



**IESNA LM-79-08  
ELECTRICAL AND PHOTOMETRIC MEASUREMENTS OF  
SOLID-STATE LIGHTING PRODUCTS  
MEASUREMENT AND TEST REPORT**

For  
**Eiko Limited**

23220 W. 84th Street, Shawnee, KS, USA

**Model: LEDP-18WR40/830-DIM3**

<b>Report Type:</b> Original Report		<b>Product Type:</b> Dimmable directional BR40 lamp	
<b>Test Engineer:</b>	Jack Zhou	<i>Jack Zhou</i>	
<b>Report Number:</b>	RSZ130110510-10		
<b>Test Date:</b>	2012-09-24 to 2012-09-25		
<b>Report Date:</b>	2013-01-14		
<b>Reviewed By:</b>	Jeanne Han /Safety Manager	<i>Jeanne Han</i>	
<b>Note:</b>	This report (Report # RSZ130110510-10) is based on previous report (Report # RSZ120920508-10). .		
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**Note:** The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. This report may contain test method that is not accredited by the NVLAP accreditation and has been remarked in the report.

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## 1 - GENERAL INFORMATION

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

EUT	Rating	Brand	Manufacturer	Model
Dimmable directional BR40 lamp	120V AC 60Hz 18W 3000K	Eiko	Eiko.Ltd.	LEDP-18WR40/830-DIM3

### 1.2 Test Method

The following test report is prepared on behalf of *Eiko Limited* in accordance with the following test methods:

- IESNA LM-79-2008: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products

### 1.3 Test Facility

Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.

## 2 - SUMMARY OF TEST RESULT

<b>SPECTRORADIOMETRIC TESTING IN INTEGRATING SPHERE</b>	
<b>PHOTOMETRIC</b>	-
Total Integrated Flux (Lumens)	1289.385
<b>SPECTRORADIOMETRIC</b>	-
<b>Observer</b>	-
Chromaticity Ordinate x	0.4333
Chromaticity Ordinate y	0.4050
<b>Observer</b>	-
Chromaticity Ordinate u	0.2478
Chromaticity Ordinate v	0.3475
<b>Correlated Color Temp CCT (K)</b>	3070
<b>Color Rendering Index (CRI)</b>	81.8
<b>Total Radiant Flux (W)</b>	3.809
<b>ELECTRICAL</b>	-
Input Voltage (Volts AC)	120.02
Input Current (A AC)	0.158
Input Power (Watts)	17.14
Power Factor	0.903
Total Harmonic Distortion	45.52%
Off State Power(Watts)	0.0
<b>EFFICACY</b>	-
Lumens/Watt	75.227

<b>LUMINOUS INTENSITY DISTRIBUTION</b>	
Center beam candlepower(if applicable)(cd)	442.4
Beam angle(if applicable)( ° )	105.6
Zonal lumens in the 0° -60° zone(%)	72.4%
Zonal lumens in the 60° -90° zone(%)	22.6%
Zonal lumens in the 90° -120° zone(%)	4.0%
Zonal lumens in the 120° -180° zone(%)	1.0%

### **3 - Test Method**

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Test methods according to IESNA LM-79-08 following chapter:

#### **4.0 SEASONING OF SSL PRODUCT**

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning.

#### **5.0 STABILIZATION OF SSL PRODUCT**

Before measurements are taken. The SSL product under test shall be operated long enough to reach stabilization and temperature equilibrium. The time required for stabilization depends on the type of SSL products under test. The stabilization time typically ranges from 30 min (small integrated LED lamps) to 2 or more hours for large SSL luminaires. The SSL product during stabilization shall be operated in the ambient temperature as specified in section 2.2 and in the operating orientation as specified in 6. It can be judged that stability is reached when the variation (maximum –minimum) of at least 3 readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5%. The stabilization time used for each SSL product shall be reported.

#### **9.0 TEST METHODS FOR TOTAL LUMINOUS FLUX MEASUREMENT**

#### **10.0 LUMINOUS INTENSITY DISTRIBUTION**

#### **11.0 LUMINOUS EFFICACY**

#### **12.0 TEST METHODS FOR COLOR CHARACTERISTICS OF SSL PRODUCTS**

#### **13.0 UNCERTAINTY STATEMENT**

The uncertainty of the light output measurements is  $U=1.60\%$  ( $K=2$ ), the uncertainty of the correlated color temperature measurements is  $U=21K$  ( $K=2$ ), at the 95% confidence level. This calibration results traceable to National Primary Standards and International System of Units (SI).

#### **Remark:**

1. 0 hour season, Pre-heating the lamp for 45 minutes at least;
2. Ambient:65%RH, 25°C;

**Attachment A – Spectral Flux**

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## Report of Spectroradiometric & Electric Analysis for Light Source

Product:

Manufacturer: Joinluck

Sample No.: 1#

Tested By: Blake

Date: 9-25-2012

Reviewed By: Jack

### Test Condition

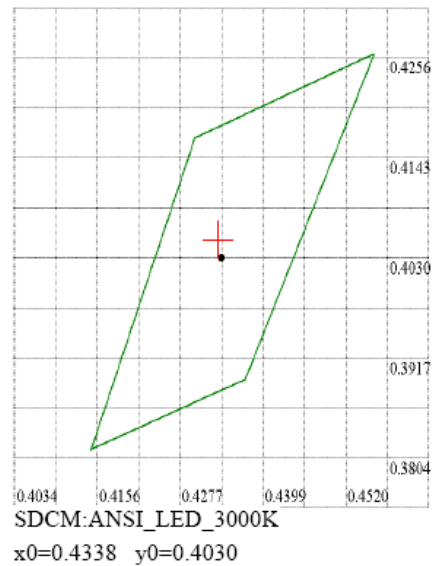
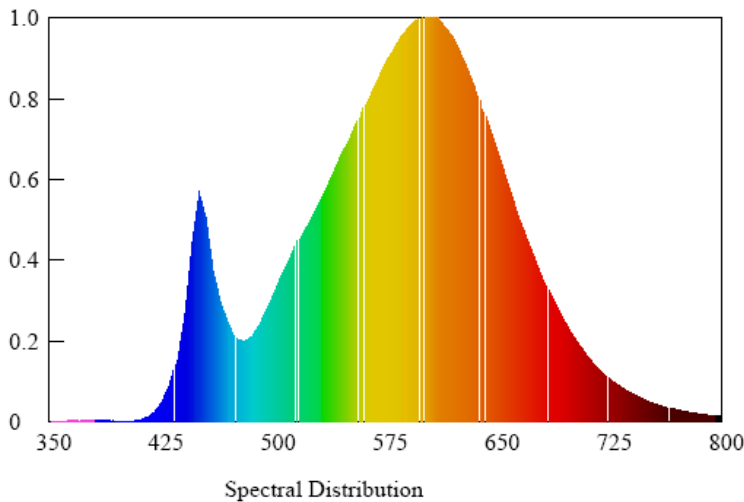
Temperature: 25.0°C

Spectrum Range: 350-800 nm

RH: 65.0%

Scan Step: 5 nm

### Spectroradiometric Parameters



Chromaticity Coordinates: x=0.4333 y=0.4050 u'=0.2478 v'=0.5212

Correlated Color Temperature: 3070 K

Dominant Wavelength: 581.0 nm(E)

Luminous Flux: 1289.385 lm

Purity: 0.5170

Chromaticity Difference: 0.0009Duv

Peak Wavelength: 605.4 nm

Color Ratio: Kr=43.5% Kg=49.6% Kb=6.9%

Color Tolerance: 0.0 SDCM

Bandwidth: 140.7nm

Radiant Flux: 3.809 W

Rendering Index: Ra=81.8

R1=80 R2=89 R3=96 R4=79 R5=79 R6=84 R7=85 R8=63

R9=14 R10=73 R11=76 R12=64 R13=82 R14=97 R15=74

### Electric Parameters

Voltage: 120.02 V

Current: 0.158 A

Power Factor: 0.903

Power: 17.14 W

Luminous Efficacy: 75.227 lm/W

**Attachment B – Light Intensity Test Data**

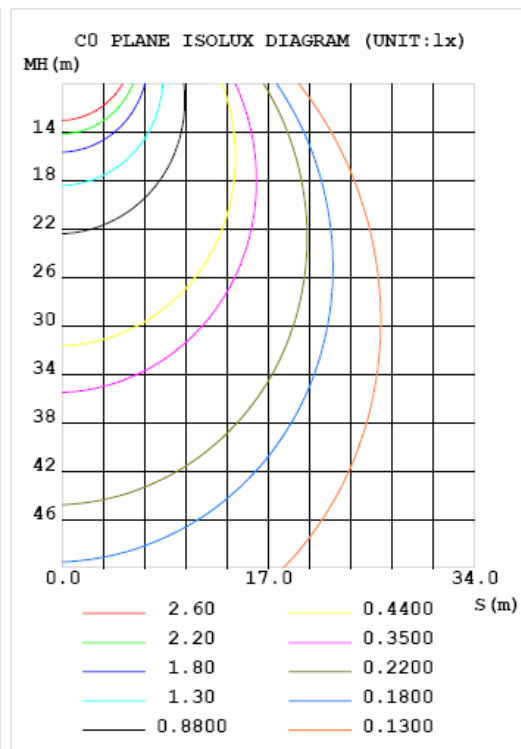
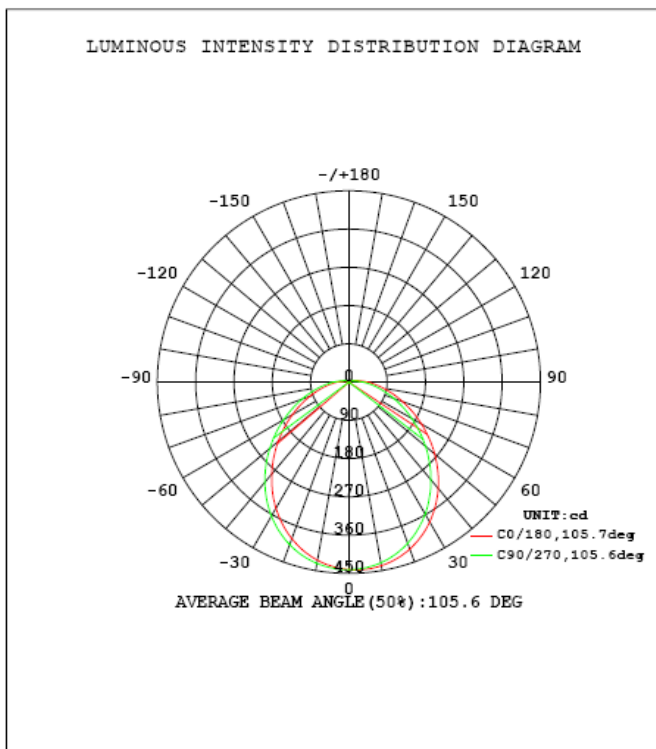
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LUMINAIRE PHOTOMETRIC TEST REPORT

NAME: Joinluck	TYPE:	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Joinluck	SUR.:	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 75.86 lm/W			
MODEL		I <sub>max</sub> (cd)	442.4	S/MH (C0/180)	1.17
NOMINAL POWER (W)	18	LOR (%)	100.0	S/MH (C90/270)	1.23
RATED VOLTAGE (V)	120	TOTAL FLUX (lm)	1301.0	η UP, DN (C0-180)	2.5, 47.4
NOMINAL FLUX (lm)	1300.96	CIE CLASS	DIRECT	η UP, DN (C180-360)	2.5, 47.6
LAMPS INSIDE	1	η up (%)	5.0	CIBSE SHR NOM	1.25
TEST VOLTAGE (V)	120.0	η down (%)	95.0	CIBSE SHR MAX	1.35



C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature: 25.1DEG  
 Operators: Jacky  
 Test Date: 2012-09-24

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System: EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
 Humidity: 52.0%  
 Test Distance: 2.458m [K=1.0000]  
 Remarks:

## EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT

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## ZONAL FLUX DIAGRAM

## ZONAL FLUX DIAGRAM:

$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315	$\gamma$	zone	total	#lum, lamp
10	425.4	428.0	433.1	437.5	438.5	436.3	431.5	426.8	0- 10	41.68	41.68	3.2,3.2
20	391.7	397.1	406.7	415.5	417.9	413.3	403.3	394.5	10- 20	118.7	160.3	12.3,12.3
30	342.8	350.2	364.1	376.3	379.7	372.7	358.1	346.0	20- 30	177.3	337.7	26,26
40	282.3	291.3	307.4	322.3	326.3	317.8	299.8	285.7	30- 40	208.8	546.5	42,42
50	216.9	226.2	242.9	258.7	263.0	254.0	235.0	220.7	40- 50	210.1	756.5	58.2,58.2
60	153.6	162.1	177.4	192.2	196.8	188.2	170.6	157.2	50- 60	185.1	941.6	72.4,72.4
70	97.99	105.0	117.8	130.4	134.5	127.1	112.4	101.0	60- 70	143.1	1085	83.4,83.4
80	55.15	59.98	69.35	78.87	81.93	76.44	65.53	57.30	70- 80	95.83	1181	90.7,90.7
90	28.19	30.55	35.87	41.65	43.75	40.33	34.02	29.49	80- 90	54.92	1235	95,95
100	15.59	16.43	18.53	21.06	22.10	20.66	17.99	16.11	90-100	28.31	1264	97.1,97.1
110	10.03	10.38	11.05	12.00	12.49	12.00	10.87	10.13	100-110	18.21	1279	98.3,98.3
120	7.044	7.196	7.422	7.788	7.943	7.754	7.280	6.987	110-120	9.049	1288	99,99
130	5.125	5.193	5.220	5.308	5.369	5.303	5.121	5.048	120-130	5.614	1294	99.4,99.4
140	3.864	3.860	3.785	3.717	3.724	3.744	3.693	3.754	130-140	3.458	1297	99.7,99.7
150	2.970	2.908	2.818	2.625	2.625	2.697	2.683	2.868	140-150	2.050	1299	99.9,99.9
160	2.362	2.292	2.243	1.927	1.952	2.046	2.007	2.291	150-160	1.132	1300	99.9,99.9
170	1.867	1.670	1.670	1.447	1.482	1.478	1.300	1.799	160-170	0.5353	1301	100,100
180	0	0	0	0	0	0	0	0	170-180	0.1337	1301	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

C Range: 0 - 360DEG  
C Interval: 22.5DEG  
Test Speed: HIGH  
Temperature:25.1DEG  
Operators:Jacky  
Test Date:2012-09-24

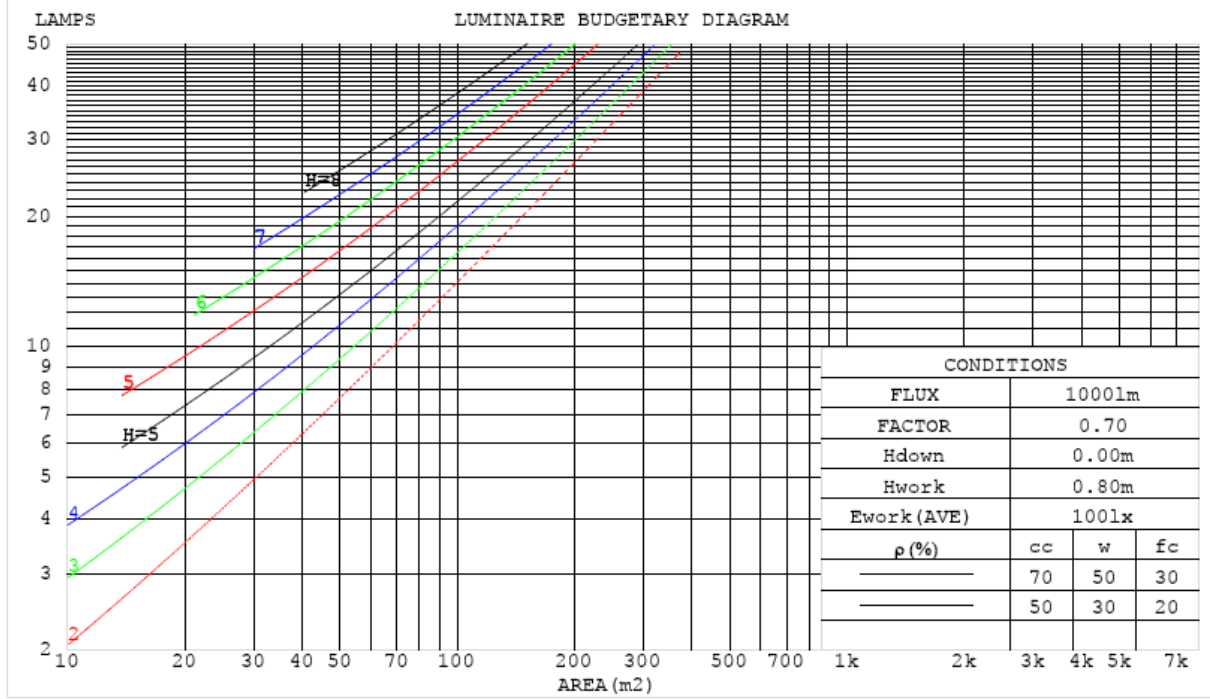
$\gamma$  Range: 0 - 180DEG  
 $\gamma$  Interval: 1.0DEG  
Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
Humidity:52.0%  
Test Distance:2.458m [K=1.0000]  
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

NAME: Joinluck	TYPE:	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Joinluck	SUR.:	PROTECTION ANGLE:

pcc	80%			70%			50%			30%			10%			0
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
pfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio															
	Coefficients of Utilization(CU)															
0.0	1.18	1.18	1.18	1.15	1.15	1.15	1.08	1.08	1.08	1.03	1.03	1.03	.97	.97	.97	.95
1.0	1.01	.97	.93	.99	.94	.91	.93	.90	.87	.89	.86	.83	.84	.82	.80	.77
2.0	.88	.81	.75	.86	.79	.74	.81	.76	.71	.77	.73	.69	.74	.70	.67	.64
3.0	.77	.69	.62	.75	.68	.62	.72	.65	.60	.68	.63	.58	.65	.60	.56	.54
4.0	.69	.60	.53	.67	.59	.52	.64	.57	.51	.61	.55	.50	.58	.53	.49	.46
5.0	.61	.52	.46	.60	.51	.45	.57	.50	.44	.55	.48	.43	.52	.47	.42	.40
6.0	.55	.46	.40	.54	.46	.39	.52	.44	.39	.50	.43	.38	.48	.42	.37	.35
7.0	.50	.41	.35	.49	.41	.35	.47	.40	.34	.45	.39	.34	.43	.38	.33	.31
8.0	.46	.37	.31	.45	.37	.31	.43	.36	.31	.41	.35	.30	.40	.34	.30	.28
9.0	.42	.34	.28	.41	.33	.28	.40	.33	.28	.38	.32	.27	.37	.31	.27	.25
10.0	.39	.31	.26	.38	.31	.25	.37	.30	.25	.36	.29	.25	.34	.29	.24	.23



C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature:25.1DEG  
 Operators:Jacky  
 Test Date:2012-09-24

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
 Humidity:52.0%  
 Test Distance:2.458m [K=1.0000]  
 Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT

WEC AND CCEC

NAME: Joinluck	TYPE:	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Joinluck	SUR.:	PROTECTION ANGLE:

ρcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Wall Exitance Coefficients(WEC)									
0.0																
1.0	.333	.189	.060	.324	.185	.059	.308	.177	.056	.293	.169	.054	.279	.162	.052	
2.0	.301	.165	.051	.294	.162	.050	.279	.155	.048	.266	.149	.047	.254	.144	.045	
3.0	.274	.146	.044	.268	.143	.043	.255	.138	.042	.243	.133	.041	.232	.128	.040	
4.0	.251	.130	.038	.245	.128	.038	.234	.124	.037	.223	.120	.036	.213	.116	.035	
5.0	.231	.118	.034	.225	.116	.034	.215	.112	.033	.206	.108	.032	.197	.105	.032	
6.0	.213	.107	.031	.209	.105	.030	.199	.102	.030	.191	.099	.029	.183	.096	.029	
7.0	.198	.098	.028	.194	.097	.028	.185	.094	.027	.178	.091	.027	.170	.088	.026	
8.0	.185	.090	.025	.181	.089	.025	.173	.087	.025	.166	.084	.024	.160	.082	.024	
9.0	.173	.084	.023	.169	.083	.023	.163	.080	.023	.156	.078	.022	.150	.076	.022	
10.0	.163	.078	.022	.159	.077	.021	.153	.075	.021	.147	.073	.021	.142	.071	.020	

ρcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Ceiling Cavity Exitance Coefficients(CCEC)									
0.0	.229	.229	.229	.196	.196	.196	.133	.133	.133	.077	.077	.077	.025	.025	.025	
1.0	.221	.195	.171	.189	.167	.147	.129	.115	.102	.074	.066	.059	.024	.021	.019	
2.0	.212	.171	.136	.182	.147	.117	.125	.102	.082	.072	.059	.048	.023	.019	.016	
3.0	.204	.153	.113	.175	.132	.098	.120	.092	.069	.070	.054	.040	.022	.017	.013	
4.0	.197	.140	.097	.169	.121	.085	.116	.085	.060	.067	.050	.035	.022	.016	.012	
5.0	.189	.130	.087	.162	.113	.075	.112	.079	.053	.065	.046	.032	.021	.015	.010	
6.0	.182	.122	.079	.156	.105	.069	.108	.074	.049	.063	.043	.029	.020	.014	.010	
7.0	.175	.115	.073	.150	.100	.064	.104	.070	.045	.060	.041	.027	.020	.013	.009	
8.0	.168	.109	.069	.145	.095	.060	.100	.066	.042	.058	.039	.025	.019	.013	.008	
9.0	.162	.104	.065	.140	.091	.057	.097	.064	.040	.056	.038	.024	.018	.012	.008	
10.0	.157	.100	.062	.135	.087	.054	.094	.061	.039	.055	.036	.023	.018	.012	.008	

C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature:25.1DEG  
 Operators:Jacky  
 Test Date:2012-09-24

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
 Humidity:52.0%  
 Test Distance:2.458m [K=1.0000]  
 Remarks:

## EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT

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## Uncorrected UGR Table

NAME: Joinluck		TYPE:					WEIGHT:				
DIM.:		SPEC.:					SERIAL No.:				
MFR.: Joinluck		SUR.:					PROTECTION ANGLE:				
ceiling/cavity	0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3	
walls	0.5	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3	
working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Room dimensions	Viewed crosswise					Viewed endwise					
x = 2H y = 2H	16.2	17.6	16.5	17.9	18.2	16.7	18.2	17.0	18.5	18.8	
3H	17.6	19.0	18.0	19.3	19.6	18.3	19.7	18.7	20.0	20.3	
4H	18.3	19.6	18.7	19.9	20.3	19.1	20.4	19.5	20.7	21.1	
6H	18.9	20.2	19.3	20.5	20.9	19.9	21.1	20.3	21.4	21.8	
8H	19.3	20.4	19.7	20.8	21.2	20.3	21.4	20.7	21.8	22.2	
12H	19.6	20.7	20.0	21.1	21.5	20.7	21.8	21.1	22.2	22.6	
4H 2H	16.8	18.1	17.2	18.4	18.8	17.2	18.5	17.6	18.8	19.2	
3H	18.4	19.6	18.9	20.0	20.4	19.0	20.2	19.5	20.5	21.0	
4H	19.3	20.3	19.7	20.7	21.2	20.0	21.0	20.4	21.4	21.8	
6H	20.1	21.0	20.6	21.4	21.9	20.9	21.8	21.4	22.3	22.7	
8H	20.5	21.3	21.0	21.8	22.3	21.4	22.2	21.9	22.7	23.2	
12H	20.9	21.7	21.4	22.2	22.7	21.9	22.7	22.4	23.2	23.7	
8H 4H	19.6	20.5	20.1	21.0	21.5	20.2	21.1	20.7	21.6	22.1	
6H	20.7	21.4	21.2	21.9	22.4	21.4	22.1	21.9	22.6	23.2	
8H	21.2	21.9	21.8	22.4	23.0	22.0	22.7	22.6	23.2	23.8	
12H	21.9	22.4	22.4	23.0	23.5	22.8	23.3	23.3	23.9	24.5	
12H 4H	19.7	20.5	20.2	21.0	21.5	20.3	21.1	20.8	21.5	22.1	
6H	20.8	21.5	21.4	22.0	22.5	21.5	22.1	22.0	22.7	23.2	
8H	21.5	22.0	22.0	22.6	23.1	22.2	22.8	22.8	23.3	23.9	
Variations with the observer position at spacings:											
S = 1.0H	+ 0.2 / - 0.2					+ 0.1 / - 0.2					
1.5H	+ 0.2 / - 0.3					+ 0.2 / - 0.2					
2.0H	+ 0.1 / - 0.3					+ 0.1 / - 0.3					

CIE Pub.117 Corrected 1301 lm Total Lamp Luminous Flux. ( $81\log(F/F_0) = 0.9$ )

C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature: 25.1DEG  
 Operators: Jacky  
 Test Date: 2012-09-24

$\gamma$  Range: 0 - 180DEG  
 $\gamma$  Interval: 1.0DEG  
 Test System: EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
 Humidity: 52.0%  
 Test Distance: 2.458m [K=1.0000]  
 Remarks:

## EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT

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## UTILIZATION FACTORS TABLE

NAME: Joinluck	TYPE:	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Joinluck	SUR.:	PROTECTION ANGLE:

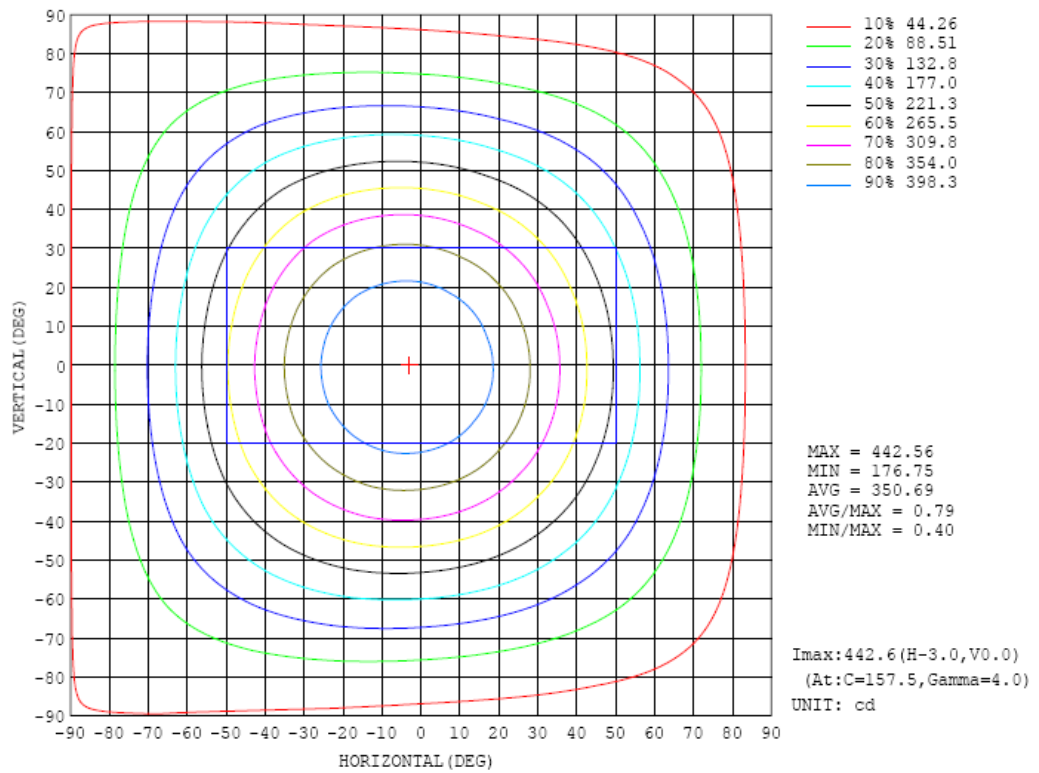
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS (PERCENT) $k(RI) \times RCR = 5$									
k = 0.60	56	44	37	55	44	37	54	43	37	30
0.80	66	54	46	64	53	46	62	52	46	39
1.00	74	62	55	72	61	54	70	63	54	46
1.25	80	70	62	79	69	62	76	67	61	53
1.50	85	75	68	83	74	67	80	72	66	57
2.00	92	83	76	90	82	75	86	79	73	64
2.50	96	88	81	94	86	80	89	83	78	68
3.00	99	92	86	97	90	85	92	87	82	72
4.00	104	97	92	101	95	90	96	91	87	77
5.00	106	101	96	103	98	94	98	94	90	80
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004			Suspended				SHRNOM = 1.25			

C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature: 25.1DEG  
 Operator: Jacky  
 Test Date: 2012-09-24

$\gamma$  Range: 0 - 180DEG  
 $\gamma$  Interval: 1.0DEG  
 Test System: EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
 Humidity: 52.0%  
 Test Distance: 2.458m [K=1.0000]  
 Remarks:

ISOCANDELA DIAGRAM

NAME: Joinluck	TYPE:	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Joinluck	SUR.:	PROTECTION ANGLE:

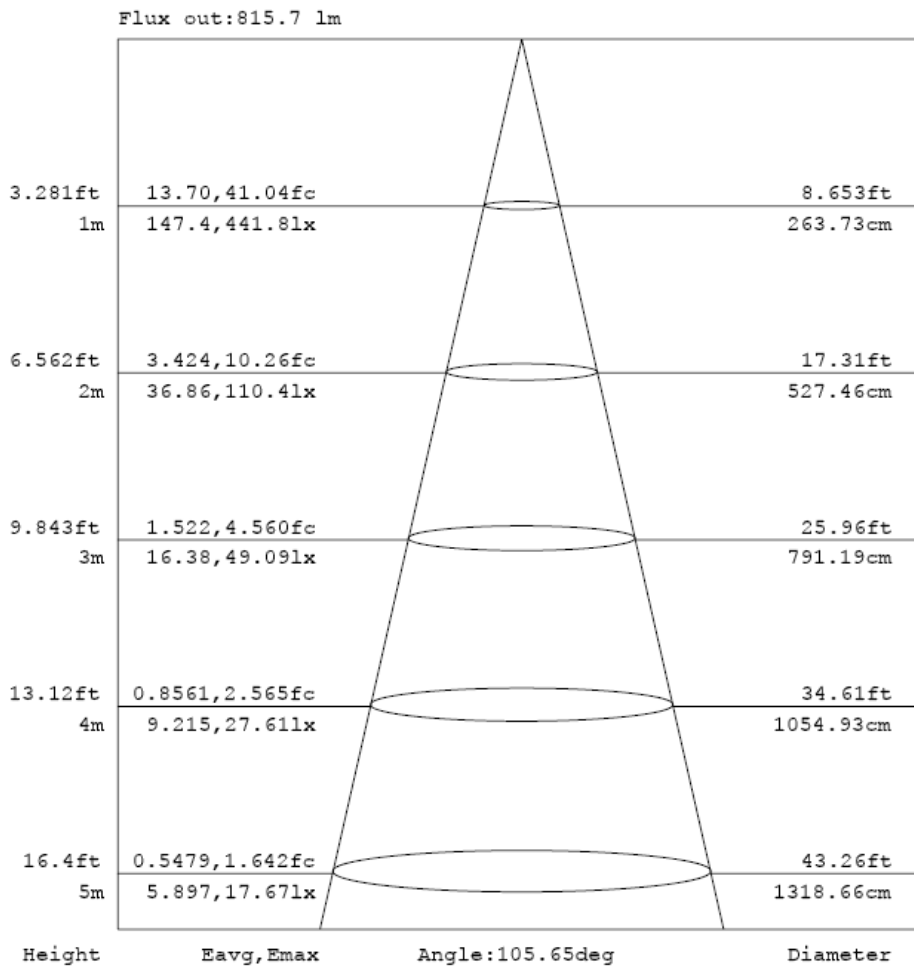


C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature: 25.1DEG  
 Operators: Jacky  
 Test Date: 2012-09-24

$\gamma$  Range: 0 - 180DEG  
 $\gamma$  Interval: 1.0DEG  
 Test System: EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
 Humidity: 52.0%  
 Test Distance: 2.458m [K=1.0000]  
 Remarks:

AAI Figure

NAME: Joinluck	TYPE:	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Joinluck	SUR.:	PROTECTION ANGLE:



Note:The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

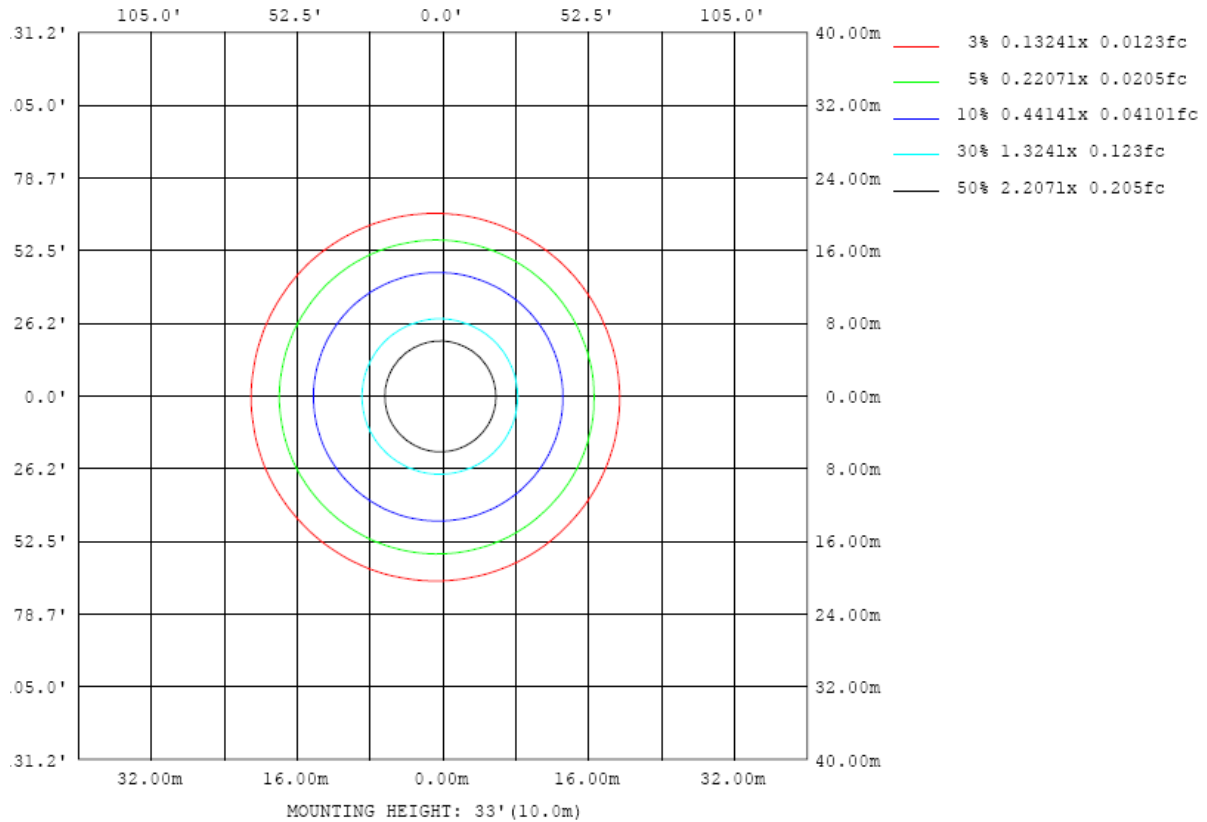
C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature:25.1DEG  
 Operators:Jacky  
 Test Date:2012-09-24

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
 Humidity:52.0%  
 Test Distance:2.458m [K=1.0000]  
 Remarks:



ISOLUX DIAGRAM

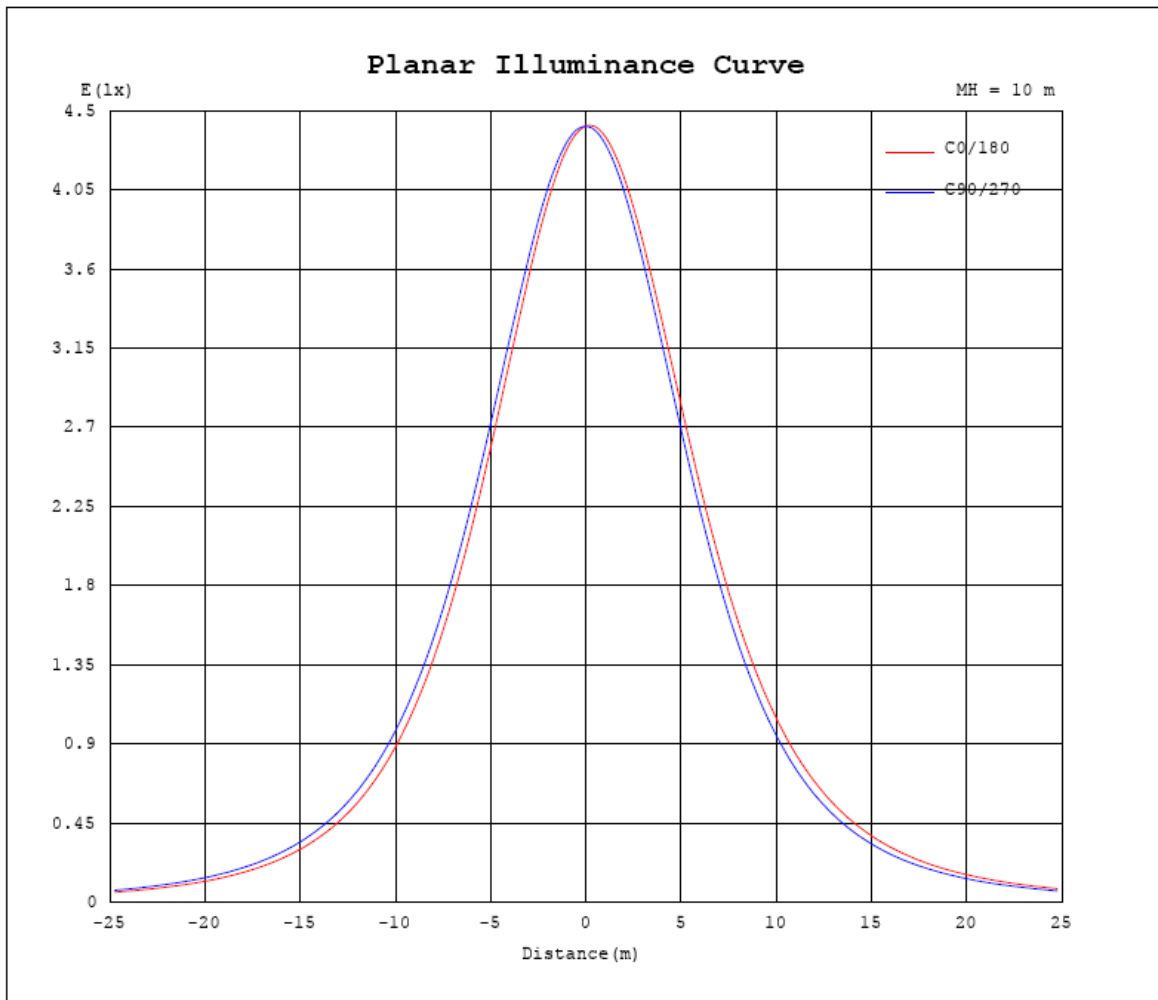
NAME: Joinluck	TYPE:	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Joinluck	SUR.:	PROTECTION ANGLE:



C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature: 25.1DEG  
 Operators: Jacky  
 Test Date: 2012-09-24

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System: EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
 Humidity: 52.0%  
 Test Distance: 2.458m [K=1.0000]  
 Remarks:

Planar Illuminance Curve



C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature:25.1DEG  
 Operators:Jacky  
 Test Date:2012-09-24

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
 Humidity:52.0%  
 Test Distance:2.458m [K=1.0000]  
 Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT

LUMINOUS DISTRIBUTION INTENSITY DATA

NAME: Joinluck	TYPE:	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Joinluck	SUR.:	PROTECTION ANGLE:

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	441	441	441	441	441	441	441	441	441	441	441	441	441	441	441	441			
5	436	436	437	438	439	441	442	442	442	442	441	440	439	437	436	436			
10	425	426	428	431	433	436	437	439	438	438	436	434	431	429	427	425			
15	411	412	415	419	422	426	429	431	431	429	427	423	420	416	413	411			
20	392	394	397	402	407	412	416	418	418	416	413	408	403	398	395	392			
25	369	371	375	381	387	394	398	401	401	398	395	389	383	376	372	369			
30	343	346	350	357	364	371	376	380	380	377	373	365	358	351	346	342			
35	314	317	322	330	337	346	351	355	354	351	347	338	330	322	317	313			
40	282	286	291	300	307	316	322	327	326	323	318	309	300	291	286	282			
45	250	253	259	268	276	285	291	296	296	292	286	277	268	259	253	249			
50	217	221	226	235	243	252	259	263	263	259	254	244	235	226	221	216			
55	185	188	194	202	210	219	225	230	230	226	221	212	202	193	188	184			
60	154	157	162	170	177	186	192	197	197	193	188	179	171	162	157	153			
65	124	127	132	140	146	155	160	165	165	161	157	149	140	132	128	124			
70	98.0	101	105	111	118	125	130	135	134	132	127	120	112	105	101	97.9			
75	74.8	76.9	80.6	86.1	91.8	98.2	103	107	107	104	100	93.9	87.3	81.0	77.3	74.7			
80	55.2	56.8	60.0	64.5	69.3	74.8	78.9	82.0	81.9	79.8	76.4	71.1	65.5	60.5	57.3	55.1			
85	39.5	40.9	43.0	46.8	50.4	55.0	58.4	60.9	60.8	59.2	56.3	51.8	47.7	43.5	41.3	39.5			
90	28.2	29.1	30.6	33.2	35.9	39.3	41.7	43.8	43.8	42.3	40.3	37.0	34.0	31.1	29.5	28.2			
95	20.6	21.1	22.0	23.7	25.5	27.8	29.4	30.9	30.9	29.9	28.6	26.4	24.4	22.4	21.4	20.6			
100	15.6	15.9	16.4	17.5	18.5	20.0	21.1	22.1	22.1	21.5	20.7	19.3	18.0	16.8	16.1	15.6			
105	12.3	12.6	12.8	13.4	14.0	14.9	15.6	16.2	16.3	15.9	15.4	14.6	13.8	13.0	12.6	12.3			
110	10.0	10.2	10.3	10.7	11.1	11.6	12.0	12.4	12.5	12.2	12.0	11.4	10.9	10.4	10.1	10.00			
115	8.36	8.44	8.58	8.76	8.99	9.30	9.57	9.79	9.82	9.73	9.53	9.17	8.83	8.51	8.36	8.30			
120	7.04	7.10	7.20	7.30	7.42	7.61	7.79	7.94	7.94	7.90	7.75	7.52	7.28	7.07	6.99	6.99			
125	5.97	6.04	6.08	6.14	6.18	6.31	6.40	6.51	6.50	6.48	6.38	6.22	6.08	5.92	5.91	5.92			
130	5.13	5.18	5.19	5.22	5.22	5.28	5.31	5.40	5.37	5.33	5.30	5.20	5.12	5.02	5.04	5.08			
135	4.43	4.47	4.46	4.46	4.43	4.44	4.44	4.49	4.46	4.44	4.44	4.38	4.34	4.29	4.34	4.40			
140	3.86	3.89	3.86	3.83	3.78	3.76	3.72	3.76	3.72	3.72	3.74	3.71	3.69	3.68	3.75	3.83			
145	3.38	3.39	3.35	3.32	3.25	3.20	3.12	3.15	3.12	3.12	3.17	3.15	3.15	3.17	3.27	3.35			
150	2.97	2.98	2.91	2.89	2.82	2.73	2.63	2.64	2.62	2.63	2.70	2.68	2.68	2.72	2.87	2.94			
155	2.63	2.61	2.54	2.55	2.48	2.35	2.22	2.22	2.23	2.26	2.32	2.32	2.31	2.36	2.56	2.62			
160	2.36	2.27	2.29	2.31	2.24	2.08	1.93	1.89	1.95	2.02	2.05	2.05	2.01	2.06	2.29	2.37			
165	2.03	1.93	1.93	2.00	1.95	1.82	1.71	1.68	1.75	1.81	1.80	1.75	1.69	1.79	2.00	2.02			
170	1.87	1.77	1.67	1.75	1.67	1.54	1.45	1.43	1.48	1.51	1.48	1.49	1.30	1.60	1.80	1.85			
175	1.63	1.58	1.52	1.50	1.49	1.38	1.30	1.34	1.39	1.26	1.25	1.12	1.19	1.38	1.65	1.64			
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:25.1DEG  
 Operators:Jacky  
 Test Date:2012-09-24

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.270  
 Humidity:52.0%  
 Test Distance:2.458m [K=1.0000]  
 Remarks:

## **Attachment C – Color Spatial Uniformity**

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C0 /180										
Gamma/C	I(cd)	CIE x	CIE y	CIE u'	CIE v'	CCT(K)	Ra	dEuv(NBS)	du'v'	Ip
-60	149.66	0.4330	0.4054	0.2475	0.5213	3079	81.7	1.73	0.0013	22760
-55	180.38	0.4338	0.4058	0.2478	0.5216	3068	81.8	1.17	0.0008	27542
-50	212.51	0.4344	0.4061	0.2481	0.5218	3059	81.7	0.71	0.0005	32464
-45	245.20	0.4349	0.4063	0.2483	0.5220	3053	81.8	0.37	0.0002	37635
-40	277.80	0.4351	0.4064	0.2484	0.5220	3050	81.8	0.20	0.0001	42691
-35	308.91	0.4353	0.4066	0.2484	0.5221	3049	81.8	0.12	0.0001	47555
-30	338.56	0.4353	0.4067	0.2484	0.5222	3049	81.8	0.10	0.0001	52140
-25	365.31	0.4352	0.4067	0.2483	0.5222	3051	81.8	0.20	0.0001	56279
-20	388.52	0.4359	0.4067	0.2488	0.5223	3040	81.7	0.36	0.0003	30507
-15	408.01	0.4358	0.4067	0.2487	0.5223	3041	81.7	0.27	0.0003	32060
-10	422.97	0.4357	0.4068	0.2486	0.5222	3043	81.7	0.19	0.0002	33341
-5	433.99	0.4355	0.4067	0.2486	0.5222	3045	81.7	0.09	0.0001	34241
0	440.00	0.4354	0.4066	0.2485	0.5222	3047	81.7	0.00	0.0001	34796
5	441.46	0.4354	0.4067	0.2485	0.5222	3047	81.8	0.05	0.0001	34965
10	438.68	0.4355	0.4067	0.2485	0.5222	3046	81.7	0.07	0.0001	34847
15	431.20	0.4355	0.4068	0.2485	0.5222	3045	81.7	0.10	0.0001	34342
20	419.33	0.4356	0.4068	0.2486	0.5222	3044	81.7	0.15	0.0002	33505
25	402.43	0.4358	0.4068	0.2487	0.5223	3042	81.7	0.25	0.0003	32332
30	381.75	0.4358	0.4068	0.2487	0.5223	3041	81.8	0.31	0.0003	30817
35	357.40	0.4359	0.4068	0.2487	0.5223	3040	81.7	0.34	0.0003	28970
40	329.74	0.4358	0.4066	0.2488	0.5222	3040	81.7	0.36	0.0003	26850
45	299.27	0.4357	0.4066	0.2487	0.5222	3041	81.7	0.28	0.0003	24439
50	266.67	0.4354	0.4065	0.2485	0.5221	3046	81.7	0.12	0.0001	21929
55	233.61	0.4349	0.4063	0.2484	0.5219	3052	81.7	0.33	0.0002	19355
60	200.59	0.4343	0.4060	0.2481	0.5217	3059	81.7	0.75	0.0005	16725

C90/270										
Gamma/C	I(cd)	CIE x	CIE y	CIE u'	CIE v'	CCT(K)	Ra	dEuv(NBS)	du'v'	Ip
-60	167.18	0.4335	0.4056	0.2477	0.5215	3072	81.7	1.35	0.0010	25434
-55	198.84	0.4343	0.4060	0.2481	0.5217	3060	81.7	0.77	0.0005	15453
-50	231.05	0.4349	0.4061	0.2484	0.5219	3051	81.7	0.40	0.0002	18026
-45	264.19	0.4354	0.4064	0.2486	0.5221	3045	81.7	0.18	0.0001	20630
-40	296.21	0.4358	0.4066	0.2488	0.5222	3040	81.7	0.36	0.0003	23155
-35	326.88	0.4360	0.4067	0.2488	0.5223	3037	81.7	0.48	0.0004	25620
-30	354.73	0.4361	0.4068	0.2488	0.5223	3037	81.7	0.48	0.0004	27787
-25	379.80	0.4360	0.4068	0.2488	0.5223	3038	81.7	0.44	0.0004	29832
-20	400.91	0.4359	0.4068	0.2487	0.5223	3040	81.8	0.34	0.0003	31518
-15	417.54	0.4357	0.4067	0.2487	0.5222	3042	81.7	0.25	0.0002	32875
-10	429.59	0.4356	0.4067	0.2486	0.5222	3044	81.8	0.14	0.0002	33902
-5	437.02	0.4355	0.4067	0.2486	0.5222	3045	81.7	0.09	0.0001	34529
0	439.99	0.4355	0.4067	0.2485	0.5222	3046	81.8	0.06	0.0001	34856
5	438.64	0.4355	0.4067	0.2485	0.5222	3046	81.7	0.04	0.0001	34782
10	432.81	0.4355	0.4067	0.2485	0.5222	3046	81.7	0.06	0.0001	34421
15	422.53	0.4356	0.4068	0.2486	0.5222	3045	81.8	0.13	0.0002	33796
20	407.89	0.4357	0.4067	0.2486	0.5222	3043	81.7	0.21	0.0002	32664
25	388.89	0.4358	0.4068	0.2487	0.5223	3042	81.7	0.25	0.0003	31279
30	365.96	0.4351	0.4067	0.2483	0.5221	3053	81.8	0.31	0.0002	58044
35	339.51	0.4352	0.4067	0.2483	0.5222	3050	81.8	0.19	0.0001	54224
40	310.15	0.4353	0.4066	0.2484	0.5221	3049	81.8	0.14	0.0001	49698
45	278.63	0.4352	0.4066	0.2484	0.5221	3050	81.7	0.16	0.0001	44978
50	245.98	0.4349	0.4063	0.2483	0.5220	3053	81.8	0.38	0.0002	39897
55	213.00	0.4345	0.4061	0.2481	0.5218	3058	81.8	0.66	0.0004	34758
60	180.63	0.4331	0.4058	0.2474	0.5215	3079	81.9	1.68	0.0012	58178

Weighted Average Point	
u'	v'
0.2485	0.5221

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**Attachment D – EUT PHOTO**

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**D1.EUT PHOTO**



**D2.EUT PHOTO**

