

Report of Test

LLIA000817-011A

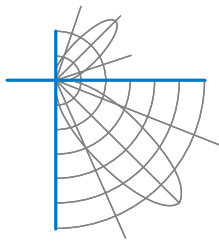
Catalog Number: MLS2-I/D-HO/HO-K40-80-4-XX-AL/AL-XXX-UNV
 Pendant mounted, extruded aluminum housing, formed white enamel
 aluminum reflectors, translucent white plastic enclosures.
 92 white upper LEDs, 92 white lower LEDs
 Two Osram Optotronic OT30W/PRG1050C/UNV/DIM/L LED drivers
 120.0Vac, 60.00Hz, 0.4634A, 55.45W, 0.997PF, 5.9%THD(i)



Performance Summary

Total Light Output	6252 lm
Luminaire Power	55.4 W
Luminous Efficacy	112.9 lm/W

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



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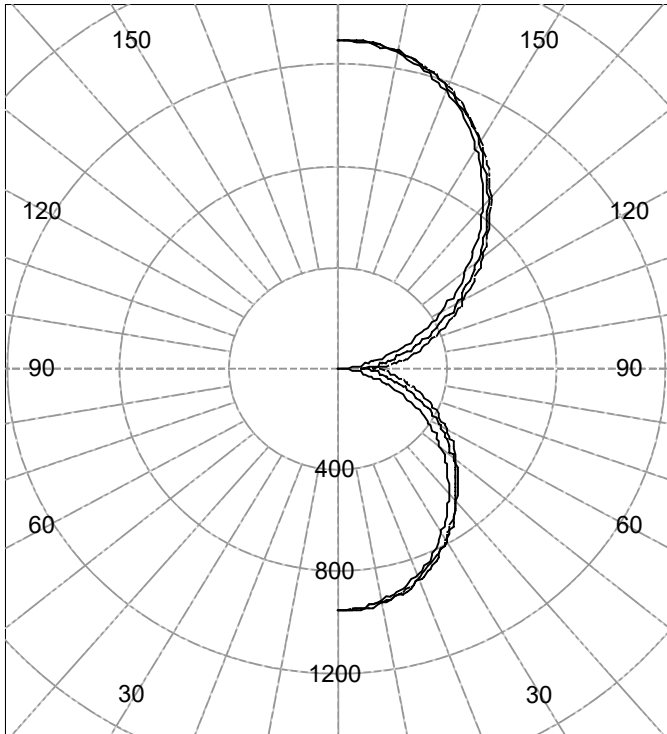
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120.0Vac, 60.00Hz, 0.4634A, 55.45W, 0.997PF, 5.9%THD(i)

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	948	948	948	948	948	
5.0	942	939	950	949	942	90
10.0	924	924	937	938	931	
15.0	895	897	914	916	907	256
20.0	857	861	880	881	872	
25.0	813	818	837	839	829	382
30.0	755	766	787	790	780	
35.0	697	710	732	736	728	452
40.0	630	649	672	680	674	
45.0	563	585	611	623	619	465
50.0	493	520	549	564	562	
55.0	422	453	486	505	506	427
60.0	351	386	423	446	450	
65.0	280	319	359	386	394	347
70.0	210	252	296	328	339	
75.0	142	186	236	273	286	241
80.0	80	126	181	223	238	
85.0	31	77	135	181	196	138
90.0	2	39	86	124	137	

AVERAGE LUMINANCE (cd / m²)

Gamma	C0	C45	C90
45.0	11638	11780	11630
55.0	10733	11210	11274
65.0	9641	10705	11171
75.0	7911	10359	11658
85.0	4963	12076	15009

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	727	N / A	11.6
0-40	1179	N / A	18.9
0-60	2071	N / A	33.1
0-90	2797	N / A	44.7
40-90	1618	N / A	25.9
60-90	726	N / A	11.6
90-180	3455	N / A	55.3
0-180	6252	N / A	100.0

Total Light Output = 6,252 lm

Signed:

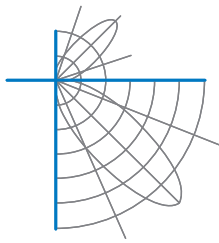
Authorized Signatory

Date of test

14-Jul-2017

Date of report

14-Jul-2017



Test Report No. LLIA000817-011A

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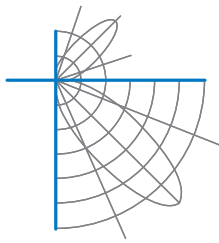
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Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	948	948	948	948	948
2.5	947	943	953	951	945
5.0	942	939	950	949	942
7.5	935	933	945	945	938
10.0	924	924	937	938	931
12.5	911	912	927	929	921
15.0	895	897	914	916	907
17.5	877	880	899	900	891
20.0	857	861	880	881	872
22.5	834	840	859	861	852
25.0	813	818	837	839	829
27.5	783	796	813	815	805
30.0	755	766	787	790	780
32.5	725	739	761	763	755
35.0	697	710	732	736	728
37.5	663	682	702	709	701
40.0	630	649	672	680	674
42.5	597	617	642	652	646
45.0	563	585	611	623	619
47.5	528	553	580	594	591
50.0	493	520	549	564	562
52.5	458	487	518	535	534
55.0	422	453	486	505	506
57.5	387	420	455	475	478
60.0	351	386	423	446	450
62.5	315	353	391	416	422
65.0	280	319	359	386	394
67.5	245	285	328	357	366
70.0	210	252	296	328	339
72.5	176	219	265	300	312
75.0	142	186	236	273	286
77.5	110	155	207	248	261
80.0	80	126	181	223	238
82.5	54	100	157	201	216
85.0	31	77	135	181	196
87.5	13	58	114	160	175
90.0	2	39	86	124	137



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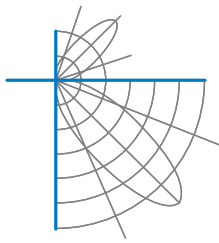
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Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	2	39	86	124	137
92.5	17	60	102	128	137
95.0	43	85	140	187	201
97.5	70	112	168	213	228
100.0	100	142	197	241	255
102.5	133	175	227	270	283
105.0	169	209	260	300	313
107.5	207	246	294	332	345
110.0	247	284	330	365	378
112.5	289	324	368	401	412
115.0	333	366	407	437	448
117.5	378	409	448	474	485
120.0	423	454	490	513	524
122.5	470	500	533	553	564
125.0	518	545	576	594	604
127.5	567	592	621	636	646
130.0	616	639	666	679	689
132.5	666	687	712	722	732
135.0	717	735	758	766	776
137.5	768	783	804	811	821
140.0	818	831	850	855	866
142.5	868	878	895	900	910
145.0	916	924	940	944	954
147.5	962	969	984	987	997
150.0	1007	1011	1027	1029	1038
152.5	1049	1052	1067	1070	1078
155.0	1089	1091	1106	1108	1115
157.5	1126	1127	1142	1143	1149
160.0	1160	1160	1174	1176	1181
162.5	1191	1189	1204	1205	1208
165.0	1218	1215	1229	1230	1233
167.5	1241	1237	1251	1252	1253
170.0	1260	1255	1270	1269	1268
172.5	1275	1270	1283	1282	1280
175.0	1286	1280	1293	1291	1287
177.5	1292	1286	1299	1296	1291
180.0	1294	1294	1294	1294	1294



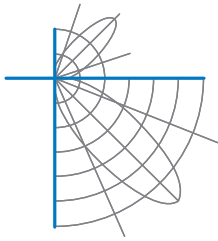
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Coefficients Of Utilization - Zonal Cavity Method																		
Effective Floor Cavity Reflectance 0.20																		
RC	80				70				50			30			10			0
	RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	
0	106	106	106	106	97	97	97	97	80	80	80	65	65	65	51	51	51	45
1	96	91	87	83	88	84	80	77	69	67	64	56	54	53	44	43	42	36
2	87	79	73	67	79	73	67	62	60	56	53	49	46	43	38	36	35	30
3	79	69	62	56	72	64	57	52	53	48	44	43	39	36	34	31	29	25
4	72	61	53	47	66	56	49	44	47	42	37	38	34	31	30	27	25	21
5	66	54	46	40	60	50	43	37	42	36	32	34	30	27	27	24	22	18
6	61	49	41	35	56	45	38	32	38	32	28	31	27	23	24	21	19	16
7	56	44	36	30	51	41	33	28	34	28	24	28	24	21	22	19	17	14
8	52	40	32	27	48	37	30	25	31	25	22	26	21	18	20	17	15	13
9	49	36	29	24	44	34	27	22	28	23	19	23	19	16	19	16	13	11
10	45	33	26	21	41	31	24	20	26	21	17	22	18	15	17	14	12	10

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.

Height(ft)	Illuminance at Nadir (fc)	Beam Width (across 50% Nadir Illum)	
		0-180	90-270
6.0	26.3	7.13	7.35
8.0	14.8	9.51	9.81
10.0	9.5	11.88	12.26
12.0	6.6	14.26	14.71
14.0	4.8	16.64	17.16
16.0	3.7	19.01	19.61



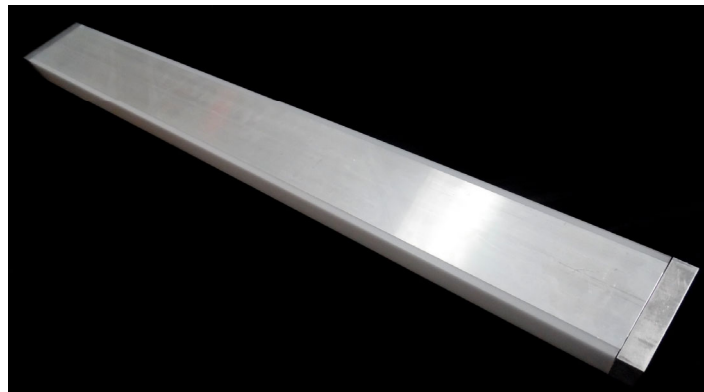
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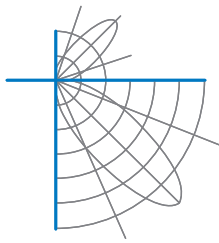
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Test Distance 9.5 m
Test Temperature 24.9 °C

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.

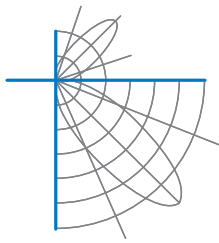
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This report is free of erasures and corrections.

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

LLIA000817-011B

Integrating Sphere Report

Catalog Number: MLS2-I/D-HO/HO-K40-80-4-XX-AL/AL-XXX-UNV

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Performance Summary

Voltage	120.0 Vac
Current	0.4629 A
Power	55.40 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	5.9 %

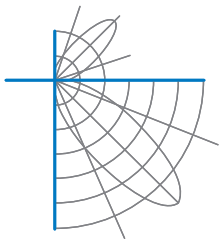
Total Luminous Flux	6263.4 lm
Efficacy	113.1 lm/W
Chromaticity (x,y)	(0.3798, 0.3775)
(u',v')	(0.2244, 0.5018)
Duv	0.0005
CCT	4023 K
CRI (Ra)	84
R9	17

Prepared For:

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

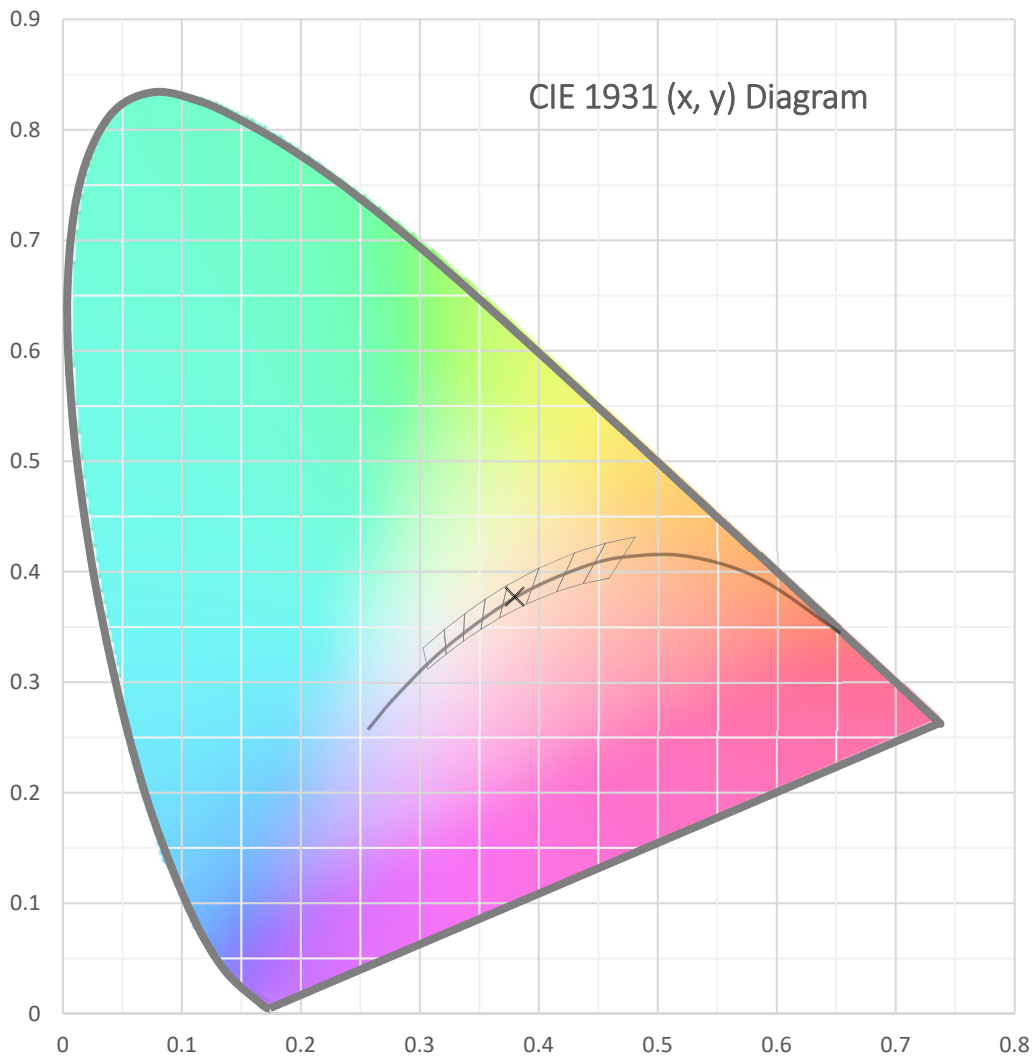
Test date: 07/07/2017

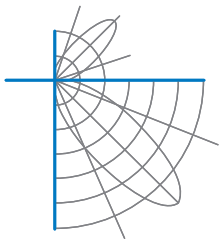
Report date: 07/14/2017



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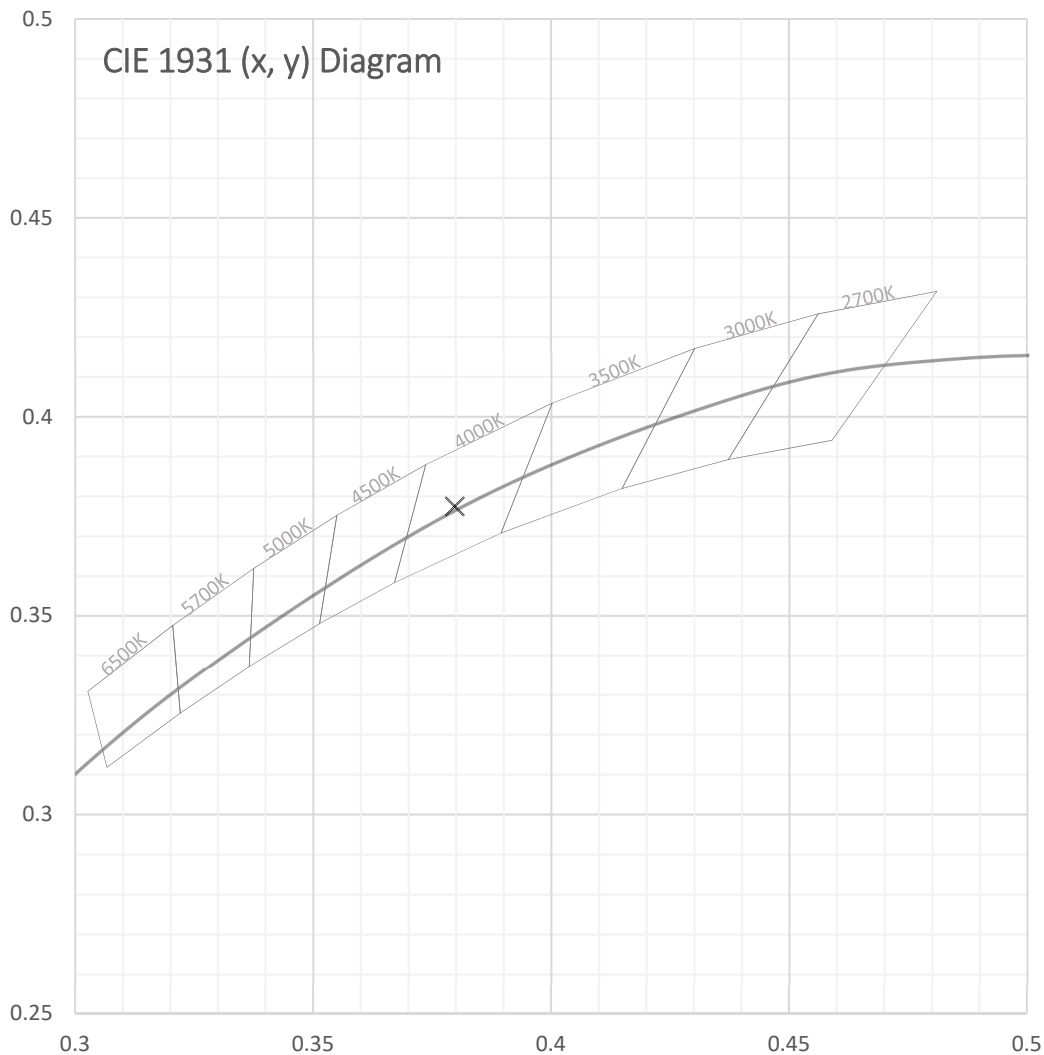
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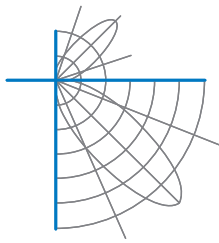




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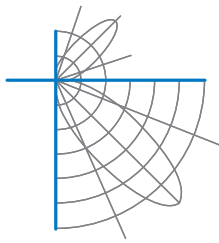
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Spectral Data	Total Radiant Flux	19.51 W
	Total Luminous Flux	6263.4 Lm
	Chromaticity CIE 1931 (x, y)	(0.3798, 0.3775)
	Chromaticity CIE 1976 (u', v')	(0.2244, 0.5018)
	Correlated Color Temperature (CCT)	4023 K
	Color Rendering Index (Ra)	84
	R1	83
	R2	91
	R3	96
	R4	82
	R5	82
	R6	87
	R7	87
	R8	67
	R9	17
	R10	78
	R11	80
	R12	61
	R13	85
	R14	98
	Distance from Planckian Locus (Duv)	0.0005
	Scotopic/Photopic Ratio *	1.721

Electrical Data

Voltage	120.0 Vac
Current	0.4629 A
Power	55.40 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	5.9 %

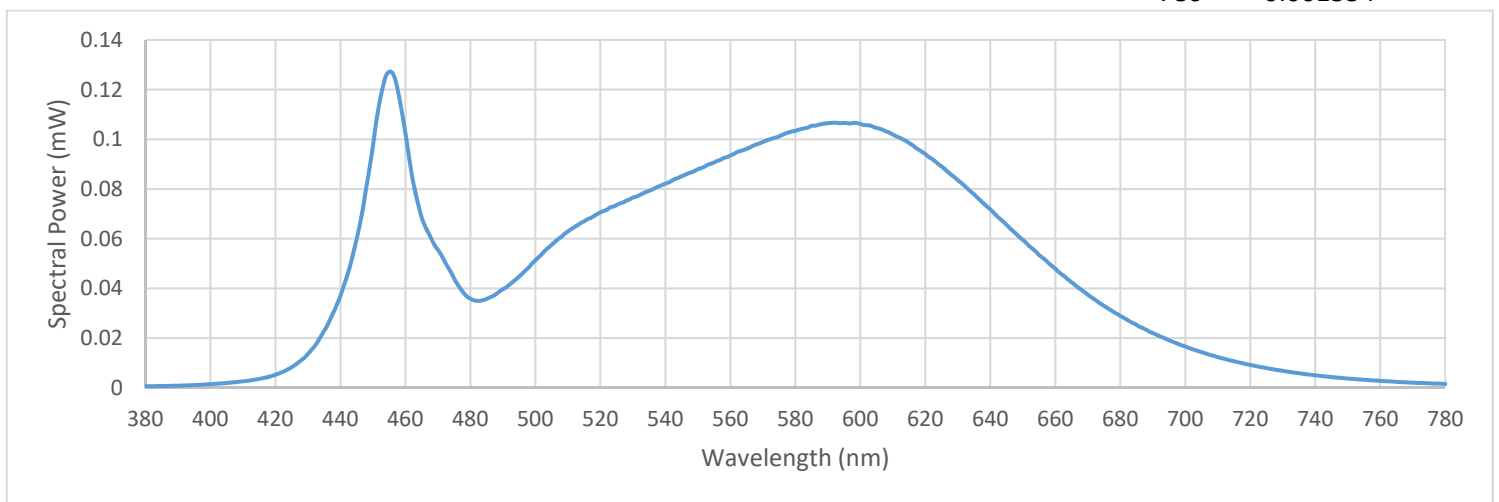


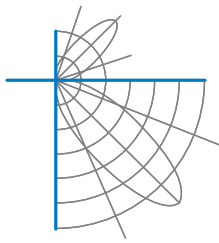
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Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

380	0.000636	480	0.035820	580	0.103418	680	0.028900
385	0.000685	485	0.035761	585	0.105480	685	0.025340
390	0.000844	490	0.039662	590	0.106519	690	0.022020
395	0.001095	495	0.044731	595	0.106588	695	0.019111
400	0.001448	500	0.051326	600	0.106218	700	0.016618
405	0.001919	505	0.057511	605	0.104541	705	0.014337
410	0.002608	510	0.062919	610	0.101922	710	0.012350
415	0.003574	515	0.066990	615	0.098493	715	0.010692
420	0.005241	520	0.070628	620	0.094091	720	0.009192
425	0.008268	525	0.073549	625	0.089096	725	0.007912
430	0.013633	530	0.076549	630	0.083541	730	0.006803
435	0.022923	535	0.079257	635	0.077891	735	0.005848
440	0.037042	540	0.082182	640	0.071801	740	0.005004
445	0.059945	545	0.085113	645	0.065582	745	0.004323
450	0.097464	550	0.087954	650	0.059530	750	0.003723
455	0.127157	555	0.090671	655	0.053444	755	0.003223
460	0.102495	560	0.093461	660	0.047936	760	0.002781
465	0.068531	565	0.096154	665	0.042496	765	0.002412
470	0.055528	570	0.098932	670	0.037484	770	0.002071
475	0.043923	575	0.101179	675	0.032977	775	0.001792
						780	0.001554





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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: 25.6 °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

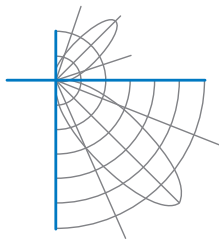
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Report of Test

LLIA000817-011C

ISTM Report

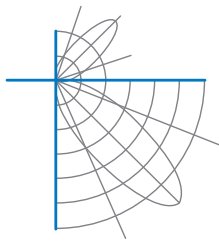
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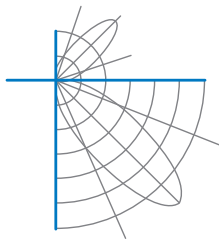
Test date: 07/20/2017
Report date: 07/20/2017



Test Report Number: LLIA000817-011C

Catalog Number: MLS2-I/D-HO/HO-K40-80-4-XX-AL/AL-XXX-UNV
Pendant mounted, extruded aluminum housing, formed white enamel
aluminum reflectors, translucent white plastic enclosures.
92 white upper LEDs, 92 white lower LEDs
Two Osram Optotronic OT30W/PRG1050C/UNV/DIM/L LED drivers

- Purpose of Test:** To determine the in-situ temperature of the specified LED Ts point and driver Tc point. In this test, in-situ temperature refers to standard laboratory conditions with the luminaire configured in accordance with appropriate sections of UL1598-2008
- Luminaire Mounting:** Pendant
- LED Test Point:** Thermocouples were attached to the LED case temperature point (Ts) as specified by report number SQETMP098101, issued 04/12/2016 by Nichia Corporation LED Testing Laboratory. The measured LED was selected according to guidance provided by DLC and ENERGY STAR for lumen maintenance projection.
- Driver Test Point:** Thermocouples were attached to the driver case in the location (Tc) designated by the manufacturer.
- Sample Selection:** LightLab International Allentown. LLC has not participated in the selection of sample(s) being tested. Testing is performed on the understanding that the significance of the report is limited to the extent to which the sample is representative of production units.
- Disclaimer:** 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.
- Procedure:** In-situ temperature measurements were performed with the luminaire mounted suspended from a simulated ceiling. The luminaire supply voltage and frequency was set according to the luminaire manufacturer's instructions. The luminaire was allowed to reach stabilization as defined in UL1598-2008 prior to reported measurements. Testing was performed in a draft-free, temperature-controlled environment with an ambient temperature of 25 +/- 5 °C.
- Test Equipment:** GW Instek APS-7100 AC Power Source
Xitron 2801 Power Analyzer
Fluke 52-ii Thermometer



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Electrical Measurements

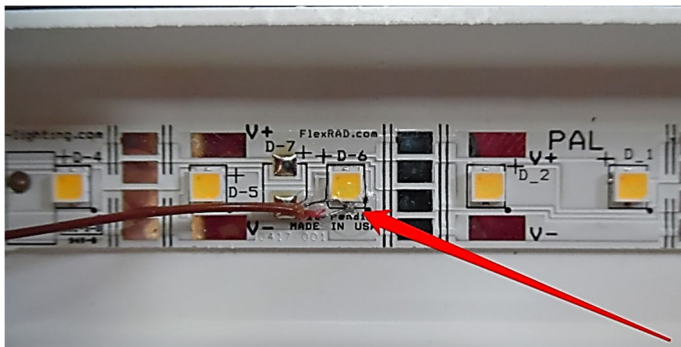
Voltage	120.0 Vac
Current	0.4643 A
Power	55.52 W
Frequency	60.0 Hz
Power Factor	0.997
Current THD	6.0 %
Driver #1 Output	0.723 Adc
Driver #2 Output	0.720 Adc

Temperature Measurements

LED #1 (Ts)	61.6°C	Driver #1 (Tc)	52.2°C
LED #2 (Ts)	57.2°C	Driver #2 (Tc)	50.0°C

*The above temperatures have been normalized to 25°C ambient.

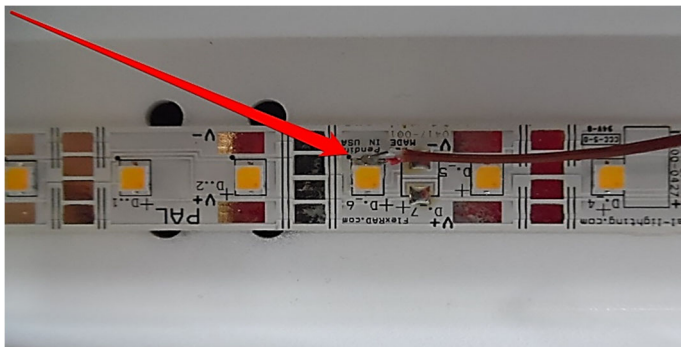
Measured Ambient Temperature (Ta) 23.7°C



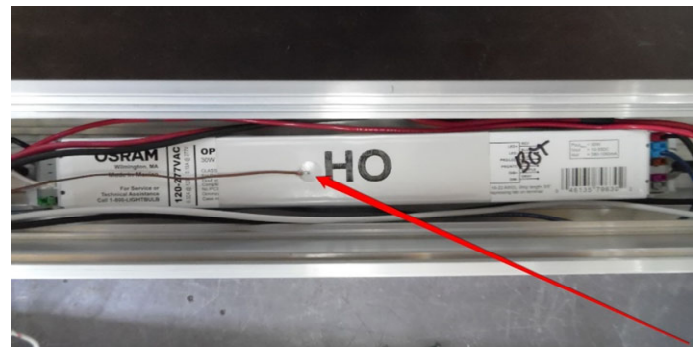
LED Thermocouple Location 1 (Top)



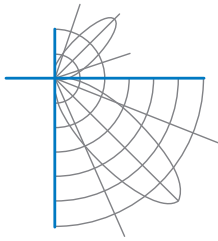
Driver Thermocouple Location 1 (Top)



LED Thermocouple Location 2 (Bottom)

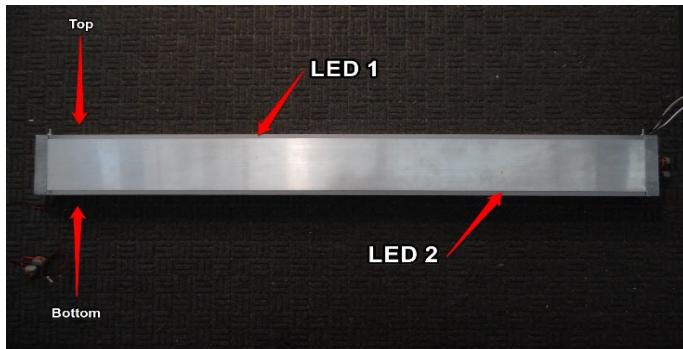


Driver Thermocouple Location 2 (Bottom)



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Selected LED Locations