LightLab INTERNATIONAL ALLENTOWN LLC

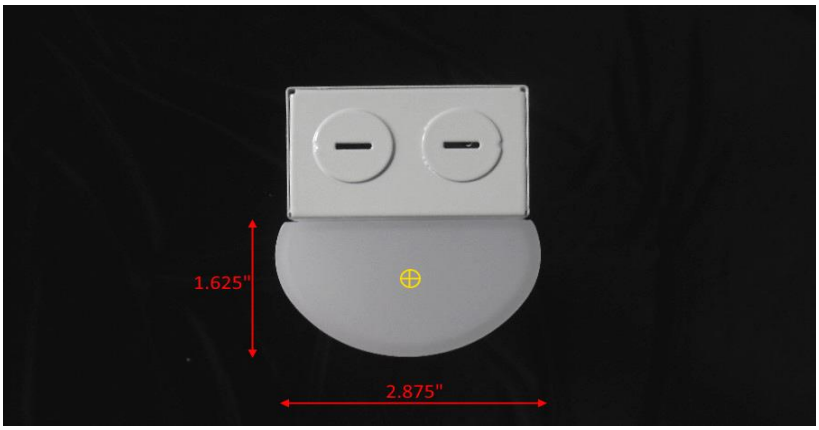
NVLAP TESTING Lab Code: 201079-0

Report of Test

LLIA001509-001

Indoor Distribution Photometry Test Report

Catalog Number: F-L2/20W/CTS/D-87 - 4000K Setting
Surface mounted downlight, formed steel housing, formed white enamel aluminum reflector, translucent linear ribbed plastic enclosure.
392 LEDs, 196 cool white and 196 warm white LEDs
One Fosen FS-TMG013B0450TW LED driver



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

Performance Summary					
Input Voltage	120.0	V	Luminous Flux	2778.6	Lumens
Input Current	0.1613	A	Total Efficacy	144.7	Lm/W
Input Power	19.20	W	Downward Flux	2313.7	Lumens
Frequency	60.00	Hz	Downward Flux	83.3	% of Total
Power Factor	0.992				
Current THD	6.6	%			

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

Test date: 08/09/2021
Report date: 08/09/2021

Signed: Michael L. Grather

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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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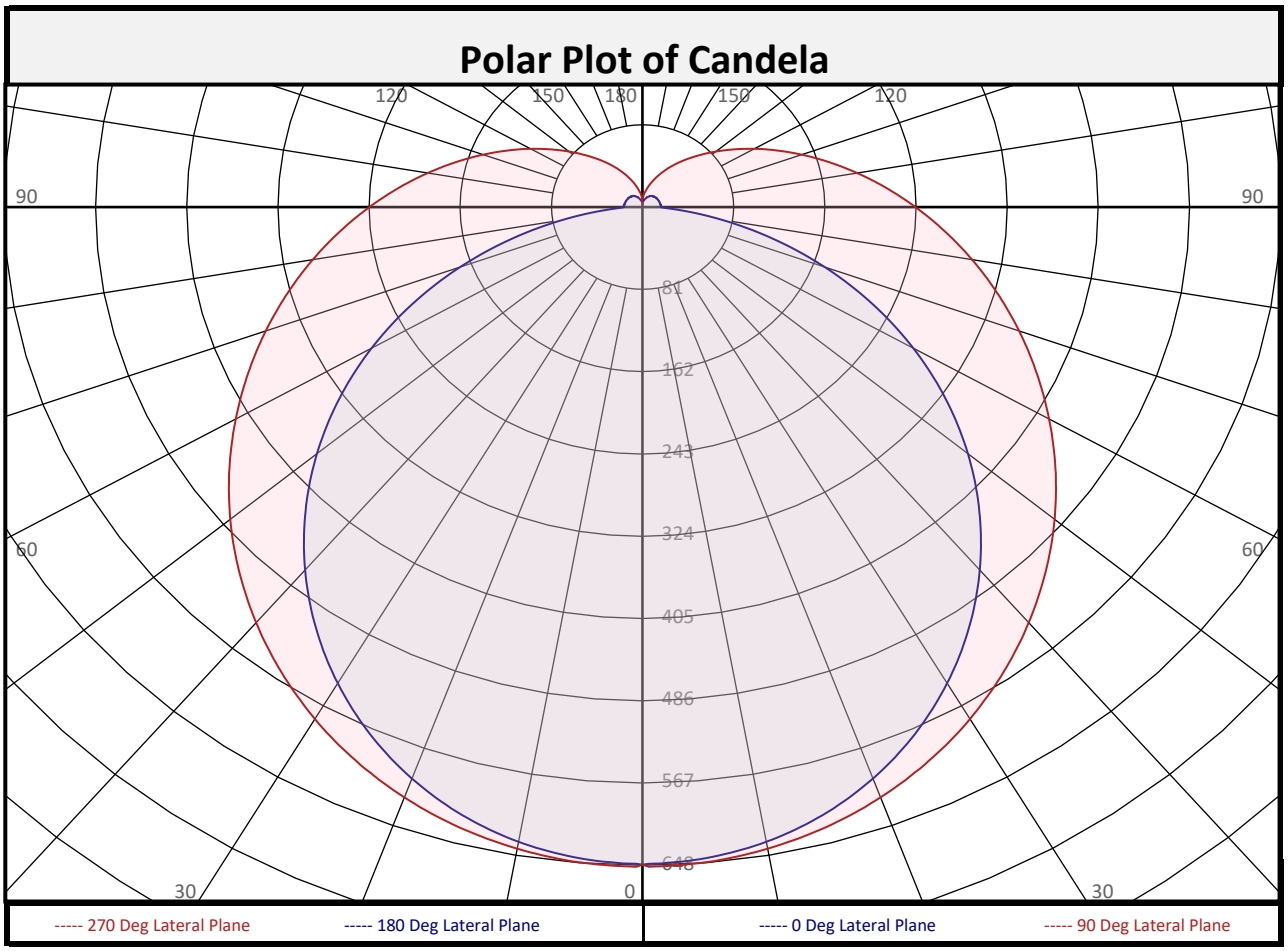

Zonal Flux Summary									
Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total	Zone (Deg Vert)	Flux (Lumens)	Percent of Total
0-10	61.4	2.2%	90-100	145.1	5.2%	0-20	237.9	8.6%
10-20	176.5	6.4%	100-110	108.5	3.9%	0-30	508.7	18.3%
20-30	270.8	9.7%	110-120	79.0	2.8%	0-40	842.5	30.3%
30-40	333.8	12.0%	120-130	55.5	2.0%	0-60	1555	56.0%
40-50	360.6	13.0%	130-140	36.8	1.3%	0-80	2121	76.3%
50-60	351.6	12.7%	140-150	22.5	0.8%	10-90	2252	81.0%
60-70	312.3	11.2%	150-160	11.8	0.4%	20-50	965.2	34.7%
70-80	254.0	9.1%	160-170	4.8	0.2%	40-90	1471	52.9%
80-90	192.7	6.9%	170-180	0.9	0.0%	60-90	759.0	27.3%
0-90	2314	83.3%	90-180	465.0	16.7%	0-180	2779	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	647	647	647	647	647	647	647	647	647
	2.5	646	645	647	648	649	648	647	645	646
	5	644	643	645	646	647	646	645	643	644
	7.5	640	640	641	644	645	644	641	640	640
	10	635	635	637	640	641	640	637	635	635
	12.5	628	628	632	635	637	635	632	628	628
	15	620	620	625	630	632	630	625	620	620
	17.5	610	611	617	623	626	623	617	611	610
	20	599	601	608	615	618	615	608	601	599
	22.5	586	589	598	607	611	607	598	589	586
	25	573	576	587	598	602	598	587	576	573
	27.5	558	562	575	588	592	588	575	562	558
	30	541	547	562	577	582	577	562	547	541
	32.5	524	531	548	565	571	565	548	531	524
	35	506	514	534	552	559	552	534	514	506
	37.5	487	496	518	539	547	539	518	496	487
	40	466	477	502	526	534	526	502	477	466
	42.5	445	458	486	512	520	512	486	458	445
	45	423	437	469	497	507	497	469	437	423
	47.5	401	417	451	482	493	482	451	417	401
	50	378	395	433	467	478	467	433	395	378
	52.5	353	373	415	451	463	451	415	373	353
	55	329	351	397	435	448	435	397	351	329
	57.5	304	329	378	419	433	419	378	329	304
	60	278	306	359	403	417	403	359	306	278
	62.5	252	283	341	387	402	387	341	283	252
	65	226	261	323	371	386	371	323	261	226
	67.5	199	238	305	355	371	355	305	238	199
	70	172	216	287	339	356	339	287	216	172
	72.5	146	195	270	324	341	324	270	195	146
	75	120	175	253	308	326	308	253	175	120
	77.5	95	156	237	293	312	293	237	156	95
	80	72	138	222	279	297	279	222	138	72
	82.5	51	122	207	265	283	265	207	122	51
	85	34	107	193	251	269	251	193	107	34
	87.5	22	95	180	237	256	237	180	95	22
	90	17	84	168	225	243	225	168	84	17

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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	17	84	168	225	243	225	168	84	17
	92.5	17	75	156	212	230	212	156	75	17
	95	17	68	146	200	218	200	146	68	17
	97.5	16	62	135	188	205	188	135	62	16
	100	16	56	126	177	194	177	126	56	16
	102.5	16	52	118	166	182	166	118	52	16
	105	16	49	110	156	172	156	110	49	16
	107.5	16	46	102	146	161	146	102	46	16
	110	16	44	95	137	151	137	95	44	16
	112.5	16	42	89	128	141	128	89	42	16
	115	16	40	83	120	132	120	83	40	16
	117.5	16	38	78	112	123	112	78	38	16
	120	16	37	73	104	115	104	73	37	16
	122.5	16	36	69	97	107	97	69	36	16
	125	15	34	64	90	99	90	64	34	15
	127.5	15	33	60	84	92	84	60	33	15
	130	15	32	57	78	85	78	57	32	15
	132.5	15	30	53	72	79	72	53	30	15
	135	15	29	50	67	73	67	50	29	15
	137.5	14	28	46	62	67	62	46	28	14
	140	14	26	43	57	62	57	43	26	14
	142.5	14	25	40	53	57	53	40	25	14
	145	14	24	37	48	52	48	37	24	14
	147.5	13	22	35	44	48	44	35	22	13
	150	12	21	32	40	43	40	32	21	12
	152.5	12	20	29	36	39	36	29	20	12
	155	11	18	27	33	35	33	27	18	11
	157.5	10	17	24	29	32	29	24	17	10
	160	10	15	22	26	28	26	22	15	10
	162.5	9	14	20	23	25	23	20	14	9
	165	8	13	17	21	22	21	17	13	8
	167.5	7	11	15	18	19	18	15	11	7
	170	7	9	12	16	16	16	12	9	7
	172.5	7	7	10	14	14	14	10	7	7
	175	7	6	8	10	12	10	8	6	7
	177.5	6	6	5	6	7	6	5	6	6
	180	5	5	5	5	5	5	5	5	5

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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	115	115	115	115		110	110	110	110		102	102	102		94	94	94		87	87	87	83
1	102	96	91	86		98	92	88	83		85	81	78		78	75	72		72	70	67	64
2	92	83	75	68		88	79	72	66		73	67	62		67	62	58		62	58	54	51
3	83	72	63	56		79	69	61	54		63	57	51		58	53	48		54	49	45	42
4	76	63	54	47		72	61	52	45		56	49	43		52	45	41		48	42	38	35
5	70	56	47	40		66	54	45	39		50	42	37		46	40	35		43	37	33	30
6	64	50	41	34		61	48	40	33		45	37	32		42	35	30		38	33	29	26
7	59	45	36	30		56	44	35	29		41	33	28		38	31	27		35	30	25	23
8	55	41	33	27		53	40	32	26		37	30	25		35	28	24		32	27	23	20
9	51	38	29	24		49	36	29	23		34	27	22		32	26	21		30	24	20	18
10	48	35	27	21		46	34	26	21		31	25	20		29	23	19		27	22	18	16

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	18.0	7.46	8.04
8.0	10.1	9.95	10.72
10.0	6.5	12.44	13.40
12.0	4.5	14.92	16.08
14.0	3.3	17.41	18.76
16.0	2.5	19.90	21.44

Average Luminance (cd/m^2)

	0 deg Plane	45 deg Plane	90 deg Plane
0	14544	14544	14544
45	12594	10285	10287
55	11743	9477	9704
65	10468	8750	9285
75	8319	8236	9105
85	4869	8143	9305

Spacing Criterion

0 degree plane:	1.2
90 degree plane:	1.3
180 degree plane:	1.2
270 degree plane:	1.3

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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	17.2	18.6	17.8	19.2	19.9	20.1	21.5	20.7	22.1	22.8
	3H	18.7	20.0	19.3	20.6	21.4	22.9	24.2	23.5	24.8	25.5
	4H	19.2	20.4	19.9	21.1	21.8	24.3	25.5	24.9	26.1	26.9
	6H	19.6	20.7	20.2	21.3	22.1	25.8	26.9	26.4	27.5	28.3
	8H	19.6	20.7	20.3	21.4	22.1	26.5	27.6	27.2	28.3	29.0
	12H	19.6	20.7	20.3	21.4	22.2	27.3	28.4	28.0	29.0	29.8
4H	2H	18.3	19.5	18.9	20.1	20.9	20.5	21.7	21.2	22.4	23.1
	3H	20.1	21.1	20.7	21.8	22.6	23.5	24.5	24.2	25.2	26.0
	4H	20.7	21.7	21.4	22.4	23.2	25.1	26.0	25.7	26.7	27.5
	6H	21.2	22.0	21.9	22.7	23.5	26.8	27.6	27.4	28.3	29.1
	8H	21.3	22.1	22.0	22.8	23.6	27.6	28.4	28.3	29.1	29.9
	12H	21.4	22.1	22.1	22.8	23.7	28.6	29.3	29.3	30.0	30.9
8H	4H	21.7	22.4	22.3	23.1	24.0	25.3	26.1	26.0	26.8	27.6
	6H	22.3	23.0	23.1	23.8	24.6	27.1	27.8	27.9	28.6	29.4
	8H	22.6	23.2	23.3	24.0	24.8	28.2	28.8	28.9	29.5	30.4
	12H	22.8	23.3	23.5	24.1	25.0	29.3	29.8	30.0	30.6	31.5
12H	4H	21.9	22.7	22.6	23.4	24.2	25.3	26.0	26.0	26.7	27.6
	6H	22.8	23.4	23.5	24.1	25.0	27.2	27.8	27.9	28.5	29.4
	8H	23.1	23.7	23.9	24.4	25.3	28.3	28.8	29.0	29.6	30.4

Maximum UGR = 31.5

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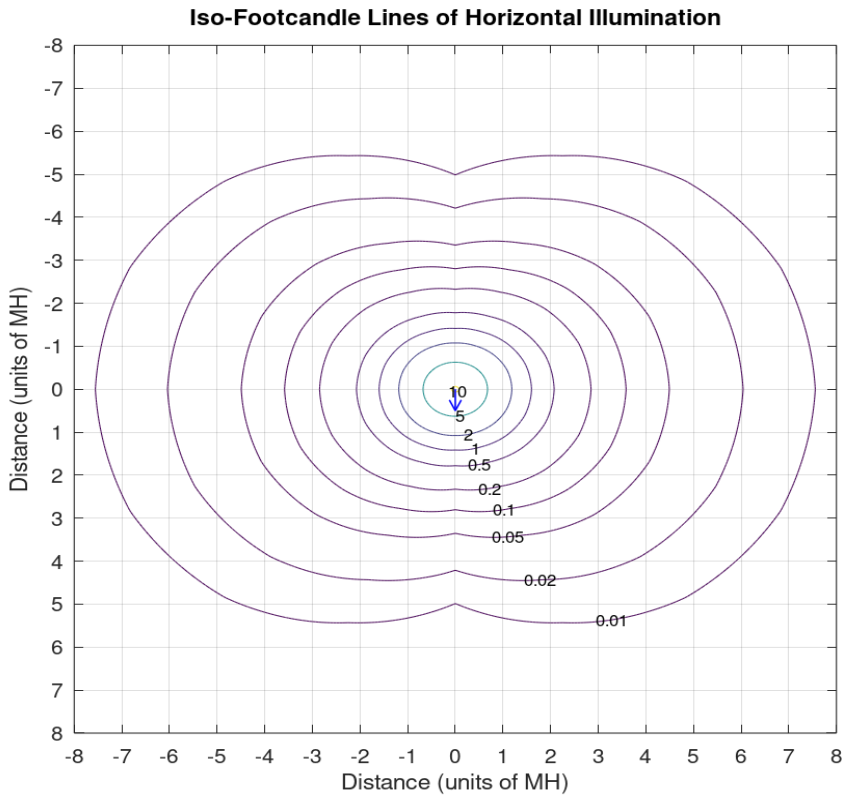
Iso-Illuminance Plot



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	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-41-14 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.