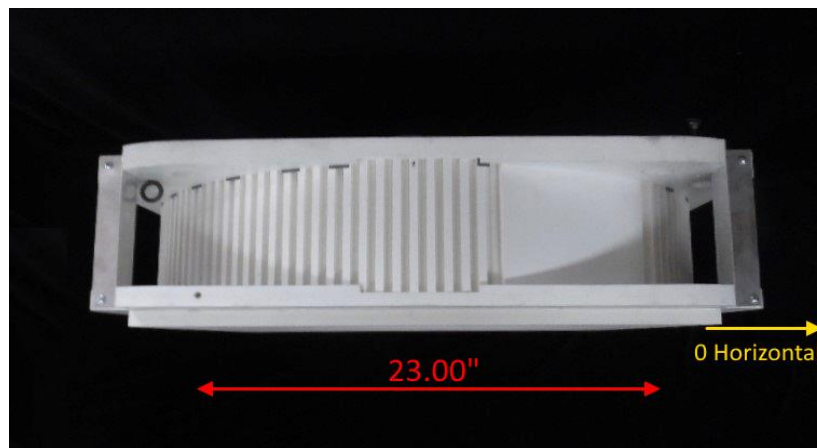


## Report of Test

**LLIA002687-004A**

### Indoor Distribution Photometry Test Report

Catalog Number: 2' Diameter Round Up  
Recessed mounted, fabricated plastic housing, no enclosure.  
360 white LEDs, 10 extruded aluminum LED housings with  
lightly frosted plastic enclosures and 36 LEDs each.  
One ERP VZM100W-24 LED power supply



Prepared For:  
Light Engine Technologies  
200 Wilson Street  
Unit A1

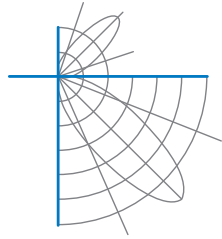
Port Jefferson Station, NY 11776, USA

Performance Summary			
Input Voltage	120.0 Vac	Luminous Flux	2861.0 Lumens
Input Current	0.4468 A	Total Efficacy	54.1 Lm/W
Input Power	52.85 W	Downward Flux	2861.0 Lumens
Frequency	60.00 Hz	Downward Flux	100.0 % of Total
Power Factor	0.986		
Current THD	13.3 %		

This test report was issued by LightLab International Allentown, LLC without alterations or erasures.

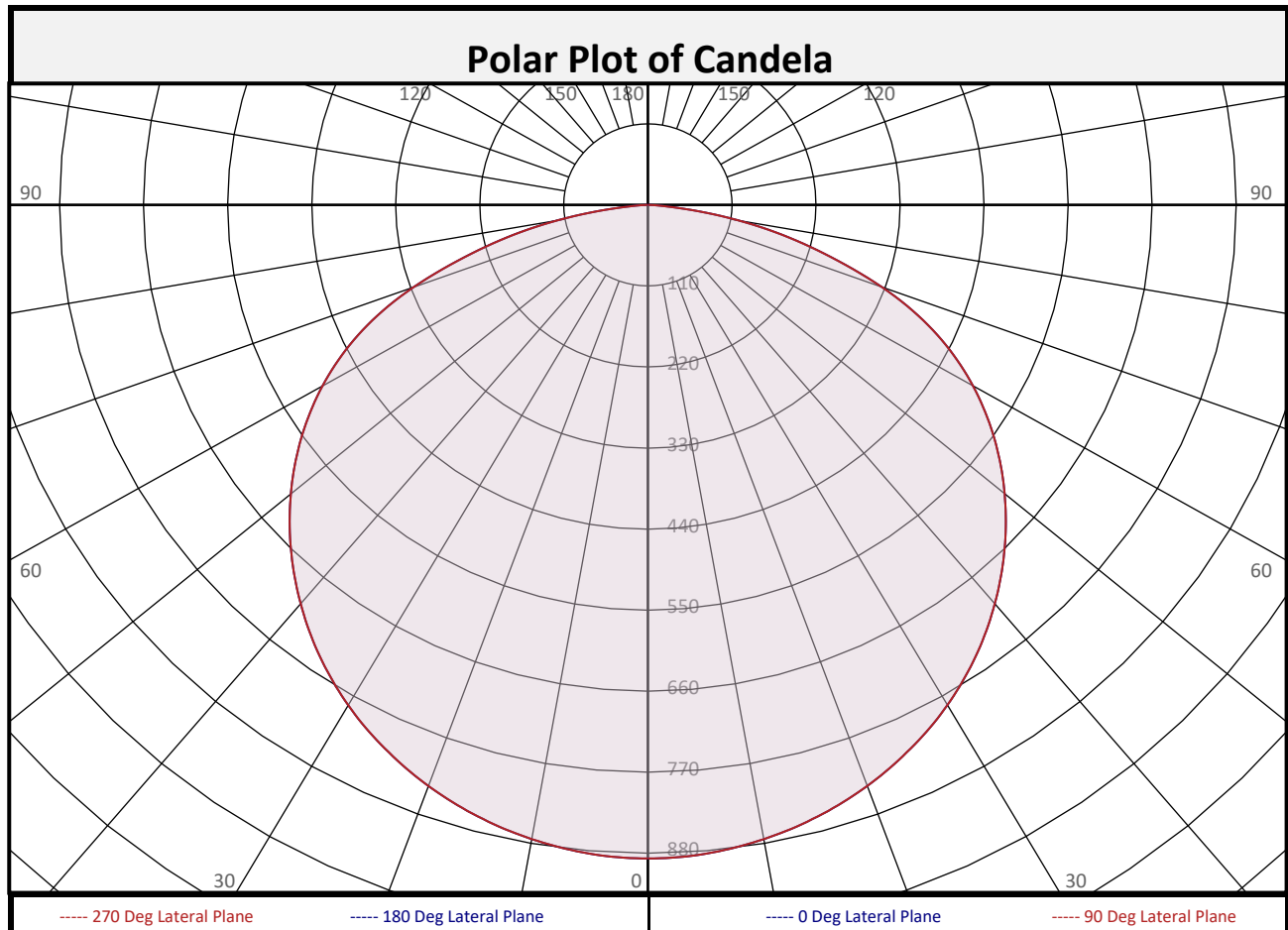
Test date: 06/17/2025  
Report date: 06/18/2025

Signed: \_\_\_\_\_

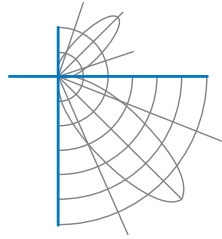


## Report of Test

### LLIA002687-004A



Zonal Flux Summary										
Zone (Deg Vert)	Flux (Lumens)	Percent of Total		Zone (Deg Vert)	Flux (Lumens)	Percent of Total		Zone (Deg Vert)	Flux (Lumens)	Percent of Total
0-10	84.1	2.9%		90-100	0.0	0.0%		0-20	326.9	11.4%
10-20	242.8	8.5%		100-110	0.0	0.0%		0-30	702.7	24.6%
20-30	375.7	13.1%		110-120	0.0	0.0%		0-40	1171	40.9%
30-40	468.4	16.4%		120-130	0.0	0.0%		0-60	2176	76.0%
40-50	509.8	17.8%		130-140	0.0	0.0%		0-80	2819	98.5%
50-60	494.8	17.3%		140-150	0.0	0.0%		10-90	2777	97.1%
60-70	410.8	14.4%		150-160	0.0	0.0%		20-90	1354	47.3%
70-80	232.8	8.1%		160-170	0.0	0.0%		40-90	1690	59.1%
80-90	41.7	1.5%		170-180	0.0	0.0%		60-90	685.3	24.0%
0-90	2861	100.0%		90-180	0.0	0.0%		0-180	2861	100.0%



## Report of Test

**LLIA002687-004A**

Luminous Intensity (Candela) Table

Lateral (C-Plane) Angles										
	0	22.5	45	67.5	90	112.5	135	157.5	180	
Vertical (Gamma) Angles - Data was acquired in 0.5° increments, 2.5° increments shown.	0	887	887	887	887	887	887	887	887	887
	2.5	886	886	886	886	886	886	886	886	886
	5	884	884	884	884	884	884	884	884	884
	7.5	880	880	880	880	880	880	880	880	880
	10	874	874	874	874	874	874	874	874	874
	12.5	868	868	868	868	868	868	868	868	868
	15	859	859	859	859	859	859	859	859	859
	17.5	850	850	850	850	850	850	850	850	850
	20	839	839	839	839	839	839	839	839	839
	22.5	827	827	827	827	827	827	827	827	827
	25	814	814	814	814	814	814	814	814	814
	27.5	800	800	800	800	800	800	800	800	800
	30	784	784	784	784	784	784	784	784	784
	32.5	767	767	767	767	767	767	767	767	767
	35	748	748	748	748	748	748	748	748	748
	37.5	728	728	728	728	728	728	728	728	728
	40	707	707	707	707	707	707	707	707	707
	42.5	684	684	684	684	684	684	684	684	684
	45	660	660	660	660	660	660	660	660	660
	47.5	636	636	636	636	636	636	636	636	636
	50	610	610	610	610	610	610	610	610	610
	52.5	582	582	582	582	582	582	582	582	582
	55	554	554	554	554	554	554	554	554	554
	57.5	524	524	524	524	524	524	524	524	524
	60	491	491	491	491	491	491	491	491	491
	62.5	456	456	456	456	456	456	456	456	456
	65	418	418	418	418	418	418	418	418	418
	67.5	375	375	375	375	375	375	375	375	375
	70	326	326	326	326	326	326	326	326	326
	72.5	272	272	272	272	272	272	272	272	272
	75	220	220	220	220	220	220	220	220	220
	77.5	170	170	170	170	170	170	170	170	170
	80	118	118	118	118	118	118	118	118	118
	82.5	68	68	68	68	68	68	68	68	68
	85	24	24	24	24	24	24	24	24	24
	87.5	6	6	6	6	6	6	6	6	6
	90	0	0	0	0	0	0	0	0	0

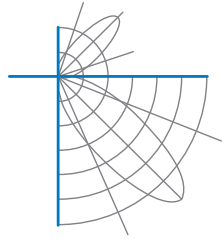
16 lateral half-planes of data were acquired, 22.5 degree increments shown.

**North America (issuing laboratory)**

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www.lightlabint.com



## Report of Test

**LLIA002687-004A**

Luminous Intensity (Candela) Table

Lateral (C-Plane) Angles										
	0	22.5	45	67.5	90	112.5	135	157.5	180	
Vertical (Gamma) Angles - Data was acquired in 0.5° increments shown.	90	0	0	0	0	0	0	0	0	0
	92.5	0	0	0	0	0	0	0	0	0
	95	0	0	0	0	0	0	0	0	0
	97.5	0	0	0	0	0	0	0	0	0
	100	0	0	0	0	0	0	0	0	0
	102.5	0	0	0	0	0	0	0	0	0
	105	0	0	0	0	0	0	0	0	0
	107.5	0	0	0	0	0	0	0	0	0
	110	0	0	0	0	0	0	0	0	0
	112.5	0	0	0	0	0	0	0	0	0
	115	0	0	0	0	0	0	0	0	0
	117.5	0	0	0	0	0	0	0	0	0
	120	0	0	0	0	0	0	0	0	0
	122.5	0	0	0	0	0	0	0	0	0
	125	0	0	0	0	0	0	0	0	0
	127.5	0	0	0	0	0	0	0	0	0
	130	0	0	0	0	0	0	0	0	0
	132.5	0	0	0	0	0	0	0	0	0
	135	0	0	0	0	0	0	0	0	0
	137.5	0	0	0	0	0	0	0	0	0
	140	0	0	0	0	0	0	0	0	0
	142.5	0	0	0	0	0	0	0	0	0
	145	0	0	0	0	0	0	0	0	0
	147.5	0	0	0	0	0	0	0	0	0
	150	0	0	0	0	0	0	0	0	0
	152.5	0	0	0	0	0	0	0	0	0
	155	0	0	0	0	0	0	0	0	0
	157.5	0	0	0	0	0	0	0	0	0
	160	0	0	0	0	0	0	0	0	0
	162.5	0	0	0	0	0	0	0	0	0
	165	0	0	0	0	0	0	0	0	0
	167.5	0	0	0	0	0	0	0	0	0
	170	0	0	0	0	0	0	0	0	0
	172.5	0	0	0	0	0	0	0	0	0
	175	0	0	0	0	0	0	0	0	0
	177.5	0	0	0	0	0	0	0	0	0
	180	0	0	0	0	0	0	0	0	0

16 lateral half-planes of data were acquired, 22.5 degree increments shown.

**North America (issuing laboratory)**

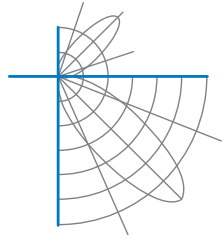
LightLab International Allentown, LLC  
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## Report of Test

### LLIA002687-004A

#### 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		111	111	111		106	106	106		102	102	102	100			
1	108	103	99	95		106	101	97	93		97	94	90		93	90	88		89	87	85	83			
2	98	89	82	76		95	87	81	75		84	78	74		81	76	72		78	74	70	68			
3	89	78	69	63		86	76	68	62		73	67	61		70	65	60		68	63	59	57			
4	81	69	59	52		79	67	59	52		65	57	51		62	56	51		60	55	50	48			
5	74	61	52	45		72	60	51	45		58	50	44		56	49	44		54	48	43	41			
6	68	55	45	39		66	54	45	39		52	44	38		50	43	38		49	42	38	35			
7	63	49	40	34		62	49	40	34		47	39	34		46	39	33		44	38	33	31			
8	59	45	36	30		57	44	36	30		43	35	30		42	35	30		40	34	29	28			
9	55	41	33	27		53	41	32	27		39	32	27		38	31	27		37	31	26	25			
10	51	38	30	24		50	37	30	24		36	29	24		35	29	24		34	28	24	22			

For absolute test reports, RUs are expressed as a percentage of total lumen 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(ft)	Illuminance at Nadir (fc)	Ground-level distance to half-of-nadir illuminance (ft)	
		0-180 deg	90-270 deg
6.0	24.6	7.89	7.89
8.0	13.9	10.52	10.52
10.0	8.9	13.16	13.16
12.0	6.2	15.79	15.79
14.0	4.5	18.42	18.42
16.0	3.5	21.05	21.05

#### Spacing Criterion

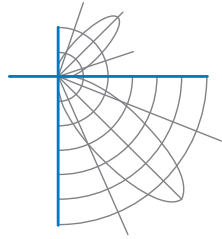
SC: 1.3

#### Average Luminance (cd/m<sup>2</sup>)

	0 deg Plane	45 deg Plane	90 deg Plane
0	3310	3310	3310
45	3484	3484	3484
55	3603	3603	3603
65	3692	3692	3692
75	3169	3169	3169
85	1042	1042	1042

#### Beam and Field Angle

0-180 Degree Plane	
Beam Angle:	126.8°
Field Angle:	162.9°
90-270 Degree Plane	
Beam Angle:	126.8°
Field Angle:	162.9°



## Report of Test

### LLIA002687-004A

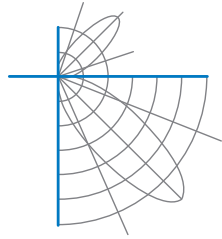
#### UGR Table - Corrected

##### Reflectances

Ceiling Cavity	70	70	50	50	30	70	70	50	50	30
Walls	50	30	50	30	30	50	30	50	30	30
Floor Cavity	20	20	20	20	20	20	20	20	20	20

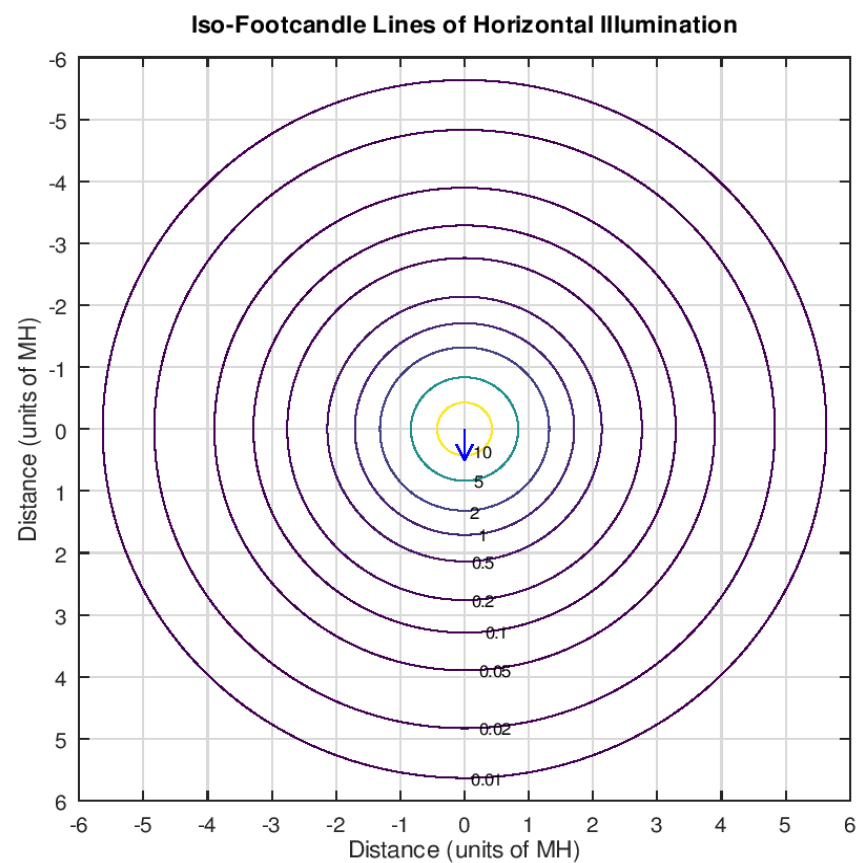
Room Size		UGR Viewed Crosswise					UGR Viewed Endwise				
X=2H	Y=2H	16.2	17.8	16.5	18.2	18.5	16.2	17.8	16.5	18.2	18.5
	3H	18.2	19.8	18.6	20.1	20.5	18.2	19.8	18.6	20.1	20.5
	4H	19.0	20.4	19.4	20.7	21.1	19.0	20.4	19.4	20.7	21.1
	6H	19.4	20.7	19.8	21.1	21.5	19.4	20.7	19.8	21.1	21.5
	8H	19.5	20.8	19.9	21.2	21.6	19.5	20.8	19.9	21.2	21.6
	12H	19.5	20.8	20.0	21.1	21.6	19.5	20.8	20.0	21.1	21.6
4H	2H	16.9	18.4	17.3	18.7	19.1	16.9	18.4	17.3	18.7	19.1
	3H	19.2	20.4	19.6	20.8	21.2	19.2	20.4	19.6	20.8	21.2
	4H	20.0	21.1	20.4	21.5	21.9	20.0	21.1	20.4	21.5	21.9
	6H	20.6	21.5	21.0	22.0	22.4	20.6	21.5	21.0	22.0	22.4
	8H	20.7	21.6	21.2	22.0	22.5	20.7	21.6	21.2	22.0	22.5
	12H	20.7	21.5	21.2	22.0	22.5	20.7	21.5	21.2	22.0	22.5
8H	4H	20.3	21.2	20.8	21.7	22.1	20.3	21.2	20.8	21.7	22.1
	6H	21.0	21.7	21.5	22.2	22.7	21.0	21.7	21.5	22.2	22.7
	8H	21.1	21.8	21.7	22.3	22.8	21.1	21.8	21.7	22.3	22.8
	12H	21.2	21.8	21.7	22.3	22.8	21.2	21.8	21.7	22.3	22.8
12H	4H	20.3	21.2	20.8	21.6	22.1	20.3	21.2	20.8	21.6	22.1
	6H	21.0	21.7	21.5	22.2	22.7	21.0	21.7	21.5	22.2	22.7
	8H	21.2	21.8	21.7	22.3	22.8	21.2	21.8	21.7	22.3	22.8

Maximum UGR = 22.8

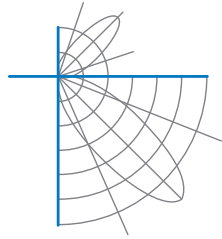


## Report of Test LLIA002687-004A

### Iso-Illuminance Plot



The isofootcandle values shown in the plot above are based on a mounting height of  $h = 8.0$  feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the contribution of room reflections.



## Report of Test LLIA002687-004A

### Additional Pictures of Test Subject



**North America (issuing laboratory)**

LightLab International Allentown, LLC  
905 Harrison Street, Suite 135  
Allentown, PA 18103 USA

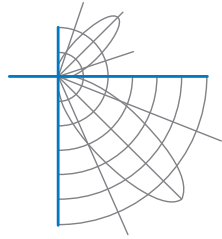
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## Report of Test

### LLIA002687-004A

Test Distance                      9.5 m  
Ambient Temperature            24.9 °C

#### Notes

The laboratory has not participated in the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.

Tested in accordance with the applicable sections of IES LM-79-24. Format of reports and angular increments based on IES LM-41-20 and LM-46-20.

The luminous intensity values, and other derived quantities, contained in this report are based on the absolute data, as measured.

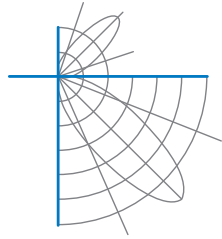
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

This report is free of erasures and corrections.

Photometric intensity values are reported using the CIE C-Gamma coordinate system as defined in CIE publication number 121.

This report may contain data that are not covered by the NVLAP accreditation. Quantities marked with ‡ are not covered.

This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.



## Report of Test

**LLIA002687-004B**

Integrating Sphere Report

Catalog Number: 2' Diameter Round Up

Recessed mounted, fabricated plastic housing, no enclosure.

360 white LEDs, 10 extruded aluminum LED housings with  
lightly frosted plastic enclosures and 36 LEDs each.

One ERP VZM100W-24 LED power supply



### Performance Summary

Voltage	120.0 Vac
Current	0.4483 A
Power	53.05 W
Frequency	59.99 Hz
Power Factor	0.986
Current THD	13.2 %
Total Luminous Flux	2938.1 lm
Efficacy	55.4 lm/W
Chromaticity (x,y)	(0.4501, 0.4074)
(u',v')	(0.2576, 0.5247)
Duv	-0.0003
CCT	2817 K
CRI (Ra)	98
R9	90
TM-30: Rf	94
TM-30: Rg	99
TM-30: Rcs,h1	-1

Prepared For:

Light Engine Technologies

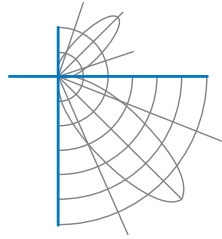
200 Wilson Street

Unit A1

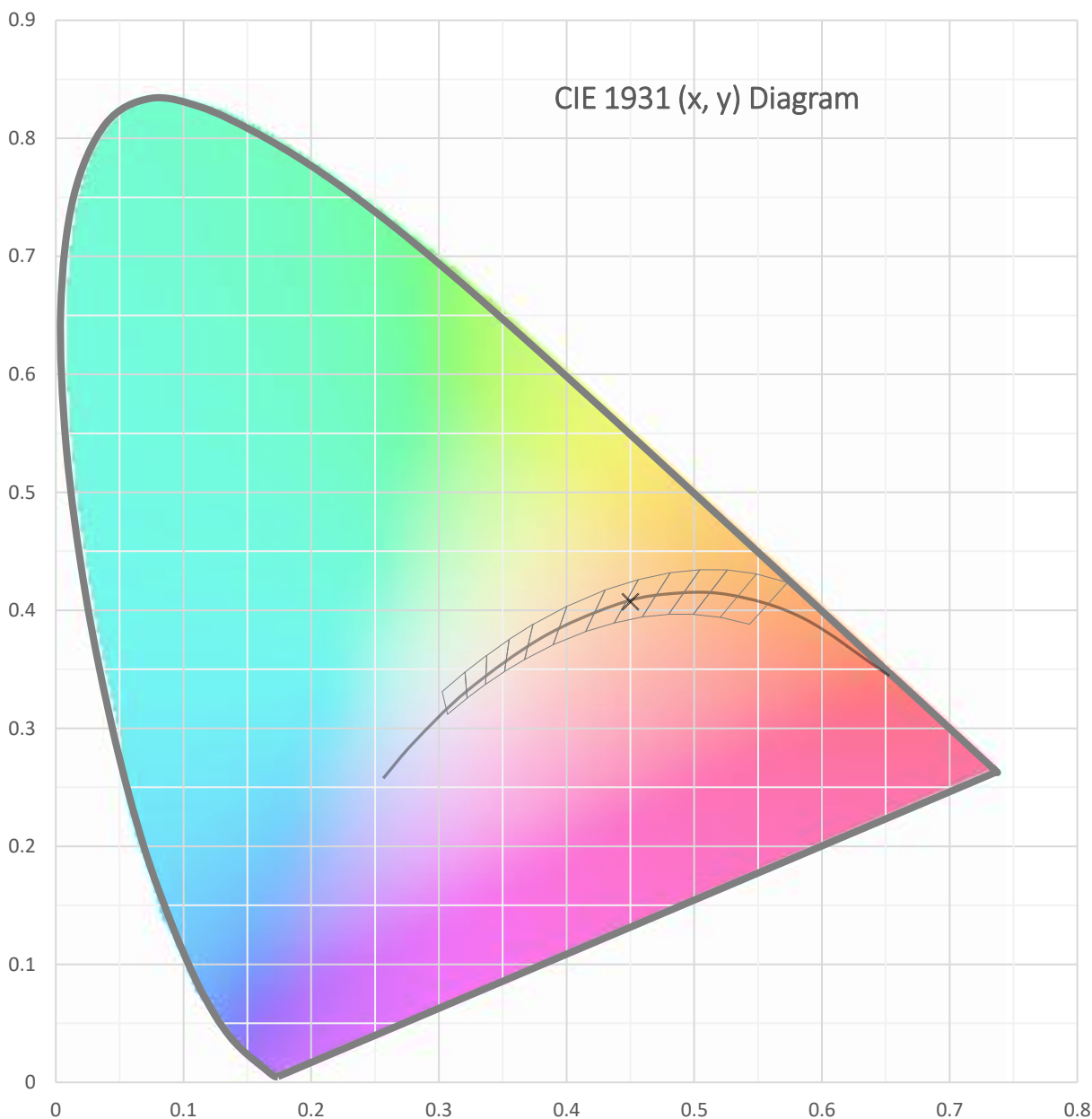
Port Jefferson Station, NY 11776, USA

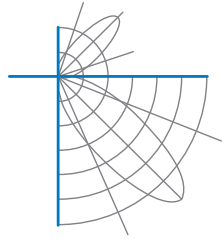
Test date: 06/12/2025

Report date: 06/18/2025

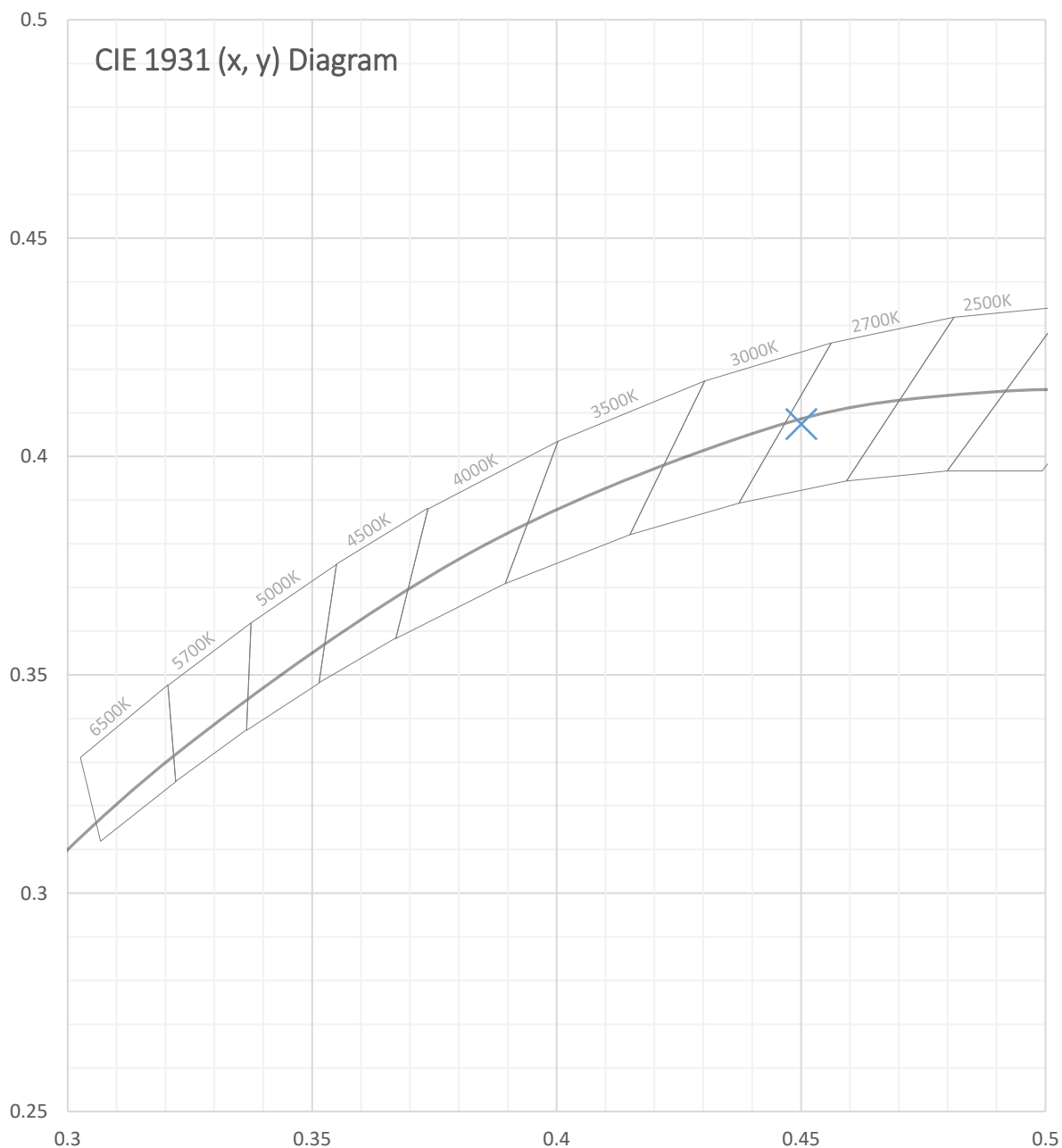


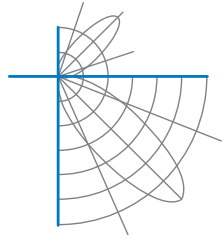
Test Report Number: LLIA002687-004B





Test Report Number: LLIA002687-004B



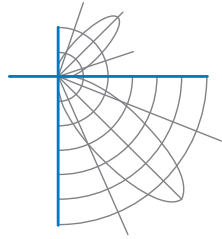


Test Report Number: LLIA002687-004B

Total Radiant Flux	11.25 W
Total Luminous Flux	2938.1 Lm
Chromaticity CIE 1931 (x, y)	(0.4501, 0.4074)
Chromaticity CIE 1976 (u', v')	(0.2576, 0.5247)
Correlated Color Temperature (CCT)	2817 K
Color Rendering Index (Ra)	98
R1	99
R2	100
R3	98
R4	99
R5	99
R6	97
R7	97
R8	95
R9	90
R10	99
R11	98
R12	86
R13	99
R14	98
TM-30: Rf	94
TM-30: Rg	99
TM-30: Rcs,h1	-1
Distance from Planckian Locus (Duv)	-0.0003
Scotopic/Photopic Ratio $\frac{V_{sc}}{V_{ph}}$	1.386

**Electrical Data**

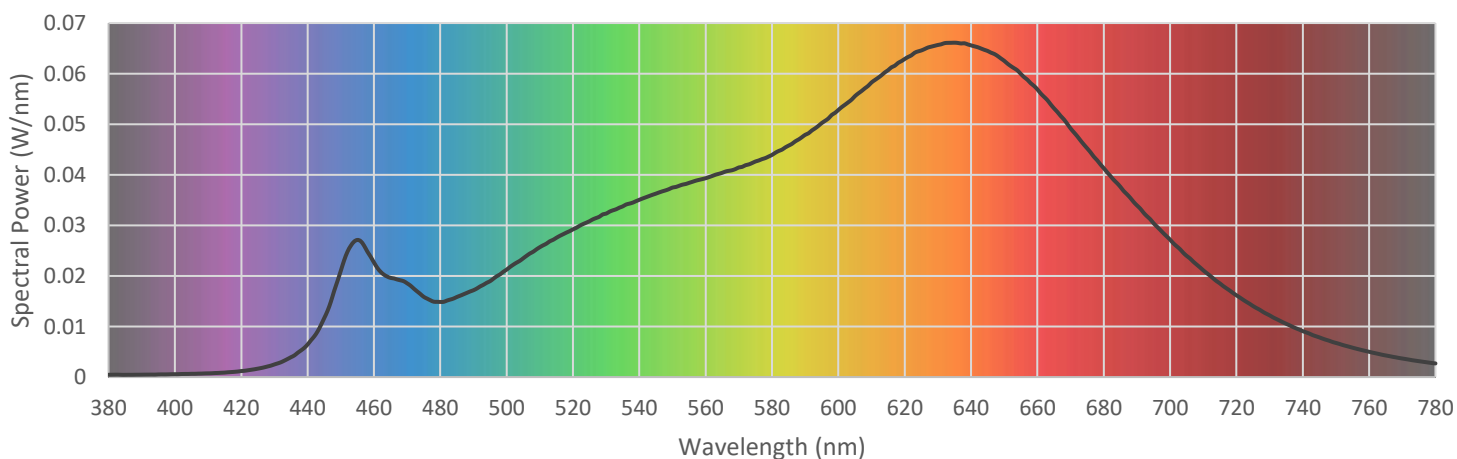
Voltage	120.0 Vac
Current	0.4483 A
Power	53.05 W
Frequency	59.99 Hz
Power Factor	0.986
Current THD	13.2 %



Test Report Number: LLIA002687-004B

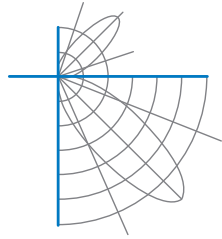
Summary Spectral Power Distribution (wavelength - nm, spectral power - W/nm)

380	0.000455	480	0.014856	580	0.043925	680	0.041298
385	0.000439	485	0.015840	585	0.045764	685	0.037625
390	0.000470	490	0.017173	590	0.047904	690	0.033948
395	0.000518	495	0.018958	595	0.050233	695	0.030426
400	0.000568	500	0.021245	600	0.052816	700	0.027169
405	0.000647	505	0.023491	605	0.055548	705	0.023962
410	0.000735	510	0.025683	610	0.058260	710	0.021113
415	0.000887	515	0.027541	615	0.060682	715	0.018527
420	0.001189	520	0.029208	620	0.062892	720	0.016165
425	0.001666	525	0.030829	625	0.064579	725	0.014043
430	0.002502	530	0.032318	630	0.065667	730	0.012206
435	0.003935	535	0.033749	635	0.066116	735	0.010535
440	0.006449	540	0.035049	640	0.065587	740	0.009078
445	0.011649	545	0.036270	645	0.064477	745	0.007844
450	0.021008	550	0.037472	650	0.062528	750	0.006749
455	0.027112	555	0.038401	655	0.059936	755	0.005810
460	0.022658	560	0.039317	660	0.056884	760	0.004999
465	0.019612	565	0.040391	665	0.053139	765	0.004274
470	0.018532	570	0.041447	670	0.049164	770	0.003669
475	0.015862	575	0.042621	675	0.045222	775	0.003140
						780	0.002691



**North America (issuing laboratory)**

**Australasia & S.E. Asia**



Test Report Number: LLIA002687-004B

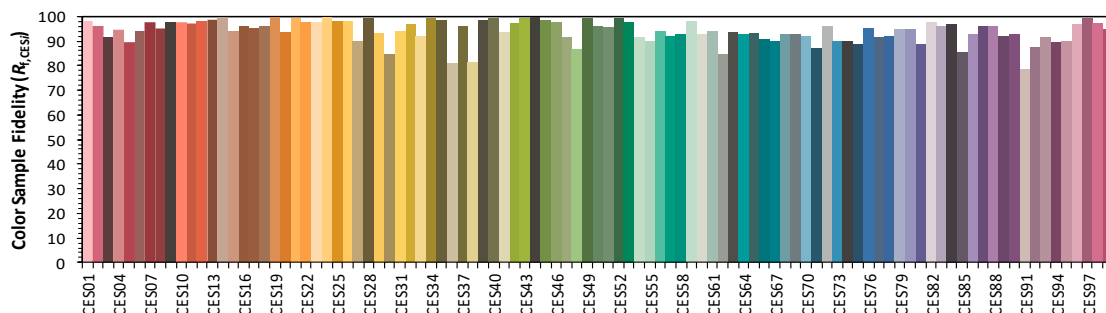
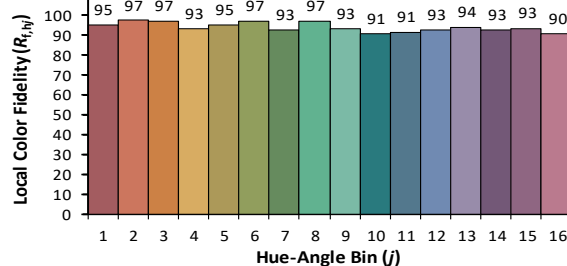
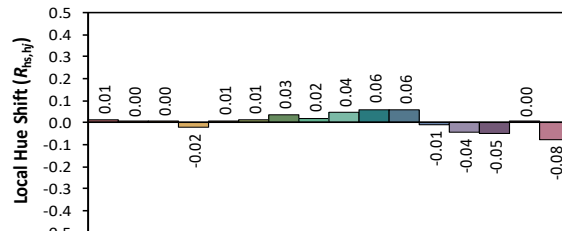
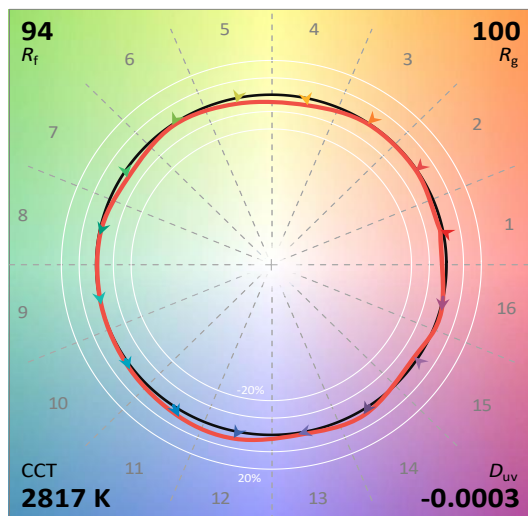
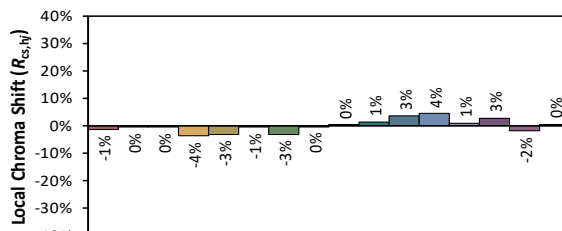
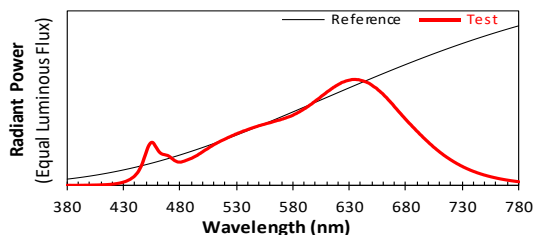
### IES TM-30 Details

Source: LLIA002687-004B

Manufacturer: Light Engine Technologies

Date: 6/18/2025

Model: 2" Diameter Round Up

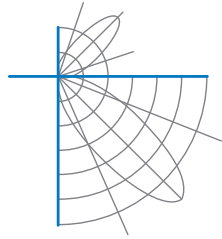


Notes:

x **0.4501**  
y **0.4074**  
u' **0.2576**  
v' **0.5246**

CIE 13.3-1995  
(CRI)

R<sub>a</sub> 98  
R<sub>g</sub> 90



## Test Report Number: LLIA002687-004B

Test Equipment Configuration:	LightLab International Allentown 2m Integrating Sphere Measurements acquired using a Labsphere CDS 2600 spectroradiometer Testing was performed using $4\pi$ geometry
Test Temperature:	24.8 °C
Test Procedure:	Tested in accordance with the applicable sections of: LM-79-24, LM-78-20, LM-58-20, ANSI_ANSLG C78.377-2024, TM-30-24
Significance:	The laboratory has not participated in the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.
Notes:	<p>The measurements and other derived quantities contained in this report are based on the absolute data as measured.</p> <p>Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.</p> <p>This report is free of erasures and corrections</p> <p>This report may contain data that are not covered by the NVLAP accreditation. Quantities marked with ‡ are not covered.</p> <p>This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.</p>

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