LightLab INTERNATIONAL ALLENTOWN LLC

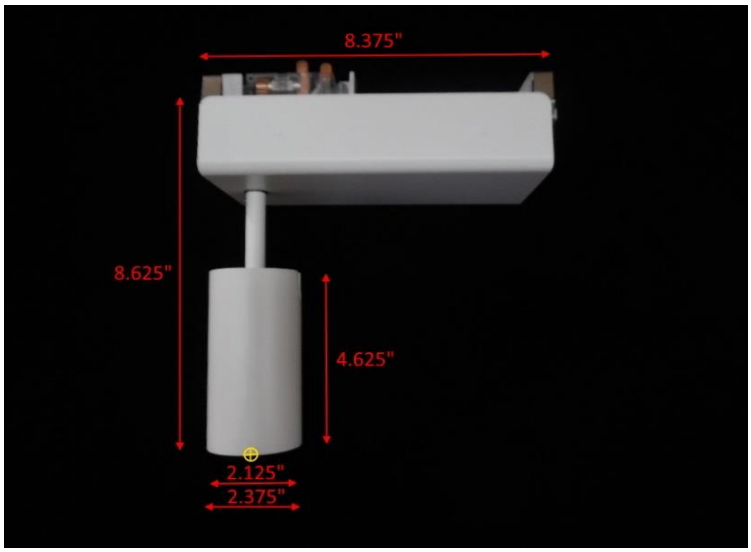
NVLAP TESTING Lab Code: 201079-0

Report of Test

LLIA001532-004A

Indoor Distribution Photometry Test Report

Catalog Number: C2O-L1090TH-9HCE0PA-P1, 15 degree optic 6500K
Track mounted steel driver housing with cylindrical aluminum luminaire housing,
clear multi-faceted clear conical lens below LED and black plastic baffle.
One "Bridgelux Vesta 9mm Tunable" White LED
One eldoLED DUALdrive 561/S LED driver



Prepared For:
LiteLab, Inc
251 Elm Street
Buffalo, NY 14203, USA

Performance Summary					
Input Voltage	120.0	V	Luminous Flux	409.7	Lumens
Input Current	0.0982	A	Total Efficacy	36.9	Lm/W
Input Power	11.10	W	Downward Flux	409.7	Lumens
Frequency	60.00	Hz	Downward Flux	100.0	% of Total
Power Factor	0.942				
Current THD	14.4	%			

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

Test date: 08/30/2021
Report date: 09/01/2021

Signed: Michael L. Grather

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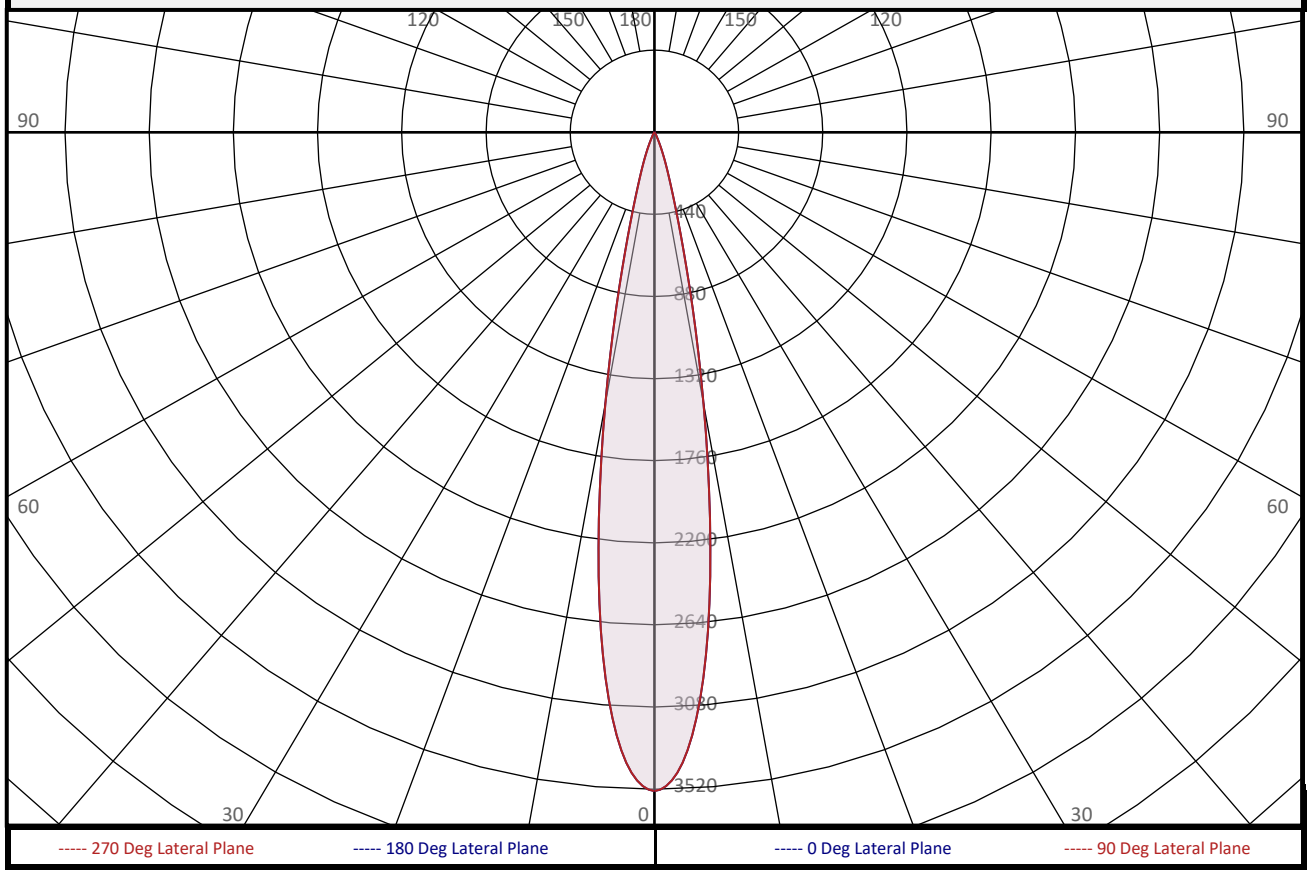
Polar Plot of Candela



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	231.2	56.4%	90-100	0.0	0.0%	0-20	376.0	91.8%
10-20	144.8	35.3%	100-110	0.0	0.0%	0-30	401.6	98.0%
20-30	25.6	6.2%	110-120	0.0	0.0%	0-40	407.9	99.6%
30-40	6.3	1.5%	120-130	0.0	0.0%	0-60	409.5	100.0%
40-50	1.3	0.3%	130-140	0.0	0.0%	0-80	409.7	100.0%
50-60	0.3	0.1%	140-150	0.0	0.0%	10-90	178.5	43.6%
60-70	0.1	0.0%	150-160	0.0	0.0%	20-50	33.2	8.1%
70-80	0.0	0.0%	160-170	0.0	0.0%	40-90	1.8	0.4%
80-90	0.0	0.0%	170-180	0.0	0.0%	60-90	0.2	0.0%
0-90	409.7	100.0%	90-180	0.0	0.0%	0-180	409.7	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	3530	3530	3530	3530	3530	3530	3530	3530	3530
	2.5	3381	3381	3381	3381	3381	3381	3381	3381	3381
	5	2937	2937	2937	2937	2937	2937	2937	2937	2937
	7.5	2244	2244	2244	2244	2244	2244	2244	2244	2244
	10	1483	1483	1483	1483	1483	1483	1483	1483	1483
	12.5	850	850	850	850	850	850	850	850	850
	15	450	450	450	450	450	450	450	450	450
	17.5	253	253	253	253	253	253	253	253	253
	20	152	152	152	152	152	152	152	152	152
	22.5	86	86	86	86	86	86	86	86	86
	25	46	46	46	46	46	46	46	46	46
	27.5	26	26	26	26	26	26	26	26	26
	30	18	18	18	18	18	18	18	18	18
	32.5	14	14	14	14	14	14	14	14	14
	35	10	10	10	10	10	10	10	10	10
	37.5	6	6	6	6	6	6	6	6	6
	40	4	4	4	4	4	4	4	4	4
	42.5	2	2	2	2	2	2	2	2	2
	45	1	1	1	1	1	1	1	1	1
	47.5	1	1	1	1	1	1	1	1	1
	50	1	1	1	1	1	1	1	1	1
	52.5	0	0	0	0	0	0	0	0	0
	55	0	0	0	0	0	0	0	0	0
	57.5	0	0	0	0	0	0	0	0	0
	60	0	0	0	0	0	0	0	0	0
	62.5	0	0	0	0	0	0	0	0	0
	65	0	0	0	0	0	0	0	0	0
	67.5	0	0	0	0	0	0	0	0	0
	70	0	0	0	0	0	0	0	0	0
	72.5	0	0	0	0	0	0	0	0	0
	75	0	0	0	0	0	0	0	0	0
	77.5	0	0	0	0	0	0	0	0	0
	80	0	0	0	0	0	0	0	0	0
	82.5	0	0	0	0	0	0	0	0	0
	85	0	0	0	0	0	0	0	0	0
	87.5	0	0	0	0	0	0	0	0	0
	90	0	0	0	0	0	0	0	0	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
	90	0	0	0	0	0	0	0	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	116	114	112	111		113	112	110	109		108	107	106		104	103	103		101	100	100	98
2	113	110	107	105		111	108	106	104		105	103	101		102	101	99		99	98	97	96
3	110	106	103	100		108	105	102	100		102	100	98		100	98	97		98	97	95	94
4	107	103	100	97		106	102	99	97		100	97	95		98	96	94		97	95	93	92
5	105	100	97	94		104	99	96	94		98	95	93		96	94	92		95	93	92	91
6	103	98	94	92		102	97	94	92		96	93	91		95	92	91		94	92	90	89
7	101	96	92	90		100	95	92	90		94	91	89		93	91	89		92	90	88	88
8	99	94	90	88		98	93	90	88		92	90	88		92	89	87		91	89	87	86
9	97	92	89	86		96	92	88	86		91	88	86		90	88	86		90	87	86	85
10	96	90	87	85		95	90	87	85		89	87	85		89	86	85		88	86	84	84

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	98.1	1.87	1.87
8.0	55.2	2.49	2.49
10.0	35.3	3.11	3.11
12.0	24.5	3.73	3.73
14.0	18.0	4.36	4.36
16.0	13.8	4.98	4.98

Average Luminance (cd/m^2)			
	0 deg Plane	45 deg Plane	90 deg Plane
0	1376214	1376214	1376214
45	699	699	699
55	196	196	196
65	109	109	109
75	100	100	100
85	51	51	51

Spacing Criterion

Spacing Criterion:	0.3
Beam Angle:	18.1 °
Field Angle:	32.3 °

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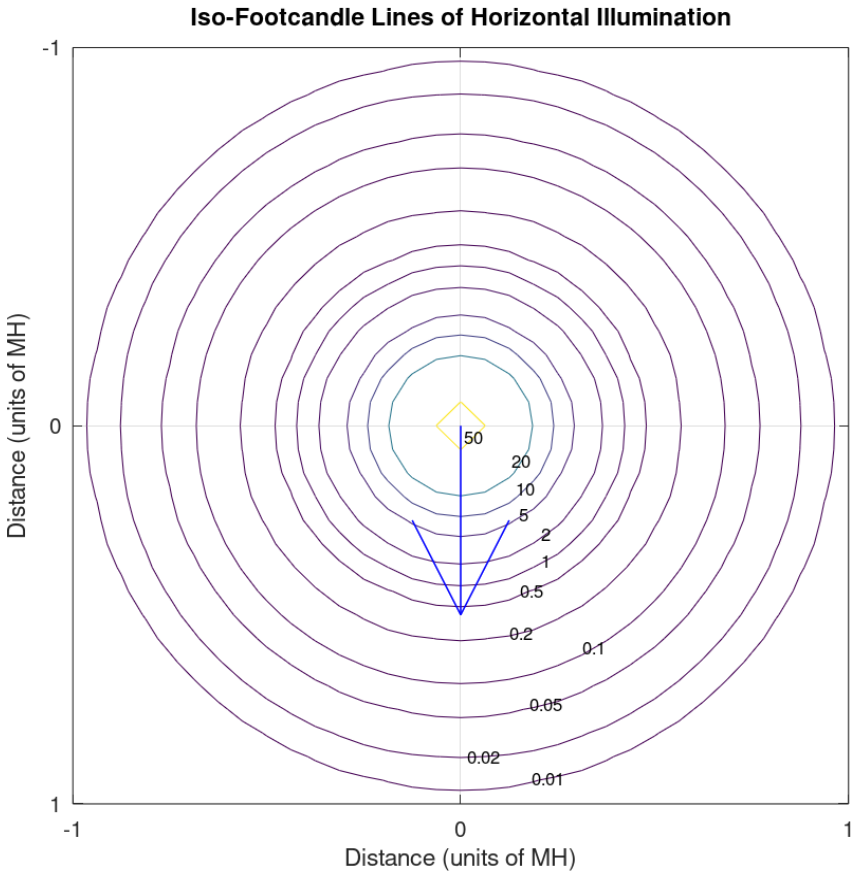
Iso-Illuminance Plot



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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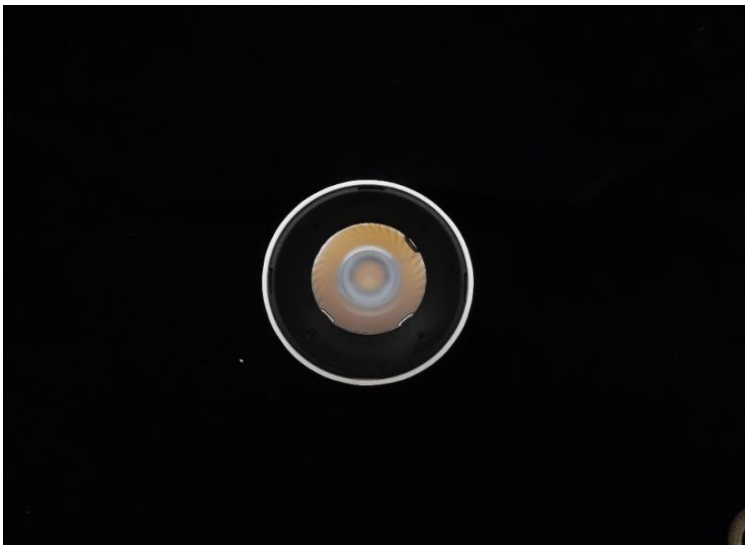
Additional Pictures of Test Subject



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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.

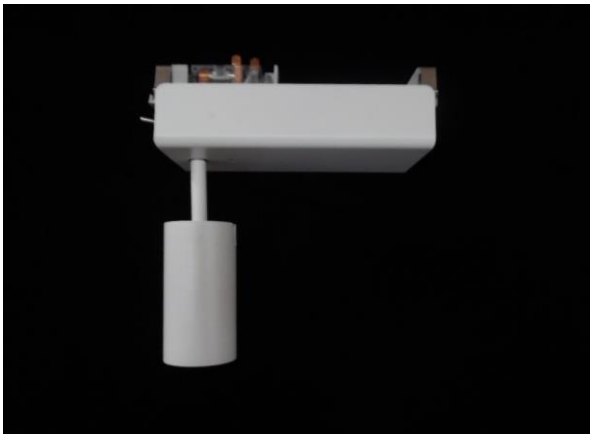
LightLab INTERNATIONAL ALLENTOWN LLC

NVLAP TESTING Lab Code: 201079-0

Report of Test

LLIA001532-004B

Integrating Sphere Report
Catalog Number: C2O-L1090TH-9HCE0PA-P1, 15 degree optic 6500K
Track mounted steel driver housing with cylindrical aluminum luminaire housing,
clear multi-faceted clear conical lens below LED and black plastic baffle.
One "Bridgelux Vesta 9mm Tunable" White LED
One eldoLED DUALdrive 561/S LED driver



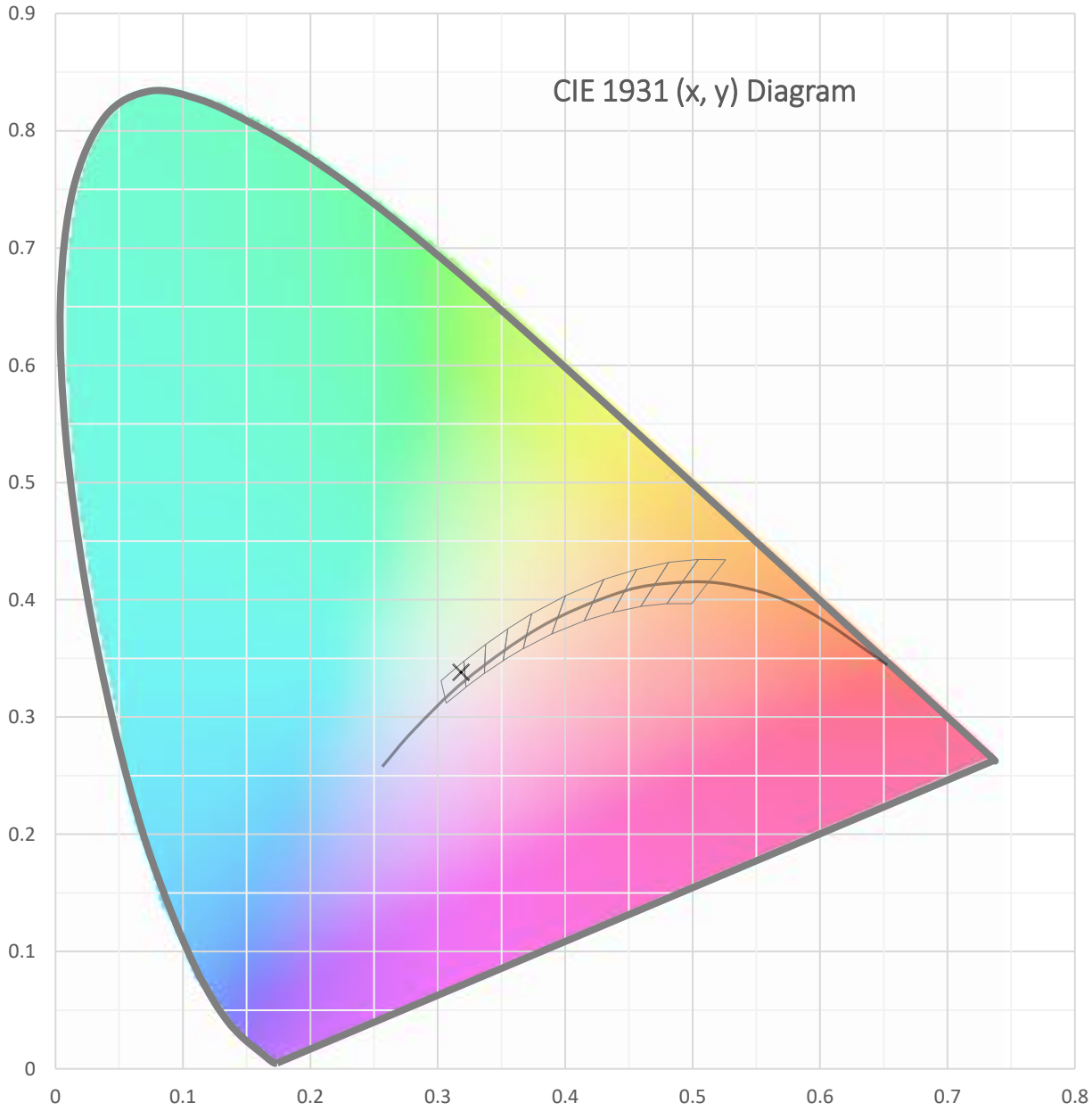
Performance Summary

Voltage		120.0	Vac
Current		0.0984	A
Power		11.13	W
Frequency		59.99	Hz
Power Factor		0.943	
Current THD		14.1	%
Total Luminous Flux		407.8	lm
Efficacy		36.6	lm/W
Chromaticity	(x,y)	(0.3183, 0.3381)	
	(u',v')	(0.1983, 0.4739)	
Duv		0.0051	
CCT		6163	K
CRI (Ra)		91	
R9		53	
TM-30: Rf		89	
TM-30: Rg		98	
TM-30: Rcs,h1		-6	

Prepared For:
LiteLab, Inc
251 Elm Street
Buffalo, NY 14203, USA

Test date: 08/27/2021
Report date: 09/01/2021

Test Report Number: LLIA001532-004B



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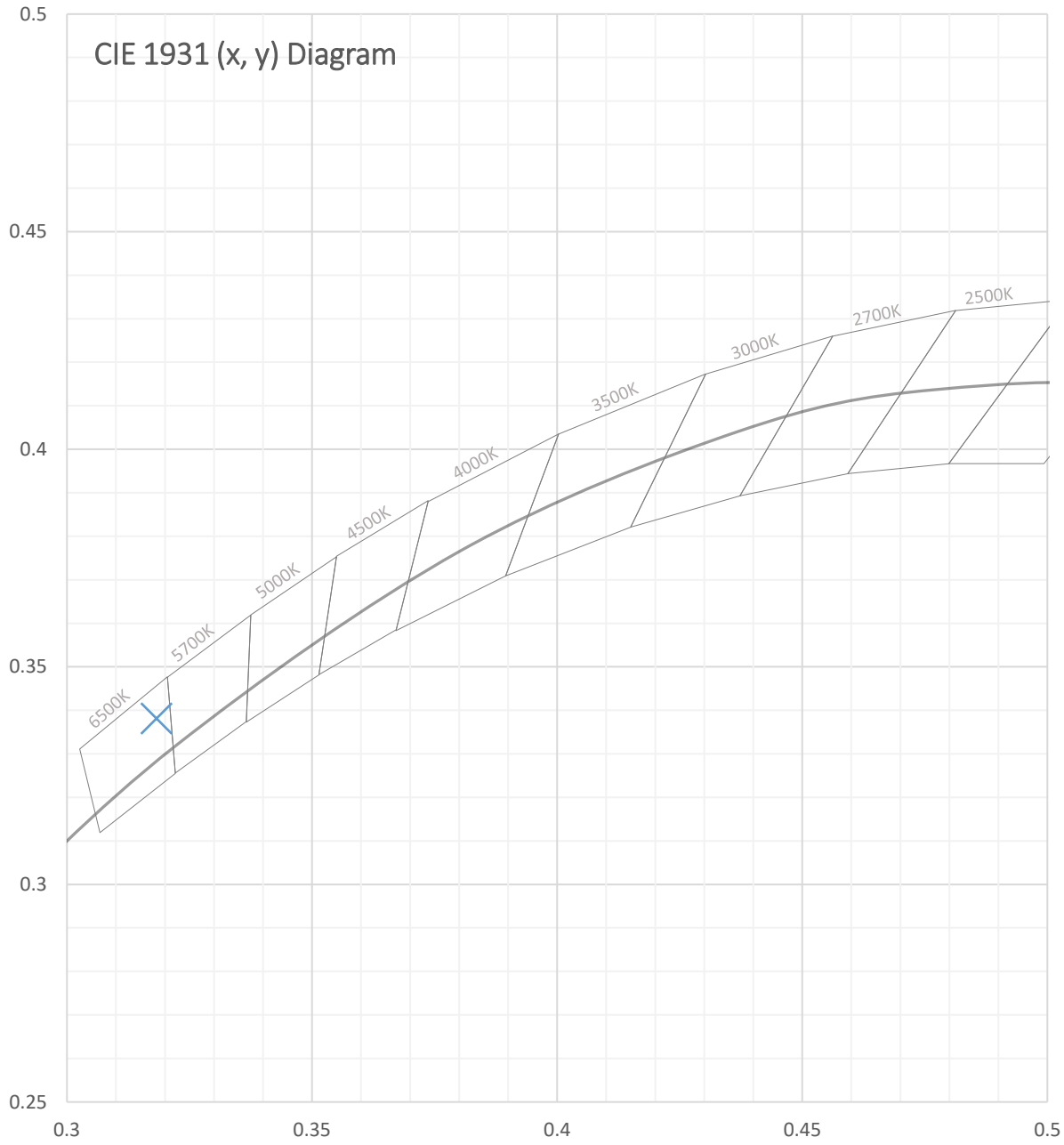


Test Report Number: LLIA001532-004B

Total Radiant Flux	1.417	W
Total Luminous Flux	407.8	Lm
Chromaticity CIE 1931 (x, y)	(0.3183, 0.3381)	
Chromaticity CIE 1976 (u', v')	(0.1983, 0.4739)	
Correlated Color Temperature (CCT)	6163	K
Color Rendering Index (Ra)	91	
R1	89	
R2	93	
R3	95	
R4	90	
R5	90	
R6	89	
R7	94	
R8	84	
R9	53	
R10	83	
R11	90	
R12	71	
R13	90	
R14	97	
TM-30: Rf	89	
TM-30: Rg	98	
TM-30: Rcs,h1	-6	
Distance from Planckian Locus (Duv)	0.0051	
Scotopic/Photopic Ratio ǂ	2.289	

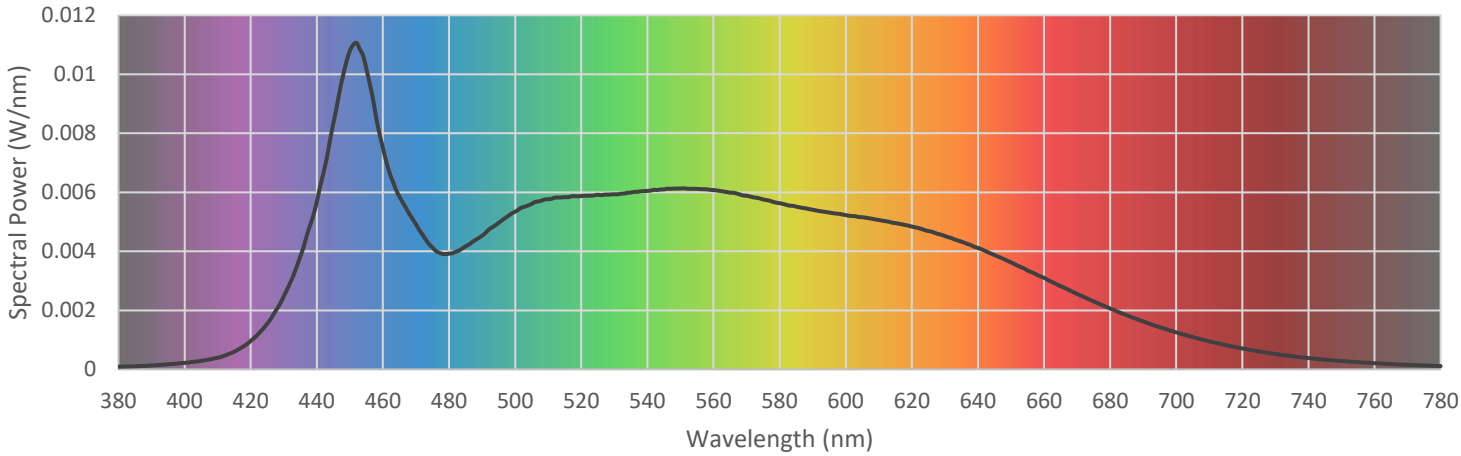
Electrical Data

Voltage	120.0	Vac
Current	0.0984	A
Power	11.13	W
Frequency	59.99	Hz
Power Factor	0.943	
Current THD	14.1	%

Test Report Number: LLIA001532-004B

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

380	0.000090	480	0.003920	580	0.005631	680	0.002063
385	0.000105	485	0.004171	585	0.005515	685	0.001839
390	0.000132	490	0.004529	590	0.005411	690	0.001626
395	0.000172	495	0.004966	595	0.005314	695	0.001429
400	0.000220	500	0.005343	600	0.005227	700	0.001255
405	0.000288	505	0.005608	605	0.005156	705	0.001092
410	0.000395	510	0.005765	610	0.005063	710	0.000949
415	0.000596	515	0.005838	615	0.004959	715	0.000821
420	0.000966	520	0.005877	620	0.004838	720	0.000708
425	0.001550	525	0.005918	625	0.004687	725	0.000608
430	0.002475	530	0.005935	630	0.004518	730	0.000521
435	0.003821	535	0.005991	635	0.004328	735	0.000446
440	0.005684	540	0.006047	640	0.004117	740	0.000382
445	0.008348	545	0.006098	645	0.003875	745	0.000328
450	0.010797	550	0.006129	650	0.003627	750	0.000284
455	0.010172	555	0.006117	655	0.003350	755	0.000243
460	0.007496	560	0.006076	660	0.003101	760	0.000209
465	0.005851	565	0.005988	665	0.002820	765	0.000179
470	0.004915	570	0.005884	670	0.002558	770	0.000152
475	0.004128	575	0.005758	675	0.002306	775	0.000130
						780	0.000111



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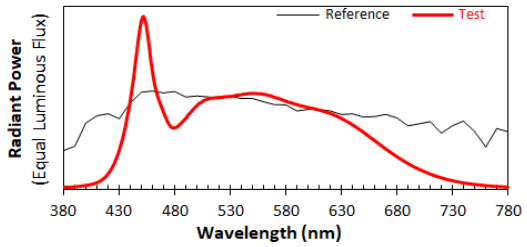
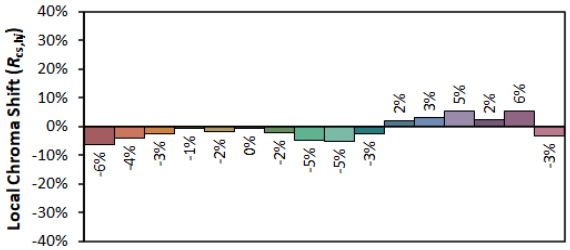
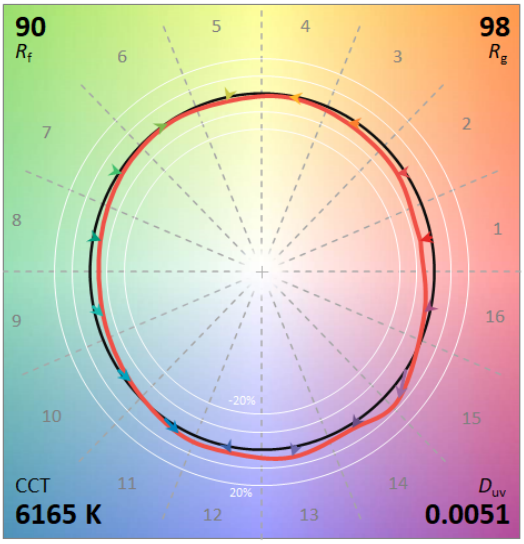
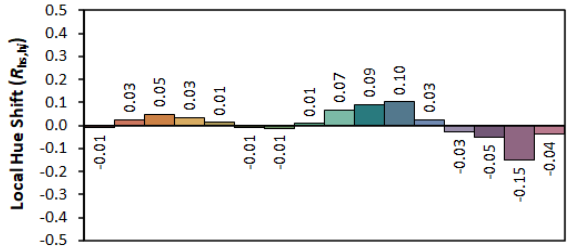
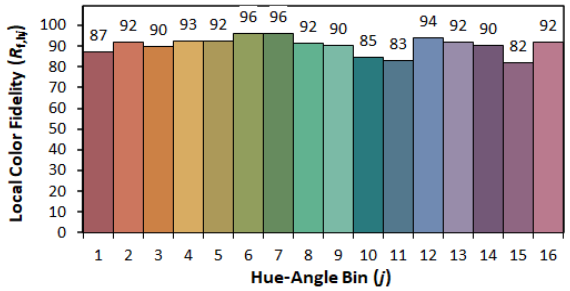
IES TM-30 Details

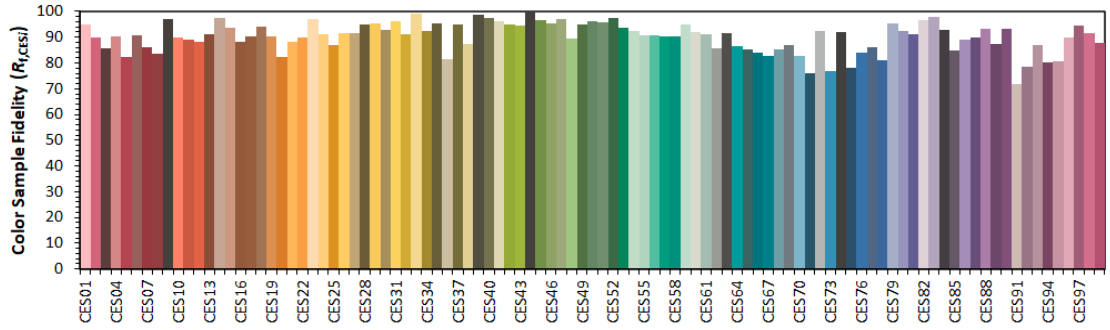












Notes:

x	0.3183
y	0.3380
u'	0.1983
v'	0.4739

CIE 13.3-1995 (CRI)

R_a	91
R_9	53

Test Report Number: LLIA001532-004B

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:	24.7 °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, 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 ǂ 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.

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

USA east coast LightLab Int'l Allentown LLC, 905 Harrison Street, Suite 135, Allentown, PA 18103, Ph: +1 484-273-0705, www.lightlaballentown.com (issuing laboratory)

Australasia & S.E. Asia LightLab International, 50 Redcliffe Gardens Drive, Clontarf, Queensland, 4019, Australia, Ph : +61 7 3283 7862, Fx : +61 7 3283 8751, www.lightlabint.com