



NVLAP Lab Code 500089-0

**Report Number:** PL05592-001B  
**Model:** CPY250AxxDB-ULxxxx / BXCCAxD13-Uxxxxx  
**Date:** 06/26/2015

## Cree Racine Engineering Services Testing Laboratory (RESTL) Photometric Testing and Evaluation Report

**Prepared For:**

Christopher Strom

Cree, Inc.

9201 Washington Avenue

Racine, WI 53406

**Prepared By:**

**Approved By:**

Cedric Duviols, Photometric Test Technician

Christopher McLaurin, Photometric Specialist

### Product Information

Manufacturer	Cree, Inc.
Model Number (SKU)	CPY250AxxDB-ULxxxx / BXCCAxD13-Uxxxxx
Serial Number	PL05592-001
LED Type	XTE DA1150

### Product Description

Cast white painted finned metal housing, molded white plastic reflector, 1 white circuit board with multiple LEDs, clear prismatic dome glass lens in cast white painted metal frame.

### Driver Information (Where Applicable)

CREE LE098X02 R1

Length	Width	Height
15.0"	15.0"	3.25"

### Sample

The following sample was submitted for evaluation





NVLAP Lab Code 500089-0

Key Photometric Data	Sphere Output	Goniophotometer	
Luminous Flux	13701.2	13585.0	lm
Efficacy	115.24	114.77	lm/W
Correlated Color Temperature (CCT)	5744	K	
Color Rendering Index (CRI)	70		
R <sub>9</sub>	-25		
Duv	0.00403306		
S/P Ratio*	1.87		

Electrical Measurements	Sphere		Goniophotometer		
	120V	277V	120V	277V	
Input Wattage	118.89	116.17	118.37	115.84	W
Input Current	1.00	0.44	0.99	0.44	A
Input Voltage	119.99	277.03	120.12	277.05	V
Power Factor	0.995	0.937	0.996	0.940	
Off-State Power	0	0	0	0	W
Total Harmonic Distortion (Voltage)	0.06	0.05	0.09	0.10	%
Total Harmonic Distortion (Amperage)	5.28	8.25	5.39	8.45	%

**Note:** All photometric measurements taken at 120VAC.

Luminous Intensity Distribution	Goniophotometer	
Max Candela	5495.9	Cd
Angle of Max Candela (Horizontal)	5	°
Angle of Max Candela (Vertical)	5	°

Key Test Parameters	Sphere Output	Goniophotometer	
Stabilization Time	33	43	min
Total Operating Time (Stabilization + Test)	38	63	min
Ambient Temperature	24.0	24.6	°C

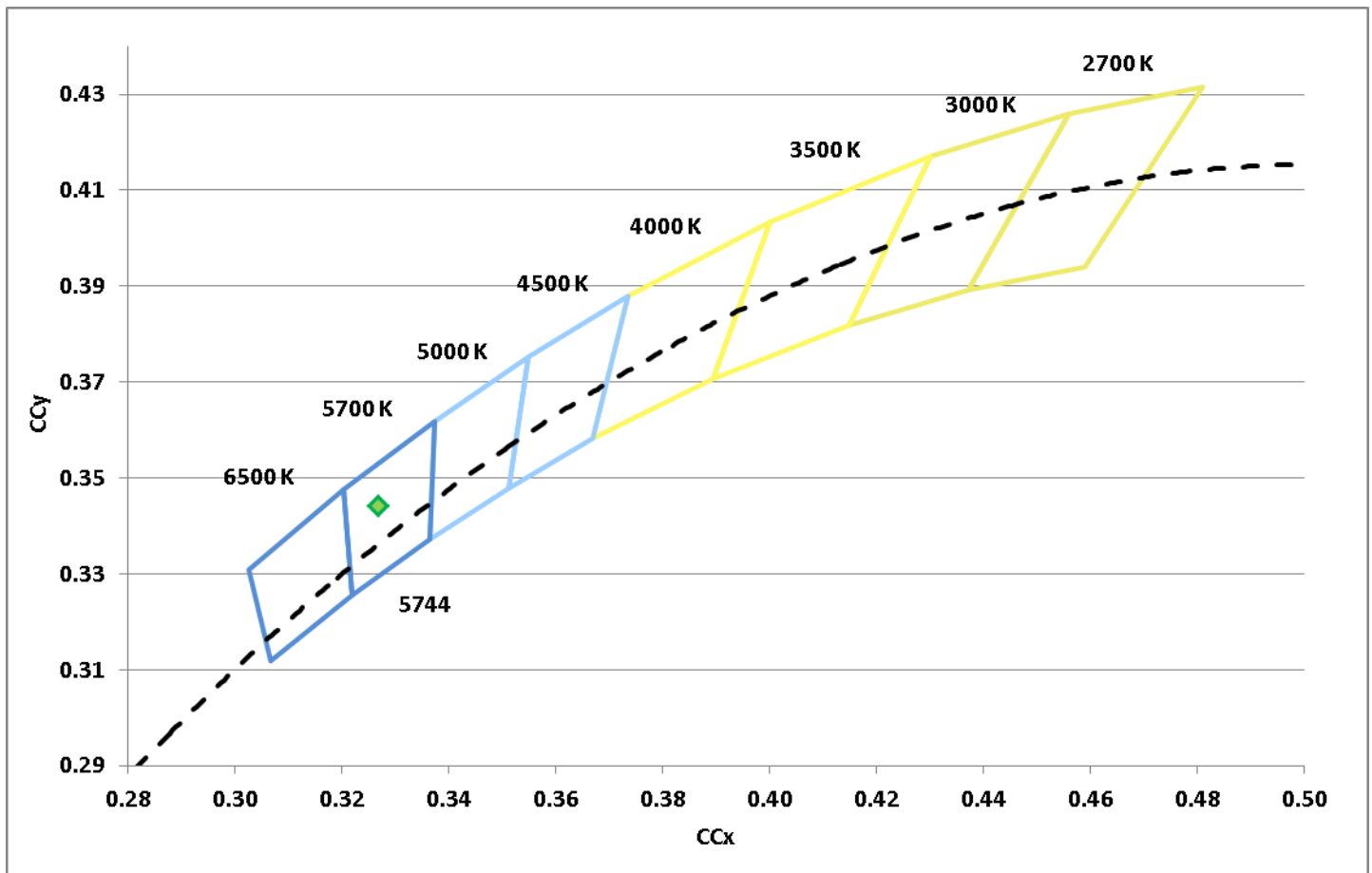
### Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.3269	0.3441	0.2020	0.3188	0.2020	0.4782	0.00403306

### Color Rendering Index Details

Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
70	69	73	75	72	71	64	77	61	-25	35	72	44	69	86

### Chromaticity Diagram



### Spectral Distribution

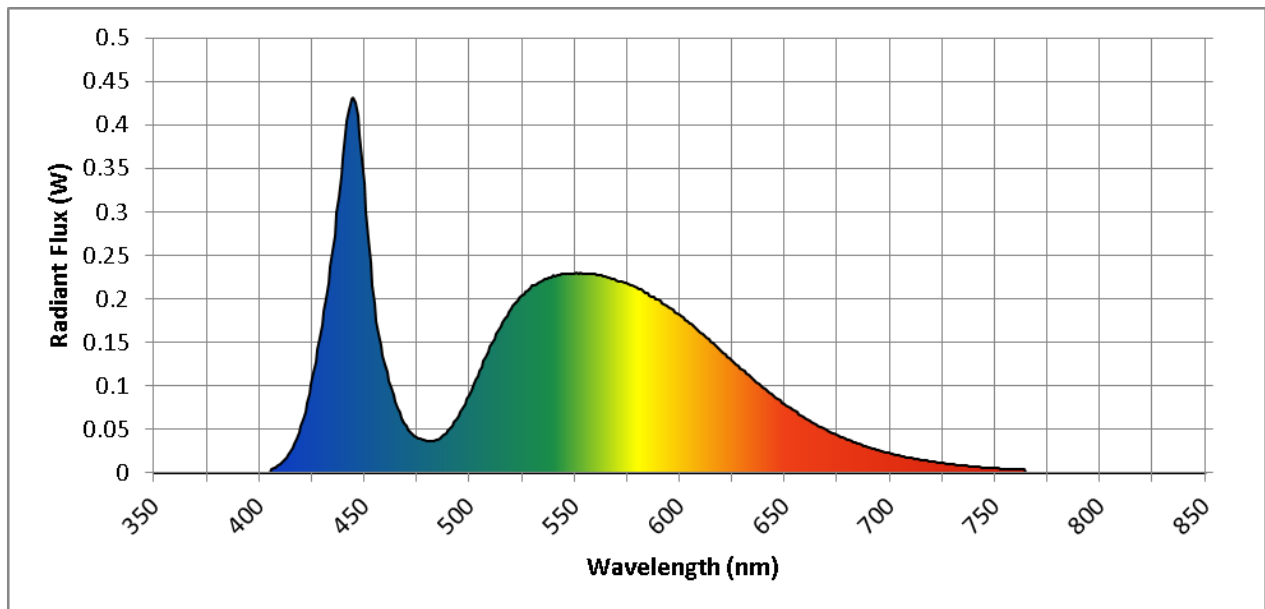
$\lambda$ (nm)	W/nm
360	0.000545
370	0.000538
380	0.000090
390	0.000135
400	0.001368
410	0.010096
420	0.053887
430	0.169952
440	0.362262
450	0.332778
460	0.125449
470	0.054176
480	0.037323
490	0.048645
500	0.090049
510	0.144848
520	0.189096

$\lambda$ (nm)	W/nm
530	0.215340
540	0.227152
550	0.228929
560	0.228499
570	0.222564
580	0.212835
590	0.199965
600	0.182343
610	0.162140
620	0.140419
630	0.119232
640	0.098313
650	0.079719
660	0.063653
670	0.049753
680	0.038678
690	0.029919

$\lambda$ (nm)	W/nm
700	0.023079
710	0.017535
720	0.013415
730	0.010196
740	0.007660
750	0.005738
760	0.004368
770	0.003182
780	0.002508
790	0.001739
800	0.001566
810	0.001190
820	0.000707
830	0.000554

<b>Dominant Wavelength</b>	515	nm
<b>Peak Wavelength</b>	445	nm

### Spectral Power Distribution (W/nm)



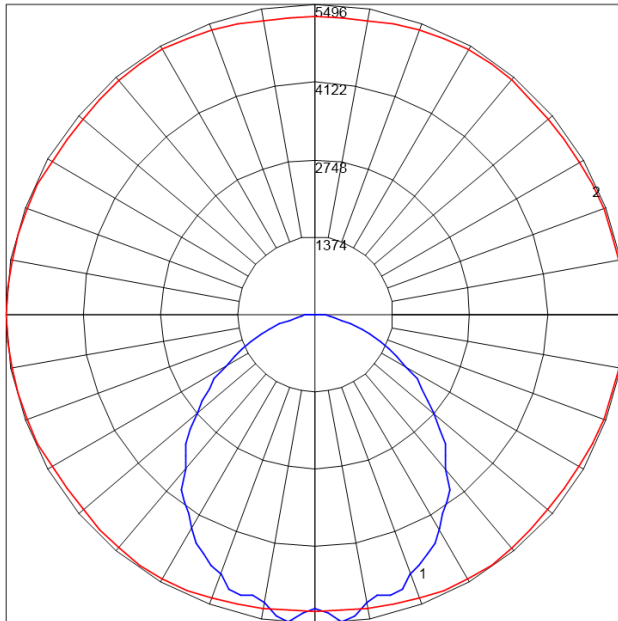


NVLAP Lab Code 500089-0

### Zonal Lumen Summary

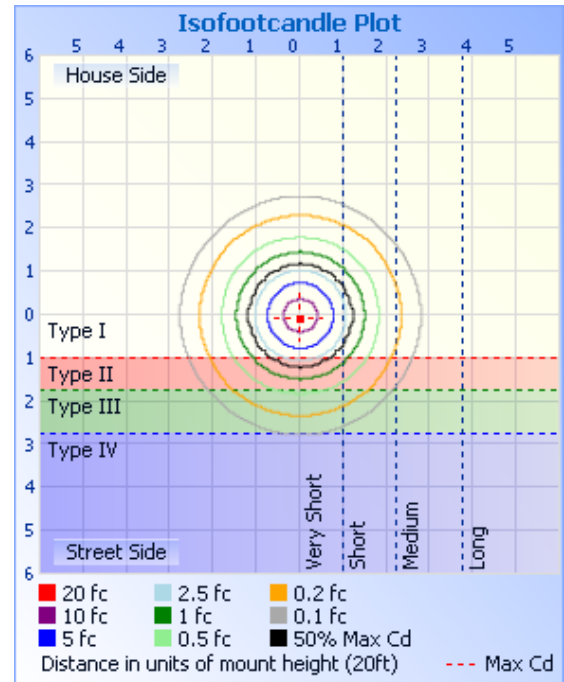
Zone	Lumens	% of Total	Zone	Lumens	% of Total
0-5	128.2	0.9%	90-95	35.4	0.3%
5-10	382.2	2.8%	95-100	15.9	0.1%
10-15	618.6	4.6%	100-105	8.3	0.1%
15-20	838.4	6.2%	105-110	3.6	0.0%
20-25	1,012.4	7.5%	110-115	0.9	0.0%
25-30	1,151.0	8.5%	115-120	0.1	0.0%
30-35	1,236.1	9.1%	120-125	0.0	0.0%
35-40	1,278.9	9.4%	125-130	0.0	0.0%
40-45	1,257.1	9.3%	130-135	0.0	0.0%
45-50	1,198.2	8.8%	135-140	0.0	0.0%
50-55	1,098.9	8.1%	140-145	0.0	0.0%
55-60	976.4	7.2%	145-150	0.0	0.0%
60-65	806.7	5.9%	150-155	0.0	0.0%
65-70	618.4	4.6%	155-160	0.0	0.0%
70-75	434.8	3.2%	160-165	0.0	0.0%
75-80	262.4	1.9%	165-170	0.0	0.0%
80-85	146.0	1.1%	170-175	0.0	0.0%
85-90	76.1	0.6%	175-180	0.0	0.0%
			<b>Total</b>	<b>13585.0 lm</b>	<b>100%</b>

### Candela Plot

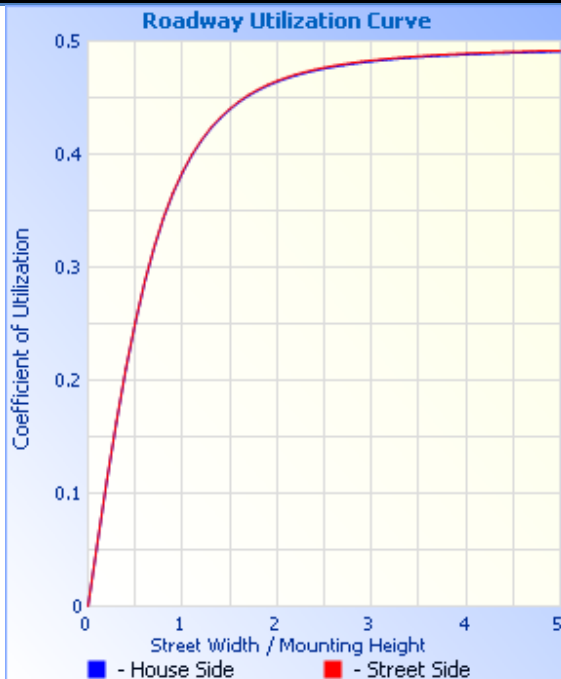


Maximum Candela = 5495.94 Located At Horizontal Angle = 5, Vertical Angle = 5  
 # 1 - Vertical Plane Through Horizontal Angles (5 - 185) (Through Max. Cd.)  
 # 2 - Horizontal Cone Through Vertical Angle (5) (Through Max. Cd.)

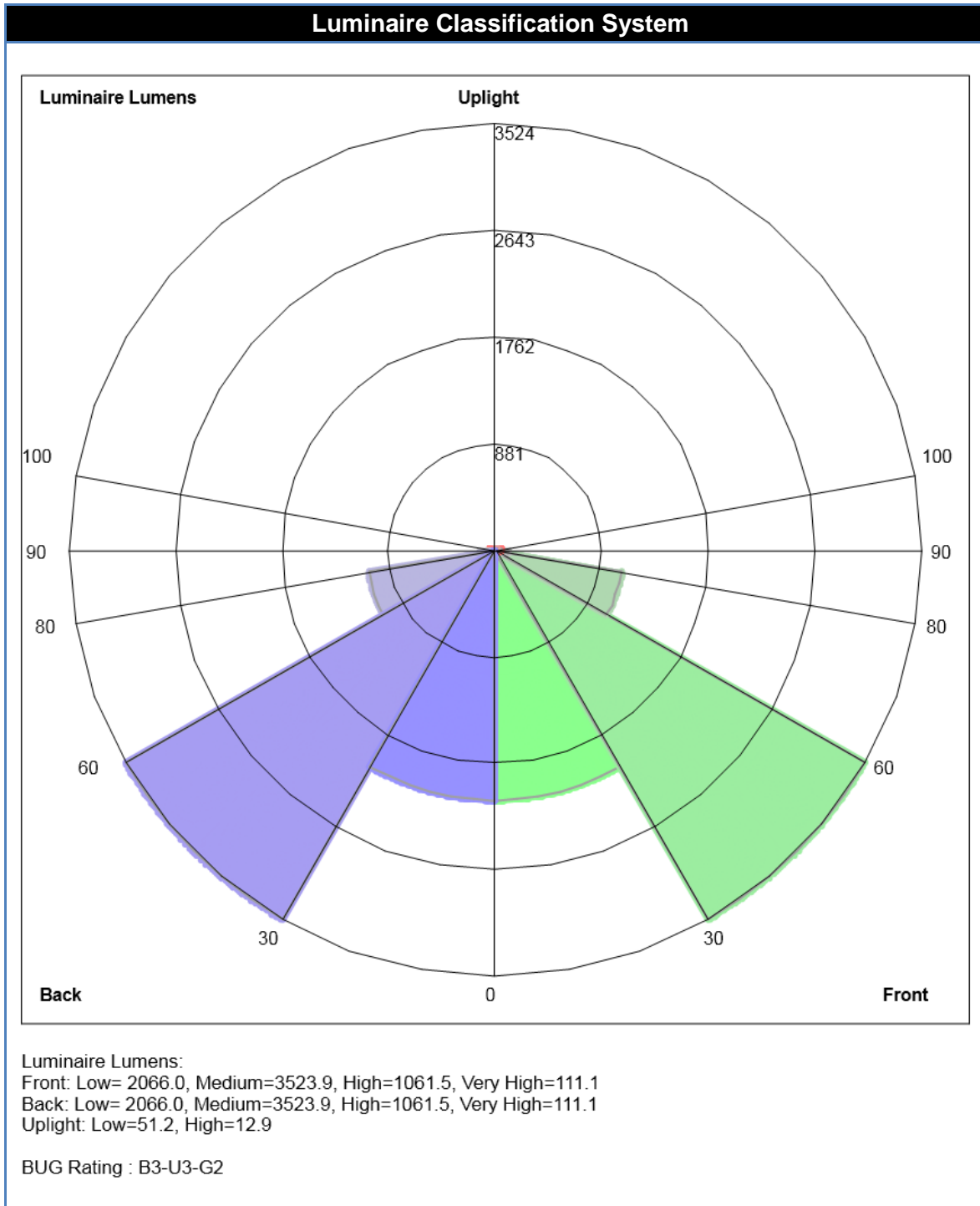
### Illuminance Plot



### Roadway Utilization



Roadway Summary	Lumens	% Lamp
Cutoff Classification	CUTOFF	
Distribution	Type VS	
Downward Street Side	6,761.1	49.8%
Downward House Side	6,761.1	49.8%
Downward Total	13,522.1	99.5%
Upward Street Side	32.1	0.2%
Upward House Side	32.1	0.2%
Upward Total	64.1	0.5%
<b>Total Lumens</b>	<b>13,586.2</b>	<b>100%</b>







NVLP Lab Code 500089-0

### Candela Tabulations

	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	5224	5224	5224	5224	5224	5224	5224	5224	5224	5224	5224	5224	5224	5224	5224	5224	5224	5224	5224
2.5	5313	5318	5316	5318	5326	5331	5337	5346	5346	5350	5355	5356	5353	5348	5344	5343	5346	5346	5344
5	5483	5496	5482	5462	5455	5444	5415	5396	5391	5411	5428	5446	5438	5415	5376	5339	5307	5287	5290
7.5	5400	5408	5378	5353	5347	5349	5367	5407	5433	5459	5456	5454	5429	5403	5361	5308	5266	5244	5234
10	5235	5209	5188	5184	5202	5215	5224	5274	5296	5262	5265	5310	5339	5379	5362	5277	5187	5155	5156
12.5	5088	5126	5160	5185	5188	5182	5166	5208	5234	5221	5228	5235	5282	5365	5350	5295	5235	5167	5126
15	5091	5172	5191	5251	5305	5207	5159	5106	5067	5115	5142	5140	5167	5195	5259	5294	5255	5122	5037
17.5	5109	5121	5114	5166	5151	5105	5150	5133	5062	4993	5033	5066	5068	5123	5111	5090	5120	5157	5170
20	4979	4912	4923	4896	4963	5062	5064	5068	5019	4985	4943	4925	4939	5001	4979	4971	4995	4993	4951
22.5	4802	4822	4814	4793	4795	4745	4853	4847	4955	4965	4867	4791	4798	4807	4828	4847	4867	4808	4744
25	4721	4704	4682	4748	4657	4594	4659	4645	4714	4822	4752	4672	4641	4658	4684	4658	4712	4683	4620
27.5	4661	4587	4670	4638	4606	4521	4499	4552	4534	4542	4559	4543	4514	4448	4554	4582	4601	4608	4518
30	4454	4393	4328	4415	4467	4459	4385	4389	4409	4334	4285	4406	4435	4352	4384	4412	4419	4437	4374
32.5	4242	4190	4166	4181	4181	4186	4243	4194	4188	4140	4119	4169	4220	4167	4202	4201	4202	4229	4236
35	4069	4082	4147	4062	4045	3989	3992	4016	4036	3986	3949	3973	4030	4012	3985	3983	4076	4117	4088
37.5	3883	3930	3926	3883	3859	3836	3817	3773	3748	3832	3795	3748	3829	3837	3869	3872	3959	3907	3905
40	3625	3600	3583	3634	3622	3611	3652	3593	3594	3590	3623	3570	3634	3672	3596	3608	3629	3602	3703
42.5	3365	3426	3362	3358	3298	3362	3332	3396	3442	3422	3474	3395	3372	3407	3366	3421	3440	3444	3420
45	3253	3260	3233	3188	3158	3130	3095	3117	3152	3249	3215	3098	3127	3213	3176	3193	3257	3261	3250
47.5	3004	3007	3005	2972	2975	2936	2925	2971	2990	2961	2951	2967	2996	2925	2968	2953	2986	2986	2996
50	2778	2737	2743	2742	2749	2703	2732	2766	2732	2683	2736	2796	2747	2700	2751	2723	2769	2794	2765
52.5	2537	2527	2546	2489	2513	2507	2535	2570	2483	2555	2503	2502	2540	2493	2526	2522	2532	2572	2584
55	2345	2300	2278	2282	2265	2339	2366	2288	2335	2315	2288	2288	2356	2321	2367	2328	2362	2343	2393
57.5	2164	2145	2142	2114	2084	2091	2057	2089	2110	2075	2135	2103	2119	2130	2127	2118	2153	2177	2162
60	1840	1848	1873	1872	1936	1934	1846	1923	1892	1898	1876	1944	1910	1945	1915	1888	1906	1888	1891
62.5	1628	1629	1626	1626	1673	1695	1729	1676	1635	1677	1666	1673	1692	1681	1647	1628	1633	1617	1621
65	1450	1437	1444	1418	1402	1421	1424	1448	1482	1448	1461	1432	1427	1425	1423	1420	1411	1411	1441
67.5	1248	1241	1218	1218	1204	1220	1203	1199	1229	1222	1218	1210	1189	1180	1213	1241	1244	1268	1263
70	1027	1030	1027	1022	1001	987	1005	1005	1000	975	998	999	1029	1010	1022	1034	1040	1057	1087
72.5	884	869	854	847	828	822	815	811	793	781	790	812	818	843	827	853	858	863	877
75	665	655	673	665	666	671	651	641	632	628	625	648	637	648	651	651	657	656	667
77.5	470	476	467	470	472	479	489	494	489	486	481	494	486	482	474	473	475	474	482
80	347	342	340	342	347	349	355	359	365	358	359	361	362	358	353	349	350	350	350
82.5	257	260	260	260	261	264	267	268	271	272	270	268	268	266	264	262	265	262	260
85	183	189	188	189	190	193	194	195	197	200	198	195	195	195	192	190	193	191	188
87.5	127	131	131	131	133	134	136	137	137	139	138	137	136	136	135	134	135	133	132
90	87	88	89	90	92	92	93	95	96	98	98	97	97	97	96	95	95	93	94



NVLP Lab Code 500089-0

### Candela Tabulations (Continued)

	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
92.5	50	50	50	50	51	53	54	57	60	63	65	67	69	71	73	73	74	74	75
95	24	25	24	22	23	25	28	31	34	38	42	46	50	53	57	59	61	63	64
97.5	6	6	6	5	4	6	10	15	20	25	31	36	41	46	50	53	56	59	59
100	0	0	0	0	0	0	2	7	12	18	23	28	32	37	42	46	49	52	52
102.5	0	0	0	0	0	0	0	1	5	10	16	20	25	29	33	36	39	41	42
105	0	0	0	0	0	0	0	0	1	4	8	13	17	21	25	27	30	32	32
107.5	0	0	0	0	0	0	0	0	0	0	2	5	9	13	17	19	21	22	23
110	0	0	0	0	0	0	0	0	0	0	0	0	2	5	9	11	13	14	15
112.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	7	8	9
115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	5
117.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
122.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
132.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
137.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
142.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
147.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
152.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
157.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
167.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



NVLAP Lab Code 500089-0

### Integrating Sphere Equipment List

Description	Manufacturer	Model	Serial Number
2M Sphere	Everfine	2M	1004156T
CCD Array Spectrometer	Labsphere	MC-9801	98010360
Programmable AC Source	Adaptive	FC200	2280220
Power Analyzer	Yokogawa	WT310	C2QC04045V

### Goniophotometer Equipment List

Description	Manufacturer	Model	Serial Number
AC Power Source	Chroma	61602	616020002300
Type C Goniophotometer	LSI / UL	6440T	6440PN2028
Spectroradiometer	Gooch & Housego	770VIS/NIR	12415212
Power Meter	Yokogawa	WT210	91M945458

### 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
2m Sphere	Tungsten Halogen Omni-Directional 75W Calibration Lamp, Serial Number F119
Type C Goniophotometer and Spectrometer	Tungsten Halogen Omni-Directional 500W Calibration Lamp, Serial Numbers 13C069, 13C070, 13C071. For color calibration of spectrometer, 13C074.

**Disclaimers:**

This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the federal government.

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

This report shall not be reproduced, except in full, without written approval of the CESTL.

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 "Sphere" or "Integrating Sphere", were performed by the subcontracted laboratory identified in the footer on the first page of this report. Subcontracted testing is strictly integrating sphere based. All other tests are performed using a Type C goniophotometer.

The integrating sphere information in the equipment list, report items marked with \*\*, or results specifically identified as "Sphere" or "Integrating Sphere", are the actual equipment used, and test results produced, by the subcontracted laboratory when subcontracting is indicated on the cover page.

**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.

Goniophotometer



Integrating Sphere





NVLAP Lab Code 500089-0

### 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
03/05/15	A	DMS	Origination	C. Duviols	R. Higley
06/26/15	B	DMS	Changed internal part number from: BXCCAxA13-Uxxxxx to: BXCCAxD13-Uxxxxx	L. Li	C. McLaurin