

Report of Test

LLIA001159-003A

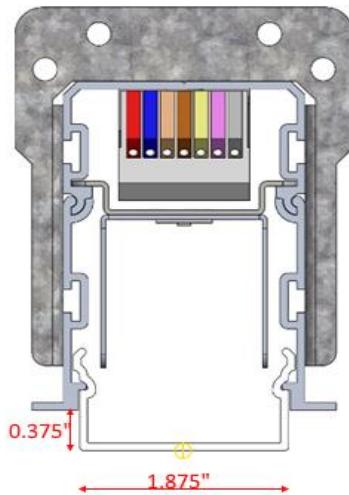
Indoor Distribution Photometry Test Report

Catalog Number: MLR2-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.

92 white LEDs, One PAL-Lighting FlexRad board.

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

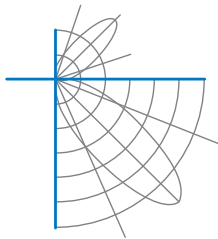
Performance Summary			
Input Voltage	120.0 V	Luminous Flux	1860.7 Lumens
Input Current	0.1562 A	Total Efficacy	100.0 Lm/W
Input Power	18.60 W	Downward Flux	1732.8 Lumens
Frequency	60.00 Hz	Downward Flux	93.1 % of Total
Power Factor	0.992		
Current THD	6.0 %		

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

Test date: 09/05/2019

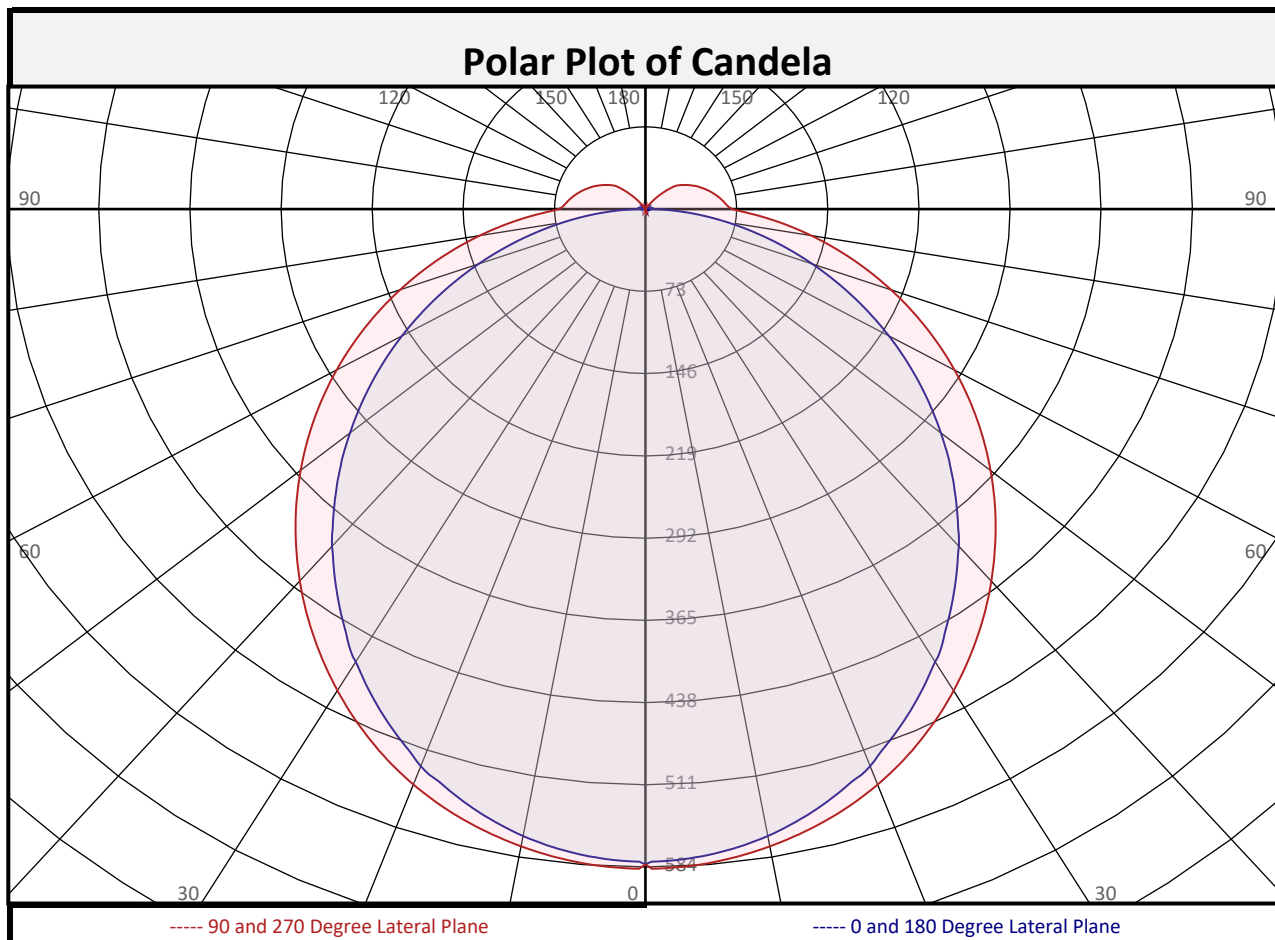
Report date: 09/06/2019

Signed: _____



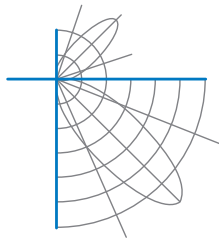
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Zonal Flux Summary

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	54.9	3.0%	90-100	42.7	2.3%	0-20	211.1	11.3%
10-20	156.2	8.4%	100-110	35.5	1.9%	0-30	445.5	23.9%
20-30	234.4	12.6%	110-120	26.0	1.4%	0-40	725.3	39.0%
30-40	279.8	15.0%	120-130	16.6	0.9%	0-60	1283	69.0%
40-50	290.2	15.6%	130-140	6.5	0.3%	0-80	1653	88.8%
50-60	267.9	14.4%	140-150	0.7	0.0%	10-90	1678	90.2%
60-70	218.4	11.7%	150-160	0.0	0.0%	20-50	804.3	43.2%
70-80	151.4	8.1%	160-170	0.0	0.0%	40-90	1008	54.2%
80-90	79.6	4.3%	170-180	0.0	0.0%	60-90	449.5	24.2%
0-90	1733	93.1%	90-180	127.9	6.9%	0-180	1861	100.0%

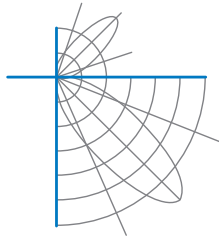


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Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	0	582	582	582	582	582	582	582	582	582
	2.5	578	579	580	583	585	583	580	579	578
	5	576	576	578	581	583	581	578	576	576
	7.5	571	572	574	577	579	577	574	572	571
	10	565	566	568	572	574	572	568	566	565
	12.5	557	558	561	566	568	566	561	558	557
	15	548	549	553	558	561	558	553	549	548
	17.5	537	538	544	550	553	550	544	538	537
	20	526	527	533	540	544	540	533	527	526
	22.5	511	514	522	529	533	529	522	514	511
	25	496	500	509	517	521	517	509	500	496
	27.5	480	485	496	504	508	504	496	485	480
	30	464	469	480	490	494	490	480	469	464
	32.5	446	453	465	475	479	475	465	453	446
	35	428	435	448	459	463	459	448	435	428
	37.5	409	417	432	443	448	443	432	417	409
	40	391	399	414	427	431	427	414	399	391
	42.5	370	380	396	409	414	409	396	380	370
	45	350	361	378	392	397	392	378	361	350
	47.5	330	342	359	374	379	374	359	342	330
50	309	322	340	356	361	356	340	322	309	
52.5	288	302	321	337	342	337	321	302	288	
55	267	282	302	318	324	318	302	282	267	
57.5	246	262	283	300	305	300	283	262	246	
60	225	242	263	280	286	280	263	242	225	
62.5	204	221	243	261	267	261	243	221	204	
65	183	201	224	242	248	242	224	201	183	
67.5	162	181	204	223	228	223	204	181	162	
70	142	161	185	204	209	204	185	161	142	
72.5	122	142	166	184	190	184	166	142	122	
75	103	123	147	166	172	166	147	123	103	
77.5	84	104	129	147	153	147	129	104	84	
80	66	87	111	129	135	129	111	87	66	
82.5	48	70	93	111	117	111	93	70	48	
85	32	53	77	94	100	94	77	53	32	
87.5	16	38	60	78	83	78	60	38	16	
90	3	24	47	64	70	64	47	24	3	



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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	24	47	64	70	64	47	24	3
	92.5	3	22	44	60	66	60	44	22	3
	95	2	21	43	59	64	59	43	21	2
	97.5	2	20	42	57	62	57	42	20	2
	100	2	19	40	55	60	55	40	19	2
	102.5	2	18	38	53	58	53	38	18	2
	105	2	17	37	51	56	51	37	17	2
	107.5	2	16	35	49	54	49	35	16	2
	110	2	14	34	47	52	47	34	14	2
	112.5	2	10	32	45	49	45	32	10	2
	115	2	7	30	42	47	42	30	7	2
	117.5	2	4	28	40	45	40	28	4	2
	120	2	2	27	38	42	38	27	2	2
	122.5	2	2	24	36	40	36	24	2	2
	125	2	1	19	34	38	34	19	1	2
	127.5	1	1	15	31	35	31	15	1	1
	130	1	1	11	27	33	27	11	1	1
	132.5	1	0	7	22	28	22	7	0	1
	135	0	0	3	17	23	17	3	0	0
	137.5	0	0	0	13	18	13	0	0	0
140	0	0	0	8	13	8	0	0	0	
142.5	0	0	0	3	8	3	0	0	0	
145	0	0	0	0	3	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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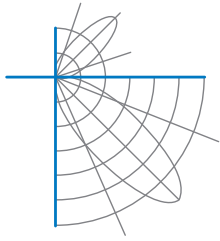
Coefficients of Utilization/Room Utilization - Zonal Cavity Method																						
Effective Floor Cavity Reflectance 0.20																						
RC	80					70					50				30				10			0
RW	70	50	30	10		70	50	30	10		50	30	10		50	30	10		50	30	10	0
RCR																						
0	117	117	117	117		114	114	114	114		107	107	107		101	101	101		96	96	96	93
1	106	101	96	92		102	98	93	89		92	89	85		87	84	81		82	80	78	75
2	96	87	80	74		93	85	78	72		80	74	70		76	71	67		71	68	64	62
3	87	76	68	61		84	74	66	60		70	63	58		66	61	56		63	58	54	52
4	80	67	58	51		77	65	57	51		62	55	49		59	53	48		56	51	46	44
5	73	60	51	44		71	58	50	43		56	48	42		53	46	41		50	45	40	38
6	68	54	45	38		65	53	44	38		50	43	37		48	41	36		46	40	35	33
7	63	49	40	34		60	48	39	33		46	38	33		43	37	32		42	36	31	29
8	58	45	36	30		56	44	35	30		42	34	29		40	33	29		38	32	28	26
9	54	41	33	27		53	40	32	27		38	31	26		37	30	26		35	29	25	23
10	51	38	30	24		49	37	29	24		35	29	24		34	28	23		33	27	23	21

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	16.2	7.16	7.57	
8.0	9.1	9.55	10.09	
10.0	5.8	11.94	12.61	
12.0	4.0	14.32	15.13	
14.0	3.0	16.71	17.65	
16.0	2.3	19.10	20.18	

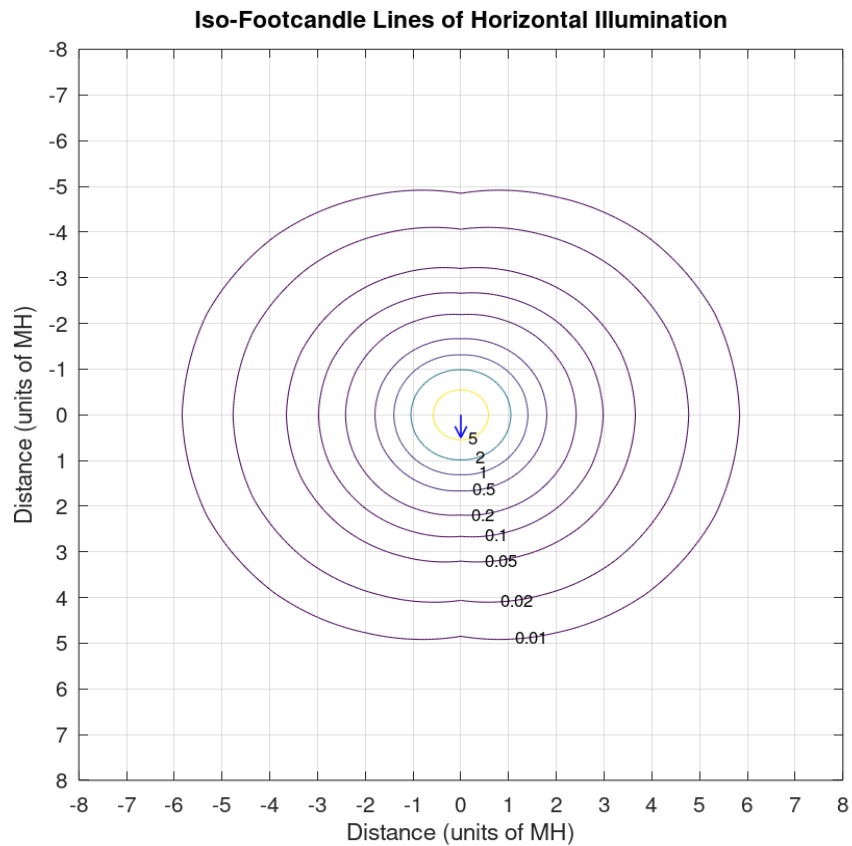
Average Luminance (cd/m ²)			
	0 deg Plane	45 deg Plane	90 deg Plane
0	10257	10257	10257
45	8655	8213	8243
55	8121	7669	7746
65	7512	7104	7233
75	6786	6476	6696
85	5921	5789	6151

Spacing Criterion	
0 degree plane:	1.2
90 degree plane:	1.3
180 degree plane:	1.2
270 degree plane:	1.3

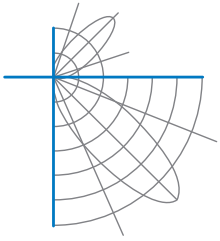


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Iso-Illuminance Plot

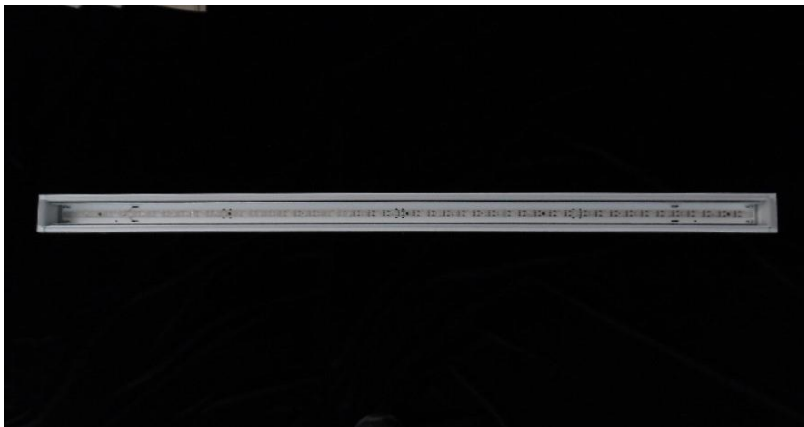


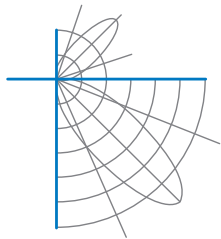
The isofootcandle values shown in the plot above are based on a mounting height of $h = 8.0$ feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the contribution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



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Additional Pictures of Test Subject





Report of Test

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Test Distance 9.5 m
Ambient Temperature 25.6 °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

LLIA001159-003B

Integrating Sphere Report

Catalog Number: MLR2-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.

92 white LEDs, One PAL-Lighting FlexRad board.

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



Performance Summary

Voltage	120.0 Vac
Current	0.1565 A
Power	18.63 W
Frequency	60.00 Hz
Power Factor	0.992
Current THD	6.0 %

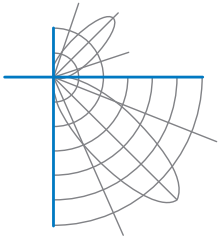
Total Luminous Flux	1870.7 lm
Efficacy	100.4 lm/W
Chromaticity (x,y)	(0.4101, 0.3912)
(u',v')	(0.2387, 0.5122)
Duv	-0.0008
CCT	3400 K
CRI (Ra)	83
R9	14
TM-30: Rf	83
TM-30: Rg	97

Prepared For:

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

Test date: 09/04/2019

Report date: 09/06/2019



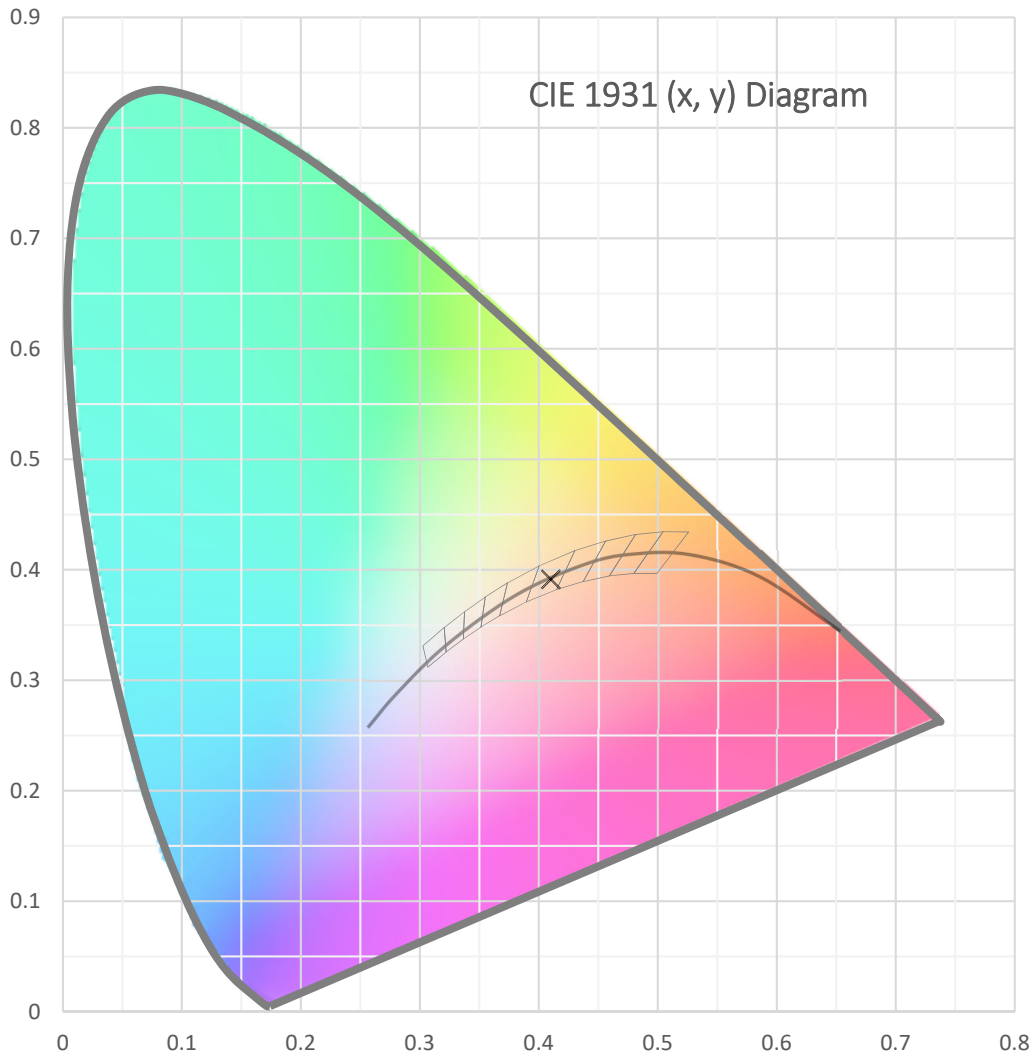
Test Report Number: LLIA001159-003B

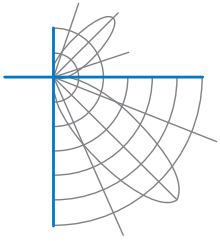
Catalog Number: MLR2-MO-K35-80-4-XX-AL1-UNV

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

92 white LEDs, One PAL-Lighting FlexRad board.

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





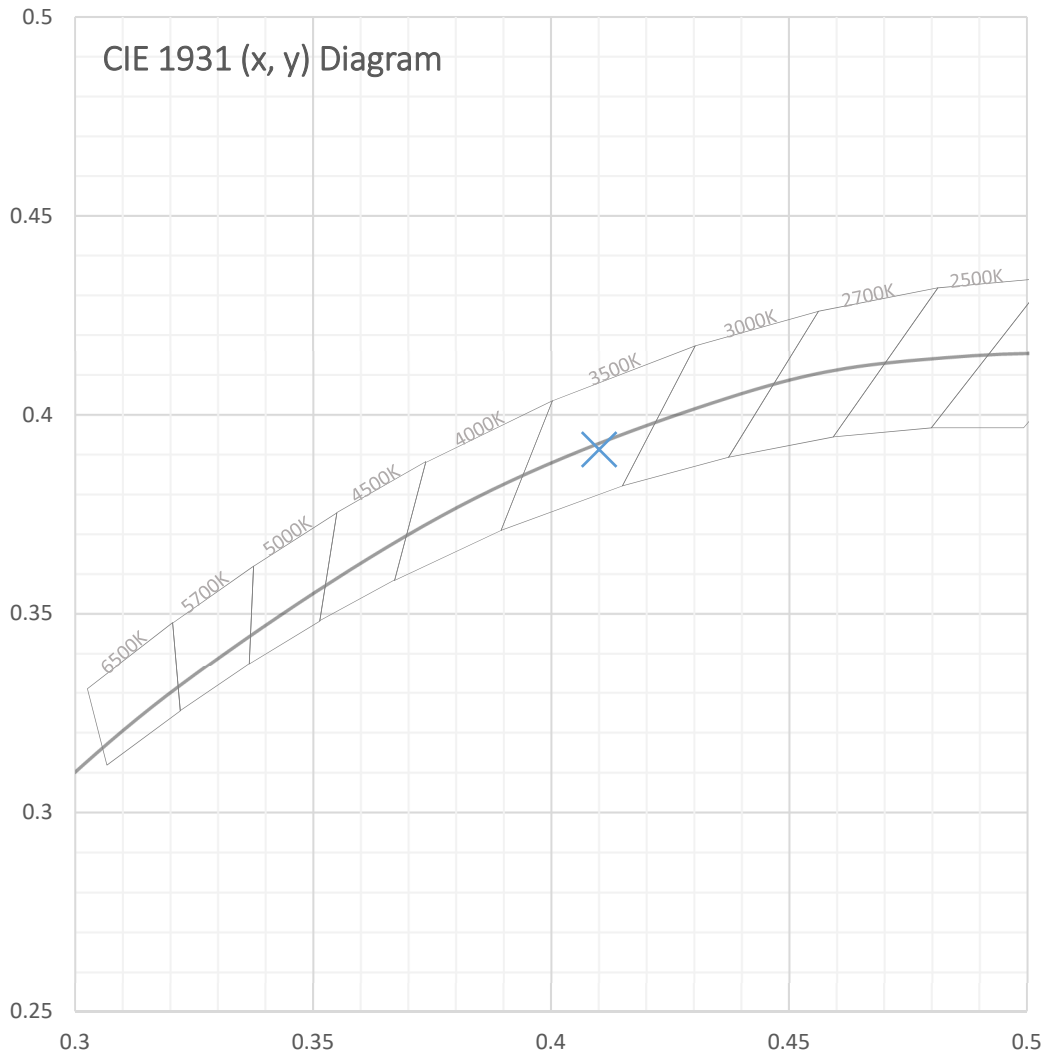
Test Report Number: LLIA001159-003B

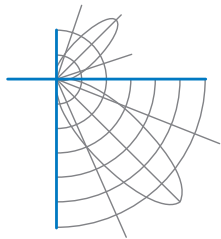
Catalog Number: MLR2-MO-K35-80-4-XX-AL1-UNV

Recessed ceiling mounted, extruded aluminum housing with steel endcaps,
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Test Report Number: LLIA001159-003B

Catalog Number: MLR2-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.

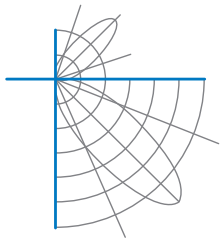
92 white LEDs, One PAL-Lighting FlexRad board.

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

Spectral Data	Total Radiant Flux	5.786 W
	Total Luminous Flux	1870.7 Lm
	Chromaticity CIE 1931 (x, y)	(0.4101, 0.3912)
	Chromaticity CIE 1976 (u', v')	(0.2387, 0.5122)
	Correlated Color Temperature (CCT)	3400 K
	Color Rendering Index (Ra)	83
	R1	82
	R2	90
	R3	96
	R4	82
	R5	82
	R6	86
	R7	85
	R8	64
	R9	14
	R10	76
	R11	81
	R12	66
	R13	84
	R14	98
	TM-30: Rf	83
	TM-30: Rg	97
	Distance from Planckian Locus (Duv)	-0.0008
	Scotopic/Photopic Ratio *	1.491

Electrical Data

Voltage	120.0 Vac
Current	0.1565 A
Power	18.63 W
Frequency	60.00 Hz
Power Factor	0.992
Current THD	6.0 %



Test Report Number: LLIA001159-003B

Catalog Number: MLR2-MO-K35-80-4-XX-AL1-UNV

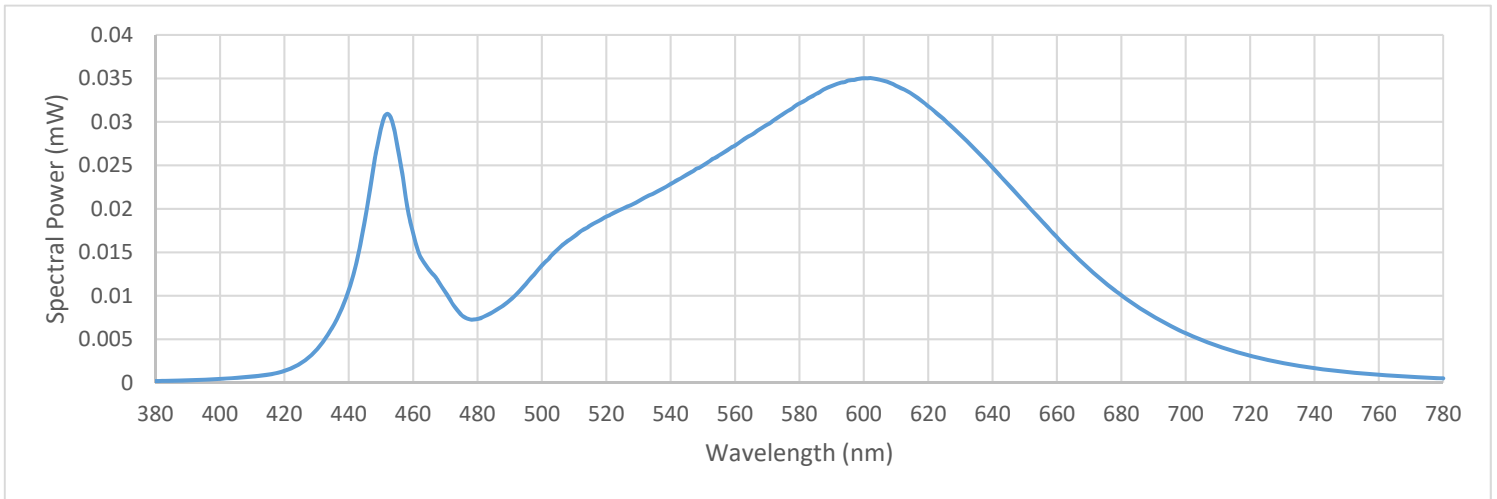
Recessed ceiling mounted, extruded aluminum housing with steel endcaps,
formed white enamel aluminum reflector, translucent white plastic enclosure.

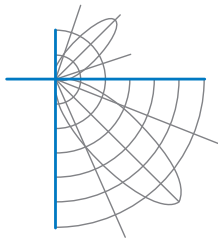
92 white LEDs, One PAL-Lighting FlexRad board.

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

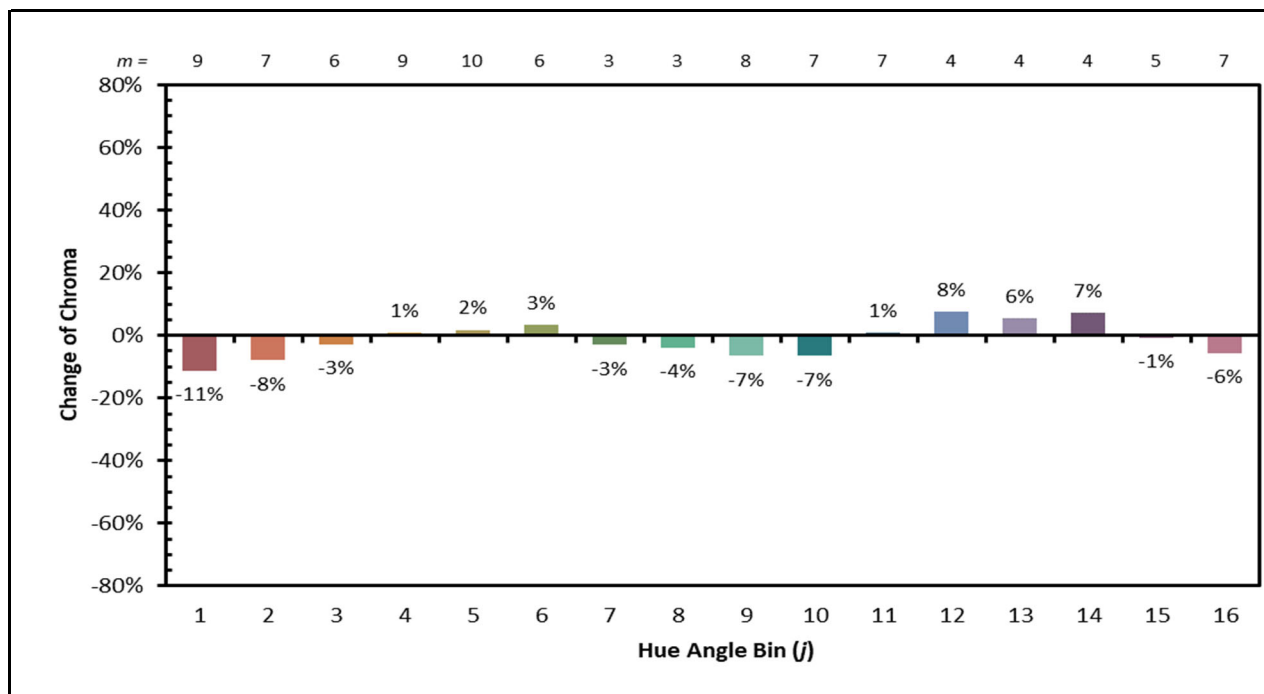
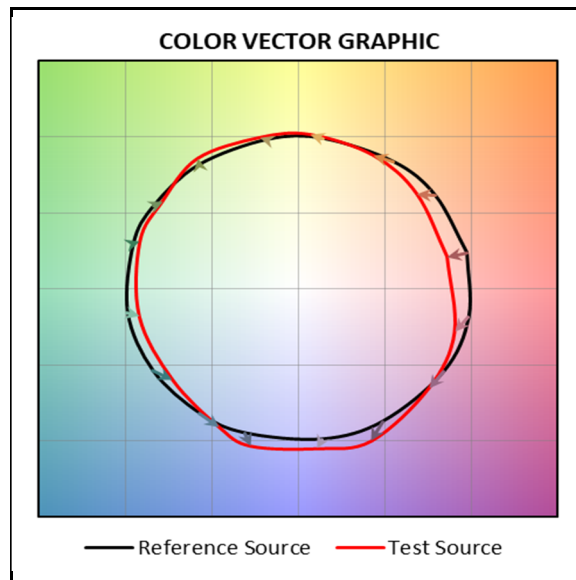
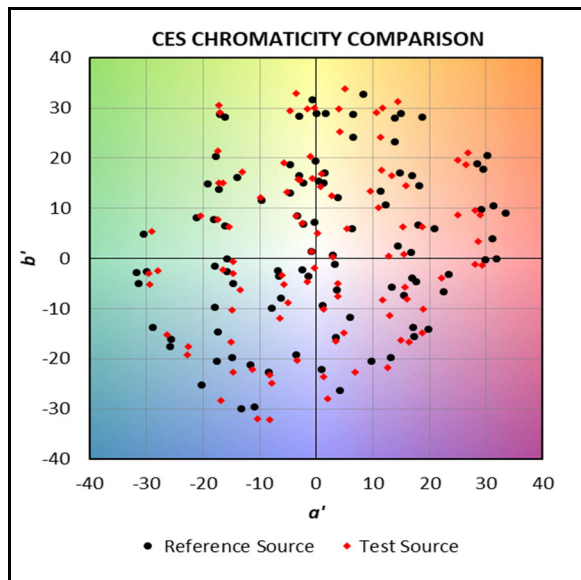
Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

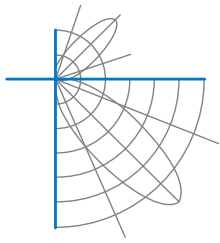
380	0.000207	480	0.007336	580	0.032132	680	0.010048
385	0.000223	485	0.008190	585	0.033191	685	0.008773
390	0.000273	490	0.009465	590	0.034114	690	0.007618
395	0.000348	495	0.011354	595	0.034739	695	0.006593
400	0.000453	500	0.013493	600	0.035021	700	0.005695
405	0.000568	505	0.015341	605	0.034833	705	0.004908
410	0.000709	510	0.016811	610	0.034160	710	0.004217
415	0.000918	515	0.018087	615	0.033170	715	0.003625
420	0.001367	520	0.019104	620	0.031801	720	0.003115
425	0.002219	525	0.019978	625	0.030262	725	0.002666
430	0.003797	530	0.020898	630	0.028495	730	0.002286
435	0.006436	535	0.021818	635	0.026729	735	0.001961
440	0.010610	540	0.022866	640	0.024745	740	0.001676
445	0.018685	545	0.023922	645	0.022735	745	0.001441
450	0.029216	550	0.024975	650	0.020727	750	0.001242
455	0.027461	555	0.026148	655	0.018712	755	0.001066
460	0.017198	560	0.027274	660	0.016748	760	0.000927
465	0.012957	565	0.028482	665	0.014835	765	0.000794
470	0.010408	570	0.029680	670	0.013080	770	0.000682
475	0.007791	575	0.030920	675	0.011501	775	0.000588
						780	0.000507





IES TM-30 Details





Test Report Number: LLIA001159-003B

Catalog Number: MLR2-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.

92 white LEDs, One PAL-Lighting FlexRad board.

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 π geometry

Test Temperature: 25.1 °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

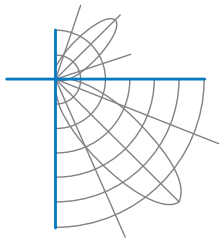
Significance: The laboratory has not participated in the selection of samples to be tested.
All testing is performed on the understanding that the significance of the report
is limited to the extent that the test sample is representative of production units.

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

LLIA001159-003C

Electrical Test Report

Catalog Number: MLR2-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.

92 white LEDs, One PAL-Lighting FlexRad board.

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



Performance Summary

Voltage	277.0 Vac
Current	0.0721 A
Power	19.07 W
Frequency	60.00 Hz
Power Factor	0.955
Current THD	9.7 %

Ambient Temperature: 25.5 °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: 09/05/2019

Report date: 09/06/2019

Electrical Report Template V1-2