
Subject: How do I make it hollow?

Posted by [jglantz](#) on Fri, 29 Oct 2010 14:44:06 GMT

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I am a total noob to Shapeways and 3d modeling in general.

I want to make my model hollow, otherwise its insanely expensive to order it.

Does anyone have any ideas or advice on how can I do that? I used CB Model Pro to create it, because I can't figure out any other 3D program.

if anyone can point me in the right direction I'd really appreciate it. Also, if I want it to be rescaled...do I have to do that or is there some way to specify that when ordering?

Thanks

its a model of my hedgehog...

http://www.shapeways.com/model/170617/hedgehog.html?gid=ug52_593

Subject: Re: How do I make it hollow?

Posted by [clsn](#) on Tue, 09 Nov 2010 04:47:48 GMT

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I can't find the official FAQ/tutorial/post, but here's the situation:

Owing to the way Shapeways figures volume, things aren't considered hollow unless there's some hole joining the inside to the outside. That is, there has to be a way for the support material on the inside to get out. You can't just have a vacant space in the middle that isn't connected to the outside world.

That said, you *are* allowed to make that connecting hole really really small, such that the support material can't actually get out (and in that case you essentially get the support material for free. Don't abuse this.) But that looks like the problem you have here: you have an empty space in the middle, but it isn't connected to the outside, so it is still considered solid.

What's the link to the post or whatever that explains all this? Also, some of the tutorials are out-of-date: they talk about how overlapping solids are double-charged (they aren't anymore), etc.

Subject: Re: How do I make it hollow?

Posted by [GHP](#) on Tue, 09 Nov 2010 09:13:30 GMT

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I don't know CB Model Pro and I can't see your model (it's set to be hidden, I think), but you could try use "Uniform Mesh Resampling" in Meshlab (on the "Remeshing..." submenu of the "Filters" menu) with a negative offset (use the "Planar simplification" option), invert the normals so that they point inwards, and connect this to the exterior with a tunnel somewhere in the model. You can use a boolean difference operation to subtract a cone shape for the tunnel. Boolean operations are available in Blender (not Meshlab, as far as I know), although they aren't terribly reliable, and are most likely to work with low-resolution models. Similar operations may be available in CB Model Pro.

Subject: Re: How do I make it hollow?

Posted by [globaldeb](#) on Wed, 10 Nov 2010 08:10:17 GMT

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Subject: Re: How do I make it hollow?

Posted by [dmvaldman](#) on Fri, 10 Dec 2010 18:23:23 GMT

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I'm in the same situation as the poster, and also new to this. Say I wanted to make a spherical shell with a certain thickness.

Is there no other way to print it as a hollow object than to make a small tunnel from the outer sphere to the inner sphere?

Do any softwares do this automatically by, say, doing the boolean difference between the outer sphere and the inner sphere?

In particular I'm using Rhino 3D.

Subject: Re: How do I make it hollow?

Posted by [Magic](#) on Sat, 11 Dec 2010 09:13:19 GMT

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The tunnel-thing is really specific to Shapeways. I am afraid that no tool will do it automatically. Look at the video in this model. It is a tutorial (for 3DS Max) to explain how to hollow a die (including the tunnel). Note that if the tunnel is too small, Shapeways automatic tools will just ignore it, so check the price to be sure the hollowing has properly been taken into account.

Subject: Re: How do I make it hollow?

Posted by [shanec102](#) on Sun, 09 Jan 2011 17:36:08 GMT

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I am using zbrush. I have found that the "extract subtool" makes my model to puffy and the wall thickness is uneven. and sometimes i can not get the wall to be thick enough.

Does anyone have a way to make a hollowed out model on zbrush?

I have seen tutorials on meshlab and blender... are these programs the way to hollow out model?

Links to all tutorials on hollowing via zbrush would be appreciated. Also links to meshlab tutorials and blender tutorials for hollowing would help as well?

Subject: Re: How do I make it hollow?

Posted by [razh00](#) on Thu, 27 Jan 2011 09:51:21 GMT

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shanec102 wrote on Sun, 09 January 2011 17:36 I am using zbrush. I have found that the "extract subtool" makes my model to puffy and the wall thickness is uneven. and sometimes i can not get the wall to be thick enough.

Does anyone have a way to make a hollowed out model on zbrush?

I have seen tutorials on meshlab and blender... are these programs the way to hollow out model?

Links to all tutorials on hollowing via zbrush would be appreciated. Also links to meshlab tutorials and blender tutorials for hollowing would help as well?

im in the same situation here

Ã,Â¿anybody knows how to do this?

Subject: Re: How do I make it hollow?

Posted by [shanec102](#) on Thu, 27 Jan 2011 19:11:23 GMT

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Hi razhoo,

I have been playing around with different ways of hollowing on zbrush. And there is a way. I am not sure if it is the most efficient way. When i am done I am going to post a zbrush tutorial in full. But till here is some basic ways I have tried.

I should tell you I am a beginner at zbrush, so there is probably an easier way.

outline:

WAY1:subtract boolean

WAY2:manually

WAY3:extract

WAY4:re-topography

WAY #1 : subtract boolean

1. Draw a cube on the canvas, click Edit button then make it a Polymesh3D.
2. In the Subtool palette, click Append button and select the Cylinder. (will automatically be made a Polymesh3D)
3. Click on the Cylinder in the Subtool palette to make it the active subtool.
4. Go to Deformations submenu and, using the XYZ toggles with the Size slider, size the cylinder to what you want. You can also do the same to move it using the Offset slider.
5. Select the Boolean Subtract (middle) icon on the Cylinder subtool.
6. Select the Cube subtool then click Remesh All button to get a cube with a hole.

From:

<http://www.zbrushcentral.com/showthread.php?t=97643&high light=subtract+boolean>

.....

Tips to save you hours:

1. The "boolean Subtract (middle)Icon" is the 2nd symbol from left to right. It is one empty circle and one white circle overlapped.

2. When you deform the appended object (to be deleted from the initial object) stretch part of it to protrude through the initial object so that when you subtract it, it will make a hole. The hole is for the sand to fall it during the printing.

3. When you deform and are working on the appended object click the transparency button. (on zbrush4 this is on the right at the bottom next to poly f, ghost, solo, xpose, frame, zyz, l.sym, local. floor, zoom..... buttons) you can push and pull the appended shape in and out of the initial object.

4. On stage 5 when you hit 're mesh all'. On the button there are letters x,y,z. This will make the re meshing mirror whatever axis is turned on. If you are sculpting a figure with the x axis mirroring the entire time then it won't matter if the x is highlighted on the re mesh all button. - but if your sculpture is asymmetrical then you will want all buttons off.

5. On step 5 I have had the best success moving the res slider all the way to the right, and the polish to 2 or 3. I do not know what res stands for but the more to the right the more squares the re mesh uses --- therefore more detail is saved. I polish so low to not lose detail as well.

below steps I use on all my hollowing processes _____

6. then I export it using the 3d printer exporter plugin. (you might have to use the decimation master plugin as well). export as a stl binary file.

7. then I use netfabb to check the wall thickness. and adjust the size. and that will give me the file to upload to shapeways

Problems:

1. depending on how complex the model: I have found fishers running through the shell of my model. (fisher : my made up word for a mesh tube that connects one side of the model wall to the other forming what seems to be a tube running through the inside) I do not know if shapeways will print that because at that point in your mesh the thickness is 0, or very close to it. I don't

know how to fix them.

2. After stage 5. depending on how complex the model: You will still need to use control shift to slice your model open and look at cross sections of your models walls. You will have to subtly use the move and smooth key to make sure all your walls are not close, and not too far from the exterior wall.

3. This is a problem for all my hollowing method. You have to re mesh all (i am talking about a simple re mesh here, just hitting re mesh all) once or twice during your sculpting to make sure that your model has one smooth wall around. i.e. no crumpled areas or walls pushed behind each other.

Conclusion:

1. As of now, i have not found a way to get around the 'fishers' problem. so unless your model is fairly simple this method will probably create these fishers.

2. When you are deforming the appended part you will not be able to do this perfectly to get a 1mm wall all the way around. So- this be time consuming and cost you some more money to print.

WAY #2: Manually

1. I litterly mask a circle where i want my hole to be in the model. I then invert the mask so the circle area is now unmasked.

2. then I geometry divide,divide...divide. so that that small circle has a bunch more points.

3. open up sub tool menu, and hit append, ----append the same sculpture you are working on. (in your subtools you should have 2 of the same sculpture) -- Then click transparency. (The appended subtool should be transparent now.

4. I use control,shift , drag then alt to hide as much of the masked initial subtool as possible. (

My first subtool should be just the circle, and the second subtool should be a transparent full sculpture) now you are ready to start sculpting the inside walls.

5. Use move and smooth to turn the flat circle into an inner shell the best you can. Make sure the none of the inner wall is poking out of the transparency.

6. shift, control - tap the outside area to bring the entire initial sculpture into view. and hide or delete the appended sculpture.

7. use shift control to view cross sections of your model. The outside wall will be masked so it wont move. This way you can move the inside wall as close/or away form the outside wall. (i slice the model many times and just wok on the outside edge of the cross section) --- this can take hours.

problems

1. very, very time consuming
2. the shell will not be perfect so will cost you \$\$\$ in printing.

conclusion

1. If you are doing multiple prints the time put into this process is acceptable.
2. IF you just want to hollow a large chunk of the center area but are not to concerned with getting the walls to 1mm accuracy this will be fairly fast and will work.
3. The simpler the model the easier and more efficient this is.

Way 3 extract

1. open sub tool menu.
2. hit extract button (i set E smt and s smt to zero) (depending on the complexity of your model i set the thickness form .2 to 1. The bigger you want to print the small the extract thickness can be.
3. I will then use control shift to slice my model and correct areas that overlap. (If you have a clean model. meaning your re meshed a couple of time while you were sculpting and have no

overlapping areas, this part will not take long. i just look for areas that crease in my model when i am fixing stuff.)

Problems

1. Extracting puffs out the model. So if you are doing portraits this will screw up allot of your detail. The bigger the extracted thickness the more distortion. I do not know how to extract so the distorted wall goes inward. what i do is make the extracting process part of my sculpting process. What i mean is. i extract before i am finished sculpting. I extract when my model is still a bit general looking. Then after the extraction i sculpt (only add) on to the surface wall. You cant really subtractive sculpt, as you will crush your wall in.

conclusion.

I can get my cheapest most accurate wall this way. But obviously my sculpting process is changed and my freedom to change things toward the end is reduced quite a bit.

This 'extract' process is only good for models of 40x40x40mm or larger really. Once you start going smaller you will have to extract a thicker wall and this will distort the model to much. above 40mm and the extract distortion is manageable. because you can stay around .3 -.5 extract thickness.

Way #4 re-topography

There is a way to re mesh using retopography. And you can set your wall thickness using this. and then you project the details onto the new topography using the project brush. I have not figured out re topography yet. and this does not seem very fast at all to me either.

Subject: Re: How do I make it hollow?

Posted by [shanec102](#) on Thu, 27 Jan 2011 19:54:24 GMT

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2 questions

1. There must be a way to extract inward - so you don't loos the initial detail?

re topography an projection will do this to some degree ... but i am not sure how it deals with areas like fingers... will it push wall through each other at narrow points?

2. is there a way to isolate walls? for example if i can mask my inner wall while i am working on the outer wall that would be a huge help. - maybe poly grouping.. but how?

I think on blender there is a button you push so that you dont effect the walls behind the wall you are working on. is there something like this in zbrush?

Subject: Re: How do I make it hollow?

Posted by [dizingof](#) on Thu, 27 Jan 2011 20:39:47 GMT

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Hey guys

After seeing so many of these kind of threads i thought ok i'm willing to help out (when time permits) and hollow any complex/organic/zbrush models with an exact wall thickness you choose (for ex: 1.5mm for plastics, 3mm for full color sandstone/steel/glass etc.) throughout the inner model's bumps and curves and with NO change to the outer topology.... up to the 500k poly limit or your own limit - for a maximum savings on printing cost - see examples on my own models using the 'view in 3d' java viewer .

ex: Human Male

Cheers

Subject: Re: How do I make it hollow?

Posted by [shanec102](#) on Thu, 27 Jan 2011 21:02:51 GMT

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dizingof

Your walls are really great. Your services would save me a tone of time. I would eventually like to learn how to do this on my own. But until i learn how to do this your services are greatly appreciated.

shane

Subject: Re: How do I make it hollow?

Posted by [razh00](#) on Thu, 27 Jan 2011 21:14:17 GMT

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Amazing dizingof

when you have time ã,â¿could you please make a tutorial?

Im sure many noobs like me will be really thankful

Subject: Re: How do I make it hollow?

Posted by [dizingof](#) on Thu, 27 Jan 2011 21:16:47 GMT

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razh00 wrote on Thu, 27 January 2011 21:14

Amazing dizingof

when you have time ã,â¿could you please make a tutorial?

Im sure many noobs like me will be really thankful

well... i was a total noob too a year ago..

Subject: Re: How do I make it hollow?

Posted by [shanec102](#) on Thu, 27 Jan 2011 21:23:47 GMT

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As my previous hollowing "tutorial" shows... I obviously dont know what i am doing.

Looking at dizingof's walls makes my walls look amateur at best.

Dizingof

Do you have any pointers. Maybe what software you are using? or a youtube video? anything?

I feel like i am spinning my wheels with my efforts in zbrush.

shane

Subject: Re: How do I make it hollow?

Posted by [cottontail](#) on Mon, 13 Jun 2011 07:49:49 GMT

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I'd buy the requisite number of items from your shop if you could give me a tutorial on how to painlessly hollow out a design sculpted in zbrush.

Subject: Re: How do I make it hollow?

Posted by [dizingof](#) on Mon, 13 Jun 2011 09:04:07 GMT

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sorry cant.

when it comes to zbrush and up to 1 million triangles the task i explained on another thread isn't viable.

however from time to time i will be helping out designers with zbrush models.

Subject: Re: How do I make it hollow?

Posted by [bib993](#) on Tue, 08 Jan 2013 15:01:15 GMT

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Here is an extremely useful tutorial I could find to hollow a model in Meshlab:
<http://www.trompe.nl/2011/10/22/hollowing-a-3d-model/>

However it seems to fail with a large number of faces (It worked for me with 100,000 faces but not with 900,000).

Subject: Re: How do I make it hollow?

Posted by [Tigermoth](#) on Sun, 17 Feb 2013 23:03:41 GMT

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dmvaldman wrote on Fri, 10 December 2010 18:23l'm in the same situation as the poster, and also new to this. Say I wanted to make a spherical shell with a certain thickness.

Is there no other way to print it as a hollow object than to make a small tunnel from the outer sphere to the inner sphere?

Do any softwares do this automatically by, say, doing the boolean difference between the outer sphere and the inner sphere?

In particular I'm using Rhino 3D.

For those lucky enough to have Rhino v5...

<http://www.youtube.com/watch?v=BSkzD35bamQ>

Seems like these kind of features are the holy grail for 3d modelers...I've been trying to just do it by eye and scaling in sub'd programs with little success, Trying to offset the surface inwards when you might have parts of it that don't want hollowing, or getting your outer details tangled on the inside are all issues too...I'm guessing ill have to give in and use yet another 3rd part app to do this post-initial model at some stage :/
