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/827FL40
Test Engineer:	David Zhang
Report No.:	BTR66.181.13.1361.01
Sample Received Date:	Sep 09, 2013
Test Performed Date:	Sep 09, 2013 to Sep 13, 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/827FL40
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	19W
Nominal CCT	:	2700K
Nominal CRI	:	82
Nominal Lumen Output	:	1200Lumens
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 09, 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

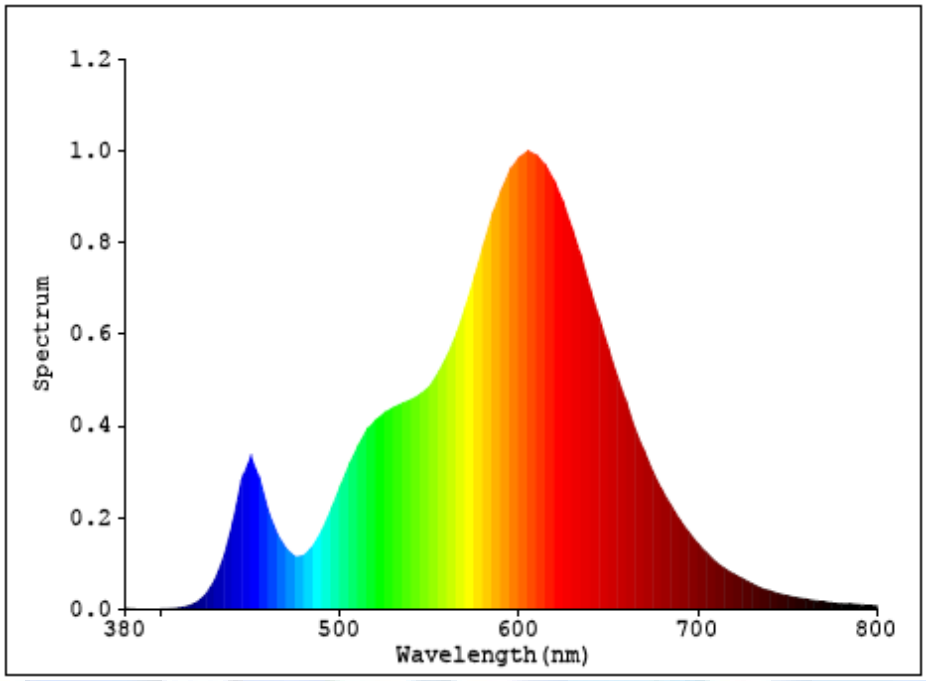
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	1266.00		NVLAP/EPA
	Luminous Efficacy (lm/w)	61.62		NVLAP/EPA
	Correlated Color Temperature (CCT)	2675		NVLAP/EPA
	Color Rendering Index– CRI	82.7		NVLAP/EPA
	Input Power (W)	20.55		NVLAP/EPA
Optional Fields	Power Type	☒AC	☐DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.1795		NVLAP/EPA
	Power Factor	0.9538		NVLAP/EPA
	x(CIE 1931)	0.4635		NVLAP/EPA
	y(CIE 1931)	0.4139		NVLAP/EPA
	u' (CIE 1976)	0.2634		NVLAP/EPA
	v' (CIE 1976)	0.5291		NVLAP/EPA
	Duv(CIE 1976)	0.0009		NVLAP/EPA
	Beam Angle: (Degree)	36.4		NVLAP/EPA
	Center beam candlepower: (cd)	2343		NVLAP/EPA
	Zonal lumen density (0-60°):	95.6%		NVLAP/EPA
	Zonal lumen density (60-90°):	4.4%		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)	83	NVLAP/EPA
	CRI (R5)	82	NVLAP/EPA
	CRI (R6)	92	NVLAP/EPA
	CRI (R7)	81	NVLAP/EPA
	CRI (R8)	55	NVLAP/EPA
	CRI (R9)	1	NVLAP/EPA
	CRI (R10)	83	NVLAP/EPA
	CRI (R11)	85	NVLAP/EPA
	CRI (R12)	79	NVLAP/EPA
	CRI (R13)	84	NVLAP/EPA
	CRI (R14)	98	NVLAP/EPA

Lumen summary:

[OTHER] Gamma(deg)	Fz(lm)	Ft(lm)	%Lum	%Lamp
[OTHER] 0- 10	201.03	201.03	15.88	15.88
[OTHER] 10- 20	399.23	600.27	47.41	47.41
[OTHER] 20- 30	306.71	906.97	71.64	71.64
[OTHER] 30- 40	163.66	1070.63	84.57	84.57
[OTHER] 40- 50	87.46	1158.09	91.48	91.48
[OTHER] 50- 60	51.59	1209.68	95.55	95.55
[OTHER] 60- 70	32.72	1242.40	98.13	98.13
[OTHER] 70- 80	18.90	1261.29	99.63	99.63
[OTHER] 80- 90	4.71	1266.00	100.00	100.00
[OTHER] 90-100	0.00	1266.00	100.00	100.00
[OTHER] 100-110	0.00	1266.00	100.00	100.00
[OTHER] 110-120	0.00	1266.00	100.00	100.00
[OTHER] 120-130	0.00	1266.00	100.00	100.00
[OTHER] 130-140	0.00	1266.00	100.00	100.00
[OTHER] 140-150	0.00	1266.00	100.00	100.00
[OTHER] 150-160	0.00	1266.00	100.00	100.00
[OTHER] 160-170	0.00	1266.01	100.00	100.00
[OTHER] 170-180	0.00	1266.01	100.00	100.00

4 – Spectral Flux Plots



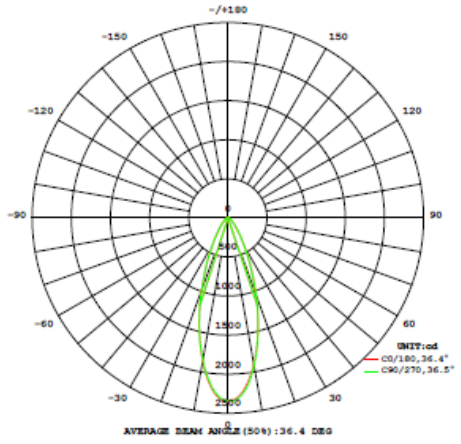
5 – EUT Photos

6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.1795A Power:20.55W Factor:0.9538		
MODEL: 19PAR38G3DIM/827FL40		
POWER: 19W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 61.62 lm/W

TOTAL FLUX: 1266.0 lm



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	1857	1842	1850	1864	1901	1921	1922	1903	0- 10	201.0	201.0	15.9
20	988.4	976.2	987.2	1011	1050	1060	1054	1037	10- 20	399.2	600.3	47.4
30	394.8	387.5	393.2	407.6	426.7	427.2	425.2	413.6	20- 30	306.7	907.0	71.6
40	167.5	160.5	156.0	154.8	159.8	165.4	172.9	174.7	30- 40	163.7	1071	84.6
50	80.41	77.27	74.21	73.04	73.91	77.17	80.79	82.35	40- 50	87.46	1158	91.5
60	44.54	43.15	41.51	41.12	41.18	42.68	44.69	45.26	50- 60	51.59	1210	95.6
70	25.56	25.19	24.36	24.03	24.30	25.02	25.74	25.73	60- 70	32.72	1242	98.1
80	10.61	10.34	9.989	9.984	10.34	10.69	11.06	10.98	70- 80	18.90	1261	99.6
90	0.0061	0.0044	0.0032	0.0040	0	0	0.0046	0	80- 90	4.709	1266	100
100	0	0	0	0	0	0	0	0	90-100	0.0001	1266	100
110	0	0	0	0	0	0	0	0	100-110	0	1266	100
120	0	0	0	0	0	0	0	0	110-120	0	1266	100
130	0	0	0	0	0	0	0	0	120-130	0	1266	100
140	0	0	0	0	0	0	0	0	130-140	0	1266	100
150	0	0	0	0	0	0	0	0	140-150	0	1266	100
160	0.0042	0.0049	0.0045	0.0047	0.0076	0.0065	0.0061	0.0065	150-160	0.0004	1266	100
170	0.0193	0.0204	0.0204	0.0215	0.0227	0.0211	0.0215	0.0220	160-170	0.0035	1266	100
180	0	0	0	0	0	0	0	0	170-180	0.0017	1266	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:0.1795A Power:20.55W Factor:0.9538		
MODEL: 19PAR38G3DIM/827FL40		
POWER: 19W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 61.62 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	2342	2342	2342	2342	2343	2342	2341	2340	2342	2342	2342	2342	2343	2342	2341	2340			
5	2219	2210	2203	2199	2197	2198	2201	2208	2227	2236	2243	2249	2251	2249	2243	2235			
10	1857	1847	1842	1845	1850	1856	1864	1874	1901	1912	1921	1925	1922	1914	1903	1887			
15	1425	1413	1410	1415	1423	1435	1447	1459	1485	1493	1499	1501	1496	1487	1474	1458			
20	988	979	976	980	987	1000	1011	1021	1050	1056	1060	1060	1054	1048	1037	1022			
25	638	629	626	630	642	653	664	675	694	693	695	693	687	678	669	661			
30	395	390	387	389	393	399	408	414	427	427	427	429	425	418	414	409			
35	252	248	245	244	244	245	247	250	257	258	261	267	268	265	264	261			
40	168	164	161	158	156	154	155	155	160	162	165	170	173	173	175	173			
45	115	113	110	107	105	104	103	103	106	108	111	115	117	118	119	119			
50	80.4	79.2	77.3	75.4	74.2	73.5	73.0	72.6	73.9	75.4	77.2	79.3	80.8	81.7	82.4	82.8			
55	59.3	58.2	56.8	55.3	54.6	54.1	53.9	53.5	54.1	54.9	56.2	57.8	58.8	59.4	59.8	60.2			
60	44.5	43.9	43.1	42.2	41.5	41.2	41.1	40.8	41.2	41.6	42.7	43.8	44.7	44.9	45.3	45.5			
65	33.4	33.2	32.7	32.3	31.8	31.4	31.4	31.1	31.5	31.9	32.5	33.2	33.6	33.5	33.8	33.8			
70	25.6	25.5	25.2	24.9	24.4	24.1	24.0	23.9	24.3	24.5	25.0	25.6	25.7	25.6	25.7	25.9			
75	18.4	18.3	18.1	17.8	17.5	17.3	17.3	17.3	17.6	17.8	18.2	18.7	18.9	18.8	18.8	18.8			
80	10.6	10.5	10.3	10.2	9.99	9.92	9.98	10.0	10.3	10.5	10.7	11.0	11.1	11.0	11.0	10.9			
85	3.80	3.72	3.61	3.53	3.46	3.45	3.49	3.72	3.89	3.98	4.08	4.23	4.27	4.23	4.21	4.14			
90	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	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	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
165	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	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	0.01	0.01	0.02	0.02	0.01	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]