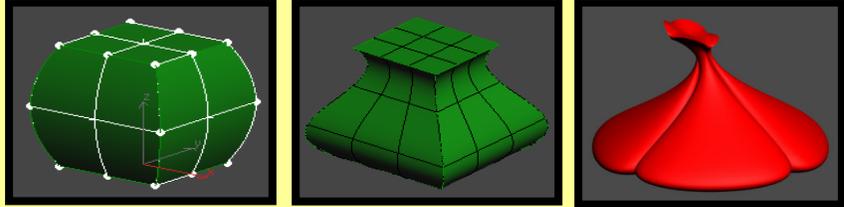


Power Box Tool

In this tutorial, you will learn how to create a Power Box and be shown how to:

- Edit Control Points and Handles.
- Edit Spline Cage Settings.
 - Smooth Bezier Curves, C1 Bezier Curves, Y-Axis Symmetry, Edge Rounding



Tool Used In This Tutorial

This tutorial will be accomplished with the following tool:



Power Box tool (**Pwr_Box**).

Creating Power Box

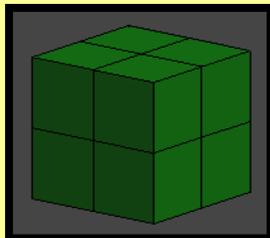
In this section we will discuss:

- A) Smooth Bezier Curves for the Power Box
- B) C1 Bezier Curves for the Power Box

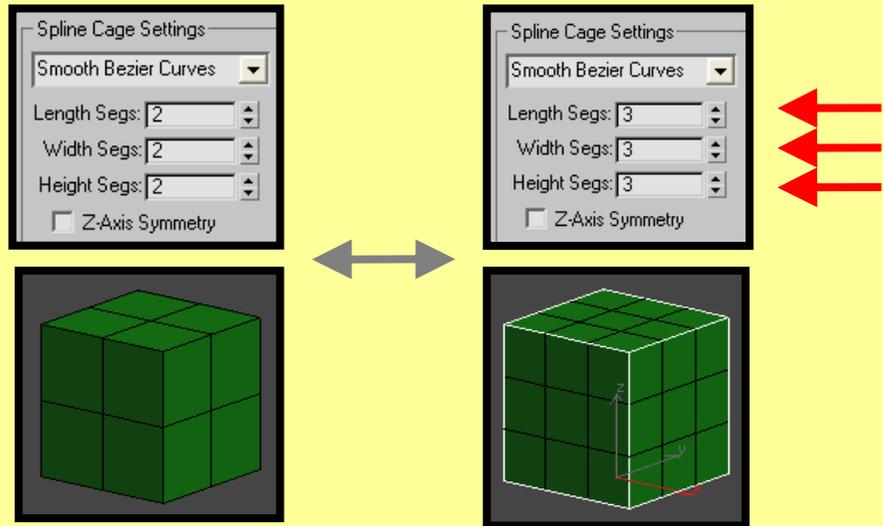
Procedure – Power Box Tool

The Power Box tool provides a convenient way to create a spline cage that consists of 6 Rail Sweep surfaces. The initial shape is a box. The shape of the box can be modified by editing the points and curves of the associated spline cage sketch or using the Sub-Object Point or Sub-Object Curve editing on the Power Box object itself.

- 1) Start off by accessing the Power Box tool .
- 2) In the user view port use the click/drag/click method and create a Power Box shape.



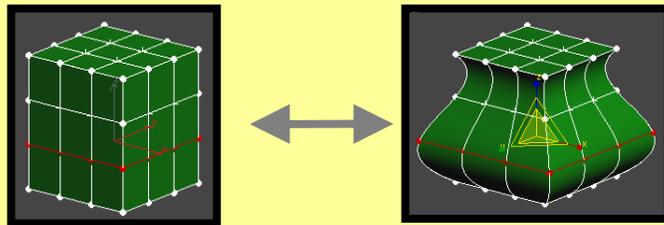
3) While the shape is still selected, go into the modify mode. Under the Power Box Parameters roll out, you can change the Length, Width, and Height segments of your shape by adjusting the spinners. Change the Length, Width, and Height segments to 3 for this example. By Increasing the number of segments in your shape will allow for more detail.



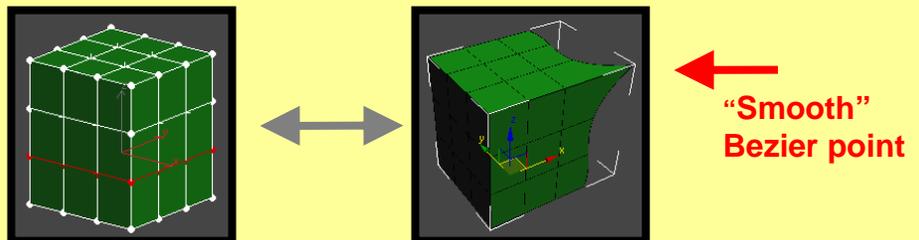
A) Smooth Bezier Curves for the Power Box

1) Change the Spline Cage Type to "Smooth Bezier Curves", if not already done. Select the "Sub Object Curve" option of your "Pwr_Box" sub-object. Ctrl-Shift-Click the third row on your shape. This will select a loop of edges around the box. Scale the selected edges outward to inflate the box along these edges.

- The "Sub Object Curve" sub-object allows you to grab a complete Edge on your object. You can also use the "Ctrl" key to select multiple Sub Object Points and Edges.

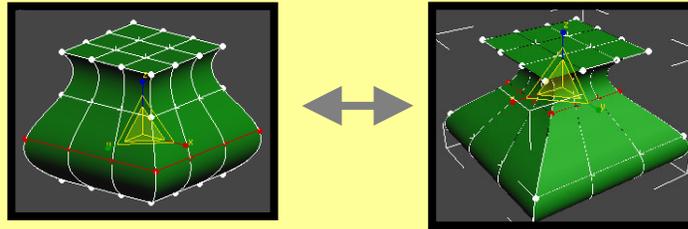


- When working in the "Smooth Bezier Curves" mode, the Smooth Bezier Curves will consist of "Smooth" Bezier points. To alter an object with a Smooth Bezier Curve, for this example, create another 3x3x3 pwr_box object. Go to the Sub Object Point mode and select the top right corner and pull outward. By dragging the Smooth Bezier points, you can alter your object in a variety of ways.

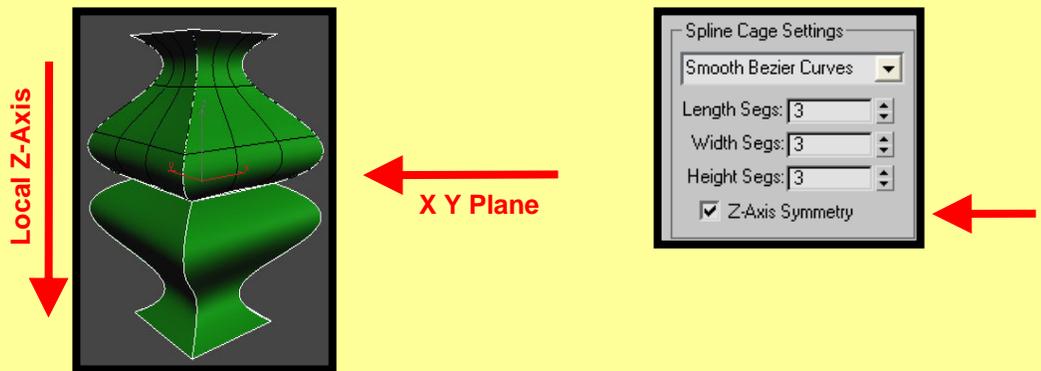


A) Smooth Bezier Curves for the Power Box

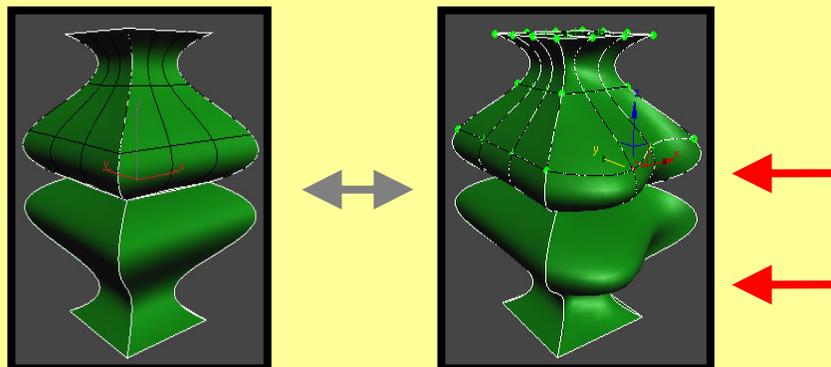
2) Go back to your original object. Select the second row of Sub Object Curve points using the Ctrl-Shift-Click method and Scale inward. This creates a shape that looks like a perfume bottle.



4) While your bottle shape is still selected, Click the “Z-Axis Symmetry” option. This option specifies that a symmetry will be applied at the local Z-Axis about the X Y plane.



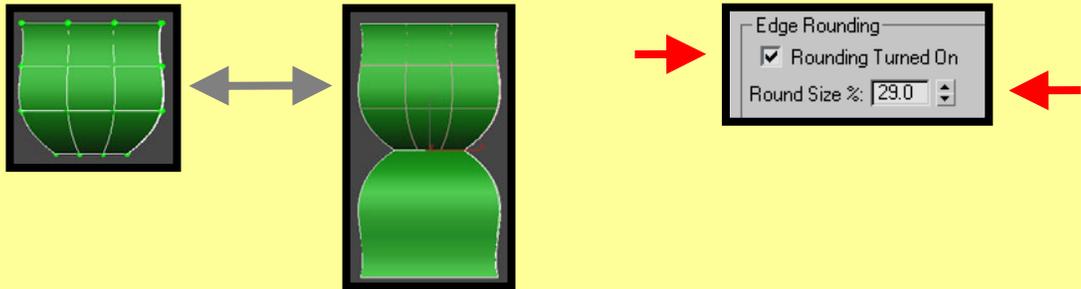
5) Select a “Sub Object point” on the original shape and drag along the local Y-axis“. Any changes you make to the original shape’s sub-d will be reflected on the mirrored shape.



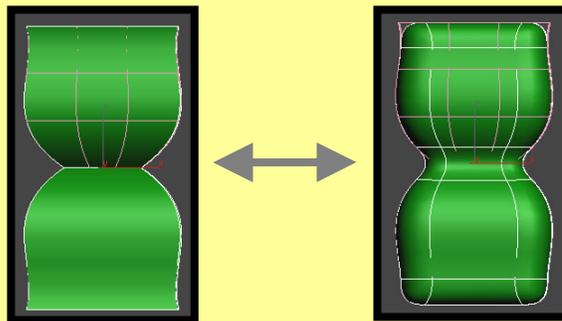
A) Smooth Bezier Curves for the Power Box

6) Examining the Edge Rounding options. Edge Rounding is useful for smoothing between all edges and at the corners of your Power Box. If symmetry is turned on, it will also blend the connection between the symmetric objects.

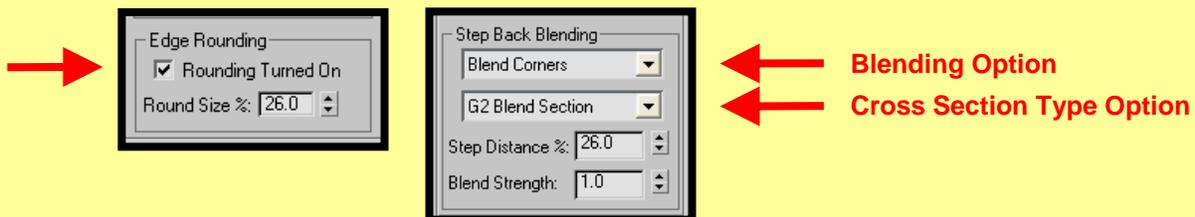
Create a new Power Box. Go in to the "Sub Object point mode" of the Box and select the entire bottom row of points and scale inward. While your shape is still selected, Click the "Z-Axis Symmetry" option. Next, turn on the "Rounding Turned On" option and adjust the "Round Size %" spinner.



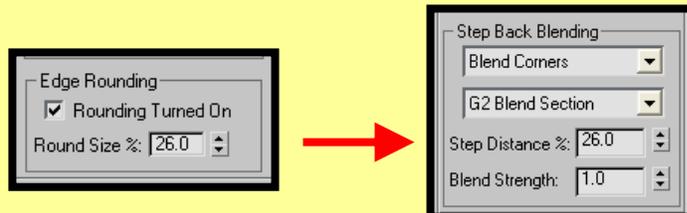
By Adjusting the "Round Size %" spinner, the higher the value the smoother the blends between the two mirrored objects surfaces and the corners of the resultant shape.



When the "Rounding Turned On" option is selected, this is a short cut for turning on the "Step Back Blending" options in the "Power Surface Parameters" panel. When the "Rounding Turned On" option is selected, this option sets the Blending option to "Blend Corners" and the Cross Section Type option to "G2 Blend Section" in the Step Back Blending dialog.



As you adjust the "Round Size %" spinner, the "Step Distance %" spinner within the Step Back Blending dialog adjust simultaneously.



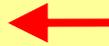
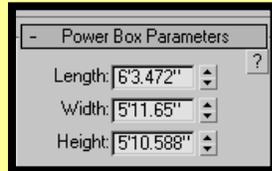
A) Smooth Bezier Curves for the Power Box

7) While the shape is still selected, you have the option to adjust the Length, Width, and Height settings under the Power Plane Parameters roll out of your shape.

Length: Size of the Box in the X direction of the local coordinate system.

Width: Size of the Box in the Y direction of the local coordinate system.

Height: Size of the Box in the Z direction of the



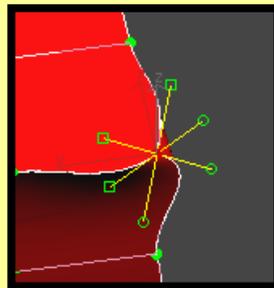
Note: the modification of the **Length**, **Width**, and **Height** of your shape will reset the spline cage to the original rectangle shape and loose any edits done on the spline cage. Once you have modified the spline cage, you can change the number of segments without resetting the rectangle shape because the new spline cage is generated using the existing surface.

B) C1 Bezier Curves for the Power Box

The “C1 Bezier Curves” spline cage type works very similar to the “Smooth Bezier Curves” spline cage type except for the operation of the Bezier curves.

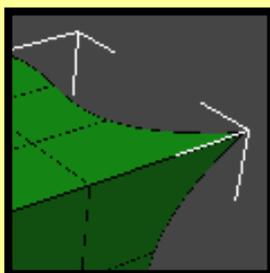
1) Let us look at the operation of the “C1 Bezier Curves” points.

When working in the “C1 Bezier Curves” mode, the C1 Bezier Curves will consist of “C1” Bezier points. The C1 Bezier point contains Three sets of Control Handles for the edges and corners of your Box and Two sets of Control Handles for the sides of your Box to assist you in defining your shape.

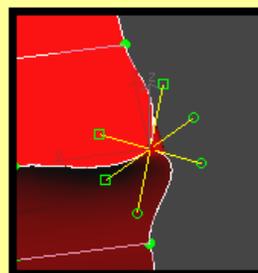


“C1” Bezier point with three sets of control handles for the edges and corners

Recap: For the Edges and Corners of your box, the “Smooth Bezier Curves” use “Smooth” Bezier points and the “C1 Bezier Curves” use “C1” Bezier points with Three sets of Control Handles.

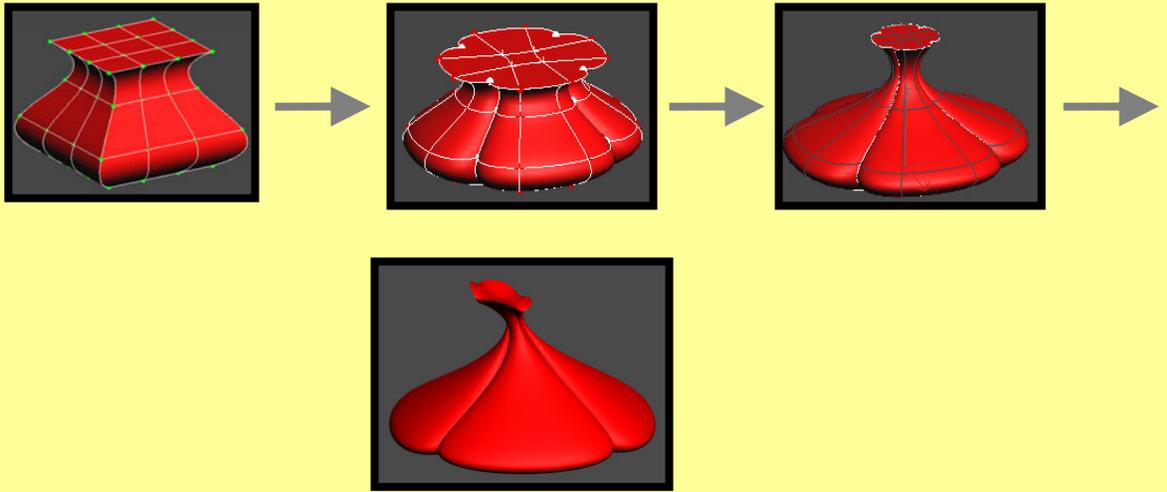


“Smooth” Bezier point

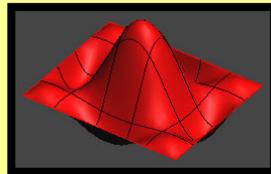


“C1” Bezier point with three sets of control handles

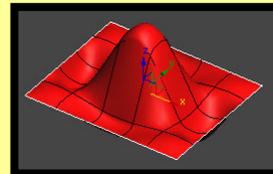
2) By altering the Control handles you can create interesting forms.



Also, another interesting difference between “C1 Bezier Curves” and “Smooth Bezier Curves”. The “C1 Bezier Curves” has less rippling effects on the surface of your shape because of the added vector constraints to the localized edits. Notice the difference in the wavelike motion between the “Smooth” and “C1” bezier curves.



↑
“Smooth”
Bezier point



↑
“C1”
Bezier point

Because the “C1” and “Smooth” bezier curves parameters work very similar, refer back to the “A) Smooth Bezier Curves for the Power Box” section in regards to:

- “Length”, “Width”, and “Height” Segment settings
- “Y-Axis Symmetry” option
- “Rounding Turned On” option
- “Round Size %” setting
- Rectangle “Length”, “Width”, and “Height” settings

Summary

In this tutorial, you were shown how to create Power Box using:

- Smooth Bezier Curves spline cage type
- C1 Bezier curve spline cage type

You were also shown how to modify a Box using:

- “Length”, “Width”, and “Height” Segment settings
- “Y-Axis Symmetry” option
- “Rounding Turned On” option
- “Round Size %” setting
- Rectangle “Length”, “Width”, and “Height” settings



Power Box tool (**Pwr_Box**).