LightLab INTERNATIONAL ALLENTOWN LLC

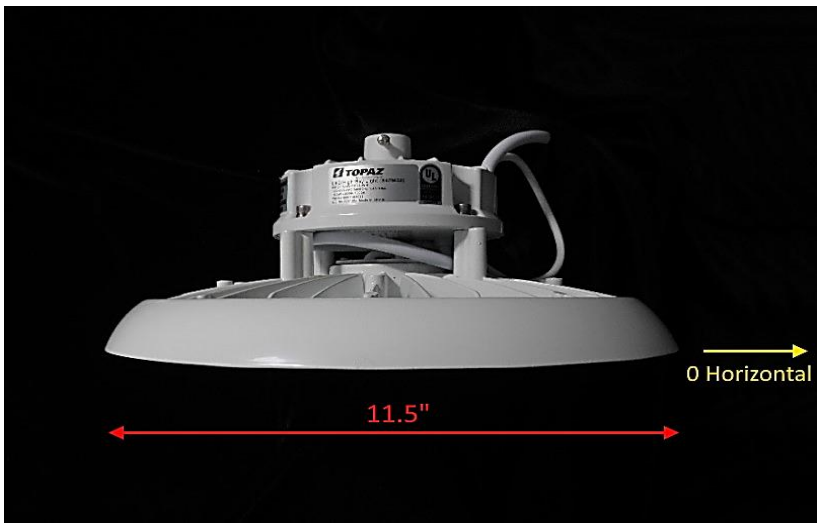
NVLAP TESTING Lab Code: 201079-0

Report of Test

LLIA001750-001A

Indoor Distribution Photometry Test Report

Catalog Number: HBC-150W-PCTS-xx - 5000K, 150W setting
Suspended downlight, cast aluminum luminaire and driver housings, clear plastic enclosure with concentric lenses.
560 white LEDs on white circuit board; 320CW, 240WW. Only 320CW LEDs on for this test.
One LiFud LF-FHB150YAIV LED driver



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

Performance Summary					
Input Voltage	120.0	Vac	Luminous Flux	23997.7	Lumens
Input Current	1.251	A	Total Efficacy	160.4	Lm/W
Input Power	149.6	W	Downward Flux	23997.7	Lumens
Frequency	60.00	Hz	Downward Flux	100.0	% of Total
Power Factor	0.997				
Current THD	3.7	%			

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

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

Signed: Michael L. Grather

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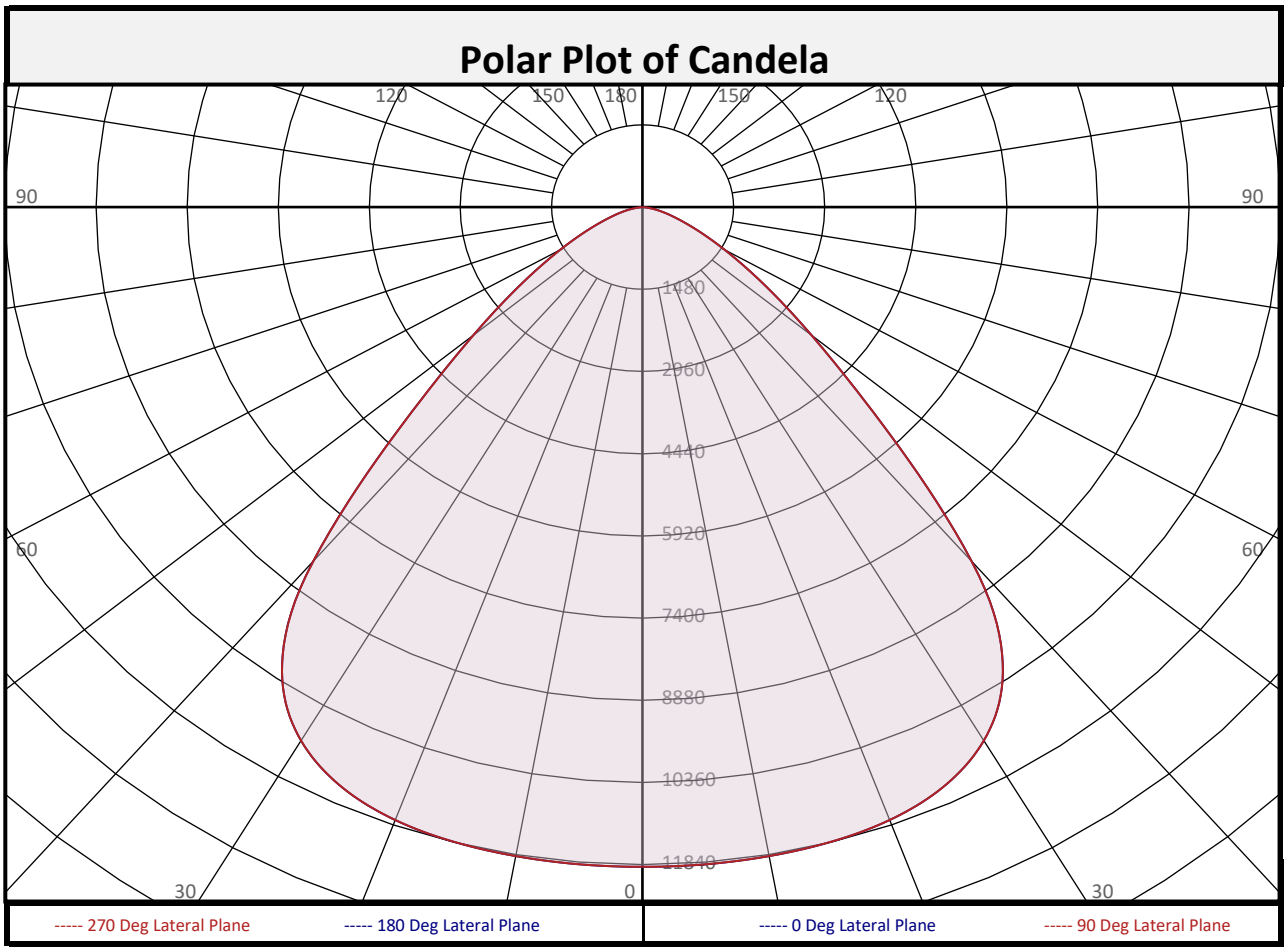

Zonal Flux Summary									
Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total
0-10	1134	4.7%	90-100	0.0	0.0%	0-20	4485	18.7%
10-20	3350	14.0%	100-110	0.0	0.0%	0-30	9797	40.8%
20-30	5313	22.1%	110-120	0.0	0.0%	0-40	16077	67.0%
30-40	6280	26.2%	120-130	0.0	0.0%	0-60	22580	94.1%
40-50	4330	18.0%	130-140	0.0	0.0%	0-80	23945	99.8%
50-60	2172	9.1%	140-150	0.0	0.0%	10-90	22864	95.3%
60-70	994.7	4.1%	150-160	0.0	0.0%	20-50	15923	66.4%
70-80	371.2	1.5%	160-170	0.0	0.0%	40-90	7920	33.0%
80-90	52.3	0.2%	170-180	0.0	0.0%	60-90	1418	5.9%
0-90	23998	100.0%	90-180	0.0	0.0%	0-180	23998	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	11880	11880	11880	11880	11880	11880	11880	11880	11880
	2.5	11881	11881	11881	11881	11881	11881	11881	11881	11881
	5	11879	11879	11879	11879	11879	11879	11879	11879	11879
	7.5	11874	11874	11874	11874	11874	11874	11874	11874	11874
	10	11867	11867	11867	11867	11867	11867	11867	11867	11867
	12.5	11855	11855	11855	11855	11855	11855	11855	11855	11855
	15	11834	11834	11834	11834	11834	11834	11834	11834	11834
	17.5	11801	11801	11801	11801	11801	11801	11801	11801	11801
	20	11746	11746	11746	11746	11746	11746	11746	11746	11746
	22.5	11662	11662	11662	11662	11662	11662	11662	11662	11662
	25	11536	11536	11536	11536	11536	11536	11536	11536	11536
	27.5	11354	11354	11354	11354	11354	11354	11354	11354	11354
	30	11095	11095	11095	11095	11095	11095	11095	11095	11095
	32.5	10734	10734	10734	10734	10734	10734	10734	10734	10734
	35	10215	10215	10215	10215	10215	10215	10215	10215	10215
	37.5	9464	9464	9464	9464	9464	9464	9464	9464	9464
	40	8321	8321	8321	8321	8321	8321	8321	8321	8321
	42.5	6861	6861	6861	6861	6861	6861	6861	6861	6861
	45	5482	5482	5482	5482	5482	5482	5482	5482	5482
	47.5	4407	4407	4407	4407	4407	4407	4407	4407	4407
	50	3584	3584	3584	3584	3584	3584	3584	3584	3584
	52.5	2924	2924	2924	2924	2924	2924	2924	2924	2924
	55	2379	2379	2379	2379	2379	2379	2379	2379	2379
	57.5	1928	1928	1928	1928	1928	1928	1928	1928	1928
	60	1551	1551	1551	1551	1551	1551	1551	1551	1551
	62.5	1237	1237	1237	1237	1237	1237	1237	1237	1237
	65	977	977	977	977	977	977	977	977	977
	67.5	763	763	763	763	763	763	763	763	763
	70	591	591	591	591	591	591	591	591	591
	72.5	455	455	455	455	455	455	455	455	455
	75	343	343	343	343	343	343	343	343	343
	77.5	244	244	244	244	244	244	244	244	244
	80	155	155	155	155	155	155	155	155	155
	82.5	81	81	81	81	81	81	81	81	81
	85	35	35	35	35	35	35	35	35	35
	87.5	5	5	5	5	5	5	5	5	5
	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	90
2	104	97	92	88		101	96	91	87		92	88	85		89	86	83		86	84	81	79
3	96	88	82	76		94	87	81	76		84	79	74		81	77	73		79	75	72	70
4	90	80	73	67		88	79	72	67		76	70	66		74	69	65		72	68	64	62
5	83	73	65	60		82	72	65	59		70	63	59		68	62	58		66	61	58	56
6	78	66	59	53		76	65	58	53		64	57	53		62	57	52		61	56	52	50
7	73	61	53	48		71	60	53	48		59	52	47		57	52	47		56	51	47	45
8	68	56	49	43		67	55	48	43		54	48	43		53	47	43		52	47	43	41
9	64	52	44	40		62	51	44	39		50	44	39		49	43	39		48	43	39	37
10	60	48	41	36		59	48	41	36		47	40	36		46	40	36		45	40	36	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	330.0	8.11	8.11
8.0	185.6	10.81	10.81
10.0	118.8	13.51	13.51
12.0	82.5	16.21	16.21
14.0	60.6	18.91	18.91
16.0	46.4	21.61	21.61

Spacing Criterion

SC: 1.3

Average Luminance (cd/m^2)

	0 deg Plane	45 deg Plane	90 deg Plane
0	177275	177275	177275
45	115696	115696	115696
55	61902	61902	61902
65	34507	34507	34507
75	19802	19802	19802
85	6010	6010	6010

Beam and Field Angle

0-180 Degree Plane

Beam Angle: 88.2°

Field Angle: 125.9°

90-270 Degree Plane

Beam Angle: 88.2°

Field Angle: 125.9°

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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	23.0	24.4	23.4	24.7	25.0	23.0	24.4	23.4	24.7	25.0
	3H	23.6	24.8	24.0	25.2	25.5	23.6	24.8	24.0	25.2	25.5
	4H	23.8	24.9	24.2	25.3	25.7	23.8	24.9	24.2	25.3	25.7
	6H	23.9	24.9	24.3	25.3	25.7	23.9	24.9	24.3	25.3	25.7
	8H	23.9	24.8	24.3	25.2	25.6	23.9	24.8	24.3	25.2	25.6
	12H	23.8	24.7	24.3	25.1	25.6	23.8	24.7	24.3	25.1	25.6
4H	2H	23.2	24.3	23.6	24.7	25.1	23.2	24.3	23.6	24.7	25.1
	3H	24.0	24.9	24.4	25.3	25.7	24.0	24.9	24.4	25.3	25.7
	4H	24.2	25.0	24.7	25.4	25.9	24.2	25.0	24.7	25.4	25.9
	6H	24.3	25.0	24.8	25.5	25.9	24.3	25.0	24.8	25.5	25.9
	8H	24.3	25.0	24.8	25.4	25.9	24.3	25.0	24.8	25.4	25.9
	12H	24.3	24.9	24.8	25.4	25.8	24.3	24.9	24.8	25.4	25.8
8H	4H	24.3	24.9	24.7	25.3	25.8	24.3	24.9	24.7	25.3	25.8
	6H	24.4	24.9	24.9	25.4	25.9	24.4	24.9	24.9	25.4	25.9
	8H	24.4	24.9	24.9	25.4	25.9	24.4	24.9	24.9	25.4	25.9
	12H	24.4	24.8	24.9	25.3	25.8	24.4	24.8	24.9	25.3	25.8
12H	4H	24.2	24.8	24.7	25.3	25.7	24.2	24.8	24.7	25.3	25.7
	6H	24.3	24.8	24.9	25.3	25.8	24.3	24.8	24.9	25.3	25.8
	8H	24.4	24.8	24.9	25.3	25.9	24.4	24.8	24.9	25.3	25.9

Maximum UGR = 25.9

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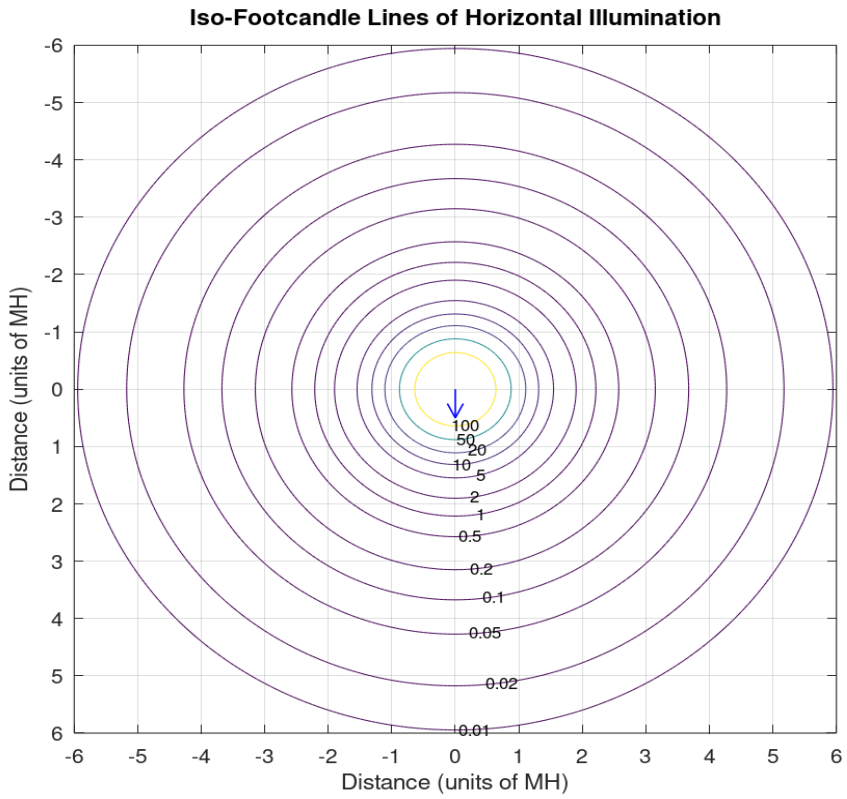
Iso-Illuminance Plot



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	25.3 °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

LLIA001750-001B

Integrating Sphere Report
Catalog Number: HBC-150W-PCTS-xx - 5000K, 150W setting
Suspended downlight, cast aluminum luminaire and driver housings, clear plastic enclosure with concentric lenses.
560 white LEDs on white circuit board; 320CW, 240WW. Only 320CW LEDs on for this test.
One LiFud LF-FHB150YAIV LED driver

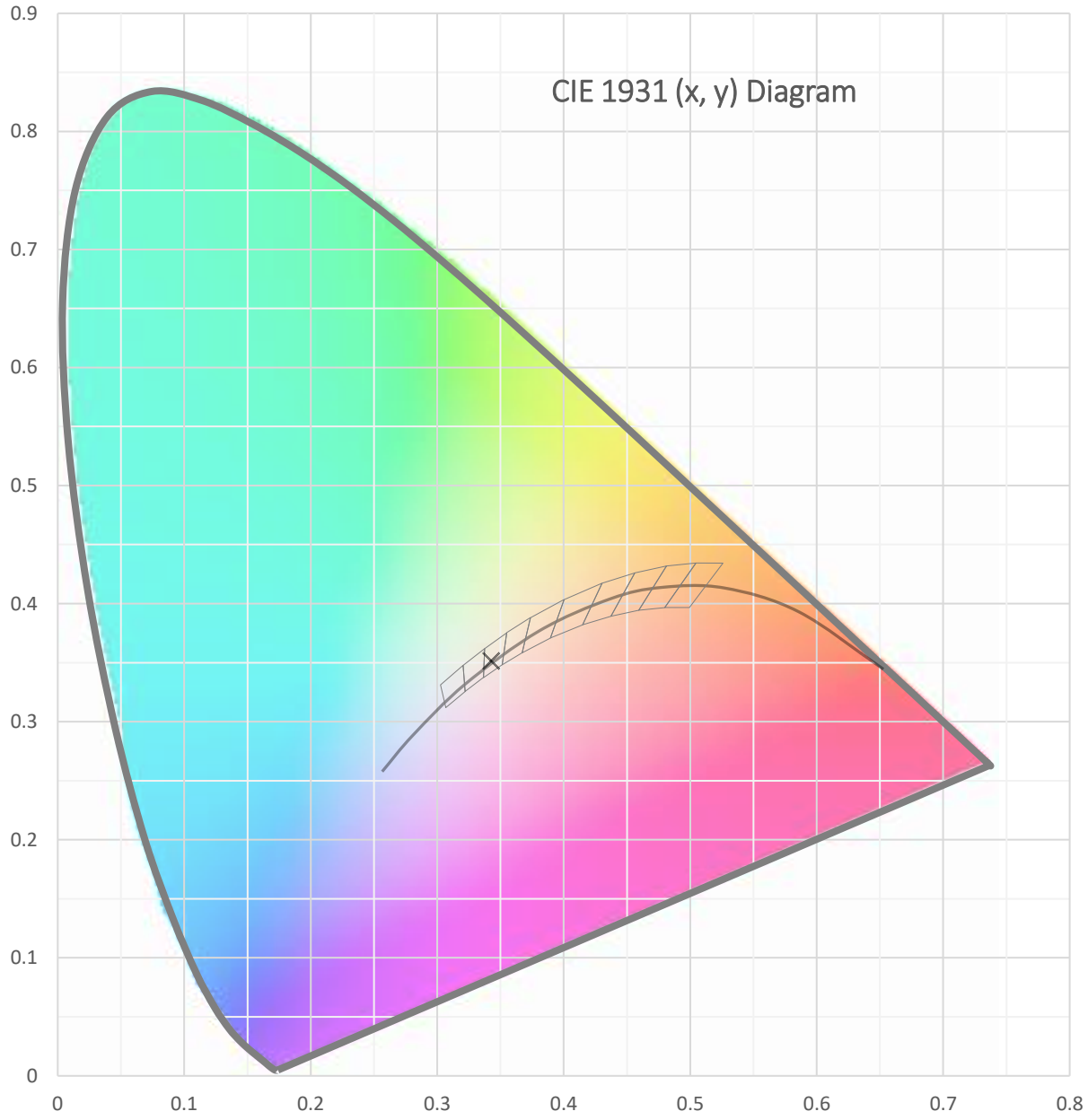
Performance Summary

Voltage	120.0	Vac
Current	1.249	A
Power	149.4	W
Frequency	59.99	Hz
Power Factor	0.996	
Current THD	3.8	%
Total Luminous Flux	23821.2	lm
Efficacy	159.4	lm/W
Chromaticity (x,y)	(0.3427, 0.3513)	
(u',v')	(0.2099, 0.4842)	
Duv	0.0008	
CCT	5093	K
CRI (Ra)	83	
R9	3	
TM-30: Rf	81	
TM-30: Rg	93	
TM-30: Rcs,h1	-14	

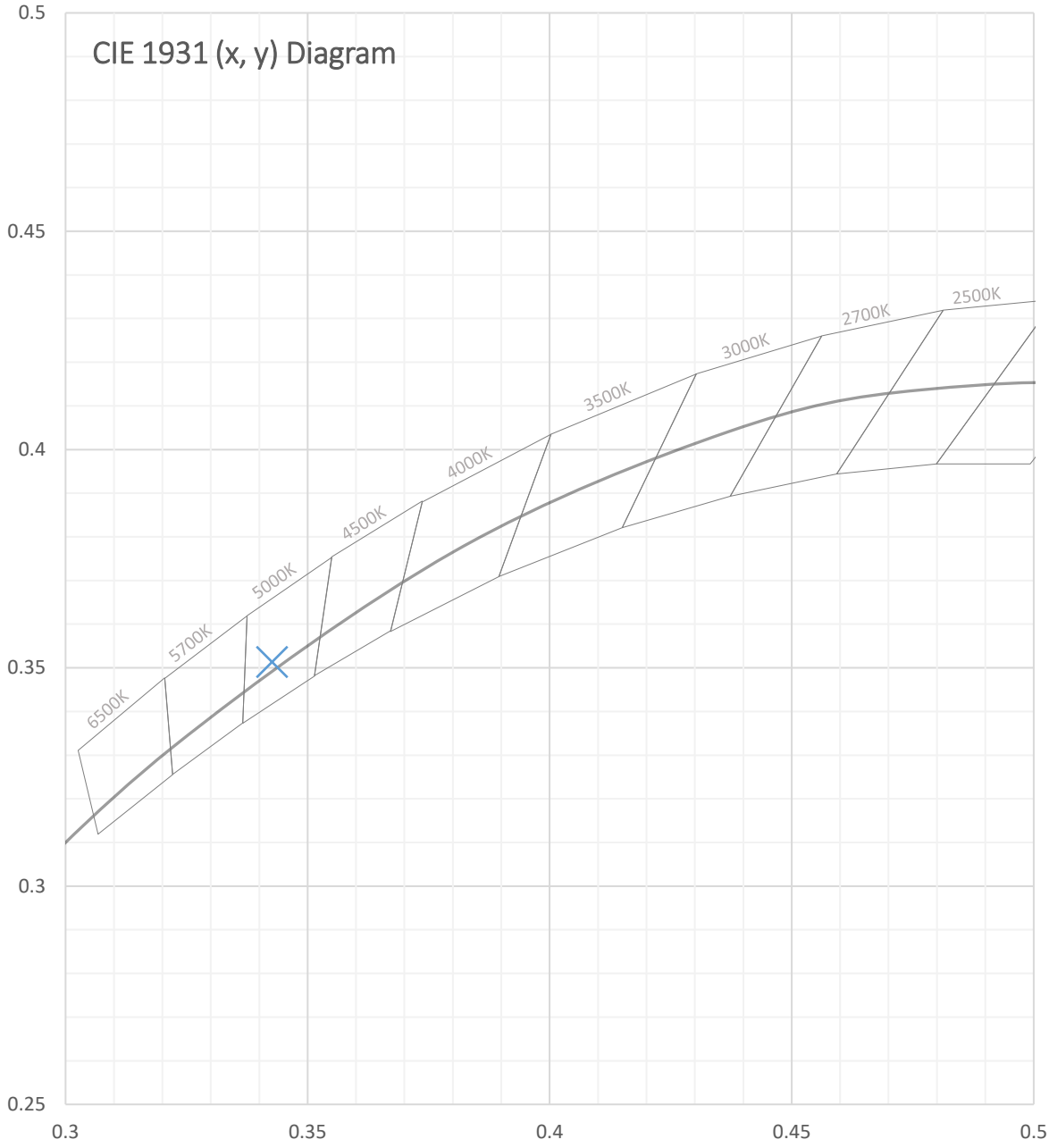
Prepared For:
Topaz Lighting Corp
925 Waverly Avenue
Holtsville, NY 11742, USA

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

Test Report Number: LLIA001750-001B



Test Report Number: LLIA001750-001B



Test Report Number: LLIA001750-001B

Total Radiant Flux	74.70	W
Total Luminous Flux	23821.2	Lm
Chromaticity CIE 1931 (x, y)	(0.3427, 0.3513)	
Chromaticity CIE 1976 (u', v')	(0.2099, 0.4842)	
Correlated Color Temperature (CCT)	5093	K
Color Rendering Index (Ra)	83	
R1	82	
R2	91	
R3	94	
R4	81	
R5	82	
R6	86	
R7	85	
R8	64	
R9	3	
R10	78	
R11	80	
R12	63	
R13	85	
R14	98	
TM-30: Rf	81	
TM-30: Rg	93	
TM-30: Rcs,h1	-14	
Distance from Planckian Locus (Duv)	0.0008	
Scotopic/Photopic Ratio ǂ	2.010	

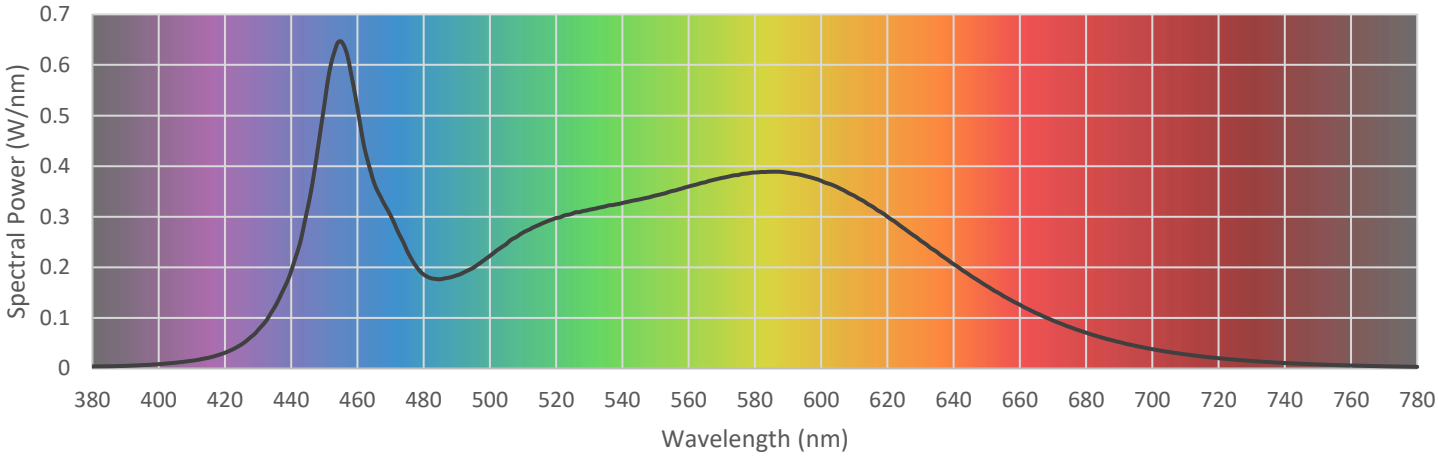
Electrical Data

Voltage	120.0	Vac
Current	1.249	A
Power	149.4	W
Frequency	59.99	Hz
Power Factor	0.996	
Current THD	3.8	%

Test Report Number: LLIA001750-001B

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

380	0.004054	480	0.185821	580	0.387455	680	0.070716
385	0.004339	485	0.176202	585	0.388894	685	0.060777
390	0.005106	490	0.184165	590	0.386847	690	0.052197
395	0.006658	495	0.199122	595	0.380912	695	0.044545
400	0.008542	500	0.222641	600	0.371121	700	0.038189
405	0.011255	505	0.246275	605	0.358156	705	0.032588
410	0.015151	510	0.268666	610	0.341555	710	0.027844
415	0.021123	515	0.284333	615	0.321941	715	0.023749
420	0.031049	520	0.297483	620	0.300208	720	0.020267
425	0.047600	525	0.306459	625	0.276990	725	0.017324
430	0.076036	530	0.313701	630	0.252922	730	0.014830
435	0.121176	535	0.320643	635	0.230208	735	0.012610
440	0.192732	540	0.327061	640	0.206275	740	0.010768
445	0.318116	545	0.333900	645	0.183953	745	0.009230
450	0.521014	550	0.341907	650	0.163203	750	0.007926
455	0.646756	555	0.350705	655	0.143413	755	0.006778
460	0.514510	560	0.359648	660	0.125967	760	0.005852
465	0.367296	565	0.367983	665	0.109419	765	0.005021
470	0.302562	570	0.376632	670	0.094872	770	0.004319
475	0.232259	575	0.382408	675	0.082070	775	0.003742
						780	0.003233

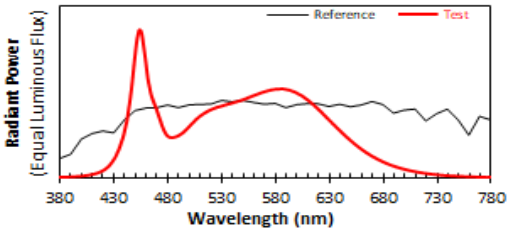


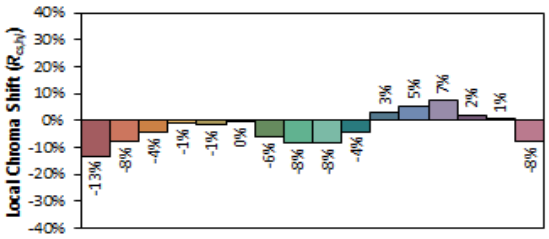
Test Report Number: LLIA001750-001B

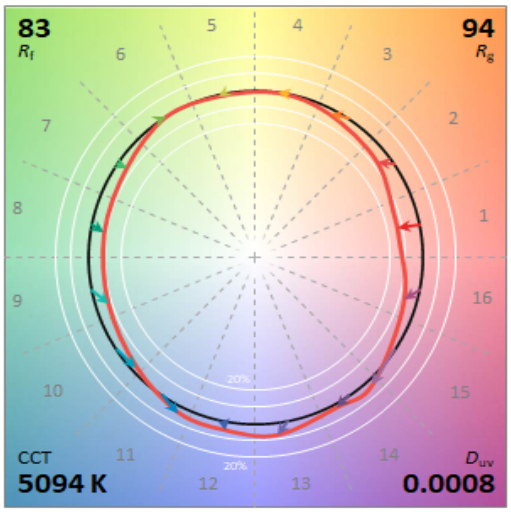
IES TM-30 Details

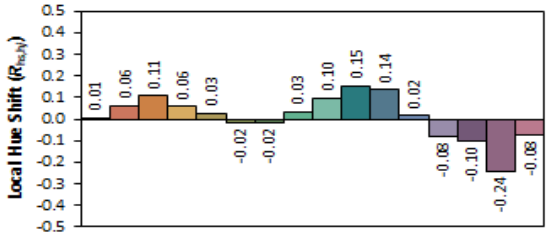
Source: LLIA001750-001A **Manufacturer:** Topaz Lighting Corp

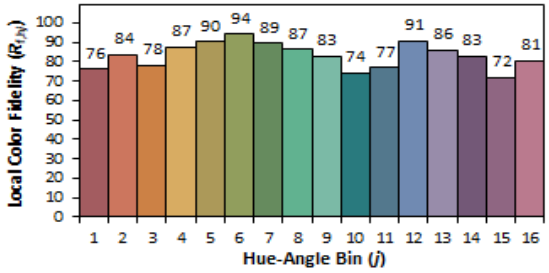
Date: 5/12/2022 **Model:** HBC-150W-PCTS-xx - 5000K, 150W setting

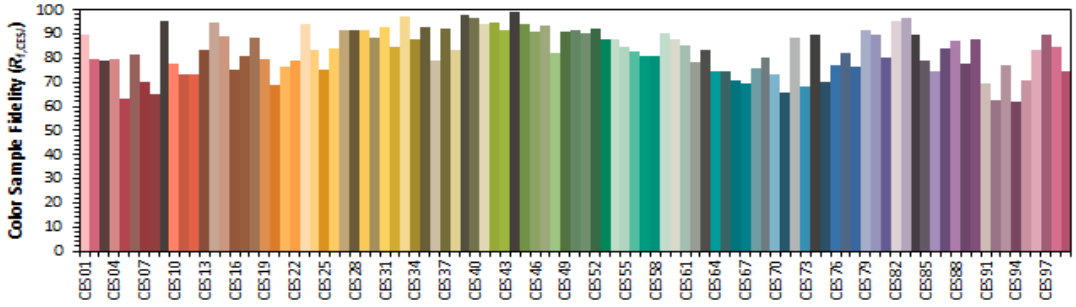












Notes:

x	0.3426
y	0.3512
u'	0.2099
v'	0.4841

CIE 13.3-1995 (CRI)

R_a	83
R_9	3

Test Report Number: LLIA001750-001B

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 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.

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