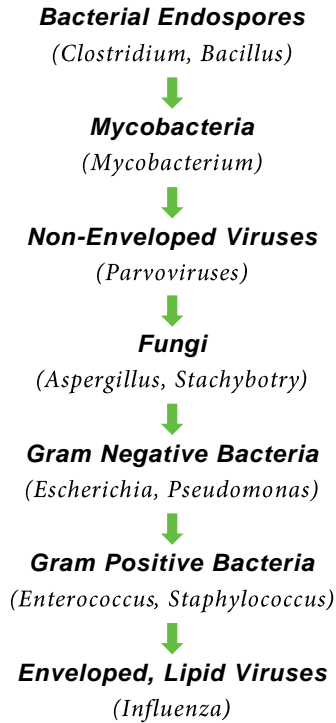


# Biological Efficacy of ClorDiSys Chlorine Dioxide Gas



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 testing.

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

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

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

Bacteria	Ref.
<i>Yersinia pestis</i>	30
<i>Yersinia ruckerii</i> ATCC 29473	31
<i>Adenovirus</i> Type 40	6
<i>Calicivirus</i>	42
<i>Canine Parvovirus</i>	8
<i>Coronavirus</i>	3
<i>Feline Calici Virus</i>	3
<i>Foot and Mouth disease</i>	8
<i>Hantavirus</i>	8
<i>Hepatitis A Virus</i>	3
<i>Hepatitis B Virus</i>	8
<i>Hepatitis C Virus</i>	8
<i>Human coronavirus</i>	8
<i>Human Immunodeficiency Virus</i>	3
<i>Human Rotavirus</i> type 2 (HRV)	15
<i>Influenza A</i>	22
<i>Minute Virus of Mouse (Parovirus)(MVM-i)</i>	8
<i>Minute Virus of Mouse (Parovirus)(MVM-p)</i>	8
<i>Mouse Hepatitis Virus (MHV-A59)</i>	8
<i>Mouse Hepatitis Virus (MHV-JHM)</i>	8
<i>Mouse Parvovirus</i> type 1 (MPV-1)	8
<i>Murine Parainfluenza Virus</i> Type 1 (Sendai)	8
<i>Newcastle Disease Virus</i>	8
<i>Norwalk Virus</i>	8
<i>Poliovirus</i>	20
<i>Rotavirus</i>	3
<i>Severe Acute Respiratory Syndrome (SARS) Coronavirus</i>	43
<i>Sialodscryoadenitis Virus (Coronavirus)(SDAV)</i>	8
<i>Simian rotavirus</i> SA-11	15
<i>Theiler's Mouse Encephalomyelitis Virus (TMEV)</i>	8
<i>Vaccinia Virus</i>	10
Algae/Fungi/Mold/Yeast	Ref.
<i>Alternaria alternata</i>	26
<i>Aspergillus aeneus</i>	28
<i>Aspergillus aurolatus</i>	28
<i>Aspergillus brunneo-uniseriatus</i>	28
<i>Aspergillus caespitosus</i>	28

Algae/Fungi/Mold/Yeast	Ref.
<i>Aspergillus cervinus</i>	28
<i>Aspergillus clavatonanicus</i>	28
<i>Aspergillus clavatus</i>	28
<i>Aspergillus egyptiacus</i>	28
<i>Aspergillus elongatus</i>	28
<i>Aspergillus fischeri</i>	28
<i>Aspergillus fumigatus</i>	28
<i>Aspergillus giganteus</i>	28
<i>Aspergillus longivesica</i>	28
<i>Aspergillus niger</i>	12
<i>Aspergillus ochraceus</i>	28
<i>Aspergillus parvathecius</i>	28
<i>Aspergillus sydowii</i>	28
<i>Aspergillus unguis</i>	28
<i>Aspergillus ustus</i>	28
<i>Aspergillus versicolor</i>	28
<i>Botrytis species</i>	3
<i>Candida spp.</i>	5
<i>Candida albicans</i>	28
<i>Candida dubliniensis</i>	28
<i>Candida maltosa</i>	28
<i>Candida parapsilosis</i>	28
<i>Candida sake</i>	28
<i>Candida sojae</i>	28
<i>Candida spp.</i>	5
<i>Candida tropicalis</i>	28
<i>Candida viswanathii</i>	28
<i>Chaetomium globosum</i>	7
<i>Cladosporium cladosporioides</i>	7
<i>Debaryomyces etchellsii</i>	28
<i>Eurotium spp.</i>	5
<i>Fusarium solani</i>	3
<i>Lodderomyces elongisporus</i>	28
<i>Mucor circinelloides</i>	28
<i>Mucor flavus</i>	28
<i>Mucor indicus</i>	28
<i>Mucor mucedo</i>	28
<i>Mucor rademosus</i>	28
<i>Mucor ramosissimus</i>	28
<i>Mucor saturnus</i>	28
<i>Penicillium chrysogenum</i>	7
<i>Penicillium digitatum</i>	3
<i>Penicillium herquei</i>	28
<i>Penicillium spp.</i>	5
<i>Phormidium boneri</i>	3
<i>Pichia pastoris</i>	3
<i>Poitrasia circinans</i>	28
<i>Rhizopus oryzae</i>	28

Algae/Fungi/Mold/Yeast	Ref.
<i>Roridin A</i>	33
<i>Saccharomyces cerevisiae</i>	3
<i>Stachybotrys chartarum</i>	7
<i>T-mentag (athlete's foot fungus)</i>	3
<i>Verrucarin A</i>	33

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

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

Beta Lactams	Ref.
Amoxicillin	29
Ampicillin	29
Cefadroxil	29
Cefazolin	29
Cephalexin	29
Imipenem	29
Penicillin G	29
Penicillin V	29

Protozoa	Ref.
<i>Chironomid larvae</i>	27
<i>Cryptosporidium</i>	34
<i>Cryptosporidium parvum</i> Oocysts	9
<i>Cyclospora cayetanensis</i> oocysts	41
<i>Giardia</i>	34

Microsporidia	Ref.
<i>Encephalitozoon intestinalis</i>	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%

#### About Us

The Ecosense Company is a bio-decontamination service provider located in Northeast Ohio. We are a certified ClorDiSys service partner who uses their proven sterilization method for decontaminating high-risk and critical applications where complete sterility results must be achieved and validated. Our in-situ treatment capabilities range from treating individual pieces of equipment and single rooms to large buildings and confined spaces. We also offer contract sterilization services at our Ohio facility where we can accommodate a wide variety of items ranging from small products to large pieces of equipment.

ClorDiSys Solutions, Inc. of Branchburg, 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 industries operating under GxP. The current management team was instrumental in the development of the low residue, low corrosion chlorine dioxide gas sterilization method which is still unique to the industry today. ClorDiSy is now recognized as the worldwide leader in providing highly effective decontamination solutions to the pharmaceutical, food processing, life sciences and bio-technology industries with difficult and demanding decontamination requirements.

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