



EFFICACY DATA for Surface Disinfectant Cleaner

VIRUCIDAL DATA:

Test Method:

- * U.S. E.P.A. Pesticide Assessment Guidelines, Subdivision G: Product Performance, Section 91-2 (f), and Section 91-30, (d), (e), November 1982.
- + Protocols for Testing the Efficacy of Disinfectants against Hepatitis B Virus (HBV) (EPA, Federal Register, Vol. 65, No. 166, 8/25/2000, p. 51828).
- ‡ Protocol for Testing Disinfectants against Hepatitis C Virus using Bovine Viral Diarrhea Virus as approved by the U.S. EPA on August 15, 2002.

Test Conditions: 0.5 oz/gal dilution, 10 minute contact time, 5% organic soil load, sterile glass petri dishes, 400 ppm hard water, 21-24°C exposure temperature

Results:

Test Organism	Sample	Titer Reduction
*Avian Influenza A Virus (H3N2) (Avian Reassortant) (ATCC VR-2072)	A B	>4.25 log ₁₀ >4.25 log ₁₀
*Avian Influenza Virus, Type A (Turkey/WIS/66) (H9N2)	A B	>4.0 log ₁₀ >4.0 log ₁₀
*Bovine rhinotracheitis, strain LA (ATCC VR-188)	A B	>5.0 log ₁₀ >5.0 log ₁₀
‡Bovine Viral Diarrhea Virus (BVDV)	A B	5.9 log ₁₀ 5.9 log ₁₀
*Canine distemper Virus, strain Lederle (ATCC VR-128)	A B	>6.25 log ₁₀ >6.25 log ₁₀
*Feline picornavirus, strain FRV (ATCC VR-649)	A B	>4.25 log ₁₀ >4.25 log ₁₀
+Hepatitis B Virus (HBV) (Duck Hepatitis B Virus-DHBV)	A B	4.5 log ₁₀ 4.7 log ₁₀
‡Hepatitis C Virus (HCV) (Bovine Viral Diarrhea Virus-BVDV)	A B	5.9 log ₁₀ 5.9 log ₁₀
*Herpes Simplex Type 1 (ATCC VR-260)	A B	>5.0 log ₁₀ >5.0 log ₁₀
*Herpes Simplex Type 2 (ATCC VR-734)	A B	>6.0 log ₁₀ >6.0 log ₁₀
*Human Coronavirus (ATCC VR-740, strain 229E)	A B	>3.0 log ₁₀ >3.0 log ₁₀
*Human Immunodeficiency Virus, HTLV-III _{RF} , strain of HIV-1 (associated with AIDS)	A B	>3.5 log ₁₀ >3.5 log ₁₀
*Human Immunodeficiency Virus Type 2 (HIV-2), strain CBL-20	A B	>3.25 log ₁₀ >3.25 log ₁₀
*Influenza A2, strain Hong Kong (ATCC VR-544)	A B	>4.25 log ₁₀ >4.25 log ₁₀
*Pandemic 2009 H1N1 Influenza A Virus (Refer to Note on next page.)		
*Paramyxovirus (Mumps) (ATCC VR-1438)	A B	>3.0 log ₁₀ >3.0 log ₁₀
*Porcine Respiratory & Reproductive Syndrome Virus (PRRSV), strain NVSL	A B	>5.0 log ₁₀ >5.0 log ₁₀
*Pseudorabies, strain Aujeszky (ATCC VR-135)	A B	>5.25 log ₁₀ >5.25 log ₁₀
*Rabies Virus (attenuated CDC ERA strain)	A B	3.0 log ₁₀ 3.0 log ₁₀
*Rotavirus, strain SA-11 (ATCC VR-899)	A B	4.5 log ₁₀ 4.5 log ₁₀
*SARS Associated Coronavirus (ZeptoMetrix)	A B	3.03 log ₁₀ 3.03 log ₁₀
*Vaccinia, strain WR (ATCC VR-119)	A B	>5.5 log ₁₀ >5.5 log ₁₀

Conclusion: Under the conditions of this investigation, **MARK3** Surface Disinfectant Cleaner demonstrated **virucidal** activity against Avian Influenza A Virus (H3N2), Avian Influenza Virus, Type A (H9N2), Bovine rhinotracheitis, Bovine Viral Diarrhea Virus (BVDV), Canine distemper virus, Feline picornavirus, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Herpes Simplex Type 1, Herpes Simplex Type 2, Human Coronavirus, Human Immunodeficiency Virus (HIV-1), Human Immunodeficiency Virus Type 2 (HIV-2), Influenza A2, Pandemic 2009 H1N1 Influenza A Virus, Paramyxovirus (Mumps), Porcine Respiratory & Reproductive Syndrome Virus (PRRSV), Pseudorabies, Rabies Virus, Rotavirus, SARS Associated Coronavirus, and Vaccinia according to criteria established by the U.S. Environmental Protection Agency for registration and labeling of a disinfectant product as a virucide.

NOTE: Per the EPA guidance document dated October 21, 2009, disinfectant products that bear label claims against human, avian, or swine influenza A virus, and have submitted and received approval of efficacy data to support these label claims, may include a label claim against the Pandemic 2009 H1N1 Influenza A Virus.

Results: Test Organism	Sample	No. of Carriers	
		Exposed	Positive
Enterobacter cloaca (ATCC 23355)	A	10	0
	B	10	0
Enterobacter cloacae (clinical isolate)	A	10	0
	B	10	0
Enterococcus faecalis (ATCC 19433)	A	10	0
	B	10	0
Enterococcus faecalis (clinical isolate)	A	10	0
	B	10	0
Escherichia coli (ATCC 11229)	A	10	0
	B	10	0
Escherichia coli (clinical isolate)	A	10	0
	B	10	0
Fusobacterium necrophorum (ATCC 27852)	A	10	0
	B	10	0
Gentamicin resistant Acinetobacter baumannii (Fairfax Hospital CI 02001)	A	10	0
	B	10	0
Klebsiella pneumoniae subsp. Pneumoniae (ATCC 13883)	A	10	0
	B	10	0
Lactobacillus casei subsp. Rhamnosus (ATCC 7469)	A	10	0
	B	10	0
Levofloxacin resistant Acinetobacter baumannii (Fairfax Hospital CI 02001)	A	10	0
	B	10	0
Listeria monocytogenes (ATCC 35152)	A	10	0
	B	10	0
Methicillin Resistant Staphylococcus aureus (MRSA) (ATCC 33592)	A	10	0
	B	10	0
Pasteurella multocida (ATCC 7707)	A	10	0
	B	10	0
Proteus mirabilis (ATCC 9921)	A	10	0
	B	10	0
Proteus mirabilis (ATCC 25933)	A	10	0
	B	10	0
Proteus vulgaris (ATCC 13315)	A	10	0
	B	10	0

Results: Test Organism	Sample	No. of Carriers	
		Exposed	Positive
Enterobacter cloaca (ATCC 23355)	A	10	0
	B	10	0
Enterobacter cloacae (clinical isolate)	A	10	0
	B	10	0
Enterococcus faecalis (ATCC 19433)	A	10	0
	B	10	0
Enterococcus faecalis (clinical isolate)	A	10	0
	B	10	0
Escherichia coli (ATCC 11229)	A	10	0
	B	10	0
Escherichia coli (clinical isolate)	A	10	0
	B	10	0
Fusobacterium necrophorum (ATCC 27852)	A	10	0
	B	10	0
Gentamicin resistant Acinetobacter baumannii (Fairfax Hospital CI 02001)	A	10	0
	B	10	0
Klebsiella pneumoniae subsp. Pneumoniae (ATCC 13883)	A	10	0
	B	10	0
Lactobacillus casei subsp. Rhamnosus (ATCC 7469)	A	10	0
	B	10	0
Levofloxacin resistant Acinetobacter baumannii (Fairfax Hospital CI 02001)	A	10	0
	B	10	0
Listeria monocytogenes (ATCC 35152)	A	10	0
	B	10	0
Methicillin Resistant Staphylococcus aureus (MRSA) (ATCC 33592)	A	10	0
	B	10	0
Pasteurella multocida (ATCC 7707)	A	10	0
	B	10	0
Proteus mirabilis (ATCC 9921)	A	10	0
	B	10	0
Proteus mirabilis (ATCC 25933)	A	10	0
	B	10	0
Proteus vulgaris (ATCC 13315)	A	10	0
	B	10	0

Results: Test Organism	Sample	No. of Carriers	
		Exposed	Positive
Pseudomonas fluorescens (ATCC 15916)	A	10	0
	B	10	1
	C	10	0
Pseudomonas tolaasii (ATCC 33618)	A	10	0
	B	10	0
Salmonella enterica subsp. enterica serotype paratyphi B (ATCC 8759)	A	10	0
	B	10	0
Salmonella enterica subsp. enterica serotype pullorum (ATCC 9120)	A	10	0
	B	10	0
Salmonella enterica subsp. enterica serotype typhi (ATCC 6539)	A	10	0
	B	10	0
Salmonella enterica subsp. enterica serotype typhimurium (ATCC 14028)	A	10	0
	B	10	0
Salmonella enterica subsp. enterica serotype enteritidis (ATCC 13076)	A	10	0
	B	10	0
Serratia marcescens (ATCC 8100)	A	10	0
	B	10	0
Shigella dysenteriae (ATCC 12180)	A	10	0
	B	10	0
Shigella flexneri Type 2bA1 (ATCC 12022)	A	10	0
	B	10	0
Shigella sonnei (ATCC 25931)	A	10	0
	B	10	0
Staphylococcus aureus subsp. Aureus (ATCC 33592)	A	10	0
	B	10	0
Staphylococcus aureus (clinical isolate)	A	10	0
	B	10	0
Staphylococcus epidermidis (ATCC 29641)	A	10	0
	B	10	0
Staphylococcus epidermidis (clinical isolate)	A	10	0
	B	10	0
Streptococcus pyogenes Group A (ATCC 19615)	A	10	0
	B	10	0
Streptococcus pyogenes (clinical-flesh eating strain, BIRD M3)	A	10	0
	B	10	0

Results: Test Organism	Sample	No. of Carriers	
		Exposed	Positive
Tobramycin resistant <i>Acinetobacter baumannii</i> (Fairfax Hospital CI 02001)	A	10	0
	B	10	0
Vancomycin Intermediate Resistant <i>Staphylococcus aureus</i> (VISA) (HIP-5836)	A	10	0
	B	10	0
Vancomycin Resistant <i>Enterococcus faecalis</i> (VRE) (ATCC 51575)	A	10	0
	B	10	0
<i>Xanthomonas maltophilia</i> (clinical isolate)	A	10	0
	B	10	0
<i>Xanthomonas axonopodis</i> (pathovar citri) when diluted at 1.18 oz./gal. (1:108 dilution)	A	10	0
	B	10	0

Conclusion: Under the conditions of these investigations, **MARK3** Surface Disinfectant Cleaner demonstrated **disinfectant** activity against *Staphylococcus aureus*, *Salmonella enterica*, *Pseudomonas aeruginosa* PRD-10, Ampicillin resistant *Acinetobacter baumannii*, Bactrim resistant *Acinetobacter baumannii*, *Bordetella bronchiseptica*, Cefazolin resistant *Acinetobacter baumannii*, Ceftazidime resistant *Acinetobacter baumannii*, Ceftriaxone resistant *Acinetobacter baumannii*, Ciprofloxacin resistant *Acinetobacter baumannii*, Community Associated Methicillin Resistant *Staphylococcus aureus* (CAMRSA) (NRS 123, Genotype USA400), Community Associated Methicillin Resistant *Staphylococcus aureus* (CA-MRSA) (NRS 384, Genotype USA300), *Corynebacterium ammoniagenes*, *Enterobacter aerogenes*, *Enterobacter cloacae*, *Enterococcus faecalis*, *Escherichia coli*, *Fusobacterium necrophorum*, Gentamicin resistant *Acinetobacter baumannii*, *Klebsiella pneumoniae* subsp. *pneumoniae*, *Lactobacillus casei* subsp. *rhamnosus*, Levofloxacin resistant *Acinetobacter baumannii*, *Listeria monocytogenes*, Methicillin Resistant *Staphylococcus aureus* (MRSA), *Pasteurella multocida*, *Proteus mirabilis* (ATCC 9921), *Proteus mirabilis* (ATCC 25933), *Proteus vulgaris*, *Pseudomonas fluorescens*, *Pseudomonas tolaasii*, *Salmonella enterica* subsp. *enterica* serotype *paratyphi B*, *Salmonella enterica* subsp. *enterica* serotype *pullorum*, *Salmonella enterica* subsp. *enterica* serotype *typhi*, *Salmonella enterica* subsp. *enterica* serotype *typhimurium*, *Salmonella enterica* subsp. *enterica* serotype *enteritidis*, *Serratia marcescens*, *Shigella dysenteriae*, *Shigella flexneri* Type 2b, *Shigella sonnei*, *Staphylococcus aureus* subsp. *aureus*, *Staphylococcus epidermidis*, *Streptococcus pyogenes* Group A, *Streptococcus pyogenes* (clinical-flesh eating strain, BIRD M3), Tobramycin resistant *Acinetobacter baumannii*, Vancomycin Intermediate Resistant *Staphylococcus aureus* (VISA) and Vancomycin Resistant *Enterococcus faecalis* (VRE), according to criteria established by the U.S. Environmental Protection Agency for registration and labeling of a disinfectant product as a bactericide.

MARK3 Surface Disinfectant Cleaner also demonstrated **disinfectant** activity against the following antibiotic resistant clinical isolates: *Enterobacter cloacae*, *Enterococcus faecalis*, *Escherichia coli*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Xanthomonas maltophilia*. When diluted at 1.18 oz./gal. (1:108 dilution), **MARK3** Surface Disinfectant Cleaner demonstrated **disinfectant** activity against *Xanthomonas axonopodis* (pathovar *citri*) (Citrus Canker Disease).

BACTERICIDAL STABILITY DATA OF USE-SOLUTION:**Test Method:** Use Dilution**Test Conditions:** 5% organic soil load, 10 minute contact time, stainless steel carrier substrates, 400 ppm hard water, 20°C exposure temperature, 0.5 oz/gal dilution**Storage Conditions:** sealed containers at room temperature**Results:**

Test Time	Sample	Test Organism	No. of Carriers		
			Exposed	Positive	
Zero Time	A	<i>Staphylococcus aureus</i> (ATCC 6538)	10	0	
		<i>Salmonella enterica</i> (ATCC 10708)	10	0	
		<i>Pseudomonas aeruginosa</i> (ATCC 15442)	10	0	
	B	<i>Staphylococcus aureus</i> (ATCC 6538)	10	0	
		<i>Salmonella enterica</i> (ATCC 10708)	10	0	
		<i>Pseudomonas aeruginosa</i> (ATCC 15442)	10	0	
	Week 1	A	<i>Staphylococcus aureus</i> (ATCC 6538)	10	0
			<i>Salmonella enterica</i> (ATCC 10708)	10	0
			<i>Pseudomonas aeruginosa</i> (ATCC 15442)	10	0
B		<i>Staphylococcus aureus</i> (ATCC 6538)	10	0	
		<i>Salmonella enterica</i> (ATCC 10708)	10	0	
		<i>Pseudomonas aeruginosa</i> (ATCC 15442)	10	0	
Week 2		A	<i>Staphylococcus aureus</i> (ATCC 6538)	10	0
			<i>Salmonella enterica</i> (ATCC 10708)	10	0
			<i>Pseudomonas aeruginosa</i> (ATCC 15442)	10	0
	B	<i>Staphylococcus aureus</i> (ATCC 6538)	10	0	
		<i>Salmonella enterica</i> (ATCC 10708)	10	0	
		<i>Pseudomonas aeruginosa</i> (ATCC 15442)	10	0	
	Week 3	A	<i>Staphylococcus aureus</i> (ATCC 6538)	10	0
			<i>Salmonella enterica</i> (ATCC 10708)	10	0
			<i>Pseudomonas aeruginosa</i> (ATCC 15442)	10	0
B		<i>Staphylococcus aureus</i> (ATCC 6538)	10	0	
		<i>Salmonella enterica</i> (ATCC 10708)	10	0	
		<i>Pseudomonas aeruginosa</i> (ATCC 15442)	10	0	
Week 4		A	<i>Staphylococcus aureus</i> (ATCC 6538)	10	0
			<i>Salmonella enterica</i> (ATCC 10708)	10	0
			<i>Pseudomonas aeruginosa</i> (ATCC 15442)	10	0
	B	<i>Staphylococcus aureus</i> (ATCC 6538)	10	0	
		<i>Salmonella enterica</i> (ATCC 10708)	10	0	
		<i>Pseudomonas aeruginosa</i> (ATCC 15442)	10	0	

Conclusion:

The results of this investigation show that a 0.5 oz/gal use dilution of BTC® 885 Neutral Disinfectant Cleaner-256 will demonstrate disinfectant efficacy against *Staphylococcus aureus*, *Salmonella enterica*, and *Pseudomonas aeruginosa* for up to 4 weeks in accordance with criteria established by the U.S. Environmental Protection Agency for registration and labeling of a disinfectant product as a bactericide.