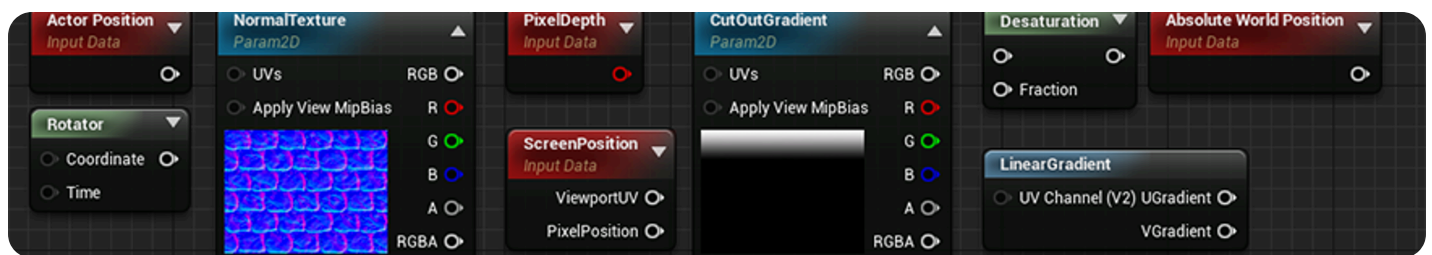


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/ Material Expressions Reference

Material Expressions Reference

Reference for all Material expressions available for use in the Material Editor.



This page is a reference index for all **Material expression** nodes available in the [Material Editor](#). Material Expressions are the building blocks for creating fully functional Materials in Unreal Engine.

Each Material expression is a self-contained black box that either outputs a set of one or more specific values, or performs a single operation on one or more inputs and then outputs the results of that operation.

Parameters

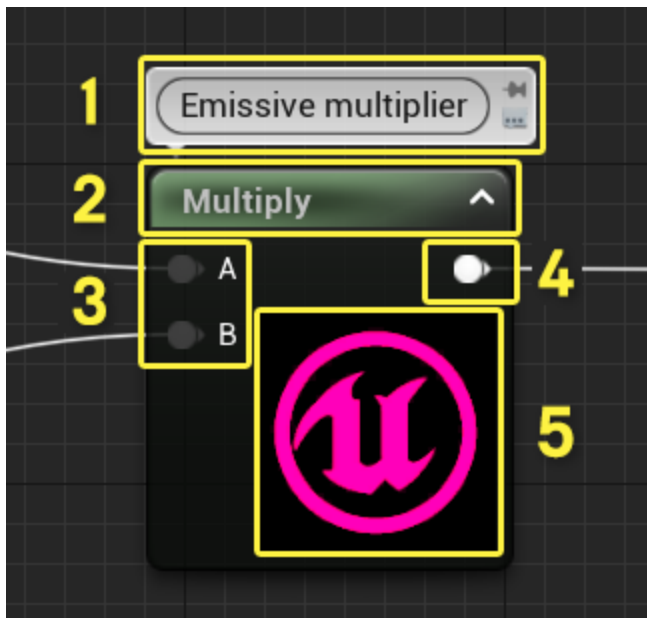
Certain Material expressions are parameters, meaning you can modify their values (dynamically during runtime in some cases) in a [Material Instance](#) of the base material containing the parameter.

You should assign all parameters a unique name using the **Parameter Name** details property. This name is used to identify each specific parameter when you edit an instance in the [Material Instance Editor](#).

If two parameters of the same type have the same name within a Material, they are treated as the same parameter. Changing the value of one parameter in the Material Instance would change the value of both parameter expressions in the Material. You can set a default value for your parameters in the Details Panel. This default value is used in the Material Instance unless it is overridden and modified there.

Material Expression Properties

All Material Expression nodes contain the same properties that provide different kinds of information. Below, we use a Texture Sample node to highlight these on properties.

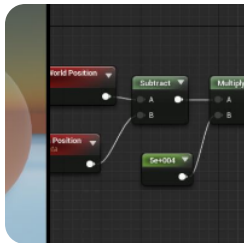


Number	Property Name	Description
1	Description	All materials expressions have a common Desc (Description) property, which is accessible from the Details Panel. Any text entered into this in this property displays in the Material Editor just above the expression in the workspace. It can be used for any purpose, but usually serves as a good way to leave short notes about the purpose or function of the expression.
2	Title bar	Displays the name and/or pertinent information about the the Material Expression.

Number	Property Name	Description
3	Inputs	Links to any values used by the Material Expression.
4	Outputs	Links that output the results of the Material Expression operation.
5	Preview	Displays a preview of the values that are output by the Material Expression. This updates automatically when realtime update is enabled and can be manually updated using the Spacebar.

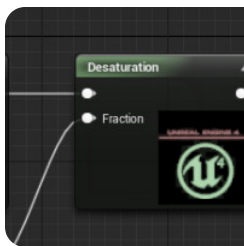
Material Expression Types

These reference pages are organized according to the categories in the Material Editor palette.



Atmosphere Material Expressions

Material Expressions that affect fog and other atmospheric level effects.



Color Material Expressions

Material expressions that perform actions on color inputs.



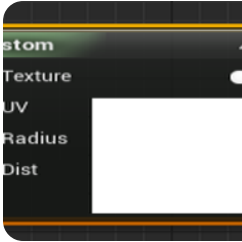
Constant Material Expressions

Material Expressions whose outputs generally do not change once set in the Editor or when play begins.



Coordinates Material Expressions

Expressions that perform actions on texture coordinates or output values that can be used as, or to modify, texture coordinates.



Custom Material Expressions

Material expressions that allow the use of custom, plain shader code.



Depth Material Expressions

Material expressions that deal with depth of the pixel being rendered.



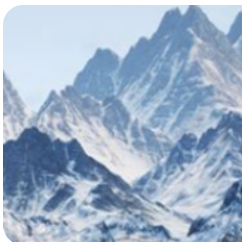
Font Material Expressions

Material Expressions that sample and output font assets.



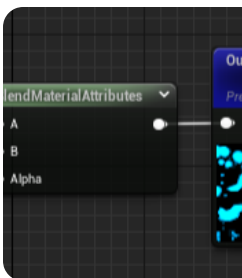
Material Function Expressions

Material expressions that are used to create or execute Materials Functions.



Landscape Material Expressions

Material expressions for creating Materials apply to Landscape terrains.



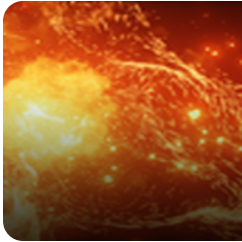
Material Attributes Expressions

These expression nodes serve as a way to separate or combine various Material attributes, which is particularly useful when creating Layered Materials.



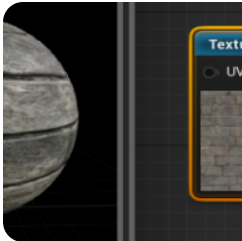
Material Parameter Expressions

Expressions that expose properties to Material Instances to be overridden in child instances or modified at runtime.



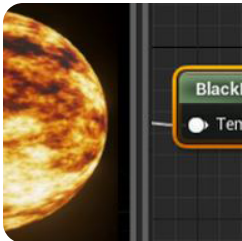
Particle Material Expressions

Expressions used for creating Materials for emitters in Particle Systems.



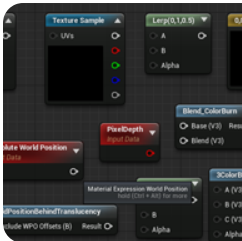
Texture Material Expressions

Expressions that sample and output textures.



Utility Material Expressions

Material expressions that perform various utility operations on one or more inputs.



Vector Material Expressions

Material expressions that output a vector value, such as a position or normal.



Vector Operation Material Expressions

Material Expressions that perform operations on vector input values.

Expression Index

This is a reference list of many, but not all, Material Expressions. All links shown here can also be accessed through the Expression Types pages listed above. Additionally, you can use

Ctrl+F to find the expression node you need and follow the link to its description.

Atmosphere

- [AtmosphericFogColor](#)

Color

- [Desaturation](#)

Constants

- [Constant](#)
- [Constant2Vector](#)
- [Constant3Vector](#)
- [Constant4Vector](#)
- [DistanceCullFade](#)
- [PerInstanceFadeAmount](#)
- [PerInstanceRandom](#)
- [Time](#)
- [TwoSidedSign](#)
- [VertexColor](#)

Coordinates

- [ActorPositionWS](#)
- [CameraPositionWS](#)
- [LightmapUVs](#)
- [ObjectOrientation](#)
- [ObjectPositionWS](#)
- [ObjectRadius](#)
- [Panner](#)
- [ParticlePositionWS](#)
- [PixelNormalWS](#)
- [Rotator](#)
- [SceneTexelSize](#)
- [ScreenPosition](#)
- [TextureCoordinate](#)
- [VertexNormalWS](#)

- [ViewSize](#)
- [WorldPosition](#)

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- [FontSampleParameter](#)

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- [MaterialFunctionCall](#)
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- [TextureObject](#)

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- [MakeMaterialAttributes](#)

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- [ComponentMask](#)
- [Cosine](#)
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- [Divide](#)
- [DotProduct](#)
- [Floor](#)
- [Fmod](#)
- [Frac](#)
- [If](#)
- [LinearInterpolate](#)
- [Multiply](#)
- [Normalize](#)
- [OneMinus](#)
- [Power](#)
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- [SquareRoot](#)
- [Subtract](#)

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- [TextureSampleParameterSubUV](#)
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- [TextureSampleParameterMovie](#)

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- [ParticleMacroUV](#)
- [ParticleMotionBlurFade](#)
- [ParticlePositionWS](#)
- [ParticleRadius](#)
- [ParticleRelativeTime](#)
- [ParticleSize](#)
- [ParticleSpeed](#)
- [SphericalParticleOpacity](#)
- [ParticleSubUV](#)
- [TextureSampleParameterSubUV](#)

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- [LandscapeLayerCoords](#)
- [LandscapeLayerSwitch](#)

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- [Desaturation](#)
- [Distance](#)

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- [LightmassReplace](#)
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- [Noise](#)
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- [RotateAboutAxis](#)
- [SphereMask](#) *[Thin Translucent](#)
- [AntialiasedTextureMask](#)

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- [ObjectPositionWS](#)
- [ParticlePositionWS](#)
- [PixelNormalWS](#)
- [ReflectionVectorWS](#)

- [VertexNormalWS](#)