



## LM-79-08 Test Report

for

### GREEN CREATIVE LTD

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

**2x4' Trofkit**

**Model: 30TROFKIT24DIM/840/277V**

**Laboratory: Leading Testing Laboratories**

**NVLAP CODE: 200960-0**

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Report No.: HZ17010017g

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 *Jim Zhang*



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/840/277V**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
139.7	4066.7	29.11	0.9936
CCT (K)	CRI	Stabilization Time (Light & Power)	
3811	83.0	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. 14, 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/840/277V
<b>Electrical Ratings</b>	: 120-277V, 60Hz
<b>Product Description</b>	: 4000K, 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 24.6°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	0.109
Power Factor	0.9936	0.9503
Test Power (W)	29.11	28.62
THD A%	9.63	11.09
Luminous Efficacy (lm/W)	139.7	140.2
Total Luminous Flux (lm)	4066.7	4012.5
Color Rendering Index (CRI)	83.0	
R9	13	
Correlated Color Temperature (CCT) (K)	3811	
Chromaticity (Chroma x, Chroma y)	(0.3920, 0.3912)	
Chromaticity (Chroma u, Chroma v)	(0.2269, 0.3397)	
Chromaticity (Chroma u', Chroma v')	(0.2269, 0.5095)	
Duv	0.0034	
Average Beam Angle (°)	121.1	
Center Beam Candle Power (cd)	1292	
Spacing Criteria	1.25 (0°-180°)/ 1.32 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	75.02%	
Zonal Lumens in the 60°-90°Zone	24.64%	
Zonal Lumens in the 90°-120°Zone	0.17%	
Zonal Lumens in the 120°-180°Zone	0.18%	

Special Color Rendering Indices	
R1	81
R2	88
R3	93
R4	83
R5	81
R6	83
R7	88
R8	67
R9	13
R10	71
R11	82
R12	60
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

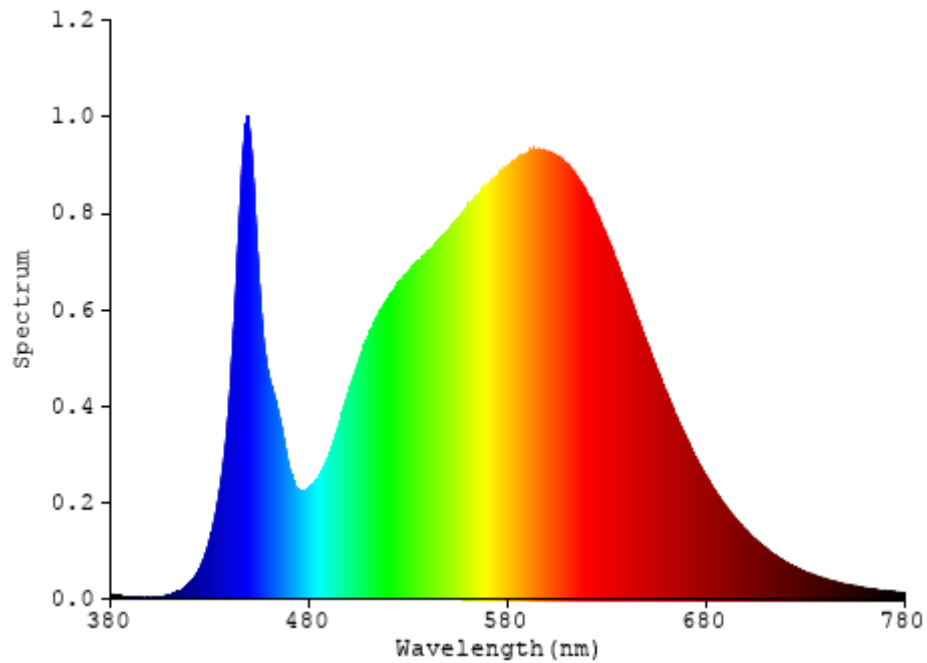


Chart 1: Spectral Power Distribution

## Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	122.399	3.01%
10- 20	352.22	8.66%
20- 30	539.068	13.26%
30- 40	661.002	16.25%
40- 50	706.281	17.37%
50- 60	669.719	16.47%
60- 70	550.673	13.54%
70- 80	351.086	8.63%
80- 90	100.095	2.46%
90-100	2.022	0.05%
100-110	2.202	0.05%
110-120	2.509	0.06%
120-130	2.417	0.06%
130-140	1.985	0.05%
140-150	1.446	0.04%
150-160	0.907	0.02%
160-170	0.454	0.01%
170-180	0.168	0.00%
Total	4066.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	3050.689	75.02%
60- 90	1001.854	24.64%
0-90	4052.543	99.65%
90- 180	14.11	0.35%
0- 180	4066.7	100%

Table 3: Zonal Lumen Data

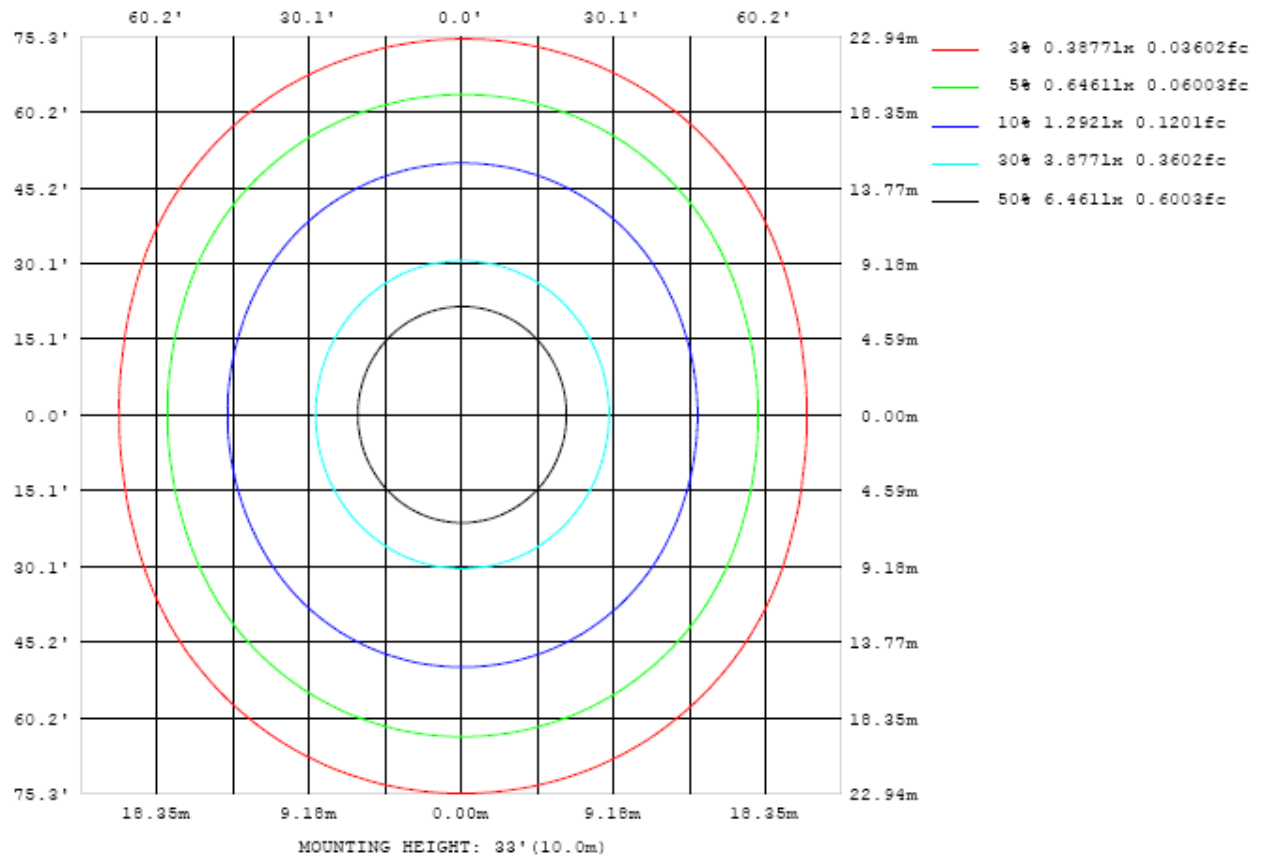


Chart 2: Illuminance Plot (Footcandles)



## Luminous Intensity Distribution Plots

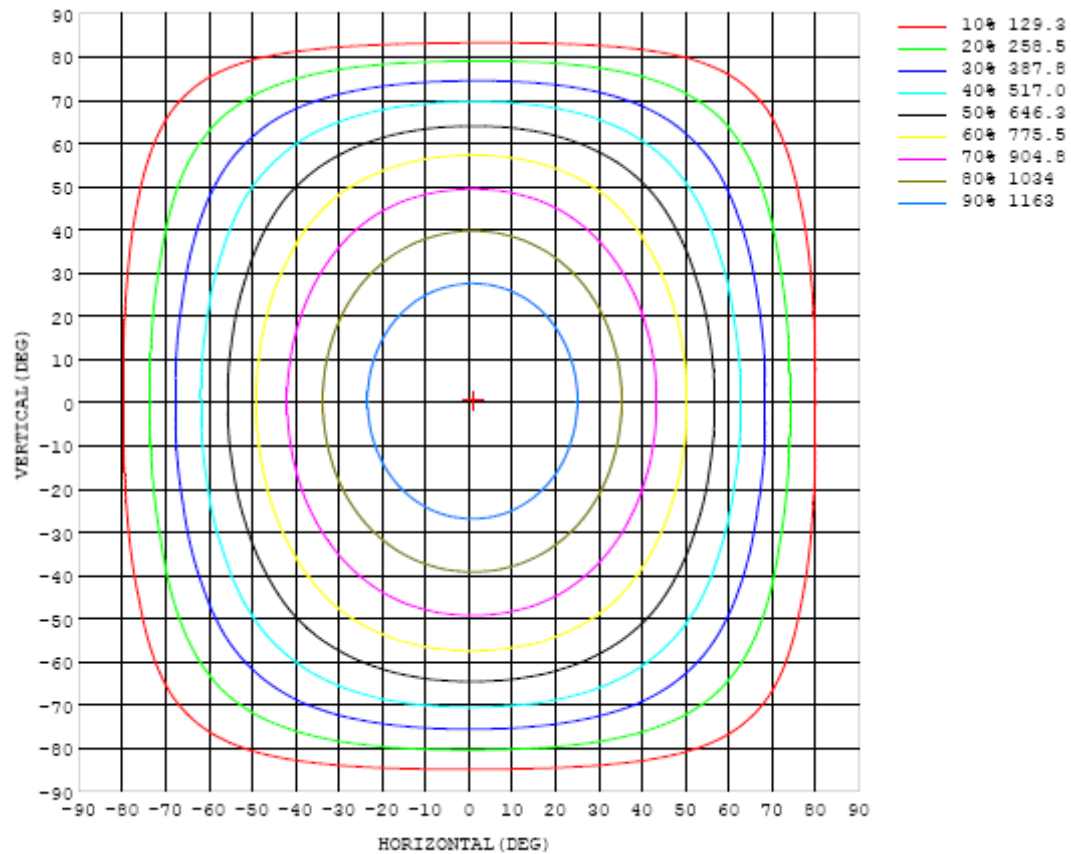


Chart 3: Isocandela Plot

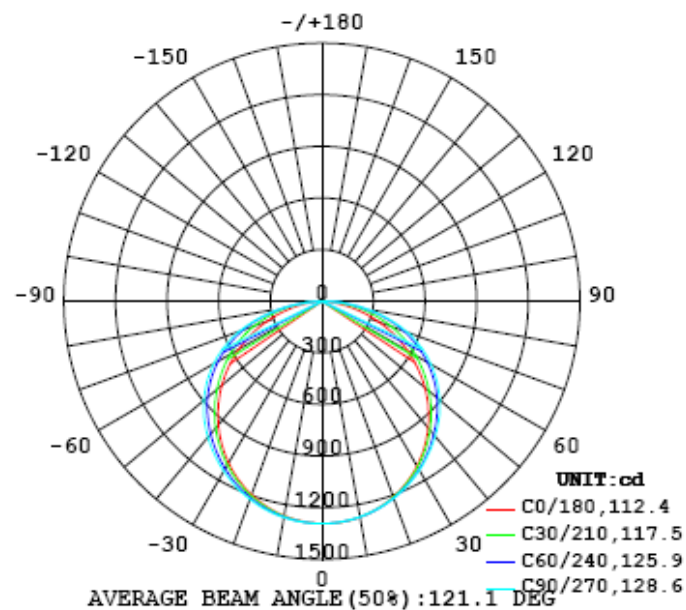


Chart 4: Polar Candela Distribution

## Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292
5	1289	1289	1288	1288	1288	1288	1287	1287	1287	1287	1286	1286	1286	1285	1285	1285	1285	1285	1285
10	1274	1274	1273	1273	1273	1273	1273	1273	1273	1272	1272	1271	1270	1269	1268	1267	1266	1266	1266
15	1248	1248	1248	1248	1249	1249	1250	1250	1250	1249	1248	1247	1245	1242	1240	1239	1237	1237	1237
20	1211	1211	1211	1213	1215	1216	1218	1219	1219	1218	1217	1214	1211	1208	1204	1201	1198	1197	1197
25	1163	1163	1165	1168	1171	1174	1177	1179	1180	1180	1178	1174	1169	1164	1158	1153	1149	1146	1146
30	1105	1106	1108	1113	1118	1123	1128	1132	1134	1134	1131	1126	1120	1112	1104	1096	1090	1086	1086
35	1037	1038	1042	1049	1057	1065	1072	1078	1081	1081	1078	1072	1063	1052	1041	1030	1022	1017	1016
40	960	961	967	977	988	1000	1011	1020	1024	1025	1021	1013	1001	986	971	957	946	939	938
45	874	877	884	898	913	930	945	956	962	963	958	949	934	915	895	877	863	854	852
50	781	784	795	813	834	856	874	887	893	894	889	879	862	839	815	792	774	762	760
55	681	685	699	723	750	776	795	808	815	816	812	801	784	760	731	702	679	664	661
60	575	581	599	629	661	687	707	722	730	731	727	715	697	673	644	609	579	562	557
65	465	473	497	532	564	591	613	628	635	637	633	622	604	578	549	514	478	455	449
70	351	362	393	428	460	487	507	522	528	529	526	517	501	477	447	414	375	346	339
75	237	251	286	320	349	372	387	397	402	403	401	395	384	366	340	308	272	238	229
80	130	147	179	207	230	247	259	266	268	269	269	265	258	243	224	200	171	136	125
85	44.2	58.8	77.6	94.7	108	117	122	125	125	125	125	125	122	116	105	90.4	72.7	52.5	41.6
90	1.90	3.39	4.48	5.44	5.11	4.82	5.27	5.56	4.44	4.81	4.93	5.28	6.23	3.86	4.27	4.87	3.65	3.65	0.14
95	0.25	1.07	0.98	1.77	2.06	2.29	2.56	2.65	2.65	2.74	2.65	2.99	2.70	2.49	2.29	1.90	0.81	0.70	0.31
100	0.53	1.48	1.44	2.24	2.35	2.38	2.40	2.31	2.06	2.01	2.23	2.62	2.60	2.57	2.48	2.23	1.18	0.84	0.55
105	0.87	1.58	1.68	2.73	2.79	2.70	2.78	2.71	2.44	2.38	2.60	3.00	3.04	2.83	2.86	2.59	1.42	0.98	0.89
110	1.16	1.63	1.78	3.14	3.32	3.34	3.37	3.25	2.93	2.88	2.90	3.44	3.46	3.24	3.06	2.74	1.53	1.13	1.08
115	1.31	1.69	1.77	3.10	3.56	3.77	3.86	3.70	3.36	3.31	3.43	3.82	3.84	3.55	3.17	2.62	1.53	1.04	1.29
120	1.59	1.44	1.71	2.89	3.46	3.84	3.99	3.97	3.84	3.82	3.78	3.99	4.02	3.70	3.20	2.58	1.54	1.25	1.57
125	1.53	1.49	1.72	2.72	3.29	3.86	4.10	4.10	4.09	4.05	3.97	3.98	3.99	3.68	3.15	2.49	1.69	1.58	1.59
130	1.76	1.78	1.91	2.49	3.11	3.56	3.93	4.05	4.09	4.07	3.99	3.89	3.79	3.47	3.03	2.36	1.70	1.41	1.70
135	1.77	1.87	1.59	2.44	2.85	3.28	3.61	3.82	3.91	3.93	3.84	3.68	3.46	3.21	2.75	2.46	1.12	1.63	1.87
140	1.70	1.62	0.90	2.23	2.60	3.02	3.37	3.54	3.60	3.61	3.55	3.44	3.27	2.90	2.61	2.27	1.01	1.48	1.67
145	1.53	1.62	1.30	2.14	2.53	2.79	2.95	3.23	3.36	3.37	3.31	3.11	2.92	2.74	2.49	1.56	1.83	1.80	1.83
150	1.86	1.70	1.81	1.22	2.31	2.55	2.73	2.84	2.91	2.92	2.88	2.75	2.75	2.53	2.29	1.18	1.91	1.90	2.08
155	1.70	1.67	1.86	1.91	1.21	2.28	2.42	2.55	2.56	2.56	2.55	2.51	2.39	2.25	1.17	1.91	1.61	1.63	1.70
160	1.64	1.88	1.86	2.08	1.93	1.20	1.12	1.59	2.13	2.13	2.16	1.59	1.13	1.11	1.57	1.63	1.60	1.54	1.80
165	1.66	1.96	1.80	1.80	1.86	1.88	1.79	1.04	0.96	0.99	1.03	1.07	1.82	1.73	1.42	1.12	1.25	1.29	1.47
170	1.62	1.74	1.86	1.74	1.83	1.73	1.68	1.68	1.69	1.65	1.73	1.80	1.74	1.62	1.72	1.64	1.57	1.60	1.63
175	2.08	2.09	2.08	2.07	2.00	1.82	1.72	1.74	1.68	1.61	1.64	1.51	1.62	1.79	1.84	1.82	1.80	1.79	1.76
180	1.45	1.45	1.46	1.47	1.49	1.53	1.65	1.76	1.55	1.65	1.34	1.37	1.41	1.47	1.54	1.59	1.61	1.61	1.68

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	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292	1292		
5	1285	1285	1286	1287	1287	1288	1288	1288	1289	1289	1289	1289	1289	1289	1289	1289	1289		
10	1267	1268	1269	1270	1272	1273	1275	1276	1276	1277	1277	1277	1277	1277	1276	1276	1275		
15	1238	1239	1242	1244	1247	1250	1252	1254	1255	1256	1256	1255	1254	1253	1251	1250	1249		
20	1198	1201	1204	1208	1212	1217	1220	1223	1225	1225	1225	1224	1222	1219	1217	1214	1213		
25	1148	1151	1157	1163	1169	1175	1180	1184	1187	1187	1186	1184	1180	1176	1171	1168	1165		
30	1088	1093	1100	1108	1117	1126	1133	1138	1141	1141	1139	1135	1130	1123	1117	1111	1107		
35	1019	1025	1034	1045	1058	1069	1078	1084	1088	1089	1085	1079	1071	1062	1052	1045	1040		
40	941	949	961	976	992	1007	1019	1027	1032	1031	1026	1017	1005	992	980	970	963		
45	856	866	882	901	922	941	955	964	968	968	962	950	935	917	900	887	878		
50	764	777	797	821	847	868	883	892	897	896	890	878	859	836	814	796	785		
55	667	683	709	738	765	786	802	811	816	815	809	797	777	751	723	699	686		
60	564	585	618	649	675	697	713	722	727	727	720	706	687	661	628	599	581		
65	459	485	521	551	577	598	613	621	625	626	620	608	588	562	530	495	472		
70	351	383	417	446	470	489	499	505	509	509	507	498	481	456	426	389	361		
75	244	279	308	334	351	363	370	373	375	378	377	373	362	342	316	283	249		
80	144	172	193	210	221	227	229	229	230	233	236	237	232	219	201	176	144		
85	54.8	68.5	78.1	81.7	81.7	80.0	76.9	73.0	74.1	78.8	85.2	89.1	91.8	91.3	84.8	71.9	53.9		
90	0.72	1.04	2.23	2.38	2.23	2.39	2.53	1.92	2.09	2.05	2.37	2.62	2.35	2.77	1.94	0.45	0.43		
95	0.89	0.84	1.47	1.59	1.74	1.96	1.88	1.65	1.61	1.65	1.92	2.04	1.95	1.82	1.52	0.61	0.64		
100	1.14	1.11	1.79	1.92	2.13	2.18	2.00	1.64	1.53	1.62	1.92	1.97	1.98	1.96	1.78	0.83	0.83		
105	1.19	1.27	2.10	2.29	2.40	2.45	2.26	1.90	1.79	1.86	2.13	2.16	2.09	2.12	1.93	1.06	0.97		
110	1.26	1.35	2.25	2.54	2.71	2.74	2.55	2.17	2.07	2.12	2.42	2.45	2.34	2.21	2.03	1.21	1.09		
115	1.28	1.37	2.28	2.64	2.86	2.92	2.74	2.45	2.38	2.38	2.60	2.63	2.50	2.30	1.98	1.31	1.21		
120	1.29	1.42	2.21	2.66	2.92	2.99	2.82	2.63	2.59	2.56	2.69	2.74	2.60	2.35	1.94	1.44	1.63		
125	1.51	1.55	2.18	2.59	2.91	2.98	2.88	2.78	2.76	2.71	2.76	2.76	2.61	2.28	1.93	1.50	1.61		
130	1.59	1.40	2.13	2.53	2.74	2.93	2.92	2.89	2.87	2.81	2.80	2.73	2.49	2.29	1.98	1.26	1.80		
135	1.77	1.22	2.24	2.43	2.70	2.75	2.78	2.84	2.85	2.77	2.67	2.61	2.51	2.27	2.03	1.57	1.72		
140	1.31	1.14	1.98	2.45	2.58	2.69	2.74	2.77	2.76	2.73	2.67	2.58	2.40	2.32	1.70	1.34	1.68		
145	1.62	1.66	1.59	2.38	2.52	2.52	2.59	2.63	2.65	2.60	2.51	2.47	2.39	1.85	1.43	1.68	1.62		
150	1.92	1.85	1.59	1.98	2.33	2.41	2.51	2.52	2.50	2.47	2.42	2.36	1.93	1.31	1.62	1.90	1.94		
155	1.76	1.87	2.09	1.55	1.50	1.94	2.09	2.28	2.28	2.28	1.94	1.89	1.30	1.67	2.07	1.95	1.92		
160	1.79	1.79	1.65	1.90	1.45	1.52	1.18	1.32	1.44	1.31	1.23	1.55	1.60	2.18	1.98	2.05	2.01		
165	1.54	1.54	1.53	1.43	1.58	1.95	1.88	1.48	1.42	1.40	1.77	2.04	1.93	1.95	2.09	2.00	1.98		
170	1.60	1.76	1.84	1.89	1.89	1.79	1.70	1.60	1.57	1.47	1.55	1.66	1.93	1.94	1.91	1.84	1.80		
175	1.77	1.77	1.76	1.75	1.72	1.71	1.67	1.50	1.54	1.45	1.62	1.68	1.60	1.78	1.84	1.91	2.00		
180	1.68	1.67	1.67	1.67	1.66	1.63	1.61	1.57	1.39	1.52	1.26	1.42	1.55	1.56	1.56	1.57	1.58		

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.