



Shenzhen Belling Efficiency Testing Lab



Report No.:BL170719010-9

Date of issue 2017-11-27

Version 1.0

Total pages 14

## Test report of

**IES LM-79-08**

**Approved Method: Electrical and Photometric**

**Measurements of Solid-State Lighting Products**

**Applicant:**

ShenZhen KEMEILAI Optoelectronic Co., LTD

**Address:**

#116, Xiangshan Rd., Songgang, Bao' an, Shenzhen, Guangdong

**For Product:**

High Bay Luminaires for Commercial and Industrial Buildings

**Model No.:**

KML-UFOH100-40 / KML-UFOH100-57

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.

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Complied by: Ike Li

Review by: Jason Zhou

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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 U.S. Government.



# 1 General

## 1.1 Product Information

<b>Manufacturer</b>	ShenZhen KEMEILAI Optoelectronic Co., LTD
<b>Manufacturer Address</b>	#116, Xiangshan Rd., Songgang, Bao' an, Shenzhen, Guangdong
<b>Brand Name</b>	KML
<b>Luminaire Type</b>	High Bay Luminaires for Commercial and Industrial Buildings
<b>Model Number</b>	KML-UFOH100-40 / KML-UFOH100-57
<b>Rated Inputs</b>	AC 100-277V 50/60Hz
<b>Rated Power</b>	100 W
<b>Nominal CCT</b>	4000K / 5700K
<b>Date of Receipt Samples</b>	2017-11-01

## 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	2018-09-20
AC Power Source	ALL POWER	APW-110N	992257	2018-08-26
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S13100234	2018-09-14
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2018-08-28
Integral Sphere	SENSING	SPR-600M	N.A	2018-08-26
Digital Power Meter	YOKOGAWA	WT210	91L929742	2018-08-28
Optical Color and Electrical Measurement System	SENSING	SPR-3000	N.A	2018-08-26
Temperature/humidity/clock	VICTOR	VC230	57636	2018-09-12
Digital Anemometer	TECMAN	TD8901	026141	2018-09-12

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
KML-UFOH100-40	120.01	60	0.894	107.00	0.997
KML-UFOH100-57	120.01	60	0.911	109.00	0.997

#### 3.1.2 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
KML-UFOH100-40	16060.70	150.1	3966	72.0	-24
KML-UFOH100-57	16709.70	153.3	5334	74.6	-18

#### 3.1.3 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
KML-UFOH100-40	-0.0006	0.3815	0.3761	0.2261	0.5015
KML-UFOH100-57	0.00343	0.3366	0.3514	0.2058	0.4833

### 3.2 Goniophotometer System

#### 3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
KML-UFOH100-40	120.12	60	0.888	106.3000	0.9966

#### 3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 20-50°(%lm)
15977.32	150.30	51.892



### 3.3 Additional Test

Model Number	Test Item	Test Voltage (V)	Frequency(Hz)	Test Result
KML-UFOH100-40	Power Factor	277	60	0.925
	THDi	277	60	12.7%



## 4 Test Data

### KML-UFOH100-40

#### Test Condition

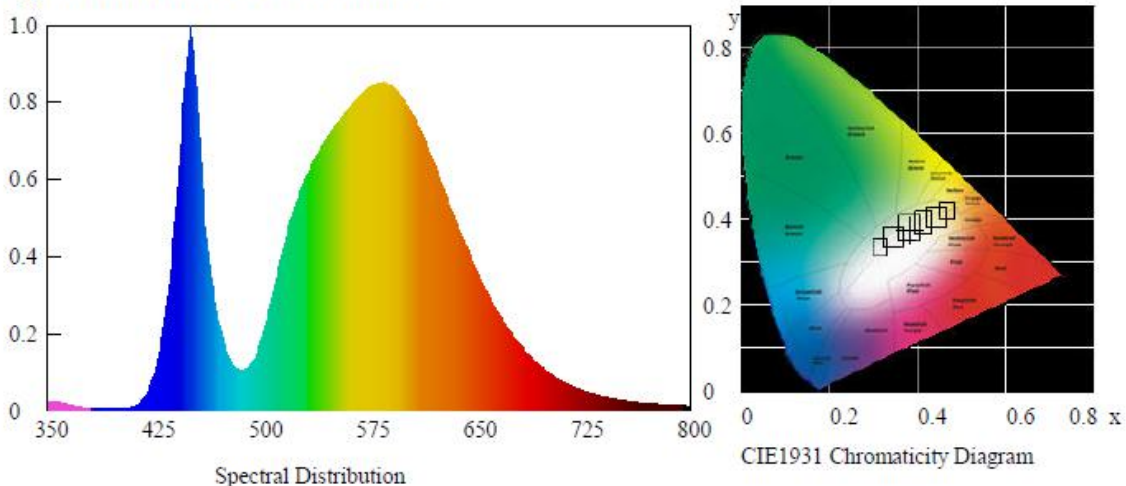
Temperature: 25°C

RH: 58%

Spectrum Range: 350-800 nm

Scan Step: 5 nm

#### Spectroradiometric Parameters

Chromaticity Coordinates:  $x=0.3815$   $y=0.3761$   $u'=0.2261$   $v'=0.5015$ 

Correlated Color Temperature: 3966 K

Dominant Wavelength: 578.0 nm(E)

Colour Fidelity Index:  $R_f=70$ Gamut Index:  $R_g=94$ 

Luminous Flux: 16060.70 lm

Purity: 0.2740

Chromaticity Difference:  $-0.0006$ Duv

Peak Wavelength: 450.0 nm

Color Ratio:  $K_r=37.5\%$   $K_g=56.0\%$   $K_b=6.5\%$ 

Bandwidth: 25.3nm

Radiant Flux: 48.341 W

Photosynthetically Active Radiation(PAR): 46.89W

Photosynthetic Photon Flux(PPF): 220.58 $\mu$ mol/sRendering Index:  $R_a=72.0$  $R_1=70$   $R_2=79$   $R_3=85$   $R_4=70$   $R_5=68$   $R_6=69$   $R_7=82$   $R_8=54$  $R_9=-24$   $R_{10}=48$   $R_{11}=65$   $R_{12}=39$   $R_{13}=72$   $R_{14}=91$   $R_{15}=65$   $R_e=62$ 

#### Electric Parameters

Voltage: 120.01 V

Current: 0.894 A

Power Factor: 0.997

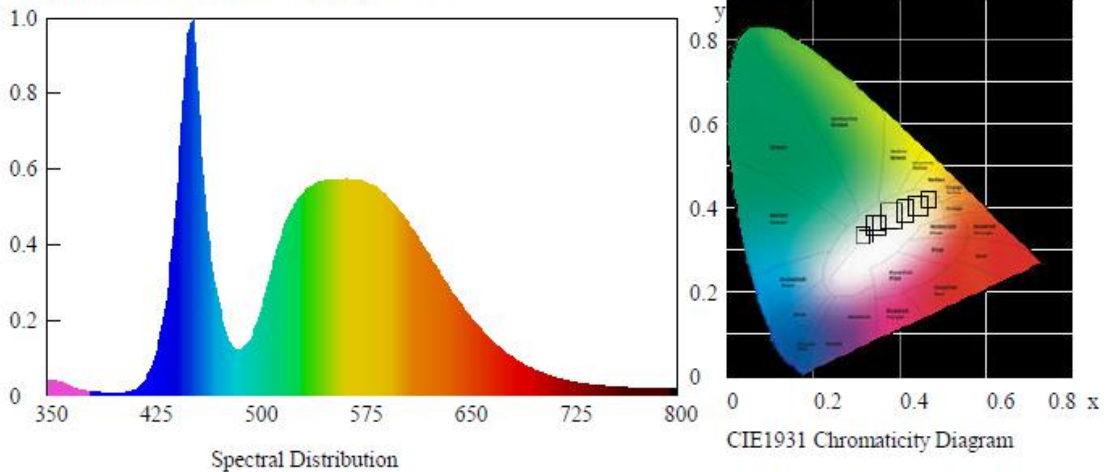
Power: 107.00 W

Luminous Efficacy: 150.1 lm/W

**KML-UFOH100-57****Test Condition**

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

RH: 58%  
Scan Step: 5 nm

**Spectroradiometric Parameters**

Chromaticity Coordinates:  $x=0.3366$   $y=0.3514$   $u'=0.2058$   $v'=0.4833$

Correlated Color Temperature: 5334 K

Dominant Wavelength: 560.0 nm(E)

Colour Fidelity Index:  $R_f=72$

Gamut Index:  $R_g=93$

Luminous Flux: 16709.70 lm

Purity: 0.0639

Chromaticity Difference:  $+0.00343\text{Duv}$

Peak Wavelength: 455.0 nm

Color Ratio:  $K_r=31.8\%$   $K_g=59.2\%$   $K_b=9.0\%$

Bandwidth: 19.7nm

Radiant Flux: 51.442 W

Photosynthetically Active Radiation(PAR): 49.53W

Photosynthetic Photon Flux(PPF): 227.31  $\mu\text{mol/s}$

Rendering Index:  $R_a=74.6$

$R_1=73$   $R_2=80$   $R_3=83$   $R_4=74$   $R_5=72$   $R_6=70$   $R_7=84$   $R_8=61$

$R_9=-18$   $R_{10}=49$   $R_{11}=70$   $R_{12}=41$   $R_{13}=75$   $R_{14}=90$   $R_{15}=68$   $R_e=65$

**Electric Parameters**

Voltage: 120.01 V

Current: 0.911 A

Power Factor: 0.997

Power: 109.00 W

Luminous Efficacy: 153.3 lm/W



**Zonal Flux Diagram**

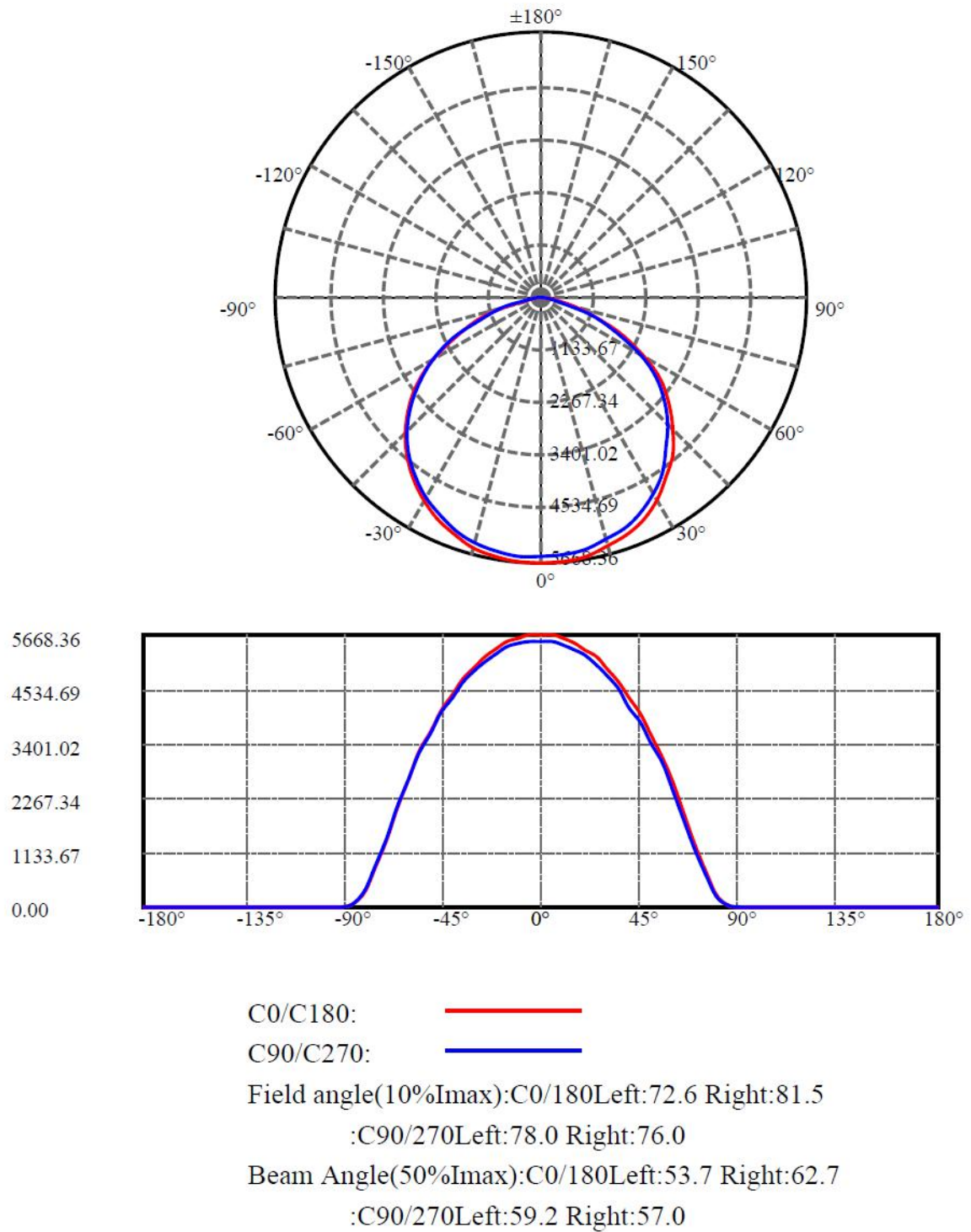
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	5556.130	.000	.000	.000%	.000%
5.0	5544.123	132.700	132.700	.831%	.831%
10.0	5497.012	394.976	527.677	2.472%	3.303%
15.0	5401.355	646.484	1174.160	4.046%	7.349%
20.0	5268.244	879.325	2053.485	5.504%	12.853%
25.0	5100.810	1087.522	3141.007	6.807%	19.659%
30.0	4882.351	1263.377	4404.385	7.907%	27.566%
35.0	4622.130	1399.601	5803.986	8.760%	36.326%
40.0	4319.876	1491.906	7295.892	9.338%	45.664%
45.0	3954.811	1532.125	8828.018	9.589%	55.253%
50.0	3550.516	1516.561	10344.580	9.492%	64.745%
55.0	3101.044	1446.271	11790.850	9.052%	73.797%
60.0	2585.236	1314.368	13105.220	8.226%	82.024%
65.0	1923.750	1096.143	14201.360	6.861%	88.884%
70.0	1324.774	822.547	15023.910	5.148%	94.033%
75.0	741.379	540.059	15563.960	3.380%	97.413%
80.0	290.262	276.038	15840.000	1.728%	99.141%
85.0	47.855	91.874	15931.880	.575%	99.716%
90.0	3.354	14.021	15945.900	.088%	99.803%
95.0	2.753	1.672	15947.570	.010%	99.814%
100.0	2.962	1.553	15949.120	.010%	99.824%
105.0	3.263	1.666	15950.790	.010%	99.834%
110.0	3.784	1.842	15952.630	.012%	99.845%
115.0	4.281	2.042	15954.670	.013%	99.858%
120.0	4.985	2.252	15956.930	.014%	99.872%
125.0	5.534	2.431	15959.360	.015%	99.888%
130.0	6.003	2.508	15961.870	.016%	99.903%
135.0	6.342	2.495	15964.360	.016%	99.919%
140.0	6.695	2.414	15966.770	.015%	99.934%
145.0	6.929	2.273	15969.050	.014%	99.948%
150.0	7.217	2.083	15971.130	.013%	99.961%
155.0	7.452	1.856	15972.990	.012%	99.973%
160.0	7.386	1.556	15974.540	.010%	99.983%
165.0	7.321	1.212	15975.760	.008%	99.990%
170.0	7.256	.865	15976.620	.005%	99.996%
175.0	7.295	.521	15977.140	.003%	99.999%
180.0	7.647	.179	15977.320	.001%	100.000%



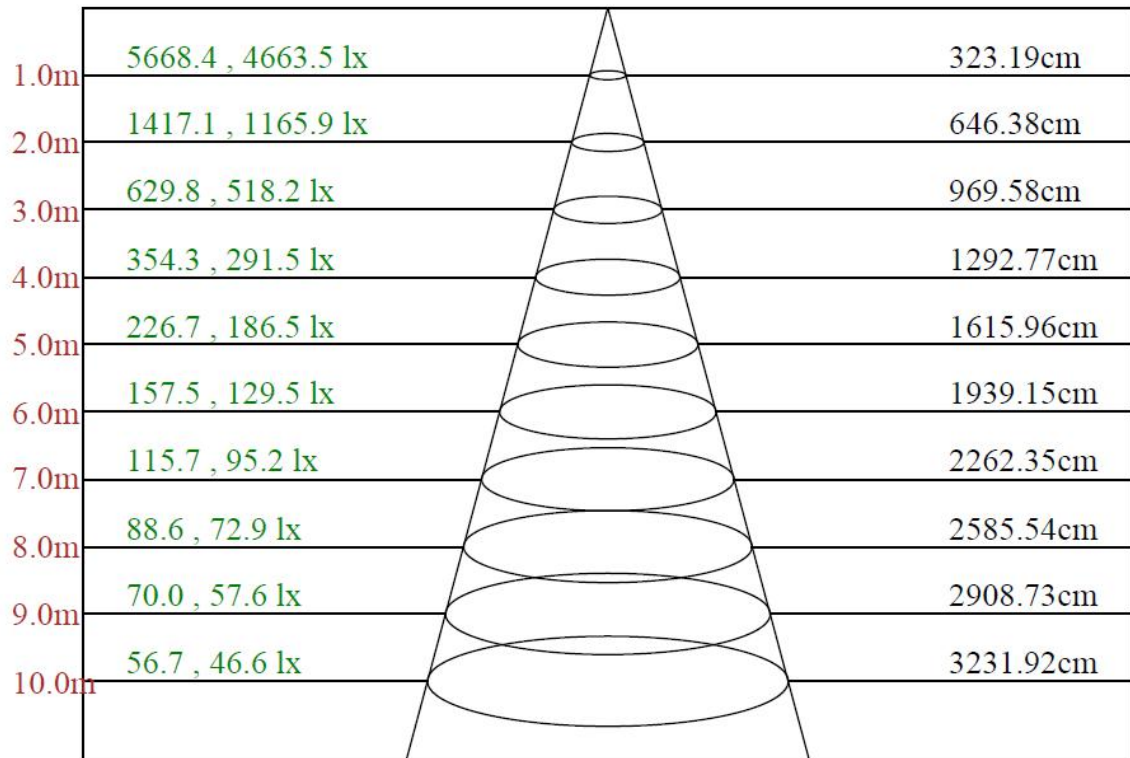
## Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





## Lux distance Curve



Max , Ave

Beam angle of C180plane116.49



**Luminous Intensity Distribution Data**

C/ $\gamma$ (°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	5662.10	5655.83	5607.81	5501.32	5365.60	5204.82	4962.61	4689.08	4380.05
22.5	5639.13	5609.90	5561.87	5453.30	5325.93	5152.62	4899.97	4659.85	4352.91
45.0	5605.72	5572.31	5524.29	5411.53	5288.34	5104.60	4870.74	4603.47	4357.08
67.5	5561.87	5545.17	5476.26	5371.86	5246.58	5067.01	4820.62	4572.15	4317.41
90.0	5536.82	5515.94	5470.00	5350.98	5229.88	5048.22	4808.10	4542.92	4162.27
112.5	5518.02	5495.06	5428.24	5328.01	5190.20	5014.81	4768.42	4507.42	4162.06
135.0	5470.00	5472.09	5413.62	5302.96	5167.24	4996.02	4762.16	4501.16	4158.30
157.5	5455.38	5447.03	5388.57	5277.90	5123.39	4964.70	4735.01	4457.31	4156.21
180.0	5662.10	5668.36	5611.99	5528.46	5378.13	5223.61	5010.63	4745.45	4434.34
202.5	5639.13	5614.07	5570.22	5486.70	5342.63	5171.41	4977.23	4712.05	4407.19
225.0	5605.72	5570.22	5540.99	5444.94	5317.57	5150.53	4935.46	4686.99	4382.14
247.5	5561.87	5551.43	5509.67	5428.24	5294.61	5129.65	4931.29	4672.37	4369.61
270.0	5536.82	5528.46	5497.14	5407.36	5284.17	5117.12	4927.11	4672.37	4377.96
292.5	5518.02	5503.41	5486.70	5396.92	5265.37	5106.68	4925.02	4664.02	4375.87
315.0	5470.00	5486.70	5440.77	5371.86	5242.40	5085.80	4912.50	4653.58	4373.79
337.5	5455.38	5470.00	5424.06	5359.33	5229.88	5075.36	4870.74	4613.91	4350.82
360.0	5662.10	5655.83	5607.81	5501.32	5365.60	5204.82	4962.61	4689.08	4380.05

C/ $\gamma$ (°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	4004.41	3589.52	3112.62	2599.38	1913.05	1286.43	705.75	252.86	33.62
22.5	3954.30	3534.19	3082.76	2558.67	1874.00	1278.29	698.03	260.79	33.62
45.0	3927.16	3508.51	3046.22	2531.52	1848.11	1260.75	674.85	245.76	31.74
67.5	3884.98	3476.77	3020.75	2496.03	1796.54	1220.45	660.44	237.41	32.16
90.0	3842.38	3431.67	2977.52	2445.29	1776.07	1195.60	639.98	221.33	29.65
112.5	3824.01	3406.61	2937.43	2429.21	1760.62	1162.82	612.00	220.29	29.65
135.0	3797.70	3400.77	2933.05	2399.98	1697.15	1173.05	602.40	209.64	27.35
157.5	3787.05	3372.79	2918.43	2412.50	1722.20	1158.65	611.58	214.86	27.77
180.0	4066.85	3661.77	3229.55	2688.75	2045.64	1402.53	827.28	330.33	56.59
202.5	4035.53	3647.15	3187.79	2659.52	2035.20	1404.61	801.18	340.14	59.51
225.0	4027.17	3626.27	3196.14	2680.40	2016.41	1415.05	812.24	339.51	59.72
247.5	4016.73	3634.63	3183.61	2684.57	2051.90	1427.58	818.92	336.38	65.36
270.0	4035.53	3636.71	3187.79	2688.75	2060.25	1433.85	848.37	357.26	65.15
292.5	4033.44	3636.71	3221.20	2688.75	2074.87	1452.64	865.49	358.31	70.58
315.0	4033.44	3636.71	3206.58	2701.28	2043.55	1475.61	839.60	364.15	68.49
337.5	4006.29	3607.48	3175.26	2699.19	2064.43	1448.46	843.98	355.17	74.75
360.0	4004.41	3589.52	3112.62	2599.38	1913.05	1286.43	705.75	252.86	33.62

C/ $\gamma$ (°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	1.67	1.46	1.88	2.30	2.71	3.34	4.18	4.59	5.01
22.5	2.71	2.51	2.92	2.92	3.55	4.18	4.80	5.22	5.64
45.0	2.92	2.71	2.71	3.34	3.76	4.39	5.22	5.64	6.06
67.5	2.92	2.71	3.13	3.13	3.76	4.18	5.01	5.64	6.06
90.0	2.71	2.92	3.13	3.55	3.76	4.39	5.01	5.64	6.26
112.5	2.92	2.71	2.92	3.13	3.97	4.59	5.22	5.64	6.06
135.0	2.92	2.92	2.92	3.34	3.97	4.18	4.80	5.64	6.06
157.5	3.13	2.71	3.13	3.34	3.76	4.39	5.01	5.85	6.06
180.0	2.92	2.51	2.92	3.13	3.55	3.97	4.80	5.43	5.85
202.5	3.55	2.92	3.13	3.55	3.76	4.39	5.22	5.43	6.06
225.0	3.76	3.13	2.92	3.55	3.97	4.39	5.22	5.64	6.26
247.5	3.76	2.92	3.34	3.34	3.97	4.39	5.22	5.64	6.26
270.0	4.39	3.13	3.13	3.55	4.18	4.59	5.01	5.64	6.26
292.5	4.18	2.92	3.13	3.34	4.18	4.59	5.01	5.64	6.06
315.0	4.59	2.92	2.92	3.34	3.97	4.39	5.01	5.64	6.06
337.5	4.59	2.92	3.13	3.34	3.76	4.18	5.01	5.64	6.06
360.0	1.67	1.46	1.88	2.30	2.71	3.34	4.18	4.59	5.01

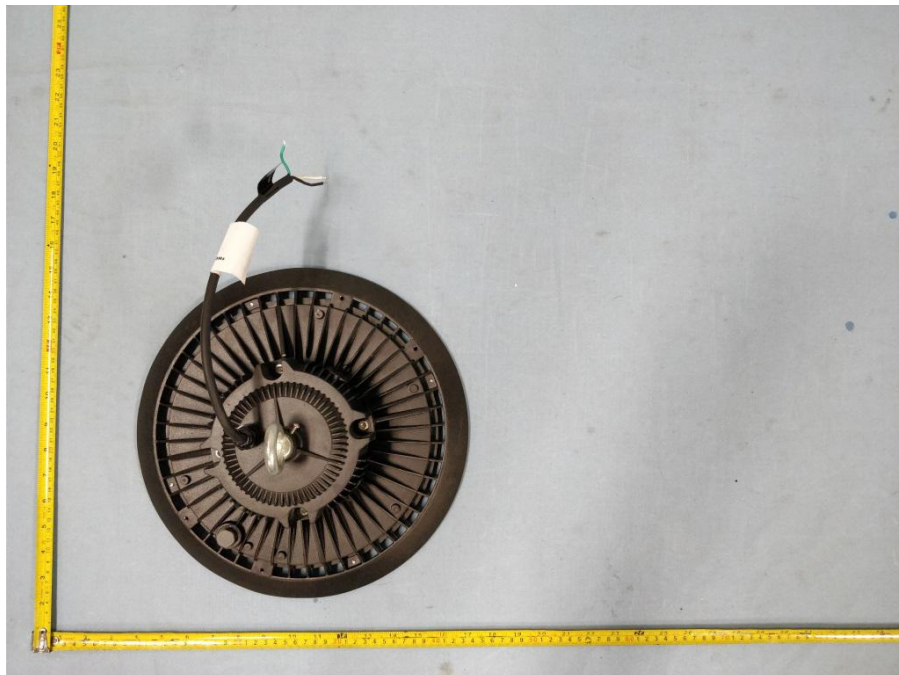
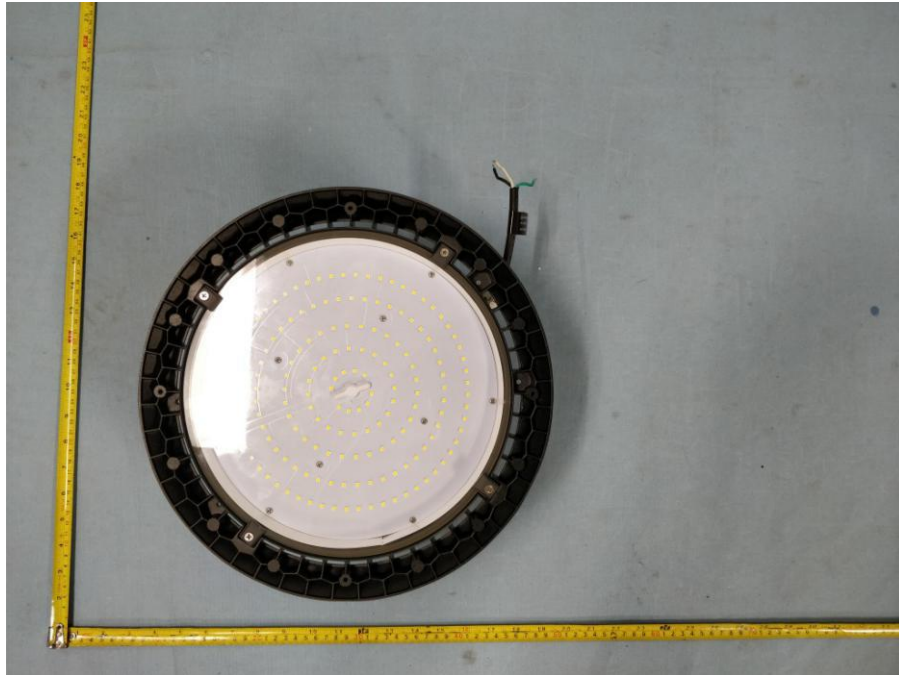


C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	5.22	5.85	6.26	6.26	6.68	6.47	6.26	6.06	6.47
22.5	6.26	6.47	6.68	7.31	7.52	7.52	7.31	7.31	7.73
45.0	6.68	6.89	7.10	7.31	7.52	7.52	7.31	7.31	7.52
67.5	6.47	7.10	7.10	7.31	7.52	7.52	7.52	7.31	7.52
90.0	6.68	6.68	7.10	7.10	7.73	7.73	7.52	7.52	7.73
112.5	6.47	6.68	7.10	7.52	7.52	7.73	7.52	7.31	7.73
135.0	6.47	6.89	7.10	7.31	7.73	7.52	7.73	7.73	7.52
157.5	6.47	6.89	7.10	7.52	7.52	7.52	7.31	7.31	7.52
180.0	6.26	6.68	6.68	7.10	7.31	7.10	7.31	7.10	6.89
202.5	6.47	6.68	7.10	7.31	7.52	7.52	7.31	7.31	7.10
225.0	6.26	6.68	7.10	7.31	7.31	7.31	7.31	7.52	7.31
247.5	6.47	6.89	6.89	7.10	7.52	7.31	7.31	7.10	7.31
270.0	6.26	6.68	6.89	7.52	7.52	7.52	7.31	7.31	7.31
292.5	6.47	6.68	6.89	7.10	7.52	7.31	7.52	7.52	7.10
315.0	6.26	6.68	6.89	7.10	7.31	7.31	7.31	7.10	7.10
337.5	6.26	6.68	6.89	7.31	7.52	7.31	7.31	7.31	6.89
360.0	5.22	5.85	6.26	6.26	6.68	6.47	6.26	6.06	6.47
C/γ(°)	180.0								
0.0	6.68								
22.5	7.73								
45.0	7.73								
67.5	7.73								
90.0	7.93								
112.5	7.73								
135.0	7.93								
157.5	7.73								
180.0	6.68								
202.5	7.73								
225.0	7.73								
247.5	7.73								
270.0	7.93								
292.5	7.73								
315.0	7.93								
337.5	7.73								
360.0	6.68								





## Photo Document



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