NVLAP Lab Code 500089-0

Report Number:	PL09285-001
Model:	ARE-EDG-5M-xx-06-E-UL-xx-700-xxxx-40K
Date:	09/13/2016

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

Prepared For:

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Prepared By:

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Approved By:

Christopher McLaurin, Photometric Specialist

This report contains data that are not covered by the NVLAP accreditation.

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Product Information	
Manufacturer	Cree, Inc.
Model Number (SKU)	ARE-EDG-5M-xx-06-E-UL-xx-700-xxxx-40K
Serial Number	PL09285-001
LED Type	XP-G2

Product Description

Brown metal housing with two end caps and one mounting arm. Mesh metal plate on top. Three heatsinks each with one LED board and brown metal trim plate. One clear plastic optical lens below each LED.

Driver Information (Where Applicable)

Philips LED-INTA-0700C-210DO

Length	Width	Height
27.0”	14.0”	4.0”

Sample

The following sample was submitted for evaluation

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Key Photometric Data	Sphere Output	Goniophotometer	
Luminous Flux	13387.1	13136.0	lm
Efficacy	98.61	96.95	lm/W
Correlated Color Temperature (CCT)	3915	K	
Color Rendering Index (CRI)	74		
R_9	-12		
Duv	-0.00021424		
S/P Ratio*	1.50		

	Sphere		Goniophotometer		
Electrical Measurements	**120V**	**277V**	**120V**	**277V**	
Input Wattage	135.76	133.82	135.49	133.59	W
Input Current	1.13	0.51	1.13	0.50	A
Input Voltage	120.03	277.13	120.10	276.96	V
Power Factor	0.998	0.956	0.998	0.958	
Off-State Power	0	0	0	0	W
Total Harmonic Distortion (Voltage)	0.07	0.06	0.09	0.08	%
Total Harmonic Distortion (Amperage)	5.27	11.66	5.32	11.70	%

Note: All photometric measurements taken at 120VAC.

Luminous Intensity Distribution	Goniophotometer	
Max Candela	4,382.3	Cd
Angle of Max Candela (Horizontal)	0	°
Angle of Max Candela (Vertical)	65	°

Key Test Parameters	Sphere Output	Goniophotometer	
Stabilization Time	82	61	min
Total Operating Time (Stabilization + Test)	90	81	min
Ambient Temperature	24.5	24.8	˚C

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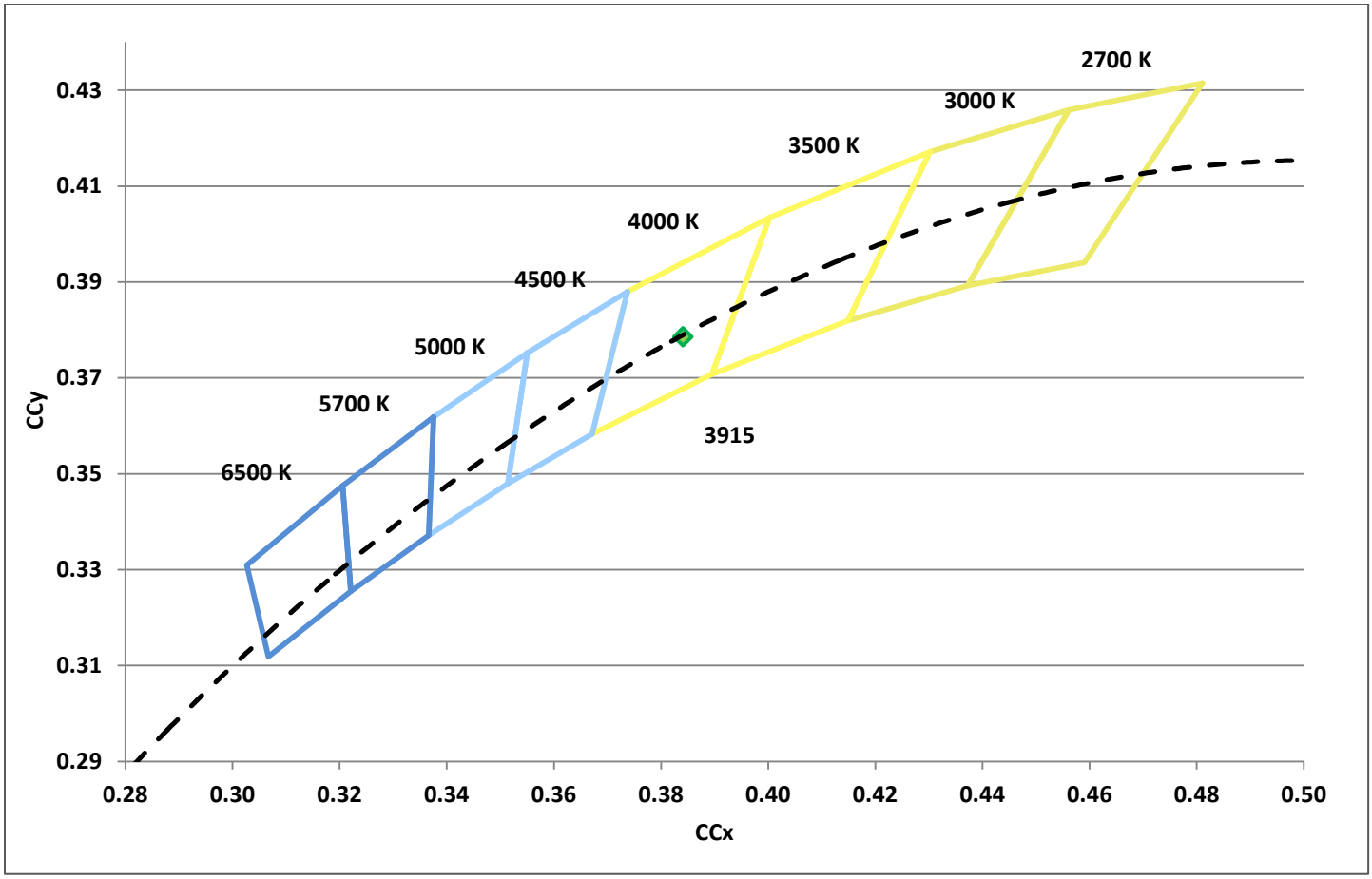
Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.3841	0.3785	0.2268	0.3353	0.2268	0.5029	-0.00021424

Color Rendering Index Details

Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
74	73	79	84	75	72	71	82	59	-12	50	72	48	73	90

Chromaticity Diagram



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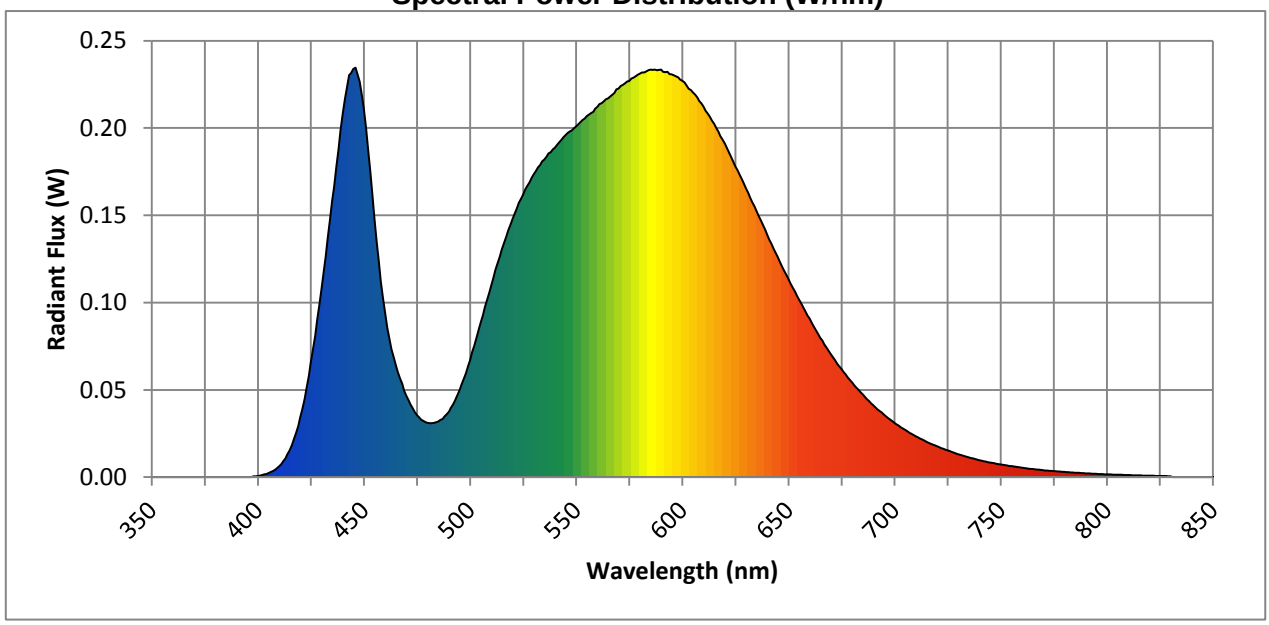
Spectral Distribution

λ(nm)	W/nm	λ(nm)	W/nm	λ(nm)	W/nm
360	0.000049	530	0.173536	700	0.031097
370	0.000019	540	0.188703	710	0.023372
380	0.000022	550	0.200873	720	0.017611
390	0.000003	560	0.212067	730	0.013140
400	0.000626	570	0.222643	740	0.009681
410	0.006156	580	0.230998	750	0.007216
420	0.034210	590	0.233505	760	0.005364
430	0.108210	600	0.226922	770	0.004007
440	0.208114	610	0.212367	780	0.002914
450	0.210801	620	0.191110	790	0.002155
460	0.093375	630	0.165325	800	0.001579
470	0.046491	640	0.139083	810	0.001090
480	0.031085	650	0.113438	820	0.000751
490	0.037528	660	0.090726	830	0.000493
500	0.067023	670	0.070418		
510	0.109642	680	0.054169		
520	0.148046	690	0.041080		

Dominant Wavelength	579	nm
Peak Wavelength	445	nm

Spectral Power Distribution (W/nm)



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Zonal Lumen Summary

Zone	Lumens	% of Total	Zone	Lumens	% of Total
0-5	20.3	0.2%	90-95	0.0	0.0%
5-10	60.5	0.5%	95-100	0.0	0.0%
10-15	105.2	0.8%	100-105	0.0	0.0%
15-20	166.3	1.3%	105-110	0.0	0.0%
20-25	252.3	1.9%	110-115	0.0	0.0%
25-30	354.6	2.7%	115-120	0.0	0.0%
30-35	455.1	3.5%	120-125	0.0	0.0%
35-40	542.9	4.1%	125-130	0.0	0.0%
40-45	661.7	5.0%	130-135	0.0	0.0%
45-50	905.0	6.9%	135-140	0.0	0.0%
50-55	1252.9	9.5%	140-145	0.0	0.0%
55-60	1506.3	11.5%	145-150	0.0	0.0%
60-65	1778.2	13.5%	150-155	0.0	0.0%
65-70	1988.3	15.1%	155-160	0.0	0.0%
70-75	1677.5	12.8%	160-165	0.0	0.0%
75-80	1013.6	7.7%	165-170	0.0	0.0%
80-85	356.4	2.7%	170-175	0.0	0.0%
85-90	38.9	0.3%	175-180	0.0	0.0%
			Total	**13136.0 lm**	**100%**

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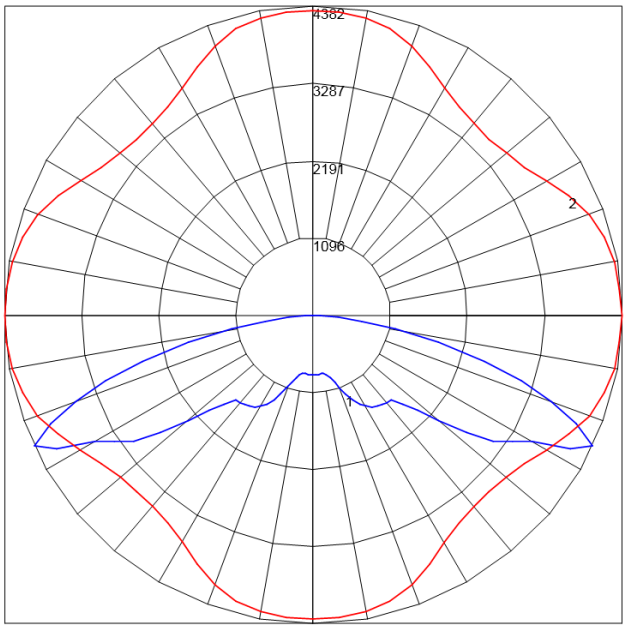
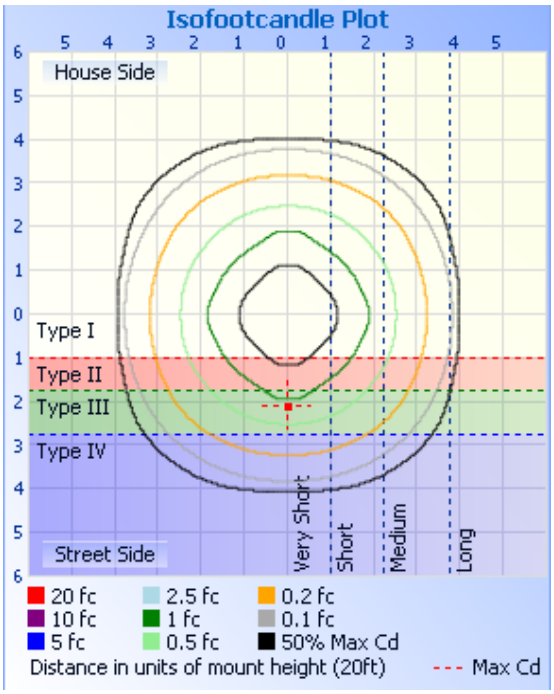
Candela Plot

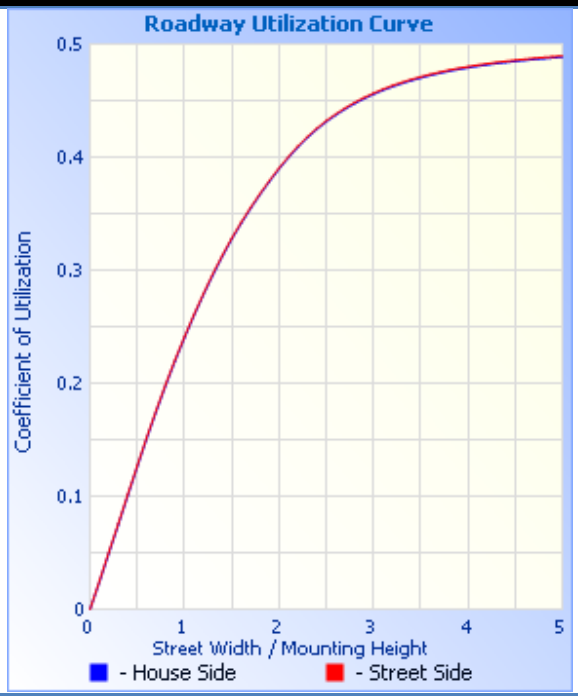


Maximum Candela = 4382.32 Located At Horizontal Angle = 0, Vertical Angle = 65
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (65) (Through Max. Cd.)

Illuminance Plot

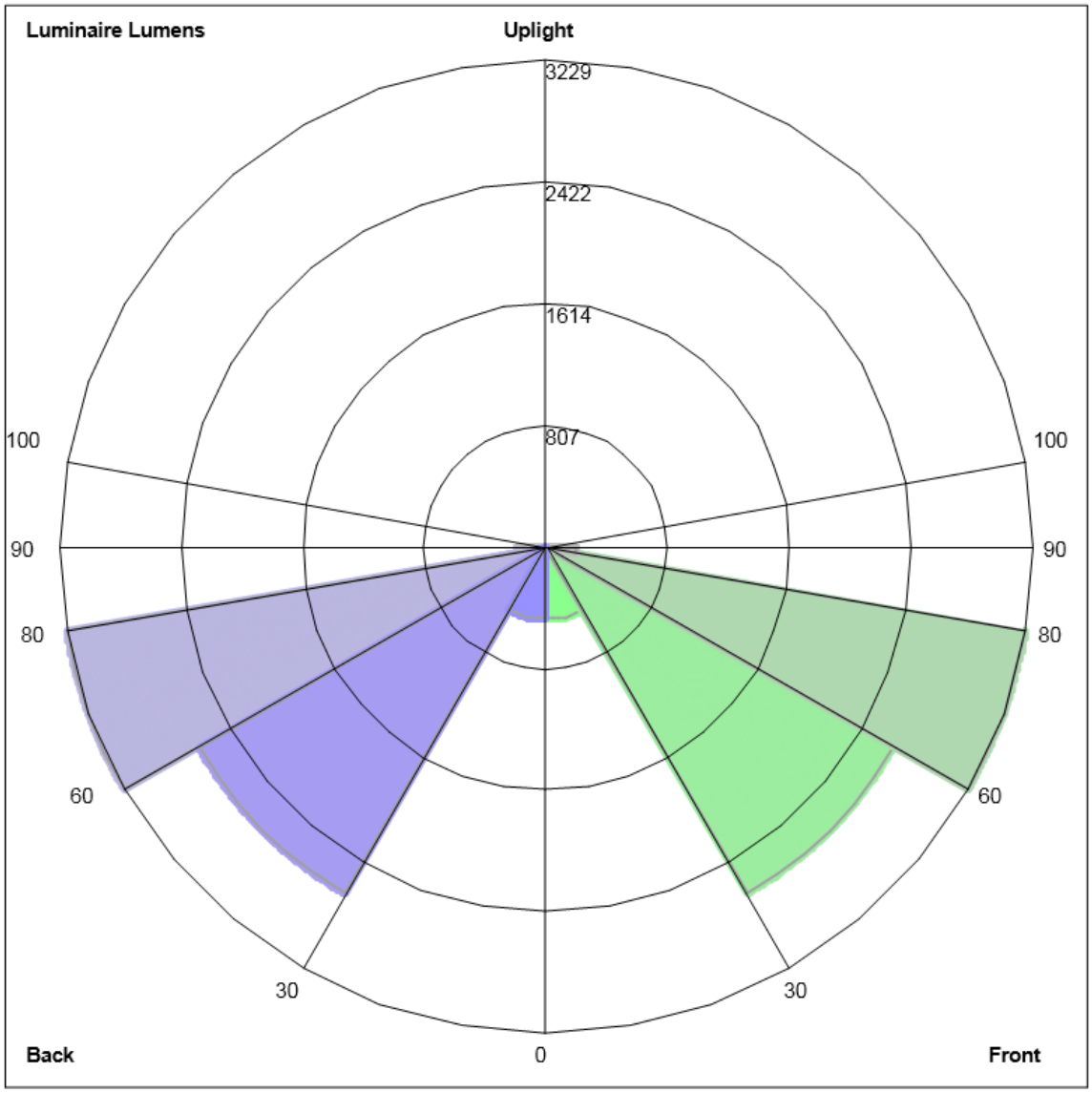


Roadway Utilization



Roadway Summary	Lumens	% Lamp
Distribution	Type VS	
Downward Street Side	6,567.0	50.0%
Downward House Side	6,567.0	50.0%
Downward Total	13,134.0	100.0%
Upward Street Side	0.0	0.0%
Upward House Side	0.0	0.0%
Upward Total	0.0	0.0%
Total Lumens	**13,134.0**	**100.0%**

Luminaire Classification System



Luminaire Lumens:
Front: Low=479.2, Medium=2660.9, High=3228.9, Very High=197.8
Back: Low=479.2, Medium=2660.9, High=3228.9, Very High=197.8
Uplight: Low=0.0, High=0.0

BUG Rating : B4-U0-G2

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Candela Tabulations

	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	852	852	852	852	852	852	852	852	852	852	852	852	852	852	852	852	852	852	852
2.5	849	850	850	849	849	849	850	848	852	849	849	849	850	849	849	852	851	848	847
5	844	845	845	844	844	844	846	844	848	844	844	845	846	845	845	848	847	844	843
7.5	841	842	842	842	842	842	844	842	846	843	843	843	845	844	844	847	846	843	842
10	848	848	848	848	848	848	850	849	853	850	850	851	852	851	852	855	854	851	850
12.5	874	874	875	875	875	876	878	877	882	879	879	881	882	880	881	884	884	880	880
15	922	920	922	922	922	922	927	925	930	928	929	929	930	929	930	932	931	927	926
17.5	1000	996	997	997	996	997	1000	999	1004	1001	1002	1003	1003	1001	1001	1003	1002	998	997
20	1102	1099	1097	1095	1092	1091	1091	1089	1095	1090	1090	1092	1092	1090	1092	1095	1094	1092	1091
22.5	1215	1213	1212	1206	1203	1198	1194	1189	1193	1187	1186	1189	1192	1192	1197	1203	1205	1203	1202
25	1327	1325	1324	1318	1313	1304	1299	1291	1292	1285	1284	1288	1293	1296	1304	1315	1319	1317	1317
27.5	1423	1421	1419	1414	1409	1401	1396	1386	1387	1379	1379	1383	1390	1394	1404	1415	1420	1418	1418
30	1497	1495	1494	1492	1489	1484	1480	1472	1474	1466	1465	1471	1476	1480	1489	1497	1499	1497	1497
32.5	1549	1548	1548	1548	1549	1548	1548	1543	1549	1541	1540	1544	1547	1547	1551	1556	1556	1553	1551
35	1585	1583	1586	1587	1591	1594	1599	1598	1608	1601	1600	1600	1600	1594	1594	1597	1595	1589	1586
37.5	1601	1600	1604	1611	1620	1627	1636	1639	1651	1645	1644	1641	1637	1628	1623	1621	1615	1608	1605
40	1617	1616	1621	1628	1639	1653	1676	1695	1722	1725	1716	1698	1675	1654	1642	1638	1632	1624	1622
42.5	1638	1636	1650	1676	1718	1773	1830	1877	1921	1925	1909	1876	1825	1770	1722	1689	1662	1644	1640
45	1802	1812	1836	1867	1908	1957	2016	2072	2127	2136	2117	2076	2017	1955	1906	1868	1834	1805	1800
47.5	2013	2011	2038	2078	2143	2220	2311	2392	2464	2477	2452	2394	2317	2225	2152	2101	2060	2032	2026
50	2319	2325	2363	2413	2485	2571	2662	2735	2803	2814	2794	2741	2670	2582	2504	2448	2400	2363	2349
52.5	2738	2739	2772	2808	2858	2914	2966	3004	3051	3054	3046	3018	2978	2930	2884	2852	2813	2784	2777
55	3116	3107	3117	3121	3131	3137	3143	3144	3166	3162	3168	3172	3175	3170	3167	3173	3162	3151	3152
57.5	3352	3331	3318	3284	3253	3216	3189	3173	3189	3189	3199	3213	3234	3256	3287	3328	3351	3359	3365
60	3575	3532	3494	3418	3357	3299	3255	3226	3236	3235	3244	3260	3289	3317	3356	3407	3441	3457	3465
62.5	4114	4086	4016	3876	3724	3571	3451	3371	3352	3338	3346	3370	3417	3476	3572	3712	3841	3918	3938
65	4382	4368	4345	4278	4173	4008	3830	3670	3585	3543	3551	3611	3735	3899	4072	4213	4289	4317	4328
67.5	4046	4033	4051	4063	4078	4069	4026	3945	3888	3836	3858	3927	4001	4034	4042	4043	4037	4017	4011
70	3599	3591	3614	3641	3684	3733	3792	3843	3896	3904	3894	3851	3789	3714	3653	3617	3589	3560	3557
72.5	3104	3105	3132	3164	3208	3251	3304	3370	3446	3459	3440	3377	3302	3228	3178	3145	3116	3083	3087
75	2510	2516	2552	2579	2622	2658	2692	2726	2770	2769	2760	2726	2686	2641	2608	2584	2562	2517	2510
77.5	1821	1822	1848	1886	1934	1974	2010	2019	2036	2043	2035	2019	1953	1854	1757	1679	1641	1609	1589
80	1181	1182	1181	1222	1265	1300	1316	1323	1331	1342	1220	1138	1121	1109	1090	1071	1059	1045	1036
82.5	695	692	688	703	724	743	748	692	617	631	619	582	531	493	483	482	479	476	477
85	352	343	338	336	343	299	286	208	182	182	207	185	169	147	135	125	112	105	110
87.5	103	90	92	84	70	54	37	18	14	11	14	14	12	8	7	6	6	6	6
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
97.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
107.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
117.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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

Integrating Sphere Equipment List

Description	Manufacturer	Model	Serial Number
2M Sphere	Everfine	2M	1004156T
CCD Array Spectrometer	Otsuka	MC-9801	98010360
Programmable AC Source	Adaptive	FC200	2280220
Power Analyzer	Chroma	66202	66202 0005018

Goniophotometer Equipment List

Description	Manufacturer	Model	Serial Number
AC Power Source	Elgar	CW1251P	1248A02602
Type C Goniophotometer	LSI / UL	6440T	6440PN2028
Spectroradiometer	Gooch & Housego	770VIS/NIR	12415189
Power Meter	Yokogawa	WT210	91M945458

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-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:

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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 ± 1˚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.

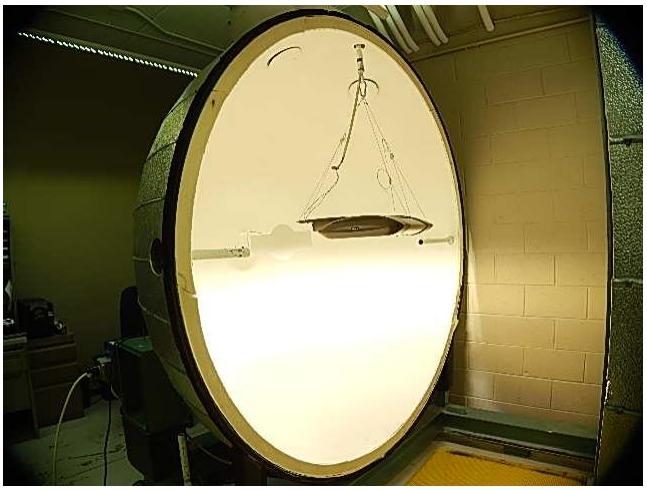
The integrating sphere information in the equipment list, report items marked with **, or results specifically identified as "Sphere" or "Integrating Sphere", are the actual equipment used, and test results produced, by the subcontracted laboratory when subcontracting is indicated on the cover page.

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



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
09/13/16	A	DMS	Origination	L. Li	C. McLaurin