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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:

IKIO LED LIGHTING

### Address:

8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250

### For Product:

Fuel Pump Canopy Luminaires

### Model No.:

IK-CPSL-75W-DY-3000K / IK-CPSL-75W-DY-5700K

IK-CPSL-75W-DN-3000K / IK-CPSL-75W-DN-5700K

IK-CPSL-75W-DY-3000K / IK-CPSL-75W-DY-5700K

IK-CPSL-75W-DN-3000K / IK-CPSL-75W-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.

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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>	IKIO LED LIGHTING
<b>Manufacturer Address</b>	8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250
<b>Brand Name</b>	IKIO
<b>Luminaire Type</b>	Fuel Pump Canopy Luminaires
<b>Model Number</b>	IK-CPSL-75W-DY-3000K / IK-CPSL-75W-DY-5700K IK-CPSL-75W-DN-3000K / IK-CPSL-75W-DN-5700K IK-CPSL-75W-DY-3000K / IK-CPSL-75W-DY-5700K IK-CPSL-75W-DN-3000K / IK-CPSL-75W-DN-5700K
<b>Rated Inputs</b>	AC 120-277V 50/60Hz
<b>Rated Power</b>	75 W
<b>Nominal CCT</b>	3000K / 5700K
<b>Date of Receipt Samples</b>	2018-09-21
<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
Digital Anemometer	TECMAN	TD8901	026141	2019-09-11

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-75W-DY-3000K	120.07	60	0.629	75.02	0.994
IK-CPSL-75W-DY-5700K	120.09	60	0.635	75.77	0.994

#### 3.1.2 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
IK-CPSL-75W-DY-3000K	9505.03	126.7	3012	84.6	18
IK-CPSL-75W-DY-5700K	10039.53	132.5	5558	82.8	11

#### 3.1.3 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
IK-CPSL-75W-DY-3000K	+0.00028	0.4365	0.4046	0.2501	0.5215
IK-CPSL-75W-DY-5700K	+0.00004	0.3312	0.3400	0.2064	0.4768

### 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-75W-DY-3000K	120.08	60	0.6258	74.70	0.9941

#### 3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-40°(%lm)	Zonal Lumen in 40-70°(%lm)
9445.13	126.44	48.353	46.594



### 3.3 Additional Test

Model Number	Test Item	Test Voltage (V)	Frequency(Hz)	Test Result
IK-CPSL-75W-DY-3000K	Power Factor	277	60	0.927
	THD	277	60	12.1%

draft



## 4 Test Data

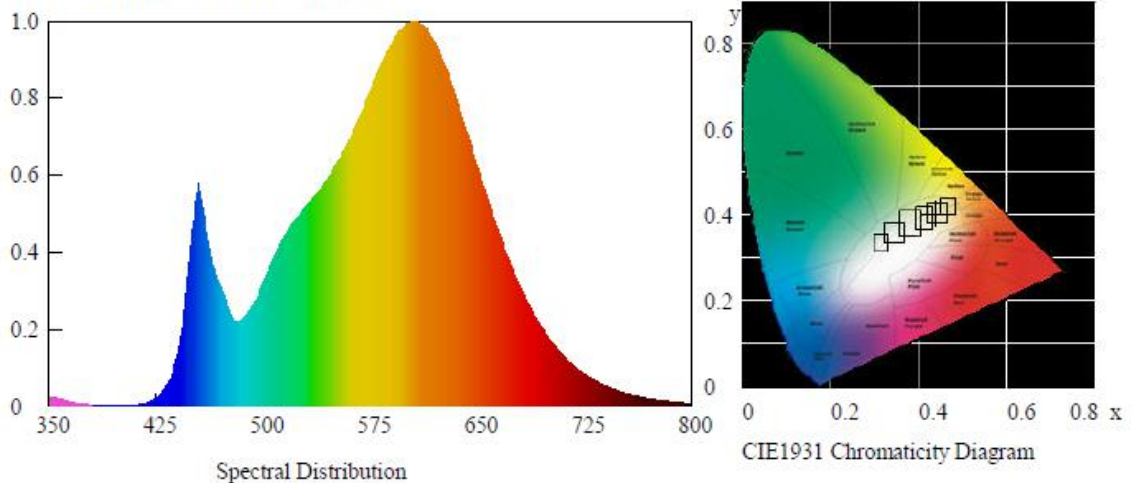
### IK-CPSL-75W-DY-3000K

#### Test Condition

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

RH: 58%  
Scan Step: 5 nm

#### Spectroradiometric Parameters



Chromaticity Coordinates:  $x=0.4365$   $y=0.4046$   $u'=0.2501$   $v'=0.5215$

Correlated Color Temperature: 3012 K

Dominant Wavelength: 581.0 nm(E)

Colour Fidelity Index:  $R_f=83$

Gamut Index:  $R_g=94$

Luminous Flux: 9505.03 lm

Purity: 0.5270

Chromaticity Difference: +0.00028Duv

Peak Wavelength: 605.0 nm

Color Ratio:  $K_r=44.7\%$   $K_g=47.8\%$   $K_b=7.5\%$

Bandwidth: 138nm

Radiant Flux: 29.653 W

Rendering Index:  $R_a=84.6$

$R_1=84$   $R_2=93$   $R_3=96$   $R_4=82$   $R_5=83$   $R_6=91$   $R_7=84$   $R_8=63$

$R_9=18$   $R_{10}=83$   $R_{11}=81$   $R_{12}=71$   $R_{13}=87$   $R_{14}=99$   $R_{15}=77$   $R_e=79$

#### Electric Parameters

Voltage: 120.07 V

Current: 0.629 A

Power Factor: 0.994

Power: 75.02 W

Luminous Efficacy: 126.7 lm/W

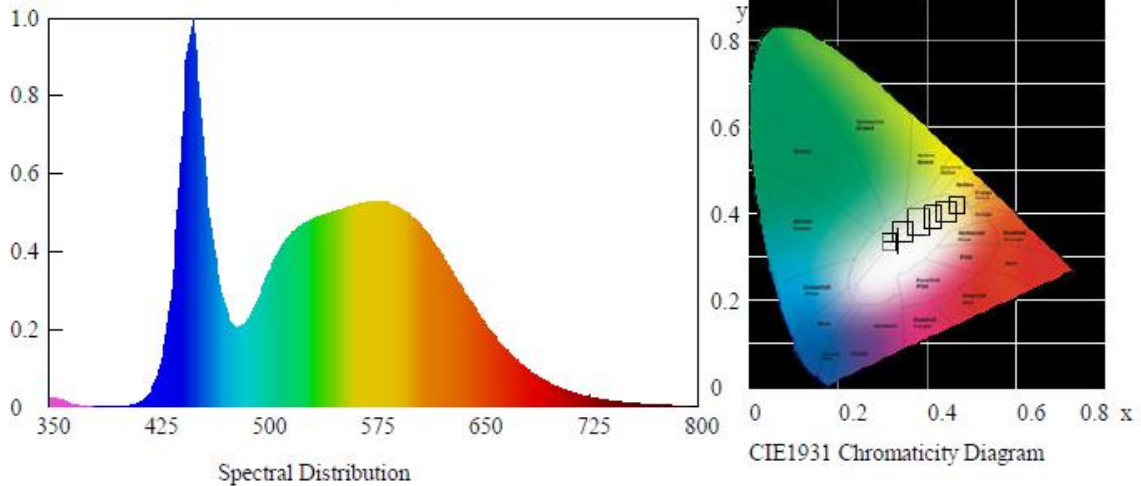
**IK-CPSL-75W-DY-5700K****Test Condition**

Temperature: 25°C

RH: 58%

Spectrum Range: 350-800 nm

Scan Step: 5 nm

**Spectroradiometric Parameters**Chromaticity Coordinates:  $x=0.3312$   $y=0.3400$   $u'=0.2064$   $v'=0.4768$ 

Correlated Color Temperature: 5558 K

Dominant Wavelength: 534.0 nm(E)

Colour Fidelity Index:  $R_f=80$ Gamut Index:  $R_g=97$ 

Luminous Flux: 10039.53 lm

Purity: 0.0147

Chromaticity Difference: +0.00004Duv

Peak Wavelength: 450.0 nm

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

Bandwidth: 24.7nm

Radiant Flux: 35.682 W

Rendering Index:  $R_a=82.8$  $R_1=82$   $R_2=87$   $R_3=89$   $R_4=84$   $R_5=83$   $R_6=81$   $R_7=87$   $R_8=70$  $R_9=11$   $R_{10}=68$   $R_{11}=84$   $R_{12}=60$   $R_{13}=83$   $R_{14}=94$   $R_{15}=78$   $R_e=76$ **Electric Parameters**

Voltage: 120.09 V

Current: 0.635 A

Power Factor: 0.994

Power: 75.77 W

Luminous Efficacy: 132.5 lm/W

**Zonal Flux Diagram**

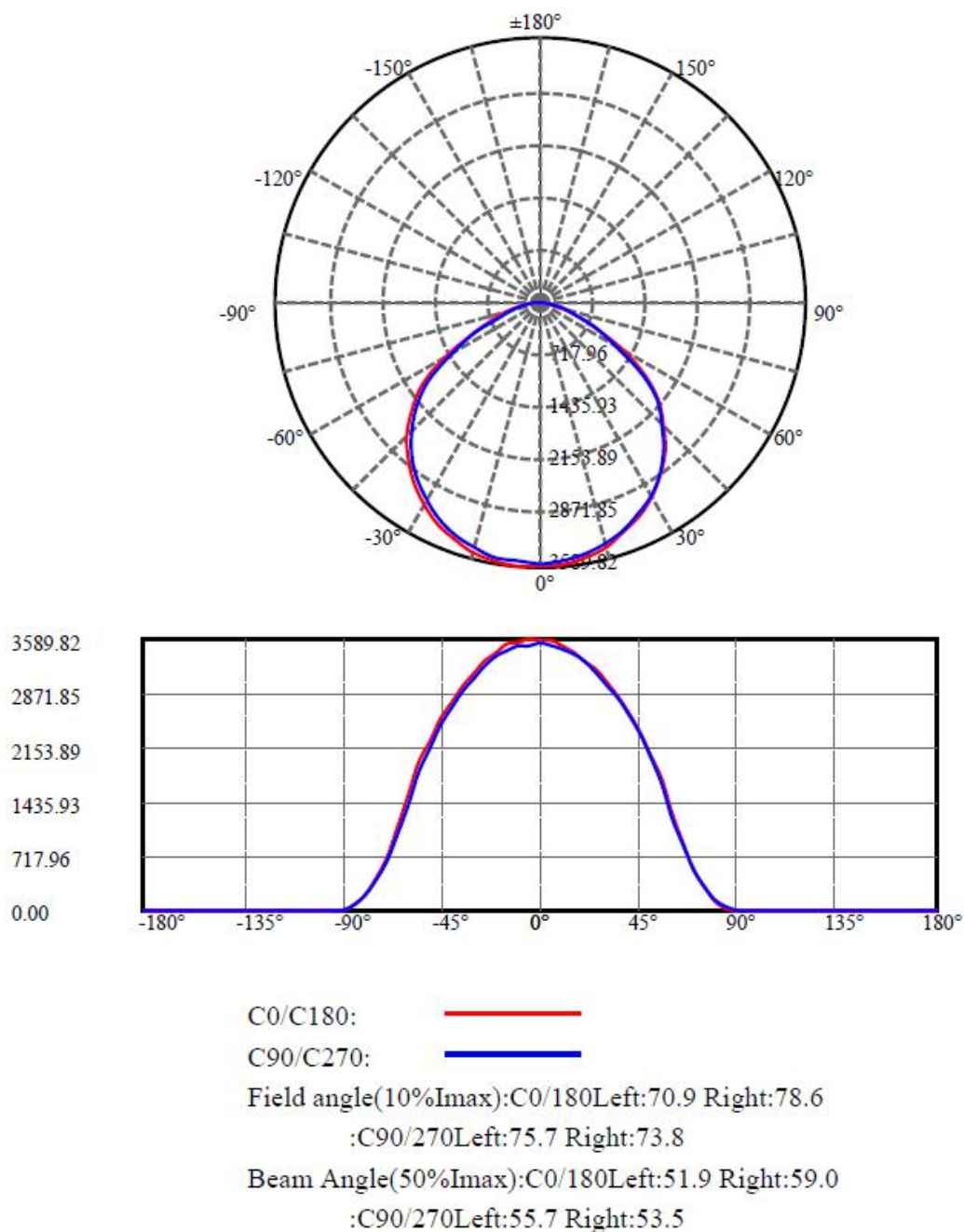
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	3542.123	.000	.000	.000%	.000%
5.0	3527.439	84.515	84.515	.895%	.895%
10.0	3488.262	250.974	335.488	2.657%	3.552%
15.0	3417.280	409.632	745.120	4.337%	7.889%
20.0	3320.481	555.286	1300.406	5.879%	13.768%
25.0	3197.944	683.663	1984.069	7.238%	21.006%
30.0	3047.311	790.342	2774.411	8.368%	29.374%
35.0	2865.910	870.763	3645.174	9.219%	38.593%
40.0	2659.185	921.820	4566.995	9.760%	48.353%
45.0	2415.977	939.707	5506.702	9.949%	58.302%
50.0	2136.935	919.983	6426.685	9.740%	68.042%
55.0	1794.532	854.832	7281.517	9.051%	77.093%
60.0	1364.429	730.185	8011.702	7.731%	84.824%
65.0	948.840	562.360	8574.062	5.954%	90.778%
70.0	606.282	393.767	8967.828	4.169%	94.947%
75.0	345.682	248.828	9216.656	2.634%	97.581%
80.0	164.968	136.636	9353.292	1.447%	99.028%
85.0	55.365	59.870	9413.162	.634%	99.662%
90.0	1.711	15.628	9428.790	.165%	99.827%
95.0	.933	.724	9429.514	.008%	99.835%
100.0	1.011	.528	9430.042	.006%	99.840%
105.0	1.270	.610	9430.652	.006%	99.847%
110.0	1.620	.755	9431.408	.008%	99.855%
115.0	2.048	.929	9432.337	.010%	99.865%
120.0	2.385	1.078	9433.414	.011%	99.876%
125.0	2.877	1.216	9434.630	.013%	99.889%
130.0	3.279	1.338	9435.969	.014%	99.903%
135.0	3.629	1.396	9437.364	.015%	99.918%
140.0	3.901	1.394	9438.759	.015%	99.933%
145.0	4.121	1.338	9440.098	.014%	99.947%
150.0	4.342	1.246	9441.344	.013%	99.960%
155.0	4.536	1.124	9442.467	.012%	99.972%
160.0	4.562	.954	9443.421	.010%	99.982%
165.0	4.433	.741	9444.162	.008%	99.990%
170.0	4.497	.530	9444.691	.006%	99.995%
175.0	4.575	.325	9445.016	.003%	99.999%
180.0	4.743	.111	9445.127	.001%	100.000%



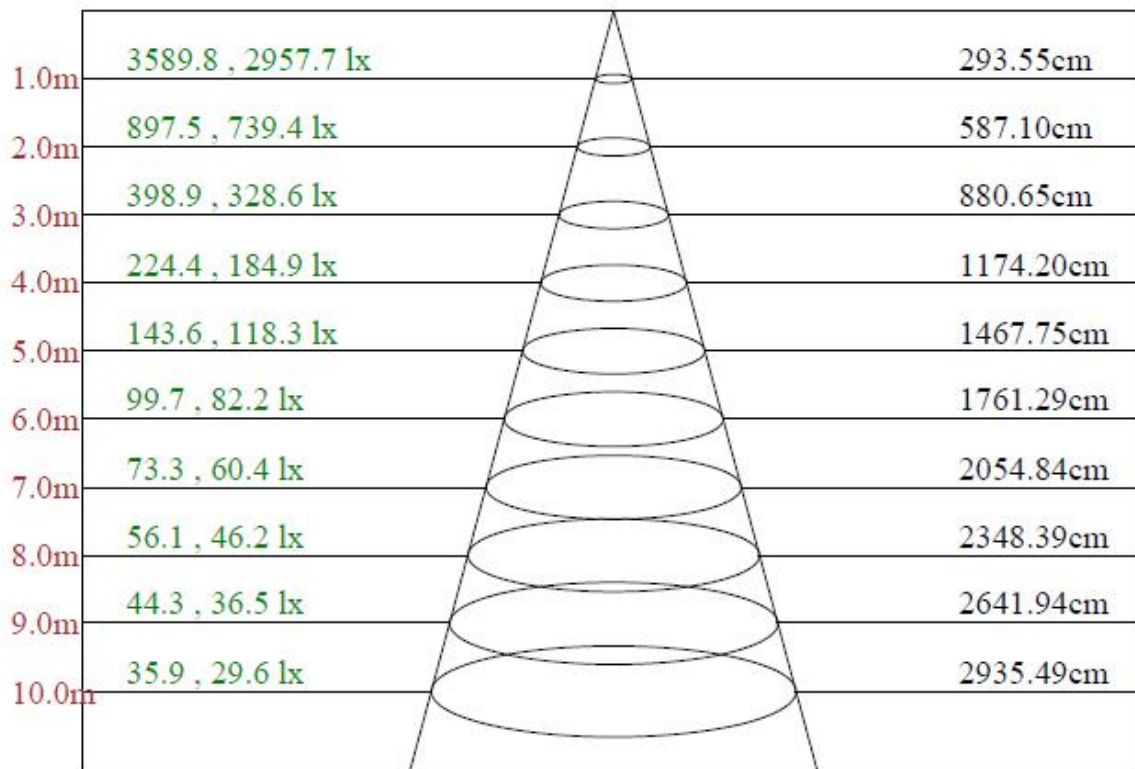
## Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





## Lux distance Curve



Max , Ave

Beam angle of C180plane111.36

**Luminous Intensity Distribution Data**

C/γ(°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	3576.75	3560.79	3505.42	3422.06	3303.66	3189.82	3030.15	2838.55	2622.07
22.5	3569.29	3541.09	3491.53	3411.90	3305.32	3169.91	3012.32	2824.24	2603.41
45.0	3559.75	3528.65	3468.72	3394.90	3298.27	3157.89	3005.89	2815.74	2609.83
67.5	3542.95	3518.69	3473.28	3392.62	3286.66	3158.72	3005.06	2809.52	2598.22
90.0	3549.17	3505.63	3466.85	3395.94	3288.94	3148.55	2996.77	2810.97	2597.81
112.5	3524.71	3508.74	3451.71	3378.31	3279.40	3150.42	2989.51	2799.57	2593.45
135.0	3501.27	3509.98	3449.64	3372.71	3273.80	3139.64	2987.23	2802.26	2590.76
157.5	3513.09	3497.54	3450.26	3374.58	3272.97	3143.99	2985.98	2797.49	2587.02
180.0	3576.75	3589.82	3546.89	3512.68	3404.85	3309.26	3154.98	2970.85	2769.92
202.5	3569.29	3566.59	3536.53	3473.90	3386.19	3273.80	3131.14	2953.64	2746.28
225.0	3559.75	3540.05	3513.51	3453.37	3363.59	3248.09	3101.69	2930.00	2730.10
247.5	3542.95	3533.62	3508.74	3443.21	3348.86	3230.05	3088.01	2919.21	2709.99
270.0	3549.17	3511.43	3510.61	3426.21	3355.91	3231.71	3082.61	2904.70	2706.26
292.5	3524.71	3517.24	3482.82	3414.80	3326.05	3206.20	3066.65	2899.10	2689.67
315.0	3501.27	3501.90	3484.48	3398.42	3311.95	3200.19	3057.32	2884.59	2695.27
337.5	3513.09	3507.29	3471.21	3410.86	3321.29	3208.90	3061.67	2894.12	2696.92
360.0	3576.75	3560.79	3505.42	3422.06	3303.66	3189.82	3030.15	2838.55	2622.07

C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	2365.15	2077.13	1728.55	1290.82	870.08	536.86	291.13	107.21	17.00
22.5	2356.65	2089.57	1738.92	1292.27	880.24	558.63	307.31	132.09	34.21
45.0	2357.89	2062.82	1714.87	1294.34	889.16	554.27	306.69	142.87	41.47
67.5	2349.60	2057.63	1685.84	1242.09	860.13	549.09	308.76	144.53	42.51
90.0	2334.04	2044.78	1662.41	1220.73	838.36	536.65	299.64	138.93	41.68
112.5	2347.94	2050.79	1690.61	1242.50	841.67	535.40	305.65	143.08	40.85
135.0	2347.73	2061.16	1705.74	1264.69	873.19	541.21	299.43	135.41	38.98
157.5	2341.09	2047.89	1708.44	1264.90	855.15	529.39	287.61	131.26	37.12
180.0	2541.82	2263.13	1956.23	1538.61	1065.00	689.89	395.02	195.75	71.95
202.5	2510.30	2259.81	1924.30	1505.02	1056.08	679.52	391.29	197.82	73.82
225.0	2491.02	2214.19	1897.34	1471.63	1052.56	669.77	392.12	194.92	72.99
247.5	2470.69	2198.85	1852.76	1417.10	1009.22	657.75	384.86	197.41	76.72
270.0	2459.91	2172.30	1838.87	1398.85	983.51	641.36	380.51	190.77	74.24
292.5	2454.11	2180.60	1844.47	1416.06	1008.39	661.06	386.93	194.30	77.14
315.0	2461.16	2202.37	1872.05	1469.77	1041.78	671.22	396.68	197.61	74.44
337.5	2466.55	2207.97	1891.12	1501.49	1056.91	688.44	397.30	195.54	70.71
360.0	2365.15	2077.13	1728.55	1290.82	870.08	536.86	291.13	107.21	17.00

C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	0.83	0.83	0.83	1.24	1.87	2.07	2.49	3.11	3.53
22.5	1.24	1.04	1.24	1.66	1.87	2.28	2.70	2.90	3.11
45.0	1.24	1.24	1.45	1.45	1.87	2.28	2.70	3.11	3.32
67.5	1.24	1.24	1.24	1.45	1.66	2.28	2.70	3.32	3.53
90.0	1.24	1.24	1.24	1.66	1.87	2.28	2.70	2.90	3.73
112.5	1.24	1.04	1.45	1.66	2.07	2.28	2.70	2.90	3.53
135.0	1.24	1.04	1.24	1.66	2.07	2.49	2.49	3.11	3.53
157.5	1.04	1.04	1.45	1.45	1.87	2.49	2.90	3.32	3.73
180.0	4.56	0.62	0.62	1.04	1.45	1.87	2.07	2.70	3.11
202.5	2.90	0.62	0.83	1.04	1.24	1.87	2.07	2.90	3.11
225.0	2.07	0.83	1.04	1.04	1.45	2.07	2.28	2.90	3.11
247.5	0.83	1.04	0.62	1.04	1.45	1.87	2.07	2.70	3.11
270.0	1.04	0.62	0.62	1.04	1.24	1.66	2.07	2.70	3.11
292.5	1.04	0.83	0.83	0.83	1.24	1.66	2.28	2.49	2.90
315.0	1.87	0.83	0.62	1.04	1.24	1.66	2.07	2.49	3.11
337.5	3.73	0.83	0.83	1.04	1.45	1.66	1.87	2.49	2.90
360.0	0.83	0.83	0.83	1.24	1.87	2.07	2.49	3.11	3.53



$C/\gamma(^{\circ})$	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	3.73	3.94	4.15	4.36	4.56	4.36	4.15	4.36	4.36
22.5	3.73	4.15	4.36	4.56	4.56	4.77	4.56	4.56	4.56
45.0	3.73	4.15	4.15	4.56	4.77	4.56	4.56	4.56	4.77
67.5	3.73	3.94	4.15	4.36	4.56	4.56	4.56	4.56	4.77
90.0	3.73	3.94	4.15	4.36	4.77	4.56	4.56	4.56	4.77
112.5	3.73	3.94	4.36	4.36	4.56	4.56	4.36	4.36	4.56
135.0	3.94	4.15	4.36	4.36	4.56	4.77	4.36	4.36	4.56
157.5	3.94	4.36	4.36	4.56	4.98	4.77	4.56	4.56	4.56
180.0	3.53	3.73	3.94	4.36	4.56	4.56	4.36	4.56	4.56
202.5	3.73	3.73	4.15	4.36	4.36	4.56	4.56	4.56	4.77
225.0	3.11	3.73	3.94	4.36	4.36	4.56	4.36	4.56	4.56
247.5	3.32	3.73	3.94	4.15	4.56	4.56	4.36	4.36	4.56
270.0	3.73	3.73	3.94	4.36	4.15	4.36	4.56	4.56	4.36
292.5	3.53	3.73	3.94	4.15	4.36	4.36	4.36	4.36	4.56
315.0	3.32	3.73	3.94	3.94	4.36	4.56	4.36	4.56	4.56
337.5	3.53	3.73	4.15	4.36	4.56	4.56	4.36	4.56	4.36
360.0	3.73	3.94	4.15	4.36	4.56	4.36	4.15	4.36	4.36

$C/\gamma(^{\circ})$	180.0
0.0	4.56
22.5	4.77
45.0	4.77
67.5	4.77
90.0	4.77
112.5	4.77
135.0	4.77
157.5	4.77
180.0	4.56
202.5	4.77
225.0	4.77
247.5	4.77
270.0	4.77
292.5	4.77
315.0	4.77
337.5	4.77
360.0	4.56



## 5 Performance Assessment

Model name	CCT(K)	Total Luminous(lm)	Power(W)	Luminous Efficacy(lm/W)
IK-CPSL-75W-DY-3000K	3000K	9505.03	75.02	126.7
IK-CPSL-75W-DN-3500K	3500K	9611.93 <sup>*1</sup>	75.40 <sup>*2</sup>	127.5 <sup>*3</sup>
IK-CPSL-75W-DY-4000K	4000K	9718.83 <sup>*1</sup>	75.40 <sup>*2</sup>	128.9 <sup>*3</sup>
IK-CPSL-75W-DN-4500K	4500K	9825.73 <sup>*1</sup>	75.40 <sup>*2</sup>	130.3 <sup>*3</sup>
IK-CPSL-75W-DN-5000K	5000K	9932.63 <sup>*1</sup>	75.40 <sup>*2</sup>	131.7 <sup>*3</sup>
IK-CPSL-75W-DY-5700K	5700K	10039.53	75.77	132.5

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

$$9611.93 = (10039.53 - 9505.03) / 5 + 9505.03$$

$$9718.83 = (10039.53 - 9505.03) / 5 + 9611.93$$

$$9825.73 = (10039.53 - 9505.03) / 5 + 9718.83$$

$$9932.63 = (10039.53 - 9505.03) / 5 + 9825.73$$

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

$$75.40 = (75.02 + 75.77) / 2$$

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

$$127.5 = 9611.93 / 75.40$$

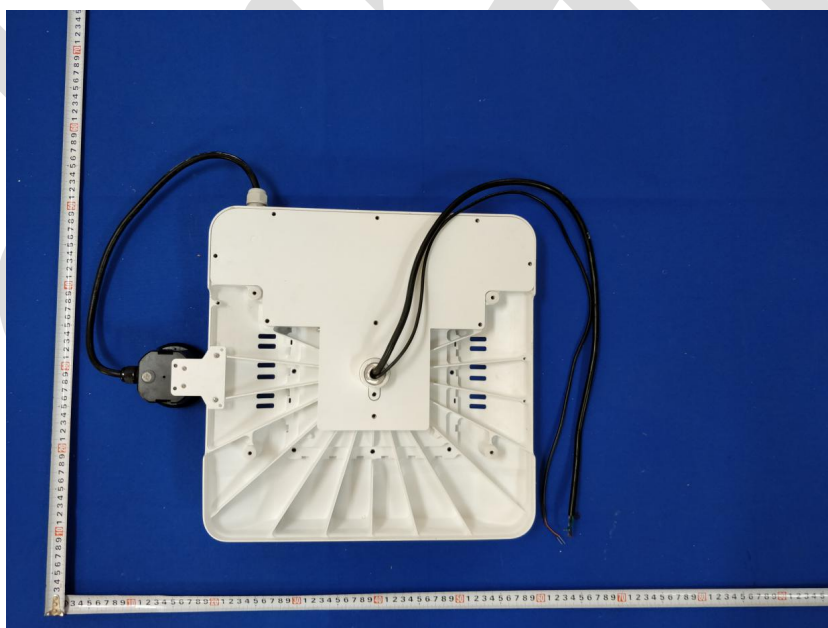
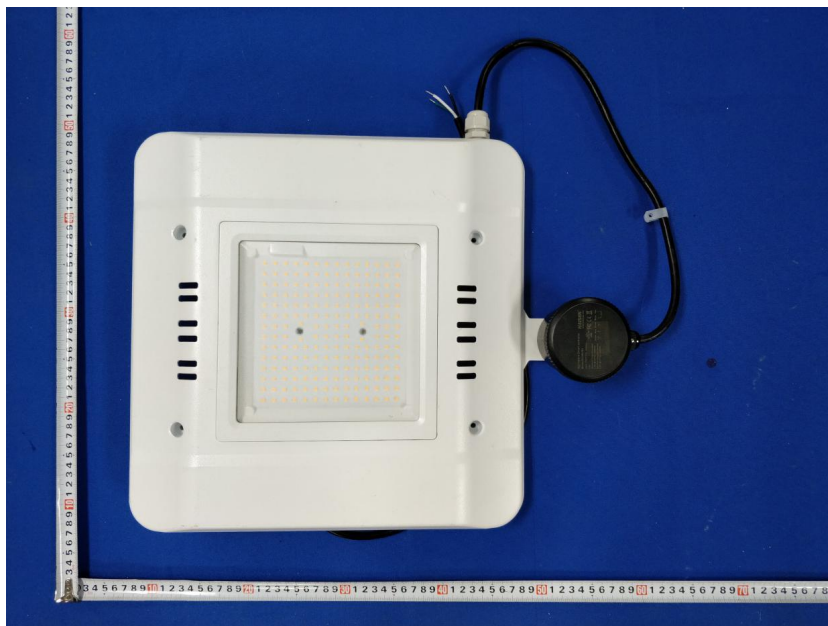
$$128.9 = 9718.83 / 75.40$$

$$130.3 = 9825.73 / 75.40$$

$$131.7 = 9932.63 / 75.40$$



## Photo Document



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