



LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC.

1501 Industrial Way N. Toms River, NJ 08755.

Troffer Retrofit kit

Model: TRK22D25LED50-DL

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, Yuhang Dist,
Hangzhou, Zhejiang Province, China 311100

Tel: +86 571 86376106

www.ledtestlab.com

Report No.: HZ16100019b

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

Reviewed by:

Engineer: April Zou
Oct. 21, 2016

Approved by:

Manager: Jim Zhang
Oct. 21, 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: **TRK22D25LED50-DL**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
133.5	3433.1	25.72	0.9885
CCT (K)	CRI	Stabilization Time (Light & Power)	
5023	82.6	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Oct. 19, 2016
Date of Test	: Oct. 20, 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

TABLE OF CONTENT

LM-79-08 Test Report.....	1
Test Summary.....	2
Sample Photo.....	4
TEST RESULTS	5
Spectral Power Distribution	6
Zonal Lumen Tabulation	7
Luminous Intensity Distribution Plots.....	9
Luminous Intensity Data	10
EQUIPMENT LIST	12
TEST METHODS	12
Seasoning of SSL Product.....	12
Goniophotometer Method	12
Photometric and Electrical Measurements.....	12
Color Characteristics Measurements.....	13
Color Spatial Uniformity	13

Sample Photo



Figure 1- Overview of the sample in Lithonia 2GT8 Lensed 2x2

Equipment Under Test (EUT)

Name	: Troffer Retrofit kit
Model	: TRK22D25LED50-DL
Electrical Ratings	: 120~277Vac, 50/60Hz, 25W
Product Description	: 5000K, 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 24.2°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.

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)	0.217	0.100
Power Factor	0.9885	0.9380
Test Power (W)	25.72	26.03
THD A%	7.23	10.71
Luminous Efficacy (lm/W)	133.5	132.0
Total Luminous Flux (lm)	3433.1	3435.4
Color Rendering Index (CRI)	82.6	
R9	2	
Correlated Color Temperature (CCT) (K)	5023	
Chromaticity (Chroma x, Chroma y)	(0.3443, 0.3495)	
Chromaticity (Chroma u, Chroma v)	(0.2117, 0.3223)	
Chromaticity (Chroma u', Chroma v')	(0.2117, 0.5141)	
Duv	0.0007	
Average Beam Angle (°)	112.8	
Center Beam Candle Power (cd)	1189	
Spacing Criteria	1.21 (0°-180°)/ 1.27 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	77.32%	
Zonal Lumens in the 60°-90°Zone	22.53%	
Zonal Lumens in the 90°-120°Zone	0.06%	
Zonal Lumens in the 120°-180°Zone	0.09%	

Special Color Rendering Indices	
R1	81
R2	87
R3	92
R4	84
R5	83
R6	84
R7	85
R8	65
R9	2
R10	71
R11	85
R12	71
R13	82
R14	96

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

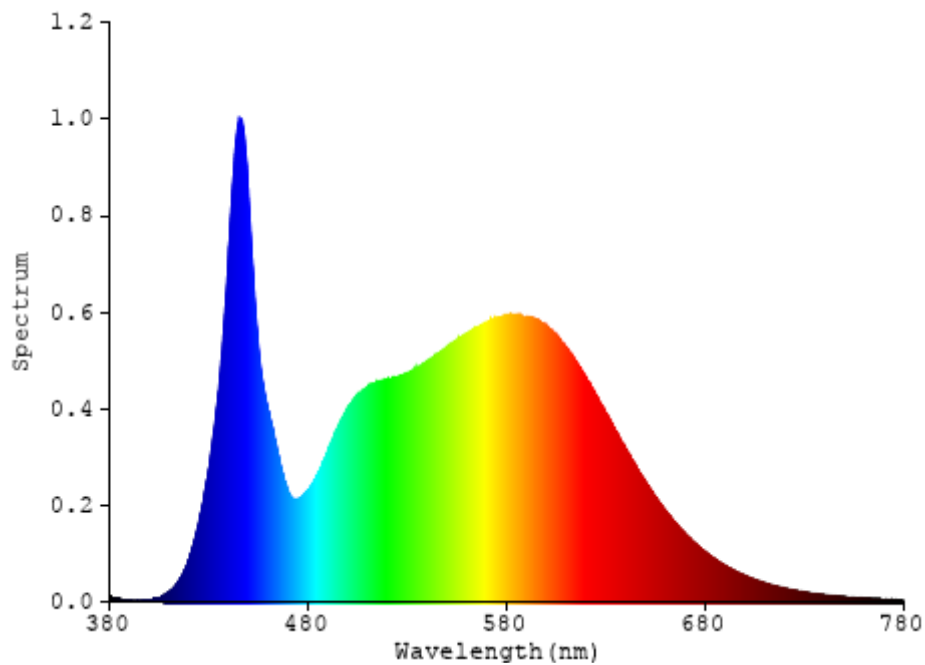


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	112.499	3.28%
10- 20	322.195	9.38%
20- 30	487.532	14.20%
30- 40	584.896	17.04%
40- 50	602.143	17.54%
50- 60	545.064	15.88%
60- 70	435.215	12.68%
70- 80	273.892	7.98%
80- 90	64.401	1.88%
90-100	0.668	0.02%
100-110	0.746	0.02%
110-120	0.815	0.02%
120-130	0.802	0.02%
130-140	0.764	0.02%
140-150	0.654	0.02%
150-160	0.473	0.01%
160-170	0.276	0.01%
170-180	0.092	0.00%
Total	3433.1	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2654.329	77.32%
60- 90	773.508	22.53%
0-90	3427.837	99.85%
90- 180	5.29	0.15%
0- 180	3433.1	100%

Table 3: Zonal Lumen Data

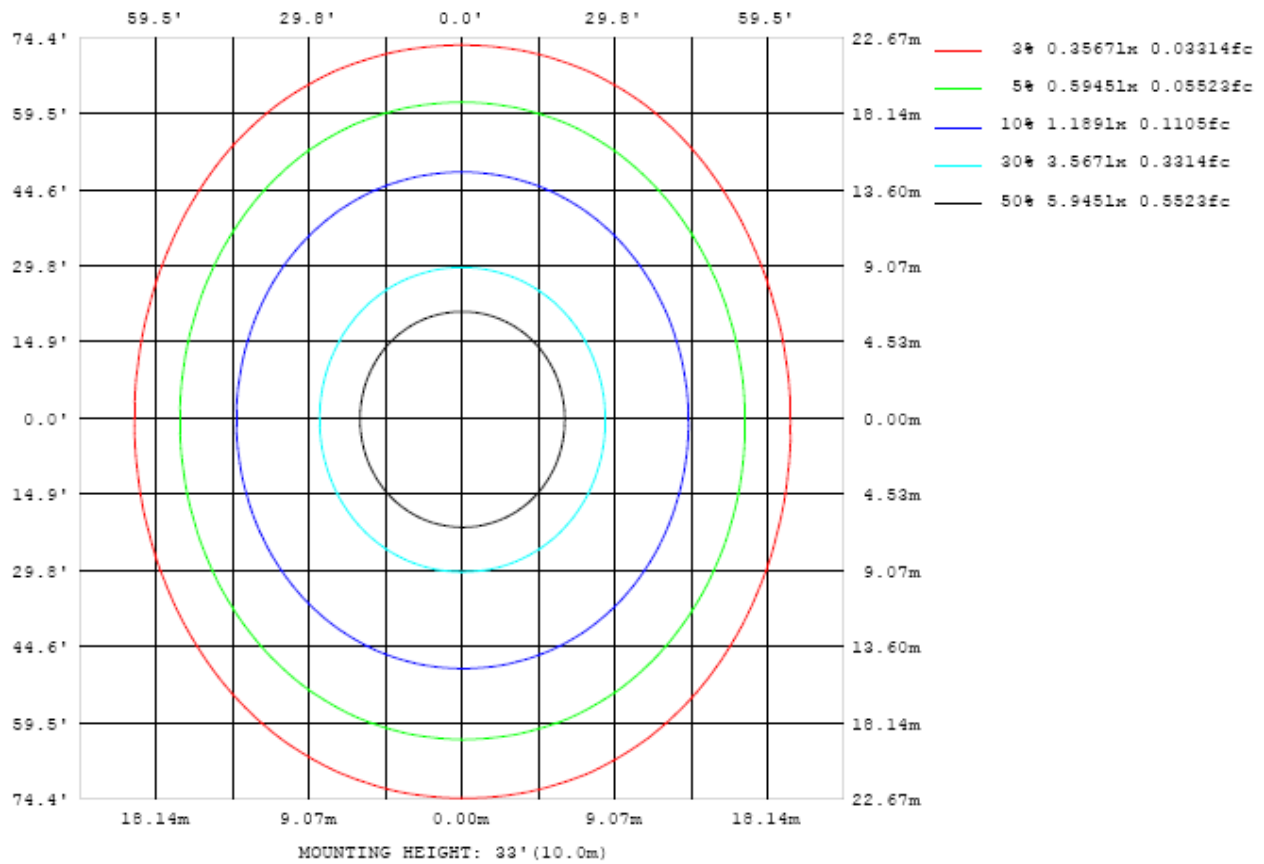


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

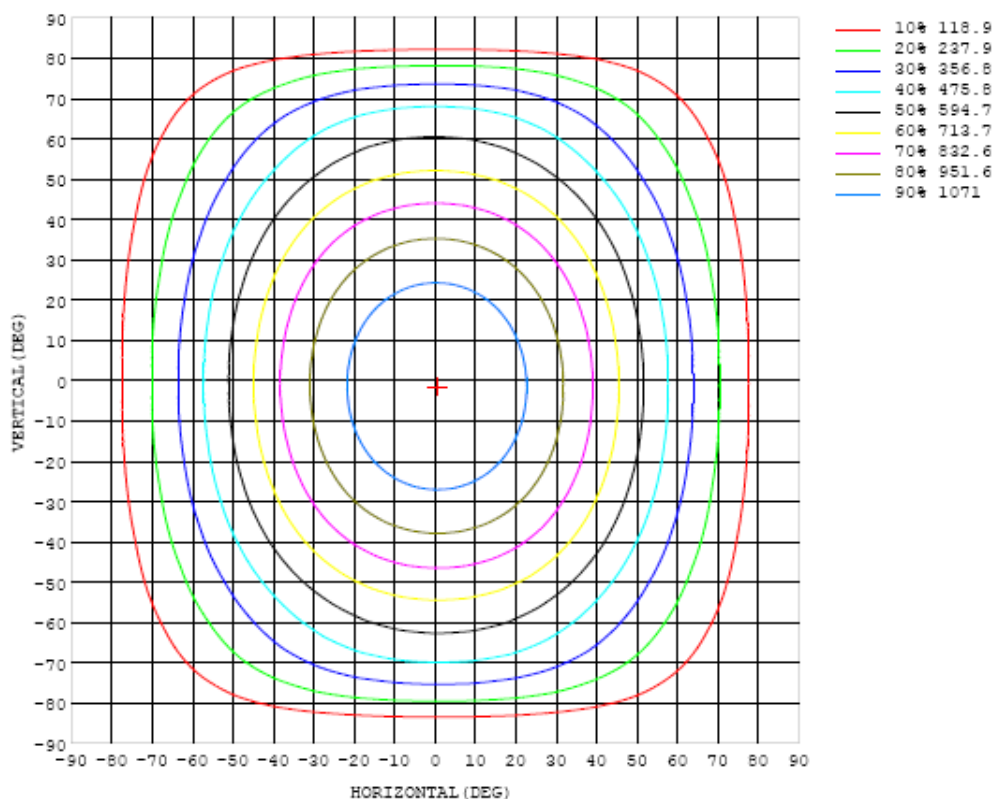


Chart 3: Isocandela Plot

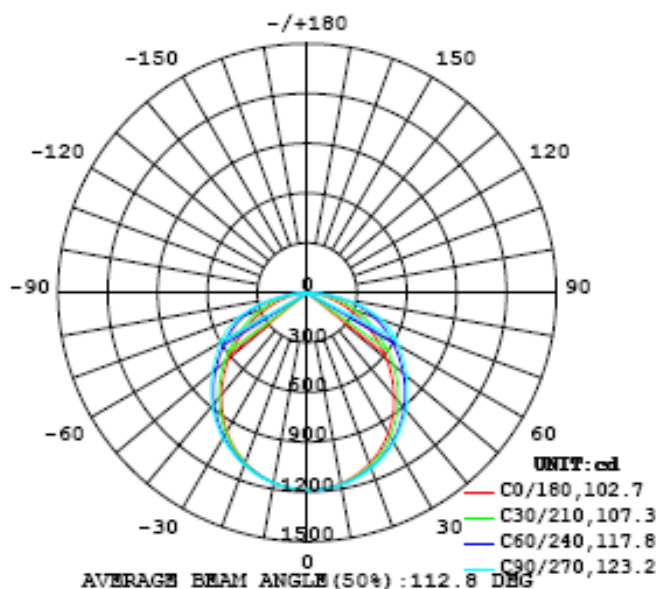


Chart 4: Polar Candela Distribution

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	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189
5	1184	1185	1185	1186	1186	1187	1187	1187	1187	1187	1187	1186	1186	1185	1185	1184	1183	1183	1182
10	1167	1168	1169	1171	1172	1174	1175	1176	1176	1176	1175	1174	1173	1171	1169	1167	1166	1164	1163
15	1138	1140	1142	1145	1148	1151	1153	1155	1156	1156	1155	1153	1150	1147	1143	1140	1137	1134	1132
20	1097	1099	1103	1108	1113	1118	1122	1125	1126	1127	1125	1122	1117	1112	1107	1101	1095	1091	1089
25	1043	1046	1052	1060	1068	1076	1081	1086	1088	1089	1086	1082	1076	1068	1059	1050	1043	1037	1034
30	977	982	990	1001	1012	1023	1032	1038	1041	1042	1039	1033	1025	1014	1002	989	978	970	967
35	900	906	917	931	947	962	974	982	986	987	983	976	965	951	935	918	904	894	889
40	814	821	835	853	873	892	908	918	923	924	920	912	898	880	860	839	821	809	804
45	721	729	745	767	792	815	834	847	853	855	850	840	824	802	777	753	732	718	712
50	625	633	651	675	704	732	755	771	779	781	776	764	744	719	690	662	639	623	617
55	527	536	555	581	613	645	674	694	704	706	700	686	662	632	600	569	544	527	521
60	430	439	458	487	522	559	593	618	631	633	627	609	581	547	509	476	448	431	425
65	335	344	365	395	434	476	515	544	557	560	553	535	504	464	422	385	356	338	332
70	244	253	275	308	350	394	431	459	471	474	468	451	421	383	340	299	267	248	242
75	160	169	191	225	265	301	332	352	362	364	359	347	325	294	257	217	184	164	158
80	84.9	92.9	112	141	168	193	211	220	223	222	221	217	207	190	165	137	108	89.7	84.7
85	28.3	31.4	39.7	54.3	64.9	72.6	72.6	70.9	69.3	68.0	69.1	70.3	72.3	70.7	64.1	52.4	38.6	30.4	28.3
90	0.17	0.16	1.70	2.05	2.55	0.68	0.27	0.20	0.19	0.22	0.20	0.21	0.26	0.63	2.19	2.20	0.32	0.12	0.11
95	0.16	0.19	0.51	0.55	0.53	0.29	0.22	0.19	0.18	0.18	0.16	0.19	0.21	0.32	0.54	0.47	0.36	0.19	0.16
100	0.23	0.26	0.63	0.61	0.38	0.29	0.27	0.25	0.23	0.23	0.20	0.24	0.25	0.28	0.39	0.59	0.57	0.35	0.28
105	0.32	0.32	0.60	0.48	0.39	0.33	0.31	0.29	0.28	0.28	0.25	0.27	0.30	0.34	0.40	0.49	0.60	0.44	0.41
110	0.45	0.36	0.47	0.45	0.47	0.45	0.43	0.39	0.37	0.37	0.35	0.39	0.42	0.45	0.46	0.44	0.49	0.44	0.56
115	0.45	0.39	0.45	0.47	0.51	0.52	0.50	0.51	0.50	0.51	0.48	0.49	0.50	0.51	0.50	0.47	0.45	0.41	0.55
120	0.56	0.46	0.50	0.47	0.53	0.54	0.54	0.54	0.55	0.56	0.53	0.53	0.53	0.53	0.53	0.44	0.50	0.48	0.68
125	0.46	0.50	0.53	0.55	0.53	0.59	0.59	0.58	0.60	0.61	0.58	0.58	0.57	0.57	0.47	0.55	0.48	0.49	0.60
130	0.70	0.64	0.56	0.61	0.57	0.52	0.64	0.64	0.64	0.64	0.62	0.62	0.62	0.50	0.62	0.61	0.62	0.59	0.86
135	0.69	0.60	0.69	0.59	0.63	0.63	0.55	0.57	0.65	0.67	0.62	0.54	0.53	0.63	0.66	0.59	0.72	0.64	0.93
140	0.85	0.69	0.73	0.62	0.65	0.71	0.73	0.70	0.66	0.64	0.67	0.70	0.70	0.68	0.62	0.69	0.77	0.70	1.03
145	0.78	0.68	0.75	0.78	0.65	0.67	0.74	0.73	0.75	0.75	0.74	0.75	0.72	0.66	0.70	0.78	0.72	0.70	0.86
150	0.92	0.81	0.74	0.83	0.75	0.67	0.63	0.64	0.66	0.70	0.69	0.65	0.65	0.74	0.77	0.79	0.71	0.77	1.10
155	0.99	0.87	0.76	0.80	0.76	0.74	0.66	0.65	0.62	0.62	0.65	0.69	0.74	0.81	0.82	0.77	0.73	0.74	1.08
160	0.94	0.77	0.75	0.77	0.79	0.77	0.72	0.76	0.75	0.74	0.79	0.79	0.84	0.86	0.85	0.77	0.87	0.80	1.23
165	0.92	0.90	0.87	0.82	0.78	0.73	0.74	0.74	0.71	0.76	0.79	0.82	0.83	0.80	0.80	0.83	0.85	0.89	1.16
170	0.93	0.95	0.90	0.88	0.83	0.73	0.69	0.66	0.69	0.70	0.73	0.79	0.78	0.81	0.87	0.86	0.82	0.89	1.07
175	0.86	0.89	0.89	0.85	0.83	0.78	0.75	0.76	0.85	0.82	0.84	0.85	0.87	0.86	0.88	0.90	0.93	0.96	1.03
180	1.01	1.00	0.98	0.96	0.95	0.98	1.01	1.01	0.91	1.03	0.69	1.04	1.10	1.07	1.08	1.08	1.09	1.09	1.06

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	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189	1189		
5	1182	1182	1181	1181	1181	1181	1182	1182	1182	1182	1182	1182	1183	1183	1183	1183	1184		
10	1163	1163	1163	1163	1164	1164	1165	1165	1166	1166	1166	1166	1166	1166	1166	1166	1166		
15	1132	1132	1133	1134	1136	1137	1139	1140	1140	1141	1140	1139	1139	1138	1137	1136	1137		
20	1089	1090	1092	1095	1098	1101	1104	1106	1107	1107	1106	1104	1102	1099	1097	1096	1095		
25	1034	1036	1040	1046	1051	1056	1060	1063	1064	1064	1062	1059	1055	1050	1046	1043	1041		
30	967	971	978	987	995	1002	1008	1012	1013	1013	1010	1005	999	992	984	979	976		
35	890	896	907	919	931	941	949	953	955	954	950	944	934	923	912	904	899		
40	805	814	827	843	859	872	882	888	890	888	883	874	862	847	832	821	814		
45	715	725	741	761	780	798	810	817	819	817	811	799	783	764	745	731	722		
50	620	632	651	674	698	719	734	743	746	743	735	719	699	675	653	636	626		
55	524	538	559	586	614	640	659	670	673	669	658	639	613	585	560	540	529		
60	429	444	467	498	532	563	586	599	603	598	584	560	528	495	466	444	432		
65	336	352	379	415	453	488	512	525	528	524	510	483	447	409	376	351	338		
70	247	265	296	335	372	403	425	436	440	436	424	399	367	328	290	263	248		
75	165	185	216	250	278	299	316	325	328	326	316	300	276	245	210	180	164		
80	90.9	109	133	153	170	178	182	183	183	185	185	181	171	152	130	105	89.4		
85	30.1	35.7	43.5	48.5	45.6	43.6	40.3	38.1	37.7	40.6	44.5	46.6	53.3	51.8	45.4	36.1	30.0		
90	0.17	0.47	0.76	1.02	1.24	1.37	1.41	1.44	1.42	1.50	1.39	1.38	1.23	1.01	0.68	0.31	0.14		
95	0.24	0.56	0.78	0.98	1.16	1.23	1.04	1.05	1.06	1.06	1.10	1.25	1.16	0.98	0.76	0.53	0.32		
100	0.30	0.71	0.92	1.11	1.25	1.28	1.05	1.05	1.07	1.06	1.10	1.31	1.24	1.10	0.88	0.68	0.37		
105	0.41	0.80	1.04	1.26	1.39	1.33	1.15	1.14	1.15	1.15	1.17	1.40	1.38	1.25	1.00	0.77	0.49		
110	0.50	0.86	1.10	1.34	1.49	1.33	1.28	1.28	1.30	1.29	1.29	1.40	1.49	1.31	1.06	0.84	0.57		
115	0.55	0.89	1.11	1.32	1.38	1.37	1.38	1.40	1.43	1.41	1.39	1.40	1.42	1.31	1.07	0.88	0.63		
120	0.52	0.95	1.09	1.27	1.37	1.42	1.45	1.49	1.51	1.50	1.46	1.43	1.38	1.27	1.07	0.94	0.79		
125	0.50	0.99	1.14	1.27	1.41	1.46	1.51	1.54	1.57	1.55	1.51	1.46	1.40	1.24	1.10	0.94	0.71		
130	0.95	1.08	1.22	1.34	1.41	1.52	1.57	1.62	1.63	1.61	1.57	1.50	1.40	1.28	1.21	0.82	0.94		
135	1.03	1.19	1.31	1.40	1.48	1.53	1.57	1.63	1.65	1.61	1.56	1.54	1.46	1.41	1.27	0.74	0.93		
140	1.13	0.82	1.34	1.43	1.52	1.60	1.65	1.68	1.68	1.65	1.63	1.57	1.50	1.38	1.34	0.98	1.10		
145	0.88	0.87	1.36	1.46	1.56	1.62	1.66	1.67	1.69	1.65	1.62	1.57	1.51	1.42	0.83	1.07	0.96		
150	1.04	1.18	0.92	1.48	1.49	1.52	1.61	1.61	1.60	1.61	1.57	1.49	1.47	1.04	0.93	1.28	1.16		
155	1.17	1.30	1.32	0.94	1.39	1.50	1.52	1.52	1.53	1.54	1.51	1.48	0.96	0.89	1.34	1.32	1.22		
160	1.25	1.32	1.37	1.35	0.92	0.96	0.94	1.22	1.39	1.23	0.95	0.89	0.89	1.34	1.36	1.29	1.24		
165	1.17	1.24	1.29	1.31	1.35	1.34	1.23	0.90	0.86	0.88	0.93	1.10	1.10	1.12	1.14	1.12	1.10		
170	1.08	1.10	1.07	1.20	1.17	1.31	1.33	1.28	1.27	1.16	1.05	1.08	1.17	1.22	1.15	1.11	1.07		
175	1.03	1.04	1.04	1.09	1.09	1.08	1.11	1.18	1.16	1.05	1.03	0.97	0.96	1.00	1.04	0.93	0.94		
180	1.06	1.05	1.03	1.01	0.98	0.97	0.96	0.94	0.94	0.94	1.00	0.92	0.92	0.98	1.03	1.04	1.04		

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 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 ***

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement.

Prepared by: Leading Testing Laboratories
3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, Yuhang Dist,
Hangzhou, Zhejiang Province, China 311100
Tel: +86 571 86376106 www.ledtestlab.com

Page 13 of 13