

Report Number: PL09769-001A
Model: LS4-25L-50K-10V-FD
Date: 12/13/2016

Cree Engineering Services Testing Laboratory (CESTL) Photometric Testing and Evaluation Report

Prepared For:

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Product Information	
Manufacturer	Cree Inc
Model Number (SKU)	LS4-25L-50K-10V-FD
Serial Number	WK10Y14296
LED Type	XHG2

Product Description
 Four foot linear luminaire with a white, formed aluminum body and a diffuse cylindrical lens.

Driver Information (Where Applicable)
 Integral

Length	Width	Height
48"	2.5"	3"

Sample
 The following sample was submitted for evaluation





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Key Photometric Data	Sphere Output	Goniophotometer	
Luminous Flux	2503.0	2426.1	lm
Efficacy	137.83	133.38	lm/W
Correlated Color Temperature (CCT)	4839	K	
Color Rendering Index (CRI)	82		
R ₉	14		
Duv	0.003088		
S/P Ratio*	1.87		

Electrical Measurements	Sphere		Goniophotometer		
	120V	277V	120V	277V	
Input Wattage	18.16	18.13	18.19	18.12	W
Input Current	0.15	0.07	0.15	0.07	A
Input Voltage	120.02	277.04	120.05	277.01	V
Power Factor	0.987	0.930	0.984	0.926	
Off-State Power	0	0	0	0	W
Total Harmonic Distortion (Voltage)	0.05	0.05	0.09	0.11	%
Total Harmonic Distortion (Amperage)	10.11	16.27	10.22	16.70	%

Note: All photometric measurements taken at 120VAC.

Luminous Intensity Distribution	Goniophotometer	
Maximum Candela	652.1	Cd
Horizontal Angle of Max Candela	67.5	°
Vertical Angle of Max Candela	2.5	°
Zonal Lumens (0° – 30°)	502.6 (20.7%)	lm (%)
Zonal Lumens (0° – 40°)	829.1 (34.2%)	lm (%)
Zonal Lumens (0° – 60°)	1509.3 (62.2%)	lm (%)
Zonal Lumens (60° – 90°)	669.9 (27.6%)	lm (%)
Color Angular Uniformity	NA	

Key Test Parameters	Sphere Output	Goniophotometer	
Stabilization Time	51	29	min
Total Operating Time (Stabilization + Test)	51	49	min
Ambient Temperature	24.6	24.4	°C



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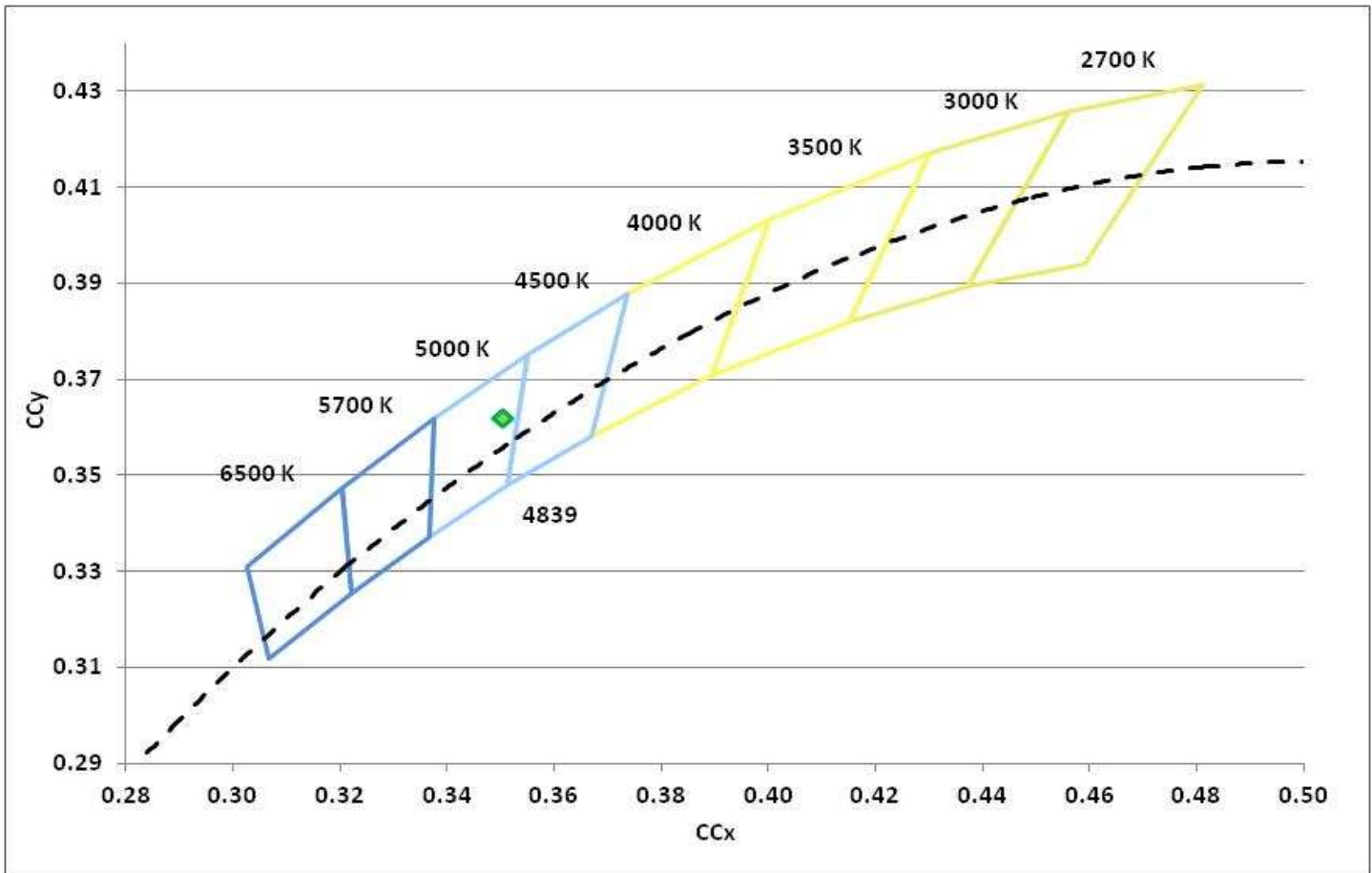
Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.3505	0.3621	0.2110	0.3270	0.2110	0.4905	0.003088

Color Rendering Index Details

Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
82	80	86	89	82	80	80	88	70	14	66	81	55	81	94

Chromaticity Diagram



Spectral Distribution

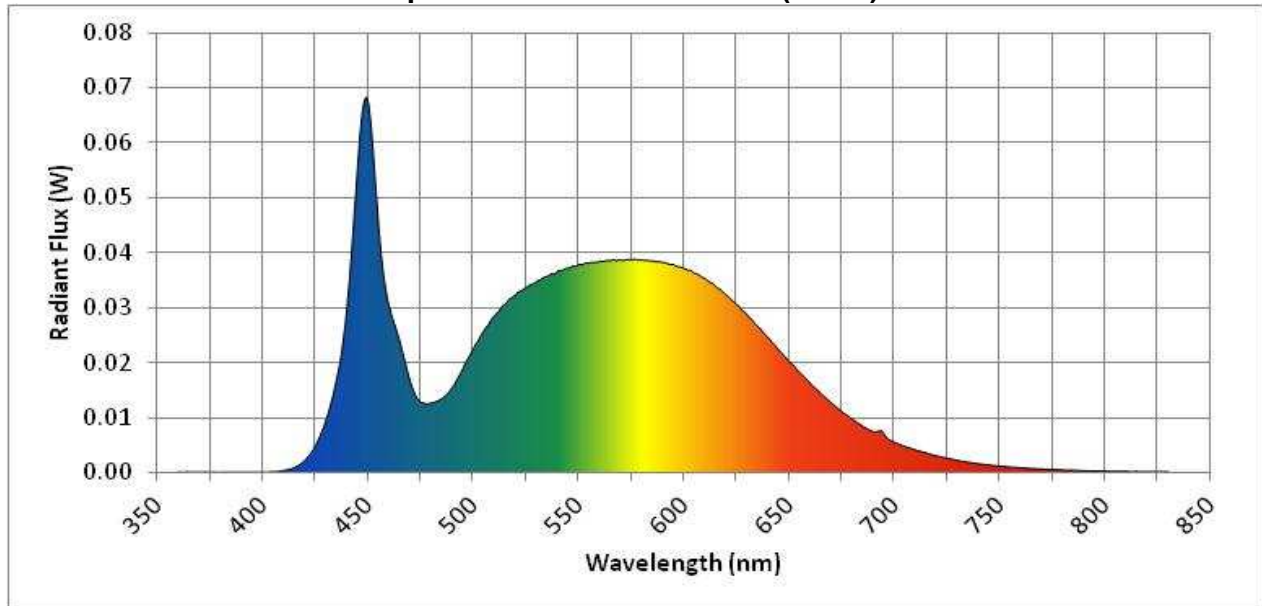
λ (nm)	W/nm
360	0.000165
370	0.000102
380	0.000101
390	0.000090
400	0.000089
410	0.000391
420	0.002318
430	0.009781
440	0.030930
450	0.067233
460	0.030075
470	0.016365
480	0.012714
490	0.015587
500	0.022679
510	0.028669
520	0.032421

λ (nm)	W/nm
530	0.034936
540	0.036795
550	0.037934
560	0.038579
570	0.038757
580	0.038751
590	0.038287
600	0.037178
610	0.035391
620	0.032348
630	0.028757
640	0.024592
650	0.020302
660	0.016321
670	0.012721
680	0.009746
690	0.007494

λ (nm)	W/nm
700	0.005561
710	0.004145
720	0.003074
730	0.002232
740	0.001614
750	0.001217
760	0.000900
770	0.000659
780	0.000494
790	0.000349
800	0.000298
810	0.000215
820	0.000175
830	0.000216

Dominant Wavelength	571	nm
Peak Wavelength:	449	nm

Spectral Power Distribution (W/nm)





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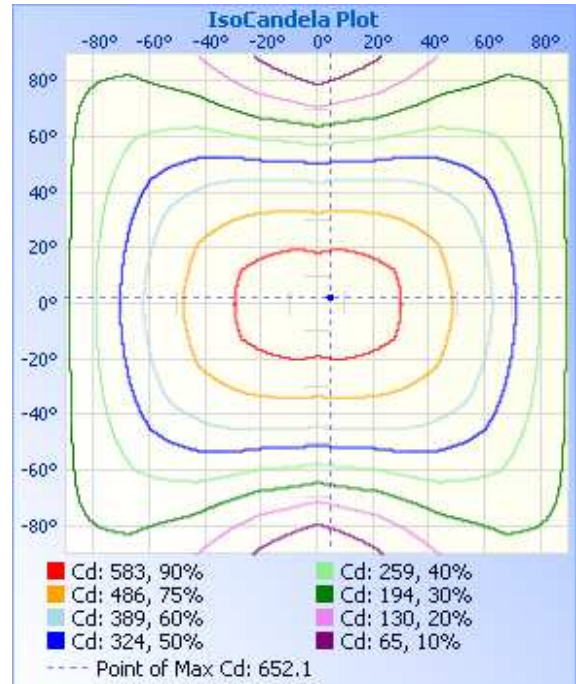
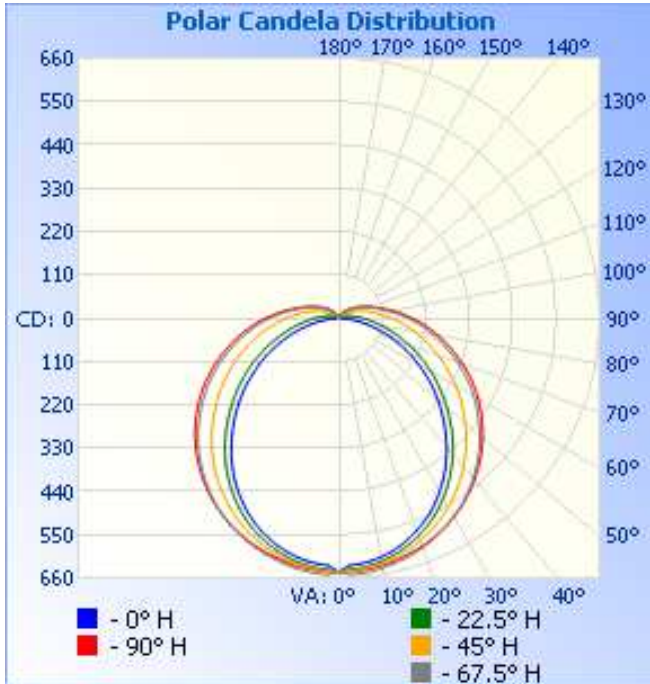
Zonal Lumen Summary **

Zone	Lumens	% of Total	Zone	Lumens	% of Total
0-5	15.3	0.6%	90-95	57.5	2.4%
5-10	45.5	1.9%	95-100	46.0	1.9%
10-15	74.2	3.1%	100-105	36.5	1.5%
15-20	100.5	4.1%	105-110	28.7	1.2%
20-25	123.8	5.1%	110-115	22.4	0.9%
25-30	143.2	5.9%	115-120	17.1	0.7%
30-35	158.2	6.5%	120-125	12.7	0.5%
35-40	168.4	6.9%	125-130	9.2	0.4%
40-45	173.6	7.2%	130-135	6.6	0.3%
45-50	174.1	7.2%	135-140	4.4	0.2%
50-55	170.1	7.0%	140-145	2.7	0.1%
55-60	162.3	6.7%	145-150	1.5	0.1%
60-65	151.0	6.2%	150-155	0.8	0%
65-70	136.8	5.6%	155-160	0.4	0%
70-75	120.5	5.0%	160-165	0.2	0%
75-80	103.5	4.3%	165-170	0.1	0%
80-85	86.9	3.6%	170-175	0.0	0%
85-90	71.2	2.9%	175-180	0	0%
Total			2426.1 lm		100%

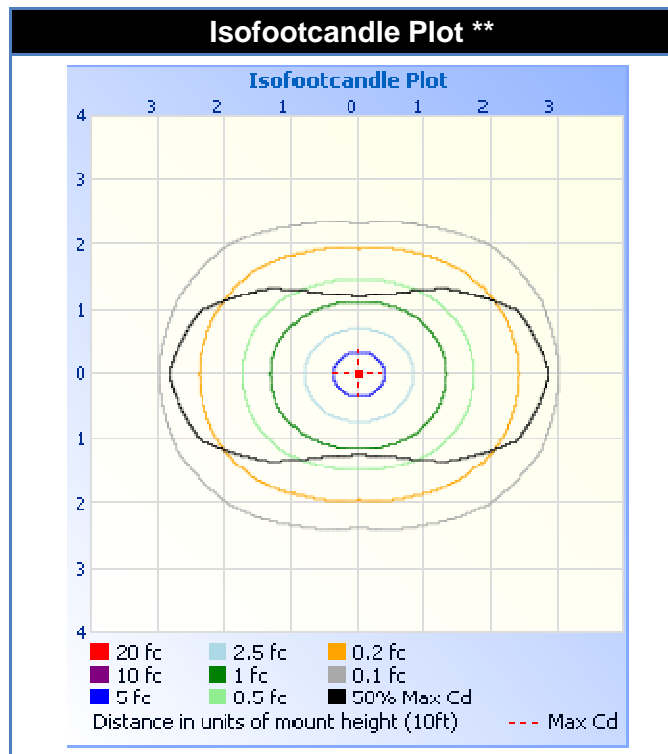
Spacing Criteria **

Spacing Criterion (0 - 180)	1.20
Spacing Criterion (90 - 270)	1.36
Spacing Criterion (Diagonal)	1.42

Candela Plots **



Isofootcandle Plot **





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Candela Tabulations **

	0	22.5	45	67.5	90
0	644	644	644	644	644
2.5	628	639	643	652	644
5	626	636	640	651	643
7.5	622	632	637	648	640
10	616	626	632	644	637
12.5	608	619	626	639	633
15	598	610	619	633	628
17.5	588	600	611	627	622
20	575	589	601	620	616
22.5	561	576	591	612	609
25	545	561	580	603	601
27.5	528	546	567	593	592
30	510	528	554	582	582
32.5	490	510	539	570	572
35	469	490	524	558	561
37.5	448	470	508	544	548
40	425	449	492	530	535
42.5	401	428	474	515	521
45	378	405	456	499	507
47.5	354	382	437	483	492
50	330	359	418	466	476
52.5	306	336	399	449	459
55	282	313	380	431	442
57.5	257	291	361	413	425
60	233	268	341	394	408
62.5	209	247	322	376	389
65	185	225	303	356	370
67.5	161	203	284	337	351
70	139	183	265	318	332
72.5	117	163	246	298	312
75	95	144	228	279	293
77.5	76	127	210	261	274
80	57	111	193	243	256
82.5	40	96	177	226	238
85	25	83	162	209	220
87.5	12	72	147	192	203
90	1	62	134	176	186



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Candela Tabulations (Continued) **

	0	22.5	45	67.5	90
92.5	0	52	121	161	170
95	0	45	109	146	154
97.5	0	38	98	132	140
100	0	33	87	119	127
102.5	0	28	79	108	115
105	0	24	70	98	104
107.5	0	21	63	88	95
110	0	18	56	80	86
112.5	0	16	50	72	78
115	0	13	44	65	70
117.5	0	11	39	58	64
120	0	8	34	52	57
122.5	0	7	30	47	52
125	0	5	26	42	47
127.5	0	4	22	37	42
130	0	3	19	33	37
132.5	0	2	16	29	33
135	0	2	14	26	29
137.5	0	2	10	22	26
140	0	1	7	19	22
142.5	0	1	6	16	20
145	0	1	5	12	17
147.5	0	1	4	8	12
150	0	1	4	7	9
152.5	0	0	3	5	8
155	0	0	2	4	6
157.5	0	0	2	3	5
160	0	0	1	2	4
162.5	0	0	1	2	2
165	0	0	1	1	2
167.5	0	0	0	1	1
170	0	0	0	0	1
172.5	0	0	0	0	0
175	0	0	0	0	0
177.5	0	0	0	0	0
180	0	0	0	0	0



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Integrating Sphere Equipment List

Description	Manufacturer	Model	Serial Number
3M Sphere	Labsphere	CSTM-CSLMS-3M98-HDS	82456
CCD Array Spectrometer	Otsuka	MC-9801	98010165
Programmable AC Source	Chroma	61603	616030000761
Single Channel Power Analyzer	Xitron	2801	28011110008
Aux Lamp Power Supply	Labsphere	LPS-100-0833	1002104538

Goniophotometer Equipment List

Description	Manufacturer	Model	Serial Number
AC Power Source	Adaptive	FC210	2300229
AC Power Source	Elgar	CW1251	1126A06399
Type C Goniophotometer	LSI / UL	6440T	6440TE0192T
Spectroradiometer	Gooch & Housego	770VIS/NIR	11414155
Power Meter	Yokogawa	WT210	91L220953

Test Methods Used:

Title	Description
ANSI C82.77:2002	Harmonic Emission Limits- Related Power Quality Req't's for Lighting Equipment
CIE Pub. 13.3:1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. 15:2004	Colorimetry
IES LM-58:1994	Spectroradiometric Measurements
IES LM-65:2001	Single-Ended Compact Fluorescent Lamps – Life Test Performance
IES LM-79:2008	Electrical and Photometric Measurements of Solid-State Lighting Products

Reference Standard Used:

Equipment	Description
3m Sphere	Tungsten Halogen Omni-Directional 75W Calibration Lamp, Serial Number G141
Type C Goniophotometer	Tungsten Halogen Omni-Directional 500W Calibration Lamp, Serial Number 97A

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The results contained in this report pertain only to the tested sample.

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* Items marked with a single asterisk are not covered by the NVLAP accreditation.

In the event that the recorded temperature is outside of $25 \pm 1^\circ\text{C}$, this is considered a non-standard condition.

** In the event that testing is subcontracted, test results in this report marked with the symbol **, or noted as "Goniophotometer", were performed by the subcontracted laboratory identified in the footer on the first page of this report. Subcontracted testing is strictly goniophotometer based. All other tests are performed using an integrating sphere.

The goniophotometer information in the equipment list, report items marked with **, or results specifically identified as "Goniophotometer", are the actual equipment used, and test results produced, by the subcontracted laboratory.

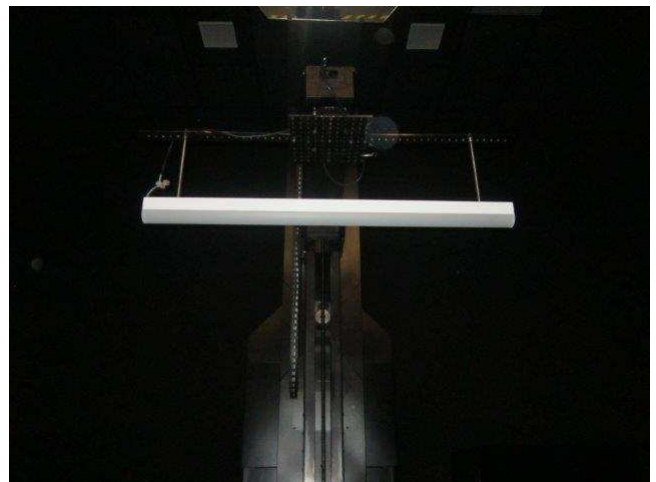
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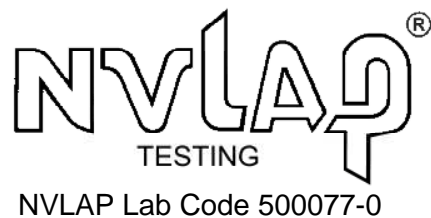
The photos below are intended to show the orientation and fixturing/set-up of the units under test. These are critical to understanding the results of the test given the sensitivity of many products and measurement systems to orientation and set-up considerations, and also for reproducing the conditions of the test.

Sphere Picture



Goniophotometer Picture





Document Revision History:

Each subsequent revision of this report replaces the preceding report.

Date	Rev	DCN #	Change Details	By	Approval
12/13/16	A	DMS	Origination	A. Gressel	C. McLaurin