

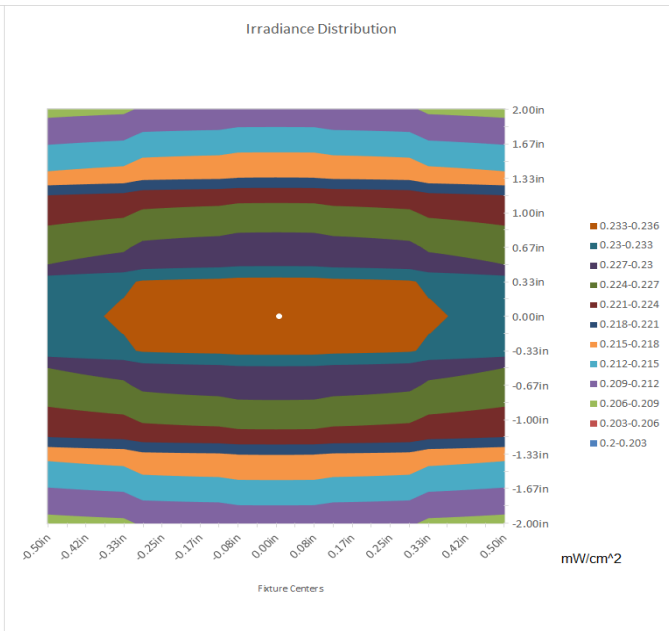
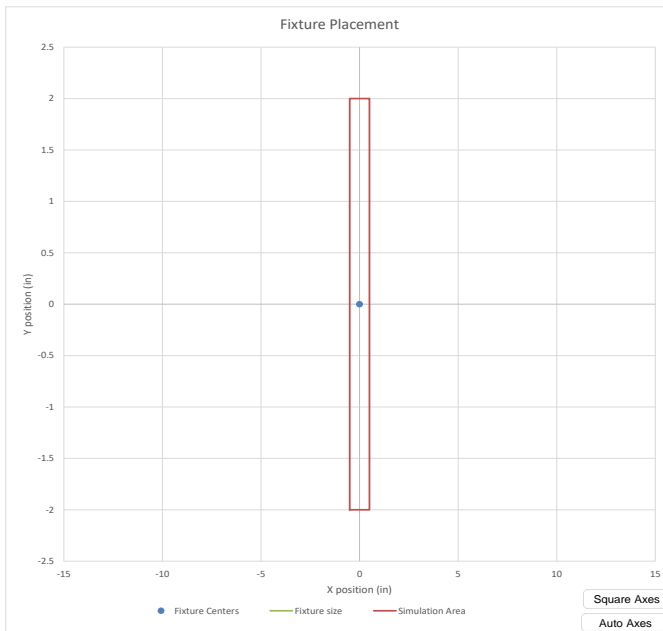
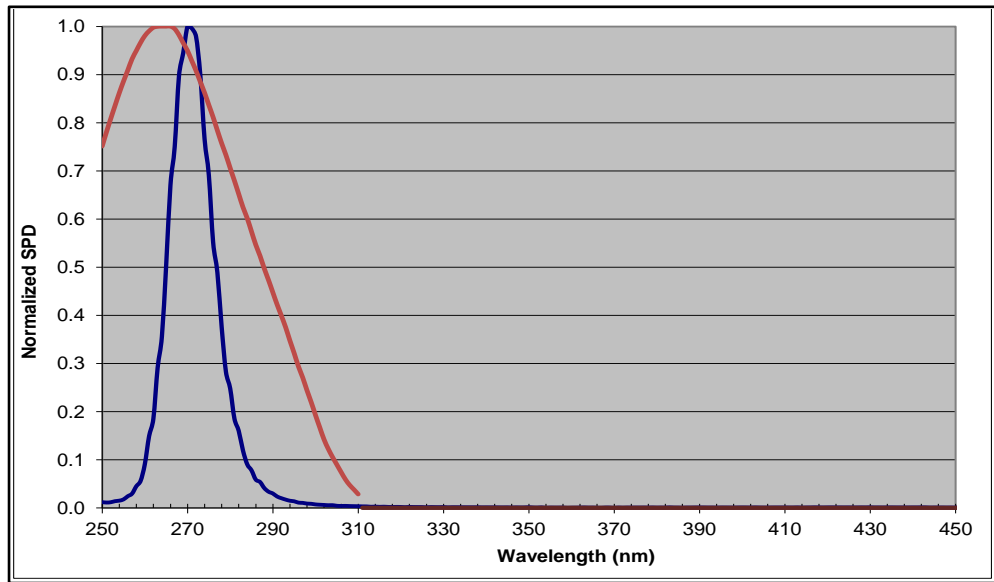
### FLS UV Tool System Report

#### System Parameters

	Product Family	LED Part Number	Flux	Flux Units
LED 1	Seoul Viosys UV	275nm Family	14.350	mW
LED 2			0.000	mW
LED 3			0.000	mW
LED 4			0.000	mW
LED 5			0.000	mW
LED 6			0.000	mW
LED 7			0.000	mW
LED 8			0.000	mW
LED 9			0.000	mW
LED 10			0.000	mW

Total Flux	14.350	mW	
FWHM viewing angle	130.00	deg	<input type="checkbox"/> Load IES File
Distance	3.5000	in	<input type="checkbox"/> Use IES File
On time	1.00	s	
Optical Efficiency	100.00	%	
Light source type	Point Source		
Simulation Surface Length	4.0000	in	
Simulation Surface Width	1.0000	in	
Number of fixtures	Go To Fixture Placement Tab		
Flux Unit	mW		
Energy Unit	mJ		
Area Unit	cm^2		
Average irradiance of Array	0.2221	mW/cm^2	
Average dosage of Array	0.2221	mJ/cm^2	
Peak irradiance of Array	0.2348	mW/cm^2	
Peak dosage of Array	0.2348	mJ/cm^2	

## System Spectrum and Irradiance Result



Uniformity Metrics	
Max / Min	1.129
Max / Average	1.0572
Min / Average ( $U_0$ )	0.9365
Variance ( $\sigma^2$ )	0.0001
Coefficient of Variation	1.764%
Simulation Area Coverage	40%

± 5%

Rectangular	Number of Fixtures on Length	1	
	Fixture Spacing on Length	1	in
	Number of Fixtures on Width	1	
	Fixture Spacing on Width	1	in

## Surface Purification Results

Wall Reflectance		100%		Irradiance		Min: 0.208, Max: 0.235		mW/cm <sup>2</sup>			
Simulate Chamber				Adjusted Irradiance		0.2221		mW/cm <sup>2</sup>			
				Time		1.000		s			
				Adjusted Dosage		0.194		mJ/cm <sup>2</sup>			
				% Reduction at system dosage		Time required for % reduction of original population		Target			
1st bounce contribution		49%		2 log (99%)		4 log (99.99%)		6 log (99.9999%)		80.00%	
2nd bounce contribution		35%									
<b>Bacteria</b>											
Acinetobacter baumannii <sup>9</sup>		14.6983%		29s		58s		1m 26s		10s	
Bacillus anthracis - Anthrax <sup>1</sup>		11.3614%		38s		1m 16s		1m 54s		13s	
Bacillus anthracis spores - Anthrax spores <sup>1</sup>		2.2455%		3m 22s		6m 45s		10m 8s		1m 10s	
Bacillus magaterium sp. (spores) <sup>1</sup>		18.2723%		23s		46s		1m 8s		8s	
Bacillus magaterium sp. (veg.) <sup>1</sup>		34.2754%		11s		22s		33s		4s	
Bacillus paratyphus <sup>1</sup>		15.8027%		27s		54s		1m 20s		9s	
Bacillus subtilis spores <sup>1</sup>		4.6573%		1m 36s		3m 13s		4m 49s		34s	
Bacillus subtilis <sup>1</sup>		9.0978%		48s		1m 36s		2m 24s		17s	
Clostridium difficile <sup>5</sup>		4.6573%		1m 36s		3m 13s		4m 49s		34s	
Corynebacterium diphtheriae <sup>1</sup>		14.8856%		29s		57s		1m 25s		10s	
Ebertella typhosa <sup>1</sup>		22.5791%		18s		36s		54s		6s	
Escherichia coli <sup>1,2</sup>		14.6983%		29s		58s		1m 26s		10s	
Leptospiracanicola - infectious Jaundice <sup>1</sup>		16.0437%		26s		53s		1m 19s		9s	
Micrococcus candidus <sup>1</sup>		8.1767%		54s		1m 47s		2m 41s		19s	
Micrococcus sphaeroides <sup>1</sup>		6.5863%		1m 7s		2m 15s		3m 22s		24s	
Mycobacterium tuberculosis <sup>1</sup>		9.9607%		44s		1m 27s		2m 11s		15s	
Neisseria catarrhalis <sup>1</sup>		11.6126%		37s		1m 14s		1m 51s		13s	
Phytomonas tumefaciens <sup>1</sup>		12.2919%		35s		1m 10s		1m 45s		12s	
Proteus vulgaris <sup>1,2</sup>		14.6983%		29s		58s		1m 26s		10s	
Pseudomonas aeruginosa <sup>1,2</sup>		9.5097%		46s		1m 32s		2m 18s		16s	
Pseudomonas fluorescens <sup>1</sup>		14.6983%		29s		58s		1m 26s		10s	
Salmonella enteritidis <sup>1</sup>		12.8952%		33s		1m 6s		1m 40s		12s	
Salmonella paratyphi - Enteric fever <sup>1</sup>		15.8027%		27s		54s		1m 20s		9s	
Salmonella typhosa - Typhoid fever <sup>1</sup>		22.5791%		18s		36s		54s		6s	
Salmonella typhimurium <sup>1</sup>		6.6701%		1m 6s		2m 13s		3m 20s		23s	
Sarcina lutea <sup>1</sup>		3.8965%		1m 55s		3m 51s		5m 47s		40s	
Serratia marcescens <sup>1</sup>		15.6615%		27s		54s		1m 21s		9s	
Shigella dysenteriae - Dysentery <sup>1</sup>		22.1059%		18s		37s		55s		6s	
Shigella flexneri - Dysentery <sup>1</sup>		26.5526%		15s		30s		45s		5s	
Shigella paradysenteriae <sup>1</sup>		26.5526%		15s		30s		45s		5s	
Spirillum rubrum <sup>1</sup>		15.6615%		27s		54s		1m 21s		9s	
Staphylococcus albus <sup>1</sup>		16.7593%		25s		50s		1m 15s		9s	
Staphylococcus aureus <sup>1,2</sup>		14.6983%		29s		58s		1m 26s		10s	
Staphylococcus hemolyticus <sup>1</sup>		17.3679%		24s		48s		1m 12s		8s	
Staphylococcus lactis <sup>1</sup>		11.2398%		39s		1m 17s		1m 55s		13s	
Stenotrophomonas maltophilia <sup>1</sup>		10.6012%		41s		1m 22s		2m 3s		14s	
Streptococcus viridans <sup>1</sup>		24.1276%		17s		33s		50s		6s	
Vibrio comma - Cholera <sup>1</sup>		14.9067%		29s		57s		1m 25s		10s	
<b>Molds</b>											
Aspergillus flavus <sup>1</sup>		1.0542%		7m 14s		14m 29s		21m 43s		2m 31s	
Aspergillus glaucus <sup>1</sup>		1.1852%		6m 26s		12m 52s		19m 18s		2m 14s	
Aspergillus niger <sup>1</sup>		0.3174%		24m 8s		48m 16s		1h 12m 25s		8m 26s	
Mucor racemosus A <sup>1</sup>		2.9368%		2m 34s		5m 8s		7m 43s		54s	
Mucor racemosus B <sup>1</sup>		2.9368%		2m 34s		5m 8s		7m 43s		54s	
Oospora lactis <sup>1</sup>		9.0978%		48s		1m 36s		2m 24s		17s	
Penicillium expansum <sup>1</sup>		4.6573%		1m 36s		3m 13s		4m 49s		34s	
Penicillium roqueforti <sup>1</sup>		3.8965%		1m 55s		3m 51s		5m 47s		40s	
Penicillium digitatum <sup>1</sup>		1.1852%		6m 26s		12m 52s		19m 18s		2m 14s	
Rhisopus nigricans <sup>1</sup>		0.4758%		16m 5s		32m 11s		48m 16s		5m 37s	
<b>Protozoa</b>											
Chlorella Vulgaris <sup>1</sup>		4.6573%		1m 36s		3m 13s		4m 49s		34s	
Nematode Eggs <sup>1</sup>		1.1340%		6m 43s		13m 27s		20m 11s		2m 21s	
Paramecium <sup>1</sup>		5.1110%		1m 27s		2m 55s		4m 23s		31s	
<b>Virus</b>											
Bacteriophage - E. Coli (MS2) <sup>1</sup>		14.6983%		29s		58s		1m 26s		10s	
Coronavirus (SARS-CoV-2) <sup>4</sup>		18.9293%		22s		44s		1m 5s		8s	
Infectious Hepatitis <sup>1</sup>		12.2919%		35s		1m 10s		1m 45s		12s	
Influenza <sup>1</sup>		14.6983%		29s		58s		1m 26s		10s	
Poliovirus - Poliomyelitis <sup>1</sup>		14.6983%		29s		58s		1m 26s		10s	
Tobacco mosaic <sup>1</sup>		0.2382%		32m 11s		1h 4m 22s		1h 36m 33s		11m 14s	
<b>Yeast</b>											
Brewers yeast <sup>1</sup>		14.6983%		29s		58s		1m 26s		10s	
Candida albicans <sup>3</sup>		7.9207%		56s		1m 51s		2m 47s		20s	
Common yeast cake <sup>1</sup>		7.6411%		58s		1m 55s		2m 53s		20s	
Saccharomyces cerevisiae <sup>1</sup>		7.6411%		58s		1m 55s		2m 53s		20s	
Saccharomyces ellipsoideus <sup>1</sup>		7.6411%		58s		1m 55s		2m 53s		20s	
Saccharomyces spores <sup>1,2</sup>		5.7874%		1m 17s		2m 34s		3m 51s		27s	

## Skin and Eye Safety

Wavelength	Limit on	Maximum Limit (at conditions in UV Tool tab)	Limit Units	Potential Danger to	Value of system in UV Tool Tab		SAFE?	Maximum Time (based on Peak)
					Average	Peak		
180-400nm	Effective radiant exposure	3	mJ/cm <sup>2</sup>	Eyes and Skin	0.20	0.21	SAFE	14.36s
300-700nm	Effective blue light irradiance	10.000	mW/cm <sup>2</sup>	Eyes	0.00	0.00	SAFE	No Limit
300-700nm	Effective blue light radiance	100000.000	mW/cm <sup>2</sup> sr	Eyes	0.06	0.07	SAFE	No Limit
180-280nm	Radiant exposure	3	mJ/cm <sup>2</sup>	Eyes and Skin	0.20	0.21	SAFE	14.00s
280-302nm	Radiant exposure	3	mJ/cm <sup>2</sup>	Eyes and Skin	0.02	0.02	SAFE	2m 19s
303nm	Radiant exposure	4	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
304nm	Radiant exposure	6	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
305nm	Radiant exposure	10	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
306nm	Radiant exposure	16	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
307nm	Radiant exposure	25	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
308nm	Radiant exposure	40	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
309nm	Radiant exposure	63	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
310nm	Radiant exposure	100	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
311nm	Radiant exposure	160	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
312nm	Radiant exposure	250	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
313nm	Radiant exposure	400	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
314nm	Radiant exposure	630	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h
315-400nm	Radiant exposure	1000	mJ/cm <sup>2</sup>	Eyes and Skin	0.00	0.00	SAFE	>8h

Values as measured directly under the light source looking directly at the light source (worst case scenario)

Notes:

New Version Test (2) 2x2 Chamber 100% Reflectivity

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