

SUMMARY

Test Condition: 15V 60Hz for SL23

Setting: 1 (Max light output)

Criteria	Result
Total Lumen Output (lm)	482.128
Total Power(W)	9.8602
Lamp Luminaire Efficacy (lm/W)	48.90
Power Factor	0.7154
Field Angle (°)	43.8
Correlated Color Temperature (CCT)	3023
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	94
Fidelity Index (R _f)	95
Gamut Index (R _g)	102
Chromaticity Coordinate (x)	0.4360
Chromaticity Coordinate (y)	0.4050
Chromaticity Coordinate (u')	0.2496
Chromaticity Coordinate (v')	0.5216
In-situ Case Temperature of LED/COB (°C)	48.7
Drive Current of LED/COB (mA)	255
Projection Life Time, Reported L70 (hours)	>66000

Test Condition: 15V 60Hz for SL23

Setting: 2 (Medium light output)

Criteria	Result
Total Lumen Output (lm)	406.47
Total Power(W)	7.9040
Lamp Luminaire Efficacy (lm/W)	51.43
Power Factor	0.7029
Correlated Color Temperature (CCT)	3030
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	96
Fidelity Index (R _f)	96
Gamut Index (R _g)	102
Chromaticity Coordinate (x)	0.4357
Chromaticity Coordinate (y)	0.4053
Chromaticity Coordinate (u')	0.2493
Chromaticity Coordinate (v')	0.5217

***** End of Page *****

SUMMARY (Cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 3 (Medium light output)

Criteria	Result
Total Lumen Output (lm)	341.34
Total Power(W)	6.4094
Lamp Luminaire Efficacy (lm/W)	53.26
Power Factor	0.6963
Correlated Color Temperature (CCT)	3026
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	96
Fidelity Index (R _f)	96
Gamut Index (R _g)	102
Chromaticity Coordinate (x)	0.4359
Chromaticity Coordinate (y)	0.4050
Chromaticity Coordinate (u')	0.2495
Chromaticity Coordinate (v')	0.5216

Test Condition: 15V 60Hz for SL23

Setting: 4 (Medium light output)

Criteria	Result
Total Lumen Output (lm)	271.863
Total Power(W)	5.2236
Lamp Luminaire Efficacy (lm/W)	52.05
Power Factor	0.6908
Correlated Color Temperature (CCT)	3024
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	97
Fidelity Index (R _f)	96
Gamut Index (R _g)	102
Chromaticity Coordinate (x)	0.4359
Chromaticity Coordinate (y)	0.4048
Chromaticity Coordinate (u')	0.2496
Chromaticity Coordinate (v')	0.5215

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SUMMARY (Cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 5 (Medium light output)

Criteria	Result
Total Lumen Output (lm)	210.289
Total Power(W)	3.8712
Lamp Luminaire Efficacy (lm/W)	54.32
Power Factor	0.6896
Correlated Color Temperature (CCT)	3022
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	98
Fidelity Index (R _f)	96
Gamut Index (R _g)	102
Chromaticity Coordinate (x)	0.4359
Chromaticity Coordinate (y)	0.4045
Chromaticity Coordinate (u')	0.2497
Chromaticity Coordinate (v')	0.5214

Test Condition: 15V 60Hz for SL23

Setting: 6 (Minimum light output)

Criteria	Result
Total Lumen Output (lm)	144.036
Total Power(W)	2.6764
Lamp Luminaire Efficacy (lm/W)	53.82
Power Factor	0.6848
Correlated Color Temperature (CCT)	3015
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	98
Fidelity Index (R _f)	96
Gamut Index (R _g)	102
Chromaticity Coordinate (x)	0.4360
Chromaticity Coordinate (y)	0.4040
Chromaticity Coordinate (u')	0.2500
Chromaticity Coordinate (v')	0.5212

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EQUIPMENT LIST

Equipment Used	Model Number	Control Number
Fluke Temperature Meter	52	EC2357
Everfine- DC Power Supply	WY12010	EC4753-7
Everfine- AC power source for Integrating Sphere System	VPS1010 PWM	EC4760-12
Everfine - AC power source for Goniophotometer System	VPS1060 PWM	EC4753-8
Two meter integrating sphere unit	Everfine – 2M	EC4760
Everfine - Digital Power Meter	PF2010A	EC4760-10
YOKOGAWA - Digital Power Meter	WT210	EC4553
Everfine – Goniophotometer	Go-R5000	EC4753
Draught-proof enclosure	N/A	EC2201
Agilent - Data Acquisition Unit	34970A	EC2043
QINGZHI - Power Meter	8770A	EC2652
YOKOGAWA - Digital Power Meter	WT-210	EC4553

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TEST METHOD

Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79

Light Distribution and Output Measurements

Light Distribution and total light output (luminous flux) were measured using a Go-R5000 Type-C Rotating Mirror Goniophotometer. Temperature 25°C and relative humidity of 60% was measured at a position in the testing laboratory.

The lamp rotates only around the fixed vertical axle in the prescribed burning position. The lamp and mirror permit the measurement of luminous intensity at the direction of any horizontal or vertical angle without tilting the lamp. The lamp was allowed to stabilize before measurements were made.

Chromaticity Measurements

Chromaticity was measured using a 2 meters integrating sphere spectral lamp measurement system. Temperature was measured at a position inside the sphere shielded from direct light. Relative humidity of 65% was measured at a position in the testing laboratory.

Spectral radiant flux measurements were made using spectroradiometer attached to the detector port of the integrating sphere. Each lamp was allowed to stabilize before measurements were made. The calibration of the integrating sphere spectroradiometer system is by the reference/standard lamps which are traceable to National Institute of Metrology P.R. CHINA. Lamp efficacy (lumens per watt) for each lamp model was then computed based on the luminous flux result. Electrical measurements including voltage, power and power factor were measured using YOKOGAWA - Digital Power Meter., model WT210.

Standard lamp used:

Model: Labsphere SCL-1400

Current: 2.679A

Temperature Measurement Test

The sample was operated at 25±5°C until constant temperatures were obtained. A temperature was considered constant if sample was operating for at least three hours and upon three successive readings-taken at 15 minutes intervals- were within one degree and were not rising.

Thermocouples were attached at locations described in the results by means of epoxy.

Driver current Measurement Test

During the temperature measurement test, measure the forward current for each LED package/array/module.

***** End of Page *****

RESULTS OF TESTS

Test Condition: 15V 60Hz for SL23

Setting: 1 (Max light output)

Total operation burning time: 70 min

Stabilization time: 60 min

Photometric Measurements at 25°C

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
SL23							
0231201-15-018	N/A	3023	98	0.4360	0.4050	0.2496	0.5216

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (A)	Lamp Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
SL23							
0231201-15-018	N/A	15.0	0.9229	9.8602	0.7154	482.128	48.90

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL23		
0-30	448.8	93.1
0-40	469.3	97.3
0-60	480.1	99.6
0-90	482.0	100.00
0-180	482.1	100.00

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL23		
Beam (50%)	22.8	23.2
Beam Angle	23.0	

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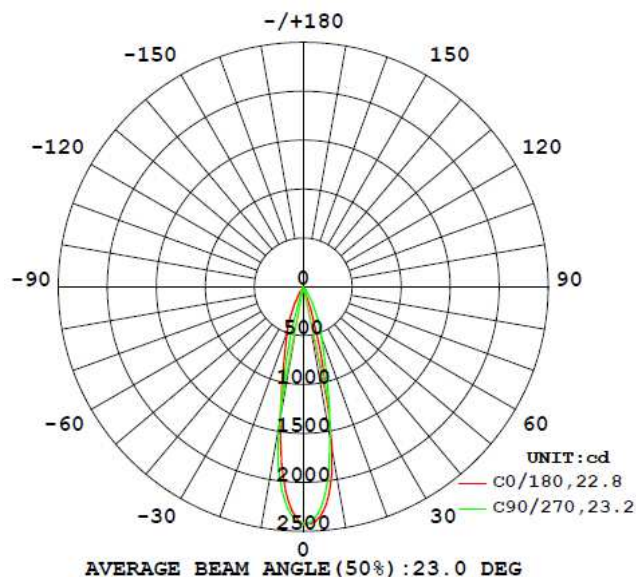
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL23

Setting: 1 (Max light output)

G \ C(°)	0	22.5	45	67.5	90
0	2421.3	2421.3	2421.3	2421.3	2421.3
5	2308.9	2294.1	2276.0	2255.0	2231.8
10	1703.1	1664.5	1673.3	1628.0	1577.7
15	695.3	694.9	767.5	873.4	905.1
20	52.7	59.6	240.8	471.5	542.6
25	14.5	22.6	36.5	173.0	322.0
30	4.4	8.4	20.0	37.3	142.9
35	3.1	5.6	10.8	20.5	44.3
40	1.6	3.7	5.9	12.8	26.4
45	0.5	2.0	3.9	7.7	14.6
50	0.1	0.8	2.5	4.4	9.4
55	0.0	0.2	1.6	2.8	5.7
60	0.0	0.0	0.9	2.0	3.1
65	0.0	0.0	0.5	1.3	2.0
70	0.0	0.0	0.2	0.9	1.4
75	0.0	0.0	0.0	0.6	1.0
80	0.0	0.0	0.0	0.4	0.7
85	0.0	0.0	0.0	0.2	0.5
90	0.0	0.0	0.0	0.1	0.3



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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

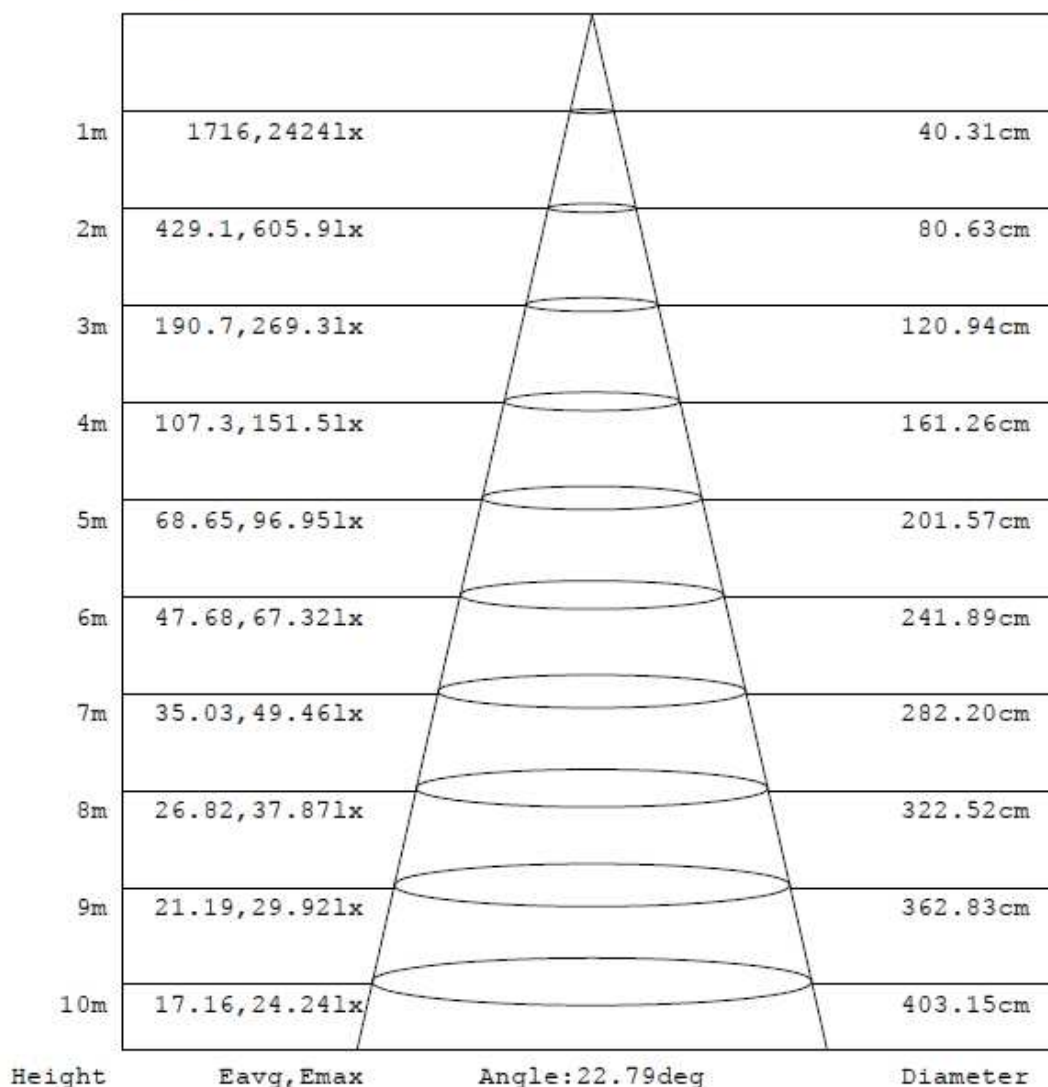
Setting: 1 (Max light output)

Illumination Plots

Model No.: SL23
Mount Height: 10 m

Illuminance - Cone of Light

Flux out: 243.6 lm



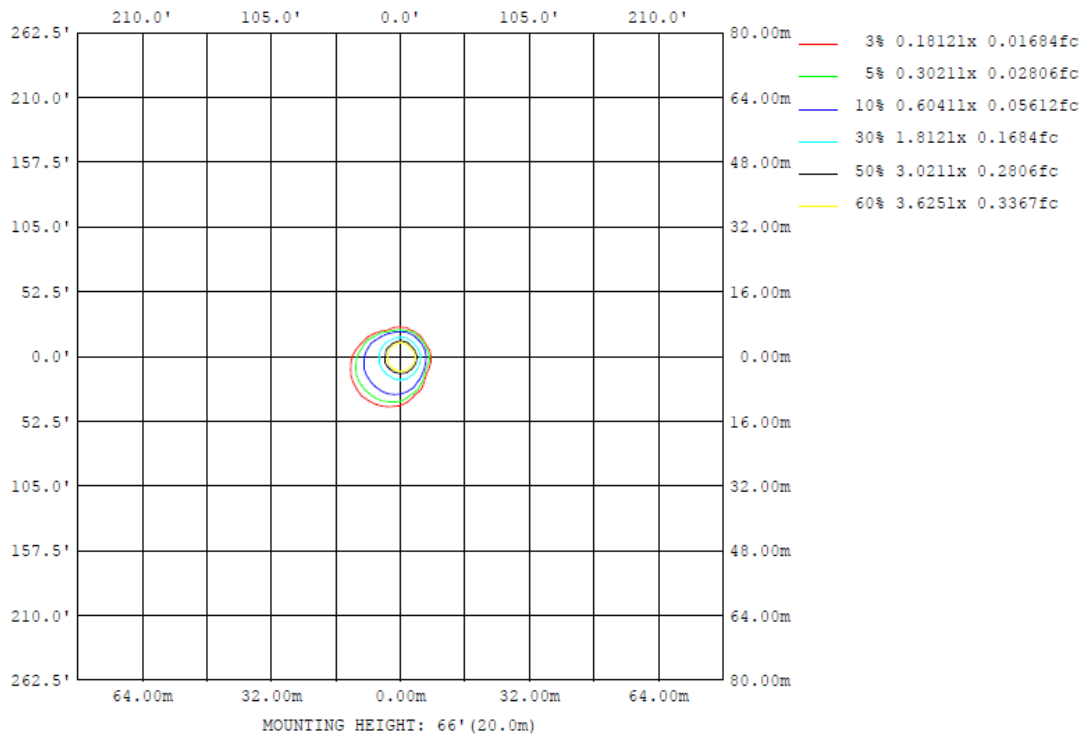
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23
Setting: 1 (Max light output)

Model No.: SL23
Mount Height: 20 m
Isoillumination Plot



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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 1 (Max light output)

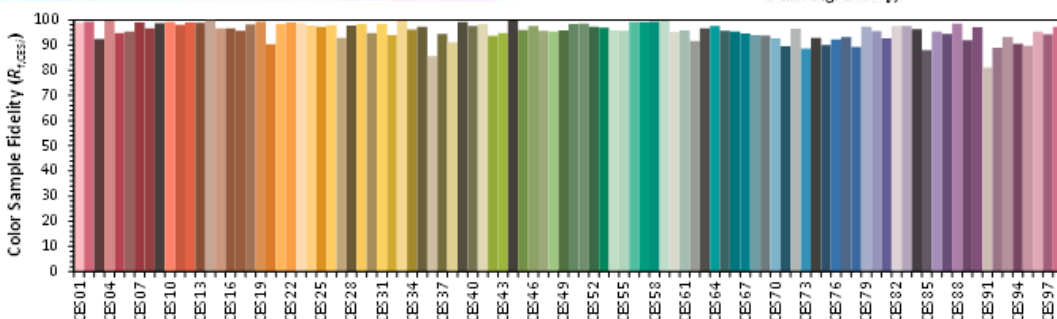
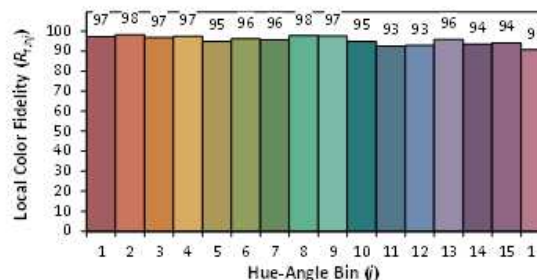
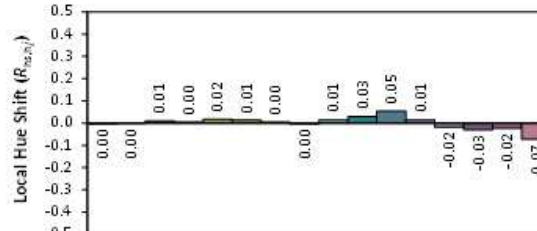
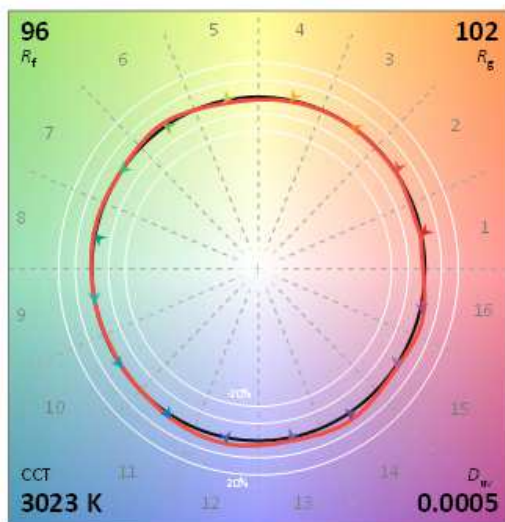
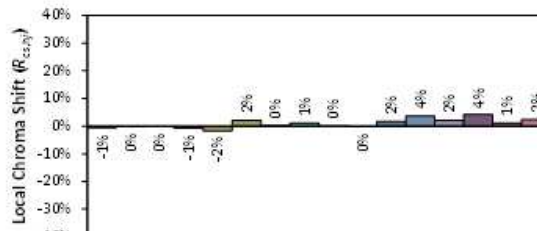
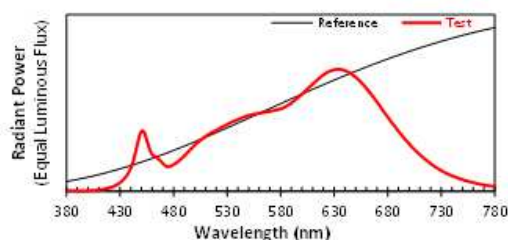
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: STERLING LIGHTING LLC

Date: 12/18/2023

Model: SL23



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4360

y 0.4050

u' 0.2496

v' 0.5216

CIE 13.3-1995
(CRI)

R_a 98

R_g 94

***** End of Page *****

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 2 (Medium light output)

Total operation burning time: 70 min

Stabilization time: 60 min

Photometric Measurements at 25°C

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
SL23							
0231201-15-018	N/A	3030	98	0.4357	0.4053	0.2493	0.5217

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (A)	Lamp Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
SL23							
0231201-15-018	N/A	15.0	0.7408	7.9040	0.7029	406.47	51.43

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL23		
0-30	377.6	92.9
0-40	395.7	97.4
0-60	404.8	99.6
0-90	406.4	100.00
0-180	406.5	100.00

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL23		
Beam (50%)	22.8	23.6
Beam Angle	23.2	

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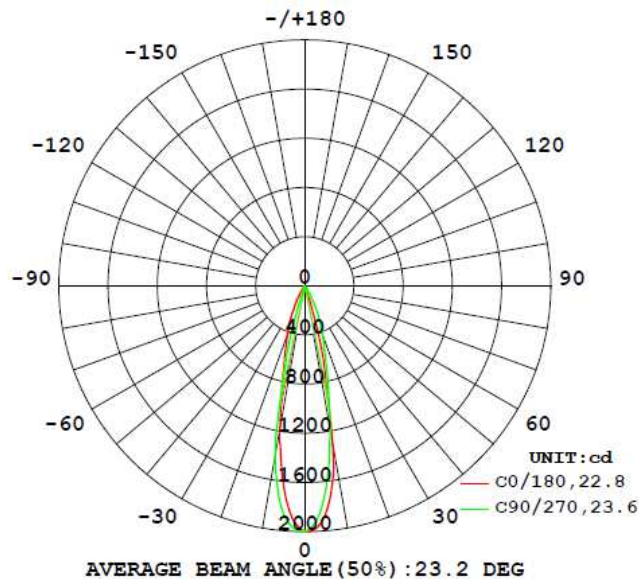
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL23

Setting: 2 (Medium light output)

G \ C(°)	0	22.5	45	67.5	90
0	1995.8	1995.8	1995.8	1995.8	1995.8
5	1876.4	1838.0	1802.2	1770.5	1751.2
10	1312.1	1219.2	1224.6	1209.7	1182.3
15	521.7	477.5	558.0	611.4	678.9
20	38.9	40.5	147.3	353.3	414.7
25	11.5	17.0	27.0	84.8	242.9
30	3.8	6.6	14.5	26.1	85.8
35	2.6	4.4	7.6	14.6	30.6
40	1.3	2.8	4.2	8.8	17.4
45	0.4	1.5	2.8	5.2	10.3
50	0.0	0.5	1.8	2.8	6.4
55	0.0	0.1	1.1	2.0	3.7
60	0.0	0.0	0.6	1.4	2.0
65	0.0	0.0	0.3	0.9	1.4
70	0.0	0.0	0.1	0.6	1.0
75	0.0	0.0	0.0	0.4	0.7
80	0.0	0.0	0.0	0.2	0.5
85	0.0	0.0	0.0	0.1	0.3
90	0.0	0.0	0.0	0.1	0.2



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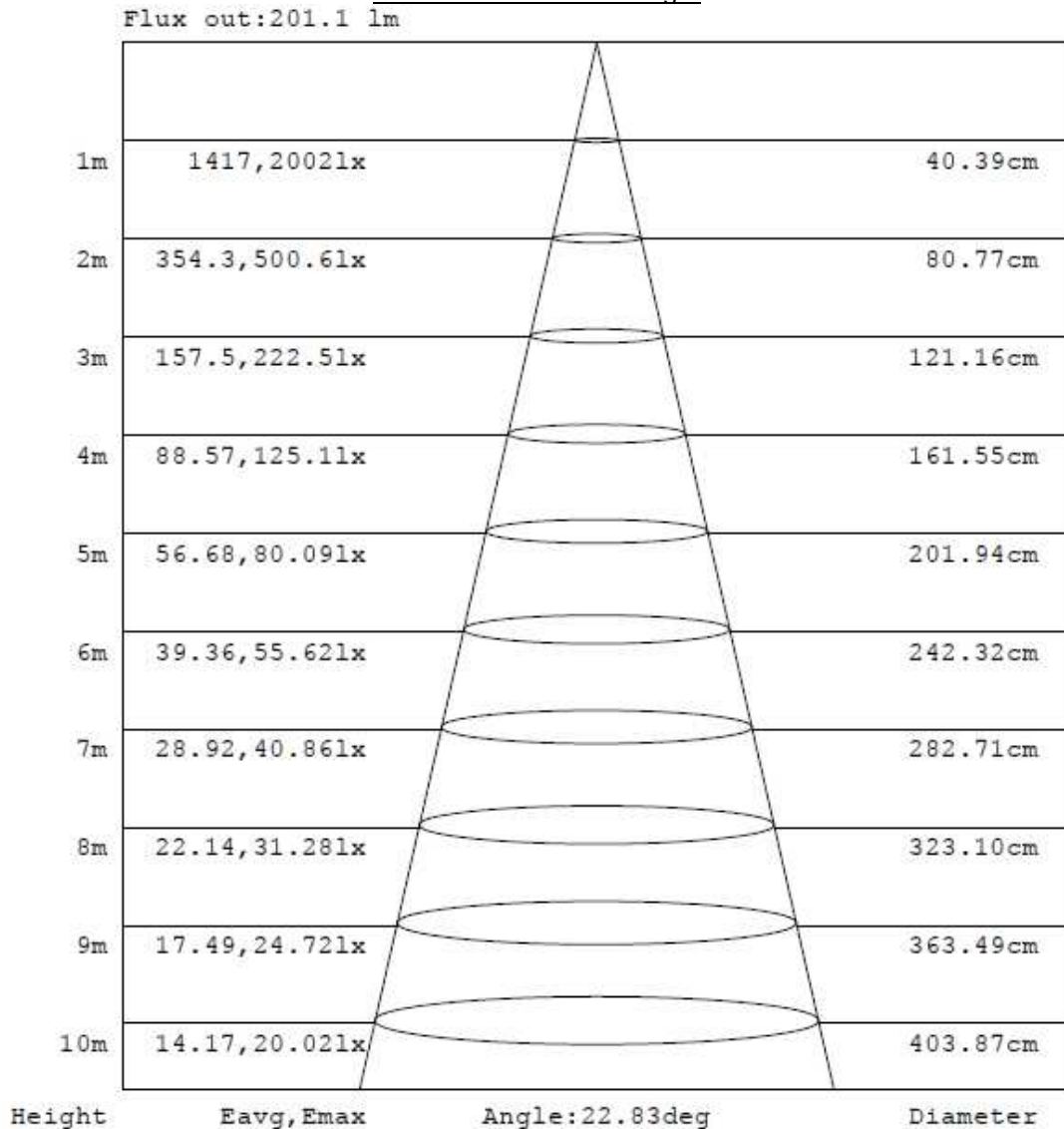
RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23
Setting: 2 (Medium light output)

Illumination Plots

Model No.: SL23
Mount Height: 10 m

Illuminance - Cone of Light



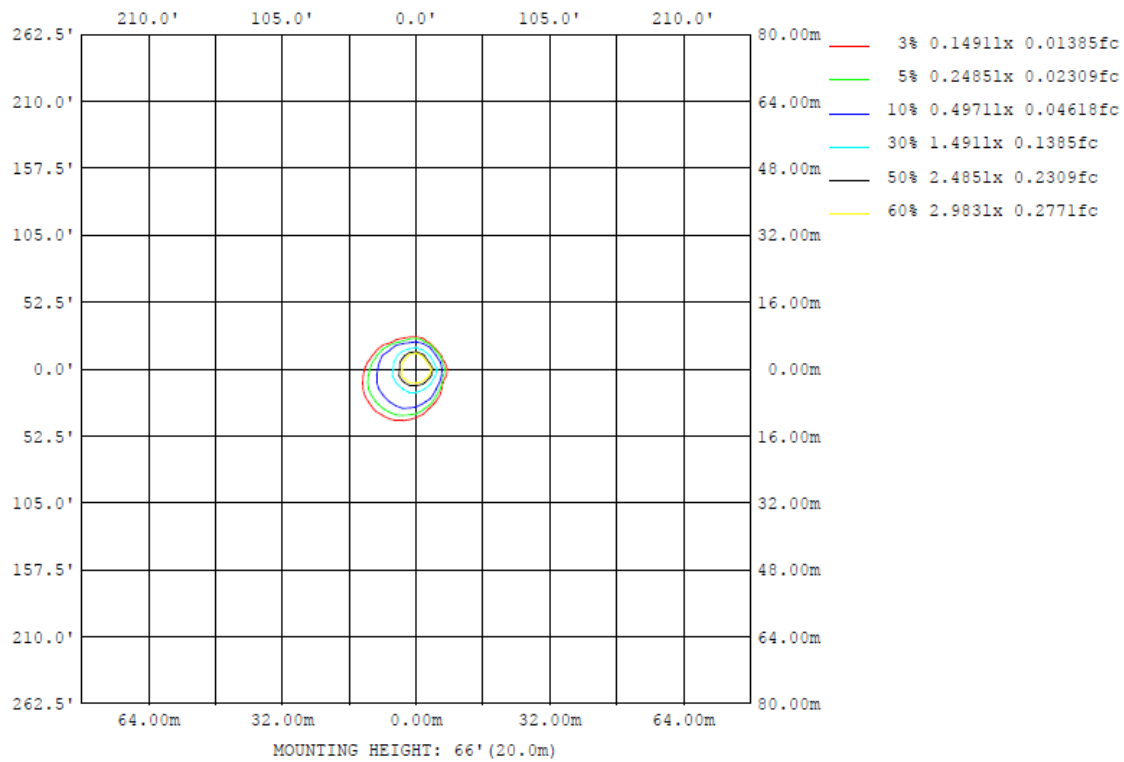
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance

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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23
Setting: 2 (Medium light output)

Model No.: SL23
Mount Height: 20 m
Isoillumination Plot



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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 2 (Medium light output)

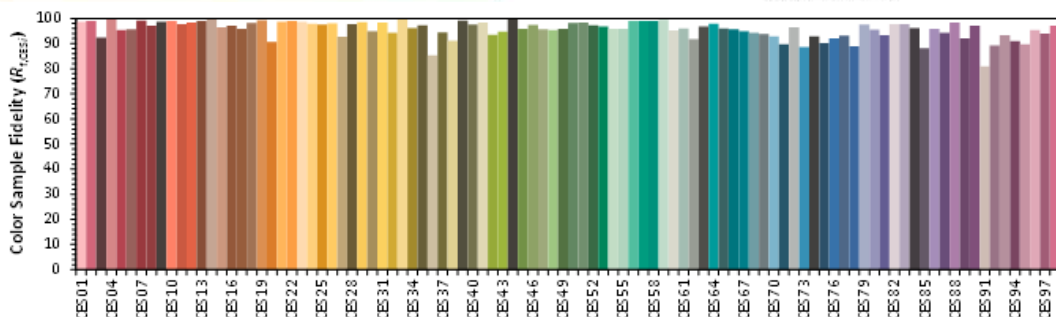
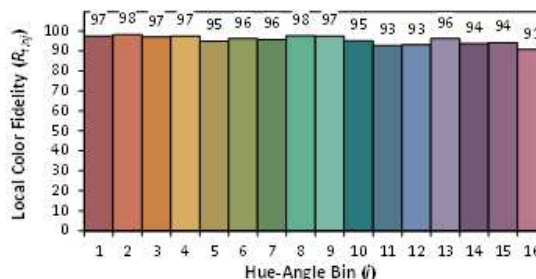
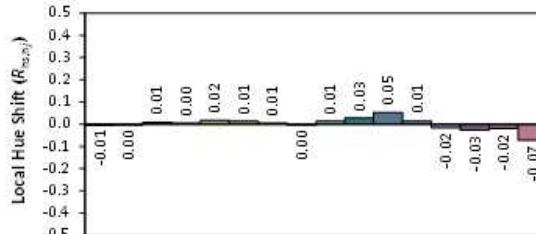
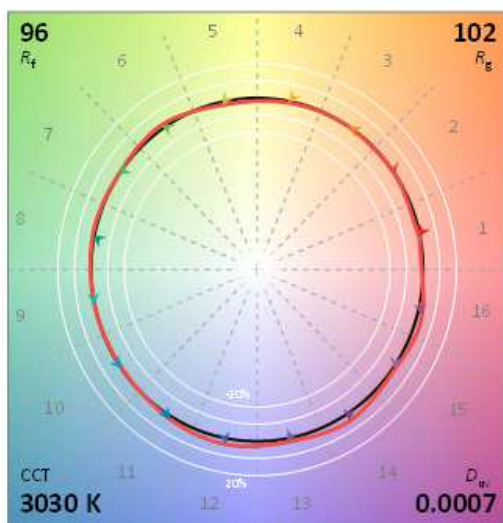
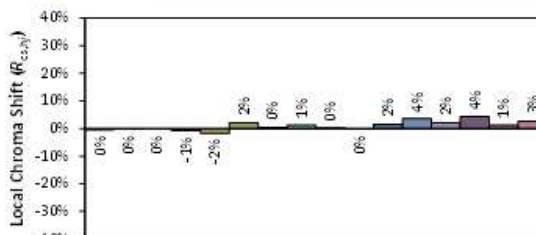
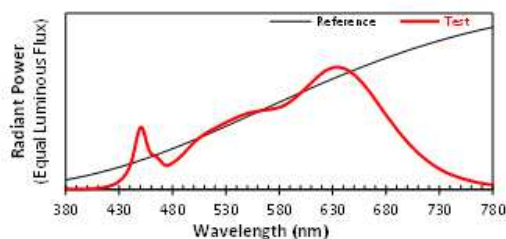
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: STERLING LIGHTING LLC

Date: 12/18/2023

Model: SL23



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4357

y 0.4053

u' 0.2493

v' 0.5217

CIE 13.3-1995
(CRI)

R_a 98

R_g 96

***** End of Page *****

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 3 (Medium light output)

Total operation burning time: 70 min

Stabilization time: 60 min

Photometric Measurements at 25°C

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
SL23							
0231201-15-018	N/A	3026	98	0.4359	0.4050	0.2495	0.5216

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (A)	Lamp Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
SL23							
0231201-15-018	N/A	15.0	0.6133	6.4094	0.6963	341.34	53.26

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL23		
0-30	314.5	92.1
0-40	331.4	97.1
0-60	339.8	99.5
0-90	341.2	100.00
0-180	341.3	100.00

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL23		
Beam (50%)	22.7	23.4
Beam Angle	23.1	

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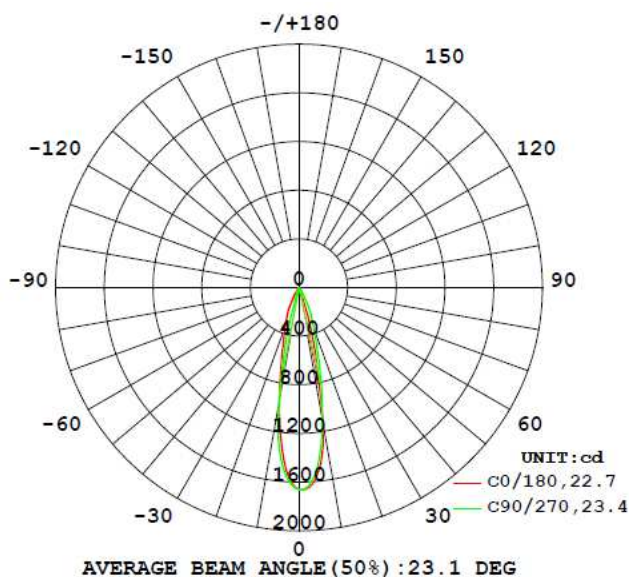
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL23

Setting: 3 (Medium light output)

G \ C(°)	0	22.5	45	67.5	90
0	1658.9	1658.9	1658.9	1658.9	1658.9
5	1576.4	1549.6	1520.2	1555.8	1540.8
10	1146.5	1054.5	1042.1	1140.5	1104.9
15	464.6	408.7	468.5	582.3	640.2
20	33.8	32.9	92.2	310.4	360.4
25	9.3	12.1	19.3	64.1	210.2
30	2.5	4.4	10.0	19.9	63.8
35	1.7	3.2	5.0	11.7	24.1
40	0.8	2.0	3.2	6.8	12.7
45	0.1	0.8	2.1	3.8	8.1
50	0.0	0.2	1.2	2.4	4.9
55	0.0	0.0	0.6	1.6	2.8
60	0.0	0.0	0.3	1.1	1.6
65	0.0	0.0	0.1	0.7	1.2
70	0.0	0.0	0.0	0.4	0.8
75	0.0	0.0	0.0	0.2	0.6
80	0.0	0.0	0.0	0.1	0.4
85	0.0	0.0	0.0	0.0	0.2
90	0.0	0.0	0.0	0.0	0.2



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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

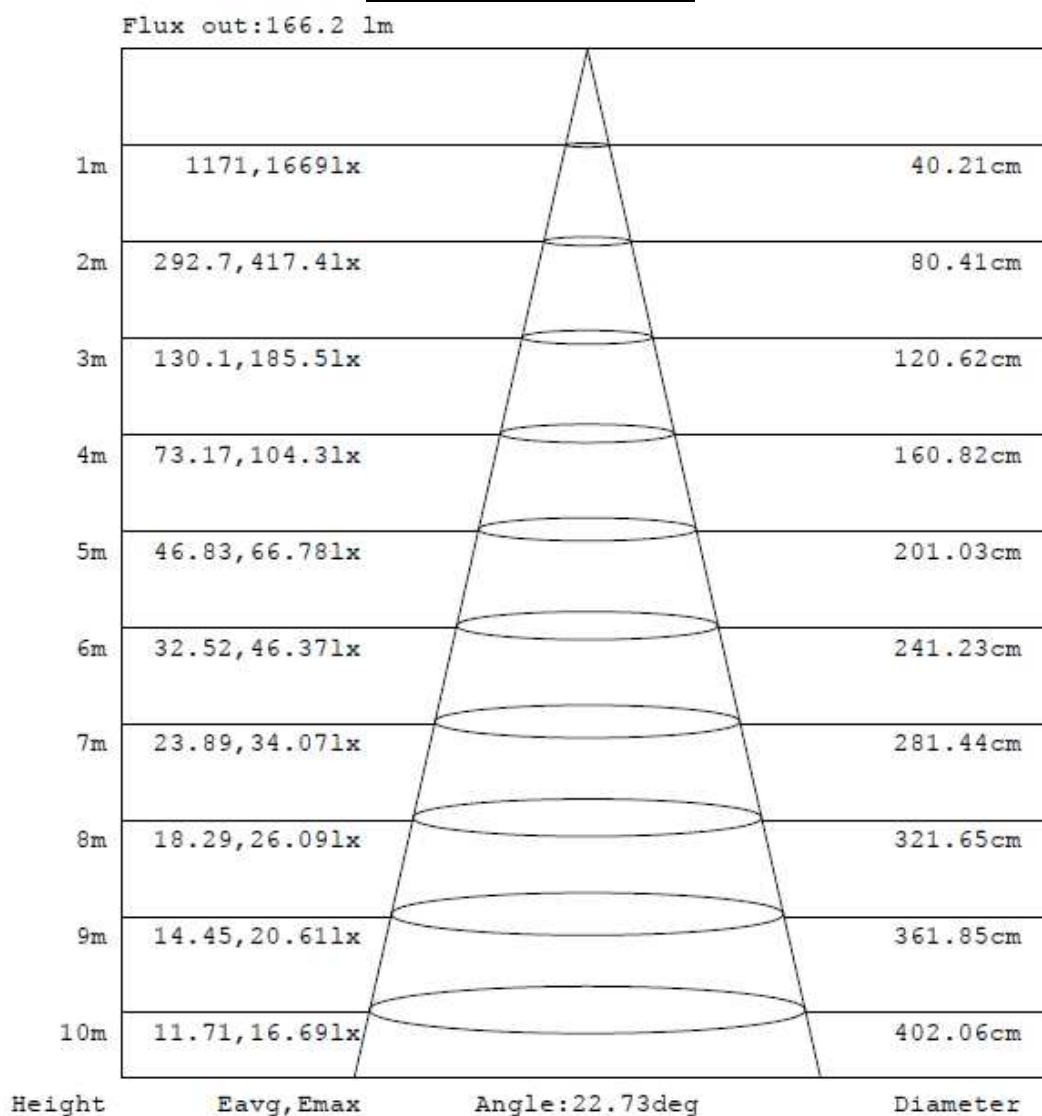
Setting: 3 (Medium light output)

Illumination Plots

Model No.: SL23

Mount Height: 10 m

Illuminance - Cone of Light



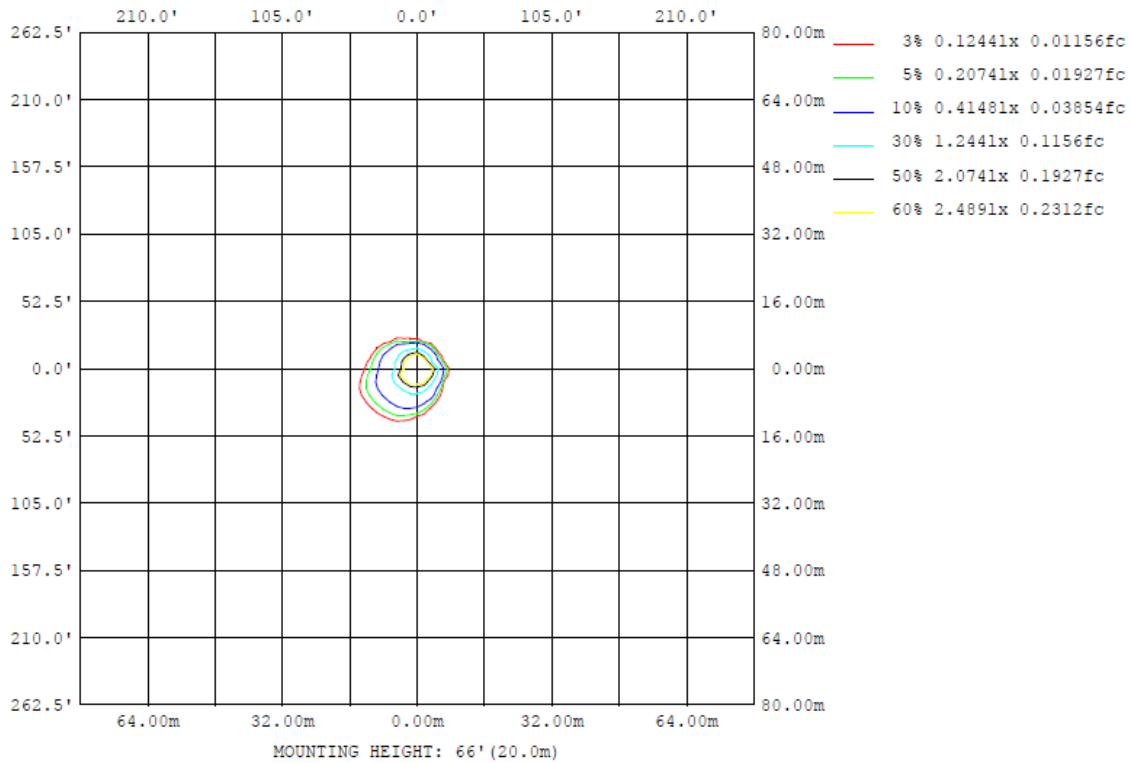
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23
Setting: 3 (Medium light output)

Model No.: SL23
Mount Height: 20 m
Isoillumination Plot



***** End of Page *****

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 3 (Medium light output)

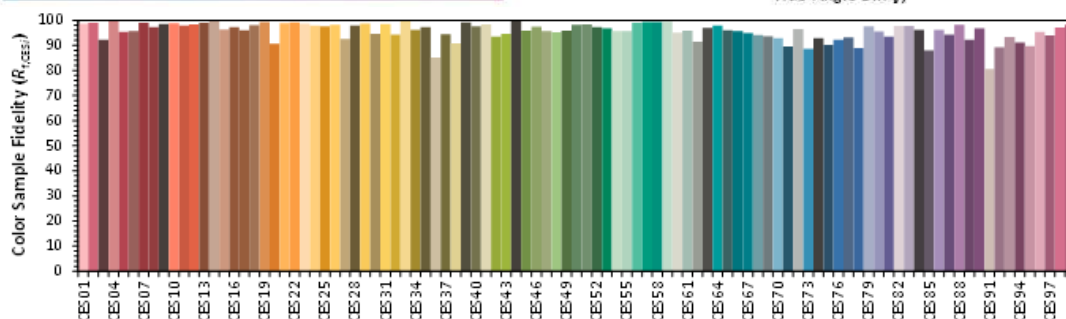
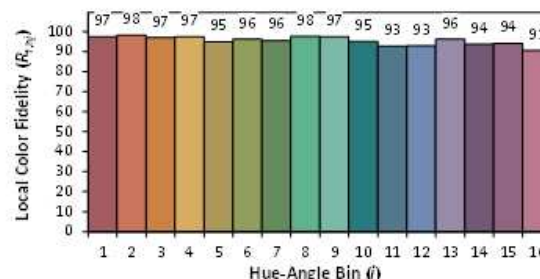
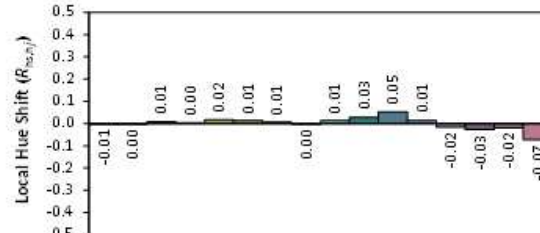
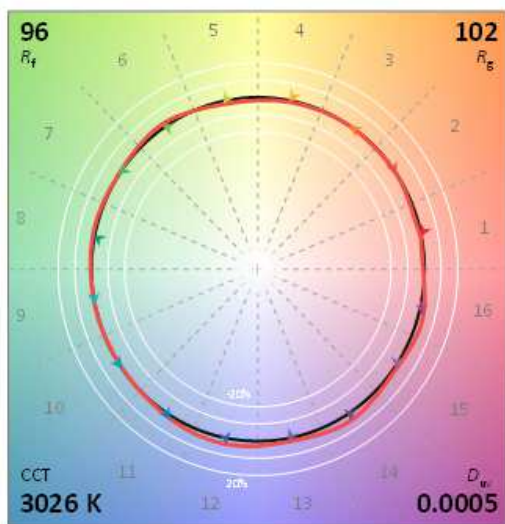
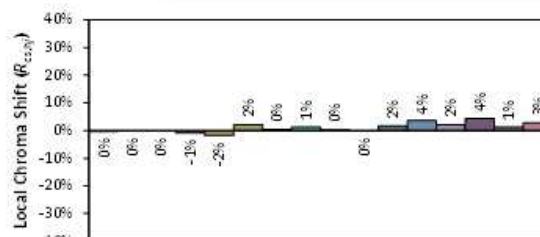
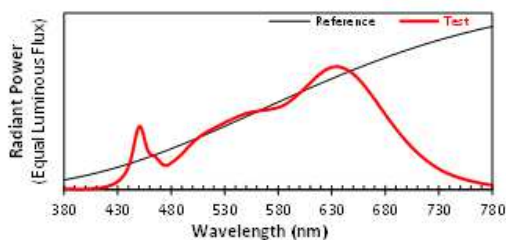
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: STERLING LIGHTING LLC

Date: 12/18/2023

Model: SL23



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4359
y 0.4050
u' 0.2495
v' 0.5216

CIE 13.3-1995
(CRI)

R_a 98
R_s 96

***** End of Page *****

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 4 (Medium light output)

Total operation burning time: 70 min

Stabilization time: 60 min

Photometric Measurements at 25°C

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
SL23							
0231201-15-018	N/A	3024	98	0.4359	0.4048	0.2496	0.5215

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (A)	Lamp Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
SL23							
0231201-15-018	N/A	15.0	0.5033	5.2236	0.6908	271.863	52.05

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL23		
0-30	254.1	93.5
0-40	264.9	97.4
0-60	270.8	99.6
0-90	271.8	100.00
0-180	271.9	100.00

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL23		
Beam (50%)	23.5	22.7
Beam Angle	23.1	

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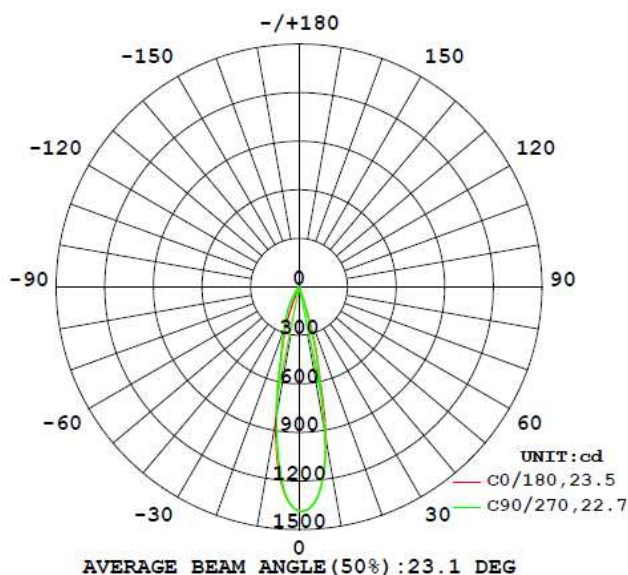
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL23

Setting: 4 (Medium light output)

G \ C(°)	0	22.5	45	67.5	90
0	1384.6	1384.6	1384.6	1384.6	1384.6
5	1302.2	1301.3	1303.8	1305.5	1305.0
10	951.6	955.6	951.0	935.6	911.9
15	411.6	393.8	387.7	377.5	360.0
20	42.1	30.2	25.2	30.4	26.9
25	14.5	8.5	6.1	5.3	5.4
30	6.0	3.0	1.6	0.9	1.1
35	3.8	2.2	1.0	0.4	0.6
40	2.5	1.1	0.2	0.0	0.1
45	1.4	0.3	0.0	0.0	0.0
50	0.6	0.0	0.0	0.0	0.0
55	0.1	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0
80	0.0	0.0	0.0	0.0	0.0
85	0.0	0.0	0.0	0.0	0.0
90	0.0	0.0	0.0	0.0	0.0



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RESULTS OF TESTS (cont'd)

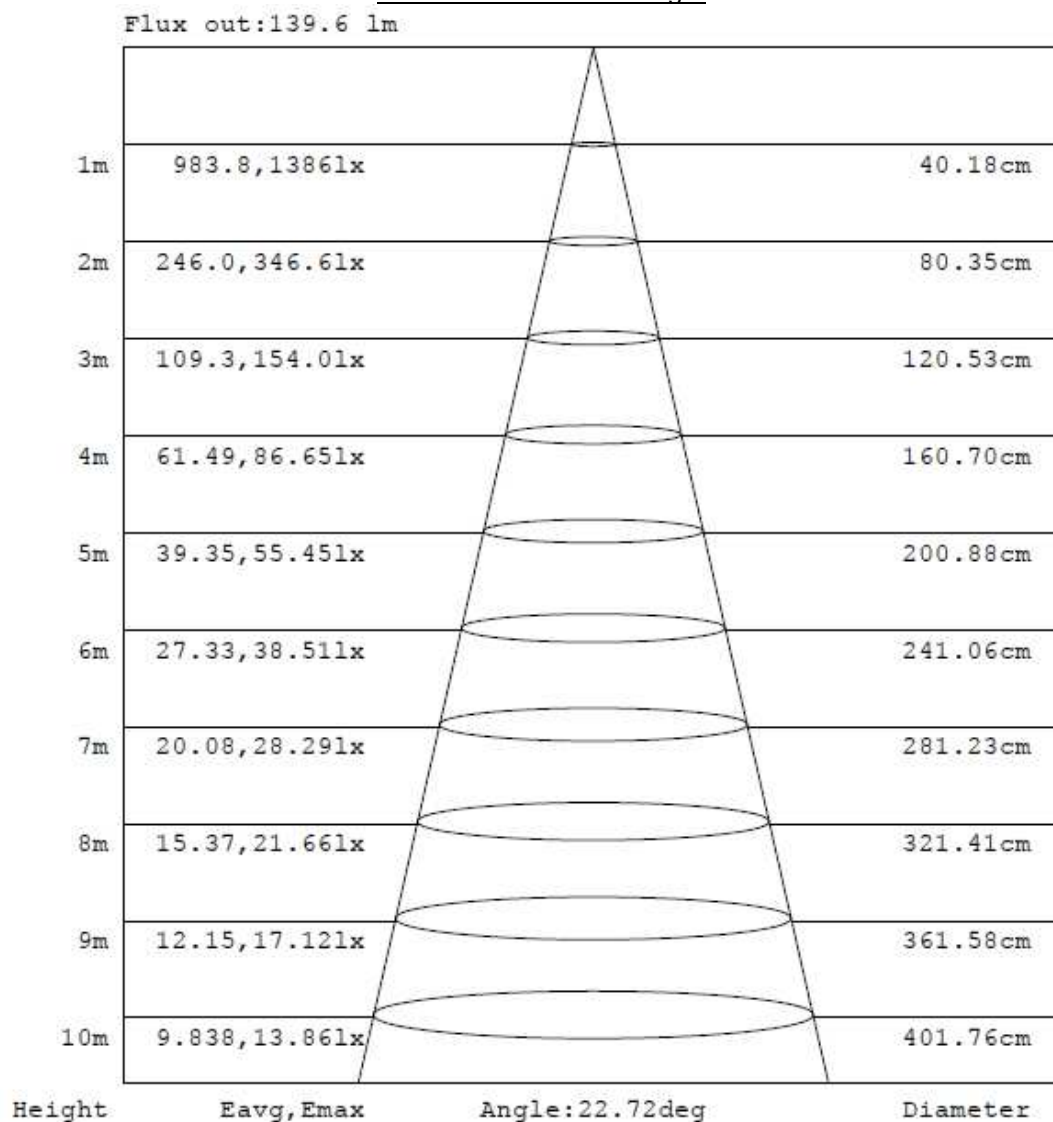
Test Condition: 15V 60Hz for SL23

Setting: 4 (Medium light output)

Illumination Plots

Model No.: SL23
Mount Height: 10 m

Illuminance - Cone of Light



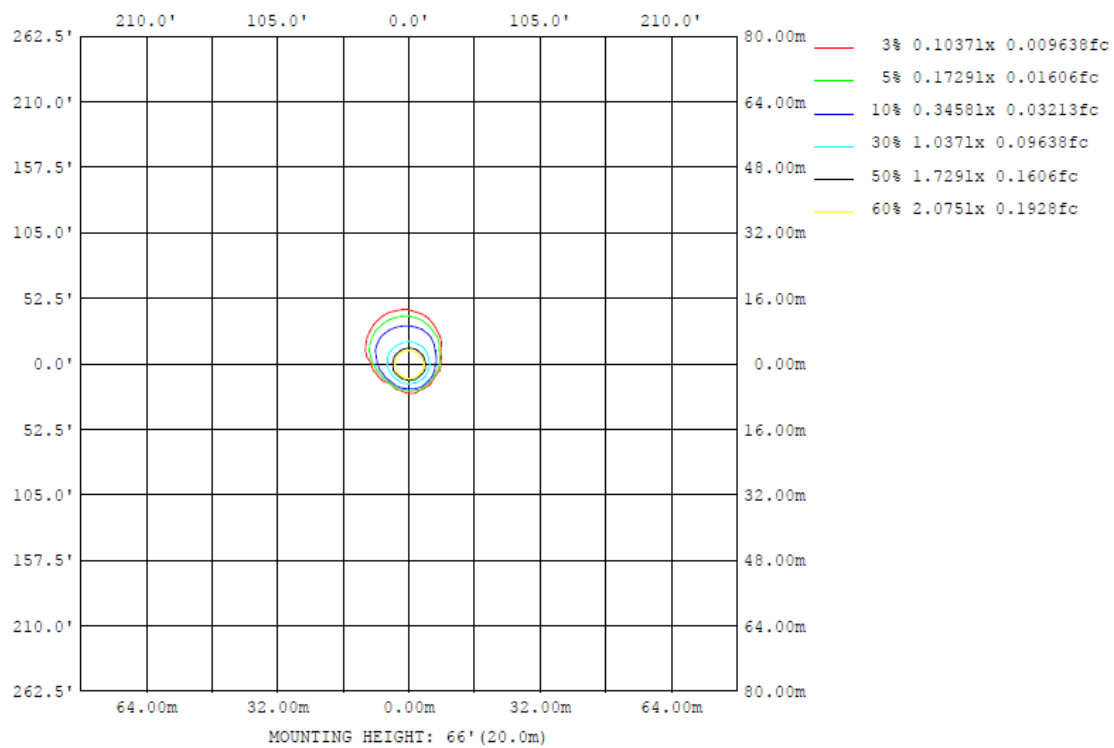
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23
Setting: 4 (Medium light output)

Model No.: SL23
Mount Height: 20 m
Isoillumination Plot



***** End of Page *****

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 5 (Medium light output)

Total operation burning time: 70 min

Stabilization time: 60 min

Photometric Measurements at 25°C

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
SL23							
0231201-15-018	N/A	3022	98	0.4359	0.4045	0.2497	0.5214

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (A)	Lamp Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
SL23							
0231201-15-018	N/A	15.0	0.3711	3.8712	0.6896	210.289	54.32

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL23		
0-30	194.5	92.5
0-40	204.5	97.3
0-60	209.4	99.6
0-90	210.3	100.00
0-180	210.3	100.00

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL23		
Beam (50%)	22.8	23.8
Beam Angle	23.3	

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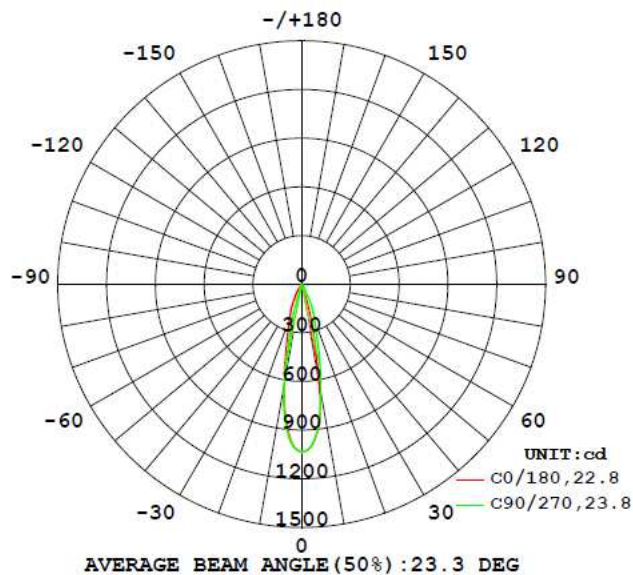
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL23

Setting: 5 (Medium light output)

G \ C(°)	0	22.5	45	67.5	90
0	1033.2	1033.2	1033.2	1033.2	1033.2
5	957.4	952.6	951.1	951.3	952.8
10	617.8	597.5	635.7	679.5	680.4
15	231.9	220.6	289.9	333.1	394.6
20	21.1	21.0	40.0	172.0	231.5
25	4.3	6.4	11.5	32.4	137.9
30	1.5	2.6	6.1	11.1	41.2
35	1.0	1.9	3.0	6.8	14.9
40	0.4	1.1	1.9	3.9	7.8
45	0.1	0.4	1.2	2.3	4.9
50	0.0	0.1	0.7	1.3	3.0
55	0.0	0.0	0.4	0.9	1.8
60	0.0	0.0	0.2	0.6	1.0
65	0.0	0.0	0.0	0.4	0.7
70	0.0	0.0	0.0	0.2	0.5
75	0.0	0.0	0.0	0.1	0.3
80	0.0	0.0	0.0	0.1	0.2
85	0.0	0.0	0.0	0.0	0.1
90	0.0	0.0	0.0	0.0	0.1



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RESULTS OF TESTS (cont'd)

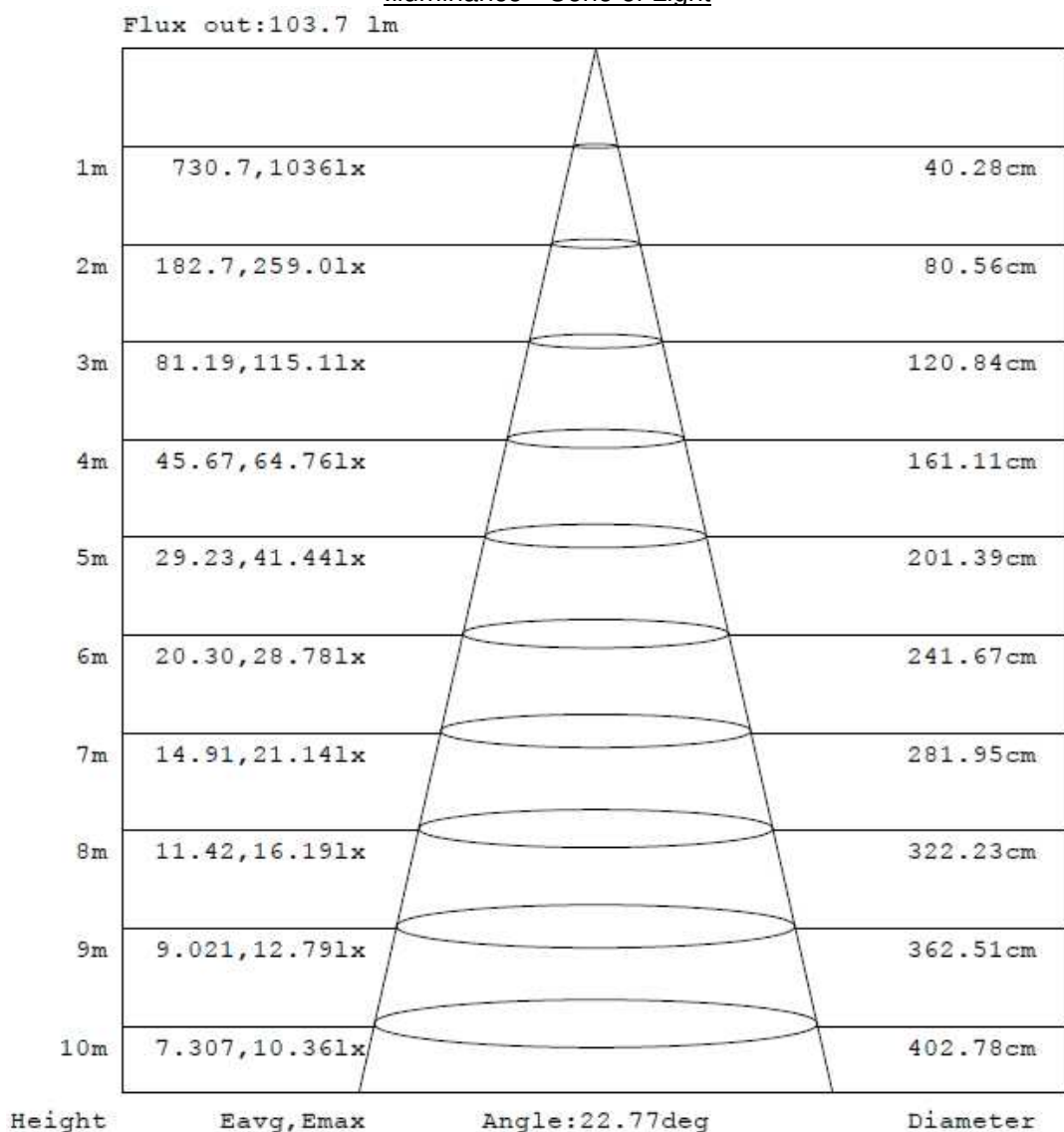
Test Condition: 15V 60Hz for SL23

Setting: 5 (Medium light output)

Illumination Plots

Model No.: SL23
Mount Height: 10 m

Illuminance - Cone of Light



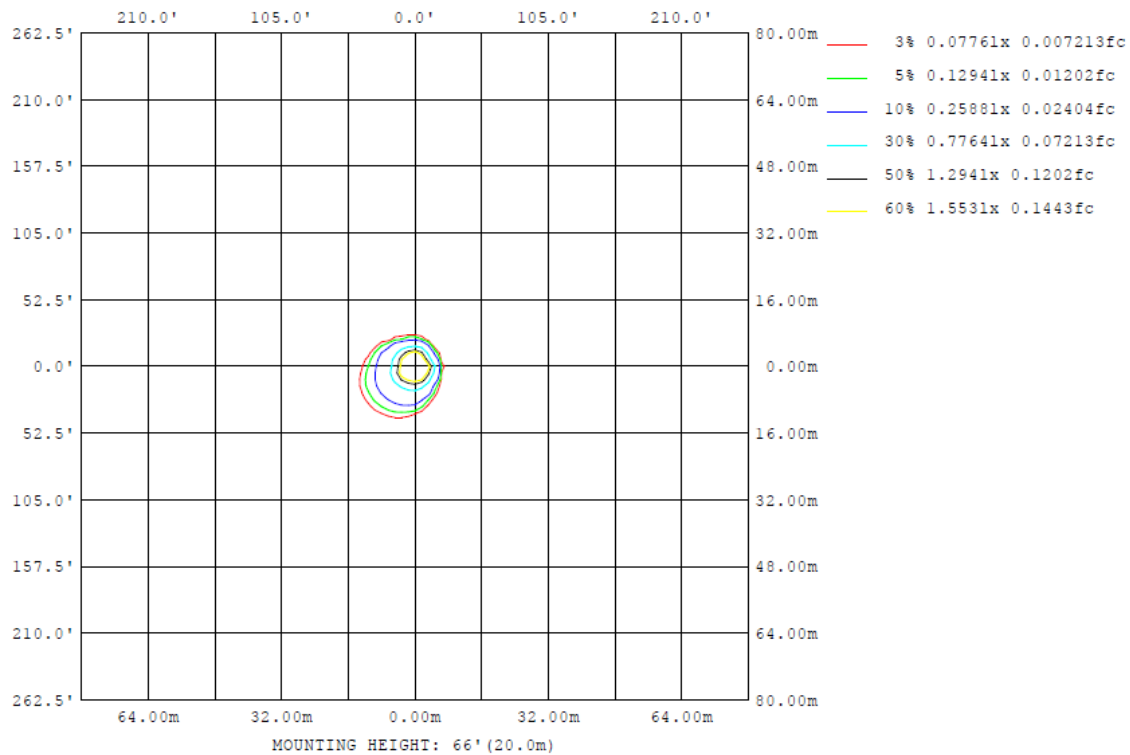
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23
Setting: 5 (Medium light output)

Model No.: SL23
Mount Height: 20 m
Isoillumination Plot



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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23
Setting: 5 (Medium light output)

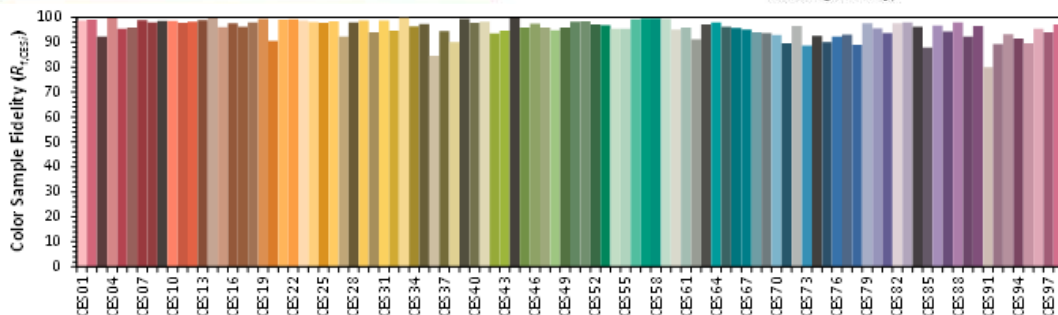
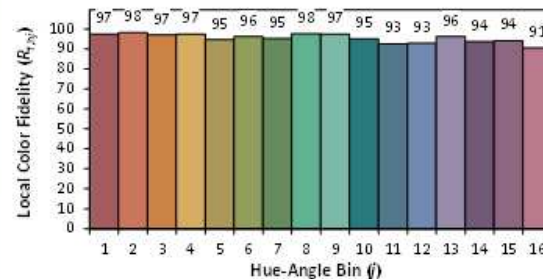
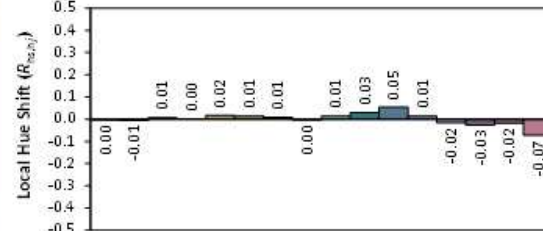
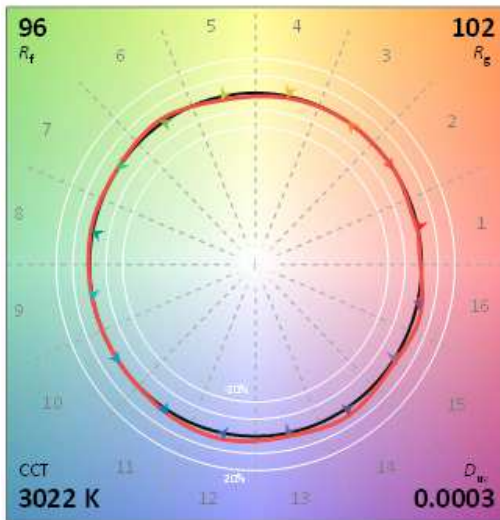
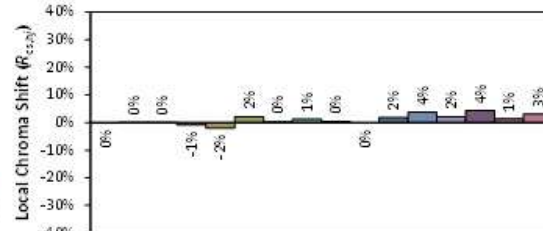
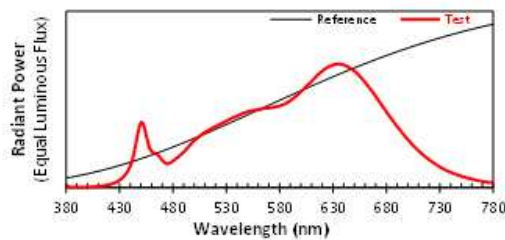
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: STERLING LIGHTING LLC

Date: 12/18/2023

Model: SL23



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4359
y 0.4045
u' 0.2497
v' 0.5214

CIE 13.3-1995
(CRI)

R_a 98
R_s 98

***** End of Page *****

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 6 (Minimum light output)

Total operation burning time: 70 min

Stabilization time: 60 min

Photometric Measurements at 25°C

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
SL23							
0231201-15-018	N/A	3015	98	0.4360	0.4040	0.2500	0.5212

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (A)	Lamp Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
SL23							
0231201-15-018	N/A	15.0	0.2564	2.6764	0.6848	144.036	53.82

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL23		
0-30	133.2	78.7
0-40	140.1	97.3
0-60	143.5	99.6
0-90	144.0	100.00
0-180	144.0	100.00

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL23		
Beam (50%)	22.7	23.4
Beam Angle	23.0	

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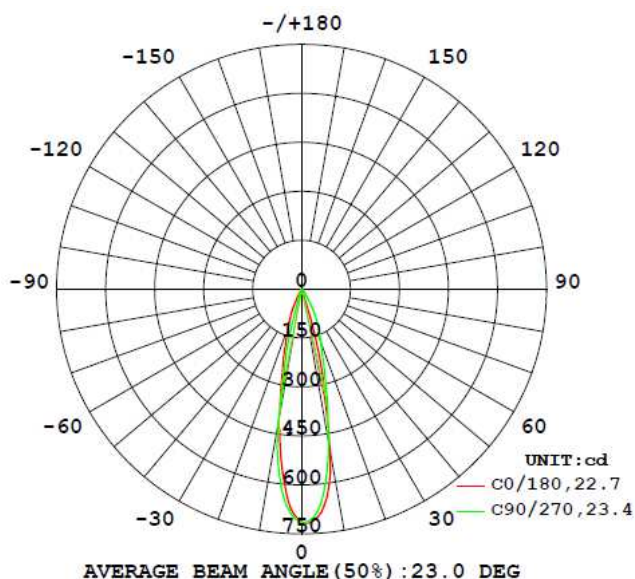
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL23

Setting: 6 (Minimum light output)

G \ C(°)	0	22.5	45	67.5	90
0	713.2	713.2	713.2	713.2	713.2
5	686.5	674.4	660.4	647.5	663.2
10	501.4	489.8	477.7	452.7	475.6
15	207.3	224.1	246.0	262.7	275.7
20	17.5	35.8	118.7	148.9	172.3
25	5.1	8.0	25.0	82.9	114.8
30	1.7	4.0	7.3	23.9	60.9
35	1.2	2.0	4.4	9.0	26.5
40	0.7	1.3	2.5	4.9	11.3
45	0.2	0.8	1.4	3.0	6.9
50	0.0	0.4	0.9	1.9	3.7
55	0.0	0.2	0.6	1.0	2.4
60	0.0	0.1	0.4	0.6	1.4
65	0.0	0.0	0.2	0.4	0.7
70	0.0	0.0	0.1	0.3	0.4
75	0.0	0.0	0.0	0.2	0.3
80	0.0	0.0	0.0	0.1	0.2
85	0.0	0.0	0.0	0.1	0.1
90	0.0	0.0	0.0	0.0	0.1



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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

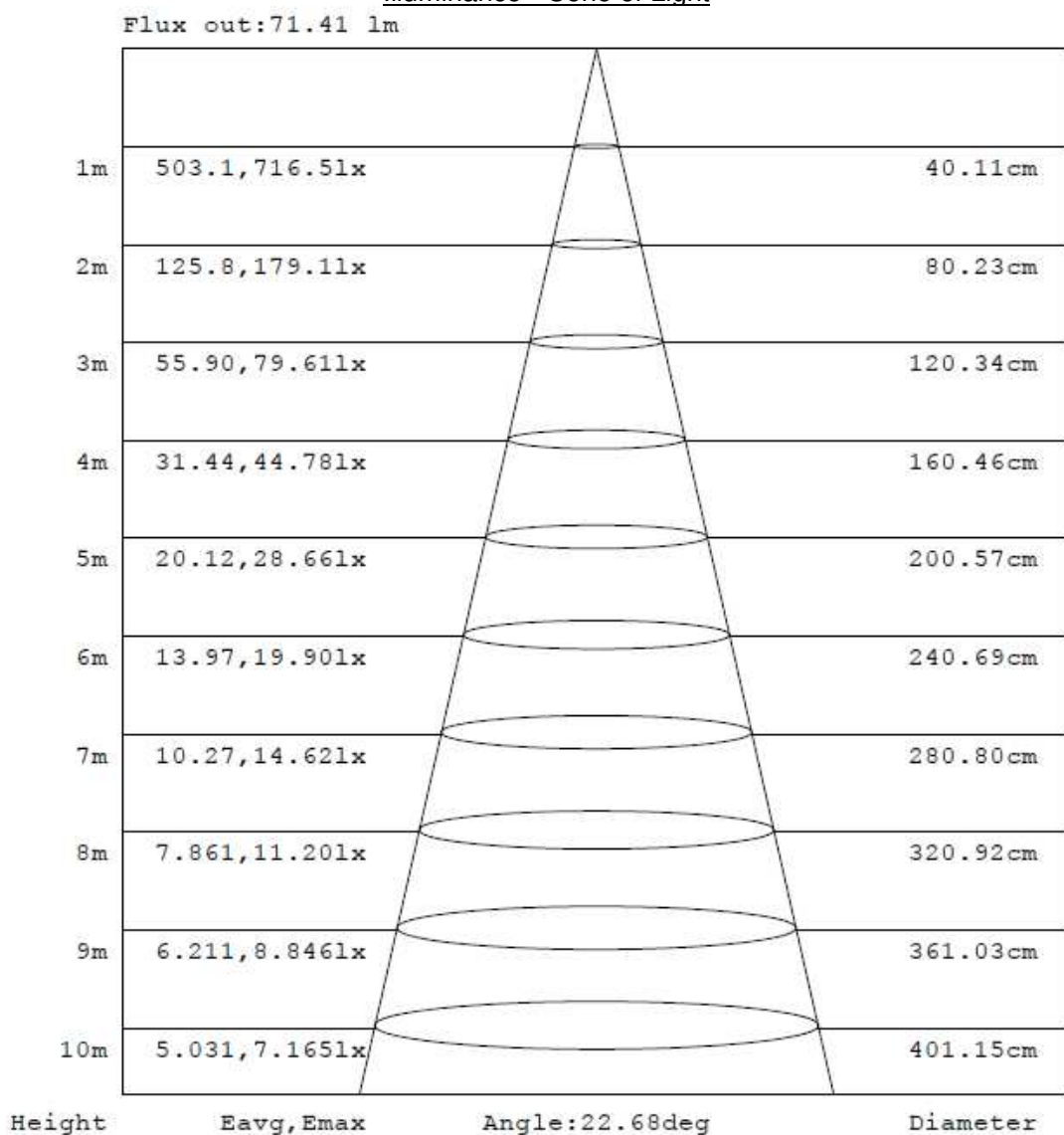
Setting: 6 (Minimum light output)

Illumination Plots

Model No.: SL23

Mount Height: 10 m

Illuminance - Cone of Light



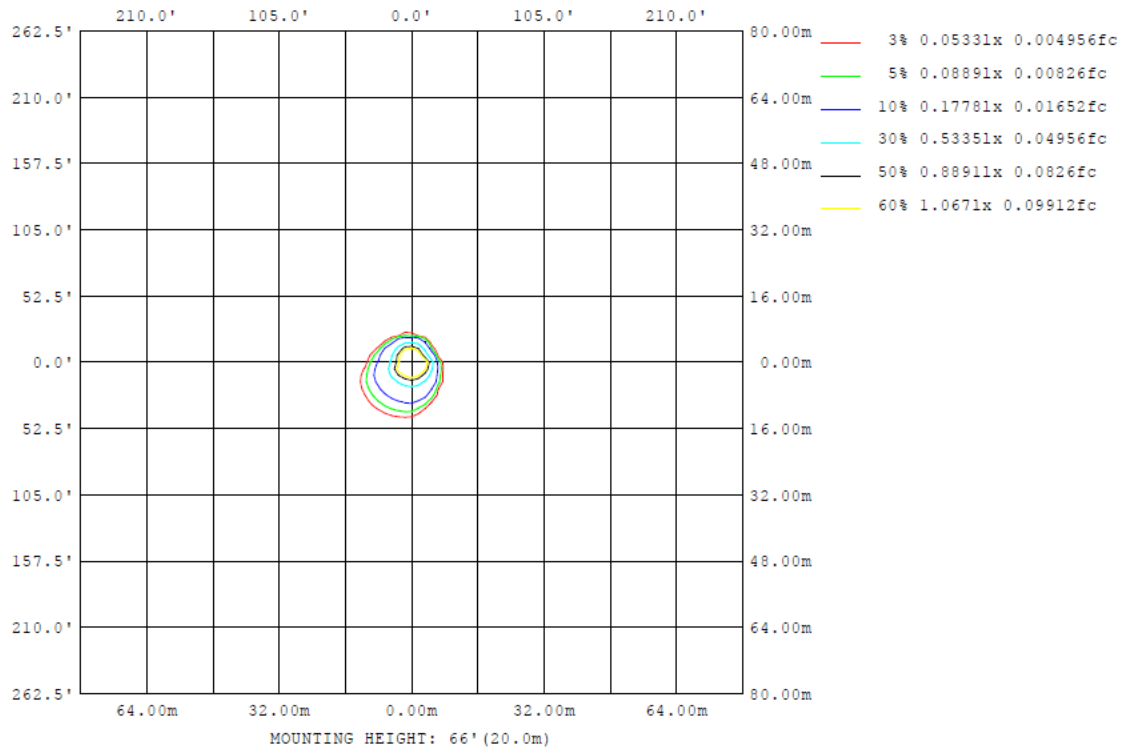
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23
Setting: 6 (Minimum light output)

Model No.: SL23
Mount Height: 20 m
Isoillumination Plot



***** End of Page *****

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL23

Setting: 6 (Minimum light output)

ANSI/IES TM-30-18 Color Rendition Report

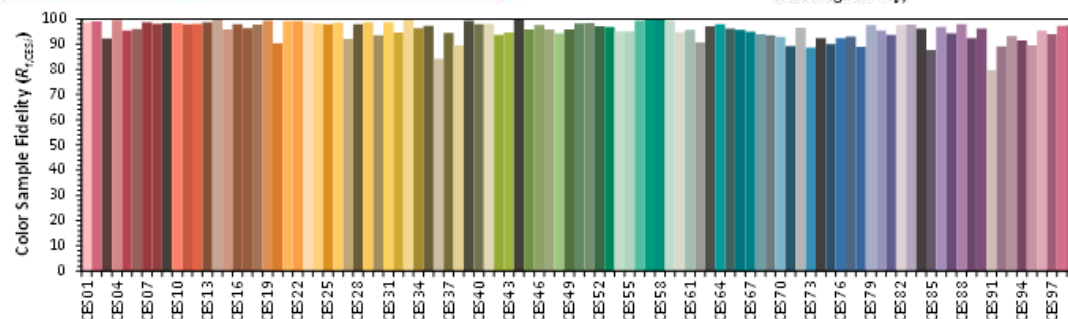
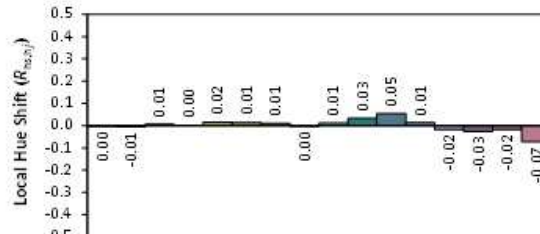
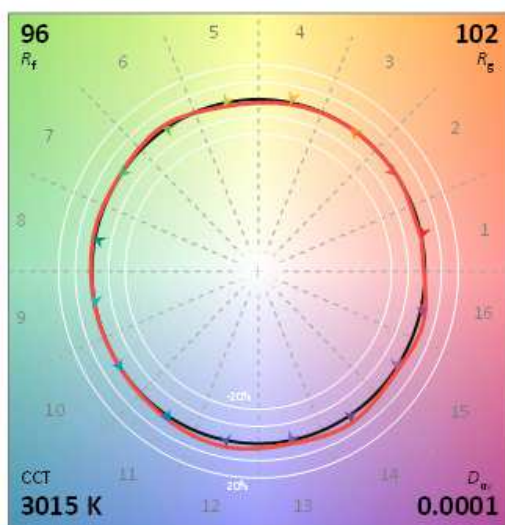
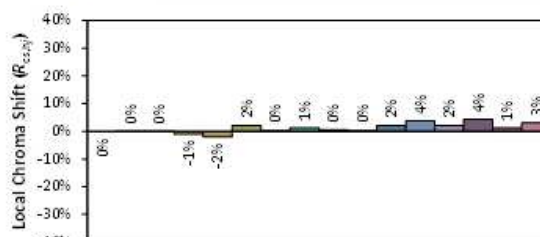
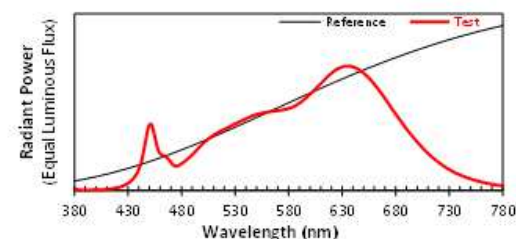
Source: LED

Manufacturer:

STERLING LIGHTING LLC

Date: 12/18/2023

Model: SL23



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4360

y 0.4040

u' 0.2500

v' 0.5212

CIE 13.3-1995
(CRI)

R_a 98

R_g 98

***** End of Page *****

RESULTS OF TESTS (cont'd)

IN SITU TEMPERATURE MEASUREMENT TEST

Test Results of LED chip temperature and current

TMP led: CMB1510-0000-000N0U0A30G	
In-situ case temperature of LED source (°C)	Limit single led chip temperature(°C)
48.7	105
Measured Drive current for each LED package/array/module (mA)	Limit single led chip current (mA)
255.7	465

Note: In-situ case temperature was corrected to ambient temperature at 25°C in above table.

***** End of Page *****

RESULTS OF TESTS (cont'd)

IN SITU TEMPERATURE MEASUREMENT TEST

Lumen Maintenance Life Projection (Cont'd) - led chip point 1

The Calculation is based on the Illumination Engineering Society's TM-21-11: Projecting Long Term Lumen Maintenance of LED Light Sources.

Table 1: Report at each LM-80 Test Condition					
Description of LED Light Source Tested (manufacturer, model, catalog number)		Manufacturer: CREE LED Model: CMB1510-0000-000N0U0A30G Report Number: CLD-AP250 REV14 Issued: Mar. 10, 2023			
Test Condition 1 - 105°C Case Temp					
Sample size	13	Sample size	-	Sample size	-
Number of failures	0	Number of failures	-	Number of failures	-
DUT drive current used in the test (mA)	465	DUT drive current used in the test (mA)	-	DUT drive current used in the test (mA)	-
Test duration (hours)	12,000	Test duration (hours)	-	Test duration (hours)	-
Test duration used for projection (hour to hour)	6,000 - 12,000	Test duration used for projection (hour to hour)	-	Test duration used for projection (hour to hour)	-
Tested case temperature (°C)	105	Tested case temperature (°C)	-	Tested case temperature (°C)	-
α	2.593E-06	α	-	α	-
B	1.002	B	-	B	-
Reported L70(12k) (hours)	>66000	Reported L70(12k) (hours)	-	Reported L70(12k) (hours)	-

Table 2: Interpolation Report (projection based on <i>in-situ</i> temperature entered)	
$T_{s,1}$ (°C)	105.00
$T_{s,1}$ (K)	378.15
α_1	2.593E-06
B_1	1.002
$T_{s,2}$ (°C)	-
$T_{s,2}$ (K)	-
α_2	-
B_2	-
E_{θ}/K_0	-
A	-
B_0	1.002
$T_{s,i}$ (°C)	48.70
$T_{s,i}$ (K)	321.85
α_i	2.593E-06
Reported L70(12k) at 48.7°C (hours)	>66000

In-Situ Inputs	
Drive current for each LED package/array/module (mA):	255
In-situ case temperature (T_c , °C):	48.7
Percentage of initial lumens to project to (e.g. for L_{70} , enter 70):	70

Results	
Time (t) at which to estimate lumen maintenance (hours):	60,000
Lumen maintenance at time (t) (%):	85.79%
Reported L70 (hours):	>66000

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