

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

Oct 10, 2013

Product Name:	LED BR40
Model No:	17BR40G3DIM/830
Test Engineer:	David Zhang <i>David Zhang</i>
Report No.:	BTR66.181.13.1424.01
Sample Received Date:	Sep 26, 2013
Test Performed Date:	Sep 26, 2013 to Oct 10, 2013
Reviewed By:	Steven Hsu <i>Steven Hsu</i>
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



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1 - GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

Applicant	:	Green Creative Ltd.
Product Name	:	LED BR40
Model No	:	17BR40G3DIM/830
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	17W
Nominal CCT	:	3000K
Nominal CRI	:	83
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
		<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Non Standard
Nominal Shape of Bulb(Designation)	:	<input type="checkbox"/> Omnidirectional A, BT, P, PS, S, T <input type="checkbox"/> Decorative B, BA, C, CA, DC, F, G <input checked="" type="checkbox"/> 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, Shiyao, 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ambient temperature conditions is measured using a 1.6m 4Π 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 $\pm 1.12\%$ 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

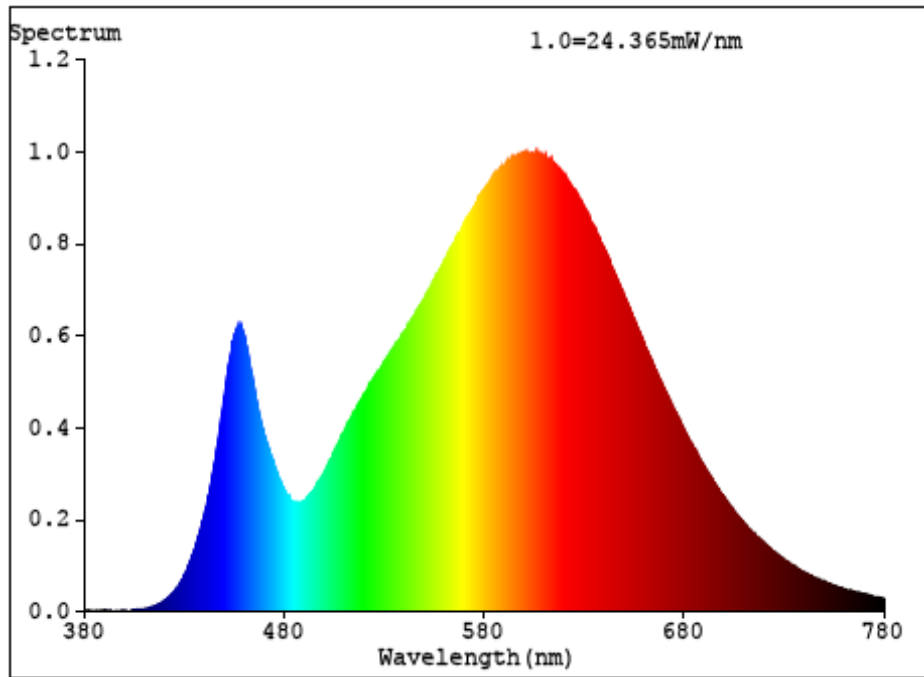
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	1266.30		NVLAP/EPA
	Luminous Efficacy (lm/w)	74.90		NVLAP/EPA
	Correlated Color Temperature (CCT)	3103		NVLAP/EPA
	Color Rendering Index– CRI	83.7		NVLAP/EPA
	Input Power (W)	16.91		NVLAP/EPA
Optional Fields	Power Type	<input checked="" type="checkbox"/> AC	<input type="checkbox"/> DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.1490		NVLAP/EPA
	Power Factor	0.9454		NVLAP/EPA
	x(CIE 1931)	0.4276		NVLAP/EPA
	y(CIE 1931)	0.3968		NVLAP/EPA
	u' (CIE 1976)	0.2477		NVLAP/EPA
	v' (CIE 1976)	0.5171		NVLAP/EPA
	Duv(CIE 1976)	0.0016		NVLAP/EPA
	Beam Angle: (Degree)	111.8		NVLAP/EPA
	Center beam candlepower: (cd)	399		NVLAP/EPA
	Zonal lumen density (0-60°):	69.8%		NVLAP/EPA
	Zonal lumen density (60-90°):	25.0%		NVLAP/EPA
	Zonal lumen density (90-120°):	4.7%		NVLAP/EPA
Zonal lumen density (120-180°):	0.5%		NVLAP/EPA	

	CRI (R1)	82	NVLAP/EPA
	CRI (R2)	92	NVLAP/EPA
	CRI (R3)	96	NVLAP/EPA
	CRI (R4)	79	NVLAP/EPA
	CRI (R5)	82	NVLAP/EPA
	CRI (R6)	88	NVLAP/EPA
	CRI (R7)	85	NVLAP/EPA
	CRI (R8)	65	NVLAP/EPA
	CRI (R9)	22	NVLAP/EPA
	CRI (R10)	80	NVLAP/EPA
	CRI (R11)	76	NVLAP/EPA
	CRI (R12)	68	NVLAP/EPA
	CRI (R13)	85	NVLAP/EPA
	CRI (R14)	99	NVLAP/EPA

Lumen summary:

[OTHER]	Gamma(deg)	Fz(lm)	Ft(lm)	%Lum	%Lamp
[OTHER]	0- 10	37.56	37.56	2.97	2.97
[OTHER]	10- 20	107.47	145.03	11.45	11.45
[OTHER]	20- 30	162.30	307.32	24.27	24.27
[OTHER]	30- 40	194.38	501.71	39.62	39.62
[OTHER]	40- 50	200.35	702.05	55.44	55.44
[OTHER]	50- 60	182.23	884.29	69.83	69.83
[OTHER]	60- 70	147.07	1031.35	81.44	81.44
[OTHER]	70- 80	104.79	1136.14	89.72	89.72
[OTHER]	80- 90	64.88	1201.02	94.84	94.84
[OTHER]	90-100	34.61	1235.64	97.58	97.58
[OTHER]	100-110	16.57	1252.21	98.88	98.88
[OTHER]	110-120	8.16	1260.37	99.53	99.53
[OTHER]	120-130	3.97	1264.34	99.84	99.84
[OTHER]	130-140	1.56	1265.90	99.97	99.97
[OTHER]	140-150	0.40	1266.30	100.00	100.00
[OTHER]	150-160	0.03	1266.33	100.00	100.00
[OTHER]	160-170	0.00	1266.33	100.00	100.00
[OTHER]	170-180	0.00	1266.33	100.00	100.00

4 – Spectral Flux Plots



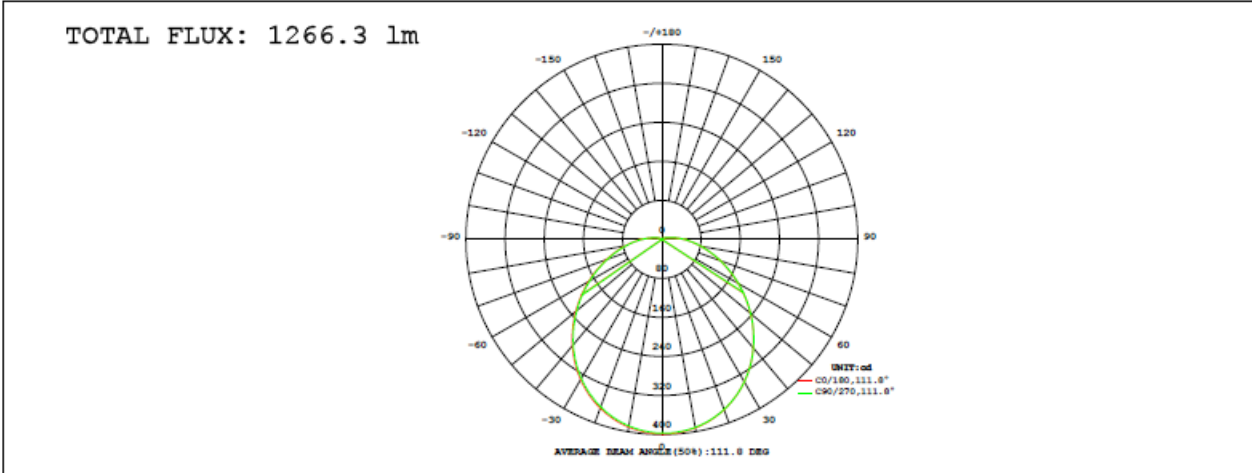
5 – EUT Photos



6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.1490A Power:16.91W Factor:0.9454		
MODEL: 17BR40G3DIM/830		
POWER: 17W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 74.90 lm/W



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	390.4	388.8	388.1	388.1	392.1	392.1	391.2	389.6	0- 10	37.56	37.56	2.97
20	368.1	365.9	365.4	366.2	371.3	371.9	371.0	368.6	10- 20	107.5	145.0	11.5
30	331.7	329.1	328.8	330.4	336.8	337.8	336.9	334.0	20- 30	162.3	307.3	24.3
40	283.9	281.3	281.1	283.1	290.5	291.7	290.9	287.6	30- 40	194.4	501.7	39.6
50	229.4	226.8	226.9	229.1	236.3	237.7	237.0	233.5	40- 50	200.3	702.1	55.4
60	173.1	170.5	170.7	173.4	179.5	181.0	180.3	176.9	50- 60	182.2	884.3	69.8
70	120.1	117.6	117.9	120.8	126.3	127.7	127.0	124.1	60- 70	147.1	1031	81.4
80	75.16	73.33	73.56	75.76	80.55	81.82	81.21	78.95	70- 80	104.8	1136	89.7
90	41.86	40.66	40.78	42.23	45.64	46.60	46.10	44.39	80- 90	64.88	1201	94.8
100	20.97	20.25	20.31	21.18	23.03	23.64	23.34	22.31	90-100	34.61	1236	97.6
110	10.52	10.12	10.11	10.52	11.34	11.66	11.57	11.09	100-110	16.57	1252	98.9
120	5.765	5.540	5.525	5.752	6.297	6.481	6.443	6.170	110-120	8.160	1260	99.5
130	2.828	2.702	2.709	2.848	3.204	3.321	3.294	3.099	120-130	3.969	1264	99.8
140	1.037	0.9772	1.000	1.068	1.273	1.343	1.335	1.191	130-140	1.565	1266	100
150	0.1608	0.1479	0.1584	0.1739	0.2425	0.2961	0.3105	0.2309	140-150	0.3962	1266	100
160	0	0	0	0	0.0018	0.0255	0.0282	0	150-160	0.0347	1266	100
170	0	0	0	0	0	0	0	0	160-170	0.0006	1266	100
180	0	0	0	0	0	0	0	0	170-180	0	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:0.1490A Power:16.91W Factor:0.9454		
MODEL: 17BR40G3DIM/830		
POWER: 17W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 74.90 lm/W

Table--1

UNIT: cd

C (DEG) \ y (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338			
0	399	398	398	397	397	396	396	396	399	398	398	397	397	396	396	396			
5	396	396	395	395	394	394	394	394	397	397	397	396	396	395	395	394			
10	390	389	389	388	388	388	388	388	392	392	392	392	391	390	390	389			
15	381	380	379	379	379	379	379	380	383	384	384	383	383	382	381	380			
20	368	367	366	365	365	366	366	367	371	372	372	372	371	370	369	367			
25	352	350	349	349	349	349	350	351	356	356	356	356	356	354	353	351			
30	332	330	329	329	329	329	330	332	337	337	338	338	337	336	334	332			
35	309	307	306	306	306	307	308	309	315	316	316	316	315	314	312	310			
40	284	282	281	281	281	282	283	285	290	291	292	292	291	289	288	286			
45	257	256	255	254	255	255	257	258	264	265	265	265	265	263	261	259			
50	229	228	227	227	227	228	229	231	236	237	238	238	237	235	234	231			
55	201	200	199	198	199	200	201	203	208	209	209	209	209	207	205	203			
60	173	171	170	170	171	172	173	175	179	181	181	181	180	179	177	175			
65	146	144	143	143	143	145	146	148	152	153	153	153	153	151	150	148			
70	120	119	118	117	118	119	121	122	126	127	128	128	127	126	124	122			
75	96.3	95.0	94.2	94.0	94.4	95.5	97.0	98.5	102	103	104	104	103	102	100	98.7			
80	75.2	74.0	73.3	73.1	73.6	74.4	75.8	77.2	80.5	81.4	81.8	81.8	81.2	80.2	78.9	77.4			
85	57.2	56.0	55.4	55.3	55.6	56.3	57.7	59.0	61.6	62.3	62.7	62.6	62.1	61.3	60.1	58.8			
90	41.9	41.1	40.7	40.6	40.8	41.4	42.2	43.3	45.6	46.3	46.6	46.5	46.1	45.3	44.4	43.3			
95	29.9	29.3	29.0	28.9	29.1	29.5	30.2	31.0	32.8	33.4	33.6	33.5	33.2	32.6	31.8	31.0			
100	21.0	20.5	20.2	20.2	20.3	20.7	21.2	21.8	23.0	23.5	23.6	23.6	23.3	22.9	22.3	21.7			
105	14.7	14.3	14.1	14.1	14.1	14.4	14.8	15.2	16.0	16.3	16.5	16.5	16.3	16.0	15.6	15.1			
110	10.5	10.3	10.1	10.1	10.1	10.3	10.5	10.9	11.3	11.6	11.7	11.7	11.6	11.4	11.1	10.8			
115	7.84	7.66	7.53	7.49	7.51	7.61	7.81	8.05	8.41	8.57	8.65	8.66	8.59	8.45	8.26	8.05			
120	5.76	5.64	5.54	5.51	5.52	5.60	5.75	5.95	6.30	6.42	6.48	6.50	6.44	6.33	6.17	6.00			
125	4.14	4.04	3.96	3.94	3.96	4.02	4.14	4.31	4.59	4.69	4.73	4.75	4.70	4.60	4.47	4.33			
130	2.83	2.75	2.70	2.69	2.71	2.75	2.85	2.99	3.20	3.28	3.32	3.34	3.29	3.21	3.10	2.99			
135	1.81	1.75	1.72	1.71	1.73	1.76	1.84	1.95	2.11	2.17	2.21	2.22	2.19	2.12	2.02	1.93			
140	1.04	0.99	0.98	0.98	1.00	1.02	1.07	1.15	1.27	1.31	1.34	1.36	1.33	1.28	1.19	1.13			
145	0.50	0.46	0.46	0.46	0.48	0.50	0.52	0.56	0.64	0.67	0.71	0.72	0.71	0.67	0.60	0.55			
150	0.16	0.15	0.15	0.15	0.16	0.17	0.17	0.18	0.24	0.27	0.30	0.31	0.31	0.28	0.23	0.20			
155	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.01	0.04	0.07	0.10	0.11	0.10	0.09	0.06	0.04			
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.03	0.03	0.01	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	0.01	0.01	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 V2.0.265
 Humidity:62.7%
 Test Distance:2.456m [K=1.0000]