



LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

2x2' Troffer

Model: 25TROFKIT22DIM/840/277V

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.: HZ170100170

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/840/277V**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
136.5	3250.7	23.82	0.9923
CCT (K)	CRI	Stabilization Time (Light & Power)	
3811	84.3	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/840/277V
Electrical Ratings	: 120-277V, 60Hz
Product Description	: 4000K, 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)	0.200	0.091
Power Factor	0.9923	0.9353
Test Power (W)	23.82	23.45
THD A%	9.70	11.77
Luminous Efficacy (lm/W)	136.5	138.7
Total Luminous Flux (lm)	3250.7	3251.8
Color Rendering Index (CRI)	84.3	
R9	17	
Correlated Color Temperature (CCT) (K)	3811	
Chromaticity (Chroma x, Chroma y)	(0.3915, 0.3895)	
Chromaticity (Chroma u, Chroma v)	(0.2272, 0.3391)	
Chromaticity (Chroma u', Chroma v')	(0.2272, 0.5087)	
Duv	0.0028	
Average Beam Angle (°)	117.6	
Center Beam Candle Power (cd)	1080	
Spacing Criteria	1.21 (0°-180°)/ 1.31 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	76.22%	
Zonal Lumens in the 60°-90°Zone	23.52%	
Zonal Lumens in the 90°-120°Zone	0.12%	
Zonal Lumens in the 120°-180°Zone	0.14%	

Special Color Rendering Indices	
R1	83
R2	90
R3	96
R4	83
R5	82
R6	86
R7	88
R8	67
R9	17
R10	76
R11	82
R12	61
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

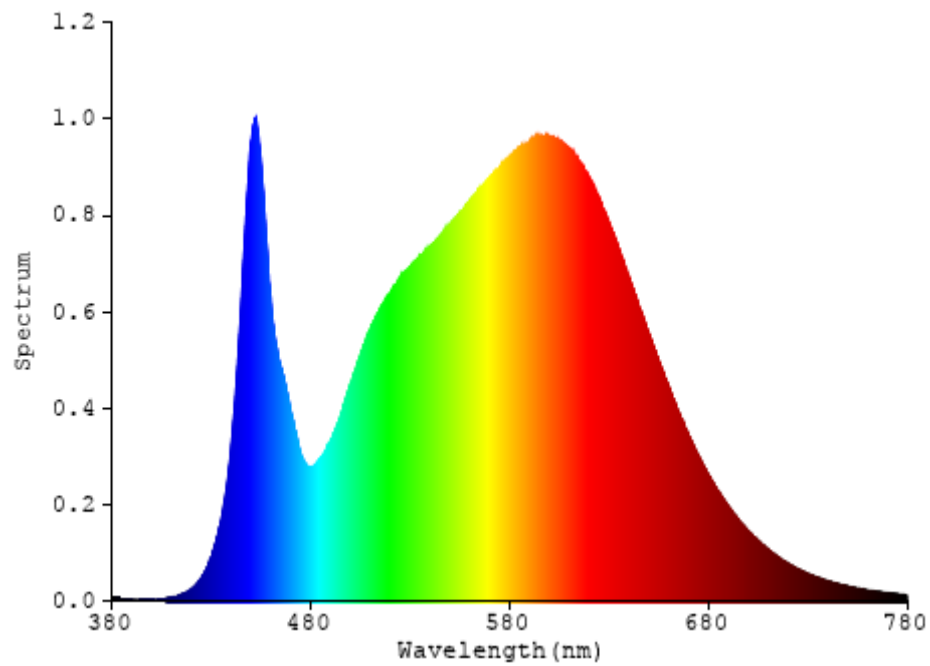


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	102.21	3.14%
10- 20	292.884	9.01%
20- 30	444.588	13.68%
30- 40	538.893	16.58%
40- 50	567.959	17.47%
50- 60	531.045	16.34%
60- 70	429.592	13.22%
70- 80	265.817	8.18%
80- 90	69.239	2.13%
90-100	1.086	0.03%
100-110	1.251	0.04%
110-120	1.413	0.04%
120-130	1.373	0.04%
130-140	1.224	0.04%
140-150	0.956	0.03%
150-160	0.653	0.02%
160-170	0.364	0.01%
170-180	0.12	0.00%
Total	3250.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2477.579	76.22%
60- 90	764.648	23.52%
0-90	3242.227	99.74%
90- 180	8.44	0.26%
0- 180	3250.7	100%

Table 3: Zonal Lumen Data

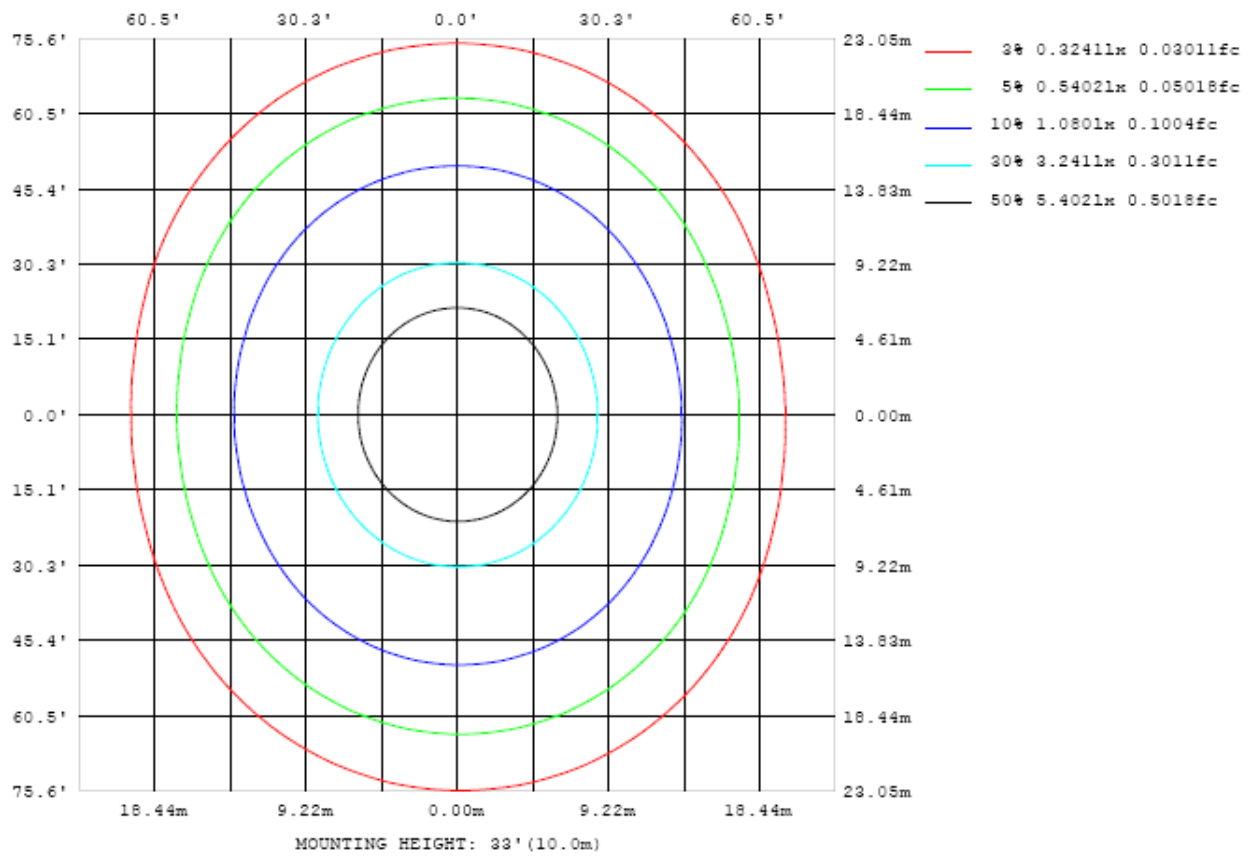


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

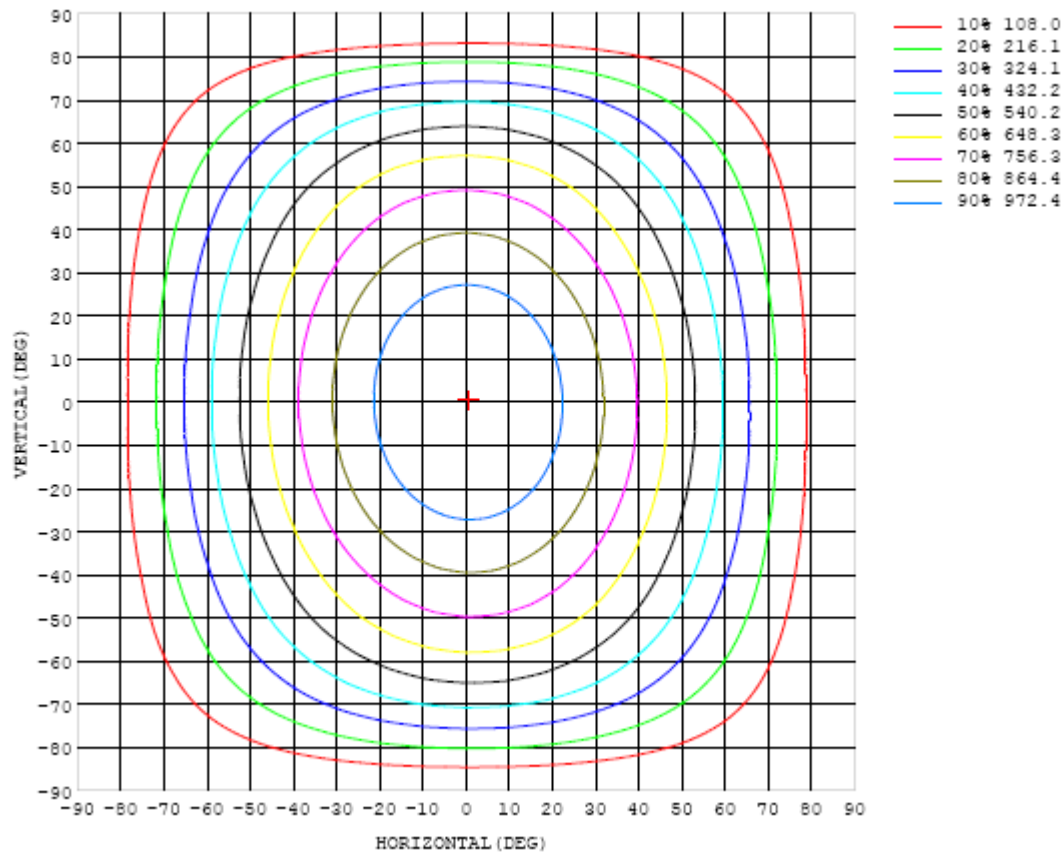


Chart 3: Isocandela Plot

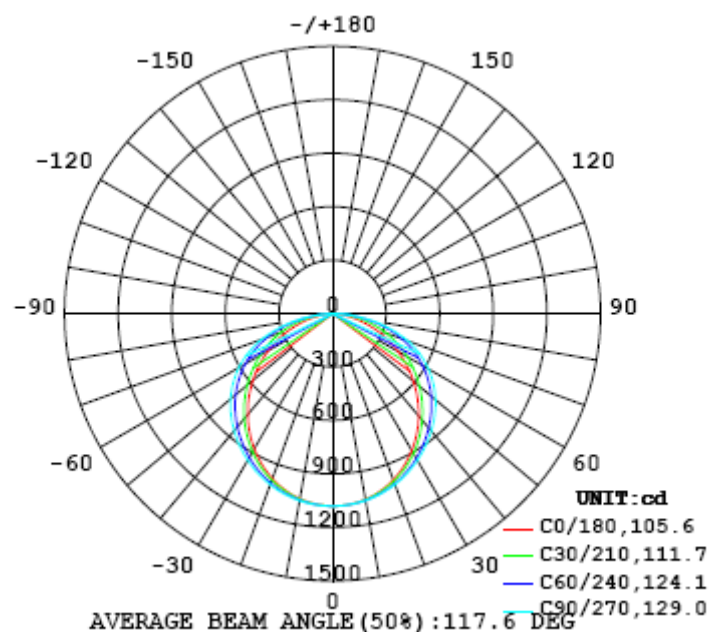


Chart 4: Polar Candela Distribution

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	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080
5	1075	1076	1076	1076	1076	1076	1076	1076	1076	1076	1076	1076	1075	1075	1074	1074	1073	1073	1073
10	1059	1060	1060	1061	1062	1063	1064	1065	1065	1065	1064	1063	1062	1060	1059	1057	1056	1055	1055
15	1032	1032	1034	1036	1039	1041	1044	1045	1046	1046	1045	1042	1040	1036	1033	1030	1027	1026	1026
20	993	995	997	1001	1006	1012	1016	1019	1021	1021	1018	1015	1010	1004	998	992	989	986	986
25	945	947	951	958	966	974	981	986	988	989	985	980	973	964	955	946	940	936	935
30	887	890	896	906	917	928	938	946	950	950	946	939	929	916	903	892	883	878	877
35	822	826	834	846	861	877	890	900	906	907	902	892	878	862	846	830	819	812	811
40	750	755	765	781	800	819	837	851	859	860	853	841	823	803	782	763	750	741	739
45	672	678	691	710	734	758	781	798	807	809	801	786	764	739	714	692	675	665	663
50	591	598	613	636	664	694	720	740	751	753	745	727	703	673	643	617	597	585	582
55	507	515	533	559	592	626	654	675	687	689	681	662	636	604	570	539	516	503	499
60	422	431	451	481	517	551	581	604	617	619	610	590	563	531	495	461	434	419	414
65	336	346	369	402	437	471	502	525	539	541	532	512	484	451	416	381	351	334	329
70	249	261	286	318	351	384	412	435	447	448	441	422	397	366	333	300	269	249	244
75	166	178	204	232	261	288	311	328	337	338	332	319	299	274	246	217	188	168	162
80	89.7	101	122	145	165	185	201	214	221	222	217	208	193	175	154	133	110	92.4	87.8
85	30.1	35.7	47.2	58.5	68.9	78.9	86.8	92.8	96.4	96.7	95.0	90.2	83.4	74.5	64.2	52.5	40.2	31.6	29.1
90	0.14	0.20	2.06	2.55	2.61	2.10	1.59	0.70	0.22	0.19	0.37	2.79	1.74	2.16	2.61	1.98	0.45	0.18	0.12
95	0.16	0.15	0.45	0.53	0.67	0.71	0.66	0.36	0.17	0.16	0.23	0.34	0.48	0.62	0.69	0.48	0.35	0.28	0.24
100	0.30	0.22	0.43	0.52	0.56	0.53	0.38	0.33	0.25	0.22	0.26	0.38	0.52	0.68	0.66	0.55	0.37	0.35	0.41
105	0.44	0.30	0.47	0.52	0.50	0.45	0.43	0.40	0.32	0.30	0.31	0.41	0.49	0.53	0.69	0.61	0.51	0.42	0.62
110	0.62	0.35	0.53	0.56	0.58	0.58	0.55	0.50	0.42	0.42	0.43	0.49	0.57	0.63	0.62	0.64	0.59	0.54	0.79
115	0.71	0.41	0.65	0.72	0.71	0.70	0.67	0.64	0.57	0.57	0.58	0.61	0.66	0.73	0.75	0.73	0.70	0.65	0.86
120	0.94	0.47	0.78	0.82	0.82	0.80	0.76	0.73	0.68	0.68	0.69	0.69	0.68	0.72	0.86	0.80	0.81	0.83	0.87
125	0.88	0.81	0.90	0.90	0.92	0.92	0.90	0.85	0.81	0.81	0.82	0.78	0.71	0.83	0.90	0.92	0.91	0.75	0.85
130	0.95	0.73	0.85	0.96	0.96	0.98	1.02	0.99	0.94	0.94	0.92	0.90	0.83	0.87	0.94	1.03	0.65	0.67	1.17
135	1.12	0.97	0.66	1.11	1.02	1.06	1.02	1.01	1.03	1.05	0.94	0.92	0.78	0.99	0.89	1.10	1.04	1.00	1.51
140	1.41	1.04	1.09	0.92	1.16	1.12	1.16	1.10	1.06	1.07	0.98	0.98	0.91	1.04	0.90	0.68	1.10	1.20	1.49
145	1.16	1.01	1.12	0.74	1.22	1.25	1.16	1.13	1.15	1.08	1.04	0.97	0.98	1.14	0.96	0.75	1.06	1.15	1.30
150	1.28	1.08	0.80	0.90	0.76	1.18	1.15	1.17	1.16	1.07	1.18	1.15	1.07	0.98	0.79	1.19	1.15	1.32	1.40
155	1.27	1.17	1.06	1.16	1.14	0.67	0.66	1.07	1.08	1.18	1.13	1.00	0.74	0.79	1.19	1.16	1.13	1.31	1.54
160	1.36	1.32	1.27	1.11	1.11	1.17	1.00	0.73	0.70	0.69	0.75	0.77	1.03	0.91	0.82	0.91	1.12	1.29	1.73
165	1.41	1.38	1.35	1.32	1.16	1.05	1.13	1.18	1.16	1.08	1.15	1.18	1.08	0.84	0.82	1.12	1.10	1.07	1.40
170	1.33	1.33	1.40	1.41	1.35	1.24	1.14	1.07	1.10	1.06	0.96	1.06	1.06	0.99	0.90	1.04	1.11	1.27	1.43
175	1.20	1.19	1.19	1.30	1.32	1.25	1.20	1.26	1.34	1.25	1.19	1.20	1.18	1.15	1.09	1.01	1.03	1.05	1.16
180	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08

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	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080		
5	1074	1074	1074	1075	1075	1076	1076	1077	1077	1077	1077	1077	1077	1077	1076	1076	1076	1075	
10	1056	1057	1058	1060	1061	1063	1064	1065	1066	1066	1065	1065	1064	1062	1061	1060	1059		
15	1027	1029	1031	1035	1039	1042	1044	1046	1047	1047	1046	1044	1041	1039	1036	1033	1032		
20	987	991	995	1001	1007	1013	1017	1020	1022	1021	1019	1015	1010	1005	1000	996	994		
25	938	943	950	959	968	976	983	987	989	988	984	978	970	962	955	949	946		
30	880	887	896	909	921	933	942	948	950	948	943	934	923	912	901	893	888		
35	815	823	836	851	868	883	896	903	906	903	895	883	869	854	840	830	823		
40	743	754	769	789	810	829	845	854	858	854	843	828	809	790	772	759	751		
45	667	680	698	721	747	771	790	801	805	800	787	768	744	720	699	683	674		
50	588	601	624	652	681	709	730	742	746	741	727	704	676	648	622	603	593		
55	505	522	547	579	612	640	663	676	680	674	659	635	605	572	543	521	509		
60	421	440	469	502	535	564	587	601	606	600	584	559	528	495	462	437	424		
65	337	358	389	421	452	482	505	518	522	516	501	475	445	412	380	353	338		
70	253	276	305	334	363	390	409	420	423	420	407	384	356	326	297	269	252		
75	172	194	218	243	265	284	298	306	309	307	298	282	261	237	211	186	169		
80	95.7	113	131	146	161	172	181	186	188	188	182	173	159	144	126	107	92.7		
85	31.8	38.1	44.7	49.8	53.8	55.8	55.9	55.7	57.0	59.3	61.3	61.2	57.8	52.3	44.9	36.8	30.9		
90	0.29	1.03	1.57	1.84	2.24	2.42	2.92	2.71	2.73	2.94	2.72	2.75	2.30	2.02	1.52	0.80	0.22		
95	0.37	0.95	1.28	1.55	1.81	2.05	1.96	1.90	1.94	1.91	2.15	2.07	1.77	1.47	1.16	0.88	0.42		
100	0.46	1.26	1.56	1.91	2.27	2.45	2.06	1.76	1.79	1.81	2.30	2.36	2.09	1.76	1.44	1.05	0.49		
105	0.57	1.44	1.86	2.27	2.64	2.79	2.38	2.14	2.20	2.18	2.66	2.72	2.46	2.09	1.73	1.28	0.62		
110	0.68	1.50	2.01	2.48	2.87	3.02	2.56	2.43	2.49	2.47	2.85	2.96	2.71	2.31	1.85	1.31	0.77		
115	0.81	1.50	2.04	2.52	2.93	3.07	2.68	2.73	2.78	2.74	2.93	3.08	2.79	2.38	1.87	1.33	0.94		
120	0.78	1.51	2.01	2.50	2.92	2.93	2.81	2.92	2.97	2.92	2.91	3.01	2.78	2.34	1.85	1.29	1.16		
125	0.71	1.43	1.97	2.44	2.74	2.81	2.89	3.04	3.08	3.02	2.93	2.85	2.66	2.26	1.76	1.51	1.12		
130	1.05	1.67	1.78	2.31	2.56	2.76	2.92	3.06	3.10	3.05	2.92	2.73	2.50	2.16	1.68	0.85	1.18		
135	1.61	1.71	1.85	2.18	2.47	2.67	2.86	2.98	3.01	2.98	2.82	2.65	2.41	1.98	1.94	0.99	1.05		
140	1.48	1.03	2.03	2.02	2.27	2.60	2.76	2.84	2.86	2.82	2.70	2.54	2.16	2.10	1.86	1.43	1.35		
145	1.18	1.16	1.90	2.25	2.21	2.31	2.47	2.64	2.68	2.58	2.37	2.26	2.19	1.96	0.98	1.41	1.05		
150	1.19	1.83	1.17	2.09	2.25	2.25	2.33	2.30	2.30	2.28	2.40	2.31	2.23	1.30	1.01	1.60	1.43		
155	1.51	1.91	1.57	1.07	1.88	2.08	2.27	2.28	2.34	2.33	2.28	2.07	1.31	1.24	1.94	1.59	1.52		
160	1.63	1.47	1.77	1.67	1.20	1.03	1.18	1.94	2.03	1.94	1.25	1.11	1.16	1.85	1.91	1.53	1.40		
165	1.46	1.56	1.60	1.82	2.00	1.78	1.07	1.02	1.12	1.16	1.21	1.71	1.64	1.62	1.30	1.29	1.33		
170	1.44	1.47	1.26	1.42	1.56	1.63	1.60	1.57	1.40	1.34	1.49	1.55	1.55	1.54	1.50	1.49	1.64		
175	1.18	1.22	1.23	1.21	1.21	1.24	1.31	1.38	1.28	1.19	1.19	1.21	1.28	1.34	1.41	1.36	1.19		
180	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08		

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.

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