FLUID PAINTER

Stick Fluids over Animated Objects

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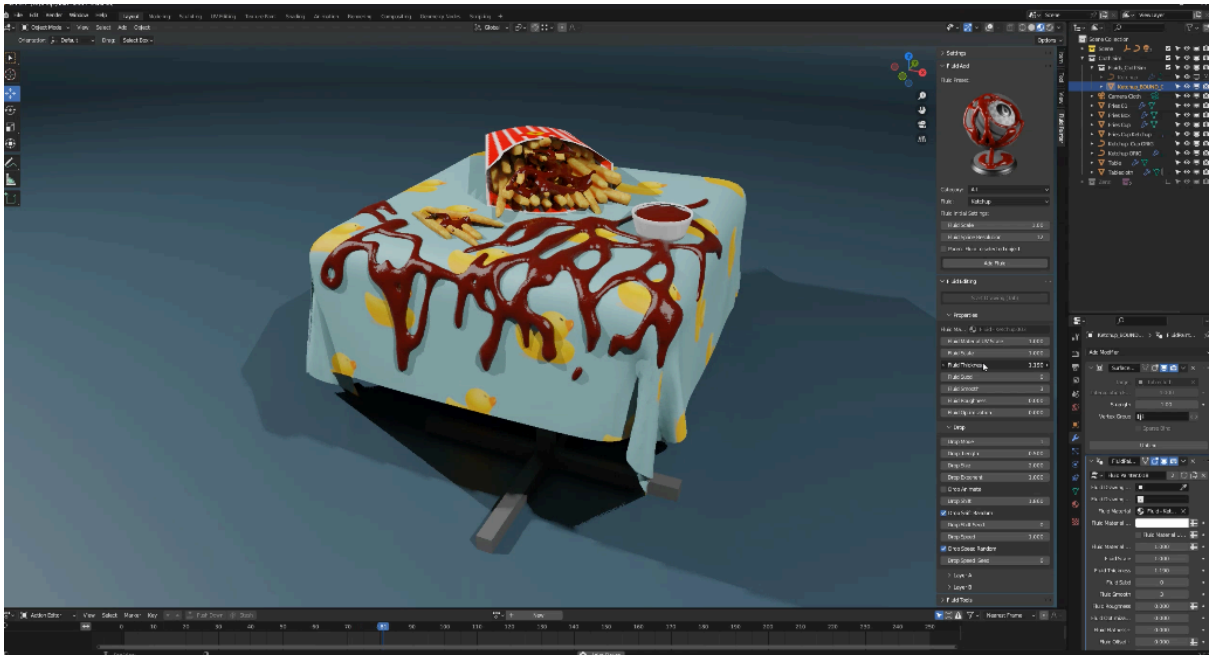
Fluid Painter 1.3 introduces a new tool for sticking fluids over animated objects, which can include rigged meshes, objects with simulations, or any other animated mesh.

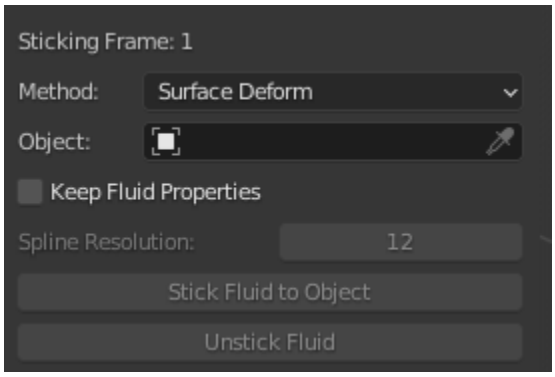
Example of glaze attached over a rigged mesh. Drops on the right pics are animated thanks to a setting (keep fluid properties) that allows the editing of the fluid parameters after the sticking.



Example of Ketchup attached to a simulated tablecloth.

Tool UI

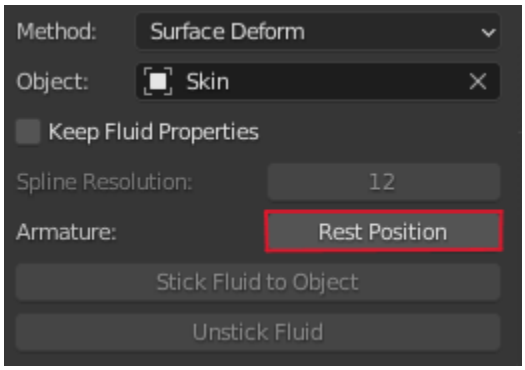
Here's the interface of the tool:



Sticking Frame
It's the current timeline frame. When sticking a fluid, especially to an animated object, it's useful to have the timeline frame saved, in case the original fluid needs to be restored at the same point in the timeline. The saved frame can be restored during the unsticking operation.

Method
There are two main methods to stick a fluid to an animated object, the **Surface Deform** method and the **Vertex Group** method. Also, both methods, thanks to a new flag of the **Fluid Painter Geometry Node**, allows the fluid parameters to remain available after sticking.

Object
The target object to which the fluid will be attached to.
If the object has an armature, a button to switch between the Pose and Rest positions will appear.



Note: Only the **Surface Deform Method** allows painting the fluid while the target object is in Pose Position.

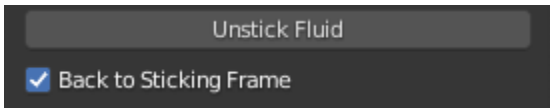
Keep Fluid Properties

When this flag is enabled, just the fluid curve will be converted to mesh and attached to the target object. The Fluid Geometry Node will be retained, allowing the fluid properties to remain available after sticking.

Spline Resolution
This option is active when Keep the Fluid Properties is enabled, and it sets the segmentation of the fluid curve just before it is converted to a mesh.

Stick Fluid to Object
This function sticks the selected fluid or fluids to the target object.
The original fluids are retained for any future needs.

Unstick Fluid
This function unsticks the fluid from the object. After that, the fluid is deleted and the original one is restored. If **"Back to Sticking Frame"** is selected, the timeline is returned to the frame at which the fluid was originally stuck.



Surface Deform Method

The **Surface Deform** method binds the fluid to the mesh using a surface deform modifier.
It's the recommended method and it can be used to stick the fluid over rigged meshes, objects with soft body or cloth simulations, and any other animated mesh.
This method also allows to paint the fluid over any state of the target object, for example when the armature is in pose position, or at any stage of a simulation.

USE FOR	- Rigged Objects. - Objects with Soft/Cloth simulations. - Any other animated object.
PROS	- Preferred method, fluid sticks on any mesh. - Fluid can be painted while the animation is not in rest position.
CONS	- Limitations of the Surface Deform Modifier (Check the list below) - In case of export, the fluid mesh will be a static mesh and won't be attached to the target mesh anymore.

Limitations of the Surface Deform Modifier

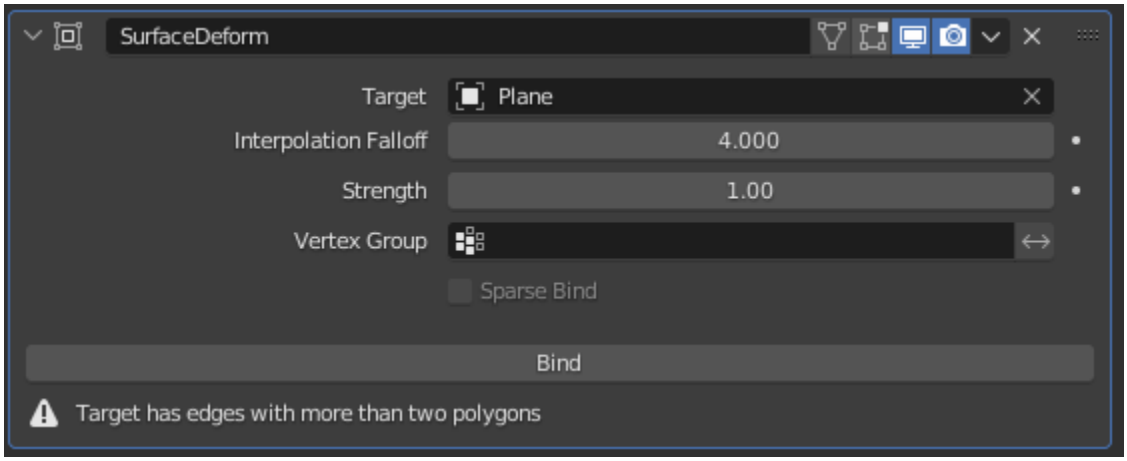
Given that the **Surface Deform Method** relies on the **Surface Deform Modifier** to attach the fluid to the mesh, it is subject to the limitations of that modifier. Therefore, thorough inspection of the target mesh is crucial, as certain conditions may prevent successful fluid binding. In the event of sticking failure, it's important to examine the Surface Deform Modifier added to the fluid for any errors. Below, I'll detail various scenarios and their potential solutions.

Target Object has Subdivision and/or Multires Modifiers

The **Subdivision** and **Multires Modifiers** alter the polygon count of the object, requiring a **Surface Deform Modifier** to be added to the fluid for each **Subdivision Level** specified in these modifiers. However, don't worry, as the tool will handle this process for you. This ensures that the fluid maintains its visual quality in both viewport and render, regardless of the levels set in the modifiers.

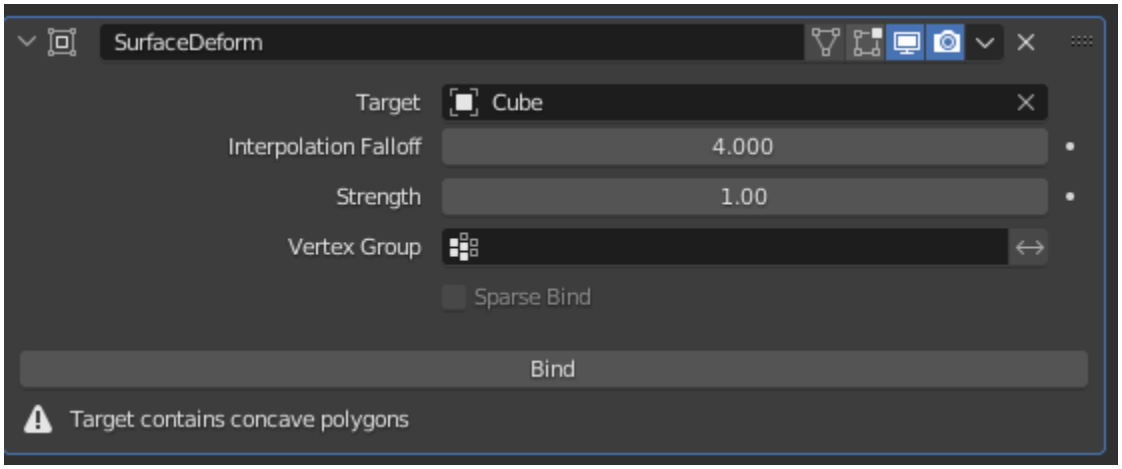
In the unique scenario where both modifiers are present, the tool behaves differently. It adds a Surface Modifier for each Subdivision Level of the Multires Modifier.
However, for the Subdivision Modifier, only one Surface Modifier is added, specifically at the Render Level. This Surface Modifier is hidden in the viewport to prevent any potential issues.
Note: To prevent potential issues, ensure that you do not change the Render Level settings of any of the modifiers after applying the sticking operation.

Target Object has edges with more than two polygons



Happens when three faces have one common edge.
Fix: What does "Target has edges with more than two polygons" mean? - Blender Stack Exchange

Target Object contains concave polygons



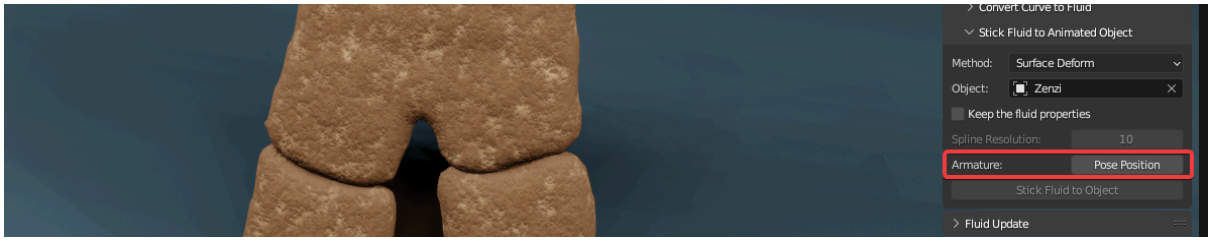
Happens when the target mesh has one or more concave polygon.
Fix 1: Select all vertices in Edit Mode, Mesh > Cleanup > Split Concave Faces
Fix 2: Add a Triangulate Modifier to the target mesh.

Surface Deform Method Example: Rigged Object

To show how the **Surface Deform Method** works, as an animated object we'll use a rigged Zenzi, created with the Fluid Painter biscuit preset, converted to mesh and rigged with Mixamo.

At first, set **Surface Deform** as stick method, then assign the, then assign the **Zenzi** mesh as **Target Object**.

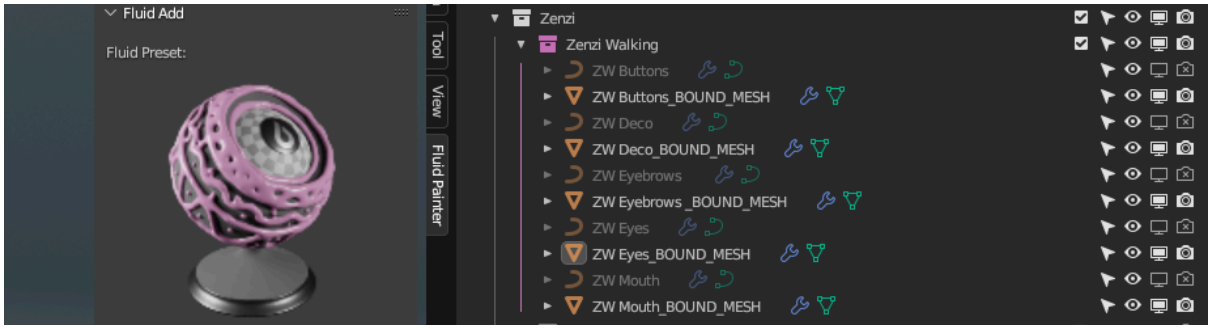
Since the object has an armature, a button to set the **Pose** or **Rest Position** gets available. With the Surface Deform method it's possible to paint the fluids in any position of the object, so set the position you prefer. You can also choose any frame of the armature animation.



Anyway, for convenience, we'll paint the fluid in **Rest Position**. Now it's time to add some fluids over the target object, the sticking tool supports multiple fluids so we can add as many as we want.

Now that the fluids are painted, select them all and click on **Stick Fluid to Object**

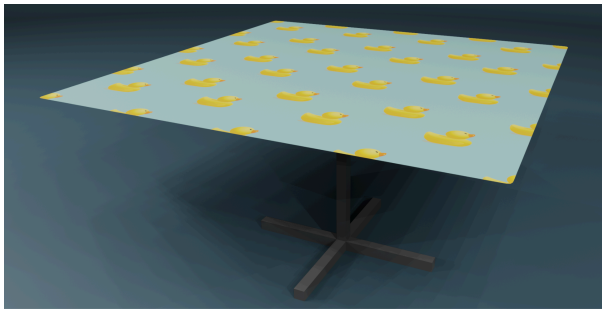
The Fluids are now attached to the Zenzi mesh, and a copy of the original Fluids curves are kept for any need.



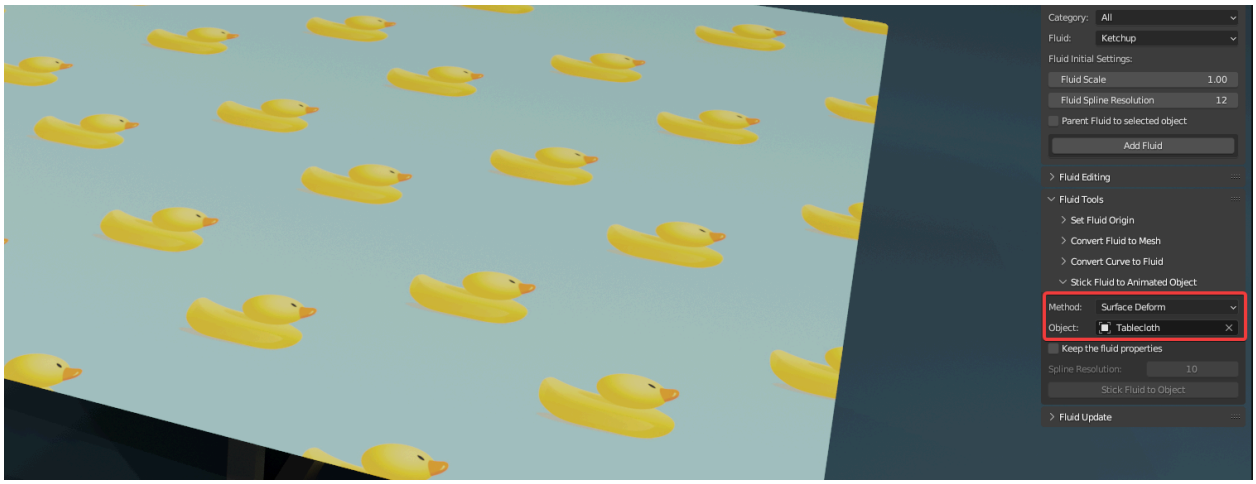
And this is the result, as we switch to pose position and start the animation, the fluids follow the rigged mesh.

Surface Deform Method Example: Cloth Simulation

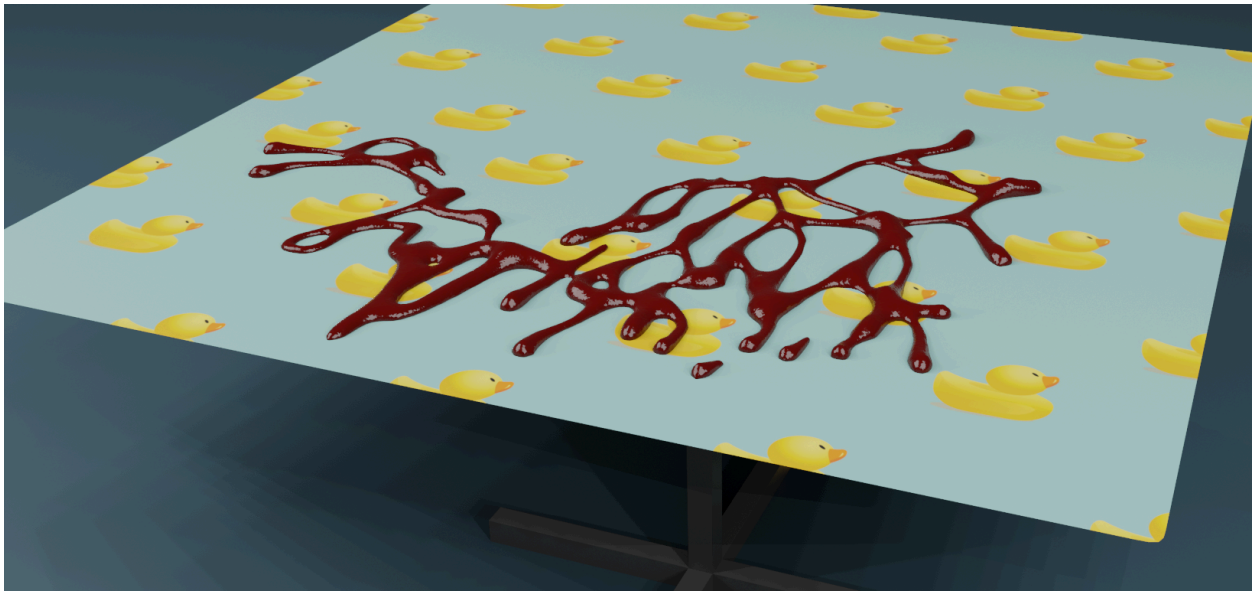
In this example, we'll use the **Surface Deform Method** to stick Ketchup over a simulated tablecloth.



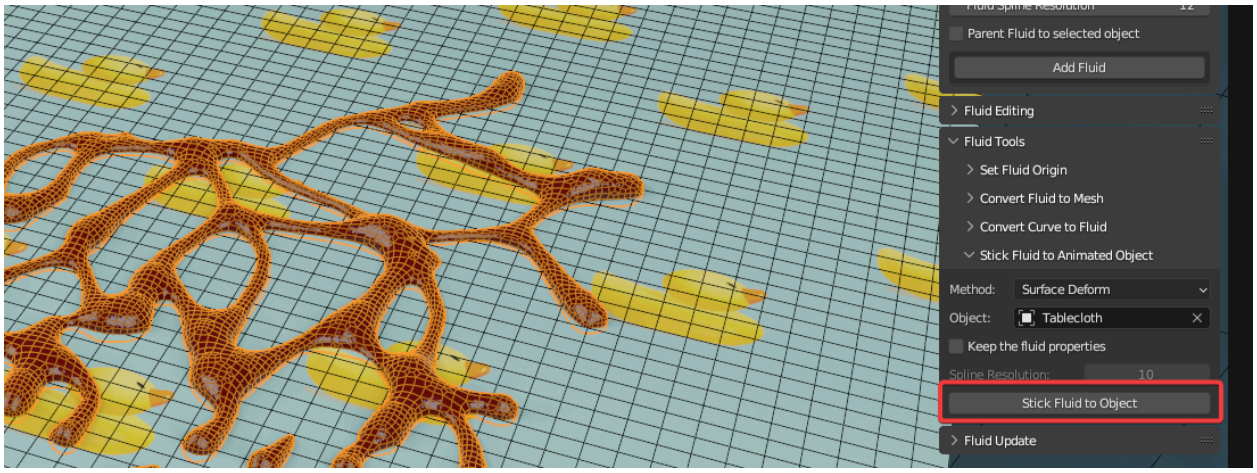
At first, set **Surface Deform** as stick method, then assign the **Tablecloth** object as **Target Object**.



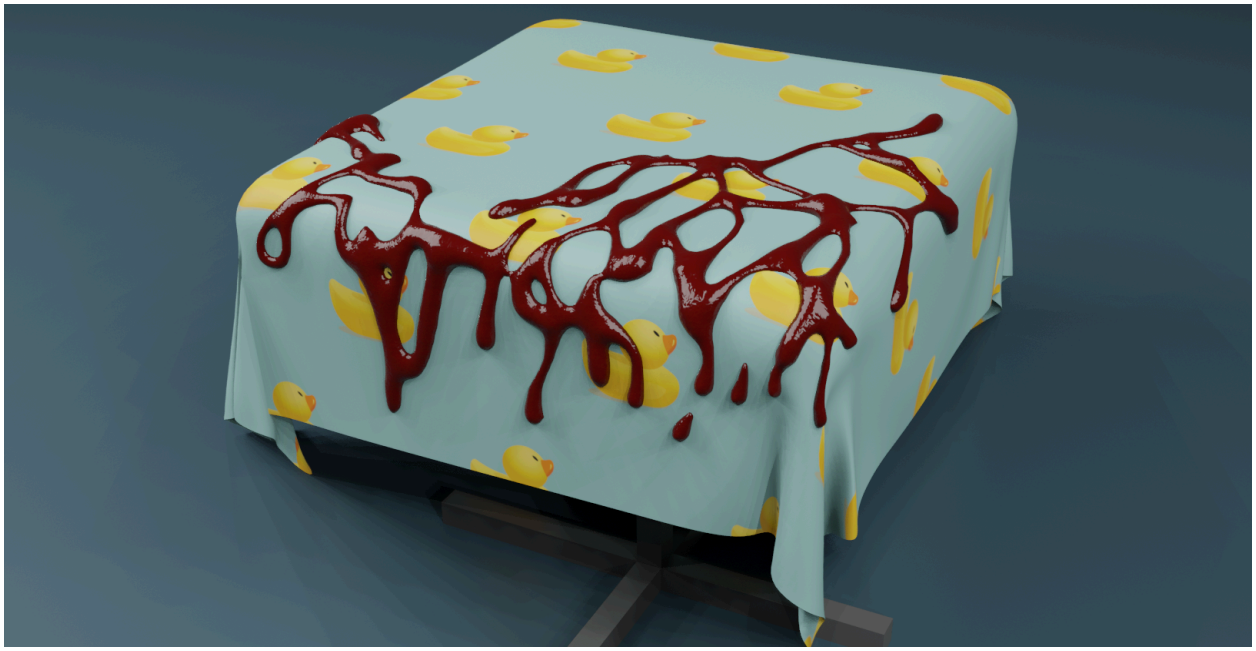
Now paint the Ketchup fluid over the table. Since we're using the Surface Deform Method, the fluid can be painted at any stage of the simulation, but for the best result it's better to do that when the cloth is in pre-sim state.



Now that the fluid is painted, select it and click on **Stick Fluid to Object.**



The ketchup is now attached to the tablecloth.



Vertex Groups Method

Vertex Groups method transfers the Vertex Groups data from the target object to the Fluid Mesh, and it can only be used when the target object is rigged and has an armature modifier. It has some limitations, for example if the target object contains shape keys, they won't affect the fluid, unless using tools to transfer these as well (Es: https://youtu.be/JnNYTcfTnmk). However, this method can be useful when exporting the fluid to other 3D software, as the resulting fluid is essentially a rigged mesh.

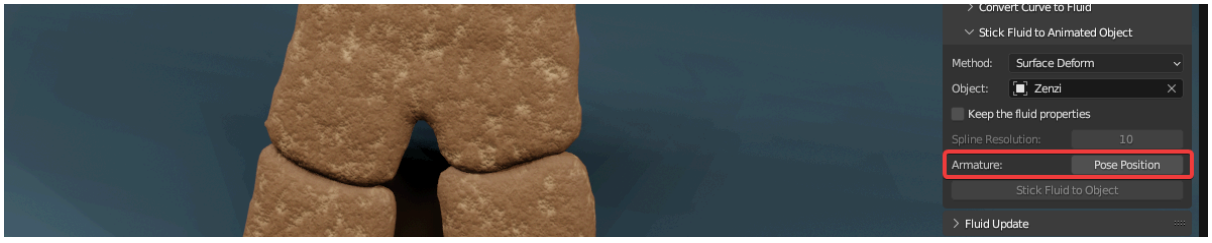
USE FOR	- Rigged Object
PROS	- Fluid mesh is rigged to an armature, useful for when exporting it to other 3D software/engines. - Vertex weight can be modified.
CONS	- Target object shape keys won't affect the fluid mesh. - It works only on rigged objects that have an armature. - Fluid must be painted when the target object is in rest position.

Vertex Groups Method Example

To show how the **Vertex Group Method** works, as an animated object we'll use a rigged Zenzi, created with the Fluid Painter biscuit preset, converted to mesh and rigged with Mixamo.

At first, set **Vertex Groups** as stick method, then assign the **Zenzi** mesh as **Target Object**.

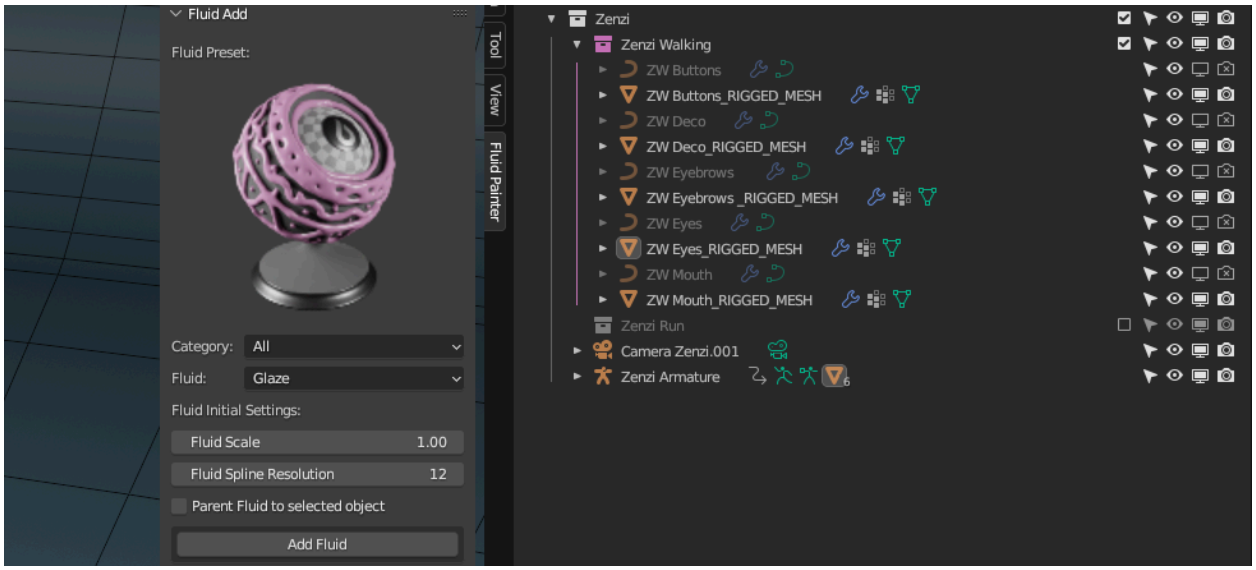
Since the object has an armature, a button to set the **Pose** or **Rest Position** gets available. Anyway, with the Vertex Groups method, it's possible to stick the fluids only if the armature is in rest position, that's why we need to paint the fluids in that position.



After setting the **Rest Position**, it's time to add some fluids over the target object, the sticking tool supports multiple fluids so we can add as many as we want.

Now that the fluids are painted, select them all and click on **Stick Fluid to Object.**

The Fluids are now attached to the Zenzi mesh, and a copy of the original Fluids curves are kept for any need



And this is the result, as we switch to pose position and start the animation, the fluids follow the rigged mesh

Keep Fluid Properties

Both stick methods, thanks to the new version of the **Fluid Painter Geometry Node** of **Fluid Painter 1.3**, allows the fluid parameters to remain available after sticking.
Anyway, this feature is quite resource intensive, and it's recommended to use it only when animating fluid parameters.

USE FOR	- Fluids with animated properties.
PROS	- Fluid properties can be modified and animated after the sticking
CONS	- Since the fluid curve is converted to mesh, curve point radius previously set by hand will be lost after the conversion. - Resource intensive.

Example

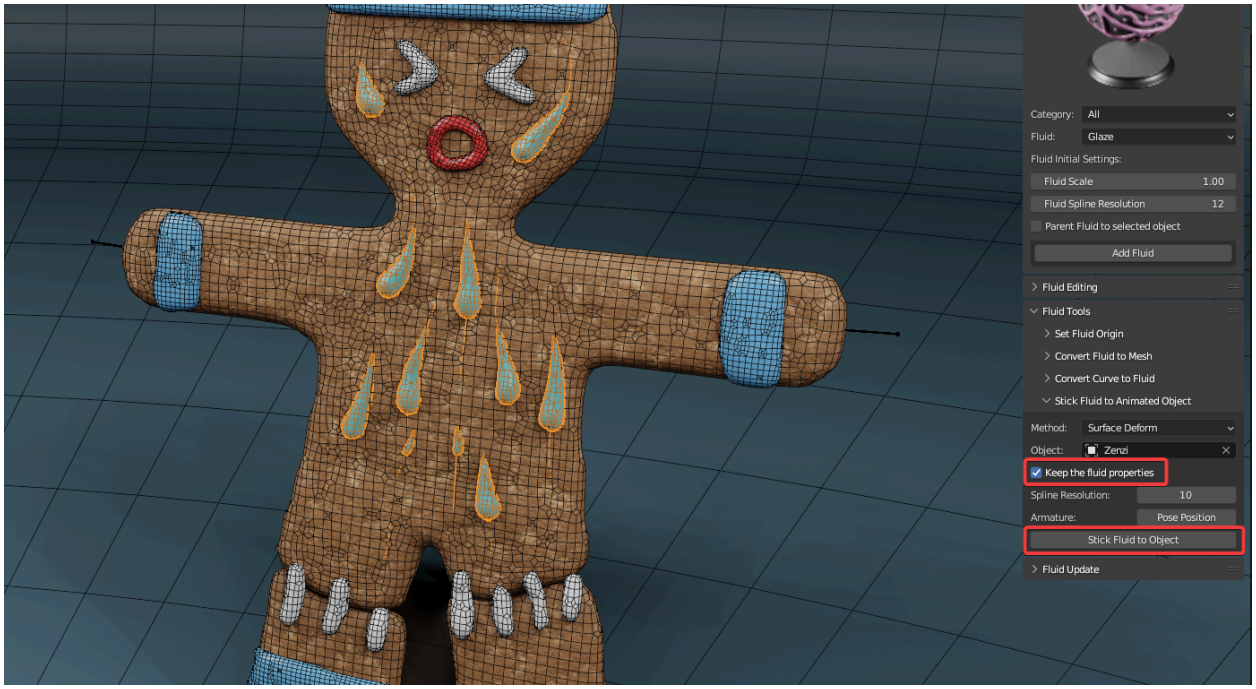
To show how the **Keep Fluid Properties** works, as animated object we'll use a rigged Zenzi, created with the Fluid Painter biscuit preset, converted to mesh and rigged with Mixamo.

Follow the previous tutorials and get to the point where the target mesh is assigned to the tool panel and the fluids are painted. In this case we'll have one of the fluids that's animated using the drop properties.

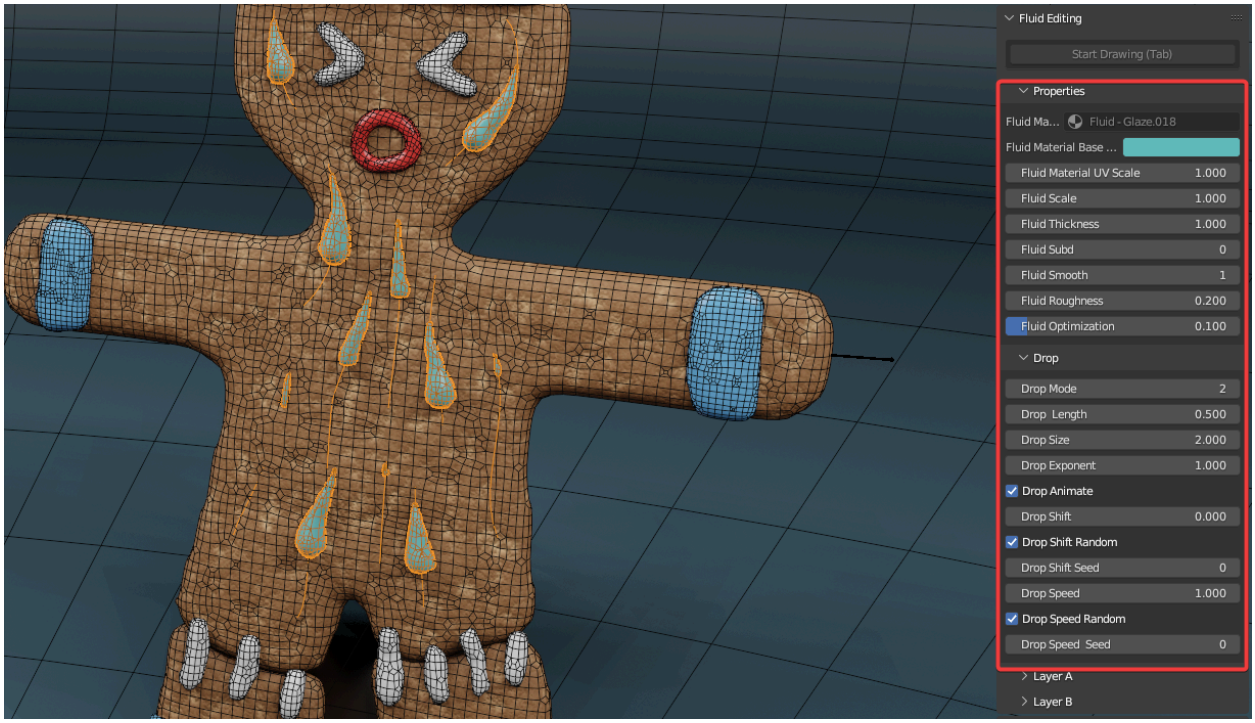
NOTE: The **Keep Fluid Properties** works with both stick methods, anyway, in case you choose the vertex groups method to export the fluid mesh later, keep in mind that the fluid animation won't be exported.

Now select all the fluids except the one with the drops and stick them to the mesh.
For these fluids we'll leave the Keep Fluid Properties flag to false. The fluids are now converted to mesh and attached to the target object, but the properties can't be modified anymore.

Now select the fluid with the dros, see the flag to true and click on Stick Fluid to Object.
This time only the fluid curve is converted to mesh and attached to the target object, white the fluid painter geometry node is preserved, keeping all the fluid properties.



If we check the fluid edit panel, we still have access to the fluid properties that can be modified and animated. Anyway, since the fluid curve is now a mesh, it’s not editable anymore.



Now, as we play the animation, the static fluids will follow the rigged object, and the drops will continue to move over the fluid curve mesh.