MAKE: PROJECTS

DIY Filament Extruder

Build the open source Filabot Wee extruder to melt plastic pellets into inexpensive printer filament, and even recycle old prints.

By **Tyler McNaney** Difficulty: Moderate

Is your 3D printer burning through filament? Guess what — there's no reason it has to be expensive. With a filament extruder, you can make your own filament from plastic pellets costing as little as $3–$5 a pound, saving you up to 90% compared to purchasing filament from online sellers.

We launched Filabot on Kickstarter with the goal of recycling waste plastic into something useful. The project has evolved into a family of machines, the first of which is our new Filabot Wee, which melts inexpensive PLA or ABS pellets and extrudes high-quality filament in 1.75mm and 3mm diameters.

The Filabot Wee is designed to use as few parts as possible while still making quality filament, quickly, for fused-filament

PARTS

Filabot Wee Kit $649, includes all of the parts listed below. You can buy them separately for about $325–$350 total, but the kit will save you a lot of shopping as well as cutting, bending, milling, and welding the parts.

Wire nuts McMaster #7108K2

TOOLS

FOR THE KIT BUILD:

Screwdrivers, Phillips and flat-head

Wrenches, 7/8" (2)

Adjustable wrench

Clamp

Wire cutter/stripper

Pliers, vise-grip

Pliers, needlenose

Allen wrenches, metric

Hammer, small

fabrication (FFF) 3D printers. We sell it fully assembled, or as a complete kit. In addition, the Wee is an open hardware project under the terms of the BY-NC-SA Creative Commons license, and we're making our plans freely available so that anyone can build their own. Here's how.

ADDITIONAL, FOR THE SCRATCH BUILD:

- **Metal lathe and/or mill**
- **Drill press and metal drilling bits**
- **Thread tapping set**
- **Plasma cutter, metal laser cutter, or water jet**
- **Bending brake**
- **Saws for cutting plywood: jigsaw, scroll saw, table saw**
- **Welding equipment**

DOWNLOADS

- **PDF templates for plywood and metal fabricated parts**
- **Filabot Wee Wiring Schematic**

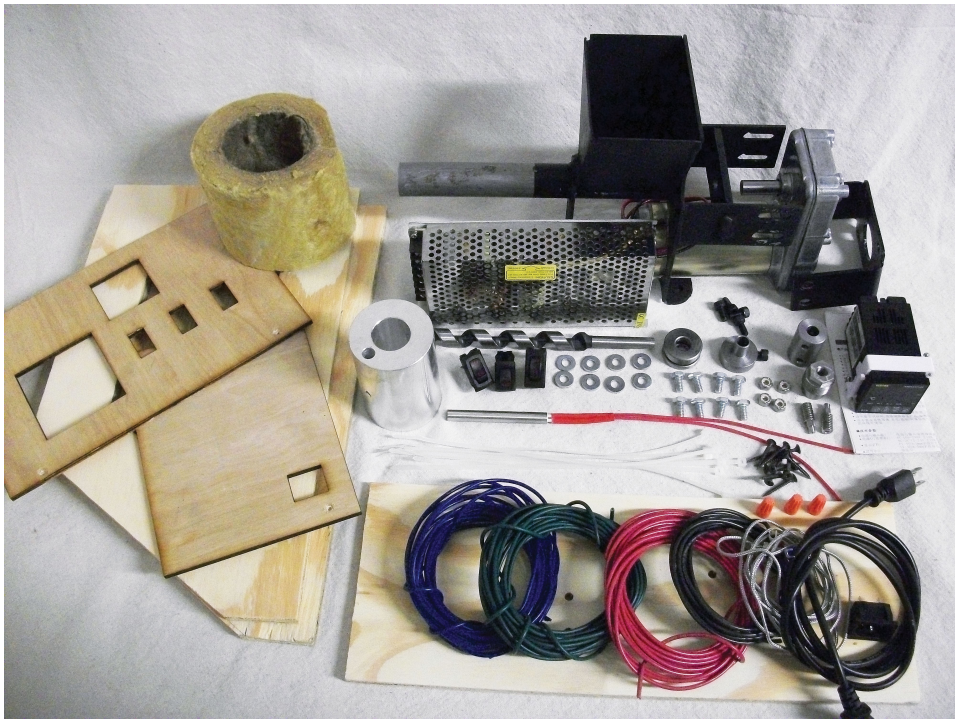
Filabot Wee Filament Extruder Specifications

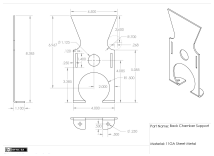
- Maximum temperature: 350°C
- Extrude rate: 5ipm–20ipm, depending on plastic and diameter
- Feed screw speed: 35rpm
- Input power: 120V AC or 220V AC
- Power draw: ~300W
- Footprint: 17″×7″×8″

STEPS

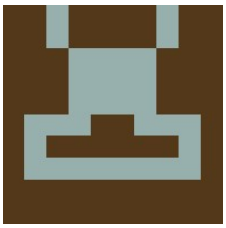
PROJECT STEPS

Step #1: Check or make your parts





- If you bought a kit, check the Bill of Materials to make sure all the necessary parts are provided, and contact Filabot if anything's missing.
- Scratch builders, you've got some wood- and metalworking in your future. To get started, click on the above parts drawings.
- Using a laser cutter or a fine woodworking saw, cut the enclosure's top control panel and back wall from the 6mm plywood. Using heavier saws, cut the 1/2" plywood to make the base and the side panels.
- Cut, drill, and bend the 11-gauge sheet metal, per the drawings, to make the motor mount, back chamber support, front chamber support, and 2 side brackets. Cut and bend the hopper from 18-gauge sheet metal, and cut the thrust bearing plate from 1/4" sheet metal. We cut our parts on a plasma cutter, and it's really the way to go; a local CNC service may be able to do this for you.
- Now to the machining. Chuck the 1018 steel rod stock in a metal lathe or mill to cut the basic profiles for the motor coupler, shaft collar, and large nozzle. Then mill the hex edges on the large nozzle. Go back to your lathe and/or mill to cut the 1045 steel rod as needed to fabricate the chamber, and the aluminum rod as needed to fabricate the chamber surround (aka heater holder). Drill and tap threads on all parts as indicated by the drawings.
- Finally, drill out the 2-16 hex bolts to make 4 nozzles: 1.75mm and 3mm for the 2 test nozzles, and 1.35mm and 2.5mm for the 2 "undersized" nozzles, which are the ones you'll actually use most of the time.



TYLER MCNANEY
Tyler McNaney's childhood toys never survived unscathed by his flat-head screwdriver. He is still intrigued by how things work.

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Alele • 2 years ago

Hi! Where to get same motor? Can you provide motor model pls

15 • Reply • Share ›

unmannedair • 2 years ago

This is a start to a nice idea, but it seems poorly executed. Lots of welding/machining and other stuff most people don't have access to use. Also, the screw is the cause of the plastic expansion after extrusion, what is needed is a draw system where the plastic is cooled before leaving the tube and then drawn out through a cooler and spooled. This is mechanically simpler and easier to set up. A shredder would also increase efficiency in recycling, but I'm not going to give everything away just yet. I'll let you know when I have mine finished.

5 • Reply • Share ›

Göran Carl Heintz • a year ago

Being negative is shitty behaviour but thats pretty damn expensive. There is another that does the same thing for 399 assembled on kickstarter. That is also kinda pricey considering you can buy a full assembled 3dprinter for 299 but if I turn out to print a lot then ill get an extruder.

2 • Reply • Share ›

unmannedair ↗ Göran Carl Heintz • 9 months ago

Wasn't trying to be shitty, was giving constructive criticism/ design suggestions for version 2. Advantages of a draw system include higher rates of filament extrusion. The only limitation is how fast you can cool the filament. With a water bath system that is as fast as you can pull it... pretty much.

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Prajakta Gupte • a month ago

terminal block means exactly what?