

Supporting information

Aerosol Filtration Efficiency of Common Fabrics Used in Respiratory Cloth Masks

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Filtration efficiencies for various fabrics tested at two different flow rates, and the effect of layering on the filtration efficiencies of chiffon, silk, and 600 TPI cotton. Detailed information on various fabrics used.

Figure S1: Filtration Efficiency of Different Fabrics as a Function of Number of Layers at a Flow Rate of 1.2 CFM. The plot shows the filtration efficiencies of chiffon (1 and 2 layers), silk (1, 2, and 4 layers), and 600 TPI cotton (1 and 2 layers).

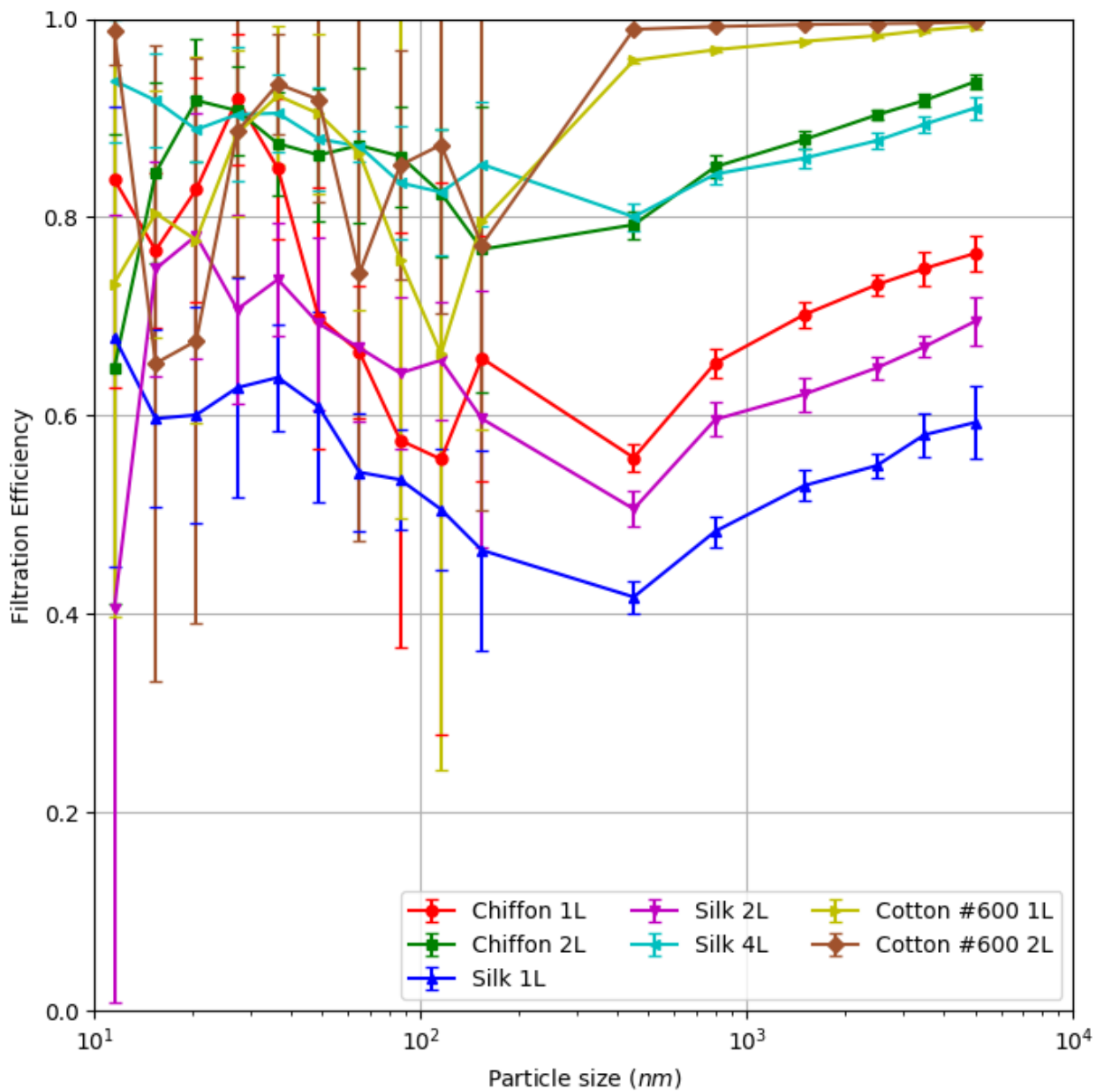


Table S1: Filtration efficiencies of various test specimens at a velocity of 0.26 m/s (3.2 CFM) and the corresponding ΔP values. The filtration efficiencies are the weighted average of seven replicates. ΔP indicates the pressure difference across the sample and is a good indicator of the breathability through the sample when used as mask.

Sample/Fabric	Flow Rate: 3.2 CFM		
	Filter Efficiency (%)		Pressure Diff.
	<300 nm Average \pm Err	>300 nm Average \pm Err	ΔP (Pa)
N95 - No Gap	94 \pm 5	99.9 \pm 0.0	13.2
N95 - Gap	58 \pm 12	64 \pm 2	11.9
Surgical Mask - No Gap	61 \pm 16	81 \pm 1	11.9
Surgical Mask - Gap	15 \pm 17	10 \pm 1	11.9
Cotton Quilt	64 \pm 9	82 \pm 1	11.5
Quilter's Cotton #80	14 \pm 18	39 \pm 4	8.7
Flannel	22 \pm 14	54 \pm 2	10.2
Chiffon	25 \pm 12	59 \pm 2	13.2
Synthetic Silk	14 \pm 14	25 \pm 3	11.7
Satin	14 \pm 11	51 \pm 2	13.9

Figure S2: Filtration Efficiency of Different Samples Tested at a Flow Rate of 1.2 CFM. Plot shows the filtration efficiencies for various samples across the two size distributions including N95 and surgical mask.

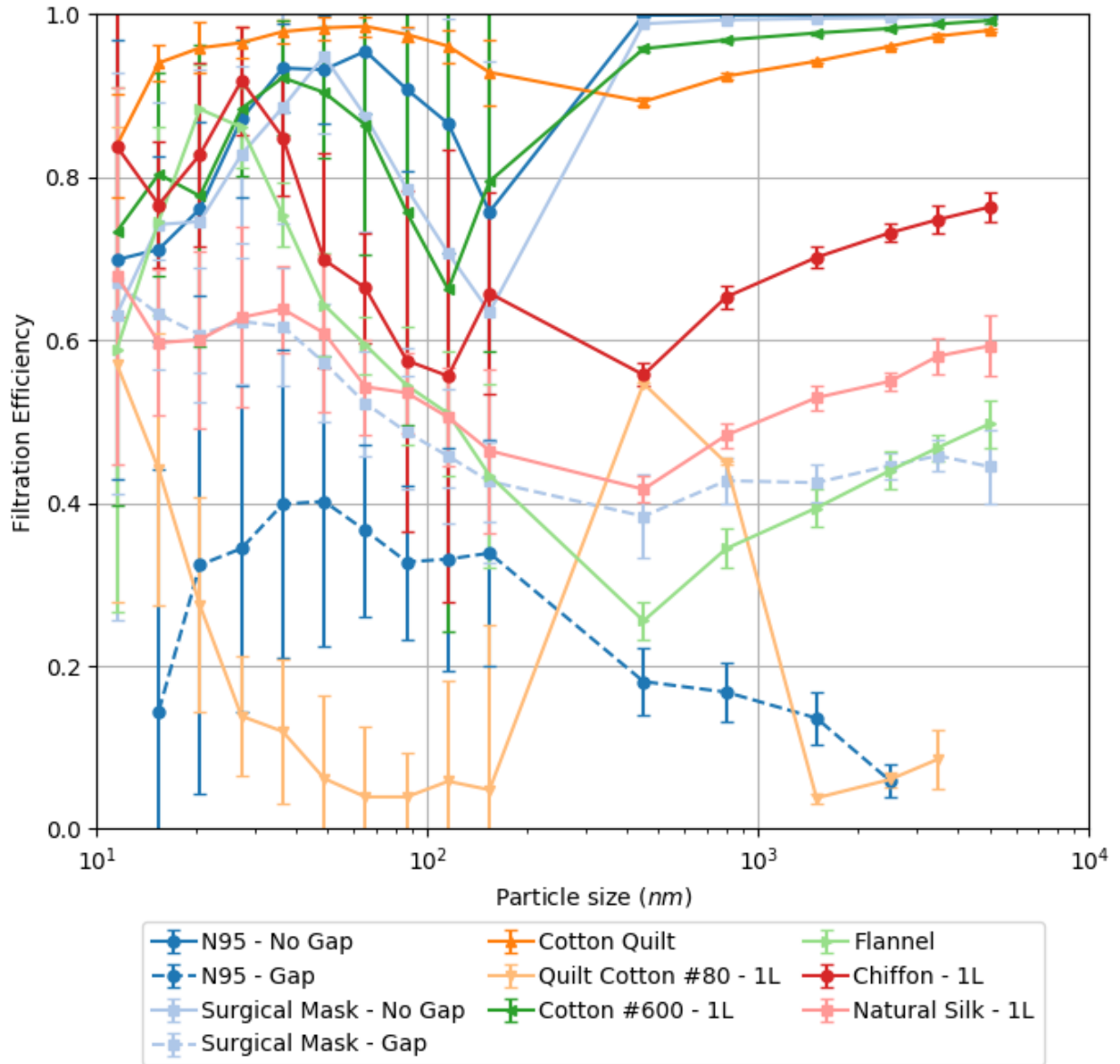


Figure S3: Filtration Efficiency of Different Samples Tested at a Flow Rate of 1.2 CFM. Plot shows the filtration efficiencies for various multi-layered samples across the two size distributions.

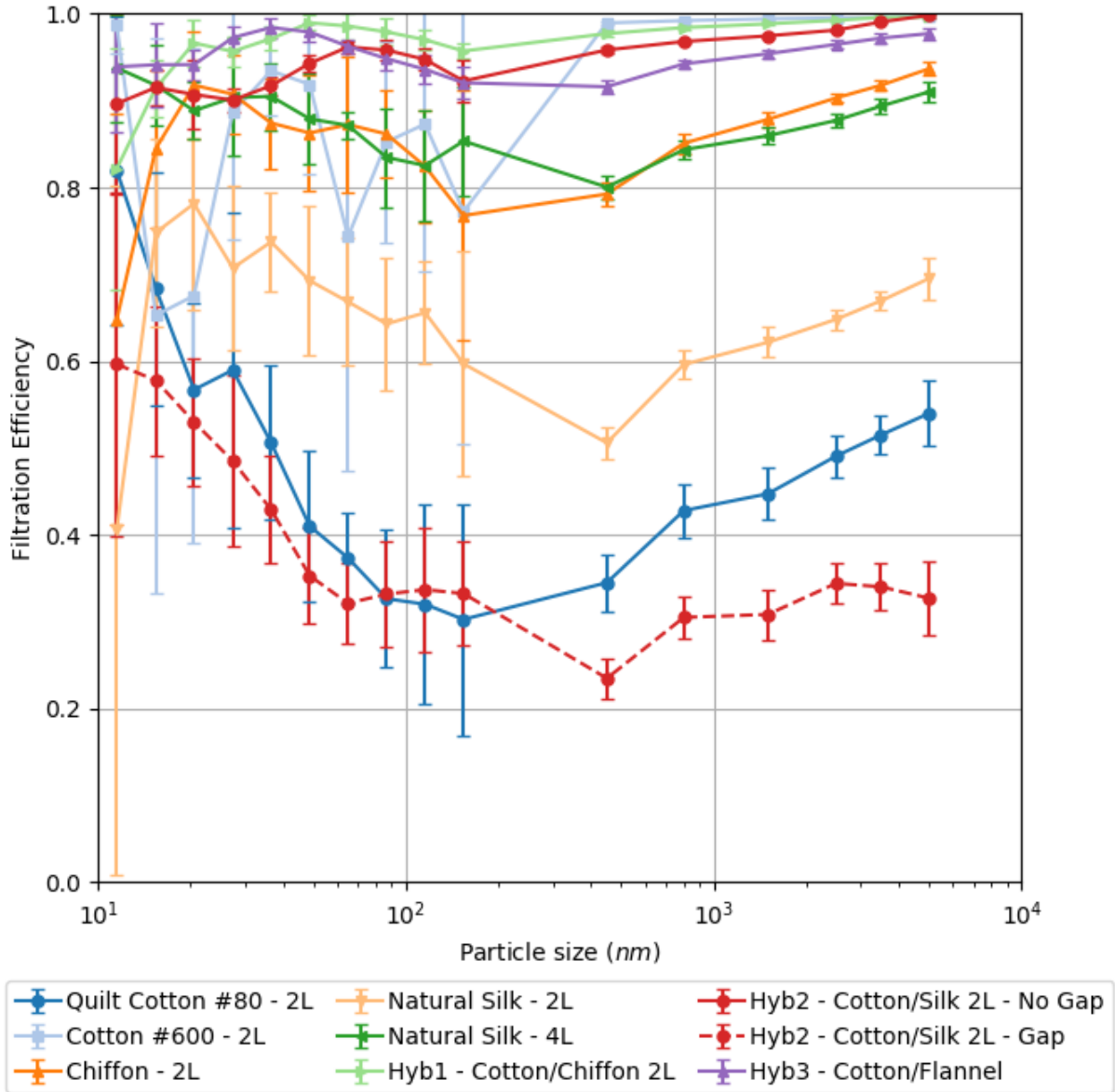


Figure S4: Filtration Efficiency of Different Samples Tested at a Flow Rate of 3.2 CFM. Plot shows the filtration efficiencies for various samples across the two size distributions.

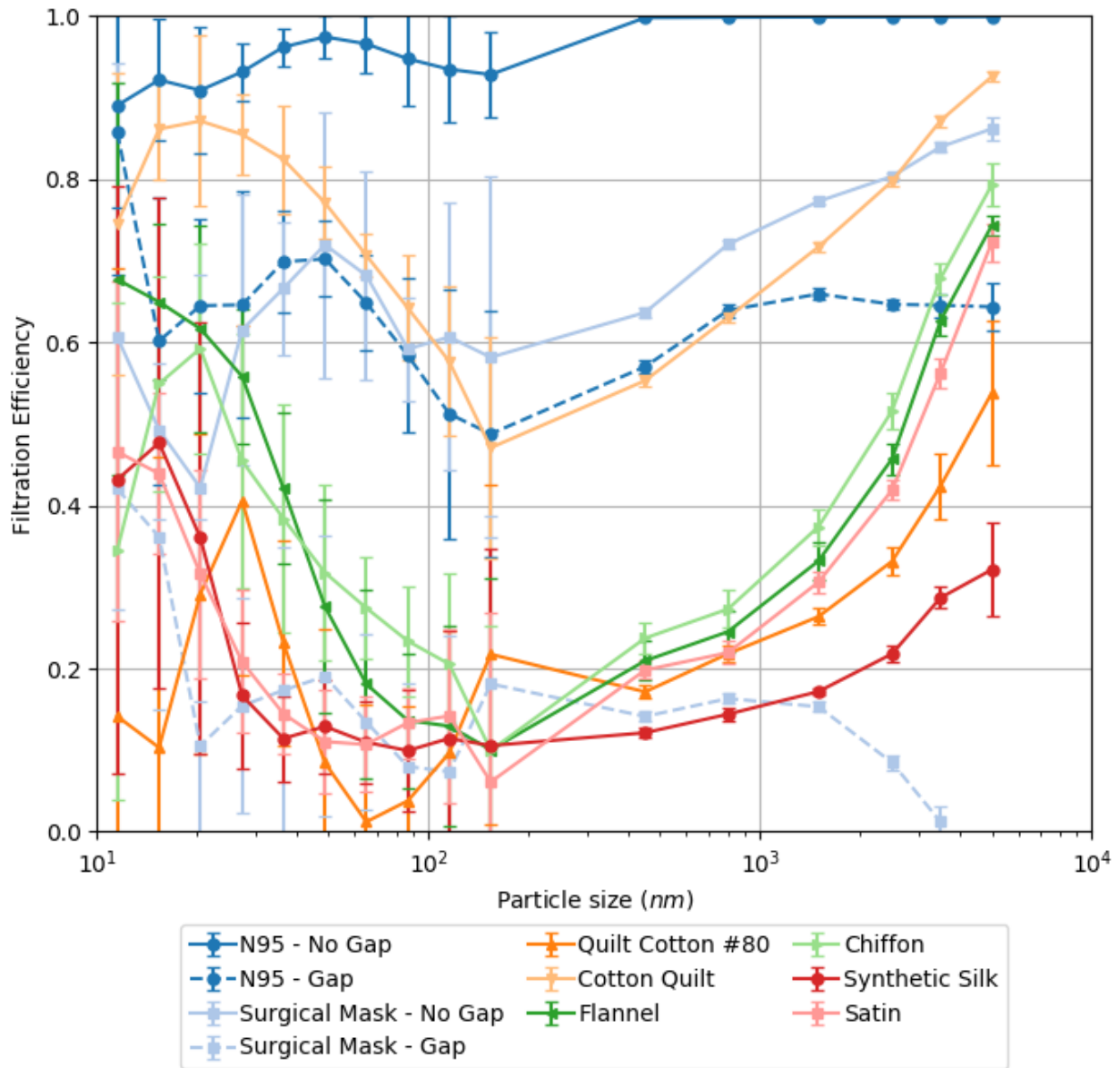












Table S2: Specific Information on the Various Fabrics Used. Table showing the composition, microstructure, approximate porosity, thread diameter, approximate thread pitch, and the source of the materials (where applicable). Pitch and thread diameter often vary depending upon the weave direction resulting in the variation noted.

<i>Fabric Name</i>	<i>Composition</i>	<i>Microstructure (Optical image)</i>	<i>Porosity (%)</i>	<i>Thread Diameter (μm)</i>	<i>Thread Pitch (μm)</i>	<i>Purchased From (Seller Part #)</i>
Cotton Quilt	Two layers of 120 TPI cotton Filling: ~0.5cm (90% Cotton, 5% polyester, 5% other fibers)		20.1	227	300-400	NA
Quilters Cotton #80	100% cotton		14	270	460-500	NA
Cotton #600	100% cotton		<1	55-75	70-75	Wamsutta
Flannel	65% cotton, 35% polyester		15	300-440	500-650	Walmart Fabric Center
Chiffon	90% polyester, 10% spandex		3	200-250	220-320	Jo-Ann Stores (1636949)
Natural Silk	100% silk		1.5	180-260	270-500	NA
Synthetic Silk	100% polyester		3	190-230	440-570	Jo-Ann Stores (1446277)
Satin	97% polyester, 3% spandex		11	210	165-520	Jo-Ann Stores (4488359)
Spandex	52% nylon, 39% polyester, 9% spandex		6	160-170	200-480	Jo-Ann Stores (17026402)
Polyester	100% woven polyester		23	180-200	300-500	Walmart Fabric Center