



LM-79-08 Test Report

for

ABBlighting, Inc.

1501 Industrial Way N. Toms River, NJ 08755

55W area light

Model: ABAR055LED50III

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ13120003a

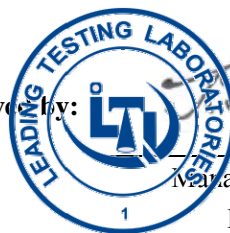
The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Review by:

April Zou

Engineer: April Zou
Dec. 05, 2013

Approved by:



Jim Zhang

Manager: Jim Zhang
Dec. 05, 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: **ABAR055LED50III**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
102.7	5484.0	53.4	0.9929
CCT (K)	CRI	Stabilization Time (Light & Power)	
4853	80.4	70	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Dec. 05, 2013
Date of Test	: Dec. 05, 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	: 55W area light
Model	: ABAR055LED50III
Electrical Ratings	: 100~277V AC, 50/60Hz, 55W
Product Description	: 5000K, Outdoor Luminaire, 2 LED bars Manufacturer of light source: Philips Quantity of light source: 24 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 70 minutes, and the total operating time including stabilization was 105 minutes.

Parameter	Result			Special Color Rendering Indices	
Test Voltage (V)	120.0	100.0	277.0	R1	82
Voltage frequency (Hz)	60	60	60	R2	84
Test Current (A)	0.448	0.547	0.200	R3	82
Power Factor	0.9929	0.9894	0.9560	R4	82
Test Power (W)	53.4	54.1	53.0	R5	82
THD A%	7.51	8.05	7.39	R6	75
Luminous Efficacy (lm/W)	102.7			R7	85
Total Luminous Flux (lm)	5484.0			R8	72
Color Rendering Index (CRI)	80.4			R9	15
R9	15			R10	58
Correlated Color Temperature (CCT) (K)	4853			R11	80
Chromaticity (Chroma x, Chroma y)	(0.3499, 0.3594)			R12	55
Chromaticity (Chroma u, Chroma v)	(0.2116, 0.3261)			R13	82
Chromaticity (Chroma u', Chroma v')	(0.2116, 0.4891)			R14	89
Duv	0.0020				
Average Beam Angle (°)	103.8				
Center Beam Candle Power (cd)	1550				
Spacing Criteria	0.70(0°-180°)/ 2.03(90°-270°)				
Zonal Lumens in the 0°-60°Zone	79.38%				
Zonal Lumens in the 60°-90°Zone	20.62%				
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

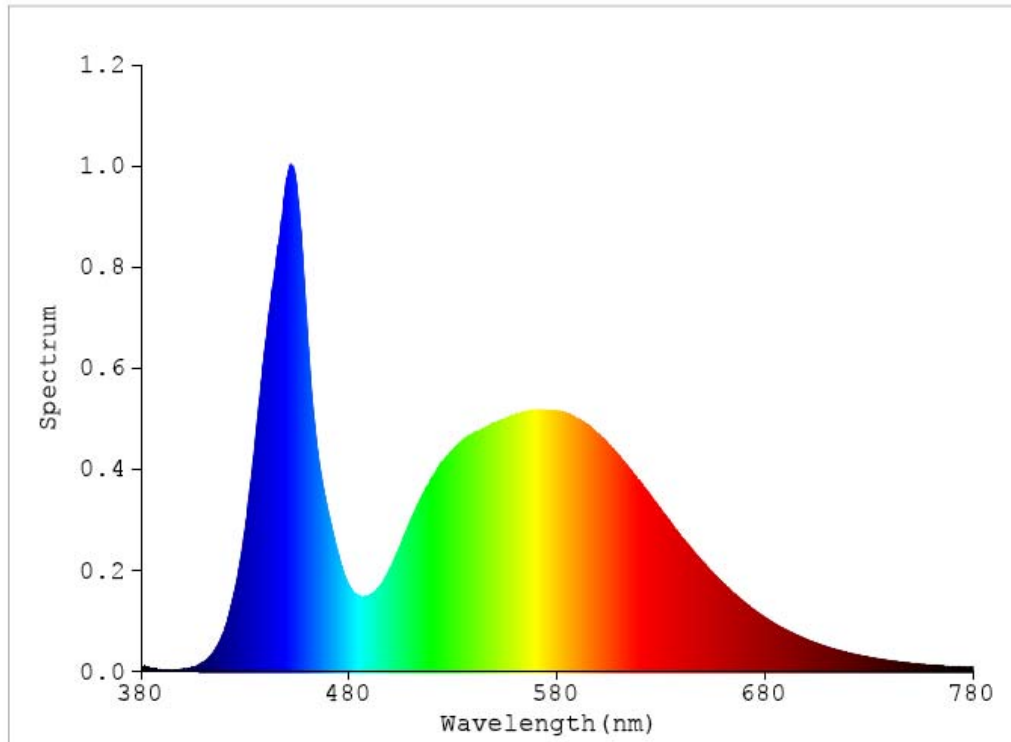


Chart 1: Spectral Power Distribution

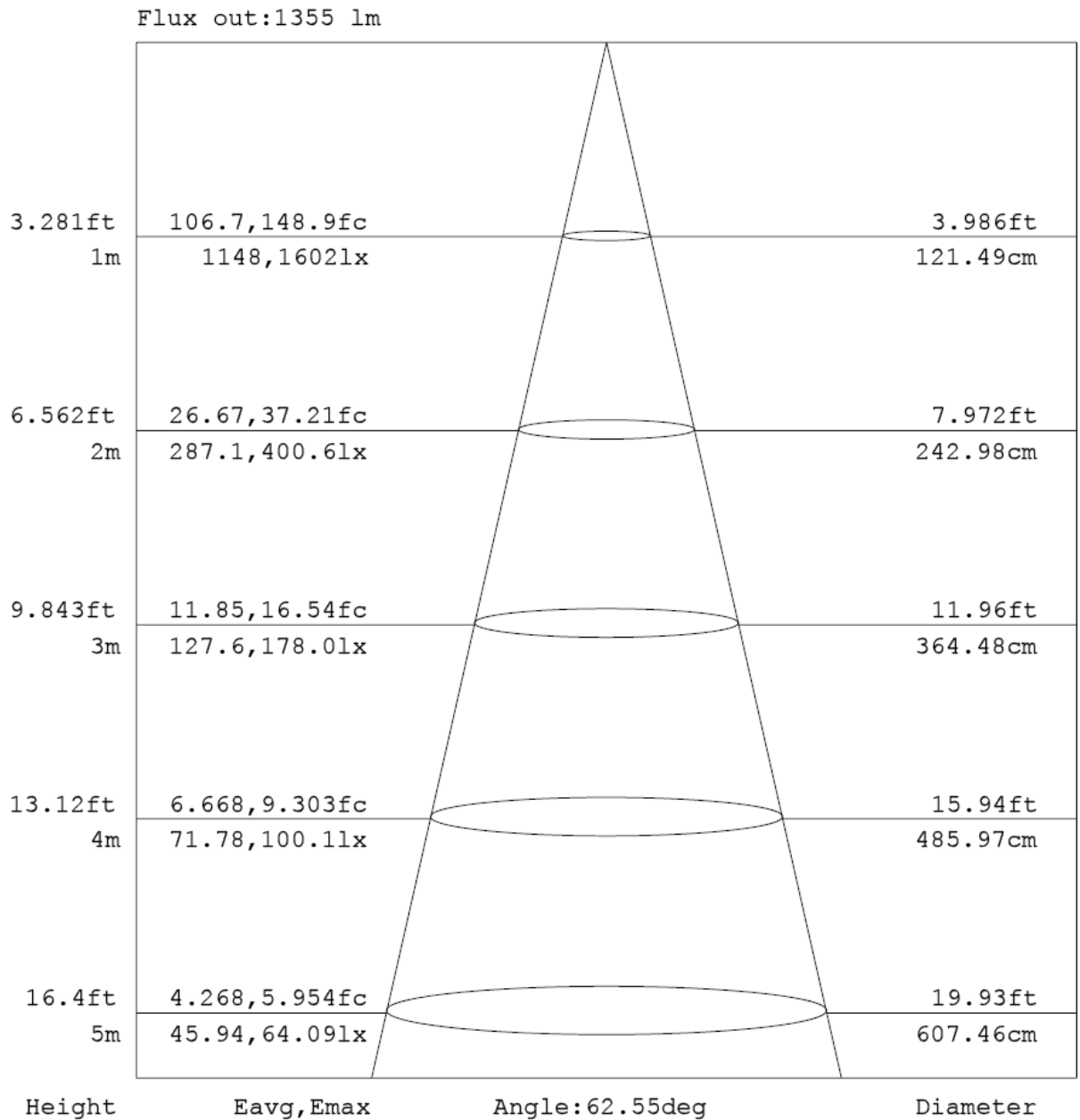
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	146.68	2.67%
10- 20	420.909	7.68%
20- 30	666.316	12.15%
30- 40	923.087	16.83%
40- 50	1120.718	20.44%
50- 60	1075.438	19.61%
60- 70	855.352	15.60%
70- 80	255.491	4.66%
80- 90	19.974	0.36%
90-100	0.003	0.00%
Total	5484.0	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	4353.148	79.38%
60- 90	1130.817	20.62%
0-90	5484.0	100.00%
90- 180	0.003	0.00%
0- 180	5484.0	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

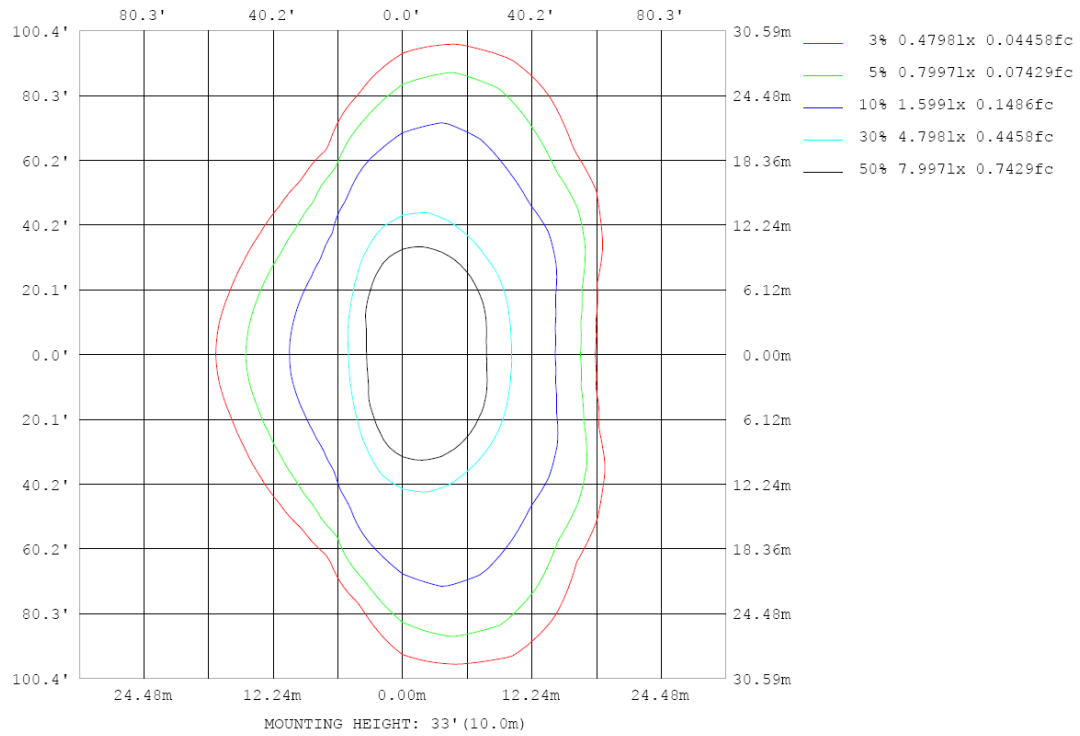


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

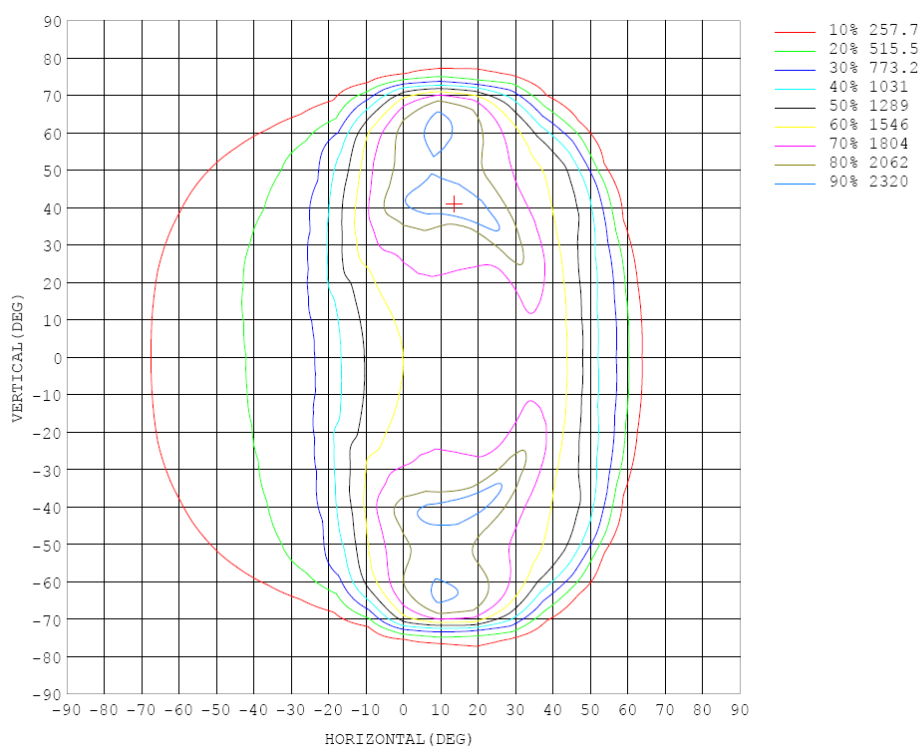


Chart 4: Isocandela Plot

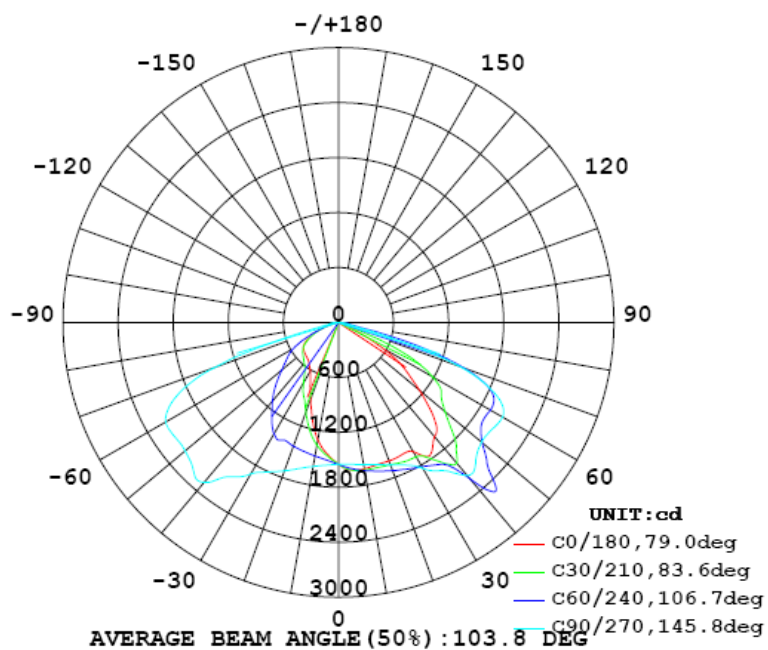


Chart 5: Polar Candela Distribution

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	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
5	1617	1618	1618	1615	1614	1609	1601	1590	1574	1556	1536	1516	1498	1480	1465	1454	1445	1441	1442
10	1622	1625	1630	1636	1642	1645	1641	1630	1609	1576	1536	1494	1453	1413	1377	1346	1321	1306	1302
15	1609	1615	1627	1640	1656	1671	1681	1676	1653	1606	1546	1481	1413	1336	1259	1192	1140	1110	1101
20	1608	1619	1636	1653	1674	1697	1721	1732	1710	1655	1575	1482	1367	1234	1106	1005	937	901	892
25	1602	1619	1649	1679	1703	1734	1766	1793	1779	1718	1617	1487	1323	1136	971	851	777	740	732
30	1629	1634	1658	1693	1735	1773	1819	1865	1871	1840	1748	1557	1282	1021	834	713	650	624	618
35	1753	1767	1815	1836	1834	1839	1894	1962	2021	1973	1795	1496	1128	859	683	604	568	557	557
40	1628	1672	1811	2002	2160	2225	2228	2307	2335	2182	1867	1393	995	719	597	550	531	525	523
45	1470	1506	1622	1793	1959	2152	2346	2442	2323	2116	1767	1256	847	627	553	522	511	509	506
50	1153	1206	1330	1514	1705	1872	2044	2183	2182	2033	1690	1123	717	575	523	496	491	495	490
55	877	935	1110	1368	1550	1728	1907	2124	2207	2039	1603	968	643	536	483	455	449	461	467
60	532	599	822	1180	1442	1606	1911	2221	2333	2064	1460	776	555	465	414	385	380	398	409
65	197	219	302	767	1116	1379	1855	2277	2362	1906	1081	494	365	317	298	291	292	316	316
70	121	129	108	159	523	833	1452	1918	1873	1405	513	226	186	176	176	181	188	202	201
75	86.3	99.9	76.7	93.0	115	234	609	577	528	337	125	83.0	81.1	85.2	86.5	89.8	80.6	57.0	51.9
80	38.0	39.9	38.9	41.7	51.9	87.5	131	165	112	93.6	68.0	45.1	43.2	34.9	28.7	29.8	23.5	20.0	20.6
85	0.77	0.76	0.76	0.83	2.49	6.18	22.4	30.1	13.5	13.1	17.5	14.7	9.15	3.33	0.51	0.35	0.32	0.30	0.30
90	0.08	0.08	0.08	0.09	0.10	0.11	0.12	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.08	0.07	0.07	0.07	0.08

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	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550		
5	1442	1451	1460	1475	1491	1509	1527	1546	1563	1579	1591	1600	1606	1608	1611	1612	1613		
10	1311	1331	1360	1397	1439	1481	1524	1563	1597	1622	1635	1638	1634	1626	1618	1615	1616		
15	1117	1156	1217	1295	1377	1457	1535	1599	1651	1682	1690	1679	1659	1638	1618	1602	1599		
20	911	959	1042	1159	1300	1437	1557	1653	1724	1763	1764	1737	1698	1658	1629	1607	1597		
25	751	803	896	1039	1222	1417	1581	1709	1801	1848	1841	1796	1746	1701	1654	1617	1594		
30	637	681	762	906	1123	1406	1677	1845	1909	1948	1925	1861	1802	1738	1675	1631	1618		
35	568	593	644	747	955	1268	1653	1917	2058	2087	2008	1933	1879	1835	1831	1812	1766		
40	531	548	582	646	802	1121	1568	2008	2279	2431	2368	2294	2264	2163	1981	1790	1651		
45	511	521	543	585	687	968	1437	1933	2245	2425	2448	2362	2161	1959	1799	1628	1504		
50	496	498	510	536	606	808	1280	1855	2183	2318	2263	2119	1896	1753	1542	1336	1199		
55	464	460	465	486	544	685	1103	1766	2178	2338	2215	1953	1736	1559	1360	1088	924		
60	404	390	392	411	463	568	874	1620	2174	2410	2233	1882	1583	1448	1150	786	597		
65	319	299	295	298	316	370	529	1243	1975	2370	2175	1728	1318	1095	718	292	223		
70	203	192	184	179	182	195	253	687	1434	1888	1796	1302	766	503	180	111	127		
75	59.2	93.3	93.1	91.8	93.2	92.9	98.1	181	368	563	530	565	225	121	96.4	79.3	99.6		
80	23.8	29.4	30.7	36.8	46.8	49.1	50.4	77.9	97.9	126	179	134	93.3	58.4	44.6	38.4	40.8		
85	0.31	0.32	0.41	2.64	9.15	15.8	24.4	34.9	26.1	33.2	53.7	34.2	12.7	2.66	0.75	0.75	0.75		
90	0.09	0.09	0.10	0.12	0.13	0.15	0.16	0.17	0.17	0.18	0.17	0.16	0.14	0.13	0.12	0.11	0.10		

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

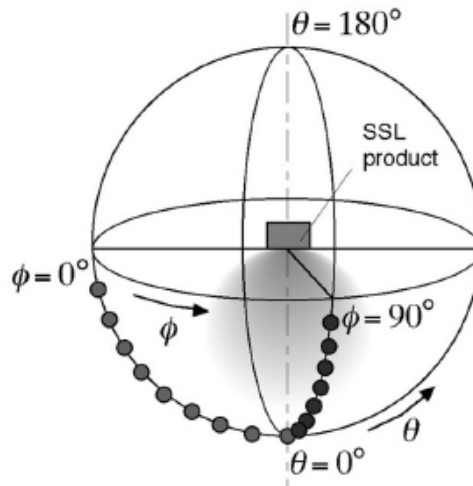
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as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