camera. “Normal Direction” changes the bending of the normals. Value of 0 creates spherical normals while value of 1 results in flat, camera-facing normals. Lit particles are generating self-shadowing based on the normal of the particle. Thus, adding more bend in them results in softer look. Suggested value lies between 0.1 to 0.2 .



In some cases you should consider enabling one of the Sort Modes. This way you will avoid graphical artifacts of particles popping in front of other particles while moving. This is especially important with Lit Particles because of varied lightness values.

Shadows

Lit Particle Shaders use Alpha channel of your texture to generate shadows. A Material which has texture without Alpha channel may not work correctly. You can reference supplied sample textures which are compatible with shadow-casting feature.

After assigning proper texture you simply check “Cast Shadows” in the “Renderer” tab. Self Shadowing works independently of “Cast Shadows” option.

Changelog

Version 1.3

- added multi-light support

Version 1.2

- dropped support for Unity versions older than 5.2
- done some slight optimizations (4 to 2 max instructions per vertex depending on the platform)
- half-lambert lighting is now properly implemented
- Thickness factor can now be set from 0 (blackest shadows) to 1 (no visible shadows at all)