

Report of Test

LLIA001201-002A

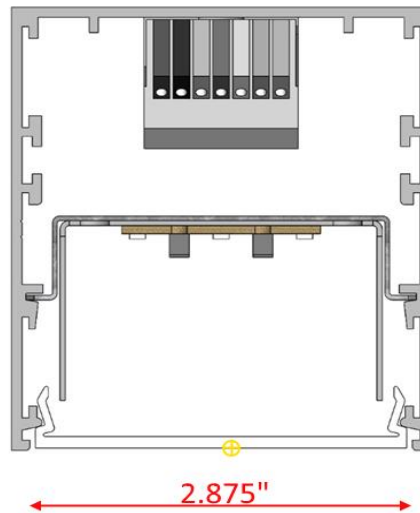
Indoor Distribution Photometry Test Report

Catalog Number: MLS3-D-HO-K35-80-XX-LOH-XXXX-120

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflector, translucent white plastic enclosure.

144 white LEDs, one Osram PrevaLED BAR LED board

One Osram Optotronic OTi 30/120-277/1A0 DIM-1 L G2 LED driver labeled as 500mA.



Prepared For:

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

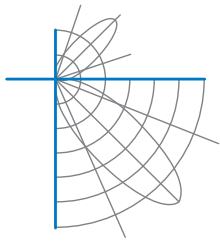
Performance Summary			
Input Voltage	120.0 V	Luminous Flux	2982.6 Lumens
Input Current	0.2424 A	Total Efficacy	103.9 Lm/W
Input Power	28.72 W	Downward Flux	2982.6 Lumens
Frequency	60.00 Hz	Downward Flux	100.0 % of Total
Power Factor	0.987		
Current THD	7.5 %		

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

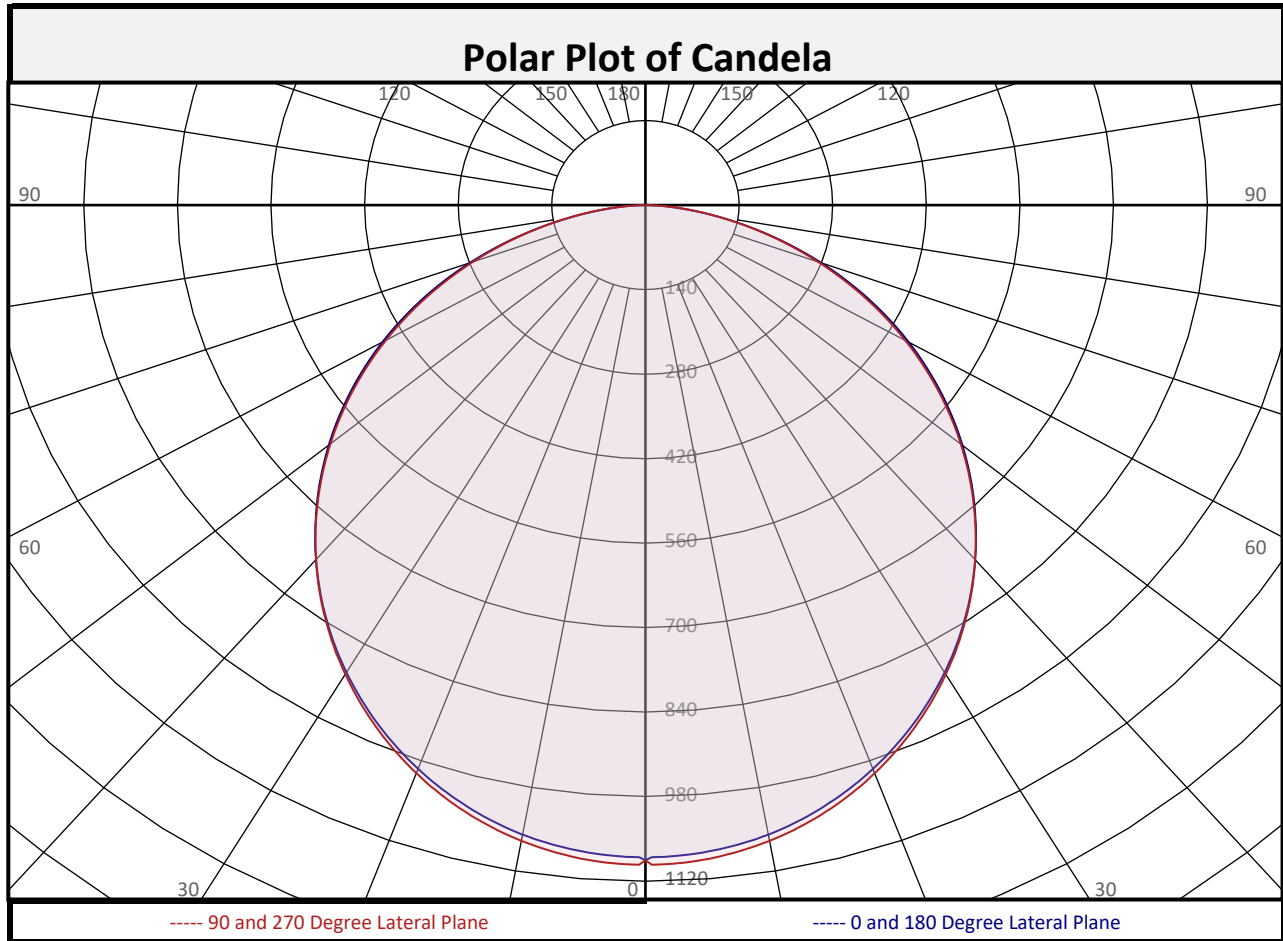
Test date: 12/20/2019

Report date: 12/23/2019

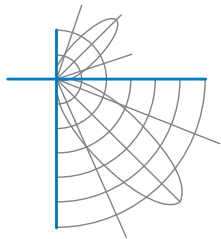
Signed: _____



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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	102.6	3.4%		90-100	0.0	0.0%		0-20	394.5	13.2%
10-20	291.9	9.8%		100-110	0.0	0.0%		0-30	832.1	27.9%
20-30	437.6	14.7%		110-120	0.0	0.0%		0-40	1353	45.4%
30-40	521.4	17.5%		120-130	0.0	0.0%		0-60	2368	79.4%
40-50	535.1	17.9%		130-140	0.0	0.0%		0-80	2931	98.3%
50-60	479.0	16.1%		140-150	0.0	0.0%		10-90	2880	96.6%
60-70	361.2	12.1%		150-160	0.0	0.0%		20-50	1494	50.1%
70-80	202.1	6.8%		160-170	0.0	0.0%		40-90	1629	54.6%
80-90	51.8	1.7%		170-180	0.0	0.0%		60-90	615.1	20.6%
0-90	2983	100.0%		90-180	0.0	0.0%		0-180	2983	100.0%

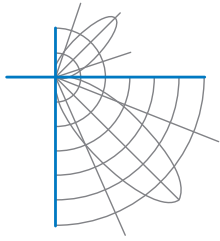


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Luminous Intensity (Candela) Table

		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	0	1086	1086	1086	1086	1086	1086	1086	1086	1086
	2.5	1079	1080	1083	1088	1092	1088	1083	1080	1079
	5	1075	1076	1079	1083	1088	1083	1079	1076	1075
	7.5	1069	1069	1071	1076	1080	1076	1071	1069	1069
	10	1059	1060	1062	1066	1070	1066	1062	1060	1059
	12.5	1047	1047	1049	1053	1056	1053	1049	1047	1047
	15	1032	1032	1034	1038	1041	1038	1034	1032	1032
	17.5	1014	1014	1016	1020	1023	1020	1016	1014	1014
	20	994	994	996	999	1002	999	996	994	994
	22.5	972	972	973	977	979	977	973	972	972
	25	948	948	949	952	954	952	949	948	948
	27.5	922	922	922	926	927	926	922	922	922
	30	894	894	894	897	898	897	894	894	894
	32.5	865	864	864	866	867	866	864	864	865
	35	833	833	832	834	835	834	832	833	833
	37.5	801	800	800	801	802	801	800	800	801
	40	766	766	765	767	766	767	765	766	766
	42.5	731	731	730	731	730	731	730	731	731
	45	694	695	693	694	693	694	693	695	694
	47.5	657	657	656	655	655	655	656	657	657
50	618	618	617	616	615	616	617	618	618	
52.5	578	579	577	576	574	576	577	579	578	
55	538	538	536	535	533	535	536	538	538	
57.5	496	497	495	493	491	493	495	497	496	
60	454	455	452	450	448	450	452	455	454	
62.5	411	411	409	407	405	407	409	411	411	
65	367	368	365	363	361	363	365	368	367	
67.5	323	323	321	320	318	320	321	323	323	
70	279	279	277	276	274	276	277	279	279	
72.5	235	235	234	232	231	232	234	235	235	
75	191	191	191	190	189	190	191	191	191	
77.5	149	149	150	150	149	150	150	149	149	
80	109	110	111	112	111	112	111	110	109	
82.5	72	74	76	77	77	77	76	74	72	
85	41	43	45	46	46	46	45	43	41	
87.5	17	18	18	18	18	18	18	18	17	
90	0	0	1	1	1	1	1	0	0	



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		Lateral (C-Plane) Angles								
		0	22.5	45	67.5	90	112.5	135	157.5	180
Vertical (Gamma) Angles	90	0	0	1	1	1	1	1	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	



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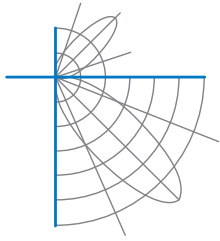
Coefficients of Utilization/Room Utilization - Zonal Cavity Method																						
Effective Floor Cavity Reflectance 0.20																						
RC	80					70					50				30				10			0
RW	70	50	30	10		70	50	30	10		50	30	10		50	30	10		50	30	10	0
RCR																						
0	119	119	119	119		116	116	116	116		111	111	111		106	106	106		102	102	102	100
1	109	104	100	96		106	102	98	94		98	94	91		94	91	89		90	88	86	84
2	99	91	84	78		96	89	83	77		85	80	75		82	78	74		79	75	72	70
3	90	80	72	65		88	78	71	64		75	69	63		72	67	62		70	65	61	59
4	83	71	62	55		80	69	61	55		67	60	54		64	58	53		62	57	53	50
5	76	63	54	48		74	62	54	47		60	52	47		58	51	46		56	50	46	44
6	70	57	48	41		68	56	47	41		54	47	41		52	46	41		51	45	40	38
7	65	52	43	37		63	51	42	37		49	42	36		48	41	36		46	40	36	34
8	61	47	39	33		59	46	38	33		45	38	32		44	37	32		43	37	32	30
9	57	43	35	29		55	43	35	29		41	34	29		40	34	29		39	33	29	27
10	53	40	32	27		52	39	32	27		38	31	27		37	31	26		37	31	26	25

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	30.2	7.36	7.38	
8.0	17.0	9.82	9.84	
10.0	10.9	12.27	12.31	
12.0	7.5	14.73	14.77	
14.0	5.5	17.18	17.23	
16.0	4.2	19.63	19.69	

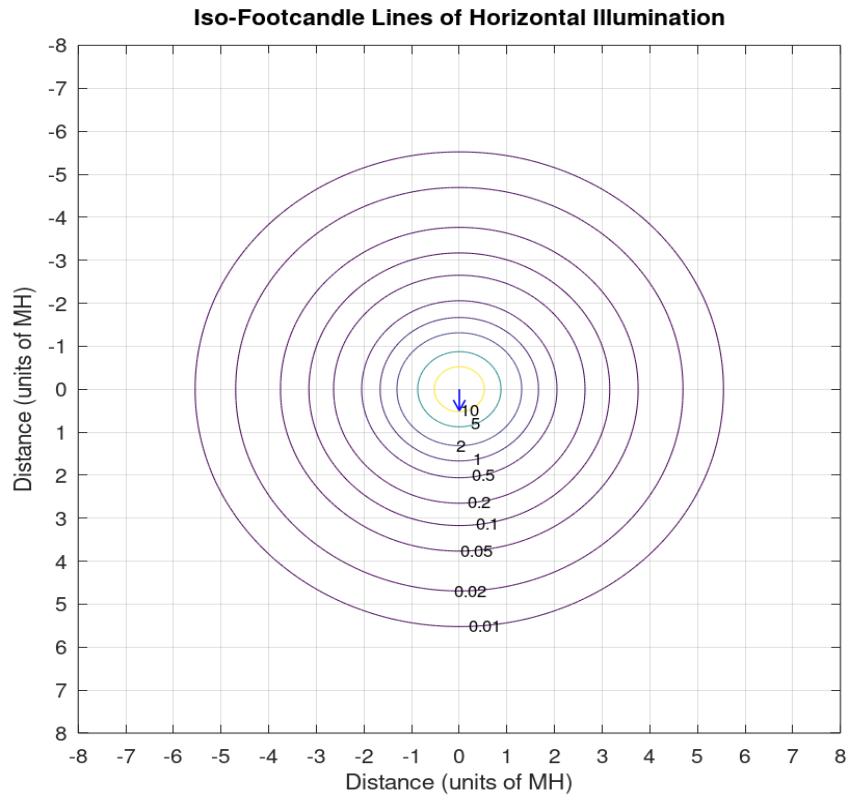
Average Luminance (cd/m ²)			
	0 deg Plane	45 deg Plane	90 deg Plane
0	12452	12452	12452
45	11264	11249	11238
55	10756	10722	10665
65	9974	9916	9811
75	8475	8452	8370
85	5426	5936	6035

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

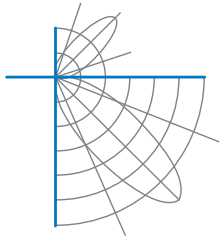


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Iso-Illuminance Plot



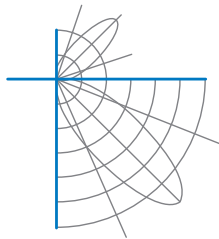
The isofootcandle values shown in the plot above are based on a mounting height of $h = 8.0$ feet. Grid values show multiples of mounting height. The isoilluminance contour lines are expressed in units of footcandles. The values expressed are based on the direct light from a single unit without the contribution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



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Additional Pictures of Test Subject





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Test Distance 9.5 m
Ambient Temperature 24.9 °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-79-19 and ANSI C82.77-10:2014. 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.

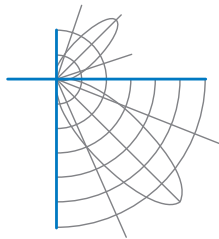
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

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

LLIA001201-002B

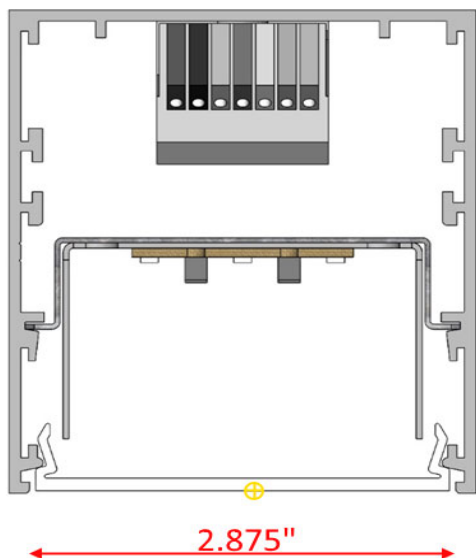
Integrating Sphere Report

Catalog Number: MLS3-D-HO-K35-80-XX-LOH-XXXX-120

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflector, translucent white plastic enclosure.

144 white LEDs, one Osram PrevaLED BAR LED board

One Osram Optotronic OTi 30/120-277/1A0 DIM-1 L G2 LED driver labeled as 500mA.



Performance Summary

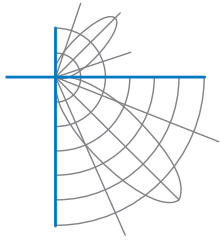
Voltage	120.0 Vac
Current	0.2426 A
Power	28.68 W
Frequency	59.99 Hz
Power Factor	0.985
Current THD	7.4 %
Total Luminous Flux	2992.2 lm
Efficacy	104.3 lm/W
Chromaticity (x,y)	(0.4055, 0.3943)
(u',v')	(0.2344, 0.5128)
Duv	0.0015
CCT	3524 K
CRI (Ra)	82
R9	4
TM-30: Rf	81
TM-30: Rg	98

Prepared For:

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

Test date: 12/19/2019

Report date: 12/23/2019



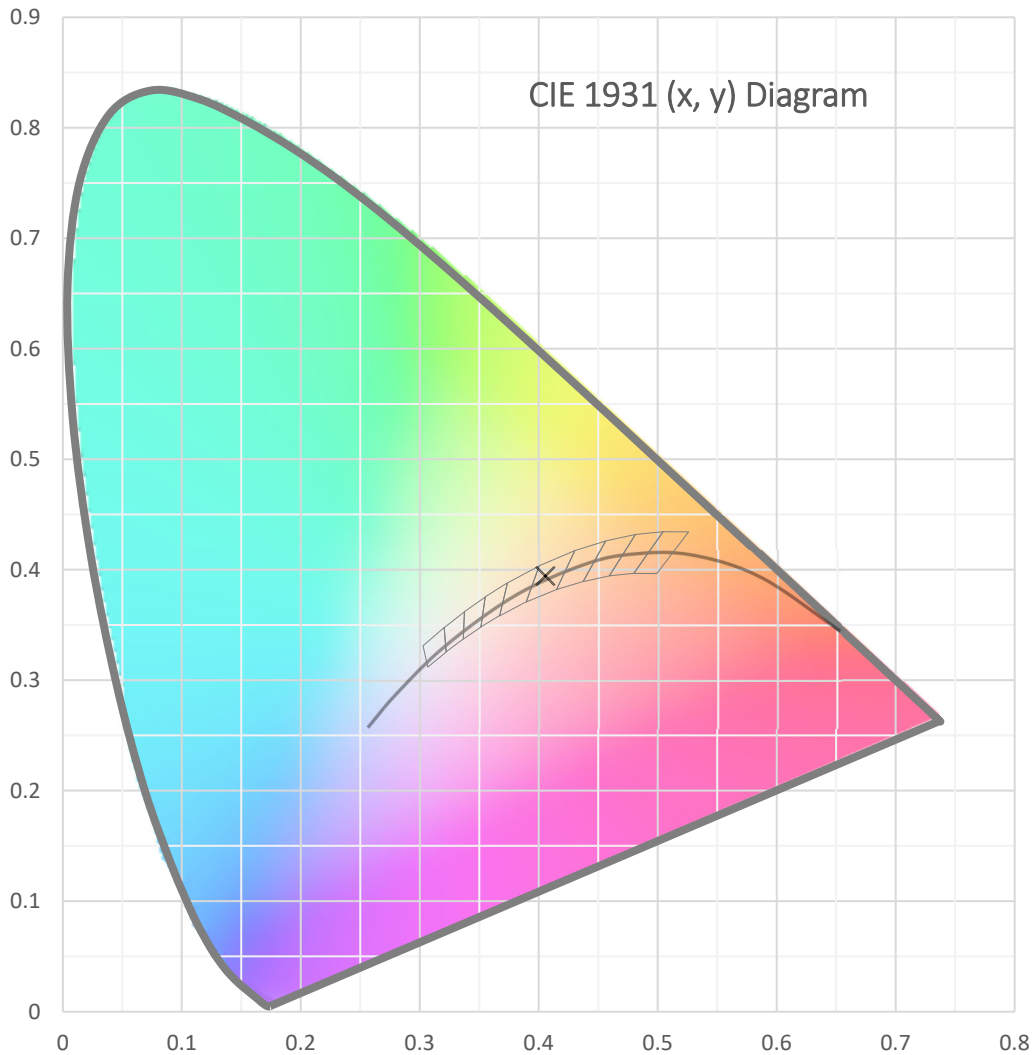
Test Report Number: LLIA001201-002B

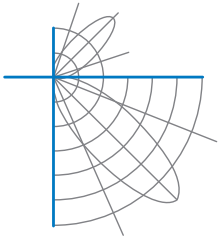
Catalog Number: MLS3-D-HO-K35-80-XX-LOH-XXXX-120

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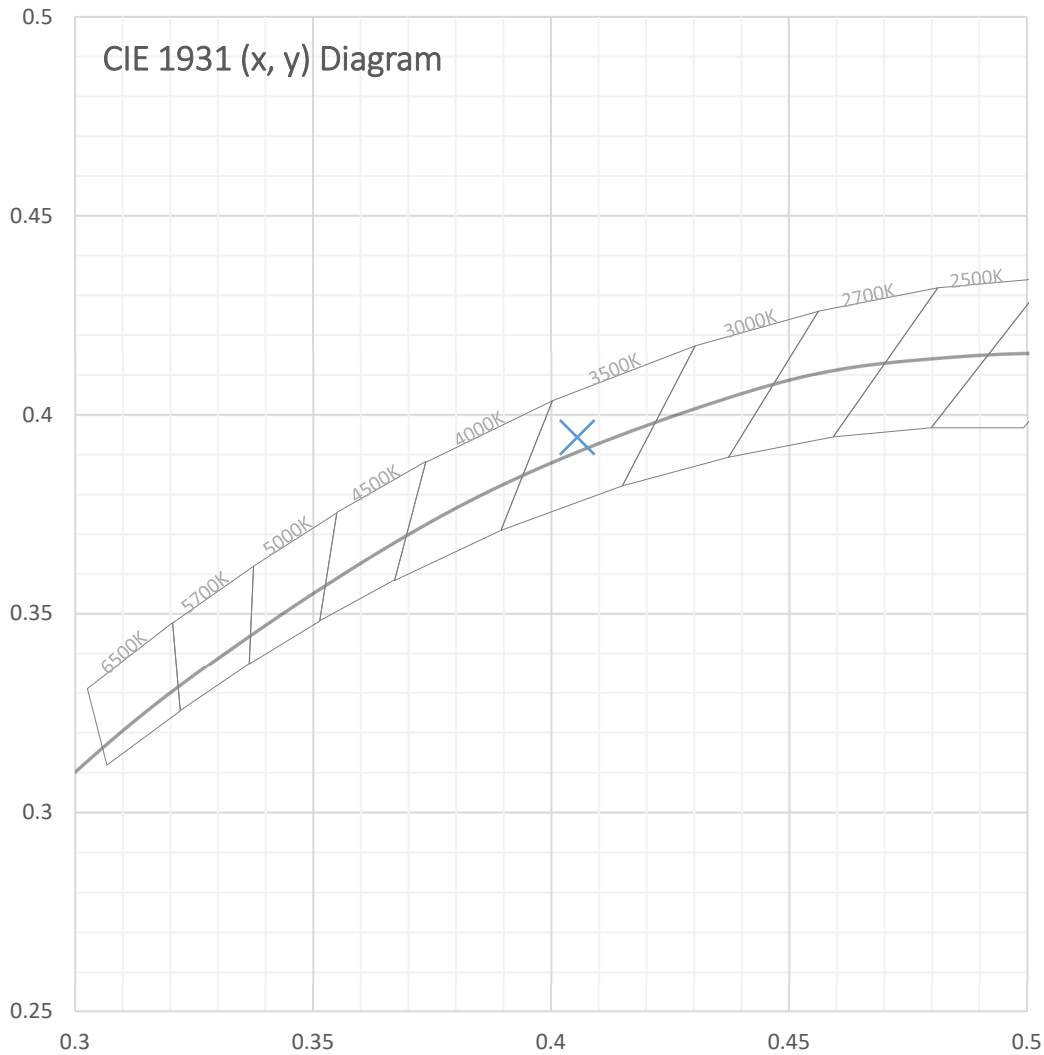
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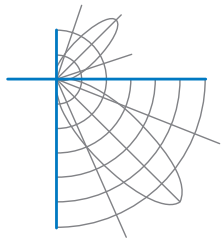
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Spectral Data	Total Radiant Flux	8.889 W
	Total Luminous Flux	2992.2 Lm
	Chromaticity CIE 1931 (x, y)	(0.4055, 0.3943)
	Chromaticity CIE 1976 (u', v')	(0.2344, 0.5128)
	Correlated Color Temperature (CCT)	3524 K
	Color Rendering Index (Ra)	82
	R1	81
	R2	87
	R3	93
	R4	83
	R5	80
	R6	83
	R7	86
	R8	62
	R9	4
	R10	69
	R11	83
	R12	59
	R13	82
	R14	96
	TM-30: Rf	81
	TM-30: Rg	98
	Distance from Planckian Locus (Duv)	0.0015
	Scotopic/Photopic Ratio *	1.483

Electrical Data

Voltage	120.0 Vac
Current	0.2426 A
Power	28.68 W
Frequency	59.99 Hz
Power Factor	0.985
Current THD	7.4 %



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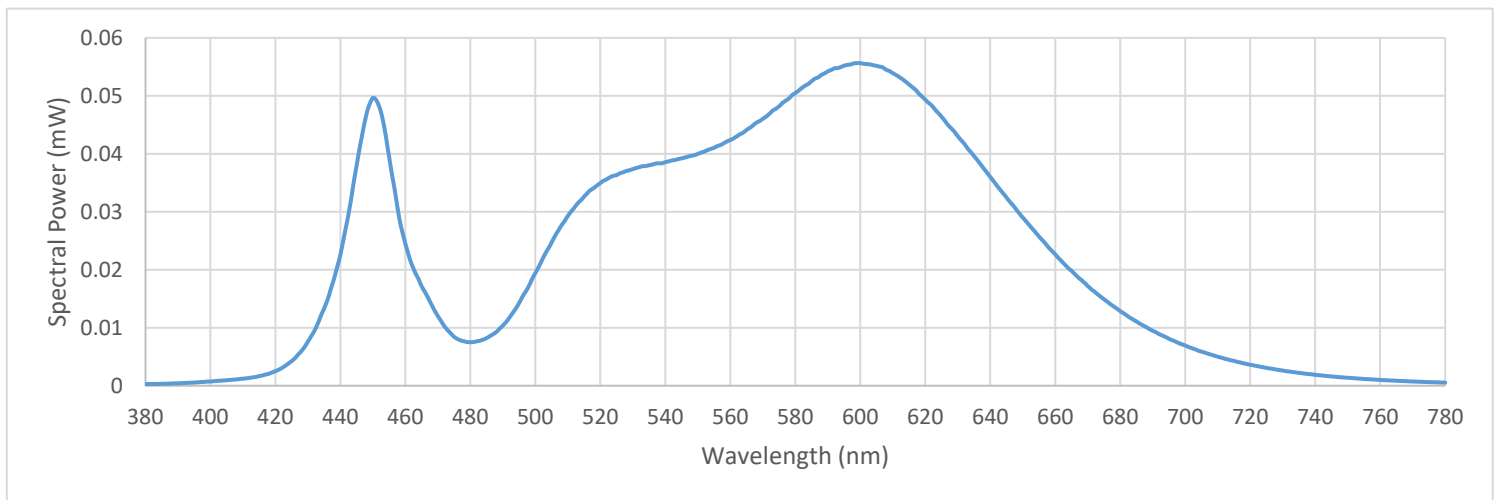
Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflector, translucent white plastic enclosure.

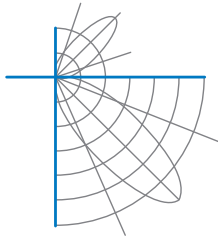
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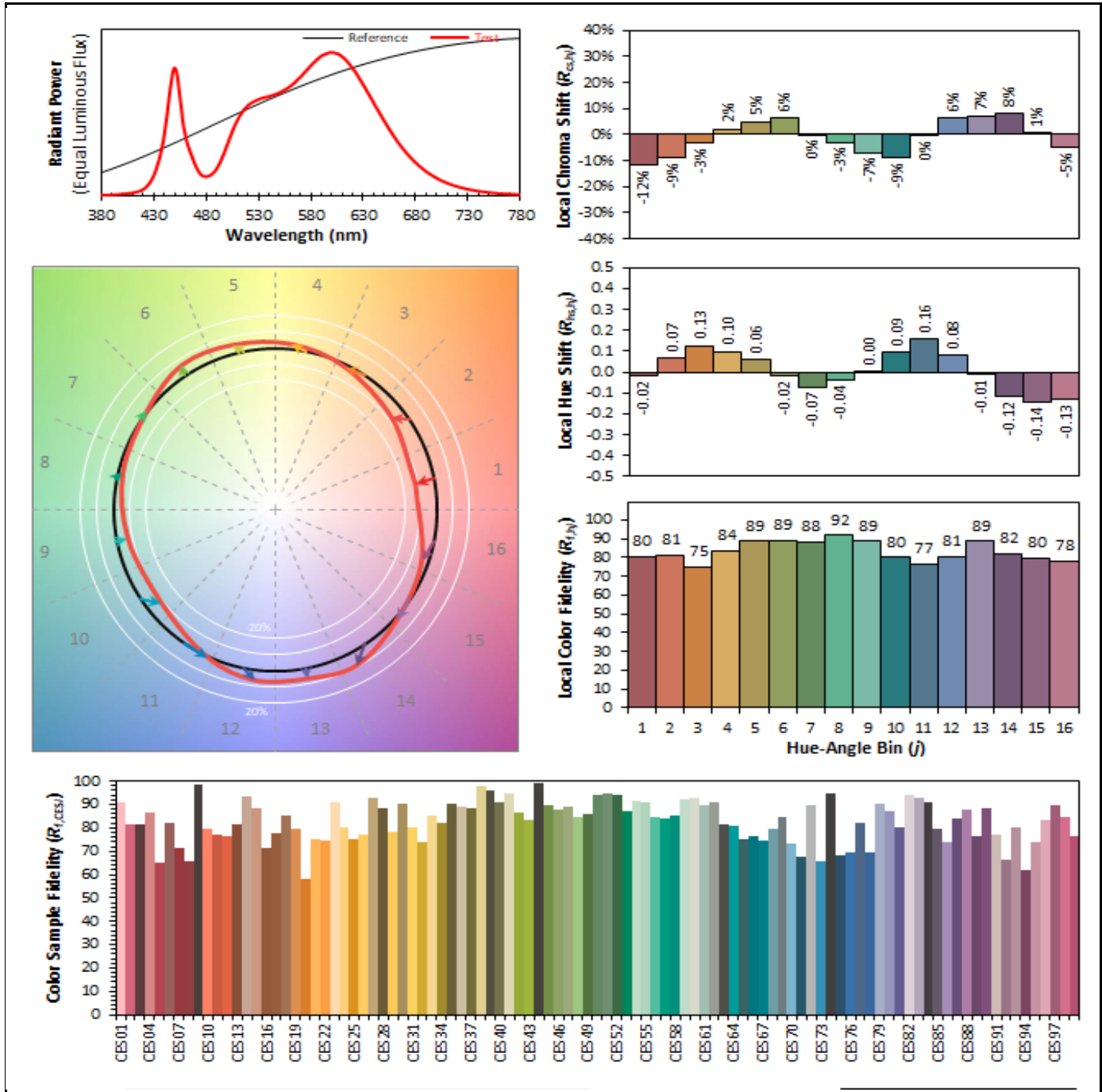
Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

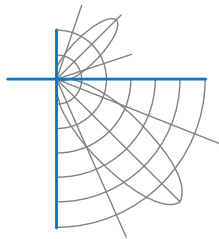
380	0.000299	480	0.007514	580	0.050500	680	0.012873
385	0.000334	485	0.008224	585	0.052548	685	0.011083
390	0.000435	490	0.010397	590	0.054239	690	0.009486
395	0.000558	495	0.014286	595	0.055217	695	0.008104
400	0.000742	500	0.019473	600	0.055646	700	0.006943
405	0.000958	505	0.024720	605	0.055167	705	0.005896
410	0.001233	510	0.029314	610	0.053905	710	0.005015
415	0.001656	515	0.032621	615	0.051972	715	0.004279
420	0.002530	520	0.034978	620	0.049335	720	0.003630
425	0.004266	525	0.036337	625	0.046397	725	0.003082
430	0.007635	530	0.037375	630	0.043042	730	0.002622
435	0.013378	535	0.038042	635	0.039612	735	0.002225
440	0.022624	540	0.038576	640	0.036005	740	0.001889
445	0.038076	545	0.039231	645	0.032465	745	0.001616
450	0.049667	550	0.040011	650	0.029009	750	0.001378
455	0.039408	555	0.041041	655	0.025721	755	0.001180
460	0.024524	560	0.042383	660	0.022665	760	0.001013
465	0.017157	565	0.044141	665	0.019817	765	0.000867
470	0.012024	570	0.046050	670	0.017210	770	0.000742
475	0.008433	575	0.048205	675	0.014920	775	0.000635
						780	0.000545





IES TM-30 Details





Test Report Number: LLIA001201-002B

Catalog Number: MLS3-D-HO-K35-80-XX-LOH-XXXX-120

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144 white LEDs, one Osram PrevaLED BAR LED board

One Osram Optotronic OTi 30/120-277/1A0 DIM-1 L G2 LED driver labeled as 500mA.

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: 24.7 °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,
ANSI C82-77-10:2014, TM-30-15

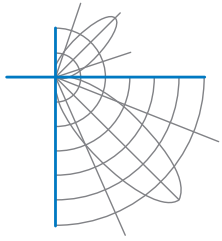
Significance: The laboratory has not participated in the selection of samples to be tested.
All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.

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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Report of Test

LLIA001201-002C

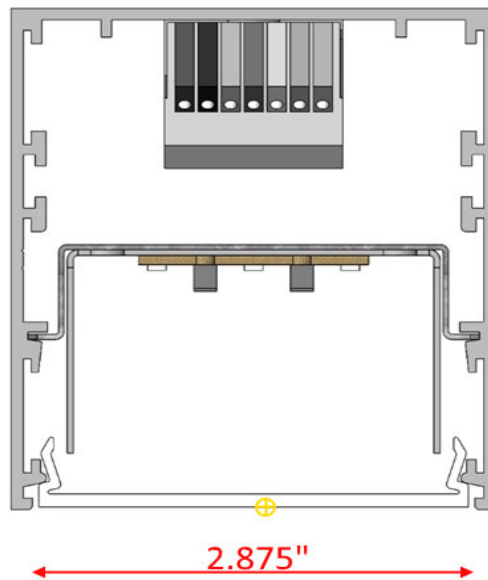
ISTM Report

Catalog Number: MLS3-D-HO-K35-80-XX-LOH-XXXX-120

Pendant mounted, extruded aluminum housing, formed white enamel aluminum reflector, translucent white plastic enclosure.

144 white LEDs, one Osram PrevaLED BAR LED board

One Osram Optotronic OTi 30/120-277/1A0 DIM-1 L G2 LED driver labeled as 500mA.

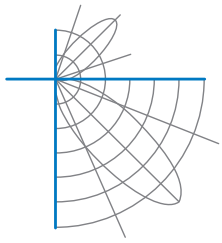


Prepared For:
Precision Architectural Lighting
4830 Timber Creek Drive
Houston, TX 77017, USA

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

Test date: 12/20/2019

Report date: 12/23/2019



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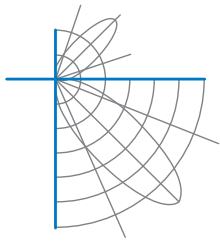
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- Purpose of Test:** To determine the in-situ temperature of the specified LED Ts point and driver Tc point. In this test, in-situ temperature refers to standard laboratory conditions with the luminaire configured in accordance with appropriate sections of UL1598-2008
- Luminaire Mounting:** Pendant
- LED Test Point:** Thermocouples were attached to the LED case temperature point (Ts) as specified by report number SQETMR704203, issued 06/04/2018 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 suspended from a simulated ceiling. 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



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Electrical Measurements

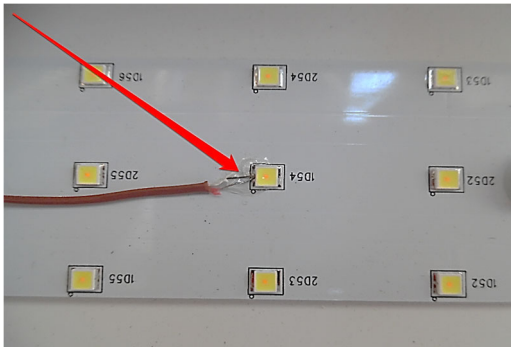
Voltage	120.0 Vac
Current	0.2432 A
Power	28.83 W
Frequency	60.0 Hz
Power Factor	0.988
Current THD	7.4 %
Driver #1 Output	0.499 Adc

Temperature Measurements

LED #1 (Ts)	47.0°C	Driver #1 (Tc)	41.7°C
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*The above temperatures have been normalized to 25°C ambient.

Measured Ambient Temperature (Ta) 24.3°C



LED Thermocouple Location



Driver Thermocouple Location



Selected LED Location