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3450 16th Ave W, Suite 200, Seattle, WA 98119 | (206) 634-1656 | dustystrings.com

Face Shield PPE Project

4-4-2020

This document is designed to be a stand-alone resource to allow those with 3D printers and lasers to help contribute to the supply of a vital piece of personal protective equipment, face shields, for our front-line medical care staff during this Coronavirus pandemic. ***Note: The PDF version of this document does not have the embedded files, so you'll need to download the .doc version, or access the files through the 3dverkstan website.***

There are just two parts:

1) 3D printed headband or visor frame
2) Face shield, made of clear acetate sheet. Laser cut or punch holes with three-hole paper punch per instructions below

Overview of the project:

https://3dverkstan.se/protective-visor/

That was our source for the design and the 3D printer files. This was designed in Sweden by Erik Cederberg, whose design goals included:

- Using readily available plastic sheets with as little modification as possible, and only common tools used.
- All features printable with nozzle sizes up to 1mm and layer heights up to 0.5mm. *(Dusty note: Typical nozzle size is 0.4mm which can print at most 0.2mm layers. The thicker the print layers the faster the print. Go as thick as you can on these prints as they are "2D" extruded shapes. With a 0.2mm layer, a single frame print should take about 65 minutes.)*
- Drip protection above the eyes
- No tight tolerances requiring well-tuned printers.
- Design that works equally well with most common filament materials (PLA, CPE, PETG, ABS etc.)

Feel free to download files directly from that site if you want. We've made this document so you don't have to sort through all the different versions and can just get started.

Informative video by 3D Printing Nerd (a local Washingtonian!) on the project:

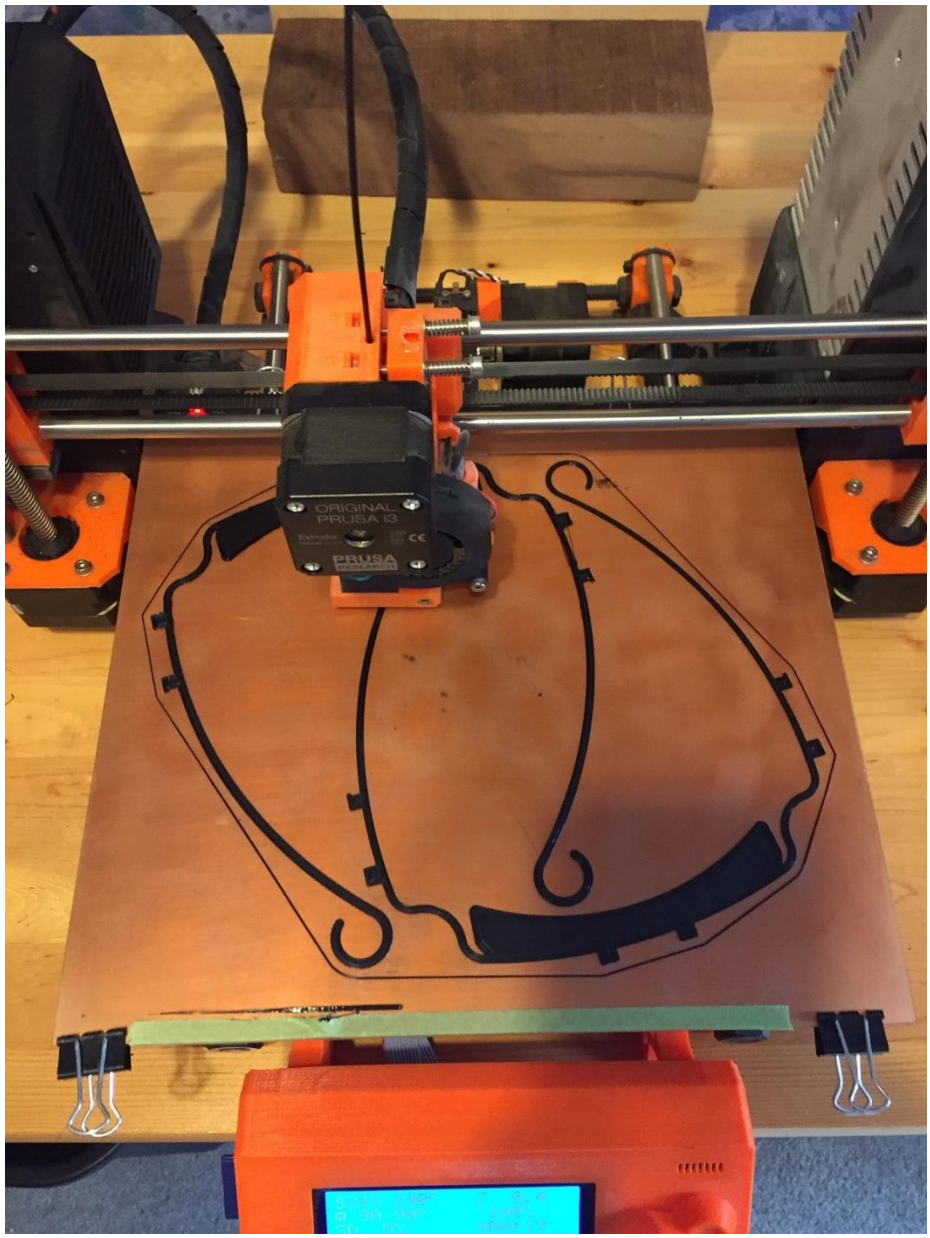
https://www.youtube.com/watch?v=CHDMdyN5Jjs

Headband Model for 3D Printers

This is the headband/visor frame 3D model (double click to open):

Visor_Frame_NORTH_AMERICA_LETTER_v3.stl

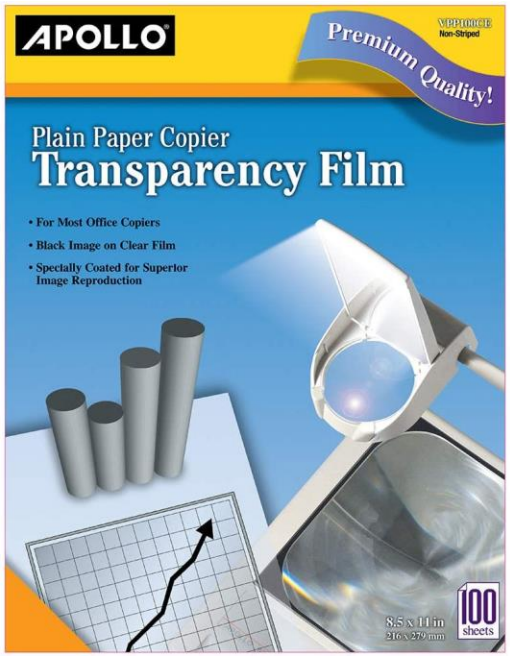
You will likely want to nest two of these on your print plate (see below). We have experimented with the stacked method of printing which can be found on the 3DVerkstan site. While it is nice to let your printer work for hours, the parts did not turn out as well because they tended to stick together and they need more post processing time at the end (as compared to printing one or two at once.)



Face Shield

This is the type of clear film used for the face shield. We recommend transparencies for laser printer not for inkjet, because they are smoother plastic and may be easier to clean.

https://www.amazon.com/Apollo-Transparency-Copier-Without-VPP100CE/dp/B001E67VP6/ref=as_li_ss_tl?crid=1WBOOADF1N6&dchild=1&keywords=overhead+transparencies&qid=1585171740&sprefix=overhead+trans,aps,460&sr=8-5&th=1&linkCode=sl1&tag=3dpriner-20&linkId=01436984fe68fbbbd7787b21e9b0e953&language=en_US



Here is another supplier for the clear transparencies:

https://www.binding101.com/clear-gloss-report-covers

Clear Gloss Covers [8 ½" x 11" with Square Corners, 7 Mil, Unpunched, With Tissue] (100 / Box)
Item#033027CLAA

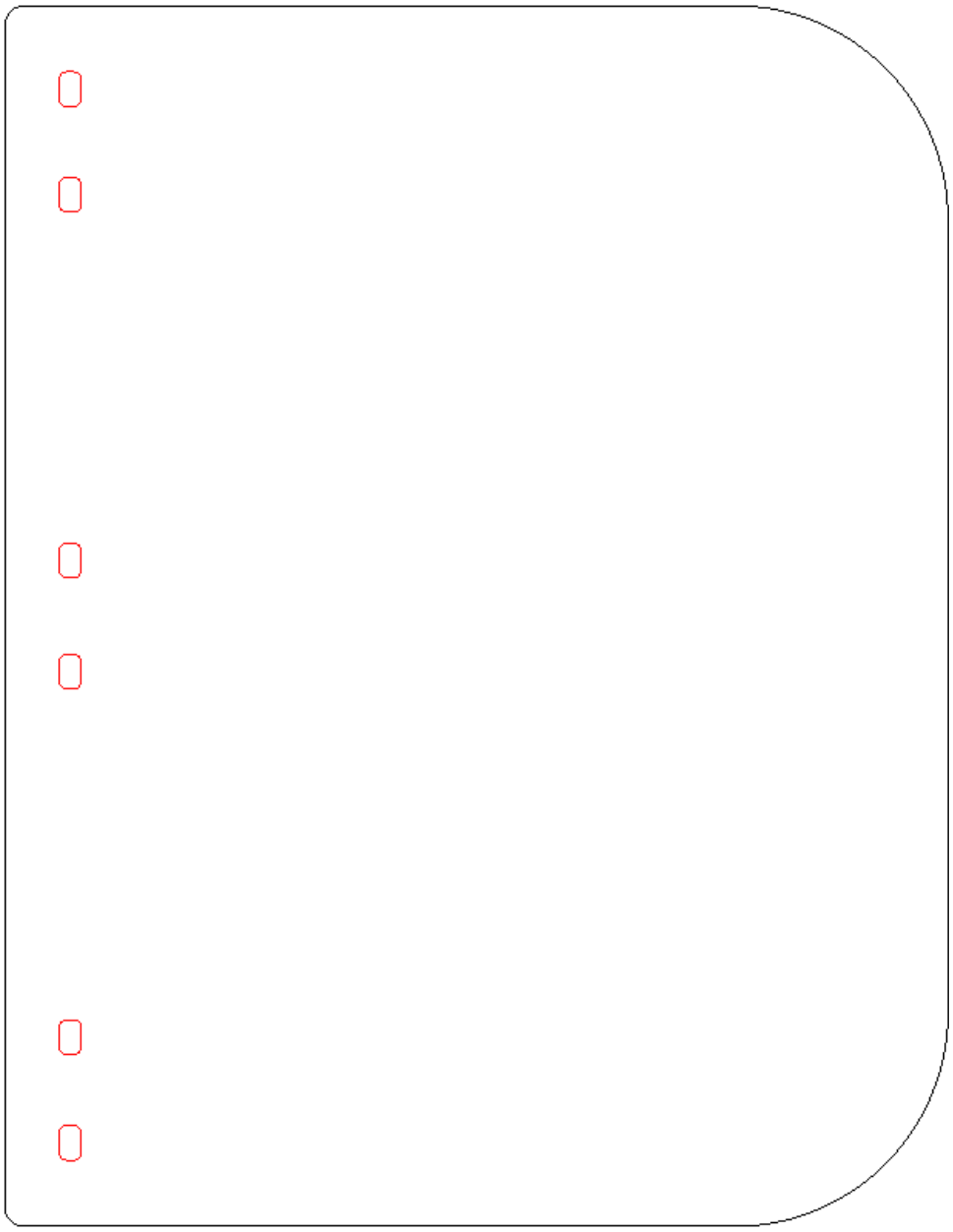
Drawings for Laser Cutting Face Shield Acetate Film

These are drawing files for the face shield. We found that the template supplied by 3DVerkstan for the “North American” version didn’t quite fit the headband frame, so we modified it ourselves. The first is a Corel Draw file and the second is a .dxf file.

face shield clear sheet.cdr

face shield clear sheet.dxf

Here is a PDF file version.



face shield clear sheet.pdf

Assembly Instructions

This was copied and pasted here from the website of the designer as a cover sheet if you were delivering these headbands and shields as kits to another party. As you can see, the acetate film shields can be punched with a standard 3-hole paper punch with a slight addition of a ½" spacer. The rounded corners can be cut with scissors. We have been making these sheets on our laser.

Protective Visor by 3DVerkstan

Published on Mar 26, 2020, By erikcederb.
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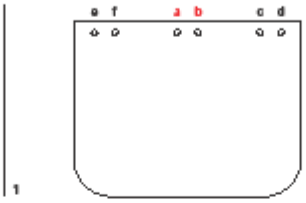
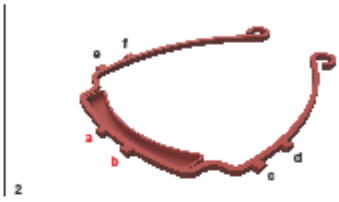
http://www.youmagine.com/designs/26808 Hosted on YOUMAGINE

PACKAGE CONTENTS

1. 6-hole clear plastic shield US letter size (8.5" x 11")
2. Plastic head band
3. Instruction sheet and 6-hole shield template printed in the back of this instruction sheet





ASSEMBLY INSTRUCTIONS

Attach the 6-hole clear plastic shield (**1**) to the plastic head band (**2**): first push the two center holes **a** and **b** of the clear plastic shield into buttons **a** and **b** of the plastic head band. Once **a** and **b** holes are in place wrap the clear plastic shield carefully around the frame of the plastic head band and insert into side buttons **c** and **d** being careful not to rip the plastic when putting it on button **d** which has a slight hook feature to hold it in place. Then repeat for side buttons **e** and **f**.

TO MAKE ADDITIONAL 6-HOLE CLEAR PLASTIC SHIELDS (8.5" X 11")

MATERIALS

1. 3 Hole "Letter" size punch.
2. US Letter (8.5" x 11") clear plastic acetate (~0.2mm PET recommended).
3. Template: see back of this instruction sheet for template or go to https://www.youmagine.com/designs/protective-visor-by-3dverkstan to download PDF: *Laser-cut Shield North America 6 Hole Letter Format.*
4. Scissors.

HOW TO DO THE PUNCHING

1. Set your hole punch to the setting for a Letter sheet.
2. Set or make a 1/2" spacer to create a 6-hole pattern with a 1" offset on your hole punch. The 1/2" spacer is what creates the hole offset needed. Figure **A** shows 1/2" spacer shown in red.
3. Make one punch along one of the long sides, with the short edge resting and aligned with your spacer piece.
4. Flip the clear plastic sheet, and make one punch on the opposite side, so you end up with 6 holes along the same edge.
5. Use scissors to trim bottom corners as shown in the Diagram 1-1.

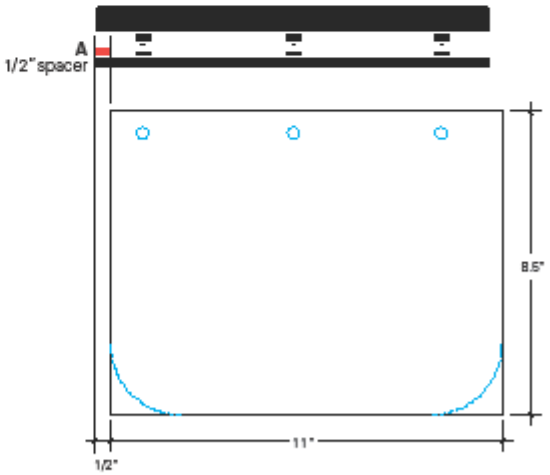


Diagram 1-1 showing how to align the US Letter clear plastic sheet with the hole punch to obtain the correct position for the first three holes, shown in blue.
See back for 6-hole shield template.

INSTRUCTION SHEET DESIGNED BY SYLVIA CEDEÑO - WWW.POGODESIGN.US