



LM-79-08 Test Report

for

ABBlighting, Inc.

1501 Industrial Way N. Toms River, NJ 08755

110W Area Light

Model: ABAR110LED50III

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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

Tel: +86-571-56680806

www.ledtestlab.com

Report No.: HZ13110007b

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

Review by:

April Zou

Engineer: April Zou
Nov. 18, 2013

Approved by:



Jim Zhang

Manager: Jim Zhang
Nov. 18, 2013

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: **ABAR110LED50III**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
105.6	11019.0	104.3	0.9958
CCT (K)	CRI	Stabilization Time (Light & Power)	
4845	75.8	80	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Nov. 8, 2013
Date of Test	: Nov. 12, 2013
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

TABLE OF CONTENT

LM-79-08 Test Report.....	1
Test Summary.....	2
Sample Photos	4
TEST RESULTS	5
Spectral Power Distribution	6
Zonal Lumen Tabulation.....	7
Illuminance Plots.....	8
Luminous Intensity Distribution Plots.....	10
Luminous Intensity Data	11
EQUIPMENT LIST	12
TEST METHODS	12
Seasoning of SSL Product.....	12
Sphere-Spectroradiometer Method- Photometric and Electrical Measurements.....	12
Goniophotometer Method	13
Photometric and Electrical Measurements	13
Color Characteristics Measurements.....	13
Color Spatial Uniformity	13

Sample Photos



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: 110W Area Light
Model	: ABAR110LED50III
Electrical Ratings	: 100~277V AC, 50/60Hz, 110W
Product Description	: 5000K, Outdoor Luminaire, 4 LED bars Manufacturer of light source: Philips Quantity of light source: 48 pcs Model of light source: LUXEON T
Manufacturer	: ABB Lighting (Shanghai) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza,# 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 25.2°C.

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

The stabilization time of the sample was 80 minutes, and the total operating time including stabilization was 115 minutes.

Parameter	Result			Special Color Rendering Indices	
Test Voltage (V)	120.0	100.0	277.0	R1	81
Voltage frequency (Hz)	60	60	60	R2	84
Test Current (A)	0.872	1.055	0.405	R3	83
Power Factor	0.9958	0.9977	0.9098	R4	82
Test Power (W)	104.3	105.4	102.1	R5	81
THD A%	4.77	4.34	9.36	R6	76
Luminous Efficacy (lm/W)	105.6			R7	85
Total Luminous Flux (lm)	11019.0			R8	71
Color Rendering Index (CRI)	75.8			R9	13
R9	13			R10	60
Correlated Color Temperature (CCT) (K)	4845			R11	79
Chromaticity (Chroma x, Chroma y)	(0.3503, 0.3614)			R12	55
Chromaticity (Chroma u, Chroma v)	(0.2112, 0.3267)			R13	82
Chromaticity (Chroma u', Chroma v')	(0.2112, 0.4901)			R14	90
Duv	0.0028				
Average Beam Angle (°)	102.8				
Center Beam Candle Power (cd)	3130				
Spacing Criteria	1.96 (0°-180°)/ 1.62(90°-270°)				
Zonal Lumens in the 0°-60°Zone	80.28%				
Zonal Lumens in the 60°-90°Zone	19.72%				
Zonal Lumens in the 90°-120°Zone	0.00%				
Zonal Lumens in the 120°-180°Zone	0.00%				

Table 2: Test data per Sphere-Spectroradiometer 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

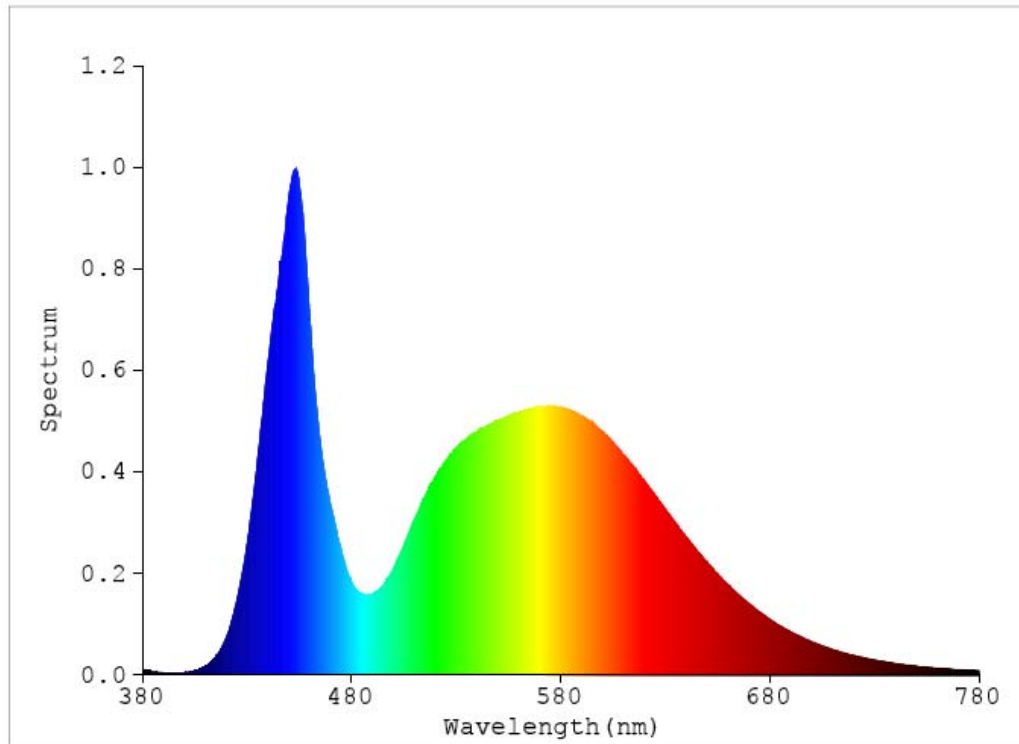


Chart 1: Spectral Power Distribution

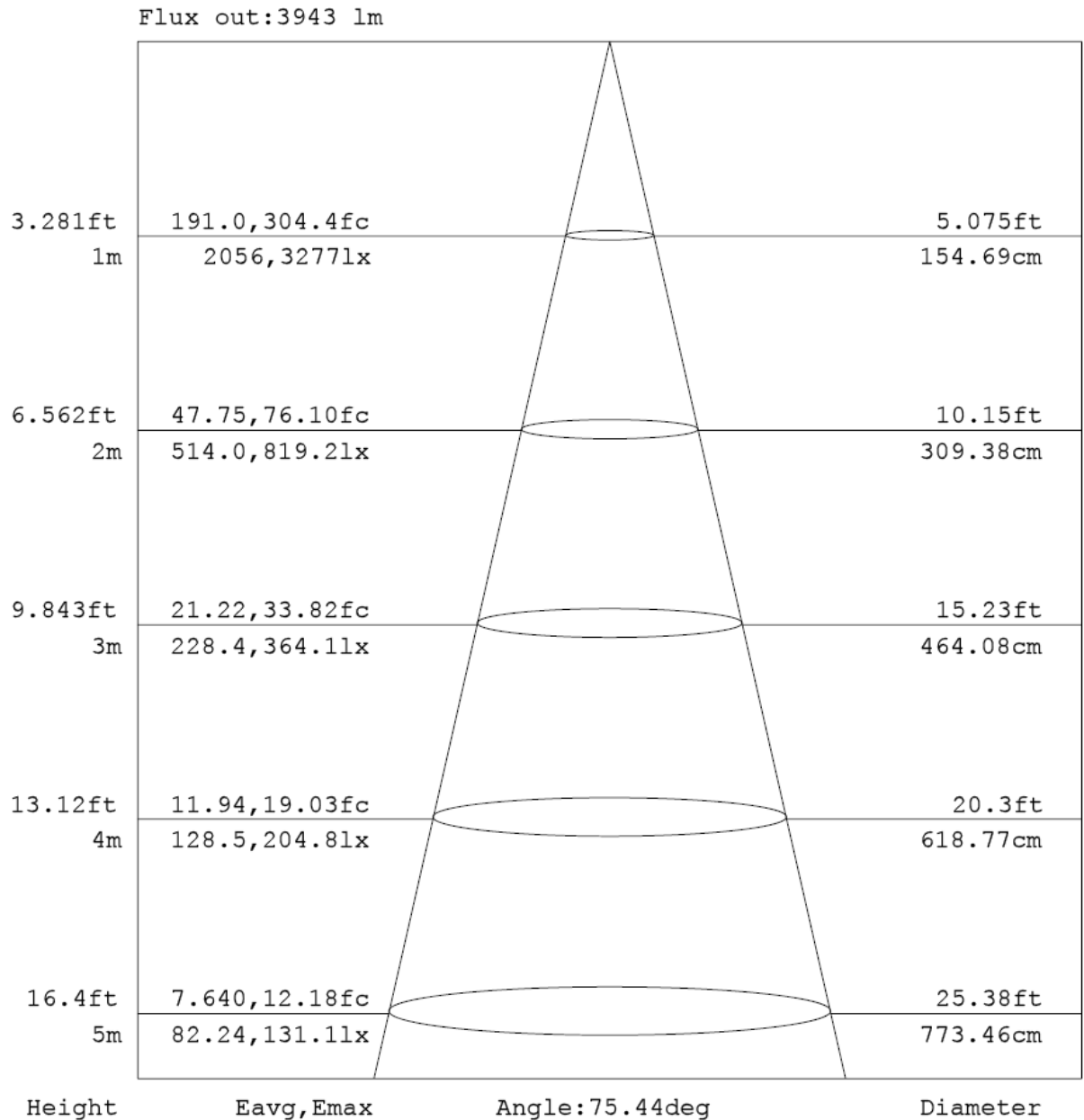
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	297.643	2.70%
10- 20	858.166	7.79%
20- 30	1354.35	12.29%
30- 40	1849.267	16.78%
40- 50	2291.861	20.80%
50- 60	2194.818	19.92%
60- 70	1657.269	15.04%
70- 80	468.121	4.25%
80- 90	47.142	0.43%
90-100	0.007	0.00%
Total	11018.6	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	8846.105	80.28%
60- 90	2172.532	19.72%
0-90	11018.6	100.00%
90- 180	0.007	0.00%
0- 180	11018.6	100%

Table 4: Zonal Lumen Data

Illuminance Plots



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

Chart 2: Beam Angle

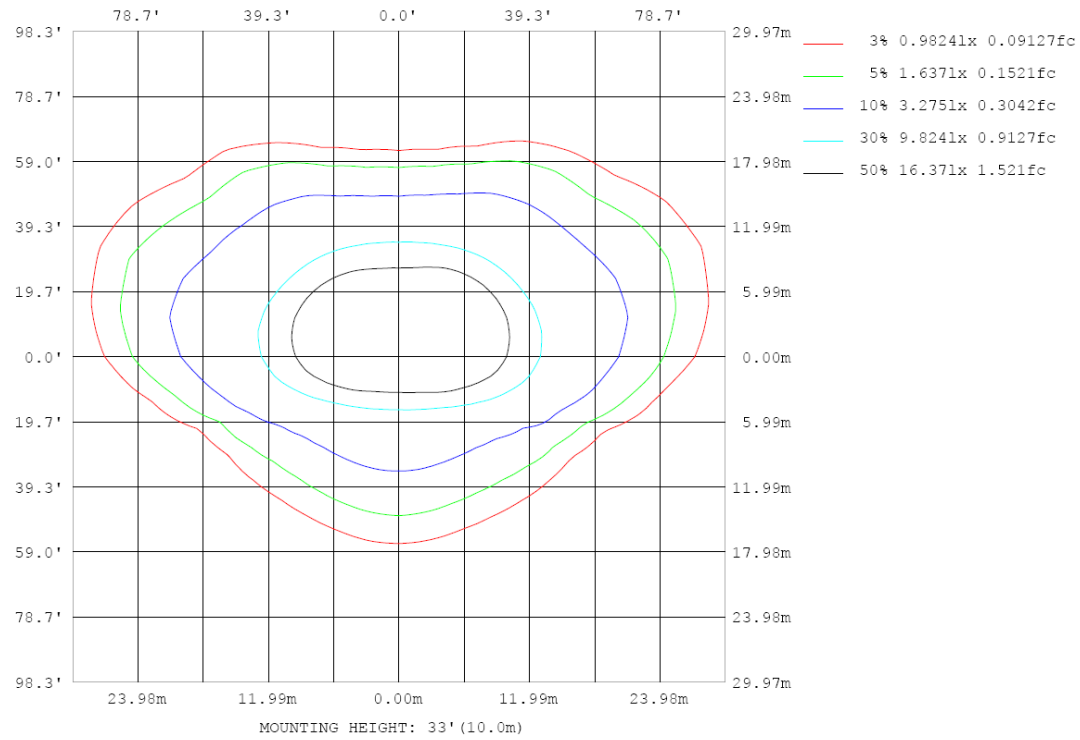


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

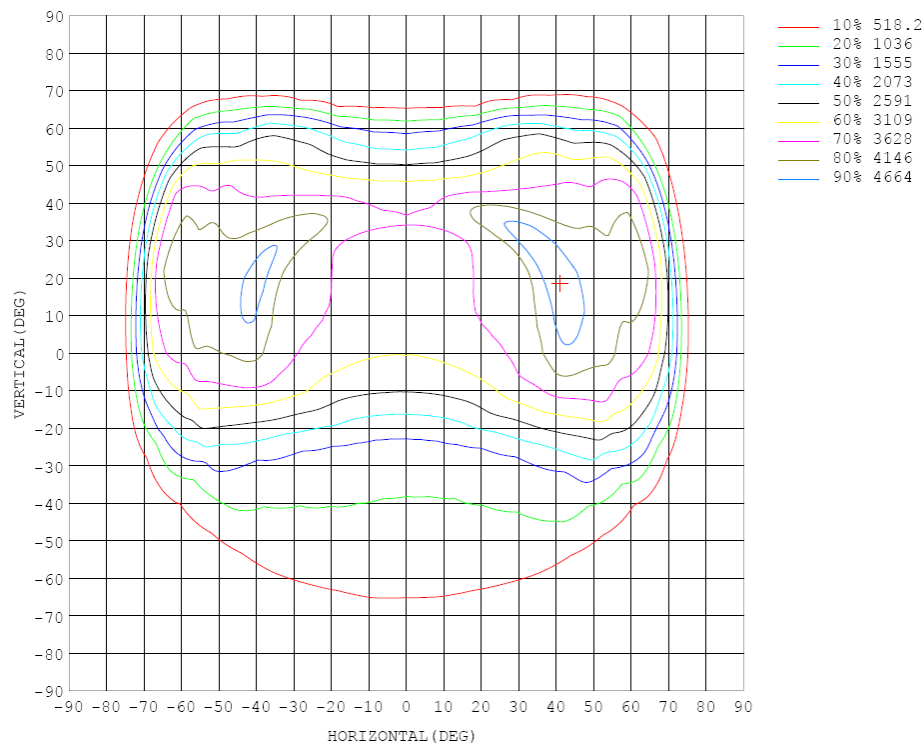


Chart 4: Isocandela Plot

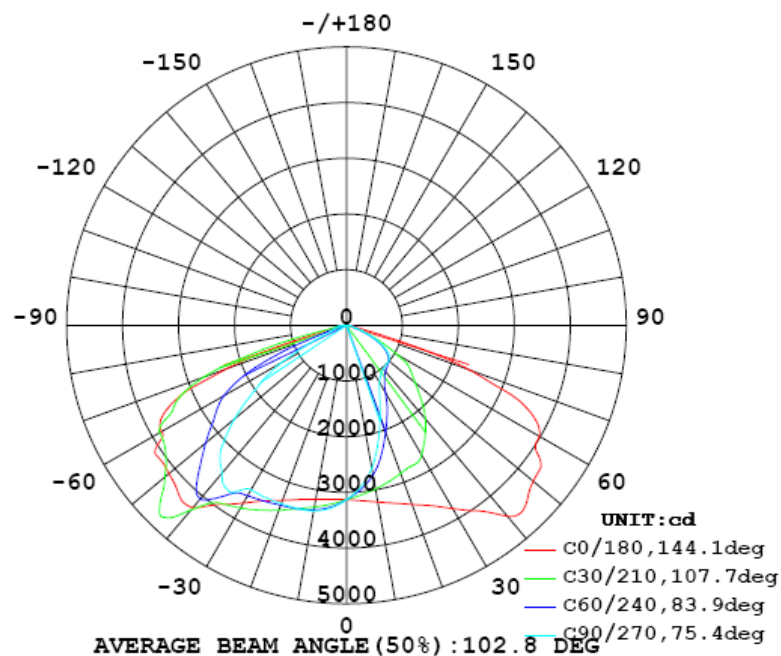


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130
5	3161	3126	3089	3053	3018	2985	2958	2936	2921	2916	2919	2930	2948	2972	3001	3033	3066	3100	3133
10	3220	3148	3068	2982	2893	2805	2728	2667	2626	2609	2620	2654	2710	2781	2862	2945	3026	3101	3168
15	3306	3196	3064	2909	2738	2564	2408	2288	2212	2181	2200	2266	2376	2526	2693	2854	3003	3131	3237
20	3422	3275	3078	2828	2542	2270	2046	1886	1792	1758	1782	1863	2006	2214	2476	2758	3001	3194	3344
25	3573	3398	3135	2779	2378	2011	1725	1539	1439	1405	1430	1517	1683	1936	2282	2676	3037	3293	3476
30	3799	3613	3244	2687	2123	1675	1395	1259	1198	1181	1201	1262	1386	1623	2005	2529	3083	3473	3681
35	4063	3761	3190	2448	1801	1371	1183	1105	1076	1071	1083	1117	1190	1344	1688	2259	2997	3598	3921
40	4473	3954	3091	2195	1508	1197	1086	1040	1026	1024	1030	1049	1092	1183	1419	1978	2816	3702	4274
45	4538	3873	2865	1888	1301	1103	1035	1007	1005	1005	1008	1014	1033	1088	1241	1686	2562	3577	4254
50	4356	3718	2595	1601	1175	1037	982	970	984	987	990	978	977	1007	1112	1427	2254	3407	4141
55	4231	3517	2282	1392	1086	956	893	880	905	926	913	890	884	906	1000	1234	1913	3206	4118
60	3978	2972	1579	1027	902	795	737	723	751	768	761	727	721	747	832	996	1364	2655	3815
65	3582	2157	891	612	512	511	500	500	529	528	545	507	502	507	489	568	796	1908	3528
70	2339	914	338	267	250	245	269	281	293	282	297	288	277	250	253	276	327	807	2277
75	545	187	113	107	109	119	132	153	129	131	127	153	134	122	113	113	115	189	460
80	115	81.8	53.2	50.3	52.4	60.4	71.8	78.4	80.6	81.4	79.1	75.7	70.2	58.9	49.5	48.6	50.0	71.1	106
85	14.1	17.8	15.6	15.0	16.0	16.0	19.8	20.2	26.5	29.5	26.5	19.9	19.0	14.0	13.3	13.4	12.4	13.7	16.8
90	0.21	0.15	0.11	0.10	0.09	0.09	0.09	0.08	0.08	0.08	0.07	0.07	0.07	0.08	0.08	0.09	0.10	0.12	0.25

Table 5: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130	3130		
5	3165	3196	3222	3243	3260	3274	3285	3291	3295	3296	3294	3290	3281	3267	3247	3223	3194		
10	3229	3278	3313	3336	3350	3361	3371	3379	3385	3390	3396	3400	3396	3385	3364	3330	3283		
15	3324	3381	3410	3421	3419	3410	3401	3401	3404	3414	3431	3452	3472	3484	3477	3445	3389		
20	3456	3518	3531	3514	3475	3439	3415	3406	3408	3421	3444	3480	3524	3565	3592	3581	3523		
25	3611	3671	3660	3606	3543	3482	3438	3416	3412	3427	3461	3516	3575	3651	3714	3731	3683		
30	3804	3840	3787	3691	3612	3534	3463	3420	3410	3425	3480	3555	3646	3734	3831	3896	3887		
35	4044	4014	3903	3808	3737	3715	3706	3665	3645	3657	3684	3703	3763	3850	3972	4082	4123		
40	4574	4508	4329	4313	4270	4069	3777	3530	3468	3582	3885	4219	4413	4386	4363	4540	4641		
45	4666	4848	4735	4479	4110	3743	3436	3232	3179	3265	3525	3919	4393	4844	5101	5169	4928		
50	4466	4469	4234	3911	3614	3290	2933	2687	2614	2718	2971	3340	3726	4072	4386	4603	4590		
55	4483	4359	3946	3577	3300	2884	2405	2058	1961	2108	2493	2991	3413	3742	4055	4406	4500		
60	4314	4316	3855	3294	3008	2531	1836	1455	1351	1491	1930	2636	3112	3487	3826	4171	4341		
65	4334	4171	3392	2847	2510	1816	928	615	548	620	974	1894	2564	2826	3564	4194	4302		
70	3089	3452	2714	1746	1313	552	257	267	257	274	260	580	1334	1868	2872	3373	3149		
75	807	1019	1168	570	297	201	177	222	212	230	177	197	306	660	1293	1099	813		
80	142	245	200	156	137	138	139	168	162	178	136	133	138	167	220	259	156		
85	19.3	40.6	70.0	48.1	58.4	75.1	77.9	89.2	96.2	90.3	76.3	76.9	58.1	46.7	67.0	37.8	20.6		
90	0.22	0.24	0.44	0.52	0.45	0.35	0.30	0.25	0.25	0.35	0.44	0.47	0.64	0.71	0.65	0.50	0.47		

Table 6: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Sep. 18, 2013	Sep. 17, 2014
Digital Power Meter	PF2010A	HZTE028-01	Sep. 18, 2013	Sep. 17, 2014
AC Power Supply	PCR 500L	HZTE001-08	Sep. 18, 2013	Sep. 17, 2014
DC Power Supply	WY12010	HZTE004-03	Sep. 18, 2013	Sep. 17, 2014
Temperature Meter	TES1310	HZTE017-01	Sep. 18, 2013	Sep. 17, 2014
Standard source	D908	HZTE012-01	Sep. 18, 2013	Sep. 17, 2014
Integrate Sphere system	2M	HZTE015-01	Sep. 18, 2013	Sep. 17, 2014
Digital Power Meter	WT210	HZTE008-01	Sep. 18, 2013	Sep. 17, 2014
AC Power Supply	PCR 500L	HZTE001-07	Sep. 18, 2013	Sep. 17, 2014
DC Power Supply	6154	HZTE004-04	Sep. 18, 2013	Sep. 17, 2014
Temperature and humidity recorder	JR900	HZTE018-01	Sep. 18, 2013	Sep. 17, 2014
Standard source	SCL-1400	HZTE012-02	Sep. 18, 2013	Sep. 17, 2014

Table 7: 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.

Sphere-Spectroradiometer Method- Photometric and Electrical Measurements

A Labsphere Model CDS 2100 Spectroradiometer and Two Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit. The coating reflectance of each sphere is 98%. The measure geometry is 4π . Self-absorption correction is conducted in testing. Bandwidth of spectroradiometer is 350nm-1050nm.

Ambient temperature was measured at a position inside the sphere. 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 Yokogawa Power Analyzer.

The standard reference of the integrated sphere system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Standards and Technology.

The uncertainty of integrating sphere system reported in this document is expended uncertainty is 1.06% with a

coverage factor $k=2$.

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 expanded uncertainty is 1.94% with a coverage factor $k=2$.

Color Characteristics Measurements

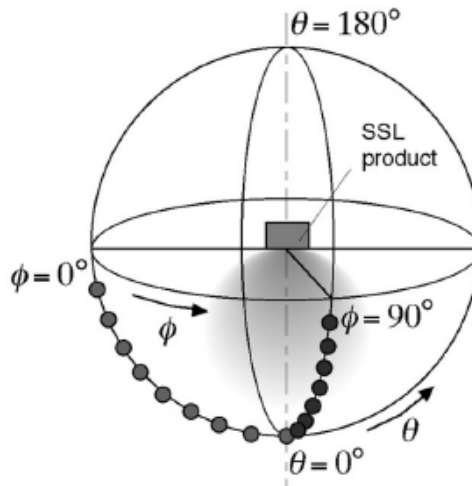
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as 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 ($C=0^\circ/180^\circ$ and $C=90^\circ/270^\circ$) 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, $\Delta u'v'$, 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.



*** End of Report ***

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement