

## Report of Test

LLIA001168-001A

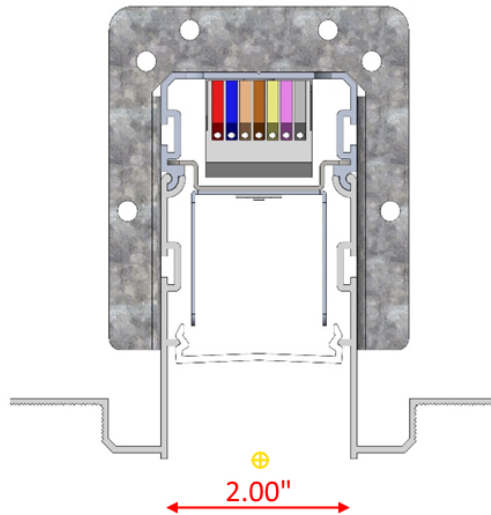
Indoor Distribution Photometry Test Report

Catalog Number: MLR2RG-MO-K35-80-4-XX-LOH-UNV

Recessed ceiling mounted, extruded aluminum housing, formed white enamel aluminum reflector, translucent white plastic enclosure.

144 white LEDs, four Osram PrevaLED BARs with 36 LEDs each.

One Osram Optotronic OTi 20/120-277/700 DIM-1 L G2 LED driver labeled as 480mA.



Prepared For:

Precision Architectural Lighting  
4830 Timber Creek Drive  
Houston, TX 77017, USA

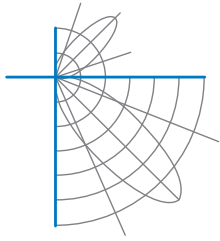
Performance Summary			
Input Voltage	120.0 V	Luminous Flux	1488.1 Lumens
Input Current	0.1562 A	Total Efficacy	80.1 Lm/W
Input Power	18.57 W	Downward Flux	1488.1 Lumens
Frequency	60.00 Hz	Downward Flux	100.0 % of Total
Power Factor	0.991		
Current THD	6.1 %		

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

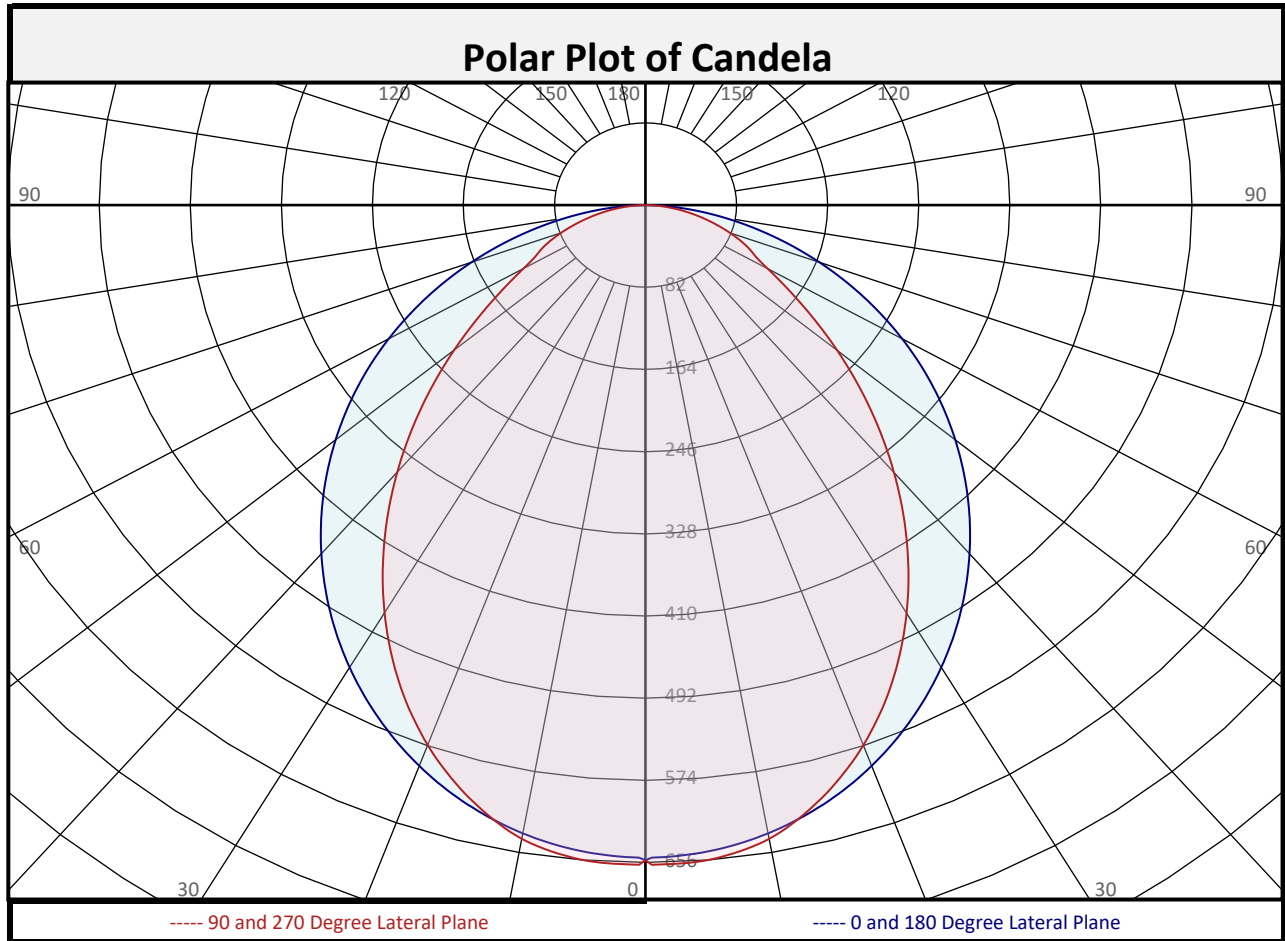
Test date: 10/31/2019

Report date: 11/04/2019

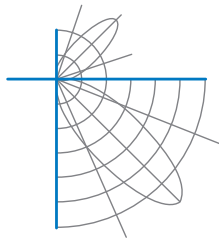
Signed: \_\_\_\_\_



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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	61.8	4.2%		90-100	0.0	0.0%		0-20	235.6	15.8%
10-20	173.8	11.7%		100-110	0.0	0.0%		0-30	487.5	32.8%
20-30	252.0	16.9%		110-120	0.0	0.0%		0-40	771.0	51.8%
30-40	283.4	19.0%		120-130	0.0	0.0%		0-60	1249	83.9%
40-50	266.8	17.9%		130-140	0.0	0.0%		0-80	1467	98.6%
50-60	211.3	14.2%		140-150	0.0	0.0%		10-90	1426	95.8%
60-70	140.9	9.5%		150-160	0.0	0.0%		20-50	802.2	53.9%
70-80	76.6	5.1%		160-170	0.0	0.0%		40-90	717.2	48.2%
80-90	21.5	1.4%		170-180	0.0	0.0%		60-90	239.1	16.1%
0-90	1488	100.0%		90-180	0.0	0.0%		0-180	1488	100.0%

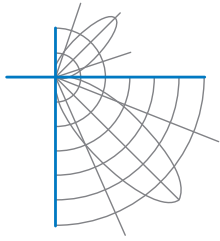


## Report of Test

### LLIA001168-001A

Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	0	654	654	654	654	654	654	654	654	654
	2.5	650	651	652	656	658	656	652	651	650
	5	647	648	650	654	656	654	650	648	647
	7.5	643	644	646	649	650	649	646	644	643
	10	637	638	639	641	642	641	639	638	637
	12.5	629	631	631	629	629	629	631	631	629
	15	619	621	619	614	613	614	619	621	619
	17.5	608	609	604	597	594	597	604	609	608
	20	596	597	587	577	573	577	587	597	596
	22.5	582	582	568	556	550	556	568	582	582
	25	567	566	548	532	525	532	548	566	567
	27.5	550	548	527	507	498	507	527	548	550
	30	533	529	503	480	470	480	503	529	533
	32.5	515	508	479	452	441	452	479	508	515
	35	495	487	453	422	410	422	453	487	495
	37.5	475	465	427	393	379	393	427	465	475
	40	454	442	399	362	348	362	399	442	454
	42.5	433	418	371	331	316	331	371	418	433
	45	411	394	343	301	285	301	343	394	411
	47.5	388	369	314	270	255	270	314	369	388
50	364	343	284	240	225	240	284	343	364	
52.5	341	317	255	211	197	211	255	317	341	
55	317	291	226	184	170	184	226	291	317	
57.5	292	264	198	158	147	158	198	264	292	
60	267	237	170	135	127	135	170	237	267	
62.5	242	210	144	116	112	116	144	210	242	
65	217	182	120	103	103	103	120	182	217	
67.5	192	155	100	93	92	93	100	155	192	
70	167	129	84	82	81	82	84	129	167	
72.5	142	103	74	70	69	70	74	103	142	
75	118	79	62	59	58	59	62	79	118	
77.5	94	58	50	48	47	48	50	58	94	
80	72	45	38	37	36	37	38	45	72	
82.5	51	32	27	26	26	26	27	32	51	
85	31	19	17	16	16	16	17	19	31	
87.5	12	8	8	7	7	7	8	8	12	
90	0	0	0	0	0	0	0	0	0	



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		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	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	



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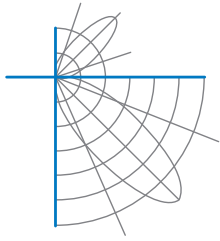
Coefficients of Utilization/Room Utilization - Zonal Cavity Method																						
Effective Floor Cavity Reflectance 0.20																						
RC	80					70					50				30				10			0
RW	70	50	30	10		70	50	30	10		50	30	10		50	30	10		50	30	10	0
RCR																						
0	119	119	119	119		116	116	116	116		111	111	111		106	106	106		102	102	102	100
1	110	105	101	98		107	103	99	96		99	96	93		95	93	90		91	89	88	86
2	100	93	86	81		98	91	85	80		87	83	78		84	80	77		81	78	75	73
3	92	82	75	69		90	81	74	68		78	72	67		75	70	66		73	68	65	62
4	85	74	65	59		83	72	65	59		70	63	58		68	62	57		65	60	56	54
5	78	66	58	51		76	65	57	51		63	56	51		61	55	50		59	54	50	48
6	73	60	51	45		71	59	51	45		57	50	45		56	49	44		54	48	44	42
7	68	55	46	40		66	54	46	40		52	45	40		51	45	40		50	44	39	38
8	63	50	42	36		62	49	42	36		48	41	36		47	41	36		46	40	36	34
9	59	46	38	33		58	46	38	33		44	38	33		43	37	33		42	37	32	31
10	56	43	35	30		54	42	35	30		41	35	30		40	34	30		39	34	30	28

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	18.2	7.29	6.58	
8.0	10.2	9.72	8.77	
10.0	6.5	12.15	10.96	
12.0	4.5	14.58	13.15	
14.0	3.3	17.01	15.34	
16.0	2.6	19.44	17.53	

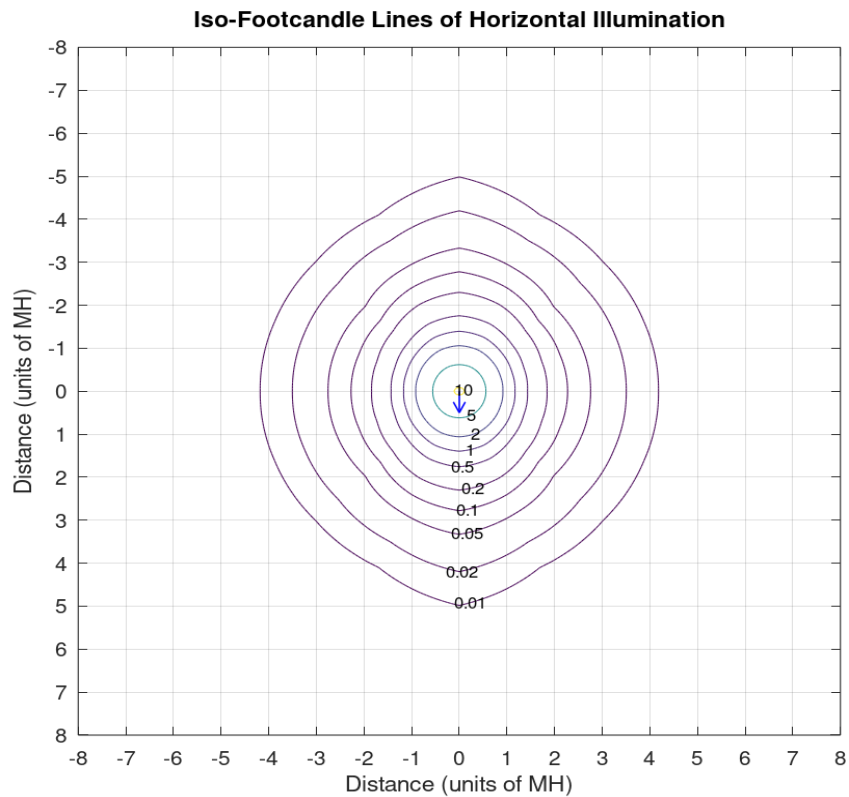
Average Luminance (cd/m <sup>2</sup> )			
	0 deg Plane	45 deg Plane	90 deg Plane
0	10839	10839	10839
45	9624	8030	6686
55	9148	6544	4927
65	8506	4720	4040
75	7540	3999	3693
85	5871	3277	3072

Spacing Criterion	
0 degree plane:	1.2
90 degree plane:	1.1
180 degree plane:	1.2
270 degree plane:	1.1

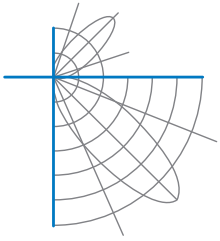


## Report of Test LLIA001168-001A

### Iso-Illuminance Plot

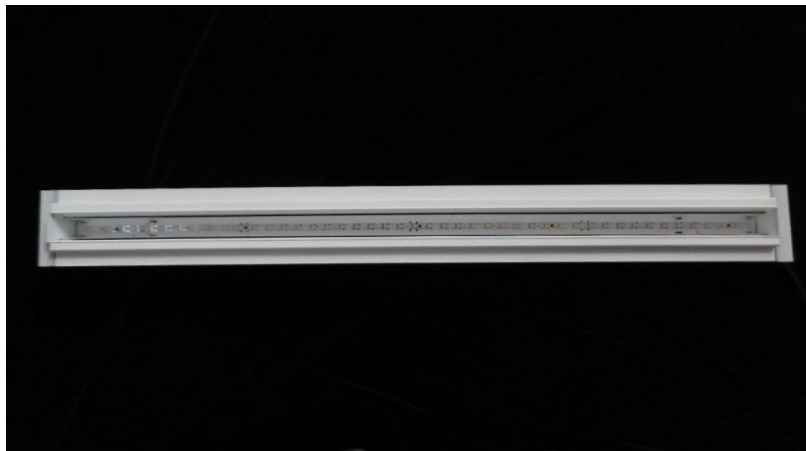
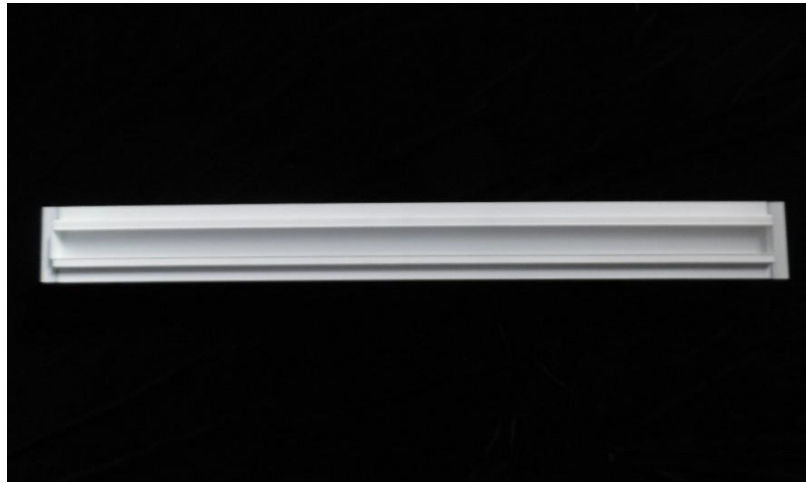


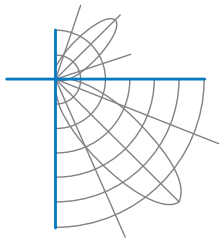
The isofootcandle values shown in the plot above are based on a mounting height of  $h = 8.0$  feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the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



Report of Test  
LLIA001168-001A

**Additional Pictures of Test Subject**





## Report of Test

### LLIA001168-001A

Test Distance                    9.5 m  
Ambient Temperature        24.7 °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 publications: IES LM-79-19 and ANSI C82.77-10:2014. Format of reports and angular increments based on IES LM-41-14 and LM-46-04.

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.

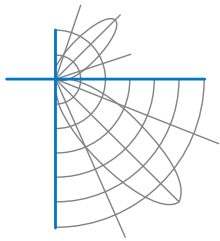
This report is free of erasures and corrections.

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

**LLIA001168-001B**

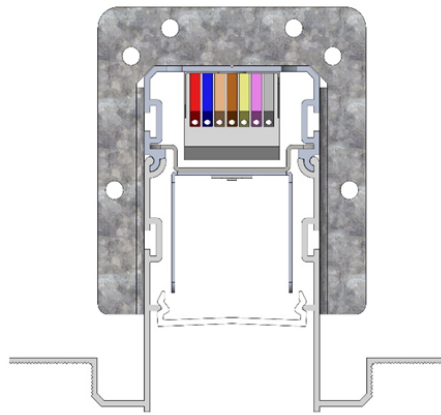
Integrating Sphere Report

Catalog Number: MLR2RG-MO-K35-80-4-XX-LOH-UNV

Recessed ceiling mounted, extruded aluminum housing, formed white enamel aluminum reflector, translucent white plastic enclosure.

144 white LEDs, four Osram PrevaLED BARs with 36 LEDs each.

One Osram Optotronic OTi 20/120-277/700 DIM-1 L G2 LED driver labeled as 480mA.



### Performance Summary

Voltage	120.0 Vac
Current	0.1563 A
Power	18.57 W
Frequency	59.97 Hz
Power Factor	0.990
Current THD	6.1 %

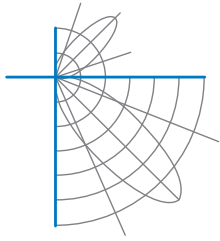
Total Luminous Flux	1502.0 lm
Efficacy	80.9 lm/W
Chromaticity (x,y)	(0.4030, 0.3860)
(u',v')	(0.2362, 0.5089)
Duv	-0.0016
CCT	3513 K
CRI (Ra)	84
R9	15
TM-30: Rf	83
TM-30: Rg	95

Prepared For:

Precision Architectural Lighting  
4830 Timber Creek Drive  
Houston, TX 77017, USA

Test date: 10/30/2019

Report date: 11/04/2019



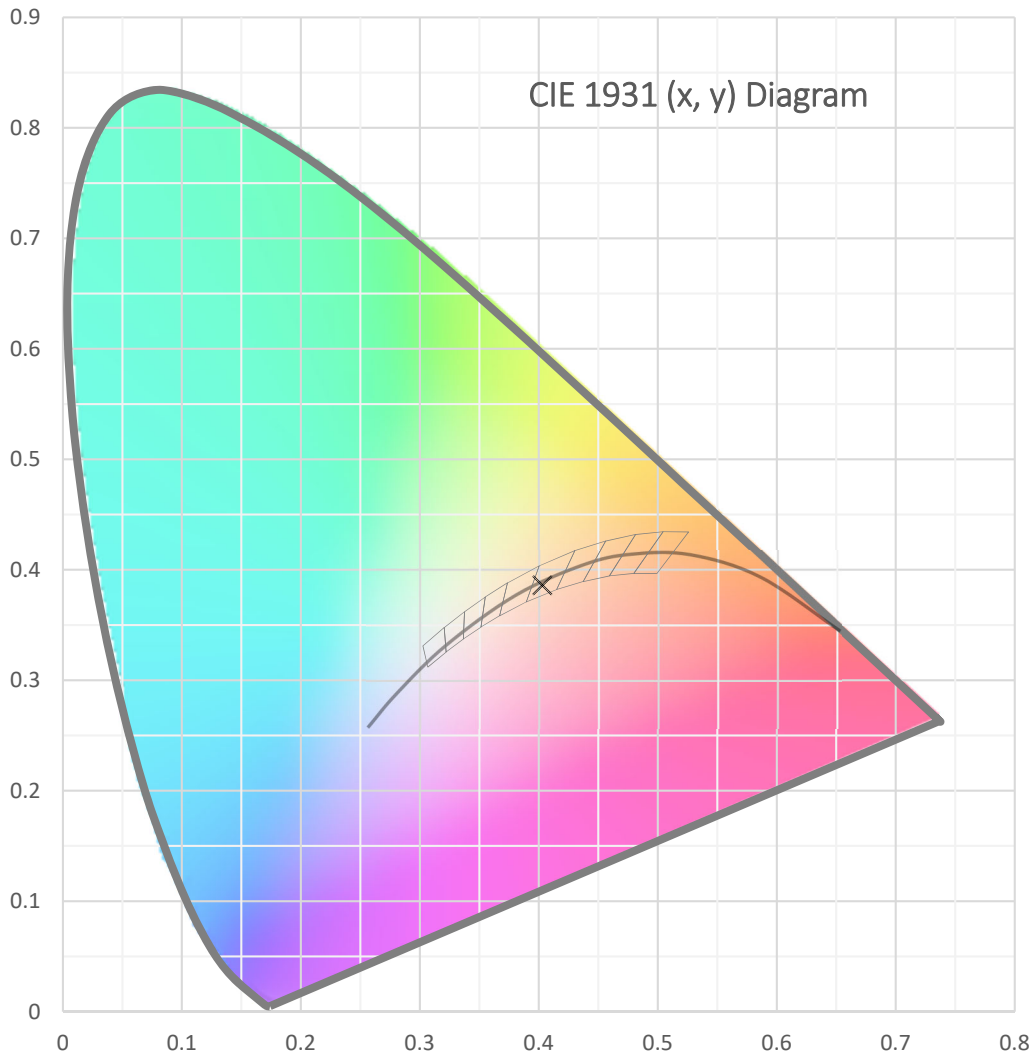
**Test Report Number: LLIA001168-001B**

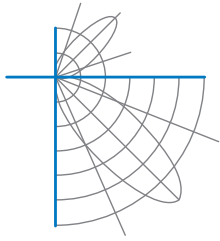
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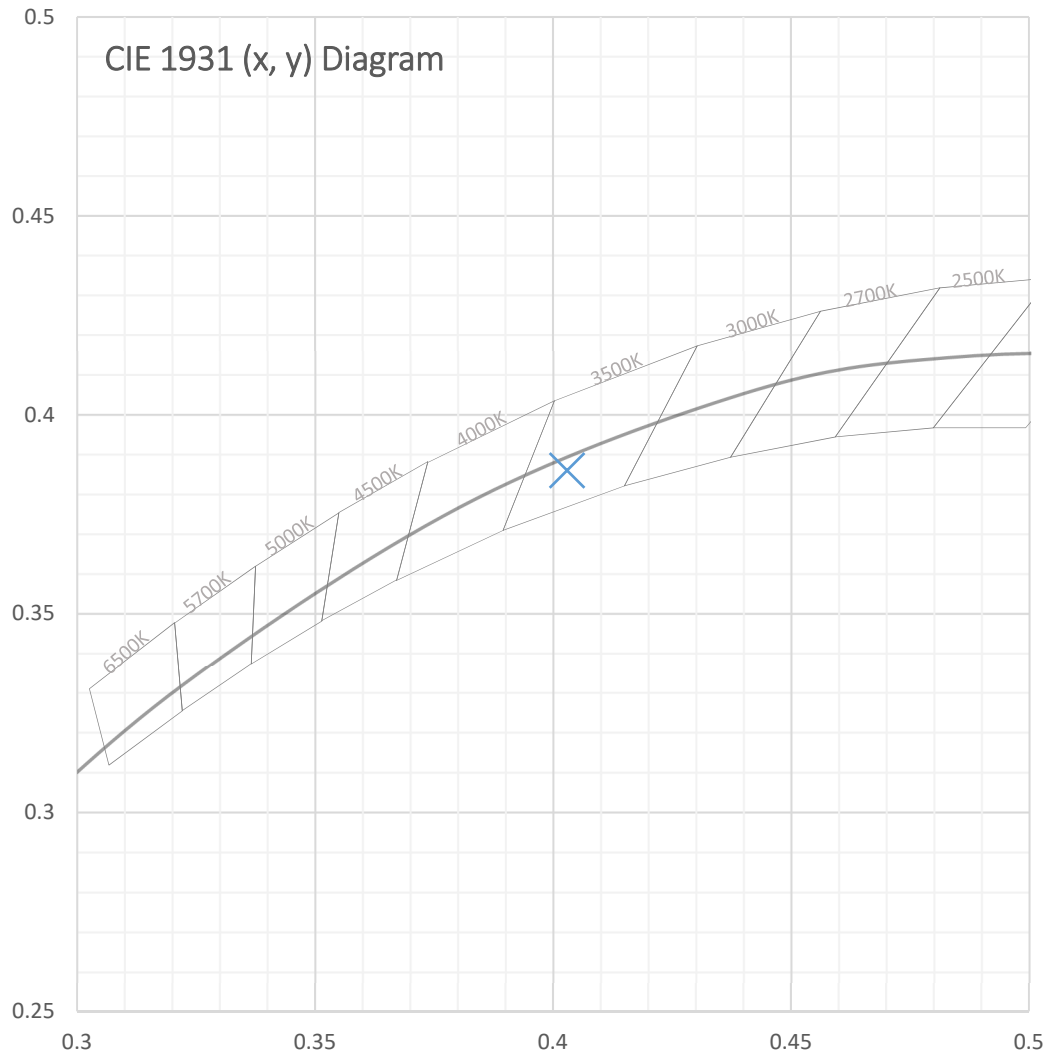
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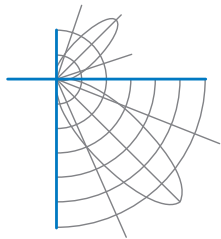
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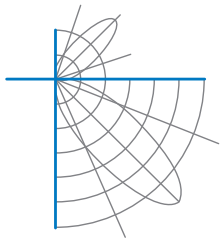
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<b>Spectral Data</b>	Total Radiant Flux	4.655 W
	Total Luminous Flux	1502.0 Lm
	Chromaticity CIE 1931 (x, y)	(0.4030, 0.3860)
	Chromaticity CIE 1976 (u', v')	(0.2362, 0.5089)
	Correlated Color Temperature (CCT)	3513 K
	Color Rendering Index (Ra)	84
	R1	83
	R2	92
	R3	96
	R4	81
	R5	83
	R6	89
	R7	84
	R8	64
	R9	15
	R10	81
	R11	80
	R12	66
	R13	86
	R14	99
	TM-30: Rf	83
	TM-30: Rg	95
	Distance from Planckian Locus (Duv)	-0.0016
	Scotopic/Photopic Ratio *	1.567

**Electrical Data**

Voltage	120.0 Vac
Current	0.1563 A
Power	18.57 W
Frequency	59.97 Hz
Power Factor	0.990
Current THD	6.1 %



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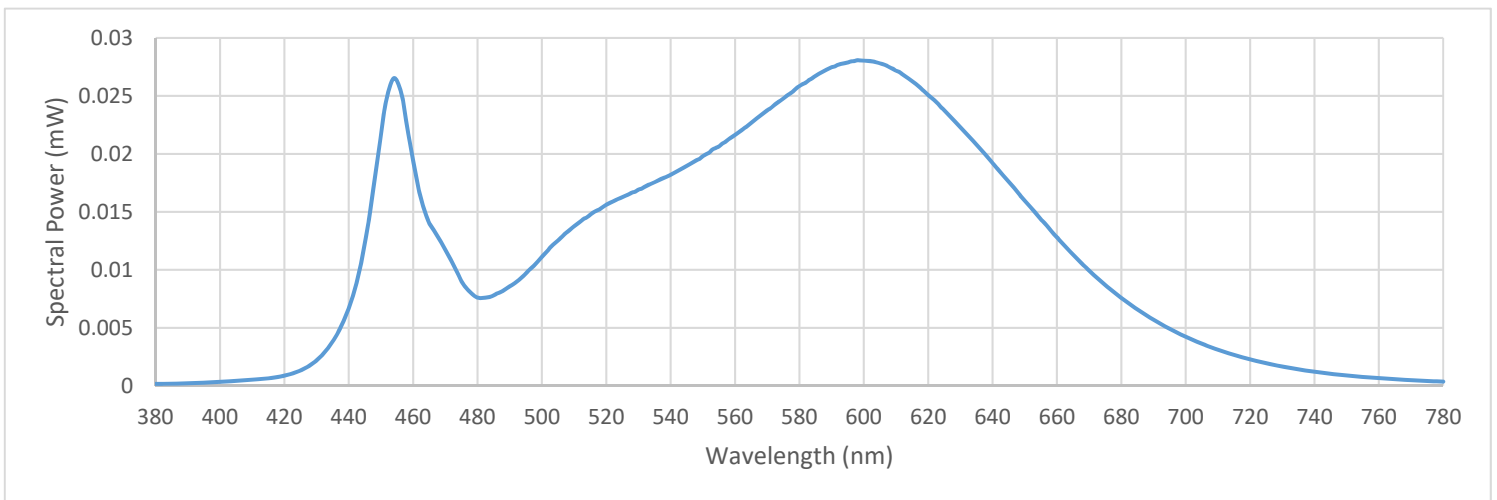
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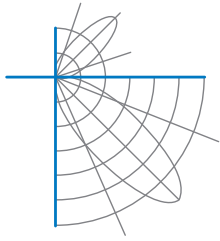
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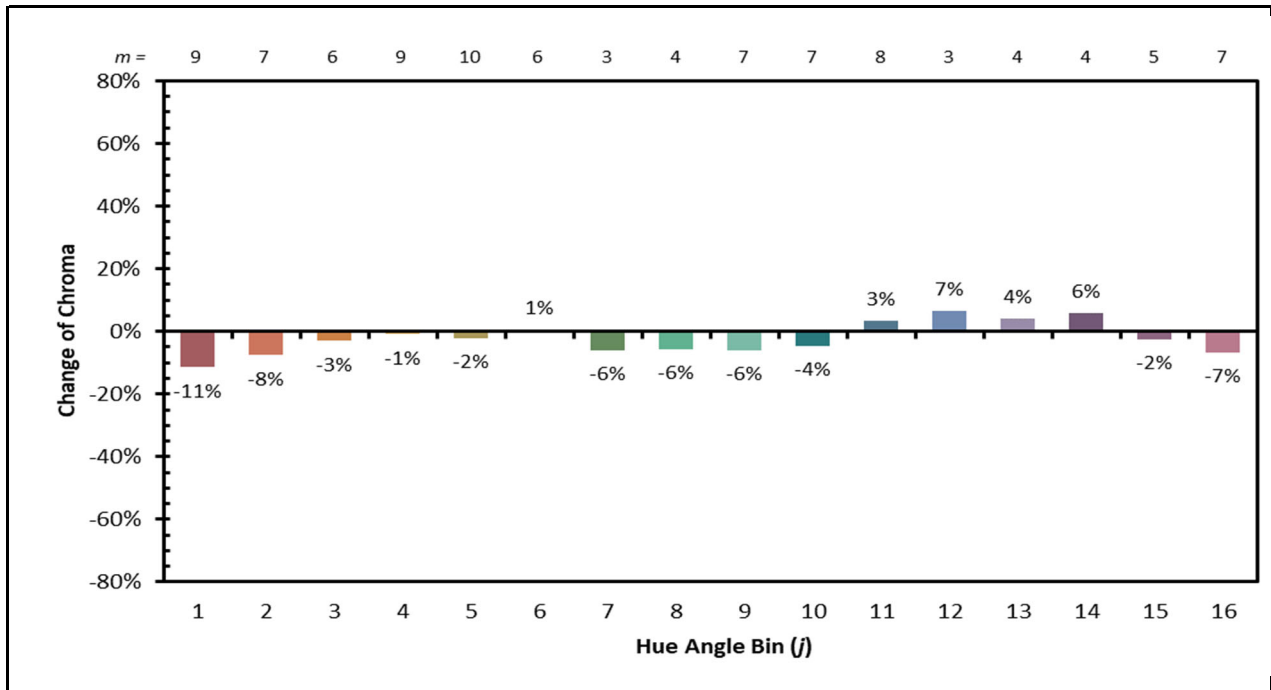
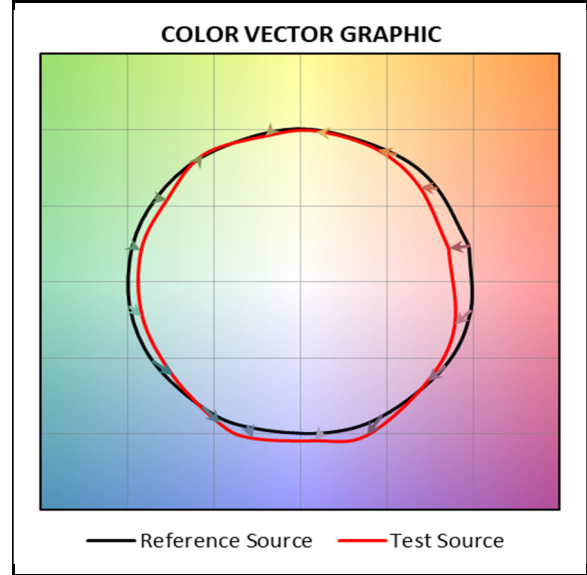
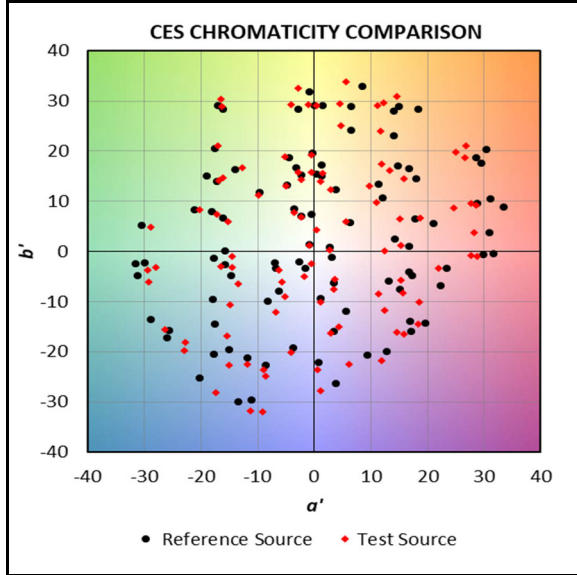
Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

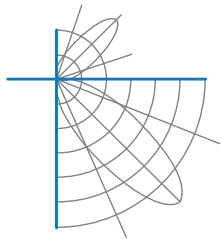
380	0.000170	480	0.007607	580	0.025842	680	0.007566
385	0.000179	485	0.007794	585	0.026741	685	0.006591
390	0.000215	490	0.008579	590	0.027475	690	0.005697
395	0.000261	495	0.009687	595	0.027881	695	0.004899
400	0.000340	500	0.011115	600	0.028042	700	0.004239
405	0.000427	505	0.012545	605	0.027799	705	0.003627
410	0.000522	510	0.013767	610	0.027164	710	0.003108
415	0.000640	515	0.014756	615	0.026284	715	0.002663
420	0.000877	520	0.015618	620	0.025074	720	0.002276
425	0.001327	525	0.016254	625	0.023769	725	0.001939
430	0.002199	530	0.016916	630	0.022308	730	0.001661
435	0.003824	535	0.017545	635	0.020812	735	0.001416
440	0.006643	540	0.018190	640	0.019207	740	0.001208
445	0.012280	545	0.018952	645	0.017608	745	0.001036
450	0.021603	550	0.019804	650	0.015966	750	0.000889
455	0.026283	555	0.020643	655	0.014355	755	0.000762
460	0.019434	560	0.021632	660	0.012822	760	0.000658
465	0.014025	565	0.022690	665	0.011323	765	0.000564
470	0.011723	570	0.023763	670	0.009923	770	0.000484
475	0.009027	575	0.024767	675	0.008691	775	0.000417
						780	0.000356





IES TM-30 Details





**Test Report Number: LLIA001168-001B**

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Recessed ceiling mounted, extruded aluminum housing, formed white enamel aluminum reflector, translucent white plastic enclosure.

144 white LEDs, four Osram PrevaLED BARs with 36 LEDs each.

One Osram Optotronic OTi 20/120-277/700 DIM-1 L G2 LED driver labeled as 480mA.

**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:** 25.4 °C

**Test Procedure:** Tested in accordance with the applicable sections of:  
LM-79-19, LM-78-07, LM-58-13, ANSI\_ANSLG C78.377-2017,  
ANSI C82-77-10:2014, TM-30-15

**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:** The measurements 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

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