TESTING
NVLAP LAB CODE 600149-0

Ningbo TengLi Testing Co., Ltd

2nd floor, Block B, Ningbo Testing and Certification Base, No. 66
Qingyi Road, Ningbo National Hi-Tech Zone, Ningbo, Zhejiang
Tel: 86574-8783 6802
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LM-79-08 Test Report

For

CEA ELECTRIC CO.,LTD

(Brand Name: CEA EAEC)

55TH DINGDA ROAD,FUYANG INDUSTRIAL ZONE, YINGQUAN DISTRICT,
FUYANG,ANHUI,CHINA 236000

Model name(s): CSFL-100XX-Y

Report Type:	Testing and Report According to IES LM-79-2008
Type of Luminaire:	Architectural Flood and Spot Luminaires
Report Date:	2018-04-16
Prepared By:	Ningbo TengLi Testing Co., Ltd 2nd floor, Block B, Ningbo Testing and Certification Base, No. 66 Qingyi Road, Ningbo National Hi-Tech Zone, Ningbo, Zhejiang

Test & Report By:

Engineer: Bill Luo

Review By:

Engineer: Johnson Sun

Note: 1.The results contained in this report pertain only to the tested samples.

2.This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

1.1 Product Information:		
Model Number	CSFL-100XX-Y	
Remark	"XX" stands for different CCT:30=3000K, 35=3500K,40=4000K,45=4500K,50=5000K,57=5700K	
Representative (Tested) Model	CSFL-10030-Y,CSFL-10057-Y	
Model Difference	All construction and rating are the same, except CCT	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Architectural Flood and Spot Luminaires	
LED Manufacturer	Guangzhou Hongli Opto-Electronic Co., Ltd.	
LED Model	HL-AT-2835D46W-2C-S1-08-PCT-HR3	
Dimming	N/A	
Sample Number	STD180222NB-B1(3000K),B2(5700K)	
Date of Receipt	Apr.01,2018	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

1.2 Rated Values:	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz
Nominal Power	100W
Rated Initial Lamp Lumen	--
Declared CCT	3000K,3500K,4000K,4500K,5000K, 5700K

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1.3 Test Specifications:

Test item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2015 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.4 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method: Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25 ℃ ±1 ℃, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1 °vertical intervals and 22.5 °horizontal intervals.
2) Chromaticity Measurement – Sphere-Spectroradiometer Method: Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 ºC ±1 ºC. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.
3) Electrical Measurements: Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25 ºC ±1 ºC. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

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2.1 Summary of Test Result

Criteria Item	Measured Value			Compliance	Requirement (DLC V4.2)	
Power (W)	3000K	120V	94.52	N/A	N/A	
		277V	95.84			
	5700K	120V	95.74			
		277V	96.06			
Power Factor	3000K	120V	0.9883	Pass	>= 0.9(-3%)	
		277V	0.8820			
	5700K	120V	0.9888			
		277V	0.8824			
THD %	3000K	120V	12.34	Pass	<= 20(+5)	
		277V	19.21			
	5700K	120V	12.89			
		277V	19.48			
CRI	3000K	82.5		Pass	>= 65(-2)	
	5700K	83.7				
CCT (K)	3000K	2968		Pass	<=5700K	
	5700K	5525				
Luminous Intensity Distribution	Zonal lumens in the 0-90 °		99.9	Pass	>= 85(-3)	
Total Luminous	3000K	120V	10856	Pass	⩾1000 lm	
		277V	10792			
	5700K	120V	11193			
		277V	11035			
Luminous Efficacy	3000K	120V	114.85	Pass	Standard: >= 100(-3%)	Premium: >= 120(-3%)
		277V	112.60			
	5700K	120V	116.91			
		277V	114.88			

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2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2018-04-02	**Test Ambient:**	25.2 ℃
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	CSFL-10030-Y		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD180222	120.0	60	0.7970	94.52	0.9883	12.34
NB-B1	277.0	60	0.3923	95.84	0.8820	19.21

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	2968
Duv	-0.0002
Chromaticity (x, y)	x=0.4390 y=0.4043
Chromaticity (u', v')	u'=0.2518 v'=0.5218
Color Rendering Index (CRI)	82.5
R9	4

Special Color Rendering Indices			
R1	82	R9	4
R2	93	R10	85
R3	93	R11	80
R4	80	R12	75
R5	82	R13	85
R6	93	R14	97
R7	80	R15	73
R8	56	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	10856	10792
Luminous Efficacy (lm/W)	114.85	112.60
Worst Luminous/Highest Watts	112.60	
Zonal lumens in the 0-90 °zone (%)	99.9	--
Beam Angle (°)	111.0	--
Center Beam Candle Power (cd)	4062	--

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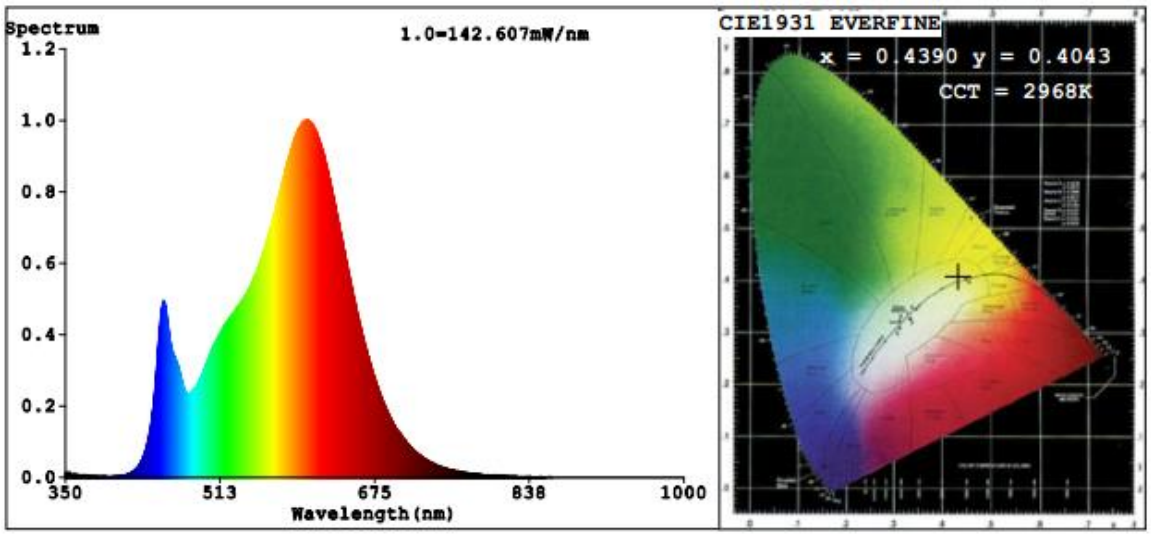
Spectral Power Distribution & Chromaticity Diagram

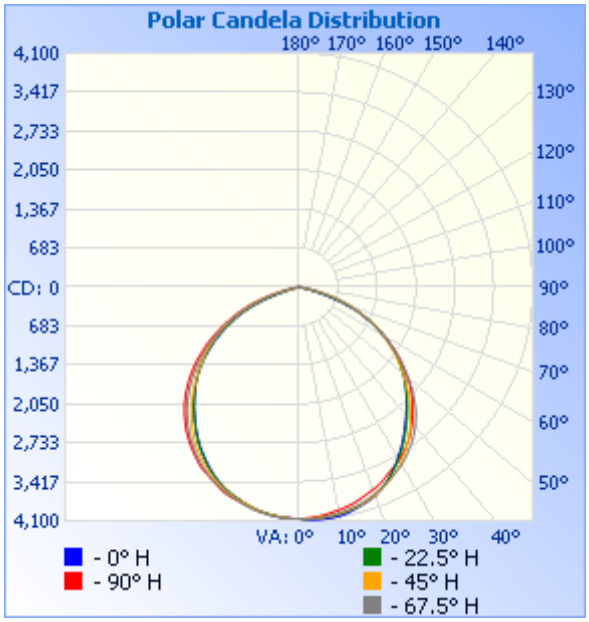


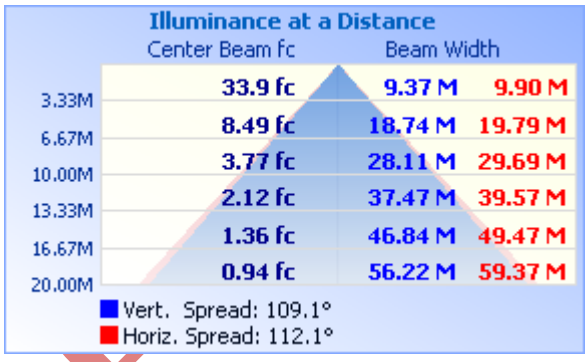
Zonal Lumen Tabulation

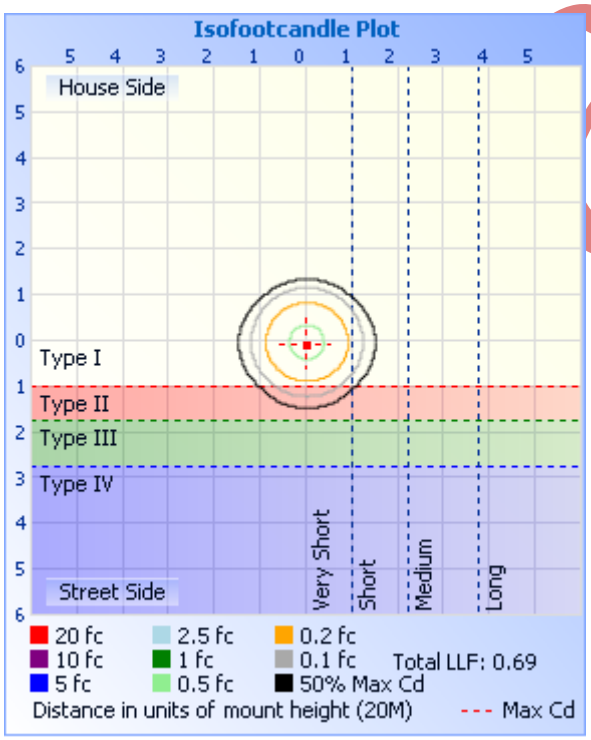
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	3,191.3	29.4%
0-40	5,230.0	48.2%
0-60	9,144.7	84.3%
60-90	1,693.8	15.6%
70-100	438.3	4%
90-120	3.1	0%
0-90	10,838.5	99.9%
90-180	15.7	0.1%
0-180	10,854.2	100%

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-10	385.7	3.6%	90-100	0.1	0%
10-20	1,111.0	10.2%	100-110	1.0	0%
20-30	1,694.6	15.6%	110-120	2.0	0%
30-40	2,038.7	18.8%	120-130	2.6	0%
40-50	2,088.5	19.2%	130-140	2.8	0%
50-60	1,826.2	16.8%	140-150	2.7	0%
60-70	1,255.7	11.6%	150-160	2.2	0%
70-80	426.4	3.9%	160-170	1.6	0%
80-90	11.7	0.1%	170-180	0.7	0%

Photometric Data







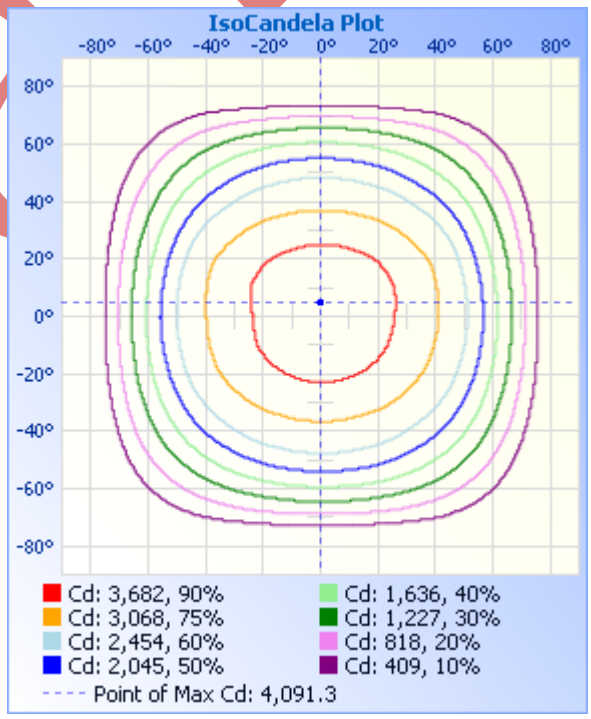


Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	
0	4062	4062	4062	4062	4062	4062	4062	4062	4062	4062	4062	4062	4062	4062	4062	4062	
5	4042	4069	4066	4082	4091	4067	4058	4065	4036	4048	4032	4033	4050	4041	4043	4047	
10	3996	4036	4050	4048	4076	4043	4034	4025	3973	3992	3977	3970	3988	3983	3988	3998	
15	3914	3968	3984	4001	3995	3986	3979	3961	3891	3905	3898	3884	3887	3889	3896	3918	
20	3834	3877	3887	3884	3896	3887	3886	3860	3782	3792	3778	3761	3770	3765	3786	3813	
25	3688	3748	3752	3720	3711	3708	3743	3737	3644	3662	3630	3597	3594	3602	3636	3676	
30	3540	3592	3572	3489	3460	3478	3560	3594	3501	3502	3445	3389	3372	3386	3451	3505	
35	3338	3403	3326	3224	3192	3218	3314	3403	3320	3299	3223	3143	3129	3140	3222	3296	
40	3105	3160	3036	2944	2919	2942	3037	3168	3077	3061	2947	2864	2862	2862	2946	3045	
45	2835	2871	2719	2661	2656	2661	2724	2867	2810	2763	2645	2590	2589	2590	2632	2760	
50	2514	2518	2386	2378	2397	2381	2390	2507	2492	2430	2311	2289	2293	2301	2307	2430	
55	2156	2129	2044	2068	2087	2073	2054	2109	2131	2051	1975	1952	1940	1961	1985	2067	
60	1752	1718	1700	1715	1721	1720	1710	1710	1736	1670	1609	1564	1553	1581	1629	1681	
65	1329	1318	1338	1325	1312	1322	1333	1322	1323	1275	1215	1161	1140	1170	1237	1277	
70	905	913	934	868	835	882	934	925	900	873	807	732	656	733	814	860	
75	439	490	496	343	290	342	504	495	442	432	387	232	160	234	399	426	
80	104	136	85.2	12.6	9.60	13.0	89.8	141	111	109	42.2	9.06	7.92	9.51	42.0	105	
85	3.31	4.02	3.82	2.81	2.40	2.86	4.10	4.58	4.05	4.29	2.87	1.27	0.79	1.24	2.73	3.69	
90	0.06	0.11	0.05	0.00	0.00	0.00	0.08	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	
95	0.03	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.16	0.19	0.14	0.00	0.00	0.00	0.16	0.17	
100	0.43	0.43	0.30	0.19	0.05	0.14	0.30	0.35	0.57	0.54	0.55	0.44	0.41	0.47	0.60	0.60	
105	1.13	1.11	0.87	0.76	0.60	0.63	0.74	0.93	1.14	1.09	0.90	0.82	0.91	0.99	1.10	1.18	
110	1.84	1.80	1.47	1.09	1.15	1.18	1.31	1.72	1.90	1.63	1.47	1.39	1.48	1.37	1.67	1.92	
115	2.49	2.53	2.04	1.45	1.76	1.61	1.75	2.43	2.60	2.45	1.94	1.80	1.92	1.86	2.19	2.63	
120	3.03	3.00	2.21	1.91	2.27	2.00	2.05	2.88	3.06	2.91	2.26	2.16	2.47	2.08	2.44	3.01	
125	3.35	3.10	2.48	2.78	2.93	2.77	2.46	3.09	3.46	3.24	2.51	2.73	2.97	2.91	2.69	3.18	
130	3.92	3.51	2.83	3.38	3.46	3.42	2.79	3.62	3.90	3.68	2.81	3.25	3.39	3.43	2.88	3.51	
135	4.44	3.61	3.00	3.57	3.59	3.62	2.99	3.69	4.27	3.71	3.16	3.60	3.60	3.70	3.01	3.56	
140	4.62	3.64	3.24	4.14	4.17	3.83	3.40	3.78	4.46	3.84	3.57	3.96	4.23	4.08	3.32	3.56	
145	4.60	4.13	3.92	4.53	4.69	4.27	4.11	4.30	4.24	4.11	4.09	4.31	4.80	4.49	4.06	4.00	
150	4.22	4.60	4.63	4.69	4.88	4.77	4.79	4.96	3.76	4.62	4.55	4.48	5.19	4.80	4.69	4.52	
155	4.51	4.76	5.07	4.75	4.83	4.82	5.19	5.23	4.49	4.62	4.82	4.60	5.19	4.82	4.88	4.35	
160	5.59	5.08	5.23	5.19	5.15	5.23	5.59	5.23	5.19	4.47	4.99	4.81	5.19	4.88	4.93	4.55	
165	6.11	5.46	5.80	5.84	5.70	5.97	5.94	5.61	5.74	5.71	5.24	5.38	5.49	5.24	5.21	4.99	
170	6.33	6.04	6.38	6.73	7.05	6.93	6.22	6.16	6.27	6.21	6.05	6.14	6.51	6.74	6.47	6.03	
175	7.13	6.47	6.81	7.61	7.68	7.66	6.87	6.65	6.98	6.99	6.76	6.88	7.19	7.59	7.45	6.77	
180	6.81	6.75	6.84	7.26	7.27	7.53	7.01	6.79	6.87	6.94	6.60	6.71	7.19	7.20	7.34	6.75	

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2.3 Electrical, Photometric and Chromaticity Measurements

Test date	2018-04-02	**Test Ambient:**	25.2 ºC
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	CSFL-10057-Y		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD180222	120.0	60	0.8069	95.74	0.9888	12.89
NB-B2	277.0	60	0.3930	96.06	0.8824	19.48

Chromaticity Measurement - Sphere-Spectroradiometer Method:

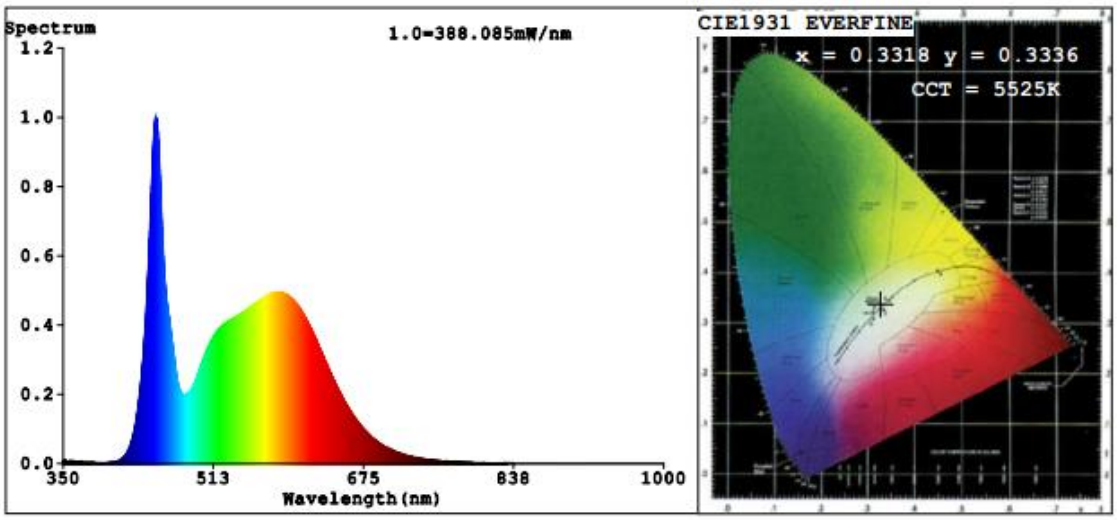
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	5525
Duv	-0.0035
Chromaticity (x, y)	x=0.3318 y=0.3336
Chromaticity (u', v')	u'=0.2094 v'=0.4736
Color Rendering Index (CRI)	83.7
R9	11

Special Color Rendering Indices			
R1	83	R9	11
R2	89	R10	72
R3	91	R11	84
R4	84	R12	63
R5	84	R13	85
R6	83	R14	95
R7	86	R15	79
R8	69	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	11193	11035
Luminous Efficacy (lm/W)	116.91	114.88
Most Worst Luminous/Highest Watts	114.88	

Spectral Power Distribution & Chromaticity Diagram



2.4 Performance Assessment:

Model name	CCT(K)	Luminous Efficacy (lm/W)	Power (W)	Total Luminous (lm)
CSFL-10030-Y	3000K	114.85	94.52	10856
CSFL-10035-Y	3500K	115.26*1	95.13*2	10965*3
CSFL-10040-Y	4000K	115.67*1	95.13*2	11004*3
CSFL-10045-Y	4500K	116.09*1	95.13*2	11044*3
CSFL-10050-Y	5000K	116.50*1	95.13*2	11083*3
CSFL-10057-Y	5700K	116.91	95.74	11193

*1: This value is calculated and the calculation formula is as below:

115.26= (116.91-114.85)/5*1+114.85

115.67= (116.91-114.85)/5*2+114.85

116.09= (116.91-114.85)/5*3+114.85

116.50= (116.91-114.85)/5*4+114.85

*2: This value is calculated and the calculation formula is as below:

95.13= (94.52+95.74)/2

*3: This value is calculated and the calculation formula is as below:

10965=115.26*95.13

11004=115.67*95.13

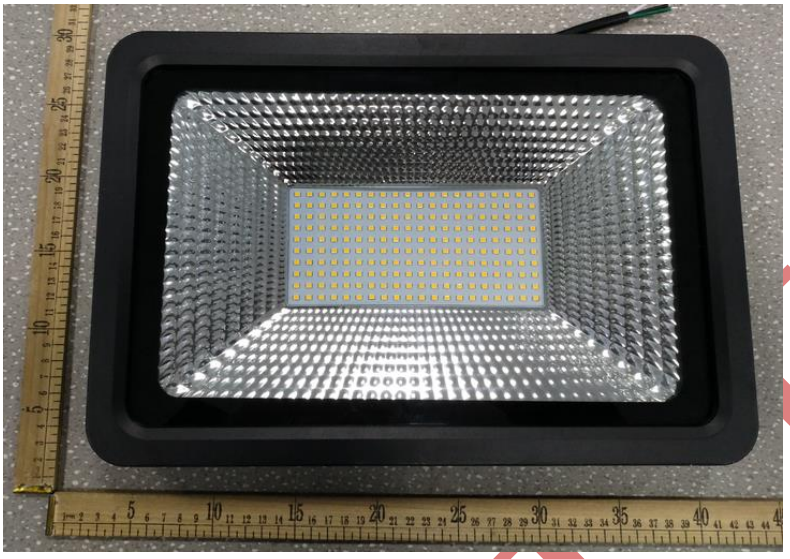
11044=116.09*95.13

11083=116.50*95.13

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-702	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-701	Spectral analysis system HAAS-2000	Verified by D204 standard lamp	
D204	Standard Lamp	2018-02-09	2019-02-08
ST-R-704	Power Meter for Integrating Sphere	2018-01-08	2019-01-07
ST-R-714	Goniophotometer system	Verified by D908S standard lamp	
D908S	Standard Lamp	2018-02-14	2019-02-13
ST-R-711	Power Meter for Goniophotometer	2018-01-08	2019-01-07
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

4. Product Photo



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