



Shenzhen Belling Efficiency Testing Lab Co., Ltd



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Total pages 12

Test report of

IES LM-79-08

Approved Method: Electrical and Photometric

Measurements of Solid-State Lighting Products

Applicant:

AFX Inc.

Address:

2345N.Ernie Krueger Circle Waukegan, IL 60087 ,USA

For Product:

LED Downlight

Model No.:

SLMF04L30D1WH

Test laboratory: Shenzhen Belling Efficiency Testing Lab Co., Ltd, 1Floor, No.1 Building, Meibaohe Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong Prov.518101 China.

Complied by: Jarvis zhang

Review by: Jason zhou

Project Engineer

Technical Manager

Note: The test data was only valid for the test sample(s). 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 Co., Ltd. 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	AFX Inc.
Manufacturer Address	2345N.Ernie Krueger Circle Waukegan, IL 60087 ,USA
Brand Name	AFX
Luminaire Type	LED Downlight
Model Number	SLMF04L30D1WH
Rated Inputs	AC 120V 60Hz
Rated Power	10 W
Nominal CCT	3000K
Date of Receipt Samples	2020-05-08
Date of test	2020-05-08 to 2020-05-11
Burning Time Before Test	0hour(For New Products)

1.2 Standards or methods

- ANSI C78.377-2017:Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-10:2014:Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment - Solid State
- 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	2021-04-02
AC Power Source	ALL POWER	APW-110N	992257	2021-04-02
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S1510065	2021-04-08
Total Spectral Radiant Flux Standard Lamp	SENSING	12V/20W	LSD12201731	2021-04-08
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2021-04-02
Thermostatic stabilized photometric sphere	SENSING	SPR-600M	N.A	2021-04-02
Digital Power Meter	YOKOGAWA	WT210	91L929742	2021-04-02
Spectral radiometer	SENSING	SPR-3000	S1101108	2021-04-02
Environment Measurer	XUYAO	HS-1	N/A	2021-04-08
Environment Measurer	XUYAO	HS-1	N/A	2021-04-08
Stop watch	KISLO	K610	N/A	2020-05-12
Digital Anemometer	TECMAN	TD8901	026141	2020-09-10

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab Co., Ltd 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.

Integrating Sphere Uncertainty: The uncertainty of the light output (luminous flux) measurements is $U=1.8\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=20\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=1.8$ ($K=2$), at the 95% confidence level. The uncertainty of power meter AC current $U=0.18\%$ of rdg, AC Voltage $U=0.16\%$ of rdg, Power $U=0.20\%$ ($K=2$), at the 95% confidence level.



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.

Goniophotometer Uncertainty :The uncertainty of the luminous intensity is $U=1.6\%$ ($K=2$), at the 95% confidence level.



3 Test Result Summary

3.1 Integrating Sphere System (Total operating time for integrating sphere test: 1.0 hour)

3.1.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
SLMF04L30D1WH	120.11	60	0.082	9.81	0.996

3.1.2 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
SLMF04L30D1WH	602.13	61.4	3002	94.0	70

3.1.3 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
SLMF04L30D1WH	+0.0033	0.4417	0.4141	0.2493	0.5260

3.2 Goniophotometer System (Total operating time for luminous intensity distribution: 1.0 hour)

3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
SLMF04L30D1WH	120.06	60	0.0820	9.77	0.9960

3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-60°(%lm)
587.52	60.11	75.08



4 Test Data

SLMF04L30D1WH

Test Condition

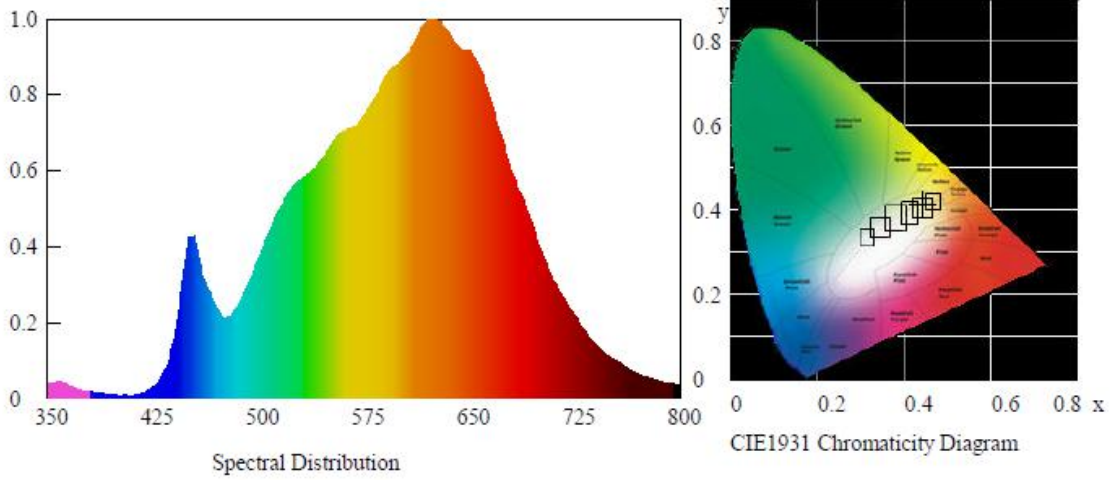
Temperature: °C

RH: %

Spectrum Range: 350-800 nm

Scan Step: 5 nm

Spectroradiometric Parameters

Chromaticity Coordinates: $x=0.4417$ $y=0.4141$ $u'=0.2493$ $v'=0.526$

Correlated Color Temperature: 3002 K

Dominant Wavelength: 580.0 nm(E)

Colour Fidelity Index: $R_f=92$ Gamut Index: $R_g=98$

Luminous Flux: 602.13 lm

Purity: 0.5711

Chromaticity Difference: $+0.0033$ Duv

Peak Wavelength: 625.0 nm

Color Ratio: $K_r=43.2\%$ $K_g=48.8\%$ $K_b=8.0\%$

Bandwidth: 178.3nm

Radiant Flux: 2.257 W

Rendering Index: $R_a=94.0$

R1=94 R2=95 R3=96 R4=95 R5=93 R6=94 R7=96 R8=88

R9=70 R10=88 R11=96 R12=78 R13=95 R14=97 R15=91 $R_e=91$

Electric Parameters

Voltage: 120.11 V

Current: 0.082 A

Power Factor: 0.996

Power: 9.81 W

Luminous Efficacy: 61.4 lm/W



Zonal Flux Diagram

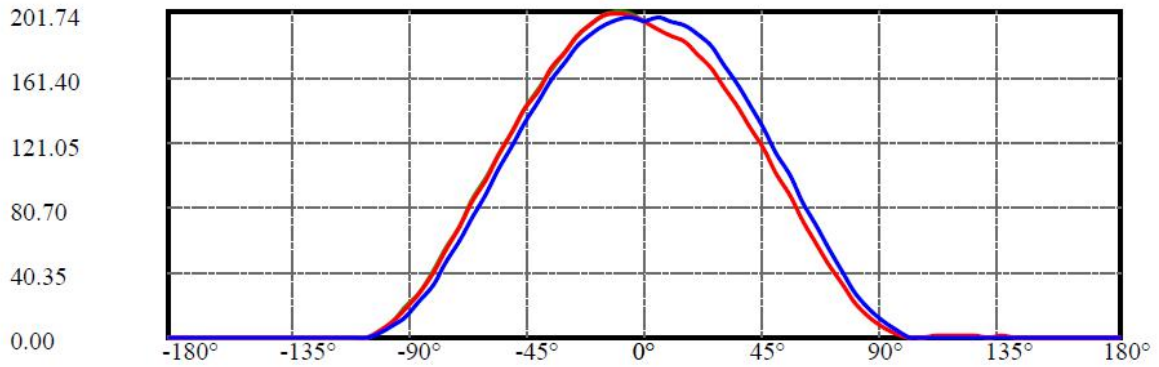
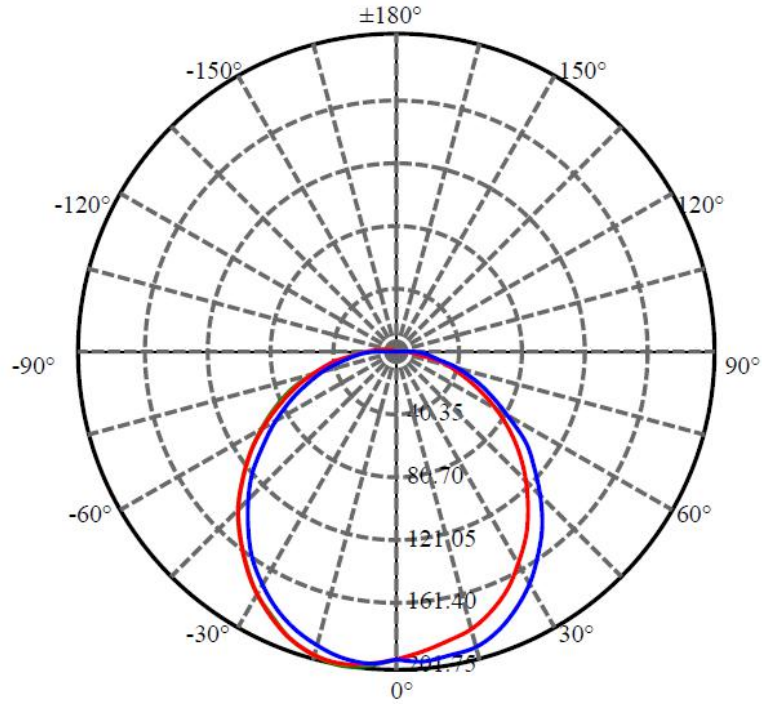
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	195.808	0.000	0	0.00%	0.00%
5.0	195.843	4.682	4.682	0.80%	0.80%
10.0	194.475	13.963	18.645	2.37%	3.17%
15.0	191.363	22.888	41.533	3.89%	7.07%
20.0	185.649	31.071	72.604	5.28%	12.36%
25.0	177.332	38.070	110.674	6.47%	18.84%
30.0	167.111	43.589	154.263	7.41%	26.26%
35.0	155.548	47.514	201.777	8.08%	34.34%
40.0	142.831	49.782	251.559	8.47%	42.82%
45.0	129.283	50.384	301.943	8.57%	51.39%
50.0	114.796	49.320	351.263	8.39%	59.79%
55.0	100.604	46.835	398.098	7.97%	67.76%
60.0	85.447	43.005	441.103	7.31%	75.08%
65.0	70.852	37.997	479.1	6.46%	81.55%
70.0	56.794	32.321	511.421	5.50%	87.05%
75.0	42.871	26.051	537.472	4.43%	91.48%
80.0	30.262	19.568	557.04	3.33%	94.81%
85.0	19.826	13.610	570.65	2.31%	97.13%
90.0	11.831	8.668	579.318	1.47%	98.60%
95.0	5.822	4.833	584.151	0.82%	99.43%
100.0	1.663	2.034	586.185	0.35%	99.77%
105.0	0.134	0.481	586.666	0.08%	99.86%
110.0	0.268	0.105	586.771	0.02%	99.87%
115.0	0.269	0.136	586.907	0.02%	99.90%
120.0	0.268	0.131	587.038	0.02%	99.92%
125.0	0.268	0.124	587.162	0.02%	99.94%
130.0	0.242	0.111	587.273	0.02%	99.96%
135.0	0.134	0.076	587.349	0.01%	99.97%
140.0	0.081	0.040	587.388	0.01%	99.98%
145.0	0.107	0.031	587.42	0.01%	99.98%
150.0	0.134	0.036	587.455	0.01%	99.99%
155.0	0.081	0.027	587.482	0.00%	99.99%
160.0	0.027	0.011	587.494	0.00%	100.00%
165.0	0.081	0.009	587.503	0.00%	100.00%
170.0	0.054	0.008	587.51	0.00%	100.00%
175.0	0.054	0.004	587.514	0.00%	100.00%
180.0	0.095	0.002	587.516	0.00%	100.00%



Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]



C225(Max): 

C0/C180: 

C90/C270: 

Field angle(10%Imax):C0/180Left:88.7 Right:80.4

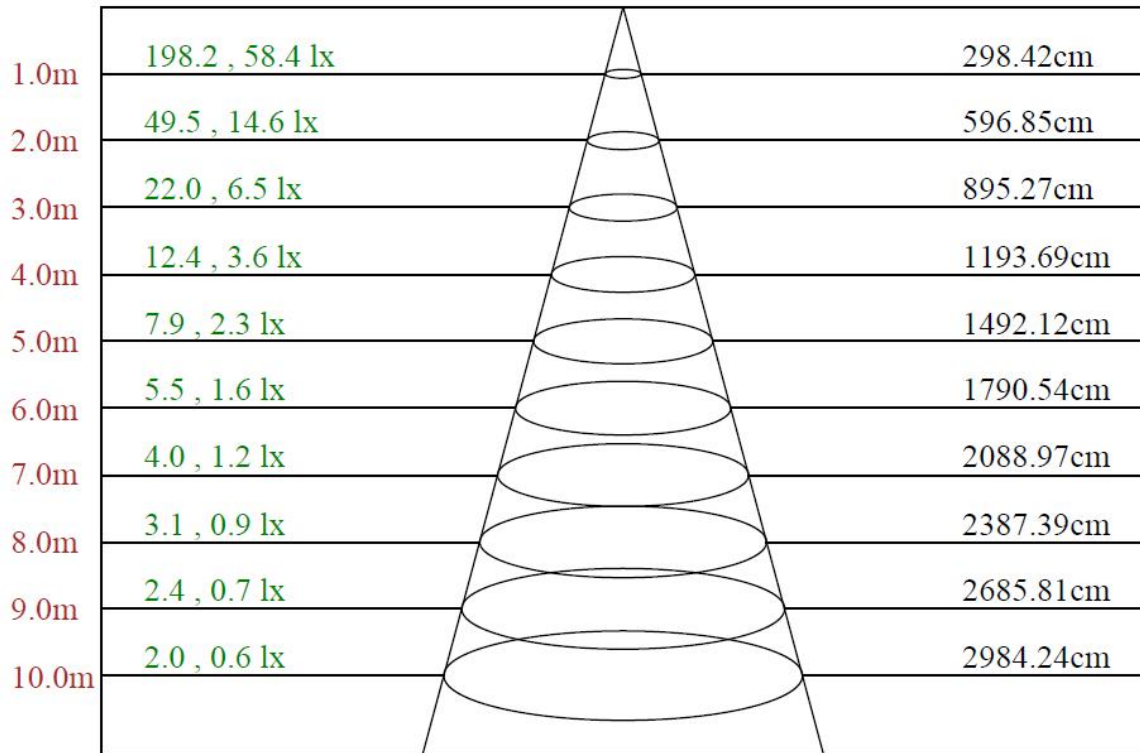
:C90/270Left:86.3 Right:84.0

Beam Angle(50%Imax):C0/180Left:59.2 Right:50.5

:C90/270Left:56.7 Right:55.3



Lux distance Curve



Max , Ave

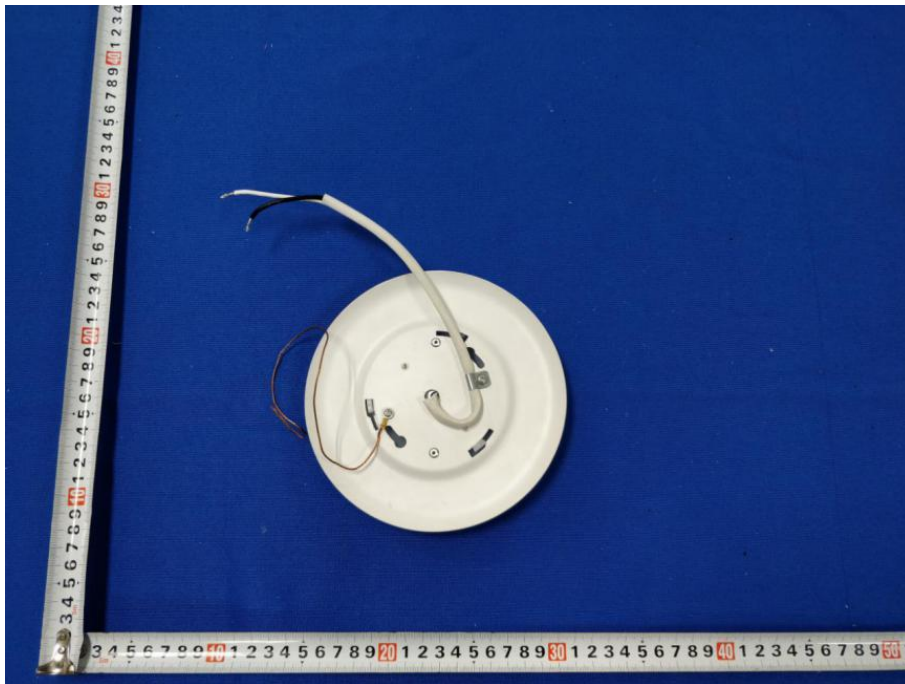
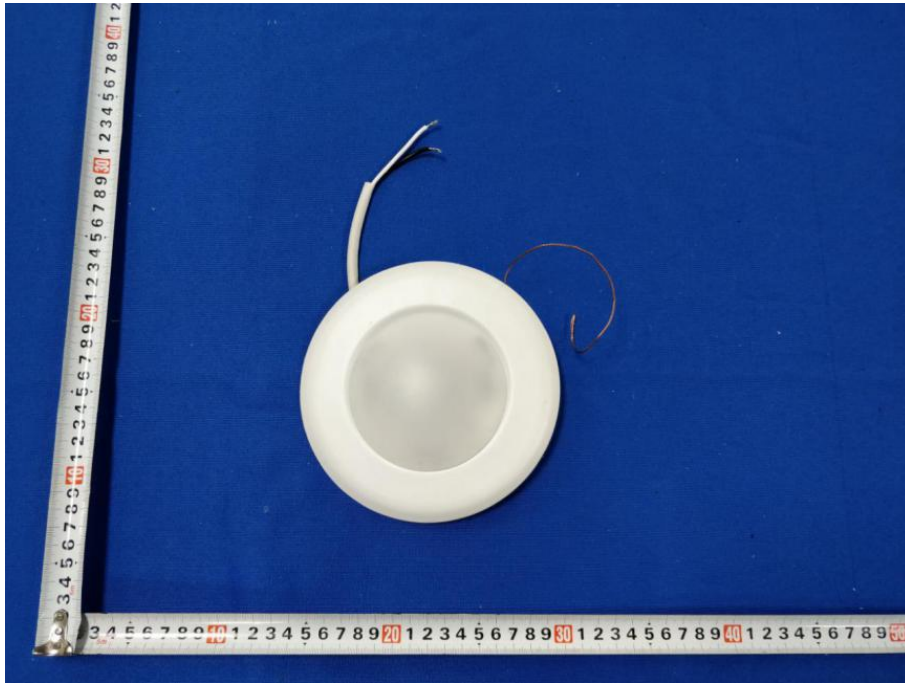
Beam angle of C225 plane 112.34

**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	195.81	190.59	187.15	182.43	175.35	166.55	155.17	142.94	130.06
45.0	195.81	191.44	186.29	180.50	174.27	165.26	154.53	142.30	129.42
90.0	195.81	197.88	195.74	193.59	188.44	180.07	169.34	156.89	143.58
135.0	195.81	195.95	197.02	195.74	191.23	183.07	172.99	161.83	148.95
180.0	195.81	198.74	200.67	199.17	194.02	186.51	176.85	166.33	153.24
225.0	195.81	200.46	201.75	199.81	194.02	186.29	177.06	165.26	153.67
270.0	195.81	198.10	196.59	193.16	187.80	179.85	169.98	159.46	146.80
315.0	195.81	193.59	190.59	186.51	180.07	171.05	160.97	149.38	136.93
360.0	195.81	190.59	187.15	182.43	175.35	166.55	155.17	142.94	130.06
C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	116.76	101.95	87.14	72.11	57.52	44.64	31.98	20.82	12.23
45.0	116.33	98.30	86.49	70.83	56.88	43.57	30.91	20.39	12.23
90.0	128.77	113.97	100.01	83.70	68.68	54.51	39.71	27.47	17.81
135.0	133.71	121.05	106.88	91.64	76.41	62.03	47.43	33.91	22.54
180.0	141.01	127.92	112.46	98.08	83.92	68.89	54.09	39.92	27.47
225.0	141.87	127.49	113.11	99.37	84.78	69.11	54.94	40.78	28.12
270.0	133.28	119.12	104.31	88.85	74.26	60.52	46.36	33.05	22.11
315.0	122.55	108.60	94.43	78.98	64.39	51.08	37.56	25.76	16.10
360.0	116.76	101.95	87.14	72.11	57.52	44.64	31.98	20.82	12.23
C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	6.22	1.93	0.43	0.43	1.07	1.29	1.29	0.86	0.43
45.0	6.22	1.93	0.22	0.43	0.64	0.22	0.64	0.64	0.64
90.0	10.09	4.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135.0	13.95	7.51	2.15	0.00	0.00	0.00	0.00	0.00	0.00
180.0	17.38	9.66	3.86	0.00	0.00	0.22	0.00	0.00	0.22
225.0	18.46	10.30	4.08	0.22	0.00	0.00	0.00	0.00	0.00
270.0	13.09	7.08	2.36	0.00	0.22	0.22	0.00	0.43	0.43
315.0	9.23	3.65	0.22	0.00	0.22	0.22	0.22	0.22	0.22
360.0	6.22	1.93	0.43	0.43	1.07	1.29	1.29	0.86	0.43
C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	0.64	0.22	0.22	0.22	0.00	0.00	0.00	0.00	0.00
45.0	0.00	0.00	0.00	0.22	0.00	0.00	0.22	0.00	0.00
90.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
225.0	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00
270.0	0.43	0.43	0.43	0.43	0.43	0.22	0.43	0.43	0.43
315.0	0.00	0.00	0.22	0.00	0.22	0.00	0.00	0.00	0.00
360.0	0.64	0.22	0.22	0.22	0.00	0.00	0.00	0.00	0.00
C/γ(°)	180.0								
0.0	0.10								
45.0	0.10								
90.0	0.10								
135.0	0.10								
180.0	0.10								
225.0	0.10								
270.0	0.10								
315.0	0.10								
360.0	0.10								



Photo Document



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