



Report of Test

LLIA000817-007A

Catalog Number: MQR2-HO-K35-80-2X2-XX-FL-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 1250mA
120.0Vac, 60.00Hz, 0.4099A, 49.03W, 0.997PF, 8.0%THD(i)



Performance Summary

Total Light Output	5008 lm
Luminaire Power	49.0 W
Luminous Efficacy	102.2 lm/W

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



Test Report No. LLIA000817-007A

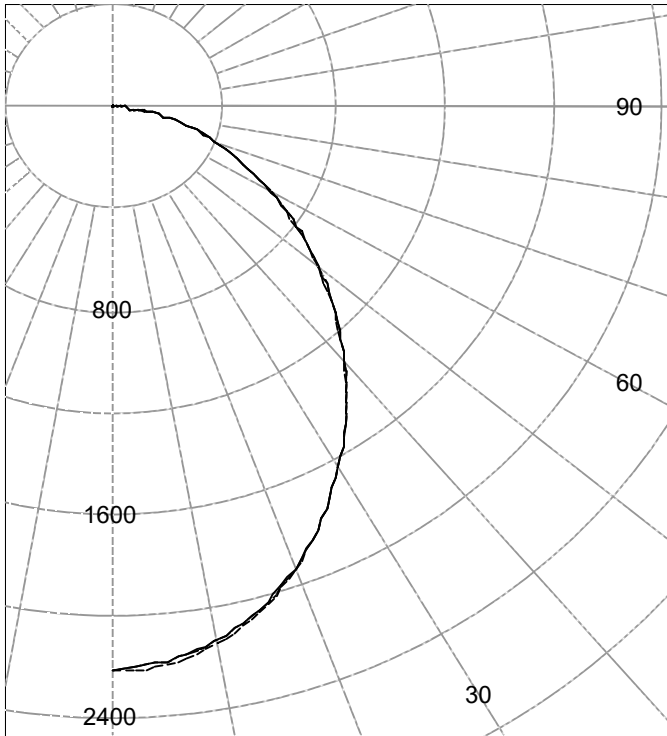
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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry) C0-C90

AVERAGE LUMINANCE (cd / m²)

Gamma	C0	C45	C90
45.0	16721	16645	16749
55.0	14719	14635	14743
65.0	12761	12760	12782
75.0	10795	10916	10823
85.0	8452	8802	8518

INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	2213	2213	2213	2213	2213	208
5.0	2185	2195	2201	2196	2185	
10.0	2130	2139	2145	2140	2131	
15.0	2042	2050	2055	2051	2043	576
20.0	1926	1931	1935	1932	1928	823
25.0	1787	1790	1793	1791	1789	
30.0	1633	1634	1636	1635	1635	
35.0	1469	1469	1469	1470	1471	918
40.0	1302	1299	1300	1300	1304	874
45.0	1136	1130	1131	1131	1138	
50.0	972	966	965	967	974	
55.0	811	809	807	810	813	725
60.0	659	660	658	660	660	515
65.0	518	519	518	519	519	
70.0	387	389	389	389	388	
75.0	268	271	272	271	269	287
80.0	162	165	166	165	163	82
85.0	71	72	74	73	71	
90.0	0	0	1	1	1	

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	1607	N / A	32.1
0-40	2526	N / A	50.4
0-60	4124	N / A	82.3
0-90	5008	N / A	100.0
40-90	2482	N / A	49.6
60-90	884	N / A	17.7
90-180	0	N / A	0.0
0-180	5008	N / A	100.0

Total Light Output = 5,008 lm

Signed:

Authorized Signatory

Spacing Criterion: 0-180 1.1
Spacing Criterion: 90-270 1.1

Date of test 9-Jul-2017
Date of report 11-Jul-2017



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Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	2213	2213	2213	2213	2213
2.5	2199	2209	2215	2210	2199
5.0	2185	2195	2201	2196	2185
7.5	2162	2172	2177	2172	2163
10.0	2130	2139	2145	2140	2131
12.5	2090	2099	2104	2099	2091
15.0	2042	2050	2055	2051	2043
17.5	1987	1994	1998	1995	1989
20.0	1926	1931	1935	1932	1928
22.5	1860	1863	1866	1864	1861
25.0	1787	1790	1793	1791	1789
27.5	1712	1714	1716	1715	1714
30.0	1633	1634	1636	1635	1635
32.5	1552	1552	1553	1553	1553
35.0	1469	1469	1469	1470	1471
37.5	1385	1384	1385	1385	1387
40.0	1302	1299	1300	1300	1304
42.5	1219	1214	1215	1215	1221
45.0	1136	1130	1131	1131	1138
47.5	1054	1047	1048	1048	1056
50.0	972	966	965	967	974
52.5	891	887	885	887	893
55.0	811	809	807	810	813
57.5	734	733	731	734	735
60.0	659	660	658	660	660
62.5	587	588	587	588	588
65.0	518	519	518	519	519
67.5	451	452	452	453	452
70.0	387	389	389	389	388
72.5	327	328	329	329	327
75.0	268	271	272	271	269
77.5	213	216	217	216	214
80.0	162	165	166	165	163
82.5	115	117	119	117	115
85.0	71	72	74	73	71
87.5	32	32	32	32	32
90.0	0	0	1	1	1



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Coefficients Of Utilization - Zonal Cavity Method

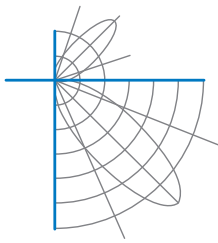
Effective Floor Cavity Reflectance 0.20

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	110	110	110	105	105	105	100	100	100	98
1	109	104	100	97	106	102	98	95	97	94	91	93	91	88	89	87	85	83
2	100	92	85	80	97	90	84	79	86	81	77	82	78	75	79	76	73	70
3	91	81	73	67	89	79	72	67	76	70	65	73	68	64	70	66	62	60
4	84	72	64	58	81	71	63	57	68	61	56	66	60	55	63	58	54	52
5	77	65	57	50	75	64	56	50	62	54	49	59	53	48	57	52	48	46
6	72	59	50	44	70	58	50	44	56	49	43	54	48	43	52	47	42	40
7	67	54	45	39	65	53	45	39	51	44	39	49	43	38	48	42	38	36
8	62	49	41	35	61	48	41	35	47	40	35	46	39	34	44	38	34	32
9	58	45	37	32	57	45	37	32	43	36	32	42	36	31	41	35	31	29
10	55	42	34	29	53	41	34	29	40	33	29	39	33	29	38	32	28	27

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	61.5	6.69	6.70
8.0	34.6	8.92	8.93
10.0	22.1	11.15	11.16
12.0	15.4	13.38	13.39
14.0	11.3	15.61	15.63
16.0	8.6	17.84	17.86



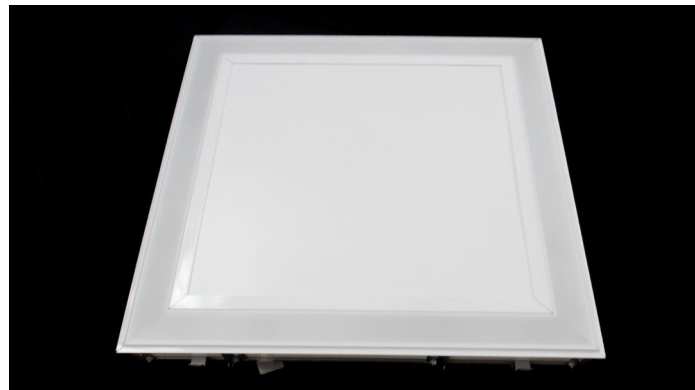
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Test Distance 9.5 m
Test Temperature 25.0 °C

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

LLIA000817-007B

Integrating Sphere Report

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Performance Summary

Voltage	120.0 Vac
Current	0.4100 A
Power	49.03 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	8.0 %

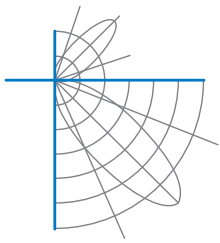
Total Luminous Flux	5149.6 lm
Efficacy	105.0 lm/W
Chromaticity (x,y)	(0.4059, 0.3871)
(u',v')	(0.2376, 0.5099)
Duv	-0.0017
CCT	3457 K
CRI (Ra)	84
R9	17

Prepared For:

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

Test date: 07/07/2017

Report date: 07/11/2017



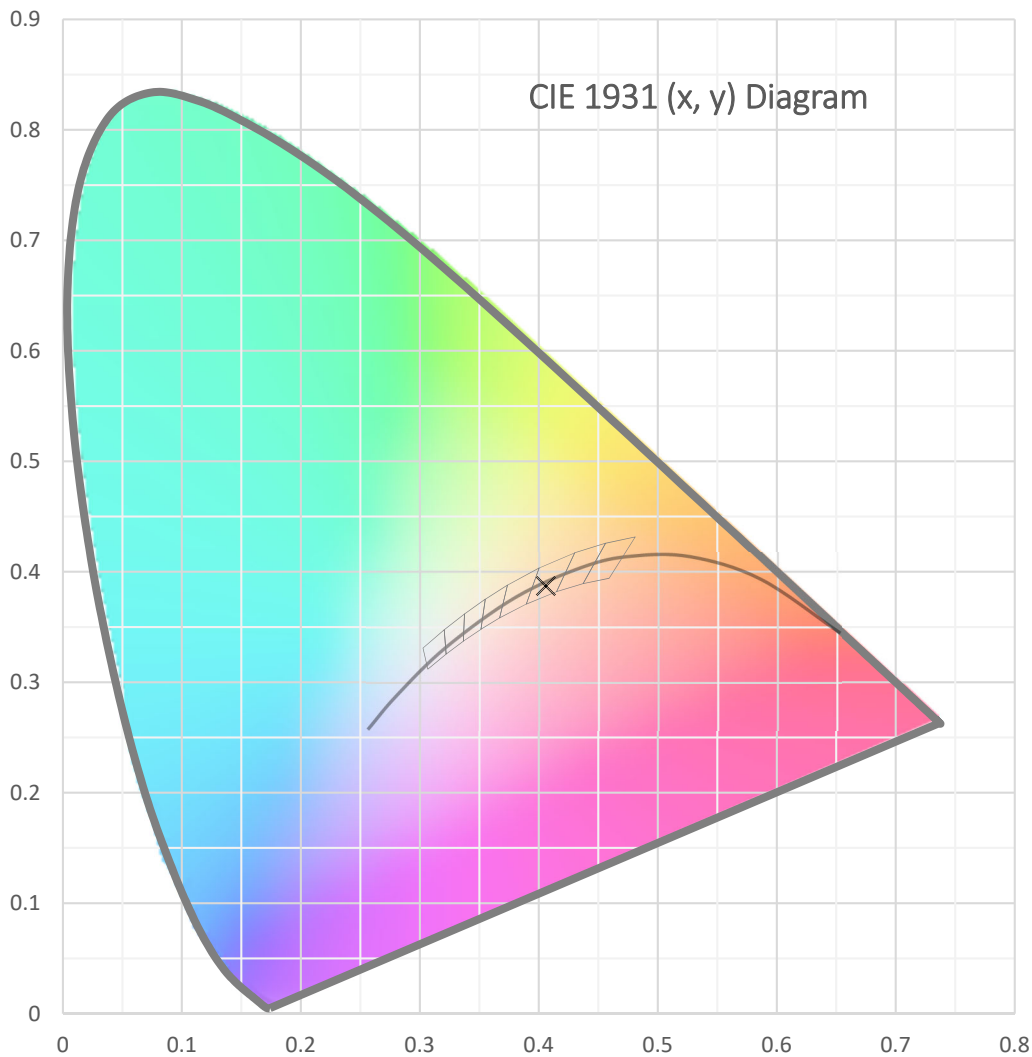
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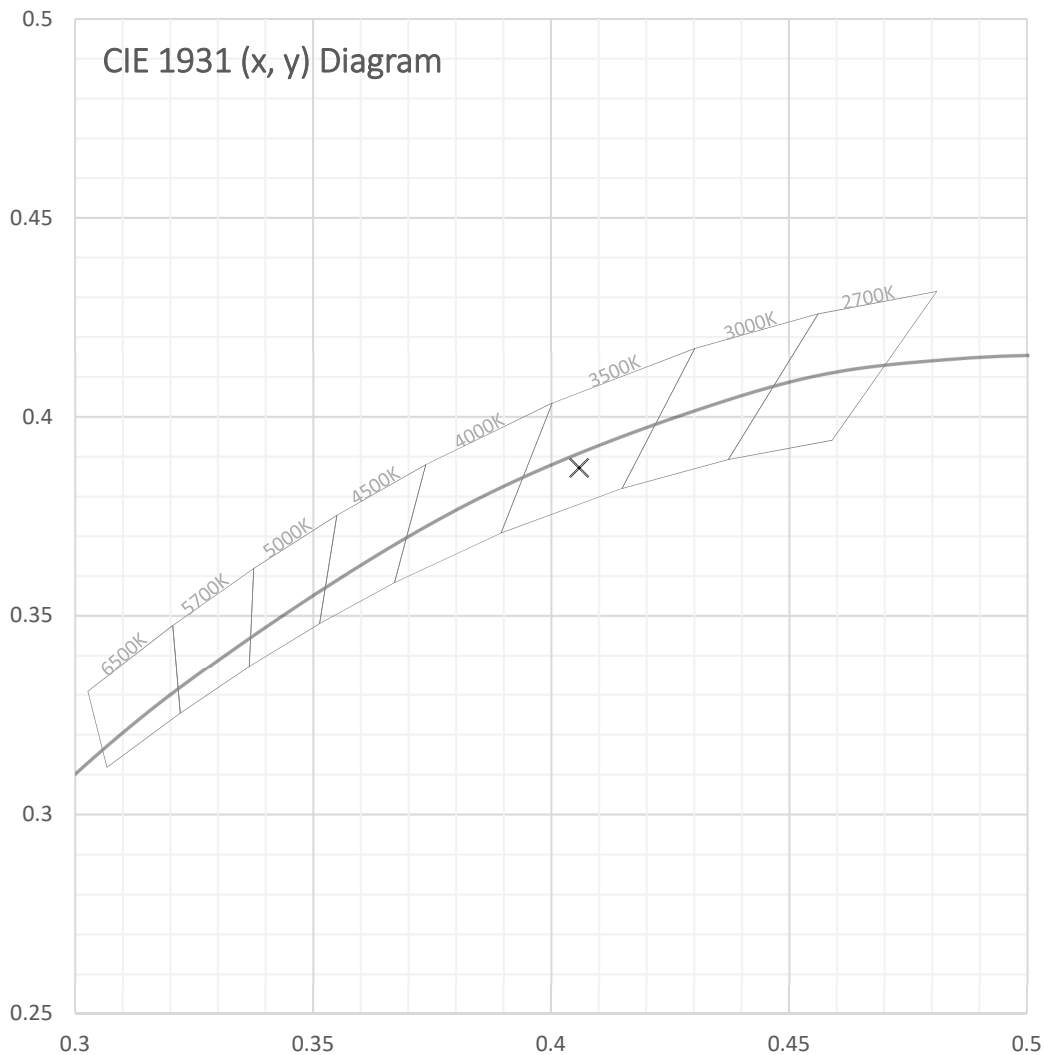
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Spectral Data	Total Radiant Flux	16.08 W
	Total Luminous Flux	5149.6 Lm
	Chromaticity CIE 1931 (x, y)	(0.4059, 0.3871)
	Chromaticity CIE 1976 (u', v')	(0.2376, 0.5099)
	Correlated Color Temperature (CCT)	3457 K
	Color Rendering Index (Ra)	84
	R1	83
	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)	-0.0017
	Scotopic/Photopic Ratio *	1.535

Electrical Data

Voltage	120.0 Vac
Current	0.4100 A
Power	49.03 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	8.0 %



Test Report Number: LLIA000817-007B

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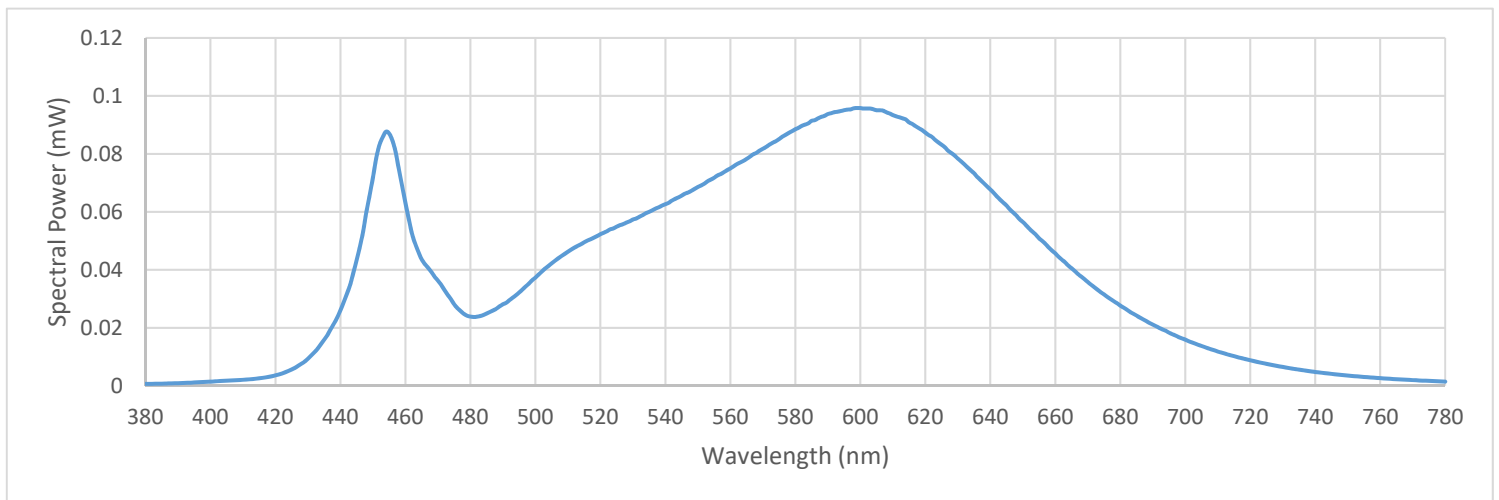
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Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

380	0.000685	480	0.023853	580	0.088498	680	0.027641
385	0.000727	485	0.024943	585	0.091409	685	0.024221
390	0.000902	490	0.028111	590	0.093735	690	0.021097
395	0.001132	495	0.032168	595	0.095066	695	0.018322
400	0.001445	500	0.037315	600	0.095791	700	0.015928
405	0.001744	505	0.042237	605	0.095051	705	0.013735
410	0.002067	510	0.046251	610	0.093398	710	0.011817
415	0.002577	515	0.049500	615	0.090852	715	0.010234
420	0.003595	520	0.052291	620	0.087352	720	0.008789
425	0.005635	525	0.054873	625	0.083167	725	0.007556
430	0.009356	530	0.057351	630	0.078387	730	0.006500
435	0.015920	535	0.060013	635	0.073310	735	0.005577
440	0.026051	540	0.062647	640	0.067762	740	0.004757
445	0.043476	545	0.065589	645	0.062152	745	0.004110
450	0.071858	550	0.068576	650	0.056508	750	0.003534
455	0.087005	555	0.071741	655	0.050879	755	0.003043
460	0.063083	560	0.074978	660	0.045659	760	0.002642
465	0.043635	565	0.078247	665	0.040529	765	0.002273
470	0.036272	570	0.081750	670	0.035797	770	0.001954
475	0.028127	575	0.085098	675	0.031499	775	0.001687
						780	0.001453





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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:	25.2 °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.



Report of Test

LLIA000817-007C

ISTM Report

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

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

Test date: 07/10/2017

Report date: 07/11/2017



Test Report Number: LLIA000817-007C

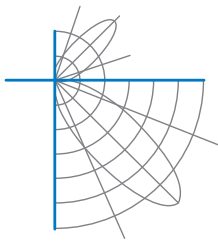
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Purpose of Test:	To determine the in-situ temperature of the specified LED Ts point and driver Tc point. In this test, in-situ temperature refers to standard laboratory conditions with the luminaire configured in accordance with appropriate sections of UL1598-2008
Luminaire Mounting:	Recessed/Ceiling (NON-IC)
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 inside of a normal temperature test box for type NON-IC luminaires. 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

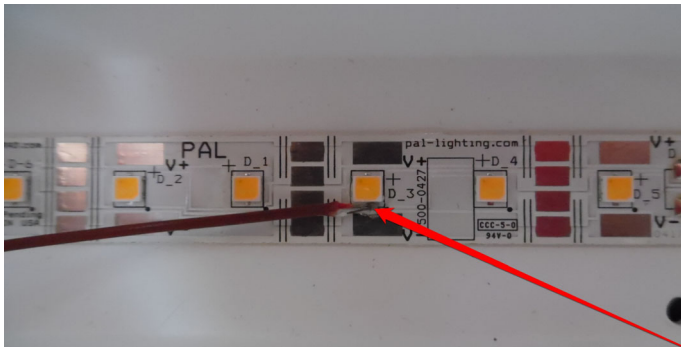
Voltage	120.0 Vac
Current	0.4131 A
Power	49.41 W
Frequency	60.0 Hz
Power Factor	0.997
Current THD	8.0 %
Driver #1 Output	1.249 Adc

Temperature Measurements

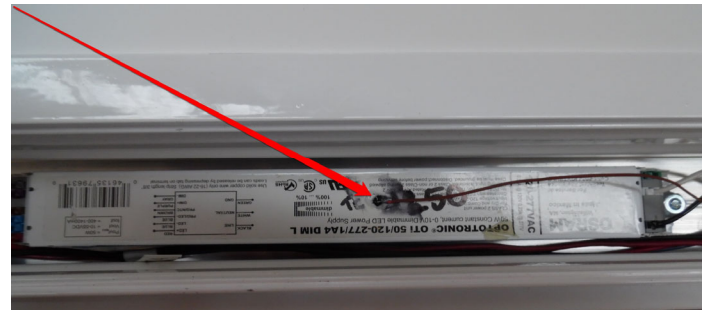
LED #1 (Ts)	56.1°C	Driver #1 (Tc)	55.0°C
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*The above temperatures have been normalized to 25°C ambient.

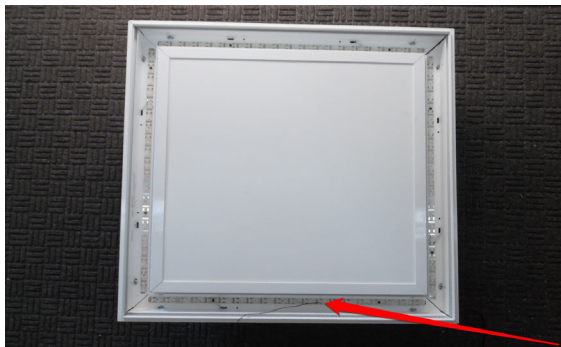
Measured Ambient Temperature (Ta) 24.3°C



LED Thermocouple Location



Driver Thermocouple Location



Selected LED Location