

Report of Test

LLIA001159-004A

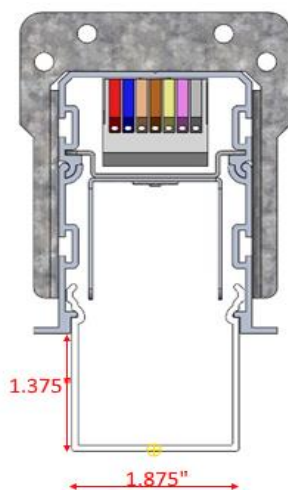
Indoor Distribution Photometry Test Report

Catalog Number: MLR2-HO-K35-80-4-XX-AL2-UNV

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

92 white LEDs, One PAL-Lighting FlexRad board.

One Osram Optotronic OTi 30/120-277/1A0 DIM-1 L G2 LED driver labeled as 720mA



Prepared For:

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

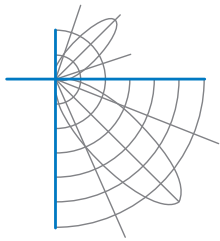
Performance Summary			
Input Voltage	120.0 V	Luminous Flux	2747.6 Lumens
Input Current	0.2312 A	Total Efficacy	100.3 Lm/W
Input Power	27.39 W	Downward Flux	2221.7 Lumens
Frequency	60.00 Hz	Downward Flux	80.9 % of Total
Power Factor	0.988		
Current THD	7.4 %		

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

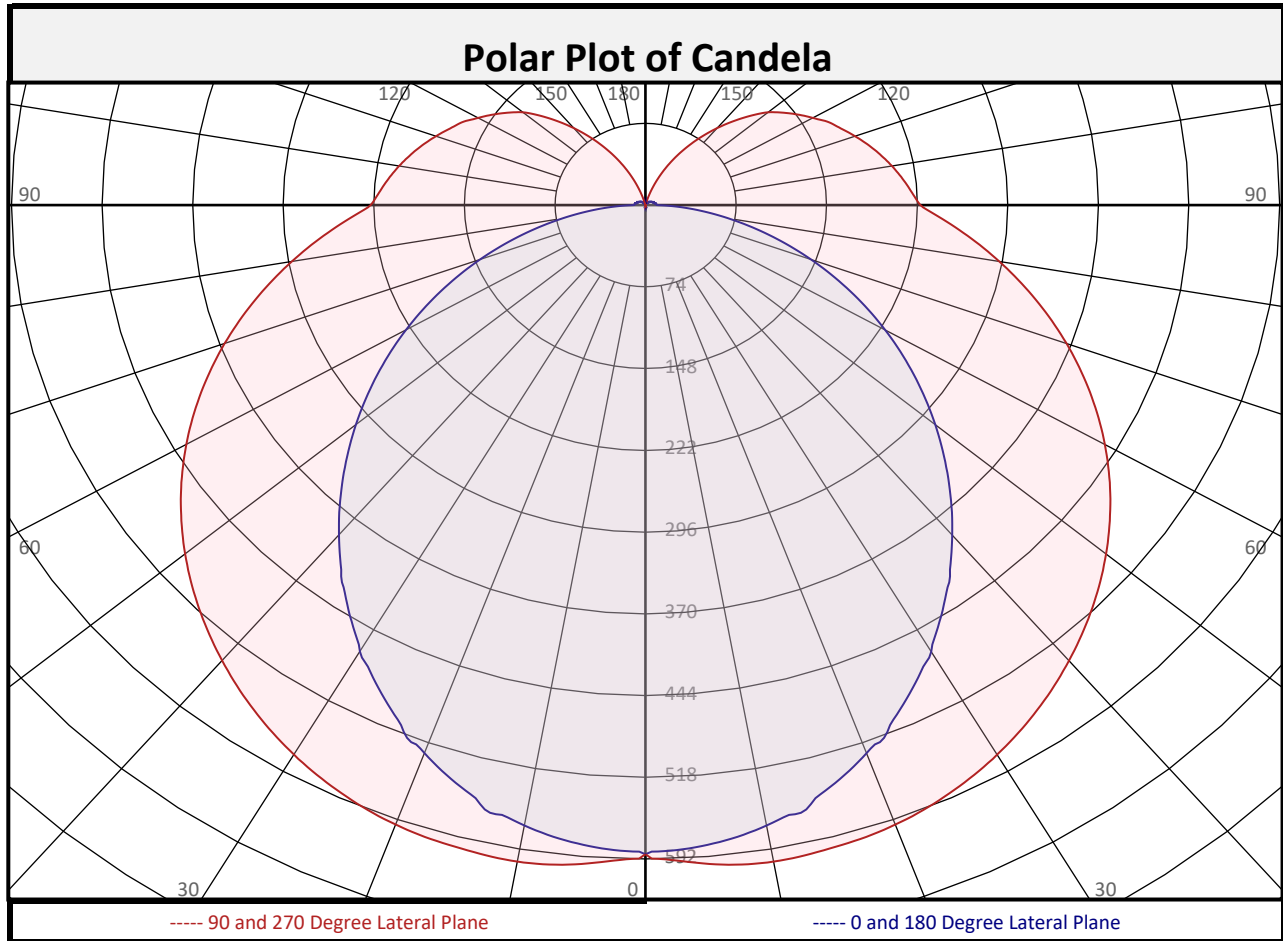
Test date: 09/05/2019

Report date: 09/06/2019

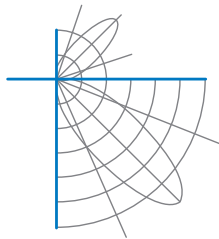
Signed: _____



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	56.3	2.0%		90-100	145.5	5.3%		0-20	220.3	8.0%	
10-20	164.0	6.0%		100-110	127.3	4.6%		0-30	473.8	17.2%	
20-30	253.5	9.2%		110-120	103.0	3.7%		0-40	788.8	28.7%	
30-40	315.0	11.5%		120-130	75.3	2.7%		0-60	1475	53.7%	
40-50	344.7	12.5%		130-140	46.0	1.7%		0-80	2037	74.1%	
50-60	341.9	12.4%		140-150	21.8	0.8%		10-90	2165	78.8%	
60-70	308.8	11.2%		150-160	6.6	0.2%		20-50	913.2	33.2%	
70-80	252.3	9.2%		160-170	0.4	0.0%		40-90	1433	52.2%	
80-90	185.1	6.7%		170-180	0.0	0.0%		60-90	746.3	27.2%	
0-90	2222	80.9%		90-180	525.9	19.1%		0-180	2748	100.0%	

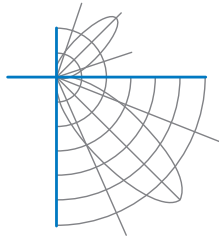


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Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	0	588	588	588	588	588	588	588	588	588
	2.5	584	585	588	592	594	592	588	585	584
	5	581	584	589	595	599	595	589	584	581
	7.5	577	581	590	598	602	598	590	581	577
	10	570	578	589	599	604	599	589	578	570
	12.5	565	572	587	598	603	598	587	572	565
	15	552	569	582	595	601	595	582	569	552
	17.5	541	557	579	592	600	592	579	557	541
	20	528	547	570	589	597	589	570	547	528
	22.5	516	536	562	584	593	584	562	536	516
	25	499	523	553	578	588	578	553	523	499
	27.5	482	510	544	571	582	571	544	510	482
	30	467	495	533	563	575	563	533	495	467
	32.5	447	480	522	554	567	554	522	480	447
	35	429	464	510	545	558	545	510	464	429
	37.5	409	448	497	535	549	535	497	448	409
	40	390	431	484	524	538	524	484	431	390
	42.5	370	415	470	512	528	512	470	415	370
	45	350	397	455	500	516	500	455	397	350
	47.5	329	380	440	487	504	487	440	380	329
50	309	362	425	473	491	473	425	362	309	
52.5	288	344	409	459	478	459	409	344	288	
55	268	325	393	445	464	445	393	325	268	
57.5	247	306	376	430	449	430	376	306	247	
60	226	288	359	414	433	414	359	288	226	
62.5	205	269	342	397	417	397	342	269	205	
65	185	249	324	381	401	381	324	249	185	
67.5	164	230	306	363	384	363	306	230	164	
70	144	211	288	346	366	346	288	211	144	
72.5	124	193	271	328	348	328	271	193	124	
75	105	174	253	310	330	310	253	174	105	
77.5	86	157	235	292	312	292	235	157	86	
80	68	139	218	274	293	274	218	139	68	
82.5	52	123	201	256	275	256	201	123	52	
85	36	107	184	239	257	239	184	107	36	
87.5	22	92	168	222	240	222	168	92	22	
90	9	80	154	208	225	208	154	80	9	

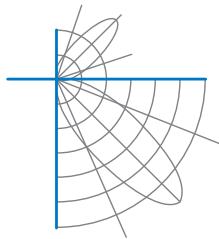


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Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	90	9	80	154	208	225	208	154	80	9
	92.5	9	78	151	202	219	202	151	78	9
	95	9	76	148	198	214	198	148	76	9
	97.5	9	74	145	194	209	194	145	74	9
	100	8	72	142	189	204	189	142	72	8
	102.5	8	70	138	184	199	184	138	70	8
	105	8	68	134	179	194	179	134	68	8
	107.5	7	65	130	174	188	174	130	65	7
	110	7	61	126	168	182	168	126	61	7
	112.5	7	56	122	163	176	163	122	56	7
	115	7	52	117	157	171	157	117	52	7
	117.5	6	47	112	152	165	152	112	47	6
	120	6	43	108	146	158	146	108	43	6
	122.5	5	38	102	139	151	139	102	38	5
	125	5	34	94	133	145	133	94	34	5
	127.5	5	30	86	126	138	126	86	30	5
	130	4	25	78	117	131	117	78	25	4
	132.5	4	21	71	108	121	108	71	21	4
	135	4	17	64	98	111	98	64	17	4
	137.5	3	13	56	89	101	89	56	13	3
140	3	9	49	80	91	80	49	9	3	
142.5	2	5	42	70	81	70	42	5	2	
145	2	3	35	61	71	61	35	3	2	
147.5	2	2	28	52	61	52	28	2	2	
150	2	1	22	43	52	43	22	1	2	
152.5	1	1	16	35	42	35	16	1	1	
155	1	0	10	27	33	27	10	0	1	
157.5	0	0	4	19	24	19	4	0	0	
160	0	0	0	11	16	11	0	0	0	
162.5	0	0	0	4	8	4	0	0	0	
165	0	0	0	0	2	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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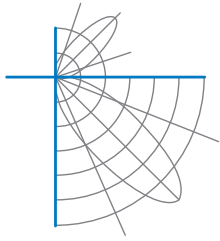
Coefficients of Utilization/Room Utilization - Zonal Cavity Method																						
Effective Floor Cavity Reflectance 0.20																						
RC	80					70					50				30				10			0
RW	70	50	30	10		70	50	30	10		50	30	10		50	30	10		50	30	10	0
RCR																						
0	114	114	114	114		110	110	110	110		100	100	100		92	92	92		84	84	84	81
1	102	96	91	86		97	92	87	83		84	80	77		77	74	71		70	68	65	62
2	91	82	74	68		87	78	71	65		72	66	61		66	61	57		60	56	53	49
3	83	71	62	55		78	68	60	53		62	56	50		57	51	47		52	47	44	40
4	75	63	53	46		71	60	51	45		55	48	42		50	44	39		46	41	37	34
5	69	55	46	39		65	53	44	38		49	41	36		45	39	34		41	36	32	29
6	63	50	40	34		60	48	39	33		44	37	31		40	34	29		37	32	27	25
7	59	45	36	29		56	43	35	29		40	32	27		37	30	26		34	28	24	22
8	55	41	32	26		52	39	31	25		36	29	24		34	27	23		31	26	22	19
9	51	37	29	23		48	36	28	23		33	26	22		31	25	20		29	23	19	17
10	48	34	26	21		45	33	25	20		31	24	19		29	23	18		26	21	17	16

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	16.3	7.10	8.71	
8.0	9.2	9.46	11.61	
10.0	5.9	11.83	14.52	
12.0	4.1	14.20	17.42	
14.0	3.0	16.56	20.32	
16.0	2.3	18.93	23.23	

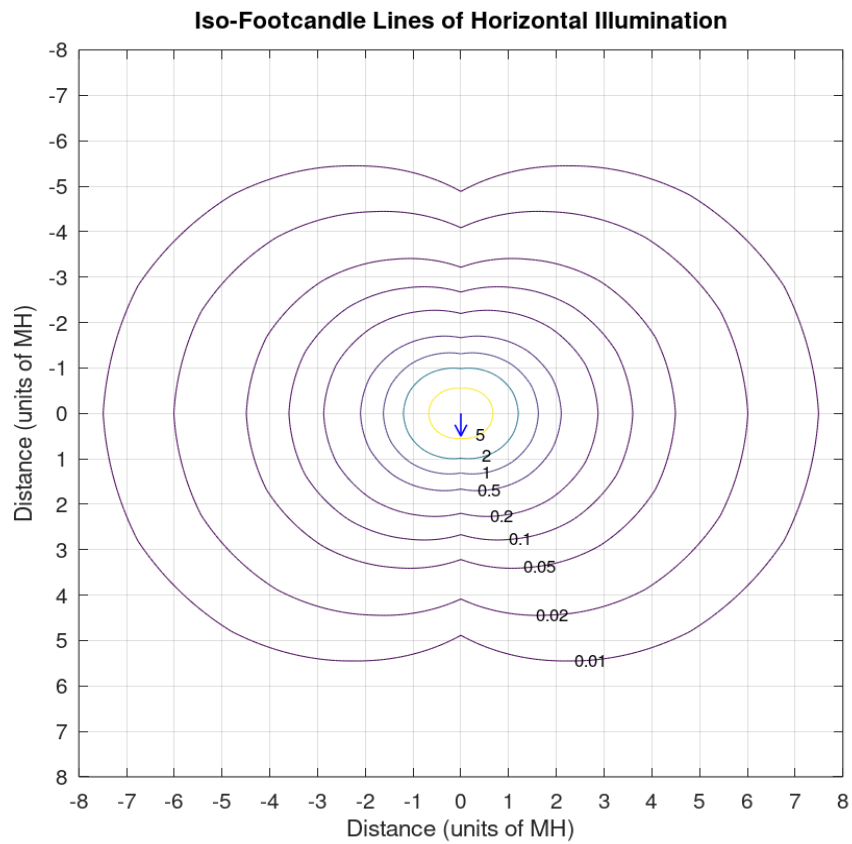
Average Luminance (cd/m ²)			
	0 deg Plane	45 deg Plane	90 deg Plane
0	10365	10365	10365
45	8655	9898	10727
55	8134	9977	11089
65	7572	10285	11701
75	6917	11119	12872
85	6725	13894	15844

Spacing Criterion	
0 degree plane:	1.2
90 degree plane:	1.5
180 degree plane:	1.2
270 degree plane:	1.5

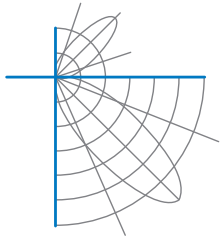


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Iso-Illuminance Plot



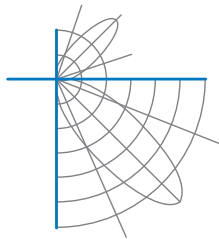
The isofootcandle values shown in the plot above are based on a mounting height of $h = 8.0$ feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the contribution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



Report of Test
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Additional Pictures of Test Subject





Report of Test

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Test Distance 9.5 m
Ambient Temperature 25.4 °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.

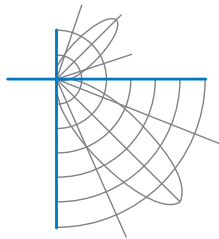
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

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

LLIA001159-004B

Integrating Sphere Report

Catalog Number: MLR2-HO-K35-80-4-XX-AL2-UNV

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

92 white LEDs, One PAL-Lighting FlexRad board.

One Osram Optotronic OTi 30/120-277/1A0 DIM-1 L G2 LED driver labeled as 720mA



Performance Summary

Voltage	120.0 Vac
Current	0.2316 A
Power	27.41 W
Frequency	60.00 Hz
Power Factor	0.986
Current THD	7.3 %
Total Luminous Flux	2758.9 lm
Efficacy	100.7 lm/W
Chromaticity (x,y)	(0.4039, 0.3869)
(u',v')	(0.2364, 0.5094)
Duv	-0.0014
CCT	3500 K
CRI (Ra)	84
R9	15
TM-30: Rf	83
TM-30: Rg	94

Prepared For:

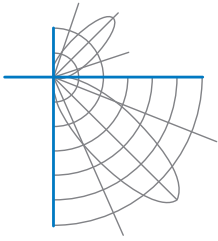
Precision Architectural Lighting

4830 Timber Creek Drive

Houston, TX 77017, USA

Test date: 09/04/2019

Report date: 09/06/2019



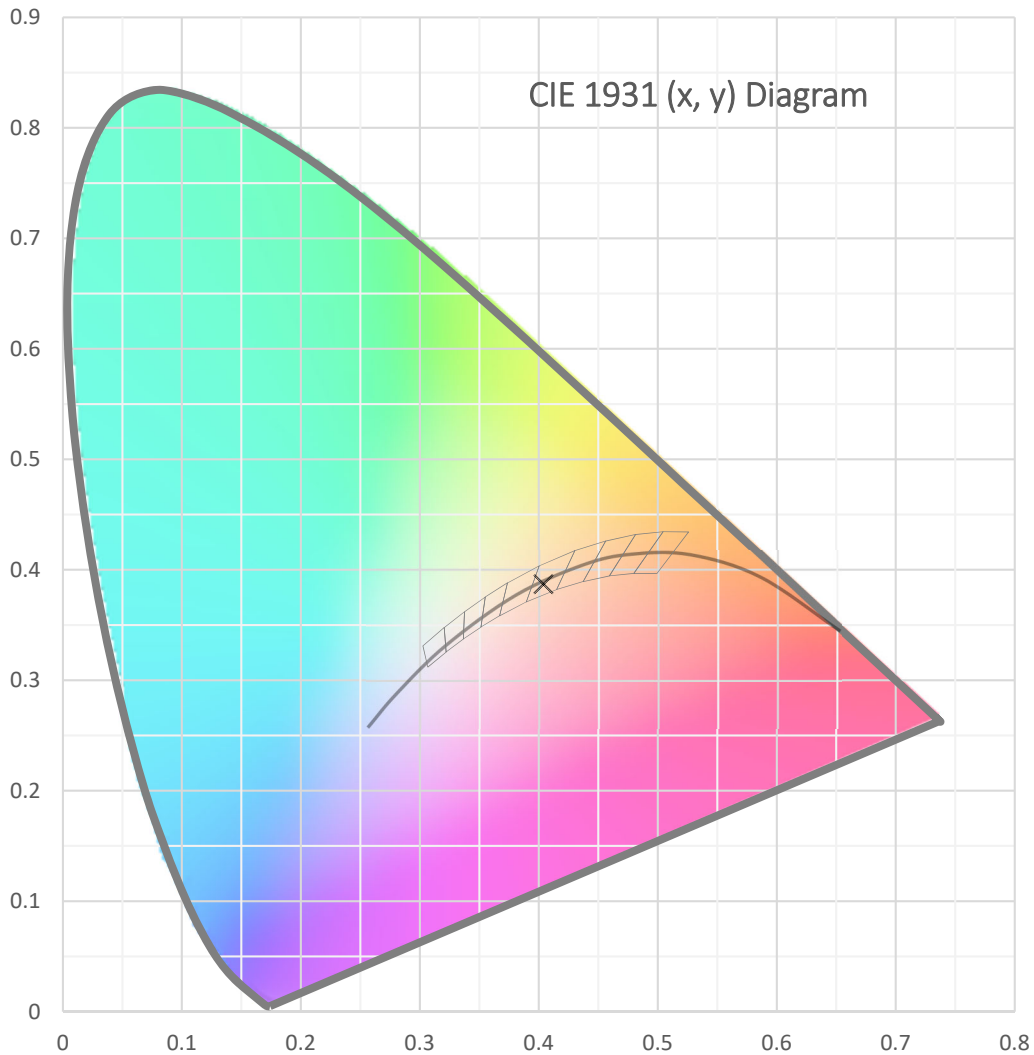
Test Report Number: LLIA001159-004B

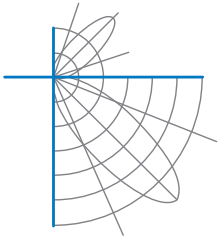
Catalog Number: MLR2-HO-K35-80-4-XX-AL2-UNV

Recessed ceiling mounted, extruded aluminum housing with steel endcaps,
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92 white LEDs, One PAL-Lighting FlexRad board.

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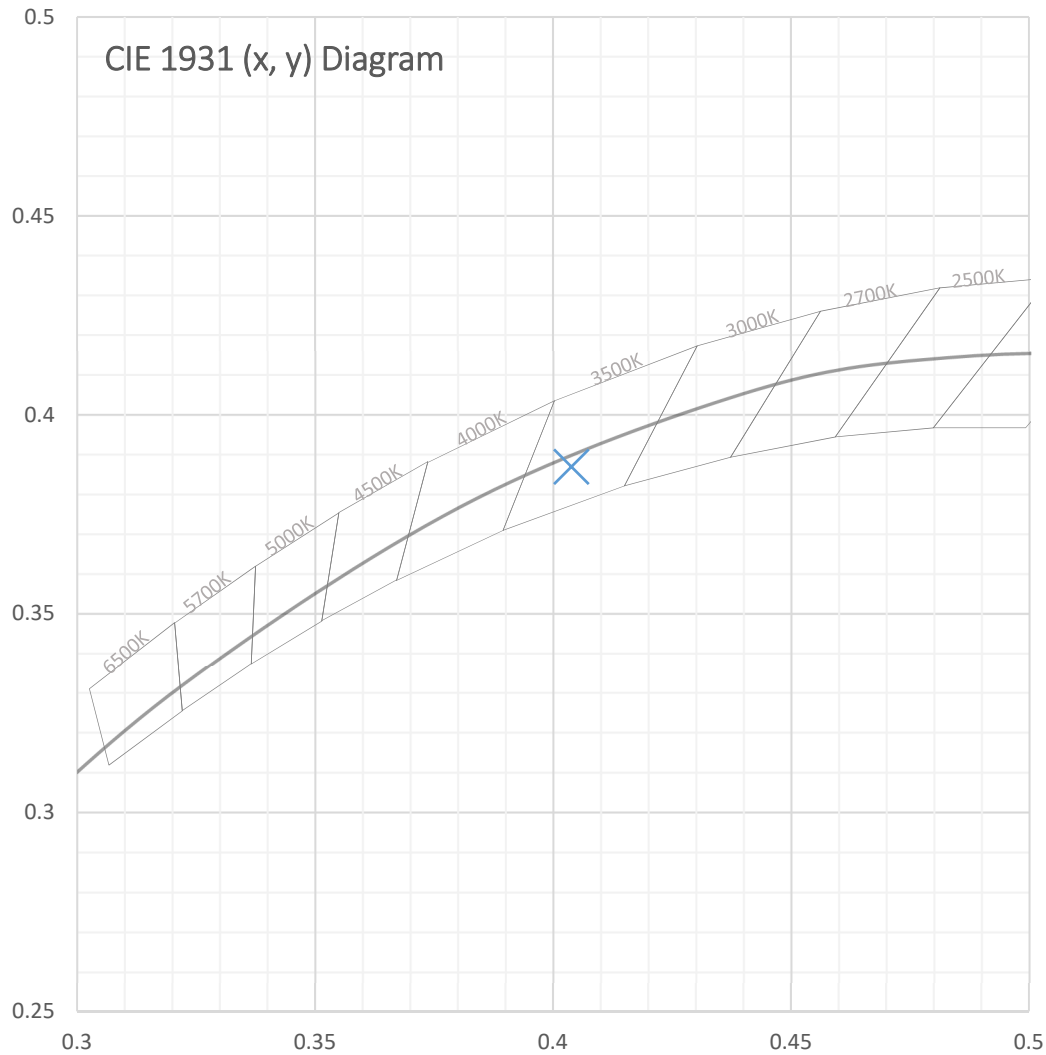
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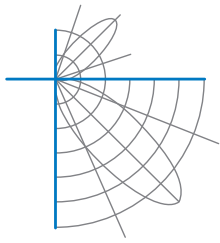
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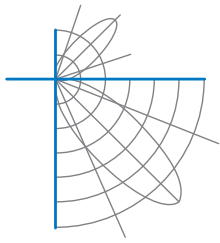
One Osram Optotronic OTi 30/120-277/1A0 DIM-1 L G2 LED driver labeled as 720mA

Spectral Data

Total Radiant Flux	8.565 W
Total Luminous Flux	2758.9 Lm
Chromaticity CIE 1931 (x, y)	(0.4039, 0.3869)
Chromaticity CIE 1976 (u', v')	(0.2364, 0.5094)
Correlated Color Temperature (CCT)	3500 K
Color Rendering Index (Ra)	84
R1	83
R2	93
R3	96
R4	81
R5	83
R6	90
R7	84
R8	64
R9	15
R10	82
R11	80
R12	67
R13	86
R14	99
TM-30: Rf	83
TM-30: Rg	94
Distance from Planckian Locus (Duv)	-0.0014
Scotopic/Photopic Ratio *	1.567

Electrical Data

Voltage	120.0 Vac
Current	0.2316 A
Power	27.41 W
Frequency	60.00 Hz
Power Factor	0.986
Current THD	7.3 %



Test Report Number: LLIA001159-004B

Catalog Number: MLR2-HO-K35-80-4-XX-AL2-UNV

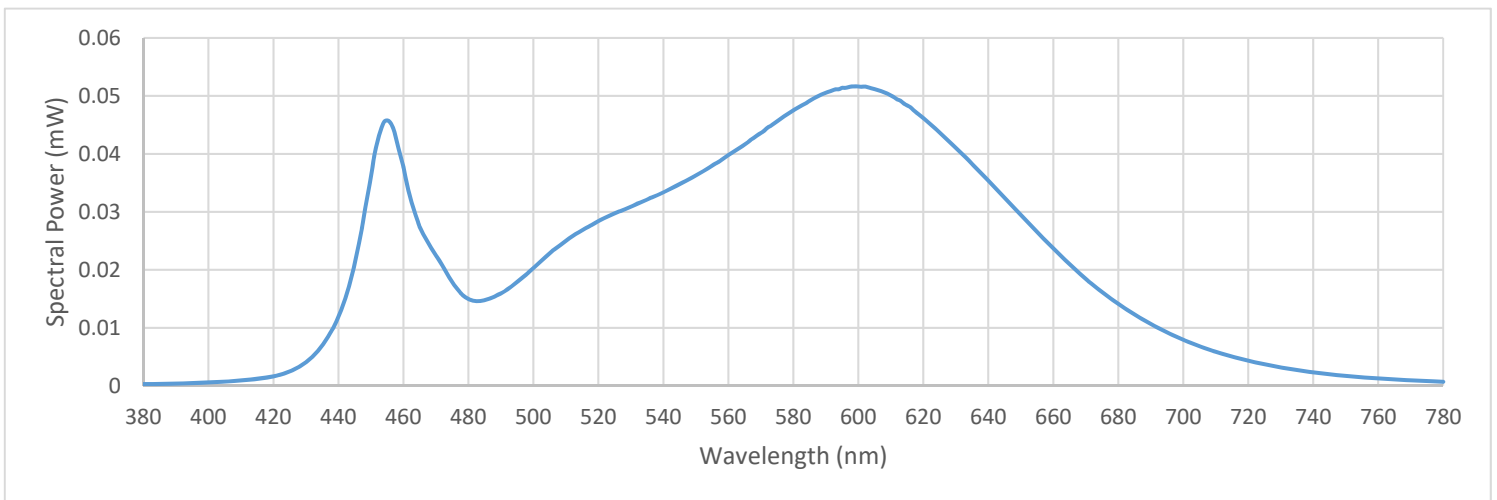
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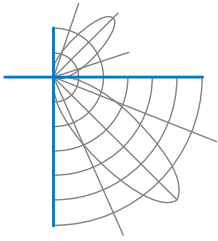
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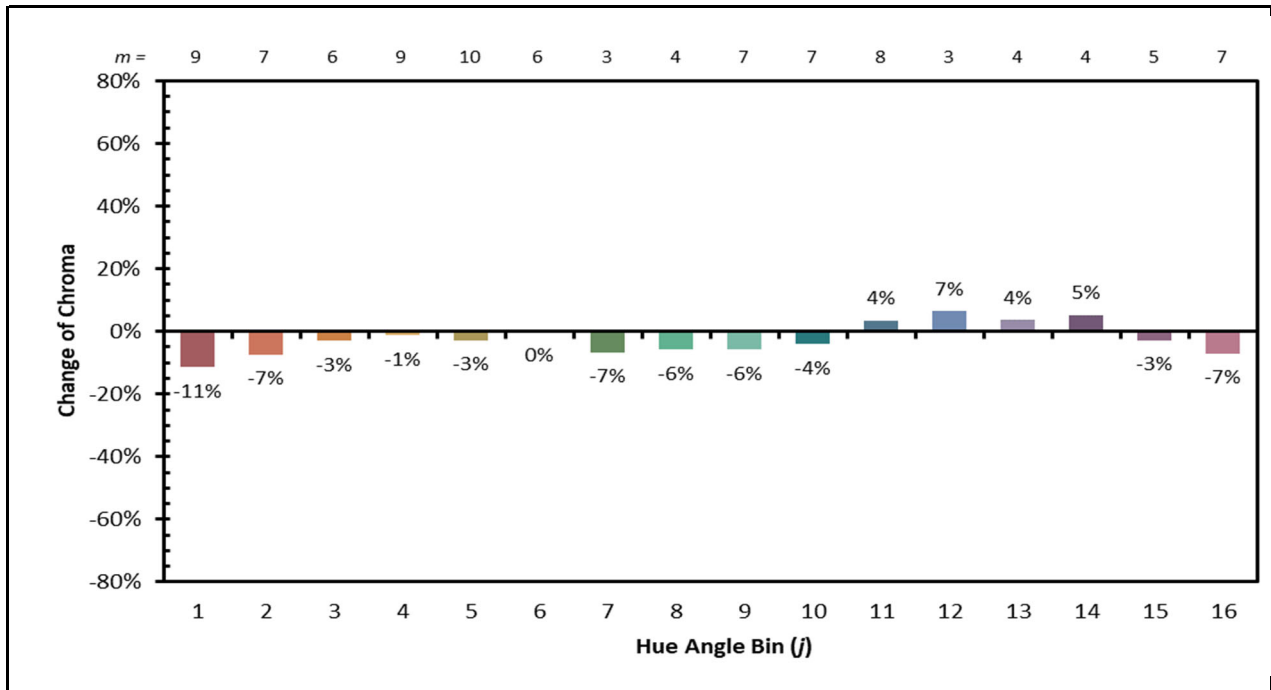
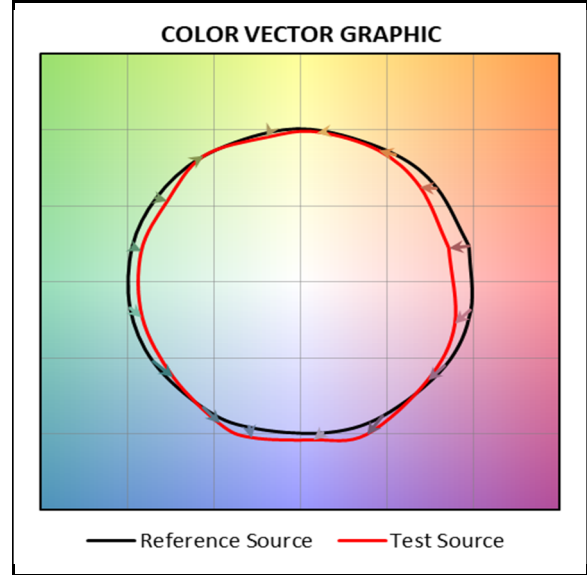
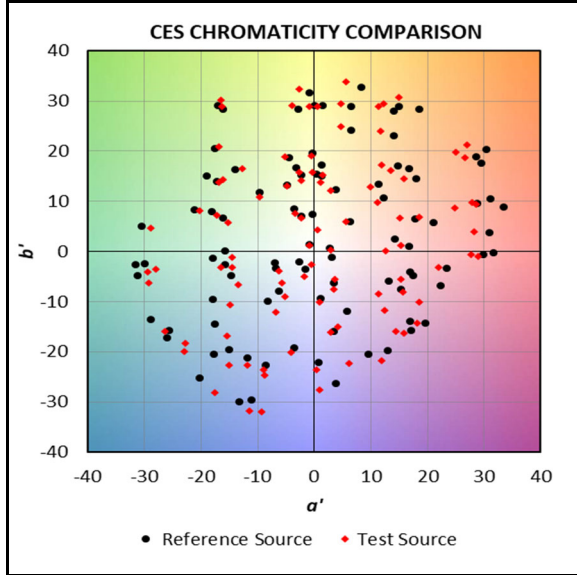
Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

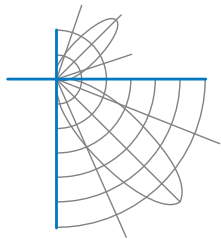
380	0.000302	480	0.014978	580	0.047496	680	0.014111
385	0.000308	485	0.014747	585	0.049176	685	0.012310
390	0.000368	490	0.015938	590	0.050555	690	0.010668
395	0.000443	495	0.017902	595	0.051389	695	0.009194
400	0.000572	500	0.020342	600	0.051622	700	0.007942
405	0.000730	505	0.022821	605	0.051127	705	0.006831
410	0.000917	510	0.025011	610	0.050089	710	0.005846
415	0.001179	515	0.026819	615	0.048366	715	0.005039
420	0.001630	520	0.028437	620	0.046175	720	0.004328
425	0.002467	525	0.029753	625	0.043728	725	0.003695
430	0.004033	530	0.030875	630	0.041045	730	0.003170
435	0.006959	535	0.032097	635	0.038280	735	0.002708
440	0.011908	540	0.033343	640	0.035361	740	0.002306
445	0.021099	545	0.034793	645	0.032464	745	0.001992
450	0.036053	550	0.036251	650	0.029461	750	0.001703
455	0.045769	555	0.037980	655	0.026543	755	0.001464
460	0.037744	560	0.039778	660	0.023704	760	0.001266
465	0.027400	565	0.041592	665	0.020969	765	0.001088
470	0.022492	570	0.043595	670	0.018451	770	0.000935
475	0.017837	575	0.045618	675	0.016181	775	0.000804
						780	0.000693





IES TM-30 Details





Test Report Number: LLIA001159-004B

Catalog Number: MLR2-HO-K35-80-4-XX-AL2-UNV

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

92 white LEDs, One PAL-Lighting FlexRad board.

One Osram Optotronic OTi 30/120-277/1A0 DIM-1 L G2 LED driver labeled as 720mA

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: 25.3 °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.