



Summary of Antimicrobial Efficacy

The following results were obtained using Oxine® - a proprietary formula of Bio-Cide International, Inc. These results should not be extrapolated for other chlorine dioxide based products that may take much higher concentrations to achieve similar biocidal activities.

Bacteria

Effective April 2004

TEST ORGANISM	CONTACT TIME	CONCENTRATION	RESULT
Alicyclobacillus acidoterrestris	10 min	30 ppm	99.998% kill
Bacillus cereus spores	5 min	200 ppm	99.999% kill
Campylobacter jejuni	30 sec	30 ppm	99.9% kill
Erwinia carotovora	60 sec	50 ppm	99.999% kill
Escherichia coli O157:H7	60 sec	3 ppm	99.999% kill
Lactobacillus sp.	60 sec	20 ppm	99.999% kill
Legionella pneumophila	60 sec	25 ppm	99.999% kill
Listeria monocytogenes	60 sec	25 ppm	99.9999% kill
Mycobacterium bovis (tuberculosis)	10 min	500 ppm	99.9999% kill
Pediococcus sp.	60 sec	20 ppm	99.999% kill
Proteus mirabilis	60 sec	100 ppm	99.999999% kill
Pseudomonas aeruginosa	60 sec	5 ppm	99.9999% kill
Salmonella typhimurium	60 sec	100 ppm	99.999% kill
Staphylococcus aureus	60 sec	30 ppm	99.999% kill
Streptococcus faecalis	60 sec	100 ppm	99.99999% kill
Streptococcus faecium	60 sec	100 ppm	99.9999% kill

Fungi

TEST ORGANISM	CONTACT TIME	CONCENTRATION	RESULT
Aspergillus fumigatus spores	60 sec	100 ppm	99.9999% kill
Aspergillus niger	60 sec	100 ppm	99.9999% kill
Candida albicans	60 sec	100 ppm	99.99999% kill
Cladosporium	30 sec	500 ppm	99.999% kill
Mucor sp	30 sec	500 ppm	99.999% kill
Penicillium	60 sec	100 ppm	99.999% kill
Penicillium roquefortii	60 sec	500 ppm	100% kill
Saccharomyces cerevisiae	60 sec	30 ppm	99.999% kill
Stachybotrys chartarum	60 sec	100 ppm	99.997% Kill
Trichophyton mentagrophytes	5 min	500 ppm	100% kill

Viruses

TEST ORGANISM	CONTACT TIME	CONCENTRATION	RESULT
African Swine Fever Virus	5 min	500 ppm	100% virucidal
Canine Parvovirus	10 min	500 ppm	100% virucidal
Coxsackie Virus	5 min	550 ppm	99.9% kill
Foot & Mouth Disease Virus	5 min	500 ppm	100% virucidal
Herpes Simplex Virus Type 1	5 min	550 ppm	99.9% kill
Newcastle Disease virus	10 min	500 ppm	100% kill
Polio Virus Type 2	5 min	550 ppm	99.9% kill
PRRS virus	60 sec	312 ppm	100% virucidal
Pseudorabies virus	10 min	500 ppm	100% virucidal
Rhino Virus	5 min	550 ppm	99.9% kill
Swine Vesicular Disease Virus	5 min	500 ppm	100% virucidal