LightLab INTERNATIONAL ALLENTOWN LLC

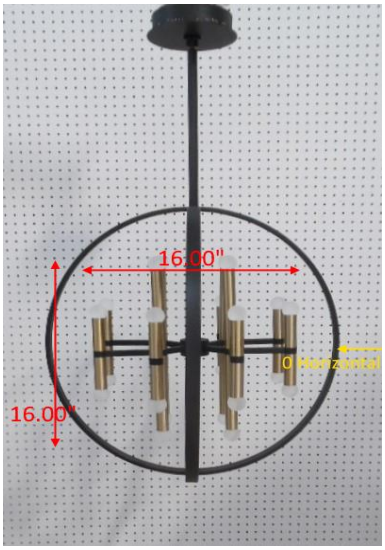
NVLAP TESTING Lab Code: 201079-0

Report of Test

LLIA001389-005A-R01*

Indoor Distribution Photometry Test Report

Catalog Number: 3-684-1540 Nero
Pendant mounted, formed steel and tubular steel housings,
frosted decorative plastic enclosures.
24 White LEDs
Two ES LD030D-CA07242-M28F LED drivers



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

Performance Summary					
Input Voltage	120.0	V	Luminous Flux	1292.7	Lumens
Input Current	0.5123	A	Total Efficacy	21.3	Lm/W
Input Power	60.79	W	Downward Flux	665.5	Lumens
Frequency	60.00	Hz	Downward Flux	51.5	% of Total
Power Factor	0.989				
Current THD	7.6	%			

*This test report supersedes test report LLIA001389-005A

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

Test date: 01/22/2021
Report date: 01/26/2021

Signed: Michael L. Grather

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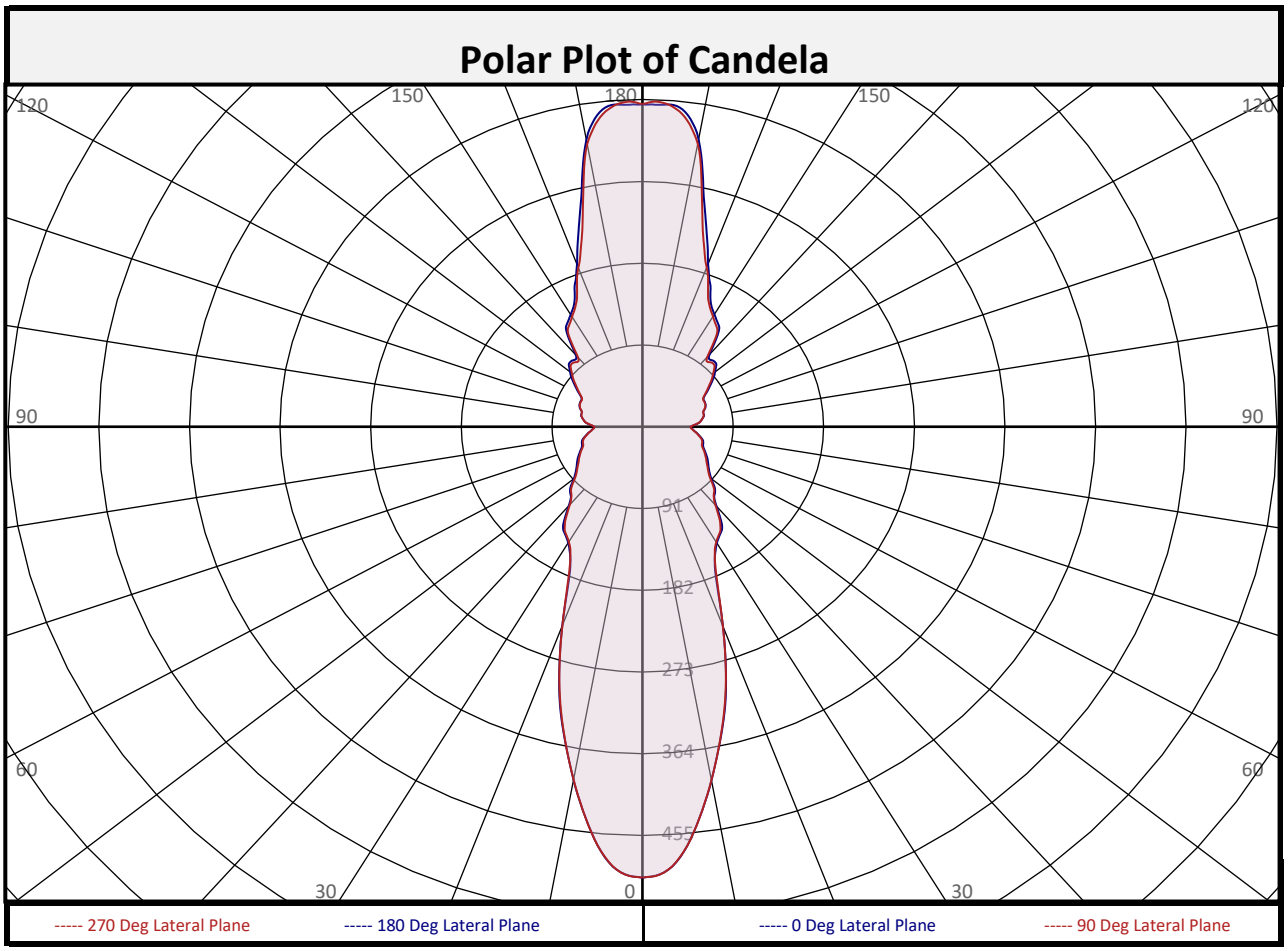

Zonal Flux Summary									
Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total
0-10	42.8	3.3%	90-100	65.5	5.1%	0-20	131.2	10.1%
10-20	88.4	6.8%	100-110	70.0	5.4%	0-30	217.4	16.8%
20-30	86.2	6.7%	110-120	72.3	5.6%	0-40	301.0	23.3%
30-40	83.6	6.5%	120-130	75.3	5.8%	0-60	458.1	35.4%
40-50	80.8	6.3%	130-140	78.3	6.1%	0-80	600.4	46.4%
50-60	76.2	5.9%	140-150	83.6	6.5%	10-90	622.7	48.2%
60-70	72.2	5.6%	150-160	79.8	6.2%	20-50	250.6	19.4%
70-80	70.1	5.4%	160-170	69.7	5.4%	40-90	364.5	28.2%
80-90	65.1	5.0%	170-180	32.8	2.5%	60-90	207.4	16.0%
0-90	665.5	51.5%	90-180	627.2	48.5%	0-180	1293	100.0%

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Luminous Intensity (Candela) Table

	Lateral (C-Plane) Angles									
Vertical (Gamma) Angles		0	22.5	45	67.5	90	112.5	135	157.5	180
	0	502	502	502	502	502	502	502	502	502
	2.5	497	497	497	497	497	497	497	497	497
	5	475	476	476	475	475	475	476	476	475
	7.5	439	439	440	439	439	439	440	439	439
	10	399	399	398	399	399	399	398	399	399
	12.5	359	358	356	358	359	358	356	358	359
	15	321	320	320	320	319	320	320	320	321
	17.5	277	282	286	282	277	282	286	282	277
	20	236	245	253	245	235	245	253	245	236
	22.5	198	212	222	213	199	213	222	212	198
	25	172	185	193	186	173	186	193	185	172
	27.5	158	165	172	166	157	166	172	165	158
	30	149	151	156	152	148	152	156	151	149
	32.5	144	141	143	141	143	141	143	141	144
	35	139	133	133	133	136	133	133	133	139
	37.5	128	127	121	125	126	125	121	127	128
	40	116	123	108	121	114	121	108	123	116
	42.5	106	118	99	117	106	117	99	118	106
	45	103	113	92	112	102	112	92	113	103
	47.5	98	108	83	108	96	108	83	108	98
	50	90	104	75	105	88	105	75	104	90
	52.5	85	100	71	101	83	101	71	100	85
	55	81	95	70	95	80	95	70	95	81
	57.5	78	89	70	88	76	88	70	89	78
	60	76	84	68	84	74	84	68	84	76
	62.5	73	81	65	81	71	81	65	81	73
	65	70	79	64	79	69	79	64	79	70
	67.5	67	77	63	77	66	77	63	77	67
	70	65	74	62	74	64	74	62	74	65
	72.5	64	73	60	73	63	73	60	73	64
	75	63	72	58	72	62	72	58	72	63
	77.5	61	71	59	71	60	71	59	71	61
	80	58	70	59	70	57	70	59	70	58
	82.5	55	69	58	68	55	68	58	69	55
	85	52	67	56	66	51	66	56	67	52
	87.5	50	64	51	63	49	63	51	64	50
	90	49	62	47	62	49	62	47	62	49

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Luminous Intensity (Candela) Table

	Lateral (C-Plane) Angles									
Vertical (Gamma) Angles		0	22.5	45	67.5	90	112.5	135	157.5	180
	90	49	62	47	62	49	62	47	62	49
	92.5	53	65	48	65	53	65	48	65	53
	95	58	68	49	68	58	68	49	68	58
	97.5	60	69	51	70	60	70	51	69	60
	100	62	71	53	71	62	71	53	71	62
	102.5	63	72	54	73	63	73	54	72	63
	105	63	73	55	74	63	74	55	73	63
	107.5	65	74	54	75	65	75	54	74	65
	110	67	76	55	76	67	76	55	76	67
	112.5	68	78	57	79	68	79	57	78	68
	115	68	82	60	82	68	82	60	82	68
	117.5	69	84	62	85	69	85	62	84	69
	120	73	87	62	88	73	88	62	87	73
	122.5	79	91	61	91	77	91	61	91	79
	125	84	95	61	96	82	96	61	95	84
	127.5	90	99	64	99	88	99	64	99	90
	130	95	100	70	100	93	100	70	100	95
	132.5	100	102	79	102	98	102	79	102	100
	135	102	106	91	106	100	106	91	106	102
	137.5	101	112	104	111	97	111	104	112	101
	140	104	118	119	117	101	117	119	118	104
	142.5	120	126	131	124	117	124	131	126	120
	145	134	135	141	134	131	134	141	135	134
	147.5	139	144	147	143	136	143	147	144	139
	150	144	152	154	151	141	151	154	152	144
	152.5	150	160	168	160	147	160	168	160	150
	155	161	170	187	169	156	169	187	170	161
	157.5	176	190	201	189	172	189	201	190	176
	160	192	214	213	211	188	211	213	214	192
	162.5	216	234	231	229	206	229	231	234	216
	165	244	254	245	248	233	248	245	254	244
	167.5	281	275	272	272	274	272	272	275	281
	170	324	319	314	311	319	311	314	319	324
	172.5	350	344	335	343	344	343	335	344	350
	175	359	355	351	355	357	355	351	355	359
	177.5	359	359	359	361	362	361	359	359	359
	180	359	359	359	359	359	359	359	359	359

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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	107	107	107	107		99	99	99	99		84	84	84		70	70	70		57	57	57	51
1	96	91	87	83		89	84	80	77		71	68	66		59	57	55		48	47	45	40
2	88	79	73	67		80	73	68	63		62	58	54		52	48	46		42	40	38	33
3	80	70	62	56		73	65	58	52		55	50	45		46	42	39		37	35	32	28
4	73	62	54	48		67	58	50	45		49	43	39		41	37	33		34	31	28	24
5	68	56	47	41		62	52	44	39		44	39	34		37	33	29		31	27	25	22
6	63	50	42	36		58	47	40	34		40	34	30		34	30	26		28	25	22	19
7	58	46	38	32		54	43	36	30		37	31	27		31	27	24		26	23	20	18
8	54	42	34	29		50	39	32	27		34	28	24		29	25	21		24	21	18	16
9	51	39	31	26		47	36	29	25		31	26	22		27	23	20		23	19	17	15
10	48	36	28	24		44	33	27	22		29	24	20		25	21	18		21	18	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	13.9	3.66	3.66
8.0	7.8	4.88	4.88
10.0	5.0	6.10	6.10
12.0	3.5	7.32	7.31
14.0	2.6	8.54	8.53
16.0	2.0	9.76	9.75

Average Luminance (cd/m^2)			
	0 deg Plane	45 deg Plane	90 deg Plane
0	21832	21832	21832
45	4475	3990	4422
55	3530	3061	3470
65	3041	2779	2987
75	2740	2542	2691
85	2255	2447	2237

Spacing Criterion

0 degree plane:	0.6
90 degree plane:	0.6
180 degree plane:	0.6
270 degree plane:	0.6

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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	3.8	4.7	4.7	5.7	6.9	3.8	4.7	4.7	5.6	6.9
	3H	6.0	6.8	6.9	7.8	9.0	5.9	6.8	6.9	7.7	9.0
	4H	7.1	7.9	8.0	8.8	10.1	7.0	7.8	8.0	8.8	10.0
	6H	8.2	8.9	9.1	9.8	11.1	8.1	8.8	9.1	9.8	11.1
	8H	8.6	9.3	9.6	10.3	11.6	8.6	9.3	9.5	10.3	11.5
	12H	9.1	9.7	10.1	10.7	12.0	9.0	9.7	10.0	10.7	12.0
4H	2H	4.1	4.9	5.1	5.9	7.2	4.1	4.9	5.1	5.9	7.1
	3H	6.7	7.3	7.6	8.3	9.6	6.6	7.3	7.6	8.3	9.6
	4H	8.0	8.7	9.0	9.7	11.0	8.0	8.6	9.0	9.6	10.9
	6H	9.4	9.9	10.4	10.9	12.2	9.3	9.9	10.3	10.9	12.2
	8H	10.0	10.5	11.0	11.5	12.8	9.9	10.4	10.9	11.4	12.8
	12H	10.5	11.0	11.5	12.0	13.4	10.5	11.0	11.5	12.0	13.3
8H	4H	8.4	8.9	9.4	9.9	11.2	8.4	8.9	9.4	9.9	11.2
	6H	10.0	10.4	11.0	11.5	12.8	9.9	10.4	11.0	11.4	12.8
	8H	10.8	11.2	11.8	12.2	13.6	10.8	11.2	11.8	12.2	13.5
	12H	11.6	11.9	12.6	13.0	14.3	11.5	11.9	12.6	12.9	14.3
12H	4H	8.5	9.0	9.5	10.0	11.3	8.5	8.9	9.5	9.9	11.3
	6H	10.1	10.5	11.2	11.6	12.9	10.1	10.5	11.1	11.5	12.9
	8H	11.0	11.4	12.0	12.4	13.8	11.0	11.3	12.0	12.4	13.7

Maximum UGR = 14.3

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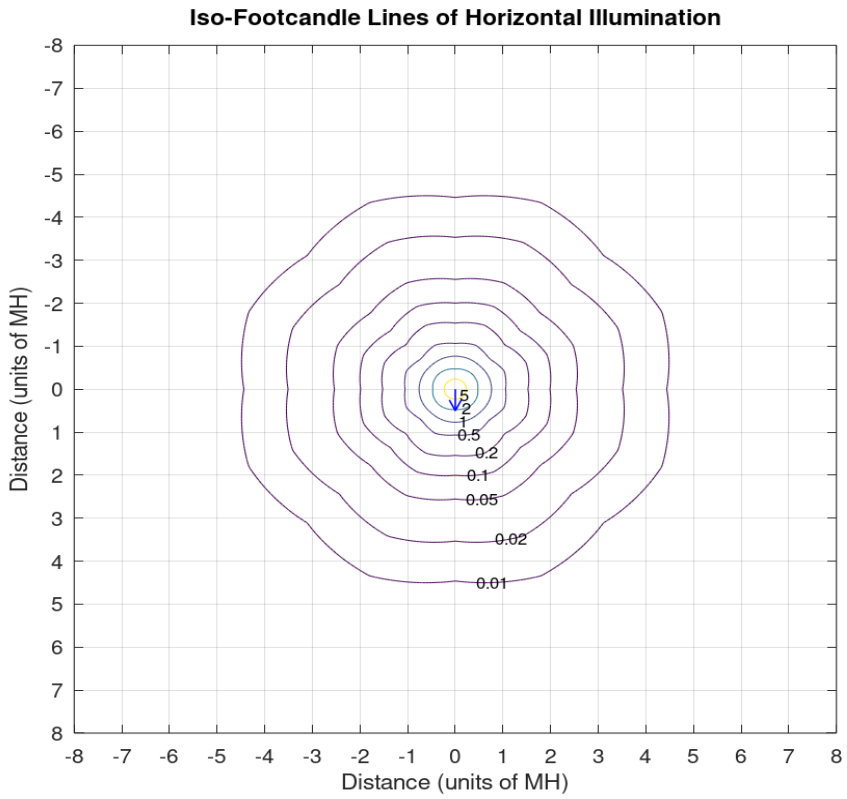
Iso-Illuminance Plot



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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Test Distance	9.5 m
Ambient Temperature	25.0 °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.

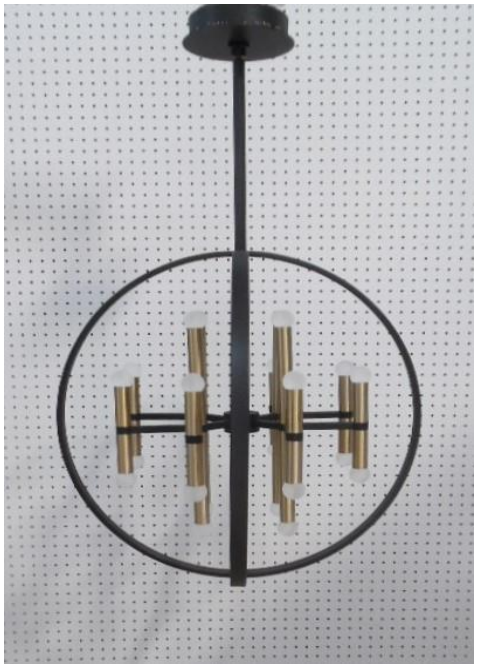
Revision

R01 - 01/26/2021 - Catalog number was changed

Report of Test

LLIA001389-005B-R01*

Integrating Sphere Report
Catalog Number: 3-684-1540 Nero
Pendant mounted, formed steel and tubular steel housings,
frosted decorative plastic enclosures.
24 White LEDs
Two ES LD030D-CA07242-M28F LED drivers



Performance Summary

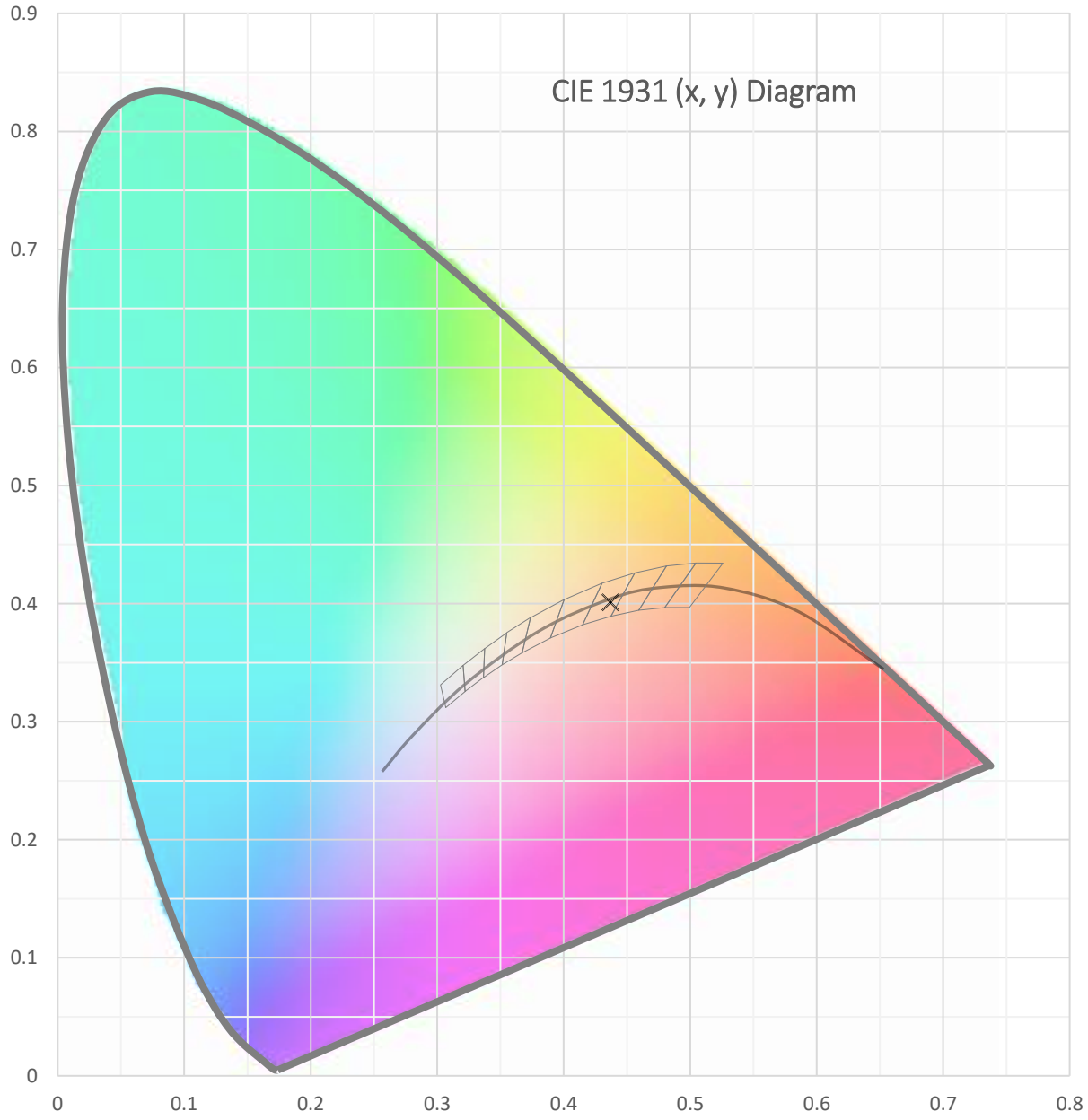
Voltage	120.0	Vac
Current	0.5098	A
Power	60.85	W
Frequency	59.99	Hz
Power Factor	0.995	
Current THD	5.3	%
Total Luminous Flux	1369.9	lm
Efficacy	22.5	lm/W
Chromaticity (x,y)	(0.4369, 0.4010)	
(u',v')	(0.2519, 0.5202)	
Duv	-0.0012	
CCT	2975	K
CRI (Ra)	91	
R9	53	
TM-30: Rf	90	
TM-30: Rg	98	
TM-30: Rcs,h1	-6	

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

*This test report supersedes test report LLIA001389-005B

Test date: 01/15/2021
Report date: 01/26/2021

Test Report Number: LLIA001389-005B-R01



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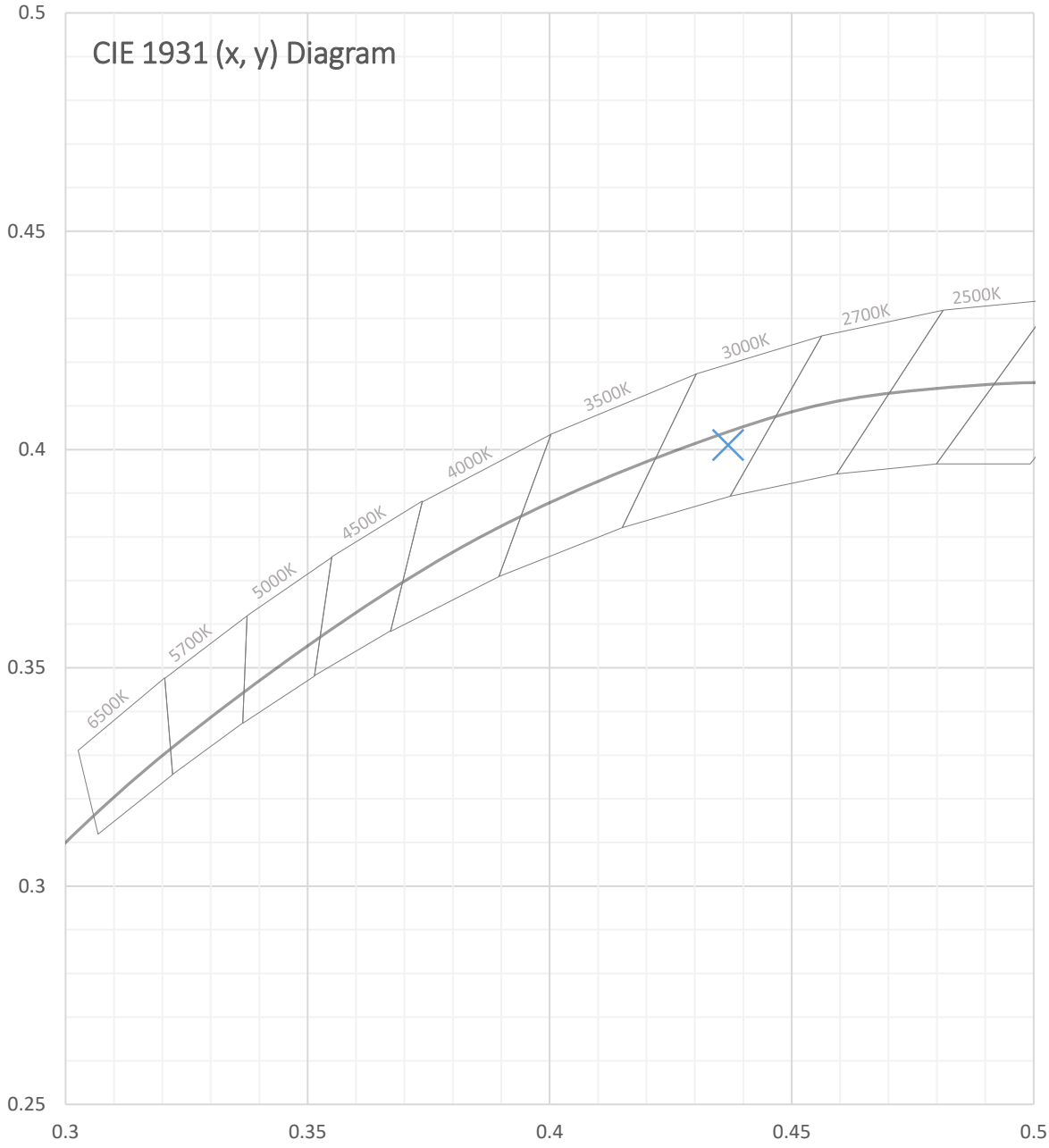

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Total Radiant Flux	4.775	W
Total Luminous Flux	1369.9	Lm
Chromaticity CIE 1931 (x, y)	(0.4369, 0.4010)	
Chromaticity CIE 1976 (u', v')	(0.2519, 0.5202)	
Correlated Color Temperature (CCT)	2975	K
Color Rendering Index (Ra)	91	
R1	91	
R2	96	
R3	98	
R4	90	
R5	91	
R6	95	
R7	90	
R8	79	
R9	53	
R10	90	
R11	90	
R12	83	
R13	93	
R14	99	
TM-30: Rf	90	
TM-30: Rg	98	
TM-30: Rcs,h1	-6	
Distance from Planckian Locus (Duv)	-0.0012	
Scotopic/Photopic Ratio ǂ	1.408	

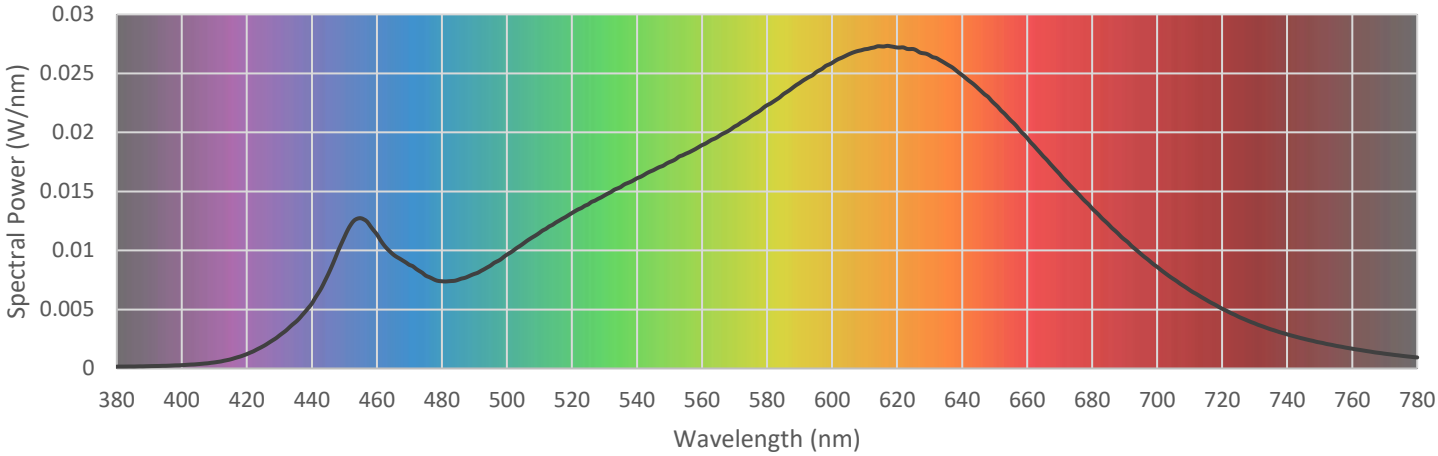
Electrical Data

Voltage	120.0	Vac
Current	0.5098	A
Power	60.85	W
Frequency	59.99	Hz
Power Factor	0.995	
Current THD	5.3	%

Test Report Number: LLIA001389-005B-R01

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

380	0.000157	480	0.007390	580	0.022301	680	0.013553
385	0.000164	485	0.007514	585	0.023234	685	0.012221
390	0.000196	490	0.008013	590	0.024180	690	0.010911
395	0.000226	495	0.008725	595	0.025082	695	0.009700
400	0.000281	500	0.009646	600	0.025884	700	0.008609
405	0.000370	505	0.010574	605	0.026597	705	0.007581
410	0.000512	510	0.011490	610	0.027040	710	0.006647
415	0.000772	515	0.012358	615	0.027289	715	0.005826
420	0.001218	520	0.013171	620	0.027191	720	0.005063
425	0.001881	525	0.013898	625	0.027060	725	0.004388
430	0.002789	530	0.014659	630	0.026532	730	0.003821
435	0.003934	535	0.015374	635	0.025828	735	0.003310
440	0.005499	540	0.016116	640	0.024856	740	0.002890
445	0.007975	545	0.016793	645	0.023714	745	0.002523
450	0.011134	550	0.017485	650	0.022424	750	0.002204
455	0.012730	555	0.018192	655	0.021009	755	0.001920
460	0.011360	560	0.018920	660	0.019536	760	0.001675
465	0.009661	565	0.019647	665	0.017967	765	0.001452
470	0.008775	570	0.020490	670	0.016478	770	0.001250
475	0.007866	575	0.021353	675	0.014989	775	0.001081
						780	0.000933



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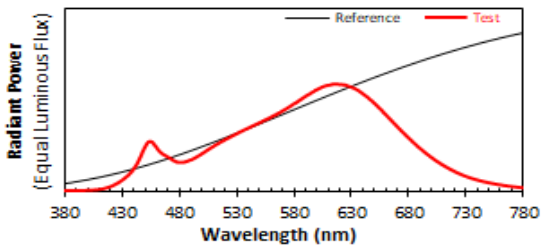
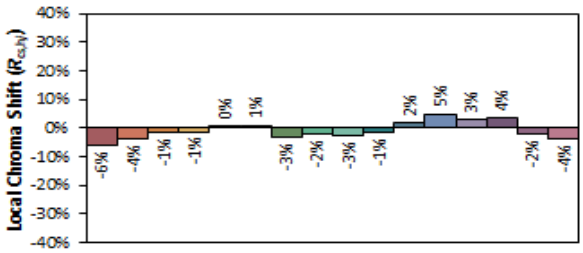
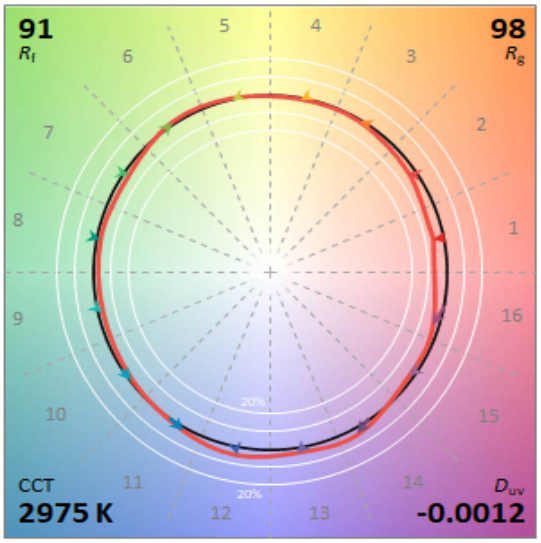
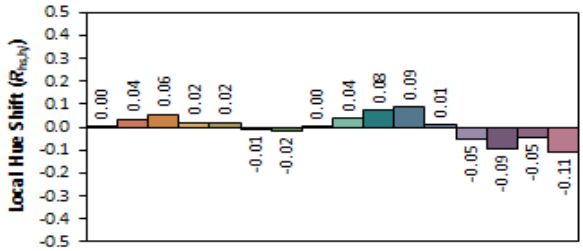
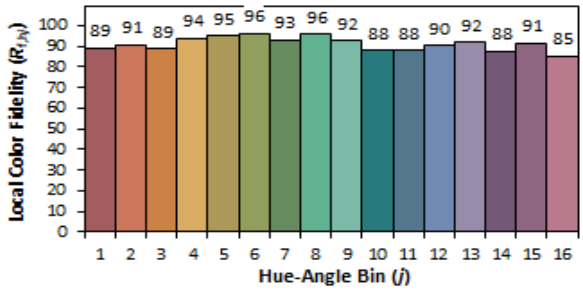
IES TM-30 Details

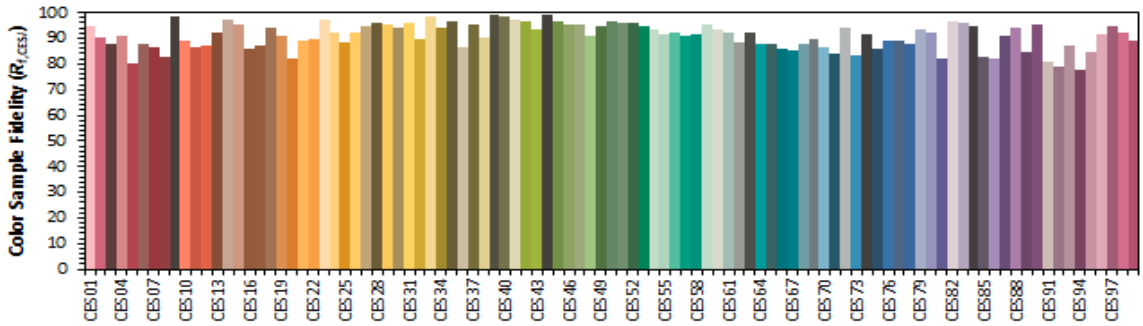












Notes:

x	0.4369
y	0.4010
u'	0.2519
v'	0.5201

CIE 13.3-1995 (CRI)

R_a	91
R_9	53

Test Report Number: LLIA001389-005B-R01

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:	25.6 °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.
Revision:	R01 - 01/26/2021 - Catalog number was changed

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