

# Appendix E

## Particle Tube Flow - Houdini helpcard

### Particle Tube Flow

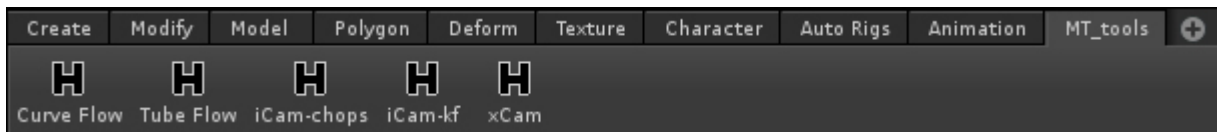
Tool for creating particles flowing along a tube-like surface.

This tool's interface mimics the interface of Maya's *Effects > Create Curve Flow* tool to make it easier for Maya users to transition to Houdini.

[Using the tool](#) | [Tool dialog options](#) | [Modifying an existing setup](#) | [Example files](#)

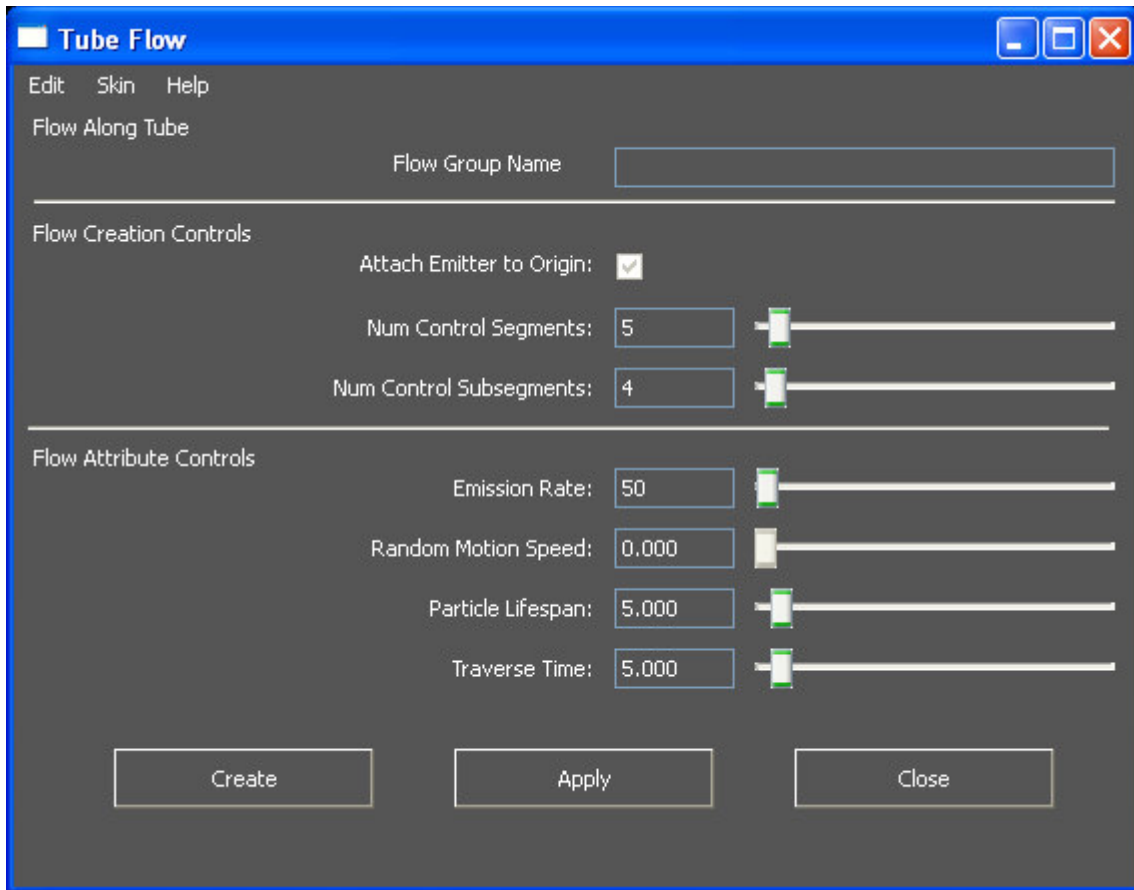
#### ***Using the Particle Tube Flow tool***

There are two ways to use the tool, which is accessible via the Tube Flow icon on the custom shelf called MT\_tools.



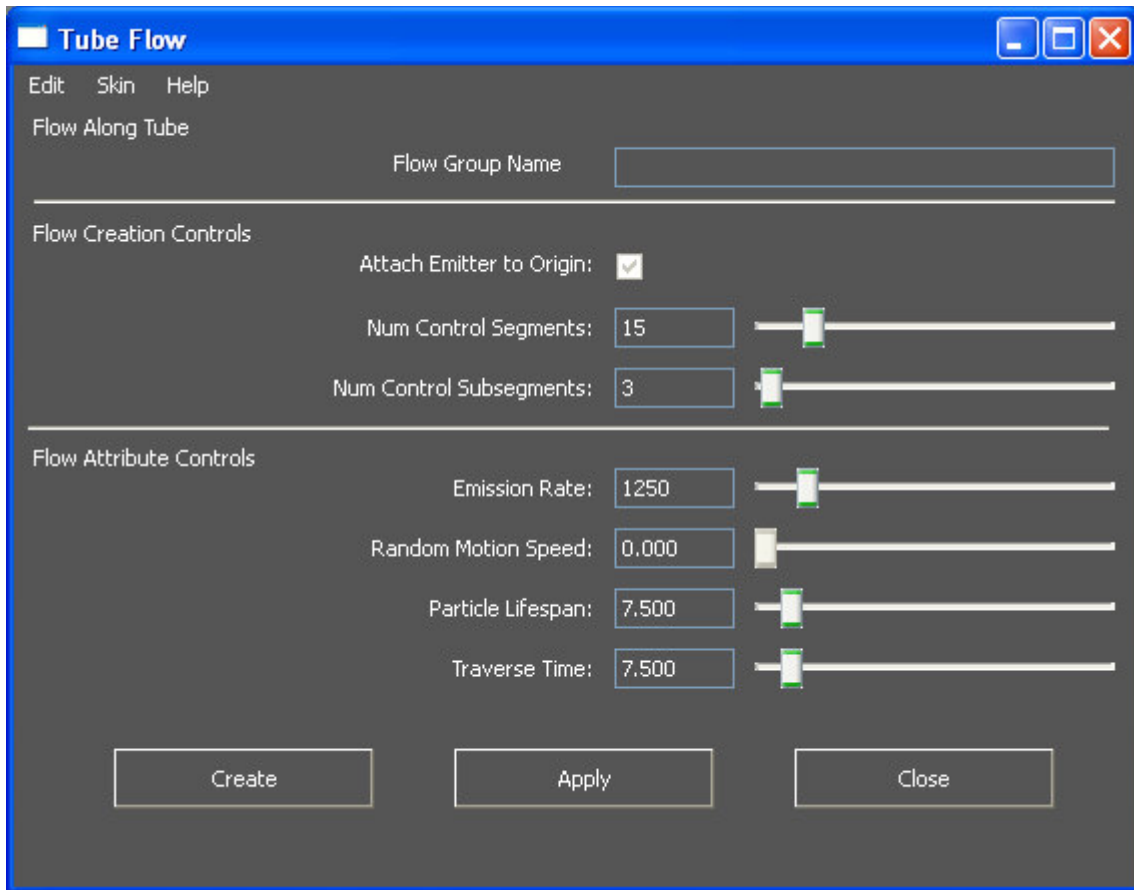
I. Automatically create a particle flow:

1. Select the object containing the tube geometry.
2. *Ctrl+click* the tool's icon to create a tube flow with default parameters (see next snapshot for defaults).



## II. Manually enter parameter values:

1. Select the object containing the tube geometry.
2. Click the tool's icon.
3. Modify the parameters available in the dialog (or use the default values), then press *Create*.  
The dialog will close automatically.  
Alternatively, create several flows for the same curve selection using the *Apply* button, then press *Close* to close the dialog.



## Tool Dialog Options

### Flow Along Tube

Flow Group Name	Name of the geometry object which will contain the network created by the tool. If you don't enter a name, Houdini creates a default name.
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### Flow Creation Controls

Attach Emitter to Origin	This parameter is disabled in the tube flow tool's UI. The emitter will be attached to the origin automatically.
Num Control Segments	Sets the number of segments into which the tube is divided. Adjusting it will change the shape of the tube interactively. Higher numbers will create a denser surface mesh.
Num Control Subsegments	Sets the number of sub-segments that each segment has. Adjusting it will change the shape of the tube interactively. Higher numbers may result in a very dense surface mesh, which takes a long time to create, so avoid setting it above 10, unless the curve is very long.

### Flow Attribute Controls

Emission Rate	Sets the number of particles emitted each second.
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Random Motion Speed	This parameter is disabled in the tube flow's UI. By default the particles will stick to the skinned surface.
Particles Lifespan	Sets how many seconds each emitted particle lives.
Traverse Time	Determines the time in seconds it takes the particles to traverse the tube. Higher values make the particles move slower. In contrast with the curve flow, where traverse time is not guaranteed, the tube flow makes sure that the traverse time is matched, via a expression.

## ***Tool Dialog Menus***

### **Edit**

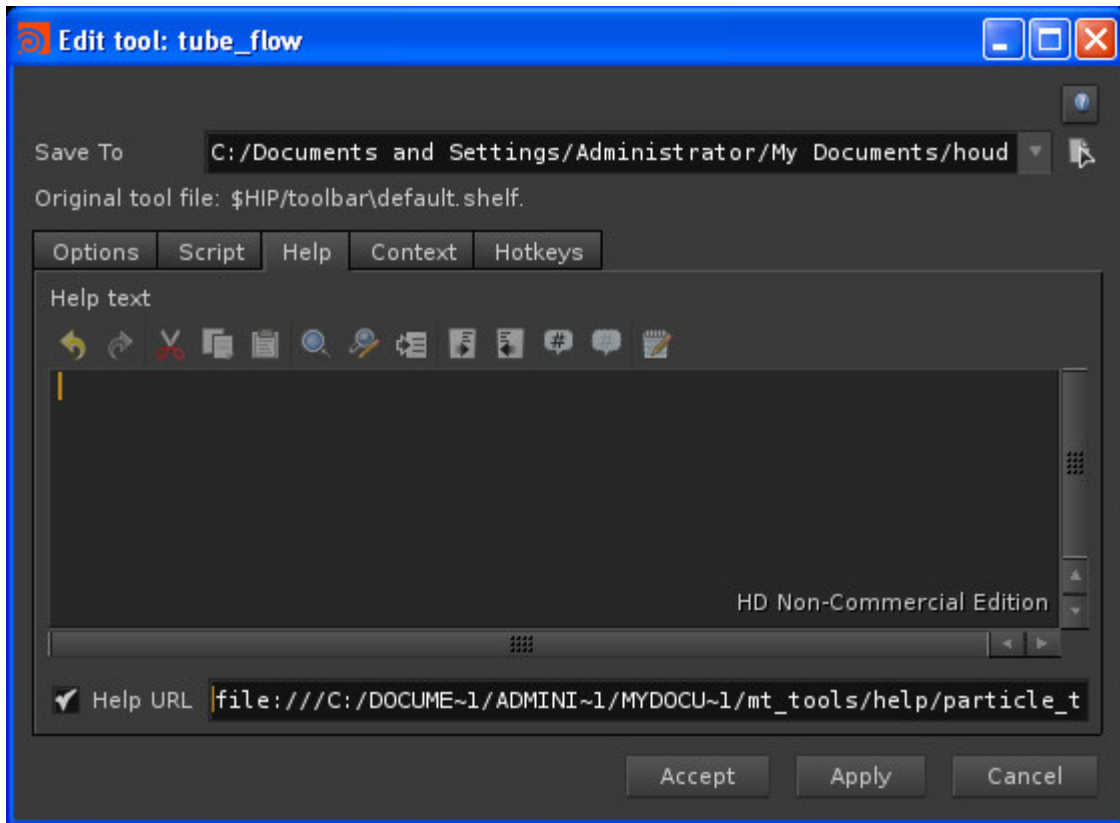
Save Settings	Saves the dialog settings to \$HOUDINI_HOME/houdini_tube_flow.pref, where \$HOUDINI_HOME is Houdini's home directory. For example, for Houdini 10, On Windows it defaults to My Documents/houdini10.0/, whereas on Linux it defaults to ~/houdini10.0/
Reset Settings	Resets the values to the defaults.
Import Settings	Imports the settings from an external file.
Export Settings	Exports the settings to an external file.

### **Skin**

Light	Sets the dialog's colors to lightgray background and black text font.
Dark	Sets the dialog's colors to darkgray background and lightgray text font.

### **Help**

Help on Particle Tube Flow Tool	<p>Opens this helpcard in a Houdini help browser.</p> <p>Note: You can also open the helpcard by hovering the mouse pointer over the tool's icon and pressing F1. To enable this behavior, you need to enter the location of this helpfile in the Help URL in the tool's Help tab.</p>
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## ***Modifying an existing setup***

After the tool's dialog window has been closed, users still have high-level control over the tube flow setup. This is done via spare parameters in the custom “Flow” tab of the geometry object created by the tool.

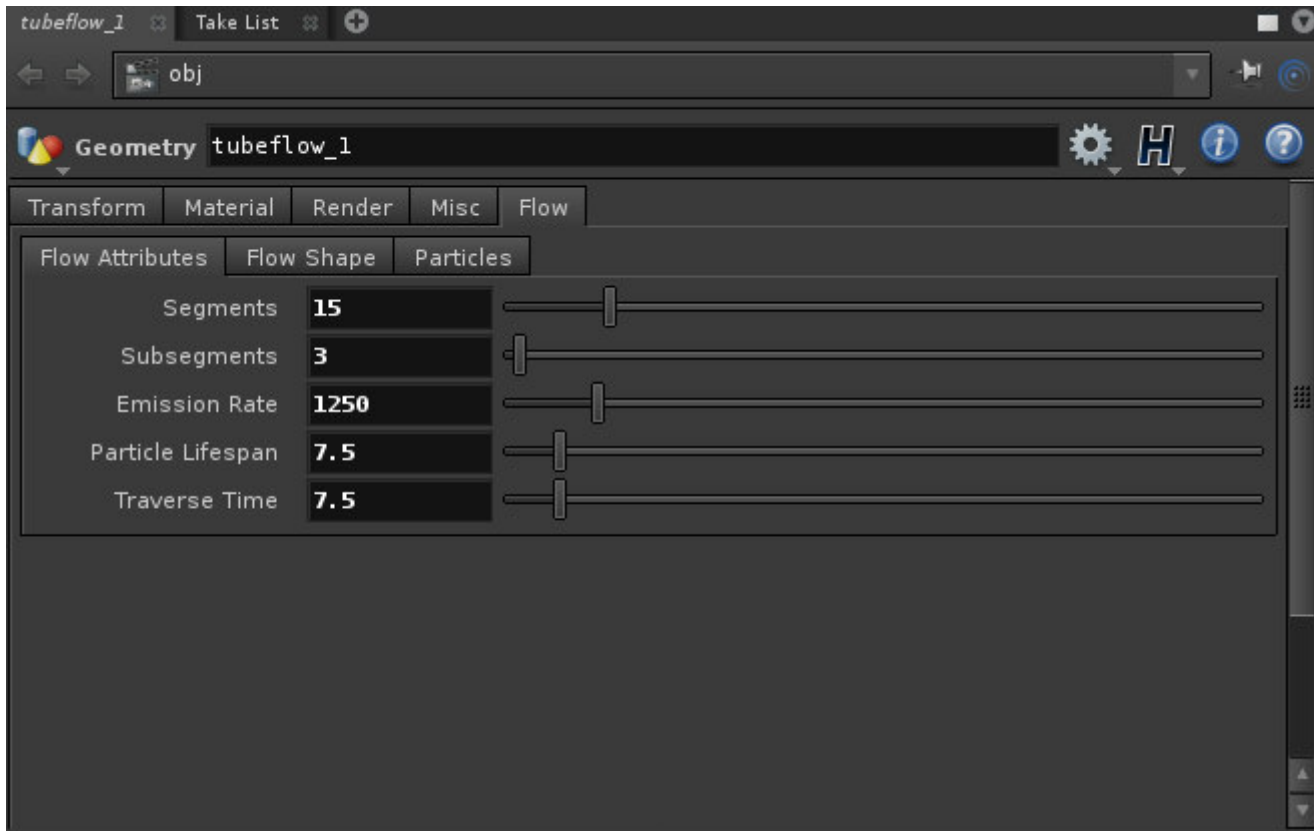
## **Flow Attributes**

These are Flow Attribute settings replicated from the tool's dialog window.

While Maya's *Create tube Flow Effect* tool does not allow changing the number of segments and sub-segments after the effect has been created,

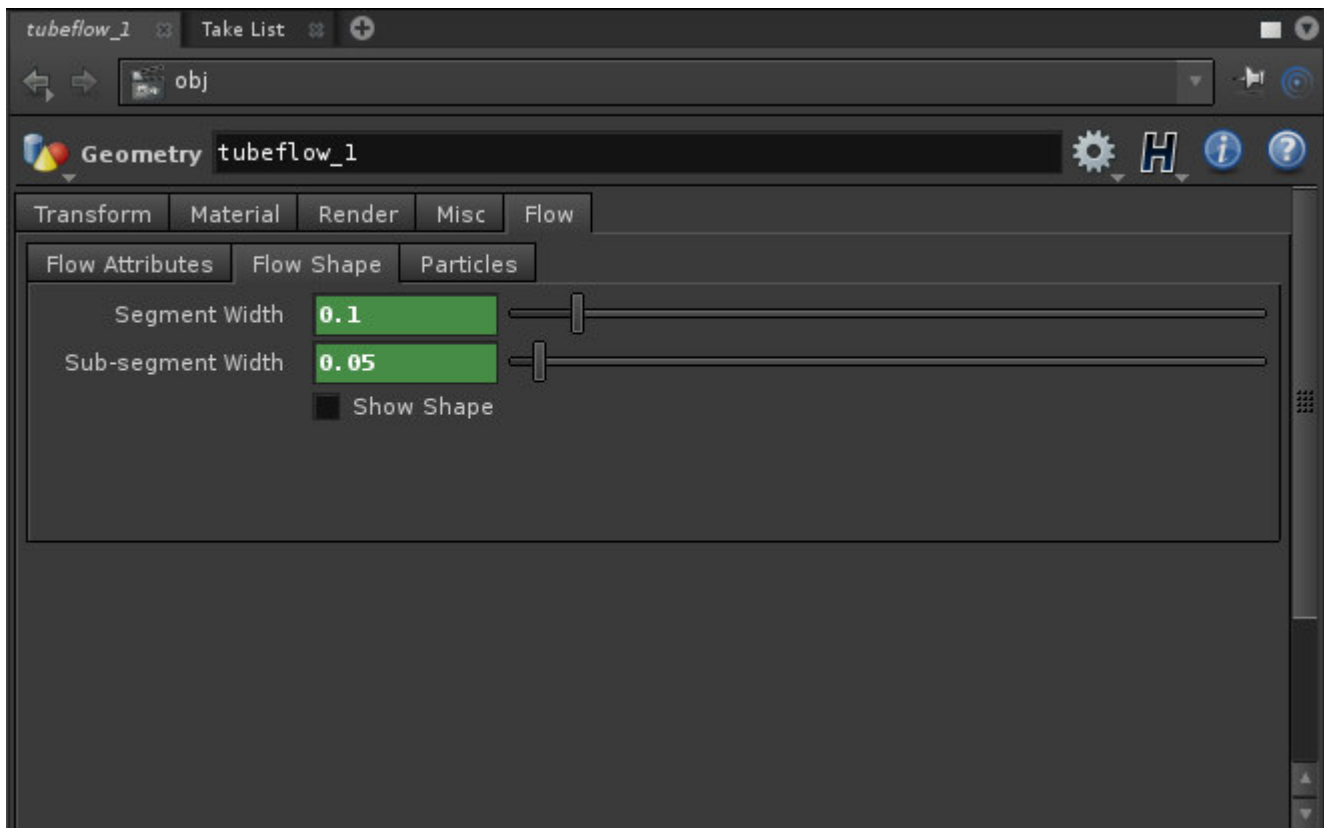
Houdini's procedural nature allows changing them as well.

Adjust the values, rewind to frame 1 if necessary, and rerun the particle simulation.

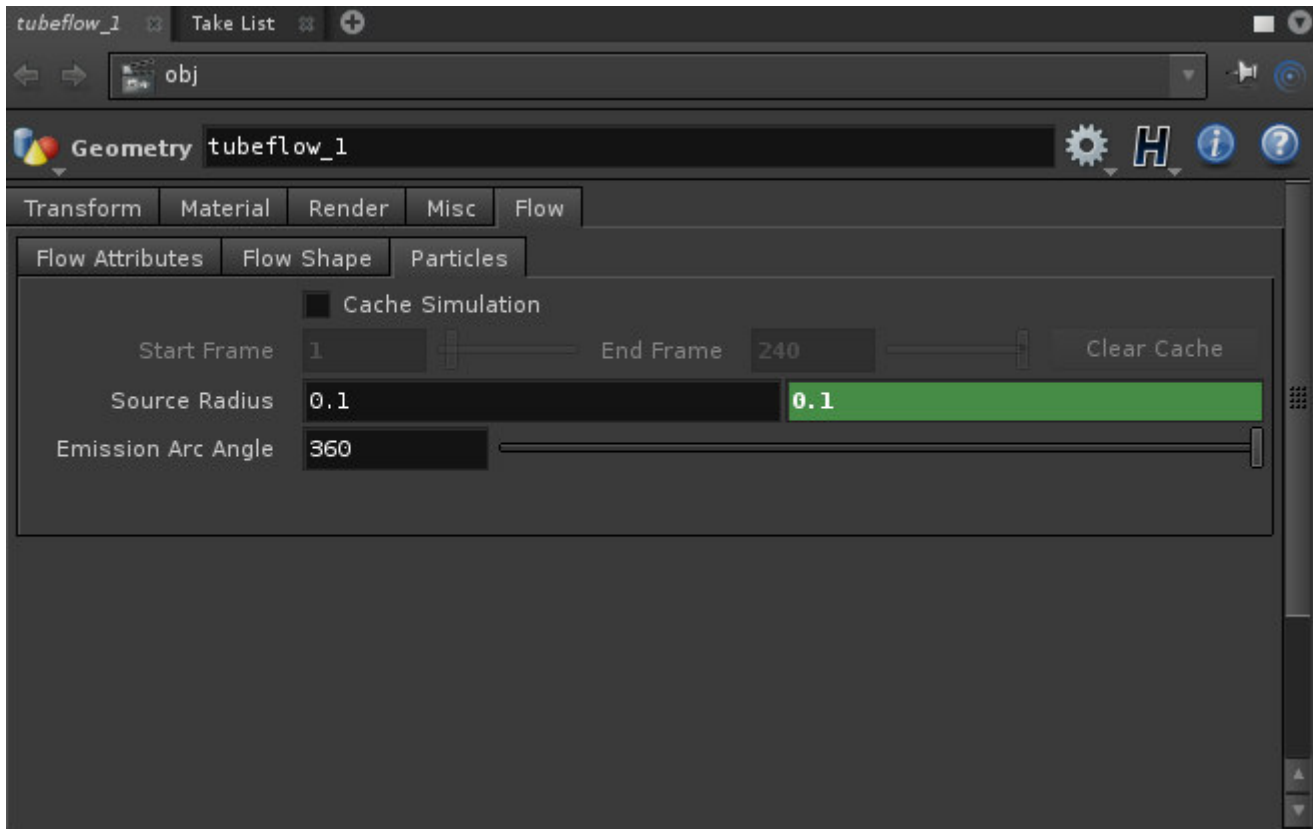


## Flow Shape

Allows control over the width of the shape's segments and sub-segments. Also, allows turning the shape visibility on/off.



## Particles



Cache Simulation	Enable/disable caching.
Start/End Frame	By default caching is set to run from the first until the last frame of the playbar.
Clear Cache	Use to rerun a particle simulation when parameters have been changed or before you disable caching.
Source Radius	Sets the radius of the particle emitter.
Emission Arc Angle	Controls the extent to which the particle flow wraps around the surface. Lower the angle to create a band/ribbon of particles.

### **Example files**

`$HOME/mt_tools/help/particle_tube_flow/examples/`

The example files demonstrate various uses of the particle tube flow tool.