

LM-79-08 TEST REPORT

for

GREEN CREATIVE LTD

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

LED Highbay

Model: 135HIDHB/850/BYP/EX39

135HIDHBSen/850/BYP/EX39

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ20010030b

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

Review by:



Engineer: April Zou
Feb. 21, 2020



Approved by:



Manager: Jim Zhang
Feb. 21, 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: 135HIDHB/850/BYP/EX39

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
150.6	20445.0	135.79	0.9987
CCT (K)	CRI	Stabilization Time (Light & Power)	
4967	83.5	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. 20, 2020
Date of Test	: Feb. 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 Highbay
Model	: 135HIDHB/850/BYP/EX39
Electrical Ratings	: 120-277V, 50/60Hz, 135W
Product Description	: Highbay 20000lm no sensor 5000K
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 26.0 °C.

Base orientation was light down. 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)	1.133	0.506
Power Factor	0.9987	0.9421
Test Power (W)	135.79	131.95
THD A%	3.99	7.85
Luminous Efficacy (lm/W)	150.6	154.9
Total Luminous Flux (lm)	20445.0	20443.0
Color Rendering Index (CRI)	83.5	
R9	10.7	
Correlated Color Temperature (CCT)(K)	4967	
Chromaticity Chroma x	0.3466	
Chromaticity Chroma y	0.3595	
Chromaticity Chroma u	0.2094	
Chromaticity Chroma v	0.3258	
Duv	0.0033	
Chromaticity Chroma u'	0.2094	
Chromaticity Chroma v'	0.4887	

Special Color Rendering Indices	
R1	81.5
R2	89.1
R3	94
R4	81.7
R5	81.2
R6	83.9
R7	88.1
R8	68.1
R9	10.7
R10	73.5
R11	80.6
R12	55.6
R13	83.7
R14	96.9

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 24.8 °C.

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)	1.143
Power Factor	0.9985
Power (W)	137.08
Luminous Efficacy (lm/W)	151.2
Total Luminous Flux (lm)	20725.0
Beam Angle (°)	110.6 (0°-180°) / 110.5 (90°-270°)
Center Beam Candle Power (cd)	7747
Maximum Beam Candle Power (cd)	7754 (At: C=140.0, Gamma=0.5)
Spacing Criteria	1.26 (0°-180°) / 1.26 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	83.34%
Zonal Lumens in the 60 °-90 °Zone	14.44%
Zonal Lumens in the 90 °-120 °Zone	0.66%
Zonal Lumens in the 120 °-180 °Zone	1.56%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

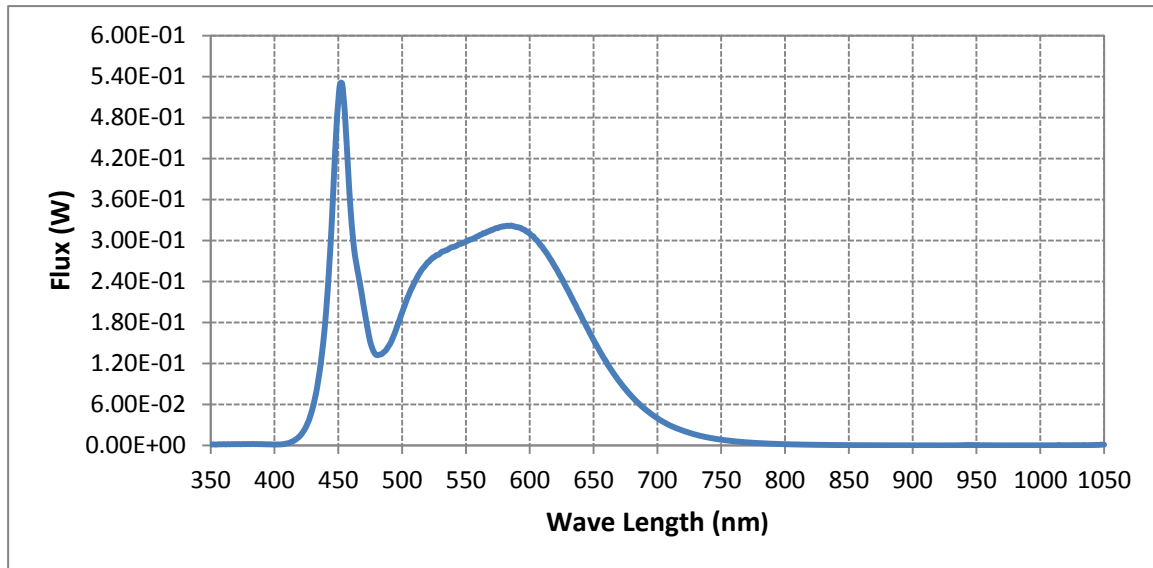
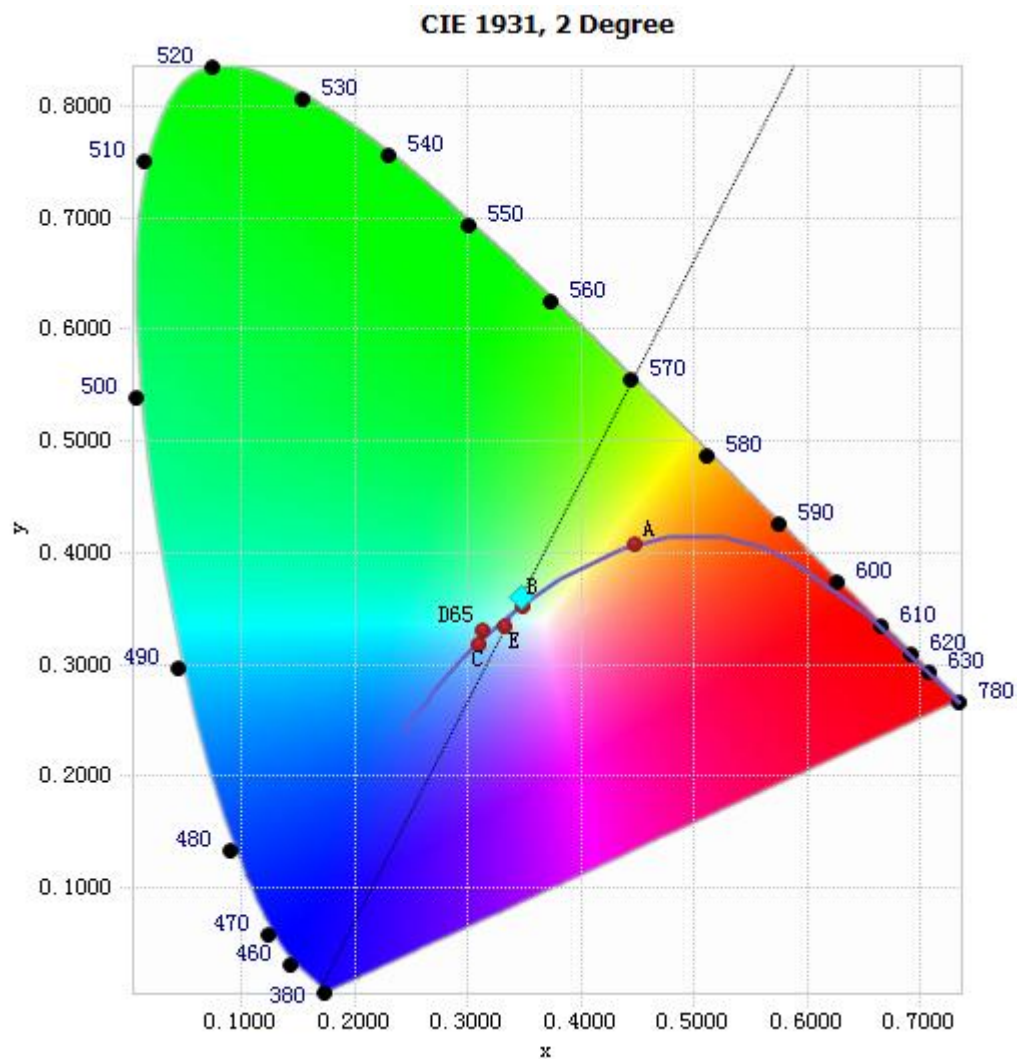


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.05E-03	485	1.36E-01	590	3.20E-01	695	4.64E-02
385	2.00E-03	490	1.47E-01	595	3.16E-01	700	3.99E-02
390	1.96E-03	495	1.68E-01	600	3.10E-01	705	3.42E-02
395	1.65E-03	500	1.95E-01	605	3.01E-01	710	2.92E-02
400	1.39E-03	505	2.20E-01	610	2.90E-01	715	2.52E-02
405	1.60E-03	510	2.40E-01	615	2.76E-01	720	2.17E-02
410	3.08E-03	515	2.56E-01	620	2.61E-01	725	1.86E-02
415	6.76E-03	520	2.68E-01	625	2.45E-01	730	1.59E-02
420	1.41E-02	525	2.76E-01	630	2.27E-01	735	1.36E-02
425	2.86E-02	530	2.82E-01	635	2.09E-01	740	1.16E-02
430	5.56E-02	535	2.86E-01	640	1.90E-01	745	9.93E-03
435	1.04E-01	540	2.91E-01	645	1.72E-01	750	8.51E-03
440	1.87E-01	545	2.95E-01	650	1.54E-01	755	7.26E-03
445	3.32E-01	550	2.98E-01	655	1.38E-01	760	6.24E-03
450	5.04E-01	555	3.02E-01	660	1.22E-01	765	5.35E-03
455	4.90E-01	560	3.07E-01	665	1.07E-01	770	4.63E-03
460	3.36E-01	565	3.11E-01	670	9.43E-02	775	3.95E-03
465	2.57E-01	570	3.16E-01	675	8.25E-02	780	3.40E-03
470	2.02E-01	575	3.18E-01	680	7.17E-02		
475	1.52E-01	580	3.21E-01	685	6.22E-02		
480	1.32E-01	585	3.22E-01	690	5.37E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3466, 0.3595)

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

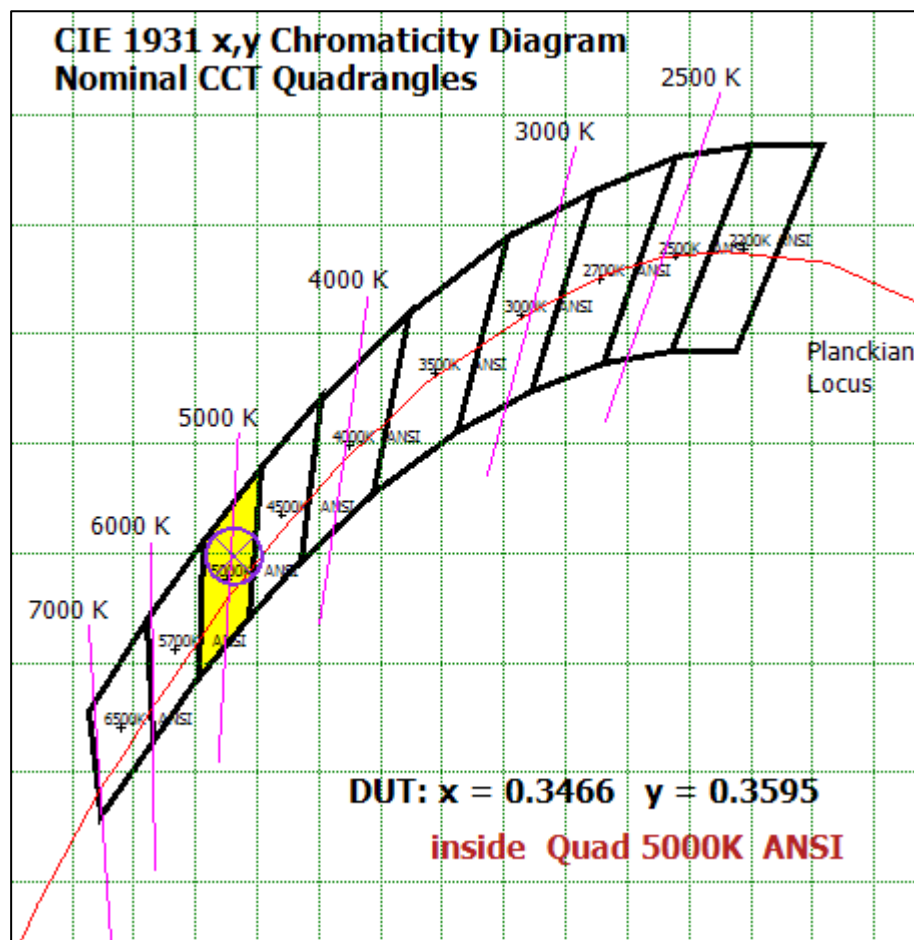
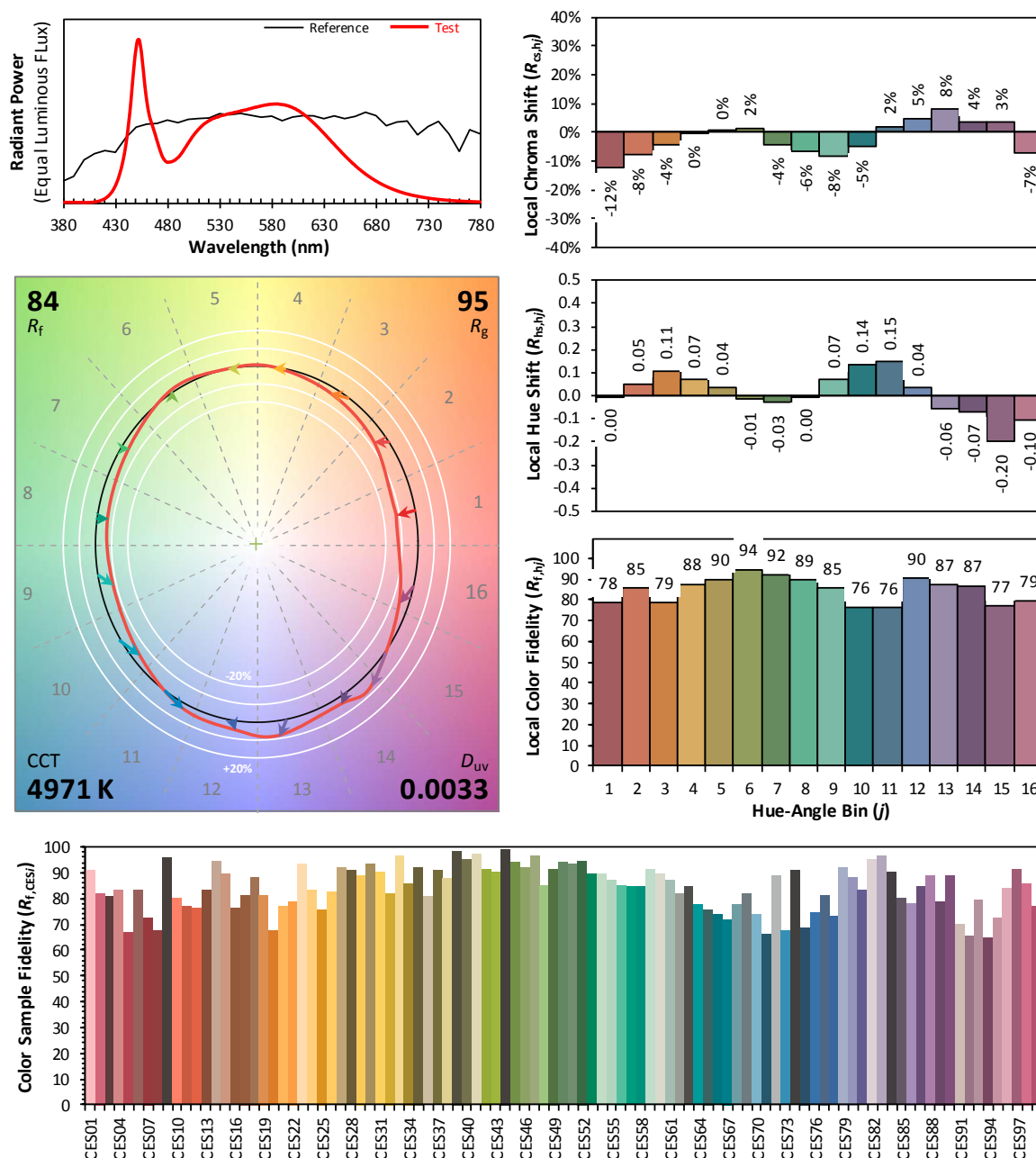


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method



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

x 0.3466
 y 0.3595
 u' 0.2094
 v' 0.4887

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

$\gamma(^{\circ})$	Lumens	% Total
0- 10	734.054	3.54%
10- 20	2107.649	10.17%
20- 30	3200.975	15.45%
30- 40	3843.208	18.54%
40- 50	3922.633	18.93%
50- 60	3463.59	16.71%
60- 70	2067.011	9.97%
70- 80	784.176	3.78%
80- 90	141.35	0.68%
90-100	45.15	0.22%
100-110	37.102	0.18%
110-120	53.826	0.26%
120-130	70.057	0.34%
130-140	76.299	0.37%
140-150	72.353	0.35%
150-160	58.719	0.28%
160-170	36.608	0.18%
170-180	9.775	0.05%
Total	20724.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	17272.11	83.34%
60- 90	2992.537	14.44%
0-90	20264.65	97.78%
90- 180	459.889	2.22%
0- 180	20724.5	100%

Table 5: Zonal Lumen

Note: The Flux in this table might be a little different from the total flux in Table 2 due to rounding.

Illuminance Plots- Goniophotometer Method

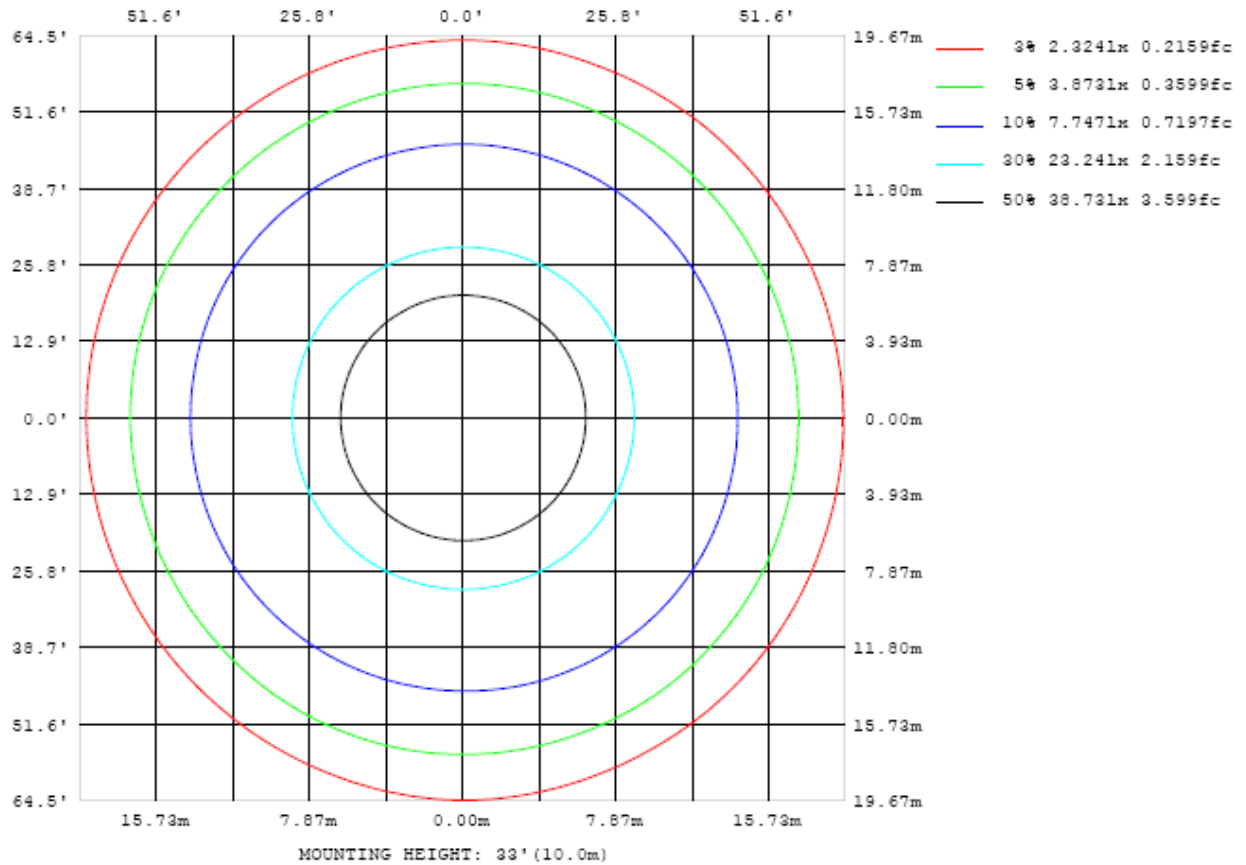


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

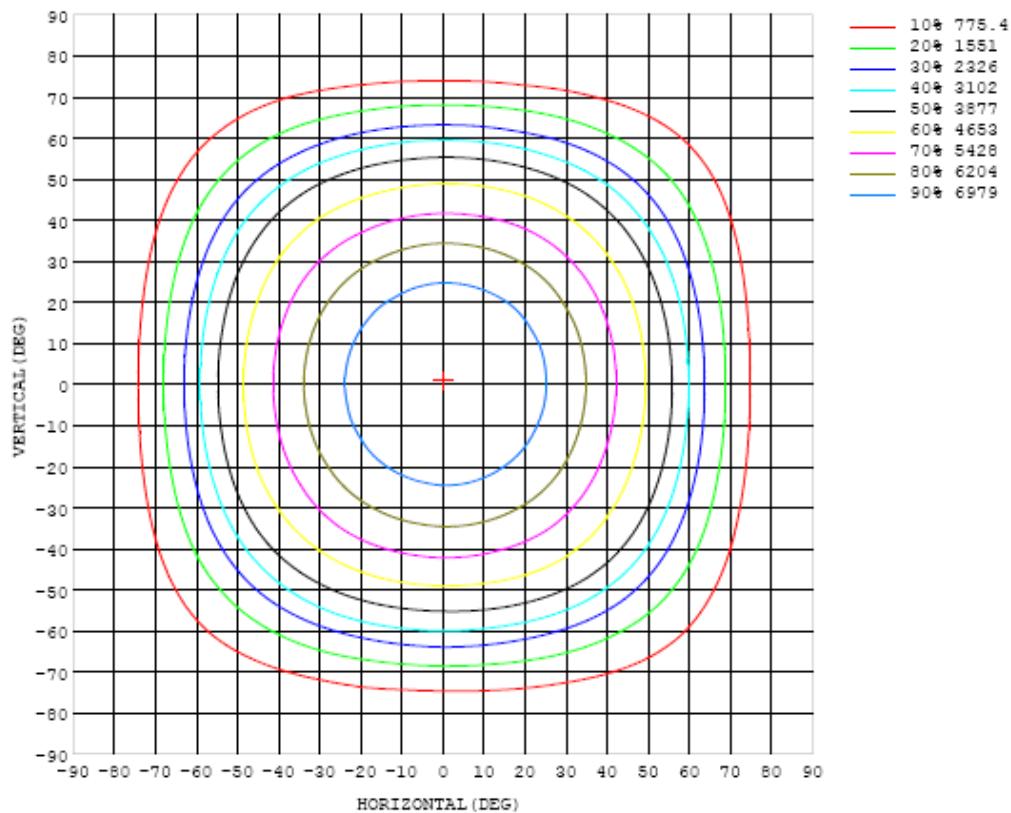


Chart 6: Isocandela Plot

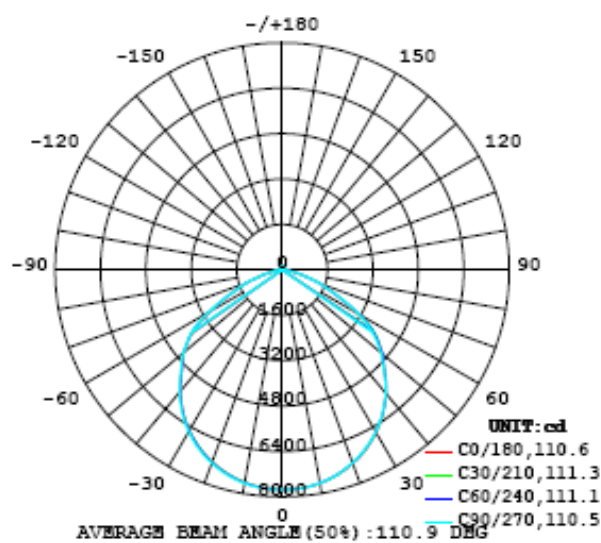


Chart 7: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1

UNIT: cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747
5	7729	7732	7720	7722	7729	7728	7724	7723	7732	7725	7720	7712	7715	7719	7717	7700	7709	7703	7710
10	7636	7642	7636	7631	7636	7635	7633	7634	7637	7635	7616	7618	7616	7616	7613	7602	7609	7608	7609
15	7490	7485	7480	7482	7477	7476	7473	7477	7477	7469	7453	7456	7447	7454	7453	7429	7437	7445	7442
20	7276	7266	7257	7250	7252	7254	7245	7248	7247	7242	7226	7225	7220	7221	7209	7198	7212	7206	7209
25	6989	6984	6970	6967	6965	6958	6953	6954	6957	6946	6929	6919	6917	6918	6910	6897	6904	6906	6909
30	6624	6621	6612	6611	6610	6609	6600	6596	6601	6586	6569	6558	6548	6550	6544	6533	6543	6537	6547
35	6189	6182	6182	6189	6193	6188	6175	6175	6176	6167	6147	6130	6134	6132	6124	6107	6106	6104	6098
40	5663	5663	5665	5686	5697	5702	5688	5670	5668	5668	5655	5644	5635	5632	5621	5590	5594	5579	5589
45	5099	5098	5098	5106	5124	5139	5127	5107	5105	5095	5081	5081	5086	5077	5057	5031	5019	5007	4999
50	4600	4592	4578	4593	4622	4637	4613	4581	4555	4538	4524	4523	4532	4521	4508	4513	4517	4509	4518
55	3994	4001	4014	4025	4031	4015	3988	3961	3939	3903	3891	3887	3880	3875	3878	3879	3865	3852	3856
60	3056	3071	3091	3117	3119	3128	3109	3090	3089	3085	3082	3064	3039	2999	2960	2932	2918	2918	2925
65	2088	2103	2106	2120	2127	2113	2114	2114	2120	2121	2083	2058	2038	2023	2011	2009	2007	2002	2001
70	1411	1415	1416	1423	1427	1423	1404	1395	1378	1375	1368	1357	1340	1321	1316	1313	1310	1314	1310
75	754	747	758	790	803	786	762	763	741	717	718	737	712	702	697	711	705	702	698
80	303	299	307	294	288	287	297	295	298	291	281	282	277	277	275	268	262	260	270
85	133	133	133	138	138	135	132	126	122	121	116	117	112	107	111	109	110	110	118
90	45.1	44.9	44.2	45.1	43.4	44.7	43.3	42.4	41.5	42.5	41.9	43.1	42.9	41.9	41.3	42.5	41.0	43.3	42.7
95	43.5	43.4	43.3	43.6	43.1	42.6	41.2	39.9	39.4	39.2	40.6	39.8	39.2	38.7	39.0	39.6	40.9	40.6	39.8
100	35.9	34.7	35.2	35.1	35.0	34.7	34.0	33.8	33.1	34.7	33.3	32.8	32.4	32.6	32.6	32.7	32.9	32.7	32.9
105	34.4	32.9	33.4	33.1	32.3	32.3	32.4	33.1	32.0	32.5	32.8	33.0	30.5	32.4	32.5	32.0	32.4	33.5	34.3
110	40.8	40.7	40.0	39.9	40.0	39.5	40.3	40.4	38.6	39.1	40.2	40.3	40.3	41.8	41.7	42.2	42.1	43.3	43.9
115	53.3	53.1	50.4	51.8	52.2	51.3	53.3	53.2	47.7	52.1	53.1	52.5	52.3	55.4	52.7	55.3	55.4	56.3	56.5
120	67.0	67.0	62.6	64.7	66.4	63.3	67.2	66.1	65.4	65.5	65.9	66.4	60.4	68.6	67.0	68.5	63.9	64.0	69.4
125	77.5	78.9	70.3	76.3	77.3	73.3	79.1	76.9	78.7	72.7	76.3	78.3	73.9	76.9	74.5	76.9	79.2	77.5	81.8
130	86.9	90.5	76.7	90.1	87.7	83.7	89.2	86.1	90.1	82.8	86.8	90.6	87.7	88.9	88.3	93.0	87.4	88.2	93.5
135	94.2	101	88.2	101	98.0	95.2	96.7	95.7	101	93.0	96.4	101	97.2	102	98.1	99.3	95.7	92.5	104
140	105	111	96.0	109	109	105	107	96.9	111	104	106	112	107	114	106	113	106	99.4	114
145	113	118	101	113	117	111	118	106	115	112	113	121	113	121	108	119	113	110	118
150	117	122	110	120	123	117	124	116	113	113	115	124	116	122	106	123	126	116	128
155	122	131	117	124	120	122	117	119	121	128	123	131	123	133	120	131	132	118	129
160	115	134	125	124	120	121	126	121	121	135	127	138	129	131	128	130	138	128	135
165	120	126	130	108	122	109	121	127	128	121	132	141	132	134	123	127	141	131	140
170	130	119	105	98.4	93.6	105	81.5	91.4	98.2	114	121	110	127	122	131	129	114	130	131
175	78.3	73.9	74.4	82.9	91.0	82.3	80.0	77.6	79.5	76.5	106	99.4	107	108	102	111	89.4	98.5	110
180	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63

Table 6: 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	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747	7747		
5	7714	7713	7709	7721	7721	7713	7725	7726	7731	7723	7722	7724	7737	7736	7725	7728	7724		
10	7616	7611	7611	7619	7623	7629	7624	7638	7639	7626	7632	7636	7641	7646	7636	7643	7643		
15	7443	7446	7442	7447	7452	7458	7469	7482	7481	7475	7483	7491	7494	7493	7490	7497	7486		
20	7212	7212	7206	7215	7225	7219	7233	7253	7259	7254	7268	7267	7274	7280	7272	7280	7277		
25	6914	6904	6910	6923	6921	6921	6936	6957	6962	6967	6971	6982	6995	6998	6990	7005	6989		
30	6542	6545	6551	6548	6550	6552	6573	6588	6594	6600	6610	6619	6632	6636	6626	6637	6632		
35	6101	6108	6110	6109	6115	6106	6120	6132	6144	6146	6167	6175	6195	6201	6187	6198	6189		
40	5591	5598	5603	5606	5594	5584	5588	5609	5622	5624	5647	5675	5683	5688	5685	5687	5688		
45	5007	5021	5030	5032	5019	5002	5001	5030	5042	5042	5061	5075	5087	5085	5094	5104	5106		
50	4505	4509	4536	4545	4539	4514	4493	4503	4528	4530	4541	4561	4562	4563	4573	4588	4596		
55	3861	3892	3900	3918	3923	3919	3916	3916	3930	3931	3934	3945	3949	3950	3951	3962	3981		
60	2939	2943	2942	2940	2954	2951	2972	2996	3002	3005	2995	2991	3004	3007	3003	3036	3063		
65	1996	1995	1987	1992	2005	2002	1997	2004	2007	2005	2009	2035	2055	2065	2080	2088	2088		
70	1315	1314	1320	1337	1339	1323	1310	1304	1317	1325	1333	1338	1332	1339	1367	1393	1416		
75	693	675	680	684	691	697	686	693	696	705	704	709	708	729	741	763	766		
80	267	266	269	263	265	262	262	261	258	261	269	277	283	292	292	298	307		
85	113	109	112	116	116	116	117	117	125	130	131	131	130	131	135	136	137		
90	41.6	42.3	43.7	42.8	44.5	44.1	42.4	41.9	42.4	42.1	44.7	45.5	45.1	44.9	45.2	44.8	45.5		
95	39.6	40.1	41.1	42.7	42.7	41.7	40.2	40.1	40.7	43.8	43.5	43.6	44.2	44.3	45.5	46.3	44.8		
100	33.2	33.3	34.3	34.2	34.2	35.0	33.8	34.4	34.9	35.7	35.7	36.3	36.3	36.2	36.9	36.4	36.1		
105	35.3	34.7	34.2	34.2	34.6	34.3	34.0	34.5	33.9	34.4	34.8	34.2	34.0	34.1	33.9	34.3	34.6		
110	44.1	44.8	44.3	44.6	44.9	43.7	44.1	43.2	42.7	42.0	41.8	41.6	41.0	40.8	40.8	42.2	42.3		
115	56.6	58.6	57.8	57.4	57.1	57.1	57.6	56.2	56.1	55.8	54.9	54.8	53.9	54.6	54.6	55.1	55.0		
120	68.6	71.3	69.4	70.5	69.5	68.9	70.6	68.1	69.2	67.1	67.0	67.6	66.9	68.2	67.0	68.1	67.5		
125	79.6	83.3	80.2	82.7	80.5	79.5	82.6	79.2	81.9	78.2	78.1	78.8	77.9	80.5	78.0	80.3	78.1		
130	90.0	92.8	90.5	94.4	90.8	90.1	94.7	89.9	93.9	88.9	88.7	89.1	87.8	91.6	87.8	91.2	86.3		
135	96.7	104	100	105	100	100.0	106	99.9	105	98.8	99.8	99.5	97.6	103	97.7	99.8	97.6		
140	104	114	108	115	109	109	116	109	115	108	111	109	107	113	106	108	107		
145	110	123	116	124	117	117	124	116	124	116	119	118	115	122	114	116	115		
150	120	126	122	131	125	124	131	122	130	121	127	125	121	128	120	127	116		
155	126	135	127	136	134	129	137	127	136	127	135	134	127	134	126	135	130		
160	127	134	132	139	141	133	140	133	136	134	140	141	132	138	131	141	140		
165	133	143	140	134	138	136	138	137	144	142	141	135	135	141	130	139	130		
170	131	119	125	130	125	127	125	128	134	125	128	126	135	131	116	115	106		
175	110	112	118	117	116	110	117	117	107	111	112	110	115	97.5	99.0	110	106		
180	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63		

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 expanded 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 expanded uncertainty is 2.3% with a coverage factor $k=2$.

Color Characteristics Measurements

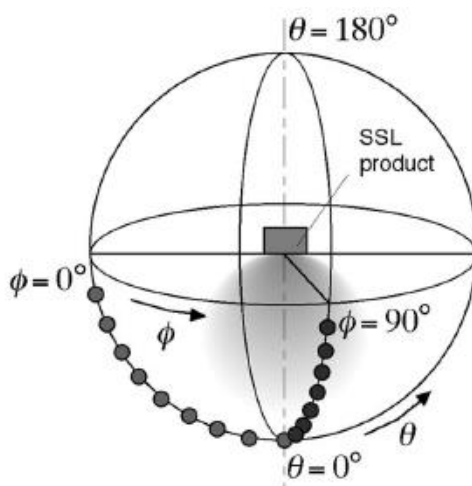
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as 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 ($C=0^\circ/180^\circ$ 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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