Subject: Threaded holes
Posted by Neaker on Sun, 19 Feb 2012 04:57:55 GMT
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I have a project in mind that needs to be prinnted in several seperate pieces, due to Tight clearances, and the method of assembly requires some threaded holes, that I need for setscrews to hold things together. While I can model the threads, I'm unsure of how well the 3D printing process does them. One alternitive that is far easier to do, is to place an hole in the location I need equal to the minor diameter of the threads I need, and then go back and cut them with a tap. Obviously this limits the Materiels I can use to either plastics or stainless steel. The other materials may be either to hard, or to expensive.

Subject: Re: Threaded holes
Posted by bvr on Sun, 19 Feb 2012 11:22:26 GMT
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Neaker,
If you look around the 3d print community you will find a few printed nuts and bolts, all of them are large(approx. 19mm or bigger) and had to be made with a sloppy fit to ensure turning. As nice as it would be to print my threads I usually just drill and tap my parts.

bvr

Subject: Re: Threaded holes
Posted by GlenG on Tue, 21 Feb 2012 21:57:31 GMT
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So you know, the SS material is hard and abrasive. Carbide drills & taps should be the rule. Pilot holes (tap drill size) could help save some time but probably print tolerances need consideration.

Subject: Re: Threaded holes
Posted by bvr on Tue, 21 Feb 2012 22:49:05 GMT
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Just an fyi for anyone else looking into tapping holes. The listed tap drill sizes are usually for a 72-75% thread. If you are just attaching parts and not looking for max strength use a larger size tap drill, it will make tapping much easier.

For depth of thread engagement the general rule for max strength is "2*D" @ 72-75% thread(2 times the diameter of the bolt). After that its diminishing returns.

One of the most important things, especially on the stainless steel, is your choice of lubricant. If its hard and tough, I use "Tap-Magic"--after tapping hundreds of 4-40 threads in stainless nothing else will do!(and I've never had to use a carbide tap)
For the plastics it's dishsoap and water or compressed air.

@GlenG-
I have not had a chance to machine any of the Shapeways SS. Is the base SS alloy a free-machining alloy?
That being said everything that follows is conjecture..
I have to think with all the bronze/brass in the finished product that it must exhibit some free machining properties? And being that it's relatively hard, would a tool geometry similar to one for brass/plastic work better? Perhaps its just not a mat'l. that likes being cut and prefers the "scrape"?

ymmv

hope it helps some
bvr

edits: can't speel

Subject: Re: Threaded holes
Posted by denali3ddesign on Wed, 22 Feb 2012 03:44:58 GMT
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I've successfully printed 1/4" threads with FUD, but the same print didn't work with WSF. The FUD model worked perfectly with a 1/4" bolt from the hardware store right out of the Shapeways box.

Subject: Re: Threaded holes
Posted by GlenG on Wed, 22 Feb 2012 03:59:59 GMT
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The rules that apply to standard wrought or cast stainless alloys do not apply to the 3d printed stainless offered by SW.
This metal is a true composite, composed of approx 60% alloy 420 ss with the remainder being a tin bronze alloy. Alloy 420 is a hardenable alloy. In any condition it is more difficult to machine than other stainless alloys like 304, 316 etc. Thermal processing of SW prints leaves the material annealed and as machinable as it will ever get. However, something about the fact that this is a composite material makes it a real bear to mill, drill, thread, grind, or polish. Definitely not '"free machining". I am sure there is some big science to explain this, but suffice it to say that hi-speed , even cobalt tooling will have a rough time of it. If you could make more than 3 or 4 holes with a fresh drill bit (no matter what coolant you use) I would be surprized, shocked and humbly, eat my hat. It has just NOT been our experience and we have drilled thousands of holes in this stuff. Flat carbide (not spiral) drill bits rule around our shop.

-G

Subject: Re: Threaded holes
Posted by Brian H on Fri, 24 Feb 2012 05:12:55 GMT
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Hey,

I've had some experience in using screws to fasten small pieces together. If you make an unthreaded hole with a diameter of 3mm to 3.25mm (depending on surrounding wall thickness), thats' enough to fit a 3.5mm screw, the kind you find keeping PC cases together. Just jam it in with a screwdriver and it will carve out the tap its self. If you're only trying to use it to fasten pieces together then how tight the screw fits shouldn't be a problem.

Subject: Re: Threaded holes
Posted by BillBedford on Fri, 24 Feb 2012 22:54:07 GMT
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You should use thread forming screws. These are specially designed for use on plastics.

Subject: Re: Threaded holes
Posted by Greek2Me on Wed, 29 Feb 2012 22:51:03 GMT
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If you are needing a fine thread, say for a machine bolt, you can pick up some threaded inserts at the hardware store, then oversize your holes to suit. Almost all standard threads (Imperial and Metric) should be readily available in both plastic or metal inserts.

Subject: Re: Threaded holes
Posted by bvr on Thu, 01 Mar 2012 02:16:46 GMT
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denali3ddesign,
printed 1/4" threads..pretty neat.

Greek2me, the threaded inserts are a good option. I've got a drawer full of them in 8-32 in brass i had forgotten about..thanks;)

BillBedford, thread forming screws are another good alternative.

bvr