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 06, 2013

Product Name:	LED 6”can retrofit kit
Model No:	12DL6G3DIM/827
Test Engineer:	David Zhang
Report No.:	BTR66.181.13.1492.28
Sample Received Date:	Nov 01, 2013
Test Performed Date:	Nov 01, 2013 to Nov 05, 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 6”can retrofit kit
Model No	:	12DL6G3DIM/827
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	12W
Nominal CCT	:	2700K
Nominal CRI	:	82
Nominal Lumen Output	:	760Lumens
Nominal Life Time	:	35000Hours
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
Date of Receiving Sample	:	Nov 01, 2013
Measurement quantities measured	:	1 pcs
Orientation During Testing	:	Horizontal
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, 2013	Oct 17, 2014
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, 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, 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, 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, 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

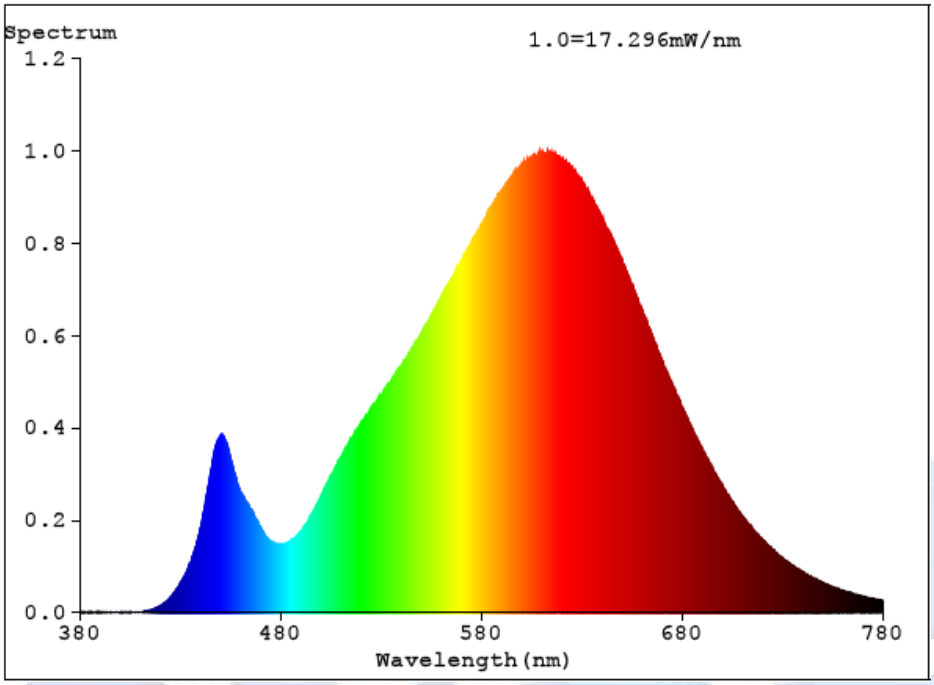
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	828.92		NVLAP/EPA
	Luminous Efficacy (lm/w)	71.13		NVLAP/EPA
	Correlated Color Temperature (CCT)	2730		NVLAP/EPA
	Color Rendering Index– CRI	84.1		NVLAP/EPA
	Input Power (W)	11.65		NVLAP/EPA
Optional Fields	Power Type	☒AC	☐DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.0972		NVLAP/EPA
	Power Factor	0.9985		NVLAP/EPA
	x(CIE 1931)	0.4590		NVLAP/EPA
	y(CIE 1931)	0.4130		NVLAP/EPA
	u' (CIE 1976)	0.2609		NVLAP/EPA
	v' (CIE 1976)	0.5281		NVLAP/EPA
	Duv(CIE 1976)	0.0009		NVLAP/EPA
	Beam Angle: (Degree)	93.5		NVLAP/EPA
	Center beam candlepower: (cd)	383		NVLAP/EPA
	Zonal lumen density (0-60°):	87.3%		NVLAP/EPA
	Zonal lumen density (60-90°):	12.7%		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)	90	NVLAP/EPA
	CRI (R3)	97	NVLAP/EPA
	CRI (R4)	82	NVLAP/EPA
	CRI (R5)	81	NVLAP/EPA
	CRI (R6)	87	NVLAP/EPA
	CRI (R7)	87	NVLAP/EPA
	CRI (R8)	66	NVLAP/EPA
	CRI (R9)	25	NVLAP/EPA
	CRI (R10)	77	NVLAP/EPA
	CRI (R11)	80	NVLAP/EPA
	CRI (R12)	69	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	35.98	35.98	4.34	4.34
[OTHER] 10- 20	100.67	136.65	16.49	16.49
[OTHER] 20- 30	145.19	281.84	34.00	34.00
[OTHER] 30- 40	162.81	444.65	53.64	53.64
[OTHER] 40- 50	155.20	599.85	72.37	72.37
[OTHER] 50- 60	123.70	723.55	87.29	87.29
[OTHER] 60- 70	74.67	798.22	96.30	96.30
[OTHER] 70- 80	26.76	824.98	99.52	99.52
[OTHER] 80- 90	3.93	828.91	100.00	100.00
[OTHER] 90-100	0.01	828.92	100.00	100.00
[OTHER] 100-110	0.00	828.92	100.00	100.00
[OTHER] 110-120	0.00	828.92	100.00	100.00
[OTHER] 120-130	0.00	828.92	100.00	100.00
[OTHER] 130-140	0.00	828.92	100.00	100.00
[OTHER] 140-150	0.00	828.92	100.00	100.00
[OTHER] 150-160	0.00	828.92	100.00	100.00
[OTHER] 160-170	0.00	828.92	100.00	100.00
[OTHER] 170-180	0.00	828.92	100.00	100.00

4 – Spectral Flux Plots



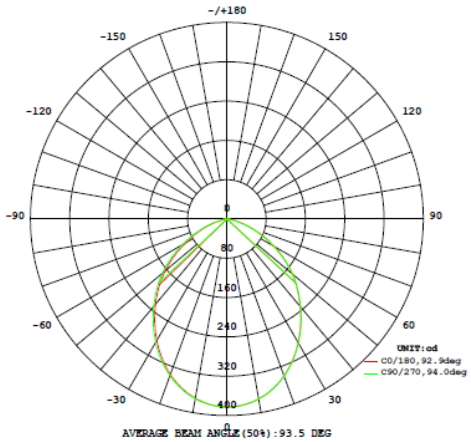
5 – EUT Photos

6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.0972A Power:11.65W Factor:0.9985		
MODEL: 12DL6G3DIM/827		
POWER: 12W	VOLTAGE: 120.0V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 71.13 lm/W

TOTAL FLUX: 828.92 lm



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	370.4	370.6	371.5	371.8	371.9	371.6	371.7	371.5	0- 10	35.98	35.98	4.34
20	336.7	337.1	339.2	340.5	340.1	339.2	340.3	339.4	10- 20	100.7	136.6	16.5
30	285.5	286.4	289.8	291.9	290.3	288.7	291.2	289.6	20- 30	145.2	281.8	34
40	226.1	227.5	231.7	234.7	232.4	230.2	233.5	231.0	30- 40	162.8	444.7	53.6
50	164.6	166.1	171.6	176.6	174.4	172.0	174.6	170.4	40- 50	155.2	599.9	72.4
60	98.03	99.37	105.2	111.2	111.1	108.5	108.8	103.8	50- 60	123.7	723.5	87.3
70	41.07	42.16	46.76	51.41	52.85	51.08	49.35	45.27	60- 70	74.67	798.2	96.3
80	6.761	7.170	7.822	9.544	11.11	10.41	8.705	7.151	70- 80	26.76	825.0	99.5
90	0	0	0.0017	0.0785	0.5775	0.4876	0.0583	0	80- 90	3.934	828.9	100
100	0	0	0	0	0	0	0	0	90-100	0.0083	828.9	100
110	0	0	0	0	0	0	0	0	100-110	0.0000	828.9	100
120	0	0	0	0	0	0	0	0	110-120	0	828.9	100
130	0	0	0	0	0	0	0	0	120-130	0	828.9	100
140	0	0	0	0	0	0	0	0	130-140	0	828.9	100
150	0	0	0	0	0	0	0	0	140-150	0	828.9	100
160	0	0	0	0	0	0	0	0	150-160	0	828.9	100
170	0	0	0	0	0	0	0	0	160-170	0	828.9	100
180	0	0	0	0	0	0	0	0	170-180	0	828.9	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 V2.0.287
Humidity:62.7%
Test Distance:2.463m [K=1.0000]

LUMINOUS DISTRIBUTION INTENSITY DATA

Electrical: Voltage:120.0V Current:0.0972A Power:11.65W Factor:0.9985		
MODEL: 12DL6G3DIM/827		
POWER: 12W	VOLTAGE: 120.0V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 71.13 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	382	382	383	383	382	382	382	383	382	382	383	383	382	382	382	383			
5	379	379	379	380	380	380	380	380	380	380	380	380	380	380	380	380			
10	370	370	371	371	371	372	372	372	372	372	372	372	372	372	371	371			
15	356	356	356	357	358	358	359	358	359	358	358	358	358	358	358	357			
20	337	337	337	338	339	340	340	340	340	339	339	340	340	340	339	339			
25	313	313	313	315	316	317	318	317	317	316	316	317	317	317	316	315			
30	286	285	286	288	290	291	292	291	290	289	289	290	291	291	290	288			
35	256	256	257	259	261	263	264	263	262	260	260	262	263	262	261	259			
40	226	226	227	229	232	234	235	234	232	230	230	232	233	233	231	229			
45	196	196	198	200	202	204	205	205	203	200	201	203	204	203	201	199			
50	165	165	166	168	172	175	177	176	174	172	172	174	175	173	170	168			
55	131	131	132	135	138	142	145	144	143	141	141	142	142	140	137	134			
60	98.0	98.1	99.4	102	105	109	111	111	111	109	109	109	109	107	104	101			
65	67.8	67.8	69.1	71.3	74.3	77.5	79.7	80.2	80.6	79.0	78.4	78.3	77.6	75.6	72.9	70.7			
70	41.1	41.1	42.2	44.2	46.8	49.4	51.4	52.1	52.8	51.9	51.1	50.4	49.4	47.5	45.3	43.4			
75	19.2	19.2	20.0	21.4	23.3	25.3	26.9	27.7	28.8	28.3	27.6	26.6	25.3	23.7	22.1	20.8			
80	6.76	6.84	7.17	7.10	7.82	8.68	9.54	10.2	11.1	10.9	10.4	9.62	8.70	7.83	7.15	6.69			
85	2.42	2.41	2.56	2.85	3.22	3.60	3.94	4.19	4.53	4.56	4.47	4.25	3.89	3.48	3.10	2.84			
90	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.26	0.58	0.59	0.49	0.28	0.06	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
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 V2.0.287
Humidity:62.7%
Test Distance:2.463m [K=1.0000]