



LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC.

1501 Industrial Way N. Toms River, NJ 08755.

WRAP

Model: WRP06D28LED301S

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ16100018g

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

Reviewed by:

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Dec. 27, 2016

Approved by:

Manager: Jim Zhang
Dec. 27, 2016

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: **WRP06D28LED301S**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
134.2	3378.2	25.17	0.9959
CCT (K)	CRI	Stabilization Time (Light & Power)	
3097	82.0	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Dec. 14, 2016
Date of Test	: Dec. 14, 2016
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



Sample view

Equipment Under Test (EUT)

Name	: WRAP
Model	: WRP06D28LED301S
Electrical Ratings	: 120~277Vac, 50/60Hz, 28W
Product Description	: 3000K, Aluminum frame, Frosted Lens, SPCC with powder paint Manufacturer of light source: LG Innotek Co., Ltd Model of light source: LGIT 5630HE Package
Manufacturer	: ABOVE ALL LIGHTING INC.
Address	: Room 1012, North Minch Fortune 108 Plaza,# 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 24.9°C.

Base orientation was base up. 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.

The photometric distance of Goniophotometer is 30 m.

Luminous data was taken at 0.5° vertical intervals and 10.0° horizontal intervals.

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.211	0.099
Power Factor	0.9959	0.9218
Test Power (W)	25.17	25.24
THD A%	8.30	9.48
Luminous Efficacy (lm/W)	134.2	135.0
Total Luminous Flux (lm)	3378.2	3406.9
Color Rendering Index (CRI)	82.0	
R9	3	
Correlated Color Temperature (CCT) (K)	3097	
Chromaticity (Chroma x, Chroma y)	(0.4305, 0.4023)	
Chromaticity (Chroma u, Chroma v)	(0.2472, 0.3465)	
Chromaticity (Chroma u', Chroma v')	(0.2472, 0.5197)	
Duv	0.0002	
Average Beam Angle (°)	92.5	
Center Beam Candle Power (cd)	1282	
Spacing Criteria	1.23 (0°-180°)/ 1.21 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	73.94%	
Zonal Lumens in the 60°-90°Zone	17.37%	
Zonal Lumens in the 90°-120°Zone	6.05%	
Zonal Lumens in the 120°-180°Zone	2.65%	

Special Color Rendering Indices	
R1	80
R2	91
R3	95
R4	79
R5	81
R6	89
R7	82
R8	57
R9	3
R10	80
R11	78
R12	72
R13	83
R14	98

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

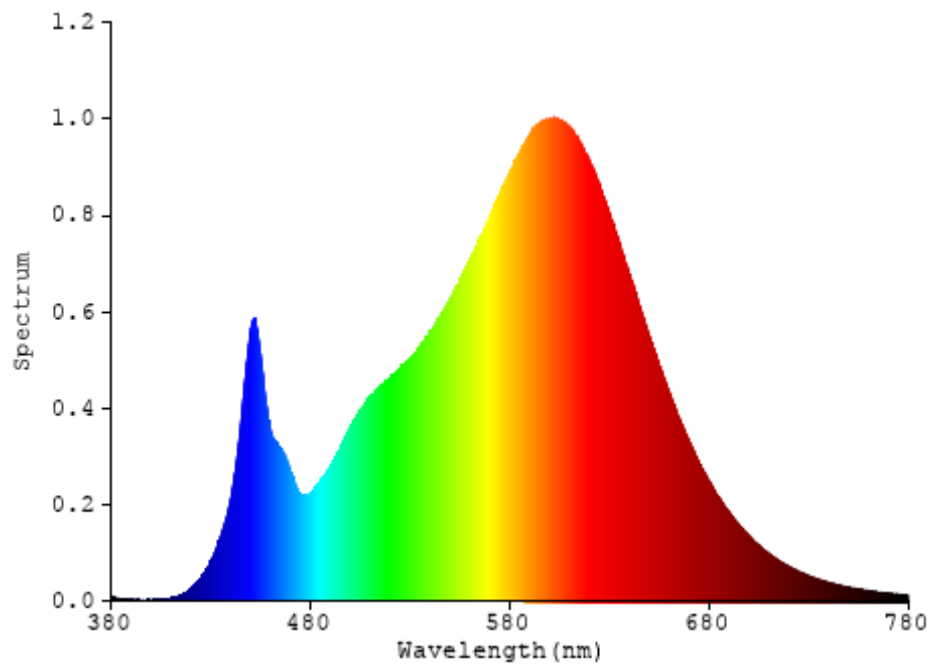


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	121.491	3.60%
10- 20	349.582	10.35%
20- 30	527.189	15.61%
30- 40	600.307	17.77%
40- 50	524.578	15.53%
50- 60	374.594	11.09%
60- 70	259.42	7.68%
70- 80	201.784	5.97%
80- 90	125.603	3.72%
90-100	75.774	2.24%
100-110	69.934	2.07%
110-120	58.545	1.73%
120-130	40.666	1.20%
130-140	25.106	0.74%
140-150	13.594	0.40%
150-160	6.964	0.21%
160-170	2.75	0.08%
170-180	0.32	0.01%
Total	3378.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2497.741	73.94%
60- 90	586.807	17.37%
0-90	3084.548	91.31%
90- 180	293.653	8.69%
0- 180	3378.2	100%

Table 3: Zonal Lumen Data

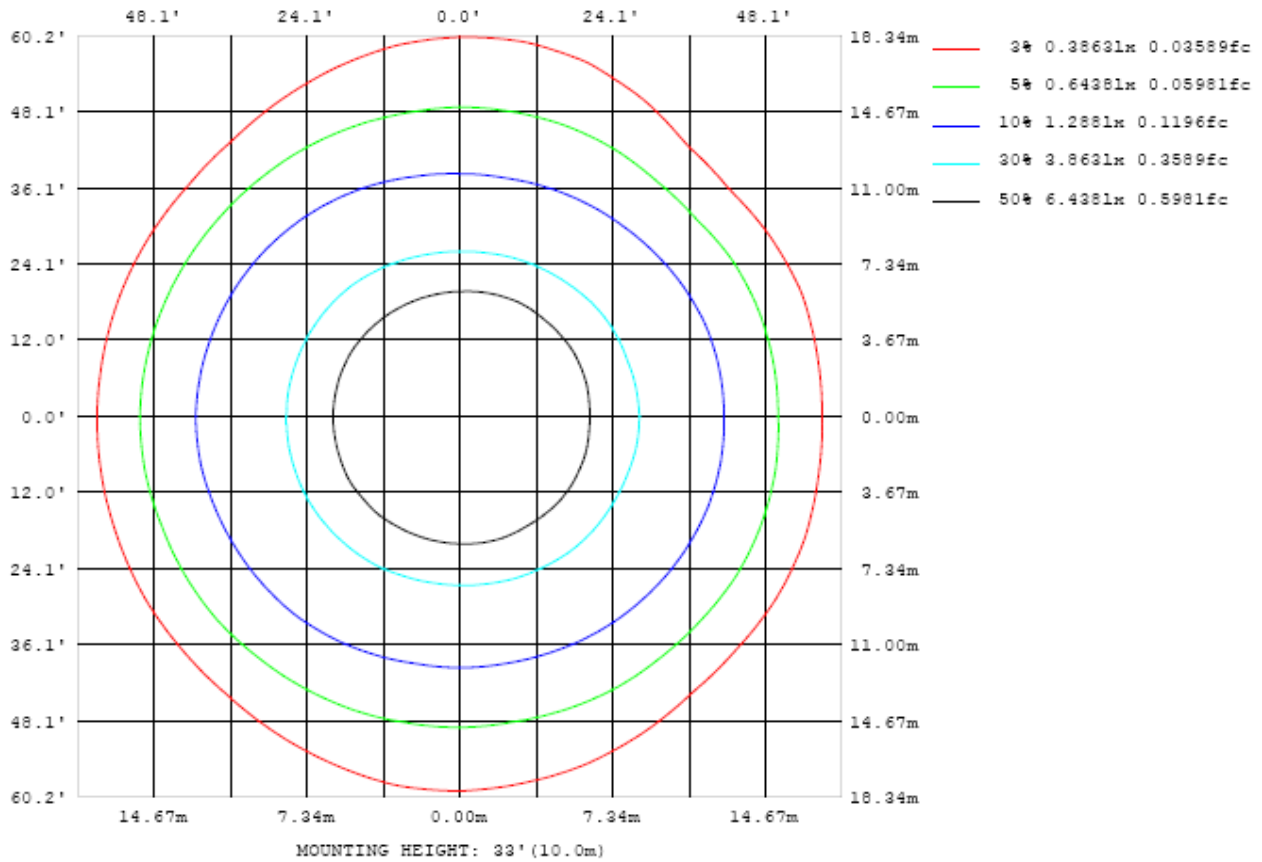


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

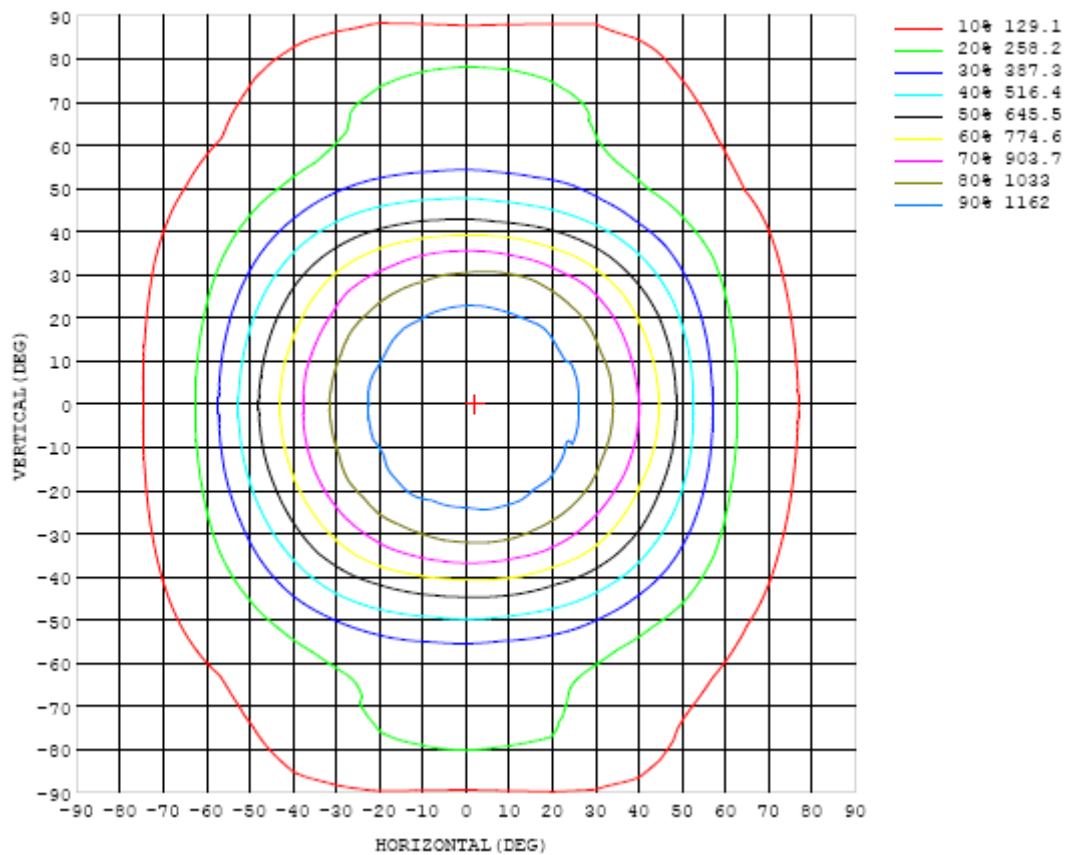


Chart 3: Isocandela Plot

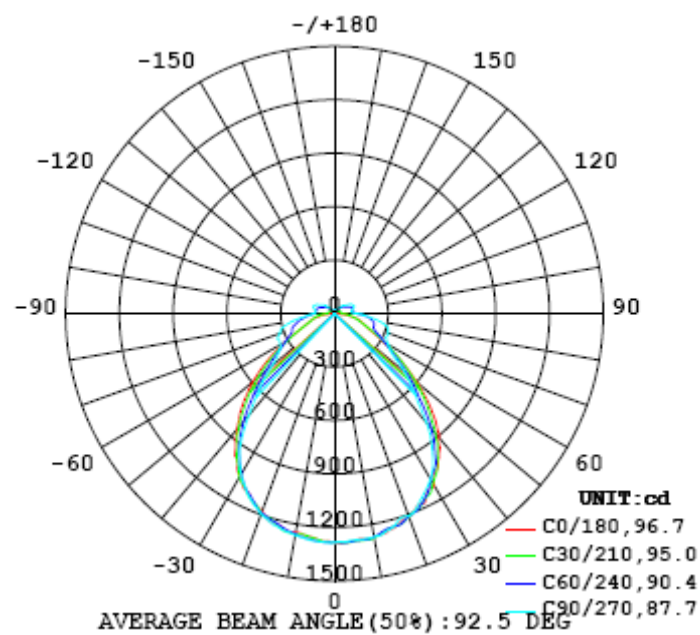


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282
5	1278	1278	1279	1283	1286	1284	1280	1280	1278	1273	1274	1271	1270	1271	1269	1269	1265	1264	1264
10	1272	1274	1275	1277	1283	1276	1271	1276	1278	1272	1269	1268	1264	1261	1261	1261	1255	1249	1245
15	1250	1246	1241	1240	1245	1245	1240	1241	1243	1243	1250	1235	1225	1235	1243	1234	1226	1220	1225
20	1212	1217	1214	1213	1221	1215	1212	1216	1222	1207	1203	1197	1203	1195	1196	1198	1189	1183	1181
25	1176	1175	1159	1167	1167	1162	1168	1162	1160	1147	1146	1146	1152	1154	1140	1140	1136	1126	1121
30	1111	1104	1096	1100	1099	1100	1077	1084	1085	1073	1068	1067	1067	1067	1065	1071	1063	1052	1051
35	1009	1009	1006	1003	997	992	984	970	959	955	954	953	957	959	966	969	960	969	970
40	906	903	889	876	872	864	840	827	811	799	801	807	827	833	838	846	850	849	845
45	767	757	737	733	722	700	668	655	644	637	639	650	665	691	704	700	714	722	724
50	602	603	594	588	569	555	535	519	510	511	509	523	537	552	559	567	574	586	594
55	442	451	450	444	430	416	411	400	391	394	394	403	410	422	435	433	437	448	452
60	315	319	328	325	314	312	326	336	342	347	345	336	328	318	318	321	318	319	318
65	222	226	240	235	228	236	264	300	315	316	311	298	270	245	234	231	231	222	215
70	174	177	174	172	176	195	231	286	317	320	311	287	239	194	174	170	172	168	161
75	145	133	126	134	148	184	229	266	299	309	295	267	229	185	146	133	131	130	128
80	96.6	93.7	87.8	103	130	171	216	240	251	261	253	235	207	163	130	107	97.6	95.5	88.6
85	39.5	54.4	56.9	69.9	106	147	179	185	185	186	184	182	168	137	103	77.0	58.7	52.6	41.2
90	0.66	11.3	21.8	41.3	78.4	112	125	128	125	122	124	127	122	102	76.2	41.8	21.6	10.7	0.75
95	0.65	9.49	21.2	40.4	74.8	101	107	105	99.6	98.4	101	104	105	95.0	71.7	41.2	19.8	9.37	0.58
100	0.78	9.14	20.9	39.2	68.0	91.8	102	101	97.9	95.9	97.6	99.6	99.0	88.0	66.6	38.7	19.3	9.94	0.69
105	0.85	8.73	19.3	36.1	61.1	86.2	104	109	107	106	106	105	99.1	82.7	59.0	34.4	17.0	9.72	0.80
110	1.01	7.59	17.7	32.6	55.3	79.4	101	113	117	118	115	110	96.5	74.4	52.0	29.5	17.1	9.12	0.92
115	1.20	7.42	16.6	30.4	48.6	71.1	91.8	106	114	115	112	102	86.9	66.4	44.8	28.8	16.1	8.68	1.07
120	1.41	7.38	15.2	26.8	43.8	60.9	78.5	92.4	101	104	99.1	89.4	74.4	56.9	41.8	26.3	14.4	8.28	1.25
125	1.56	6.98	13.8	22.8	38.6	54.3	66.5	77.5	84.7	86.4	83.0	73.9	63.9	52.7	38.0	22.7	12.8	7.61	1.40
130	1.59	6.31	13.0	19.2	31.9	46.7	58.4	67.1	72.5	74.0	71.2	66.2	58.1	46.3	32.2	19.7	11.9	6.76	1.38
135	1.69	5.99	12.3	16.7	25.9	38.3	48.4	56.6	62.3	63.8	61.4	56.7	48.2	38.0	26.9	17.1	11.4	6.13	1.23
140	1.70	5.55	11.5	15.1	21.2	31.0	38.7	44.7	49.5	51.0	49.3	45.1	38.4	30.8	22.1	15.3	10.9	5.75	1.34
145	1.57	4.82	10.7	14.5	18.4	25.3	30.7	34.5	37.5	39.0	38.3	35.2	30.5	25.2	19.4	14.9	10.7	5.29	1.61
150	1.27	3.82	9.61	13.6	16.8	21.7	25.5	27.5	29.2	29.9	29.4	27.8	25.1	21.9	18.2	14.5	9.73	4.54	1.78
155	0.99	2.89	7.95	11.8	15.0	18.9	22.0	23.3	24.0	24.1	23.4	22.9	21.5	19.4	16.6	12.8	8.20	3.59	1.66
160	1.14	2.52	6.28	9.96	12.6	15.7	18.6	19.9	20.6	20.6	20.0	19.6	18.5	16.6	14.0	10.1	6.93	3.05	1.45
165	1.35	1.88	4.40	7.68	9.98	12.2	14.7	16.2	17.2	17.6	17.2	16.8	15.6	13.4	10.7	8.20	5.31	2.48	1.49
170	1.29	1.27	2.16	4.08	5.93	7.39	8.72	9.93	10.8	11.7	11.2	10.6	9.75	8.66	7.12	5.22	3.12	1.50	1.58
175	1.09	1.21	1.25	1.28	1.67	2.57	3.36	3.93	4.27	4.37	4.30	4.06	3.66	3.11	2.40	1.74	1.53	1.55	1.55
180	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02

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	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282		
5	1268	1269	1267	1270	1274	1279	1280	1279	1280	1280	1281	1284	1286	1282	1280	1277	1276		
10	1249	1254	1256	1256	1255	1256	1262	1261	1262	1267	1269	1273	1274	1268	1260	1260	1264		
15	1231	1231	1230	1232	1228	1223	1228	1232	1237	1245	1237	1239	1239	1238	1239	1247	1254		
20	1182	1186	1192	1191	1189	1189	1191	1199	1195	1202	1200	1200	1207	1207	1207	1213	1215		
25	1124	1129	1131	1125	1123	1121	1123	1127	1132	1130	1133	1148	1158	1162	1157	1163	1176		
30	1047	1053	1060	1045	1043	1039	1033	1041	1042	1056	1063	1072	1070	1088	1081	1103	1110		
35	968	950	950	943	936	929	931	923	922	928	932	946	963	989	990	999	1009		
40	846	834	830	822	809	790	765	754	742	752	771	796	823	856	876	876	891		
45	720	704	696	681	659	634	607	590	588	579	594	619	654	692	720	738	753		
50	582	570	555	540	519	499	481	460	454	454	466	483	502	529	556	584	595		
55	443	432	420	409	400	393	384	378	380	381	380	385	382	391	416	432	441		
60	314	310	304	297	300	318	332	345	349	352	345	326	290	284	303	318	316		
65	219	220	214	214	232	270	315	333	347	346	325	278	236	209	210	227	229		
70	167	161	157	166	199	253	294	309	325	327	303	261	209	173	159	165	177		
75	129	125	128	150	188	223	257	282	297	289	264	235	198	157	133	120	132		
80	94.6	95.2	106	131	155	190	215	227	233	230	220	202	170	134	108	85.6	93.0		
85	49.3	54.3	72.7	98.7	126	148	158	160	160	161	161	156	136	105	69.6	52.3	52.6		
90	10.6	20.9	42.0	75.4	102	118	119	119	118	120	122	122	113	81.6	43.3	23.0	11.2		
95	9.38	20.0	40.8	72.0	96.6	107	108	108	106	108	111	113	106	77.7	42.8	22.8	10.3		
100	9.55	18.6	38.3	68.3	92.2	104	109	109	110	111	114	113	101	72.8	40.8	21.1	9.65		
105	9.24	17.5	33.8	60.0	84.1	104	114	119	121	122	121	113	93.6	64.7	37.2	19.2	8.69		
110	9.15	16.3	29.4	51.0	74.2	95.9	111	121	125	125	118	105	82.2	55.9	33.4	17.6	7.95		
115	8.77	15.4	28.1	45.0	64.0	83.7	101	112	117	116	106	90.7	70.9	49.3	29.9	16.9	8.47		
120	7.96	14.2	24.6	41.8	58.2	72.0	86.2	95.8	100	98.9	92.0	78.7	63.0	44.0	25.3	15.5	7.89		
125	7.21	13.1	21.3	35.5	51.7	65.0	76.2	85.0	87.6	87.0	80.5	69.5	54.7	36.3	21.6	14.4	6.82		
130	6.25	12.7	18.6	29.7	42.6	54.2	64.4	72.5	75.3	74.0	67.2	57.4	44.8	30.1	18.9	14.0	6.25		
135	5.31	11.8	16.7	24.9	35.0	43.7	51.2	56.6	58.9	58.1	52.9	46.0	36.8	24.8	17.4	13.1	5.45		
140	4.56	10.4	15.4	20.9	28.5	34.9	40.1	43.6	45.1	44.3	41.2	36.8	29.9	21.2	16.3	11.5	4.63		
145	3.98	9.12	14.1	18.6	23.7	28.0	31.6	34.2	34.8	34.2	32.4	29.9	25.2	19.1	14.9	9.76	3.88		
150	3.29	7.31	12.4	16.8	20.6	23.4	25.5	27.0	27.0	27.0	26.5	25.1	21.6	17.0	12.8	7.89	3.12		
155	2.42	6.02	9.36	13.5	17.2	19.7	21.2	22.1	22.2	22.8	22.6	21.4	18.5	14.6	10.8	6.36	2.31		
160	1.58	3.90	7.50	9.59	12.1	15.5	17.4	18.7	19.1	19.7	19.1	17.6	14.8	11.9	9.28	5.23	1.82		
165	1.71	2.07	4.01	6.78	8.89	10.9	12.6	13.8	14.2	15.1	14.1	12.5	10.8	9.07	6.76	3.58	1.46		
170	1.77	1.74	1.85	2.72	4.29	5.95	7.12	8.02	8.29	8.37	8.14	7.36	6.19	4.72	2.93	1.69	1.27		
175	1.60	1.68	1.67	1.67	1.66	1.65	1.48	1.54	1.53	1.41	1.29	1.20	1.19	1.21	1.16	1.03	1.03		
180	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 27, 2016	Jul. 26, 2017
Digital Power Meter	PF2010A	HZTE028-01	Jul. 27, 2016	Jul. 26, 2017
AC Power Supply	PCR 500L	HZTE001-08	Jul. 27, 2016	Jul. 26, 2017
DC Power Supply	WY12010	HZTE004-03	Jul. 27, 2016	Jul. 26, 2017
Temperature Meter	TES1310	HZTE017-01	Jul. 27, 2016	Jul. 26, 2017
Standard Source	D908	HZTE012-01	Jul. 27, 2016	Jul. 26, 2017
Standard source	SCL-1400	HZTE012-02	Jul. 27, 2016	Jul. 26, 2017

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

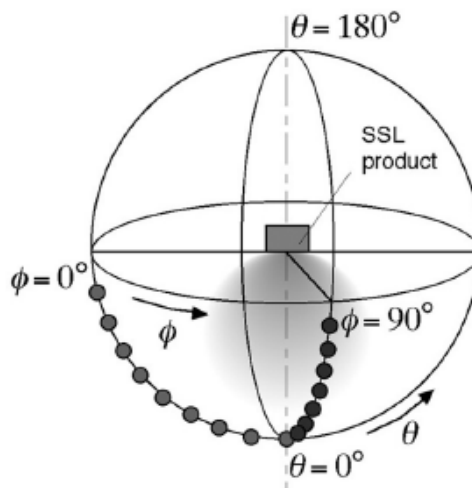
Color Characteristics Measurements

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 ($C=0^\circ/180^\circ$ 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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