NAMSA

CONFIDENTIAL
REPORT

PEOPLE > SCIENCE > SOLUTIONS

Test Facility
9 Morgan
Irvine, CA 92618
949.951.3110

STUDY TITLE
Assessment of Antibacterial Finishes on Textile Materials - AATCC Test Method 100

TEST ARTICLE NAME
GRAY MATTER WITH SILVER PRO

TEST ARTICLE IDENTIFICATION
RAE 120 AND 210

TEST ARTICLE PHYSICAL DESCRIPTION
BEC TECH GRAY MATTER WITH SILVER PRO AT A RATE = 120 AND ONE AT 210

TEST ARTICLE RECEIVED
October 15, 2014

SPONSOR
Ed Softsky
Quality Filters, Inc.
23351 Grissom Drive
Robertsdale, AL

PURPOSE
The purpose of this study is to evaluate the degree of antibacterial activity on the textile materials following a quantitative procedure.

RESULTS

Sample ID	Results (CFU/sample)					
	Zero Contact Time CFU / Specimen		24 hour Contact Time CFU / Specimen		Percent Reduction (%)	
	S. aureus	*K. pneumoniae*	*S. aureus*	*K. pneumoniae*	*S. aureus*	*K. pneumoniae*
RATE 120	2.40×10^5	1.07×10^5	$< 1.00 \times 10^2$	$< 1.00 \times 10^2$	> 99.96	> 99.91
RATE 210	2.50×10^5	1.22×10^5	$< 1.00 \times 10^2$	$< 1.00 \times 10^2$	> 99.96	> 99.92

	A. brasiliensis	*A. brasiliensis*	*A. brasiliensis*
RATE 120	1.75×10^5	3.50×10^4	80.00
RATE 210	1.65×10^5	3.90×10^4	76.36

CFU = Colony Forming Units

The following formulas were used to calculate percent reduction.

% Reduction = B-A/B x 100

B = Number of bacteria recovered from inoculated test sample at 0 contact time.
A = Number of bacteria recovered from inoculated test sample in the jar incubated over desired contact period.

PROCEDURE
Specified layers of sample were inoculated evenly with the challenge organism. After inoculation, samples were incubated at specified temperature for 24 hours. Immediately after inoculation, zero contact time samples were neutralized with appropriate neutralizer. Serial dilutions were prepared and plated in duplicate using appropriate media. 24 hour samples were processed similarly.

All plates were incubated at 37 ± 2°C for 24-48 hours. The number of bacteria per specimen was reported and the percent reduction of bacteria was calculated.

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TEST INFORMATION

Date Testing Initiated:	10-20-14	Date Testing Terminated:	10-27-14
Test Organism:	*Staphylococcus aureus* *Klebsiella pneumoniae* *Aspergillus brasiliensis*	Source No. 6538 Source No. 4352 Source No. 16404	
Sample Size:	1 layer of 1 7/8" in diameter		
Number of Layers:	One (1)		
Pre-treatment:	Triton X		
Neutralizer:	Letheen Broth		
Neutralizer Volume:	100 mL		
Target Inoculum Level per sample:	(1-2) x 10^5 CFU		
Inoculum Volume:	1.0 mL		
Inoculum Population:	*S. aureus* = 2.45 x 10^5 CFU/mL *K. pneumoniae* = 1.37 x 10^5 CFU/mL *A. brasiliensis* = 1.75 x 10^5 CFU/mL		
Incubation Temperature:	35-39°C / 27-29°C		

COMMENT

Organisms were derived from an ATCC® organism, or an organism determined to be equivalent. ATCC is a registered trademark of American Type Culture Collection.

REFERENCE

The American Association of Textile Chemists and Colorists (AATCC) 100, Antibacterial Finishes on Textile Materials: Assessment of (2012).

APPROVAL Jayendra Uppal for 10-30-14

Robert D. Hughes, BS
Laboratory Operations Manager, Sterility Assurance

Date

Results apply only to the test article tested. Any extrapolation of these data to other articles is the sponsor's responsibility. All procedures were conducted in conformance with good manufacturing practices, certified to ISO 13485:2003.

Blue Heaven Technologies
2820 S. English Station Road - Louisville, KY 40299
Tel: (502) 357-0132 Fax (502) 267-8379

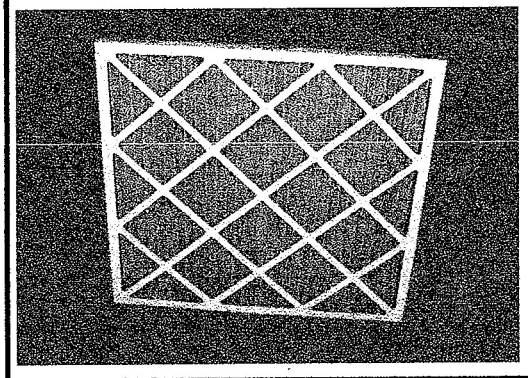
Date: 29-Apr-20 TEST NO. 20-235-1

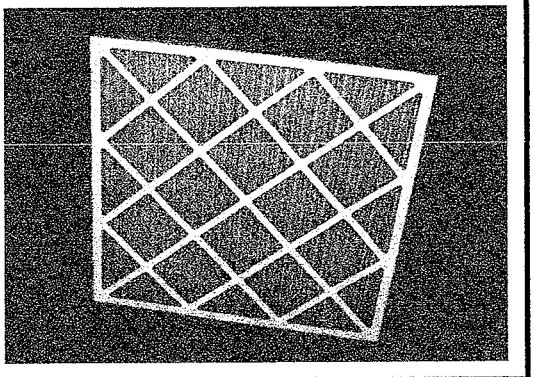
ASHRAE Standard 52.2-2017 TEST REPORT

Initial Efficiency / Resistance

Filter Description

Manufacturer	All Filters Inc
Filter Model	Silver Micron
Part Number	N/A
Generic Filter Type	Pleated
Nominal Dimensions (H x W x D)	24" x 24" x 1"
Pocket / Pleat Quantity	32 Pleats
Media Type	Synthetic
Est. Gross Media Area	9.39Ft²
Adhesive Type	N/A





Test Conditions

Loading Dust Type	NA	Test Air Temp (degrees F.)	75
Barometric Pressure (In. Hg.)	29.02	Relative Humidity (%)	45

Test Results

Airflow Rate (CFM)	**1180**
Nominal Face Velocity (fpm)	**295**
Initial Resistance (in WG)	**0.24**
E1 (%) Initial Efficiency 0.30 - 1.0 um	**28**
E2 (%) Initial Efficiency 1.0 - 3.0 um	**68**
E3 (%) Initial Efficiency 3.0 - 10.0 um	**87**
Estimated * Minimum Efficiency Reporting Value (MERV)	**MERV 11 @ 1180 CFM**

*** If initial data is minimum**

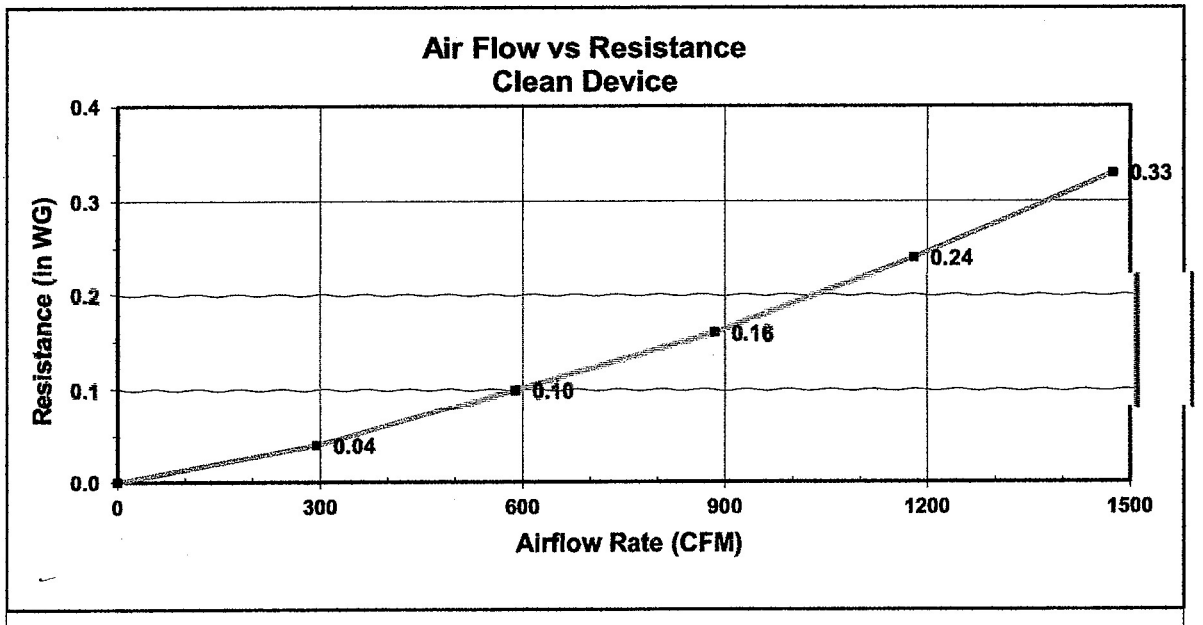
Comments Tested For: SilverMicron Technology

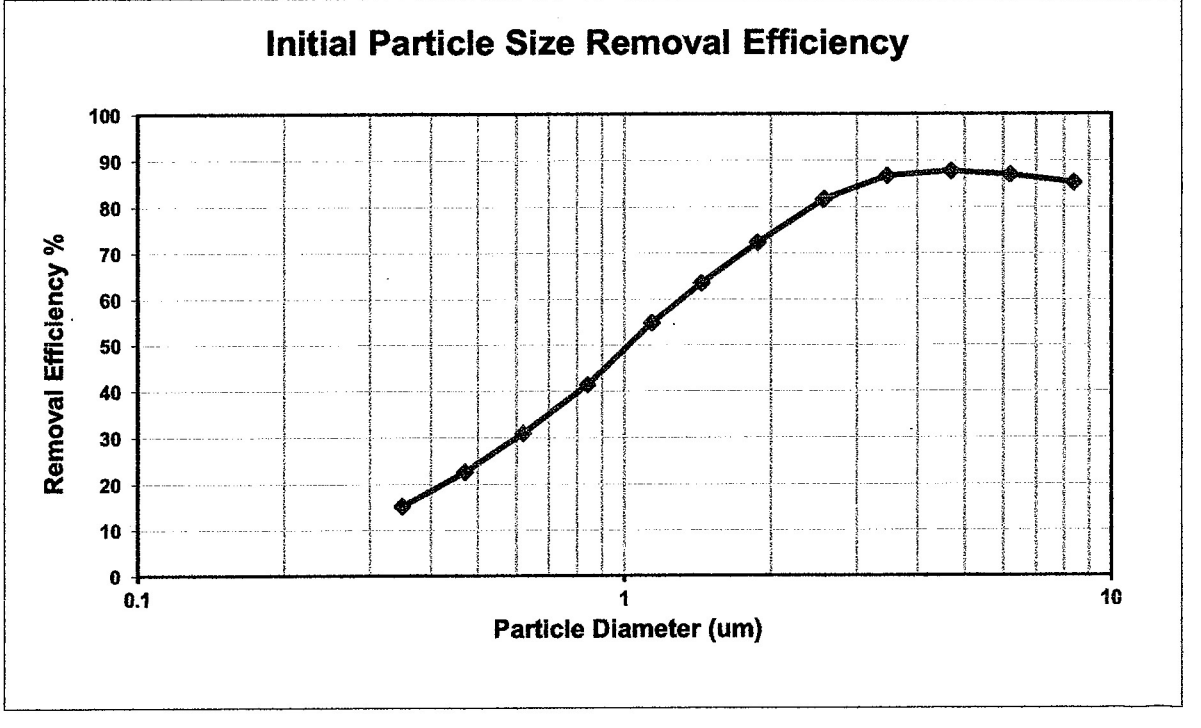
Test Performed by: CR Approved By:

Important Note: Please be advised that the ASHRAE committee SSPC 52.2. in March 2016, has published "addendum e" relative to the 52.2-2012 test protocol. This addendum restricts the use of the acronym "MERV" as only applicable to a test report that has been completed using the "entire procedure prescribed by the standard". This report is a modified version of the procedure and therefore, subject to that ruling.In the best interest of our customers, Blue Heaven Technologies has elected to delay this action until further assessment can be made at committee level. Where applicable, the qualified use of the term "MERV" will continue to be part of our reported data.

Blue Heaven Technologies
2820 S. English Station Rd. Louisville, KY
502 357 0132

Test No. 20-235-1
Date: 29-Apr-20





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502 357 0132

Test No. 20-235-1
Date: 29-Apr-20

Data - Initial Resistance

Airflow (CFM)	Resistance (in WG)
0	0.00
295	0.04
590	0.10
885	0.16
1180	0.24
1475	0.33

Data - Particle Removal Efficiency

Particle Size Range (um)	Geometric Mean Diam (um)	Initial Particle Removal Efficiency (%)
0.30 - 0.40	0.35	15.2
0.40 - 0.55	0.47	22.6
0.55 - 0.70	0.62	30.9
0.70 - 1.00	0.84	41.4
1.00 - 1.30	1.14	54.8
1.30 - 1.60	1.44	63.5
1.60 - 2.20	1.88	72.3
2.20 - 3.00	2.57	81.6
3.00 - 4.00	3.46	86.7
4.00 - 5.50	4.69	87.7
5.50 - 7.00	6.20	86.9
7.00 - 10.00	8.37	85.2