

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 17, 2013

Product Name:	LED A19
Model No:	02-508/840
Test Engineer:	David Zhang 
Report No.:	BTR66.181.13.1353.01
Sample Received Date:	Sep 09, 2013
Test Performed Date:	Sep 09, 2013 to Sep 13, 2013
Reviewed By:	Steven Hsu 
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TABLE OF CONTENTS

1 - GENERAL INFORMATION.....3

- 1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)3
- 1.2 OBJECTIVE3
- 1.3 TEST FACILITY DESCRIPTION.....4
- 1.4 TEST EQUIPMENT LIST4

2 - TEST METHOD.....5

- 2.1 PHOTOMETRIC AND ELECTRICAL MEASUREMENT (INTEGRATED SPHERE METHOD)5
- 2.2 PHOTOMETRIC AND ELECTRICAL MEASUREMENT (GONIOPHOTOMETER METHOD)5
- 2.3 DEVIATION FROM STANDARD OPERATING PROCEDURE5

3 – SUMMARY OF TEST RESULT6

4 – SPECTRAL FLUX PLOTS8

5 – EUT PHOTOS.....9

6 – LUMINOUS INTENSITY DISTRIBUTION TEST PLOTS (CIE CHROMATICITY).....10



1 - GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

Applicant	:	Green Creative Ltd.
Product Name	:	LED A19
Model No	:	02-508/840
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	6.5W
Nominal CCT	:	4000K
Nominal CRI	:	80
Nominal Lumen Output	:	530Lumens
Nominal Life Time	:	25000Hours
Number of hours operated prior to measurement for new sample	:	0 Hours
Stabilization Time	:	1.0 hours
Total operating time for measurement include stabilization time	:	2.5 hours
		<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Non Standard
Nominal Shape of Bulb(Designation)	:	<input checked="" type="checkbox"/> Omnidirectional A, BT, P, PS, S, T <input type="checkbox"/> Decorative B, BA, C, CA, DC, F, G <input 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, 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ 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

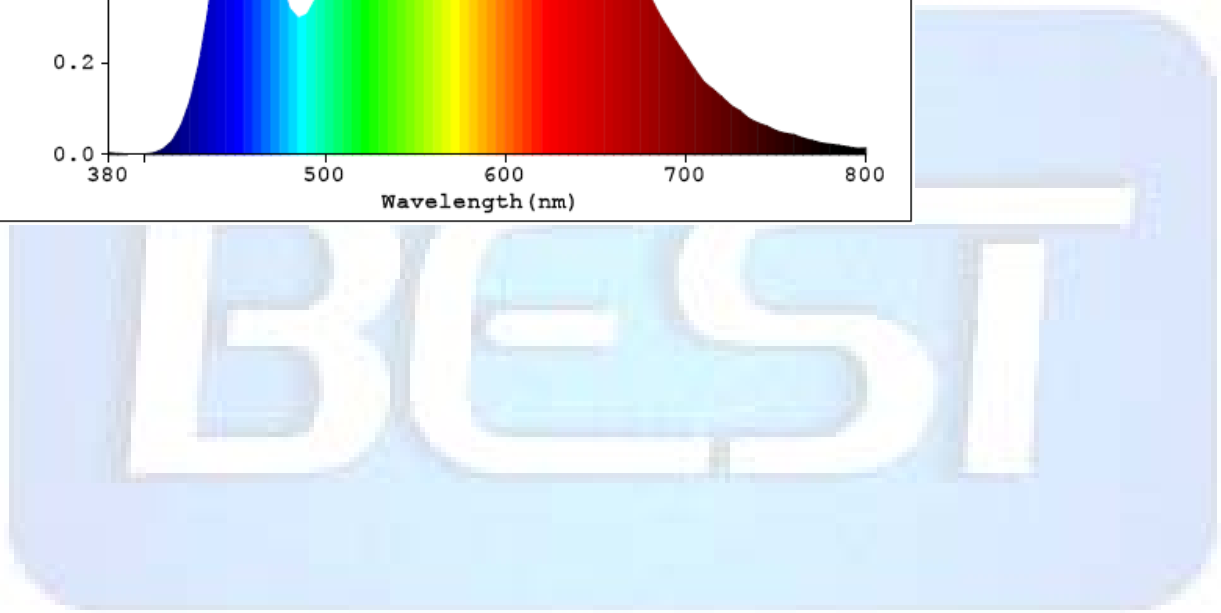
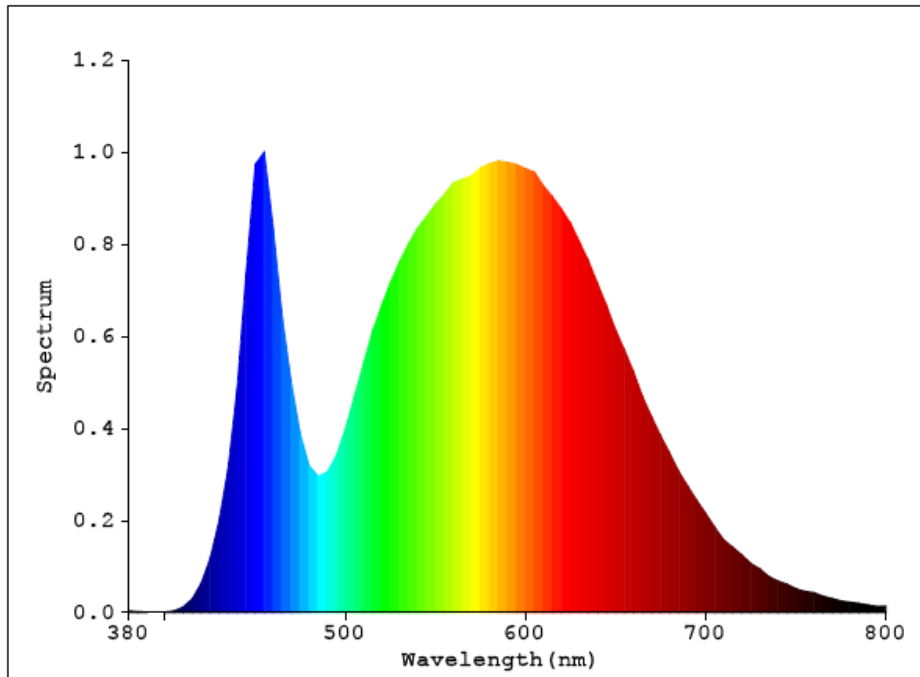
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	582.58		NVLAP/EPA
	Luminous Efficacy (lm/w)	87.17		NVLAP/EPA
	Correlated Color Temperature (CCT)	4041		NVLAP/EPA
	Color Rendering Index– CRI	82.8		NVLAP/EPA
	Input Power (W)	6.68		NVLAP/EPA
Optional Fields	Power Type	<input checked="" type="checkbox"/> AC	<input type="checkbox"/> DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.0624		NVLAP/EPA
	Power Factor	0.8916		NVLAP/EPA
	x(CIE 1931)	0.3791		NVLAP/EPA
	y(CIE 1931)	0.3774		NVLAP/EPA
	u' (CIE 1976)	0.2240		NVLAP/EPA
	v' (CIE 1976)	0.5017		NVLAP/EPA
	Duv(CIE 1976)	0.0007		NVLAP/EPA
	Beam Angle: (Degree)	134.8		NVLAP/EPA
	Center beam candlepower: (cd)	131		NVLAP/EPA
	Zonal lumen density (0-60°):	56.2%		NVLAP/EPA
	Zonal lumen density (60-90°):	29.1%		NVLAP/EPA
	Zonal lumen density (90-120°):	11.9%		NVLAP/EPA
Zonal lumen density (120-180°):	2.8%		NVLAP/EPA	

	CRI (R1)	81	NVLAP/EPA
	CRI (R2)	88	NVLAP/EPA
	CRI (R3)	91	NVLAP/EPA
	CRI (R4)	81	NVLAP/EPA
	CRI (R5)	80	NVLAP/EPA
	CRI (R6)	82	NVLAP/EPA
	CRI (R7)	89	NVLAP/EPA
	CRI (R8)	71	NVLAP/EPA
	CRI (R9)	22	NVLAP/EPA
	CRI (R10)	69	NVLAP/EPA
	CRI (R11)	77	NVLAP/EPA
	CRI (R12)	57	NVLAP/EPA
	CRI (R13)	83	NVLAP/EPA
	CRI (R14)	95	NVLAP/EPA

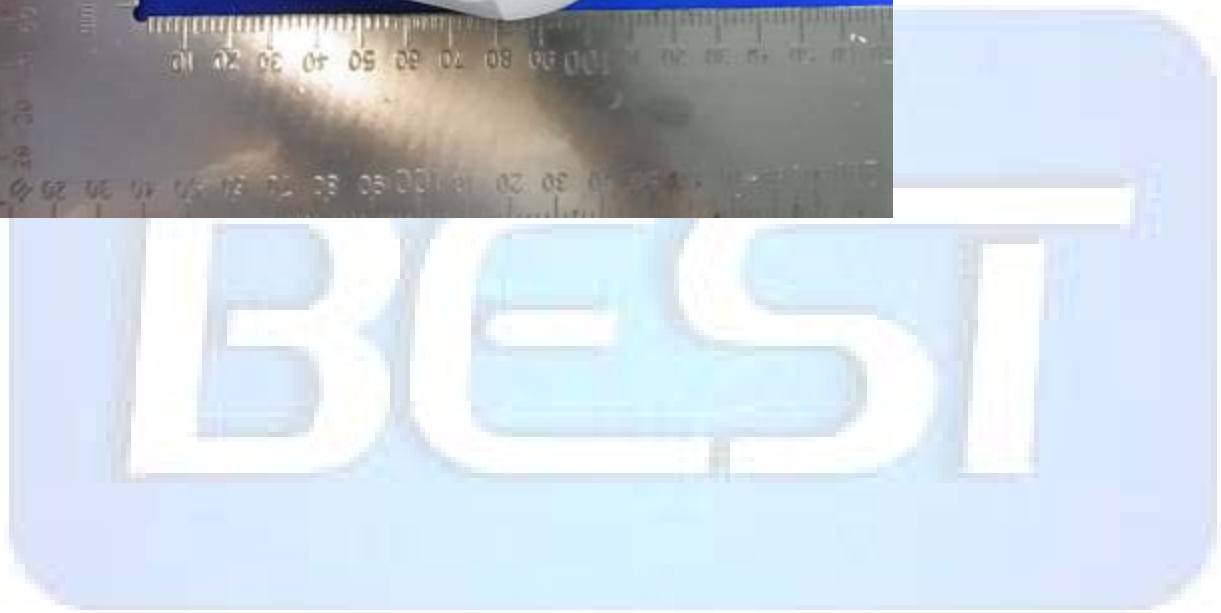
Lumen summary:

Gamma(deg)	Fz(lm)	Ft(lm)	%Lum	%Lamp
0- 10	12.38	12.38	2.13	2.13
10- 20	35.92	48.30	8.29	8.29
20- 30	55.88	104.19	17.88	17.88
30- 40	70.12	174.30	29.92	29.92
40- 50	77.06	251.36	43.15	43.15
50- 60	76.15	327.51	56.22	56.22
60- 70	68.51	396.02	67.98	67.98
70- 80	56.78	452.80	77.72	77.72
80- 90	44.01	496.81	85.28	85.28
90-100	32.28	529.09	90.82	90.82
100-110	22.43	551.52	94.67	94.67
110-120	14.66	566.18	97.19	97.19
120-130	8.79	574.97	98.70	98.70
130-140	4.69	579.66	99.50	99.50
140-150	2.09	581.75	99.86	99.86
150-160	0.69	582.44	99.98	99.98
160-170	0.13	582.57	100.00	100.00
170-180	0.00	582.58	100.00	100.00

4 – Spectral Flux Plots



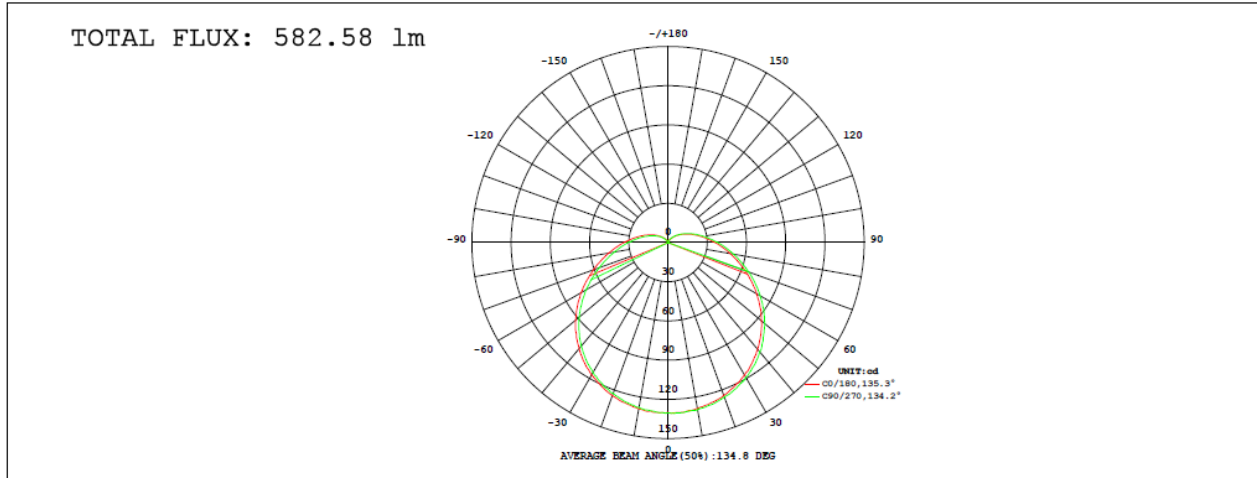
5 – EUT Photos



6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.0624A Power:6.683W Factor:0.8916		
MODEL: 02-508/840		
POWER: 6.5W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 87.17 lm/W



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	129.2	128.6	128.1	128.5	129.0	129.4	129.9	129.4	0- 10	12.38	12.38	2.13
20	124.6	123.4	122.8	123.2	124.4	125.5	126.0	125.4	10- 20	35.92	48.30	8.29
30	117.0	115.4	114.9	115.5	117.1	118.5	119.0	118.6	20- 30	55.88	104.2	17.9
40	105.9	103.9	103.4	104.3	106.5	108.3	109.2	108.6	30- 40	70.12	174.3	29.9
50	92.28	89.71	88.75	90.22	93.28	95.38	96.62	95.29	40- 50	77.06	251.4	43.1
60	76.97	73.86	72.43	74.63	78.24	80.27	81.27	80.13	50- 60	76.15	327.5	56.2
70	60.66	57.36	55.92	58.70	62.83	64.51	65.45	64.34	60- 70	68.51	396.0	68
80	45.98	43.00	41.66	44.32	48.28	49.88	50.72	49.26	70- 80	56.78	452.8	77.7
90	33.80	31.35	30.52	32.81	35.96	37.26	38.06	36.62	80- 90	44.01	496.8	85.3
100	24.32	22.40	21.82	23.74	26.29	27.24	27.80	26.68	90-100	32.28	529.1	90.8
110	17.08	15.56	15.22	16.71	18.69	19.48	19.78	18.88	100-110	22.43	551.5	94.7
120	11.49	10.29	10.17	11.32	12.79	13.45	13.65	12.87	110-120	14.66	566.2	97.2
130	7.264	6.351	6.314	7.234	8.338	8.826	8.926	8.355	120-130	8.794	575.0	98.7
140	4.111	3.496	3.503	4.139	4.974	5.337	5.387	4.954	130-140	4.689	579.7	99.5
150	1.944	1.555	1.557	1.985	2.552	2.794	2.834	2.551	140-150	2.088	581.8	99.9
160	0.6296	0.4398	0.4389	0.6794	1.011	1.125	1.166	1.014	150-160	0.6912	582.4	100
170	0.0240	0.0074	0.0007	0.0433	0.1898	0.2557	0.2672	0.2073	160-170	0.1296	582.6	100
180	0	0	0	0	0	0	0	0	170-180	0.0043	582.6	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:0.0624A Power:6.683W Factor:0.8916		
MODEL: 02-508/840		
POWER: 6.5W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 87.17 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	130	131	131	130	130	130	131	131	130	131	131	130	130	130	131	131			
5	130	130	130	129	129	130	130	130	130	130	131	131	131	130	130	130			
10	129	129	129	128	128	128	128	129	129	129	129	130	130	130	129	129			
15	127	127	126	126	126	126	126	126	127	127	128	128	128	128	128	127			
20	125	124	123	123	123	123	123	124	124	125	126	126	126	126	125	125			
25	121	120	120	119	119	120	120	120	121	122	122	123	123	123	123	122			
30	117	116	115	115	115	115	116	116	117	118	118	119	119	119	119	118			
35	112	111	110	110	109	110	110	111	112	113	114	114	115	114	114	113			
40	106	105	104	103	103	104	104	105	107	107	108	109	109	109	109	108			
45	99.3	98.1	97.3	96.7	96.3	96.8	97.7	98.5	100	101	102	103	103	103	102	101			
50	92.3	90.9	89.7	89.1	88.7	89.3	90.2	91.7	93.3	94.3	95.4	96.2	96.6	96.2	95.3	94.0			
55	84.6	83.4	82.0	80.7	80.6	81.5	82.7	84.1	86.0	87.2	88.0	88.7	89.3	88.9	88.0	86.7			
60	77.0	75.2	73.9	72.6	72.4	73.0	74.6	76.2	78.2	79.3	80.3	81.0	81.3	81.1	80.1	78.7			
65	68.7	67.0	65.5	64.1	63.8	64.9	66.7	68.4	70.4	71.5	72.3	73.0	73.4	73.1	72.2	70.6			
70	60.7	58.9	57.4	56.0	55.9	57.0	58.7	60.5	62.8	63.8	64.5	65.1	65.4	65.2	64.3	62.8			
75	53.0	51.4	49.8	48.5	48.5	49.4	51.2	53.0	55.2	56.4	57.0	57.6	57.8	57.5	56.6	55.2			
80	46.0	44.4	43.0	41.7	41.7	42.8	44.3	46.2	48.3	49.2	49.9	50.4	50.7	50.2	49.3	48.0			
85	39.6	38.1	36.8	35.7	35.8	36.7	38.3	39.9	41.8	42.8	43.2	43.6	44.1	43.5	42.7	41.3			
90	33.8	32.5	31.4	30.4	30.5	31.3	32.8	34.3	36.0	36.8	37.3	37.7	38.1	37.5	36.6	35.5			
95	28.8	27.6	26.6	25.8	25.8	26.7	27.9	29.3	30.8	31.5	31.9	32.4	32.5	32.1	31.3	30.2			
100	24.3	23.3	22.4	21.7	21.8	22.6	23.7	24.9	26.3	26.9	27.2	27.6	27.8	27.3	26.7	25.6			
105	20.5	19.5	18.7	18.2	18.3	18.9	20.0	21.1	22.2	22.9	23.1	23.4	23.5	23.2	22.5	21.7			
110	17.1	16.2	15.6	15.1	15.2	15.8	16.7	17.7	18.7	19.2	19.5	19.7	19.8	19.4	18.9	18.1			
115	14.1	13.3	12.7	12.4	12.5	13.1	13.9	14.7	15.6	16.0	16.3	16.5	16.5	16.2	15.7	15.0			
120	11.5	10.8	10.3	10.0	10.2	10.7	11.3	12.1	12.8	13.2	13.5	13.7	13.7	13.4	12.9	12.3			
125	9.23	8.64	8.20	8.01	8.15	8.56	9.14	9.82	10.4	10.8	11.0	11.1	11.1	10.9	10.5	9.91			
130	7.26	6.75	6.35	6.19	6.31	6.71	7.23	7.79	8.34	8.65	8.83	8.94	8.93	8.71	8.35	7.86			
135	5.56	5.11	4.80	4.69	4.80	5.11	5.54	6.03	6.53	6.80	6.96	7.05	7.02	6.83	6.52	6.09			
140	4.11	3.76	3.50	3.41	3.50	3.77	4.14	4.53	4.97	5.21	5.34	5.41	5.39	5.23	4.95	4.58			
145	2.92	2.63	2.42	2.35	2.42	2.65	2.94	3.28	3.65	3.83	3.95	4.01	3.99	3.86	3.63	3.32			
150	1.94	1.72	1.55	1.50	1.56	1.74	1.99	2.25	2.55	2.69	2.79	2.84	2.83	2.73	2.55	2.30			
155	1.19	1.02	0.90	0.85	0.90	1.04	1.23	1.44	1.68	1.76	1.85	1.89	1.89	1.81	1.68	1.50			
160	0.63	0.52	0.44	0.41	0.44	0.54	0.68	0.83	1.01	1.05	1.12	1.16	1.17	1.12	1.01	0.89			
165	0.25	0.16	0.15	0.14	0.17	0.22	0.31	0.41	0.51	0.53	0.60	0.63	0.63	0.60	0.53	0.44			
170	0.02	0.01	0.01	0.00	0.00	0.01	0.04	0.11	0.19	0.20	0.26	0.28	0.27	0.25	0.21	0.14			
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]