

Report of Test

LLIA000676-010A

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

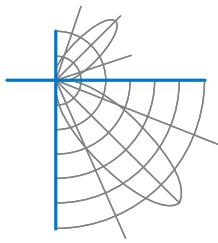
Direct/indirect luminaire, extruded brown aluminum housing, upper and lower white reflectors, translucent white plastic enclosures. 264 white LEDs, four lower Osram PrevaLED Bar boards with 36 LEDs each and four upper Osram PrevaLED Line boards with 30 LEDs each. Two Osram Optotronic OTi 30/120-277/1A0 DIM L LED drivers.
120.0Vac, 60.0Hz, 0.5592A, 66.91W, 0.997PF, 6.61%THD(i)



Performance Summary

Total Light Output	6461 lm
Luminaire Power	66.9 W
Luminous Efficacy	96.6 lm/W

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

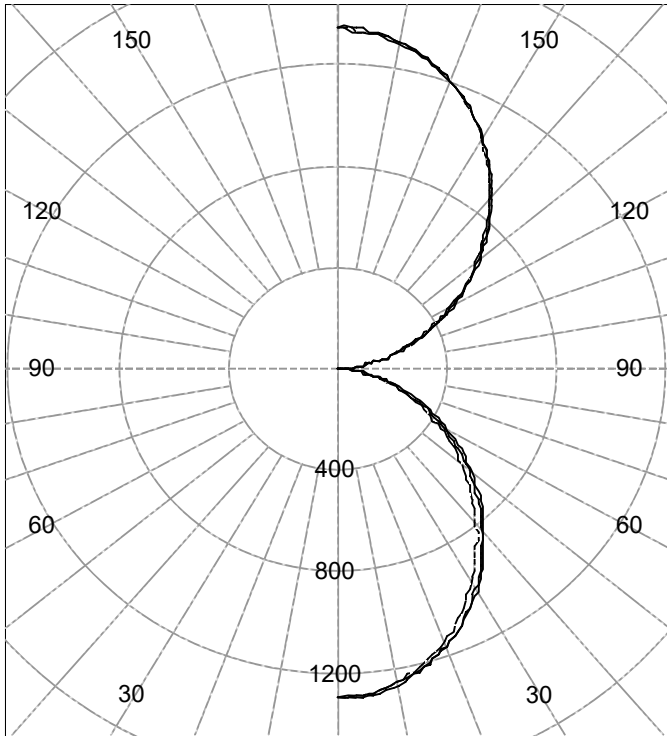


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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry) C0-C90

INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	1298	1298	1298	1298	1298	
5.0	1283	1286	1294	1291	1283	122
10.0	1257	1259	1265	1262	1252	
15.0	1214	1215	1220	1214	1202	342
20.0	1158	1157	1159	1151	1137	
25.0	1089	1087	1086	1074	1058	497
30.0	1010	1006	1002	988	971	
35.0	924	919	911	895	878	566
40.0	832	826	816	798	782	
45.0	737	731	719	701	685	552
50.0	641	635	622	603	589	
55.0	543	539	526	508	495	468
60.0	448	446	433	416	405	
65.0	356	355	343	328	319	338
70.0	268	267	257	244	238	
75.0	185	185	177	166	162	186
80.0	110	110	103	96	92	
85.0	47	45	38	32	30	46
90.0	1	2	2	2	2	

AVERAGE LUMINANCE (cd / m²)

Gamma	C0	C45	C90
45.0	6239	6081	5793
55.0	5667	5489	5164
65.0	5045	4858	4521
75.0	4282	4090	3739
85.0	3243	2639	2043

ZONAL FLUX AND PERCENTAGES

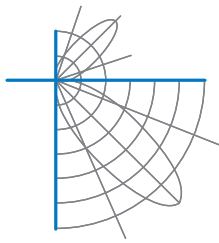
Zone	Flux (lm)	% Lamp	% Luminaire
0-30	961	N / A	14.9
0-40	1527	N / A	23.6
0-60	2547	N / A	39.4
0-90	3117	N / A	48.2
40-90	1590	N / A	24.6
60-90	570	N / A	8.8
90-180	3344	N / A	51.8
0-180	6461	N / A	100.0

Total Light Output = 6,461 lm

Signed:

Michael L. Grather
Authorized Signatory

Date of test 9-Dec-2016
Date of report 9-Dec-2016



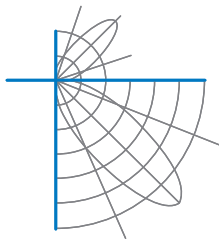
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Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	1298	1298	1298	1298	1298
2.5	1289	1293	1300	1299	1291
5.0	1283	1286	1294	1291	1283
7.5	1272	1275	1282	1279	1269
10.0	1257	1259	1265	1262	1252
12.5	1237	1239	1245	1240	1229
15.0	1214	1215	1220	1214	1202
17.5	1188	1188	1192	1184	1171
20.0	1158	1157	1159	1151	1137
22.5	1125	1123	1124	1114	1099
25.0	1089	1087	1086	1074	1058
27.5	1051	1048	1045	1032	1016
30.0	1010	1006	1002	988	971
32.5	968	963	957	942	925
35.0	924	919	911	895	878
37.5	879	873	864	847	830
40.0	832	826	816	798	782
42.5	785	779	767	750	733
45.0	737	731	719	701	685
47.5	689	683	670	652	637
50.0	641	635	622	603	589
52.5	592	587	574	555	542
55.0	543	539	526	508	495
57.5	496	492	480	462	450
60.0	448	446	433	416	405
62.5	402	400	388	371	362
65.0	356	355	343	328	319
67.5	312	311	300	285	278
70.0	268	267	257	244	238
72.5	226	225	216	205	199
75.0	185	185	177	166	162
77.5	146	146	139	130	126
80.0	110	110	103	96	92
82.5	77	77	70	63	60
85.0	47	45	38	32	30
87.5	20	16	9	6	5
90.0	1	2	2	2	2



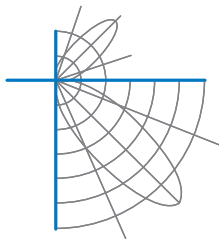
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Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	1	2	2	2	2
92.5	25	25	25	25	25
95.0	56	56	56	56	55
97.5	88	89	89	89	88
100.0	124	125	124	123	123
102.5	161	162	161	160	159
105.0	202	203	201	199	197
107.5	244	245	242	239	237
110.0	288	289	285	281	279
112.5	335	334	329	324	322
115.0	382	381	375	369	367
117.5	429	429	422	415	413
120.0	477	478	471	462	460
122.5	526	527	519	509	509
125.0	575	576	569	558	558
127.5	624	625	618	607	607
130.0	673	674	668	656	657
132.5	723	723	717	706	707
135.0	773	772	767	755	758
137.5	822	821	816	805	807
140.0	871	869	865	854	857
142.5	919	917	913	903	906
145.0	965	963	960	951	954
147.5	1010	1008	1006	998	1000
150.0	1052	1051	1050	1043	1045
152.5	1093	1092	1092	1086	1088
155.0	1132	1131	1132	1127	1129
157.5	1168	1167	1170	1166	1167
160.0	1201	1200	1204	1201	1202
162.5	1231	1230	1236	1233	1232
165.0	1257	1257	1263	1261	1260
167.5	1280	1280	1287	1285	1284
170.0	1299	1299	1307	1305	1303
172.5	1314	1314	1323	1321	1317
175.0	1325	1325	1334	1333	1328
177.5	1332	1331	1341	1339	1334
180.0	1338	1338	1338	1338	1338



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Coefficients Of Utilization - Zonal Cavity Method

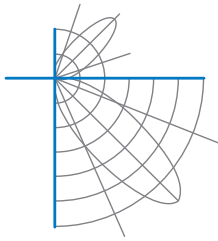
Effective Floor Cavity Reflectance 0.20

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	107	107	107	107	98	98	98	98	82	82	82	68	68	68	55	55	55	48
1	98	93	89	86	90	86	83	80	72	70	68	60	58	57	48	47	46	41
2	89	82	76	70	82	75	70	66	64	60	56	53	50	48	43	41	39	35
3	81	72	65	59	74	66	60	55	56	51	48	47	43	40	38	36	34	29
4	74	64	56	50	68	59	52	47	50	45	41	42	38	35	34	31	29	25
5	68	57	49	43	63	53	46	40	45	39	35	38	33	30	31	28	25	22
6	63	51	43	37	58	47	40	35	40	35	31	34	30	27	28	25	22	19
7	58	46	38	33	53	43	36	31	37	31	27	31	27	23	26	22	20	17
8	54	42	34	29	50	39	32	27	33	28	24	28	24	21	23	20	18	16
9	50	38	31	26	46	36	29	24	31	25	22	26	22	19	22	19	16	14
10	47	35	28	23	43	33	26	22	28	23	19	24	20	17	20	17	15	13

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

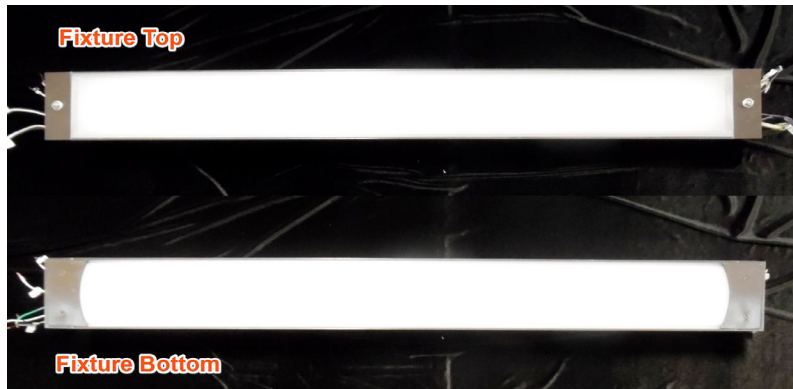
Height(ft)	Illuminance at Nadir (fc)	Beam Width (across 50% Nadir Illum)	
		0-180	90-270
6.0	36.1	6.99	6.76
8.0	20.3	9.33	9.02
10.0	13.0	11.66	11.27
12.0	9.0	13.99	13.53
14.0	6.6	16.32	15.78
16.0	5.1	18.65	18.04

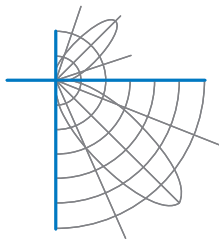


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Test Distance 9.5 m
Test Temperature 24.8 °C

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.

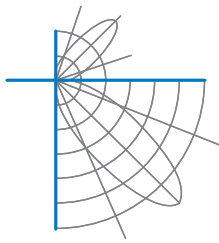
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

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.



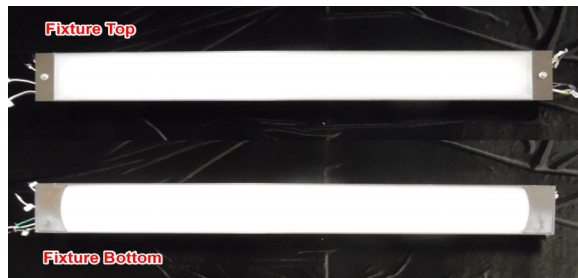
Report of Test

LLIA000676-010B

Integrating Sphere Report

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

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Performance Summary

Voltage	120.0 Vac
Current	0.5589 A
Power	66.88 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	6.6 %

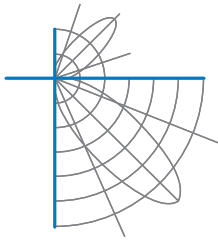
Total Luminous Flux	6950.6 lm
Efficacy	103.9 lm/W
Chromaticity (x,y)	(0.3809, 0.3788)
(u',v')	(0.2246, 0.5025)
Duv	0.0008
CCT	4002 K
CRI (Ra)	83
R9	15

Prepared For:

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

Test date: 12/05/2016

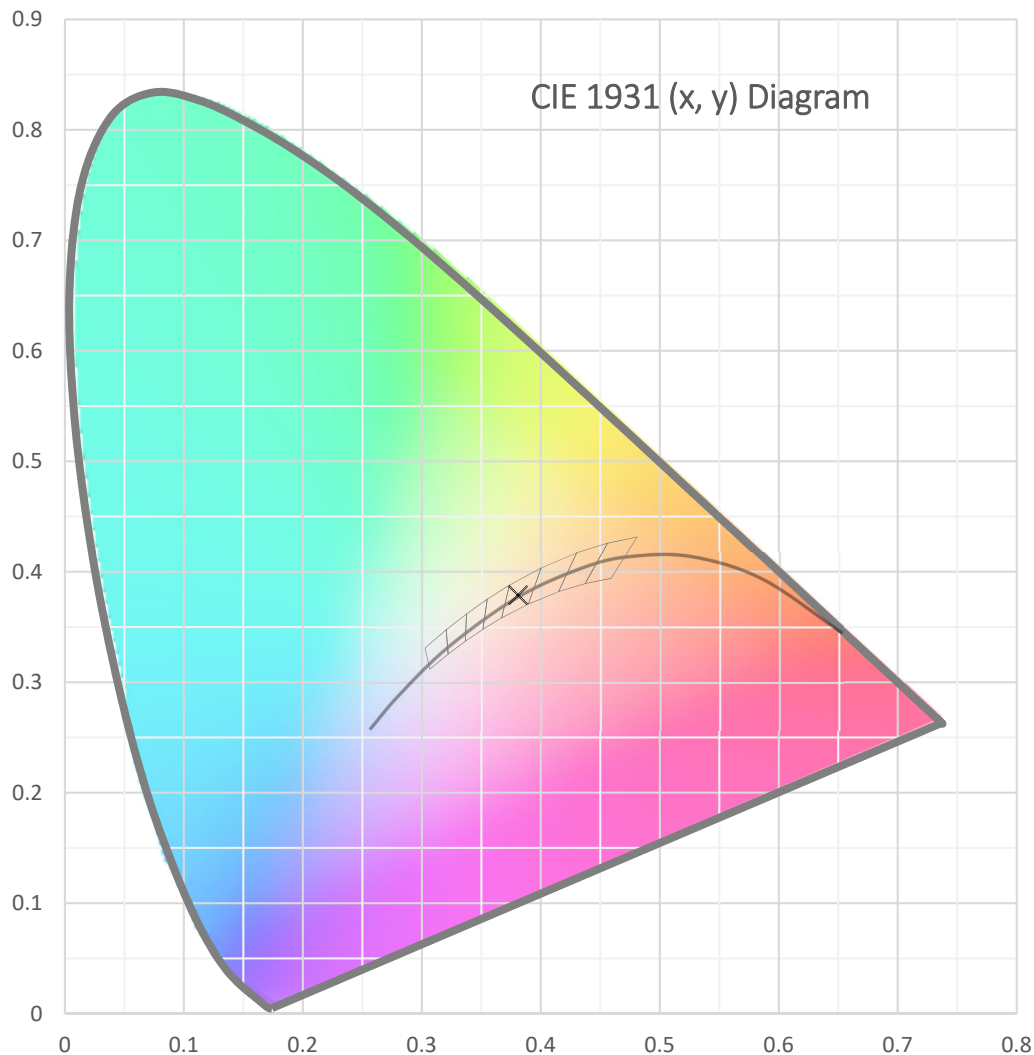
Report date: 12/09/2016

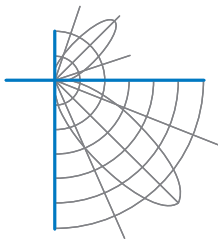


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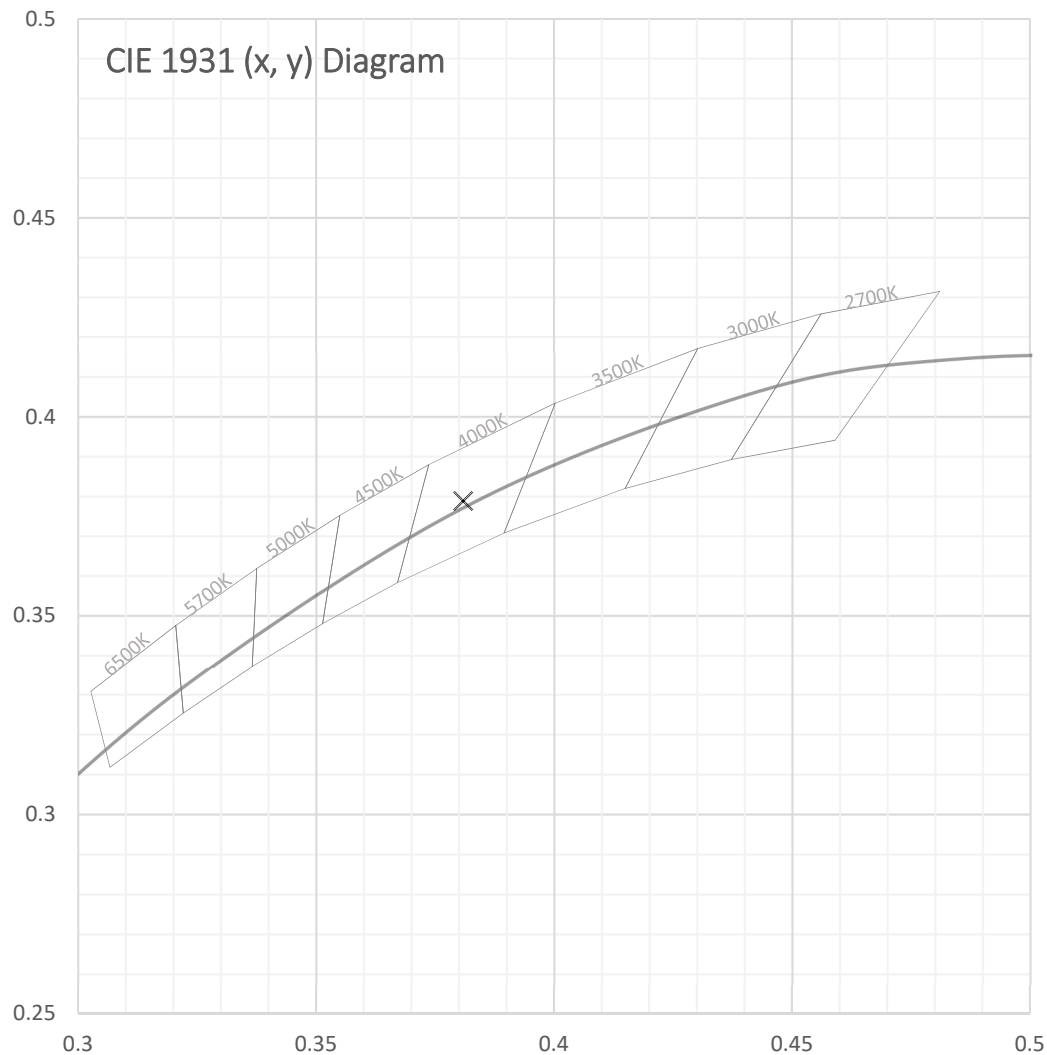


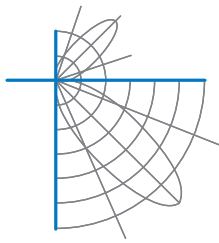


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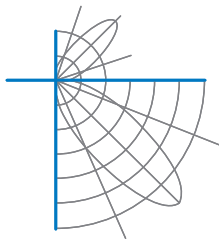
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Spectral Data	Total Radiant Flux	21.57 W
	Total Luminous Flux	6950.6 Lm
	Chromaticity CIE 1931 (x, y)	(0.3809, 0.3788)
	Chromaticity CIE 1976 (u', v')	(0.2246, 0.5025)
	Correlated Color Temperature (CCT)	4002 K
	Color Rendering Index (Ra)	83
	R1	82
	R2	89
	R3	94
	R4	82
	R5	81
	R6	84
	R7	87
	R8	67
	R9	15
	R10	74
	R11	80
	R12	60
	R13	84
	R14	97
	Distance from Planckian Locus (Duv)	0.0008
	Scotopic/Photopic Ratio *	1.684

Electrical Data

Voltage	120.0 Vac
Current	0.5589 A
Power	66.88 W
Frequency	60.00 Hz
Power Factor	0.997
Current THD	6.6 %



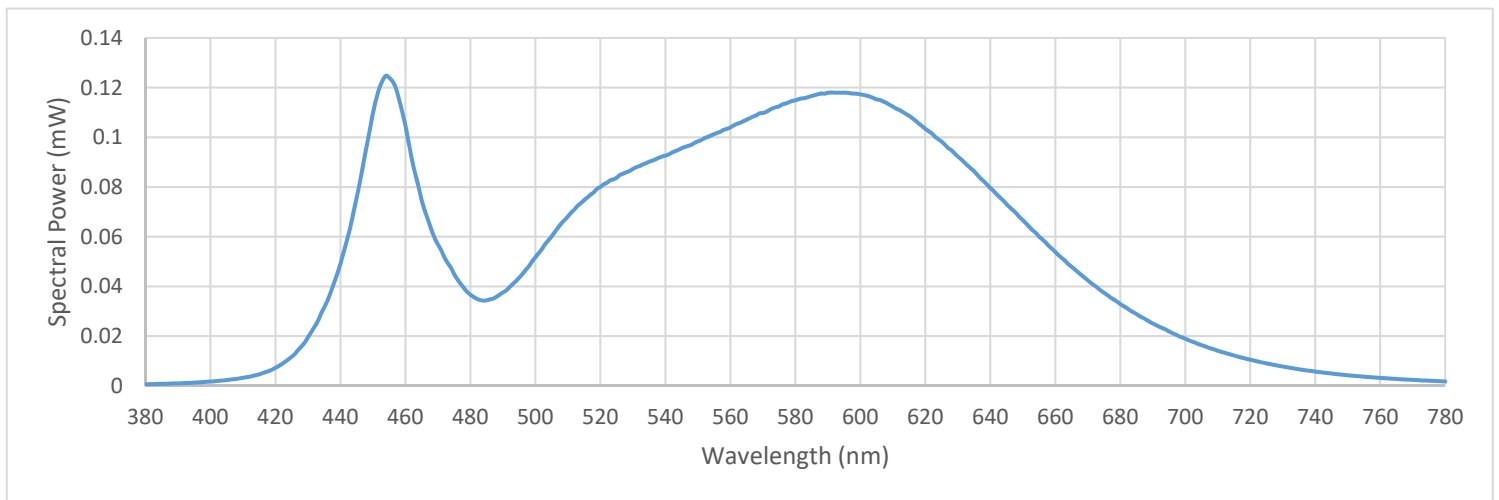
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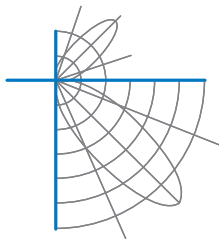
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Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

380	0.000662	480	0.036627	580	0.114885	680	0.032886
385	0.000751	485	0.034384	585	0.116635	685	0.028851
390	0.000966	490	0.037536	590	0.117909	690	0.025099
395	0.001272	495	0.043486	595	0.117997	695	0.021858
400	0.001706	500	0.051744	600	0.117281	700	0.018963
405	0.002299	505	0.060146	605	0.115271	705	0.016341
410	0.003214	510	0.068112	610	0.112372	710	0.014098
415	0.004596	515	0.074702	615	0.108672	715	0.012207
420	0.007229	520	0.080033	620	0.103418	720	0.010502
425	0.011697	525	0.083719	625	0.098307	725	0.009020
430	0.019483	530	0.087269	630	0.092296	730	0.007759
435	0.031571	535	0.090183	635	0.086351	735	0.006646
440	0.049036	540	0.092645	640	0.079611	740	0.005708
445	0.075764	545	0.095628	645	0.073100	745	0.004931
450	0.109670	550	0.098367	650	0.066668	750	0.004240
455	0.123971	555	0.101262	655	0.060067	755	0.003663
460	0.104736	560	0.103991	660	0.053894	760	0.003182
465	0.074649	565	0.107083	665	0.047908	765	0.002737
470	0.056903	570	0.109775	670	0.042446	770	0.002349
475	0.044915	575	0.112453	675	0.037434	775	0.002031
						780	0.001759





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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:	24.8 °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.