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/840FL40
Test Engineer:	David Zhang
Report No.:	BTR66.181.13.1430.01
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 200779-0

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/840FL40
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	19W
Nominal CCT	:	4000K
Nominal CRI	:	82
Nominal Lumen Output	:	1320Lumens
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

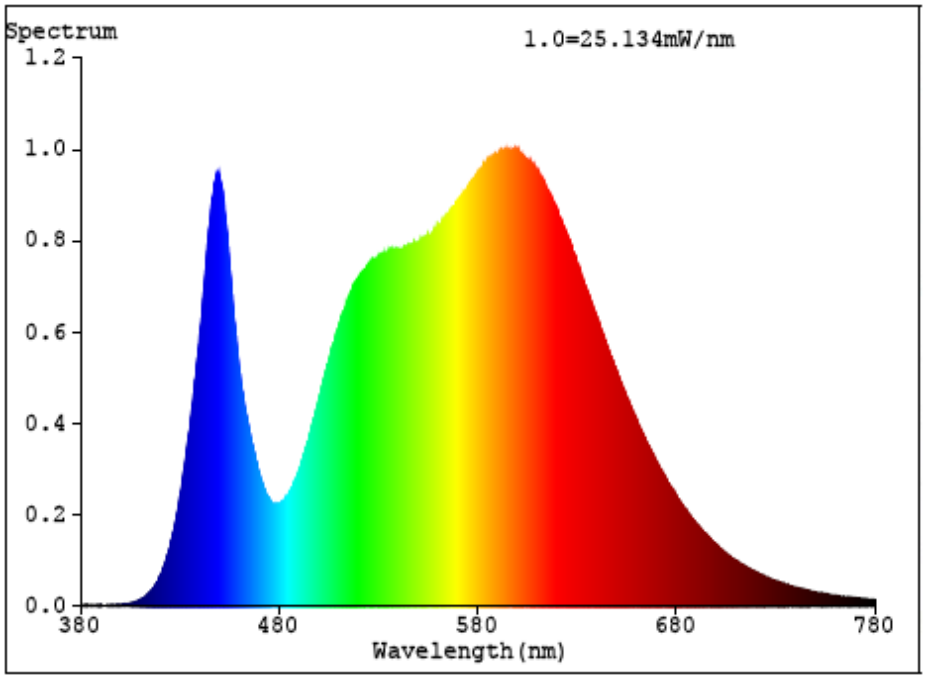
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	1440.30		NVLAP/EPA
	Luminous Efficacy (lm/w)	69.37		NVLAP/EPA
	Correlated Color Temperature (CCT)	3941		NVLAP/EPA
	Color Rendering Index– CRI	82.5		NVLAP/EPA
	Input Power (W)	20.76		NVLAP/EPA
Optional Fields	Power Type	☒AC	☐DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.1815		NVLAP/EPA
	Power Factor	0.9527		NVLAP/EPA
	x(CIE 1931)	0.3856		NVLAP/EPA
	y(CIE 1931)	0.3871		NVLAP/EPA
	u' (CIE 1976)	0.2243		NVLAP/EPA
	v' (CIE 1976)	0.5068		NVLAP/EPA
	Duv(CIE 1976)	0.0033		NVLAP/EPA
	Beam Angle: (Degree)	35.9		NVLAP/EPA
	Center beam candlepower: (cd)	2709		NVLAP/EPA
	Zonal lumen density (0-60°):	95.4%		NVLAP/EPA
	Zonal lumen density (60-90°):	4.6%		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)	87	NVLAP/EPA
	CRI (R3)	93	NVLAP/EPA
	CRI (R4)	84	NVLAP/EPA
	CRI (R5)	81	NVLAP/EPA
	CRI (R6)	83	NVLAP/EPA
	CRI (R7)	87	NVLAP/EPA
	CRI (R8)	65	NVLAP/EPA
	CRI (R9)	6	NVLAP/EPA
	CRI (R10)	69	NVLAP/EPA
	CRI (R11)	84	NVLAP/EPA
	CRI (R12)	62	NVLAP/EPA
	CRI (R13)	82	NVLAP/EPA
	CRI (R14)	96	NVLAP/EPA

Lumen summary:

	Gamma(deg)	Fz(lm)	Ft(lm)	%Lum	%Lamp
[OTHER]	0- 10	229.92	229.92	15.96	15.96
[OTHER]	10- 20	451.08	680.99	47.28	47.28
[OTHER]	20- 30	350.94	1031.93	71.65	71.65
[OTHER]	30- 40	183.75	1215.68	84.41	84.41
[OTHER]	40- 50	99.35	1315.03	91.30	91.30
[OTHER]	50- 60	59.19	1374.22	95.41	95.41
[OTHER]	60- 70	37.68	1411.90	98.03	98.03
[OTHER]	70- 80	22.22	1434.13	99.57	99.57
[OTHER]	80- 90	6.14	1440.27	100.00	100.00
[OTHER]	90-100	0.01	1440.27	100.00	100.00
[OTHER]	100-110	0.00	1440.27	100.00	100.00
[OTHER]	110-120	0.00	1440.27	100.00	100.00
[OTHER]	120-130	0.00	1440.27	100.00	100.00
[OTHER]	130-140	0.00	1440.27	100.00	100.00
[OTHER]	140-150	0.00	1440.27	100.00	100.00
[OTHER]	150-160	0.00	1440.28	100.00	100.00
[OTHER]	160-170	0.00	1440.28	100.00	100.00
[OTHER]	170-180	0.00	1440.28	100.00	100.00

4 – Spectral Flux Plots



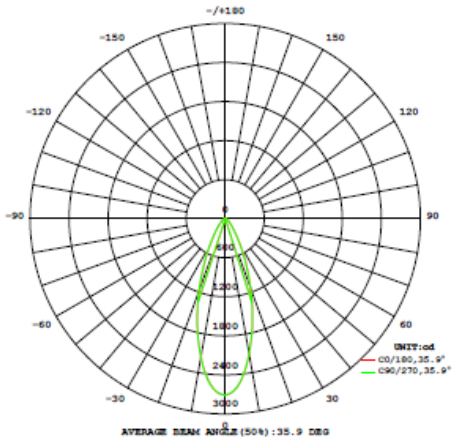
5 – EUT Photos

6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.1815A Power:20.76W Factor:0.9527		
MODEL: 19PAR38G3DIM/840FL40		
POWER: 19W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 69.37 lm/W

TOTAL FLUX: 1440.3 lm



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	2159	2171	2161	2129	2110	2097	2110	2146	0- 10	229.9	229.9	16
20	1174	1189	1186	1162	1143	1123	1131	1166	10- 20	451.1	681.0	47.3
30	475.2	484.8	486.9	476.8	457.1	437.5	437.9	464.7	20- 30	350.9	1032	71.6
40	200.0	200.8	194.9	182.8	172.0	165.3	169.6	187.9	30- 40	183.8	1216	84.4
50	96.83	97.14	92.74	85.91	81.95	80.81	83.24	90.37	40- 50	99.35	1315	91.3
60	52.16	52.85	51.43	48.80	46.63	45.99	46.81	49.21	50- 60	59.19	1374	95.4
70	30.43	31.20	30.31	28.53	27.48	27.44	27.68	28.80	60- 70	37.68	1412	98
80	13.80	14.43	13.80	12.62	11.96	11.48	11.69	12.72	70- 80	22.22	1434	99.6
90	0.2404	0.4812	0.3575	0.0537	0	0	0	0.0448	80- 90	6.141	1440	100
100	0	0	0	0	0	0	0	0	90-100	0.0085	1440	100
110	0	0	0	0	0	0	0	0	100-110	0	1440	100
120	0	0	0	0	0	0	0	0	110-120	0	1440	100
130	0	0	0	0	0	0	0	0	120-130	0	1440	100
140	0	0	0	0	0	0	0	0	130-140	0	1440	100
150	0	0	0	0	0	0	0	0	140-150	0	1440	100
160	0.0072	0.0078	0.0076	0.0079	0.0112	0.0110	0.0115	0.0112	150-160	0.0013	1440	100
170	0.0242	0.0249	0.0251	0.0265	0.0267	0.0278	0.0267	0.0272	160-170	0.0049	1440	100
180	0	0	0	0	0	0	0	0	170-180	0.0021	1440	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:0.1815A Power:20.76W Factor:0.9527		
MODEL: 19PAR38G3DIM/840FL40		
POWER: 19W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 69.37 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	2705	2706	2705	2705	2706	2707	2708	2709	2705	2706	2705	2705	2706	2707	2708	2709			
5	2562	2569	2573	2575	2569	2560	2550	2537	2535	2530	2528	2529	2534	2544	2555	2567			
10	2159	2168	2171	2170	2161	2146	2129	2110	2110	2100	2097	2102	2110	2126	2146	2164			
15	1667	1676	1679	1678	1671	1656	1640	1622	1616	1606	1603	1605	1615	1632	1653	1672			
20	1174	1185	1189	1189	1186	1176	1162	1148	1143	1128	1123	1122	1131	1147	1166	1185			
25	772	780	786	787	788	783	773	759	753	741	734	731	737	748	763	778			
30	475	481	485	486	487	484	477	462	457	445	437	435	438	451	465	475			
35	299	303	303	302	300	297	288	278	273	265	260	260	264	275	287	297			
40	200	202	201	199	195	190	183	175	172	167	165	166	170	179	188	197			
45	138	139	138	136	132	128	123	118	116	114	114	114	117	122	129	135			
50	96.8	98.3	97.1	95.6	92.7	89.5	85.9	82.8	81.9	81.1	80.8	81.4	83.2	86.2	90.4	95.5			
55	69.9	71.1	70.4	69.7	68.0	65.7	63.7	61.6	60.7	60.4	60.2	60.5	61.6	63.0	65.6	68.8			
60	52.2	53.1	52.8	52.5	51.4	50.2	48.8	47.4	46.6	46.2	46.0	46.2	46.8	47.8	49.2	51.2			
65	39.5	40.2	40.4	40.2	39.3	38.2	37.1	35.9	35.5	35.3	35.4	35.5	35.8	36.5	37.3	38.7			
70	30.4	31.0	31.2	31.0	30.3	29.4	28.5	27.6	27.5	27.2	27.4	27.5	27.7	28.3	28.8	29.8			
75	22.5	23.0	23.3	23.2	22.6	21.8	21.0	20.2	20.2	19.7	19.8	19.7	20.1	20.7	21.2	21.9			
80	13.8	14.2	14.4	14.3	13.8	13.2	12.6	12.0	12.0	11.5	11.5	11.4	11.7	12.3	12.7	13.4			
85	5.94	6.28	6.47	6.40	6.13	5.67	5.27	4.85	4.70	4.32	4.19	4.16	4.34	4.73	5.12	5.61			
90	0.24	0.42	0.48	0.47	0.36	0.19	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.22			
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	0.01	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			
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	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03			
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]