

IESNA LM-79: 2008

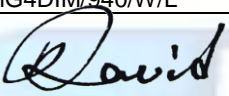

Measurement and Test Report

for

Green Creative Ltd.

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

Sept 09, 2015

Model Name:	LED TRACK
Model No:	22TRMG4DIM/940/B/H; 22TRMG4DIM/940/W/H ; 22TRMG4DIM/940/B/J ; 22TRMG4DIM/940/W/J ; 22TRMG4DIM/940/B/L ; 22TRMG4DIM/940/W/L
Test Engineer:	David Zhang 
Report No.:	BTR66.181.15.0012.04
Sample Received Date:	Sept 06, 2015
Test Performed Date:	Sept 06, 2015 to Sept 09, 2015
Reviewed By:	Steven Hsu 
Prepared By:	BEST Test Service Shenzhen Co., Ltd. 1st Floor, 1st Building, Weitai Industrial Park, Yingrenshi, Shiyao, Baoan, Shenzhen, China TEL: +86-755-28236006 FAX: +86-755-23467087-811 Email: certification@bestcert.cn



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1 - GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

Applicant	: Green Creative Ltd.
Model Name	: LED TRACK
Model No	: 22TRMG4DIM/940/B/H; 22TRMG4DIM/940/W/H ; 22TRMG4DIM/940/B/J ; 22TRMG4DIM/940/W/J ; 22TRMG4DIM/940/B/L ; 22TRMG4DIM/940/W/L
Brand	: GREEN CREATIVE
Nominal Operation Voltage	: AC 120V/60Hz
Nominal Power	: 22W
Nominal CCT	: 4000K
Nominal CRI	: 90
Nominal Lumen Output	: 1300 Lumens
Nominal Life Time	: 40000 Hours
Number of hours operated prior to measurement for new sample	: 0 Hours
Stabilization Time	: 1.5 hours
Total operating time for measurement include stabilization time	: 3.5 hours
Date of Receiving Sample	: Sept 06, 2015
Measurement quantities measured	: 1 pcs
Orientation During Testing	: Base up
Test Requested	: Electrical and Photometric Test Luminous Intensity Distribution Test

Note: These models are only lamp color and lamp base different, here we choose 22TRMG4DIM/940/B/H to be tested and others 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, 2014	Oct 17, 2015
3	Goniophotometer+ Spectrophotometer System	Nov 20, 2014	Nov 19, 2015
4	Standard Light Source	Sep 17, 2014	Sep 16, 2015
5	Standard Light Source	Sep 17, 2014	Sep 16, 2015
6	Digital Storage Oscilloscope	Oct 18, 2014	Oct 17, 2015
7	Ultra Compact Simulator	Oct 20, 2014	Oct 19, 2015
8	Temperature Chamber	Oct 20, 2014	Oct 19, 2015
9	Digital Caliper	Nov 20, 2014	Nov 19, 2015
10	Digital CC&CV DC Power Supply(30V 5A)	N/A	N/A
11	5 1/2 Digital Multimeter	Oct 18, 2014	Oct 17, 2015
12	Digital CC&CV DC Power Supply(120V 10A)	N/A	N/A
13	6 1/2 Digital Multimeter	Oct 18, 2014	Oct 17, 2015
14	Digital Multimeter	Oct 18, 2014	Oct 17, 2015
15	Temperature Recorder+Thermocouple	Nov 20, 2014	Nov 19, 2015
16	Timer Controller	Nov 20, 2014	Nov 19, 2015

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

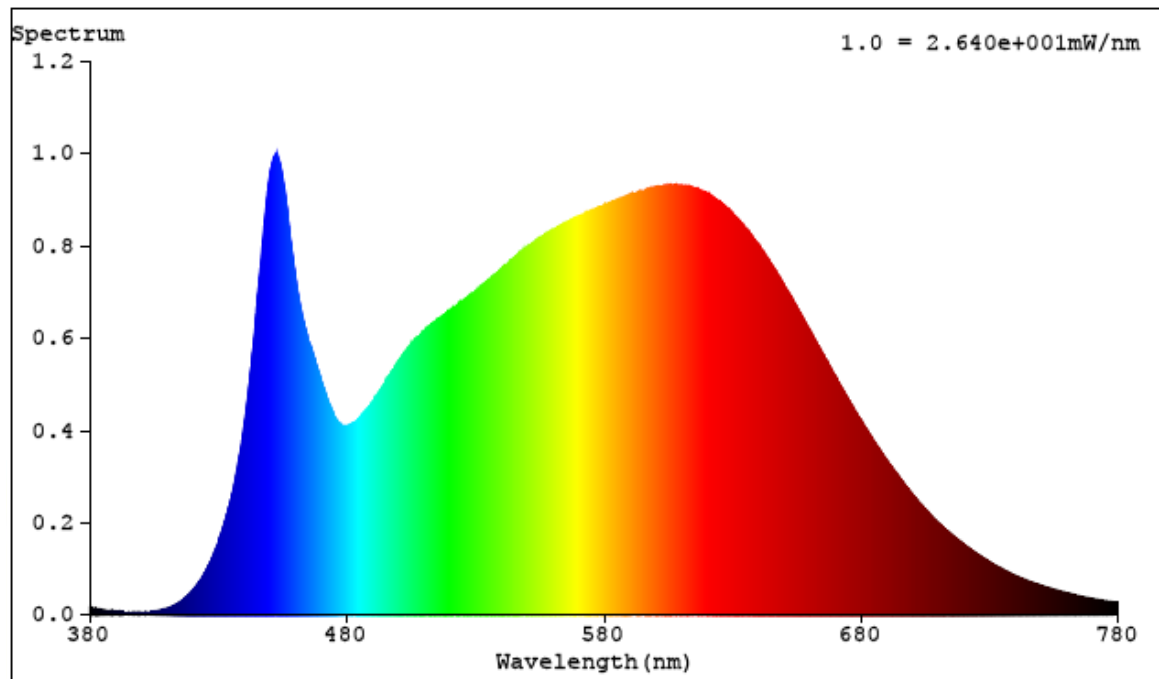
	Item	Test Result		Accreditation
Required Fields	Lumen Output (Lumens)	1645.30		NVLAP/EPA
	Luminous Efficacy (lm/w)	77.87		NVLAP/EPA
	Correlated Color Temperature (CCT)	3976		NVLAP/EPA
	Color Rendering Index– CRI	91.5		NVLAP/EPA
	Input Power (W)	21.13		NVLAP/EPA
Optional Fields	Power Type	<input checked="" type="checkbox"/> AC	<input type="checkbox"/> DC	/
	Input Voltage (V)	120.0		NVLAP/EPA
	Input Current (A)	0.1805		NVLAP/EPA
	Power Factor	0.9765		NVLAP/EPA
	x(CIE 1931)	0.3810		NVLAP/EPA
	y(CIE 1931)	0.3756		NVLAP/EPA
	u' (CIE 1976)	0.2260		NVLAP/EPA
	v' (CIE 1976)	0.5012		NVLAP/EPA
	Duv(CIE 1976)	0.0007		NVLAP/EPA
	Beam Angle: (Degree)	20.5		NVLAP/EPA
	Center beam candlepower: (cd)	9032		NVLAP/EPA
	Zonal lumen density (0-60°):	98.2%		NVLAP/EPA
	Zonal lumen density (60-90°):	1.8%		NVLAP/EPA
	Zonal lumen density (90-120°):	0%		NVLAP/EPA
	Zonal lumen density (120-180°):	0%		NVLAP/EPA

	CRI (R1)	91	NVLAP/EPA
	CRI (R2)	96	NVLAP/EPA
	CRI (R3)	97	NVLAP/EPA
	CRI (R4)	90	NVLAP/EPA
	CRI (R5)	91	NVLAP/EPA
	CRI (R6)	92	NVLAP/EPA
	CRI (R7)	92	NVLAP/EPA
	CRI (R8)	82	NVLAP/EPA
	CRI (R9)	56	NVLAP/EPA
	CRI (R10)	89	NVLAP/EPA
	CRI (R11)	90	NVLAP/EPA
	CRI (R12)	73	NVLAP/EPA
	CRI (R13)	93	NVLAP/EPA
	CRI (R14)	99	NVLAP/EPA

Lumen summary:

[OTHER]	Gamma(deg)	Fz(lm)	Ft(lm)	%Lum	%Lamp
[OTHER]	0- 10	624.06	624.06	37.93	37.93
[OTHER]	10- 20	646.73	1270.79	77.24	77.24
[OTHER]	20- 30	223.91	1494.70	90.85	90.85
[OTHER]	30- 40	63.51	1558.20	94.71	94.71
[OTHER]	40- 50	32.58	1590.79	96.69	96.69
[OTHER]	50- 60	25.72	1616.50	98.25	98.25
[OTHER]	60- 70	20.38	1636.88	99.49	99.49
[OTHER]	70- 80	8.06	1644.95	99.98	99.98
[OTHER]	80- 90	0.33	1645.28	100.00	100.00
[OTHER]	90-100	0.00	1645.28	100.00	100.00
[OTHER]	100-110	0.00	1645.28	100.00	100.00
[OTHER]	110-120	0.00	1645.28	100.00	100.00
[OTHER]	120-130	0.00	1645.28	100.00	100.00
[OTHER]	130-140	0.00	1645.28	100.00	100.00
[OTHER]	140-150	0.00	1645.28	100.00	100.00
[OTHER]	150-160	0.00	1645.28	100.00	100.00
[OTHER]	160-170	0.01	1645.29	100.00	100.00
[OTHER]	170-180	0.01	1645.30	100.00	100.00

4 – Spectral Flux Plots



5 – EUT Photos



6 – Luminous Intensity Distribution Test Plots (CIE Chromaticity)

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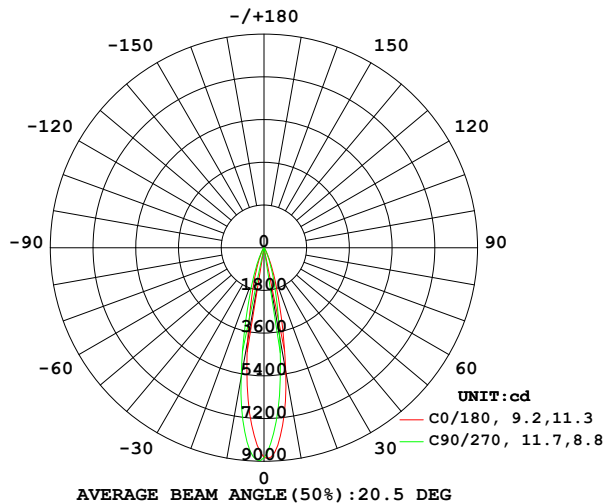


LUMINAIRE PHOTOMETRIC TEST REPORT

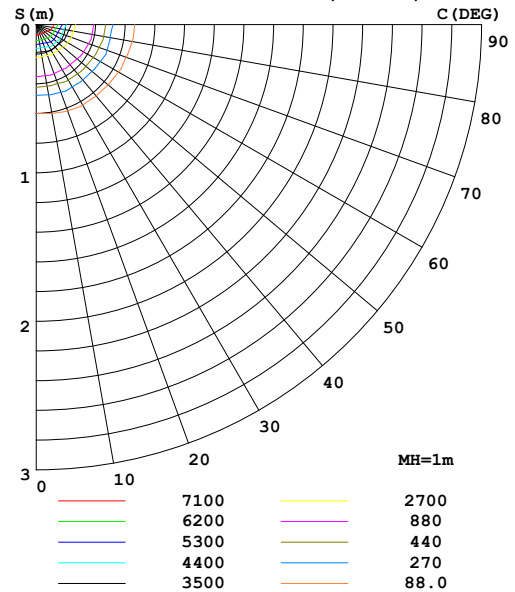
Test:U:120.0V I:0.1805A P:21.13W PF:0.9765 Lamp Flux:1645.3x1 lm		
NAME:	TYPE:22TRMG4DIM/940/B/H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	SUR.:	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 77.87 lm/W			
MODEL	22TRMG4DIM/940/B/H	Hmax(cd)	9032	S/MH(C0/180)	0.39
NOMINAL POWER(W)	22	LOR(%)	100.0	S/MH(C90/270)	0.31
RATED VOLTAGE(V)	120.0	TOTAL FLUX(lm)	1645.3	η UP,DN(C0-180)	0.0,54.0
NOMINAL FLUX(lm)	1645.3	CIE CLASS	DIRECT	η UP,DN(C180-360)	0.0,46.0
LAMPS INSIDE	1	η up(%)	0.0	CIBSE SHR NOM	0.00
TEST VOLTAGE(V)	120.0	η down(%)	100.0	CIBSE SHR MAX	1.00

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



PLANAR ISOLUX DIAGRAM(UNIT:lx)



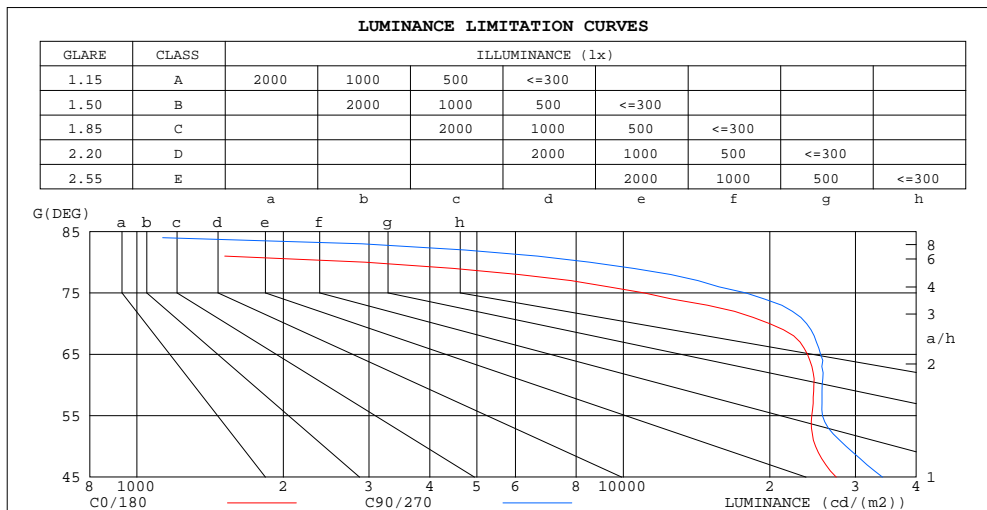
C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2015-09-08

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:

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	3974	4764	5590	5844	5302	4355	3816	3741	0- 10	624.1	624.1	37.9,37.9
20	857.0	1024	1243	1341	1217	1013	883.4	831.3	10- 20	646.7	1271	77.2,77.2
30	161.7	199.9	241.3	233.2	203.1	189.7	177.6	164.3	20- 30	223.9	1495	90.8,90.8
40	51.28	60.15	66.89	61.42	54.73	50.96	52.79	50.33	30- 40	63.51	1558	94.7,94.7
50	31.94	33.67	36.91	33.35	32.38	31.75	32.78	31.66	40- 50	32.58	1591	96.7,96.7
60	24.64	25.11	25.63	25.52	25.42	25.17	25.22	24.84	50- 60	25.72	1617	98.2,98.2
70	13.67	15.20	16.29	16.63	16.26	14.59	13.23	12.93	60- 70	20.38	1637	99.5,99.5
80	1.023	2.007	2.961	3.166	2.620	1.537	0.8263	0.7088	70- 80	8.065	1645	100,100
90	0	0	0	0	0	0	0	0	80- 90	0.3318	1645	100,100
100	0	0	0	0	0	0	0	0	90-100	0	1645	100,100
110	0	0	0	0	0	0	0	0	100-110	0	1645	100,100
120	0	0	0	0	0	0	0	0	110-120	0	1645	100,100
130	0	0	0	0	0	0	0	0	120-130	0	1645	100,100
140	0	0	0	0	0	0	0	0	130-140	0	1645	100,100
150	0	0	0	0	0	0	0	0	140-150	0	1645	100,100
160	0.0152	0.0102	0.0073	0.0049	0.0104	0.0135	0.0197	0.0252	150-160	0.0011	1645	100,100
170	0.0953	0.0801	0.0716	0.0702	0.0774	0.0828	0.0990	0.1131	160-170	0.0118	1645	100,100
180	0	0.0129	0.0170	0.0212	0.0022	0.0030	0.0036	0.0027	170-180	0.0090	1645	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



LUMINANCE cd/(m2)		
G(°)	C0/180	C90/270
85	0	31
80	2945	8525
75	11036	17860
70	19990	23821
65	23905	25432
60	24636	25625
55	24399	25673
50	24843	28713
45	27395	34116

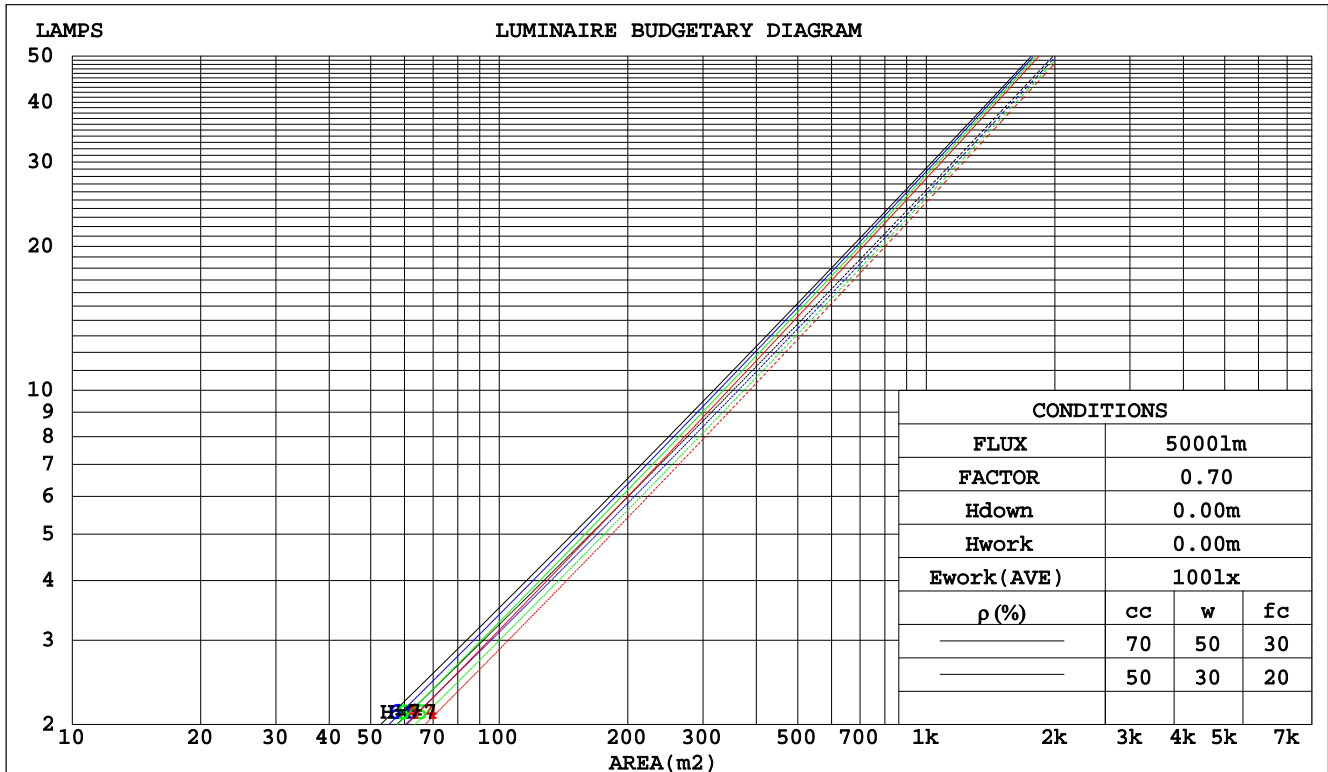
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Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2015-09-08

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:

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

Test:U:120.0V I:0.1805A P:21.13W PF:0.9765 Lamp Flux:1645.3x1 lm		
NAME:	TYPE:22TRMG4DIM/940/B/H	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	1.19	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	1.12	1.10	1.09	1.10	1.09	1.07	1.06	1.05	1.04	1.03	1.02	1.01	.99	.98	.98	.96
2.0	1.07	1.04	1.01	1.05	1.02	.00	1.02	.00	.98	.99	.97	.96	.96	.95	.94	.92
3.0	1.02	.98	.95	1.01	.97	.94	.98	.95	.93	.96	.93	.91	.94	.92	.90	.89
4.0	.98	.94	.90	.97	.93	.90	.95	.91	.89	.93	.90	.88	.91	.89	.87	.86
5.0	.94	.90	.87	.93	.89	.86	.92	.88	.85	.90	.87	.85	.89	.86	.84	.83
6.0	.91	.86	.83	.90	.86	.83	.89	.85	.82	.87	.84	.82	.86	.84	.81	.80
7.0	.88	.83	.80	.87	.83	.80	.86	.82	.80	.85	.82	.79	.84	.81	.79	.78
8.0	.85	.81	.78	.85	.81	.78	.84	.80	.77	.83	.80	.77	.82	.79	.77	.76
9.0	.83	.78	.76	.82	.78	.76	.81	.78	.75	.81	.77	.75	.80	.77	.75	.74
10.0	.80	.76	.74	.80	.76	.74	.79	.76	.73	.79	.75	.73	.78	.75	.73	.72



C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2015-09-08

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:0.1805A P:21.13W PF:0.9765 Lamp Flux:1645.3x1 lm		
NAME:	TYPE:22TRMG4DIM/940/B/H	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	.145	.082	.026	.138	.079	.025	.125	.072	.023	.114	.066	.021	.104	.060	.019	
2.0	.135	.074	.023	.129	.071	.022	.119	.066	.021	.109	.061	.019	.101	.057	.018	
3.0	.125	.067	.020	.121	.065	.019	.112	.061	.018	.104	.057	.017	.097	.054	.017	
4.0	.117	.061	.018	.113	.059	.017	.106	.056	.017	.099	.053	.016	.093	.050	.015	
5.0	.110	.056	.016	.106	.055	.016	.100	.052	.015	.094	.050	.015	.089	.048	.014	
6.0	.103	.052	.015	.100	.051	.015	.095	.049	.014	.090	.047	.014	.085	.045	.013	
7.0	.098	.048	.014	.095	.047	.014	.091	.046	.013	.086	.044	.013	.082	.043	.013	
8.0	.093	.045	.013	.091	.045	.013	.086	.043	.012	.083	.042	.012	.079	.041	.012	
9.0	.088	.043	.012	.086	.042	.012	.083	.041	.012	.079	.040	.011	.076	.039	.011	
10.0	.084	.040	.011	.083	.040	.011	.079	.039	.011	.076	.038	.011	.073	.037	.011	

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	.190	.190	.190	.163	.163	.163	.111	.111	.111	.064	.064	.064	.020	.020	.020	
1.0	.169	.158	.147	.145	.135	.127	.099	.093	.088	.057	.054	.051	.018	.017	.017	
2.0	.151	.133	.117	.130	.114	.101	.089	.079	.071	.051	.046	.041	.016	.015	.013	
3.0	.137	.113	.095	.117	.098	.082	.080	.068	.058	.046	.040	.034	.015	.013	.011	
4.0	.124	.098	.078	.107	.085	.068	.073	.059	.048	.042	.035	.028	.014	.011	.009	
5.0	.114	.086	.065	.098	.074	.057	.067	.052	.040	.039	.030	.024	.013	.010	.008	
6.0	.105	.076	.055	.090	.066	.048	.062	.046	.034	.036	.027	.020	.012	.009	.007	
7.0	.097	.068	.047	.084	.059	.041	.058	.041	.029	.034	.024	.017	.011	.008	.006	
8.0	.091	.061	.041	.078	.053	.035	.054	.037	.025	.031	.022	.015	.010	.007	.005	
9.0	.085	.055	.035	.073	.048	.031	.051	.034	.022	.029	.020	.013	.010	.007	.004	
10.0	.080	.051	.031	.069	.044	.027	.048	.031	.019	.028	.018	.011	.009	.006	.004	

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2015-09-08

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:0.1805A P:21.13W PF:0.9765 Lamp Flux:1645.3x1 lm											
NAME:					TYPE: 22TRMG4DIM/940/B/H			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		16.8	17.5	17.0	17.6	17.8	17.4	18.1	17.6	18.2	18.4
3H		18.1	18.7	18.3	18.9	19.1	18.7	19.3	18.9	19.5	19.7
4H		18.3	18.9	18.5	19.1	19.3	19.1	19.7	19.3	19.9	20.1
6H		18.2	18.8	18.5	19.0	19.3	19.1	19.7	19.4	19.9	20.2
8H		18.2	18.8	18.5	19.0	19.2	19.1	19.7	19.4	19.9	20.2
12H		18.1	18.7	18.5	18.9	19.2	19.1	19.6	19.4	19.9	20.1
4H 2H		17.4	18.0	17.7	18.2	18.4	17.9	18.5	18.1	18.7	18.9
3H		18.8	19.3	19.1	19.6	19.9	19.3	19.9	19.6	20.1	20.4
4H		19.0	19.5	19.4	19.8	20.1	19.8	20.2	20.1	20.5	20.8
6H		19.0	19.5	19.4	19.8	20.1	19.8	20.3	20.2	20.6	21.0
8H		19.0	19.4	19.4	19.7	20.1	19.8	20.2	20.2	20.6	20.9
12H		18.9	19.3	19.3	19.7	20.0	19.8	20.1	20.2	20.5	20.9
8H 4H		19.1	19.5	19.5	19.9	20.2	19.8	20.2	20.2	20.5	20.9
6H		19.1	19.4	19.5	19.8	20.2	19.9	20.2	20.3	20.6	21.0
8H		19.0	19.3	19.5	19.8	20.2	19.9	20.2	20.3	20.6	21.0
12H		19.0	19.2	19.4	19.7	20.1	19.8	20.0	20.3	20.5	21.0
12H 4H		19.1	19.5	19.5	19.8	20.2	19.7	20.1	20.1	20.5	20.9
6H		19.1	19.4	19.5	19.8	20.2	19.8	20.1	20.3	20.6	21.0
8H		19.0	19.3	19.5	19.7	20.2	19.8	20.1	20.3	20.5	21.0
Variations with the observer position at spacings:											
S = 1.0H		+ 0.4 / - 0.5					+ 0.4 / - 0.5				
1.5H		+ 0.5 / - 0.5					+ 0.8 / - 0.4				
2.0H		+ 0.2 / - 0.5					+ 0.5 / - 0.5				

CIE Pub.117 Corrected 1645 lm Total Lamp Luminous Flux.(8log(F/F0) = 1.7)

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2015-09-08

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:0.1805A P:21.13W PF:0.9765 Lamp Flux:1645.3x1 lm		
NAME:	TYPE:22TRMG4DIM/940/B/H	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) $k(RI) \times RCR = 5$									
$k = 0.60$	88	82	78	88	82	78	87	82	78	75
0.80	96	90	86	95	89	86	94	89	86	82
1.00	100	94	91	99	94	90	97	94	90	86
1.25	103	98	95	102	98	95	101	97	94	90
1.50	106	101	98	105	101	98	103	99	97	92
2.00	109	105	101	107	104	101	105	102	99	94
2.50	110	107	104	109	105	103	106	103	101	95
3.00	112	109	106	110	107	105	107	104	103	96
4.00	114	111	109	112	110	108	108	106	105	98
5.00	115	113	111	113	111	110	109	108	107	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:25.6DEG
 Operators:David
 Test Date:2015-09-08

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:

ISOCANDELA DIAGRAM

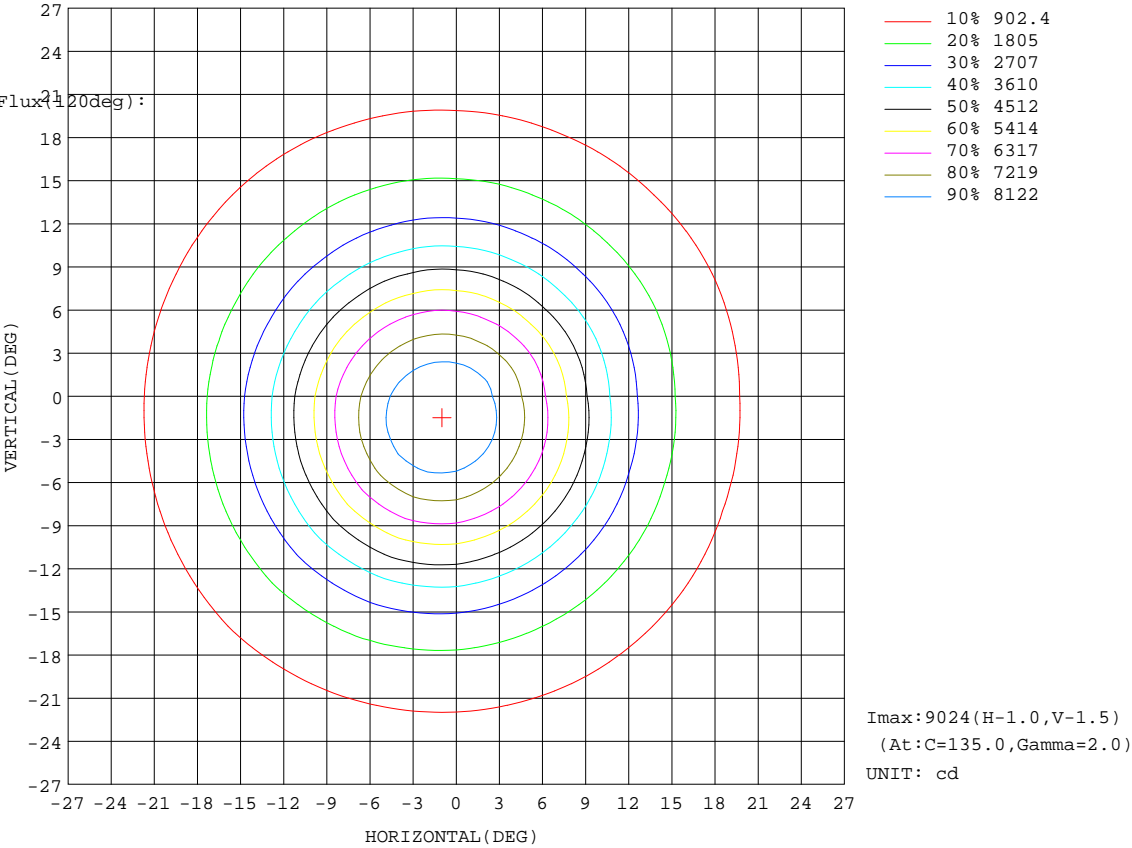
Test:U:120.0V I:0.1805A P:21.13W PF:0.9765 Lamp Flux:1645.3x1 lm		
NAME:	TYPE:22TRMG4DIM/940/B/H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	SUR.:	PROTECTION ANGLE:

Conical surface Flux(90deg):

1575.9 lm
%lum = 95.8%
%lamp = 95.8%

Conical surface Flux(120deg):

1616.5 lm
%lum = 98.2%
%lamp = 98.2%



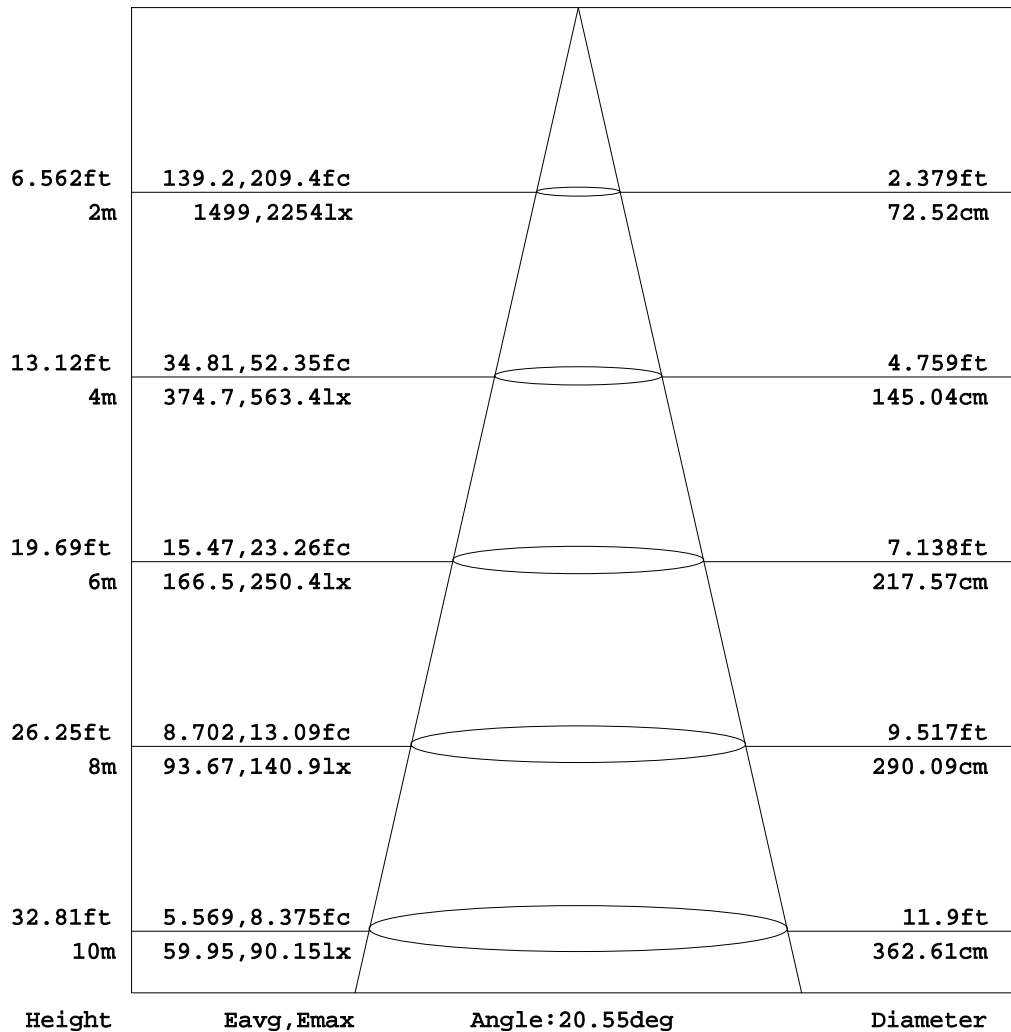
C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2015-09-08

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:

AAI Figure

Test:U:120.0V I:0.1805A P:21.13W PF:0.9765 Lamp Flux:1645.3x1 lm		
NAME:	TYPE:22TRMG4DIM/940/B/H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	SUR.:	PROTECTION ANGLE:

Flux out:711.6 lm



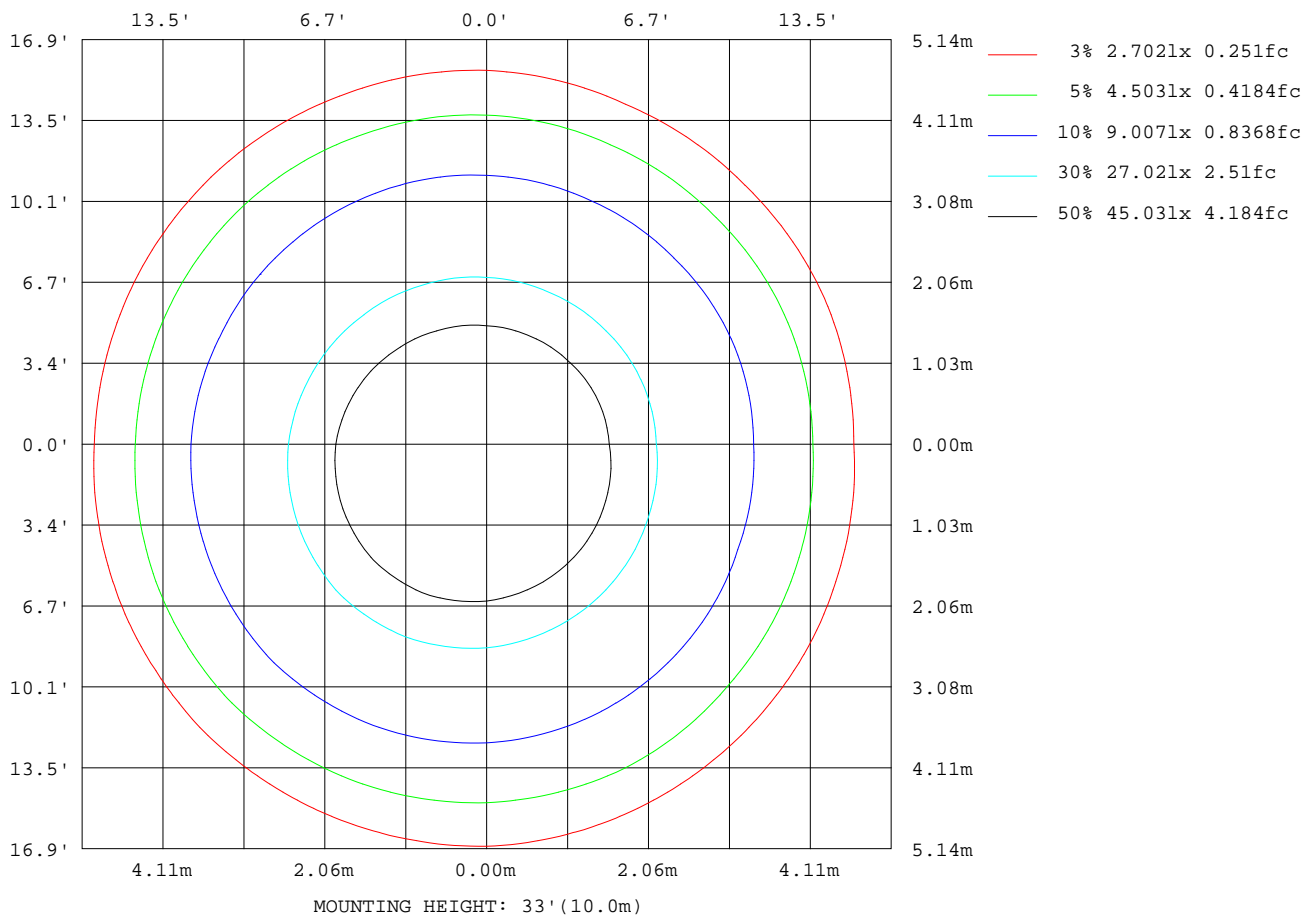
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature: 25.6DEG
 Operators: David
 Test Date: 2015-09-08

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

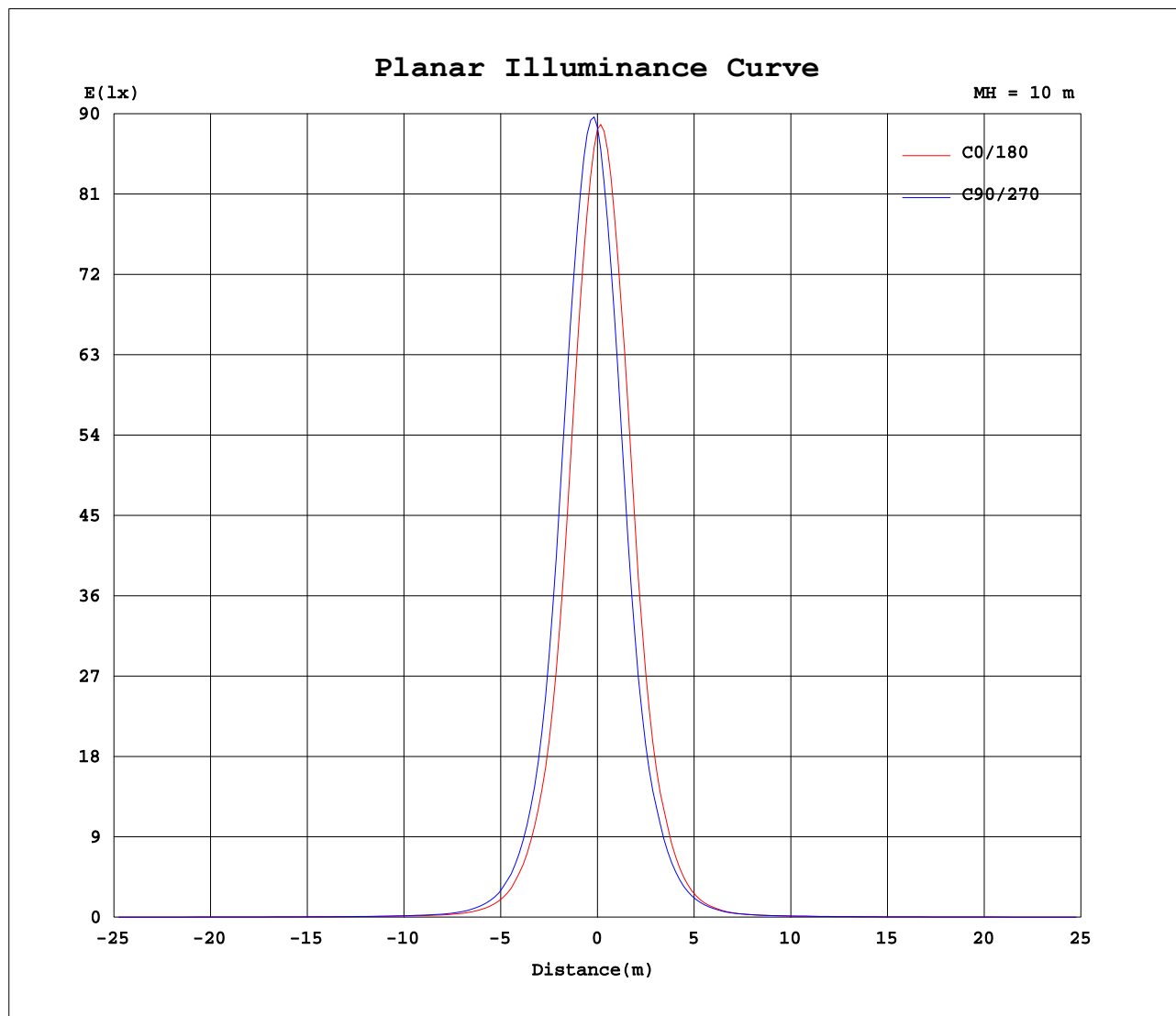
Test:U:120.0V I:0.1805A P:21.13W PF:0.9765 Lamp Flux:1645.3x1 lm		
NAME:	TYPE:22TRMG4DIM/940/B/H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: GC	SUR.:	PROTECTION ANGLE:



C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature: 25.6DEG
 Operators: David
 Test Date: 2015-09-08

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:

Planar Illuminance Curve



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature: 25.6DEG
Operators: David
Test Date: 2015-09-08

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:

LUMINOUS DISTRIBUTION INTENSITY DATA

Test:U:120.0V I:0.1805A P:21.13W PF:0.9765 Lamp Flux:1645.3x1 lm																		
NAME:									TYPE:22TRMG4DIM/940/B/H									WEIGHT:
SPEC.:									DIM.:									SERIAL No.:
MFR.: GC									SUR.:									PROTECTION ANGLE:

Table--1

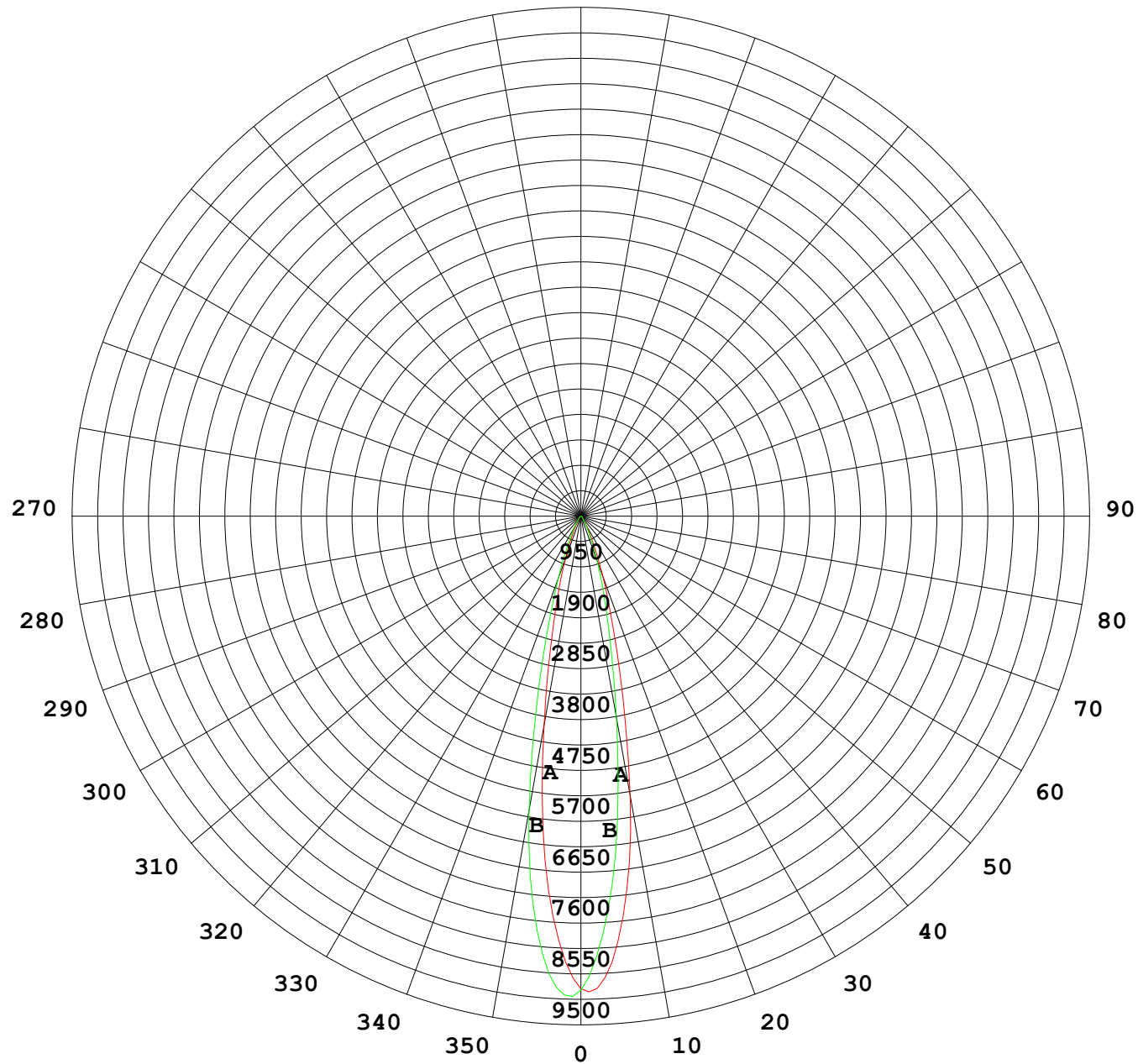
UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338			
0	8826	8827	8834	8845	8850	8860	8870	8876	8826	8827	8834	8845	8850	8860	8870	8876			
5	6998	7284	7603	7937	8210	8387	8409	8238	7963	7624	7294	7020	6828	6734	6764	6890			
10	3974	4318	4764	5207	5590	5828	5844	5607	5302	4821	4355	4026	3816	3723	3741	3867			
15	1863	1993	2220	2473	2746	2929	2962	2790	2591	2310	2092	1943	1836	1786	1780	1836			
20	857	917	1024	1139	1243	1316	1341	1271	1217	1093	1013	940	883	843	831	855			
25	362	398	456	510	554	573	580	548	495	467	438	408	389	362	357	366			
30	162	181	200	221	241	234	233	218	203	197	190	184	178	167	164	169			
35	80.4	89.7	97.7	107	115	107	101	95.5	91.8	88.8	86.3	86.2	85.5	79.3	78.9	81.2			
40	51.3	57.6	60.2	63.0	66.9	62.8	61.4	59.2	54.7	55.3	51.0	51.7	52.8	49.2	50.3	52.2			
45	38.7	41.5	43.1	45.5	48.2	44.5	43.4	42.6	40.0	40.1	38.4	39.1	40.3	37.4	38.0	38.9			
50	31.9	32.7	33.7	35.5	36.9	34.6	33.3	33.0	32.4	32.1	31.7	32.2	32.8	31.5	31.7	31.8			
55	28.0	28.4	28.5	29.6	29.5	28.9	28.5	28.9	28.2	28.3	28.1	28.3	28.8	28.4	28.4	28.6			
60	24.6	25.1	25.1	25.5	25.6	25.4	25.5	25.7	25.4	25.3	25.2	25.0	25.2	24.9	24.8	25.0			
65	20.2	20.5	20.8	21.3	21.5	21.8	21.9	21.8	21.5	21.1	20.8	20.3	20.0	20.1	19.9	20.2			
70	13.7	14.6	15.2	16.0	16.3	16.7	16.6	16.5	16.3	15.5	14.6	13.8	13.2	12.9	12.9	13.4			
75	5.71	6.74	7.50	8.55	9.24	9.45	9.49	9.17	8.73	7.64	6.63	5.74	5.25	4.95	5.00	5.30			
80	1.02	1.45	2.01	2.54	2.96	3.21	3.17	2.86	2.62	2.07	1.54	1.11	0.83	0.68	0.71	0.88			
85	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
90	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			
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	0.00	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			
160	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03			
165	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.07			
170	0.10	0.09	0.08	0.08	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.09	0.10	0.11	0.11	0.12			
175	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.12			
180	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.02	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: 2015-09-08

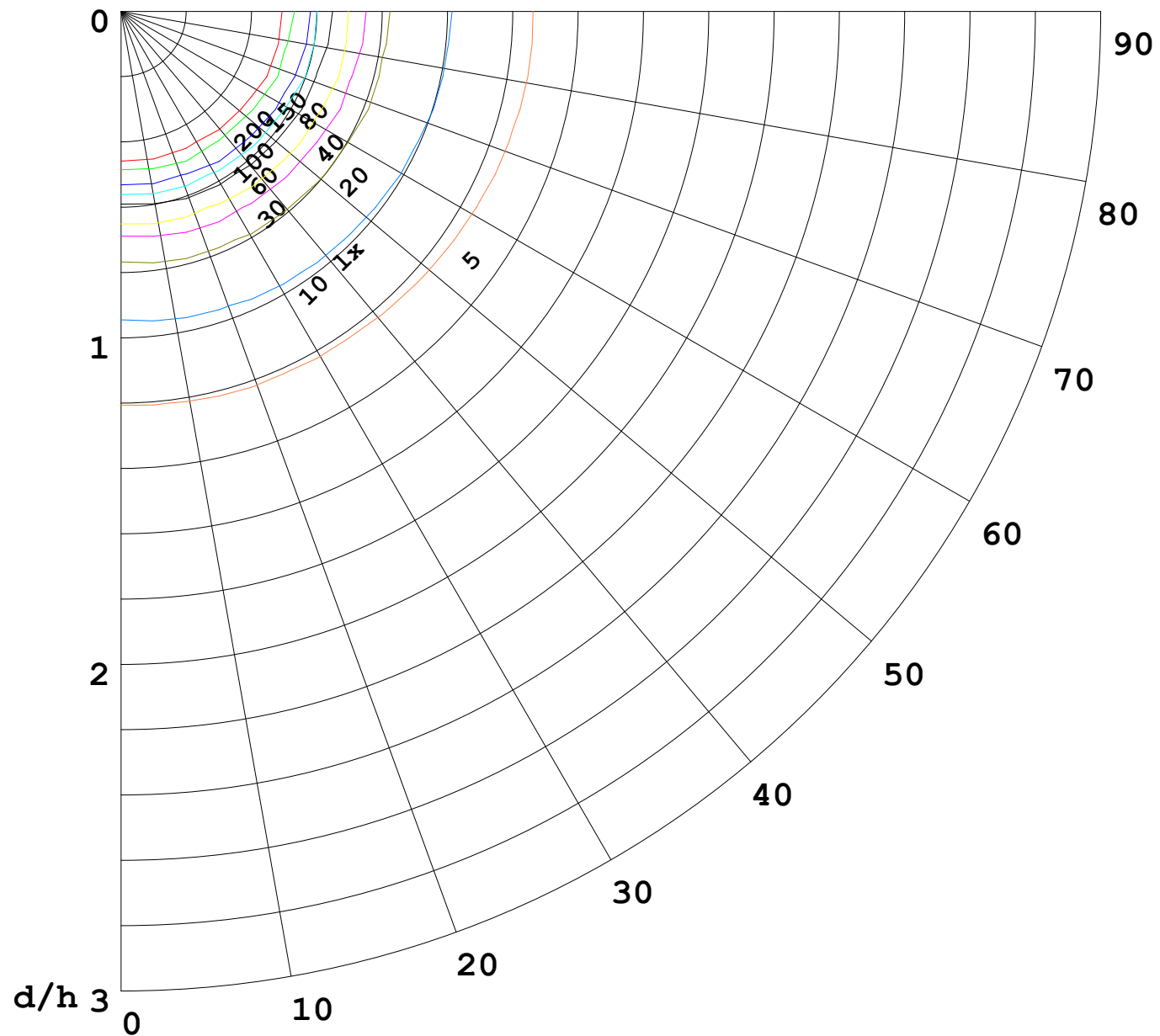
γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity: 67.1%
 Test Distance: 2.455m [K=1.0000]
 Remarks:

I (cd)



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

