

*Memorandum*

To  
EUROMATE BV  
Attn. Joost Moelands

From  
Jos van der Vossen, PhD

Copy to  
Roberto Traversari, PhD

Subject  
Assessment of VTT report on VisionAir Blueline with HepaMax  
filter

Utrechtseweg 48  
3704 HE Zeist  
P.O. Box 360  
3700 AJ Zeist

www.tno.nl

T +31 88 866 60 00  
F +31 88 866 87 28

Date  
7 May 2020

Our reference  
MSB-2020-100332443 VOJ-voj

Contact person  
Jos van der Vossen, PhD

Dear Mr Moelands,

At your request, TNO, the Netherlands Organization for Applied Scientific Research, has taken note of the VTT report with reference VTT-CR-02254-18, in which, among other things, the "clean air delivery rate in particle filtration" of the VisionAir single and VisionAir double air cleaners with HEPA H13 and carbon filter was researched. This assessment of the VTT report by TNO is for your own use only and cannot be used for publication purposes.

The following can be said about its contents. HEPA filters are classified and tested ex-factory according to NEN-EN1822. A HEPA H13 filter has a filter efficiency of 99.95% for the most penetrating particle size (MPPS). This means that particles of a size that penetrates the filter the most are filtered out of the air stream with this efficiency. All other particle sizes are filtered out of the air stream with an even higher efficiency. VTT has tested the entire device, also taking account of any leakage through the device structure, including the sealing of the filter seat. VPP has measured smaller particles in the range of 0.09  $\mu\text{m}$  to 2.17  $\mu\text{m}$  for air streams of 62 m<sup>3</sup>/h to 465 m<sup>3</sup>/h for the VisionAir single and 117 m<sup>3</sup>/h to 982 m<sup>3</sup>/h for the VisionAir double. The worst case efficiency with which particles are filtered by both systems is above 97% for particles of 0.1  $\mu\text{m}$ .

SARS-CoV-2 virus particles will always be surrounded by a cocoon of respiratory fluid. The total diameter of these aerosols including the virus particle depends on humidity (Yang W, Marr LC (2011) Dynamics of Airborne Influenza A Viruses Indoors and Dependence on Humidity. PLOS ONE 6(6): e21481) but cannot be smaller than the dimensions of SARS-CoV-2 virus particles. These particles are 0.12  $\mu\text{m}$  in size (Linsey C, Marrant Charles P, Lunsford presentation Transmission of Virus in Droplets and Aerosols March 20, 2020; Muhammad Adnan Shereen, Suliman Khan, Abeer Kazmi, Nadia Bashir, Rabeea Siddique. 2020. COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. J. Adv. Res., 24: 91-98).

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*P. Arbouw*



Based on the filter efficiency and the sizes of aerosols that may contain the SARS-CoV-2 virus, it is concluded that the VisionAir single and VisionAir double air cleaners with HEPA H13 and carbon filter will capture this virus, thereby reducing the concentration of aerosols that may contain the virus in a room during operation of the system. Larger particles of the size of bacteria (about 1  $\mu\text{m}$ ), for example, are captured by more than 99%.

In conclusion, based on the data from the VTT report, both VisionAir systems with H13 filter can filter SARS-CoV-2 as well as bacteria out of the air with high efficiency during their operation.

Kind regards,



Jos van der Vossen  
Department of Microbiology and Systems Biology

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