



LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

2x2' Troffer

Model: 25TROFKIT22DIM/830/277V

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17010017m

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/830/277V**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
131.8	3135.2	23.78	0.9923
CCT (K)	CRI	Stabilization Time (Light & Power)	
2984	83.8	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. 12, 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/830/277V
Electrical Ratings	: 120-277V, 60Hz
Product Description	: 3000K, 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)	0.200	0.090
Power Factor	0.9923	0.9352
Test Power (W)	23.78	23.42
THD A%	9.77	11.58
Luminous Efficacy (lm/W)	131.8	133.9
Total Luminous Flux (lm)	3135.2	3137.0
Color Rendering Index (CRI)	83.8	
R9	14	
Correlated Color Temperature (CCT) (K)	2984	
Chromaticity (Chroma x, Chroma y)	(0.4392, 0.4066)	
Chromaticity (Chroma u, Chroma v)	(0.2509, 0.3485)	
Chromaticity (Chroma u', Chroma v')	(0.2509, 0.5227)	
Duv	0.0007	
Average Beam Angle (°)	117.1	
Center Beam Candle Power (cd)	1043	
Spacing Criteria	1.21 (0°-180°)/ 1.29 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	76.25%	
Zonal Lumens in the 60°-90°Zone	23.49%	
Zonal Lumens in the 90°-120°Zone	0.11%	
Zonal Lumens in the 120°-180°Zone	0.15%	

Special Color Rendering Indices	
R1	82
R2	91
R3	97
R4	82
R5	82
R6	89
R7	85
R8	62
R9	14
R10	79
R11	82
R12	70
R13	84
R14	99

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

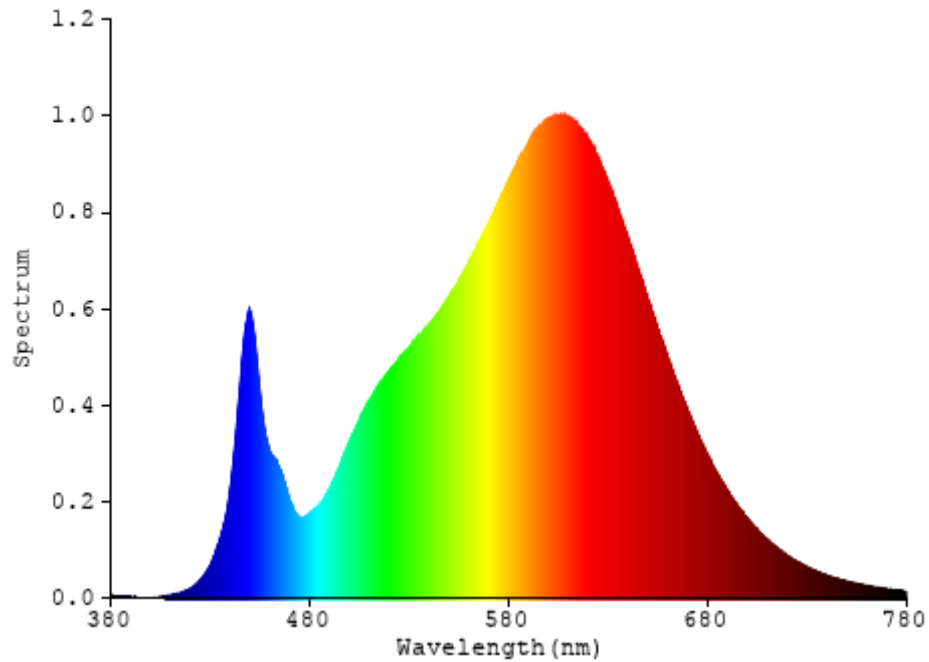


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	98.72	3.15%
10- 20	282.839	9.02%
20- 30	429.143	13.69%
30- 40	519.939	16.58%
40- 50	547.781	17.47%
50- 60	512.01	16.33%
60- 70	414.085	13.21%
70- 80	256.149	8.17%
80- 90	66.272	2.11%
90-100	1.059	0.03%
100-110	1.177	0.04%
110-120	1.367	0.04%
120-130	1.364	0.04%
130-140	1.214	0.04%
140-150	0.95	0.03%
150-160	0.637	0.02%
160-170	0.353	0.01%
170-180	0.121	0.00%
Total	3135.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2390.432	76.25%
60- 90	736.506	23.49%
0-90	3126.938	99.74%
90- 180	8.242	0.26%
0- 180	3135.2	100%

Table 3: Zonal Lumen Data

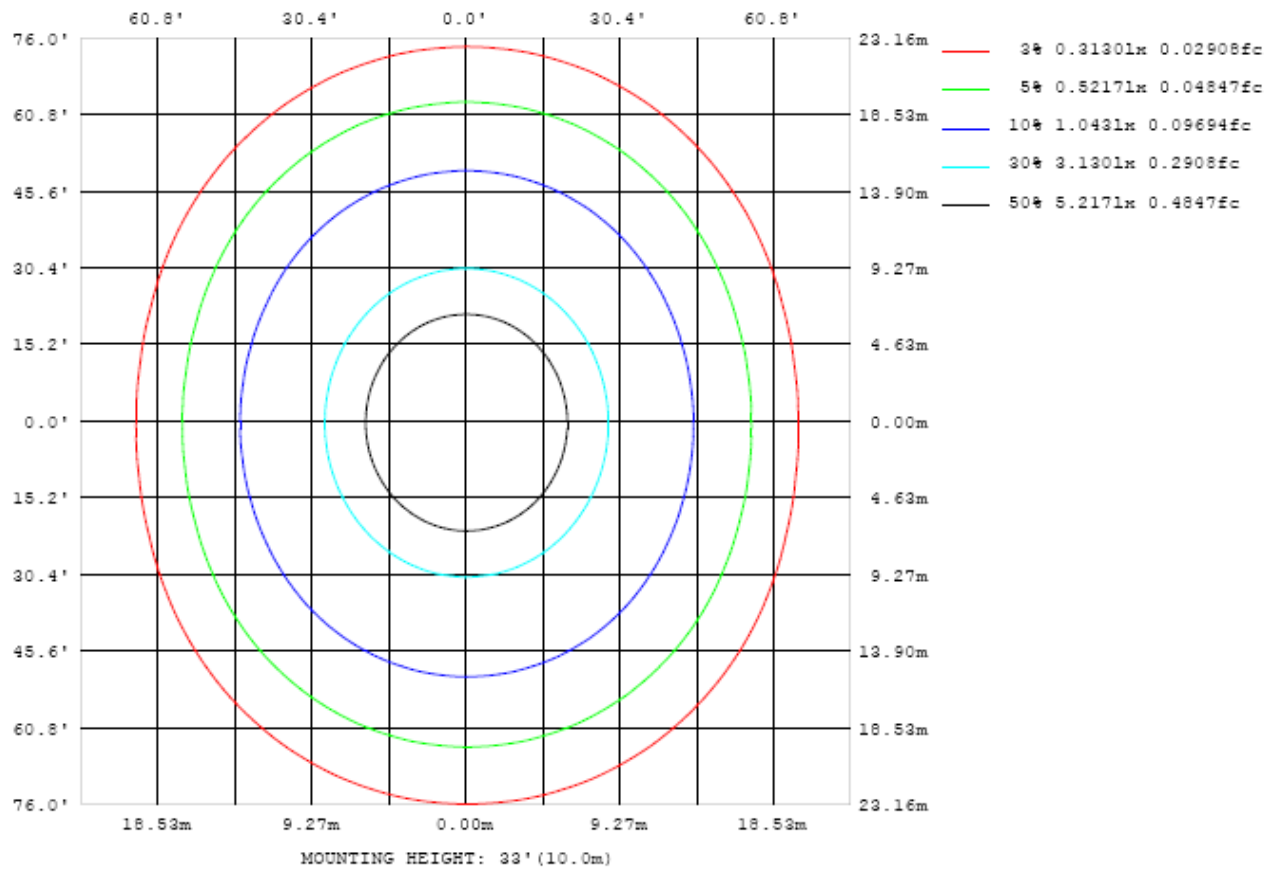


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

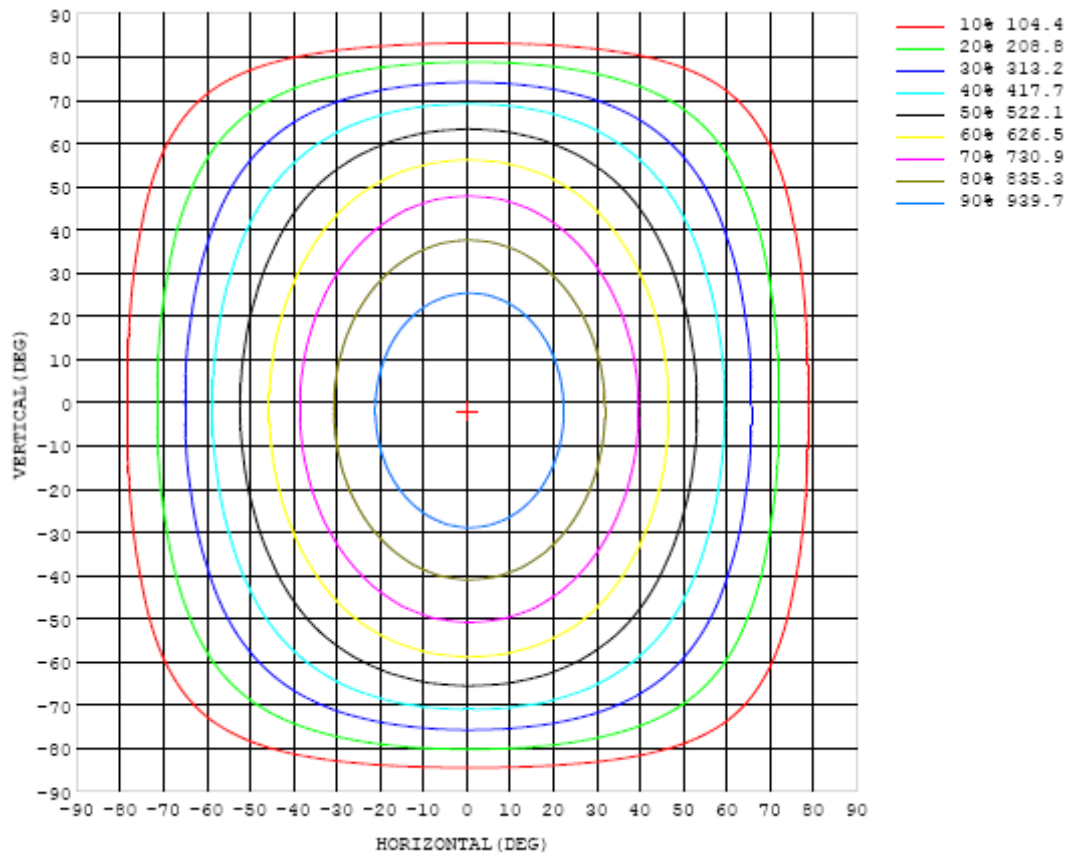


Chart 3: Isocandela Plot

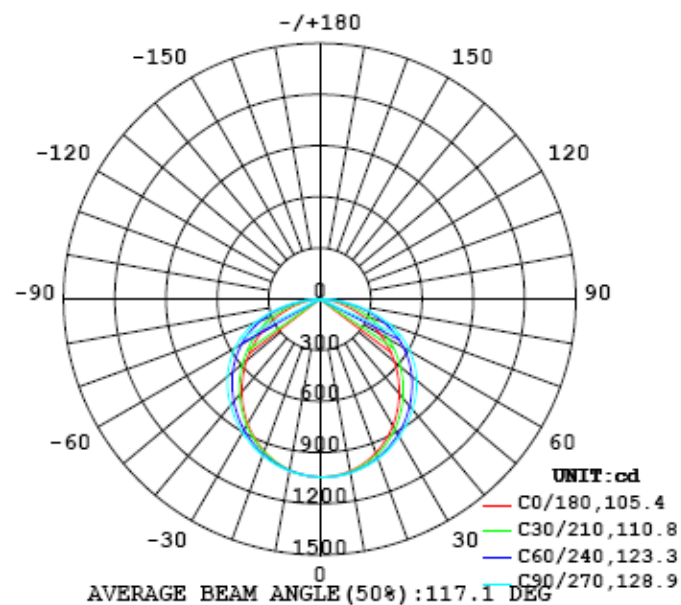


Chart 4: Polar Candela Distribution

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	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043
5	1039	1040	1040	1041	1042	1042	1043	1042	1043	1043	1043	1042	1041	1040	1039	1038	1038	1037	1036
10	1024	1025	1026	1028	1030	1032	1033	1034	1034	1034	1034	1032	1030	1028	1026	1024	1021	1020	1019
15	997	999	1002	1005	1009	1012	1016	1018	1019	1019	1018	1015	1011	1007	1003	998	994	991	989
20	960	963	967	973	979	985	990	994	996	997	995	990	985	978	971	963	957	952	950
25	913	917	923	931	940	949	957	963	967	967	965	959	950	940	930	919	911	904	901
30	857	862	869	880	893	905	917	926	930	932	928	920	909	896	881	868	856	848	844
35	794	800	809	823	838	855	870	882	889	890	886	876	861	844	826	809	794	785	780
40	725	731	742	759	779	799	819	834	843	845	840	827	809	787	765	744	727	716	711
45	650	656	670	690	714	739	763	782	793	796	790	775	752	726	699	675	655	642	637
50	572	579	594	617	645	676	703	725	738	741	734	718	693	663	631	603	580	565	559
55	491	498	515	541	574	608	639	662	675	679	672	654	628	596	561	528	502	485	479
60	408	416	435	465	500	535	567	591	606	610	602	584	556	524	487	451	422	404	397
65	325	333	355	387	422	456	488	513	528	531	524	506	479	446	410	374	342	322	315
70	241	251	274	306	339	371	400	423	436	439	433	417	392	362	328	295	263	241	233
75	161	170	194	223	252	278	301	318	328	330	325	313	294	270	242	213	185	162	154
80	87.1	95.8	116	138	159	178	194	206	212	213	211	202	189	171	151	130	108	89.6	82.9
85	29.3	33.7	44.2	55.8	66.6	75.5	82.4	87.7	90.6	91.2	89.9	85.7	79.5	71.8	62.1	51.2	39.3	30.3	27.1
90	0.15	0.24	2.10	2.92	3.57	3.39	3.38	4.37	3.97	3.82	4.64	4.67	3.50	3.50	3.38	2.71	0.92	0.34	0.11
95	0.16	0.27	0.79	1.12	1.40	1.74	2.08	2.07	2.00	1.99	2.00	2.07	2.01	1.73	1.41	1.11	0.77	0.57	0.19
100	0.30	0.36	1.04	1.34	1.65	1.98	2.19	2.00	1.60	1.63	1.63	2.01	2.13	1.93	1.64	1.34	1.04	0.63	0.33
105	0.49	0.48	1.24	1.61	1.98	2.32	2.52	2.26	1.89	1.95	1.93	2.28	2.45	2.27	1.95	1.64	1.27	0.73	0.51
110	0.66	0.61	1.29	1.75	2.20	2.57	2.72	2.40	2.12	2.19	2.17	2.44	2.69	2.53	2.20	1.80	1.33	0.84	0.69
115	0.71	0.71	1.32	1.79	2.27	2.68	2.88	2.54	2.41	2.51	2.47	2.59	2.87	2.67	2.30	1.85	1.36	0.82	0.82
120	0.93	0.61	1.23	1.78	2.26	2.68	2.80	2.54	2.62	2.70	2.68	2.63	2.80	2.67	2.30	1.84	1.25	0.93	1.03
125	0.85	0.84	1.39	1.75	2.21	2.58	2.67	2.65	2.76	2.85	2.82	2.72	2.69	2.58	2.25	1.80	1.46	1.12	0.98
130	0.95	1.08	1.33	1.58	2.08	2.37	2.54	2.67	2.79	2.85	2.81	2.71	2.58	2.41	2.13	1.62	1.34	1.14	1.12
135	1.08	1.11	0.89	1.81	1.80	2.20	2.42	2.59	2.71	2.77	2.74	2.62	2.46	2.28	1.86	1.80	0.83	1.37	1.43
140	1.40	1.21	0.94	1.84	1.78	1.95	2.30	2.44	2.52	2.58	2.57	2.48	2.36	2.03	1.81	1.83	0.88	1.05	1.38
145	1.21	0.94	1.24	1.03	1.76	1.96	2.04	2.16	2.39	2.41	2.39	2.22	2.09	2.02	1.97	1.00	1.13	0.79	1.23
150	1.21	1.21	1.39	0.76	1.70	1.97	2.05	2.02	2.05	2.07	2.06	2.06	1.96	1.98	1.81	0.96	1.62	1.00	1.44
155	1.27	1.31	1.38	1.63	0.82	1.38	1.81	2.03	2.05	2.04	2.05	1.93	1.76	1.38	0.84	1.65	1.43	1.34	1.48
160	1.30	1.18	1.33	1.63	1.54	0.87	0.84	0.97	1.52	1.72	1.61	0.89	0.76	0.88	1.45	1.50	1.40	1.54	1.65
165	1.31	1.30	1.08	1.10	1.19	1.34	1.40	1.14	0.89	0.91	0.77	0.86	1.51	1.75	1.69	1.44	1.36	1.41	1.38
170	1.30	1.33	1.24	1.29	1.35	1.42	1.41	1.33	1.25	1.12	1.24	1.43	1.44	1.44	1.41	1.15	1.36	1.40	1.46
175	1.34	1.34	1.19	1.25	1.39	1.32	1.25	1.25	1.16	1.12	1.22	1.28	1.29	1.16	1.17	1.15	1.13	1.12	1.15
180	1.19	1.19	1.19	1.19	1.17	1.11	1.05	1.01	1.09	1.14	1.01	1.06	1.12	1.15	1.15	1.15	1.15	1.16	1.19

Table 4: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043	1043		
5	1036	1036	1036	1036	1036	1036	1036	1037	1037	1037	1037	1037	1037	1038	1038	1038	1038	1039	
10	1018	1018	1018	1019	1020	1021	1022	1023	1024	1024	1024	1023	1023	1023	1023	1023	1023	1023	
15	989	989	990	993	995	998	1000	1002	1003	1003	1003	1002	1000	998	997	996	996		
20	949	951	953	958	963	967	971	974	976	976	975	972	969	965	962	960	959		
25	901	903	908	915	922	930	936	940	943	942	940	935	930	923	918	914	912		
30	844	848	855	865	875	886	895	901	904	903	899	892	884	874	866	860	857		
35	781	786	795	808	823	837	849	857	860	859	853	843	831	818	807	799	794		
40	711	718	730	747	765	783	798	809	813	811	803	790	773	757	742	731	725		
45	638	646	661	682	704	727	745	758	762	760	750	733	712	691	673	659	651		
50	561	571	589	614	641	666	687	701	706	703	691	672	648	622	599	582	573		
55	481	493	515	544	574	600	623	638	643	640	627	606	580	551	524	504	493		
60	400	415	440	471	501	529	552	567	573	570	555	534	507	477	448	424	411		
65	319	336	364	393	423	451	474	489	494	491	478	456	429	399	370	344	328		
70	238	258	284	311	339	364	385	397	401	399	389	369	345	317	290	264	246		
75	161	180	202	226	247	266	281	291	295	294	286	272	253	231	208	184	166		
80	88.3	103	120	136	150	163	173	179	182	181	177	168	156	142	126	108	92.1		
85	28.9	34.1	40.4	46.2	51.0	51.4	55.5	53.2	54.0	53.8	57.1	60.5	57.6	52.3	45.2	37.3	31.0		
90	0.17	0.67	0.69	0.65	0.79	1.02	0.75	0.21	0.16	0.18	0.39	0.36	0.62	0.82	0.94	0.40	0.23		
95	0.17	0.45	0.49	0.55	0.57	0.58	0.39	0.26	0.23	0.23	0.40	0.49	0.53	0.55	0.52	0.31	0.36		
100	0.25	0.44	0.48	0.52	0.52	0.44	0.41	0.34	0.31	0.33	0.40	0.46	0.54	0.51	0.43	0.49	0.40		
105	0.34	0.50	0.55	0.56	0.54	0.52	0.49	0.44	0.41	0.42	0.50	0.51	0.54	0.57	0.55	0.54	0.47		
110	0.42	0.61	0.65	0.66	0.66	0.66	0.65	0.58	0.55	0.57	0.61	0.67	0.69	0.69	0.69	0.66	0.59		
115	0.50	0.73	0.78	0.78	0.77	0.76	0.76	0.70	0.68	0.69	0.71	0.76	0.80	0.81	0.81	0.76	0.69		
120	0.64	0.83	0.86	0.91	0.89	0.87	0.85	0.79	0.79	0.80	0.81	0.84	0.89	0.92	0.87	0.87	0.85		
125	0.94	1.01	1.00	0.98	1.02	1.00	0.98	0.92	0.92	0.93	0.94	0.96	1.00	0.97	0.97	0.98	0.89		
130	0.89	0.83	1.07	1.12	1.09	1.14	1.12	1.09	1.09	1.09	1.11	1.11	1.06	1.11	1.09	0.71	0.73		
135	1.15	0.82	1.26	1.18	1.23	1.19	1.17	1.19	1.20	1.18	1.15	1.16	1.21	1.18	1.24	1.06	1.03		
140	1.15	1.20	1.01	1.32	1.28	1.33	1.30	1.28	1.26	1.27	1.27	1.30	1.26	1.32	0.82	1.31	1.29		
145	1.15	1.28	0.91	1.41	1.46	1.35	1.34	1.32	1.33	1.30	1.30	1.35	1.44	1.22	0.91	1.29	1.21		
150	1.49	1.34	1.41	1.00	1.42	1.43	1.45	1.39	1.35	1.35	1.36	1.36	1.15	0.98	1.09	1.03	1.29		
155	1.48	1.30	1.45	1.29	0.99	0.95	1.32	1.38	1.34	1.38	1.15	0.85	0.86	1.37	1.39	1.22	1.35		
160	1.47	1.31	1.10	1.11	1.08	1.16	0.96	0.95	0.89	0.91	0.91	1.16	1.31	1.32	1.28	1.39	1.42		
165	1.24	1.26	1.19	0.95	0.99	1.21	1.42	1.35	1.35	1.34	1.37	1.38	1.26	1.27	1.26	1.37	1.41		
170	1.44	1.36	1.24	1.08	1.10	1.07	1.23	1.21	1.24	1.23	1.21	1.20	1.22	1.36	1.40	1.45	1.40		
175	1.16	1.15	1.13	1.20	1.19	1.27	1.36	1.39	1.38	1.37	1.38	1.24	1.24	1.31	1.36	1.35	1.21		
180	1.19	1.19	1.19	1.18	1.17	1.16	1.09	0.90	1.08	1.12	1.08	1.07	1.09	1.11	1.13	1.14	1.14		

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.

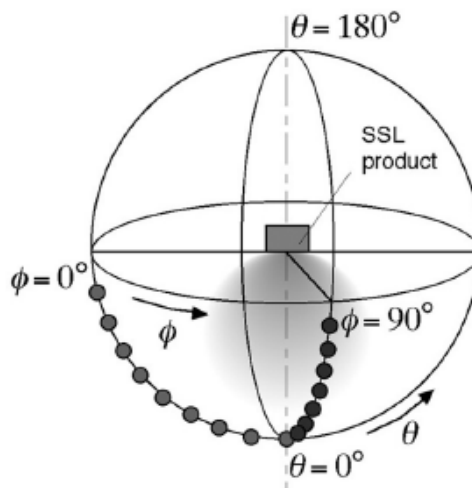
Color Characteristics Measurements

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.