Microbiology Study Report NG2478-A3

Client Information

Company Name:	Advanced Vapor Technologies	Sponsor:	Rick Hoverson
Sponsor's Phone:	1-800-997-6584	E-mail:	rick@advap.com

Test Information

Test(s) Performed:	Quantitative Custom Surface Time-Kill Rangefinding Test (Study ID NG2478-A2)		
Protocol Followed:	Quantitative Time-Kill	Performed by:	B. Tanner, A. Gregg

Sample Information

Test Substance ID(s):	VaporJet PC 2400 with TANCS™	Number of Devices:	1

Parameters

Microorganism(s):	*K. pneumoniae* (NDM-1 Strain)	Exposure Temp.	Ambient (~22 - 24°C)
Subculture Number:	1	Type of Carrier:	Clay Test Surfaces
Growth Medium:	Tryptic Soy Broth	# of Replicates:	Duplicate, With Duplicate Plating
Contact Time(s):	Various, See Table Below	Incubation Temp.:	36.0 ± 1°C
Product Dilution(s):	Device; Ready to Use	Incubation Time:	18 - 24 Hours
Neutralizer Used:	D/E Broth (10 mL)		

Controls

Neutralized:	Passed (All)	Growth Control:	Passed (All)
Broth Sterility:	Passed, Control D/E Tube Neg.	Agar Sterility:	Passed (All)

Test Results

Controls Performance:	Normal	Test(s) Valid?:	Yes

Notes: After treatment of the surfaces by the VaporJet PC 2400 with TANCS™ (low setting) for the contact time, surfaces were left for ~20 seconds at room temperature, then harvested. Additionally, after each multiple-contact time series of treatments, the towel was sectioned and analyzed for target microorganism. One towel section replicate demonstrated low levels of environmental microorganisms (likely *Bacillus* endospores), but both towel sections were free from target organism.

Tests Completed: 3-Feb-2011 **Report Sent:** 9-Feb-2011

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Summary of Study Procedure

Preparation and Inoculation of Carriers

- Small clay test surfaces were obtained for testing.
- Each brick selected was checked for fit into machined aluminum carrier holders.
- Test surfaces were sterilized prior to testing.
- Test surfaces were inoculated, then set aside until visibly dry (about 20 minutes).

Preparation of Test Device

- The Water reservoir for the steamer was filled with ordinary tap water.
- The test device was turned on and allowed to equilibrate for 10 minutes.
- The test device was set to the lowest setting for all testing.

Test Execution

- Inoculated, dried test surfaces were treated with the device for differing amounts of time, (0.5, 1, 2, and 5 seconds), and light to moderate pressure was applied during each test.
- The treated coupons were allowed an approximately 20 second rest time prior to harvesting.
- The treated coupons were harvested and enumerated relative to "time-zero" controls through elution with D/E broth and plating on Tryptic Soy Agar.
- Microbial reductions were calculated and reported.

Additional Notes

- A clean towel was used for set A, and then another clean towel was used for set B.
- A zone of inhibition test was performed using the test organism and the antibiotic Ertapenem (10 μg) to verify the strength and strain of the test organism.
- The test organism was shown to be Ertapenem (carbapenem) resistant.

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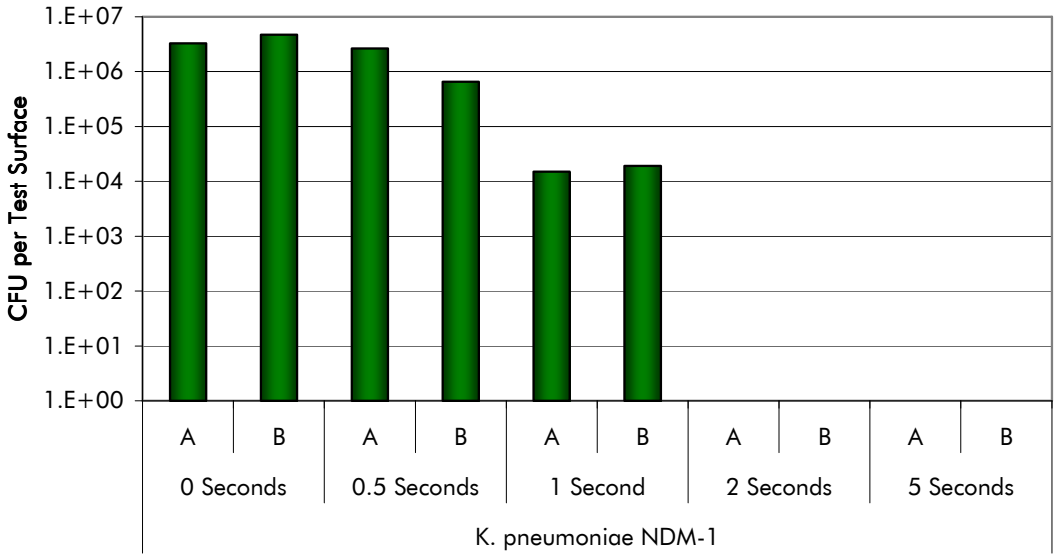
Summary Table and Chart

Microorganism	Exposure Time (seconds)	Replicate	CFU/Surface	Average CFU/Surface	Average Percent Reduction
K. pneumoniae NDM-1	Initial Dry Inoculum (No Exposure)	A	3.30E+06	3.98E+06	n/a
		B	4.65E+06		
	0.5	A	2.65E+06	1.65E+06	58.49057%
		B	6.50E+05		
	1	A	1.50E+04	1.70E+04	99.57233%
		B	1.90E+04		
	2	A	<5	<5	99.99990%
		B	<5		
	5	A	<5	<5	99.99990%
		B	<5		

VaporJet PC 2400 with TANCS

Note: Towels analyzed post-treatment - all were free from contamination.



Note: Values Below Limit of Detection (5 CFU/Surface) Expressed as Zero on this Chart

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Additional Information

Method of Calculation for Percent Reduction:

% Reduction = 1- (C/B)*100, where:

B = Average number of viable cells on the control pieces after 24 hours.

C = Average number of viable cells on the test pieces after 24 hours.

Photograph from the Study:

Test carriers inoculated with the test organism prior to treatment with cleaning instrument.

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Photograph from the Study:

Towel fabric being removed from the head of the instrument, to be further analyzed.
All towels were shown by lab analysis to be free from *K. pneumoniae* NDM-1 after use in the study.

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