

# **PG-1600S C-γ Goniophotometer Test System**

## **Luminous Intensity Distribution Test System**

### **(Brochure)**

<http://www.pegotester.com>

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EMC&EMI Test System: [http://www.pegotester.com/products/EMC\\_EMI](http://www.pegotester.com/products/EMC_EMI)

Integrating Sphere System: [http://www.pegotester.com/products/integrating\\_sphere](http://www.pegotester.com/products/integrating_sphere)

Goniophotometer test system: <http://www.pegotester.com/products/goniophotometer>

Electrical Safety Tester: [http://www.pegotester.com/products/Safety\\_tester](http://www.pegotester.com/products/Safety_tester)

Environment Test Chamber: [http://www.pegotester.com/products/Test\\_chamber](http://www.pegotester.com/products/Test_chamber)

AC&DC Power Supply: [http://www.pegotester.com/products/power\\_supply](http://www.pegotester.com/products/power_supply)

IEC60061-3 Lamp Gauges: <http://www.pegotester.com/products/gauge>

IEC and UL Probes for verification: <http://www.pegotester.com/products/probe>

## 1. Introduction:

PG-1600S Goniophotometer Test System (Luminous Intensity Distribution Test System) is designed according to LM-79 and CIE standard regarding C-γ test solution, widely applied to test LED, HID, CFL and other luminaire, like floodlight, downlight, panel light, streetlight and so on. The measuring parameters includes spatial intensity distribution curve, cross section spatial intensity distribution curve, isolux distribution curve, luminance limitation curve, area luminous flux, luminaires efficiency, UGR glare class, total luminous flux, effective luminous flux, utilization factor and etc. All the test data can be saved as IES file which can input to Dialux directly, also the data can be output as PDF and excel files for analysis purpose.

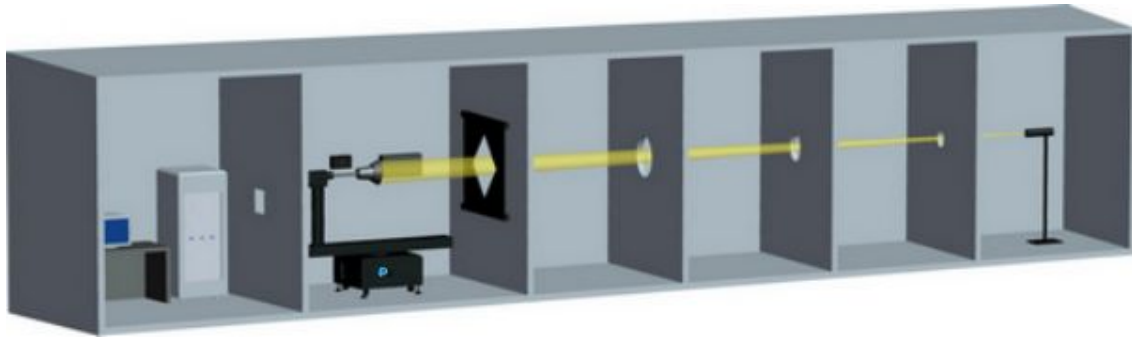
- 1) For Indoor Lighting fixture: upward light ratio, downward light ratio, max allowable spacing height ratio, luminaire limitation curve, utilization factor, budgetary estimate table.
- 2) For floodlight: half peak side angle, type B luminous intensity distribution data, zonal luminous flux distribution data, space luminous intensity curve.
- 3) For streetlight: max allowable spacing height ratio, upward light ratio, downward light ratio, zonal flux, luminous intensity, utilization factor.

## 2. Configuration:

- 1) PG-1600S goniophotometer:
  - Rotating console: can realize 0 degree automated location function by software; Vertical axis rotation range:  $0^{\circ} \sim +360^{\circ}$ ; Horizontal axis rotation range:  $-180^{\circ} \sim +180^{\circ}$   
Angle accuracy:  $0.1^{\circ}$ , resolution:  $0.1^{\circ}$
  - Photo-detector: class1, pre-amplification, with supporter
  - Photometer:  $0.01 \text{ lx} \sim 200 \text{ klx}$ ; low drifting, high accuracy
  - 3-D English software: can output IES file, LDT file, CSV file, CIE file and etc.
  - Double channel cross-beam laser alignment device for calibration
  - Clamps for lamp mounting
- 2) Luminous intensity standard lamp
  - Made by OSRAM, traceable to NIM,  $380 \text{ nm} \sim 780 \text{ nm}$
  - Life time: 2000h above
- 3) 105 digital power meter (AC)
  - current, voltage, power, power factor
  - Voltage:  $0 \sim 600 \text{ V (AC)}$ ; Current:  $0.005 \sim 20.00 \text{ A}$
  - Accuracy:  $\pm 0.4\% \text{ reading} + 0.1\% \text{ range} + 1 \text{ digit}$
- 4) 3005 CC&CV DC power supply
  - Output voltage:  $0 \sim 30 \text{ V (DC)}$ ; Output current:  $0 \sim 5 \text{ A (DC)}$
  - Resolution:  $1 \text{ mV (voltage)}$ ,  $1 \text{ mA (current)}$
- 5) 500VA AC power supply:
  - Output power:  $500 \text{ W}$
  - Output voltage:  $0 \sim 150 \text{ V}$ ,  $151 \sim 300 \text{ V}$
  - Output frequency:  $45 \sim 75 \text{ Hz}$ ,  $50 \text{ Hz}$ ,  $60 \text{ Hz}$ ,  $100 \text{ Hz}$ ,  $200 \text{ Hz}$ ,  $400 \text{ Hz}$ , stability:  $\leq \pm 0.05\%$
  - Waveform: sine wave, distortion:  $\leq 2.0\%$
- 6) 19 inch cabinet: put the overall control system
- 7) Computer and printer: prepare by user

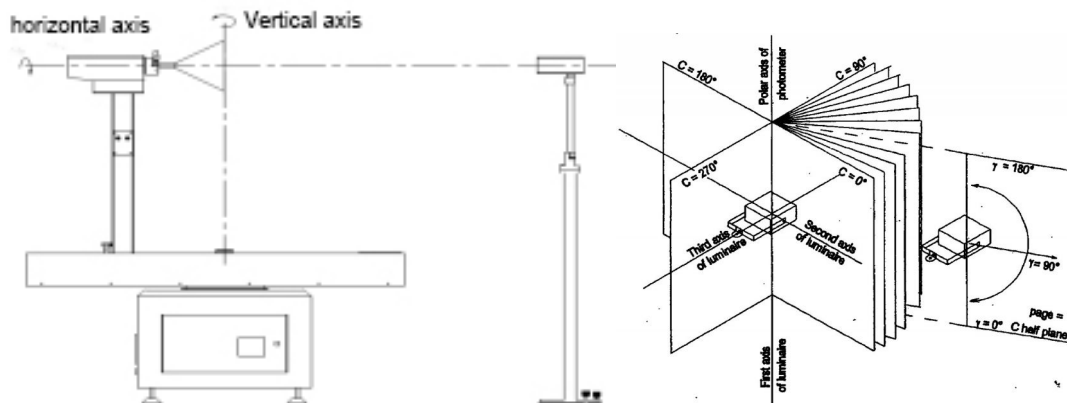
### 3. Lab requirement:

- 1) Dark room dimension: 3m(H)\*2.5m(W)\*8m(L) above, or designed according to lamp size and lab size. The rotating console and detector are put in dark room. Dark room (includes wall, ceiling and floor) should be coated with dull dark paint, or be covered with black carpet or black cloth.
- 2) Control room: 2.5m(H)\*3m(W)\*3m(L). The control cabinet, computer and printer are put in control room.
- 3) The temperature of dark room should be controlled by air conditioner according to CIE requirement.
- 4) Pego will provide lab design support according to actual conditions after order confirmed.



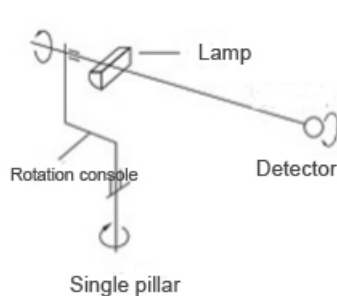
### 3. Working Principle

PG-1600S goniophotometer System carries out measuring methods of fixed location and rotating luminaires. The measured luminaire is installed on the two-dimension rotating table, using cross laser to make the luminaire lighting center superposed with the rotating center of rotating table. The mechanical equipment allows turning the tested luminaires around a vertical axis and a horizontal axis. When tested luminaires turn around horizontal axis, the detector which is at the same level with rotating table will measure the intensity of each direction at this surface. When rotating with vertical axis, the detector will measure the intensity at the vertical surface. The vertical and horizontal axis can be rotated continuously at  $\pm 180^\circ$  or  $0\sim 360^\circ$ . According to the measurement requirements, the system can be operated in C- $\gamma$  coordinates. When getting intensity distribution data, computer will calculate other photometric parameters automatically.



## 2) Single pillar structure (C-γ and conic coordinate)

This structure is applied to downlight, grille lamp, home lighting fixture and LED streetlight. When install the light fixture, make sure the glow center of lamp coincide with rotation console center. Lamp axis should coincide with rotation console.



## 4. Parameters:

- 1) Test distance: 2m~10m (depends on lamp size and lab size)
- 2) English version software can run in win7 or win XP
- 3) Can test max lamp (with lamp fixture) size:  $\phi 1300*400(\text{mm})$ , 30KG, 300V/500w



## 5. Goniophotometer system designed according to :

- 1) CIE Pub. NO.70, "The Measurement of Absolute Luminous Intensity Distributions"
- 2) CIE DIV. II -TC10, "Photometry of Luminaires"
- 3) CIE Pub.NO.76, "Photometry-the CIE System of Physical Photometry"
- 4) CIE 121-1996 "The Photometry of Goniophotometer of Luminaires"
- 5) IESNA LM-75 "Goniophotometer Types and Photometric Coordinates"
- 6) IESNA LM-79 "Electrical and Photometric Measurements of Solid-state Lighting Products"
- 7) IESNA-1971(73-96) "IES Practical Guide to Photometry"
- 8) IESNA 61341 "Method of Measurement of Center Beam Intensity and Beam Angle(s) of Reflector Lamp"

## 6. Reference Test Report:

## LED Testing Report

### Luminaire Property

Luminaire:

Report NO.:

Test NO.:

Lamp:

Sum Lumens: 928.65 lm

Number of Lamps: 1

Diameter: 200mm

Length: mm

Photometric Type: Type C

Voltage: 221.8 V

Current: 0.062 A

Power: 11.7 W

Power Factor: 0.851

Ballast Type:

Width: mm

Height: mm

Remark:

### Photometric Results

Lumens: 18999.43 lm

Efficiency: 82.6062 lm/W

Central Intensity: 7707.938cd

Maximum Intensity: 9300.15cd

Angle of maximum intensity: C:150.0 G:20.0

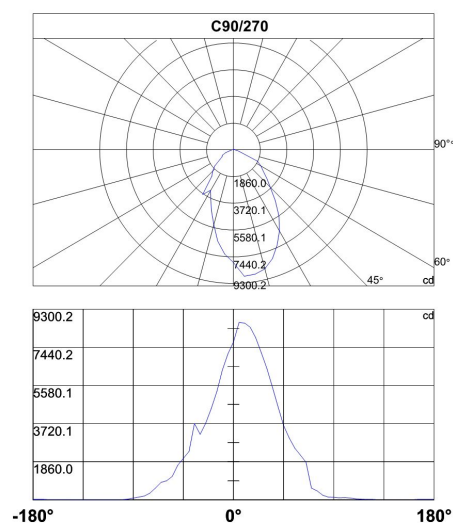
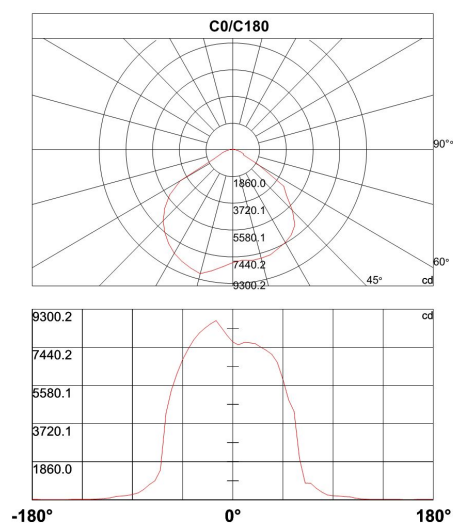
Half Peak Side Angle(50%): Left: -57.6 Right:40.0

Light Out Rate(LOR): 100.00%

Up Flux Rate: 1.54%

Down Flux Rate: 98.46%

Beam Angle(10%): Left: -84.4 Right:49.5



## LED Testing Report

**Photometric Data Table [cd]**

C\G	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0
0.0	7707.9	7567.9	7680.2	7664.1	7629.4	7447.6	7297.9	7100.1	6709.8	5875.7
30.0	7707.9	8311.1	8757.5	9040.8	8968.7	8845.7	8757.5	8538.3	7811.2	7134.8
60.0	7707.9	8132.0	8311.1	8340.5	8546.3	8353.8	7845.9	7212.4	6225.9	5100.5
90.0	7707.9	8661.3	8629.2	8418.0	7912.7	7180.3	6397.0	5504.2	4533.8	3632.9
120.0	7707.9	8418.0	8607.8	8738.8	8693.3	8340.5	7950.2	7097.4	6070.9	4865.3
150.0	7707.9	8209.5	8704.0	9139.8	9300.2	8925.9	8885.8	8524.9	8196.1	7506.4
180.0	7707.9	8019.7	8396.6	8754.8	8589.1	8388.6	8150.7	7805.8	7356.7	6859.5
210.0	7707.9	7706.9	7733.6	7650.8	7284.5	6814.1	6044.2	5351.8	4654.1	3980.4
240.0	7707.9	7362.1	6843.5	6220.6	5458.7	4568.5	3774.6	3234.6	3726.5	2332.4
270.0	7707.9	7145.5	6332.9	5303.7	4453.6	3729.1	3199.9	3726.5	2364.7	2027.4
300.0	7707.9	7364.7	6696.4	5966.6	5250.2	4507.1	3739.8	3178.5	3785.3	2458.0
330.0	7707.9	7378.1	7191.0	6963.8	6391.7	5996.0	5472.1	4934.8	4378.7	3689.1
360.0	7707.9	7567.9	7680.2	7664.1	7629.4	7447.6	7297.9	7100.1	6709.8	5875.7

C\G	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0	90.0	95.0
0.0	4876.0	4322.6	2026.3	818.0	800.9	562.7	380.7	236.0	203.4	187.1
30.0	6100.3	5156.7	4426.9	2087.8	802.5	524.0	264.4	130.7	100.0	94.6
60.0	3921.6	3090.2	2582.3	2119.9	578.2	377.7	214.7	118.4	80.7	79.1
90.0	3023.4	2515.5	2189.4	1833.8	578.5	435.7	228.8	133.9	119.4	104.8
120.0	3729.1	2927.2	2579.7	2210.8	1317.1	423.4	261.2	154.2	105.1	97.0
150.0	6389.0	5285.0	4662.1	2809.6	723.6	589.7	310.4	149.2	103.2	100.0
180.0	6185.8	5359.8	4226.4	1448.9	924.9	745.6	498.8	336.6	261.7	217.9
210.0	3445.8	2911.1	2666.0	882.7	572.3	406.3	255.0	162.3	137.7	113.6
240.0	2153.8	1629.9	1513.7	1397.6	840.7	533.8	304.2	172.7	134.2	112.5
270.0	1688.9	1146.3	926.0	858.6	574.7	327.7	186.6	141.7	94.4	41.7
300.0	2283.2	1506.1	1410.4	1314.7	787.8	487.9	271.9	155.6	128.6	114.7
330.0	3282.7	3007.4	2632.6	714.6	506.0	360.6	228.8	143.6	121.4	116.6
360.0	4876.0	4322.6	2026.3	818.0	800.9	562.7	380.7	236.0	203.4	187.1

C\G	100.0	105.0	110.0	115.0	120.0	125.0	130.0	135.0	140.0	145.0
0.0	166.3	145.2	93.0	51.9	39.6	28.9	23.0	19.8	18.4	18.4
30.0	103.7	99.4	64.2	45.7	33.7	23.8	19.2	16.3	14.7	15.0
60.0	69.8	64.2	50.0	30.5	21.9	17.1	14.2	11.8	11.2	12.0
90.0	112.5	87.1	50.8	33.4	24.1	19.0	15.0	11.5	10.2	10.2
120.0	90.9	87.1	73.0	40.6	24.9	17.9	14.2	11.5	10.4	10.4
150.0	95.7	86.3	74.0	57.5	42.5	30.2	20.9	17.1	14.4	13.6
180.0	189.8	162.3	97.0	62.0	47.6	36.4	25.1	20.9	17.9	16.8
210.0	84.7	68.4	54.8	39.8	27.0	16.8	11.2	9.4	8.0	8.0
240.0	91.4	63.9	33.4	18.2	10.7	6.9	5.3	5.3	5.6	6.7
270.0	11.2	4.5	3.5	2.9	2.4	2.4	2.7	3.2	4.5	6.1
300.0	82.9	43.8	21.9	11.5	6.9	4.3	3.5	3.7	4.8	6.1
330.0	85.8	65.0	48.9	31.5	19.2	12.6	9.4	7.5	7.2	8.0
360.0	166.3	145.2	93.0	51.9	39.6	28.9	23.0	19.8	18.4	18.4

LED Testing Report

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**Photometric Data Table [cd]**

C\G	150.0	155.0	160.0	165.0	170.0	175.0	180.0
0.0	17.6	16.3	16.0	17.9	20.3	22.2	20.2
30.0	15.2	15.2	16.0	18.4	20.9	22.7	20.2
60.0	12.8	14.2	16.0	19.0	22.2	24.9	20.2
90.0	11.0	11.8	13.9	17.1	20.3	22.5	20.2
120.0	10.4	11.2	13.1	15.5	18.7	20.9	20.2
150.0	12.6	12.6	13.4	15.2	17.9	19.5	20.2
180.0	15.2	13.9	13.6	14.7	16.3	17.1	20.2
210.0	8.6	9.4	10.4	13.1	16.3	16.3	20.2
240.0	8.0	9.6	11.8	15.0	18.7	18.7	20.2
270.0	7.8	9.6	11.8	14.7	18.2	18.2	20.2
300.0	8.0	9.9	11.5	14.2	17.6	17.6	20.2
330.0	9.1	10.4	11.5	13.9	16.8	16.8	20.2
360.0	17.6	16.3	16.0	17.9	20.3	22.2	20.2

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Equipment: PG=1600S  
Temperature: 25 DegDate: 2015-05-29  
Humidity: 60%

Operator: Steven

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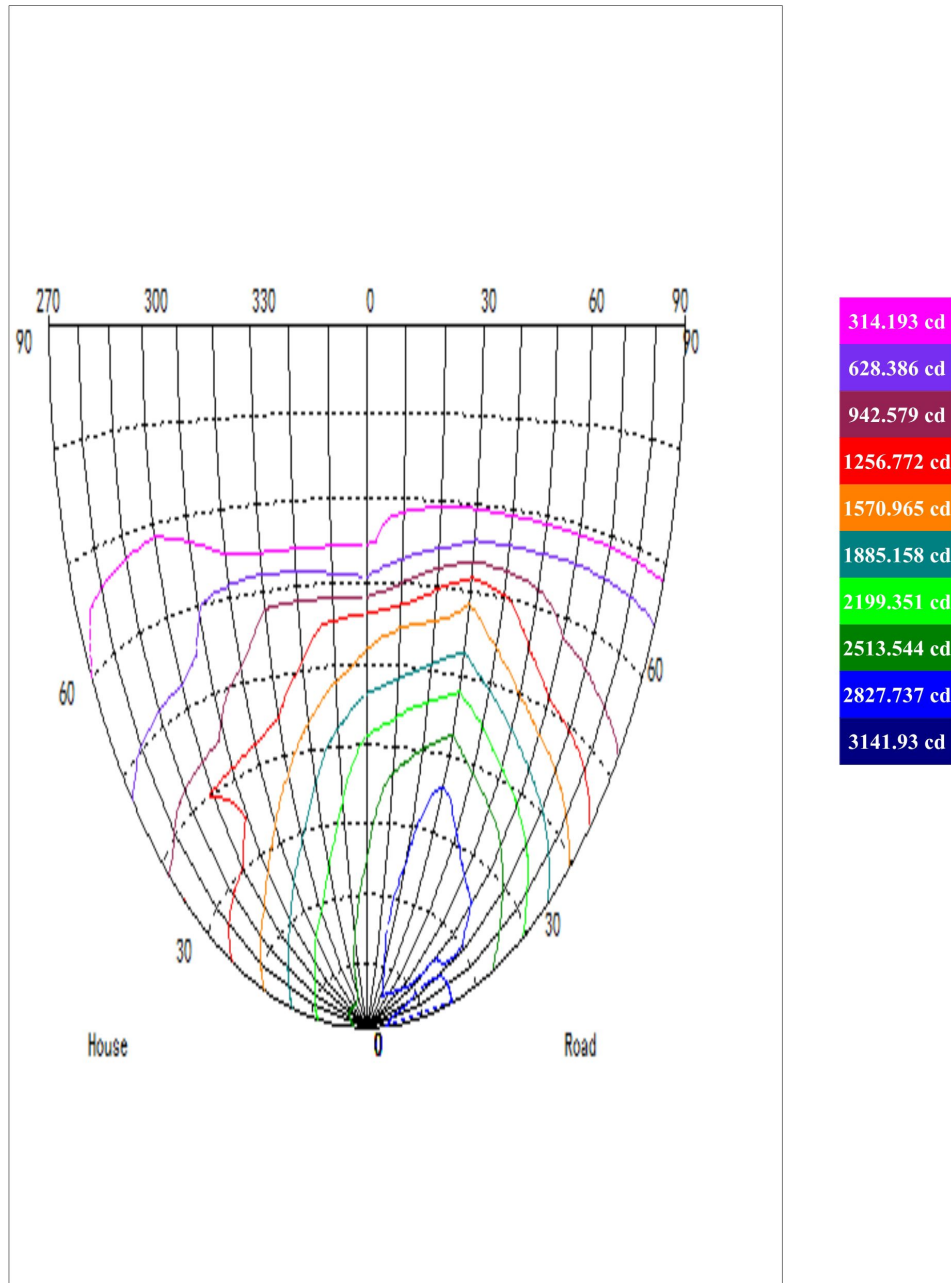
LED Testing Report

Zonal Flux Distribution

Gamma [°]	I <sub>mean</sub> [cd]	Zonal Flux [lm]	Sum Flux [lm]	Zonal Flux [%]	Sum Flux [%]
0	7707.94	0.00	0.00	0.00	0.00
5	7856.39	186.07	186.07	0.98	0.98
10	7823.64	560.92	746.99	2.95	3.93
15	7683.52	919.87	1666.87	4.84	8.77
20	7373.20	1240.89	2907.75	6.53	15.30
25	6924.77	1499.59	4407.34	7.89	23.20
30	6459.63	1693.81	6101.15	8.92	32.11
35	6017.43	1837.33	7938.48	9.67	41.78
40	5484.48	1919.01	9857.49	10.10	51.88
45	4621.87	1871.27	11728.76	9.85	61.73
50	3923.31	1726.68	13455.44	9.09	70.82
55	3238.14	1557.14	15012.58	8.20	79.02
60	2653.48	1361.83	16374.42	7.17	86.18
65	1541.40	1019.78	17394.20	5.37	91.55
70	750.62	580.36	17974.55	3.05	94.61
75	481.27	322.00	18296.54	1.69	96.30
80	283.79	204.71	18501.25	1.08	97.38
85	169.57	123.19	18624.44	0.65	98.03
90	132.47	82.70	18707.14	0.44	98.46
95	114.97	67.75	18774.89	0.36	98.82
100	98.73	58.07	18832.96	0.31	99.12
105	81.44	48.21	18881.17	0.25	99.38
110	55.38	35.76	18916.93	0.19	99.57
115	35.46	23.00	18939.93	0.12	99.69
120	25.04	14.71	18954.64	0.08	99.76
125	18.02	9.95	18964.59	0.05	99.82
130	13.63	6.88	18971.47	0.04	99.85
135	11.49	5.08	18976.55	0.03	99.88
140	10.63	4.10	18980.65	0.02	99.90
145	10.96	3.60	18984.25	0.02	99.92
150	11.36	3.29	18987.54	0.02	99.94
155	12.01	2.96	18990.49	0.02	99.95
160	13.25	2.65	18993.14	0.01	99.97
165	15.73	2.39	18995.53	0.01	99.98
170	18.69	2.04	18997.57	0.01	99.99
175	19.78	1.38	18998.95	0.01	100.00
180	20.19	0.48	18999.42	0.00	100.00



Hangzhou Linkcolor Technology Co.,Ltd  
LED Testing Report



Equipment: PG-1600S  
Temperature: 25 Deg

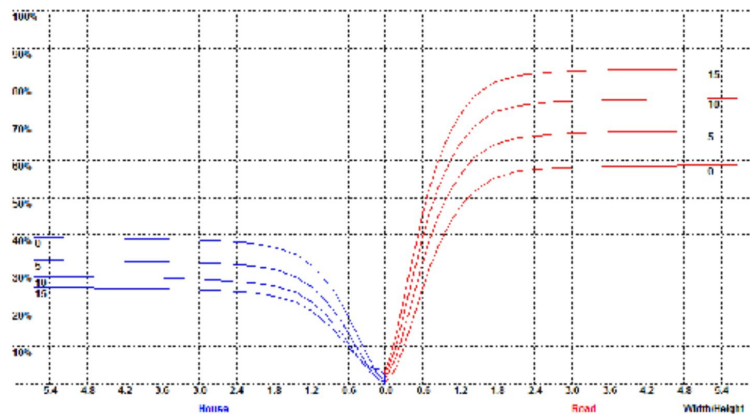
Date: 2015-05-29  
Humidity: 60%

Operator: Steven

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LED Testing Report

Coefficient Utilization Curve



Equipment: PG-1600S  
Temperature: 25 Deg

Date: 2015-05-29  
Humidity: 60%

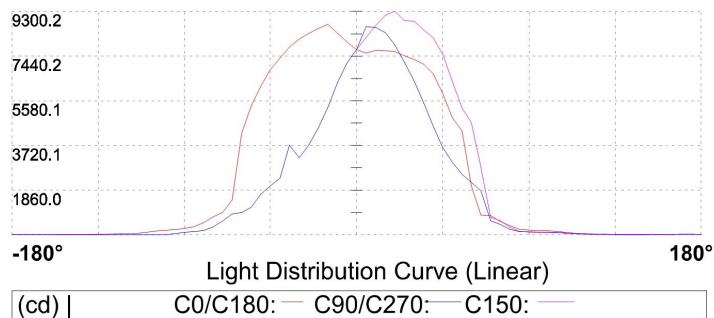
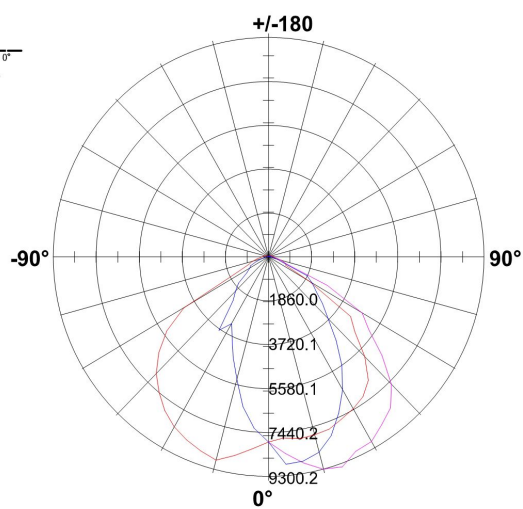
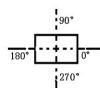
Operator: Steven

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LED Testing Report

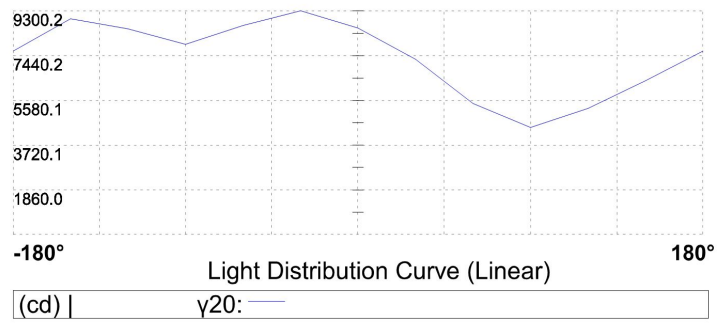
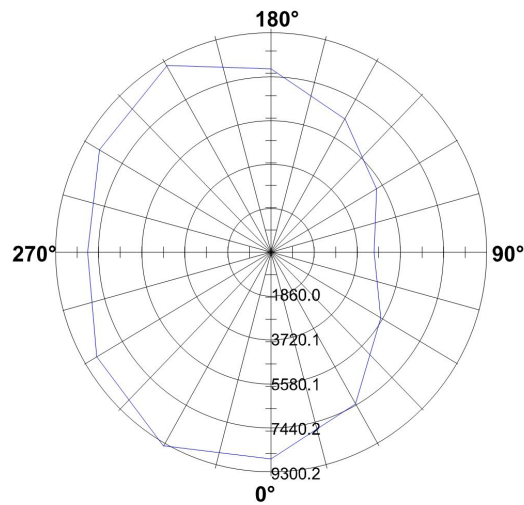
Light Distribution Curve [Unit: cd]

Luminaire



LED Testing Report

**Max Plane Light Distribution Curve [Unit: cd]**



Equipment: PG-1600S  
Temperature: 25 Deg

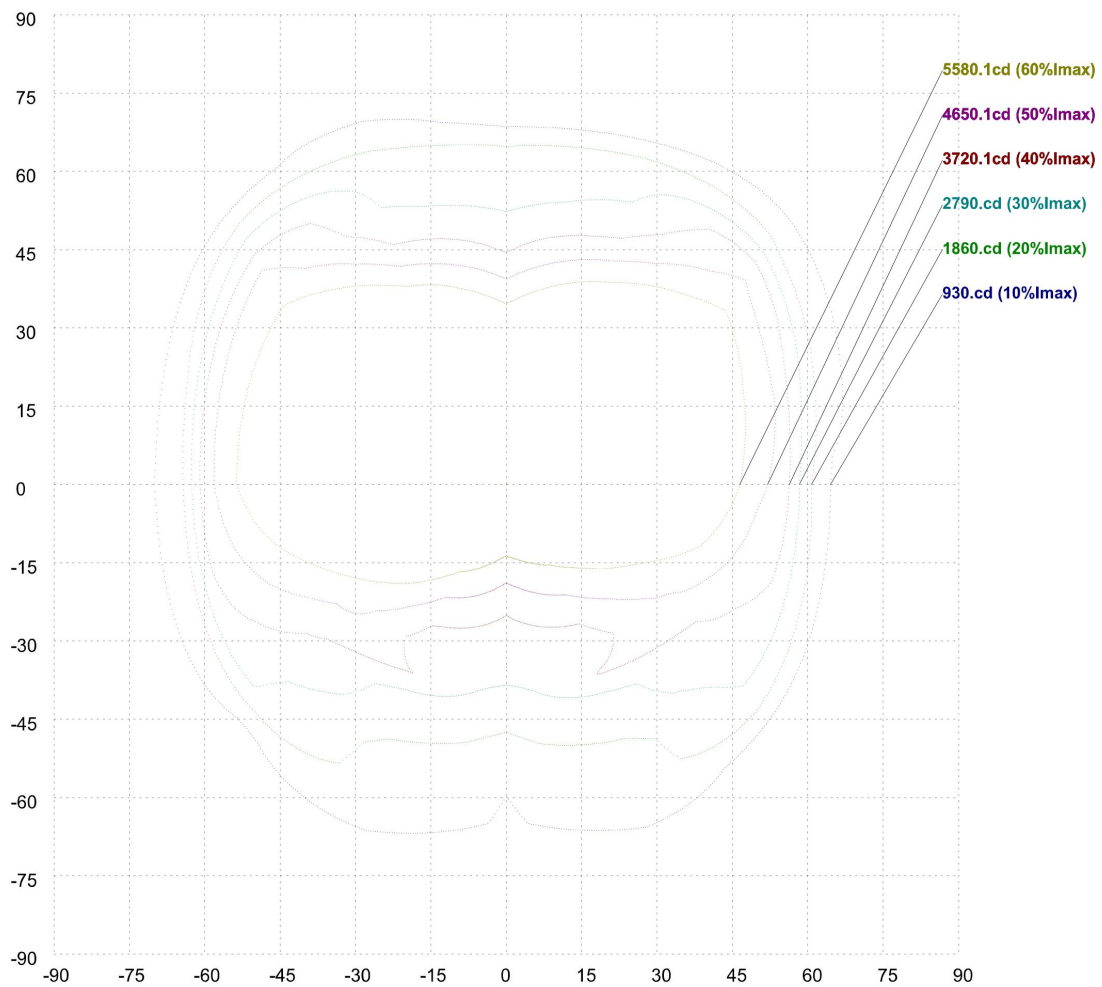
Date: 2015-05-29  
Humidity: 60%

Operator: Steven

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等光强曲线 V-H [cd]

第9页



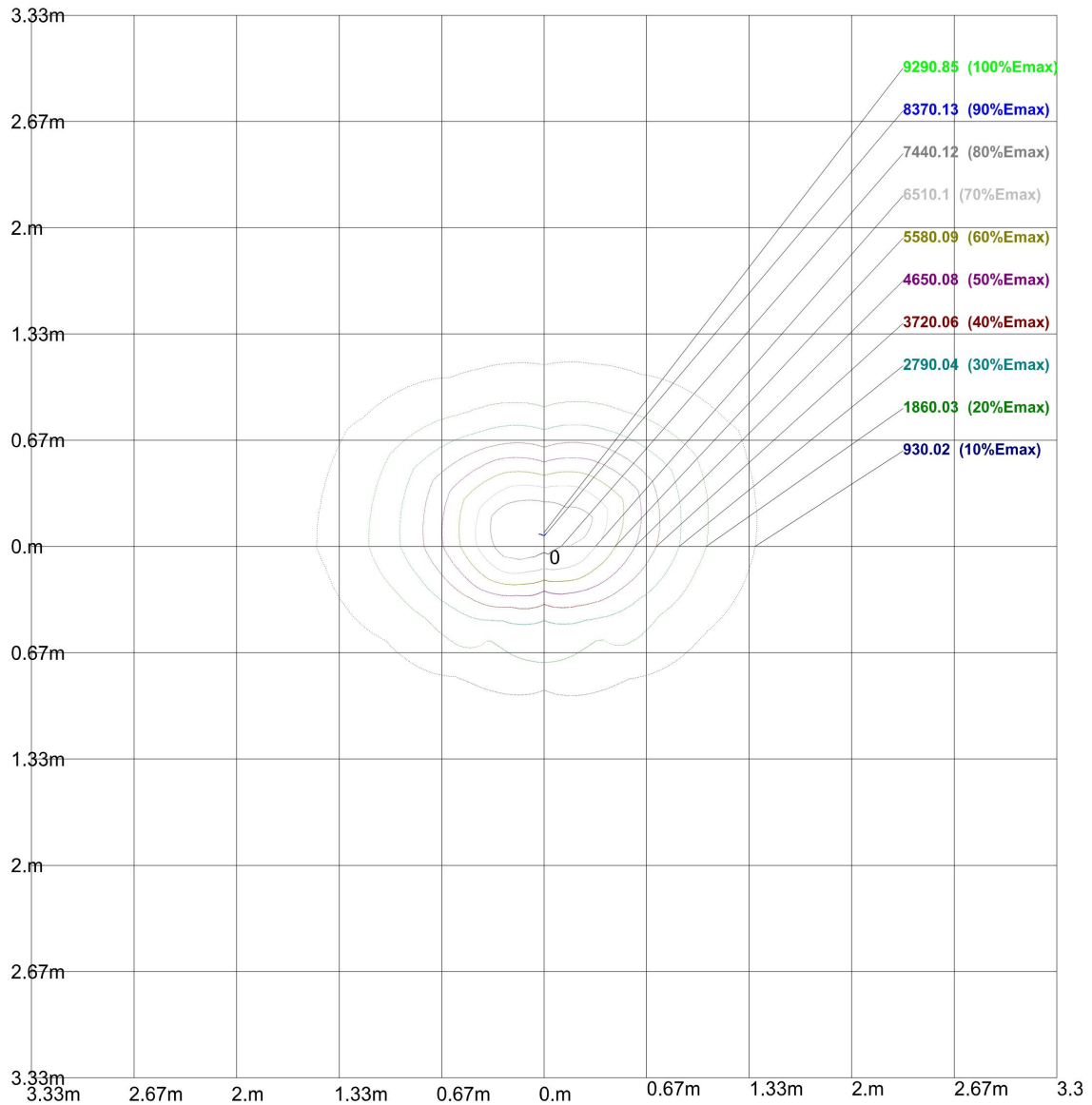
测试设备:PG-1600S  
环境温度:25℃

测试日期:2015-05-29  
环境湿度:60%

测试人员:Steven  
报告编号:

LED Testing Report

Iso-Lux[lx]



Height: 1 m  
Max Illuminance : 9300.15lx

Equipment: PG-1600S  
Temperature: 25 Deg

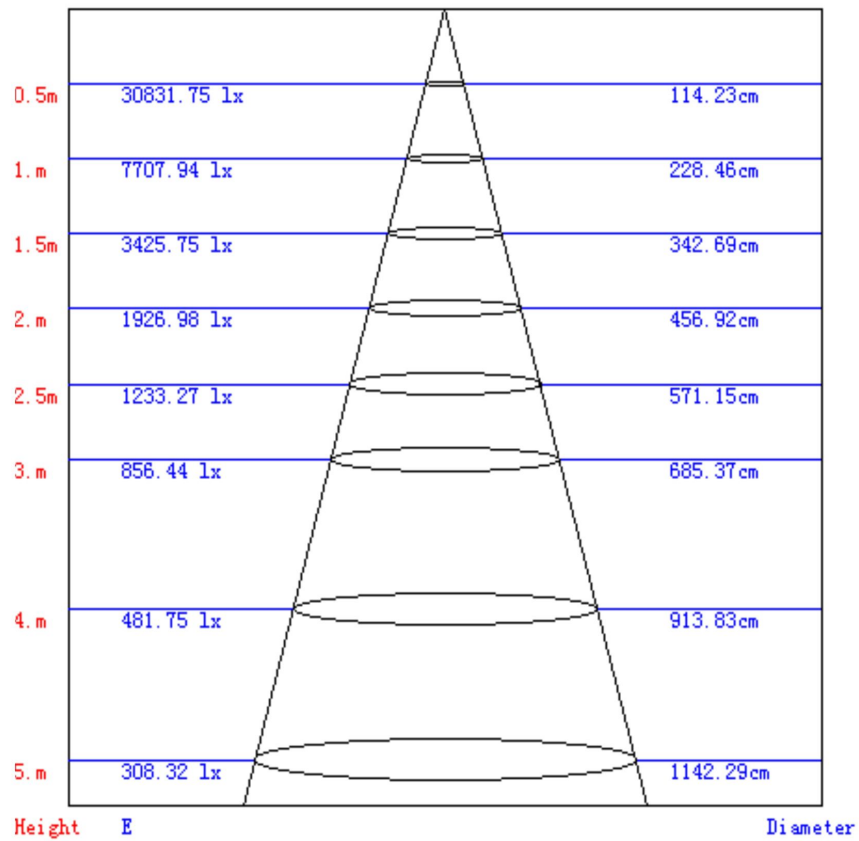
Date: 2015-05-29  
Humidity: 60%

Operator: Steven

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LED Testing Report

Lux-Distance Curve



Beam Angle:97.60°

Equipment:PG-1600S  
Temperature:25 Deg

Date:2015-05-29  
Humidity:60%

Operator:Steven

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LED Testing Report

Utilization Coefficient Table

RHOCC	80			70			50			30			10			0
RHOW	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR	COEFFICIENTS OF UTILIZATION FOR RHOFC=20															
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	1.00
1	1.08	1.06	1.05	1.06	1.04	1.03	1.02	1.00	0.99	0.97	0.95	0.93	0.91	0.89	0.87	0.81
2	0.94	0.92	0.90	0.93	0.90	0.88	0.90	0.87	0.85	0.87	0.83	0.80	0.82	0.78	0.75	0.70
3	0.82	0.79	0.78	0.82	0.78	0.76	0.80	0.76	0.73	0.77	0.73	0.69	0.74	0.69	0.65	0.61
4	0.72	0.69	0.68	0.72	0.69	0.66	0.71	0.67	0.63	0.69	0.64	0.60	0.67	0.61	0.57	0.53
5	0.64	0.61	0.59	0.64	0.61	0.58	0.64	0.59	0.56	0.63	0.57	0.53	0.61	0.55	0.50	0.46
6	0.57	0.54	0.53	0.57	0.54	0.52	0.58	0.53	0.50	0.57	0.51	0.47	0.56	0.50	0.45	0.41
7	0.51	0.49	0.47	0.52	0.48	0.46	0.52	0.48	0.44	0.52	0.46	0.42	0.51	0.45	0.40	0.37
8	0.46	0.44	0.43	0.47	0.44	0.42	0.48	0.43	0.40	0.48	0.42	0.38	0.48	0.41	0.36	0.33
9	0.42	0.40	0.39	0.43	0.40	0.38	0.44	0.39	0.36	0.44	0.39	0.35	0.44	0.38	0.33	0.30
10	0.39	0.37	0.35	0.39	0.36	0.35	0.41	0.36	0.33	0.41	0.36	0.32	0.41	0.35	0.30	0.27

Equipment:PG-1600S  
Temperature:25 Deg

Date:2015-05-29  
Humidity:60%

Operator:Steven

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