

Report of Test

LLIA002687-002A

Indoor Distribution Photometry Test Report

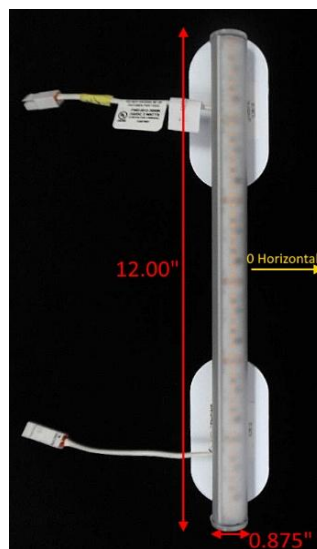
Catalog Number: FWD-I012-3000K 6W

Surface mounted, extruded aluminum housing, lightly frosted plastic lens.

One system with 624 LEDs was tested to create a fully loaded condition.

Optical measurements were performed only on a 12" luminaire containing 48 white LEDs

One ERP VZM100W-24 LED power supply



Prepared For:

Light Engine Technologies

200 Wilson Street

Unit A1

Port Jefferson Station, NY 11776, USA

Input System Voltage	120.0 Vac	12" Section Luminous Flux	580.4 Lumens
Input System Current	0.5698 A	12" Section Efficacy**†	111.6 Lm/W
Input System Power	67.63 W	Downward Flux	58.2 Lumens
12" Section System Power**†	5.202 W	Downward Flux	10.0 % of Total
System Frequency	60.00 Hz		
System Power Factor	0.990		
System Current THD	11.3 %		

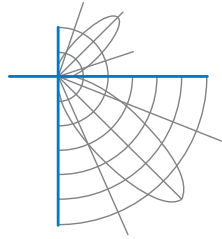
**12" Section System Power and Efficacy is calculated using the fraction (48/624) of measured full-system input power

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

Test date: 06/17/2025

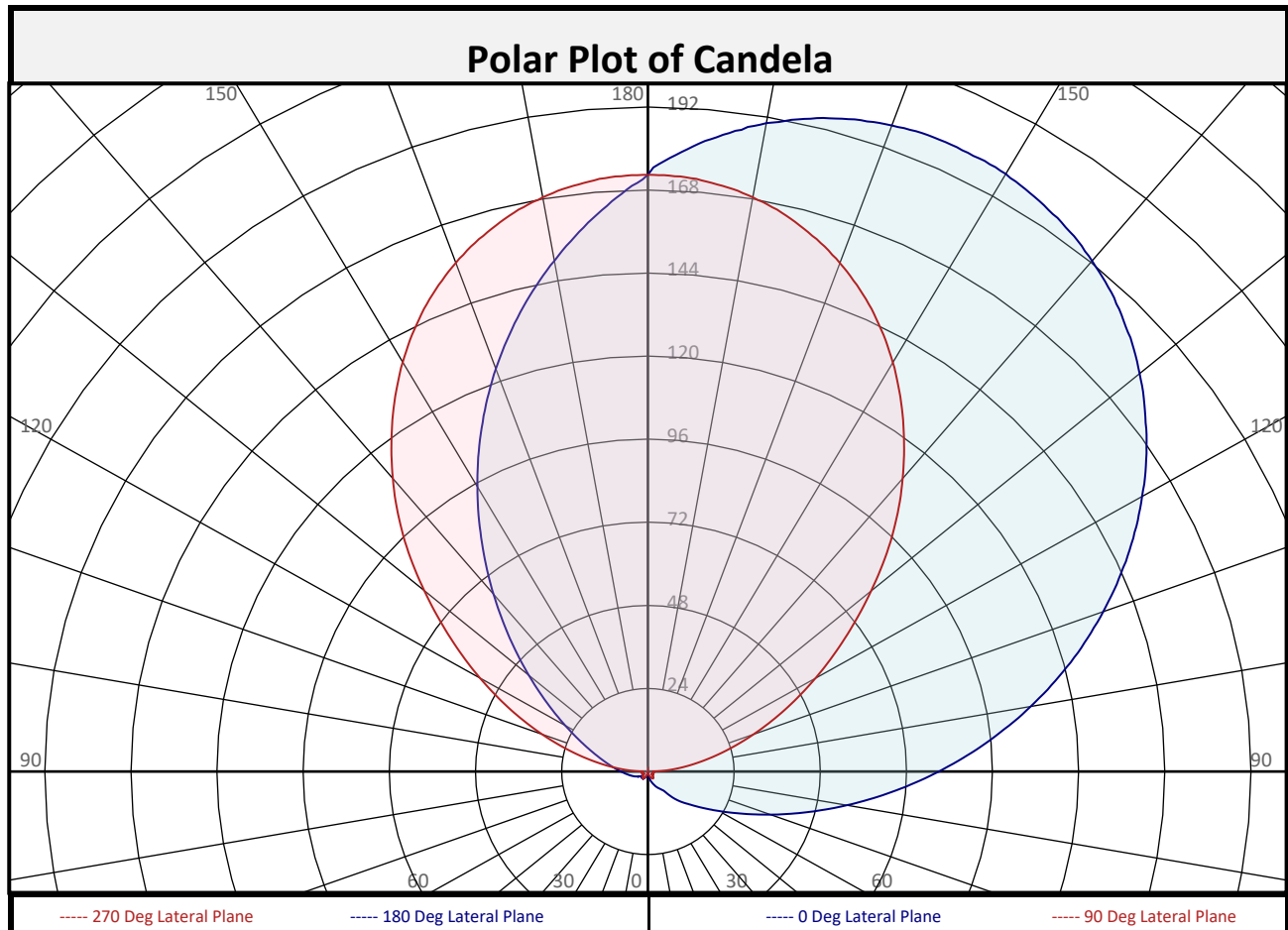
Report date: 06/18/2025

Signed: _____

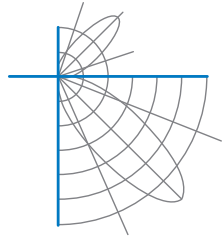


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Zonal Flux Summary										
Zone (Deg Vert)	Flux (Lumens)	Percent of Total		Zone (Deg Vert)	Flux (Lumens)	Percent of Total		Zone (Deg Vert)	Flux (Lumens)	Percent of Total
0-10	0.0	0.0%		90-100	34.2	5.9%		0-20	0.5	0.1%
10-20	0.4	0.1%		100-110	48.8	8.4%		0-30	1.7	0.3%
20-30	1.3	0.2%		110-120	63.8	11.0%		0-40	4.0	0.7%
30-40	2.2	0.4%		120-130	76.7	13.2%		0-60	12.4	2.1%
40-50	3.3	0.6%		130-140	84.2	14.5%		0-80	35.6	6.1%
50-60	5.1	0.9%		140-150	82.4	14.2%		10-90	58.1	10.0%
60-70	8.7	1.5%		150-160	69.5	12.0%		20-50	6.8	1.2%
70-80	14.4	2.5%		160-170	46.4	8.0%		40-90	54.2	9.3%
80-90	22.6	3.9%		170-180	16.3	2.8%		60-90	45.8	7.9%
0-90	58.2	10.0%		90-180	522.3	90.0%		0-180	580.4	100.0%



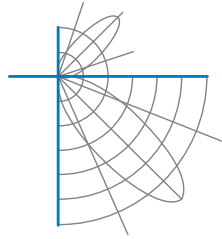
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Luminous Intensity (Candela) Table

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	0	0	0	0	0	0	0	0	0
	2.5	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0
	7.5	0	0	0	1	1	1	1	1	1
	10	1	1	1	1	1	1	1	1	1
	12.5	2	2	1	1	1	1	1	1	1
	15	3	2	2	1	1	1	1	1	1
	17.5	3	3	2	2	1	1	1	1	1
	20	3	3	3	2	1	1	1	1	1
	22.5	4	4	3	2	2	2	2	2	2
	25	4	4	4	3	2	2	2	2	2
	27.5	5	5	4	3	2	2	2	2	2
	30	5	5	4	3	2	2	2	2	2
	32.5	6	5	5	3	2	2	2	2	2
	35	6	6	5	3	2	2	2	2	2
	37.5	7	6	5	4	2	3	3	3	2
	40	8	7	5	4	2	3	2	2	2
	42.5	10	8	5	3	2	2	2	2	2
	45	12	10	5	3	2	2	2	2	2
	47.5	13	11	6	3	2	2	2	2	2
	50	15	13	6	3	2	2	1	2	2
	52.5	16	14	8	3	1	2	1	2	2
	55	18	16	10	3	1	2	1	2	2
	57.5	20	18	11	3	1	1	2	2	3
	60	23	20	13	3	2	1	2	3	3
	62.5	26	23	14	3	2	1	2	3	3
	65	29	25	16	4	2	1	2	3	3
	67.5	32	29	18	5	2	1	2	3	4
	70	36	32	20	6	2	2	3	4	4
	72.5	41	36	22	7	2	2	3	4	4
	75	46	40	25	8	2	2	3	4	5
	77.5	51	44	28	9	2	2	3	5	5
	80	56	49	31	10	1	2	4	5	5
	82.5	62	54	34	12	2	2	4	6	6
	85	68	60	38	14	2	2	5	6	6
	87.5	74	66	42	16	2	3	5	7	7
	90	81	72	47	19	2	4	6	7	8

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



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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.	90	81	72	47	19	2	4	6	7	8
	92.5	88	78	52	23	4	4	7	8	8
	95	95	84	57	26	7	6	8	9	9
	97.5	101	91	62	31	10	7	9	10	10
	100	108	97	68	35	14	9	11	11	11
	102.5	115	104	74	40	18	12	13	12	12
	105	122	110	80	45	22	15	15	14	13
	107.5	128	117	86	50	26	18	17	16	15
	110	135	123	93	56	31	22	19	18	16
	112.5	141	130	99	62	37	26	22	20	18
	115	147	136	106	68	42	30	26	22	21
	117.5	153	142	112	75	48	35	29	25	23
	120	159	148	119	81	54	40	33	29	27
	122.5	164	154	125	88	60	45	38	32	30
	125	170	159	132	96	67	51	43	36	34
	127.5	174	165	138	103	74	57	48	41	38
	130	179	169	144	110	81	64	53	46	43
	132.5	183	174	149	117	89	71	59	51	49
	135	187	178	154	124	96	77	65	57	54
	137.5	190	181	160	130	103	84	72	63	60
	140	193	185	164	136	110	91	78	70	67
	142.5	195	187	169	142	117	98	85	77	74
	145	197	190	172	148	124	105	92	84	80
	147.5	198	192	176	153	130	112	99	91	88
	150	199	193	179	158	136	119	106	98	95
	152.5	200	194	181	162	142	125	113	105	102
	155	200	195	182	165	147	131	120	112	109
	157.5	200	195	184	169	152	137	126	119	117
	160	199	195	185	171	156	143	133	126	124
	162.5	197	193	185	173	160	148	139	133	131
	165	195	192	185	174	163	153	145	139	137
	167.5	193	190	184	175	166	157	150	146	144
	170	190	187	182	176	168	161	155	152	150
	172.5	187	184	181	176	170	164	160	157	156
	175	183	181	178	175	171	167	165	163	162
	177.5	178	177	175	174	172	170	169	168	167
	180	172	172	172	172	172	172	172	172	172

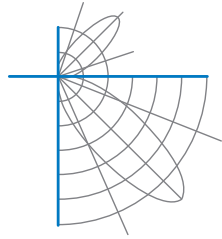
16 lateral half-planes of data were acquired, 22.5 degree increments shown.

North America (issuing laboratory)

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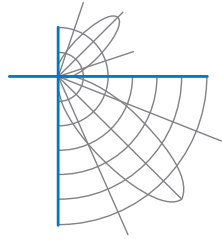
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Coefficients of Utilization/Room Utilization - Zonal Cavity Method

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	98	98	98	98		85	85	85	85		61	61	61		39	39	39		19	19	19	10
1	87	82	78	74		75	71	68	64		51	48	46		32	30	29		14	13	13	5
2	79	71	65	59		68	61	56	52		44	40	37		27	25	23		12	11	10	3
3	71	62	54	49		61	54	47	42		38	34	30		23	21	19		10	9	8	2
4	65	54	47	41		56	47	40	35		33	29	25		21	18	16		9	7	6	1
5	59	48	40	34		51	42	35	30		30	25	22		18	15	13		8	6	5	1
6	54	43	35	29		47	37	30	26		26	22	18		16	14	11		7	6	4	1
7	50	38	31	25		43	33	27	22		24	19	16		15	12	10		6	5	4	1
8	46	34	27	22		40	30	24	19		21	17	14		13	11	9		6	4	3	1
9	43	31	24	19		37	27	21	17		19	15	12		12	9	7		5	4	3	0
10	40	28	21	17		34	25	19	15		18	13	11		11	8	7		5	3	3	0

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.



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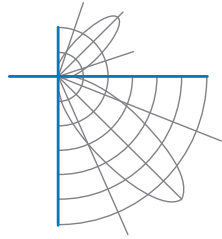
UGR Table - Corrected

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

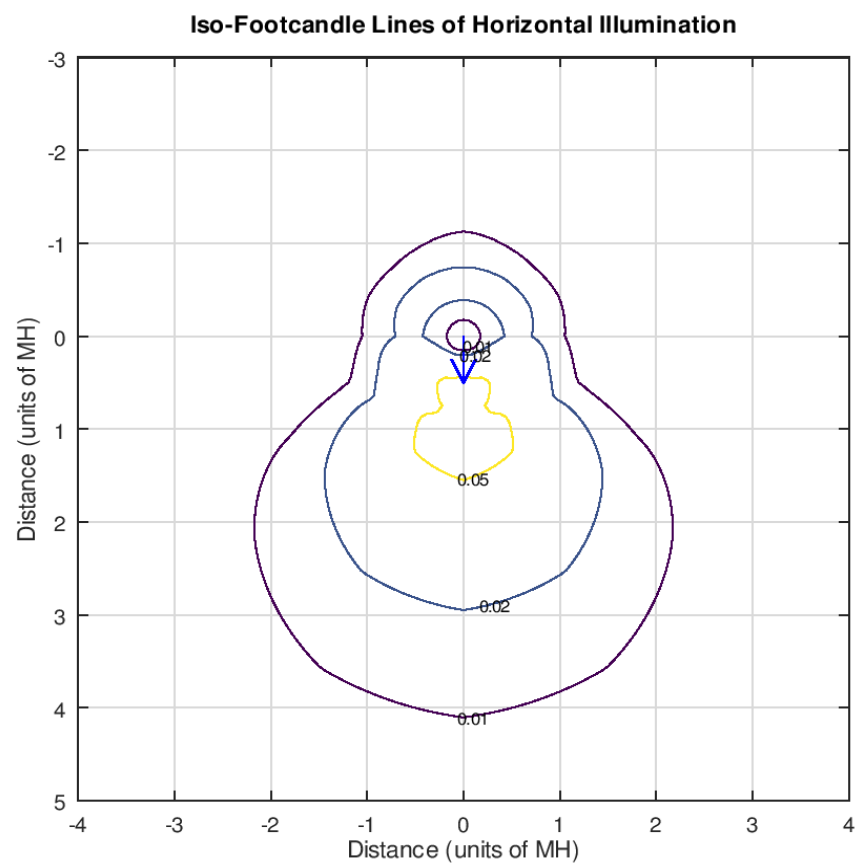
Room Size		UGR Viewed Crosswise					UGR Viewed Endwise				
X=2H	Y=2H	8.7	9.3	9.9	10.5	12.3	0.0	0.0	0.0	0.0	0.0
	3H	14.9	15.5	16.2	16.7	18.5	0.0	0.0	0.0	0.0	0.0
	4H	18.2	18.8	19.5	20.0	21.8	0.0	0.0	0.0	0.0	1.5
	6H	21.7	22.2	22.9	23.4	25.2	0.0	0.0	0.8	1.2	3.0
	8H	23.5	24.0	24.7	25.2	27.0	0.2	0.7	1.4	1.9	3.6
	12H	25.4	25.8	26.6	27.1	28.8	0.8	1.2	2.0	2.4	4.2
4H	2H	9.1	9.6	10.3	10.8	12.6	1.0	1.6	2.3	2.8	4.5
	3H	15.6	16.0	16.8	17.3	19.0	3.5	3.9	4.7	5.2	6.9
	4H	19.1	19.5	20.3	20.7	22.5	4.4	4.8	5.6	6.0	7.8
	6H	22.7	23.1	24.0	24.3	26.1	5.4	5.8	6.6	7.0	8.8
	8H	24.6	25.0	25.9	26.2	28.0	5.9	6.2	7.1	7.5	9.3
	12H	26.6	27.0	27.9	28.2	30.0	6.3	6.6	7.5	7.9	9.7
8H	4H	19.3	19.6	20.5	20.9	22.7	9.6	9.9	10.8	11.2	13.0
	6H	23.2	23.4	24.4	24.7	26.5	10.8	11.1	12.1	12.4	14.2
	8H	25.2	25.5	26.5	26.7	28.5	11.3	11.5	12.5	12.8	14.6
	12H	27.5	27.7	28.7	28.9	30.8	11.7	11.9	12.9	13.1	15.0
12H	4H	19.3	19.6	20.5	20.8	22.6	11.3	11.6	12.6	12.9	14.7
	6H	23.2	23.4	24.4	24.7	26.5	12.8	13.1	14.1	14.4	16.2
	8H	25.3	25.6	26.6	26.8	28.6	13.5	13.8	14.8	15.0	16.9

Maximum UGR = 30.8

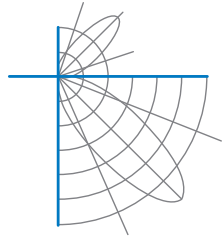


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Iso-Illuminance Plot

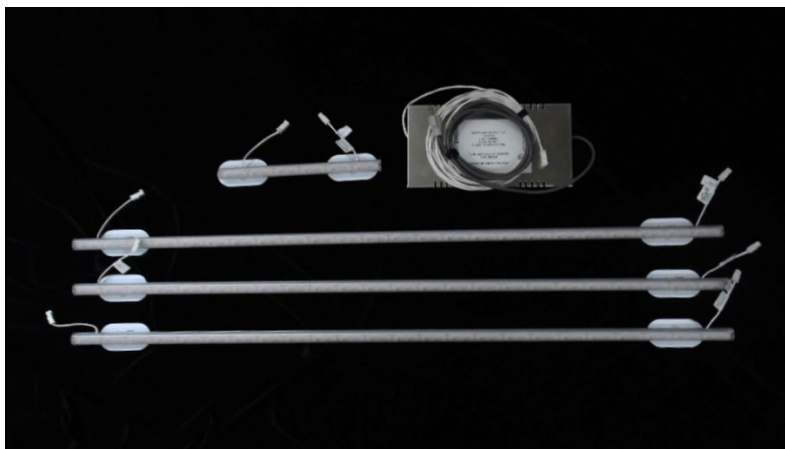
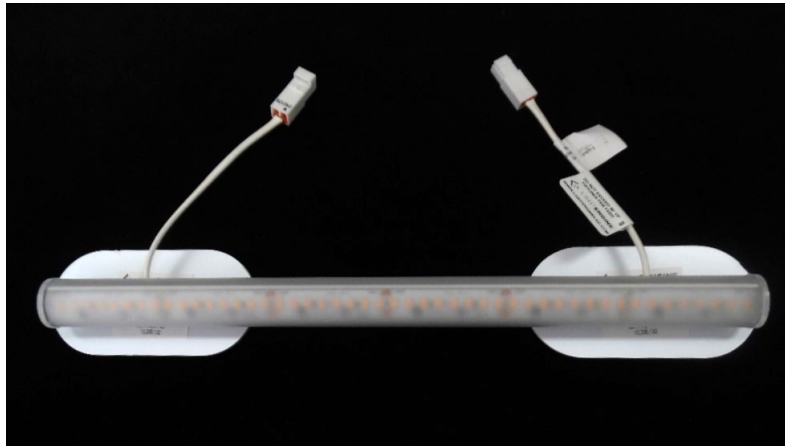


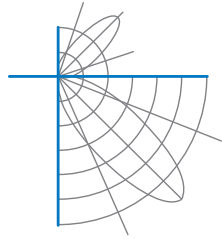
The isofootcandle values shown in the plot above are based on a mounting height of $h = 8.0$ feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the contribution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



Report of Test LLIA002687-002A

Additional Pictures of Test Subject





Report of Test

LLIA002687-002A

Test Distance 9.5 m
Ambient Temperature 25.3 °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.

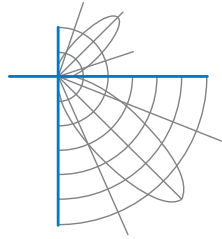
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

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

LLIA002687-002B

Integrating Sphere Report

Catalog Number: FWD-I012-3000K 6W

Surface mounted, extruded aluminum housing, lightly frosted plastic lens.

One system with 624 LEDs was tested to create a fully loaded condition.

Optical measurements were performed only on a 12" luminaire containing 48 white LEDs

One ERP VZM100W-24 LED power supply



Performance Summary System

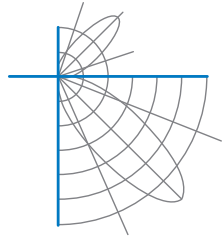
Voltage	120.0 Vac
System Current	0.5692 A
System Power	67.58 W
12" Section System Power**†	5.198 W
System Frequency	59.99 Hz
System Power Factor	0.990
System Current THD	11.3 %
12" Section Luminous Flux	584.1 lm
12" Section System Efficacy**†	112.4 lm/W
Chromaticity (x,y)	(0.4354, 0.4010)
(u',v')	(0.2509, 0.5199)
Duv	-0.0010
CCT	3001 K
CRI (Ra)	98
R9	96
TM-30: Rf	94
TM-30: Rg	100
TM-30: Rcs,h1	-1

Prepared For:
Light Engine Technologies
200 Wilson Street
Unit A1
Port Jefferson Station, NY 11776, USA

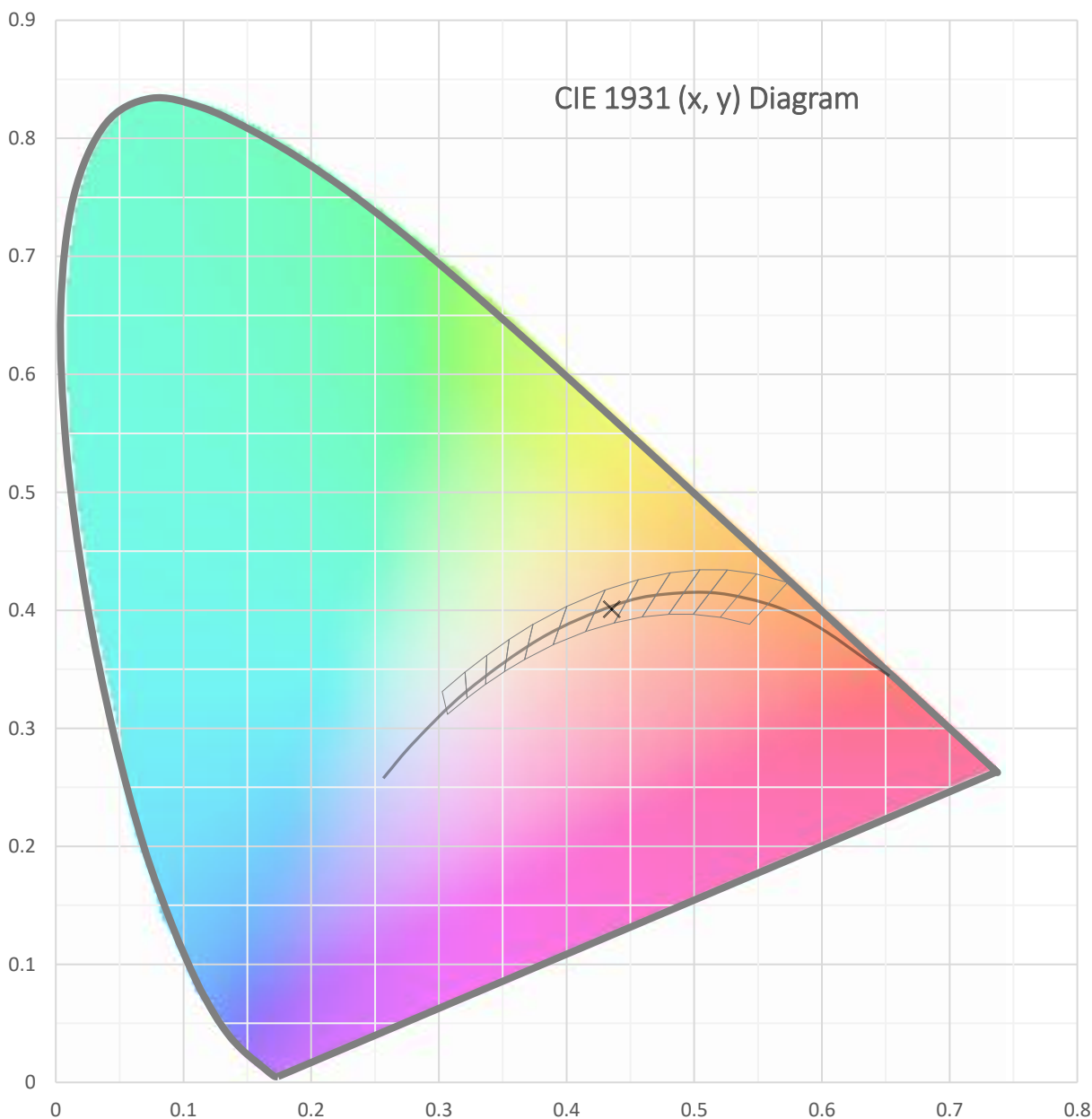
**12" Section System Power and Efficacy is calculated using the fraction (48/624) of measured full-system input power

Test date: 06/13/2025

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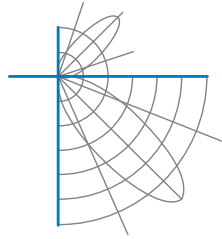


North America (issuing laboratory)

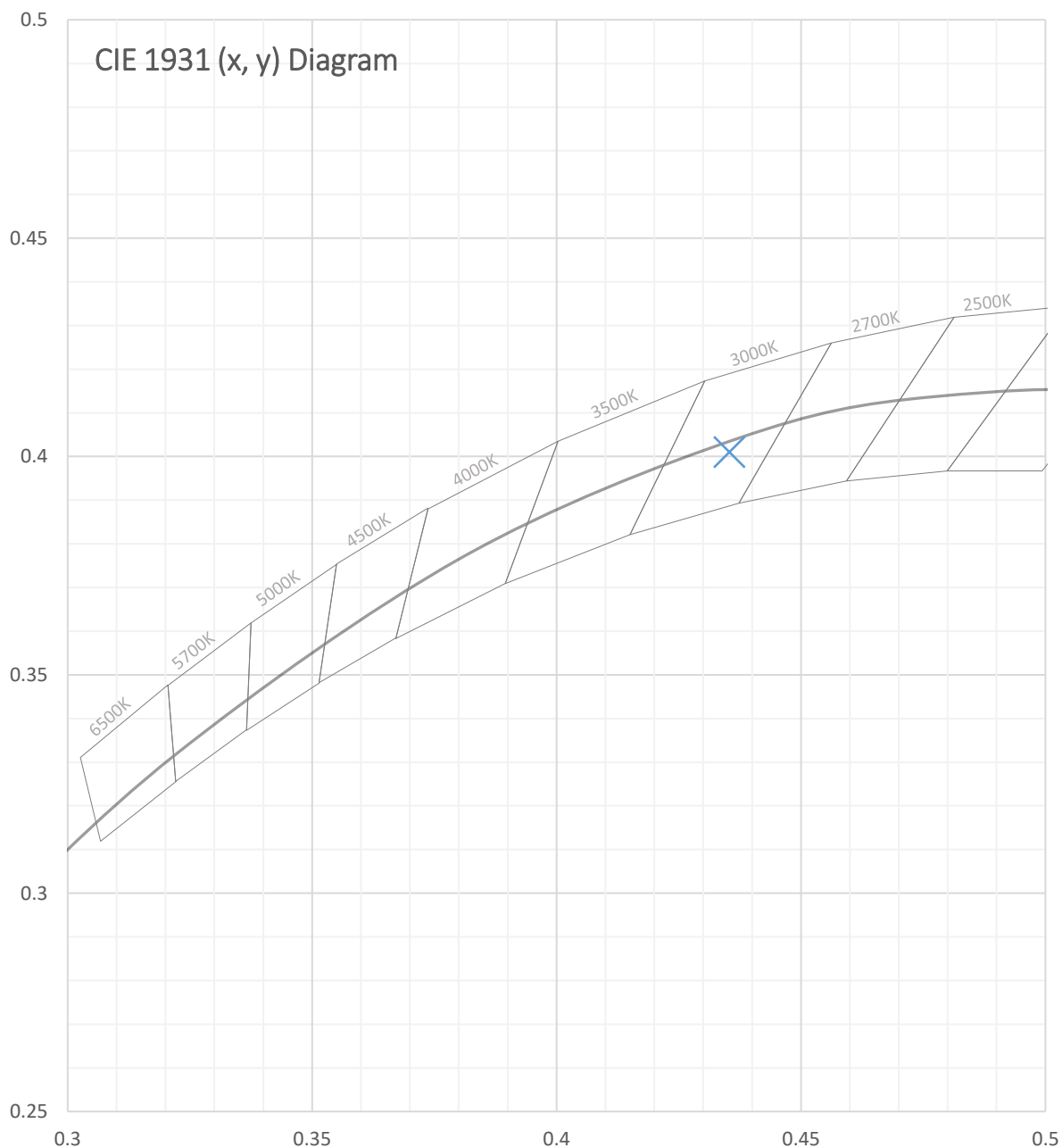
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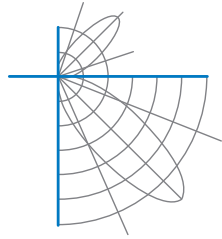
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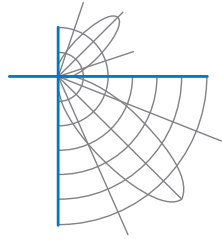


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Total Radiant Flux	2.222 W
Total Luminous Flux	584.1 Lm
Chromaticity CIE 1931 (x, y)	(0.4354, 0.4010)
Chromaticity CIE 1976 (u', v')	(0.2509, 0.5199)
Correlated Color Temperature (CCT)	3001 K
Color Rendering Index (Ra)	98
R1	98
R2	99
R3	97
R4	99
R5	98
R6	97
R7	98
R8	98
R9	96
R10	100
R11	97
R12	84
R13	98
R14	97
TM-30: Rf	94
TM-30: Rg	100
TM-30: Rcs,h1	-1
Distance from Planckian Locus (Duv)	-0.0010
Scotopic/Photopic Ratio \neq	1.479

Electrical Data

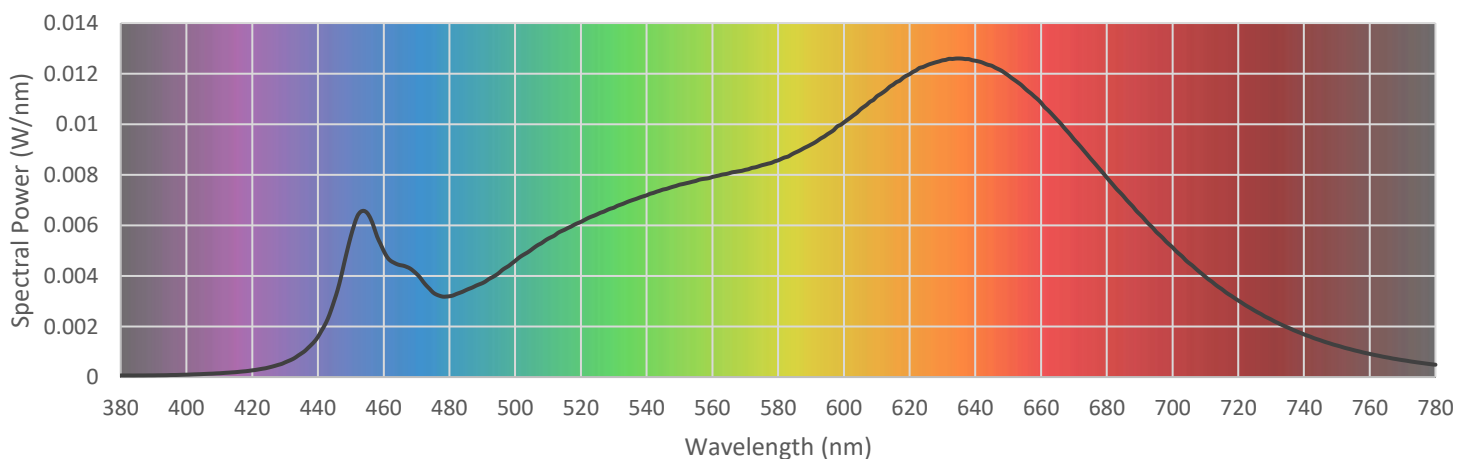
Voltage	120.0 Vac
Current	0.5692 A
Power	67.58 W
Frequency	59.99 Hz
Power Factor	0.990
Current THD	11.3 %



Test Report Number: LLIA002687-002B

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

380	0.000065	480	0.003197	580	0.008569	680	0.007890
385	0.000064	485	0.003437	585	0.008865	685	0.007165
390	0.000067	490	0.003713	590	0.009193	690	0.006444
395	0.000080	495	0.004110	595	0.009602	695	0.005747
400	0.000095	500	0.004594	600	0.010068	700	0.005130
405	0.000120	505	0.005043	605	0.010582	705	0.004512
410	0.000151	510	0.005469	610	0.011097	710	0.003967
415	0.000195	515	0.005823	615	0.011561	715	0.003479
420	0.000266	520	0.006136	620	0.011976	720	0.003027
425	0.000378	525	0.006439	625	0.012314	725	0.002626
430	0.000581	530	0.006697	630	0.012525	730	0.002277
435	0.000938	535	0.006968	635	0.012598	735	0.001962
440	0.001592	540	0.007187	640	0.012510	740	0.001688
445	0.003041	545	0.007415	645	0.012312	745	0.001455
450	0.005566	550	0.007607	650	0.011934	750	0.001249
455	0.006485	555	0.007757	655	0.011425	755	0.001068
460	0.004990	560	0.007912	660	0.010851	760	0.000917
465	0.004427	565	0.008055	665	0.010156	765	0.000782
470	0.004082	570	0.008195	670	0.009404	770	0.000669
475	0.003347	575	0.008375	675	0.008651	775	0.000571
						780	0.000488

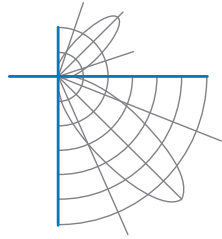


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Test Report Number: LLIA002687-002B

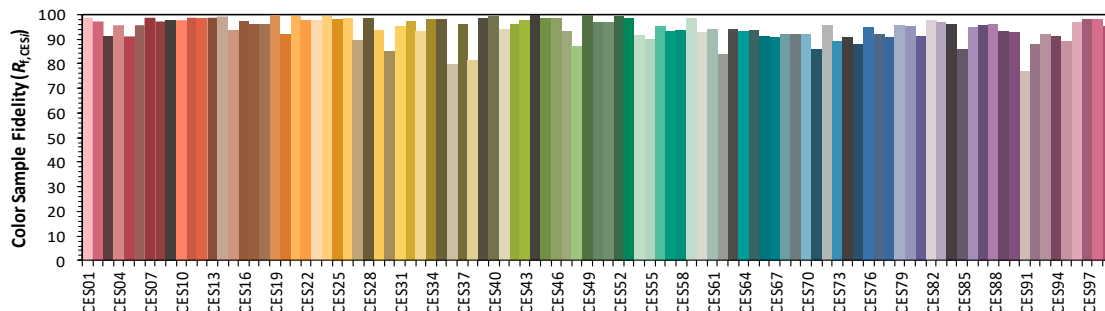
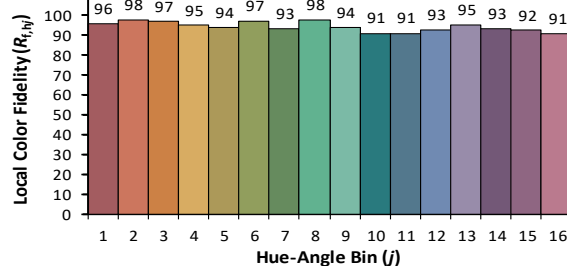
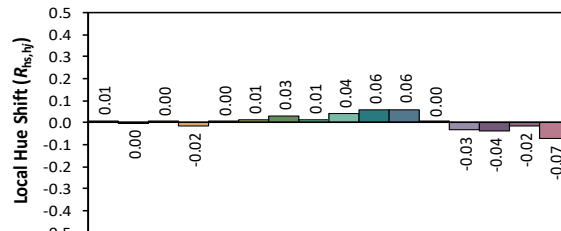
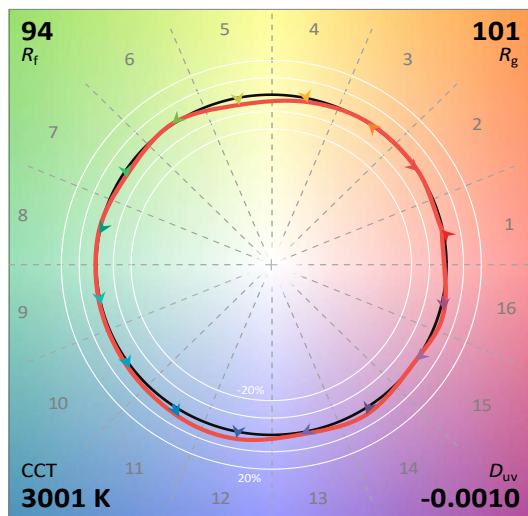
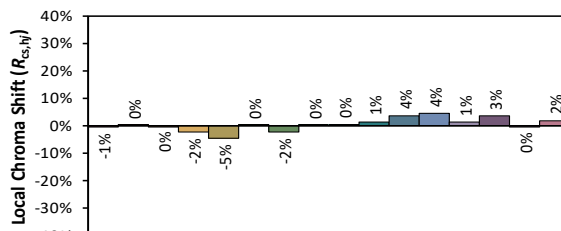
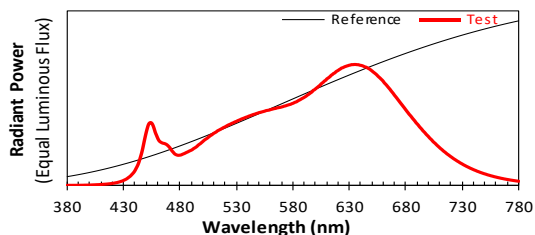
IES TM-30 Details

Source: LLIA002687-002B

Manufacturer: Light Engine Technologies

Date: 6/18/2025

Model: FWD-I012-3000K 6W

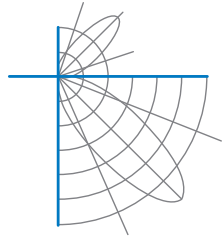


Notes:

x 0.4354
y 0.4010
u' 0.2509
v' 0.5199

CIE 13.3-1995
(CRI)

R_a 98
R_g 96



Test Report Number: LLIA002687-002B

Test Equipment Configuration:	LightLab International Allentown 2m Integrating Sphere Measurements acquired using a Labsphere CDS 2600 spectroradiometer Testing was performed using 4π geometry
Test Temperature:	24.3 °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>

Sphere Report Template V2-19

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