LightLab INTERNATIONAL ALLENTOWN LLC

NVLAP TESTING Lab Code: 201079-0

Report of Test

LLIA000824-019A

Catalog Number: 3-694-24 Echo Ceiling
Ceiling mounted, formed steel housing, white patterned fabric enclosure
with translucent plastic liner, translucent white plastic lower enclosure.
60 white LEDs, Two Harvard Engineering LEDENG-152-930-NL LED boards with 30 LEDs each.
Two LTF DA12W350C1834D010-0014 dimming LED drivers.
120.0Vac, 60.00Hz, 0.2200A, 25.73W, 0.975PF, 9.2%THD(i)

Performance Summary

Total Light Output	1277	lm
Luminaire Power	25.7	W
Luminous Efficacy	49.7	lm/W

PREPARED FOR : Oxygen Lighting, 201 Railhead Road, Fort Worth, TX 76106, USA

USA west coast LightLab International, LLC, 24825 N. 16th Avenue, Suite 125, Phoenix, AZ, 85085, Ph : +1 623-434-1499, Fx : +1 623-434-1492, www.lightlabint.com

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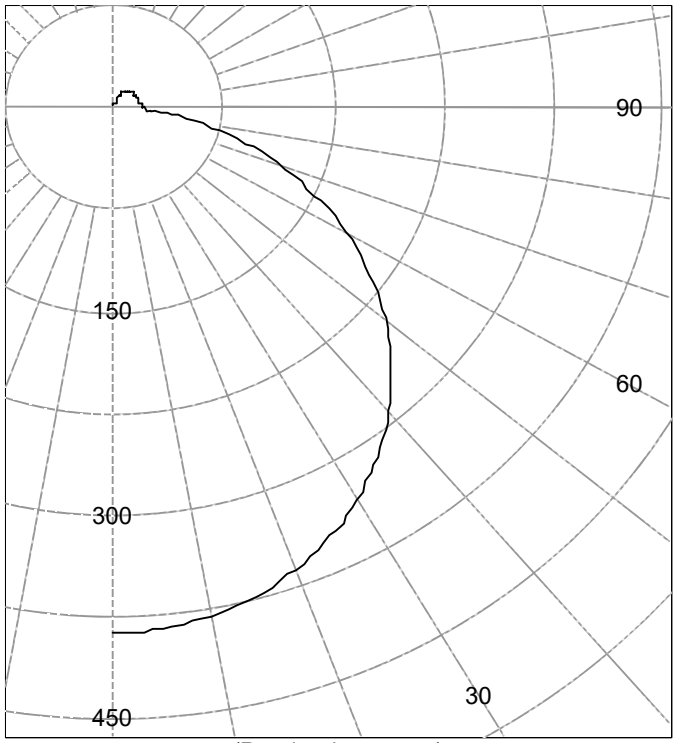
Legend: All planes - Solid (cd)



(Rotational symmetry)

INTENSITY SUMMARY (cd)

Gamma	All Planes	Flux (lm)	Gamma	C0	Flux (lm)
0	386		90	20	
5	385	37	95	19	21
10	381		100	19	
15	373	105	105	18	19
20	362		110	18	
25	349	161	115	18	18
30	333		120	18	
35	314	196	125	17	15
40	292		130	17	
45	268	206	135	16	12
50	241		140	15	
55	213	190	145	14	9
60	183		150	13	
65	151	149	155	12	6
70	118		160	11	
75	86	91	165	9	3
80	56		170	7	
85	32	37	175	3	0
90	20		180	1	

AVERAGE LUMINANCE (cd / m^2)

Gamma	C0
45.0	3040
55.0	2747
65.0	2337
75.0	1728
85.0	941

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	%Lamp	%Luminaire
0-30	303	N / A	23.7
0-40	499	N / A	39.1
0-60	896	N / A	70.2
0-90	1173	N / A	91.9
40-90	674	N / A	52.8
60-90	277	N / A	21.7
90-180	104	N / A	8.1
0-180	1277	N / A	100.0

Total Light Output = 1,277 lm

Spacing Criterion:	0-180	1.3
Spacing Criterion:	90-270	1.3

Signed: Michael L. Grather

Authorized Signatory

Date of test 10-Aug-2017
Date of report 14-Aug-2017

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Test Report No. LLIA000824-019A

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120.0Vac, 60.00Hz, 0.2200A, 25.73W, 0.975PF, 9.2%THD(i)

Intensity (cd) and Flux (lm) data

Gamma	Intensity	Flux	Gamma	Intensity	Flux
0.0	386		90.0	20	
2.5	386		92.5	19	
5.0	385	37	95.0	19	
7.5	383		97.5	19	21
10.0	381		100.0	19	
12.5	377		102.5	18	
15.0	373	105	105.0	18	
17.5	368		107.5	18	19
20.0	362		110.0	18	
22.5	356		112.5	18	
25.0	349	161	115.0	18	
27.5	341		117.5	18	18
30.0	333		120.0	18	
32.5	323		122.5	17	
35.0	314	196	125.0	17	
37.5	303		127.5	17	15
40.0	292		130.0	17	
42.5	280		132.5	16	
45.0	268	206	135.0	16	
47.5	255		137.5	16	12
50.0	241		140.0	15	
52.5	227		142.5	15	
55.0	213	190	145.0	14	
57.5	198		147.5	14	9
60.0	183		150.0	13	
62.5	167		152.5	13	
65.0	151	149	155.0	12	
67.5	135		157.5	12	6
70.0	118		160.0	11	
72.5	102		162.5	10	
75.0	86	91	165.0	9	
77.5	71		167.5	8	3
80.0	56		170.0	7	
82.5	42		172.5	5	
85.0	32	37	175.0	3	
87.5	24		177.5	2	0
90.0	20		180.0	1	

Test Number: LLIA000824-019A

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Coefficients Of 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
0	117	117	117	117	113	113	113	113	107	107	107	100	100	100	95	95	95	92
1	106	101	97	93	103	98	94	90	92	89	86	87	84	82	82	80	78	76
2	96	88	81	75	93	85	79	73	80	75	70	76	71	68	72	68	65	62
3	88	77	69	62	84	75	67	61	71	64	59	67	61	57	63	59	55	52
4	80	68	59	52	77	66	58	51	62	55	50	59	53	48	56	51	47	44
5	74	61	51	45	71	59	50	44	56	48	43	53	47	42	50	45	40	38
6	68	54	45	39	65	53	45	38	50	43	37	48	41	36	46	40	35	33
7	63	49	40	34	61	48	40	34	46	38	33	44	37	32	42	36	31	29
8	58	45	36	30	56	44	36	30	42	35	29	40	33	29	38	32	28	26
9	54	41	33	27	53	40	32	27	38	31	26	37	30	26	35	29	25	23
10	51	38	30	25	49	37	29	24	35	29	24	34	28	23	33	27	23	21

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	10.7	7.67	7.67
8.0	6.0	10.23	10.23
10.0	3.9	12.79	12.79
12.0	2.7	15.35	15.35
14.0	2.0	17.90	17.90
16.0	1.5	20.46	20.46

Test Report No. LLIA000824-019A

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Test Distance	9.5 m
Test Temperature	24.8 °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 C78.377:2015, ANSI C82.77-10:2014.

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.

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Report of Test

LLIA000824-019B

Integrating Sphere Report
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Performance Summary

Voltage	120.0	Vac
Current	0.2202	A
Power	25.75	W
Frequency	59.97	Hz
Power Factor	0.974	
Current THD	9.1	%
Total Luminous Flux	1293.6	lm
Efficacy	50.2	lm/W
Chromaticity (x,y)	(0.4399, 0.4047)	
(u',v')	(0.2522, 0.5221)	
Duv	-0.0001	
CCT	2956	K
CRI (Ra)	93	
R9	63	

Prepared For:
Oxygen Lighting
201 Railhead Road
Fort Worth, TX 76106, USA

Test date: 08/11/2017
Report date: 08/14/2017

Test Report Number: LLIA000824-019B

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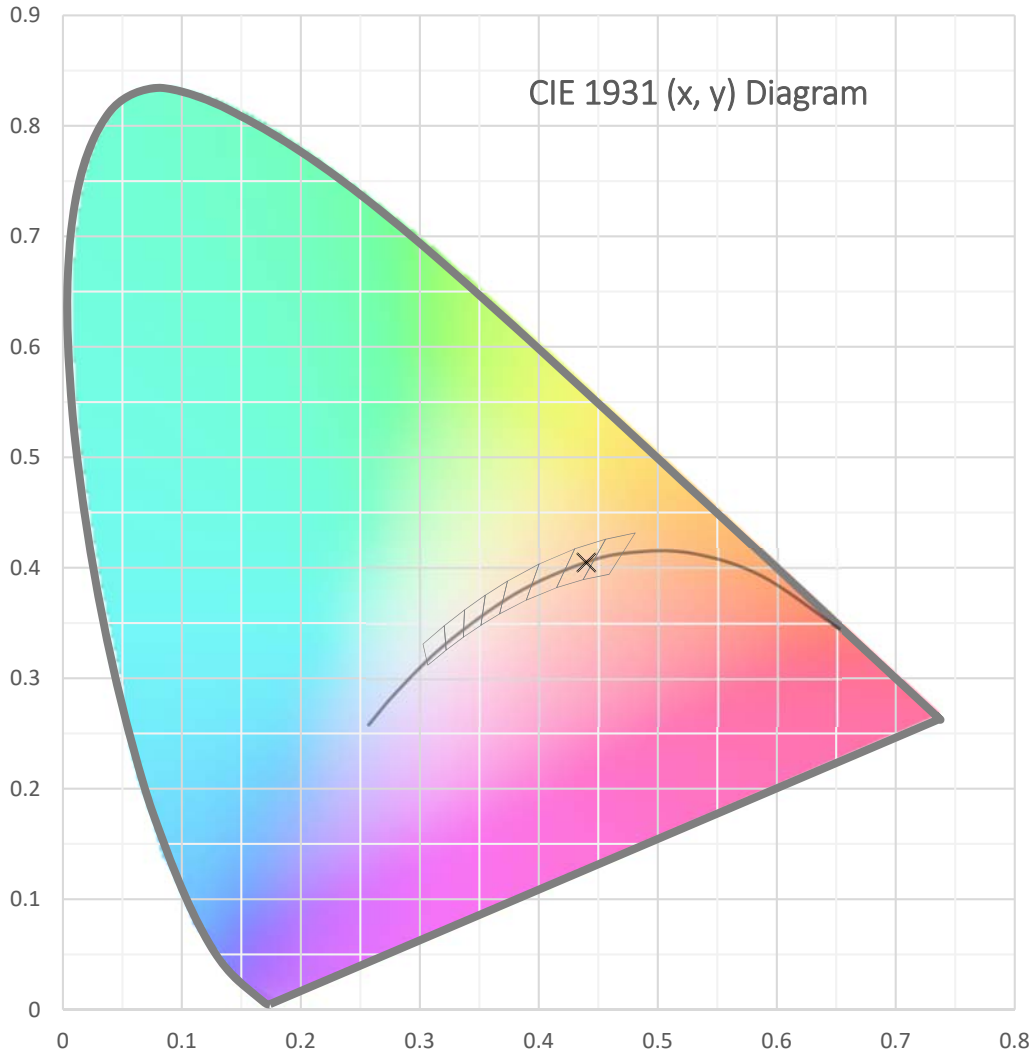

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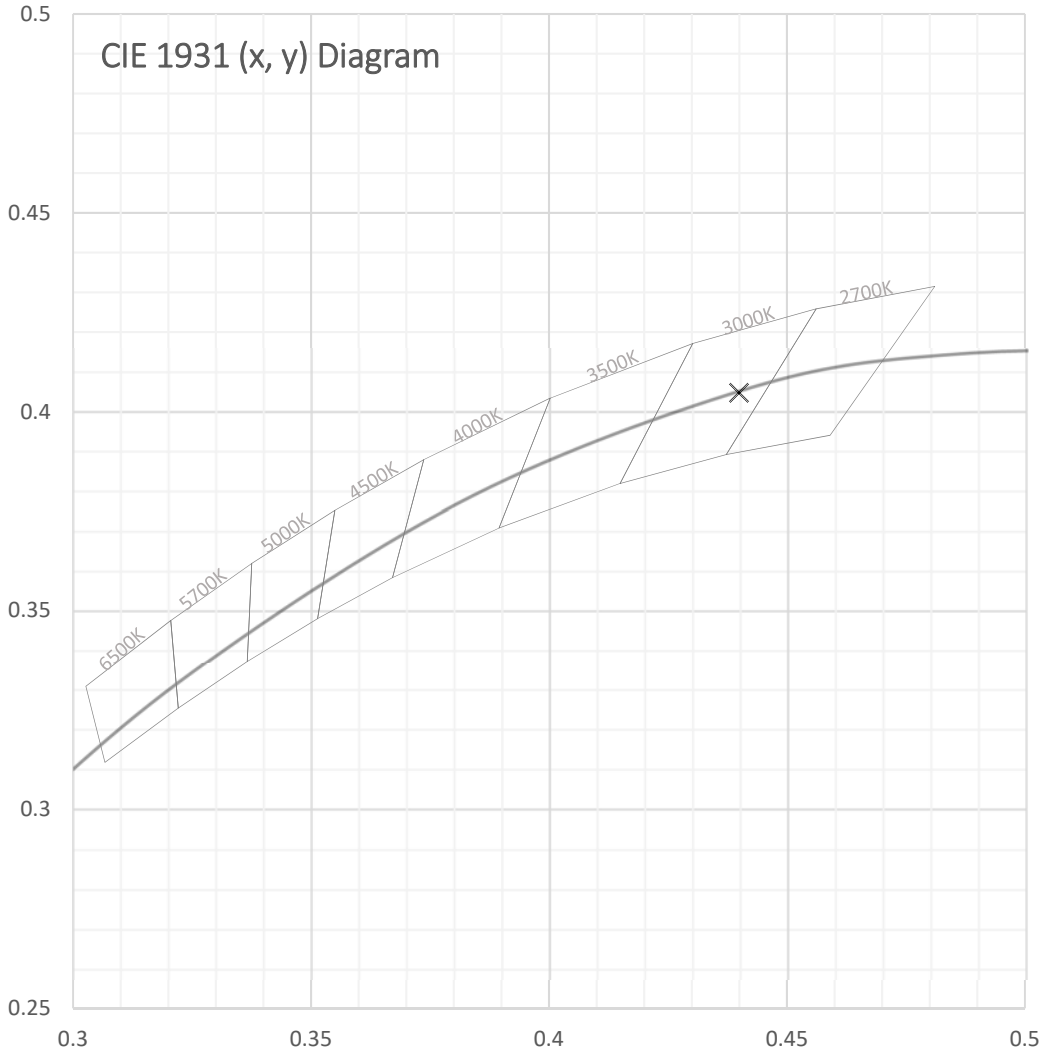

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Spectral Data	Total Radiant Flux	4.596	W
	Total Luminous Flux	1293.6	Lm
	Chromaticity CIE 1931 (x, y)	(0.4399, 0.4047)	
	Chromaticity CIE 1976 (u', v')	(0.2522, 0.5221)	
	Correlated Color Temperature (CCT)	2956	K
	Color Rendering Index (Ra)	93	
	R1	93	
	R2	95	
	R3	96	
	R4	93	
	R5	92	
	R6	94	
	R7	93	
	R8	84	
	R9	63	
	R10	88	
	R11	93	
	R12	81	
	R13	93	
	R14	97	
	Distance from Planckian Locus (Duv)	-0.0001	
	Scotopic/Photopic Ratio *	1.381	
Electrical Data			
	Voltage	120.0	Vac
	Current	0.2202	A
	Power	25.75	W
	Frequency	59.97	Hz
	Power Factor	0.974	
	Current THD	9.1	%

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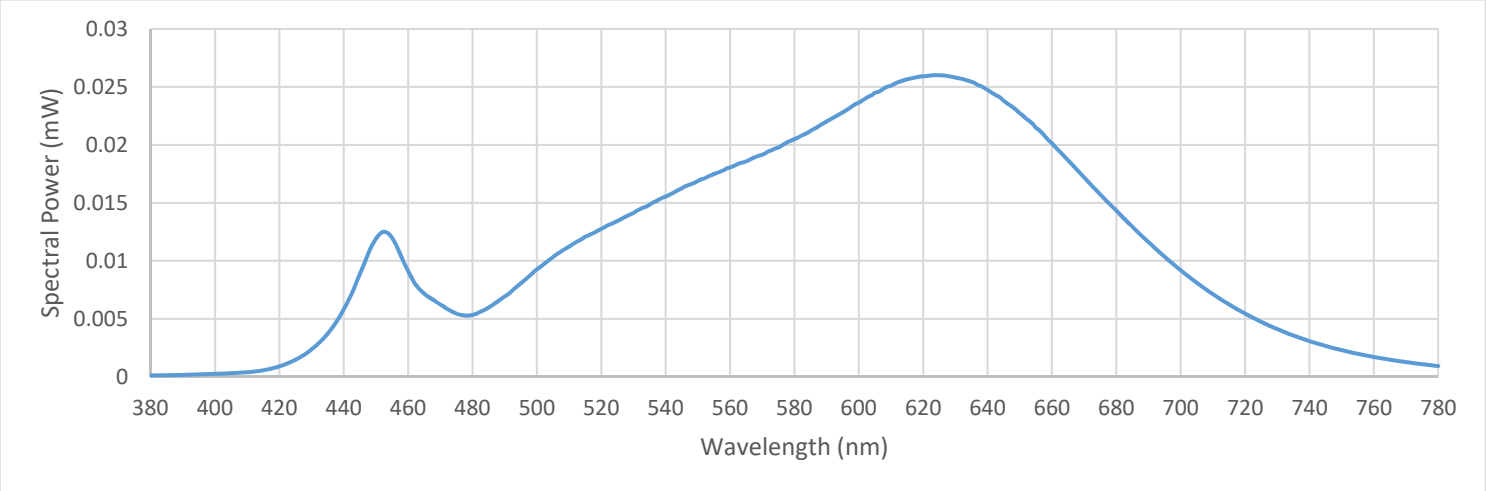
Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

380	0.000118	480	0.005345	580	0.020487	680	0.014314
385	0.000131	485	0.005977	585	0.021208	685	0.012958
390	0.000161	490	0.006936	590	0.022027	690	0.011620
395	0.000202	495	0.008042	595	0.022813	695	0.010334
400	0.000252	500	0.009260	600	0.023636	700	0.009194
405	0.000306	505	0.010321	605	0.024490	705	0.008119
410	0.000392	510	0.011216	610	0.025110	710	0.007109
415	0.000557	515	0.012079	615	0.025657	715	0.006250
420	0.000901	520	0.012748	620	0.025918	720	0.005444
425	0.001474	525	0.013427	625	0.026002	725	0.004731
430	0.002371	530	0.014117	630	0.025801	730	0.004120
435	0.003730	535	0.014843	635	0.025428	735	0.003551
440	0.005795	540	0.015544	640	0.024734	740	0.003069
445	0.008859	545	0.016252	645	0.023795	745	0.002658
450	0.011917	550	0.016883	650	0.022736	750	0.002291
455	0.011994	555	0.017496	655	0.021488	755	0.001974
460	0.009139	560	0.018051	660	0.020150	760	0.001715
465	0.007166	565	0.018569	665	0.018655	765	0.001473
470	0.006233	570	0.019154	670	0.017176	770	0.001263
475	0.005428	575	0.019768	675	0.015721	775	0.001084
						780	0.000932



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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 4π geometry
Test Temperature:	24.5 °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.

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