ES64 Microbial Efficacy Data Sheet

One-Step Hospital Disinfectant, Virucide, Fungicide, Mildewstat, Sanitizer and Cleaner. Listed below, and in the following pages is a summary of the Antimicrobial Claims and a review of the test results.

Claim: Disinfectant	**Contact Time:**	**Organic Soil**	**Water Conditions**
	10 minutes	5%	250 ppm as $CaCO_3$
Test Method	Official method of the AOAC,14 Edition Use-Dilution Method		

1)

Organism	**ATCC#**	**Use-Dilution Concentration**	**Hard Water Condition**	**Replicates**	**Results**
Acinetobacter baumannii	19606	600 ppm (2 oz./gal)	250 ppm	10,10	0/10, 0/10
Brevibacterium ammoniagenes	6871	600 ppm	250 ppm	10, 10	0/10, 0/10
Enterobacter aerogenes	13408	600 ppm	250 ppm	10, 10	0/10, 0/10
Enterobacter cloacae	13047	600 ppm	250 ppm	10, 10	0/10, 0/10
Escherichia coli	11229	600 ppm	250 ppm	10, 10	0/10, 0/10
Escherichia coli (Methicillin Resistant)	25922	600 ppm	250 ppm	10, 10	0/10, 0/10
Klebsiella pneumoniae	4352	600 ppm	250 ppm	10, 10	0/10, 0/10
Klebsiella pneumoniae (Methicillin Resistant)	13883	600 ppm	250 ppm	10, 10	0/10, 0/10
Proteus vulgaris	1335	600 ppm	250 ppm	10, 10	0/10, 0/10
Pseudomonas aeruginosa	15442	600 ppm	250 ppm	60, 60, 60, 10, 10	0/60, 0/60, 0/60 0/10, 0/10
Pseudomonas aeruginosa	15442	768 ppm (3 oz/gal)	250 ppm	60, 60, 60 10, 10	0/60, 0/60, 0/60 0/10, 0/10
Salmonella choleraesuis	10708	600 ppm	250 ppm	60, 60, 60, 10, 10	0/60, 0/60, 0/60 0/10, 0/10
Salmonella choleraesuis	10708	768 ppm	250 ppm	60, 60, 60 10, 10	0/60, 0/60, 0/60 0/10, 0/10
Salmonella schottmuelleri	10719	600 ppm	250 ppm	10, 10	0/10, 0/10
Salmonella typhi	6539	600 ppm	250 ppm	10, 10	0/10, 0/10
Salmonella typhimurium	15277	600 ppm	250 ppm	10, 10	0/10, 0/10
Serratia marcescens	274	600 ppm	250 ppm	10, 10	0/10, 0/10
Shigella dysenteriae	13313	600 ppm	250 ppm	10, 10	0/10, 0/10
Shigella flexneri	11836	600 ppm	250 ppm	10, 10	0/10, 0/10
Shigella sonnei	9290	600 ppm	250 ppm	10, 10	0/10, 0/10
Staphylococcus aureus	6538	600 ppm	250 ppm	60, 60, 60, 10, 10	0/60, 0/60, 0/60 0/10, 0/10
Staphylococcus aureus	6538	768 ppm	250 ppm	60, 60, 60 10, 10	0/60, 0/60, 0/60 0/10, 0/10
Staphylococcus aureus (Methicillin Resistant)	33591	600 ppm	250 ppm	10, 10	0/10, 0/10
Staphylococcus aureus[1]	CDC No. HIP-5836	768 ppm	250 ppm	10, 10	0/10, 0/10
Staphylococcus aureus[1]	CDC No. HIP-5836	600 ppm	250 ppm	10, 10	0/10, 0/10
Staphylococcus epidermidis	35984	600 ppm	250 ppm	10, 10	0/10, 0/10
Streptococcus (Enterococcus) faecalis	11700	600 ppm	250 ppm	10, 10	0/10, 0/10
Streptococcus (Enterococcus) faecalis (Methicillin Resistant)	19433	600 ppm	250 ppm	10, 10	0/10, 0/10
Streptococcus	51299	600 ppm	250 ppm	10, 10	0/10, 0/10

(Enterococcus) faecalis (Vancomycin Resistant)			250 ppm 250 ppm		
Streptococcus pyogenes	12344	600 ppm	250 ppm	10, 10	0/10, 0/10

[1] Reduced Susceptibility to Vancomycin

2)

Claim: Mildewstat	**Contact Time:** 10 minutes	**Organic Soil** 5%	**Water Conditions** 250 ppm as $CaCO_3$
Test Method	Mildewstat (Mold and Mildew Conrol)-EPA-TSD 6-201 Mildewstat on Hard Surfaces		

Organism	**ATCC#**	**Use-Dilution Concentration**	**Hard Water Condition**	**Replicates**	**Results**
Aspergillus niger	6275	600 ppm (2 oz/gal)	250 ppm	10, 10	0/10, 0/10

Claim: Fungicide	**Contact Time:** 10 minutes	**Organic Soil** 5%	**Water Conditions** 250 ppm as $CaCO_3$
Test Method Official Method of Analysis of the AOAC -Fungicidal Test-use dilution			

Organism	**ATCC#**	**Use-Dilution Concentration**	**Hard Water Condition**	**Replicates**	**Results/**
Trichophyton mentagrophytes	9533	600 ppm (2 oz/gal)	250 ppm	10, 10	0/10, 0/10

3) Claim: Fungicide	**Contact Time:**	**Organic Soil**	**Water Conditions**
	10 minutes	5%	250 ppm as $CaCO_3$
Test Method	Official Method of Analysis of the AOAC -Fungicidal Test		

Organism	**ATCC#**	**Use-Dilution Concentration**	**Replicates**	**Results 5 Min 10 Min 15 Min**
Candida albicans	11651	600 ppm (2 oz/gal)	18	0/18 0 0 0

4) Claim: Sanitizer Non-Food	**Contact Time:** 60 seconds	**Organic Soil** 5%	**Water Conditions** 250 ppm as $CaCO_3$
Test Method	Sanitizer Non-Food Contact Surfaces EPA for Inanimate, Non-Food Contact Surfaces Dis. 5		

Organism	**ATCC#**	**Use-Dilution Concentration**	**Hard Water Condition**	**Replicates**	**Results**
Enterobacter aerogenes	13048	600 ppm (2 oz/gal)	250 ppm	12 glass slides 12 ceramic tiles	> 99.9% reduction in 60 seconds
Staphylococcus aureus	6538	600 ppm	250 ppm	12 glass slides 12 ceramic tiles	> 99.9% reduction in 60 seconds

5) Claim: Virucide	**Contact Time** 2 minutes	**Organic Soil** 5%	**Water Conditions :** 250 ppm as $CaCO_3$
Test Method	EPA guidelines		

Organism	**Source of Virus or ATCC#**	**Host System; Cytopathic Effect**	**Use-Dilution Concentration**	**Contact Time**	**Hard Water Condition**	**Replicates**	**Reduction (Log 10) of virus titer**

Chlamydia psittaci (eukaryote parasite)	VR-1310	HeLa 229 cells cytopathic effect	600 ppm (2 oz. gal)	2 min	250 ppm	8	>3.0
Hepatitis B	Hepadna Virus, inc. D(1)HBV	Primary Duck hepaocytes No cytopathic effect	600 ppm .	10 Min.	250 ppm	6	4.8, 4.8
Herpes Simplex Type 1	HSV-1; ATCC VR-733	VERO cells; lytic cytopathic effect	600 ppm	2 Min.	250 ppm	8	>5.0
Herpes Simplex Type 2	HSV-1; ATCC VR-734	VERO cells; lytic cytopathic effect	600 ppm	2 Min.	250 ppm	8	>5.0
HIV-1 (AIDS Virus)	HTLV-IIIRF; NCI	MT2 cells; lytic cytopathic effect	600 ppm	2 Min.	250 ppm	8	>3.0
Influenza A/PR	ATCC VR-95	MDCK cells; lytic cytopathic effect	600 ppm	2 Min.	250 ppm	8	>3.0
Rubella virus	ATRCC VR315	RK13 cells; cytopathic effect	600 ppm	2 Min.	250 ppm	8	>3.0
Vaccinia	ATCC VR156	VERO Cells; lytic cytopathic effect	600 ppm	2 Min.	250 ppm	8	>3.0

6) Summary of Antimicrobial Efficacy - Etiology[2]

Pathogenic Organisms Effect

Acinetobacter calcoaceticus	Gram negative (spherical shape) bacteria. Occurs in soil, water and sewage. A nosocomial infection can cause septicemia, meningitis and urinary tract infections.
Aspergillus niger	Black mold, found in shower and dressing rooms. Environmental contaminant may also cause "Aspergillosis."
Brevibacteriun ammoniagenes	Gram positive bacteria environmental contaminant. Associated with industrial contamination.
Candida albicans	Fungi, yeast. This organism exhibits dimorphism; exists both as fungi and yeast. Causes skin rashes. Common cause for diaper rash. Can infect both oral and vaginal cavities. Causes itching and discomfort.
Chlamydia psittaci	Once believed to be a large virus but later found to be a parasitic bacterium. Infections causes fever, malaise and hacking cough. Most infections are occupational; poultry workers and other keepers of birds.
Enterbacter aerogenes	Gram negative bacteria spread by anal/oral route of infection. Associated with bacteremia, respiratory, wound and urinary tract infections.
Enterobacter cloacae	Gram negative bacteria spread by anal/oral route of infection. Associated with bacteremia, respiratory, wound and urinary tract infections.
Escherichia coli	Gram negative bacteria spread by anal/oral route of infection, resulting in diarrhea outbreaks. Associated with urinary tract infections and bacteremia
HBV (Hepatitis B virus)	Lipophilic (enveloped) DNA virus of the Hepadnaviridae family. Causative agent of Hepatitis B (serum hepatitis).
Herpes Simplex Type 1&2	Lipophilic (enveloped) DNA virus may result in oral mucocutaneous lesions. Associated with most orofacial herpes and HSV encephalitis.
HIV-1 (AIDS Virus)	Lipophilic (enveloped) RNA retrovirus. Human Immunodeficiency Virus. Known to be the etiologic agent of Acquired Immunodeficiency Syndrome (AIDS).
Influenza A/PR	Lipophilic (enveloped) RNA virus. Causative agent in viral flu. Causes flu epidemics in nearly 2 of every 3 years.
Klebsiella pneumoniae	Gram negative bacteria associated with severe pneumonia, bacteremia and urinary tract infections.
Pseudomonas aeruginosa	Gram negative bacteria identified as a major cause of hospital acquired (nosocomial) infections. Causes wound infections (especially burn), meningitis, pneumonia and eye infections. Required for Hospital Disinfectants.

Rubella	Lipophilic (enveloped) RNA togavirus. The causative agent of German measles.
Salmonella choleraesuis	Gram negative bacteria associated with acute gastroenteritis and septicemia. Required for Hospital Disinfectants.
Salmonella schottmuelleri	Gram negative (rod shape) bacteria associated with acute gastroenteritis and diarrhea.
Salmonella typhi	Gram negative (rod shape) bacteria associated with acute gastroenteritis and diarrhea the causative for typoid fever
Salmonella typhimurium	Gram negative (rod shape) bacteria associated with acute gastroenteritis and diarrhea,
Serratia marcescens	Gram negative bacteria associated with urinary tract infections, meningitis and septicemia
Shigella dysenteriae	Gram negative bacteria directly spread by anal/oral route of infection; indirectly (including food, hands, flies) spread by contaminated food and inanimate objects resulting in bacillary dysentery.
Shigella flexneri	Gram negative bacteria directly spread by anal/oral route of infection; indirectly (including food, hands, flies) spread by contaminated food and inanimate objects resulting in bacillary dysentery.
Shigella sonnei	Gram negative bacteria directly spread by anal/oral route of infection; indirectly (including food, hands, flies) spread by contaminated food and inanimate objects resulting in bacillary dysentery.
Staphylococcus aureus	Gram positive bacteria identified as a major cause of hospital acquired (nosocomial) infections. Colonizes food and secretes enterotoxins which cause food poisoning after ingestion. Causes wound infections, septicemia, endocarditis, meningitis, osteomyelitis and pneumonia. Required for Hospital Disinfectants.
Streptococcus (Enterococcus) faecalis	Gram positive (Enterococci) bacteria causing hemolysis, urinary tract infections and endocarditis.
Streptococcus (Enterococcus) pyogenes	Gram positive (Enterococci) bacteria causing hemolysis, urinary tract infections and endocarditis.
Trichophyton mentagrophytes	Athlete's foot fungus. Found in shower and dressing rooms.
Vaccinia	Lipophilic (enveloped) DNA poxvirus; causes poxvirus infections.

[1] Microbiology, D. Kingsbury and G. Wagner; Harwal Publishing 1990