3D Systems

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Links

Reusable 3D-Printed Face Shield Frame

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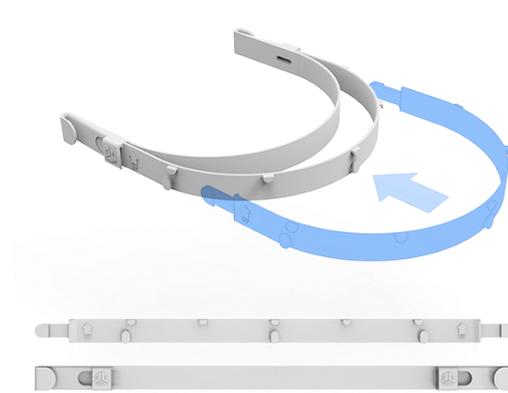
The Need

There is a shortage of Face Shields at hospitals for medical responders who are testing and treating COVID-19 patients. Medical responders need to be protected from respiratory droplets from coughing and sneezing. Even though many individuals and groups are designing and manufacturing face shield frames for these responders, many of the designs are not optimized for high-density optimized additive manufacturing and cannot be accessed locally.

The Solution

We have designed a face shield frame that is:

- A downloadable file to enable local production using any Selective Laser Sintering (SLS) Printer
- Optimized for high-density nesting
- Reusable design made of medical-grade nylon that is autoclavable and compatible with disinfectant cleaners
- Comfortable due to its flexible, non-rigid, form-fitting design.
- Compatible with bonnets and bouffants for protection of the forehead and eyes due to the retention tabs.

The Outcome
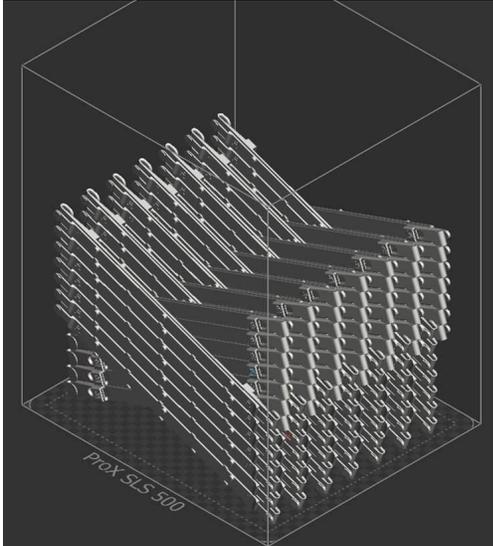
98 face shields printed on a sPro 60 in 24 hours

Face Shield Frame

This face shield frame has been manufactured using medical grade nylons on the following platform:

- sPro 60, 140, 230
- ProX 500 and 6100

The design is a two-part flat pack design that will clip into each other to provide structure while minimizing material usage and maximizing the density of parts that can be manufactured.
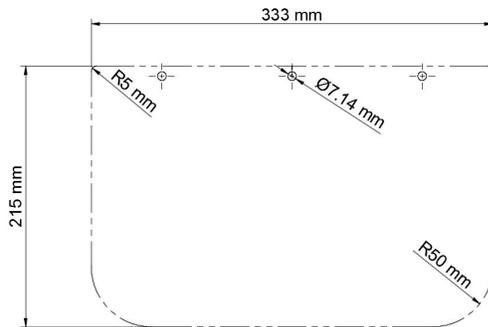
Face shield frame drawing.

Face Shield

Each face shield can be cut out of a clear sheet material. We recommend 1/32" (0.79 mm) thick clear polycarbonate with holes cut out from a US standard 3-hole punch. Thicker and thinner sheets can also work with this design from 0.008" - 0.04". The shield protects below the neck and past the temples and gives the user a wide range of motion.

Splash Guard

Face shield frame's minimal design

Due to the open top design of our face shield frame, there are situations when more protection is required. The face shield frame has retention tabs that will hook standard headwear like surgical bonnets and bouffants to protect your face from aerosol and particulates. Alternative designs for a splash guard are being explored.

Suspension System

Rubber-bands, elastic straps and nylon cord are some of the wide variety of suspension system options available.

Assembly Directions
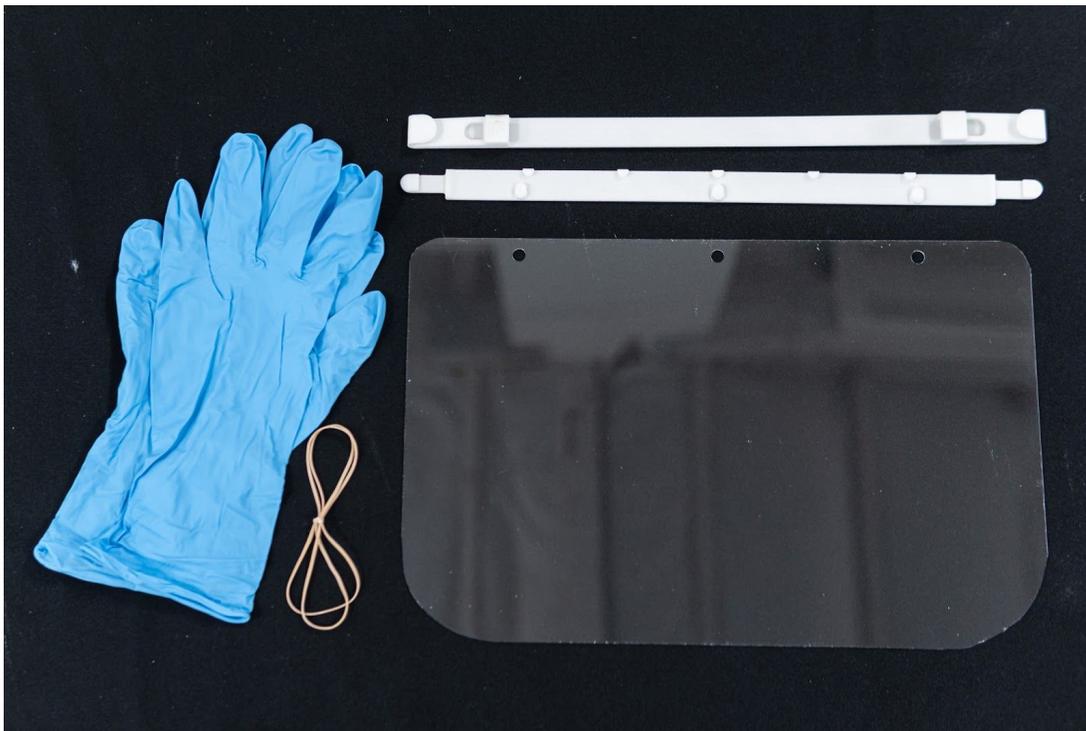
*Components for Face Shield assembly (plastic + bands x2 + rubber-band) and gloves.*

1. Clean parts by **soaking in 70% IPA** for ~60 seconds or **autoclaving**

2. Attach the cut polycarbonate sheet to the with inserts at either end. First by pushing it up under the small retention tab, press your finger down on the plastic and then pull down and across the larger tab. Repeat with the other two tabs.


3. Then starting from one side, push the end clip of the outer band into the slot of the back frame band. *(Note that the 3DS logo on the back band is facing up and that the front band has the 5 small clips on the top of the part.)*
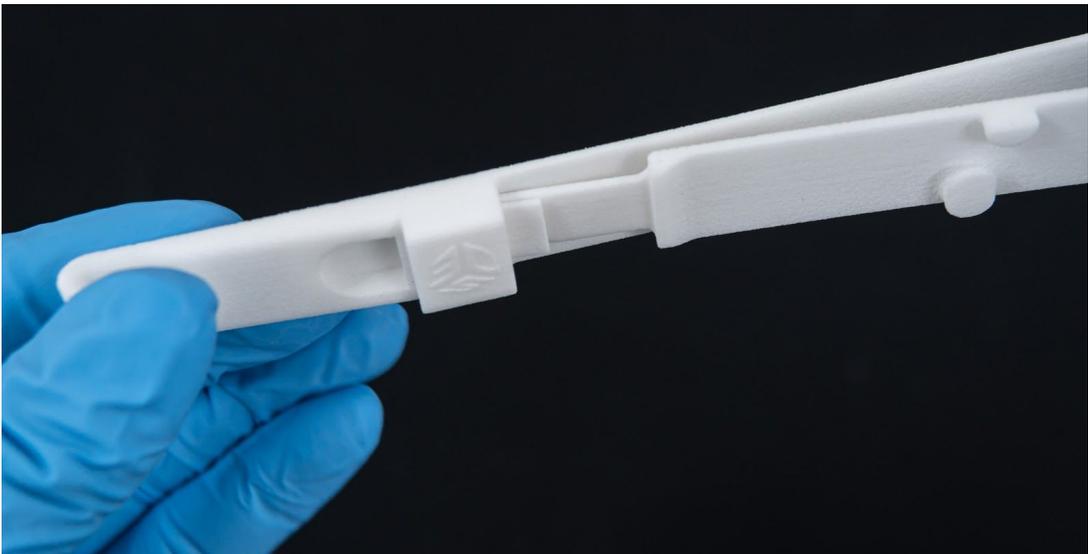
4. Repeat for the other side.

5. Attach at-least two rubber-bands on the back (or however much tension is needed).
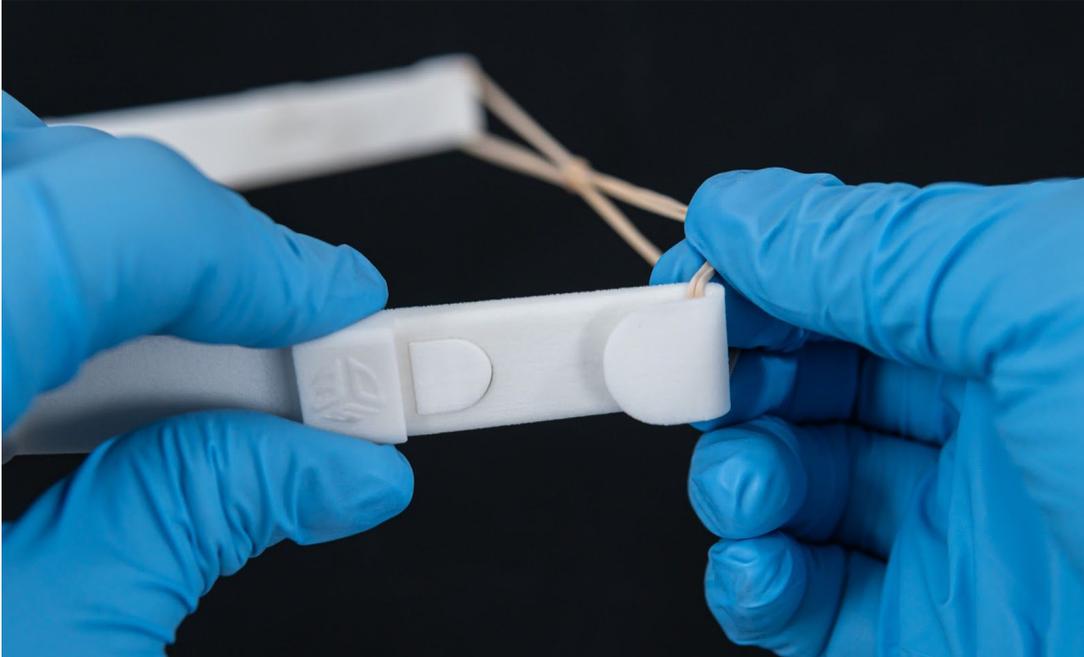
6. For further protection through the opening on the top of the face shield frame, use a bouffant or something similar to put around your head and hook it onto the retention tabs to keep the opening of the frame sealed.

- To disassemble, press the release tab and slide out the front band as shown below.

Details

Healthcare Infection Control Practices Advisory Committee/CDC Standard Precautions guidelines for prevention of transmission of infectious agents in healthcare venues includes the use of face shields (with a medical/surgical face mask) when sprays, splashes, or splatter are anticipated.

Disclaimer

3D Systems does not support the unlicensed production of medical parts at this time. While our printing systems can be used to create medically certifiable parts - those parts, materials, and workflows have gone through extensive testing by certified organizations and are normally not transferable to other geometries or applications.

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