



LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

2x4' Trofkit

Model: 30TROFKIT24DIM/835/277V

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17010017f

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. 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/835/277V**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
138.7	3997.1	28.82	0.9935
CCT (K)	CRI	Stabilization Time (Light & Power)	
3359	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

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Sample Photos



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

Equipment Under Test (EUT)

Name	: 2x4' Trofkit
Model	: 30TROFKIT24DIM/835/277V
Electrical Ratings	: 120-277V, 60Hz
Product Description	: 3500K, 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°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)	0.242	0.108
Power Factor	0.9935	0.9495
Test Power (W)	28.82	28.34
THD A%	9.58	10.98
Luminous Efficacy (lm/W)	138.7	141.1
Total Luminous Flux (lm)	3997.1	3998.8
Color Rendering Index (CRI)	83.9	
R9	15	
Correlated Color Temperature (CCT) (K)	3359	
Chromaticity (Chroma x, Chroma y)	(0.4159, 0.4008)	
Chromaticity (Chroma u, Chroma v)	(0.2385, 0.3446)	
Chromaticity (Chroma u', Chroma v')	(0.2385, 0.5169)	
Duv	0.0021	
Average Beam Angle (°)	121.1	
Center Beam Candle Power (cd)	1272	
Spacing Criteria	1.25 (0°-180°)/ 1.31 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	75.09%	
Zonal Lumens in the 60°-90°Zone	24.56%	
Zonal Lumens in the 90°-120°Zone	0.16%	
Zonal Lumens in the 120°-180°Zone	0.18%	

Special Color Rendering Indices	
R1	82
R2	90
R3	96
R4	83
R5	82
R6	87
R7	87
R8	65
R9	15
R10	76
R11	81
R12	64
R13	84
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

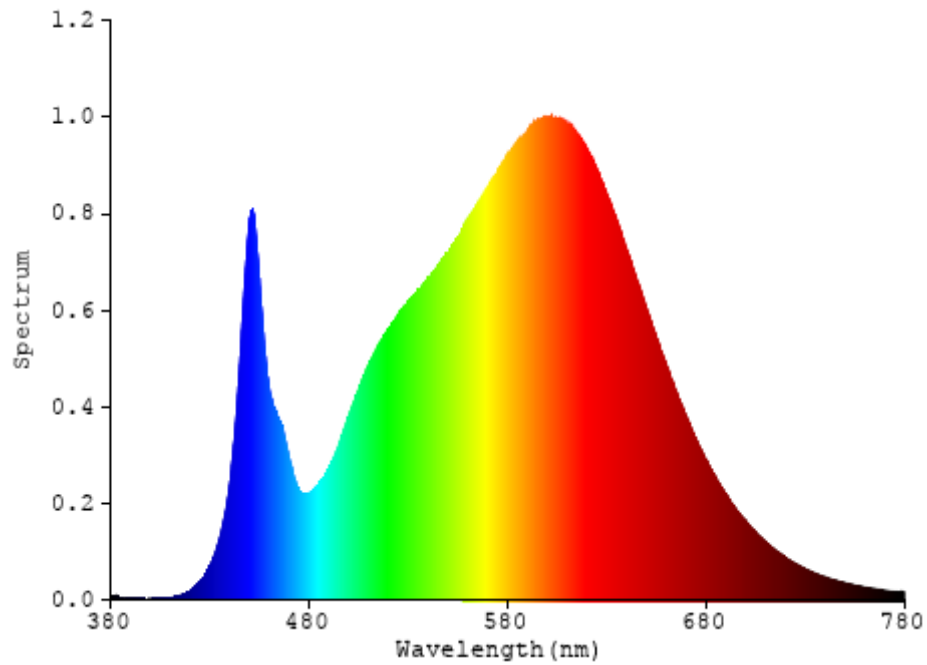


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	120.467	3.01%
10- 20	346.631	8.67%
20- 30	530.451	13.27%
30- 40	650.368	16.27%
40- 50	694.884	17.38%
50- 60	658.824	16.48%
60- 70	541.394	13.54%
70- 80	344.185	8.61%
80- 90	96.049	2.40%
90-100	1.932	0.05%
100-110	2.171	0.05%
110-120	2.478	0.06%
120-130	2.377	0.06%
130-140	1.949	0.05%
140-150	1.426	0.04%
150-160	0.898	0.02%
160-170	0.456	0.01%
170-180	0.17	0.00%
Total	3997.1	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	3001.625	75.09%
60- 90	981.628	24.56%
0-90	3983.253	99.65%
90- 180	13.857	0.35%
0- 180	3997.1	100%

Table 3: Zonal Lumen Data

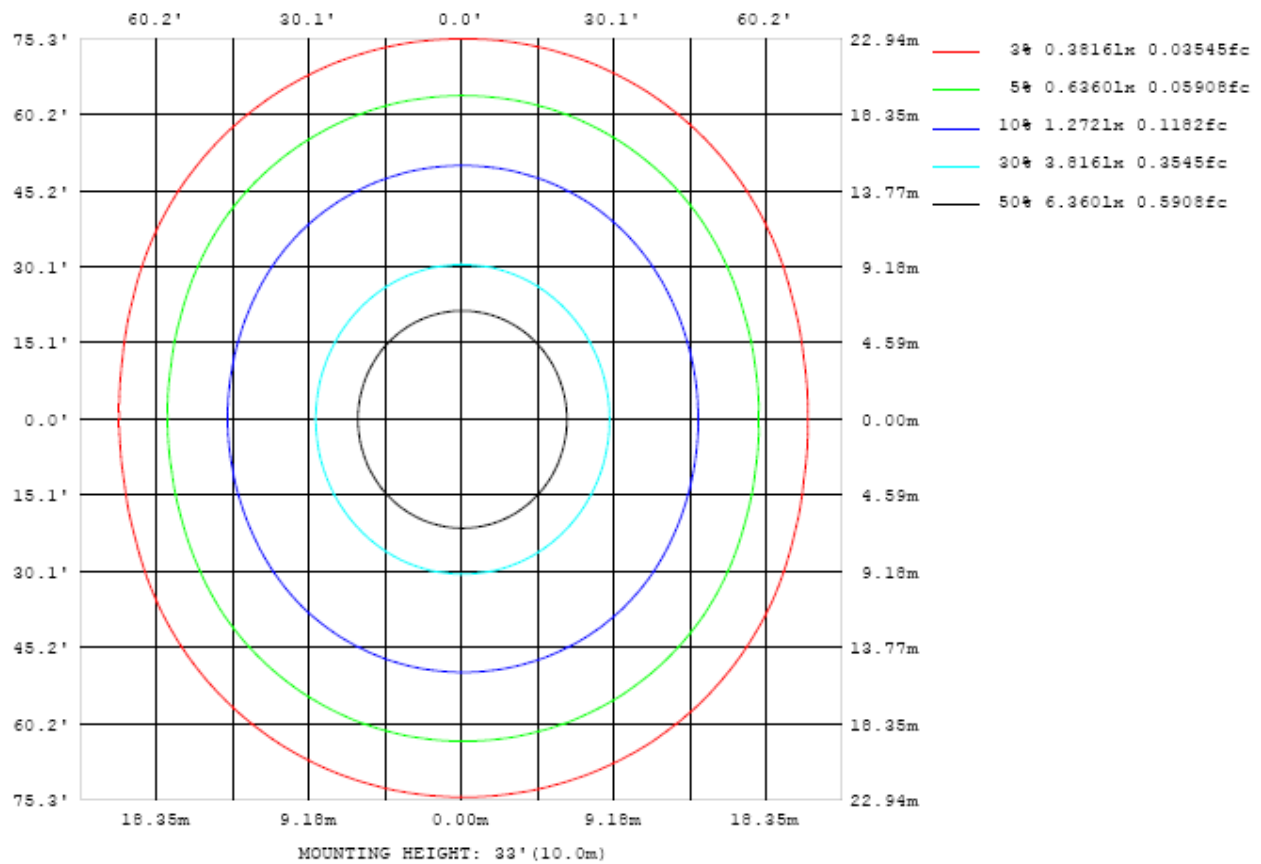


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

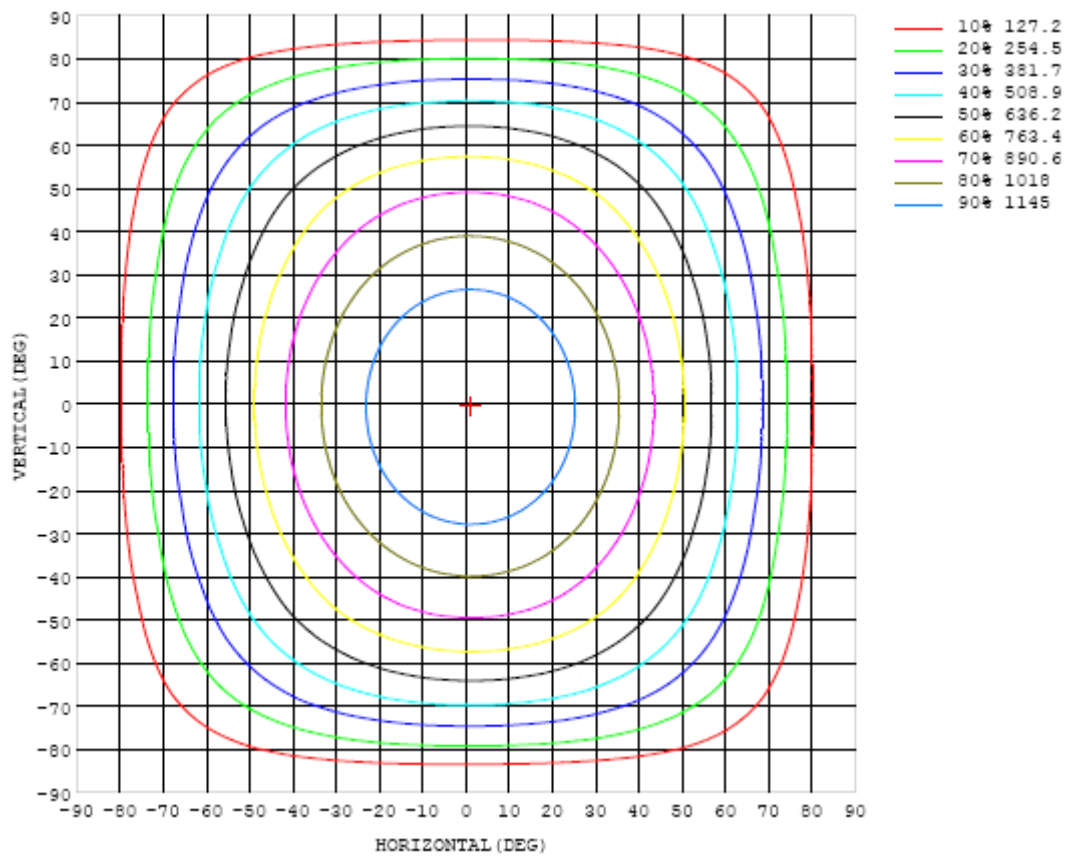


Chart 3: Isocandela Plot

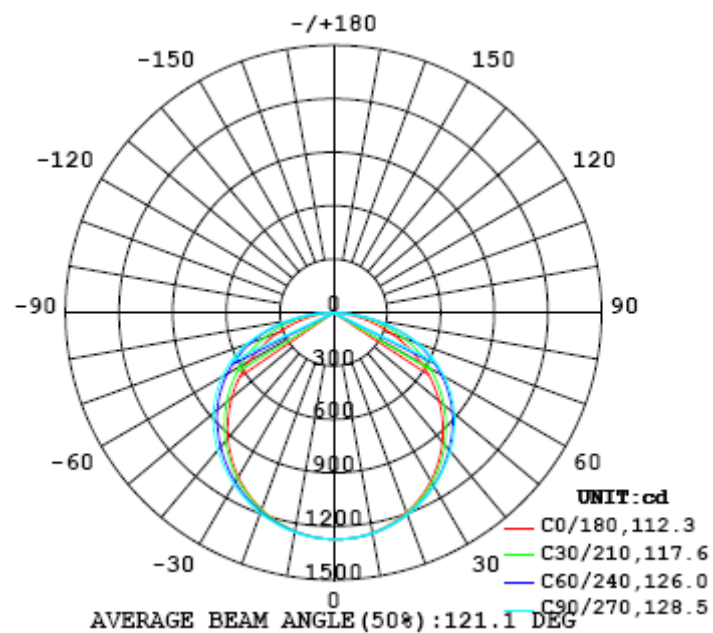


Chart 4: Polar Candela Distribution

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	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272
5	1269	1269	1269	1270	1270	1270	1270	1269	1269	1269	1269	1268	1267	1267	1266	1265	1265	1264	1264
10	1255	1255	1256	1257	1257	1258	1258	1258	1258	1257	1256	1255	1253	1252	1250	1248	1247	1246	1245
15	1230	1231	1232	1233	1235	1236	1237	1237	1237	1236	1235	1233	1230	1227	1224	1221	1219	1217	1216
20	1194	1195	1197	1200	1202	1205	1207	1208	1208	1207	1205	1202	1198	1193	1188	1184	1180	1177	1176
25	1147	1149	1152	1156	1160	1164	1168	1170	1170	1169	1167	1162	1156	1150	1143	1136	1131	1127	1125
30	1090	1092	1097	1103	1109	1115	1120	1124	1125	1124	1121	1115	1107	1098	1089	1080	1072	1068	1065
35	1023	1026	1032	1040	1049	1058	1066	1071	1074	1073	1069	1061	1051	1039	1026	1015	1005	999	997
40	948	951	958	969	981	994	1005	1013	1017	1016	1011	1002	988	973	956	942	930	922	919
45	863	867	876	891	907	925	940	950	955	954	949	938	921	902	881	862	847	838	835
50	771	776	787	806	828	850	868	879	884	883	878	866	849	826	800	776	758	747	744
55	673	678	693	717	745	769	787	798	803	803	798	786	768	746	717	687	664	650	647
60	568	574	594	624	654	679	697	710	715	715	710	698	680	657	628	594	565	549	545
65	460	467	492	526	555	580	600	612	617	616	612	601	584	560	532	499	465	444	440
70	348	357	387	421	449	473	491	499	502	502	498	491	477	457	429	398	362	336	332
75	235	248	281	311	336	354	365	370	371	371	369	365	356	341	320	293	260	230	224
80	129	144	173	195	212	224	231	233	232	231	231	230	226	217	202	184	159	130	122
85	44.1	55.9	69.3	80.2	85.6	85.8	84.8	79.5	74.3	72.5	75.3	80.9	84.8	84.6	82.2	75.2	63.3	48.1	40.5
90	1.92	2.75	2.96	3.15	3.52	3.32	3.60	3.65	3.33	3.67	3.06	3.40	3.17	3.06	2.83	2.75	2.39	1.44	0.14
95	0.25	0.90	0.93	1.71	2.06	2.23	2.44	2.53	2.43	2.34	2.43	2.58	2.38	2.17	2.04	1.73	0.81	0.71	0.31
100	0.50	1.16	1.37	2.16	2.32	2.42	2.52	2.46	2.12	2.15	2.28	2.57	2.53	2.44	2.33	2.11	1.17	0.83	0.55
105	0.85	1.21	1.43	2.49	2.79	2.82	2.94	2.91	2.63	2.58	2.67	2.96	2.91	2.75	2.77	2.49	1.33	0.94	0.84
110	1.12	1.37	1.61	2.80	3.14	3.32	3.44	3.35	3.02	2.98	3.06	3.37	3.36	3.20	3.00	2.63	1.39	1.08	1.04
115	1.28	1.51	1.59	2.74	3.28	3.60	3.80	3.72	3.48	3.46	3.48	3.71	3.70	3.45	3.10	2.54	1.41	1.06	1.20
120	1.60	1.36	1.59	2.61	3.26	3.70	3.92	3.85	3.77	3.76	3.74	3.83	3.85	3.56	3.09	2.43	1.43	1.26	1.43
125	1.54	1.49	1.65	2.47	3.11	3.61	3.86	3.88	3.90	3.92	3.89	3.88	3.79	3.49	2.97	2.32	1.54	1.54	1.48
130	1.80	1.81	1.86	2.27	2.88	3.31	3.65	3.79	3.87	3.91	3.86	3.77	3.61	3.22	2.82	2.18	1.58	1.44	1.66
135	1.77	1.89	1.50	2.26	2.62	3.05	3.31	3.50	3.63	3.69	3.63	3.49	3.29	3.04	2.58	2.19	1.09	1.69	1.83
140	1.72	1.70	0.91	2.07	2.50	2.77	3.12	3.30	3.37	3.41	3.38	3.29	3.11	2.76	2.49	2.01	1.00	1.51	1.57
145	1.58	1.67	1.37	1.88	2.42	2.68	2.80	2.92	3.04	3.11	3.02	2.90	2.80	2.69	2.29	1.34	1.90	1.75	1.77
150	1.93	1.74	1.87	1.27	2.17	2.52	2.62	2.70	2.67	2.68	2.67	2.68	2.61	2.51	2.13	1.21	1.94	1.93	2.04
155	1.81	1.72	1.89	2.13	1.34	1.66	2.31	2.48	2.44	2.41	2.45	2.48	2.27	1.57	1.27	1.91	1.54	1.61	1.69
160	1.85	1.85	1.90	2.06	2.14	1.37	1.07	1.05	1.18	1.42	1.23	1.06	1.08	1.18	1.69	1.61	1.55	1.60	1.79
165	1.87	1.90	1.92	1.80	1.78	1.88	1.99	1.82	1.30	1.12	1.29	1.79	1.99	1.61	1.20	1.11	1.24	1.35	1.52
170	1.77	1.69	1.87	1.92	1.82	1.91	1.81	1.68	1.67	1.62	1.61	1.63	1.66	1.75	1.78	1.67	1.66	1.67	1.56
175	2.02	2.07	2.09	2.08	2.06	2.01	1.91	1.71	1.75	1.63	1.59	1.55	1.78	1.83	1.81	1.81	1.79	1.77	1.79
180	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37

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	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272		
5	1264	1264	1264	1264	1264	1265	1265	1266	1266	1266	1267	1267	1267	1268	1268	1268	1269		
10	1245	1245	1246	1246	1247	1249	1250	1251	1251	1252	1253	1253	1253	1253	1254	1254	1254		
15	1216	1216	1217	1219	1221	1223	1225	1227	1229	1229	1230	1230	1230	1229	1229	1229	1229		
20	1176	1177	1179	1183	1186	1190	1193	1196	1198	1199	1199	1198	1197	1196	1194	1194	1193		
25	1125	1128	1132	1137	1143	1148	1153	1157	1159	1160	1159	1158	1155	1152	1150	1148	1147		
30	1066	1070	1076	1083	1091	1099	1105	1111	1114	1114	1113	1110	1105	1100	1096	1092	1090		
35	998	1003	1012	1022	1033	1044	1052	1059	1062	1063	1060	1055	1048	1040	1033	1027	1024		
40	922	929	940	954	969	983	994	1002	1006	1006	1002	994	984	972	962	954	949		
45	839	848	862	881	900	918	933	942	946	946	940	929	914	898	884	873	865		
50	749	761	780	804	828	849	865	875	879	878	872	860	841	820	800	784	774		
55	654	669	694	724	751	772	788	798	803	802	795	783	763	737	711	690	677		
60	554	574	605	638	665	687	704	715	719	718	711	697	677	650	618	591	574		
65	450	477	513	545	572	595	612	622	626	625	618	603	582	556	523	489	467		
70	345	378	414	444	472	492	506	513	517	517	512	500	481	453	423	385	357		
75	241	277	309	336	358	373	383	389	391	392	390	382	367	345	316	281	247		
80	142	174	199	219	235	246	252	256	257	259	259	254	243	227	205	177	143		
85	55.9	73.4	88.0	98.4	104	107	108	108	109	111	114	115	112	106	93.0	75.7	54.9		
90	0.59	0.93	2.61	3.27	3.18	2.84	3.24	2.66	2.49	2.63	3.45	3.77	3.31	2.00	1.31	0.62	0.64		
95	0.97	0.82	1.43	1.55	1.67	1.94	1.92	1.71	1.73	1.65	1.98	2.19	2.07	1.93	1.63	0.62	0.68		
100	1.19	1.15	1.74	1.85	2.00	2.01	1.86	1.53	1.44	1.53	1.87	1.97	2.06	2.03	1.86	0.87	0.86		
105	1.23	1.32	2.14	2.22	2.30	2.33	2.15	1.78	1.70	1.79	2.08	2.16	2.13	2.18	2.04	1.13	1.00		
110	1.28	1.41	2.35	2.56	2.65	2.66	2.45	2.05	1.97	2.05	2.35	2.43	2.38	2.33	2.14	1.30	1.09		
115	1.27	1.45	2.41	2.73	2.89	2.93	2.70	2.38	2.33	2.34	2.62	2.67	2.56	2.39	2.09	1.40	1.21		
120	1.24	1.51	2.38	2.76	3.00	3.06	2.82	2.63	2.58	2.57	2.73	2.81	2.69	2.45	2.07	1.51	1.60		
125	1.44	1.60	2.34	2.72	2.99	3.05	2.90	2.80	2.78	2.74	2.81	2.84	2.72	2.43	2.07	1.60	1.57		
130	1.55	1.47	2.28	2.62	2.86	2.99	2.96	2.93	2.92	2.85	2.87	2.83	2.63	2.42	2.10	1.35	1.75		
135	1.66	1.31	2.32	2.54	2.76	2.84	2.89	2.97	2.96	2.90	2.80	2.68	2.61	2.37	2.10	1.60	1.70		
140	1.29	1.18	2.19	2.50	2.67	2.82	2.82	2.83	2.81	2.79	2.75	2.69	2.51	2.40	1.78	1.42	1.64		
145	1.59	1.51	1.85	2.43	2.58	2.62	2.71	2.78	2.78	2.74	2.63	2.53	2.47	2.08	1.29	1.60	1.61		
150	1.87	1.77	1.57	2.03	2.40	2.49	2.58	2.61	2.61	2.55	2.49	2.44	2.17	1.49	1.50	1.81	1.94		
155	1.76	1.87	1.94	1.54	1.95	2.01	2.36	2.35	2.35	2.33	2.29	1.96	1.46	1.53	2.05	1.99	1.94		
160	1.76	1.72	1.81	1.88	1.36	1.24	1.48	1.90	1.89	1.90	1.43	1.29	1.51	2.07	2.06	2.02	2.08		
165	1.55	1.55	1.48	1.43	1.76	1.95	1.43	1.36	1.35	1.27	1.39	1.91	2.02	1.93	2.00	2.06	2.03		
170	1.64	1.77	1.83	1.93	1.75	1.56	1.71	1.57	1.58	1.47	1.53	1.65	1.77	1.90	1.94	1.92	1.83		
175	1.80	1.79	1.78	1.75	1.70	1.72	1.67	1.54	1.56	1.57	1.62	1.64	1.66	1.66	1.75	1.89	1.97		
180	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37		

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° 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.

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