



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. : BTR66.181.15.0030.34

Product Name : LED T8 TUBE

Model Number : L48T8-840-15G-XT H

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.....	2200 lm
Nominal CCT	4000K
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.

Luminous Intensity

A 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 25meters 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
120.0	60.0	0.143	/	17.08	0.998	2201.80	128.91
CCT (K)	CRI (Ra)	R9	x CIE1931	y CIE1931	u' CIE1976	v' CIE1976	Duv CIE1976
4129	83.9	14	0.3760	0.3777	0.2218	0.5014	0.0018

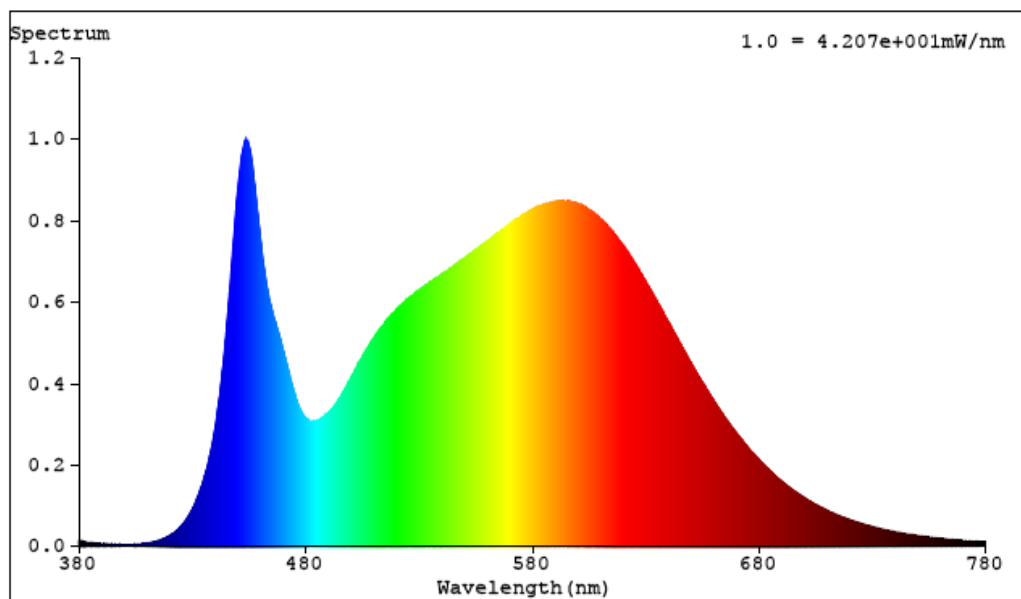
Luminous Intensity

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

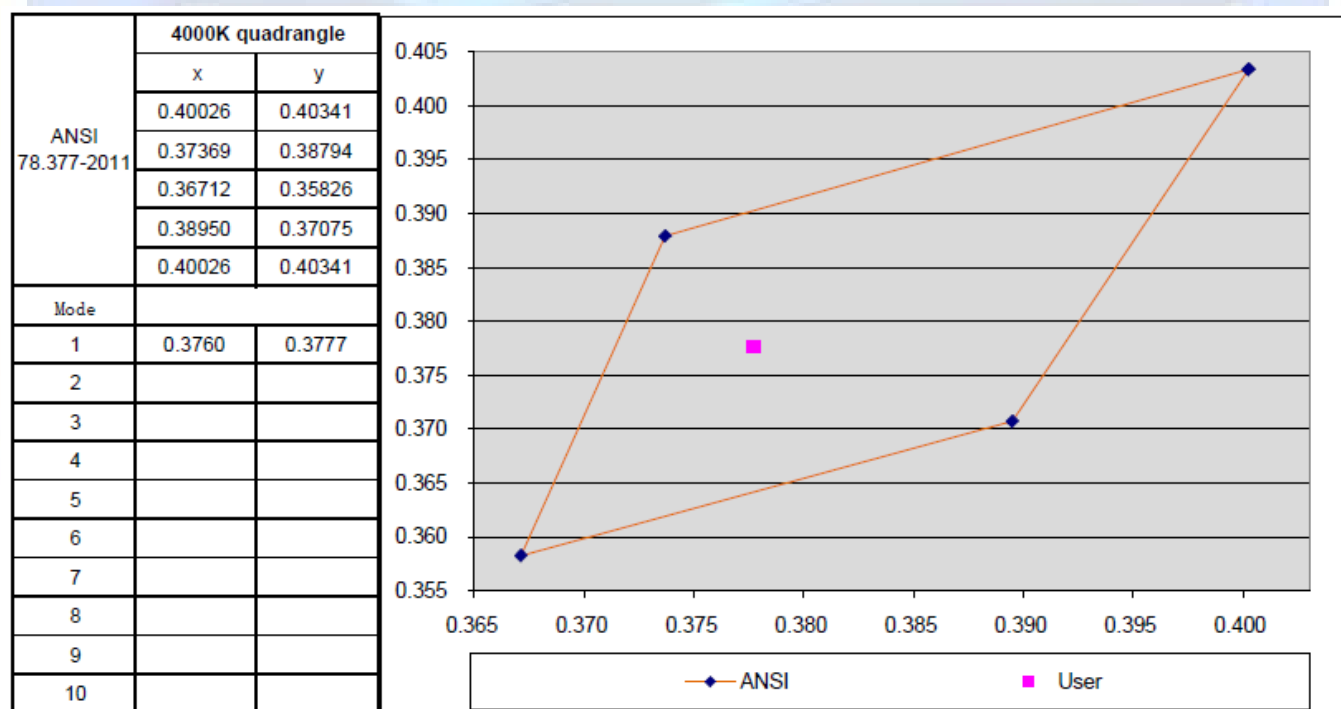
Photometric and Electrical Test Data

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	0.286	5.4%	34.26	0.998	3511.08	102.48	1.32	1.26

Spectral Plots



7 Step Quadrangle



EUT Photo



Luminous Intensity Distribution Test Plots (CIE Chromaticity)

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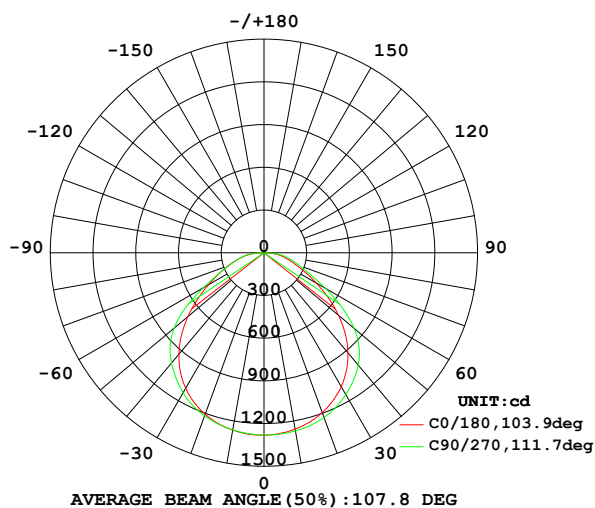


LUMINAIRE PHOTOMETRIC TEST REPORT

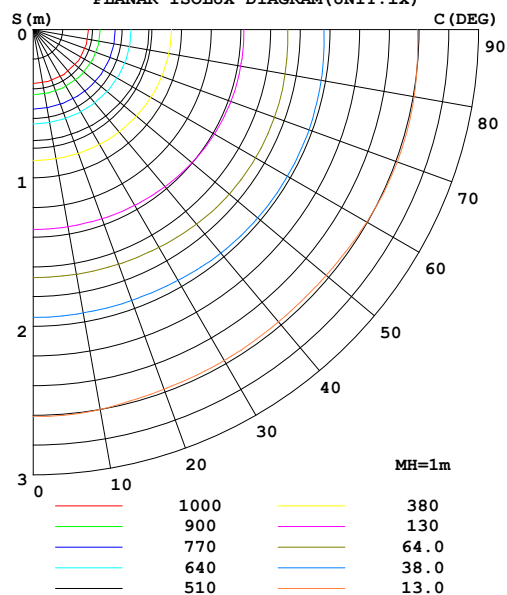
Test:U:120.0V I:0.2860A P:34.26W PF:0.9980 Lamp Flux:1755.54x2 lm		
NAME:	TYPE:L48T8/840/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 102.48 lm/W			
MODEL	L48T/840/15G-XT H	I _{max} (cd)	1281	S/MH (C0/180)	1.26
NOMINAL POWER (W)		LOR (%)	100.0	S/MH (C90/270)	1.33
RATED VOLTAGE (V)	120.0	TOTAL FLUX (lm)	3511.1	η UP,DN (C0-180)	0.1,49.7
NOMINAL FLUX (lm)	1755.54	CIE CLASS	DIRECT	η UP,DN (C180-360)	0.1,50.1
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)



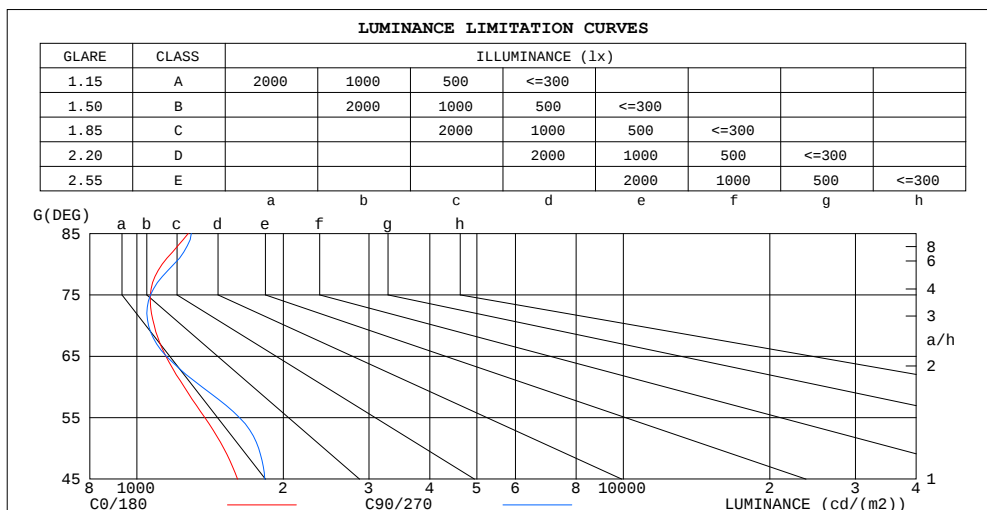
C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-01-15

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	1265	1264	1263	1258	1258	1263	1270	1269	0- 10	121.4	121.4	3.46, 3.46
20	1207	1213	1219	1203	1195	1212	1232	1225	10- 20	351.2	472.6	13.5, 13.5
30	1100	1119	1136	1109	1085	1119	1149	1136	20- 30	540.2	1013	28.8, 28.8
40	929.2	969.6	1010	963.3	917.5	973.6	1030	984.0	30- 40	657.8	1671	47.6, 47.6
50	698.3	758.8	823.5	754.3	683.6	759.1	827.2	767.6	40- 50	673.4	2344	66.8, 66.8
60	450.4	496.6	490.1	462.2	423.4	466.2	496.5	503.7	50- 60	552.9	2897	82.5, 82.5
70	267.4	248.3	260.3	204.3	230.4	211.3	262.9	251.6	60- 70	342.7	3240	92.3, 92.3
80	140.9	123.6	149.0	110.5	120.3	110.4	147.5	127.2	70- 80	190.4	3430	97.7, 97.7
90	6.492	6.624	9.797	3.063	0.2643	0.8191	1.188	2.922	80- 90	76.69	3507	99.9, 99.9
100	0.3707	0.5820	0.3041	0.6101	0.4078	0.5574	0.3485	0.4597	90-100	0.8547	3508	99.9, 99.9
110	0.5342	0.6679	0.7120	0.8195	0.4570	0.6458	0.6841	0.5164	100-110	0.5899	3508	99.9, 99.9
120	0.6147	0.6472	0.8316	0.6875	0.5466	0.6552	0.7013	0.5273	110-120	0.6318	3509	99.9, 99.9
130	0.6660	0.6877	0.8035	0.8030	0.5867	0.5857	0.5991	0.5325	120-130	0.5750	3509	100, 100
140	0.7523	0.7930	0.9002	0.8585	0.6687	0.6522	0.6338	0.6261	130-140	0.5257	3510	100, 100
150	0.8762	0.8752	0.8806	0.8781	0.7650	0.7773	0.8002	0.6994	140-150	0.4882	3510	100, 100
160	0.8372	0.9076	0.8469	0.9242	0.8261	0.8384	0.7776	0.8171	150-160	0.3812	3511	100, 100
170	0.7861	0.8450	0.7803	0.8823	0.7929	0.8381	0.7930	0.8157	160-170	0.2369	3511	100, 100
180	1.010	0.9478	0.9370	0.9601	1.009	0.9668	0.8414	0.9249	170-180	0.0872	3511	100, 100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



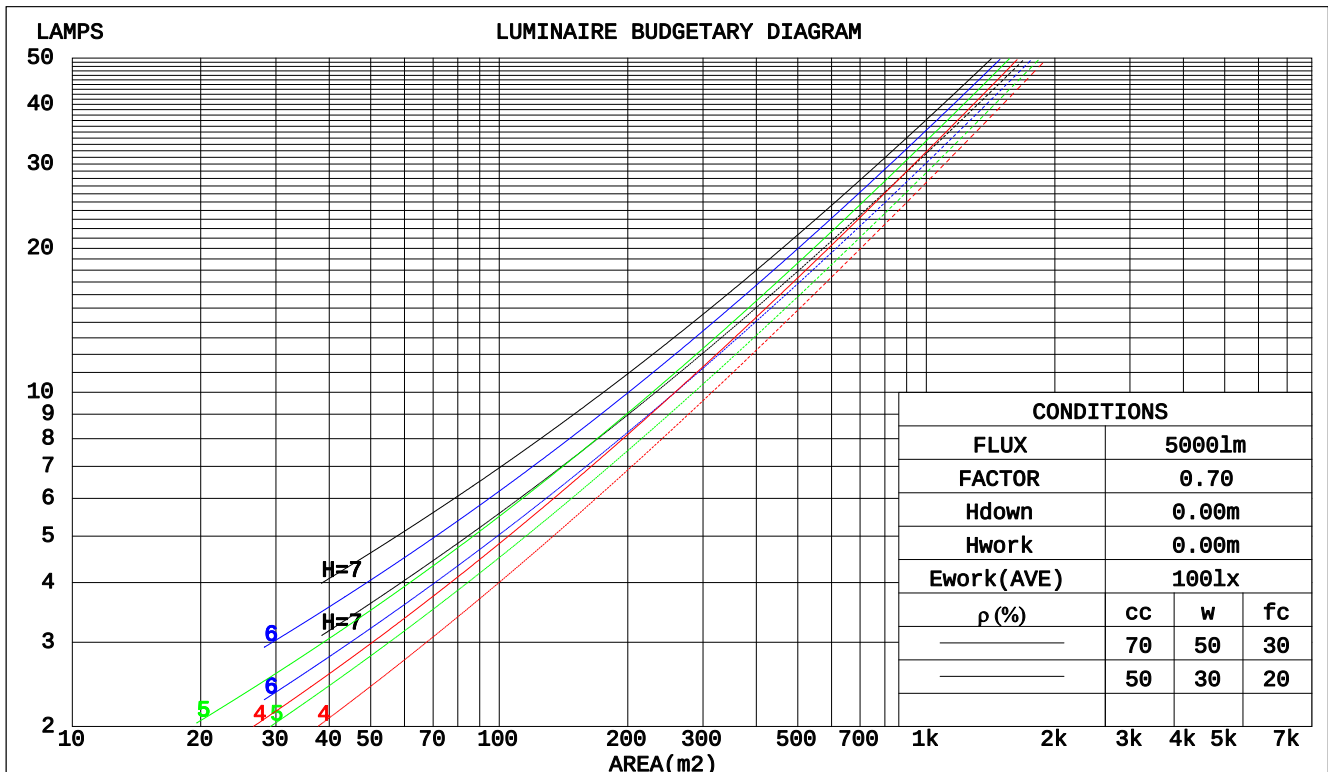
C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature: 25.6DEG
Operators: David
Test Date: 2016-01-15

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:0.2860A P:34.26W PF:0.9980 Lamp Flux:1755.54x2 lm		
NAME:	TYPE:L48T8/840/15G-XT H	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	1.04	1.00	.97	1.02	.98	.95	.98	.95	.92	.94	.91	.89	.90	.88	.86	.84
2.0	.92	.85	.79	.90	.84	.79	.86	.81	.77	.83	.79	.75	.80	.76	.73	.71
3.0	.81	.73	.67	.79	.72	.66	.76	.70	.65	.74	.68	.64	.71	.66	.63	.60
4.0	.72	.63	.57	.71	.63	.56	.68	.61	.56	.66	.60	.55	.64	.58	.54	.52
5.0	.64	.56	.49	.63	.55	.49	.61	.54	.48	.59	.53	.48	.57	.52	.47	.45
6.0	.58	.49	.43	.57	.49	.43	.55	.48	.42	.54	.47	.42	.52	.46	.42	.40
7.0	.53	.44	.38	.52	.44	.38	.50	.43	.38	.49	.42	.37	.48	.42	.37	.35
8.0	.48	.40	.34	.47	.39	.34	.46	.39	.34	.45	.38	.33	.44	.38	.33	.31
9.0	.44	.36	.31	.44	.36	.30	.42	.35	.30	.41	.35	.30	.40	.34	.30	.28
10.0	.41	.33	.28	.40	.33	.28	.39	.32	.27	.38	.32	.27	.37	.31	.27	.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:0.2860A P:34.26W PF:0.9980 Lamp Flux:1755.54x2 lm		
NAME:	TYPE:L48T8/840/15G-XT H	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	.298	.170	.054	.291	.166	.053	.278	.159	.051	.266	.153	.049	.254	.147	.048		
2.0	.280	.154	.047	.274	.151	.046	.262	.146	.045	.251	.141	.044	.242	.137	.043		
3.0	.260	.138	.041	.255	.136	.041	.244	.132	.040	.235	.129	.039	.226	.125	.039		
4.0	.241	.125	.037	.236	.124	.037	.227	.120	.036	.219	.117	.035	.211	.115	.035		
5.0	.224	.114	.033	.220	.113	.033	.211	.110	.032	.204	.108	.032	.197	.105	.032		
6.0	.208	.104	.030	.205	.103	.030	.197	.101	.029	.191	.099	.029	.184	.097	.029		
7.0	.195	.096	.027	.191	.095	.027	.185	.093	.027	.179	.092	.027	.173	.090	.026		
8.0	.182	.089	.025	.179	.088	.025	.173	.087	.025	.168	.085	.025	.163	.084	.024		
9.0	.171	.083	.023	.168	.082	.023	.163	.081	.023	.158	.079	.023	.154	.078	.023		
10.0	.161	.077	.021	.159	.077	.021	.154	.075	.021	.150	.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	.164	.164	.164	.112	.112	.112	.064	.064	.064	.021	.021	.021	
1.0	.180	.157	.136	.154	.135	.117	.106	.093	.081	.061	.054	.047	.019	.017	.015	
2.0	.172	.133	.100	.147	.114	.087	.101	.079	.061	.058	.046	.035	.019	.015	.012	
3.0	.164	.115	.077	.140	.099	.066	.096	.069	.047	.056	.040	.027	.018	.013	.009	
4.0	.156	.102	.060	.134	.088	.053	.092	.061	.037	.053	.036	.022	.017	.012	.007	
5.0	.148	.091	.049	.128	.079	.043	.088	.055	.030	.051	.032	.018	.016	.011	.006	
6.0	.141	.083	.041	.122	.072	.036	.084	.050	.025	.049	.030	.015	.016	.010	.005	
7.0	.135	.076	.035	.116	.066	.030	.080	.046	.021	.047	.027	.013	.015	.009	.004	
8.0	.129	.070	.030	.111	.061	.026	.077	.043	.019	.045	.025	.011	.014	.008	.004	
9.0	.123	.065	.027	.106	.057	.023	.073	.040	.016	.043	.024	.010	.014	.008	.003	
10.0	.117	.061	.024	.101	.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:0.2860A P:34.26W PF:0.9980 Lamp Flux:1755.54x2 lm											
NAME:					TYPE:L48T8/840/15G-XT H			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		13.8	15.3	14.0	15.5	15.7	14.4	15.9	14.7	16.1	16.3
	3H	14.9	16.3	15.2	16.5	16.7	15.4	16.7	15.7	17.0	17.2
	4H	15.4	16.7	15.8	17.0	17.2	15.9	17.2	16.2	17.4	17.7
	6H	16.0	17.2	16.3	17.4	17.7	16.4	17.6	16.7	17.9	18.1
	8H	16.2	17.4	16.5	17.7	17.9	16.6	17.8	16.9	18.1	18.4
	12H	16.4	17.5	16.8	17.8	18.1	16.8	17.9	17.2	18.2	18.5
4H	2H	14.3	15.6	14.6	15.8	16.1	14.8	16.1	15.1	16.3	16.6
	3H	15.6	16.7	15.9	17.0	17.3	16.0	17.1	16.3	17.4	17.7
	4H	16.2	17.3	16.6	17.6	17.9	16.6	17.6	17.0	17.9	18.3
	6H	16.9	17.8	17.3	18.2	18.5	17.3	18.2	17.7	18.5	18.9
	8H	17.2	18.1	17.6	18.5	18.8	17.6	18.5	18.0	18.8	19.2
	12H	17.5	18.3	17.9	18.7	19.1	17.9	18.7	18.3	19.1	19.5
8H	4H	16.4	17.3	16.8	17.6	18.0	16.8	17.6	17.2	18.0	18.4
	6H	17.3	18.0	17.7	18.4	18.8	17.6	18.3	18.1	18.7	19.2
	8H	17.7	18.3	18.2	18.8	19.2	18.1	18.7	18.6	19.1	19.6
	12H	18.1	18.7	18.6	19.1	19.6	18.5	19.1	19.0	19.5	20.0
12H	4H	16.5	17.2	16.9	17.6	18.0	16.8	17.6	17.2	17.9	18.3
	6H	17.4	18.0	17.8	18.4	18.9	17.7	18.3	18.2	18.7	19.2
	8H	17.9	18.4	18.3	18.9	19.3	18.2	18.8	18.7	19.2	19.7
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 3511 lm Total Lamp Luminous Flux.(8log(F/F0) = 4.4)

C Range: 0 - 360DEG
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 Remarks:

UTILIZATION FACTORS TABLE

Test:U:120.0V I:0.2860A P:34.26W PF:0.9980 Lamp Flux:1755.54x2 lm		
NAME:	TYPE:L48T8/840/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

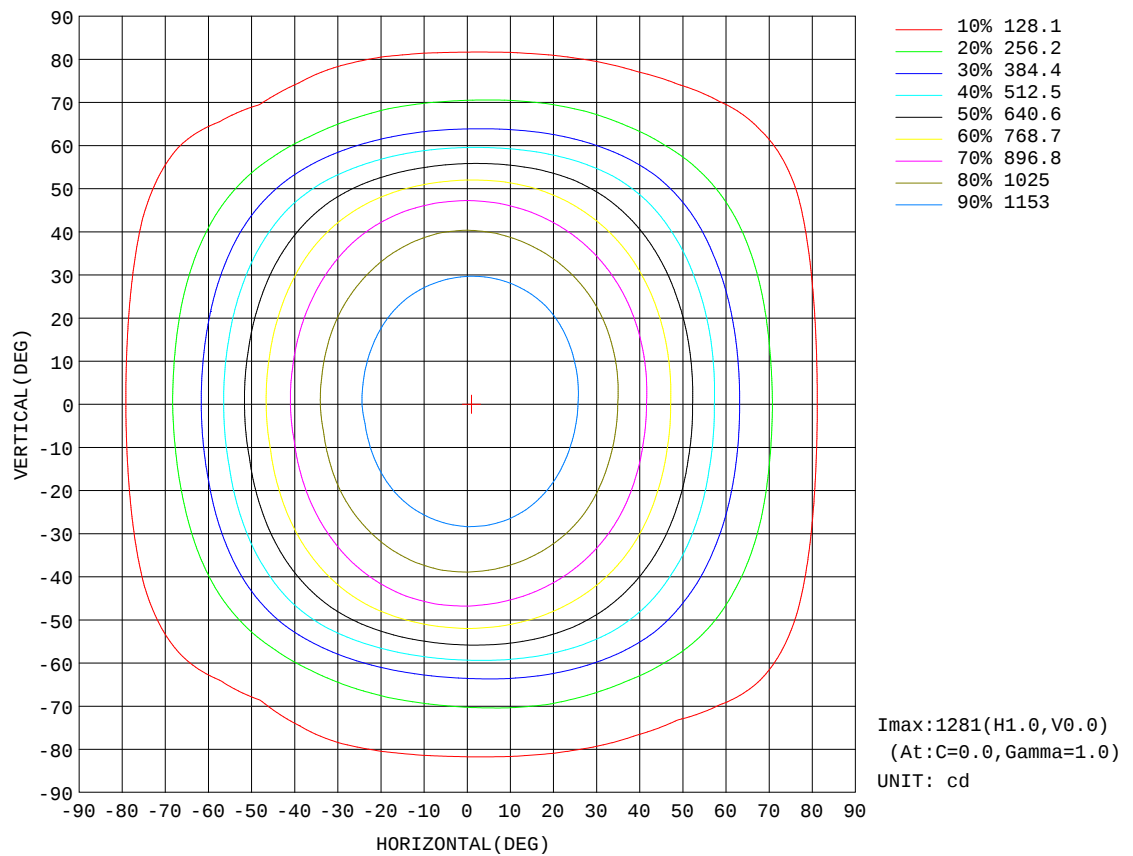
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) $k(RI) \times RCR = 5$									
k = 0.60	59	48	41	58	47	41	57	47	40	34
0.80	69	58	51	68	57	51	66	57	50	43
1.00	78	67	60	77	66	60	74	68	59	52
1.25	85	75	68	83	74	68	81	73	67	60
1.50	90	80	74	88	79	73	85	78	72	65
2.00	96	88	82	94	87	81	91	85	80	72
2.50	100	92	87	98	91	86	94	88	84	76
3.00	103	96	91	101	95	90	97	92	88	80
4.00	107	101	97	104	99	95	100	96	93	84
5.00	109	104	100	107	102	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:0.2860A P:34.26W PF:0.9980 Lamp Flux:1755.54x2 lm		
NAME:	TYPE:L48T8/840/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:



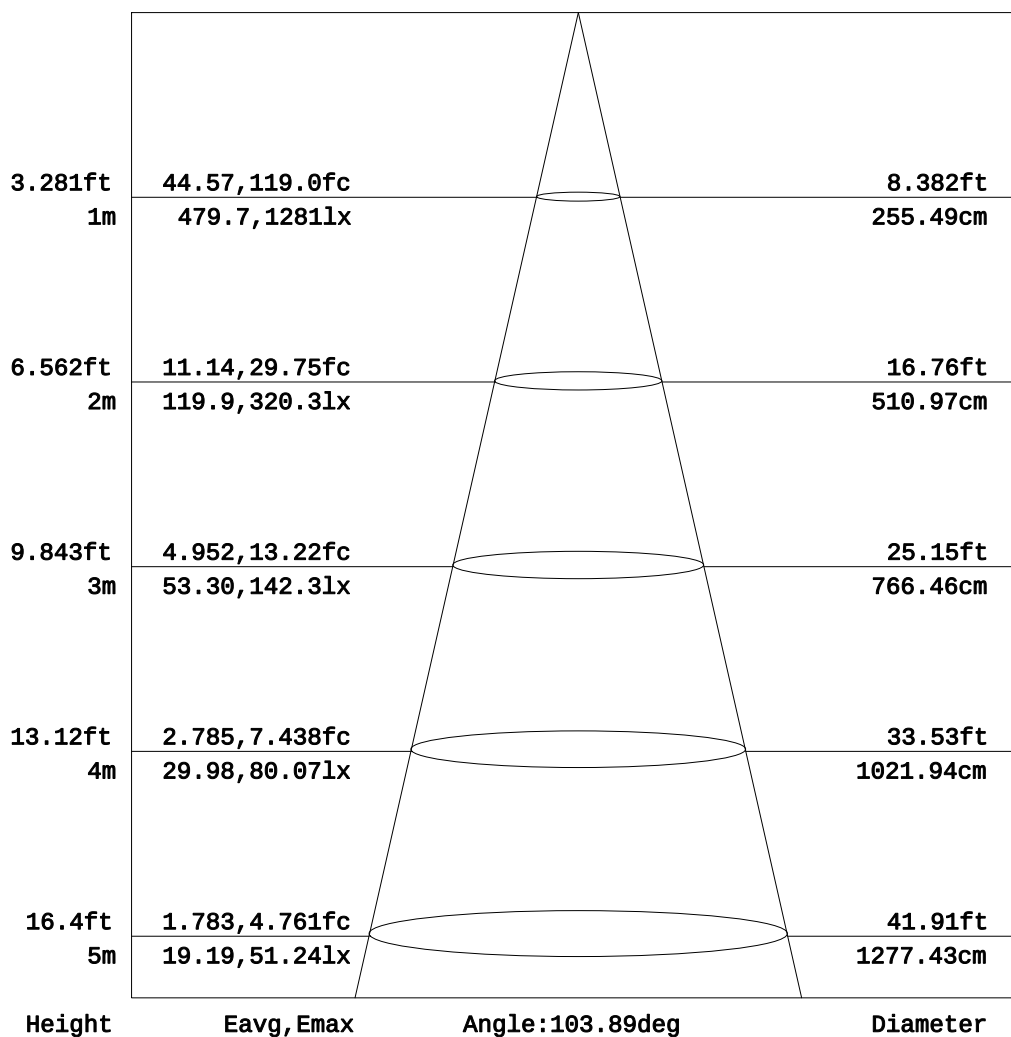
C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2016-01-15

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:0.2860A P:34.26W PF:0.9980 Lamp Flux:1755.54x2 lm		
NAME:	TYPE:L48T8/840/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

Flux out:2469 lm



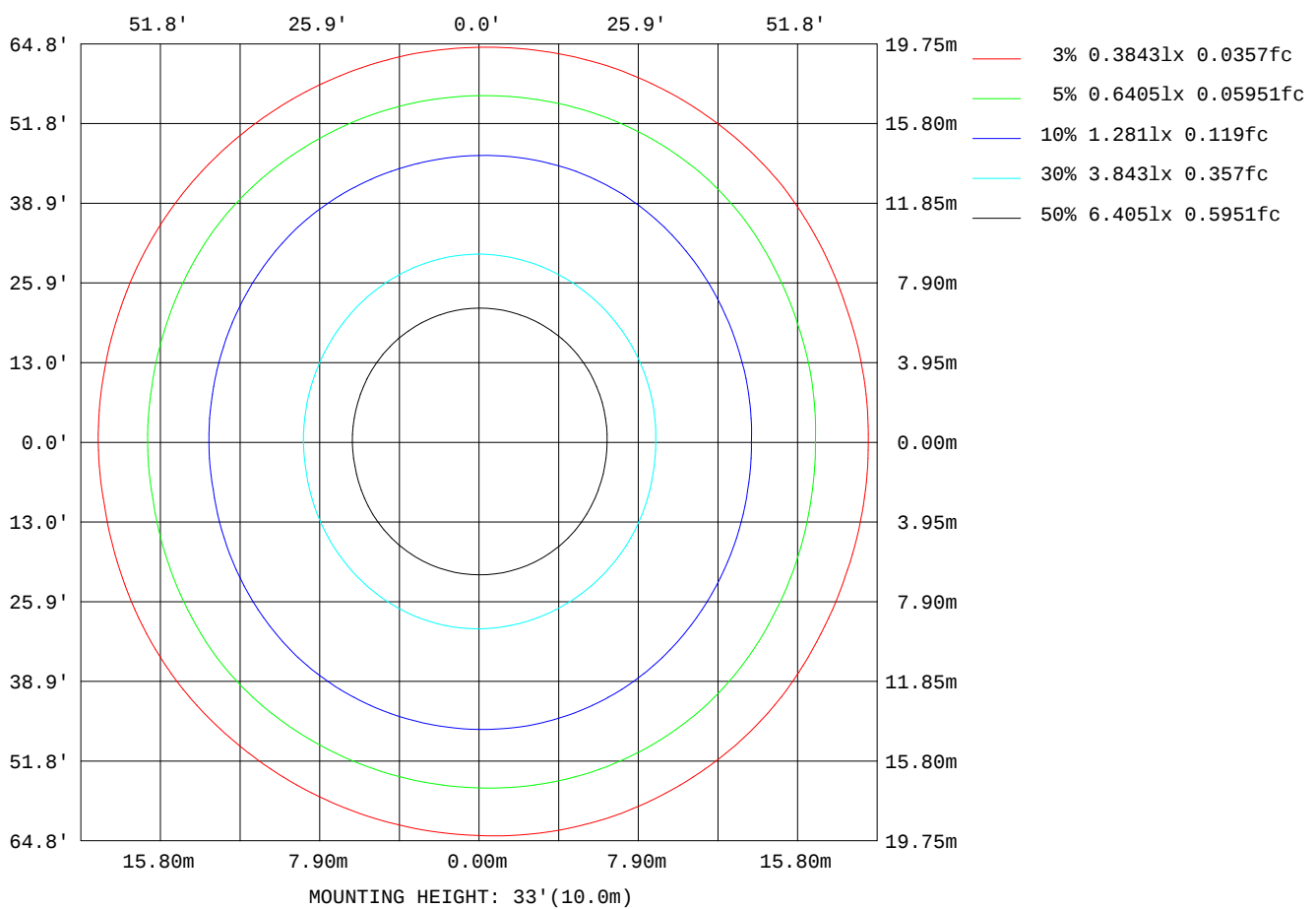
Note:The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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

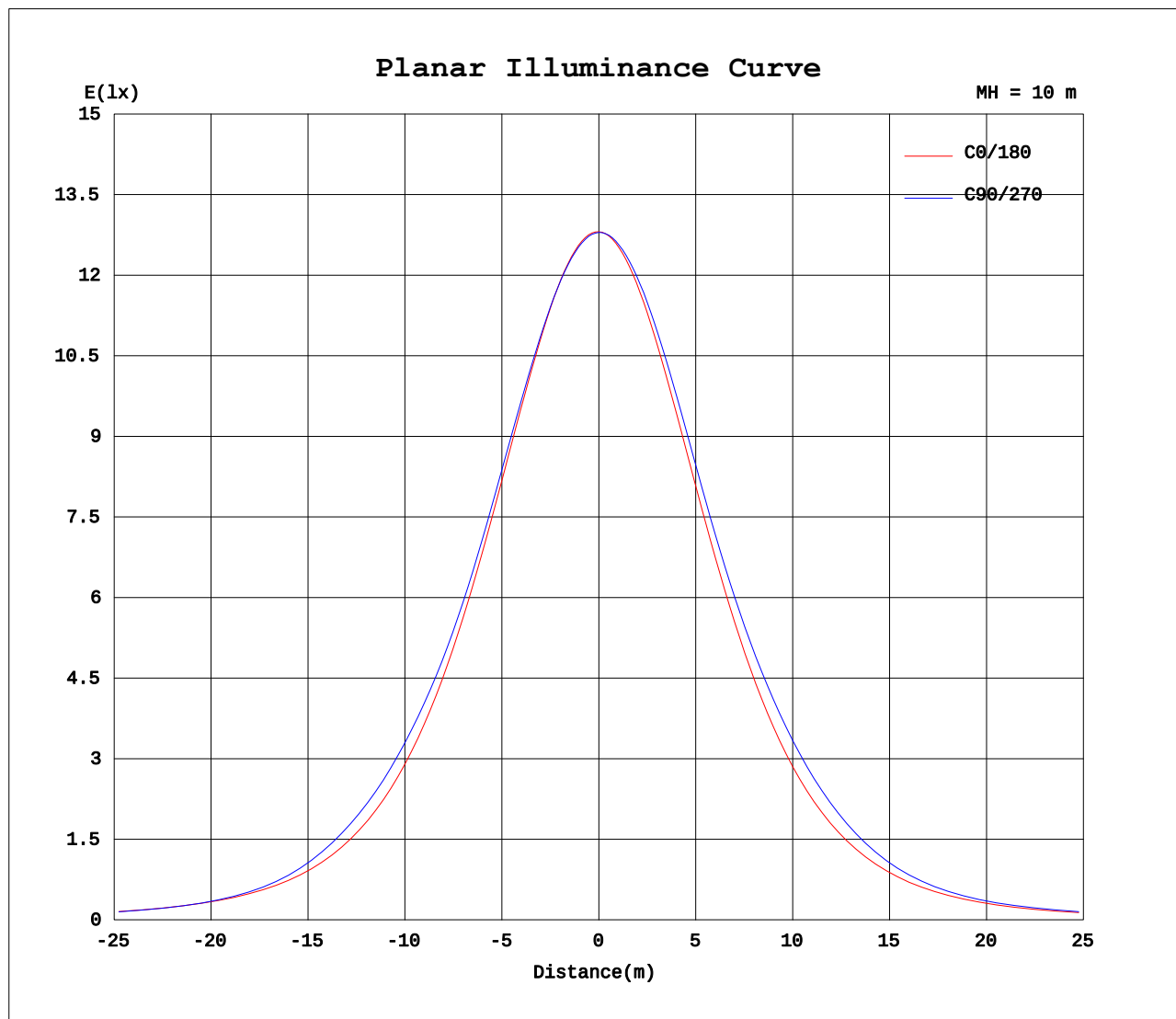
Test:U:120.0V I:0.2860A P:34.26W PF:0.9980 Lamp Flux:1755.54x2 lm		
NAME:	TYPE:L48T8/840/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:



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:0.2860A P:34.26W PF:0.9980 Lamp Flux:1755.54x2 lm																		
NAME:									TYPE:L48T8/840/15G-XT H					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	1281	1281	1281	1280	1280	1280	1280	1280	1280	1280	1280	1279	1280	1279	1280	1280	1280	1280	1281
5	1278	1278	1277	1277	1276	1276	1275	1275	1275	1275	1274	1274	1273	1273	1273	1272	1272	1272	1274
10	1265	1264	1264	1264	1264	1264	1264	1264	1264	1263	1262	1261	1260	1259	1257	1256	1256	1255	1258
15	1242	1241	1241	1241	1242	1244	1245	1245	1245	1245	1244	1242	1239	1237	1234	1231	1230	1229	1232
20	1207	1206	1207	1208	1211	1214	1217	1219	1219	1219	1217	1214	1210	1206	1201	1197	1194	1192	1195
25	1160	1159	1160	1164	1169	1174	1179	1182	1184	1184	1182	1177	1172	1165	1158	1152	1146	1143	1146
30	1100	1099	1101	1107	1116	1123	1130	1135	1137	1136	1133	1127	1121	1113	1104	1094	1087	1082	1085
35	1023	1023	1028	1037	1048	1058	1066	1072	1075	1076	1074	1068	1059	1048	1036	1025	1013	1006	1009
40	929	930	938	951	963	976	988	999	1007	1010	1009	1001	988	972	955	939	924	914	917
45	820	822	832	847	864	881	898	914	926	933	932	921	903	881	858	836	818	805	807
50	698	701	712	730	749	769	788	805	817	824	819	808	791	767	741	718	698	682	684
55	570	573	584	600	620	642	660	670	675	671	663	654	642	627	605	583	565	550	552
60	450	452	461	472	490	503	508	507	500	490	482	475	469	466	459	443	430	421	423
65	349	348	345	350	358	362	364	365	360	350	342	334	325	315	309	308	307	308	315
70	267	264	255	251	247	250	260	267	266	260	253	244	229	210	199	202	211	220	230
75	199	196	189	177	168	173	189	200	202	199	195	187	171	149	135	139	153	164	168
80	141	140	134	124	121	126	136	145	149	149	146	139	129	116	105	103	110	117	120
85	80.0	79.0	75.7	76.0	77.2	77.5	79.6	82.5	83.4	81.2	79.5	77.6	73.6	69.1	63.5	59.5	58.6	60.6	65.1
90	6.49	8.42	8.17	7.70	6.92	6.33	6.20	5.54	4.08	9.80	8.15	6.86	5.47	3.50	2.62	2.46	2.45	2.64	0.26
95	0.24	0.48	0.56	0.55	0.51	0.41	0.42	0.43	0.44	0.45	0.46	0.45	0.47	0.44	0.49	0.50	0.46	0.38	0.22
100	0.37	0.44	0.53	0.68	0.68	0.48	0.33	0.30	0.29	0.30	0.32	0.31	0.36	0.60	0.62	0.57	0.48	0.38	0.41
105	0.51	0.58	0.55	0.63	0.65	0.59	0.62	0.62	0.61	0.64	0.62	0.59	0.59	0.61	0.99	0.57	0.52	0.44	0.51
110	0.53	0.61	0.60	0.80	0.67	0.67	0.65	0.64	0.69	0.71	0.71	0.68	0.66	0.66	0.98	0.65	0.57	0.49	0.46
115	0.50	0.54	0.58	0.68	0.64	0.69	0.73	0.73	0.76	0.78	0.78	0.75	0.70	0.70	0.68	0.64	0.57	0.50	0.51
120	0.61	0.59	0.63	0.63	0.65	0.64	0.68	0.76	0.81	0.83	0.82	0.78	0.72	0.69	0.68	0.64	0.71	0.64	0.55
125	0.61	0.63	0.58	0.72	0.65	0.69	0.70	0.72	0.75	0.79	0.79	0.77	0.73	0.74	0.74	0.68	0.69	0.61	0.56
130	0.67	0.68	0.64	0.68	0.69	0.68	0.75	0.77	0.79	0.80	0.80	0.81	0.81	0.78	0.83	0.82	0.68	0.65	0.59
135	0.63	0.67	0.67	0.66	0.77	0.81	0.82	0.79	0.82	0.84	0.84	0.84	0.84	0.87	0.83	0.71	0.70	0.74	0.57
140	0.75	0.74	0.69	0.72	0.72	0.87	0.87	0.88	0.86	0.90	0.88	0.92	0.92	0.92	0.80	0.74	0.74	0.74	0.67
145	0.78	0.79	0.77	0.81	0.82	0.77	0.87	0.92	0.91	0.94	0.93	0.94	0.93	0.82	0.81	0.85	0.82	0.85	0.74
150	0.88	0.90	0.82	0.86	0.88	0.87	0.83	0.82	0.86	0.88	0.88	0.82	0.83	0.84	0.91	0.90	0.86	0.92	0.77
155	0.90	0.89	0.83	0.89	0.90	0.90	0.90	0.85	0.82	0.82	0.81	0.84	0.88	0.91	0.87	0.92	0.90	0.91	0.77
160	0.84	0.89	0.90	0.86	0.91	0.91	0.89	0.90	0.87	0.85	0.85	0.87	0.86	0.91	0.93	0.90	0.84	0.91	0.83
165	0.84	0.85	0.88	0.87	0.86	0.88	0.90	0.90	0.83	0.84	0.80	0.89	0.90	0.88	0.82	0.79	0.84	0.86	0.83
170	0.79	0.79	0.82	0.83	0.85	0.84	0.83	0.84	0.84	0.78	0.78	0.85	0.87	0.89	0.88	0.84	0.83	0.82	0.79
175	1.02	1.01	1.01	1.01	1.01	0.98	0.93	0.92	0.89	0.81	0.85	0.91	0.92	0.96	1.02	1.04	1.03	1.04	1.00
180	1.01	1.00	0.99	0.96	0.95	0.95	0.90	0.81	0.84	0.94	0.96	0.87	0.94	0.95	0.97	0.97	0.99	1.01	1.01

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:0.2860A P:34.26W PF:0.9980 Lamp Flux:1755.54x2 lm																	
NAME:									TYPE:L48T8/840/15G-XT H						WEIGHT:		
SPEC.:									DIM.:						SERIAL No.:		
MFR.: ESPEN									SUR.:1.2*0.6						PROTECTION ANGLE:		

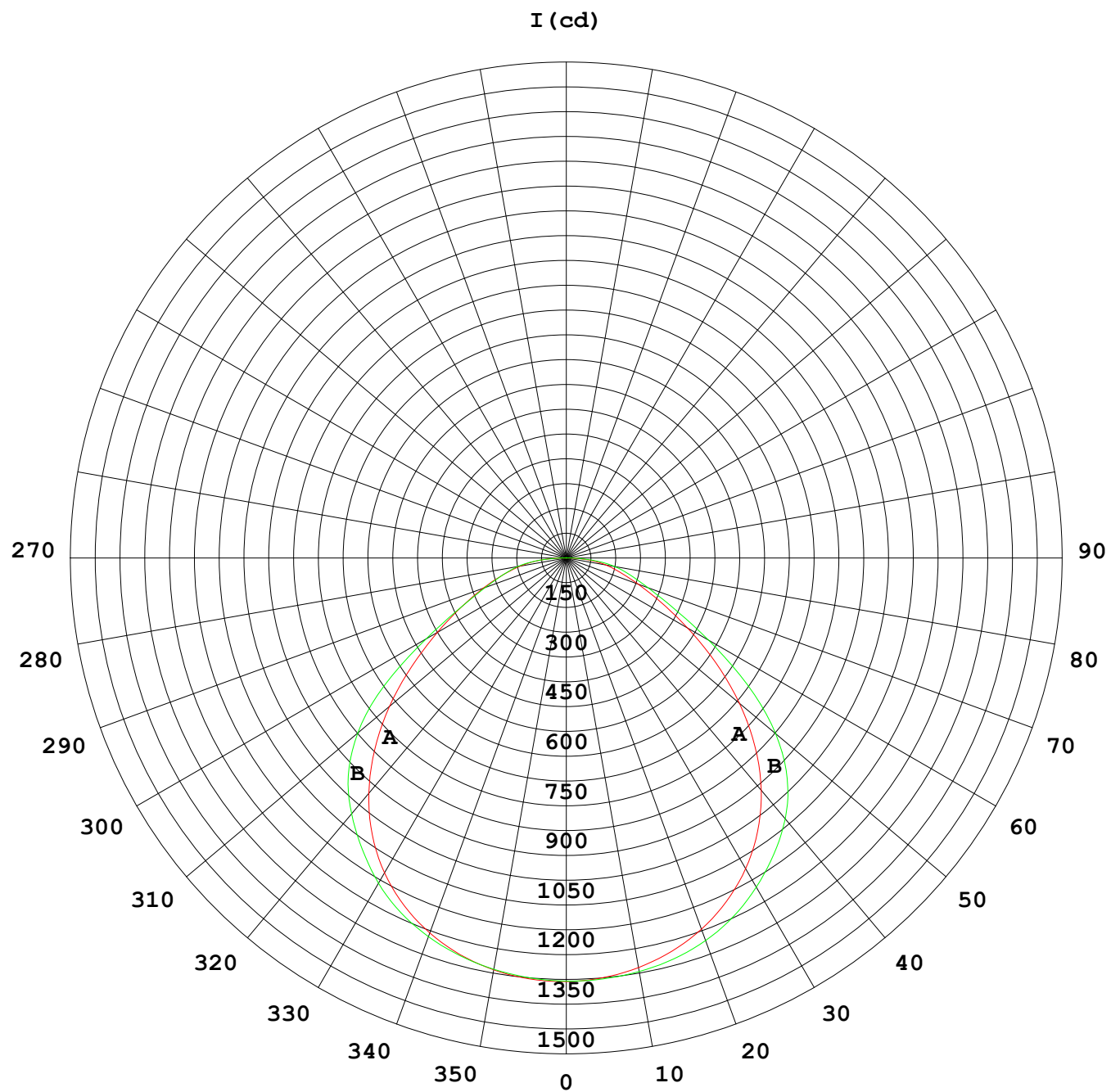
Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	1281	1281	1280	1280	1280	1280	1280	1280	1280	1280	1279	1280	1279	1280	1280	1280	1280		
5	1274	1275	1275	1276	1276	1277	1277	1278	1278	1278	1279	1278	1278	1278	1278	1278	1277		
10	1259	1259	1260	1262	1264	1266	1268	1269	1270	1271	1271	1270	1269	1268	1267	1266	1265		
15	1233	1235	1238	1241	1244	1248	1251	1254	1256	1256	1256	1255	1253	1250	1248	1245	1243		
20	1197	1200	1204	1209	1215	1220	1225	1229	1232	1233	1232	1230	1227	1223	1218	1214	1210		
25	1149	1153	1160	1167	1175	1182	1188	1193	1197	1198	1198	1195	1190	1184	1177	1170	1165		
30	1088	1094	1104	1114	1124	1133	1140	1146	1149	1151	1149	1146	1140	1132	1123	1113	1106		
35	1013	1022	1034	1046	1060	1072	1083	1091	1094	1094	1089	1082	1074	1064	1052	1041	1032		
40	922	933	947	964	983	1000	1016	1027	1030	1026	1018	1005	991	977	964	951	939		
45	813	826	844	867	890	912	930	942	945	940	927	911	893	875	858	843	831		
50	689	703	724	747	771	793	809	820	827	826	815	798	778	757	737	721	709		
55	556	568	586	607	628	641	652	660	669	676	677	669	651	630	608	591	581		
60	426	434	447	462	470	477	485	492	497	502	508	511	510	498	479	465	458		
65	315	314	316	319	325	334	343	351	356	361	367	367	366	364	357	350	349		
70	228	219	211	207	215	234	250	258	263	267	268	264	255	249	252	258	264		
75	169	160	147	141	151	172	188	197	200	203	202	193	179	170	174	188	197		
80	121	115	107	106	115	128	139	145	148	149	145	138	129	126	126	132	141		
85	64.7	63.5	62.9	64.5	68.6	73.2	76.8	79.2	79.2	81.1	80.6	78.2	76.5	76.7	77.3	76.0	80.3		
90	0.38	0.58	0.71	0.77	0.87	0.95	0.99	1.13	1.19	1.47	1.87	2.33	2.73	3.11	11.7	12.6	13.3		
95	0.40	0.47	0.54	0.48	0.43	0.47	0.47	0.48	0.49	0.48	0.46	0.44	0.41	0.49	0.54	0.50	0.44		
100	0.40	0.44	0.69	0.63	0.48	0.45	0.37	0.34	0.35	0.35	0.33	0.34	0.38	0.54	0.67	0.51	0.39		
105	0.48	0.50	0.59	0.67	0.60	0.59	0.56	0.54	0.56	0.53	0.53	0.51	0.53	0.60	0.53	0.48	0.41		
110	0.50	0.53	0.59	0.62	0.67	0.68	0.66	0.67	0.68	0.65	0.62	0.59	0.54	0.49	0.52	0.49	0.51		
115	0.53	0.58	0.61	0.64	0.66	0.69	0.75	0.74	0.74	0.70	0.64	0.56	0.52	0.50	0.52	0.46	0.45		
120	0.57	0.64	0.59	0.65	0.66	0.69	0.70	0.70	0.70	0.67	0.61	0.54	0.52	0.53	0.48	0.48	0.50		
125	0.53	0.54	0.57	0.58	0.61	0.62	0.61	0.60	0.62	0.61	0.58	0.55	0.55	0.51	0.57	0.53	0.52		
130	0.55	0.54	0.58	0.62	0.55	0.57	0.59	0.59	0.60	0.59	0.58	0.56	0.53	0.53	0.57	0.48	0.55		
135	0.60	0.58	0.53	0.60	0.65	0.62	0.57	0.59	0.59	0.57	0.56	0.56	0.60	0.60	0.50	0.55	0.54		
140	0.65	0.65	0.63	0.61	0.70	0.67	0.66	0.62	0.63	0.59	0.65	0.64	0.64	0.61	0.58	0.57	0.60		
145	0.78	0.76	0.74	0.72	0.68	0.76	0.76	0.75	0.76	0.74	0.73	0.72	0.62	0.61	0.69	0.70	0.73		
150	0.82	0.78	0.77	0.79	0.76	0.72	0.72	0.78	0.80	0.76	0.68	0.67	0.67	0.73	0.73	0.69	0.80		
155	0.80	0.79	0.82	0.79	0.80	0.81	0.77	0.76	0.74	0.73	0.73	0.74	0.75	0.75	0.79	0.74	0.82		
160	0.83	0.85	0.80	0.84	0.84	0.83	0.81	0.83	0.78	0.77	0.79	0.77	0.80	0.84	0.76	0.78	0.82		
165	0.85	0.88	0.84	0.78	0.80	0.83	0.88	0.84	0.79	0.78	0.81	0.85	0.77	0.78	0.73	0.87	0.84		
170	0.79	0.82	0.84	0.83	0.85	0.86	0.87	0.86	0.79	0.79	0.82	0.83	0.78	0.85	0.80	0.80	0.80		
175	1.00	1.01	1.02	1.03	1.03	0.97	0.92	0.97	0.92	0.85	0.87	0.91	0.90	0.91	0.98	0.99	0.97		
180	1.01	1.00	0.98	0.97	0.96	0.95	0.92	0.86	0.84	0.90	0.90	0.83	0.92	0.93	0.96	0.97	0.99		

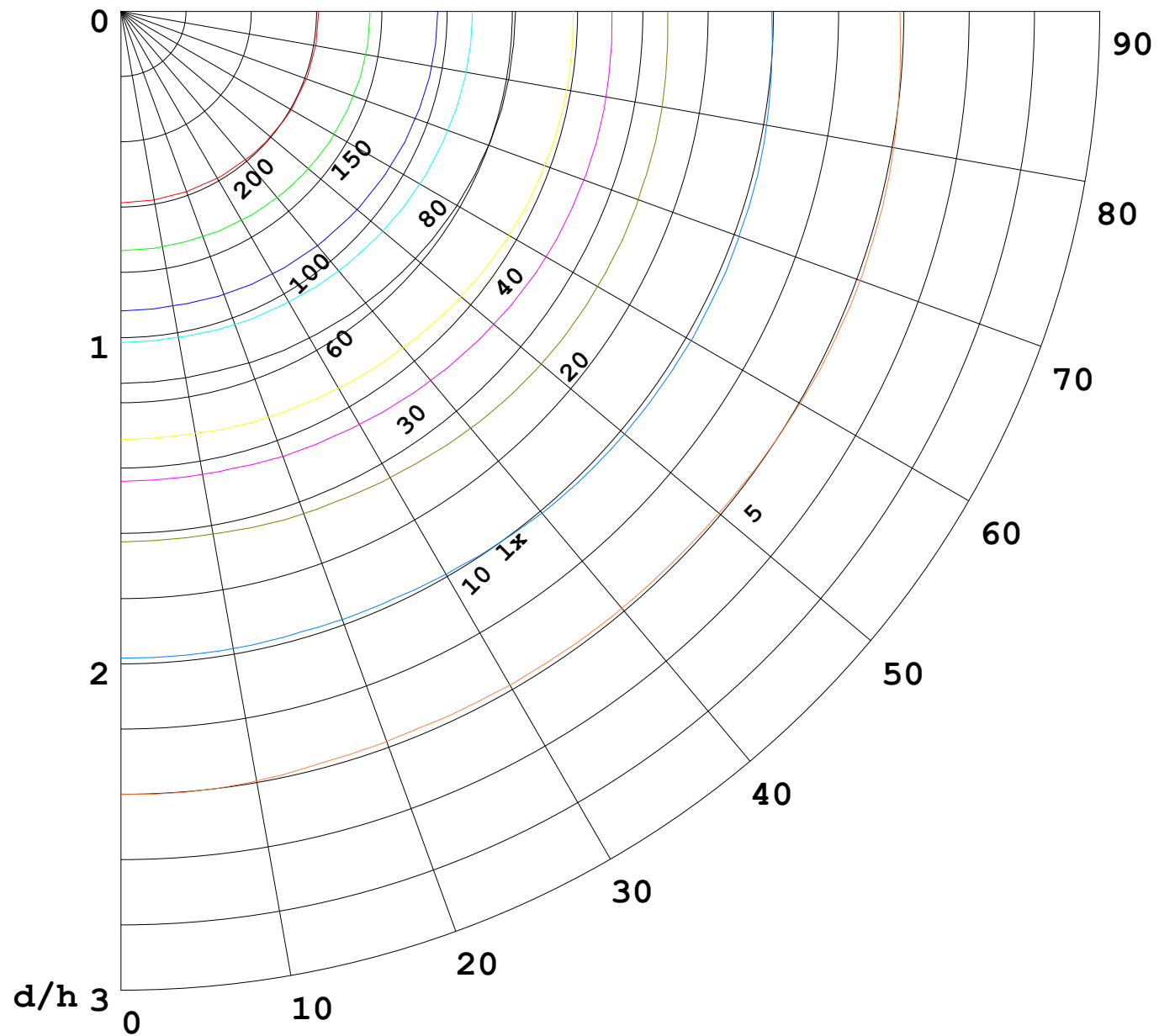
C Range: 0 - 360DEG
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 Test Speed: HIGH
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γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE G0-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.455m [K=1.0000]
 Remarks:



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

