Lab Code: 200707-0

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-11WR30/830-DIM

Report Type: Original Report	**Product Type:** Dimmable directional BR30 lamp
Test Engineer:	Jack Zhou
Report Number:	RSZ120808517-10
Test Date:	2012-07-24
Report Date:	2012-08-08
Reviewed By:	Jeanne Han
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen). 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China. Tel: +86-755-33320018 Fax: +86-755-33320008

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT	Rating	Brand	Manufacturer	Model
Dimmable directional BR30 lamp	AC120V 60Hz 11W 3000K	Eiko	Eiko Limited	LEDP-11WR30/830-DIM

1.2 Objective

The following test report is prepared on behalf of *Eiko Limited* in accordance with the following American National Standards or illumination Engineering Society of North America Test Guides:

- ANSI C78.377-2008 Specification for the Chromaticity of Solid State Lighting Products
- IESNA LM-79-2008: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- ANSI/UL 153-2005: Portable Electric Luminaires
- UL 1598-2004: Luminaires
- ASTM E 283-2004: Restricted air movement
- IESNA LM-16: Correlated Color Temperature
- INSNA LM-58-94: Color Rendering Index and Correlated Color Temperature
- CIE Publication No.13.3-1995: Method of Measuring and Specifying Color Rendering of Light Sources

1.3 Test Facility

The test facility used by Bay Area Compliance Laboratories Corp. (Shenzhen). is6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade ZoneShenzhen, Guangdong, China.

Bay Area Compliance Laboratories Corp. (Shenzhen). is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (NVLAP). The NVLAP Lab Code is 200707-0.

2 - SUMMARY OF TEST RESULT

SPECTRORADIOMETRIC TESTING IN INTEGRATING SPHERE	
PHOTOMETRIC	-
Total Integrated Flux (Lumens)	857.308
SPECTRORADIOMETRIC	-
Observer	-
Chromaticity Ordinate x	0.4379
Chromaticity Ordinate y	0.4028
Observer	-
Chromaticity Ordinate u'	0.2517
Chromaticity Ordinate v'	0.5210
Correlated Color Temp CCT (K)	2973
Color Rendering Index (CRI)	81.5
Total Radiant Flux (W)	2.426
ELECTRICAL	-
Input Voltage (Volts AC)	120.02
Input Current (A AC)	0.114
Input Power (Watts)	10.04
Power Factor	0.734
Total Harmonic Distortion	88.68%
Off State Power(Watts)	0.0
EFFICACY	-
Lumens/Watt	85.389

LUMINOUS INTENSITY DISTRIBUTION	
Center beam candlepower(if applicable)(cd)	290.7
Beam angle(if applicable)(°)	107.0
Zonal lumens in the 0° -60° zone(%)	71.6%
Zonal lumens in the 60° -90° zone(%)	23.2%
Zonal lumens in the 90° -120° zone(%)	4.2%
Zonal lumens in the 120° -180° zone(%)	1.0%

Note: The test data was only good for the test sample. It may have deviation for other test sample.

3 - Test Method

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 fir 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 luminaries. 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 reading 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 TLTAL 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*=1.50% (K=2), the uncertainty of the correlated color temperature measurements is *U*=14K (K=2), at the 95% confidence level. This calibration results traceable to the NATIONAL INSTITUTE OF METROLOGY (NIM).

Remark:

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

Attachment A – Spectral Flux

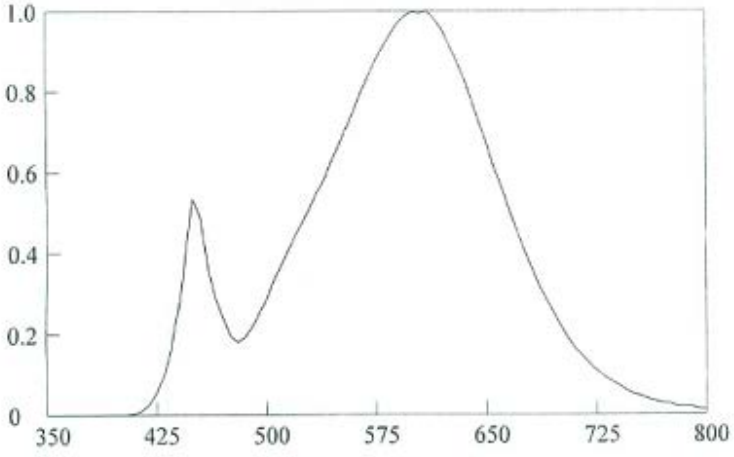
Report of Spectroradiometric & Electric Analysis for Light Source

Product: LEDP-11WR30/830-DIM
Manufacturer: Joinluck
Sample No.: 1# Date: 7-24-2012
Tested By: Blake Reviewed By: Jack

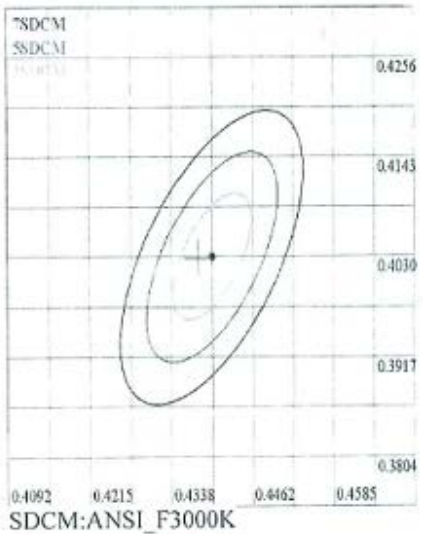
Test Condition

Temperature: 25.0°C RH: 65.0%
Spectrum Range: 350-800 nm Scan Step: 5 nm

Spectroradiometric Parameters



Spectral Distribution



SDCM:ANSI_F3000K
x0=0.4400 y0=0.4030

Chromaticity Coordinates: x=0.4379 y=0.4028 u'=0.2517 v'=0.5210
Correlated Color Temperature: 2973 K Dominant Wavelength: 582.0 nm(E)
Luminous Flux: 857.308 lm Purity: 0.5241
Chromaticity Difference: -0.0006Duv Peak Wavelength: 608.6 nm
Color Ratio: Kr=44.5% Kg=48.9% Kb=6.6% Color Tolerance: 1.3 SDCM
Bandwidth: 137.4nm Radiant Flux: 2.426 W
Rendering Index: Ra=81.5

R1=79	R2=89	R3=96	R4=78	R5=78	R6=85	R7=84	R8=62
R9=13	R10=74	R11=75	R12=66	R13=82	R14=98	R15=74	

Electric Parameters

Voltage: 120.02 V Current: 0.114 A
Power Factor: 0.734 Power: 10.04 W

Luminous Efficacy: 85.389 lm/W

Attachment B – Light Intensity Test Data

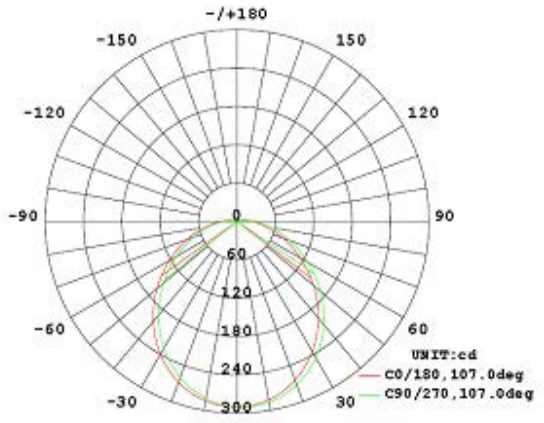
EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 1 Of 11

LUMINAIRE PHOTOMETRIC TEST REPORT

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

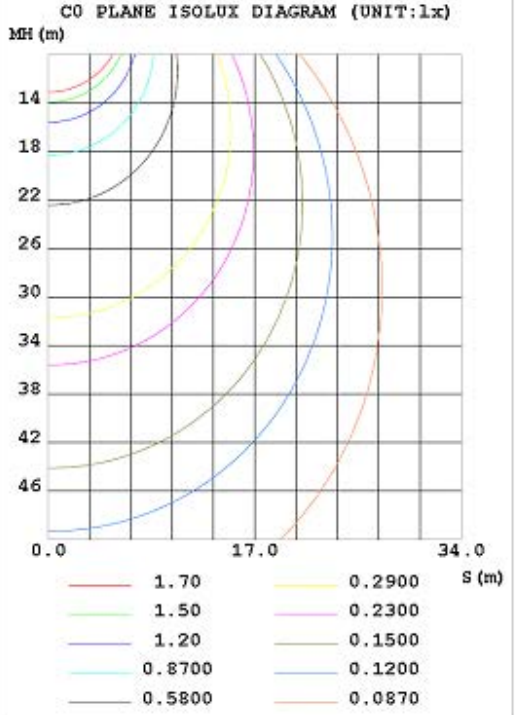
DATA OF LAMP		PHOTOMETRIC DATA		Eff: 82.94 lm/W	
MODEL	LEDP-11WR30/830-DIM	Imax(cd)	290.7	S/MH(C0/180)	1.23
NOMINAL POWER(W)	11	LOR(%)	100.0	S/MH(C90/270)	1.18
RATED VOLTAGE(V)	120	TOTAL FLUX(lm)	870.89	η UP,DN(C0-180)	2.5,45.9
NOMINAL FLUX(lm)	870.893	CIE CLASS	DIRECT	η UP,DN(C180-360)	2.7,48.9
LAMPS INSIDE	1	η up(%)	5.2	CIBSE SHR NOM	1.25
TEST VOLTAGE(V)	120.1	η down(%)	94.8	CIBSE SHR MAX	1.35

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



AVERAGE BEAM ANGLE(50%):107.0 DEG

C0 PLANE ISOLUX DIAGRAM (UNIT:lx)



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:Jacky
Test Date:2012-07-24

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

ZONAL FLUX DIAGRAM

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	285.0	282.5	281.1	281.4	283.3	285.6	287.3	287.0	0- 10	27.42	27.42	3.15,3.15
20	267.7	262.7	260.0	260.6	264.4	268.9	272.3	271.9	10- 20	77.97	105.4	12.1,12.1
30	239.6	233.0	229.3	230.0	234.9	241.0	245.8	245.6	20- 30	116.5	221.9	25.5,25.5
40	204.1	195.8	191.3	192.1	197.6	204.8	210.7	210.7	30- 40	137.5	359.4	41.3,41.3
50	163.6	155.3	150.3	150.9	156.0	163.8	170.3	170.6	40- 50	139.5	498.9	57.3,57.3
60	122.1	114.2	109.5	109.8	114.2	121.2	127.7	128.2	50- 60	124.4	623.3	71.6,71.6
70	83.31	76.40	72.43	72.53	75.95	81.93	87.76	88.23	60- 70	97.70	721.0	82.8,82.8
80	49.97	44.93	41.99	42.05	44.61	48.96	53.39	53.72	70- 80	66.45	787.4	90.4,90.4
90	26.22	23.32	21.69	21.66	23.04	25.53	28.25	28.48	80- 90	38.38	825.8	94.8,94.8
100	13.39	12.15	11.50	11.48	12.01	13.07	14.41	14.49	90-100	19.67	845.5	97.1,97.1
110	7.849	7.293	6.953	6.956	7.187	7.655	8.208	8.277	100-110	10.42	855.9	98.3,98.3
120	5.160	4.806	4.627	4.649	4.767	5.014	5.367	5.446	110-120	6.113	862.0	99,99
130	3.648	3.364	3.224	3.283	3.319	3.469	3.758	3.862	120-130	3.763	865.8	99.4,99.4
140	2.721	2.433	2.331	2.428	2.381	2.485	2.769	2.906	130-140	2.329	868.1	99.7,99.7
150	2.170	1.825	1.772	1.920	1.773	1.848	2.168	2.338	140-150	1.416	869.5	99.8,99.8
160	1.911	1.530	1.449	1.650	1.482	1.513	1.867	2.038	150-160	0.8405	870.4	99.9,99.9
170	1.595	1.055	0.8025	1.084	1.031	1.146	1.506	1.746	160-170	0.4241	870.8	100,100
180	0.0374	0.0375	0.0367	0.0372	0.0374	0.0371	0.0365	0.0368	170-180	0.1034	870.9	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:Jacky
Test Date:2012-07-24

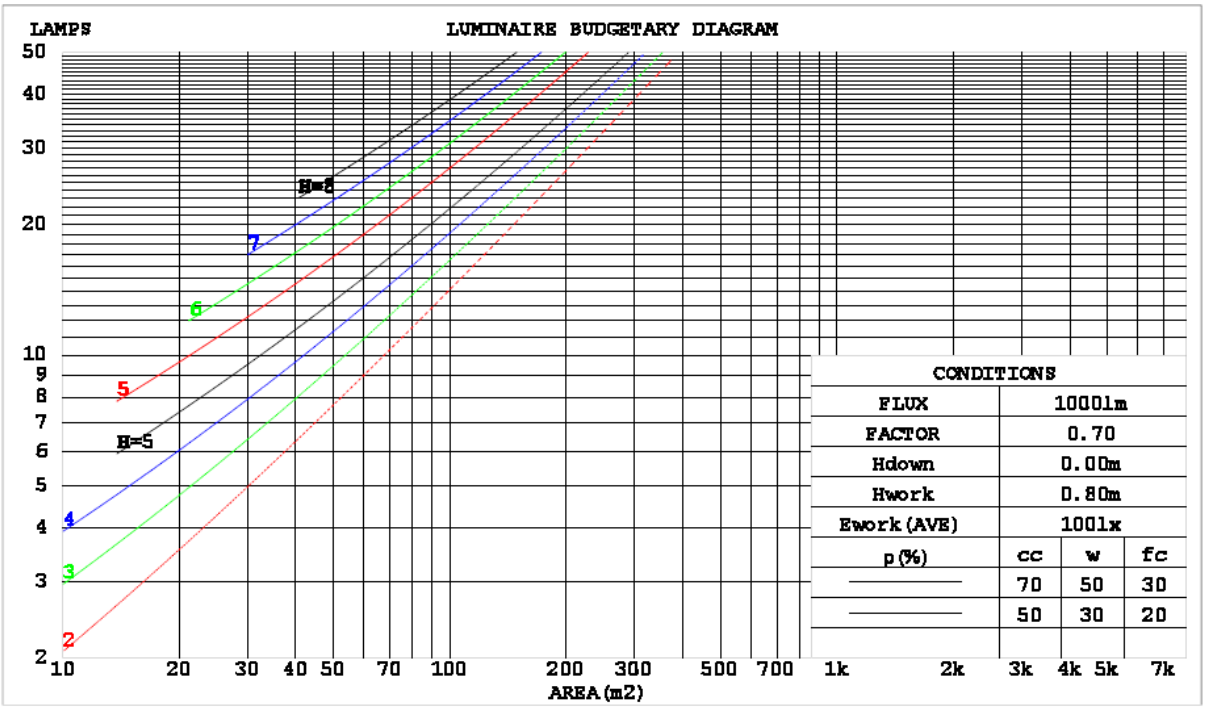
γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 3 Of 11

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

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			Coefficients of Utilization(CU)												
0.0	1.18	1.18	1.18	1.14	1.14	1.14	1.08	1.08	1.08	1.03	1.03	1.03	.97	.97	.97	.95
1.0	1.01	.97	.92	.98	.94	.90	.93	.90	.86	.88	.86	.83	.84	.82	.80	.77
2.0	.88	.81	.75	.86	.79	.73	.81	.76	.71	.77	.72	.68	.73	.70	.66	.64
3.0	.77	.69	.62	.75	.67	.61	.71	.65	.59	.68	.62	.58	.65	.60	.56	.53
4.0	.68	.59	.52	.67	.58	.52	.63	.56	.50	.60	.54	.49	.58	.52	.48	.46
5.0	.61	.52	.45	.60	.51	.45	.57	.49	.44	.54	.48	.43	.52	.46	.42	.39
6.0	.55	.46	.39	.54	.45	.39	.51	.44	.38	.49	.43	.37	.47	.41	.37	.35
7.0	.50	.41	.35	.49	.40	.34	.47	.39	.34	.45	.38	.33	.43	.37	.33	.31
8.0	.45	.37	.31	.45	.36	.31	.43	.35	.30	.41	.35	.30	.40	.34	.29	.27
9.0	.42	.33	.28	.41	.33	.28	.39	.32	.27	.38	.31	.27	.37	.31	.26	.25
10.0	.39	.31	.25	.38	.30	.25	.36	.30	.25	.35	.29	.24	.34	.28	.24	.22



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:Jacky
Test Date:2012-07-24

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 4 Of 11

WEC AND CCEC

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						Wall Exitance Coeffcients(WEC)									
0.0																
1.0	.337	.192	.061	.328	.187	.059	.312	.179	.057	.297	.171	.055	.283	.164	.053	
2.0	.304	.167	.051	.297	.163	.050	.282	.157	.049	.269	.151	.047	.256	.145	.046	
3.0	.277	.147	.044	.270	.144	.043	.257	.139	.042	.245	.134	.041	.234	.129	.040	
4.0	.253	.131	.039	.247	.129	.038	.235	.125	.037	.224	.120	.036	.214	.116	.035	
5.0	.232	.118	.034	.227	.116	.034	.216	.113	.033	.207	.109	.032	.198	.106	.032	
6.0	.215	.108	.031	.210	.106	.030	.200	.103	.030	.192	.100	.029	.183	.097	.029	
7.0	.199	.098	.028	.195	.097	.028	.186	.094	.027	.178	.091	.027	.171	.089	.026	
8.0	.186	.091	.025	.182	.089	.025	.174	.087	.025	.167	.084	.024	.160	.082	.024	
9.0	.174	.084	.023	.170	.083	.023	.163	.081	.023	.157	.078	.022	.150	.076	.022	
10.0	.163	.078	.022	.160	.077	.022	.153	.075	.021	.148	.073	.021	.142	.071	.020	

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						Ceiling Cavity Exitance Coefficients(CCEC)									
0.0	.230	.230	.230	.196	.196	.196	.134	.134	.134	.077	.077	.077	.025	.025	.025	
1.0	.222	.196	.172	.190	.168	.148	.130	.116	.102	.075	.067	.060	.024	.022	.019	
2.0	.214	.172	.137	.183	.148	.118	.126	.102	.082	.072	.060	.048	.023	.019	.016	
3.0	.206	.155	.114	.177	.133	.098	.121	.093	.069	.070	.054	.041	.023	.018	.013	
4.0	.198	.141	.098	.170	.122	.085	.117	.085	.060	.068	.050	.036	.022	.016	.012	
5.0	.191	.131	.087	.164	.114	.076	.113	.079	.054	.065	.047	.032	.021	.015	.011	
6.0	.183	.123	.080	.158	.106	.069	.109	.075	.049	.063	.044	.029	.020	.014	.010	
7.0	.176	.116	.074	.152	.101	.064	.105	.071	.046	.061	.042	.027	.020	.014	.009	
8.0	.170	.110	.070	.146	.096	.061	.101	.067	.043	.059	.040	.026	.019	.013	.008	
9.0	.164	.105	.066	.141	.092	.058	.098	.064	.041	.057	.038	.024	.018	.012	.008	
10.0	.158	.101	.063	.136	.088	.055	.094	.062	.039	.055	.037	.023	.018	.012	.008	

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:Jacky
Test Date:2012-07-24

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 5 Of 11

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	15.5	17.0	15.9	17.3	17.6	15.1	16.5	15.4	16.8	17.1
	3H	17.2	18.6	17.6	18.9	19.3	16.7	18.0	17.0	18.3	18.7
	4H	18.1	19.4	18.5	19.7	20.1	17.4	18.7	17.8	19.0	19.4
	6H	18.9	20.1	19.3	20.5	20.8	18.1	19.3	18.5	19.7	20.1
	8H	19.3	20.5	19.7	20.8	21.2	18.5	19.6	18.9	20.0	20.4
	12H	19.7	20.9	20.2	21.3	21.7	18.9	20.0	19.3	20.4	20.8
4H	2H	16.1	17.4	16.5	17.7	18.1	15.7	17.0	16.1	17.4	17.7
	3H	18.0	19.1	18.4	19.5	19.9	17.5	18.6	17.9	19.0	19.4
	4H	19.0	20.0	19.4	20.4	20.9	18.4	19.4	18.9	19.9	20.3
	6H	20.0	20.9	20.4	21.3	21.8	19.3	20.2	19.8	20.7	21.1
	8H	20.5	21.3	21.0	21.8	22.3	19.7	20.6	20.2	21.1	21.6
	12H	21.0	21.8	21.6	22.3	22.8	20.2	21.0	20.7	21.5	22.0
8H	4H	19.3	20.2	19.8	20.6	21.1	18.8	19.7	19.3	20.1	20.6
	6H	20.5	21.2	21.0	21.7	22.3	19.9	20.6	20.4	21.1	21.7
	8H	21.2	21.8	21.7	22.4	22.9	20.5	21.2	21.1	21.7	22.3
	12H	21.9	22.5	22.5	23.0	23.6	21.2	21.8	21.8	22.3	22.9
12H	4H	19.3	20.1	19.8	20.6	21.1	18.9	19.7	19.4	20.1	20.7
	6H	20.6	21.3	21.2	21.8	22.4	20.1	20.7	20.6	21.2	21.8
	8H	21.4	22.0	21.9	22.5	23.1	20.8	21.3	21.3	21.9	22.5
Variations with the observer position at spacings:											
S = 1.0H		+ 0.1 / - 0.2					+ 0.1 / - 0.2				
1.5H		+ 0.2 / - 0.3					+ 0.2 / - 0.3				
2.0H		+ 0.1 / - 0.2					+ 0.1 / - 0.3				

CIE Pub.117 Corrected 870.9 lm Total Lamp Luminous Flux.(Slog(F/F0) = -0.5)

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:Jacky
Test Date:2012-07-24

γ Range: 0 - 180DEG
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Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 6 Of 11

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) x RCR = 5									
k = 0.60	55	44	37	55	43	37	53	43	36	30
0.80	65	53	46	64	53	45	62	52	45	38
1.00	73	62	54	72	61	54	69	62	53	46
1.25	80	69	61	78	68	61	75	66	60	52
1.50	85	74	67	83	73	66	80	71	65	57
2.00	92	82	75	90	81	75	86	78	73	64
2.50	96	87	81	93	86	79	89	82	77	68
3.00	99	91	85	97	90	84	92	86	81	72
4.00	103	97	92	101	95	90	95	91	87	76
5.00	106	100	96	103	98	94	98	94	90	79
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:25.2DEG
Operators:Jacky
Test Date:2012-07-24

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

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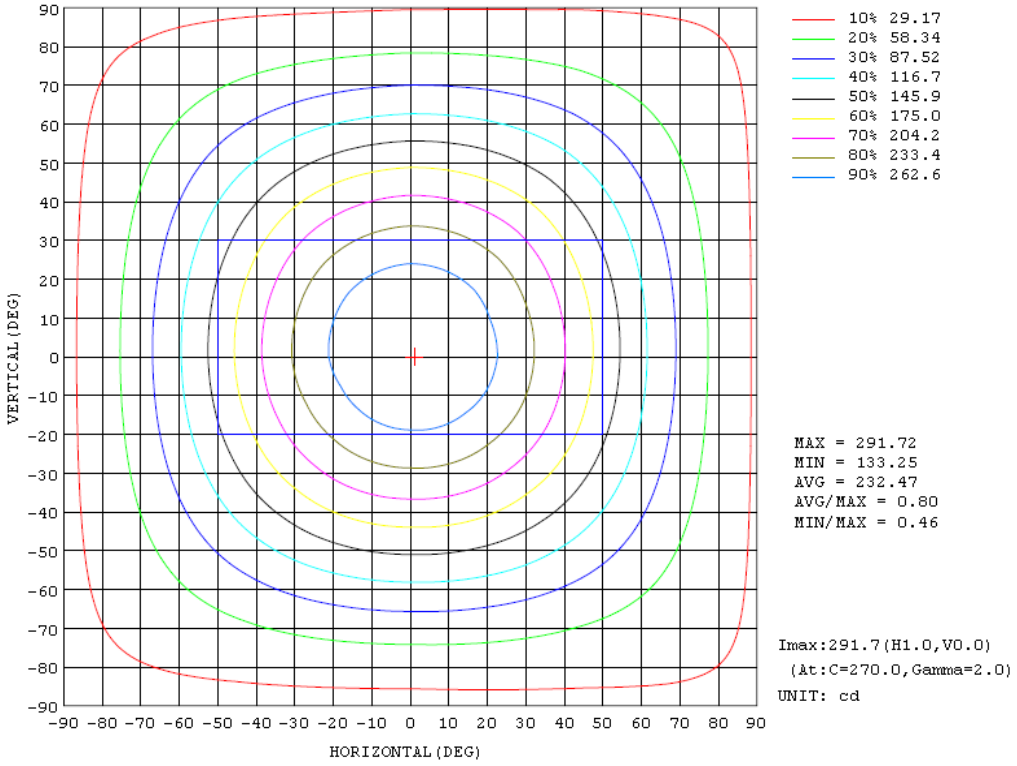
ISOCANDELA DIAGRAM

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



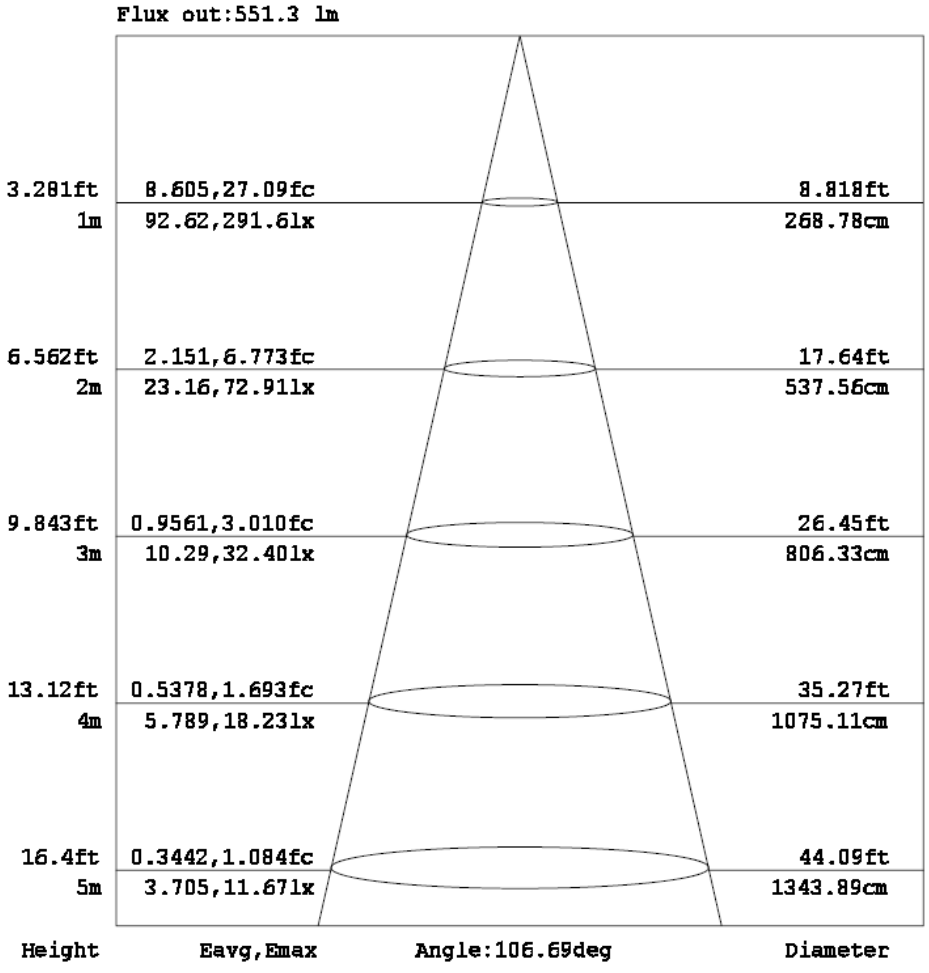
C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:Jacky
Test Date:2012-07-24

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 8 Of 11

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.

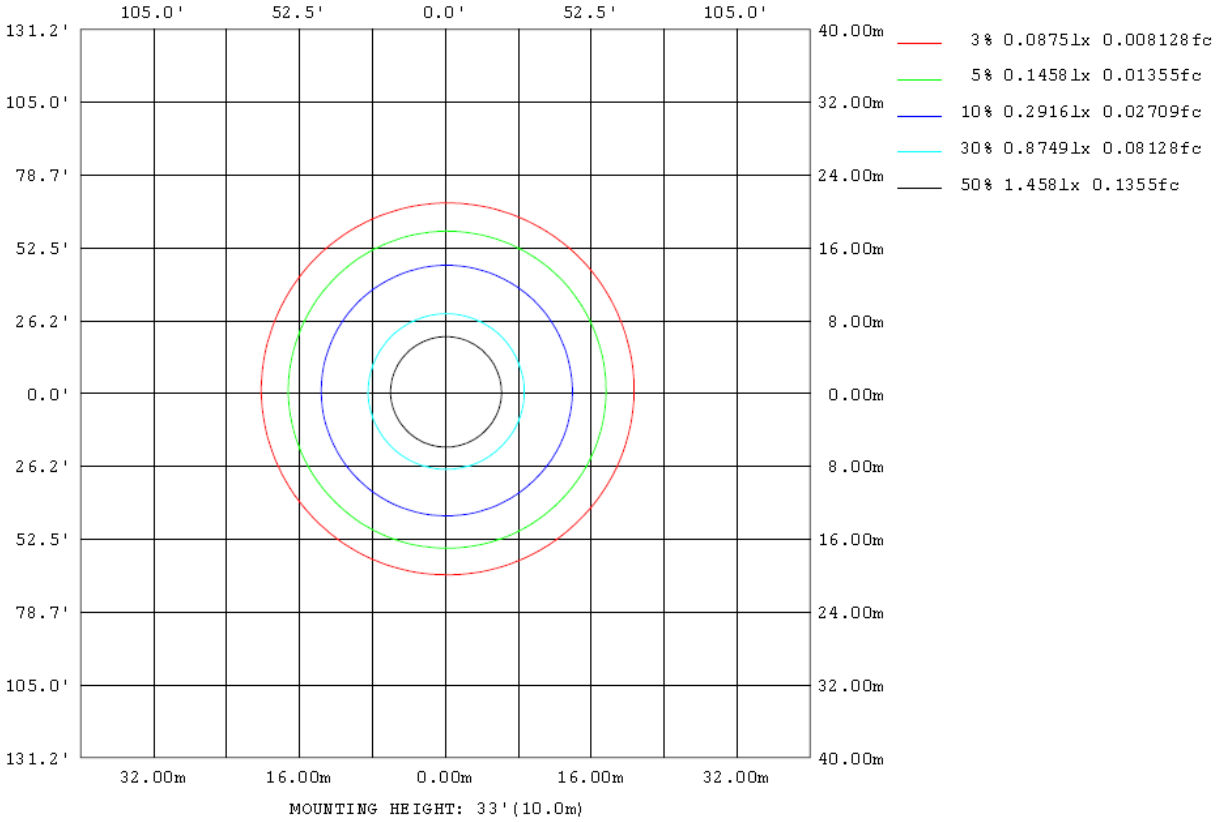
C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:Jacky
Test Date:2012-07-24

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 9 Of 11

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:25.2DEG
Operators:Jacky
Test Date:2012-07-24

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

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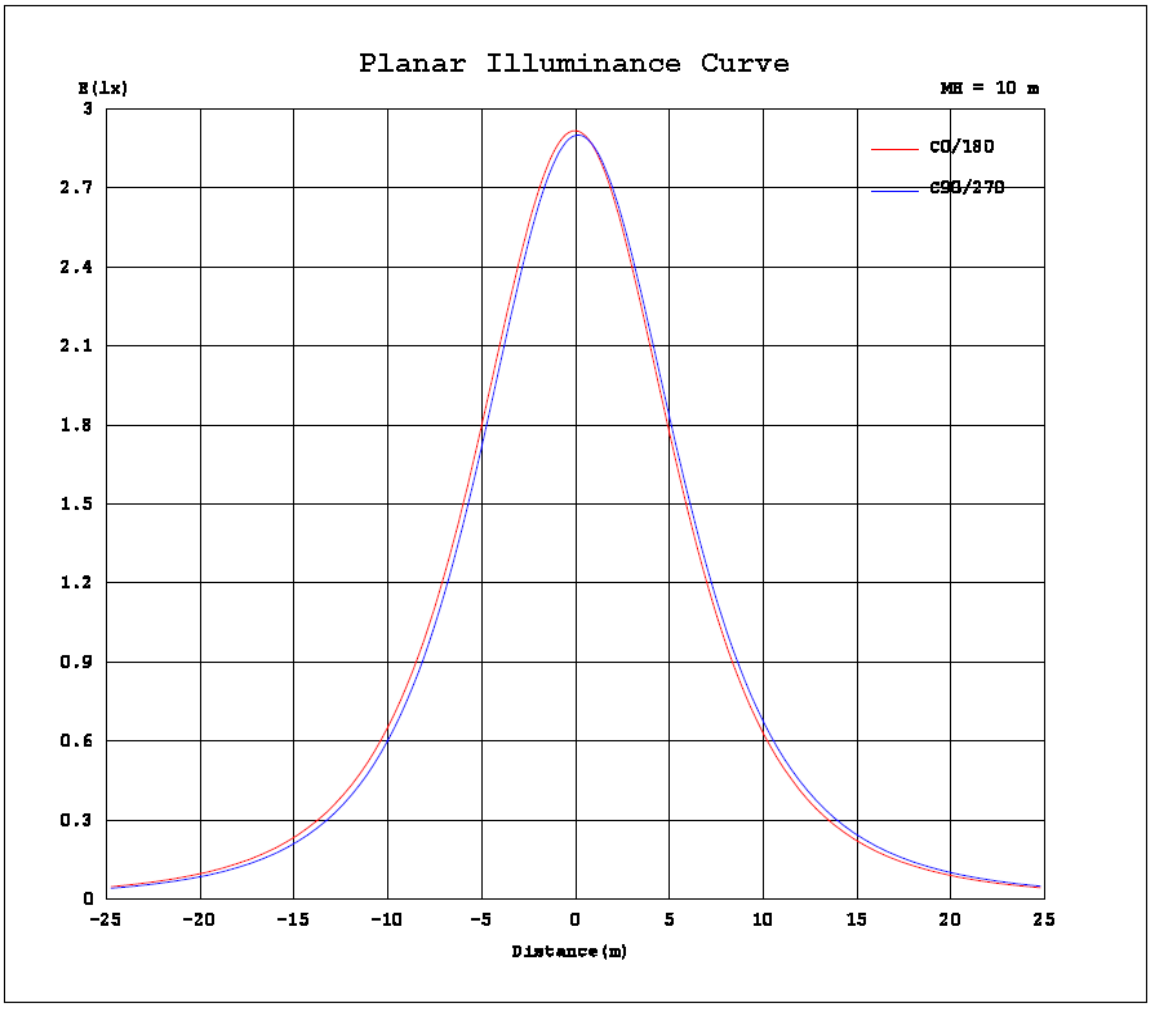
Planar Illuminance Curve



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:Jacky
Test Date:2012-07-24

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

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LUMINOUS DISTRIBUTION INTENSITY DATA

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

Table--1 UNIT: cd

γ (DEG) \ C(DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338
0	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290
5	289	289	288	288	287	287	287	288	288	289	290	290	290	290	290	290
10	285	284	282	282	281	281	281	282	283	284	286	287	287	287	287	286
15	278	276	274	273	272	272	272	274	275	277	279	280	281	281	281	279
20	268	266	263	261	260	260	261	262	264	266	269	271	272	272	272	270
25	255	252	249	247	246	246	246	248	251	253	256	258	260	260	260	258
30	240	237	233	231	229	229	230	232	235	237	241	243	246	246	246	243
35	223	219	215	213	211	211	212	214	217	220	224	227	229	230	229	226
40	204	201	196	194	191	192	192	195	198	200	205	208	211	211	211	208
45	184	181	176	173	171	171	172	174	177	180	185	188	191	191	191	188
50	164	160	155	152	150	150	151	153	156	159	164	167	170	171	171	167
55	143	139	135	132	130	130	130	132	135	138	142	146	149	150	149	146
60	122	119	114	111	109	109	110	112	114	117	121	125	128	129	128	125
65	102	98.9	94.7	92.1	90.2	90.1	90.5	92.2	94.4	97.0	101	104	107	108	108	105
70	83.3	80.1	76.4	74.0	72.4	72.2	72.5	74.0	76.0	78.2	81.9	85.0	87.8	88.4	88.2	86.0
75	65.7	63.0	59.5	57.6	56.0	56.0	56.1	57.5	59.2	61.0	64.4	67.3	69.6	70.3	70.0	68.2
80	50.0	47.8	44.9	43.4	42.0	42.0	42.0	43.3	44.6	46.1	49.0	51.1	53.4	53.8	53.7	51.9
85	36.7	35.1	32.8	31.6	30.5	30.5	30.5	31.5	32.4	33.6	35.9	37.6	39.5	39.7	39.8	38.3
90	26.2	25.0	23.3	22.5	21.7	21.7	21.7	22.4	23.0	23.9	25.5	26.9	28.3	28.5	28.5	27.4
95	18.6	17.8	16.6	16.1	15.6	15.6	15.5	16.0	16.4	17.0	18.1	19.0	20.0	20.1	20.1	19.4
100	13.4	12.9	12.2	11.8	11.5	11.5	11.5	11.7	12.0	12.4	13.1	13.7	14.4	14.4	14.5	14.0
105	10.1	9.70	9.25	9.03	8.82	8.82	8.82	8.98	9.13	9.37	9.82	10.2	10.6	10.7	10.7	10.4
110	7.85	7.59	7.29	7.13	6.95	7.00	6.96	7.10	7.19	7.34	7.65	7.95	8.21	8.30	8.28	8.10
115	6.29	6.11	5.86	5.77	5.64	5.67	5.64	5.75	5.81	5.89	6.14	6.32	6.57	6.62	6.64	6.49
120	5.16	5.01	4.81	4.73	4.63	4.67	4.65	4.74	4.77	4.82	5.01	5.17	5.37	5.43	5.45	5.34
125	4.31	4.16	4.00	3.93	3.84	3.90	3.88	3.96	3.96	3.99	4.15	4.29	4.46	4.54	4.55	4.47
130	3.65	3.50	3.36	3.30	3.22	3.29	3.28	3.34	3.32	3.34	3.47	3.60	3.76	3.85	3.86	3.80
135	3.13	2.98	2.85	2.79	2.73	2.80	2.80	2.85	2.80	2.81	2.92	3.05	3.21	3.31	3.33	3.27
140	2.72	2.56	2.43	2.37	2.33	2.41	2.43	2.46	2.38	2.38	2.48	2.61	2.77	2.89	2.91	2.86
145	2.41	2.23	2.10	2.02	2.01	2.09	2.13	2.14	2.04	2.02	2.13	2.26	2.43	2.55	2.58	2.52
150	2.17	1.99	1.83	1.74	1.77	1.85	1.92	1.91	1.77	1.74	1.85	1.99	2.17	2.30	2.34	2.27
155	2.00	1.83	1.63	1.53	1.57	1.69	1.78	1.75	1.59	1.55	1.63	1.80	1.98	2.11	2.16	2.09
160	1.91	1.73	1.53	1.44	1.45	1.56	1.65	1.67	1.48	1.45	1.51	1.70	1.87	1.99	2.04	1.98
165	1.76	1.50	1.37	1.27	0.96	1.28	1.34	1.41	1.26	1.25	1.33	1.51	1.70	1.86	1.93	1.86
170	1.60	1.28	1.05	0.93	0.80	1.08	1.08	1.11	1.03	1.04	1.15	1.30	1.51	1.67	1.75	1.67
175	1.42	1.21	1.05	0.92	0.61	0.57	0.85	0.90	0.92	0.92	1.07	1.22	1.40	1.53	1.57	1.51
180	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:Jacky
Test Date:2012-07-24

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.270
Humidity:48.0%
Test Distance:2.649m [K=1.0000]
Remarks:

Attachment C – Color Spatial Uniformity

C0 /180										
Gamma\C	I(cd)	CIE x	CIE y	CIE u'	CIE v'	CCT(K)	Ra	dEuv(NBS)	du'v'	Ip
-60	113.42	0.4395	0.4041	0.2522	0.5218	2957	81.3	0.69	0.0005	17748
-55	133.66	0.4401	0.4043	0.2525	0.5219	2950	81.3	0.45	0.0002	20874
-50	154.24	0.4404	0.4045	0.2526	0.5221	2945	81.3	0.31	0.0000	24129
-45	175.08	0.4407	0.4047	0.2528	0.5222	2942	81.4	0.35	0.0001	27350
-40	195.04	0.4409	0.4048	0.2528	0.5223	2941	81.4	0.39	0.0002	30541
-35	214.14	0.4410	0.4049	0.2528	0.5223	2939	81.4	0.46	0.0003	33572
-30	231.97	0.4410	0.4049	0.2528	0.5223	2940	81.3	0.41	0.0003	36412
-25	247.85	0.4409	0.4050	0.2527	0.5223	2942	81.4	0.33	0.0002	38918
-20	261.54	0.4408	0.4050	0.2527	0.5223	2943	81.4	0.27	0.0002	41149
-15	272.77	0.4407	0.4050	0.2526	0.5223	2944	81.4	0.20	0.0002	42974
-10	281.09	0.4406	0.4049	0.2526	0.5223	2946	81.4	0.12	0.0002	44303
-5	286.61	0.4405	0.4049	0.2525	0.5223	2948	81.4	0.01	0.0002	45265
0	288.98	0.4405	0.4050	0.2525	0.5223	2948	81.4	0.00	0.0002	45687
5	288.20	0.4405	0.4050	0.2525	0.5223	2949	81.4	0.05	0.0002	45691
10	284.46	0.4405	0.4049	0.2525	0.5222	2948	81.4	0.03	0.0002	45211
15	277.69	0.4405	0.4049	0.2525	0.5222	2947	81.4	0.05	0.0002	44261
20	267.90	0.4406	0.4049	0.2526	0.5223	2946	81.4	0.10	0.0001	42870
25	255.27	0.4406	0.4049	0.2526	0.5222	2945	81.4	0.18	0.0001	41101
30	240.31	0.4407	0.4048	0.2527	0.5222	2943	81.4	0.27	0.0001	38746
35	223.21	0.4407	0.4047	0.2527	0.5222	2943	81.3	0.33	0.0001	36139
40	204.34	0.4407	0.4046	0.2527	0.5221	2943	81.4	0.36	0.0001	33281
45	184.14	0.4406	0.4045	0.2527	0.5221	2943	81.3	0.36	0.0001	30091
50	163.30	0.4403	0.4044	0.2526	0.5220	2946	81.4	0.37	0.0001	26891
55	142.16	0.4400	0.4042	0.2525	0.5219	2950	81.4	0.50	0.0003	23549
60	121.29	0.4394	0.4039	0.2523	0.5217	2956	81.4	0.81	0.0006	20227

C90/270										
Gamma\C	I(cd)	CIE x	CIE y	CIE u'	CIE v'	CCT(K)	Ra	dEuv(NBS)	du'v'	Ip
-60	123.15	0.4395	0.4038	0.2524	0.5217	2955	81.4	0.79	0.0005	19169
-55	144.05	0.4399	0.4040	0.2526	0.5218	2949	81.4	0.62	0.0003	22433
-50	164.88	0.4403	0.4042	0.2527	0.5220	2945	81.4	0.47	0.0002	25781
-45	185.59	0.4405	0.4044	0.2528	0.5220	2943	81.3	0.44	0.0001	29006
-40	205.37	0.4407	0.4045	0.2528	0.5221	2941	81.4	0.46	0.0002	32163
-35	223.90	0.4407	0.4046	0.2528	0.5221	2942	81.3	0.41	0.0002	35067
-30	240.65	0.4407	0.4046	0.2528	0.5222	2942	81.3	0.39	0.0001	37779
-25	255.59	0.4406	0.4047	0.2527	0.5222	2943	81.4	0.31	0.0001	40164
-20	267.81	0.4405	0.4047	0.2526	0.5222	2945	81.4	0.21	0.0001	42151
-15	277.36	0.4405	0.4047	0.2526	0.5222	2947	81.4	0.15	0.0001	43690
-10	284.05	0.4404	0.4048	0.2525	0.5222	2948	81.4	0.11	0.0001	44750
-5	287.76	0.4403	0.4047	0.2525	0.5222	2949	81.4	0.14	0.0002	45453
0	288.36	0.4404	0.4048	0.2525	0.5222	2949	81.4	0.09	0.0002	45603
5	286.05	0.4404	0.4048	0.2525	0.5222	2948	81.4	0.12	0.0001	45346
10	280.67	0.4405	0.4048	0.2525	0.5222	2947	81.4	0.11	0.0001	44614
15	272.20	0.4405	0.4048	0.2526	0.5222	2946	81.4	0.14	0.0001	43414
20	261.02	0.4406	0.4048	0.2527	0.5222	2944	81.4	0.22	0.0001	41851
25	247.33	0.4408	0.4048	0.2527	0.5222	2942	81.3	0.31	0.0002	39799
30	231.44	0.4408	0.4047	0.2528	0.5222	2942	81.3	0.36	0.0002	37403
35	213.59	0.4408	0.4047	0.2528	0.5222	2941	81.3	0.40	0.0002	34679
40	194.44	0.4407	0.4046	0.2528	0.5221	2942	81.4	0.42	0.0002	31690
45	174.30	0.4399	0.4045	0.2523	0.5220	2954	81.4	0.44	0.0004	56101
50	153.72	0.4398	0.4043	0.2523	0.5219	2955	81.4	0.51	0.0004	49787
55	133.08	0.4396	0.4042	0.2522	0.5218	2957	81.4	0.65	0.0005	43404
60	112.91	0.4392	0.4039	0.2521	0.5216	2961	81.4	0.94	0.0007	37122

Weighted Average Point	
u'	v'
0.2526	0.5221

Attachment D – EUT PHOTO

D1.EUT PHOTO

D2.EUT PHOTO