Photometric Test Report

Relevant Standards

IES LM-79-2008

Prepared For

ESPEN TECHNOLOGY INC

12257 FLORENCE AVE SANTA FE SPRINGS, CA 90670 USA
Eric Yu 562.529.2938 x 221 eric@espentech.com

Test Laboratory:

UL-CCIC Company Limited

Test Laboratory Address:

No.2, Chengwan Road, Suzhou Industrial Park, Suzhou 21522, China

Catalog Number

L36T8/835/11G-XT 2C N

Project Number

4788554269

Report Number

4788554269_2R02

Test Date

07/28/2018 - 08/03/2018

Issue Date

08/15/2018

Revision Date

10/09/2018

Prepared By

Jonathan Xu
Elvis Wu

Approved By

Duff Yang

Test List

Test Item	Test	Test Date	Model Number	Tests Conducted By
1	Integrating Sphere Test for the Lower CCT	08/03/2018	L36T8/835/11G-XT 2C N	Elvis Wu
2	Goniophotometer Test for the Lower CCT	07/28/2018	L36T8/835/11G-XT 2C N	Elvis Wu

Remark (if any)

1. UL test equipment information is recorded on Meter Use in UL's Aurora database.
This report replace 4788554269_2R01 (original report number), the report 4788554269_2R01 is terminated.

Production Description

Luminaire Description: T8 Three-Foot Linear Replacement Lamps

Model Number: L36T8/835/11G-XT 2C N

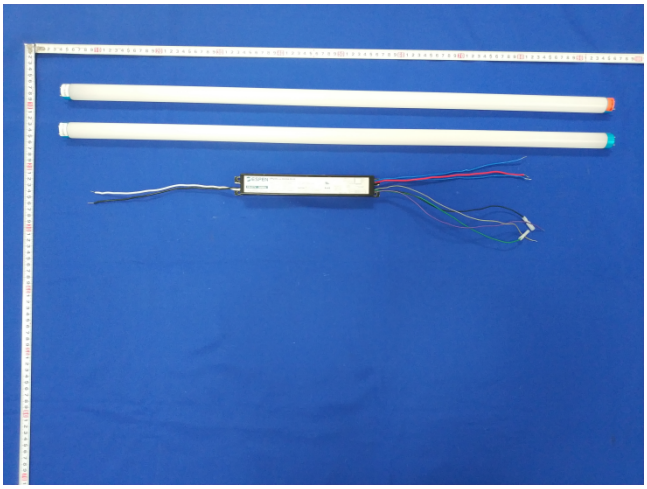
Rated Voltage: 120-277V

Frequency: 50/60Hz

LED Package: L128-3580RA3500xxx

Remark: Housing Model: C 2 25 MVOLT GEB10IS

Photos of Luminaire Characteristics



LM-79 Measurement and Test Results

Integrating Sphere Test for the Lower CCT

Model No.	L36T8/835/11G-XT 2C N	Sample ID.	1679360-006, 1679360-007, 1722774-001
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

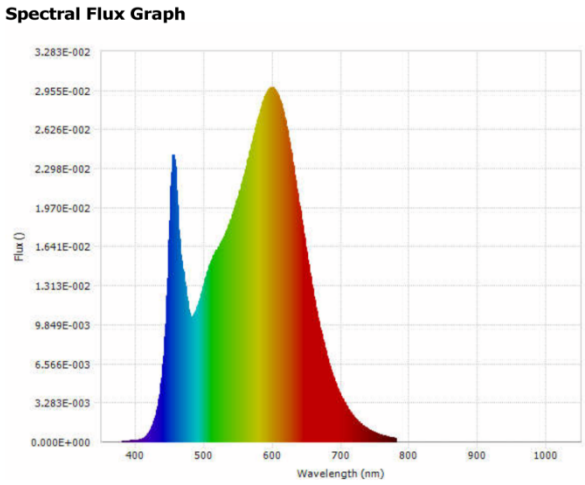
1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25° C ± 1° C. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by Labsphere, Inc., Optical Calibration Laboratory.
3.The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result.The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm. Testing Orientation of this product is horizontal.

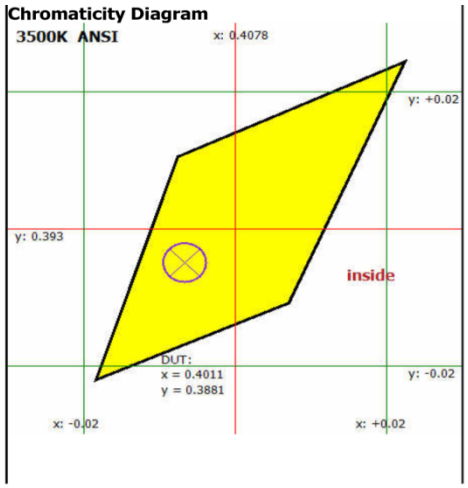
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD
25.1	119.98	60	0.2163	25.842	0.9957	N/A

Test Results

CCT (K)	CRI (Ra)	Duv	Luminous Flux (lm)	Luminous Efficacy (lm/W)	Luminous Efficacy (lm/ft)
3571	83.8	0.0002	1598.03	123.68	N/A





Luminous Flux	1598.03	Chrom x	0.4011
Chrom y	0.3881	Chrom u	0.2340
Chrom v	0.3397	Duv	0.0002
Chrom u'	0.2340	Chrom v'	0.5096
CCT	3571	Luminous Efficacy	61.84
Ra	83.8	R1	83.0
R2	93.8	R3	94.1
R4	80.5	R5	83.4
R6	91.5	R7	82.8
R8	61.4	R9	10.1
R10	85.4	R11	79.8
R12	70.7	R13	86.1
R14	97.3	R15	76.0
Rf	82.8	Rg	93.0

Goniophotometer Test

Model No.	L36T8/835/11G-XT 2C N	Sample ID.	1679360-006, 1679360-007, 1722774-001
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric paramters were measured using a type C goniophotometer and software.
3.The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The reference standard lamp is rated current 3.875A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology, China.
4.The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the largest dimension of the test SSL product. Testing Orientation of this product is horizontal.

Goniophotometer Test Conditions

Temperature(°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.2	120.05	60	0.2159	25.806	0.9958	Horizontal

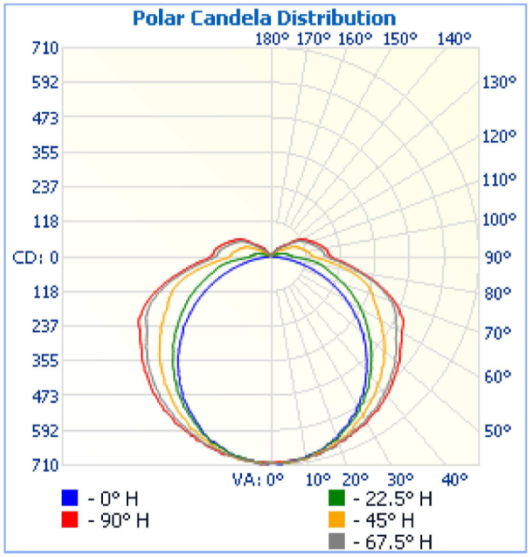
Test Results

Flux (lm)	Zonal Lumen Requirement	Zonal Lumen Requirement	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
2967.8	58.6%	N/A	161.1	158.6	154.6	108.5	115.00

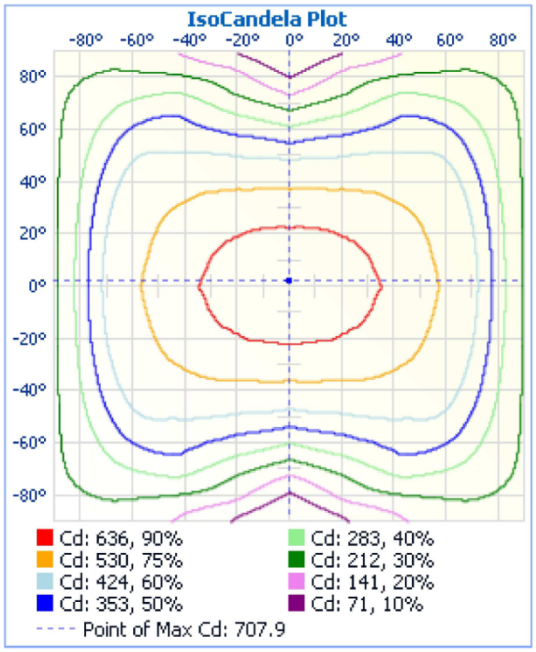
SC	SC
0~180°	90°~270°
1.26	1.40

Goniophotometer Test (Cont'd)

Light Distribution Curve



IsoCandela Plot



Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	555.5	18.7%
0-40	925.8	31.2%
0-60	1,740.1	58.6%
60-90	871.2	29.4%
70-100	622.7	21%
90-120	297.3	10%
0-90	2,611.3	88%
90-180	356.5	12%
0-180	2,967.8	100%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-5	16.8	0.6%	90-95	66.7	2.2%
5-10	49.8	1.7%	95-100	61.5	2.1%
10-15	81.5	2.7%	100-105	54.1	1.8%
15-20	110.8	3.7%	105-110	45.9	1.5%
20-25	137.0	4.6%	110-115	38.8	1.3%
25-30	159.5	5.4%	115-120	30.3	1%
30-35	178.2	6.0%	120-125	21.3	0.7%
35-40	192.2	6.5%	125-130	13.7	0.5%
40-45	201.5	6.8%	130-135	9.5	0.3%
45-50	206.1	6.9%	135-140	6.4	0.2%
50-55	205.8	6.9%	140-145	3.9	0.1%
55-60	201.0	6.8%	145-150	1.9	0.1%
60-65	193.9	6.5%	150-155	0.9	0%
65-70	182.8	6.2%	155-160	0.5	0%
70-75	164.6	5.5%	160-165	0.4	0%
75-80	139.6	4.7%	165-170	0.3	0%
80-85	109.9	3.7%	170-175	0.2	0%
85-90	80.5	2.7%	175-180	0.1	0%

Intensity Data(cd)

Candela Table - Type C																	
	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	702	702	702	702	702	702	702	702	702	702	702	702	702	702	702	702	702
1	703	704	702	702	700	702	705	701	708	701	705	702	700	702	702	704	703
2	706	703	704	703	699	702	707	703	706	703	707	702	699	703	704	703	706
3	707	705	701	704	697	698	704	704	707	704	704	698	697	704	701	705	707
4	701	704	704	700	699	702	699	700	702	700	699	702	699	700	704	704	701
5	699	703	700	698	698	700	702	697	698	697	702	700	698	698	700	703	699
6	698	701	703	698	697	698	699	699	696	699	699	698	697	698	703	701	698
7	699	698	704	700	698	699	701	693	695	693	701	699	698	700	704	698	699
8	699	695	696	695	697	698	695	692	693	692	695	698	697	695	696	695	699
9	694	698	699	696	698	694	699	688	690	688	699	694	698	696	699	698	694
10	692	693	699	697	692	693	694	688	693	688	694	693	692	697	699	693	692
11	686	691	697	695	692	690	692	686	683	686	692	690	692	695	697	691	686
12	686	686	689	690	690	692	690	684	686	684	690	692	690	690	689	686	686
13	683	684	687	696	692	687	687	677	676	677	687	687	692	696	687	684	683
14	681	684	686	687	692	687	685	674	671	674	685	687	692	687	686	684	681
15	677	681	682	689	686	683	679	670	670	670	679	683	686	689	682	681	677
16	673	674	684	682	686	682	677	665	665	665	677	682	686	682	684	674	673
17	667	669	682	684	682	679	672	665	658	665	672	679	682	684	682	669	667
18	666	664	674	684	681	677	670	665	660	665	670	677	681	684	674	664	666
19	657	662	671	682	680	677	664	653	654	653	664	677	680	682	671	662	657
20	658	661	668	674	674	674	661	648	647	648	661	674	674	674	668	661	658
25	627	631	651	657	661	659	646	622	612	622	646	659	661	657	651	631	627
30	589	603	627	644	652	640	617	592	577	592	617	640	652	644	627	603	589
35	549	566	595	626	637	620	591	557	536	557	591	620	637	626	595	566	549
40	508	526	568	602	614	598	565	513	492	513	565	598	614	602	568	526	508
45	459	484	536	577	590	574	530	471	445	471	530	574	590	577	536	484	459
50	412	441	505	553	568	548	494	426	391	426	494	548	568	553	505	441	412
55	353	396	469	521	540	518	459	384	337	384	459	518	540	521	469	396	353
60	299	352	430	493	514	488	421	338	281	338	421	488	514	493	430	352	299
65	241	307	395	470	496	468	387	294	223	294	387	468	496	470	395	307	241
70	184	261	369	434	448	426	362	246	166	246	362	426	448	434	369	261	184
75	125	213	330	378	384	366	316	203	108	203	316	366	384	378	330	213	125
80	71	180	269	307	315	297	252	171	56	171	252	297	315	307	269	180	71
85	27	131	200	243	253	235	186	112	18	112	186	235	253	243	200	131	27
90	4	75	147	193	207	190	140	71	3	71	140	190	207	193	147	75	4
95	3	62	133	179	195	179	133	61	3	61	133	179	195	179	133	62	3
100	3	52	120	167	182	166	118	52	3	52	118	166	182	167	120	52	3
105	2	37	107	150	166	149	106	34	3	34	106	149	166	150	107	37	2
110	2	23	95	136	149	134	94	23	3	23	94	134	149	136	95	23	2
115	2	18	77	123	134	122	69	15	3	15	69	122	134	123	77	18	2
120	2	12	48	104	119	101	40	10	3	10	40	101	119	104	48	12	2
125	2	7	39	69	86	64	28	5	2	5	28	64	86	69	39	7	2
130	2	3	32	52	59	45	22	2	2	2	22	45	59	52	32	3	2
135	2	2	22	40	46	30	14	2	3	2	14	30	46	40	22	2	2
140	3	2	13	31	36	22	8	2	3	2	8	22	36	31	13	2	3
145	3	3	5	18	23	11	3	3	3	3	3	11	23	18	5	3	3
150	3	3	2	8	12	5	2	3	3	3	2	5	12	8	2	3	3
155	3	3	2	2	2	2	2	3	3	3	2	2	2	2	2	3	3
160	3	3	2	2	1	2	3	3	3	3	3	2	1	2	2	3	3
165	3	3	3	2	2	2	3	3	3	3	3	2	2	2	3	3	3
170	3	3	3	3	2	2	3	3	3	3	3	2	2	3	3	3	3
175	4	4	3	3	2	3	3	4	4	4	3	3	2	3	3	4	4
180	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

****** END OF REPORT. THIS PAGE INTENTIONALLY LEFT BLANK ******