



LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

2x2' Troffer

Model: 25TROFKIT22DIM/850/277V

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17010017p

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: **25TROFKIT22DIM/850/277V**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
137.3	3289.9	23.96	0.9923
CCT (K)	CRI	Stabilization Time (Light & Power)	
4877	83.7	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. 13, 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 2x2

Equipment Under Test (EUT)

Name	: 2x2' Troffer
Model	: 25TROFKIT22DIM/850/277V
Electrical Ratings	: 120-277V, 60Hz
Product Description	: 5000K, Frosted Lens, CRI80
Manufacturer	: GREEN CREATIVE LTD
Address	: 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)	0.201	0.091
Power Factor	0.9923	0.9361
Test Power (W)	23.96	23.59
THD A%	9.76	10.72
Luminous Efficacy (lm/W)	137.3	139.5
Total Luminous Flux (lm)	3289.9	3290.6
Color Rendering Index (CRI)	83.7	
R9	16	
Correlated Color Temperature (CCT) (K)	4877	
Chromaticity (Chroma x, Chroma y)	(0.3494, 0.3607)	
Chromaticity (Chroma u, Chroma v)	(0.2108, 0.3265)	
Chromaticity (Chroma u', Chroma v')	(0.2108, 0.4897)	
Duv	0.0029	
Average Beam Angle (°)	118.0	
Center Beam Candle Power (cd)	1089	
Spacing Criteria	1.21 (0°-180°)/ 1.31 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	76.14%	
Zonal Lumens in the 60°-90°Zone	23.60%	
Zonal Lumens in the 90°-120°Zone	0.12%	
Zonal Lumens in the 120°-180°Zone	0.15%	

Special Color Rendering Indices	
R1	82
R2	88
R3	92
R4	83
R5	82
R6	83
R7	89
R8	70
R9	16
R10	71
R11	81
R12	56
R13	84
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

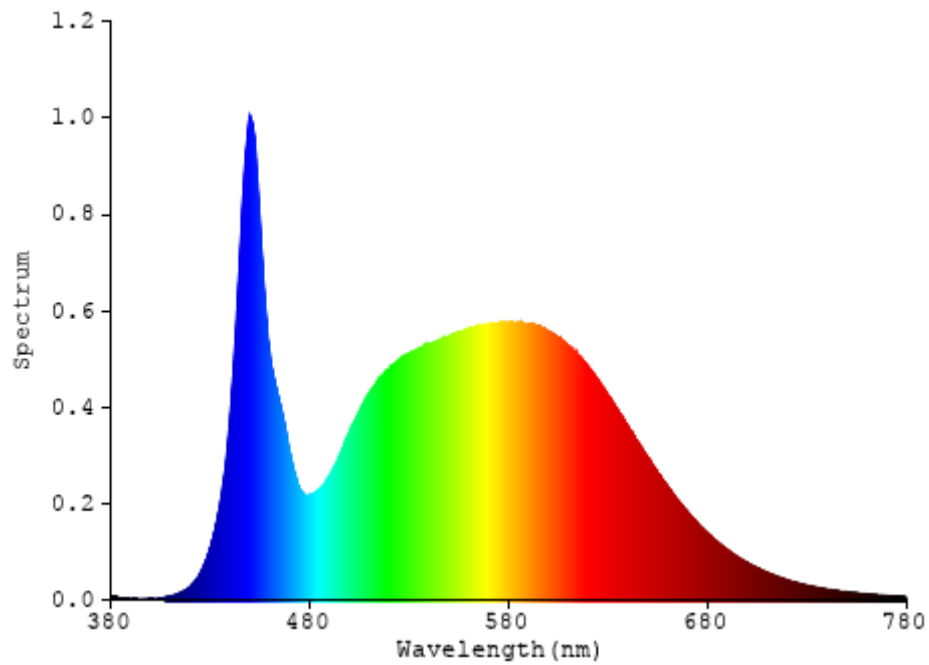


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	103.083	3.13%
10- 20	295.428	8.98%
20- 30	448.709	13.64%
30- 40	544.57	16.55%
40- 50	574.854	17.47%
50- 60	538.247	16.36%
60- 70	436.024	13.25%
70- 80	270.17	8.21%
80- 90	70.14	2.13%
90-100	1.117	0.03%
100-110	1.262	0.04%
110-120	1.46	0.04%
120-130	1.433	0.04%
130-140	1.272	0.04%
140-150	0.992	0.03%
150-160	0.668	0.02%
160-170	0.369	0.01%
170-180	0.122	0.00%
Total	3289.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2504.891	76.14%
60- 90	776.334	23.60%
0-90	3281.225	99.74%
90- 180	8.695	0.26%
0- 180	3289.9	100%

Table 3: Zonal Lumen Data

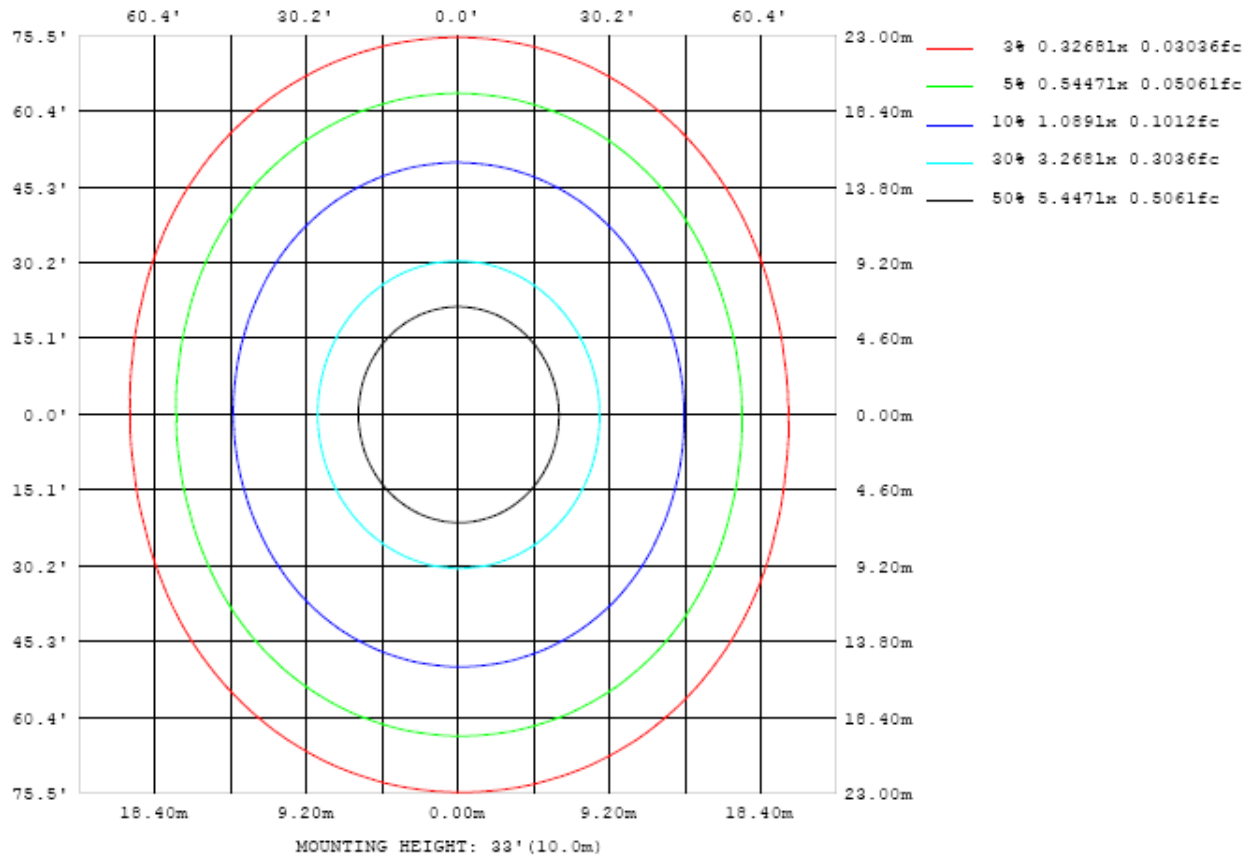


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

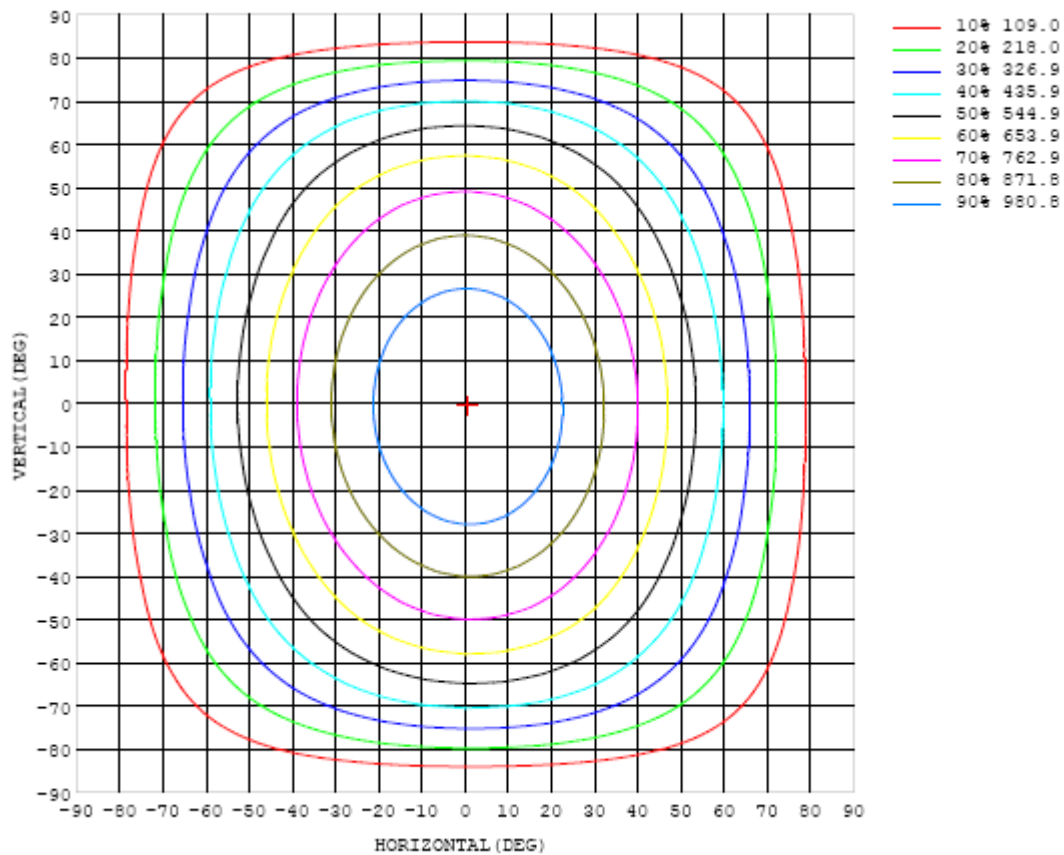


Chart 3: Isocandela Plot

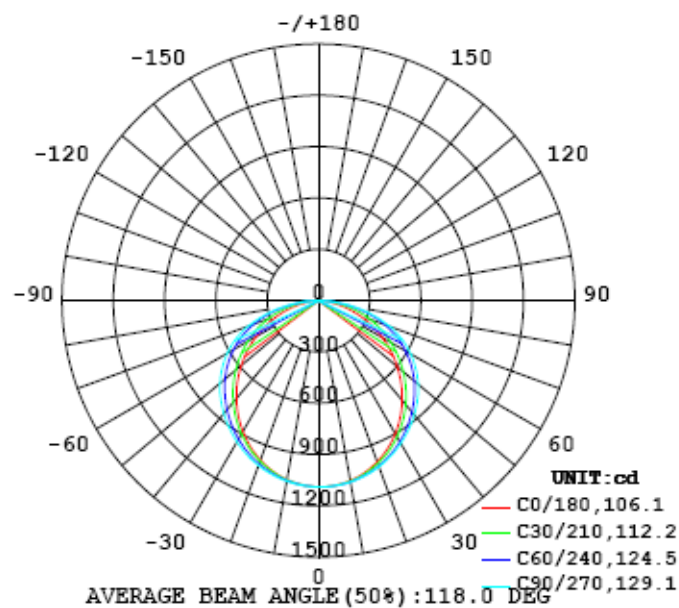


Chart 4: Polar Candela Distribution

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	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089
5	1085	1085	1086	1086	1087	1087	1087	1087	1087	1087	1087	1086	1085	1085	1084	1083	1083	1082	1082
10	1069	1070	1071	1073	1074	1075	1076	1077	1077	1077	1076	1075	1073	1071	1069	1067	1065	1064	1063
15	1042	1043	1046	1048	1051	1054	1057	1059	1059	1059	1058	1055	1051	1047	1043	1040	1036	1034	1033
20	1004	1006	1010	1014	1020	1025	1030	1033	1035	1034	1032	1028	1022	1015	1009	1003	998	994	993
25	956	958	964	971	979	987	995	1000	1003	1002	999	993	985	975	965	956	949	945	943
30	899	902	910	919	930	942	952	960	964	964	960	952	940	927	914	902	893	887	885
35	834	838	847	860	875	890	904	914	920	920	915	904	889	872	856	841	829	821	819
40	762	767	779	795	813	832	850	864	871	872	865	851	833	812	792	773	759	750	747
45	684	690	703	723	747	770	792	809	818	819	812	796	774	748	723	701	684	674	671
50	602	609	624	647	676	705	731	750	760	761	753	735	711	681	651	625	604	593	590
55	517	524	542	569	603	636	663	683	694	695	687	668	642	611	577	545	522	509	506
60	430	438	458	489	525	559	588	609	621	622	613	594	567	535	499	465	438	423	420
65	342	351	374	408	442	476	506	528	539	541	532	513	486	452	418	383	354	337	334
70	254	265	290	322	355	387	414	434	443	444	437	421	396	365	333	300	270	251	248
75	169	180	206	234	262	288	309	325	331	331	326	314	295	271	244	215	188	168	165
80	91.6	102	122	144	164	182	196	207	210	211	208	200	186	169	150	130	109	92.0	88.9
85	30.8	35.6	45.5	56.4	65.2	71.6	77.6	82.2	83.5	83.2	82.5	78.8	73.4	66.8	58.9	49.0	37.9	30.6	29.2
90	0.19	0.22	1.57	1.52	1.25	0.94	1.14	0.55	0.14	0.13	0.27	0.84	1.02	1.38	1.17	1.10	0.42	0.18	0.12
95	0.16	0.15	0.45	0.51	0.63	0.68	0.63	0.36	0.18	0.17	0.22	0.44	0.38	0.67	0.61	0.47	0.36	0.34	0.25
100	0.30	0.23	0.42	0.52	0.58	0.54	0.41	0.34	0.26	0.25	0.28	0.40	0.51	0.58	0.52	0.44	0.42	0.38	0.42
105	0.45	0.31	0.48	0.53	0.52	0.48	0.45	0.40	0.34	0.32	0.34	0.44	0.54	0.63	0.58	0.49	0.46	0.45	0.63
110	0.64	0.36	0.54	0.58	0.61	0.60	0.56	0.52	0.45	0.45	0.46	0.51	0.61	0.68	0.71	0.64	0.58	0.55	0.79
115	0.74	0.44	0.71	0.75	0.74	0.71	0.68	0.67	0.59	0.60	0.61	0.62	0.67	0.76	0.79	0.77	0.70	0.67	0.87
120	1.00	0.47	0.81	0.86	0.85	0.83	0.80	0.76	0.71	0.71	0.66	0.62	0.75	0.86	0.89	0.83	0.83	0.84	0.88
125	0.89	0.83	0.93	0.94	0.95	0.96	0.94	0.90	0.85	0.85	0.77	0.73	0.85	0.96	0.94	0.94	0.94	0.87	1.02
130	1.02	0.77	1.03	1.00	1.00	1.01	1.06	1.03	0.98	0.90	0.82	0.82	0.92	1.00	1.07	1.05	0.67	0.71	1.24
135	1.15	1.00	0.67	1.13	1.05	1.09	1.05	1.04	1.05	0.98	0.84	0.81	0.92	1.13	1.09	1.14	0.87	1.04	1.52
140	1.44	1.06	1.07	1.12	1.16	1.14	1.20	1.14	1.00	0.98	0.86	0.94	1.09	1.17	1.18	0.70	1.12	1.09	1.50
145	1.20	1.02	1.15	0.76	1.22	1.27	1.18	1.15	1.07	1.07	1.12	1.12	1.15	1.31	1.24	0.76	1.13	1.17	1.31
150	1.32	1.09	0.84	0.86	0.77	1.18	1.17	1.09	1.17	1.05	1.12	1.19	1.14	1.19	0.82	1.27	1.19	1.33	1.40
155	1.34	1.13	1.02	1.20	1.11	0.70	0.68	1.14	1.12	1.13	1.15	1.07	0.77	0.84	1.13	1.22	1.17	1.35	1.54
160	1.40	1.33	1.25	1.12	1.14	1.07	0.94	0.76	0.72	0.70	0.77	0.80	1.02	0.92	0.84	0.92	1.10	1.29	1.71
165	1.47	1.39	1.33	1.24	1.13	1.16	1.13	1.09	1.16	1.10	1.19	1.20	1.03	0.86	0.84	1.05	1.14	1.15	1.47
170	1.43	1.33	1.33	1.34	1.28	1.14	1.05	1.06	1.06	1.07	0.99	1.04	0.97	1.00	0.92	0.98	1.11	1.29	1.50
175	1.27	1.27	1.24	1.19	1.18	1.19	1.17	1.19	1.23	1.25	1.24	1.24	1.18	1.14	1.09	1.06	1.05	1.12	1.16
180	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11

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	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089	1089		
5	1082	1082	1082	1082	1083	1083	1084	1084	1084	1085	1085	1085	1085	1085	1085	1085	1085		
10	1063	1064	1065	1066	1067	1069	1070	1071	1072	1072	1072	1071	1071	1070	1069	1069	1069		
15	1034	1035	1037	1040	1044	1047	1049	1051	1053	1052	1051	1050	1048	1045	1043	1042	1042		
20	994	996	1000	1006	1012	1017	1021	1024	1026	1026	1024	1020	1016	1012	1008	1005	1004		
25	944	948	955	963	972	980	987	991	993	992	989	983	976	969	963	958	956		
30	887	893	902	913	925	936	945	951	954	952	947	939	929	919	910	903	899		
35	822	830	841	856	872	887	899	907	910	907	900	889	875	861	849	839	834		
40	751	761	776	794	814	833	848	858	862	858	848	834	816	798	782	770	763		
45	676	688	705	728	753	775	794	806	810	806	793	775	752	730	709	694	685		
50	596	610	632	659	688	714	735	749	753	748	734	712	685	657	632	613	603		
55	513	530	556	588	620	647	669	684	688	682	668	644	615	582	553	531	519		
60	428	448	478	512	545	574	597	612	617	610	594	569	538	504	472	446	433		
65	343	365	398	431	464	493	516	531	534	529	513	487	456	423	390	361	345		
70	258	283	314	345	376	402	422	433	437	433	420	396	368	337	306	276	258		
75	176	200	227	253	277	297	313	321	324	321	311	293	272	247	219	193	174		
80	98.6	118	138	155	172	186	197	202	204	203	196	185	170	152	133	112	96.0		
85	33.0	41.0	49.8	57.6	63.8	69.3	74.4	75.4	76.5	78.5	76.6	72.3	66.7	59.0	49.6	39.7	32.5		
90	0.29	1.13	1.90	2.41	2.71	3.23	3.80	3.72	3.93	4.05	3.48	3.25	2.67	2.39	1.67	0.78	0.24		
95	0.37	0.96	1.30	1.58	1.86	2.07	2.00	2.02	2.05	2.03	2.23	2.15	1.85	1.52	1.19	0.91	0.43		
100	0.47	1.28	1.58	1.93	2.26	2.41	2.03	1.73	1.77	1.79	2.31	2.40	2.13	1.77	1.48	1.08	0.52		
105	0.59	1.51	1.91	2.28	2.63	2.77	2.34	2.11	2.16	2.14	2.68	2.75	2.49	2.15	1.80	1.31	0.65		
110	0.70	1.58	2.08	2.54	2.90	3.04	2.58	2.42	2.47	2.45	2.88	3.01	2.77	2.41	1.94	1.35	0.80		
115	0.80	1.61	2.14	2.63	3.03	3.15	2.73	2.75	2.80	2.75	2.97	3.18	2.91	2.48	1.98	1.38	0.98		
120	0.69	1.63	2.15	2.64	3.05	3.05	2.89	2.99	3.04	2.97	2.98	3.12	2.91	2.47	1.98	1.38	1.22		
125	0.77	1.55	2.13	2.61	2.89	2.93	2.97	3.12	3.15	3.08	2.98	2.96	2.81	2.41	1.86	1.56	1.13		
130	1.30	1.75	1.93	2.47	2.72	2.88	3.02	3.17	3.19	3.12	2.99	2.83	2.63	2.31	1.81	0.76	1.17		
135	1.67	1.79	2.00	2.28	2.61	2.80	2.98	3.10	3.12	3.08	2.92	2.75	2.52	2.11	2.03	1.06	1.06		
140	1.46	1.04	2.12	2.13	2.40	2.74	2.89	2.97	2.99	2.95	2.81	2.65	2.27	2.21	1.94	1.71	1.39		
145	1.06	1.21	1.99	2.32	2.33	2.45	2.61	2.78	2.82	2.72	2.51	2.38	2.28	2.12	1.06	1.36	1.12		
150	1.27	1.85	1.18	2.18	2.32	2.34	2.45	2.43	2.44	2.41	2.51	2.41	2.33	1.15	1.03	1.61	1.50		
155	1.59	1.96	1.83	1.07	1.90	2.15	2.35	2.37	2.43	2.41	2.36	2.16	1.22	1.20	1.94	1.66	1.57		
160	1.71	1.54	1.84	1.73	1.18	1.01	1.13	1.87	2.06	1.78	1.20	1.09	1.11	1.86	1.97	1.62	1.57		
165	1.52	1.62	1.65	1.83	2.04	1.79	1.25	1.05	1.13	1.15	1.28	1.71	1.62	1.62	1.36	1.29	1.51		
170	1.51	1.51	1.38	1.51	1.61	1.67	1.66	1.56	1.41	1.37	1.55	1.61	1.60	1.57	1.51	1.46	1.56		
175	1.18	1.21	1.23	1.24	1.27	1.35	1.37	1.39	1.30	1.20	1.23	1.30	1.33	1.38	1.52	1.50	1.32		
180	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11		

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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