

## Report of Test

**LLIA001159-008A**

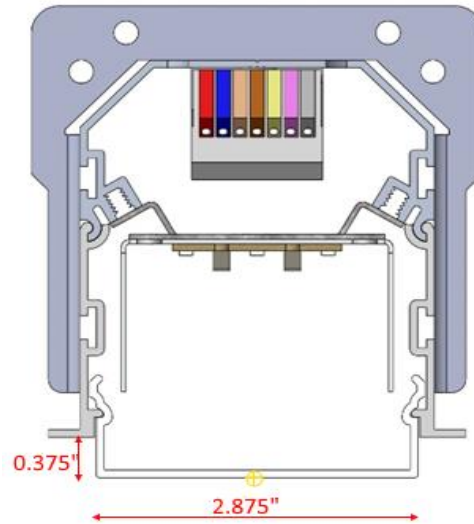
Indoor Distribution Photometry Test Report

Catalog Number: MLR3-MO-K35-80-4-XX-AL1-UNV

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

144 white LEDs, One Osram PrevaLED Bar LED board.

One Osram Optotronic OTi 20/120-277/700 DIM-1 L G2 LED driver labeled as 380mA



Prepared For:

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

### Performance Summary

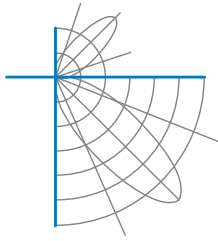
Input Voltage	120.0 V	Luminous Flux	2582.5 Lumens
Input Current	0.1827 A	Total Efficacy	118.6 Lm/W
Input Power	21.77 W	Downward Flux	2463.0 Lumens
Frequency	60.00 Hz	Downward Flux	95.4 % of Total
Power Factor	0.993		
Current THD	5.5 %		

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

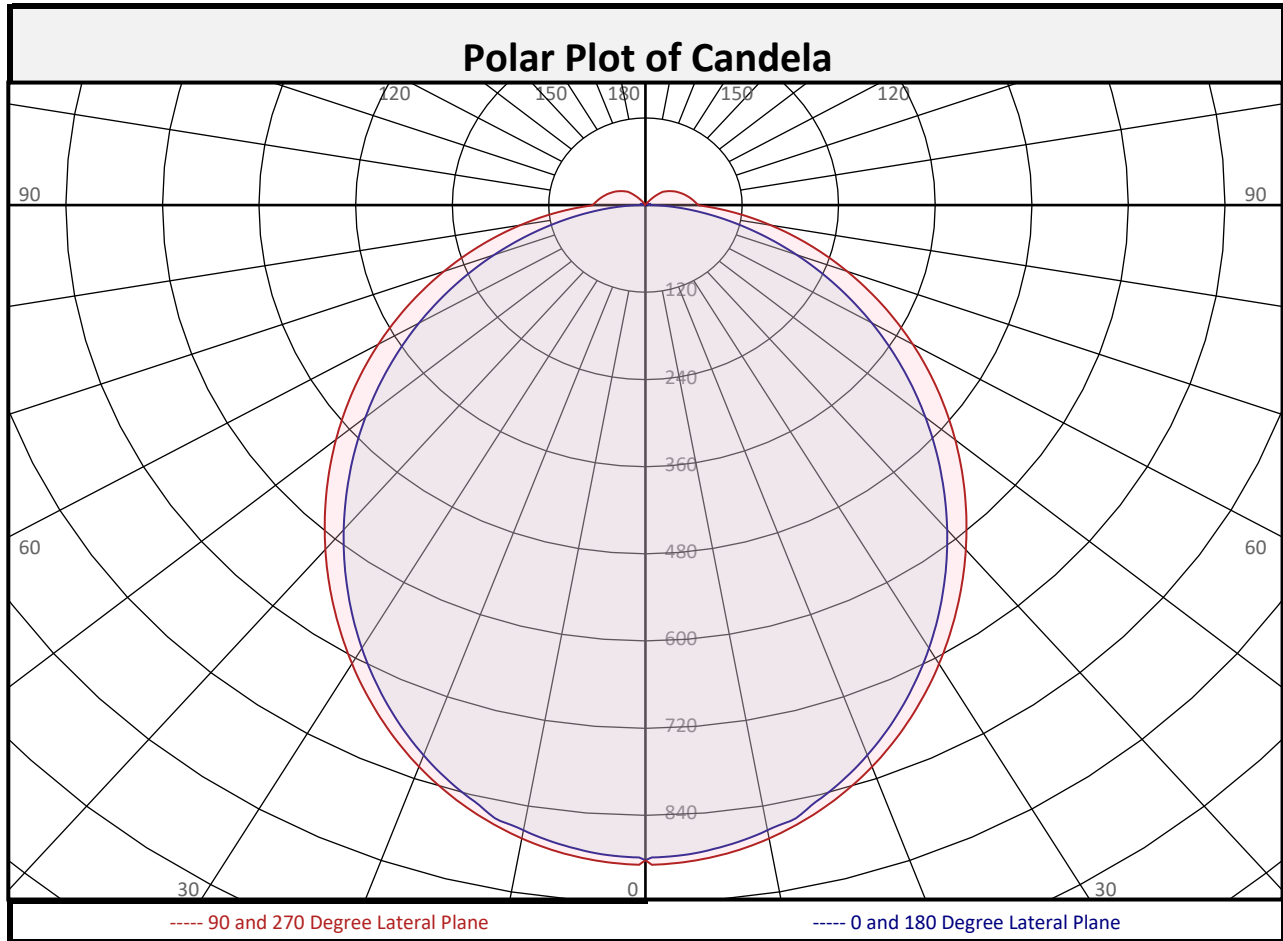
Test date: 08/29/2019

Report date: 09/04/2019

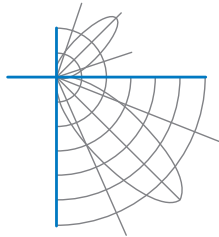
Signed: \_\_\_\_\_



Report of Test  
LLIA001159-008A



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	85.0	3.3%		90-100	41.0	1.6%		0-20	324.8	12.6%
10-20	239.8	9.3%		100-110	33.4	1.3%		0-30	678.5	26.3%
20-30	353.8	13.7%		110-120	24.0	0.9%		0-40	1092	42.3%
30-40	413.7	16.0%		120-130	14.9	0.6%		0-60	1886	73.0%
40-50	418.4	16.2%		130-140	5.7	0.2%		0-80	2373	91.9%
50-60	375.3	14.5%		140-150	0.5	0.0%		10-90	2378	92.1%
60-70	295.0	11.4%		150-160	0.0	0.0%		20-50	1186	45.9%
70-80	192.5	7.5%		160-170	0.0	0.0%		40-90	1371	53.1%
80-90	89.5	3.5%		170-180	0.0	0.0%		60-90	577.0	22.3%
0-90	2463	95.4%		90-180	119.6	4.6%		0-180	2583	100.0%

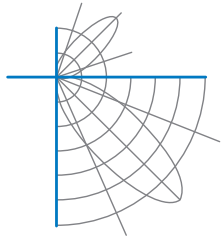


## Report of Test

### LLIA001159-008A

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	902	902	902	902	902	902	902	902	902
	2.5	897	897	899	903	906	903	899	897	897
	5	892	892	895	899	902	899	895	892	892
	7.5	884	885	887	892	895	892	887	885	884
	10	874	875	877	882	885	882	877	875	874
	12.5	864	864	865	869	873	869	865	864	864
	15	845	846	849	855	858	855	849	846	845
	17.5	826	828	836	838	841	838	836	828	826
	20	806	808	812	819	823	819	812	808	806
	22.5	783	785	791	798	802	798	791	785	783
	25	759	761	768	775	779	775	768	761	759
	27.5	732	735	744	752	755	752	744	735	732
	30	704	708	717	728	729	728	717	708	704
	32.5	676	680	690	700	702	700	690	680	676
	35	645	651	662	672	675	672	662	651	645
	37.5	615	621	633	643	647	643	633	621	615
	40	583	591	604	615	619	615	604	591	583
	42.5	551	560	574	586	590	586	574	560	551
	45	519	529	544	556	561	556	544	529	519
	47.5	486	498	513	527	531	527	513	498	486
50	454	466	483	497	502	497	483	466	454	
52.5	421	435	452	467	472	467	452	435	421	
55	389	403	422	438	443	438	422	403	389	
57.5	357	372	391	408	413	408	391	372	357	
60	325	340	361	378	383	378	361	340	325	
62.5	293	309	331	348	354	348	331	309	293	
65	261	278	301	319	324	319	301	278	261	
67.5	230	248	271	290	295	290	271	248	230	
70	200	218	242	261	267	261	242	218	200	
72.5	170	189	214	232	238	232	214	189	170	
75	141	161	186	205	211	205	186	161	141	
77.5	113	134	159	178	184	178	159	134	113	
80	88	108	133	152	157	152	133	108	88	
82.5	64	84	109	127	132	127	109	84	64	
85	41	62	85	103	108	103	85	62	41	
87.5	21	41	63	80	85	80	63	41	21	
90	3	23	44	61	66	61	44	23	3	

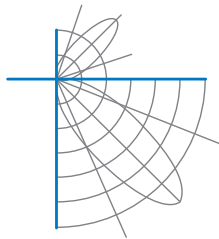


## Report of Test

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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	90	3	23	44	61	66	61	44	23	3
	92.5	3	22	43	58	63	58	43	22	3
	95	3	21	41	56	61	56	41	21	3
	97.5	3	20	40	54	59	54	40	20	3
	100	3	19	38	52	57	52	38	19	3
	102.5	3	18	36	50	54	50	36	18	3
	105	3	16	35	48	52	48	35	16	3
	107.5	3	15	33	46	50	46	33	15	3
	110	3	13	31	43	48	43	31	13	3
	112.5	3	10	30	41	45	41	30	10	3
	115	3	7	28	39	43	39	28	7	3
	117.5	3	4	26	37	41	37	26	4	3
	120	3	2	24	35	38	35	24	2	3
	122.5	2	2	21	32	36	32	21	2	2
	125	2	2	17	30	33	30	17	2	2
	127.5	2	2	13	28	31	28	13	2	2
	130	2	1	9	24	29	24	9	1	2
	132.5	1	1	5	19	24	19	5	1	1
	135	1	0	2	15	20	15	2	0	1
	137.5	1	0	0	11	15	11	0	0	1
140	0	0	0	6	10	6	0	0	0	
142.5	0	0	0	3	6	3	0	0	0	
145	0	0	0	0	2	0	0	0	0	
147.5	0	0	0	0	1	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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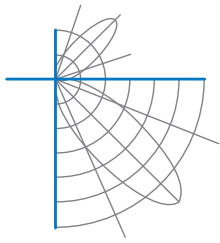
Coefficients of Utilization/Room Utilization - Zonal Cavity Method																						
Effective Floor Cavity Reflectance 0.20																						
RC	80					70					50				30				10			0
RW	70	50	30	10		70	50	30	10		50	30	10		50	30	10		50	30	10	0
RCR																						
0	118	118	118	118		115	115	115	115		109	109	109		103	103	103		98	98	98	95
1	107	102	97	93		104	99	95	91		94	91	88		89	87	84		85	83	81	78
2	97	89	82	76		94	86	80	74		82	77	72		78	74	70		74	71	67	65
3	88	78	69	63		86	76	68	62		72	66	60		69	63	59		66	61	57	55
4	81	69	60	53		78	67	59	53		64	57	51		61	55	50		59	53	49	47
5	75	62	53	46		72	60	52	45		58	50	44		55	49	44		53	47	43	40
6	69	55	46	40		67	54	46	40		52	45	39		50	43	38		48	42	38	35
7	64	50	42	35		62	49	41	35		47	40	35		45	39	34		44	38	33	31
8	59	46	37	32		58	45	37	31		43	36	31		42	35	30		40	34	30	28
9	56	42	34	28		54	41	34	28		40	33	28		39	32	27		37	31	27	25
10	52	39	31	26		51	38	31	26		37	30	25		36	29	25		35	29	25	23

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	25.1	7.02	7.23	
8.0	14.1	9.36	9.64	
10.0	9.0	11.69	12.05	
12.0	6.3	14.03	14.47	
14.0	4.6	16.37	16.88	
16.0	3.5	18.71	19.29	

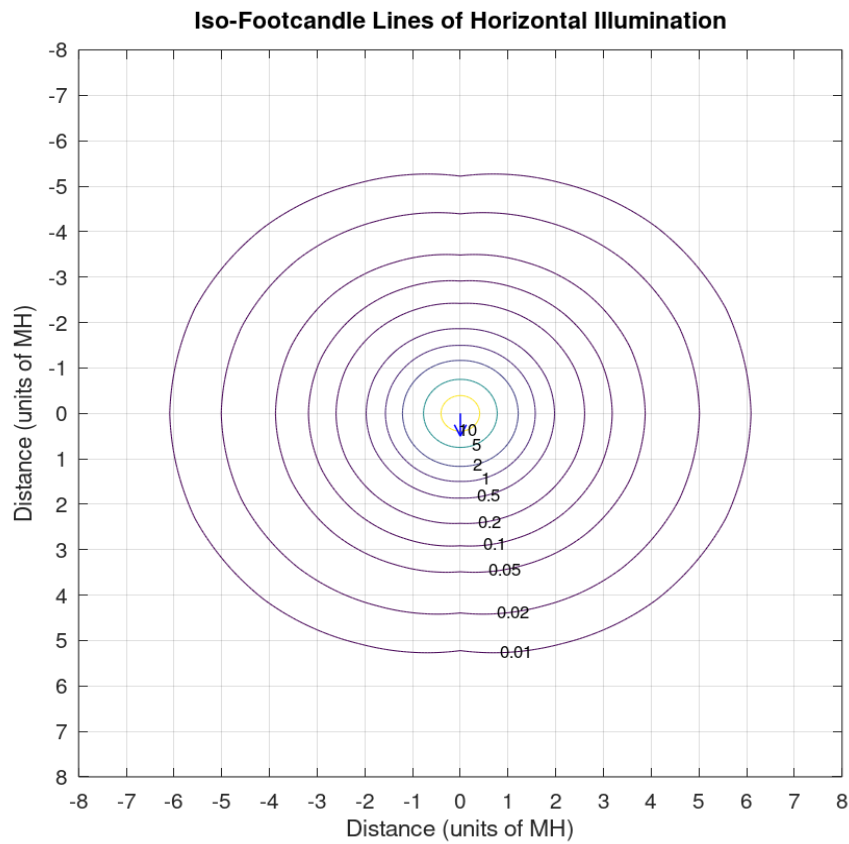
Average Luminance (cd/m <sup>2</sup> )			
	0 deg Plane	45 deg Plane	90 deg Plane
0	15904	15904	15904
45	12839	11821	11654
55	11825	10721	10587
65	10717	9549	9474
75	9316	8177	8216
85	7681	6430	6660

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

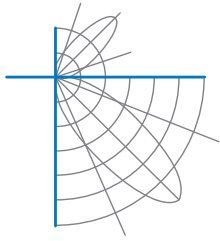


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**Iso-Illuminance Plot**



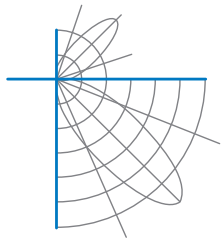
The isofootcandle values shown in the plot above are based on a mounting height of  $h = 8.0$  feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the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



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**Additional Pictures of Test Subject**





## Report of Test

### LLIA001159-008A

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 publications: IES LM-79-08 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.

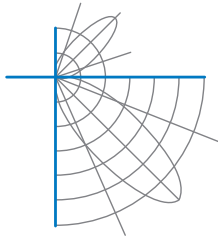
This report is free of erasures and corrections.

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

**LLIA001159-008B**

Integrating Sphere Report

Catalog Number: MLR3-MO-K35-80-4-XX-AL1-UNV

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

144 white LEDs, One Osram PrevaLED Bar LED board.

One Osram Optotronic OTi 20/120-277/700 DIM-1 L G2 LED driver labeled as 380mA



### Performance Summary

Voltage	120.0 Vac
Current	0.1826 A
Power	21.77 W
Frequency	60.00 Hz
Power Factor	0.993
Current THD	5.5 %

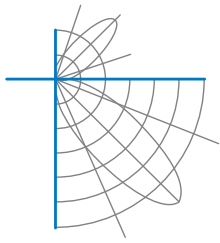
Total Luminous Flux	2597.0 lm
Efficacy	119.3 lm/W
Chromaticity (x,y)	(0.4058, 0.3925)
(u',v')	(0.2353, 0.5121)
Duv	0.0007
CCT	3504 K
CRI (Ra)	83
R9	7
TM-30: Rf	82
TM-30: Rg	97

Prepared For:

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

Test date: 08/30/2019

Report date: 09/04/2019



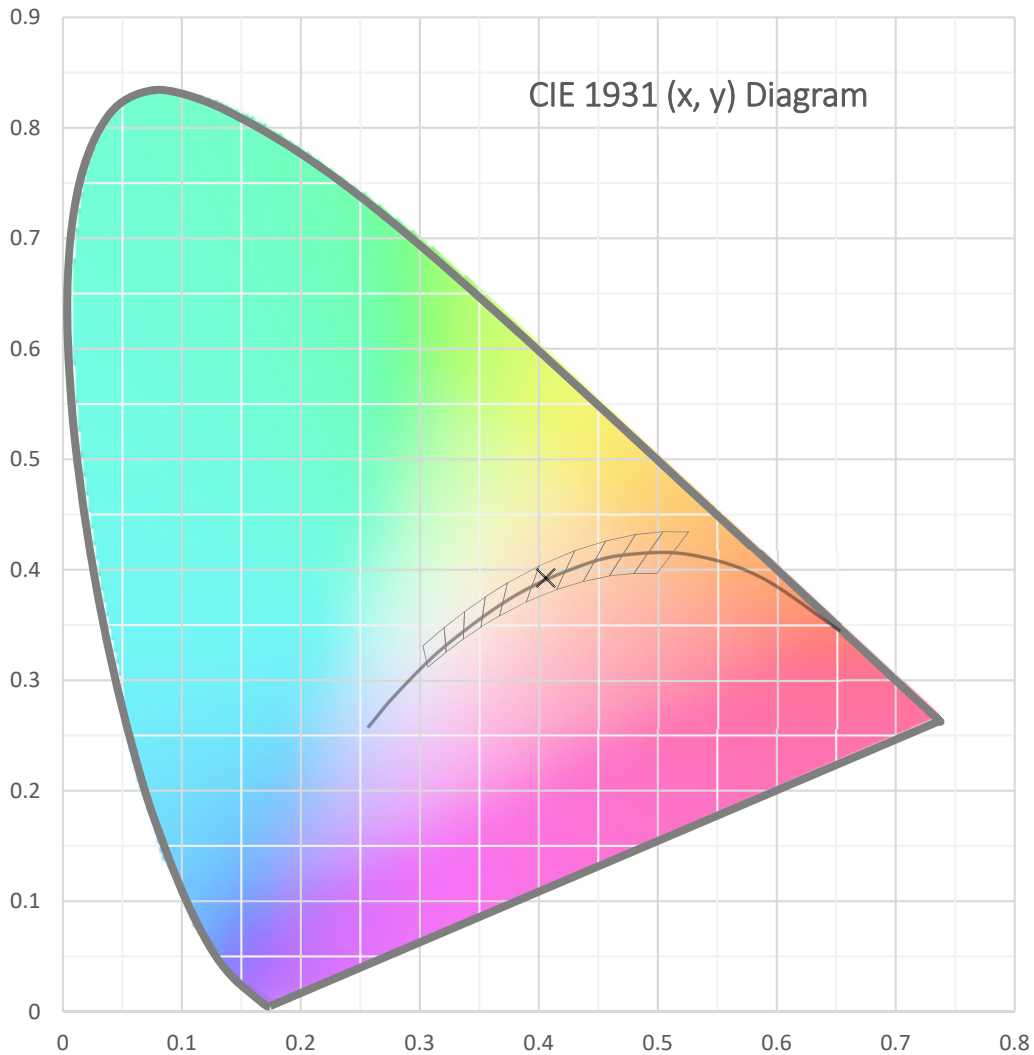
**Test Report Number: LLIA001159-008B**

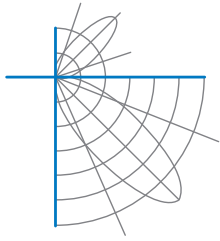
Catalog Number: MLR3-MO-K35-80-4-XX-AL1-UNV

Recessed ceiling mounted, extruded aluminum housing with steel endcaps,  
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One Osram Optotronic OTi 20/120-277/700 DIM-1 L G2 LED driver labeled as 380mA





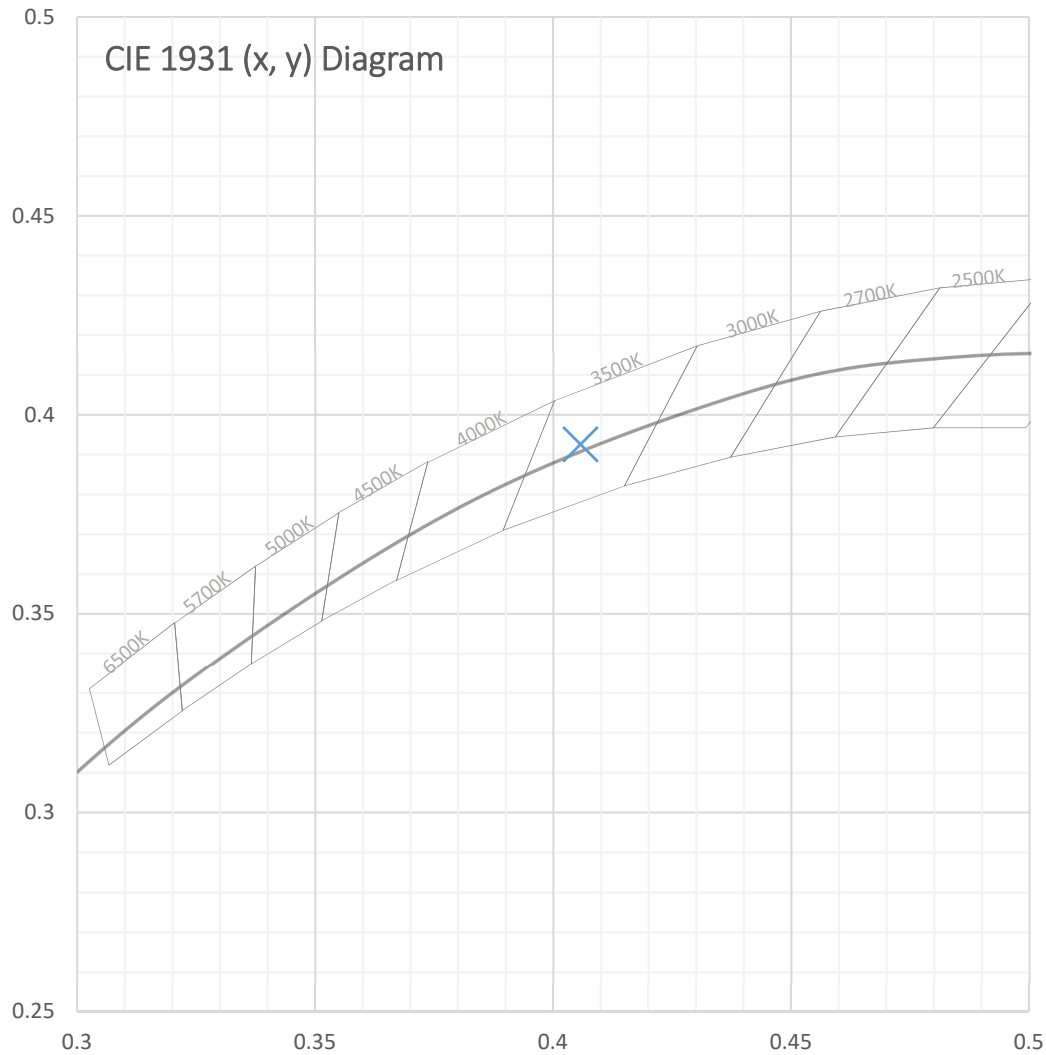
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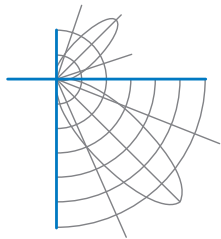
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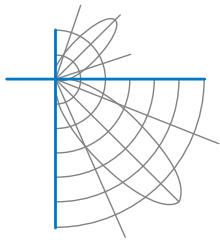
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<b>Spectral Data</b>	Total Radiant Flux	7.774 W
	Total Luminous Flux	2597.0 Lm
	Chromaticity CIE 1931 (x, y)	(0.4058, 0.3925)
	Chromaticity CIE 1976 (u', v')	(0.2353, 0.5121)
	Correlated Color Temperature (CCT)	3504 K
	Color Rendering Index (Ra)	83
	R1	82
	R2	88
	R3	94
	R4	83
	R5	81
	R6	84
	R7	86
	R8	63
	R9	7
	R10	72
	R11	83
	R12	60
	R13	83
	R14	96
	TM-30: Rf	82
	TM-30: Rg	97
	Distance from Planckian Locus (Duv)	0.0007
	Scotopic/Photopic Ratio *	1.495

**Electrical Data**

Voltage	120.0 Vac
Current	0.1826 A
Power	21.77 W
Frequency	60.00 Hz
Power Factor	0.993
Current THD	5.5 %



**Test Report Number: LLIA001159-008B**

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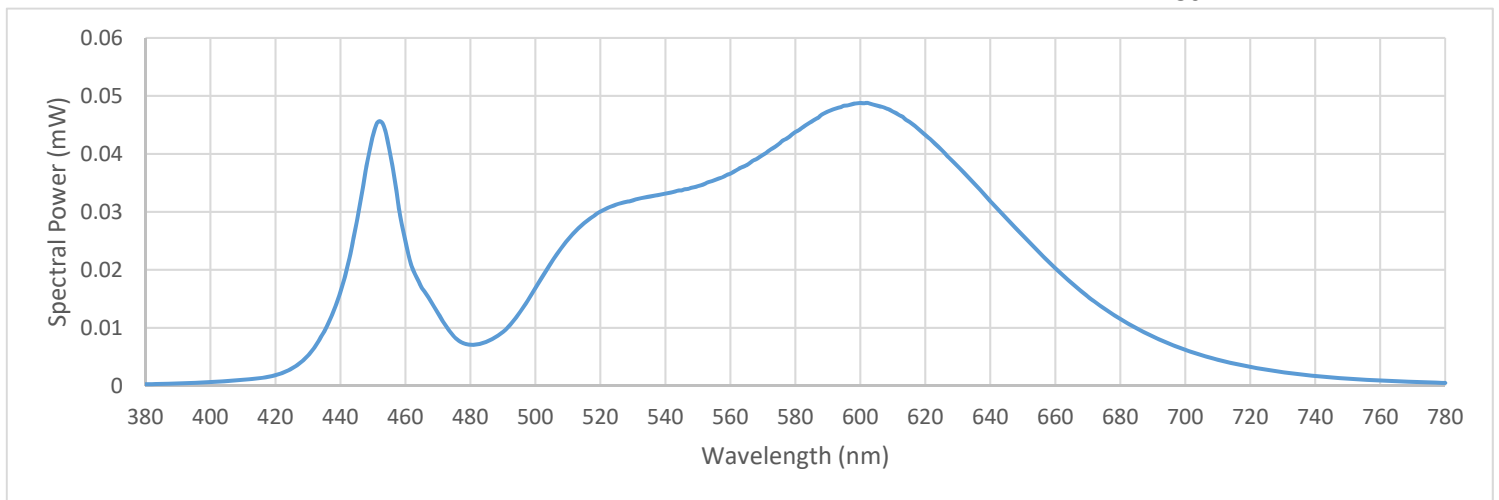
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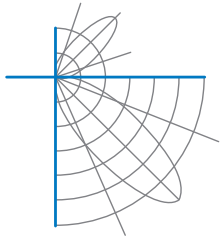
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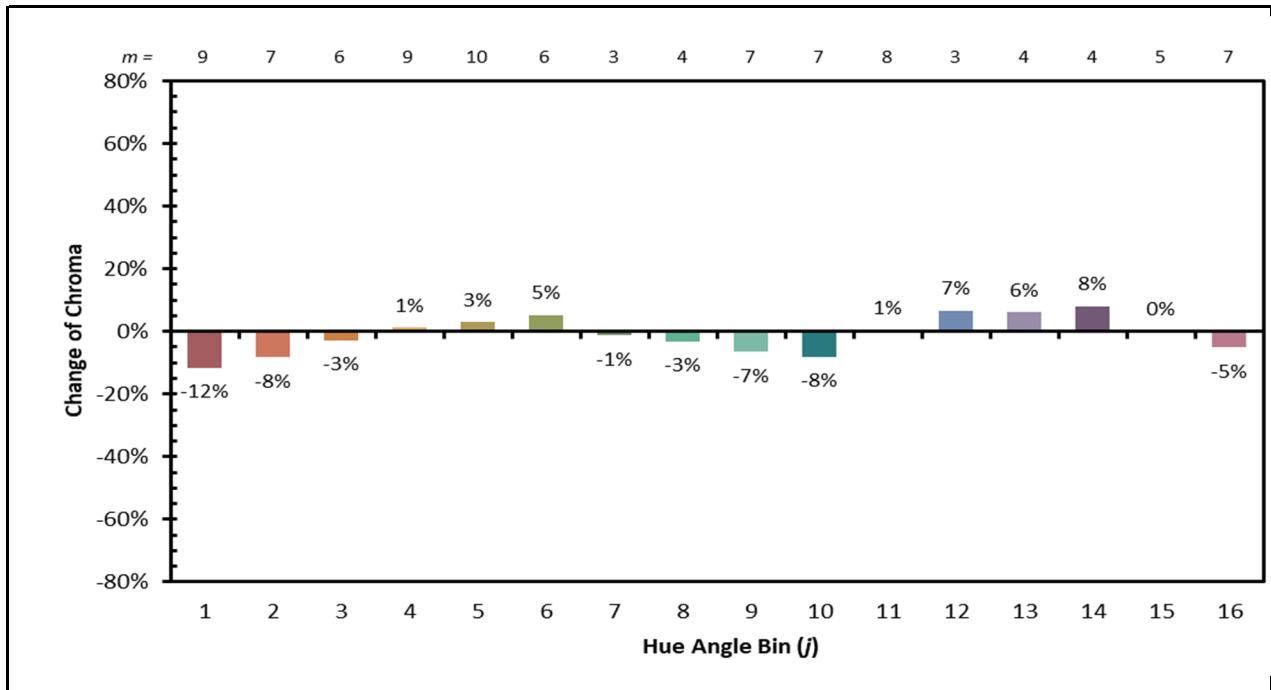
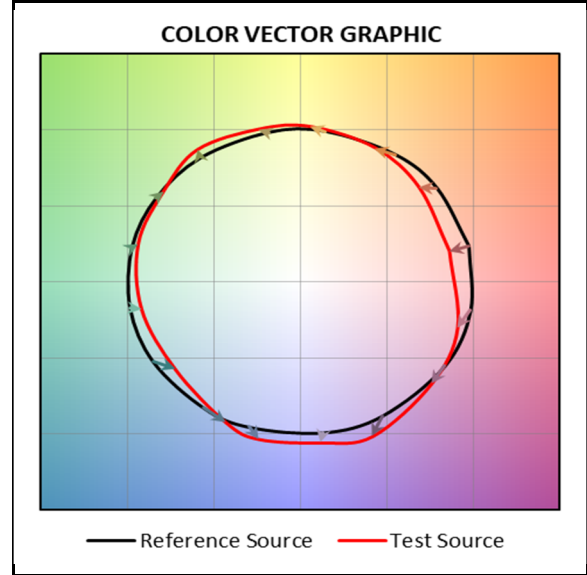
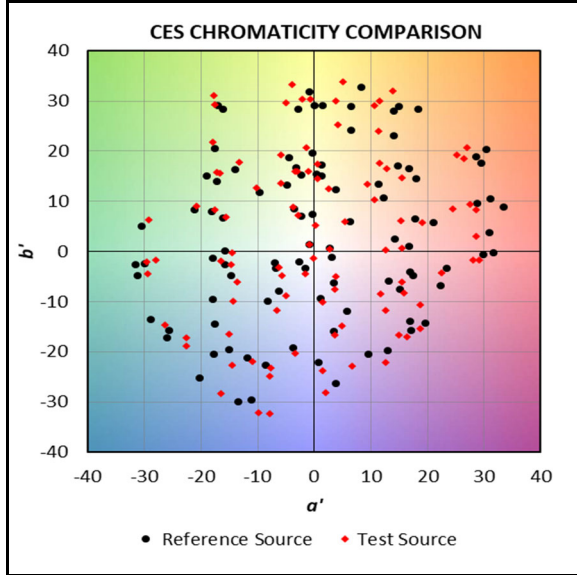
**Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)**

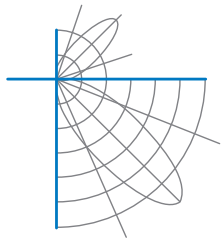
380	0.000283	480	0.007071	580	0.043774	680	0.011521
385	0.000304	485	0.007609	585	0.045579	685	0.009923
390	0.000385	490	0.009296	590	0.047277	690	0.008495
395	0.000498	495	0.012454	595	0.048308	695	0.007265
400	0.000653	500	0.016858	600	0.048783	700	0.006195
405	0.000825	505	0.021344	605	0.048352	705	0.005278
410	0.001019	510	0.025231	610	0.047283	710	0.004484
415	0.001280	515	0.028087	615	0.045577	715	0.003825
420	0.001829	520	0.030079	620	0.043247	720	0.003253
425	0.002939	525	0.031301	625	0.040713	725	0.002760
430	0.005220	530	0.031982	630	0.037829	730	0.002348
435	0.009352	535	0.032620	635	0.034970	735	0.001991
440	0.016154	540	0.033146	640	0.031839	740	0.001690
445	0.028197	545	0.033702	645	0.028861	745	0.001442
450	0.043075	550	0.034446	650	0.025899	750	0.001230
455	0.040882	555	0.035426	655	0.023017	755	0.001052
460	0.024986	560	0.036579	660	0.020298	760	0.000906
465	0.016929	565	0.038056	665	0.017733	765	0.000774
470	0.012551	570	0.039811	670	0.015395	770	0.000662
475	0.008446	575	0.041749	675	0.013352	775	0.000569
						780	0.000490





IES TM-30 Details





**Test Report Number: LLIA001159-008B**

Catalog Number: MLR3-MO-K35-80-4-XX-AL1-UNV

Recessed ceiling mounted, extruded aluminum housing with steel endcaps,  
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144 white LEDs, One Osram PrevaLED Bar LED board.

One Osram Optotronic OTi 20/120-277/700 DIM-1 L G2 LED driver labeled as 380mA

**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:** 25.3 °C

**Test Procedure:** Tested in accordance with the applicable sections of:  
LM-79-08, LM-78-07, LM-58-13, ANSI\_ANSLG C78.377-2017,  
ANSI C82-77-10:2014, TM-30-15

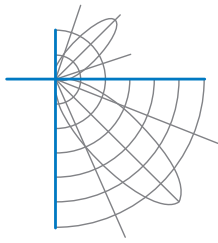
**Significance:** The laboratory has not participated in the selection of samples to be tested.  
All testing is performed on the understanding that the significance of the report  
is limited to the extent that the test sample is representative of production units.

**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.



## Report of Test

**LLIA001159-008C**

Electrical Test Report

Catalog Number: MLR3-MO-K35-80-4-XX-AL1-UNV

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

144 white LEDs, One Osram PrevaLED Bar LED board.

One Osram Optotronic OTi 20/120-277/700 DIM-1 L G2 LED driver labeled as 380mA



### Performance Summary

Voltage	277.0 Vac
Current	0.0835 A
Power	22.21 W
Frequency	60.00 Hz
Power Factor	0.960
Current THD	9.9 %

Ambient Temperature: 25.2 °C

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

Tested in accordance with the applicable sections of C82.77-10-2014. 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. 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.

Test date: 08/29/2019

Report date: 09/04/2019

Electrical Report Template V1-2