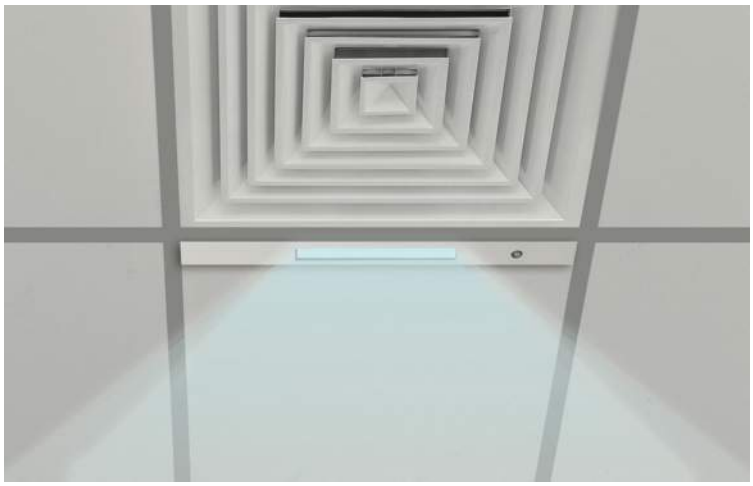
LIGHTENGINE
HEALTH CARE

SANITILE
UV-C LED



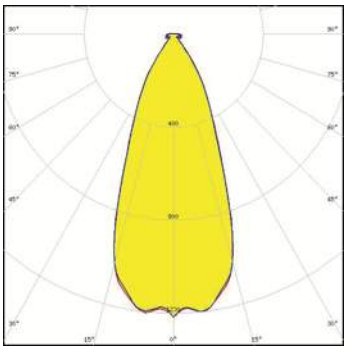
UV-C LIGHT IS NOT VISIBLE WHEN ON

The SaniTile UV-C LED sanitizing light is a revolutionary approach to germicidal UV sterilization. This discreet lay in fixture seamlessly integrates into new and existing construction to allow for whole project coverage.

The SaniTile germicidal luminaire specializes in high frequency rapid sanitizing for surfaces with heavy usage, to allow for a cleaning regimen with minimal interruption.

These units can be used as a supplemental night time cleaning treatment, or rapid intermittent treatment between occupancy.

PHOTOMETRICS

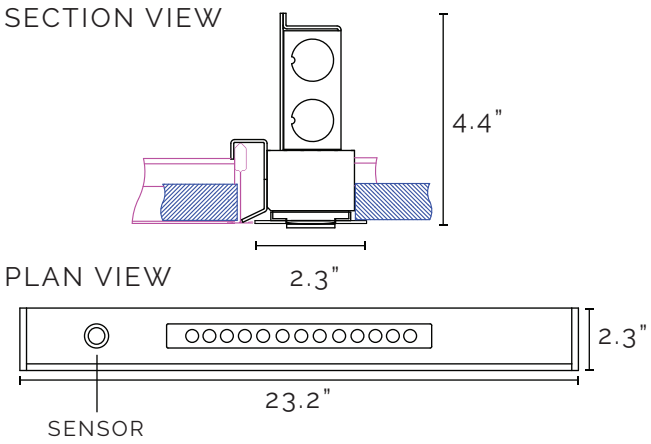


DOSAGE:

60"x60" area from 7'-6" above calc plane (10min)
Peak - 6 mJ/cm²
Average - 4 mJ/cm²

8'x8' area from 7'-6" above calc plane (20min)
Peak - 11.9mJ/cm²
Average - 4.4 mJ/cm²

TECHNICAL DRAWING



TECHNICAL INFORMATION

illumination characteristics
285 nm peak wavelength UV-C Germicidal LEDs optimized with 40 degree UV stable optic. A high power LED warning light is illuminated during operation. This fixture does not generate ozone.

electrical characteristics
120-277V driver with occupancy sensor and warning light integrated into to each 58W cleaning head. Units are activated by localized switching to initiate cleaning cycles. Bluetooth mesh sensors allow for multipe units to be linked together with keypads and other third party controls. Units can be controlled via time clock, BMS, IoT wired and wireless controllers, or other intelligent building controls.

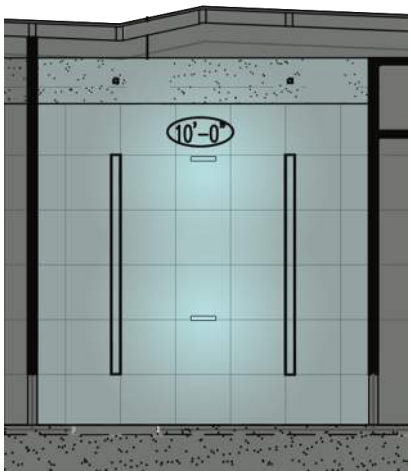
materials
Painted aluminum grid aperture designed to connect to new or existing ACT ceilings. Extruded aluminum heat sink, metal suspension yoke for T Grid connection. Gyp mount or surface mount available.

operation
Cleaning cycles are activated by localized switch or 3rd party control systemand will run for complete cleaning cycle as specified. If the room becomes occupied the units will interrupt the cleaning cycle. Cleaning cycles can be optimized for size of room, desired target level, and frequency.

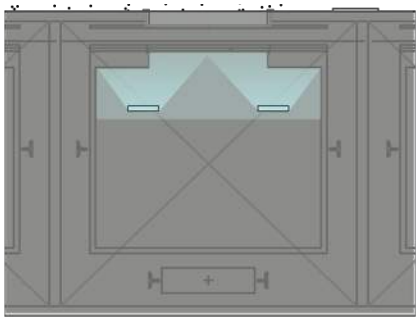
options
Available in grid, surface and pendant mounted configurations. Custom finish and mounting options available. Lower power units available for applications where longer cleaning times are desired.

certifications
UL 8802 Germicidal System
UL 1598, UL 8750, CSA C22.2#250.0, CSA C22.2#250.13, IEC 62471, UL 61010-1
RoHS Compliant
Made in the USA

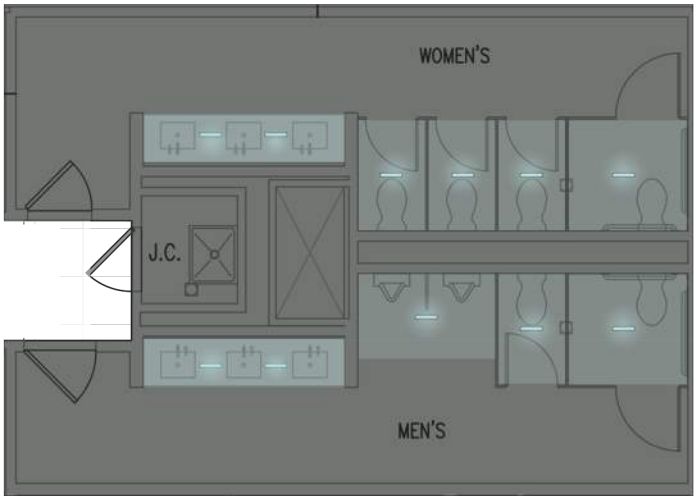
EXAMPLE APPLICATION AREAS



conference rooms / offices
SaniTile units can be operated in conference rooms or private offices for rapid cleaning cycles between occupancy. Using multiple units per room, surfaces can be cleaned to 99% virus reduction in 12 minutes*, allowing for minimal downtime between occupants. Single units can be used focusing on high touch surfaces which would achieve 99% reduction in 18 minutes.



elevators
SaniTile units can be operated in elevators for rapid cleaning cycles throughout the day. Using one unit per button area, surfaces can be cleaned to 99% virus reduction in 6 minutes*, allowing for high frequency cleaning with minimal down time.



restrooms
SaniTile units can be operated in restrooms for rapid cleaning cycles throughout the day. Using one unit per stall, surfaces can be cleaned to 99% virus reduction in 12 minutes*, allowing for high frequency cleaning with minimal down time.

*Calculated times are based on average dosage over study area for SARS-CoV-2

LIGHTENGINE
HEALTH CARE

SANITILE UV-C LED

ORDERING

SANITILE	**ST**-TGRID-S-SW-RP-90%

MOUNTING

TGRID - UNIVERSAL T GRID
SGRID - SLOT GIRD
FL - FLANGE
SF - SURFACE MOUNT
FL - FLANGE FOR HARD CEILING
XX - SPECIAL MOUNTING AVAILABLE

APPLICATION

S - STANDALONE
G - GROUP (SEVERAL IN THE SAME ROOM)
D - DISTRIBUTED ARRAY (SPREAD THROUGH LARGE AREA)
EL - ELEVATOR
OTHER

CONTROL

SW - TOGGLE SWITCH
TSW - TIMER SWITCH

3RD PARTY CONTROL CAN BE USED
SYSTEM MUST BE UL 8802 LISTED

OPERATION MODES

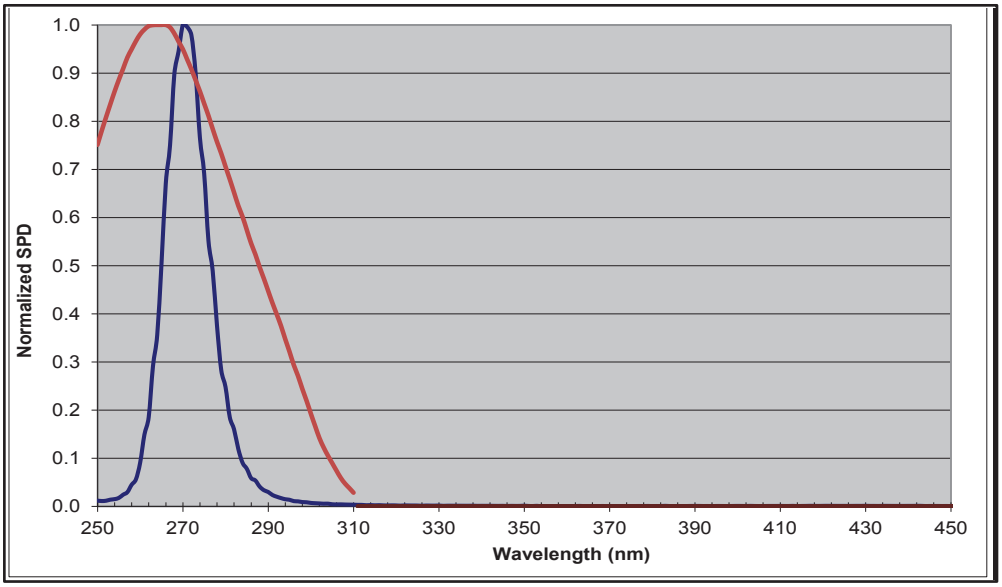
RP - RAPID SANITIZE MODE (STANDARD)
PA - PASSIVE SANITIZE MODE
(TYPICALLY 2X LONGER CLEANING CYCLES)

TARGET % REDUCTION

80%
90%
99%
CONSULT FACTORY FOR SPECIFIC CALCULATIONS

SPECTRAL REPORT

System Spectrum and Irradiance Result



SURFACE PURIFICATION RESULTS

2'X2' TARGETED SURFACE 6FT AWAY FROM TARGET

Irradiance	Min: 0.013, Max: 0.016			mW/cm^2	
	0.0144				
Adjusted Irradiance	0.013			mW/cm^2	
Time	300.000			s	
Adjusted Dosage	3.785			mJ/cm^2	
% Reduction at system dosage	Time required for % reduction of original population			Target	
	2 log (99%)	4 log (99.99%)	6 log (99.9999%)	90.00%	
Virus					
Bacteriopfage - E. Coli (MS2)[1]	95.4673%	7m 26s	14m 53s	22m 19s	3m 43s
Coronavirus (SARS-CoV-2)[4]	98.3158%	5m 38s	11m 16s	16m 54s	2m 49s
Infectious Hepatitis[1]	92.2108%	9m 1s	18m 2s	27m 3s	4m 30s
Influenza[1]	95.4673%	7m 26s	14m 53s	22m 19s	3m 43s
Poliovirus - Poliomyelitis[1]	95.4673%	7m 26s	14m 53s	22m 19s	3m 43s
Tobacco mosaic[1]	4.5348%	8h 16m 9s	16h 32m 19s	>24h	4h 8m 4s

10X12 OFFICE SPACE 2 FIXTURES (7.5FT ABOVE TASK)

Irradiance	Min: 0.000, Max: 0.013			mW/cm^2	
	0.0047				
Adjusted Irradiance	0.004			mW/cm^2	
Time	900.000			s	
Adjusted Dosage	3.735			mJ/cm^2	
% Reduction at system dosage	Time required for % reduction of original population			Target	
	2 log (99%)	4 log (99.99%)	6 log (99.9999%)	90.00%	
Virus					
Bacteriopfage - E. Coli (MS2)[1]	95.2772%	22m 37s	45m 15s	1h 7m 53s	11m 18s
Coronavirus (SARS-CoV-2)[4]	98.2219%	17m 8s	34m 17s	51m 25s	8m 34s
Infectious Hepatitis[1]	91.9422%	27m 25s	54m 51s	1h 22m 16s	13m 42s
Influenza[1]	95.2772%	22m 37s	45m 15s	1h 7m 53s	11m 18s
Poliovirus - Poliomyelitis[1]	95.2772%	22m 37s	45m 15s	1h 7m 53s	11m 18s
Tobacco mosaic[1]	4.4759%	>24h	>24h	>24h	12h 34m 15s

8X8 OFFICE SPACE 1 FIXTURE (7.5FT ABOVE TASK)

Irradiance	Min: 0.000, Max: 0.010			mW/cm^2	
	0.0037				
Adjusted Irradiance	0.003			mW/cm^2	
Time	1200.000			s	
Adjusted Dosage	3.861			mJ/cm^2	
% Reduction at system dosage	Time required for % reduction of original population			Target	
	2 log (99%)	4 log (99.99%)	6 log (99.9999%)	90.00%	
Virus					
Bacteriopfage - E. Coli (MS2)[1]	95.7407%	29m 10s	58m 21s	1h 27m 32s	14m 35s
Coronavirus (SARS-CoV-2)[4]	98.4486%	22m 6s	44m 12s	1h 6m 19s	11m 3s
Infectious Hepatitis[1]	92.6005%	35m 22s	1h 10m 44s	1h 46m 7s	17m 41s
Influenza[1]	95.7407%	29m 10s	58m 21s	1h 27m 32s	14m 35s
Poliovirus - Poliomyelitis[1]	95.7407%	29m 10s	58m 21s	1h 27m 32s	14m 35s
Tobacco mosaic[1]	4.6238%	>24h	>24h	>24h	16h 12m 45s

ADA BATHROOM STALL (7.5FT ABOVE TASK)

Irradiance	Min: 0.002, Max: 0.010			mW/cm^2	
	0.0067				
Adjusted Irradiance	0.006			mW/cm^2	
Time	600.000			s	
Adjusted Dosage	3.545			mJ/cm^2	
% Reduction at system dosage	Time required for % reduction of original population			Target	
	2 log (99%)	4 log (99.99%)	6 log (99.9999%)	90.00%	
Virus					
Bacteriopfage - E. Coli (MS2)[1]	94.4850%	15m 53s	31m 47s	47m 40s	7m 56s
Coronavirus (SARS-CoV-2)[4]	97.8181%	12m 2s	24m 4s	36m 7s	6m 1s
Infectious Hepatitis[1]	90.8425%	19m 15s	38m 31s	57m 47s	9m 37s
Influenza[1]	94.4850%	15m 53s	31m 47s	47m 40s	7m 56s
Poliovirus - Poliomyelitis[1]	94.4850%	15m 53s	31m 47s	47m 40s	7m 56s
Tobacco mosaic[1]	4.2534%	17h 39m 30s	>24h	>24h	8h 49m 45s

Test results based on typical conditions, times may vary based on time and distance and can be calculated per project.
Cycle times are based around SARS-CoV-2.

PRECAUTIONS FOR USE

These devices are ultraviolet LEDs. During operation, the LED emits high intensity ultraviolet (UV) light, which is harmful to skin and eyes. Do not look directly into the UV light and wear protective equipment during operation. Prolonged direct exposure to UV-C radiation is dangerous.

These fixtures are designed with several safety measures in place to prevent accidential UV exposure, disabling the sensor or any aspect of the fixture voids warranty.

UV light will cause premature aging on materials that are not UV stable.

UV light is hazardous to skin and may cause negative side effects. Avoid exposure to UV light when LED is operational.

Precautions must be taken to avoid looking directly at the UV light without the use of UV light protective glasses. Do not look directly at the front of the LED or at the LED's lens when LED is operational.

All testing data is preliminary pending third party verification.

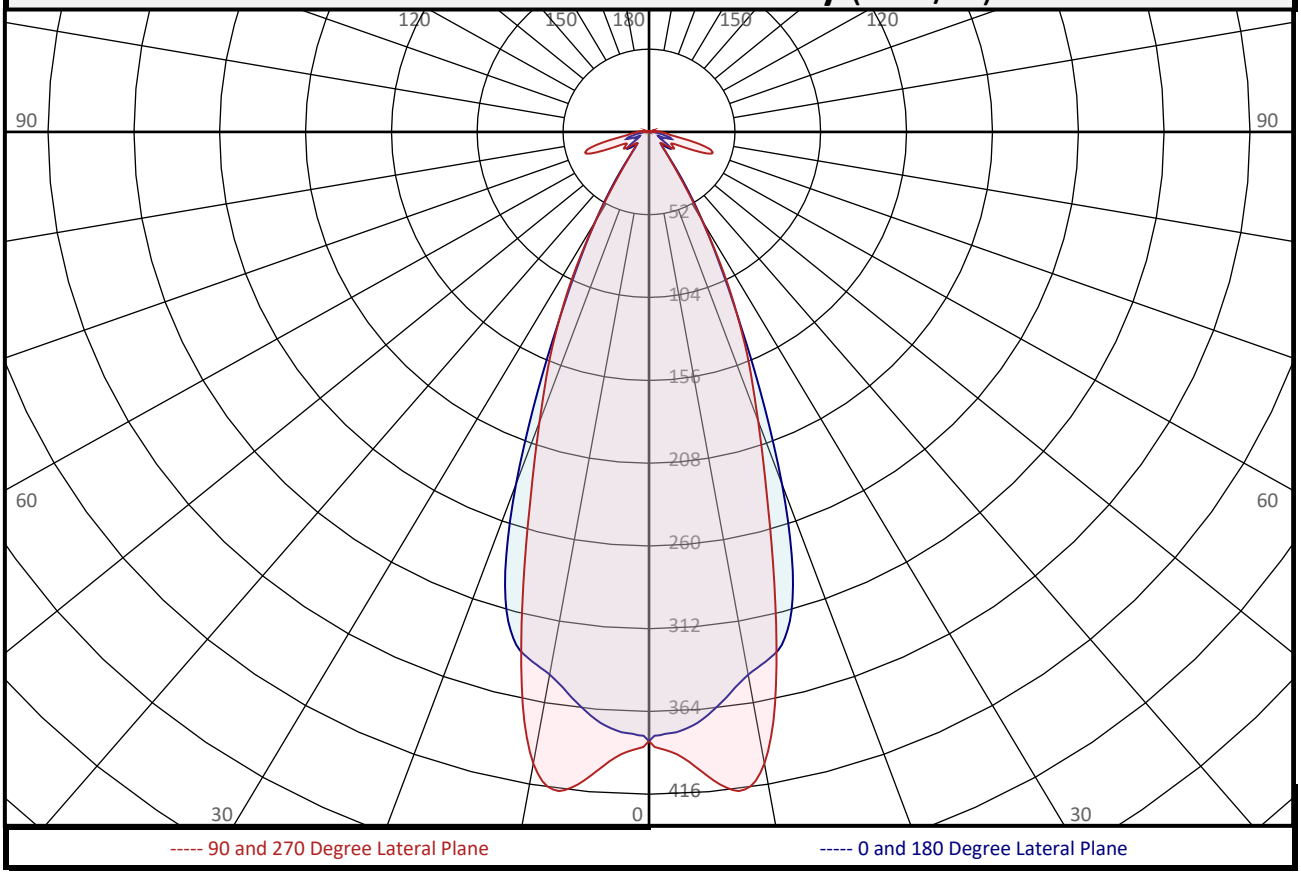
Effectiveness is dependent on application, and may vary depending on surfaces and field of view.

UV-C sanitizing is not a replacement for chemical surface cleaning or other cleanliness practices.

The effectiveness of UV-C light is based on time, intensity and distance. Various pathogens require different doses of UV-C to be deactivated, and surface variations may affect the efficiency. Therefore, we cannot guarantee that the user will achieve the surface virus reduction results set forth above.

Light Engine Technologies, Inc. reserves the right to alter and update documentation as needed.

Polar Plot of Radiant Intensity (mW/sr)

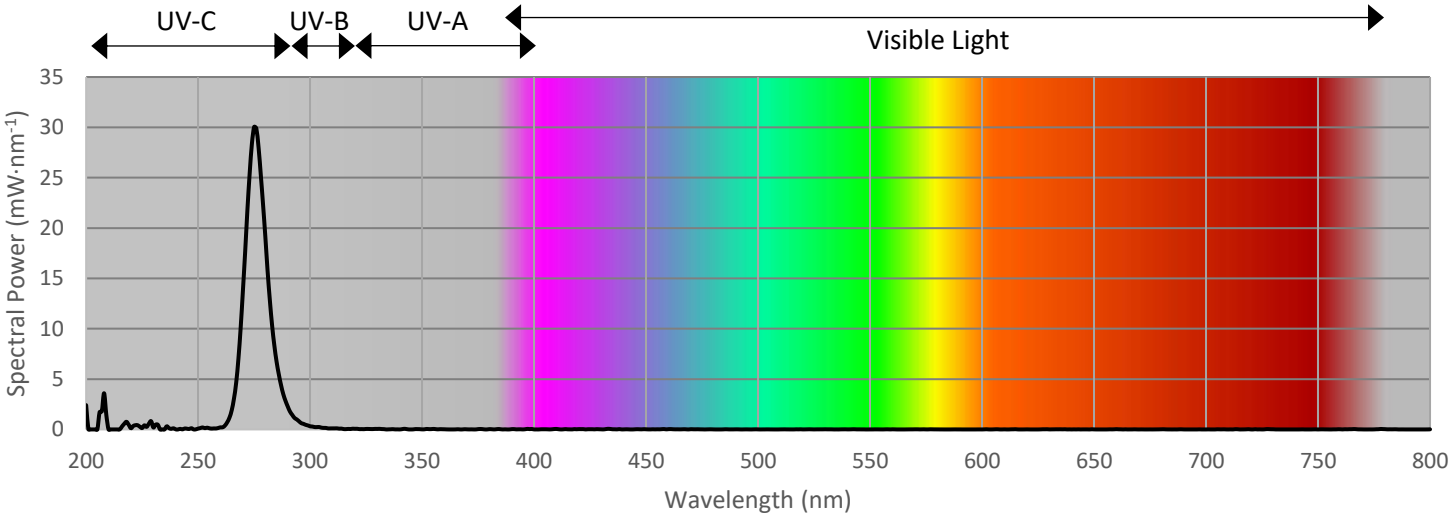


Zonal Radiant Power Summary

Zone (Deg Vert)	Radiant Power (mW_{UV-C})	Percent of Total	Zone (Deg Vert)	Radiant Power (mW_{UV-C})	Percent of Total	Zone (Deg Vert)	Radiant Power (mW_{UV-C})	Percent of Total
0-10	38.3	12.7%	90-100	2.6	0.9%	0-20	126.6	42.1%
10-20	88.4	29.4%	100-110	0.5	0.2%	0-30	188.3	62.6%
20-30	61.6	20.5%	110-120	0.4	0.1%	0-40	212.3	70.6%
30-40	24.0	8.0%	120-130	0.0	0.0%	0-60	235.0	78.2%
40-50	10.6	3.5%	130-140	0.0	0.0%	0-80	285.1	94.8%
50-60	12.2	4.1%	140-150	0.0	0.0%	10-90	258.8	86.1%
60-70	20.1	6.7%	150-160	0.0	0.0%	20-50	96.2	32.0%
70-80	29.9	9.9%	160-170	0.0	0.0%	40-90	84.8	28.2%
80-90	12.0	4.0%	170-180	0.0	0.0%	60-90	62.0	20.6%
0-90	297.1	98.8%	90-180	3.5	1.2%	0-180	300.6	100.0%

Spectral Radiant Flux Summary

Radiant Flux Tabulation			
Waveband (nm)	Radiant Flux (mW_r)	Percent of Total	Efficiency (W_r/W_e)
UV-C 200-280	300.6	75.4%	0.006
UV-B 280-315	92.9	23.3%	0.002
UV-A 315-400	1.9	0.5%	0.000
400-500	1.4	0.3%	0.000
500-600	0.5	0.1%	0.000
600-700	0.5	0.1%	0.000
Far-Red 700-800	0.7	0.2%	0.000
Total 200-800	398.5	100.0%	0.008



Coefficients of Utilization/Room Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80					70					50				30				10			0
RW	70	50	30	10		70	50	30	10		50	30	10		50	30	10		50	30	10	0
RCR																						
0	119	119	119	119		116	116	116	116		110	110	110		106	106	106		101	101	101	99
1	109	105	101	97		106	102	99	96		98	95	92		94	92	89		90	88	86	84
2	102	95	89	84		99	93	87	83		89	84	81		86	82	79		82	79	77	75
3	95	87	80	74		93	85	79	74		82	77	72		79	75	71		77	73	70	68
4	90	80	73	68		88	79	72	67		76	71	66		74	69	65		72	68	64	63
5	85	75	68	63		83	74	67	62		72	66	62		70	65	61		68	64	60	58
6	81	71	63	58		79	70	63	58		68	62	58		66	61	57		65	60	57	55
7	77	67	60	55		76	66	59	55		64	59	54		63	58	54		62	57	54	52
8	74	63	56	52		72	62	56	52		61	55	51		60	55	51		59	54	51	49
9	71	60	54	49		69	59	53	49		58	53	49		57	52	49		56	52	48	47
10	68	57	51	47		67	57	51	47		56	50	47		55	50	46		54	49	46	45

For absolute test reports, RUs are expressed as a percentage of total light output. For relative test reports, CUs are expressed as a percentage of total lamp output. Calculations were based on published IES procedures, and are based on the zonal cavity method. Basic assumptions: 1) Room surfaces are lambertian reflectors. 2) Incident flux on each surface is uniformly distributed. 3) The room is spectrally neutral. When luminaires are not evenly distributed throughout the room, or do not exhibit lateral symmetry, CU values may differ from actual performance.

Circle of Light Plot

Height(m)	Irradiance at Nadir ($\mu W_{UV\text{-}C} \cdot cm^{-2}$)	Ground-level distance to half-of-nadir irradiance (m) 0-180 deg	90-270 deg
0.50	153.0	0.37	0.33
0.75	68.0	0.55	0.49
1.00	38.3	0.73	0.66
1.25	24.5	0.92	0.82
1.50	17.0	1.10	0.99
2.00	9.6	1.47	1.32