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## Efficacy Report Summarization for PureAC

October 2021

### **PureAC**

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Patent Pending US 62/962,513

Testing Facility:

**Microchem Laboratory**

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About: Microchem Laboratory specializes in the testing of disinfectants, sanitizers, antimicrobial devices, medical devices, and personal care products. It also supports companies with routine environmental monitoring and microbial identification.

Microchem Laboratory is located in the greater Austin, Texas area. It is owned and operated by microbiologist Dr. Benjamin Tanner. The core of the company was founded by Dr. Tanner as Antimicrobial Test Laboratories in 2006. Antimicrobial Test Laboratories was later combined with a niche cosmetic testing lab and Microchem Laboratory, founded in 1988 by Dr. Norman Miner. The combined labs have operated under one roof as Microchem Laboratory since 2016. Microchem Laboratory is ISO 17025 accredited and offers testing in compliance with current Good Laboratory Practice (GLP) regulations as stipulated by EPA and FDA. Clients are always welcome to tour the lab, observe studies, and audit the lab's quality systems.



**MICROCHEM**  
L A B O R A T O R Y

## STUDY REPORT

### Study Title

Antibacterial Activity and Efficacy of PureAC's Device

### Test Method

Custom Device Study Based on: Modified ASTM E1153

### Study Identification Number

NG18626

### Study Sponsor

Chris Bishop  
Pure AC  
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### Test Facility

Microchem Laboratory  
1304 W. Industrial Blvd  
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(512) 310-8378

Report Author: Sage Tuchsén, B.S.

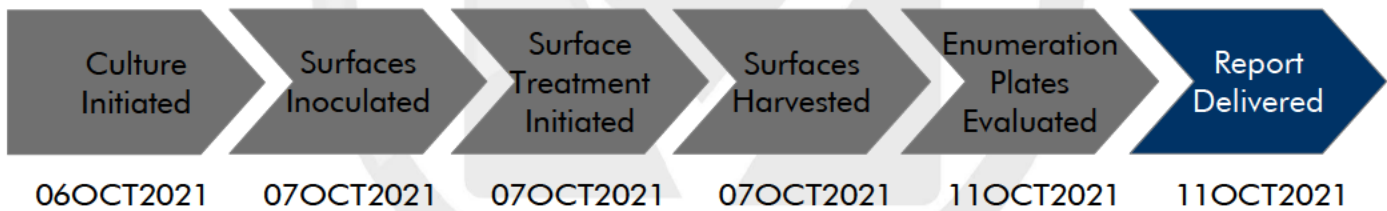
## Purpose of the Study

The purpose of this study was to determine the antimicrobial efficacy of PureAC's submitted test device.

## Brief History of the Performing Laboratory

Microchem Laboratory is located in the greater Austin, Texas area. It is owned and operated by microbiologist Dr. Benjamin Tanner. The core of the company was founded by Dr. Tanner as Antimicrobial Test Laboratories in 2006. Antimicrobial Test Laboratories was later combined with a niche cosmetic testing lab and Microchem Laboratory, founded in 1988 by Dr. Norman Miner. The combined labs have operated under one roof as Microchem Laboratory since 2016. Microchem Laboratory is ISO 17025 accredited and offers testing in compliance with current Good Laboratory Practice (GLP) regulations as stipulated by EPA and FDA. Clients are always welcome to tour the lab, observe studies, and audit the lab's quality systems.

## Study Timeline



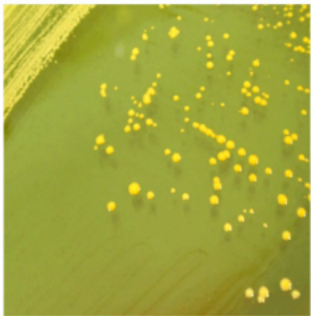
## Test Substance Information

Name of Test Device: PureAC Window Unit Device  
Manufacturer: PureAC  
Mode of Active: Ozone

The test device was received on 08 SEP 2021. An operations manual was included with the device.

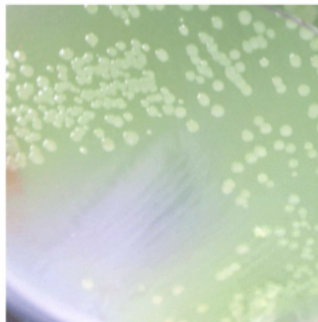
## Test Microorganism Information

The test microorganism(s) selected for this test:



### *Staphylococcus aureus* 6538

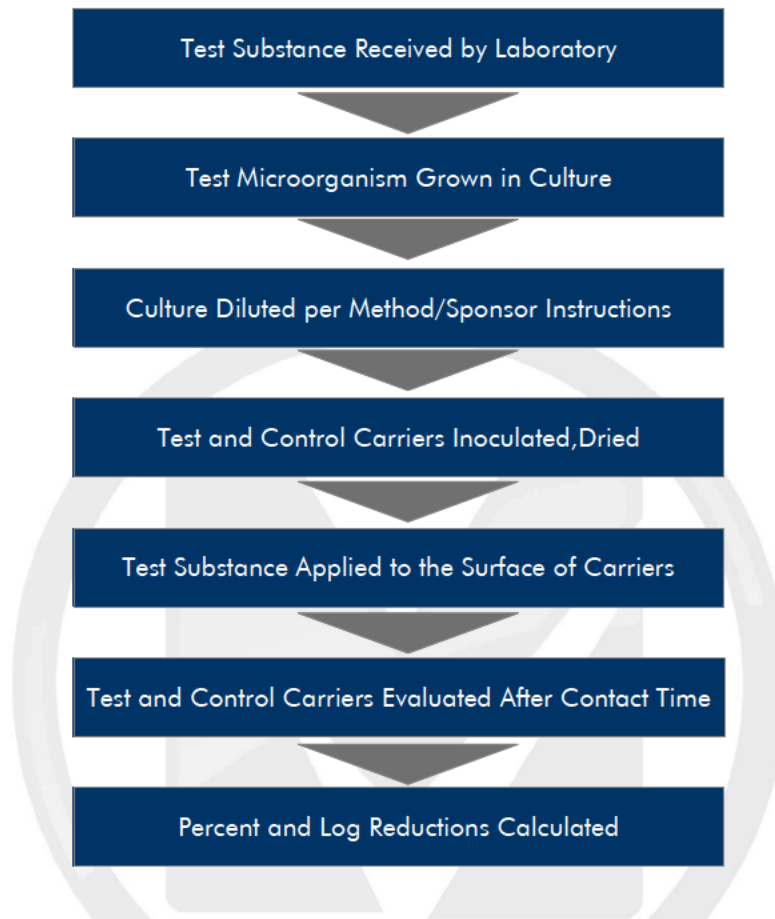
This bacterium is a Gram-positive, spherical-shaped, facultative anaerobe. *Staphylococcus* species are known to demonstrate resistance to antibiotics such as methicillin. *S. aureus* pathogenicity can range from commensal skin colonization to more severe diseases such as pneumonia and toxic shock syndrome (TSS). *S. aureus* is commonly used in several test methods as a model for gram positive bacteria. It can be difficult to disinfect but does demonstrate susceptibility to low level disinfectants.



### *Pseudomonas aeruginosa*

This bacteria is a Gram-negative, rod-shaped microorganism with a single flagellum. It grows optimally under aerobic conditions, however, it can use a host of electron receptors to respire anaerobically. *P. aeruginosa* can be found almost anywhere in nature and it is an opportunistic pathogen. Like many other bacterial-related diseases, the ability to form resilient biofilms within human tissues under anaerobic conditions is thought to be the primary cause for pathogenicity.

## Diagram of the Procedure



## Summary of the Procedure

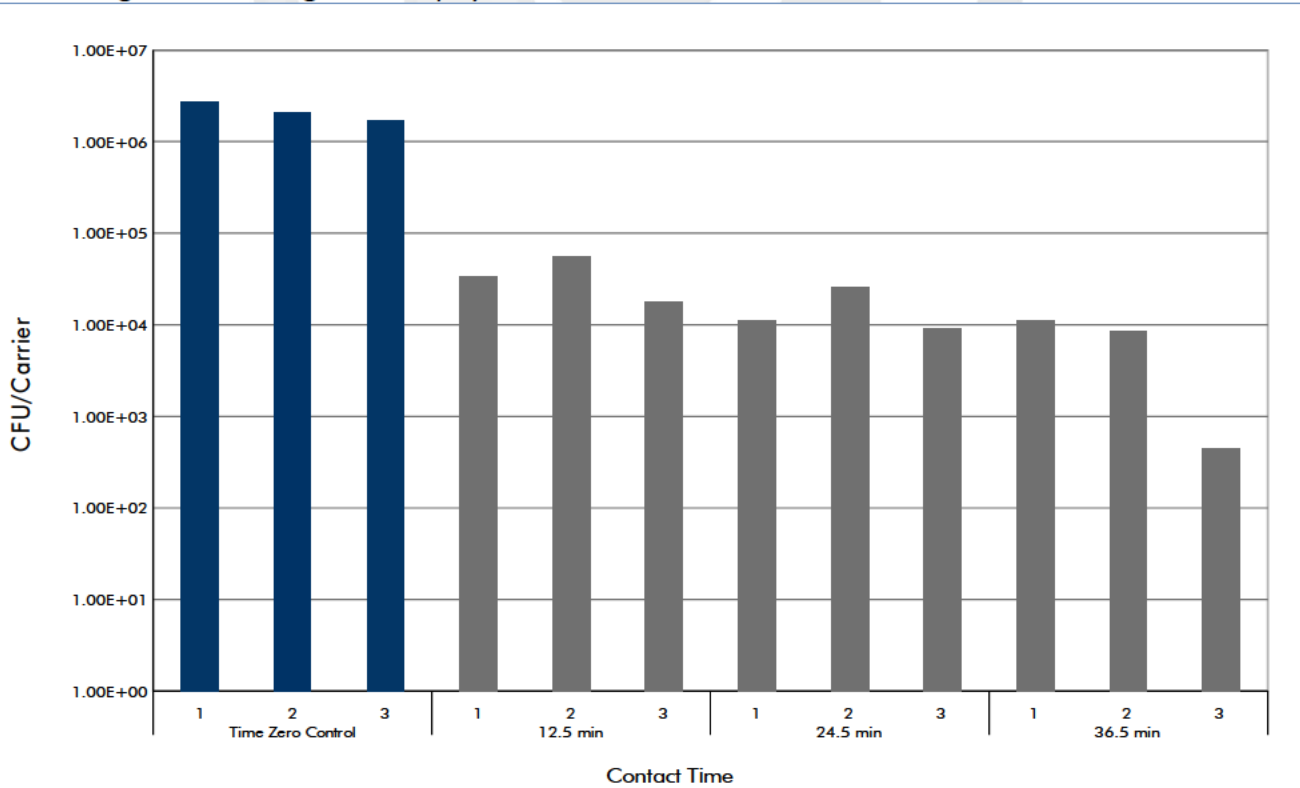
- The test microorganism is prepared, usually by growth in liquid culture medium or on an appropriate agar plate.
- The test culture may be supplemented with an artificial soil load, such as horse or fetal bovine serum, for one-step cleaner/sanitizer claims.
- Sterilized carriers are inoculated with a volume of the test culture. Inoculated slides are dried. Only completely dried carriers are used in the test.
- Test carriers are treated with the test device and incubated for the predetermined contact time.
- Control carriers are harvested at appropriate intervals to accurately represent any reduction during the contact time.
- At the conclusion of the contact time, test and control carriers are chemically neutralized.
- Dilutions of the neutralized test substance are evaluated using appropriate growth media to determine the surviving microorganisms at the respective contact time.
- The effect of the test substance is compared to the effect of the control substance in order to determine microbial reductions.

## Results of the Study

Table 1: Results of *Staphylococcus aureus* ATCC 6538 test

Test Microorganism	Contact Time	Replicate	Replicate CFU/Carrier	Average CFU/Carrier	Percent Reduction Compared to Time Zero	Log <sub>10</sub> Reduction Compared to Time Zero
<i>Staphylococcus aureus</i> ATCC 6538	Time Zero Control	1	2.73E+06	2.17E+06	N/A	N/A
		2	2.08E+06			
		3	1.69E+06			
	12.5 min	1	3.30E+04	3.57E+04	98.35%	1.78
		2	5.60E+04			
		3	1.80E+04			
	24.5 min	1	1.10E+04	1.53E+04	99.29%	2.15
		2	2.60E+04			
		3	9.00E+03			
	36.5 min	1	1.10E+04	6.68E+03	99.69%	2.51
		2	8.58E+03			
		3	4.50E+02			

Figure 1: Log reduction against *Staphylococcus aureus* ATCC 6538



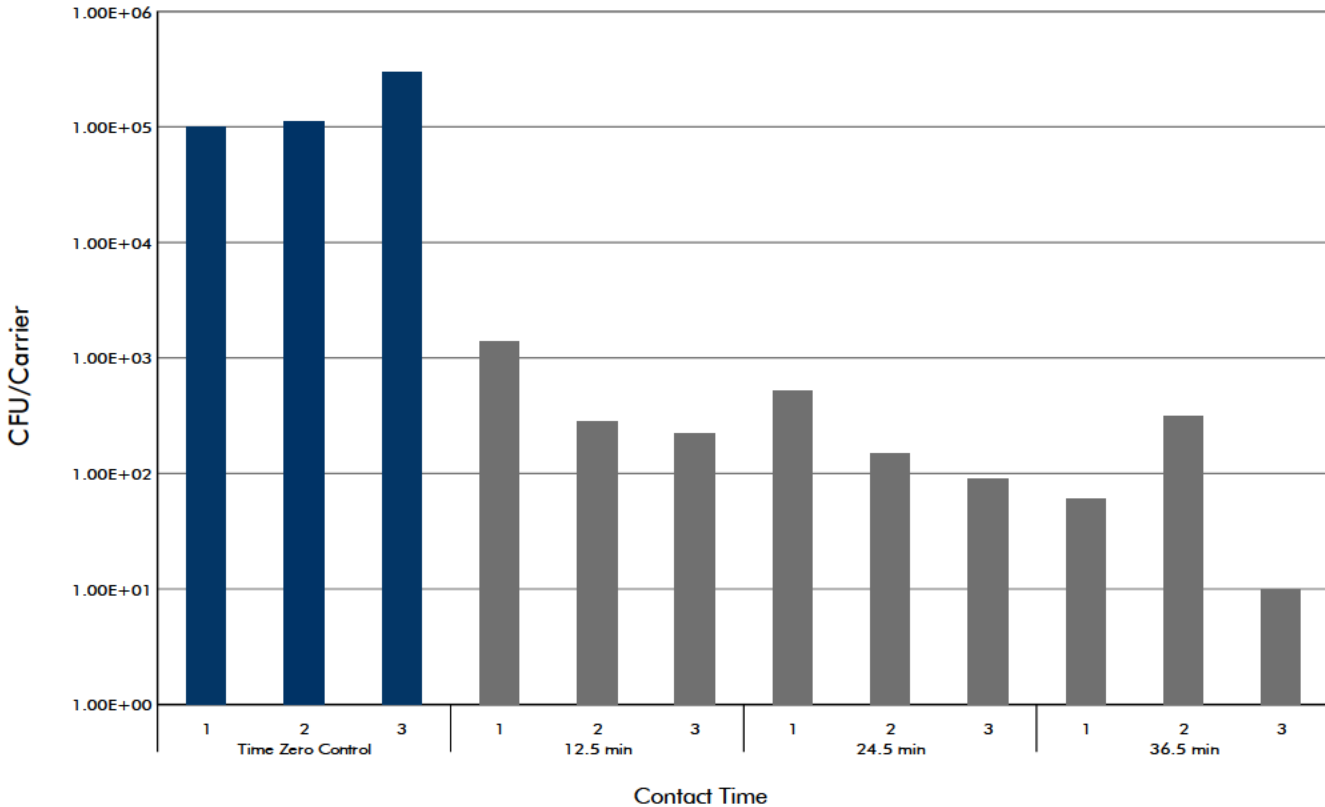


## Results of the Study (cont.)

Table 2: Results of *Pseudomonas aeruginosa* ATCC 15442 test

Test Microorganism	Contact Time	Replicate	Replicate CFU/Carrier	Average CFU/Carrier	Percent Reduction Compared to Time Zero	Log <sub>10</sub> Reduction Compared to Time Zero
<i>Pseudomonas aeruginosa</i> ATCC 15442	Time Zero Control	1	1.00E+05	1.70E+05	N/A	
		2	1.10E+05			
		3	3.00E+05			
	12.5 min	1	1.37E+03	6.23E+02	99.63%	2.44
		2	2.80E+02			
		3	2.20E+02			
	24.5 min	1	5.20E+02	2.53E+02	99.85%	2.83
		2	1.50E+02			
		3	9.00E+01			
	36.5 min	1	6.00E+01	<1.27E+02	>99.93%	>3.13
		2	3.10E+02			
		3	<1.00E+01			

Figure 2: Log reduction against *Pseudomonas aeruginosa* ATCC 15442







**MICROCHEM**  
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## STUDY REPORT

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### Study Identification Number

NG18789

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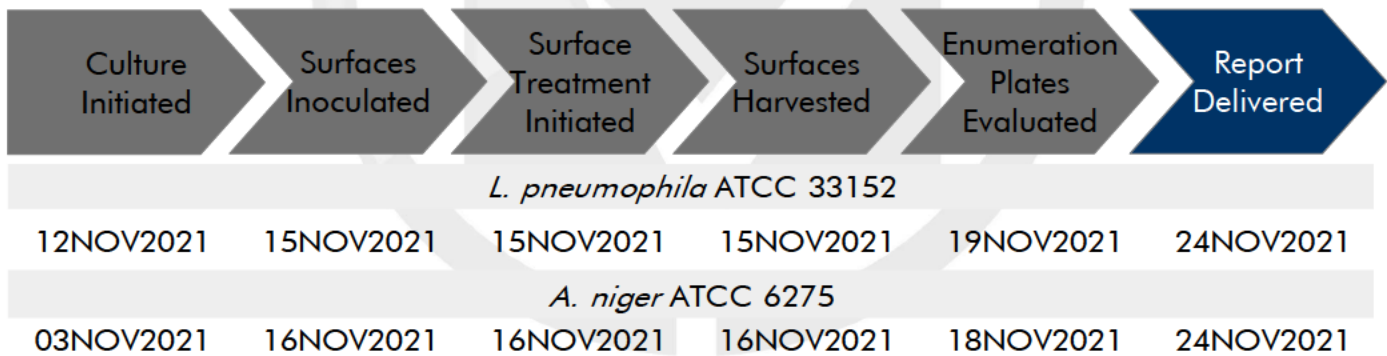
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## Study Timeline



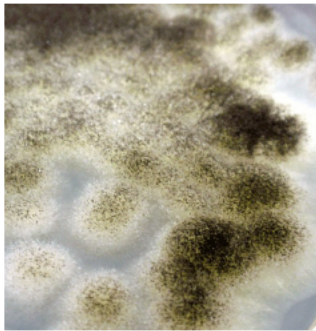
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Manufacturer: PureAC  
Mode of Active: Ozone

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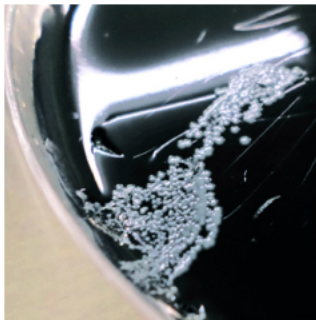
## Test Microorganism Information

The test microorganism(s) selected for this test:



### *Aspergillus niger*

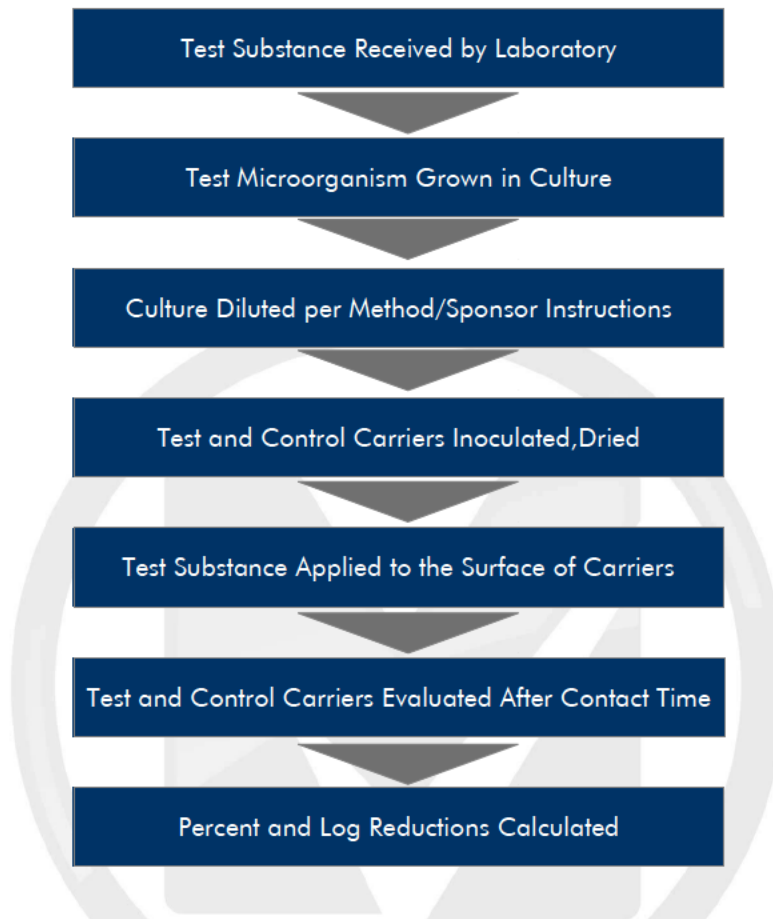
This fungi is a conidiophore, or a sexual spore generating aerobic fungus. *A. niger* is responsible for food spoilage and black mold. Although it is primarily a plant pathogen, *A. niger* is known to cause the lung disease aspergillosis when a significant amount of spores are inhaled. *A. niger* is a fungus commonly associated with unsightly growth on manufactured goods and is commonly used as a benchmark for fungal resistance testing.



### *Legionella pneumophila* 33152

This bacteria is a Gram-negative, rod-shaped, flagellated aerobe. *Legionella pneumophila* is the primary pathogen of the *Legionella* genus, responsible for causing legionellosis and Legionnaire's Disease, a form of pneumonia, by invading white blood cells. This bacteria is generally found in still water, including cooling units, reservoirs, and swimming pools and is not transmissible person to person.

## Diagram of the Procedure



## Summary of the Procedure

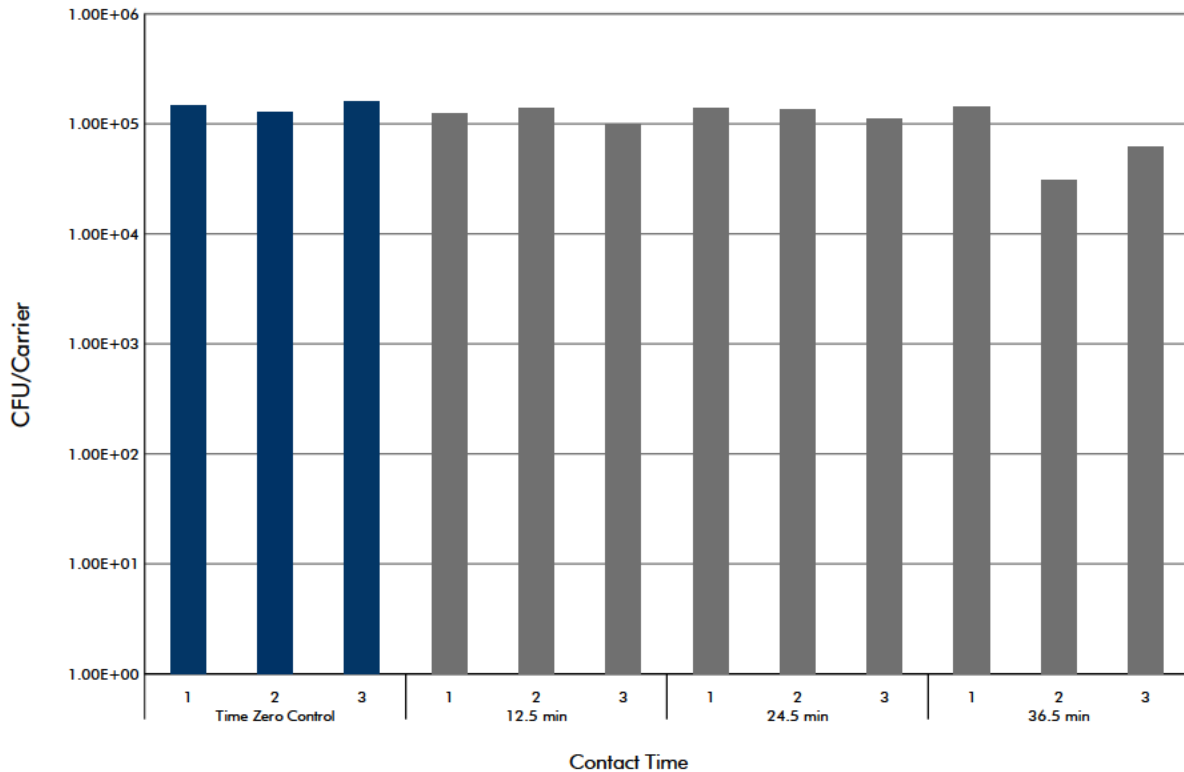
- The test microorganism is prepared, usually by growth in liquid culture medium or on an appropriate agar plate.
- The test culture may be supplemented with an artificial soil load, such as horse or fetal bovine serum, for one-step cleaner/sanitizer claims.
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- Dilutions of the neutralized test substance are evaluated using appropriate growth media to determine the surviving microorganisms at the respective contact time.
- The effect of the test substance is compared to the effect of the control substance in order to determine microbial reductions.

## Results of the Study

Table 1: Results of *Aspergillus niger* ATCC 6275 test

Test Microorganism	Contact Time	Replicate	Replicate CFU/Carrier	Average CFU/Carrier	Percent Reduction Compared to Time Zero	Log <sub>10</sub> Reduction Compared to Time Zero
<i>Aspergillus niger</i> ATCC 6275	Time Zero Control	1	1.44E+05	1.43E+05	N/A	
		2	1.26E+05			
		3	1.59E+05			
	12.5 min	1	1.24E+05	1.21E+05	15.62%	0.07
		2	1.39E+05			
		3	9.90E+04			
	24.5 min	1	1.39E+05	1.29E+05	9.79%	0.04
		2	1.36E+05			
		3	1.12E+05			
	36.5 min	1	1.43E+05	7.83E+04	45.22%	0.26
		2	3.10E+04			
		3	6.10E+04			

Figure 1: Log reduction against *Aspergillus niger* ATCC 6275



## Results of the Study (cont.)

Table 2: Results of *Legionella pneumophila* ATCC 33152 test

Test Microorganism	Contact Time	Replicate	Replicate CFU/Carrier	Average CFU/Carrier	Percent Reduction Compared to Time Zero	Log <sup>10</sup> Reduction Compared to Time Zero
Legionella pneumophila ATCC 33152	Time Zero Control	1	1.80E+04	<9.33E+03	N/A	
		2	9.00E+03			
		3	<1.00E+03			
	12.5 min	1	4.10E+02	4.30E+02	95.4%	1.34
		2	4.00E+02			
		3	4.80E+02			
	24.5 min	1	<1.00E+01	<1.00E+01	>99.89%	>2.97
		2	<1.00E+01			
		3	<1.00E+01			
	36.5 min	1	1.90E+02	<7.00E+01	>99.3%	>2.12
		2	<1.00E+01			
		3	<1.00E+01			

Note: The limit of detection for this assay was 1.00E+01. Values below the limit of detection are reported as <1.00E+01 in the chart above.

Figure 2: Log reduction against *Legionella pneumophila* ATCC 33152

