

**TOXICITY PROFILE - Defensive™ Foaming Hand & Skin Sanitizer**

Acute Oral LD50 is > 5.0 g/kg, Category IV  
 Acute Dermal LD50 >2.0 g/kg, Category III  
 Eye Irritation – Category III  
 Skin Irritation – Category IV  
 Not a Skin Sensitizer

**EFFICACY - Defensive™ Foaming Hand & Skin Sanitizer**

**Time Kill Study**

This study is designed to examine the rate of kill of a test substance after inoculation with a test organism. Results are expressed in percent reduction and log reduction of the test organism. Exposure time 15 Seconds.

	Test Population Control (CFU/mL)*	Number of Survivors (CFU/mL)*	Percent Reduction	Log Reduction
<i>Candida albicans</i> ATCC 10231	1.6 x 10 <sup>5</sup>	6.0 x 10 <sup>3</sup>	96.3	1.42 Log <sub>10</sub>
<i>Clostridium difficile</i> ATCC 9689	3.4 x 10 <sup>6</sup>	< 2	> 99.9999	> 6.20 Log <sub>10</sub>
<i>Enterococcus faecalis</i> (VRE) ATCC 51575 <i>Vancomycin Resistant</i>	1.12 x 10 <sup>6</sup>	3.2 x 10 <sup>1</sup>	99.99	4.54 Log <sub>10</sub>
<i>Escherichia coli</i> ATCC 11229	3.8 x 10 <sup>6</sup>	4	99.999	6.00 Log <sub>10</sub>
<i>Escherichia coli</i> O157:H7 ATCC 35150	1.26 x 10 <sup>6</sup>	< 2	> 99.999	> 5.80 Log <sub>10</sub>
<i>Klebsiella pneumoniae</i> ATCC 4352	1.10 x 10 <sup>6</sup>	2	99.999	5.70 Log <sub>10</sub>
<i>Listeria monocytogenes</i> ATCC 19117	4.7 x 10 <sup>6</sup>	1.9 x 10 <sup>3</sup>	99.9	3.39 Log <sub>10</sub>
<i>Pseudomonas aeruginosa</i> ATCC #15442	3.5 x 10 <sup>6</sup>	< 2	99.9999	> 6.20 Log <sub>10</sub>
<i>Salmonella typhi</i> ATCC 6539	1.27 x 10 <sup>6</sup>	2	99.999	5.80 Log <sub>10</sub>
<i>Staphylococcus aureus</i> ATCC #6538	6.7 x 10 <sup>6</sup>	< 2	> 99.9999	> 6.53 Log <sub>10</sub>
<i>Staphylococcus aureus</i> (MRSA) ATCC 33592 <i>Methicillin Resistant</i>	1.23 x 10 <sup>7</sup>	3.8 x 10 <sup>3</sup>	> 99.9	3.51 Log <sub>10</sub>
<i>Staphylococcus epidermidis</i> ATCC 12228	7.2 x 10 <sup>5</sup>	< 2	99.999	5.56 Log <sub>10</sub>
<i>Streptococcus pneumoniae</i> ATCC 6305	6.4 x 10 <sup>5</sup>	< 2	> 99.999	> 5.51 Log <sub>10</sub>
<i>Streptococcus pyogenes</i> ATCC #19615	1.77 x 10 <sup>6</sup>	< 2	> 99.999	> 5.90 Log <sub>10</sub>
<i>Xanthomonas axonopodis</i> ATCC 49118 <i>(Citrus Canker)</i>	1.28 x 10 <sup>6</sup>	3.6 x 10 <sup>1</sup>	> 99.99	4.55 Log <sub>10</sub>

\* Colony forming units per mL of test mixture

### CHLORINE EQUIVALENCY TEST - Defensive™ Foaming Hand & Skin Sanitizer

The object of this test is to determine the available chlorine germicidal equivalent concentration of the product as compared to the 200, 100 and 50 PPM available chlorine in the NaOCl standard controls.

#### Initial Suspension Population

Staphylococcus aureus ATCC #6538 7.6 x 10<sup>8</sup> CFU/mL

Salmonella typhi ATCC #6539 1.2 x 10<sup>8</sup> CFU/mL

Test Substance	Concentration	Subculture Series									
		1	2	3	4	5	6	7	8	9	10
Test Organism: <i>S. aureus</i>											
NaOCl (Control)	200 PPM	0	0	0	0	0	+	+	+	+	+
	100 PPM	0	0	+	+	+	+	+	+	+	+
	50 PPM	0	+	+	+	+	+	+	+	+	+
Defensive™ Foaming Hand & Skin Sanitizer		0	0	0	0	0	0	0	0	0	0
Test Organism: <i>S. typhi</i>											
NaOCl (Control)	200 PPM	0	0	0	0	0	0	+	+	+	+
	100 PPM	0	0	0	+	+	+	+	+	+	+
	50 PPM	0	0	+	+	+	+	+	+	+	+
Defensive™ Foaming Hand & Skin Sanitizer		0	0	0	0	0	0	0	0	0	0

**+** = Growth of Organism

**0** = No Growth of Organism

The subcultures of positive broths (tubes showing Growth) demonstrated pure cultures of the test organism.

#### EFFICACY RESULTS - Defensive™ Foaming Hand & Skin Sanitizer

Defensive™ Foaming Hand Sanitizer demonstrated an available chlorine equivalent to greater than the 200 PPM NaOCl standard control when tested against Staphylococcus aureus and Salmonella typhi.