

MeshBoolean



Version 1.6 – December 2017

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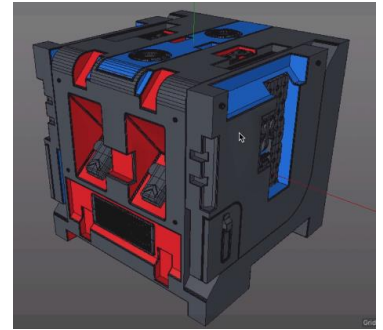
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1. Introduction

“MeshBoolean” is a Cinema 4D Generator plugin that will speed up your solid modelling process.

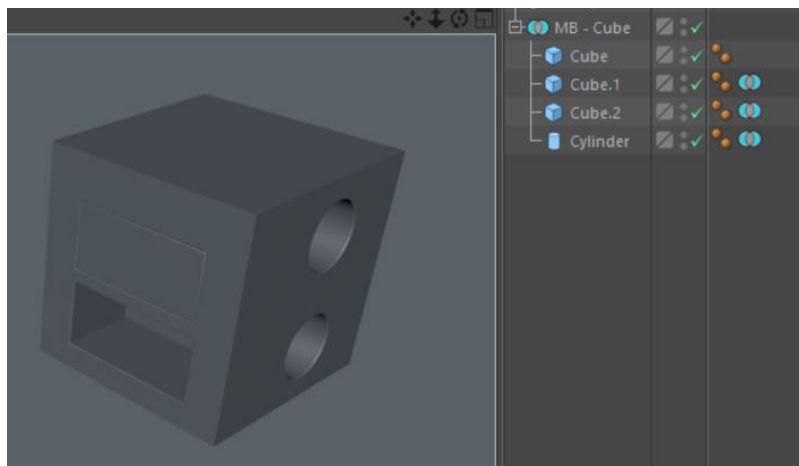
Basically it has a well thought user interface for using Booleans and together with an easy workflow, it will speed up your solid modelling process. No need to use Null, Connect or Symmetry Objects!

And the good thing – it is all is parametric!



Here a typical and simple example:

Only 4 objects and two tags will generate this beautiful result.



Using tags you can define Boolean Type, Bevel parameters, Symmetry options and much more. Imagine doing this with standard Cinema 4D tools and objects!

To add objects to the MeshBoolean quickly (using short cuts and/or Icons), we added 4 Command plugins. For each MeshBoolean tag (see below), we added a Command

For more information, tutorials and FAQ, please visit our website at www.thegreatsummit.com.

Note: Internally the plugin uses Cinema 4D’s Booleans and thus has the same Boolean ‘limitations’ and flaws of the Cinema 4D Boolean algorithm.

1.1 Version V1.5

MeshBoolean V1.5 now supports MoGraph.

1.2 Version V1.6

MeshBoolean V1.6 now supports:

- Smoothing. See chapter 3.2
- Bevel material. See chapter 3.3.

MeshBoolean V1.6 issues fixed:

- Handling of materials

MeshBoolean V1.6 known issues:

- Putting a material on individual objects does not work when Smoothing is selected. Putting a material on the MeshBoolean generator works.
- When Cut-In is selected, Smoothing does not work.
- Optimize and Solid Bevel First are not taken into account when Smoothing is selected.

2. Installation

When you buy the plugin from our website, you will receive an email with a zip file containing the plugin and one year support.

Just unzip the zip file in the Maxon Cinema 4D plugins folder and you are ready to go.

2.1 Compatibility

- CINEMA 4D R17 or later (latest build for each version).
- Studio, Visualize, Broadcast and Prime, Student.
- Both Mac & PC builds are included.
- 64 bit only.

Note: For this plugin, license and support policy has been changed!
This plugin does not require a license file based on your Cinema 4d license.
So, when you buy the plugin, you do not need to enter your Cinema 4d.

3. Using MeshBoolean

Using MeshBoolean is very easy.

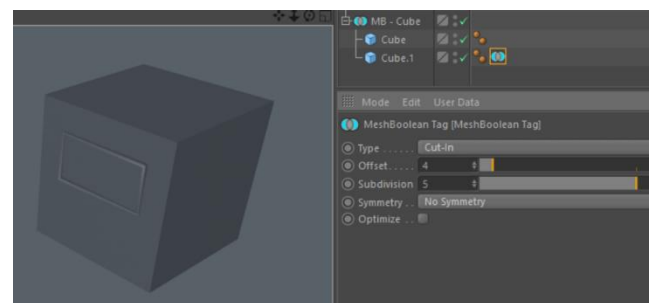
We put a lot of effort in making this plugin easy and with minimal mouse clicks to use.

Basically you add child objects (minimal two) to the plugin and define per child the type of Boolean, Bevel options and Symmetry options.

Let's build our example from above.

- Start the MeshBoolean plugin
- Add two cubes, one smaller than the other and place the 2nd cube where you want it
- Add a MeshBoolean Tag to the 2nd child.
- Set Type to Cut-In and set the Bevel options.

On the right the first result.

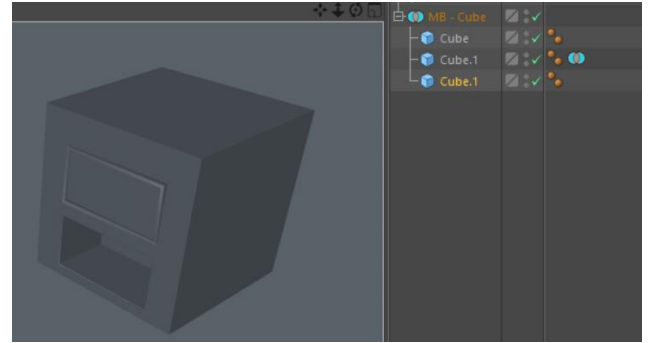


- Now add a 3rd cube to MeshBoolean, scale it and place it.

Because there is no tag added, the default values now apply:
Type = A Subtract B, Bevel Offset = 1.0 and Subdivision = 2.

On the right the second result.

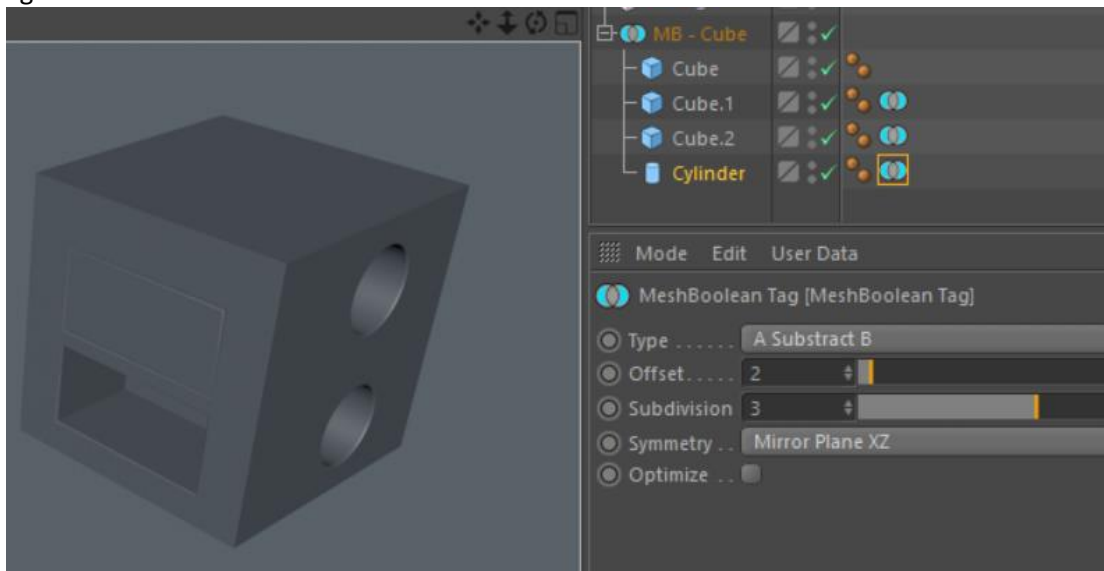
- Now add a Cylinder to the MeshBoolean with Orientation +X, scale it and place it.



Again, because there is no tag, the default values now apply: Type = A Subtract B, Bevel Offset = 1.0 and Bevel Subdivision = 2. So, let's add a MeshBoolean tag and set Symmetry.

- Add a MeshBoolean tag and set Symmetry to Mirror Plane XZ

This will give us our final result.

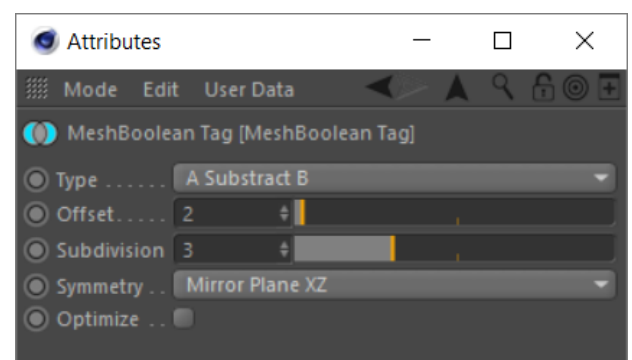


3.1 MeshBoolean Tag

With the MeshBoolean tag you define per child the Boolean Type, Bevel options, Symmetry Options and Smoothing.

Following types are defined:

- Subtract (A Subtract B)
- Cut-In
- Union
- Intersect (A Intersect B)



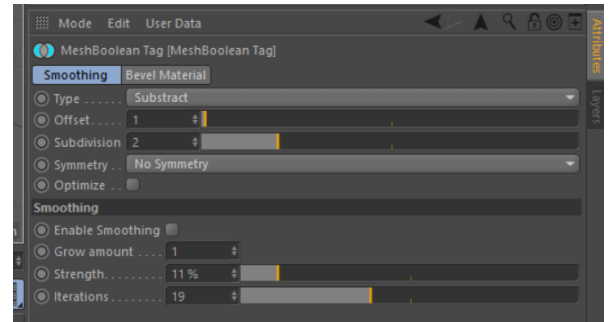
Note: If there is no tag, the default values apply:
Type = A Subtract B, Bevel Offset = 1.0 and Bevel Subdivision = 2.
No symmetry and no smoothing.

Note: The first child object of the MeshBoolean is considered the master, the A object.
Adding a MeshBoolean tag to this master will have no effect.

3.2 Smoothing

To smooth the edges even further, 'Smoothing' is added.
The edge between the two objects is given an extra smoothing using the Smoothing Deformer (internally).

Note: This is especially useful if you use Union and rounded objects like Cylinders and Spheres.



Grow amount:

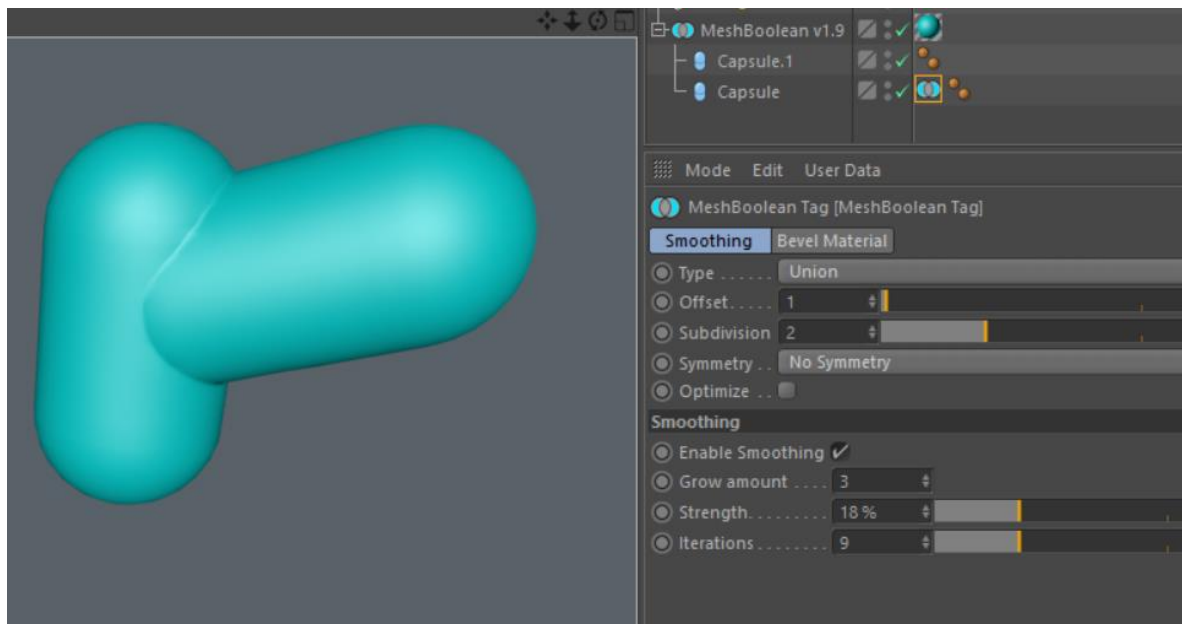
This defines how many polygon loops should be added to the current bevel (the edge between the two objects).

Strength [0..100%]:

This parameter controls the strength of the Smoothing Deformer. Lower values will restore the object toward its non-deformed state.

Iterations [0..50]:

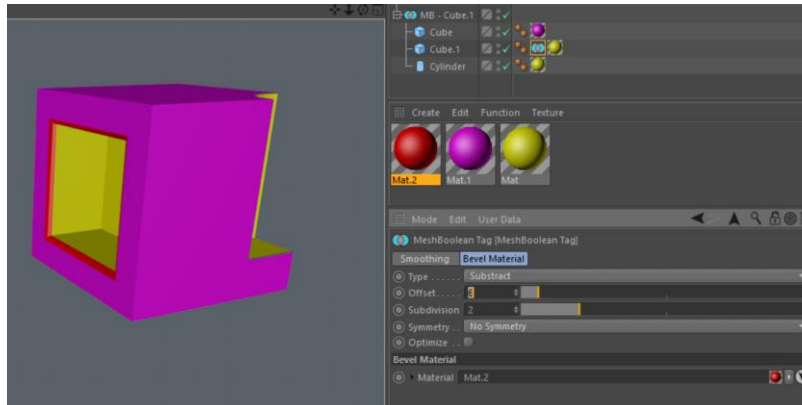
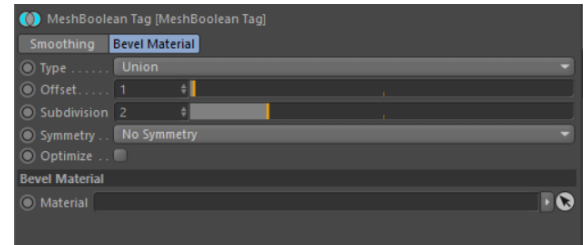
Defines how many times the smoothing algorithm will be applied. Increasing iterations will accentuate the impact of the deformer, if you prefer, by smoothing the mesh further. Do not increase this value too much, as CINEMA 4D could become unresponsive depending on your machine.



3.3 Bevel Material

This is an easy way to apply a material to a bevel.
Just Drag & Drop a material on the link field and the material will be applied to object.

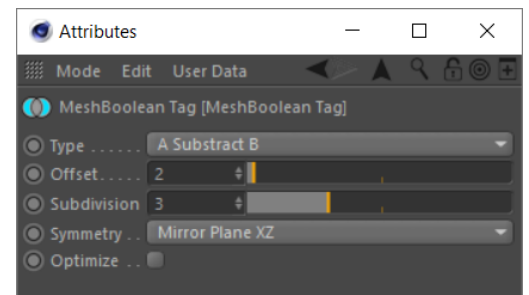
Note: The Selection field of the material texture is set to the object's name. Internally the bevel polygon selection is given the same name as the object.



4. MeshBoolean Commands

To add objects to the MeshBoolean quickly (using short cuts and/or Icons), we added 4 Command plugins. For each MeshBoolean tag we added a Command:

- MeshBoolean Command Subtract
- MeshBoolean Command Cut-In
- MeshBoolean Command Intersect
- MeshBoolean Command Union



Note See for the 5th MeshBoolean Command, the Bake command, paragraph 4.4.

You can define your own short cuts and icons to each of the above Commands.

Before you run the command you must select two objects:

- If none of the two selected objects is a MeshBoolean object, a new MeshBoolean object is inserted and both selected objects are inserted as children of the MeshBoolean object.
- The corresponding tag is added with the corresponding type set to the second child.
- The name of the new MeshBoolean object will be: "MB - " + name of the first child (the first selected object).

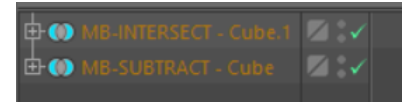
Note: The objects are inserted according to the sequence you selected the objects.

- If one of the objects selected is a MeshBoolean object, the other selected object is inserted as the last child of the MeshBoolean.
The corresponding tag is added with the corresponding type set.

4.1 MeshBoolean Command Cut-In

When the MeshBoolean Command Cut-In is used (A Subtract B and A Intersect B), two different MeshBooleans are created.

One for the A Subtract B (named "MB-SUBTRACT – 'Name of first child'") and one for the A Intersect B (named "MB-INTERSECT – 'Name of second child'")



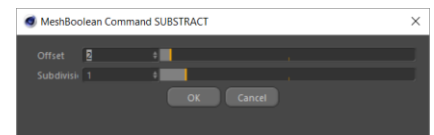
Now you can add other objects to either of the two MeshBooleans, thus having more control.

Note: Using the command mode, two MeshBooleans are created. Using the 'manual' mode and setting the tag to A Intersect B, there is only one MeshBoolean.

4.2 MeshBoolean Command Options

Each MeshBoolean Command has an option dialog, where you can set the Bevel options Offset and Subdivision.

When the tag is created by the MeshBoolean Command, these options are copied to the MeshBoolean Tag Bevel options.



4.3 Example MeshBoolean Command

So, let's do our example using MeshBoolean Commands.

- Create, resize and place two Cubes.
- Select the two Cubes in the correct order. First object A and then object B.
- Select MeshBoolean Command CUTIN or select the short cut or icon assigned to the command. If needed you can change the bevel option using the command options dialog.
- Two MeshBoolean objects will be created, each with the two children.
A MeshBoolean tag is added to the second child (object B). For the Subtract MeshBoolean the tag is set to A Subtract B and for the Intersect MeshBoolean the tag is set to A Intersect B.
- Add another Cube and scale and move it.
- Select that Cube and the Subtract MeshBoolean and select MeshBoolean Command SUBTRACT or select the short cut or icon assigned to the command. If needed you can change the bevel option using the command options dialog.
- The Cube will be inserted as last child of the selected MeshBoolean object.
A MeshBoolean tag is added to the Cube.
- Now add a Cylinder with Orientation +X and scale and move it.
- Select that Cylinder and the Subtract MeshBoolean where you want to add the Cylinder to.
- Select MeshBoolean Command SUBTRACT or select the short cut or icon assigned to the command. If needed you can change the bevel option using the command options dialog.
- The Cylinder will be inserted as last child of the selected MeshBoolean object.
A MeshBoolean tag is added to the Cylinder.
- Select the Cylinder's MeshBoolean tag and set Symmetry to Mirror Plane XZ

Done!

4.4 MeshBoolean Command Bake

This command bakes the MeshBoolean object and all its children to one polygon object.
Just select a MeshBoolean and give the command.

The Original MeshBoolean and all its children will be deleted.
Of course this can be undone with the Undo commands.

5. MeshBoolean settings

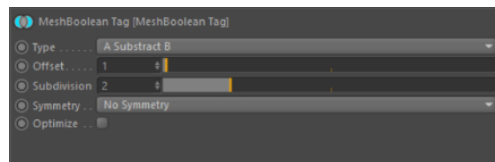
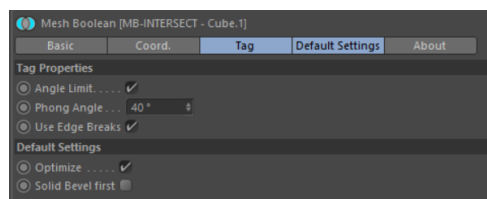
5.1 Optimize

Optimize can sometimes improve the mesh generated.

There are two way to optimize the mesh.

- 1) Using the Optimize parameter that can be found under MeshBoolean setting - Default Settings.
- 2) Using the Optimize parameter that can be found under the MeshBoolean tag settings.

Note: Optimize is default On.



Below an overview how and when the two optimize settings are used.

MeshBoolean Optimize	MeshBoolean Tag Optimize	Result
False	False	No optimize for this child
False	True	Child is optimized
True	Don't care	All is optimized

Note: When Smoothing is selected, Optimize is disregarded.

5.2 Solid Bevel First

A Solid Bevel before any of the other Bevel will sometimes improve the mesh.

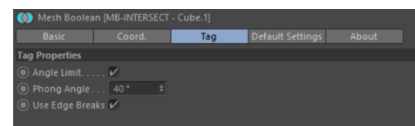
Setting this “Solid Bevel first” option will generate a Solid Bevel internally before other bevels are applied.

Note: When Smoothing is selected, Solid Bevel first is disregarded.

5.3 MeshBoolean Phong tag

On the final resulting object, a Phong tag is added.

You can change the settings for this Phong tag, using the MeshBoolean parameters



6. Do's and Don'ts

'Empty' Null

Do not use a Null without any children in the MeshBoolean hierarchy. When done, no MeshBoolean is created.

Boolean algorithm

Internally the plugin uses Cinema 4D's Booleans and thus has the same Boolean limitations and the same flaws as Cinema 4D's Boolean algorithm.

Adding or moving objects will sometimes screw up the mesh.

Moving objects slightly or changing the sequence of the objects will, in that case, often give a better result. Common "Boolean" sense is your best option.

Sometimes you will see following messages in the Console:

"Modeling Kernel Error: Triangulation"

"Modeling Kernel Error: Failed"

Both are exceptions that happen quite often when you deal with "complex" or overlapping geometry. So, try not to overlap Boolean objects and follow the recommendations given above.

Cubes are best handled by the Boolean algorithm.

Warning – Technical Stuff

The Maxon support team answered on my mentioning of the above console messages: With reference to your request most likely the tool is trying to create degenerated ngons, and our triangulator doesn't digest them comfortably.

Degenerated ngons are usually ngons with:

- collapsed outlines;
- outlines which intersect other outlines or self-intersect;
- collapsed ngons;

At the time of writing the only way to fix them is to remove those ngons or avoid those situations but, in any case, you can easily ignore the error.

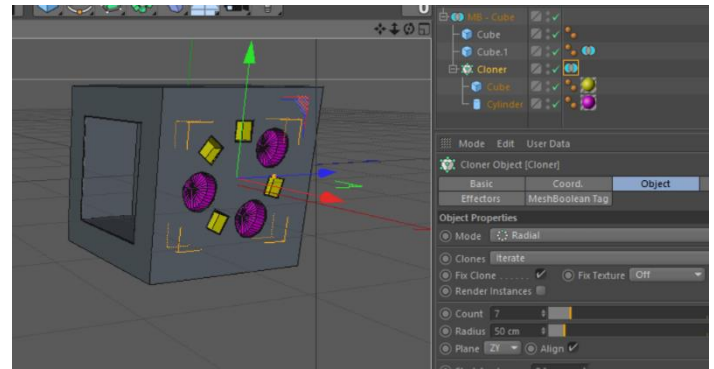
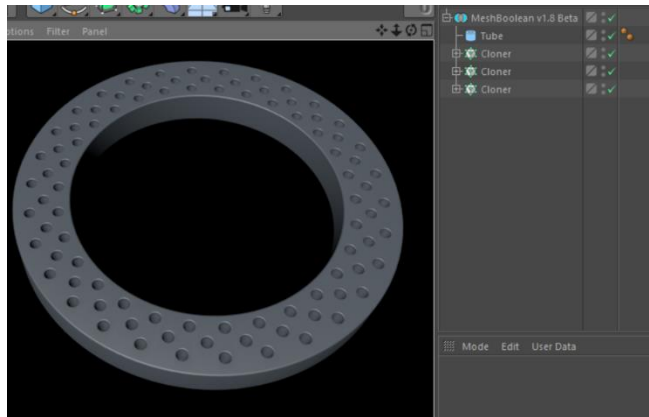
7. Advanced usage

7.1 MoGraph

MoGraph is fully supported.

Just create a MoGraph object and place it under the MeshBoolean generator.

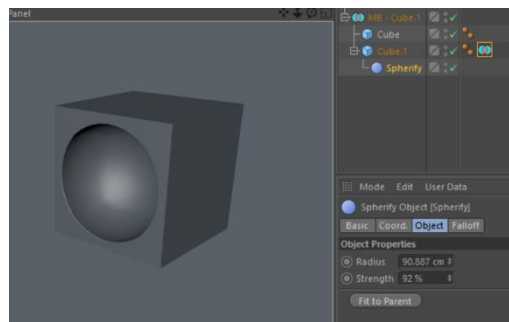
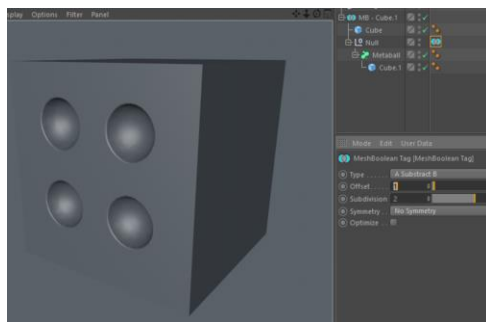
Of course, adding MoGraph Cloners can make the mesh very complex, be careful!



7.2 Modifiers and Generators

Modifiers are supported.

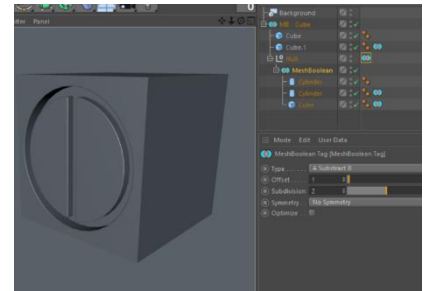
Generators must be placed under a Null.



7.3 MeshBoolean as a child of another MeshBoolean.

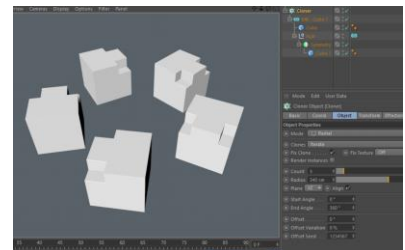
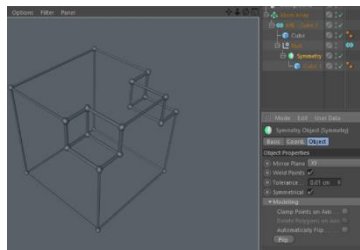
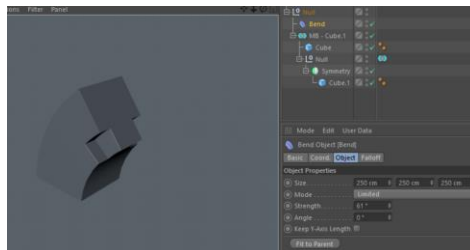
You can add another MeshBoolean under a Null as a child to a MeshBoolean.

Note: Because this creates, most of the time, a complex mesh, it can result in Modelling errors.



7.4 MeshBoolean as a child

Of course you can use the MeshBoolean together with Generators, Modifiers and MoGraph.



8. Examples



