



IENALM-79 TEST REPORT

Applicant's name : Espen Technology Inc.

Address : 12257 Florence Ave., Santa Fe Springs, CA 90670, USA

Brand Name : ESPEN

Report No. : BTR66.181.15.0030.28

Product Name : LED T8 TUBE

Model Number : L48T8-830-15G-XT N

Tested by
(printed name and signature) : David Zhang

Title : Test Engineer

Approved by
(printed name and signature) : Steven Su

Title : Approved Signatory

Date of issue : Jan 20, 2016

Testing Laboratory Name : BEST Test Service Shenzhen Co., Ltd.

Address : 1st Floor, 1st Building, Weitai Industrial Park, Yingrenshi, Shiyuan, Baoan,
Shenzhen, China

Accreditation : DLC/Lighting Facts/UL/ETL/ELI/NVLAP/EPA/DOE

Test specification

Standard : IESNA LM-79

Test procedure : IESNA LM-79 Test Procedure

Non-standard test method : No

Test Report Form No. : BEST_ LM-79

TRF originator..... : BEST Test Service Shenzhen Co., Ltd. Mr Tseng

Master TRF : BEST_ LM-79.doc

Note:

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Product description:	
Test date	Jan 15, 2016 to Jan 20, 2016
Sample Quantity	1 unit
SKU.....	N/A
Rating(s) (V; Hz)	AC 100-277V/60Hz
Nominal Power	15W
Nominal Power Factor	>0.9
Nominal Lumen Output.....	1800 lm
Nominal CCT	3000K
Nominal CRI(Ra)	80
Number of hours operated prior to measurement	0H
Total operating time of the product for measurements including stabilization	3.5H
Ambient temperature	25°C
Orientation (burning position) of SSL product during test	Lighting Surface Down
Stabilization time	1.5 H
Photometric method	Sphere-spectroradiometer+Goniophotometer
reference standard used	DC 24V 100W Omni-Directional Halogen Calibrated by NIM China
Correction factors applied	Self absorbing applied
Photometric measurement conditions	See test method description below
Bandwidth of spectroradiometer	2nm
Statement of uncertainties	1.12%
Deviation from standard operating procedures,	None

Photometric and Electrical Measurement

Total light output (luminous flux) for the $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ambient temperature conditions is measured using a EVERFINE 2.0 m 4 π geometry integrating sphere. Temperature is measured at a position inside the sphere. Spectral radiant flux measurements are made using Integral Sphere to the detector port of the integrating sphere. Each lamp is operated at rated voltage in its designated orientation by a CHROMA 61602 AC SOURCE. Each lamp should be stable before measurements are made as below:

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 380 to 780 nm by EVERFINE HASS-2000. The calibration of the sphere photometer-spectrometer system is traceable to the NIM China by a calibrated halogen incandescent lamp. 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 YOKOGAWA WT310 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 380-780 nm.

Photometric and Electrical Test Data

Input Voltage (V)	Frequency (Hz)	Input Current (A)	ITHD	Input Power (W)	Power Factor	Lumen Output (Lumens)	Efficiency Lumen/w
120.0	60.0	0.119	/	14.25	0.997	1810.00	127.02
CCT (K)	CRI (Ra)	R9	x CIE1931	y CIE1931	u' CIE1976	v' CIE1976	Duv CIE1976
2924	82.8	10	0.4417	0.4044	0.2535	0.5222	-0.0005

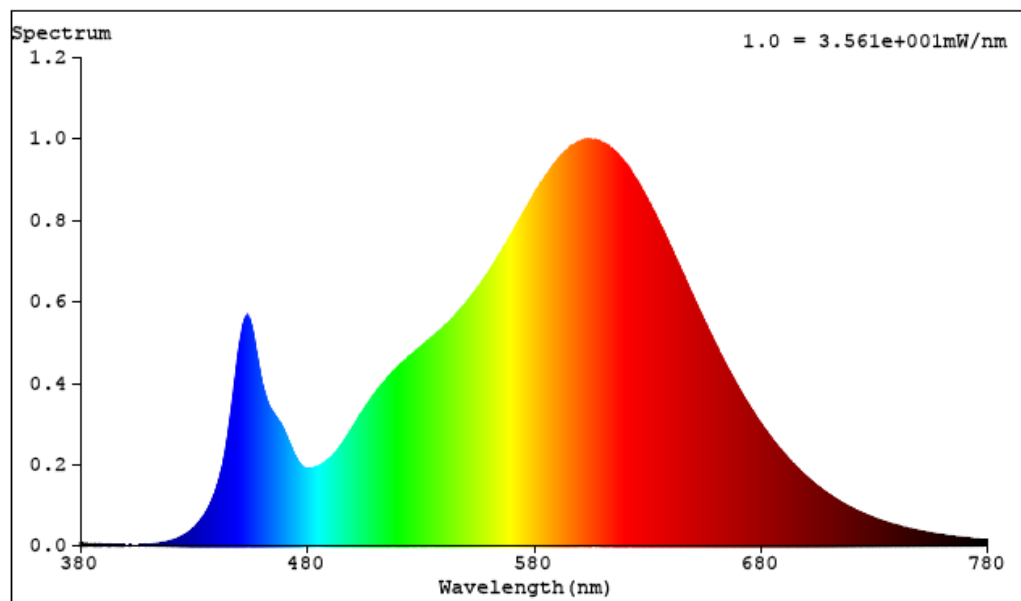
Luminous Intensity

2 lamps together with driver, were installed in a LITHONIA 2GT8 Troffer lensed 2*4, and mounted in the centre of Goniophotometer, Everfine GOR-5000 Goniophotometer was used to measure the intensity at each angle of distribution, Luminous intensity (cd) is measured within each vertical plane at a 5° vertical angle increment (maximum) from 0° to 180° Luminous intensity (cd), measurements repeated in vertical planes about the lamp (polar) axis in maximum increments of 22.5° from 0° to 180°, and export the intensity (cd) with excel format. The test distance is 25 meters from the Goniophotometer to the detector

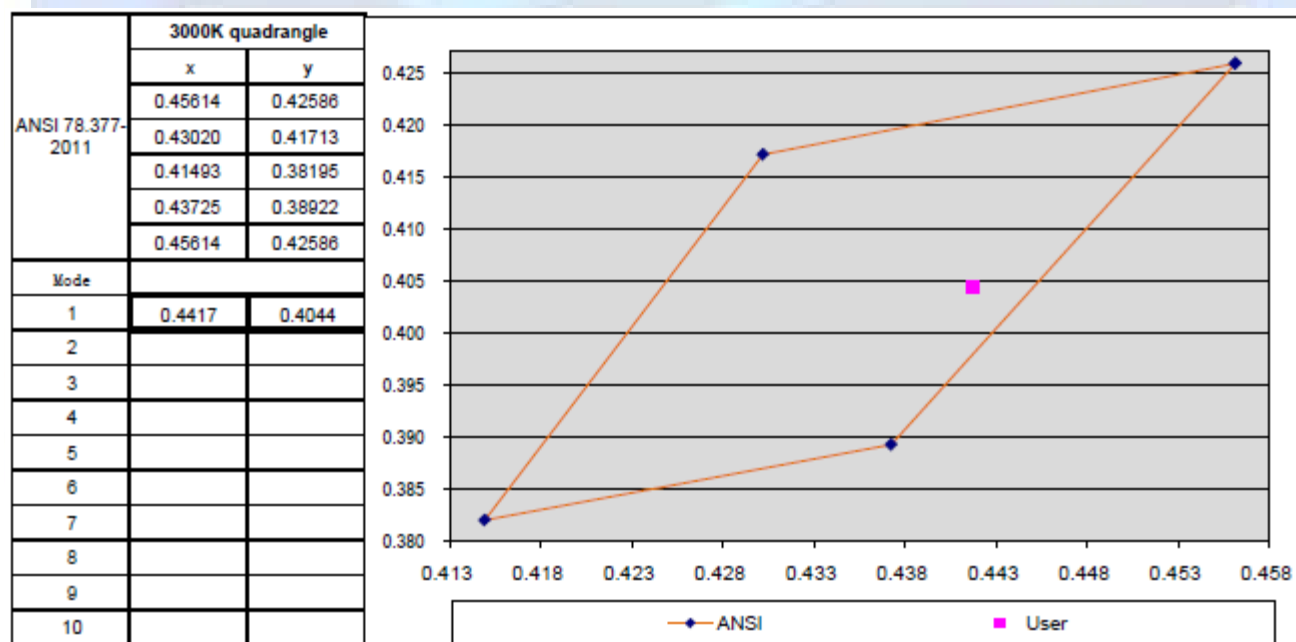
Photometric and Electrical Test Data

Input Voltage (V)	Frequency (Hz)	Input Current (A)	ITHD	Input Power (W)	Power Factor	Lumen Output (Lumens)	Efficiency Lumen/w	Spacing Criteria 0-180°	Spacing Criteria 90-270°
120.0	60.0	0.244	5.2%	29.24	0.997	2926.30	100.06	1.32	1.24

Spectral Plots



7 Step Quadrangle



EUT Photo



Luminous Intensity Distribution Test Plots (CIE Chromaticity)

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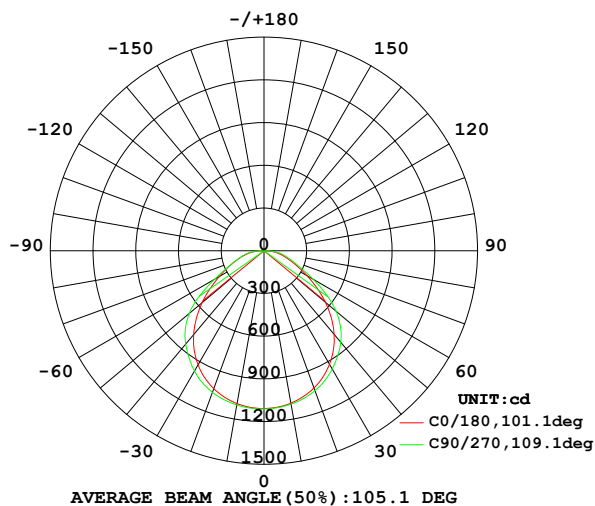


LUMINAIRE PHOTOMETRIC TEST REPORT

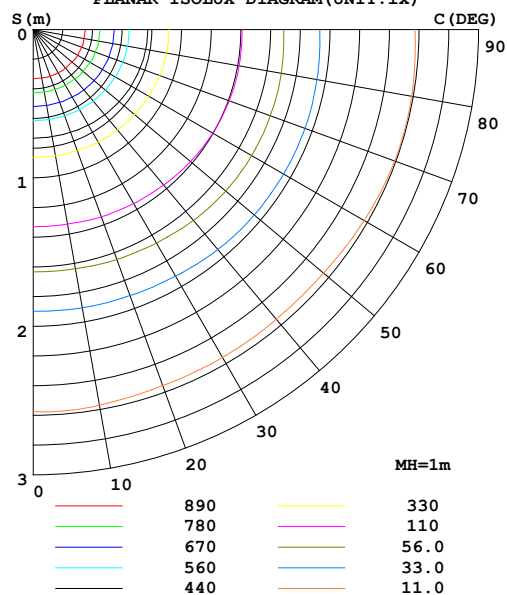
Test:U:120.0V I:0.2444A P:29.24W PF:0.9970 Lamp Flux:1463.14x2 lm		
NAME:	TYPE:L48T8/830/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 100.06 lm/W			
MODEL	L48T8/830/15G-XT N	I _{max} (cd)	1112	S/MH (C0/180)	1.24
NOMINAL POWER (W)	15	LOR (%)	100.0	S/MH (C90/270)	1.28
RATED VOLTAGE (V)	120.0	TOTAL FLUX (lm)	2926.3	η UP,DN (C0-180)	0.1, 50.3
NOMINAL FLUX (lm)	1463.14	CIE CLASS	DIRECT	η UP,DN (C180-360)	0.0, 49.7
LAMPS INSIDE	2	η up (%)	0.1	CIBSE SHR NOM	1.25
TEST VOLTAGE (V)	120.0	η down (%)	99.9	CIBSE SHR MAX	1.35

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



PLANAR ISOLUX DIAGRAM (UNIT: lx)



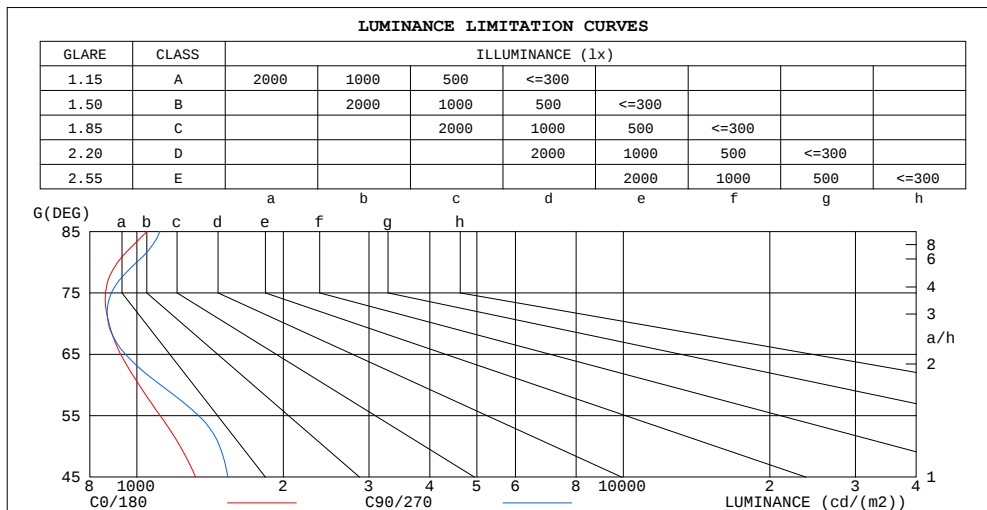
C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature: 25.6DEG
 Operators: David
 Test Date: 2016-01-15

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE G0-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	1090	1096	1100	1095	1087	1089	1094	1094	0- 10	105.2	105.2	3.6,3.6
20	1031	1047	1058	1044	1026	1033	1046	1043	10- 20	302.7	407.9	13.9,13.9
30	925.7	955.7	976.6	952.4	920.4	939.1	958.2	949.4	20- 30	460.7	868.6	29.7,29.7
40	768.6	814.9	855.0	816.1	766.1	801.5	838.9	804.4	30- 40	552.1	1421	48.6,48.6
50	568.1	626.9	685.0	628.8	563.4	614.1	660.7	614.1	40- 50	555.1	1976	67.5,67.5
60	363.9	405.5	402.7	380.4	347.6	375.8	395.0	397.7	50- 60	449.5	2425	82.9,82.9
70	215.8	203.0	215.3	168.3	190.1	172.5	212.3	200.3	60- 70	278.1	2703	92.4,92.4
80	114.1	101.7	124.9	92.34	99.78	90.70	122.1	103.2	70- 80	156.1	2860	97.7,97.7
90	6.124	6.489	8.803	2.626	0.4071	0.9302	1.236	2.825	80- 90	64.04	2924	99.9,99.9
100	0.2321	0.3952	0.1974	0.3579	0.2603	0.3184	0.1653	0.2661	90-100	0.6409	2924	99.9,99.9
110	0.3318	0.4395	0.4809	0.4155	0.2613	0.3430	0.3614	0.2977	100-110	0.3561	2925	99.9,99.9
120	0.3639	0.3901	0.5300	0.3776	0.3286	0.3423	0.3918	0.3143	110-120	0.3669	2925	100,100
130	0.3679	0.4174	0.4831	0.4405	0.3909	0.4065	0.4001	0.3541	120-130	0.3433	2925	100,100
140	0.4030	0.4803	0.5620	0.4649	0.4350	0.4458	0.4509	0.4245	130-140	0.3298	2926	100,100
150	0.4796	0.5265	0.5392	0.4932	0.4353	0.4278	0.4224	0.3947	140-150	0.2911	2926	100,100
160	0.4889	0.5435	0.5033	0.5382	0.4439	0.4379	0.3636	0.4285	150-160	0.2142	2926	100,100
170	0.4824	0.5201	0.4649	0.5479	0.4486	0.4548	0.3943	0.4439	160-170	0.1333	2926	100,100
180	0.5948	0.5455	0.5271	0.5330	0.5874	0.5624	0.4989	0.5359	170-180	0.0514	2926	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



LUMINANCE cd/(m2)		
G(°)	C0/180	C90/270
85	1049	1115
80	913	999
75	862	886
70	876	874
65	926	947
60	1011	1118
55	1117	1340
50	1228	1480
45	1320	1537

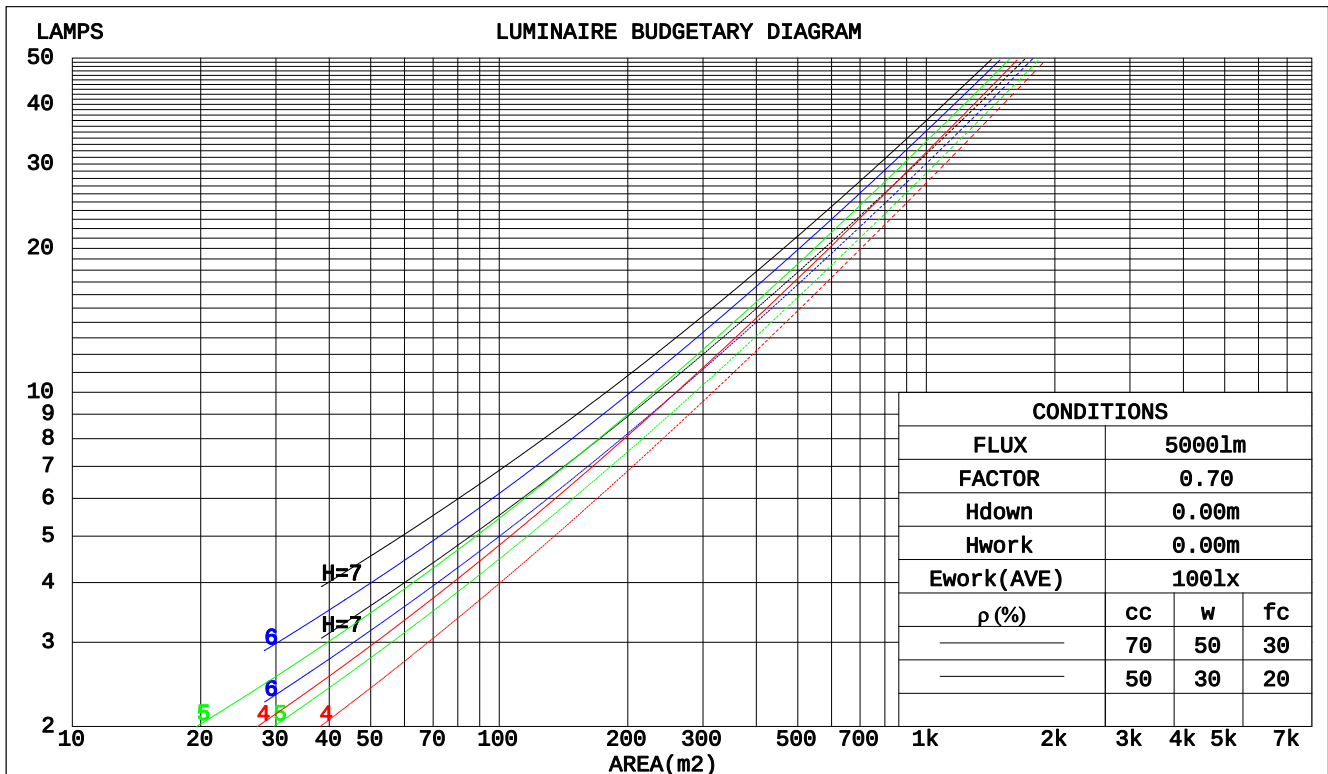
C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature: 25.6DEG
Operators: David
Test Date: 2016-01-15

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System: EVERFINE G0-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:0.2444A P:29.24W PF:0.9970 Lamp Flux:1463.14x2 lm		
NAME:	TYPE:L48T8/830/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

ρ _{CC}	80%			70%			50%			30%			10%			0
ρ _W	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρ _{fc}	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	1.05	1.00	.97	1.02	.99	.95	.98	.95	.92	.94	.92	.89	.91	.89	.87	.85
2.0	.92	.85	.80	.90	.84	.79	.86	.81	.77	.83	.79	.75	.80	.77	.74	.71
3.0	.81	.73	.67	.80	.72	.66	.77	.70	.65	.74	.69	.64	.71	.67	.63	.61
4.0	.72	.64	.57	.71	.63	.57	.68	.62	.56	.66	.60	.55	.64	.59	.55	.52
5.0	.65	.56	.50	.64	.55	.49	.62	.54	.49	.60	.53	.48	.58	.52	.48	.46
6.0	.58	.50	.44	.58	.49	.43	.56	.48	.43	.54	.48	.43	.53	.47	.42	.40
7.0	.53	.45	.39	.52	.44	.38	.51	.43	.38	.49	.43	.38	.48	.42	.38	.36
8.0	.49	.40	.34	.48	.40	.34	.47	.39	.34	.45	.39	.34	.44	.38	.34	.32
9.0	.45	.37	.31	.44	.36	.31	.43	.36	.31	.42	.35	.31	.41	.35	.30	.29
10.0	.41	.33	.28	.41	.33	.28	.40	.33	.28	.39	.32	.28	.38	.32	.28	.26



C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature: 25.6DEG
 Operators: David
 Test Date: 2016-01-15

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE G0-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:0.2444A P:29.24W PF:0.9970 Lamp Flux:1463.14x2 lm		
NAME:	TYPE:L48T8/830/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

ρ_{cc}	80%			70%			50%			30%			10%			0	
ρ_w	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0	
ρ_{fc}	20%			20%			20%			20%			20%			0	
RCR	RCR:Room Cavity Ratio						Wall Exitance Coefficients(WEC)										
0.0																	
1.0	.296	.168	.053	.289	.165	.052	.276	.158	.051	.264	.152	.049	.252	.146	.047		
2.0	.278	.152	.047	.272	.150	.046	.260	.145	.045	.249	.140	.044	.240	.135	.043		
3.0	.258	.137	.041	.253	.135	.041	.242	.131	.040	.233	.128	.039	.224	.124	.038		
4.0	.239	.124	.037	.235	.123	.036	.226	.120	.036	.217	.117	.035	.209	.114	.035		
5.0	.222	.113	.033	.218	.112	.033	.210	.109	.032	.202	.107	.032	.195	.104	.031		
6.0	.207	.104	.030	.203	.103	.030	.196	.100	.029	.189	.098	.029	.183	.096	.029		
7.0	.193	.096	.027	.190	.095	.027	.184	.093	.027	.178	.091	.026	.172	.089	.026		
8.0	.181	.089	.025	.178	.088	.025	.172	.086	.025	.167	.085	.024	.162	.083	.024		
9.0	.170	.082	.023	.167	.082	.023	.162	.080	.023	.157	.079	.023	.153	.078	.022		
10.0	.160	.077	.021	.158	.076	.021	.153	.075	.021	.149	.074	.021	.145	.073	.021		

ρ_{CC}	80%			70%			50%			30%			10%			0
ρ_W	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρ_{fC}	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Ceiling Cavity Exitance Coefficients(CCEC)									
0.0	.191	.191	.191	.163	.163	.163	.112	.112	.112	.064	.064	.064	.020	.020	.020	
1.0	.180	.157	.136	.154	.135	.117	.105	.093	.081	.061	.054	.047	.019	.017	.015	
2.0	.171	.133	.100	.147	.114	.087	.100	.079	.061	.058	.046	.035	.019	.015	.012	
3.0	.163	.115	.077	.140	.099	.066	.096	.069	.047	.055	.040	.027	.018	.013	.009	
4.0	.155	.101	.060	.133	.088	.053	.092	.061	.037	.053	.036	.022	.017	.012	.007	
5.0	.148	.091	.049	.127	.079	.043	.087	.055	.030	.051	.032	.018	.016	.011	.006	
6.0	.141	.083	.041	.121	.072	.036	.083	.050	.025	.048	.029	.015	.016	.010	.005	
7.0	.134	.076	.035	.115	.066	.030	.080	.046	.021	.046	.027	.013	.015	.009	.004	
8.0	.128	.070	.030	.110	.061	.026	.076	.043	.019	.044	.025	.011	.014	.008	.004	
9.0	.122	.065	.026	.105	.056	.023	.073	.040	.016	.042	.023	.010	.014	.008	.003	
10.0	.116	.061	.024	.100	.053	.021	.070	.037	.015	.041	.022	.009	.013	.007	.003	

C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-01-15

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE G0-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:0.2444A P:29.24W PF:0.9970 Lamp Flux:1463.14x2 lm											
NAME:					TYPE:L48T8/830/15G-XT N			WEIGHT:			
SPEC.:					DIM.:			SERIAL No.:			
MFR.: ESPEN					SUR.:1.2*0.6			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		13.0	14.5	13.3	14.7	14.9	13.7	15.2	14.0	15.4	15.6
	3H	14.1	15.5	14.4	15.7	16.0	14.7	16.0	15.0	16.3	16.5
	4H	14.7	16.0	15.0	16.2	16.5	15.2	16.5	15.5	16.7	17.0
	6H	15.2	16.4	15.5	16.7	16.9	15.7	16.9	16.0	17.2	17.4
	8H	15.4	16.6	15.8	16.9	17.2	15.9	17.1	16.3	17.4	17.7
	12H	15.6	16.8	16.0	17.0	17.3	16.2	17.3	16.5	17.6	17.9
4H	2H	13.5	14.8	13.9	15.1	15.3	14.1	15.4	14.4	15.6	15.9
	3H	14.8	15.9	15.2	16.2	16.5	15.3	16.4	15.6	16.7	17.0
	4H	15.5	16.5	15.8	16.8	17.1	15.9	16.9	16.3	17.2	17.6
	6H	16.1	17.0	16.5	17.4	17.8	16.6	17.5	17.0	17.8	18.2
	8H	16.5	17.3	16.9	17.7	18.1	16.9	17.8	17.4	18.2	18.5
	12H	16.8	17.5	17.2	17.9	18.3	17.2	18.0	17.7	18.4	18.8
8H	4H	15.7	16.5	16.1	16.9	17.3	16.1	16.9	16.5	17.3	17.7
	6H	16.5	17.2	16.9	17.6	18.0	16.9	17.6	17.4	18.1	18.5
	8H	17.0	17.6	17.4	18.0	18.5	17.4	18.1	17.9	18.5	18.9
	12H	17.4	17.9	17.9	18.4	18.8	17.9	18.4	18.4	18.9	19.4
12H	4H	15.7	16.5	16.1	16.9	17.3	16.1	16.8	16.5	17.2	17.6
	6H	16.6	17.2	17.1	17.6	18.1	17.0	17.6	17.5	18.1	18.5
	8H	17.1	17.6	17.6	18.1	18.6	17.6	18.1	18.0	18.5	19.0
Variations with the observer position at spacings:											
S = 1.0H		+ 0.2 / - 0.3					+ 0.2 / - 0.2				
1.5H		+ 0.2 / - 0.4					+ 0.3 / - 0.5				
2.0H		+ 0.2 / - 0.4					+ 0.4 / - 0.4				

CIE Pub.117 Corrected 2926 lm Total Lamp Luminous Flux.(8log(F/F0) = 3.7)

C Range: 0 - 360DEG
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 Remarks:

UTILIZATION FACTORS TABLE

Test:U:120.0V I:0.2444A P:29.24W PF:0.9970 Lamp Flux:1463.14x2 lm		
NAME:	TYPE:L48T8/830/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

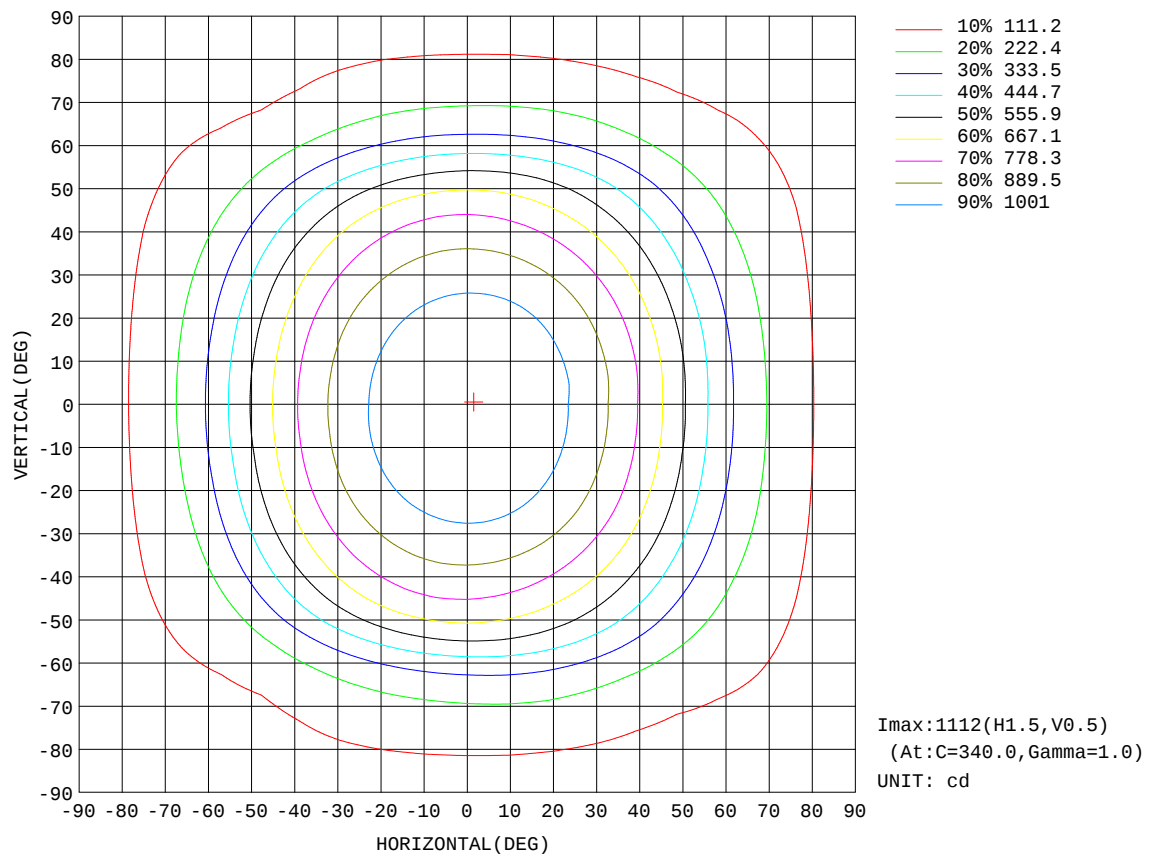
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) $k(RI) \times RCR = 5$									
k = 0.60	60	48	42	59	48	41	58	48	41	35
0.80	70	59	52	69	58	51	67	57	51	44
1.00	78	68	61	77	67	60	75	68	60	53
1.25	85	75	69	84	75	68	81	73	67	60
1.50	90	81	74	88	80	74	85	78	73	65
2.00	97	88	82	95	87	82	91	85	80	73
2.50	100	93	87	98	91	86	94	89	84	76
3.00	103	97	91	101	95	90	97	92	88	80
4.00	107	101	97	105	100	96	100	96	93	84
5.00	109	104	101	107	103	99	102	99	96	87
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004			Suspended					SHRNOM = 1.25		

C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-01-15

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE G0-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.455m [K=1.0000]
 Remarks:

ISOCANDELA DIAGRAM

Test:U:120.0V I:0.2444A P:29.24W PF:0.9970 Lamp Flux:1463.14x2 lm		
NAME:	TYPE:L48T8/830/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:



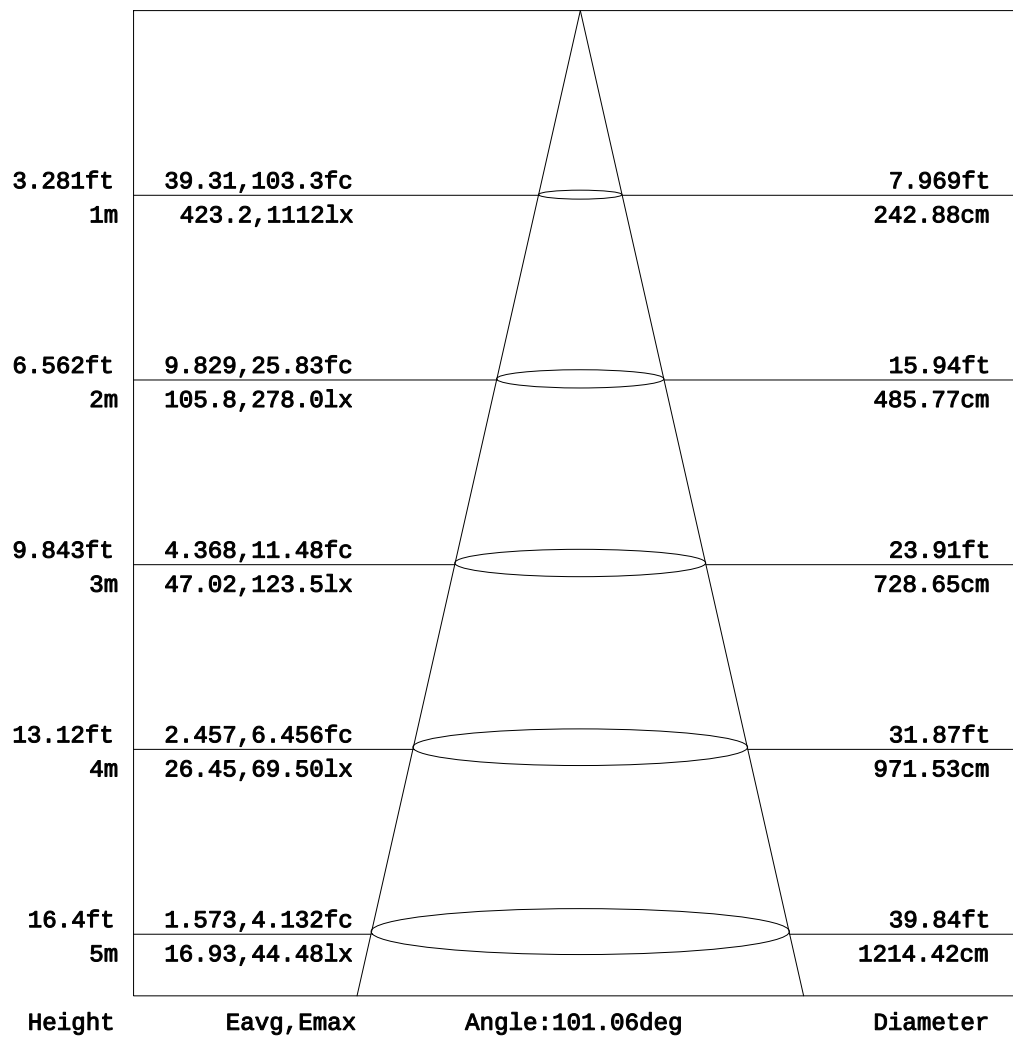
C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2016-01-15

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE G0-R5000_V2 SYSTEM V2.0.287
Humidity:67.1%
Test Distance:2.455m [K=1.0000]
Remarks:

AAI Figure

Test:U:120.0V I:0.2444A P:29.24W PF:0.9970 Lamp Flux:1463.14x2 lm		
NAME:	TYPE:L48T8/830/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

Flux out:2027 lm



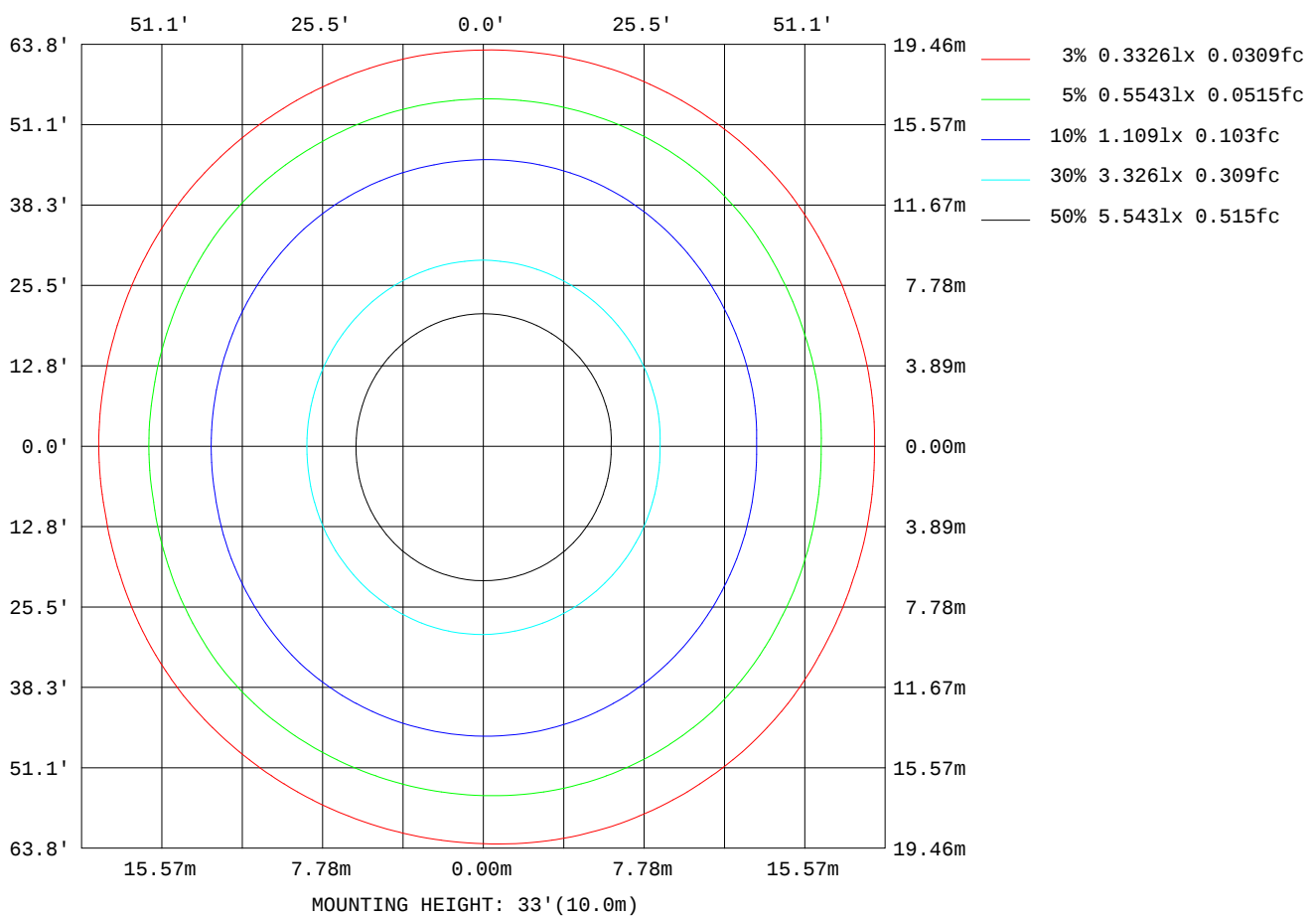
Note:The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2016-01-15

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE G0-R5000_V2 SYSTEM V2.0.287
Humidity:67.1%
Test Distance:2.455m [K=1.0000]
Remarks:

ISOLUX DIAGRAM

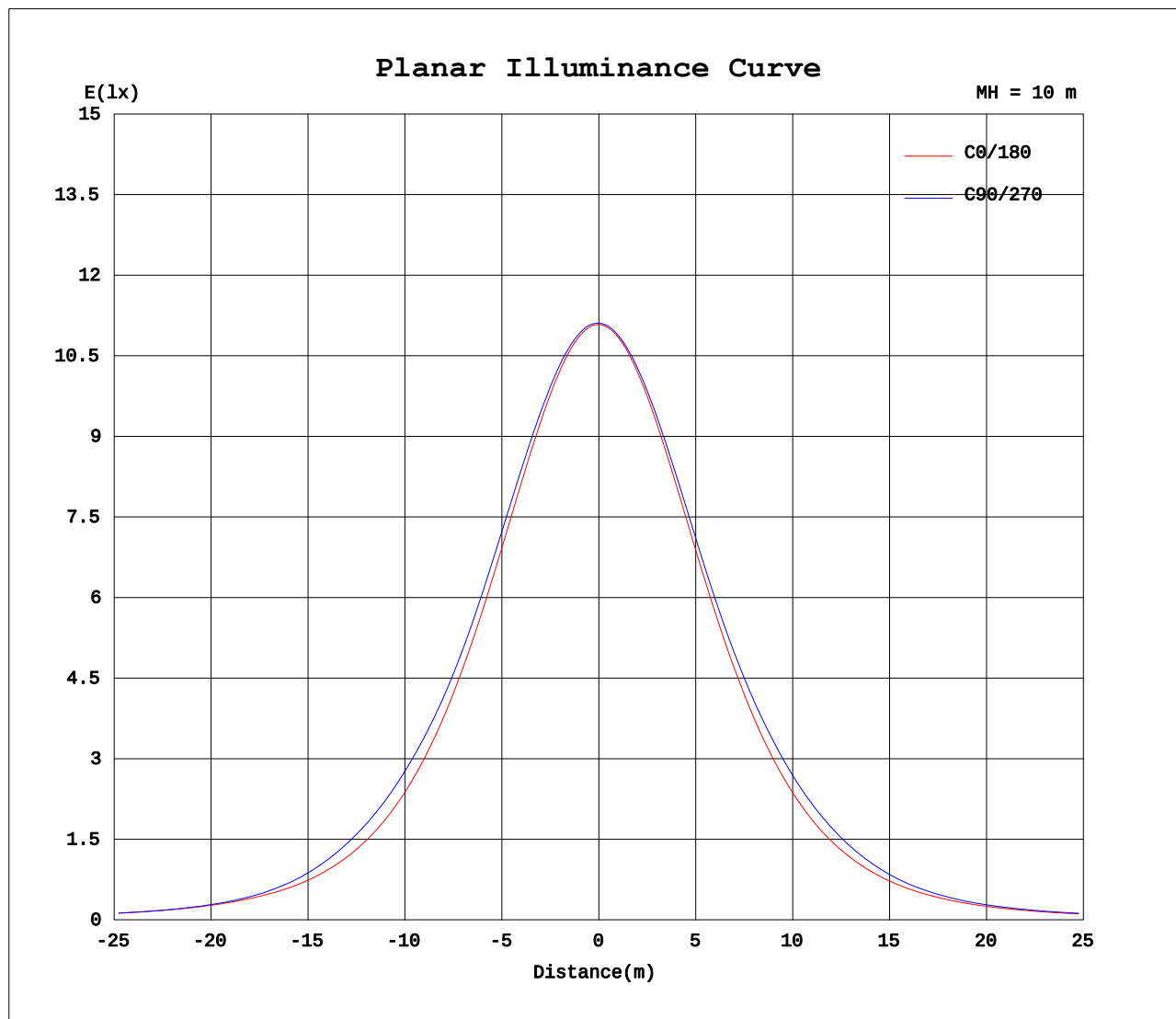
Test:U:120.0V I:0.2444A P:29.24W PF:0.9970 Lamp Flux:1463.14x2 lm		
NAME:	TYPE:L48T8/830/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:



C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2016-01-15

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE G0-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: 10.0DEG
Test Speed: HIGH
Temperature: 25.6DEG
Operators: David
Test Date: 2016-01-15

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System: EVERFINE G0-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:0.2444A P:29.24W PF:0.9970 Lamp Flux:1463.14x2 lm																		
NAME:									TYPE:L48T8/830/15G-XT N					WEIGHT:				
SPEC.:									DIM.:					SERIAL No.:				
MFR.: ESPEN									SUR.:1.2*0.6					PROTECTION ANGLE:				

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1108	1109	1109	1110	1110	1110	1111	1111	1111	1111	1111	1111	1112	1112	1112	1112	1112	1112	1108
5	1104	1105	1106	1107	1107	1108	1108	1109	1109	1109	1109	1109	1108	1108	1108	1107	1106	1106	1102
10	1090	1091	1093	1094	1096	1097	1098	1100	1100	1100	1100	1099	1098	1096	1095	1093	1092	1090	1087
15	1066	1068	1070	1072	1075	1078	1080	1082	1083	1083	1083	1081	1079	1076	1073	1070	1067	1065	1062
20	1031	1033	1036	1040	1045	1049	1053	1056	1058	1058	1057	1055	1051	1047	1042	1037	1032	1029	1026
25	985	987	991	997	1003	1010	1016	1020	1023	1023	1022	1018	1014	1008	1001	993	987	982	979
30	926	929	934	942	951	960	968	973	976	977	975	970	965	957	948	939	930	923	920
35	854	858	865	876	887	897	906	913	917	918	917	913	905	895	884	873	861	852	850
40	769	773	783	796	809	821	833	843	851	855	855	849	838	824	808	793	780	769	766
45	672	677	688	703	719	735	751	765	776	783	783	775	760	741	721	702	685	672	670
50	568	574	585	601	618	636	653	668	679	685	682	674	659	640	618	597	580	565	563
55	461	466	477	491	509	527	543	552	556	553	547	540	531	519	501	482	466	454	453
60	364	367	375	385	400	411	416	416	411	403	396	390	386	383	378	365	354	347	348
65	282	282	281	285	292	295	298	300	296	288	281	275	268	259	254	254	253	254	259
70	216	215	208	206	202	204	213	220	220	215	209	202	190	173	163	166	174	182	190
75	161	160	154	145	138	143	156	166	168	165	163	156	142	124	111	115	126	136	140
80	114	114	110	102	99.2	104	113	120	125	125	123	117	108	96.7	88.0	85.8	91.3	97.7	99.8
85	65.8	65.4	63.2	63.4	64.2	65.1	67.3	70.2	71.8	69.9	68.7	66.8	63.0	57.4	53.4	50.3	49.4	50.9	54.7
90	6.12	8.08	8.02	7.79	6.72	6.25	6.01	5.73	3.88	8.80	7.22	0.95	3.65	2.96	2.29	2.04	2.11	2.68	0.41
95	0.15	0.34	0.36	0.38	0.35	0.27	0.27	0.28	0.28	0.28	0.29	0.28	0.28	0.26	0.31	0.35	0.31	0.26	0.14
100	0.23	0.30	0.35	0.47	0.46	0.33	0.22	0.19	0.19	0.20	0.21	0.19	0.24	0.32	0.40	0.39	0.32	0.25	0.26
105	0.32	0.38	0.36	0.41	0.45	0.40	0.43	0.41	0.40	0.42	0.42	0.39	0.38	0.37	0.38	0.36	0.32	0.27	0.31
110	0.33	0.40	0.38	0.41	0.43	0.45	0.44	0.43	0.46	0.48	0.48	0.45	0.42	0.42	0.42	0.36	0.34	0.29	0.26
115	0.30	0.32	0.35	0.40	0.40	0.44	0.47	0.48	0.51	0.52	0.52	0.48	0.43	0.42	0.39	0.35	0.32	0.28	0.28
120	0.36	0.35	0.37	0.38	0.39	0.39	0.42	0.47	0.51	0.53	0.52	0.48	0.42	0.39	0.37	0.34	0.40	0.37	0.33
125	0.35	0.37	0.34	0.44	0.39	0.41	0.42	0.43	0.46	0.48	0.47	0.46	0.41	0.40	0.39	0.35	0.36	0.32	0.36
130	0.37	0.39	0.38	0.39	0.43	0.41	0.45	0.46	0.48	0.48	0.47	0.48	0.45	0.43	0.45	0.44	0.36	0.34	0.39
135	0.33	0.38	0.39	0.39	0.47	0.50	0.51	0.49	0.50	0.51	0.51	0.50	0.48	0.49	0.45	0.35	0.36	0.39	0.40
140	0.40	0.41	0.39	0.42	0.43	0.53	0.54	0.55	0.54	0.56	0.54	0.56	0.54	0.52	0.41	0.39	0.39	0.38	0.43
145	0.42	0.44	0.44	0.48	0.50	0.46	0.52	0.57	0.57	0.59	0.57	0.57	0.55	0.45	0.43	0.46	0.44	0.47	0.45
150	0.48	0.52	0.47	0.50	0.52	0.53	0.50	0.50	0.53	0.54	0.52	0.49	0.47	0.47	0.51	0.50	0.47	0.51	0.44
155	0.51	0.52	0.49	0.52	0.54	0.54	0.55	0.53	0.51	0.50	0.49	0.51	0.52	0.52	0.49	0.52	0.51	0.52	0.43
160	0.49	0.53	0.54	0.52	0.54	0.55	0.53	0.54	0.53	0.50	0.52	0.52	0.52	0.53	0.55	0.52	0.50	0.53	0.44
165	0.52	0.52	0.54	0.54	0.52	0.53	0.52	0.53	0.50	0.49	0.48	0.53	0.54	0.53	0.50	0.47	0.52	0.53	0.45
170	0.48	0.48	0.50	0.51	0.53	0.51	0.47	0.49	0.49	0.46	0.48	0.53	0.55	0.55	0.55	0.52	0.51	0.50	0.45
175	0.62	0.60	0.61	0.61	0.61	0.60	0.57	0.57	0.56	0.51	0.53	0.56	0.56	0.58	0.62	0.63	0.63	0.62	0.59
180	0.59	0.58	0.57	0.56	0.55	0.54	0.51	0.45	0.49	0.53	0.54	0.48	0.49	0.53	0.54	0.56	0.59	0.59	0.59

C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-01-15

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE G0-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:0.2444A P:29.24W PF:0.9970 Lamp Flux:1463.14x2 lm																	
NAME:									TYPE:L48T8/830/15G-XT N						WEIGHT:		
SPEC.:									DIM.:						SERIAL No.:		
MFR.: ESPEN									SUR.: 1.2*0.6						PROTECTION ANGLE:		

Table--2

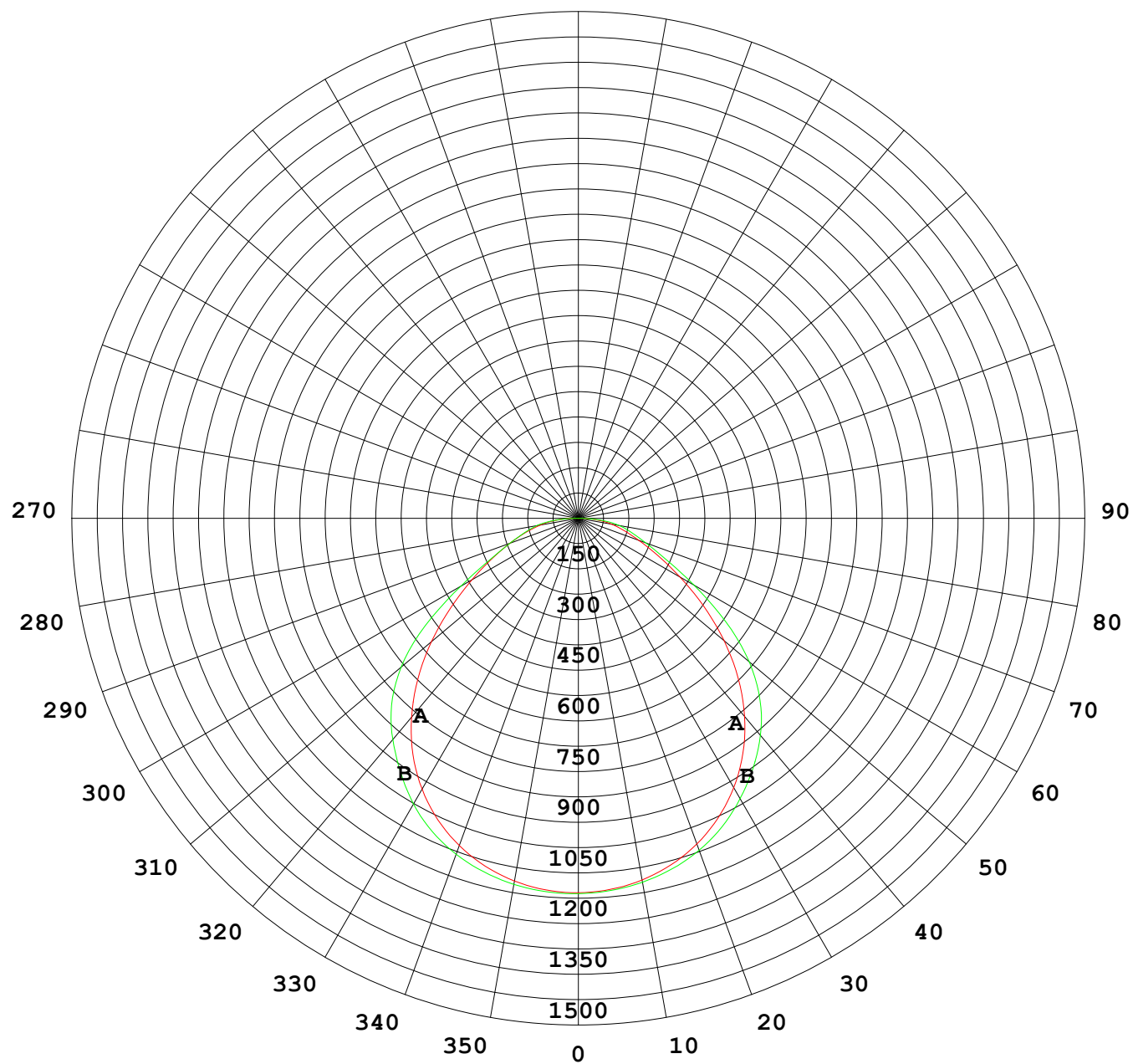
UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	1109	1109	1110	1110	1110	1111	1111	1111	1111	1111	1111	1112	1112	1112	1112	1112	1112		
5	1103	1103	1104	1104	1104	1104	1105	1106	1106	1106	1106	1107	1107	1107	1107	1108	1108		
10	1087	1088	1088	1089	1090	1091	1092	1093	1094	1094	1094	1094	1094	1094	1094	1094	1094		
15	1062	1062	1064	1065	1067	1070	1072	1073	1074	1075	1075	1075	1074	1072	1071	1071	1071		
20	1025	1027	1029	1032	1035	1039	1041	1044	1046	1047	1047	1046	1044	1041	1039	1037	1037		
25	979	981	984	989	994	998	1002	1006	1007	1008	1008	1007	1004	1000	996	993	991		
30	921	924	929	936	942	949	953	957	958	959	958	956	952	947	941	936	933		
35	850	855	863	871	880	888	895	900	902	901	898	893	887	880	873	867	863		
40	768	774	783	795	808	820	830	837	839	836	829	820	809	799	791	784	778		
45	671	679	692	708	724	739	752	760	761	756	746	734	721	708	696	688	681		
50	565	575	589	606	623	639	650	657	661	659	650	636	621	607	593	583	577		
55	454	462	475	490	505	515	522	527	532	536	536	530	516	500	485	474	469		
60	348	353	362	373	379	383	389	393	395	398	402	403	402	394	380	372	370		
65	258	256	257	259	263	270	277	283	285	289	292	291	289	287	284	279	282		
70	188	180	173	169	176	191	203	209	212	215	215	212	203	198	201	207	213		
75	140	132	121	115	123	142	154	160	163	165	164	156	145	137	141	152	159		
80	100	95.4	88.1	87.1	94.3	105	115	120	122	122	119	112	105	102	102	107	115		
85	54.0	52.8	52.2	53.4	57.2	61.4	64.5	67.0	66.6	68.1	67.4	64.5	62.6	62.5	63.3	62.5	66.3		
90	0.57	0.74	0.83	0.85	1.01	1.07	1.04	1.19	1.24	1.57	1.91	2.37	2.66	2.99	10.5	10.6	11.3		
95	0.27	0.36	0.38	0.32	0.25	0.26	0.25	0.26	0.26	0.26	0.25	0.26	0.24	0.32	0.35	0.32	0.29		
100	0.25	0.30	0.43	0.38	0.26	0.23	0.17	0.15	0.17	0.18	0.17	0.18	0.20	0.32	0.43	0.32	0.24		
105	0.29	0.29	0.35	0.37	0.33	0.31	0.28	0.28	0.30	0.28	0.29	0.30	0.31	0.35	0.32	0.29	0.25		
110	0.28	0.29	0.32	0.33	0.35	0.35	0.33	0.35	0.36	0.35	0.34	0.34	0.32	0.28	0.30	0.29	0.31		
115	0.29	0.31	0.32	0.31	0.33	0.35	0.36	0.38	0.40	0.38	0.36	0.32	0.29	0.29	0.31	0.26	0.26		
120	0.34	0.38	0.32	0.35	0.33	0.33	0.35	0.38	0.39	0.38	0.35	0.32	0.31	0.32	0.29	0.30	0.32		
125	0.33	0.34	0.36	0.36	0.37	0.37	0.36	0.37	0.37	0.37	0.35	0.35	0.34	0.33	0.39	0.35	0.33		
130	0.37	0.37	0.40	0.44	0.37	0.38	0.40	0.41	0.40	0.39	0.39	0.37	0.35	0.35	0.39	0.31	0.37		
135	0.42	0.41	0.37	0.43	0.47	0.45	0.41	0.42	0.41	0.40	0.39	0.38	0.42	0.42	0.34	0.37	0.37		
140	0.40	0.43	0.41	0.41	0.48	0.47	0.47	0.44	0.45	0.41	0.44	0.44	0.43	0.42	0.36	0.36	0.40		
145	0.48	0.47	0.44	0.41	0.40	0.47	0.47	0.46	0.46	0.45	0.45	0.45	0.38	0.36	0.43	0.44	0.46		
150	0.48	0.44	0.43	0.44	0.41	0.38	0.38	0.43	0.42	0.40	0.36	0.34	0.37	0.42	0.42	0.42	0.49		
155	0.44	0.43	0.46	0.41	0.42	0.42	0.37	0.36	0.35	0.34	0.35	0.38	0.40	0.42	0.45	0.44	0.48		
160	0.45	0.46	0.41	0.45	0.43	0.41	0.39	0.39	0.36	0.36	0.39	0.39	0.40	0.45	0.42	0.43	0.47		
165	0.48	0.48	0.44	0.40	0.40	0.43	0.43	0.40	0.35	0.35	0.38	0.44	0.42	0.42	0.42	0.49	0.48		
170	0.46	0.47	0.47	0.46	0.45	0.46	0.45	0.44	0.39	0.39	0.42	0.43	0.43	0.46	0.46	0.48	0.47		
175	0.60	0.59	0.60	0.61	0.61	0.57	0.52	0.54	0.50	0.47	0.48	0.52	0.52	0.54	0.59	0.60	0.60		
180	0.59	0.58	0.57	0.56	0.56	0.55	0.54	0.50	0.50	0.52	0.51	0.48	0.52	0.55	0.56	0.57	0.59		

C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature: 25.6DEG
 Operators: David
 Test Date: 2016-01-15

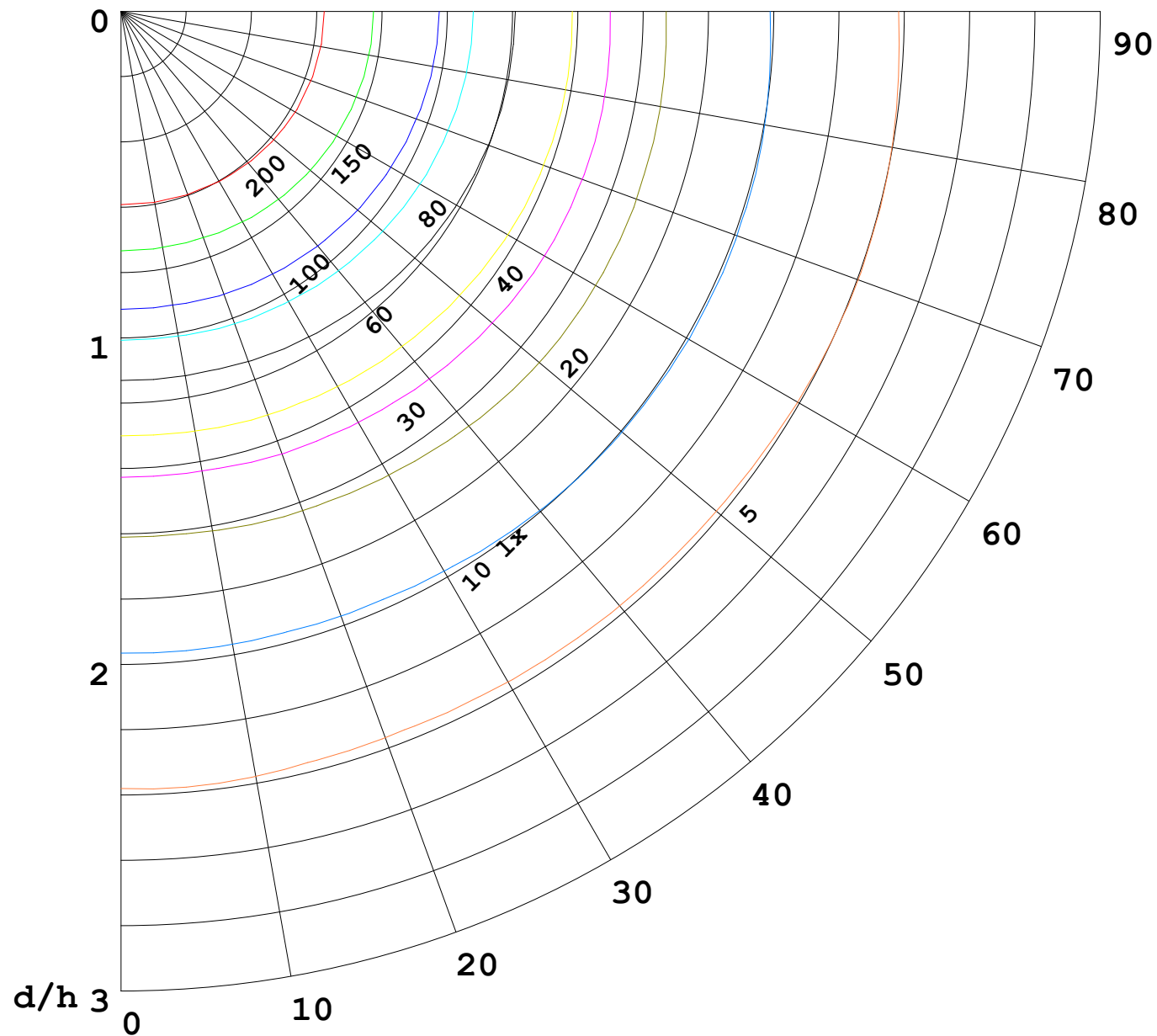
γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE G0-R5000_V2 SYSTEM V2.0.287
 Humidity: 67.1%
 Test Distance: 2.455m [K=1.0000]
 Remarks:

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

