

Report of Test

LLIA000817-006A

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV
Recessed or suspended, extruded aluminum housing, formed white enamel
aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA
120.0Vac, 60.00Hz, 0.2669A, 31.93W, 0.997PF, 6.0%THD(i)



Performance Summary

Total Light Output	3373 lm
Luminaire Power	31.9 W
Luminous Efficacy	105.7 lm/W

PREPARED FOR : Precision Architectural Lighting, 4830 Timber Creek Drive, Houston, TX 77017



Test Report No. LLIA000817-006A

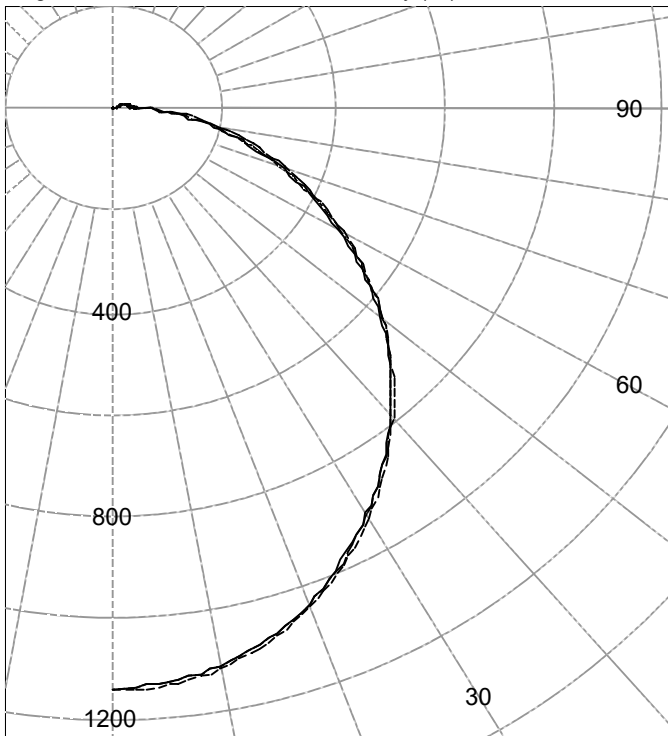
Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA
120.0Vac, 60.00Hz, 0.2669A, 31.93W, 0.997PF, 6.0%THD(i)

Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry) C0-C90

INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	1141	1141	1141	1141	1141	
5.0	1130	1136	1138	1136	1130	108
10.0	1111	1116	1119	1116	1111	
15.0	1079	1084	1087	1084	1079	305
20.0	1036	1039	1042	1040	1036	
25.0	981	985	989	986	982	454
30.0	920	924	927	925	921	
35.0	853	857	860	858	855	536
40.0	782	785	788	787	785	
45.0	709	711	714	713	712	550
50.0	633	635	638	637	636	
55.0	553	557	560	559	556	499
60.0	472	479	483	481	476	
65.0	393	401	406	403	397	398
70.0	316	326	331	328	319	
75.0	242	254	261	256	246	269
80.0	174	188	195	191	179	
85.0	116	127	133	130	121	136
90.0	36	41	44	43	38	

AVERAGE LUMINANCE (cd / m²)

Gamma	C0	C45	C90
45.0	9617	9610	9659
55.0	9163	9186	9219
65.0	8735	8870	8813
75.0	8531	8947	8672
85.0	10710	11416	11132

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	867	N / A	25.7
0-40	1403	N / A	41.6
0-60	2452	N / A	72.7
0-90	3254	N / A	96.5
40-90	1851	N / A	54.9
60-90	802	N / A	23.8
90-180	119	N / A	3.5
0-180	3373	N / A	100.0

Total Light Output = 3,373 lm

Spacing Criterion: 0-180 1.2
Spacing Criterion: 90-270 1.2

Signed:

Authorized Signatory

Date of test 10-Jul-2017
Date of report 11-Jul-2017



Test Report No. LLIA000817-006A

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA
120.0Vac, 60.00Hz, 0.2669A, 31.93W, 0.997PF, 6.0%THD(i)

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	1141	1141	1141	1141	1141
2.5	1135	1140	1143	1141	1135
5.0	1130	1136	1138	1136	1130
7.5	1122	1127	1130	1128	1122
10.0	1111	1116	1119	1116	1111
12.5	1096	1101	1104	1102	1096
15.0	1079	1084	1087	1084	1079
17.5	1059	1063	1065	1063	1059
20.0	1036	1039	1042	1040	1036
22.5	1009	1013	1017	1014	1010
25.0	981	985	989	986	982
27.5	951	955	959	956	952
30.0	920	924	927	925	921
32.5	886	891	894	892	889
35.0	853	857	860	858	855
37.5	818	821	825	823	820
40.0	782	785	788	787	785
42.5	746	749	752	750	749
45.0	709	711	714	713	712
47.5	672	674	676	675	675
50.0	633	635	638	637	636
52.5	593	597	599	598	596
55.0	553	557	560	559	556
57.5	512	518	521	520	516
60.0	472	479	483	481	476
62.5	433	440	444	442	436
65.0	393	401	406	403	397
67.5	354	363	368	365	358
70.0	316	326	331	328	319
72.5	278	289	296	292	282
75.0	242	254	261	256	246
77.5	207	220	227	223	211
80.0	174	188	195	191	179
82.5	144	157	163	160	149
85.0	116	127	133	130	121
87.5	89	96	100	99	93
90.0	36	41	44	43	38



Test Report No. LLIA000817-006A

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA
120.0Vac, 60.00Hz, 0.2669A, 31.93W, 0.997PF, 6.0%THD(i)

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	36	41	44	43	38
92.5	33	38	41	39	35
95.0	31	36	39	37	33
97.5	30	34	38	36	32
100.0	29	33	36	34	30
102.5	28	32	35	33	29
105.0	27	30	33	31	28
107.5	26	29	32	30	27
110.0	25	26	31	27	26
112.5	24	24	29	25	25
115.0	23	22	28	23	24
117.5	22	20	26	21	23
120.0	21	18	24	20	22
122.5	20	17	20	18	21
125.0	19	17	16	17	20
127.5	18	15	13	16	19
130.0	16	13	9	14	17
132.5	13	11	5	11	14
135.0	11	8	2	9	11
137.5	8	6	2	7	9
140.0	6	4	2	4	6
142.5	4	2	2	2	4
145.0	2	2	2	2	2
147.5	2	1	2	2	2
150.0	1	1	1	1	1
152.5	1	1	1	1	1
155.0	1	1	1	1	1
157.5	0	0	0	0	0
160.0	0	0	0	0	0
162.5	0	0	0	0	0
165.0	0	0	0	0	0
167.5	0	0	0	0	0
170.0	0	0	0	0	0
172.5	0	0	0	0	0
175.0	0	0	0	0	0
177.5	0	0	0	0	0
180.0	0	0	0	0	0



Test Number: LLIA000817-006A

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel
aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA
120.0Vac, 60.00Hz, 0.2669A, 31.93W, 0.997PF, 6.0%THD(i)

Coefficients Of Utilization - Zonal Cavity Method

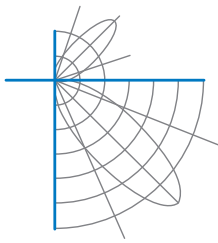
Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	118	118	118	118	115	115	115	115	109	109	109	104	104	104	99	99	99	96
1	107	102	97	93	104	99	95	91	94	91	87	90	87	84	85	83	81	79
2	97	88	81	75	94	86	79	74	82	76	71	78	73	69	74	71	67	65
3	88	77	69	62	85	75	68	61	72	65	60	69	63	58	66	61	57	54
4	81	68	59	52	78	67	58	52	64	57	51	61	55	50	58	53	49	46
5	74	61	52	45	72	60	51	45	57	50	44	55	48	43	53	47	42	40
6	69	55	46	39	66	54	45	39	52	44	38	50	43	38	48	42	37	35
7	64	50	41	35	62	49	40	34	47	39	34	45	39	33	44	38	33	31
8	59	45	37	31	57	45	36	31	43	36	30	41	35	30	40	34	30	28
9	55	42	33	28	54	41	33	28	40	32	27	38	32	27	37	31	27	25
10	52	39	31	25	50	38	30	25	37	30	25	35	29	25	34	29	24	23

For absolute test reports, CUs are expressed as a percentage of total lumen 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)	Beam Width (across 50% Nadir Illum)	
		0-180	90-270
6.0	31.7	7.21	7.23
8.0	17.8	9.62	9.64
10.0	11.4	12.02	12.05
12.0	7.9	14.43	14.46
14.0	5.8	16.83	16.87
16.0	4.5	19.24	19.28



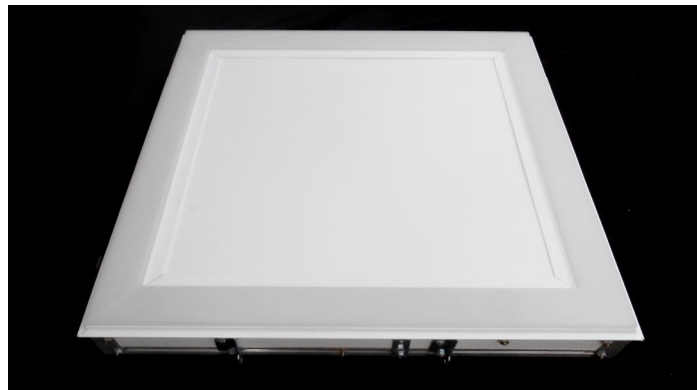
Test Report No. LLIA000817-006A

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA
120.0Vac, 60.00Hz, 0.2669A, 31.93W, 0.997PF, 6.0%THD(i)





Test Report No. LLIA000817-006A

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA
120.0Vac, 60.00Hz, 0.2669A, 31.93W, 0.997PF, 6.0%THD(i)

Test Distance 9.5 m
Test Temperature 24.9 °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 (Sec. 12), IES LM-16-93, IES LM-58-13, CIE 13.3:1995, CIE 15:2004, ANSI C78.377:2015, ANSI C82.77-10:2014.

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 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

LLIA000817-006B

Integrating Sphere Report

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel
aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA



Performance Summary

Voltage	120.0 Vac
Current	0.2669 A
Power	31.94 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	6.0 %

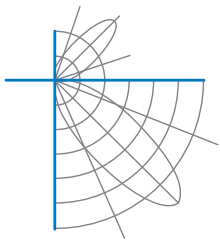
Total Luminous Flux	3466.8 lm
Efficacy	108.5 lm/W
Chromaticity (x,y)	(0.4072, 0.3874)
(u',v')	(0.2383, 0.5101)
Duv	-0.0019
CCT	3431 K
CRI (Ra)	84
R9	17

Prepared For:

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

Test date: 07/07/2017

Report date: 07/11/2017



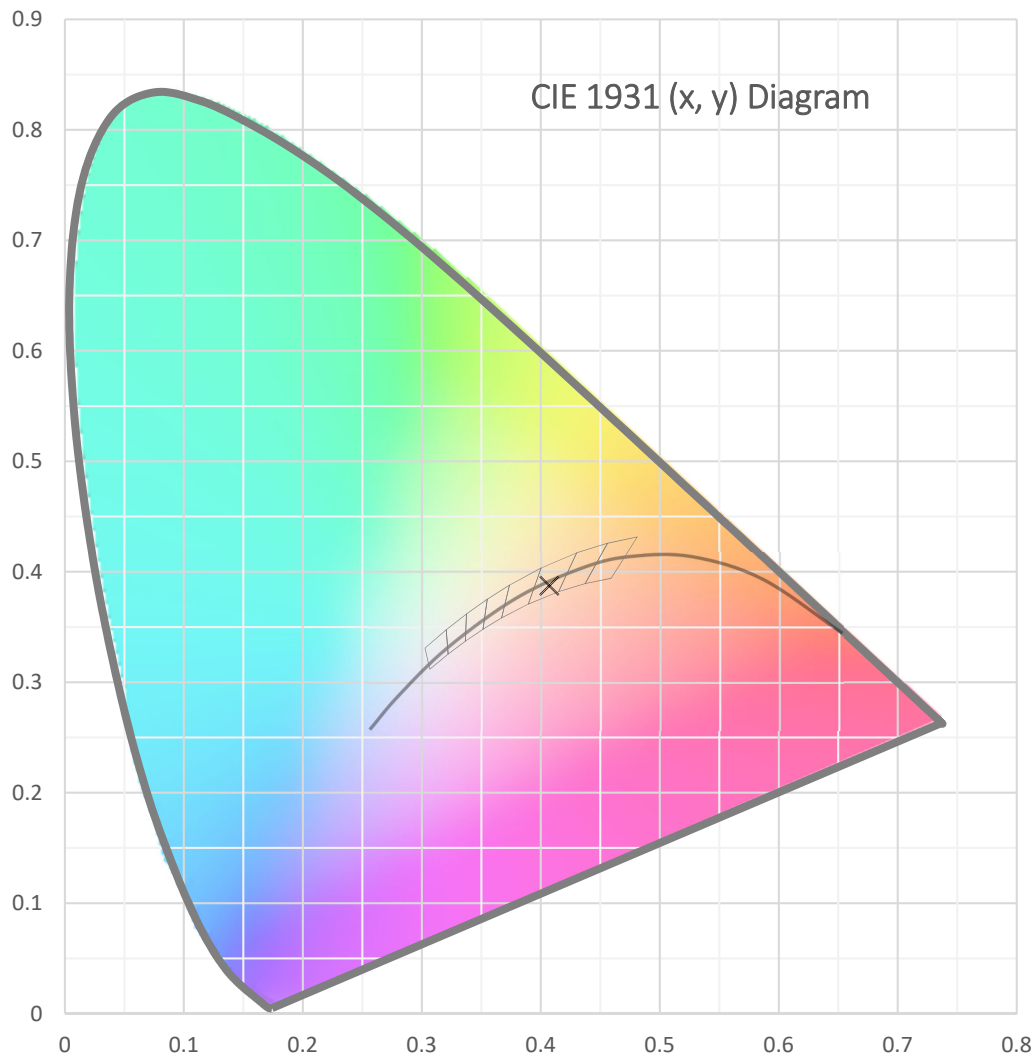
Test Report Number: LLIA000817-006B

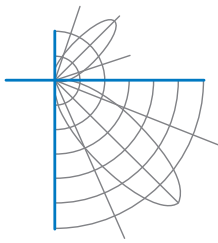
Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel
aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA





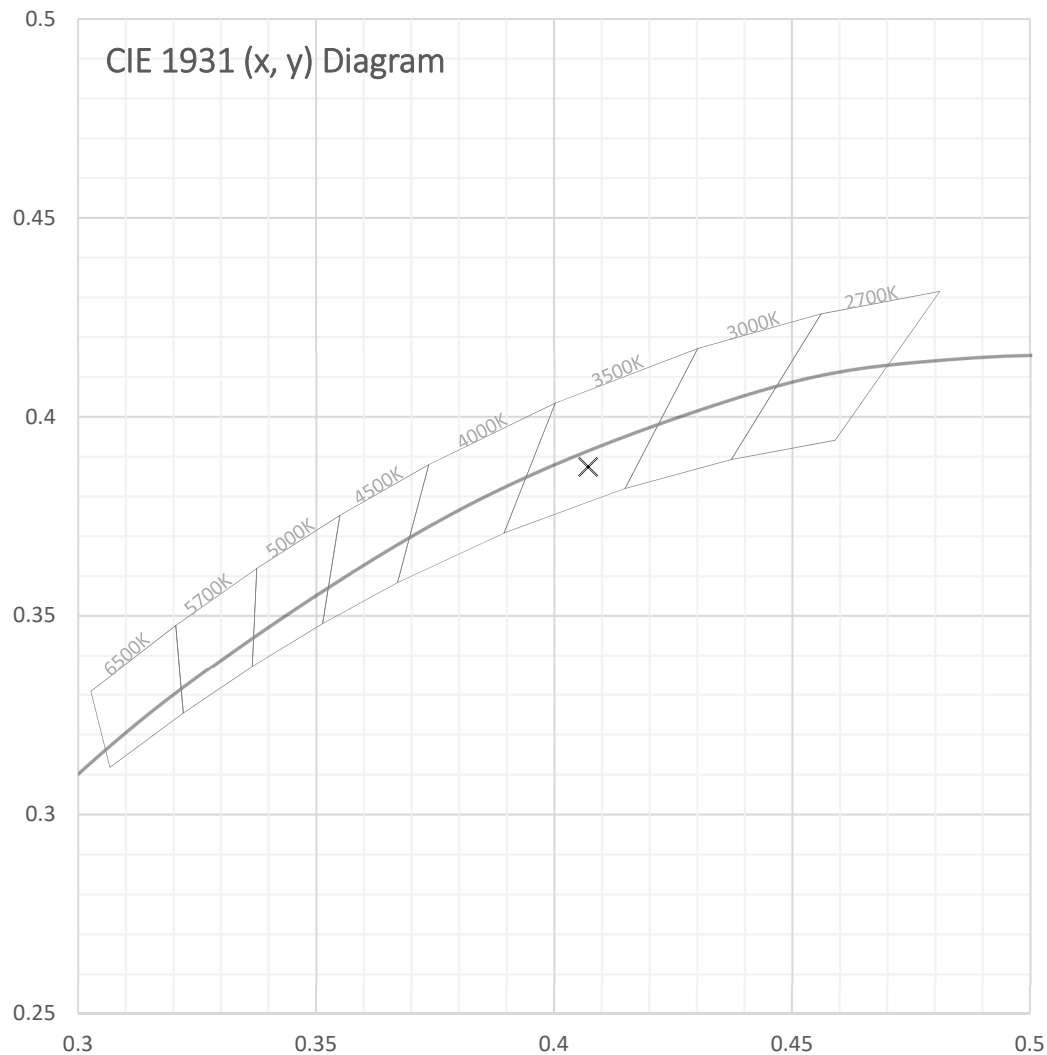
Test Report Number: LLIA000817-006B

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel
aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA





Test Report Number: LLIA000817-006B

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel
aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA

Spectral Data

Total Radiant Flux	10.82 W
Total Luminous Flux	3466.8 Lm
Chromaticity CIE 1931 (x, y)	(0.4072, 0.3874)
Chromaticity CIE 1976 (u', v')	(0.2383, 0.5101)
Correlated Color Temperature (CCT)	3431 K
Color Rendering Index (Ra)	84
R1	83
R2	92
R3	96
R4	82
R5	83
R6	88
R7	85
R8	65
R9	17
R10	80
R11	80
R12	67
R13	85
R14	98
Distance from Planckian Locus (Duv)	-0.0019
Scotopic/Photopic Ratio *	1.528

Electrical Data

Voltage	120.0 Vac
Current	0.2669 A
Power	31.94 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	6.0 %



Test Report Number: LLIA000817-006B

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

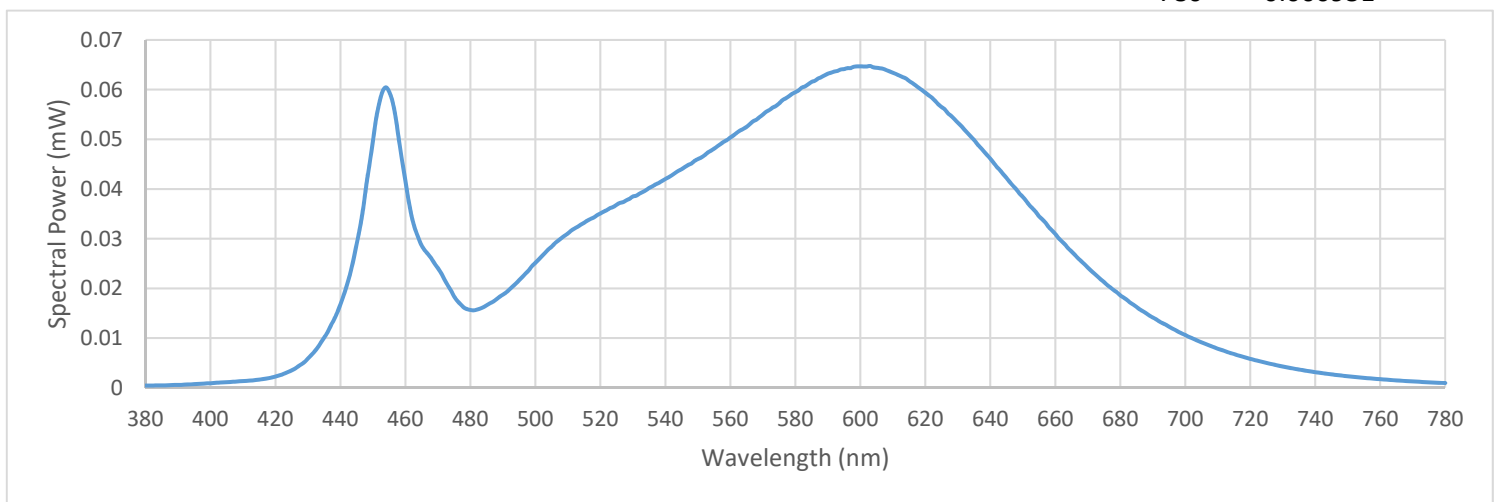
Recessed or suspended, extruded aluminum housing, formed white enamel
aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA

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

380	0.000446	480	0.015656	580	0.059492	680	0.018600
385	0.000472	485	0.016606	585	0.061539	685	0.016270
390	0.000580	490	0.018740	590	0.063195	690	0.014151
395	0.000731	495	0.021649	595	0.064124	695	0.012287
400	0.000911	500	0.025144	600	0.064678	700	0.010617
405	0.001122	505	0.028400	605	0.064390	705	0.009134
410	0.001349	510	0.031057	610	0.063380	710	0.007863
415	0.001652	515	0.033204	615	0.061752	715	0.006791
420	0.002270	520	0.035088	620	0.059389	720	0.005814
425	0.003505	525	0.036835	625	0.056495	725	0.004994
430	0.005878	530	0.038495	630	0.053341	730	0.004278
435	0.010096	535	0.040213	635	0.049881	735	0.003675
440	0.016801	540	0.042011	640	0.046102	740	0.003139
445	0.028961	545	0.043987	645	0.042212	745	0.002710
450	0.049688	550	0.046017	650	0.038417	750	0.002326
455	0.059567	555	0.048117	655	0.034499	755	0.002006
460	0.041603	560	0.050358	660	0.030962	760	0.001733
465	0.028622	565	0.052513	665	0.027434	765	0.001488
470	0.024082	570	0.054983	670	0.024192	770	0.001278
475	0.018366	575	0.057219	675	0.021260	775	0.001105
						780	0.000951





Test Report Number: LLIA000817-006B

Catalog Number: MQR2-MO-K35-80-2X2-XX-AL-PPNL/FO1M-UNV

Recessed or suspended, extruded aluminum housing, formed white enamel
aluminum reflectors, translucent white plastic enclosures.

160 white LEDs, 4 boards with 40 LEDs each.

One Osram Optotronic OTi 50/120-277/1A4 DIM L LED driver programmed to 840mA

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:	24.8 °C
Test Procedure:	Tested in accordance with the applicable sections of: LM-79-08, LM-78-07, LM-58-13, ANSI_ANSLG C78.377-2015, ANSI C82-77-10:2014
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.