



LM-79-08 Test Report

for

ABBlighting, Inc.

1501 Industrial Way N. Toms River, NJ 08755

160W Area Light

Model: ABAR160LED50III

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ13110007h

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

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Oct. 22, 2013

Approved by:



Jim Zhang

Manager: Jim Zhang
Oct. 22, 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: **ABAR160LED50III**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
109.6	17125.0	156.3	0.9959
CCT (K)	CRI	Stabilization Time (Light & Power)	
4877	76.1	80	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Oct. 21, 2013
Date of Test	: Oct. 22, 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	: 160W Area Light
Model	: ABAR160LED50III
Electrical Ratings	: 100~277V AC, 50/60Hz, 160W
Product Description	: 5000K, Outdoor Luminaire, 6 LED bars Manufacturer of light source: Philips Quantity of light source: 72 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 24.9°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	85
Test Current (A)	1.308	1.588	0.610	R3	83
Power Factor	0.9959	0.9978	0.9061	R4	82
Test Power (W)	156.3	158.4	153.1	R5	81
THD A%	6.56	5.88	15.41	R6	76
Luminous Efficacy (lm/W)	109.6			R7	86
Total Luminous Flux (lm)	17125.0			R8	72
Color Rendering Index (CRI)	76.1			R9	15
R9	15			R10	61
Correlated Color Temperature (CCT) (K)	4877			R11	79
Chromaticity (Chroma x, Chroma y)	(0.3494, 0.3606)			R12	55
Chromaticity (Chroma u, Chroma v)	(0.2108, 0.3264)			R13	82
Chromaticity (Chroma u', Chroma v')	(0.2108, 0.4896)			R14	90
Duv	0.0028				
Average Beam Angle (°)	102.9				
Center Beam Candle Power (cd)	4829				
Spacing Criteria	0.70 (0°-180°)/ 1.98(90°-270°)				
Zonal Lumens in the 0°-60°Zone	79.32%				
Zonal Lumens in the 60°-90°Zone	20.68%				
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

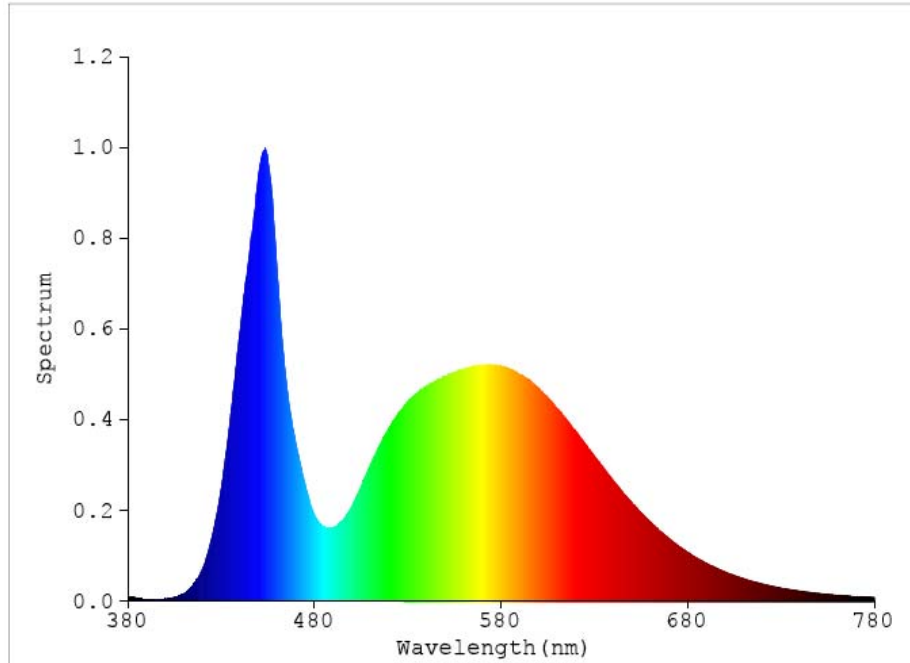


Chart 1: Spectral Power Distribution

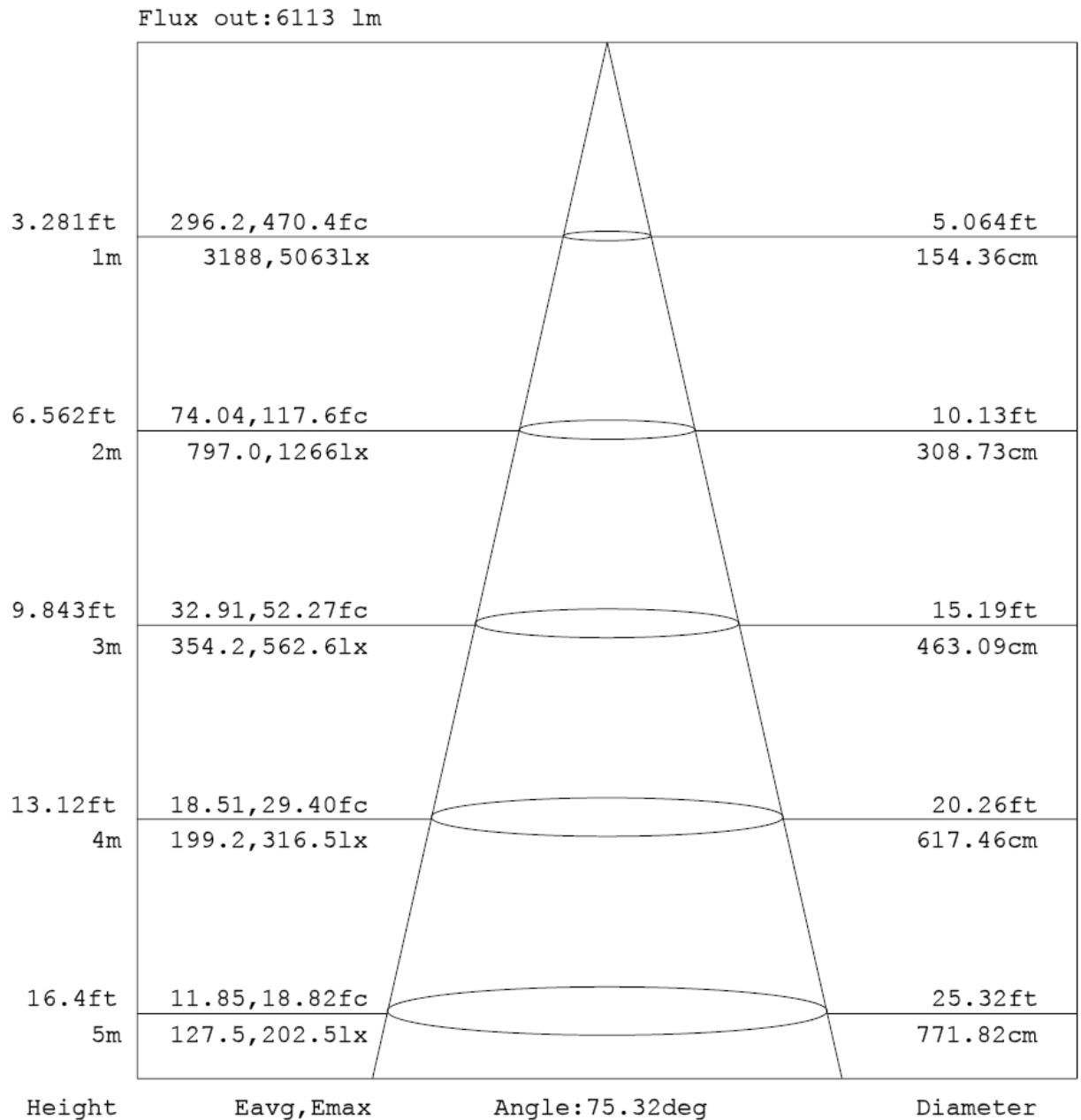
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	458.627	2.68%
10- 20	1327.965	7.75%
20- 30	2106.639	12.30%
30- 40	2859.066	16.69%
40- 50	3481.459	20.33%
50- 60	3349.65	19.56%
60- 70	2672.244	15.60%
70- 80	788.323	4.60%
80- 90	81.433	0.48%
90-100	0.007	0.00%
Total	17125.0	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	13583.406	79.32%
60- 90	3542	20.68%
0-90	17125.0	100.00%
90- 180	0.007	0.00%
0- 180	17125.0	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

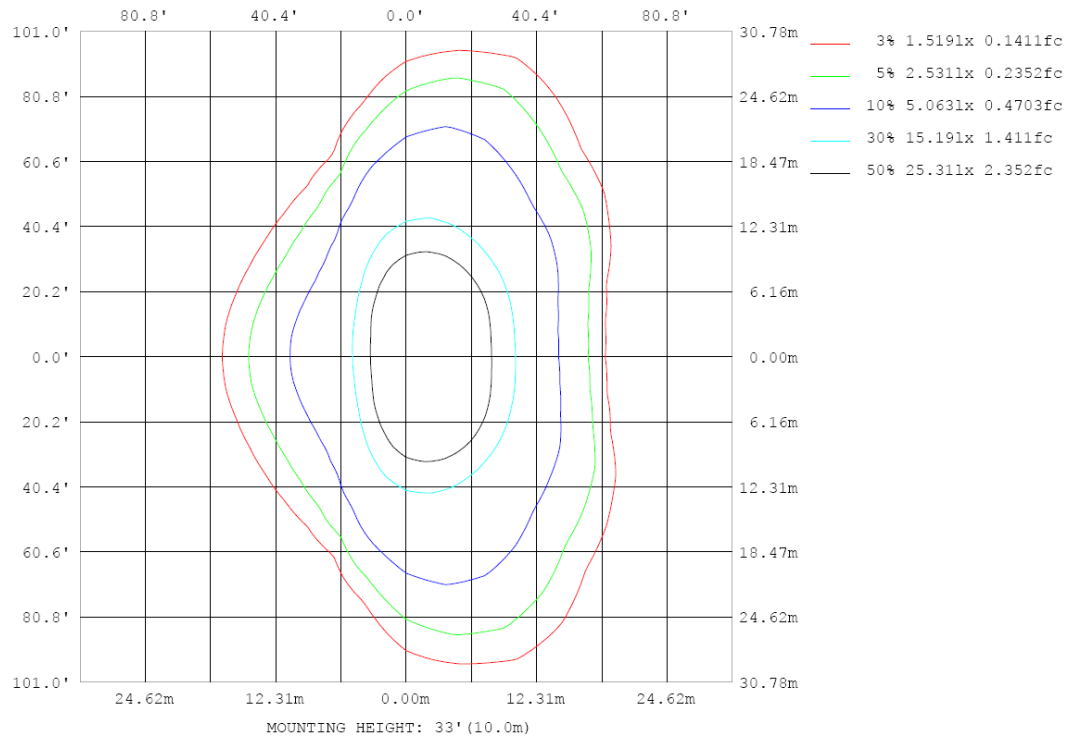


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

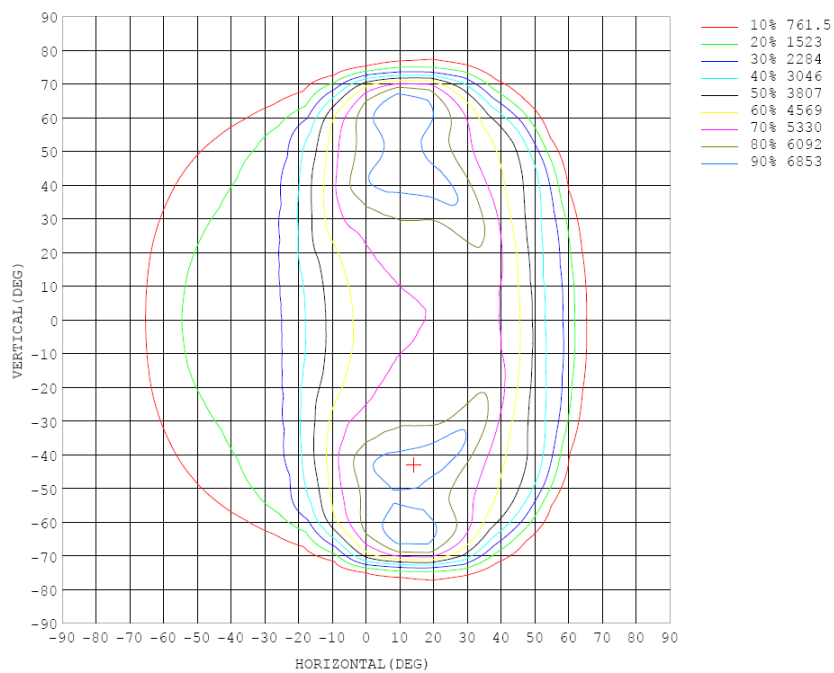


Chart 4: Isocandela Plot

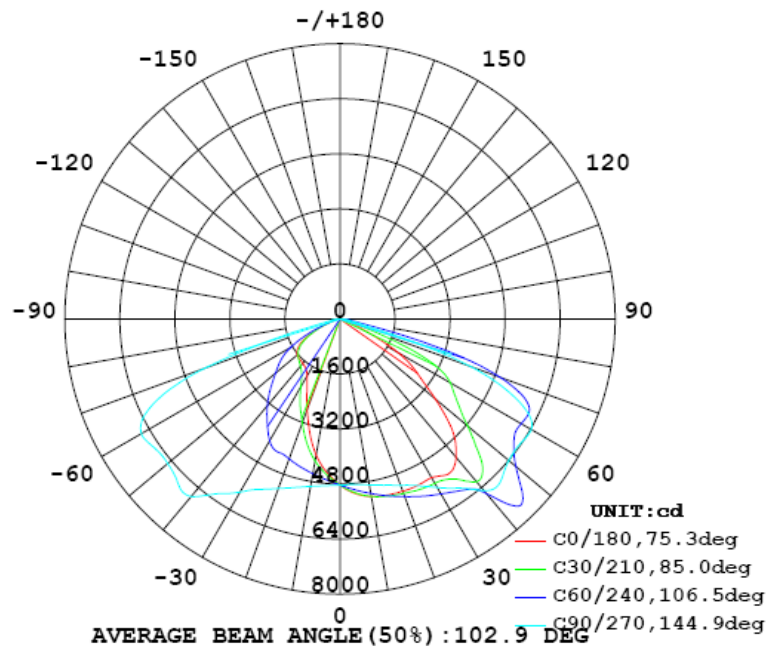


Chart 5: Polar Candela Distribution

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	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829
5	5093	5091	5084	5070	5049	5022	4987	4943	4893	4840	4782	4723	4666	4612	4564	4524	4495	4479	4474
10	5241	5245	5244	5238	5222	5194	5150	5088	5004	4899	4779	4649	4514	4384	4262	4157	4077	4031	4014
15	5301	5307	5318	5329	5344	5348	5323	5256	5150	5000	4817	4606	4375	4126	3886	3683	3533	3444	3416
20	5329	5339	5362	5401	5446	5481	5496	5449	5328	5141	4890	4585	4216	3821	3444	3143	2940	2833	2799
25	5339	5352	5399	5471	5543	5629	5685	5673	5552	5344	5045	4636	4108	3530	3031	2663	2429	2310	2279
30	5326	5333	5401	5516	5652	5769	5872	5930	5871	5656	5303	4704	3910	3138	2553	2190	2008	1935	1919
35	5497	5507	5577	5678	5795	5929	6094	6218	6215	6005	5474	4598	3547	2671	2118	1878	1781	1753	1752
40	5249	5383	5739	6172	6472	6580	6626	6837	6887	6514	5670	4399	3156	2266	1872	1733	1688	1682	1687
45	4641	4800	5214	5806	6480	7101	7507	7629	7287	6627	5544	4057	2721	1977	1734	1654	1640	1653	1661
50	3620	3822	4238	4851	5529	6152	6675	6982	6902	6406	5299	3620	2308	1796	1622	1568	1579	1614	1627
55	2733	2942	3441	4150	4839	5527	6168	6753	6880	6369	5064	3131	2022	1645	1477	1420	1432	1482	1503
60	1930	2178	2791	3701	4311	5064	6085	7014	7197	6421	4583	2436	1644	1363	1216	1151	1149	1202	1221
65	801	932	1458	2808	3696	4511	6068	7210	7171	5787	3213	1389	983	823	761	743	749	793	791
70	377	407	423	963	2121	3098	4944	6195	5626	4042	1368	562	430	380	365	372	385	397	387
75	281	311	259	320	565	1101	2142	1860	1391	765	322	199	181	179	188	205	220	196	199
80	178	192	174	192	218	291	436	467	298	227	160	108	102	110	122	141	144	136	144
85	51.9	50.7	52.7	65.8	75.5	79.9	129	103	61.0	56.5	55.3	47.0	44.2	40.4	42.2	42.5	40.9	41.6	47.4
90	0.16	0.16	0.17	0.17	0.18	0.20	0.29	0.26	0.25	0.22	0.23	0.22	0.28	0.26	0.32	0.19	0.18	0.18	0.21

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	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829	4829		
5	4484	4506	4539	4583	4635	4691	4749	4808	4865	4916	4963	5002	5033	5056	5073	5083	5088		
10	4039	4099	4190	4305	4433	4568	4701	4829	4943	5040	5118	5172	5204	5223	5231	5232	5232		
15	3459	3569	3739	3954	4202	4453	4686	4894	5071	5211	5304	5349	5360	5347	5328	5307	5293		
20	2853	2986	3212	3534	3923	4329	4699	5000	5246	5427	5529	5554	5522	5467	5408	5361	5329		
25	2335	2485	2752	3155	3687	4271	4785	5165	5464	5688	5787	5767	5694	5604	5500	5410	5349		
30	1964	2074	2286	2671	3276	4094	4920	5497	5807	5984	6052	5979	5851	5723	5580	5435	5346		
35	1775	1833	1955	2230	2800	3691	4827	5708	6203	6393	6311	6174	6040	5922	5816	5677	5543		
40	1701	1730	1794	1957	2386	3290	4568	5879	6738	7180	7051	6771	6694	6514	6126	5670	5322		
45	1670	1672	1696	1795	2079	2860	4234	5686	6687	7311	7527	7272	6828	6275	5646	5092	4713		
50	1629	1603	1596	1657	1872	2449	3809	5482	6540	7037	7021	6675	6134	5510	4802	4150	3718		
55	1483	1448	1435	1488	1682	2113	3299	5277	6566	7117	6878	6187	5428	4801	4048	3278	2827		
60	1206	1163	1154	1207	1359	1666	2561	4876	6670	7472	7097	6012	4956	4309	3505	2570	2065		
65	802	762	759	779	843	1015	1493	3634	6095	7377	7074	5674	4260	3557	2505	1275	883		
70	409	401	394	391	413	471	632	1802	4170	5653	5894	4335	2706	1905	785	400	398		
75	198	226	210	198	194	203	229	400	884	1649	1995	1904	884	479	307	264	306		
80	140	147	142	122	110	108	115	179	231	311	494	399	284	225	202	184	192		
85	42.4	39.5	43.6	42.4	42.5	44.9	49.5	61.7	53.7	68.5	124	140	84.4	93.0	81.0	63.0	54.6		
90	0.23	0.26	0.31	0.36	0.37	0.41	0.43	0.40	0.36	0.32	0.31	0.28	0.23	0.22	0.20	0.19	0.18		

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

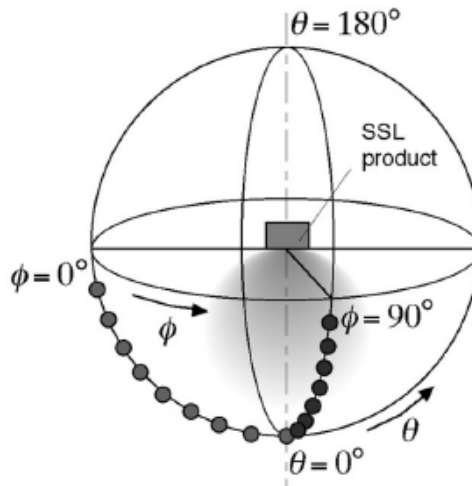
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as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