

SUMMARY

Test Condition: 15V 60Hz for SL13

Setting : 1 (Max Light Output)

Criteria	Result
Total Lumen Output (lm)	182.339
Total Power(W)	6.0967
Lamp Luminaire Efficacy (lm/W)	29.91
Power Factor	0.7092
Field Angle (°)	101.4
Correlated Color Temperature (CCT)	2901
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	87
Fidelity Index (R _f)	95
Gamut Index (R _g)	101
Chromaticity Coordinate (x)	0.4433
Chromaticity Coordinate (y)	0.4048
Chromaticity Coordinate (u')	0.2544
Chromaticity Coordinate (v')	0.5226
In-situ Case Temperature of LED/COB (°C)	57.9
Drive Current of LED/COB (mA)	125
Projection Life Time, Reported L70 (hours)	>42000

Test Condition: 15V 60Hz for SL13

Setting: 2 (Medium Light Output)

Criteria	Result
Total Lumen Output (lm)	138.993
Total Power(W)	4.2050
Lamp Luminaire Efficacy (lm/W)	33.05
Power Factor	0.6930
Correlated Color Temperature (CCT)	2893
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	88
Fidelity Index (R _f)	95
Gamut Index (R _g)	101
Chromaticity Coordinate (x)	0.4443
Chromaticity Coordinate (y)	0.4057
Chromaticity Coordinate (u')	0.2546
Chromaticity Coordinate (v')	0.5231

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

SUMMARY

Test Condition: 15V 60Hz for SL13

Setting: 3 (Medium Light Output)

Criteria	Result
Total Lumen Output (lm)	105.57
Total Power(W)	3.0118
Lamp Luminaire Efficacy (lm/W)	35.05
Power Factor	0.6838
Correlated Color Temperature (CCT)	2893
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	89
Fidelity Index (R _f)	95
Gamut Index (R _g)	101
Chromaticity Coordinate (x)	0.4449
Chromaticity Coordinate (y)	0.4064
Chromaticity Coordinate (u')	0.2547
Chromaticity Coordinate (v')	0.5235

Test Condition: 15V 60Hz for SL13

Setting: 4 (Medium Light Output)

Criteria	Result
Total Lumen Output (lm)	71.5707
Total Power(W)	1.9595
Lamp Luminaire Efficacy (lm/W)	36.53
Power Factor	0.6634
Correlated Color Temperature (CCT)	2883
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	90
Fidelity Index (R _f)	95
Gamut Index (R _g)	101
Chromaticity Coordinate (x)	0.4453
Chromaticity Coordinate (y)	0.4065
Chromaticity Coordinate (u')	0.2549
Chromaticity Coordinate (v')	0.5236

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

SUMMARY

Test Condition: 15V 60Hz for SL13

Setting: 5 (Medium Light Output)

Criteria	Result
Total Lumen Output (lm)	37.5384
Total Power(W)	1.0773
Lamp Luminaire Efficacy (lm/W)	34.84
Power Factor	0.6091
Correlated Color Temperature (CCT)	2876
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	92
Fidelity Index (R _f)	94
Gamut Index (R _g)	100
Chromaticity Coordinate (x)	0.4457
Chromaticity Coordinate (y)	0.4064
Chromaticity Coordinate (u')	0.2552
Chromaticity Coordinate (v')	0.5236

Test Condition: 15V 60Hz for SL13

Setting: 6 (Min Light Output)

Criteria	Result
Total Lumen Output (lm)	14.3612
Total Power(W)	0.5503
Lamp Luminaire Efficacy (lm/W)	26.10
Power Factor	0.5460
Correlated Color Temperature (CCT)	2873
Color Rendering Index (CRI)	98
Color Rendering Index (R ₉)	93
Fidelity Index (R _f)	94
Gamut Index (R _g)	100
Chromaticity Coordinate (x)	0.4458
Chromaticity Coordinate (y)	0.4061
Chromaticity Coordinate (u')	0.2554
Chromaticity Coordinate (v')	0.5235

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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 stabilise 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 SL13

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')
SL13							
A240906-22-005	N/A	2901	98	0.4433	0.4048	0.2544	0.5226

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)
SL13							
A240906-22-005	N/A	15.0	0.5713	6.0967	0.7092	182.339	29.91

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL13		
0-30	97.677	53.57
0-40	147.755	81.03
0-60	180.658	99.08
0-90	182.322	99.99
0-180	182.34	100.0

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL13		
Beam (50%)	77.5	77.5
Beam Angle	77.5	

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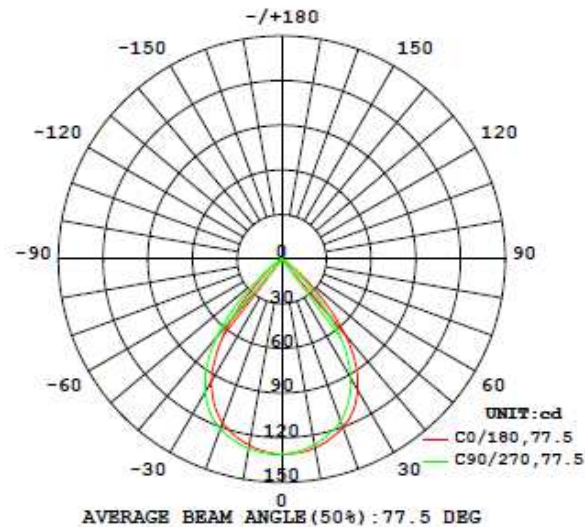
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL13

Setting : 1 (Max Light Output)

G \ C(°)	0	22.5	45	67.5	90
0	130.98	130.98	130.98	130.98	130.98
5	130.53	130.39	129.93	129.70	129.57
10	128.67	128.01	127.35	126.81	126.50
15	125.13	124.19	123.20	122.42	121.94
20	120.08	118.81	117.50	116.39	115.64
25	112.83	110.81	108.70	107.00	105.96
30	101.96	99.01	96.34	94.04	92.54
35	86.72	82.98	79.42	76.39	74.36
40	66.08	61.30	56.77	52.87	50.28
45	40.27	35.38	31.01	27.60	26.05
50	18.71	15.76	13.44	11.76	10.75
55	7.91	6.71	5.75	5.02	4.57
60	3.38	2.77	2.31	1.89	1.68
65	1.18	1.00	0.90	0.81	0.76
70	0.68	0.65	0.62	0.59	0.56
75	0.49	0.43	0.37	0.33	0.31
80	0.21	0.17	0.13	0.12	0.11
85	0.06	0.04	0.03	0.02	0.02
90	0.01	0.00	0.00	0.00	0.00



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RESULTS OF TESTS (cont'd)

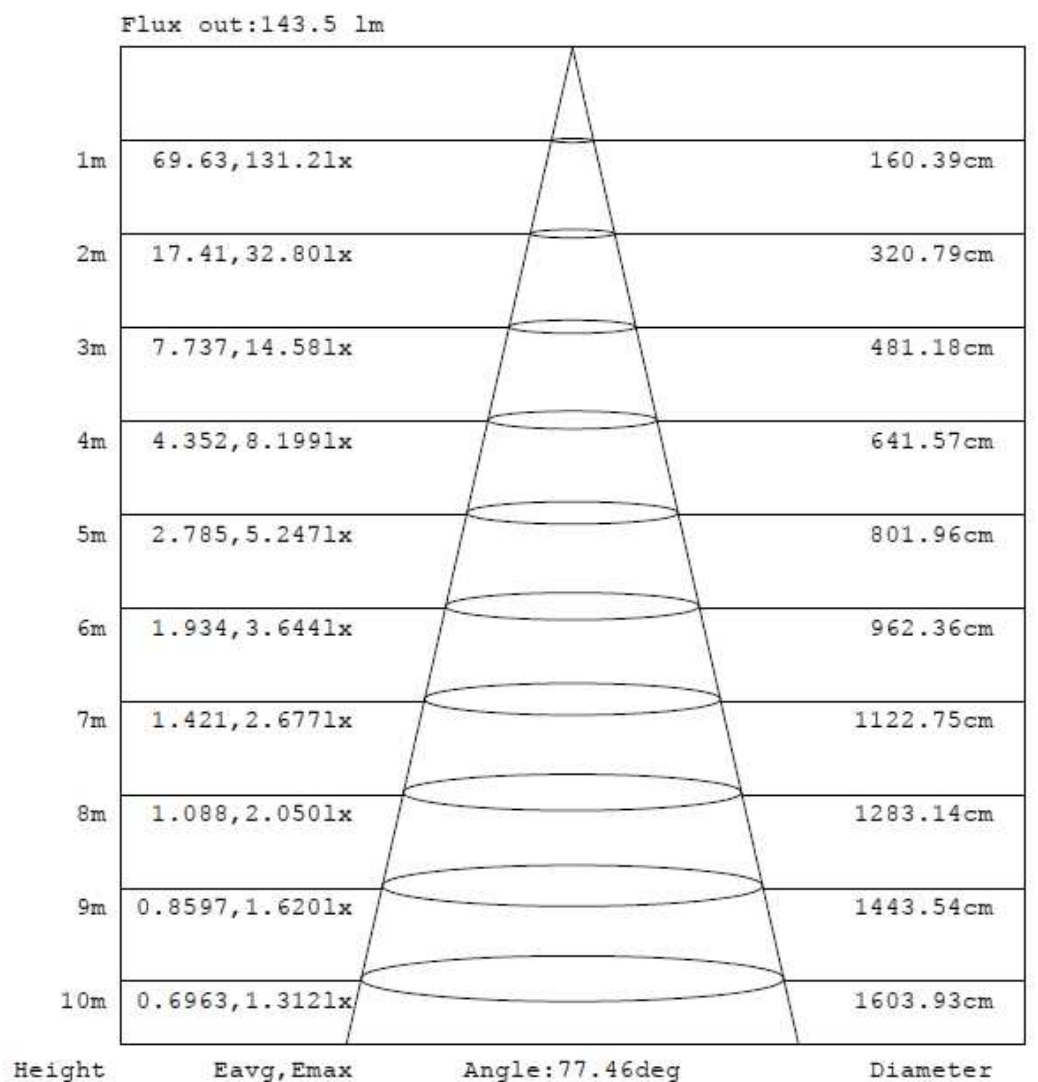
Test Condition: 15V 60Hz for SL13

Setting : 1 (Max Light Output)

Illumination Plots

Model No.: SL13
Mount Height: 10 m

Illuminance - Cone of Light



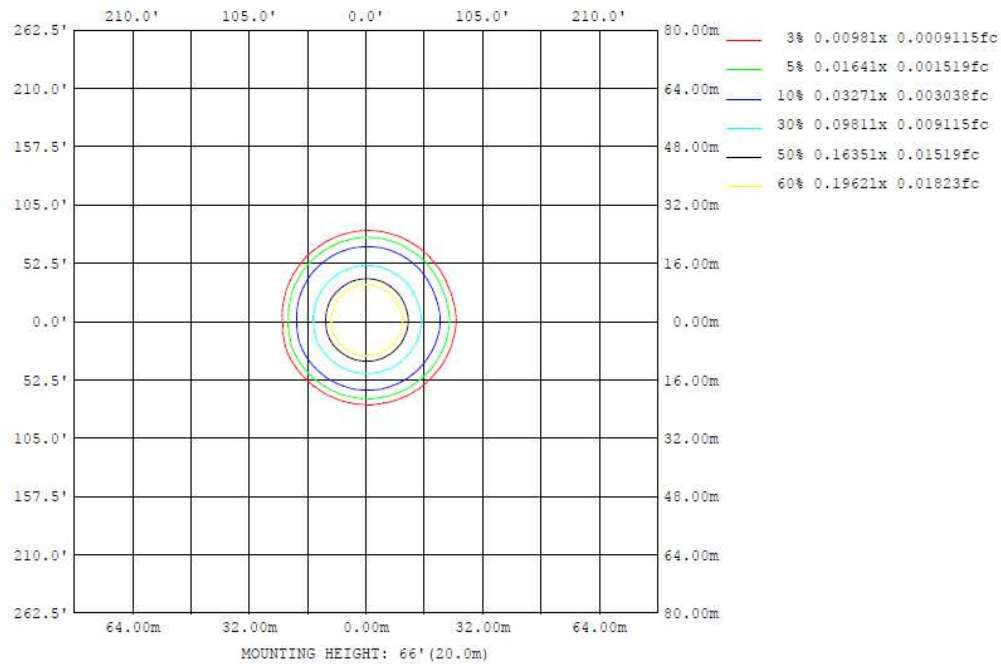
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 1 (Max Light Output)

Model No.: SL13
Mount Height: 20 m
Isoillumination Plot



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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13

Setting : 1 (Max Light Output)

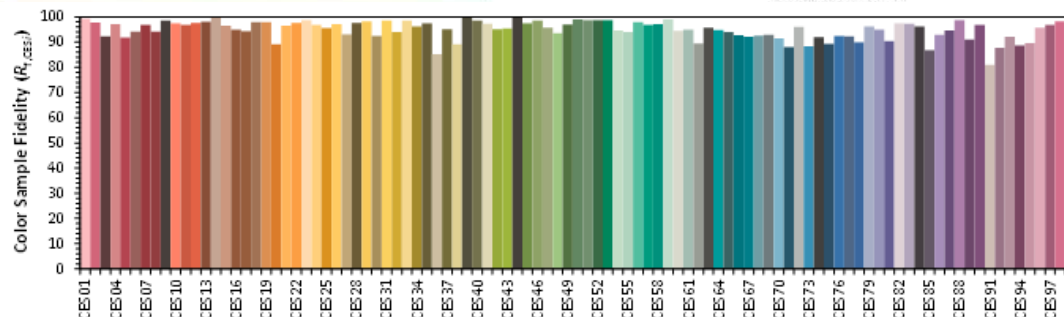
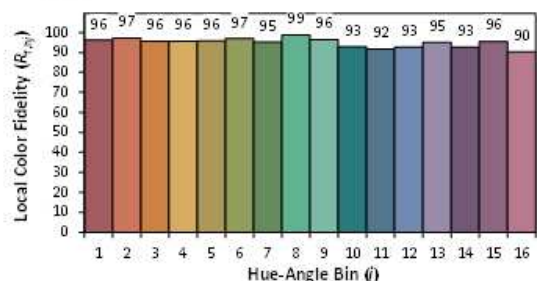
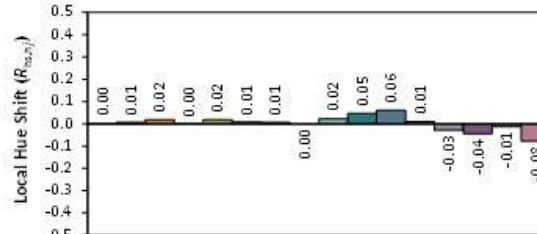
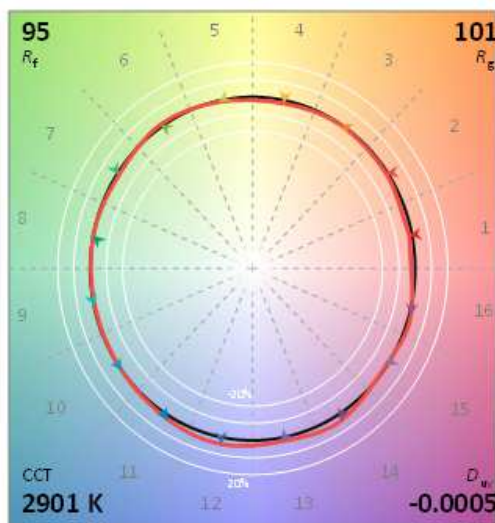
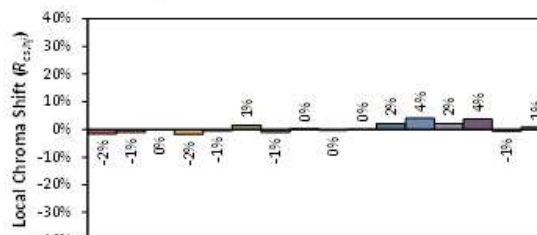
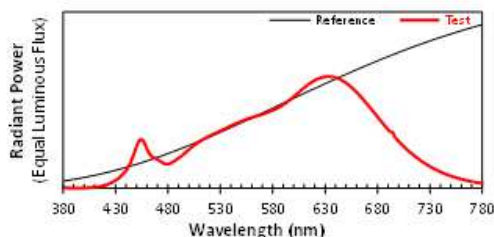
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: STERLING LIGHTING LLC

Date: 9/18/2023

Model: SL13



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

x 0.4433
y 0.4048
u' 0.2544
v' 0.5226

CIE 13.3-1995
(CRI)

R_a 98
R_s 87

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RESULTS OF TESTS(cont'd)

Test Condition: 15V 60Hz for SL13

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')
SL13							
A240906-22-005	N/A	2893	98	0.4443	0.4057	0.2546	0.5231

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)
SL13							
A240906-22-005	N/A	15.0	0.4020	4.2050	0.6930	138.993	33.05

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL13		
0-30	74.403	53.53
0-40	112.704	81.09
0-60	137.731	99.09
0-90	138.976	99.99
0-180	138.993	100.0

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL13		
Beam (50%)	77.6	77.7
Beam Angle	77.7	

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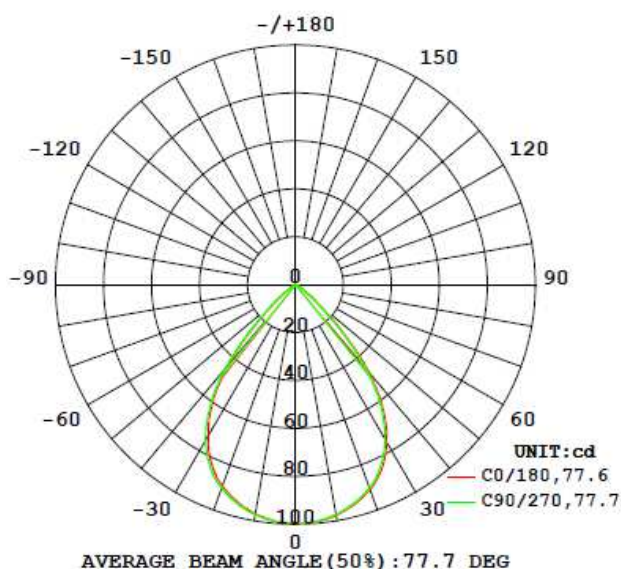
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL13

Setting : 2 (Medium Light Output)

G \ C(°)	0	22.5	45	67.5	90
0	99.70	99.70	99.70	99.70	99.70
5	99.31	99.13	99.23	99.17	99.09
10	97.67	97.37	97.60	97.38	97.30
15	94.88	94.42	94.75	94.44	94.30
20	90.86	90.24	90.67	90.31	90.13
25	84.95	83.93	84.69	84.12	83.85
30	76.09	74.69	75.76	74.94	74.68
35	63.93	62.08	63.53	62.54	62.21
40	47.41	45.08	47.07	45.79	45.32
45	27.64	25.73	27.38	26.45	26.01
50	12.45	11.25	12.35	11.67	11.37
55	5.31	4.85	5.34	5.05	4.88
60	2.30	2.01	2.31	2.16	2.00
65	0.78	0.72	0.78	0.74	0.73
70	0.50	0.49	0.50	0.49	0.48
75	0.34	0.31	0.34	0.32	0.31
80	0.14	0.12	0.13	0.12	0.12
85	0.04	0.03	0.04	0.03	0.03
90	0.00	0.00	0.00	0.00	0.00



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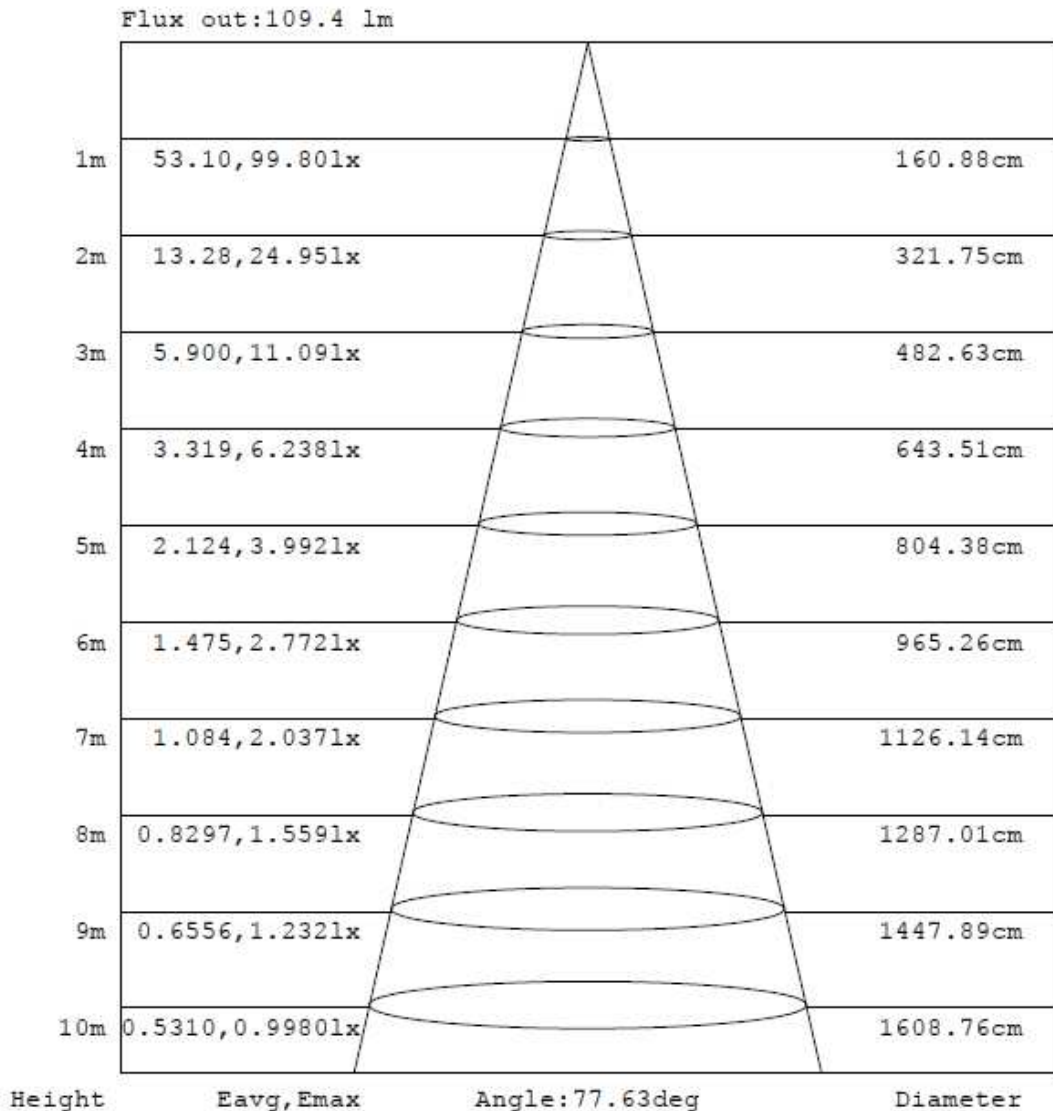
RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 2 (Medium Light Output)

Illumination Plots

Model No.: SL13
Mount Height: 10 m

Illuminance - Cone of Light



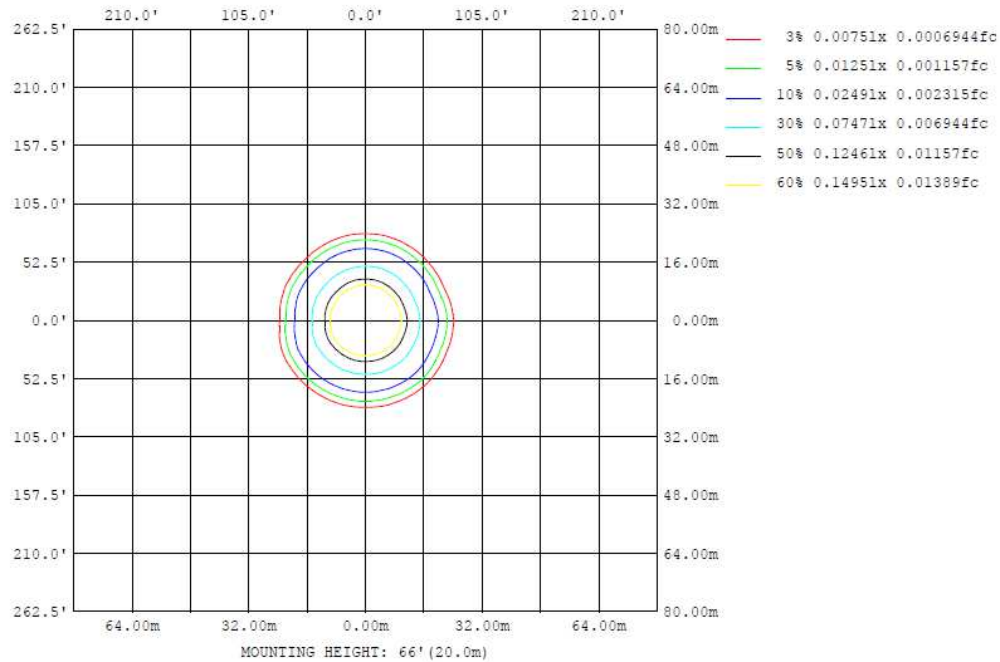
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 2 (Medium Light Output)

Model No.: SL13
Mount Height: 20 m
Isoillumination Plot



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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13

Setting : 2 (Medium Light Output)

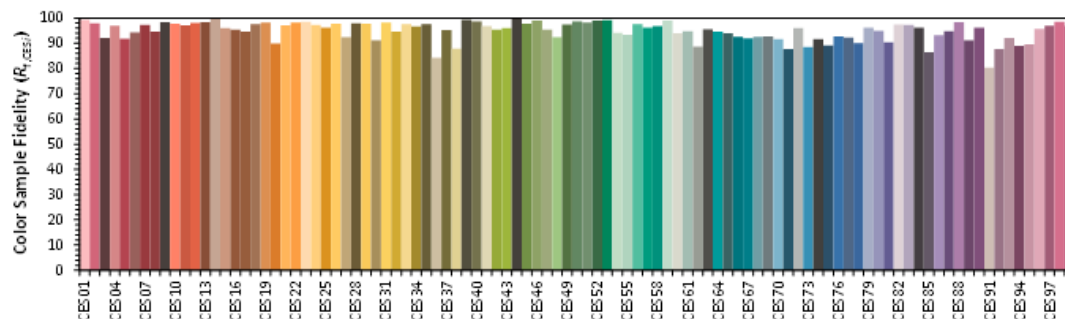
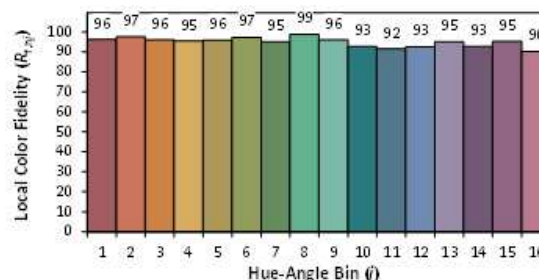
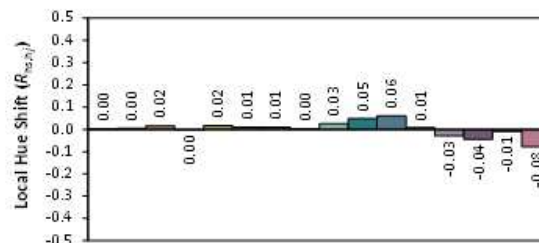
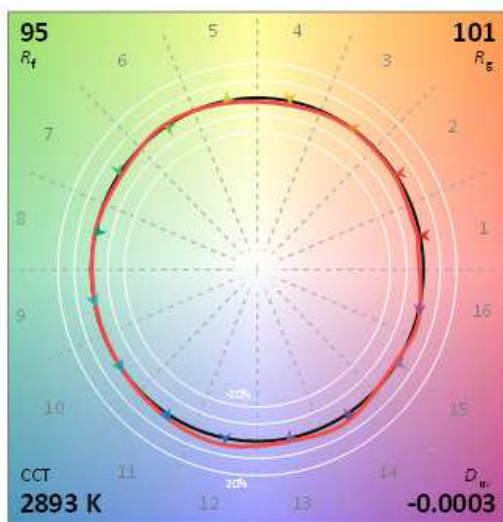
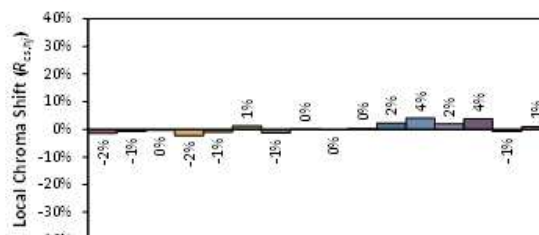
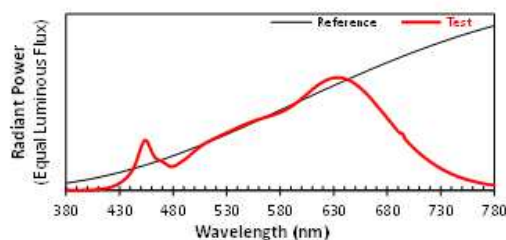
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: STERLING LIGHTING LLC

Date: 9/18/2023

Model: SL13



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

x 0.4443

y 0.4057

u' 0.2546

v' 0.5231

CIE 13.3-1995
(CRI)

R_a 98

R_g 88

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RESULTS OF TESTS(cont'd)

Test Condition: 15V 60Hz for SL13

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')
SL13							
A240906-22-005	N/A	2889	98	0.4449	0.4064	0.2547	0.5235

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)
SL13							
A240906-22-005	N/A	15.0	0.2934	3.0118	0.6838	105.57	35.05

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL13		
0-30	56.480	53.50
0-40	85.605	81.09
0-60	104.603	99.08
0-90	105.554	99.98
0-180	105.57	100.0

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL13		
Beam (50%)	77.7	77.6
Beam Angle	77.7	

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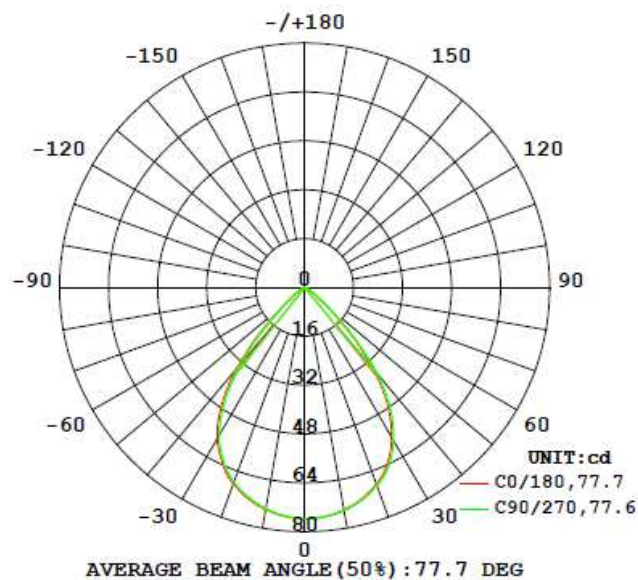
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL13

Setting : 3 (Medium Light Output)

G \ C(°)	0	22.5	45	67.5	90
0	75.64	75.64	75.64	75.64	75.64
5	75.24	75.24	75.28	75.33	75.35
10	73.91	73.95	74.04	74.10	74.15
15	71.72	71.71	71.89	72.01	72.06
20	68.56	68.62	68.81	68.91	69.05
25	63.88	63.96	64.20	64.42	64.63
30	56.99	57.08	57.37	57.67	57.98
35	47.51	47.68	48.04	48.45	48.84
40	34.69	34.95	35.42	35.97	36.51
45	20.00	20.24	20.71	21.28	21.86
50	8.68	8.85	9.14	9.49	9.82
55	3.68	3.78	3.92	4.09	4.22
60	1.52	1.57	1.66	1.73	1.80
65	0.56	0.56	0.58	0.61	0.62
70	0.37	0.37	0.38	0.38	0.38
75	0.25	0.25	0.25	0.26	0.26
80	0.10	0.10	0.10	0.10	0.11
85	0.03	0.03	0.03	0.03	0.03
90	0.00	0.00	0.00	0.00	0.00



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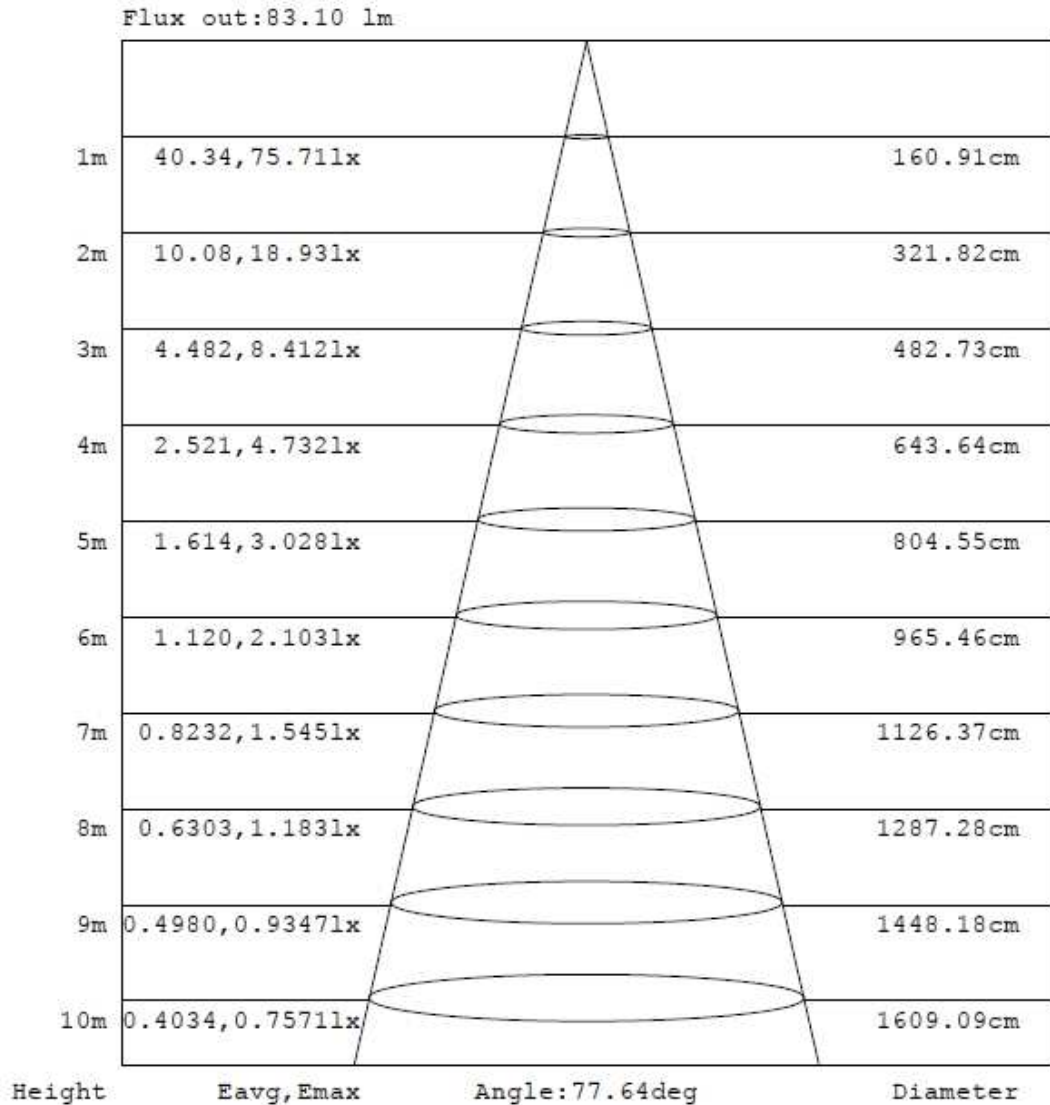
RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 3 (Medium Light Output)

Illumination Plots

Model No.: SL13
Mount Height: 10 m

Illuminance - Cone of Light



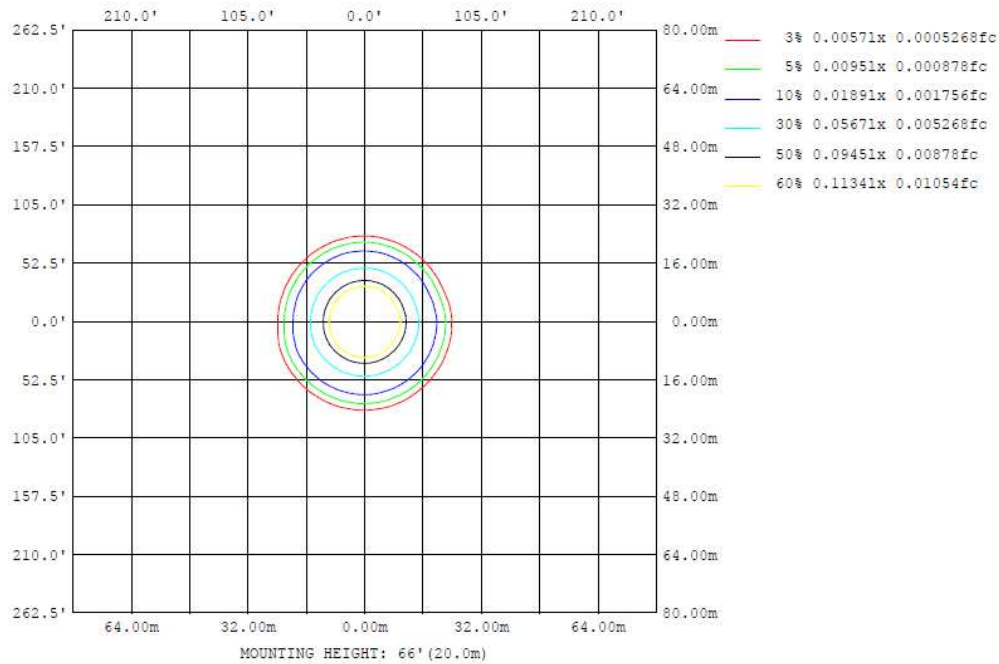
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 3 (Medium Light Output)

Model No.: SL13
Mount Height: 20 m
Isoillumination Plot



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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 3 (Medium Light Output)

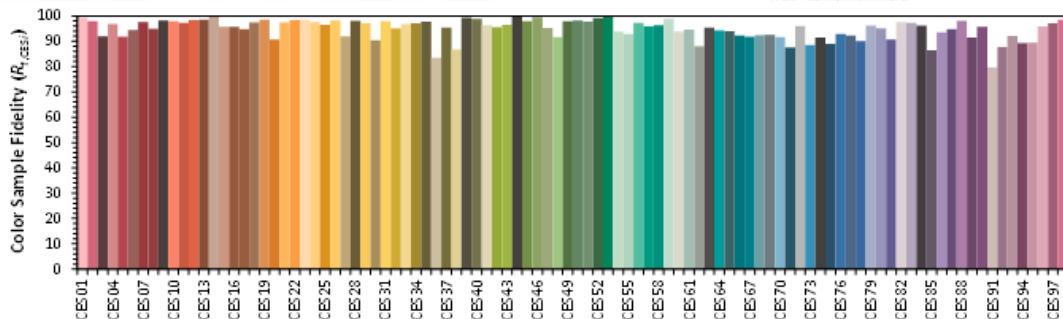
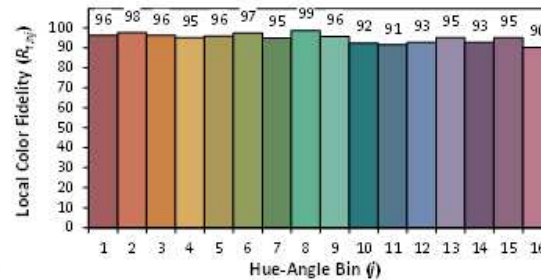
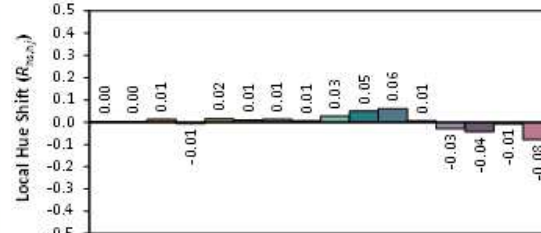
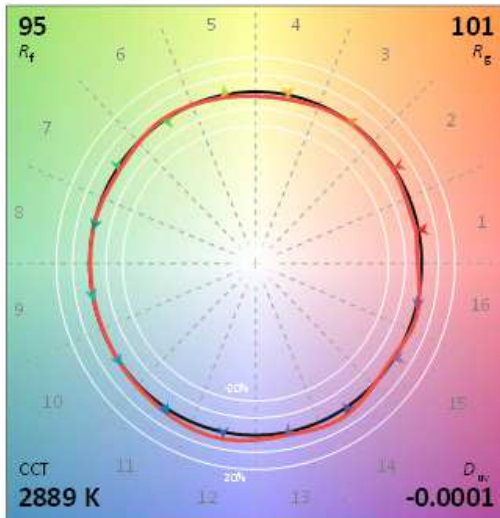
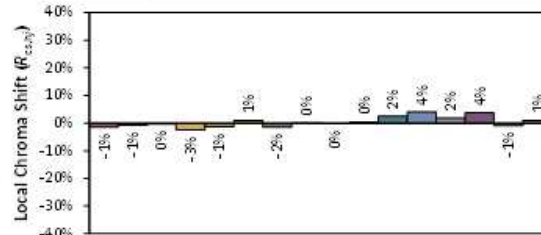
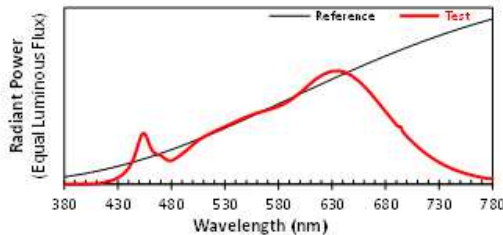
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: STERLING LIGHTING LLC

Date: 9/18/2023

Model: SL13



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

x 0.4449

y 0.4064

u' 0.2547

v' 0.5235

CIE 13.3-1995
(CRI)

R_a 98

R_g 89

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

RESULTS OF TESTS(cont'd)

Test Condition: 15V 60Hz for SL13

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')
SL13							
A240906-22-005	N/A	2883	98	0.4453	0.4065	0.2549	0.5236

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)
SL13							
A240906-22-005	N/A	15.0	0.1965	1.9595	0.6634	71.5707	36.53

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL13		
0-30	38.486	53.77
0-40	58.221	81.35
0-60	70.928	98.07
0-90	71.557	99.98
0-180	71.5707	100.0

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL13		
Beam (50%)	77.4	77.4
Beam Angle	77.4	

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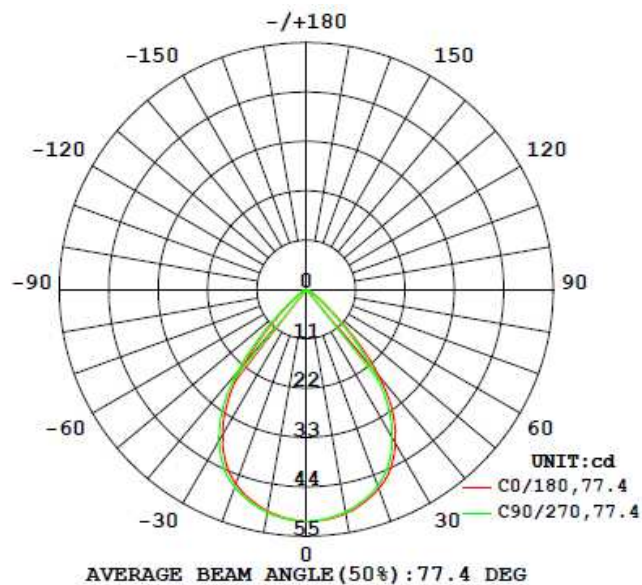
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL13

Setting : 4 (Medium Light Output)

G \ C(°)	0	22.5	45	67.5	90
0	51.60	51.60	51.60	51.60	51.60
5	51.42	51.40	51.33	51.30	51.26
10	50.64	50.57	50.47	50.38	50.31
15	49.22	49.10	48.97	48.83	48.73
20	47.17	47.02	46.81	46.66	46.55
25	44.21	43.92	43.66	43.37	43.18
30	39.75	39.33	38.93	38.59	38.31
35	33.56	33.01	32.48	32.02	31.70
40	25.18	24.45	23.75	23.19	22.77
45	14.96	14.22	13.53	12.98	12.59
50	6.67	6.27	5.92	5.66	5.45
55	2.81	2.75	2.63	2.49	2.43
60	1.18	1.13	1.07	1.02	0.96
65	0.42	0.40	0.38	0.37	0.36
70	0.26	0.26	0.25	0.25	0.24
75	0.18	0.17	0.17	0.16	0.15
80	0.08	0.07	0.06	0.06	0.06
85	0.02	0.02	0.02	0.02	0.01
90	0.00	0.00	0.00	0.00	0.00



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

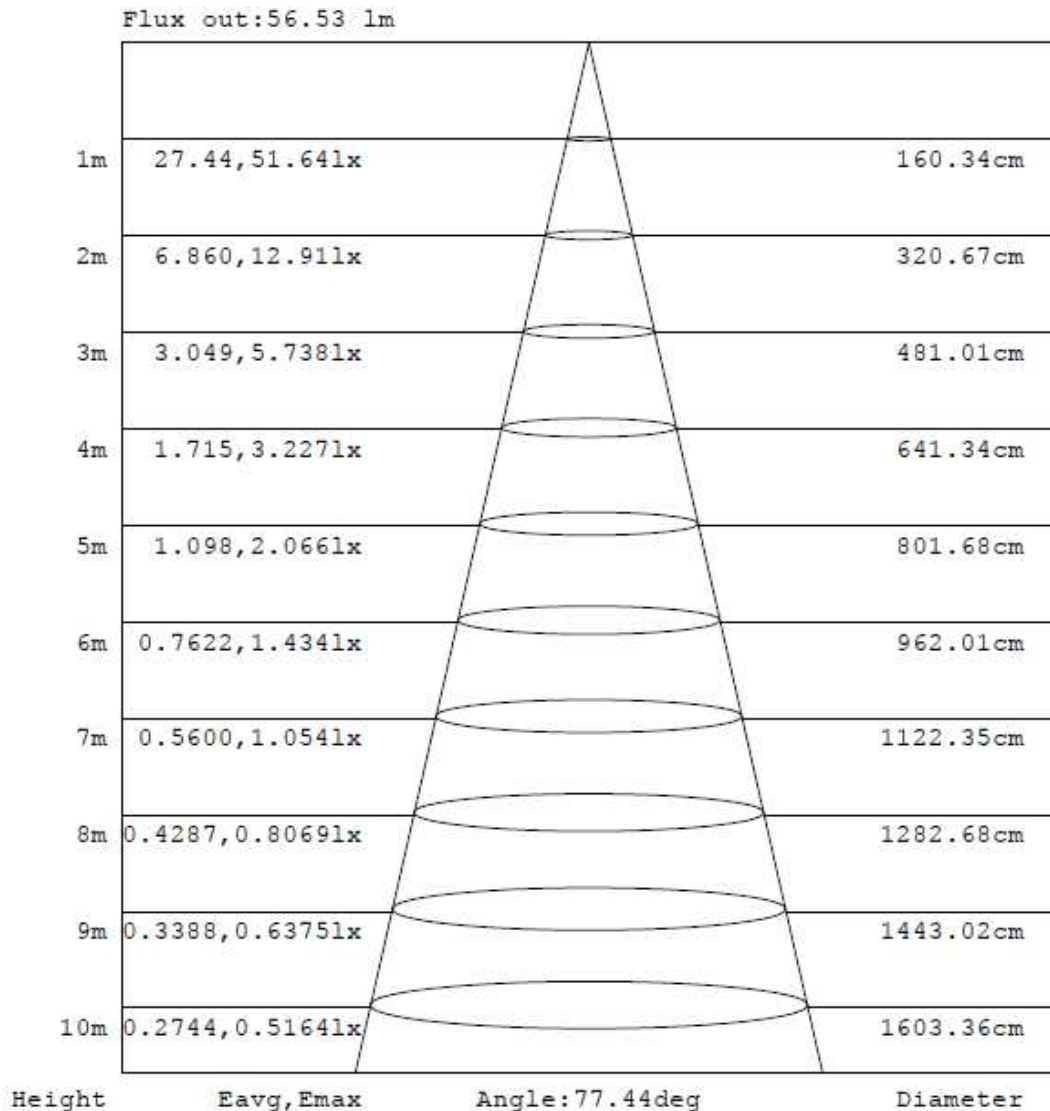
RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 4 (Medium Light Output)

Illumination Plots

Model No.: SL13
Mount Height: 10 m

Illuminance - Cone of Light



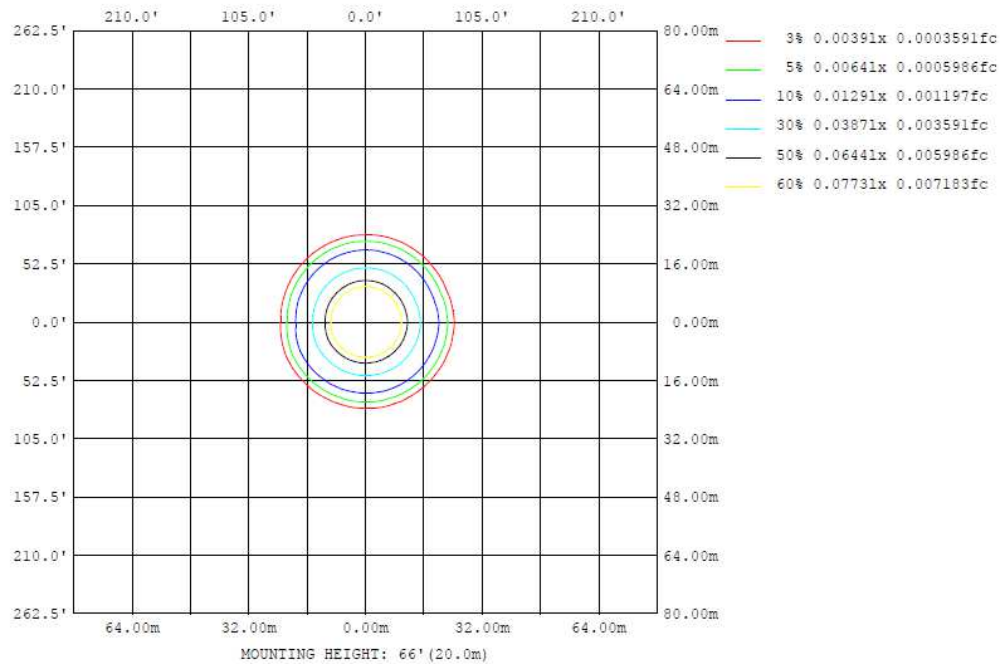
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 4 (Medium Light Output)

Model No.: SL13
Mount Height: 20 m
Isoillumination Plot



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

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13

Setting : 4 (Medium Light Output)

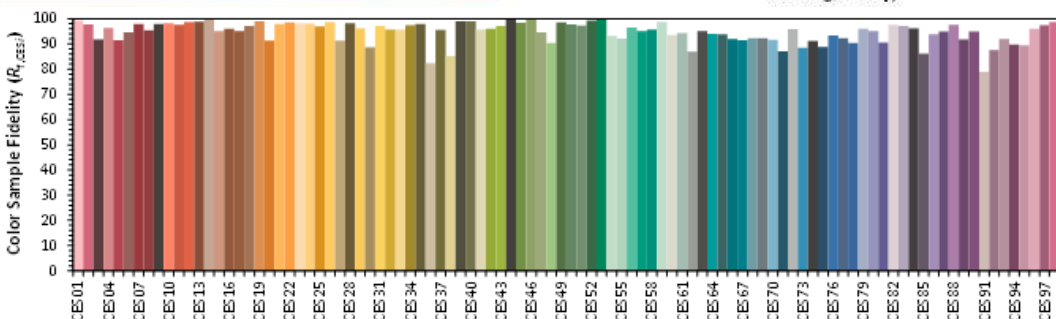
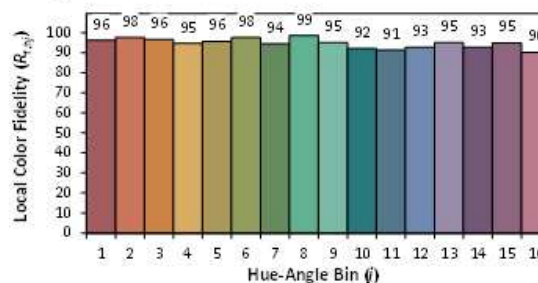
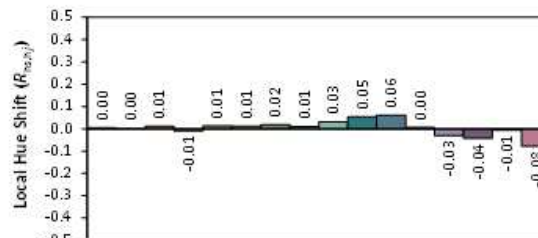
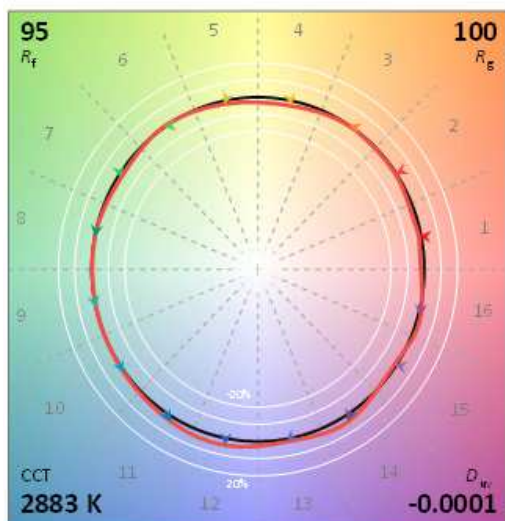
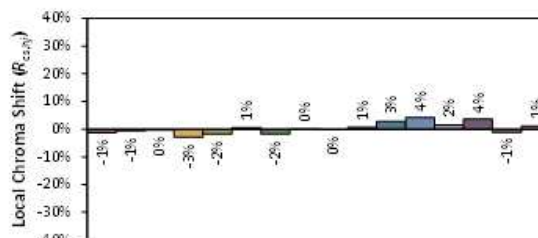
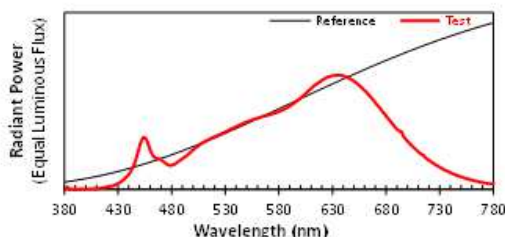
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: STERLING LIGHTING LLC

Date: 9/18/2023

Model: SL13



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

x 0.4453

y 0.4065

u' 0.2549

v' 0.5236

CIE 13.3-1995
(CRI)

R_a 98

R_g 90

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

RESULTS OF TESTS(cont'd)

Test Condition: 15V 60Hz for SL13

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')
SL13							
A240906-22-005	N/A	2876	98	0.4457	0.4064	0.2552	0.5236

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)
SL13							
A240906-22-005	N/A	15.0	0.1176	1.0073	0.6091	37.5384	34.84

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL13		
0-30	20.145	53.67
0-40	30.497	81.24
0-60	37.187	99.06
0-90	37.524	99.96
0-180	37.538	100.0

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL13		
Beam (50%)	77.5	77.6
Beam Angle	77.6	

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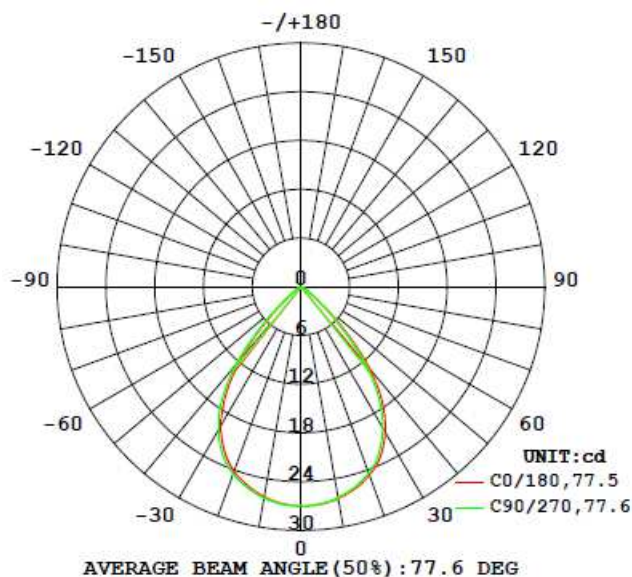
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL13

Setting : 5 (Medium Light Output)

G \ C(°)	0	22.5	45	67.5	90
0	26.993	26.993	26.993	26.993	26.993
5	26.884	26.857	26.859	26.833	26.826
10	26.473	26.428	26.397	26.359	26.329
15	25.720	25.659	25.606	25.554	25.515
20	24.648	24.565	24.500	24.422	24.383
25	23.091	22.943	22.832	22.727	22.650
30	20.719	20.546	20.378	20.238	20.140
35	17.489	17.236	17.010	16.840	16.723
40	13.096	12.768	12.484	12.237	12.092
45	7.746	7.418	7.141	6.918	6.761
50	3.454	3.282	3.143	3.030	2.944
55	1.456	1.400	1.354	1.310	1.267
60	0.621	0.600	0.574	0.551	0.527
65	0.220	0.211	0.204	0.197	0.193
70	0.137	0.136	0.134	0.132	0.130
75	0.097	0.093	0.089	0.086	0.083
80	0.042	0.039	0.036	0.034	0.032
85	0.013	0.012	0.011	0.010	0.010
90	0.003	0.002	0.002	0.002	0.002



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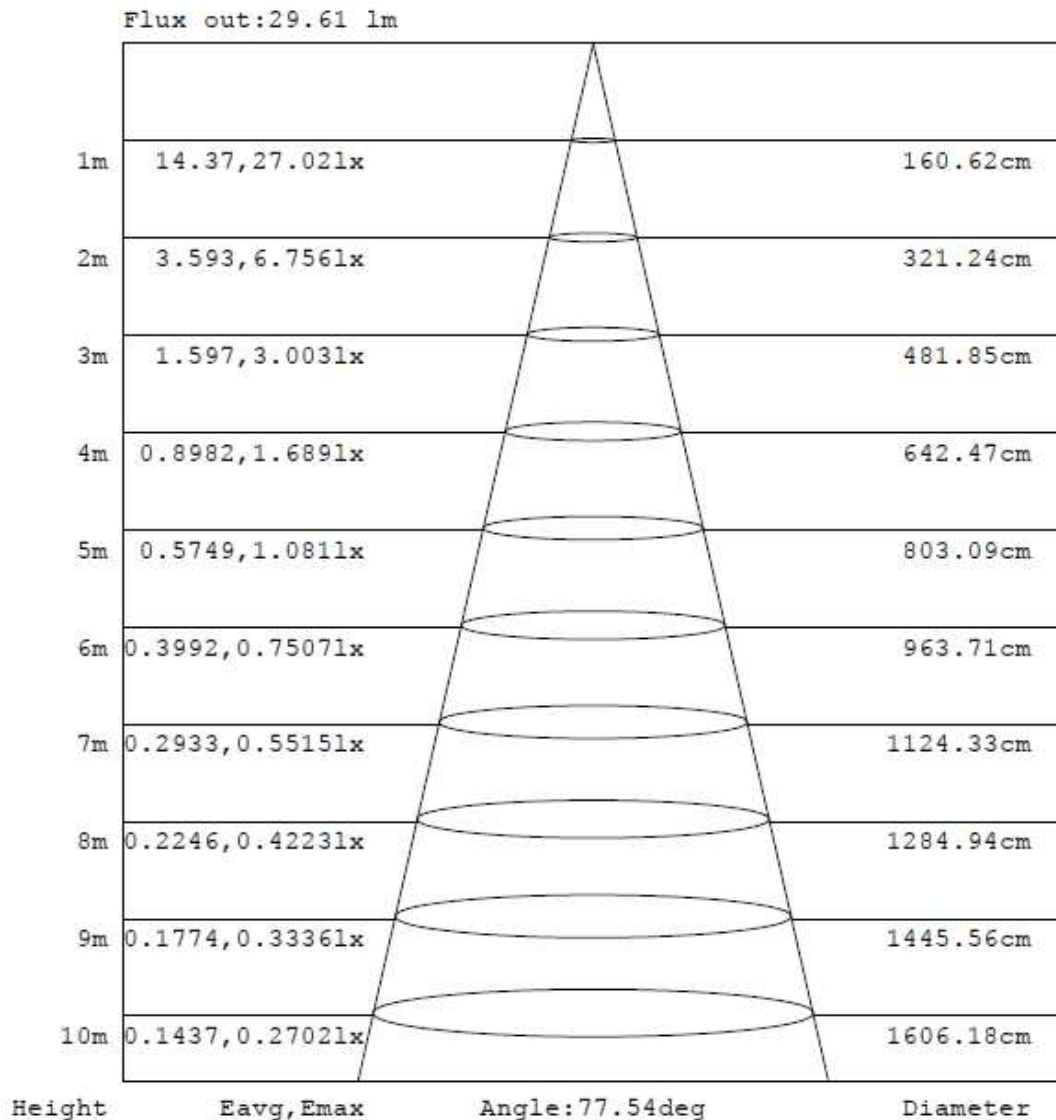
RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 5 (Medium Light Output)

Illumination Plots

Model No.: SL13
Mount Height: 10 m

Illuminance - Cone of Light



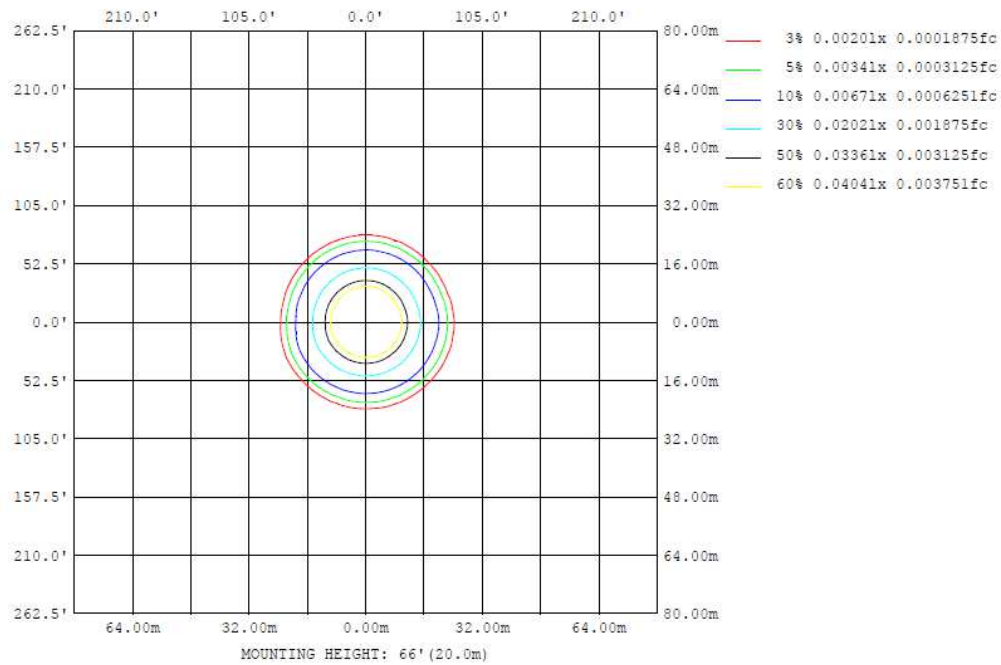
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 5 (Medium Light Output)

Model No.: SL13
Mount Height: 20 m
Isoillumination Plot



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

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 5 (Medium Light Output)

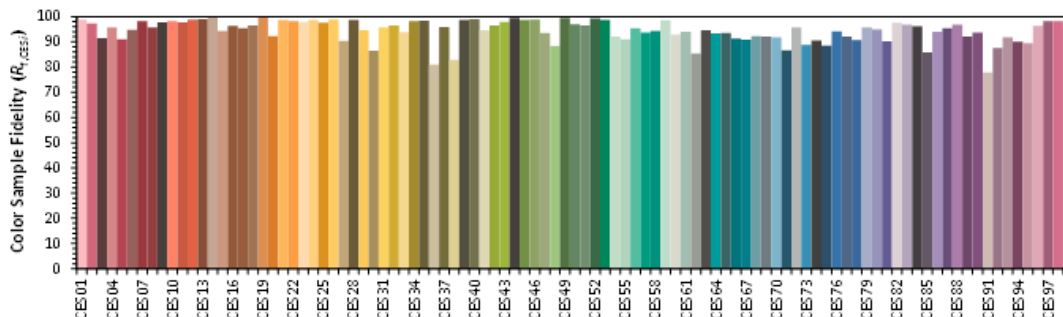
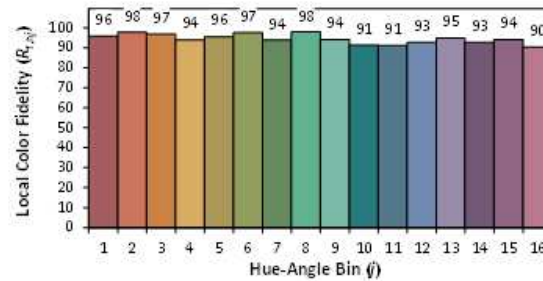
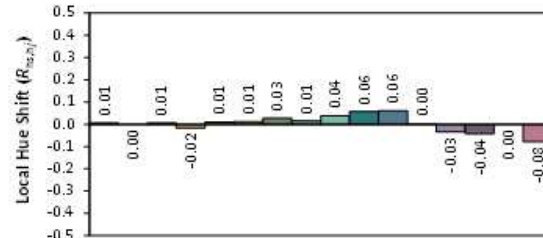
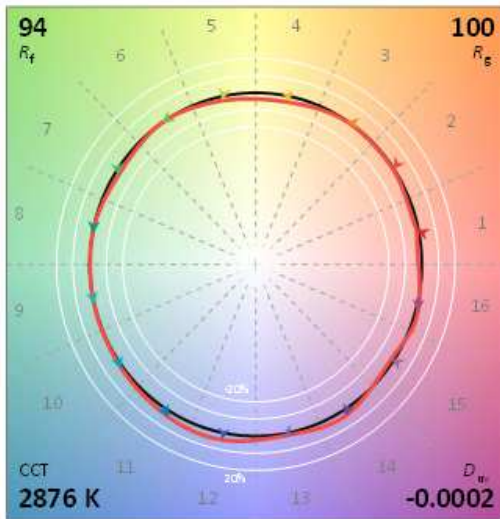
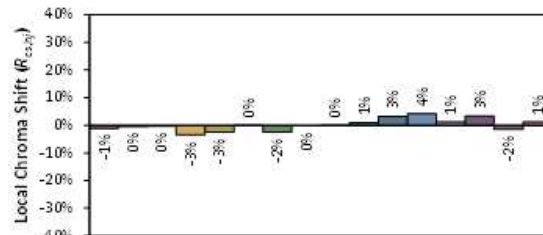
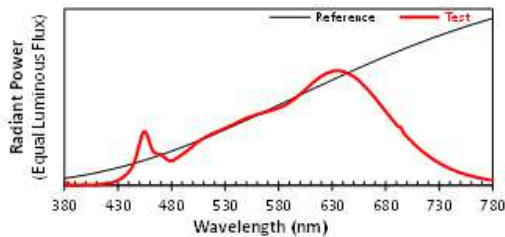
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: STERLING LIGHTING LLC

Date: 9/18/2023

Model: SL13



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

x 0.4457
y 0.4064
u' 0.2552
v' 0.5236

CIE 13.3-1995
(CRI)

R_a 98
R_g 92

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

RESULTS OF TESTS(cont'd)

Test Condition: 15V 60Hz for SL13

Setting : 6 (Min 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')
SL13							
A240906-22-005	N/A	2873	98	0.4458	0.4061	0.2554	0.5235

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)
SL13							
A240906-22-005	N/A	15.0	0.0670	0.5503	0.5460	14.3612	26.10

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
SL13		
0-30	7.720	53.75
0-40	11.665	81.22
0-60	14.212	98.96
0-90	14.347	99.88
0-180	14.361	100.0

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
SL13		
Beam (50%)	77.3	77.3
Beam Angle	77.3	

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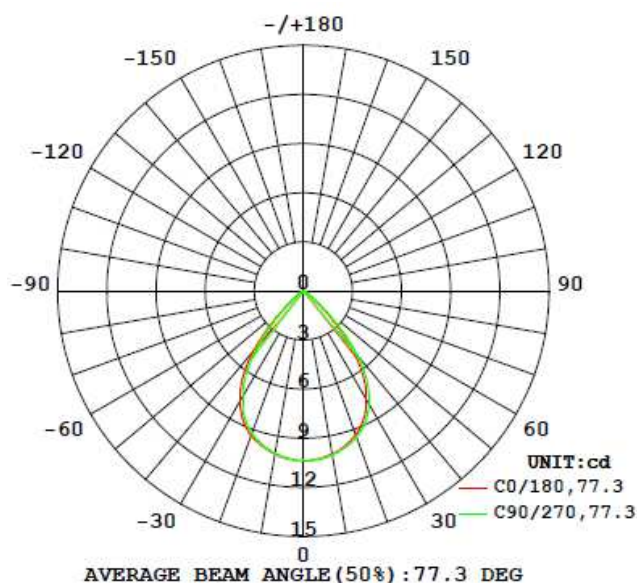
RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 15V 60Hz for SL13

Setting : 6 (Min Light Output)

G \ C(°)	0	22.5	45	67.5	90
0	10.36	10.36	10.36	10.36	10.36
5	10.28	10.30	10.31	10.32	10.33
10	10.10	10.12	10.14	10.15	10.18
15	9.79	9.80	9.83	9.87	9.90
20	9.34	9.37	9.42	9.46	9.49
25	8.68	8.73	8.78	8.85	8.90
30	7.71	7.76	7.85	7.93	8.00
35	6.38	6.46	6.57	6.59	6.78
40	4.59	4.69	4.84	4.99	5.12
45	2.56	2.67	2.81	2.95	3.08
50	1.09	1.14	1.22	1.31	1.39
55	0.47	0.49	0.53	0.57	0.60
60	0.19	0.21	0.23	0.24	0.26
65	0.07	0.08	0.08	0.09	0.09
70	0.05	0.05	0.05	0.05	0.05
75	0.03	0.03	0.04	0.04	0.04
80	0.01	0.01	0.02	0.02	0.02
85	0.01	0.01	0.01	0.01	0.01
90	0.00	0.00	0.00	0.00	0.00



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RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13

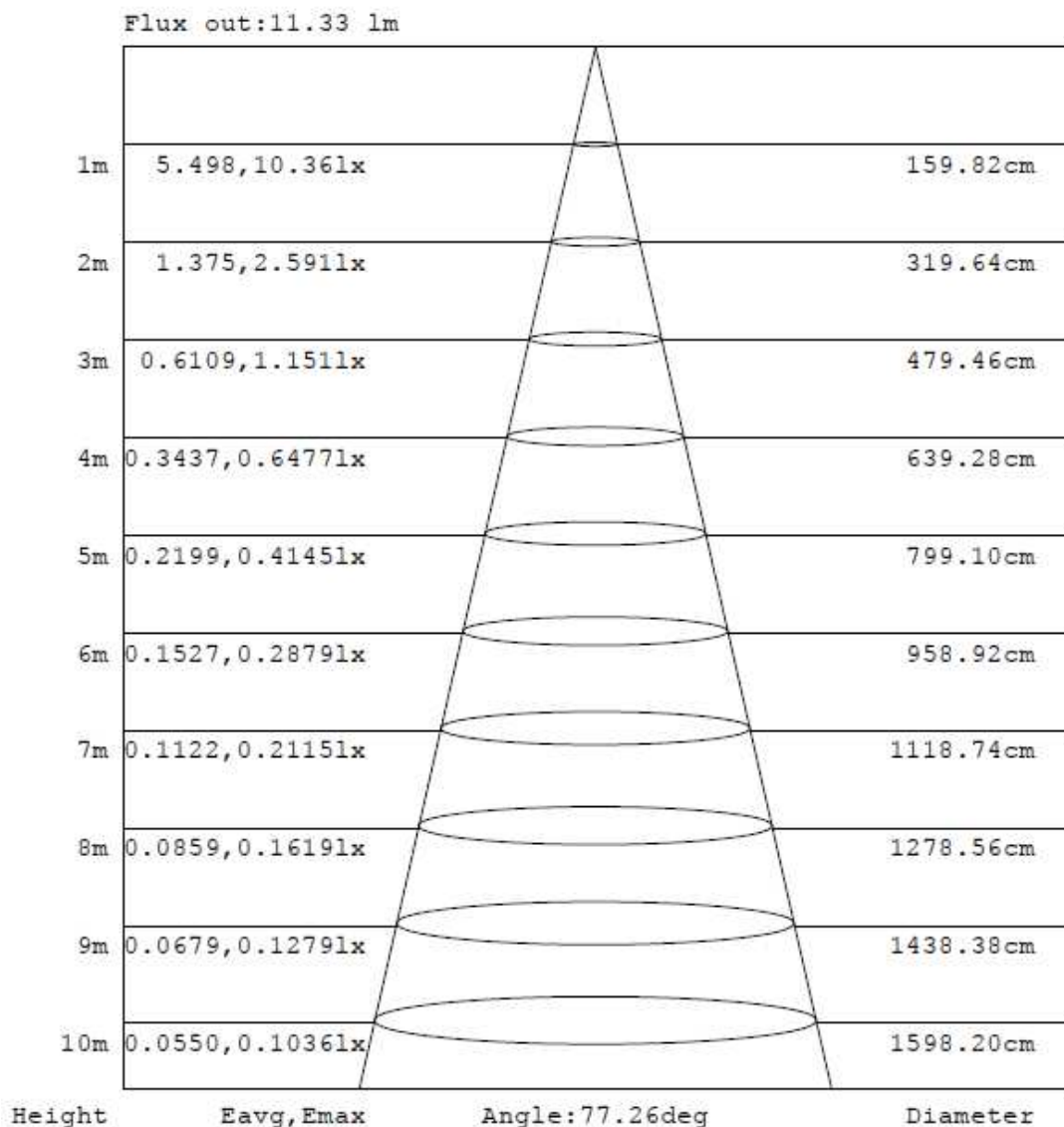
Setting : 6 (Min Light Output)

Illumination Plots

Model No.: SL13

Mount Height: 10 m

Illuminance - Cone of Light



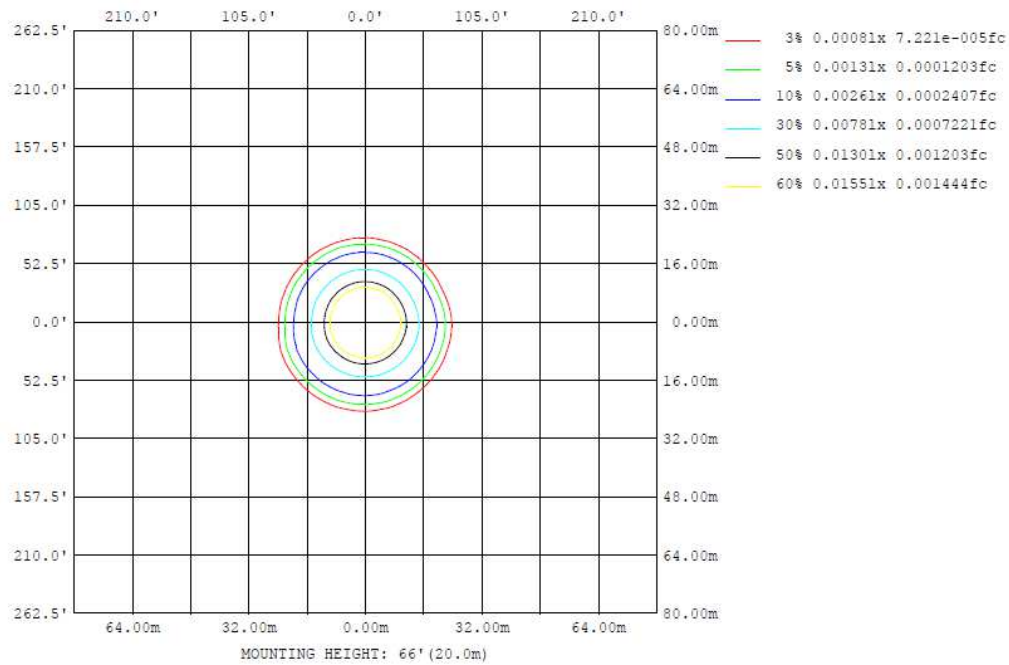
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 6 (Min Light Output)

Model No.: SL13
Mount Height: 20 m
Isoillumination Plot



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

RESULTS OF TESTS (cont'd)

Test Condition: 15V 60Hz for SL13
Setting : 6 (Min Light Output)

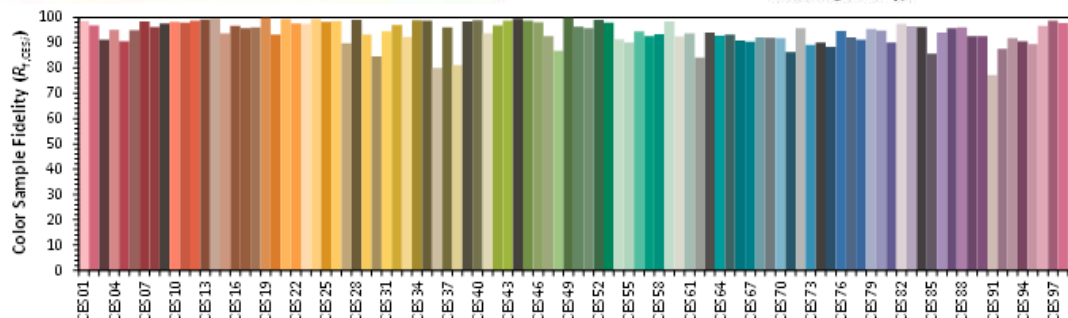
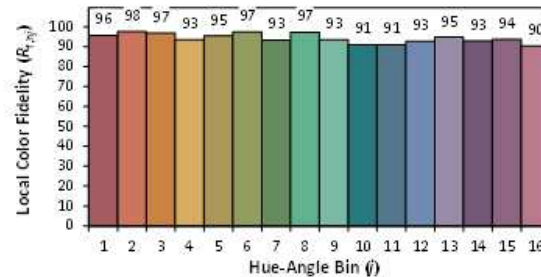
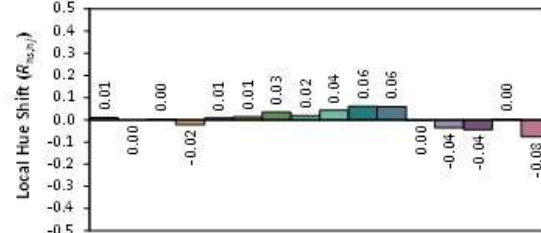
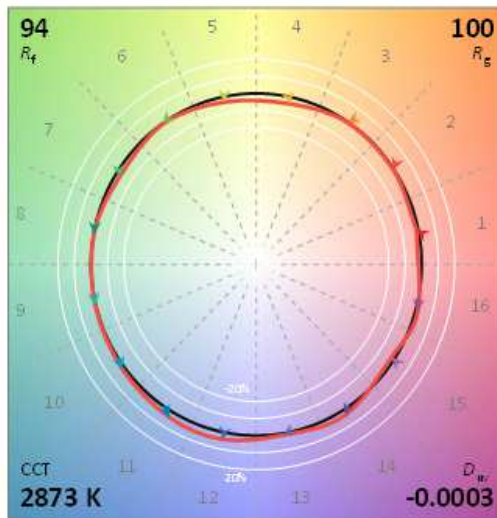
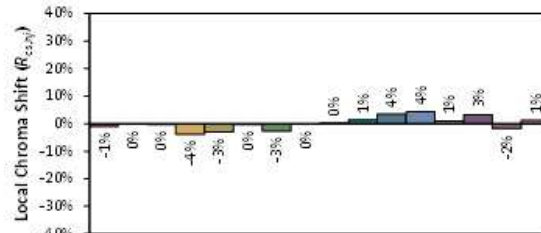
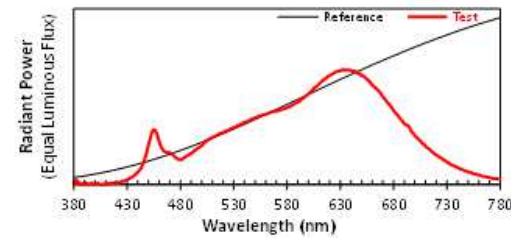
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: STERLING LIGHTING LLC

Date: 9/18/2023

Model: SL13



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

x 0.4458
y 0.4061
u' 0.2554
v' 0.5235

CIE 13.3-1995
(CRI)

R_a 98
R_g 93

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

RESULTS OF TESTS (cont'd)

IN SITU TEMPERATURE MEASUREMENT TEST

Test Results of LED chip temperature and current

TMP led: CXA1304	
In-situ case temperature of LED source (°C)	Limit single led chip temperature(°C)
57.9	85
Measured Drive current for each LED package/array/module (mA)	Limit single led chip current (mA)
125	692

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						Table 2: Interpolation Report (projection based on <i>in-situ</i> temperature entered)	
Description of LED Light Source Tested (manufacturer, model, catalog number)		Manufacturer: Cree LED Model: CXA1304 Report No: CLD-AP144 Rev5 Issued: Jun. 11, 201				$T_{s,1}$ (°C)	85.00
Test Condition 1 - 85°C Case Temp						$T_{s,1}$ (K)	358.15
Sample size	25	Sample size	-	Sample size	-	α_1	2.424E-06
Number of failures	0	Number of failures	-	Number of failures	-	B_1	0.985
DUT drive current used in the test (mA)	692	DUT drive current used in the test (mA)	-	DUT drive current used in the test (mA)	-	$T_{s,2}$ (°C)	-
Test duration (hours)	7,056	Test duration (hours)	-	Test duration (hours)	-	$T_{s,2}$ (K)	-
Test duration used for projection (hour to hour)	2,016 - 7,056	Test duration used for projection (hour to hour)	-	Test duration used for projection (hour to hour)	-	α_2	-
Tested case temperature (°C)	85	Tested case temperature (°C)	-	Tested case temperature (°C)	-	B_2	-
α	2.424E-06	α	-	α	-	E_{θ}/k_0	-
B	0.985	B	-	B	-	A	-
Reported L70(7k) (hours)	>42000	Reported L70(7k) (hours)	-	Reported L70(7k) (hours)	-	B_0	0.985
						$T_{s,1}$ (°C)	57.90
						$T_{s,1}$ (K)	331.05
						α_1	2.424E-06
						Reported L70(7k) at 57.9°C (hours)	>42000

In-Situ Inputs

Drive current for each LED package/array/module (mA):	125
<i>In-situ</i> case temperature (T_c , °C):	57.9
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):	50,000
Lumen maintenance at time (t) (%):	87.30%
Reported L70 (hours):	>42000

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