

Report of Test

LLIA000676-004A

Catalog Number: ML3WL-I/D-MO/HO-K40-4-X-LOH/LOH-X-X-UNV

Direct/indirect pendant luminaire, extruded 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.

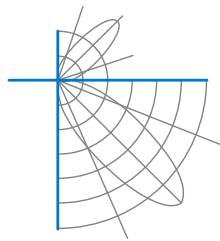
120.0Vac, 60.0Hz, 0.3846A, 46.01W, 0.997PF, 5.25%THD(i)



Performance Summary

Total Light Output	4575 lm
Luminaire Power	46.0 W
Luminous Efficacy	99.5 lm/W

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



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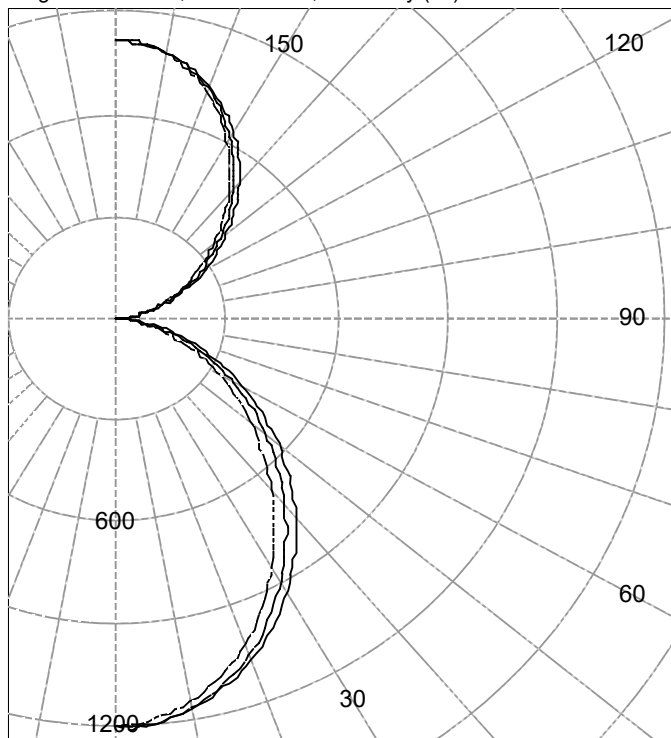
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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



AVERAGE LUMINANCE (cd / m²)

Gamma	C0	C45	C90
45.0	8854	8222	7501
55.0	7901	7219	6448
65.0	6881	6185	5368
75.0	5591	4861	4001
85.0	3605	2115	1183

INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	1204	1204	1204	1204	1204	113
5.0	1195	1189	1199	1195	1186	
10.0	1170	1162	1169	1162	1150	
15.0	1129	1119	1121	1108	1093	314
20.0	1074	1062	1057	1039	1020	
25.0	1007	992	981	956	936	
30.0	930	913	895	866	844	448
35.0	846	827	804	773	750	
40.0	757	737	711	678	655	
45.0	665	646	618	585	564	475
50.0	573	555	527	495	476	
55.0	482	466	440	410	393	
60.0	393	381	357	330	315	392
65.0	309	300	278	253	241	
70.0	229	222	203	182	172	
75.0	154	150	134	117	110	142
80.0	87	85	72	59	55	
85.0	33	30	20	13	11	
90.0	0	1	1	1	1	28

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	875	N / A	19.1
0-40	1375	N / A	30.1
0-60	2242	N / A	49.0
0-90	2686	N / A	58.7
40-90	1311	N / A	28.7
60-90	444	N / A	9.7
90-180	1889	N / A	41.3
0-180	4575	N / A	100.0

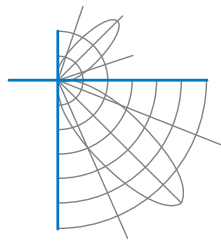
Total Light Output = 4,575 lm

Signed:

Michael L. Grather
Authorized Signatory

Date of test
Date of report

8-Dec-2016
8-Dec-2016



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Catalog Number: ML3WL-I/D-MO/HO-K40-4-X-LOH/LOH-X-X-UNV

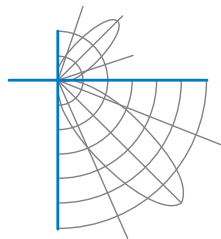
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120.0Vac, 60.0Hz, 0.3846A, 46.01W, 0.997PF, 5.25%THD(i)

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	1204	1204	1204	1204	1204
2.5	1201	1196	1206	1204	1196
5.0	1195	1189	1199	1195	1186
7.5	1184	1178	1186	1181	1170
10.0	1170	1162	1169	1162	1150
12.5	1151	1143	1147	1137	1124
15.0	1129	1119	1121	1108	1093
17.5	1103	1092	1091	1075	1059
20.0	1074	1062	1057	1039	1020
22.5	1042	1028	1020	999	979
25.0	1007	992	981	956	936
27.5	969	953	939	912	891
30.0	930	913	895	866	844
32.5	888	870	850	820	797
35.0	846	827	804	773	750
37.5	802	782	758	725	702
40.0	757	737	711	678	655
42.5	711	692	664	631	609
45.0	665	646	618	585	564
47.5	619	600	572	540	519
50.0	573	555	527	495	476
52.5	527	510	483	452	434
55.0	482	466	440	410	393
57.5	437	424	398	369	354
60.0	393	381	357	330	315
62.5	351	340	317	291	278
65.0	309	300	278	253	241
67.5	268	260	240	217	206
70.0	229	222	203	182	172
72.5	190	185	168	149	141
75.0	154	150	134	117	110
77.5	119	116	102	87	81
80.0	87	85	72	59	55
82.5	58	56	44	34	31
85.0	33	30	20	13	11
87.5	12	7	2	1	1
90.0	0	1	1	1	1



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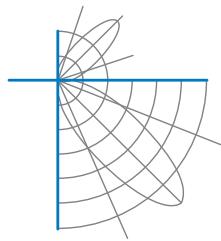
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120.0Vac, 60.0Hz, 0.3846A, 46.01W, 0.997PF, 5.25%THD(i)

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	0	1	1	1	1
92.5	10	11	11	11	11
95.0	25	26	26	26	25
97.5	43	43	42	41	41
100.0	63	62	61	59	57
102.5	85	83	80	77	75
105.0	108	106	101	97	94
107.5	133	130	124	118	115
110.0	159	155	147	139	136
112.5	186	182	172	163	159
115.0	214	209	198	187	183
117.5	242	237	224	212	207
120.0	271	266	252	238	233
122.5	300	295	280	265	260
125.0	330	325	309	292	287
127.5	361	355	339	321	316
130.0	391	385	370	351	346
132.5	422	416	400	381	376
135.0	454	447	431	412	408
137.5	485	478	462	443	440
140.0	517	509	494	475	472
142.5	547	539	525	507	504
145.0	577	569	556	539	537
147.5	606	599	586	571	569
150.0	634	627	616	602	600
152.5	661	654	645	632	631
155.0	686	680	672	661	660
157.5	710	704	699	689	688
160.0	731	726	723	715	713
162.5	751	746	745	738	737
165.0	768	764	765	759	758
167.5	783	779	782	777	776
170.0	795	792	796	793	791
172.5	805	802	807	805	803
175.0	812	809	815	814	811
177.5	816	813	820	818	815
180.0	818	818	818	818	818



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Coefficients Of Utilization - Zonal Cavity Method

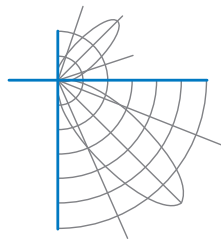
Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	109	109	109	109	102	102	102	102	88	88	88	76	76	76	64	64	64	59
1	100	96	92	89	93	90	86	83	78	76	73	67	66	64	57	56	55	50
2	91	84	78	73	85	79	74	69	69	65	61	59	57	54	51	49	47	43
3	84	74	67	61	78	70	63	58	61	56	52	53	49	46	45	43	40	37
4	77	66	58	52	71	62	55	50	54	49	45	47	43	40	41	38	35	32
5	71	59	51	45	66	56	48	43	49	43	39	43	38	35	37	33	31	28
6	65	53	45	39	61	50	43	38	44	38	34	39	34	31	34	30	27	25
7	60	48	40	35	56	45	38	33	40	34	30	35	31	27	31	27	24	22
8	56	44	36	31	52	41	34	30	37	31	27	32	28	24	28	25	22	20
9	52	40	33	28	49	38	31	27	34	28	24	30	25	22	26	23	20	18
10	49	37	30	25	46	35	28	24	31	26	22	28	23	20	24	21	18	16

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	33.4	6.95	6.42
8.0	18.8	9.26	8.57
10.0	12.0	11.58	10.71
12.0	8.4	13.90	12.85
14.0	6.1	16.21	14.99
16.0	4.7	18.53	17.13



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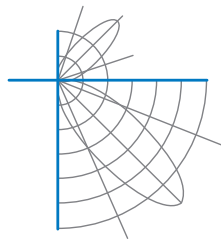
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Test Distance 9.5 m
Test Temperature 24.4 °C

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.

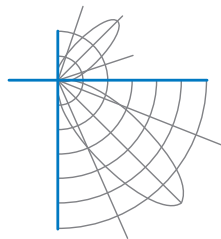
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

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.



Report of Test

LLIA000676-004B

Integrating Sphere Report

Catalog Number: ML3WL-I/D-MO/HO-K40-4-X-LOH/LOH-X-X-UNV

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Performance Summary

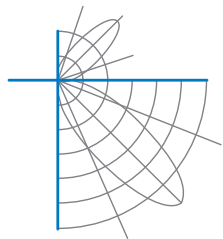
Voltage	120.0 Vac
Current	0.3841 A
Power	45.94 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	5.3 %
Total Luminous Flux	4730.9 lm
Efficacy	103.0 lm/W
Chromaticity (x,y)	(0.3807, 0.3787)
(u',v')	(0.2245, 0.5025)
Duv	0.0008
CCT	4007 K
CRI (Ra)	82
R9	12

Prepared For:

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

Test date: 12/07/2016

Report date: 12/08/2016

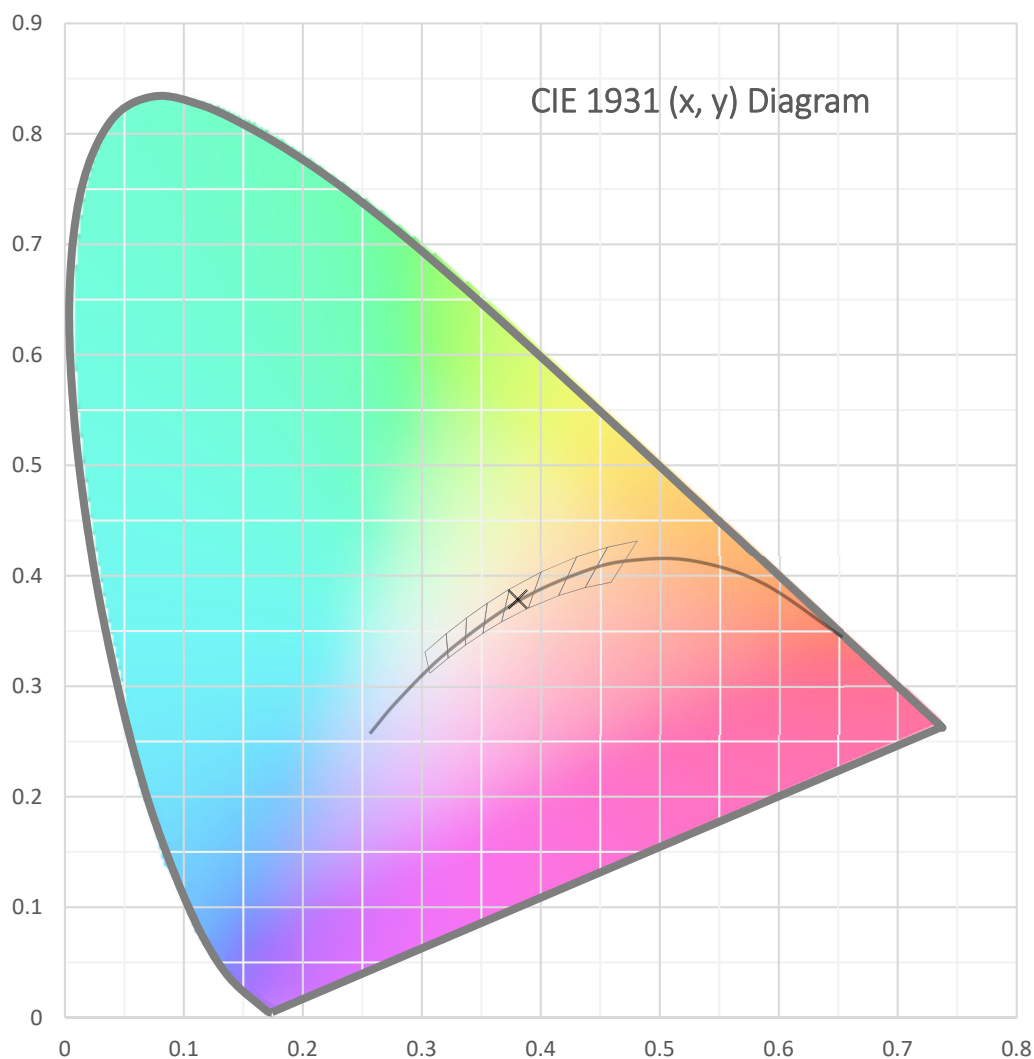


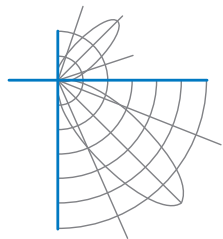
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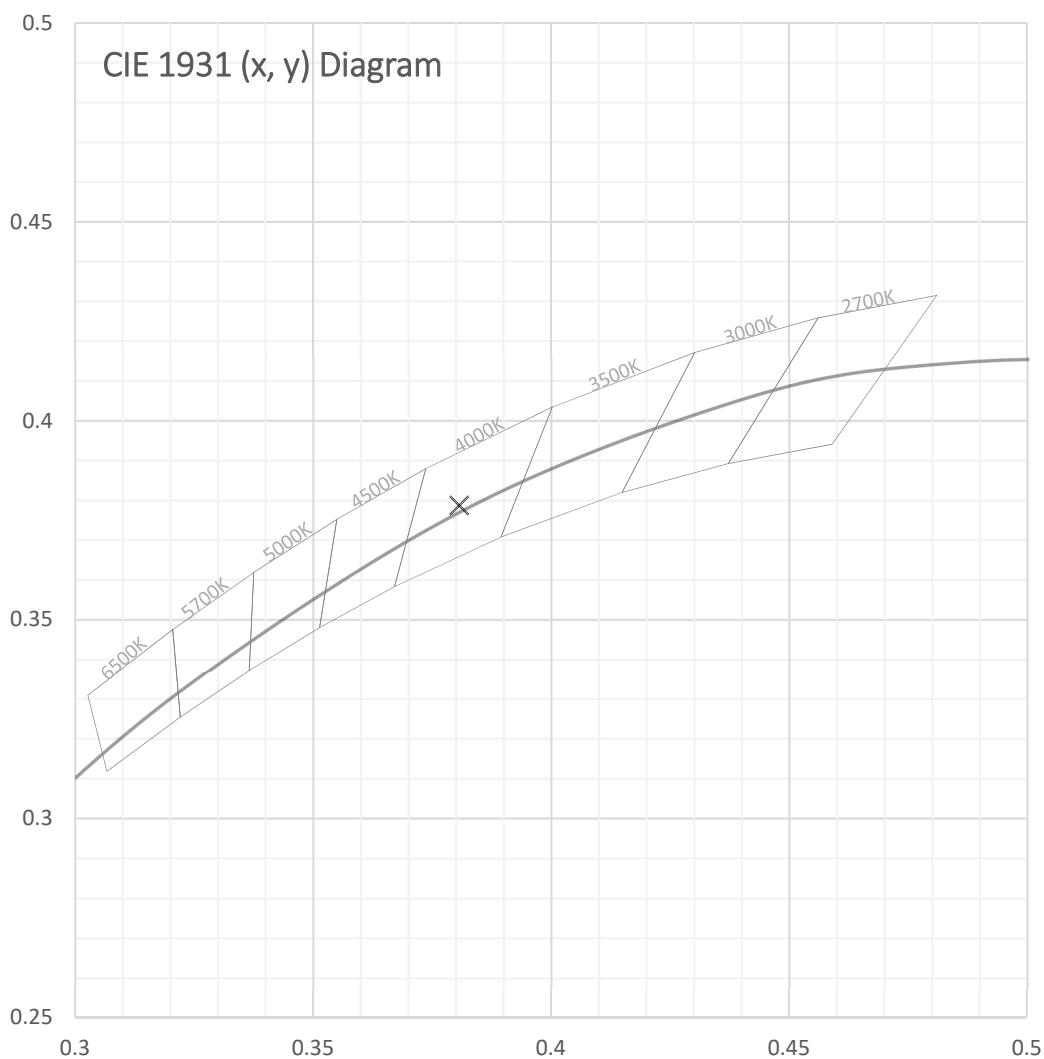


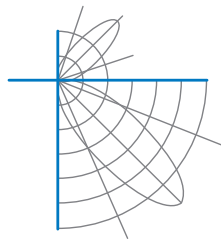
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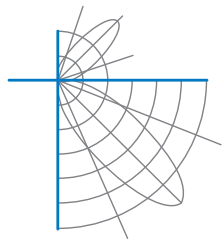
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Spectral Data

Total Radiant Flux	14.60 W
Total Luminous Flux	4730.9 Lm
Chromaticity CIE 1931 (x, y)	(0.3807, 0.3787)
Chromaticity CIE 1976 (u', v')	(0.2245, 0.5025)
Correlated Color Temperature (CCT)	4007 K
Color Rendering Index (Ra)	82
R1	81
R2	88
R3	92
R4	82
R5	80
R6	82
R7	87
R8	67
R9	12
R10	70
R11	80
R12	57
R13	82
R14	96
Distance from Planckian Locus (Duv)	0.0008
Scotopic/Photopic Ratio *	1.658

Electrical Data

Voltage	120.0 Vac
Current	0.3841 A
Power	45.94 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	5.3 %



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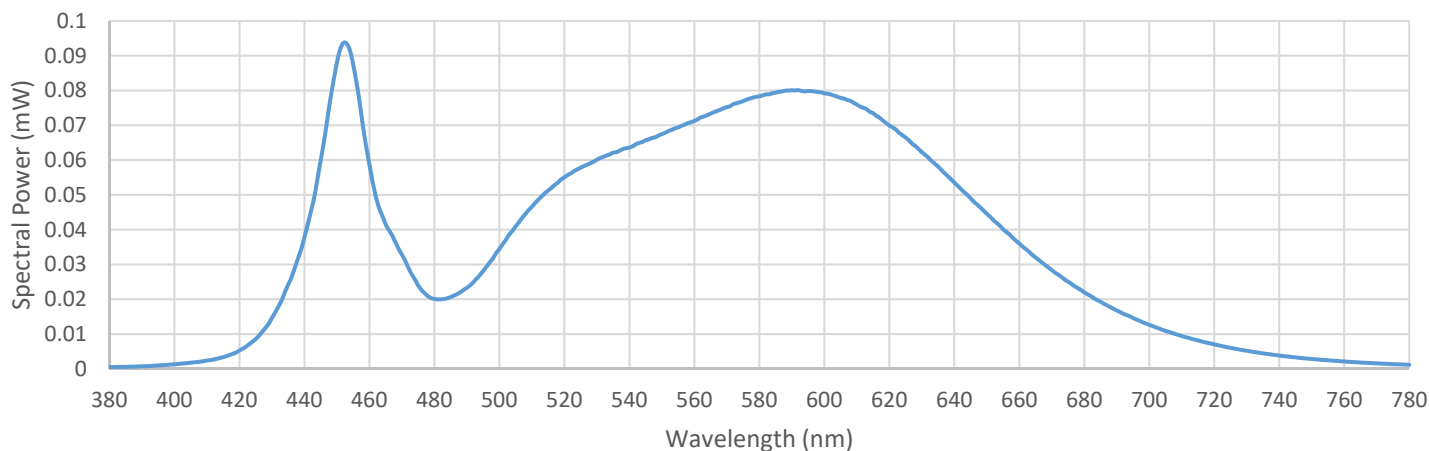
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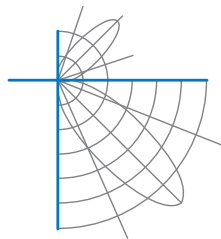
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Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

380	0.000484	480	0.020098	580	0.078340	680	0.021980
385	0.000549	485	0.020623	585	0.079380	685	0.019261
390	0.000723	490	0.023286	590	0.080072	690	0.016772
395	0.000957	495	0.028113	595	0.079868	695	0.014591
400	0.001307	500	0.034470	600	0.079235	700	0.012655
405	0.001731	505	0.040907	605	0.077890	705	0.010890
410	0.002361	510	0.046603	610	0.075955	710	0.009411
415	0.003328	515	0.051237	615	0.073465	715	0.008138
420	0.005243	520	0.055028	620	0.069944	720	0.007006
425	0.008563	525	0.057813	625	0.066468	725	0.006007
430	0.014598	530	0.060128	630	0.062272	730	0.005178
435	0.024173	535	0.062127	635	0.058133	735	0.004440
440	0.037728	540	0.063581	640	0.053516	740	0.003814
445	0.059921	545	0.065703	645	0.049020	745	0.003285
450	0.088088	550	0.067495	650	0.044570	750	0.002825
455	0.087483	555	0.069396	655	0.040121	755	0.002436
460	0.058696	560	0.071262	660	0.036034	760	0.002108
465	0.041557	565	0.073357	665	0.032032	765	0.001810
470	0.032799	570	0.075216	670	0.028374	770	0.001562
475	0.023946	575	0.076931	675	0.025056	775	0.001345
						780	0.001164





Test Report Number: LLIA000676-004B

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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:	24.2 °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.

Sphere Report Template V2-7