Supplemental Information for:

Filtering Performances of 20 Protective Fabrics against Solid Aerosols

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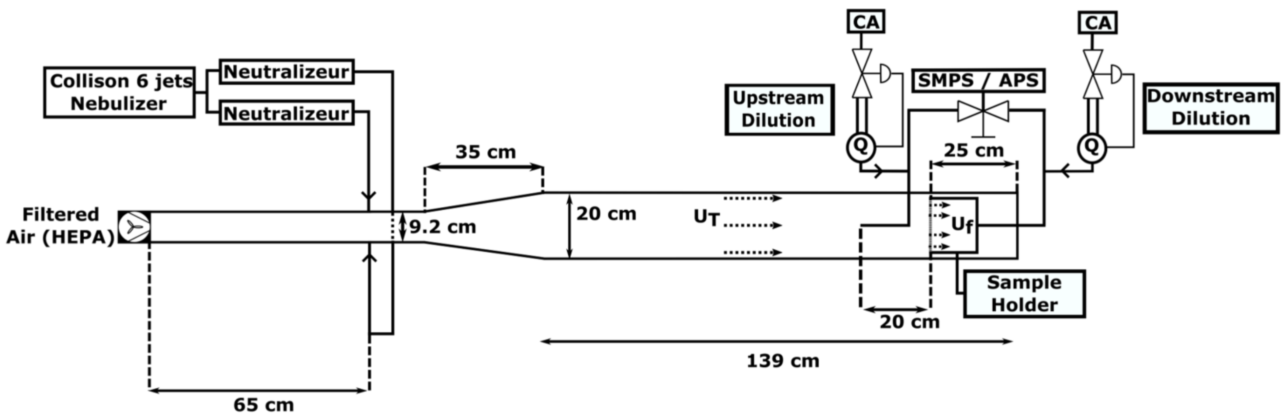

Figure S1. Experimental setup used for protection efficiency measurements.

Table S1. Coefficient of variation of particles concentration following the guidelines of ASHRAE standard 52.2-2012.

Aerodynamic diameter (μm)	Coefficient of variation **(U_T: 0.1 m/s)**	Coefficient of variation **(U_T: 0.2 m/s)**	Coefficient of variation **(U_T: 0.3 m/s)**
0.025	5.44%	8.25%	2.84%
0.041	5.15%	6.70%	2.29%
0.070	4.52%	5.22%	2.85%
0.129	3.53%	5.99%	3.39%
0.233	4.47%	5.72%	7.44%
0.435	6.46%	7.09%	11.02%
0.739	9.86%	11.45%	17.24%
1.226	15.71%	16.85%	18.43%
2.020	17.47%	15.44%	15.49%
3.027	14.98%	9.05%	12.61%

Table S2. Coefficient of variation of air velocity following the guidelines of ASHRAE standard 52.2-2012.

Coefficient of variation **(U_T: 0.1 m/s)**	Coefficient of variation **(U_T: 0.2 m/s)**	Coefficient of variation **(U_T: 0.3 m/s)**
11.7%	8.9%	10.2%

Since the SMPS provides results based on the electric mobility diameter while those of the APS are based on the aerodynamic diameter, a conversion was performed using a published extrapolated effective density curve of cubic NaCl particles.[S1]

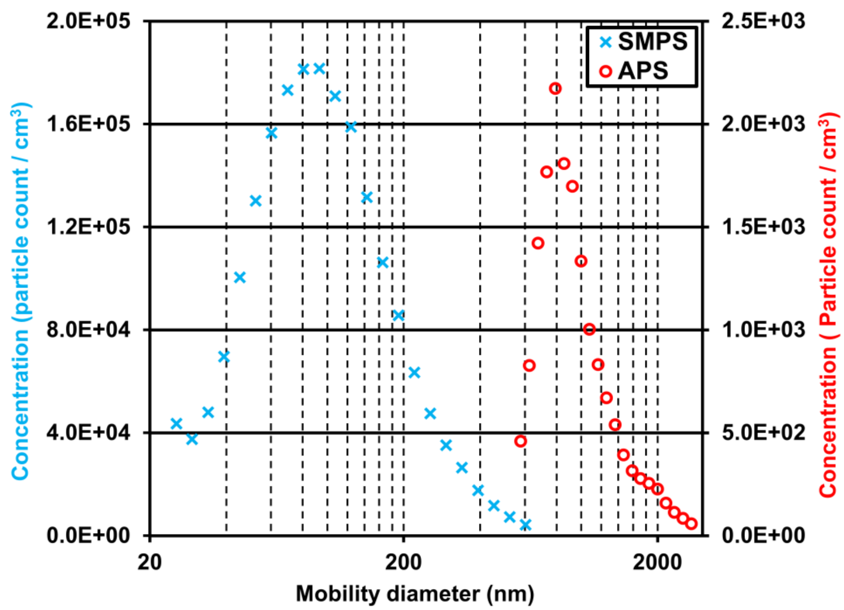

Figure S2. SMPS (cross) and APS (circle) NaCl particle size distributions

S1. **Zelenyuk, A., Y. Cai, and D. Imre:** From Agglomerates of Spheres to Irregularly Shaped Particles: Determination of Dynamic Shape Factors from Measurements of Mobility and Vacuum Aerodynamic Diameters. *Aerosol Sci. and Technol.*, *40*(3), 197–217 (2006)

The protection efficiencies of the fabrics were computed from the upstream and downstream concentrations measured with the previously described SMPS/APS coupling. Based on standard EN 779 (European Committee for Standardization, 2012), dedicated to establishing the performance of filters, these upstream and downstream samplings were taken according to the sequence described in Table S3.

Table S3 Measurement sequence to obtain protection efficiencies

1	2	3	4	5	6	7	8	9	10	11	12	13
$C_{up,1}$	X	X	$C_{up,p}$	$C_{up,2}$	X	X	$C_{up,p}$	$C_{up,3}$	X	X	$C_{up,p}$	$C_{up,4}$
X	$C_{down,p}$	$C_{down,1}$	X	X	$C_{down,p}$	$C_{down,2}$	X	X	$C_{down,p}$	$C_{down,3}$	X	X

In Table S3, C_{up} and C_{down} (/cm^3) are the concentrations measured upstream and downstream of the fabrics. The concentrations marked in italic in the table correspond to a purge of the tubing connecting the test bench to the sampling devices. Thus, these concentrations were not used for the efficiency calculations. As a result of this measurement sequence, three values of fractional efficiencies (efficiency per particle size) for each garment sample were calculated:

$$\mathrm{E_i} = \frac{\mathrm{C_{up,i}} - \mathrm{C_{down,i}}}{\left(\frac{\mathrm{C_{up,i}} + \mathrm{C_{up,i+1}}}{2}\right)} \qquad \text{S1}$$

The fractional protection efficiencies of a sample were therefore taken as the η_i average:

$$\mathrm{E} = \frac{\sum_{\mathrm{i}=0}^{3} \mathrm{E_i}}{3} \qquad \text{S2}$$

The efficiency measurements described above were performed in triplicate for each fabric type.

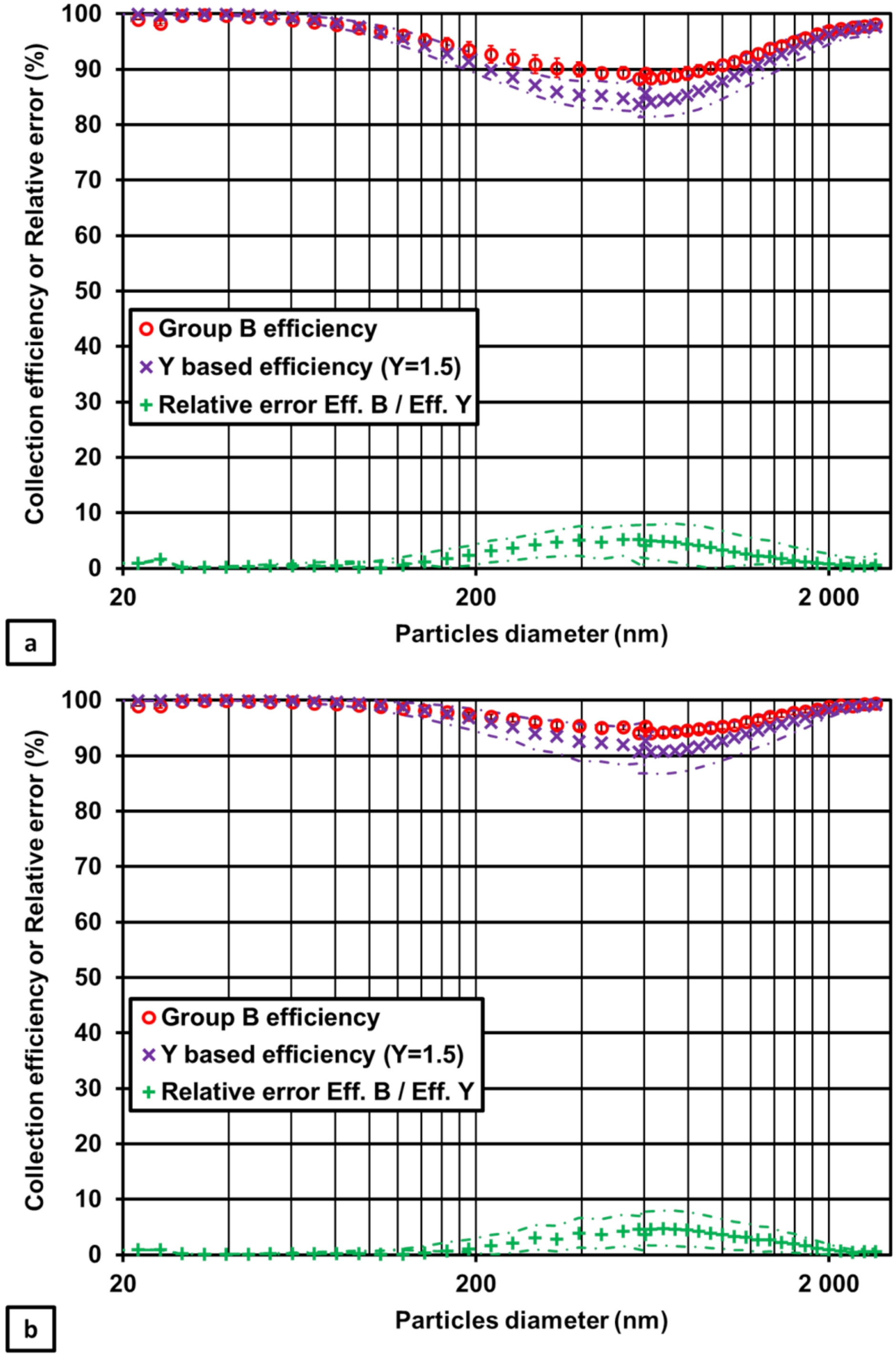

Figure S3. Comparison of the virtual protective clothing with the group B fabrics assuming a M layer thickness of Y x $Z_{M,A}$ (Y = 1.5) – a: 0.15 cm/s, b: 0.05 cm/s