LightLab INTERNATIONAL ALLENTOWN LLC

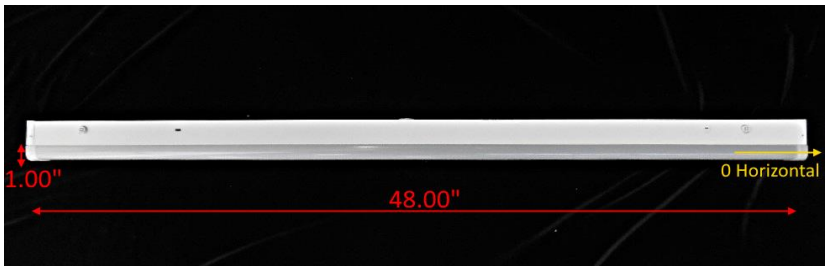
NVLAP TESTING Lab Code: 201079-0

Report of Test

LLIA002197-001

Indoor Distribution Photometry Test Report

Catalog Number: LS4-40-40K-D
Surface mounted, formed white painted steel housing/reflector, clear prismatic plastic lens.
140 white LEDs on one LED board
One FS-TMG041B0850TC LED driver



Prepared For:
Topaz Lighting, A Southwire Company
925 Waverly Avenue
Holtsville, NY 11742, USA

Performance Summary					
Input Voltage	120.0	Vac	Luminous Flux	5517.6	Lumens
Input Current	0.3276	A	Total Efficacy	141.3	Lm/W
Input Power	39.06	W	Downward Flux	4724.0	Lumens
Frequency	60.00	Hz	Downward Flux	85.6	% of Total
Power Factor	0.994				
Current THD	5.9	%			

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

Test date: 08/21/2023
Report date: 08/30/2023

Signed: Michael L. Grather Digitally signed by Michael L. Grather Date: 2023.08.30 17:10:56 -04'00'

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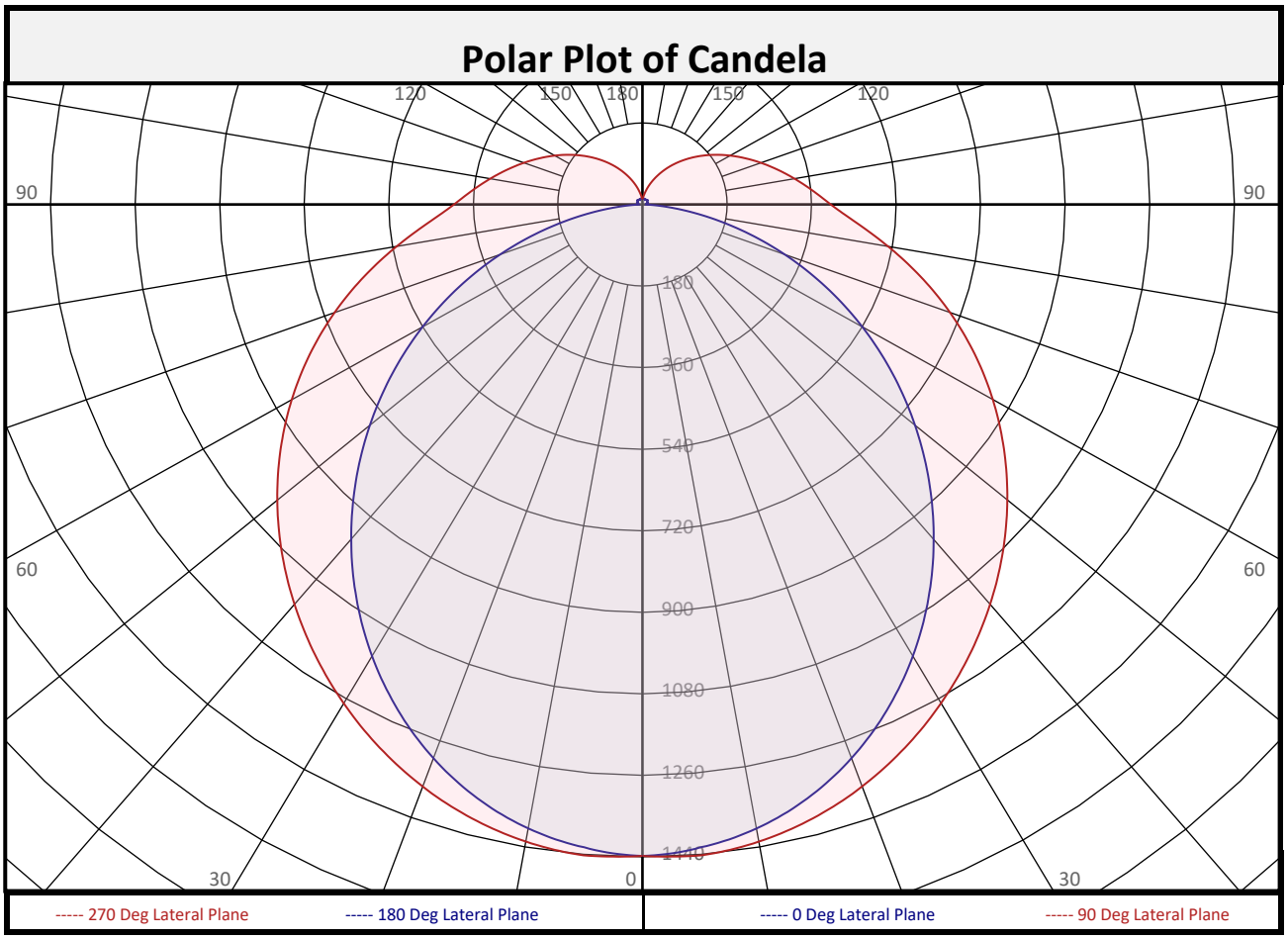

Zonal Flux Summary

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	136.1	2.5%	90-100	234.1	4.2%	0-20	525.4	9.5%
10-20	389.3	7.1%	100-110	184.7	3.3%	0-30	1115	20.2%
20-30	589.5	10.7%	110-120	140.7	2.5%	0-40	1830	33.2%
30-40	715.1	13.0%	120-130	101.2	1.8%	0-60	3314	60.1%
40-50	759.1	13.8%	130-140	66.9	1.2%	0-80	4407	79.9%
50-60	724.5	13.1%	140-150	39.1	0.7%	10-90	4588	83.2%
60-70	621.8	11.3%	150-160	18.7	0.3%	20-50	2064	37.4%
70-80	471.3	8.5%	160-170	6.8	0.1%	40-90	2894	52.5%
80-90	317.3	5.8%	170-180	1.4	0.0%	60-90	1410	25.6%
0-90	4724	85.6%	90-180	793.6	14.4%	0-180	5518	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	1438	1438	1438	1438	1438	1438	1438	1438	1438
2.5	1434	1433	1436	1439	1441	1439	1436	1433	1434
5	1424	1425	1431	1438	1442	1438	1431	1425	1424
7.5	1414	1415	1423	1432	1437	1432	1423	1415	1414
10	1399	1401	1412	1423	1428	1423	1412	1401	1399
12.5	1380	1384	1397	1411	1417	1411	1397	1384	1380
15	1357	1363	1379	1396	1403	1396	1379	1363	1357
17.5	1331	1339	1359	1378	1386	1378	1359	1339	1331
20	1301	1311	1335	1358	1367	1358	1335	1311	1301
22.5	1268	1280	1309	1336	1346	1336	1309	1280	1268
25	1232	1247	1280	1311	1323	1311	1280	1247	1232
27.5	1193	1211	1249	1285	1298	1285	1249	1211	1193
30	1151	1173	1216	1256	1271	1256	1216	1173	1151
32.5	1108	1132	1182	1227	1243	1227	1182	1132	1108
35	1062	1091	1146	1195	1214	1195	1146	1091	1062
37.5	1014	1047	1108	1163	1184	1163	1108	1047	1014
40	965	1002	1070	1130	1152	1130	1070	1002	965
42.5	914	956	1030	1095	1119	1095	1030	956	914
45	863	909	989	1060	1085	1060	989	909	863
47.5	811	862	948	1023	1050	1023	948	862	811
50	758	814	906	986	1014	986	906	814	758
52.5	704	765	864	947	978	947	864	765	704
55	650	716	820	908	940	908	820	716	650
57.5	596	666	777	868	901	868	777	666	596
60	541	617	732	827	862	827	732	617	541
62.5	486	567	688	786	821	786	688	567	486
65	431	518	643	744	781	744	643	518	431
67.5	377	468	599	702	739	702	599	468	377
70	323	420	554	660	697	660	554	420	323
72.5	269	372	510	617	655	617	510	372	269
75	217	325	467	575	613	575	467	325	217
77.5	167	280	425	533	571	533	425	280	167
80	121	238	384	493	531	493	384	238	121
82.5	78	199	346	454	492	454	346	199	78
85	43	165	312	419	457	419	312	165	43
87.5	18	139	284	389	426	389	284	139	18
90	9	122	263	365	401	365	263	122	9

16 lateral half-planes of data were acquired, 22.5 degree increments shown.

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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	9	122	263	365	401	365	263	122	9
	92.5	9	113	248	346	381	346	248	113	9
	95	9	105	235	330	363	330	235	105	9
	97.5	9	98	223	314	345	314	223	98	9
	100	9	92	212	299	329	299	212	92	9
	102.5	10	87	201	284	313	284	201	87	10
	105	10	82	191	270	298	270	191	82	10
	107.5	10	78	181	257	283	257	181	78	10
	110	11	74	171	244	269	244	171	74	11
	112.5	11	70	162	231	255	231	162	70	11
	115	12	66	154	219	242	219	154	66	12
	117.5	12	63	145	207	229	207	145	63	12
	120	13	59	137	195	216	195	137	59	13
	122.5	13	56	129	184	204	184	129	56	13
	125	13	53	121	173	191	173	121	53	13
	127.5	13	50	114	162	180	162	114	50	13
	130	14	47	106	152	168	152	106	47	14
	132.5	14	45	99	141	157	141	99	45	14
	135	13	41	92	131	146	131	92	41	13
	137.5	13	38	85	121	135	121	85	38	13
	140	13	35	78	112	124	112	78	35	13
	142.5	13	32	72	102	114	102	72	32	13
	145	13	30	66	93	104	93	66	30	13
	147.5	12	27	60	84	94	84	60	27	12
	150	12	25	53	75	84	75	53	25	12
	152.5	12	22	46	67	75	67	46	22	12
	155	12	20	40	59	66	59	40	20	12
	157.5	12	19	34	52	57	52	34	19	12
	160	13	17	29	45	49	45	29	17	13
	162.5	13	16	25	38	42	38	25	16	13
	165	13	15	21	32	35	32	21	15	13
	167.5	13	13	18	27	29	27	18	13	13
	170	14	12	15	22	23	22	15	12	14
	172.5	14	12	13	17	19	17	13	12	14
	175	14	13	11	12	15	12	11	13	14
	177.5	13	13	12	12	13	12	12	13	13
	180	12	12	12	12	12	12	12	12	12

16 lateral half-planes of data were acquired, 22.5 degree increments shown.

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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		111	111	111	111		103	103	103		96	96	96		89	89	89	86
1	103	98	93	88		99	94	90	85		87	83	80		81	78	75		75	73	70	67
2	93	84	77	70		89	81	74	68		75	69	65		70	65	61		65	61	58	54
3	85	73	65	58		81	71	63	56		66	59	53		61	55	51		56	52	48	45
4	77	65	55	48		74	62	54	47		58	51	45		54	48	43		50	45	41	38
5	71	57	48	41		68	55	47	40		52	44	39		48	42	37		45	40	35	33
6	65	52	42	36		62	50	41	35		47	39	34		44	37	32		41	35	31	28
7	60	47	38	31		58	45	37	31		42	35	30		40	33	28		37	31	27	25
8	56	42	34	28		54	41	33	27		39	31	26		36	30	25		34	28	24	22
9	52	39	31	25		50	38	30	24		35	28	24		33	27	23		31	26	22	20
10	49	36	28	22		47	35	27	22		33	26	21		31	25	21		29	24	20	18

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	39.9	7.17	7.90
8.0	22.5	9.56	10.53
10.0	14.4	11.95	13.16
12.0	10.0	14.34	15.80
14.0	7.3	16.73	18.43
16.0	5.6	19.12	21.06

Spacing Criterion

0 deg:	1.2
90 deg:	1.3
180 deg:	1.2
270 deg:	1.3

Average Luminance (cd/m^2)

	0 deg Plane	45 deg Plane	90 deg Plane
0	23218	23218	23218
45	19302	16512	16522
55	17764	15132	15434
65	15768	13730	14393
75	12579	12263	13338
85	6442	11098	12606

Beam and Field Angle

0-180 Degree Plane

Beam Angle: 103.4°

Field Angle: 157.4°

90-270 Degree Plane

Beam Angle: 137.1°

Field Angle: 270.6°

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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	18.8	20.2	19.4	20.8	21.4	22.0	23.4	22.5	23.9	24.6
	3H	20.2	21.5	20.8	22.1	22.8	24.6	25.9	25.2	26.5	27.1
	4H	20.7	21.9	21.3	22.5	23.2	25.9	27.1	26.5	27.7	28.4
	6H	20.9	22.1	21.5	22.7	23.4	27.2	28.4	27.8	29.0	29.7
	8H	21.0	22.1	21.6	22.7	23.4	27.9	29.0	28.6	29.7	30.4
	12H	21.0	22.0	21.6	22.6	23.4	28.7	29.8	29.4	30.4	31.1
4H	2H	19.9	21.1	20.5	21.7	22.4	22.3	23.5	22.9	24.1	24.8
	3H	21.6	22.6	22.2	23.3	24.0	25.2	26.2	25.8	26.9	27.6
	4H	22.1	23.1	22.8	23.8	24.5	26.6	27.6	27.3	28.2	29.0
	6H	22.5	23.4	23.2	24.0	24.8	28.2	29.0	28.8	29.7	30.4
	8H	22.6	23.4	23.3	24.1	24.8	29.0	29.8	29.6	30.5	31.2
	12H	22.6	23.4	23.3	24.1	24.8	29.9	30.6	30.6	31.3	32.1
8H	4H	23.0	23.8	23.7	24.5	25.2	26.8	27.6	27.5	28.3	29.0
	6H	23.6	24.3	24.3	25.0	25.8	28.5	29.2	29.2	29.9	30.7
	8H	23.8	24.4	24.5	25.1	25.9	29.5	30.1	30.1	30.8	31.6
	12H	23.9	24.4	24.6	25.2	26.0	30.5	31.1	31.2	31.8	32.6
12H	4H	23.3	24.0	23.9	24.7	25.5	26.8	27.5	27.5	28.2	29.0
	6H	24.0	24.6	24.7	25.3	26.1	28.5	29.2	29.2	29.8	30.7
	8H	24.3	24.8	25.0	25.5	26.4	29.5	30.1	30.2	30.8	31.6

Maximum UGR = 32.6

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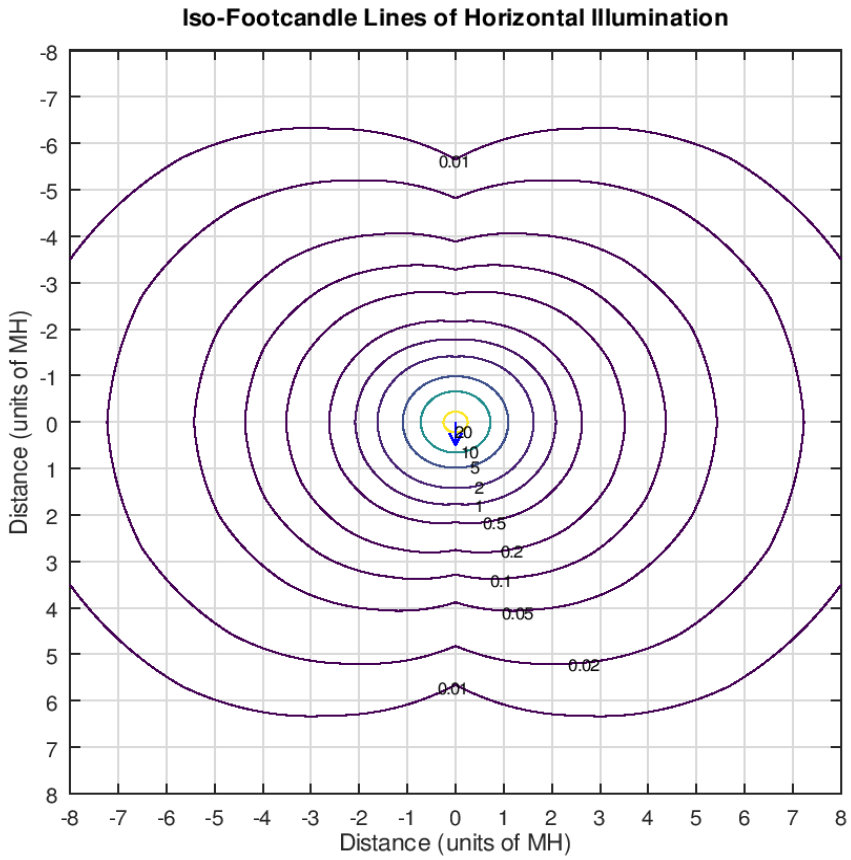
Iso-Illuminance Plot



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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Test Distance	9.5 m
Ambient Temperature	24.5 °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.