

# Liquid Preview

## Overview

The parameters in this rollout control the representation of the fluid's caches in the viewport, showing a preview of what the fluid is doing. These preview controls can give you a sense of what is going on with your simulation, and whether it needs tweaking, before you decide to start rendering.

The **Viewport Preview** is almost completely independent from rendering, and allows you to control the visibility of specific **Grid Channels** and **Particle Types**, in order to customize the preview. Depending on the **Read Cache for Preview** mode used, all enabled parameters in this rollout will be displayed in the viewport, provided that the cache file's content is within a parameter's specified value range for that frame.

Liquid simulations are displayed using the **Particle Preview** by default. You can also enable the **Show Mesh** mode, to override the Particle Preview and show the liquid as a mesh.

The Particle Preview section lets you control the visibility of different Particle Types, and manage their preview color. For example, you could preview only the Splash and Foam particles.

There is also a **Voxel Preview**, which uses 2D triangles to emulate the shape of the volume. You can choose to preview specific Grid Channels, such as Viscosity and RGB, or even preview the Liquid Channel as voxels if you plan to render the liquid particles using a volumetric render mode, for example.

In addition, you can preview the simulation's Velocity, to see how Phoenix forces or standard 3ds Max forces affect the simulation.

Keep in mind that the Voxel and Particle preview parameters are all independent from rendering. They do not affect the render settings.

UI Path: ||Select Liquid Simulator object|| > **Modify panel > Preview rollout**

## Parameters

**Expand** – Opens a floating dialog that contains the selected rollout and automatically folds the command panel rollout.

**Re-Center** – Resets the position of the floating rollout.

**?** – Opens up the help documents for the Liquid Preview rollout.

**Read Cache for Preview** | *prv\_read\_cache* – Allows to completely disable reading of cache files in order to speed up the viewport and the simulation. When cache files are not read, neither voxels and particles, nor the grid bounding box or the **Cache File Content** under the **Simulation** rollout will be shown. This way scrolling the timeline would be quick as there will be no access to hard disk or the network. If you still need to see the grid bounding box and the **Cache File Content** info, you could leave this option to **Always**, and instead disable all voxel preview options, the **Mesh Preview**, **GPU Preview** and all particle previews. The intended use for this parameter is as a last step performance optimization - once you're done tweaking your setup and you're ready to commit to a high-resolution, overnight simulation, disable the preview of cache files.

**Always** – Cache files are always read by the preview.

**Disable During Sim** – Cache files are read only when the simulation is stopped. This would speed up the simulation and is good for overnight simulations where you don't need to watch the simulation constantly.

**Don't Preview Caches** – Cache files are never read for the preview. They will only be read during rendering, or in case any of the Phoenix tools requires them - e.g. the **Particle Shader**, the **Grid Texture**, etc.

**Detail Reduction** | *prv\_dwnsmp* – Decreases the grid and particle detail in the preview. A value of 0 means no reduction. Increase this value if the interface starts to lag due to the simulation being very large. Note that this parameter does not affect the Mesh preview.

**Auto Reduction** | *prv\_autoreduct* – Enables automatic adjustment of the **Detail Reduction** parameter to improve display performance. The preview detail will be reduced up to a point where the preview will display fast without blocking the interface. Note that the detail will only decrease automatically, but will not increase.

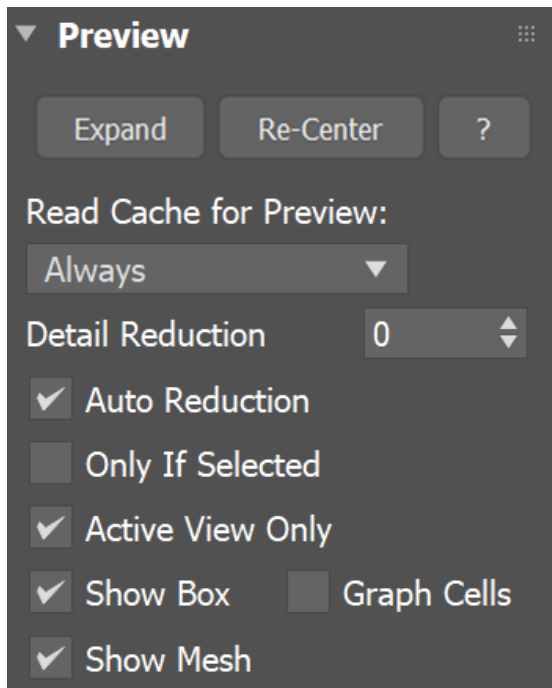
**Only if Selected** | *show\_only\_sel* – When enabled, the viewport preview is only drawn if the Simulator is selected.

**Active View Only** | *prv\_avonly* – When enabled, only the selected viewport shows the content of the Simulator.

**Show Box** | *showgrid* – Shows the bounding box of the Simulator. The green outline is drawn based on the settings in the Grid rollout while the red outline displays the bounds of the currently loaded cache file, if it exists.

**Graph Cells** | *gridcells* – Shows a lattice with the cell sizes on the sides of the Simulator's box or the Slice Preview.

**Show Mesh** | *showmesh* – When enabled, shows the [implicit surface](#) as a mesh. This mode overrides the Voxel Preview mode. Note that if [Render Mode](#) is set to **Ocean Mesh**, the ocean will have lower detail in the preview than in the render in order to speed up the viewport display.



## Particle Preview

The parameters here control the visualization of Particle Types generated by the Simulator. Phoenix can only preview the Particle Types present in the cache file for the current frame.

You can specify a **Particle Channel** to use as a basis for adjusting the particle preview color, using the **Scale Color By** option. For example, you could set the Scale Color By option to the Speed particle channel, so that the faster the particles move, the whiter they appear in the preview.

You can find more info on Particle Channels from the [Particle Channel Ranges](#) page.

**Show** | *prv\_particles*, *prv\_prt\_name* – Enables the preview of particles. The controls below affect the visualization of the currently selected particle group.

**Particle Size** | *viewPartSize* – Sets the size of the particles in the viewport. Note that all particles are drawn with the same size. You can choose the particle system to edit from the dropdown menu.

**Show System** | *show\_prt\_face* – When enabled, the particle system will be visible in the Simulator's preview. You can choose the Particle System to edit from the dropdown menu.

**Preview Color** | *prv\_prt\_color\_face* – Specifies the default color of the particles. Moving particles are displayed as a blend between their default color and white, based on the selected Scale Color By channel. Note that if the particle system has an RGB channel exported, it will be used in place of the **Preview Color**.

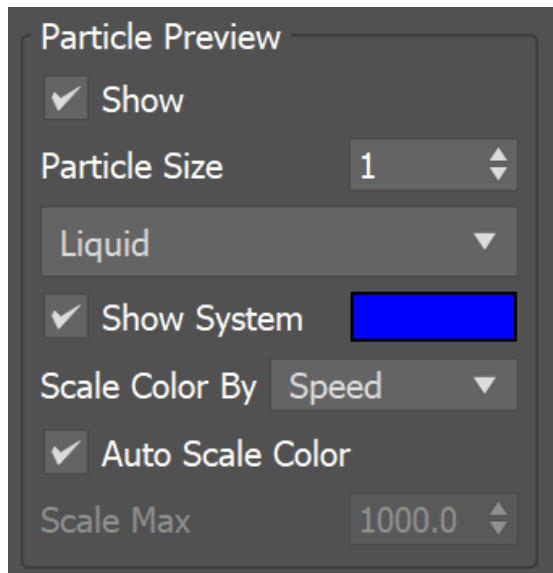
**Scale Color By** | *prv\_prt\_colscale\_chan\_face* – Specifies the particle channel used for adjusting the particle preview color.

- **No Scaling** – All particles will be the same color - the one specified by **Preview Color**.
- **Speed** – The faster the particles move, the whiter they will appear. The preview is only affected by the **Scale Max** option if the particle system has the **Velocity** channel export enabled.
- **Size** – The larger the particles are, the whiter they will appear. The preview is only affected by the **Scale Max** option if the particle system has the **Size** channel export enabled.

- **Age** – The older the particles are, the whiter they will appear. The preview is only affected by the **Scale Max** option if the particle system has the **Age** channel export enabled.
- **Viscosity** – The higher the viscosity the particles, the whiter they will appear. The preview is only affected by the **Scale Max** option if the particle system has the **Viscosity** channel export enabled.

**Auto Scale Color** | *prv\_prt\_awspeed\_face* – When enabled, automatically calculates **Scale Max** based on the Min/Max range of the selected **Scale Color By** particle channel, assuming the respective channel export has been enabled in the **Output** rollout for the selected particle system.

**Scale Max** | *prv\_prt\_wspeed\_face* – When **Auto** is disabled, allows you to specify a constant value at which the particle preview color becomes pure white. Particles with a **Scale Color By** channel value higher than the specified **Scale Max** are also pure white. You can also find more info about the usual particle channel maximum values on the [Particle Channel Ranges](#) page.



## Voxel Preview

The **Voxel Preview** displays the **Grid Channel** content of each cell. Phoenix can only preview the channels present in the cache file for the current frame. All enabled channels are drawn if their content is between the corresponding thresholds.

To see the list of available channels and their ranges for an input sim cache, go to the **Cache File Content** section of the Simulation rollout. You can also find more info on the [Grid Channel Ranges](#) page.

Note that you can also specify the Voxel Preview value range for any Grid Channel, if you disable the **Auto Range** option.

For example, you could enable only **Viscosity**, and specify the range to be between 0.5 and 1.0, so that you can see where the liquid is more viscous. Grid Viscosity Channel values that are below 0.5, or above 1.0, would not appear in the preview at all.

**Only the Overlap Of:** | *prv\_and* – When enabled, shows only the cells where the following selected channels overlap.

**Liquid** | *prv\_temperature, prv\_t\_threshold, prv\_t\_threshold2, prv\_t\_color, prv\_t\_color2* – Enables the representation of the liquid channel.

**Velocity** | *prv\_velocity, prv\_v\_threshold, prv\_v\_threshold2, prv\_v\_color, prv\_v\_color2* – Enables the representation of the velocity channel.

**Velocity Streamlines** | *viewVelStreamlines, viewVelStreamlinesThreshold, viewVelStreamlinesThreshold2, viewVelStreamlinesColor, viewVelStreamlinesColor2* – Traces the velocity field of the cache files to generate a streamline preview.

**As Rainbow** | *viewVelStreamlinesColorCurve* – Represents the Velocity Streamlines in rainbow colors, where red is the fastest, green is medium speed and blue is the slowest.

**Lines Length** | *viewVelStreamlinesMaxIterations* – Signifies the maximum length of each streamline in the preview. Adjusting the value will provide you with a guide /preview of the velocity field's motion. The Line's length is measured in voxels and at the lowest setting, the Streamlines will be no larger than a voxel.

The **Velocity** Preview is inactive when the **Forces** Preview is enabled, and vice versa. Similarly, the **Velocity Streamlines** Preview is inactive when the **Force Streamlines** Preview is enabled, or the other way around.

**Viscosity** | *prv\_viscosity, prv\_visc\_color1, prv\_visc\_color2, prv\_visc\_threshold1, prv\_visc\_threshold2* - Enables the representation of the viscosity channel.

**Special** | *prv\_smoke, prv\_smoke\_threshold, prv\_smoke\_threshold2, prv\_smoke\_color, prv\_smoke\_color2* - Enables the representation of special channels.

**Forces** | *prv\_forces, prv\_f\_threshold, prv\_f\_threshold2, prv\_f\_color, prv\_f\_color2, prv\_force\_list* - Enables preview of how Phoenix forces or standard 3ds Max forces will affect the simulation.

**Force Streamlines** | *viewForceStreamlines, viewForceStreamlinesThreshold, viewForceStreamlinesThreshold2, viewForceStreamlinesColor, viewForceStreamlinesColor2* - Enables a streamline preview of how Phoenix forces or standard 3ds Max forces will affect the simulation. This preview can be shown even without any loaded simulation.

**As Rainbow** | *viewForceStreamlinesColorCurve* - Represents the Force Streamlines in rainbow colors, where red is the fastest, green is medium speed and blue is the slowest. This preview can be shown even without any loaded simulation.

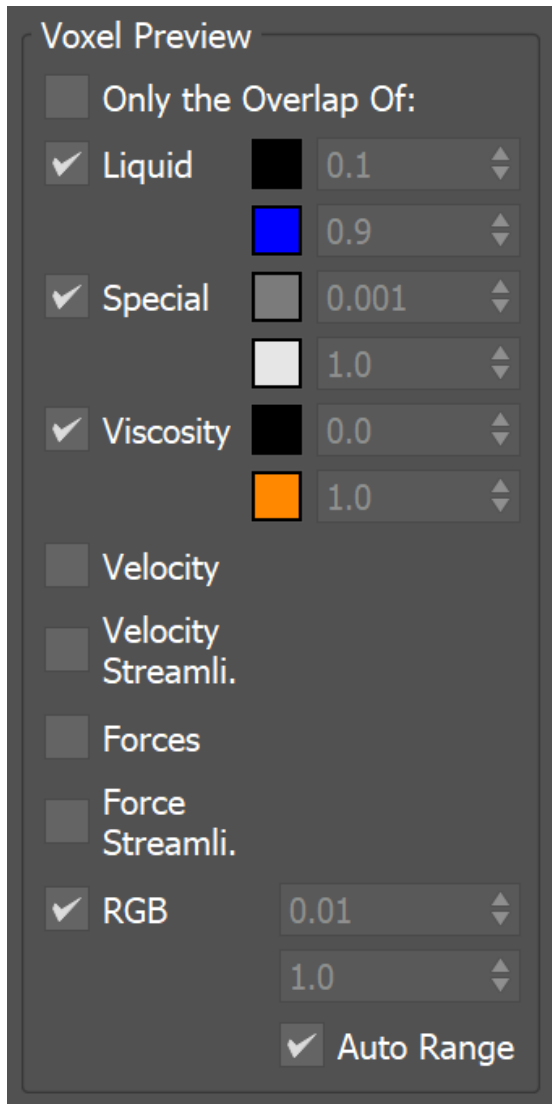
**Lines Length** | *viewForceStreamlinesMaxIterations* - Signifies the maximum length of each streamline in the preview. Adjusting the value will provide you with a guide/preview of the force field's motion. The Streamline's length is measured in voxels and at the lowest setting, the Streamlines will be no larger than a voxel.

Use the Add or Remove buttons to select which forces will be previewed. Unlike other voxel preview channels which use the size of the loaded cache, the Forces preview can also work without a loaded cache and will use the grid size of the Simulator.

Additionally, some Phoenix and standard 3ds Max forces such as the Drag force are not supported yet, and are shown as if their velocity is always 0 and will not be visible. In addition, forces that act differently depending on the quantity of content in the grid (e.g. amount of liquid, smoke, or no content) are not yet supported by the preview.

**RGB** | *prv\_uvw, prv\_uvw\_threshold, prv\_uvw\_threshold2* - Enables the representation of the RGB channel.

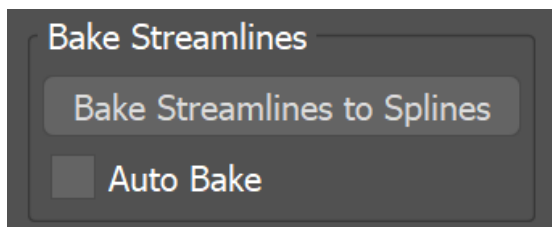
**Auto Range** | *prv\_autorange* - When enabled, automatically adjusts the preview ranges of visible channels for the current frame so that important data is always visible and the preview is always quick.



## Bake Streamlines

**Bake Streamlines to Splines** – Button for converting the currently shown Streamline preview (either Velocity Streamlines or Force Streamlines) into native 3ds Max splines. The baked splines can be rendered like any regular 3ds Max spline - through enabling the rendering in the Rendering rollout of the spline settings or via applying a [Hair and Fur modifier](#) over the spline.

**Auto Bake** | *autoBakeStreamlineCurvesOnPreviewChange* – Enables automatic Streamlines to Splines baking on any change in the Streamlines Preview. While the Auto Bake option is enabled you don't have to press the Bake Streamlines button in order for scene changes to be applied to the splines and changing the timeline frame will update the baked splines. This allows for rendering animations when using the [Hair and Fur modifier](#) over the spline.



## Slice Preview

The Slice preview displays only a single slice of voxels which can be convenient for debugging and fine-tuning a simulation.

**Draw a Slice** | *prv\_sect* – When enabled, only a voxel-thick cross-section of the grid is visible. This works for voxels, particles, and velocity streamlines, but not for the GPU Preview or the Mesh Preview. It allows for a better view of occluded details and can help when previewing very rich data such as velocity fields, or in order to see underwater cavities.

**Along Axis X, Y, Z** | *prv\_sect\_axis* – Specifies the axis along which the grid will be sliced.

**Disabled** – Turns the Draw Just a Slice feature off.

**Slice Level** | *prv\_sect\_lv* – Specifies the offset of the slice from the bottom center of the grid in voxels.

**Slice Width** | *prv\_sect\_width* – Specifies the width of the slice in voxels.

