



Notes from LASER 3284 efforts to provide PPE face shields to health workers in our area and beyond.

NOTE: Before you start 3D printing PPE devices, find out what your community/healthcare professionals need and will accept before moving forward with printing. Also, some material like the face shield clear sheet and elastic may be hard to resource. Other devices such as masks may not meet more stringent health guidelines and be rejected.

www.laser3284.org

laser3284@camdentonschools.org

What inspired our LASER 3284 robotics team to start printing PPE face shields?

FIRST FRC LASER 3284 robotics team chose to print 3D face shields per the request of our local hospital representative to help. Our FIRST robotics team has a good rapport with our community and the hospital is one of our sponsors. The hospital official indicated the importance of the face shield is that health workers with a face shield can prolong the use of the approved masks in short supply.

Secondly, our middle school had received an eMINTS grant this year and had 10 VariQuest Trifecta 800 3D printers with a large print bed setting idle. School administration approved us relocating the equipment to a location where only 1 or 2 individuals access the printers due to campus restrictions.

How are you funding your donation of face shields?

The middle school had a large amount of filament on hand which the robotics team can replace when things get back to normal. The LASER 3284 robotics team is using our fundraised money to purchase the plastic 4' x 8' PETG plastic sheets and elastic material. Two of our events were canceled and this is a good cause for those unexpended funds.

Why was the Prusa face shield design chosen?

There were a few options for face shields available to download last week. More options are available now. Research the options for what meets your needs and setup. For example I was able to laser cut the PETG shield material and laser cut notches in the elastic. We are printing the RC3 version.

Prusa had already made 10,000 face shields in the Czech Republic and currently makes 1,000 a day. The prototype from the Prusa files were comfortable and better quality than a front line nurse currently had to use. Feedback was very positive. The materials and resources available at their website was more complete than any others I found available.

There is a new study that indicates transmission may be taking place through the eyes. The face shield in conjunction with safety glasses and mask is a good frontline defense.

A local church had sourced enough material and had a die made to stamp cut 5,000 plastic shields. Currently we have about 3,500 reserved as of today, 4/1/20. We **may** be able to supply some shields if the end user pays shipping. Contact laser3284@camdentonschools.org about availability of the shields for your use, if you have difficulty finding sheet material.

Video from Prusa showing the process: <https://youtu.be/pP7z3iw76GA>

Where can I get the Prusa files, directions, and other details?

The Prusa website link below is dedicated to the mask and easy to navigate. They have instructions and details about the development of the face shield. It is currently on the third revision. They freely offer all the standard 3D files (STL, STP, 3MF) to the public. You will have to use your slicer for your particular 3D printers. They also have options for stack printing of 2, 4, or 8 at a time. I preferred to do the single prints as they were hard to peel apart on the Trifecta PLA material.

<https://www.prusaprinters.org/prints/25857-protective-face-shield-rc1>

What print material should be used?

The PETG filament is recommended for durability. There are discussions on websites debating which material is best. We are using PLA, (because it is what we have and school purchases are suspended), on the Trifecta 800 printers and it seems to be doing great. We currently have 125 face shields being used at the local hospital and they have requested more.

What about liability?

Prusa is working to get certified approval in the Czech Republic, but it takes time. They have a section on the website per their sanitizing recommendation. We ask our health end users to sanitize the masks before use. I trust they know what will work. I tried bleach wipes and 100 percent alcohol on my prototypes with no apparent effects on the PLA or PETG material. The face shield is not held to as stringent guidelines as the respirators and masks.

Other resources I have referenced recently.

Prusa 3D Printed Faceshields FAQs: https://help.prusa3d.com/en/article/3d-printed-protective-face-shields-faqs_125479

MSU (Michigan State University) is printing PRUSA shields:
https://msutoday.msu.edu/news/2020/msu-colleges-collaborate-to-create-3d-printed-medical-face-shields-in-response-to-covid-19-crisis/?utm_campaign=standard-promo&utm_source=msufacebook-post&utm_medium=social

U.S. Department of Health and Human Services — National Institutes of Health

NIH 3D print exchange: <https://3dprint.nih.gov/collections/covid-19-response?fbclid=IwAR3klxoXuiWpVE3Z0Bma6by6wjYVt2Gt30Lthk0h8TvMUxkX1-u7dhjwP9k>

Additive Manufacturing - website article: <https://www.additivemanufacturing.media/blog/post/3d-printing-and-coronavirus-check-in---week-of-3302020>

Article on 3D Masks: <https://www.billingsclinic.com/foundation/>



