

*Memorandum***To**

[REDACTED]

**From**

[REDACTED]

**Subject**

Comparative test filter efficacy of mouth masks material

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7 May 2020

**Our reference**

MSB-2020-100332201-MHe

At the request of CardiAid Benelux TNO has assessed the barrier properties of mouth masks material applied to an aerosol of nebulised saline (0.02% NaCl).

**Method**

TNO has set up a test system in which mouth masks can be tested comparatively for filtering functionality in a conditioned cabinet of 1 m<sup>3</sup>. In this conditioned space, nebulised particles are measured after suction at 28L / min through 2 channels: 1) containing the mouth mask material and 2) reference without filter. Subsequently, the particles of 0.3 micro meters (µm), 0.5 µm and 1 µm in each channel are counted by individual laser particle counters (Lighthouse Solair). The better the mouth mask material functions, the more particles are retained. The difference from the reference (without filter) can then be expressed in the percentage that is blocked by the filter.

**Results**

The filter efficiency results of the Nuokang Medical KN95 mouth masks from CardiAid Benelux have been compared with FFP2 reference mouth masks 3M Aura 1862+ FFP2 and Honeywell 2211 FFP2 as well as a type II-R surgical mask. The results are shown in Figure 1.

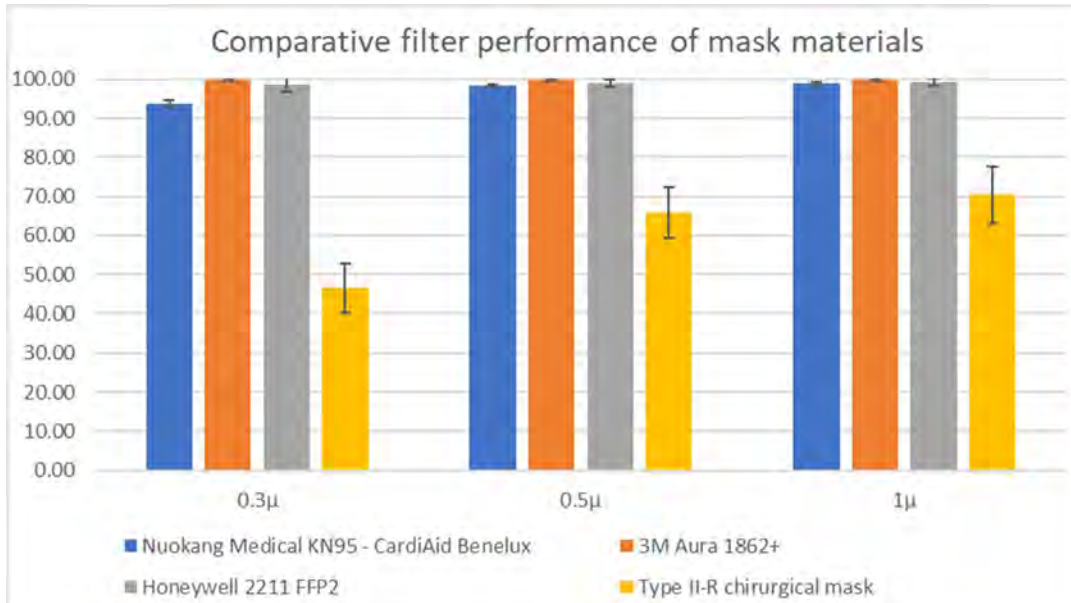
**Conclusion**

The results show that the Nuokang Medical KN95 mouth masks from CardiAid Benelux perform less well in terms of permeability of the filter material than the reference mouth masks 3M Aura 1862+ FFP2 and Honeywell 2211 FFP2. In particular, the barrier function for 0.3 µm particles are suboptimal. Compared to the Type II-R surgical mask, the Nuokang Medical KN95 mouth masks from CardiAid Benelux perform much better in terms of permeability of the filter material. In conclusion, the masks are not advised to be used for health care workers in contact with COVID-19 patients, but can be used to protect the surrounding of the user against spread of aerosols.

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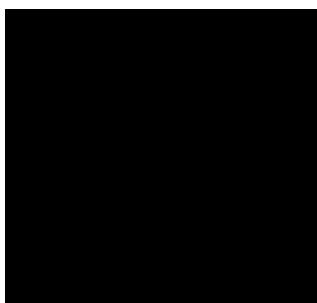
**Figure 1.** Filter efficiency of different types of mouth masks.

The result only gives an indication of the quality of the filter material compared to the available reference material. TNO has neither examined nor tested the fit according to NEN EN standard 149; 2001 + A1: 2009. The result of the measurement cannot be used for certification purposes.

If you have any questions regarding the results of the test, please contact the undersigned.

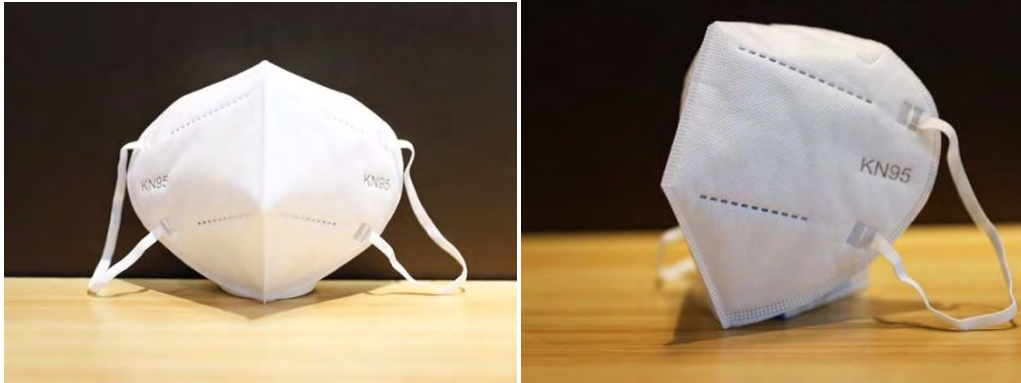
We hope to have informed you sufficiently.

Sincerely,



Senior Scientist  
Microbiology & Systems Biology

**Appendix.** Photos of the mouth mask material obtained from CardiAid Benelux



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