



Shenzhen Belling Efficiency Testing Lab



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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-UFOH150-40 / KML-UFOH150-57

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.

Complied by: Ike Li

Review by: Jason Zhou

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

Manufacturer	ShenZhen KEMEILAI Optoelectronic Co., LTD
Manufacturer Address	#116, Xiangshan Rd., Songgang, Bao' an, Shenzhen, Guangdong
Brand Name	KML
Luminaire Type	High Bay Luminaires for Commercial and Industrial Buildings
Model Number	KML-UFOH150-40 / KML-UFOH150-57
Rated Inputs	AC 100-277V 50/60Hz
Rated Power	150 W
Nominal CCT	4000K / 5700K
Date of Receipt Samples	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 ± 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
KML-UFOH150-40	120.02	60	1.289	154.40	0.998
KML-UFOH150-57	120.03	60	1.302	155.60	0.996

3.1.2 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
KML-UFOH150-40	23036.48	149.2	3984	72.2	-23
KML-UFOH150-57	23775.68	152.8	5668	75.1	-16

3.1.3 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
KML-UFOH150-40	-0.00069	0.3807	0.3754	0.2258	0.5010
KML-UFOH150-57	0.00121	0.3287	0.3401	0.2047	0.4765

3.2 Goniophotometer System

3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
KML-UFOH150-40	120.13	60	1.2836	153.8900	0.998

3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 20-50°(%lm)
22955.58	149.17	51.776



3.3 Additional Test

Model Number	Test Item	Test Voltage (V)	Frequency(Hz)	Test Result
KML-UFOH150-40	Power Factor	277	60	0.941
	THDi	277	60	13.6%



4 Test Data

KML-UFOH150-40

Test Condition

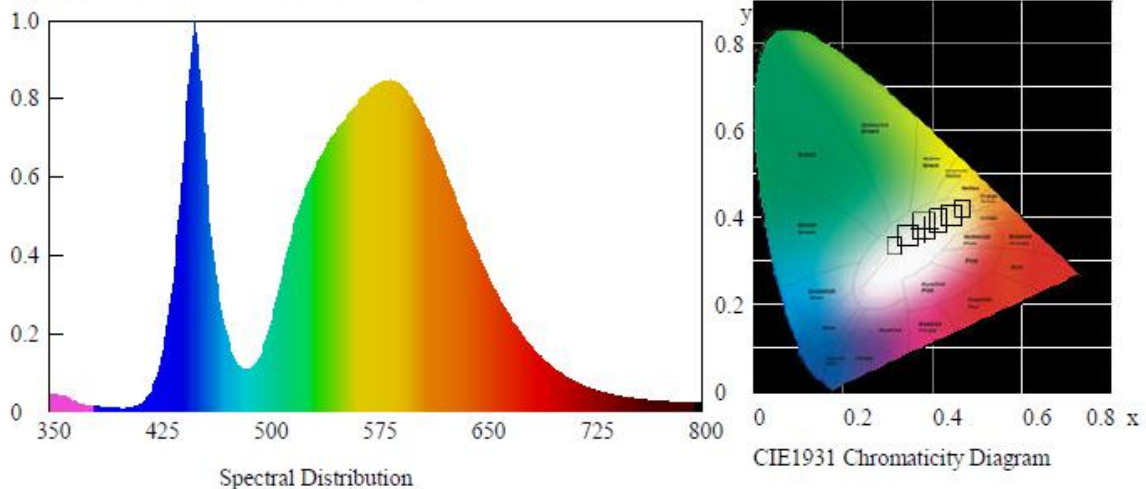
Temperature: 25°C

RH: 58%

Spectrum Range: 350-800 nm

Scan Step: 5 nm

Spectroradiometric Parameters

Chromaticity Coordinates: $x=0.3807$ $y=0.3754$ $u'=0.2258$ $v'=0.501$

Correlated Color Temperature: 3984 K

Dominant Wavelength: 578.0 nm(E)

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

Luminous Flux: 23036.48 lm

Purity: 0.2695

Chromaticity Difference: -0.00069Duv

Peak Wavelength: 450.0 nm

Color Ratio: $K_r=37.4\%$ $K_g=56.0\%$ $K_b=6.6\%$

Bandwidth: 25.3nm

Radiant Flux: 68.211 W

Photosynthetically Active Radiation(PAR): 65.56W

Photosynthetic Photon Flux(PPF): 308.30 μ mol/sRendering Index: $R_a=72.2$ $R_1=70$ $R_2=79$ $R_3=85$ $R_4=71$ $R_5=68$ $R_6=69$ $R_7=82$ $R_8=54$ $R_9=-23$ $R_{10}=49$ $R_{11}=65$ $R_{12}=39$ $R_{13}=72$ $R_{14}=91$ $R_{15}=65$ $R_e=62$

Electric Parameters

Voltage: 120.02 V

Current: 1.289 A

Power Factor: 0.998

Power: 154.40 W

Luminous Efficacy: 149.2 lm/W

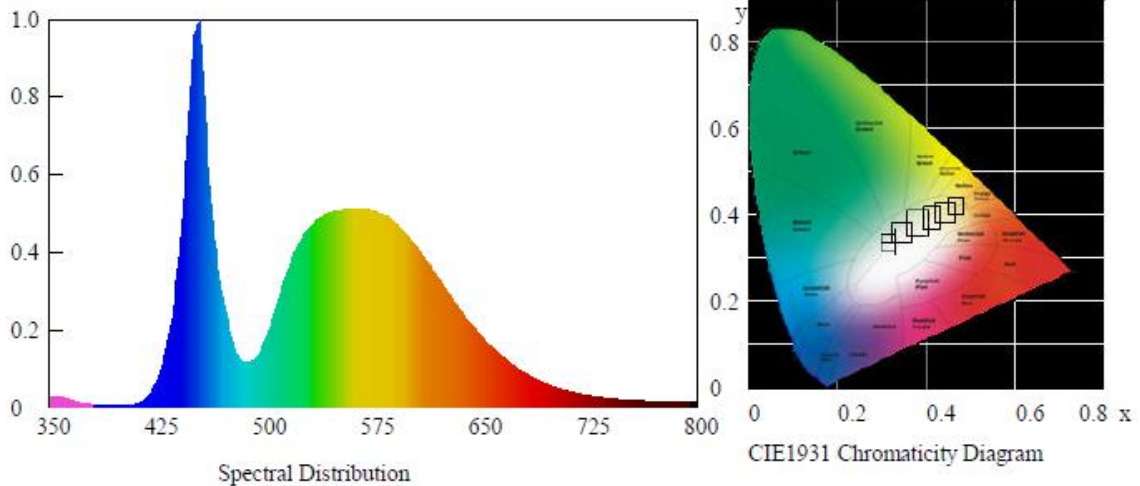
**KML-UFOH150-57****Test Condition**

Temperature: 25°C

RH: 58%

Spectrum Range: 350-800 nm

Scan Step: 5 nm

Spectroradiometric ParametersChromaticity Coordinates: $x=0.3287$ $y=0.3401$ $u'=0.2047$ $v'=0.4765$

Correlated Color Temperature: 5668 K

Dominant Wavelength: 512.0 nm(E)

Colour Fidelity Index: $R_f=72$ Gamut Index: $R_g=93$

Luminous Flux: 23775.68 lm

Purity: 0.0151

Chromaticity Difference: +0.00121Duv

Peak Wavelength: 455.0 nm

Color Ratio: $K_r=31.5\%$ $K_g=59.2\%$ $K_b=9.3\%$

Bandwidth: 19.2nm

Radiant Flux: 72.82 W

Photosynthetically Active Radiation(PAR): 70.46W

Photosynthetic Photon Flux(PPF): 321.55 $\mu\text{mol/s}$ Rendering Index: $R_a=75.1$ $R_1=73$ $R_2=80$ $R_3=83$ $R_4=75$ $R_5=73$ $R_6=71$ $R_7=84$ $R_8=62$ $R_9=-16$ $R_{10}=50$ $R_{11}=71$ $R_{12}=41$ $R_{13}=75$ $R_{14}=90$ $R_{15}=70$ $R_e=65$ **Electric Parameters**

Voltage: 120.03 V

Current: 1.302 A

Power Factor: 0.996

Power: 155.60 W

Luminous Efficacy: 152.8 lm/W

**Zonal Flux Diagram**

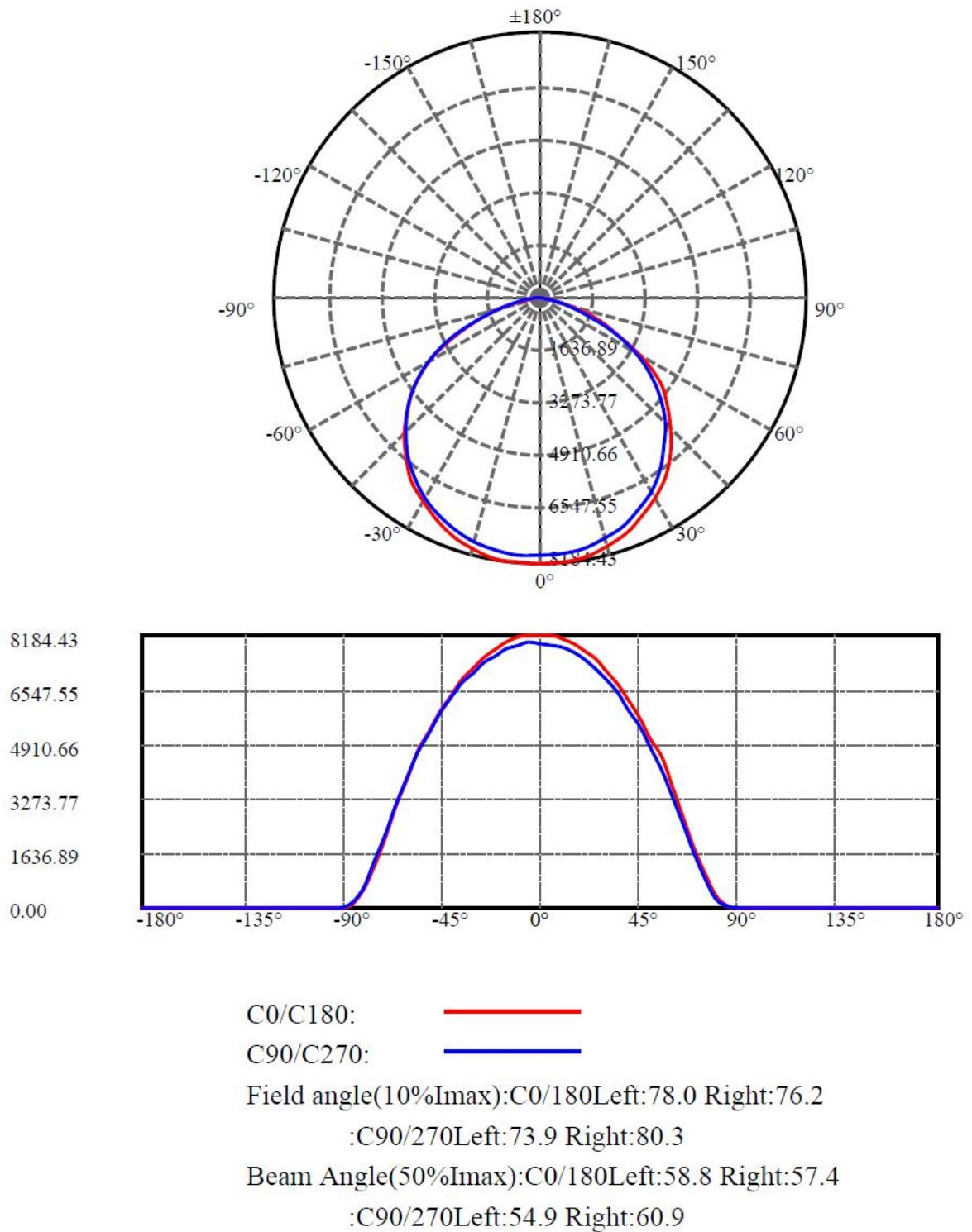
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	7984.242	.000	.000	.000%	.000%
5.0	7975.368	190.793	190.793	.831%	.831%
10.0	7900.852	567.942	758.735	2.474%	3.305%
15.0	7761.737	929.094	1687.829	4.047%	7.353%
20.0	7563.374	1263.004	2950.833	5.502%	12.855%
25.0	7310.984	1560.046	4510.879	6.796%	19.650%
30.0	6998.955	1810.935	6321.814	7.889%	27.539%
35.0	6629.375	2006.867	8328.682	8.742%	36.282%
40.0	6186.844	2138.289	10466.970	9.315%	45.597%
45.0	5671.232	2195.619	12662.590	9.565%	55.161%
50.0	5087.368	2173.933	14836.520	9.470%	64.631%
55.0	4423.689	2068.021	16904.540	9.009%	73.640%
60.0	3688.470	1875.103	18779.650	8.168%	81.809%
65.0	2793.869	1575.869	20355.520	6.865%	88.674%
70.0	1927.965	1195.599	21551.110	5.208%	93.882%
75.0	1097.557	790.823	22341.940	3.445%	97.327%
80.0	436.906	410.580	22752.520	1.789%	99.115%
85.0	77.113	139.671	22892.190	.608%	99.724%
90.0	4.946	22.469	22914.660	.098%	99.822%
95.0	3.315	2.262	22916.920	.010%	99.832%
100.0	3.602	1.879	22918.800	.008%	99.840%
105.0	4.111	2.064	22920.860	.009%	99.849%
110.0	4.737	2.313	22923.170	.010%	99.859%
115.0	5.598	2.617	22925.790	.011%	99.870%
120.0	6.421	2.922	22928.710	.013%	99.883%
125.0	7.138	3.134	22931.850	.014%	99.897%
130.0	7.778	3.243	22935.090	.014%	99.911%
135.0	8.339	3.257	22938.350	.014%	99.925%
140.0	8.861	3.185	22941.530	.014%	99.939%
145.0	9.305	3.031	22944.560	.013%	99.952%
150.0	9.618	2.787	22947.350	.012%	99.964%
155.0	9.892	2.469	22949.820	.011%	99.975%
160.0	9.827	2.068	22951.890	.009%	99.984%
165.0	9.736	1.612	22953.500	.007%	99.991%
170.0	9.657	1.150	22954.650	.005%	99.996%
175.0	9.736	.694	22955.340	.003%	99.999%
180.0	9.944	.235	22955.580	.001%	100.000%



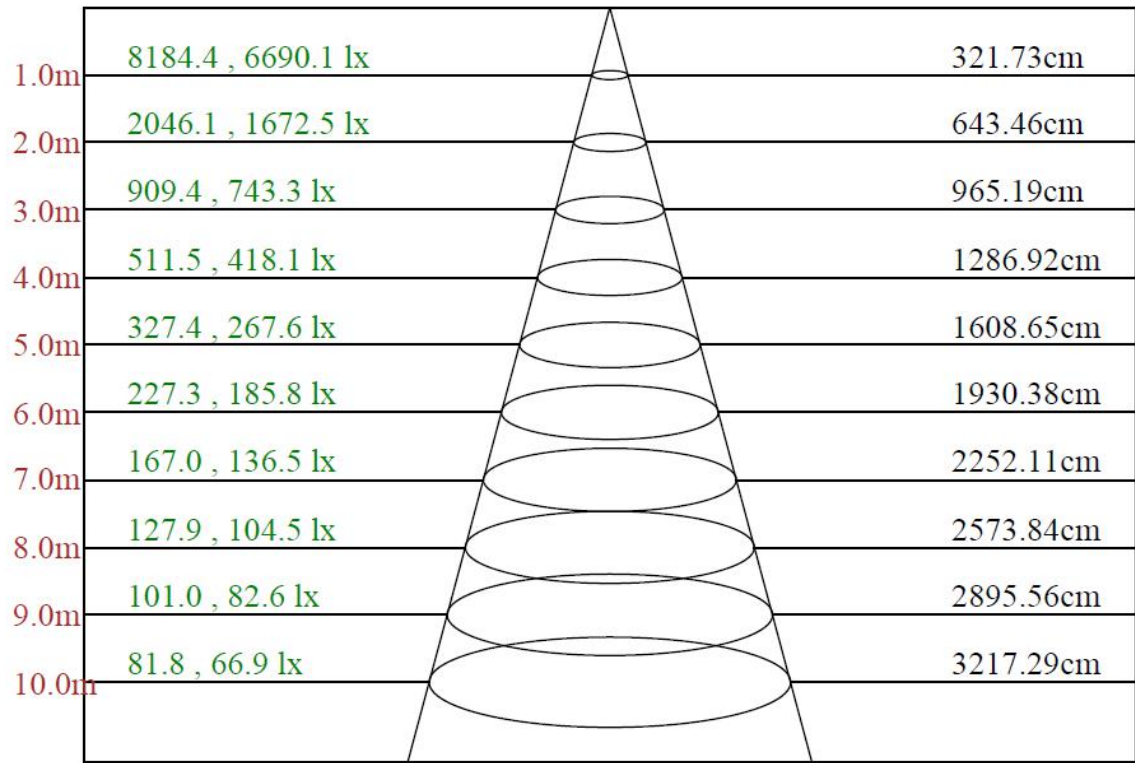
Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





Lux distance Curve



Max , Ave Beam angle of C0plane116.24

**Luminous Intensity Distribution Data**

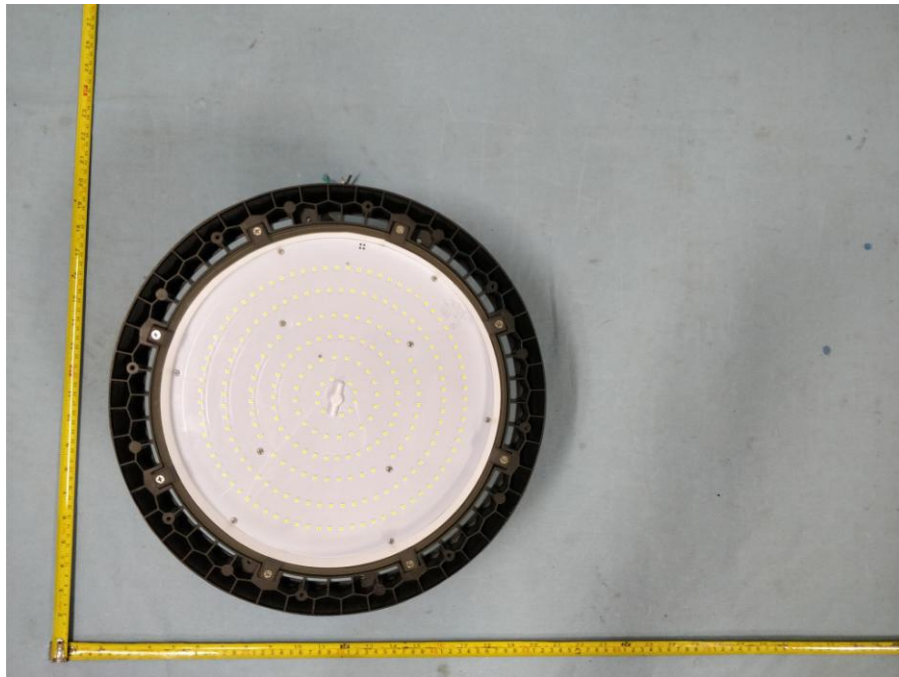
C/ $\gamma(^{\circ})$	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	8184.43	8161.46	8082.12	7938.04	7716.71	7447.36	7125.80	6733.25	6261.36
22.5	8109.26	8063.33	7998.60	7833.64	7631.11	7347.13	7023.49	6624.68	6142.34
45.0	8042.45	8004.86	7898.37	7777.27	7560.11	7265.70	6931.62	6549.51	6085.97
67.5	7983.98	7963.10	7844.08	7710.45	7497.47	7219.76	6887.77	6474.34	6006.62
90.0	7942.22	7904.64	7827.38	7662.43	7466.15	7165.48	6837.66	6443.02	5956.51
112.5	7896.28	7871.23	7760.56	7612.31	7397.25	7115.36	6787.54	6386.64	5929.36
135.0	7867.05	7825.29	7764.74	7603.96	7370.10	7104.92	6800.07	6401.26	5937.72
157.5	7848.26	7854.52	7758.48	7580.99	7378.45	7119.54	6789.63	6403.35	5983.65
180.0	8184.43	8182.34	8130.14	7977.72	7796.06	7547.58	7232.29	6866.89	6428.40
202.5	8109.26	8105.09	8057.06	7904.64	7722.98	7497.47	7190.53	6833.48	6399.17
225.0	8042.45	8057.06	7992.33	7854.52	7670.78	7439.01	7140.42	6804.25	6382.47
247.5	7983.98	8004.86	7931.78	7821.12	7635.28	7413.95	7111.19	6793.81	6378.29
270.0	7942.22	7969.37	7898.37	7781.44	7599.78	7386.81	7081.95	6756.22	6342.79
292.5	7896.28	7915.08	7869.14	7750.12	7545.50	7353.40	7050.63	6731.17	6313.56
315.0	7867.05	7871.23	7814.85	7702.10	7526.70	7297.02	7025.58	6666.44	6236.30
337.5	7848.26	7852.44	7785.62	7677.04	7499.56	7255.26	6967.11	6601.71	6204.98
360.0	8184.43	8161.46	8082.12	7938.04	7716.71	7447.36	7125.80	6733.25	6261.36
C/ $\gamma(^{\circ})$	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	5712.21	5106.68	4505.33	3640.47	2668.08	1803.85	969.26	340.56	38.21
22.5	5622.43	5016.90	4145.56	3528.35	2586.02	1738.91	909.96	304.64	36.12
45.0	5536.82	4925.02	4144.94	3475.10	2529.64	1665.41	884.70	294.62	31.53
67.5	5490.88	4868.65	4152.66	3408.49	2468.05	1643.28	845.86	277.92	29.65
90.0	5426.15	4812.27	4119.67	3354.20	2455.52	1616.55	825.19	267.27	30.69
112.5	5394.83	4793.48	4129.49	3378.42	2445.50	1635.76	846.69	278.33	31.53
135.0	5396.92	4843.59	4158.09	3409.12	2488.51	1655.60	863.19	291.91	33.83
157.5	5463.74	4870.74	4157.05	3443.36	2533.40	1704.04	912.05	320.93	39.88
180.0	5916.84	5315.49	4705.78	3906.07	3041.63	2124.98	1243.84	539.13	105.03
202.5	5889.69	5302.96	4686.99	3960.36	3081.30	2179.27	1310.65	560.64	114.22
225.0	5883.43	5313.40	4695.34	3949.92	3118.88	2216.86	1339.89	604.69	131.13
247.5	5870.90	5305.05	4705.78	3974.97	3133.50	2218.94	1385.82	612.00	134.26
270.0	5854.20	5298.78	4684.90	3972.89	3125.15	2233.56	1367.03	628.91	138.44
292.5	5808.26	5240.32	4664.02	3931.13	3068.77	2179.27	1352.41	592.58	124.86
315.0	5753.97	5219.44	4603.47	3858.04	3018.66	2141.69	1285.60	566.69	113.80
337.5	5718.47	5165.15	4519.95	3824.64	2939.31	2089.49	1218.78	509.69	100.64
360.0	5712.21	5106.68	4505.33	3640.47	2668.08	1803.85	969.26	340.56	38.21
C/ $\gamma(^{\circ})$	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	2.09	2.30	2.30	2.92	3.76	4.39	5.85	6.47	6.89
22.5	3.34	3.34	3.34	4.18	4.59	5.85	6.68	7.31	7.93
45.0	3.34	3.34	3.55	4.39	5.01	5.85	6.68	7.52	8.14
67.5	3.34	3.34	3.55	4.39	5.01	6.06	6.68	7.52	8.35
90.0	3.34	3.34	3.55	4.39	5.01	6.06	6.68	7.73	8.14
112.5	3.34	3.34	3.97	4.39	5.01	5.85	6.68	7.52	8.14
135.0	3.34	3.34	3.76	4.18	4.80	5.85	6.68	7.31	8.14
157.5	3.55	3.34	3.76	4.18	5.01	5.85	6.47	7.31	7.93
180.0	4.80	2.92	3.34	3.76	4.39	5.01	6.06	6.68	7.31
202.5	6.68	3.34	3.76	3.97	4.80	5.43	6.26	7.10	7.52
225.0	7.10	3.55	3.76	3.97	4.80	5.64	6.26	6.89	7.73
247.5	8.35	3.55	3.76	4.18	4.59	5.64	6.26	6.68	7.52
270.0	7.73	3.55	3.97	4.39	4.59	5.64	6.26	6.89	7.73
292.5	7.52	3.55	3.76	3.97	4.80	5.43	6.47	7.10	7.52
315.0	6.26	3.55	3.76	4.39	4.80	5.43	6.47	7.31	7.73
337.5	5.01	3.34	3.76	4.18	4.80	5.64	6.26	6.89	7.73
360.0	2.09	2.30	2.30	2.92	3.76	4.39	5.85	6.47	6.89



C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	7.31	7.93	8.56	8.77	8.98	8.98	8.77	8.56	8.98
22.5	8.56	9.19	9.61	10.23	10.23	10.23	10.23	9.81	10.02
45.0	8.56	9.19	9.81	10.02	10.23	10.44	10.23	9.81	10.02
67.5	8.98	9.40	9.61	10.02	10.23	10.02	10.02	10.02	10.23
90.0	8.56	9.19	9.61	9.81	10.23	10.23	10.02	9.81	9.81
112.5	8.77	9.19	9.40	10.02	10.23	10.02	9.61	9.81	10.02
135.0	8.56	9.19	9.61	9.61	10.02	10.02	9.81	9.61	10.02
157.5	8.56	8.98	9.61	9.81	10.02	9.81	9.81	9.81	10.02
180.0	8.14	8.56	8.98	9.19	9.61	9.40	9.61	9.40	9.61
202.5	8.14	8.77	9.40	9.81	9.81	9.61	9.61	9.81	9.61
225.0	8.14	8.77	8.98	9.61	10.02	9.81	9.81	9.81	9.61
247.5	8.14	8.77	9.40	9.40	9.81	9.81	9.61	9.81	9.40
270.0	8.14	8.56	8.98	9.40	9.81	9.81	9.40	9.61	9.81
292.5	8.35	8.77	8.98	9.40	9.61	9.81	9.61	9.61	9.61
315.0	8.14	8.56	9.19	9.40	9.81	9.61	9.81	9.61	9.61
337.5	8.35	8.77	9.19	9.40	9.61	9.61	9.81	9.61	9.40
360.0	7.31	7.93	8.56	8.77	8.98	8.98	8.77	8.56	8.98
C/γ(°)	180.0								
0.0	8.77								
22.5	10.23								
45.0	10.23								
67.5	10.02								
90.0	10.23								
112.5	10.02								
135.0	9.81								
157.5	10.23								
180.0	8.77								
202.5	10.23								
225.0	10.23								
247.5	10.02								
270.0	10.23								
292.5	10.02								
315.0	9.81								
337.5	10.23								
360.0	8.77								



Photo Document



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