



## 26.9.7 Editors - Properties Editor - Modifiers Properties Tab - Grease Pencil - Generate Modifiers

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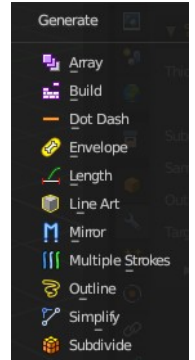
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## Grease Pencil - Generate modifiers

Some of the modifiers are just available for specific object types.

Left grease pencil object, right a mesh object.



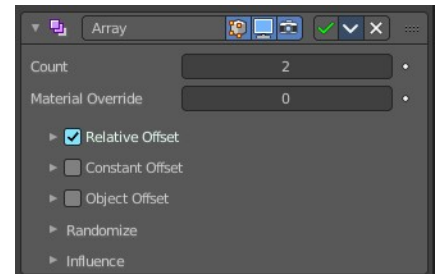
### Array

The Array modifier creates an array of copies of the base object. Each copy can offset from the previous one in any of a number of possible ways. Vertices in adjacent copies can be merged if they are nearby, allowing smooth Subdivision Surface frameworks to be generated.

This modifier can be useful when combined with tillable meshes for quickly developing large scenes. It is also useful for creating complex repetitive shapes.

Multiple Array modifiers may be active for an object at the same time. This allows to create complex three-dimensional constructs.

Hint for Offset Calculation. The transformation applied from one copy to the next is calculated as the sum of the three different components (Relative, Constant and Object), each of which can be enabled/disabled independently of the others. This allows, for example, a relative offset of (1.0, 0.0, 0.0) and a constant offset of (0.1, 0.0, 0.0), giving an array of objects neatly spaced along the X axis with a constant 0.1 unit between them, whatever the original object's size.



### Count

Number of Items

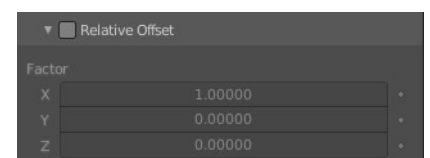
### Material Override

Index of the material used for generated strokes. A value of 0 uses the original material.

### Relative Offset subpanel

#### **Factor X/Y/Z**

Adds a translation equal to the object's bounding box size along each axis to



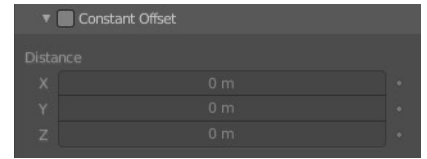


the offset, multiplied by a scaling factor. X, Y and Z scaling factors can be specified.

## Constant Offset subpanel

### *Distance X/Y/Z*

Adds a constant translation component to the duplicate object's offset. X, Y and Z constant components can be specified.



## Object Offset subpanel

Adds a transformation taken from a chosen object relative to the current object to the offset.



### *Object*

Choose an object.

## Randomize

Randomize the transform values.

### *Offset*

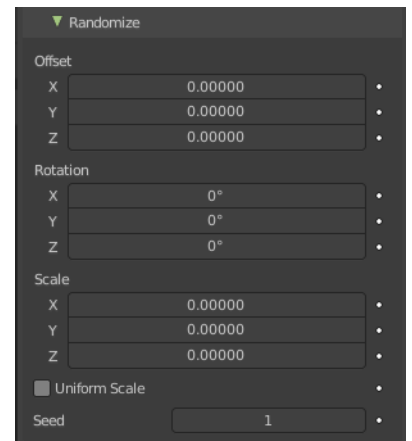
Randomize the offset values.

### *Rotation*

Randomize the rotation values.

### *Scale*

Randomize the scale values.



### **Uniform Scale**

Use uniform scaling.

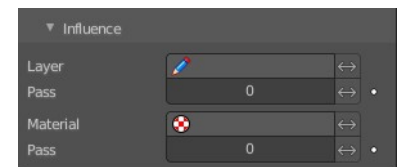
### *Seed*

The random seed value.

## Influence subpanel

### *Layer*

Restricts the effect only to one layer or to any layers that share the same pass index. Click to pick the layer that you want to use.



### **Inverse Layers**

Inverts the influence.

## Pass

The layer pass index.

## Inverse Pass

Inverts the influence.

## Material

Restricts the effect only to material that share the same material or pass index. Click to pick the material that you want to use.

## Invert Materials

Inverts the influence.

## Pass

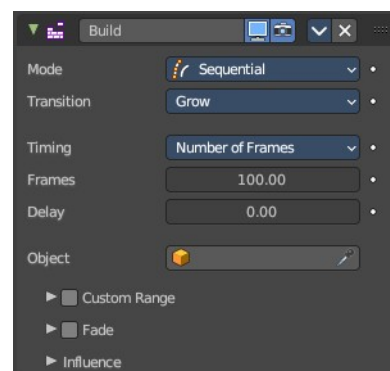
The material pass index.

## Inverse Pass

Inverts the influence.

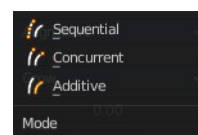
## Build

The Build modifier lets the strokes of the grease pencil object appear or disappear over time when you play the animation.



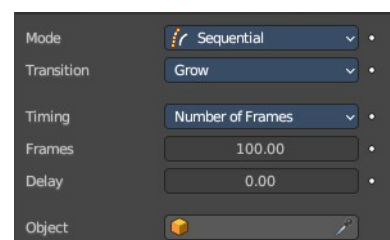
## Mode

How many strokes are animated at the same time.



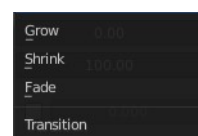
## Sequential mode

Strokes appear or disappear one after the other.



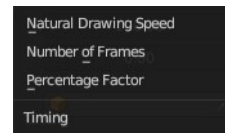
## Transition

How the strokes are animated. The items should be self explaining.



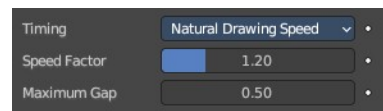
## Timing

How to calculate the timing of the frames.



### **Natural Drawing Speed**

Use recorded speed multiplied by a factor.



### **Speed Factor**

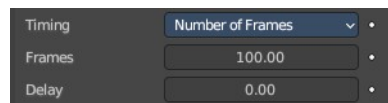
Multiply recorded drawing speed by a factor.

### **Maximum Gap**

The maximum gap between strokes in seconds.

### **Number of Frames**

Set a fixed number of frames for all build animations.



### **Frames**

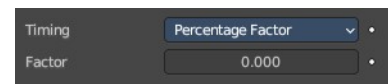
Maximum number of frames that the build effect can run.

### **Delay**

Number of frames to delay before the modifier has any effect.

### **Percentage Factor**

Set a manual percentage to build.



### **Factor**

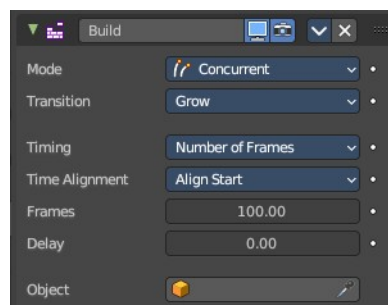
How much the stroke is visible.

### **Object**

Pick an object as the starting position.

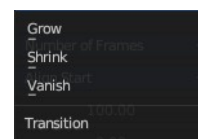
## **Concurrent Mode**

All strokes appear or disappear at once.



### **Transition**

How the strokes are animated.



### **Grow**

Grow over the animation time.

### **Shrink**

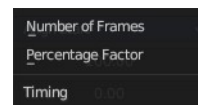
Shrink over the animation time.

## **Vanish**

Vanish over the animation time.

## **Timing**

What method to use to build animations. Number of frames, or percentage.



## **Number of frames**



## **Time Alignment**

When strokes should start to appear or disappear.

### **Align Start**

All strokes appears at the same time.



### **Align End**

All strokes disappears at the same time.

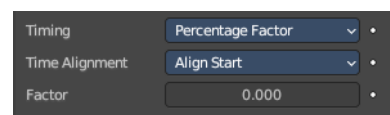
## **Frames**

Maximum number of frames that the build effect can run.

## **Delay**

Number of frames after each GP keyframe before the modifier has any effect.

## **Percentage Factor**

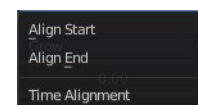


## **Time Alignment**

When strokes should start to appear or disappear.

### **Align Start**

All strokes appears at the same time.



### **Align End**

All strokes disappears at the same time.

## **Factor**

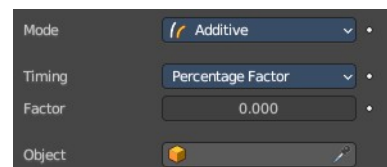
How much the stroke is visible.

## **Object**

Pick an object as the starting position.

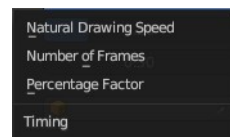
## Additive

Builds only new strokes. Assumes additive painting.



## Timing

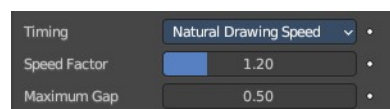
What method to use to build animations.



## Natural Drawing Speed

### Speed Factor

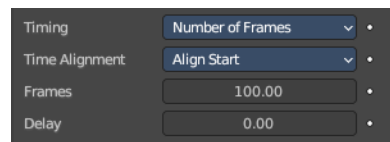
Multiply the recording speed by a factor.



### Maximum Gap

The maximum gap between strokes in seconds.

## Number of frames



## Time Alignment

When strokes should start to appear or disappear.



### Align Start

All strokes appears at the same time.

### Align End

All strokes disappears at the same time.

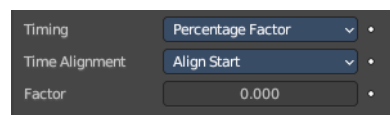
## Frames

Maximum number of frames that the build effect can run.

## Delay

Number of frames after each GP keyframe before the modifier has any effect.

## Percentage Factor



## Time Alignment

When strokes should start to appear or disappear.



### Align Start

All strokes appears at the same time.

### ***Align End***

All strokes disappears at the same time.

### **Factor**

How much the stroke is visible.

### **Start delay**

Number of frames after each GP keyframe before the modifier has any effect.

### **Frames**

Maximum number of frames that the build effect can run.

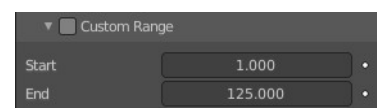
### **Object**

Pick an object as the starting position.

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## **Custom Range**

Only modify strokes that lies in the specified time frame.



### ***Start***

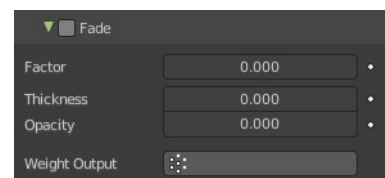
The first frame of the range.

### ***End***

The last frame of the range.

## **Fade subpanel**

Fade out strokes instead of cutting them off.



### ***Factor***

The factor for how much the stroke is fading out.

### ***Thickness***

How much strength fading applies on top of stroke thickness.

### ***Opacity***

How much strength fading applies on top of stroke opacity.

### ***Weight Output***

Limit the fade to a vertex group.

## **Influence subpanel**

### ***Layer***

Restricts the effect only to one layer or to any layers that share the same pass



index. Click to pick the layer that you want to use.

## Inverse Layers

Inverts the influence.

## Pass

The layer pass index.

## Inverse Pass

Inverts the influence.

## Dot Dash

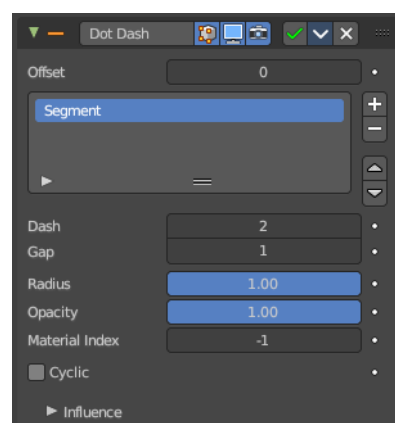
Turns a grease pencil stroke into a dotted line.

## Offset

The offset into each stroke before the dot creation starts.

## Segment list

Manage the single segments of the dotted dash. Segments gets repeated as they appear in the list. Means when you just have one segment in the list, then this shape will be repeated. When you have two, then the first will be displayed, then the second, then the first, and so on. Every segment can have its own settings. Which are managed below.



## Add Segment

Add a new dash segment.

## Remove Segment

Remove the dash segment.

## Move Dash Segment up or down

Moves the selected dash segment up or down in the list.

## Search element

By clicking at the triangle button you reveal a search field with which you can search through the list.



## Edit Box

Type in the search term and hit enter.

## Invert

Inverts the search term.

## Sort by name

Sorts the list alphabetically.

## Reverse

Inverts the list.

## Dash

The number of points (vertices) from the original stroke to include in this segment.

## Gap

The number of points (vertices) skipped after this segment.

## Radius

The radius of the segment. Maximum is 1 of the original stroke.

## Opacity

The visibility of this segment.

## Material Index

What material to use.

## Cyclic

Enable cyclic on individual stroke dashes.

## Influence subpanel

### *Layer*

Restricts the effect only to one layer or to any layers that share the same pass index. Click to pick the layer that you want to use.

### *Inverse Layers*

Inverts the influence.

### *Pass*

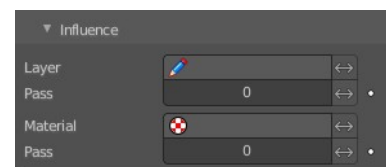
The layer pass index.

### *Inverse Pass*

Inverts the influence.

### *Material*

Restricts the effect only to material that share the same material or pass index. Click to pick the material that you want to use.





## **Invert Materials**

Inverts the influence.

## **Pass**

The material pass index.

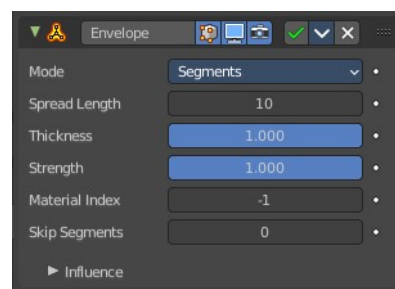
## **Inverse Pass**

Inverts the influence.

---

## **Envelope**

Generates an envelope shape that connects all points in this envelope.



## **Mode**

### ***Deform***

Deform the stroke to best match the envelope shape.

### ***Segments***

Add segments to create the envelope. Keep the original stroke.

### ***Fills***

Add Fill segments to create the envelope. This method does not keep the original stroke.

## **Spread Length**

The number of points to skip to create straight segments.

## **Thickness**

Thickness multiplier for the thickness of the new stroke.

## **Strength**

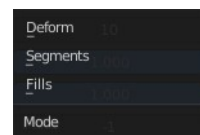
Strength multiplier for the strength of the new stroke.

## **Material Index**

The material index of the material that is used.

## **Skip Segments**

Define a number of segments to skip to reduce the complexity.



## Influence subpanel

### **Layer**

Restricts the effect only to one layer or to any layers that share the same pass index. Click to pick the layer that you want to use.

### **Inverse Layers**

Inverts the influence.

### **Pass**

The layer pass index.

### **Inverse Pass**

Inverts the influence.

### **Material**

Restricts the effect only to material that share the same material or pass index. Click to pick the material that you want to use.

### **Invert Materials**

Inverts the influence.

### **Pass**

The material pass index.

### **Inverse Pass**

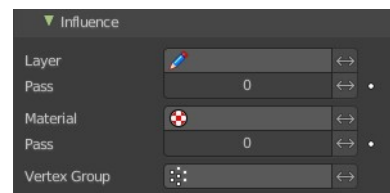
Inverts the influence.

### **Vertex Group**

Assign a vertex group to modulate the deform.

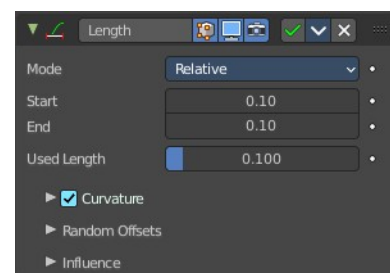
### **Inverse Pass**

Inverts the influence.



## Length

The Length Modifier extends or shortens the original strokes length.



## Mode

Defines the mode to use for the length calculation. Relative to the length of the grease pencil stroke, or absolute in geometry space.



## Factor Start/End

Length difference for each stroke.

## Used Length

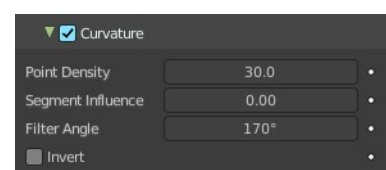
What position of the stroke is used for the calculation of the extension.

## Curvature subpanel

Follow the curvature of the stroke.

### *Point Density*

Multiplied by Start/End for the total added point count.



### *Segment Influence*

How much the length of the individual segments should influence the final computed curvature.

### *Filter Angle*

Ignore points of the stroke that derivate from their neighbours by more than this angle.

### *Invert*

Invert the curvature of the stroke's extension.

## Random Offset subpanel

Randomization for the start / end lengths.

### *Random offset Start*

Size of random length added to the start of each stroke.

### *Random offset End*

Size of random length added to the end of each stroke.

### *Random Noise Offset*

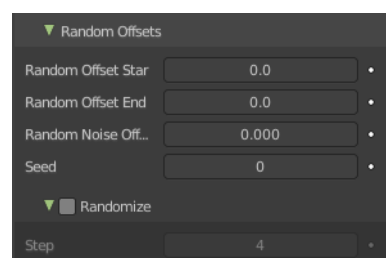
Smoothly offset the random value of each stroke.

### *Seed*

The random seed value.

## Randomize subpanel

Use random values over time.



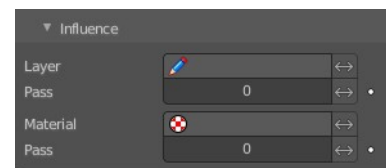
## Step

Number of frames before recalculate random values again.

## Influence subpanel

### Layer

Restricts the effect only to one layer or to any layers that share the same pass index. Click to pick the layer that you want to use.



### Inverse Layers

Inverts the influence.

### Pass

The layer pass index.

### Inverse Pass

Inverts the influence.

### Material

Restricts the effect only to material that share the same material or pass index. Click to pick the material that you want to use.

### Invert Materials

Inverts the influence.

### Pass

The material pass index.

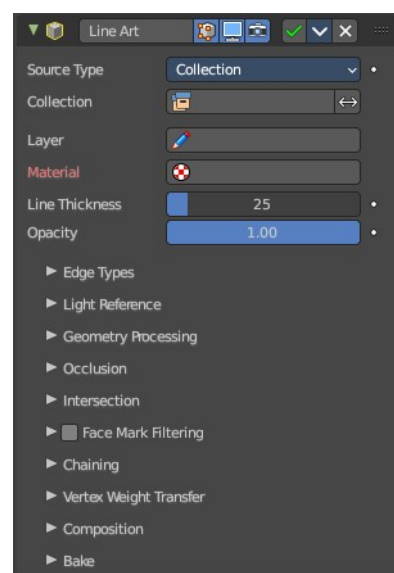
### Inverse Pass

Inverts the influence.

## Line Art

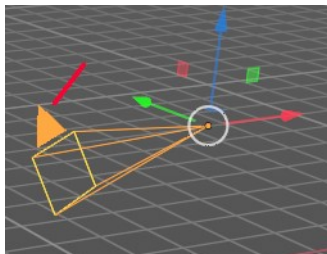
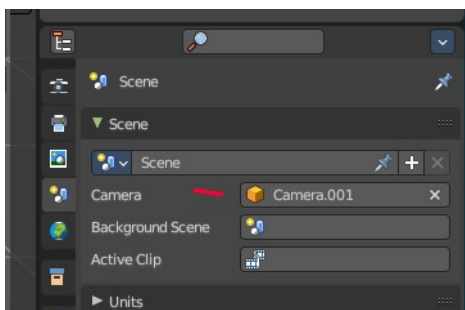
The Line Art modifier generates stylized line art from the scene or selected source collection or objects.

Note that due to lack of global cache at the moment, each Line Art modifier will run the entire occlusion calculation for itself. So if you have multiple line art modifiers to select different parts of the scene (to apply different styles, etc.), the evaluation will take much longer. There are plans to remedy this in the future, but this is a known limitation for now.



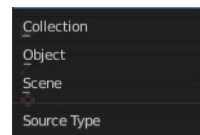
This modifier requires to have a **ACTIVE** camera in the scene, since the outline is created from this active camera. And the outline is created from exact this view of the camera. So better switch to camera view to check if the view fits.

The active camera has the active orange triangle above the widget. You can also see the active camera in the Scene properties.



## Source Type

What type of geometry source should line art be generated from.



### Collection

#### Collection

The collection where you want to apply the line art to.

#### Invert

Inverts the selection of collections.

#### Layer

Grease Pencil layer that is assigned to the generated strokes.

#### Material

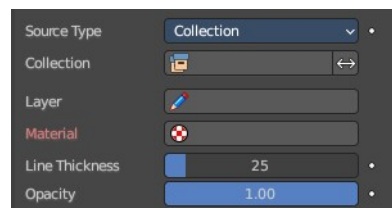
Grease pencil material assigned to the generated strokes.

#### Line Thickness

The thickness of the line.

#### Opacity

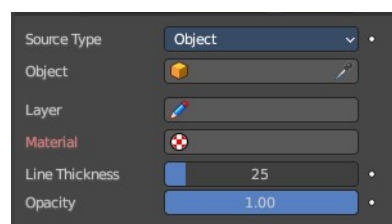
The opacity of the line.



## Object

### Object

The object where you want to apply the line art to.



## Layer

Grease Pencil layer that is assigned to the generated strokes.

## Material

Grease pencil material assigned to the generated strokes.

## Line Thickness

The thickness of the line.

## Opacity

The opacity of the line.

---

## Scene

Applies the line art grease pencil strokes to the whole scene.

## Layer

Grease Pencil layer that is assigned to the generated strokes.

## Material

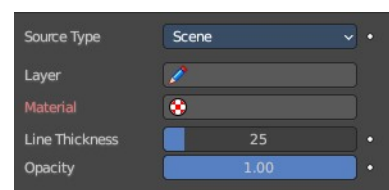
Grease pencil material assigned to the generated strokes.

## Line Thickness

The thickness of the line.

## Opacity

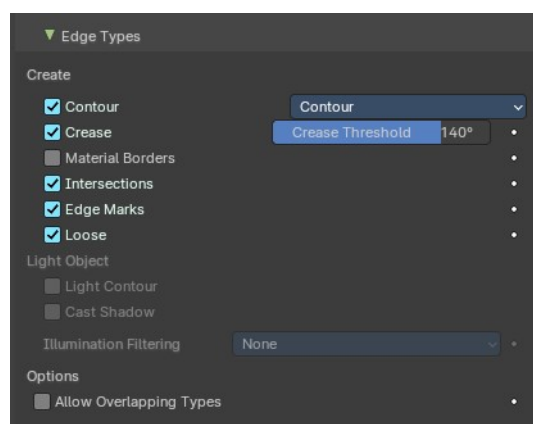
The opacity of the line.



---

## Edge types subpanel

Which kind of edges to influence.



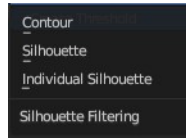
## Create

### Use Contour

Use a contour.

## ***Silhouette Filtering***

What kind of contour to use.



## **Use Crease**

Generate strokes from crease edges.

## ***Crease Threshold***

Angles smaller than this value will be treated as creases.

## **Crease**

Influence crease edges. The angle what edges are treated as creases can be adjusted in the edit box.

## **Material Borders**

Generate strokes from borders between materials.

## **Intersections**

Generate strokes from intersections.

## **Edge Marks**

Generate strokes from edge marks.

## **Loose**

Generate strokes from loose geometry.

## ***Light Object***

### **Light Contour**

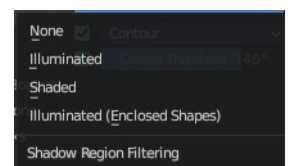
You need to pick a light object in the Light Reference panel. Generate light shadow separation lines from a referenced light object.

### **Cast Shadow**

You need to pick a light object in the Light Reference panel. The line casts shadow.

### **Illumination filtering**

You need to pick a light object in the Light Reference panel. How to thread the shadow region filtering. The names should be self explaining.



## ***Options***

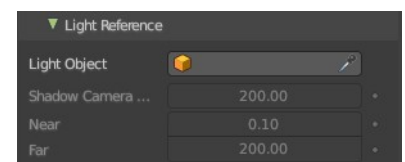
### **Allow Overlapping Types**

Allow an edge to have multiple overlapping types.

---

## **Light Reference subpanel**

This panel allows you to add a light object as a source for line art.



## ***Light Object***

Pick the light source.

## ***Shadow Camera Size***

Represents the orthographic scale of an ortho camera. It calculates the area to cover.

## ***Near***

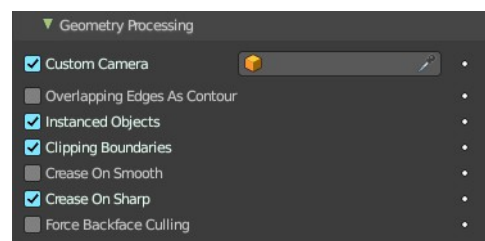
The near clip plane of the shadow camera.

## ***Far***

The far clip plane of the shadow camera.

---

## **Geometry Processing subpanel**



### ***Custom Camera***

Allows to pick a different camera than the active scene camera for line art rendering.

### ***Overlapping Edges as Contour***

This option allows overlapping edges (e.g. from an edge split modifier or imported geometry where two edges occupy the exact same space) to be drawn as contour. Enabling this option will slow down the calculation slightly but it will handle edge overlapping cases without erroneous occlusion results.

### ***Instanced Objects***

This option enables particles and other instanced objects to be loaded for line art calculation. There will be performance impact when there are a large amount of instanced objects in the scene.

### ***Clipping Boundaries***

When enabled, line art will generate clipping lines as contour type at the place where near or far clipping planes cut the model. Otherwise there will be no lines.

### ***Crease on Smooth***

Allow crease edges to show inside smooth surfaces.

### ***Crease on Sharp***

Allow crease to show on sharp edges.

### ***Force Back Face Culling***

Remove all backfaces to speed up calculation.

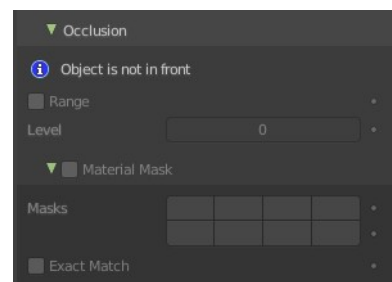


## Occlusion Subpanel

### Range

If enabled, the modifier will select lines that have an occlusion level between start and end values.

If not enabled just a single Level value slider shows.



### Material Mask subpanel

Use material masks to filter out occluded strokes. You need to have a range level higher than 0.

### Masks

Choose up to eight mask bits for the masking.

### Exact match

Require matching all material masks instead of just one.

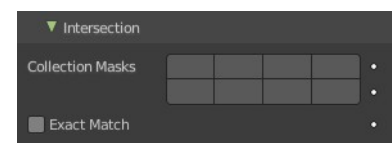
## Intersection subpanel

### Collection Masks

Choose up to eight mask bits for masking.

### Exact match

Require matching all intersections instead of just one.



## Face Mask Filtering subpanel

Filter Feature Lines using Freestyle Face Masks.

### Invert

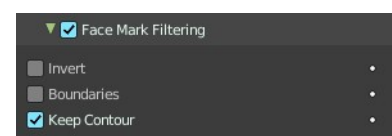
Invert face mask filtering.

### Boundaries

Filter feature lines based on face mask boundaries.

### Keep Contour

Preserve contour lines while filtering.



## Chain

### ***Intersection with Contour***

Allows intersection lines to be chained together with contour lines.

### ***All Lines***

Enabling this option will cause all lines to have the type of contour and to be chained together.

### ***Loose Edges***

Allow loose edges to be chained together.

### ***Loose As Contour***

Loose edges will have contour type.

### ***Preserve Details***

Keep the zig-zag noise in initial chaining.

### ***Geometry Space***

Use Geometry distance for chaining instead of image space.

### ***Image Threshold***

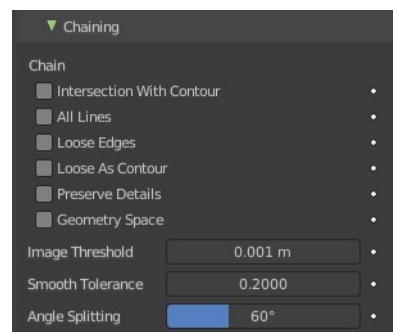
Segments with an image distance smaller than this value will be chained together.

### ***Smooth tolerance***

Strength of smoothing applied on jagged chains.

### ***Angle Splitting***

The angle in screen space below which a stroke is split into two.



## Vertex Weight Transfer subpanel

### ***Filter Source***

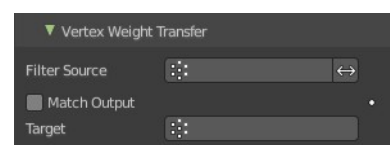
If source mesh has vertex groups whose name starts with this string, then the vertex weight info will be transferred into weight groups in Grease Pencil strokes.

### ***Invert Vertex Group***

Inverts the selection.

### ***Match Output***

Transfer the filtered object vertex weights into Grease Pencil weight groups with the same names as the filtered ones.



## Target

If Match Output is off, then a target vertex group has to be specified. If there are multiple weight groups copied into target, then the highest weight value is copied into it.

## Composition

### Overscan

A margin to prevent an abrupt end of the stroke at the edge of the image.

### Image boundary trimming

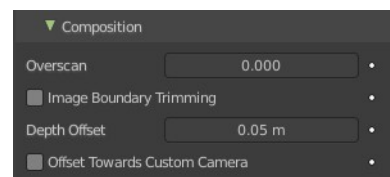
Trim all edges right at the boundary of image (including overscan region)

### Depth Offset

Move strokes slightly towards the camera to avoid clipping.

### Towards custom camera

Offset strokes towards selected camera instead of the active camera.



## Bake subpanel

### Bake Line Art / Bake Line Art (All)

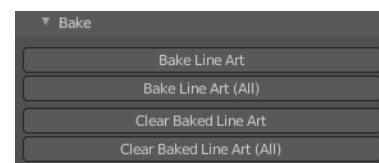
Bakes Line Art strokes for active Grease Pencil object within the start, end frame range in scene.

Bake Line Art (All) bakes all Grease Pencil objects that contains at least one Line Art modifier. After baking, baked Line Art modifier will be deactivated automatically.

### Clear Baked Line Art / Clear Baked Line Art ( All)

Clears baked line art frames within the scene frame range for active Grease Pencil object.

Clear Baked Line Art (All) applies the same operation for all Grease Pencil objects that contains at least one Line Art modifier.



## Mirror

The Mirror modifier for the Grease Pencil Object works in Object mode. It mirrors the object along its local X, Y and/or Z axes, across the Object Origin.

It can also use another object as the mirror center, then use that object's local axes instead of its own.

### Object

Define an object to mirror at its origin instead of mirroring along the grease pencil origin.

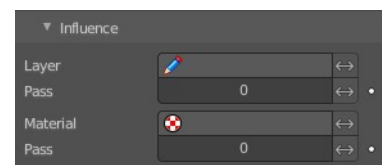


You can animate it to move the mirror axis.

## Influence

### Layer

Restricts the effect only to one layer or to any layers that share the same pass index. Click to pick the layer that you want to use.



### Invert

Inverts the influence.

### Pass

The layer pass index.

### Invert

Inverts the influence.

### Material

Restricts the effect only to material that share the same material or pass index. Click to pick the material that you want to use.

### Invert

Inverts the influence.

### Pass

The material pass index.

### Invert

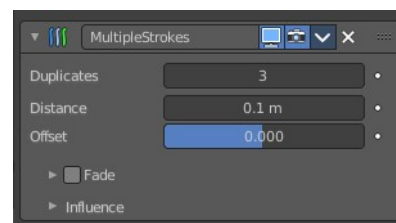
Inverts the influence.

## Multiple Strokes

Adds multiple parallel copies of the stroke around the original stroke.

### Duplicates

The number of additional strokes.



### Distance

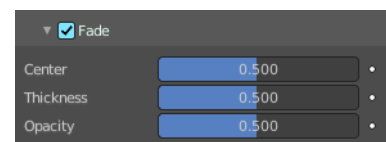
Distance between the original and the duplicate strokes.

### Offset

Control the offset position (inner or outer) for duplicate strokes.

## Fade

Fade out duplicate strokes, using their opacity or thickness.



## Center

Control the initial position for the fading.

## Thickness

Fade influence on strokes thickness.

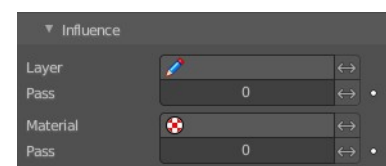
## Opacity

Fade influence on strokes opacity.

## Influence

### Layer

Restricts the effect only to one layer or to any layers that share the same pass index. Click to pick the layer that you want to use.



### Invert

Inverts the influence.

### Pass

The layer pass index.

### Invert

Inverts the influence.

### Material

Restricts the effect only to material that share the same material or pass index. Click to pick the material that you want to use.

### Invert

Inverts the influence.

### Pass

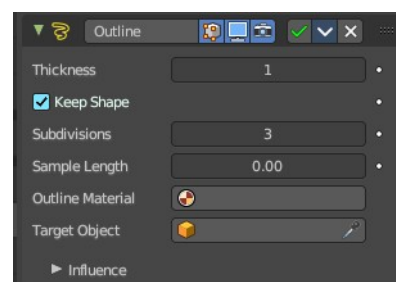
The material pass index.

### Invert

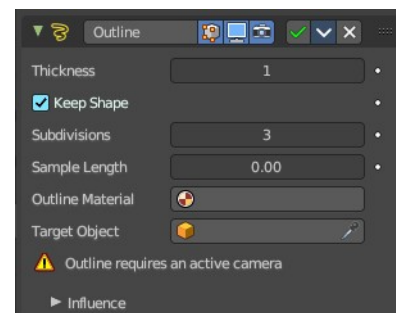
Inverts the influence.

## Outline

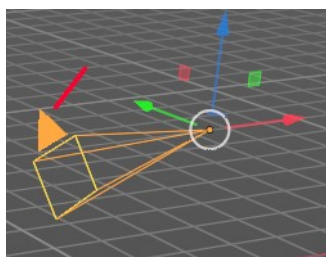
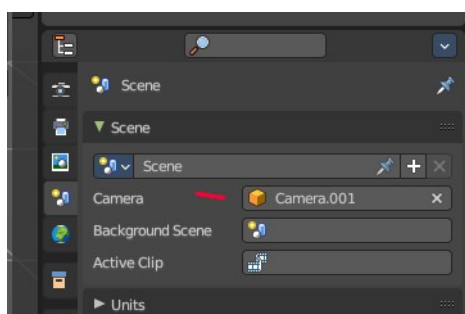
Draws an outline around the grease pencil stroke.



This modifier requires to have a **ACTIVE** camera in the scene, since the outline is created from this active camera. And the outline is created from exact this view of the camera. So better switch to camera view to check if the view fits. You will get a warning in the modifier when the active camera is missing.



The active camera has the active orange triangle above the widget. You can also see the active camera in the Scene properties.



## Thickness

The thickness of the outline.

## Keep Shape

Try to keep global shape.

## Subdivisions

Subdivisions of the outline grease pencil stroke.

## Sample Length

The distance between the vertices.

## Outline material

Material used for the outline strokes. If no material is chosen then the material from the parent stroke is used.

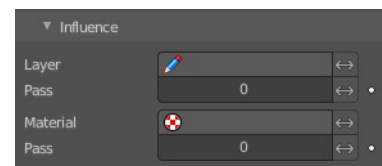
## Target object

A target object to define the stroke start.

## Influence

### Layer

Restricts the effect only to one layer or to any layers that share the same pass index. Click to pick the layer that you want to use.



### Invert

Inverts the influence.

### Pass

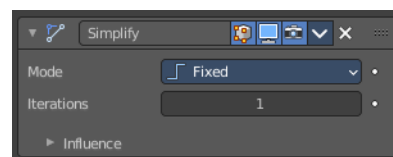
The layer pass index.

### Invert

Inverts the influence.

## Simplify

The Simplify modifier allows you to reduce the amount of points in the strokes. It tries to reduce points while maintaining the lines shape.



### Mode

How to reduce points in the strokes.

### Fixed

Deletes alternated points in the strokes, except the start and end points.

### Adaptive

Uses the RDP algorithm (Ramer-Douglas-Peucker algorithm) for points deletion. The algorithm try to obtain a similar line shape with fewer points.

### Sample

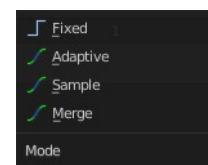
Recreates the stroke geometry with a predefined length between points.

### Merge

Simplifies the strokes by merging points that are closer than a specified distance to each other.

### Iterations

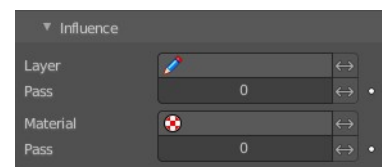
Number of times to repeat the procedure.



## Influence

### Layer

Restricts the effect only to one layer or to any layers that share the same pass index. Click to pick the layer that you want to use.



### Invert

Inverts the influence.

### Pass

The layer pass index.

### Invert

Inverts the influence.

### Material

Restricts the effect only to material that share the same material or pass index. Click to pick the material that you want to use.

### Invert

Inverts the influence.

### Pass

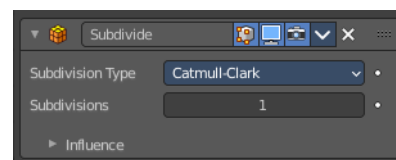
The material pass index.

### Invert

Inverts the influence.

## Subdivide

The Subdivide modifier subdivide the strokes by inserting points between other points to the lines.



### Subdivision Type

#### Catmull-Clark

Subdivides and smooths the surfaces.

#### Simple

Only subdivides the surfaces, without any smoothing.





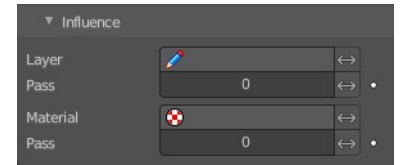
## Subdivisions

Number of subdivisions.

## Influence

### *Layer*

Restricts the effect only to one layer or to any layers that share the same pass index. Click to pick the layer that you want to use.



### **Invert**

Inverts the influence.

### *Pass*

The layer pass index.

### **Invert**

Inverts the influence.

### *Material*

Restricts the effect only to material that share the same material or pass index. Click to pick the material that you want to use.

### **Invert**

Inverts the influence.

### *Pass*

The material pass index.

### **Invert**

Inverts the influence.