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Laboratory #: 849935-1-20
Report Date: December 9, 2020
Received Date: November 30, 2020

Attention: Hasnain Karamali
Specimen: #1: Adults Non-Medical Face Mask – Lot#: 20200618

TEST REPORT

One specimen, consisting of face masks, was submitted to be tested for bacteria filtration efficiency to determine acceptability with level barrier classification under ASTM F2100-19 requirements.



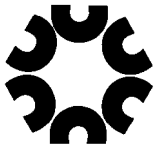
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Note: This report ONLY contains results for one of the five requirements as per ASTM F2100-19. Unless all the tests are performed, final overall performance level cannot be achieved for the submitted medical mask.

Medical Face Mask Material Requirements

Characteristic	Level 1 Barrier	Level 2 Barrier	Level 3 Barrier	Summary Results
Bacterial Filtration Efficiency, %	≥95	≥98	≥98	Pass any Level
Differential Pressure, mm H ₂ O/cm ²	<5.0	<6.0	<6.0	Not performed
Sub-Micron Particulate Filtration Efficiency at 0.1 micron, %	≥95	≥98	≥98	Not performed
Synthetic Blood Penetration minimum pressure in mmHg for pass result	80	120	160	Not performed
Flame Spread	Class 1	Class 1	Class 1	Not performed
OVERALL PERFORMANCE LEVEL	Incomplete			



BACTERIAL FILTRATION EFFICIENCY

A Bacterial Filtration Efficiency (BFE) test was completed according to the procedure in ASTM F2101-19 to determine the filtration efficiency of test articles by comparing the bacterial control counts upstream of the test article to the bacterial counts recovered downstream. A suspension of *S. aureus* was aerosolized using a nebulizer and delivered to the test article at a constant rate with a target delivery rate of $1.7 \times 10^3 - 3.0 \times 10^3$ colony forming units (CFU) per test article with a mean particle size of $3.0 \pm 0.3 \mu\text{m}$. The aerosolized suspension was drawn through the test article which was clamped in a six stage Andersen air sampler, at a constant flow rate of 28.3 liters per minute (LPM), for collection on bacteriological agar plates.

Challenge Microbe: *Staphylococcus aureus* ATCC 6538
Test Side: User side facing challenge
Area Tested: $\sim 38.5 \text{ cm}^2$
Flow Rate: 28.3 LPM
Test Article Conditioning: $85 \pm 5\% \text{ RH}$ at $25.0 \pm 0.5^\circ\text{C}$ for a minimum of 4 hours
Challenge Level: $2.3 \times 10^3 \text{ CFU}$
Mean Particle Size: $3.2 \mu\text{m}$

Requirements ASTM F2100-19:
Bacterial filtration efficiency (%)
Level 1 Barrier: ≥ 95
Level 2 Barrier: ≥ 98
Level 3 Barrier: ≥ 98

RESULTS

Specimen #	Total CFU Recovered	Percent BFE (%)	Specimen (Pass/Fail)	FINAL RESULT
1-1	3	99.9	Pass	Pass any Level
1-2	1	>99.9	Pass	
1-3	<1	>99.9	Pass	

The filtration efficiency percentages were calculated using the following equation:

$$\% \text{ BFE} = \frac{C - T}{C} \times 100$$

C = Challenge Level
T = Total CFU recovered downstream of test article

Note: Testing performed by GAP EnviroMicrobial Services Ltd., 1020 Hargrieve Road, Unit 14, London, Ontario, Canada, N6E 1P5