



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. : BTR66.181.15.0030.33

Product Name : LED T8 TUBE

Model Number : L48T8-835-15G-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, Shiyang, 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	3500K
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 4π 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

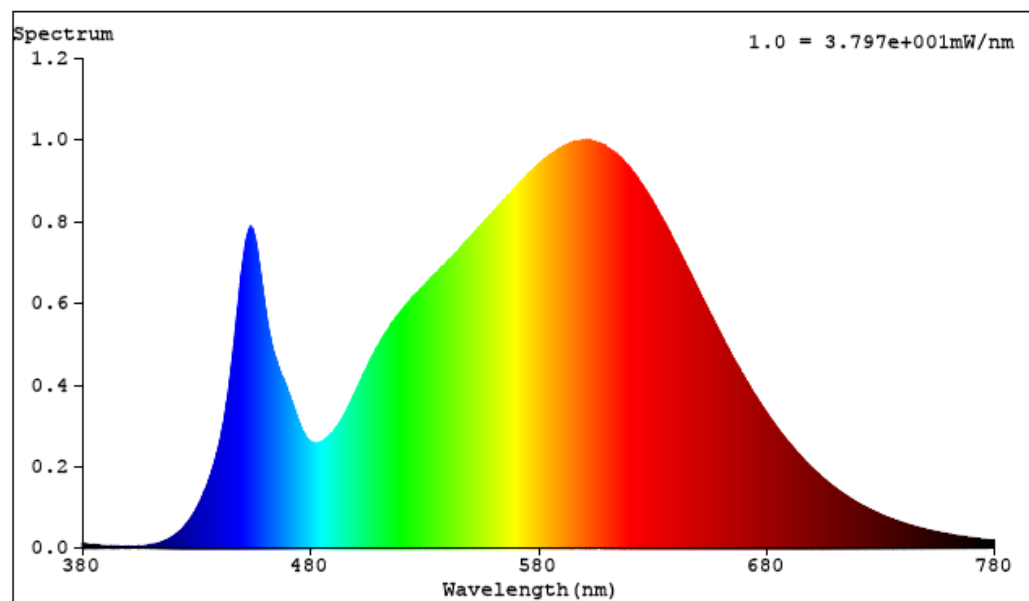
Input Voltage (V)	Frequency (Hz)	Input Current (A)	ITHD	Input Power (W)	Power Factor	Lumen Output (Lumens)	Efficiency Lumen/w
120.0	60.0	0.144	/	17.18	0.998	2211.20	128.71
CCT (K)	CRI (Ra)	R9	x CIE1931	y CIE1931	u' CIE1976	v' CIE1976	Duv CIE1976
3460	84.0	19	0.4098	0.3977	0.2358	0.5148	0.0021

Luminous Intensity

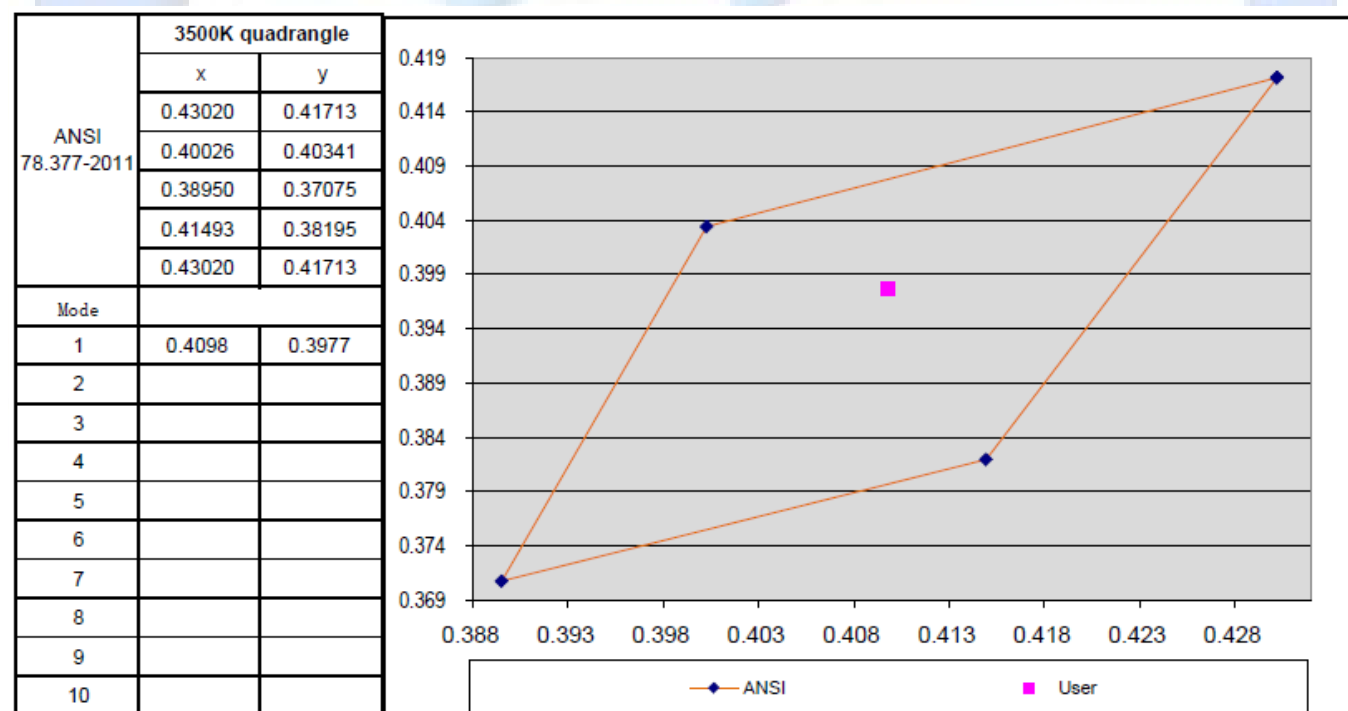
2 lamps together with driver, were installed in a LITHONIA 2GT8 Troffer lensed 2*4, and mounted in the centre of Goniophotometer, Everfine GOR-5000 Goniophotometer was used to measure the intensity at each angle of distribution, Luminous intensity (cd) is measured within each vertical plane at a 5° vertical 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

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	0.287	5.4%	34.32	0.998	3574.90	104.16	1.28	1.24

Spectral Plots



7 Step Quadrangle



EUT Photo



Luminous Intensity Distribution Test Plots (CIE Chromaticity)

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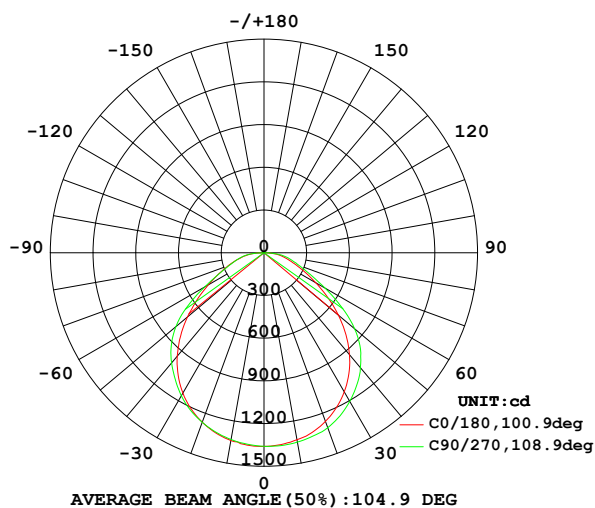


LUMINAIRE PHOTOMETRIC TEST REPORT

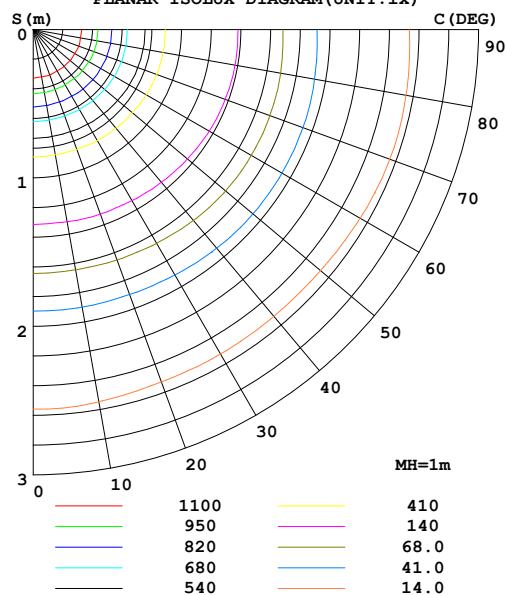
Test:U:120.0V I:0.2870A P:34.32W PF:0.9980 Lamp Flux:1787.45x2 lm		
NAME:	TYPE:L48T8/835/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 104.16 lm/W			
MODEL	L48T/835/15G-XT H	I _{max} (cd)	1360	S/MH (C0/180)	1.24
NOMINAL POWER (W)		LOR (%)	100.0	S/MH (C90/270)	1.31
RATED VOLTAGE (V)	120.0	TOTAL FLUX (lm)	3574.9	η UP,DN (C0-180)	0.1,49.4
NOMINAL FLUX (lm)	1787.45	CIE CLASS	DIRECT	η UP,DN (C180-360)	0.0,50.5
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)



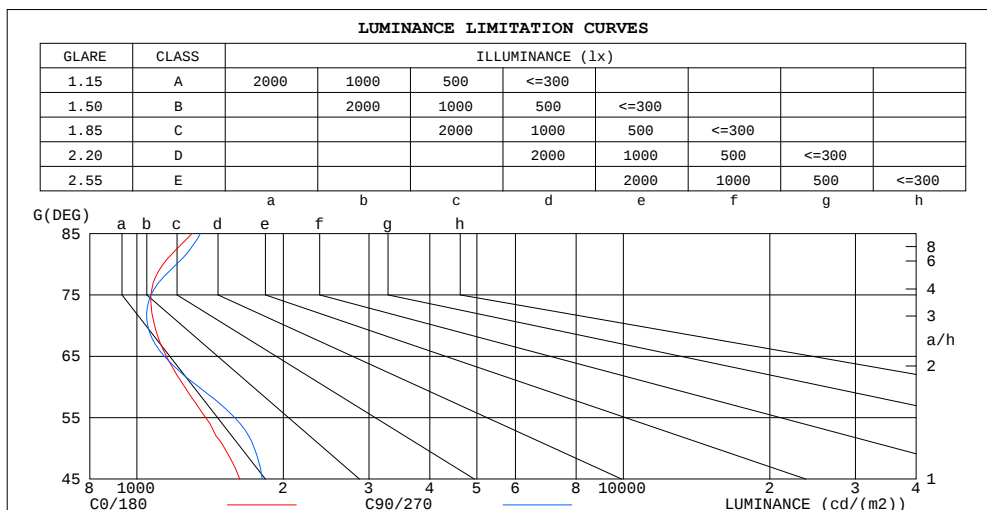
C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2016-01-15

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	1339	1334	1332	1329	1333	1342	1351	1347	0- 10	128.7	128.7	3.6,3.6
20	1267	1265	1268	1255	1261	1286	1308	1299	10- 20	370.8	499.5	14,14
30	1139	1150	1160	1134	1128	1170	1205	1189	20- 30	564.0	1064	29.8,29.8
40	947.5	976.6	1009	963.5	934.4	997.2	1052	1013	30- 40	674.9	1738	48.6,48.6
50	701.7	754.6	807.3	737.8	682.4	758.6	831.2	775.9	40- 50	677.0	2415	67.6,67.6
60	451.6	492.3	482.6	450.1	418.2	458.1	493.1	501.3	50- 60	548.1	2964	82.9,82.9
70	267.9	247.3	259.4	201.9	228.8	208.5	263.3	250.8	60- 70	339.5	3303	92.4,92.4
80	141.6	124.1	150.7	110.5	119.8	110.3	149.8	127.8	70- 80	190.5	3493	97.7,97.7
90	7.663	7.847	3.456	3.507	0.2813	0.8147	1.486	3.199	80- 90	78.03	3572	99.9,99.9
100	0.2925	0.4984	0.2413	0.4092	0.3235	0.3908	0.2104	0.3686	90-100	0.8263	3572	99.9,99.9
110	0.4011	0.5434	0.5923	0.4838	0.3048	0.4358	0.4586	0.3855	100-110	0.4401	3573	99.9,99.9
120	0.4382	0.4829	0.6439	0.4530	0.4013	0.4234	0.4931	0.3922	110-120	0.4504	3573	100,100
130	0.4565	0.5125	0.5913	0.5455	0.4762	0.4981	0.4974	0.4342	120-130	0.4229	3574	100,100
140	0.4983	0.5951	0.6975	0.5815	0.5276	0.5407	0.5519	0.5067	130-140	0.4059	3574	100,100
150	0.5856	0.6462	0.6725	0.6016	0.5289	0.5279	0.5136	0.4903	140-150	0.3571	3574	100,100
160	0.6071	0.6714	0.6181	0.6516	0.5366	0.5258	0.4548	0.5323	150-160	0.2619	3575	100,100
170	0.5813	0.6279	0.5581	0.6558	0.5565	0.5623	0.4775	0.5513	160-170	0.1622	3575	100,100
180	0.7173	0.6768	0.6561	0.6712	0.7197	0.6884	0.6019	0.6581	170-180	0.0629	3575	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



LUMINANCE cd/(m2)		
G(°)	C0/180	C90/270
85	1299	1351
80	1132	1206
75	1069	1069
70	1088	1053
65	1149	1138
60	1254	1341
55	1386	1589
50	1516	1744
45	1628	1810

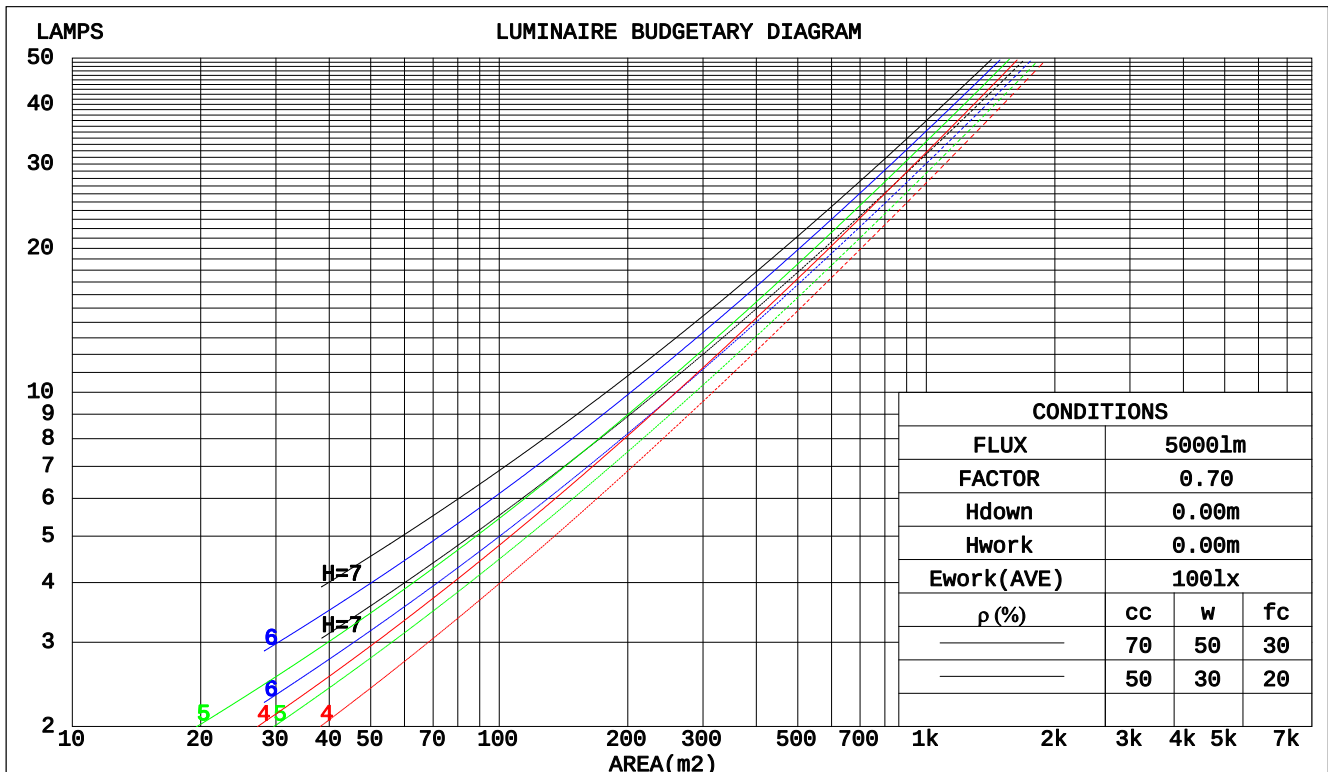
C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature: 25.6DEG
Operators: David
Test Date: 2016-01-15

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:0.2870A P:34.32W PF:0.9980 Lamp Flux:1787.45x2 lm		
NAME:	TYPE:L48T8/835/15G-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	1.05	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	.56	.49	.62	.54	.49	.60	.53	.48	.58	.52	.48	.46
6.0	.59	.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	.35	.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	.31	.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:0.2870A P:34.32W PF:0.9980 Lamp Flux:1787.45x2 lm		
NAME:	TYPE:L48T8/835/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

ρcc	80%			70%			50%			30%			10%			0	
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0	
ρfc	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	.263	.152	.049	.252	.146	.047		
2.0	.278	.152	.047	.272	.150	.046	.260	.145	.045	.249	.140	.044	.239	.135	.043		
3.0	.258	.137	.041	.253	.135	.041	.242	.131	.040	.233	.128	.039	.224	.124	.038		
4.0	.239	.124	.037	.234	.123	.036	.225	.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	.183	.093	.027	.177	.091	.026	.172	.089	.026		
8.0	.181	.088	.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	.067	.096	.069	.047	.055	.040	.028	.018	.013	.009	
4.0	.155	.102	.061	.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
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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:

UGR(Unified Glare Rating) Table

Test:U:120.0V I:0.2870A P:34.32W PF:0.9980 Lamp Flux:1787.45x2 lm											
NAME:					TYPE:L48T8/835/15G-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		13.7	15.2	14.0	15.4	15.6	14.3	15.7	14.5	15.9	16.1
	3H	14.9	16.2	15.1	16.4	16.7	15.3	16.6	15.6	16.8	17.1
	4H	15.4	16.7	15.7	16.9	17.2	15.8	17.0	16.1	17.3	17.5
	6H	15.9	17.1	16.2	17.4	17.7	16.3	17.5	16.6	17.8	18.0
	8H	16.2	17.3	16.5	17.6	17.9	16.5	17.7	16.9	18.0	18.3
	12H	16.4	17.5	16.7	17.8	18.1	16.7	17.9	17.1	18.2	18.5
4H	2H	14.2	15.5	14.5	15.8	16.0	14.7	15.9	15.0	16.2	16.4
	3H	15.5	16.6	15.9	16.9	17.2	15.8	17.0	16.2	17.3	17.6
	4H	16.2	17.2	16.5	17.5	17.8	16.5	17.5	16.9	17.8	18.2
	6H	16.9	17.8	17.2	18.1	18.5	17.2	18.1	17.6	18.4	18.8
	8H	17.2	18.0	17.6	18.4	18.8	17.5	18.4	18.0	18.8	19.1
	12H	17.5	18.3	17.9	18.6	19.0	17.9	18.6	18.3	19.0	19.4
8H	4H	16.4	17.2	16.8	17.6	18.0	16.7	17.5	17.1	17.9	18.3
	6H	17.2	17.9	17.7	18.3	18.8	17.6	18.3	18.0	18.7	19.1
	8H	17.7	18.3	18.1	18.7	19.2	18.0	18.7	18.5	19.1	19.5
	12H	18.1	18.6	18.6	19.1	19.6	18.5	19.0	19.0	19.5	20.0
12H	4H	16.4	17.2	16.8	17.6	18.0	16.7	17.5	17.1	17.8	18.2
	6H	17.3	17.9	17.8	18.4	18.8	17.6	18.2	18.1	18.7	19.1
	8H	17.8	18.4	18.3	18.8	19.3	18.2	18.7	18.7	19.2	19.6
Variations with the observer position at spacings:											
S = 1.0H		+ 0.2 / - 0.3					+ 0.2 / - 0.2				
1.5H		+ 0.2 / - 0.3					+ 0.3 / - 0.5				
2.0H		+ 0.2 / - 0.4					+ 0.4 / - 0.4				

CIE Pub.117 Corrected 3575 lm Total Lamp Luminous Flux.(8log(F/F0) = 4.4)

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:

UTILIZATION FACTORS TABLE

Test:U:120.0V I:0.2870A P:34.32W PF:0.9980 Lamp Flux:1787.45x2 lm		
NAME:	TYPE:L48T8/835/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

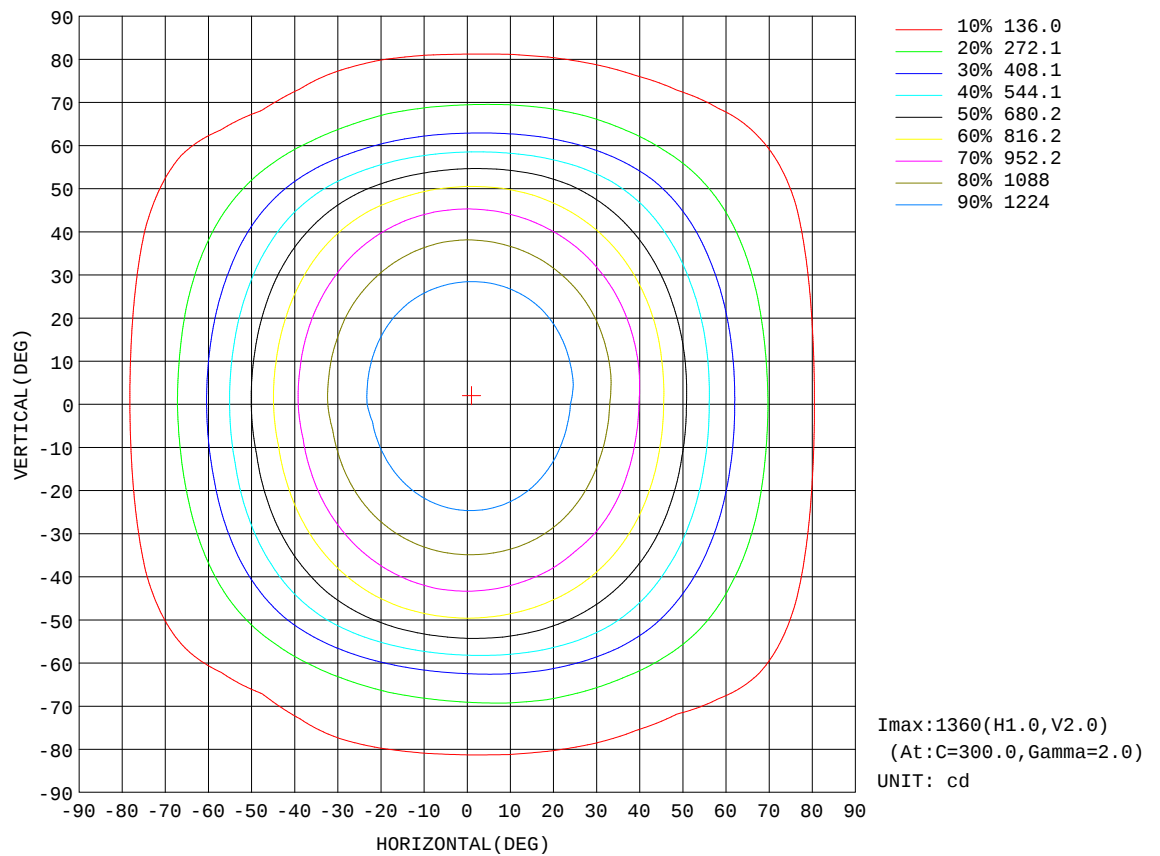
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) $k(RI) \times RCR = 5$									
k = 0.60	60	48	42	59	48	41	58	48	41	35
0.80	70	59	52	69	58	51	67	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	92	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:0.2870A P:34.32W PF:0.9980 Lamp Flux:1787.45x2 lm		
NAME:	TYPE:L48T8/835/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:



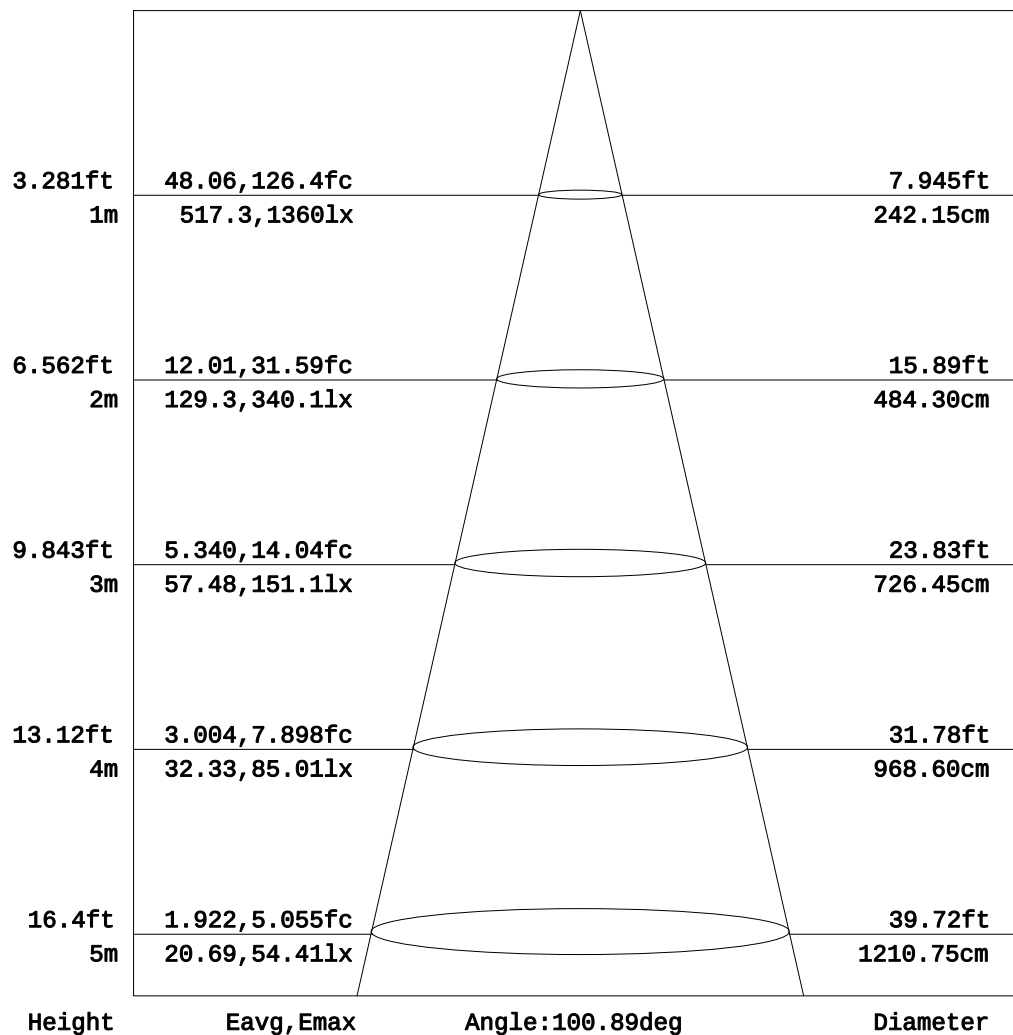
C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2016-01-15

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:0.2870A P:34.32W PF:0.9980 Lamp Flux:1787.45x2 lm		
NAME:	TYPE:L48T8/835/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

Flux out:2478 lm



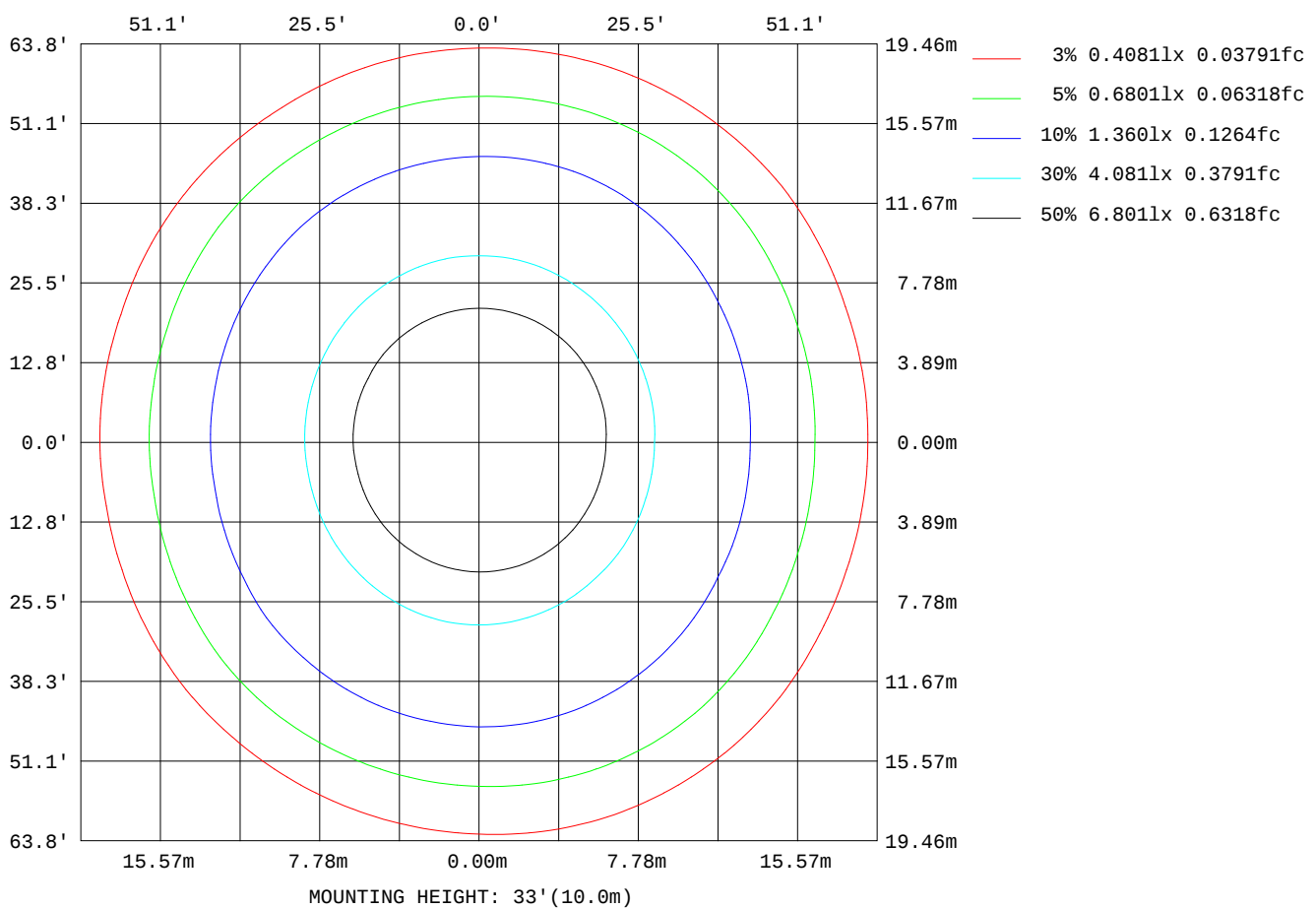
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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

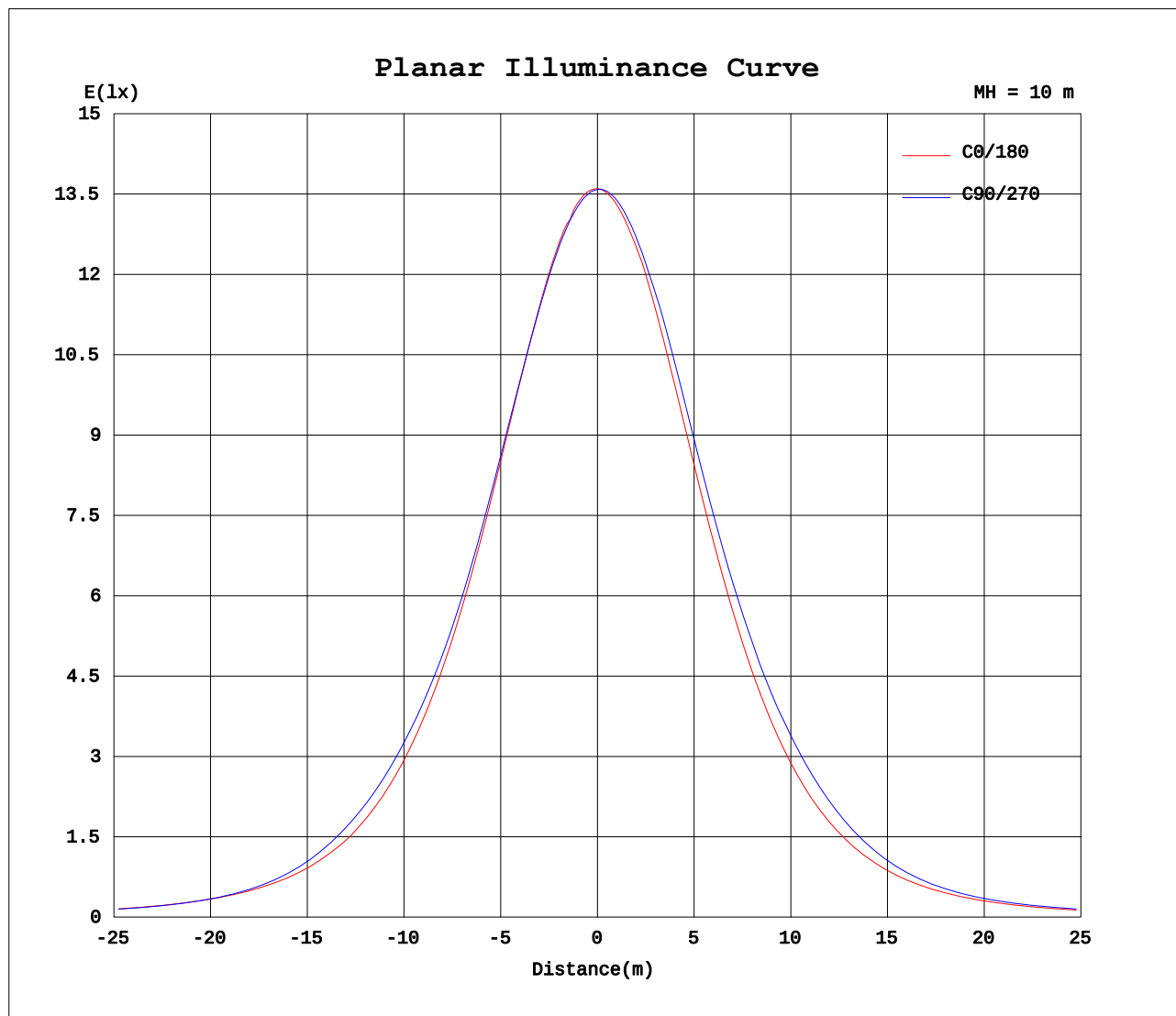
Test:U:120.0V I:0.2870A P:34.32W PF:0.9980 Lamp Flux:1787.45x2 lm		
NAME:	TYPE:L48T8/835/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:



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:0.2870A P:34.32W PF:0.9980 Lamp Flux:1787.45x2 lm																		
NAME:									TYPE:L48T8/835/15G-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	1360	1360	1360	1360	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1360	1360	1360
5	1356	1355	1354	1353	1352	1352	1351	1351	1350	1350	1349	1349	1349	1349	1349	1349	1350	1351	1352
10	1339	1337	1336	1335	1334	1333	1334	1333	1333	1332	1331	1330	1330	1329	1328	1328	1329	1330	1333
15	1310	1308	1307	1305	1305	1306	1306	1306	1305	1305	1303	1302	1300	1298	1297	1295	1296	1296	1306
20	1267	1265	1263	1263	1265	1266	1267	1268	1268	1268	1266	1263	1260	1257	1253	1251	1250	1250	1261
25	1211	1208	1208	1209	1212	1216	1219	1221	1222	1221	1219	1215	1209	1204	1199	1194	1192	1191	1202
30	1139	1136	1137	1141	1147	1153	1158	1161	1162	1160	1157	1152	1145	1138	1130	1124	1119	1117	1128
35	1052	1049	1052	1059	1068	1076	1082	1086	1088	1087	1084	1078	1070	1060	1050	1040	1033	1029	1039
40	947	946	952	963	974	980	994	1003	1007	1009	1007	999	986	971	956	943	931	925	934
45	829	829	838	850	865	877	896	908	917	922	919	907	890	869	849	830	816	806	814
50	702	703	712	728	745	764	780	794	804	807	801	789	772	749	726	705	688	677	682
55	572	574	584	598	616	635	650	659	662	656	642	636	623	610	590	570	555	544	547
60	452	452	459	469	486	499	503	501	494	483	473	465	458	453	447	432	421	415	418
65	350	348	343	348	356	359	361	362	357	346	337	329	319	307	303	302	301	304	311
70	268	264	255	251	246	249	259	267	266	259	251	242	227	208	196	199	208	219	229
75	199	196	189	177	168	174	190	201	203	199	195	187	171	149	134	138	152	163	168
80	142	141	134	125	121	127	137	146	151	151	147	140	130	116	105	103	110	117	120
85	81.5	80.3	77.2	77.5	78.4	78.9	81.7	85.2	86.9	84.8	83.0	80.4	75.7	70.6	64.8	62.7	59.4	62.6	65.2
90	7.66	9.74	9.49	9.09	8.11	7.59	7.52	7.04	5.11	3.46	9.29	8.18	6.67	3.99	3.02	2.67	2.77	3.26	0.28
95	0.19	0.41	0.47	0.47	0.44	0.34	0.33	0.34	0.34	0.34	0.34	0.34	0.33	0.30	0.38	0.39	0.35	0.32	0.17
100	0.29	0.36	0.44	0.59	0.59	0.40	0.27	0.24	0.23	0.24	0.25	0.24	0.27	0.36	0.45	0.45	0.37	0.29	0.32
105	0.39	0.46	0.44	0.51	0.55	0.50	0.53	0.51	0.50	0.52	0.50	0.47	0.46	0.44	0.44	0.42	0.39	0.33	0.39
110	0.40	0.48	0.47	0.50	0.54	0.55	0.54	0.52	0.57	0.59	0.57	0.54	0.50	0.48	0.48	0.43	0.42	0.35	0.30
115	0.36	0.40	0.43	0.49	0.49	0.54	0.58	0.58	0.61	0.63	0.62	0.57	0.51	0.49	0.46	0.43	0.39	0.34	0.34
120	0.44	0.43	0.46	0.47	0.48	0.48	0.51	0.58	0.63	0.64	0.62	0.58	0.51	0.46	0.45	0.41	0.50	0.45	0.40
125	0.43	0.45	0.41	0.55	0.48	0.51	0.52	0.53	0.56	0.59	0.57	0.55	0.50	0.49	0.48	0.43	0.45	0.39	0.44
130	0.46	0.48	0.46	0.50	0.52	0.50	0.55	0.57	0.59	0.59	0.58	0.59	0.56	0.52	0.57	0.55	0.43	0.41	0.48
135	0.41	0.45	0.48	0.48	0.58	0.61	0.63	0.60	0.62	0.63	0.62	0.62	0.60	0.61	0.55	0.44	0.44	0.48	0.49
140	0.50	0.50	0.48	0.51	0.53	0.66	0.66	0.68	0.67	0.70	0.67	0.69	0.68	0.65	0.52	0.47	0.48	0.46	0.53
145	0.52	0.55	0.54	0.59	0.61	0.57	0.65	0.71	0.71	0.73	0.71	0.71	0.68	0.56	0.52	0.57	0.55	0.56	0.55
150	0.59	0.63	0.57	0.62	0.65	0.65	0.62	0.62	0.66	0.67	0.65	0.61	0.58	0.58	0.63	0.61	0.57	0.61	0.53
155	0.63	0.64	0.59	0.64	0.66	0.67	0.67	0.64	0.63	0.62	0.60	0.62	0.64	0.64	0.60	0.62	0.61	0.62	0.52
160	0.61	0.66	0.66	0.63	0.67	0.67	0.65	0.67	0.65	0.62	0.63	0.64	0.63	0.64	0.66	0.62	0.60	0.64	0.54
165	0.64	0.64	0.67	0.65	0.64	0.64	0.63	0.64	0.59	0.59	0.58	0.63	0.65	0.65	0.61	0.58	0.61	0.63	0.54
170	0.58	0.59	0.61	0.63	0.64	0.62	0.59	0.60	0.60	0.56	0.58	0.64	0.66	0.66	0.65	0.63	0.63	0.61	0.56
175	0.75	0.74	0.75	0.75	0.76	0.73	0.69	0.69	0.68	0.62	0.63	0.68	0.68	0.71	0.75	0.77	0.77	0.77	0.72
180	0.72	0.71	0.68	0.67	0.67	0.68	0.69	0.67	0.63	0.66	0.57	0.56	0.60	0.67	0.67	0.67	0.68	0.71	0.72

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:0.2870A P:34.32W PF:0.9980 Lamp Flux:1787.45x2 lm																	
NAME:									TYPE:L48T8/835/15G-XT H						WEIGHT:		
SPEC.:									DIM.:						SERIAL No.:		
MFR.: ESPEN									SUR.:1.2*0.6						PROTECTION ANGLE:		

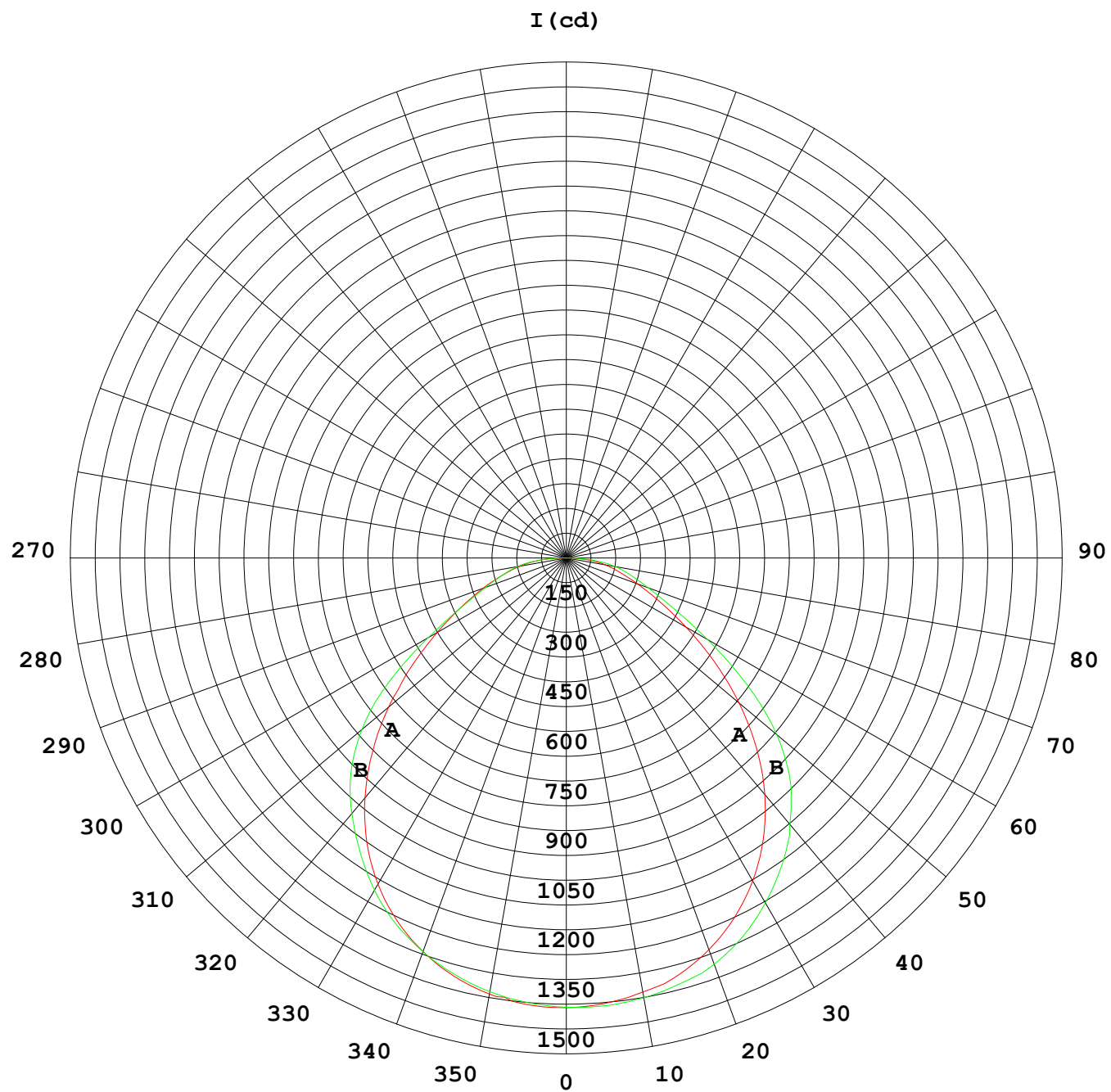
Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	1360	1360	1360	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1360	1360		
5	1353	1353	1354	1355	1356	1357	1358	1358	1359	1359	1359	1359	1358	1358	1358	1358	1356		
10	1335	1336	1338	1341	1343	1346	1348	1349	1351	1351	1350	1350	1348	1346	1345	1344	1342		
15	1309	1312	1317	1321	1323	1326	1329	1331	1333	1333	1332	1331	1330	1327	1325	1322	1320		
20	1264	1269	1275	1282	1289	1295	1300	1305	1308	1309	1308	1306	1301	1296	1290	1284	1279		
25	1206	1213	1221	1230	1239	1247	1254	1260	1263	1265	1264	1261	1255	1248	1239	1231	1224		
30	1133	1141	1152	1165	1176	1186	1194	1201	1205	1206	1204	1200	1194	1184	1174	1163	1154		
35	1045	1056	1070	1084	1098	1112	1123	1132	1136	1135	1131	1124	1115	1104	1091	1079	1067		
40	941	954	970	987	1007	1026	1042	1053	1052	1054	1046	1034	1020	1005	991	977	964		
45	821	835	854	877	901	923	942	955	959	955	944	929	911	892	874	858	841		
50	689	703	723	747	770	793	806	823	831	832	823	806	786	766	745	728	715		
55	552	563	580	601	622	636	646	657	667	674	677	671	653	632	610	593	583		
60	421	426	440	454	462	470	480	487	493	500	507	510	506	497	479	465	459		
65	311	309	310	313	319	328	340	350	355	361	366	366	364	362	356	349	349		
70	227	217	208	204	213	232	250	258	263	268	269	264	254	248	251	258	264		
75	169	159	146	140	151	172	189	198	202	205	203	194	179	170	174	188	197		
80	121	115	106	106	115	128	141	148	150	151	147	139	130	126	127	132	141		
85	64.5	63.2	62.5	64.6	69.5	74.7	79.0	82.0	82.1	83.9	83.0	79.8	77.4	77.2	77.9	76.5	80.8		
90	0.35	0.54	0.70	0.72	0.91	1.07	1.12	1.39	1.49	1.96	2.51	2.86	3.09	3.30	12.0	12.7	13.4		
95	0.33	0.37	0.44	0.34	0.29	0.31	0.31	0.32	0.32	0.34	0.32	0.33	0.31	0.42	0.45	0.42	0.37		
100	0.31	0.33	0.53	0.46	0.33	0.28	0.21	0.20	0.21	0.22	0.21	0.24	0.28	0.46	0.57	0.42	0.30		
105	0.36	0.35	0.44	0.46	0.40	0.39	0.36	0.35	0.38	0.37	0.37	0.39	0.41	0.49	0.41	0.37	0.31		
110	0.34	0.35	0.39	0.43	0.45	0.43	0.41	0.45	0.46	0.45	0.43	0.44	0.41	0.36	0.37	0.35	0.37		
115	0.35	0.38	0.39	0.40	0.42	0.45	0.45	0.49	0.50	0.48	0.44	0.40	0.37	0.36	0.38	0.32	0.30		
120	0.41	0.46	0.40	0.43	0.42	0.42	0.44	0.48	0.49	0.48	0.44	0.40	0.38	0.40	0.36	0.36	0.38		
125	0.40	0.41	0.44	0.44	0.46	0.47	0.45	0.47	0.47	0.46	0.45	0.43	0.43	0.39	0.46	0.42	0.41		
130	0.45	0.45	0.49	0.53	0.46	0.47	0.50	0.50	0.50	0.49	0.49	0.46	0.44	0.43	0.46	0.39	0.45		
135	0.51	0.51	0.46	0.53	0.58	0.55	0.51	0.52	0.51	0.49	0.48	0.47	0.50	0.51	0.41	0.46	0.46		
140	0.51	0.53	0.51	0.49	0.59	0.58	0.58	0.54	0.55	0.51	0.54	0.53	0.52	0.49	0.46	0.46	0.48		
145	0.57	0.55	0.54	0.52	0.48	0.57	0.58	0.56	0.57	0.55	0.55	0.54	0.45	0.45	0.53	0.54	0.56		
150	0.58	0.52	0.54	0.55	0.51	0.47	0.46	0.51	0.51	0.49	0.44	0.42	0.46	0.52	0.52	0.50	0.60		
155	0.53	0.52	0.53	0.51	0.52	0.52	0.47	0.44	0.43	0.42	0.45	0.48	0.50	0.52	0.54	0.52	0.59		
160	0.53	0.55	0.49	0.52	0.53	0.51	0.48	0.49	0.45	0.45	0.48	0.49	0.51	0.55	0.50	0.53	0.59		
165	0.56	0.58	0.54	0.48	0.50	0.51	0.52	0.50	0.45	0.45	0.48	0.53	0.49	0.51	0.49	0.62	0.61		
170	0.55	0.58	0.58	0.56	0.56	0.56	0.55	0.53	0.48	0.46	0.49	0.52	0.52	0.58	0.58	0.58	0.58		
175	0.72	0.73	0.74	0.74	0.74	0.68	0.63	0.67	0.63	0.58	0.60	0.64	0.64	0.66	0.72	0.74	0.72		
180	0.72	0.71	0.70	0.69	0.69	0.68	0.66	0.60	0.60	0.63	0.63	0.60	0.64	0.67	0.69	0.70	0.72		

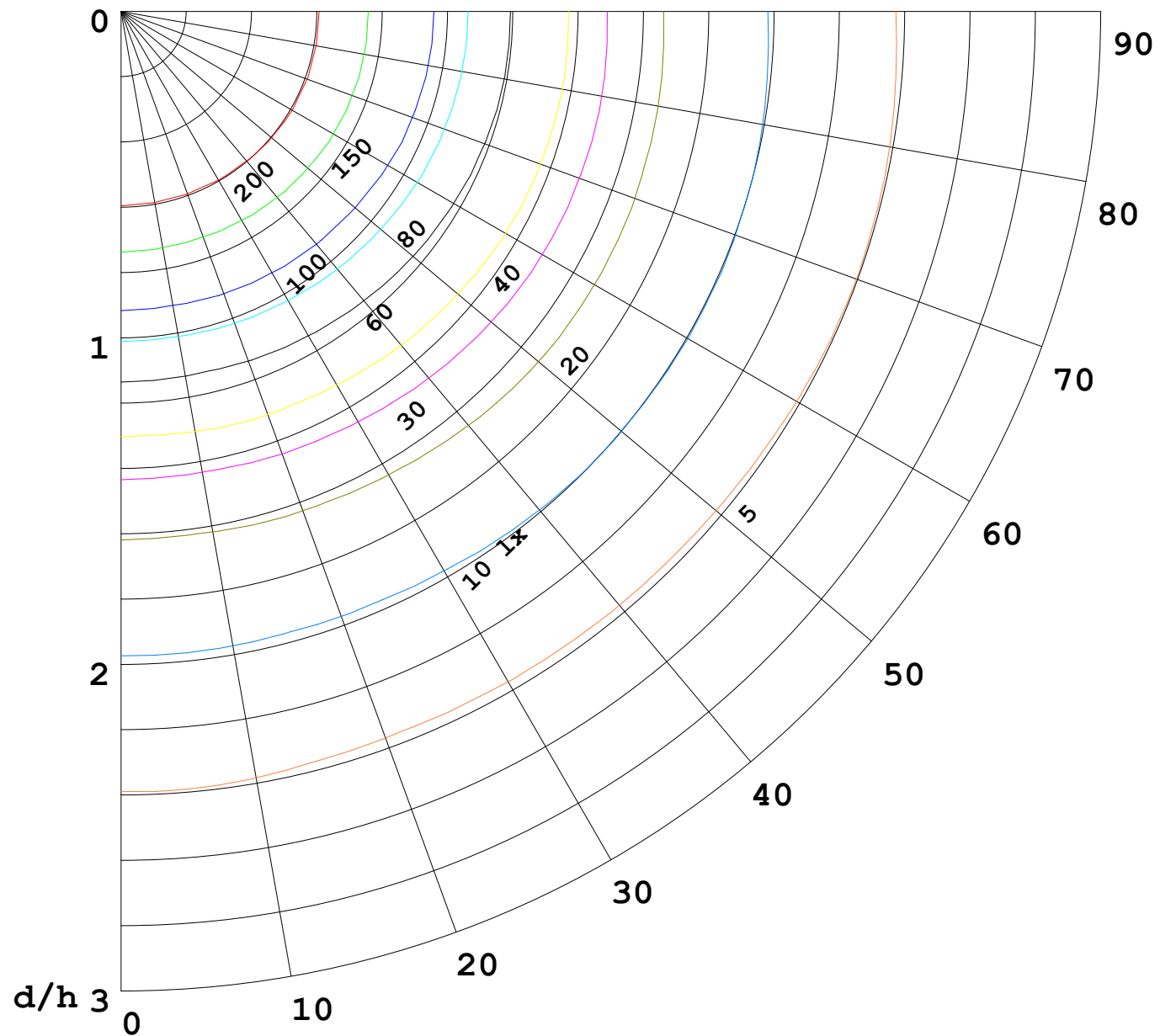
C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-01-15

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:



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

