

Report Number: PL13010-001A
Model: HXB-C-xx-70L-M-50K-8-UL-xx-xxx
Date: 8/14/2018

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

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A handwritten signature in black ink that reads "April Gressel".

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Becky Kuebler, Manager Test Engineering

Product Information

Manufacturer	Cree Inc
Model Number (SKU)	HXB-C-xx-70L-M-50K-8-UL-xx-xxx
Serial Number	PL13010-001
LED Type	MHD-E

Product Description

Extruded aluminum enclosure with finned aluminum heat sink, gray polymeric housing, white polymeric reflector, and clear polymeric optical lens covering LEDs

Driver Information (Where Applicable)

Philips XI300C150V300BSR1

Length	Width	Height
18.5"	18.5"	26"

Sample

The following sample was submitted for evaluation



Key Photometric Data	Sphere Output	Goniophotometer	
Luminous Flux	67375.0	67296.0	lm
Efficacy	137.98	138.01	lm/W
Correlated Color Temperature (CCT)	4867		
Color Rendering Index (CRI)	80		
R ₉	4		
Duv	0.003048		
S/P Ratio*	1.85		
CIE Type	Direct		
Color Angular Uniformity	N/A		

	Sphere		Goniophotometer		
Electrical Measurements	120V	277V	120V	277V	
Input Wattage	488.30	482.90	487.60	482.50	W
Input Current	4.09	1.80	4.07	1.79	A
Input Voltage	119.98	277.02	120.12	277.01	V
Power Factor	0.996	0.969	0.997	0.970	
Off-State Power	0	0	0	0	W
Total Harmonic Distortion (Voltage)	0.21	0.09	0.14	0.11	%
Total Harmonic Distortion (Amperage)	6.24	7.50	5.30	6.21	%

Note: All photometric measurements taken at 120VAC.

Key Test Parameters	Sphere Output	Goniophotometer	
Stabilization Time	56	52	min
Total Operating Time (Stabilization + Test)	76	72	min
Ambient Temperature	24.8	24.5	°C

Spacing Criteria

Spacing Criterion (0 - 180)	1.32
Spacing Criterion (90 - 270)	1.30
Spacing Criterion (Diagonal)	1.44

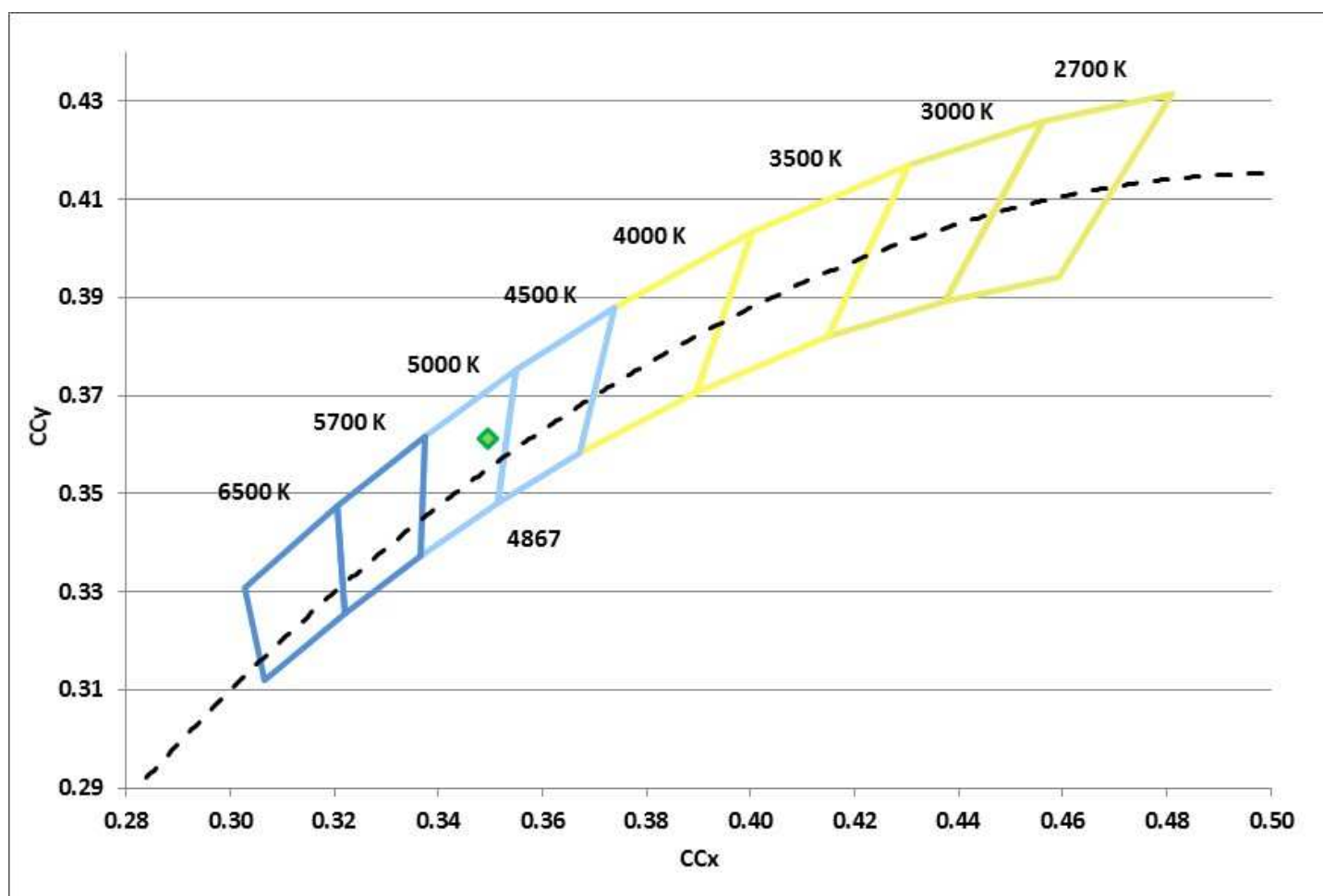
Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.3496	0.3613	0.2107	0.3267	0.2107	0.4900	0.003048

Color Rendering Index Details

Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
80	78	83	88	81	79	78	86	67	4	61	80	55	79	93

Chromaticity Diagram



Spectral Distribution

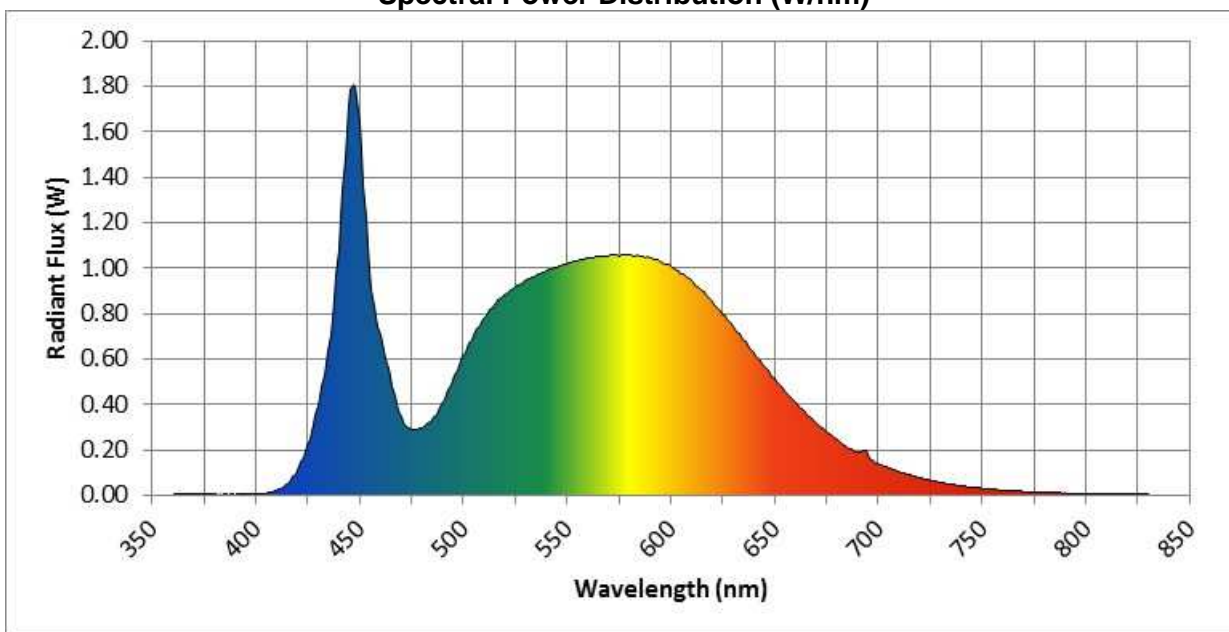
$\lambda(\text{nm})$	W/nm
360	0.002701
370	0.003224
380	0.003594
390	0.002650
400	0.004867
410	0.020460
420	0.108965
430	0.391907
440	1.078977
450	1.639512
460	0.703017
470	0.346730
480	0.298328
490	0.404679
500	0.610380
510	0.778243
520	0.880033

$\lambda(\text{nm})$	W/nm
530	0.944174
540	0.985444
550	1.019193
560	1.042500
570	1.053129
580	1.057187
590	1.046240
600	1.009416
610	0.944250
620	0.852101
630	0.743897
640	0.627494
650	0.514900
660	0.410818
670	0.319631
680	0.244363
690	0.187391

$\lambda(\text{nm})$	W/nm
700	0.139006
710	0.104082
720	0.077269
730	0.056369
740	0.041327
750	0.030960
760	0.022894
770	0.016859
780	0.013238
790	0.010551
800	0.007602
810	0.005593
820	0.004719
830	0.003690

Dominant Wavelength	571	nm
Peak Wavelength	447	nm

Spectral Power Distribution (W/nm)



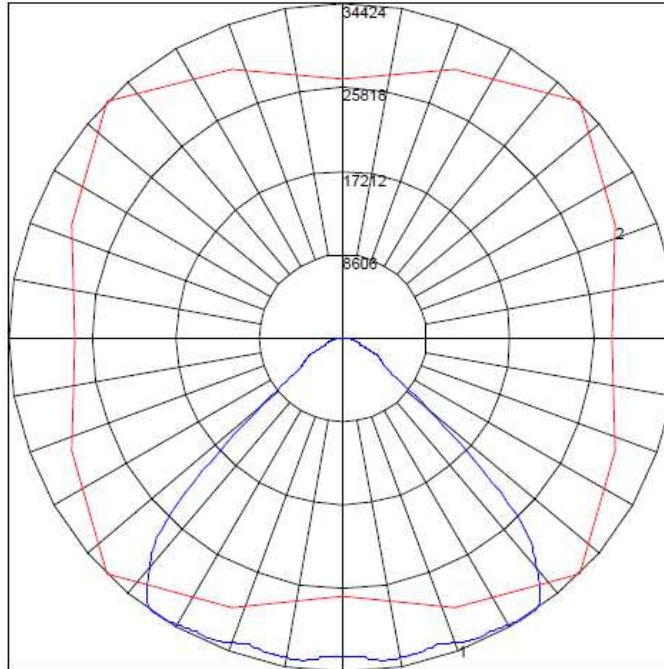
Zonal Lumen Summary

Zone	Lumens	% of Total	Zone	Lumens
0-20	12443.26	18.5	0-10	3166.45
0-30	27139.33	40.3	10-20	9276.81
0-40	45589.47	67.7	20-30	14696.07
0-60	62027.86	92.2	30-40	18450.14
0-80	66754.68	99.2	40-50	11668.35
0-90	67229.12	99.9	50-60	4770.05
10-90	64062.68	95.2	60-70	3101.11
20-40	33146.21	49.3	70-80	1625.7
20-50	44814.56	66.6	80-90	474.45
40-70	19539.5	29	90-100	0.78
60-80	4726.81	7	100-110	0
70-80	1625.7	2.4	110-120	0
80-90	474.45	0.7	120-130	0.09
90-110	0.78	0	130-140	6.29
90-120	0.78	0	140-150	15.8
90-130	0.87	0	150-160	20.05
90-150	22.96	0	160-170	16.95
90-180	66.87	0.1	170-180	6.91
110-180	66.09	0.1		
Total	67295.99 lm	100%		

Luminance Data (Cd./Sq.M)

Average in Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	79302	209287	86655
55	55134	59277	55043
65	44339	45026	47524
75	45869	30361	44492
85	36974	24722	38405

Candela Plots



Maximum Candela = 34424.4 - Located At Horizontal Angle = 45, Vertical Angle = 34
1 - Vertical Plane Through Horizontal Angles (45 - 225) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (34) (Through Max. Cd.)

Coefficients of Utilization

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	111	108	104	101	109	105	102	100	101	99	96	97	95	94	94	92	91	89
2	103	97	91	87	101	95	90	86	92	88	84	89	85	82	86	83	80	78
3	96	88	81	76	94	86	80	75	83	78	74	81	76	73	78	74	71	69
4	89	79	72	67	87	78	71	66	76	70	65	74	69	64	72	67	64	62
5	83	72	65	59	81	71	64	59	69	63	58	67	62	58	66	61	57	55
6	78	66	58	53	76	65	58	53	64	57	52	62	56	52	61	55	51	50
7	73	61	53	48	71	60	53	48	59	52	47	57	51	47	56	51	47	45
8	68	56	48	43	66	55	48	43	54	48	43	53	47	43	52	46	42	41
9	64	52	44	39	62	51	44	39	50	44	39	49	43	39	48	43	39	37
10	60	48	41	36	59	47	41	36	47	40	36	46	40	36	45	39	36	34

Candela Tabulations

	0	22.5	45	67.5	90
0	32947	32947	32947	32947	32947
2.5	32713.2	32920.5	32958.3	33087.6	33107.3
5	32889.4	33176.8	33225.6	33089.9	32984.8
7.5	33278.9	33739.3	33482.2	32820.1	32663.3
10	32789.8	33502.8	33520.5	33022.8	32693.2
12.5	31943.8	32767	33443.6	33170.7	32466.4
15	31808	32387.2	33287.9	33257.6	32223.3
17.5	31689.8	32473.2	33148.4	33001.4	31733
20	30654.6	32273.4	33531.5	32925.1	31515
22.5	29635.8	31627.8	33817.6	32576.8	30309.1
25	29428	31472.6	33933.9	31875.8	30091.8
27.5	28906.7	31416.8	33962.9	31882.4	29346.8
30	28421.5	30883.3	34150.5	31149.4	28360.5
32.5	28122.4	30580	34392.9	30744.9	27868.1
35	27183.8	29997.3	34370	29233	26212.5
37.5	24753.5	28281.8	33332.9	27636.8	24701.5
40	20395.6	24598.3	31022.6	24370.2	20255.5
42.5	14824.4	19044.5	28710.3	18730	14893
45	9126.9	12611.5	24087	12905.3	9973.2
47.5	6733.1	7871.8	17437.3	8507.1	7104.8
50	6136.8	6050.3	11599.5	6086.8	6158.2
52.5	5700.9	5489.1	7351.8	5439.7	5682
55	5147.2	4966.8	5533.9	4956.7	5138.7
57.5	4614.5	4381.1	4816.9	4471.1	4601.8
60	4050.7	3960.9	4378.7	4104.8	4127
62.5	3505.1	3604.7	3831	3634.6	3663.7
65	3049.9	3104.8	3097.2	3104.3	3269
67.5	2672.2	2619.2	2410.3	2627.3	2886.4
70	2436.9	2187.2	1906.9	2215.9	2549.1
72.5	2202	1797.7	1555.5	1835.7	2223.3
75	1932.3	1467.4	1279	1475.7	1874.3
77.5	1584.1	1180	1024.5	1154.5	1492.8
80	1201.2	915.2	780.7	872.7	1134.2
82.5	850.5	660.3	557.5	630.5	841.6
85	524.5	408.7	350.7	412.1	544.8
87.5	224.1	174.4	156.7	182.9	233.2
90	10.4	16.8	20.8	25.6	28.9

Candela Tabulations

	0	22.5	45	67.5	90
92.5	0	0	0	0	0
95	0	0	0	0	0
97.5	0	0	0	0	0
100	0	0	0	0	0
102.5	0	0	0	0	0
105	0	0	0	0	0
107.5	0	0	0	0	0
110	0	0	0	0	0
112.5	0	0	0	0	0
115	0	0	0	0	0
117.5	0	0	0	0	0
120	0	0	0	0	0
122.5	0	0	0	0	0
125	0	0	0	0	0
127.5	0	0	0.3	0	0
130	0	1.3	2.5	0.9	0.2
132.5	2.7	4.4	6.1	4.6	2.6
135	6.7	8.5	9.5	8.4	6.3
137.5	10.5	12.2	13.4	12.2	10.6
140	15	16.4	17.4	16.6	14.8
142.5	19.6	20.9	21.9	21	20
145	24.1	25.7	26.5	25.4	24.6
147.5	29.4	30.1	31.2	29.9	29.3
150	34.3	34.8	35.3	34.8	34.6
152.5	39.1	39.3	40	39.6	38.8
155	43.8	43.9	44.4	43.9	44.2
157.5	48.3	47.9	48.6	48.3	48.2
160	52.7	52.6	52.3	52.5	52.6
162.5	57.2	57.1	57	56.8	56.8
165	61.1	61	61	60.9	60.7
167.5	64.4	64.6	64.3	64.1	64
170	66.9	67	67.1	67	66.8
172.5	71.4	71.2	71.2	71.2	71.1
175	76.2	76	75.8	75.8	76.1
177.5	78.3	78.3	78.1	78.2	78.3
180	79.1	79.1	79.1	79.1	79.1

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	1027119144

*Goniophotometer Equipment List (Cree Durham Technology Center, NVLAP Lab Code 500070-0)

Description	Manufacturer	Model	Serial Number
AC Power Source	Adaptive	FC200	2300230
DC Power Source	Sorensen	XHR 150-7	1424A01504
DC Power Source	GW	GPR-30H 10D	EF810483
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 Reqt'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-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 F132
*Type C Goniophotometer and Spectrometer (Cree Durham Technology Center, NVLAP Lab Code 500070-0)	Tungsten Halogen Omni-Directional 500W Calibration Flux Lamp, Serial Number 97A. For color calibration of spectroradiometer, Serial Numbers 12C066, 12C067, 12C068.

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

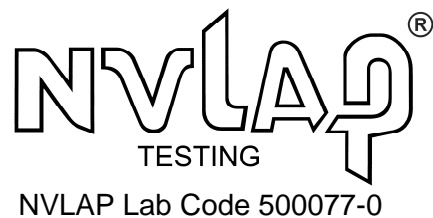
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Additional Comments:

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.





Document Revision History:

Each subsequent revision of this report replaces the preceding report.

Date	Rev	DCN #	Change at the time of this test	By	Approval
8/14/2018	A	DMS	Origination	A. Gressel	B. Kuebler