



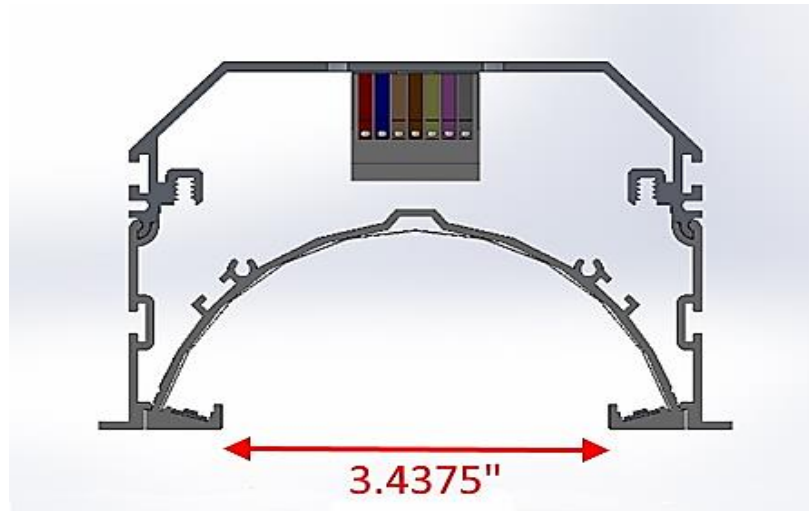
Report of Test

LLIA001570-003A

Indoor Distribution Photometry Test Report

Catalog Number: ARR-HO-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 600mA



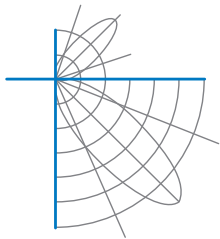
Prepared For:
Precision Architectural Lighting
4830 Timber Creek Drive
Houston, TX 77017, USA

Performance Summary			
Input Voltage	120.0 V	Luminous Flux	2357.2 Lumens
Input Current	0.1857 A	Total Efficacy	107.7 Lm/W
Input Power	21.89 W	Downward Flux	2357.2 Lumens
Frequency	60.00 Hz	Downward Flux	100.0 % of Total
Power Factor	0.982		
Current THD	9.8 %		

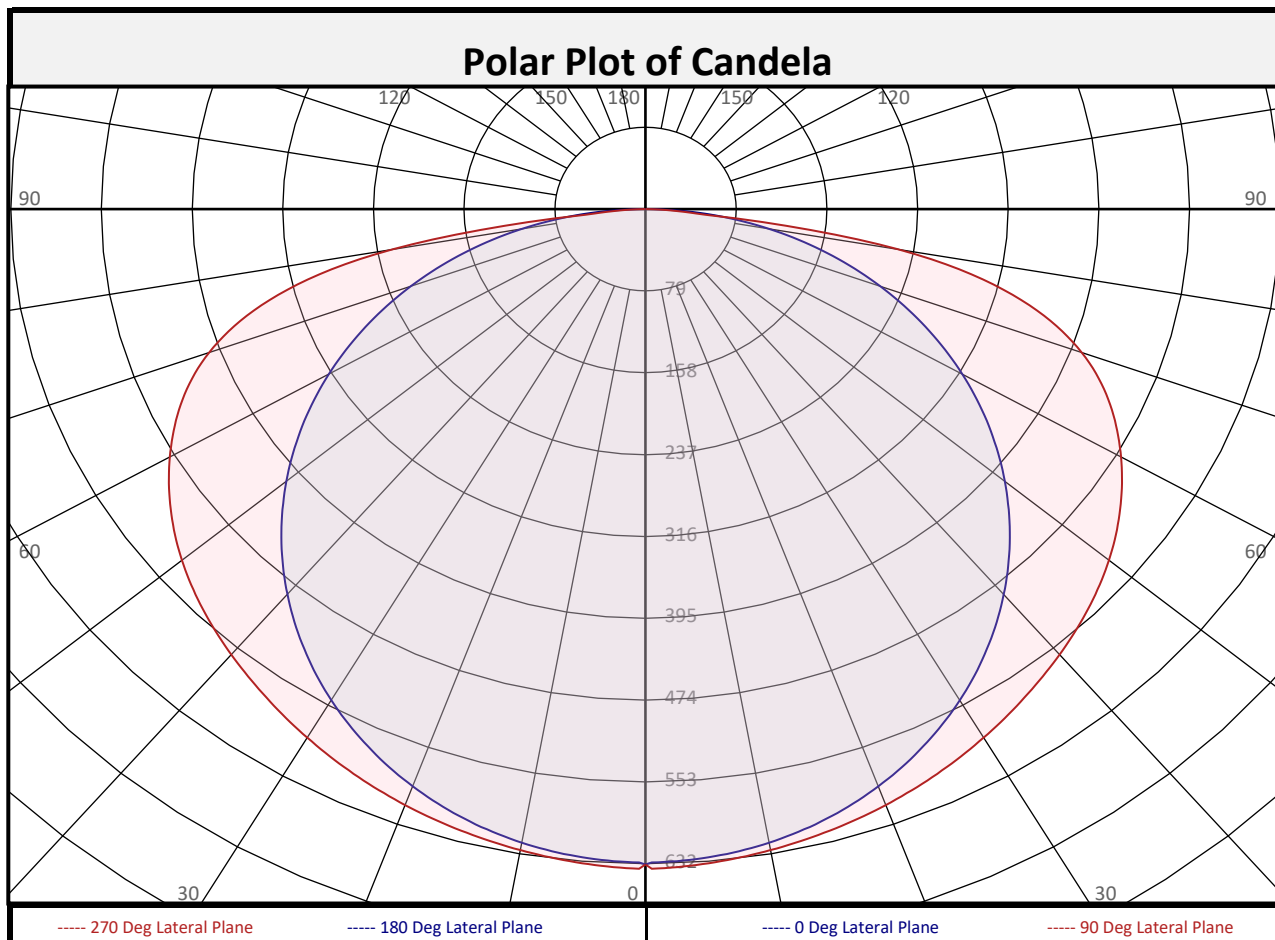
This test report was issued by LightLab International Allentown, LLC without alterations or erasures.

Test date: 10/28/2021
Report date: 11/01/2021

Signed: _____



Report of Test
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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	60.0	2.5%		90-100	0.0	0.0%		0-20	233.4	9.9%
10-20	173.4	7.4%		100-110	0.0	0.0%		0-30	503.4	21.4%
20-30	270.0	11.5%		110-120	0.0	0.0%		0-40	844.9	35.8%
30-40	341.5	14.5%		120-130	0.0	0.0%		0-60	1620	68.7%
40-50	383.1	16.3%		130-140	0.0	0.0%		0-80	2270	96.3%
50-60	391.6	16.6%		140-150	0.0	0.0%		10-90	2297	97.4%
60-70	363.8	15.4%		150-160	0.0	0.0%		20-50	994.7	42.2%
70-80	286.5	12.2%		160-170	0.0	0.0%		40-90	1512	64.1%
80-90	87.4	3.7%		170-180	0.0	0.0%		60-90	737.6	31.3%
0-90	2357	100.0%		90-180	0.0	0.0%		0-180	2357	100.0%



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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	633	633	633	633	633	633	633	633	633
	2.5	630	630	631	633	636	633	631	630	630
	5	628	628	629	631	634	631	629	628	628
	7.5	625	625	626	629	631	629	626	625	625
	10	621	621	622	625	628	625	622	621	621
	12.5	616	616	618	622	625	622	618	616	616
	15	609	609	612	618	621	618	612	609	609
	17.5	602	602	606	613	617	613	606	602	602
	20	593	593	599	607	612	607	599	593	593
	22.5	583	584	592	602	607	602	592	584	583
	25	572	574	583	595	602	595	583	574	572
	27.5	560	563	575	589	596	589	575	563	560
	30	548	550	565	581	589	581	565	550	548
	32.5	534	537	555	574	583	574	555	537	534
	35	518	523	544	566	576	566	544	523	518
	37.5	503	509	532	557	569	557	532	509	503
	40	485	493	520	549	562	549	520	493	485
	42.5	468	477	508	540	554	540	508	477	468
	45	449	460	495	531	546	531	495	460	449
	47.5	429	443	482	521	537	521	482	443	429
50	409	424	469	511	527	511	469	424	409	
52.5	387	406	455	500	517	500	455	406	387	
55	365	386	441	488	505	488	441	386	365	
57.5	342	367	427	475	492	475	427	367	342	
60	319	347	411	461	479	461	411	347	319	
62.5	294	326	395	445	464	445	395	326	294	
65	269	306	378	429	447	429	378	306	269	
67.5	244	286	360	411	428	411	360	286	244	
70	218	265	341	389	404	389	341	265	218	
72.5	191	244	320	363	376	363	320	244	191	
75	164	223	296	330	339	330	296	223	164	
77.5	136	201	266	287	291	287	266	201	136	
80	109	177	225	228	224	228	225	177	109	
82.5	81	150	166	138	124	138	166	150	81	
85	53	108	72	40	39	40	72	108	53	
87.5	24	27	16	15	15	15	16	27	24	
90	0	0	0	0	0	0	0	0	0	



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Luminous Intensity (Candela) Table

	Lateral (C-Plane) Angles									
	0	22.5	45	67.5	90	112.5	135	157.5	180	
90	0	0	0	0	0	0	0	0	0	0
92.5	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0
97.5	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0
102.5	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0
107.5	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0
112.5	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0
117.5	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0
122.5	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0
127.5	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0
132.5	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0
137.5	0	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0
142.5	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0
147.5	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0
152.5	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	0	0	0
157.5	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0
162.5	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0
167.5	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0
172.5	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0
177.5	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0

Vertical (Gamma) Angles - Data was acquired in 0.5° increments, 2.5° increments shown.



Report of Test

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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	64				
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	17.6	7.72	8.40	
8.0	9.9	10.30	11.21	
10.0	6.3	12.87	14.01	
12.0	4.4	15.45	16.81	
14.0	3.2	18.02	19.61	
16.0	2.5	20.60	22.41	

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	6203	6203	6203
45	6222	6861	7565
55	6242	7541	8631
65	6247	8765	10366
75	6202	11220	12836
85	5941	8056	4371

Beam and Field Angle	
0-180 Degree Plane	
Beam Angle:	120.0°
Field Angle:	168.1°
90-270 Degree Plane	
Beam Angle:	152.3°
Field Angle:	167.6°



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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

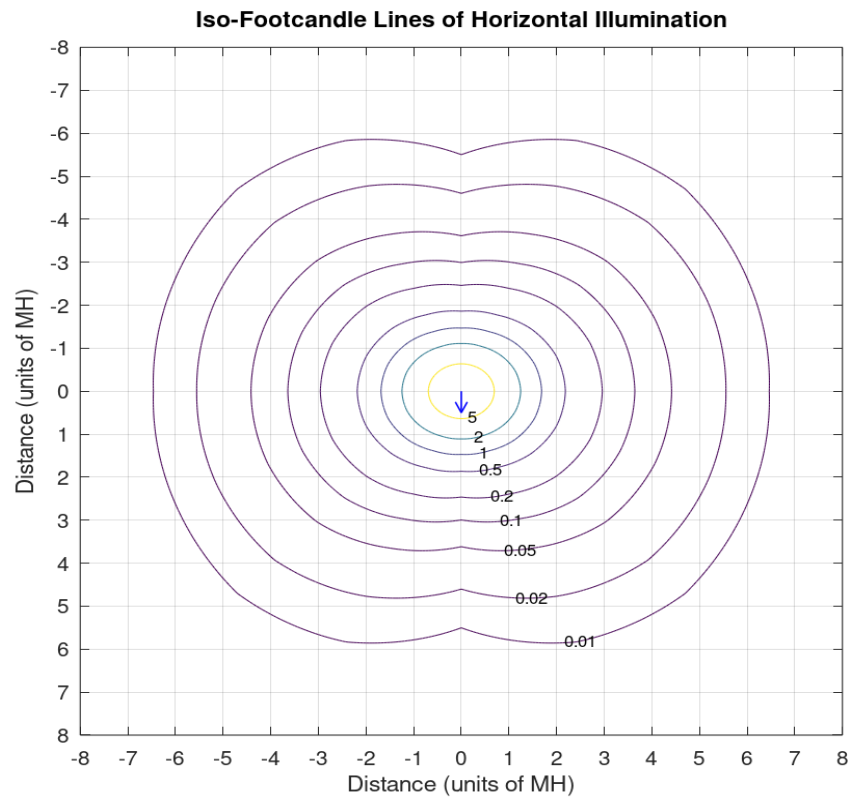
X=2H	Y=2H	18.4	20.1	18.7	20.4	20.7	20.3	22.1	20.7	22.4	22.7	
		3H	20.6	22.2	20.9	22.5	22.9	23.2	24.9	23.6	25.2	25.5
		4H	21.5	23	21.9	23.4	23.7	24.6	26.1	25	26.5	26.8
		6H	22.3	23.7	22.7	24.1	24.4	25.6	27.1	26.1	27.4	27.8
		8H	22.6	23.9	23	24.3	24.7	25.9	27.3	26.3	27.7	28.1
		12H	22.8	24.1	23.2	24.5	24.9	26	27.3	26.4	27.7	28.1
4H	2H	19.6	21.2	20	21.5	21.9	21	22.5	21.4	22.9	23.3	
	3H	22.1	23.4	22.5	23.8	24.2	24.2	25.5	24.6	25.9	26.3	
	4H	23.2	24.4	23.6	24.8	25.2	25.8	27	26.2	27.4	27.8	
	6H	24.2	25.2	24.6	25.7	26.1	27	28.1	27.5	28.5	29	
	8H	24.6	25.5	25	26	26.4	27.3	28.3	27.8	28.8	29.2	
	12H	24.8	25.7	25.3	26.2	26.7	27.4	28.3	27.9	28.8	29.2	
8H	4H	24.2	25.2	24.7	25.6	26.1	26.2	27.2	26.7	27.7	28.1	
	6H	25.4	26.3	25.9	26.8	27.2	27.7	28.5	28.2	29	29.5	
	8H	26	26.7	26.5	27.2	27.7	28.1	28.8	28.6	29.3	29.8	
	12H	26.4	27.1	26.9	27.6	28.1	28.2	28.8	28.7	29.3	29.9	
12H	4H	24.4	25.3	24.9	25.8	26.2	26.3	27.2	26.8	27.7	28.1	
	6H	25.8	26.5	26.3	27	27.5	27.8	28.6	28.3	29	29.6	
	8H	26.4	27	26.9	27.5	28.1	28.3	28.9	28.8	29.4	30	

Maximum UGR = 30.0

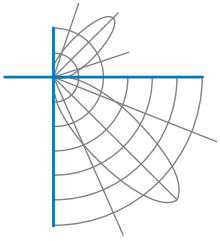


Report of Test LLIA001570-003A

Iso-Illuminance Plot

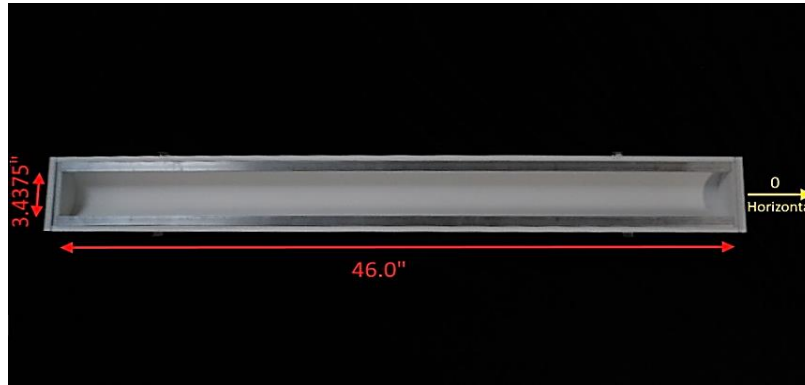


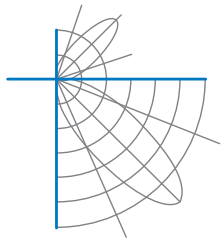
The isofootcandle values shown in the plot above are based on a mounting height of $h = 8.0$ feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the contribution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



Report of Test
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Additional Pictures of Test Subject





Report of Test

LLIA001570-003A

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.

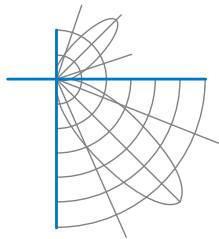
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

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

LLIA001570-003B

Integrating Sphere Report

Catalog Number: ARR-HO-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 600mA



Performance Summary

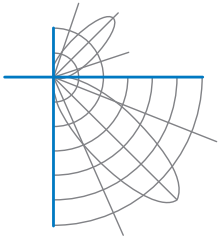
Voltage	120.0 Vac
Current	0.1859 A
Power	21.88 W
Frequency	59.99 Hz
Power Factor	0.981
Current THD	9.8 %
Total Luminous Flux	2350.8 lm
Efficacy	107.4 lm/W
Chromaticity (x,y)	(0.3858, 0.3845)
(u',v')	(0.2255, 0.5057)
Duv	0.0021
CCT	3917 K
CRI (Ra)	83
R9	9
TM-30: Rf	82
TM-30: Rg	94
TM-30: Rcs,h1	-12

Prepared For:

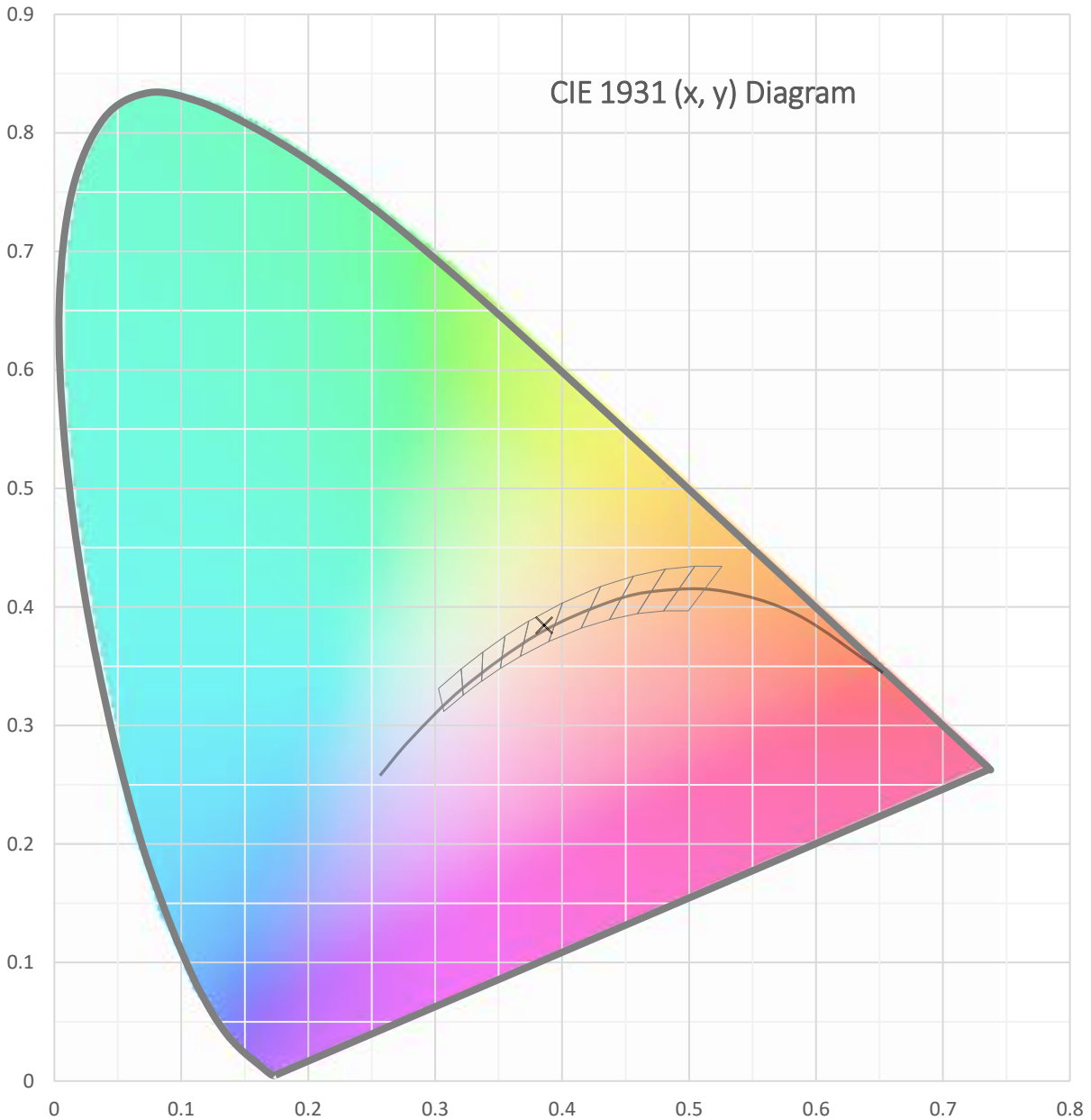
Precision Architectural Lighting
4830 Timber Creek Drive
Houston, TX 77017, USA

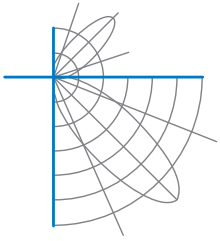
Test date: 10/27/2021

Report date: 10/29/2021

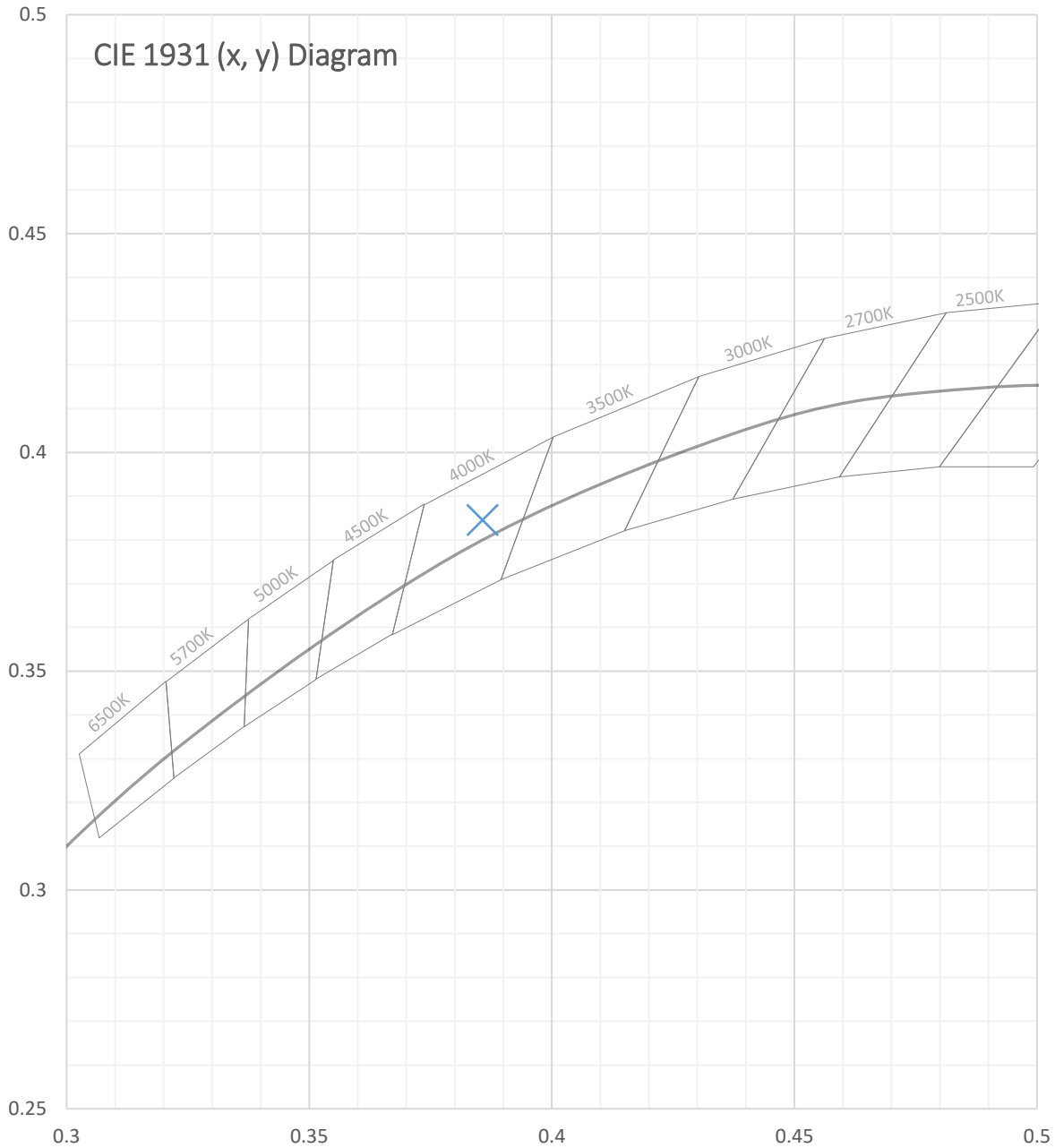


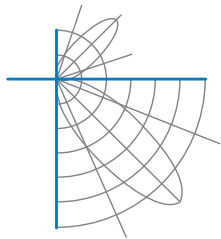
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Test Report Number: LLIA001570-003B





Test Report Number: LLIA001570-003B

Total Radiant Flux	7.117 W
Total Luminous Flux	2350.8 Lm
Chromaticity CIE 1931 (x, y)	(0.3858, 0.3845)
Chromaticity CIE 1976 (u', v')	(0.2255, 0.5057)
Correlated Color Temperature (CCT)	3917 K
Color Rendering Index (Ra)	83
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)	0.0021
Scotopic/Photopic Ratio ‡	1.680

Electrical Data

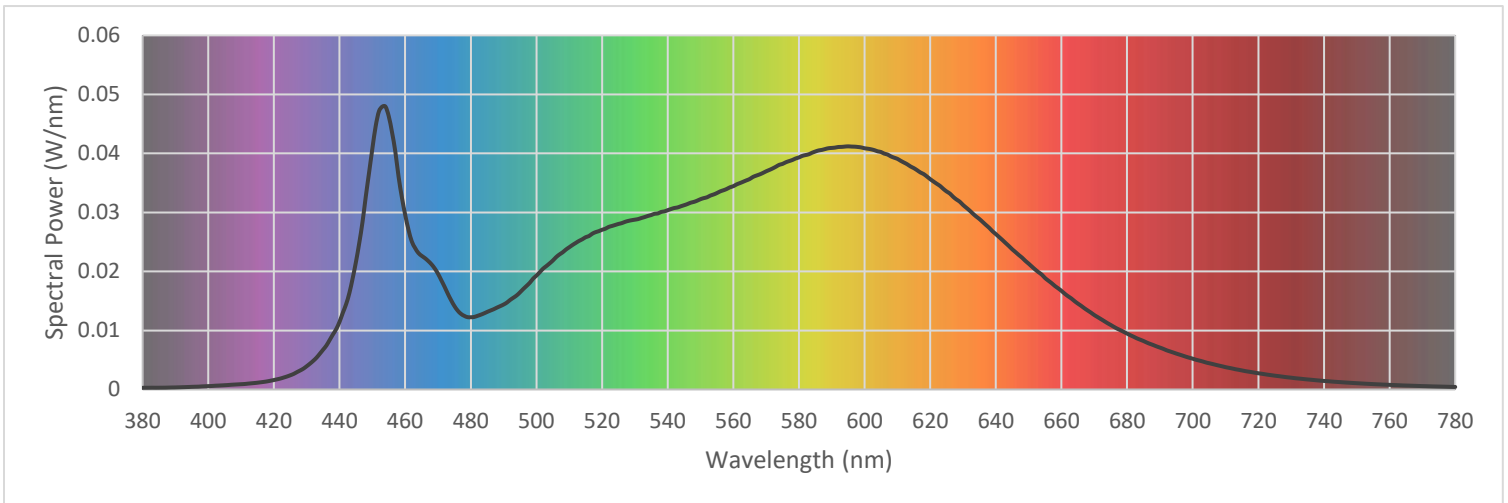
Voltage	120.0 Vac
Current	0.1859 A
Power	21.88 W
Frequency	59.99 Hz
Power Factor	0.981
Current THD	9.8 %

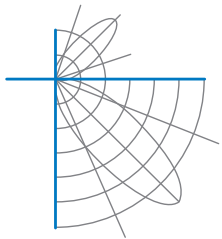


Test Report Number: LLIA001570-003B

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

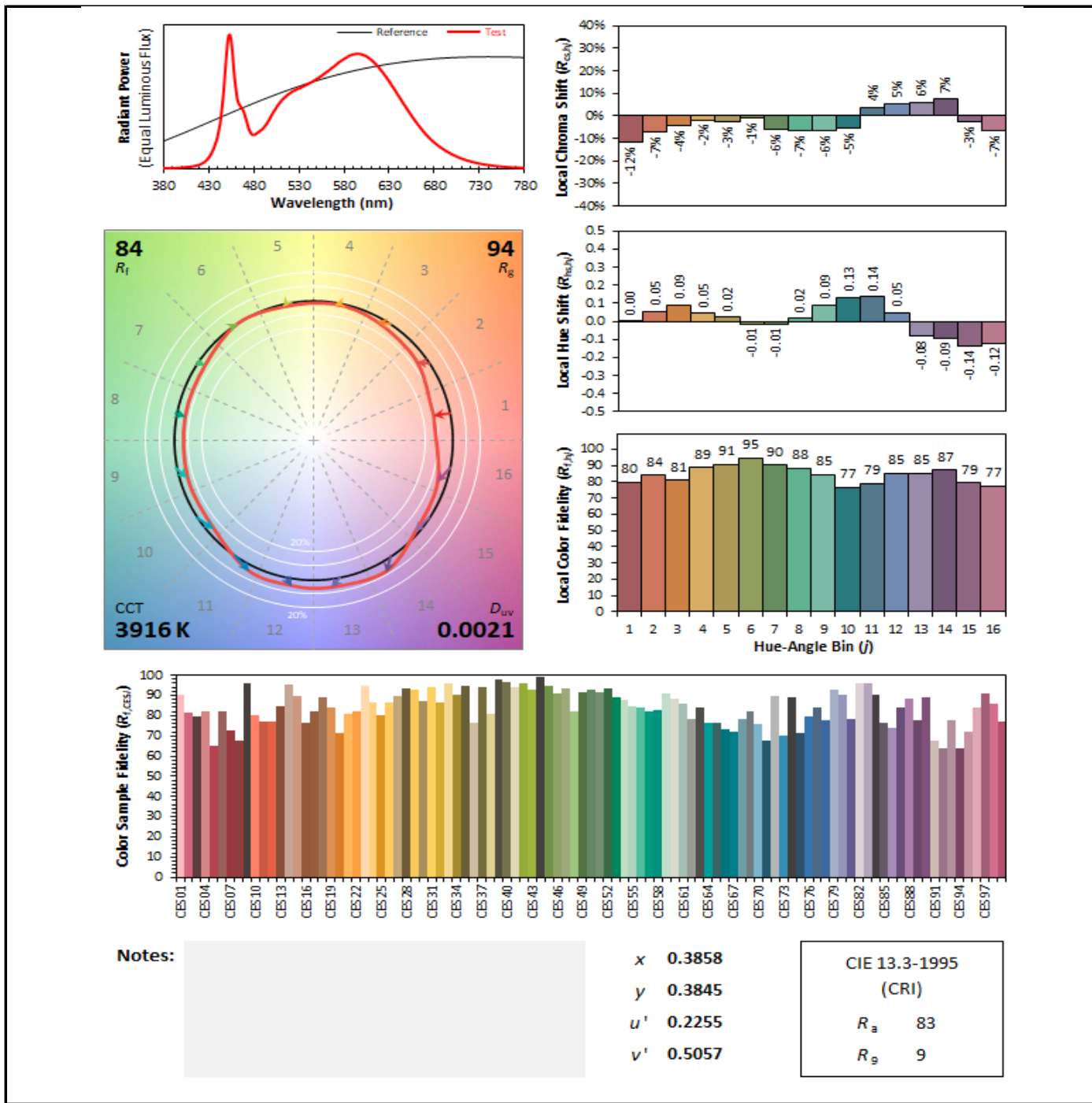
380	0.000284	480	0.012239	580	0.039320	680	0.009463
385	0.000298	485	0.013142	585	0.040320	685	0.008210
390	0.000346	490	0.014394	590	0.040927	690	0.007097
395	0.000445	495	0.016463	595	0.041192	695	0.006081
400	0.000567	500	0.019291	600	0.040868	700	0.005215
405	0.000720	505	0.021850	605	0.040234	705	0.004447
410	0.000891	510	0.024096	610	0.039077	710	0.003782
415	0.001147	515	0.025799	615	0.037505	715	0.003225
420	0.001598	520	0.027061	620	0.035638	720	0.002746
425	0.002405	525	0.028047	625	0.033548	725	0.002337
430	0.003943	530	0.028774	630	0.031266	730	0.001994
435	0.006752	535	0.029560	635	0.028882	735	0.001696
440	0.011476	540	0.030380	640	0.026328	740	0.001444
445	0.021629	545	0.031219	645	0.023750	745	0.001239
450	0.040814	550	0.032243	650	0.021320	750	0.001062
455	0.046286	555	0.033280	655	0.018878	755	0.000907
460	0.029584	560	0.034444	660	0.016707	760	0.000780
465	0.022655	565	0.035663	665	0.014551	765	0.000669
470	0.019609	570	0.036963	670	0.012613	770	0.000574
475	0.014139	575	0.038219	675	0.010935	775	0.000494
						780	0.000426

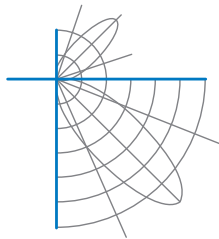




Test Report Number: LLIA001570-003B

IES TM-30 Details





Test Report Number: LLIA001570-003B

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: 25.3 °C

Test Procedure: Tested in accordance with the applicable sections of:
LM-79-19, LM-78-07, LM-58-13, ANSI_ANSLG 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.

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.

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.