



LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

2x2' Troffer

Model: 25TROF22DIM/840/277V

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17010017k

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

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/840/277V

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
135.2	3311.3	24.50	0.9928
CCT (K)	CRI	Stabilization Time (Light & Power)	
3811	84.4	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

Equipment Under Test (EUT)

Name	: 2x2' Troffer
Model	: 25TROF22DIM/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)	0.206	0.092
Power Factor	0.9928	0.9403
Test Power (W)	24.50	24.08
THD A%	9.35	12.08
Luminous Efficacy (lm/W)	135.2	137.6
Total Luminous Flux (lm)	3311.3	3313.6
Color Rendering Index (CRI)	84.4	
R9	17	
Correlated Color Temperature (CCT) (K)	3811	
Chromaticity (Chroma x, Chroma y)	(0.3913, 0.3890)	
Chromaticity (Chroma u, Chroma v)	(0.2273, 0.3390)	
Chromaticity (Chroma u', Chroma v')	(0.2273, 0.5085)	
Duv	0.0026	
Average Beam Angle (°)	118.5	
Center Beam Candle Power (cd)	1093	
Spacing Criteria	1.21 (0°-180°)/ 1.30 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	75.48%	
Zonal Lumens in the 60°-90°Zone	24.40%	
Zonal Lumens in the 90°-120°Zone	0.04%	
Zonal Lumens in the 120°-180°Zone	0.08%	

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	85
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

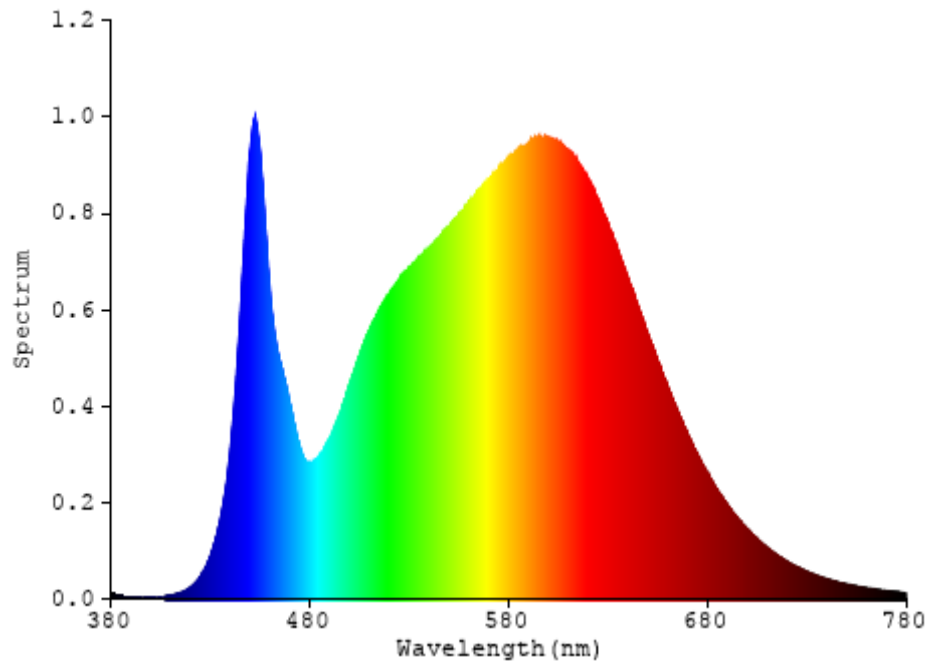


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	103.388	3.12%
10- 20	296.156	8.94%
20- 30	449.354	13.57%
30- 40	543.953	16.43%
40- 50	571.246	17.25%
50- 60	535.357	16.17%
60- 70	442.717	13.37%
70- 80	288.575	8.71%
80- 90	76.562	2.31%
90-100	0.272	0.01%
100-110	0.412	0.01%
110-120	0.549	0.02%
120-130	0.641	0.02%
130-140	0.683	0.02%
140-150	0.604	0.02%
150-160	0.424	0.01%
160-170	0.277	0.01%
170-180	0.093	0.00%
Total	3311.3	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2499.454	75.48%
60- 90	807.854	24.40%
0-90	3307.308	99.88%
90- 180	3.955	0.12%
0- 180	3311.3	100%

Table 3: Zonal Lumen Data

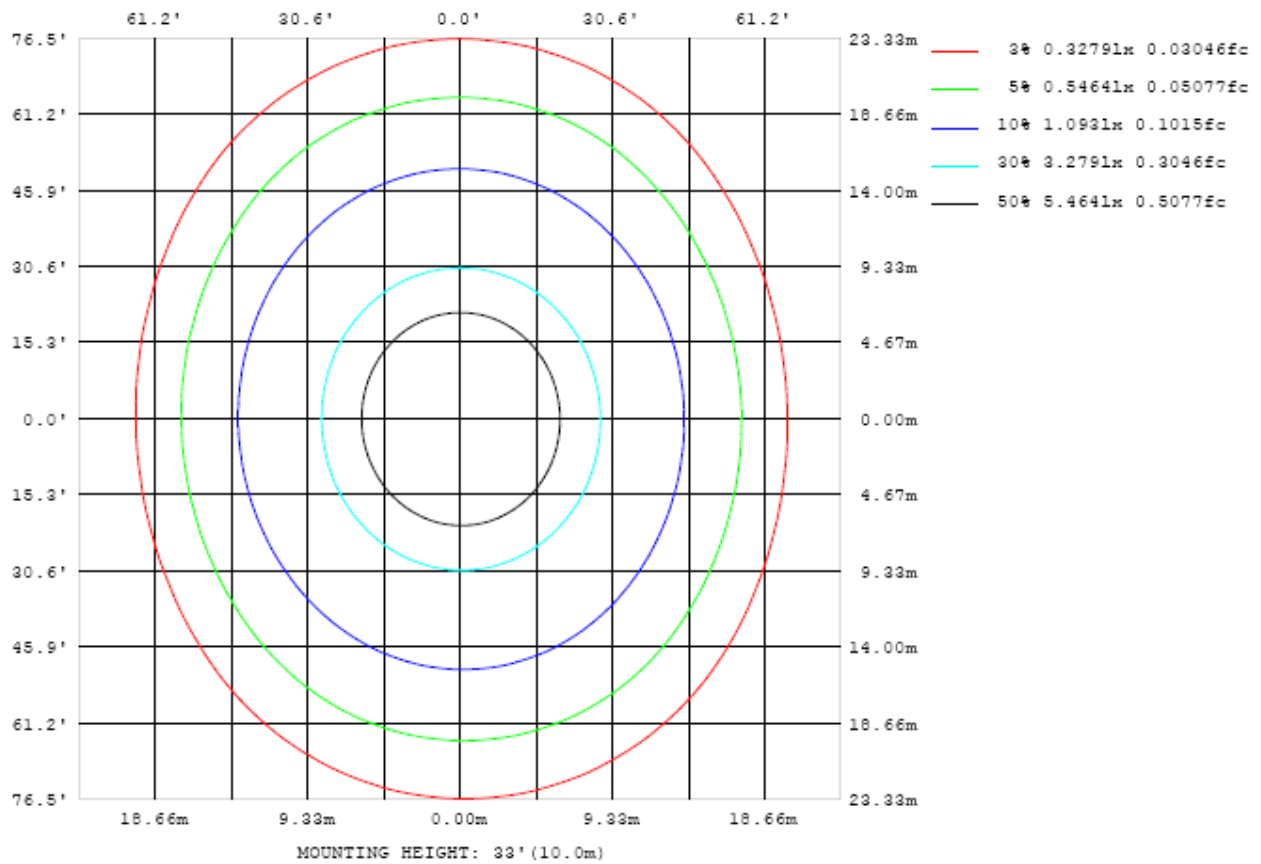


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

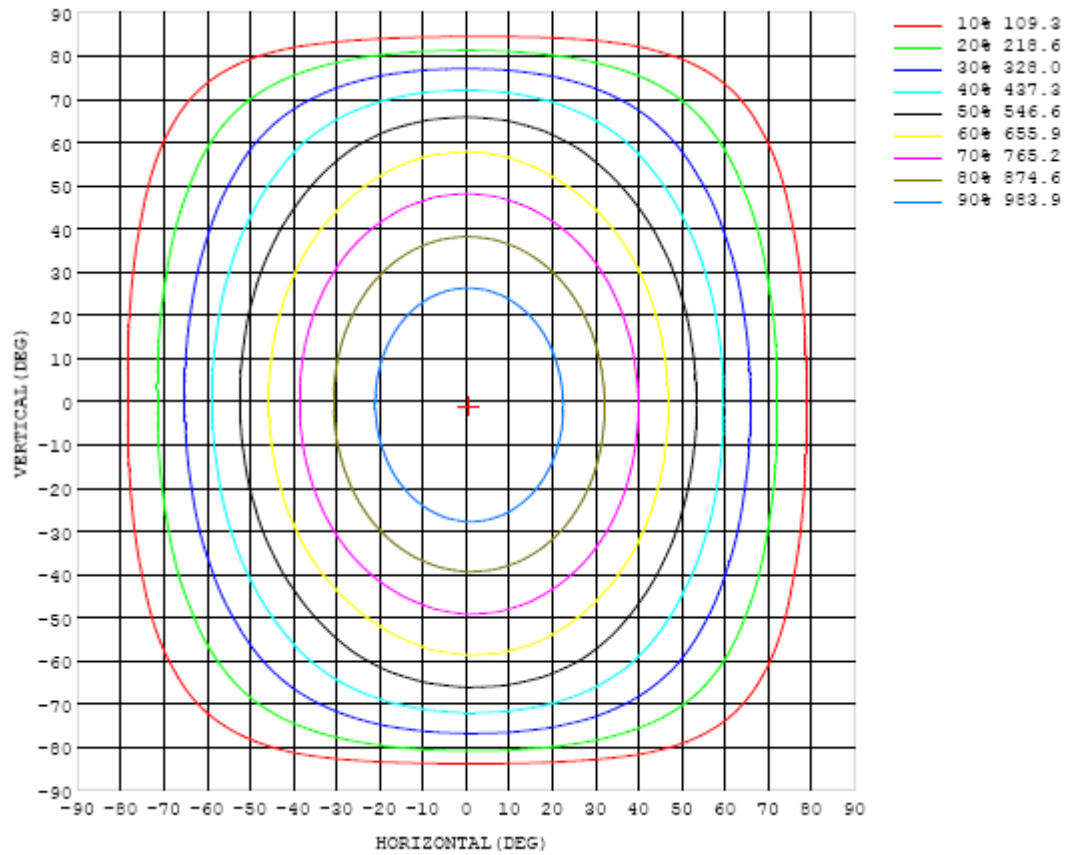


Chart 3: Isocandela Plot

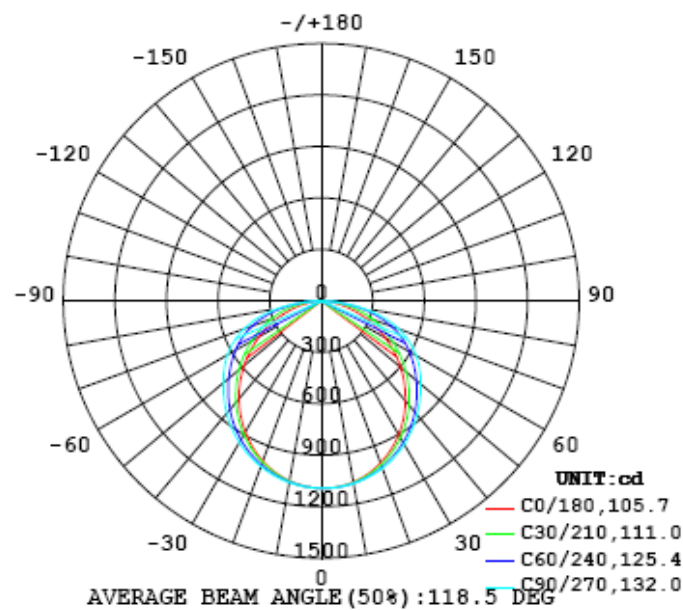


Chart 4: Polar Candela Distribution

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	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093
5	1089	1089	1089	1090	1090	1090	1090	1091	1091	1091	1090	1089	1089	1088	1088	1087	1086	1086	1085
10	1072	1073	1074	1076	1077	1079	1079	1080	1081	1080	1079	1078	1076	1074	1072	1070	1068	1066	1066
15	1045	1046	1048	1051	1054	1058	1060	1062	1063	1063	1061	1058	1054	1050	1046	1042	1038	1036	1035
20	1006	1009	1012	1017	1022	1028	1033	1036	1038	1038	1035	1030	1024	1018	1011	1004	999	995	994
25	958	961	966	973	981	990	997	1002	1005	1005	1001	995	986	977	967	957	950	945	943
30	900	904	911	921	932	944	953	961	965	965	961	952	941	928	915	902	892	886	884
35	835	839	848	860	875	890	903	913	919	919	913	903	889	872	855	840	827	820	817
40	762	767	778	793	811	830	847	860	867	867	861	848	830	810	790	771	757	748	745
45	684	690	702	720	742	765	786	802	811	812	804	789	767	743	719	697	681	671	668
50	602	608	622	643	669	697	722	742	754	756	746	727	702	673	645	620	601	589	586
55	517	524	539	563	593	626	658	683	697	699	688	666	635	601	568	539	518	506	503
60	430	437	454	481	516	556	593	620	635	638	626	602	568	529	490	457	434	420	417
65	342	350	369	400	440	482	519	547	562	565	553	529	496	455	413	376	349	334	331
70	254	263	284	319	360	399	434	461	476	478	468	445	413	375	334	295	265	248	246
75	169	178	201	236	271	305	335	359	371	373	364	345	317	284	250	214	184	166	163
80	91.7	99.9	121	148	174	197	217	233	241	241	236	224	205	182	158	131	106	90.4	87.8
85	31.2	34.9	44.1	56.2	65.6	68.6	67.9	66.4	64.9	63.5	64.3	66.0	67.0	66.2	59.4	48.2	36.4	29.7	29.0
90	0.21	0.04	0.50	0.15	0.05	0.08	0.39	0.51	0.64	0.53	0.15	0.12	0.10	0.06	0.03	0.09	0.00	0.04	0.10
95	0.17	0.17	0.21	0.25	0.30	0.37	0.45	0.52	0.54	0.37	0.19	0.16	0.15	0.15	0.14	0.13	0.14	0.14	0.20
100	0.26	0.23	0.31	0.36	0.41	0.47	0.50	0.51	0.47	0.33	0.24	0.22	0.23	0.21	0.19	0.17	0.17	0.18	0.25
105	0.30	0.31	0.41	0.44	0.48	0.51	0.53	0.52	0.47	0.35	0.31	0.31	0.31	0.31	0.30	0.29	0.27	0.27	0.35
110	0.45	0.36	0.51	0.54	0.56	0.57	0.58	0.58	0.53	0.44	0.41	0.41	0.39	0.41	0.42	0.42	0.38	0.40	0.46
115	0.51	0.39	0.63	0.65	0.64	0.66	0.65	0.64	0.58	0.52	0.51	0.51	0.50	0.52	0.54	0.57	0.50	0.53	0.58
120	0.59	0.37	0.72	0.76	0.75	0.76	0.74	0.70	0.65	0.61	0.60	0.61	0.60	0.63	0.67	0.69	0.61	0.64	0.52
125	0.68	0.68	0.76	0.87	0.87	0.88	0.86	0.82	0.76	0.73	0.72	0.73	0.71	0.76	0.80	0.81	0.70	0.67	0.72
130	0.54	0.54	0.82	0.98	0.98	0.98	0.98	0.95	0.86	0.84	0.78	0.85	0.82	0.89	0.91	0.90	0.56	0.62	0.77
135	0.72	0.95	0.70	0.92	1.07	1.08	1.08	1.05	0.95	0.90	0.89	0.90	0.91	0.99	0.99	0.87	0.69	1.00	1.03
140	0.84	1.01	0.94	0.96	1.02	1.17	1.17	1.13	1.00	0.96	1.01	0.94	0.99	1.09	0.94	0.67	1.04	1.01	1.01
145	0.81	1.03	0.98	0.77	0.90	0.91	1.10	1.12	1.06	1.04	0.97	1.02	1.11	1.03	0.96	0.62	1.09	1.09	1.05
150	0.71	0.88	0.83	0.78	0.79	0.82	0.78	0.85	0.87	0.85	0.86	0.93	1.03	0.97	0.73	1.15	1.09	0.97	1.05
155	0.81	0.83	0.79	0.80	0.77	0.61	0.59	0.77	0.71	0.76	0.85	0.83	0.67	0.72	0.99	1.15	1.15	1.13	1.10
160	0.88	0.81	0.81	0.79	0.83	0.92	0.76	0.63	0.64	0.60	0.60	0.66	0.94	0.72	0.77	0.90	0.95	1.01	1.11
165	1.01	0.93	1.00	1.10	1.12	1.01	0.94	0.94	0.99	1.01	1.06	1.06	0.98	0.81	0.84	0.93	0.92	0.83	0.88
170	1.08	1.05	1.09	1.11	1.14	1.14	1.11	1.11	1.14	1.13	1.12	1.09	1.00	0.88	0.78	0.87	0.92	1.09	1.20
175	1.02	1.11	1.13	1.14	1.16	1.19	1.19	1.23	1.23	1.17	1.17	1.14	1.09	1.07	0.98	0.82	0.80	0.85	0.86
180	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76

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	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093	1093		
5	1085	1085	1086	1086	1086	1087	1087	1087	1088	1088	1088	1088	1088	1088	1088	1088	1088		
10	1066	1066	1067	1069	1070	1072	1073	1074	1075	1075	1075	1074	1074	1073	1072	1072	1072		
15	1035	1037	1039	1042	1046	1049	1052	1054	1055	1055	1054	1053	1051	1049	1046	1045	1044		
20	995	997	1002	1007	1013	1018	1023	1026	1028	1028	1026	1023	1019	1014	1010	1007	1006		
25	944	949	955	963	972	980	987	992	994	994	990	985	978	972	965	960	958		
30	886	892	901	912	924	935	945	951	954	953	948	940	931	921	911	904	900		
35	820	828	840	854	869	884	896	904	907	905	899	888	876	863	850	841	835		
40	748	758	773	790	809	827	842	852	856	853	844	831	815	798	783	770	763		
45	672	684	701	721	744	766	784	797	801	798	786	769	749	729	709	695	686		
50	592	605	625	650	677	703	725	740	745	740	726	705	680	655	632	615	604		
55	509	524	547	576	608	640	666	684	689	683	665	639	609	579	552	532	520		
60	425	442	468	501	540	576	606	624	630	623	603	574	537	501	470	447	434		
65	340	359	389	427	469	506	536	554	560	554	533	503	465	424	388	362	346		
70	255	277	311	351	390	425	454	472	478	471	452	422	386	346	307	277	259		
75	173	197	231	267	301	332	358	374	379	373	356	329	297	262	226	194	175		
80	97.4	119	146	174	199	222	240	252	255	251	240	221	198	171	143	115	97.3		
85	33.4	43.6	57.9	70.7	78.4	83.3	87.2	90.0	91.8	94.3	94.6	92.9	86.8	73.5	57.8	43.0	33.6		
90	0.10	0.12	0.19	0.19	0.23	0.27	0.32	0.38	0.41	0.36	0.29	0.26	0.22	0.23	0.20	0.16	0.17		
95	0.21	0.20	0.24	0.25	0.26	0.27	0.35	0.39	0.41	0.34	0.29	0.25	0.24	0.22	0.21	0.19	0.18		
100	0.25	0.24	0.27	0.29	0.32	0.36	0.39	0.42	0.45	0.39	0.36	0.34	0.30	0.27	0.26	0.25	0.26		
105	0.33	0.34	0.37	0.40	0.43	0.45	0.47	0.49	0.46	0.47	0.45	0.43	0.41	0.38	0.37	0.32	0.35		
110	0.43	0.44	0.46	0.49	0.51	0.54	0.56	0.56	0.55	0.56	0.54	0.52	0.50	0.47	0.45	0.38	0.43		
115	0.53	0.53	0.54	0.54	0.57	0.60	0.62	0.61	0.60	0.62	0.62	0.59	0.55	0.53	0.53	0.39	0.53		
120	0.63	0.59	0.61	0.61	0.61	0.63	0.63	0.64	0.63	0.66	0.65	0.63	0.61	0.60	0.61	0.41	0.58		
125	0.64	0.54	0.69	0.68	0.67	0.67	0.68	0.66	0.67	0.70	0.71	0.69	0.69	0.68	0.66	0.64	0.68		
130	0.67	0.66	0.66	0.77	0.76	0.76	0.75	0.75	0.75	0.79	0.81	0.79	0.79	0.78	0.62	0.62	0.64		
135	1.01	0.94	0.69	0.86	0.86	0.85	0.84	0.83	0.83	0.87	0.90	0.91	0.90	0.77	0.83	0.97	0.64		
140	1.05	1.01	0.89	0.82	0.89	0.95	0.93	0.92	0.91	0.92	0.98	1.00	0.84	0.88	1.08	1.10	0.90		
145	0.93	1.08	1.02	0.97	0.88	0.87	0.95	0.98	0.97	0.95	0.88	0.92	0.79	0.90	1.00	1.11	0.99		
150	0.83	1.20	1.17	1.14	0.91	0.82	0.87	0.86	0.84	0.83	0.84	0.92	1.02	1.08	1.00	0.97	0.98		
155	0.99	1.23	1.16	1.04	0.93	0.90	0.93	0.93	0.94	0.96	0.96	0.98	1.00	0.92	1.06	0.87	0.90		
160	1.13	0.98	1.04	0.96	1.06	0.97	0.93	1.04	1.06	1.08	1.09	1.13	1.08	1.03	1.13	0.90	1.00		
165	0.92	0.97	1.02	1.18	1.19	0.96	0.83	0.95	1.07	1.06	1.00	1.05	1.07	1.20	1.06	1.01	1.11		
170	1.24	1.22	1.03	0.95	0.93	0.91	0.86	0.85	0.88	0.95	0.98	0.98	0.86	0.84	0.89	0.88	0.95		
175	0.89	0.93	0.95	0.92	0.91	0.89	0.87	0.86	0.87	0.86	0.87	0.87	0.85	0.85	0.90	0.91	0.89		
180	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76		

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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