



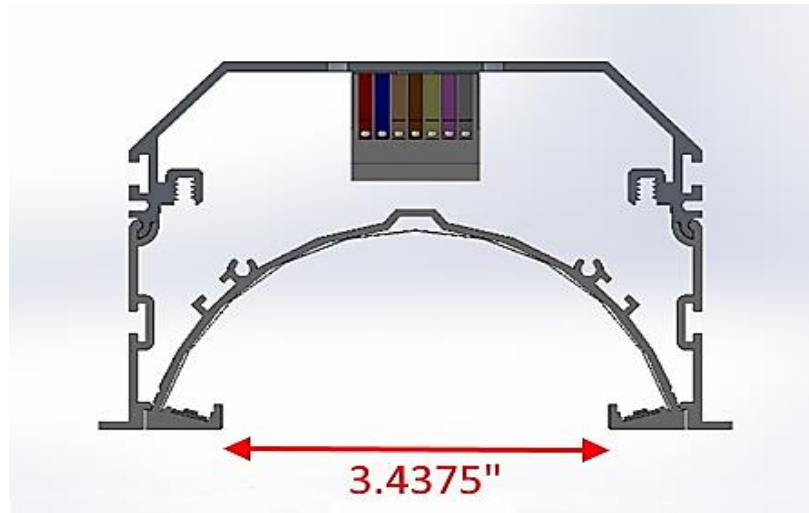
Report of Test

LLIA001570-004A

Indoor Distribution Photometry Test Report

Catalog Number: ARR-MO-K40-80-4-XX-120-DIM1

Recessed mounted, aluminum housing, steel end caps, aluminum reflector/LED holder and white painted ends, white plastic reflector sheet, open bottom. 368 white LEDs, two rows of 184 LEDs aimed up with one-piece diffuse plastic lens above each row of LEDs
One Osram Oti30/120-277/1A0DIM-1LG2 LED driver labeled as 400mA



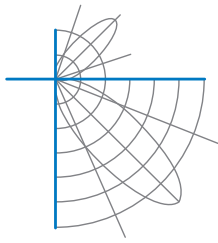
Prepared For:
Precision Architectural Lighting
4830 Timber Creek Drive
Houston, TX 77017, USA

Performance Summary			
Input Voltage	120.0 V	Luminous Flux	1581.6 Lumens
Input Current	0.1334 A	Total Efficacy	103.8 Lm/W
Input Power	15.24 W	Downward Flux	1581.6 Lumens
Frequency	60.00 Hz	Downward Flux	100.0 % of Total
Power Factor	0.952		
Current THD	13.0 %		

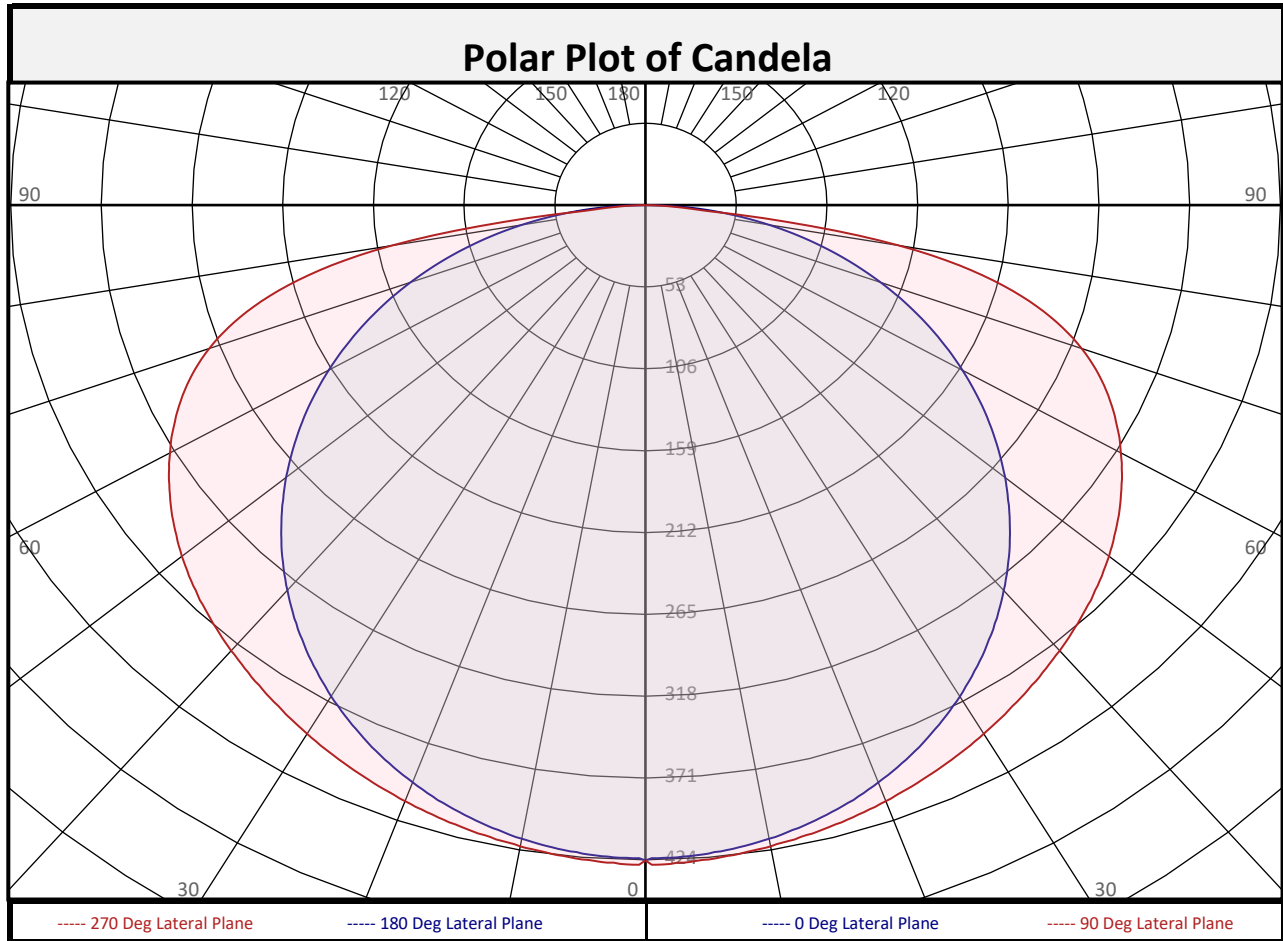
This test report was issued by LightLab International Allentown, LLC without alterations or erasures.

Test date: 10/29/2021
Report date: 11/01/2021

Signed: _____



Report of Test
LLIA001570-004A



Zonal Flux Summary

Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total
0-10	40.2	2.5%	90-100	0.0	0.0%	0-20	156.6	9.9%
10-20	116.3	7.4%	100-110	0.0	0.0%	0-30	337.7	21.4%
20-30	181.1	11.5%	110-120	0.0	0.0%	0-40	566.8	35.8%
30-40	229.1	14.5%	120-130	0.0	0.0%	0-60	1086	68.7%
40-50	257.0	16.2%	130-140	0.0	0.0%	0-80	1523	96.3%
50-60	262.7	16.6%	140-150	0.0	0.0%	10-90	1541	97.4%
60-70	244.1	15.4%	150-160	0.0	0.0%	20-50	667.3	42.2%
70-80	192.2	12.2%	160-170	0.0	0.0%	40-90	1015	64.2%
80-90	58.8	3.7%	170-180	0.0	0.0%	60-90	495.1	31.3%
0-90	1582	100.0%	90-180	0.0	0.0%	0-180	1582	100.0%



Report of Test

LLIA001570-004A

Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles - Data was acquired in 0.5° increments, 2.5° increments shown.	0	424	424	424	424	424	424	424	424	424
	2.5	423	423	423	425	426	425	423	423	423
	5	422	421	422	423	425	423	422	421	422
	7.5	419	419	420	422	424	422	420	419	419
	10	417	416	417	420	422	420	417	416	417
	12.5	413	413	414	417	419	417	414	413	413
	15	409	409	411	414	417	414	411	409	409
	17.5	404	403	407	411	414	411	407	403	404
	20	398	398	402	408	411	408	402	398	398
	22.5	391	392	397	404	407	404	397	392	391
	25	384	385	391	399	404	399	391	385	384
	27.5	376	377	385	395	400	395	385	377	376
	30	367	369	379	390	395	390	379	369	367
	32.5	358	360	372	385	391	385	372	360	358
	35	348	351	365	379	386	379	365	351	348
	37.5	337	341	357	374	381	374	357	341	337
	40	326	331	349	368	377	368	349	331	326
	42.5	314	320	341	362	371	362	341	320	314
	45	301	309	332	356	366	356	332	309	301
	47.5	288	297	323	350	360	350	323	297	288
50	274	285	315	343	354	343	315	285	274	
52.5	260	272	305	335	346	335	305	272	260	
55	245	259	296	327	339	327	296	259	245	
57.5	230	246	286	319	330	319	286	246	230	
60	214	233	276	309	321	309	276	233	214	
62.5	197	219	265	299	311	299	265	219	197	
65	181	205	254	288	300	288	254	205	181	
67.5	164	192	242	276	287	276	242	192	164	
70	146	178	229	261	271	261	229	178	146	
72.5	128	164	215	244	252	244	215	164	128	
75	110	149	199	222	227	222	199	149	110	
77.5	92	135	178	193	195	193	178	135	92	
80	73	119	151	153	150	153	151	119	73	
82.5	55	100	112	93	83	93	112	100	55	
85	36	72	48	27	26	27	48	72	36	
87.5	16	19	11	10	10	10	11	19	16	
90	0	0	0	0	0	0	0	0	0	



Report of Test

LLIA001570-004A

Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles - Data was acquired in 0.5° increments, 2.5° increments shown.	90	0	0	0	0	0	0	0	0	0
	92.5	0	0	0	0	0	0	0	0	0
	95	0	0	0	0	0	0	0	0	0
	97.5	0	0	0	0	0	0	0	0	0
	100	0	0	0	0	0	0	0	0	0
	102.5	0	0	0	0	0	0	0	0	0
	105	0	0	0	0	0	0	0	0	0
	107.5	0	0	0	0	0	0	0	0	0
	110	0	0	0	0	0	0	0	0	0
	112.5	0	0	0	0	0	0	0	0	0
	115	0	0	0	0	0	0	0	0	0
	117.5	0	0	0	0	0	0	0	0	0
	120	0	0	0	0	0	0	0	0	0
	122.5	0	0	0	0	0	0	0	0	0
	125	0	0	0	0	0	0	0	0	0
	127.5	0	0	0	0	0	0	0	0	0
	130	0	0	0	0	0	0	0	0	0
	132.5	0	0	0	0	0	0	0	0	0
	135	0	0	0	0	0	0	0	0	0
	137.5	0	0	0	0	0	0	0	0	0
	140	0	0	0	0	0	0	0	0	0
	142.5	0	0	0	0	0	0	0	0	0
	145	0	0	0	0	0	0	0	0	0
	147.5	0	0	0	0	0	0	0	0	0
	150	0	0	0	0	0	0	0	0	0
	152.5	0	0	0	0	0	0	0	0	0
	155	0	0	0	0	0	0	0	0	0
	157.5	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	
162.5	0	0	0	0	0	0	0	0	0	
165	0	0	0	0	0	0	0	0	0	
167.5	0	0	0	0	0	0	0	0	0	
170	0	0	0	0	0	0	0	0	0	
172.5	0	0	0	0	0	0	0	0	0	
175	0	0	0	0	0	0	0	0	0	
177.5	0	0	0	0	0	0	0	0	0	
180	0	0	0	0	0	0	0	0	0	



Report of Test

LLIA001570-004A

Coefficients of Utilization/Room 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	50	30	10	0	
RCR																						
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100				
1	107	101	96	91	104	99	94	90	94	90	87	90	87	84	87	84	82	79				
2	96	86	78	72	93	84	77	71	80	74	69	77	72	67	74	70	66	63				
3	86	74	65	58	84	73	64	57	70	62	56	67	60	55	64	59	54	52				
4	78	65	55	48	76	64	55	48	61	53	47	59	52	46	56	50	46	43				
5	72	58	48	41	70	57	47	40	54	46	40	52	45	39	50	44	39	37				
6	66	52	42	35	64	51	41	35	49	41	34	47	40	34	45	39	34	32				
7	61	47	37	31	59	46	37	30	44	36	30	43	35	30	41	35	30	28				
8	57	42	33	27	55	42	33	27	40	32	27	39	32	27	38	31	26	24				
9	53	39	30	24	51	38	30	24	37	29	24	36	29	24	35	28	24	22				
10	50	36	27	22	48	35	27	22	34	27	22	33	26	21	32	26	21	20				

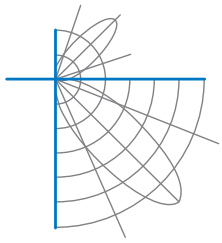
For absolute test reports, RUs are expressed as a percentage of total lumen output. For relative test reports, CUs are expressed as a percentage of total lamp output. Calculations were based on published IES procedures, and are based on the zonal cavity method. Basic assumptions: 1) Room surfaces are 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)	Ground-level distance to half-of-nadir illuminance (ft)		
		0-180 deg	90-270 deg	
6.0	11.8	7.72	8.41	
8.0	6.6	10.30	11.21	
10.0	4.2	12.87	14.02	
12.0	2.9	15.44	16.82	
14.0	2.2	18.02	19.62	
16.0	1.7	20.59	22.42	

Spacing Criterion	
0 deg:	1.3
90 deg:	1.4
180 deg:	1.3
270 deg:	1.4

Average Luminance (cd/m ²)			
	0 deg Plane	45 deg Plane	90 deg Plane
0	4160	4160	4160
45	4175	4606	5073
55	4188	5058	5789
65	4193	5882	6951
75	4166	7525	8612
85	4011	5448	2946

Beam and Field Angle	
0-180 Degree Plane	
Beam Angle:	120.1°
Field Angle:	168.1°
90-270 Degree Plane	
Beam Angle:	152.3°
Field Angle:	167.6°



Report of Test

LLIA001570-004A

UGR Table - Corrected

Reflectances

Ceiling Cavity	70	70	50	50	30	70	70	50	50	30
Walls	50	30	50	30	30	50	30	50	30	30
Floor Cavity	20	20	20	20	20	20	20	20	20	20

Room Size

UGR Viewed Crosswise

UGR Viewed Endwise

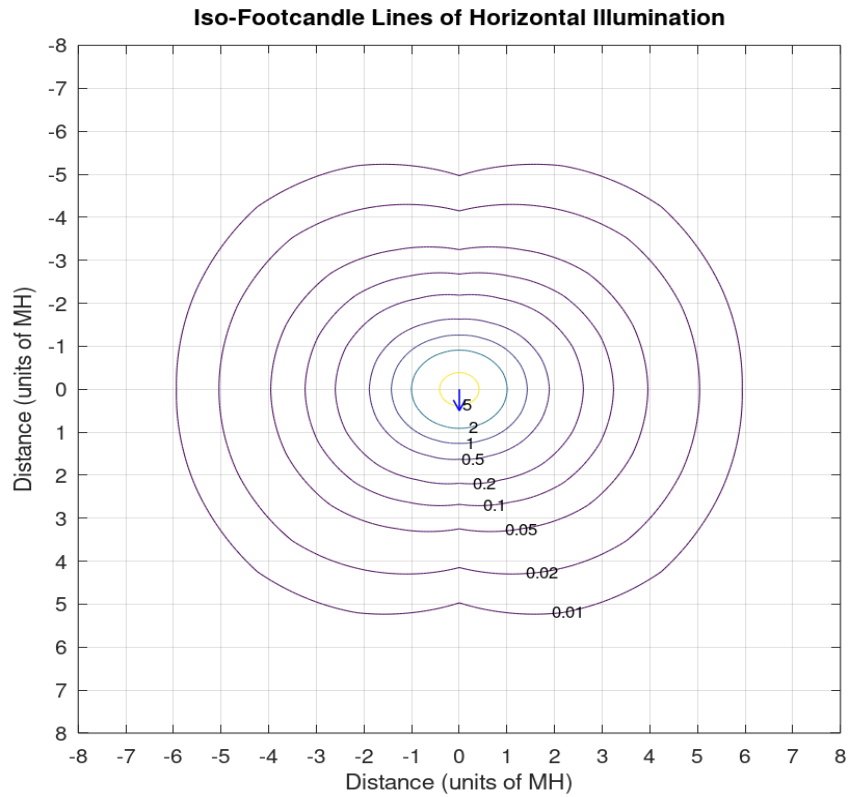
X=2H	Y=2H	17	18.7	17.3	19	19.3	18.9	20.7	19.3	21	21.3
	3H	19.2	20.8	19.5	21.1	21.5	21.8	23.5	22.2	23.8	24.1
	4H	20.1	21.6	20.5	22	22.3	23.2	24.7	23.6	25.1	25.4
	6H	20.9	22.3	21.3	22.7	23.1	24.2	25.7	24.7	26	26.4
	8H	21.2	22.5	21.6	22.9	23.3	24.5	25.9	24.9	26.3	26.7
	12H	21.4	22.7	21.8	23.1	23.5	24.6	25.9	25	26.3	26.7
4H	2H	18.2	19.8	18.6	20.1	20.5	19.6	21.1	20	21.5	21.9
	3H	20.7	22	21.1	22.4	22.8	22.8	24.1	23.2	24.5	24.9
	4H	21.8	23	22.2	23.4	23.9	24.4	25.6	24.8	26	26.4
	6H	22.8	23.8	23.2	24.3	24.7	25.6	26.7	26.1	27.1	27.6
	8H	23.2	24.2	23.6	24.6	25.1	25.9	26.9	26.4	27.4	27.8
	12H	23.4	24.3	23.9	24.8	25.3	26	26.9	26.5	27.4	27.9
8H	4H	22.8	23.8	23.3	24.2	24.7	24.8	25.8	25.3	26.3	26.7
	6H	24	24.9	24.5	25.4	25.8	26.3	27.1	26.8	27.6	28.1
	8H	24.6	25.3	25.1	25.8	26.3	26.7	27.4	27.2	27.9	28.4
	12H	25	25.7	25.5	26.2	26.7	26.8	27.5	27.3	27.9	28.5
12H	4H	23	23.9	23.5	24.4	24.8	24.9	25.8	25.4	26.3	26.7
	6H	24.4	25.1	24.9	25.6	26.1	26.4	27.2	26.9	27.6	28.2
	8H	25	25.6	25.5	26.1	26.7	26.9	27.5	27.4	28	28.6

Maximum UGR = 28.6

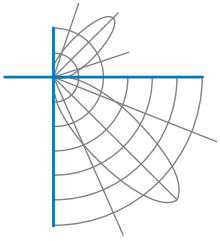


Report of Test
LLIA001570-004A

Iso-Illuminance Plot

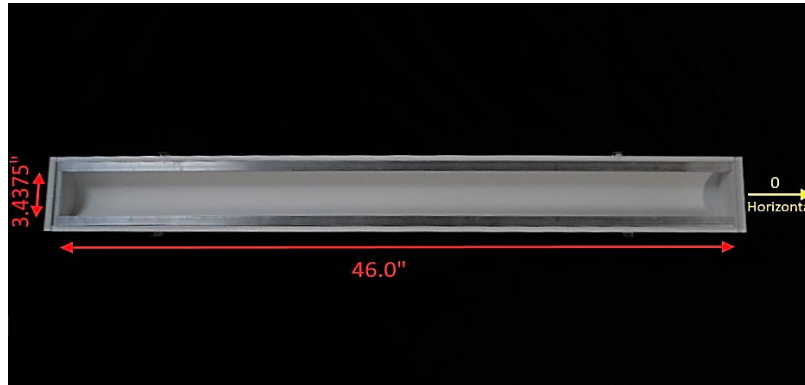


The isofootcandle values shown in the plot above are based on a mounting height of $h = 8.0$ feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the contribution of room reflections.



Report of Test
LLIA001570-004A

Additional Pictures of Test Subject





Report of Test

LLIA001570-004A

Test Distance 9.5 m
Ambient Temperature 25.4 °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 IES LM-79-19. Format of reports and angular increments based on IES LM-41-14 and LM-46-04.

The luminous intensity values, and other derived quantities, contained in this report are based on the absolute data, as measured.

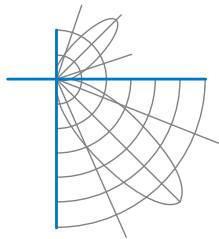
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

This report is free of erasures and corrections.

Photometric intensity values are reported using the CIE C-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

LLIA001570-004B

Integrating Sphere Report

Catalog Number: ARR-MO-K40-80-4-XX-120-DIM1

Recessed mounted, aluminum housing, steel end caps, aluminum reflector/LED holder and white painted ends, white plastic reflector sheet, open bottom. 368 white LEDs, two rows of 184 LEDs aimed up with one-piece diffuse plastic lens above each row of LEDs
One Osram Oti30/120-277/1A0DIM-1LG2 LED driver labeled as 400mA



Performance Summary

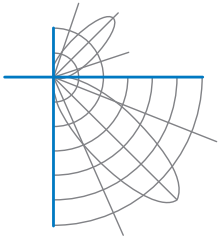
Voltage	120.0 Vac
Current	0.1332 A
Power	15.31 W
Frequency	59.99 Hz
Power Factor	0.958
Current THD	13.0 %
Total Luminous Flux	1579.6 lm
Efficacy	103.2 lm/W
Chromaticity (x,y)	(0.3862, 0.3851)
(u',v')	(0.2256, 0.5061)
Duv	0.0022
CCT	3909 K
CRI (Ra)	84
R9	9
TM-30: Rf	82
TM-30: Rg	94
TM-30: Rcs,h1	-12

Prepared For:

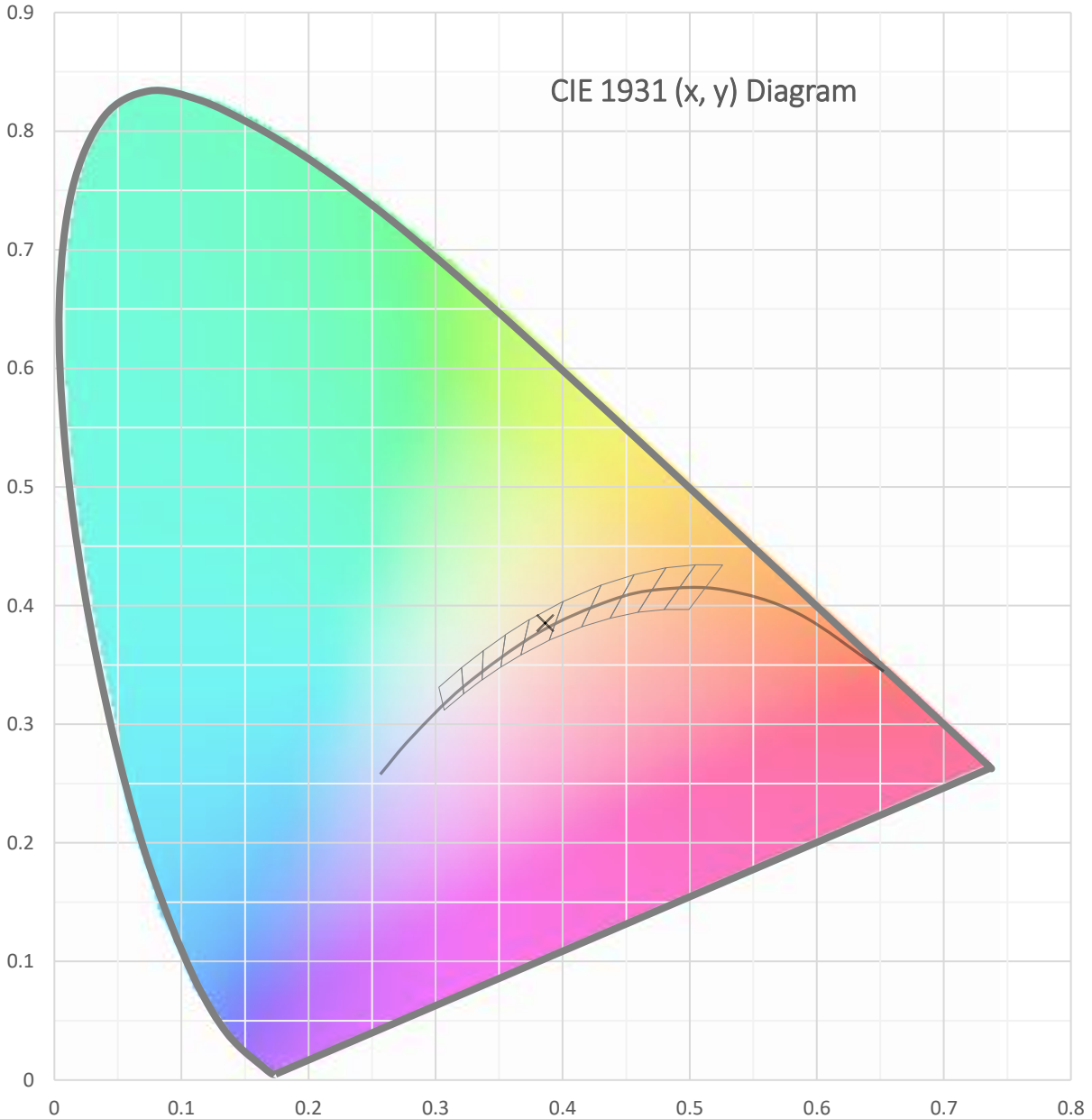
Precision Architectural Lighting
4830 Timber Creek Drive
Houston, TX 77017, USA

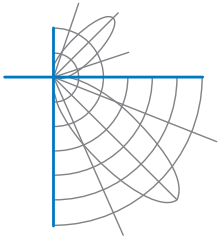
Test date: 10/28/2021

Report date: 10/29/2021

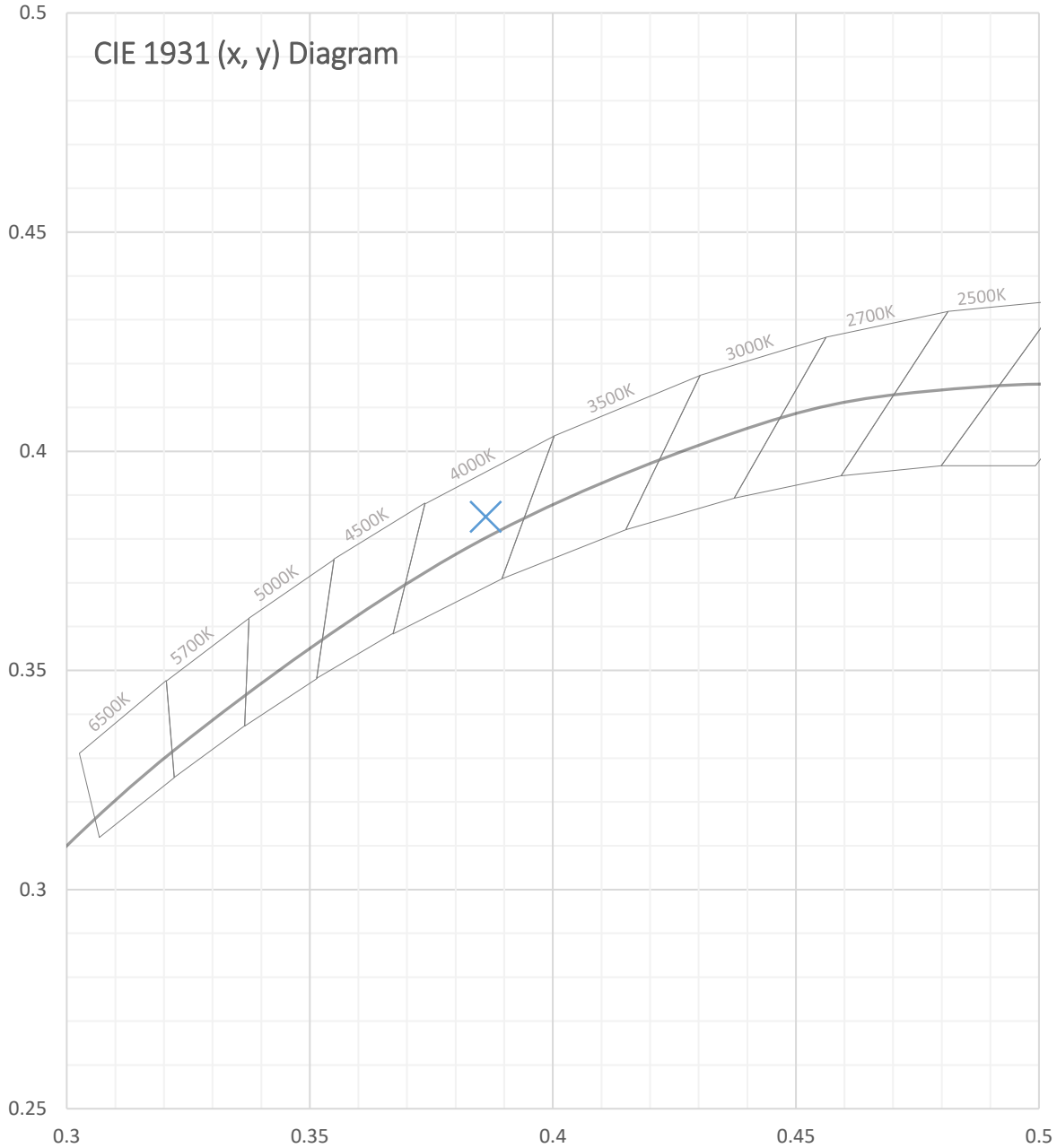


Test Report Number: LLIA001570-004B





Test Report Number: LLIA001570-004B





Test Report Number: LLIA001570-004B

Total Radiant Flux	4.777 W
Total Luminous Flux	1579.6 Lm
Chromaticity CIE 1931 (x, y)	(0.3862, 0.3851)
Chromaticity CIE 1976 (u', v')	(0.2256, 0.5061)
Correlated Color Temperature (CCT)	3909 K
Color Rendering Index (Ra)	84
R1	82
R2	90
R3	96
R4	81
R5	82
R6	87
R7	86
R8	64
R9	9
R10	77
R11	81
R12	60
R13	84
R14	98
TM-30: Rf	82
TM-30: Rg	94
TM-30: Rcs,h1	-12
Distance from Planckian Locus (Duv)	0.0022
Scotopic/Photopic Ratio ‡	1.678

Electrical Data

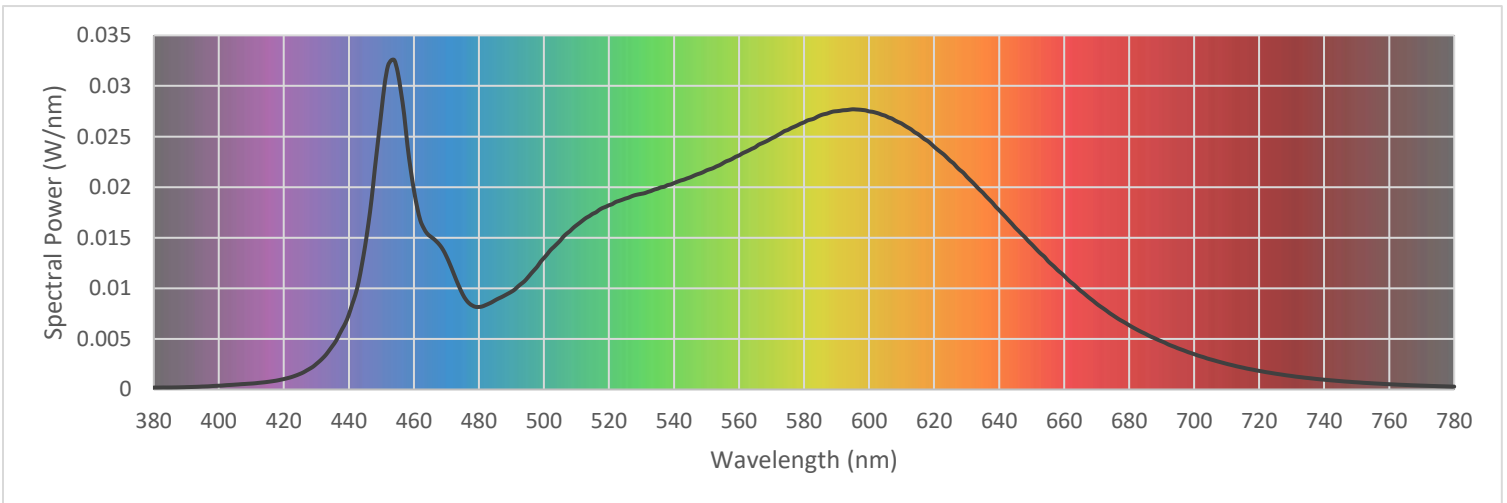
Voltage	120.0 Vac
Current	0.1332 A
Power	15.31 W
Frequency	59.99 Hz
Power Factor	0.958
Current THD	13.0 %



Test Report Number: LLIA001570-004B

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

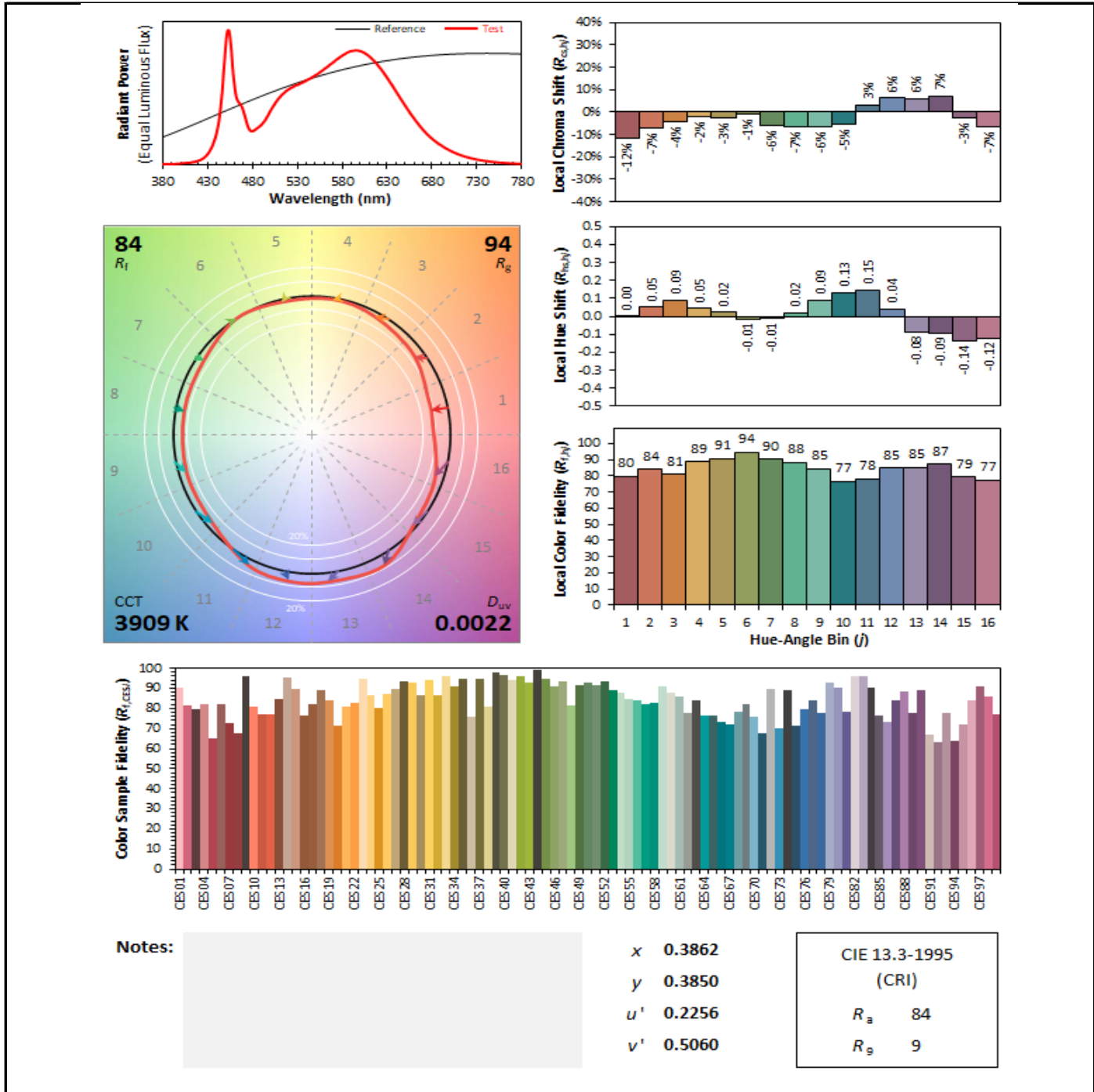
380	0.000191	480	0.008158	580	0.026398	680	0.006351
385	0.000197	485	0.008819	585	0.027089	685	0.005504
390	0.000230	490	0.009658	590	0.027503	690	0.004759
395	0.000291	495	0.011052	595	0.027693	695	0.004068
400	0.000372	500	0.012995	600	0.027484	700	0.003493
405	0.000479	505	0.014713	605	0.027056	705	0.002974
410	0.000584	510	0.016229	610	0.026290	710	0.002534
415	0.000746	515	0.017362	615	0.025252	715	0.002159
420	0.001030	520	0.018209	620	0.023996	720	0.001836
425	0.001543	525	0.018863	625	0.022593	725	0.001563
430	0.002528	530	0.019341	630	0.021052	730	0.001332
435	0.004328	535	0.019847	635	0.019453	735	0.001132
440	0.007414	540	0.020398	640	0.017734	740	0.000964
445	0.014215	545	0.020968	645	0.015985	745	0.000826
450	0.027471	550	0.021653	650	0.014358	750	0.000707
455	0.031387	555	0.022351	655	0.012707	755	0.000604
460	0.019709	560	0.023127	660	0.011239	760	0.000518
465	0.015143	565	0.023940	665	0.009775	765	0.000445
470	0.013160	570	0.024814	670	0.008475	770	0.000381
475	0.009410	575	0.025647	675	0.007338	775	0.000327
						780	0.000281

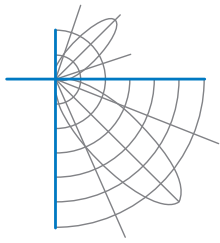




Test Report Number: LLIA001570-004B

IES TM-30 Details





Test Report Number: LLIA001570-004B

Test Equipment Configuration: LightLab International Allentown 2m Integrating Sphere
Measurements acquired using a Labsphere CDS 2600 spectroradiometer
Testing was performed using 4π geometry

Test Temperature: 24.6 °C

Test Procedure: Tested in accordance with the applicable sections of:
LM-79-19, LM-78-07, LM-58-13, ANSI_ANSI C78.377-2017, TM-30-18

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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