

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-20 DFL1-20

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-20,DFL1-20
Remark	DFL1-20 stand for large u-shaped iron. DFL1A-20 stand for rocker arm.
Representative (Tested) Model	DFL1-20(2700K), DFL1-20(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-A1(2700K),A2(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	20W
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	18.67	N/A	N/A	
	5700K	120V	18.97			
Power Factor	2700K	120V	0.9866	Pass	≥ 0.9(-3%)	
	5700K	120V	0.9753			
THD %	2700K	120V	16.21	Pass	≤ 20(+5)	
	5700K	120V	16.87			
CRI	2700K	80.9		Pass	≥ 80(-2)	
	5700K	81.5				
CCT (K)	2700K	2755		Pass	≤ 5700K	
	5700K	5354				
Luminous Intensity Distribution	Zonal lumens in the 0-90°		99.9	Pass	≥ 85%(-3%)	
Total Luminous	2700K	120V	1769.5	Pass	≥ 1000lm(-10%)	
	5700K	120V	1970			
Luminous Efficacy	2700K	120V	94.78	Pass	Standard: ≥ 90(-3%)	Premium: ≥ 110(-3%)
	5700K	120V	103.85			

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	DFL1-20(2700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD170629 NB-A1	120.0	60	0.1577	18.67	0.9866	16.21

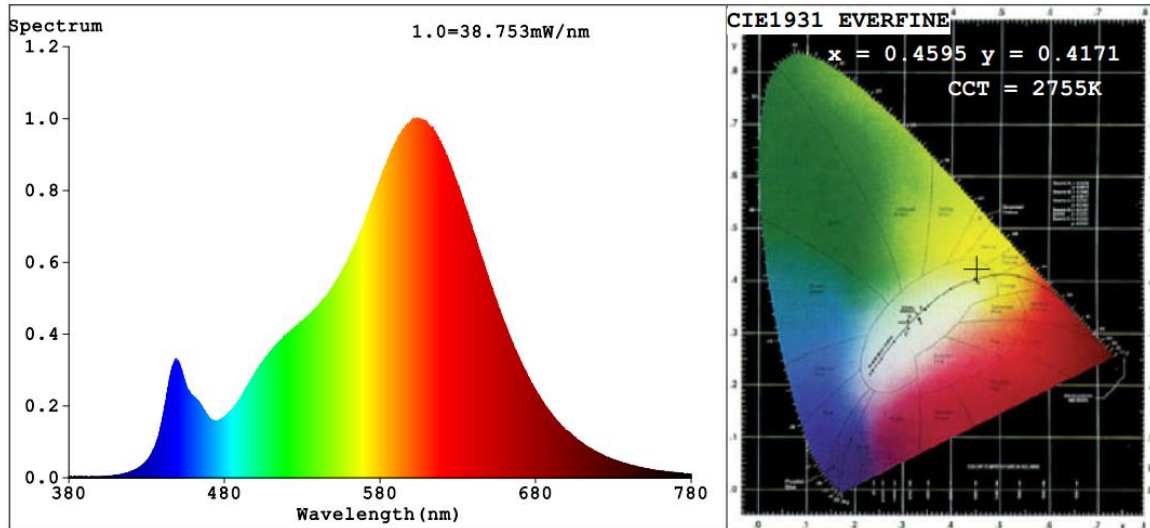
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	79	R9	0
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	2755	R3	95	R11	79
Duv	0.0024	R4	79	R12	75
Chromaticity (x, y)	x=0.4595 y=0.4171	R5	80	R13	82
Chromaticity (u', v')	u'=0.2594 v'=0.5297	R6	90	R14	98
Color Rendering Index (CRI)	80.9	R7	81	R15	70
R9	0	R8	53	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1769.5
Luminous Efficacy (lm/W)	94.78
Zonal lumens in the 0-90° zone (%)	99.9
Beam Angle (°)	109.8
Center Beam Candle Power (cd)	690

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	540.8	30.6%
0-40	883.4	49.9%
0-60	1,526.0	86.3%
60-90	241.6	13.7%
70-100	51.6	2.9%
90-120	0.1	0%
0-90	1,767.6	99.9%
90-180	1.4	0.1%
0-180	1,769.0	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	65.4	3.7%	90-100	0	0%
10-20	188.4	10.6%	100-110	0.0	0%
20-30	287.1	16.2%	110-120	0.1	0%
30-40	342.6	19.4%	120-130	0.2	0%
40-50	344.6	19.5%	130-140	0.3	0%
50-60	297.9	16.8%	140-150	0.3	0%
60-70	190.0	10.7%	150-160	0.3	0%
70-80	48.7	2.8%	160-170	0.2	0%
80-90	2.9	0.2%	170-180	0.1	0%

Photometric Data

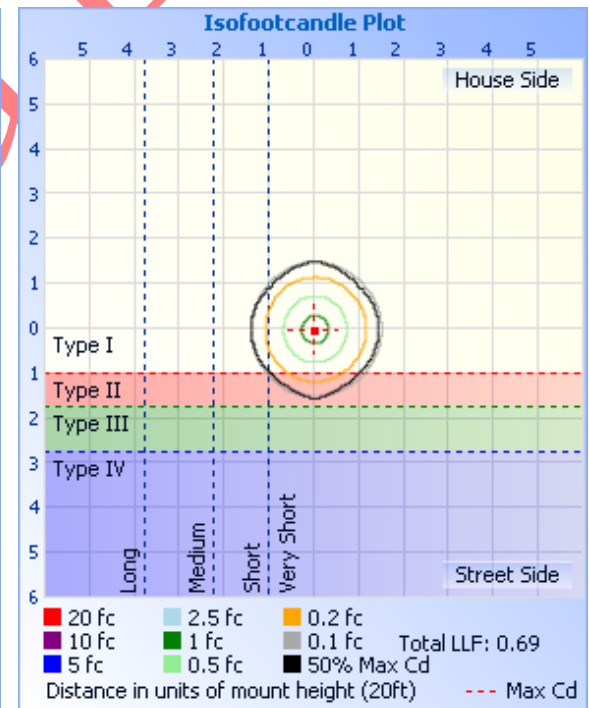
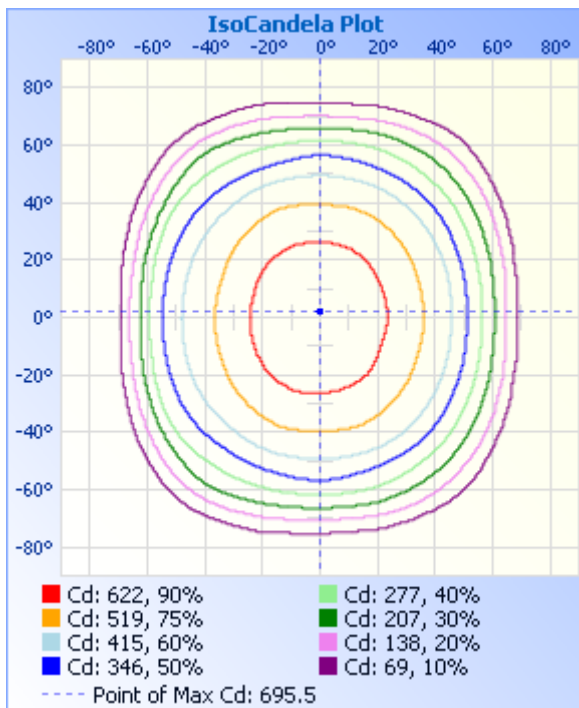
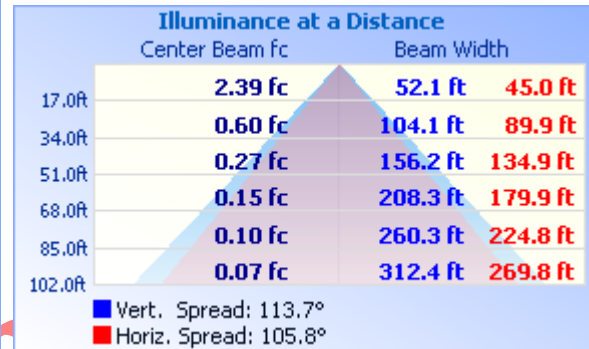
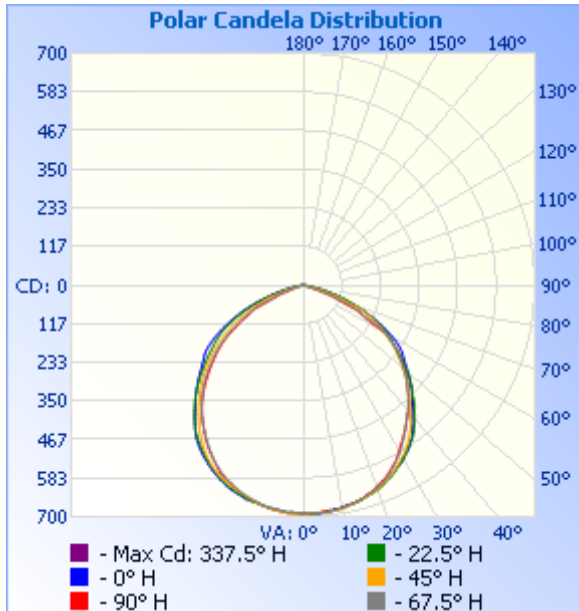


Table--1

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	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690
5	690	689	688	689	686	688	686	691	685	685	688	685	688	687	685	691
10	680	684	684	682	682	683	682	680	677	678	678	676	678	678	678	678
15	671	673	671	671	670	669	670	669	669	666	662	659	664	662	661	667
20	653	657	655	651	649	651	651	653	653	650	644	636	640	640	646	654
25	632	634	632	623	620	624	627	632	629	626	621	607	609	610	621	633
30	604	607	599	583	580	586	594	601	600	594	588	568	570	573	592	600
35	570	571	558	536	536	539	553	565	562	558	543	524	524	528	546	566
40	515	524	506	493	494	493	500	518	508	511	491	477	475	483	497	512
45	464	467	452	446	447	446	443	465	457	456	437	423	417	430	441	462
50	415	411	396	396	400	396	389	405	405	396	379	360	354	366	384	406
55	368	348	342	344	347	344	334	348	363	338	316	295	291	302	324	345
60	310	293	283	283	276	284	278	289	299	283	248	220	212	230	257	293
65	232	229	222	181	179	182	220	223	222	213	177	154	119	157	191	223
70	149	152	129	93.5	60.6	93.3	129	148	142	136	108	45.7	39.9	69.4	115	144
75	72.7	80.5	45.6	11.1	10.3	10.06	52.2	71.4	67.6	57.4	22.5	7.94	8.60	10.01	40.5	65.8
80	20.2	19.5	5.24	6.16	6.48	5.19	3.55	16.8	15.6	10.4	4.42	6.07	6.83	5.84	4.22	16.7
85	0.77	1.74	3.18	3.91	3.64	3.09	1.93	1.12	0.35	1.10	2.19	2.65	2.61	3.29	2.21	1.16
90	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
95	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
100	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
105	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
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11	0.05	0.00	0.00	0.00	0.03	0.08
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.19	0.11	0.05	0.05	0.06	0.08	0.22
120	0.19	0.16	0.00	0.00	0.00	0.00	0.00	0.22	0.33	0.30	0.19	0.11	0.16	0.14	0.14	0.24
125	0.24	0.33	0.00	0.05	0.00	0.05	0.03	0.32	0.38	0.35	0.22	0.24	0.22	0.22	0.22	0.27
130	0.30	0.32	0.05	0.35	0.27	0.24	0.22	0.33	0.43	0.43	0.30	0.30	0.35	0.33	0.27	0.33
135	0.35	0.32	0.24	0.38	0.30	0.27	0.33	0.35	0.43	0.43	0.35	0.35	0.41	0.38	0.35	0.35
140	0.35	0.35	0.30	0.35	0.33	0.27	0.35	0.38	0.43	0.54	0.49	0.46	0.52	0.44	0.41	0.46
145	0.38	0.41	0.35	0.35	0.35	0.33	0.38	0.38	0.43	0.60	0.60	0.54	0.57	0.52	0.54	0.54
150	0.38	0.43	0.46	0.35	0.38	0.38	0.62	0.51	0.43	0.62	0.65	0.62	0.60	0.60	0.68	0.57
155	0.41	0.43	0.54	0.41	0.44	0.38	0.68	0.51	0.62	0.62	0.65	0.62	0.60	0.63	0.65	0.57
160	0.62	0.46	0.68	0.46	0.60	0.49	0.73	0.65	0.76	0.68	0.73	0.71	0.63	0.66	0.65	0.60
165	0.73	0.65	0.76	0.62	0.74	0.74	0.73	0.81	0.79	0.78	0.76	0.76	0.71	0.74	0.76	0.71
170	0.73	0.73	0.76	0.76	0.82	0.76	0.76	0.81	0.79	0.78	0.79	1.00	0.85	0.96	0.92	0.92
175	0.73	0.73	0.92	0.81	1.12	0.87	0.81	0.81	0.79	0.76	0.79	1.09	0.85	1.17	0.89	0.89
180	0.76	0.73	1.00	0.84	1.18	0.90	0.84	0.81	0.79	0.76	0.73	1.00	0.85	1.09	0.89	0.84

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	DFL1-20(5700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD170629 NB-A2	120.0	60	0.1621	18.97	0.9753	16.87

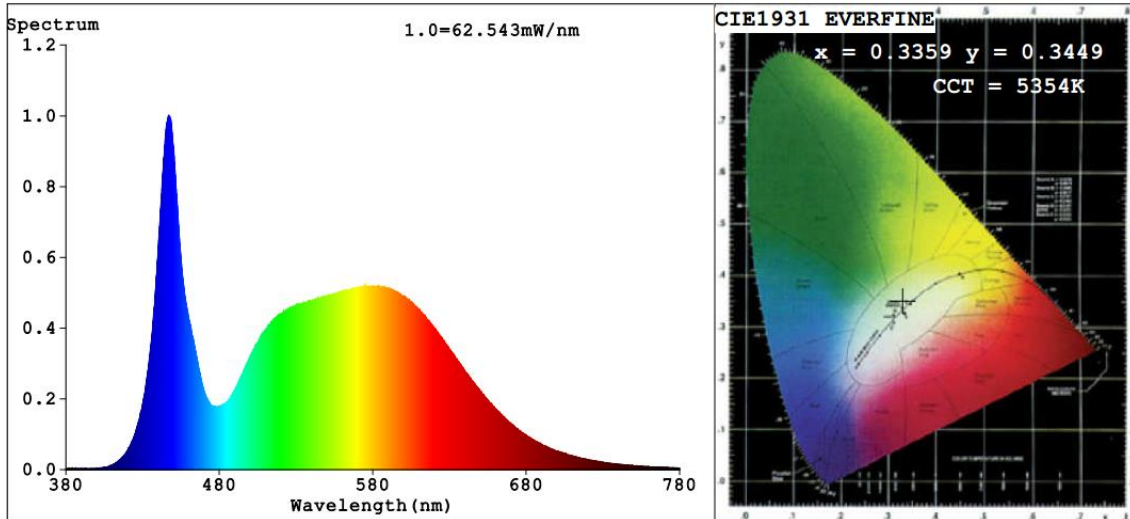
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	4
Frequency (Hz)	60	R2	85	R10	65
CCT (K)	5354	R3	88	R11	83
Duv	0.0005	R4	83	R12	62
Chromaticity (x, y)	x=0.3359 y=0.3449	R5	82	R13	81
Chromaticity (u', v')	u'=0.2077 v'=0.4800	R6	80	R14	94
Color Rendering Index (CRI)	81.5	R7	85	R15	75
R9	4	R8	68	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1970
Luminous Efficacy (lm/W)	103.85

Spectral Power Distribution & Chromaticity Diagram



2.4 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
DFL1-20(2700K)	2700K	1769.5	18.67	94.78
DFL1-20(3000K)	3000K	1802.9 ^{*1}	18.82 ^{*2}	95.80 ^{*3}
DFL1-20(3500K)	3500K	1836.3 ^{*1}	18.82 ^{*2}	97.57 ^{*3}
DFL1-20(4000K)	4000K	1869.8 ^{*1}	18.82 ^{*2}	99.35 ^{*3}
DFL1-20(4500K)	4500K	1903.2 ^{*1}	18.82 ^{*2}	101.12 ^{*3}
DFL1-20(5000K)	5000K	1936.6 ^{*1}	18.82 ^{*2}	102.90 ^{*3}
DFL1-20(5700K)	5700K	1970	18.97	103.85

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

$$1802.9 = (1970 - 1769.5) / 6 + 1769.5$$

$$1836.3 = (1970 - 1769.5) / 6 + 1803$$

$$1869.8 = (1970 - 1769.5) / 6 + 1836$$

$$1903.2 = (1970 - 1769.5) / 6 + 1870$$

$$1936.6 = (1970 - 1769.5) / 6 + 1903$$

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

$$18.82 = (18.67 + 18.97) / 2$$

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

$$95.80 = 1802.9 / 18.82$$

$$97.57 = 1836.3 / 18.82$$

$$99.35 = 1869.8 / 18.82$$

$$101.12 = 1903.2 / 18.82$$

$$102.90 = 1936.6 / 18.82$$

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 *******