

Report of Test

LLIA001493-003A

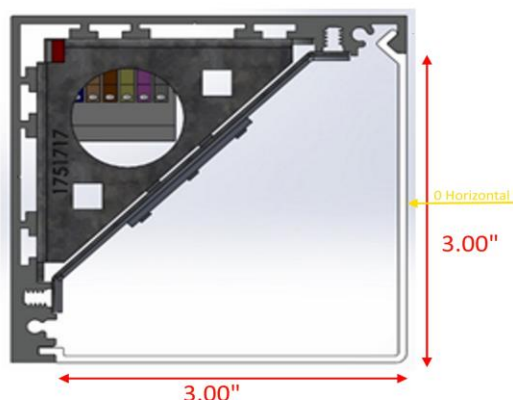
Indoor Distribution Photometry Test Report

Catalog Number: AS350-HO-K40-80-4-XX-LOH-FXXX-UNV-XX

Wall/ceiling mounted extruded aluminum housing, white enamel
aluminum reflector, translucent white plastic enclosure.

144 white LEDs, one Osram PrevaLED Bar board with 144 LEDs.

One Osram Optotronic OTi 30/120-277/1A0 DIM L LED driver programmed to 720mA.



Prepared For:

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

Performance Summary

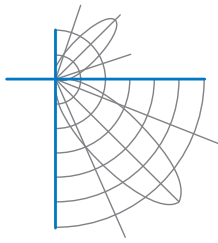
Input Voltage	120.0 V	Luminous Flux	3495.1 Lumens
Input Current	0.2297 A	Total Efficacy	127.1 Lm/W
Input Power	27.49 W	Downward Flux	2657.3 Lumens
Frequency	60.00 Hz	Downward Flux	76.0 % of Total
Power Factor	0.997		
Current THD	5.7 %		

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

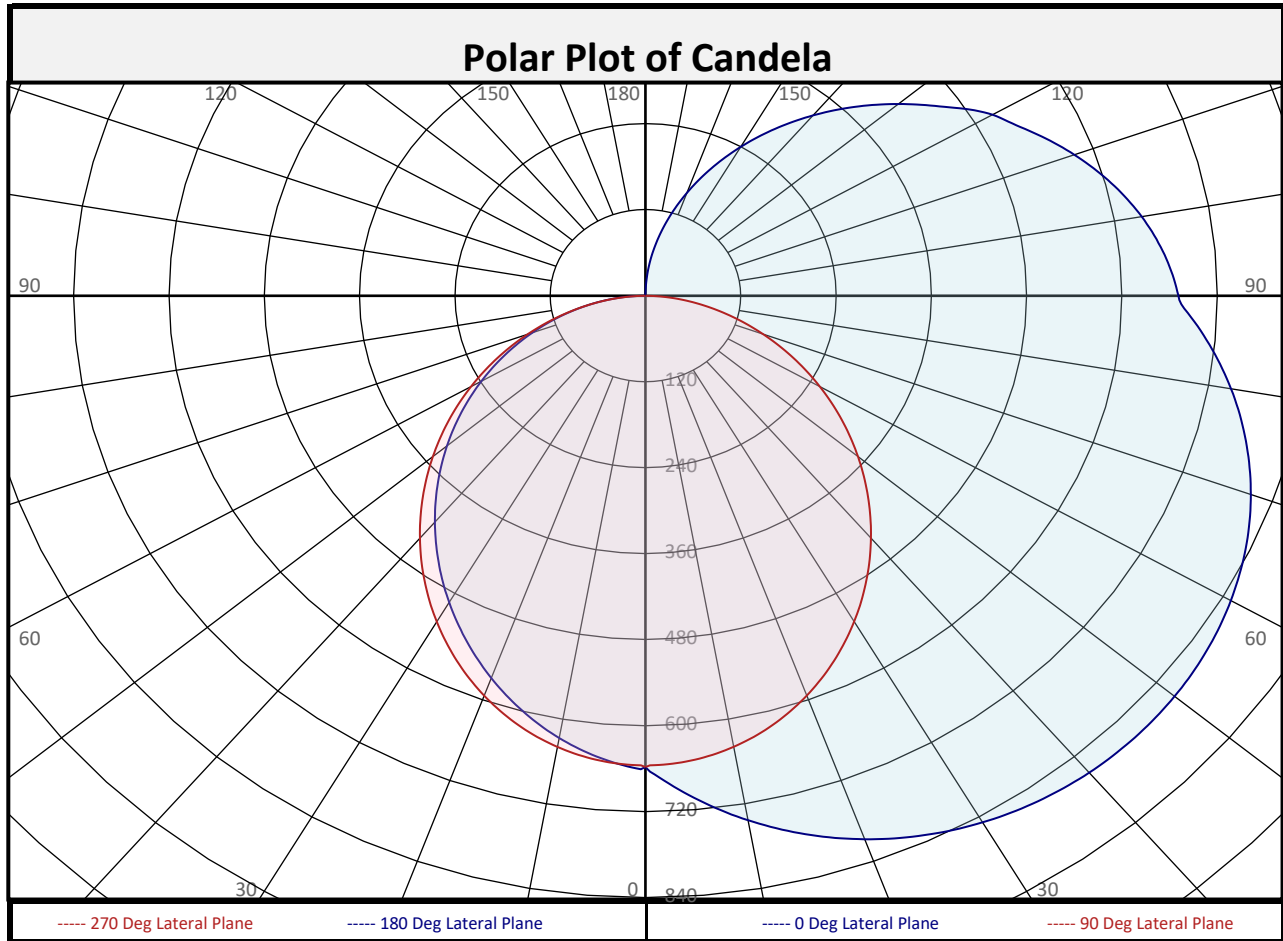
Test date: 07/08/2021

Report date: 07/09/2021

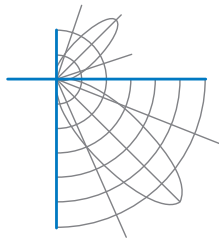
Signed: _____



Report of Test
LLIA001493-003A



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	Zone (Deg Vert)	Flux (Lumens)	Percent of Total																																																																														
0-10	63.4	1.8%	90-100	202.4	5.8%	0-20	249.7	7.1%	10-20	186.3	5.3%	100-110	183.2	5.2%	0-30	540.7	15.5%	20-30	291.0	8.3%	110-120	154.4	4.4%	0-40	906.4	25.9%	30-40	365.7	10.5%	120-130	120.8	3.5%	0-60	1719	49.2%	40-50	404.8	11.6%	130-140	85.5	2.4%	0-80	2413	69.0%	50-60	407.4	11.7%	140-150	53.3	1.5%	10-90	2594	74.2%	60-70	376.1	10.8%	150-160	27.3	0.8%	20-50	1062	30.4%	70-80	318.0	9.1%	160-170	9.6	0.3%	40-90	1751	50.1%	80-90	244.6	7.0%	170-180	1.2	0.0%	60-90	938.6	26.9%	0-90	2657	76.0%	90-180	837.8	24.0%	0-180	3495	100.0%

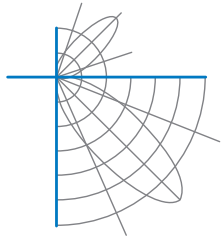


Report of Test

LLIA001493-003A

Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	0	658	658	658	658	658	658	658	658	658
	2.5	681	678	670	660	654	652	652	654	656
	5	703	697	684	666	651	647	645	646	648
	7.5	724	716	696	670	646	640	637	636	638
	10	743	732	706	672	639	632	627	625	627
	12.5	761	748	715	672	631	621	615	612	614
	15	778	762	723	671	620	609	602	598	599
	17.5	793	775	728	667	608	596	587	583	584
	20	807	786	732	662	594	581	572	567	568
	22.5	820	795	734	655	579	565	555	550	550
	25	830	803	735	646	562	547	537	532	532
	27.5	840	810	734	637	544	529	519	513	514
	30	848	815	732	625	525	510	500	494	494
	32.5	856	820	729	613	506	490	480	474	474
	35	861	822	724	599	485	470	460	454	454
	37.5	866	824	718	585	464	449	439	433	434
	40	869	824	710	569	442	427	418	412	412
	42.5	871	823	702	553	419	405	396	391	391
	45	872	821	693	536	396	383	374	369	370
	47.5	871	817	683	518	373	361	352	348	348
50	870	813	671	499	350	338	330	326	326	
52.5	867	807	659	480	326	315	308	304	304	
55	863	800	646	461	302	292	286	282	283	
57.5	858	792	632	441	278	269	263	260	261	
60	851	783	617	421	254	245	241	238	239	
62.5	843	773	601	400	230	222	219	217	217	
65	834	761	585	379	206	199	196	195	195	
67.5	823	748	568	358	182	177	174	173	174	
70	811	734	551	337	159	154	153	152	152	
72.5	797	720	533	316	136	132	132	131	131	
75	783	703	514	296	114	111	111	111	111	
77.5	767	686	496	276	92	90	91	91	91	
80	749	668	477	256	72	70	71	71	72	
82.5	730	649	458	237	52	51	52	53	53	
85	709	629	438	218	33	33	34	34	34	
87.5	688	608	419	200	15	16	16	17	17	
90	671	592	404	185	0	0	0	0	0	

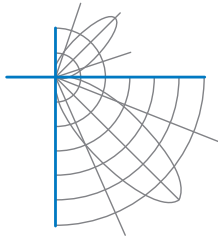


Report of Test

LLIA001493-003A

Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	90	671	592	404	185	0	0	0	0	0
	92.5	664	587	400	183	0	0	0	0	0
	95	656	580	396	182	0	0	0	0	0
	97.5	646	572	392	180	0	0	0	0	0
	100	635	562	386	177	0	0	0	0	0
	102.5	622	551	379	175	0	0	0	0	0
	105	607	539	372	172	0	0	0	0	0
	107.5	592	526	364	169	0	0	0	0	0
	110	575	511	355	165	0	0	0	0	0
	112.5	557	496	346	162	0	0	0	0	0
	115	539	481	336	158	0	0	0	0	0
	117.5	521	464	326	153	0	0	0	0	0
	120	505	447	315	149	0	0	0	0	0
	122.5	484	433	304	144	0	0	0	0	0
	125	460	414	294	139	0	0	0	0	0
	127.5	438	394	283	134	0	0	0	0	0
	130	416	373	270	130	0	0	0	0	0
	132.5	394	354	255	124	0	0	0	0	0
	135	373	335	241	118	0	0	0	0	0
	137.5	351	315	227	111	0	0	0	0	0
140	329	296	214	104	0	0	0	0	0	
142.5	306	276	200	98	0	0	0	0	0	
145	284	256	186	92	0	0	0	0	0	
147.5	262	236	172	85	0	0	0	0	0	
150	240	216	158	78	0	0	0	0	0	
152.5	218	196	143	69	0	0	0	0	0	
155	196	177	129	62	0	0	0	0	0	
157.5	174	157	116	54	0	0	0	0	0	
160	153	138	102	47	0	0	0	0	0	
162.5	132	119	86	40	0	0	0	0	0	
165	111	100	70	33	0	0	0	0	0	
167.5	91	83	55	26	0	0	0	0	0	
170	72	65	42	21	0	0	0	0	0	
172.5	53	47	29	15	0	0	0	0	0	
175	34	31	18	9	0	0	0	0	0	
177.5	15	10	7	5	0	0	0	0	0	
180	0	0	0	0	0	0	0	0	0	



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LLIA001493-003A

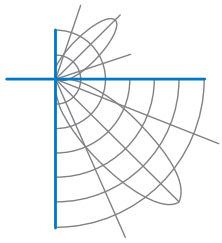
Coefficients of Utilization/Room Utilization - Zonal Cavity Method																						
Effective Floor Cavity Reflectance 0.20																						
RC	80					70					50				30				10			0
RW	70	50	30	10		70	50	30	10		50	30	10		50	30	10		50	30	10	0
RCR																						
0	113	113	113	113		108	108	108	108		98	98	98		89	89	89		80	80	80	76
1	100	95	89	84		95	90	85	81		81	77	74		73	70	67		66	63	61	57
2	90	81	73	67		85	77	70	64		69	64	59		62	58	54		56	52	49	46
3	82	70	61	54		77	67	58	52		60	53	48		54	49	44		49	44	40	37
4	74	61	52	45		70	58	50	43		53	46	40		48	42	37		43	38	34	31
5	68	54	45	38		64	52	43	37		47	40	34		42	36	32		38	33	29	26
6	62	49	39	33		59	46	38	32		42	35	30		38	32	27		35	29	25	23
7	58	44	35	29		55	42	34	28		38	31	26		35	29	24		31	26	22	20
8	54	40	31	25		51	38	30	24		35	28	23		32	26	21		29	24	20	18
9	50	36	28	22		47	35	27	22		32	25	20		29	23	19		27	21	18	16
10	47	33	25	20		44	32	25	20		29	23	18		27	21	17		25	20	16	14

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	18.3	9.13	7.16	
8.0	10.3	12.17	9.54	
10.0	6.6	15.21	11.93	
12.0	4.6	18.26	14.31	
14.0	3.4	21.30	16.70	
16.0	2.6	24.34	19.08	

Average Luminance (cd/m ²)			
	0 deg Plane	45 deg Plane	90 deg Plane
0	7080	7080	7080
45	6635	6178	6033
55	6668	6030	5665
65	6755	5922	5240
75	6879	5877	4731
85	7046	5959	4113

Spacing Criterion	
0 degree plane:	1.9
90 degree plane:	1.2
180 degree plane:	1.1
270 degree plane:	1.2



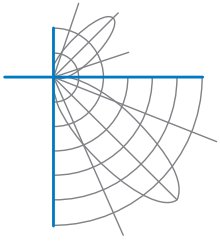
Report of Test

LLIA001493-003A

UGR TABLE - CORRECTED

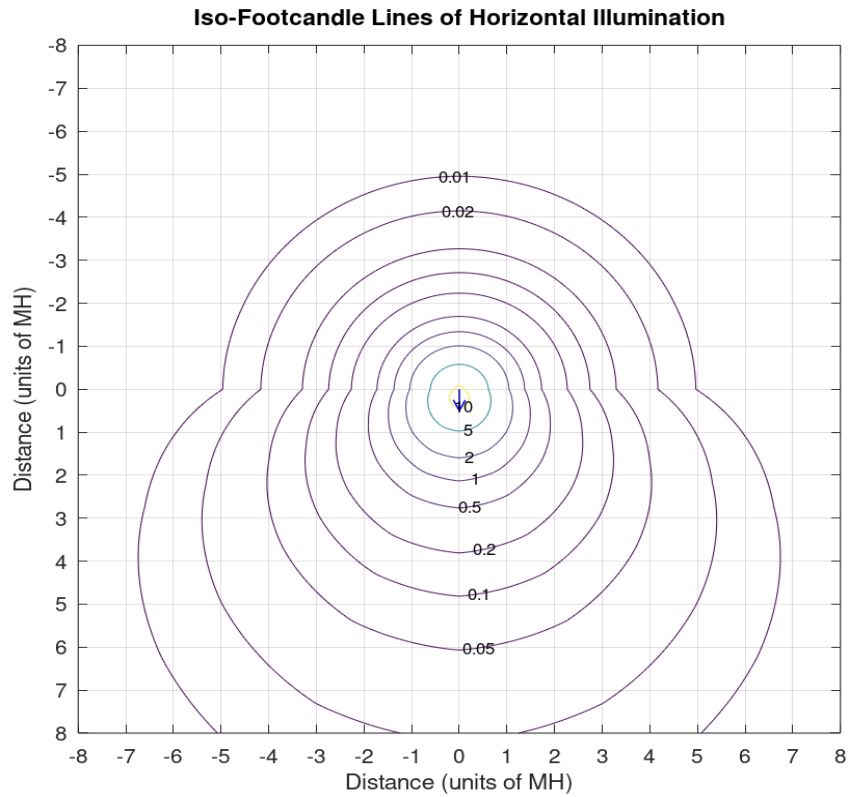
Reflectances											
Ceiling Cavity		70	70	50	50	30	70	70	50	50	30
Walls		50	30	50	30	30	50	30	50	30	30
Floor Cavity		20	20	20	20	20	20	20	20	20	20
Room Size	UGR Viewed Crosswise	UGR Viewed Endwise									
X=2H	Y=2H	20.5	21.8	21.2	22.5	23.3	13.0	14.3	13.7	15.0	15.9
	3H	23.8	25.0	24.5	25.7	26.6	14.4	15.6	15.1	16.3	17.2
	4H	25.6	26.7	26.3	27.4	28.3	14.9	16.0	15.6	16.7	17.6
	6H	27.4	28.4	28.1	29.2	30.1	15.1	16.2	15.9	16.9	17.8
	8H	28.3	29.3	29.1	30.1	31.0	15.2	16.2	15.9	17.0	17.9
	12H	29.4	30.3	30.1	31.1	32.0	15.2	16.2	16.0	16.9	17.9
4H	2H	20.7	21.9	21.5	22.6	23.5	14.7	15.8	15.4	16.6	17.4
	3H	24.3	25.3	25.0	26.0	26.9	16.4	17.3	17.1	18.1	19.0
	4H	26.2	27.1	26.9	27.9	28.8	17.0	17.9	17.7	18.6	19.6
	6H	28.2	29.0	29.0	29.8	30.7	17.4	18.2	18.2	19.0	19.9
	8H	29.3	30.0	30.1	30.8	31.8	17.5	18.3	18.3	19.0	20.0
	12H	30.5	31.1	31.2	31.9	32.9	17.6	18.3	18.4	19.1	20.0
8H	4H	26.3	27.1	27.1	27.9	28.8	18.4	19.2	19.2	20.0	20.9
	6H	28.5	29.1	29.3	30.0	30.9	19.1	19.8	19.9	20.6	21.5
	8H	29.7	30.3	30.5	31.1	32.1	19.4	19.9	20.2	20.8	21.7
	12H	31.1	31.6	31.9	32.4	33.4	19.5	20.0	20.3	20.9	21.9
12H	4H	26.3	27.0	27.1	27.8	28.8	18.9	19.6	19.7	20.4	21.4
	6H	28.5	29.1	29.3	29.9	30.9	19.8	20.4	20.6	21.2	22.2
	8H	29.8	30.3	30.6	31.1	32.1	20.2	20.7	21.0	21.5	22.5

Maximum UGR = 33.4

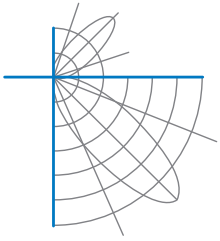


Report of Test
LLIA001493-003A

Iso-Illuminance Plot



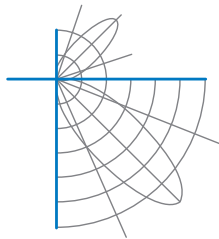
The isofootcandle values shown in the plot above are based on a mounting height of $h = 8.0$ feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the contribution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



Report of Test
LLIA001493-003A

Additional Pictures of Test Subject





Report of Test

LLIA001493-003A

Test Distance 9.5 m
Ambient Temperature 25.1 °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.

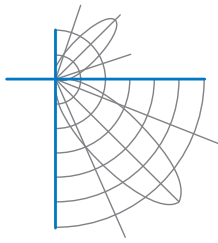
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

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

LLIA001493-003B

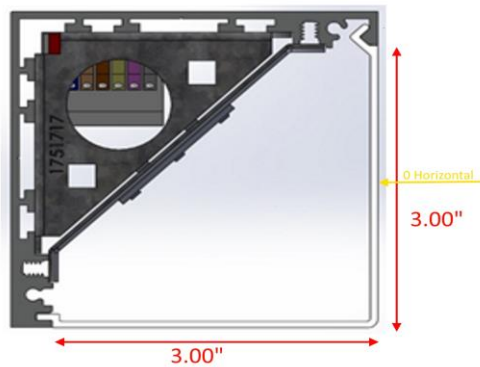
Integrating Sphere Report

Catalog Number: AS350-HO-K40-80-4-XX-LOH-FXXX-UNV-XX

Wall/ceiling mounted extruded aluminum housing, white enamel
aluminum reflector, translucent white plastic enclosure.

144 white LEDs, one Osram PrevaLED Bar board with 144 LEDs.

One Osram Optotronic OTi 30/120-277/1A0 DIM L LED driver programmed to 720mA.



Performance Summary

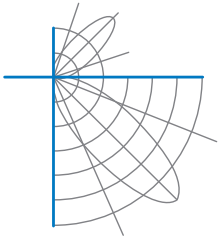
Voltage	120.0 Vac
Current	0.2297 A
Power	27.50 W
Frequency	59.99 Hz
Power Factor	0.997
Current THD	5.7 %
Total Luminous Flux	3591.5 lm
Efficacy	130.6 lm/W
Chromaticity (x,y)	(0.3794, 0.3747)
(u',v')	(0.2252, 0.5005)
Duv	-0.0007
CCT	4014 K
CRI (Ra)	85
R9	18
TM-30: Rf	83
TM-30: Rg	95
TM-30: Rcs,h1	-11

Prepared For:

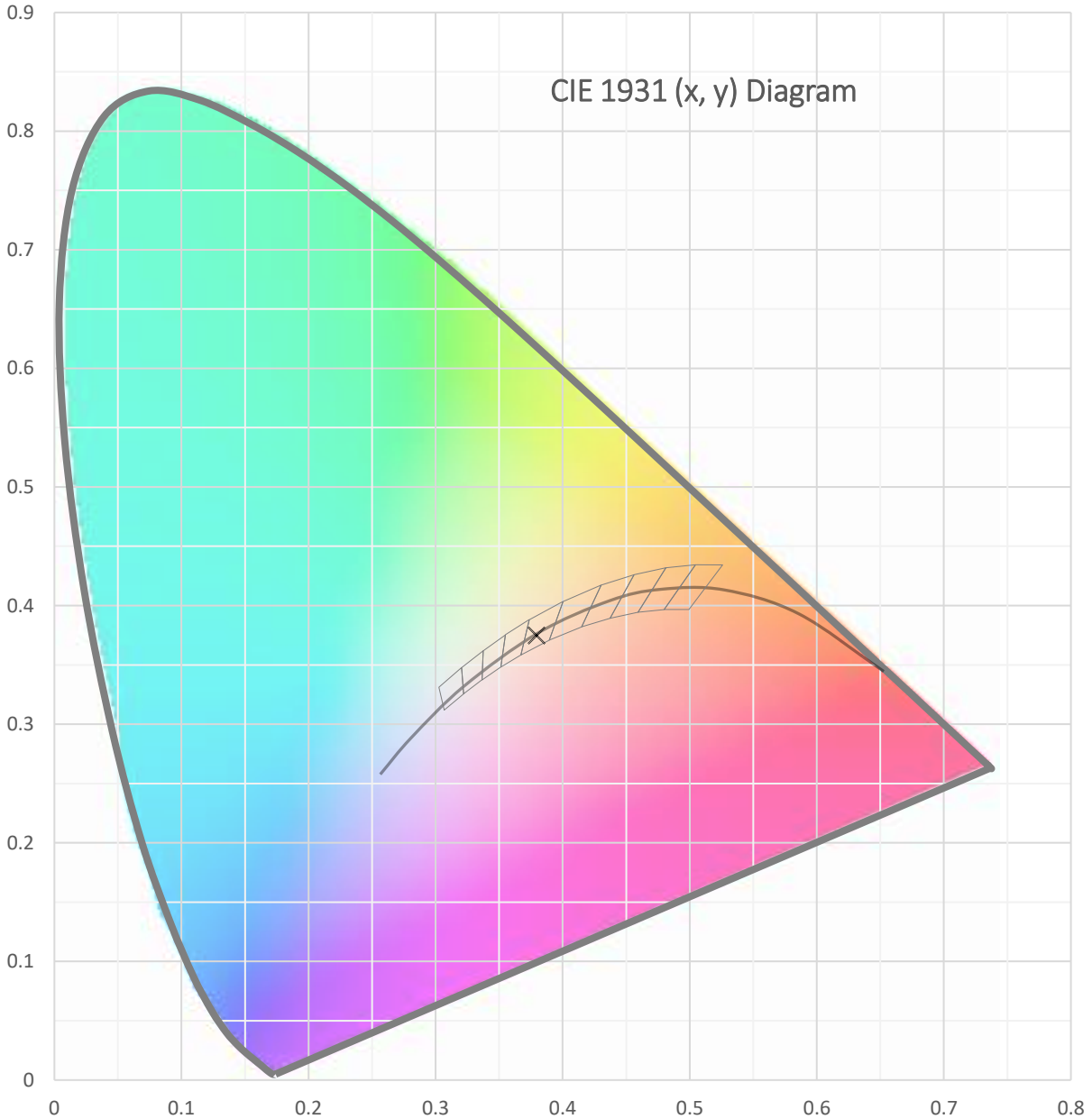
Precision Architectural Lighting
4830 Timber Creek Drive
Houston, TX 77017, USA

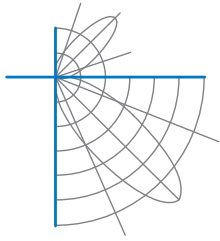
Test date: 07/08/2021

Report date: 07/09/2021

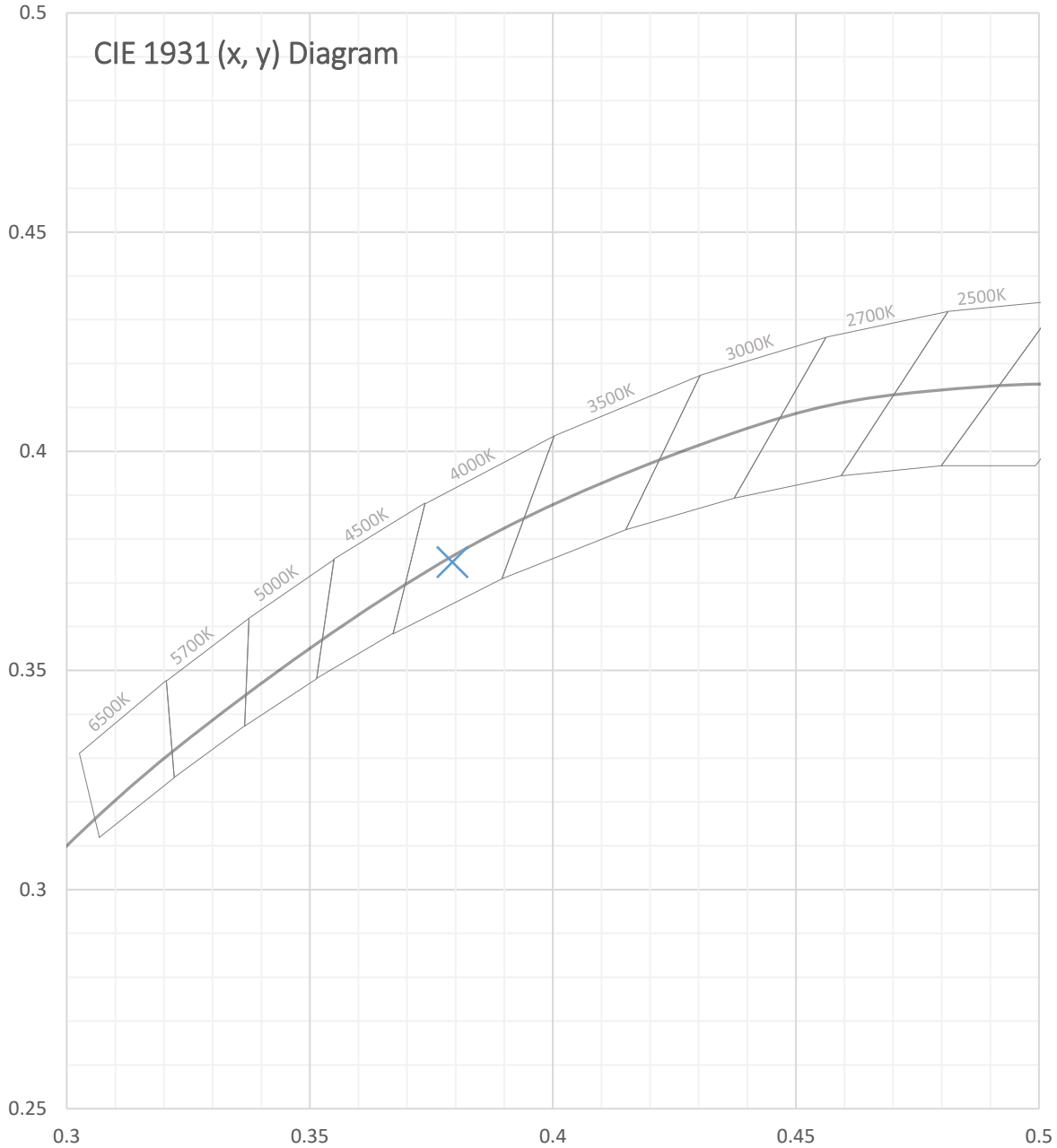


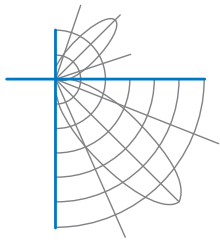
Test Report Number: LLIA001493-003B





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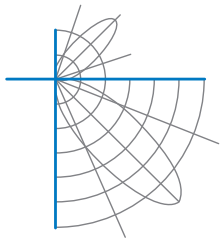


Test Report Number: LLIA001493-003B

Total Radiant Flux	11.21 W
Total Luminous Flux	3591.5 Lm
Chromaticity CIE 1931 (x, y)	(0.3794, 0.3747)
Chromaticity CIE 1976 (u', v')	(0.2252, 0.5005)
Correlated Color Temperature (CCT)	4014 K
Color Rendering Index (Ra)	85
R1	84
R2	92
R3	96
R4	83
R5	83
R6	87
R7	86
R8	67
R9	18
R10	79
R11	82
R12	62
R13	86
R14	98
TM-30: Rf	83
TM-30: Rg	95
TM-30: Rcs,h1	-11
Distance from Planckian Locus (Duv)	-0.0007
Scotopic/Photopic Ratio ‡	1.727

Electrical Data

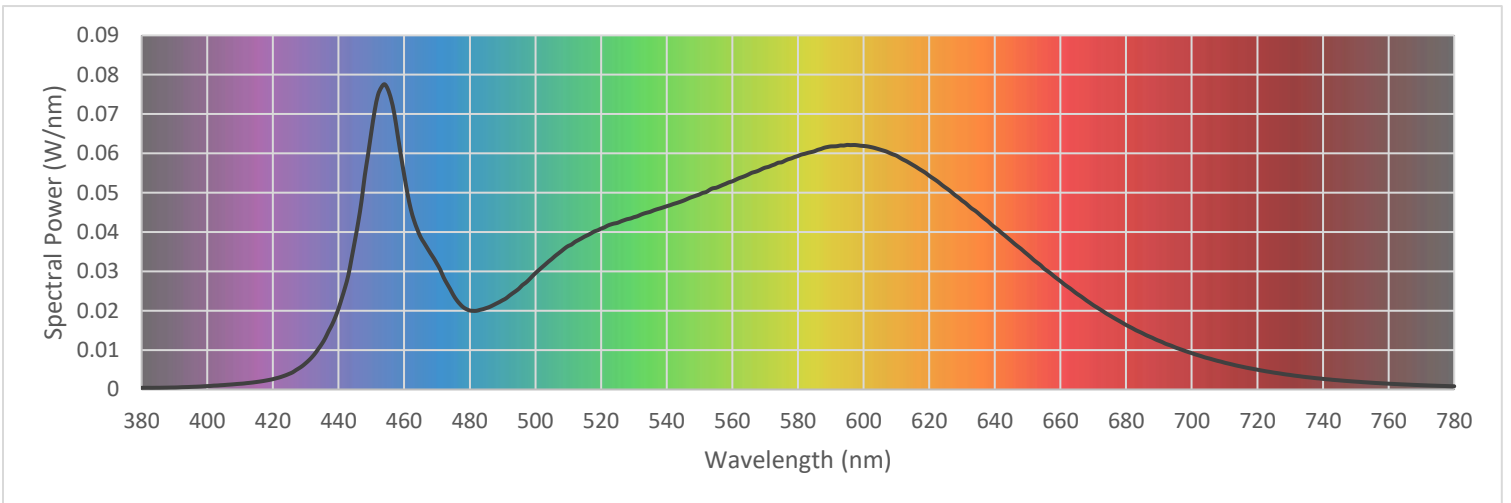
Voltage	120.0 Vac
Current	0.2297 A
Power	27.50 W
Frequency	59.99 Hz
Power Factor	0.997
Current THD	5.7 %

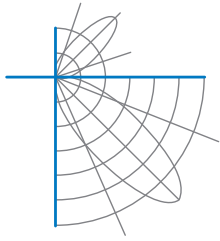


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Summary Spectral Power Distribution (wavelength - nm, spectral power - W/nm)

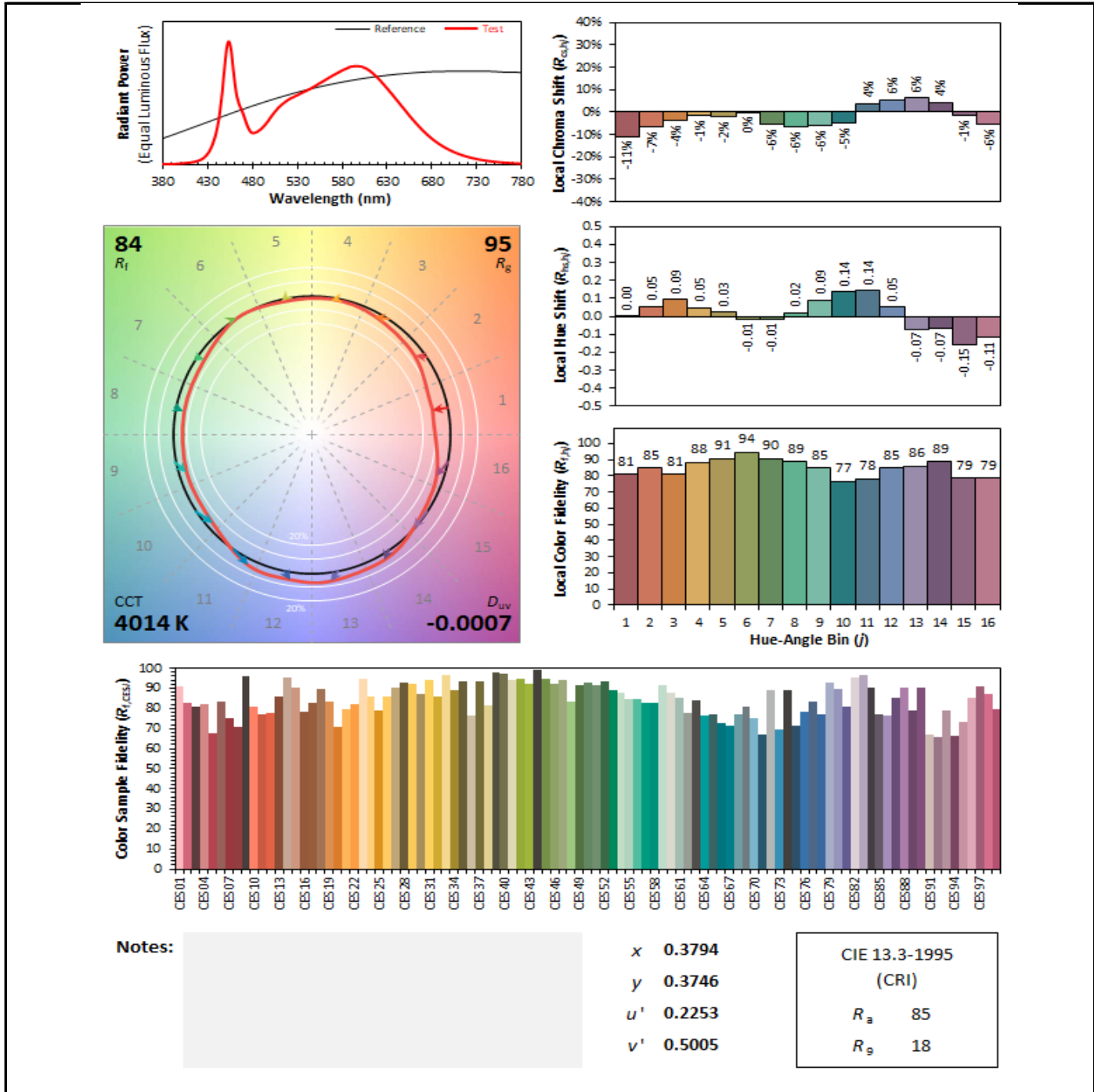
380	0.000414	480	0.020067	580	0.059340	680	0.016387
385	0.000432	485	0.020682	585	0.060536	685	0.014295
390	0.000498	490	0.022681	590	0.061770	690	0.012372
395	0.000656	495	0.025645	595	0.062156	695	0.010679
400	0.000857	500	0.029559	600	0.061890	700	0.009235
405	0.001120	505	0.033185	605	0.060977	705	0.007944
410	0.001450	510	0.036466	610	0.059436	710	0.006808
415	0.001898	515	0.038866	615	0.057069	715	0.005849
420	0.002626	520	0.040878	620	0.054329	720	0.005021
425	0.003989	525	0.042347	625	0.051292	725	0.004287
430	0.006690	530	0.043780	630	0.048013	730	0.003686
435	0.011696	535	0.045158	635	0.044742	735	0.003136
440	0.020588	540	0.046574	640	0.041197	740	0.002691
445	0.037922	545	0.047957	645	0.037757	745	0.002312
450	0.065476	550	0.049569	650	0.034293	750	0.001990
455	0.076348	555	0.051250	655	0.030703	755	0.001703
460	0.054490	560	0.052898	660	0.027535	760	0.001467
465	0.038728	565	0.054678	665	0.024348	765	0.001266
470	0.031937	570	0.056382	670	0.021419	770	0.001087
475	0.023976	575	0.057725	675	0.018817	775	0.000935
						780	0.000809

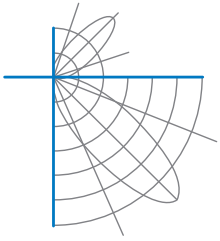




Test Report Number: LLIA001493-003B

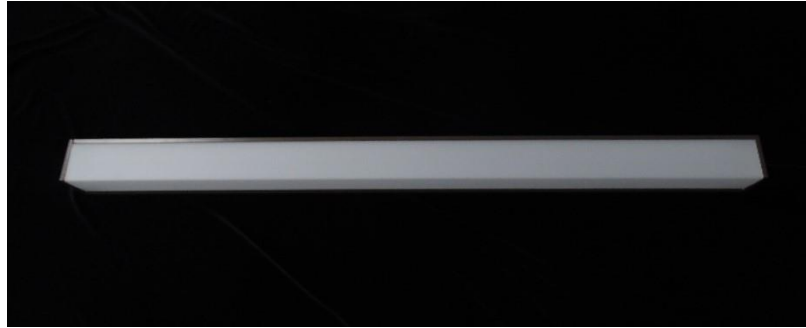
IES TM-30 Details

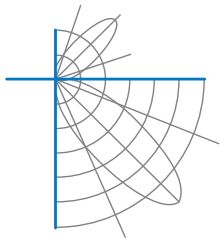




Test Report Number: LLIA001493-003B

Additional Pictures of Test Subject





Test Report Number: LLIA001493-003B

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: 25.0 °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.

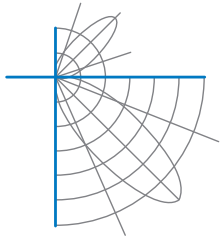
Notes: The measurements and other derived quantities contained in this report are based on the absolute data as measured.

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.



Report of Test

LLIA001493-003C

ISTM Report

Catalog Number: AS350-HO-K40-80-4-XX-LOH-FXXX-UNV-XX

Wall/ceiling mounted extruded aluminum housing, white enamel
aluminum reflector, translucent white plastic enclosure.

144 white LEDs, one Osram PrevaLED Bar board with 144 LEDs.

One Osram Optotronic OTi 30/120-277/1A0 DIM L LED driver programmed to 720mA.

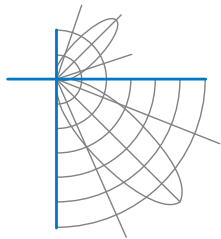


Prepared For:
Precision Architectural Lighting
4830 Timber Creek Drive
Houston, TX 77017, USA

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

Test date: 07/09/2021

Report date: 07/09/2021



Test Report Number: LLIA001493-003C

Catalog Number: AS350-HO-K40-80-4-XX-LOH-FXXX-UNV-XX

Wall/ceiling mounted extruded aluminum housing, white enamel aluminum reflector, translucent white plastic enclosure.

144 white LEDs, one Osram PrevaLED Bar board with 144 LEDs.

One Osram Optotronic OTi 30/120-277/1A0 DIM L LED driver programmed to 720mA.

Purpose of Test: To determine the in-situ temperature of the specified LED Ts point and driver Tc point. In this test, in-situ temperature refers to standard laboratory conditions with the luminaire configured in accordance with appropriate sections of UL1598-2008

Luminaire Mounting: Surface/Wall

LED Test Point: Thermocouples were attached to the LED case temperature point (Ts) as specified by report number SQETMN558901, issued 02/24/2019 by Nichia Corporation LED Testing Laboratory. The measured LED was selected according to guidance provided by DLC and ENERGY STAR for lumen maintenance projection.

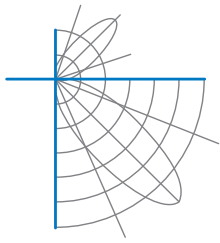
Driver Test Point: Thermocouples were attached to the driver case in the location (Tc) designated by the manufacturer.

Sample Selection: LightLab International Allentown. LLC has not participated in the selection of sample(s) being tested. Testing is performed on the understanding that the significance of the report is limited to the extent to which the sample is representative of production units.

Disclaimer: 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.

Procedure: In-situ temperature measurements were performed with the luminaire mounted vertically, on a simulated wall. The luminaire supply voltage and frequency was set according to the luminaire manufacturer's instructions. The luminaire was allowed to reach stabilization as defined in UL1598-2008 prior to reported measurements. Testing was performed in a draft-free, temperature-controlled environment with an ambient temperature of 25 +/- 5 °C.

Test Equipment: GW Instek APS-7100 AC Power Source
Xitron 2801 Power Analyzer
Fluke 52-ii Thermometer



Test Report Number: LLIA001493-003C

Catalog Number: AS350-HO-K40-80-4-XX-LOH-FXXX-UNV-XX

Wall/ceiling mounted extruded aluminum housing, white enamel aluminum reflector, translucent white plastic enclosure.

144 white LEDs, one Osram PrevaLED Bar board with 144 LEDs.

One Osram Optotronic OTi 30/120-277/1A0 DIM L LED driver programmed to 720mA.

Electrical Measurements

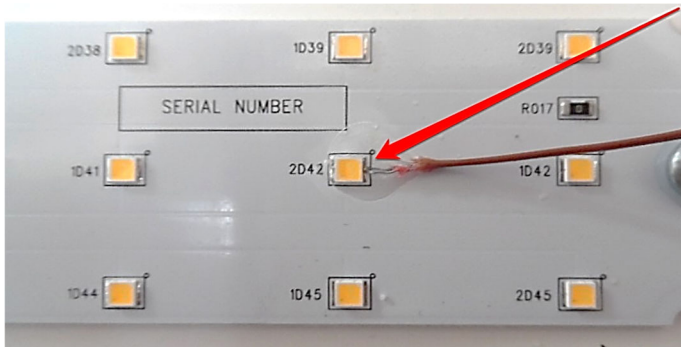
Voltage	120.0 Vac
Current	0.2300 A
Power	27.52 W
Frequency	60.0 Hz
Power Factor	0.997
Current THD	5.8 %
Driver #1 Output	0.717 Adc

Temperature Measurements

LED #1 (Ts)	42.5°C	Driver #1 (Tc)	49.1°C
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*The above temperatures have been normalized to 25°C ambient.

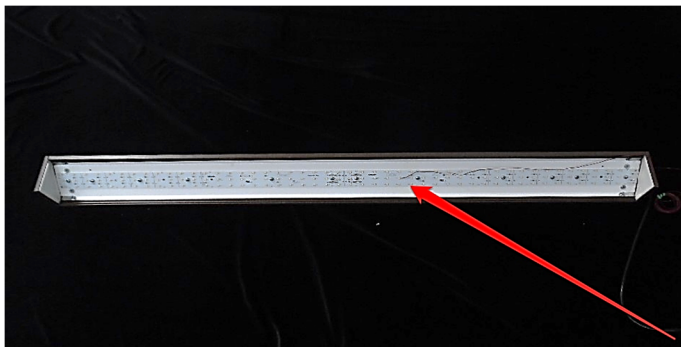
Measured Ambient Temperature (Ta) 24.1°C



LED Thermocouple Location



Driver Thermocouple Location



Selected LED Location