NVLAP LAB CODE 200960-0

LM-79-08 Test Report

for

GREEN CREATIVE LTD

756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

2x4' Trofkit

Model: 30TROFKIT24DIM/830/277V

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.: HZ17010017e

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

Review by:

Engineer: April Zou

Jan. 17, 2017

Approved by:

Manager: Jim Zhang

Jan. 17, 2017

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: **30TROFKIT24DIM/830/277V**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
134.7	3900.7	28.95	0.9936

CCT (K)	CRI	Stabilization Time (Light & Power)
2979	83.9	60

Table 1: Executive Data Summary

Note: The above results are recorded/ derived from measurements made using an Integrating Sphere.

Test specifications:	
Date of Receipt	: Jan. 10, 2017
Date of Test	: Jan. 14, 2017
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

Sample Photos

Overview of the sample in Fixture: Lithonia 2GT8 Lensed 2x4

Equipment Under Test (EUT)	
Name	: 2x4' Trofkit
Model	: 30TROFKIT24DIM/830/277V
Electrical Ratings	: 120-277V, 60Hz
Product Description	: 3000K, Frosted Lens, CRI80
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 24.6℃.

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 95 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)	0.243	0.108
Power Factor	0.9936	0.9499
Test Power (W)	28.95	28.47
THD A%	9.51	11.45
Luminous Efficacy (lm/W)	134.7	137.0
Total Luminous Flux (lm)	3900.7	3901.4
Color Rendering Index (CRI)	83.9	
R9	14	
Correlated Color Temperature (CCT) (K)	2979	
Chromaticity (Chroma x, Chroma y)	(0.4396, 0.4068)	
Chromaticity (Chroma u, Chroma v)	(0.2511, 0.3485)	
Chromaticity (Chroma u', Chroma v')	(0.2511, 0.5228)	
Duv	0.0007	
Average Beam Angle (°)	121.0	
Center Beam Candle Power (cd)	1243	
Spacing Criteria	1.25 (0°-180°)/ 1.29 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	75.10%	
Zonal Lumens in the 60°-90°Zone	24.55%	
Zonal Lumens in the 90°-120°Zone	0.17%	
Zonal Lumens in the 120°-180°Zone	0.18%	

Special Color Rendering Indices	
R1	82
R2	91
R3	97
R4	82
R5	82
R6	89
R7	85
R8	62
R9	14
R10	79
R11	82
R12	70
R13	84
R14	99

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

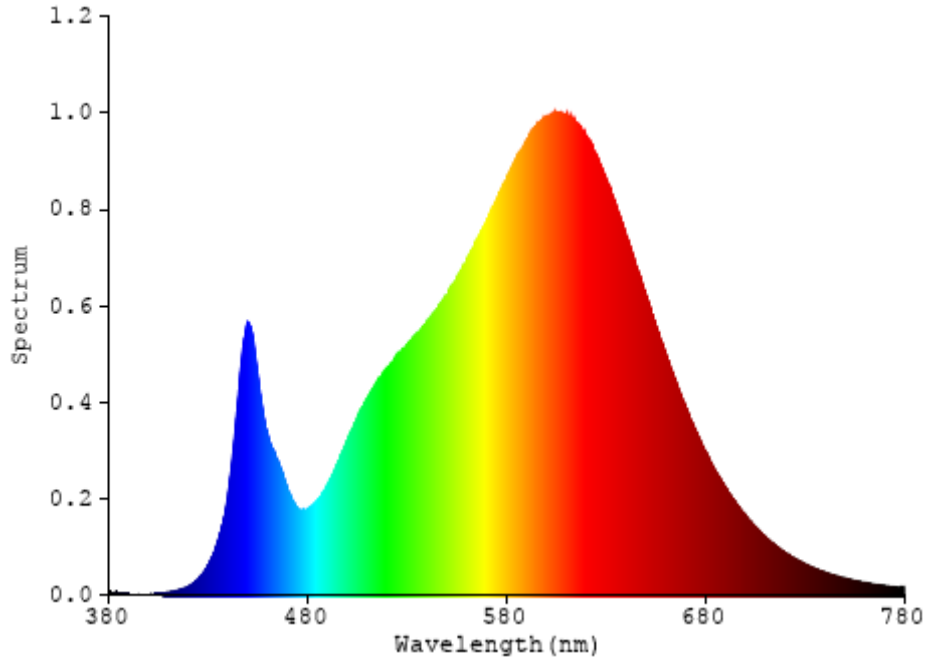


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	117.693	3.02%
10- 20	338.578	8.68%
20- 30	517.944	13.28%
30- 40	634.794	16.27%
40- 50	677.969	17.38%
50- 60	642.605	16.47%
60- 70	528.017	13.54%
70- 80	335.636	8.60%
80- 90	93.923	2.41%
90-100	1.907	0.05%
100-110	2.123	0.05%
110-120	2.412	0.06%
120-130	2.327	0.06%
130-140	1.905	0.05%
140-150	1.42	0.04%
150-160	0.875	0.02%
160-170	0.437	0.01%
170-180	0.17	0.00%
Total	3900.7	100%

γ(°)	Lumens	% Total
0- 60	2929.583	75.10%
60- 90	957.576	24.55%
0-90	3887.159	99.65%
90- 180	13.576	0.35%
0- 180	3900.7	100%

Table 3: Zonal Lumen Data

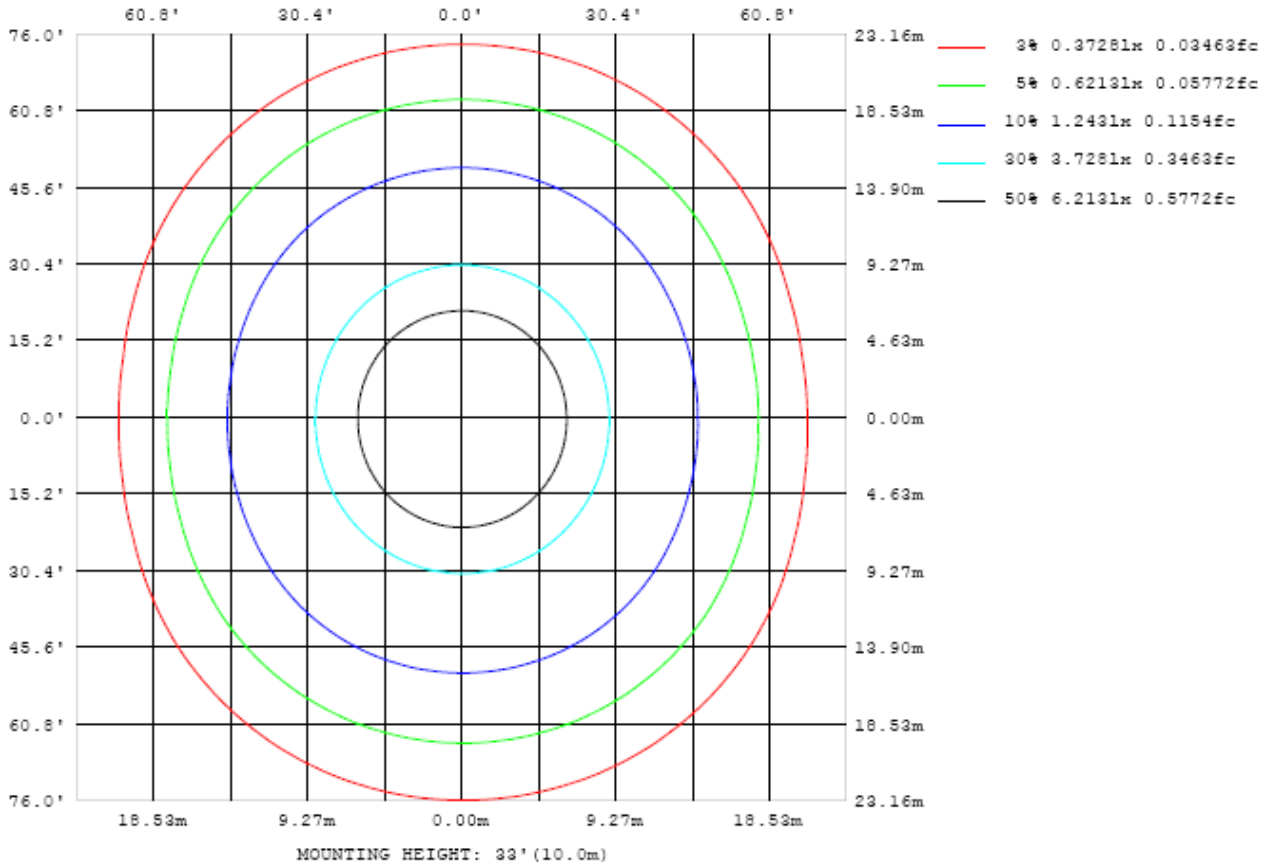


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

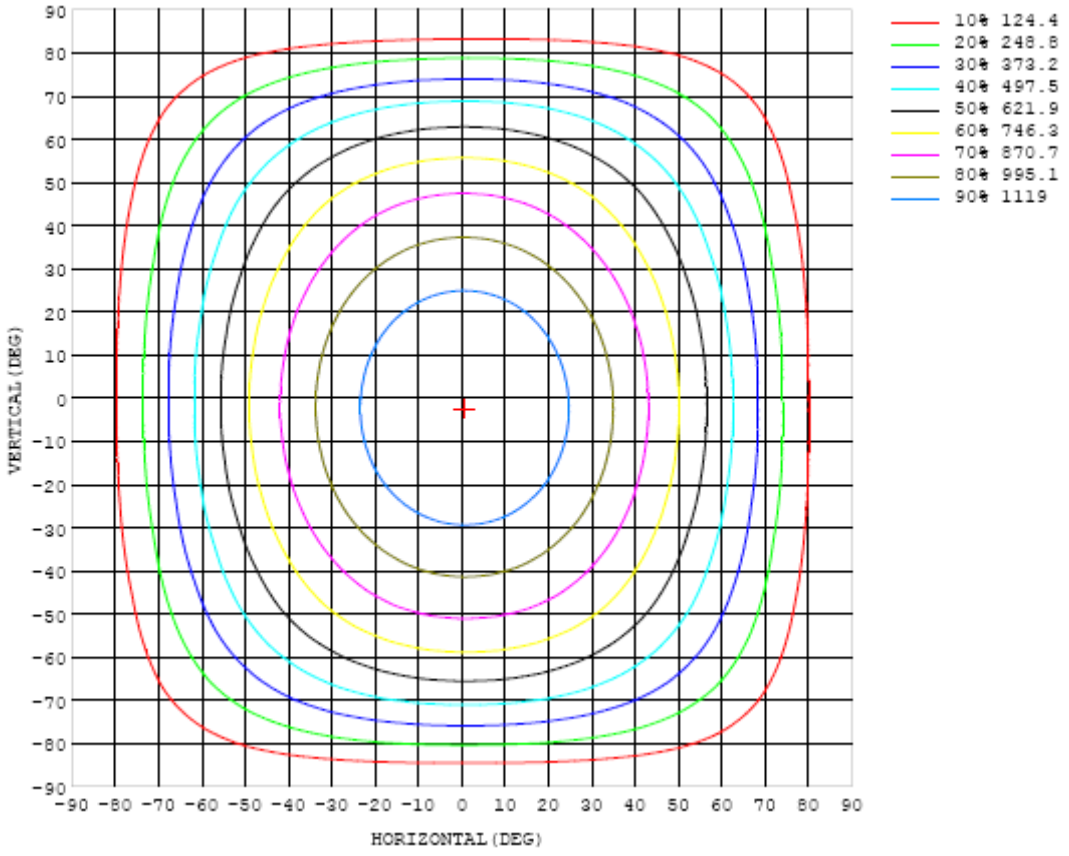


Chart 3: Isocandela Plot

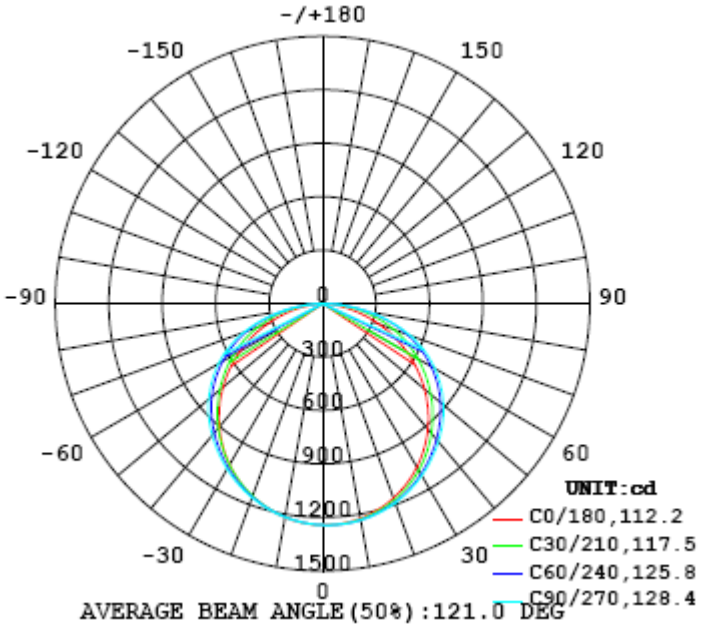


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243
5	1239	1239	1240	1241	1242	1242	1243	1243	1243	1243	1242	1242	1241	1241	1240	1239	1238	1237	1236
10	1224	1225	1227	1229	1230	1232	1233	1234	1234	1234	1233	1232	1230	1229	1226	1224	1222	1220	1218
15	1198	1201	1203	1206	1209	1212	1214	1216	1216	1216	1215	1213	1210	1207	1203	1199	1196	1193	1190
20	1162	1165	1169	1174	1179	1183	1187	1189	1190	1190	1189	1186	1181	1176	1171	1165	1159	1155	1151
25	1115	1120	1125	1131	1138	1144	1150	1154	1156	1156	1154	1149	1143	1136	1128	1120	1113	1107	1103
30	1059	1064	1071	1079	1089	1097	1105	1111	1114	1114	1111	1105	1097	1087	1077	1066	1057	1049	1044
35	993	999	1008	1019	1031	1043	1053	1061	1065	1065	1062	1054	1044	1031	1017	1003	992	983	977
40	919	925	936	950	966	981	995	1005	1011	1011	1007	998	984	968	950	933	919	908	902
45	836	844	857	874	894	914	932	945	951	952	948	936	920	899	877	856	838	826	819
50	747	755	771	793	818	843	864	878	885	886	881	870	851	827	799	773	752	737	730
55	651	661	680	707	739	766	788	802	809	810	806	794	775	750	718	686	660	643	635
60	550	561	584	618	653	681	702	718	725	727	722	709	690	665	633	596	564	543	535
65	445	458	486	525	559	588	610	624	632	633	629	617	597	572	541	503	465	440	431
70	336	352	387	426	458	486	505	518	523	523	520	512	495	472	441	406	365	335	325
75	228	246	285	320	349	371	385	394	396	396	394	388	378	360	335	303	265	230	219
80	125	146	181	209	230	246	255	259	260	259	259	256	249	237	218	195	166	131	119
85	43.8	60.3	78.7	95.1	106	111	113	113	111	110	111	111	110	107	99.1	86.2	68.8	49.9	39.0
90	2.00	3.48	4.27	3.74	3.30	3.82	3.18	3.43	3.66	2.33	3.82	3.22	3.90	4.07	3.03	3.61	2.94	2.29	0.15
95	0.25	0.83	0.73	1.33	1.49	1.61	1.92	1.88	1.67	1.66	1.55	1.86	2.01	1.84	1.74	1.41	0.61	0.64	0.31
100	0.48	1.06	0.97	1.57	1.73	1.91	1.92	1.73	1.42	1.35	1.44	1.74	1.83	1.89	1.82	1.69	0.84	0.82	0.56
105	0.76	1.07	1.13	1.94	2.05	2.15	2.19	1.96	1.64	1.57	1.65	1.92	1.99	1.94	1.98	1.82	0.93	0.94	0.93
110	1.00	1.14	1.23	2.12	2.35	2.48	2.48	2.24	1.86	1.80	1.87	2.16	2.23	2.17	2.10	1.91	1.06	1.08	1.13
115	1.09	1.16	1.27	2.19	2.51	2.69	2.72	2.51	2.20	2.14	2.16	2.41	2.45	2.34	2.17	1.88	1.16	1.09	1.34
120	1.41	1.17	1.32	2.14	2.56	2.79	2.83	2.62	2.42	2.37	2.35	2.50	2.57	2.45	2.24	1.85	1.26	1.33	1.59
125	1.51	1.44	1.39	2.10	2.51	2.80	2.84	2.70	2.60	2.56	2.52	2.58	2.62	2.51	2.23	1.85	1.39	1.52	1.65
130	1.60	1.64	1.31	2.01	2.34	2.61	2.76	2.73	2.68	2.65	2.61	2.60	2.57	2.39	2.20	1.89	1.17	1.43	1.60
135	1.39	1.40	1.24	1.97	2.22	2.46	2.54	2.60	2.65	2.65	2.60	2.49	2.39	2.34	2.13	1.98	1.07	1.46	1.79
140	1.60	1.31	1.03	1.91	2.18	2.36	2.51	2.50	2.49	2.48	2.47	2.44	2.40	2.27	2.13	1.65	1.20	1.32	1.62
145	1.79	1.74	1.59	1.67	2.09	2.27	2.32	2.39	2.45	2.45	2.41	2.33	2.25	2.19	2.08	1.31	1.61	1.63	1.79
150	1.80	1.84	1.76	1.31	1.75	2.09	2.14	2.21	2.26	2.25	2.24	2.17	2.11	2.06	1.67	1.45	1.77	1.86	2.12
155	1.51	1.75	1.65	1.83	1.35	1.69	1.72	2.04	2.03	2.02	2.02	2.01	1.65	1.49	1.36	1.65	1.45	1.61	1.77
160	1.53	1.73	1.80	1.70	1.75	1.17	0.95	1.15	1.53	1.61	1.50	1.15	1.03	1.31	1.68	1.52	1.58	1.52	1.70
165	1.53	1.63	1.63	1.50	1.35	1.42	1.55	1.29	1.17	1.23	1.17	1.26	1.70	1.60	1.51	1.36	1.44	1.41	1.51
170	1.39	1.47	1.57	1.70	1.72	1.69	1.55	1.47	1.42	1.43	1.42	1.51	1.54	1.42	1.72	1.78	1.77	1.76	1.69
175	1.90	1.89	1.82	1.73	1.78	1.81	1.71	1.70	1.65	1.50	1.51	1.44	1.56	1.76	1.82	1.85	1.88	1.90	1.94
180	1.73	1.73	1.74	1.76	1.81	1.85	1.71	1.44	1.52	1.69	1.43	1.70	1.72	1.70	1.73	1.74	1.75	1.75	1.79

Table 4: Luminous Intensity Data

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243	1243		
5	1235	1235	1234	1234	1234	1234	1234	1234	1234	1234	1235	1235	1235	1236	1236	1237	1238		
10	1217	1216	1215	1215	1216	1216	1216	1217	1217	1217	1218	1218	1219	1219	1220	1221	1222		
15	1188	1188	1187	1187	1188	1189	1190	1191	1192	1192	1193	1193	1193	1193	1193	1195	1196		
20	1149	1149	1149	1150	1152	1154	1156	1158	1159	1159	1159	1159	1158	1157	1157	1158	1159		
25	1100	1100	1102	1105	1108	1112	1115	1118	1119	1119	1118	1117	1115	1113	1111	1111	1112		
30	1042	1043	1046	1051	1057	1062	1067	1071	1073	1072	1071	1068	1064	1060	1057	1055	1056		
35	976	978	982	990	998	1006	1013	1018	1020	1020	1017	1012	1005	999	994	991	990		
40	901	904	912	922	935	947	956	962	965	964	959	951	941	931	923	918	916		
45	819	824	835	850	867	882	894	901	904	902	897	886	872	858	846	838	834		
50	730	739	753	773	794	812	824	832	835	834	827	816	800	780	763	751	745		
55	637	649	669	694	717	734	747	755	759	757	750	738	721	699	675	658	650		
60	538	554	581	608	630	649	663	671	675	673	665	653	635	613	585	562	550		
65	436	458	488	513	537	556	570	577	580	580	573	561	542	519	492	463	447		
70	333	360	389	414	436	453	462	468	471	471	467	458	442	419	393	362	340		
75	231	260	285	308	323	334	341	346	348	349	348	342	331	313	290	261	234		
80	134	159	177	192	203	210	213	214	216	219	220	218	211	199	183	161	133		
85	50.0	61.7	70.4	74.1	75.0	74.9	70.9	67.6	68.0	72.8	80.0	84.8	85.9	83.9	76.8	65.2	49.6		
90	0.78	1.20	2.40	3.01	3.22	3.41	3.54	3.09	3.45	3.47	3.73	3.39	3.08	3.02	2.35	0.76	0.35		
95	1.08	1.06	1.83	2.07	2.24	2.43	2.50	2.40	2.40	2.45	2.62	2.45	2.24	2.09	1.75	0.78	0.70		
100	1.32	1.44	2.26	2.42	2.51	2.60	2.50	2.19	2.12	2.26	2.58	2.55	2.50	2.39	2.18	1.02	0.86		
105	1.42	1.66	2.72	2.91	2.89	3.01	2.94	2.64	2.61	2.72	3.01	2.97	2.84	2.86	2.59	1.12	0.96		
110	1.49	1.72	2.93	3.18	3.35	3.47	3.35	3.05	3.03	3.13	3.43	3.43	3.27	3.11	2.74	1.18	1.07		
115	1.58	1.69	2.83	3.34	3.64	3.83	3.71	3.50	3.49	3.53	3.79	3.79	3.56	3.21	2.64	1.21	1.19		
120	1.39	1.70	2.75	3.34	3.76	3.96	3.89	3.82	3.83	3.83	3.95	3.94	3.66	3.19	2.57	1.23	1.59		
125	1.50	1.82	2.67	3.27	3.71	3.92	3.96	3.98	4.00	3.98	3.99	3.89	3.60	3.07	2.48	1.40	1.65		
130	1.59	1.89	2.47	3.08	3.49	3.78	3.91	4.00	4.04	3.99	3.92	3.74	3.38	2.95	2.33	1.19	1.73		
135	1.87	1.51	2.55	2.84	3.31	3.54	3.73	3.87	3.91	3.84	3.70	3.51	3.21	2.71	2.29	1.02	1.62		
140	1.66	1.03	2.34	2.72	3.03	3.36	3.55	3.65	3.67	3.63	3.51	3.31	2.92	2.71	2.26	1.45	1.61		
145	1.77	1.74	1.95	2.64	2.90	3.04	3.18	3.34	3.39	3.28	3.12	2.97	2.84	2.54	1.25	2.05	1.77		
150	1.95	2.21	1.34	2.46	2.70	2.88	3.00	2.98	2.98	2.92	2.87	2.77	2.57	1.47	1.31	1.89	1.85		
155	1.63	1.95	2.19	1.33	1.89	2.56	2.67	2.68	2.66	2.63	2.56	2.41	1.29	1.30	2.21	1.86	1.81		
160	1.73	1.64	1.78	1.95	1.27	1.28	1.26	1.58	1.88	1.55	1.22	1.13	1.18	2.22	2.07	2.09	1.97		
165	1.52	1.49	1.29	1.33	1.74	2.18	2.09	1.46	1.32	1.25	1.68	2.12	1.93	1.82	1.90	1.90	1.89		
170	1.67	1.74	1.82	1.63	1.68	1.70	1.88	1.92	1.95	1.94	1.91	1.85	1.92	2.01	1.87	1.73	1.62		
175	1.95	2.00	1.99	2.01	2.09	1.96	1.80	1.62	1.66	1.63	1.90	1.82	1.71	1.85	1.90	1.90	1.89		
180	1.79	1.79	1.78	1.78	1.79	1.78	1.74	1.63	1.47	1.68	1.36	1.53	1.69	1.70	1.70	1.71	1.71		

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

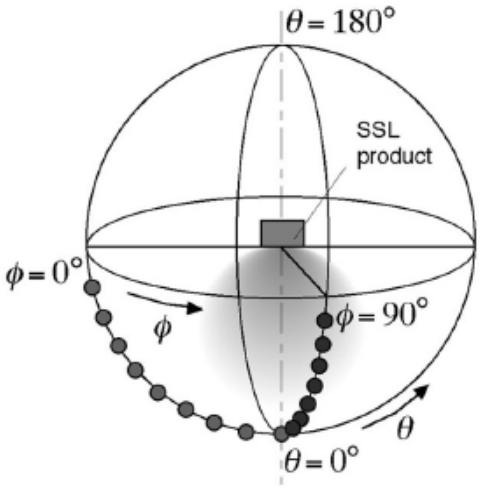
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured 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 2x4’ Trofkits) 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°/180° and C=90°/270°) 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, Δu'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 ***

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