

IESNA LM-79: 2008

Measurement and Test Report

for

Green Creative Ltd.

Room 1206-7, New Victory House, 93-103 Wing Lok Street, Central, HONG KONG

Nov 20, 2013

Product Name:	LED PAR38
Model No:	16PAR38G3DIM/827FL40
Test Engineer:	David Zhang 
Report No.:	BTR66.181.13.1493.33
Sample Received Date:	Nov 18, 2013
Test Performed Date:	Nov 18, 2013 to Nov 20, 2013
Reviewed By:	Steven Hsu 
Prepared By:	BEST Test Service Shenzhen Co., Ltd. 1st Floor, 1st Building, Weitai Industrial Park, Yingrenshi, Shiyan, Baoan, Shenzhen, China TEL: +86-755-28236006 FAX: +86-755-23467087-811 Email: certification@bestcert.cn



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1 - GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

Applicant : Green Creative Ltd.
 Product Name : LED PAR38
 Model No : 16PAR38G3DIM/827FL40
 Brand : GREEN CREATIVE
 SKU : T.B.D
 12 NC Code : T.B.D
 Nominal Operation Voltage : AC 120V/60Hz
 Nominal Power : 16W
 Nominal CCT : 2700K
 Nominal CRI : 82
 Nominal Lumen Output : 950Lumens
 Nominal Life Time : 40000Hours
 Number of hours operated prior to measurement for new sample : 0 Hours
 Stabilization Time : 1.5 hours
 Total operating time for measurement include stabilization time : 3.5 hours
 Standard Non Standard
 Nominal Shape of Bulb(Designation) : Omnidirectional A, BT, P, PS, S, T
 Decorative B, BA, C, CA, DC, F, G
 Directional R, BR, ER, PAR, MR, K
 Date of Receiving Sample : Nov 18, 2013
 Measurement quantities measured : 1 pcs
 Orientation During Testing : Base up
 Test Requested : Electrical and Photometric Test
 Luminous Intensity Distribution Test

1.2 Objective

The following test report is prepared on behalf of Green Creative Ltd. in accordance with IESNA LM-79-08, used the following American National Standards or illumination Engineering Society of North America test guides:

ANSI C78.377-2008: Specifications for the Chromaticity of Solid State Lighting Products;
 ANSI C79.1– 2002: American National Standard for Electric Lamps – Nomenclature for Glass Bulbs Intended for Use with Electric Lamps;
 ANSI C78.20 – 2003: American National Standard for Electric Lamps – A, G, PS, and Similar Shapes with E26 Medium Screw Bases;
 ANSI C78.21 – 2011: American National Standard for Electric Lamps – PAR and R Shapes;
 ANSI C78.24 – 2001: American National Standard for Electric Lamps – Two-inch (51 mm); Integral-reflector Lamps with Front Covers and GU5.3 or GX 5.3 Bases;
 ANSI/IEC C81.61-2003: American National Standard for Electric Lamp Bases;
 ANSI/IEEE C62.41 – 1991 (01-May-1991): Surge Voltages in Low-Voltage AC Power Circuits, Recommended Practice for;
 CIE Publication No. 13.3 – 1995: Method of Measuring and Specifying Color Rendering of Light Sources;
 CIE Publication No. 18.2 – 1983: The Basis of Physical Photometry;
 IESNA LM-16-1993: Practical Guide to Colorimetry of Light Sources;
 IESNA LM-28-89 – 1989: Guide for the Selection, Care, and Use of Electrical Instruments in the Photometric Laboratory;
 IESNA LM-79-08 Electrical and Photometric Measurement of Solid State Lighting Products
 UL 1993 – 1999: Standard for Self-Ballasted Lamps and Lamp Adapters;
 UL 8750 – 2009: Light Emitting Diode (LED) Equipment for Use in Lighting Products.

1.3 Test Facility Description

The Energy Efficiency Lab used by BEST to collect energy efficiency measurement data is located in 1st Floor, 1st Building, Weitai Industrial Park, Yingrenshi, Shiyao, Baoan, Shenzhen, China. BEST Test Service Shenzhen Co., Ltd is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200770-0). BEST Test Service Shenzhen Co., Ltd is also an ELI accredited lab for lighting products (ELI Certificate No. ELI-L04-2010) and UL accredited lab for lighting products

1.4 Test Equipment List

Apparatus List	Device	Cal. Date	Cal Due Date
1	Integral Sphere+ Spectrophotometer System	Mar 10, 2013	Mar 09, 2014
2	Digital Power Meter	Oct 18, 2013	Oct 17, 2014
3	Goniophotometer+ Spectrophotometer System	Nov 20, 2013	Nov 19, 2014
4	Standard Light Source	Sep 17, 2013	Sep 16, 2014
5	Standard Light Source	Sep 17, 2013	Sep 16, 2014
6	Digital Storage Oscilloscope	Oct 18, 2013	Oct 17, 2014
7	Ultra Compact Simulator	Oct 20, 2013	Oct 20, 2014
8	Temperature Chamber	Oct 20, 2013	Oct 20, 2014
9	Digital Caliper	Nov 20, 2013	Nov 19, 2014
10	Digital CC&CV DC Power Supply(30V 5A)	N/A	N/A
11	5 1/2 Digital Multimeter	Oct 18, 2013	Oct 17, 2014
12	Digital CC&CV DC Power Supply(120V 10A)	N/A	N/A
13	6 1/2 Digital Multimeter	Oct 18, 2013	Oct 17, 2014
14	Digital Multimeter	Oct 18, 2013	Oct 17, 2014
15	Temperature Recorder+Thermocouple	Nov 20, 2013	Nov 19, 2014
16	Timer Controller	Nov 20, 2013	Nov 19, 2014

Statement of Traceability: BEST Test Service Shenzhen Co., Ltd. certifies that all calibration has been performed using suitable standards traceable to the NIM China.

2 - Test Method

2.1 Photometric and Electrical Measurement (Integrated Sphere Method)

Total light output (luminous flux) for the $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ambient temperature conditions is measured using a 1.6m 4Π geometry integrating sphere. Temperature is measured at a position inside the sphere. Spectral radiant flux measurements are made using Lab sphere to the detector port of the integrating sphere. Each lamp is operated at rated voltage in its designated orientation. Each lamp should be stable before measurements are made. The determining method of stable is as follows:

Step 1 Take 3 measurements of the lamp light output at 15 minute interval (total time=30mintues.)This time period is in addition to the recommended pre-burning time.

Step 2 Calculate the percent difference between the maximum measured value and the minimum measured value for the three consecutive measurements.

Step 3 if the value calculated in Step 2 does not exceed 0.5 percent, the lamp is considered stable. Luminous flux, chromaticity coordinates, correlated color temperature and color rendering index for each lamp are calculated from the spectral radiant flux measurements taken at 2 nm intervals over the range 350 to 1050 nm. The calibration of the sphere photometer-spectrometer system is traceable to the NIST USA. Lamp efficacy (lumens per watts) for each lamp model is computed based on the revised luminous flux result. Electrical measurements including voltage, current, power and power factor are measured using the digital power Meter.

The total uncertainty of the light output measurements is estimated, at the 95% confidence level, not to exceed $\pm 1.12\%$ over the wavelength range 350-1050 nm.

2.2 Photometric and Electrical Measurement (GonioPhotometer Method)

A Goniometer was used to measure the intensity (candelas) at each angle of distribution for each sample; the photometric distance is 24m. Ambient temperature was measured equal to the height of the sample mounted on the Goniometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to be stable before measurement was made. Electrical measurements including voltage, current, power and power factor were measured using the Power Analyzer

Before each measurement, the method below should be used to determine the lamp is stable or not.

Step 1 Take 3 measurements of the lamp intensity at 15 minute interval (total time=30mintues.)This time period is in addition to the recommended pre-burning time.

Step 2 Calculate the percent difference between the maximum measured value and the minimum measured value for the three consecutive measurements.

Step 3 if the value calculated in Step 2 does not exceed 0.5 percent, the lamp is considered stable.

Some graphics were created with Photometric Plus software.

2.3 Deviation from standard operating procedure

None.

3 – Summary of Test Result

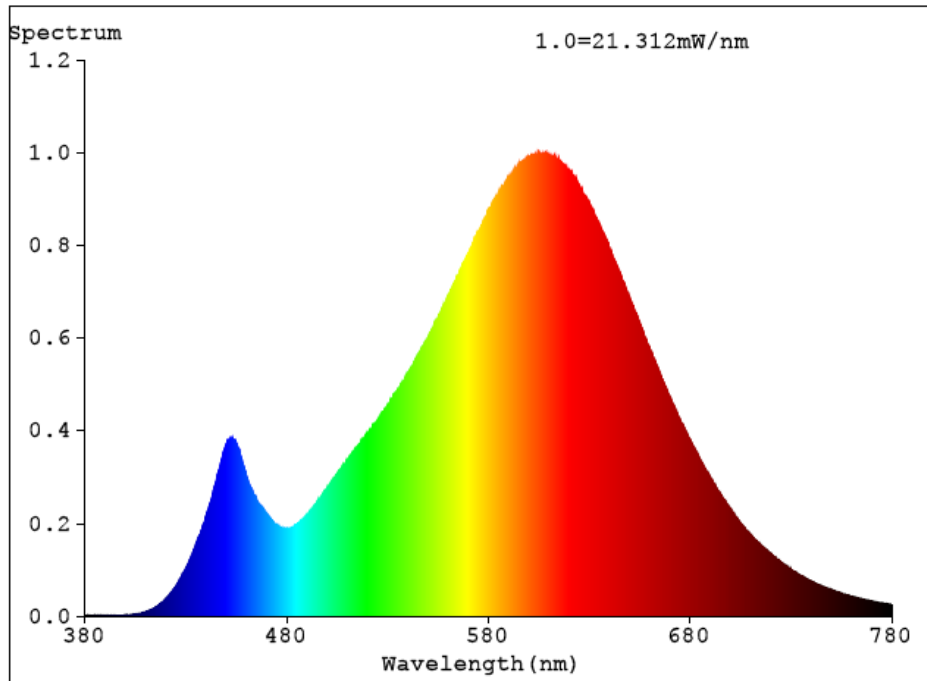
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	1030.30		NVLAP/EPA
	Luminous Efficacy (lm/w)	58.60		NVLAP/EPA
	Correlated Color Temperature (CCT)	2788		NVLAP/EPA
	Color Rendering Index– CRI	82.2		NVLAP/EPA
	Input Power (W)	17.58		NVLAP/EPA
Optional Fields	Power Type	<input checked="" type="checkbox"/> AC	<input type="checkbox"/> DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.1573		NVLAP/EPA
	Power Factor	0.9311		NVLAP/EPA
	x(CIE 1931)	0.4518		NVLAP/EPA
	y(CIE 1931)	0.4071		NVLAP/EPA
	u' (CIE 1976)	0.2589		NVLAP/EPA
	v' (CIE 1976)	0.5248		NVLAP/EPA
	Duv(CIE 1976)	0.0006		NVLAP/EPA
	Beam Angle: (Degree)	41.1		NVLAP/EPA
	Center beam candlepower: (cd)	1622		NVLAP/EPA
	Zonal lumen density (0-60°):	93.7%		NVLAP/EPA
	Zonal lumen density (60-90°):	6.3%		NVLAP/EPA
	Zonal lumen density (90-120°):	0%		NVLAP/EPA
Zonal lumen density (120-180°):	0%		NVLAP/EPA	

	CRI (R1)	80	NVLAP/EPA
	CRI (R2)	91	NVLAP/EPA
	CRI (R3)	97	NVLAP/EPA
	CRI (R4)	79	NVLAP/EPA
	CRI (R5)	80	NVLAP/EPA
	CRI (R6)	88	NVLAP/EPA
	CRI (R7)	83	NVLAP/EPA
	CRI (R8)	61	NVLAP/EPA
	CRI (R9)	14	NVLAP/EPA
	CRI (R10)	78	NVLAP/EPA
	CRI (R11)	76	NVLAP/EPA
	CRI (R12)	73	NVLAP/EPA
	CRI (R13)	82	NVLAP/EPA
	CRI (R14)	99	NVLAP/EPA

Lumen summary:

[OTHER]	Gamma(deg)	Fz(lm)	Ft(lm)	%Lum	%Lamp
[OTHER]	0- 10	146.53	146.53	14.22	14.22
[OTHER]	10- 20	328.31	474.83	46.09	46.09
[OTHER]	20- 30	244.05	718.89	69.77	69.77
[OTHER]	30- 40	122.70	841.59	81.68	81.68
[OTHER]	40- 50	74.10	915.69	88.87	88.87
[OTHER]	50- 60	49.76	965.44	93.70	93.70
[OTHER]	60- 70	35.19	1000.64	97.12	97.12
[OTHER]	70- 80	22.27	1022.90	99.28	99.28
[OTHER]	80- 90	7.41	1030.31	100.00	100.00
[OTHER]	90-100	0.00	1030.31	100.00	100.00
[OTHER]	100-110	0.00	1030.31	100.00	100.00
[OTHER]	110-120	0.00	1030.31	100.00	100.00
[OTHER]	120-130	0.00	1030.31	100.00	100.00
[OTHER]	130-140	0.00	1030.31	100.00	100.00
[OTHER]	140-150	0.00	1030.31	100.00	100.00
[OTHER]	150-160	0.00	1030.31	100.00	100.00
[OTHER]	160-170	0.00	1030.32	100.00	100.00
[OTHER]	170-180	0.00	1030.32	100.00	100.00

4 – Spectral Flux Plots



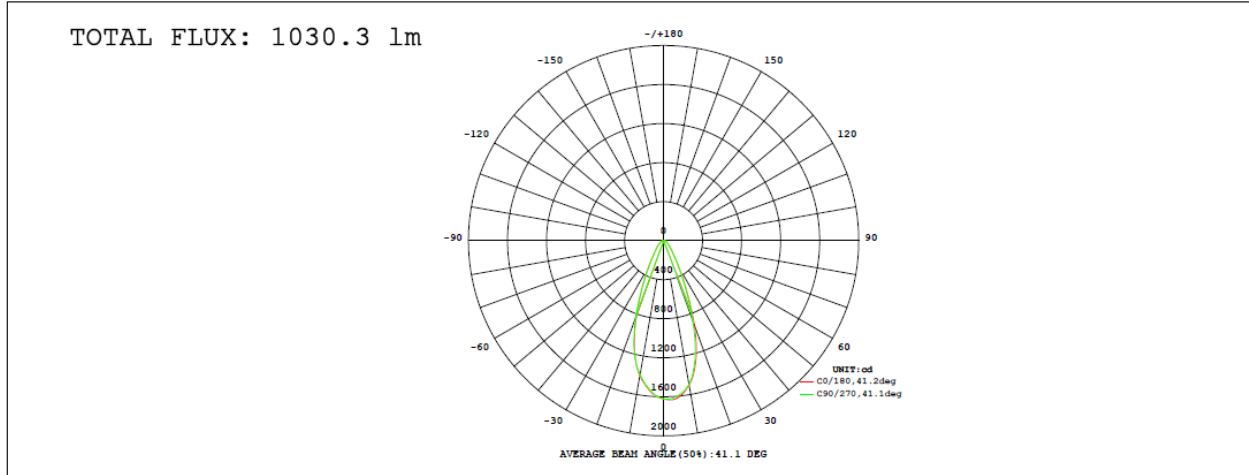
5 – EUT Photos



6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.1573A Power:17.58W Factor:0.9311		
MODEL: 16PAR38G3DIM/827FL40		
POWER: 16W	VOLTAGE: 120.0V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 58.60 lm/W



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	1404	1376	1393	1445	1503	1511	1495	1468	0- 10	146.5	146.5	14.2
20	811.2	819.4	834.4	838.6	918.4	880.1	872.5	867.0	10- 20	328.3	474.8	46.1
30	310.1	308.5	298.2	307.9	307.7	307.7	315.3	308.2	20- 30	244.1	718.9	69.8
40	131.6	138.8	128.8	126.5	123.8	127.8	130.3	130.9	30- 40	122.7	841.6	81.7
50	72.21	76.97	71.51	70.54	68.25	69.40	70.26	72.34	40- 50	74.10	915.7	88.9
60	44.28	45.65	44.10	43.72	42.49	42.72	42.93	43.70	50- 60	49.76	965.4	93.7
70	28.37	29.14	28.59	28.07	27.51	27.30	27.52	27.87	60- 70	35.19	1001	97.1
80	14.10	14.71	14.57	14.15	13.75	13.34	13.43	13.73	70- 80	22.27	1023	99.3
90	0.0375	0.1800	0.2082	0.0657	0.0147	0	0	0.0049	80- 90	7.406	1030	100
100	0	0	0	0	0	0	0	0	90-100	0.0037	1030	100
110	0	0	0	0	0	0.0001	0	0	100-110	0.0000	1030	100
120	0	0	0	0	0	0	0	0	110-120	0.0000	1030	100
130	0	0	0	0	0	0	0	0	120-130	0	1030	100
140	0	0	0	0	0	0	0	0	130-140	0	1030	100
150	0	0	0	0	0	0	0	0	140-150	0	1030	100
160	0.0029	0.0038	0.0036	0.0029	0.0023	0.0039	0.0039	0.0048	150-160	0.0002	1030	100
170	0.0138	0.0142	0.0144	0.0140	0.0131	0.0140	0.0129	0.0136	160-170	0.0025	1030	100
180	0	0	0	0	0	0	0	0	170-180	0.0010	1030	100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:David

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:65.0%
 Test Distance:2.463m [K=1.0000]

LUMINOUS DISTRIBUTION INTENSITY DATA

Electrical: Voltage:120.0V Current:0.1573A Power:17.58W Factor:0.9311		
MODEL: 16PAR38G3DIM/827FL40		
POWER: 16W	VOLTAGE: 120.0V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 58.60 lm/W

Table--1

UNIT: cd

C (DEG) \ y (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338			
0	1621	1621	1621	1621	1621	1621	1621	1622	1621	1621	1621	1621	1621	1621	1621	1622			
5	1553	1540	1530	1528	1543	1565	1584	1605	1618	1618	1617	1611	1599	1594	1585	1573			
10	1404	1387	1376	1375	1393	1424	1445	1478	1503	1497	1511	1511	1495	1479	1468	1444			
15	1155	1150	1151	1162	1169	1180	1205	1244	1272	1263	1256	1257	1249	1235	1229	1202			
20	811	824	819	824	834	830	839	879	918	904	880	873	873	874	867	842			
25	509	507	513	507	512	509	522	529	551	548	534	521	528	536	531	530			
30	310	297	308	310	298	298	308	301	308	319	308	297	315	314	308	322			
35	192	187	197	195	185	183	186	182	183	190	187	183	190	190	189	198			
40	132	131	139	136	129	125	126	123	124	127	128	126	130	131	131	136			
45	96.1	96.5	102	99.4	94.6	91.9	92.7	90.8	90.1	91.2	92.3	91.2	94.0	94.8	95.9	98.5			
50	72.2	72.4	77.0	74.5	71.5	69.7	70.5	68.8	68.3	68.4	69.4	69.2	70.3	71.1	72.3	73.6			
55	55.7	55.6	58.7	57.4	55.2	54.0	54.7	53.7	53.1	52.7	53.5	53.8	53.9	54.4	55.3	56.6			
60	44.3	44.0	45.7	45.6	44.1	43.4	43.7	42.9	42.5	42.2	42.7	43.0	42.9	42.9	43.7	44.8			
65	35.9	35.8	36.7	37.1	35.8	35.3	35.2	34.8	34.6	34.3	34.6	35.0	34.8	34.9	35.3	36.2			
70	28.4	28.4	29.1	29.6	28.6	28.2	28.1	27.8	27.5	27.2	27.3	27.7	27.5	27.6	27.9	28.9			
75	21.2	21.3	22.0	22.2	21.6	21.4	21.1	20.9	20.8	20.4	20.4	20.8	20.5	20.6	20.8	21.6			
80	14.1	14.4	14.7	14.9	14.6	14.4	14.2	13.8	13.8	13.5	13.3	13.4	13.4	13.6	13.7	14.4			
85	6.88	7.09	7.40	7.48	7.38	7.26	7.04	6.77	6.75	6.45	6.29	6.27	6.31	6.43	6.68	7.10			
90	0.04	0.10	0.18	0.24	0.21	0.14	0.07	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.04			
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
165	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
170	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
175	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:David

y Range: 0 - 180DEG
 y Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:65.0%
 Test Distance:2.463m [K=1.0000]