LightLab INTERNATIONAL ALLENTOWN LLC

NVLAP TESTING Lab Code: 201079-0

Report of Test

LLIA001306-002

Indoor Distribution Photometry Test Report

Catalog Number: F-WPC/20W/CTS/BZ-96 - 4000K Setting
Surface mounted, cast aluminum housing, formed white enamel
aluminum reflector, clear linear prismatic lens with frosted side sections.
90 white LEDs, one MWP03-20W-15C3B*2-2835-A0 LED board
One HB-LPG020G-52 LED Driver

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

Performance Summary					
Input Voltage	120.0	V	Luminous Flux	2720.2	Lumens
Input Current	0.1546	A	Total Efficacy	148.2	Lm/W
Input Power	18.36	W	Downward Flux	2428.9	Lumens
Frequency	60.00	Hz	Downward Flux	89.3	% of Total
Power Factor	0.990				
Current THD	7.8	%			

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

Test date: 08/24/2020
Report date: 08/26/2020

Signed: Michael L. Grather

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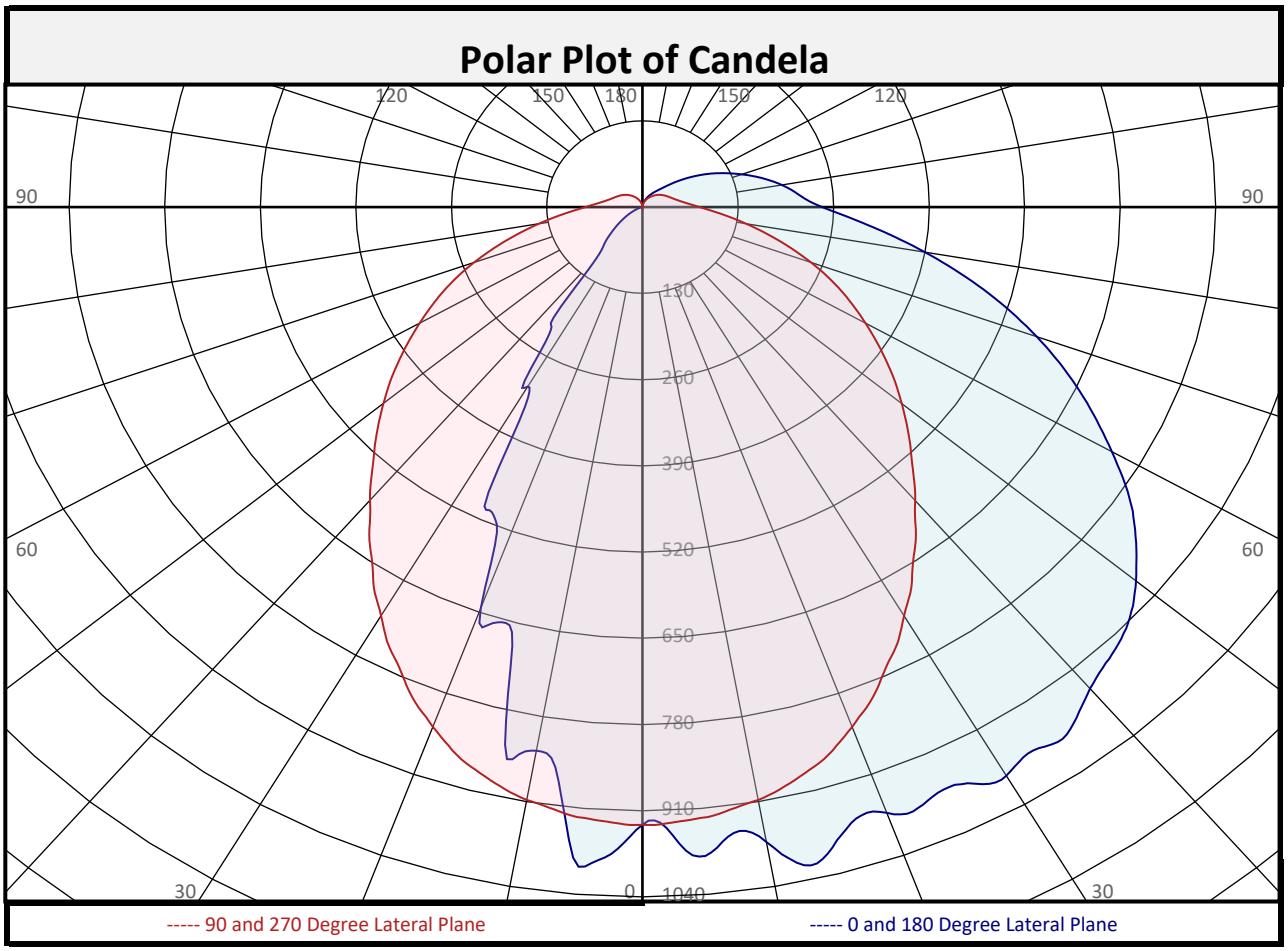

Zonal Flux Summary									
Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total
0-10	90.1	3.3%	90-100	95.3	3.5%	0-20	338.1	12.4%
10-20	248.0	9.1%	100-110	71.5	2.6%	0-30	682.5	25.1%
20-30	344.4	12.7%	110-120	51.5	1.9%	0-40	1062	39.0%
30-40	379.0	13.9%	120-130	34.0	1.2%	0-60	1774	65.2%
40-50	368.0	13.5%	130-140	20.4	0.7%	0-80	2287	84.1%
50-60	344.6	12.7%	140-150	11.3	0.4%	10-90	2339	86.0%
60-70	294.1	10.8%	150-160	5.3	0.2%	20-50	1091	40.1%
70-80	218.8	8.0%	160-170	1.7	0.1%	40-90	1367	50.3%
80-90	141.9	5.2%	170-180	0.2	0.0%	60-90	654.8	24.1%
0-90	2429	89.3%	90-180	291.3	10.7%	0-180	2720	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	932	932	932	932	932	932	932	932	932
	2.5	948	944	933	924	929	945	963	973	976
	5	982	983	970	929	924	958	982	996	998
	7.5	952	956	973	946	916	966	983	900	874
	10	972	954	943	956	908	965	883	828	832
	12.5	1016	997	933	949	894	961	817	837	853
	15	999	1004	954	923	878	921	812	760	685
	17.5	967	965	968	892	859	855	813	649	657
	20	972	941	942	860	834	793	698	657	644
	22.5	980	951	898	838	808	750	623	578	518
	25	969	938	866	827	776	724	613	501	504
	27.5	980	920	855	816	747	699	586	475	363
	30	990	922	839	797	712	670	506	345	313
	32.5	977	911	808	758	681	628	449	297	261
	35	985	892	784	711	643	568	411	257	217
	37.5	970	884	770	666	611	511	351	198	136
	40	948	857	745	632	577	467	285	156	90
	42.5	933	830	715	605	545	439	253	101	78
	45	921	810	689	578	516	414	226	83	68
	47.5	902	792	659	546	488	391	192	73	58
	50	877	771	630	518	460	363	168	64	49
	52.5	847	746	603	495	433	334	146	55	41
	55	815	719	578	474	405	306	124	46	33
	57.5	779	690	554	450	378	281	109	39	27
	60	737	657	527	426	351	259	97	33	22
	62.5	697	622	498	402	324	237	87	27	17
	65	656	588	469	375	298	214	77	22	12
	67.5	615	553	439	344	271	192	68	18	9
	70	571	515	408	313	244	170	60	14	6
	72.5	526	475	377	284	217	150	52	11	4
	75	481	435	345	257	190	130	46	9	2
	77.5	434	394	313	232	166	113	40	7	1
	80	390	354	281	208	143	97	36	6	0
	82.5	347	315	250	185	122	83	32	5	0
	85	307	279	222	164	105	72	29	5	0
	87.5	273	248	197	145	90	62	27	4	0
	90	244	222	177	130	78	55	25	4	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	244	222	177	130	78	55	25	4	0
	92.5	225	205	162	118	69	49	23	4	0
	95	213	193	152	109	62	44	22	4	0
	97.5	203	183	143	101	57	40	20	4	0
	100	192	173	134	95	52	37	19	4	0
	102.5	180	163	126	89	49	35	18	4	0
	105	169	152	119	84	46	33	18	4	0
	107.5	156	141	111	79	44	32	17	4	0
	110	144	131	104	74	41	31	17	4	0
	112.5	132	121	97	70	40	30	16	4	0
	115	121	111	90	66	38	29	16	4	0
	117.5	110	101	84	62	37	28	15	4	0
	120	99	91	77	58	35	27	15	4	0
	122.5	88	82	71	54	34	26	14	3	0
	125	77	73	65	51	32	25	14	4	0
	127.5	68	64	59	47	31	24	13	4	0
	130	58	56	54	44	29	23	13	3	0
	132.5	50	50	49	41	27	21	12	3	0
	135	43	44	45	37	26	20	11	3	0
	137.5	37	39	41	34	24	19	10	3	0
	140	33	35	37	31	22	17	10	3	0
	142.5	30	32	34	29	21	16	9	3	0
	145	27	29	30	26	19	15	8	2	0
	147.5	24	26	27	24	18	13	7	2	0
	150	21	23	24	21	16	12	7	2	0
	152.5	19	20	22	19	14	11	6	2	0
	155	16	18	19	17	13	9	5	2	0
	157.5	14	15	16	14	11	8	4	1	0
	160	12	13	14	12	10	7	4	1	0
	162.5	10	11	12	10	8	6	3	1	0
	165	8	9	9	8	7	5	3	1	0
	167.5	6	7	7	7	5	4	2	1	0
	170	5	5	5	5	4	3	2	1	0
	172.5	3	4	4	4	3	2	2	1	0
	175	2	2	2	2	2	2	1	1	0
	177.5	1	1	1	1	1	1	1	1	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	116	116	116	116		113	113	113	113		105	105	105		98	98	98		92	92	92	89
1	105	99	95	90		101	96	92	88		90	86	83		84	81	79		79	77	74	72
2	95	86	79	73		91	83	77	71		78	73	68		73	69	65		69	65	62	59
3	87	76	67	60		83	73	65	59		69	62	57		64	59	54		61	56	52	50
4	79	67	58	51		76	65	57	50		61	54	48		58	52	47		54	49	45	42
5	73	60	51	44		70	58	50	44		55	48	42		52	46	41		49	44	39	37
6	67	54	45	39		65	53	44	38		50	42	37		47	41	36		45	39	35	32
7	63	49	40	34		60	48	40	34		45	38	33		43	37	32		41	35	31	29
8	58	45	37	31		56	44	36	30		42	35	29		40	33	29		38	32	28	26
9	55	41	33	28		53	40	33	27		38	32	27		37	30	26		35	29	25	23
10	51	38	30	25		50	37	30	25		36	29	24		34	28	24		32	27	23	21

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
10.0	9.3	11.74	11.48
12.0	6.5	14.09	13.77
14.0	4.8	16.44	16.07
16.0	3.6	18.78	18.36
18.0	2.9	21.13	20.66
20.0	2.3	23.48	22.95

Average Luminance (cd/m^2)

	0 deg Plane	45 deg Plane	90 deg Plane
0	102680	102680	102680
45	62426	46133	50970
55	54859	38344	42654
65	45191	31766	34731
75	34978	24694	25677
85	24464	17322	17406

Spacing Criterion

0 degree plane:	1.6
90 degree plane:	1.1
180 degree plane:	0.8
270 degree plane:	1.1

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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	27.5	28.9	28.0	29.4	30.0	22.2	23.6	22.7	24.1	24.7
	3H	29.7	31.0	30.3	31.6	32.2	23.8	25.1	24.3	25.6	26.3
	4H	30.7	31.9	31.3	32.5	33.1	24.4	25.6	25.0	26.2	26.8
	6H	31.6	32.7	32.2	33.3	33.9	24.9	26.0	25.5	26.6	27.2
	8H	32.0	33.0	32.5	33.6	34.3	25.1	26.2	25.7	26.7	27.4
	12H	32.3	33.3	32.9	33.9	34.6	25.2	26.3	25.8	26.8	27.5
4H	2H	27.7	28.9	28.3	29.5	30.1	22.9	24.2	23.5	24.7	25.3
	3H	30.2	31.2	30.8	31.8	32.5	24.8	25.8	25.3	26.4	27.0
	4H	31.3	32.3	31.9	32.9	33.6	25.5	26.4	26.1	27.0	27.7
	6H	32.4	33.2	33.0	33.8	34.5	26.1	26.9	26.7	27.6	28.2
	8H	32.8	33.6	33.5	34.3	35.0	26.3	27.1	26.9	27.7	28.4
	12H	33.3	34.0	33.9	34.7	35.4	26.5	27.2	27.2	27.9	28.6
8H	4H	31.5	32.2	32.1	32.9	33.6	26.0	26.8	26.6	27.4	28.1
	6H	32.6	33.3	33.3	34.0	34.7	26.8	27.4	27.4	28.1	28.8
	8H	33.2	33.8	33.9	34.5	35.2	27.1	27.7	27.8	28.4	29.1
	12H	33.8	34.3	34.5	35.0	35.8	27.4	27.9	28.1	28.6	29.4
12H	4H	31.4	32.2	32.1	32.8	33.5	26.1	26.9	26.8	27.5	28.2
	6H	32.7	33.3	33.3	33.9	34.7	27.0	27.6	27.6	28.2	29.0
	8H	33.3	33.8	33.9	34.5	35.3	27.3	27.9	28.0	28.6	29.3

Maximum UGR = 35.8

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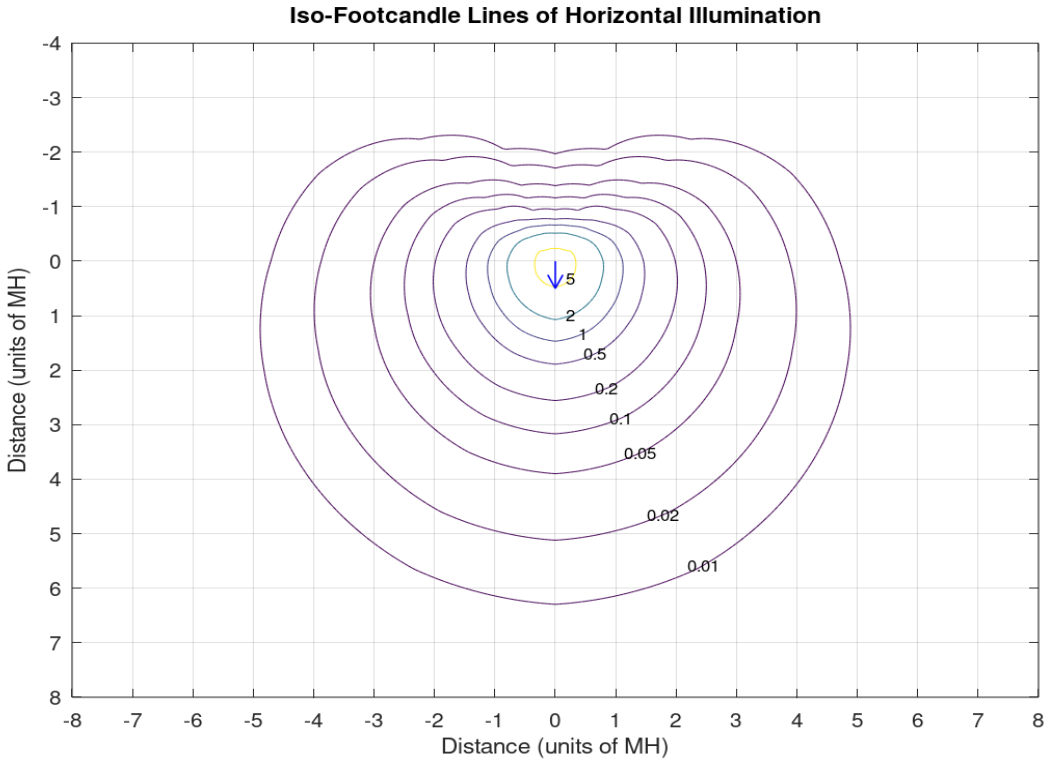
Iso-Illuminance Plot



The isofootcandle values shown in the plot above are based on a mounting height of h = 12.0 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	25.8 °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 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.