

3D Printed Fly Reel Version 5.1 (1/22/2015)

see [change log](#) at end of this document

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Please forward comments, suggestions and requests to mhackney@eclecticangler.com.

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1. You may not post or give the files away to others. If someone asks you for them, just send them to: <http://www.eclecticangler.com/3d-printed-reel-plans> please.
2. You may not sell reels you create with this design or derivative of this design,.
3. You may post as many photos of your printed reels as you'd like, we love to see what people have done!

Thank you,

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README

The *3D Printed Fly Fishing Reel* is composed of 9 printed parts and a short length of Nylon™ filament for the pawl. There are two reel variations, a simple reel that has solid back plate and spool plates and a ported variation with decorative porting (holes) in the back plate and spool plates. The STL files for the ported variation are in the “Ported Parts” folder. You can mix and match these variations to create some attractive combinations:

1. all solid
2. all ported
3. solid back plate, ported spool plates
4. ported back plate, solid spool plates

In addition to the ported variation, you can expose the spool plates' infill in most slicers by specifying no top or bottom skin. I use KISSlicer and set the *Skin Thickness* parameter on the *Style* tab to “0”. Then, I use a *33% Rounded infill* style. This creates an interesting and attractive “woven” look. You can combine this with the ported option to create even more variations. You can also print the parts in different colors to create interesting effects. Frames in one color and the spool and foot in a complimentary or contrasting color look great. I have lots of photos of how I developed this reel and a few of the many possible variations:

- The story on how I developed the reel: [*Development of my 3D Printed Fly Reel*](#)
- Photos of reels: [*3D Printed Fly Fishing Reels*](#)
- [*Field & Stream's Hook Shots*](#) video of the 3D printed reel catching some BIG trout

Achieving dimensional accuracy can be challenging with additive manufacturing technologies like 3D printing. Factors like printer calibration, filament plastic type, extrusion temperature, and print speed all affect the dimensional accuracy of the printed parts. Fly fishing reels have rotating components that require some degree of precision so I've designed this reel to accommodate dimensional inconsistencies. For example, the main spindle is fluted to minimize rotating friction of the spool. The fluting also helps with fitting the rotating click spindle since there is less print-to-print contact surface. The inside diameter of the click spindle is the most critical dimension for a smooth reel. Since printers and materials vary greatly and can result in this bore being too tight or loose, I've provided three sizes of click spindles (located in the folder named *4-Click-Spindle*), the standard size and one with a smaller bore and one with a larger bore. Start by printing the spindle named *4-Click-Spindle-1 2.4.stl* (see printing instructions below) and test its fit. If it is too tight, print *4-Click-Spindle-1 2.6.stl*, if it is too loose, print *4-Click-Spindle-1 2.2.stl*.

Please read the *PRINTING*, *COMMENTS*, *ASSEMBLY*, and *REEL CARE* sections below for instructions and tips on printing and assembling the reel.

Note: the STL files have a part number as the first part of their name to make them easier to find.

If you'd like to make a small donation for my work, I do have a [PayPal Donate](#) button on the reel's product page.

PRINTING

1-Reel-Back-Plate.stl

Print this part with four perimeters and 33 to 50% straight, honeycomb or round infill. Use a fan (low air flow) after the first few layers of the pillars start to print. If you start the fan too soon, (or too high) it might cause the back plate to warp and separate from the print bed. It also helps to go slow on the first few pillar layers so they bond better to the back plate. I use the print speed sliders in my hot application (Repetier) to adjust the speed manually during a print.

2-Reel-Front-Ring.stl

Print this part with four perimeters and 33 to 50% straight, honeycomb or round infill. Use a fan but, again, don't turn it on too soon or it may cause the part to separate from the bed.

3-Foot.stl

Print this part with four perimeters and 50% straight infill for strength and use a fan after the first 25 layers. Depending on your fan, you might need to lower the fan's speed so you don't warp the part, causing it to curl and separate from the bed.

4-Click-Spindle.stl

Print this part with four perimeters and 33 to 50% straight, honeycomb or round infill. This is a good part to print in nylon.

5-Spool-Back-Plate.stl

Print this part with four perimeters and 33 to 50% straight, honeycomb or round infill. Use a fan on the hub after the first ten layers have printed.

6-Spool-Front-Plate.stl

Print this part with four perimeters and 33 to 50% straight, honeycomb or round infill.

7-Handle-Spindle.stl (I've also provided these as separate files 7a and 7b)

This file contains both the handle and the spindle. Printing both at the same time gives each part a chance to cool. Use a fan (but not too much air flow). Print these parts with four perimeters with 50% straight infill.

8-Spool-Retainer.stl

Print this part with four perimeters with 33 to 50% straight, honeycomb or round infill. Use a fan after the first few layers.

COMMENTS

I combine parts so several print at the same time. Here's how I slice (KISSlicer) and print these parts in four print runs:

1. Parts 1 and 2 at the same time - four perimeters, 33% round infill
2. Part 4 by itself - four perimeters, 33% round infill
3. Parts 5 and 6 at the same time - four perimeters, 33% round infill, no skins so the infill is exposed
4. Parts 3, 7 and 8 at the same time - four perimeters, 50% straight infill

ASSEMBLY

I like to use Gorilla™ Super Glue to assemble my reels. It is a medium thickness glue that is easier to spread and gives a little longer working time than the standard thin super glues.



The spool-spindle and handle-spindle rotating assemblies require some form of lubrication. It is best not to use normal petroleum based oils or greases on these parts. I've found three simple lubricants that work well:

1. Vaseline™
2. Parafin wax
3. my Otter Butter (I find this to be the best and use it on all my reels)



Spindle Fit

Print variation click spindle *4-Click-Spindle-12.4.stl* first, it is the standard size. Sand the fluted spindle (part 1) gently with 400 grit wet-dry sandpaper to remove any nubs and imperfections then test the fit with the click spindle. It should slide over the spindle easily. If the fit is too tight, print *4-Click-Spindle-12.6.stl*, if it is too loose, print *4-Click-Spindle-12.2.stl*. One of these three variations should work. If not, you may need to do a little more sanding of the spindle or drill or ream the click spindle. Lubricate the spindle with Vaseline, paraffin wax or Otter Butter before final assembly of the spool.

Note: this is the most critical fit for the smooth operation of the reel, so take your time and get a nice smooth fit. The click spindle should rotate easily on the spindle.

Click "Pawl" Fit

The click pawl is a short length of 1/16" or 1.75mm Nylon or ABS filament, Nylon is preferred. I use Nylon rod I purchase from [Amazon](#). Cut a piece about 25mm long. The hole for the pawl is hidden inside the rim of the backplate where the large foot pillar is located. Insert the pawl into the pocket from inside the rim. You may need to trim the hole opening or shave down the end of the filament to get it to fit. Once you have a good friction fit, remove it and coat the end with CA glue and re-seat the pawl all the way into the hole.



Once the CA has cured, trim the pawl to fit the click spindle. Place the click spindle over the frame spindle and align the space between two teeth with the check pawl. Mark the pawl with a sharp pencil at the valley between the teeth. Remove the click spindle and cut the pawl to length with a sharp hobby knife. Test the check by rotating the click pawl and listening for a pleasant "click, click, click" and feeling for a smooth action. You can carefully shorten the nylon pawl to get a gentler click. It's also good to round the end of the pawl with fine (400-600 grit) sandpaper.

Frame and Foot Assembly

The foot (part 3) slides onto the foot pillar of the back plate (part 1). It will stop at a little protrusion that locates the foot in the proper place. Do not force it over this protrusion, you may break off the pillar. You may need to sand or trim the inside of the crescent shaped hole in the foot. Once the foot slides on easily, remove it and apply some CA glue all around the pillar where the foot will reside above the protrusion. Install the foot and make sure it is aligned and square to the frame while the CA cures.

Next, attach the front ring (part 2) to the pillars on the back plate. You may have to trim any burrs from the edge of the pockets in the front ring and the top of the pillars with a sharp hobby knife. Be careful not to break the pillars off. Once you have a good fit, glue the front ring to the pillars with a little CA in each pocket.

Spool Assembly

The spool is assembled from three parts (4, 5 and 6). Start by inserting the click spindle (4) into the spool back plate from the bottom. The check ratchet should be flush with the bottom of the plate. You may need to sand the outside of the click spindle. Once you have a good fit, remove the click spindle and coat the lower half and the top of the click ratchet with CA glue, then insert it into the spool back plate. Install the spool front plate (6) onto the spool back plate spindle. Glue this with CA glue and allow the assembly to cure.

Note: if you are using the ported spool parts, make sure to align the holes in the back plate with those in the front plate, it looks better that way.

Handle Assembly

The handle (part 7a) must turn easily on the handle spindle (part 7b). You may need to sand the handle spindle to smooth off any nubs. Once you have a good fit, remove the handle from the spindle. Next, fit the pin at the bottom of the spindle into the hole in the reel front plate. Trim the pin with a sharp hobby knife if necessary, you want a snug fit.

Install the handle on the spindle, using a little vaseline, wax or Otter Butter as lubricant. Coat the spindle pin with CA being careful not to use too much and not to get any on the handle - a toothpick helps here. Insert the pin into the spool front plate and press it firmly into place. Make sure the handle turns freely and that there is no excess CA oozing out. Allow the CA to cure.

Final Assembly

Allow the CA to cure thoroughly. Slide the spool assembly onto the spindle - make sure the spindle is lubricated. You may need to rotate it as you slide it into place over the click

pawl at the bottom of the pocket. Once the spool is in place, rotate it back and forth to make sure it moves freely and the click check is working properly and sounds nice. If it doesn't sand and trim until it does. You'll know when it's right!

Dry fit the spool retainer (part 8) into the end of the spindle, it keeps the spool from falling off. The spool should rotate freely with the retainer in place. If it doesn't you may need to shim or trim it or the end of the spindle. Glue the retainer into the spindle with a little CA using a toothpick applicator to place the CA in the hole in the top of the spindle.

Allow the CA to cure, install your fly line, and go fishing!

REEL CARE

The 3D printed reels do not require a lot of maintenance. A quick dunk in fresh water to remove dirt is about all they need. They don't have any metal parts so salt water will not affect them.

I get a lot of questions about using PLA for these reels. PLA (polylactic acid) is a biodegradable polymer made from renewable resources like corn starch. PLA requires heat and moisture in a compost before it will start to break down. I have several PLA reel parts in a jar of water that have been sitting for over a year. There is absolutely no sign of decomposition or any effects from the water. So use PLA, it makes a beautiful and strong reel.

CHANGE LOG

Version 5.0 (12/19/2014)

Significant design update including:

- * “Post & Pocket” frame construction
- * fluted spindle
- * larger handle and handle spindle
- * foot locator
- * optional ported frame and spool plates

Version 5.1 (1/22/2015)

Minor performance update:

- * closer tolerances on spindle length
- * hidden click check pocket
- * minor tweaks to handle and spool plates so slicers can create unbroken perimeters
- * tapered spool retainer improves fit