Face Shield Building Instructions

The presented face shield is fully produced from sheet material by laser-cutting, with a material cost of around 1.50 euro per shield. It contains only 4 parts, resists thorough cleaning with alcohol or soap and has a total weight of only 50 gram.

We have demonstrated a production speed of 460 full face shields in 24 working hours, including post-processing, cleaning and packing the shields.

This design by Demonstrator Lab Amsterdam is available at
www.github.com/DemonstratorLab/ContraCovid

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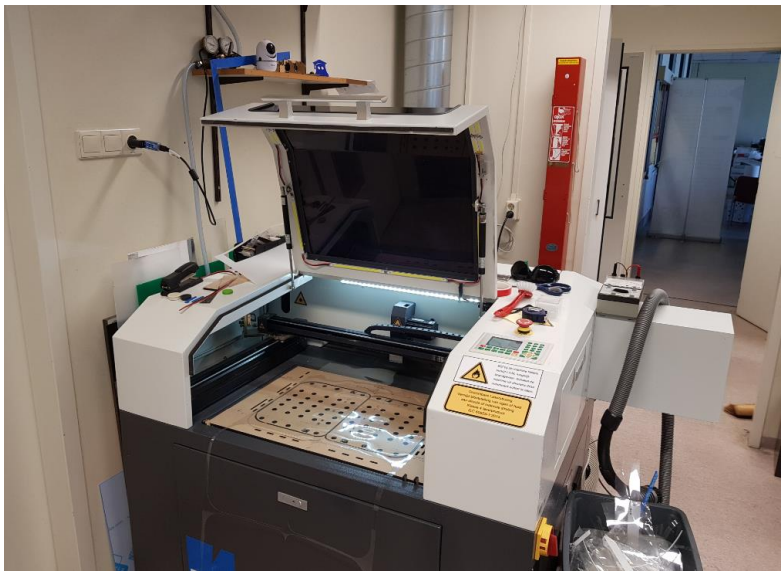
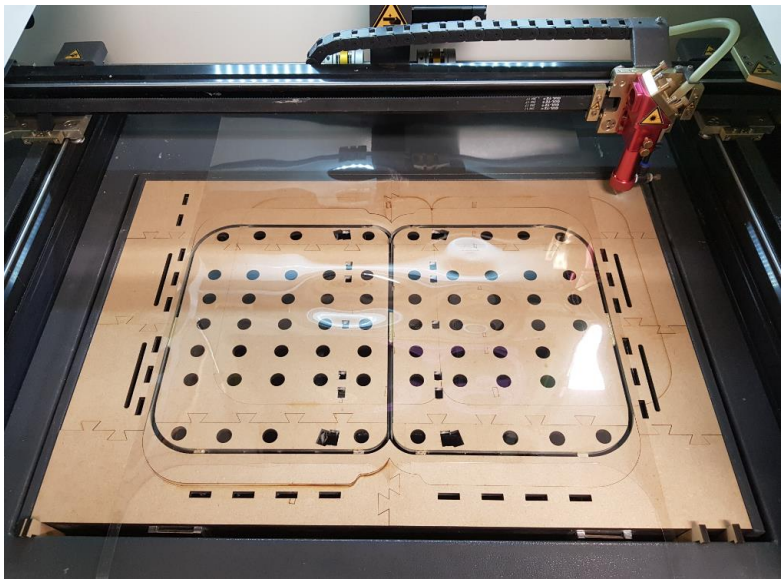
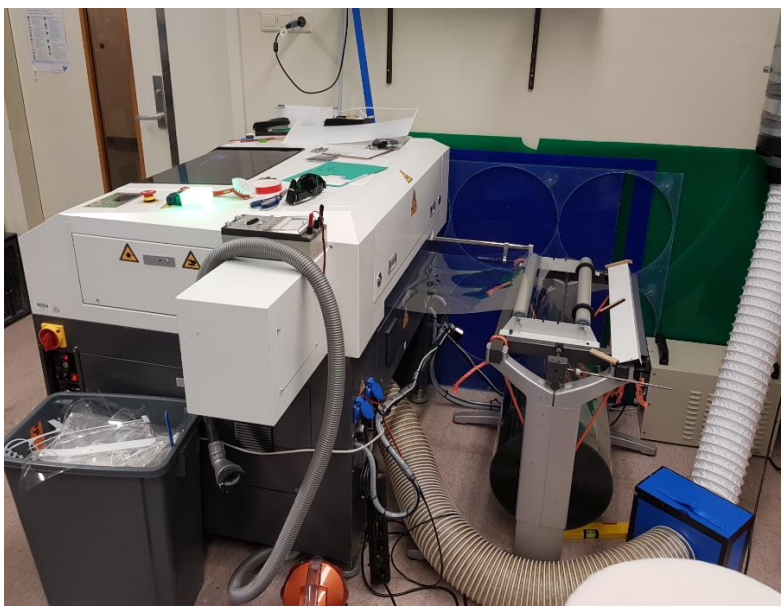
The shield part:



Laser cutter: BRM4060
Tube: 1250 mm max 80 W CO_2

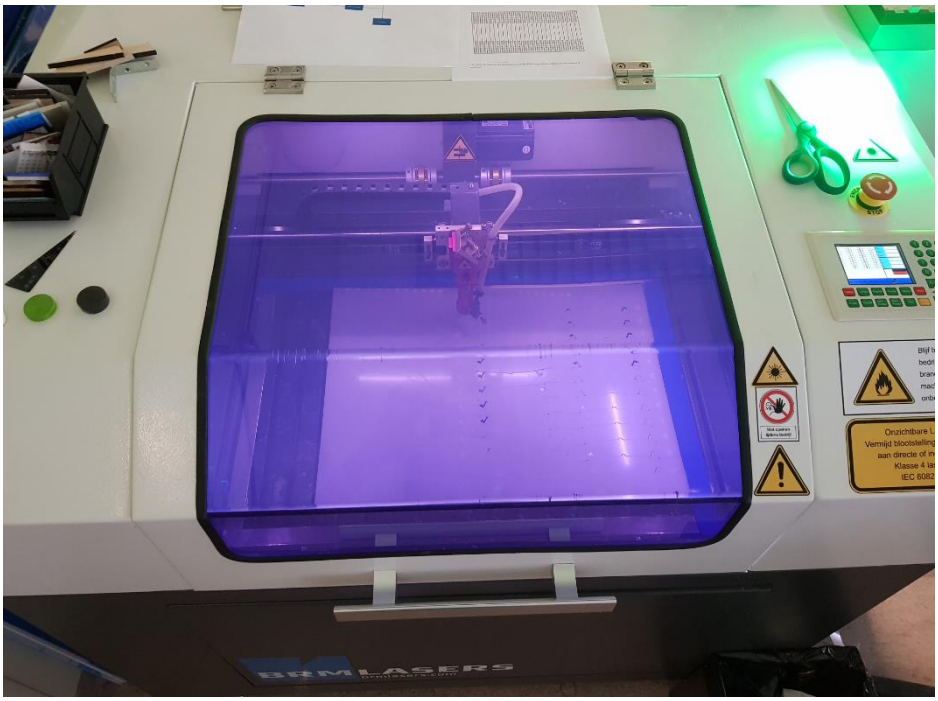


Cut the shield part from 0.2 mm APET foil by making use of a custom made template. The template holds the foil in place by the exhaust holes in the template. The foil is cut at 350 mm/s at 76 W.

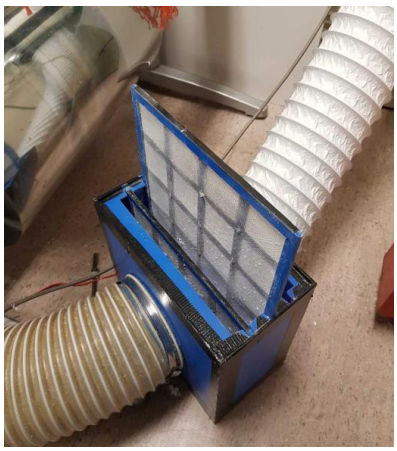


A home-made manual foil dispenser feeds the foil from the backside of the machine.

The frame parts:



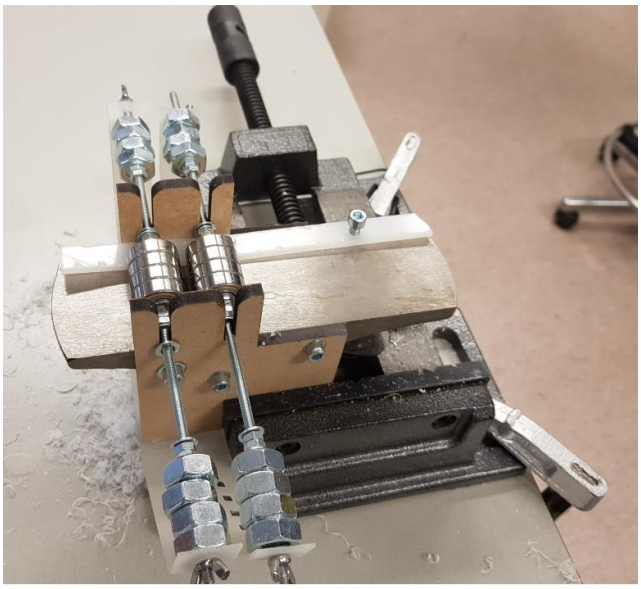
The headband is cut from 2 mm HDPE at 14 mm/s and 78.5W. The spacer part is cut from 3 mm HDPE at 8 mm/s and 78.5W.
Both use an initial cut-through of 200 ms at 16 W.



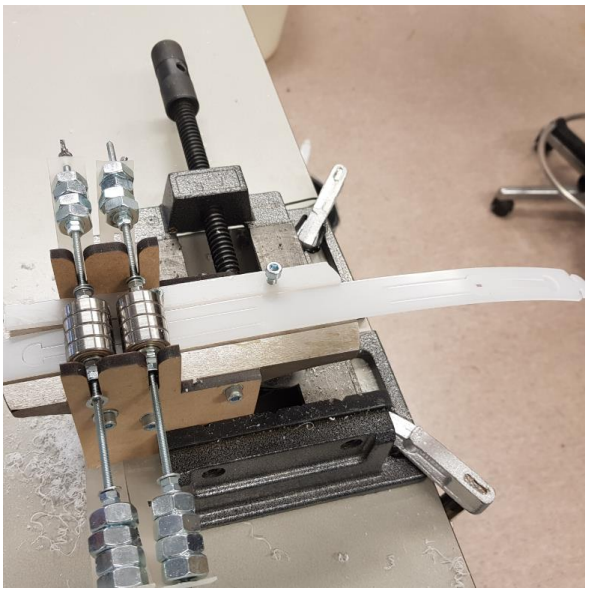
Use a filter (fine-mesh) in the exhaust while cutting HDPE Since laser-cutting will release a lot of particles.

You can mount an unpowered PC fan in the exhaust for monitoring the filter, connect it to a voltmeter.

The voltmeter shows the speed of airflow. Clean the filter when the value is low.



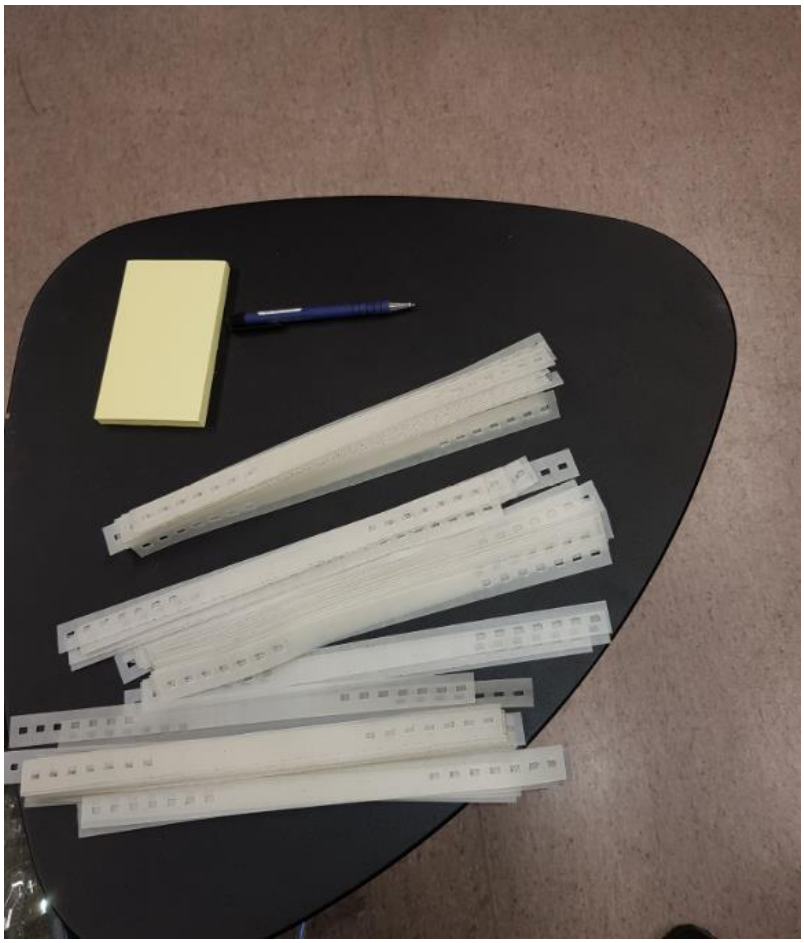
Use an up-side-down mounted scrape for cutting the edges created by the laser-cut. The guidance wheels (bearings) are not applying force (except gravity), this avoids cutting into the material.



Feed the headband from right to left (50%) and then gently pull back to the right while scraping the edges. Rotate 180 degrees and repeat for the remaining 50%.

Remove scrape defects and flakes by pulling the headband trough a blue flame (quickly and smoothly)

The elastic band:



The bands are cut from 1 mm thick silicone rubber with a speed of 45 mm/s a power at high speed of 72 W and a power at low speed (around the corners) of 28 W.

Remove the remaining carbon particles after cutting by a damp cloth, then soak the bands in a solution of 70% alcohol in water for 10 minutes. Dry well and package directly after.

Face shield assembly:

1) Clean hands thoroughly for 20 seconds with soap and water
2) Fold the headband as pictured, keep the smooth side inwards to the forehead
3) Connect the spacer part (two hooks) to the headband (two holes)
4) Connect the rubber band
5) Connect the shield to the spacer, bend the arrowheads of the headband to connect them to the shield.