

Report of Test

LLIA000676-003A

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

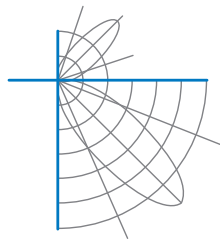
120.0Vac, 60.0Hz, 0.2918A, 34.80W, 0.994PF, 5.20%THD(i)



Performance Summary

Total Light Output	3585 lm
Luminaire Power	34.8 W
Luminous Efficacy	103.0 lm/W

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



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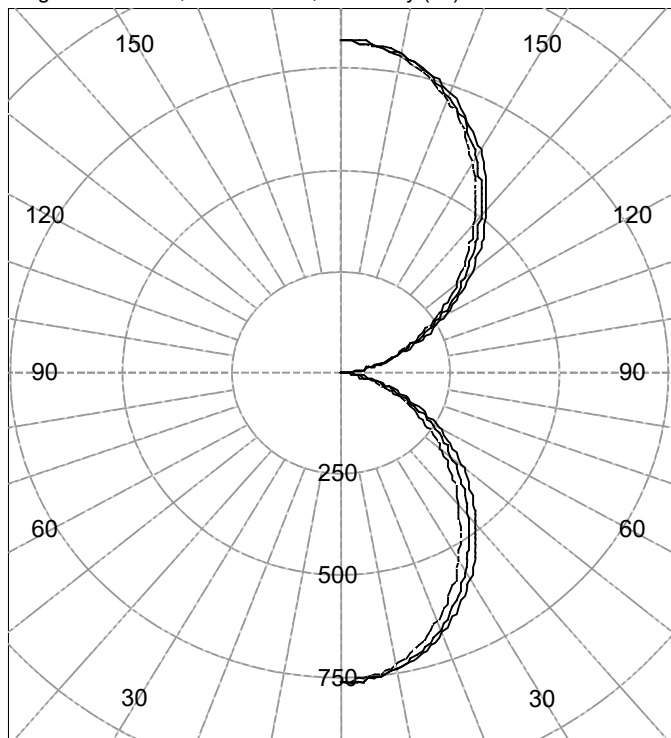
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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry)

C0-C90

AVERAGE LUMINANCE (cd / m²)

Gamma	C0	C45	C90
45.0	5598	5197	4742
55.0	4994	4563	4079
65.0	4347	3917	3404
75.0	3535	3090	2545
85.0	2289	1379	788

INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	762	762	762	762	762	
5.0	756	753	759	756	751	71
10.0	740	736	740	735	727	
15.0	714	708	709	701	692	198
20.0	679	672	669	657	646	
25.0	637	628	620	605	592	284
30.0	588	578	566	548	534	
35.0	535	523	509	489	474	316
40.0	479	466	449	428	414	
45.0	421	409	391	370	356	300
50.0	362	351	333	313	301	
55.0	304	295	278	259	249	248
60.0	249	241	226	209	200	
65.0	195	190	176	161	153	174
70.0	145	140	129	115	109	
75.0	97	95	85	74	70	90
80.0	55	54	46	38	35	
85.0	21	19	13	9	7	18
90.0	0	1	1	1	1	

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	554	N / A	15.4
0-40	870	N / A	24.3
0-60	1418	N / A	39.6
0-90	1700	N / A	47.4
40-90	830	N / A	23.2
60-90	282	N / A	7.9
90-180	1885	N / A	52.6
0-180	3585	N / A	100.0

Total Light Output = 3,585 lm

Signed:

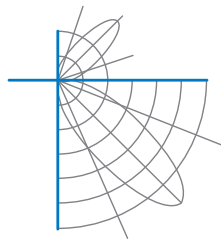
Michael L. Grather
Authorized Signatory

Date of test

8-Dec-2016

Date of report

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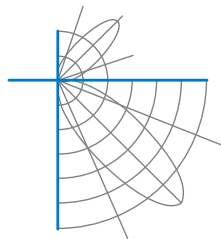
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Two Osram Optotronic OTi 30/120-277/1A0 DIM L LED drivers.

120.0Vac, 60.0Hz, 0.2918A, 34.80W, 0.994PF, 5.20%THD(i)

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	762	762	762	762	762
2.5	760	757	763	762	757
5.0	756	753	759	756	751
7.5	749	746	751	747	741
10.0	740	736	740	735	727
12.5	728	723	726	720	711
15.0	714	708	709	701	692
17.5	698	691	690	680	670
20.0	679	672	669	657	646
22.5	659	651	646	632	619
25.0	637	628	620	605	592
27.5	613	603	594	577	563
30.0	588	578	566	548	534
32.5	562	551	538	518	504
35.0	535	523	509	489	474
37.5	507	495	479	458	444
40.0	479	466	449	428	414
42.5	450	437	420	399	385
45.0	421	409	391	370	356
47.5	391	380	362	341	328
50.0	362	351	333	313	301
52.5	333	323	305	286	274
55.0	304	295	278	259	249
57.5	276	268	252	233	224
60.0	249	241	226	209	200
62.5	222	215	200	184	176
65.0	195	190	176	161	153
67.5	169	165	152	137	130
70.0	145	140	129	115	109
72.5	120	117	106	94	89
75.0	97	95	85	74	70
77.5	75	74	65	56	52
80.0	55	54	46	38	35
82.5	37	36	28	22	20
85.0	21	19	13	9	7
87.5	8	5	2	1	1
90.0	0	1	1	1	1



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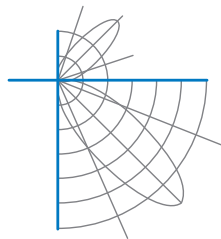
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Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	0	1	1	1	1
92.5	10	10	11	11	11
95.0	25	26	26	25	25
97.5	43	43	42	41	40
100.0	63	62	60	58	57
102.5	84	83	80	77	75
105.0	108	106	101	96	94
107.5	132	130	123	117	114
110.0	158	155	147	139	136
112.5	185	181	171	162	158
115.0	213	209	197	186	182
117.5	241	237	224	211	206
120.0	270	265	251	237	232
122.5	300	295	280	264	259
125.0	329	324	309	292	286
127.5	360	354	338	320	315
130.0	390	384	369	350	345
132.5	421	415	399	380	375
135.0	453	446	430	411	407
137.5	484	477	461	442	438
140.0	515	508	493	474	471
142.5	546	538	524	506	503
145.0	576	568	555	538	535
147.5	605	598	585	570	567
150.0	633	626	615	601	599
152.5	659	653	644	631	629
155.0	685	679	672	660	659
157.5	708	703	698	688	686
160.0	730	725	722	714	712
162.5	749	745	744	737	736
165.0	766	763	763	758	756
167.5	781	778	780	776	775
170.0	794	791	794	791	790
172.5	803	801	806	803	801
175.0	810	808	814	812	809
177.5	814	812	818	817	814
180.0	817	817	817	817	817



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Coefficients Of Utilization - Zonal Cavity Method

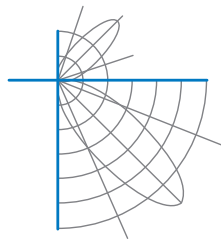
Effective Floor Cavity Reflectance 0.20

RC RW	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	107	107	107	107	98	98	98	98	82	82	82	67	67	67	54	54	54	47
1	98	93	90	86	90	86	83	80	72	70	68	60	58	57	48	47	46	41
2	89	82	76	71	82	76	70	66	64	60	57	53	50	48	43	41	39	34
3	81	72	65	59	75	67	60	55	56	52	48	47	44	41	38	36	34	30
4	75	64	56	50	68	59	53	47	50	45	41	42	38	35	34	31	29	26
5	69	57	49	43	63	53	46	41	45	40	36	38	34	31	31	28	26	22
6	63	51	43	38	58	48	41	36	41	35	31	34	30	27	28	25	23	20
7	58	46	39	33	54	43	36	31	37	32	28	31	27	24	26	23	20	18
8	54	42	35	29	50	39	33	28	34	28	25	29	24	21	24	21	18	16
9	51	39	31	26	47	36	29	25	31	26	22	26	22	19	22	19	17	14
10	47	35	28	24	44	33	27	22	29	23	20	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	21.2	6.95	6.42
8.0	11.9	9.26	8.56
10.0	7.6	11.58	10.70
12.0	5.3	13.89	12.85
14.0	3.9	16.21	14.99
16.0	3.0	18.53	17.13



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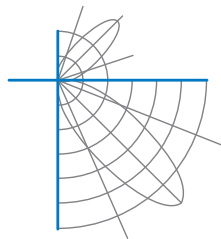
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Test Distance 9.5 m
Test Temperature 24.7 °C

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.

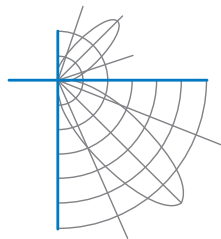
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

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

LLIA000676-003B

Integrating Sphere Report

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

Pendant mounted direct and indirect luminaire, extruded aluminum housing, with upper and lower white inner reflectors and white plastic lens enclosures. 264 white LEDs, four direct Osram PrevaLED Bar boards with 36 LEDs each and four Indirect Osram PrevaLED Line boards with 30 LEDs each. Two Osram Optotronic OTi 30/120-277/1A0 DIM L LED drivers.



Performance Summary

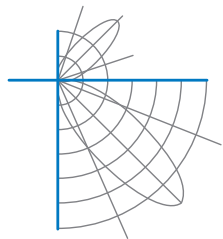
Voltage	120.0 Vac
Current	0.2918 A
Power	34.81 W
Frequency	60.00 Hz
Power Factor	0.994
Current THD	5.3 %
Total Luminous Flux	3698.1 lm
Efficacy	106.2 lm/W
Chromaticity (x,y)	(0.3809, 0.3788)
(u',v')	(0.2246, 0.5026)
Duv	0.0009
CCT	4004 K
CRI (Ra)	82
R9	13

Prepared For:

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

Test date: 12/07/2016

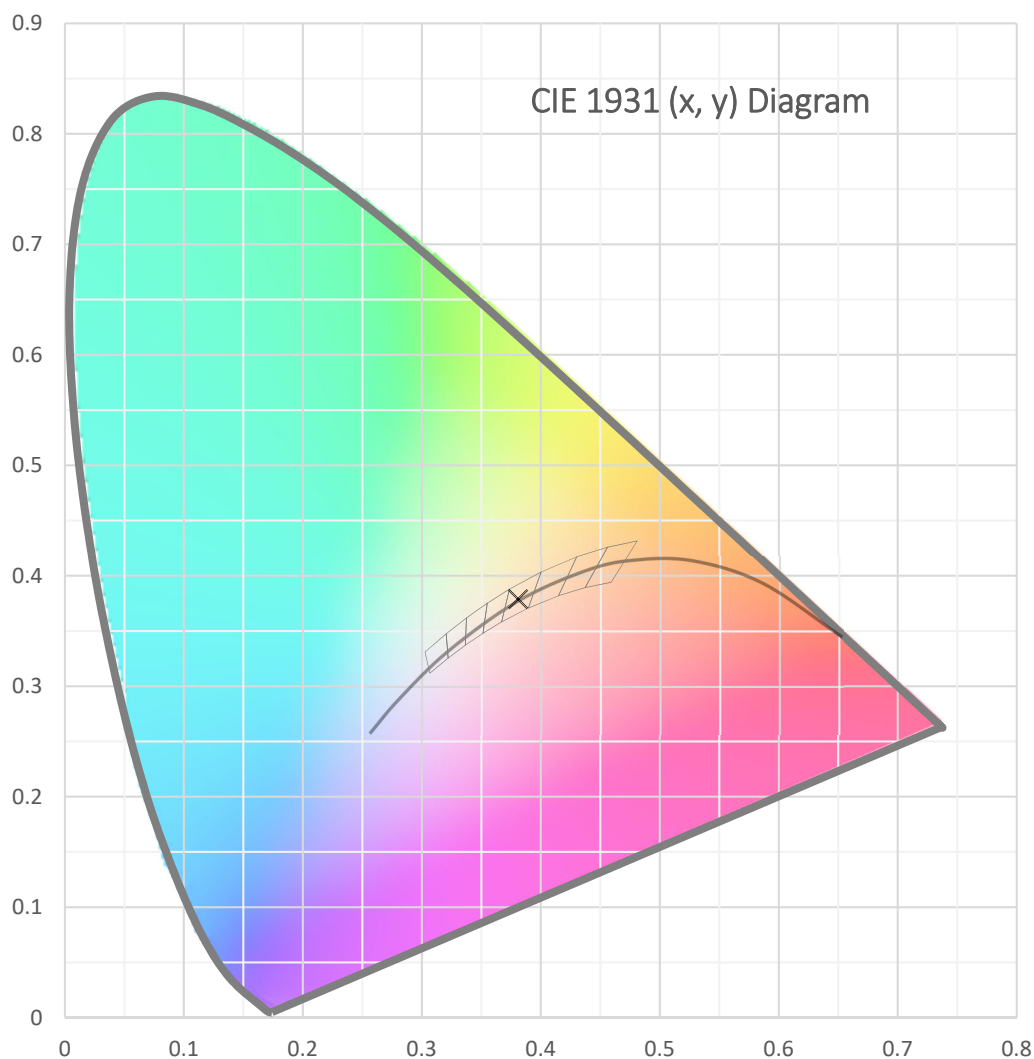
Report date: 12/08/2016

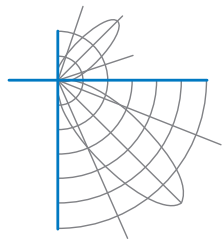


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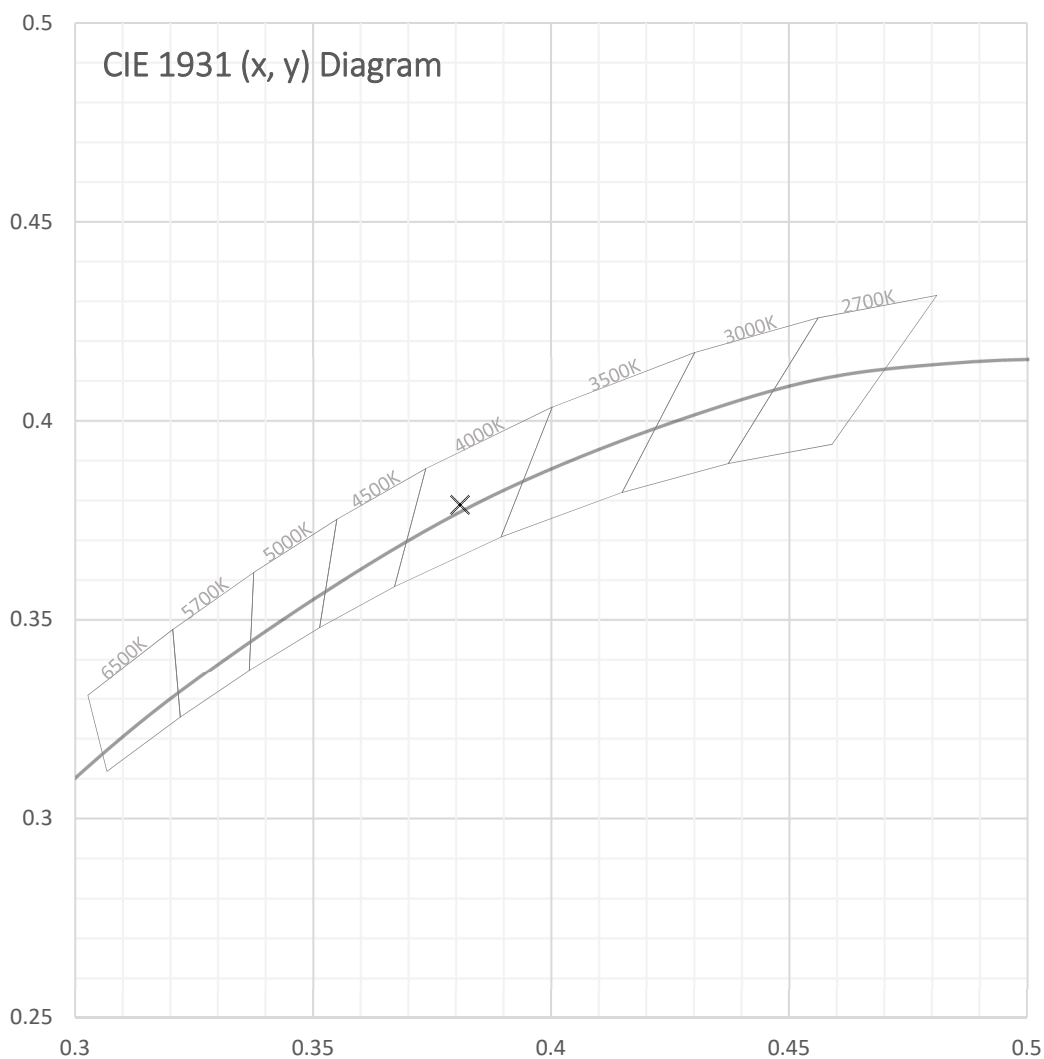


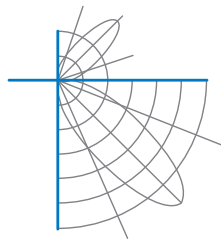


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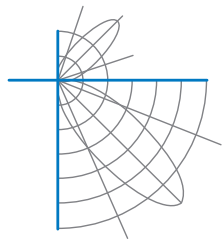
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Spectral Data

Total Radiant Flux	11.41 W
Total Luminous Flux	3698.1 Lm
Chromaticity CIE 1931 (x, y)	(0.3809, 0.3788)
Chromaticity CIE 1976 (u', v')	(0.2246, 0.5026)
Correlated Color Temperature (CCT)	4004 K
Color Rendering Index (Ra)	82
R1	81
R2	88
R3	92
R4	82
R5	80
R6	82
R7	87
R8	67
R9	13
R10	70
R11	80
R12	57
R13	82
R14	96
Distance from Planckian Locus (Duv)	0.0009
Scotopic/Photopic Ratio *	1.659

Electrical Data

Voltage	120.0 Vac
Current	0.2918 A
Power	34.81 W
Frequency	60.00 Hz
Power Factor	0.994
Current THD	5.3 %



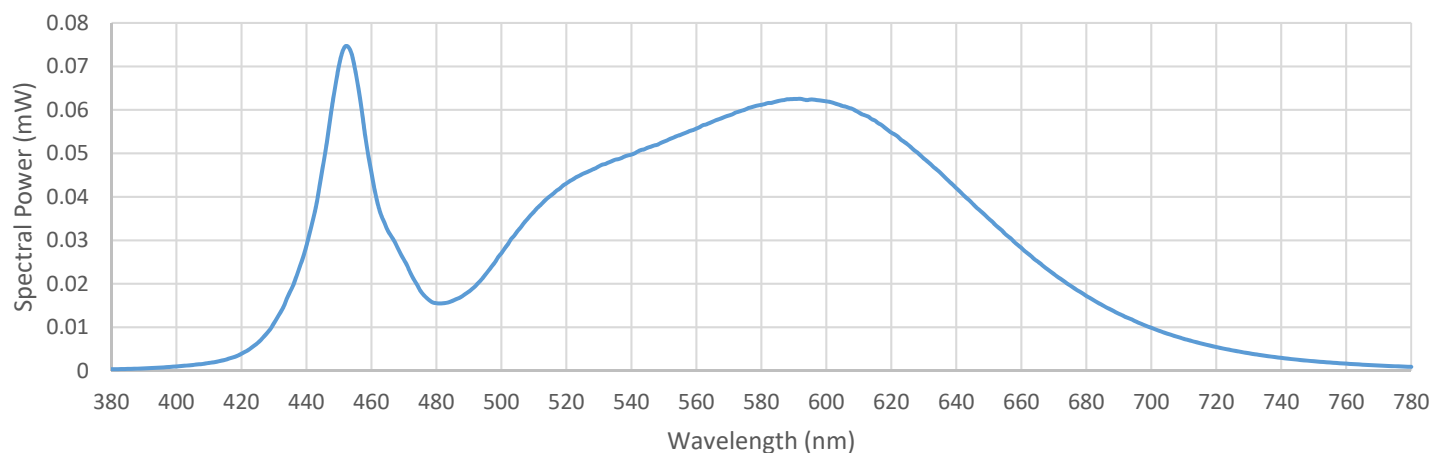
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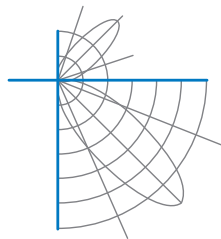
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Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

380	0.000372	480	0.015545	580	0.061161	680	0.017217
385	0.000423	485	0.016094	585	0.061998	685	0.015077
390	0.000553	490	0.018217	590	0.062509	690	0.013117
395	0.000730	495	0.022045	595	0.062377	695	0.011414
400	0.001000	500	0.027046	600	0.061953	700	0.009898
405	0.001324	505	0.032150	605	0.060895	705	0.008518
410	0.001807	510	0.036560	610	0.059416	710	0.007345
415	0.002520	515	0.040175	615	0.057517	715	0.006349
420	0.003917	520	0.043082	620	0.054763	720	0.005459
425	0.006401	525	0.045264	625	0.052071	725	0.004691
430	0.010936	530	0.047031	630	0.048836	730	0.004034
435	0.018231	535	0.048542	635	0.045607	735	0.003459
440	0.028734	540	0.049717	640	0.041983	740	0.002966
445	0.046719	545	0.051303	645	0.038458	745	0.002556
450	0.070146	550	0.052699	650	0.034964	750	0.002197
455	0.069190	555	0.054223	655	0.031502	755	0.001900
460	0.045565	560	0.055710	660	0.028279	760	0.001637
465	0.032296	565	0.057289	665	0.025149	765	0.001411
470	0.025540	570	0.058718	670	0.022259	770	0.001209
475	0.018476	575	0.060059	675	0.019645	775	0.001047
						780	0.000902





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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:	24.1 °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.