



## LM-79-08 Test Report

for

### GREEN CREATIVE LTD

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

**2x4' Trofkit**

**Model: 30TROFKIT24DIM/850/277V**

**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.: HZ17010017h

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

Review by:

*April Zou*

Engineer: April Zou  
Jan. 18, 2017



Approved by

Manager: Jim Zhang  
Jan. 18, 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/850/277V**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
140.5	4081.5	29.05	0.9937
CCT (K)	CRI	Stabilization Time (Light & Power)	
4769	84.5	60	

Table 1: Executive Data Summary

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

### Test specifications:

<b>Date of Receipt</b>	: Jan. 10, 2017
<b>Date of Test</b>	: Jan. 16, 2017
<b>Test item</b>	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
<b>Reference Standard</b>	: IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

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### Sample Photos



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

### Equipment Under Test (EUT)

<b>Name</b>	: 2x4' Trofkit
<b>Model</b>	: 30TROFKIT24DIM/850/277V
<b>Electrical Ratings</b>	: 120-277V, 60Hz
<b>Product Description</b>	: 5000K, Frosted Lens, CRI80
<b>Manufacturer</b>	: GREEN CREATIVE LTD
<b>Address</b>	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

## TEST RESULTS

Test ambient temperature was 24.7°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 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)	0.244	0.108
Power Factor	0.9937	0.9503
Test Power (W)	29.05	28.55
THD A%	9.43	11.41
Luminous Efficacy (lm/W)	140.5	142.9
Total Luminous Flux (lm)	4081.5	4082.3
Color Rendering Index (CRI)	84.5	
R9	18	
Correlated Color Temperature (CCT) (K)	4769	
Chromaticity (Chroma x, Chroma y)	(0.3530, 0.3653)	
Chromaticity (Chroma u, Chroma v)	(0.2115, 0.3282)	
Chromaticity (Chroma u', Chroma v')	(0.2115, 0.4923)	
Duv	0.0036	
Average Beam Angle (°)	121.2	
Center Beam Candle Power (cd)	1299	
Spacing Criteria	1.25 (0°-180°)/ 1.31 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	75.14%	
Zonal Lumens in the 60°-90°Zone	24.51%	
Zonal Lumens in the 90°-120°Zone	0.17%	
Zonal Lumens in the 120°-180°Zone	0.18%	

Special Color Rendering Indices	
R1	83
R2	91
R3	95
R4	82
R5	82
R6	86
R7	88
R8	70
R9	18
R10	77
R11	80
R12	55
R13	85
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

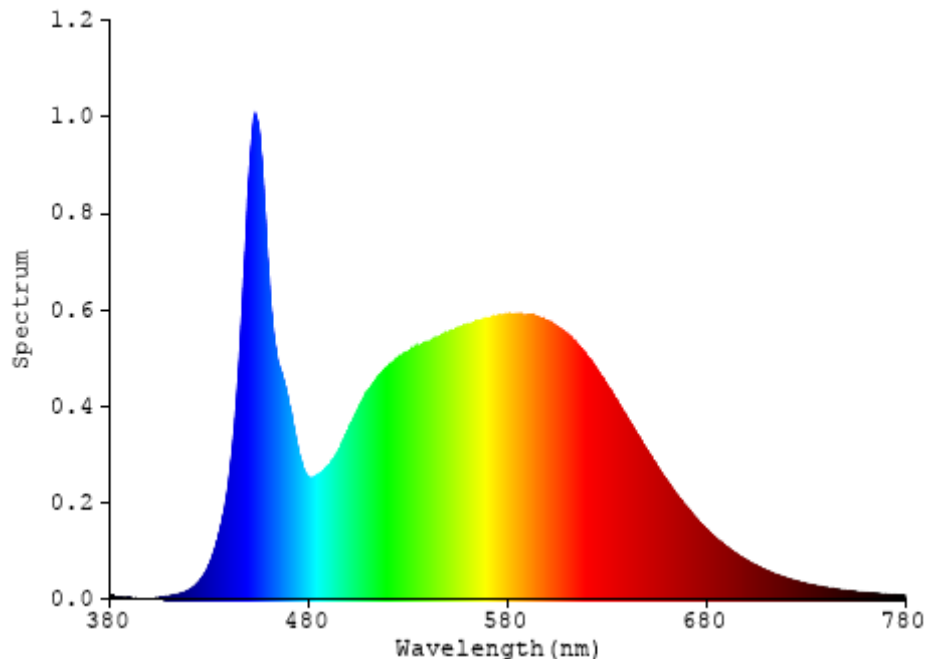


Chart 1: Spectral Power Distribution

### Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	123.051	3.01%
10- 20	354.057	8.67%
20- 30	541.859	13.28%
30- 40	664.477	16.28%
40- 50	710.03	17.40%
50- 60	673.202	16.49%
60- 70	552.95	13.55%
70- 80	350.574	8.59%
80- 90	97.001	2.38%
90-100	2.012	0.05%
100-110	2.219	0.05%
110-120	2.538	0.06%
120-130	2.462	0.06%
130-140	2.023	0.05%
140-150	1.485	0.04%
150-160	0.931	0.02%
160-170	0.468	0.01%
170-180	0.175	0.00%
Total	4081.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	3066.676	75.14%
60- 90	1000.525	24.51%
0-90	4067.201	99.65%
90- 180	14.313	0.35%
0- 180	4081.5	100%

Table 3: Zonal Lumen Data

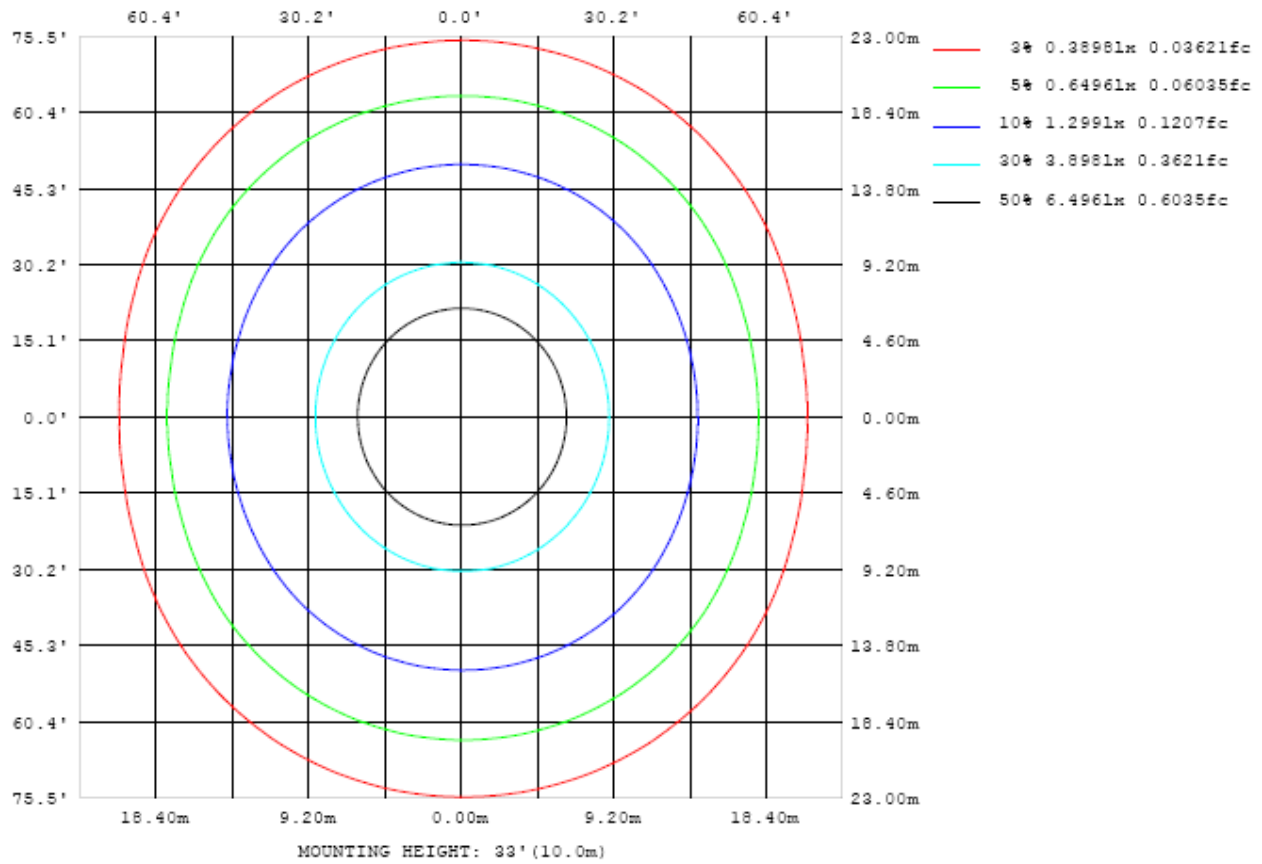


Chart 2: Illuminance Plot (Footcandles)



## Luminous Intensity Distribution Plots

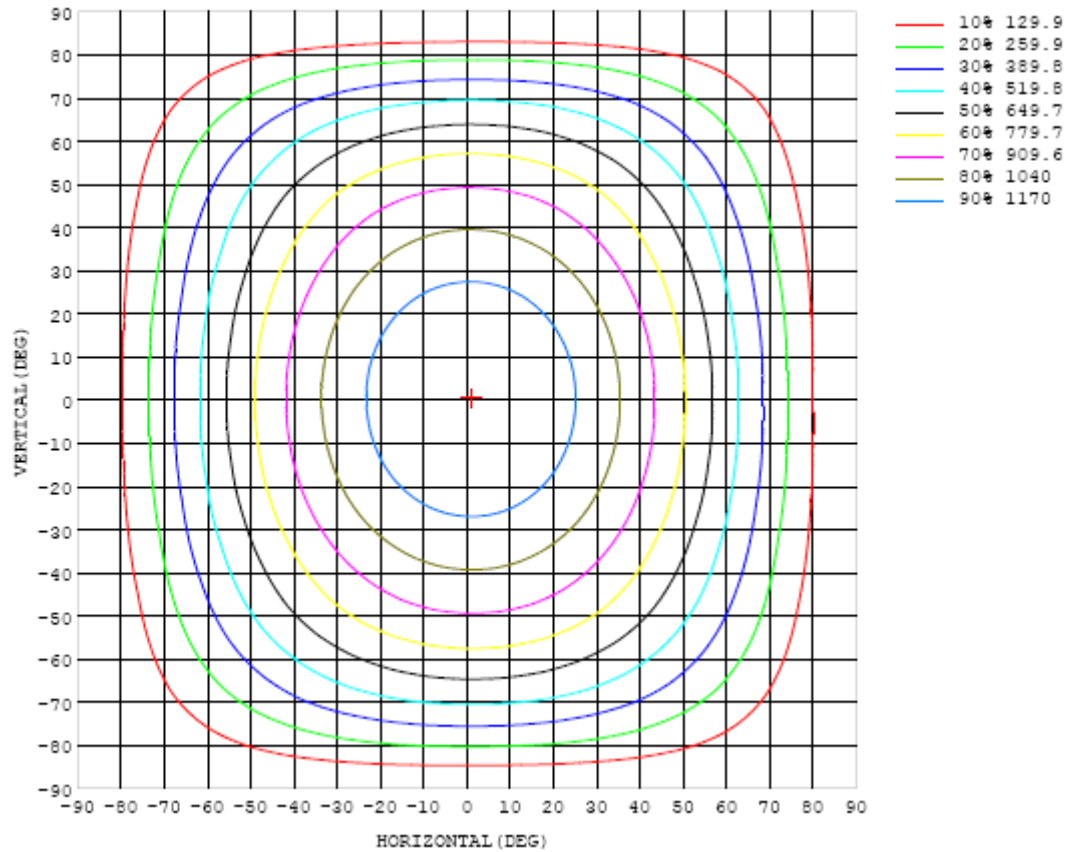


Chart 3: Isocandela Plot

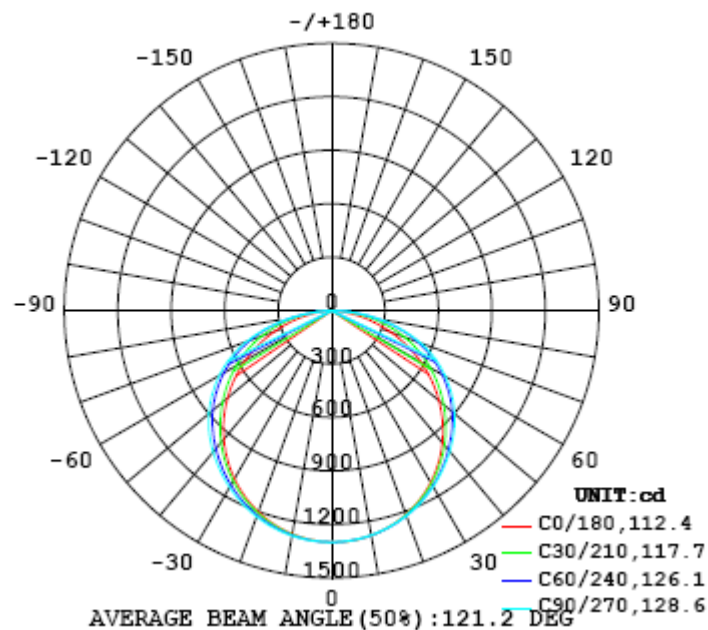


Chart 4: Polar Candela Distribution

## 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	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299
5	1296	1296	1295	1295	1295	1295	1294	1294	1294	1294	1293	1293	1293	1292	1292	1292	1292	1291	1292
10	1281	1281	1280	1280	1281	1281	1280	1280	1280	1279	1279	1278	1276	1275	1274	1273	1273	1272	1273
15	1255	1255	1255	1255	1256	1257	1257	1257	1257	1256	1255	1253	1251	1249	1247	1245	1243	1242	1243
20	1218	1218	1219	1220	1222	1224	1225	1226	1226	1225	1224	1221	1217	1214	1210	1206	1204	1202	1203
25	1170	1171	1172	1175	1179	1182	1185	1187	1187	1186	1184	1180	1175	1169	1163	1158	1154	1151	1151
30	1112	1113	1116	1120	1126	1132	1136	1140	1141	1140	1137	1132	1125	1117	1108	1100	1094	1091	1090
35	1044	1046	1050	1057	1065	1074	1081	1086	1089	1088	1084	1077	1067	1056	1045	1034	1026	1021	1020
40	967	969	976	986	997	1009	1019	1028	1032	1031	1027	1018	1005	990	975	960	949	943	942
45	881	884	893	907	923	939	954	965	970	970	964	953	937	918	898	880	866	857	855
50	787	792	803	822	844	866	883	895	901	901	895	884	866	843	817	794	776	765	763
55	686	692	708	732	760	786	804	817	823	823	817	805	787	763	733	704	680	666	663
60	580	587	607	638	671	697	716	730	737	737	731	718	699	675	645	610	581	563	559
65	469	478	504	541	573	600	621	635	642	642	637	624	605	580	550	514	478	456	450
70	354	366	399	436	468	495	515	527	532	532	528	518	501	477	447	414	375	346	339
75	239	255	292	326	355	377	392	401	404	404	402	394	382	364	339	307	271	238	228
80	130	149	183	211	233	250	261	267	268	268	267	263	255	241	221	198	169	135	124
85	44.1	59.2	77.9	94.5	107	114	118	119	119	119	119	119	116	111	102	87.8	70.3	51.3	40.7
90	1.95	3.26	3.89	3.98	4.06	4.47	4.71	4.80	11.4	5.12	4.46	4.42	4.16	4.62	3.63	3.73	3.01	2.22	0.14
95	0.31	1.08	1.05	1.85	2.16	2.42	2.70	2.81	2.75	2.79	2.68	2.90	2.72	2.37	2.13	1.78	0.72	0.73	0.30
100	0.52	1.27	1.41	2.21	2.40	2.49	2.56	2.51	2.20	2.12	2.25	2.55	2.51	2.46	2.37	2.17	1.05	0.93	0.56
105	0.86	1.37	1.63	2.71	2.88	2.85	2.98	2.92	2.59	2.54	2.65	2.97	2.94	2.80	2.81	2.61	1.24	1.02	0.87
110	1.12	1.47	1.71	2.98	3.23	3.34	3.43	3.35	2.98	2.94	3.04	3.36	3.37	3.25	3.13	2.81	1.35	1.13	1.08
115	1.31	1.57	1.69	2.93	3.42	3.71	3.87	3.77	3.48	3.45	3.49	3.78	3.81	3.60	3.28	2.74	1.44	1.10	1.28
120	1.62	1.41	1.72	2.86	3.44	3.87	4.08	3.99	3.84	3.84	3.83	3.99	4.01	3.77	3.31	2.70	1.52	1.31	1.57
125	1.58	1.55	1.75	2.73	3.36	3.84	4.07	4.05	4.05	4.06	4.03	4.07	4.03	3.76	3.25	2.61	1.67	1.62	1.61
130	1.81	1.87	1.91	2.52	3.15	3.60	3.89	3.99	4.06	4.10	4.06	4.01	3.88	3.55	3.13	2.44	1.69	1.49	1.68
135	1.82	1.94	1.47	2.50	2.89	3.30	3.58	3.79	3.92	3.98	3.93	3.79	3.59	3.35	2.86	2.48	1.11	1.72	1.87
140	1.73	1.61	0.90	2.29	2.71	3.04	3.40	3.56	3.64	3.68	3.66	3.58	3.42	3.05	2.69	2.31	1.02	1.54	1.68
145	1.63	1.71	1.47	2.05	2.62	2.84	3.05	3.25	3.41	3.45	3.41	3.22	3.06	2.87	2.58	1.32	1.92	1.89	1.86
150	1.95	1.79	1.92	1.21	2.44	2.64	2.82	2.89	2.97	2.99	2.97	2.86	2.83	2.65	2.47	1.18	2.07	1.98	2.13
155	1.78	1.79	1.95	2.15	1.22	2.30	2.53	2.61	2.59	2.60	2.61	2.61	2.49	2.17	1.16	2.04	1.63	1.68	1.72
160	1.71	2.04	1.98	2.21	2.15	1.21	1.11	1.35	2.18	2.32	2.21	1.37	1.11	1.10	1.77	1.61	1.72	1.57	1.83
165	1.70	2.05	1.90	1.95	1.89	2.01	2.00	1.22	0.99	1.03	1.03	1.17	2.07	1.80	1.43	1.19	1.31	1.33	1.51
170	1.67	1.79	1.96	1.83	1.94	1.90	1.83	1.80	1.81	1.78	1.80	1.86	1.83	1.64	1.75	1.68	1.63	1.67	1.64
175	2.13	2.15	2.14	2.17	2.11	1.96	1.82	1.87	1.77	1.72	1.71	1.54	1.66	1.88	1.89	1.87	1.85	1.85	1.82
180	1.69	1.69	1.69	1.68	1.65	1.61	1.58	1.52	1.33	1.47	1.26	1.60	1.62	1.62	1.67	1.69	1.69	1.69	1.75

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	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299	1299		
5	1292	1292	1293	1293	1294	1294	1295	1295	1296	1296	1296	1296	1296	1296	1296	1296	1296		
10	1273	1274	1276	1277	1278	1280	1281	1282	1283	1283	1284	1283	1283	1283	1282	1282	1281		
15	1244	1245	1248	1250	1253	1256	1258	1260	1261	1262	1262	1261	1260	1259	1258	1257	1256		
20	1204	1206	1210	1214	1218	1222	1226	1229	1231	1231	1231	1230	1228	1225	1223	1221	1219		
25	1153	1157	1162	1168	1175	1181	1186	1190	1192	1192	1191	1189	1186	1181	1178	1174	1172		
30	1093	1098	1105	1113	1122	1131	1138	1143	1146	1146	1144	1140	1134	1128	1122	1118	1114		
35	1023	1029	1038	1050	1062	1073	1083	1089	1093	1092	1089	1083	1075	1066	1058	1051	1047		
40	945	953	965	980	996	1011	1023	1031	1035	1034	1029	1020	1009	997	985	975	970		
45	859	869	885	904	925	944	959	967	972	971	965	953	938	920	904	892	884		
50	767	779	799	824	849	871	886	895	899	898	892	880	861	839	817	800	790		
55	669	685	710	740	768	789	804	814	818	817	810	798	779	752	725	703	690		
60	565	586	618	651	677	698	715	724	728	727	720	707	687	661	629	600	584		
65	459	485	521	551	578	600	614	622	626	626	620	608	587	561	530	495	474		
70	351	382	416	445	470	488	498	504	506	507	504	496	479	453	424	388	361		
75	243	277	307	332	349	360	366	369	372	372	372	368	357	339	313	281	249		
80	141	170	191	207	218	223	225	224	225	227	230	230	225	213	197	173	142		
85	52.8	65.7	74.9	77.7	76.7	72.9	67.2	63.2	63.2	68.4	76.7	82.1	84.7	84.8	79.9	68.7	52.4		
90	0.74	1.10	2.51	2.53	2.41	2.66	2.95	2.20	2.31	2.28	2.71	3.03	2.64	2.90	2.17	0.49	0.43		
95	0.90	0.84	1.41	1.60	1.74	1.97	1.93	1.65	1.56	1.59	1.87	2.00	1.92	1.83	1.61	0.52	0.66		
100	1.15	1.14	1.77	1.92	2.10	2.16	2.04	1.63	1.52	1.62	1.94	2.05	2.08	2.03	1.84	0.77	0.85		
105	1.19	1.28	2.19	2.32	2.41	2.44	2.30	1.90	1.80	1.89	2.17	2.25	2.19	2.23	1.91	1.03	0.99		
110	1.25	1.38	2.37	2.63	2.76	2.78	2.60	2.19	2.11	2.17	2.49	2.55	2.46	2.30	2.11	1.13	1.12		
115	1.30	1.41	2.42	2.77	2.93	3.01	2.80	2.50	2.43	2.44	2.70	2.75	2.62	2.35	1.99	1.26	1.23		
120	1.30	1.46	2.34	2.79	3.03	3.10	2.90	2.71	2.66	2.63	2.77	2.85	2.71	2.39	1.97	1.44	1.65		
125	1.51	1.57	2.28	2.70	3.02	3.08	2.98	2.87	2.83	2.79	2.85	2.86	2.73	2.34	2.03	1.40	1.66		
130	1.62	1.42	2.21	2.60	2.83	3.02	3.00	2.97	2.96	2.90	2.89	2.83	2.59	2.33	2.04	1.33	1.84		
135	1.83	1.35	2.28	2.51	2.77	2.83	2.86	2.94	2.93	2.86	2.75	2.69	2.59	2.33	1.89	1.56	1.72		
140	1.31	1.14	2.09	2.49	2.66	2.78	2.83	2.86	2.84	2.80	2.74	2.65	2.47	2.36	1.71	1.24	1.68		
145	1.59	1.48	1.85	2.41	2.56	2.59	2.67	2.72	2.73	2.67	2.58	2.53	2.43	1.91	1.35	1.80	1.70		
150	1.99	2.00	1.60	2.01	2.37	2.45	2.55	2.56	2.54	2.50	2.45	2.40	1.98	1.38	1.61	1.93	2.00		
155	1.81	1.88	2.14	1.55	1.73	1.96	2.22	2.32	2.32	2.32	2.02	1.93	1.35	1.70	2.19	1.94	1.98		
160	1.82	1.81	1.68	1.95	1.46	1.51	1.23	1.50	1.68	1.49	1.25	1.56	1.63	2.25	2.02	2.11	2.09		
165	1.57	1.58	1.58	1.44	1.58	2.05	1.88	1.44	1.44	1.38	1.68	2.11	1.96	1.99	2.03	2.06	2.03		
170	1.64	1.80	1.89	1.88	1.93	1.67	1.71	1.61	1.61	1.50	1.57	1.67	1.89	2.02	1.98	1.88	1.86		
175	1.83	1.83	1.81	1.80	1.76	1.74	1.70	1.53	1.55	1.47	1.62	1.72	1.63	1.81	1.88	1.95	2.04		
180	1.75	1.74	1.74	1.73	1.72	1.69	1.67	1.62	1.43	1.59	1.28	1.46	1.62	1.63	1.62	1.64	1.64		

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 ( $C=0^\circ/180^\circ$  and  $C=90^\circ/270^\circ$ ) and at  $10^\circ$  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](http://www.ledtestlab.com)

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