



LM-79-08 Test Report

for

ABBlighting, Inc.

1501 Industrial Way N. Toms River, NJ 08755

135W Area Light

Model: ABAR135LED50III

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ13110007c

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

Review by:

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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: **ABAR135LED50III**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
108.5	13958.0	128.7	0.9941
CCT (K)	CRI	Stabilization Time (Light & Power)	
4886	76	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

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Sample Photos



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: 135W Area Light
Model	: ABAR135LED50III
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 25.2°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)	1.079	1.306	0.523	R3	83
Power Factor	0.9941	0.9970	0.8728	R4	82
Test Power (W)	128.7	130.3	126.5	R5	81
THD A%	7.11	6.29	18.20	R6	76
Luminous Efficacy (lm/W)	108.5			R7	85
Total Luminous Flux (lm)	13958.0			R8	72
Color Rendering Index (CRI)	76			R9	15
R9	15			R10	59
Correlated Color Temperature (CCT) (K)	4886			R11	79
Chromaticity (Chroma x, Chroma y)	(0.3489, 0.3589)			R12	55
Chromaticity (Chroma u, Chroma v)	(0.2111, 0.3259)			R13	82
Chromaticity (Chroma u', Chroma v')	(0.2111, 0.4888)			R14	90
Duv	0.0022				
Average Beam Angle (°)	100.8				
Center Beam Candle Power (cd)	3954				
Spacing Criteria	1.94 (0°-180°)/ 1.60(90°-270°)				
Zonal Lumens in the 0°-60°Zone	79.83%				
Zonal Lumens in the 60°-90°Zone	20.17%				
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

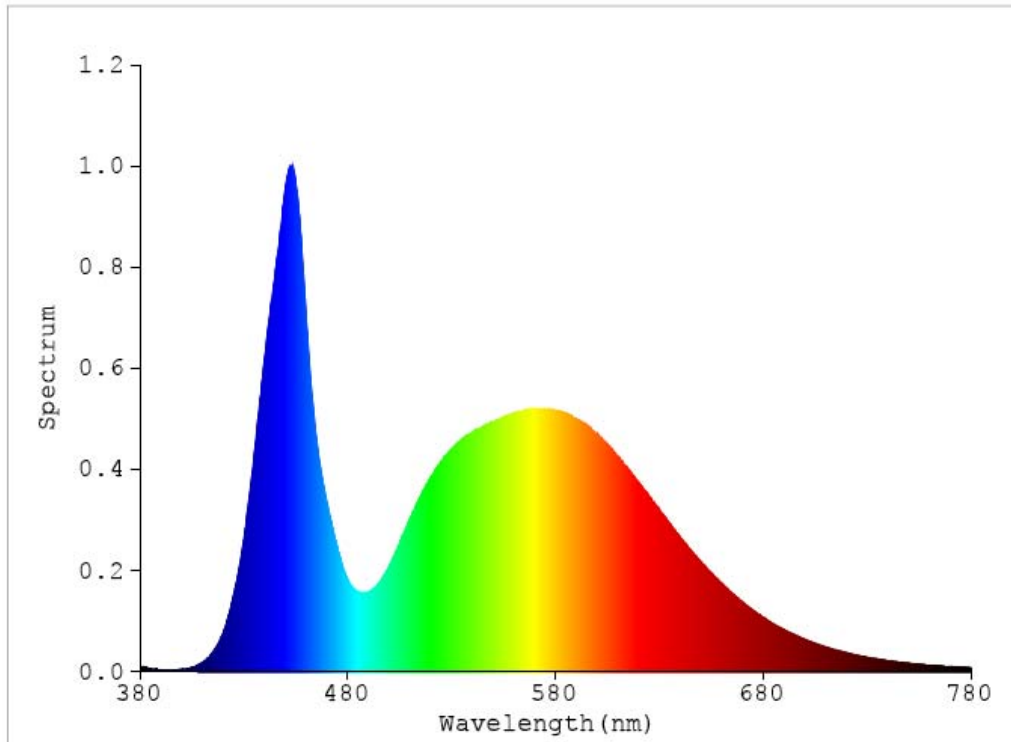


Chart 1: Spectral Power Distribution

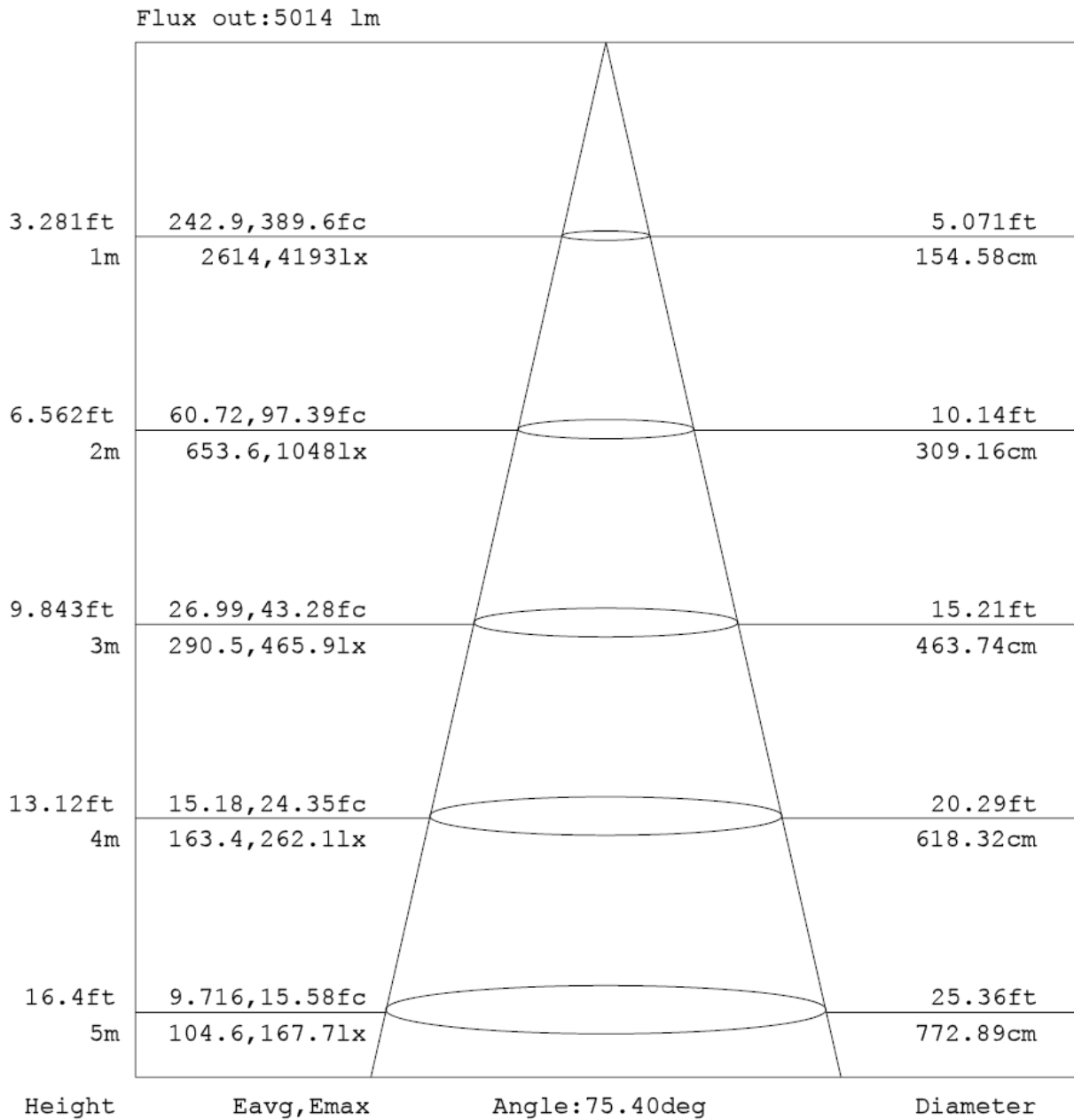
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	376.226	2.70%
10- 20	1088.262	7.80%
20- 30	1729.774	12.39%
30- 40	2341.165	16.77%
40- 50	2856.544	20.46%
50- 60	2750.868	19.71%
60- 70	2137.063	15.31%
70- 80	619.032	4.43%
80- 90	59.405	0.43%
90-100	0.008	0.00%
Total	13958.3	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	11142.839	79.83%
60- 90	2815.5	20.17%
0-90	13958.3	100.00%
90- 180	0.008	0.00%
0- 180	13958.3	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

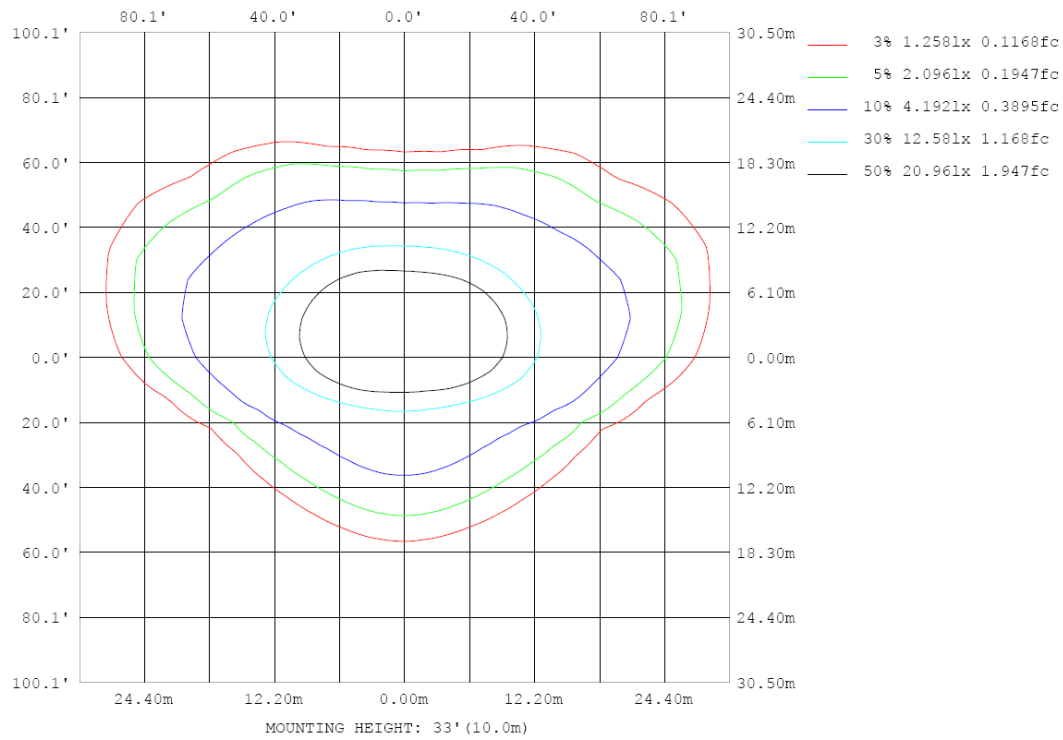


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

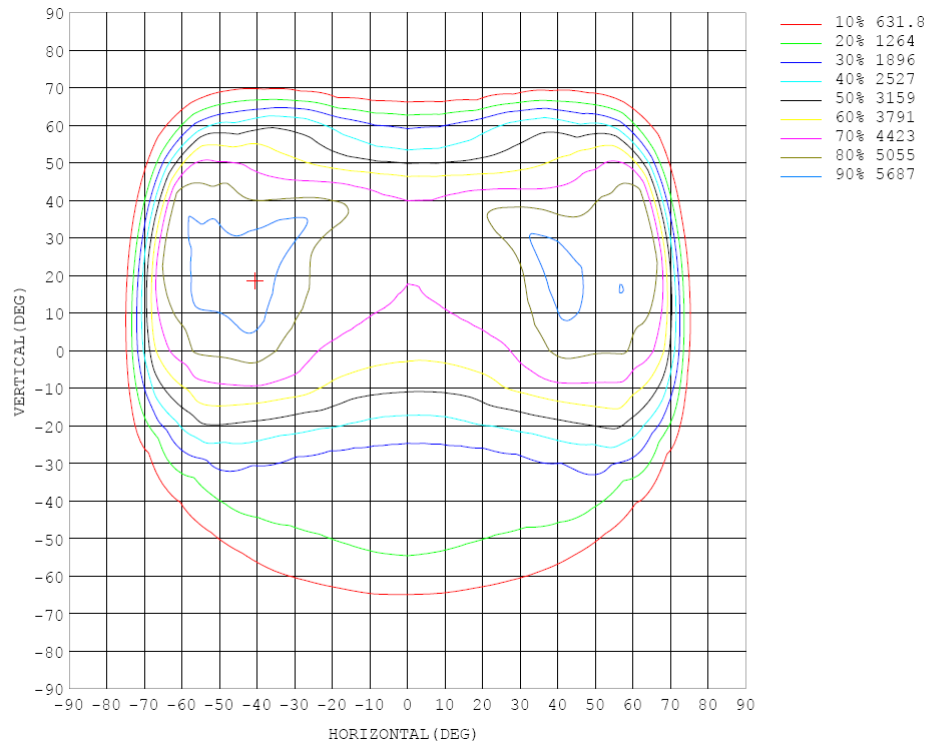


Chart 4: Isocandela Plot

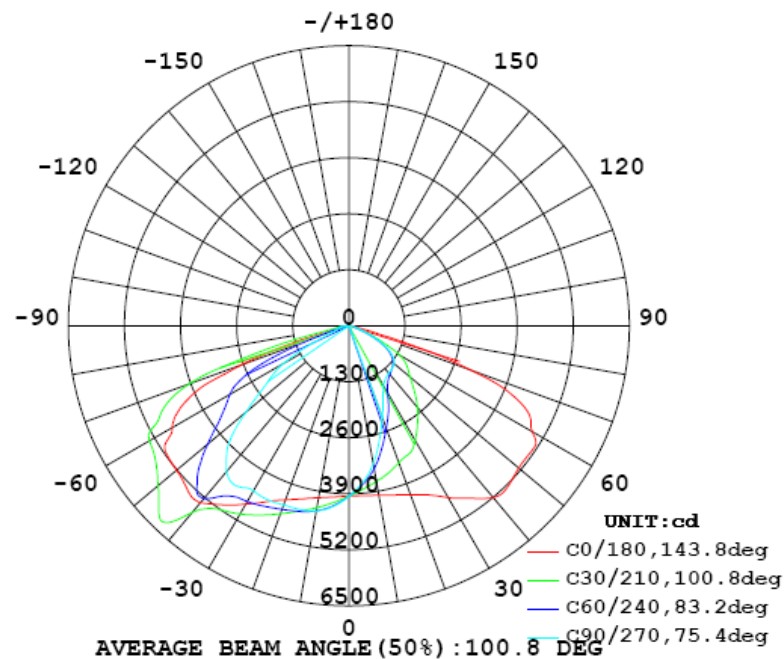


Chart 5: Polar Candela Distribution

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	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954
5	3955	3906	3856	3807	3761	3721	3689	3665	3653	3651	3660	3678	3706	3743	3787	3835	3886	3936	3986
10	3991	3890	3782	3671	3563	3459	3369	3300	3260	3251	3273	3326	3405	3503	3613	3727	3841	3951	4052
15	4064	3910	3734	3537	3324	3120	2949	2825	2757	2739	2772	2856	2995	3180	3394	3616	3819	3999	4156
20	4172	3961	3702	3384	3051	2758	2533	2379	2294	2270	2306	2408	2581	2828	3140	3487	3811	4079	4300
25	4329	4076	3731	3286	2833	2453	2172	1988	1893	1872	1911	2017	2207	2504	2910	3392	3882	4250	4500
30	4604	4284	3745	3076	2499	2069	1804	1672	1618	1609	1634	1704	1846	2115	2558	3173	3886	4452	4774
35	4886	4397	3598	2773	2143	1755	1581	1508	1486	1486	1501	1537	1617	1800	2187	2838	3697	4550	5072
40	5201	4443	3382	2474	1848	1577	1477	1440	1435	1437	1445	1461	1503	1611	1884	2503	3446	4556	5355
45	5236	4321	3136	2147	1640	1470	1412	1397	1405	1412	1413	1409	1422	1490	1679	2161	3146	4368	5320
50	5138	4164	2809	1851	1503	1376	1334	1336	1358	1367	1363	1344	1335	1380	1522	1879	2774	4166	5214
55	5131	3968	2419	1649	1380	1250	1202	1198	1227	1248	1231	1197	1189	1226	1346	1614	2331	3852	5168
60	4897	3419	1853	1355	1132	1009	961	946	973	994	980	942	936	963	1056	1251	1662	3098	4729
65	4501	2413	1063	768	673	629	606	603	626	625	638	607	603	624	624	720	983	2113	4189
70	2997	965	405	324	291	279	297	305	314	301	321	320	317	292	303	338	399	870	2653
75	634	214	140	129	129	141	156	178	159	160	157	177	163	149	138	140	146	219	584
80	137	100	70.7	66.5	70.0	77.2	88.8	90.6	91.3	95.2	92.2	91.1	89.3	78.5	71.9	66.4	70.3	91.7	132
85	18.1	21.5	18.8	18.5	17.5	17.6	22.3	24.4	33.6	39.6	33.7	24.6	22.9	18.1	17.4	17.3	16.0	17.6	23.2
90	0.21	0.17	0.13	0.12	0.11	0.11	0.11	0.10	0.10	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.12	0.14	0.26

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	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954	3954		
5	4034	4078	4116	4148	4174	4192	4204	4210	4210	4204	4193	4176	4154	4125	4091	4049	4004		
10	4144	4223	4283	4324	4348	4359	4364	4365	4363	4356	4347	4334	4314	4280	4234	4169	4086		
15	4289	4391	4452	4476	4476	4458	4438	4421	4411	4407	4412	4420	4422	4410	4371	4303	4197		
20	4473	4593	4641	4632	4589	4534	4484	4447	4426	4420	4433	4454	4487	4521	4522	4462	4341		
25	4689	4821	4847	4794	4705	4624	4548	4488	4453	4445	4468	4501	4554	4622	4672	4649	4526		
30	4985	5066	5043	4942	4827	4709	4585	4482	4425	4420	4470	4553	4638	4733	4831	4852	4761		
35	5338	5357	5210	5074	4945	4824	4716	4610	4540	4521	4559	4647	4760	4865	4987	5093	5097		
40	5824	5888	5662	5539	5471	5230	4886	4568	4409	4446	4649	4922	5177	5308	5418	5614	5570		
45	5958	6289	6221	5941	5482	4971	4483	4138	3975	4034	4282	4662	5127	5588	5867	6025	5735		
50	5796	5964	5778	5373	4838	4276	3723	3313	3120	3204	3525	3981	4505	5058	5466	5697	5576		
55	5858	5947	5470	4820	4212	3591	2958	2501	2322	2429	2795	3304	3876	4499	5055	5554	5592		
60	5614	5920	5337	4447	3773	3188	2427	1959	1766	1893	2314	2939	3412	4077	4902	5652	5625		
65	5413	5685	4810	3913	3266	2535	1490	964	811	894	1347	2339	3077	3623	4589	5606	5608		
70	3741	4653	3924	2574	1870	1043	433	372	348	362	387	878	1863	2473	3908	4988	4304		
75	965	1531	1561	948	473	283	247	293	279	293	256	268	415	864	1675	1725	1075		
80	178	307	311	222	185	190	189	223	211	223	197	187	184	208	282	317	192		
85	24.9	41.7	82.0	66.9	70.5	87.0	84.6	90.1	97.6	94.8	84.5	84.7	76.9	62.7	84.5	50.9	28.2		
90	0.25	0.33	0.55	0.52	0.44	0.35	0.31	0.26	0.27	0.37	0.46	0.48	0.62	0.71	0.77	0.51	0.45		

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

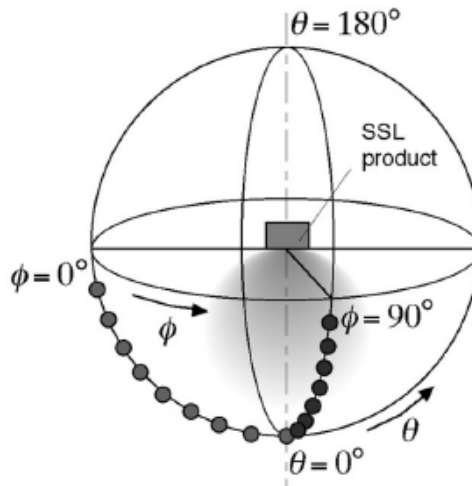
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as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

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