



Shenzhen Belling Efficiency Testing Lab



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Total pages 14

## 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:**

High Bay Luminaires for Commercial and Industrial Buildings

**Model No.:**

IK-HBP1-19A130-0200-30 / IK-HBP1-19A130-0200-57

Test laboratory: Shenzhen Belling Efficiency Testing Lab., 1/F., Building 1, 1F, No.1 building, Meibaohe industrial park, Dalang street, Shenzhen, Guangdong Prov.518101, China.

*Zac.kuang*

*Jasonzhou*

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Complied by: Zac Kuang

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Project Engineer

Technical Manager

Note: 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. This report must not be used by the customer to claim product certification, approval, or endorsement By NVLAP, NIST, or any agency of the Federal 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>	High Bay Luminaires for Commercial and Industrial Buildings
<b>Model Number</b>	IK-HBP1-19A130-0200-30 / IK-HBP1-19A130-0200-57
<b>Rated Inputs</b>	AC 100-277V 50/60Hz
<b>Rated Power</b>	200 W
<b>Nominal CCT</b>	3000K / 5700K
<b>Date of Receipt Samples</b>	2017-06-05

## 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	2017-09-21
AC Power Source	ALL POWER	APW-110N	992257	2017-08-27
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S13100234	2017-09-15
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2017-08-29
Integral Sphere	SENSING	SPR-600M	N.A	2017-08-27
Digital Power Meter	YOKOGAWA	WT210	91L929742	2017-08-29
Optical Color and Electrical Measurement System	SENSING	SPR-3000	N.A	2017-08-27
Temperature/humidity/clock	VICTOR	VC230	57636	2017-09-13
Digital Anemometer	TECMAN	TD8901	026141	2017-09-13

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab 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-HBP1-19A130-0200-30	120.07	60	1.710	203.95	0.993
IK-HBP1-19A130-0200-57	119.92	60	1.737	206.96	0.994

#### 3.1.2 Additional Test

Test Item	Model	Test Voltage (V)	Frequency (Hz)	Test Result
Power factor	IK-HBP1-19A130-0200-30	120	60	0.993
		277	60	0.918
	IK-HBP1-19A130-0200-57	120	60	0.994
		277	60	0.926
Total harmonic distortion	IK-HBP1-19A130-0200-30	120	60	10.2%
		277	60	16.3%
	IK-HBP1-19A130-0200-57	120	60	10.9%
		277	60	16.8%
Off state power (W)	IK-HBP1-19A130-0200-30	120	60	0
	IK-HBP1-19A130-0200-30	277	60	0

#### 3.1.3 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
IK-HBP1-19A130-0200-30	25798.247	126.493	3156	82.2	7
IK-HBP1-19A130-0200-57	27424.477	132.511	5924	84.4	14

#### 3.1.4 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
IK-HBP1-19A130-0200-30	-0.0010	0.4249	0.3972	0.2457	0.5168
IK-HBP1-19A130-0200-57	0.0030	0.3232	0.3387	0.2014	0.4750



## 3.2 Goniophotometer System

### 3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
IK-HBP1-19A130-0200-30	120.07	60	1.6936	201.98	0.9933

### 3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 20-50°(%lm)
25542.22	126.46	53.882



## 4 Test Data

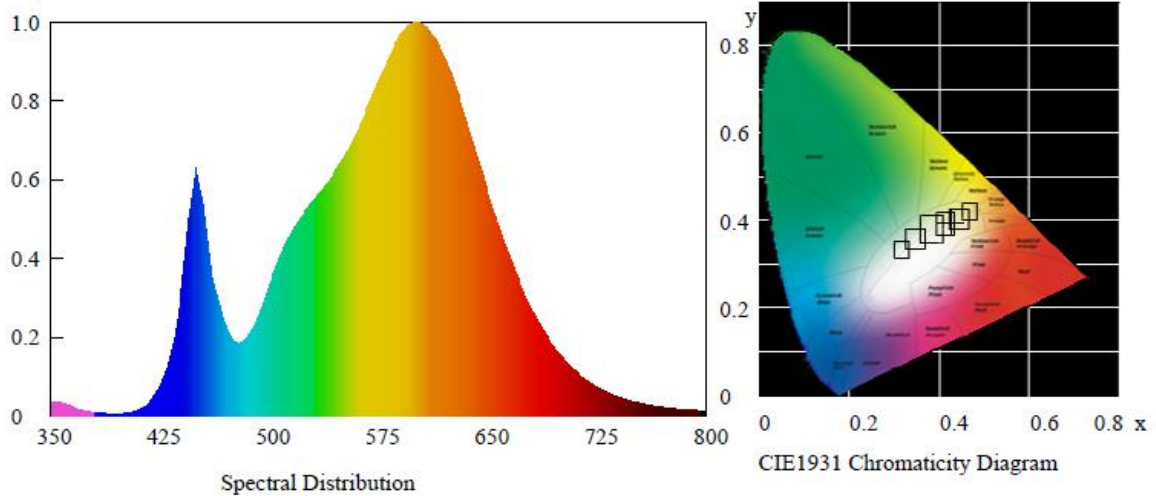
**IK-HBP1-19A130-0200-30**

### Test Condition

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

RH: 58%  
Scan Step: 5 nm

### Spectroradiometric Parameters



Chromaticity Coordinates:  $x=0.4249$   $y=0.3972$   $u'=0.2457$   $v'=0.5168$

Correlated Color Temperature: 3156 K

Dominant Wavelength: 581.0 nm(E)

Luminous Flux: 25798.247 lm

Purity: 0.4693

Chromaticity Difference: -0.0010Duv

Peak Wavelength: 472.1 nm

Color Ratio:  $K_r=43.6\%$   $K_g=49.0\%$   $K_b=7.5\%$

Bandwidth: 279.3nm

Radiant Flux: 65.292 W

Rendering Index:  $R_a=82.2$

$R_1=81$   $R_2=90$   $R_3=96$   $R_4=81$   $R_5=81$   $R_6=87$   $R_7=83$   $R_8=60$

$R_9=7$   $R_{10}=76$   $R_{11}=80$   $R_{12}=69$   $R_{13}=83$   $R_{14}=98$   $R_{15}=74$

### Electric Parameters

Voltage: 120.07 V

Current: 1.71 A

Power Factor: 0.993

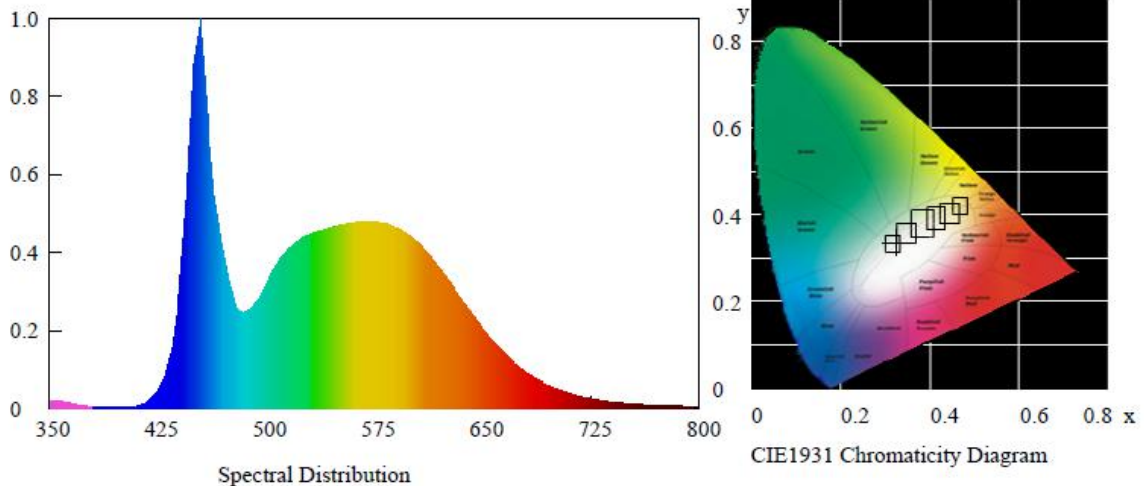
Power: 203.95 W

Luminous Efficacy: 126.493 lm/W

**IK-HBP1-19A130-0200-57****Test Condition**

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

RH: 58%  
Scan Step: 5 nm

**Spectroradiometric Parameters**

Chromaticity Coordinates:  $x=0.3232$   $y=0.3387$   $u'=0.2014$   $v'=0.4750$

Correlated Color Temperature: 5924 K

Dominant Wavelength: 498.0 nm(E)

Luminous Flux: 27424.477 lm

Purity: 0.0322

Chromaticity Difference: 0.0030Duv

Peak Wavelength: 447.6 nm

Color Ratio:  $K_r=31.6\%$   $K_g=55.8\%$   $K_b=12.7\%$

Bandwidth: -444.1nm

Radiant Flux: 77.763 W

Rendering Index:  $R_a=84.4$

$R_1=83$   $R_2=91$   $R_3=94$   $R_4=82$   $R_5=83$   $R_6=85$   $R_7=88$   $R_8=70$

$R_9=14$   $R_{10}=76$   $R_{11}=81$   $R_{12}=57$   $R_{13}=86$   $R_{14}=96$   $R_{15}=79$

**Electric Parameters**

Voltage: 119.92 V

Current: 1.737 A

Power Factor: 0.994

Power: 206.96 W

Luminous Efficacy: 132.511 lm/W



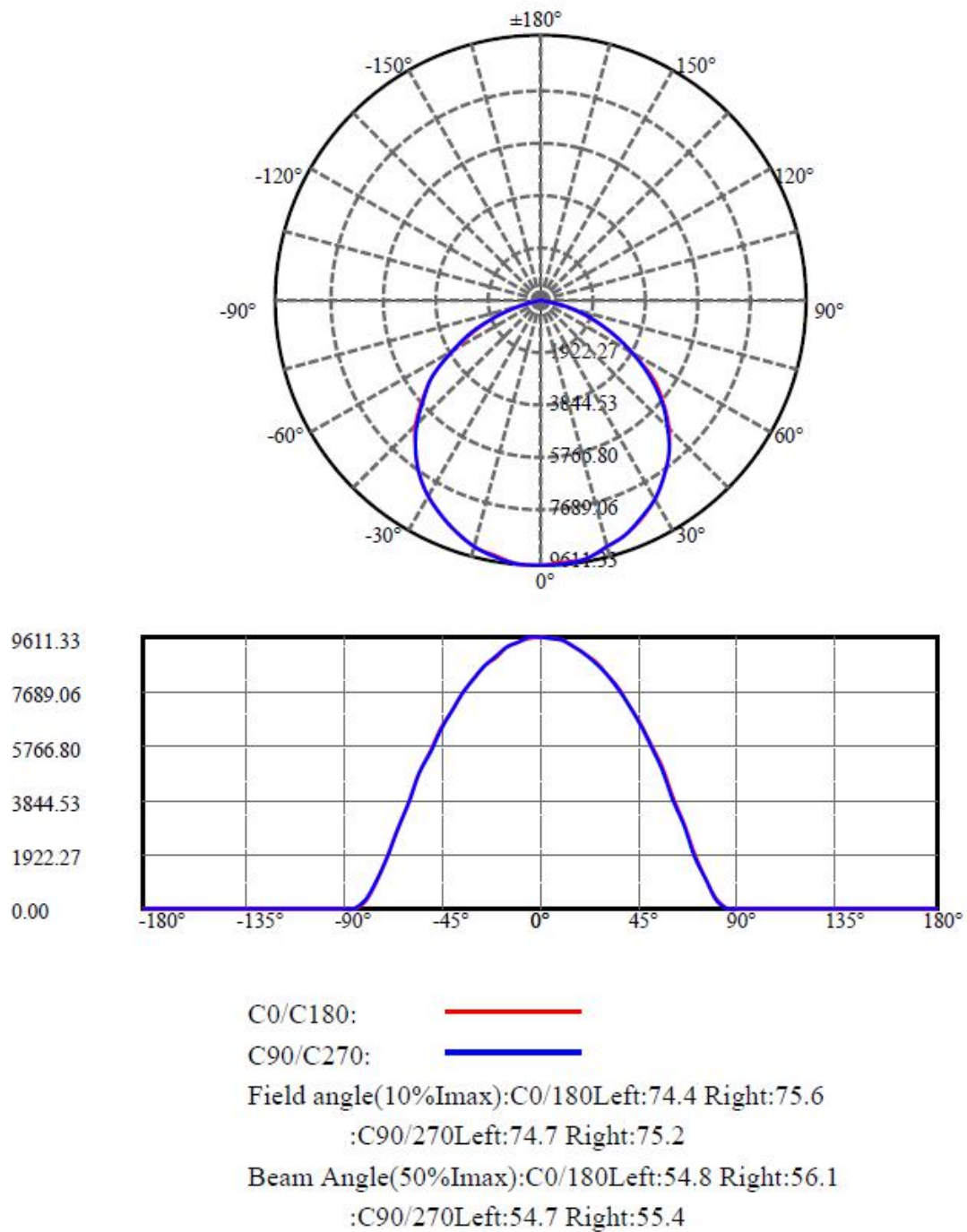
**Zonal Flux Diagram**

Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	9601.787	.000	.000	.000%	.000%
5.0	9557.266	229.041	229.041	.897%	.897%
10.0	9450.735	679.976	909.017	2.662%	3.559%
15.0	9259.933	1109.904	2018.921	4.345%	7.904%
20.0	8980.090	1503.234	3522.155	5.885%	13.790%
25.0	8636.646	1847.671	5369.826	7.234%	21.023%
30.0	8208.933	2131.822	7501.648	8.346%	29.370%
35.0	7711.258	2344.360	9846.008	9.178%	38.548%
40.0	7116.592	2473.915	12319.920	9.686%	48.234%
45.0	6448.785	2511.740	14831.660	9.834%	58.067%
50.0	5691.938	2453.210	17284.870	9.605%	67.672%
55.0	4846.050	2291.309	19576.180	8.971%	76.642%
60.0	3830.030	2005.451	21581.630	7.852%	84.494%
65.0	2848.990	1623.682	23205.310	6.357%	90.851%
70.0	1840.920	1187.516	24392.830	4.649%	95.500%
75.0	948.921	729.220	25122.050	2.855%	98.355%
80.0	295.425	332.952	25455.000	1.304%	99.659%
85.0	12.720	83.730	25538.730	.328%	99.986%
90.0	.000	3.483	25542.210	.014%	100.000%
95.0	.000	.000	25542.210	.000%	100.000%
100.0	.000	.000	25542.210	.000%	100.000%
105.0	.000	.000	25542.210	.000%	100.000%
110.0	.000	.000	25542.210	.000%	100.000%
115.0	.000	.000	25542.210	.000%	100.000%
120.0	.000	.000	25542.210	.000%	100.000%
125.0	.000	.000	25542.210	.000%	100.000%
130.0	.000	.000	25542.210	.000%	100.000%
135.0	.000	.000	25542.210	.000%	100.000%
140.0	.000	.000	25542.210	.000%	100.000%
145.0	.000	.000	25542.210	.000%	100.000%
150.0	.000	.000	25542.210	.000%	100.000%
155.0	.000	.000	25542.210	.000%	100.000%
160.0	.000	.000	25542.210	.000%	100.000%
165.0	.000	.000	25542.210	.000%	100.000%
170.0	.000	.000	25542.210	.000%	100.000%
175.0	.000	.000	25542.210	.000%	100.000%
180.0	.000	.000	25542.210	.000%	100.000%

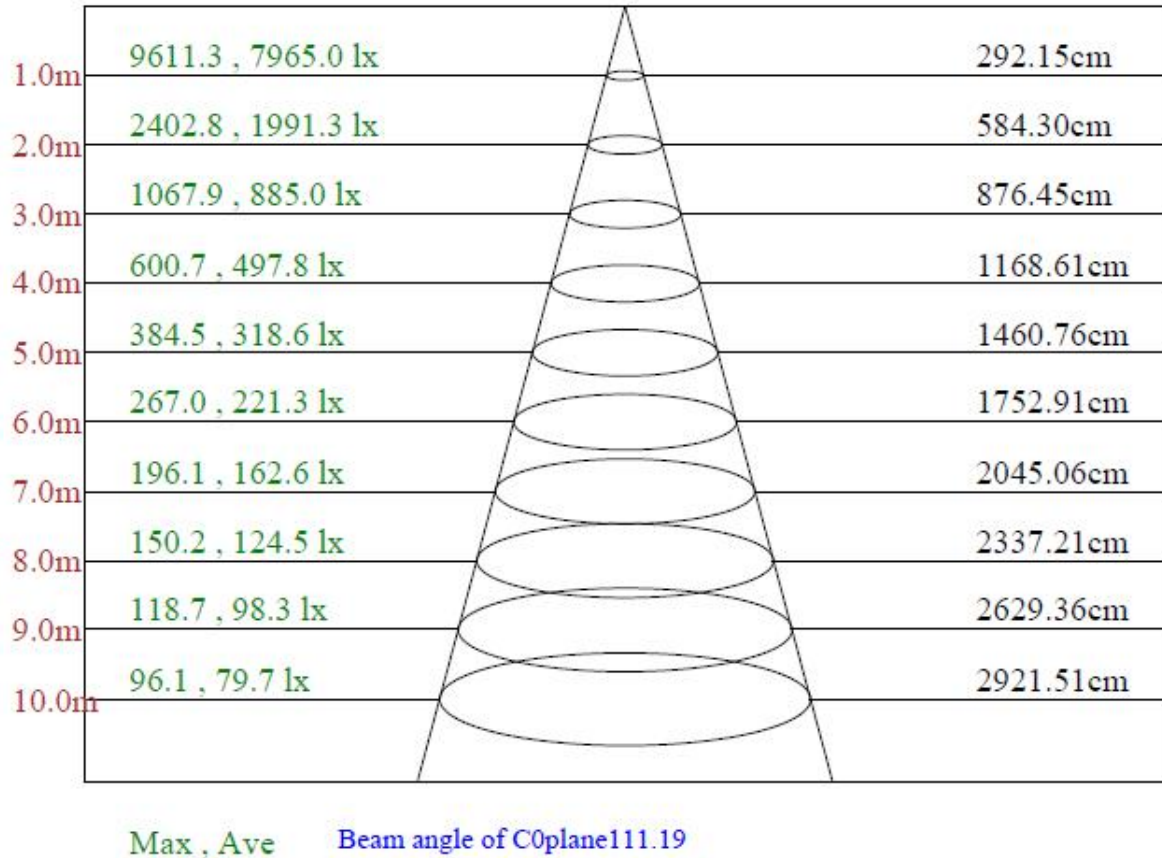
**Luminous Intensity Distribution Diagram**

Light Distribution Curve [Unit:cd]





## Lux distance Curve





**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	9611.33	9535.01	9484.13	9280.60	9026.20	8695.48	8288.43	7805.07	7219.94
22.5	9611.33	9585.89	9484.13	9306.04	9051.64	8720.92	8288.43	7805.07	7245.38
45.0	9611.33	9585.89	9458.69	9306.04	9051.64	8720.92	8288.43	7805.07	7245.38
67.5	9585.89	9560.45	9458.69	9255.16	9000.76	8695.48	8288.43	7805.07	7219.94
90.0	9611.33	9560.45	9509.57	9280.60	9026.20	8670.04	8288.43	7754.19	7194.50
112.5	9585.89	9560.45	9458.69	9255.16	9000.76	8670.04	8237.55	7779.63	7169.06
135.0	9585.89	9535.01	9433.25	9255.16	9000.76	8670.04	8212.11	7728.75	7118.18
157.5	9611.33	9535.01	9458.69	9255.16	8975.32	8619.16	8237.55	7703.31	7118.18
180.0	9611.33	9560.45	9407.80	9255.16	8924.44	8593.72	8161.23	7652.43	7041.86
202.5	9611.33	9560.45	9433.25	9255.16	8975.32	8644.60	8161.23	7677.87	7016.42
225.0	9611.33	9560.45	9407.80	9255.16	8949.88	8568.28	8135.79	7626.99	7041.86
247.5	9585.89	9560.45	9433.25	9229.72	8924.44	8568.28	8110.35	7626.99	7041.86
270.0	9611.33	9585.89	9458.69	9255.16	8949.88	8593.72	8161.23	7652.43	7016.42
292.5	9585.89	9560.45	9433.25	9229.72	8924.44	8568.28	8135.79	7652.43	7016.42
315.0	9585.89	9509.57	9433.25	9229.72	8949.88	8593.72	8186.67	7652.43	7092.74
337.5	9611.33	9560.45	9458.69	9255.16	8949.88	8593.72	8161.23	7652.43	7067.30
360.0	9611.33	9535.01	9484.13	9280.60	9026.20	8695.48	8288.43	7805.07	7219.94
C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	6583.94	5871.61	5032.08	3989.03	2996.86	1979.25	1037.96	351.08	20.35
22.5	6583.94	5846.17	5032.08	3963.59	2996.86	1953.81	1063.40	325.64	20.35
45.0	6558.50	5846.17	4981.20	3963.59	2971.42	1928.37	1037.96	325.64	20.35
67.5	6583.94	5846.17	4930.32	3938.15	2971.42	1928.37	987.08	300.20	20.35
90.0	6533.06	5769.85	4879.44	3887.27	2920.54	1877.49	987.08	300.20	20.35
112.5	6507.62	5769.85	4904.88	3887.27	2920.54	1902.93	987.08	300.20	20.35
135.0	6507.62	5718.97	4879.44	3861.83	2869.66	1801.17	961.64	300.20	20.35
157.5	6431.30	5718.97	4854.00	3836.39	2844.22	1826.61	961.64	300.20	20.35
180.0	6380.42	5591.77	4777.68	3734.63	2717.02	1775.73	859.88	249.32	0.00
202.5	6304.09	5566.33	4701.36	3658.31	2717.02	1724.85	859.88	274.76	0.00
225.0	6329.53	5566.33	4701.36	3760.07	2717.02	1775.73	834.44	274.76	20.35
247.5	6354.97	5566.33	4752.24	3785.51	2767.90	1775.73	885.32	249.32	0.00
270.0	6329.53	5540.89	4752.24	3734.63	2742.46	1775.73	910.76	274.76	20.35
292.5	6405.86	5617.21	4777.68	3760.07	2793.34	1826.61	936.20	300.20	0.00
315.0	6405.86	5617.21	4803.12	3760.07	2844.22	1801.17	961.64	300.20	0.00
337.5	6380.42	5617.21	4777.68	3760.07	2793.34	1801.17	910.76	300.20	0.00
360.0	6583.94	5871.61	5032.08	3989.03	2996.86	1979.25	1037.96	351.08	20.35
C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
157.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
202.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
225.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
247.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
270.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
292.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
315.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
337.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

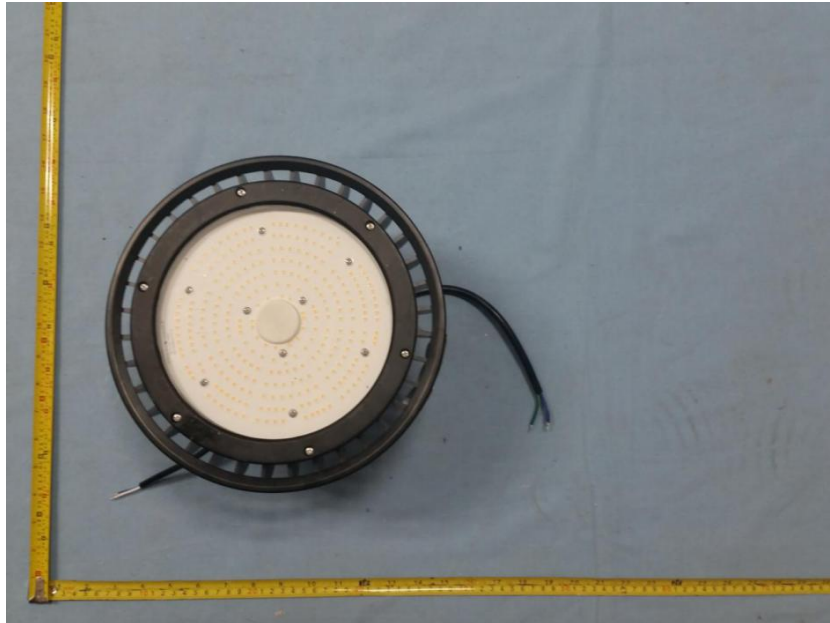


C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
157.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
202.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
225.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
247.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
270.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
292.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
315.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
337.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C/γ(°)	180.0								
0.0	0.00								
22.5	0.00								
45.0	0.00								
67.5	0.00								
90.0	0.00								
112.5	0.00								
135.0	0.00								
157.5	0.00								
180.0	0.00								
202.5	0.00								
225.0	0.00								
247.5	0.00								
270.0	0.00								
292.5	0.00								
315.0	0.00								
337.5	0.00								
360.0	0.00								





## Photo Document



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