Thank you to everyone working on the shield project. Every person has contributed to protecting the lives of medical personnel working on the front line.

Allocating Materials:

Shield:

Recommended materials: Clear Polycarbonate, Duralar, clear acrylic

- Carbonate is harder to laser-cut but very clear
- Duralar is much faster to laser cut but reflections reduce visibility.
- Thickness: 0.010” or 0.020” (“ = inch)
- Get sheets with dimensions that are divisible by shield size if you can, but supply is spotty and you may need to get sizes that leave more plastic waste than a divisible sheet.
- Laser cut to size (or cut by hand if necessary)
    - Laser cut model linked here

- **Quick Dimensions**: (Look at the drawing on the last page of this doc for details)
    - Long side: 305 mm (~12”) *before corner cuts*
    - Short side: 202 mm (~8”) *before corner cuts*
    - Corner cuts on bottom: 40 mm across and down, which will reduce the short side length to about 160 mm

Visor:

3D printed from .STL model linked here: https://github.com/timotheelionnet/faceshield

Recommended Print Settings:

- Disable Raft
- Plate temperature: 55℃
- Wall thickness: 1.4 mm
- Wall count: 2
- Layer Thickness: 0.3 mm
- Infill: 10%
- 2 solid layers at the top and bottom.
- Pattern: Triangles if possible
- Using a 0.8 mm nozzle improves printing rate by more than 2-fold vs 0.4 mm

Strap:

Elastic, ½“ wide, cut to lengths of 28” (Look in hardware, or arts & crafts stores)

- Original model strap-lock.stl fits these

As of 4/13 we switched to wider elastic straps 3/4” and 5/8“

- **Only** the updated model strap-lock_5_16_extended.stl is suitable for these sizes

Strap Lock:

[3D model is also on github]

Note previous section, use a compatible strap lock for your elastic

Foam Padding:

Material: Adhesive foam, rubber or poly

Maker: Frost King is a common brand, look for weather stripping at hardware stores mostly anywhere.

Ideal Dimensions:

- Width: ¾" wide is
- Thickness: ⅜-⅝"
- Length: 12" per unit

Glue or Rivets

- Rivets give better durability, but glue by itself is faster and satisfactory

Pop Rivets: 1/8" diameter, 1/8" grip length, and you will need a hand-held riveter (4 per unit). Parts and tool available at some hardware stores- Home Depot is best bet

Glue: Super glue. We recommend Gorilla Glue Gel which is widely available

List of Parts

1 3D printed visor
1 3D printed strap lock
1 transparent shield
1 elastic band
1 piece of foam
Either **4** pop-rivets **or** about **7** spots of glue

Assembly:

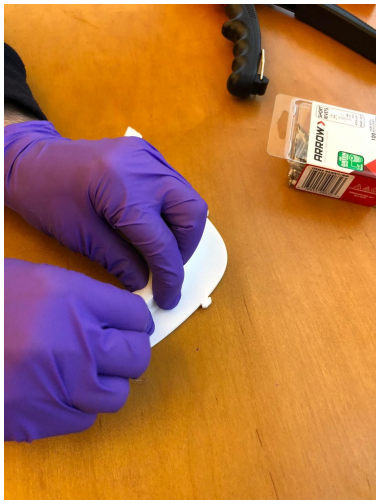
- Cut elastic bands, shields, and foam to size en mass to speed things up

1. **Peel the covering off of the foam strips** (to prevent adhesion problems later)
   If you're using rivets, go straight to **step 2**

   If you're using glue: dab generous, regularly spaced spots from edge to edge along where the foam is going to be adhered (and skip step 3).

2. **Adhere foam to the visor (photos below)**

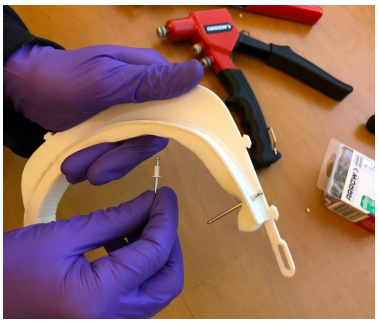
   Compress it long-ways as you go. The foam's length eventually contracts, so scrunching it like this prevents it from lifting off of the plastic between adhesion points.

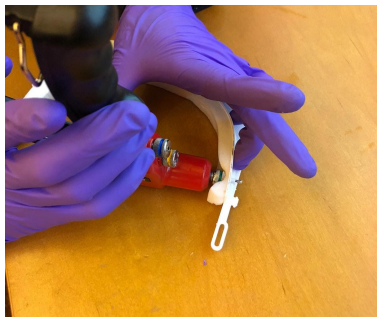

3. **To rivet:**
   a. Poke holes through the foam using back-end of the rivet
   b. Push the front of each rivet (with sheath) through of their hole, inside to outside.
   c. Slide the riveter onto the rivet, squeeze once, then squeeze again to snap the tail of the rivet off.
      - This might take more than two squeezes and that's ok.

(a)

(b)

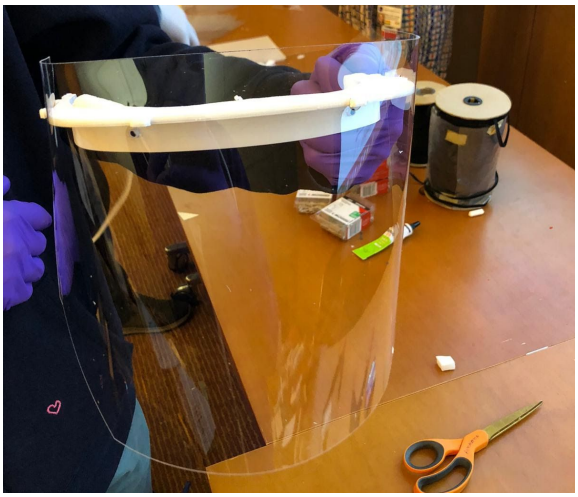


(c)

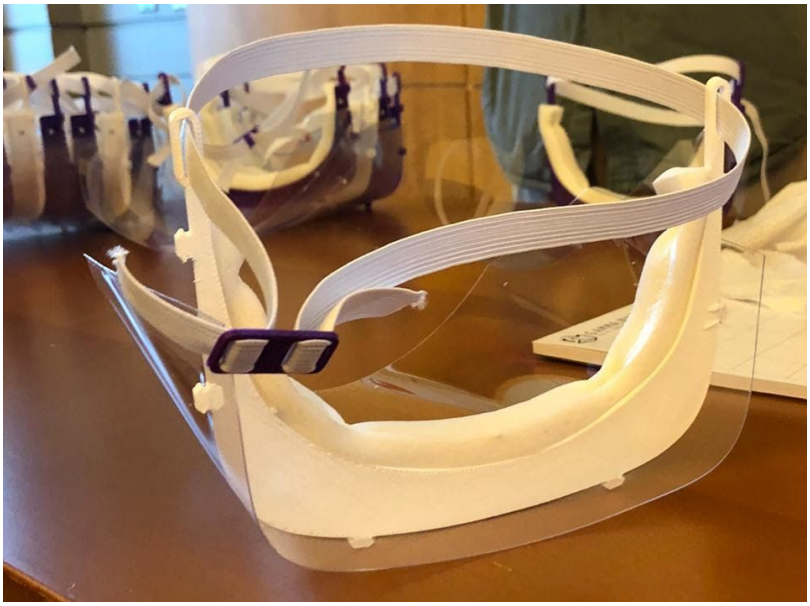


One completed rivet shown here (inside, outside face):

4. **Attach shield to visor (photos below)**
   - There are 6 knobs on the edge of the current version of the visor which the shield should pop onto (with a fair amount of force).
     - **You only need to use the middle 4, as our shield is cut with only 4 holes**
   - The flat side of the visor should be facing up when it's done



5. **Feed the strap through the slots on the "back" of the visor**
   - Feed the ends of the elastic through a middle hole, and out the nearest outer hole



6. **Wipe down** the inside and outside of the shield, as well as the top and bottom of the exposed plastic on the visor.
   - Isopropyl rubbing alcohol 70% wipe, or any other CDC-recommended formulation

7. **We package them in garbage bags in sets of 20**
   - This has been an efficient way to keep track of things
   - We deliver our shields on foot and by car

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Rendering of the Clear Plastic Shield