Lab Code: 200707-0

IESNA LM-79-08
(NOT INCLUDE SPATIAL NON-UNIFORMITY OF CHROMATICITY)
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-13WPAR30/FL/830-DIM

Report Type:	**Product Type:**
Original Report	Dimmable directional PAR30 lamp

Test Engineer:	Jack Zhou
Report Number:	RSZ120808514-10
Test Date:	2011-09-19 Jack . zhou
Report Date:	2012-08-08
Reviewed By:	Jeanne Han Jeanne . Han
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan) Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China Tel: +86-0769-86858888 Fax:+86-0769-86858588

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT	Rating	Manufacturer	Model
Dimmable directional PAR30 lamp	AC120V 60Hz 13 W E26,3000 K PAR30	Eiko Limited	LEDP-13WPAR30/FL/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. (Dongguan). is located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China

Bay Area Compliance Laboratories Corp. (Dongguan) is the International Accreditation Service (IAS) accredited laboratory. The IAS Lab Code is TL-460.

2 - SUMMARY OF TEST RESULT

SPECTRORADIOMETRIC TESTING IN INTEGRATING SPHERE	
PHOTOMETRIC	-
Total Integrated Flux (Lumens)	710.401
SPECTRORADIOMETRIC	-
Observer	-
Chromaticity Ordinate x	0.4301
Chromaticity Ordinate y	0.3970
Observer	-
Chromaticity Ordinate u	0.2492
Chromaticity Ordinate v	0.3450
Correlated Color Temp CCT (K)	3059
Color Rendering Index (CRI)	82.8
Total Radiant Flux (W)	2.22
ELECTRICAL	-
Input Voltage (Volts AC)	120.0
Input Current (mA AC)	146
Input Power (Watts)	13.5
Power Factor	0.767
EFFICACY	-
Lumens/Watt	52.622

LUMINOUS INTENSITY DISTRIBUTION	
Center beam candlepower(if applicable)(cd)	1364
Beam angle(if applicable)(°)	43.5
Zonal lumens in the 0° -60° zone(%)	98.3%
Zonal lumens in the 60° -90° zone(%)	1.7%
Zonal lumens in the 90° -120° zone(%)	0.0%
Zonal lumens in the 120° -180° zone(%)	0.0%

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

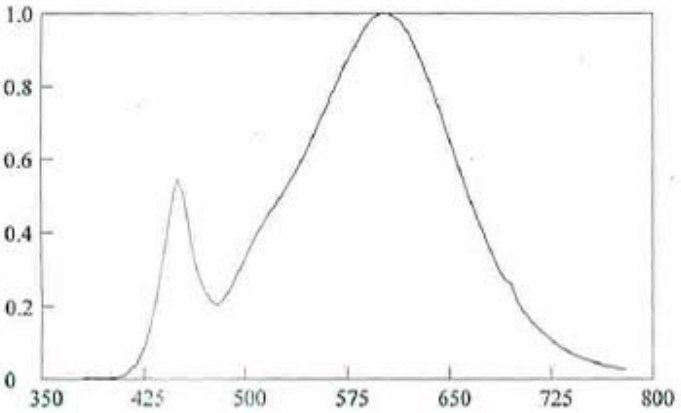
Report of Spectroradiometric & Electric Analysis for Light Source

Product: LEDP-13WPAR30/FL/830-DIM
Manufacturer: Joinluck
Sample No.: 1# Date: 9-19-2011
Tested By: Jimmy Reviewed By: Jack

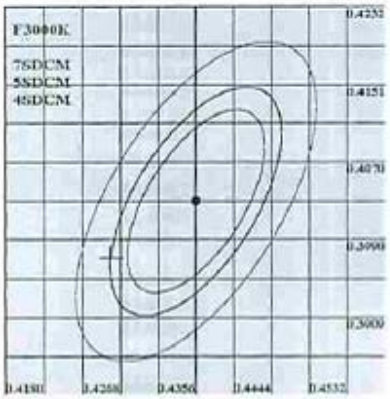
Test Condition

Temperature: 25.0°C RH: 65.0%
Spectrum Range: 380-780 nm Scan Step: 5 nm

Spectroradiometric Parameters



Spectral Distribution



SDCM:F3000K

x0=0.4400 y0=0.4030

Chromaticity Coordinates: x=0.4301 y=0.3970 u=0.2492 v=0.345

Correlated Color Temperature: 3059 K Dominant Wavelength: 582.0 nm(E)

Luminous Flux: 710.401 lm Purity: 0.4836

Chromaticity Difference: -1.90E-03duv Peak Wavelength: 602.6 nm

Red Color Ratio: 44.1% Green Color Ratio: 48.7%

Blue Color Ratio: 7.2% Color Tolerance: 5.0 SDCM

Rendering Index: Ra=82.8 Radiant Flux: 2.22 W

R1=81 R2=90 R3=96 R4=80 R5=81 R6=87 R7=84 R8=63

R9=15 R10=78 R11=78 R12=72 R13=83 R14=98 R15=76

Electric Parameters

Voltage: 120.0 V Current: 0.146 A

Power Factor: 0.767 Power: 13.5 W

Luminous Efficacy: 52.622 lm/W

Attachment B– Light Intensity Test Data

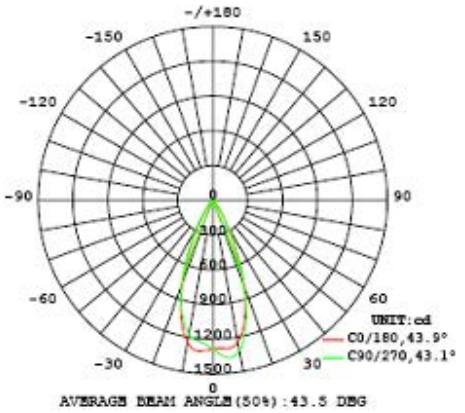
EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 1 Of 11

LUMINAIRE PHOTOMETRIC TEST REPORT

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

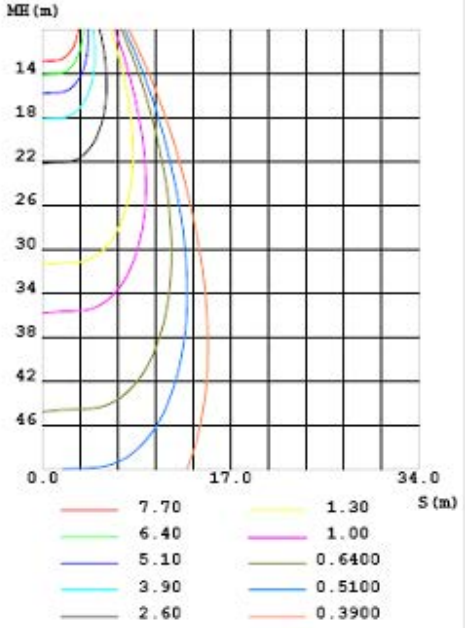
DATA OF LAMP		PHOTOMETRIC DATA Eff: 55.70 lm/W			
MODEL LEDP-13WPAR30/FL/830-DIM		Imax(cd)	1364	S/MH(C0/180)	0.69
NOMINAL POWER(W)	13	LOR(%)	100.0	S/MH(C90/270)	0.68
RATED VOLTAGE(V)	120	TOTAL FLUX(lm)	754.24	η UP,DN(C0-180)	0.0,51.4
NOMINAL FLUX(lm)	754.238	CIE CLASS	DIRECT	η UP,DN(C180-360)	0.0,48.6
LAMPS INSIDE	1	η up(%)	0.0	CIBSE SHR NOM	0.50
TEST VOLTAGE(V)	120.0	η down(%)	100.0	CIBSE SHR MAX	0.70

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



AVERAGE BEAM ANGLE(50%):43.5 DEG

C0 PLANE ISOLUX DIAGRAM (UNIT:lx)



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.1DEG
Operators:Jack
Test Date:2011-09-19

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 2 Of 11

ZONAL FLUX DIAGRAM

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	1242	1334	1318	1273	1241	1229	1172	1149	0- 10	122.2	122.2	16.2,16.2
20	787.9	846.3	781.4	745.6	762.8	788.0	772.3	675.8	10- 20	287.9	410.2	54.4,54.4
30	262.3	272.4	245.9	242.4	251.5	265.6	264.3	228.4	20- 30	219.2	629.3	83.4,83.4
40	58.07	62.30	57.00	47.79	51.25	62.28	53.40	49.96	30- 40	80.73	710.1	94.1,94.1
50	15.24	16.19	14.96	13.33	14.31	16.22	14.31	13.00	40- 50	22.21	732.3	97.1,97.1
60	8.314	8.586	8.224	7.243	8.341	9.266	8.756	7.779	50- 60	9.320	741.6	98.3,98.3
70	5.446	5.599	5.522	4.997	5.630	6.119	6.026	5.443	60- 70	7.018	748.6	99.3,99.3
80	2.523	2.571	2.472	2.287	2.576	2.844	2.724	2.595	70- 80	4.309	752.9	99.8,99.8
90	0.0135	0.0034	0.0209	0.0362	0.0538	0.0734	0.0734	0.0543	80- 90	1.318	754.2	100,100
100	0	0	0	0	0	0	0	0	90-100	0.0030	754.2	100,100
110	0	0	0	0	0	0	0	0	100-110	0	754.2	100,100
120	0	0	0	0	0	0	0	0	110-120	0	754.2	100,100
130	0	0	0	0	0	0	0	0	120-130	0	754.2	100,100
140	0	0	0	0	0	0	0	0	130-140	0	754.2	100,100
150	0	0.0010	0.0014	0.0010	0	0	0	0	140-150	0.0001	754.2	100,100
160	0.0104	0.0117	0.0107	0.0109	0.0060	0.0074	0.0070	0.0072	150-160	0.0019	754.2	100,100
170	0.0189	0.0183	0.0183	0.0189	0.0123	0.0156	0.0152	0.0156	160-170	0.0038	754.2	100,100
180	0.0000	0.0004	0.0008	0.0012	0	0	0	0	170-180	0.0013	754.2	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.1DEG
Operators:Jack
Test Date:2011-09-19

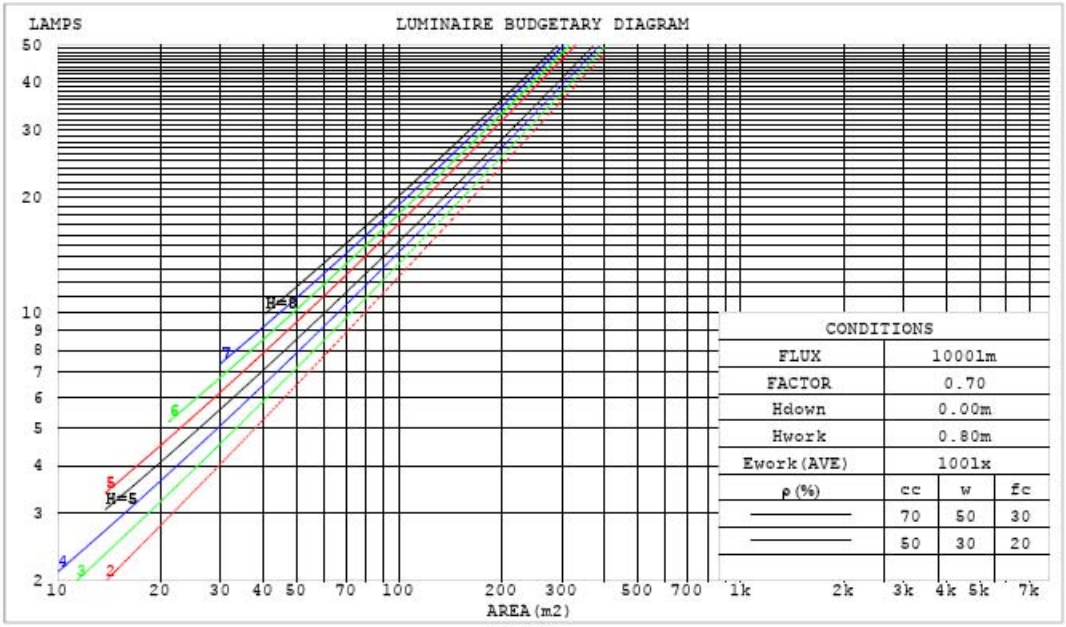
γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [K=1.0000]
Remarks:

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	1.19	1.19	1.19	1.16	1.16	1.16	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	.00
1.0	1.11	1.09	1.07	1.09	1.07	1.05	1.05	1.03	1.02	1.01	1.00	.99	.98	.97	.96	.94
2.0	1.04	1.01	.97	1.03	.99	.96	.99	.97	.94	.96	.94	.92	.94	.92	.90	.89
3.0	.98	.94	.90	.97	.93	.89	.94	.91	.88	.92	.89	.86	.90	.87	.85	.84
4.0	.93	.88	.84	.92	.87	.83	.89	.85	.82	.87	.84	.81	.86	.83	.80	.79
5.0	.88	.82	.79	.87	.82	.78	.85	.81	.78	.83	.80	.77	.82	.79	.76	.75
6.0	.83	.78	.74	.82	.77	.74	.81	.77	.73	.80	.76	.73	.78	.75	.72	.71
7.0	.79	.74	.70	.79	.73	.70	.77	.73	.69	.76	.72	.69	.75	.72	.69	.67
8.0	.75	.70	.66	.75	.70	.66	.74	.69	.66	.73	.69	.66	.72	.68	.66	.64
9.0	.72	.67	.63	.72	.67	.63	.71	.66	.63	.70	.66	.63	.69	.65	.63	.61
10.0	.69	.64	.60	.69	.64	.60	.68	.63	.60	.67	.63	.60	.66	.62	.60	.59



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.1DEG
Operators:Jack
Test Date:2011-09-19

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [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:

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 Coeffcients(WEC)									
0.0																
1.0	.169	.096	.030	.162	.092	.029	.149	.086	.027	.138	.079	.026	.127	.074	.024	
2.0	.159	.087	.027	.153	.084	.026	.143	.079	.025	.133	.075	.023	.124	.070	.022	
3.0	.150	.080	.024	.145	.078	.023	.136	.074	.022	.128	.070	.021	.120	.067	.021	
4.0	.141	.074	.022	.137	.072	.021	.130	.069	.021	.123	.066	.020	.116	.063	.019	
5.0	.134	.068	.020	.131	.067	.020	.124	.065	.019	.118	.062	.018	.112	.060	.018	
6.0	.127	.064	.018	.124	.063	.018	.119	.061	.018	.113	.059	.017	.108	.057	.017	
7.0	.121	.060	.017	.119	.059	.017	.114	.057	.017	.109	.056	.016	.104	.054	.016	
8.0	.116	.057	.016	.114	.056	.016	.109	.055	.016	.105	.053	.015	.101	.052	.015	
9.0	.111	.054	.015	.109	.053	.015	.105	.052	.015	.101	.051	.015	.098	.050	.014	
10.0	.107	.051	.014	.105	.051	.014	.101	.049	.014	.098	.048	.014	.094	.047	.014	

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	.190	.190	.190	.163	.163	.163	.111	.111	.111	.064	.064	.064	.020	.020	.020	
1.0	.171	.157	.146	.146	.135	.125	.100	.093	.087	.057	.054	.050	.018	.017	.016	
2.0	.155	.133	.114	.132	.114	.099	.091	.079	.069	.052	.046	.040	.017	.015	.013	
3.0	.141	.113	.091	.121	.098	.079	.083	.068	.056	.048	.040	.033	.015	.013	.011	
4.0	.130	.099	.074	.112	.085	.065	.077	.059	.045	.044	.035	.027	.014	.011	.009	
5.0	.121	.087	.062	.104	.075	.054	.072	.052	.038	.041	.031	.022	.013	.010	.007	
6.0	.113	.077	.052	.097	.067	.045	.067	.047	.032	.039	.028	.019	.013	.009	.006	
7.0	.106	.069	.044	.091	.060	.038	.063	.042	.027	.037	.025	.016	.012	.008	.005	
8.0	.100	.063	.038	.086	.055	.033	.060	.038	.023	.035	.023	.014	.011	.007	.005	
9.0	.095	.058	.033	.082	.050	.028	.057	.035	.020	.033	.021	.012	.011	.007	.004	
10.0	.090	.053	.029	.078	.046	.025	.054	.033	.018	.032	.019	.011	.010	.006	.004	

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.1DEG
Operators:Jack
Test Date:2011-09-19

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [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	3.9	4.8	4.1	4.9	5.1	3.6	4.5	3.9	4.7	4.8
3H	4.2	5.0	4.4	5.2	5.4	3.9	4.7	4.2	4.9	5.1
4H	4.3	5.1	4.6	5.3	5.5	4.1	4.8	4.4	5.0	5.3
6H	4.5	5.2	4.8	5.4	5.6	4.2	4.9	4.5	5.2	5.4
8H	4.5	5.2	4.8	5.4	5.7	4.3	4.9	4.6	5.2	5.4
12H	4.5	5.2	4.8	5.4	5.7	4.3	4.9	4.6	5.2	5.5
4H 2H	3.9	4.6	4.2	4.8	5.1	3.6	4.4	3.9	4.6	4.8
3H	4.3	4.9	4.6	5.2	5.5	4.1	4.7	4.4	5.0	5.2
4H	4.5	5.1	4.9	5.4	5.7	4.3	4.9	4.7	5.2	5.5
6H	4.8	5.3	5.1	5.6	6.0	4.6	5.1	4.9	5.4	5.8
8H	4.9	5.3	5.2	5.7	6.1	4.6	5.1	5.0	5.5	5.8
12H	4.9	5.4	5.3	5.7	6.1	4.7	5.1	5.1	5.5	5.9
8H 4H	4.6	5.1	5.0	5.4	5.8	4.4	4.9	4.8	5.2	5.6
6H	4.9	5.3	5.3	5.7	6.1	4.7	5.1	5.1	5.5	5.9
8H	5.1	5.4	5.5	5.8	6.3	4.8	5.2	5.3	5.6	6.1
12H	5.2	5.5	5.6	5.9	6.4	4.9	5.3	5.4	5.7	6.2
12H 4H	4.6	5.0	5.0	5.4	5.8	4.4	4.8	4.8	5.2	5.6
6H	4.9	5.3	5.4	5.7	6.1	4.7	5.1	5.2	5.5	5.9
8H	5.1	5.4	5.5	5.8	6.3	4.9	5.2	5.3	5.6	6.1
Variations with the observer position at spacings:										
S = 1.0H	+ 1.6 / - 1.8					+ 1.5 / - 1.8				
1.5H	+ 3.1 / - 1.7					+ 3.0 / - 1.7				
2.0H	+ 1.6 / - 0.7					+ 1.6 / - 0.7				

CIE Pub.117 Corrected 754.2 lm Total Lamp Luminous Flux.(8log(F/F0) = -1.0)

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.1DEG
Operators:Jack
Test Date:2011-09-19

γ Range: 0 - 180DEG
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Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [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	88	82	78	87	82	78	87	81	78	74
0.80	95	89	86	95	89	86	93	89	85	82
1.00	99	94	90	99	93	90	97	93	90	86
1.25	103	98	95	102	98	94	100	96	94	89
1.50	106	101	98	105	101	97	103	99	96	92
2.00	109	104	101	107	103	100	104	101	99	94
2.50	110	106	103	109	105	103	106	103	101	95
3.00	112	108	106	110	107	105	107	104	102	96
4.00	114	111	109	112	109	107	108	106	105	98
5.00	115	113	111	113	111	109	109	108	106	99
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004				Suspended					SHRNOM = 1.25	

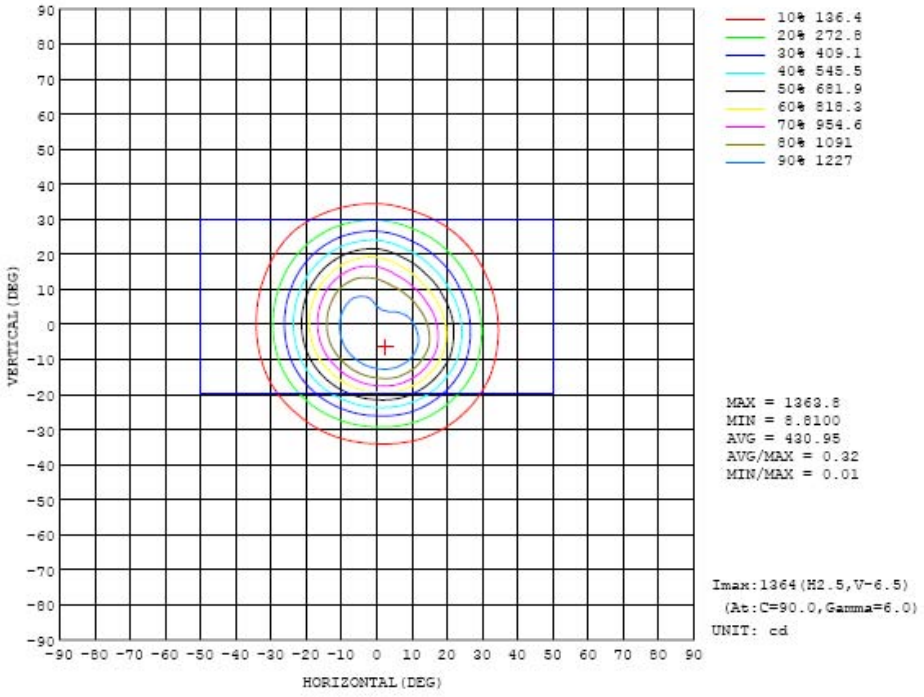
C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.1DEG
Operators:Jack
Test Date:2011-09-19

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 7 Of 11

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:Jack
Test Date:2011-09-19

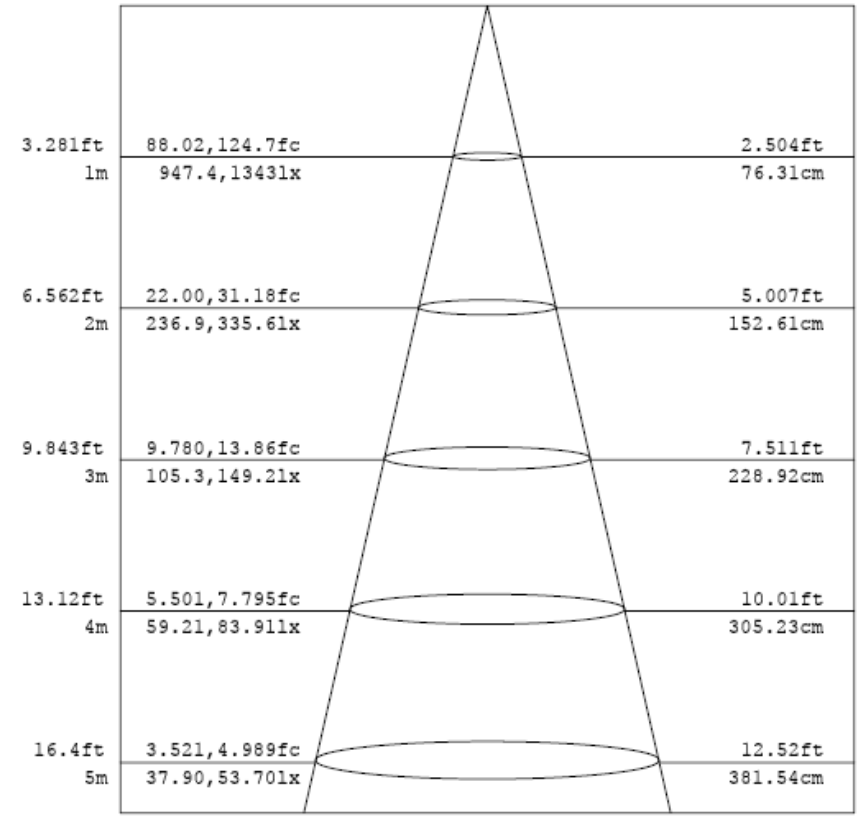
γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 8 Of 11

AAI Figure

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

Flux out:438.6 lm



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

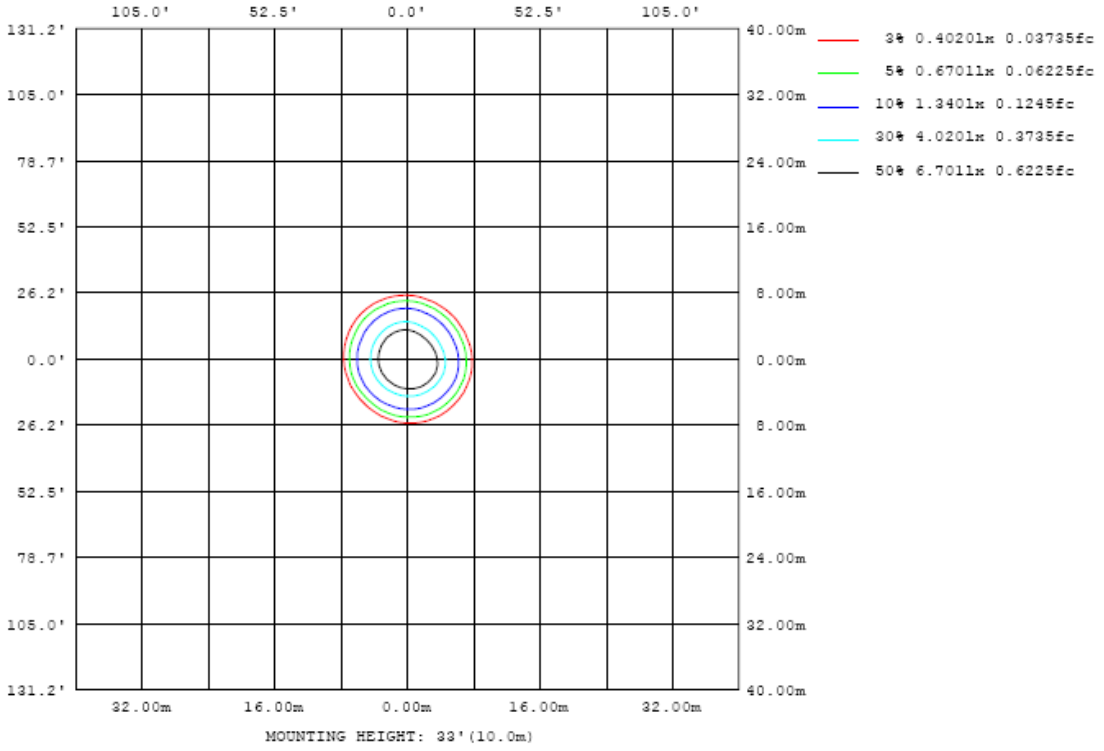
C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.1DEG
Operators:Jack
Test Date:2011-09-19

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [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:

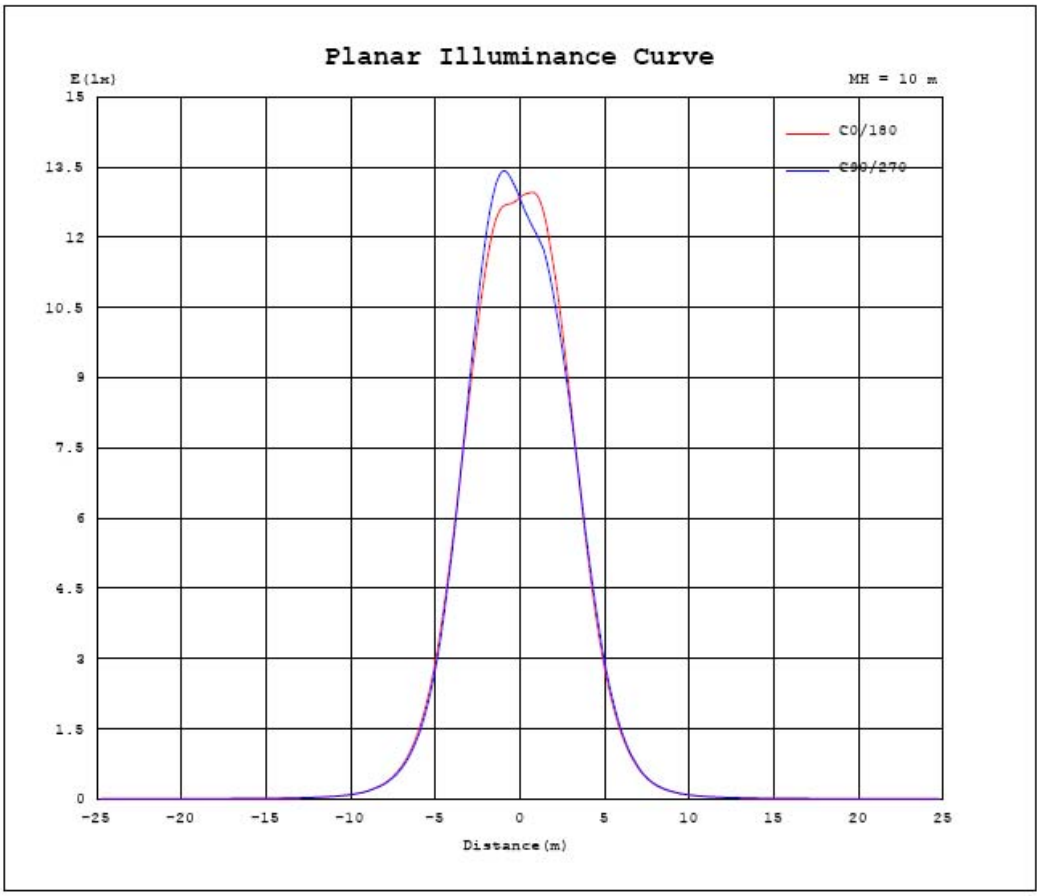


C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.1DEG
Operators:Jack
Test Date:2011-09-19

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 10 Of 11

Planar Illuminance Curve



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.1DEG
Operators:Jack
Test Date:2011-09-19

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [K=1.0000]
Remarks:

EVERFINE GONIOPHOTOMETERS SYSTEM TEST REPORT Page 11 Of 11

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	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284			
5	1283	1313	1338	1353	1358	1353	1339	1327	1309	1290	1268	1245	1228	1222	1228	1250			
10	1242	1297	1334	1337	1318	1298	1273	1253	1241	1235	1229	1205	1172	1146	1149	1186			
15	1060	1143	1168	1159	1106	1074	1050	1051	1051	1057	1073	1060	1017	958	945	980			
20	788	853	846	828	781	755	746	755	763	771	788	795	772	702	676	706			
25	493	535	523	500	466	455	461	469	468	473	493	506	493	440	424	436			
30	262	290	272	264	246	241	242	254	252	254	266	272	264	237	228	236			
35	126	138	133	132	118	111	106	114	118	124	134	129	124	110	108	112			
40	58.1	62.4	62.3	61.4	57.0	50.5	47.8	47.3	51.2	59.4	62.3	59.2	53.4	50.1	50.0	52.7			
45	27.3	30.1	29.7	29.3	26.9	25.4	22.8	22.0	24.4	28.5	30.0	27.9	25.5	23.3	23.7	25.0			
50	15.2	15.8	16.2	15.4	15.0	14.6	13.3	13.4	14.3	15.3	16.2	14.9	14.3	13.5	13.0	13.6			
55	9.99	10.2	10.2	9.87	9.78	9.81	9.27	9.44	10.1	10.4	10.7	10.2	10.1	9.67	9.03	9.43			
60	8.31	8.62	8.59	8.42	8.22	7.71	7.24	7.70	8.34	8.90	9.27	9.15	8.76	8.03	7.78	7.74			
65	7.04	7.55	7.23	7.35	7.14	6.65	6.24	6.52	7.28	7.52	7.76	7.82	7.62	7.06	6.82	6.73			
70	5.45	5.89	5.60	5.78	5.52	5.23	5.00	5.19	5.63	6.02	6.12	6.12	6.03	5.67	5.44	5.31			
75	4.04	4.25	4.14	4.18	3.92	3.77	3.64	3.74	4.04	4.39	4.44	4.40	4.33	4.09	4.01	3.93			
80	2.52	2.68	2.57	2.63	2.47	2.33	2.29	2.37	2.58	2.77	2.84	2.77	2.72	2.58	2.60	2.53			
85	1.15	1.22	1.14	1.16	1.09	1.04	1.02	1.08	1.19	1.24	1.33	1.28	1.29	1.19	1.23	1.17			
90	0.01	0.02	0.00	0.01	0.02	0.03	0.04	0.05	0.05	0.05	0.07	0.05	0.07	0.04	0.05	0.02			
95	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			
100	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			
105	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			
110	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			
115	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			
120	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			
125	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			
130	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			
135	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			
140	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			
145	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			
150	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			
155	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
160	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
165	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
170	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02			
175	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	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
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Test Date:2011-09-19

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:2.454m [K=1.0000]
Remarks:

Attachment C– EUT PHOTO