LightLab INTERNATIONAL ALLENTOWN LLC

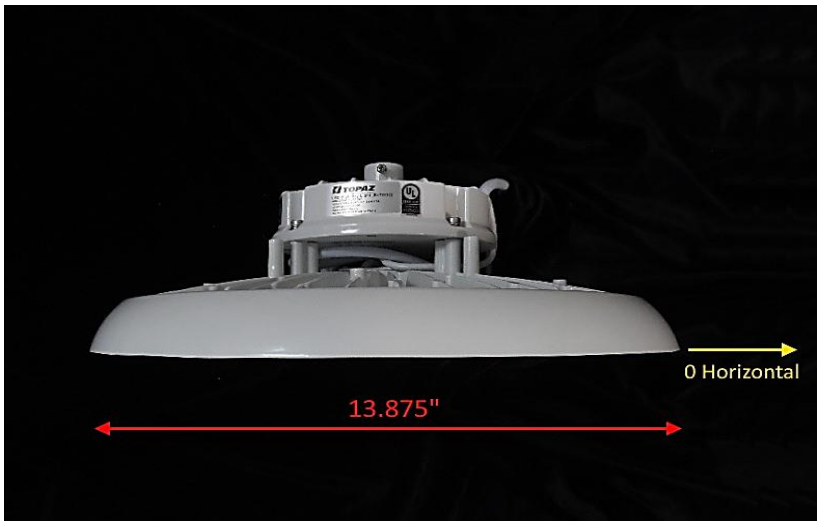
NVLAP TESTING Lab Code: 201079-0

Report of Test

LLIA001750-005A

Indoor Distribution Photometry Test Report

Catalog Number: HBC-200W-PCTS-xx - 5000K, 200W setting
Suspended downlight, cast aluminum luminaire and driver housings, clear plastic enclosure with concentric lenses.
720 white LEDs on white circuit board; 400CW, 320WW. Only 400CW LEDs on for this test.
One LiFud LF-FHB200YAIV LED driver



Prepared For:
Topaz Lighting Corp
925 Waverly Avenue
Holtsville, NY 11742, USA

Performance Summary					
Input Voltage	120.0	Vac	Luminous Flux	31672.3	Lumens
Input Current	1.672	A	Total Efficacy	158.3	Lm/W
Input Power	200.1	W	Downward Flux	31672.3	Lumens
Frequency	60.00	Hz	Downward Flux	100.0	% of Total
Power Factor	0.997				
Current THD	2.7	%			

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

Test date: 05/12/2022
Report date: 05/13/2022

Signed: Michael L. Grather

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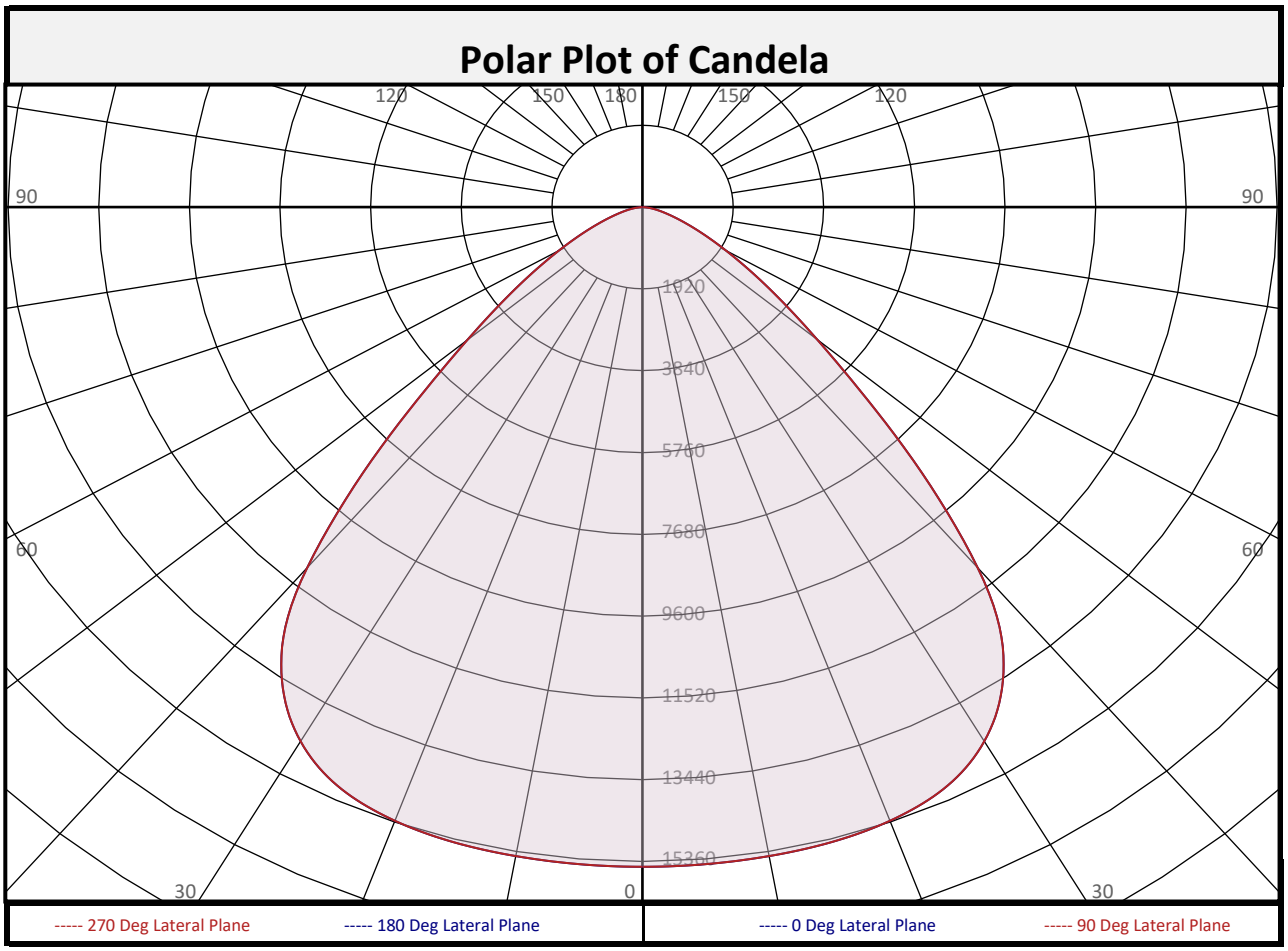

Zonal Flux Summary									
Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total
0-10	1478	4.7%	90-100	0.0	0.0%	0-20	5849	18.5%
10-20	4371	13.8%	100-110	0.0	0.0%	0-30	12790	40.4%
20-30	6941	21.9%	110-120	0.0	0.0%	0-40	21014	66.3%
30-40	8224	26.0%	120-130	0.0	0.0%	0-60	29796	94.1%
40-50	5883	18.6%	130-140	0.0	0.0%	0-80	31585	99.7%
50-60	2899	9.2%	140-150	0.0	0.0%	10-90	30194	95.3%
60-70	1304	4.1%	150-160	0.0	0.0%	20-50	21048	66.5%
70-80	484.7	1.5%	160-170	0.0	0.0%	40-90	10658	33.7%
80-90	87.1	0.3%	170-180	0.0	0.0%	60-90	1876	5.9%
0-90	31672	100.0%	90-180	0.0	0.0%	0-180	31672	100.0%

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Luminous Intensity (Candela) Table

Vertical (Gamma) Angles - Data was acquired in 0.5° increments, 2.5° increments shown.	Lateral (C-Plane) Angles								
	0	22.5	45	67.5	90	112.5	135	157.5	180
0	15487	15487	15487	15487	15487	15487	15487	15487	15487
2.5	15486	15486	15486	15486	15486	15486	15486	15486	15486
5	15483	15483	15483	15483	15483	15483	15483	15483	15483
7.5	15478	15478	15478	15478	15478	15478	15478	15478	15478
10	15470	15470	15470	15470	15470	15470	15470	15470	15470
12.5	15458	15458	15458	15458	15458	15458	15458	15458	15458
15	15437	15437	15437	15437	15437	15437	15437	15437	15437
17.5	15398	15398	15398	15398	15398	15398	15398	15398	15398
20	15332	15332	15332	15332	15332	15332	15332	15332	15332
22.5	15232	15232	15232	15232	15232	15232	15232	15232	15232
25	15080	15080	15080	15080	15080	15080	15080	15080	15080
27.5	14839	14839	14839	14839	14839	14839	14839	14839	14839
30	14485	14485	14485	14485	14485	14485	14485	14485	14485
32.5	14000	14000	14000	14000	14000	14000	14000	14000	14000
35	13340	13340	13340	13340	13340	13340	13340	13340	13340
37.5	12433	12433	12433	12433	12433	12433	12433	12433	12433
40	11051	11051	11051	11051	11051	11051	11051	11051	11051
42.5	9310	9310	9310	9310	9310	9310	9310	9310	9310
45	7559	7559	7559	7559	7559	7559	7559	7559	7559
47.5	6004	6004	6004	6004	6004	6004	6004	6004	6004
50	4826	4826	4826	4826	4826	4826	4826	4826	4826
52.5	3913	3913	3913	3913	3913	3913	3913	3913	3913
55	3173	3173	3173	3173	3173	3173	3173	3173	3173
57.5	2559	2559	2559	2559	2559	2559	2559	2559	2559
60	2048	2048	2048	2048	2048	2048	2048	2048	2048
62.5	1626	1626	1626	1626	1626	1626	1626	1626	1626
65	1279	1279	1279	1279	1279	1279	1279	1279	1279
67.5	996	996	996	996	996	996	996	996	996
70	768	768	768	768	768	768	768	768	768
72.5	585	585	585	585	585	585	585	585	585
75	441	441	441	441	441	441	441	441	441
77.5	327	327	327	327	327	327	327	327	327
80	227	227	227	227	227	227	227	227	227
82.5	140	140	140	140	140	140	140	140	140
85	64	64	64	64	64	64	64	64	64
87.5	7	7	7	7	7	7	7	7	7
90	0	0	0	0	0	0	0	0	0

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Luminous Intensity (Candela) Table

Vertical (Gamma) Angles - Data was acquired in 0.5° increments, 2.5° increments shown.	Lateral (C-Plane) 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	112	108	105	102		109	106	103	100		102	99	97		98	96	94		94	93	91	89
2	104	97	92	88		101	96	91	87		92	88	85		89	86	83		86	83	81	79
3	96	88	81	76		94	86	80	75		84	78	74		81	77	73		79	75	72	70
4	90	80	72	67		87	78	72	66		76	70	66		74	69	65		72	68	64	62
5	83	72	65	59		81	71	64	59		69	63	58		68	62	58		66	61	57	55
6	78	66	59	53		76	65	58	53		64	57	52		62	56	52		61	56	52	50
7	72	61	53	48		71	60	53	48		58	52	47		57	51	47		56	51	47	45
8	68	56	48	43		66	55	48	43		54	47	43		53	47	43		52	46	42	41
9	64	52	44	39		62	51	44	39		50	44	39		49	43	39		48	43	39	37
10	60	48	41	36		59	47	40	36		46	40	36		46	40	36		45	39	35	34

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	430.2	8.11	8.11
8.0	242.0	10.81	10.81
10.0	154.9	13.52	13.52
12.0	107.5	16.22	16.22
14.0	79.0	18.92	18.92
16.0	60.5	21.63	21.63

Spacing Criterion

SC: 1.3

Average Luminance (cd/m^2)

	0 deg Plane	45 deg Plane	90 deg Plane
0	158756	158756	158756
45	109584	109584	109584
55	56718	56718	56718
65	31034	31034	31034
75	17475	17475	17475
85	7560	7560	7560

Beam and Field Angle

0-180 Degree Plane

Beam Angle: 89.5°

Field Angle: 126.0°

90-270 Degree Plane

Beam Angle: 89.5°

Field Angle: 126.0°

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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	22.6	24.0	23.0	24.3	24.6	22.6	24.0	23.0	24.3	24.6
	3H	23.3	24.4	23.6	24.8	25.1	23.3	24.4	23.6	24.8	25.1
	4H	23.4	24.5	23.8	24.9	25.2	23.4	24.5	23.8	24.9	25.2
	6H	23.5	24.5	23.9	24.9	25.3	23.5	24.5	23.9	24.9	25.3
	8H	23.5	24.4	23.9	24.8	25.2	23.5	24.4	23.9	24.8	25.2
	12H	23.5	24.4	23.9	24.8	25.2	23.5	24.4	23.9	24.8	25.2
4H	2H	22.8	23.9	23.2	24.3	24.7	22.8	23.9	23.2	24.3	24.7
	3H	23.6	24.5	24.0	24.9	25.3	23.6	24.5	24.0	24.9	25.3
	4H	23.8	24.6	24.2	25.0	25.5	23.8	24.6	24.2	25.0	25.5
	6H	23.9	24.6	24.4	25.1	25.5	23.9	24.6	24.4	25.1	25.5
	8H	24.0	24.6	24.4	25.0	25.5	24.0	24.6	24.4	25.0	25.5
	12H	23.9	24.5	24.4	25.0	25.5	23.9	24.5	24.4	25.0	25.5
8H	4H	23.8	24.5	24.3	24.9	25.4	23.8	24.5	24.3	24.9	25.4
	6H	24.0	24.5	24.5	25.0	25.5	24.0	24.5	24.5	25.0	25.5
	8H	24.0	24.5	24.5	25.0	25.5	24.0	24.5	24.5	25.0	25.5
	12H	24.0	24.4	24.5	24.9	25.5	24.0	24.4	24.5	24.9	25.5
12H	4H	23.8	24.4	24.3	24.8	25.3	23.8	24.4	24.3	24.8	25.3
	6H	24.0	24.4	24.5	24.9	25.5	24.0	24.4	24.5	24.9	25.5
	8H	24.0	24.4	24.5	24.9	25.5	24.0	24.4	24.5	24.9	25.5

Maximum UGR = 25.5

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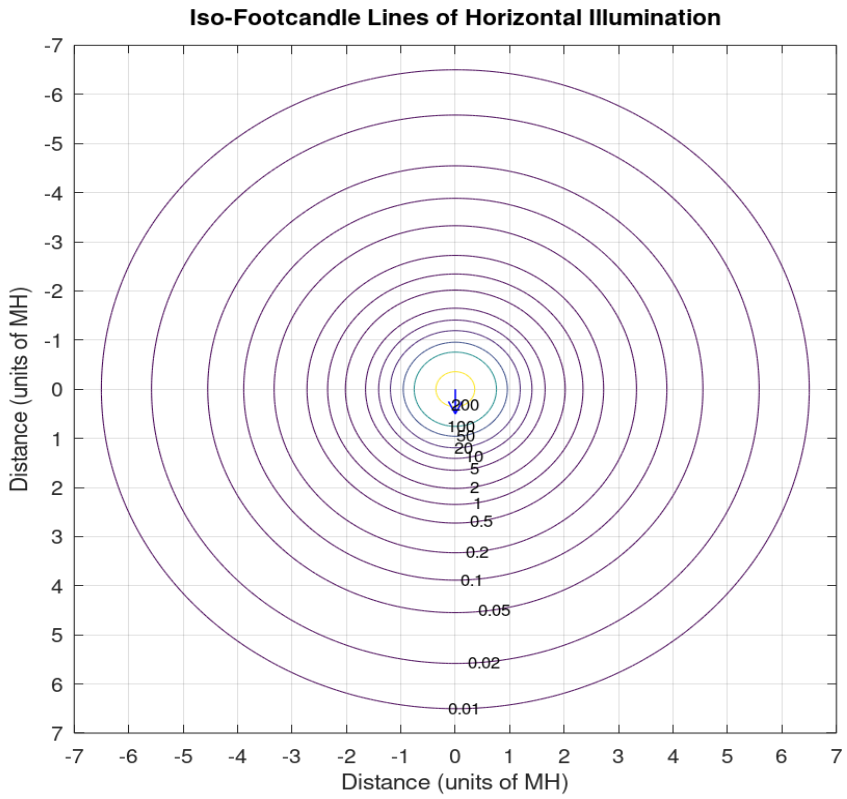
Iso-Illuminance Plot



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

Report of Test

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Test Distance	9.5 m
Ambient Temperature	25.2 °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-41-20 and LM-46-20.

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

LLIA001750-005B

Integrating Sphere Report
Catalog Number: HBC-200W-PCTS-xx - 5000K, 200W setting
Suspended downlight, cast aluminum luminaire and driver
housings, clear plastic enclosure with concentric lenses.
720 white LEDs on white circuit board; 400CW, 320WW. Only 400CW LEDs on for this test.
One LiFud LF-FHB200YAIV LED driver

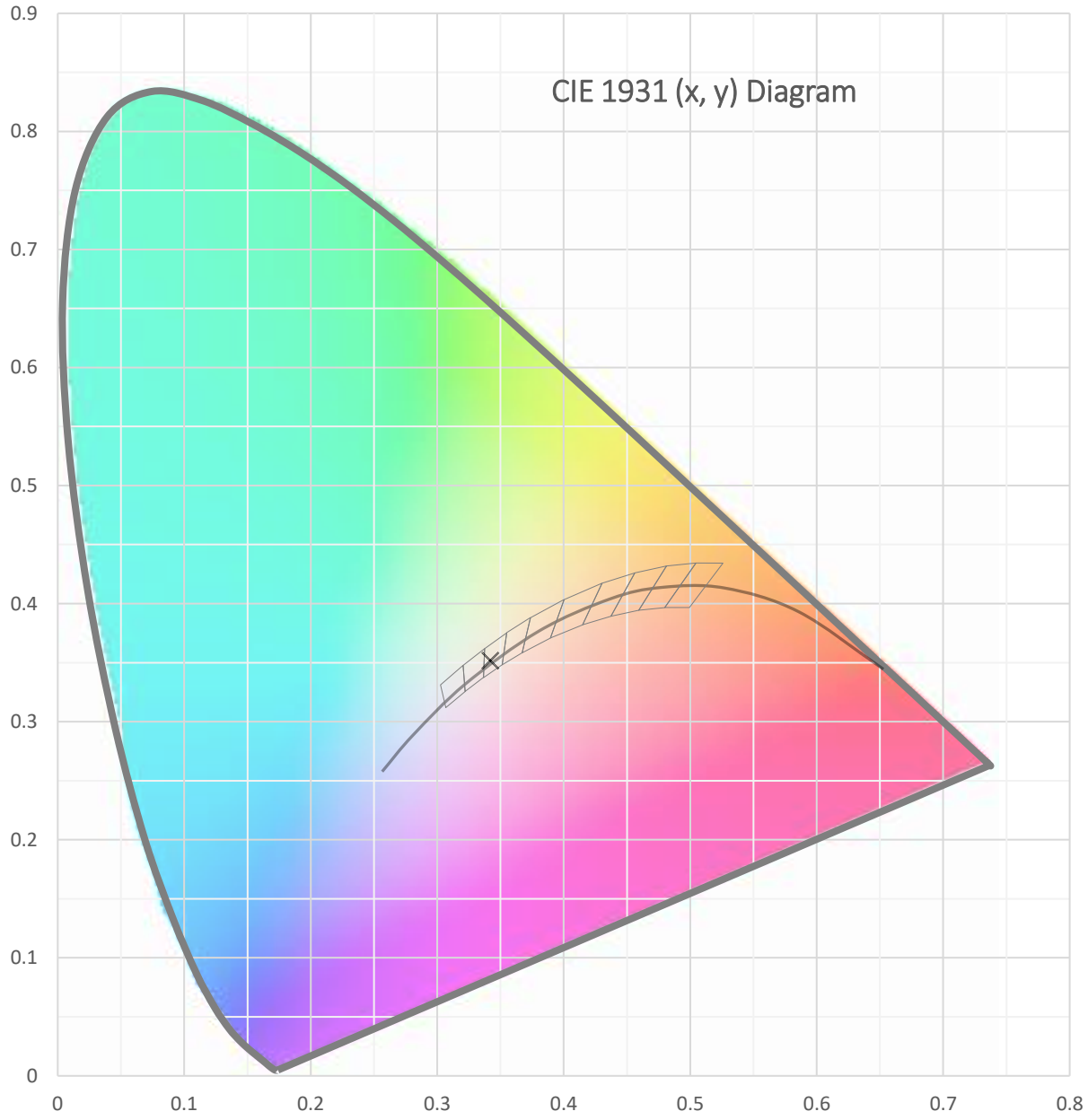
Performance Summary

Voltage	120.0	Vac
Current	1.671	A
Power	199.9	W
Frequency	59.99	Hz
Power Factor	0.997	
Current THD	2.7	%
Total Luminous Flux	31827.1	lm
Efficacy	159.2	lm/W
Chromaticity (x,y)	(0.3421, 0.3516)	
(u',v')	(0.2094, 0.4842)	
Duv	0.0012	
CCT	5116	K
CRI (Ra)	83	
R9	2	
TM-30: Rf	81	
TM-30: Rg	93	
TM-30: Rcs,h1	-14	

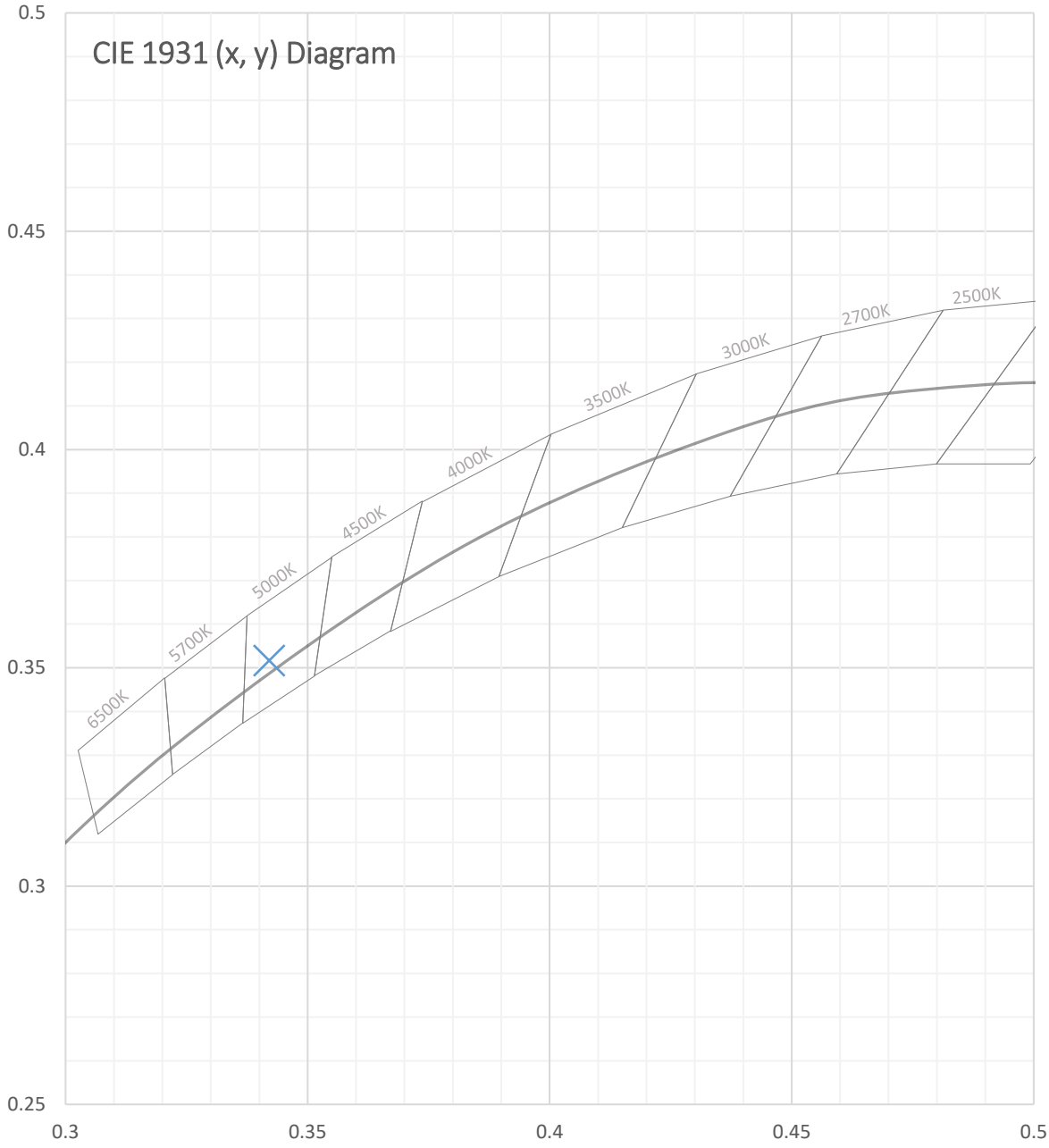
Prepared For:
Topaz Lighting Corp
925 Waverly Avenue
Holtsville, NY 11742, USA

Test date: 05/10/2022
Report date: 05/13/2022

Test Report Number: LLIA001750-005B



Test Report Number: LLIA001750-005B



Test Report Number: LLIA001750-005B

Total Radiant Flux	99.65	W
Total Luminous Flux	31827.1	Lm
Chromaticity CIE 1931 (x, y)	(0.3421, 0.3516)	
Chromaticity CIE 1976 (u', v')	(0.2094, 0.4842)	
Correlated Color Temperature (CCT)	5116	K
Color Rendering Index (Ra)	83	
R1	81	
R2	91	
R3	94	
R4	81	
R5	82	
R6	86	
R7	85	
R8	64	
R9	2	
R10	77	
R11	80	
R12	62	
R13	84	
R14	98	
TM-30: Rf	81	
TM-30: Rg	93	
TM-30: Rcs,h1	-14	
Distance from Planckian Locus (Duv)	0.0012	
Scotopic/Photopic Ratio ǂ	2.012	

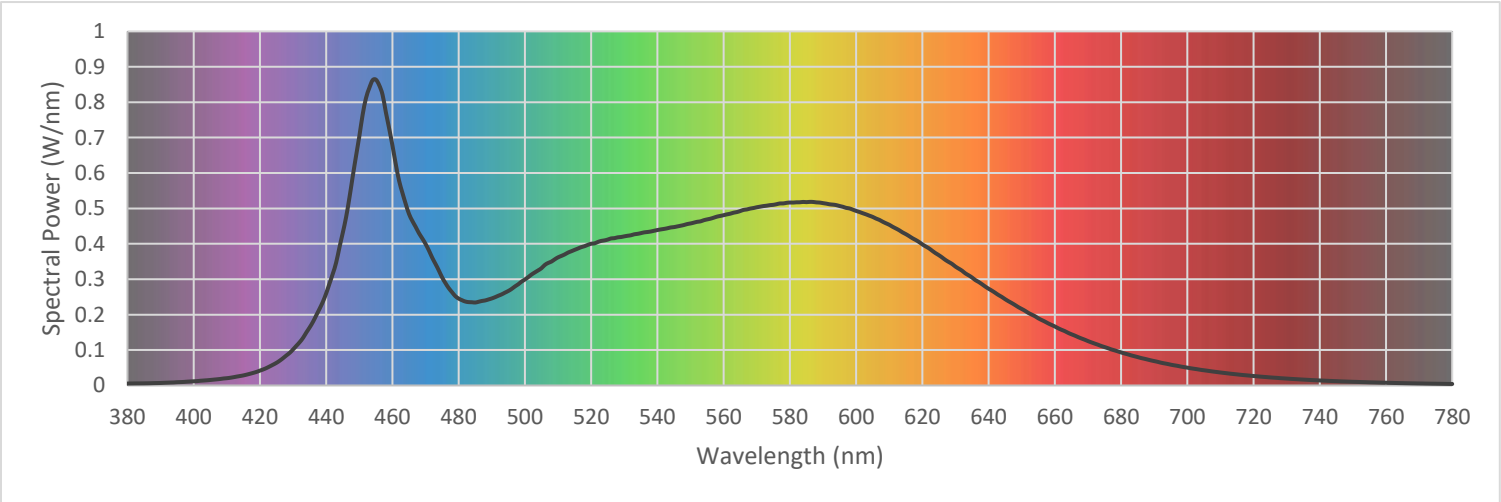
Electrical Data

Voltage	120.0	Vac
Current	1.671	A
Power	199.9	W
Frequency	59.99	Hz
Power Factor	0.997	
Current THD	2.7	%

Test Report Number: LLIA001750-005B

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

380	0.005500	480	0.245346	580	0.516633	680	0.093360
385	0.006036	485	0.234244	585	0.517753	685	0.080220
390	0.007058	490	0.245815	590	0.514907	690	0.068856
395	0.009214	495	0.266912	595	0.506769	695	0.058718
400	0.011827	500	0.299254	600	0.492981	700	0.050354
405	0.015514	505	0.331179	605	0.476052	705	0.042954
410	0.020528	510	0.361841	610	0.453830	710	0.036668
415	0.028455	515	0.382895	615	0.427504	715	0.031326
420	0.041982	520	0.400273	620	0.398508	720	0.026734
425	0.064071	525	0.411952	625	0.367885	725	0.022796
430	0.101868	530	0.421139	630	0.335669	730	0.019514
435	0.163899	535	0.430146	635	0.304937	735	0.016588
440	0.260430	540	0.438920	640	0.273219	740	0.014154
445	0.431303	545	0.447262	645	0.243695	745	0.012146
450	0.704004	550	0.457522	650	0.216118	750	0.010399
455	0.863584	555	0.468943	655	0.189786	755	0.008894
460	0.677474	560	0.480859	660	0.166662	760	0.007701
465	0.484292	565	0.492556	665	0.144631	765	0.006587
470	0.399587	570	0.503236	670	0.125391	770	0.005667
475	0.305021	575	0.510106	675	0.108507	775	0.004910
						780	0.004251

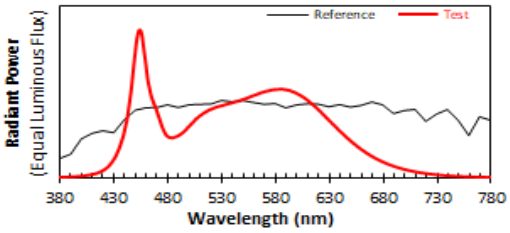


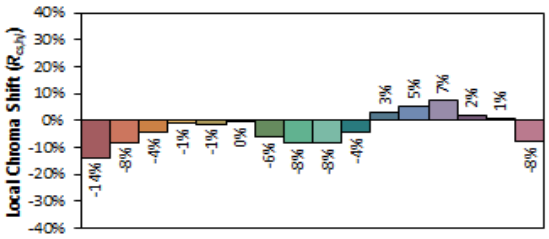
Test Report Number: LLIA001750-005B

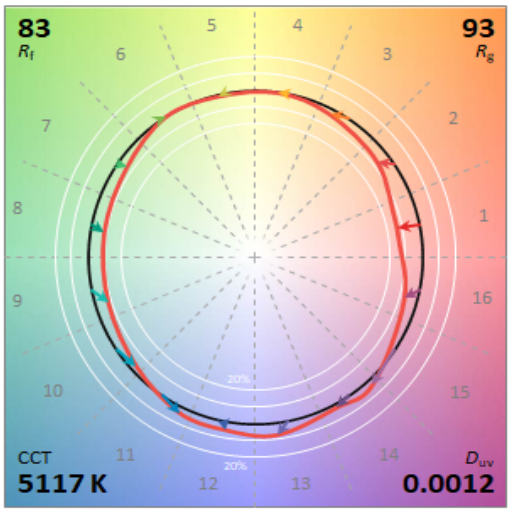
IES TM-30 Details

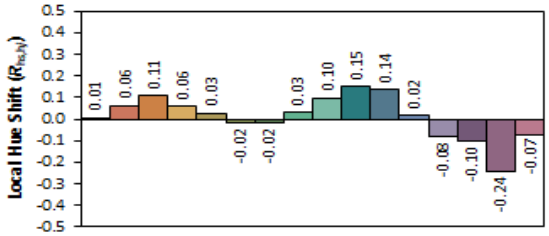
Source: LLIA001750-005B **Manufacturer:** Topaz Lighting Corp

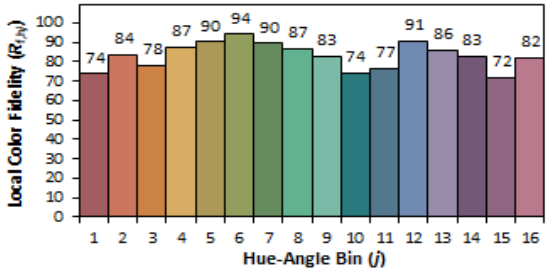
Date: 5/13/2022 **Model:** HBC-200W-PCTS-xx - 5000K, 200W setting

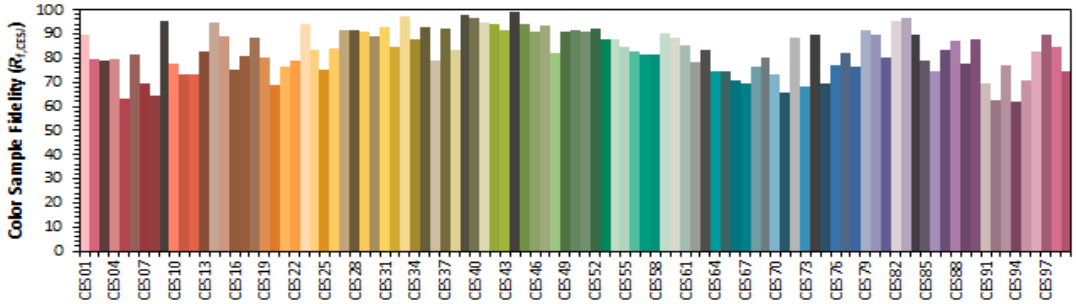












Notes:

x	0.3421
y	0.3515
u'	0.2094
v'	0.4842

CIE 13.3-1995 (CRI)

R_a	83
R_9	2

Test Report Number: LLIA001750-005B

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:	25.0 °C
Test Procedure:	Tested in accordance with the applicable sections of: LM-79-19, LM-78-20, LM-58-20, ANSI_ANSLG C78.377-2017, TM-30-20
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.

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