



Date of issue 2018-11-27

Version 1.0

Total pages 15

## Test report of

## IES LM-79-08

## Approved Method: Electrical and Photometric

## Measurements of Solid-State Lighting Products

**Applicant:**

Shenzhen Huadian Lighting Co.,LTD.

**Address:**

2F Building A Jinkaijin Industrial Park Shuitian Shiyan Town Baoan District 518108  
Shenzhen, CHINA

**For Product:**

Fuel Pump Canopy Luminaires

**Model No.:**

IK-CPSL-150W-DY-3000K / IK-CPSL-150W-DY-5700K  
IK-CPSL-150W-DN-3000K / IK-CPSL-150W-DN-5700K

Test laboratory: Shenzhen Belling Efficiency Testing Lab Co.,Ltd., 1Floor, No.1 Building, Meibaohe Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong Prov.518101 China.

*Zac.kuang*

*Jasonzhou*

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Complied by: Zac Kuang

Review by: Jason zhou

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Project Engineer

Technical Manager

Note: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Shenzhen Belling Efficiency Testing Lab Co.,Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement By NVLAP, NIST, or any agency of the U.S. Government.



# 1 General

## 1.1 Product Information

<b>Manufacturer</b>	Shenzhen Huadian Lighting Co.,LTD.
<b>Manufacturer Address</b>	2F Building A Jinkaijin Industrial Park Shuitian Shiyan Town Baoan District 518108 Shenzhen, CHINA
<b>Brand Name</b>	Huadian
<b>Luminaire Type</b>	Fuel Pump Canopy Luminaires
<b>Model Number</b>	IK-CPSL-150W-DY-3000K / IK-CPSL-150W-DY-5700K IK-CPSL-150W-DN-3000K / IK-CPSL-150W-DN-5700K
<b>Rated Inputs</b>	AC 120-277V 50/60Hz
<b>Rated Power</b>	150 W
<b>Nominal CCT</b>	3000K / 5700K
<b>Date of Receipt Samples</b>	2018-09-17
<b>Date of Test</b>	2018-09-22 to 2018-11-25

## 1.2 Standards or methods

- ANSI C78.377-2015: Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits-Related Power Quality Requirements for Lighting Equipment
- CIE Publication No.13.3-1995: Method of Measuring and Specifying Color Rendering of Light Sources
- IESNA LM-79-08 Approved Method: Electric & Photometric Measurement of Solid-state Lighting Products



### 1.3 Equipment list

Device	Manufacture	Model No.	Serial No.	Calibration due date
Goniophotometric System	SENSING	GMS-3000	N.A	2019-04-09
AC Power Source	ALL POWER	APW-110N	992257	2019-04-25
Total Luminous Flux Standard Lamp	SENSING	110V/200W	S1520062	2019-04-14
Total Spectral Radiant Flux Standard Lamp	SENSING	12V/20W	LSD12201731	2019-04-16
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2019-04-09
Integral Sphere	SENSING	SPR-600M	N.A	2019-05-31
Digital Power Meter	YOKOGAWA	WT210	91L929742	2019-04-09
Optical Color and Electrical Measurement System	SENSING	SPR-3000	S1101108	2019-04-09
Environment Measurer	KTJ	HTC-1	N/A	2019-06-23
Environment Measurer	KTJ	TA218B	N/A	2019-06-23
Electronic clock	CHUANGRONG	QUARTZ	823	2019-07-19

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab Co.,Ltd attests that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).



## 2 Test conducted and method

### 2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , the air flow around the sample(s) being tested did not affect the performance.

### 2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within  $\pm 0.2$  percent under load.

### 2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

### 2.4 Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards.  $4\pi$  geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

### 2.5 Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement. The standard light source has been calibrated regularly and traceable to the National Primary Standards.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report. The method according to IESNA LM-79-08 following chapter.



## 3 Test Result Summary

### 3.1 Integrating Sphere System

#### 3.1.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
IK-CPSL-150W-DY-3000K	120.02	60	1.232	147.54	0.998
IK-CPSL-150W-DY-5700K	120.05	60	1.248	149.56	0.998

#### 3.1.2 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
IK-CPSL-150W-DY-3000K	18737.58	127.0	2929	82.6	10
IK-CPSL-150W-DY-5700K	19801.74	132.4	5616	82.8	10

#### 3.1.3 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
IK-CPSL-150W-DY-3000K	-0.0004	0.4415	0.4046	0.2533	0.5223
IK-CPSL-150W-DY-5700K	-0.00021	0.3299	0.3384	0.2061	0.4758

### 3.2 Goniophotometer System

#### 3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
IK-CPSL-150W-DY-3000K	120.05	60	1.2234	146.50	0.9975

#### 3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-40°(%lm)	Zonal Lumen in 40-70°(%lm)
18592.66	126.91	48.320	46.658



### 3.3 Additional Test

Model Number	Test Item	Test Voltage (V)	Frequency(Hz)	Test Result
IK-CPSL-150W-DY-3000K	Power Factor	277	60	0.977
	THD	277	60	7.9%

draft



## 4 Test Data

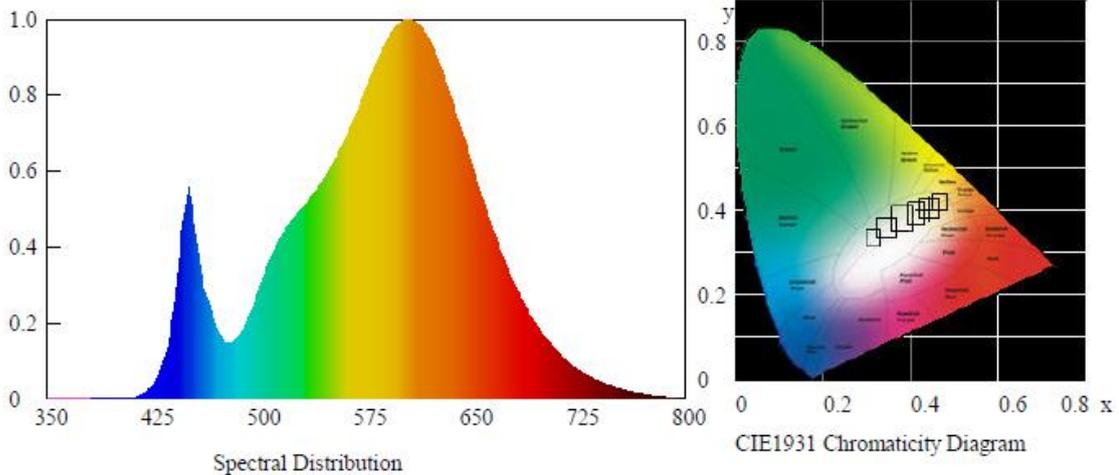
### IK-CPSL-150W-DY-3000K

#### Test Condition

Temperature: 25°C  
Spectrum Range: 350-800 nm

RH: 58%  
Scan Step: 5 nm

#### Spectroradiometric Parameters



Chromaticity Coordinates:  $x=0.4415$   $y=0.4046$   $u'=0.2533$   $v'=0.5223$

Correlated Color Temperature: 2929 K

Dominant Wavelength: 582.0 nm(E)

Colour Fidelity Index:  $R_f=82$

Gamut Index:  $R_g=97$

Luminous Flux: 18737.58 lm

Purity: 0.5408

Chromaticity Difference:  $-0.0004D_{uv}$

Peak Wavelength: 605.0 nm

Color Ratio:  $K_r=45.4\%$   $K_g=47.8\%$   $K_b=6.9\%$

Bandwidth: 125.6nm

Radiant Flux: 64.963 W

Rendering Index:  $R_a=82.6$

$R_1=81$   $R_2=90$   $R_3=97$   $R_4=81$   $R_5=81$   $R_6=87$   $R_7=84$   $R_8=60$

$R_9=10$   $R_{10}=77$   $R_{11}=80$   $R_{12}=69$   $R_{13}=84$   $R_{14}=98$   $R_{15}=74$   $R_e=77$

#### Electric Parameters

Voltage: 120.02 V

Current: 1.232 A

Power Factor: 0.998

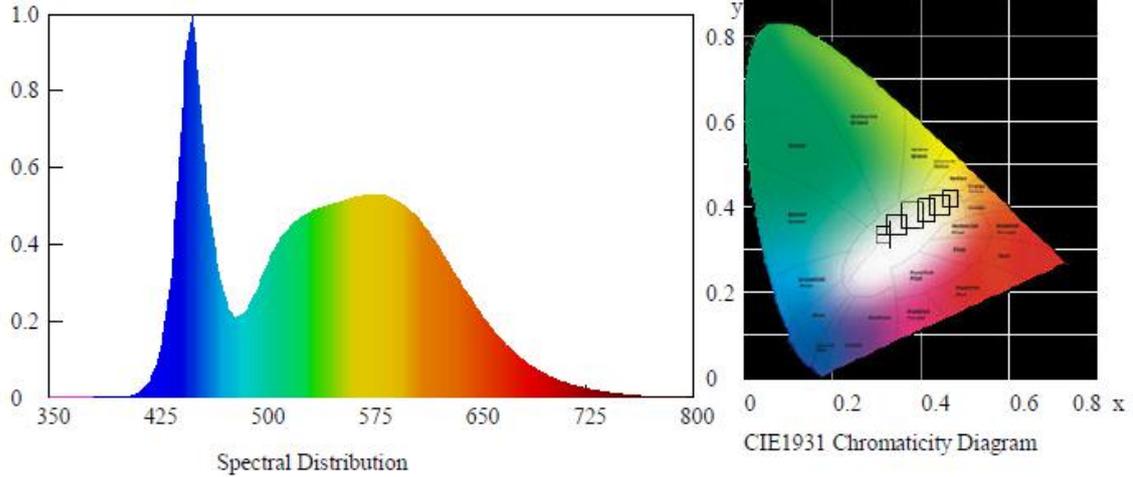
Power: 147.54 W

Luminous Efficacy: 127.0 lm/W

**IK-CPSL-150W-DY-5700K****Test Condition**

Temperature: 25°C  
Spectrum Range: 350-800 nm

RH: 58%  
Scan Step: 5 nm

**Spectroradiometric Parameters**

Chromaticity Coordinates:  $x=0.3299$   $y=0.3384$   $u'=0.2061$   $v'=0.4758$

Correlated Color Temperature: 5616 K

Dominant Wavelength: 513.0 nm(E)

Colour Fidelity Index:  $R_f=80$

Gamut Index:  $R_g=97$

Luminous Flux: 19801.74 lm

Purity: 0.0111

Chromaticity Difference:  $-0.00021$ Duv

Peak Wavelength: 450.0 nm

Color Ratio:  $K_r=32.6\%$   $K_g=55.8\%$   $K_b=11.6\%$

Bandwidth: 24.2nm

Radiant Flux: 68.188 W

Rendering Index:  $R_a=82.8$

$R_1=82$   $R_2=87$   $R_3=89$   $R_4=84$   $R_5=83$   $R_6=81$   $R_7=87$   $R_8=70$

$R_9=10$   $R_{10}=68$   $R_{11}=84$   $R_{12}=61$   $R_{13}=83$   $R_{14}=94$   $R_{15}=78$   $R_e=76$

**Electric Parameters**

Voltage: 120.05 V

Current: 1.248 A

Power Factor: 0.998

Power: 149.56 W

Luminous Efficacy: 132.4 lm/W



## Zonal Flux Diagram

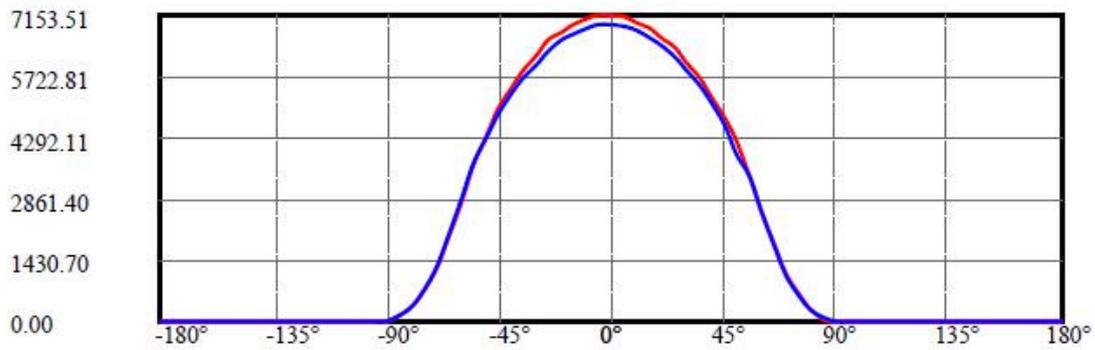
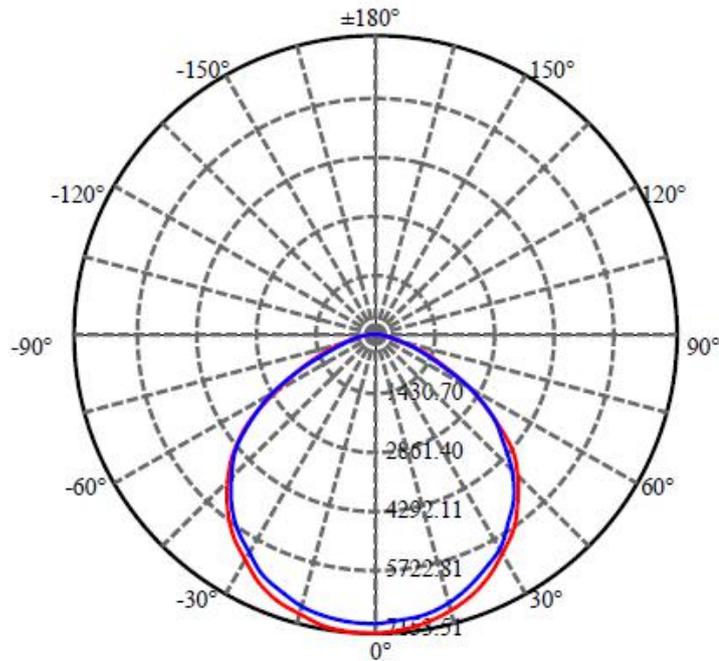
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	6971.505	.000	.000	.000%	.000%
5.0	6941.701	166.328	166.328	.895%	.895%
10.0	6859.371	493.708	660.036	2.655%	3.550%
15.0	6720.242	805.534	1465.570	4.333%	7.883%
20.0	6535.673	1092.474	2558.043	5.876%	13.758%
25.0	6292.350	1345.423	3903.466	7.236%	20.995%
30.0	5992.837	1554.701	5458.167	8.362%	29.357%
35.0	5635.792	1712.397	7170.563	9.210%	38.567%
40.0	5233.063	1813.386	8983.950	9.753%	48.320%
45.0	4757.166	1849.772	10833.720	9.949%	58.269%
50.0	4211.679	1812.286	12646.010	9.747%	68.016%
55.0	3533.574	1684.076	14330.080	9.058%	77.074%
60.0	2703.747	1441.739	15771.820	7.754%	84.828%
65.0	1871.965	1112.364	16884.190	5.983%	90.811%
70.0	1187.716	774.731	17658.920	4.167%	94.978%
75.0	674.037	486.632	18145.550	2.617%	97.595%
80.0	321.280	266.319	18411.870	1.432%	99.028%
85.0	107.272	116.448	18528.320	.626%	99.654%
90.0	3.225	30.255	18558.570	.163%	99.817%
95.0	2.125	1.465	18560.040	.008%	99.825%
100.0	2.431	1.238	18561.280	.007%	99.831%
105.0	2.919	1.432	18562.710	.008%	99.839%
110.0	3.628	1.711	18564.420	.009%	99.848%
115.0	4.410	2.035	18566.450	.011%	99.859%
120.0	5.265	2.352	18568.800	.013%	99.872%
125.0	5.985	2.600	18571.400	.014%	99.886%
130.0	6.779	2.775	18574.180	.015%	99.901%
135.0	7.451	2.875	18577.050	.015%	99.916%
140.0	7.891	2.841	18579.890	.015%	99.931%
145.0	8.379	2.715	18582.610	.015%	99.946%
150.0	8.734	2.520	18585.130	.014%	99.959%
155.0	9.003	2.245	18587.370	.012%	99.972%
160.0	9.051	1.894	18589.270	.010%	99.982%
165.0	8.954	1.484	18590.750	.008%	99.990%
170.0	8.917	1.060	18591.810	.006%	99.995%
175.0	9.051	.643	18592.450	.003%	99.999%
180.0	9.454	.221	18592.670	.001%	100.000%



### Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]



C0/C180: ——

C90/C270: ——

Field angle(10%Imax):C0/180Left:75.2 Right:74.2

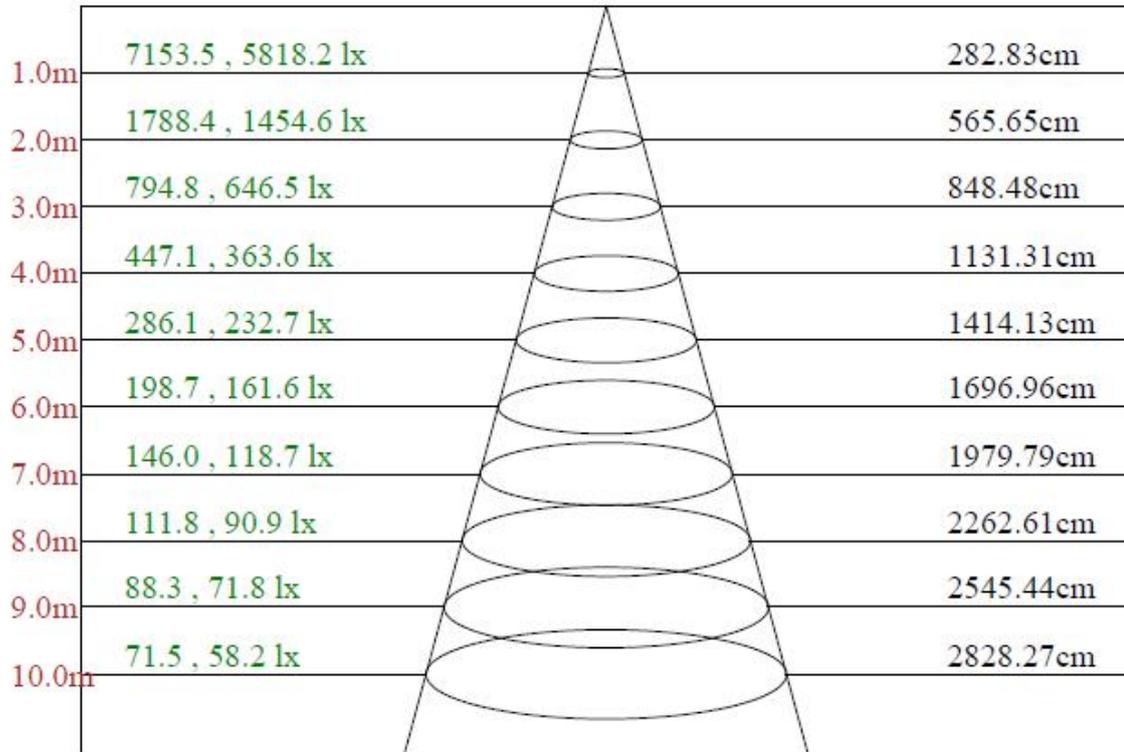
:C90/270Left:75.5 Right:73.9

Beam Angle(50%Imax):C0/180Left:55.5 Right:53.9

:C90/270Left:56.5 Right:54.2



Lux distance Curve



Max , Ave      Beam angle of C0plane109.44

**Luminous Intensity Distribution Data**

C/ $\gamma$ ( $^{\circ}$ )	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	7153.51	7108.56	6987.38	6829.08	6641.46	6399.11	6035.59	5685.75	5240.15
22.5	7079.24	7042.11	6936.57	6778.26	6582.82	6303.34	6014.09	5634.94	5210.83
45.0	7010.84	6973.70	6874.03	6705.95	6496.83	6254.48	5953.51	5582.17	5171.74
67.5	6969.80	6918.98	6825.17	6672.73	6473.38	6211.49	5916.37	5541.13	5118.98
90.0	6930.71	6881.85	6789.99	6639.50	6446.02	6189.99	5883.15	5494.22	5111.16
112.5	6885.76	6844.71	6748.95	6594.55	6410.84	6158.72	5842.10	5470.77	5075.98
135.0	6874.03	6832.99	6745.04	6596.50	6404.97	6141.13	5857.74	5500.08	5075.98
157.5	6868.17	6831.03	6741.13	6594.55	6408.88	6145.04	5840.15	5476.63	5072.07
180.0	7153.51	7141.78	7071.42	6952.21	6774.35	6555.46	6229.08	5869.47	5457.09
202.5	7079.24	7061.65	6999.11	6879.89	6696.18	6461.65	6182.17	5820.61	5418.00
225.0	7010.84	6989.34	6936.57	6809.53	6635.59	6401.06	6107.90	5771.75	5376.96
247.5	6969.80	6946.34	6877.94	6760.67	6586.73	6360.02	6078.59	5732.66	5328.10
270.0	6930.71	6922.89	6856.44	6727.45	6557.42	6326.80	6018.00	5683.80	5318.32
292.5	6885.76	6862.30	6788.04	6670.77	6492.92	6258.39	5982.82	5650.57	5247.97
315.0	6874.03	6856.44	6791.94	6661.00	6477.29	6246.67	5975.00	5631.03	5257.74
337.5	6868.17	6852.53	6780.22	6651.23	6485.10	6264.26	5969.14	5627.12	5247.97
360.0	7153.51	7108.56	6987.38	6829.08	6641.46	6399.11	6035.59	5685.75	5240.15
C/ $\gamma$ ( $^{\circ}$ )	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	4759.36	4219.95	3393.82	2562.03	1766.00	1123.59	632.84	261.50	45.15
22.5	4714.41	4202.36	3418.06	2563.59	1764.24	1131.40	638.50	292.77	87.56
45.0	4690.96	4167.18	3466.33	2626.52	1791.41	1115.38	617.01	291.79	93.42
67.5	4653.83	4155.45	3462.03	2610.89	1773.43	1117.72	612.51	277.33	84.82
90.0	4591.29	3898.65	3381.71	2555.77	1724.57	1082.35	586.52	263.06	74.66
112.5	4604.97	4343.08	3386.20	2549.32	1738.83	1076.29	588.67	270.29	80.72
135.0	4591.29	3888.87	3360.60	2496.36	1702.87	1069.25	589.25	270.29	77.79
157.5	4573.70	3897.67	3233.95	2427.76	1666.72	1027.63	583.19	276.94	88.14
180.0	4966.53	4374.35	3659.04	2793.23	1943.07	1247.30	732.32	362.54	137.98
202.5	4950.90	4372.39	3657.08	2804.96	1978.25	1270.75	737.98	376.03	143.45
225.0	4907.90	4360.67	3731.35	2883.14	2001.70	1280.53	744.04	368.01	134.85
247.5	4860.99	4352.85	3715.71	2902.68	2032.97	1298.12	740.72	366.06	131.92
270.0	4851.22	4317.67	3698.12	2898.77	2013.43	1270.75	729.19	353.75	123.52
292.5	4794.54	4305.94	3680.53	2894.86	2038.83	1302.02	740.52	357.66	133.29
315.0	4806.27	4278.58	3686.40	2887.05	2023.20	1296.16	753.23	375.05	139.74
337.5	4796.50	4251.22	3606.27	2803.01	1991.93	1294.21	758.11	377.40	139.35
360.0	4759.36	4219.95	3393.82	2562.03	1766.00	1123.59	632.84	261.50	45.15
C/ $\gamma$ ( $^{\circ}$ )	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	1.56	1.56	1.95	2.15	3.13	3.91	4.89	5.67	6.45
22.5	2.15	1.95	2.54	2.93	3.71	4.69	5.28	6.06	6.84
45.0	2.15	2.35	2.74	3.32	3.91	4.69	5.47	6.45	7.04
67.5	2.15	2.35	2.74	3.32	3.71	4.69	5.47	6.25	7.04
90.0	2.54	2.35	2.74	3.13	3.91	4.50	5.47	6.25	7.04
112.5	2.54	2.35	2.54	3.13	3.91	4.69	5.47	6.25	7.04
135.0	2.15	2.35	2.54	3.13	3.91	4.89	5.67	6.25	6.84
157.5	2.35	2.35	2.74	3.32	3.91	4.50	5.47	6.25	7.04
180.0	3.52	1.76	1.95	2.35	3.13	3.91	5.08	5.67	6.65
202.5	4.10	1.95	2.15	2.74	3.52	4.30	4.89	5.67	6.65
225.0	3.91	2.35	2.35	2.93	3.52	4.30	5.28	5.86	6.65
247.5	2.93	2.15	2.35	2.93	3.71	4.30	5.08	5.86	6.84
270.0	2.74	2.15	2.35	2.93	3.52	4.30	5.28	5.86	6.65
292.5	2.74	2.15	2.54	2.74	3.52	4.30	5.08	5.67	6.65
315.0	7.04	1.95	2.54	2.74	3.52	4.30	5.08	6.06	6.45
337.5	7.04	1.95	2.15	2.93	3.52	4.30	5.28	5.67	6.65
360.0	1.56	1.56	1.95	2.15	3.13	3.91	4.89	5.67	6.45



C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	7.04	7.62	8.01	8.40	8.60	8.60	8.40	8.21	8.40
22.5	7.82	8.21	8.60	9.19	9.58	9.38	9.19	9.19	9.19
45.0	7.62	8.01	8.60	8.99	9.19	8.99	8.99	8.99	9.19
67.5	7.62	8.01	8.40	8.60	8.99	8.99	8.80	8.99	9.19
90.0	7.62	8.01	8.40	8.60	8.80	8.99	8.99	8.99	9.38
112.5	7.62	7.82	8.40	8.80	8.80	9.19	8.99	8.99	9.38
135.0	7.62	8.01	8.60	8.99	9.19	9.19	9.19	8.99	9.19
157.5	7.62	8.21	8.80	8.99	9.19	9.19	9.19	9.19	9.19
180.0	7.43	8.01	8.21	8.80	8.99	8.99	8.99	8.99	8.99
202.5	7.43	8.01	8.40	8.99	9.19	9.19	9.19	8.99	9.19
225.0	7.43	8.01	8.40	8.80	9.19	9.19	9.19	9.19	9.19
247.5	7.23	7.62	8.40	8.40	8.99	8.99	8.99	8.80	8.99
270.0	7.23	7.62	8.21	8.40	8.80	8.99	8.80	8.80	8.80
292.5	7.23	7.62	8.21	8.40	8.80	8.99	8.60	8.80	8.80
315.0	7.23	7.62	8.01	8.80	8.80	8.99	8.80	8.60	8.99
337.5	7.43	7.82	8.40	8.60	8.99	8.99	8.99	8.99	8.80
360.0	7.04	7.62	8.01	8.40	8.60	8.60	8.40	8.21	8.40

C/γ(°)	180.0
0.0	8.80
22.5	9.58
45.0	9.77
67.5	9.38
90.0	9.58
112.5	9.38
135.0	9.38
157.5	9.77
180.0	8.80
202.5	9.58
225.0	9.77
247.5	9.38
270.0	9.58
292.5	9.38
315.0	9.38
337.5	9.77
360.0	8.80





## 5 Performance Assessment

Model name	CCT(K)	Total Luminous(lm)	Power(W)	Luminous Efficacy(lm/W)
IK-CPSL-150W-DY-3000K	3000K	18737.58	147.54	127.0
IK-CPSL-150W-DY-3500K	3500K	18950.41 * <sup>1</sup>	148.55 * <sup>2</sup>	127.6 * <sup>3</sup>
IK-CPSL-150W-DY-4000K	4000K	19163.24 * <sup>1</sup>	148.55 * <sup>2</sup>	129.0 * <sup>3</sup>
IK-CPSL-150W-DY-4500K	4500K	19376.08 * <sup>1</sup>	148.55 * <sup>2</sup>	130.4 * <sup>3</sup>
IK-CPSL-150W-DY-5000K	5000K	19588.91 * <sup>1</sup>	148.55 * <sup>2</sup>	131.9 * <sup>3</sup>
IK-CPSL-150W-DY-5700K	5700K	19801.74	149.56	132.4

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

$$18950.41=(19801.74-18737.58) /5+18737.58$$

$$19163.24=(19801.74-18737.58) /5+18950.41$$

$$19376.08=(19801.74-18737.58) /5+19163.24$$

$$19588.91=(19801.74-18737.58) /5+19376.08$$

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

$$148.55=(147.54+149.56)/2$$

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

$$127.6=18950.41 /148.55$$

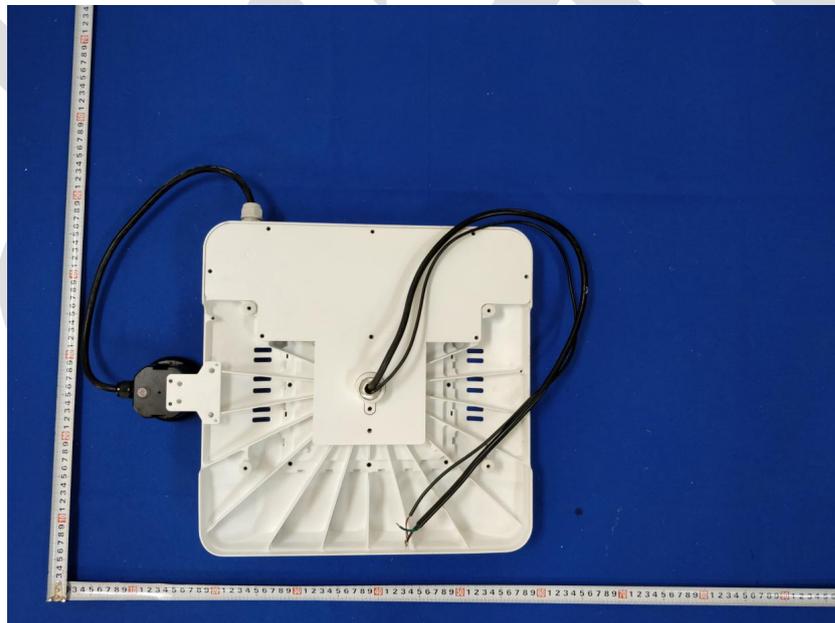
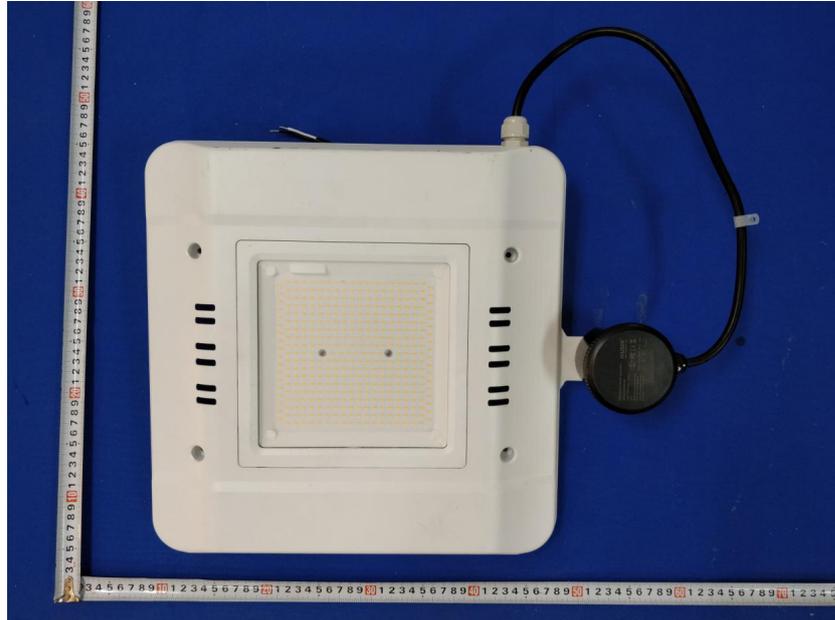
$$129.0=19163.24 /148.55$$

$$130.4=19376.08/148.55$$

$$131.9=19588.91 /148.55$$



## Photo Document



\*\*\*\*End of test report\*\*\*\*