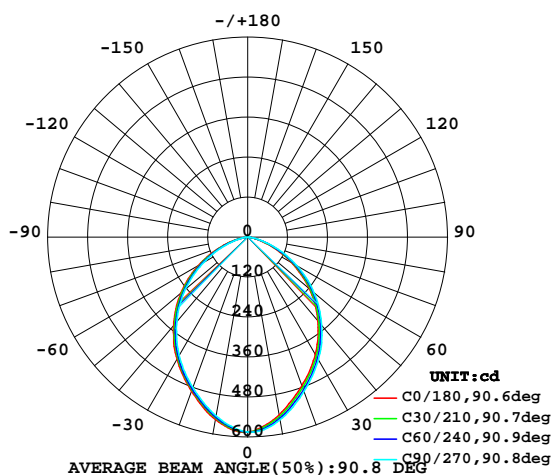


LUMINAIRE PHOTOMETRIC TEST REPORT

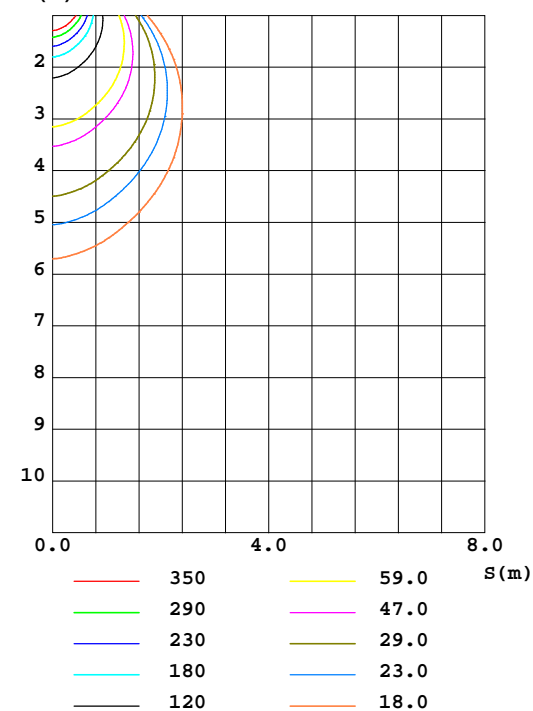
Test:U:230.4V I:0.0890A P:17.90W PF:0.8730 Lamp Flux:1221.31x1 lm		
NAME: LPA-DR-HAL4-18-857-D90-C3	TYPE:18W	WEIGHT:
DIM.:	SPEC.:5700K	SERIAL No.:
MFR.:	SUR.:0.00816714	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 68.23 lm/W			
MODEL		I _{max} (cd)	586.0	S/MH(C0/180)	1.05
NOMINAL POWER(W)	18	LOR(%)	100.0	S/MH(C90/270)	1.10
RATED VOLTAGE(V)	230	TOTAL FLUX(lm)	1221.3	η UP,DN(C0-180)	0.0,50.6
NOMINAL FLUX(lm)	1221.31	CIE CLASS	DIRECT	η UP,DN(C180-360)	0.0,49.4
LAMPS INSIDE	1	η up(%)	0.0	CIBSE SHR NOM	1.25
TEST VOLTAGE(V)	230.4	η down(%)	100.0	CIBSE SHR MAX	1.25

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



C0 PLANE ISOLUX DIAGRAM (UNIT:lx)



C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2017-07-06

γ Range: 0 - 90DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.700m [K=1.0000]
Remarks:

ZONAL FLUX DIAGRAM

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	Φ lum, lamp
10	542.6	550.2	557.3	557.0	556.2	550.8	545.2	541.3	0- 10	54.02	54.02	4.42,4.42
20	475.5	485.2	493.6	492.7	492.6	487.3	481.0	475.3	10- 20	145.9	199.9	16.4,16.4
30	406.4	416.0	424.7	425.3	424.2	418.2	411.1	405.8	20- 30	208.0	407.9	33.4,33.4
40	327.8	336.9	345.7	348.0	346.1	339.0	331.1	326.2	30- 40	236.3	644.2	52.7,52.7
50	242.6	251.3	260.4	263.7	262.1	253.6	244.5	240.7	40- 50	227.9	872.2	71.4,71.4
60	150.8	159.7	169.1	172.2	171.2	162.1	152.6	149.3	50- 60	184.7	1057	86.5,86.5
70	66.77	74.14	82.32	84.62	84.44	76.80	68.40	64.07	60- 70	115.5	1172	96,96
80	13.95	17.11	19.19	15.60	14.75	14.56	14.13	12.02	70- 80	44.51	1217	99.6,99.6
90	0.3788	0.3819	0.3283	0.3188	0.3157	0.3188	0.3346	0.3472	80- 90	4.482	1221	100,100
100									90-100			
110									100-110			
120									110-120			
130									120-130			
140									130-140			
150									140-150			
160									150-160			
170									160-170			
180									170-180			
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

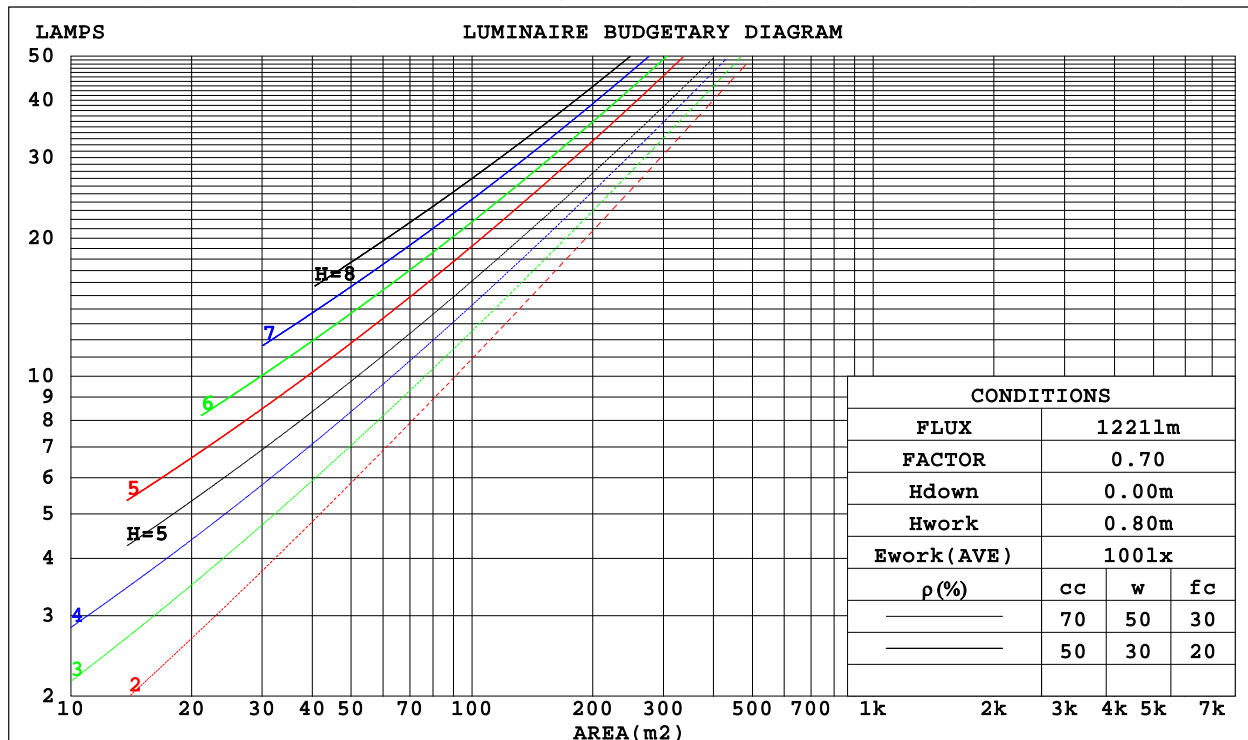
C Range: 0 - 360DEG
 C Interval: 30.0DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:DAMIN
 Test Date:2017-07-06

γ Range: 0 - 90DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-2000A_V1 SYSTEM V2.0.276
 Humidity:65.0%
 Test Distance:9.700m [K=1.0000]
 Remarks:

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

Test:U:230.4V I:0.0890A P:17.90W PF:0.8730 Lamp Flux:1221.31x1 lm		
NAME: LPA-DR-HAL4-18-857-D90-C3	TYPE:18W	WEIGHT:
DIM.:	SPEC.:5700K	SERIAL No.:
MFR.:	SUR.:0.00816714	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	1.06	1.02	.99	1.04	1.01	.98	.90	.97	.95	.96	.94	.92	.92	.91	.89	.87
2.0	.94	.88	.83	.92	.87	.82	.89	.84	.80	.85	.82	.78	.83	.79	.76	.74
3.0	.84	.76	.70	.82	.75	.70	.79	.73	.68	.76	.71	.67	.74	.70	.66	.64
4.0	.75	.67	.60	.73	.66	.60	.71	.64	.59	.69	.63	.58	.67	.62	.58	.56
5.0	.67	.59	.53	.66	.58	.52	.64	.57	.52	.62	.56	.51	.60	.55	.51	.49
6.0	.61	.52	.46	.60	.52	.46	.58	.51	.46	.57	.50	.45	.55	.49	.45	.43
7.0	.55	.47	.41	.55	.47	.41	.53	.46	.41	.52	.45	.41	.50	.45	.40	.38
8.0	.51	.43	.37	.50	.42	.37	.49	.42	.37	.48	.41	.37	.47	.41	.36	.35
9.0	.47	.39	.34	.46	.39	.34	.45	.38	.33	.44	.38	.33	.43	.37	.33	.31
10.0	.43	.36	.31	.43	.36	.31	.42	.35	.31	.41	.35	.30	.40	.34	.30	.29



C Range: 0 - 360DEG
 C Interval: 30.0DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:DAMIN
 Test Date:2017-07-06

γ Range: 0 - 90DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-2000A_V1 SYSTEM V2.0.276
 Humidity:65.0%
 Test Distance:9.700m [K=1.0000]
 Remarks:

WEC AND CCEC

Test:U:230.4V I:0.0890A P:17.90W PF:0.8730 Lamp Flux:1221.31x1 lm		
NAME: LPA-DR-HAL4-18-857-D90-C3	TYPE:18W	WEIGHT:
DIM.:	SPEC.:5700K	SERIAL No.:
MFR.:	SUR.:0.00816714	PROTECTION ANGLE:

pcc	80%			70%			50%			30%			10%			0
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
pfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio Wall Exitance Coefficients(WEC)															
0.0																
1.0	.265	.151	.048	.259	.147	.047	.245	.141	.045	.233	.135	.043	.222	.129	.042	
2.0	.258	.141	.043	.252	.139	.043	.240	.134	.042	.230	.129	.040	.220	.124	.039	
3.0	.243	.130	.039	.238	.127	.038	.228	.124	.038	.219	.120	.037	.210	.116	.036	
4.0	.228	.118	.035	.223	.117	.035	.214	.114	.034	.206	.111	.033	.198	.108	.033	
5.0	.213	.109	.031	.209	.107	.031	.201	.105	.031	.194	.102	.030	.187	.100	.030	
6.0	.199	.100	.029	.196	.099	.028	.189	.097	.028	.182	.095	.028	.176	.093	.028	
7.0	.187	.092	.026	.184	.092	.026	.177	.090	.026	.172	.088	.026	.166	.086	.025	
8.0	.176	.086	.024	.173	.085	.024	.167	.083	.024	.162	.082	.024	.157	.081	.023	
9.0	.165	.080	.022	.163	.079	.022	.158	.078	.022	.153	.077	.022	.148	.075	.022	
10.0	.156	.075	.021	.154	.074	.021	.149	.073	.021	.145	.072	.020	.141	.071	.020	

pcc	80%			70%			50%			30%			10%			0
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
pfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio Ceiling Cavity Exitance Coefficients(CCEC)															
0.0	.190	.190	.190	.163	.163	.163	.111	.111	.111	.064	.064	.064	.020	.020	.020	
1.0	.177	.157	.138	.152	.134	.119	.104	.092	.082	.060	.053	.048	.019	.017	.015	
2.0	.168	.132	.102	.144	.114	.088	.098	.079	.062	.057	.046	.036	.018	.015	.012	
3.0	.159	.114	.078	.137	.098	.068	.094	.068	.047	.054	.040	.028	.017	.013	.009	
4.0	.152	.101	.061	.130	.087	.053	.089	.061	.038	.052	.035	.022	.017	.012	.007	
5.0	.144	.090	.050	.124	.078	.043	.085	.054	.031	.049	.032	.018	.016	.010	.006	
6.0	.137	.081	.041	.118	.070	.036	.082	.049	.025	.047	.029	.015	.015	.009	.005	
7.0	.131	.074	.035	.113	.065	.030	.078	.045	.022	.045	.027	.013	.015	.009	.004	
8.0	.125	.069	.030	.107	.059	.026	.074	.042	.019	.043	.025	.011	.014	.008	.004	
9.0	.119	.064	.026	.103	.055	.023	.071	.039	.016	.041	.023	.010	.013	.008	.003	
10.0	.114	.059	.023	.098	.052	.020	.068	.036	.014	.040	.021	.009	.013	.007	.003	

C Range: 0 - 360DEG
 C Interval: 30.0DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:DAMIN
 Test Date:2017-07-06

γ Range: 0 - 90DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-2000A_V1 SYSTEM V2.0.276
 Humidity:65.0%
 Test Distance:9.700m [K=1.0000]
 Remarks:

Uncorrected UGR Table

Test:U:230.4V I:0.0890A P:17.90W PF:0.8730 Lamp Flux:1221.31x1 lm											
NAME: LPA-DR-HAL4-18-857-D90-C3					TYPE:18W			WEIGHT:			
DIM.:					SPEC.:5700K			SERIAL No.:			
MFR.:					SUR.:0.00816714			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	25.5	26.9	25.8	27.1	27.3	25.9	27.3	26.2	27.5	27.7	
	3H	26.3	27.6	26.6	27.8	28.1	26.8	28.1	27.1	28.3	28.6
	4H	26.5	27.7	26.8	27.9	28.2	27.1	28.3	27.4	28.5	28.8
	6H	26.5	27.6	26.8	27.9	28.2	27.1	28.3	27.5	28.5	28.8
	8H	26.4	27.5	26.8	27.8	28.1	27.1	28.2	27.4	28.5	28.8
	12H	26.4	27.5	26.7	27.8	28.1	27.1	28.1	27.4	28.4	28.7
4H	2H	26.0	27.2	26.3	27.4	27.7	26.3	27.5	26.6	27.7	28.0
	3H	26.9	27.9	27.2	28.2	28.5	27.3	28.4	27.7	28.7	29.0
	4H	27.1	28.1	27.5	28.4	28.7	27.6	28.6	28.0	28.9	29.2
	6H	27.2	28.0	27.5	28.4	28.7	27.8	28.6	28.2	29.0	29.3
	8H	27.1	27.9	27.5	28.3	28.7	27.7	28.5	28.2	28.9	29.3
	12H	27.1	27.8	27.5	28.2	28.6	27.7	28.4	28.1	28.8	29.2
8H	4H	27.2	27.9	27.6	28.3	28.7	27.7	28.5	28.1	28.8	29.2
	6H	27.3	27.9	27.7	28.3	28.7	27.8	28.5	28.3	28.9	29.3
	8H	27.3	27.8	27.7	28.3	28.7	27.9	28.4	28.3	28.9	29.3
	12H	27.3	27.8	27.7	28.2	28.7	27.8	28.3	28.3	28.8	29.2
12H	4H	27.1	27.9	27.6	28.2	28.6	27.6	28.4	28.1	28.7	29.1
	6H	27.3	27.8	27.7	28.2	28.7	27.8	28.4	28.3	28.8	29.3
	8H	27.3	27.8	27.7	28.2	28.7	27.8	28.3	28.3	28.8	29.2
Variations with the observer position at spacings:											
S = 1.0H	+ 0.4 / - 0.5					+ 0.3 / - 0.4					
1.5H	+ 0.2 / - 0.5					+ 0.2 / - 0.4					
2.0H	+ 0.6 / - 0.7					+ 0.6 / - 0.6					

CIE Pub.117 Corrected 1221 lm Total Lamp Luminous Flux.(8log(F/F0) = 0.7)

C Range: 0 - 360DEG
 C Interval: 30.0DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:DAMIN
 Test Date:2017-07-06

γ Range: 0 - 90DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-2000A_V1 SYSTEM V2.0.276
 Humidity:65.0%
 Test Distance:9.700m [K=1.0000]
 Remarks:

UTILIZATION FACTORS TABLE

Test:U:230.4V I:0.0890A P:17.90W PF:0.8730 Lamp Flux:1221.31x1 lm		
NAME: LPA-DR-HAL4-18-857-D90-C3	TYPE:18W	WEIGHT:
DIM.:	SPEC.:5700K	SERIAL No.:
MFR.:	SUR.:0.00816714	PROTECTION ANGLE:

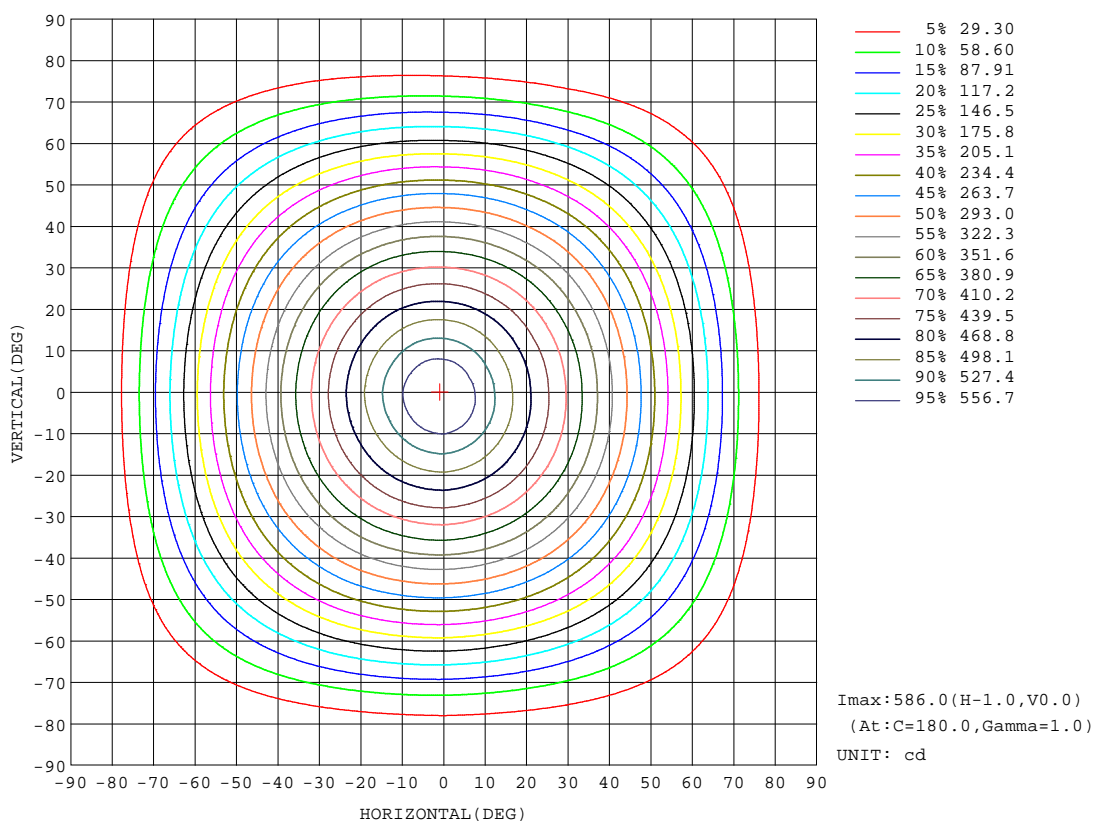
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) $k(RI) \times RCR = 5$									
k = 0.60	62	51	45	61	51	45	60	50	44	38
0.80	72	62	55	71	61	55	70	60	54	48
1.00	81	71	64	79	70	64	77	71	63	57
1.25	87	78	72	86	77	71	84	76	71	64
1.50	92	83	77	91	83	77	88	81	76	69
2.00	98	91	85	97	90	85	93	88	83	76
2.50	102	95	90	100	94	89	96	91	87	79
3.00	105	99	94	103	97	93	99	95	91	83
4.00	108	103	99	106	102	98	102	98	95	87
5.00	110	106	103	108	104	101	104	101	98	89
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004			Suspended					SHRNOM = 1.25		

C Range: 0 - 360DEG
 C Interval: 30.0DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:DAMIN
 Test Date:2017-07-06

γ Range: 0 - 90DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-2000A_V1 SYSTEM V2.0.276
 Humidity:65.0%
 Test Distance:9.700m [K=1.0000]
 Remarks:

ISOCANDELA DIAGRAM

Test:U:230.4V I:0.0890A P:17.90W PF:0.8730 Lamp Flux:1221.3lx1 lm		
NAME: LPA-DR-HAL4-18-857-D90-C3	TYPE:18W	WEIGHT:
DIM.:	SPEC.:5700K	SERIAL No.:
MFR.:	SUR.:0.00816714	PROTECTION ANGLE:



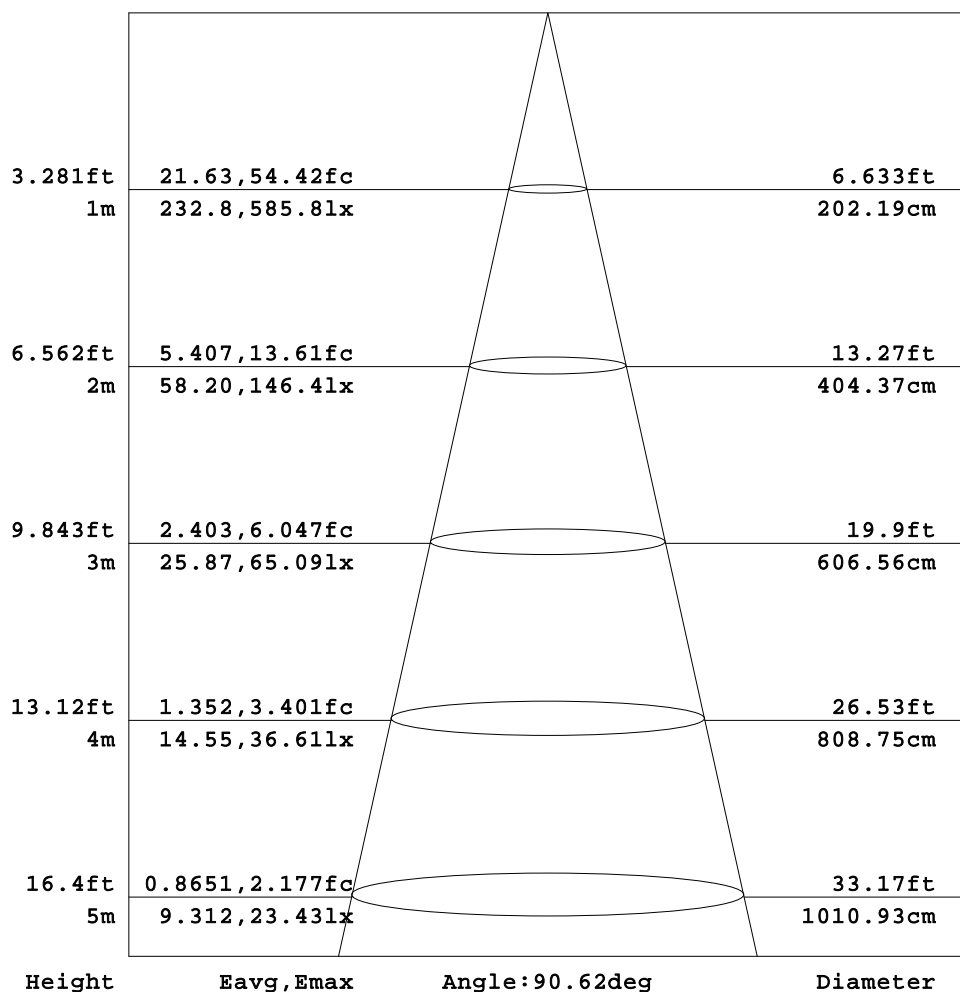
C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2017-07-06

γ Range: 0 - 90DEG
 γ Interval: 1.0DEG
Test System:EVERFINE GO-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.700m [K=1.0000]
Remarks:

AAI Figure

Test:U:230.4V I:0.0890A P:17.90W PF:0.8730 Lamp Flux:1221.31x1 lm		
NAME: LPA-DR-HAL4-18-857-D90-C3	TYPE:18W	WEIGHT:
DIM.:	SPEC.:5700K	SERIAL No.:
MFR.:	SUR.:0.00816714	PROTECTION ANGLE:

Flux out:784.2 lm



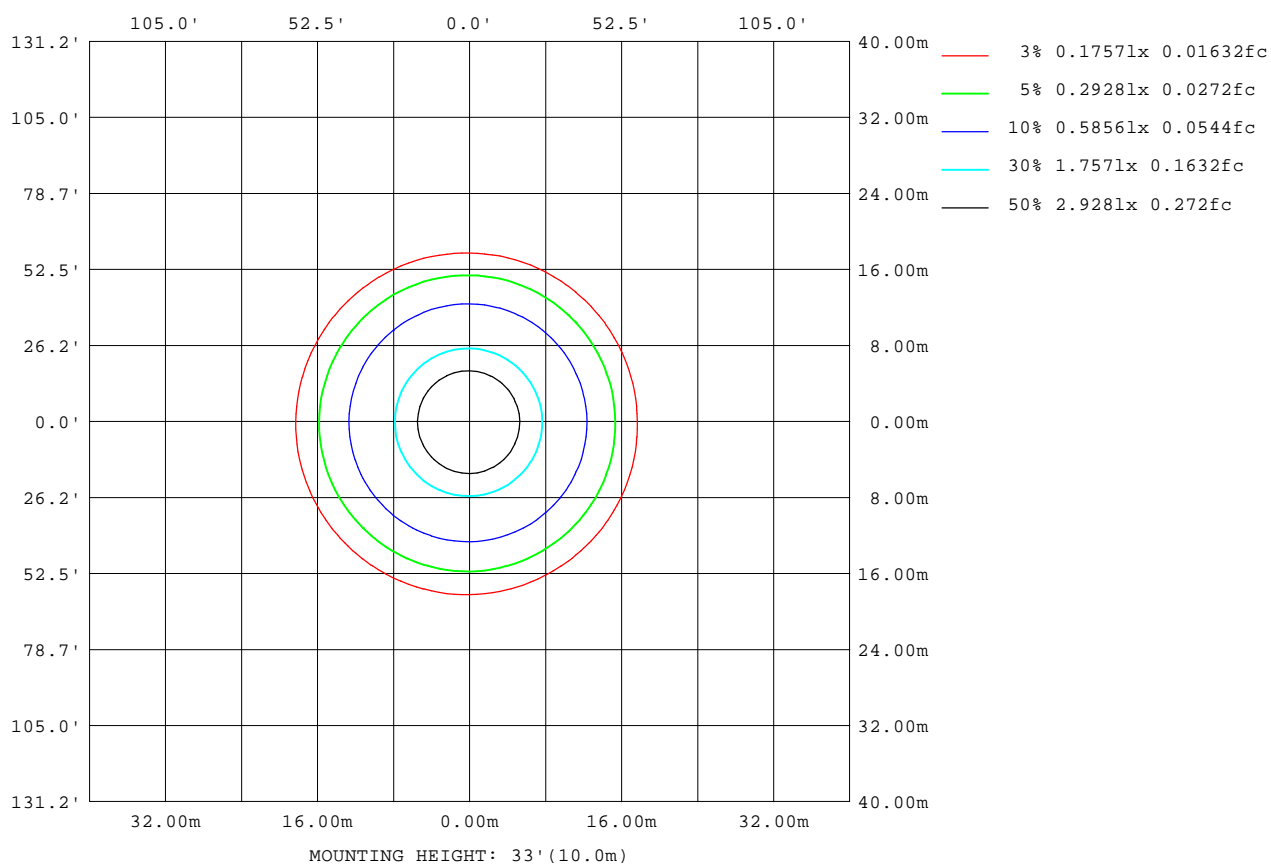
Note:The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2017-07-06

γ Range: 0 - 90DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.700m [K=1.0000]
Remarks:

ISOLUX DIAGRAM

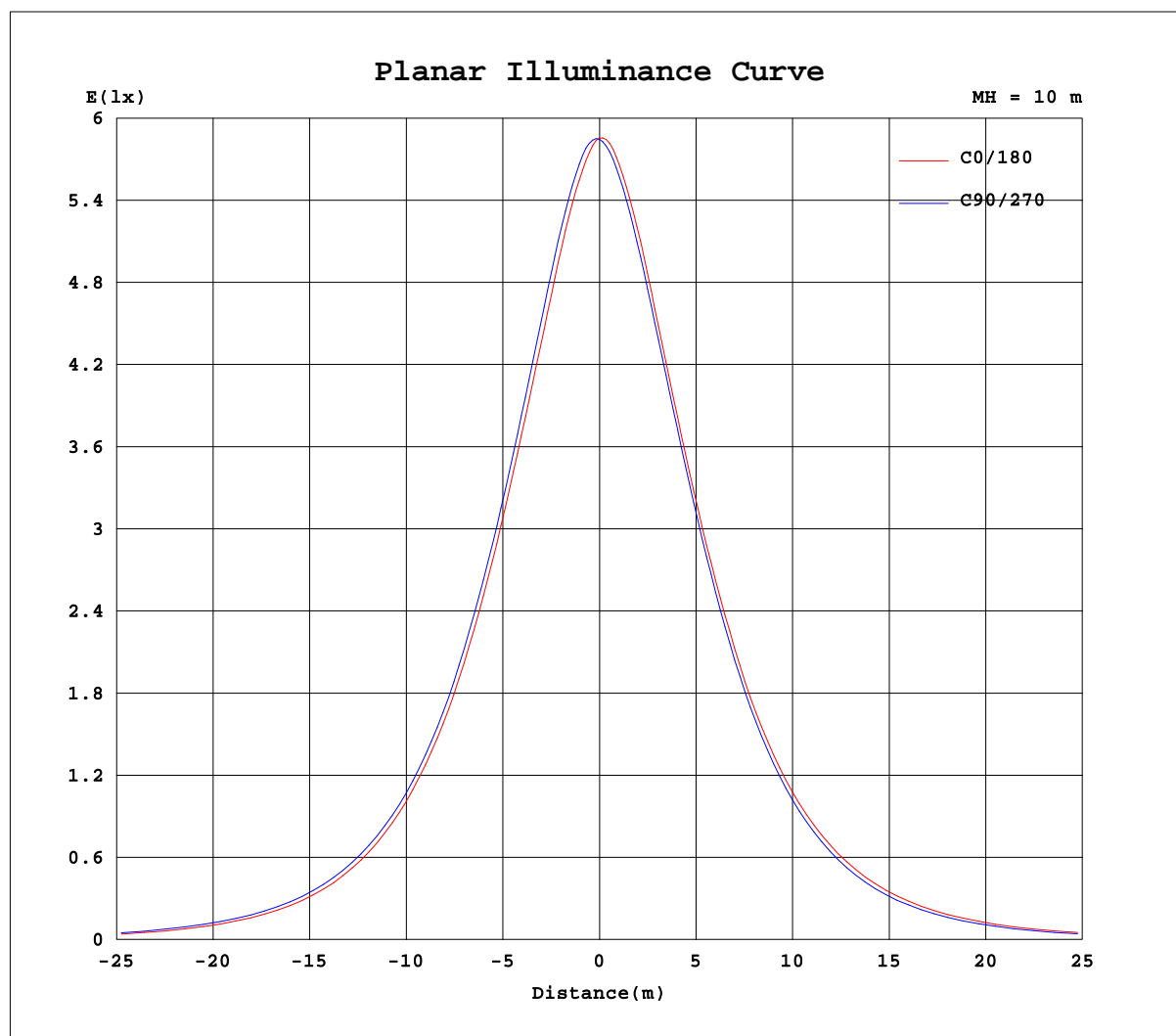
Test:U:230.4V I:0.0890A P:17.90W PF:0.8730 Lamp Flux:1221.3lx1 lm		
NAME: LPA-DR-HAL4-18-857-D90-C3	TYPE:18W	WEIGHT:
DIM.:	SPEC.:5700K	SERIAL No.:
MFR.:	SUR.:0.00816714	PROTECTION ANGLE:



C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2017-07-06

γ Range: 0 - 90DEG
 γ Interval: 1.0DEG
Test System:EVERFINE GO-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.700m [K=1.0000]
Remarks:

Planar Illuminance Curve



C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature: 25.3DEG
Operators: DAMIN
Test Date: 2017-07-06

γ Range: 0 - 90DEG
 γ Interval: 1.0DEG
Test System: EVERFINE GO-2000A_V1 SYSTEM V2.0.276
Humidity: 65.0%
Test Distance: 9.700m [K=1.0000]
Remarks:

Test:U:230.4V I:0.0890A P:17.90W PF:0.8730 Lamp Flux:1221.31x1 1m		
NAME: LPA-DR-HAL4-18-857-D90-C3	TYPE:18W	WEIGHT:
DIM.:	SPEC.:5700K	SERIAL No.:
MFR.:	SUR.:0.00816714	PROTECTION ANGLE:

UNIT: cd

C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature: 25.3DEG
Operators: DAMIN
Test Date: 2017-07-06

```

γ Range: 0 - 90DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-2000A_V1 SYSTEM V2.0.276
Humidity: 65.0%
Test Distance: 9.700m [K=1.0000]
Remarks:

```