



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-L120-0100-DN-30-MLV2-XXNX / IK-SBSL-L120-0100-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.

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Project Engineer

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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.

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Shenzhen Belling Efficiency Testing Lab

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# 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>	Outdoor Pole/Arm-Mounted Area and Roadway Luminaires
<b>Model Number</b>	IK-SBSL-L120-0100-DN-30-MLV2-XXNX / IK-SBSL-L120-0100-DN-57-MLV2-XXNX
<b>Rated Inputs</b>	AC 277-480V 50/60Hz
<b>Rated Power</b>	100 W
<b>Nominal CCT</b>	3000K / 5700K
<b>Date of Receipt Samples</b>	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  $\pm 0.2$  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-SBSL-L120-0100-DN-30-MLV2-XXNX	276.96	60	0.379	104.46	0.995
IK-SBSL-L120-0100-DN-57-MLV2-XXNX	276.98	60	0.380	104.57	0.994

#### 3.1.2 Additional Test

Test Item	Model	Test Voltage (V)	Frequency (Hz)	Test Result
Power factor	IK-SBSL-L120-0100-DN-30-MLV2-XXNX	277	60	0.995
		480	60	0.928
	IK-SBSL-L120-0100-DN-57-MLV2-XXNX	277	60	0.994
		480	60	0.935
Total harmonic distortion	IK-SBSL-L120-0100-DN-30-MLV2-XXNX	277	60	11.7%
		480	60	16.0%
	IK-SBSL-L120-0100-DN-57-MLV2-XXNX	277	60	12.2%
		480	60	16.9%
Off state power (W)	IK-SBSL-L120-0100-DN-30-MLV2-XXNX	277	60	0
	IK-SBSL-L120-0100-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-L120-0100-DN-30-MLV2-XXNX	12065.548	115.504	2999	83.7	13
IK-SBSL-L120-0100-DN-57-MLV2-XXNX	12976.928	124.098	5480	85.0	19

#### 3.1.4 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
IK-SBSL-L120-0100-DN-30-MLV2-XXNX	-0.0011	0.4355	0.4009	0.2510	0.5199
IK-SBSL-L120-0100-DN-57-MLV2-XXNX	0.0024	0.3330	0.3462	0.2053	0.4802



## 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-L120-0100-DN-30-MLV2-XXNX	277.07	60	0.378	104.20	0.995

### 3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-90°(%lm)	Zonal Lumen in 80-90°(%lm)
12006.87	115.23	99.820	0.647



## 4 Test Data

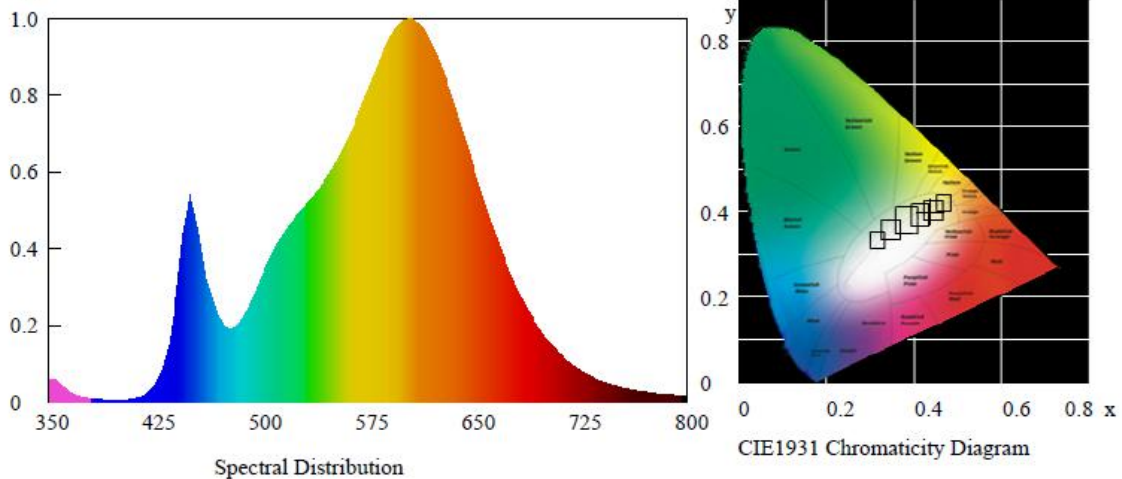
### IK-SBSL-L120-0100-DN-30-MLV2-XXNX

#### Test Condition

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

RH: 58%  
Scan Step: 5 nm

#### Spectroradiometric Parameters



Chromaticity Coordinates:  $x=0.4355$   $y=0.4009$   $u'=0.2510$   $v'=0.5199$

Correlated Color Temperature: 2999 K

Dominant Wavelength: 582.0 nm(E)

Luminous Flux: 12065.548 lm

Purity: 0.5114

Chromaticity Difference: -0.0011Duv

Peak Wavelength: 780.5 nm

Color Ratio:  $K_r=45.0\%$   $K_g=47.6\%$   $K_b=7.4\%$

Bandwidth: 606nm

Radiant Flux: 32.828 W

Rendering Index:  $R_a=83.7$

$R_1=82$   $R_2=92$   $R_3=97$   $R_4=82$   $R_5=83$   $R_6=90$   $R_7=83$   $R_8=61$

$R_9=13$   $R_{10}=81$   $R_{11}=82$   $R_{12}=74$   $R_{13}=85$   $R_{14}=99$   $R_{15}=75$

#### Electric Parameters

Voltage: 276.96 V

Current: 0.379 A

Power Factor: 0.995

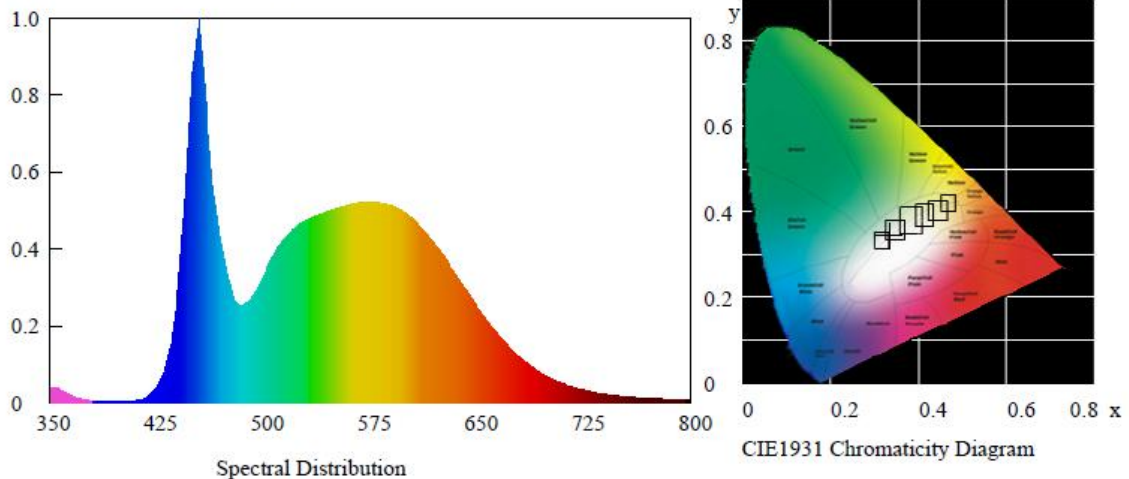
Power: 104.46 W

Luminous Efficacy: 115.504 lm/W

**IK-SBSL-L120-0100-DN-57-MLV2-XXNX****Test Condition**

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

RH: 58%  
Scan Step: 5 nm

**Spectroradiometric Parameters**

Chromaticity Coordinates:  $x=0.3330$   $y=0.3462$   $u'=0.2053$   $v'=0.4802$

Correlated Color Temperature: 5480 K

Dominant Wavelength: 553.0 nm(E)

Luminous Flux: 12976.928 lm

Purity: 0.0380

Chromaticity Difference: 0.0024Duv

Peak Wavelength: 448.0 nm

Color Ratio:  $K_r=32.6\%$   $K_g=55.3\%$   $K_b=12.1\%$

Bandwidth: -443.9nm

Radiant Flux: 39.274 W

Rendering Index:  $R_a=85.0$

$R_1=84$   $R_2=91$   $R_3=94$   $R_4=83$   $R_5=83$   $R_6=85$   $R_7=88$   $R_8=71$

$R_9=19$   $R_{10}=77$   $R_{11}=82$   $R_{12}=59$   $R_{13}=87$   $R_{14}=97$   $R_{15}=80$

**Electric Parameters**

Voltage: 276.98 V

Current: 0.380 A

Power Factor: 0.994

Power: 104.57 W

Luminous Efficacy: 124.098 lm/W



**Zonal Flux Diagram**

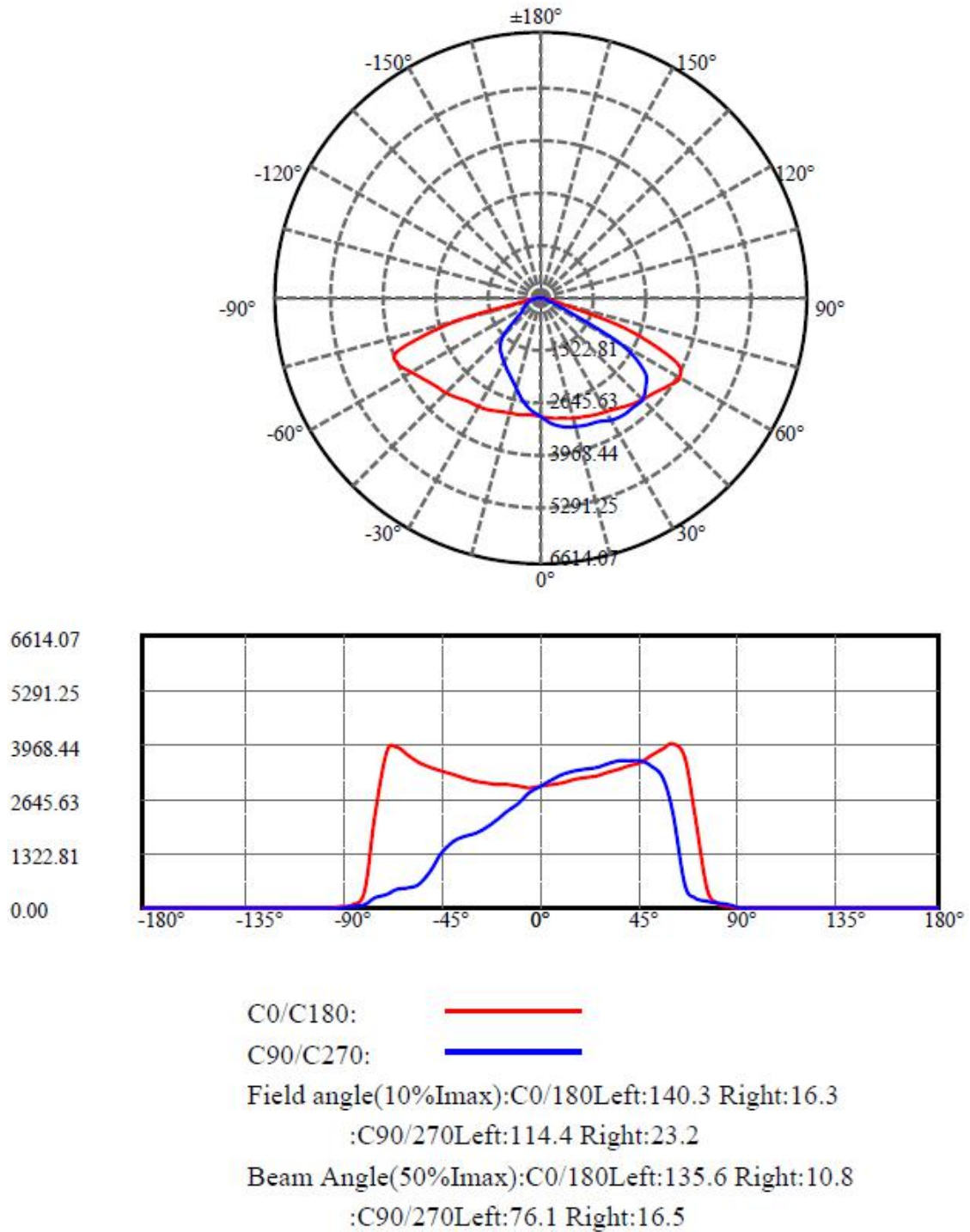
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	2951.441	.000	.000	.000%	.000%
5.0	2946.772	70.511	70.511	.587%	.587%
10.0	2942.443	210.676	281.187	1.755%	2.342%
15.0	2931.814	348.457	629.644	2.902%	5.244%
20.0	2918.873	482.179	1111.823	4.016%	9.260%
25.0	2907.396	611.068	1722.891	5.089%	14.349%
30.0	2911.863	736.432	2459.323	6.133%	20.483%
35.0	2935.557	861.074	3320.397	7.172%	27.654%
40.0	2975.227	986.170	4306.566	8.213%	35.868%
45.0	2981.820	1102.995	5409.562	9.186%	45.054%
50.0	2941.088	1196.810	6606.372	9.968%	55.022%
55.0	2867.295	1262.936	7869.308	10.518%	65.540%
60.0	2694.813	1285.666	9154.974	10.708%	76.248%
65.0	2197.259	1189.272	10344.250	9.905%	86.153%
70.0	1369.067	903.017	11247.260	7.521%	93.674%
75.0	491.578	486.343	11733.600	4.051%	97.724%
80.0	158.539	173.953	11907.560	1.449%	99.173%
85.0	58.819	59.061	11966.620	.492%	99.665%
90.0	9.397	18.678	11985.300	.156%	99.820%
95.0	1.679	3.033	11988.330	.025%	99.846%
100.0	1.756	.933	11989.260	.008%	99.853%
105.0	2.110	1.035	11990.300	.009%	99.862%
110.0	2.526	1.212	11991.510	.010%	99.872%
115.0	2.942	1.385	11992.890	.012%	99.884%
120.0	3.374	1.535	11994.430	.013%	99.896%
125.0	3.774	1.652	11996.080	.014%	99.910%
130.0	3.975	1.685	11997.770	.014%	99.924%
135.0	4.067	1.625	11999.390	.014%	99.938%
140.0	4.113	1.515	12000.910	.013%	99.950%
145.0	4.098	1.370	12002.280	.011%	99.962%
150.0	4.129	1.211	12003.490	.010%	99.972%
155.0	4.129	1.045	12004.530	.009%	99.981%
160.0	4.021	.855	12005.390	.007%	99.988%
165.0	3.867	.650	12006.040	.005%	99.993%
170.0	3.851	.458	12006.500	.004%	99.997%
175.0	3.790	.273	12006.770	.002%	99.999%
180.0	3.913	.092	12006.860	.001%	100.000%



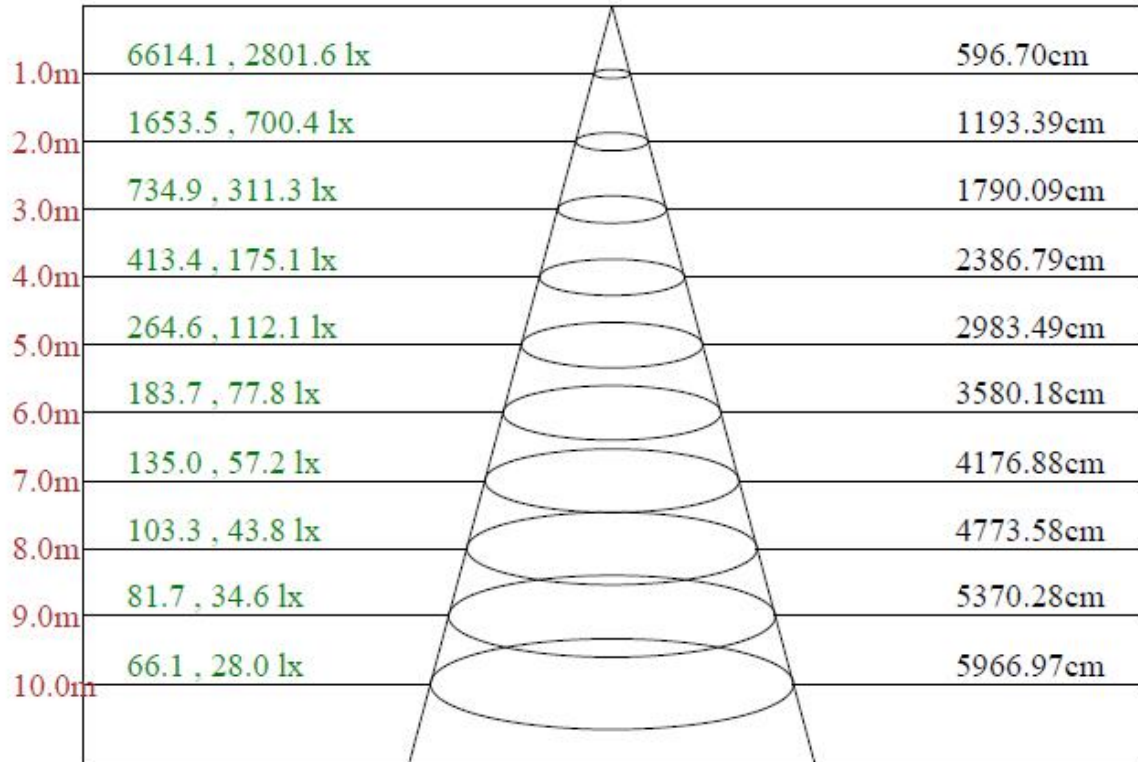
## Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





## Lux distance Curve



Max , Ave

Beam angle of C157.5plane139.24

draft



**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	2957.14	2983.02	3049.08	3107.50	3154.58	3210.78	3282.26	3359.91	3457.52
22.5	2940.38	3042.67	3153.84	3284.48	3397.87	3517.66	3646.33	3816.16	4071.28
45.0	2964.29	3077.67	3219.16	3360.89	3469.84	3578.79	3681.08	3829.22	4012.36
67.5	2953.94	3113.17	3246.52	3342.90	3430.16	3523.82	3618.47	3699.57	3779.19
90.0	2961.58	3108.73	3241.84	3322.93	3364.34	3402.30	3497.69	3563.51	3565.48
112.5	2951.47	3091.48	3200.43	3291.63	3361.63	3423.99	3480.93	3545.51	3617.24
135.0	2949.01	3055.74	3175.53	3258.35	3376.17	3452.34	3546.01	3652.74	3818.38
157.5	2933.72	2997.07	3088.52	3190.81	3299.76	3384.80	3487.34	3611.33	3807.53
180.0	2957.14	2927.07	2957.63	2980.31	3015.56	3057.46	3101.34	3154.33	3234.20
202.5	2940.38	2859.78	2798.65	2748.61	2700.54	2643.85	2585.19	2547.97	2517.65
225.0	2964.29	2805.30	2670.23	2532.93	2395.64	2288.91	2177.74	2081.85	2014.32
247.5	2953.94	2784.35	2583.46	2390.71	2208.80	2046.61	1913.50	1815.89	1707.68
270.0	2961.58	2796.92	2565.22	2339.19	2130.41	1948.50	1813.67	1723.95	1591.59
292.5	2951.47	2788.05	2597.02	2404.51	2213.48	2038.23	1905.86	1823.53	1719.76
315.0	2949.01	2831.43	2700.54	2554.62	2439.02	2303.94	2199.68	2121.29	2078.16
337.5	2933.72	2885.91	2831.43	2798.65	2744.17	2696.35	2652.73	2622.16	2611.32
360.0	2957.14	2983.02	3049.08	3107.50	3154.58	3210.78	3282.26	3359.91	3457.52

C/ $\gamma(^{\circ})$	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	3552.17	3682.07	3845.24	3976.38	3662.10	2257.11	495.94	106.24	51.52
22.5	4286.95	4681.34	5286.96	6030.13	6496.49	4322.70	793.70	151.59	64.58
45.0	4247.76	4485.13	4746.66	4668.27	3447.41	905.85	192.26	128.42	56.94
67.5	3825.53	3764.40	3494.49	2825.52	1054.98	236.63	178.95	121.77	78.88
90.0	3588.40	3433.11	3159.26	2297.78	591.33	228.99	177.97	124.97	69.26
112.5	3677.63	3647.31	3389.73	2752.31	1124.73	239.10	176.73	120.78	75.43
135.0	3977.61	4204.13	4435.09	4345.37	3489.07	1089.73	197.69	126.20	54.97
157.5	3960.11	4251.95	4803.35	5639.94	6614.07	6058.48	1693.88	254.38	71.24
180.0	3314.06	3397.13	3541.82	3716.82	3919.44	3771.54	2215.21	419.77	87.26
202.5	2476.24	2432.61	2365.07	2084.07	1423.73	585.66	249.94	148.39	66.31
225.0	1935.69	1752.79	1321.43	716.30	423.47	335.72	246.98	143.95	38.70
247.5	1500.39	1092.94	634.47	465.37	424.70	345.58	245.50	137.30	35.99
270.0	1310.09	888.84	581.47	482.13	436.53	347.55	236.38	95.15	37.47
292.5	1490.53	1054.98	619.18	476.96	436.53	353.22	251.42	141.49	37.47
315.0	1989.67	1742.68	1235.16	658.13	429.63	351.00	261.53	153.56	38.45
337.5	2576.31	2546.00	2417.33	1981.53	1181.92	476.22	251.17	162.68	76.66
360.0	3552.17	3682.07	3845.24	3976.38	3662.10	2257.11	495.94	106.24	51.52

C/ $\gamma(^{\circ})$	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	0.99	1.23	1.48	1.97	2.47	2.47	2.96	3.20	3.20
22.5	4.44	1.48	1.23	1.23	1.73	1.73	1.97	2.47	2.47
45.0	11.59	1.73	1.48	1.73	1.97	1.97	2.47	2.47	2.47
67.5	19.23	0.99	0.99	0.99	0.99	1.23	1.23	1.48	1.97
90.0	13.56	0.74	0.49	0.74	0.74	1.23	1.23	1.48	1.97
112.5	17.75	0.49	0.49	0.74	0.99	1.23	1.48	2.22	2.47
135.0	10.35	0.49	0.74	0.74	1.23	2.22	2.47	2.71	3.45
157.5	5.92	2.47	2.47	2.96	3.70	4.19	4.68	4.93	4.93
180.0	43.38	2.22	1.97	2.47	2.47	2.71	2.96	3.45	3.70
202.5	5.67	2.96	3.45	4.19	4.44	4.93	5.42	5.92	5.92
225.0	2.22	2.47	3.20	4.19	5.18	6.16	6.16	6.41	6.41
247.5	1.48	1.73	1.73	2.22	3.20	4.19	5.18	5.42	5.42
270.0	0.99	0.99	1.23	1.48	2.22	2.71	3.45	3.94	4.44
292.5	1.23	0.99	1.23	1.48	1.97	2.47	2.96	3.70	4.19
315.0	2.47	2.47	2.22	2.47	2.71	2.96	3.70	4.44	4.44
337.5	9.12	3.45	3.70	4.19	4.44	4.68	5.67	6.16	6.16
360.0	0.99	1.23	1.48	1.97	2.47	2.47	2.96	3.20	3.20



C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	3.45	3.45	2.96	2.96	2.96	2.71	2.71	2.71	2.71
22.5	2.96	2.71	2.96	3.70	3.94	3.94	3.70	3.94	3.94
45.0	2.71	2.96	3.20	3.70	3.70	3.94	3.94	3.94	4.19
67.5	2.47	2.47	2.71	3.20	2.96	3.45	2.96	3.45	3.45
90.0	1.97	2.47	2.47	2.71	3.20	3.20	3.20	3.45	3.45
112.5	2.47	2.71	2.96	2.96	3.20	3.45	3.45	3.45	3.45
135.0	3.20	3.20	3.70	3.70	3.94	3.70	3.70	3.94	3.70
157.5	4.68	5.18	4.93	4.68	4.68	4.44	4.44	4.19	4.44
180.0	3.94	3.94	3.94	3.70	3.70	3.45	3.20	3.20	3.20
202.5	5.67	5.18	5.42	4.93	4.93	4.68	4.44	4.44	3.94
225.0	6.16	6.16	5.67	5.42	5.42	4.68	4.68	4.44	4.19
247.5	5.67	5.42	5.18	5.18	4.68	4.44	4.44	3.94	3.94
270.0	4.68	4.93	4.68	4.68	4.44	4.44	4.19	3.94	3.70
292.5	4.44	4.44	4.44	4.68	4.44	4.44	4.19	3.94	3.94
315.0	4.44	4.93	4.68	4.44	4.44	4.44	3.94	3.94	3.94
337.5	6.16	5.67	5.67	5.42	5.42	4.93	4.68	4.68	4.44
360.0	3.45	3.45	2.96	2.96	2.96	2.71	2.71	2.71	2.71

C/γ(°)	180.0
0.0	2.96
22.5	4.19
45.0	4.44
67.5	3.70
90.0	3.70
112.5	3.94
135.0	3.70
157.5	4.68
180.0	2.96
202.5	4.19
225.0	4.44
247.5	3.70
270.0	3.70
292.5	3.94
315.0	3.70
337.5	4.68
360.0	2.96





## Photo Document



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