

## INCIDENT ENERGIES

### INCIDENT ENERGIES AT 253.7 NANOMETERS (2537 ANGSTROMS) NECESSARY TO INHIBIT COLONY FORMATION IN GREATER THAN 99.9% OF MICRO-ORGANISMS (MEASURED IN MICROWATT SECONDS PER SQUARE CENTIMETER)

<b>BACTERIA</b>	<b>UV DOSE</b>	<b>BACTERIA (cont.)</b>	<b>UV DOSE</b>
<i>Agrobacterium lumefaciens</i> <sup>5</sup>	8,500	<i>Salmonella</i> Species <sup>4,7,9</sup>	10,000
<i>Bacillus anthracis</i> <sup>1,4,5,7,9</sup>	8,700	<i>Salmonella typhimurium</i> <sup>4,5,9</sup>	15,200
<i>Bacillus anthracis</i> Spores	46,200	<i>Salmonella typhi</i> (Typhoid Fever) <sup>7</sup>	7,000
<i>Bacillus megatherium</i> Sp. (veg) <sup>4,5,9</sup>	2,500	<i>Salmonella</i>	10,500
<i>Bacillus megatherium</i> Sp. (spores) <sup>4,9</sup>	5,200	<i>Sarcina lutea</i> <sup>1,4,5,6,9</sup>	26,400
<i>Bacillus paratyphosus</i> <sup>4,9</sup>	6,100	<i>Serratia marcescens</i> <sup>1,4,6,9</sup>	6,160
<i>Bacillus subtilis</i> <sup>3,4,5,6,9</sup>	11,000	<i>Shigella dysenteriae</i> - Dysentery <sup>1,5,7,9</sup>	4,200
<i>Bacillus subtilis</i> Spores <sup>2,3,4,6,9</sup>	22,000	<i>Shigella flexneri</i> - Dysentery <sup>5,7</sup>	3,400
<i>Clostridium tetani</i>	23,100	<i>Shigella paradysenteriae</i> <sup>4,9</sup>	3,400
<i>Clostridium botulinum</i>	11,200	<i>Shigella sonnei</i> <sup>5</sup>	7,000
<i>Corynebacterium diphtheriae</i> <sup>1,4,5,7,8,9</sup>	6,500	<i>Spirillum rubrum</i> <sup>1,4,6,9</sup>	6,160
<i>Dysentery bacilli</i> <sup>3,4,7,9</sup>	4,200	<i>Staphylococcus albus</i> <sup>1,6,9</sup>	5,720
<i>Eberthella typhosa</i> <sup>1,4,9</sup>	4,100	<i>Staphylococcus aureus</i> <sup>3,4,6,9</sup>	6,600
<i>Escherichia coli</i> <sup>1,2,3,4,9</sup>	6,600	<i>Staphylococcus epidermidis</i> <sup>5,7</sup>	5,800
<i>Legionella bozemanii</i> <sup>5</sup>	3,500	<i>Streptococcus faecaila</i> <sup>5,7,8</sup>	10,000
<i>Legionella dumoffill</i> <sup>5</sup>	5,500	<i>Streptococcus hemolyticus</i> <sup>1,3,4,5,6,9</sup>	5,500
<i>Legionella gormanil</i> <sup>5</sup>	4,900	<i>Streptococcus lactis</i> <sup>1,3,4,5,6</sup>	8,800
<i>Legionella micdadei</i> <sup>5</sup>	3,100	<i>Streptococcus pyrogenes</i>	4,200
<i>Legionella longbeachae</i> <sup>5</sup>	2,900	<i>Streptococcus salivarius</i>	4,200
<i>Legionella pneumophila</i> (Legionnaire's Disease)	12,300	<i>Streptococcus viridans</i> <sup>3,4,5,9</sup>	3,800
<i>Leptospiracanicola</i> -Infectious Jaundice <sup>1,9</sup>	6,000	<i>Vibrio comma</i> (Cholera) <sup>3,7</sup>	6,500
<i>Leptospira interrogans</i> <sup>1,5,9</sup>	6,000	<i>Vibrio cholerae</i> <sup>1,5,8,9</sup>	6,500
<i>Micrococcus candidus</i> <sup>4,9</sup>	12,300		
<i>Micrococcus sphaeroides</i> <sup>1,4,6,9</sup>	15,400	<b>MOLDS</b>	<b>UV DOSE</b>
<i>Mycobacterium tuberculosis</i> <sup>1,3,4,5,7,8,9</sup>	10,000	<i>Aspergillus amstelodami</i>	77,000
<i>Neisseria catarrhalis</i> <sup>1,4,5,9</sup>	8,500	<i>Aspergillus flavus</i> <sup>1,4,5,6,9</sup>	99,000
<i>Phytomonas tumefaciens</i> <sup>1,4,9</sup>	8,500	<i>Aspergillus glaucus</i> <sup>4,5,6,9</sup>	88,000
<i>Proteus vulgaris</i> <sup>1,4,5,9</sup>	6,600	<i>Aspergillus niger</i> (bread mold) <sup>2,3,4,5,6,9</sup>	330,000
<i>Pseudomonas aeruginosa</i> (Environmental Strain) <sup>1,2,3,4,5,9</sup>	10,500	<i>Mucor mucedo</i>	77,000
<i>Pseudomonas aeruginosa</i> (Lab. Strain) <sup>5,7</sup>	3,900	<i>Mucor racemosus</i> (A & B) <sup>1,3,4,6,9</sup>	35,200
<i>Pseudomonas fluorescens</i> <sup>4,9</sup>	6,600	<i>Oospora lactis</i> <sup>1,3,4,6,9</sup>	11,000
<i>Rhodospirillum rubrum</i> <sup>5</sup>	6,200	<i>Penicillium chrysogenum</i>	56,000
<i>Salmonella enteritidis</i> <sup>3,4,5,9</sup>	7,600	<i>Penicillium digitatum</i> <sup>4,5,6,9</sup>	88,000
<i>Salmonella paratyphi</i> (Enteric Fever) <sup>5,7</sup>	6,100	<i>Penicillium expansum</i> <sup>1,4,5,6,9</sup>	22,000
		<i>Penicillium roqueforti</i> <sup>1,2,3,4,5,6</sup>	26,400
		<i>Rhizopus nigricans</i> (cheese mold) <sup>3,4,5,6,9</sup>	220,000

<b>PROTOZOA</b>	<b>UV DOSE</b>	<b>YEASTS</b>	<b>UV DOSE</b>
<i>Chlorella vulgaris</i> (algae) <sup>1,2,3,4,5,9</sup>	22,000	Baker's Yeast <sup>1,3,4,5,6,7,9</sup>	8,800
Blue-green Algae	420,000	Brewer's Yeast <sup>1,2,3,4,5,6,9</sup>	6,600
<i>E. histolytica</i>	84,000	Common Yeast Cake <sup>1,4,5,6,9</sup>	13,200
<i>Giardia lamblia</i> (cysts) <sup>3</sup>	100,000	<i>Saccharomyces cerevisiae</i> <sup>4,6,9</sup>	13,200
Nematode Eggs <sup>6</sup>	40,000	<i>Saccharomyces ellipsoideus</i> <sup>4,5,6,9</sup>	13,200
Paramecium <sup>1,2,3,4,5,6,9</sup>	200,000	<i>Saccharomyces</i> sp. <sup>2,3,4,5,6,9</sup>	17,600

  

<b>VIRUS</b>	<b>UV DOSE</b>
Adeno Virus Type III <sup>3</sup>	4,500
Bacteriophage <sup>1,3,4,5,6,9</sup>	6,600
Coxsackie	6,300
Infectious Hepatitis <sup>1,5,7,9</sup>	8,000
Influenza <sup>1,2,3,4,5,7,9</sup>	6,600
Rotavirus <sup>5</sup>	24,000
Tobacco Mosaic <sup>2,4,5,6,9</sup>	440,000

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## SOURCES

1. "The Use of Ultraviolet Light for Microbial Control", Ultrapure Water, April 1989.
2. William V. Collentro, "Treatment of Water with Ultraviolet Light - Part I", Ultrapure Water, July/August 1986.
3. James E. Cruver, Ph.D., "Spotlight on Ultraviolet Disinfection", Water Technology, June 1984.
4. Dr. Robert W. Legan, "Alternative Disinfection Methods - A Comparison of UV and Ozone", Industrial Water Engineering, March/April 1982.
5. Unknown
6. Rudolph Nagy, Research Report BL-R-6-1059-3023-1, Westinghouse Electric Corporation.
7. Myron Lupal, "UV Offers Reliable Disinfection", Water Conditioning & Purification, November 1993.
8. John Treij, "Ultraviolet Technology", Water Conditioning & Purification, December 1995.
9. Bak Srikanth, "The Basic Benefits of Ultraviolet Technology", Water Conditioning & Purification, December 1995.