MDK: Elemental

QuadSpinner Material Development Kit 2.0

User Manual

Contents

Installation & Usage

Installing MDK: Elemental is simple. Close Vue if it is running. Extract the contents of the ZIP file containing the MDK to a new folder (e.g. "MDK Elemental") inside your Vue materials folder. Start Vue and you will see this folder along with the materials in the Material Library browser.

Advanced users who wish to utilize the MetaNodes in their own materials can save the MetaNode from the material.

WARNING
These materials, functions, and MetaNodes are for personal and commercial use by the end-user only. You may not distribute them as part of your own products – free or commercial.

Published Tab vs. Function Editor

The most commonly used features of the MetaNodes are exposed in the Published tab of the Advanced Material Editor. This removes the need to go to the Function Editor to change common settings. Advanced users can access the remaining functions inside the Function Editor through the MetaNode interface.

Users have complete control over which properties they may want to publish or remove in the Published tab. Simply click the angled arrow button () for options. If a parameter is being extracted to be connected to another node, the Extract Parameter button will remain unavailable while the property is published.

In the screenshots presented in this manual, an orange Publish Parameter button denotes that the property is exposed in the Published tab.

WARNING
An existing bug in Vue 10.x and higher, which is unresolved as of this writing, may cause the Published tab to be inoperable or may cause settings to not save. If you experience this, it is highly recommended you change settings inside the Function Editor.

Common Properties

MDK: Elemental components have common features that provide access to the global features of the MDK. Their function remains uniform regardless of the material it is being applied to, unless specified otherwise in that specific material's section.

Several features in MDK: Elemental have been refined into checkbox based options, as opposed to complex sliders. You can simply toggle the feature and the internal logic of the MetaNode will recalculate all interlocked settings to apply your preference.

Global Scale

With standard materials, or even with MDK 1.0, each MetaNode exposes several different scales for the different fractals contained inside. MDK: Elemental removes this redundancy by implementing Global Scale logic inside the MetaNode.

The Global Scale property directly interprets the required scale change for all the sub-fractals, instead of the user manually entering each one.

The main advantage of Global Scale is that it will restructure scale internally for specific components, so the increasing (or decreasing) scale will alter the shape of the fractals to accommodate the appropriate features for that size instead of simply 'zooming' in and out of a fractal map. For example, increasing the Global Scale of a RockMatrix component makes the major rock structures larger but also adds smaller rock shapes between those structures as would be natural in the real world.

Global Scale is a multiplier, just like Vue's Material Scale. When you change the value from 1.00 to 2.00, you are multiplying the scale. When you want to decrease the scale, it becomes a division. 0.5 will produce half the size of 1.00. In most situations, small changes are recommended over large ones as multiplication can cause drastic scale changes.

HyperAmbience & Global Radiosity Simulation

These new features allow you to modify the radiance of the material without altering your lighting and atmospheric settings. They can be further augmented by changing the Color Correction value of the overall material.

HyperAmbience lowers the contrast of the material and makes the shadowed area appear brighter in certain places. It automatically limits the darkest parts from becoming too bright so the material does not look flat. This feature affects only the shadowed areas.

Global Radiosity Simulation – usually presented as 'Brighten Material (Global Radiosity Simulation)' – allows you to increase the overall brightness and gain of the material similar to a Global Radiosity Gain increase. Unlike HyperAmbience, this feature will affect the directly lit portions as well as the shadowed areas of the material.

Examples where these features are useful are cave interiors and canyon crevices where the majority of light may be reflected or indirect, as opposed to direct. Instead of increasing the Sunlight, altering the atmosphere, or adding additional lights, turning on HyperAmbience and Global Radiosity Simulation may help you achieve the luminance required.

For added control, you may wish to utilize the Luminosity slider and/or the Color Correction in conjunction with these settings to better fit your scene's lighting conditions.

Shiny & Wet

As the names suggest, the Shiny and Wet features enable you to make the material look shiny and/or wet. The Shiny property does not make the object metallic; it just increases the shine/specularity to the degree appropriate to maintain the realism of the specific material. The Wet property makes the specular shine sharper to illustrate a wet surface.

While Shiny is not required to be on for Wet, it can enhance the effect depending on your scene's lighting conditions.

Disperse Shine Horizontally (Anisotropy)

Real surfaces of rock, bark, snow, and other natural materials have some amount of anisotropy. MDK: Elemental's logic system incorporates that material-specific Anisotropy inside every MetaNode. You can switch it on through the 'Disperse Shine Horizontally' checkbox.

If your material is on an object far away from the camera, or does not require anisotropy for any reason, you can turn it off to save a little bit of render overhead.

Transformations

All MDK: Elemental MetaNodes have at least one Transformation option. The Transformation editor allows you to change the Rotation and Twist of the entire material (commonly displayed as 'Root', in the MetaNodes) or a specific fractal generator.

Upon clicking the Edit button, you will be shown the Transformation Editor. You can alter the rotation on one or more axes, as well as twist/skew them across any two axes with this editor.

The most common usage of the Transformation is to rotate the shapes and texture of the material to match a specific angle of your terrain, HyperTerrain, or other object.

Altering the Transformation of a specific fractal generator can help you create different shapes because the processing of the fractals that create the unique material is carried out after the transformation.

Color, Color Maps, Hue/Luminosity/Saturation, Blending Colors

Every MetaNode contains at least one Color (constant) or Color Map (gradient), as well as color modification tools.

The Color or Color Map applies to the entire material. If there are multiple fractal color components, such as the three common gradients in the RockMatrix components, you will be able to modify each color map independently. The mixing method of such components will also be exposed for fine tuning. See the specific component's documentation for details.

Often, a material is dependent on texture more than color. In such situations, you will find a Color constant control (single color, instead of a gradient). This helps simplify the color selection process and increase render speed at the same time. This is very useful for layered materials.

For users who prefer to keep the general color patterning, but want to alter the actual coloration, the Hue/Luminosity/Saturation sliders allow direct modification of the completed color production by changing the output in this familiar fashion.

In addition, the Blending Color and Blending Color Ratio controls allow you to blend a single color on top of the completed color production for added control.

The SnowFall component is the only component that does not have Color production exposed. Snow is usually just a single color. If you wish to alter the color of GroundFrost, you may do so directly through the Advanced Material Editor's Color Correction color. You can also add your own Color production using the Bump output of the node and connecting it to your own Color Map.

Combination Style

Several MetaNodes have multiple color maps which are blended using a predefined combination style. If you change the Combination Style of a MetaNode, you may need to alter the color maps – or vice versa.

For details on blend modes, see http://en.wikipedia.org/wiki/Blend_modes#Multiply

For negative styles such as Multiply and Subtract, colors have the opposite/inverse effect on the combination output. Experiment to see how they'll work best for you, or switch to the Blend combination style (although that may cause the material to lose some quality).

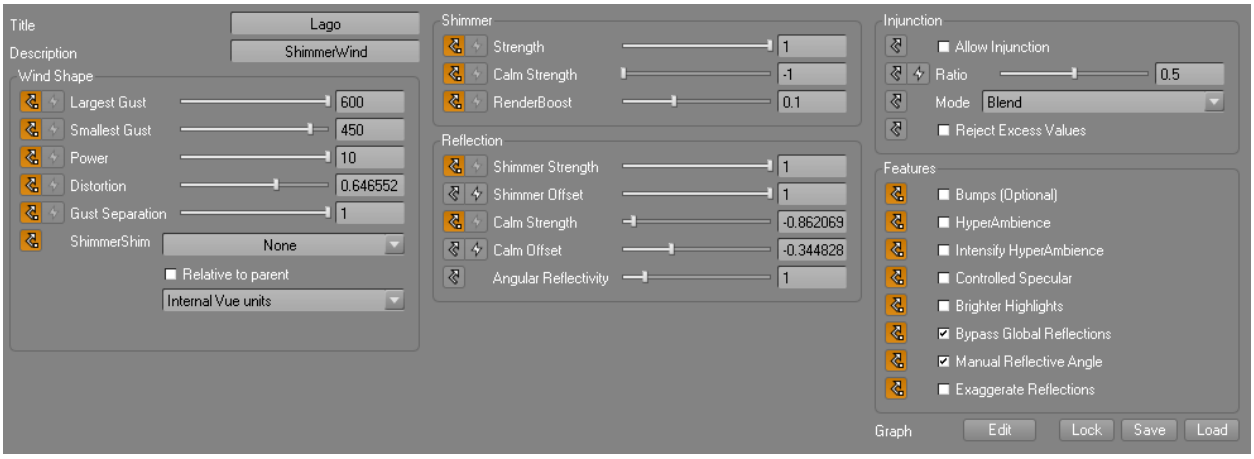
Injunction Ports

The Injunction process allows advanced users to introduce their own fractals and logic into the MDK: Elemental MetaNodes. These injunctions can be blended with the existing fractal production logic, or they can completely override them as needed. Some components will present multiple injunctions.

See the Injunction section for details.

ShimmerWind

All ShimmerWind Materials



Wind Shape

Largest Gust / Smallest Gust
These properties control the largest and smallest gusts of winds that will be created over the water surface. Smaller gusts will group themselves whenever possible and contribute to creating larger gusts. The size of the smallest gust will be randomized to within 100 units (meters by default in Vue) of the size specified. The largest gust size is the highest limit; larger shapes will not be created by groups of smaller gusts.

Power
This property controls the intensity with which the wind will interact with the water surface. Lower values create light perturbations, while higher values create stronger perturbations.

Distortion
This property controls internal collisions in the wind causing it to swirl and create curves in the wind-water interactions.

Gust Separation
This property controls how much space, in generic units, is created between different gusts of wind. This will still allow smaller gusts to coalesce into larger gusts, but it will encourage higher or lower spacing between such gusts.

ShimmerShim
The ShimmerShim is an object, any object, in the Vue scene that provides location data to ShimmerWind. This allows you to easily change the ShimmerWind surface by moving the object in the viewport. You can also animate the material using the object.

While Vue automatically exposes the Relative to Parent and Unit Selection, those should not be changed unless you have experience with those settings. By default, ShimmerWind requires them to be kept at the same values.

A video tutorial on how to use ShimmerShim can be found on our YouTube channel.

Shimmer

Strength
This property controls the strength of surface perturbations in the wind-water interactions. Specifically, this property controls the strength of the area receiving gusts of wind.

Calm Strength
This property controls the strength of surface perturbations in the calm area of the water where wind is not interacting with the water. If the calm areas of your water look too clean compared to the strong gusts, or if you are simulating stronger water currents, a higher value for this property can help create a more realistic water surface.

RenderBoost
This property is the classic QuadSpinner render speed enhancement. You can fine tune render speed by choosing the ratio between quality and speed. Low values yield more detail and render slowly, while high values exclude small details and render faster.

The default value should suffice for most still renders. For animations, values between 0.5 and 1.0 can be helpful in speeding up the render.

Reflection

Shimmer Strength
This property controls the strength of the reflections on the shimmering portion of the water where the wind interacts with the water.

Shimmer Offset
This property controls a randomization offset for the shimmer reflections. The offset allows you to distort the reflection area to make it look more natural instead of precisely stenciled.

Calm Strength
This property is exactly like the Shimmer Strength property above, but is restricted to the calm portions of the water as defined in the Shimmer control group above.

Calm Offset
Like the Shimmer Offset property, this property allows you to offset the reflections on the calm portion of the water.

Angular Reflectivity
This property controls how reflective the water is when looking from an angled point of view. It works similarly to the Turn Reflective on Angle property of a standard Vue material, but is

propagated through ShimmerWind's control logic to account for shimmers and distance correction.

This property is ignored if the Manual Reflective Angle option in Features is not checked.

Features

Bumps (Optional)

This feature allows you to add superficial bump to the water surface. This is mostly useful for flat (non-displaced) water surfaces, or very calm displaced surfaces. The bump amount can be controlled through the normal Bump Depth value in the Advanced Material Editor.

HyperAmbience + Intensify HyperAmbience

HyperAmbience in ShimmerWind works exactly as described in the Common Properties section of this manual. However, an added bonus is that HyperAmbience is routed through the ShimmerWind logic for location sensitive ambience that will react differently in the far portion of the water surface. The resulting look is something comparable to low f-stop, long exposure on a camera.

Intensify HyperAmbience allows you to double the intensity without unnecessary brightness.

Controlled Specular

This feature adds restrictions to the specular calculations and confines the shine/specular glints on the water surface to a smaller portion. By default, with this option unchecked, specular glints are distributed evenly throughout the surface.

This feature applies to displaced water surfaces only.

Brighter Highlights

This feature intensifies the glints on the water surface.

Bypass Global Reflections

This feature allows you to disable uniform (global) reflections and pass the reflection processing through ShimmerWind's location sensitive logic.

Manual Reflective Angle

This feature allows you to bypass the processed reflective angle, and use a manual value as described above in Angular Reflectivity.

Exaggerate Reflections

This feature allows you to intensify reflections for a dramatic look. The exaggerated values may not always create a realistic reflection and should be used with care. This feature is most helpful in dark areas such as alcoves and caves.

Using ShimmerShim

To use ShimmerShim, follow these simple steps:

1. Create a basic primitive object, such as a sphere.
2. Hide the object from render.
3. Place it at 0, 0, 0 coordinates in the scene. (Optional)
4. Go to the ShimmerWind material and open the selection dropdown for ShimmerShim.
5. Select Sphere > Position. Click ok.
6. You can now drag the sphere to change the position of the Shimmer.

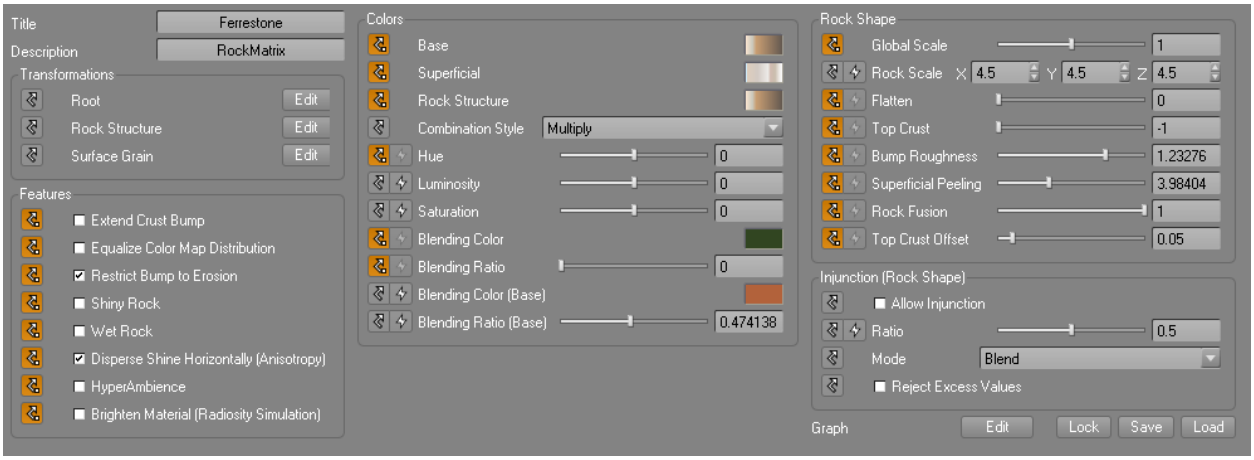
A video walkthrough of this process, as well as a tutorial on animating ShimmerWind using ShimmerShim can be found at http://www.quadspinner.com/MDK, our Facebook page, and on our YouTube channel.

WARNING

Due to a bug in Vue 10 and higher, you may experience problems selecting an object for ShimmerShim where the selection is reset when you exit the Advanced Material Editor. The workaround to this issue is to enter the Function Editor and make the selection in the MetaNode directly. This issue may be fixed in a future version of Vue.

RockMatrix

Ferrestone



Features

Extend Crust Bump

By default, the bump of the material is restricted to the upper crust. This feature enables you to extend the crust bump to cover a broader range of the material, including the cracks.

Equalize Color Map Distribution

This feature enables you to equalize the distribution of the primary color map (Base) across the complete fractal range (-1 to +1), instead of the bias set in the material by default. For ease of use while making your own color maps, you may wish to toggle this feature frequently to get the best color distribution.

Colors

Base

This color maps serves as the primary layer of coloration for the entire material. The default color map assigned to Base is the same as Rock Structure.

Superficial

This color map provides the superficial grain coloration for the entire material. Usually, this color map should have multiple color keypoints for best effect.

Rock Structure

This color map provides the coloration for the rock structure of the material. By default, it is the same color map as Base. Both maps are combined using the “Multiply” blend mode to create a darker, richer color. Offsetting either map can produce interesting effects.

Rock Shape

Rock Scale

This property allows you to edit the rock structure across all three axes, giving you broader control than the simple Global Scale property.

You can stretch the shape across any given axis by assigning it a larger value than the other two axes. Conversely, you can compress the shape by making the same axis value smaller than the other axes.

Flatten

This property allows you to flatten the extended crust. This can very useful if the top part of the crust protrudes too much – especially with displacement.

Top Crust

This is a secondary crusting layer that is disabled by default, but any values beyond -1 will start exposing it. The top crust coloration is controlled using the Superficial Color Map.

Bump Roughness

This property controls the additional roughness of the bump output.

Superficial Peeling

This is a minor effect control that decides how much superficial crust peeling should occur. It will help with close-up shots, but may not be useful for long-range perspectives.

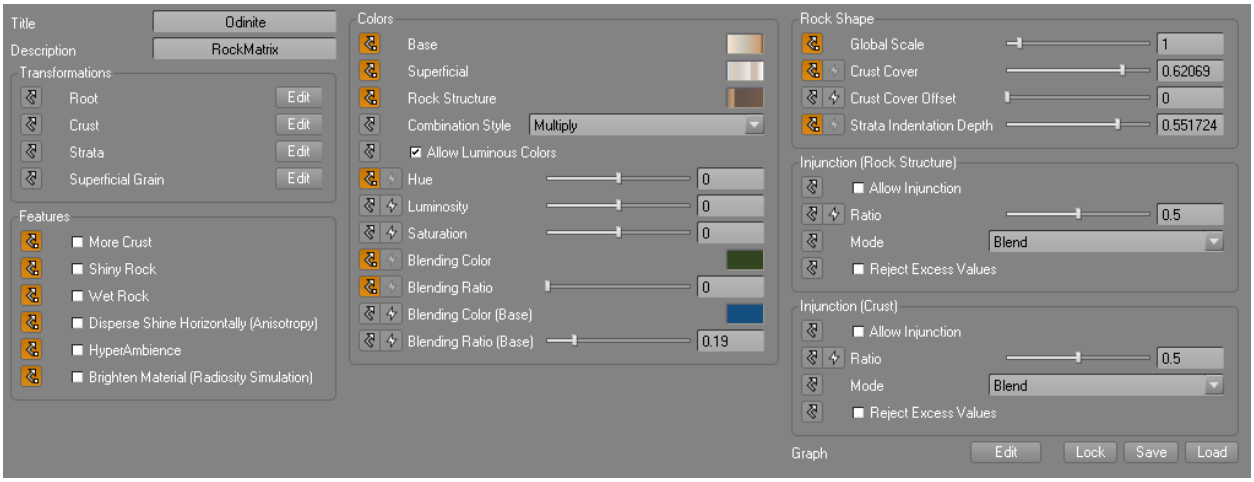
Rock Fusion

This property controls thermal erosion - how strongly the larger rock chunks in the material are fused together.

Top Crust Offset

This property allows you to control the edge spread of the Top Crust. It is very useful when you need minute adjustments to the top crust. For such tweaks, it is preferable to use the Offset rather than merely increase the Top Crust amount.

Odinite



Features

More Crust

This property extends the crust across the entire surface. The default ratio of crust vs. exposed rock is changed by about 40%. You can get further control over this distribution through the Rock Shape controls

Rock Shape

Crust Cover

This property controls how much crusting occurs on the rock surface. This is an inverted property due to the complex structure of the material internals. Negative values incur more crusting, while positive values incur less crusting.

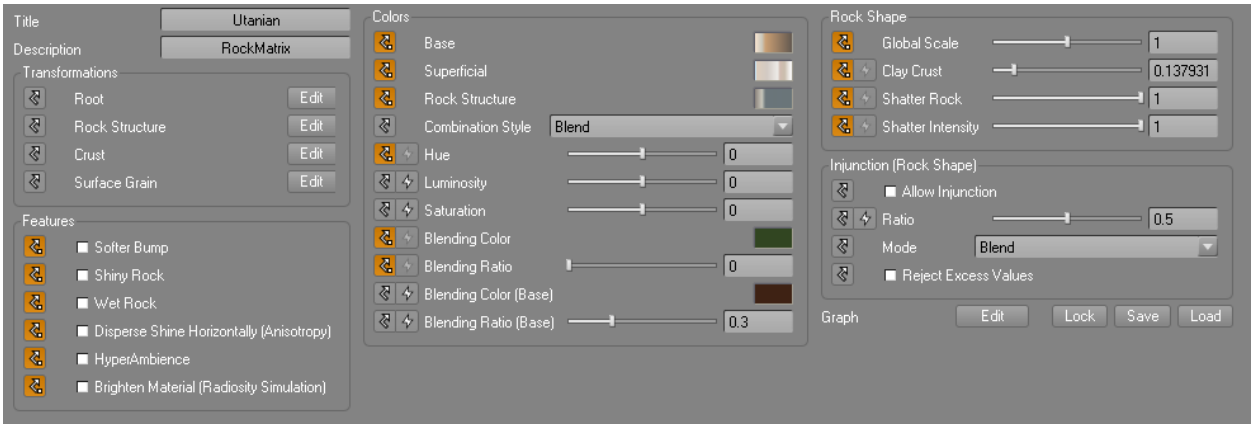
Crust Cover Offset

This property allows you to shift and offset the crust cover. It can be useful to tweak the shapes on the superficial crust layer, as well as generate randomness when multiple objects are using the same material.

Strata Indentation Depth

Odinite creates stratified indentation (horizontal lines) in the crust. The depth of these indentations are controlled by this property.

Utanian



Features

Softer Bump

This property allows you to make the intense bump on the surface become milder. This can be helpful for distant objects that may cause flickering in animations or grain in still renders.

Rock Shape

Clay Crust

This property controls how much clay accumulation occurs on the crust level. This is an inverted property due to the complex structure of the material internals. Negative values incur more crusting, while positive values incur less crusting.

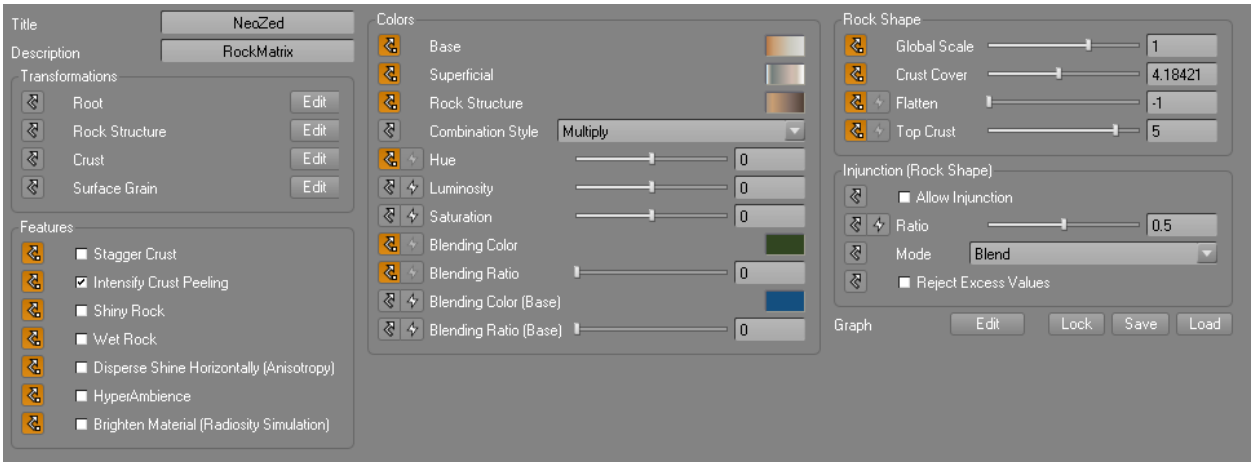
Shatter Rock

This property "shatters" the clay crust and exposes the darker material underneath. This is also an inverted property.

Shatter Intensity

This property controls the detailing that occurs from the "shattering" process. Adjust as needed for your desired level of detail. It may not be necessary for distant objects, and can be removed for faster rendering.

NeoZed



Features

Stagger Crust

NeoZed has two algorithms for distributing the crust. When this option is enabled, both algorithms are set perpendicularly to stagger the distribution.

Intensify Crust Peeling

This option is set by default. It intensifies the superficial peeling that occurs on the top crust.

Rock Shape

Crust Cover

This property controls the ratio between crust and exposed rock. Higher values increase crusting, while lower values expose more rock.

Flatten

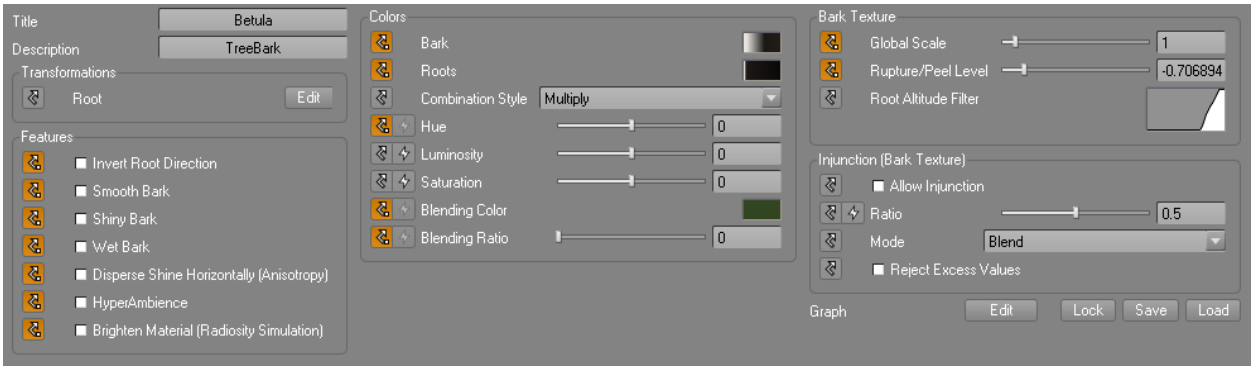
This property flattens all aspects of the protruding rock and crust. It creates a smoother surface with decreased roughness.

Top Crust

This property controls the superficial crusting on the outer most layer.

TreeBark

Betula



Features

Invert Root Direction
This option is mainly for SolidGrowth and EcoSystem usage where the root material is applied to the top of the tree. Enabling this option will fix the orientation.

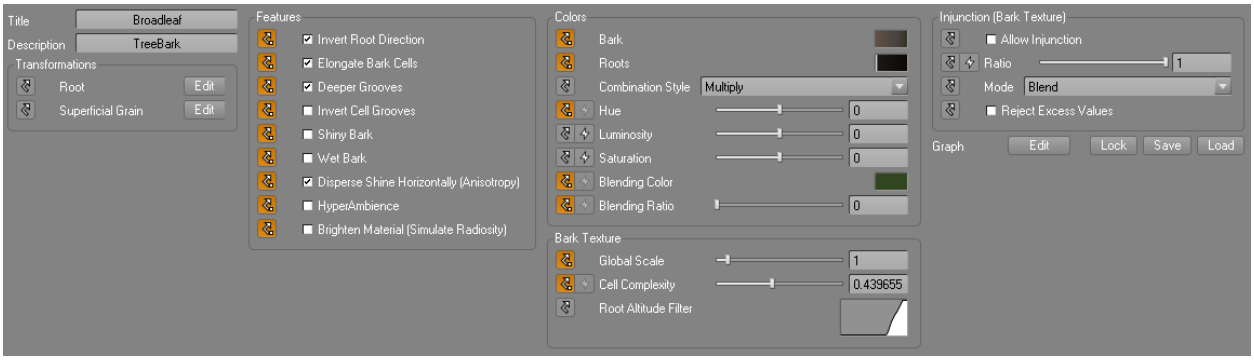
Smooth Bark
This option causes the bark to become smoother by decreasing the roughness.

Bark Texture

Rupture/Peel Level
This property controls the amount of peeling and rupturing (when peeling becomes very intense) - common on Birch trees. Excessive values may cause unnecessarily dark patches on the trunk.

Root Altitude Filter
This filter controls how the root material is applied to the tree. The default will work in most cases, but you can experiment for varied results.

Broadleaf



Features

Invert Root Direction

This option is mainly for SolidGrowth and EcoSystem usage where the root material is applied to the top of the tree. Enabling this option will fix the orientation.

Elongate Bark Cells

This option stretches the bark cells vertically in a harmonious way so that it does not look stretched. The result mimics the elongation of actual tree bark in a variety of species.

Deeper Grooves

This option deepens the grooves between bark cells.

Invert Cell Grooves

This option inverts the grooves between bark cells.

Bark Texture

Cell Complexity

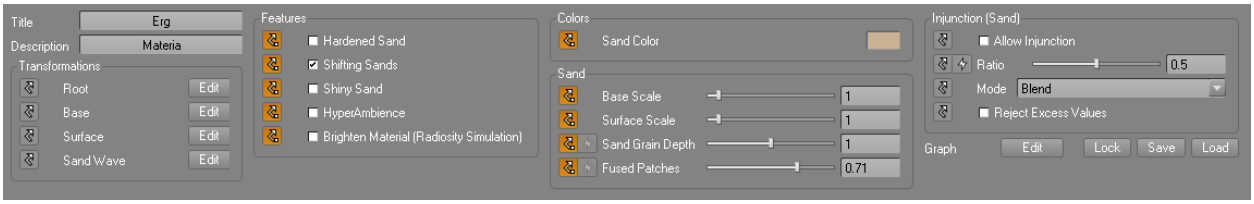
This property controls how complex the cell division of the bark can be across the tree trunk. Excessive values may cause flickering in animations and grain in still images. They may also slow down Texture Filtering.

Root Altitude Filter

This filter controls how the root material is applied to the tree. The default will work in most cases, but you can experiment for varied results.

Materia

Erg



Features

Hardened Sand
This option changes the sand to look as if it has undergone moisture compression and hardening from diverse weather. This is recommended for scenes where the sand does not move much over time – such as inside caves or ruins.

Shifting Sands
This option enables moderate shifting in the sand surface.

Shiny Sand
This option enables surface sensitive shine.

Sand

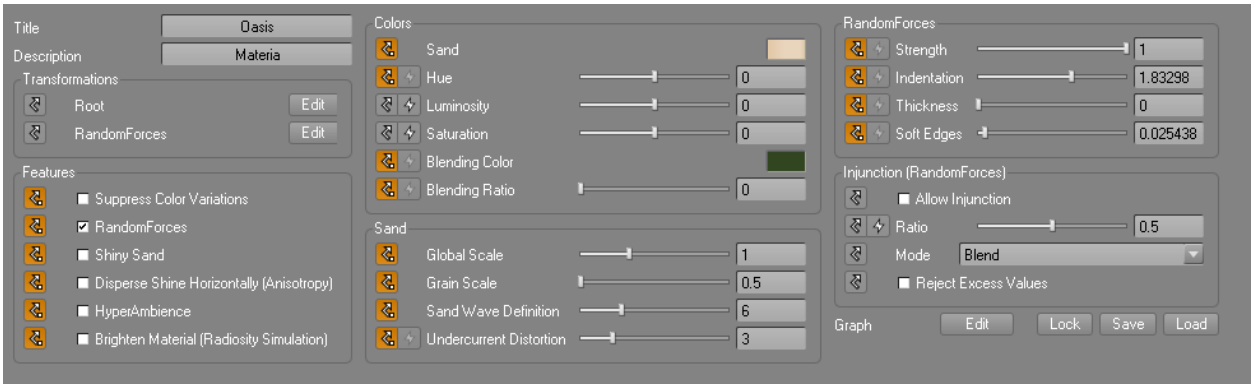
Base Scale
This property controls the scale of the grain distribution for the overall sand.

Surface Scale
This property controls the superficial hardening and the scale of the hardened surface.

Sand Grain Depth
This property controls the coarseness and depth of the sand accumulation.

Fused Patches
This property controls how strongly the patches of hardened sand will be fused together when they are close proximity.

Oasis



Features

Suppress Color Variations
This option disables the built-in large scale color variations on the sand surface.

RandomForces
This option enables the RandomForces group of controls and their inherent effects. RandomForces are variable wind and weather related changes on the sand surface that create minute, subtle turbulence.

Shiny Sand
This option enables the sand to have a moderately shiny appearance.

Sand

Grain Scale
This property controls the scale of the basic grains of sand that make the surface.

Sand Wave Direction
This property controls the direction in which the sand dunes move.

Undercurrent Distortion
This property controls how much distortion the underlying layer of sand must go through before it is rendered.

RandomForces

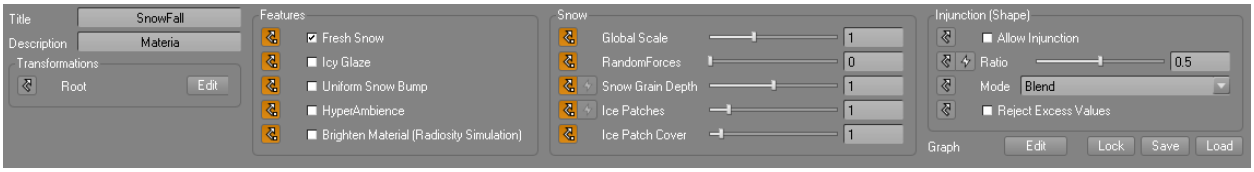
Strength
This property controls how strongly the RandomForces are implemented on the surface.

Indentation
This property controls the indentations made in the sand through RandomForces.

Thickness
This property controls how thick the RandomForces turbulence lines are in the sand surface.

Soft Edges
This property controls the softening of the edges of the RandomForces turbulence.

SnowFall



Features

Fresh Snow
This option simulates freshly fallen snow. Unchecking this option makes the snow slightly hardened and fused to simulate old snow.

Icy Glaze
This option enables an icy glaze on the top most part of the material, with shine and anisotropy to match.

Uniform Snow Bump
This option disables the random snow distribution and enables a more uniform bump on the snow. This can be useful for idyllic scenes.

Snow

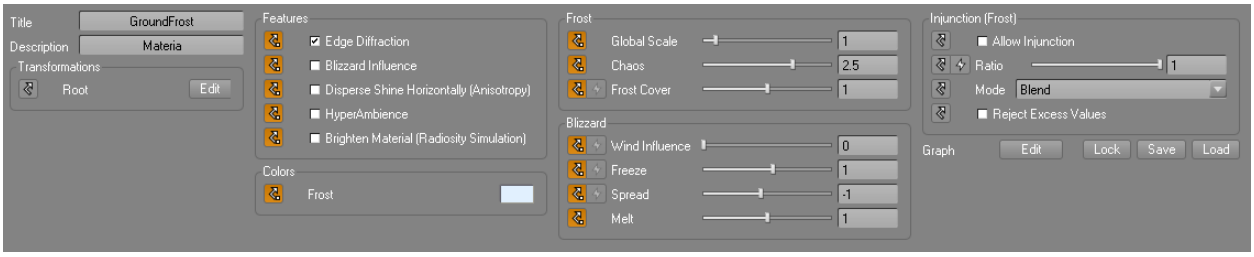
RandomForces
This property enables a built-in RandomForces turbulence much like the Oasis material. All sub-properties are configured automatically based on the strength set in this property.

Snow Grain Depth
This property controls the grainy depth exposed by the snow surface.

Ice Patches
This property controls the strength of icy patches on the snow surface.

Ice Patch Cover
This property controls the coverage of the icy patches.

GroundFrost



Features

Edge Diffraction
This option enables the frost to diffract light in a minute, subtle way near the object edges.

Blizzard Influence
This option enables non-uniform distribution as may happen during a blizzard as opposed to calmer weather.

Frost

Chaos
This property controls how chaotic the frost generation and distribution should be.

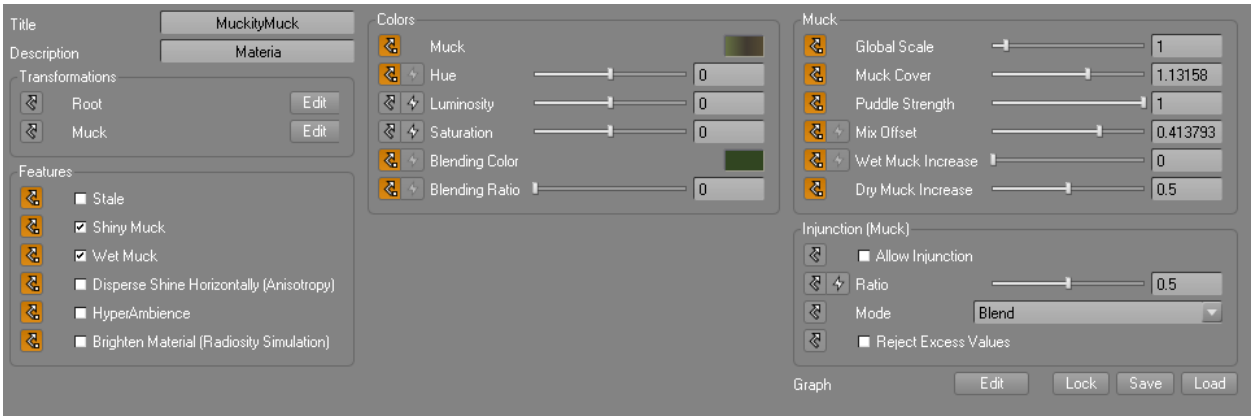
Frost Cover
This property controls the coverage of the frost layer on the object.

Blizzard

Wind Influence
This property controls how strong the wind would be during the blizzard to create the appropriate shapes and coverage on the material.

Freeze / Spread / Melt
These properties control the freezing, spreading, and melting of the frost layer. You can use them to fine tune the distribution of the frost layer.

MuckityMuck



Features

Stale

This option enables a stale, moldy look on the muck layer. Very useful for marshes, swamps, and other places with intense moisture.

Muck

Muck Cover

This property controls how much coverage the muck should have on the surface.

Puddle Strength

This property controls how puddles should form on the muck layer.

Mix Offset

This property controls the offset in the mixing process between dry and wet muck.

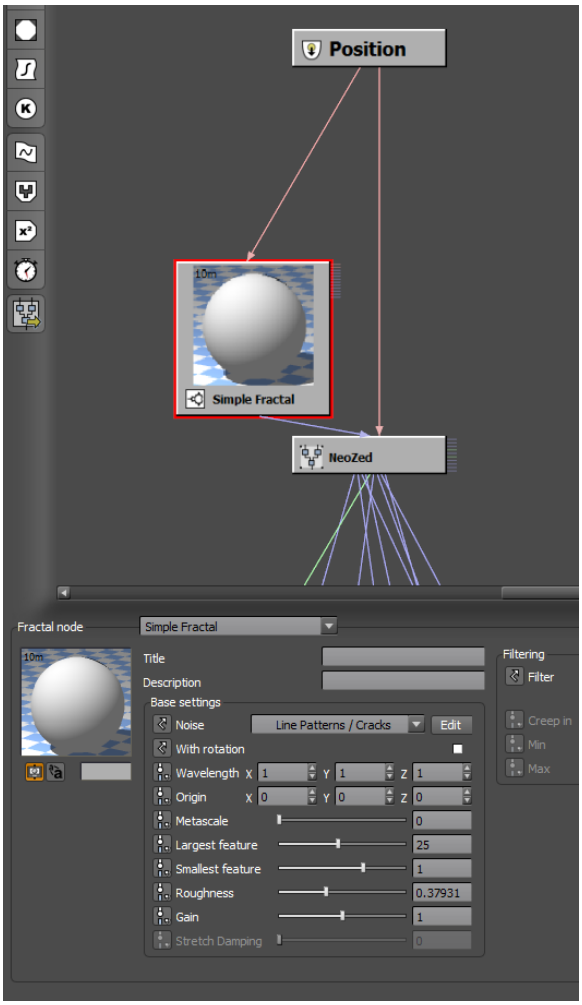
Wet Muck / Dry Muck Increase

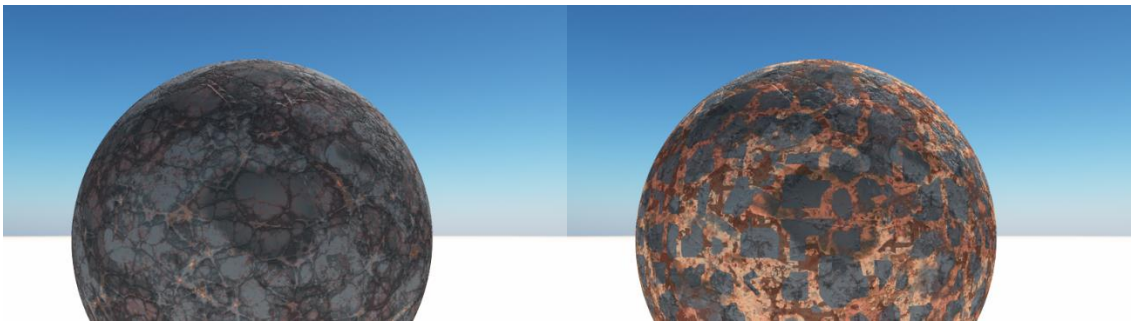
These properties allow fine control over the mixing process between dry and wet muck.

Injunction

To apply your own functions to the material creation process, you can enable Injunction and infuse the logic into the MetaNode using the Injunction port. Certain materials may have more than one such Injunction Ports.

In the example below, a Simple Fractal › Cracks is used to apply new shapes to NeoZed.

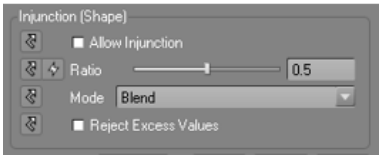




Without Injunction

With Injunction

The Injunction Properties



Allow Injunction
This option enables Injunction, and can be conveniently turned off when not needed.

Ratio
This property controls the ratio between the original shape and the Injunction.

Combination Mode
This property defines the Blend Mode through which the combination is processed.

Reject Excess Values
This option filters out excessive values that may create problems in rendering the material correctly. This is useful when your Injunction uses intense bump or displacement values.

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