



LM-79-08 Test Report

Wall lamp

ITEM NO: LTW-50W

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15100010a

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

Reviewed by:

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Oct. 12, 2015

Approved



Manager: Jim Zhang

Oct. 12, 2015

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: TLWMH50XYZZZ

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
93.2	4489.4	48.15	0.9739
CCT (K)	CRI	Stabilization Time (Light & Power)	
5218	85.4	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Oct. 09, 2015
Date of Test	: Oct. 10, 2015
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 Photo



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: Wall lamp
Model	: LTW-50W
Electrical Ratings	: 100~277Vac, 50/60Hz, 50W
Product Description	: 5000K, Outdoor Wall-Mounted Area Luminaires

TEST RESULTS

Test ambient temperature was 24.8°C.

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

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 85 minutes.

Parameter	Result		
Test Voltage (V)	120.0	100.0	277.0
Voltage frequency (Hz)	60	60	60
Test Current (A)	0.412	0.513	0.197
Power Factor	0.9739	0.9478	0.8909
Test Power (W)	48.15	48.57	48.57
THD A%	19.98	26.01	19.80
Luminous Efficacy (lm/W)	93.2		
Total Luminous Flux (lm)	4489.4		
Color Rendering Index (CRI)	85.4		
R9	18		
Correlated Color Temperature (CCT) (K)	5218		
Chromaticity (Chroma x, Chroma y)	(0.3394, 0.3499)		
Chromaticity (Chroma u, Chroma v)	(0.2082, 0.3220)		
Chromaticity (Chroma u', Chroma v')	(0.2082, 0.4830)		
Duv	0.0015		
Average Beam Angle (°)	114.7		
Center Beam Candle Power (cd)	612		
Spacing Criteria	0.48 (0°-180°)/ 1.65 (90°-270°)		
Zonal Lumens in the 0°-60°Zone	43.52%		
Zonal Lumens in the 60°-90°Zone	30.90%		
Zonal Lumens in the 90°-120°Zone	18.51%		
Zonal Lumens in the 120°-180°Zone	7.07%		

Special Color Rendering Indices	
R1	84
R2	91
R3	94
R4	85
R5	85
R6	86
R7	88
R8	70
R9	18
R10	77
R11	84
R12	66
R13	86
R14	97

Table 2: Test data per Goniophotometer 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

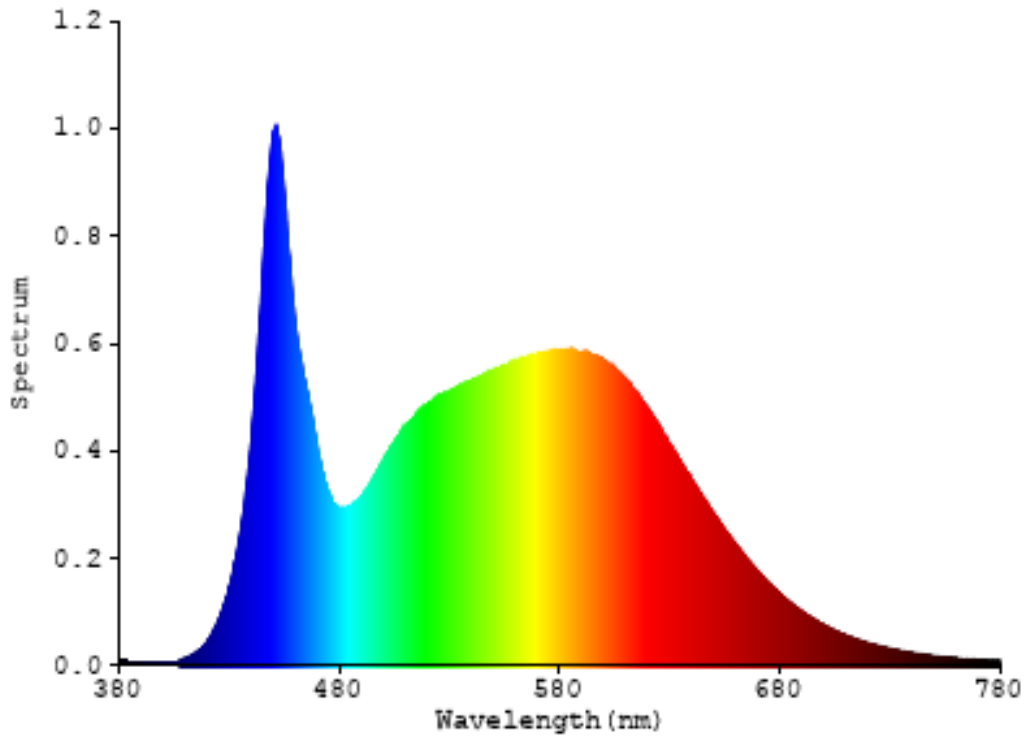


Chart 1: Spectral Power Distribution

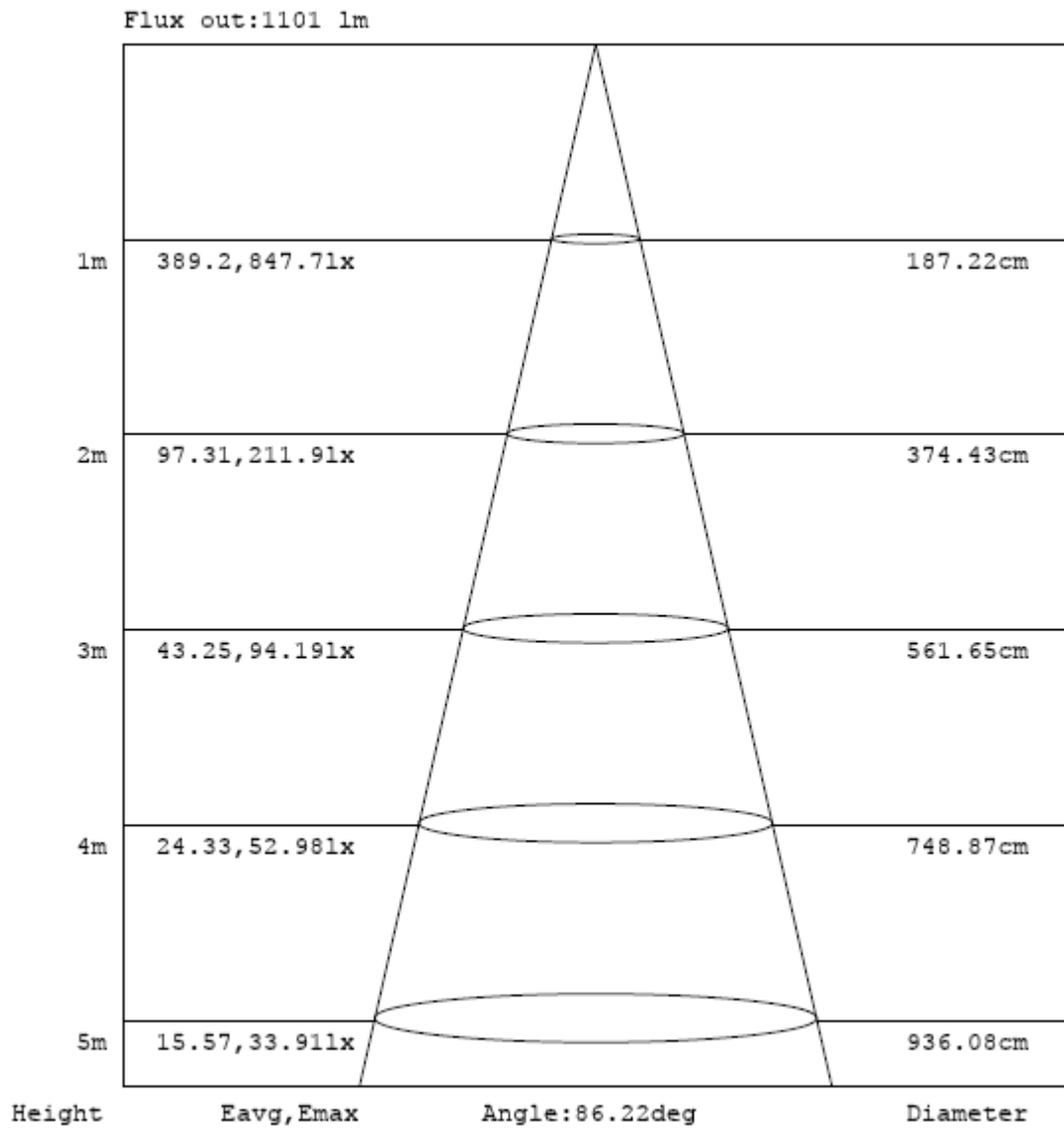
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	58.964	1.31%
10- 20	178.091	3.97%
20- 30	293.188	6.53%
30- 40	405.266	9.03%
40- 50	492.723	10.98%
50- 60	525.686	11.71%
60- 70	511.488	11.39%
70- 80	462.439	10.30%
80- 90	413.138	9.20%
90-100	343.477	7.65%
100-110	281.16	6.26%
110-120	206.588	4.60%
120-130	137.2	3.06%
130-140	84.452	1.88%
140-150	55.61	1.24%
150-160	30.956	0.69%
160-170	8.684	0.19%
170-180	0.328	0.01%
Total	4489.4	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1953.918	43.52%
60- 90	1387.065	30.90%
0-90	3340.983	74.42%
90- 180	1148.455	25.58%
0- 180	4489.4	100%

Table 3: 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

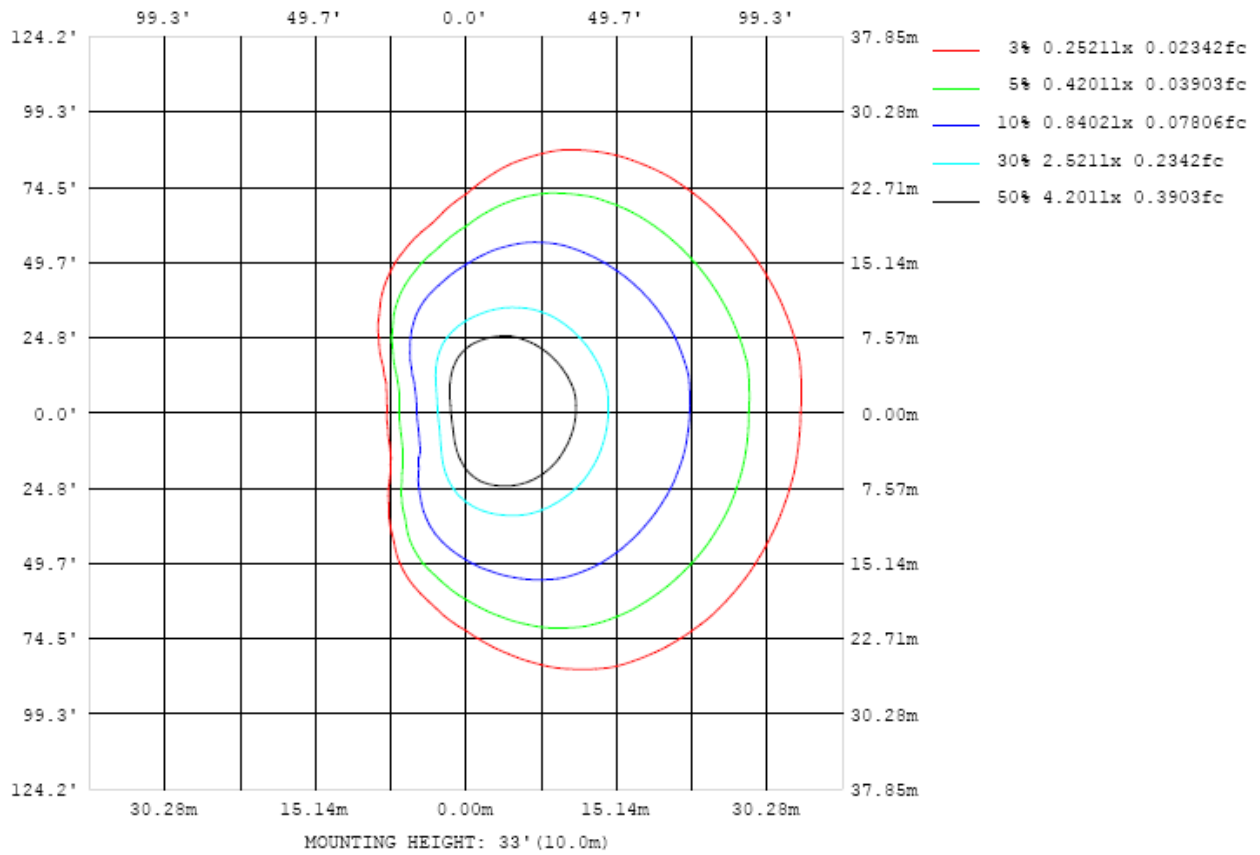


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

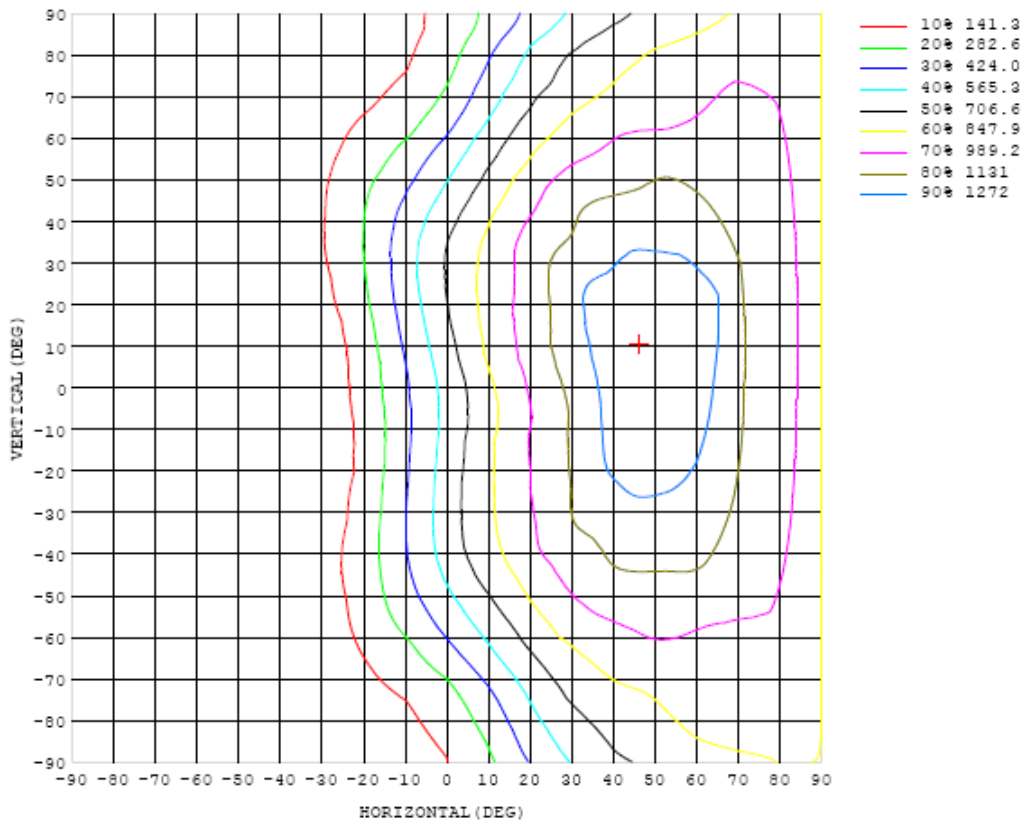


Chart 4: Isocandela Plot

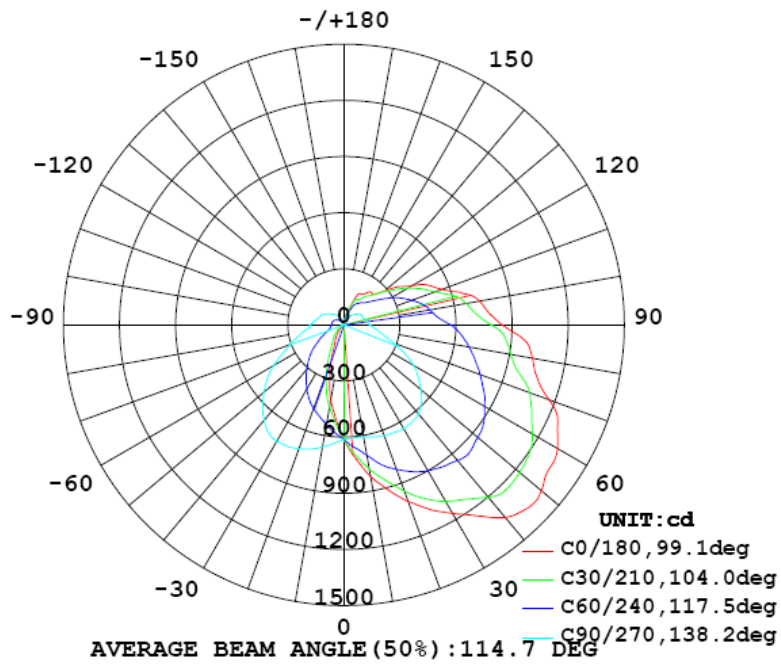


Chart 5: Polar Candela Distribution

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	612	612	612	612	612	612	612	612	612	612	612	612	612	612	612	612	612	612	612
5	715	711	705	695	685	672	657	640	623	606	589	570	552	536	526	517	509	505	504
10	822	814	801	781	759	734	707	678	644	609	571	529	492	464	441	423	413	408	408
15	912	901	880	859	837	814	773	724	673	620	561	499	449	404	360	321	298	296	294
20	1003	986	963	946	917	871	821	762	698	629	551	474	406	330	274	236	205	199	199
25	1088	1066	1045	1024	977	922	865	799	721	635	540	450	356	268	198	151	130	125	124
30	1162	1136	1119	1088	1032	971	899	824	739	638	528	422	308	211	138	109	97.7	92.9	92.4
35	1246	1217	1184	1138	1079	1007	924	841	748	634	512	394	268	166	108	83.6	73.2	67.9	68.0
40	1343	1315	1264	1203	1125	1037	946	845	743	620	489	361	232	137	87.9	62.0	51.9	46.7	46.4
45	1386	1349	1296	1236	1150	1058	955	833	715	586	456	323	198	117	69.3	43.1	34.0	29.9	29.8
50	1378	1347	1300	1227	1130	1042	936	802	672	540	413	287	168	97.4	53.3	28.1	20.7	17.5	17.7
55	1340	1313	1271	1209	1126	1027	912	765	620	485	361	250	141	79.3	40.1	16.7	10.6	8.27	8.65
60	1319	1290	1234	1163	1086	990	870	720	569	429	301	207	114	64.2	29.8	8.36	3.46	2.09	2.66
65	1261	1235	1183	1108	1029	941	825	674	511	358	242	164	93.9	52.8	22.6	3.46	1.07	1.05	1.63
70	1167	1161	1123	1057	976	884	776	619	444	283	191	130	77.6	45.0	20.0	2.88	0.89	0.74	1.43
75	1067	1057	1017	964	911	835	727	569	382	224	146	103	67.4	42.4	19.3	2.81	0.89	0.68	1.44
80	1024	1010	967	907	846	781	679	528	335	187	120	88.4	64.1	41.0	18.9	2.99	0.92	0.71	1.52
85	973	968	928	869	811	732	631	483	293	158	104	81.0	61.4	40.0	18.7	3.18	0.95	0.74	1.55
90	847	849	827	789	745	675	573	432	257	139	96.3	76.8	59.5	39.0	18.4	3.33	0.99	0.76	1.57
95	777	772	747	709	663	599	501	375	228	131	92.1	75.0	58.4	38.2	18.3	3.52	1.00	0.78	1.58
100	737	731	702	664	620	550	466	357	218	122	90.3	73.9	57.3	37.5	18.1	3.67	0.99	0.81	1.56
105	655	659	640	608	570	510	433	328	195	116	90.4	73.5	55.8	36.2	17.6	3.70	0.91	0.80	1.51
110	558	556	541	520	494	452	387	289	177	112	91.1	73.5	54.6	34.9	17.0	3.66	0.86	0.81	1.39
115	502	497	481	458	433	398	341	250	160	110	91.5	72.6	53.4	33.7	16.4	3.67	0.86	0.83	1.24
120	423	420	410	395	380	346	290	213	146	108	90.2	70.0	50.7	32.1	15.7	3.66	0.86	0.85	1.09
125	357	351	340	330	320	290	240	179	131	102	85.8	66.7	47.1	29.6	14.6	3.54	0.84	0.84	0.96
130	284	271	266	277	271	246	200	152	116	91.4	77.0	60.8	43.0	26.9	13.2	3.34	0.79	0.82	0.90
135	236	212	210	232	230	208	172	132	101	79.4	66.4	52.9	38.1	24.0	11.9	3.09	0.71	0.76	0.87
140	228	203	194	204	208	188	156	120	89.6	68.1	56.1	44.5	32.5	20.8	10.4	2.84	0.66	0.76	0.85
145	208	196	184	180	182	172	144	109	79.6	59.2	46.6	36.6	26.8	17.3	8.81	2.55	0.65	0.78	0.84
150	190	179	166	156	153	150	131	101	72.1	51.1	38.1	29.3	21.4	13.9	7.11	2.21	0.63	0.78	0.81
155	183	175	161	151	139	124	108	83.0	60.7	42.9	30.7	22.7	16.3	10.5	5.43	1.85	0.63	0.77	0.79
160	115	117	115	109	100	88.0	73.6	59.4	47.0	35.1	24.8	17.5	12.0	7.54	3.90	1.49	0.70	0.77	0.78
165	77.1	77.8	77.5	74.7	64.8	52.1	43.5	39.8	33.6	26.3	18.9	13.0	8.50	5.16	2.65	1.11	0.76	0.77	0.78
170	22.3	21.9	19.2	17.0	19.1	21.6	22.6	21.6	19.0	15.5	11.7	8.34	5.48	3.20	1.55	0.85	0.74	0.76	0.77
175	0.60	0.88	1.50	2.55	4.07	5.25	5.89	5.87	5.50	4.83	3.85	2.86	2.06	1.42	0.99	0.81	0.79	0.80	0.80
180	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68

Table 4: Luminous Intensity Data

Table--2 UNIT: cd

C (DEG) \ Y (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	612	612	612	612	612	612	612	612	612	612	612	612	612	612	612	612	612		
5	508	516	527	541	559	577	597	617	636	654	671	686	697	706	712	715	716		
10	413	426	445	471	502	540	582	623	662	698	730	761	789	811	822	827	827		
15	304	326	364	408	455	506	566	631	688	739	787	831	868	897	919	924	919		
20	209	233	273	330	401	475	549	631	703	769	835	888	934	970	1000	1021	1014		
25	129	148	194	261	345	439	530	627	716	799	868	928	988	1037	1076	1104	1102		
30	94.1	106	137	200	293	397	506	614	718	811	888	964	1029	1098	1144	1177	1182		
35	69.7	79.8	107	158	241	354	473	589	703	808	904	996	1084	1158	1213	1257	1265		
40	48.1	57.5	83.6	128	200	309	428	545	664	780	901	1015	1111	1199	1285	1345	1366		
45	30.9	38.6	62.7	104	167	268	381	488	614	744	882	1001	1096	1190	1279	1353	1409		
50	18.3	24.4	45.6	81.9	137	228	329	431	559	700	853	986	1103	1194	1272	1339	1399		
55	8.96	13.6	32.7	64.5	110	183	266	369	502	652	813	963	1079	1172	1254	1320	1359		
60	2.77	6.17	23.3	50.9	88.6	146	214	297	434	606	768	916	1025	1114	1198	1284	1341		
65	1.48	3.36	18.3	41.7	71.8	116	169	231	363	548	723	860	966	1068	1160	1241	1291		
70	1.45	2.72	16.5	38.0	62.0	91.8	128	180	305	496	677	814	921	1005	1083	1152	1206		
75	1.56	2.50	15.0	35.7	57.7	80.3	106	148	261	453	627	760	858	933	1000	1062	1103		
80	1.64	2.31	13.9	33.7	54.6	73.8	93.1	124	224	410	587	728	818	893	960	1025	1060		
85	1.69	2.11	12.9	31.8	51.9	69.8	86.5	111	188	352	524	658	759	835	908	976	1011		
90	1.73	1.95	12.0	30.1	50.0	67.8	83.3	105	182	315	461	585	679	745	803	860	887		
95	1.73	1.84	11.2	28.7	48.2	66.2	82.2	101	166	307	440	544	628	698	746	792	811		
100	1.70	1.71	10.4	26.9	45.9	64.7	82.7	101	153	277	410	508	583	652	705	752	769		
105	1.58	1.46	9.38	25.0	43.6	63.6	83.5	102	143	246	370	449	518	567	616	665	689		
110	1.42	1.23	8.30	23.1	41.7	61.8	83.3	103	136	215	325	406	457	495	533	567	582		
115	1.26	1.04	7.29	21.2	38.9	58.4	80.9	101	128	189	278	356	404	437	474	508	522		
120	1.09	0.86	6.22	18.9	35.2	54.1	75.9	95.5	117	163	229	299	344	371	394	422	442		
125	0.95	0.73	5.11	16.3	31.2	49.0	67.8	84.5	104	142	195	255	292	309	324	355	371		
130	0.89	0.67	4.11	13.8	27.2	42.5	58.1	72.3	91.6	125	169	217	247	251	244	272	297		
135	0.88	0.68	3.24	11.3	22.8	35.4	48.2	60.9	80.9	114	156	195	215	211	201	226	251		
140	0.87	0.70	2.42	8.75	18.1	28.5	39.1	51.0	72.0	104	144	178	192	189	200	227	246		
145	0.85	0.74	1.67	6.22	13.6	21.9	30.9	42.3	64.3	97.8	131	151	160	170	186	212	222		
150	0.83	0.76	1.07	3.89	9.26	15.6	23.0	33.7	52.3	78.7	109	131	148	163	180	194	199		
155	0.79	0.77	0.73	1.94	5.37	10.0	16.1	25.0	38.4	54.8	74.9	102	122	143	171	193	193		
160	0.74	0.72	0.69	0.86	2.21	5.15	9.42	16.0	24.9	33.6	42.5	64.6	85.7	96.6	107	123	121		
165	0.71	0.70	0.70	0.71	0.76	1.61	3.86	7.46	11.9	16.5	19.3	20.3	38.8	67.7	75.7	82.7	80.5		
170	0.75	0.68	0.68	0.68	0.68	0.69	0.77	1.26	2.02	2.79	3.07	2.69	1.94	4.09	23.4	20.4	20.0		
175	0.80	0.82	0.75	0.61	0.61	0.60	0.60	0.62	0.66	0.69	0.71	0.74	0.77	0.66	0.56	0.56	0.56		
180	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 17, 2015	Jul. 16, 2016
Digital Power Meter	PF2010A	HZTE028-01	Jul. 17, 2015	Jul. 16, 2016
AC Power Supply	PCR 500L	HZTE001-08	Jul. 17, 2015	Jul. 16, 2016
DC Power Supply	WY12010	HZTE004-03	Jul. 17, 2015	Jul. 16, 2016
Temperature Meter	TES1310	HZTE017-01	Jul. 17, 2015	Jul. 16, 2016
Standard source	D908	HZTE012-01	Jul. 23, 2015	Jul. 22, 2016
Standard source	SCL-1400	HZTE012-02	Oct. 21, 2014	Oct. 20, 2015

Table 6: 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.

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 $k=2$.

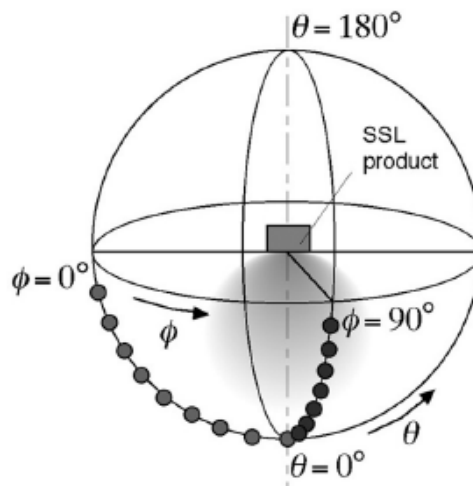
Color Characteristics Measurements

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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