

# Report of Test

## LLIA000676-009A-R01\*

\*This test report supersedes test report LLIA000676-009A

Catalog Number: ML5WL-I/D-HO/MO-K40-4-X-LOH/LOH-X-X-UNV

Direct/indirect luminaire, extruded brown aluminum housing, upper and lower white reflectors, translucent white plastic enclosures. 264 white LEDs, four lower Osram PrevaLED Bar boards with 36 LEDs each and four upper Osram PrevaLED Line boards with 30 LEDs each. Two Osram Optotronic OTi 30/120-277/1A0 DIM L LED drivers.  
120.0Vac, 60.0Hz, 0.4378A, 52.35, 0.997PF, 5.76%THD(i)



### Performance Summary

Total Light Output	5208 lm
Luminaire Power	52.3 W
Luminous Efficacy	99.6 lm/W

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

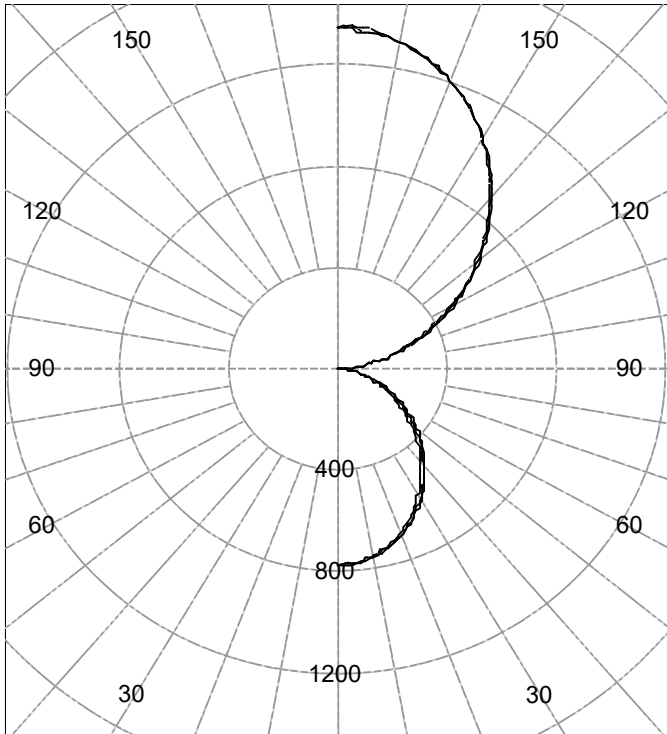


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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry) C0-C90

**INTENSITY SUMMARY (cd)**

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	774	774	774	774	774	
5.0	764	766	771	770	765	73
10.0	749	750	754	752	746	
15.0	724	724	727	724	716	204
20.0	690	690	691	686	677	
25.0	649	648	647	640	630	296
30.0	602	599	597	588	578	
35.0	550	547	543	533	523	337
40.0	496	492	486	475	465	
45.0	439	435	428	417	407	328
50.0	381	378	370	359	350	
55.0	323	321	313	302	294	278
60.0	266	265	257	247	241	
65.0	212	211	204	195	190	201
70.0	159	159	153	146	142	
75.0	110	110	106	100	97	111
80.0	65	66	62	57	56	
85.0	28	27	23	20	18	28
90.0	1	1	2	2	2	

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

Gamma	C0	C45	C90
45.0	3715	3620	3446
55.0	3370	3262	3068
65.0	2997	2885	2693
75.0	2540	2445	2235
85.0	1922	1599	1244

**ZONAL FLUX AND PERCENTAGES**

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	573	N / A	11.0
0-40	910	N / A	17.5
0-60	1517	N / A	29.1
0-90	1856	N / A	35.6
40-90	946	N / A	18.2
60-90	340	N / A	6.5
90-180	3352	N / A	64.4
0-180	5208	N / A	100.0

Total Light Output = 5,208 lm

Signed:

Michael L. Grather  
Authorized Signatory

Date of test 9-Dec-2016  
Date of report 16-Jun-2020



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**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	774	774	774	774	774
2.5	768	770	775	774	769
5.0	764	766	771	770	765
7.5	758	760	764	763	757
10.0	749	750	754	752	746
12.5	738	739	742	739	733
15.0	724	724	727	724	716
17.5	708	708	710	706	698
20.0	690	690	691	686	677
22.5	670	670	670	664	655
25.0	649	648	647	640	630
27.5	626	624	623	615	605
30.0	602	599	597	588	578
32.5	577	574	570	561	551
35.0	550	547	543	533	523
37.5	523	520	514	504	494
40.0	496	492	486	475	465
42.5	468	464	457	446	436
45.0	439	435	428	417	407
47.5	410	406	399	388	378
50.0	381	378	370	359	350
52.5	352	349	341	330	322
55.0	323	321	313	302	294
57.5	295	293	285	274	267
60.0	266	265	257	247	241
62.5	239	238	230	221	215
65.0	212	211	204	195	190
67.5	185	185	178	170	166
70.0	159	159	153	146	142
72.5	134	134	129	122	119
75.0	110	110	106	100	97
77.5	87	87	83	78	76
80.0	65	66	62	57	56
82.5	46	46	42	38	36
85.0	28	27	23	20	18
87.5	12	10	6	4	4
90.0	1	1	2	2	2



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**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	1	1	2	2	2
92.5	25	25	25	25	25
95.0	56	56	56	56	56
97.5	89	89	89	89	88
100.0	124	125	124	124	123
102.5	162	163	162	161	159
105.0	202	203	201	199	198
107.5	245	245	243	240	238
110.0	289	289	286	281	280
112.5	335	335	330	325	323
115.0	382	382	377	370	368
117.5	430	430	424	416	415
120.0	478	479	472	463	462
122.5	527	528	521	511	510
125.0	576	577	570	559	559
127.5	625	626	620	608	609
130.0	675	675	670	658	659
132.5	724	724	719	707	709
135.0	774	773	769	757	759
137.5	824	822	818	807	809
140.0	872	871	867	856	859
142.5	920	918	915	905	907
145.0	967	965	962	953	955
147.5	1011	1010	1008	1000	1002
150.0	1055	1053	1053	1045	1047
152.5	1095	1094	1095	1089	1090
155.0	1134	1133	1135	1130	1130
157.5	1170	1169	1173	1168	1168
160.0	1203	1203	1208	1204	1203
162.5	1233	1233	1239	1235	1234
165.0	1260	1260	1267	1264	1262
167.5	1283	1283	1291	1288	1285
170.0	1302	1302	1310	1308	1305
172.5	1317	1317	1326	1324	1320
175.0	1327	1328	1337	1336	1331
177.5	1334	1334	1344	1342	1337
180.0	1341	1341	1341	1341	1341



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**Coefficients Of Utilization - Zonal Cavity Method**

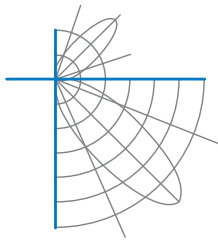
Effective Floor Cavity Reflectance 0.20

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	104	104	104	104	94	94	94	94	75	75	75	58	58	58	43	43	43	36
1	95	90	87	83	86	82	79	76	66	64	62	52	50	49	38	37	36	30
2	86	79	73	68	78	72	67	62	58	54	51	45	43	41	34	32	31	25
3	79	70	62	57	71	63	57	52	51	47	43	40	37	35	30	28	26	22
4	72	62	54	48	65	56	49	44	46	41	37	36	32	30	27	25	23	19
5	66	55	47	41	60	50	43	38	41	36	32	32	29	26	24	22	20	16
6	61	49	41	36	55	45	38	33	37	32	28	29	25	23	22	19	18	14
7	56	44	37	31	51	40	34	29	33	28	24	26	23	20	20	18	16	13
8	52	40	33	27	47	37	30	25	30	25	22	24	20	18	18	16	14	11
9	48	37	29	24	44	33	27	23	28	23	19	22	19	16	17	14	13	10
10	45	33	26	22	41	31	24	20	25	21	17	20	17	14	16	13	11	9

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.

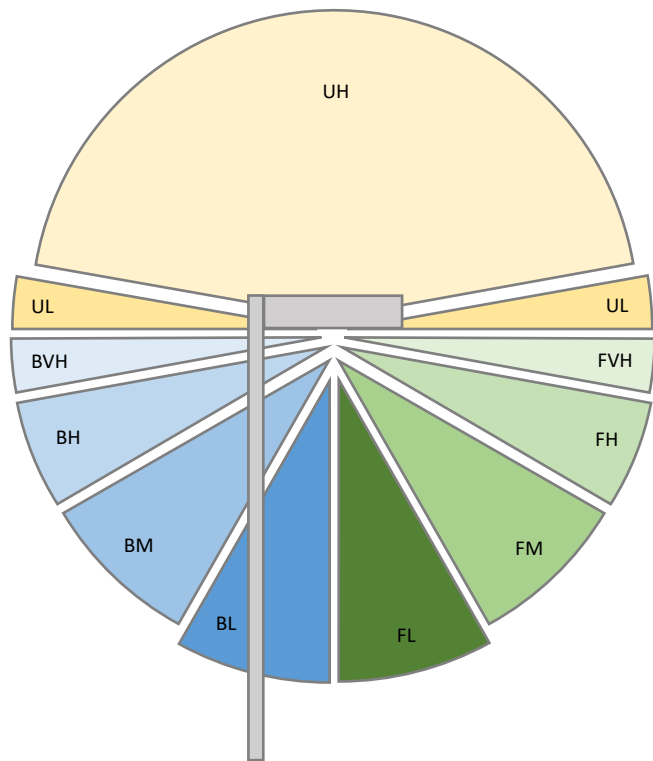
**Circle of Light Plot**

Height(ft)	Illuminance at Nadir (fc)	Beam Width (across 50% Nadir Illum)	
		0-180	90-270
6.0	21.5	6.99	6.76
8.0	12.1	9.33	9.01
10.0	7.7	11.66	11.26
12.0	5.4	13.99	13.52
14.0	3.9	16.32	15.77
16.0	3.0	18.65	18.02



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LLIA000676-009A-R01

LCS Tables and Bug Classification



**Back Light**

BL - Back Low (0°-30°)	286.3 Lm
BM - Back Mid (30°-60°)	472.0 Lm
BH - Back High (60°-80°)	156.0 Lm
BVH - Back Very High (80°-90°)	13.8 Lm

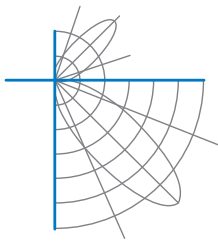
**Forward Light**

FL - Forward Low (0°-30°)	286.3 Lm
FM - Forward Mid (30°-60°)	472.0 Lm
FH - Forward High (60°-80°)	156.0 Lm
FVH - Forward Very High (80°-90°)	13.8 Lm

**Uplight**

UL - Upward Low (90°-100°)	62.6 Lm
UH - Upward High (100°-180°)	3288.9 Lm

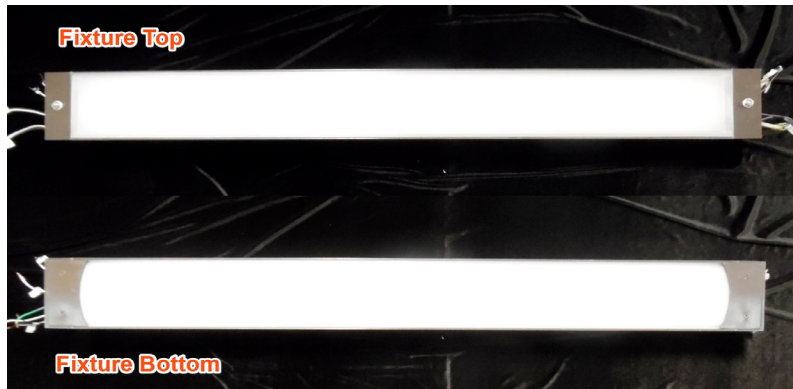
BUG Ratings: B1 - U5 - G1



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120.0Vac, 60.0Hz, 0.4378A, 52.35, 0.997PF, 5.76%THD(i)

**Test Distance** 9.5 m  
**Test Temperature** 24.8 °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 C78.377:2011, ANSI C82.77:2002.

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.

**Revision** Added LCS Tables and Bug Classification page per customer request.





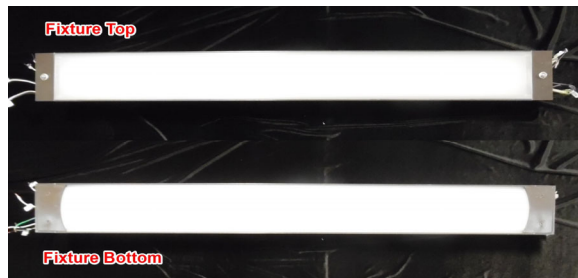
## Report of Test

**LLIA000676-009B-R01\***

Integrating Sphere Report

Catalog Number: ML5WL-I/D-HO/MO-K40-4-X-LOH/LOH-X-X-UNV

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### Performance Summary

Voltage	120.0 Vac
Current	0.4374 A
Power	52.32 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	5.8 %

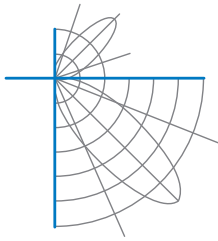
Total Luminous Flux	5571.5 lm
Efficacy	106.5 lm/W
Chromaticity (x,y)	(0.3810, 0.3786)
(u',v')	(0.2248, 0.5025)
Duv	0.0007
CCT	3997 K
CRI (Ra)	83
R9	15

Prepared For:

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

\*This test report supersedes test report LLIA000676-009B

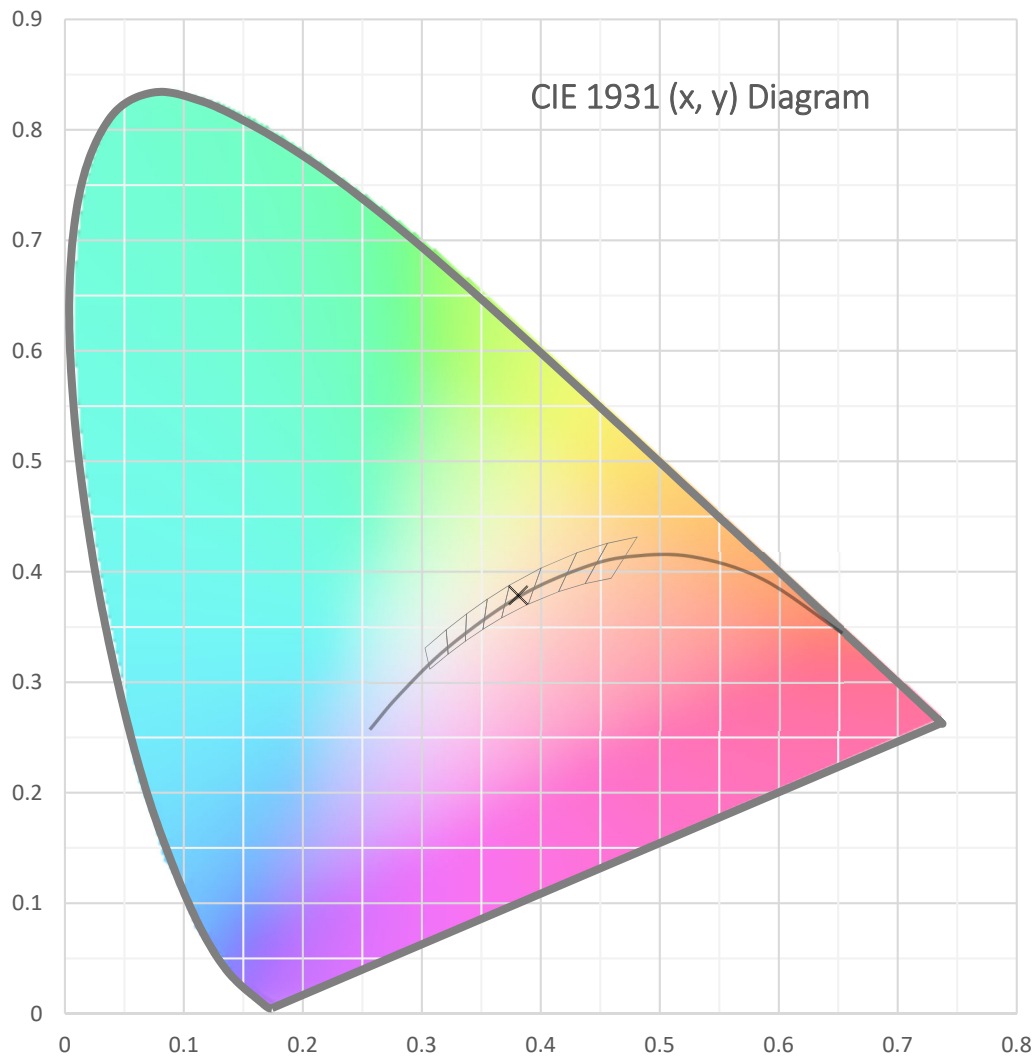
Test date: 12/05/2016  
Report date: 06/16/2020

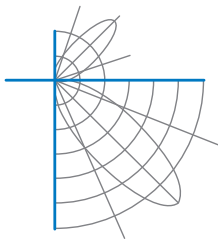


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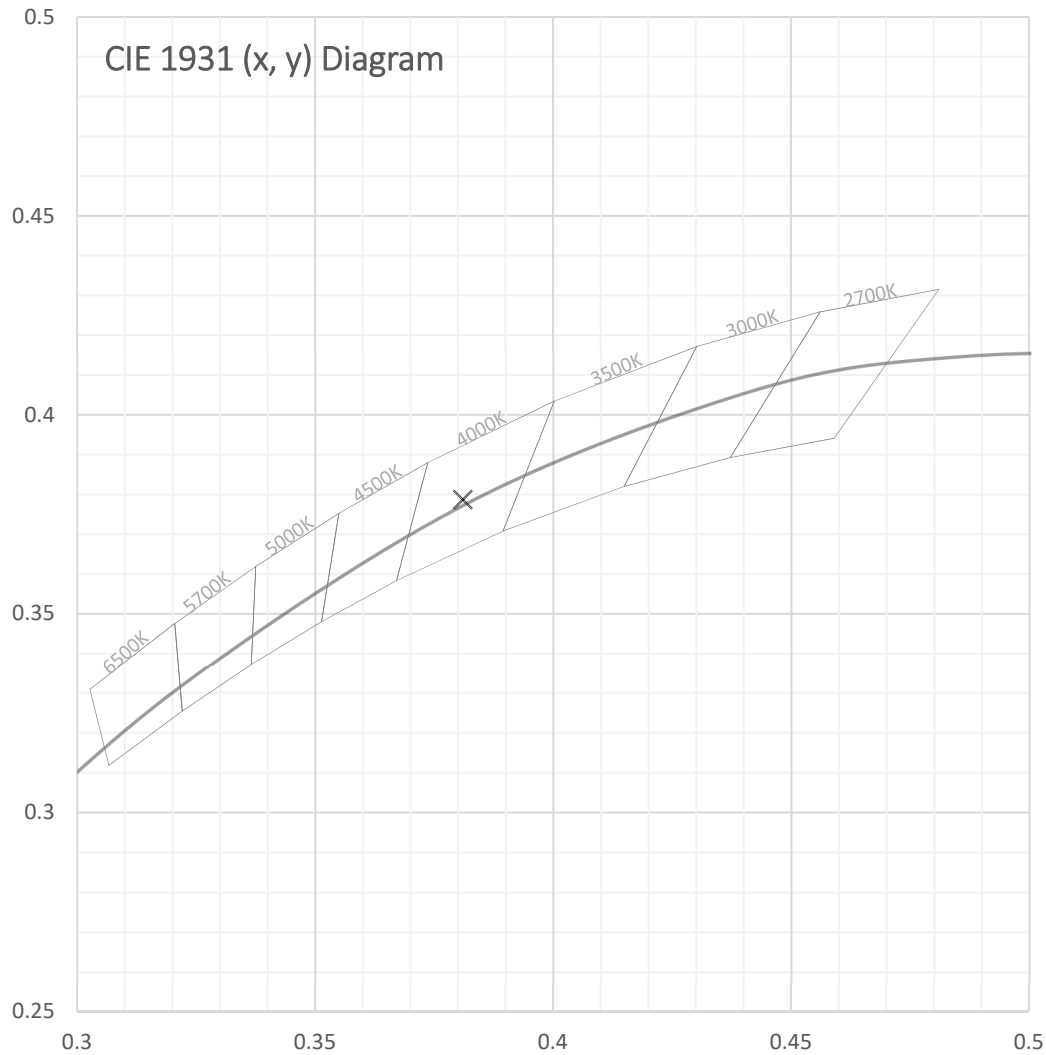




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<b>Spectral Data</b>	Total Radiant Flux	17.30 W
	Total Luminous Flux	5571.5 Lm
	Chromaticity CIE 1931 (x, y)	(0.3810, 0.3786)
	Chromaticity CIE 1976 (u', v')	(0.2248, 0.5025)
	Correlated Color Temperature (CCT)	3997 K
	Color Rendering Index (Ra)	83
	R1	82
	R2	89
	R3	94
	R4	82
	R5	81
	R6	84
	R7	87
	R8	67
	R9	15
	R10	73
	R11	80
	R12	60
	R13	84
	R14	96
	Distance from Planckian Locus (Duv)	0.0007
	Scotopic/Photopic Ratio *	1.677

**Electrical Data**

Voltage	120.0 Vac
Current	0.4374 A
Power	52.32 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	5.8 %



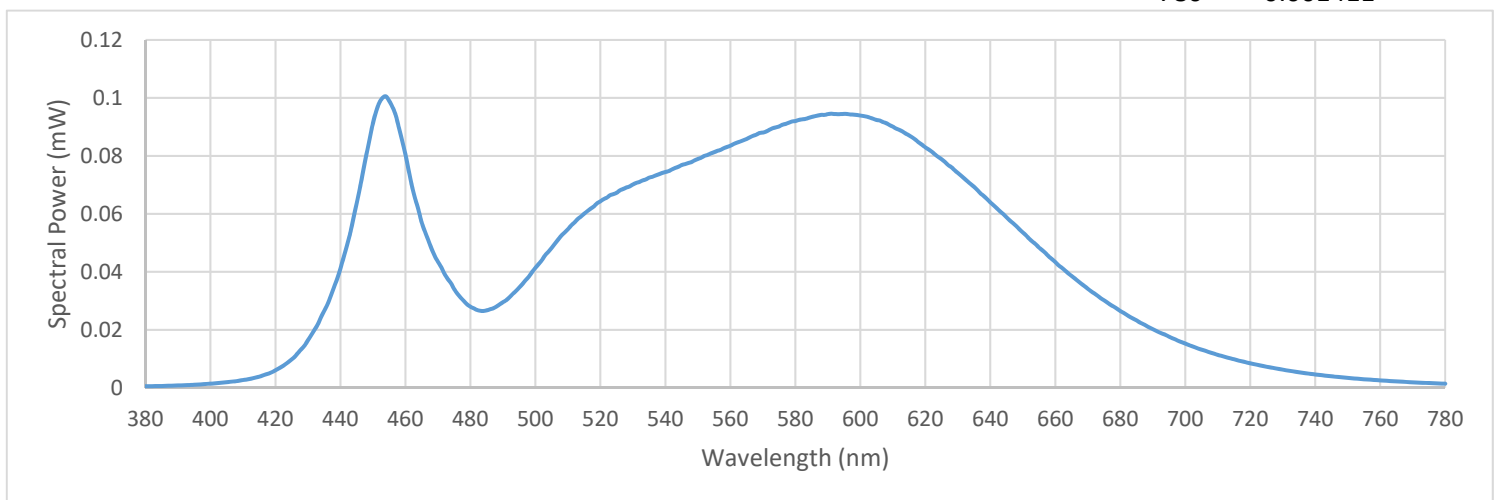
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Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

380	0.000534	480	0.027963	580	0.092010	680	0.026492
385	0.000619	485	0.026711	585	0.093415	685	0.023242
390	0.000813	490	0.029519	590	0.094411	690	0.020232
395	0.001057	495	0.034531	595	0.094491	695	0.017617
400	0.001422	500	0.041357	600	0.093914	700	0.015260
405	0.001903	505	0.048282	605	0.092381	705	0.013162
410	0.002681	510	0.054676	610	0.090092	710	0.011354
415	0.003821	515	0.060028	615	0.087086	715	0.009831
420	0.006035	520	0.064324	620	0.082953	720	0.008447
425	0.009825	525	0.067277	625	0.078850	725	0.007259
430	0.016410	530	0.070136	630	0.074108	730	0.006265
435	0.026540	535	0.072491	635	0.069325	735	0.005361
440	0.041077	540	0.074442	640	0.063962	740	0.004599
445	0.063671	545	0.076812	645	0.058797	745	0.003972
450	0.091261	550	0.078948	650	0.053605	750	0.003419
455	0.098965	555	0.081263	655	0.048350	755	0.002947
460	0.080532	560	0.083520	660	0.043377	760	0.002554
465	0.057087	565	0.085841	665	0.038582	765	0.002193
470	0.043510	570	0.088048	670	0.034168	770	0.001889
475	0.034039	575	0.090162	675	0.030168	775	0.001630
						780	0.001411





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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 $\pi$  geometry

**Test Temperature:** 24.9 °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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**Revision:** No change made to this report-revision was issued to keep in numerical order with gonio revision to add LCS page.