

IESNA LM-79: 2008

Measurement and Test Report

for

Sedna LED Ltd

A Unit 21, CBTC, Capital Business Park, Wentloog Avenue, Cardiff, CF3 2PX

Aug 09, 2013

Product Name:	LED Wall Washer
Model No:	SDWW
Test Engineer:	David Zhang 
Report No.:	BTR66.181.13.797.01
Sample Received Date:	Aug 09, 2013
Test Performed Date:	Aug 09, 2013
Reviewed By:	Steven Hsu 
Prepared By:	BEST Test Service Shenzhen Co., Ltd. 1st Floor, 1st Building, Weitai Industrial Park, Yingrenshi, Shiyan, Baoan, Shenzhen, China TEL: +86-755-28236006 FAX: +86-755-23467087-811 Email: certification@bestcert.cn



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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	3
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	: Sedna LED Ltd
Product Name	: LED Wall Washer
Model No	: SDWW
Nominal Operation Voltage	: AC 190-260V
Nominal Power	: 40W
Nominal CCT	: 3000K
Nominal CRI	: 70
Nominal Lumen Output	: 3600 Lumens
Nominal Life Time	: 5000 Hours
Number of hours operated prior to measurement for new sample	: 0 Hours
Stabilization Time	: 1.5hours
Total operating time for measurement include stabilization time	: 3.5hours
Date of Receiving Sample	: Aug 09, 2013
Date of Measurement performed	: Aug 09, 2013
Measurement quantities measured	: 1 pcs
Orientation During Testing	: Base Up/Horizontal
Test Requested	: 1. Electrical and Photometric Test 2. Luminous Intensity Distribution Test

1.2 Objective

The following test report is prepared on behalf of Sedna LED 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 Incandescent 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: 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, Shiyan, 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 Φ 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=30minutes.) 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=30minutes.) 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.

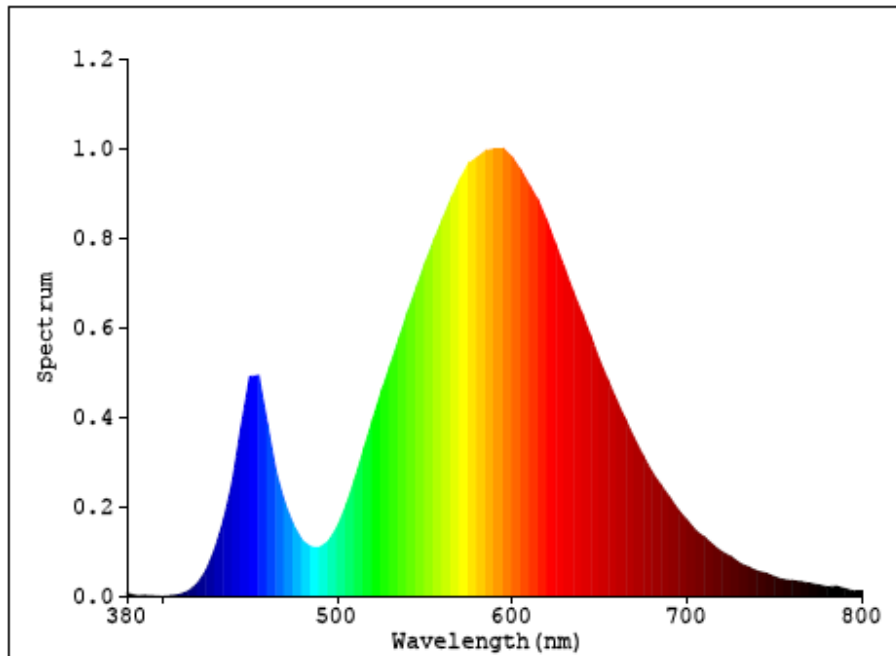
2.3 Deviation from standard operating procedure

None.

3 – Summary of Test Result

	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	3305.76		NVLAP/EPA
	Luminous Efficacy (lm/w)	75.44		NVLAP/EPA
	Correlated Color Temperature (CCT)	3080		NVLAP/EPA
	Color Rendering Index– CRI	69.7		NVLAP/EPA
	Input Power (W)	43.82		NVLAP/EPA
Optional Fields	Power Type	<input checked="" type="checkbox"/> AC	<input type="checkbox"/> DC	/
	Input Voltage (V)	230.0		NVLAP/EPA
	Input Current (A)	0.1943		NVLAP/EPA
	Power Factor	0.9801		NVLAP/EPA
	x(CIE 1931)	0.4367		NVLAP/EPA
	y(CIE 1931)	0.4135		NVLAP/EPA
	u' (CIE 1976)	0.2464		NVLAP/EPA
	v' (CIE 1976)	0.5250		NVLAP/EPA
	Duv(CIE 1976)	0.0038		NVLAP/EPA
	R9	-29		NVLAP/EPA
	Beam Angle: (Degree)	41.5		NVLAP/EPA
	Center beam candlepower: (cd)	5020		NVLAP/EPA
	Zonal lumen density (0-60°):	97.5%		NVLAP/EPA
	Zonal lumen density (60-90°):	2.4%		NVLAP/EPA
	Zonal lumen density (90-120°):	0%		NVLAP/EPA
	Zonal lumen density (120-180°):	0.1%		NVLAP/EPA

4 – Spectral Flux Plots



5 – EUT Photos



6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

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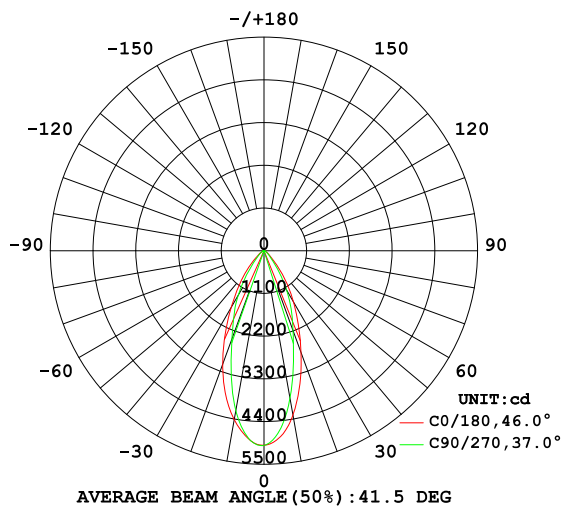


LUMINAIRE PHOTOMETRIC TEST REPORT

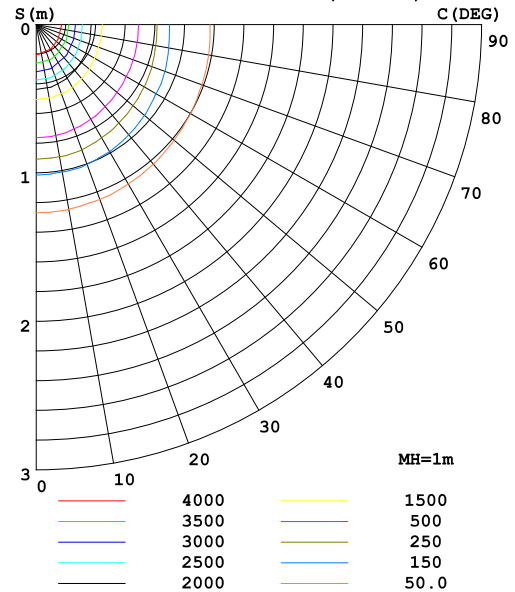
Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm		
NAME:	TYPE:SDWW	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Sedna LED Ltd	SUR.:	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 75.44 lm/W			
MODEL	SDWW	I _{max} (cd)	5020	S/MH (C0/180)	0.75
NOMINAL POWER (W)	36	LOR (%)	100.0	S/MH (C90/270)	0.62
RATED VOLTAGE (V)	230	TOTAL FLUX (lm)	3305.8	η UP, DN (C0-180)	0.0, 51.9
NOMINAL FLUX (lm)	3305.76	CIE CLASS	DIRECT	η UP, DN (C180-360)	0.0, 48.0
LAMPS INSIDE	1	η up (%)	0.1	CIBSE SHR NOM	0.50
TEST VOLTAGE (V)	230.0	η down (%)	99.9	CIBSE SHR MAX	0.70

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



PLANAR ISOLUX DIAGRAM (UNIT: lx)



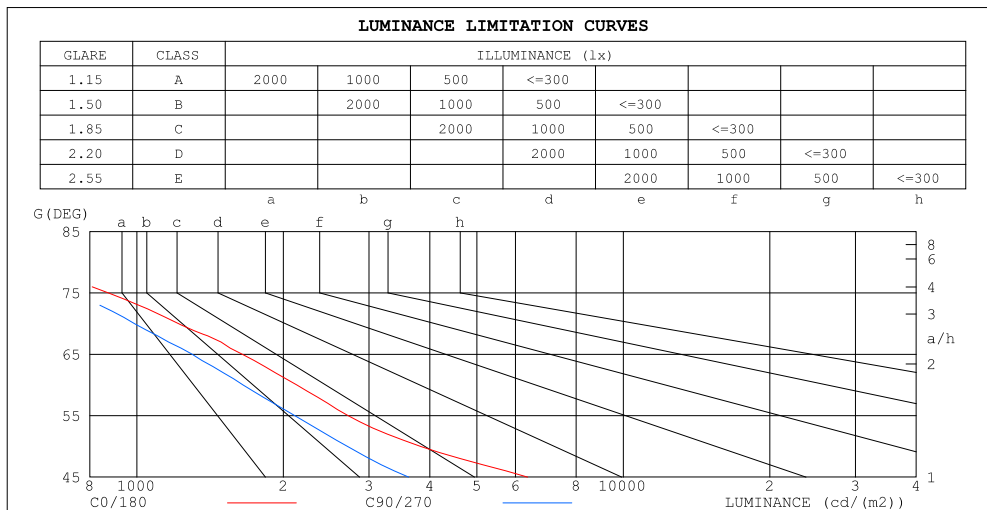
C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature: 25.2DEG
Operators: David
Test Date: 2013-08-09

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.265
Humidity: 62.7%
Test Distance: 2.448m [K=1.0000]
Remarks:

ZONAL FLUX DIAGRAM AND LUMINANCE LIMITATION CURVES

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	4416	4300	4176	4274	4296	3971	3858	4177	0- 10	437.0	437.0	13.2,13.2
20	3108	2777	2418	2612	2789	2355	2190	2693	10- 20	940.2	1377	41.7,41.7
30	1696	1455	1339	1427	1521	1265	1157	1392	20- 30	898.0	2275	68.8,68.8
40	766.4	612.9	475.5	538.8	609.7	416.6	374.4	592.3	30- 40	582.1	2857	86.4,86.4
50	246.2	206.0	173.9	182.4	190.8	161.3	155.1	198.5	40- 50	248.9	3106	94,94
60	106.6	95.37	82.65	88.04	90.86	77.14	71.82	90.15	50- 60	118.0	3224	97.5,97.5
70	41.63	38.69	33.80	35.04	34.81	28.29	28.34	34.23	60- 70	57.53	3282	99.3,99.3
80	8.275	8.013	7.348	6.585	6.320	5.227	4.409	6.266	70- 80	19.89	3302	99.9,99.9
90	0.0904	0.0203	0.0162	0.0048	0	0	0.0000	0	80- 90	2.091	3304	99.9,99.9
100	0.0093	0.0089	0.0107	0.0127	0.0085	0.0105	0.0090	0.0074	90-100	0.0042	3304	99.9,99.9
110	0.0345	0.0330	0.0350	0.0414	0.0304	0.0317	0.0263	0.0233	100-110	0.0213	3304	99.9,99.9
120	0.0804	0.0726	0.0755	0.0922	0.0802	0.0788	0.0649	0.0616	110-120	0.0492	3304	99.9,99.9
130	0.2688	0.2510	0.2483	0.2875	0.1981	0.2013	0.1718	0.1610	120-130	0.1220	3304	99.9,99.9
140	0.6808	0.6722	0.6720	0.7295	0.4098	0.4236	0.3925	0.3612	130-140	0.2824	3304	100,100
150	1.207	1.254	1.284	1.306	0.6995	0.7230	0.7139	0.6547	140-150	0.4707	3305	100,100
160	1.631	1.729	1.785	1.735	1.043	1.050	1.082	1.005	150-160	0.5460	3305	100,100
170	1.731	1.830	1.857	1.775	1.255	1.245	1.282	1.253	160-170	0.4209	3306	100,100
180	1.553	1.542	1.624	1.477	1.555	1.562	1.575	1.557	170-180	0.1447	3306	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



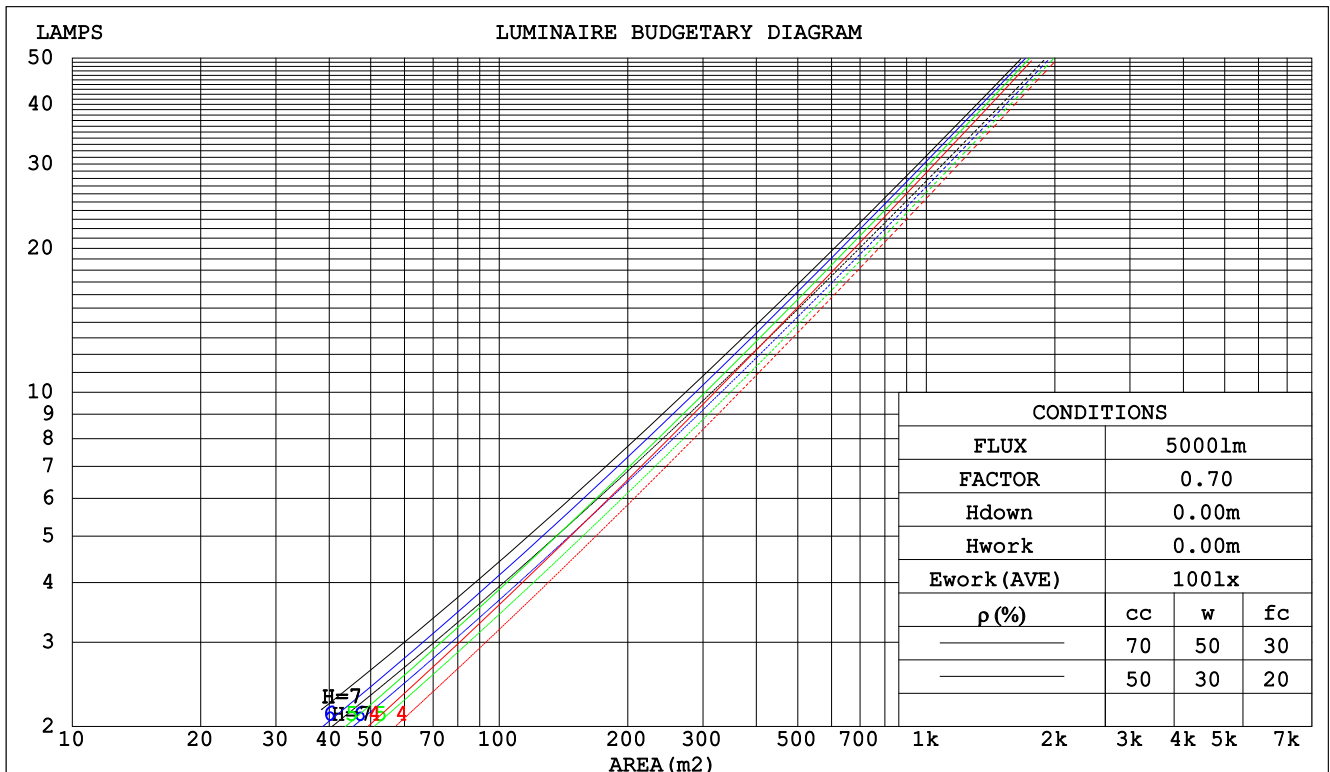
C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:David
Test Date:2013-08-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
Humidity:62.7%
Test Distance:2.448m [K=1.0000]
Remarks:

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm		
NAME:	TYPE:SDWW	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Sedna LED Ltd	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	1.19	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	1.10	1.08	1.05	1.08	1.06	1.04	1.04	1.02	1.01	1.00	.99	.98	.97	.96	.95	.93
2.0	1.02	.98	.95	1.01	.97	.94	.97	.94	.91	.94	.92	.89	.92	.89	.88	.86
3.0	.95	.90	.86	.94	.89	.85	.91	.87	.84	.89	.85	.82	.86	.84	.81	.80
4.0	.89	.83	.79	.88	.82	.78	.85	.81	.77	.83	.79	.76	.81	.78	.75	.74
5.0	.83	.77	.73	.82	.76	.72	.80	.75	.72	.79	.74	.71	.77	.73	.70	.69
6.0	.78	.72	.68	.77	.71	.67	.76	.71	.67	.74	.70	.66	.73	.69	.66	.64
7.0	.73	.67	.63	.73	.67	.63	.71	.66	.63	.70	.66	.62	.69	.65	.62	.60
8.0	.69	.63	.59	.69	.63	.59	.68	.62	.59	.67	.62	.58	.66	.61	.58	.57
9.0	.66	.60	.56	.65	.59	.56	.64	.59	.55	.63	.59	.55	.62	.58	.55	.54
10.0	.62	.56	.53	.62	.56	.52	.61	.56	.52	.60	.55	.52	.59	.55	.52	.51



C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.2DEG
 Operators:David
 Test Date:2013-08-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
 Humidity:62.7%
 Test Distance:2.448m [K=1.0000]
 Remarks:

WEC AND CCEC

Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm					
NAME:			TYPE:SDWW		WEIGHT:
DIM.:			SPEC.:		SERIAL No.:
MFR.: Sedna LED Ltd			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 Coefficients(WEC)									
0.0																
1.0	.185	.105	.033	.179	.102	.032	.166	.095	.030	.154	.089	.029	.144	.083	.027	
2.0	.178	.097	.030	.172	.095	.029	.161	.090	.028	.152	.085	.027	.143	.081	.025	
3.0	.169	.090	.027	.164	.088	.026	.155	.084	.026	.146	.080	.025	.139	.077	.024	
4.0	.160	.083	.024	.156	.082	.024	.148	.079	.023	.141	.076	.023	.134	.073	.022	
5.0	.152	.077	.022	.148	.076	.022	.141	.074	.022	.135	.071	.021	.129	.069	.021	
6.0	.144	.072	.021	.141	.071	.021	.135	.069	.020	.129	.067	.020	.124	.065	.019	
7.0	.137	.068	.019	.135	.067	.019	.129	.065	.019	.124	.064	.019	.119	.062	.018	
8.0	.131	.064	.018	.128	.063	.018	.124	.062	.018	.119	.060	.017	.115	.059	.017	
9.0	.125	.060	.017	.123	.060	.017	.118	.059	.017	.114	.057	.016	.111	.056	.016	
10.0	.120	.057	.016	.117	.057	.016	.114	.056	.016	.110	.055	.016	.106	.054	.015	

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	.191	.191	.191	.163	.163	.163	.111	.111	.111	.064	.064	.064	.020	.020	.020	
1.0	.172	.158	.145	.147	.135	.125	.101	.093	.086	.058	.054	.050	.019	.017	.016	
2.0	.158	.133	.112	.135	.114	.097	.092	.079	.068	.053	.046	.040	.017	.015	.013	
3.0	.146	.114	.089	.125	.098	.077	.086	.068	.054	.049	.040	.032	.016	.013	.010	
4.0	.135	.099	.072	.116	.086	.063	.080	.060	.044	.046	.035	.026	.015	.011	.009	
5.0	.127	.088	.059	.109	.076	.052	.075	.053	.036	.043	.031	.022	.014	.010	.007	
6.0	.119	.079	.050	.103	.068	.043	.071	.048	.031	.041	.028	.018	.013	.009	.006	
7.0	.113	.071	.042	.097	.062	.037	.067	.043	.026	.039	.025	.015	.013	.008	.005	
8.0	.107	.065	.036	.092	.056	.032	.064	.040	.022	.037	.023	.013	.012	.008	.004	
9.0	.102	.060	.031	.088	.052	.027	.061	.036	.019	.035	.022	.012	.011	.007	.004	
10.0	.097	.055	.028	.084	.048	.024	.058	.034	.017	.034	.020	.010	.011	.007	.003	

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.2DEG
 Operators:David
 Test Date:2013-08-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
 Humidity:62.7%
 Test Distance:2.448m [K=1.0000]
 Remarks:

Uncorrected UGR Table

Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm											
NAME:					TYPE:SDWW			WEIGHT:			
DIM.:					SPEC.:			SERIAL No.:			
MFR.: Sedna LED Ltd					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	2H	14.7	15.7	15.0	15.9	16.1	13.1	14.1	13.4	14.3	14.5
	3H	14.8	15.7	15.1	16.0	16.2	13.3	14.2	13.5	14.4	14.6
	4H	14.8	15.7	15.1	15.9	16.1	13.3	14.1	13.6	14.3	14.6
	6H	14.8	15.6	15.1	15.8	16.1	13.2	14.0	13.5	14.3	14.5
	8H	14.8	15.5	15.1	15.8	16.0	13.2	14.0	13.5	14.2	14.5
	12H	14.7	15.4	15.0	15.7	16.0	13.1	13.9	13.5	14.2	14.4
4H	2H	14.7	15.5	14.9	15.7	16.0	13.2	14.0	13.4	14.2	14.5
	3H	14.8	15.6	15.2	15.8	16.1	13.4	14.1	13.7	14.4	14.7
	4H	14.9	15.5	15.2	15.8	16.1	13.4	14.1	13.8	14.4	14.7
	6H	14.8	15.4	15.2	15.7	16.1	13.4	14.0	13.8	14.3	14.7
	8H	14.8	15.3	15.2	15.7	16.1	13.4	13.9	13.8	14.3	14.6
	12H	14.7	15.2	15.1	15.6	16.0	13.3	13.8	13.7	14.2	14.6
8H	4H	14.8	15.3	15.2	15.7	16.0	13.4	13.9	13.8	14.3	14.6
	6H	14.7	15.2	15.2	15.6	16.0	13.4	13.8	13.8	14.2	14.6
	8H	14.7	15.1	15.2	15.5	16.0	13.3	13.7	13.8	14.1	14.6
	12H	14.7	15.0	15.1	15.4	15.9	13.3	13.6	13.7	14.1	14.5
12H	4H	14.7	15.2	15.1	15.6	16.0	13.3	13.8	13.7	14.2	14.6
	6H	14.7	15.1	15.1	15.5	16.0	13.3	13.7	13.8	14.1	14.6
	8H	14.7	15.0	15.1	15.4	15.9	13.3	13.6	13.8	14.1	14.5
Variations with the observer position at spacings:											
S = 1.0H		+ 2.0 / - 3.1				+ 1.5 / - 2.6					
1.5H		+ 3.3 / - 2.6				+ 2.6 / - 1.9					
2.0H		+ 3.8 / - 2.3				+ 2.0 / - 1.7					

CIE Pub.117 Corrected 3306 lm Total Lamp Luminous Flux. (8log(F/F0) = 4.2)

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.2DEG
 Operators:David
 Test Date:2013-08-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
 Humidity:62.7%
 Test Distance:2.448m [K=1.0000]
 Remarks:

UTILIZATION FACTORS TABLE

Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm		
NAME:	TYPE:SDWW	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Sedna LED Ltd	SUR.:	PROTECTION ANGLE:

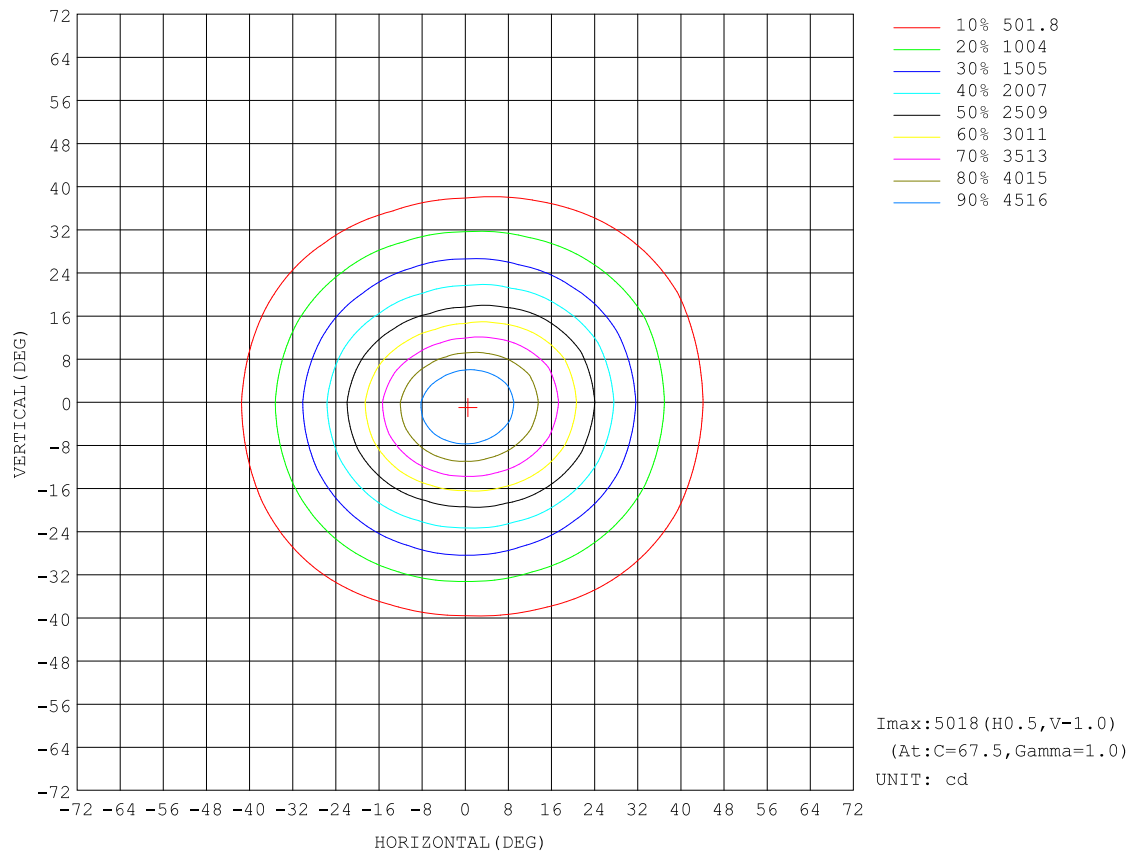
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS (PERCENT) $k(RI) \times RCR = 5$									
$k = 0.60$	83	76	72	82	76	72	82	75	71	67
0.80	91	84	80	90	84	80	89	83	80	75
1.00	96	90	86	95	89	86	94	89	85	81
1.25	101	95	91	100	94	91	98	93	90	85
1.50	104	98	95	102	98	94	100	96	93	88
2.00	107	102	99	106	101	98	103	99	97	91
2.50	109	105	101	107	103	100	104	101	99	92
3.00	111	107	104	109	106	103	105	103	101	94
4.00	113	110	107	111	108	106	107	105	103	96
5.00	114	112	110	112	110	108	108	106	105	97
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:David
 Test Date:2013-08-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
 Humidity:62.7%
 Test Distance:2.448m [K=1.0000]
 Remarks:

ISOCANDELA DIAGRAM

Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm		
NAME:	TYPE:SDWW	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Sedna LED Ltd	SUR.:	PROTECTION ANGLE:

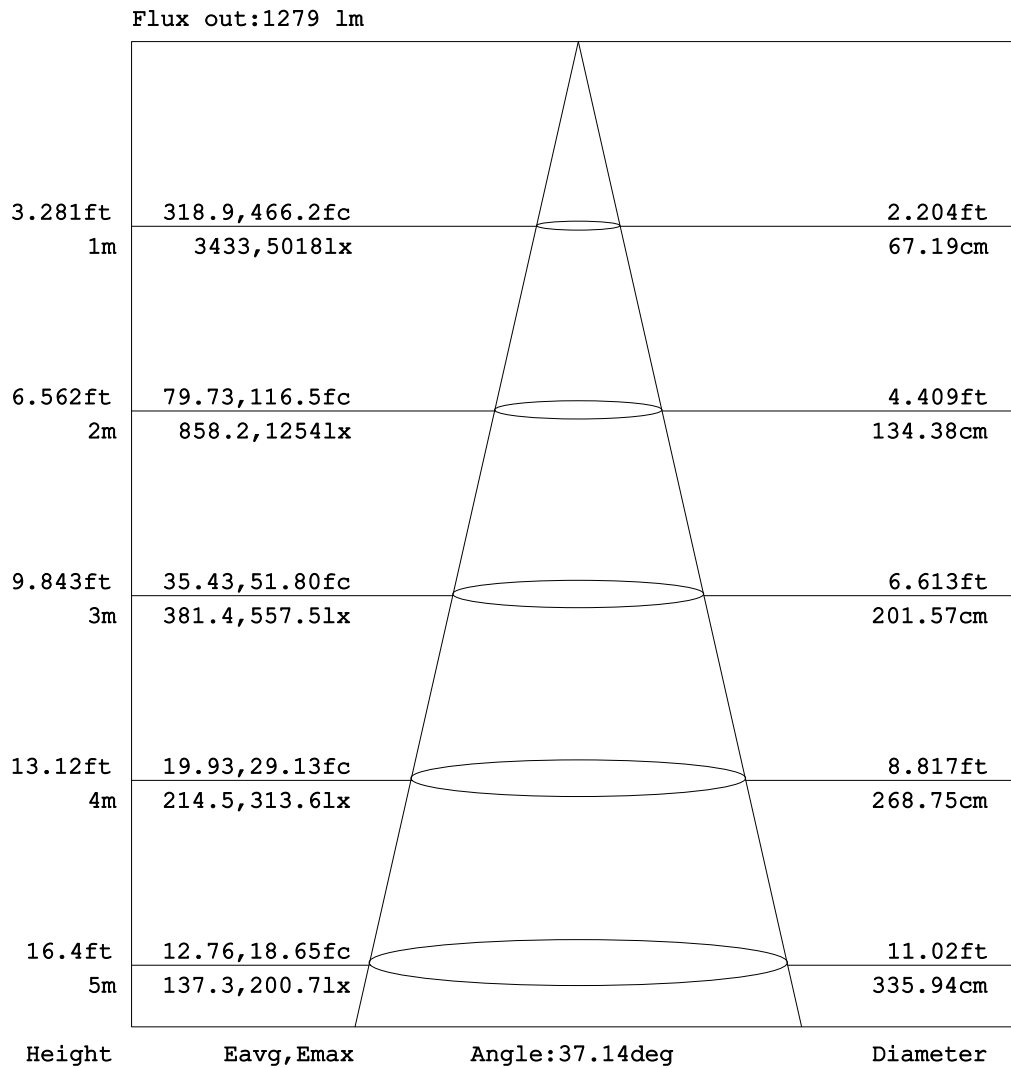


C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:David
Test Date:2013-08-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
Humidity:62.7%
Test Distance:2.448m [K=1.0000]
Remarks:

AAI Figure

Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm		
NAME:	TYPE:SDWW	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Sedna LED Ltd	SUR.:	PROTECTION ANGLE:



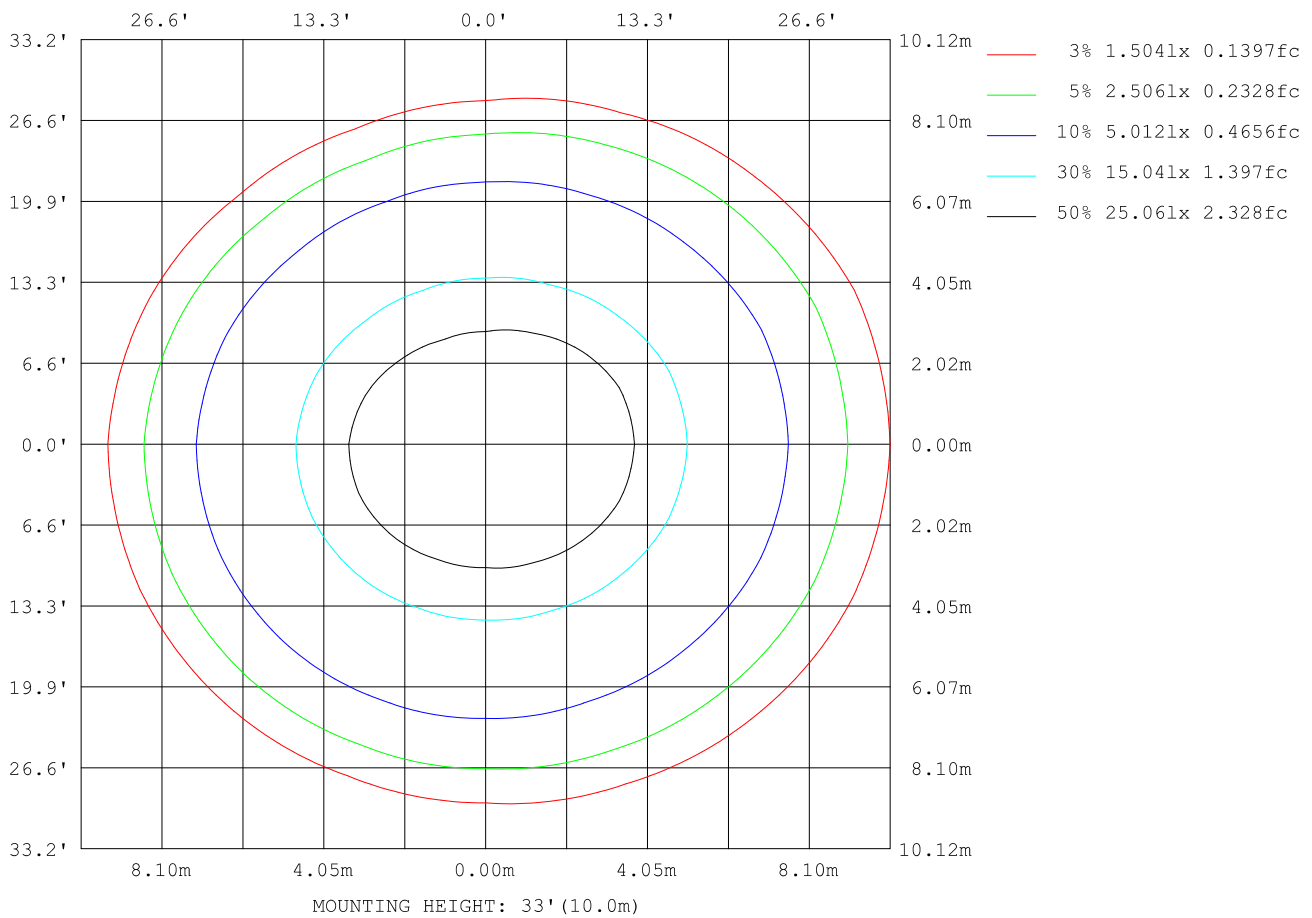
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature: 25.2DEG
Operators: David
Test Date: 2013-08-09

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.265
Humidity: 62.7%
Test Distance: 2.448m [K=1.0000]
Remarks:

ISOLUX DIAGRAM

Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm		
NAME:	TYPE:SDWW	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Sedna LED Ltd	SUR.:	PROTECTION ANGLE:



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:David
Test Date:2013-08-09

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
Humidity:62.7%
Test Distance:2.448m [K=1.0000]
Remarks:

Average Luminance Table (CIBSE)

Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm		
NAME:	TYPE:SDWW	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Sedna LED Ltd	SUR.:	PROTECTION ANGLE:

Parameter description for average Luminance	Symbol	Value	Unit
Luminance in Azimuth Plane	Bc	refer Table 2	cd/sq.m.
Intensity at angle Gamma in given azimuth plane	I	from data	cd/klm
Number of lamps	N	1	
Output of each lamp(initial lumens as specified)	F	3305.76	lm
Multiplying factor	K	1	
Luminous area in horizontal plane used in calculations	A	0.1	sq.m.
Angle to the downward vertical from light centre	Gamma	from data	deg

Table 1. Calculation parameters for determination of CIBSE LG3:1996 Average Luminance

G deg	C plane(deg)																		
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
55	2720	2716	2676	2592	2478	2351	2223	2112	2033	1983	1971	1984	2020	2071	2131	2195	2254	2302	2326
60	2131	2122	2083	2006	1907	1807	1715	1637	1580	1545	1539	1553	1585	1628	1676	1724	1767	1801	1817
65	1647	1623	1582	1519	1445	1379	1324	1275	1231	1199	1191	1198	1218	1246	1277	1309	1340	1370	1386
70	1217	1210	1188	1146	1094	1039	987	946	923	908	898	895	903	917	935	954	977	1002	1018
75	874	859	842	824	802	769	725	686	659	640	632	629	627	627	632	642	653	665	672
80	477	481	475	454	426	400	380	363	350	339	329	324	328	336	341	341	344	356	364
85	211	217	214	204	187	160	126	99	85	79	77	81	93	108	122	133	142	151	155

Table 2. Average Luminance(cd/sq.m.) for defined C plane,Gamma angle

CIBSE Category	Gamma (deg)	Average Luminance		Patch Luminance	
		maximum calculated	specified maximum	maximum measured	specified maximum
Category 1	55 to 90	2720	200	---	500
Category 2	65 to 90	1647	200	---	500
Category 3	75 to 90	874	200	---	500

Table 3. Tabulation of Average and Patch Luminance(cd/sq.m.) for defined CIBSE categories

No match

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.2DEG
 Operators:David
 Test Date:2013-08-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
 Humidity:62.7%
 Test Distance:2.448m [K=1.0000]
 Remarks:

Average Luminance Table(CIBSE)

Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm		
NAME:	TYPE:SDWW	WEIGHT:
DIM.:	SPEC.:	SERIAL No.:
MFR.: Sedna LED Ltd	SUR.:	PROTECTION ANGLE:

Parameter description for average Luminance	Symbol	Value	Unit
Luminance in Azimuth Plane	Bc	refer Table 2	cd/sq.m.
Intensity at angle Gamma in given azimuth plane	I	from data	cd/klm
Number of lamps	N	1	
Output of each lamp(initial lumens as specified)	F	3305.76	lm
Multiplying factor	K	1	
Luminous area in horizontal plane used in calculations	A	0.1	sq.m.
Angle to the downward vertical from light centre	Gamma	from data	deg

Table 1. Calculation parameters for determination of CIBSE LG3:2001 Average Luminance

G deg	C plane(deg)																		
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
55	2720	2716	2676	2592	2478	2351	2223	2112	2033	1983	1971	1984	2020	2071	2131	2195	2254	2302	2326
60	2131	2122	2083	2006	1907	1807	1715	1637	1580	1545	1539	1553	1585	1628	1676	1724	1767	1801	1817
65	1647	1623	1582	1519	1445	1379	1324	1275	1231	1199	1191	1198	1218	1246	1277	1309	1340	1370	1386
70	1217	1210	1188	1146	1094	1039	987	946	923	908	898	895	903	917	935	954	977	1002	1018
75	874	859	842	824	802	769	725	686	659	640	632	629	627	627	632	642	653	665	672
80	477	481	475	454	426	400	380	363	350	339	329	324	328	336	341	341	344	356	364
85	211	217	214	204	187	160	126	99	85	79	77	81	93	108	122	133	142	151	155

Table 2. Average Luminance(cd/sq.m.) for defined C plane,Gamma angle

range (deg)	Maximum measured	Average Luminance(cd/sq.m)			
		Maximum limit for screen type & software category used			
		Type I,II screen Some neg.s'ware	Type I,II screen Only pos.s'ware	Type III screen Some neg.s'ware	Type III screen Only pos.s'ware
55 to 90	2720	1000	1500	200	500
65 to 90	1647	1000	1500	200	500

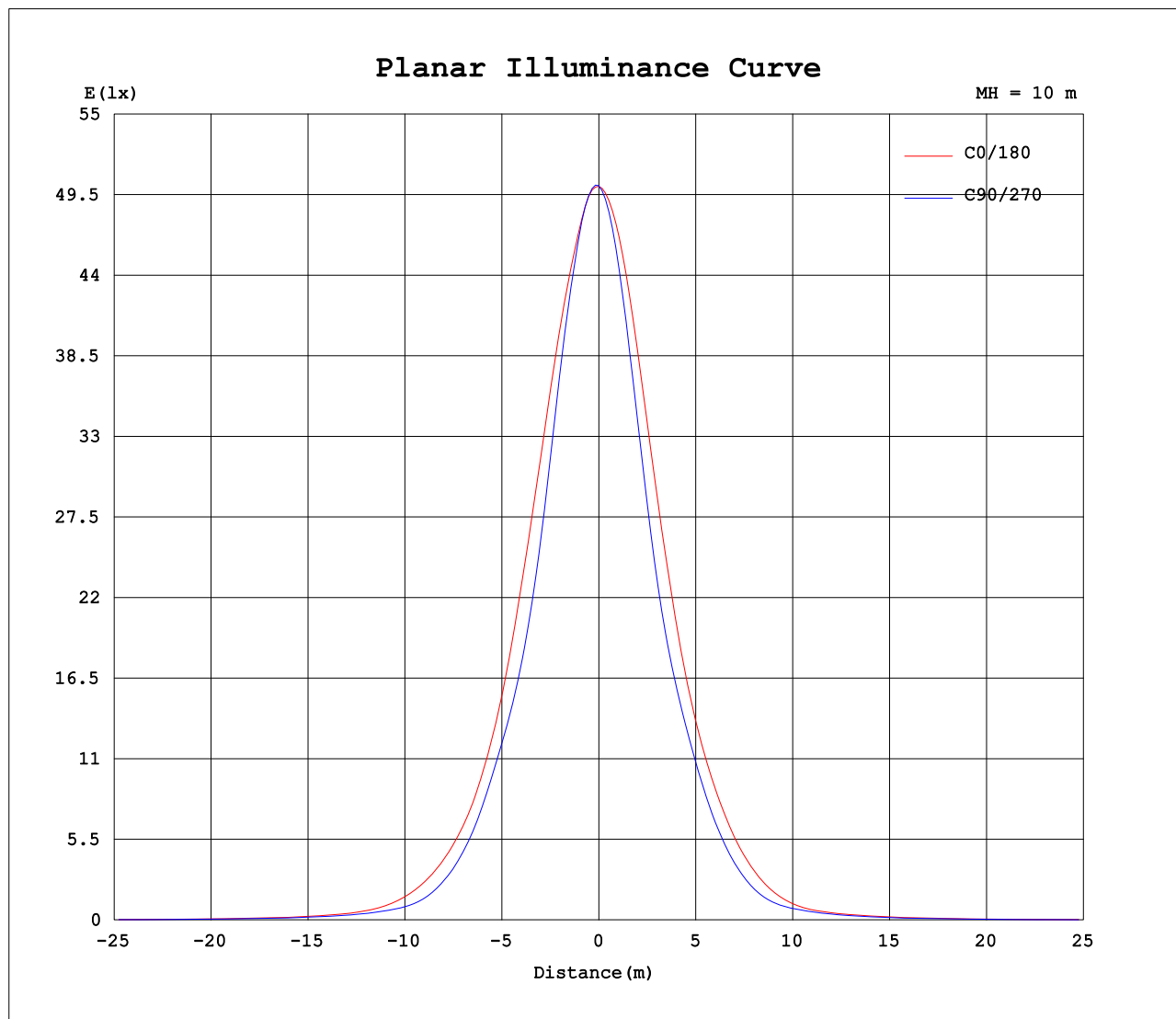
Table 3. Tabulation of average luminance(cd/sq.m.) and luminance limits

No match

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.2DEG
 Operators:David
 Test Date:2013-08-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
 Humidity:62.7%
 Test Distance:2.448m [K=1.0000]
 Remarks:

Planar Illuminance Curve



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature: 25.2DEG
Operators: David
Test Date: 2013-08-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.265
Humidity: 62.7%
Test Distance: 2.448m [K=1.0000]
Remarks:

LUMINOUS DISTRIBUTION INTENSITY DATA

Test:U:230.0V I:0.1943A P:43.82W PF:0.9801 Lamp Flux:3305.76x1 lm																	
NAME:									TYPE:SDWW						WEIGHT:		
DIM.:									SPEC.:						SERIAL No.:		
MFR.: Sedna LED Ltd									SUR.:						PROTECTION ANGLE:		

Table--1

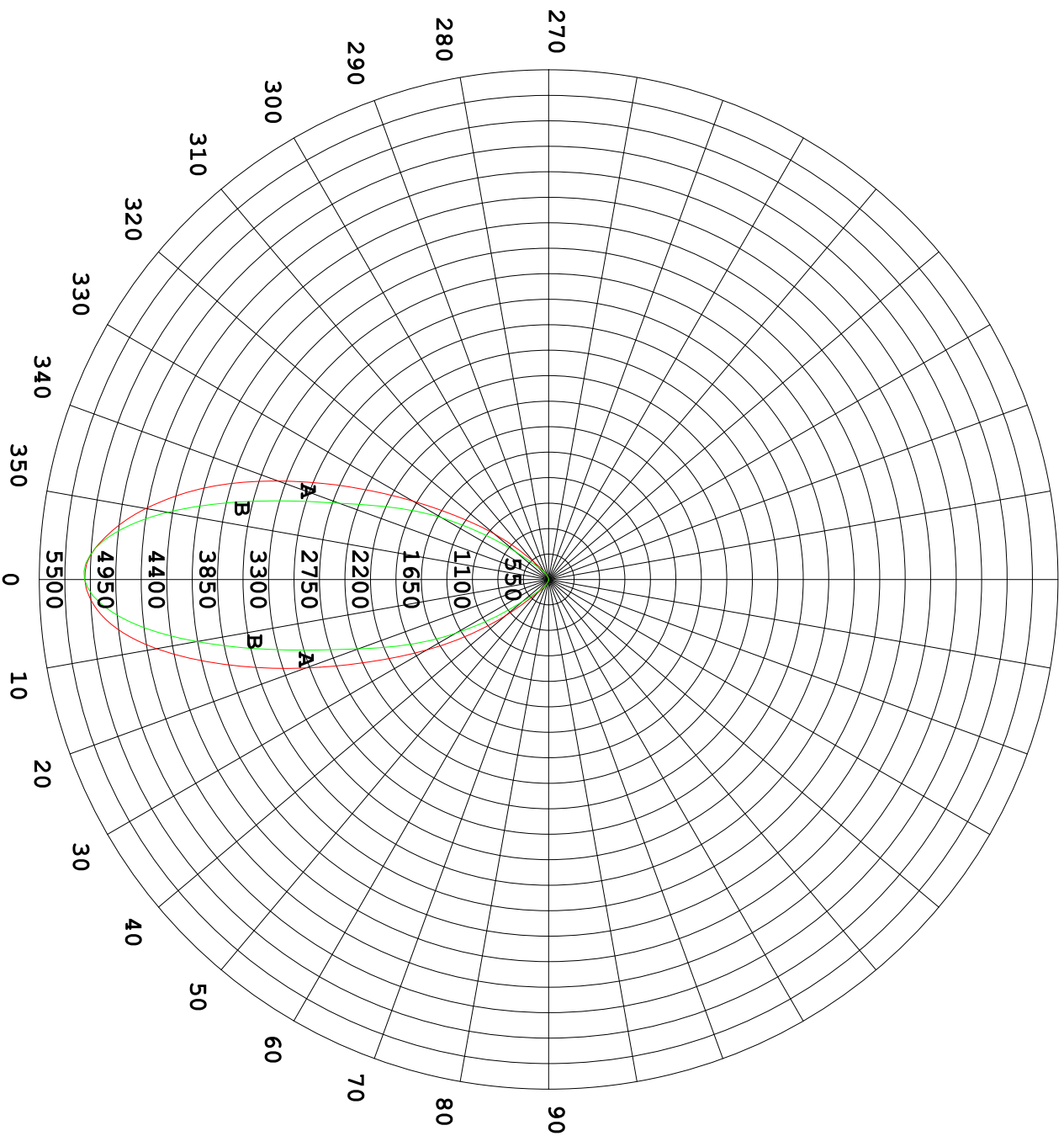
UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338			
0	5007	5010	5009	5011	5011	5011	5012	5011	5007	5010	5009	5011	5011	5011	5012	5011			
5	4839	4860	4855	4837	4823	4829	4838	4832	4812	4749	4678	4639	4643	4686	4753	4819			
10	4416	4401	4300	4202	4176	4210	4274	4316	4296	4149	3971	3864	3858	3986	4177	4352			
15	3833	3766	3575	3375	3271	3314	3448	3559	3567	3378	3122	2933	2938	3148	3458	3746			
20	3108	3020	2777	2531	2418	2454	2612	2768	2789	2603	2355	2198	2190	2359	2693	3017			
25	2363	2272	2047	1883	1832	1846	1953	2056	2087	1950	1758	1669	1662	1740	1962	2257			
30	1696	1620	1455	1360	1339	1363	1427	1501	1521	1403	1265	1172	1157	1242	1392	1602			
35	1167	1111	986	881	846	867	941	1003	1025	931	786	705	707	800	948	1115			
40	766	717	613	526	476	481	539	586	610	521	417	362	374	466	592	727			
45	450	414	345	282	256	258	280	305	315	275	233	221	223	255	325	424			
50	246	232	206	186	174	176	182	189	191	178	161	155	155	172	198	236			
55	156	152	141	128	121	122	127	132	133	125	114	106	106	117	136	153			
60	107	104	95.4	87.5	82.7	84.3	88.0	90.2	90.9	85.4	77.1	71.7	71.8	77.9	90.1	103			
65	69.6	66.8	62.2	58.5	54.9	55.9	58.3	58.4	58.6	54.1	48.4	45.7	46.5	50.3	56.9	65.9			
70	41.6	40.0	38.7	35.6	33.8	34.6	35.0	35.3	34.8	31.1	28.3	26.7	28.3	29.7	34.2	40.7			
75	22.6	21.1	21.7	19.9	18.7	18.5	17.6	17.6	17.4	16.0	14.9	14.1	14.4	16.0	19.2	22.2			
80	8.27	8.92	8.01	7.53	7.35	6.72	6.59	6.16	6.32	5.71	5.23	4.51	4.41	5.23	6.27	7.47			
85	1.84	2.02	1.93	1.34	1.21	1.28	1.48	1.36	1.35	1.08	0.54	0.17	0.17	0.46	1.13	1.69			
90	0.09	0.02	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
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	0.01	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			
105	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01			
110	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02			
115	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04			
120	0.08	0.08	0.07	0.07	0.08	0.08	0.09	0.10	0.08	0.08	0.08	0.07	0.06	0.06	0.06	0.06			
125	0.15	0.14	0.14	0.13	0.14	0.15	0.16	0.17	0.13	0.14	0.13	0.12	0.11	0.10	0.10	0.10			
130	0.27	0.26	0.25	0.25	0.25	0.27	0.29	0.30	0.20	0.21	0.20	0.18	0.17	0.17	0.16	0.16			
135	0.45	0.44	0.43	0.42	0.43	0.45	0.48	0.50	0.29	0.31	0.30	0.28	0.27	0.26	0.25	0.24			
140	0.68	0.68	0.67	0.67	0.67	0.70	0.73	0.74	0.41	0.43	0.42	0.41	0.39	0.38	0.36	0.35			
145	0.94	0.95	0.96	0.96	0.97	1.00	1.02	1.01	0.55	0.57	0.57	0.56	0.54	0.52	0.50	0.49			
150	1.21	1.24	1.25	1.28	1.28	1.31	1.31	1.29	0.70	0.71	0.72	0.72	0.71	0.68	0.65	0.64			
155	1.44	1.48	1.52	1.56	1.57	1.58	1.55	1.52	0.87	0.88	0.89	0.90	0.90	0.86	0.82	0.81			
160	1.63	1.67	1.73	1.79	1.79	1.79	1.74	1.69	1.04	1.05	1.05	1.07	1.08	1.04	1.01	0.99			
165	1.74	1.79	1.85	1.91	1.90	1.89	1.83	1.78	1.19	1.19	1.19	1.20	1.23	1.19	1.17	1.15			
170	1.73	1.78	1.83	1.88	1.86	1.84	1.78	1.72	1.26	1.25	1.24	1.25	1.28	1.25	1.25	1.23			
175	1.65	1.68	1.71	1.74	1.68	1.71	1.65	1.61	1.33	1.33	1.31	1.32	1.37	1.32	1.34	1.34			
180	1.55	1.55	1.54	1.53	1.62	1.47	1.48	1.49	1.55	1.55	1.56	1.56	1.58	1.61	1.56	1.53			

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.2DEG
Operators:David
Test Date:2013-08-09

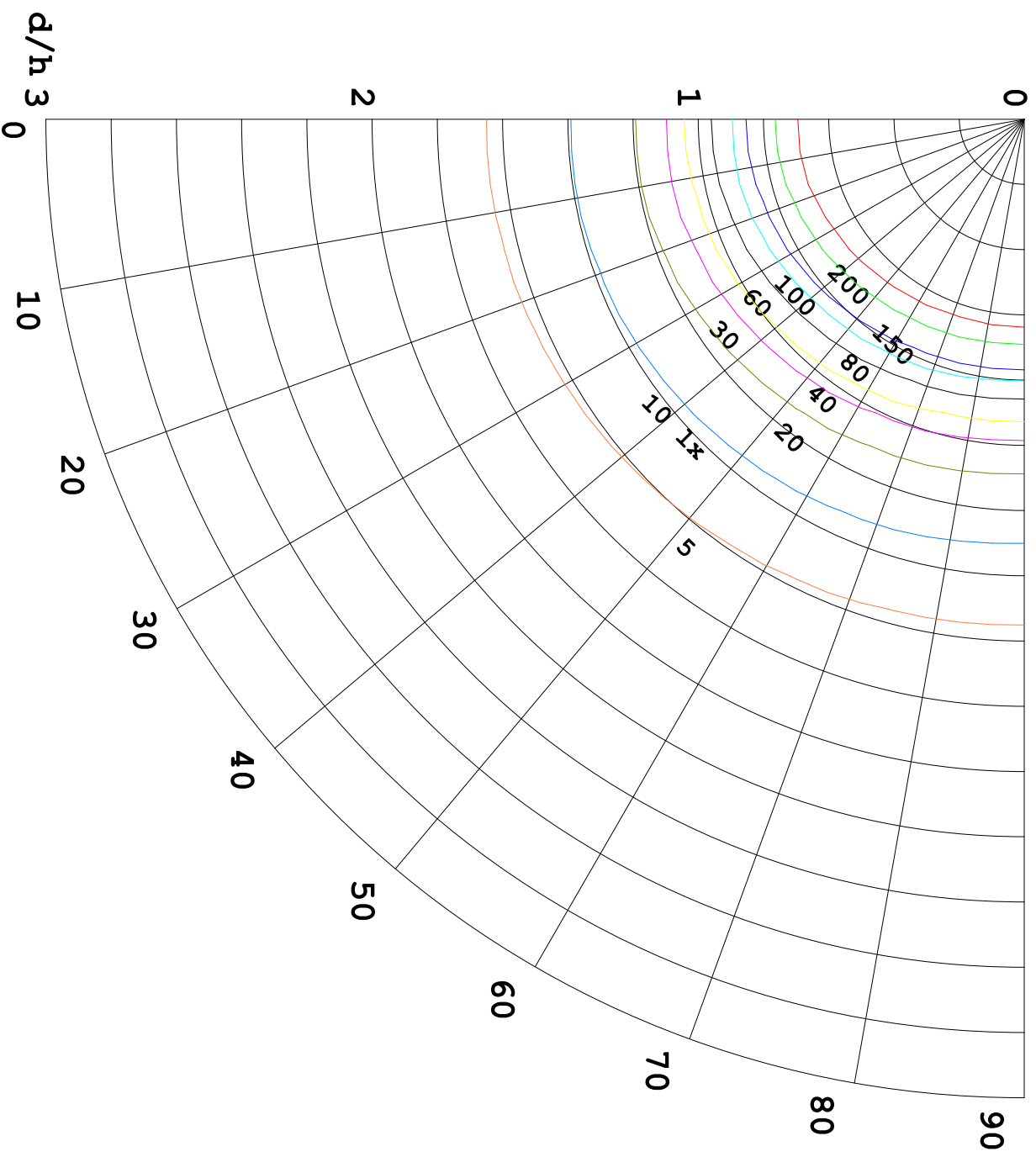
γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.265
Humidity:62.7%
Test Distance:2.448m [K=1.0000]
Remarks:

I (cd)



1000 lm

$K = 1$



F = 5000 lm
 K = 0.7
 Hcc = 0.0 m
 Hfc = 0.0 m
 Eave = 100 lx

	Pcc	Pw	Pfc
—————	70	50	30
—————	50	30	20

