

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 18, 2013

Product Name:	LED BR30
Model No:	10BR30G3DIM/840
Test Engineer:	David Zhang 
Report No.:	BTR66.181.13.1354.01
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



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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/840
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	10W
Nominal CCT	:	4000K
Nominal CRI	:	83
Nominal Lumen Output	:	775Lumens
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 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, 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 Φ 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

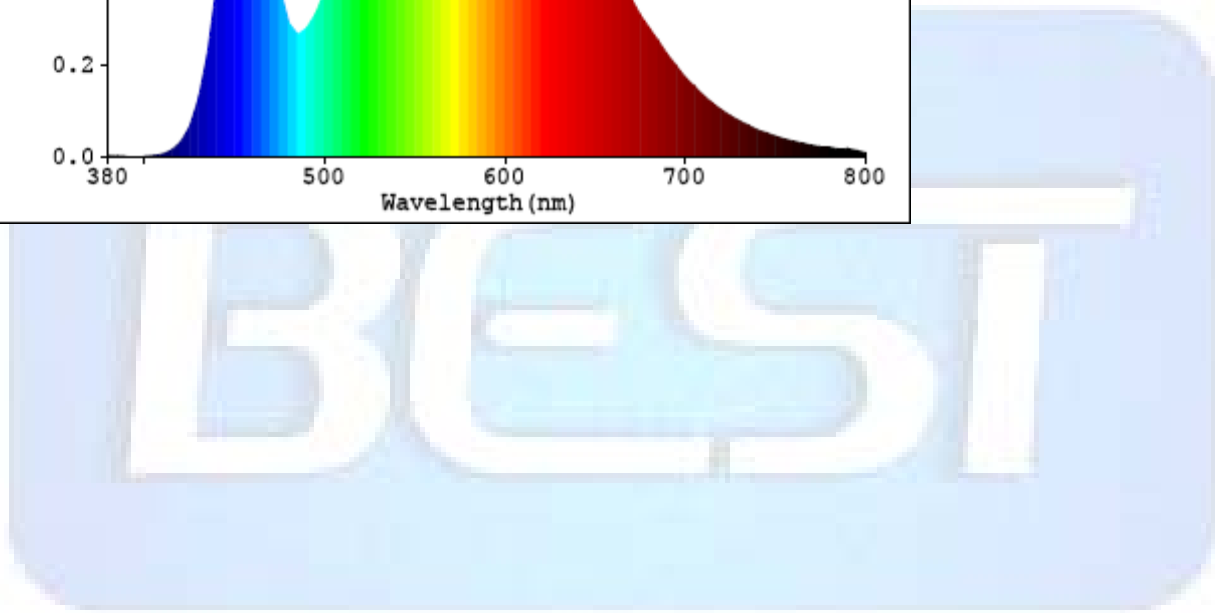
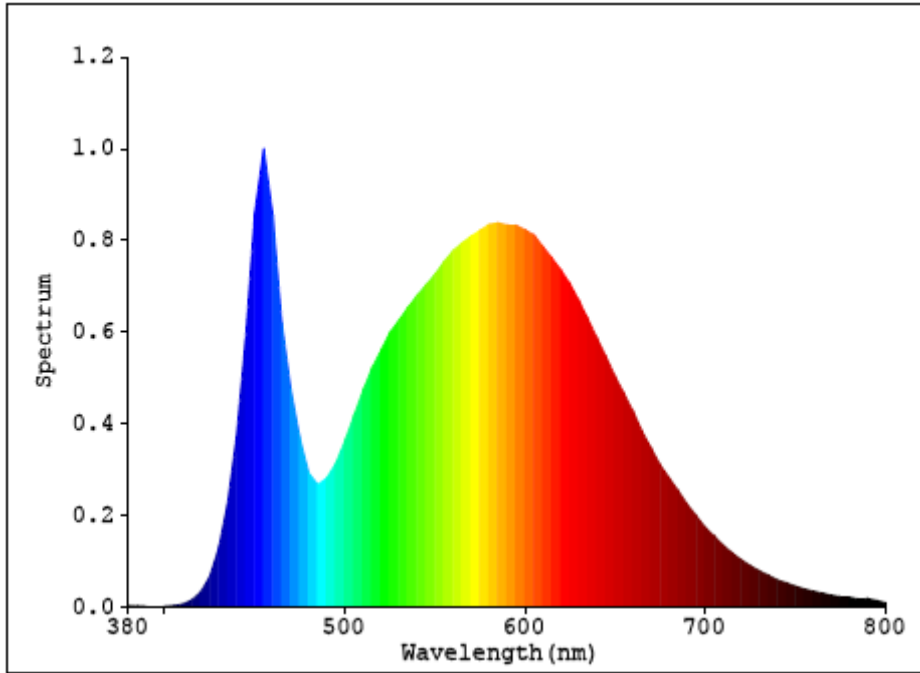
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	819.79		NVLAP/EPA
	Luminous Efficacy (lm/w)	82.57		NVLAP/EPA
	Correlated Color Temperature (CCT)	4122		NVLAP/EPA
	Color Rendering Index– CRI	83.7		NVLAP/EPA
	Input Power (W)	9.93		NVLAP/EPA
Optional Fields	Power Type	<input checked="" type="checkbox"/> AC	<input type="checkbox"/> DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.0912		NVLAP/EPA
	Power Factor	0.9076		NVLAP/EPA
	x(CIE 1931)	0.3746		NVLAP/EPA
	y(CIE 1931)	0.3710		NVLAP/EPA
	u' (CIE 1976)	0.2235		NVLAP/EPA
	v' (CIE 1976)	0.4982		NVLAP/EPA
	Duv(CIE 1976)	0.0010		NVLAP/EPA
	Beam Angle: (Degree)	115.2		NVLAP/EPA
	Center beam candlepower: (cd)	244		NVLAP/EPA
	Zonal lumen density (0-60°):	66.8%		NVLAP/EPA
	Zonal lumen density (60-90°):	25.5%		NVLAP/EPA
	Zonal lumen density (90-120°):	6.3%		NVLAP/EPA
Zonal lumen density (120-180°):	1.4%		NVLAP/EPA	

	CRI (R1)	82	NVLAP/EPA
	CRI (R2)	90	NVLAP/EPA
	CRI (R3)	94	NVLAP/EPA
	CRI (R4)	81	NVLAP/EPA
	CRI (R5)	81	NVLAP/EPA
	CRI (R6)	84	NVLAP/EPA
	CRI (R7)	88	NVLAP/EPA
	CRI (R8)	70	NVLAP/EPA
	CRI (R9)	23	NVLAP/EPA
	CRI (R10)	74	NVLAP/EPA
	CRI (R11)	78	NVLAP/EPA
	CRI (R12)	58	NVLAP/EPA
	CRI (R13)	84	NVLAP/EPA
	CRI (R14)	96	NVLAP/EPA

Lumen summary:

Gamma(deg)	Fz(lm)	Ft(lm)	%Lum	%Lamp
0- 10	22.98	22.98	2.80	2.80
10- 20	65.57	88.55	10.80	10.80
20- 30	98.88	187.44	22.86	22.86
30- 40	119.05	306.49	37.39	37.39
40- 50	124.68	431.17	52.59	52.59
50- 60	116.52	547.68	66.81	66.81
60- 70	96.79	644.47	78.61	78.61
70- 80	69.70	714.17	87.12	87.12
80- 90	42.69	756.86	92.32	92.32
90-100	25.04	781.90	95.38	95.38
100-110	16.30	798.20	97.37	97.37
110-120	10.41	808.61	98.64	98.64
120-130	6.12	814.73	99.38	99.38
130-140	3.20	817.93	99.77	99.77
140-150	1.37	819.30	99.94	99.94
150-160	0.41	819.71	99.99	99.99
160-170	0.07	819.78	100.00	100.00
170-180	0.01	819.79	100.00	100.00

4 – Spectral Flux Plots



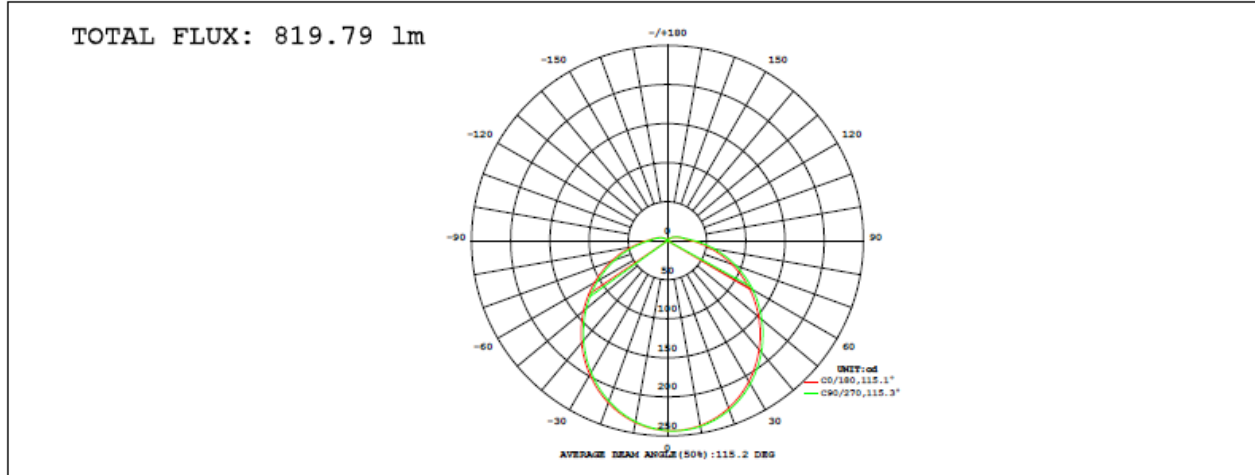
5 – EUT Photos



6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.0912A Power:9.929W Factor:0.9076		
MODEL: 10BR30G3DIM/840		
POWER: 10W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 82.57 lm/W



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	236.4	234.8	235.1	237.3	240.4	241.8	241.5	239.4	0- 10	22.98	22.98	2.8
20	220.8	217.7	218.5	222.4	228.1	231.1	230.5	226.4	10- 20	65.57	88.55	10.8
30	198.0	193.9	194.9	200.1	208.0	212.2	211.5	205.9	20- 30	98.88	187.4	22.9
40	170.4	165.6	166.6	172.7	181.9	187.2	186.5	179.8	30- 40	119.0	306.5	37.4
50	139.8	134.5	135.5	142.0	152.0	157.9	157.2	150.1	40- 50	124.7	431.2	52.6
60	107.7	102.1	102.9	109.6	120.0	126.1	125.6	118.3	50- 60	116.5	547.7	66.8
70	75.54	70.08	70.75	77.01	87.11	93.07	92.66	85.68	60- 70	96.79	644.5	78.6
80	46.22	41.86	42.31	47.25	55.64	61.02	60.68	54.65	70- 80	69.70	714.2	87.1
90	26.05	23.89	24.17	26.65	31.39	34.78	34.57	30.78	80- 90	42.69	756.9	92.3
100	17.13	16.16	16.37	17.59	19.47	20.72	20.61	19.07	90-100	25.04	781.9	95.4
110	11.80	11.11	11.29	12.20	13.48	14.28	14.19	13.14	100-110	16.30	798.2	97.4
120	7.837	7.357	7.504	8.186	9.038	9.516	9.421	8.716	110-120	10.41	808.6	98.6
130	4.868	4.553	4.676	5.171	5.773	6.019	5.916	5.453	120-130	6.125	814.7	99.4
140	2.719	2.527	2.641	2.988	3.366	3.443	3.332	3.055	130-140	3.196	817.9	99.8
150	1.204	1.125	1.230	1.451	1.656	1.626	1.495	1.360	140-150	1.370	819.3	99.9
160	0.3068	0.3452	0.4327	0.5358	0.5931	0.5311	0.3756	0.2976	150-160	0.4098	819.7	100
170	0.0728	0.1513	0.2209	0.2323	0.1906	0.1483	0.0698	0.0150	160-170	0.0712	819.8	100
180	0	0	0	0	0	0	0	0	170-180	0.0097	819.8	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:0.0912A Power:9.929W Factor:0.9076			
MODEL: 10BR30G3DIM/840			
POWER: 10W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V	
MANUFACTURER: Green Creative			Eff.: 82.57 lm/W

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338			
0	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243			
5	241	240	240	240	240	241	241	242	243	243	244	244	244	243	243	242			
10	236	235	235	235	235	236	237	239	240	241	242	242	241	241	239	238			
15	230	228	227	227	228	229	231	233	235	237	238	238	237	236	234	232			
20	221	219	218	218	218	220	222	225	228	230	231	231	230	229	226	224			
25	210	208	207	206	207	209	212	215	219	221	223	223	222	220	217	214			
30	198	195	194	194	195	197	200	204	208	211	212	213	211	209	206	202			
35	185	182	180	180	181	184	187	191	195	198	200	201	200	197	193	189			
40	170	167	166	165	167	169	173	177	182	185	187	188	186	184	180	176			
45	155	152	150	150	151	154	158	162	167	171	173	173	172	169	165	161			
50	140	136	135	134	135	138	142	146	152	156	158	158	157	154	150	145			
55	124	121	118	118	119	122	126	130	136	140	142	143	142	139	134	130			
60	108	104	102	102	103	106	110	114	120	124	126	127	126	123	118	114			
65	91.5	88.0	86.0	85.5	86.7	89.4	93.2	97.6	104	107	110	110	109	106	102	97.2			
70	75.5	72.1	70.1	69.6	70.8	73.3	77.0	81.2	87.1	90.7	93.1	93.8	92.7	89.8	85.7	81.1			
75	60.8	57.1	55.2	54.8	55.8	58.2	61.5	65.5	71.0	74.4	76.7	77.5	76.4	73.6	69.7	65.5			
80	46.2	43.5	41.9	41.5	42.3	44.3	47.3	50.8	55.6	58.8	61.0	61.7	60.7	58.2	54.7	50.8			
85	34.5	32.5	31.3	30.9	31.6	33.1	35.4	38.1	42.1	44.8	46.7	47.3	46.4	44.3	41.4	38.2			
90	26.1	24.7	23.9	23.7	24.2	25.2	26.7	28.6	31.4	33.4	34.8	35.2	34.6	33.0	30.8	28.5			
95	20.6	19.8	19.3	19.3	19.6	20.2	21.1	22.3	24.0	25.3	26.2	26.4	26.0	25.0	23.6	22.1			
100	17.1	16.5	16.2	16.1	16.4	16.9	17.6	18.4	19.5	20.2	20.7	20.9	20.6	20.0	19.1	18.2			
105	14.3	13.7	13.4	13.4	13.6	14.1	14.7	15.4	16.2	16.8	17.2	17.3	17.1	16.6	15.9	15.1			
110	11.8	11.4	11.1	11.1	11.3	11.7	12.2	12.8	13.5	14.0	14.3	14.4	14.2	13.7	13.1	12.5			
115	9.67	9.31	9.10	9.08	9.25	9.61	10.0	10.5	11.1	11.4	11.7	11.8	11.6	11.2	10.8	10.2			
120	7.84	7.53	7.36	7.35	7.50	7.81	8.19	8.58	9.04	9.32	9.52	9.57	9.42	9.12	8.72	8.30			
125	6.22	5.97	5.83	5.82	5.96	6.23	6.57	6.90	7.28	7.50	7.64	7.67	7.53	7.29	6.96	6.63			
130	4.87	4.66	4.55	4.55	4.68	4.90	5.17	5.44	5.77	5.92	6.02	6.03	5.92	5.71	5.45	5.20			
135	3.71	3.54	3.46	3.47	3.58	3.77	3.99	4.21	4.47	4.57	4.63	4.62	4.52	4.35	4.16	3.97			
140	2.72	2.59	2.53	2.55	2.64	2.80	2.99	3.16	3.37	3.42	3.44	3.42	3.33	3.19	3.06	2.93			
145	1.89	1.79	1.75	1.78	1.86	1.99	2.14	2.28	2.43	2.46	2.44	2.40	2.33	2.22	2.13	2.05			
150	1.20	1.14	1.12	1.16	1.23	1.33	1.45	1.55	1.66	1.66	1.63	1.57	1.50	1.41	1.36	1.32			
155	0.68	0.65	0.65	0.69	0.75	0.83	0.91	0.98	1.04	1.03	0.99	0.92	0.84	0.78	0.75	0.75			
160	0.31	0.32	0.35	0.39	0.43	0.48	0.54	0.57	0.59	0.58	0.53	0.45	0.38	0.32	0.30	0.32			
165	0.12	0.16	0.21	0.26	0.29	0.31	0.33	0.32	0.31	0.30	0.26	0.19	0.11	0.07	0.06	0.07			
170	0.07	0.11	0.15	0.19	0.22	0.23	0.23	0.22	0.19	0.19	0.15	0.11	0.07	0.04	0.02	0.01			
175	0.04	0.06	0.09	0.12	0.13	0.15	0.16	0.14	0.13	0.13	0.10	0.08	0.06	0.03	0.01	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]