LM-79-08 TEST REPORT

for

GREEN CREATIVE LTD

Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, KL, Hong Kong

LED High Bay

Model: 65HIDHB/840/BYP/EX39/R

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, YuhangDist, Hangzhou, Zhejiang Province, China 311100

Tel: +86571 86376106

www.ledtestlab.com

Report No.: HZ20050018k

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

Review by: April Zou

Engineer: April Zou

May 26, 2020

Approved by: Jim Zhang

Manager: Jim Zhang

May 26, 2020

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: **65HIDHB/840/BYP/EX39/R**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
143.1	9031.9	63.12	0.9697

CCT (K)	CRI	Stabilization Time (Light & Power)
4053	81.4	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 : May 15, 2020

Date of Test : May 21, 2020

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
ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

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SAMPLE PHOTO

Figure 1- Overview of the sample

Equipment Under Test(EUT)	
Name	: LED High Bay
Model	: 65HIDHB/840/BYP/EX39/R
Electrical Ratings	: 100-277Vac, 50/60Hz, 65W
Product Description	: 4000K
Manufacturer	: GREEN CREATIVE LTD
Address	: Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, KL, Hong Kong

TEST RESULTS

Test ambient temperature was 26.0 ℃.

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 65 minutes.

Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.543	0.257
Power Factor	0.9697	0.9085
Test Power (W)	63.12	64.76
THD A%	17.05	14.51
Luminous Efficacy (lm/W)	143.1	139.6
Total Luminous Flux (lm)	9031.9	9040.1
Color Rendering Index (CRI)	81.4	
R9	6.4	
Correlated Color Temperature (CCT)(K)	4053	
Chromaticity Chroma x	0.3790	
Chromaticity Chroma y	0.3790	
Chromaticity Chroma u	0.2233	
Chromaticity Chroma v	0.3349	
Duv	0.0015	
Chromaticity Chroma u ’	0.2233	
Chromaticity Chroma v’	0.5023	

Special Color Rendering Indices	
R1	79.3
R2	86.5
R3	92.2
R4	81
R5	79.3
R6	81.2
R7	86.4
R8	64.8
R9	6.4
R10	68
R11	79.5
R12	58.4
R13	80.8
R14	95.6

Table 2: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u’,v’) diagram, u’ = u = 4x/(-2x+12y+3), v’ = 3v/2 = 9y/(-2x+12y+3).

Goniophotometer Method

Test ambient temperature was 24.6 ℃.

The photometric distance is 2.47 m.

Luminous data was taken at 0.5 °vertical intervals and 10 °horizontal intervals.

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.547
Power Factor	0.9717
Power (W)	63.57
Luminous Efficacy (lm/W)	142.6
Total Luminous Flux (lm)	9064.5
Beam Angle (°)	114.4 (0^o-180^o) / 114.3 (90^o-270^o)
Center Beam Candle Power (cd)	3072
Maximum Beam Candle Power (cd)	3074 (At: C=120.0, Gamma=1.0)
Spacing Criteria	1.30 (0^o-180^o) / 1.28 (90^o-270^o)
Zonal Lumens in the 0 °-60 °Zone	79.01%
Zonal Lumens in the 60 °-90 °Zone	16.66%
Zonal Lumens in the 90 °-120 °Zone	1.02%
Zonal Lumens in the 120 °-180 °Zone	3.31%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

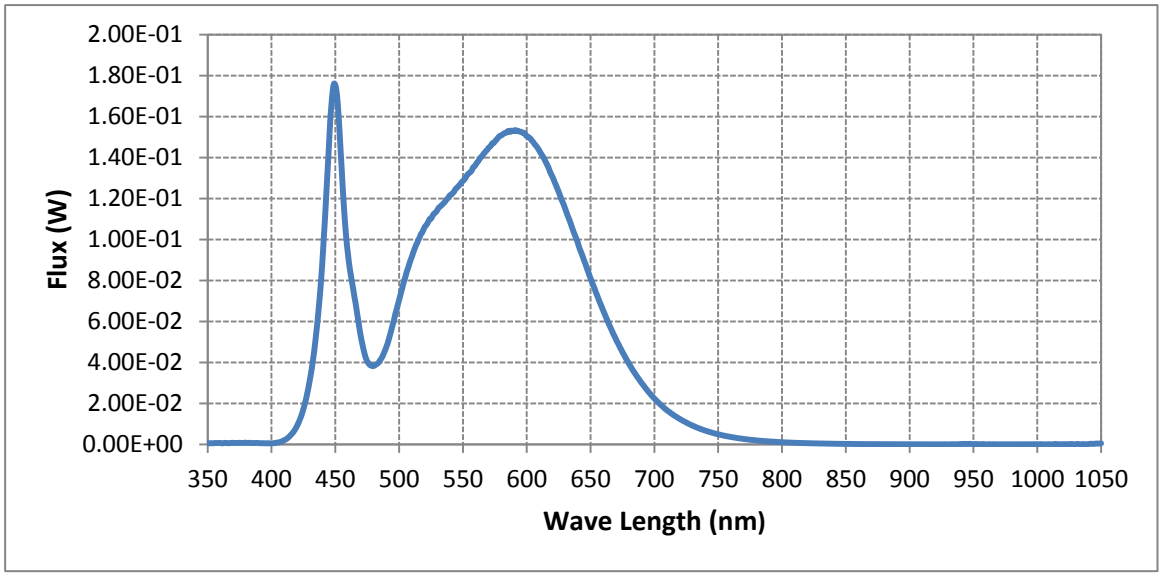
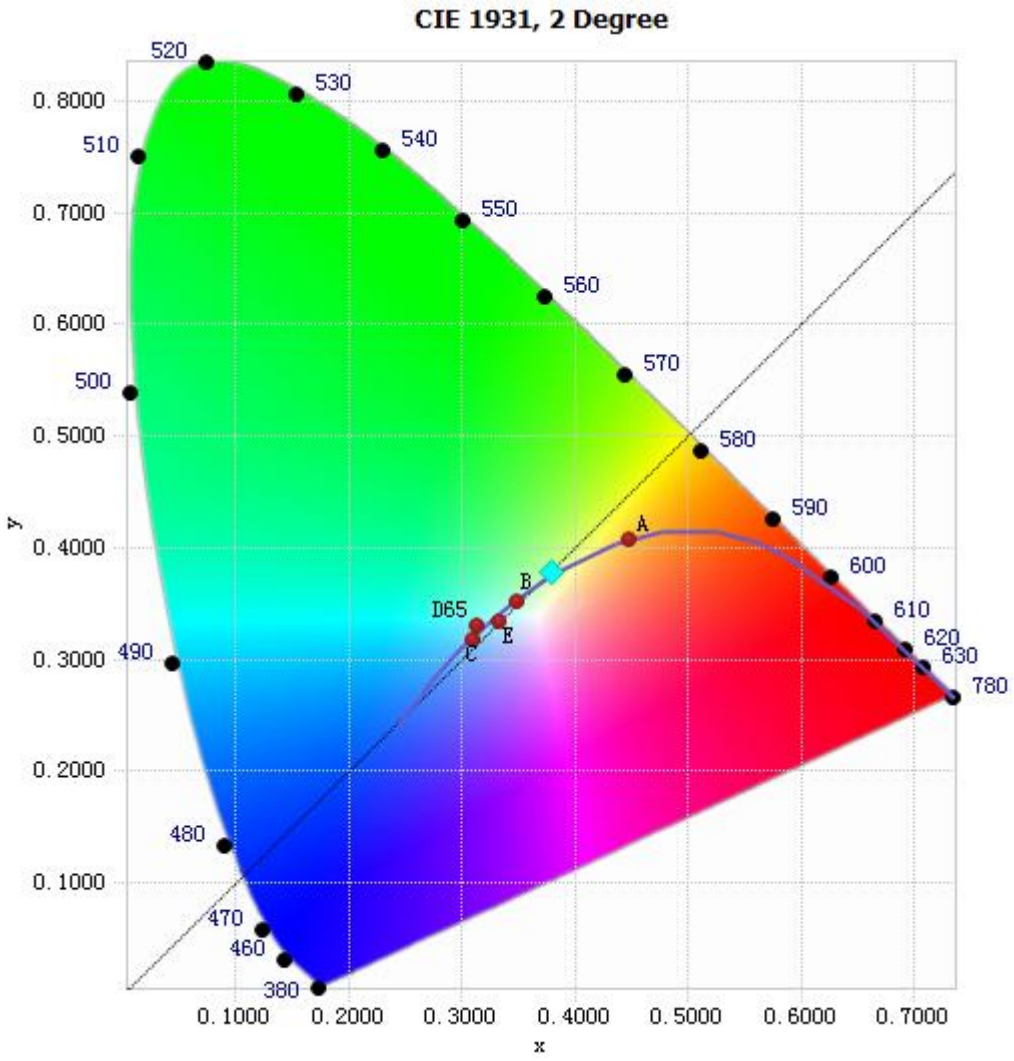


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	8.36E-04	485	4.10E-02	590	1.53E-01	695	2.60E-02
385	6.99E-04	490	4.76E-02	595	1.53E-01	700	2.25E-02
390	6.68E-04	495	5.85E-02	600	1.50E-01	705	1.93E-02
395	6.02E-04	500	7.05E-02	605	1.48E-01	710	1.66E-02
400	5.82E-04	505	8.21E-02	610	1.43E-01	715	1.44E-02
405	9.40E-04	510	9.17E-02	615	1.38E-01	720	1.24E-02
410	2.10E-03	515	9.97E-02	620	1.31E-01	725	1.07E-02
415	4.54E-03	520	1.06E-01	625	1.23E-01	730	9.19E-03
420	9.05E-03	525	1.10E-01	630	1.15E-01	735	7.86E-03
425	1.74E-02	530	1.14E-01	635	1.07E-01	740	6.75E-03
430	3.14E-02	535	1.18E-01	640	9.84E-02	745	5.80E-03
435	5.41E-02	540	1.22E-01	645	8.96E-02	750	4.96E-03
440	9.07E-02	545	1.25E-01	650	8.11E-02	755	4.25E-03
445	1.46E-01	550	1.29E-01	655	7.30E-02	760	3.67E-03
450	1.75E-01	555	1.33E-01	660	6.52E-02	765	3.14E-03
455	1.34E-01	560	1.37E-01	665	5.79E-02	770	2.69E-03
460	9.25E-02	565	1.41E-01	670	5.12E-02	775	2.30E-03
465	7.19E-02	570	1.45E-01	675	4.51E-02	780	1.98E-03
470	5.26E-02	575	1.48E-01	680	3.95E-02		
475	4.06E-02	580	1.51E-01	685	3.45E-02		
480	3.83E-02	585	1.53E-01	690	3.00E-02		

Table 4: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3790, 0.3790)

Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

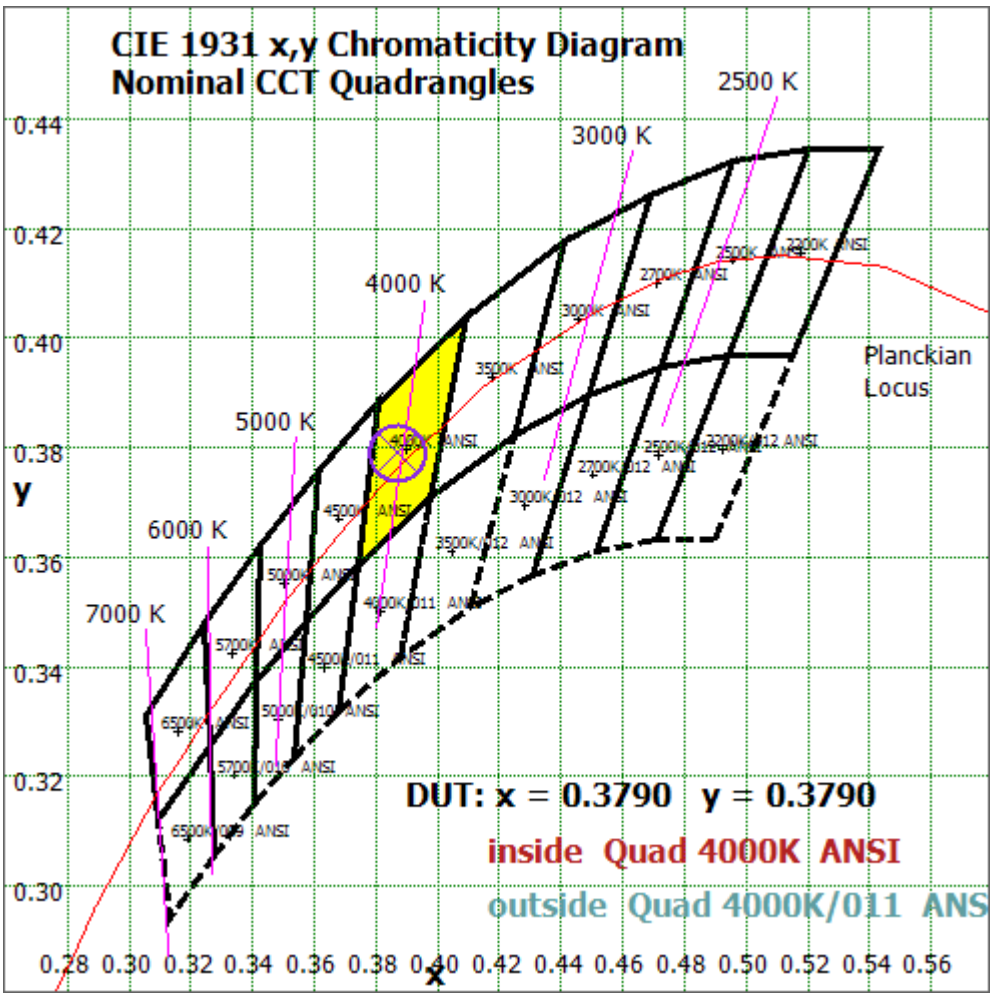
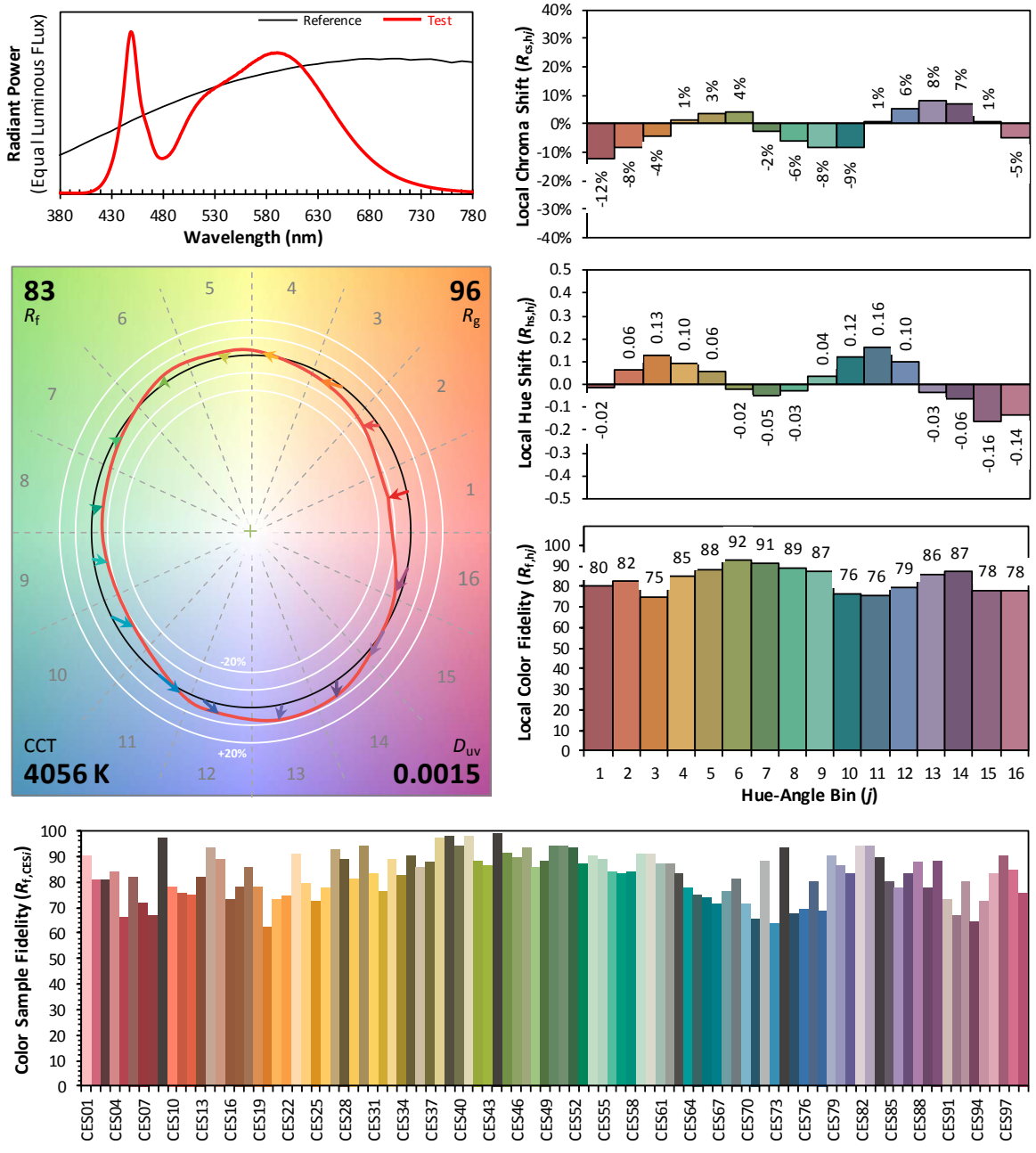


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3790
y	0.3790
u'	0.2233
v'	0.5023

Chart 4: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 2 due to rounding.

Zonal Lumen Tabulation- Goniophotometer Method

γ(°)	Lumens	% Total
0- 10	291.199	3.21%
10- 20	841.665	9.29%
20- 30	1286.158	14.19%
30- 40	1577.489	17.40%
40- 50	1678.841	18.52%
50- 60	1486.193	16.40%
60- 70	991.178	10.93%
70- 80	437.491	4.83%
80- 90	81.627	0.90%
90-100	29.339	0.32%
100-110	25.004	0.28%
110-120	38.468	0.42%
120-130	54.821	0.60%
130-140	70.925	0.78%
140-150	71.664	0.79%
150-160	59.626	0.66%
160-170	34.795	0.38%
170-180	8.008	0.09%
Total	9064.5	100%

γ(°)	Lumens	% Total
0- 60	7161.545	79.01%
60- 90	1510.296	16.66%
0-90	8671.841	95.67%
90- 180	392.65	4.33%
0- 180	9064.5	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

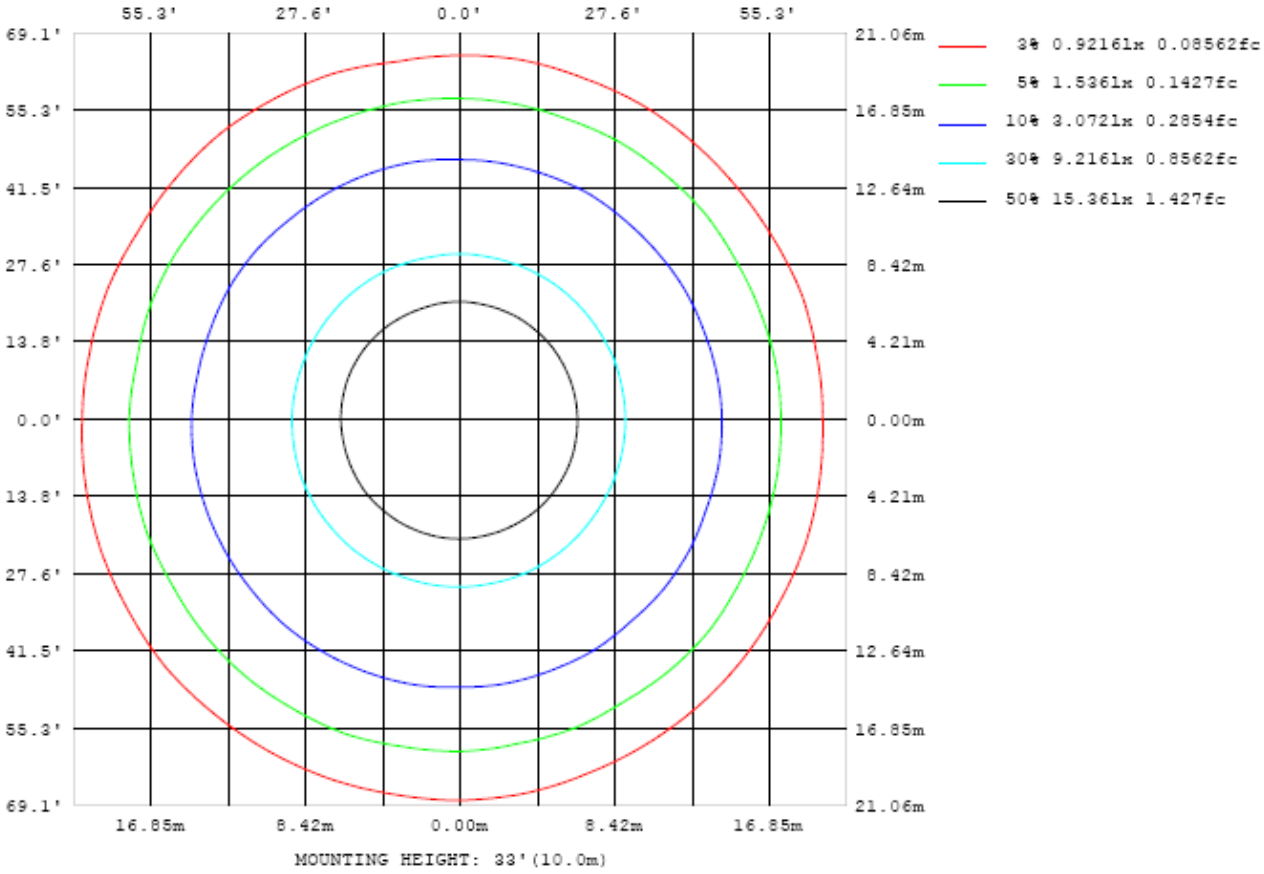


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

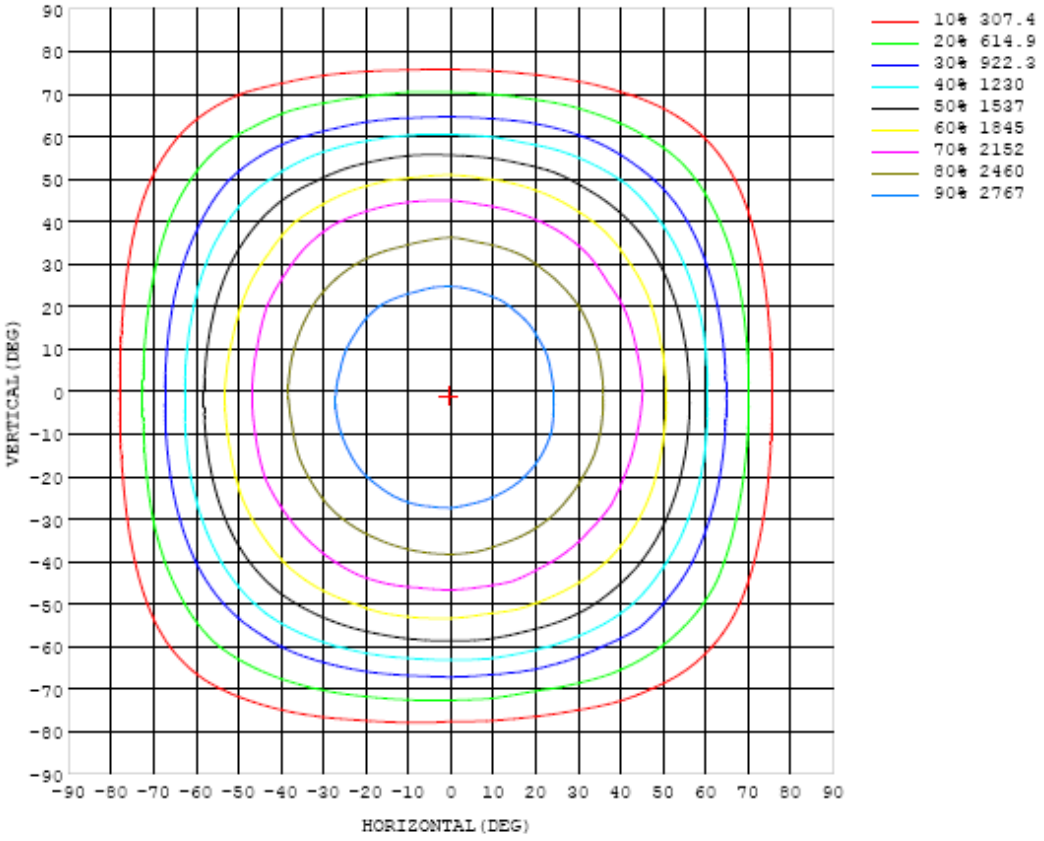


Chart 6: Isocandela Plot

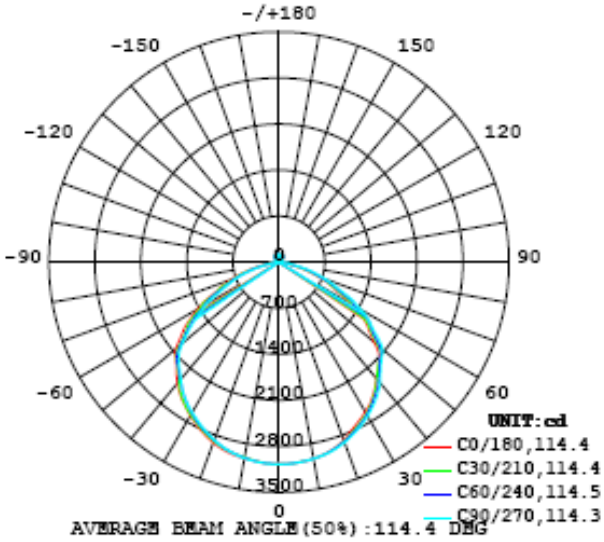


Chart 7: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072
5	3061	3064	3065	3060	3061	3062	3061	3061	3061	3063	3061	3061	3063	3062	3063	3060	3062	3058	3058
10	3040	3036	3038	3033	3033	3034	3034	3034	3035	3036	3035	3036	3037	3036	3040	3037	3038	3033	3029
15	2977	2983	2986	2984	2985	2986	2984	2987	2985	2992	2994	2998	3005	3013	3016	3011	3014	3005	2993
20	2879	2886	2890	2898	2901	2903	2906	2907	2911	2919	2922	2931	2941	2951	2960	2955	2949	2934	2918
25	2747	2754	2775	2784	2792	2796	2801	2807	2811	2819	2819	2828	2835	2840	2846	2838	2835	2829	2816
30	2629	2637	2656	2663	2670	2679	2679	2685	2688	2703	2706	2709	2707	2703	2708	2698	2693	2692	2696
35	2490	2498	2511	2513	2520	2535	2530	2540	2553	2566	2566	2558	2559	2560	2569	2557	2550	2551	2561
40	2309	2315	2320	2318	2328	2351	2362	2375	2385	2396	2397	2398	2403	2414	2415	2413	2421	2401	2405
45	2156	2142	2142	2153	2148	2160	2170	2195	2192	2201	2204	2211	2221	2220	2219	2223	2234	2219	2212
50	1898	1911	1948	1973	1989	2009	2015	2034	2025	2057	2058	2063	2055	2055	2057	2067	2059	2045	2042
55	1622	1633	1625	1665	1677	1669	1709	1711	1730	1738	1764	1775	1773	1785	1773	1769	1773	1766	1757
60	1274	1277	1291	1296	1320	1352	1351	1392	1408	1440	1428	1445	1434	1448	1454	1431	1428	1402	1408
65	917	926	931	956	979	975	997	1016	1044	1068	1082	1090	1105	1113	1121	1109	1099	1069	1049
70	626	634	659	670	689	707	683	715	742	751	742	788	778	798	773	784	790	770	758
75	344	359	369	369	406	407	434	442	441	474	499	502	496	508	512	526	493	484	474
80	127	134	143	156	161	168	168	187	195	208	211	219	232	233	235	225	223	223	209
85	49.2	50.3	52.3	53.8	57.2	57.9	60.3	65.0	68.4	73.1	74.5	79.1	80.2	79.6	80.1	78.3	77.8	79.1	74.7
90	30.7	31.5	30.7	32.8	33.0	31.5	31.0	34.9	37.0	37.5	36.3	37.3	39.7	40.5	38.3	37.2	39.4	40.0	36.7
95	24.8	25.5	23.7	23.5	23.7	25.7	26.7	27.7	30.2	32.1	32.2	32.5	32.9	33.1	32.1	32.0	31.1	31.5	31.2
100	20.6	20.9	20.4	20.8	20.7	21.6	21.4	22.7	22.2	23.4	22.8	23.8	22.7	23.0	24.2	24.0	25.1	22.4	22.4
105	24.3	21.7	22.3	24.0	23.5	21.0	22.1	22.3	22.2	21.4	23.7	22.6	21.7	21.2	21.9	21.8	20.5	22.2	21.9
110	34.5	32.2	29.9	32.5	31.6	27.8	28.1	30.2	28.4	26.3	27.1	28.6	26.8	25.9	28.2	25.4	25.4	28.5	30.4
115	42.6	42.0	41.7	39.6	39.5	39.7	37.7	39.0	37.9	36.0	35.0	34.9	35.0	34.9	34.7	34.2	34.9	35.9	38.8
120	50.9	52.5	52.2	48.2	48.4	50.9	47.6	45.9	46.8	47.3	43.5	42.9	45.9	43.9	41.4	42.2	44.4	43.7	44.5
125	66.1	65.5	65.3	64.5	63.1	62.6	61.0	59.0	59.7	59.5	56.3	54.9	55.4	54.2	52.1	52.6	55.1	53.3	54.8
130	81.5	82.8	82.0	81.9	81.2	78.5	79.3	78.4	75.3	72.9	71.7	70.7	70.4	69.9	68.0	68.1	68.2	68.5	69.8
135	97.4	97.6	99.4	100	98.3	94.2	95.9	93.3	92.6	90.2	89.5	87.5	87.6	87.0	85.4	85.6	84.7	84.6	85.0
140	109	108	109	110	109	103	108	107	104	99.7	103	103	101	100	101	101	97.0	99.0	101
145	121	119	118	119	118	110	117	116	113	107	114	113	111	110	111	110	104	110	113
150	130	129	129	128	128	118	128	126	124	116	123	122	120	119	120	120	112	119	122
155	137	126	127	136	136	125	136	135	133	124	133	132	130	128	129	130	118	128	130
160	129	128	129	142	130	127	127	140	126	126	132	138	125	124	133	136	123	123	124
165	126	125	118	105	109	114	129	126	113	127	105	132	125	113	124	125	126	121	128
170	99.3	85.4	107	101	99.1	93.5	85.1	105	108	94.6	91.9	88.0	109	117	87.5	97.8	112	113	99.2
175	93.5	82.5	84.8	84.6	75.9	68.0	76.5	70.1	48.0	50.7	53.3	63.6	63.5	70.0	87.9	85.1	80.6	62.8	69.1
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6: Luminous Intensity Data

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072		
5	3058	3056	3054	3054	3058	3058	3055	3058	3063	3060	3060	3062	3058	3064	3062	3061	3061		
10	3023	3020	3014	3014	3019	3022	3024	3026	3029	3026	3028	3032	3035	3042	3041	3043	3038		
15	2984	2978	2967	2969	2968	2966	2963	2963	2966	2964	2961	2962	2962	2971	2971	2975	2973		
20	2907	2900	2893	2892	2890	2880	2872	2874	2876	2870	2865	2862	2854	2858	2857	2865	2872		
25	2803	2798	2787	2789	2787	2773	2762	2762	2760	2753	2747	2753	2748	2747	2743	2746	2740		
30	2688	2690	2681	2674	2667	2648	2636	2636	2637	2625	2617	2621	2612	2626	2617	2621	2626		
35	2558	2555	2550	2534	2518	2501	2486	2491	2502	2480	2480	2485	2472	2476	2479	2480	2482		
40	2390	2378	2365	2352	2343	2332	2308	2302	2321	2302	2299	2299	2292	2289	2304	2311	2299		
45	2195	2193	2191	2192	2197	2183	2170	2160	2150	2136	2132	2130	2130	2131	2118	2135	2139		
50	2024	2015	1974	1980	1961	1944	1932	1902	1910	1880	1874	1867	1858	1864	1851	1872	1871		
55	1700	1690	1696	1679	1640	1633	1623	1615	1578	1573	1563	1576	1547	1554	1572	1570	1600		
60	1366	1381	1367	1353	1333	1300	1294	1291	1270	1258	1236	1260	1246	1255	1230	1239	1264		
65	1033	1026	1016	1007	975	939	926	910	901	894	911	903	891	868	884	893	896		
70	750	741	714	701	685	672	654	648	647	637	615	615	584	589	605	600	619		
75	481	464	433	407	406	385	369	350	343	345	336	332	316	319	319	319	323		
80	198	195	186	179	165	153	152	144	136	128	124	121	119	117	118	122	127		
85	72.6	72.1	70.3	65.1	58.1	55.9	53.3	51.9	49.9	49.4	49.3	47.4	46.7	45.7	46.8	47.7	49.8		
90	36.1	36.5	36.2	34.0	30.0	29.4	27.8	29.2	28.3	30.1	30.1	31.4	31.9	31.1	31.4	30.2	31.0		
95	29.5	28.5	26.1	24.2	23.4	22.8	22.5	22.3	24.3	23.8	23.3	22.3	23.1	24.4	24.8	24.5	24.1		
100	22.2	21.9	21.0	20.5	20.2	20.4	20.2	20.0	19.7	21.5	20.0	19.8	19.8	20.4	22.6	19.9	21.3		
105	21.3	21.2	21.9	22.7	20.4	21.1	24.8	23.3	22.7	22.8	24.4	23.1	23.3	26.0	23.8	23.4	24.3		
110	27.1	25.9	30.6	31.6	27.0	28.4	33.1	31.3	29.8	30.5	32.2	31.6	31.9	33.2	33.4	31.4	34.1		
115	38.1	38.4	38.4	38.7	37.3	39.6	41.0	40.6	40.8	40.0	40.3	43.5	43.0	41.9	41.9	43.3	43.5		
120	47.3	48.3	44.6	43.6	48.7	50.4	48.8	49.6	52.8	50.2	50.5	52.3	52.8	51.1	51.7	54.7	53.3		
125	58.2	58.8	54.1	54.1	60.0	61.6	63.0	65.0	66.1	65.2	65.1	66.2	66.6	67.3	67.7	68.0	67.8		
130	71.7	71.0	72.0	71.7	76.4	78.1	78.7	81.3	81.9	83.2	81.6	83.7	85.2	86.0	86.5	85.1	82.6		
135	86.4	86.0	87.4	88.3	91.0	94.1	95.3	95.6	93.5	96.1	96.9	97.0	97.4	98.5	99.0	95.5	98.2		
140	101	98.6	104	105	105	106	108	107	101	107	108	106	107	110	110	104	110		
145	113	106	114	115	114	116	117	117	109	119	119	117	119	122	122	113	121		
150	123	113	123	124	123	125	126	127	116	129	129	127	129	131	131	121	131		
155	131	119	131	131	130	123	134	134	122	135	136	126	123	137	138	125	138		
160	124	124	125	137	127	125	137	139	126	127	141	113	113	141	140	129	132		
165	128	118	118	141	130	130	130	131	130	131	130	124	102	131	132	132	131		
170	98.9	98.7	114	115	115	130	115	115	117	110	101	112	110	102	99.6	114	122		
175	69.7	80.5	81.5	95.2	83.9	96.0	94.8	94.3	90.8	81.0	102	78.0	80.8	80.9	90.3	96.0	96.9		
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

Table 7: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Aug. 02, 2019	Aug. 01, 2020
Digital Power Meter	PF2010A	HZTE028-01	Aug. 02, 2019	Aug. 01, 2020
AC Power Supply	DPS1060	HZTE001-06	Aug. 02, 2019	Aug. 01, 2020
DC Power Supply	WY12010	HZTE004-03	Aug. 02, 2019	Aug. 01, 2020
Temperature recorder	JM624U	HZTE018-08	Aug. 02, 2019	Aug. 01, 2020
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 02, 2019	Aug. 01, 2020
Standard source	D908	HZTE012-01	Aug. 02, 2019	Aug. 01, 2020
Integrate Sphere system	3M	HZTE015-04	Aug. 02, 2019	Aug. 01, 2020
Digital Power Meter	WT210	HZTE008-01	Aug. 02, 2019	Aug. 01, 2020
AC Power Supply	PCR 500L	HZTE001-07	Aug. 02, 2019	Aug. 01, 2020
DC Power Supply	IT6154	HZTE004-04	Aug. 02, 2019	Aug. 01, 2020
Standard source	SCL-1400	HZTE012-02	Aug. 02, 2019	Aug. 01, 2020
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 02, 2019	Aug. 01, 2020
Temperature Meter	TES1310	HZTE017-01	Aug. 02, 2019	Aug. 01, 2020

Table 8: 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.

Sphere-Spectroradiometer Method- Photometric and Electrical Measurements

A Labsphere Model CDS 2100 Spectroradiometer and Two Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit. The coating reflectance of each sphere is 98%. The measure geometry is 4π. Self-absorption correction is conducted in testing. Bandwidth of spectroradiometer is 350nm-1050nm.
Ambient temperature was measured at a position inside the sphere. 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 LED lamps) 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 Yokogawa Power Analyzer.
The standard reference of the integrated sphere system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Standards and Technology.

The uncertainty of integrating sphere system reported in this document is expended uncertainty is 2.1% with a coverage factor k=2.

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 LED lamps) 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 2.3% with a coverage factor k=2.

Color Characteristics Measurements

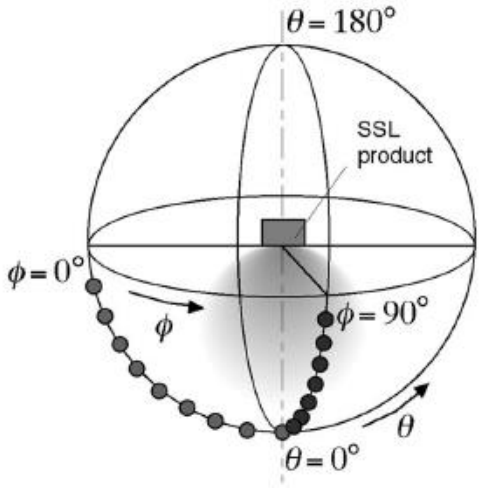
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as 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°/180° and C=90°/270°) 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, Δu'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 ***