NVLAP LAB CODE 200960-0

LM-79-08 Test Report

for

ABBlighting, Inc.

1501 Industrial Way N. Toms River, NJ 08755

TR Security Light

Model: TRSEC14501

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

No.1805, DongLiu road, BinJiang District, Hangzhou, China

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www.ledtestlab.com

Report No.: HZ16050062a

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Reviewed by:

Engineer: April Zou

Jun. 03, 2016

Approved by:

Manager: Jim Zhang

Jun. 03, 2016

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Test Summary

Sample Tested: **TRSEC14501**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
135.0	1667.0	12.35	0.9899

CCT (K)	CRI	Stabilization Time (Light & Power)
4967	82.2	60

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: May 30, 2016
Date of Test	: Jun. 01, 2016
Test item	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	: IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

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Sample Photo

Figure 1- Overview of the sample

Equipment Under Test (EUT)	
Name	: TR Security Light
Model	: TRSEC14501
Electrical Ratings	: 120~277Vac, 50/60Hz, 13W
Product Description	: 5000K, Aluminum Enclosure, Black Coating, Silver reflector Manufacturer of light source: LG INNOTEK Development Model of light source: LGIT 5630 G2 Quantity of LED light source: 50 (10S5P)
Manufacturer	: ABB Lighting (shanghai) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza,# 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 24.3℃.

Base orientation was Light down. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 85 minutes.

The photometric distance of Goniophotometer is 2.47 m.

Luminous data was taken at 0.5° vertical intervals and 10.0°horizontal intervals.

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.104	0.052
Power Factor	0.9899	0.8682
Test Power (W)	12.35	12.52
THD A%	9.70	18.71
Luminous Efficacy (lm/W)	135.0	129.4
Total Luminous Flux (lm)	1667.0	1620.4
Color Rendering Index (CRI)	82.2	
R9	-1.4	
Correlated Color Temperature (CCT) (K)	4967	
Chromaticity (Chroma x, Chroma y)	(0.3464, 0.3560)	
Chromaticity (Chroma u, Chroma v)	(0.2106, 0.3247)	
Chromaticity (Chroma u', Chroma v')	(0.2106, 0.4871)	
Duv	0.0017	
Average Beam Angle (°)	91.6	
Center Beam Candle Power (cd)	301	
Spacing Criteria	0.26 (0°-180°)/ 1.78 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	58.23%	
Zonal Lumens in the 60°-90°Zone	29.08%	
Zonal Lumens in the 90°-120°Zone	9.50%	
Zonal Lumens in the 120°-180°Zone	3.19%	

Special Color Rendering Indices	
R1	79.6
R2	87.1
R3	93.5
R4	82.4
R5	81.1
R6	82.8
R7	86.1
R8	64.5
R9	-1.4
R10	70.6
R11	82.2
R12	64.3
R13	81.3
R14	96.7

Table 2: Test data per Goniophotometer Method

Note: According to CIE 1976 (u',v') diagram, u' = u = 4x/(-2x+12y+3), v' = 3v/2 = 9y/(-2x+12y+3).

Spectral Power Distribution

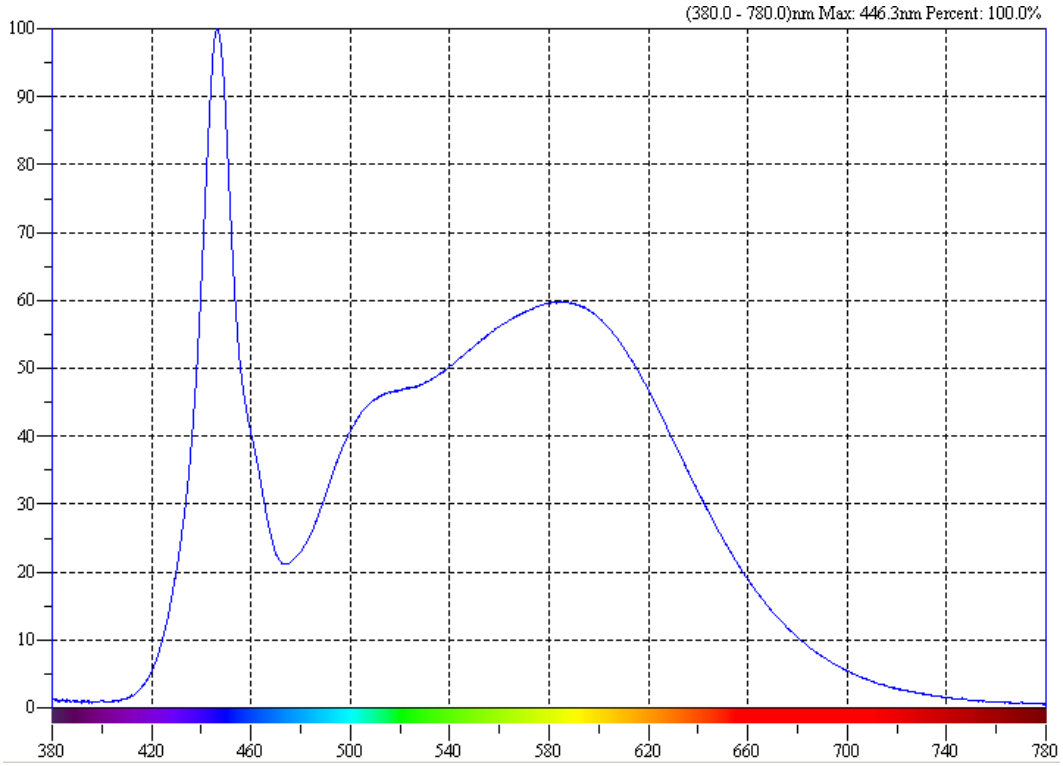


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	28.115	1.69%
10- 20	84.307	5.06%
20- 30	148.55	8.91%
30- 40	206.947	12.41%
40- 50	247.424	14.84%
50- 60	255.431	15.32%
60- 70	219.852	13.19%
70- 80	158.759	9.52%
80- 90	106.087	6.36%
90-100	72.248	4.33%
100-110	49.647	2.98%
110-120	36.439	2.19%
120-130	25.174	1.51%
130-140	15.921	0.96%
140-150	8.514	0.51%
150-160	2.908	0.17%
160-170	0.637	0.04%
170-180	0.042	0.00%
Total	1667.0	100%

γ(°)	Lumens	% Total
0- 60	970.774	58.23%
60- 90	484.698	29.08%
0-90	1455.472	87.31%
90- 180	211.53	12.69%
0- 180	1667.0	100%

Table 3: Zonal Lumen Data

Illuminance Plots

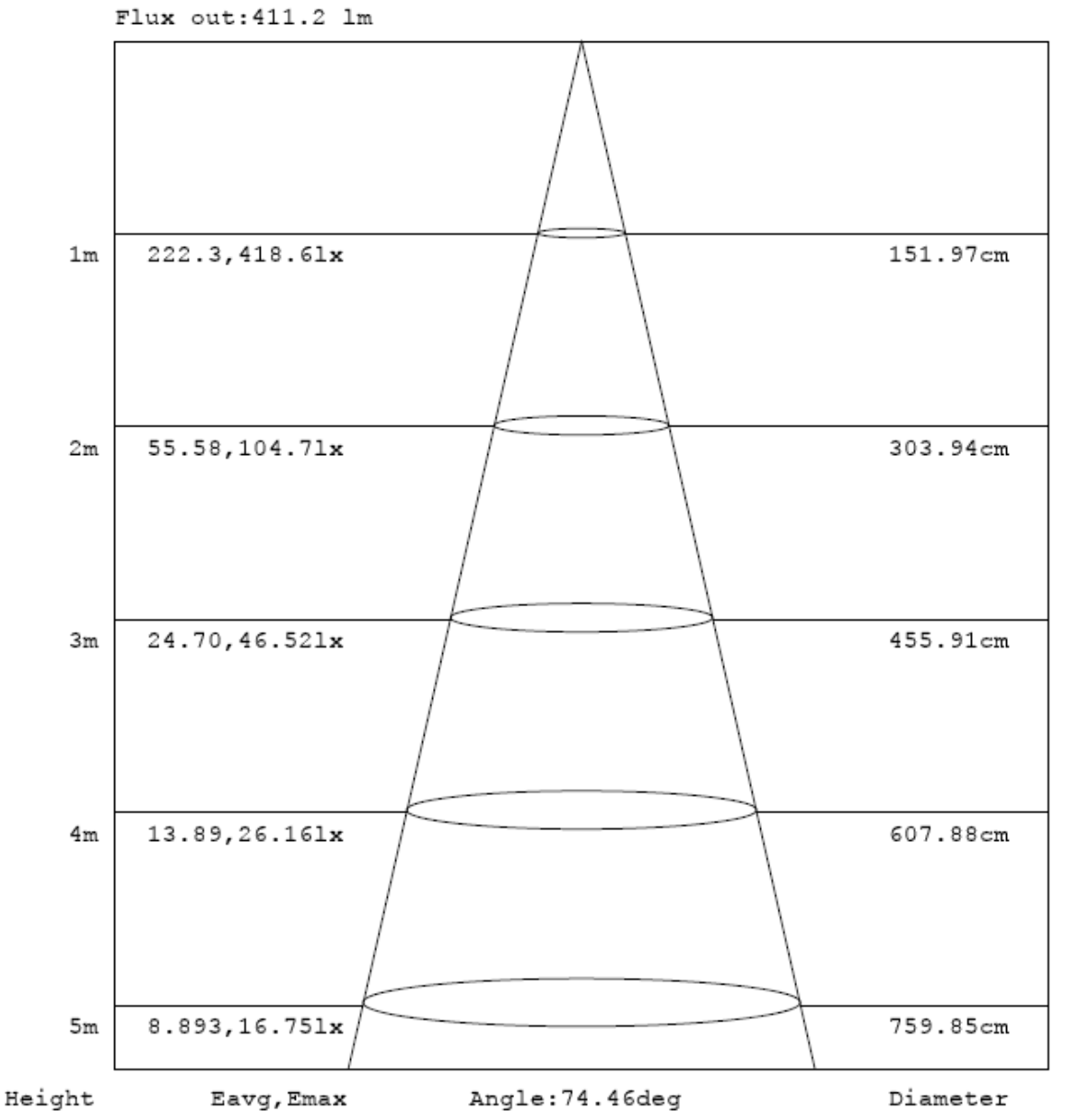


Chart 2: Beam Angle

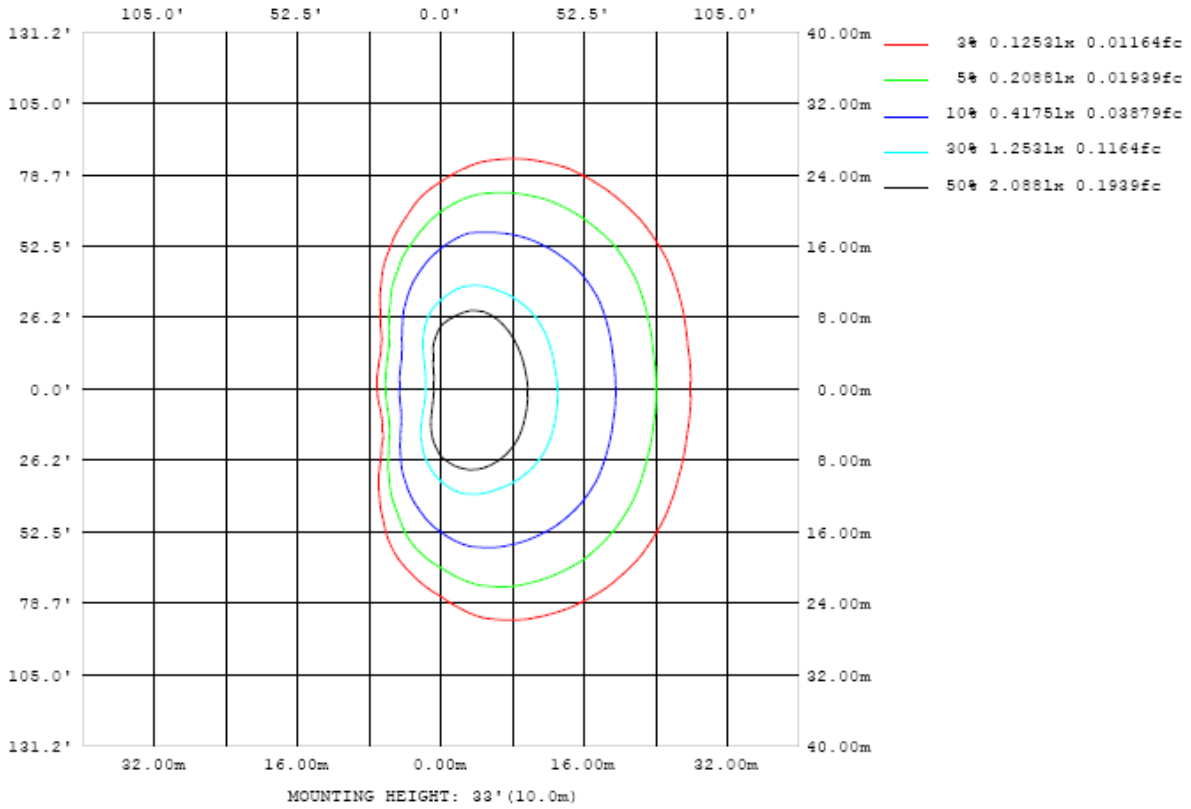


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

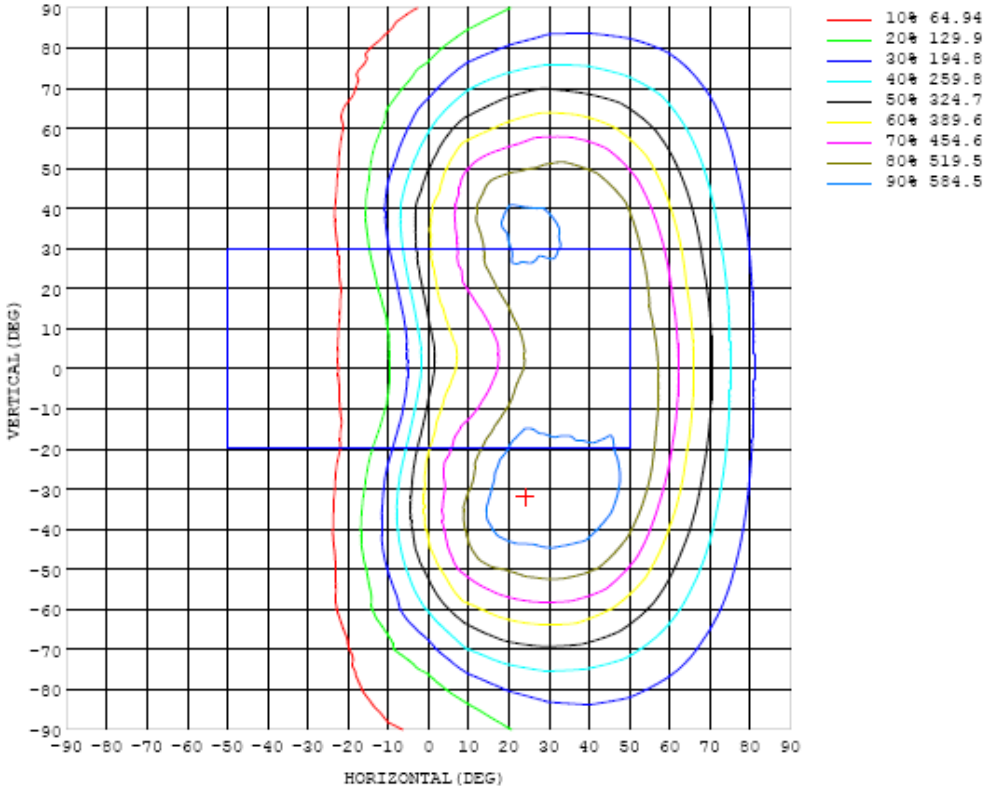


Chart 4: Isocandela Plot

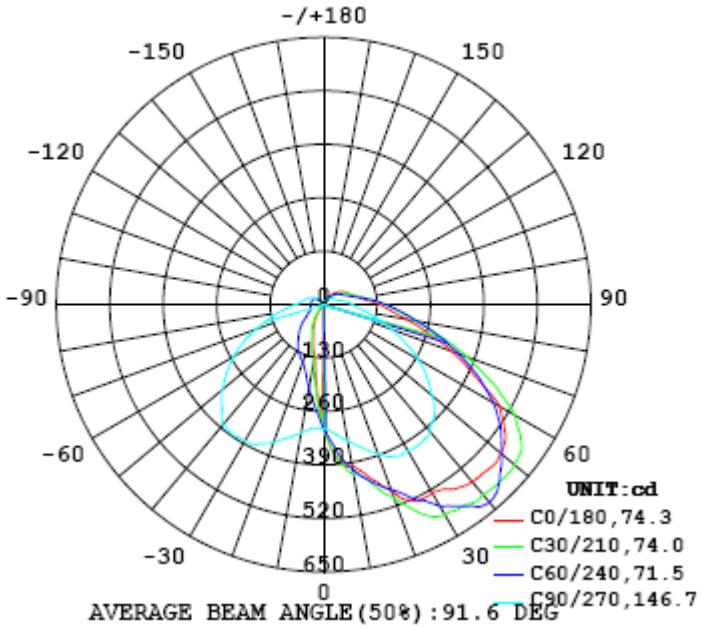


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	301	301	301	301	301	301	301	301	301	301	301	301	301	301	301	301	301	301	301
5	373	375	376	375	372	365	356	344	331	315	295	275	256	240	226	215	206	202	200
10	397	403	410	416	420	418	406	390	368	336	298	257	219	184	158	141	133	129	127
15	436	442	446	449	449	448	445	434	404	360	304	242	186	146	123	111	104	100	99.6
20	483	492	496	501	501	493	479	461	434	387	310	229	169	127	101	85.3	76.5	73.8	73.2
25	527	538	553	560	560	547	520	490	460	406	315	221	155	109	79.5	65.6	59.7	56.1	55.4
30	528	538	561	591	605	601	566	505	464	411	309	212	140	91.0	62.0	48.9	43.1	40.0	39.1
35	547	554	567	596	623	629	599	550	484	411	301	197	123	74.4	46.2	31.1	24.4	23.6	24.5
40	561	567	578	604	635	648	627	565	491	401	282	179	105	58.2	26.8	14.6	12.9	13.8	14.4
45	566	573	586	607	623	623	605	558	486	382	259	160	88.2	39.0	14.1	6.69	5.93	6.27	6.60
50	563	572	586	605	613	598	565	530	463	344	229	138	70.1	28.8	7.37	1.56	0.31	0.05	0.04
55	538	548	566	588	586	564	526	479	422	307	201	115	57.8	23.4	3.63	0.00	0.04	0.07	0.07
60	494	500	516	536	538	512	476	430	368	266	180	103	48.9	19.6	3.01	0.00	0.05	0.07	0.08
65	403	406	426	456	464	447	415	373	311	219	147	82.9	41.6	18.3	2.81	0.00	0.05	0.07	0.08
70	333	332	348	372	381	374	350	313	261	177	127	69.1	40.6	17.4	2.57	0.02	0.06	0.08	0.09
75	260	261	272	291	306	303	286	255	207	139	104	63.8	38.5	16.5	2.46	0.07	0.08	0.10	0.11
80	204	205	213	228	240	242	231	203	159	107	81.7	57.8	36.9	15.9	2.39	0.09	0.09	0.10	0.13
85	164	166	172	182	194	197	188	161	122	83.5	69.8	54.1	36.0	15.5	2.32	0.11	0.11	0.12	0.15
90	139	140	143	150	160	163	152	128	96.2	69.6	62.4	49.4	34.7	15.2	2.24	0.14	0.14	0.14	0.17
95	109	110	113	122	131	132	122	101	77.7	61.6	56.1	45.9	33.5	15.0	2.14	0.15	0.16	0.16	0.20
100	90.9	92.3	94.6	100	106	106	95.0	76.2	58.0	51.3	49.0	42.1	31.7	14.8	2.00	0.16	0.19	0.19	0.23
105	80.7	81.3	81.7	83.9	86.9	85.0	75.9	58.8	43.8	40.9	41.7	37.6	29.5	14.4	1.81	0.18	0.22	0.22	0.27
110	72.0	72.6	71.7	72.0	72.9	71.0	63.7	48.7	36.0	33.7	35.3	32.1	26.6	13.9	1.61	0.20	0.25	0.25	0.31
115	66.7	67.2	65.4	64.7	64.6	62.5	55.4	42.8	32.3	30.1	30.6	27.3	22.7	13.1	1.45	0.23	0.28	0.28	0.33
120	61.5	59.1	52.4	57.2	58.0	55.3	49.8	39.2	30.1	27.7	26.9	23.2	18.7	11.4	1.45	0.23	0.31	0.30	0.33
125	55.3	49.4	41.3	47.2	51.2	50.1	45.3	36.1	27.9	25.5	23.8	19.9	15.3	8.98	1.43	0.22	0.31	0.32	0.35
130	47.9	40.4	35.8	38.8	44.2	44.7	40.2	32.2	25.2	23.2	20.9	17.1	12.4	6.84	1.16	0.25	0.34	0.35	0.39
135	42.1	36.2	32.2	32.1	35.1	36.9	34.1	27.8	22.2	20.6	18.2	14.5	9.73	5.00	0.82	0.30	0.37	0.38	0.42
140	35.3	31.2	27.2	27.0	26.7	28.3	27.7	23.4	19.0	17.7	15.5	12.0	7.64	3.44	0.55	0.31	0.36	0.40	0.45
145	27.2	25.1	20.7	20.0	19.7	21.5	21.8	18.9	15.9	14.7	12.8	9.58	5.85	2.31	0.37	0.30	0.33	0.39	0.45
150	14.4	12.5	9.36	10.2	13.1	15.8	16.2	14.4	12.8	11.6	10.1	7.33	4.30	1.56	0.30	0.30	0.32	0.39	0.44
155	0.81	0.12	0.50	3.58	8.09	10.5	11.2	10.4	9.56	8.55	7.24	5.19	2.92	0.98	0.27	0.30	0.31	0.38	0.41
160	0.19	0.14	0.15	0.77	3.28	5.68	6.73	6.78	6.35	5.59	4.54	3.19	1.70	0.52	0.26	0.29	0.30	0.36	0.37
165	0.24	0.22	0.20	0.18	0.47	1.40	2.47	3.03	3.06	2.74	2.15	1.40	0.67	0.29	0.29	0.29	0.31	0.34	0.34
170	0.28	0.29	0.23	0.22	0.22	0.22	0.27	0.37	0.45	0.45	0.38	0.30	0.28	0.29	0.29	0.29	0.31	0.31	0.32
175	0.28	0.28	0.28	0.28	0.25	0.23	0.23	0.22	0.22	0.23	0.25	0.27	0.28	0.28	0.27	0.28	0.28	0.28	0.28
180	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

Table 4: Luminous Intensity Data

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	301	301	301	301	301	301	301	301	301	301	301	301	301	301	301	301	301		
5	201	206	213	224	236	248	264	284	302	316	328	341	352	360	365	368	371		
10	129	133	141	155	176	207	241	278	317	345	370	384	394	400	398	395	394		
15	102	106	111	119	136	170	223	281	335	377	404	420	422	421	422	426	431		
20	74.7	77.8	85.7	97.3	117	149	207	285	356	410	435	446	457	463	472	472	476		
25	57.0	61.3	67.0	76.9	99.2	138	196	288	373	428	455	484	506	517	524	523	524		
30	40.9	44.7	50.9	61.4	82.8	125	188	288	383	437	474	526	556	564	547	534	526		
35	25.8	28.3	35.5	47.3	68.6	109	178	282	386	444	500	556	590	577	551	539	540		
40	15.3	16.1	17.2	30.5	55.6	93.8	163	270	379	452	529	591	598	587	570	556	555		
45	7.39	8.03	8.61	15.2	41.8	80.9	144	246	351	449	527	585	593	584	574	562	561		
50	0.01	1.37	2.97	7.83	26.5	66.9	125	214	322	439	509	551	573	582	579	566	555		
55	0.08	0.09	0.00	3.17	19.4	52.3	107	185	289	405	465	506	550	566	565	550	533		
60	0.08	0.09	0.03	1.79	15.2	43.9	89.2	156	253	358	410	464	506	527	524	505	489		
65	0.09	0.09	0.03	2.03	13.3	37.4	84.5	138	216	304	362	411	445	467	459	430	403		
70	0.09	0.10	0.04	2.33	12.4	33.8	63.9	110	176	256	311	353	376	388	381	356	334		
75	0.11	0.12	0.06	2.59	12.1	33.9	58.0	97.7	141	211	256	291	305	315	308	286	264		
80	0.13	0.14	0.10	2.75	12.5	32.9	53.1	76.8	112	166	206	235	246	250	242	225	207		
85	0.15	0.16	0.14	2.83	13.0	32.2	50.7	62.8	87.2	129	163	190	197	196	190	176	165		
90	0.17	0.18	0.18	2.89	13.3	31.6	48.6	54.5	69.1	99.8	129	153	160	162	156	145	139		
95	0.20	0.20	0.22	2.91	13.4	31.2	45.5	49.3	58.3	78.8	103	124	132	133	128	119	111		
100	0.23	0.22	0.26	2.94	13.3	31.1	43.2	45.0	51.6	64.9	84.4	103	110	110	103	95.6	91.2		
105	0.27	0.25	0.31	2.95	13.3	31.0	40.7	41.1	46.3	55.0	70.5	87.1	93.4	93.5	89.1	83.9	81.3		
110	0.31	0.28	0.35	2.95	13.5	30.7	37.7	37.7	42.5	49.0	61.7	76.1	81.1	81.7	78.2	74.6	72.7		
115	0.33	0.30	0.34	2.95	14.1	29.6	34.0	34.7	39.3	44.8	54.9	66.4	71.7	72.8	71.1	69.0	67.5		
120	0.34	0.30	0.29	2.98	14.8	27.3	29.6	31.3	35.2	38.8	46.4	56.3	62.2	64.9	64.7	60.4	59.2		
125	0.35	0.32	0.24	3.05	14.6	23.9	25.1	27.2	29.6	31.9	38.5	47.6	53.3	55.7	56.7	49.9	46.2		
130	0.38	0.35	0.24	3.01	13.2	19.7	20.6	23.0	25.0	26.7	33.2	41.7	47.1	49.5	46.7	41.0	35.6		
135	0.41	0.38	0.26	2.70	10.6	15.1	17.2	20.1	22.2	23.3	28.8	36.3	41.4	42.6	37.9	36.0	32.5		
140	0.44	0.42	0.28	2.19	7.81	11.4	14.4	17.7	19.9	20.4	24.7	30.6	34.1	33.6	30.6	30.5	28.9		
145	0.45	0.43	0.29	1.58	5.39	8.88	12.2	15.3	17.4	17.6	20.8	25.0	26.8	25.1	24.1	23.7	23.0		
150	0.43	0.42	0.29	1.14	3.74	6.94	10.1	12.8	14.7	15.0	16.9	19.8	20.6	18.8	16.9	14.1	12.5		
155	0.40	0.39	0.30	0.85	2.68	5.26	7.87	10.2	11.6	12.1	13.0	14.6	15.1	13.7	10.6	5.60	1.26		
160	0.36	0.35	0.31	0.60	1.79	3.63	5.58	7.35	8.44	9.04	9.44	10.1	10.2	9.12	6.71	3.12	0.39		
165	0.34	0.33	0.31	0.32	0.95	2.06	3.34	4.51	5.34	5.91	6.24	6.33	6.06	5.17	3.41	1.27	0.32		
170	0.32	0.31	0.31	0.30	0.36	0.77	1.36	1.96	2.45	2.77	2.90	2.80	2.41	1.70	0.93	0.44	0.27		
175	0.28	0.28	0.28	0.28	0.28	0.29	0.30	0.34	0.38	0.41	0.42	0.40	0.36	0.31	0.28	0.28	0.28		
180	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 17, 2015	Jul. 16, 2016
Digital Power Meter	PF2010A	HZTE028-01	Jul. 17, 2015	Jul. 16, 2016
AC Power Supply	PCR 500L	HZTE001-08	Jul. 17, 2015	Jul. 16, 2016
DC Power Supply	WY12010	HZTE004-03	Jul. 17, 2015	Jul. 16, 2016
Temperature Meter	TES1310	HZTE017-01	Jul. 17, 2015	Jul. 16, 2016
Standard Source	D908	HZTE012-01	Jul. 23, 2015	Jul. 22, 2016
Standard source	SCL-1400	HZTE012-02	Oct. 21, 2015	Oct. 20, 2016

Table 6: Test Equipment List

TEST METHODS

Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning.
Therefore, no seasoning was performed.

Goniophotometer Method

Photometric and Electrical Measurements

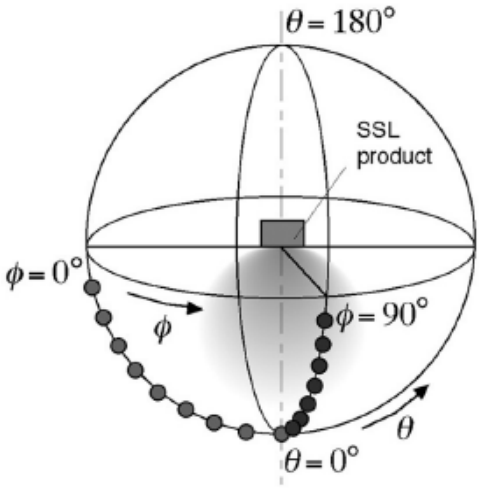
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured at the same height of the sample mounted on the Goniophotometer equipment. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.
The stabilization time typically ranges from 30 min (small integrated LED lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5 %.
Electrical measurements including voltage, current, and power were measured using the Everfine Digital Power Meter.
Some graphics were created with Photometric Plus software.
The standard reference of the Goniophotometer system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Metrology P.R. China.
The uncertainty of goniophotometer system reported in this document is expended uncertainty is 1.94% with a coverage factor k=2.

Color Characteristics Measurements

The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as values that are spatially average, weighted to intensity, over the angular range where light is intentionally emitted from the SSL product. The color characteristics measurements are using gonio-spectroradiometer.

Color Spatial Uniformity

The characteristics of SSL products may be spatially non-uniform, the chromaticity coordinate shall be measured at two vertical planes (C=0°/180° and C=90°/270°) and at 10° or less intervals for vertical angle until the light output dropped to below 10% of the peak intensity. The averaged weighted chromaticity coordinate was calculated from these points. The data was then analyzed to check for delta color differences of the u', v' chromaticity coordinates. The spatial non-uniformity of chromaticity, Δu'v', is determined as the maximum deviation (distance on the CIE (u', v') diagram) among all measured points from the spatially averaged chromaticity coordinate.
The geometry for the chromaticity measurement using gonio-spectroradiometer is shown as following.



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