

# 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

<b>Product Name:</b>	LED R20
<b>Model No:</b>	7.5R20G3DIM/824
<b>Test Engineer:</b>	David Zhang 
<b>Report No.:</b>	BTR66.181.13.1288.01
<b>Sample Received Date:</b>	Aug 29, 2013
<b>Test Performed Date:</b>	Aug 29, 2013 to Sep 02, 2013
<b>Reviewed By:</b>	Steven Hsu 
<b>Prepared By:</b>	<b>BEST Test Service Shenzhen Co., Ltd.</b> 1st Floor, 1st Building, Weitai Industrial Park, Yingrenshi, Shiyan, Baoan, Shenzhen, China TEL: +86-755-28236006 FAX: +86-755-23467087-811 Email: <a href="mailto:certification@bestcert.cn">certification@bestcert.cn</a>



**Note:** The test report only allows to be revised within the retention period unless further standard or the requirement was noticed. This report is for the exclusive use of BEST's Client and is provided pursuant to the agreement between BEST and its Client. BEST's responsibility and Liability are limited to the terms and conditions of the agreement. BEST assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the BEST name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by BEST. The observations and test results in this report are relevant only to the sample tested. This report by itself does not cover that the material, product, of service is or has ever been under a BEST certification program. National Voluntary Laboratory Accreditation Program (NVLAP) has accredited this laboratory under ISO17025: 2005 for specific laboratory activities as listed in the NVLAP directory of accredited laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation.

**TABLE OF CONTENTS**

**1 - GENERAL INFORMATION.....3**  
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....3  
1.2 OBJECTIVE .....3  
1.3 TEST FACILITY DESCRIPTION.....4  
1.4 TEST EQUIPMENT LIST .....4

**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 PROCEDURE .....5

**3 – SUMMARY OF TEST RESULT .....6**

**4 – SPECTRAL FLUX PLOTS .....7**

**5 – EUT PHOTOS.....8**

**6 – LUMINOUS INTENSITY DISTRIBUTION TEST PLOTS (CIE CHROMATICITY).....9**



## 1 - GENERAL INFORMATION

### 1.1 Product Description for Equipment under Test (EUT)

Applicant	:	Green Creative Ltd.
Product Name	:	LED R20
Model No	:	7.5R20G3DIM/824
Brand	:	GREEN CREATIVE
SKU	:	T.B.D
12 NC Code	:	T.B.D
Nominal Operation Voltage	:	AC 120V/60Hz
Nominal Power	:	7.5W
Nominal CCT	:	2400K
Nominal CRI	:	84
Nominal Lumen Output	:	420Lumens
Nominal Life Time	:	40000Hours
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 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	:	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, 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.

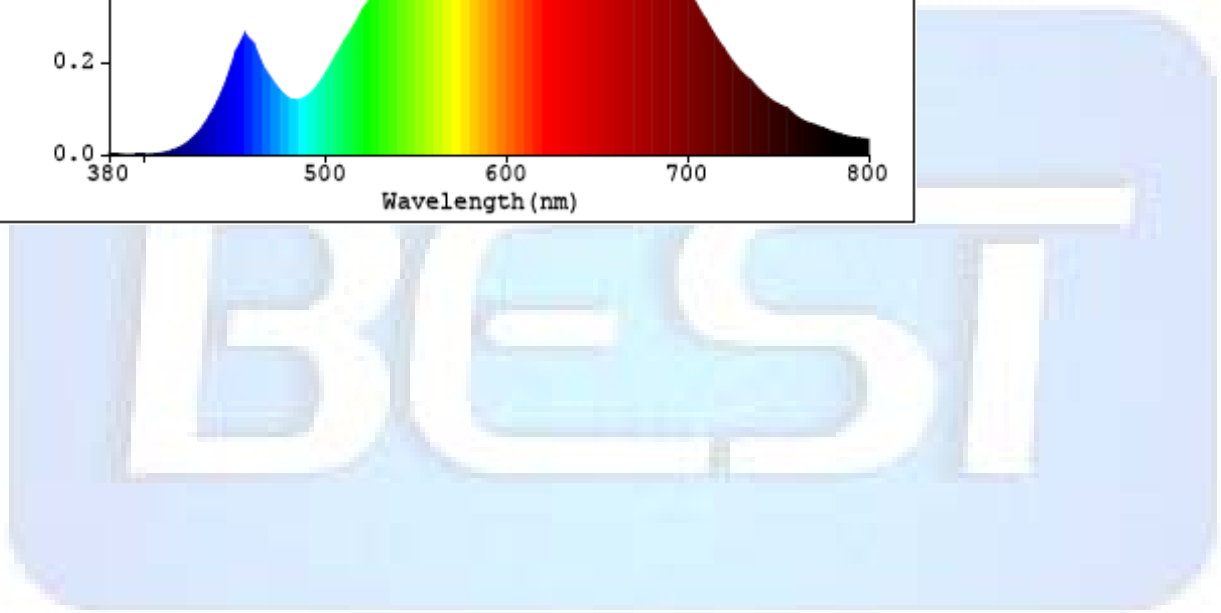
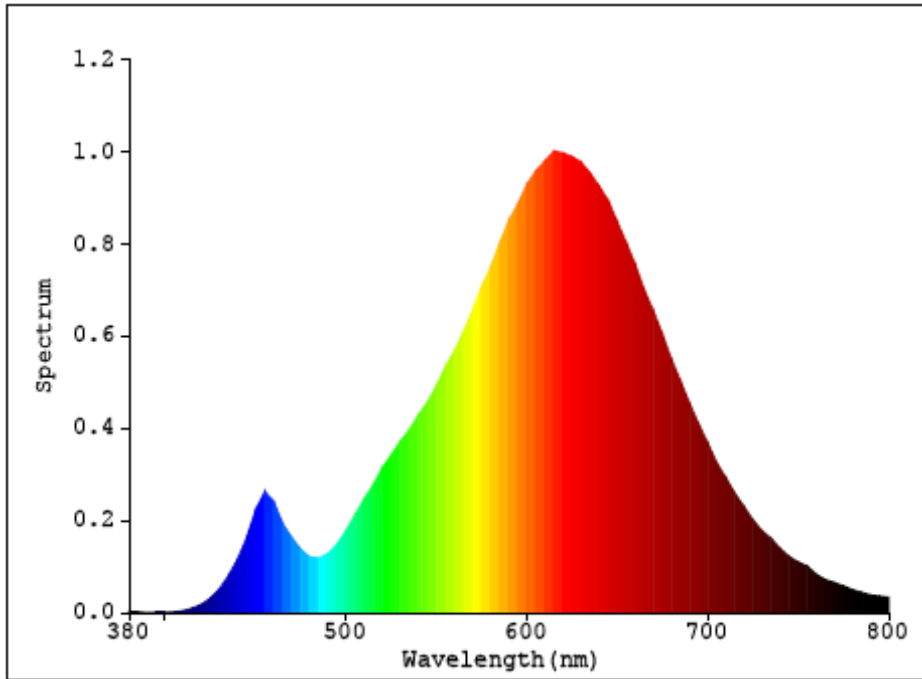
### 2.3 Deviation from standard operating procedure

None.

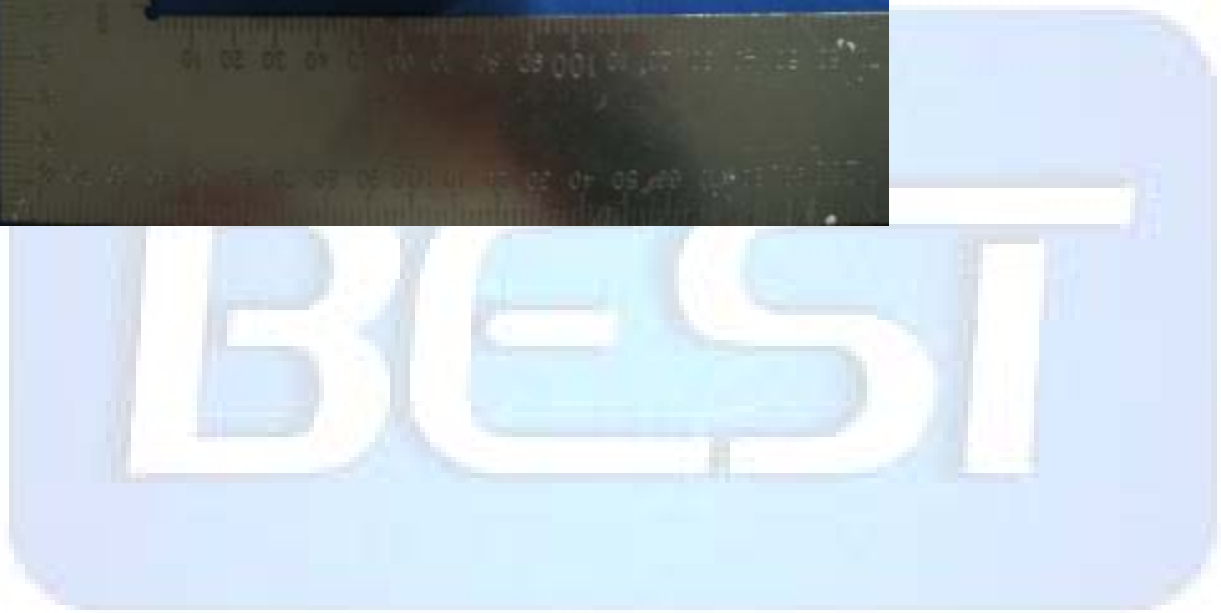
### 3 – Summary of Test Result

	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	417.15		NVLAP/EPA
	Luminous Efficacy (lm/w)	55.61		NVLAP/EPA
	Correlated Color Temperature (CCT)	2372		NVLAP/EPA
	Color Rendering Index- CRI	85.6		NVLAP/EPA
	Input Power (W)	7.50		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)	0.0677		NVLAP/EPA
	Power Factor	0.9225		NVLAP/EPA
	x(CIE 1931)	0.4855		NVLAP/EPA
	y(CIE 1931)	0.4097		NVLAP/EPA
	u' (CIE 1976)	0.2796		NVLAP/EPA
	v' (CIE 1976)	0.5309		NVLAP/EPA
	Duv(CIE 1976)	0.0017		NVLAP/EPA
	R9	33		NVLAP/EPA
	Beam Angle: (Degree)	113.3		NVLAP/EPA
	Center beam candlepower: (cd)	124		NVLAP/EPA
	Zonal lumen density (0-60°):	65.7%		NVLAP/EPA
	Zonal lumen density (60-90°):	26.1%		NVLAP/EPA
	Zonal lumen density (90-120°):	6.9%		NVLAP/EPA
Zonal lumen density (120-180°):	1.3%		NVLAP/EPA	

## 4 – Spectral Flux Plots



## 5 – EUT Photos

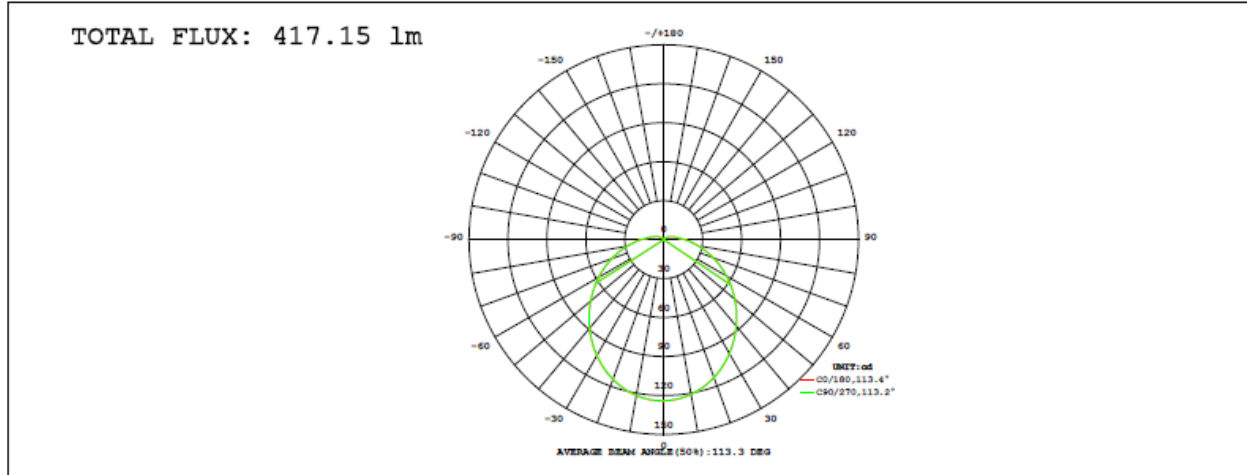




## 6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

### LAMP PHOTOMETRIC REPORT

Electrical: Voltage:120.0V Current:0.0677A Power:7.501W Factor:0.9225		
MODEL: 7.5R20G3DIM/824		
POWER: 7.5W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 55.61 lm/W



γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%
10	121.8	122.0	121.7	121.2	120.9	120.6	120.9	121.5	0- 10	11.71	11.71	2.81
20	114.6	114.7	114.3	113.5	112.9	112.4	112.9	114.0	10- 20	33.29	45.00	10.8
30	103.2	103.2	103.0	101.9	101.2	100.4	101.1	102.6	20- 30	49.89	94.89	22.7
40	89.10	89.06	88.88	87.80	86.90	86.07	86.84	88.55	30- 40	59.58	154.5	37
50	73.66	73.63	73.53	72.44	71.44	70.61	71.35	73.13	40- 50	61.97	216.4	51.9
60	57.95	57.99	57.87	56.72	55.76	54.93	55.59	57.27	50- 60	57.82	274.3	65.7
70	42.57	42.78	42.56	41.36	40.48	39.73	40.25	41.75	60- 70	48.57	322.8	77.4
80	28.49	28.81	28.55	27.44	26.69	26.09	26.46	27.69	70- 80	36.23	359.0	86.1
90	17.49	17.79	17.65	16.85	16.22	15.80	16.15	16.96	80- 90	23.84	382.9	91.8
100	10.70	10.86	10.83	10.38	9.926	9.730	10.03	10.44	90-100	14.49	397.4	95.3
110	7.027	7.108	7.104	6.811	6.519	6.421	6.660	6.919	100-110	8.963	406.3	97.4
120	4.461	4.512	4.492	4.287	4.118	4.072	4.256	4.440	110-120	5.477	411.8	98.7
130	2.647	2.670	2.632	2.499	2.403	2.402	2.541	2.663	120-130	3.059	414.9	99.5
140	1.406	1.392	1.330	1.253	1.230	1.268	1.360	1.434	130-140	1.488	416.4	99.8
150	0.6328	0.5904	0.5092	0.4658	0.4984	0.5644	0.6315	0.6730	140-150	0.5872	417.0	100
160	0.2284	0.1622	0.0834	0.0568	0.1283	0.1936	0.2553	0.2744	150-160	0.1651	417.1	100
170	0.0499	0.0073	0	0	0.0018	0.0239	0.0936	0.1050	160-170	0.0274	417.1	100
180	0	0	0	0	0	0	0	0	170-180	0.0010	417.1	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:0.0677A Power:7.501W Factor:0.9225		
MODEL: 7.5R20G3DIM/824		
POWER: 7.5W	VOLTAGE: 120V	WORKING VOLTAGE: 120.0V
MANUFACTURER: Green Creative		Eff.: 55.61 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	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124			
5	124	124	124	124	124	123	123	123	123	123	123	123	123	123	123	123			
10	122	122	122	122	122	121	121	121	121	121	121	121	121	121	121	122			
15	119	119	119	119	119	118	118	117	117	117	117	117	117	118	118	119			
20	115	115	115	115	114	114	113	113	113	113	112	113	113	113	114	114			
25	109	109	109	109	109	109	108	107	107	107	107	107	107	108	109	109			
30	103	103	103	103	103	103	102	101	101	101	100	101	101	102	103	103			
35	96.4	96.4	96.4	96.3	96.1	95.7	95.1	94.3	94.3	93.7	93.5	93.6	94.2	95.0	95.8	96.5			
40	89.1	89.1	89.1	89.0	88.9	88.5	87.8	87.0	86.9	86.3	86.1	86.3	86.8	87.6	88.5	89.2			
45	81.5	81.5	81.4	81.4	81.3	80.9	80.2	79.3	79.2	78.6	78.4	78.6	79.2	80.0	80.9	81.7			
50	73.7	73.7	73.6	73.6	73.5	73.1	72.4	71.6	71.4	70.8	70.6	70.8	71.4	72.2	73.1	73.9			
55	65.8	65.8	65.8	65.8	65.7	65.3	64.6	63.7	63.6	63.0	62.8	62.9	63.5	64.3	65.2	66.0			
60	57.9	58.0	58.0	58.0	57.9	57.4	56.7	55.9	55.8	55.2	54.9	55.1	55.6	56.4	57.3	58.0			
65	50.2	50.3	50.3	50.3	50.1	49.7	49.0	48.1	48.0	47.5	47.2	47.4	47.8	48.5	49.4	50.2			
70	42.6	42.8	42.8	42.7	42.6	42.1	41.4	40.6	40.5	40.0	39.7	39.8	40.3	40.9	41.8	42.6			
75	35.3	35.5	35.5	35.5	35.3	34.8	34.1	33.4	33.3	32.8	32.6	32.7	33.1	33.6	34.4	35.2			
80	28.5	28.8	28.8	28.8	28.5	28.1	27.4	26.8	26.7	26.3	26.1	26.2	26.5	27.0	27.7	28.4			
85	22.5	22.8	22.8	22.8	22.6	22.2	21.6	21.0	20.9	20.6	20.4	20.5	20.8	21.2	21.8	22.4			
90	17.5	17.7	17.8	17.8	17.7	17.3	16.9	16.3	16.2	15.9	15.8	15.9	16.1	16.5	17.0	17.4			
95	13.6	13.7	13.8	13.8	13.7	13.5	13.1	12.7	12.5	12.3	12.2	12.3	12.6	12.8	13.2	13.6			
100	10.7	10.8	10.9	10.9	10.8	10.7	10.4	10.1	9.93	9.76	9.73	9.83	10.0	10.2	10.4	10.6			
105	8.64	8.71	8.75	8.77	8.74	8.61	8.40	8.16	8.05	7.93	7.92	8.01	8.18	8.35	8.49	8.62			
110	7.03	7.07	7.11	7.13	7.10	6.99	6.81	6.60	6.52	6.42	6.42	6.51	6.66	6.80	6.92	7.02			
115	5.62	5.66	5.69	5.70	5.68	5.59	5.43	5.26	5.22	5.14	5.15	5.23	5.36	5.48	5.58	5.65			
120	4.46	4.49	4.51	4.52	4.49	4.41	4.29	4.15	4.12	4.06	4.07	4.14	4.26	4.36	4.44	4.49			
125	3.47	3.49	3.51	3.51	3.48	3.42	3.32	3.20	3.19	3.15	3.16	3.22	3.32	3.41	3.47	3.51			
130	2.65	2.66	2.67	2.66	2.63	2.58	2.50	2.41	2.40	2.38	2.40	2.45	2.54	2.61	2.66	2.69			
135	1.96	1.96	1.97	1.95	1.92	1.87	1.81	1.75	1.75	1.75	1.77	1.82	1.89	1.95	1.99	2.00			
140	1.41	1.40	1.39	1.37	1.33	1.29	1.25	1.22	1.23	1.24	1.27	1.31	1.36	1.41	1.43	1.44			
145	0.97	0.96	0.94	0.91	0.87	0.84	0.81	0.79	0.81	0.83	0.87	0.91	0.95	0.98	1.00	1.01			
150	0.63	0.61	0.59	0.56	0.51	0.49	0.47	0.47	0.50	0.52	0.56	0.60	0.63	0.66	0.67	0.67			
155	0.39	0.36	0.33	0.30	0.25	0.23	0.21	0.23	0.27	0.30	0.34	0.37	0.40	0.42	0.43	0.43			
160	0.23	0.20	0.16	0.12	0.08	0.07	0.06	0.07	0.13	0.15	0.19	0.23	0.26	0.27	0.27	0.27			
165	0.12	0.09	0.06	0.02	0.00	0.00	0.00	0.00	0.04	0.05	0.09	0.13	0.16	0.18	0.18	0.17			
170	0.05	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.06	0.09	0.11	0.10	0.09			
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

y Range: 0 - 180DEG  
 y Interval: 1.0DEG  
 Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.265  
 Humidity:62.7%  
 Test Distance:2.456m [K=1.0000]