



LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

2x2' Troffer

Model: 25TROF22DIM/830/277V

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17010017i

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Review by:

April Zou

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Jan. 18, 2017



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: 25TROF22DIM/830/277V

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
130.3	3192.8	24.50	0.9928
CCT (K)	CRI	Stabilization Time (Light & Power)	
2982	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

Equipment Under Test (EUT)

Name	: 2x2' Troffer
Model	: 25TROF22DIM/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)	0.206	0.092
Power Factor	0.9928	0.9403
Test Power (W)	24.50	24.07
THD A%	9.28	11.89
Luminous Efficacy (lm/W)	130.3	132.6
Total Luminous Flux (lm)	3192.8	3193.8
Color Rendering Index (CRI)	83.8	
R9	14	
Correlated Color Temperature (CCT) (K)	2982	
Chromaticity (Chroma x, Chroma y)	(0.4391, 0.4064)	
Chromaticity (Chroma u, Chroma v)	(0.2510, 0.3484)	
Chromaticity (Chroma u', Chroma v')	(0.2510, 0.5226)	
Duv	0.0006	
Average Beam Angle (°)	118.1	
Center Beam Candle Power (cd)	1055	
Spacing Criteria	1.21 (0°-180°)/ 1.29 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	75.52%	
Zonal Lumens in the 60°-90°Zone	24.36%	
Zonal Lumens in the 90°-120°Zone	0.04%	
Zonal Lumens in the 120°-180°Zone	0.08%	

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

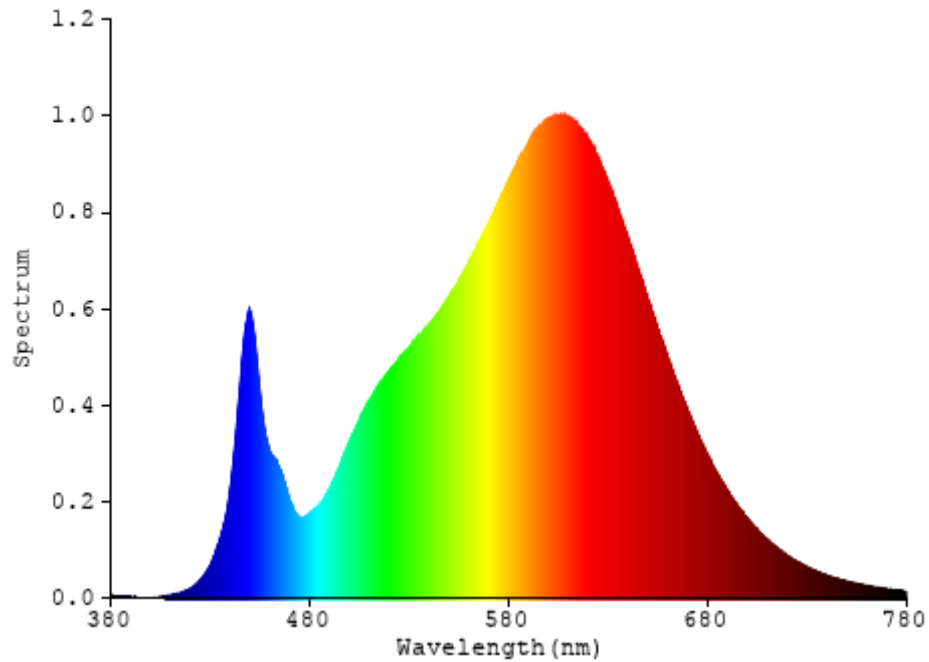


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	99.829	3.13%
10- 20	285.936	8.96%
20- 30	433.707	13.58%
30- 40	524.778	16.44%
40- 50	550.867	17.25%
50- 60	516.048	16.16%
60- 70	426.623	13.36%
70- 80	277.823	8.70%
80- 90	73.412	2.30%
90-100	0.263	0.01%
100-110	0.383	0.01%
110-120	0.502	0.02%
120-130	0.597	0.02%
130-140	0.651	0.02%
140-150	0.594	0.02%
150-160	0.421	0.01%
160-170	0.269	0.01%
170-180	0.09	0.00%
Total	3192.8	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2411.165	75.52%
60- 90	777.858	24.36%
0-90	3189.023	99.88%
90- 180	3.77	0.12%
0- 180	3192.8	100%

Table 3: Zonal Lumen Data

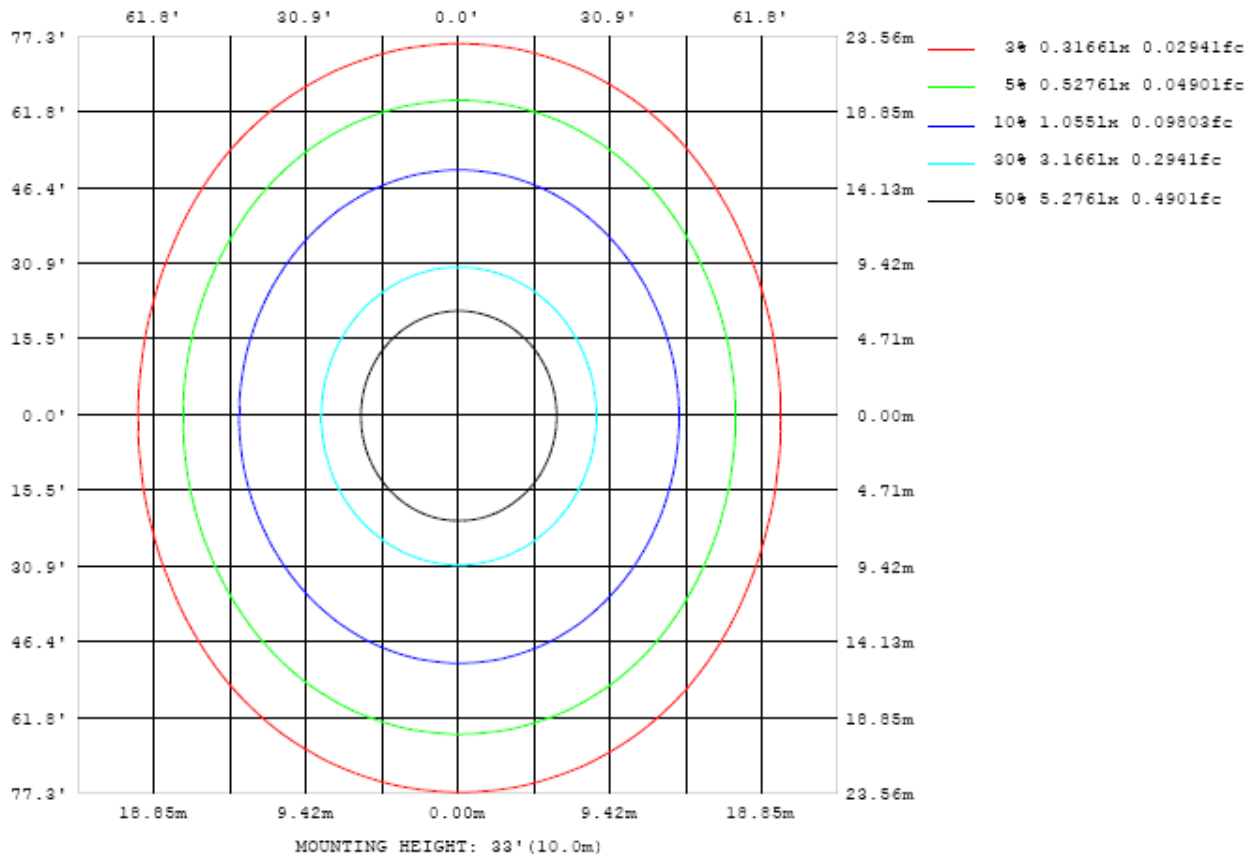


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

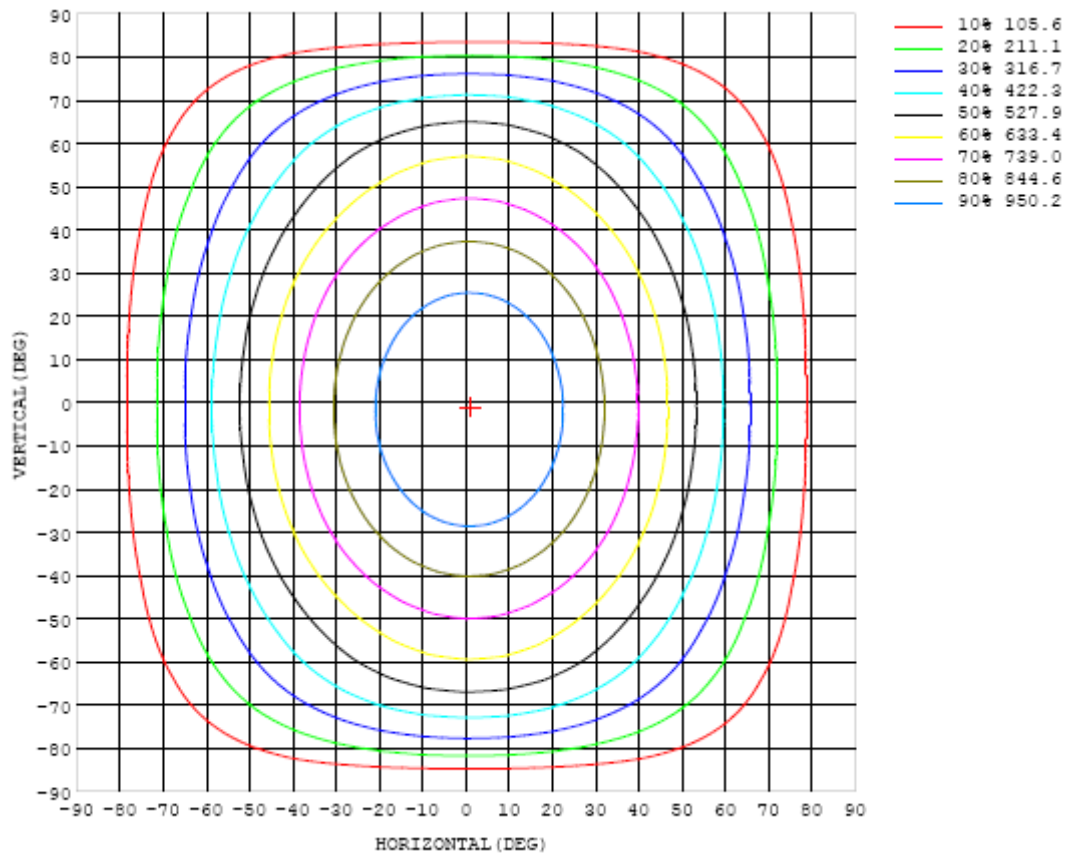


Chart 3: Isocandela Plot

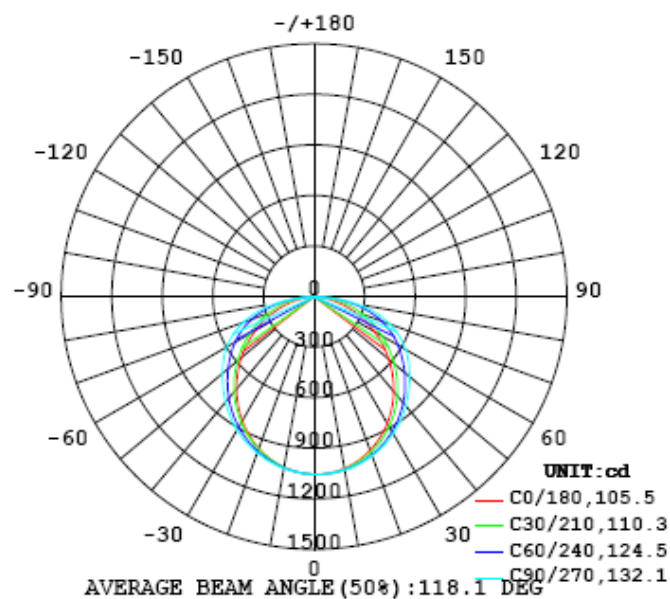


Chart 4: Polar Candela Distribution

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	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055
5	1051	1052	1052	1053	1053	1054	1054	1054	1054	1054	1054	1053	1052	1052	1051	1050	1049	1048	1048
10	1036	1037	1038	1040	1042	1043	1045	1046	1046	1046	1045	1043	1041	1039	1036	1034	1032	1030	1029
15	1009	1010	1013	1017	1020	1024	1027	1029	1030	1030	1028	1025	1022	1017	1012	1008	1004	1001	999
20	972	974	978	984	990	996	1001	1005	1007	1006	1004	1000	994	987	980	972	966	962	959
25	925	928	934	941	950	959	967	973	976	976	973	967	959	948	938	928	919	913	909
30	869	873	880	891	903	915	925	934	939	939	935	927	916	902	888	875	864	856	852
35	805	810	819	832	847	863	877	888	895	895	891	881	867	850	832	816	802	792	787
40	735	740	751	767	786	805	823	837	845	846	841	829	811	791	770	750	734	723	717
45	659	665	678	696	719	742	763	781	791	793	787	772	752	727	703	680	661	648	643
50	580	586	601	622	648	675	701	723	736	739	731	714	689	661	632	606	585	570	565
55	497	504	520	544	573	606	638	664	680	684	675	655	626	592	559	529	505	490	484
60	414	421	438	464	499	537	575	604	622	626	617	595	562	524	485	451	425	408	401
65	329	336	355	385	425	467	506	536	554	558	549	527	495	454	411	373	344	325	319
70	244	252	273	307	348	388	425	455	473	478	469	448	416	378	336	295	263	243	236
75	162	171	193	228	265	301	333	360	376	380	373	354	325	292	256	218	185	164	157
80	87.2	95.4	116	145	173	201	224	243	255	257	252	240	219	194	167	139	111	91.0	84.7
85	29.5	33.7	44.4	60.1	74.8	85.0	90.5	94.3	95.8	95.0	94.9	93.5	90.2	83.9	72.2	56.5	40.8	31.3	28.0
90	0.16	0.17	1.42	1.72	1.54	2.19	0.51	0.60	0.68	0.59	0.28	0.27	0.27	0.18	1.43	1.53	0.16	0.09	0.09
95	0.15	0.16	0.18	0.21	0.25	0.32	0.42	0.48	0.54	0.45	0.17	0.15	0.13	0.13	0.12	0.11	0.11	0.13	0.18
100	0.22	0.23	0.29	0.32	0.36	0.42	0.46	0.47	0.45	0.33	0.21	0.20	0.20	0.19	0.17	0.16	0.17	0.15	0.22
105	0.33	0.28	0.38	0.41	0.44	0.47	0.49	0.48	0.44	0.33	0.27	0.27	0.27	0.27	0.27	0.26	0.23	0.20	0.28
110	0.42	0.33	0.48	0.50	0.51	0.53	0.54	0.54	0.50	0.41	0.36	0.35	0.35	0.35	0.34	0.31	0.27	0.26	0.36
115	0.45	0.39	0.59	0.61	0.60	0.61	0.60	0.60	0.55	0.48	0.47	0.44	0.45	0.40	0.42	0.43	0.38	0.32	0.48
120	0.54	0.40	0.69	0.70	0.70	0.70	0.69	0.66	0.61	0.55	0.55	0.54	0.51	0.54	0.54	0.54	0.47	0.53	0.61
125	0.62	0.67	0.71	0.82	0.80	0.81	0.80	0.76	0.72	0.67	0.66	0.67	0.68	0.67	0.65	0.67	0.58	0.57	0.62
130	0.49	0.56	0.51	0.92	0.91	0.92	0.92	0.89	0.81	0.77	0.76	0.79	0.80	0.82	0.83	0.79	0.53	0.53	0.58
135	0.73	0.81	0.62	0.90	1.01	1.01	1.01	0.98	0.89	0.87	0.86	0.87	0.89	0.91	0.93	0.84	0.59	0.91	0.90
140	0.88	1.05	1.02	0.86	0.98	1.11	1.10	1.07	0.99	0.96	0.96	0.98	0.98	1.00	0.95	0.81	0.98	0.96	0.95
145	0.92	1.12	1.07	0.71	0.99	1.00	1.16	1.13	1.07	1.04	1.04	1.05	1.05	0.98	0.97	0.56	1.02	1.03	1.03
150	0.81	0.97	0.79	0.74	0.76	0.98	0.96	1.02	1.06	1.04	1.04	1.01	0.98	0.98	0.66	1.05	1.04	0.93	1.08
155	0.72	0.78	0.82	0.99	0.94	0.57	0.57	0.97	0.97	0.94	0.96	0.98	0.67	0.65	0.81	1.07	1.09	1.08	1.12
160	0.94	1.00	1.01	1.01	0.99	1.14	0.68	0.62	0.62	0.57	0.58	0.60	0.65	0.67	0.68	0.79	0.86	0.94	1.02
165	0.96	1.01	1.21	1.24	1.21	1.11	1.03	1.01	1.02	0.99	1.03	1.01	1.02	0.84	0.75	0.80	0.91	0.86	0.86
170	1.01	1.04	1.07	1.10	1.16	1.11	1.07	1.06	1.08	1.06	1.06	1.07	1.06	0.96	0.77	0.77	0.89	0.89	1.13
175	1.05	1.05	1.07	1.11	1.15	1.18	1.16	1.15	1.14	1.11	1.11	1.12	1.13	1.04	1.04	0.96	0.82	0.76	0.82
180	0.77	0.77	0.77	0.77	0.76	0.75	0.74	0.72	0.71	0.72	0.69	0.68	0.73	0.70	0.63	0.61	0.63	0.65	0.78

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	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055		
5	1047	1047	1047	1047	1048	1048	1048	1048	1049	1049	1049	1050	1050	1050	1050	1051	1051		
10	1028	1028	1029	1030	1031	1032	1033	1035	1035	1036	1036	1036	1036	1035	1035	1035	1035		
15	998	999	1000	1003	1006	1009	1011	1014	1015	1015	1015	1014	1012	1011	1009	1008	1008		
20	958	960	963	967	973	978	982	986	988	988	987	984	981	977	974	972	971		
25	909	912	917	924	932	939	946	951	954	954	952	947	941	936	930	926	924		
30	852	856	863	873	884	895	904	910	914	913	910	903	895	886	878	872	868		
35	788	793	803	816	830	843	855	864	868	867	862	853	841	829	818	810	805		
40	718	725	737	753	770	788	802	813	817	816	809	797	782	767	753	741	735		
45	644	653	667	686	707	728	746	759	764	762	752	737	719	700	682	668	660		
50	566	577	593	615	641	666	688	704	710	707	694	675	652	628	607	590	582		
55	486	498	517	543	574	604	630	649	657	652	636	613	584	555	529	510	500		
60	405	418	440	471	507	542	571	590	598	593	576	550	515	481	450	429	416		
65	323	338	364	398	437	473	501	521	529	524	507	480	445	407	372	347	332		
70	241	258	288	324	360	393	421	439	447	442	426	399	366	330	293	265	248		
75	163	181	211	242	273	300	323	338	344	341	328	305	278	247	215	185	168		
80	89.8	107	130	152	173	191	207	218	222	220	211	196	177	156	133	109	92.5		
85	29.7	35.9	45.7	52.3	54.1	52.7	56.5	54.8	55.6	55.1	58.3	61.5	63.2	59.4	48.8	37.9	31.1		
90	0.09	0.10	0.15	0.18	0.20	0.21	0.23	0.31	0.31	0.29	0.22	0.20	0.18	0.17	0.14	0.10	0.10		
95	0.19	0.18	0.22	0.24	0.25	0.27	0.32	0.37	0.40	0.33	0.29	0.24	0.23	0.21	0.19	0.17	0.16		
100	0.22	0.22	0.25	0.28	0.31	0.35	0.38	0.41	0.42	0.38	0.36	0.34	0.30	0.26	0.25	0.23	0.24		
105	0.27	0.29	0.33	0.38	0.40	0.43	0.46	0.48	0.45	0.46	0.45	0.42	0.40	0.38	0.37	0.34	0.35		
110	0.36	0.39	0.42	0.45	0.49	0.50	0.54	0.55	0.53	0.54	0.53	0.51	0.48	0.46	0.44	0.42	0.44		
115	0.49	0.48	0.49	0.52	0.54	0.56	0.59	0.59	0.58	0.59	0.60	0.57	0.53	0.51	0.51	0.47	0.52		
120	0.55	0.46	0.57	0.59	0.58	0.58	0.60	0.60	0.60	0.62	0.62	0.60	0.59	0.58	0.59	0.43	0.55		
125	0.58	0.60	0.67	0.65	0.65	0.63	0.65	0.64	0.64	0.67	0.68	0.67	0.66	0.66	0.65	0.62	0.69		
130	0.65	0.72	0.63	0.74	0.73	0.71	0.73	0.72	0.72	0.74	0.78	0.76	0.76	0.75	0.61	0.57	0.61		
135	0.97	0.91	0.78	0.71	0.83	0.81	0.81	0.80	0.80	0.81	0.86	0.87	0.87	0.74	0.81	0.93	0.69		
140	0.98	1.00	0.92	0.76	0.79	0.91	0.89	0.88	0.87	0.87	0.93	0.95	0.81	0.85	1.04	1.05	0.82		
145	0.84	1.03	0.98	0.95	0.91	0.84	0.83	0.88	0.91	0.83	0.84	0.88	0.79	0.80	1.06	1.10	0.91		
150	0.77	1.13	1.11	1.11	0.89	0.78	0.85	0.81	0.79	0.78	0.89	0.87	1.02	1.01	0.93	0.96	0.94		
155	1.00	1.05	1.15	0.99	0.89	0.87	0.90	0.83	0.82	0.89	0.97	0.93	0.93	0.97	1.03	0.79	0.83		
160	1.08	0.93	0.99	0.89	1.03	0.93	0.81	1.00	0.94	0.96	1.00	1.04	1.13	1.00	1.06	0.81	0.88		
165	0.88	1.02	0.92	0.94	1.17	0.96	0.80	0.86	0.99	0.96	0.99	1.00	1.04	1.14	0.94	0.97	1.04		
170	1.14	1.20	1.21	0.92	0.90	0.89	0.85	0.83	0.81	0.80	0.79	0.78	0.79	0.81	0.86	0.81	1.00		
175	0.82	0.84	0.85	0.90	0.88	0.87	0.85	0.82	0.82	0.81	0.84	0.81	0.79	0.80	0.93	0.99	1.07		
180	0.78	0.78	0.77	0.77	0.77	0.76	0.74	0.71	0.72	0.71	0.69	0.68	0.69	0.72	0.73	0.74	0.74		

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.

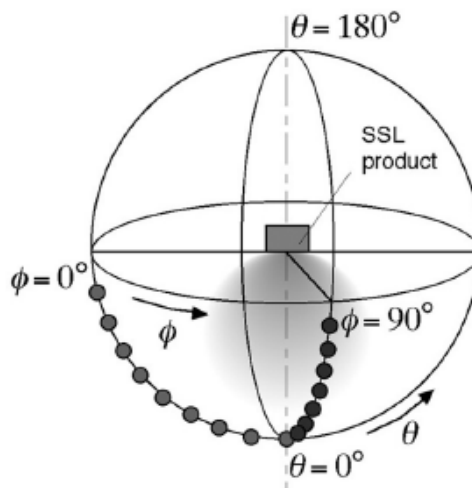
Color Characteristics Measurements

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 ***

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