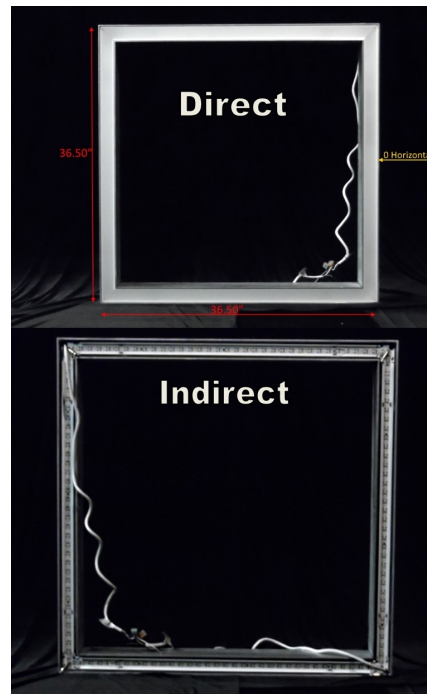


# Report of Test

## LLIA000833-008A

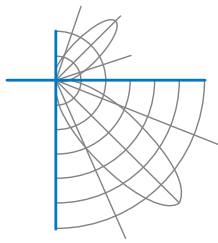
Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV  
Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.  
Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers  
120.0Vac, 60.00Hz, 1.379A, 164.8W, 0.997PF, 7.8%THD(i)



### Performance Summary

Total Light Output	20504 lm
Luminaire Power	164.8 W
Luminous Efficacy	124.4 lm/W

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



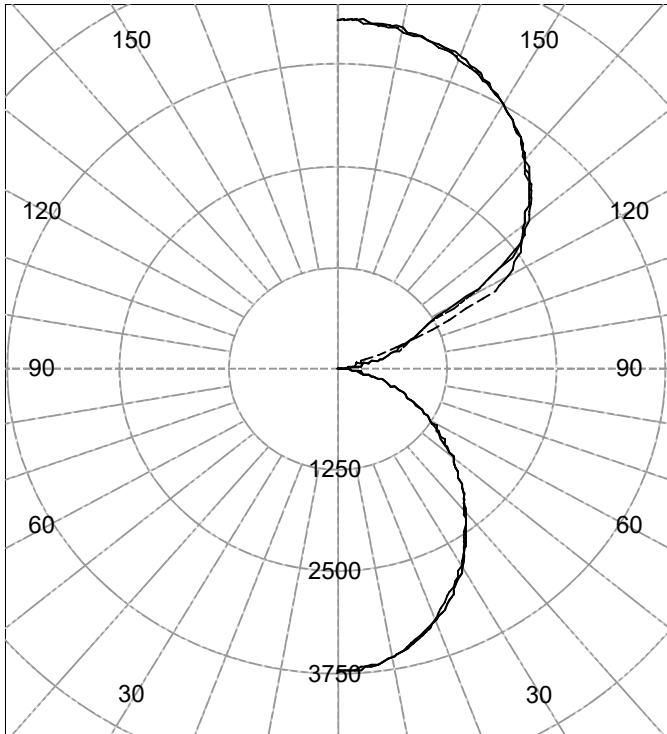
**Test Report No. LLIA000833-008A**

Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers  
120.0Vac, 60.00Hz, 1.379A, 164.8W, 0.997PF, 7.8%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	3713	3713	3713	3713	3713	
5.0	3689	3682	3676	3683	3690	349
10.0	3602	3594	3588	3595	3603	
15.0	3463	3453	3446	3454	3464	972
20.0	3280	3267	3259	3268	3280	
25.0	3064	3044	3036	3045	3063	1401
30.0	2818	2793	2787	2794	2817	
35.0	2545	2526	2522	2526	2545	1581
40.0	2258	2249	2249	2250	2257	
45.0	1970	1969	1973	1970	1970	1520
50.0	1688	1691	1699	1692	1688	
55.0	1415	1422	1429	1423	1416	1274
60.0	1163	1167	1171	1168	1164	
65.0	921	924	926	925	922	916
70.0	690	693	693	694	691	
75.0	472	476	475	477	474	505
80.0	276	279	281	280	277	
85.0	110	111	111	111	110	129
90.0	6	7	6	7	6	

**AVERAGE LUMINANCE (cd / m<sup>2</sup>)**

Gamma	C0	C45	C90
45.0	17767	17797	17767
55.0	15730	15889	15743
65.0	13904	13976	13912
75.0	11641	11697	11672
85.0	8021	8104	8045

**ZONAL FLUX AND PERCENTAGES**

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	2722	N / A	13.3
0-40	4303	N / A	21.0
0-60	7097	N / A	34.6
0-90	8647	N / A	42.2
40-90	4344	N / A	21.2
60-90	1550	N / A	7.6
90-180	11857	N / A	57.8
0-180	20504	N / A	100.0

Total Light Output = 20,504 lm

Signed:

Authorized Signatory

Date of test 17-Sep-2017  
Date of report 17-Sep-2017



**Test Report No. LLIA000833-008A**

Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers  
120.0Vac, 60.00Hz, 1.379A, 164.8W, 0.997PF, 7.8%THD(i)

**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	3713	3713	3713	3713	3713
2.5	3712	3705	3698	3705	3713
5.0	3689	3682	3676	3683	3690
7.5	3653	3645	3639	3646	3654
10.0	3602	3594	3588	3595	3603
12.5	3539	3530	3523	3530	3539
15.0	3463	3453	3446	3454	3464
17.5	3376	3365	3357	3366	3377
20.0	3280	3267	3259	3268	3280
22.5	3176	3160	3151	3160	3175
25.0	3064	3044	3036	3045	3063
27.5	2944	2922	2914	2923	2944
30.0	2818	2793	2787	2794	2817
32.5	2684	2661	2656	2661	2684
35.0	2545	2526	2522	2526	2545
37.5	2402	2388	2386	2389	2402
40.0	2258	2249	2249	2250	2257
42.5	2114	2110	2112	2110	2114
45.0	1970	1969	1973	1970	1970
47.5	1828	1829	1835	1830	1828
50.0	1688	1691	1699	1692	1688
52.5	1549	1555	1563	1556	1550
55.0	1415	1422	1429	1423	1416
57.5	1287	1294	1299	1294	1287
60.0	1163	1167	1171	1168	1164
62.5	1042	1043	1047	1044	1043
65.0	921	924	926	925	922
67.5	804	807	808	808	805
70.0	690	693	693	694	691
72.5	580	583	582	584	582
75.0	472	476	475	477	474
77.5	371	374	374	375	372
80.0	276	279	281	280	277
82.5	188	190	193	191	188
85.0	110	111	111	111	110
87.5	41	40	37	40	41
90.0	6	7	6	7	6



**Test Report No. LLIA000833-008A**

Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers  
120.0Vac, 60.00Hz, 1.379A, 164.8W, 0.997PF, 7.8%THD(i)

**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	6	7	6	7	6
92.5	34	12	11	15	31
95.0	93	51	33	54	92
97.5	189	105	111	95	177
100.0	307	161	178	151	298
102.5	426	323	217	334	420
105.0	541	503	235	495	542
107.5	653	702	251	716	658
110.0	759	807	348	823	769
112.5	863	909	855	925	877
115.0	974	1034	1396	1057	984
117.5	1116	1315	1954	1337	1146
120.0	1481	1798	2183	1792	1495
122.5	1967	2223	2351	2211	1974
125.0	2399	2500	2515	2491	2372
127.5	2635	2660	2668	2658	2621
130.0	2781	2816	2813	2811	2775
132.5	2922	2960	2960	2954	2915
135.0	3061	3098	3097	3088	3051
137.5	3195	3227	3225	3217	3186
140.0	3322	3350	3346	3341	3314
142.5	3445	3467	3459	3461	3438
145.0	3560	3576	3569	3572	3553
147.5	3667	3674	3667	3669	3659
150.0	3767	3764	3757	3760	3759
152.5	3859	3848	3840	3844	3851
155.0	3944	3925	3914	3917	3938
157.5	4019	3991	3982	3986	4013
160.0	4079	4051	4044	4049	4072
162.5	4131	4103	4097	4103	4121
165.0	4173	4149	4143	4148	4162
167.5	4207	4189	4181	4188	4199
170.0	4236	4220	4214	4221	4229
172.5	4258	4243	4237	4245	4251
175.0	4271	4260	4254	4261	4268
177.5	4279	4272	4265	4273	4281
180.0	4276	4276	4276	4276	4276



**Test Number: LLIA000833-008A**

Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers  
120.0Vac, 60.00Hz, 1.379A, 164.8W, 0.997PF, 7.8%THD(i)

**Coefficients Of Utilization - Zonal Cavity Method**

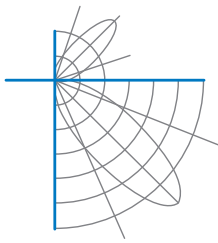
Effective Floor Cavity Reflectance 0.20

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	105	105	105	105	96	96	96	96	79	79	79	63	63	63	49	49	49	42
1	96	92	88	85	88	84	81	78	69	67	65	56	54	53	43	43	42	36
2	88	80	75	69	80	74	69	64	61	57	54	49	47	44	38	37	35	30
3	80	71	64	58	73	65	59	54	54	49	46	44	41	38	34	32	30	26
4	73	63	55	49	67	58	51	46	48	43	39	39	35	33	31	28	26	22
5	67	56	48	42	61	51	45	39	43	38	34	35	31	28	28	25	23	19
6	62	50	42	37	56	46	39	34	39	33	29	32	28	25	25	22	20	17
7	57	45	38	32	52	42	35	30	35	30	26	29	25	22	23	20	18	15
8	53	41	34	28	49	38	31	27	32	27	23	26	23	20	21	18	16	14
9	50	38	30	25	45	35	28	24	29	24	21	24	20	18	20	17	15	12
10	46	34	27	23	42	32	26	21	27	22	19	23	19	16	18	15	13	11

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	103.1	6.85	6.85
8.0	58.0	9.13	9.13
10.0	37.1	11.41	11.41
12.0	25.8	13.69	13.69
14.0	18.9	15.97	15.97
16.0	14.5	18.26	18.25

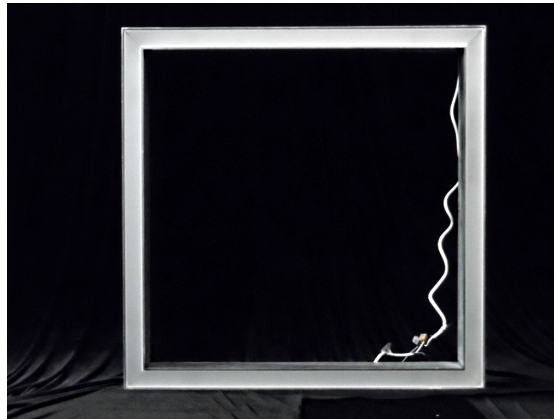


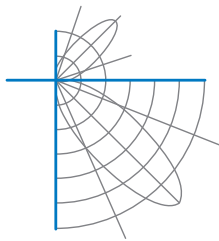
**Test Report No. LLIA000833-008A**

Catalog Number: MQS2-1/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers  
120.0Vac, 60.00Hz, 1.379A, 164.8W, 0.997PF, 7.8%THD(i)





**Test Report No. LLIA000833-008A**

Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers  
120.0Vac, 60.00Hz, 1.379A, 164.8W, 0.997PF, 7.8%THD(i)

**Test Distance**            9.5 m  
**Test Temperature**      25.8 °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.

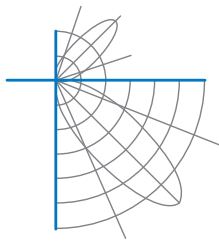
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

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

**LLIA000833-008B**

Integrating Sphere Report

Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers



### Performance Summary

Voltage	120.0 Vac
Current	1.378 A
Power	164.9 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	7.9 %

Total Luminous Flux	21839.3 lm
Efficacy	132.4 lm/W
Chromaticity (x,y)	(0.4046, 0.3876)
(u',v')	(0.2366, 0.5099)
Duv	-0.0012
CCT	3489 K
CRI (Ra)	84
R9	14

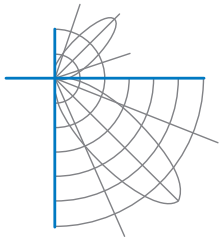
Prepared For:

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

Test date: 09/14/2017

Report date: 09/15/2017



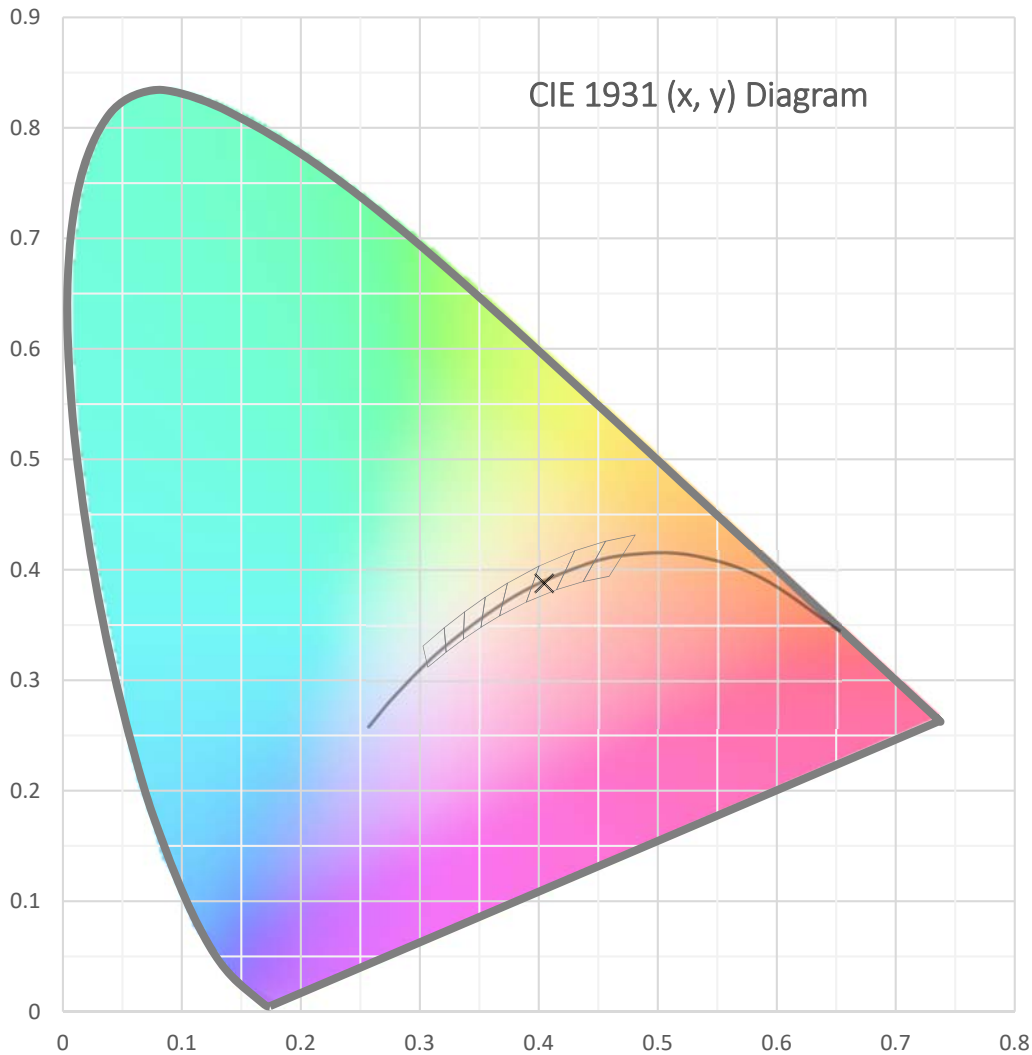


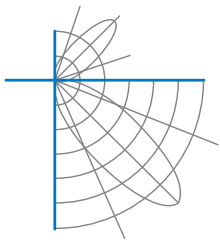
**Test Report Number: LLIA000833-008B**

Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers



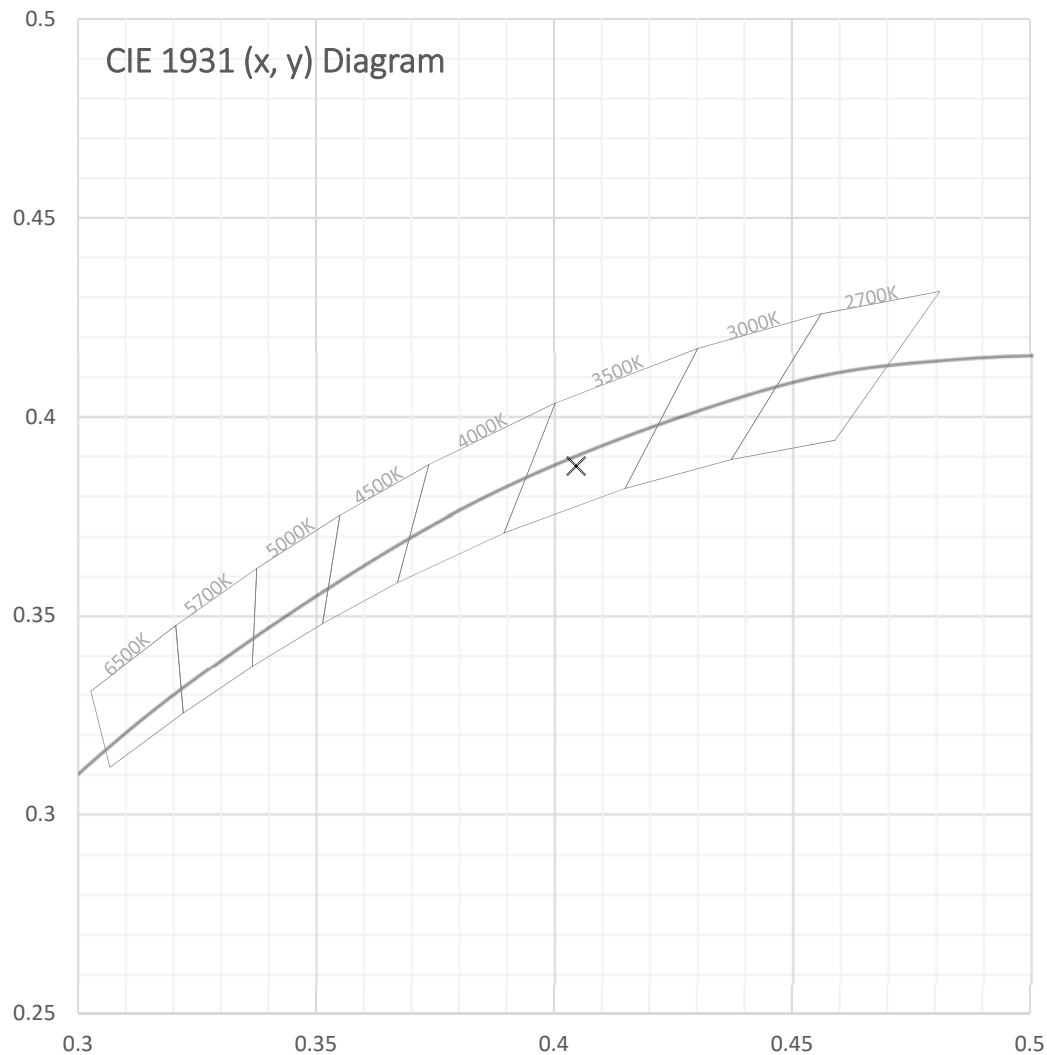


**Test Report Number: LLIA000833-008B**

Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

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Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers





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Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers

<b>Spectral Data</b>	Total Radiant Flux	67.52 W
	Total Luminous Flux	21839.3 Lm
	Chromaticity CIE 1931 (x, y)	(0.4046, 0.3876)
	Chromaticity CIE 1976 (u', v')	(0.2366, 0.5099)
	Correlated Color Temperature (CCT)	3489 K
	Color Rendering Index (Ra)	84
	R1	82
	R2	91
	R3	96
	R4	82
	R5	82
	R6	88
	R7	85
	R8	64
	R9	14
	R10	79
	R11	80
	R12	66
	R13	85
	R14	98
	Distance from Planckian Locus (Duv)	-0.0012
	Scotopic/Photopic Ratio *	1.540

**Electrical Data**

Voltage	120.0 Vac
Current	1.378 A
Power	164.9 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	7.9 %



**Test Report Number: LLIA000833-008B**

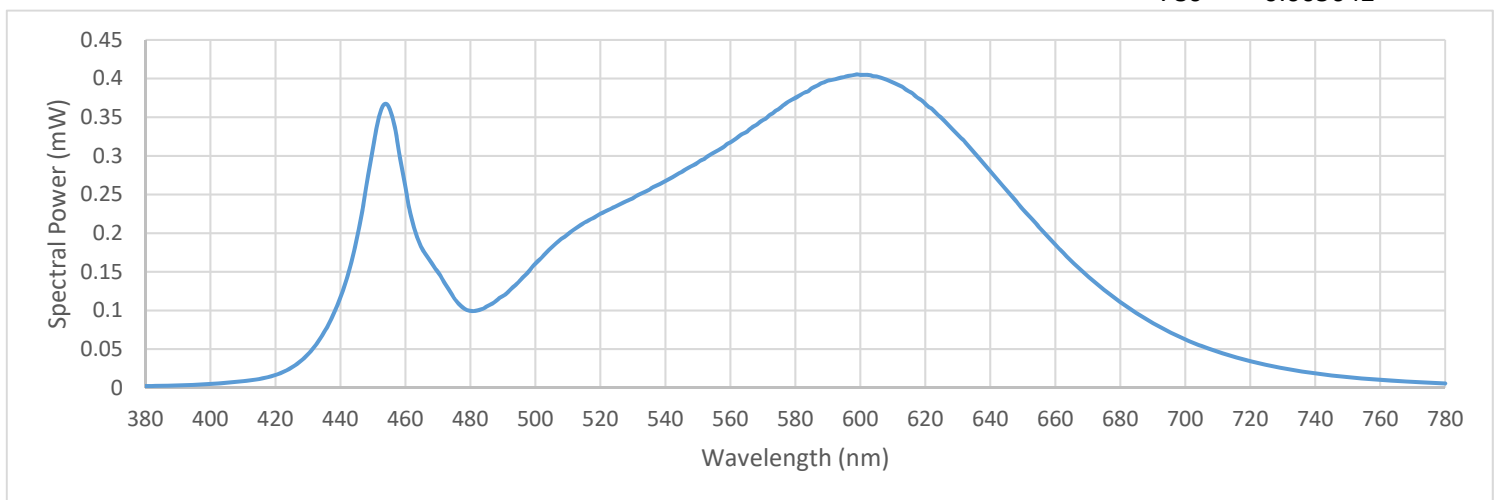
Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers

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

380	0.002254	480	0.099562	580	0.374846	680	0.110715
385	0.002389	485	0.105154	585	0.387337	685	0.096639
390	0.003001	490	0.118717	590	0.397347	690	0.083859
395	0.003776	495	0.137422	595	0.401852	695	0.072511
400	0.004986	500	0.160674	600	0.404765	700	0.062735
405	0.006460	505	0.181388	605	0.402711	705	0.054048
410	0.008518	510	0.198660	610	0.395167	710	0.046433
415	0.011259	515	0.213512	615	0.383314	715	0.040035
420	0.016555	520	0.225165	620	0.367320	720	0.034382
425	0.026154	525	0.235152	625	0.348955	725	0.029505
430	0.043423	530	0.245186	630	0.326895	730	0.025375
435	0.072268	535	0.256028	635	0.304337	735	0.021709
440	0.116949	540	0.267249	640	0.280317	740	0.018606
445	0.192540	545	0.279040	645	0.255485	745	0.015968
450	0.309726	550	0.291509	650	0.231235	750	0.013710
455	0.362469	555	0.304168	655	0.207675	755	0.011814
460	0.259812	560	0.317381	660	0.185690	760	0.010199
465	0.180819	565	0.330928	665	0.163928	765	0.008802
470	0.149978	570	0.346328	670	0.144255	770	0.007568
475	0.115590	575	0.360898	675	0.126605	775	0.006538
						780	0.005642





**Test Report Number: LLIA000833-008B**

Catalog Number: MQS2-I/D-HO/HO-K35-80-3X3-XXX-OP/FL-XXXX-UNV

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflectors, translucent white plastic lower enclosures, open top. 544 white LEDs, 4 PAL-Lighting upper LED boards with 68 LEDs each and 4 PAL-Lighting lower LED boards with 68 LEDs each.

Two Osram Optotronic Oti 50/120-277/1A4 DIM L LED drivers

**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:** 25.5 °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.

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Quantities marked with \* are not covered.