Biological Efficacy of Chlorine Dioxide

Spaulding Classification:

Bacterial Endospores
(*Clostridium, Bacillus*)
↓
Mycobacteria
(*Mycobacterium*)
↓
Non-enveloped, non-lipid viruses
(Parvoviruses)
↓
Fungi
(*Aspergillus, Stachybotrys*)
↓
Gram negative vegetative bacteria
(*Escherichia, Pseudomonas*)
↓
Gram positive bacteria
(*Enterococcus, Staphylococcus*)
↓
Enveloped, lipid viruses
(Influenza)

Chlorine dioxide gas is highly effective against fungi, viruses, bacteria, and spores both in the laboratory and in real-world settings. Extensive testing has been done using chlorine dioxide on a multitude of specific organisms, and that information can be found in each of the listed tables below. It is not a complete list of organisms in which chlorine dioxide gas is effective against, only a sample of organisms in which chlorine dioxide has been successfully tested against. To date, no organism tested against chlorine dioxide gas has proved resistant. The Spaulding classification listed on the left lists organisms in order of decreasing resistance to sterilizing agents.

As testing is continually being performed on other organisms, updated data will be added to this list as the results come in. If an organism is not listed here, it does not necessarily mean that chlorine dioxide gas is ineffective against it. Please contact us to see if there is any data or information regarding your specific organism, or to arrange for specific organism testing.

Bacteria	Ref.
Blakeslea trispora	28
Bordetella bronchiseptica	8
Brucella suis	30
Burkholderia mallei	36
Burkholderia pseudomallei	36
Campylobacter jejuni	39
Clostridium botulinum	32
Corynebacterium bovis	8
Coxiella burneti (Q-fever)	35
E. coli ATCC 11229	3
E. coli ATCC 51739	1
E. coli K12	1
E. coli O157:H7 13B88	1
E. coli O157:H7 204P	1
E. coli O157:H7 ATCC 43895	1
E. coli O157:H7 EDL933	13

Bacteria	Ref.
E. coli O157:H7 G5303	1
E. coli O157:H7 C7927	1
Erwinia carotovora (soft rot)	21
Franscicella tularensis	30
Fusarium sambucinum (dry rot)	21
Fusarium solani var. coeruleum (dry rot)	21
Helicobacter pylori	8
Helminthosporium solani (silver scurf)	21
Klebsiella pneumonia	3
Lactobacillus acidophilus NRRL B1910	1
Lactobacillus brevis	1
Lactobacillus buchneri	1
Lactobacillus plantarum	5
Legionella	38
Legionella pneumophila	42
Leuconostoc citreum TPB85	1

Bacteria	Ref.
Leuconostoc mesenteroides	5
Listeria innocua ATCC 33090	1
Listeria monocytogenes F4248	1
Listeria monocytogenes F5069	19
Listeria monocytogenes LCDC-81-861	1
Listeria monocytogenes LCDC-81-886	19
Listeria monocytogenes Scott A	1
Methicillin-resistant Staphylococcus aureus (MRSA)	3
Multiple Drug Resistant Salmonella typhimurium (MDRS)	3
Mycobacterium bovis	8
Mycobacterium fortuitum	42
Pediococcus acidilactici PH3	1
Pseudomonas aeruginosa	3
Pseudomonas aeruginosa	8
Salmonella	1
Salmonella spp.	2
Salmonella Agona	1
Salmonella Anatum Group E	1
Salmonella Choleraesins ATCC 13076	1
Salmonella choleraesuis	8
Salmonella Enterica (PT30) BAA-1045	1
Salmonella Enterica S. Enteritidis	13
Salmonella Enterica S. Javiana	13
Salmonella Enterica S. Montevideo	13
Salmonella Enteritidis E190-88	1
Salmonella Javiana	1
Salmonella newport	4
Salmonella Typhimurium C133117	1
Salmonella Anatum Group E	1
Shigella	38
Staphylococcus aureus	23
Staphylococcus aureus ATCC 25923	1
Staphylococcus faecalis ATCC 344	1
Tuberculosis	3
Vancomycin-resistant Enterococcus faecalis (VRE)	3
Vibrio strain Da-2	37
Vibrio strain Sr-3	37
Yersinia enterocolitica	40
Yersinia pestis	30
Yersinia ruckerii ATCC 29473	31

Viruses	Ref.
Adenovirus Type 40	6
Calicivirus	42
Canine Parvovirus	8
Coronavirus	3
Feline Calici Virus	3
Foot and Mouth disease	8
Hantavirus	8
Hepatitis A Virus	3
Hepatitis B Virus	8
Hepatitis C Virus	8
Human coronavirus	8
Human Immunodeficiency Virus	3
Human Rotavirus type 2 (HRV)	15
Influenza A	22
Minute Virus of Mouse (Parovirus)(MVM-i)	8
Minute Virus of Mouse (Parovirus)(MVM-p)	8
Mouse Hepatitis Virus (MHV-A59)	8
Mouse Hepatitis Virus (MHV-JHM)	8
Mouse Parvovirus type 1 (MPV-1)	8
Murine Parainfluenza Virus Type 1 (Sendai)	8
Newcastle Disease Virus	8
Norwalk Virus	8
Poliovirus	20
Rotavirus	3
Severe Acute Respiratory Syndrome (SARS) Coronavirus	43
Sialodscryoadenitis Virus (Coronavirus)(SDAV)	8
Simian rotavirus SA-11	15
Theiler's Mouse Encephalomyelitis Virus (TMEV)	8
Vaccinia Virus	10

Algae/Fungi/Mold/Yeast	Ref.
Alternaria alternata	26
Aspergillus aeneus	28
Aspergillus aurolatus	28
Aspergillus brunneo-uniseriatus	28
Aspergillus caespitosus	28
Aspergillus cervinus	28
Aspergillus clavatonanicus	28
Aspergillus clavatus	28

Algae/Fungi/Mold/Yeast	Ref.
Aspergillus egyptiacus	28
Aspergillus elongatus	28
Aspergillus fischeri	28
Aspergillus fumigatus	28
Aspergillus giganteus	28
Aspergillus longivesica	28
Aspergillus niger	12
Aspergillus ochraceus	28
Aspergillus parvathecius	28
Aspergillus sydowii	28
Aspergillus unguis	28
Aspergillus ustus	28
Aspergillus versicolor	28
Botrytis species	3
Candida spp.	5
Candida albicans	28
Candida dubliniensis	28
Candida maltosa	28
Candida parapsilosis	28
Candida sake	28
Candida sojae	28
Candida spp.	5
Candida tropicalis	28
Candida viswanathil	28
Chaetomium globosum	7
Cladosporium cladosporioides	7
Debaryomyces etchellsii	28
Eurotium spp.	5
Fusarium solani	3
Lodderomyces elongisporus	28
Mucor circinelloides	28
Mucor flavus	28
Mucor indicus	28
Mucor mucedo	28
Mucor rademosus	28
Mucor ramosissimus	28
Mucor saturnus	28
Penicillium chrysogenum	7
Penicillium digitatum	3
Penicillium herquei	28
Penicillium spp.	5

Algae/Fungi/Mold/Yeast	Ref.
Phormidium boneri	3
Pichia pastoris	3
Poitrasia circinans	28
Rhizopus oryzae	28
Roridin A	33
Saccharomyces cerevisiae	3
Stachybotrys chartarum	7
T-mentag (athlete's foot fungus)	3
Verrucarin A	33

Bacterial Spores	Ref.
Alicyclobacillus acidoterrestris	17
Bacillus coagulans	12
Bacillus anthracis	10
Bacillus anthracis Ames	30
Bacillus atrophaeus	14
Bacillus atrophaeus ATCC 49337	31
Bacillus megaterium	12
Bacillus polymyxa	12
Bacillus pumilus ATCC 27142	12
Bacillus pumilus ATCC 27147	11
Bacillus subtillis (globigii) ATCC 9372	11
Bacillus subtillis ATCC 19659	31
Bacillus subtillis 5230	12
Clostridium. sporogenes ATCC 19404	12
Geobacillus stearothermophilus ATCC 12980	11
Geobacillus stearothermophilus ATCC 7953	31
Geobacillus stearothermophilus VHP	11
Bacillus thuringiensis	18

Chemical Decontamination	Ref.
Mustard Gas	
Ricin Toxin	10
dihydronicotinamide adenine dinucleotide	24
microcystin-LR (MC-LR)	25
cylindrospermopsin (CYN)	25

Beta Lactams	Ref.
Amoxicillin	29
Amplicillin	29
Cefadroxil	29
Cefazolin	29

Beta Lactams	Ref.
Cephalexin	29
Imipenem	29
Penicillin G	29
Penicillin V	29

Protozoa	Ref.
Chironomid larvae	27
Cryptosporidium	34

Protozoa	Ref.
Cryptosporidium parvum Oocysts	9
Cyclospora cayetanensis oocysts	41
Giardia	34

Microsporidia	Ref.
Encephalitozoon intestinalis	27

ClorDiSys' gaseous chlorine dioxide is registered with the EPA as a sterilant

Product: CSI CD CARTRIDGE
EPA Reg#: 80802-1
Registrant: CLORDISYS SOLUTIONS, INC
Approval Date: 02/25//2005
Active Ingredients: Sodium chlorite 72.8%

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908.236.4100

ClorDiSys Solutions, Inc. of Lebanon, New Jersey (est. 2001) is a company providing years of experience in all aspects of chlorine dioxide technology with a strong background in the Medical Device and pharmaceutical industry operating under GxP. We are a flexible, responsive organization with a network of resources to handle any size project. Each project is approached by utilizing our strong sterilization and engineering skills while drawing on our background in Operations, Service, Validation, and Quality to provide solutions for all of your Chlorine Dioxide (CD) needs. We provide personal attention to ensure customer satisfaction in all services and equipment we supply.

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