

## Made-To-Order 3D Printing Filaments

Thank you for your interest in a custom Filamet™ from The Virtual Foundry. Beyond the standard Filamet™ 3D printing materials in The Virtual Foundry store, you have the option to commission a mad-to-order Filamet™ just for you. Advance your research, get your materials into shapes only available in 3D printing and take advantage of this low-cost additive manufacturing technology.

### Introduction

All Filamet™ materials are made in generally the same way. A powdered base material is mixed with our signature PLA-compliant binder and extruded into 3D printing filament line or pellets.

Because the operation is the same for all materials, you can apply nearly any solid material to the process. Materials we can't work with include: zinc, toxic materials, highly active materials like sodium, chemically unstable compounds and strong acids or bases.

Past custom Filamet™ builds include Molybdenum, Titanium Grade 2, Barium Titanate, Magnesium, Moon Dust Simulant (Basalt) and more.

### Materials Needed

#### Base Material

Most importantly, does your desired material come in powder form?

Powder that is spheroid and sized so that the majority of particles are 45 micron and the rest fill in smaller (-325 mesh) works best although we have worked with powders outside these parameters. What we're after is the optimum balance between minimal surface area and maximum apparent density.

If the base material has different qualities and properties than what we've worked with before, there will be an evaluation fee before the full project cost is charged. We need to make sure this material will work in the manufacturing process so we have a few initial tests to ensure success.

If the base material has familiar qualities and properties, no special evaluation is needed.

We'll typically need a minimum of 2 liters of the base material. This will be around 1-3kg of powder, depending on its density.

You may have your own powder to send us. Or, we'll need to find a supplier for the powder (\$250). If your desired base material isn't readily available in powder form, we can look at options to create the powder. This will be expensive.

## Binder

The binder in your custom Filamet™ will be the standard PLA-compliant binder used in all Filamet™ materials. We'll supply all of that every time.

## The Process

You will receive a Project Plan from The Virtual Foundry that outlines the project parameters, pricing, timelines and terms. Once that Project Plan is signed and returned, and payment is received, work will begin.

You will either send us your powder or we will work together to source the right powder.

After manufacturing is complete, we'll do a test print or two and package up the filament line on our standard spools.

As long as everything looks good at that point, we'll ship your custom Filamet™ line to you! You can expect a 2-6 week lead time between the date we receive the powder and the date we ship the final Filamet™ line to you.

We reserve the right to commercialize excess material produced unless the base material is proprietary.

## Pricing

### Powder

If you send us your own powder, there is no cost added by us.

If The Virtual Foundry procures the powder from a supplier, that powder cost will be added to the project cost, along with the procurement fee of \$250.

A fee of \$350 may apply for any hazardous material that may take extra precautions than our standard manufacturing process requires.

## Evaluation

If your base material is unusual and needs to be evaluated to ensure it will work in the Filamet™ manufacturing process, an evaluation fee of \$500 will apply. This step will be required prior to payment for manufacturing.

In the event that the powder is deemed unsuitable for our process, it will be returned at your expense.

## Manufacturing, Test Printing, Packaging

Manufacturing, test printing and packaging costs \$5,000. That's for 2 liters of powder.

## Shipping

Shipping within the contiguous United States is free. For materials shipping outside the United States, you'll need to pay those shipping costs and any associated import fees.

## Payment

Payment is required before any work begins. Payment methods include credit card, wire transfer and ACH transfers. Payment is for work performed in good faith regardless of the outcome.

## What You'll Get

You'll get 1 liter of spooled filament or pellets (whichever you choose), which will be 1kg - 3kg (density dependent) of your very own material in a 3D printable filament that can be printed in any open-architecture FFF 3D printer. The print settings will be the same as all other materials made by The Virtual Foundry. You'll find those here: <https://thevirtualfoundry.com/print/>

The debind process will be very similar to our current published debind process for our other materials. The sintering process will depend on standard sintering parameters of your base material. We won't conduct any sintering trials or development. Our expertise lies in making Filamet™.

## Development Projects

Perhaps you'd like an additive in your Filamet™, for example graphene or carbon fiber. Maybe you're interested in a Filamet™ with a different material loading percentage than we currently produce (our standard is 50-60% material loading by volume).

Cases like these may involve more than our standard evaluation and manufacturing processes and could fall into the development category. Here, you'll tell us as much as you can about the results you're after and we'll talk through a plan.

Development projects are priced on a case-by-case basis.

The resulting new product may be something you want to keep in-house. But if the new product is something The Virtual Foundry would like to add to its catalog, and your organization can accommodate that, we'll work out a profit sharing arrangement so you can recoup some of that development cost.

## To Move Forward

Contact us at [info@thevirtualfoundry.com](mailto:info@thevirtualfoundry.com) about the material you'd like in filament form. We'll talk through the plan and start you on your journey to your very own made-to-order 3D printing filament.

We reserve the right to independently develop and produce products that may bear similarities to the product created in your project.