LM-79-08 Test Report

for

ABBlighting,Inc.

1501 Industrial Way N. Toms River, NJ 08755

135W Area Light

Model: ABAR135LED50VW

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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www.ledtestlab.com

Report No.: HZ13110007a

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

Review by: April. Zou

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Nov. 18, 2013

Approved by:

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: **ABAR135LED50VW**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
108.4	14120.0	130.2	0.9953

CCT (K)	CRI	Stabilization Time (Light & Power)
5073	77	90

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

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Photos

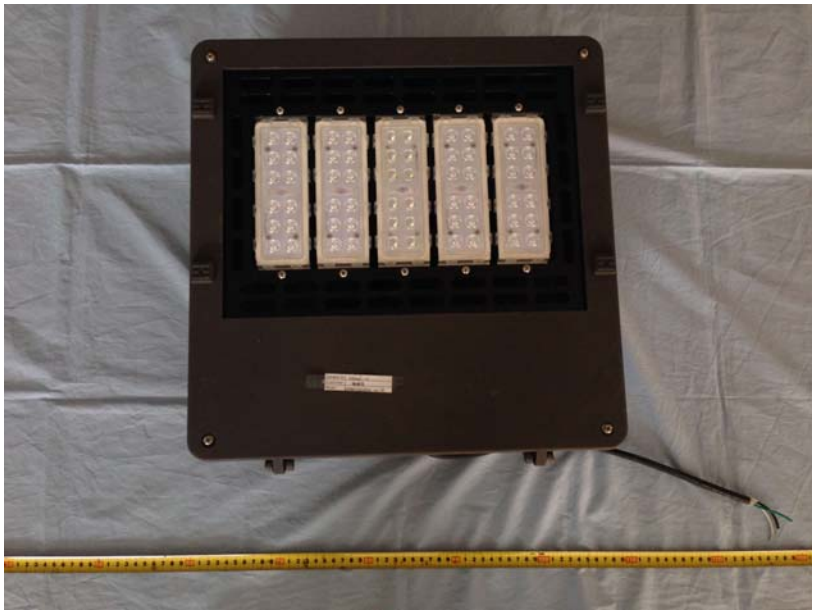


Figure 1- Overview of the sample

Equipment Under Test (EUT)	
Name	: 135W Area Light
Model	: ABAR135LED50VW
Electrical Ratings	: 100~277V AC, 50/60Hz, 135W
Product Description	: 5000K, Outdoor Luminaire, 5 LED bars Manufacturer of light source: Philips Quantity of light source: 60 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 25.1℃.

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

The stabilization time of the sample was 90 minutes, and the total operating time including stabilization was 125 minutes.

Parameter	Result		
Test Voltage (V)	120.0	100.0	277.0
Voltage frequency (Hz)	60	60	60
Test Current (A)	1.089	1.318	0.530
Power Factor	0.9953	0.9978	0.8712
Test Power (W)	130.2	131.6	127.9
THD A%	5.32	4.85	15.57
Luminous Efficacy (lm/W)	108.4		
Total Luminous Flux (lm)	14120.0		
Color Rendering Index (CRI)	77		
R9	13		
Correlated Color Temperature (CCT) (K)	5073		
Chromaticity (Chroma x, Chroma y)	(0.3431, 0.3502)		
Chromaticity (Chroma u, Chroma v)	(0.2106, 0.3225)		
Chromaticity (Chroma u', Chroma v')	(0.2106, 0.4837)		
Duv	0.0001		
Average Beam Angle (°)	152.7		
Center Beam Candle Power (cd)	900		
Spacing Criteria	3.36 (0°-180°)/ 3.29(90°-270°)		
Zonal Lumens in the 0°-60°Zone	42.42%		
Zonal Lumens in the 60°-90°Zone	57.58%		
Zonal Lumens in the 90°-120°Zone	0.00%		
Zonal Lumens in the 120°-180°Zone	0.00%		

Special Color Rendering Indices	
R1	81
R2	84
R3	83
R4	82
R5	81
R6	76
R7	86
R8	71
R9	13
R10	59
R11	79
R12	55
R13	81
R14	90

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

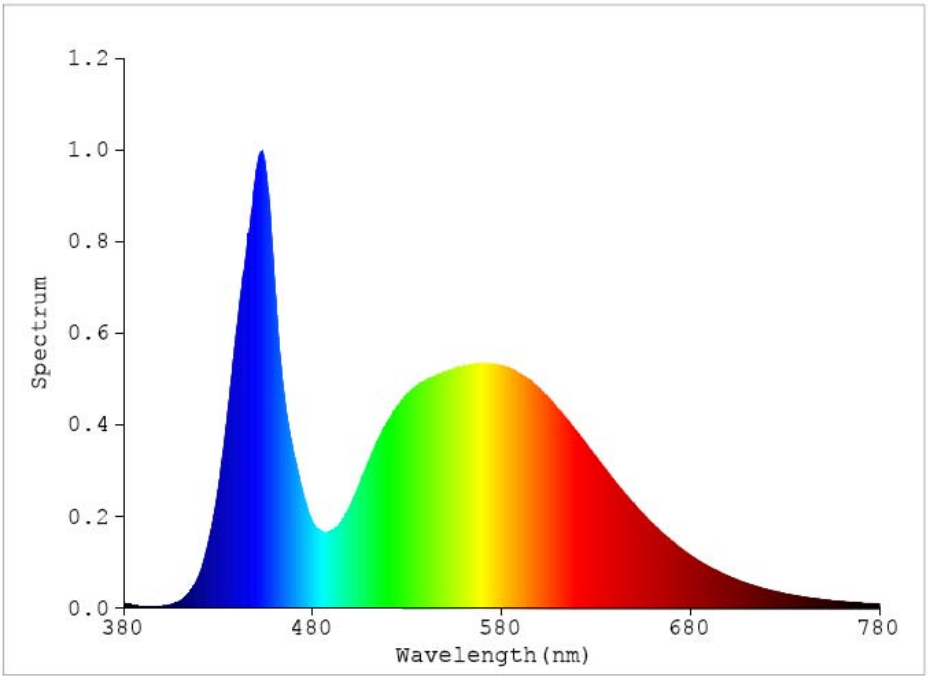


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	85.005	0.60%
10- 20	253.33	1.79%
20- 30	444.443	3.15%
30- 40	808.544	5.73%
40- 50	1533.613	10.86%
50- 60	2865.163	20.29%
60- 70	4440.068	31.44%
70- 80	3376.217	23.91%
80- 90	313.923	2.22%
90-100	0.012	0.00%
Total	14120.3	100%

γ(°)	Lumens	% Total
0- 60	5990.098	42.42%
60- 90	8130.208	57.58%
0-90	14120.3	100.00%
90- 180	0.012	0.00%
0- 180	14120.3	100%

Table 4: Zonal Lumen Data

Illuminance Plots

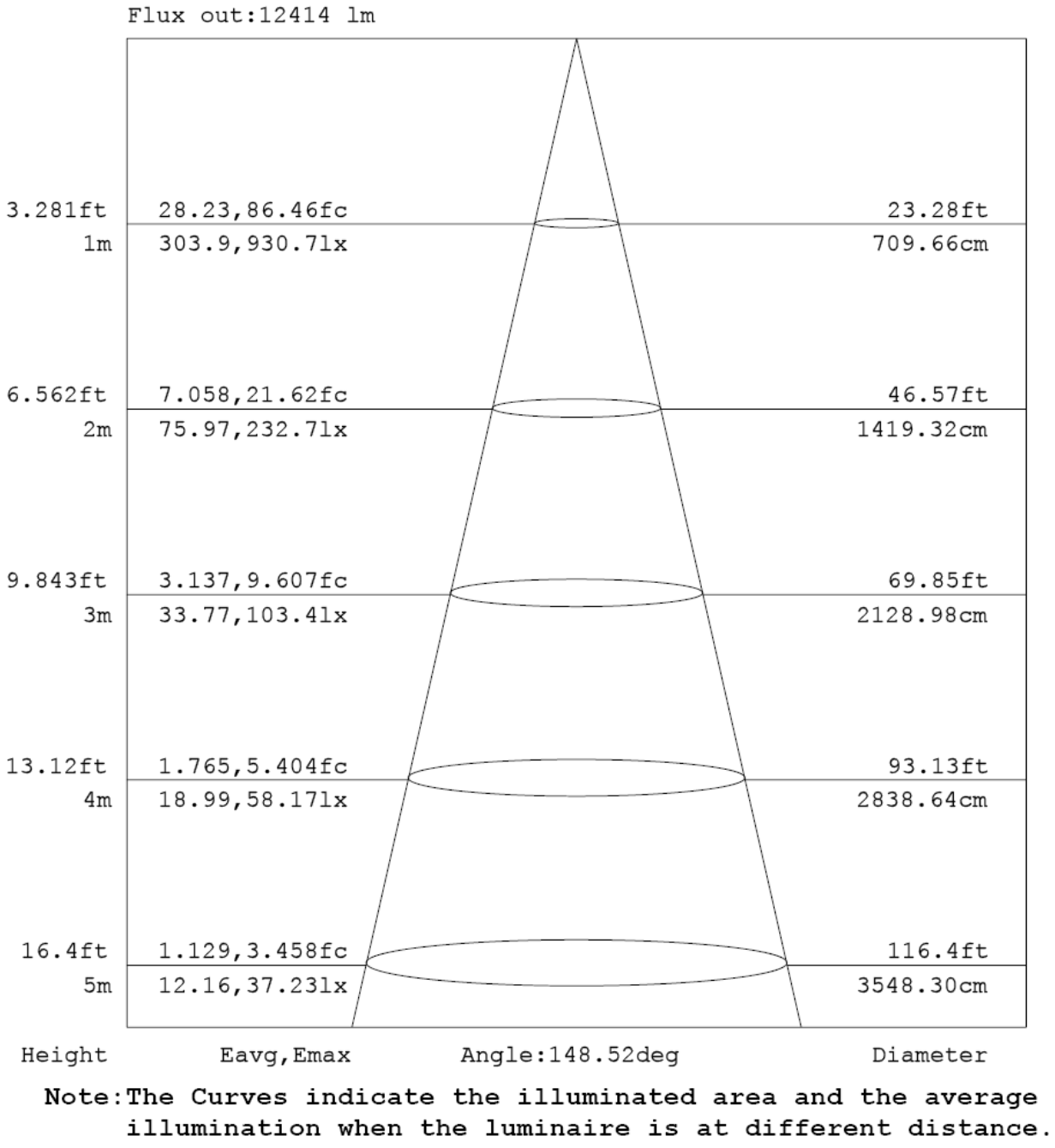


Chart 2: Beam Angle

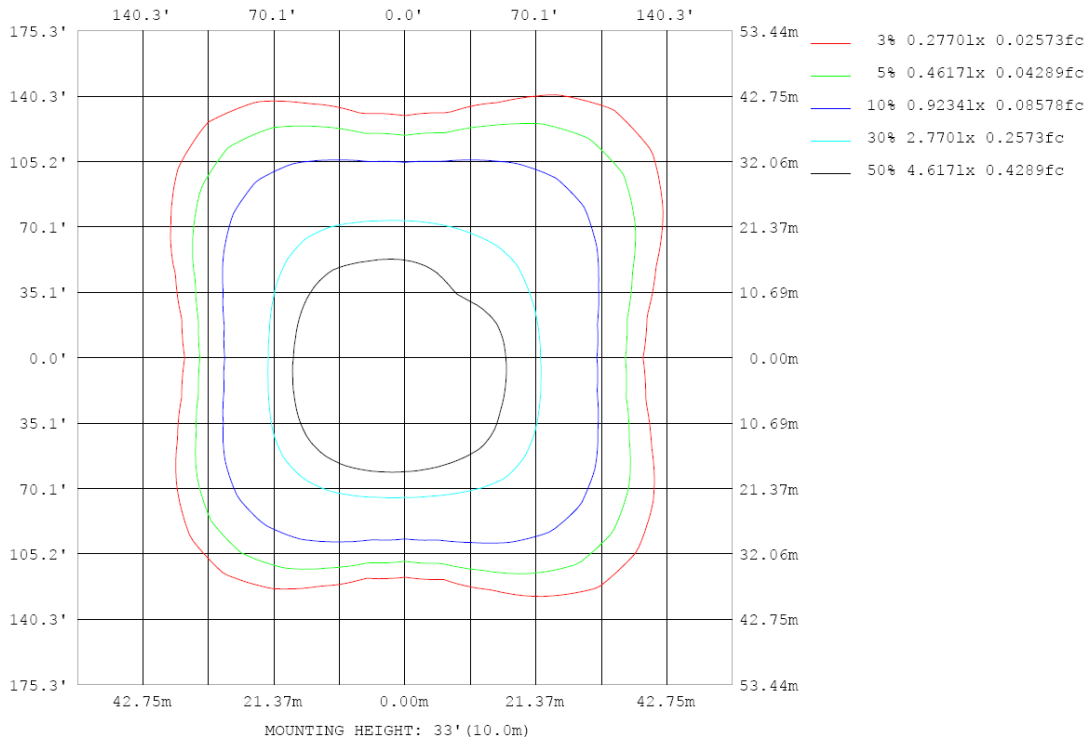


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

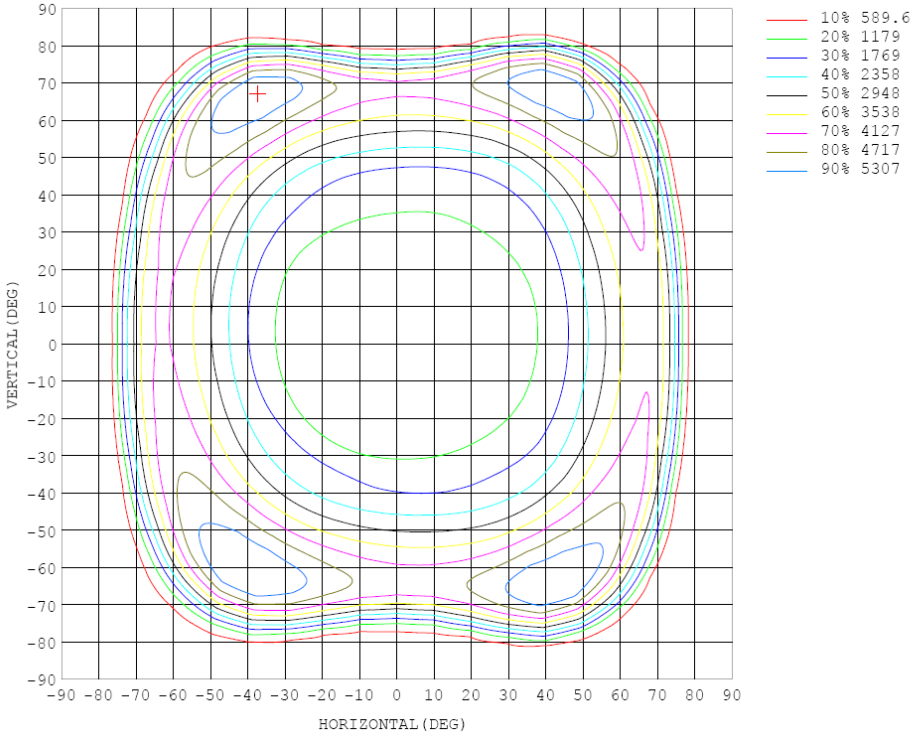


Chart 4: Isocandela Plot

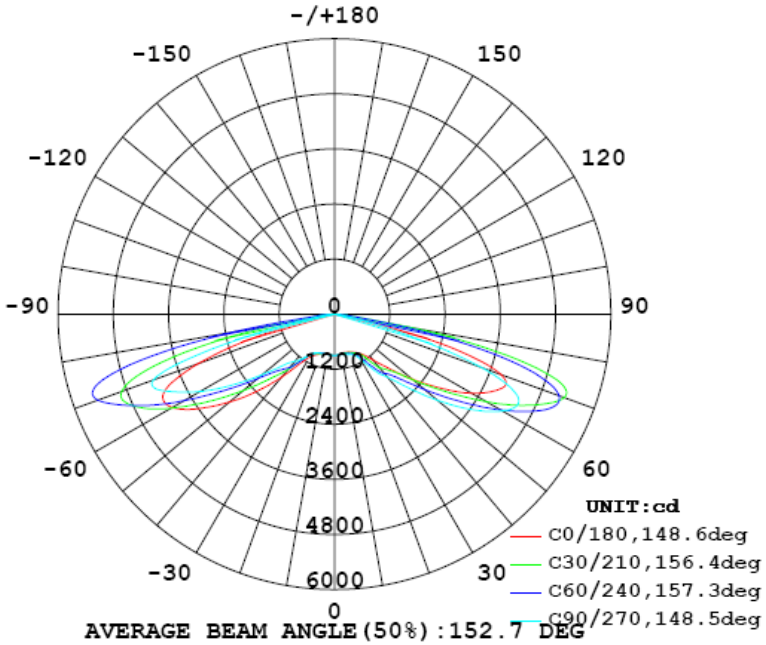


Chart 5: Polar Candela Distribution

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	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900
5	890	890	890	890	891	893	893	894	895	894	895	894	892	892	892	891	890	889	889
10	868	870	873	876	880	885	889	894	896	897	898	897	894	892	890	888	883	880	878
15	864	866	869	874	882	888	895	904	912	912	911	906	902	905	907	907	904	901	897
20	884	885	888	894	902	909	914	926	937	940	937	927	927	935	942	945	942	937	931
25	916	916	920	928	942	953	960	969	984	990	987	980	982	993	1001	1003	999	992	984
30	971	973	977	990	1016	1041	1064	1087	1119	1138	1140	1129	1120	1120	1119	1116	1109	1098	1085
35	1075	1087	1103	1141	1227	1316	1362	1397	1442	1480	1506	1515	1510	1498	1448	1397	1364	1346	1316
40	1304	1352	1429	1521	1628	1696	1689	1694	1735	1790	1840	1897	1964	2034	2054	2006	1940	1871	1793
45	1672	1702	1726	1755	1818	1906	1983	2077	2190	2270	2320	2342	2344	2373	2405	2439	2462	2443	2367
50	2206	2242	2248	2233	2287	2421	2555	2705	2830	2917	2984	3032	3044	3077	3114	3132	3130	3082	2975
55	2808	2866	2912	2937	3059	3196	3305	3434	3533	3617	3726	3833	3900	3977	3987	3908	3834	3717	3584
60	3447	3546	3681	3819	4054	4189	4176	4159	4163	4215	4364	4581	4799	4973	4968	4749	4488	4246	4067
65	3907	4063	4342	4691	5059	5202	4958	4671	4453	4413	4593	4986	5418	5703	5656	5253	4723	4298	4099
70	3848	4068	4626	5308	5791	5861	5186	4313	3632	3387	3661	4393	5249	5799	5765	5082	4103	3389	3140
75	2112	2408	3277	4544	5373	5212	3983	2521	1448	1197	1379	2363	3609	4400	4331	3389	2247	1494	1164
80	166	269	611	1653	2568	2494	1264	470	247	218	229	391	877	1593	1410	820	465	190	178
85	22.1	23.3	59.7	119	166	183	165	90.8	69.2	62.1	64.8	84.3	185	203	201	186	119	59.6	54.1
90	0.17	0.18	0.21	0.25	0.30	0.31	0.28	0.27	0.21	0.19	0.27	0.31	0.58	0.69	0.78	0.74	0.31	0.25	0.32

Table 5: 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	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900		
5	889	890	890	892	894	896	897	899	900	900	901	899	899	897	896	893	891		
10	877	879	878	882	885	888	892	894	894	895	894	891	889	884	881	875	870		
15	893	890	886	886	888	887	888	893	894	895	890	883	879	873	870	865	863		
20	924	916	909	906	904	902	900	908	909	905	893	881	880	881	883	883	883		
25	974	961	947	941	940	938	934	935	934	926	908	897	902	909	914	914	914		
30	1068	1046	1022	1008	1008	1009	1001	996	992	978	952	939	944	954	959	962	966		
35	1277	1228	1184	1169	1183	1198	1201	1191	1175	1152	1115	1084	1069	1056	1049	1053	1063		
40	1710	1625	1566	1545	1549	1522	1453	1382	1337	1314	1305	1323	1339	1322	1290	1266	1270		
45	2261	2138	2000	1884	1818	1744	1667	1618	1582	1532	1486	1473	1502	1515	1527	1568	1624		
50	2878	2749	2592	2416	2281	2182	2129	2096	2054	1985	1899	1822	1805	1844	1930	2050	2148		
55	3490	3421	3306	3156	3021	2877	2788	2739	2679	2603	2510	2415	2387	2435	2542	2674	2761		
60	4021	4079	4096	4064	3978	3766	3589	3460	3369	3314	3269	3197	3210	3256	3315	3394	3421		
65	4174	4452	4762	4985	5014	4719	4352	4097	3982	3977	4053	4131	4281	4320	4164	4049	3934		
70	3368	4035	4916	5573	5792	5470	4846	4362	4180	4316	4641	5012	5302	5280	4906	4431	4000		
75	1496	2315	3650	4939	5527	4977	3792	2612	2275	2666	3829	5018	5801	5753	4789	3453	2477		
80	202	429	1129	2249	2846	2184	901	438	387	453	979	2623	3912	3738	2307	867	260		
85	64.1	123	228	306	373	290	151	104	108	112	164	334	433	333	187	80.3	30.0		
90	0.37	0.49	0.71	0.87	0.88	0.79	0.60	0.49	0.37	0.33	0.38	0.46	0.47	0.42	0.37	0.31	0.27		

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

Color Characteristics Measurements

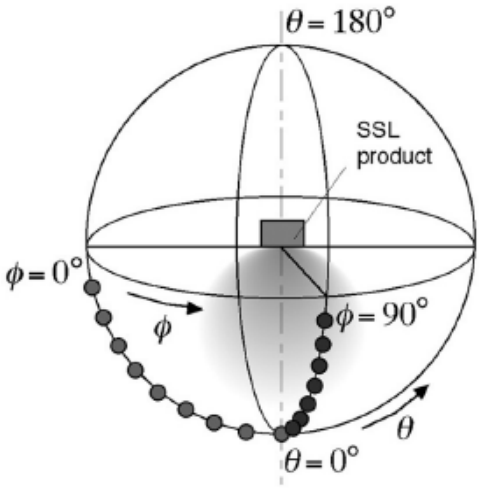
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as 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.



*** End of Report ***

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