How to Make a Filament Dryer for $30

Last UpdatedMay 30, 2018 byBrett

When it comes to 3D printing, I am notorious for leaving my filament exposed to the environment. With rolls left out for weeks (sometimes months) at a time, they start to absorb moisture from the air and ruin the print quality, long before I ever decide to use them again. This is where the Filament Dryer comes into use, basically evaporating the absorbed water from the filament over the course of several hours.

Although some materials are more prone to have issues than others, it doesn't take long for plastic to deteriorate without proper storage. I have bins filled with desiccant packets and dehumidifiers, but it only takes one decent sale before these are filled up to capacity.

There are of course several other popular options to restore spools of filament, such as baking it in the oven or leaving it in rice, but the results are hit or miss with these methods. The Filament Dryer by comparison is dead simple to use and has a near perfect success rate. After destroying several rolls with inconsistent oven temperatures, I made one of these and haven't looked back.

Purchased Parts List

Food Dehydrator WFD100W - $32.99

Printed Parts List

Dehydrator Tray Extension (Large Printers)
Dehydrator Tray Extension Parts (Small Printers)

Inspiration

The PrintDry company has been selling a Filament Dryer for years, priced at $99. It is recommend by MatterHackers and sold on Amazon with glowing reviews, where it does in fact work great. Nonetheless, it isn't exactly the affordable solution we makers are eager to purchase. Most of us would rather hold a blow dryer to our spool for hours than fork out that kind of cash.

The good news is, this isn't some innovative new solution the PrintDry company designed. In reality, it is nothing more than a $30 food dehydrator from China, re-branded and marked up over 300% for the 3D printing community. Sure, they make a few enhancements like spool sized chambers with filament feeder holes, but the product itself is nothing more than a standard kitchen appliance.

If you really want the few extra bells and whistles, just buy the individual parts from them instead. You can pickup their clear spool chambers for $28 and the filament feeder for $10.

Instructions

There are actually two models of this food dehydrator available from Westinghouse, WFD100W and WFD101W, the second of which is used for the PrintDry Filament Dryer. It's a bit larger than the base model and offers a temperature range of 35-70° Celsius, but they are otherwise quite similar in design and features. For our purpose, the cheaper model will do just fine and save us a few bucks as well.

The Westinghouse Food Dehydrator comes with 5 plastic food trays that sit too low for a standard filament spool. One potential option is to use a box cutter, and trim away the bottom of each tray, leaving just the outer walls to contain the heat. While this will work, it's a tedious process and ruins the ability to use it for food at later time.

Instead, we're going to make our own printed tray(s) and leave the sharp tools for another project. Just print out one of the tray extensions (linked above) from Thingiverse, where these are designed to encompass a full sized spool and fits the Westinghouse WFD100W perfect.

Assembly

There isn't much assembly work involved, everything snap fits together with a simple notching system. As were not using the standard trays for their intended purpose, it's just a matter of replacing them with a printed extension instead. For the sake of demonstration, we will take a brief look at the final result.

As mentioned previously, these notches allow for you to stack trays in any desired combination. My personal preference is to place one clear tray on the bottom that acts as the base. I then seat the printed tray extension, followed by another clear tray and the vented lid on top.

Note: *For those with multiple rolls of filament, you can print several tray extensions and stack them to dry several spools at once.*

The original trays are vented, allowing the heat to pass through and rise towards the top. This works to keep a stable temperature around the filament and continually dries it out.

Temperature Settings

The Filament Dryer has a single control knob that operates both the power and temperature. As soon as you rotate the knob clockwise, the unit turns on and starts generating heat. Depending on the type of filament you need to dry, the temperature you use will need to be adjusted. It's important to pay attention to the material's glass transition temperature, where drying it at or above this level of heat can permanently change and ruin the plastic.

Glass Transition Temperature: *the temperature range where plastic transitions from solid to a soft, rubbery material.*

Each setting is displayed on the front in Fahrenheit, starting with 104° (40° C) at the ON position and reaching a maximum of 158° (70° C). PLA for example has a much lower glass transition temperature than other materials, where this requires less heat to dry the filament.

The table below provides suggested drying temperatures and the estimated duration, although each material will vary by manufacturer. It is recommended to air on the side of caution, using less heat for longer periods of time if you are unsure.

Type	Temperature	Glass Transition	Duration
PLA	122° F	140-150° F	8 Hours
PETG	140° F	165-175° F	4 Hours
ABS	158° F	220-230° F	4 Hours

Filament Dryer Results

When I was first looking into this project, I came across a someone on Youtube that had tried a similar approach. As the video came to an end, he promised to share before and after shots once he had actually used it. Of course there was no follow-up results ever posted, leaving myself and the other viewers wondering if it was a success at all. Having now tested it for myself, I can confirm that it does indeed work quite well.

In the photo below, the print on the left was taken after eSUN White PLA+ had been left out for several weeks. The flat surfaces are actually very bumpy to the touch and have visible deviations in the layers. The print on the right was made after drying the filament for 8 hours, effectively removing almost all moisture and creating a much smoother surface.