



高精度空间光谱辐射分布式光度计 (LSG-1800BCCD / LSG-1700BCCD)

Brochure

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Lead in CFL & LED Test Instruments

Rev. 1/29/2019

1. 系统配置

报价包括以下项目:

A. 角光度系统:

- 旋转控制台:
 - 1) LSG-1800XCCD/LSG-1800BCCD: 采用日本三菱电机和德国角度编码器系统使得旋转角度精度能达到 0.0017 度
 - 2) LSG-1700BCCD: 采用台湾电机和角度编码器系统使得旋转角度精度达到 0.01 度
- LSG-1800XCCD/LSG-1800BCCD 在 19 寸机柜中有控制器, 与电脑连接, 由软件控制
- LSG-1800BCCD 在暗室中有控制器, 使得客户在暗室安装被测灯具时可以手动控制仪器, 无需通过电脑软件远程控制。
- 双通道&高精度光度计
- A 级恒温探头 (L 级可选)
- 激光系统对准校量
- 中英文软件

B. LMS-9000B 高精度 CCD 光谱辐射计

C. CLAMP-9000 附件和可调节的三脚架固定 LMS-9000B 光谱辐射计

D. SLS-100W 直流光强标准灯

E. 数字电参数测量仪:

- 1) LSG-1800XCCD/LSG-1800BCCD 配备 LS2010 电参数表: 高精度测量 AC 交流电压, 电流, 功率及功率因素, 并且还可以测试谐波。
- 2) LSG-1700BCCD 配备 LS2012 电参数表: 高精度测量 AC 和 DC 电压, 电流, 功率及功率因素。

F. DC3010 精密数显直流稳压稳流电源: 30V/10A 恒流恒压源输出

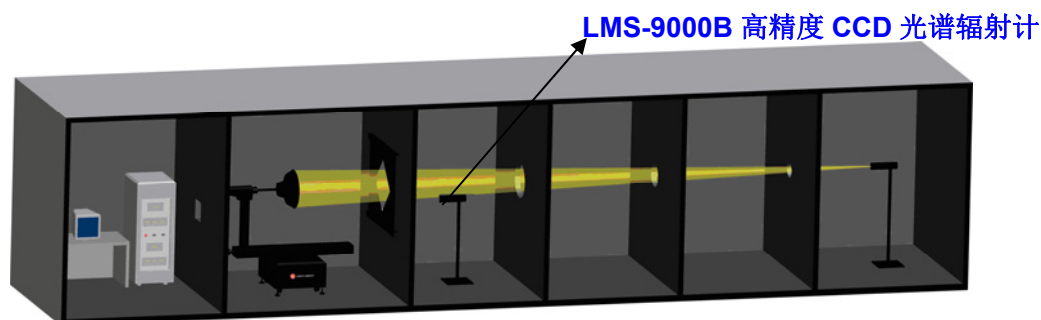
G. 交流电源:

- 1) LSG-1800XCCD/LSG-1800BCCD 配备 LSP-1KVA 交流电源
- 2) LSG-1700BCCD 配备 LSP-500VA 交流电源

H. CASE-19IN 19 英寸机柜

I. 两套夹具: 两套多功能夹具。按照客户灯具类型定做

J. 包装: 木质包装费用



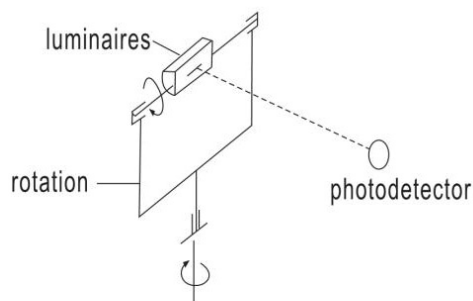
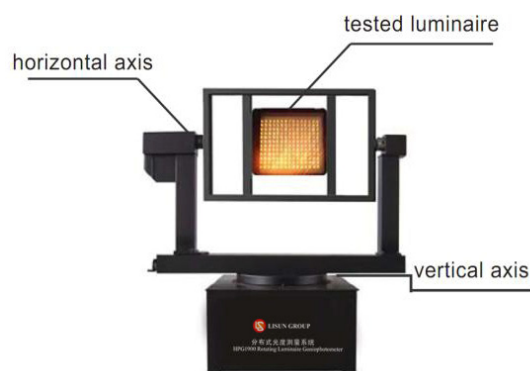
注: 电脑及打印机客户自行准备 (电脑至少有一个 USB 接口)

2. 工作原理

LSG-1800BCCD 分布光度计系统采用固定探头旋转灯具方式。光源安装在光度计上，灯具中心应与旋转中心保持在一条线上，可借助激光对准。探头固定来测试在水平方向上的所有光强数据，旋转灯具。仪器允许被测光源绕水平垂直轴旋转。当被测光源绕水平轴旋转时，探头在同同一个旋转平面上来测试这个平面上所有的方向上的光强。当被测光源绕垂直轴旋转时，探头测试的是垂直面上所有方向上的光强。垂直轴水平轴在 $-180^{\circ}\sim+180^{\circ}$ 直接持续旋转。根据测试要求，这套系统可以满足 **B- β** , **A- α** 和 **C- γ** 坐标系。当获取所有光强数据后，软件将会自动计算出其他光参数。

双臂结构（B- β , A- α 坐标系）

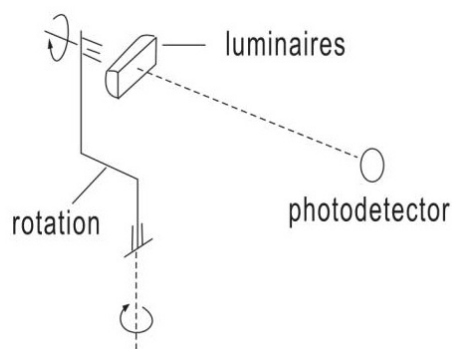
这种结构用于测试格栅灯，在 **B- β** 坐标系中灯具对称轴与水平旋转台需重合，在 **A- α** 二者垂直交叉。



Double pillars structure

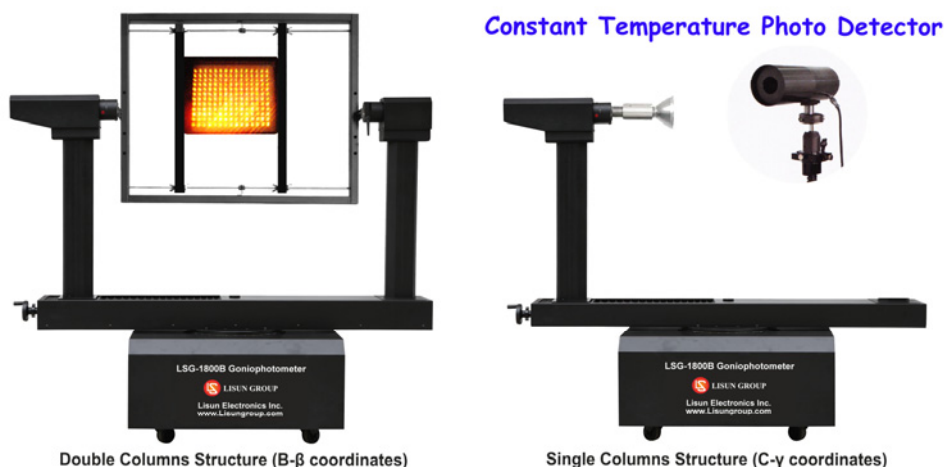
单臂结构（C- γ 和极坐标系）

在双臂基础上取下一条辅助臂即变为单臂结构。这种结构用于固定灯管，聚光灯等。灯具发光轴应于旋转台水平轴重合。

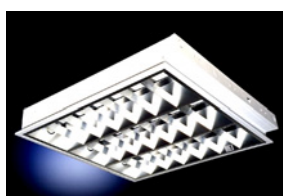


3. 系统功能

LSG-1800BCCD/LSG-1700BCCD 高精度空间光谱辐射分布光度计用于光强分布的测试，应用于 LED 路灯，室内灯，工矿灯等各类灯具的光参数。LSG-1800BCCD 在测试光强分布测试时可以测量空间颜色分布，如 CCT 空间分布等。LSG-1800BCCD 主要应用于工业实验室各类灯具光参数测量。

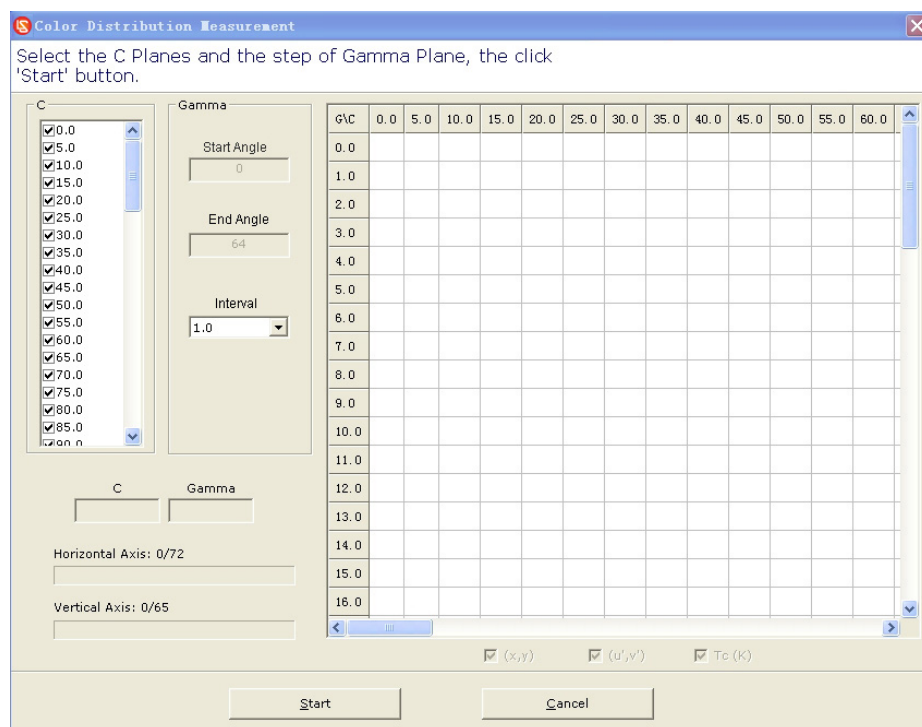


此套系统被用于测试 LED 路灯，室内灯具以及工程用灯具的空间光强分布，等光强曲线，区域光强分布曲线（用直角坐标系和极坐标系表示），亮度限制曲线，光效，眩光等级，有效光束角，上射光通量，下射光通量，总光通量，有效光通量，利用系数及电参数（电压，电流，功率，功率因素）。测试数据可保存为 IES 格式文件，可直接被照明设计软件调用。这套系统完全满足照明设计工作的要求。



4. 技术参数:

- 满足 CIE、IEC、IES LM-79 和 GB 标准要求
- 满足 B- β 和 C- γ 测试方案
- 灯具旋转角度范围: (γ) $\pm 180^\circ$ (或 0-360°), 灯具绕自身旋转角度范围: (C) $\pm 180^\circ$ (或 0-360°)
- 光度测试范围: 照度范围 0.001lx~99,999lx; 光强范围: 1.0cd~10⁷cd(探头)
- 角度精度: 0.0017°(LSG-1800BCCD) 以及 0.01°(LSG-1700BCCD)
- 和高精度快速 CCD 光谱辐射计一起使用测试空间光谱颜色
- 色品坐标精度: ± 0.0015 或 ± 0.0005 (在标准 A 光源下)
- 频谱波长范围: 380nm ~780nm; 波长精度: ± 0.5 nm

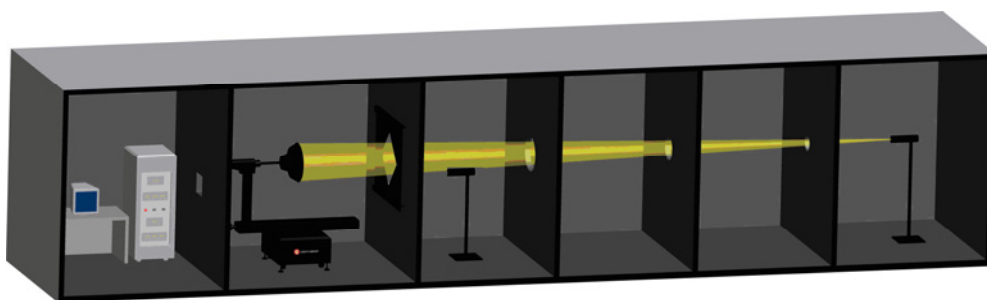


- 光度精度：CIE A 级探头 (L 级探头可选)
- 测试精度：2% (标准光源下)；杂散光：小于 0.1%
- 中英文软件，可在 WinXP，Win7 或 Win8 下运行

最大测试灯具尺寸 (mm)	最大测试灯具尺寸		最大测试重量
	非泛光灯 Diameter (E)*Depth(F)	泛光灯(L*W)	
LSG-1800XCCD	依据客户灯具尺寸定制		50Kg
LSG-1800BCCD	Ø1600×550	700*600	50kg
LSG-1700BCCD	Ø1600×580	700*600	30kg

5. 实验室要求：

- 暗室最小尺寸要求：W3.5m*H2.5m*L8m（推荐：W5m*H2.5m*15m）
- 操作室尺寸用于放置机柜，电脑及打印机：房间尺寸不小于 W3.0m*L3.0m
- 墙壁，天花板及地板需用哑光漆涂黑，也可用黑绒布覆盖。
- 放置一台空调在暗室中控制灯具周围的温度以达到 CIE 标准要求的温度。
- 确认采购订单后，LISUN 工程部将会根据客户的实验室尺寸给出暗室设计图纸。



6. 典型海外买家:

请向 LISUN 销售部索要买家信息。

7. 设计标准:

LSG-1800BCCD/LSG-1700BCCD 仪器结构, 技术参数, 测试, 操作步骤以及软件可以满足一下标准要求:

- 3.1 CIE Pub. NO.70, "The Measurement of Absolute Luminous Intensity Distributions"
- 3.2 CIE DIV. II -TC10, "Photometry of Luminaires"
- 3.3 IES LM-35-1989, "IES Approved Method for Photometric Testing of Floodlights"
- 3.4 IES LM-31, "IES Approved Method for Photometric Testing of Roadway Luminaires"
- 3.5 IES-LM-79, "Electrical and Photometric Measurements of Solid-State Lighting"
- 3.6 GB/T 7002-1986, "Luminosity Test of Flood Luminaires"
- 3.7 GB/T 9467-1988, "Luminosity Test of Indoor Luminaires"
- 3.8 GB/T 9468-1988, "Luminosity Test of Street Luminaires"
- 3.9 IES 61341 "Method of Measurement of Center Beam Intensity and Beam Angle(s) of Reflector Lamp"
- 3.10 CIE Pub.NO.76, "Photometry-the CIE System of Physical Photometry"

8. 应用软件:

LSG-1800BCCD/LSG-1700BCCD 分布光度计完全由软件控制, 包括仪器的旋转, 数据采集出路, 实时屏幕显示, 测试报告打印等, 都可由软件操作实现, 使用操作非常方便。

系统可导出如下格式:

```
IESNA Files (*.ies)
EULUMDAT Files (*.ldt)
CIEBSE TM14 Files (*.cib)
CIEBSE TM14 Files (*.tm4)
CIE Files (*.cie)
DIN CEN Files (*.cen)
Excel File (*.csv)
```

这些格式文件可以直接被相关照明设计软件调用, 如 DIALUX。应用软件还可以实现对照明设计要求作为一个工作平面等照度分布曲线, 亮度限制曲线, 灯具效率, 有效光束角, 向上的光通量比, 向下的光通量比, 有效光通量, 利用系数曲线等必要的计算。

下面是软件导出的测试报告

Report No.: LS1711

Test Time: 8/28/2017 17:02

Luminaire Property

Luminaire Manufacturer: LISUN
Luminaire Category: LED Philips 112
Lamp Catalog: LUMINUS
Number of Lamps: 1
Luminous Length (mm): 50
Luminous Height (mm): 100
Current: 0.530 A
Power Factor: 0.999

Luminaire Description: LS-71-83-8077
Lamp Description: LUMINUS001
Lumens per Lamp: 550
Luminous Width (mm): 50
Voltage: 119.9 V
Power: 63.55 W

Photometric Results

CIE Class: Direct
Measurement Flux: 539.5 lm
Downward Ratio: 98.08%
Horizontal Diffuse Angle(50%): H99.2
Vertical Diffuse Angle(50%): V101.5
Luminaire Efficacy Rating (LER): 8.54
Max. Intensity: 429.28 cd/klm
S/MH(C0/C180): 1.14

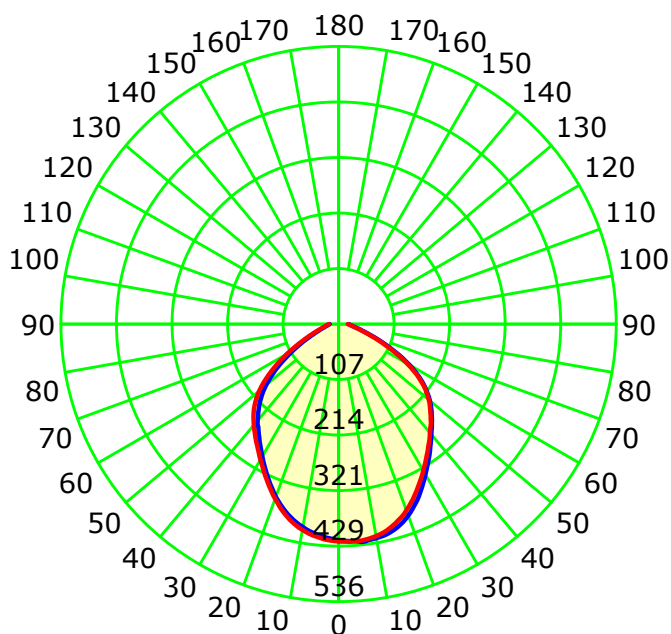
Total Rated Lamp Lumens: 550.0 lm
Efficiency: 98.08%
Upward Ratio: 0.00%

Central Intensity: 417.76 cd/klm
Pos of Max. Intensity: H45 V8
S/MH(C90/C270): 1.13

Picture Of Luminaire



Luminous Intensity Distribution Curve



Unit: cd/klm

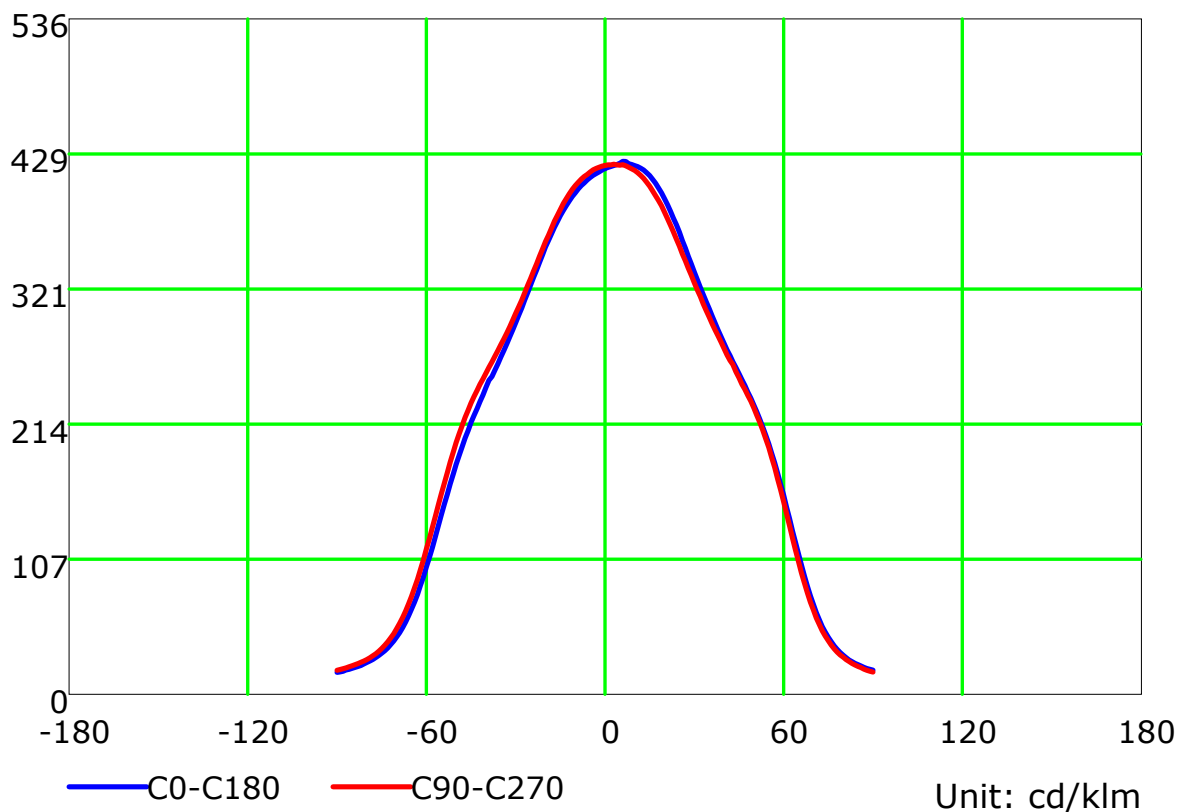
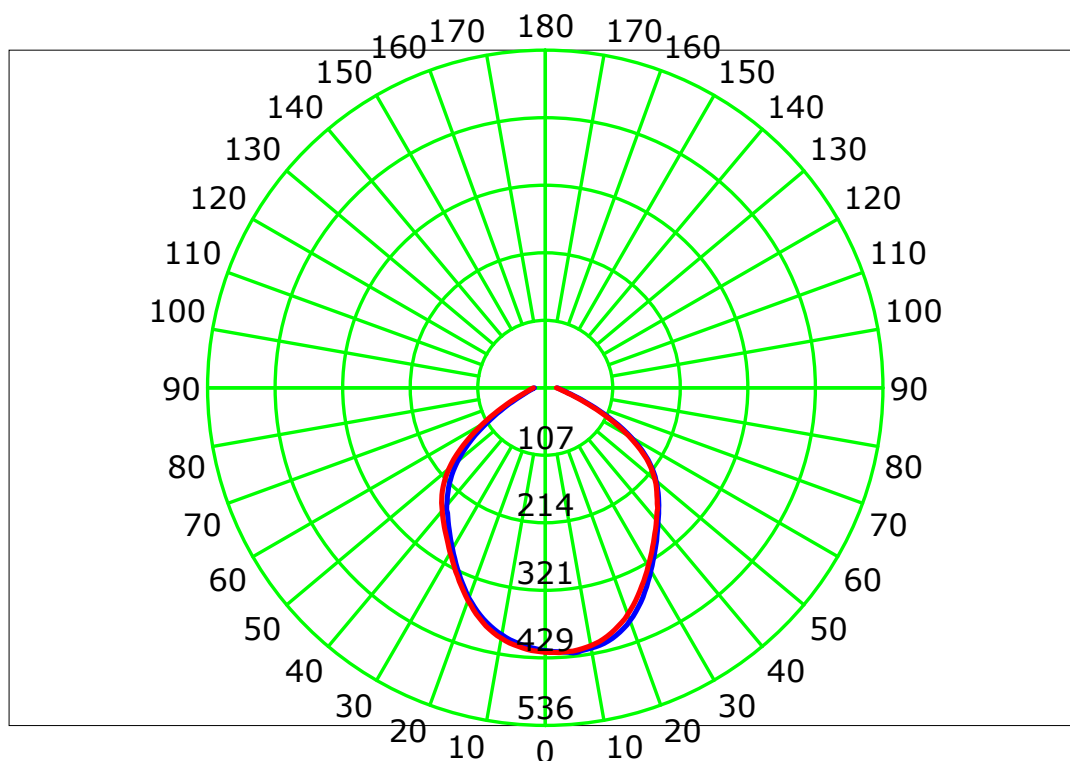
Average Diffuse Angle(50%): 100.1°

— C0-C180 — C90-C270

C Plane (°): 0.0-360.0: 45.0
Test Lab: LISUN
Test Type: TYPE C
Temperature: 24.5°
Operator: Jacky

Gamma Plane (°): 0.0-90.0: 1.0
Test Device: LSG-1800BCCD
Distance: 8.000 m
Humidity: 60%
Inspector:

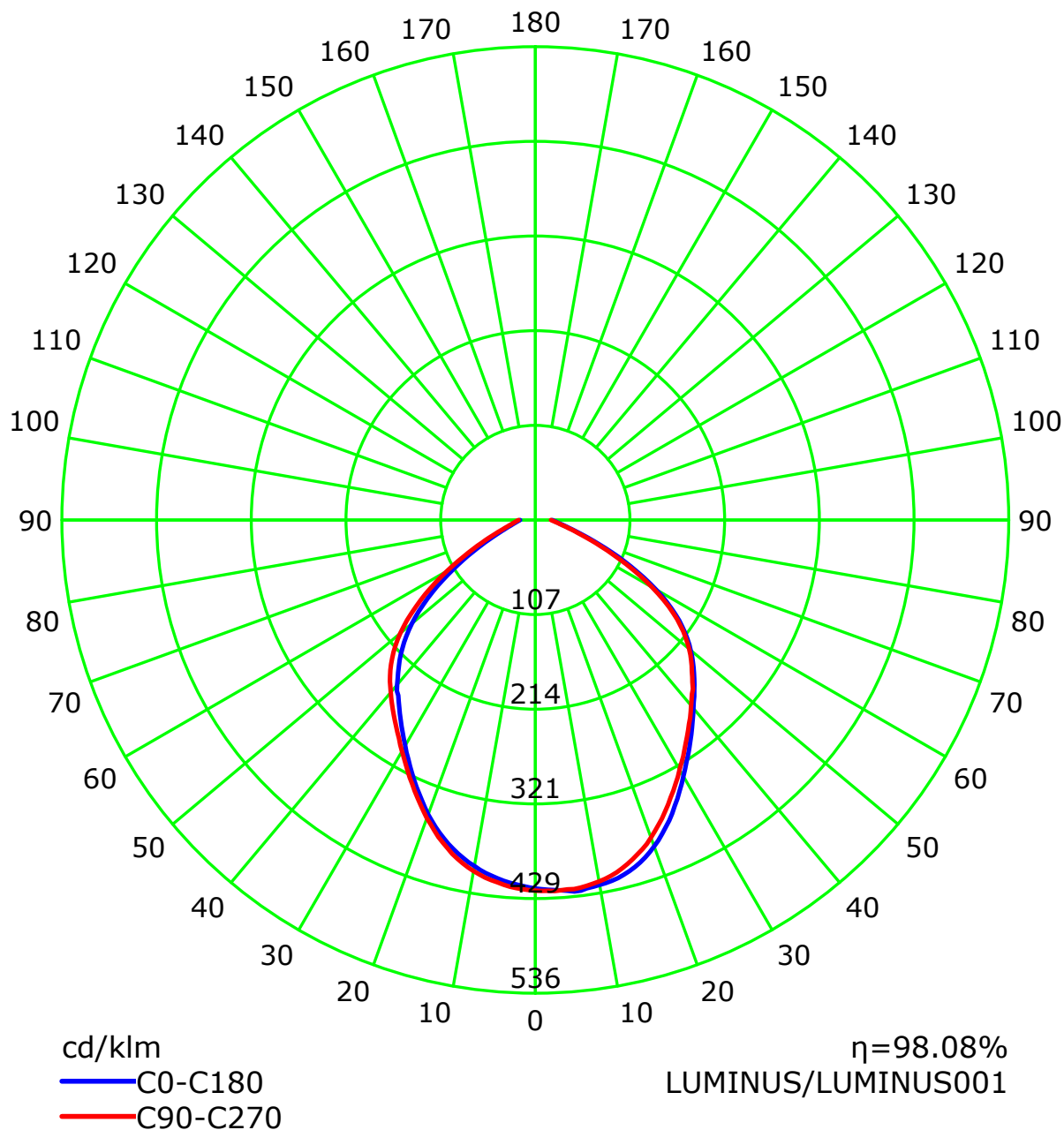
Luminous Intensity Distribution Curve



C Plane (°): 0.0-360.0: 45.0
 Test Lab: LISUN
 Test Type: TYPE C
 Temperature: 24.5°
 Operator: Jacky

Gamma Plane (°): 0.0-90.0: 1.0
 Test Device: LSG-1800BCCD
 Distance: 8.000 m
 Humidity: 60%
 Inspector:

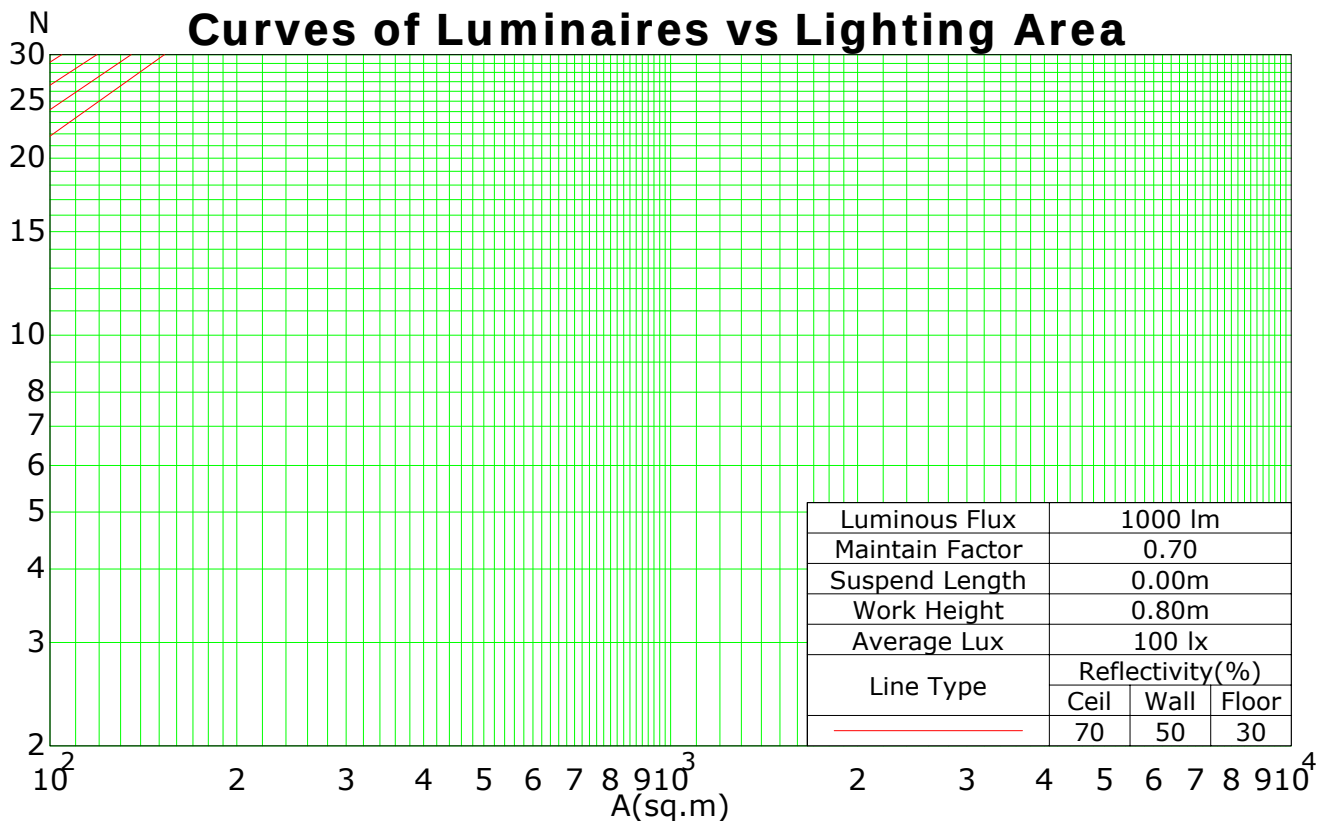
Luminous Intensity Distribution Curve(cd / klm)



Coefficients Of Utilization - Zonal Cavity Method

RC	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.5	0.5	0.5	0.3	0.3	0.3	0.1	0.1	0.1	0
RW	0.7	0.5	0.3	0.1	0.7	0.5	0.3	0.1	0.5	0.3	0.1	0.5	0.3	0.1	0.5	0.3	0.1	0
RCR	RF = 0.2																	
0	117	117	117	117	114	114	114	114	109	109	109	104	104	104	100	100	100	98
1	107	103	99	95	105	101	97	94	96	93	91	93	90	88	89	87	85	83
2	98	91	84	79	96	89	83	78	85	80	76	82	78	74	79	76	73	71
3	90	80	73	67	88	79	72	66	76	70	65	73	68	64	71	66	63	61
4	83	72	63	57	81	70	63	57	68	61	56	66	60	55	64	59	55	52
5	76	64	56	50	74	63	55	49	61	54	49	59	53	48	58	52	48	46
6	71	58	50	44	69	57	49	44	56	48	43	54	48	43	52	47	42	40
7	66	53	45	39	64	52	44	39	51	44	38	49	43	38	48	42	38	36
8	61	49	40	35	60	48	40	35	47	40	35	45	39	34	44	38	34	32
9	57	45	37	32	56	44	37	31	43	36	31	42	36	31	41	35	31	29
10	54	41	34	29	53	41	34	29	40	33	29	39	33	28	38	32	28	27

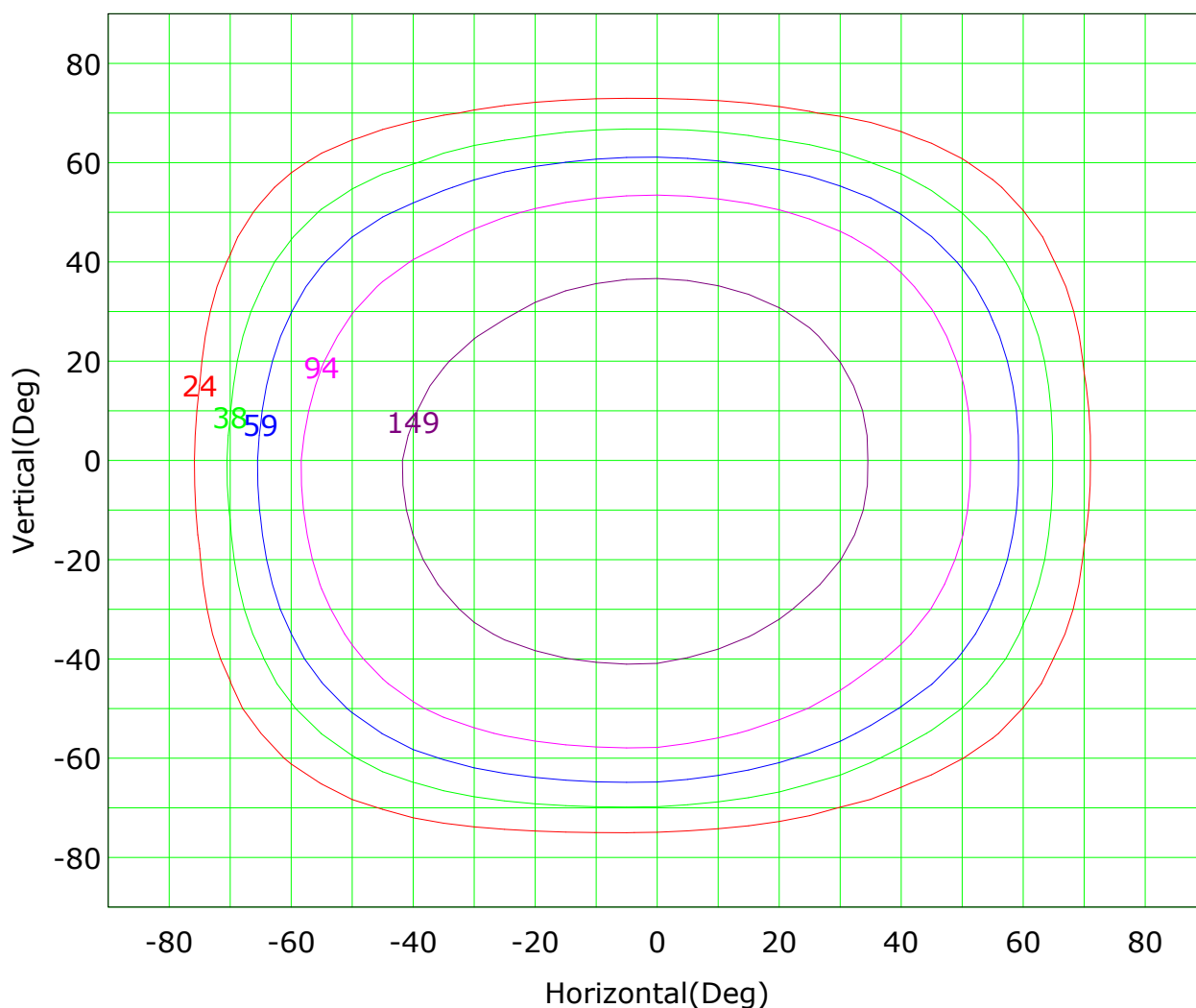
Spacing Criteria (0-180): 1.14
 Spacing Criteria (90-270): 1.13
 Spacing Criteria (Diagonal): 1.27



C Plane (°): 0.0-360.0: 45.0
 Test Lab: LISUN
 Test Type: TYPE C
 Temperature: 24.5°
 Operator: Jacky

Gamma Plane (°): 0.0-90.0: 1.0
 Test Device: LSG-1800BCCD
 Distance: 8.000 m
 Humidity: 60%
 Inspector:

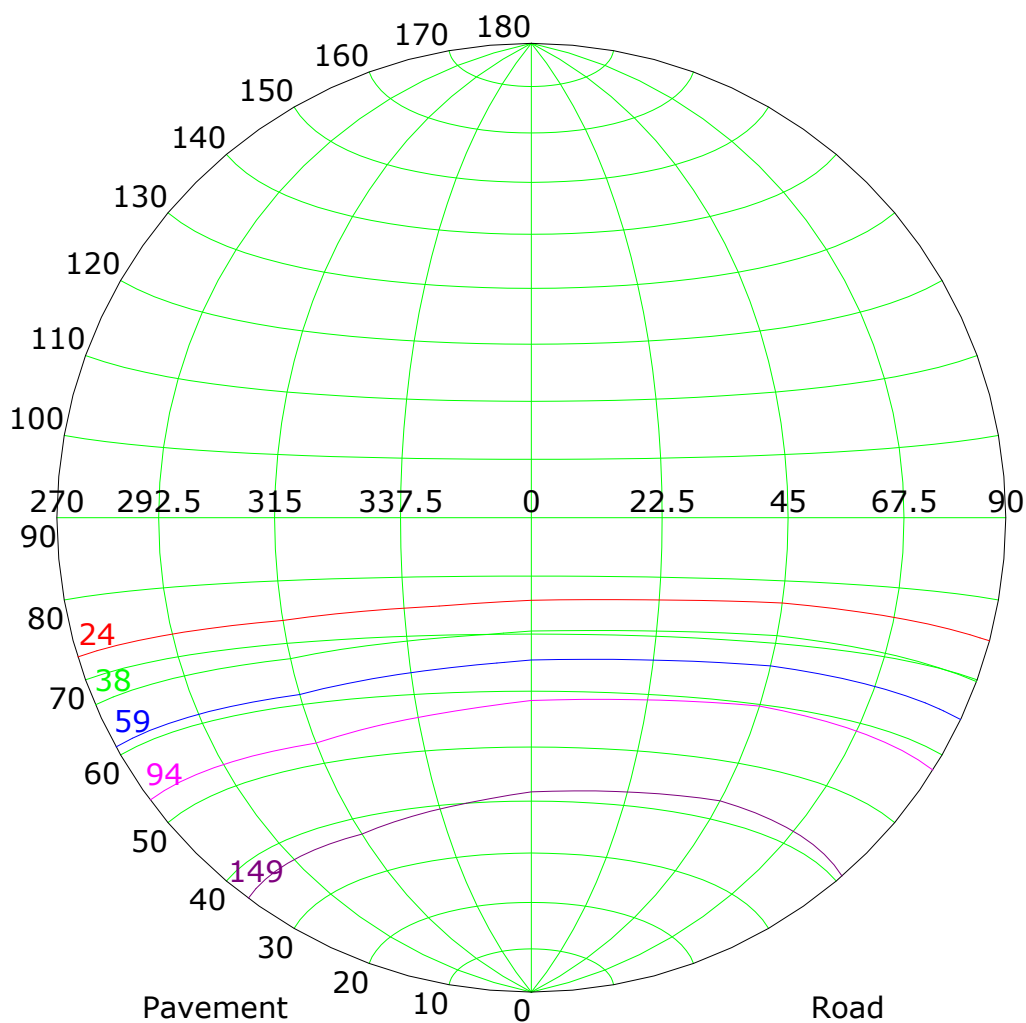
Isocandela (rectangle)



Imax (100%): 236 cd

(10%):	24 cd	(16%):	38 cd
(25%):	59 cd	(40%):	94 cd
(63%):	149 cd	(100%):	236 cd

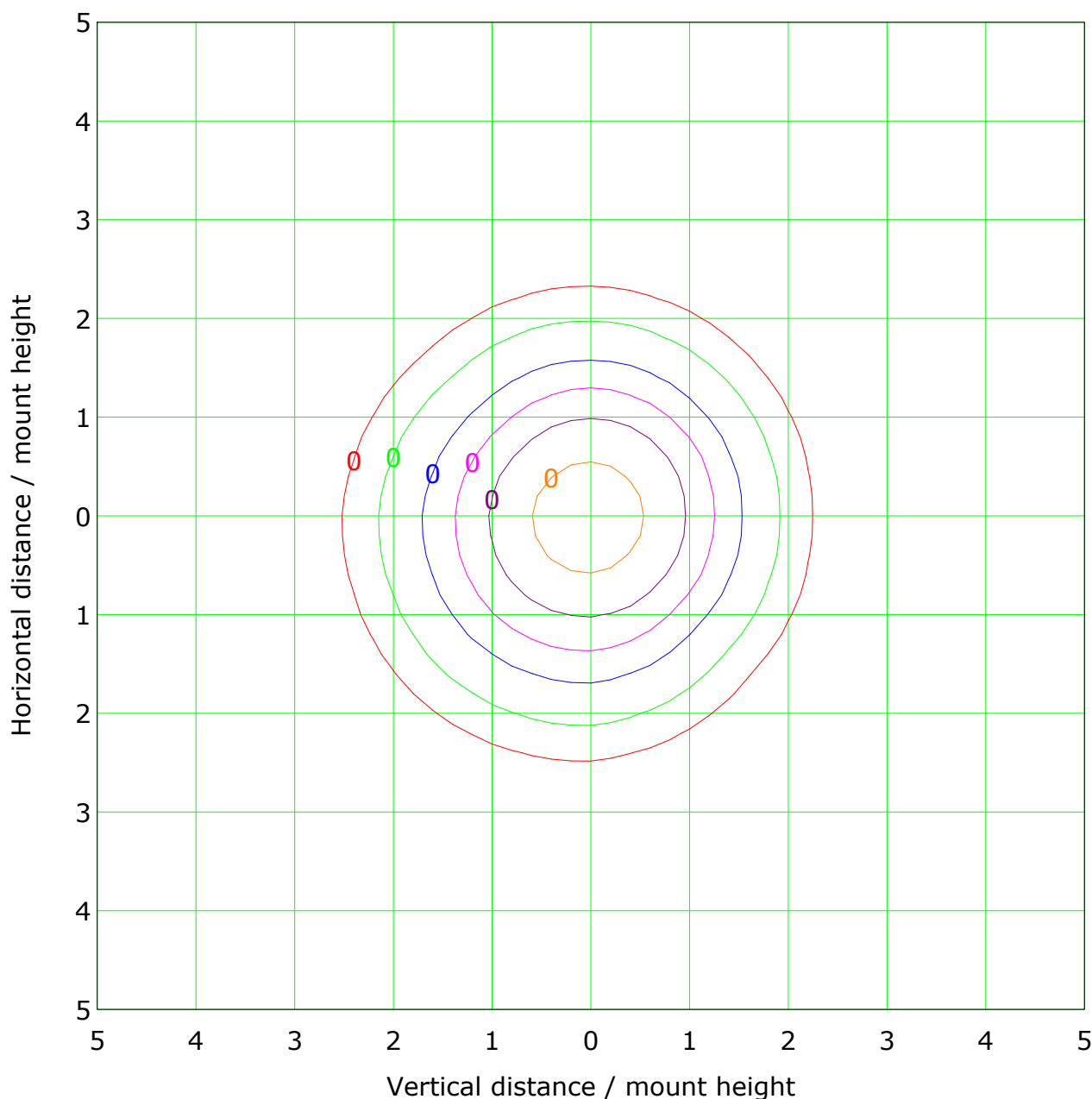
Isocandela (sphere)



Imax (100%): 236 cd

(10%):	24 cd	(16%):	38 cd
(25%):	59 cd	(40%):	94 cd
(63%):	149 cd	(100%):	236 cd

IsoPPFD Plot



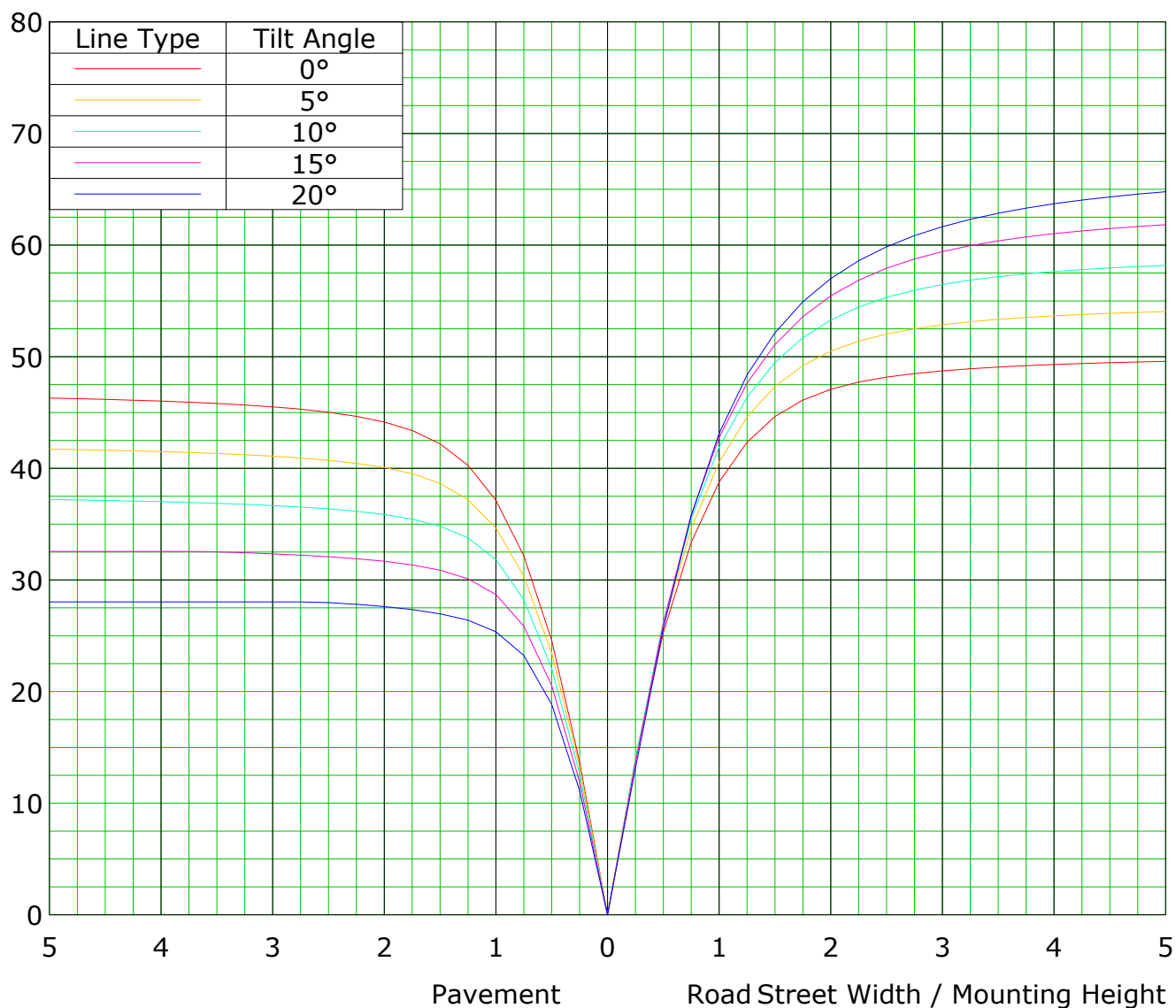
Mounting Height: 10.0m Max PPFD(100%): 0.048 $\mu\text{mol/s/m}^2$
 — (1%): 0.000 $\mu\text{mol/s/m}^2$ — (2%): 0.001 $\mu\text{mol/s/m}^2$
 — (5%): 0.002 $\mu\text{mol/s/m}^2$ — (10%): 0.005 $\mu\text{mol/s/m}^2$
 — (20%): 0.010 $\mu\text{mol/s/m}^2$ — (50%): 0.024 $\mu\text{mol/s/m}^2$
 — (100%): 0.048 $\mu\text{mol/s/m}^2$

C Plane (°): 0.0-360.0: 45.0
 Test Lab: LISUN
 Test Type: TYPE C
 Temperature: 24.5°
 Operator: Jacky

Gamma Plane (°): 0.0-90.0: 1.0
 Test Device: LSG-1800BCCD
 Distance: 8.000 m
 Humidity: 60%
 Inspector:

Roadway CU Curve

Efficiency(%)

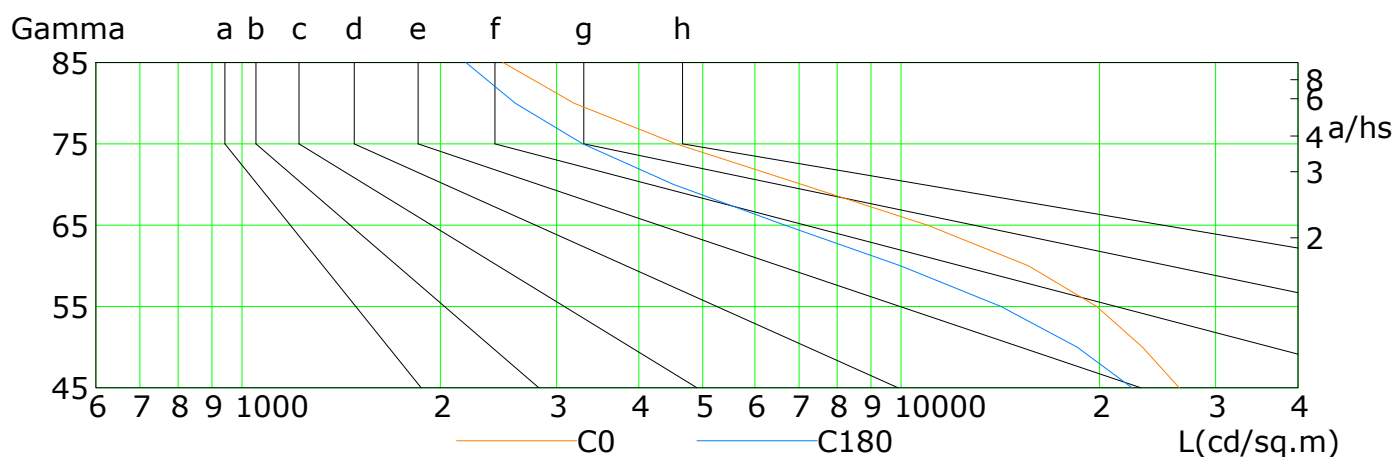
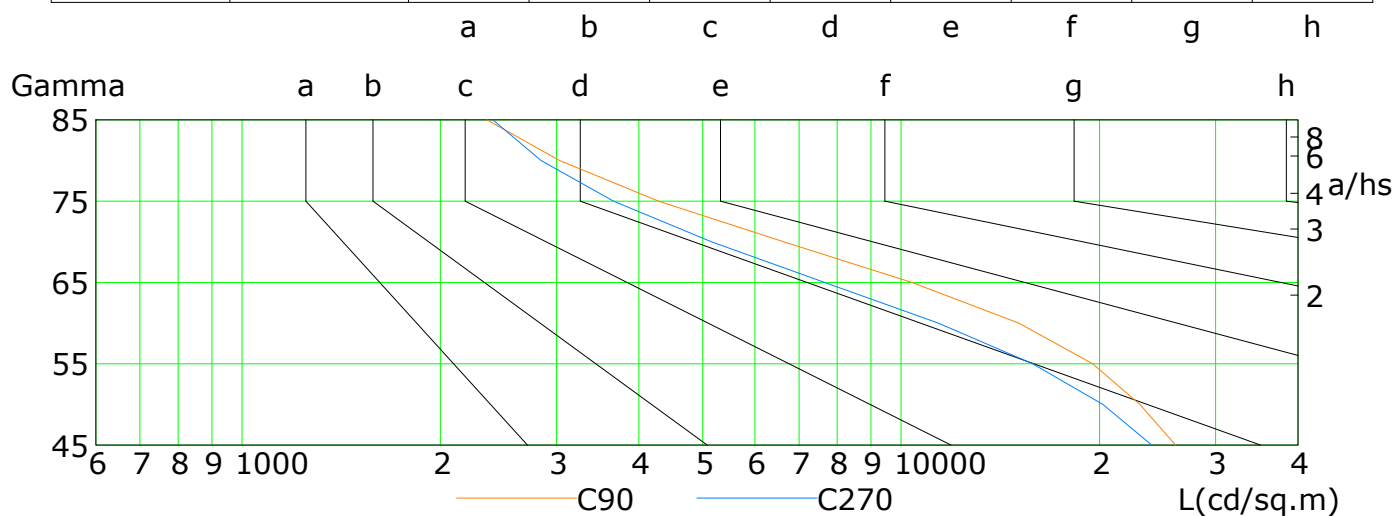


C Plane (°): 0.0-360.0: 45.0
 Test Lab: LISUN
 Test Type: TYPE C
 Temperature: 24.5°
 Operator: Jacky

Gamma Plane (°): 0.0-90.0: 1.0
 Test Device: LSG-1800BCCD
 Distance: 8.000 m
 Humidity: 60%
 Inspector:

Lum Limit Curve

Dazzle	Quality	Illuminance (lx)							
1.15	A	2000	1000	500	<=300				
1.50	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.20	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300



L(cd/sq.m)	G45	G50	G55	G60	G65	G70	G75	G80	G85
C0	26425	23238	19800	15600	10964	7073	4558	3190	2489
C90	26091	23021	19522	15087	10385	6637	4285	3033	2352
C180	22409	18493	14174	9978	6661	4520	3288	2598	2187
C270	24002	20235	15829	11389	7657	5155	3661	2842	2402

C Plane (°):0.0-360.0: 45.0

Test Lab: LISUN

Test Type: TYPE C

Temperature: 24.5°

Operator: Jacky

Gamma Plane (°):0.0-90.0:1.0

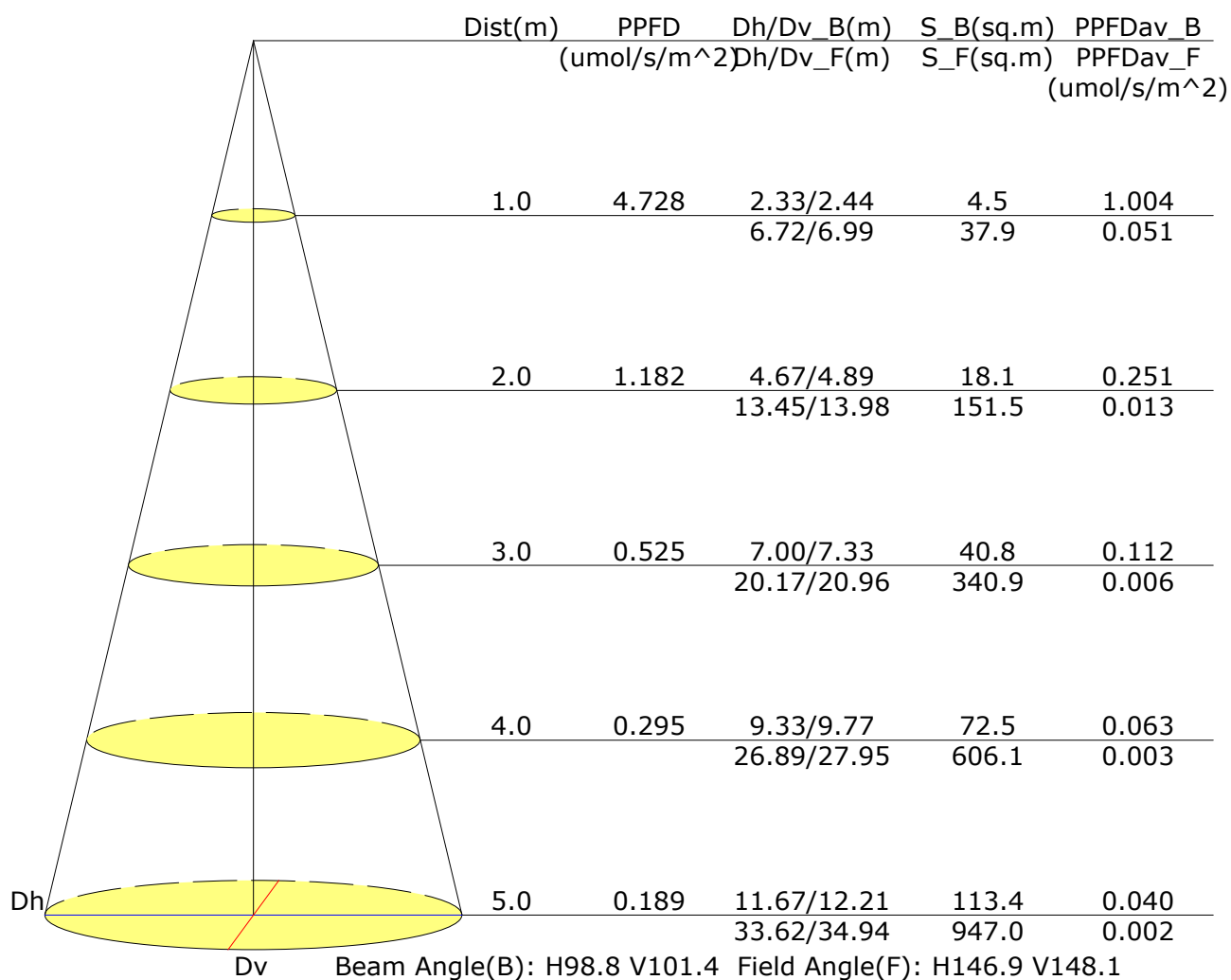
Test Device: LSG-1800BCCD

Distance: 8.000 m

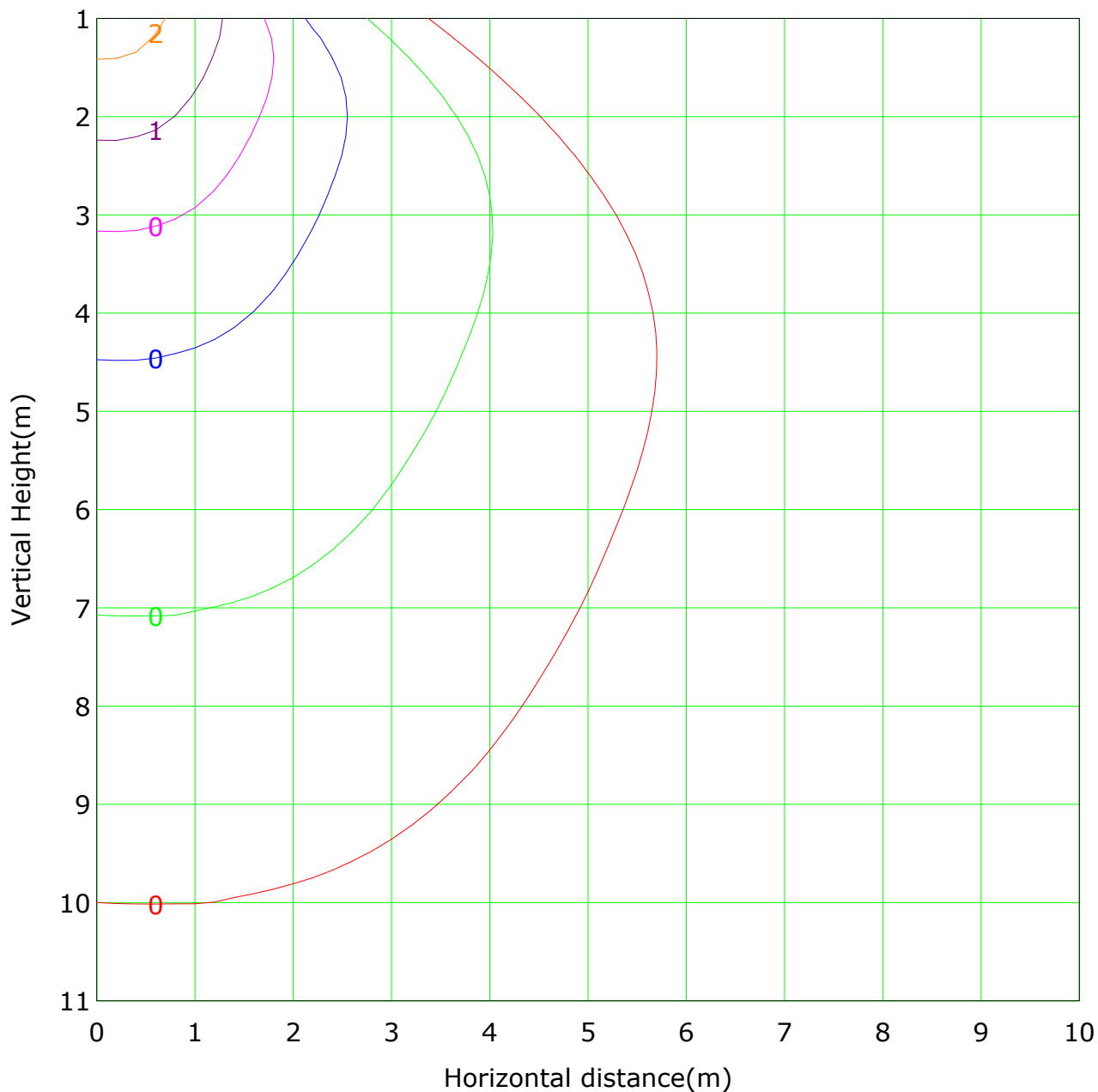
Humidity: 60%

Inspector:

PPFD at a Distance



Vertical IsoPPFD Plot



Lowest(m): 1.0m Highest(m): 11.000m Max PPFD: 4.7 $\mu\text{mol/s/m}^2$
 (1%): 0.047 $\mu\text{mol/s/m}^2$ (2%): 0.095 $\mu\text{mol/s/m}^2$
 (5%): 0.236 $\mu\text{mol/s/m}^2$ (10%): 0.473 $\mu\text{mol/s/m}^2$
 (20%): 0.946 $\mu\text{mol/s/m}^2$ (50%): 2.364 $\mu\text{mol/s/m}^2$
 (100%): 4.728 $\mu\text{mol/s/m}^2$

C Plane (°): 0.0-360.0: 45.0
 Test Lab: LISUN
 Test Type: TYPE C
 Temperature: 24.5°
 Operator: Jacky

Gamma Plane (°): 0.0-90.0: 1.0
 Test Device: LSG-1800BCCD
 Distance: 8.000 m
 Humidity: 60%
 Inspector:



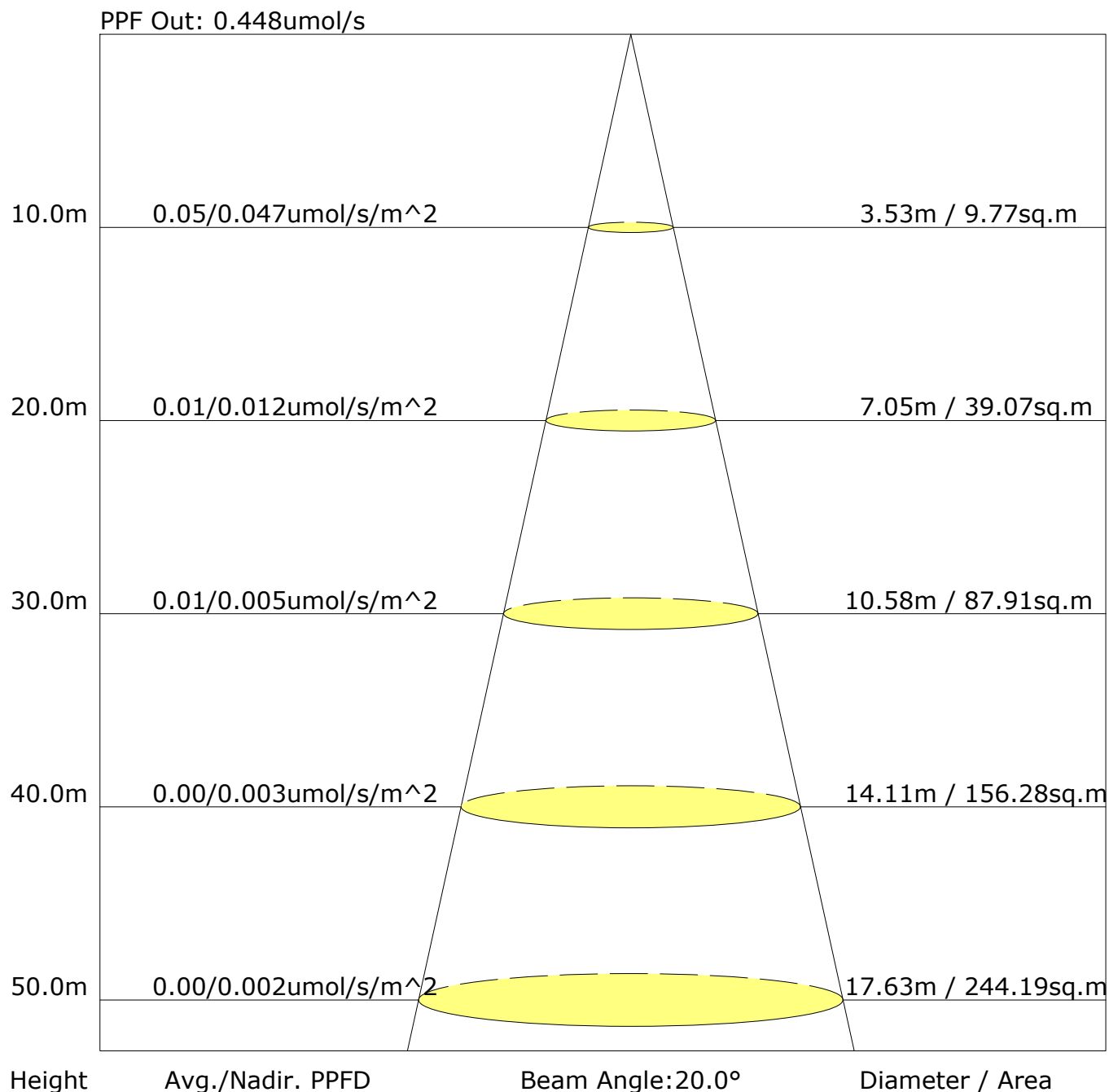
Area Flux Table

Unit: lm/klm

	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	F _{Flux(T)} (E)	F _{Flux(E)} (T)
Vertical plane	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
Horizontal plane	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
Flux(E)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
Flux(T)	1.0	3.8	9.9	23.5	44.1	66.3	88.0	107.2	119.7	122.3	114.3	97.3	76.0	54.2	32.6	14.4	4.9	1.1	981		
Flux(E)	0.0	0.1	0.1	6.3	20.4	41.1	63.3	85.2	104.4	117.0	119.7	111.7	94.6	73.3	51.6	30.0	11.7	1.7	0.0		932

Gamma Plane (°):0.0-90.0:1.0
Test Device: LSG-1800BCCD
Distance: 8.000 m
Humidity: 60%
Inspector:

The Average PPFD Effective Figure

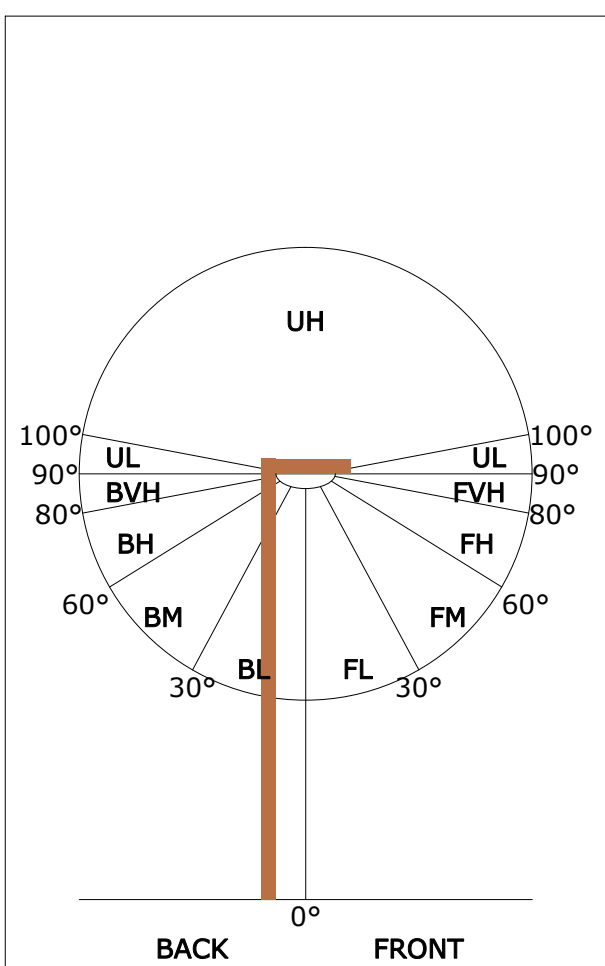


UGR Table

Reflectance:										
Ceiling (cavity)	0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
Wall	0.5	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3
Reference 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	22.5	23.8	22.8	24.1	24.3	22.1	23.4	22.4	23.6	23.9
3H	23.1	24.3	23.4	24.6	24.9	22.6	23.8	22.9	24.1	24.3
4H	23.3	24.4	23.6	24.7	25.0	22.7	23.8	23.1	24.1	24.4
6H	23.3	24.4	23.7	24.7	25.0	22.8	23.8	23.1	24.1	24.5
8H	23.4	24.4	23.7	24.7	25.0	22.8	23.8	23.2	24.1	24.5
12H	23.4	24.3	23.8	24.7	25.0	22.8	23.8	23.2	24.1	24.5
X=4H Y=2H	22.8	23.9	23.1	24.2	24.5	22.4	23.5	22.7	23.8	24.1
3H	23.5	24.4	23.8	24.8	25.1	23.0	24.0	23.4	24.3	24.6
4H	23.7	24.5	24.1	24.9	25.2	23.2	24.0	23.6	24.4	24.8
6H	23.8	24.6	24.2	24.9	25.3	23.3	24.1	23.7	24.5	24.9
8H	23.9	24.6	24.3	25.0	25.4	23.4	24.1	23.8	24.5	24.9
12H	23.9	24.6	24.4	25.0	25.4	23.4	24.1	23.9	24.5	24.9
X=8H Y=4H	23.7	24.4	24.1	24.8	25.2	23.2	23.9	23.7	24.3	24.7
6H	23.9	24.5	24.3	24.9	25.4	23.4	24.0	23.9	24.4	24.9
8H	24.0	24.5	24.5	24.9	25.4	23.5	24.0	24.0	24.5	25.0
12H	24.1	24.5	24.6	25.0	25.5	23.7	24.1	24.2	24.6	25.1
X=12H Y=4H	23.6	24.3	24.1	24.7	25.1	23.2	23.8	23.7	24.3	24.7
6H	23.9	24.4	24.4	24.8	25.3	23.4	23.9	23.9	24.4	24.9
8H	24.0	24.4	24.5	24.9	25.4	23.6	24.0	24.1	24.5	25.0
Variations with the observer position at spacings:										
S=1.0H	+0.2/-0.3					+0.3/-0.5				
S=1.5H	+0.6/-1.1					+0.8/-1.6				
S=2.0H	+1.6/-2.7					+1.8/-2.7				

Calculate in accordance with CIE Pub.117. The table is revised with 550lm ($8\log(F/F_0) = -2.1$).

FLUX DISTRIBUTION TABLE BASED ON THE IESNA LUMINAIRE CLASSIFICATION SYSTEM

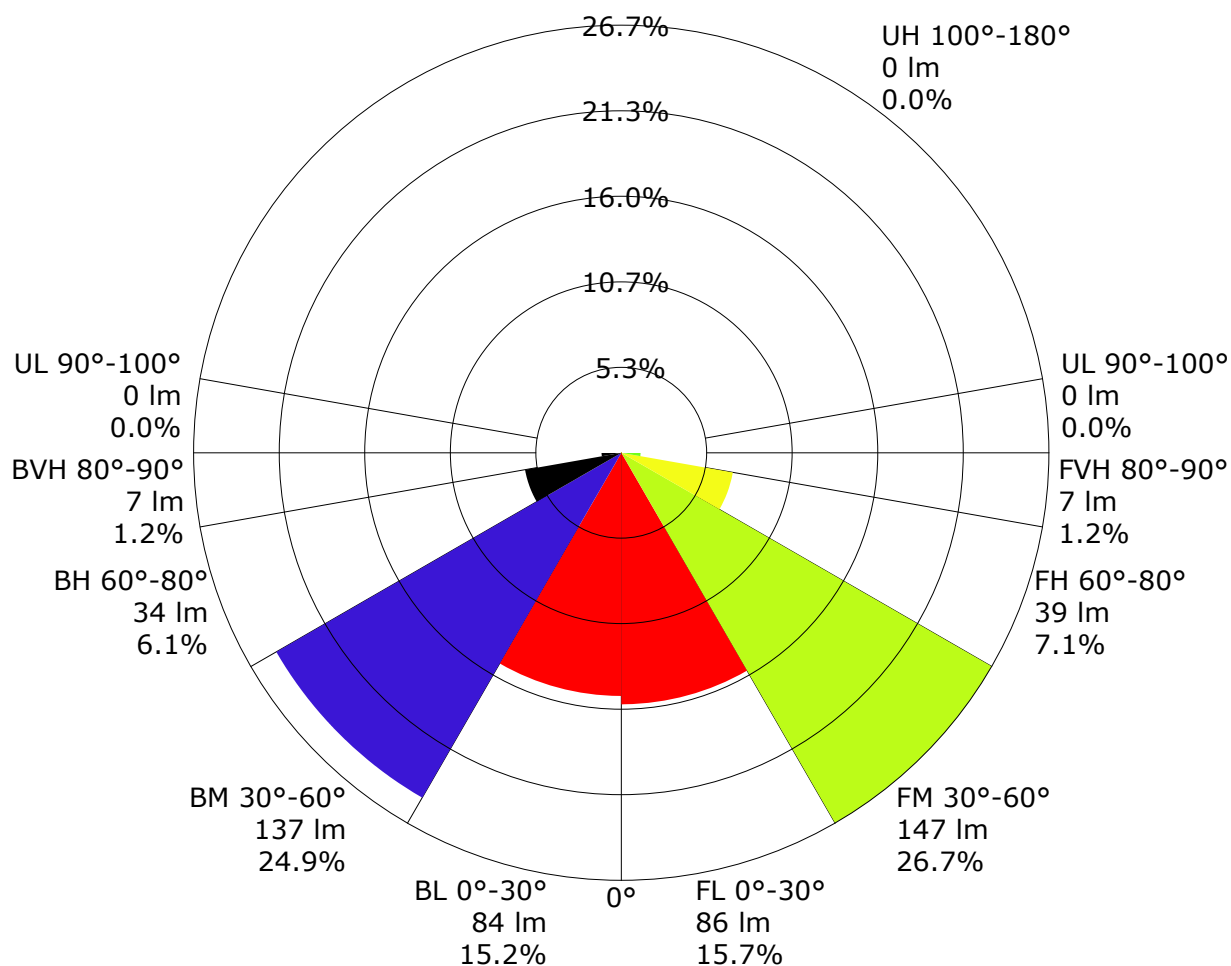
	ZONE	LUMENS	% LAMP LUMENS
	FORWARD LIGHT	279	50.7
	FL (0°-30°)	86	15.7
	FM (30°-60°)	147	26.7
	FH (60°-80°)	39	7.1
	FVH (80°-90°)	7	1.2
	BACK LIGHT	261	47.4
	BL (0°-30°)	84	15.2
	BM (30°-60°)	137	24.9
	BH (60°-80°)	34	6.1
	BVH (80°-90°)	7	1.2
	UP LIGHT	0	0.0
	UL (90°-100°)	0	0.0
	UH (100°-180°)	0	0.0
	TRAPPED LIGHT	11	1.9

BUG(Backlight,Uplight,Glare) Rating Base On TM-15-07	
Asymmetrical Luminaire Types (Type I,II,III,IV)	B0 U0 G0
Quadrilateral Symmetrical Luminaire Types (Type V,Area Light)	B0 U0 G0

C Plane (°):0.0-360.0: 45.0
 Test Lab: LISUN
 Test Type: TYPE C
 Temperature: 24.5°
 Operator: Jacky

Gamma Plane (°):0.0-90.0:1.0
 Test Device: LSG-1800BCCD
 Distance: 8.000 m
 Humidity: 60%
 Inspector:

LCS Graph



Back Light

Forward Light

Scale= MAX LCS%

Trapped Light: 11 lm, 1.9%

Color Properties

Chromaticity Coordinate: $x=0.4651$ $y=0.4138$ $u(u')=0.2645$ $v=0.3529$ $v'=0.5293$
Correlated Color Temperature: $T_c=2653K$ ($duv=0.00074$)

Measurement Flux: 539.5lm, PAR: 2.189W, PPF: 11.100umol/s

Peak Wavelength: 800nm Half Bandwidth: 185.4nm
Dominant Wavelength: 584.2nm Color Purity: 0.638

Color Ratio: $R=0.269$ $G=0.704$ $B=0.027$

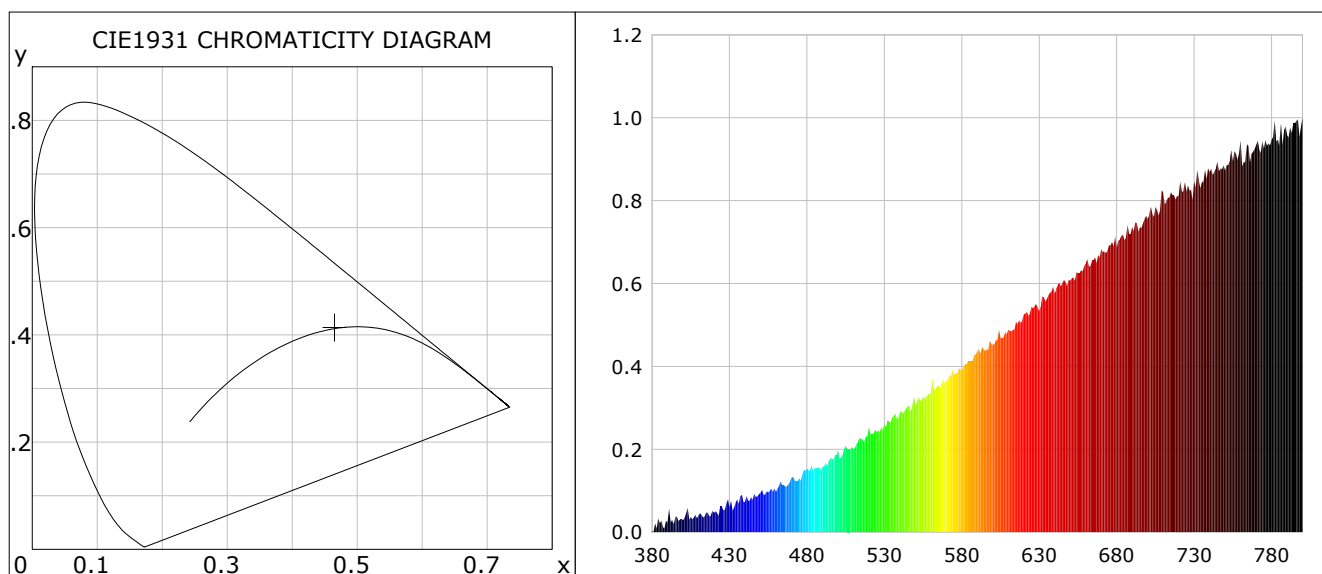
TM30: $R_f=99$, $R_g=99$

Color Render Index: $R_a=99.5$

$R_1=99.5$ $R_2=99.5$ $R_3=99.5$ $R_4=99.4$ $R_5=99.3$ $R_6=99.1$ $R_7=99.7$ $R_8=99.6$
 $R_9=98.8$ $R_{10}=98.8$ $R_{11}=99.3$ $R_{12}=98.1$ $R_{13}=99.4$ $R_{14}=99.7$ $R_{15}=99.3$

Color Quality Scale: $Q_a=96.2$ $Q_f=98.8$ $Q_p=98.5$ $Q_g=96.4$

$Q_1=96.7$ $Q_2=97.2$ $Q_3=97.1$ $Q_4=96.9$ $Q_5=96.6$ $Q_6=96.2$ $Q_7=95.9$ $Q_8=95.7$
 $Q_9=95.0$ $Q_{10}=95.5$ $Q_{11}=96.0$ $Q_{12}=96.5$ $Q_{13}=96.7$ $Q_{14}=97.2$ $Q_{15}=0.0$



C Plane (°): 0.0-360.0: 45.0
Test Lab: LISUN
Test Type: TYPE C
Temperature: 24.5°
Operator: Jacky

Gamma Plane (°): 0.0-90.0: 1.0
Test Device: LSG-1800BCCD
Distance: 8.000 m
Humidity: 60%
Inspector:

Utilisation Factor Table(Floor cavity)

Utilisation Factors UF(F)			SHR NOM = 1.25									
Room Reflectance			Room Index(RI)									
Ceiling	Wall	Floor	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00	
0.70	0.50	0.20	0.59	0.69	0.76	0.81	0.88	0.92	0.96	1.00	1.02	
	0.30		0.52	0.62	0.70	0.75	0.82	0.87	0.91	0.96	0.99	
	0.20		0.47	0.57	0.64	0.70	0.78	0.83	0.87	0.92	0.96	
0.50	0.50	0.20	0.58	0.67	0.74	0.79	0.85	0.89	0.92	0.96	0.98	
	0.30		0.51	0.61	0.68	0.73	0.80	0.85	0.88	0.93	0.95	
	0.20		0.46	0.56	0.64	0.69	0.76	0.81	0.85	0.90	0.93	
0.30	0.50	0.20	0.56	0.66	0.72	0.76	0.82	0.86	0.89	0.92	0.94	
	0.30		0.51	0.60	0.67	0.72	0.78	0.82	0.86	0.90	0.92	
	0.20		0.46	0.56	0.63	0.68	0.75	0.79	0.83	0.87	0.90	
0.00	0.00	0.00	0.44	0.54	0.60	0.65	0.71	0.76	0.79	0.83	0.86	
Rating:64W Photometrically tested without ceiling board. Multiply UF values by service correction factors Calculate in accordance with CIBSE Technical Memorandum NO.5 1980												

Utilisation Factor Table(Wall)

Utilisation Factors UF(W)			SHR NOM = 1.25									
Room Reflectance			Room Index(RI)									
Ceiling	Wall	Floor	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00	
0.70	0.50	0.20	0.92	0.75	0.64	0.55	0.44	0.37	0.31	0.25	0.20	
	0.30		0.77	0.64	0.56	0.49	0.40	0.34	0.29	0.23	0.19	
	0.20		0.66	0.56	0.49	0.44	0.36	0.31	0.27	0.22	0.18	
0.50	0.50	0.20	0.89	0.72	0.61	0.53	0.42	0.38	0.30	0.23	0.19	
	0.30		0.75	0.63	0.54	0.47	0.38	0.32	0.28	0.22	0.18	
	0.20		0.65	0.55	0.48	0.43	0.35	0.30	0.26	0.21	0.18	
0.30	0.50	0.20	0.86	0.69	0.59	0.51	0.40	0.33	0.29	0.22	0.18	
	0.30		0.74	0.61	0.52	0.46	0.37	0.31	0.27	0.21	0.18	
	0.20		0.65	0.55	0.47	0.42	0.34	0.29	0.25	0.20	0.17	
0.00	0.00	0.00	0.54	0.45	0.38	0.33	0.27	0.23	0.19	0.15	0.13	
Rating:64W Photometrically tested without ceiling board. Multiply UF values by service correction factors Calculate in accordance with CIBSE Technical Memorandum NO.5 1980												

Utilisation Factor Table(Ceiling cavity)

Utilisation Factors UF(C)			SHR NOM = 1.25									
Room Reflectance			Room Index(RI)									
Ceiling	Wall	Floor	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00	
0.70	0.50	0.20	0.16	0.17	0.18	0.18	0.19	0.20	0.20	0.21	0.21	
	0.30		0.09	0.11	0.12	0.13	0.15	0.16	0.17	0.18	0.19	
	0.20		0.05	0.06	0.08	0.09	0.11	0.13	0.14	0.16	0.17	
0.50	0.50	0.20	0.15	0.16	0.17	0.18	0.19	0.19	0.19	0.20	0.20	
	0.30		0.09	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	
	0.20		0.05	0.06	0.08	0.09	0.11	0.12	0.14	0.15	0.16	
0.30	0.50	0.20	0.15	0.16	0.16	0.17	0.18	0.18	0.19	0.19	0.19	
	0.30		0.09	0.10	0.12	0.13	0.14	0.15	0.16	0.17	0.18	
	0.20		0.05	0.06	0.08	0.09	0.11	0.12	0.13	0.15	0.16	
0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Rating:64W Photometrically tested without ceiling board. Multiply UF values by service correction factors Calculate in accordance with CIBSE Technical Memorandum NO.5 1980												

Zonal Lumen

Gamma [°]	I _{mean} [cd/klm]	Zonal Flux [lm]	Sum Zonal Flux [lm]	Rel Zonal Flux [%]	Sum Rel Zonal Flux [%]
0.0-1.0	419.2	0.2	0.2	0.04	0.04
1.0-2.0	419.0	0.7	0.9	0.12	0.16
2.0-3.0	418.8	1.1	2.0	0.20	0.36
3.0-4.0	418.4	1.5	3.5	0.28	0.64
4.0-5.0	417.8	2.0	5.5	0.36	1.00
5.0-6.0	417.0	2.4	7.9	0.44	1.44
6.0-7.0	416.1	2.8	10.8	0.52	1.96
7.0-8.0	414.7	3.3	14.0	0.59	2.55
8.0-9.0	413.0	3.7	17.7	0.67	3.22
9.0-10.0	411.1	4.1	21.8	0.74	3.96
10.0-11.0	409.0	4.5	26.3	0.82	4.78
11.0-12.0	406.6	4.9	31.2	0.89	5.67
12.0-13.0	403.9	5.3	36.4	0.96	6.63
13.0-14.0	400.7	5.6	42.1	1.03	7.65
14.0-15.0	397.1	6.0	48.1	1.09	8.74
15.0-16.0	393.3	6.3	54.4	1.15	9.90
16.0-17.0	389.1	6.7	61.1	1.21	11.11
17.0-18.0	384.7	7.0	68.1	1.27	12.38
18.0-19.0	379.9	7.3	75.3	1.32	13.70
19.0-20.0	374.9	7.5	82.9	1.37	15.07
20.0-21.0	369.6	7.8	90.7	1.42	16.49
21.0-22.0	364.0	8.0	98.7	1.46	17.95
22.0-23.0	358.4	8.3	107.0	1.50	19.46
23.0-24.0	352.7	8.5	115.5	1.54	21.00
24.0-25.0	346.9	8.7	124.2	1.58	22.58
25.0-26.0	341.0	8.9	133.0	1.61	24.19
26.0-27.0	335.1	9.0	142.0	1.64	25.83
27.0-28.0	329.1	9.2	151.2	1.67	27.49
28.0-29.0	323.2	9.3	160.5	1.69	29.18
29.0-30.0	317.4	9.4	169.9	1.71	30.90
30.0-31.0	311.6	9.5	179.5	1.73	32.63
31.0-32.0	306.0	9.6	189.1	1.75	34.39
32.0-33.0	300.5	9.7	198.9	1.77	36.16
33.0-34.0	295.1	9.8	208.7	1.79	37.94
34.0-35.0	289.8	9.9	218.6	1.80	39.74
35.0-36.0	284.6	10.0	228.6	1.81	41.55

C Plane (°): 0.0-360.0: 45.0
 Test Lab: LISUN
 Test Type: TYPE C
 Temperature: 24.5°
 Operator: Jacky

Gamma Plane (°): 0.0-90.0: 1.0
 Test Device: LSG-1800BCCD
 Distance: 8.000 m
 Humidity: 60%
 Inspector:

Zonal Lumen (Continue 1)

Gamma [°]	I _{mean} [cd/klm]	Zonal Flux [lm]	Sum Zonal Flux [lm]	Rel Zonal Flux [%]	Sum Rel Zonal Flux [%]
36.0-37.0	279.5	10.0	238.6	1.82	43.38
37.0-38.0	274.5	10.1	248.7	1.83	45.21
38.0-39.0	269.7	10.1	258.8	1.84	47.05
39.0-40.0	264.9	10.2	268.9	1.85	48.90
40.0-41.0	259.8	10.2	279.1	1.85	50.75
41.0-42.0	254.9	10.2	289.3	1.85	52.60
42.0-43.0	250.1	10.2	299.5	1.85	54.46
43.0-44.0	245.1	10.2	309.7	1.85	56.31
44.0-45.0	240.0	10.1	319.8	1.84	58.15
45.0-46.0	234.7	10.1	329.9	1.84	59.99
46.0-47.0	229.3	10.0	340.0	1.82	61.81
47.0-48.0	223.6	9.9	349.9	1.81	63.62
48.0-49.0	217.8	9.8	359.7	1.79	65.41
49.0-50.0	211.7	9.7	369.4	1.77	67.17
50.0-51.0	205.1	9.5	379.0	1.74	68.91
51.0-52.0	198.2	9.4	388.3	1.70	70.61
52.0-53.0	191.1	9.1	397.5	1.66	72.27
53.0-54.0	183.6	8.9	406.4	1.62	73.89
54.0-55.0	175.9	8.6	415.0	1.57	75.46
55.0-56.0	167.8	8.3	423.4	1.52	76.98
56.0-57.0	159.5	8.0	431.4	1.46	78.43
57.0-58.0	151.0	7.7	439.1	1.40	79.83
58.0-59.0	142.4	7.3	446.4	1.33	81.16
59.0-60.0	133.8	7.0	453.3	1.26	82.43
60.0-61.0	125.2	6.6	459.9	1.19	83.62
61.0-62.0	116.6	6.2	466.1	1.12	84.75
62.0-63.0	108.3	5.8	471.9	1.05	85.80
63.0-64.0	100.2	5.4	477.3	0.98	86.78
64.0-65.0	92.5	5.0	482.3	0.92	87.70
65.0-66.0	85.2	4.7	487.0	0.85	88.55
66.0-67.0	78.3	4.3	491.4	0.79	89.34
67.0-68.0	71.9	4.0	495.4	0.73	90.07
68.0-69.0	66.0	3.7	499.1	0.67	90.74
69.0-70.0	60.6	3.4	502.5	0.62	91.36
70.0-71.0	55.7	3.2	505.6	0.58	91.94
71.0-72.0	51.2	2.9	508.6	0.53	92.47

C Plane (°): 0.0-360.0: 45.0
 Test Lab: LISUN
 Test Type: TYPE C
 Temperature: 24.5°
 Operator: Jacky

Gamma Plane (°): 0.0-90.0: 1.0
 Test Device: LSG-1800BCCD
 Distance: 8.000 m
 Humidity: 60%
 Inspector:

Candlepower Table

Unit: cd/klm

G\C	C0.0	C45.0	C90.0	C135.0	C180.0	C225.0	C270.0	C315.0	C360.0	
G0.0	417.8	423.7	420.2	415.6	417.8	423.7	420.2	415.6	417.8	
G1.0	418.7	424.6	420.7	414.8	416.6	422.4	419.6	415.9	418.7	
G2.0	419.5	425.7	420.7	414.2	415.1	421.1	418.8	415.9	419.5	
G3.0	420.2	427.1	421.2	413.2	413.8	419.7	417.9	415.8	420.2	
G4.0	421.0	428.1	420.7	412.2	412.4	418.8	416.7	415.4	421.0	
G5.0	421.9	428.2	420.5	410.8	410.7	416.9	415.0	414.7	421.9	
G6.0	423.5	428.6	420.8	409.3	408.7	414.9	413.1	414.4	423.5	
G7.0	423.3	429.1	419.9	407.2	406.4	413.2	411.4	413.2	423.3	
G8.0	421.6	429.3	418.8	405.1	404.3	411.0	409.4	411.6	421.6	
G9.0	420.9	429.0	417.5	402.8	401.6	408.1	406.9	409.7	420.9	
G10.0	420.1	428.6	416.2	400.2	398.4	405.5	404.1	407.9	420.1	
G11.0	419.3	427.9	414.5	397.3	395.6	402.0	401.2	405.8	419.3	
G12.0	418.1	426.7	412.3	394.1	392.1	398.3	397.7	402.9	418.1	
G13.0	416.7	425.2	410.0	391.1	388.6	394.1	394.0	400.1	416.7	
G14.0	414.5	422.8	407.0	386.9	384.6	389.4	390.0	396.8	414.5	
G15.0	412.1	420.1	403.7	383.1	380.4	384.4	385.2	393.2	412.1	
G16.0	409.3	416.9	400.1	378.9	375.8	379.0	380.6	389.5	409.3	
G17.0	406.1	412.8	396.2	374.6	371.1	373.5	375.9	385.5	406.1	
G18.0	402.4	409.1	392.5	369.8	366.0	367.7	370.5	381.1	402.4	
G19.0	398.4	404.2	388.3	365.4	360.7	361.7	364.7	376.5	398.4	
G20.0	393.8	399.0	383.1	360.1	355.4	355.9	359.7	371.4	393.8	
G21.0	389.1	393.1	378.1	355.0	349.4	349.7	353.9	366.2	389.1	
G22.0	383.8	387.7	372.8	349.6	343.2	343.3	348.1	361.4	383.8	
G23.0	378.3	381.9	367.6	344.1	337.2	337.5	342.1	355.4	378.3	
G24.0	373.1	376.4	361.6	338.7	331.5	331.7	336.4	349.9	373.1	
G25.0	367.2	370.3	356.1	332.9	325.2	325.6	330.3	344.1	367.2	
G26.0	360.6	364.3	349.9	327.3	319.3	320.1	324.9	338.3	360.6	
G27.0	354.6	358.0	344.6	320.8	313.3	314.5	319.0	332.1	354.6	
G28.0	348.1	352.1	338.6	315.0	307.1	308.9	313.3	325.7	348.1	
G29.0	342.0	346.3	333.1	309.5	301.3	303.3	307.9	319.2	342.0	
G30.0	335.5	340.2	327.0	303.6	295.3	298.1	302.7	312.7	335.5	
G31.0	329.6	334.4	321.5	297.8	289.7	292.9	297.5	306.5	329.6	
G32.0	323.4	329.1	316.2	292.4	284.1	288.1	292.0	300.5	323.4	
G33.0	317.8	323.7	310.5	287.0	278.7	283.3	287.1	294.4	317.8	
G34.0	312.0	317.9	305.0	281.6	273.2	278.7	282.4	287.9	312.0	
G35.0	306.3	312.5	299.8	276.4	267.9	274.6	277.8	282.2	306.3	
G36.0	300.7	307.2	294.6	271.1	262.6	270.5	273.2	276.7	300.7	

C Plane (°):0.0-360.0: 45.0

Test Lab: LISUN

Test Type: TYPE C

Temperature: 24.5°

Operator: Jacky

Gamma Plane (°):0.0-90.0:1.0

Test Device: LSG-1800BCCD

Distance: 8.000 m

Humidity: 60%

Inspector:

Candlepower Table (Continue 1)

Unit: cd/klm

G\C	C0.0	C45.0	C90.0	C135.0	C180.0	C225.0	C270.0	C315.0	C360.0	
G37.0	294.9	302.1	289.5	265.8	257.5	266.5	268.7	271.0	294.9	
G38.0	289.4	296.6	284.9	260.6	252.6	262.3	264.2	265.6	289.4	
G39.0	284.1	291.3	279.9	255.6	249.6	258.6	259.8	259.9	284.1	
G40.0	278.8	286.3	274.7	250.7	243.8	254.5	255.2	254.9	278.8	
G41.0	273.7	281.2	269.8	245.4	237.9	250.4	250.7	249.1	273.7	
G42.0	269.1	276.5	265.3	240.3	232.6	246.3	246.3	244.0	269.1	
G43.0	264.1	271.8	262.0	234.9	227.0	241.8	241.5	238.7	264.1	
G44.0	259.6	266.9	256.2	229.1	221.7	236.8	236.7	233.3	259.6	
G45.0	254.8	262.4	251.6	223.6	216.1	231.4	231.4	227.7	254.8	
G46.0	250.1	258.8	246.5	217.6	209.6	225.7	225.7	222.2	250.1	
G47.0	245.3	253.6	242.3	211.5	203.6	219.5	220.0	216.4	245.3	
G48.0	240.2	249.4	237.6	205.2	196.9	212.6	213.7	210.4	240.2	
G49.0	235.3	244.7	233.0	198.3	190.0	205.9	207.0	204.8	235.3	
G50.0	229.7	240.2	227.6	191.4	182.8	198.2	200.0	198.0	229.7	
G51.0	224.5	235.2	221.8	184.1	175.1	189.9	192.5	190.7	224.5	
G52.0	218.6	230.2	216.1	176.4	167.3	181.6	184.6	183.4	218.6	
G53.0	212.6	224.4	210.1	168.3	159.0	172.8	176.2	175.7	212.6	
G54.0	205.9	218.4	203.1	160.6	151.1	164.0	167.7	168.3	205.9	
G55.0	199.1	211.4	196.3	152.0	142.5	154.7	159.1	160.3	199.1	
G56.0	191.5	204.0	188.3	143.7	134.1	145.2	150.6	152.2	191.5	
G57.0	183.9	196.0	180.4	135.0	125.2	135.8	141.4	143.9	183.9	
G58.0	175.7	187.9	171.4	126.6	116.8	127.0	132.8	135.8	175.7	
G59.0	166.9	178.7	162.5	117.9	108.7	118.3	123.7	127.8	166.9	
G60.0	158.3	169.4	153.1	109.9	101.2	109.5	115.5	119.5	158.3	
G61.0	148.7	159.3	143.6	101.6	93.4	101.2	107.0	111.6	148.7	
G62.0	139.5	149.3	133.9	93.9	86.6	93.4	99.1	103.8	139.5	
G63.0	129.9	138.9	124.3	86.4	79.6	86.1	91.5	96.4	129.9	
G64.0	120.7	129.1	114.7	79.9	73.4	79.2	84.6	89.0	120.7	
G65.0	111.4	118.9	105.5	73.3	67.7	72.7	77.8	82.5	111.4	
G66.0	102.8	109.5	96.6	67.3	62.5	67.2	72.0	76.0	102.8	
G67.0	93.9	99.8	88.5	61.9	57.5	61.8	66.1	70.0	93.9	
G68.0	86.1	91.4	80.8	56.9	53.0	57.3	61.1	64.5	86.1	
G69.0	78.3	83.3	73.3	52.1	49.1	52.8	56.5	59.6	78.3	
G70.0	71.4	75.8	67.0	48.2	45.6	49.1	52.1	55.2	71.4	
G71.0	64.9	69.1	60.7	44.4	42.4	45.6	48.1	51.2	64.9	
G72.0	59.2	62.5	55.5	41.2	39.6	42.4	44.9	47.4	59.2	
G73.0	53.9	56.7	50.6	38.0	36.9	39.6	41.8	44.2	53.9	

C Plane (°):0.0-360.0: 45.0

Test Lab: LISUN

Test Type: TYPE C

Temperature: 24.5°

Operator: Jacky

Gamma Plane (°):0.0-90.0:1.0

Test Device: LSG-1800BCCD

Distance: 8.000 m

Humidity: 60%

Inspector:



Unit: cd/klm

C Plane (°):0.0-360.0: 45.0
Test Lab: LISUN
Test Type: TYPE C
Temperature: 24.5°
Operator: Jacky

Gamma Plane (°):0.0-90.0:1.0
Test Device: LSG-1800BCCD
Distance: 8.000 m
Humidity: 60%
Inspector: