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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-100W-DY-3000K / IK-CPSL-100W-DY-5700K

IK-CPSL-100W-DN-3000K / IK-CPSL-100W-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

Complied by: Zac Kuang

Review by: Jason zhou

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

Manufacturer	IKIO LED LIGHTING
Manufacturer Address	8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250
Brand Name	IKIO
Luminaire Type	Fuel Pump Canopy Luminaires
Model Number	IK-CPSL-100W-DY-3000K / IK-CPSL-100W-DY-5700K IK-CPSL-100W-DN-3000K / IK-CPSL-100W-DN-5700K
Rated Inputs	AC 120-277V 50/60Hz
Rated Power	100 W
Nominal CCT	3000K / 5700K
Date of Receipt Samples	2018-09-21
Date of Test	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 ± 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. 4π 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-100W-DY-3000K	120.02	60	0.834	99.69	0.996
IK-CPSL-100W-DY-5700K	120.06	60	0.837	100.05	0.996

3.1.2 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
IK-CPSL-100W-DY-3000K	12670.60	127.1	2943	82.8	11
IK-CPSL-100W-DY-5700K	13276.64	132.7	5752	83.3	13

3.1.3 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
IK-CPSL-100W-DY-3000K	-0.00049	0.4403	0.4040	0.2528	0.5219
IK-CPSL-100W-DY-5700K	-0.00082	0.3270	0.3347	0.2056	0.4734

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-100W-DY-3000K	120.08	60	0.8246	98.59	0.9957

3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-40°(%lm)	Zonal Lumen in 40-70°(%lm)
12513.46	126.92	48.251	46.650



3.3 Additional Test

Model Number	Test Item	Test Voltage (V)	Frequency(Hz)	Test Result
IK-CPSL-100W-DY-3000K	Power Factor	277	60	0.950
	THD	277	60	10.0%

draft



4 Test Data

IK-CPSL-100W-DY-3000K

Test Condition

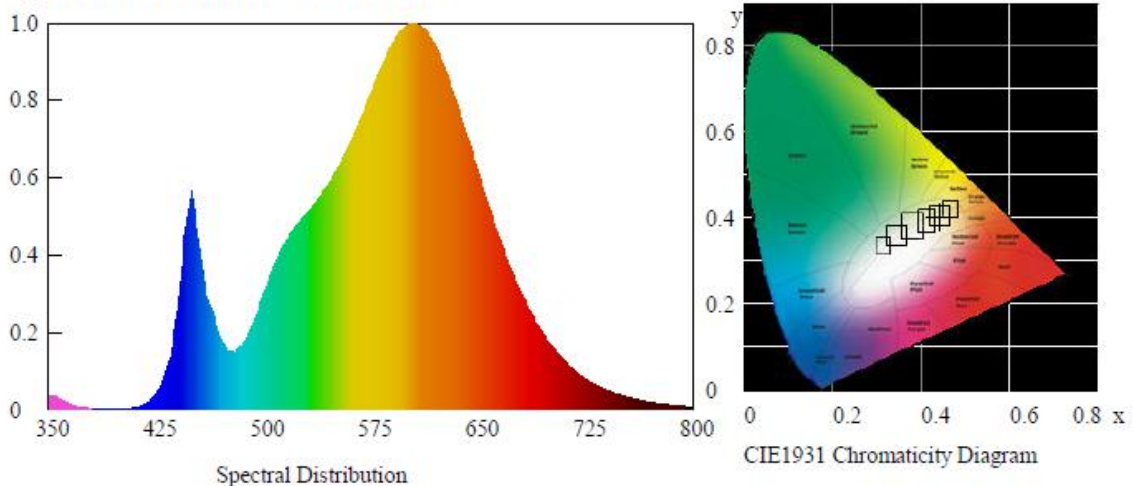
Temperature: 25°C

RH: 58%

Spectrum Range: 350-800 nm

Scan Step: 5 nm

Spectroradiometric Parameters

Chromaticity Coordinates: $x=0.4403$ $y=0.4040$ $u'=0.2528$ $v'=0.5219$

Correlated Color Temperature: 2943 K

Dominant Wavelength: 582.0 nm(E)

Colour Fidelity Index: $R_f=82$ Gamut Index: $R_g=97$

Luminous Flux: 12670.60 lm

Purity: 0.5353

Chromaticity Difference: -0.00049Duv

Peak Wavelength: 605.0 nm

Color Ratio: $K_r=45.2\%$ $K_g=47.8\%$ $K_b=6.9\%$

Bandwidth: 136.2nm

Radiant Flux: 42.325 W

Rendering Index: $R_a=82.8$ $R_1=81$ $R_2=90$ $R_3=97$ $R_4=81$ $R_5=81$ $R_6=88$ $R_7=84$ $R_8=61$ $R_9=11$ $R_{10}=77$ $R_{11}=81$ $R_{12}=69$ $R_{13}=84$ $R_{14}=98$ $R_{15}=74$ $R_e=77$

Electric Parameters

Voltage: 120.02 V

Current: 0.834 A

Power Factor: 0.996

Power: 99.69 W

Luminous Efficacy: 127.1 lm/W

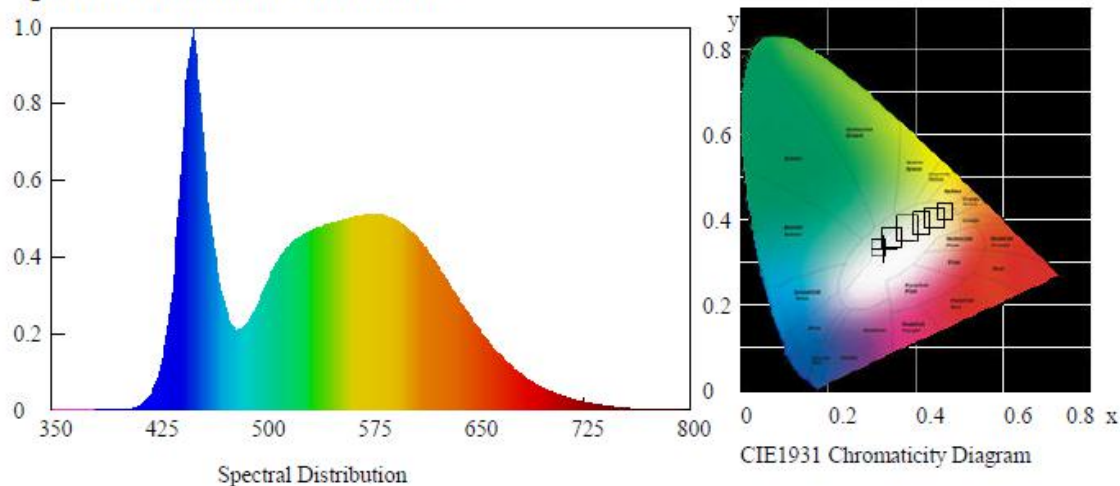
**IK-CPSL-100W-DY-5700K****Test Condition**

Temperature: 25°C

RH: 58%

Spectrum Range: 350-800 nm

Scan Step: 5 nm

Spectroradiometric ParametersChromaticity Coordinates: $x=0.3270$ $y=0.3347$ $u'=0.2056$ $v'=0.4734$

Correlated Color Temperature: 5752 K

Dominant Wavelength: 494.0 nm(E)

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

Luminous Flux: 13276.64 lm

Purity: 0.0208

Chromaticity Difference: -0.00082Duv

Peak Wavelength: 450.0 nm

Color Ratio: $K_r=32.4\%$ $K_g=55.8\%$ $K_b=11.8\%$

Bandwidth: 23.6nm

Radiant Flux: 52.735 W

Rendering Index: $R_a=83.3$ $R_1=83$ $R_2=87$ $R_3=89$ $R_4=84$ $R_5=83$ $R_6=81$ $R_7=87$ $R_8=71$ $R_9=13$ $R_{10}=69$ $R_{11}=84$ $R_{12}=61$ $R_{13}=84$ $R_{14}=94$ $R_{15}=79$ $R_e=77$ **Electric Parameters**

Voltage: 120.06 V

Current: 0.837 A

Power Factor: 0.996

Power: 100.05 W

Luminous Efficacy: 132.7 lm/W

**Zonal Flux Diagram**

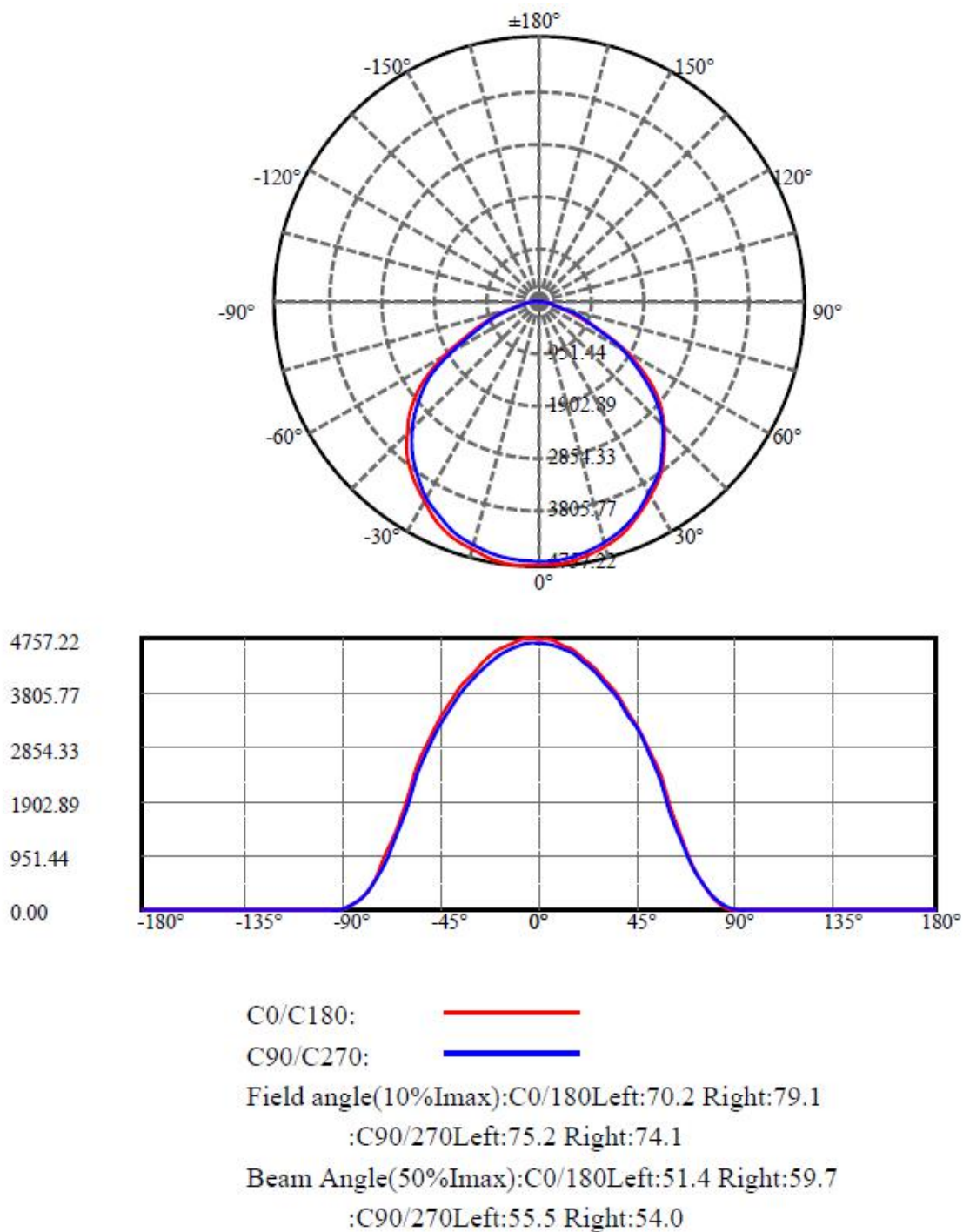
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	4682.831	.000	.000	.000%	.000%
5.0	4668.944	111.798	111.798	.893%	.893%
10.0	4608.807	331.894	443.692	2.652%	3.546%
15.0	4516.670	541.317	985.009	4.326%	7.872%
20.0	4391.324	734.144	1719.153	5.867%	13.738%
25.0	4224.078	903.597	2622.750	7.221%	20.959%
30.0	4026.762	1044.151	3666.900	8.344%	29.304%
35.0	3793.050	1151.522	4818.422	9.202%	38.506%
40.0	3516.193	1219.492	6037.914	9.745%	48.251%
45.0	3198.773	1243.330	7281.244	9.936%	58.187%
50.0	2833.412	1218.891	8500.136	9.741%	67.928%
55.0	2379.925	1133.553	9633.688	9.059%	76.987%
60.0	1807.359	967.879	10601.570	7.735%	84.721%
65.0	1257.435	745.057	11346.620	5.954%	90.675%
70.0	830.719	528.734	11875.360	4.225%	94.901%
75.0	454.684	335.984	12211.340	2.685%	97.586%
80.0	216.770	179.662	12391.000	1.436%	99.021%
85.0	71.681	78.379	12469.380	.626%	99.648%
90.0	1.896	20.146	12489.530	.161%	99.809%
95.0	1.618	.962	12490.490	.008%	99.816%
100.0	1.787	.925	12491.420	.007%	99.824%
105.0	2.101	1.040	12492.460	.008%	99.832%
110.0	2.572	1.222	12493.680	.010%	99.842%
115.0	3.067	1.428	12495.100	.011%	99.853%
120.0	3.635	1.629	12496.730	.013%	99.866%
125.0	4.275	1.828	12498.560	.015%	99.881%
130.0	4.842	1.982	12500.540	.016%	99.897%
135.0	5.180	2.025	12502.570	.016%	99.913%
140.0	5.507	1.979	12504.550	.016%	99.929%
145.0	5.833	1.892	12506.440	.015%	99.944%
150.0	6.062	1.752	12508.190	.014%	99.958%
155.0	6.267	1.560	12509.750	.012%	99.970%
160.0	6.352	1.324	12511.080	.011%	99.981%
165.0	6.267	1.040	12512.120	.008%	99.989%
170.0	6.219	.741	12512.860	.006%	99.995%
175.0	6.376	.451	12513.310	.004%	99.999%
180.0	6.497	.154	12513.460	.001%	100.000%



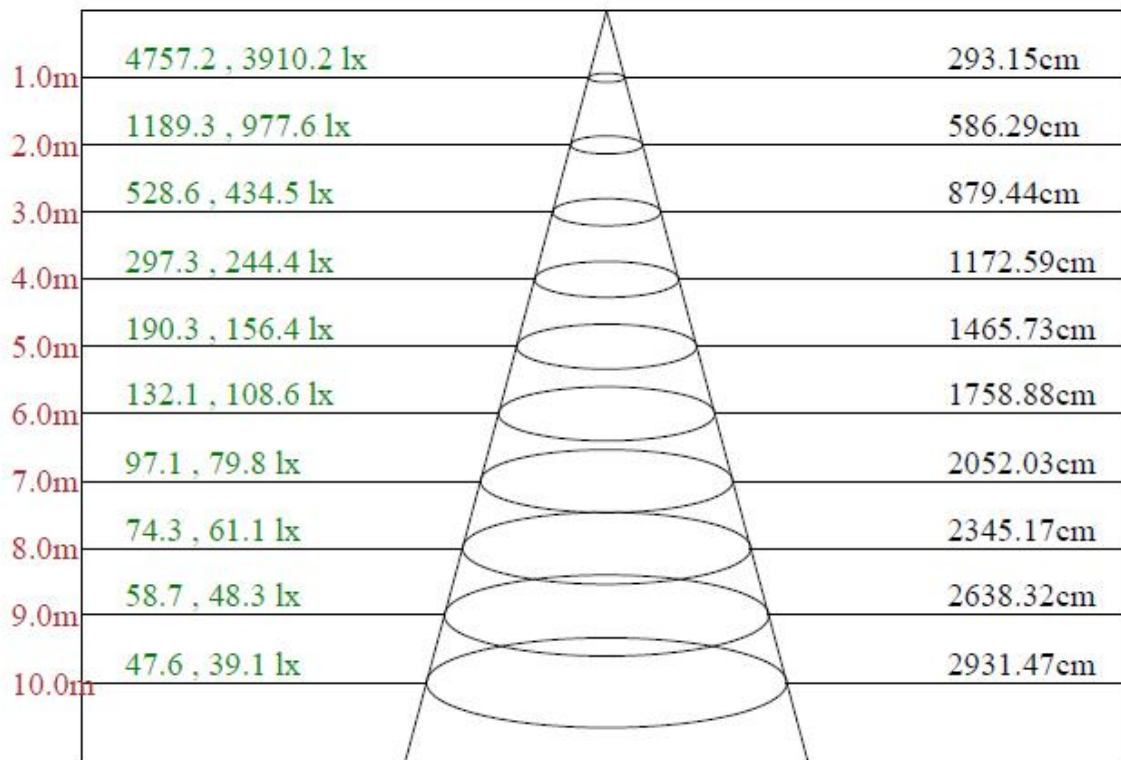
Luminous Intensity Distribution Diagram

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	4737.90	4726.30	4635.49	4554.35	4413.30	4222.02	4019.15	3777.45	3491.88
22.5	4722.44	4693.46	4620.04	4521.50	4386.25	4212.36	4003.70	3761.22	3482.80
45.0	4689.59	4664.48	4592.99	4492.52	4345.68	4179.52	3986.31	3746.34	3467.73
67.5	4681.87	4652.88	4589.12	4488.66	4357.27	4185.32	3976.65	3736.30	3459.62
90.0	4668.34	4647.09	4573.67	4482.86	4355.34	4167.93	3957.33	3736.49	3438.95
112.5	4666.41	4639.36	4569.80	4478.99	4349.54	4177.59	3978.58	3739.00	3454.21
135.0	4647.09	4633.56	4569.80	4469.33	4334.09	4171.79	3965.06	3742.09	3455.17
157.5	4649.02	4627.77	4567.87	4465.47	4339.88	4169.86	3965.06	3718.71	3443.39
180.0	4737.90	4757.22	4710.85	4623.90	4509.91	4347.61	4144.74	3930.28	3653.99
202.5	4722.44	4718.58	4672.20	4585.26	4469.33	4312.83	4117.69	3887.77	3613.41
225.0	4689.59	4683.80	4637.43	4552.41	4436.49	4270.33	4086.78	3854.93	3580.57
247.5	4681.87	4674.14	4623.90	4529.23	4413.30	4260.67	4071.32	3837.54	3567.04
270.0	4668.34	4664.48	4612.31	4521.50	4417.17	4239.41	4055.86	3822.08	3541.93
292.5	4666.41	4654.82	4591.06	4506.04	4390.12	4239.41	4036.54	3795.03	3538.06
315.0	4647.09	4631.63	4589.12	4494.45	4370.80	4212.36	4028.82	3800.83	3538.06
337.5	4649.02	4633.56	4585.26	4500.25	4372.73	4216.23	4034.61	3802.76	3532.27
360.0	4737.90	4726.30	4635.49	4554.35	4413.30	4222.02	4019.15	3777.45	3491.88

C/ γ (°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	3158.98	2793.82	2352.33	1769.61	1199.45	756.03	415.02	166.55	26.47
22.5	3160.14	2794.40	2340.74	1780.82	1209.30	757.58	420.04	185.48	53.71
45.0	3134.64	2763.48	2318.91	1748.55	1206.40	762.60	426.42	197.27	61.44
67.5	3143.53	2754.98	2273.50	1706.04	1179.35	748.11	422.55	199.59	63.37
90.0	3128.65	2734.89	2233.70	1663.15	1148.44	731.30	409.99	196.88	62.41
112.5	3130.00	2755.18	2271.96	1685.18	1161.58	742.70	417.91	196.11	61.05
135.0	3125.37	2755.56	2294.37	1733.87	1188.24	737.10	408.64	191.28	59.32
157.5	3126.14	2763.10	2298.23	1714.55	1165.64	736.71	403.81	182.39	54.29
180.0	3333.26	2999.01	2537.23	1949.88	1366.38	968.37	487.08	241.51	84.24
202.5	3304.28	2950.70	2521.78	1949.88	1364.45	974.17	500.61	242.48	88.49
225.0	3279.16	2906.27	2463.81	1893.84	1352.86	962.57	495.00	245.96	88.10
247.5	3252.11	2875.35	2432.90	1847.47	1302.62	837.18	492.11	241.71	89.46
270.0	3225.06	2859.89	2390.39	1804.97	1279.44	825.39	474.91	239.00	90.04
292.5	3226.99	2856.03	2423.24	1851.34	1296.83	836.21	493.85	244.99	91.78
315.0	3226.99	2877.28	2444.49	1889.98	1347.06	962.57	499.45	250.98	92.35
337.5	3225.06	2894.67	2481.20	1928.62	1350.92	952.91	507.56	246.15	80.38
360.0	3158.98	2793.82	2352.33	1769.61	1199.45	756.03	415.02	166.55	26.47

C/ γ (°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	1.16	1.16	1.35	1.55	2.13	2.71	3.09	3.86	4.44
22.5	1.74	1.55	1.93	2.13	2.71	3.09	3.86	4.25	5.02
45.0	1.74	1.93	2.13	2.13	2.71	3.48	3.86	4.44	5.02
67.5	1.74	1.93	1.74	2.51	2.71	3.29	3.86	4.25	5.02
90.0	1.93	1.74	2.13	2.32	2.71	3.29	3.86	4.25	5.02
112.5	1.93	1.74	1.93	2.32	2.71	3.29	3.86	4.64	5.22
135.0	1.93	1.93	1.93	2.32	2.71	3.29	3.86	4.44	5.02
157.5	1.74	1.74	2.13	2.51	2.71	3.29	3.86	4.64	5.02
180.0	1.93	1.16	1.35	1.74	2.32	2.71	3.29	4.06	4.64
202.5	2.13	1.55	1.74	1.93	2.51	2.90	3.48	4.25	4.83
225.0	1.93	1.74	1.55	2.13	2.71	3.09	3.67	4.25	4.83
247.5	1.74	1.55	1.74	1.93	2.51	2.90	3.48	4.25	4.64
270.0	1.55	1.55	1.55	1.93	2.51	3.09	3.67	4.06	4.64
292.5	1.93	1.55	1.74	1.93	2.51	2.90	3.48	4.25	4.64
315.0	2.13	1.55	1.93	2.32	2.51	2.90	3.48	4.25	4.64
337.5	3.09	1.55	1.74	1.93	2.51	2.90	3.48	4.25	4.83
360.0	1.16	1.16	1.35	1.55	2.13	2.71	3.09	3.86	4.44



C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	4.83	5.22	5.60	5.80	5.99	5.80	5.80	5.80	5.60
22.5	5.41	5.80	5.99	6.57	6.38	6.38	6.38	6.57	6.76
45.0	5.22	5.60	5.99	6.18	6.18	6.38	6.57	6.38	6.57
67.5	5.22	5.60	5.80	6.18	6.38	6.38	6.18	6.38	6.57
90.0	5.41	5.60	5.99	5.99	6.18	6.38	6.18	6.18	6.38
112.5	5.41	5.60	5.80	5.99	6.18	6.38	6.57	6.38	6.57
135.0	5.22	5.41	5.99	6.38	6.57	6.57	6.38	6.18	6.57
157.5	5.41	5.60	6.18	6.18	6.38	6.57	6.38	6.57	6.57
180.0	5.02	5.41	5.60	5.99	6.38	6.38	6.38	5.99	6.18
202.5	5.02	5.60	5.80	6.18	6.57	6.57	6.38	6.18	6.38
225.0	5.41	5.60	5.99	5.80	6.18	6.38	6.18	5.99	6.38
247.5	5.22	5.41	5.60	5.99	6.18	6.38	5.99	6.38	6.18
270.0	5.02	5.41	5.80	5.99	5.99	6.18	6.18	5.99	6.18
292.5	4.83	5.41	5.60	5.99	6.18	6.38	6.18	5.99	6.38
315.0	5.02	5.41	5.80	5.80	6.18	6.18	6.18	6.18	6.38
337.5	5.22	5.41	5.80	5.99	6.38	6.38	6.38	6.38	6.38
360.0	4.83	5.22	5.60	5.80	5.99	5.80	5.80	5.80	5.60

C/γ(°)	180.0
0.0	5.80
22.5	6.76
45.0	6.57
67.5	6.38
90.0	6.57
112.5	6.76
135.0	6.57
157.5	6.57
180.0	5.80
202.5	6.76
225.0	6.57
247.5	6.38
270.0	6.57
292.5	6.76
315.0	6.57
337.5	6.57
360.0	5.80



5 Performance Assessment

Model name	CCT(K)	Total Luminous(lm)	Power(W)	Luminous Efficacy(lm/W)
IK-CPSL-100W-DY-3000K	3000K	12670.60	99.69	127.1
IK-CPSL-100W-DY-3500K	3500K	12791.81 * ¹	99.87 * ²	128.1 * ³
IK-CPSL-100W-DY-4000K	4000K	12913.02 * ¹	99.87 * ²	129.3 * ³
IK-CPSL-100W-DY-4500K	4500K	13034.22 * ¹	99.87 * ²	130.5 * ³
IK-CPSL-100W-DY-5000K	5000K	13155.43 * ¹	99.87 * ²	131.7 * ³
IK-CPSL-100W-DY-5700K	5700K	13276.64	100.05	132.7

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

$$12791.81 = (13276.64 - 12670.60) / 5 + 12670.60$$

$$12913.02 = (13276.64 - 12670.60) / 5 + 12791.81$$

$$13034.22 = (13276.64 - 12670.60) / 5 + 12913.02$$

$$13155.43 = (13276.64 - 12670.60) / 5 + 13034.22$$

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

$$99.87 = (99.69 + 100.05) / 2$$

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

$$128.1 = 12791.81 / 99.87$$

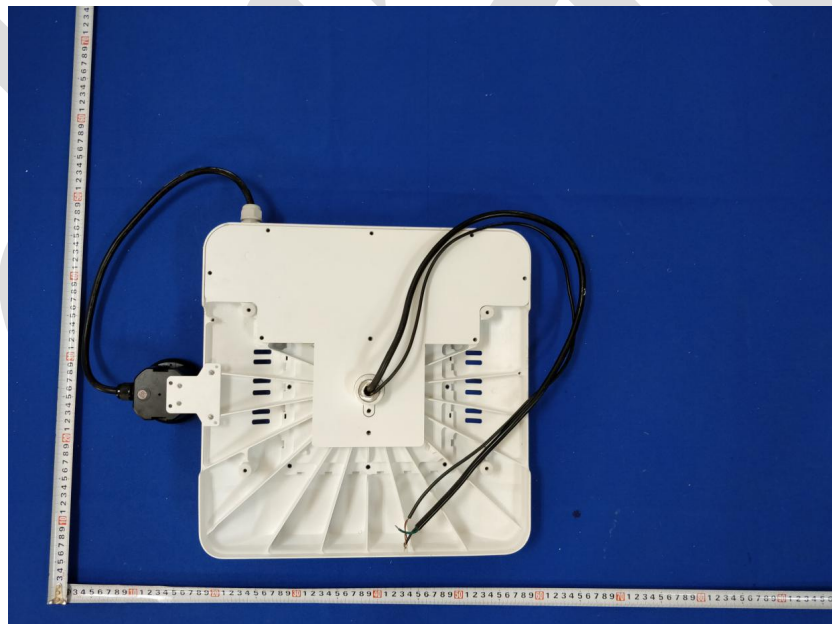
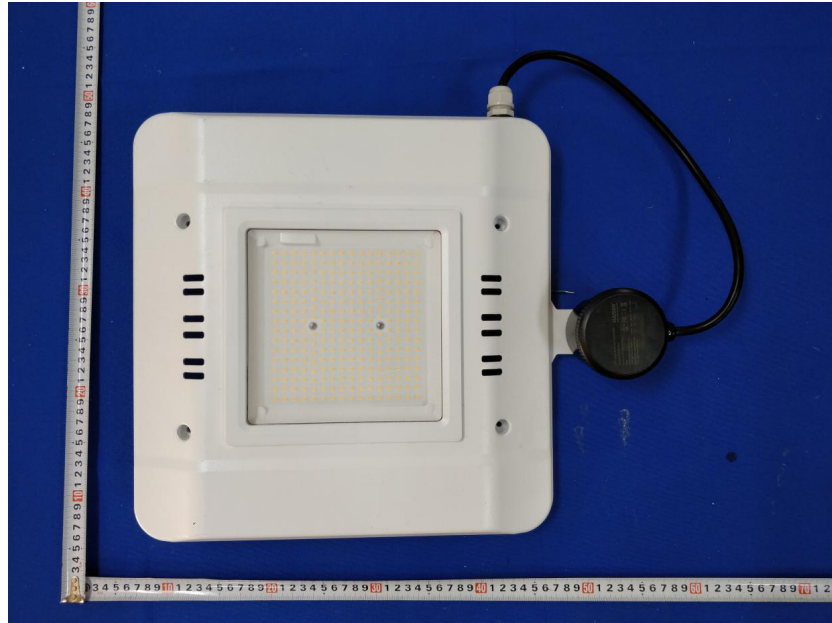
$$129.3 = 12913.02 / 99.87$$

$$130.5 = 13034.22 / 99.87$$

$$131.7 = 13155.43 / 99.87$$



Photo Document



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