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 02, 2013

Product Name:	LED BR30
Model No:	10BR30G3DIM/830
Test Engineer:	David Zhang
Report No.:	BTR66.181.13.1289.01
Sample Received Date:	Aug 29, 2013
Test Performed Date:	Aug 29, 2013 to Sep 02, 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 BR30
Model No	:	10BR30G3DIM/830
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	10W
Nominal CCT	:	3000K
Nominal CRI	:	83
Nominal Lumen Output	:	730Lumens
Nominal Life Time	:	40000Hours
Number of hours operated prior to measurement for new sample	:	0 Hours
Stabilization Time	:	1.5hours
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	:	Aug 29, 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, 2012	Sep 16, 2013
5	Standard Light Source	Sep 17, 2012	Sep 16, 2013
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.

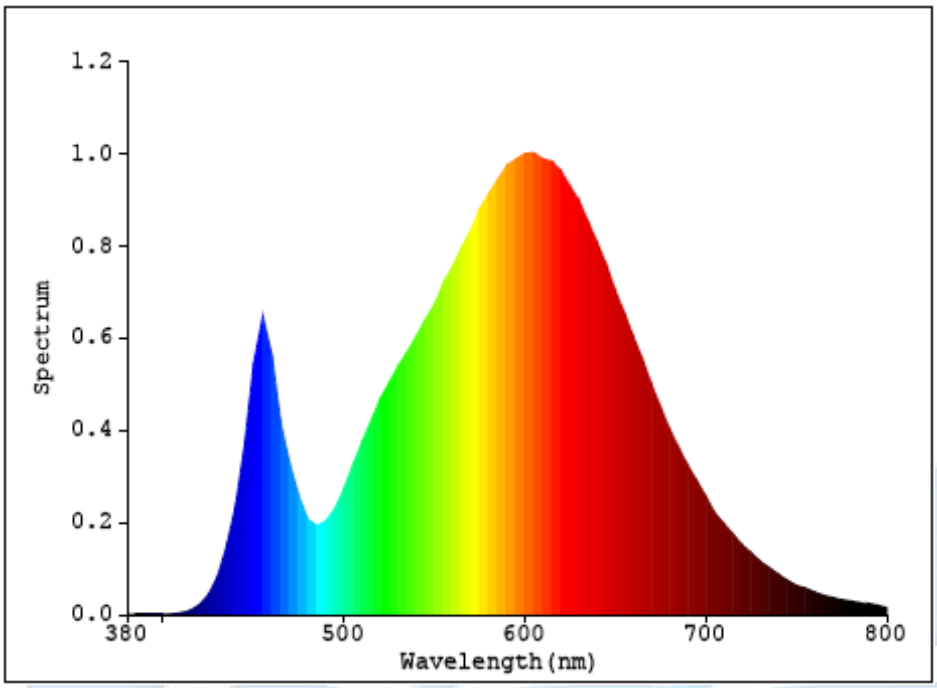
2.3 Deviation from standard operating procedure

None.

3 – Summary of Test Result

	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	790.16		NVLAP/EPA
	Luminous Efficacy (lm/w)	80.24		NVLAP/EPA
	Correlated Color Temperature (CCT)	3043		NVLAP/EPA
	Color Rendering Index– CRI	83.3		NVLAP/EPA
	Input Power (W)	9.85		NVLAP/EPA
Optional Fields	Power Type	☒AC	☐DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.0901		NVLAP/EPA
	Power Factor	0.9106		NVLAP/EPA
	x(CIE 1931)	0.4301		NVLAP/EPA
	y(CIE 1931)	0.3950		NVLAP/EPA
	u' (CIE 1976)	0.2501		NVLAP/EPA
	v' (CIE 1976)	0.5167		NVLAP/EPA
	Duv(CIE 1976)	0.0027		NVLAP/EPA
	R9	22		NVLAP/EPA
	Beam Angle: (Degree)	114.1		NVLAP/EPA
	Center beam candlepower: (cd)	238		NVLAP/EPA
	Zonal lumen density (0-60°):	67.4%		NVLAP/EPA
	Zonal lumen density (60-90°):	25.1%		NVLAP/EPA
	Zonal lumen density (90-120°):	6.1%		NVLAP/EPA
	Zonal lumen density (120-180°):	1.4%		NVLAP/EPA

4 – Spectral Flux Plots



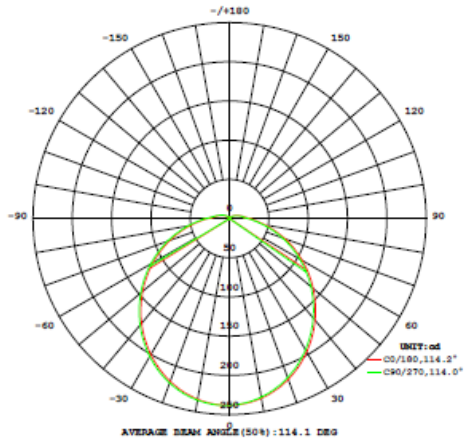
5 – EUT Photos

6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.0901A Power:9.847W Factor:0.9106		
MODEL: 10BR30G3DIM-830		
POWER: 10W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 80.24 lm/W

TOTAL FLUX: 790.16 lm



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	234.0	235.2	235.2	233.9	232.6	231.2	231.2	232.4	0- 10	22.49	22.49	2.85
20	221.0	223.3	223.1	220.6	218.1	215.7	215.7	218.1	10- 20	64.14	86.63	11
30	200.4	203.4	203.1	199.6	196.1	193.0	193.1	196.5	20- 30	96.58	183.2	23.2
40	174.2	177.8	177.2	173.1	168.9	165.2	165.5	169.6	30- 40	116.0	299.2	37.9
50	144.4	148.3	147.6	143.0	138.7	134.7	135.1	139.6	40- 50	120.9	420.1	53.2
60	112.7	116.6	116.0	111.2	106.6	102.5	102.9	107.7	50- 60	112.3	532.5	67.4
70	80.61	84.55	83.88	79.08	74.47	70.54	71.03	75.75	60- 70	92.53	625.0	79.1
80	50.66	54.24	53.61	49.37	45.30	42.15	42.52	46.38	70- 80	65.86	690.9	87.4
90	28.32	30.54	30.26	27.82	25.56	23.87	23.92	25.84	80- 90	39.85	730.7	92.5
100	17.82	18.86	18.87	17.94	16.92	16.04	15.96	16.75	90-100	23.48	754.2	95.4
110	12.33	13.10	13.14	12.46	11.64	10.98	10.90	11.47	100-110	15.43	769.6	97.4
120	8.234	8.839	8.890	8.394	7.771	7.279	7.197	7.598	110-120	9.871	779.5	98.6
130	5.159	5.638	5.702	5.333	4.906	4.525	4.445	4.709	120-130	5.829	785.3	99.4
140	2.913	3.301	3.381	3.116	2.804	2.505	2.414	2.570	130-140	3.051	788.4	99.8
150	1.309	1.612	1.705	1.554	1.343	1.131	1.000	1.045	140-150	1.310	789.7	99.9
160	0.3306	0.5576	0.6592	0.6092	0.5077	0.4041	0.2484	0.1749	150-160	0.3982	790.1	100
170	0.0637	0.1753	0.2626	0.2954	0.2863	0.2423	0.1197	0	160-170	0.0784	790.1	100
180	0	0	0	0	0	0	0	0	170-180	0.0146	790.2	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:0.0901A Power:9.847W Factor:0.9106		
MODEL: 10BR30G3DIM-830		
POWER: 10W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 80.24 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	238	238	238	238	238	238	238	238	238	238	238	238	238	238	238	238			
5	237	238	238	238	238	238	237	237	237	236	236	236	236	236	236	237			
10	234	235	235	235	235	235	234	233	233	232	231	231	231	232	232	233			
15	229	230	230	231	230	229	228	227	226	225	224	224	225	225	226	228			
20	221	222	223	224	223	222	221	219	218	217	216	215	216	217	218	220			
25	212	213	214	215	214	213	211	209	208	206	205	205	205	206	208	210			
30	200	202	203	204	203	202	200	197	196	194	193	193	193	194	197	199			
35	188	190	191	191	191	189	187	184	183	181	180	179	180	181	184	186			
40	174	176	178	178	177	175	173	170	169	167	165	165	165	167	170	172			
45	160	162	163	164	163	161	158	155	154	152	150	150	150	152	155	158			
50	144	147	148	149	148	146	143	140	139	136	135	134	135	137	140	143			
55	129	131	133	133	132	130	127	124	123	120	119	118	119	121	124	127			
60	113	115	117	117	116	114	111	108	107	104	102	102	103	105	108	111			
65	96.6	99.1	101	101	99.9	97.9	95.1	92.0	90.4	87.9	86.3	85.9	86.8	88.7	91.6	94.8			
70	80.6	83.1	84.6	84.8	83.9	81.9	79.1	76.1	74.5	72.0	70.5	70.2	71.0	73.0	75.7	78.9			
75	65.1	67.5	68.9	69.2	68.3	66.3	63.7	60.9	59.2	56.9	55.5	55.2	56.0	57.8	60.4	63.5			
80	50.7	52.9	54.2	54.5	53.6	51.8	49.4	46.8	45.3	43.3	42.1	41.9	42.5	44.1	46.4	49.1			
85	38.1	39.9	41.1	41.3	40.6	39.1	37.1	35.0	33.8	32.3	31.4	31.1	31.6	32.8	34.6	36.8			
90	28.3	29.7	30.5	30.8	30.3	29.2	27.8	26.4	25.6	24.5	23.9	23.7	23.9	24.6	25.8	27.4			
95	21.8	22.7	23.3	23.5	23.2	22.6	21.7	20.8	20.3	19.7	19.2	19.1	19.2	19.6	20.3	21.2			
100	17.8	18.4	18.9	19.0	18.9	18.5	17.9	17.3	16.9	16.4	16.0	15.9	16.0	16.2	16.8	17.4			
105	14.9	15.4	15.7	15.9	15.8	15.5	15.0	14.5	14.1	13.7	13.3	13.2	13.2	13.5	14.0	14.5			
110	12.3	12.8	13.1	13.2	13.1	12.9	12.5	12.0	11.6	11.2	11.0	10.9	10.9	11.1	11.5	11.9			
115	10.1	10.5	10.8	10.9	10.9	10.6	10.3	9.86	9.56	9.23	8.99	8.89	8.91	9.09	9.40	9.81			
120	8.23	8.59	8.84	8.95	8.89	8.69	8.39	8.04	7.77	7.48	7.28	7.19	7.20	7.33	7.60	7.95			
125	6.58	6.90	7.13	7.24	7.19	7.02	6.76	6.44	6.23	5.98	5.80	5.71	5.71	5.82	6.04	6.35			
130	5.16	5.43	5.64	5.73	5.70	5.56	5.33	5.07	4.91	4.68	4.52	4.44	4.44	4.53	4.71	4.97			
135	3.95	4.20	4.38	4.47	4.46	4.33	4.14	3.91	3.77	3.58	3.43	3.36	3.35	3.41	3.56	3.78			
140	2.91	3.13	3.30	3.38	3.38	3.28	3.12	2.93	2.80	2.64	2.50	2.43	2.41	2.45	2.57	2.75			
145	2.03	2.23	2.38	2.46	2.46	2.39	2.26	2.10	1.99	1.86	1.74	1.66	1.63	1.65	1.73	1.88			
150	1.31	1.47	1.61	1.69	1.70	1.66	1.55	1.43	1.34	1.25	1.13	1.05	1.00	0.99	1.05	1.15			
155	0.74	0.88	1.00	1.08	1.10	1.08	1.00	0.92	0.85	0.79	0.69	0.60	0.54	0.51	0.52	0.58			
160	0.33	0.46	0.56	0.63	0.66	0.65	0.61	0.55	0.51	0.48	0.40	0.32	0.25	0.19	0.17	0.19			
165	0.11	0.20	0.28	0.34	0.38	0.39	0.38	0.36	0.33	0.33	0.28	0.22	0.14	0.06	0.02	0.01			
170	0.06	0.12	0.18	0.22	0.26	0.29	0.30	0.29	0.29	0.29	0.24	0.19	0.12	0.05	0.00	0.00			
175	0.07	0.11	0.13	0.19	0.22	0.24	0.25	0.25	0.24	0.24	0.23	0.16	0.11	0.03	0.00	0.01			
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]