

# Report of Test

## LLIA000676-005A

Catalog Number: ML3WL-I/D-HO/MO-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.

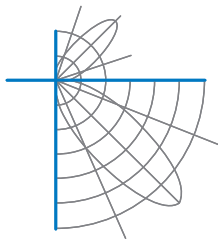
120.0Vac, 60.0Hz, 0.3824A, 45.72W, 0.996PF, 0.59%THD(i)



### Performance Summary

Total Light Output	4635 lm
Luminaire Power	45.7 W
Luminous Efficacy	101.4 lm/W

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



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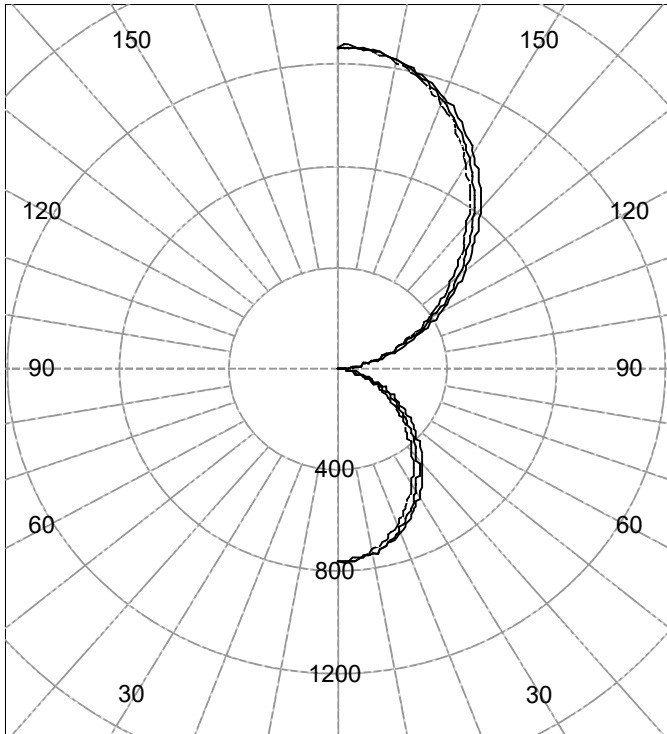
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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry) C0-C90

**INTENSITY SUMMARY (cd)**

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	760	760	760	760	760	
5.0	754	751	757	754	749	71
10.0	738	734	738	734	726	
15.0	713	707	708	700	691	198
20.0	678	671	668	656	645	
25.0	636	627	620	604	591	283
30.0	587	576	565	547	534	
35.0	534	522	508	488	474	316
40.0	478	466	449	428	414	
45.0	420	408	391	370	357	300
50.0	362	351	333	314	302	
55.0	304	295	278	260	250	248
60.0	248	241	226	210	201	
65.0	195	190	177	162	154	174
70.0	144	141	130	116	110	
75.0	97	95	86	75	71	91
80.0	55	55	46	39	36	
85.0	21	20	13	9	8	19
90.0	0	1	2	2	2	

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

Gamma	C0	C45	C90
45.0	5593	5197	4748
55.0	4990	4569	4094
65.0	4346	3935	3428
75.0	3537	3121	2579
85.0	2303	1441	867

**ZONAL FLUX AND PERCENTAGES**

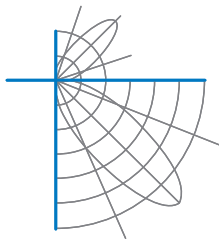
Zone	Flux (lm)	% Lamp	% Luminaire
0-30	553	N / A	11.9
0-40	869	N / A	18.7
0-60	1417	N / A	30.6
0-90	1701	N / A	36.7
40-90	832	N / A	18.0
60-90	284	N / A	6.1
90-180	2934	N / A	63.3
0-180	4635	N / A	100.0

Total Light Output = 4,635 lm

Signed:

Michael L. Grather  
Authorized Signatory

Date of test 8-Dec-2016  
Date of report 8-Dec-2016



**Test Report No. LLIA000676-005A**

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

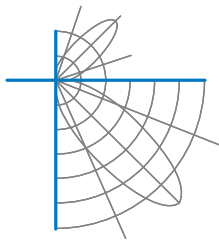
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Two Osram Optotronic OTi 30/120-277/1A0 DIM L LED drivers.

120.0Vac, 60.0Hz, 0.3824A, 45.72W, 0.996PF, 0.59%THD(i)

**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	760	760	760	760	760
2.5	758	755	762	760	755
5.0	754	751	757	754	749
7.5	747	744	749	746	739
10.0	738	734	738	734	726
12.5	727	722	724	718	710
15.0	713	707	708	700	691
17.5	696	690	689	679	669
20.0	678	671	668	656	645
22.5	658	649	645	631	619
25.0	636	627	620	604	591
27.5	612	602	593	576	563
30.0	587	576	565	547	534
32.5	561	550	537	518	504
35.0	534	522	508	488	474
37.5	506	494	479	458	444
40.0	478	466	449	428	414
42.5	449	437	420	399	385
45.0	420	408	391	370	357
47.5	391	379	362	341	329
50.0	362	351	333	314	302
52.5	333	323	306	286	275
55.0	304	295	278	260	250
57.5	276	268	252	234	225
60.0	248	241	226	210	201
62.5	221	215	201	185	177
65.0	195	190	177	162	154
67.5	170	165	153	138	132
70.0	144	141	130	116	110
72.5	120	118	107	95	90
75.0	97	95	86	75	71
77.5	75	74	66	56	53
80.0	55	55	46	39	36
82.5	37	36	29	23	21
85.0	21	20	13	9	8
87.5	8	5	2	2	2
90.0	0	1	2	2	2



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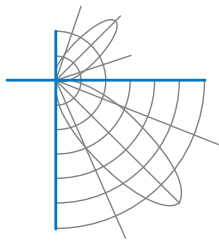
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**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	0	1	2	2	2
92.5	16	16	16	17	16
95.0	39	40	40	39	39
97.5	66	67	66	64	63
100.0	97	97	94	91	89
102.5	131	130	125	120	117
105.0	168	165	158	150	147
107.5	206	202	192	183	179
110.0	247	242	229	217	212
112.5	289	282	267	253	247
115.0	332	325	308	291	284
117.5	377	369	349	329	323
120.0	421	414	392	370	363
122.5	467	459	436	412	405
125.0	514	505	481	455	448
127.5	561	551	528	500	492
130.0	608	598	575	545	538
132.5	656	646	622	592	586
135.0	705	694	670	640	634
137.5	754	742	719	689	684
140.0	802	790	767	738	733
142.5	850	837	815	788	784
145.0	896	884	863	838	834
147.5	941	929	911	887	883
150.0	985	973	957	935	932
152.5	1026	1016	1001	982	979
155.0	1065	1055	1044	1027	1025
157.5	1101	1092	1084	1070	1068
160.0	1135	1127	1122	1110	1108
162.5	1165	1158	1156	1146	1143
165.0	1193	1186	1186	1178	1176
167.5	1215	1209	1213	1206	1204
170.0	1234	1229	1234	1230	1227
172.5	1249	1244	1251	1248	1245
175.0	1260	1256	1264	1262	1258
177.5	1267	1262	1272	1270	1265
180.0	1269	1269	1269	1269	1269



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**Coefficients Of Utilization - Zonal Cavity Method**

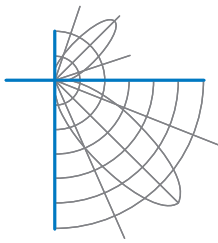
Effective Floor Cavity Reflectance 0.20

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	76	76	76	59	59	59	44	44	44	37
1	95	91	87	84	86	83	79	77	67	65	63	52	51	50	39	38	38	31
2	87	80	74	69	78	72	67	63	59	55	52	46	44	42	35	33	32	27
3	79	70	63	57	72	64	58	53	52	48	44	41	38	36	31	29	27	23
4	72	62	55	49	65	57	50	45	46	42	38	37	33	31	28	26	24	20
5	67	55	48	42	60	51	44	39	41	36	33	33	29	27	25	23	21	17
6	61	50	42	36	55	45	39	34	37	32	28	30	26	23	23	20	18	15
7	57	45	37	32	51	41	34	29	34	29	25	27	23	21	21	18	16	14
8	53	41	33	28	48	37	31	26	31	26	22	25	21	18	19	17	15	12
9	49	37	30	25	44	34	28	23	28	23	20	23	19	17	18	15	13	11
10	46	34	27	22	41	31	25	21	26	21	18	21	18	15	16	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.

**Circle of Light Plot**

Height(ft)	Illuminance at Nadir (fc)	Beam Width (across 50% Nadir Illum)	
		0-180	90-270
6.0	21.1	6.95	6.43
8.0	11.9	9.27	8.57
10.0	7.6	11.58	10.72
12.0	5.3	13.90	12.86
14.0	3.9	16.22	15.00
16.0	3.0	18.54	17.15



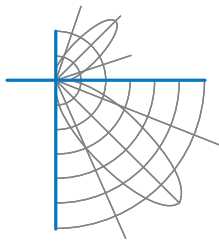
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120.0Vac, 60.0Hz, 0.3824A, 45.72W, 0.996PF, 0.59%THD(i)

**Test Distance** 9.5 m  
**Test Temperature** 24.7 °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.

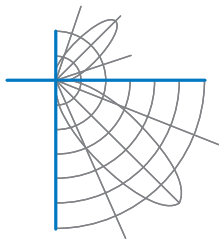
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

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

LLIA000676-005B

Integrating Sphere Report

Catalog Number: ML3WL-I/D-HO/MO-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.



### Performance Summary

Voltage	120.0 Vac
Current	0.3819 A
Power	45.67 W
Frequency	60.00 Hz
Power Factor	0.996
Current THD	6.0 %

Total Luminous Flux	4749.3 lm
Efficacy	104.0 lm/W
Chromaticity (x,y)	(0.3805, 0.3784)
(u',v')	(0.2245, 0.5023)
Duv	0.0007
CCT	4009 K
CRI (Ra)	82
R9	13

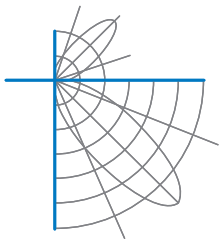
Prepared For:

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

Test date: 12/07/2016

Report date: 12/08/2016



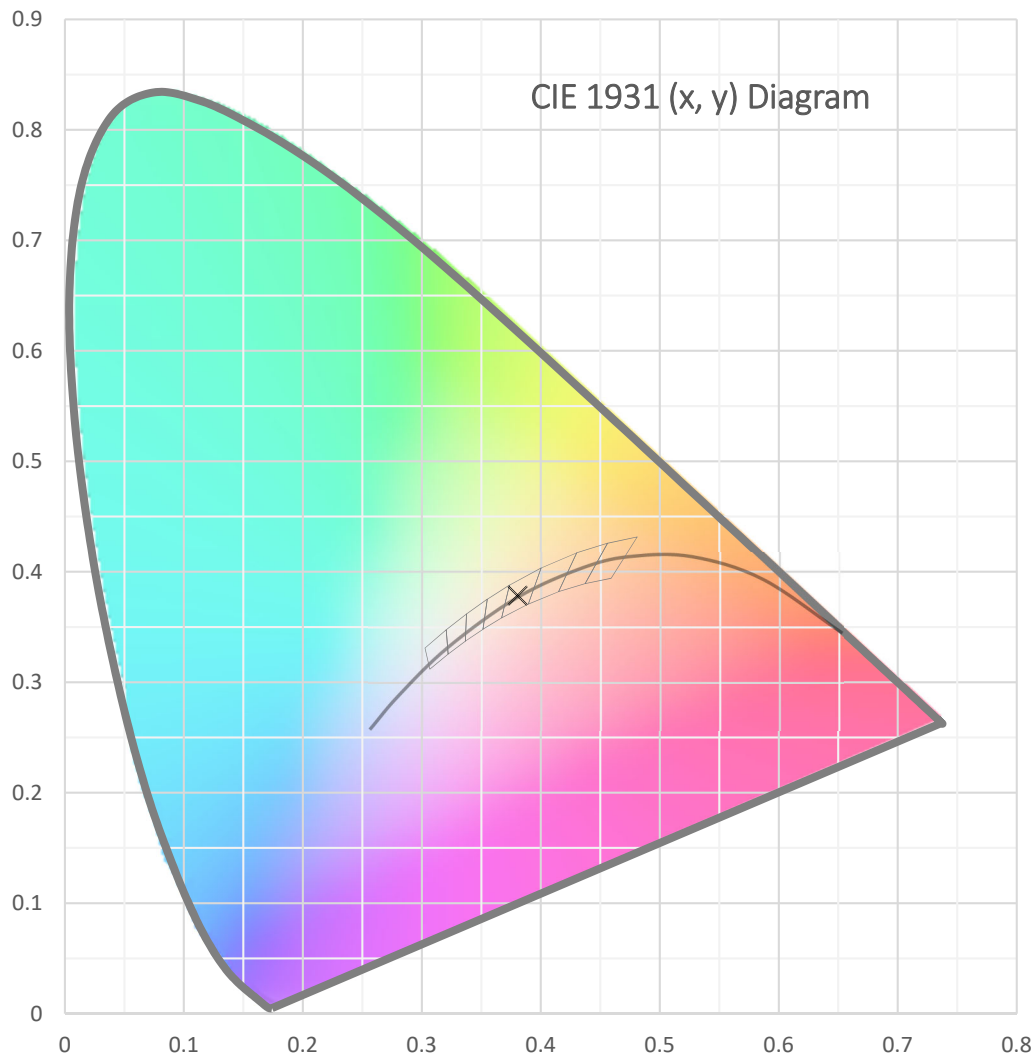


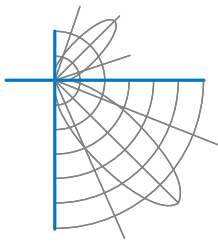
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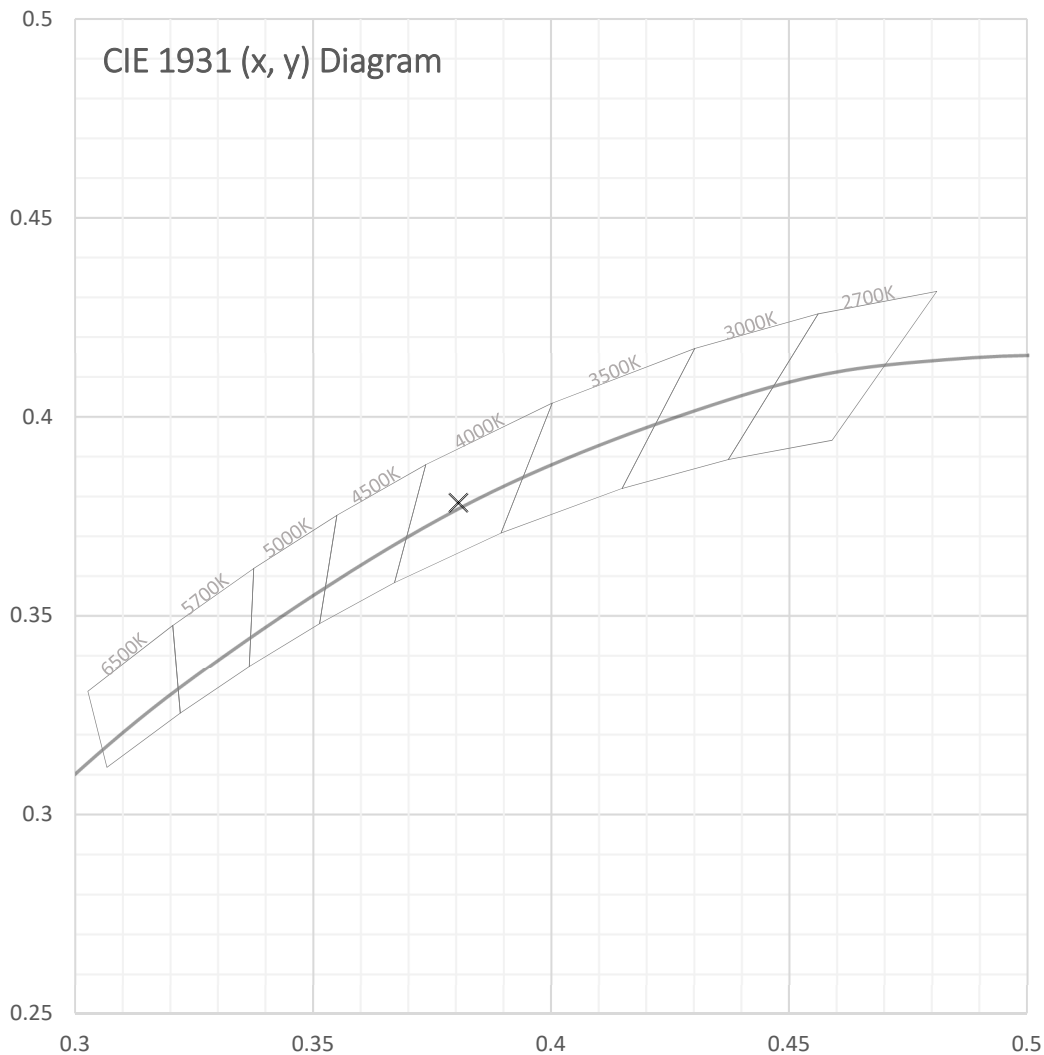


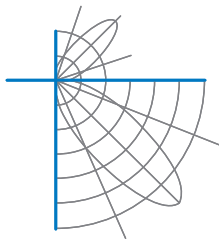
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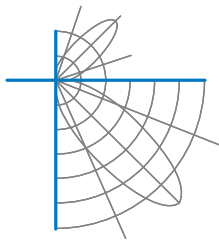
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<b>Spectral Data</b>	Total Radiant Flux	14.68 W
	Total Luminous Flux	4749.3 Lm
	Chromaticity CIE 1931 (x, y)	(0.3805, 0.3784)
	Chromaticity CIE 1976 (u', v')	(0.2245, 0.5023)
	Correlated Color Temperature (CCT)	4009 K
	Color Rendering Index (Ra)	82
	R1	81
	R2	87
	R3	92
	R4	82
	R5	80
	R6	82
	R7	87
	R8	67
	R9	13
	R10	70
	R11	80
	R12	58
	R13	82
	R14	95
	Distance from Planckian Locus (Duv)	0.0007
	Scotopic/Photopic Ratio *	1.658

**Electrical Data**

Voltage	120.0 Vac
Current	0.3819 A
Power	45.67 W
Frequency	60.00 Hz
Power Factor	0.996
Current THD	6.0 %



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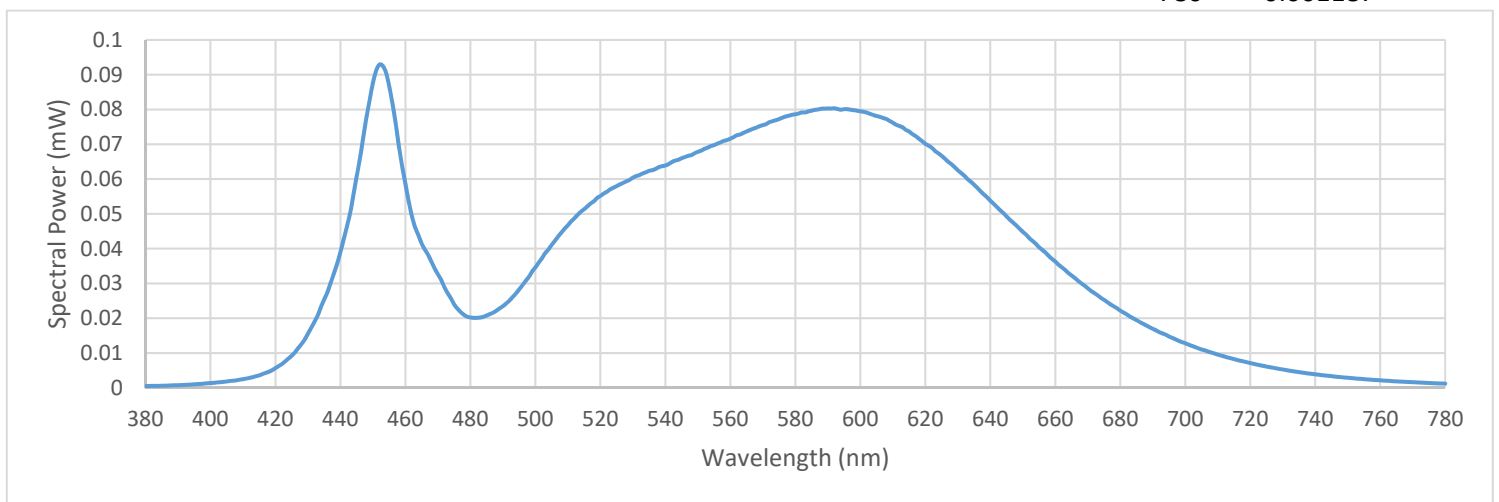
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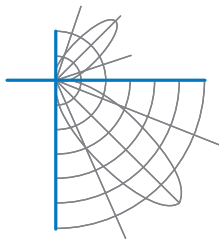
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Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

380	0.000496	480	0.020217	580	0.078631	680	0.022184
385	0.000573	485	0.020759	585	0.079670	685	0.019444
390	0.000743	490	0.023463	590	0.080306	690	0.016946
395	0.000990	495	0.028277	595	0.080094	695	0.014759
400	0.001362	500	0.034613	600	0.079484	700	0.012808
405	0.001816	505	0.041048	605	0.078132	705	0.011028
410	0.002495	510	0.046741	610	0.076202	710	0.009531
415	0.003564	515	0.051361	615	0.073676	715	0.008252
420	0.005645	520	0.055147	620	0.070140	720	0.007097
425	0.009212	525	0.057984	625	0.066696	725	0.006098
430	0.015540	530	0.060393	630	0.062546	730	0.005256
435	0.025375	535	0.062381	635	0.058383	735	0.004504
440	0.038975	540	0.063916	640	0.053785	740	0.003863
445	0.060739	545	0.066010	645	0.049274	745	0.003343
450	0.087664	550	0.067827	650	0.044842	750	0.002879
455	0.086722	555	0.069774	655	0.040401	755	0.002473
460	0.058607	560	0.071618	660	0.036296	760	0.002140
465	0.041454	565	0.073698	665	0.032290	765	0.001843
470	0.032636	570	0.075503	670	0.028608	770	0.001585
475	0.023967	575	0.077235	675	0.025293	775	0.001371
						780	0.001187





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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:	24.5 °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.  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.