



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:

Outdoor Pole/Arm-Mounted Area and Roadway Luminaires

Model No.:

IK-SBSL-L120-0150-DN-30-MLV2-XXNX / IK-SBSL-L120-0150-DN-57-MLV2-XXNX

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 used 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	Outdoor Pole/Arm-Mounted Area and Roadway Luminaires
Model Number	IK-SBSL-L120-0150-DN-30-MLV2-XXNX / IK-SBSL-L120-0150-DN-57-MLV2-XXNX
Rated Inputs	AC 277-480V 50/60Hz
Rated Power	150 W
Nominal CCT	3000K / 5700K
Date of Receipt Samples	2017-06-19

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-SBSL-L120-0150-DN-30-MLV2-XXNX	277.02	60	0.564	154.47	0.989
IK-SBSL-L120-0150-DN-57-MLV2-XXNX	277.00	60	0.570	155.98	0.988

3.1.2 Additional Test

Test Item	Model	Test Voltage (V)	Frequency (Hz)	Test Result
Power factor	IK-SBSL-L120-0150-DN-30-MLV2-XXNX	277	60	0.989
		480	60	0.924
	IK-SBSL-L120-0150-DN-57-MLV2-XXNX	277	60	0.988
		480	60	0.932
Total harmonic distortion	IK-SBSL-L120-0150-DN-30-MLV2-XXNX	277	60	11.2%
		480	60	15.8%
	IK-SBSL-L120-0150-DN-57-MLV2-XXNX	277	60	12.4%
		480	60	16.7%
Off state power (W)	IK-SBSL-L120-0150-DN-30-MLV2-XXNX	277	60	0
	IK-SBSL-L120-0150-DN-30-MLV2-XXNX	480	60	0

3.1.3 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
IK-SBSL-L120-0150-DN-30-MLV2-XXNX	17439.045	112.896	2996	82.7	11
IK-SBSL-L120-0150-DN-57-MLV2-XXNX	18057.493	115.768	5582	85.1	20

3.1.4 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
IK-SBSL-L120-0150-DN-30-MLV2-XXNX	0.0001	0.4373	0.4044	0.2507	0.5216
IK-SBSL-L120-0150-DN-57-MLV2-XXNX	0.0018	0.3306	0.3429	0.2049	0.4782



3.2 Goniophotometer System

3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
IK-SBSL-L120-0150-DN-30-MLV2-XXNX	277.07	60	0.5635	154.41	0.989

3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-90°(%lm)	Zonal Lumen in 80-90°(%lm)
17408.59	112.74	99.813	0.677



4 Test Data

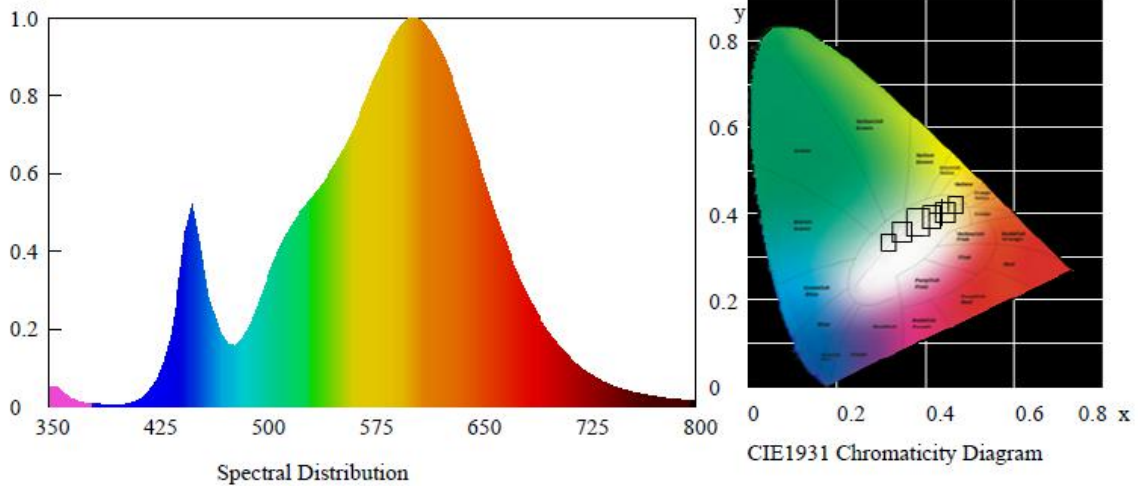
IK-SBSL-L120-0150-DN-30-MLV2-XXNX

Test Condition

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

RH: 58%
Scan Step: 5 nm

Spectroradiometric Parameters



Chromaticity Coordinates: $x=0.4373$ $y=0.4044$ $u'=0.2507$ $v'=0.5216$

Correlated Color Temperature: 2996 K

Dominant Wavelength: 581.0 nm(E)

Luminous Flux: 17439.045 lm

Purity: 0.5293

Chromaticity Difference: 0.0001Duv

Peak Wavelength: 646.8 nm

Color Ratio: $K_r=44.6\%$ $K_g=48.4\%$ $K_b=7.0\%$

Bandwidth: 131.4nm

Radiant Flux: 52.289 W

Rendering Index: $R_a=82.7$

$R_1=81$ $R_2=90$ $R_3=97$ $R_4=81$ $R_5=81$ $R_6=87$ $R_7=84$ $R_8=61$

$R_9=11$ $R_{10}=76$ $R_{11}=81$ $R_{12}=70$ $R_{13}=83$ $R_{14}=98$ $R_{15}=74$

Electric Parameters

Voltage: 277.02 V

Current: 0.564 A

Power Factor: 0.989

Power: 154.47 W

Luminous Efficacy: 112.896 lm/W

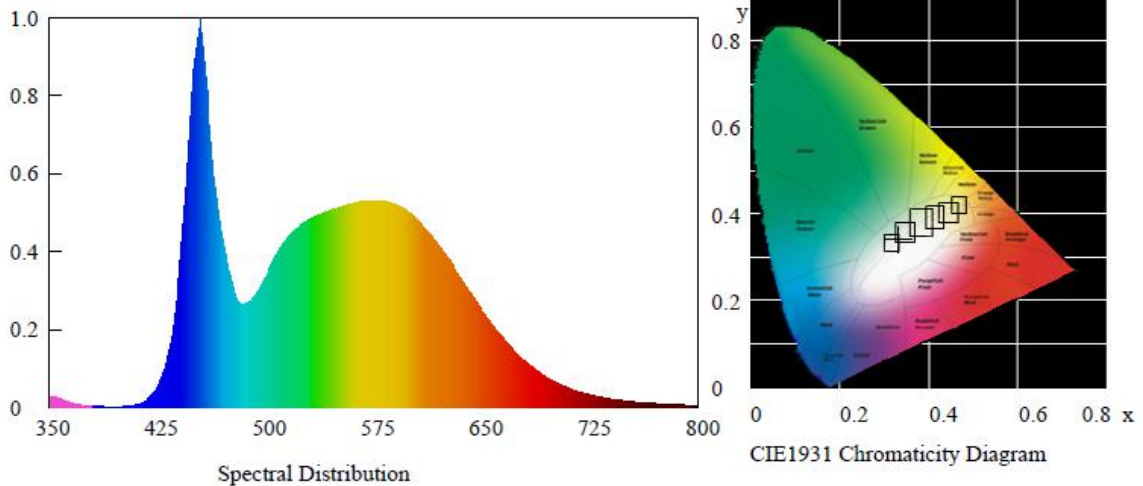
**IK-SBSL-L120-0150-DN-57-MLV2-XXNX****Test Condition**

Temperature: 25°C

RH: 58%

Spectrum Range: 350-800 nm

Scan Step: 5 nm

Spectroradiometric ParametersChromaticity Coordinates: $x=0.3306$ $y=0.3429$ $u'=0.2049$ $v'=0.4782$

Correlated Color Temperature: 5582 K

Dominant Wavelength: 537.0 nm(E)

Luminous Flux: 18057.493 lm

Purity: 0.0219

Chromaticity Difference: 0.0018Duv

Peak Wavelength: 447.3 nm

Color Ratio: $K_r=32.5\%$ $K_g=55.3\%$ $K_b=12.2\%$

Bandwidth: -443.9nm

Radiant Flux: 54.077 W

Rendering Index: $R_a=85.1$ $R_1=84$ $R_2=91$ $R_3=94$ $R_4=83$ $R_5=84$ $R_6=86$ $R_7=88$ $R_8=71$ $R_9=20$ $R_{10}=77$ $R_{11}=82$ $R_{12}=60$ $R_{13}=87$ $R_{14}=97$ $R_{15}=80$ **Electric Parameters**

Voltage: 277.0 V

Current: 0.570 A

Power Factor: 0.988

Power: 155.98 W

Luminous Efficacy: 115.768 lm/W

**Zonal Flux Diagram**

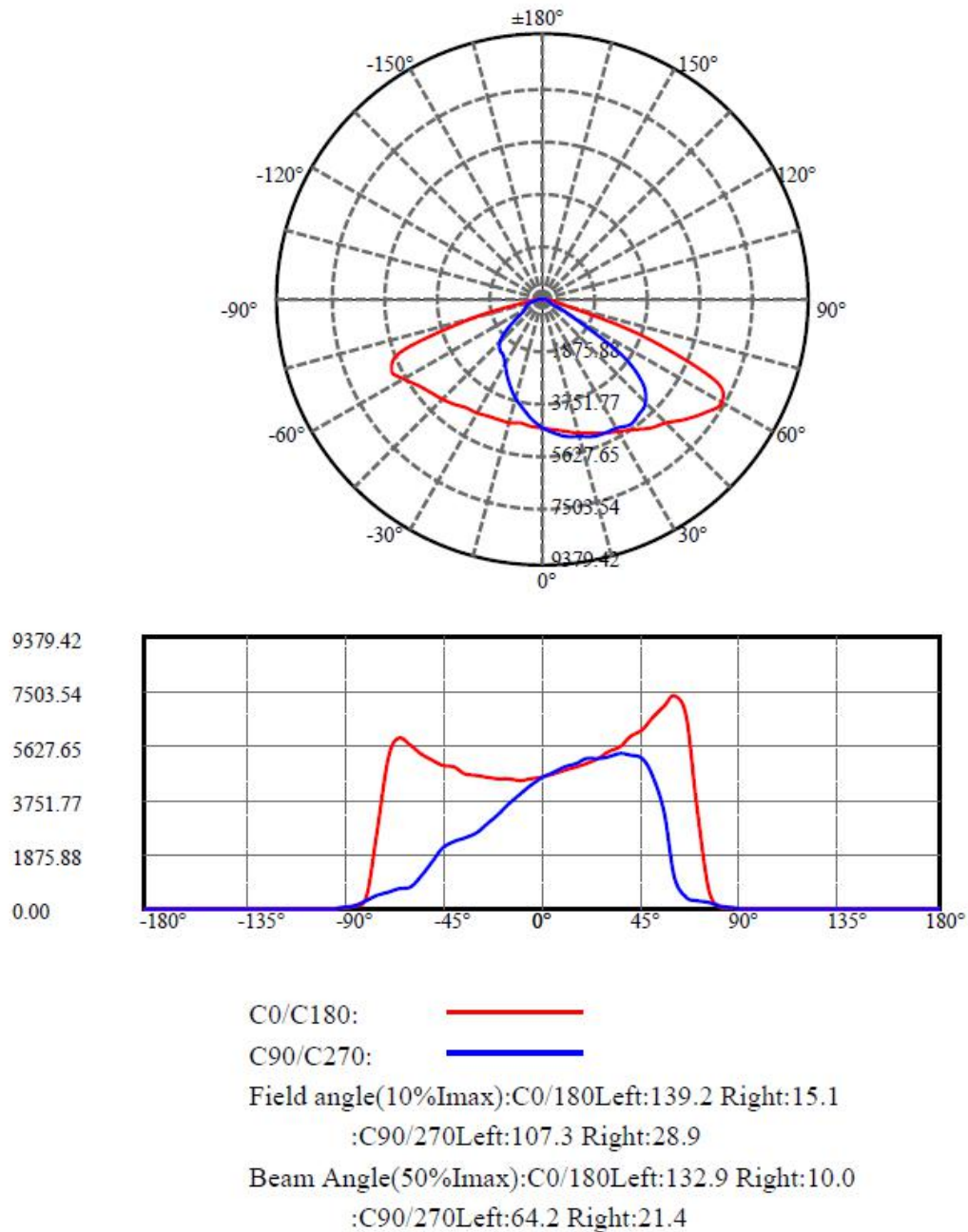
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	4521.809	.000	.000	.000%	.000%
5.0	4519.415	108.085	108.085	.621%	.621%
10.0	4511.363	323.059	431.145	1.856%	2.477%
15.0	4493.065	534.137	965.281	3.068%	5.545%
20.0	4477.717	739.319	1704.600	4.247%	9.792%
25.0	4460.346	937.438	2642.038	5.385%	15.177%
30.0	4461.842	1129.110	3771.148	6.486%	21.663%
35.0	4507.088	1320.738	5091.886	7.587%	29.249%
40.0	4573.354	1515.003	6606.889	8.703%	37.952%
45.0	4588.601	1696.410	8303.299	9.745%	47.697%
50.0	4533.694	1843.293	10146.590	10.588%	58.285%
55.0	4268.704	1913.934	12060.530	10.994%	69.279%
60.0	3597.257	1818.194	13878.720	10.444%	79.723%
65.0	2740.196	1540.647	15419.370	8.850%	88.573%
70.0	1552.335	1086.896	16506.260	6.243%	94.817%
75.0	539.800	546.850	17053.110	3.141%	97.958%
80.0	226.443	205.025	17258.140	1.178%	99.136%
85.0	95.821	87.567	17345.710	.503%	99.639%
90.0	14.735	30.271	17375.980	.174%	99.813%
95.0	2.537	4.729	17380.710	.027%	99.840%
100.0	2.622	1.402	17382.110	.008%	99.848%
105.0	3.007	1.506	17383.610	.009%	99.857%
110.0	3.734	1.762	17385.380	.010%	99.867%
115.0	4.375	2.053	17387.430	.012%	99.878%
120.0	4.988	2.276	17389.700	.013%	99.892%
125.0	5.515	2.428	17392.130	.014%	99.905%
130.0	5.999	2.504	17394.630	.014%	99.920%
135.0	6.185	2.462	17397.100	.014%	99.934%
140.0	6.313	2.314	17399.410	.013%	99.947%
145.0	6.313	2.106	17401.520	.012%	99.959%
150.0	6.356	1.865	17403.380	.011%	99.970%
155.0	6.398	1.614	17405.000	.009%	99.979%
160.0	6.227	1.324	17406.320	.008%	99.987%
165.0	5.942	1.003	17407.320	.006%	99.993%
170.0	5.786	.696	17408.020	.004%	99.997%
175.0	5.857	.416	17408.440	.002%	99.999%
180.0	5.957	.141	17408.580	.001%	100.000%



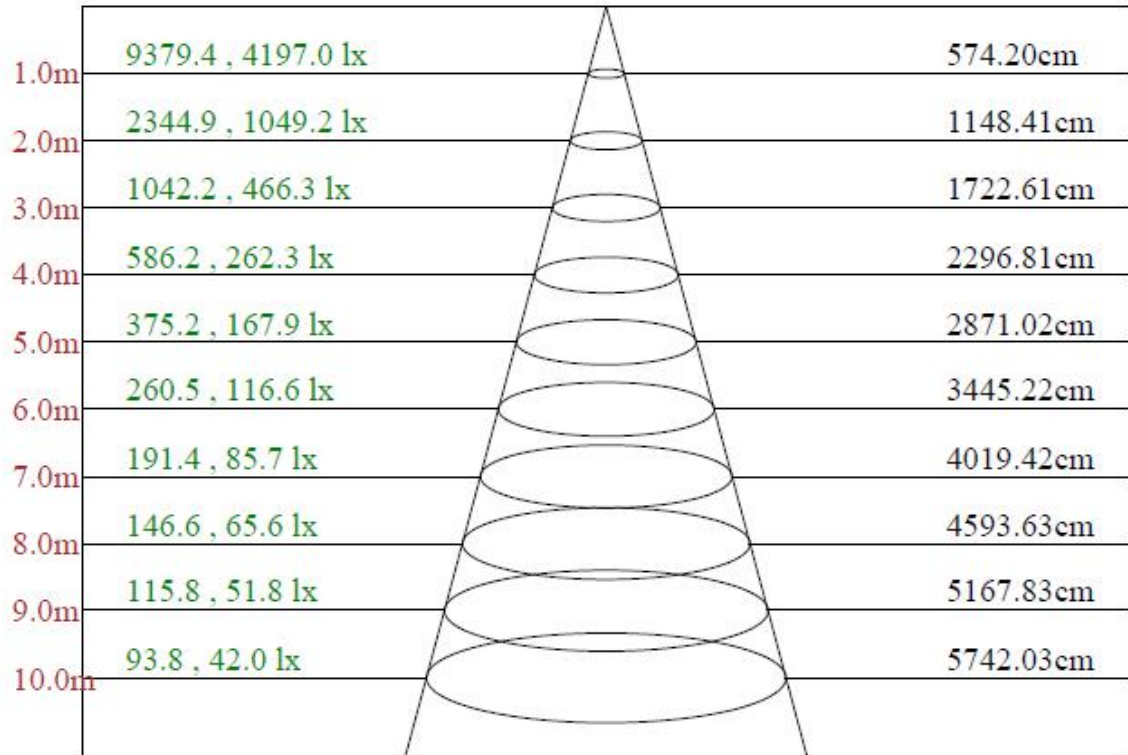
Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





Lux distance Curve



Max , Ave

Beam angle of C157.5plane140.45



**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	4531.93	4638.64	4759.71	4894.69	5019.64	5192.93	5394.49	5604.26	5948.78
22.5	4525.77	4713.20	4892.64	5094.20	5293.71	5505.53	5741.29	6126.17	6555.52
45.0	4503.65	4743.52	4953.06	5146.64	5348.20	5555.92	5777.55	6071.91	6249.30
67.5	4533.98	4757.66	4945.08	5112.44	5243.32	5390.61	5515.56	5636.41	5626.38
90.0	4546.06	4745.57	4896.74	5027.62	5162.83	5205.01	5261.56	5366.44	5324.03
112.5	4513.69	4695.18	4860.49	4969.25	5082.12	5194.98	5299.87	5404.75	5459.02
135.0	4519.84	4638.64	4813.98	4914.76	5082.12	5213.22	5384.46	5654.65	5815.85
157.5	4499.55	4546.06	4648.90	4771.79	4910.88	5049.97	5209.12	5438.95	5844.13
180.0	4531.93	4469.45	4453.26	4487.47	4511.63	4558.15	4624.50	4664.86	4872.57
202.5	4525.77	4372.55	4245.77	4138.84	4033.95	3937.28	3824.41	3731.61	3653.18
225.0	4503.65	4285.90	4070.21	3832.39	3598.68	3370.90	3165.24	2975.76	2832.80
247.5	4533.98	4253.76	3955.52	3634.94	3308.43	3012.01	2746.15	2540.49	2407.33
270.0	4546.06	4253.76	3951.41	3600.73	3272.17	2927.42	2637.16	2437.66	2324.79
292.5	4513.69	4308.25	4044.21	3749.85	3451.62	3161.36	2901.20	2695.76	2582.90
315.0	4519.84	4419.06	4237.57	4062.23	3888.94	3697.41	3526.18	3385.04	3262.14
337.5	4499.55	4469.45	4453.26	4451.21	4435.25	4392.84	4380.76	4378.70	4414.96
360.0	4531.93	4638.64	4759.71	4894.69	5019.64	5192.93	5394.49	5604.26	5948.78

C/ γ (°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	6170.64	6563.72	7009.03	7333.49	6634.18	3691.25	749.24	145.24	75.93
22.5	6988.96	7702.41	8573.18	9133.63	7859.73	2846.71	326.51	171.69	74.10
45.0	6462.94	6519.26	6055.72	3945.71	1449.92	359.12	251.95	151.17	48.34
67.5	5499.37	5062.05	3940.01	1676.56	420.91	310.55	228.24	148.21	59.97
90.0	5170.81	4596.45	3331.68	1081.00	388.76	302.34	218.43	118.57	39.67
112.5	5390.61	5039.93	4017.31	2005.12	468.33	306.45	219.57	136.12	57.92
135.0	6077.84	6317.70	6323.86	5455.14	2758.92	483.61	252.18	152.54	47.88
157.5	6083.99	6672.49	7627.85	8873.47	9379.42	6200.73	771.13	202.02	78.89
180.0	4965.15	5108.34	5354.36	5674.71	5886.31	5203.19	2530.46	407.68	121.76
202.5	3558.32	3477.84	3401.23	3106.87	2228.11	1038.81	401.07	243.74	123.13
225.0	2734.07	2582.90	2147.40	1365.32	725.07	529.90	417.49	274.98	114.46
247.5	2250.23	1873.33	1254.51	768.85	635.24	567.75	447.13	299.38	129.97
270.0	2113.20	1657.63	1095.36	780.93	673.31	596.93	463.32	292.08	143.65
292.5	2425.57	2036.59	1373.53	822.89	656.21	589.86	461.26	312.83	156.64
315.0	3187.58	3032.31	2566.71	1659.69	888.33	565.69	444.39	295.73	119.71
337.5	4338.35	4296.17	4227.53	3872.75	2790.39	1244.48	454.42	271.10	141.14
360.0	6170.64	6563.72	7009.03	7333.49	6634.18	3691.25	749.24	145.24	75.93

C/ γ (°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	2.28	2.28	2.28	2.74	3.19	3.88	4.33	4.79	5.24
22.5	2.96	2.51	2.28	2.28	2.96	3.19	3.19	3.88	4.33
45.0	2.74	2.05	1.82	2.05	2.28	2.74	2.96	2.96	3.42
67.5	2.05	1.82	1.82	1.82	2.05	2.28	2.74	2.74	3.42
90.0	1.37	1.82	1.37	1.82	2.05	2.28	2.51	2.96	3.42
112.5	1.60	1.60	1.60	2.05	2.28	2.74	3.19	3.88	4.33
135.0	1.82	1.60	2.28	2.28	3.42	4.10	5.02	5.47	5.70
157.5	2.96	2.96	2.96	4.10	5.47	6.61	7.52	7.75	7.75
180.0	47.20	3.65	3.88	4.10	4.79	5.47	5.93	6.61	6.84
202.5	23.03	3.42	4.10	5.02	6.16	7.30	7.75	8.21	8.66
225.0	19.84	2.74	2.96	4.10	5.70	7.30	8.21	8.66	8.89
247.5	21.43	2.28	2.51	2.74	3.65	4.56	5.93	7.07	7.52
270.0	31.69	2.28	2.51	2.28	3.19	3.65	4.33	5.24	5.93
292.5	22.12	2.28	2.28	2.74	2.96	3.65	4.33	5.02	5.70
315.0	24.85	3.19	2.96	3.42	4.10	4.56	5.24	5.47	6.61
337.5	27.82	4.10	4.33	4.56	5.47	5.70	6.61	7.52	8.21
360.0	2.28	2.28	2.28	2.74	3.19	3.88	4.33	4.79	5.24



C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	4.79	4.79	4.33	4.33	4.56	4.56	4.10	3.88	4.10
22.5	4.56	4.56	5.02	5.24	5.24	5.47	5.24	5.24	5.70
45.0	3.88	4.10	4.56	4.79	4.79	5.02	5.24	5.47	5.70
67.5	3.42	4.10	4.10	4.56	4.79	5.02	5.24	5.47	5.70
90.0	3.65	4.10	4.56	4.79	5.24	5.24	5.47	5.70	5.93
112.5	4.56	4.79	5.24	5.70	5.70	5.70	5.93	5.70	6.16
135.0	5.93	6.16	6.16	6.38	6.38	6.38	6.16	5.93	6.16
157.5	7.52	7.52	7.52	7.07	7.07	6.84	6.38	6.16	6.38
180.0	6.61	6.84	6.61	6.16	6.38	5.93	5.70	5.47	5.24
202.5	8.44	7.98	7.75	7.30	7.30	6.61	5.93	5.70	5.70
225.0	8.66	8.21	7.75	7.75	7.52	6.84	6.38	6.16	5.70
247.5	7.98	7.75	7.52	7.75	7.52	7.30	6.61	6.16	5.93
270.0	6.84	7.30	7.52	7.52	7.52	7.30	6.61	6.38	6.16
292.5	6.38	7.07	7.30	7.30	7.52	7.30	6.61	6.38	6.16
315.0	7.30	7.52	7.52	7.52	7.30	7.07	6.61	6.38	6.38
337.5	8.44	8.21	7.52	7.52	7.52	7.07	6.84	6.38	6.61
360.0	4.79	4.79	4.33	4.33	4.56	4.56	4.10	3.88	4.10

C/γ(°)	180.0
0.0	4.10
22.5	5.93
45.0	5.70
67.5	6.16
90.0	6.16
112.5	6.61
135.0	6.38
157.5	6.61
180.0	4.10
202.5	5.93
225.0	5.70
247.5	6.16
270.0	6.16
292.5	6.61
315.0	6.38
337.5	6.61
360.0	4.10





Photo Document



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