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 PAR38
Model No:	19PAR38G3DIM/830NF25
Test Engineer:	David Zhang
Report No.:	BTR66.181.13.1429.01
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 PAR38
Model No	:	19PAR38G3DIM/830NF25
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	19W
Nominal CCT	:	3000K
Nominal CRI	:	82
Nominal Lumen Output	:	1260Lumens
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

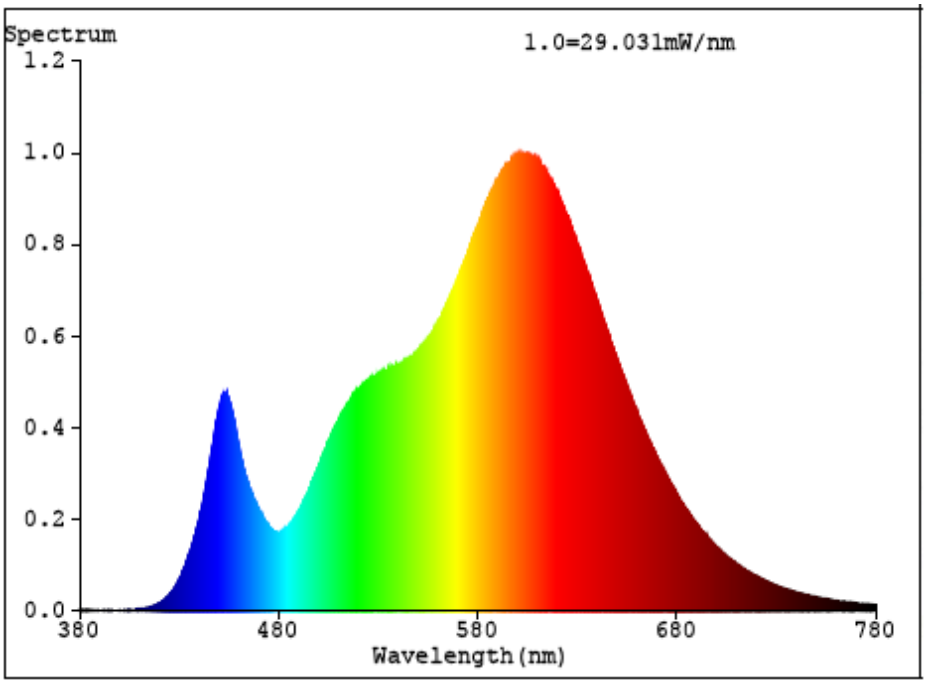
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	1369.10		NVLAP/EPA
	Luminous Efficacy (lm/w)	66.29		NVLAP/EPA
	Correlated Color Temperature (CCT)	2986		NVLAP/EPA
	Color Rendering Index– CRI	83.4		NVLAP/EPA
	Input Power (W)	20.65		NVLAP/EPA
Optional Fields	Power Type	☒AC	☐DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.1807		NVLAP/EPA
	Power Factor	0.9520		NVLAP/EPA
	x(CIE 1931)	0.4397		NVLAP/EPA
	y(CIE 1931)	0.4080		NVLAP/EPA
	u' (CIE 1976)	0.2507		NVLAP/EPA
	v' (CIE 1976)	0.5233		NVLAP/EPA
	Duv(CIE 1976)	0.0012		NVLAP/EPA
	Beam Angle: (Degree)	24.2		NVLAP/EPA
	Center beam candlepower: (cd)	4485		NVLAP/EPA
	Zonal lumen density (0-60°):	95.0%		NVLAP/EPA
	Zonal lumen density (60-90°):	5.0%		NVLAP/EPA
	Zonal lumen density (90-120°):	0%		NVLAP/EPA
	Zonal lumen density (120-180°):	0%		NVLAP/EPA

	CRI (R1)	82	NVLAP/EPA
	CRI (R2)	92	NVLAP/EPA
	CRI (R3)	96	NVLAP/EPA
	CRI (R4)	83	NVLAP/EPA
	CRI (R5)	83	NVLAP/EPA
	CRI (R6)	91	NVLAP/EPA
	CRI (R7)	83	NVLAP/EPA
	CRI (R8)	58	NVLAP/EPA
	CRI (R9)	5	NVLAP/EPA
	CRI (R10)	81	NVLAP/EPA
	CRI (R11)	84	NVLAP/EPA
	CRI (R12)	73	NVLAP/EPA
	CRI (R13)	85	NVLAP/EPA
	CRI (R14)	99	NVLAP/EPA

Lumen summary:

	Gamma(deg)	Fz(lm)	Ft(lm)	%Lum	%Lamp
[OTHER]	0- 10	329.56	329.56	24.07	24.07
[OTHER]	10- 20	481.14	810.70	59.22	59.22
[OTHER]	20- 30	241.85	1052.55	76.88	76.88
[OTHER]	30- 40	112.67	1165.23	85.11	85.11
[OTHER]	40- 50	75.91	1241.13	90.65	90.65
[OTHER]	50- 60	59.59	1300.72	95.01	95.01
[OTHER]	60- 70	41.55	1342.27	98.04	98.04
[OTHER]	70- 80	21.13	1363.40	99.59	99.59
[OTHER]	80- 90	5.66	1369.06	100.00	100.00
[OTHER]	90-100	0.00	1369.06	100.00	100.00
[OTHER]	100-110	0.00	1369.06	100.00	100.00
[OTHER]	110-120	0.00	1369.06	100.00	100.00
[OTHER]	120-130	0.00	1369.06	100.00	100.00
[OTHER]	130-140	0.00	1369.06	100.00	100.00
[OTHER]	140-150	0.00	1369.06	100.00	100.00
[OTHER]	150-160	0.00	1369.06	100.00	100.00
[OTHER]	160-170	0.01	1369.07	100.00	100.00
[OTHER]	170-180	0.00	1369.07	100.00	100.00

4 – Spectral Flux Plots



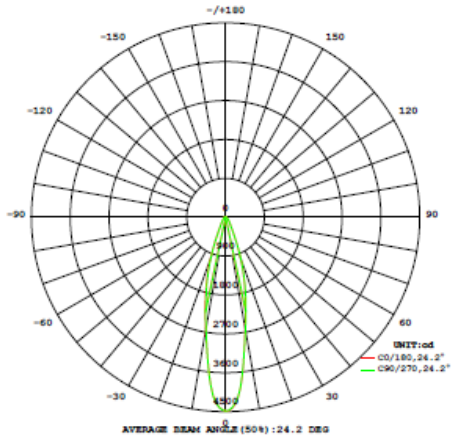
5 – EUT Photos

6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.1807A Power:20.65W Factor:0.9520		
MODEL: 19PAR38G3DIM/830NF25		
POWER: 19W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 66.29 lm/W

TOTAL FLUX: 1369.1 lm



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	2659	2645	2626	2595	2618	2627	2660	2687	0- 10	329.6	329.6	24.1
20	1043	1031	1004	995.9	1029	1037	1050	1071	10- 20	481.1	810.7	59.2
30	263.0	258.4	256.2	258.5	262.8	263.4	263.0	269.9	20- 30	241.9	1053	76.9
40	128.8	127.6	127.8	124.9	125.6	127.4	127.8	131.2	30- 40	112.7	1165	85.1
50	78.59	77.98	78.71	77.75	78.07	79.52	78.84	79.54	40- 50	75.91	1241	90.7
60	55.58	55.66	55.74	55.38	55.81	56.11	55.44	55.58	50- 60	59.59	1301	95
70	29.79	29.73	29.27	28.73	29.34	29.64	29.39	29.91	60- 70	41.55	1342	98
80	11.97	11.90	11.57	11.19	11.49	11.80	11.64	12.05	70- 80	21.13	1363	99.6
90	0.0946	0.1122	0.0575	0.0189	0.0430	0.0193	0.0570	0.2157	80- 90	5.662	1369	100
100	0	0	0	0	0	0	0	0	90-100	0.0045	1369	100
110	0	0	0	0	0	0	0	0	100-110	0	1369	100
120	0	0	0	0	0	0	0	0	110-120	0	1369	100
130	0	0	0	0	0	0	0	0	120-130	0	1369	100
140	0	0	0	0	0	0	0	0	130-140	0	1369	100
150	0	0	0	0	0	0	0	0	140-150	0	1369	100
160	0.0053	0.0058	0.0058	0.0060	0.0076	0.0074	0.0074	0.0072	150-160	0.0004	1369	100
170	0.0351	0.0361	0.0370	0.0372	0.0382	0.0377	0.0391	0.0388	160-170	0.0055	1369	100
180	0	0	0	0	0	0	0	0	170-180	0.0034	1369	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:0.1807A Power:20.65W Factor:0.9520		
MODEL: 19PAR38G3DIM/830NF25		
POWER: 19W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 66.29 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	4485	4484	4484	4482	4481	4481	4482	4483	4485	4484	4484	4482	4481	4481	4482	4483			
5	3920	3925	3930	3931	3931	3928	3923	3914	3965	3959	3957	3954	3952	3953	3958	3964			
10	2659	2656	2645	2627	2626	2619	2595	2576	2618	2622	2627	2642	2660	2678	2687	2695			
15	1785	1772	1762	1744	1729	1726	1713	1698	1736	1734	1747	1769	1774	1797	1803	1801			
20	1043	1034	1031	1019	1004	1002	996	988	1029	1030	1037	1054	1050	1067	1071	1064			
25	501	495	492	486	483	486	487	484	493	493	495	497	495	504	506	500			
30	263	261	258	258	256	258	258	257	263	262	263	264	263	268	270	269			
35	176	176	175	175	176	176	175	173	175	175	175	174	175	178	179	179			
40	129	129	128	128	128	127	125	124	126	126	127	127	128	130	131	131			
45	96.9	96.7	95.8	96.6	96.3	95.7	94.2	92.7	94.1	95.2	96.5	96.8	97.0	98.0	98.9	98.7			
50	78.6	78.4	78.0	78.7	78.7	78.4	77.8	76.8	78.1	78.9	79.5	79.4	78.8	78.7	79.5	79.7			
55	66.2	66.1	66.0	66.3	66.4	66.2	66.0	65.4	66.6	67.0	67.2	67.0	66.2	65.8	66.5	66.9			
60	55.6	55.7	55.7	55.7	55.7	55.6	55.4	55.1	55.8	56.1	56.1	56.0	55.4	55.0	55.6	56.0			
65	42.2	42.1	41.9	41.5	41.2	40.8	40.5	40.1	40.9	41.0	41.2	41.3	41.1	41.4	42.3	42.8			
70	29.8	29.8	29.7	29.5	29.3	28.9	28.7	28.5	29.3	29.6	29.6	29.5	29.4	29.3	29.9	30.3			
75	20.1	20.0	20.0	19.8	19.6	19.3	19.1	18.9	19.5	19.8	19.9	19.8	19.7	19.7	20.1	20.4			
80	12.0	12.0	11.9	11.7	11.6	11.4	11.2	11.0	11.5	11.7	11.8	11.7	11.6	11.7	12.1	12.2			
85	5.13	5.16	5.16	5.04	4.88	4.73	4.44	4.35	4.64	4.69	4.78	4.73	4.77	4.89	5.07	5.22			
90	0.09	0.11	0.11	0.08	0.06	0.03	0.02	0.02	0.04	0.03	0.02	0.03	0.06	0.11	0.22	0.25			
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	0.01	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	0.01	0.01			
165	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			
170	0.04	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04			
175	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04			
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]