Easybreath Mask – Filip Kober (rev. 4)

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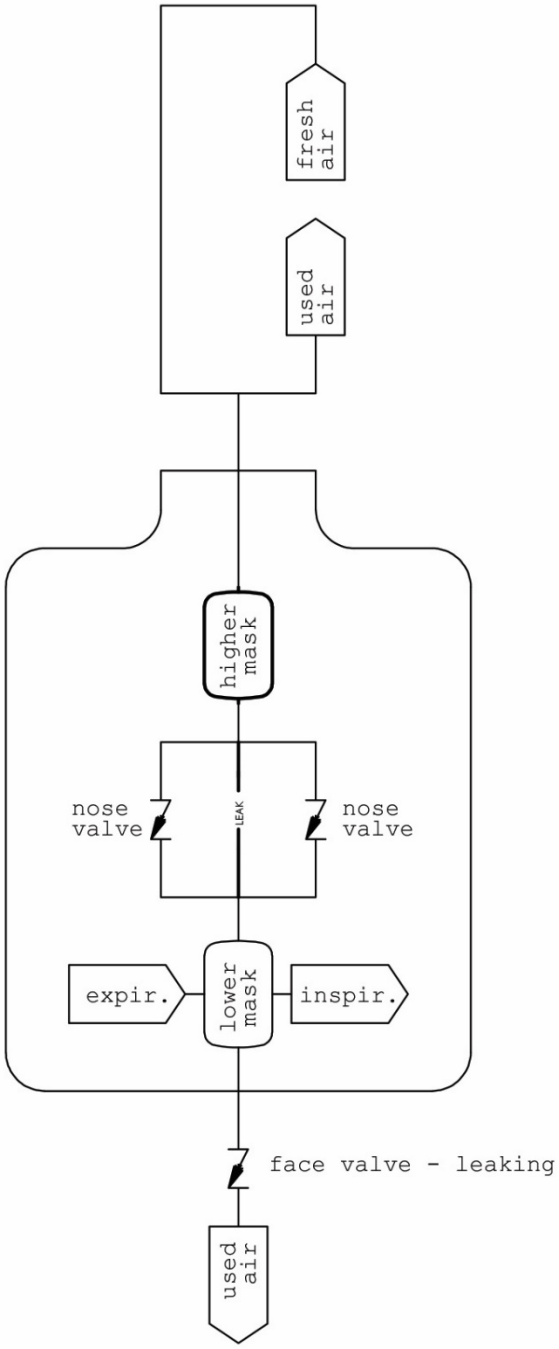


Pros of Subea mask:
- separated lines for inspiration and expiration
- good visibility
- ergonomy
- watertightness

Cons of Subea mask:
- mixed streams of fresh and used air
- leaking face valve (can be validated with low-flow breathe)

Author’s expirience with Easybreath

Author made three revisions of mask design dedicated for use with 3M P2/P3 filters or hand/machine made filters fitted to adaptor’s shape. Use of common interface has been considered from very begining. Open-source project has been released (https://grabcad.com/library/diy-fullface-mask-for-sars-cov-2-decathlon-s-subea-mask-p3-filter-rev-2-en-1) and downloaded more than 500 times, what shows actual need for such a solution.

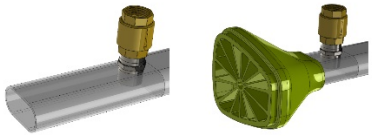
Author intended to use face check-valve and P3 filter mounted onto top tube.

MASKA CAŁOTWARZOWA

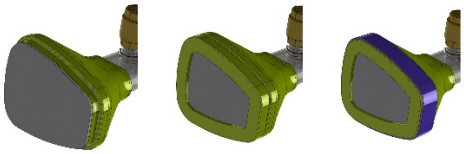
INSTRUKCJA WYKONANIA FILTRA ODDECHOWEGO

1. Wykonaj otwór w górnej, przedniej części rury powietrza maski SUBEA DECATHLON w otworze umieść i uszczelnij zawór zwrotny (przy pomocy gwintu, uszczelki, kleju, taśmy teflonowej). Zawór dostępny jest w castorama i sklepach hydraulicznych. Zawór będzie służył do usuwania wydechu i blokował dostęp powietrza z zewnątrz.

2. Przetnij rurę powietrza maski w miejscu, gdzie zmienia kształt. Wydrukuj adapter filtra z pliku adapter.stl, uszczelnij przy pomocy lakieru lub taśmy. Przyklej i uszczelnij adapter do obciętej rury przy pomocy kleju epoksydowego, uszczelek lub taśmy.

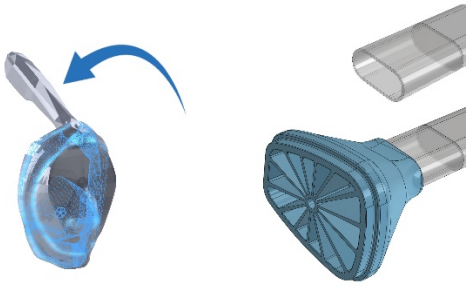


3. Użyj filtra 3M - P3 lub wytnij filter z tkaniny filtracyjnej według rysunku filter.pdf / filter.dxf Wydrukuj pokrywę z pliku pokrvwa.stl. umieść na filtrze i zabezpiecz taśmą klejącą.

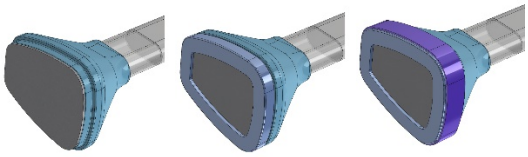


FULLFACE P3 MASK REV. 2

1. Cut-off top tube of Subea (Decathlon) snorkeling mask where the shape changes. Print (SLA, FDM) adapter.stl and seal with epoxy or basecoat. Glue the tube in adapter with epoxy or CA glue, seal with gaskets or tape.

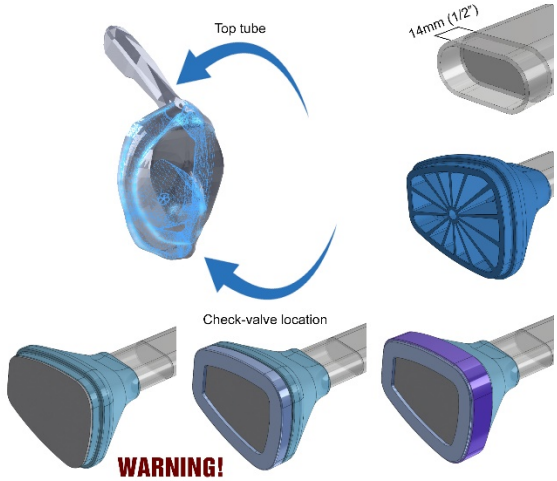


3. Use P3 filter from 3M 6000 series mask or cut it from filter.pdf / filter.dxf. Print cover.stl, mount on P3 filter and seal with adhesive tape. Mask has built-in check-valve. Now it is Your turn to save lifes, we need You!



CORONAVIRUS FULLFACE MASK

1. Cut-off top tube of **Subea (Decathlon)** snorkeling mask leaving approx. 14mm (1/2").
2. Print **adapter.stl** and seal with epoxy or basecoat. Glue-in the tube in printed adapter.
3. Seal structure with epoxy, basecoat, gaskets or tape.
4. Use **P3 filter** from 3M 6000 series mask or cut it from **filter.pdf** / filter.dxf.
5. Print **cover.stl**, mount on P3 filter and seal with adhesive tape.



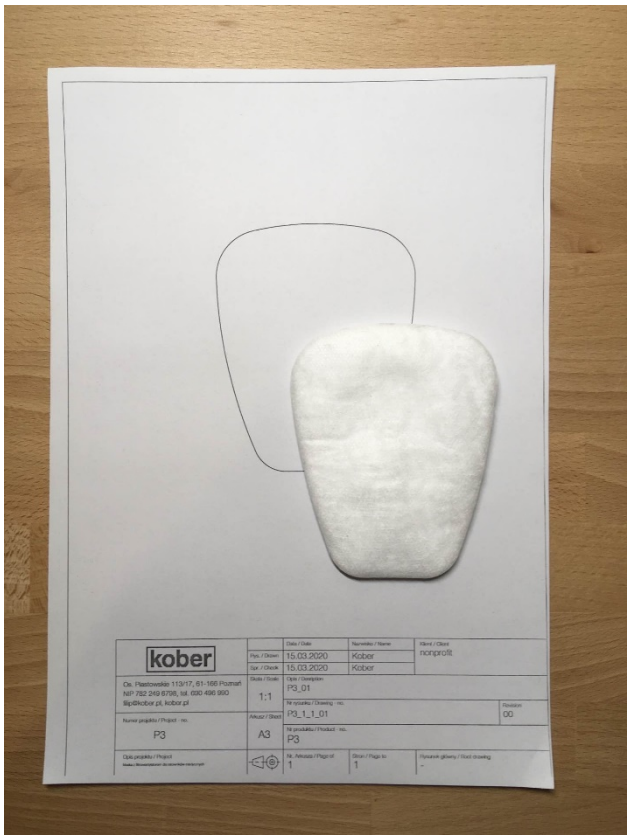
WARNING!

Mask can be successfully used for virus-protection but it has not been designed for it!
Easybreath mask has never been tested to fullfill EN136 regulations (protective gear)!
Mask has built-in check-valve but it is highly recomended to check if it is fully fuctional!
If check-valve fails and let air from outside in it should be sealed with adhesive tape!
Mask should be ventilated every 30 minutes due to CO2 retention with sealed check-valve!
Mask can be cleaned and sterilized in temperatures up to 100°C.

REV. 3 17.03.2020

Production

Parts were produced with FDM method of 3D printing by Imaginarium company from Poland. Assembly procedurę is shown down here.



Observations

Face valve was malfunctioning by low-flow, it has been solve with a sponge between face valve silicone membrane and white cover. Mask has been used for 1 hour. After that time sponge was completely wet, and air filter at the top began collecting moisture due to high expiratory resistence of face valve part of stream went up. No fogging has been observed and no CO2 effect.

Conclusions

- Stock valve has to be sealed or converted into ISO interface.
- External check valve is needed
- Expiratory line should be faced down to release condensate
- Air flow through higher section of maski is a must-have to prevent fogging
- Filter should be protected from expirational gases with a check valve.
- Expirational gases should be removed from the bottom of the mask to prevent CO2 collection
- Common ISO interface should be used for inlets and outlets
- Area of filter should be incereased

Diagram of suggested solution: