LightLab INTERNATIONAL ALLENTOWN LLC

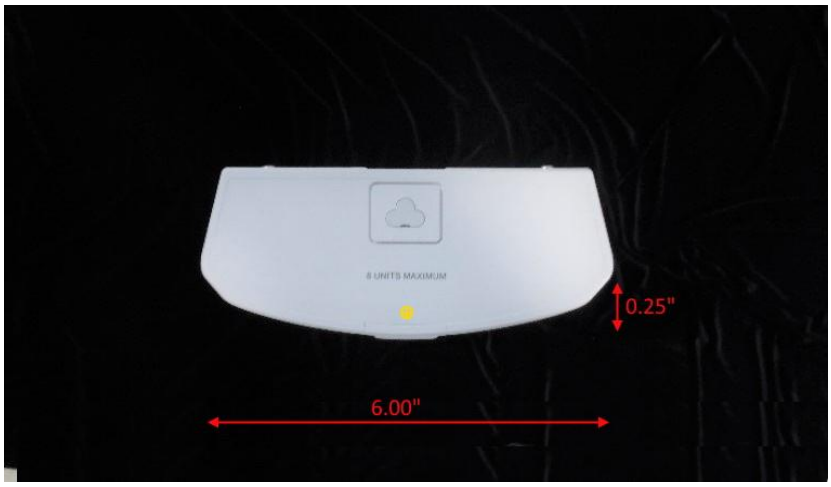
NVLAP TESTING Lab Code: 201079-0

Report of Test

LLIA001483-001

Indoor Distribution Photometry Test Report

Catalog Number: LWRAP4/48W/CTS/D-98 - 4000K Setting
Surface/pendant mounted, formed white enamel steel
housing, translucent white plastic enclosure.
480 LEDs, one LED board with 240 cool white and 240 warm white LEDs each.
One unmarked LED driver



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

Performance Summary					
Input Voltage	120.0	V	Luminous Flux	5702.5	Lumens
Input Current	0.3842	A	Total Efficacy	124.9	Lm/W
Input Power	45.67	W	Downward Flux	5660.4	Lumens
Frequency	60.00	Hz	Downward Flux	99.3	% of Total
Power Factor	0.991				
Current THD	10.1	%			

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

Test date: 06/23/2021
Report date: 06/24/2021

Signed: Michael L. Grather

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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

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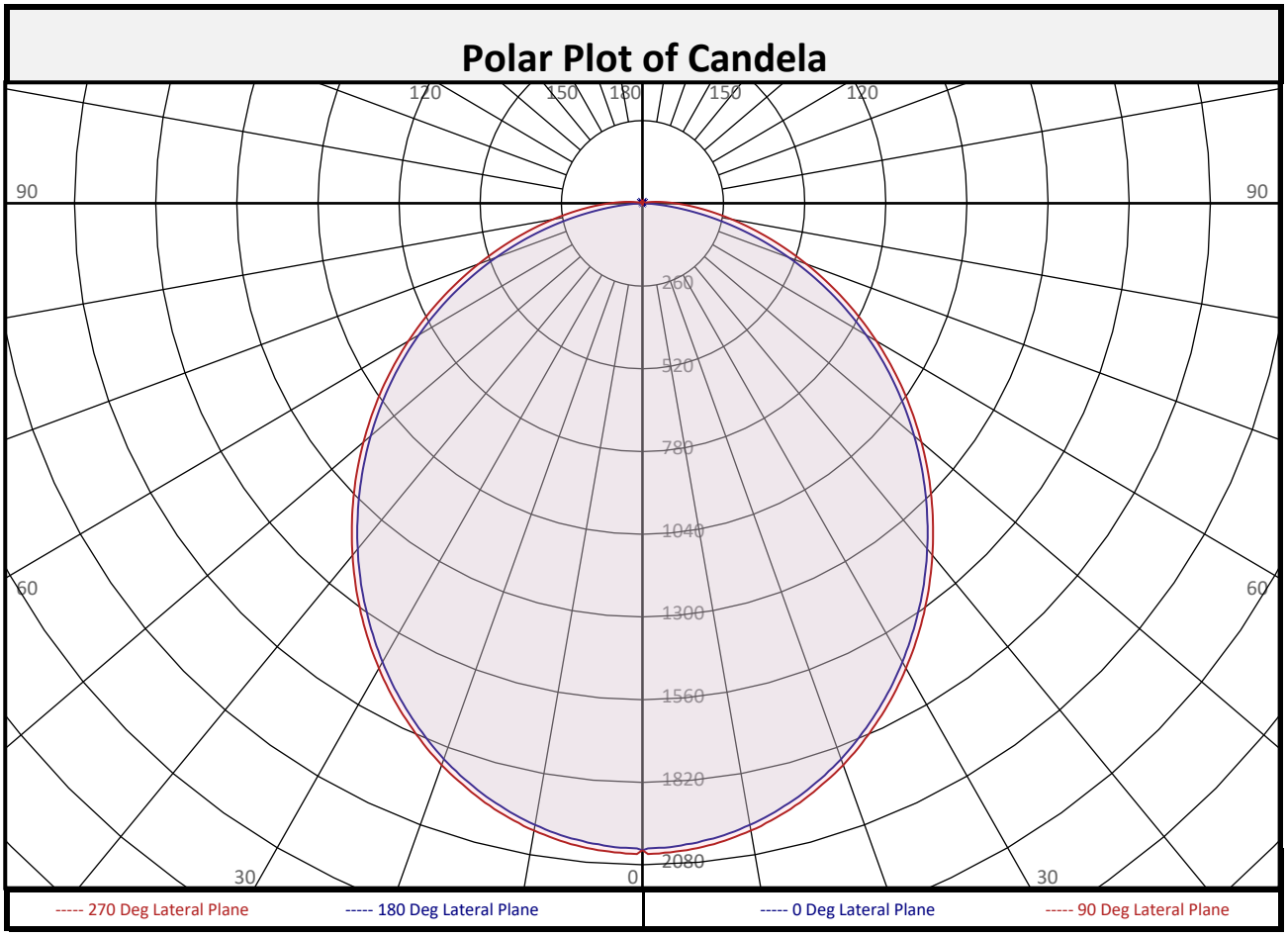

Zonal Flux Summary

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	192.2	3.4%	90-100	27.8	0.5%	0-20	738.9	13.0%
10-20	546.7	9.6%	100-110	4.3	0.1%	0-30	1558	27.3%
20-30	819.6	14.4%	110-120	1.5	0.0%	0-40	2534	44.4%
30-40	975.4	17.1%	120-130	2.1	0.0%	0-60	4430	77.7%
40-50	999.7	17.5%	130-140	2.1	0.0%	0-80	5514	96.7%
50-60	896.0	15.7%	140-150	1.8	0.0%	10-90	5468	95.9%
60-70	682.7	12.0%	150-160	1.3	0.0%	20-50	2795	49.0%
70-80	401.8	7.0%	160-170	0.9	0.0%	40-90	3127	54.8%
80-90	146.4	2.6%	170-180	0.3	0.0%	60-90	1231	21.6%
0-90	5660	99.3%	90-180	42.0	0.7%	0-180	5702	100.0%

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Luminous Intensity (Candela) Table

Vertical (Gamma) Angles	Lateral (C-Plane) Angles									
	0	22.5	45	67.5	90	112.5	135	157.5	180
0	2034	2034	2034	2034	2034	2034	2034	2034	2034
2.5	2026	2026	2029	2036	2043	2036	2029	2026	2026
5	2017	2018	2021	2029	2035	2029	2021	2018	2017
7.5	2003	2003	2007	2015	2021	2015	2007	2003	2003
10	1984	1984	1988	1996	2002	1996	1988	1984	1984
12.5	1960	1961	1965	1973	1979	1973	1965	1961	1960
15	1931	1932	1936	1944	1951	1944	1936	1932	1931
17.5	1897	1898	1903	1911	1916	1911	1903	1898	1897
20	1860	1860	1865	1874	1881	1874	1865	1860	1860
22.5	1816	1818	1823	1832	1838	1832	1823	1818	1816
25	1769	1772	1777	1786	1791	1786	1777	1772	1769
27.5	1720	1721	1728	1738	1743	1738	1728	1721	1720
30	1666	1669	1674	1685	1689	1685	1674	1669	1666
32.5	1607	1610	1617	1628	1633	1628	1617	1610	1607
35	1548	1551	1559	1569	1574	1569	1559	1551	1548
37.5	1485	1488	1496	1507	1511	1507	1496	1488	1485
40	1419	1422	1431	1442	1446	1442	1431	1422	1419
42.5	1351	1355	1364	1376	1379	1376	1364	1355	1351
45	1282	1286	1296	1307	1311	1307	1296	1286	1282
47.5	1210	1214	1225	1237	1240	1237	1225	1214	1210
50	1137	1141	1152	1165	1168	1165	1152	1141	1137
52.5	1062	1066	1079	1091	1094	1091	1079	1066	1062
55	985	990	1003	1016	1020	1016	1003	990	985
57.5	907	913	926	939	944	939	926	913	907
60	828	834	849	863	867	863	849	834	828
62.5	746	754	770	785	789	785	770	754	746
65	666	673	691	707	712	707	691	673	666
67.5	583	592	612	630	636	630	612	592	583
70	500	510	533	554	560	554	533	510	500
72.5	418	430	455	479	487	479	455	430	418
75	337	350	380	408	418	408	380	350	337
77.5	257	273	308	340	352	340	308	273	257
80	183	201	242	278	291	278	242	201	183
82.5	114	137	184	222	235	222	184	137	114
85	56	84	133	172	185	172	133	84	56
87.5	16	45	92	129	142	129	92	45	16
90	0	20	59	92	105	92	59	20	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	20	59	92	105	92	59	20	0
	92.5	0	7	36	64	75	64	36	7	0
	95	0	3	20	42	51	42	20	3	0
	97.5	0	0	11	26	33	26	11	0	0
	100	0	0	6	16	21	16	6	0	0
	102.5	0	0	4	9	13	9	4	0	0
	105	0	0	3	6	8	6	3	0	0
	107.5	0	0	3	5	6	5	3	0	0
	110	0	0	2	4	5	4	2	0	0
	112.5	0	0	0	4	4	4	0	0	0
	115	0	0	0	3	4	3	0	0	0
	117.5	0	0	0	3	3	3	0	0	0
	120	2	2	0	3	3	3	0	2	2
	122.5	3	2	2	2	3	2	2	2	3
	125	3	3	2	2	2	2	2	3	3
	127.5	3	3	3	2	0	2	3	3	3
	130	3	3	3	2	0	2	3	3	3
	132.5	3	3	3	3	0	3	3	3	3
	135	3	3	3	3	2	3	3	3	3
	137.5	3	3	3	3	2	3	3	3	3
	140	3	3	3	3	0	3	3	3	3
	142.5	3	3	3	3	2	3	3	3	3
	145	3	3	3	3	3	3	3	3	3
	147.5	2	3	3	3	3	3	3	3	2
	150	2	3	3	3	3	3	3	3	2
	152.5	2	3	3	3	3	3	3	3	2
	155	3	3	3	3	3	3	3	3	3
	157.5	3	3	3	3	3	3	3	3	3
	160	3	3	3	3	3	3	3	3	3
	162.5	3	3	3	3	3	3	3	3	3
	165	3	3	3	3	3	3	3	3	3
	167.5	3	3	3	3	4	3	3	3	3
	170	3	3	3	3	4	3	3	3	3
	172.5	3	3	3	4	4	4	3	3	3
	175	3	3	3	3	4	3	3	3	3
	177.5	4	3	3	3	4	3	3	3	4
	180	3	3	3	3	3	3	3	3	3

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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		101	101	101	99
1	108	103	99	95		105	101	97	93		97	93	90		93	90	87		89	87	85	83
2	98	90	83	77		96	88	82	76		84	79	74		81	77	73		78	74	71	69
3	90	79	71	64		87	77	70	64		74	68	62		71	66	61		69	64	60	58
4	82	70	61	54		80	69	60	54		66	59	53		64	57	52		61	56	52	49
5	76	63	54	47		73	61	53	47		59	52	46		57	51	45		55	49	45	43
6	70	56	47	41		68	55	47	41		53	46	40		52	45	40		50	44	39	37
7	65	51	42	36		63	50	42	36		49	41	36		47	40	35		46	40	35	33
8	60	47	38	32		59	46	38	32		45	37	32		43	37	32		42	36	31	29
9	56	43	35	29		55	42	34	29		41	34	29		40	33	29		39	33	28	26
10	53	40	32	26		51	39	31	26		38	31	26		37	30	26		36	30	26	24

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	56.5	7.32	7.41
8.0	31.8	9.76	9.88
10.0	20.3	12.20	12.36
12.0	14.1	14.64	14.83
14.0	10.4	17.08	17.30
16.0	7.9	19.52	19.77

Average Luminance (cd/m^2)

	0 deg Plane	45 deg Plane	90 deg Plane
0	6145	6145	6145
45	5478	5229	5170
55	5188	4872	4800
65	4758	4385	4319
75	3931	3635	3721
85	1953	2758	3288

Spacing Criterion

0 degree plane:	1.2
90 degree plane:	1.2
180 degree plane:	1.2
270 degree plane:	1.2

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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	19.7	21.3	20.1	21.7	22.0	20.1	21.7	20.4	22.0	22.3
	3H	21.4	22.9	21.8	23.2	23.6	22.0	23.4	22.4	23.8	24.2
	4H	22.0	23.4	22.4	23.7	24.1	22.7	24.1	23.1	24.5	24.9
	6H	22.3	23.6	22.8	24.0	24.4	23.4	24.7	23.8	25.1	25.5
	8H	22.4	23.6	22.9	24.1	24.5	23.7	24.9	24.1	25.3	25.7
	12H	22.4	23.6	22.9	24.0	24.5	24.0	25.1	24.4	25.5	26.0
4H	2H	20.4	21.8	20.8	22.1	22.5	20.6	22.0	21.1	22.4	22.8
	3H	22.3	23.4	22.7	23.9	24.3	22.8	23.9	23.2	24.3	24.8
	4H	23.0	24.0	23.4	24.5	24.9	23.7	24.7	24.1	25.2	25.6
	6H	23.4	24.4	23.9	24.8	25.3	24.5	25.4	25.0	25.9	26.4
	8H	23.6	24.4	24.0	24.9	25.4	24.9	25.7	25.3	26.2	26.7
	12H	23.6	24.4	24.1	24.9	25.4	25.2	26.0	25.7	26.5	27.0
8H	4H	23.3	24.2	23.8	24.7	25.1	23.9	24.8	24.4	25.3	25.8
	6H	23.9	24.6	24.4	25.1	25.6	24.9	25.6	25.4	26.1	26.6
	8H	24.1	24.7	24.6	25.3	25.8	25.4	26.0	25.9	26.5	27.1
	12H	24.2	24.8	24.7	25.3	25.8	25.9	26.5	26.4	27.0	27.5
12H	4H	23.4	24.2	23.9	24.7	25.1	24.0	24.7	24.5	25.2	25.7
	6H	24.0	24.7	24.5	25.1	25.7	25.0	25.6	25.5	26.1	26.7
	8H	24.2	24.8	24.8	25.3	25.9	25.5	26.1	26.0	26.6	27.1

Maximum UGR = 27.5

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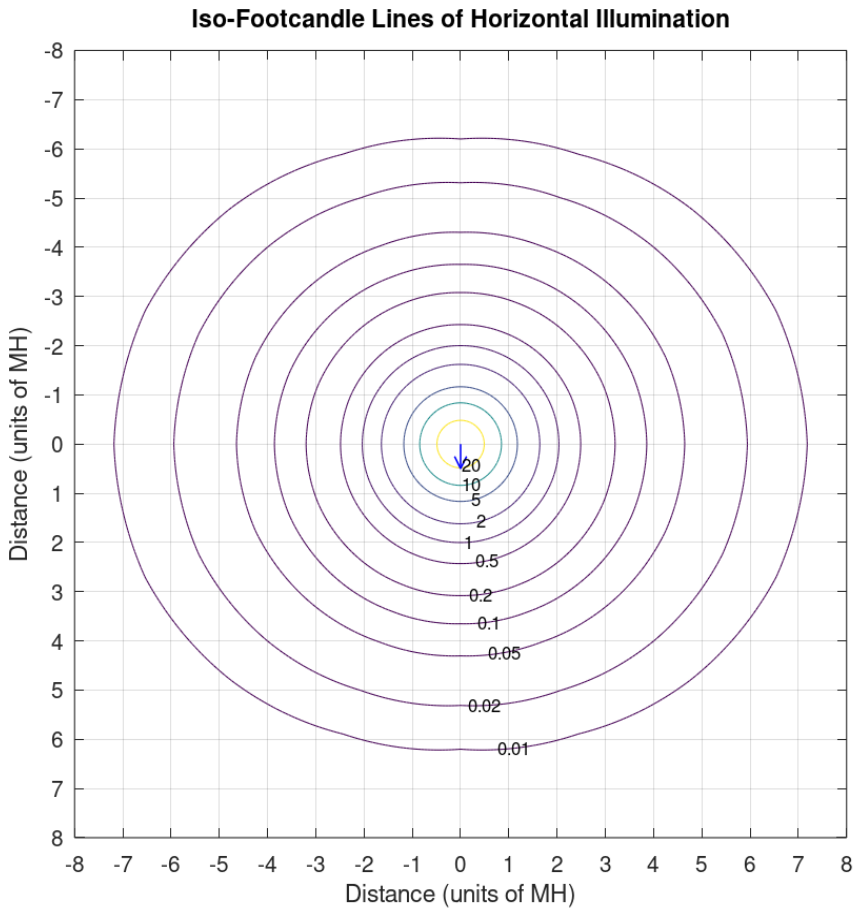
Iso-Illuminance Plot



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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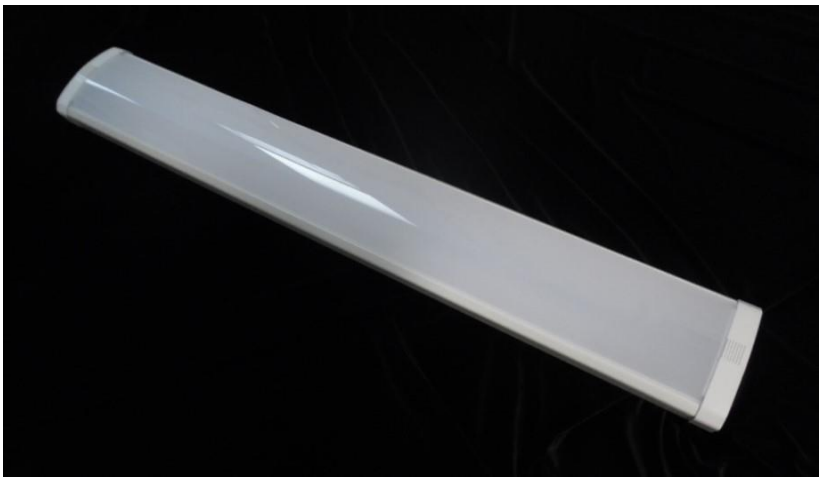
Additional Pictures of Test Subject



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Test Distance	9.5 m
Ambient Temperature	24.8 °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.