

Report of Test

LLIA001168-003A

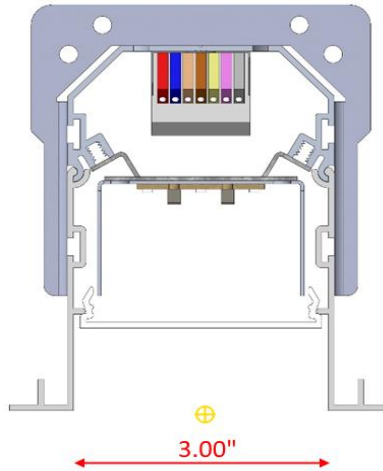
Indoor Distribution Photometry Test Report

Catalog Number: MLR3RG-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 400mA.



Prepared For:

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

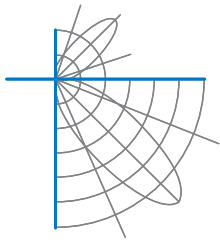
Performance Summary			
Input Voltage	120.0 V	Luminous Flux	1541.9 Lumens
Input Current	0.1321 A	Total Efficacy	98.5 Lm/W
Input Power	15.65 W	Downward Flux	1541.9 Lumens
Frequency	60.00 Hz	Downward Flux	100.0 % of Total
Power Factor	0.988		
Current THD	6.9 %		

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

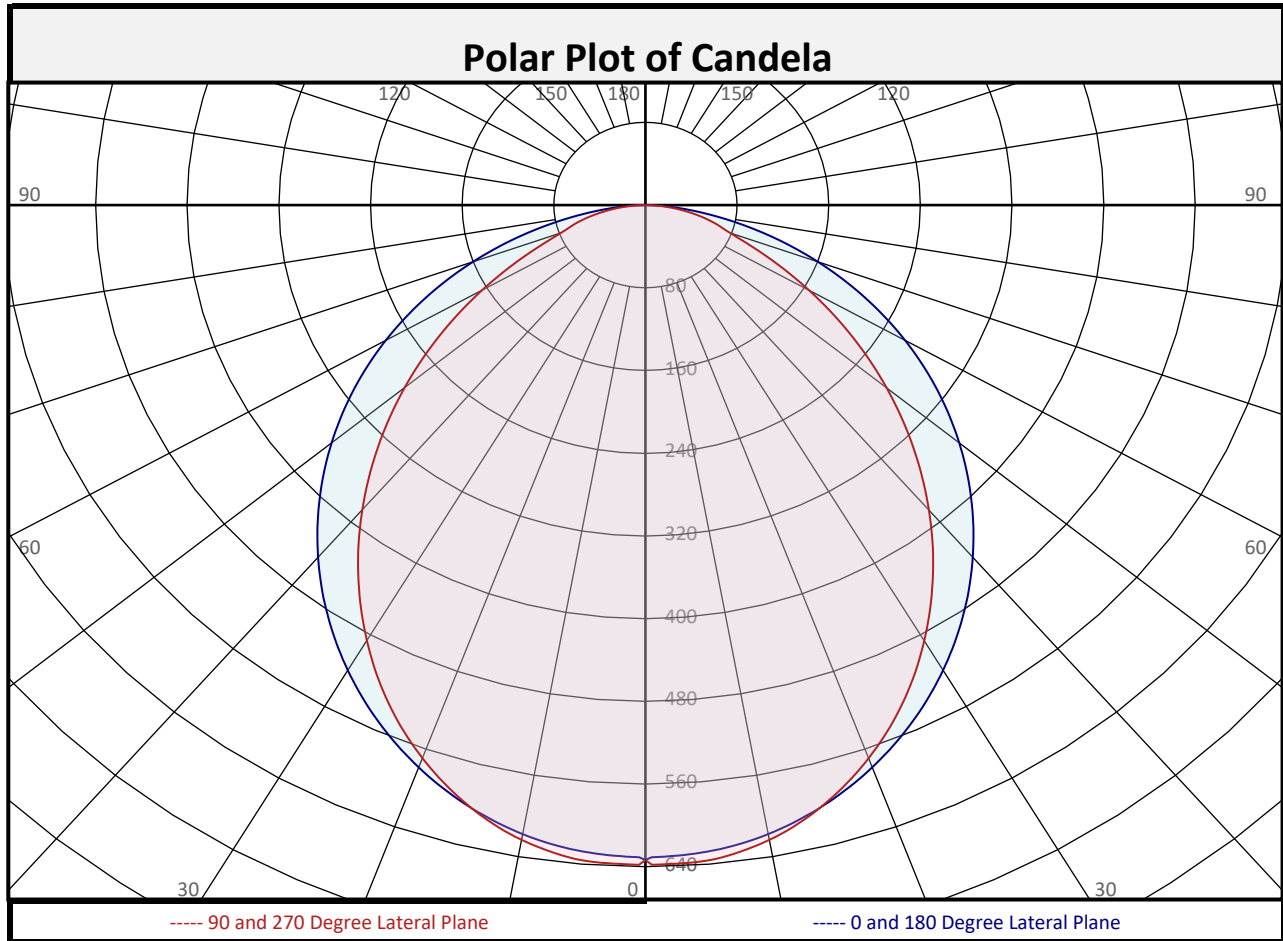
Test date: 11/01/2019

Report date: 11/04/2019

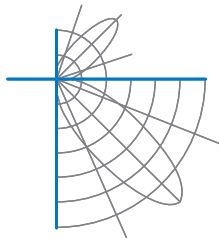
Signed: _____



Report of Test
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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	59.9	3.9%		90-100	0.0	0.0%		0-20	229.4	14.9%
10-20	169.5	11.0%		100-110	0.0	0.0%		0-30	479.0	31.1%
20-30	249.6	16.2%		110-120	0.0	0.0%		0-40	767.2	49.8%
30-40	288.2	18.7%		120-130	0.0	0.0%		0-60	1284	83.3%
40-50	282.1	18.3%		130-140	0.0	0.0%		0-80	1520	98.6%
50-60	234.7	15.2%		140-150	0.0	0.0%		10-90	1482	96.1%
60-70	157.2	10.2%		150-160	0.0	0.0%		20-50	819.9	53.2%
70-80	79.2	5.1%		160-170	0.0	0.0%		40-90	774.7	50.2%
80-90	21.5	1.4%		170-180	0.0	0.0%		60-90	257.9	16.7%
0-90	1542	100.0%		90-180	0.0	0.0%		0-180	1542	100.0%

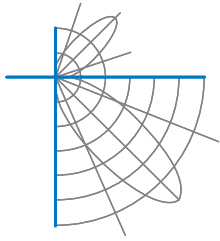


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Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	0	634	634	634	634	634	634	634	634	634
	2.5	630	630	632	635	638	635	632	630	630
	5	628	628	630	634	636	634	630	628	628
	7.5	624	625	627	629	631	629	627	625	624
	10	618	619	621	622	623	622	621	619	618
	12.5	610	612	612	613	613	613	612	612	610
	15	601	603	602	601	601	601	602	603	601
	17.5	591	592	589	587	586	587	589	592	591
	20	579	580	575	571	569	571	575	580	579
	22.5	566	566	559	554	551	554	559	566	566
	25	551	551	542	535	531	535	542	551	551
	27.5	536	535	524	514	510	514	524	535	536
	30	520	518	504	492	487	492	504	518	520
	32.5	502	499	483	468	462	468	483	499	502
	35	484	480	461	444	437	444	461	480	484
	37.5	464	459	438	419	411	419	438	459	464
	40	444	438	414	393	385	393	414	438	444
	42.5	424	417	390	367	357	367	390	417	424
	45	402	394	365	340	330	340	365	394	402
	47.5	380	371	339	312	302	312	339	371	380
50	357	347	313	285	274	285	313	347	357	
52.5	334	322	286	257	246	257	286	322	334	
55	310	297	259	230	219	230	259	297	310	
57.5	286	272	232	202	191	202	232	272	286	
60	262	246	205	175	165	175	205	246	262	
62.5	236	220	179	149	139	149	179	220	236	
65	211	194	152	124	115	124	152	194	211	
67.5	186	167	127	101	95	101	127	167	186	
70	160	142	102	82	78	82	102	142	160	
72.5	134	116	79	68	68	68	79	116	134	
75	109	92	61	59	58	59	61	92	109	
77.5	85	69	50	49	48	49	50	69	85	
80	63	47	39	38	37	38	39	47	63	
82.5	43	31	28	28	27	28	28	31	43	
85	25	20	18	18	17	18	18	20	25	
87.5	11	9	8	8	8	8	8	9	11	
90	0	0	0	0	0	0	0	0	0	

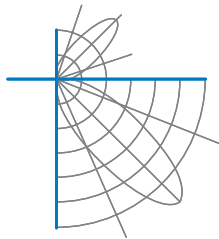


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Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	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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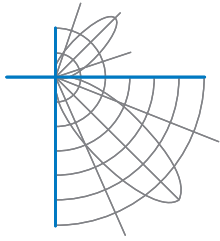
Coefficients of Utilization/Room Utilization - Zonal Cavity Method																						
Effective Floor Cavity Reflectance 0.20																						
RC	80					70					50				30				10			0
RW	70	50	30	10		70	50	30	10		50	30	10		50	30	10		50	30	10	0
RCR																						
0	119	119	119	119		116	116	116	116		111	111	111		106	106	106		102	102	102	100
1	110	105	101	97		107	103	99	96		99	96	93		95	92	90		91	89	87	85
2	100	92	86	81		98	91	85	80		87	82	78		84	80	76		81	77	74	72
3	92	82	74	68		89	80	73	67		77	71	66		75	69	65		72	68	64	62
4	84	73	64	58		82	72	64	58		69	62	57		67	61	56		65	60	55	53
5	78	65	57	50		76	64	56	50		62	55	50		60	54	49		58	53	49	46
6	72	59	50	44		70	58	50	44		56	49	44		55	48	43		53	47	43	41
7	67	54	45	39		65	53	45	39		51	44	39		50	43	39		49	43	38	36
8	62	49	41	35		61	49	41	35		47	40	35		46	39	35		45	39	35	33
9	58	45	37	32		57	45	37	32		44	37	32		42	36	31		41	36	31	29
10	55	42	34	29		53	41	34	29		40	34	29		39	33	29		39	33	29	27

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	17.6	7.33	6.91	
8.0	9.9	9.77	9.22	
10.0	6.3	12.22	11.52	
12.0	4.4	14.66	13.83	
14.0	3.2	17.10	16.13	
16.0	2.5	19.55	18.44	

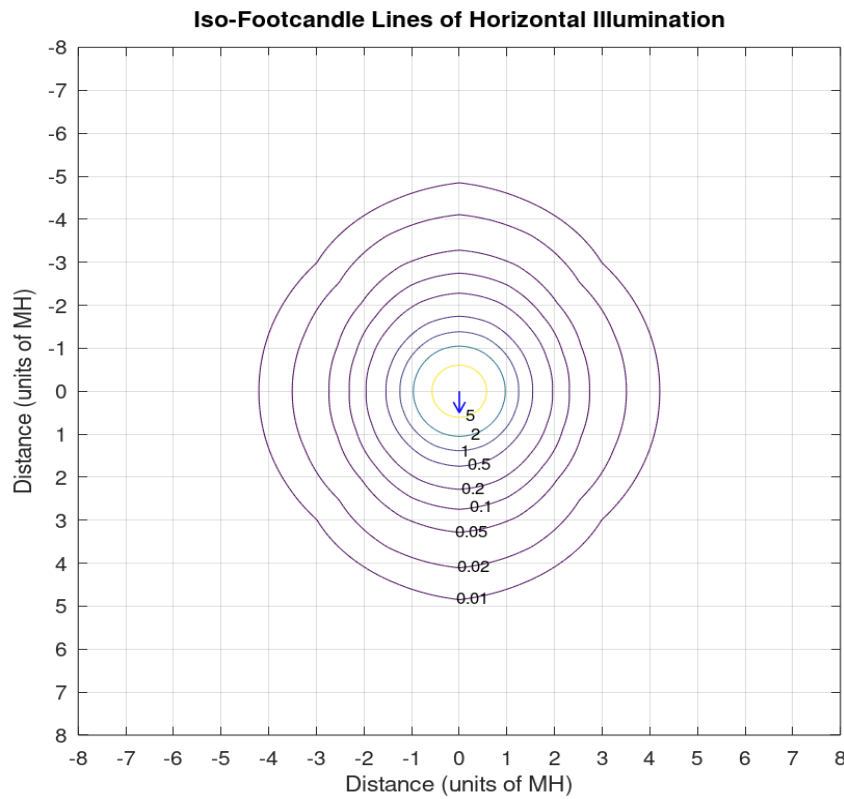
Average Luminance (cd/m ²)			
	0 deg Plane	45 deg Plane	90 deg Plane
0	7002	7002	7002
45	6284	5706	5156
55	5982	4995	4214
65	5519	3984	3020
75	4674	2607	2494
85	3212	2279	2184

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

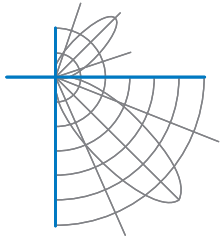


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Iso-Illuminance Plot



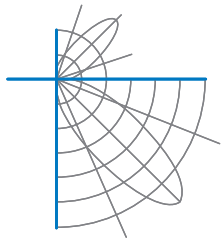
The isofootcandle values shown in the plot above are based on a mounting height of $h = 8.0$ feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the contribution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



Report of Test
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Additional Pictures of Test Subject





Report of Test

LLIA001168-003A

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

LLIA001168-003B

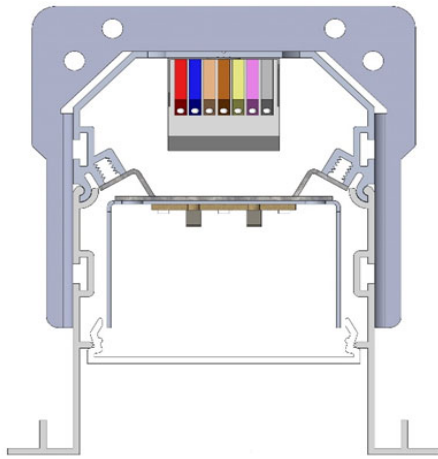
Integrating Sphere Report

Catalog Number: MLR3RG-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 400mA.



Performance Summary

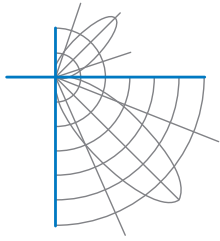
Voltage	120.0 Vac
Current	0.1322 A
Power	15.64 W
Frequency	59.97 Hz
Power Factor	0.987
Current THD	7.0 %
Total Luminous Flux	1556.8 lm
Efficacy	99.5 lm/W
Chromaticity (x,y)	(0.4051, 0.3912)
(u',v')	(0.2354, 0.5114)
Duv	0.0002
CCT	3508 K
CRI (Ra)	82
R9	7
TM-30: Rf	81
TM-30: Rg	98

Prepared For:

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

Test date: 11/01/2019

Report date: 11/05/2019



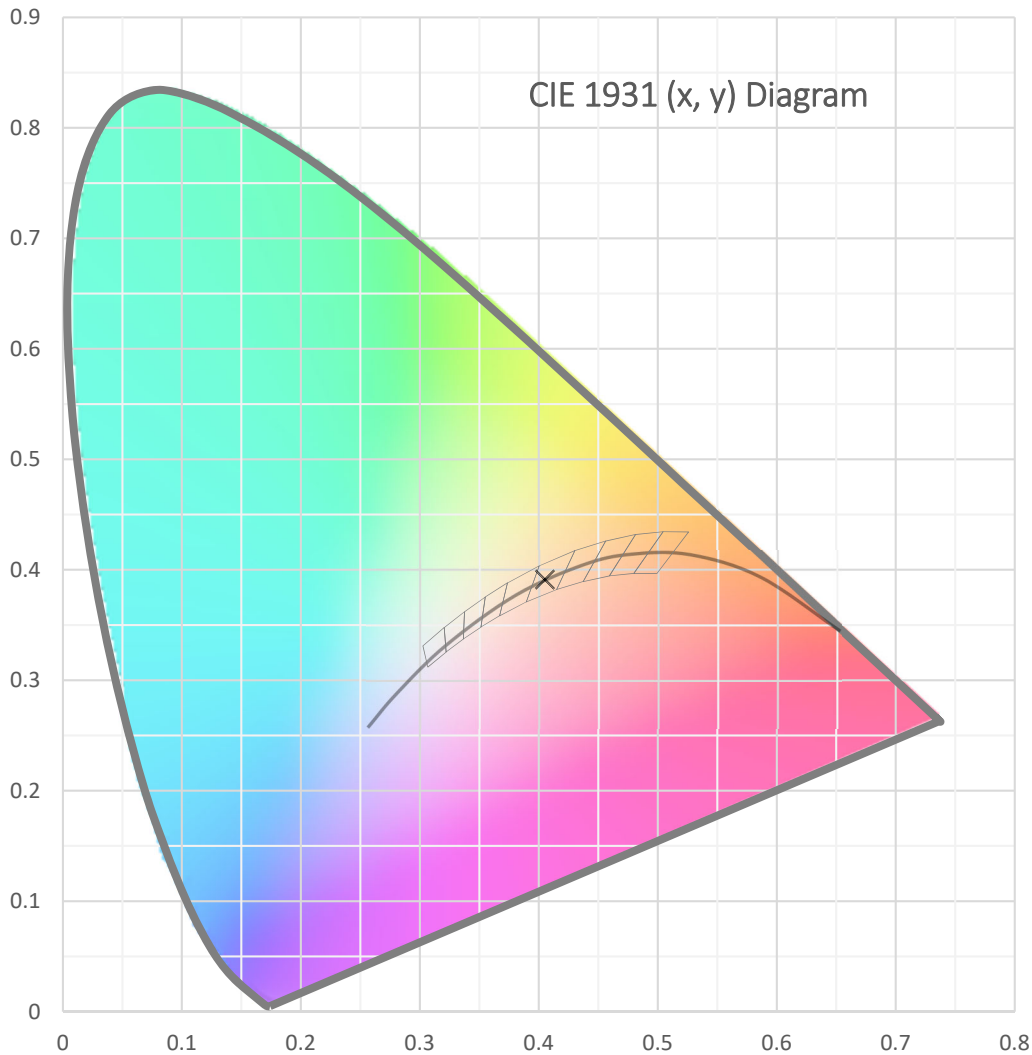
Test Report Number: LLIA001168-003B

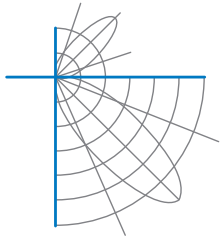
Catalog Number: MLR3RG-MO-K35-80-4-XX-LOH-UNV

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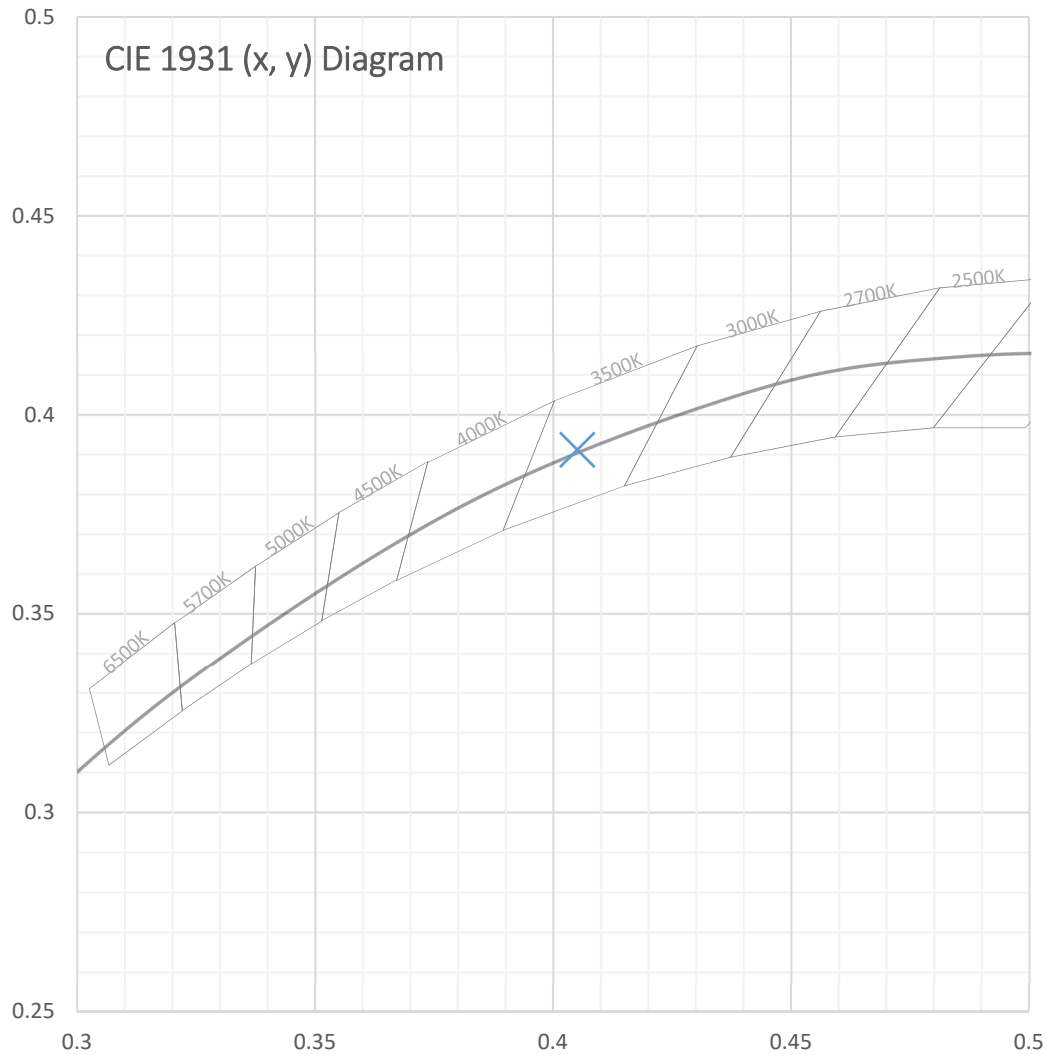
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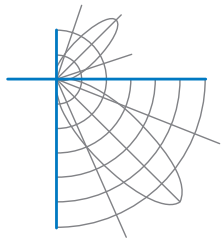
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144 white LEDs, four Osram PrevaLED BARs with 36 LEDs each.

One Osram Optotronic OTi 20/120-277/700 DIM-1 L G2 LED driver labeled as 400mA.

Spectral Data

Total Radiant Flux	4.655 W
Total Luminous Flux	1556.8 Lm
Chromaticity CIE 1931 (x, y)	(0.4051, 0.3912)
Chromaticity CIE 1976 (u', v')	(0.2354, 0.5114)
Correlated Color Temperature (CCT)	3508 K
Color Rendering Index (Ra)	82
R1	82
R2	87
R3	93
R4	84
R5	81
R6	84
R7	85
R8	63
R9	7
R10	71
R11	84
R12	61
R13	83
R14	96
TM-30: Rf	81
TM-30: Rg	98
Distance from Planckian Locus (Duv)	0.0002
Scotopic/Photopic Ratio *	1.487

Electrical Data

Voltage	120.0 Vac
Current	0.1322 A
Power	15.64 W
Frequency	59.97 Hz
Power Factor	0.987
Current THD	7.0 %



Test Report Number: LLIA001168-003B

Catalog Number: MLR3RG-MO-K35-80-4-XX-LOH-UNV

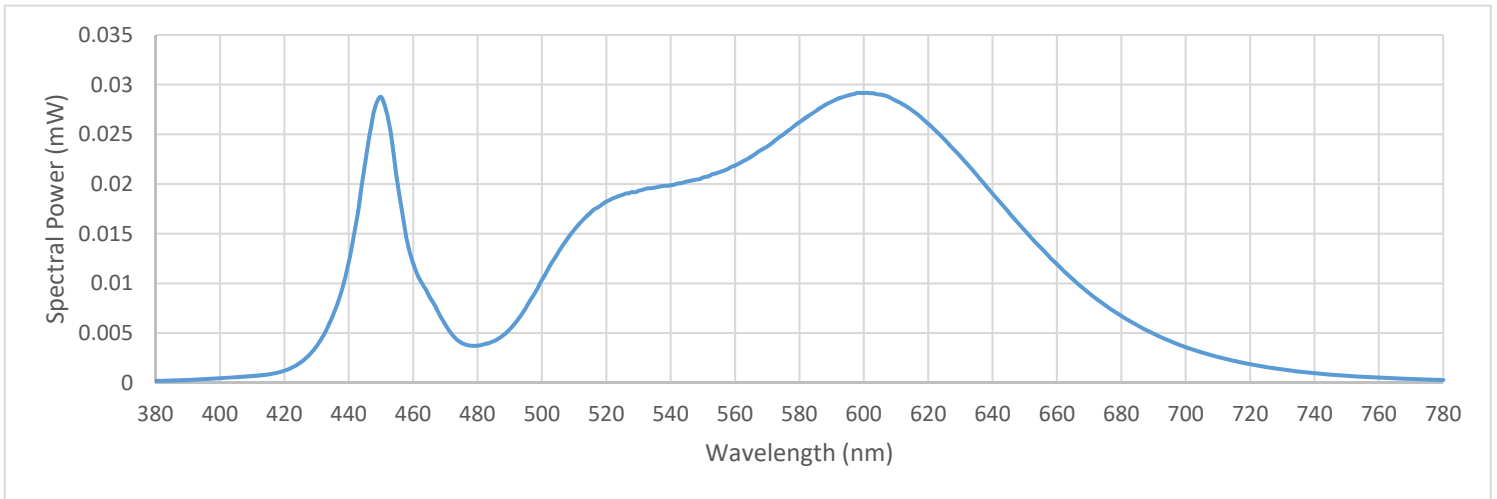
Recessed ceiling mounted, extruded aluminum housing, formed white enamel aluminum reflector, translucent white plastic enclosure.

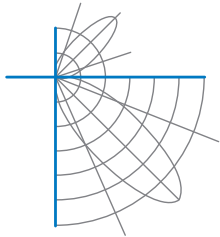
144 white LEDs, four Osram PrevaLED BARs with 36 LEDs each.

One Osram Optotronic OTi 20/120-277/700 DIM-1 L G2 LED driver labeled as 400mA.

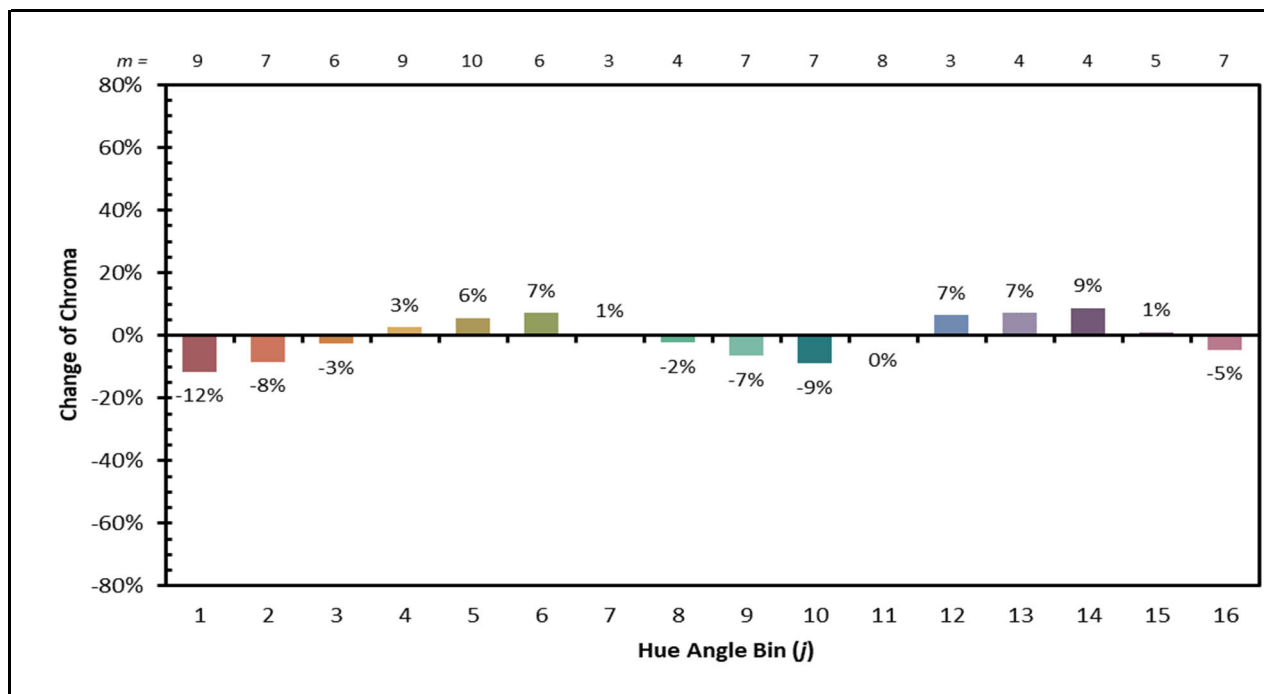
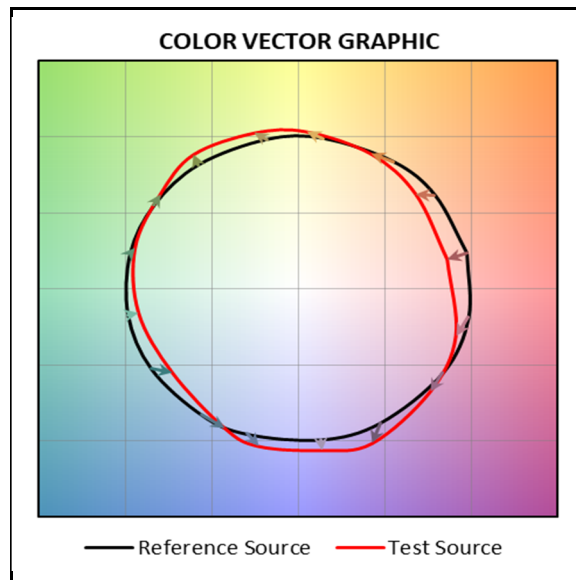
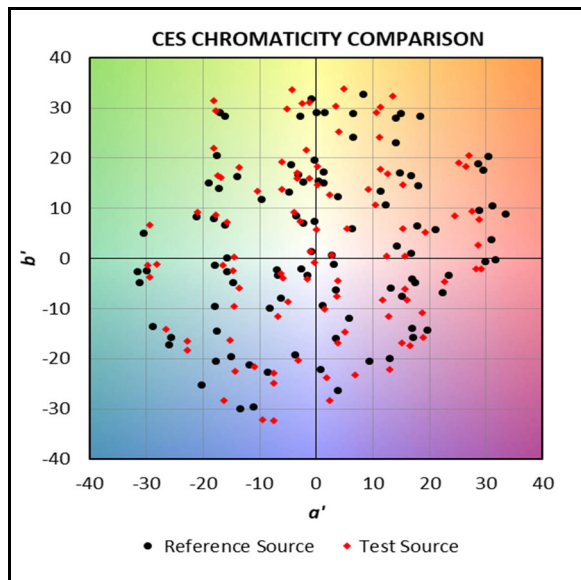
Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

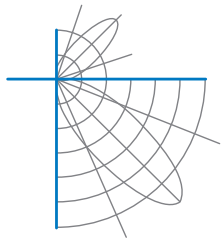
380	0.000188	480	0.003739	580	0.026207	680	0.006721
385	0.000208	485	0.004186	585	0.027303	685	0.005770
390	0.000280	490	0.005382	590	0.028285	690	0.004936
395	0.000358	495	0.007521	595	0.028913	695	0.004211
400	0.000462	500	0.010337	600	0.029149	700	0.003595
405	0.000567	505	0.013072	605	0.029002	705	0.003056
410	0.000670	510	0.015404	610	0.028354	710	0.002583
415	0.000837	515	0.017061	615	0.027422	715	0.002205
420	0.001222	520	0.018234	620	0.026040	720	0.001867
425	0.002032	525	0.018903	625	0.024502	725	0.001583
430	0.003707	530	0.019314	630	0.022766	730	0.001345
435	0.006698	535	0.019631	635	0.020961	735	0.001137
440	0.012092	540	0.019886	640	0.019030	740	0.000965
445	0.021925	545	0.020259	645	0.017167	745	0.000822
450	0.028759	550	0.020648	650	0.015309	750	0.000703
455	0.020465	555	0.021163	655	0.013557	755	0.000601
460	0.012049	560	0.021855	660	0.011930	760	0.000515
465	0.008703	565	0.022764	665	0.010392	765	0.000441
470	0.005842	570	0.023793	670	0.009004	770	0.000378
475	0.004012	575	0.024986	675	0.007792	775	0.000323
						780	0.000278





IES TM-30 Details





Test Report Number: LLIA001168-003B

Catalog Number: MLR3RG-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 400mA.

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

Test Temperature: 25.8 °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.