

**FACE SHIELD
PRODUCTION
HANDBOOK**

*Version 1.0
March 23, 2020*

INTRODUCTION

Hello! Thank you so much for volunteering to manufacture parts for crowd-sourced face shields to aid health care workers in Maryland.

We are using an open-source design developed by Prusa Labs (<https://prusalab.cz/en/>) in the Czech Republic to make face shields for health care workers. In combination with lower-grade surgical masks, face shields can provide the CDC-recommended level of protection for health care workers and first responders interacting with suspected COVID-19 carriers.

We The Builders (<https://www.wethebuilders.com/>) is hosting this build using their collaborative program for part-tracking and file hosting for community builds. Innovation Works (<https://www.innovationworks.org/>) is handling interfacing with health care providers, orders, and distribution. Open Works (<https://www.openworksby.com/>) is collecting finished parts, sanitizing, assembling, and packaging them for distribution. All of YOU are powering this project by producing parts at home.

Finished face shields will be distributed to hospitals and healthcare organizations in the Baltimore metro area as a first priority. As supply grows, we hope to be able to send further out. Face shields will be sold at cost through an e-commerce portal currently under development by Innovation Works to cover packaging, sterilization materials, and wages for assembly workers. Cash donations currently being made through social media and the Open Works website are being used for startup costs to purchase face shield material, elastic bands, packaging, shipping labels, sanitizing materials, PPE for workers, and wages to rehire furloughed technicians.

Please use this instructional guide to print, package, document, and get your prints to us. It is really important that we maintain a chain of custody for parts through the We the Builders platform for many reasons, including circling back to you after this crisis passes to say thanks.

PRINTING INSTRUCTIONS

Please go to wethebuilders.com and register for a username and login. Once you are in:

1. Download the waiver and sign. This is a critical step, as Open Works is assuming all of the liability for this project, and we need you to hold them harmless for any risk assumed in printing parts and dropping them off.
2. Read build instructions.
3. Get unique part ID from We The Builders (important, will come back to that later!)
4. Download print files.

Please find the full assembly instructions and print specifications from Prusa here (<https://manual.prusa3d.com/Guide/How+to+assemble+the+Prusa+Face+Shield+-+RC1-RC2/1527>). We are not going to reprint them here for brevity's sake.

Part specifications (from Prusa site):

- Prusa v.RC2 face shield
- Prusa print instructions PDF
- Material: PETG, ABS, or nylon are preferred for sterilization purposes, but PLA can work
- 30% infill
- Increased wall thickness: Inner wall from 1.5 mm - 2 mm, outer wall from 2 mm - 2.5 mm
- .25mm layer height
- .4mm nozzle
- At least 3 perimeters
- Supports not necessary
- On Prusa MK3 with these settings, expected print time 6 hrs and weight 105 grams

We are using the RC2 build version. Please check the finished print against the photographs and assembly instructions to ensure that it meets a minimal standard of quality, including no noticeable deformations, cracks, or flaws. Please remove any raft or support materials before preparing to deliver.

Once you have the finished, cleaned prints, please place in a clean plastic bag (ziploc or similar sealable bag) and set aside until you have a minimum of three.

SANITATION PROTOCOLS

First and most importantly, please do not make face shield parts if you or someone in your household is sick.

1. If you can, please segregate your printer in your living space away from people, pets, bathrooms, or food preparation surfaces.
2. It is currently estimated that COVID-19 can live on hard industrial surfaces (metal, plastic, and glass) for up to 3 days, but the science is in flux. If you have access to sanitizing solutions, including diluted bleach, 70% alcohol solution, or products like Star-San or Odo-Ban, please disinfect your machine before and after each print.
3. While making and handling parts, act as if you have the virus. Wear a mask and gloves if you have access to them. If you don't, wash your hands frequently for at least 30 seconds with warm soapy water.
4. If the machine is clean, the plastic is heated up enough to be considered clean once the print is finished. Do not attempt to sterilize the finished part; just drop in a clear bag with gloves or tongs and set aside. Many sterilization solutions will damage PLA, and off-the-shelf isopropyl alcohol is not concentrated enough to clean the parts.

Remember, face shields are not FDA-regulated medical devices, and are not required to be manufactured to the same degree of sterility as face masks or other items that directly interface with mucous membranes. We want to start with clean product for our own workers' safety, but will also be taking pains to disinfect as we receive parts.

PACKAGING

Ready to send us prints? Awesome!

1. Label your bagged parts with your unique Part ID - Sharpie and masking tape is fine.
2. Drop your signed waiver into the bag (we know that seems low-tech, but it's the best way to verify!)
2. Seal up and take a photo of the finished package. Make sure the Part ID is visible.
3. Login to We the Builders and upload the photo.
4. This will trigger an "incoming" message to those of us engaged in assembly at Open Works. This is super important for us to be able to track inventory and plan production schedules as we scale up.

DROP OFF INSTRUCTIONS

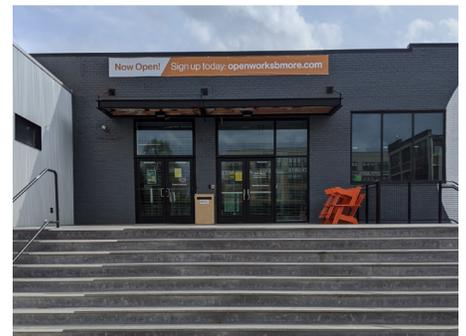
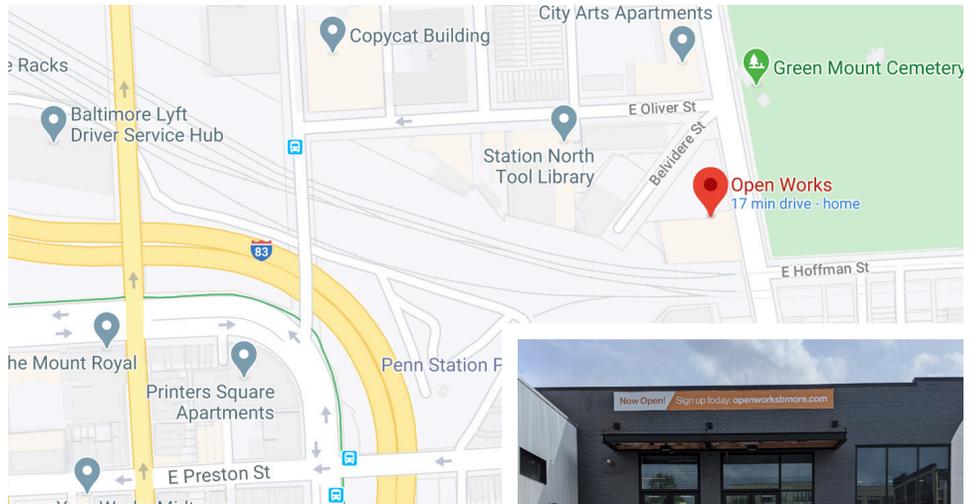
Open Works is located at 1400 Greenmount Avenue, Baltimore, MD 21202.

We have set up a contactless drop-off box on our deck.

Please drop parts in the box. We'll take care of the rest! And THANK YOU! You, brave human, are a hero, stepping up to draft yourself into an army of healers facing down a vicious, crafty, and invisible enemy.

Parts can be accepted through in person contactless drop off, or via mail, FedEx, UPS, etc. Please, when mailing, write in the address "Attention: Makers Unite."

Our friends at the Nation of Makers are hard at work coordinating national efforts: <https://getusppe.org/>



STAY IN TOUCH

We would love to stay in touch! We are also going a bit crazy right now trying to stand up a mass-manufacturing plant in 72 hours. To keep some pressure off of the staff focusing on assembly, packaging, distribution, and healthcare interfacing, please join our Slack channel here.

https://openworksmembers.slack.com/join/shared_invite/zt-cl4d75eu-oM_7u_747Y9QfNWF5Ltcag

Room: #makersunite

This is a great way to share build and print information, crowdsource sanitation protocols, and aggregate parts for drop off if folks can't get to Baltimore.

Want to share your awesome work? Please tag us on social media with the hashtag #makersunite and we will follow YOUR amazing contributions.

You can also follow us on social media:

Open Works

 facebook.com/OpenWorksBmore

 open_works_bmore

 OpenWorksBmore

We The Builders

 facebook.com/wethebuilders/

 #wethebuilders (just using the hashtag, no account)

 we_the_builders

 <https://www.wethebuilders.com/>

Innovation Works

 facebook.com/iwbmore/

 iwbmore

 iwbmore

 <https://www.iwbmore.org/>

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