

# IESNA LM-79: 2008

## Measurement and Test Report

for

**Green Creative Ltd.**

Room 1206-7, New Victory House, 93-103 Wing Lok Street, Central, HONG KONG

Mar 01, 2016

<b>Product Name:</b>	LED Lamp
<b>Model No:</b>	5.5PLS/840/HYB/GX23; 5.5PLS/840/BYP/2GX7
<b>Test Engineer:</b>	David Zhang 
<b>Report No.:</b>	BTR66.181.15.0029.11
<b>Sample Received Date:</b>	Jan 04, 2016; Feb 25, 2016
<b>Test Performed Date:</b>	Jan 04, 2016 to Jan 07, 2016; Feb 25, 2016 to Mar 01, 2016
<b>Reviewed By:</b>	Steven Hsu 
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**TABLE OF CONTENTS**

<b>1 - GENERAL INFORMATION.....</b>	<b>3</b>
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	3
1.2 OBJECTIVE .....	3
1.3 TEST FACILITY DESCRIPTION.....	4
1.4 TEST EQUIPMENT LIST .....	4
<b>2 - TEST METHOD.....</b>	<b>5</b>
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
<b>3 – SUMMARY OF TEST RESULT .....</b>	<b>6</b>
<b>4 – SPECTRAL FLUX PLOTS .....</b>	<b>7</b>
<b>5 – EUT PHOTOS.....</b>	<b>8</b>
<b>6 – LUMINOUS INTENSITY DISTRIBUTION TEST PLOTS (CIE CHROMATICITY).....</b>	<b>9</b>



## 1 - GENERAL INFORMATION

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

Applicant	: Green Creative Ltd.
Product Name	: LED Lamp
Model No	: 5.5PLS/840/HYB/GX23; 5.5PLS/840/BYP/2GX7
Brand	: GREEN CREATIVE
Nominal Operation Voltage	: AC 120V/60Hz
Nominal Power	: 5.5W
Nominal CCT	: 4000K
Nominal CRI	: 80
Nominal Lumen Output	: 520Lumens
Nominal Life Time	: 25000 Hours
Number of hours operated prior to measurement for new sample	: 0 Hours
Stabilization Time	: 1.0 hours
Total operating time for measurement include stabilization time	: 2.5 hours
Date of Receiving Sample	: Jan 04, 2016; Feb 25, 2016
Measurement quantities measured	: 1 pcs
Orientation During Testing	: Base up
Test Requested	: Electrical and Photometric Test Luminous Intensity Distribution Test

Note: These models are all the same except for the lamp Base, here we choose 5.5PLS/840/HYB/GX23 to be tested and the other to share the test data

### 1.2 Objective

The following test report is prepared on behalf of Green Creative Ltd. in accordance with IESNA LM-79-08, used the following American National Standards or Illumination Engineering Society of North America test guides:

ANSI C78.377-2008: Specifications for the Chromaticity of Solid State Lighting Products;

ANSI C79.1-2002: American National Standard for Electric Lamps – Nomenclature for Glass Bulbs Intended for Use with Electric Lamps;

ANSI C78.20-2003: American National Standard for Electric Lamps – A, G, PS, and Similar Shapes with E26 Medium Screw Bases;

ANSI C78.21-2011: American National Standard for Electric Lamps – PAR and R Shapes;

ANSI C78.24-2001: American National Standard for Electric Lamps – Two-inch (51 mm);

Integral-reflector Lamps with Front Covers and GU5.3 or GX 5.3 Bases;

ANSI/IEC C81.61-2003: American National Standard for Electric Lamp Bases;

ANSI/IEEE C62.41-1991 (01-May-1991): Surge Voltages in Low-Voltage AC Power Circuits, Recommended Practice for;

CIE Publication No. 13.3-1995: Method of Measuring and Specifying Color Rendering of Light Sources;

CIE Publication No. 18.2-1983: The Basis of Physical Photometry;

IESNA LM-16-1993: Practical Guide to Colorimetry of Light Sources;

IESNA LM-28-89-1989: Guide for the Selection, Care, and Use of Electrical Instruments in the Photometric Laboratory;

IESNA LM-79-08 Electrical and Photometric Measurement of Solid State Lighting Products

UL 1993-1999: Standard for Self-Ballasted Lamps and Lamp Adapters;

UL 8750-2009: Light Emitting Diode (LED) Equipment for Use in Lighting Products.

### 1.3 Test Facility Description

The Energy Efficiency Lab used by BEST to collect energy efficiency measurement data is located in 1st Floor, 1st Building, Weitai Industrial Park, Yingrenshi, Shiyao, Baoan, Shenzhen, China. BEST Test Service Shenzhen Co., Ltd is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200770-0). BEST Test Service Shenzhen Co., Ltd is also an ELI accredited lab for lighting products (ELI Certificate No. ELI-L04-2010) and UL accredited lab for lighting products

### 1.4 Test Equipment List

Apparatus List	Device	Cal. Date	Cal Due Date
1	Integral Sphere+ Spectrophotometer System	Mar 10, 2015	Mar 09, 2016
2	Digital Power Meter	Oct 18, 2015	Oct 17, 2016
3	Goniophotometer+ Spectrophotometer System	Nov 20, 2015	Nov 19, 2016
4	Standard Light Source	Sep 17, 2015	Sep 16, 2016
5	Standard Light Source	Sep 17, 2015	Sep 16, 2016
6	Digital Storage Oscilloscope	Oct 18, 2015	Oct 17, 2016
7	Ultra Compact Simulator	Oct 20, 2015	Oct 19, 2016
8	Temperature Chamber	Oct 20, 2015	Oct 19, 2016
9	Digital Caliper	Nov 20, 2015	Nov 19, 2016
10	Digital CC&CV DC Power Supply(30V 5A)	N/A	N/A
11	5 1/2 Digital Multimeter	Oct 18, 2015	Oct 17, 2016
12	Digital CC&CV DC Power Supply(120V 10A)	N/A	N/A
13	6 1/2 Digital Multimeter	Oct 18, 2015	Oct 17, 2016
14	Digital Multimeter	Oct 18, 2015	Oct 17, 2016
15	Temperature Recorder+Thermocouple	Nov 20, 2015	Nov 19, 2016
16	Timer Controller	Nov 20, 2015	Nov 19, 2016

**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  $\Phi$  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.

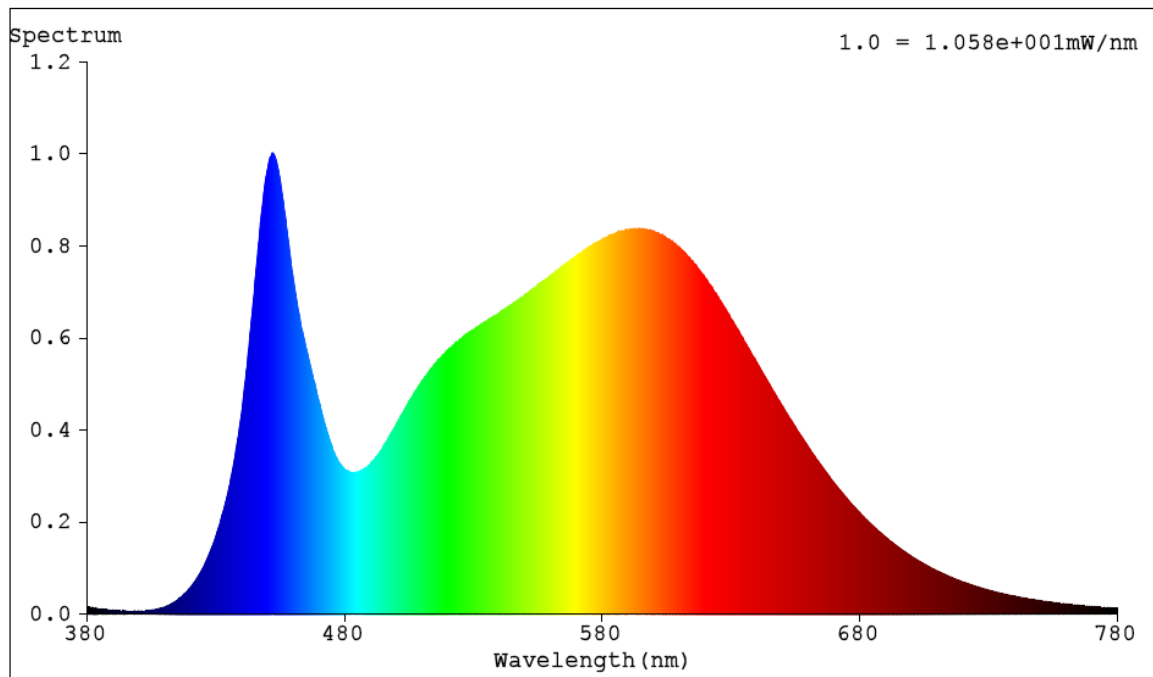
### 2.3 Deviation from standard operating procedure

None.

### 3 – Summary of Test Result

	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	529.48		NVLAP/EPA
	Luminous Efficacy (lm/w)	94.91		NVLAP/EPA
	Correlated Color Temperature (CCT)	4231		NVLAP/EPA
	Color Rendering Index– CRI	85.1		NVLAP/EPA
	Input Power (W)	5.58		NVLAP/EPA
Optional Fields	Power Type	<input checked="" type="checkbox"/> AC	<input type="checkbox"/> DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.0480		NVLAP/EPA
	Power Factor	0.9687		NVLAP/EPA
	x(CIE 1931)	0.3696		NVLAP/EPA
	y(CIE 1931)	0.3653		NVLAP/EPA
	u' (CIE 1976)	0.2225		NVLAP/EPA
	v' (CIE 1976)	0.4948		NVLAP/EPA
	Duv(CIE 1976)	-0.0021		NVLAP/EPA
	R9	20		NVLAP/EPA
	Beam Angle: (Degree)	117.7		NVLAP/EPA
	Center beam candlepower: (cd)	149.9		NVLAP/EPA
	Zonal lumen density (0-60°):	64.4%		NVLAP/EPA
	Zonal lumen density (60-90°):	24.8%		NVLAP/EPA
	Zonal lumen density (90-120°):	7.1%		NVLAP/EPA
	Zonal lumen density (120-180°):	3.7%		NVLAP/EPA

## 4 – Spectral Flux Plots



## 5 – EUT Photos





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

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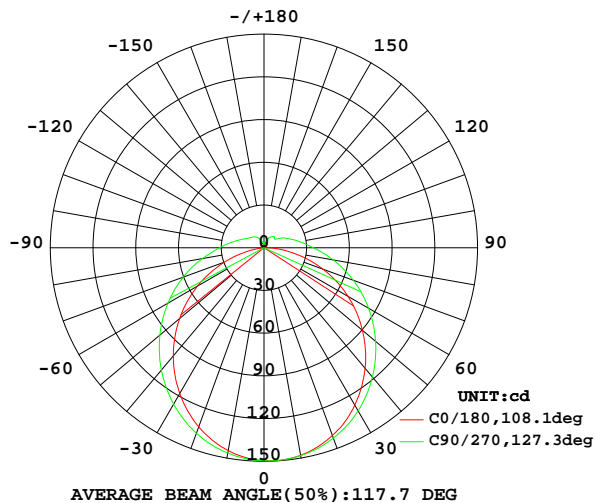


## LUMINAIRE PHOTOMETRIC TEST REPORT

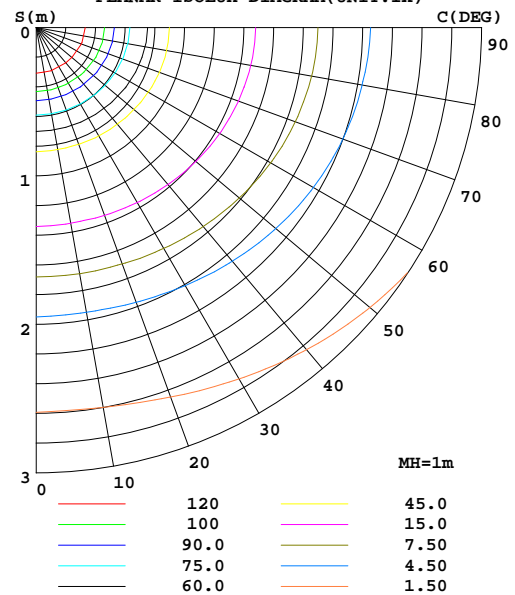
Test:U:120.0V I:0.0480A P:5.579W PF:0.9687 Lamp Flux:529.477x1 lm		
NAME:	TYPE:5.5PLS-840-HYB-GX23	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	SUR.:	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 94.91 lm/W			
MODEL	5.5PLS-840-HYB-GX23	Imax(cd)	149.9	S/MH(C0/180)	1.27
NOMINAL POWER(W)	5.5	LOR(%)	100.0	S/MH(C90/270)	1.31
RATED VOLTAGE(V)	120	TOTAL FLUX(lm)	529.48	$\eta$ UP,DN(C0-180)	5.3,43.1
NOMINAL FLUX(lm)	529.477	CIE CLASS	SEMI-D.	$\eta$ UP,DN(C180-360)	5.5,46.1
LAMPS INSIDE	1	$\eta$ up(%)	10.8	CIBSE SHR NOM	1.25
TEST VOLTAGE(V)	120	$\eta$ down(%)	89.2	CIBSE SHR MAX	1.35

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



PLANAR ISOLUX DIAGRAM(UNIT:lx)



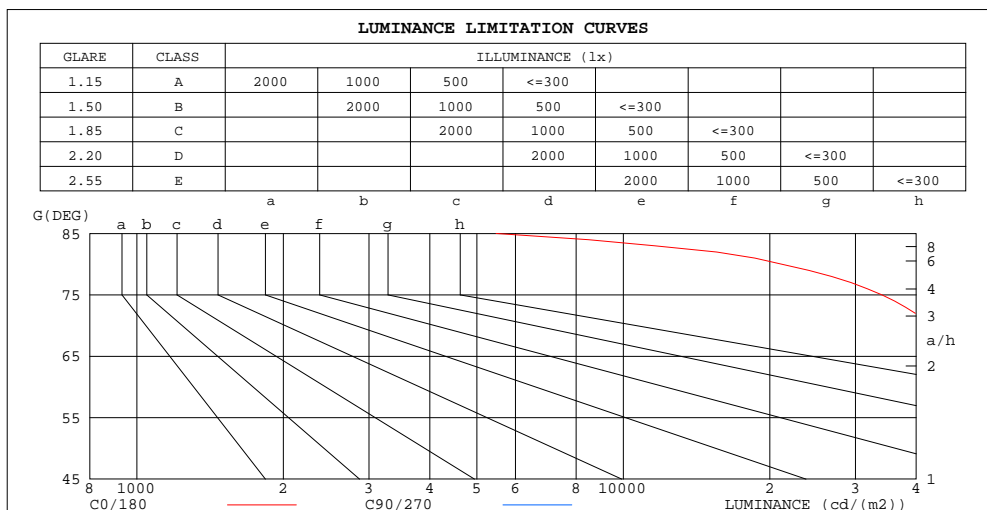
C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature:25.6DEG  
 Operators:David  
 Test Date:2016-01-06

$\gamma$  Range: 0 - 180DEG  
 $\gamma$  Interval: 1.0DEG  
 Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
 Humidity:67.1%  
 Test Distance:2.455m [K=1.0000]  
 Remarks:

## ZONAL FLUX DIAGRAM AND LUMINANCE LIMITATION CURVES

### ZONAL FLUX DIAGRAM:

$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315	$\gamma$	$\Phi$ zone	$\Phi$ total	$\%lum, lamp$
10	144.7	145.0	146.4	147.3	148.0	148.5	148.2	146.4	0- 10	14.15	14.15	2.67,2.67
20	133.9	135.2	138.7	139.7	140.3	142.1	142.3	138.2	10- 20	40.48	54.62	10.3,10.3
30	118.3	121.0	126.9	127.5	127.6	131.0	132.2	125.4	20- 30	61.34	116.0	21.9,21.9
40	99.06	103.5	112.1	111.7	110.5	115.6	118.5	109.0	30- 40	74.15	190.1	35.9,35.9
50	77.40	84.11	95.43	93.52	90.32	97.35	102.3	90.19	40- 50	77.87	268.0	50.6,50.6
60	54.03	63.82	77.93	74.10	68.03	77.46	84.78	70.30	50- 60	72.83	340.8	64.4,64.4
70	29.46	44.30	60.37	54.81	44.24	57.16	66.78	50.67	60- 70	60.52	401.3	75.8,75.8
80	7.349	27.18	43.96	36.60	20.27	37.97	49.38	32.97	70- 80	43.64	445.0	84,84
90	0.1884	16.43	31.14	22.54	2.609	22.51	34.65	20.52	80- 90	27.10	472.1	89.2,89.2
100	0.8610	11.10	22.89	14.91	0.5033	14.29	25.35	14.13	90-100	17.07	489.2	92.4,92.4
110	1.569	8.647	17.10	10.74	1.238	9.833	18.69	10.02	100-110	11.80	500.9	94.6,94.6
120	2.363	7.728	13.44	8.873	2.068	7.017	13.57	6.693	110-120	8.685	509.6	96.3,96.3
130	3.098	7.340	11.42	7.955	2.864	7.125	9.637	8.029	120-130	6.668	516.3	97.5,97.5
140	3.700	6.034	9.989	7.399	3.551	7.205	10.32	7.798	130-140	5.447	521.7	98.5,98.5
150	4.034	4.789	8.217	5.144	4.088	4.934	8.605	6.072	140-150	3.990	525.7	99.3,99.3
160	3.392	4.072	4.986	4.246	3.684	3.783	5.402	4.920	150-160	2.363	528.1	99.7,99.7
170	3.070	3.390	3.813	3.435	3.347	3.602	3.638	3.590	160-170	1.102	529.2	99.9,99.9
180	0	0	0	0	0	0	0	0	170-180	0.2723	529.5	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



LUMINANCE cd/(m2)		
G(DEG)	C0/180	C90/270
85	5474	210931
80	21161	126570
75	34016	100486
70	43066	88250
65	49427	81727
60	54026	77927
55	57312	75579
50	60203	74233
45	62571	73480

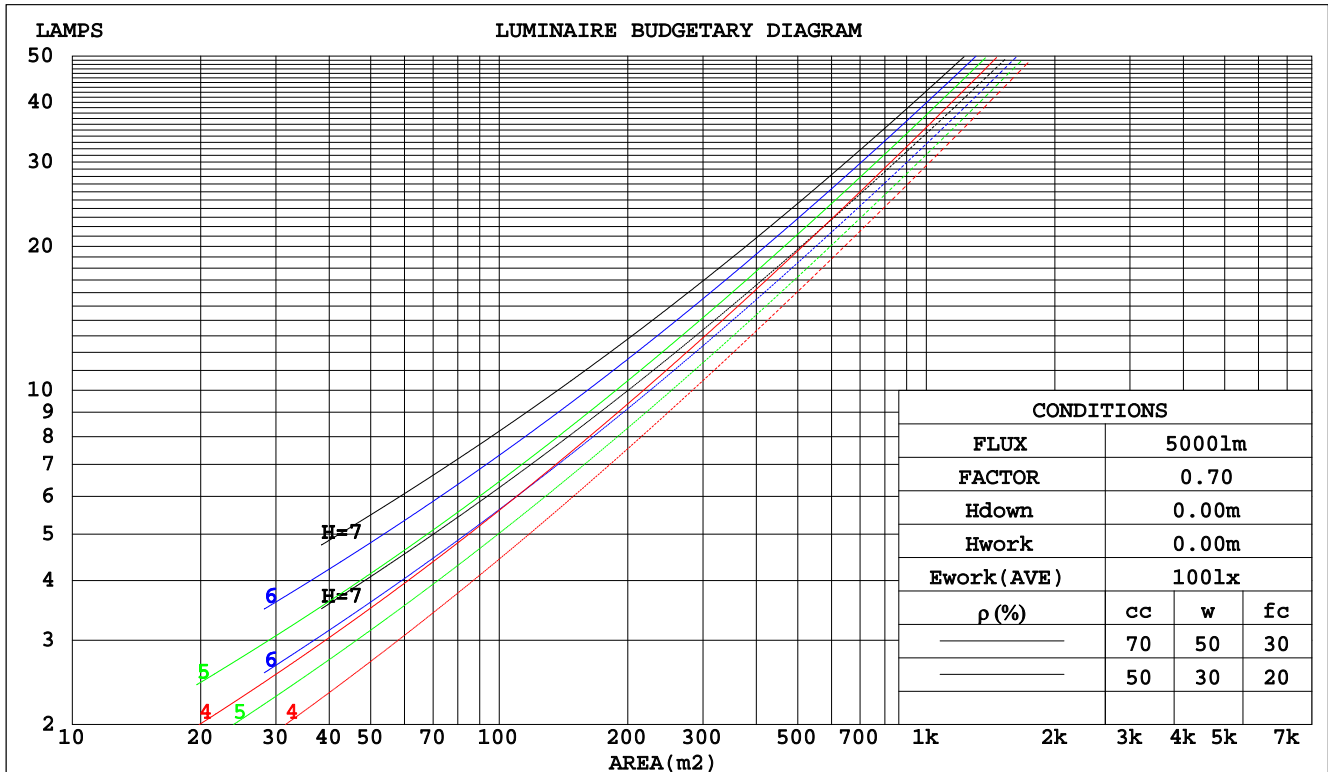
C Range: 0 - 360DEG  
C Interval: 22.5DEG  
Test Speed: HIGH  
Temperature:25.6DEG  
Operators:David  
Test Date:2016-01-06

$\gamma$  Range: 0 - 180DEG  
 $\gamma$  Interval: 1.0DEG  
Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
Humidity:67.1%  
Test Distance:2.455m [K=1.0000]  
Remarks:

## CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

Test:U:120.0V I:0.0480A P:5.579W PF:0.9687 Lamp Flux:529.477x1 lm		
NAME:	TYPE:5.5PLS-840-HYB-GX23	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	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	1.16	1.16	1.16	1.12	1.12	1.12	1.05	1.05	1.05	.98	.98	.98	.92	.92	.92	.89
1.0	.99	.94	.90	.96	.91	.87	.89	.86	.83	.84	.81	.78	.78	.76	.74	.71
2.0	.86	.78	.72	.83	.76	.70	.77	.72	.67	.72	.68	.64	.68	.64	.61	.58
3.0	.75	.66	.59	.72	.64	.58	.68	.61	.56	.63	.58	.53	.60	.55	.51	.48
4.0	.66	.57	.50	.64	.55	.49	.60	.53	.47	.56	.50	.45	.53	.48	.43	.41
5.0	.59	.49	.43	.57	.48	.42	.54	.46	.40	.50	.44	.39	.47	.42	.38	.35
6.0	.53	.44	.37	.51	.43	.36	.48	.41	.35	.46	.39	.34	.43	.37	.33	.31
7.0	.48	.39	.32	.46	.38	.32	.44	.36	.31	.41	.35	.30	.39	.33	.29	.27
8.0	.43	.35	.29	.42	.34	.28	.40	.33	.28	.38	.32	.27	.36	.30	.26	.24
9.0	.40	.31	.26	.39	.31	.26	.37	.30	.25	.35	.29	.24	.33	.28	.23	.21
10.0	.37	.29	.23	.36	.28	.23	.34	.27	.22	.32	.26	.22	.31	.25	.21	.19



C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature: 25.6DEG  
 Operators: David  
 Test Date: 2016-01-06

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System: EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
 Humidity: 67.1%  
 Test Distance: 2.455m [K=1.0000]  
 Remarks:

## WEC AND CCEC

Test:U:120.0V I:0.0480A P:5.579W PF:0.9687 Lamp Flux:529.477x1 lm		
NAME:	TYPE:5.5PLS-840-HYB-GX23	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	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	.351	.200	.063	.341	.194	.062	.321	.184	.059	.303	.175	.056	.286	.166	.054		
2.0	.314	.172	.053	.304	.168	.052	.287	.159	.050	.270	.152	.047	.255	.144	.046		
3.0	.283	.151	.045	.275	.147	.044	.259	.140	.043	.244	.134	.041	.231	.128	.040		
4.0	.258	.134	.039	.250	.131	.039	.236	.125	.037	.223	.119	.036	.210	.114	.035		
5.0	.236	.120	.035	.229	.118	.034	.216	.113	.033	.204	.108	.032	.193	.103	.031		
6.0	.217	.109	.031	.211	.107	.031	.199	.102	.030	.189	.098	.029	.178	.094	.028		
7.0	.201	.099	.028	.196	.097	.028	.185	.094	.027	.175	.090	.026	.166	.086	.025		
8.0	.187	.091	.026	.182	.090	.025	.172	.086	.025	.163	.083	.024	.155	.079	.023		
9.0	.175	.085	.024	.170	.083	.023	.161	.080	.023	.153	.077	.022	.145	.074	.021		
10.0	.164	.079	.022	.160	.077	.022	.152	.074	.021	.144	.071	.020	.137	.069	.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	.273	.273	.273	.233	.233	.233	.159	.159	.159	.092	.092	.092	.029	.029	.029	
1.0	.266	.239	.214	.228	.205	.185	.156	.141	.128	.090	.082	.074	.029	.026	.024	
2.0	.259	.216	.179	.222	.186	.155	.152	.128	.108	.088	.075	.063	.028	.024	.021	
3.0	.251	.199	.157	.215	.171	.136	.148	.119	.095	.085	.070	.056	.027	.023	.018	
4.0	.244	.186	.142	.209	.161	.123	.144	.112	.087	.083	.066	.051	.027	.021	.017	
5.0	.236	.176	.131	.203	.152	.114	.140	.106	.081	.081	.062	.048	.026	.020	.016	
6.0	.229	.168	.124	.197	.145	.108	.136	.102	.076	.079	.060	.045	.025	.020	.015	
7.0	.222	.161	.118	.191	.139	.103	.132	.098	.073	.077	.058	.043	.025	.019	.014	
8.0	.215	.155	.114	.185	.135	.099	.128	.095	.071	.075	.056	.042	.024	.018	.014	
9.0	.209	.150	.111	.180	.131	.097	.125	.092	.069	.073	.054	.041	.024	.018	.014	
10.0	.203	.146	.108	.175	.127	.094	.122	.089	.067	.071	.053	.040	.023	.017	.013	

C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature:25.6DEG  
 Operators:David  
 Test Date:2016-01-06

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
 Humidity:67.1%  
 Test Distance:2.455m [K=1.0000]  
 Remarks:

UGR(Unified Glare Rating) Table

Test:U:120.0V I:0.0480A P:5.579W PF:0.9687 Lamp Flux:529.477x1 lm											
NAME:					TYPE:5.5PLS-840-HYB-GX23			WEIGHT:			
SPEC.:					DIM.:			SERIAL No.:			
MFR.: GC					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		25.6	27.0	26.0	27.4	27.9	27.1	28.5	27.5	28.9	29.3
3H		26.8	28.1	27.3	28.6	29.0	29.3	30.6	29.7	31.0	31.5
4H		27.2	28.4	27.7	28.9	29.4	30.4	31.7	30.9	32.1	32.6
6H		27.4	28.5	27.8	29.0	29.5	31.6	32.8	32.1	33.3	33.8
8H		27.3	28.5	27.8	29.0	29.5	32.3	33.4	32.8	33.9	34.4
12H		27.3	28.4	27.8	28.9	29.4	33.1	34.2	33.6	34.6	35.2
4H 2H		26.4	27.7	26.9	28.1	28.6	27.6	28.8	28.0	29.2	29.7
3H		27.8	28.9	28.3	29.4	29.9	29.9	31.0	30.5	31.5	32.1
4H		28.3	29.3	28.9	29.8	30.4	31.3	32.3	31.8	32.8	33.3
6H		28.6	29.5	29.1	30.0	30.6	32.7	33.6	33.3	34.1	34.7
8H		28.6	29.5	29.2	30.0	30.6	33.5	34.3	34.1	34.9	35.5
12H		28.6	29.4	29.2	30.0	30.6	34.4	35.2	35.0	35.7	36.4
8H 4H		29.0	29.8	29.5	30.4	31.0	31.5	32.3	32.1	32.9	33.5
6H		29.5	30.2	30.1	30.8	31.4	33.2	33.9	33.8	34.5	35.1
8H		29.6	30.3	30.2	30.9	31.5	34.2	34.8	34.8	35.4	36.1
12H		29.7	30.2	30.3	30.9	31.6	35.3	35.9	36.0	36.5	37.2
12H 4H		29.2	29.9	29.7	30.5	31.1	31.5	32.2	32.1	32.8	33.4
6H		29.8	30.5	30.5	31.1	31.7	33.2	33.9	33.8	34.5	35.1
8H		30.1	30.7	30.7	31.3	32.0	34.3	34.8	34.9	35.5	36.2
Variations with the observer position at spacings:											
S = 1.0H		+ 0.1 / - 0.2					+ 0.1 / - 0.1				
1.5H		+ 0.2 / - 0.3					+ 0.2 / - 0.2				
2.0H		+ 0.2 / - 0.3					+ 0.2 / - 0.3				

CIE Pub.117 Corrected 529.5 lm Total Lamp Luminous Flux.(8log(F/F0) = -2.2)

C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature:25.6DEG  
 Operators:David  
 Test Date:2016-01-06

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
 Humidity:67.1%  
 Test Distance:2.455m [K=1.0000]  
 Remarks:

## UTILIZATION FACTORS TABLE

Test:U:120.0V I:0.0480A P:5.579W PF:0.9687 Lamp Flux:529.477x1 lm		
NAME:	TYPE:5.5PLS-840-HYB-GX23	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	SUR.:	PROTECTION ANGLE:

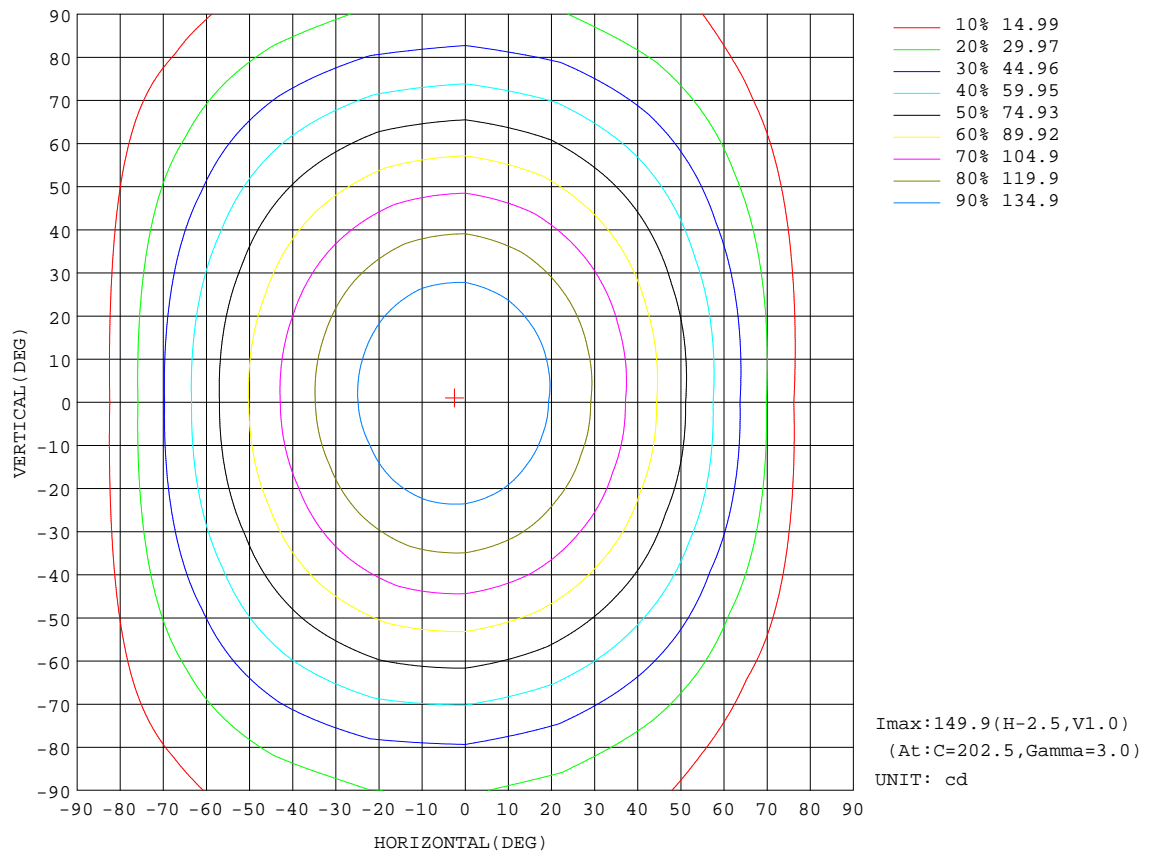
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) $k(RI) \times RCR = 5$									
$k = 0.60$	52	40	33	51	40	33	50	39	33	26
0.80	62	49	42	60	49	41	58	48	41	33
1.00	70	58	50	68	57	49	65	58	48	40
1.25	77	65	57	75	64	56	71	62	55	46
1.50	82	71	63	79	69	62	75	67	60	51
2.00	89	79	71	86	77	70	81	74	68	58
2.50	93	84	77	90	82	75	85	78	72	62
3.00	96	88	82	93	86	80	88	82	77	65
4.00	101	94	88	98	91	86	92	86	82	70
5.00	104	98	92	100	95	90	94	90	86	73
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:25.6DEG  
 Operators:David  
 Test Date:2016-01-06

$\gamma$  Range: 0 - 180DEG  
 $\gamma$  Interval: 1.0DEG  
 $\gamma$  Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
 Humidity:67.1%  
 Test Distance:2.455m [K=1.0000]  
 Remarks:

## ISOCANDELA DIAGRAM

Test:U:120.0V I:0.0480A P:5.579W PF:0.9687 Lamp Flux:529.477x1 lm		
NAME:	TYPE:5.5PLS-840-HYB-GX23	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	SUR.:	PROTECTION ANGLE:



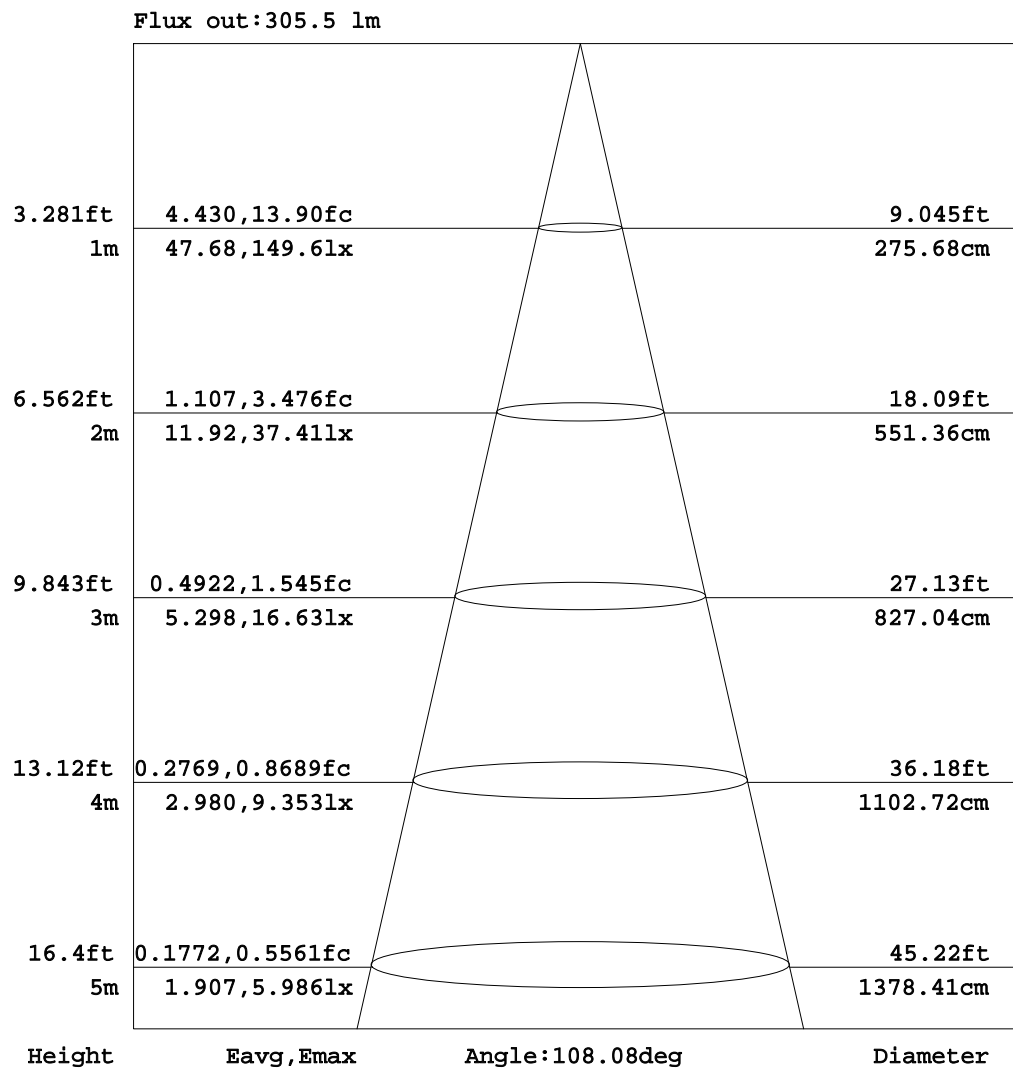
C Range: 0 - 360DEG  
C Interval: 22.5DEG  
Test Speed: HIGH  
Temperature:25.6DEG  
Operators:David  
Test Date:2016-01-06

$\gamma$  Range: 0 - 180DEG  
 $\gamma$  Interval: 1.0DEG  
Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
Humidity:67.1%  
Test Distance:2.455m [K=1.0000]  
Remarks:



## AAI Figure

Test:U:120.0V I:0.0480A P:5.579W PF:0.9687 Lamp Flux:529.477x1 lm		
NAME:	TYPE:5.5PLS-840-HYB-GX23	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	SUR.:	PROTECTION ANGLE:



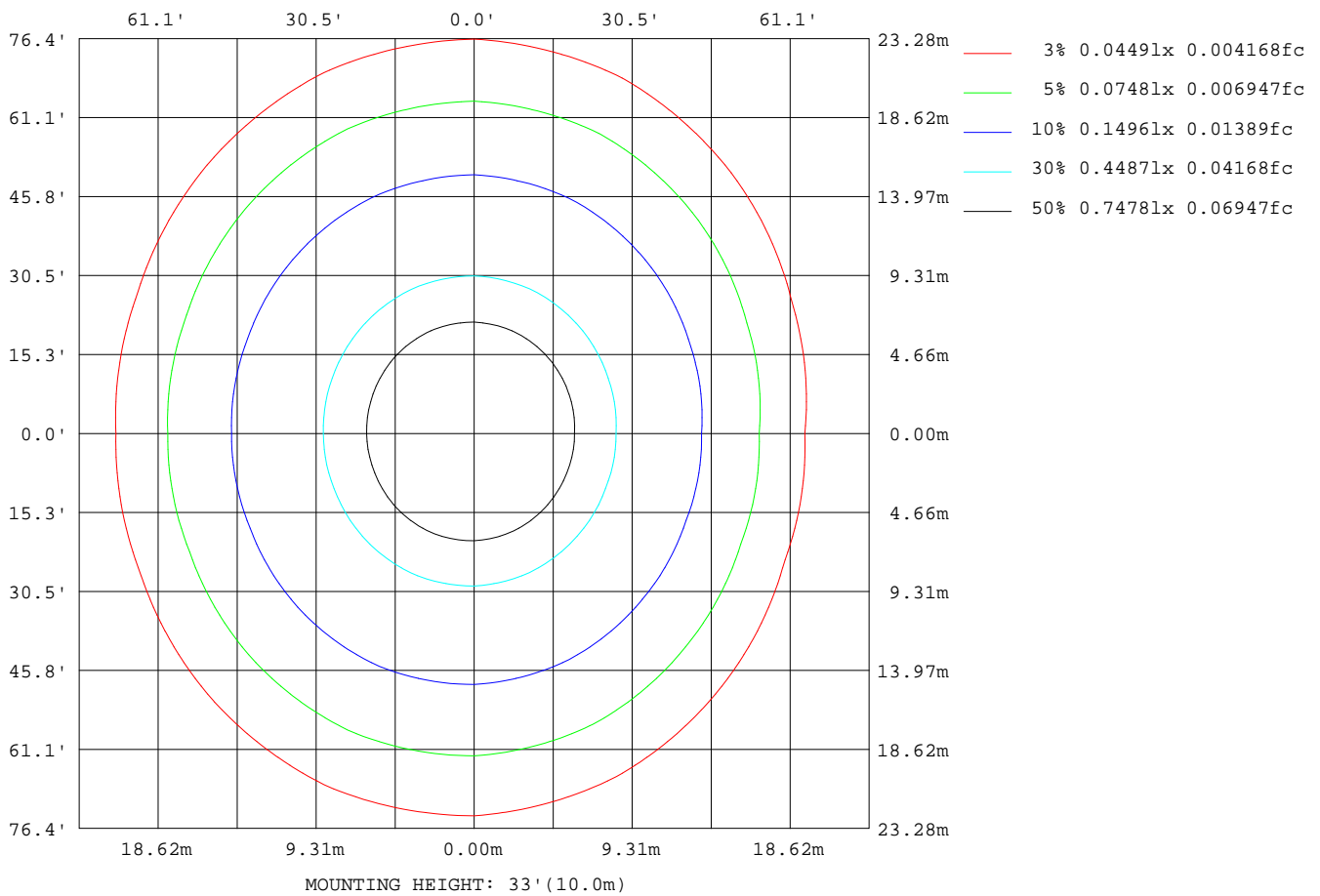
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG  
C Interval: 22.5DEG  
Test Speed: HIGH  
Temperature: 25.6DEG  
Operators: David  
Test Date: 2016-01-06

γ Range: 0 - 180DEG  
γ Interval: 1.0DEG  
Test System: EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
Humidity: 67.1%  
Test Distance: 2.455m [K=1.0000]  
Remarks:

## ISOLUX DIAGRAM

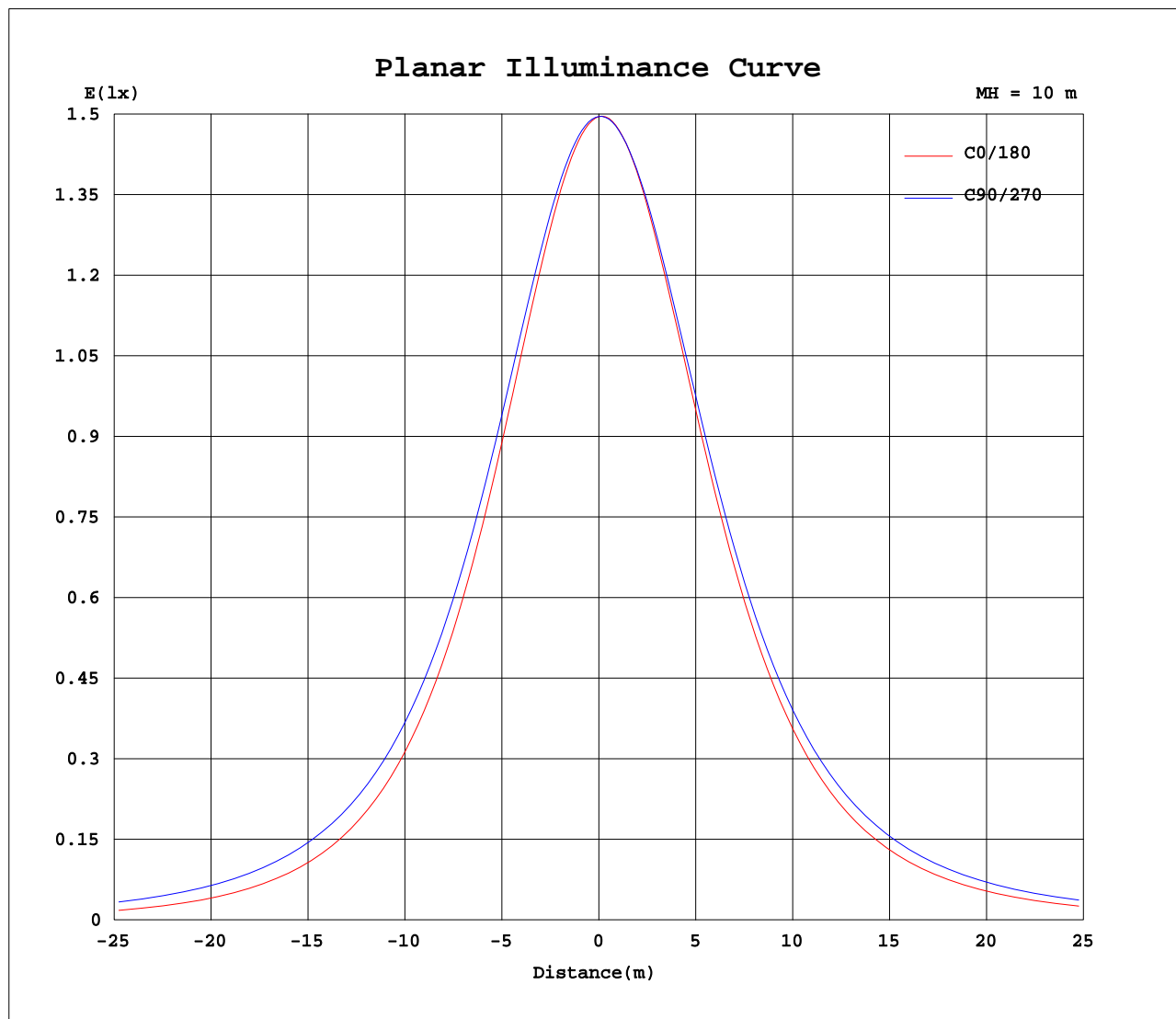
Test:U:120.0V I:0.0480A P:5.579W PF:0.9687 Lamp Flux:529.477x1 lm		
NAME:	TYPE:5.5PLS-840-HYB-GX23	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	SUR.:	PROTECTION ANGLE:



C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature: 25.6DEG  
 Operators: David  
 Test Date: 2016-01-06

$\gamma$  Range: 0 - 180DEG  
 $\gamma$  Interval: 1.0DEG  
 Test System: EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
 Humidity: 67.1%  
 Test Distance: 2.455m [K=1.0000]  
 Remarks:

## Planar Illuminance Curve



C Range: 0 - 360DEG  
C Interval: 22.5DEG  
Test Speed: HIGH  
Temperature: 25.6DEG  
Operators: David  
Test Date: 2016-01-06

$\gamma$  Range: 0 - 180DEG  
 $\gamma$  Interval: 1.0DEG  
Test System: EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
Humidity: 67.1%  
Test Distance: 2.455m [K=1.0000]  
Remarks:

## LUMINOUS DISTRIBUTION INTENSITY DATA

Test:U:120.0V I:0.0480A P:5.579W PF:0.9687 Lamp Flux:529.477x1 lm																	
NAME:									TYPE:5.5PLS-840-HYB-GX23						WEIGHT:		
SPEC.:									DIM.:						SERIAL No.:		
MFR.: GC									SUR.:						PROTECTION ANGLE:		

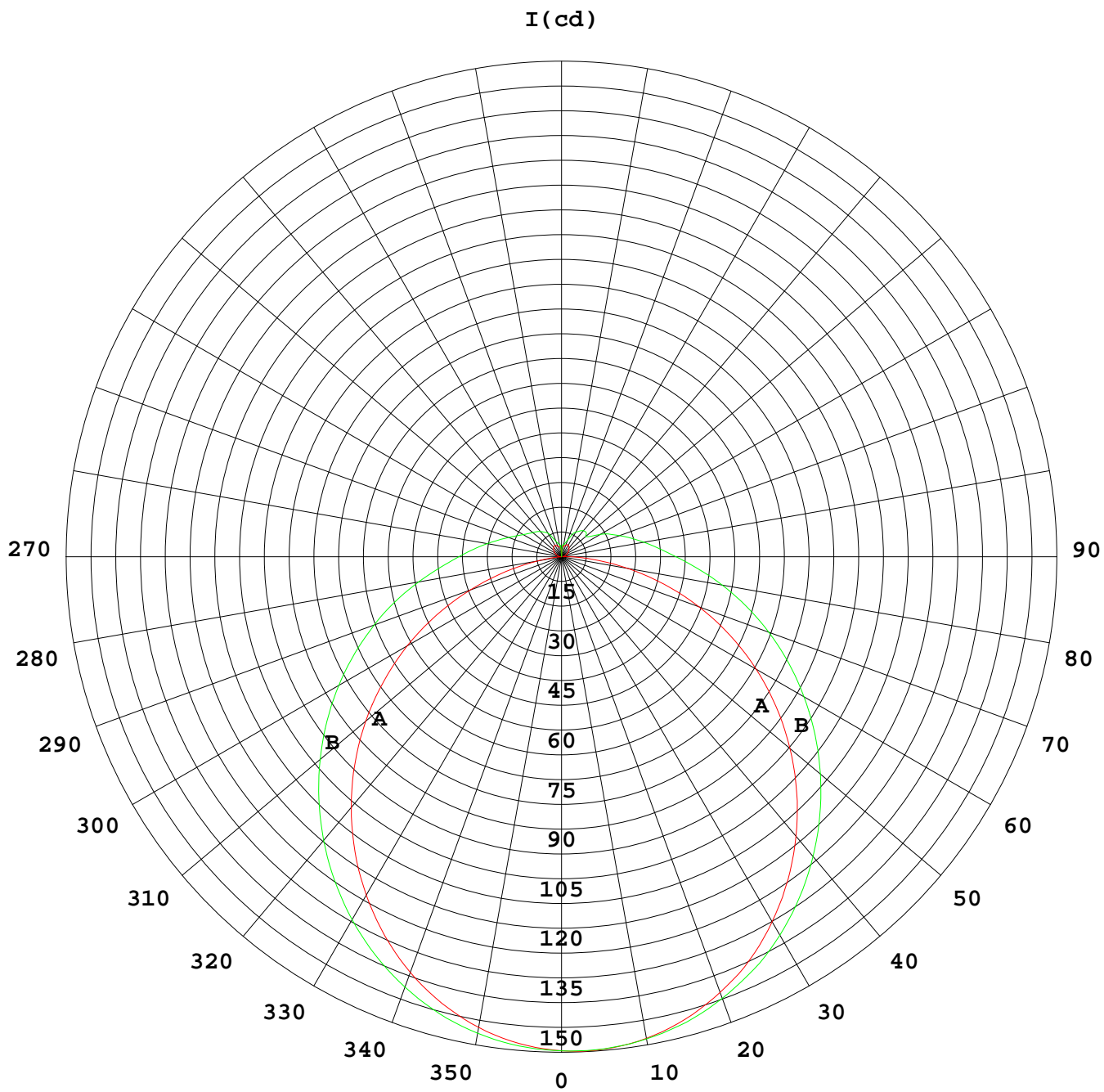
Table--1

UNIT: cd

C(DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338			
0	150	150	149	150	150	149	149	149	150	150	149	150	150	149	149	149			
5	148	148	148	148	149	149	149	149	150	150	150	150	150	149	149	148			
10	145	145	145	146	146	147	147	148	148	148	149	149	148	147	146	145			
15	140	140	141	142	143	144	144	144	145	145	146	146	146	145	143	141			
20	134	134	135	137	139	139	140	140	140	141	142	143	142	141	138	136			
25	127	127	129	131	133	134	134	134	135	136	137	138	138	136	132	129			
30	118	119	121	124	127	128	128	127	128	129	131	133	132	130	125	121			
35	109	110	113	117	120	121	120	119	119	121	124	126	126	123	118	113			
40	99.1	99.7	104	109	112	113	112	110	110	112	116	118	118	115	109	103			
45	88.5	89.4	94.1	99.9	104	105	103	100	101	103	107	110	111	107	99.8	92.9			
50	77.4	78.6	84.1	90.9	95.4	96.0	93.5	90.4	90.3	92.8	97.3	102	102	98.0	90.2	82.4			
55	65.7	67.4	74.0	81.8	86.7	87.1	83.8	79.9	79.4	82.1	87.5	92.5	93.7	89.0	80.3	71.4			
60	54.0	56.2	63.8	72.6	77.9	78.1	74.1	69.1	68.0	71.1	77.5	83.3	84.8	79.9	70.3	60.1			
65	41.8	44.7	54.0	63.4	69.1	69.1	64.3	58.3	56.3	59.8	67.3	74.0	75.8	70.7	60.4	48.9			
70	29.5	33.4	44.3	54.6	60.4	60.1	54.8	47.4	44.2	48.4	57.2	64.7	66.8	61.6	50.7	37.9			
75	17.6	23.0	35.2	46.1	52.0	51.5	45.4	36.7	32.1	37.1	47.3	55.5	57.9	52.8	41.4	27.6			
80	7.35	14.2	27.2	38.2	44.0	43.2	36.6	26.7	20.3	26.5	38.0	46.7	49.4	44.3	33.0	18.6			
85	0.95	8.20	20.8	31.3	36.8	35.7	28.7	18.1	9.71	17.2	29.5	38.6	41.4	36.7	25.8	11.9			
90	0.19	5.24	16.4	26.2	31.1	29.8	22.5	11.7	2.61	10.2	22.5	31.6	34.6	30.5	20.5	8.09			
95	0.49	3.92	13.3	22.2	26.7	25.2	18.2	8.13	0.38	6.42	17.7	26.4	29.5	25.9	16.9	6.06			
100	0.86	3.46	11.1	18.9	22.9	21.4	14.9	6.04	0.50	4.55	14.3	22.4	25.3	22.2	14.1	4.74			
105	1.19	3.46	9.60	16.2	19.7	18.3	12.5	5.06	0.85	3.60	11.6	19.0	21.8	19.0	11.9	2.61			
110	1.57	3.68	8.65	14.2	17.1	15.8	10.7	4.70	1.24	3.27	9.83	16.2	18.7	16.4	10.0	3.52			
115	1.97	3.92	8.11	12.6	15.0	13.8	9.58	4.69	1.65	3.47	8.17	14.0	16.2	14.0	7.51	4.46			
120	2.36	3.99	7.73	11.5	13.4	12.4	8.87	4.83	2.07	4.16	7.02	11.5	13.6	11.2	6.69	4.94			
125	2.74	3.73	7.46	10.7	12.3	11.4	8.38	4.98	2.48	4.44	6.61	9.58	10.8	9.12	8.30	5.18			
130	3.10	3.55	7.34	10.1	11.4	10.6	7.96	4.65	2.86	4.18	7.13	8.87	9.64	9.98	8.03	4.78			
135	3.42	3.67	7.14	9.46	10.7	10.0	7.72	4.05	3.23	3.88	7.33	9.38	10.5	10.2	7.92	4.26			
140	3.70	3.86	6.03	8.96	9.99	9.37	7.40	3.95	3.55	3.87	7.21	9.18	10.3	9.69	7.80	4.15			
145	3.95	4.06	5.02	8.24	9.12	8.66	6.12	4.09	3.84	4.02	5.92	8.61	9.52	8.98	7.10	4.23			
150	4.03	4.12	4.79	6.74	8.22	7.50	5.14	4.20	4.09	4.18	4.93	7.43	8.61	8.33	6.07	4.25			
155	3.76	3.91	4.49	5.55	6.31	5.82	4.73	4.03	4.03	4.10	4.51	5.69	7.19	7.09	5.66	4.14			
160	3.39	3.65	4.07	4.65	4.99	4.80	4.25	3.74	3.68	3.74	3.78	4.60	5.40	5.52	4.92	3.80			
165	3.18	3.39	3.80	4.09	4.26	4.18	3.90	3.65	3.45	3.41	3.60	3.81	4.27	4.41	4.06	3.56			
170	3.07	2.62	3.39	3.77	3.81	3.71	3.43	3.29	3.35	3.34	3.60	3.64	3.64	3.65	3.59	3.56			
175	2.13	2.07	1.46	2.81	2.94	2.53	2.44	2.32	2.40	2.41	2.44	2.90	3.54	3.64	3.56	2.82			
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			

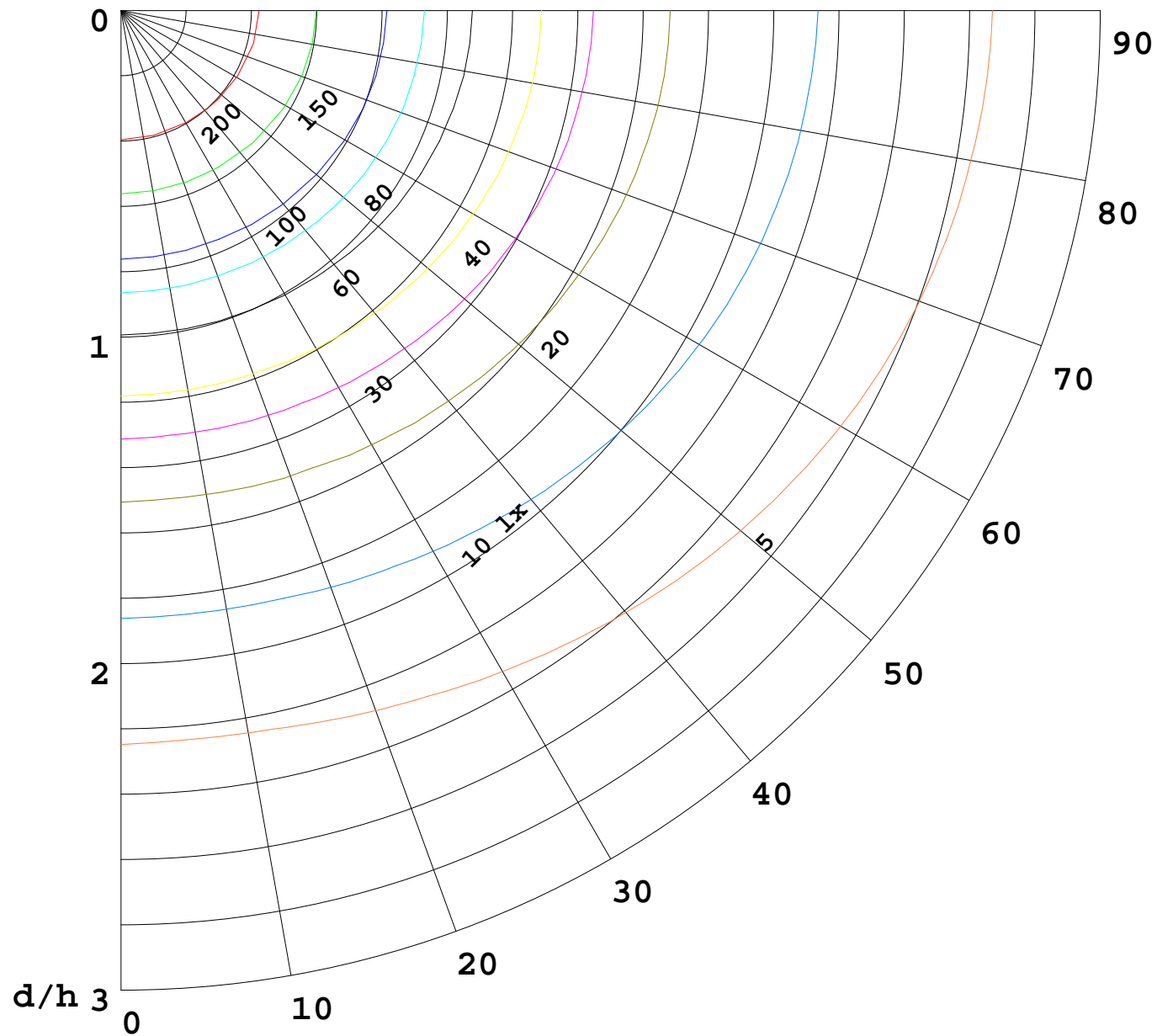
C Range: 0 - 360DEG  
 C Interval: 22.5DEG  
 Test Speed: HIGH  
 Temperature:25.6DEG  
 Operators:David  
 Test Date:2016-01-06

γ Range: 0 - 180DEG  
 γ Interval: 1.0DEG  
 Test System:EVERFINE GO-R5000\_V2 SYSTEM V2.0.287  
 Humidity:67.1%  
 Test Distance:2.455m [K=1.0000]  
 Remarks:



1000 lm

$\kappa = 1$



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

