



IESNA LM-79 TEST REPORT

Applicant's name	Espen Technology Inc.
Address	12257 Florence Ave., Santa Fe Springs, CA 90670, USA
Brand Name	ESPEN
Report No.	BTR66.181.15.0030.29
Product Name	LED T8 TUBE
Model Number	L48T8-835-15G-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	1 st Floor, 1 st Building, Weitai Industrial Park, Yingrenshi, Shiyao, 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	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 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	0.123	/	14.74	0.997	1817.30	123.29
CCT (K)	CRI (Ra)	R9	x CIE1931	y CIE1931	u' CIE1976	v' CIE1976	Duv CIE1976
3451	84.0	19	0.4104	0.3982	0.2360	0.5151	0.0021

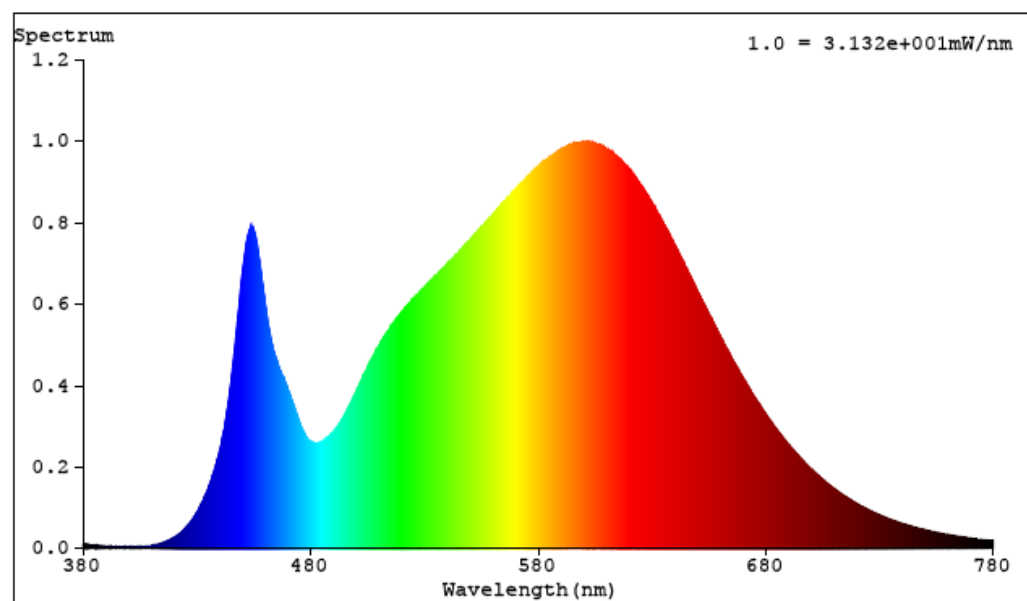
Luminous Intensity

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

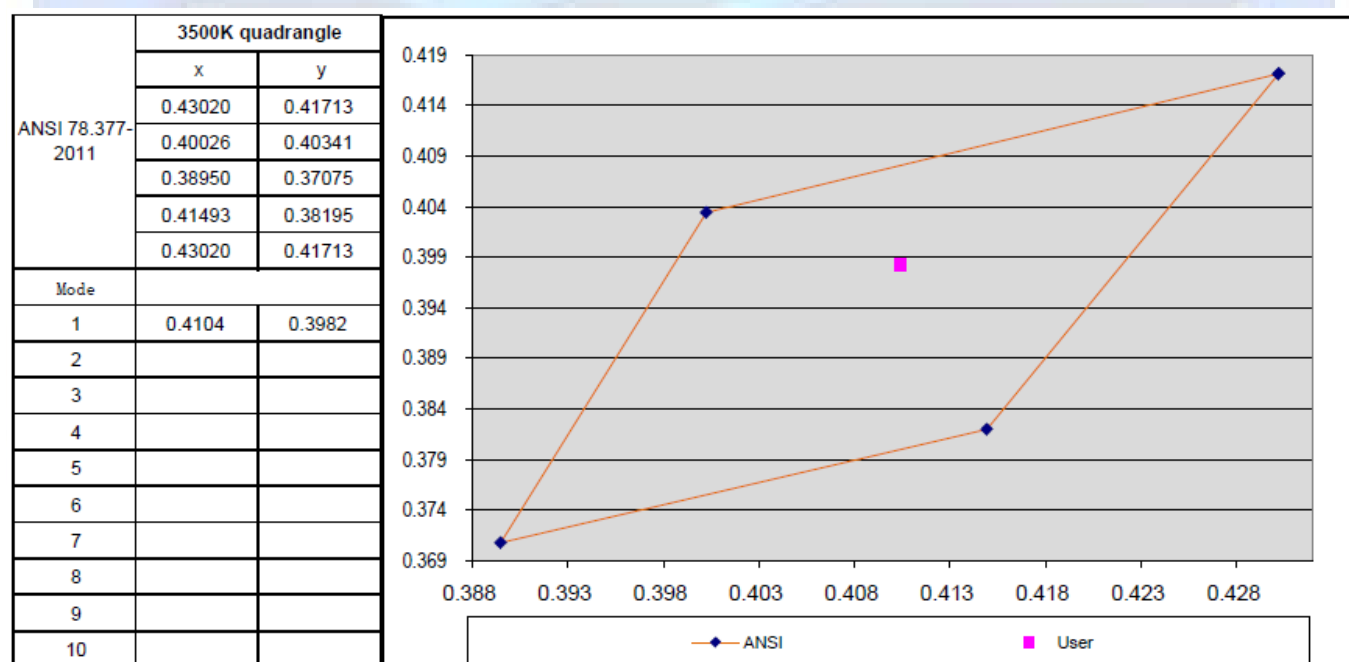
Photometric and Electrical Test Data

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	0.247	5.2%	29.59	0.997	2967.18	100.28	1.28	1.24

Spectral Plots



7 Step Quadrangle



EUT Photo



Luminous Intensity Distribution Test Plots (CIE Chromaticity)

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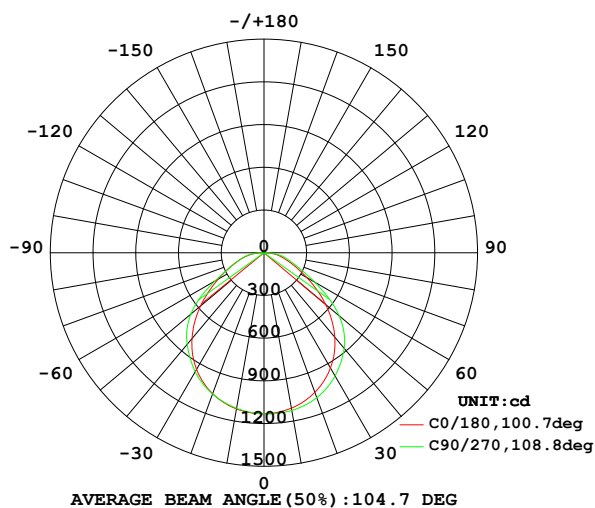


LUMINAIRE PHOTOMETRIC TEST REPORT

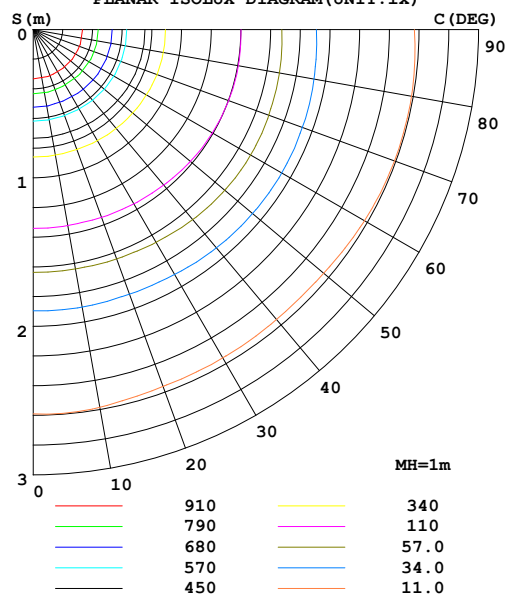
Test:U:120.0V I:0.2473A P:29.59W PF:0.9970 Lamp Flux:1483.59x2 lm		
NAME:	TYPE:L48T8/835/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 100.28 lm/W			
MODEL	L48T/835/15G-XT N	I _{max} (cd)	1136	S/MH (C0/180)	1.23
NOMINAL POWER (W)	15	LOR (%)	100.0	S/MH (C90/270)	1.31
RATED VOLTAGE (V)	120.0	TOTAL FLUX (lm)	2967.2	η UP,DN (C0-180)	0.1,49.4
NOMINAL FLUX (lm)	1483.59	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)



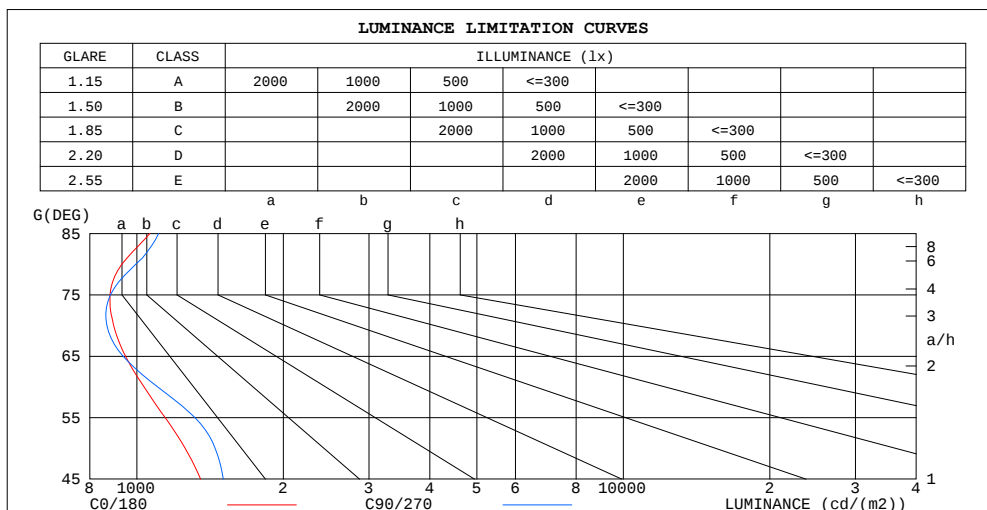
C Range: 0 - 360DEG
 C Interval: 10.0DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-01-15

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	1114	1110	1109	1106	1108	1117	1125	1122	0- 10	107.2	107.2	3.61,3.61
20	1054	1053	1055	1045	1044	1065	1084	1078	10- 20	308.2	415.5	14,14
30	946.7	956.8	965.5	944.3	934.0	969.4	998.1	987.6	20- 30	468.5	883.9	29.8,29.8
40	786.6	813.7	839.5	801.5	774.2	826.4	876.4	841.1	30- 40	560.5	1444	48.7,48.7
50	581.8	626.1	670.5	612.3	565.7	629.0	689.7	644.6	40- 50	562.3	2007	67.6,67.6
60	372.4	405.6	397.3	370.9	347.0	380.0	408.9	418.0	50- 60	454.4	2461	82.9,82.9
70	220.7	203.7	213.7	166.4	189.8	172.9	218.1	208.6	60- 70	280.9	2742	92.4,92.4
80	116.4	102.4	124.4	91.51	99.52	91.75	125.7	106.5	70- 80	157.8	2900	97.7,97.7
90	5.480	5.624	8.401	2.496	0.2667	0.7764	1.224	2.856	80- 90	64.59	2964	99.9,99.9
100	0.2417	0.4141	0.1996	0.3410	0.2650	0.3209	0.1707	0.3020	90-100	0.6352	2965	99.9,99.9
110	0.3259	0.4473	0.4894	0.3993	0.2539	0.3584	0.3767	0.3175	100-110	0.3622	2965	99.9,99.9
120	0.3585	0.3962	0.5320	0.3724	0.3279	0.3476	0.4071	0.3225	110-120	0.3707	2966	100,100
130	0.3760	0.4209	0.4883	0.4490	0.3914	0.4100	0.4087	0.3573	120-130	0.3477	2966	100,100
140	0.4100	0.4898	0.5757	0.4779	0.4345	0.4463	0.4566	0.4176	130-140	0.3341	2966	100,100
150	0.4832	0.5325	0.5527	0.4957	0.4349	0.4347	0.4256	0.4035	140-150	0.2943	2967	100,100
160	0.5006	0.5512	0.5091	0.5364	0.4446	0.4325	0.3749	0.4385	150-160	0.2157	2967	100,100
170	0.4788	0.5176	0.4602	0.5411	0.4594	0.4605	0.3921	0.4550	160-170	0.1336	2967	100,100
180	0.5913	0.5490	0.5401	0.5524	0.5925	0.5669	0.4992	0.5430	170-180	0.0518	2967	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		



LUMINANCE cd/(m2)		
G(°)	C0/180	C90/270
85	1063	1109
80	931	995
75	881	882
70	896	868
65	947	937
60	1035	1103
55	1143	1317
50	1257	1449
45	1352	1506

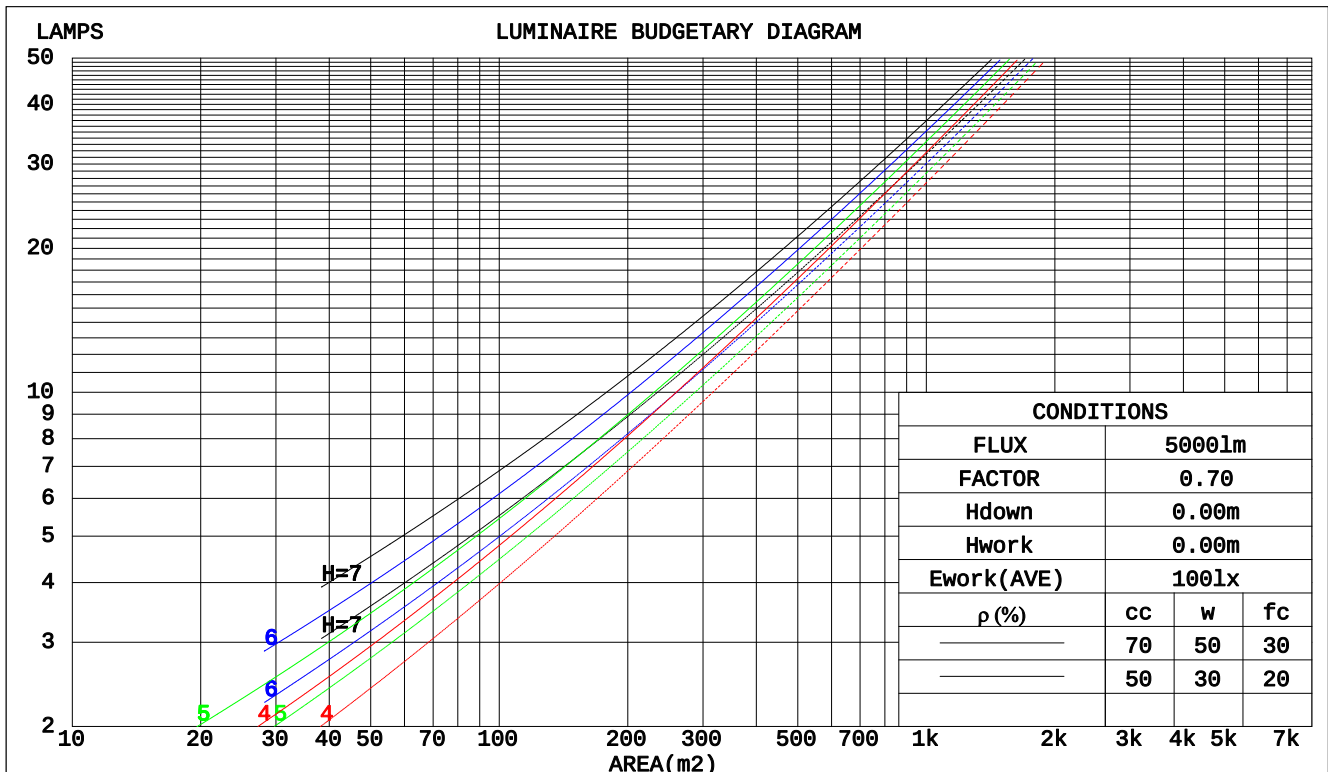
C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature: 25.6DEG
Operators: David
Test Date: 2016-01-15

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:0.2473A P:29.59W PF:0.9970 Lamp Flux:1483.59x2 lm		
NAME:	TYPE:L48T8/835/15G-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	.67	.77	.70	.65	.74	.69	.64	.71	.67	.63	.61
4.0	.72	.64	.57	.71	.63	.57	.69	.62	.56	.66	.60	.55	.64	.59	.55	.53
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	.44	.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:0.2473A P:29.59W PF:0.9970 Lamp Flux:1483.59x2 lm		
NAME:	TYPE:L48T8/835/15G-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	.275	.158	.050	.263	.152	.049	.252	.146	.047	
2.0	.278	.152	.047	.271	.150	.046	.260	.144	.045	.249	.140	.044	.239	.135	.043	
3.0	.258	.137	.041	.252	.135	.041	.242	.131	.040	.233	.128	.039	.224	.124	.038	
4.0	.239	.124	.037	.234	.123	.036	.225	.119	.036	.217	.116	.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	.101	.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	.071	.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
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 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:0.2473A P:29.59W PF:0.9970 Lamp Flux:1483.59x2 lm											
NAME:					TYPE:L48T8/835/15G-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		13.1	14.5	13.3	14.7	14.9	13.6	15.1	13.9	15.3	15.5
	3H	14.2	15.5	14.5	15.8	16.0	14.6	15.9	14.9	16.2	16.4
	4H	14.7	16.0	15.0	16.3	16.5	15.1	16.4	15.4	16.6	16.9
	6H	15.2	16.4	15.6	16.7	17.0	15.6	16.8	15.9	17.1	17.4
	8H	15.5	16.6	15.8	16.9	17.2	15.9	17.0	16.2	17.3	17.6
	12H	15.7	16.8	16.0	17.1	17.4	16.1	17.2	16.4	17.5	17.8
4H	2H	13.6	14.8	13.9	15.1	15.3	14.0	15.3	14.3	15.5	15.8
	3H	14.8	16.0	15.2	16.3	16.6	15.2	16.3	15.5	16.6	16.9
	4H	15.5	16.5	15.9	16.8	17.2	15.8	16.8	16.2	17.2	17.5
	6H	16.2	17.1	16.6	17.4	17.8	16.5	17.4	16.9	17.8	18.1
	8H	16.5	17.3	16.9	17.7	18.1	16.9	17.7	17.3	18.1	18.5
	12H	16.8	17.6	17.2	18.0	18.4	17.2	18.0	17.6	18.3	18.7
8H	4H	15.7	16.5	16.1	16.9	17.3	16.0	16.8	16.4	17.2	17.6
	6H	16.5	17.2	17.0	17.6	18.1	16.9	17.6	17.3	18.0	18.4
	8H	17.0	17.6	17.4	18.0	18.5	17.4	18.0	17.8	18.4	18.9
	12H	17.4	18.0	17.9	18.4	18.9	17.8	18.4	18.3	18.8	19.3
12H	4H	15.7	16.5	16.1	16.9	17.3	16.0	16.8	16.4	17.2	17.6
	6H	16.6	17.3	17.1	17.7	18.1	17.0	17.6	17.4	18.0	18.4
	8H	17.1	17.7	17.6	18.1	18.6	17.5	18.0	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 / - 0.3					+ 0.3 / - 0.5				
2.0H		+ 0.3 / - 0.4					+ 0.4 / - 0.4				

CIE Pub.117 Corrected 2967 lm Total Lamp Luminous Flux.(8log(F/F0) = 3.8)

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:0.2473A P:29.59W PF:0.9970 Lamp Flux:1483.59x2 lm		
NAME:	TYPE:L48T8/835/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

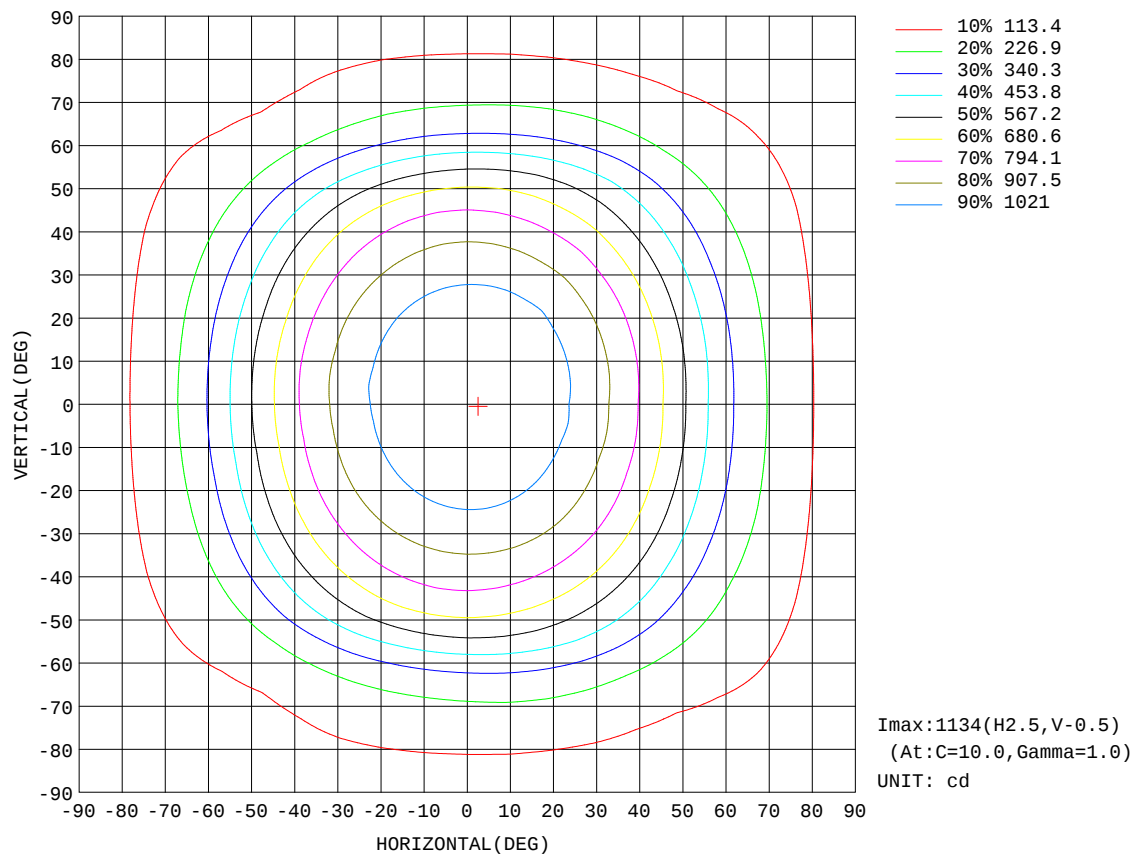
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) $k(RI) \times RCR = 5$									
k = 0.60	60	48	42	59	48	42	58	48	41	35
0.80	70	59	52	69	58	51	67	57	51	44
1.00	78	68	61	77	67	61	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	89	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:0.2473A P:29.59W PF:0.9970 Lamp Flux:1483.59x2 lm		
NAME:	TYPE:L48T8/835/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:



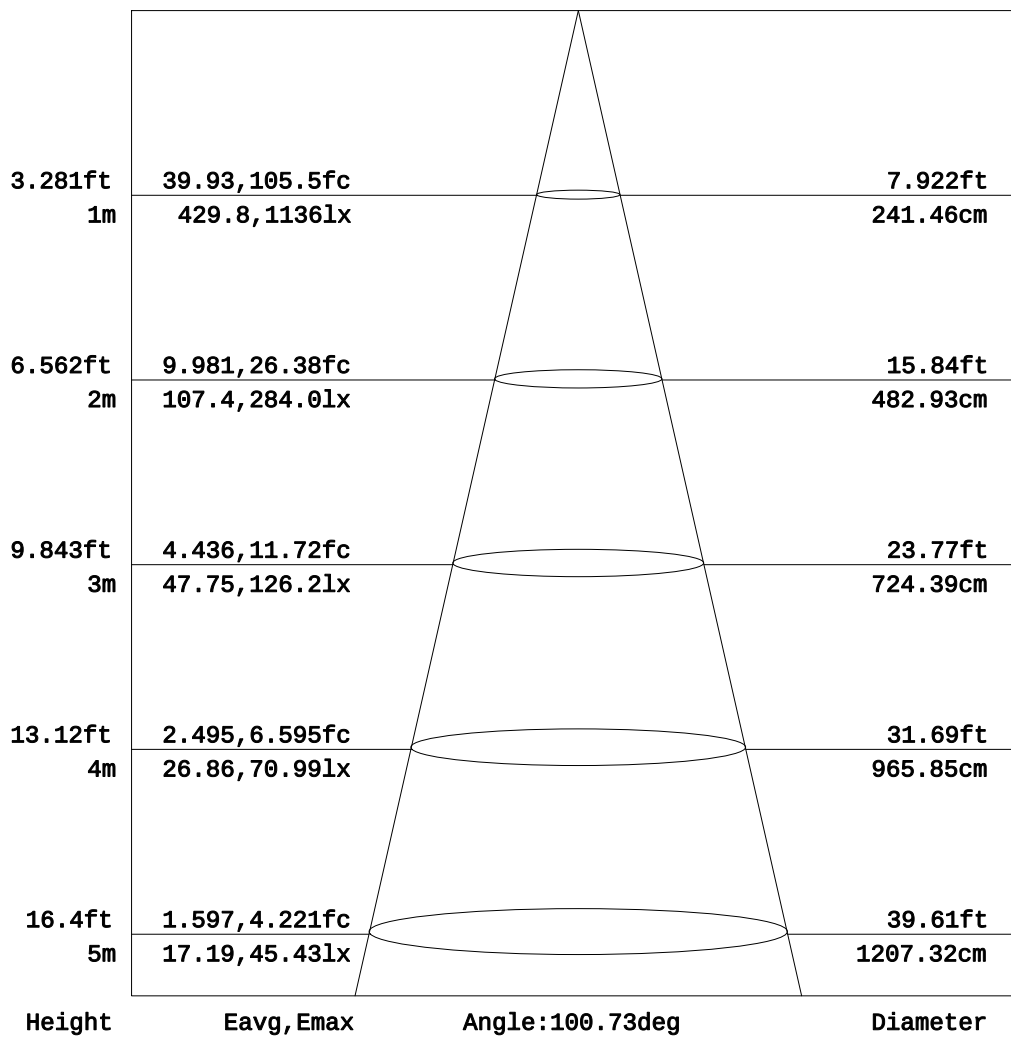
C Range: 0 - 360DEG
C Interval: 10.0DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2016-01-15

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:0.2473A P:29.59W PF:0.9970 Lamp Flux:1483.59x2 lm		
NAME:	TYPE:L48T8/835/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:

Flux out:2059 lm



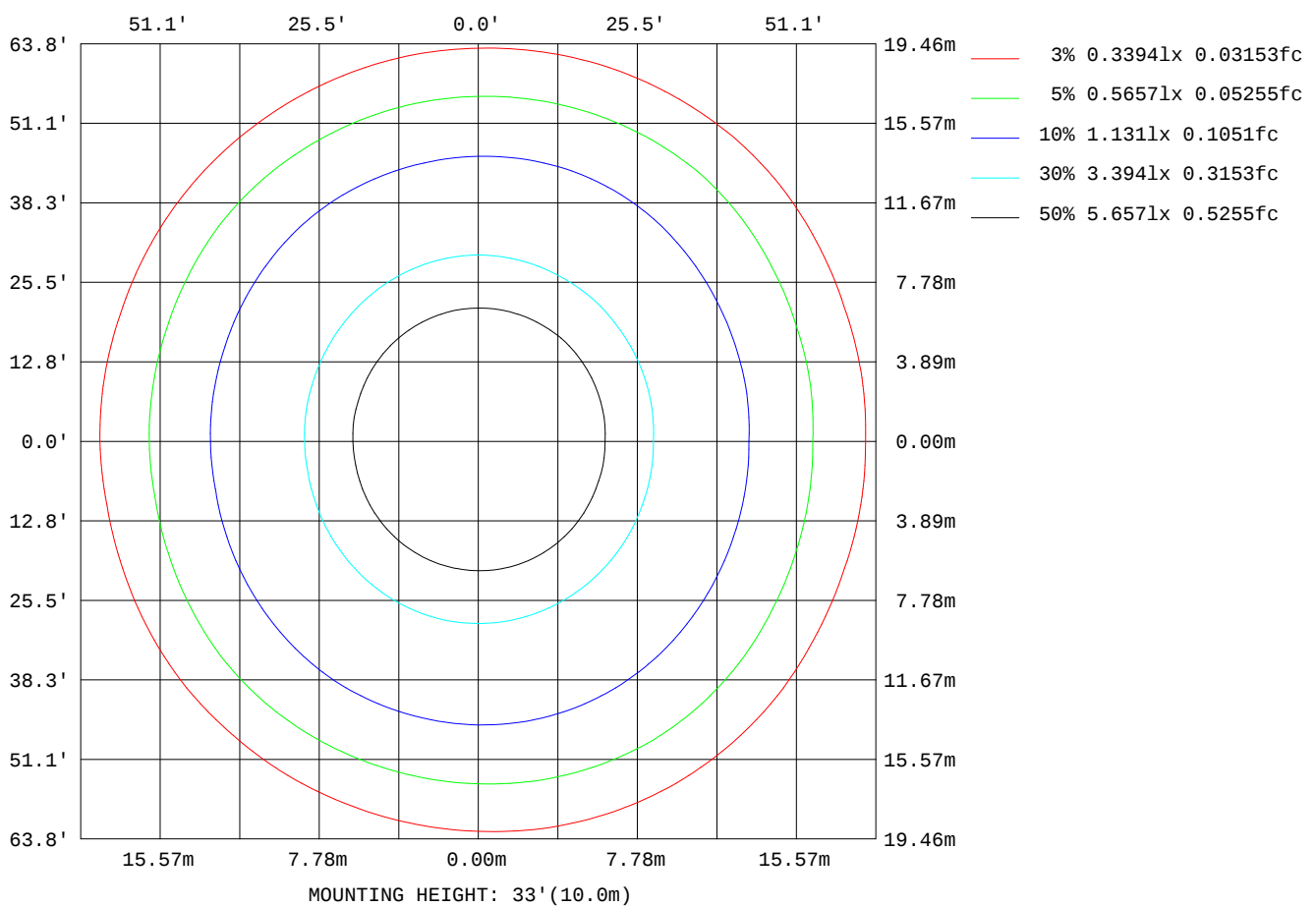
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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

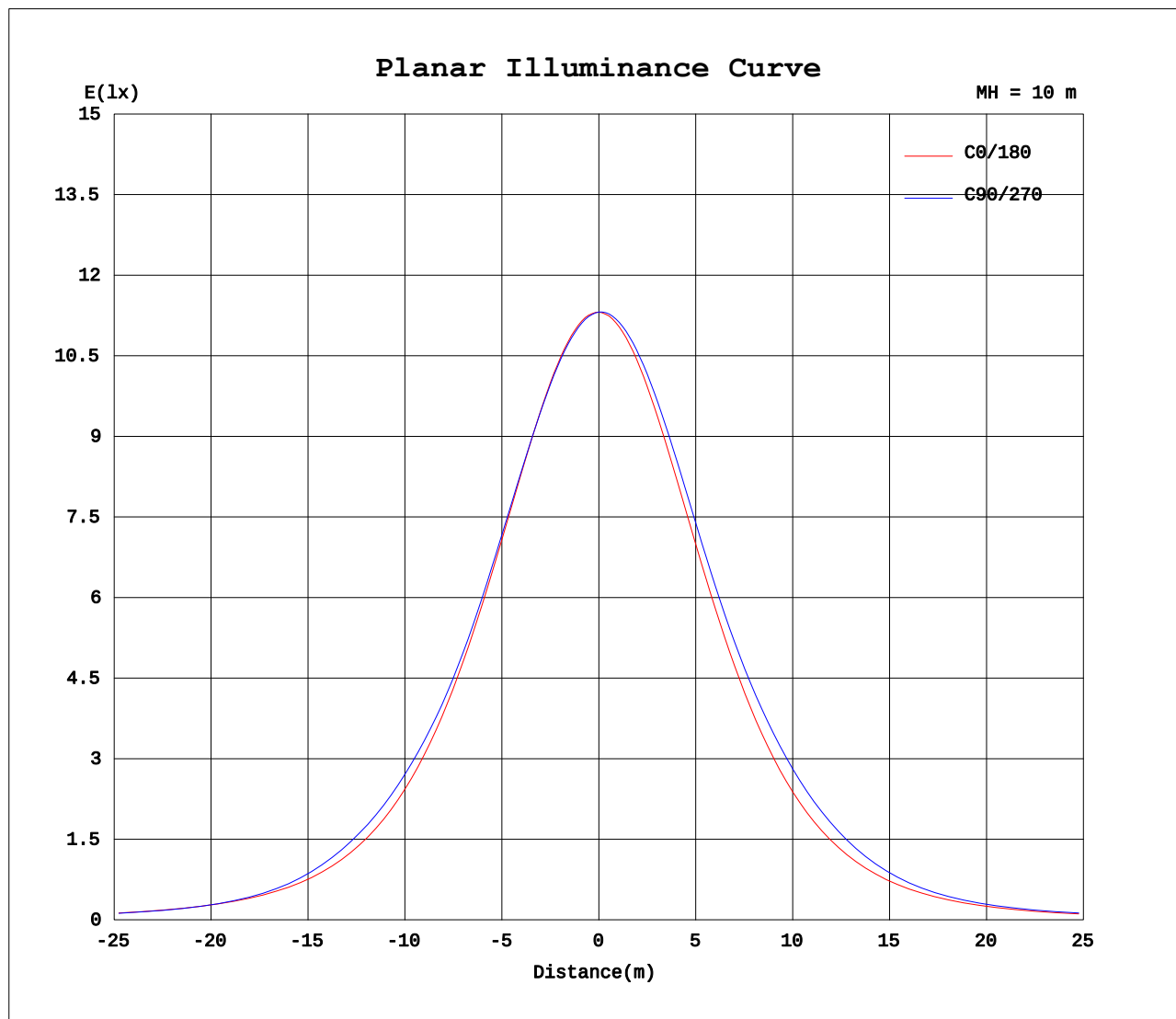
Test:U:120.0V I:0.2473A P:29.59W PF:0.9970 Lamp Flux:1483.59x2 lm		
NAME:	TYPE:L48T8/835/15G-XT N	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: ESPEN	SUR.:1.2*0.6	PROTECTION ANGLE:



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:0.2473A P:29.59W PF:0.9970 Lamp Flux:1483.59x2 lm																		
NAME:									TYPE:L48T8/835/15G-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	1131	1136	1131	1131	1132	1131	1131	1132	1132	1132	1132	1132	1132	1132	1132	1132	1132	1132	1131
5	1128	1132	1126	1126	1125	1125	1125	1125	1124	1124	1124	1123	1123	1124	1123	1123	1124	1124	1125
10	1114	1117	1112	1111	1110	1110	1110	1110	1110	1109	1108	1108	1107	1107	1106	1106	1106	1107	1108
15	1089	1092	1087	1086	1086	1087	1087	1087	1087	1086	1085	1084	1082	1081	1080	1079	1079	1079	1081
20	1054	1056	1051	1052	1052	1054	1055	1056	1056	1055	1054	1052	1049	1046	1044	1042	1040	1040	1044
25	1006	1008	1004	1006	1008	1011	1014	1016	1017	1016	1014	1010	1007	1002	998	994	991	991	995
30	947	949	946	949	954	959	964	966	967	965	963	958	953	947	941	935	931	929	934
35	874	876	875	881	888	895	900	904	905	905	902	897	890	882	874	866	859	855	860
40	787	789	791	800	809	818	827	833	838	840	837	831	820	808	795	784	775	769	774
45	688	691	695	706	719	732	745	755	763	767	765	755	740	723	706	690	678	670	674
50	582	585	591	604	619	634	647	660	667	670	665	655	643	622	603	585	571	561	566
55	472	476	482	493	509	526	539	546	548	544	536	527	519	505	487	471	459	449	453
60	372	375	378	387	400	411	416	413	407	397	389	383	379	374	368	357	347	342	347
65	288	288	283	286	293	295	299	298	295	285	278	271	264	254	249	249	248	251	258
70	221	219	210	207	202	205	215	220	220	214	207	200	188	172	161	164	172	180	190
75	164	163	156	146	138	143	157	165	168	164	161	154	142	123	111	114	125	135	140
80	116	116	111	103	100	105	114	120	125	124	122	116	107	96.0	87.0	85.1	90.4	96.7	99.5
85	66.7	66.1	63.0	63.5	64.4	64.8	67.4	70.1	71.7	69.6	68.1	66.1	63.0	56.5	51.6	49.4	48.7	50.3	54.8
90	5.48	7.31	7.06	6.65	5.84	5.41	5.24	4.62	9.63	8.40	6.89	5.73	3.57	2.83	2.16	1.92	1.93	2.35	0.27
95	0.16	0.34	0.39	0.39	0.36	0.28	0.27	0.28	0.28	0.28	0.28	0.28	0.28	0.25	0.31	0.32	0.29	0.26	0.14
100	0.24	0.30	0.36	0.49	0.49	0.34	0.22	0.20	0.19	0.20	0.21	0.20	0.22	0.31	0.38	0.37	0.30	0.24	0.27
105	0.32	0.38	0.36	0.42	0.45	0.41	0.44	0.42	0.42	0.43	0.41	0.39	0.38	0.36	0.36	0.35	0.32	0.27	0.32
110	0.33	0.39	0.39	0.41	0.44	0.45	0.44	0.43	0.47	0.49	0.47	0.44	0.42	0.40	0.40	0.35	0.34	0.29	0.25
115	0.29	0.32	0.35	0.40	0.40	0.44	0.48	0.48	0.50	0.52	0.51	0.47	0.42	0.41	0.38	0.35	0.32	0.28	0.28
120	0.36	0.35	0.38	0.39	0.40	0.39	0.42	0.48	0.52	0.53	0.52	0.47	0.42	0.38	0.37	0.34	0.41	0.37	0.33
125	0.35	0.37	0.34	0.45	0.40	0.42	0.43	0.43	0.47	0.48	0.47	0.45	0.41	0.40	0.40	0.35	0.37	0.33	0.36
130	0.38	0.39	0.38	0.41	0.43	0.41	0.46	0.47	0.49	0.49	0.48	0.49	0.46	0.43	0.47	0.45	0.35	0.34	0.39
135	0.34	0.38	0.39	0.39	0.48	0.51	0.52	0.49	0.51	0.52	0.51	0.51	0.50	0.50	0.46	0.36	0.36	0.40	0.39
140	0.41	0.42	0.40	0.42	0.43	0.55	0.55	0.56	0.55	0.58	0.55	0.57	0.56	0.53	0.42	0.39	0.39	0.38	0.43
145	0.42	0.45	0.44	0.49	0.50	0.47	0.54	0.58	0.59	0.60	0.58	0.58	0.56	0.46	0.43	0.47	0.45	0.46	0.45
150	0.48	0.52	0.47	0.51	0.53	0.53	0.51	0.51	0.55	0.55	0.54	0.50	0.48	0.48	0.51	0.50	0.47	0.50	0.43
155	0.52	0.53	0.49	0.53	0.54	0.55	0.55	0.53	0.52	0.51	0.49	0.51	0.53	0.53	0.49	0.51	0.50	0.51	0.42
160	0.50	0.54	0.55	0.52	0.55	0.55	0.54	0.55	0.54	0.51	0.52	0.52	0.52	0.53	0.54	0.51	0.49	0.53	0.44
165	0.52	0.53	0.55	0.54	0.52	0.52	0.52	0.53	0.49	0.49	0.47	0.52	0.54	0.53	0.50	0.47	0.51	0.52	0.45
170	0.48	0.49	0.51	0.52	0.53	0.51	0.49	0.49	0.49	0.46	0.48	0.53	0.55	0.55	0.54	0.52	0.52	0.51	0.46
175	0.61	0.61	0.62	0.62	0.62	0.60	0.57	0.57	0.56	0.51	0.52	0.56	0.56	0.58	0.62	0.64	0.63	0.63	0.60
180	0.59	0.58	0.57	0.56	0.55	0.55	0.52	0.46	0.50	0.54	0.49	0.47	0.50	0.55	0.56	0.57	0.59	0.60	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:0.2473A P:29.59W PF:0.9970 Lamp Flux:1483.59x2 lm																	
NAME:									TYPE:L48T8/835/15G-XT N						WEIGHT:		
SPEC.:									DIM.:						SERIAL No.:		
MFR.: ESPEN									SUR.: 1.2*0.6						PROTECTION ANGLE:		

Table--2

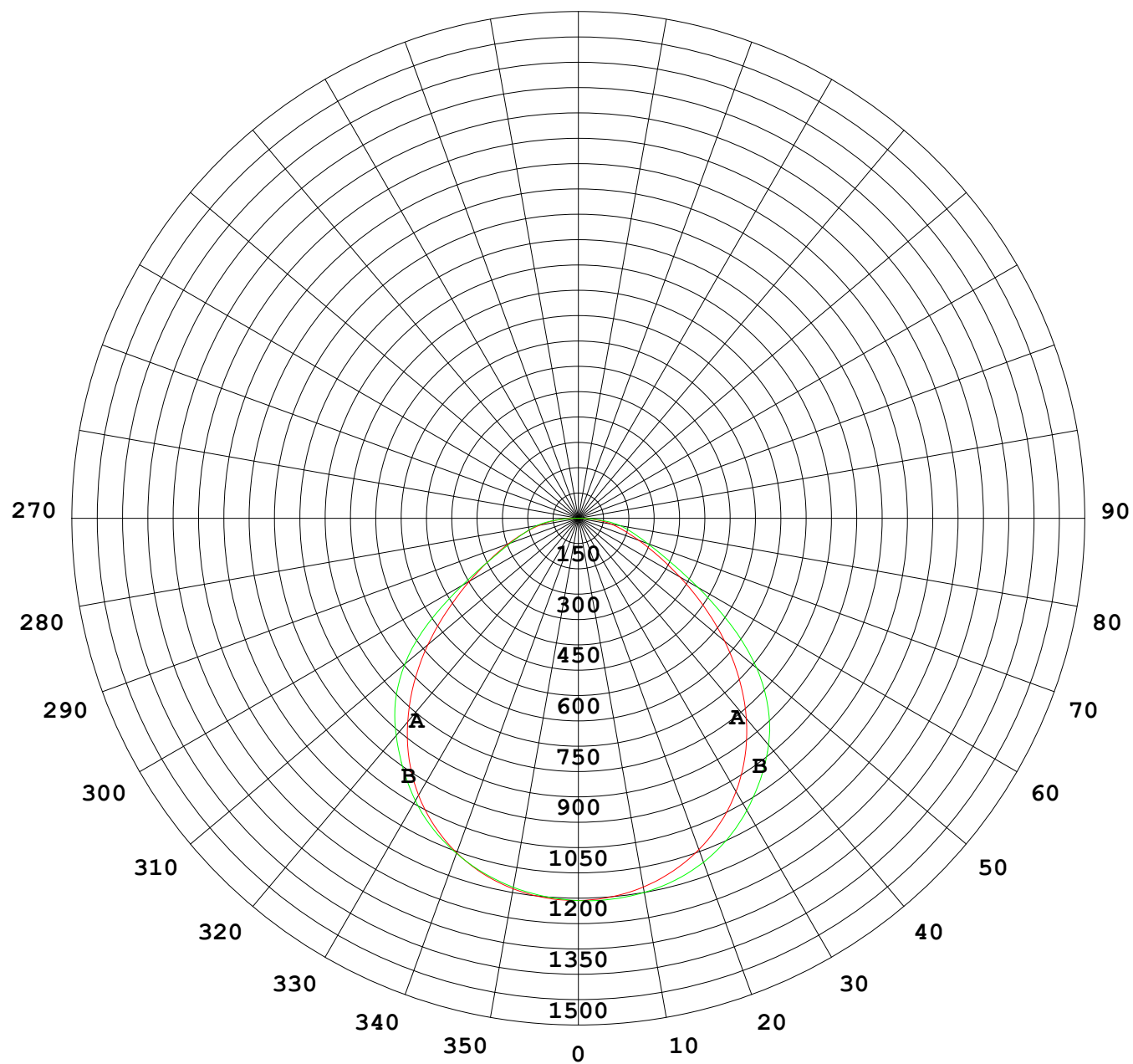
UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	1136	1131	1131	1132	1131	1131	1132	1132	1132	1132	1132	1132	1132	1132	1132	1132	1132		
5	1130	1126	1127	1128	1129	1130	1131	1131	1132	1132	1132	1132	1132	1132	1131	1131	1130		
10	1114	1112	1114	1116	1118	1120	1122	1123	1125	1125	1125	1124	1123	1122	1120	1119	1117		
15	1088	1087	1090	1094	1098	1102	1105	1107	1109	1109	1109	1108	1110	1103	1100	1097	1094		
20	1051	1051	1056	1062	1068	1073	1077	1081	1084	1084	1084	1082	1083	1074	1069	1064	1060		
25	1002	1004	1011	1019	1027	1033	1039	1044	1047	1048	1047	1045	1044	1034	1027	1020	1014		
30	942	945	955	965	974	983	989	995	998	999	998	994	993	982	973	964	957		
35	869	875	886	898	910	921	931	938	941	941	937	931	928	915	905	894	885		
40	783	791	803	818	835	850	864	873	876	874	867	857	849	833	822	810	799		
45	683	692	707	727	747	765	781	792	795	792	782	770	758	739	725	712	701		
50	574	583	600	619	639	658	672	683	690	690	682	668	655	635	618	604	594		
55	460	467	481	498	516	527	536	545	553	559	562	557	544	524	506	492	484		
60	351	355	365	376	384	390	398	404	409	415	420	423	424	412	397	386	381		
65	259	256	257	260	265	273	282	290	294	299	303	304	303	300	295	290	290		
70	189	180	173	169	177	193	207	214	218	222	223	219	212	206	209	214	219		
75	141	132	120	115	125	144	157	164	168	170	169	162	150	142	146	156	164		
80	101	95.4	88.3	87.9	95.6	107	117	123	126	126	122	115	108	105	105	110	118		
85	54.3	52.9	52.4	54.2	58.3	62.7	66.3	68.7	68.7	70.2	69.4	66.7	65.1	64.7	65.0	64.0	67.7		
90	0.41	0.55	0.66	0.69	0.86	0.94	0.99	1.17	1.22	1.64	2.07	2.44	2.65	3.07	10.9	10.9	11.5		
95	0.28	0.30	0.37	0.29	0.23	0.25	0.25	0.26	0.26	0.27	0.26	0.27	0.26	0.35	0.37	0.35	0.30		
100	0.25	0.27	0.43	0.37	0.27	0.23	0.17	0.16	0.17	0.18	0.17	0.19	0.23	0.38	0.47	0.34	0.25		
105	0.29	0.29	0.36	0.38	0.33	0.32	0.29	0.29	0.31	0.30	0.30	0.32	0.34	0.40	0.34	0.30	0.25		
110	0.28	0.29	0.32	0.35	0.37	0.35	0.34	0.37	0.38	0.37	0.36	0.36	0.34	0.30	0.30	0.29	0.30		
115	0.29	0.31	0.32	0.33	0.34	0.37	0.37	0.40	0.41	0.40	0.36	0.33	0.30	0.30	0.31	0.27	0.25		
120	0.34	0.38	0.32	0.35	0.34	0.34	0.36	0.40	0.41	0.39	0.37	0.33	0.31	0.33	0.29	0.30	0.31		
125	0.33	0.34	0.36	0.36	0.38	0.38	0.37	0.38	0.39	0.38	0.36	0.35	0.35	0.32	0.38	0.34	0.33		
130	0.37	0.37	0.40	0.44	0.38	0.39	0.41	0.41	0.41	0.40	0.40	0.38	0.36	0.36	0.38	0.32	0.36		
135	0.42	0.42	0.38	0.43	0.48	0.45	0.41	0.42	0.42	0.40	0.39	0.39	0.42	0.42	0.34	0.38	0.37		
140	0.42	0.43	0.42	0.41	0.48	0.47	0.47	0.44	0.46	0.42	0.44	0.44	0.43	0.40	0.38	0.37	0.39		
145	0.47	0.45	0.45	0.43	0.40	0.47	0.48	0.46	0.47	0.45	0.45	0.45	0.37	0.36	0.44	0.45	0.46		
150	0.48	0.43	0.44	0.45	0.42	0.38	0.38	0.42	0.43	0.40	0.36	0.35	0.38	0.43	0.43	0.41	0.50		
155	0.43	0.42	0.43	0.42	0.43	0.43	0.38	0.36	0.36	0.34	0.37	0.39	0.41	0.42	0.44	0.43	0.49		
160	0.44	0.45	0.40	0.43	0.44	0.42	0.40	0.40	0.37	0.37	0.39	0.40	0.42	0.46	0.41	0.44	0.49		
165	0.47	0.47	0.44	0.40	0.41	0.42	0.43	0.41	0.37	0.37	0.39	0.43	0.41	0.42	0.40	0.51	0.50		
170	0.46	0.47	0.48	0.46	0.46	0.46	0.45	0.44	0.39	0.38	0.40	0.42	0.43	0.48	0.47	0.48	0.48		
175	0.60	0.60	0.61	0.61	0.61	0.57	0.52	0.55	0.51	0.48	0.49	0.53	0.53	0.55	0.60	0.61	0.59		
180	0.59	0.58	0.58	0.57	0.56	0.56	0.54	0.50	0.50	0.52	0.52	0.49	0.53	0.55	0.56	0.58	0.59		

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

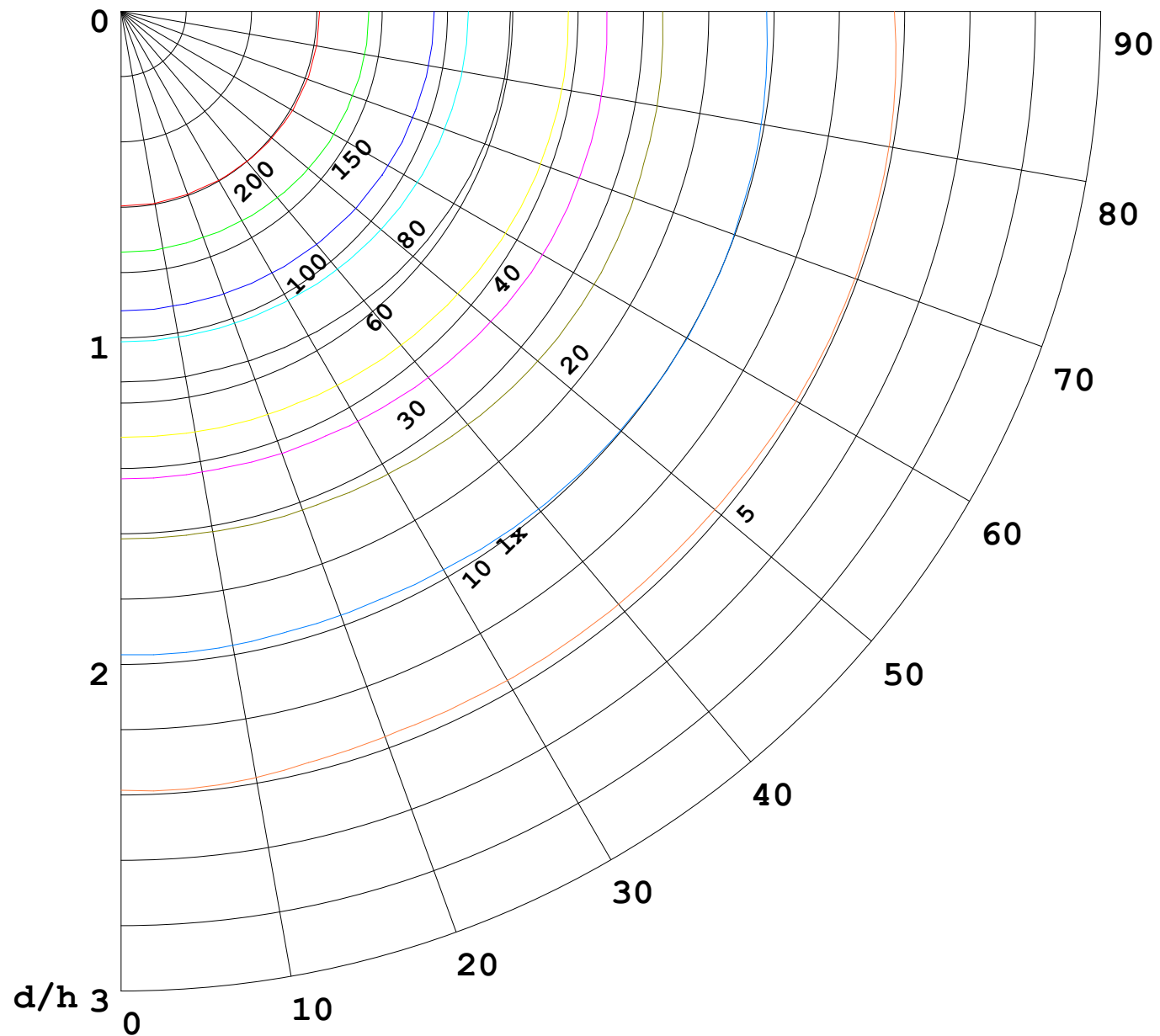
γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE G0-R5000_V2 SYSTEM V2.0.287
 Humidity: 67.1%
 Test Distance: 2.455m [K=1.0000]
 Remarks:

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

