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

Sep 29, 2013

Product Name:	LED PAR30SN
Model No:	14.5PAR30SNG3DIM/827NF25
Test Engineer:	David Zhang
Report No.:	BTR66.181.13.1426.01
Sample Received Date:	Sep 26, 2013
Test Performed Date:	Sep 26, 2013 to Sep 29, 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

NVLAP LAB CODE 200770-0

Efficient Lighting Initiative

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

Applicant	:	Green Creative Ltd.
Product Name	:	LED PAR30SN
Model No	:	14.5PAR30SNG3DIM/827NF25
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	14.5W
Nominal CCT	:	2700K
Nominal CRI	:	82
Nominal Lumen Output	:	800Lumens
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
Nominal Shape of Bulb(Designation)	:	☒Standard ☐ Non Standard ☐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	:	Sep 26, 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, Shiyan, 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, 2012	Oct 17, 2013
3	Goniophotometer+ Spectrophotometer System	Nov 20, 2012	Nov 19, 2013
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, 2012	Oct 17, 2013
7	Ultra Compact Simulator	Oct 20, 2012	Oct 20, 2013
8	Temperature Chamber	Oct 20, 2012	Oct 20, 2013
9	Digital Caliper	Nov 20, 2012	Nov 19, 2013
10	Digital CC&CV DC Power Supply(30V 5A)	N/A	N/A
11	5 1/2 Digital Multimeter	Oct 18, 2012	Oct 17, 2013
12	Digital CC&CV DC Power Supply(120V 10A)	N/A	N/A
13	6 1/2 Digital Multimeter	Oct 18, 2012	Oct 17, 2013
14	Digital Multimeter	Oct 18, 2012	Oct 17, 2013
15	Temperature Recorder+Thermocouple	Nov 20, 2012	Nov 19, 2013
16	Timer Controller	Nov 20, 2012	Nov 19, 2013

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℃ ±1℃ ambient temperature conditions is measured using a 1.6m 4∏ 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 ±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

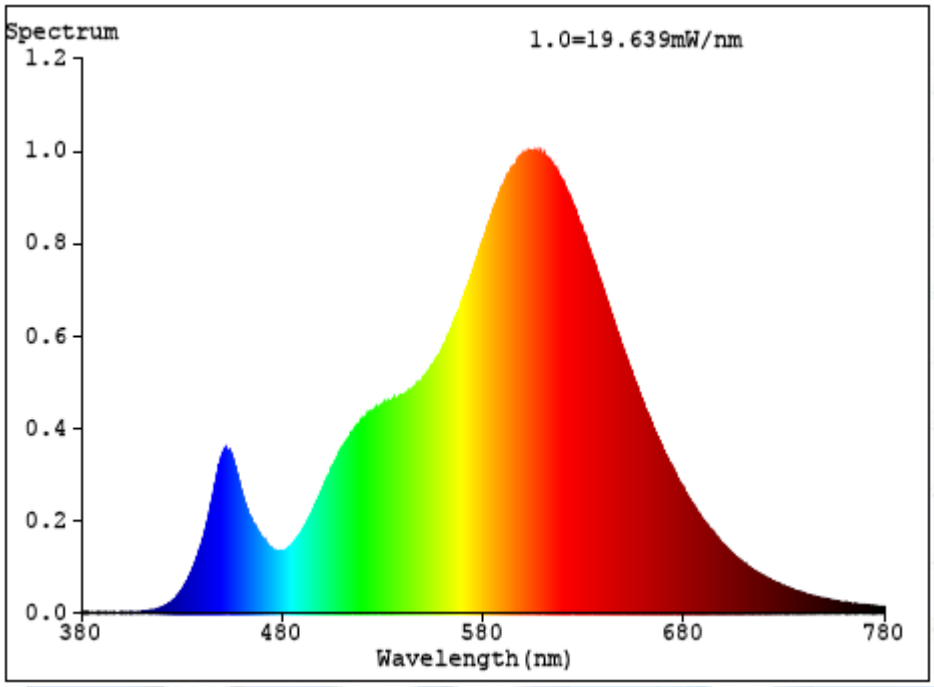
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	868.73		NVLAP/EPA
	Luminous Efficacy (lm/w)	60.90		NVLAP/EPA
	Correlated Color Temperature (CCT)	2714		NVLAP/EPA
	Color Rendering Index– CRI	82.4		NVLAP/EPA
	Input Power (W)	14.27		NVLAP/EPA
Optional Fields	Power Type	☒AC	☐DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.1237		NVLAP/EPA
	Power Factor	0.9604		NVLAP/EPA
	x(CIE 1931)	0.4609		NVLAP/EPA
	y(CIE 1931)	0.4143		NVLAP/EPA
	u' (CIE 1976)	0.2615		NVLAP/EPA
	v' (CIE 1976)	0.5289		NVLAP/EPA
	Duv(CIE 1976)	0.0013		NVLAP/EPA
	Beam Angle: (Degree)	22.9		NVLAP/EPA
	Center beam candlepower: (cd)	2892		NVLAP/EPA
	Zonal lumen density (0-60°):	94.0%		NVLAP/EPA
	Zonal lumen density (60-90°):	6.0%		NVLAP/EPA
	Zonal lumen density (90-120°):	0%		NVLAP/EPA
	Zonal lumen density (120-180°):	0%		NVLAP/EPA

	CRI (R1)	81	NVLAP/EPA
	CRI (R2)	92	NVLAP/EPA
	CRI (R3)	95	NVLAP/EPA
	CRI (R4)	82	NVLAP/EPA
	CRI (R5)	82	NVLAP/EPA
	CRI (R6)	92	NVLAP/EPA
	CRI (R7)	81	NVLAP/EPA
	CRI (R8)	55	NVLAP/EPA
	CRI (R9)	2	NVLAP/EPA
	CRI (R10)	82	NVLAP/EPA
	CRI (R11)	83	NVLAP/EPA
	CRI (R12)	75	NVLAP/EPA
	CRI (R13)	84	NVLAP/EPA
	CRI (R14)	98	NVLAP/EPA

Lumen summary:

	Gamma(deg)	Fz(lm)	Ft(lm)	%Lum	%Lamp
[OTHER]	0- 10	209.81	209.81	24.15	24.15
[OTHER]	10- 20	271.14	480.95	55.36	55.36
[OTHER]	20- 30	145.07	626.02	72.06	72.06
[OTHER]	30- 40	92.96	718.98	82.76	82.76
[OTHER]	40- 50	58.46	777.45	89.49	89.49
[OTHER]	50- 60	39.37	816.81	94.02	94.02
[OTHER]	60- 70	28.69	845.50	97.33	97.33
[OTHER]	70- 80	17.73	863.23	99.37	99.37
[OTHER]	80- 90	5.50	868.73	100.00	100.00
[OTHER]	90-100	0.00	868.73	100.00	100.00
[OTHER]	100-110	0.00	868.73	100.00	100.00
[OTHER]	110-120	0.00	868.73	100.00	100.00
[OTHER]	120-130	0.00	868.73	100.00	100.00
[OTHER]	130-140	0.00	868.73	100.00	100.00
[OTHER]	140-150	0.00	868.73	100.00	100.00
[OTHER]	150-160	0.00	868.73	100.00	100.00
[OTHER]	160-170	0.00	868.73	100.00	100.00
[OTHER]	170-180	0.00	868.73	100.00	100.00

4 – Spectral Flux Plots



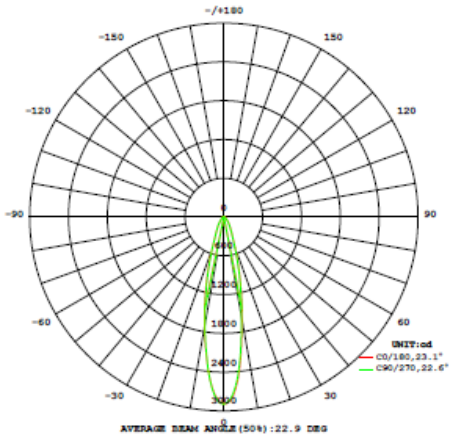
5 – EUT Photos

6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.1237A Power:14.27W Factor:0.9604		
MODEL: 14.5PAR30SNG3DIM/827NF25		
POWER: 14.5W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 60.90 lm/W

TOTAL FLUX: 868.73 lm



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	1730	1728	1692	1651	1611	1561	1579	1672	0- 10	209.8	209.8	24.2
20	554.0	549.7	542.2	521.2	502.1	490.2	497.5	525.3	10- 20	271.1	480.9	55.4
30	207.6	213.5	212.9	207.5	205.0	200.5	198.8	201.7	20- 30	145.1	626.0	72.1
40	102.6	107.6	108.8	105.7	105.1	101.4	99.90	100.0	30- 40	92.96	719.0	82.8
50	54.60	56.55	57.63	56.28	55.61	54.72	54.40	54.13	40- 50	58.46	777.4	89.5
60	34.70	35.41	36.33	36.33	36.13	35.36	35.10	34.68	50- 60	39.37	816.8	94
70	22.29	22.74	23.24	23.59	23.53	22.98	22.52	22.12	60- 70	28.69	845.5	97.3
80	10.41	10.80	10.88	11.07	11.16	10.72	10.29	10.16	70- 80	17.73	863.2	99.4
90	0.0065	0.0293	0.0723	0.0519	0.0602	0	0	0	80- 90	5.495	868.7	100
100	0	0	0	0	0	0	0	0	90-100	0.0016	868.7	100
110	0	0	0	0	0	0	0	0	100-110	0.0000	868.7	100
120	0	0	0	0	0	0	0	0	110-120	0	868.7	100
130	0	0	0	0	0	0	0	0	120-130	0	868.7	100
140	0	0	0	0	0	0	0	0	130-140	0	868.7	100
150	0	0	0	0	0	0	0	0	140-150	0	868.7	100
160	0	0	0	0	0.0000	0.0002	0.0000	0.0000	150-160	0.0000	868.7	100
170	0.0168	0.0163	0.0170	0.0185	0.0227	0.0222	0.0211	0.0200	160-170	0.0019	868.7	100
180	0	0	0	0	0	0	0	0	170-180	0.0019	868.7	100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:David

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
Humidity:62.7%
Test Distance:2.456m [K=1.0000]

LUMINOUS DISTRIBUTION INTENSITY DATA

Electrical: Voltage:120.0V Current:0.1237A Power:14.27W Factor:0.9604		
MODEL: 14.5PAR30SNG3DIM/827NF25		
POWER: 14.5W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 60.90 lm/W

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338			
0	2890	2892	2891	2892	2892	2892	2891	2892	2890	2892	2891	2892	2892	2892	2891	2892			
5	2508	2518	2518	2516	2517	2516	2511	2502	2513	2497	2481	2472	2472	2482	2497	2515			
10	1730	1738	1728	1712	1692	1669	1651	1625	1611	1579	1561	1558	1579	1619	1672	1723			
15	1051	1053	1037	1026	1011	997	980	959	949	921	905	908	924	957	1003	1050			
20	554	559	550	549	542	533	521	510	502	494	490	491	497	506	525	548			
25	309	313	312	311	307	304	299	294	299	299	297	296	296	297	302	309			
30	208	212	213	215	213	211	207	202	205	203	200	199	199	199	202	207			
35	148	151	154	155	155	152	150	146	149	146	144	143	142	142	144	148			
40	103	105	108	109	109	107	106	103	105	103	101	100	99.9	99.4	100	102			
45	73.3	75.1	76.4	77.6	77.6	76.5	75.7	74.0	74.8	73.6	73.0	72.8	72.6	72.1	72.2	73.2			
50	54.6	55.6	56.5	57.6	57.6	56.8	56.3	55.3	55.6	55.1	54.7	54.6	54.4	54.1	54.1	54.6			
55	42.6	43.1	43.7	44.5	44.6	44.2	44.1	43.7	43.7	43.2	42.9	42.9	42.8	42.6	42.5	42.7			
60	34.7	35.0	35.4	36.0	36.3	36.2	36.3	36.1	36.1	35.6	35.4	35.2	35.1	34.8	34.7	34.9			
65	28.2	28.4	28.7	29.1	29.5	29.5	29.7	29.6	29.6	29.0	28.9	28.7	28.5	28.3	28.1	28.3			
70	22.3	22.5	22.7	22.8	23.2	23.5	23.6	23.5	23.5	23.1	23.0	22.6	22.5	22.4	22.1	22.4			
75	16.4	16.6	16.8	16.8	17.0	17.3	17.3	17.3	17.4	17.0	16.9	16.6	16.5	16.4	16.1	16.5			
80	10.4	10.6	10.8	10.8	10.9	11.1	11.1	11.1	11.2	10.9	10.7	10.4	10.3	10.3	10.2	10.4			
85	4.69	4.95	5.09	5.14	5.16	5.26	5.21	5.12	5.27	5.08	4.91	4.68	4.63	4.68	4.65	4.76			
90	0.01	0.01	0.03	0.09	0.07	0.09	0.05	0.03	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00			
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	0.00	0.00	0.00	0.00	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	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02			
175	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02			
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:25.2DEG
Operators:David

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
Humidity:62.7%
Test Distance:2.456m [K=1.0000]