

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): DFL1A-50 DFL1-50

Report Type: Testing and Report According to IES LM-79-2008
Type of Luminaire: Architectural Flood and Spot Luminaires
Report Date: 2017-09-01
Ningbo TengLi Testing Co., Ltd
Prepared By: 2nd floor, Block B, Ningbo Testing and Certification Base,
No. 66 Qingyi Road, Ningbo National Hi-Tech Zone,
Ningbo, Zhejiang

Test & Report By:

Review By:

Engineer: Mark Liu

Manager: Tommy Liang

Note: 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	DFL1A-50,DFL1-50
Remark	DFL1-50 stand for large u-shaped iron. DFL1A-50 stand for rocker arm.
Representative (Tested) Model	DFL1-50(2700K), DFL1-50(5700K)
Model Difference	All construction and rating are the same, except CCT and the mounting arm.
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-2835DW-S1-08-PCT-HR3
Dimming	N/A
Sample Number	STD170629NB-C1(2700K),C2(5700K)
Date of Receipt	Aug.28, 2017
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	120 Vac, 50/60 Hz
Nominal Power	50W
Rated Initial Lamp Lumen	--
Declared CCT	2700K,3000K,3500K,4000K,4500K,5000K, 5700K

1.3 Test Specifications:

Test item	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, 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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. 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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. 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.

2.1 Summary of Test Result

Criteria Item	Measured Value			Compliance	Requirement (DLC V4.2)	
Power (W)	2700K	120V	52.78	N/A	N/A	
	5700K	120V	53.18			
Power Factor	2700K	120V	0.9729	Pass	>= 0.9(-3%)	
	5700K	120V	0.9740			
THD %	2700K	120V	22.62	Pass	≤ 20(+5)	
	5700K	120V	22.53			
CRI	2700K	80.8		Pass	≥ 80(-2)	
	5700K	81.0				
CCT (K)	2700K	2711		Pass	≤ 5700K	
	5700K	5354				
Luminous Intensity Distribution	Zonal lumens in the 0-90°		99.9	Pass	≥ 85%(-3%)	
Total Luminous	2700K	120V	5132.8	Pass	≥ 1000lm(-10%)	
	5700K	120V	5661			
Luminous Efficacy	2700K	120V	97.25	Pass	Standard: ≥ 95(-3%)	Premium: ≥ 115(-3%)
	5700K	120V	106.45			

2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2017-08-30	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DFL1-50(2700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD170629 NB-C1	120.0	60	0.4522	52.78	0.9729	22.62

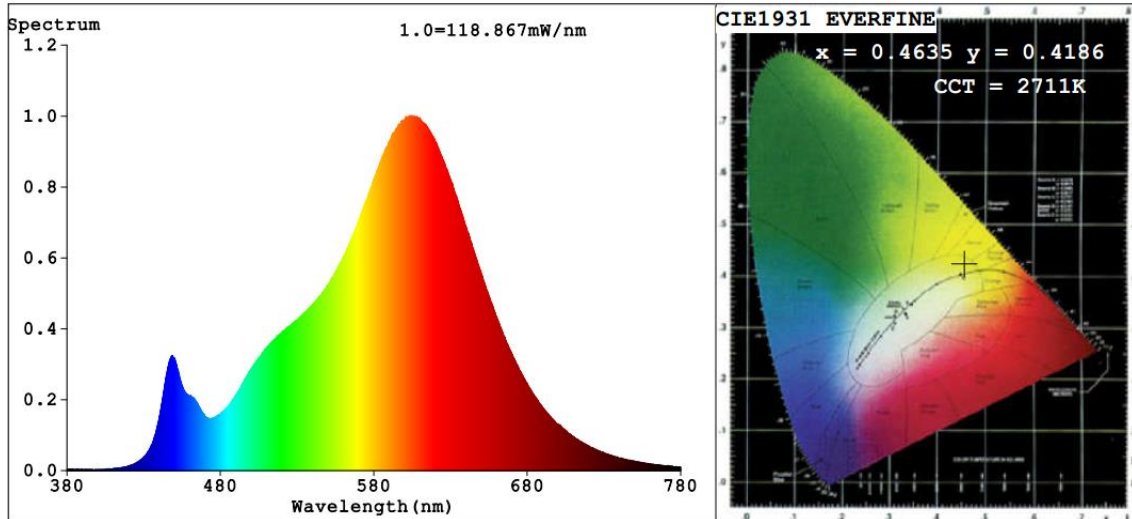
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	79	R9	0
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	2711	R3	95	R11	78
Duv	0.0026	R4	78	R12	74
Chromaticity (x, y)	x=0.4635 y=0.4186	R5	79	R13	81
Chromaticity (u', v')	u'=0.2613 v'=0.5309	R6	90	R14	98
Color Rendering Index (CRI)	80.8	R7	80	R15	69
R9	0	R8	53	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	5132.8
Luminous Efficacy (lm/W)	97.25
Zonal lumens in the 0-90° zone (%)	99.9
Beam Angle (°)	111.7
Center Beam Candle Power (cd)	1872

Spectral Power Distribution & Chromaticity Diagram

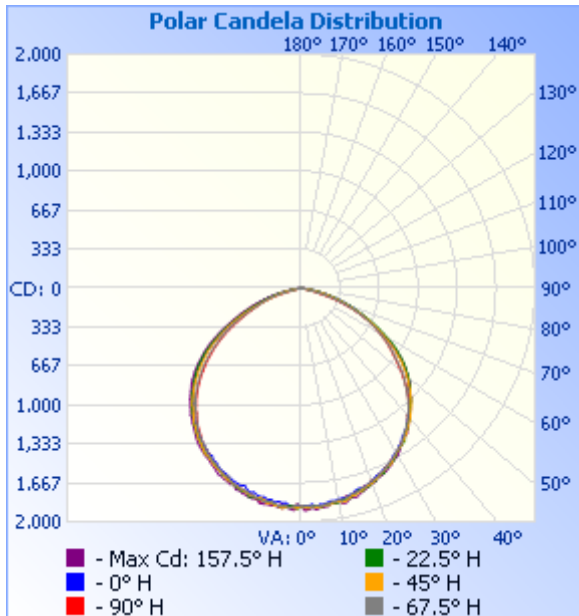


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,472.1	28.7%
0-40	2,431.7	47.4%
0-60	4,314.6	84.1%
60-90	810.6	15.8%
70-100	226.1	4.4%
90-120	1.3	0%
0-90	5,125.2	99.9%
90-180	7.0	0.1%
0-180	5,132.2	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	177.6	3.5%	90-100	0.0	0%
10-20	511.3	10.0%	100-110	0.4	0%
20-30	783.2	15.3%	110-120	0.9	0%
30-40	959.6	18.7%	120-130	1.2	0%
40-50	1,002.9	19.5%	130-140	1.3	0%
50-60	880.0	17.1%	140-150	1.2	0%
60-70	584.6	11.4%	150-160	1.0	0%
70-80	216.2	4.2%	160-170	0.7	0%
80-90	9.8	0.2%	170-180	0.3	0%

Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	6.48 fc	52.4 ft	48.0 ft
34.0ft	1.62 fc	104.8 ft	96.0 ft
51.0ft	0.72 fc	157.2 ft	144.0 ft
68.0ft	0.40 fc	209.6 ft	192.0 ft
85.0ft	0.26 fc	262.0 ft	240.0 ft
102.0ft	0.18 fc	314.4 ft	288.0 ft

■ Vert. Spread: 114.0°
 ■ Horiz. Spread: 109.4°

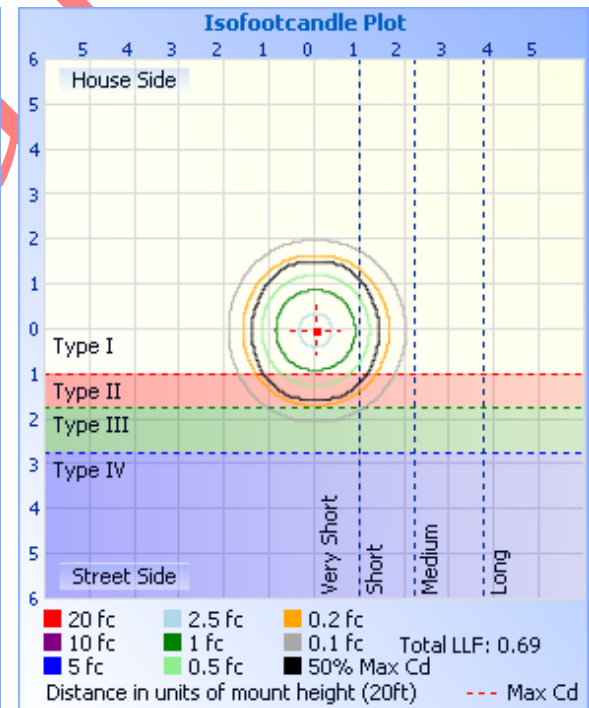
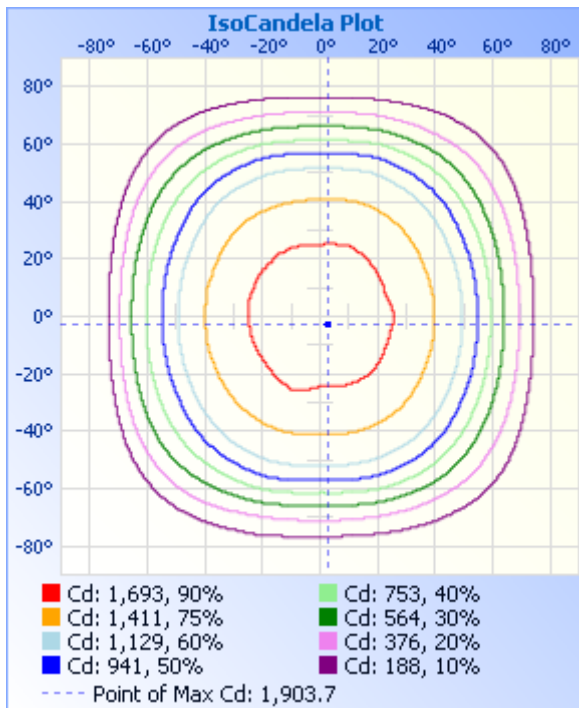


Table--1

UNIT: cd

C (DEG) γ (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	1872	1872	1872	1872	1872	1872	1872	1872	1872	1872	1872	1872	1872	1872	1872	1872	
5	1857	1885	1882	1874	1875	1863	1884	1885	1848	1878	1890	1872	1856	1892	1868	1890	
10	1833	1861	1855	1839	1848	1846	1850	1854	1815	1845	1840	1853	1842	1836	1843	1875	
15	1793	1816	1828	1810	1802	1805	1799	1849	1784	1805	1809	1798	1807	1803	1807	1831	
20	1760	1776	1775	1755	1753	1750	1760	1779	1739	1763	1760	1760	1764	1747	1773	1784	
25	1701	1702	1708	1706	1697	1687	1692	1727	1679	1695	1699	1685	1699	1684	1695	1722	
30	1620	1630	1628	1622	1635	1611	1621	1652	1606	1636	1640	1608	1608	1598	1623	1647	
35	1530	1541	1547	1532	1538	1531	1531	1547	1525	1545	1540	1516	1511	1507	1535	1563	
40	1432	1445	1451	1416	1418	1417	1434	1442	1430	1438	1432	1396	1392	1394	1434	1451	
45	1319	1328	1326	1282	1294	1285	1310	1328	1312	1315	1310	1270	1257	1263	1310	1343	
50	1191	1200	1184	1131	1123	1126	1161	1194	1180	1186	1156	1113	1094	1104	1161	1212	
55	1029	1044	1016	957	951	945	992	1041	1014	1029	990	931	918	928	996	1045	
60	825	850	820	783	783	774	795	837	792	825	792	728	712	727	797	856	
65	626	641	623	605	600	600	600	611	583	604	575	519	502	521	589	638	
70	441	440	424	406	378	393	404	403	401	399	355	347	349	352	380	439	
75	253	260	240	174	132	150	209	246	232	232	193	149	115	162	216	259	
80	77.9	94.3	58.3	9.97	6.96	5.39	28.3	83.5	72.4	68.9	28.6	8.15	9.02	8.91	47.7	83.7	
85	2.88	6.25	3.37	4.03	3.99	2.68	1.50	1.85	1.97	2.59	3.36	5.55	6.46	5.98	3.79	4.23	
90	0.11	0.08	0.03	0.00	0.00	0.00	0.03	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.05	
95	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.08	0.08	0.05	0.00	0.00	0.00	0.03	0.08	
100	0.08	0.11	0.03	0.00	0.00	0.00	0.00	0.11	0.24	0.25	0.22	0.16	0.14	0.16	0.19	0.25	
105	0.32	0.35	0.35	0.24	0.27	0.24	0.33	0.35	0.56	0.52	0.44	0.30	0.33	0.33	0.44	0.47	
110	0.72	0.73	0.49	0.30	0.36	0.30	0.49	0.68	0.86	0.84	0.68	0.52	0.52	0.52	0.71	0.82	
115	1.05	1.19	0.76	0.52	0.60	0.59	0.73	1.15	1.13	1.14	0.96	0.76	0.82	0.73	0.92	1.15	
120	1.31	1.22	0.93	0.81	1.06	0.81	0.81	1.23	1.48	1.36	1.04	1.01	1.07	0.95	0.98	1.29	
125	1.42	1.36	1.12	1.28	1.23	1.22	1.17	1.40	1.59	1.55	1.28	1.20	1.31	1.30	1.14	1.43	
130	1.77	1.49	1.20	1.44	1.56	1.43	1.27	1.62	1.91	1.66	1.45	1.44	1.58	1.57	1.33	1.51	
135	2.07	1.52	1.31	1.63	1.58	1.57	1.44	1.62	1.93	1.68	1.56	1.55	1.75	1.63	1.44	1.51	
140	2.07	1.60	1.58	1.74	2.05	1.60	1.68	1.89	2.04	1.90	1.80	1.74	2.02	1.82	1.55	1.65	
145	2.07	1.71	2.02	1.99	2.10	1.84	2.06	2.09	1.72	2.09	2.16	1.99	2.16	2.00	1.93	1.89	
150	1.77	2.06	2.21	2.07	2.24	2.06	2.36	2.28	1.77	2.20	2.29	2.18	2.16	2.11	2.26	2.09	
155	2.09	2.12	2.43	2.09	2.21	2.08	2.50	2.39	2.15	2.20	2.32	2.23	2.16	2.22	2.28	2.09	
160	2.52	2.20	2.49	2.34	2.43	2.35	2.61	2.39	2.53	2.23	2.40	2.37	2.21	2.30	2.31	2.22	
165	2.79	2.47	2.70	2.64	2.84	2.68	2.82	2.55	2.66	2.66	2.51	2.53	2.38	2.49	2.50	2.50	
170	2.85	2.69	2.95	2.94	3.20	2.95	2.96	2.96	2.77	2.82	2.95	3.05	2.98	3.17	2.99	2.99	
175	2.93	2.99	3.39	3.37	3.66	3.38	3.36	3.18	3.06	3.12	3.11	3.43	3.44	3.68	3.42	3.37	
180	2.77	3.04	3.39	3.37	3.66	3.41	3.34	3.29	2.85	2.90	3.06	3.37	3.44	3.47	3.45	3.35	

2.3 Electrical, Photometric and Chromaticity Measurements

Test date	2017-08-30	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DFL1-50(5700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD170629 NB-C2	120.0	60	0.4550	53.18	0.9740	22.53

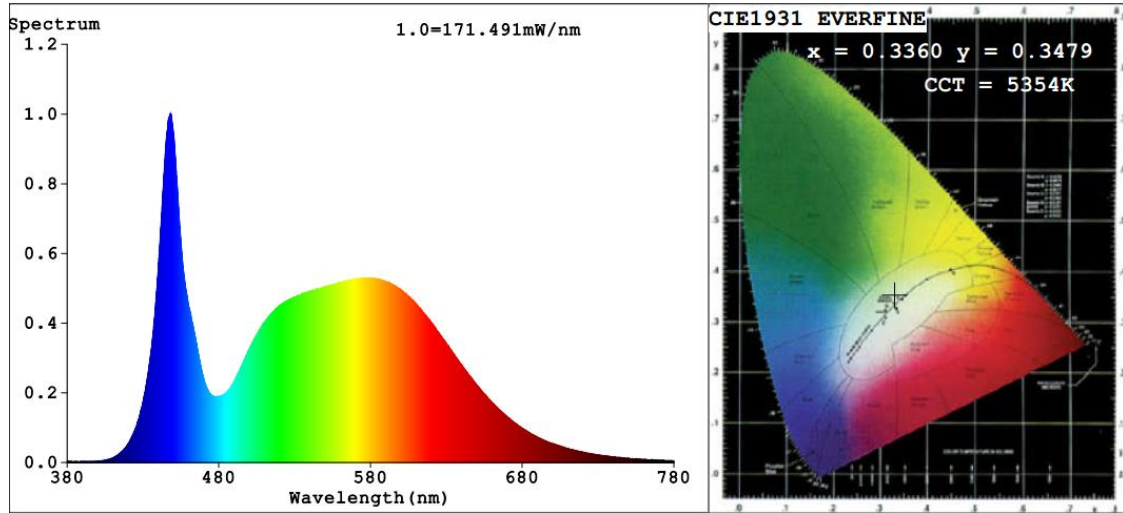
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	79	R9	0
Frequency (Hz)	60	R2	85	R10	64
CCT (K)	5354	R3	89	R11	82
Duv	0.0019	R4	82	R12	61
Chromaticity (x, y)	x=0.3360 y=0.3479	R5	81	R13	80
Chromaticity (u', v')	u'=0.2067 v'=0.4815	R6	80	R14	94
Color Rendering Index (CRI)	81.0	R7	86	R15	74
R9	0	R8	66	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	5661
Luminous Efficacy (lm/W)	106.45

Spectral Power Distribution & Chromaticity Diagram



2.4 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
DFL1-50(2700K)	2700K	5132.8	52.78	97.25
DFL1-50(3000K)	3000K	5220.8 ^{*1}	52.98 ^{*2}	98.54 ^{*3}
DFL1-50(3500K)	3500K	5308.9 ^{*1}	52.98 ^{*2}	100.21 ^{*3}
DFL1-50(4000K)	4000K	5396.9 ^{*1}	52.98 ^{*2}	101.87 ^{*3}
DFL1-50(4500K)	4500K	5484.9 ^{*1}	52.98 ^{*2}	103.53 ^{*3}
DFL1-50(5000K)	5000K	5573.0 ^{*1}	52.98 ^{*2}	105.19 ^{*3}
DFL1-50(5700K)	5700K	5661	53.18	106.45

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

$$5220.8 = (5661 - 5132.8) / 6 + 5132.8$$

$$5308.9 = (5661 - 5132.8) / 6 + 5220.8$$

$$5396.9 = (5661 - 5132.8) / 6 + 5308.9$$

$$5484.9 = (5661 - 5132.8) / 6 + 5396.9$$

$$5573.0 = (5661 - 5132.8) / 6 + 5484.9$$

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

$$52.98 = (52.78 + 53.18) / 2$$

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

$$98.55 = 5220.8 / 52.98$$

$$100.21 = 5308.9 / 52.98$$

$$101.87 = 5396.9 / 52.98$$

$$103.53 = 5484.9 / 52.98$$

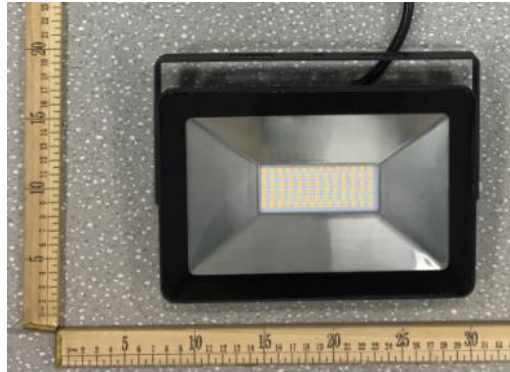
$$105.19 = 5573.0 / 52.98$$

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	2017-02-09	2018-02-08
ST-R-704	Power Meter for Integrating Sphere	2017-01-08	2018-01-07
ST-R-714	Goniophotometer system	Verified by D908S standard lamp	
D908S	Standard Lamp	2017-02-14	2018-02-13
ST-R-711	Power Meter for Goniophotometer	2017-01-08	2018-01-07
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

Draft

4. Product Photo



******* END OF REPORT *******