



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:

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-HBP1-26A130-0300-30 / IK-HBP1-26A130-0300-57

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: Zac Kuang

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 Federal 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	High Bay Luminaires for Commercial and Industrial Buildings
Model Number	IK-HBP1-26A130-0300-30 / IK-HBP1-26A130-0300-57
Rated Inputs	AC 100-277V 50/60Hz
Rated Power	300 W
Nominal CCT	3000K / 5700K
Date of Receipt Samples	2017-07-28

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 ± 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-HBP1-26A130-0300-30	120.0	60	2.569	307.4	0.997
IK-HBP1-26A130-0300-57	120.0	60	2.574	307.9	0.997

3.1.2 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
IK-HBP1-26A130-0300-30	40238.66	130.9	2995	82.1	8
IK-HBP1-26A130-0300-57	43259.95	140.5	5484	84.4	17

3.1.3 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
IK-HBP1-26A130-0300-30	0.000	0.4373	0.4041	0.2508	0.5214
IK-HBP1-26A130-0300-57	0.003	0.3329	0.3474	0.2048	0.4808

3.2 Goniophotometer System

3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
IK-HBP1-26A130-0300-30	120.06	60	2.5885	309.95	0.9973

3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 20-50°(%lm)
40545.82	130.81	53.677



3.3 Additional Test

Model Number	Test Item	Test Voltage (V)	Frequency(Hz)	Test Result
IK-HBP1-26A130-0300-30	Power Factor	277	60	0.947
	THDi	277	60	13.9%



4 Test Data

IK-HBP1-26A130-0300-30

Test Condition

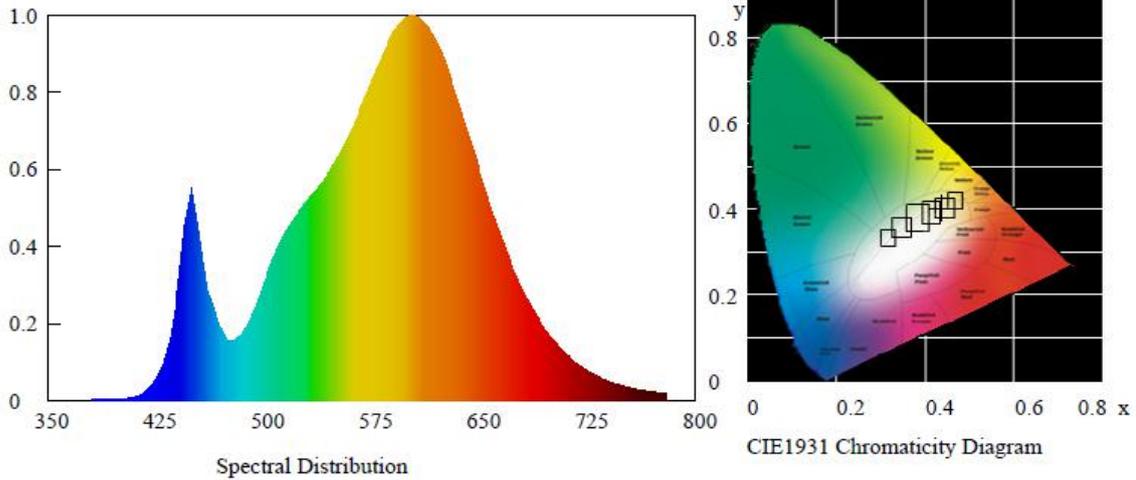
Temperature: 25°C

RH: 58%

Spectrum Range: 380-780 nm

Scan Step: 5 nm

Spectroradiometric Parameters

Chromaticity Coordinates: $x=0.4373$ $y=0.4041$ $u'=0.2508$ $v'=0.5214$

Correlated Color Temperature: 2995 K

Dominant Wavelength: 581.0 nm(E)

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

Luminous Flux: 40238.66 lm

Purity: 0.5286

Chromaticity Difference: 0.000Duv

Peak Wavelength: 605.0 nm

Color Ratio: $K_r=44.8\%$ $K_g=48.2\%$ $K_b=7.0\%$

Bandwidth: 130.5nm

Radiant Flux: 112.648 W

Photosynthetically Active Radiation(PAR): 109.02W

Photosynthetic Photon Flux(PPF): 530.04 μ mol/sRendering Index: $R_a=82.1$

R1=80 R2=89 R3=97 R4=81 R5=80 R6=87 R7=84 R8=60

R9=8 R10=76 R11=80 R12=69 R13=83 R14=98 R15=73 Re=76

Electric Parameters

Voltage: 120.0 V

Current: 2.569 A

Power Factor: 0.997

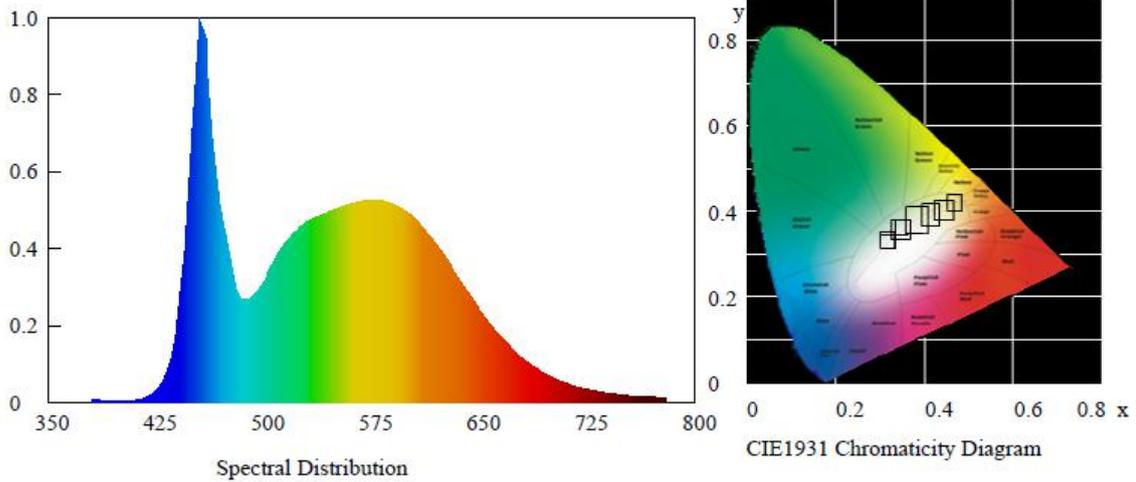
Power: 307.4 W

Luminous Efficacy: 130.9 lm/W

**IK-HBP1-26A130-0300-57****Test Condition**

Temperature: 25°C
Spectrum Range: 380-780 nm

RH: 58%
Scan Step: 5 nm

Spectroradiometric Parameters

Chromaticity Coordinates: $x=0.3329$ $y=0.3474$ $u'=0.2048$ $v'=0.4808$

Correlated Color Temperature: 5484 K

Dominant Wavelength: 553.0 nm(E)

Colour Fidelity Index: $R_f=80$

Gamut Index: $R_g=92$

Luminous Flux: 43259.95 lm

Purity: 0.0416

Chromaticity Difference: 0.003Duv

Peak Wavelength: 455.0 nm

Color Ratio: $K_r=32.7\%$ $K_g=55.1\%$ $K_b=12.2\%$

Bandwidth: 27.7nm

Radiant Flux: 123.085 W

Photosynthetically Active Radiation(PAR): 120.41W

Photosynthetic Photon Flux(PPF): 553.26 μ mol/s

Rendering Index: $R_a=84.4$

$R_1=84$ $R_2=93$ $R_3=95$ $R_4=80$ $R_5=82$ $R_6=87$ $R_7=86$ $R_8=69$

$R_9=17$ $R_{10}=80$ $R_{11}=79$ $R_{12}=58$ $R_{13}=87$ $R_{14}=97$ $R_{15}=79$ $R_e=78$

Electric Parameters

Voltage: 120.0 V

Current: 2.574 A

Power Factor: 0.997

Power: 307.9 W

Luminous Efficacy: 140.5 lm/W



Zonal Flux Diagram

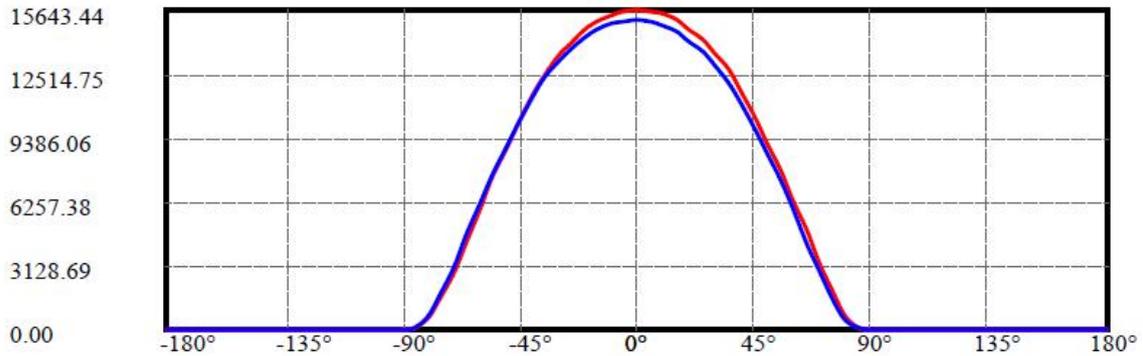
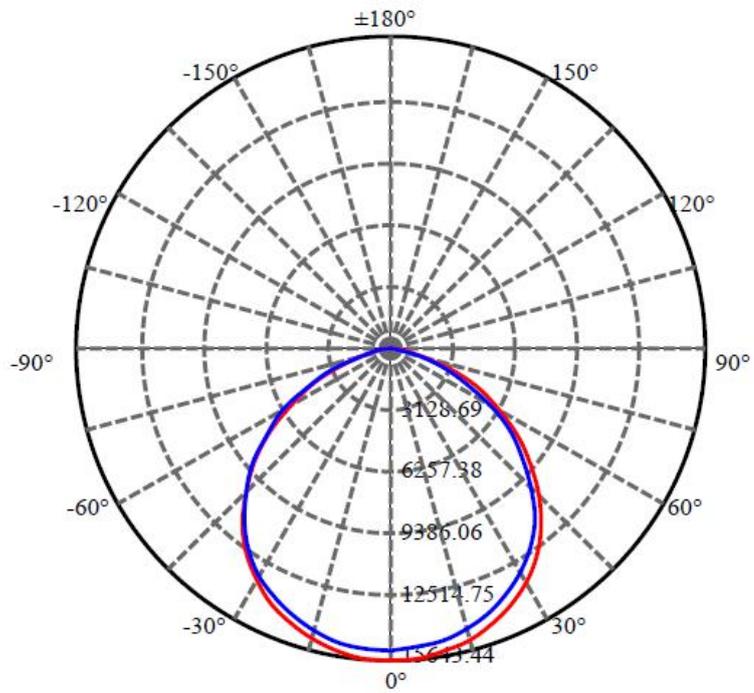
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	15251.320	.000	.000	.000%	.000%
5.0	15181.810	363.820	363.820	.897%	.897%
10.0	15011.900	1080.124	1443.943	2.664%	3.561%
15.0	14710.850	1763.134	3207.077	4.348%	7.910%
20.0	14294.420	2390.442	5597.520	5.896%	13.805%
25.0	13756.320	2942.005	8539.524	7.256%	21.061%
30.0	13083.120	3396.554	11936.080	8.377%	29.438%
35.0	12276.020	3734.312	15670.390	9.210%	38.649%
40.0	11290.740	3931.937	19602.330	9.698%	48.346%
45.0	10045.400	3950.561	23552.890	9.743%	58.090%
50.0	8801.380	3808.268	27361.160	9.393%	67.482%
55.0	7471.417	3538.248	30899.400	8.727%	76.209%
60.0	6038.039	3122.673	34022.080	7.702%	83.910%
65.0	4413.411	2540.767	36562.840	6.266%	90.177%
70.0	2995.498	1875.983	38438.830	4.627%	94.803%
75.0	1649.687	1214.177	39653.000	2.995%	97.798%
80.0	642.301	613.272	40266.280	1.513%	99.311%
85.0	107.044	203.615	40469.890	.502%	99.813%
90.0	2.116	29.889	40499.780	.074%	99.886%
95.0	1.564	1.008	40500.790	.002%	99.889%
100.0	1.840	.925	40501.710	.002%	99.891%
105.0	2.523	1.167	40502.880	.003%	99.894%
110.0	3.574	1.594	40504.480	.004%	99.898%
115.0	5.033	2.179	40506.660	.005%	99.903%
120.0	6.531	2.811	40509.470	.007%	99.910%
125.0	8.108	3.384	40512.850	.008%	99.919%
130.0	9.685	3.869	40516.720	.010%	99.928%
135.0	10.999	4.179	40520.900	.010%	99.939%
140.0	12.195	4.294	40525.190	.011%	99.949%
145.0	13.154	4.229	40529.420	.010%	99.960%
150.0	14.153	4.021	40533.440	.010%	99.969%
155.0	14.757	3.659	40537.100	.009%	99.978%
160.0	14.981	3.119	40540.220	.008%	99.986%
165.0	14.889	2.462	40542.680	.006%	99.992%
170.0	14.613	1.750	40544.430	.004%	99.997%
175.0	14.691	1.048	40545.480	.003%	99.999%
180.0	15.401	.360	40545.840	.001%	100.000%



Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]



C0/C180: —

C90/C270: —

Field angle(10%Imax):C0/180Left:75.0 Right:76.2

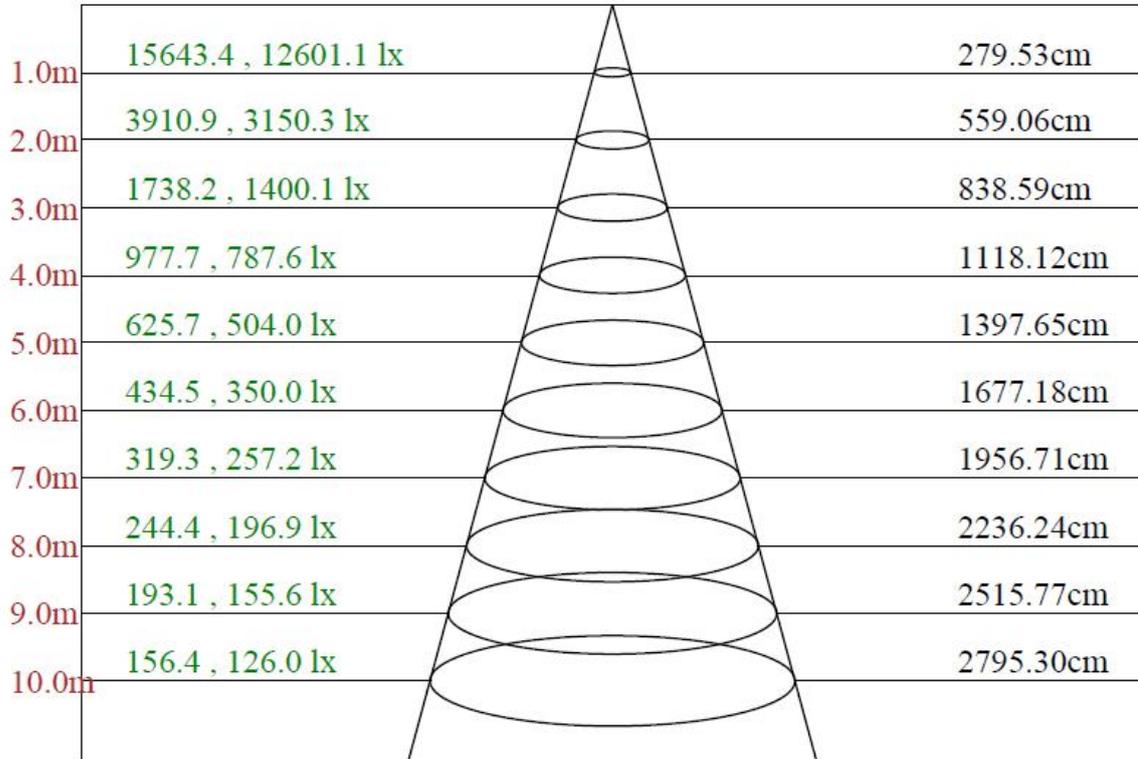
:C90/270Left:76.1 Right:75.0

Beam Angle(50%Imax):C0/180Left:53.6 Right:54.9

:C90/270Left:55.0 Right:54.0



Lux distance Curve



Max , Ave Beam angle of C0plane108.81

**Luminous Intensity Distribution Data**

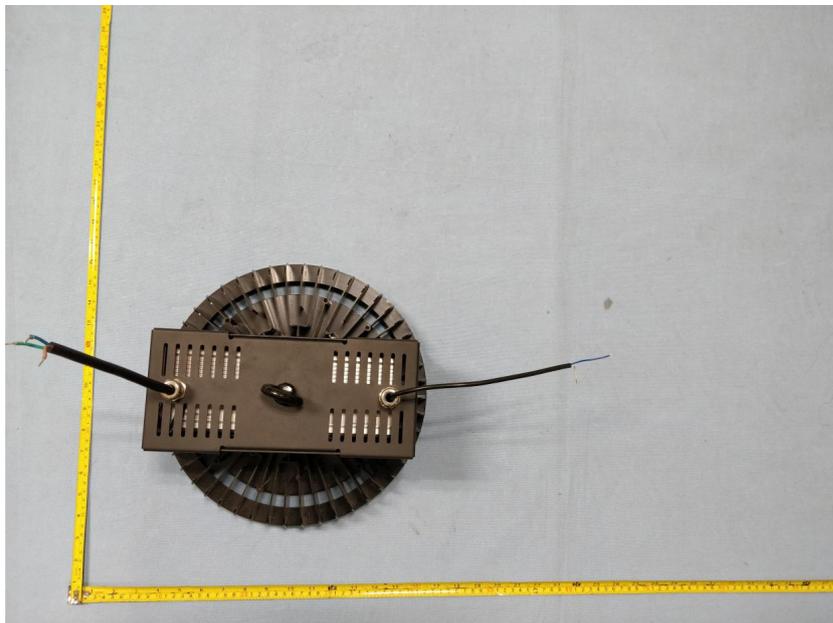
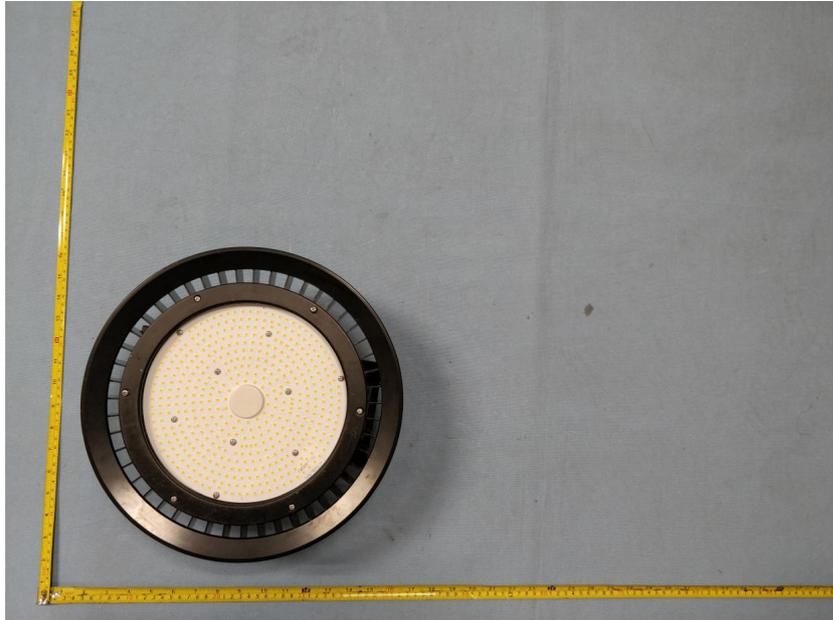
$C/\gamma(^{\circ})$	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	15643.44	15569.85	15410.06	15130.43	14705.73	14188.51	13503.10	12697.84	11663.41
22.5	15456.32	15416.37	15222.94	14926.49	14518.60	13992.98	13309.67	12453.95	11444.75
45.0	15296.53	15220.84	15073.66	14760.39	14354.61	13835.29	13141.47	12323.59	11257.63
67.5	15197.71	15111.51	14941.21	14627.93	14222.15	13679.71	13009.01	12216.37	11186.14
90.0	15140.94	15023.20	14882.33	14558.55	14131.74	13574.58	12914.40	12081.81	11108.35
112.5	15086.28	15012.69	14804.54	14478.66	14043.44	13524.12	12830.30	12037.65	11024.25
135.0	15098.89	14997.97	14760.39	14487.07	14028.72	13498.89	12788.25	11978.78	10959.07
157.5	15090.48	14995.87	14777.21	14445.02	14024.52	13446.33	12796.66	11968.27	10956.97
180.0	15643.44	15559.34	15384.83	15037.92	14627.93	14030.82	13366.43	12479.18	11451.06
202.5	15456.32	15397.45	15222.94	14892.85	14478.66	13892.06	13168.80	12321.49	11327.01
225.0	15296.53	15243.97	15079.97	14787.72	14333.58	13774.32	13091.01	12275.24	11287.06
247.5	15197.71	15134.64	14981.15	14684.70	14281.02	13736.47	13036.34	12256.31	11327.01
270.0	15140.94	15090.48	14937.00	14644.75	14245.28	13719.65	13074.19	12313.08	11354.34
292.5	15086.28	15031.61	14886.54	14611.11	14232.66	13721.76	13082.60	12296.26	11400.60
315.0	15098.89	15058.95	14918.08	14640.55	14230.56	13736.47	13099.42	12340.41	11444.75
337.5	15090.48	15044.23	14907.57	14659.47	14251.58	13749.09	13118.34	12376.16	11459.47
360.0	15643.44	15569.85	15410.06	15130.43	14705.73	14188.51	13503.10	12697.84	11663.41
$C/\gamma(^{\circ})$	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	10397.70	9140.41	7792.71	6337.78	4826.08	3258.88	1826.65	709.59	123.63
22.5	10197.97	8900.72	7523.59	6066.55	4344.61	3023.61	1730.99	731.04	148.65
45.0	10048.69	8825.03	7477.33	5992.97	4153.28	2975.88	1641.84	658.50	134.56
67.5	9970.90	8705.19	7372.21	5957.22	4146.76	2909.23	1585.92	556.95	91.46
90.0	9855.26	8623.19	7321.75	5913.07	4160.01	2877.69	1502.03	512.17	63.92
112.5	9790.08	8536.99	7252.36	5793.23	4181.45	2804.53	1440.84	458.98	49.20
135.0	9781.67	8513.86	7180.88	5753.28	4177.25	2709.49	1360.74	417.35	48.36
157.5	9697.57	8454.99	7174.57	5719.64	4167.37	2653.36	1359.69	407.04	41.63
180.0	10107.56	8808.21	7443.69	5917.28	4281.53	2851.83	1560.90	603.42	109.12
202.5	10004.54	8713.60	7336.46	5883.64	4273.12	2820.29	1560.90	621.71	114.17
225.0	10000.33	8782.98	7391.13	5942.51	4329.89	2906.50	1621.87	605.94	117.74
247.5	10086.53	8804.01	7460.51	6079.17	4504.40	3005.31	1676.53	646.73	114.17
270.0	10124.38	8921.75	7578.25	6184.29	4649.47	3156.69	1754.33	672.59	126.36
292.5	10191.66	8989.03	7746.45	6304.14	4739.88	3249.20	1869.96	745.76	129.94
315.0	10218.99	9028.98	7721.22	6360.90	4840.80	3360.64	1922.53	900.08	147.39
337.5	10252.63	9073.13	7769.58	6402.95	4838.69	3364.84	1979.29	1028.96	152.43
360.0	10397.70	9140.41	7792.71	6337.78	4826.08	3258.88	1826.65	709.59	123.63
$C/\gamma(^{\circ})$	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	1.05	0.63	0.84	1.26	3.15	4.84	6.10	7.99	9.25
22.5	1.05	0.84	1.26	2.10	3.57	4.63	6.10	7.78	9.46
45.0	1.26	1.05	1.26	2.10	3.36	4.84	6.31	7.78	9.46
67.5	1.26	1.05	1.47	2.31	3.15	4.84	6.31	7.99	9.46
90.0	1.47	1.05	1.47	2.31	3.36	4.84	6.52	7.99	9.46
112.5	1.26	1.05	1.47	2.52	3.36	5.05	6.73	8.20	9.67
135.0	1.26	1.26	1.68	2.73	3.36	5.26	6.73	8.41	10.09
157.5	1.26	0.84	1.47	2.52	3.79	5.47	6.94	8.41	10.09
180.0	2.31	1.89	2.10	2.73	3.79	5.47	6.73	8.41	10.09
202.5	2.31	1.89	2.52	2.73	4.00	5.26	6.94	8.41	10.09
225.0	2.52	2.10	2.31	2.94	3.79	5.26	6.73	8.41	10.09
247.5	2.52	2.31	2.52	2.94	3.79	5.26	6.52	7.99	9.46
270.0	2.94	2.10	2.31	2.94	3.79	4.84	6.52	7.99	9.67
292.5	3.36	2.31	2.31	2.73	3.79	4.84	6.52	7.99	9.46
315.0	3.57	2.31	2.10	2.73	3.57	5.05	6.52	7.99	9.67
337.5	4.42	2.31	2.31	2.73	3.57	4.84	6.31	7.99	9.46
360.0	1.05	0.63	0.84	1.26	3.15	4.84	6.10	7.99	9.25



$C/\gamma(^{\circ})$	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	10.72	11.98	13.25	14.09	14.93	14.93	14.72	14.30	14.72
22.5	10.72	12.20	13.04	14.30	14.72	14.93	14.93	14.72	14.93
45.0	10.72	11.98	12.83	13.88	14.51	14.72	14.72	14.51	14.93
67.5	10.72	11.77	13.04	13.67	14.30	14.72	14.72	14.51	14.72
90.0	10.93	12.20	13.04	13.67	14.30	14.72	14.51	14.51	14.72
112.5	10.93	12.41	13.04	14.09	14.30	14.72	14.72	14.30	14.93
135.0	11.35	12.41	13.46	14.30	14.72	14.93	14.93	14.72	14.93
157.5	11.35	12.62	13.46	14.30	15.14	15.35	14.93	14.72	14.93
180.0	11.56	12.83	13.67	14.93	15.56	15.56	15.56	15.14	14.51
202.5	11.35	12.41	13.46	14.72	15.56	15.35	15.35	14.93	14.93
225.0	11.35	12.20	13.25	14.51	15.14	15.35	14.93	14.93	14.51
247.5	10.93	12.41	13.04	14.09	14.72	15.14	15.14	14.72	14.51
270.0	10.93	11.98	13.04	14.09	14.30	14.72	14.72	14.30	14.51
292.5	10.72	11.77	13.04	13.67	14.30	14.51	14.51	14.30	14.30
315.0	10.93	11.98	12.83	14.09	14.72	14.93	14.93	14.51	14.51
337.5	10.72	11.98	13.04	14.09	14.93	15.14	14.93	14.72	14.51
360.0	10.72	11.98	13.25	14.09	14.93	14.93	14.72	14.30	14.72
$C/\gamma(^{\circ})$	180.0								
0.0	15.35								
22.5	15.77								
45.0	15.35								
67.5	15.56								
90.0	15.35								
112.5	15.35								
135.0	15.14								
157.5	15.35								
180.0	15.35								
202.5	15.77								
225.0	15.35								
247.5	15.56								
270.0	15.35								
292.5	15.35								
315.0	15.14								
337.5	15.35								
360.0	15.35								



Photo Document



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