



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. : BTR66.181.15.0030.35

Product Name : LED T8 TUBE

Model Number : L48T8-850-15G-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:

This report is not valid as a BEST Test Report unless signed by an approved BEST Test Service Shenzhen Co., Ltd. This report shall not be reproduced except in full without the written approval of the testing laboratory. The test report only allows to be revised within the retention period unless further standard or the requirement was noticed. This report is for the exclusive use of BEST's Client and is provided pursuant to the agreement between BEST and its Client. BEST's responsibility and Liability are limited to the terms and conditions of the agreement. BEST assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the BEST name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by BEST. The observations and test results in this report are relevant only to the sample tested. This report by itself does not cover that the material, product, of service is or has ever been under a BEST certification program. National Voluntary Laboratory Accreditation Program (NVLAP) has accredited this laboratory under ISO17025: 2005 for specific laboratory activities as listed in the NVLAP directory of accredited laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation. This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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	5000K
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	0.144	/	17.23	0.998	2209.20	128.22
CCT (K)	CRI (Ra)	R9	x CIE1931	y CIE1931	u' CIE1976	v' CIE1976	Duv CIE1976
4989	84.6	17	0.3459	0.3576	0.2096	0.4877	0.0027

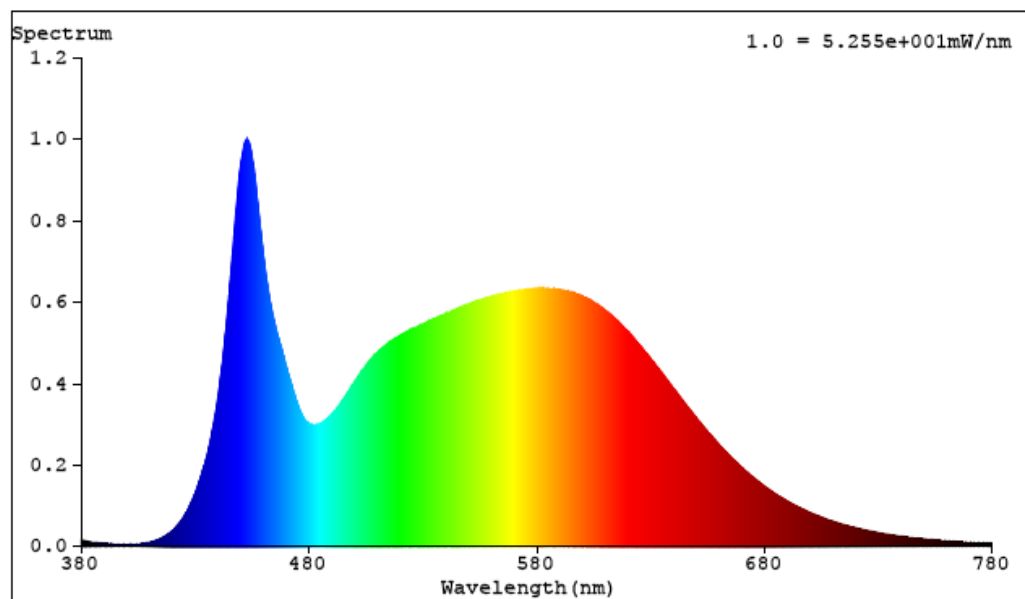
Luminous Intensity

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

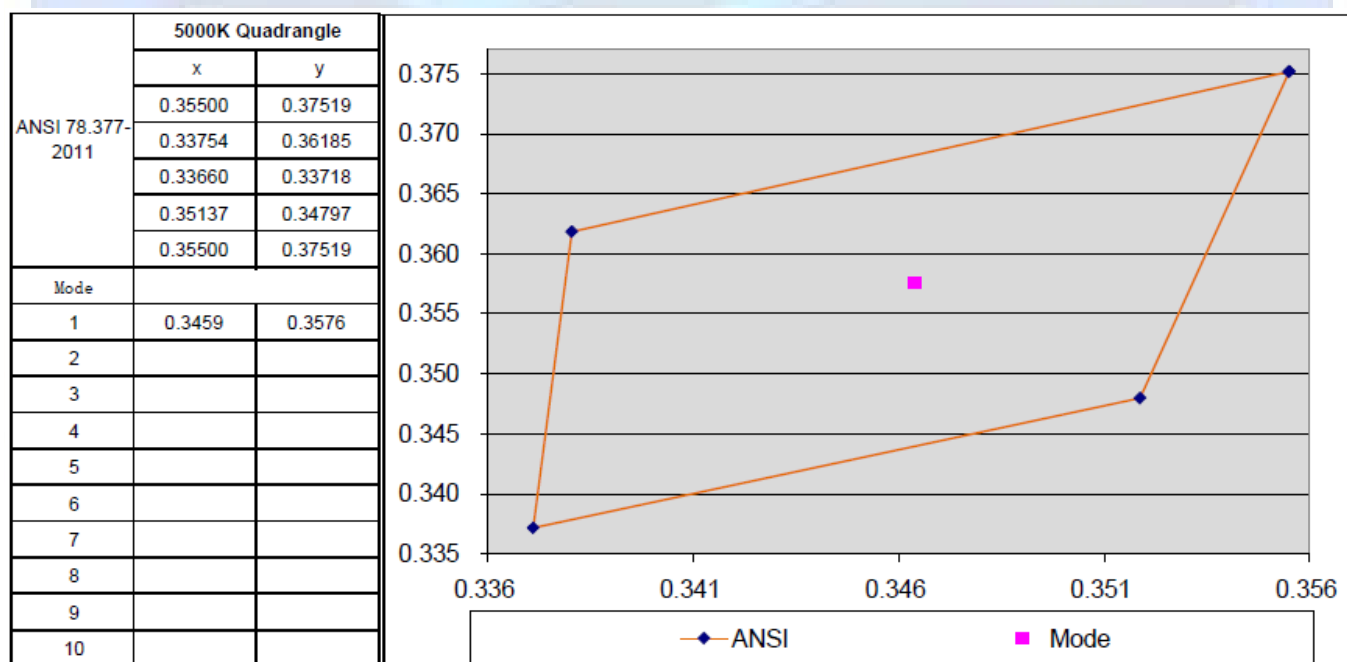
Photometric and Electrical Test Data

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	0.287	5.4%	34.38	0.998	3514.76	102.23	1.34	1.28

Spectral Plots



7 Step Quadrangle



EUT Photo



Luminous Intensity Distribution Test Plots (CIE Chromaticity)

This page is blank and see next page.

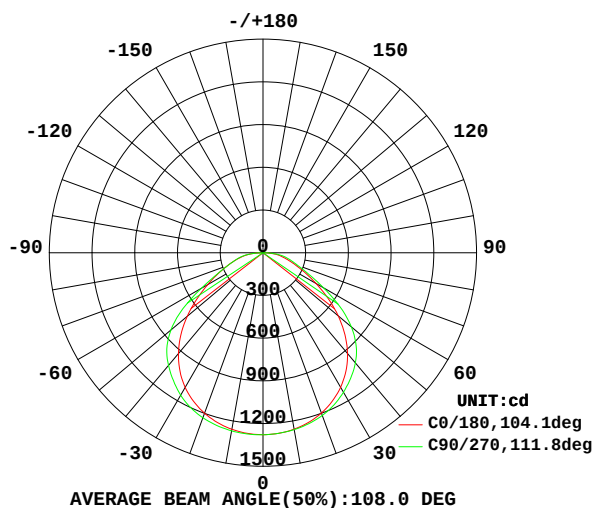


LUMINAIRE PHOTOMETRIC TEST REPORT

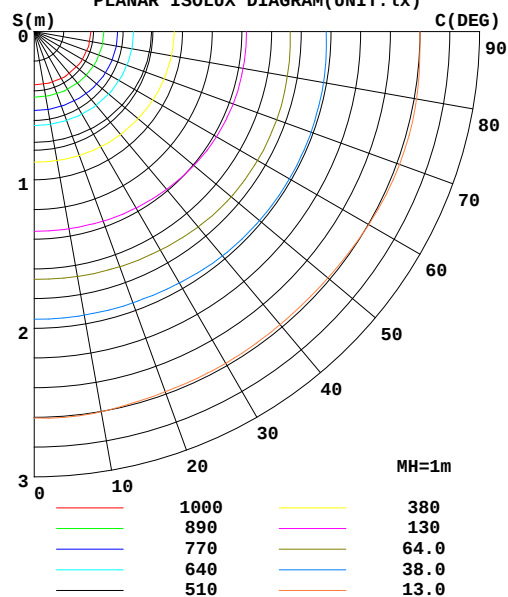
Test:U:120.0V I:0.2870A P:34.38W PF:0.9980 Lamp Flux:1757.38x2 lm		
NAME:	TYPE:L48T8/850/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 102.23 lm/W			
MODEL	L48T8/850/15G-XT H	I _{max} (cd)	1279	S/MH(C0/180)	1.26
NOMINAL POWER(W)		LOR(%)	100.0	S/MH(C90/270)	1.31
RATED VOLTAGE(V)	120.0	TOTAL FLUX(lm)	3514.8	η UP, DN(C0-180)	0.1, 50.3
NOMINAL FLUX(lm)	1757.38	CIE CLASS	DIRECT	η UP, DN(C180-360)	0.0, 49.6
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)



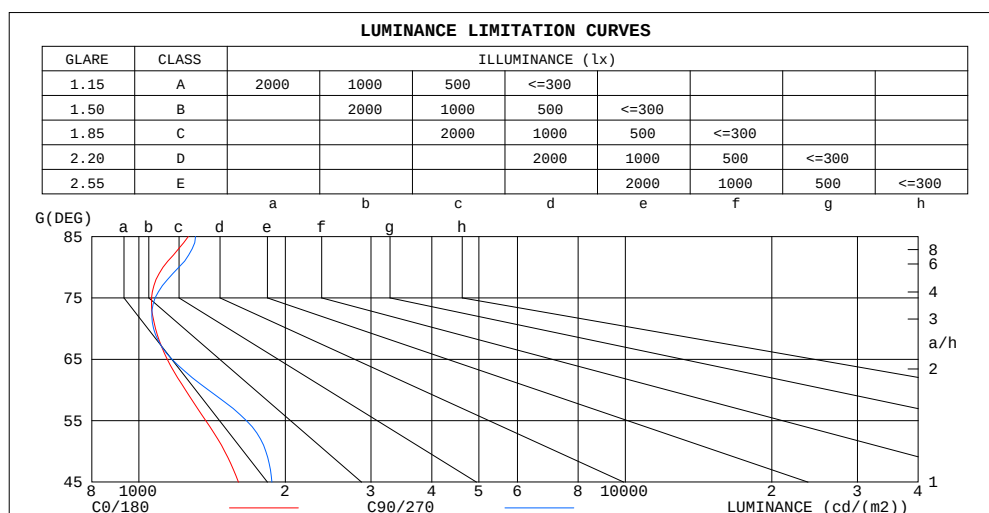
C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-01-16

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	1259	1265	1270	1265	1258	1258	1261	1261	0- 10	121.2	121.2	3.45,3.45
20	1200	1218	1233	1218	1198	1204	1216	1211	10- 20	350.9	472.1	13.4,13.4
30	1093	1128	1155	1128	1090	1109	1130	1119	20- 30	540.2	1012	28.8,28.8
40	923.6	981.1	1033	985.8	924.0	962.0	1010	966.6	30- 40	658.3	1671	47.5,47.5
50	694.8	769.7	844.0	773.2	689.8	749.5	810.4	753.1	40- 50	674.5	2345	66.7,66.7
60	448.8	503.8	500.3	471.8	428.5	463.1	490.0	495.1	50- 60	554.5	2900	82.5,82.5
70	266.5	250.6	264.0	206.5	233.2	211.6	260.5	248.6	60- 70	343.7	3243	92.3,92.3
80	140.2	124.4	151.1	112.3	121.7	110.8	147.5	126.7	70- 80	191.0	3434	97.7,97.7
90	5.863	6.503	9.266	2.671	0.2670	0.7860	0.9931	2.706	80- 90	77.03	3511	99.9,99.9
100	0.3090	0.5561	0.2615	0.4639	0.3263	0.4120	0.2224	0.3797	90-100	0.7658	3512	99.9,99.9
110	0.4295	0.5744	0.6446	0.5200	0.3212	0.4318	0.4747	0.3885	100-110	0.4652	3513	99.9,99.9
120	0.4633	0.5220	0.6979	0.4811	0.4278	0.4452	0.4912	0.4107	110-120	0.4727	3513	100,100
130	0.4703	0.5395	0.6246	0.5683	0.5011	0.5216	0.5220	0.4545	120-130	0.4457	3513	100,100
140	0.5100	0.6122	0.7188	0.5974	0.5403	0.5573	0.5834	0.5350	130-140	0.4234	3514	100,100
150	0.5909	0.6629	0.6875	0.6126	0.5515	0.5399	0.5267	0.5019	140-150	0.3684	3514	100,100
160	0.6051	0.6856	0.6269	0.6670	0.5381	0.5420	0.4582	0.5396	150-160	0.2672	3515	100,100
170	0.5737	0.6428	0.5759	0.6682	0.5488	0.5641	0.4949	0.5663	160-170	0.1649	3515	100,100
180	0.7097	0.6714	0.6572	0.6921	0.7128	0.6840	0.6022	0.6575	170-180	0.0633	3515	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT: lm		



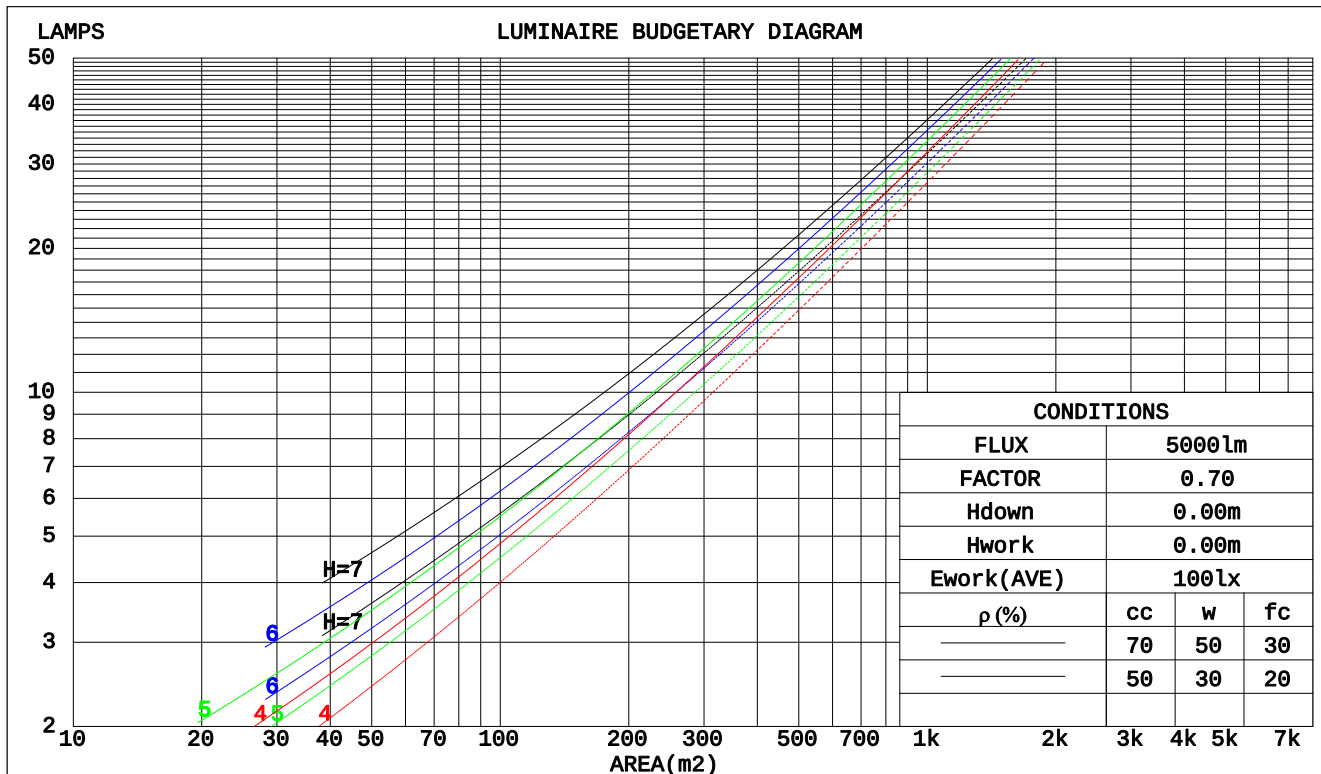
C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature: 25.6DEG
Operators: David
Test Date: 2016-01-16

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:34.38W PF:0.9980 Lamp Flux:1757.38x2 lm		
NAME:	TYPE:L48T8/850/15G-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	.25



C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature: 25.6DEG
 Operators: David
 Test Date: 2016-01-16

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:34.38W PF:0.9980 Lamp Flux:1757.38x2 lm									
NAME:					TYPE:L48T8/850/15G-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	.160	.051	.266	.153	.049	.255	.148	.048		
2.0	.280	.154	.047	.274	.151	.047	.262	.146	.045	.252	.141	.044	.242	.137	.043		
3.0	.260	.139	.041	.255	.136	.041	.245	.133	.040	.235	.129	.040	.226	.125	.039		
4.0	.241	.125	.037	.236	.124	.037	.227	.121	.036	.219	.118	.035	.211	.115	.035		
5.0	.224	.114	.033	.220	.113	.033	.212	.110	.032	.204	.108	.032	.197	.105	.032		
6.0	.209	.105	.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	.169	.082	.023	.163	.081	.023	.158	.079	.023	.154	.078	.023		
10.0	.161	.077	.021	.159	.077	.021	.154	.076	.021	.150	.074	.021	.146	.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	.106	.093	.081	.061	.054	.047	.019	.017	.015	
2.0	.171	.133	.100	.147	.114	.087	.101	.079	.060	.058	.046	.035	.019	.015	.012	
3.0	.163	.115	.076	.140	.099	.066	.096	.069	.046	.056	.040	.027	.018	.013	.009	
4.0	.156	.102	.060	.134	.088	.052	.092	.061	.037	.053	.036	.022	.017	.012	.007	
5.0	.148	.091	.049	.127	.079	.043	.088	.055	.030	.051	.032	.018	.016	.011	.006	
6.0	.141	.083	.041	.121	.072	.035	.084	.050	.025	.049	.029	.015	.016	.010	.005	
7.0	.135	.076	.035	.116	.066	.030	.080	.046	.021	.046	.027	.013	.015	.009	.004	
8.0	.128	.070	.030	.110	.061	.026	.076	.043	.018	.044	.025	.011	.014	.008	.004	
9.0	.122	.065	.026	.105	.056	.023	.073	.040	.016	.043	.023	.010	.014	.008	.003	
10.0	.117	.061	.023	.101	.053	.020	.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:2016-01-16

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:34.38W PF:0.9980 Lamp Flux:1757.38x2 lm											
NAME:					TYPE:L48T8/850/15G-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	14.1	15.5	15.7	14.5	16.0	14.8	16.2	16.4
	3H	14.9	16.3	15.2	16.5	16.8	15.5	16.9	15.8	17.1	17.3
	4H	15.5	16.8	15.8	17.0	17.3	16.0	17.3	16.3	17.5	17.8
	6H	16.0	17.2	16.3	17.5	17.7	16.5	17.7	16.8	18.0	18.2
	8H	16.2	17.4	16.6	17.7	18.0	16.7	17.9	17.1	18.2	18.5
	12H	16.4	17.5	16.8	17.8	18.1	16.9	18.0	17.3	18.3	18.6
4H	2H	14.3	15.6	14.7	15.9	16.1	14.9	16.2	15.2	16.5	16.7
	3H	15.6	16.7	16.0	17.0	17.3	16.1	17.2	16.4	17.5	17.8
	4H	16.3	17.3	16.6	17.6	18.0	16.7	17.7	17.1	18.0	18.4
	6H	16.9	17.8	17.3	18.2	18.6	17.4	18.3	17.8	18.6	19.0
	8H	17.3	18.1	17.7	18.5	18.9	17.7	18.6	18.1	18.9	19.3
	12H	17.5	18.3	18.0	18.7	19.1	18.0	18.8	18.4	19.2	19.6
8H	4H	16.5	17.3	16.9	17.7	18.1	16.9	17.7	17.3	18.1	18.5
	6H	17.3	18.0	17.7	18.4	18.8	17.7	18.4	18.2	18.8	19.3
	8H	17.7	18.4	18.2	18.8	19.2	18.2	18.8	18.6	19.2	19.7
	12H	18.2	18.7	18.6	19.1	19.6	18.6	19.2	19.1	19.6	20.1
12H	4H	16.5	17.3	16.9	17.7	18.1	16.9	17.7	17.3	18.0	18.4
	6H	17.4	18.0	17.8	18.4	18.9	17.8	18.4	18.2	18.8	19.3
	8H	17.9	18.4	18.4	18.9	19.4	18.3	18.9	18.8	19.3	19.8
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 3515 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:2016-01-16

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:34.38W PF:0.9980 Lamp Flux:1757.38x2 lm		
NAME:	TYPE:L48T8/850/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

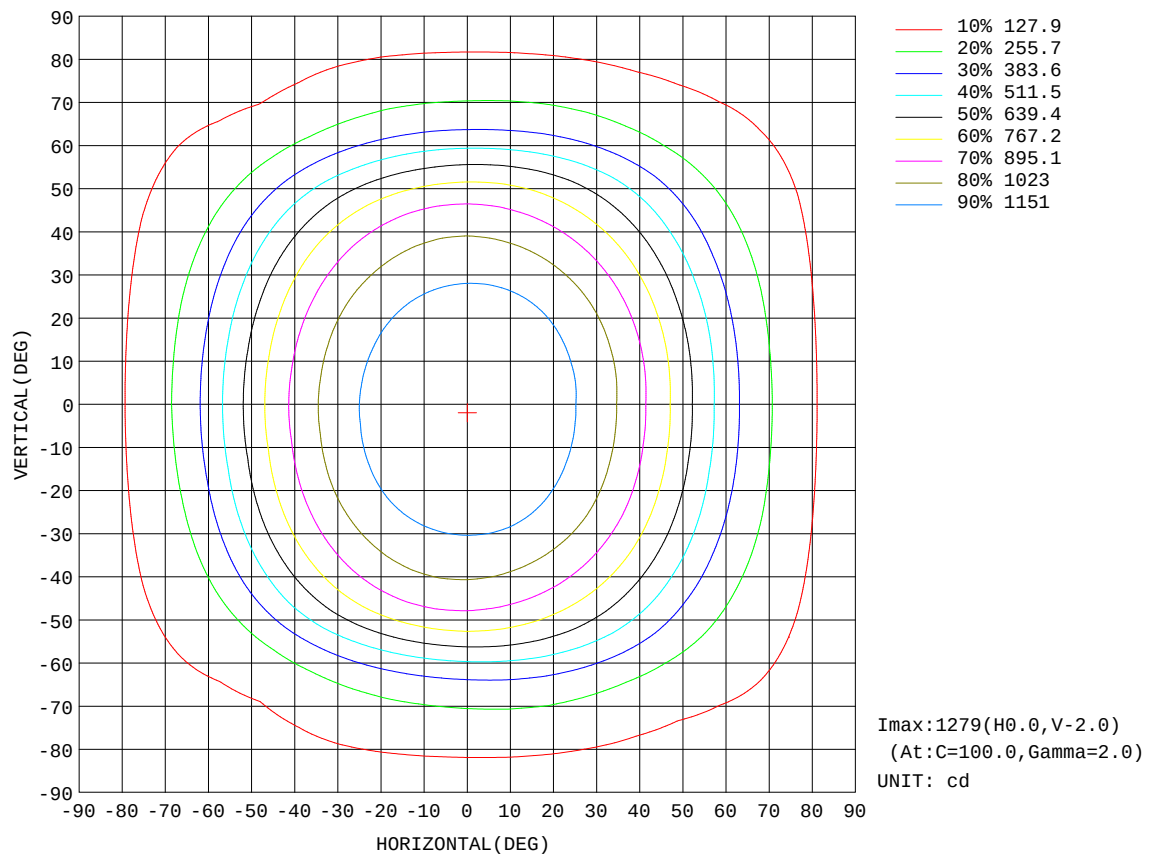
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) $k(RI) \times RCR = 5$									
$k = 0.60$	59	48	41	58	47	41	57	47	40	34
0.80	69	58	51	68	57	51	66	57	50	43
1.00	78	67	60	77	66	60	74	68	59	52
1.25	85	75	68	83	74	67	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:2016-01-16

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:34.38W PF:0.9980 Lamp Flux:1757.38x2 lm		
NAME:	TYPE:L48T8/850/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

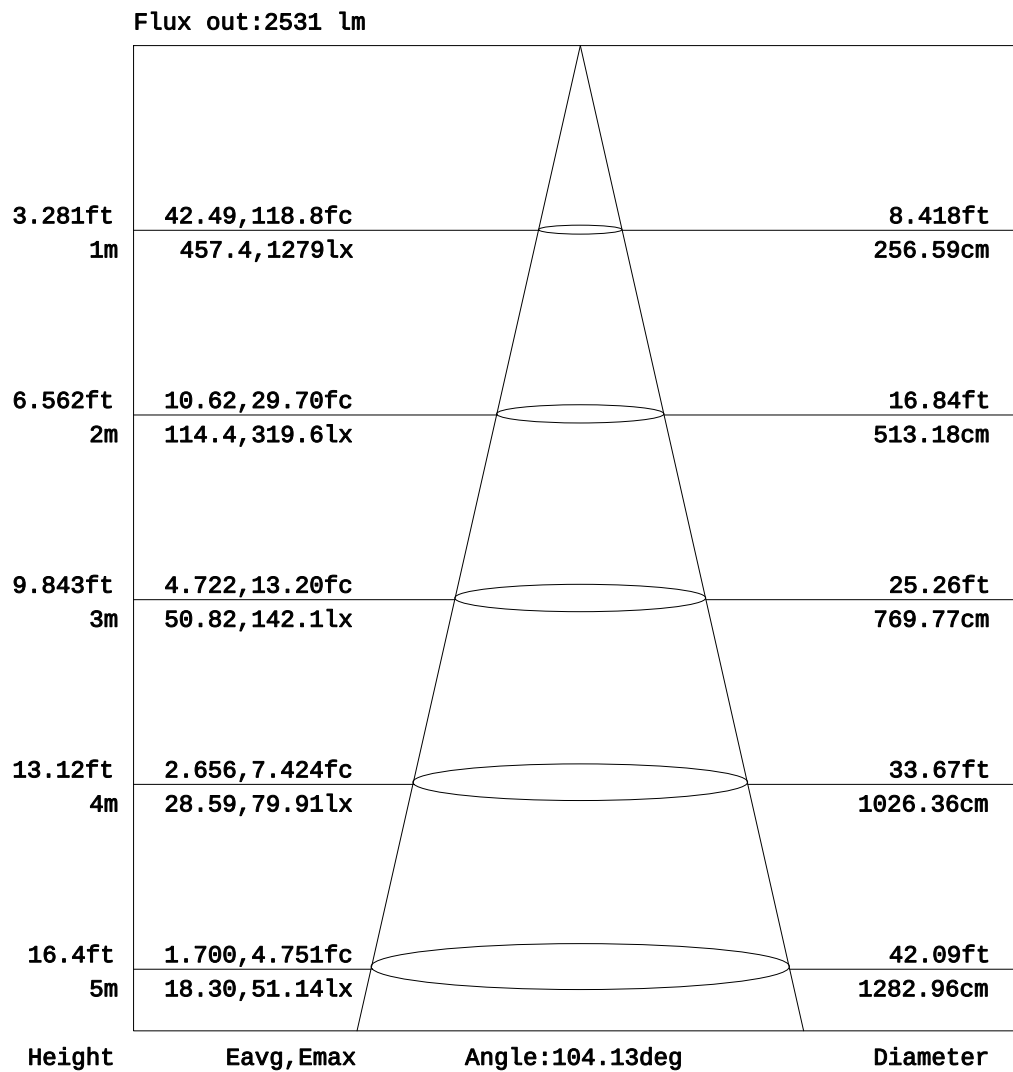


C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2016-01-16

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:34.38W PF:0.9980 Lamp Flux:1757.38x2 lm		
NAME:	TYPE:L48T8/850/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:



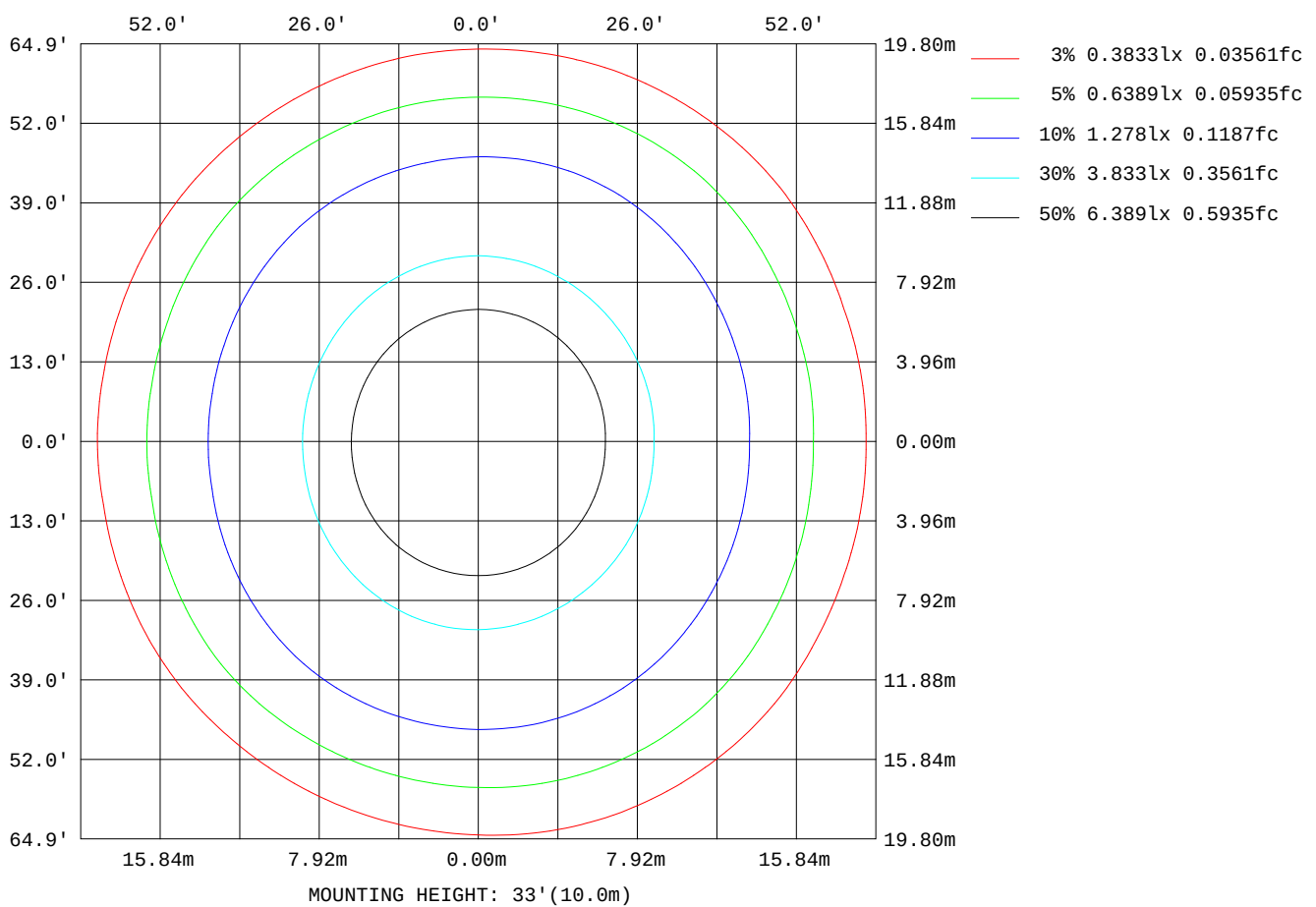
Note:The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2016-01-16

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

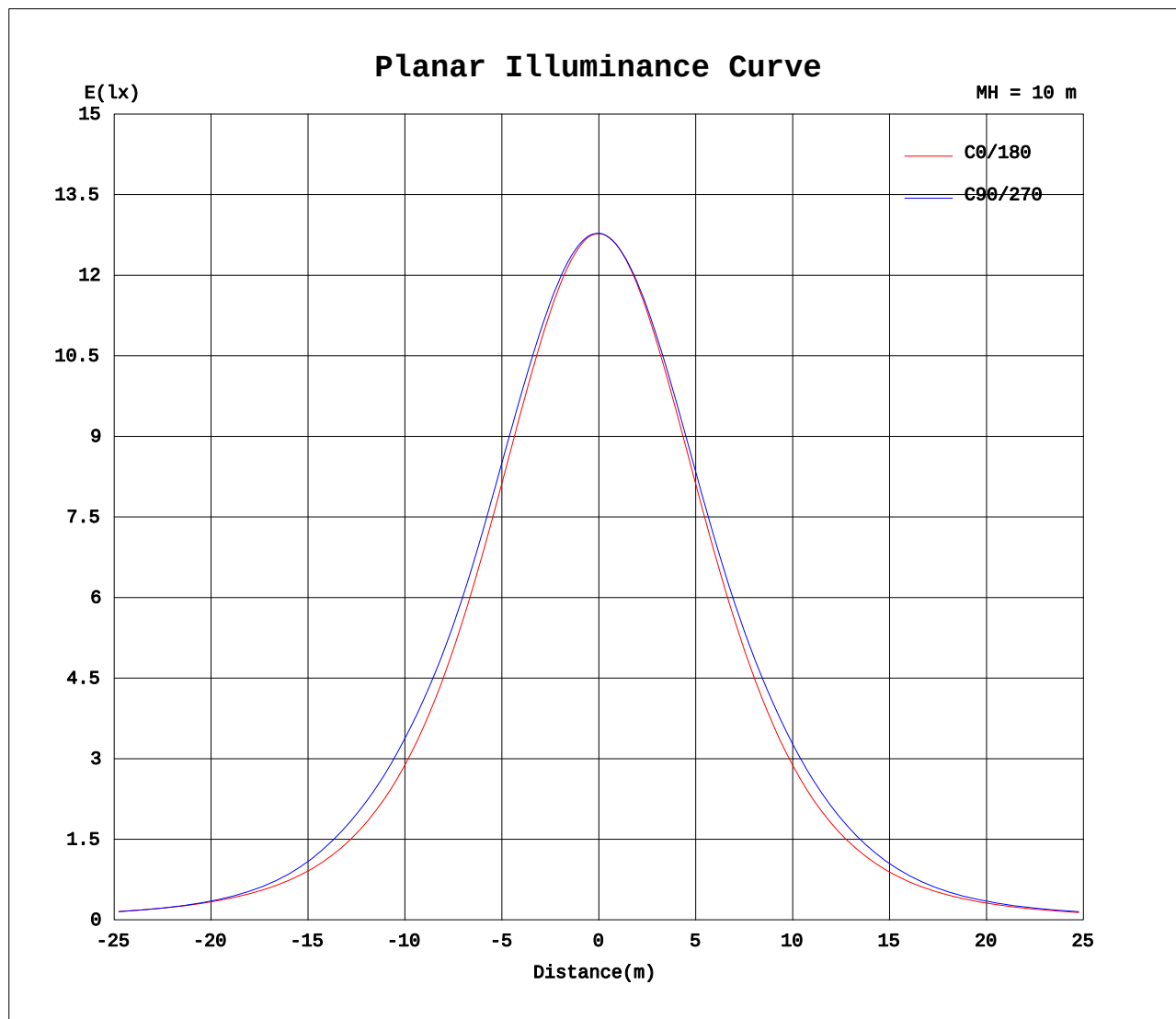
Test:U:120.0V I:0.2870A P:34.38W PF:0.9980 Lamp Flux:1757.38x2 lm		
NAME:	TYPE:L48T8/850/15G-XT H	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:



C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature: 25.6DEG
 Operators: David
 Test Date: 2016-01-16

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: 2016-01-16

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:34.38W PF:0.9980 Lamp Flux:1757.38x2 lm																		
NAME:									TYPE:L48T8/850/15G-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	1278	1278	1278	1278	1278	1278	1278	1278	1278	1278	1278	1278	1279	1279	1279	1278	1278	1279	1278
5	1273	1274	1274	1275	1275	1276	1277	1277	1277	1277	1277	1277	1277	1276	1276	1275	1274	1273	1273
10	1259	1260	1261	1263	1265	1266	1267	1269	1270	1270	1270	1269	1268	1266	1264	1262	1261	1259	1258
15	1235	1236	1238	1241	1245	1248	1251	1254	1255	1256	1255	1254	1251	1248	1245	1241	1238	1235	1234
20	1200	1202	1205	1210	1215	1221	1226	1230	1232	1233	1232	1230	1226	1221	1215	1209	1204	1200	1198
25	1153	1155	1160	1167	1175	1183	1190	1196	1200	1201	1200	1196	1191	1184	1175	1167	1159	1153	1151
30	1093	1095	1102	1111	1123	1134	1144	1151	1155	1155	1154	1149	1143	1134	1123	1112	1101	1092	1090
35	1017	1021	1029	1042	1057	1070	1081	1089	1095	1097	1096	1091	1082	1070	1057	1043	1029	1017	1015
40	924	929	941	958	973	989	1004	1017	1028	1033	1033	1026	1013	995	976	958	940	926	924
45	815	821	836	854	874	894	915	933	947	956	957	946	927	904	879	855	834	816	814
50	695	701	716	737	758	781	802	822	837	844	841	829	812	787	759	734	711	692	690
55	567	573	588	606	629	653	672	685	690	687	679	670	658	643	620	596	576	559	557
60	449	454	464	477	496	511	517	517	510	500	491	485	479	475	469	452	438	428	428
65	348	349	347	353	363	366	369	371	366	356	347	339	330	320	314	313	312	312	319
70	266	265	257	254	249	252	263	271	270	264	256	248	233	212	201	204	213	223	233
75	198	196	190	178	169	175	191	202	205	201	198	189	173	151	136	140	154	165	170
80	140	140	134	124	122	127	137	146	151	151	148	141	131	117	107	104	111	118	122
85	79.3	78.8	75.7	76.5	78.0	77.8	80.1	83.2	84.4	82.1	80.3	78.6	74.7	70.2	64.6	60.2	59.1	61.1	66.1
90	5.86	8.20	8.20	7.65	6.73	6.27	5.87	5.08	3.40	9.27	7.44	6.03	3.71	3.02	2.33	1.98	2.00	2.56	0.27
95	0.20	0.44	0.54	0.55	0.53	0.38	0.38	0.40	0.42	0.42	0.42	0.40	0.40	0.36	0.41	0.45	0.41	0.34	0.18
100	0.31	0.39	0.50	0.66	0.68	0.43	0.29	0.26	0.25	0.26	0.27	0.26	0.28	0.41	0.52	0.50	0.40	0.31	0.33
105	0.43	0.49	0.48	0.56	0.57	0.54	0.58	0.57	0.55	0.58	0.56	0.52	0.49	0.47	0.48	0.45	0.42	0.35	0.40
110	0.43	0.50	0.50	0.55	0.59	0.56	0.56	0.57	0.62	0.64	0.63	0.59	0.54	0.52	0.52	0.45	0.44	0.37	0.32
115	0.38	0.42	0.46	0.52	0.53	0.59	0.61	0.60	0.63	0.65	0.65	0.61	0.55	0.53	0.49	0.45	0.41	0.36	0.35
120	0.46	0.46	0.49	0.51	0.52	0.53	0.57	0.64	0.69	0.70	0.68	0.63	0.54	0.49	0.48	0.44	0.52	0.47	0.43
125	0.44	0.47	0.44	0.57	0.51	0.54	0.55	0.57	0.62	0.64	0.62	0.59	0.53	0.51	0.51	0.45	0.48	0.42	0.46
130	0.47	0.50	0.49	0.52	0.54	0.53	0.59	0.60	0.62	0.62	0.62	0.62	0.59	0.55	0.58	0.56	0.45	0.44	0.50
135	0.42	0.48	0.50	0.50	0.60	0.63	0.65	0.63	0.65	0.66	0.65	0.65	0.62	0.63	0.57	0.46	0.46	0.50	0.51
140	0.51	0.53	0.51	0.53	0.54	0.68	0.68	0.70	0.69	0.72	0.69	0.71	0.69	0.66	0.54	0.49	0.51	0.48	0.54
145	0.52	0.57	0.57	0.61	0.63	0.58	0.67	0.72	0.73	0.74	0.72	0.72	0.70	0.57	0.52	0.59	0.58	0.58	0.56
150	0.59	0.66	0.59	0.64	0.67	0.66	0.63	0.63	0.67	0.69	0.67	0.61	0.58	0.58	0.64	0.63	0.58	0.64	0.55
155	0.63	0.65	0.62	0.67	0.68	0.68	0.69	0.64	0.63	0.62	0.60	0.63	0.65	0.66	0.61	0.64	0.63	0.64	0.52
160	0.61	0.67	0.69	0.66	0.69	0.68	0.67	0.68	0.67	0.63	0.65	0.65	0.65	0.66	0.68	0.63	0.60	0.65	0.54
165	0.63	0.64	0.68	0.68	0.65	0.65	0.65	0.66	0.61	0.61	0.59	0.64	0.67	0.66	0.61	0.58	0.62	0.63	0.54
170	0.57	0.59	0.62	0.64	0.66	0.63	0.61	0.62	0.61	0.58	0.59	0.66	0.68	0.68	0.66	0.64	0.63	0.62	0.55
175	0.74	0.74	0.75	0.76	0.77	0.74	0.70	0.70	0.69	0.63	0.64	0.69	0.69	0.72	0.77	0.79	0.78	0.77	0.72
180	0.71	0.70	0.69	0.68	0.67	0.67	0.64	0.57	0.61	0.66	0.67	0.62	0.64	0.69	0.69	0.71	0.73	0.73	0.71

C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-01-16

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:34.38W PF:0.9980 Lamp Flux:1757.38x2 lm																	
NAME:									TYPE:L48T8/850/15G-XT H						WEIGHT:		
SPEC.:									DIM.:						SERIAL No.:		
MFR.: ESPEN									SUR.:1.2*0.6						PROTECTION ANGLE:		

Table--2

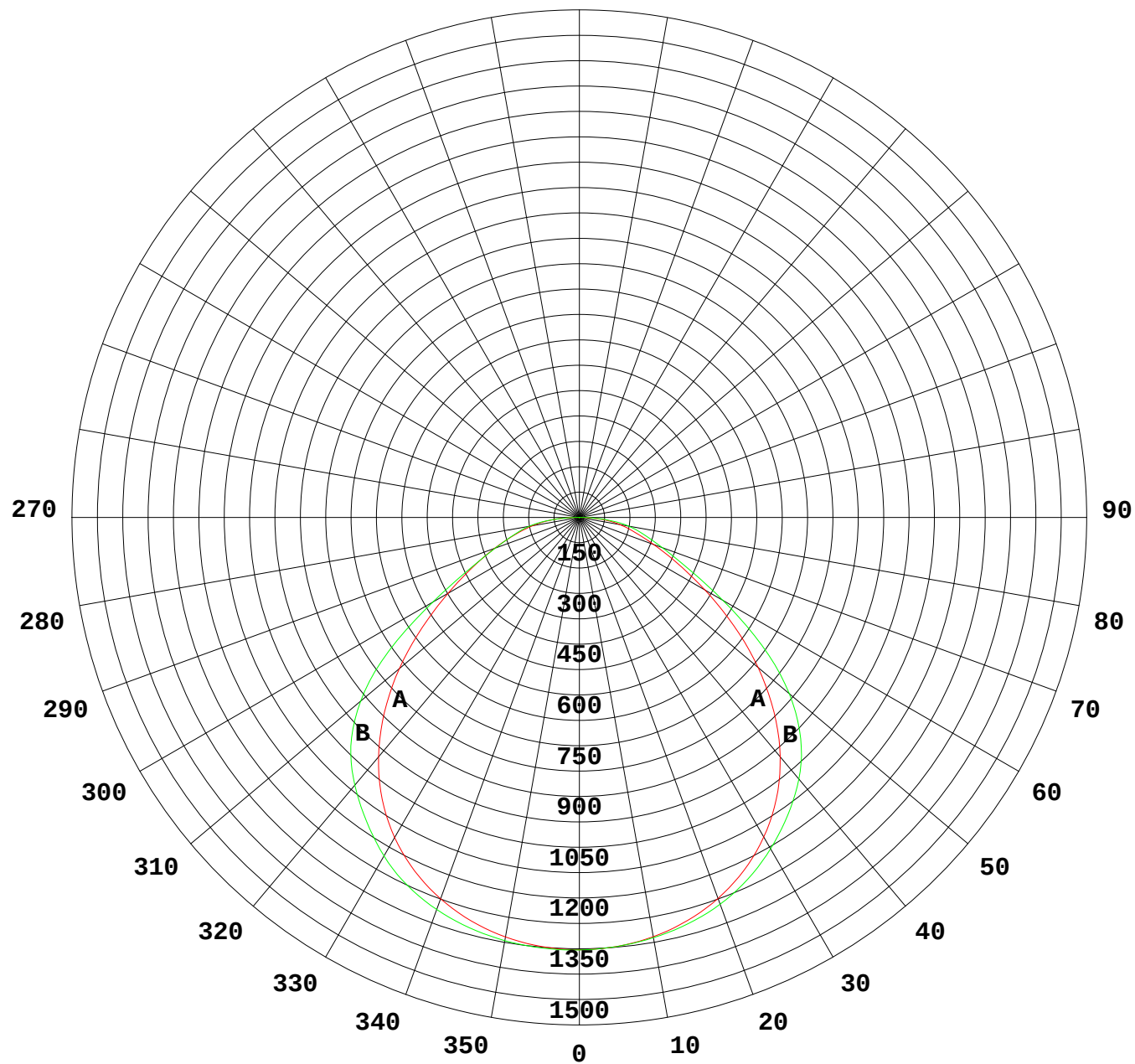
UNIT: cd

C(DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	1278	1278	1278	1278	1278	1278	1278	1278	1278	1278	1278	1279	1279	1279	1278	1278	1279		
5	1272	1272	1272	1272	1272	1272	1272	1272	1273	1273	1273	1273	1273	1273	1274	1274	1274		
10	1257	1257	1257	1258	1258	1259	1260	1261	1261	1261	1261	1261	1261	1260	1260	1260	1260		
15	1233	1233	1233	1235	1237	1238	1240	1242	1243	1243	1243	1242	1241	1239	1238	1237	1237		
20	1197	1198	1199	1202	1205	1209	1212	1214	1216	1217	1217	1215	1212	1209	1206	1204	1203		
25	1150	1151	1154	1159	1164	1169	1173	1177	1179	1180	1180	1178	1174	1169	1163	1159	1157		
30	1089	1092	1097	1105	1112	1119	1124	1128	1130	1131	1130	1127	1122	1116	1109	1102	1098		
35	1015	1019	1028	1037	1047	1057	1066	1072	1074	1073	1069	1063	1055	1047	1038	1030	1024		
40	924	930	941	954	970	984	998	1007	1010	1005	997	985	973	961	950	941	933		
45	814	823	837	856	877	896	912	923	925	920	908	893	876	859	845	833	825		
50	691	701	718	739	760	780	795	805	810	809	799	782	762	744	726	712	704		
55	558	567	582	601	620	633	643	650	659	664	664	656	639	618	599	584	577		
60	428	434	445	459	467	472	480	486	490	495	500	503	501	490	472	460	456		
65	317	315	316	319	323	332	341	348	352	357	361	362	360	358	353	346	348		
70	230	221	212	208	216	234	249	257	260	265	265	261	252	246	249	256	263		
75	171	161	148	142	152	172	188	196	199	202	200	192	177	168	172	186	196		
80	122	116	107	107	115	128	139	145	147	148	144	137	128	125	126	131	141		
85	65.2	63.8	63.3	64.8	69.3	74.1	77.6	80.1	79.7	81.4	81.0	78.2	76.3	76.3	77.0	75.8	80.0		
90	0.44	0.64	0.72	0.73	0.84	0.83	0.82	0.97	0.99	1.27	1.67	2.12	2.53	2.89	11.8	12.6	13.3		
95	0.35	0.40	0.47	0.40	0.32	0.34	0.34	0.36	0.36	0.37	0.36	0.36	0.34	0.43	0.46	0.43	0.37		
100	0.32	0.35	0.54	0.49	0.34	0.32	0.25	0.21	0.22	0.24	0.23	0.26	0.30	0.46	0.57	0.43	0.30		
105	0.36	0.36	0.43	0.48	0.42	0.40	0.37	0.36	0.39	0.37	0.37	0.39	0.41	0.48	0.41	0.37	0.31		
110	0.36	0.37	0.40	0.42	0.44	0.44	0.43	0.46	0.47	0.45	0.44	0.44	0.41	0.36	0.38	0.36	0.39		
115	0.37	0.39	0.40	0.40	0.42	0.44	0.45	0.49	0.51	0.50	0.46	0.41	0.38	0.37	0.40	0.34	0.32		
120	0.44	0.49	0.41	0.45	0.44	0.43	0.44	0.48	0.49	0.48	0.45	0.41	0.40	0.42	0.37	0.38	0.41		
125	0.43	0.43	0.46	0.47	0.48	0.48	0.45	0.47	0.47	0.47	0.46	0.45	0.45	0.42	0.48	0.44	0.43		
130	0.47	0.46	0.50	0.56	0.48	0.50	0.52	0.53	0.52	0.52	0.51	0.49	0.46	0.45	0.49	0.40	0.48		
135	0.55	0.53	0.46	0.55	0.60	0.58	0.53	0.54	0.53	0.52	0.50	0.49	0.54	0.54	0.43	0.48	0.48		
140	0.53	0.54	0.53	0.50	0.61	0.60	0.60	0.57	0.58	0.53	0.57	0.57	0.56	0.51	0.48	0.46	0.52		
145	0.59	0.59	0.56	0.53	0.49	0.60	0.61	0.59	0.60	0.57	0.57	0.57	0.47	0.45	0.54	0.54	0.58		
150	0.58	0.56	0.54	0.56	0.52	0.47	0.46	0.52	0.53	0.50	0.44	0.43	0.47	0.53	0.53	0.54	0.61		
155	0.53	0.54	0.57	0.51	0.53	0.53	0.48	0.45	0.44	0.43	0.45	0.49	0.51	0.52	0.55	0.55	0.60		
160	0.53	0.55	0.51	0.55	0.54	0.51	0.49	0.50	0.46	0.45	0.49	0.49	0.50	0.58	0.53	0.55	0.57		
165	0.56	0.57	0.53	0.49	0.50	0.52	0.53	0.50	0.45	0.45	0.48	0.55	0.52	0.53	0.50	0.61	0.59		
170	0.54	0.57	0.58	0.57	0.56	0.58	0.56	0.56	0.49	0.49	0.52	0.55	0.54	0.59	0.57	0.58	0.56		
175	0.72	0.72	0.72	0.74	0.75	0.69	0.63	0.66	0.62	0.56	0.58	0.63	0.64	0.67	0.72	0.73	0.71		
180	0.71	0.70	0.69	0.69	0.68	0.68	0.65	0.60	0.60	0.63	0.63	0.59	0.64	0.68	0.69	0.71	0.72		

C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-01-16

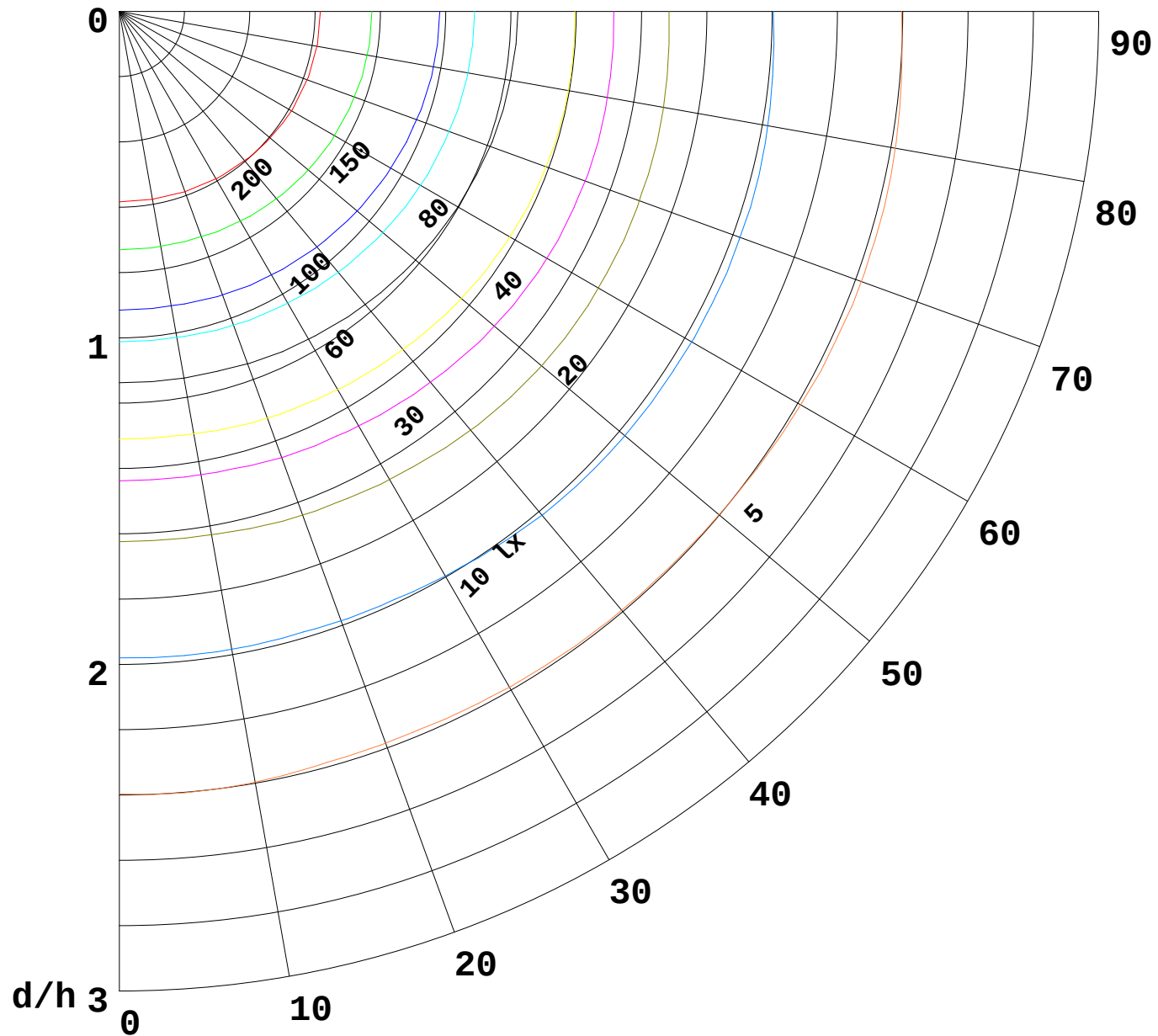
γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE G0-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.455m [K=1.0000]
 Remarks:

I(cd)



1000 λ_m

$K = 1$



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

