Physical Properties

Reference
Panel:
Physics ‣ Cloth ‣ Physical Properties

Vertex Mass
> The mass of the cloth material.

Air Viscosity
> Air has some thickness which slows falling things down.

Bending Model

> **Linear:**
>> Cloth model with linear bending springs (old).
>
> **Angular:**
>> Cloth model with angular bending springs.

Stiffness

Tension
> How much the material resists stretching.

Compression
> How much the material resists compression.

Structural
> Overall stiffness of the cloth (only in linear bending model).

Shear
> How much the material resists shearing.

Bending
> Wrinkle coefficient. Higher creates more large folds.

Damping

Tension
> Amount of damping in stretching behavior.

Compression
> Amount of damping in compression behavior.

Structural
> Amount of damping in stretching behavior (only in linear bending model).

Shear
> Amount of damping in shearing behavior.

Bending
> Amount of damping in bending behavior.

Internal Springs

As stated in the introduction, cloth physics are simulated through Springs connecting vertices on the surface of a mesh. But these springs only interact on the surface and only apply to 2D surfaces. 3D or *Internal Springs* can be used to make a mesh behave similarly to a Soft Body. Internal springs can be

the surface and only apply to 2D surfaces. 3D or *Internal Springs* can be used to make a mesh behave similarly to a Soft Body. Internal springs can be enabled by toggling the checkbox in the *Internal Springs* panel header.

Max Spring Creation Length

The maximum length an internal spring can have during creation. If the distance between internal points is greater than this, no internal spring will be created between these points. A length of zero means that there is no length limit.

Max Creation Diversion

The maximum angle that is allowed to use to connect the internal points can diverge from the vertex normal.

Check Surface Normals

Requires the points the internal springs connect to have opposite normal directions.

Tension

How much the material resists stretching.

Compression

How much the material resists compression.

Vertex Group

The *Tension* and *Compression* of internal springs can be controlled via a Vertex Group to specify which the portions of the mesh have internal springs or the spring strength.

Max Tension

Maximum tension stiffness value.

Max Compression

Maximum Compression stiffness value.

Pressure

Cloth pressure allows the simulation of soft-shelled objects such as balloons or balls that are filled with a type of fluid. This fluid is modeled as a gas; to emulate an incompressible liquid set *Pressure Scale* as high as possible without breaking the simulation. Cloth pressure can be enabled by toggling the checkbox in the *Pressure* panel header.

> Note
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> Non-manifold meshes will work with cloth pressure however, pressure will escape out of the mesh holes and cause drifting or propulsion forces. One way to get around this is by using the *Vertex Group* to exclude the non-manifold portions of the mesh.

Pressure

The uniform pressure that is constantly applied to the mesh. This value is specified in units of *Pressure Scale*, and can be negative to simulate implosions or any other case where an object has outside pressure pushing inwards.

Custom Volume

Use the *Target Volume* parameter as the initial volume for the cloth, instead of computing it from the mesh itself.

Target Volume

The mesh volume where the inner/outer pressure will be the same. If set to zero, changes in the volume of the object will not affect pressure.

Pressure Scale

Ambient pressure (in kPa) that exists both inside and outside the object, balancing out when the volume matches the target. Increase the value to make the object resist changes in volume more strongly.

Fluid Density

Specifies the density of the fluid contained inside the object (in kg/liter = 1000 kg/m^3, use 1 for water), used to generate a hydrostatic pressure gradient that simulates the weight of the fluid. If the value is negative, it instead models buoyancy from a surrounding fluid.

The fluid is not actually simulated, so while the setting helps to achieve a more plausible object shapes at rest, it cannot create realistic fluid dynamic effects. It can also be used to give more weight to a soft body like object with heavy and sufficiently flexible filling, even if it is not a fluid by itself.

The volume of the object is not preserved. If that is desired it should be used together with *Pressure Scale*. *Fluid density* times *object size* times

The volume of the object is not preserved. If that is desired it should be used together with *Pressure Scale*. *Fluid density* times *object size* times 50 is a good start value for *Scale* to make sure that no more than 10% volume change if the object does not experience higher acceleration than standard gravity.

Vertex Group

Cloth pressure can be controlled via a Vertex Group to specify which the portions of the mesh to apply pressure. Zero weight means no pressure while a weight of one means full pressure.

Note, faces with a vertex that has zero weight will be excluded from the *Target Volume* calculation.