

Report Number: PL17110-001A
Model: C-TR-D-FP14-S50L-SCCT-UC-xx-xx (HIGH 4000K)
Date: 11/29/2022

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

Prepared For:

Eduardo Torices

Cree Lighting

9201 Washington Avenue

Racine, WI 53406

Prepared By:



Meranda Hubbard, Photometric Test Technician

Approved By:



Jonathan Vollers, Technical Manager

Product Information

Manufacturer	Cree Lighting
Model Number (SKU)	C-TR-D-FP14-S50L-SCCT-UC-xx-xx (HIGH 4000K)
Serial Number	17110
LED Type	SAMSUNG SPMWHR22

Product Description

1'x4' Flat Panel luminaire with power select and CCT select switches integrated set to HIGH power at 4000K CCT

Driver Information (Where Applicable)

Shenzhen Wise Power Technology WSP-Z45FH-0421000-CW

Length	Width	Height
47.75"	11.75"	1.8"

Sample

The following sample was submitted for evaluation



Key Photometric Data	Sphere Output	Goniophotometer	
Luminous Flux	5672.8	5545	lm
Efficacy	148.36	146.77	lm/W
Correlated Color Temperature (CCT)	4067	K	
Color Rendering Index (CRI)	85		
R ₉	17		
Duv	-0.0009		
S/P Ratio*	1.74		
CIE Type	Direct		

Electrical Measurements	Sphere		Goniophotometer		
	120V	347V	120V	347V	
Input Wattage	38.24	-	37.78	37.73	W
Input Current	0.320	-	0.316	0.116	A
Input Voltage	120.13	-	120.22	347.64	V
Power Factor	0.996	-	0.996	0.933	
Off-State Power	0	-	0	0	W
Total Harmonic Distortion (Voltage)	0.18	-	0.13	0.37	%
Total Harmonic Distortion (Amperage)	7.31	-	7.45	19.79	%

Note: All photometric measurements taken at 120VAC.

Key Test Parameters	Sphere Output	Goniophotometer	
Stabilization Time	48	35	min
Total Operating Time (Stabilization + Test)	58	55	min
Ambient Temperature	24.77	25.1	°C

Spacing Criteria

Spacing Criterion (0 - 180)	1.28
Spacing Criterion (90 - 270)	1.28
Spacing Criterion (Diagonal)	1.40

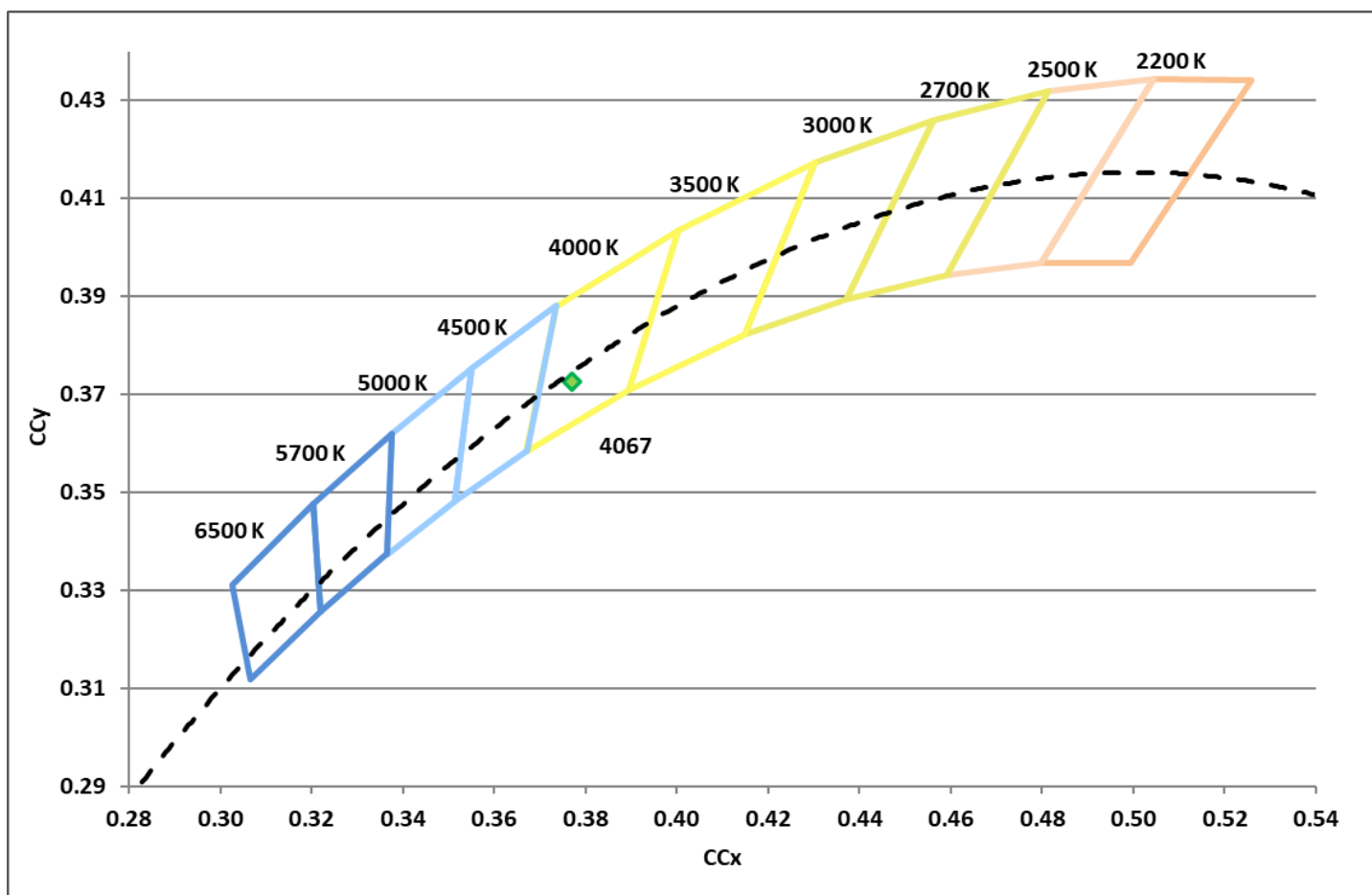
Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.3769	0.3726	0.2245	0.3328	0.2245	0.4992	-0.0009

Color Rendering Index Details

Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
85	84	91	96	84	84	87	87	67	17	79	83	62	86	98

Chromaticity Diagram



Spectral Distribution

λ (nm)	W/nm
360	0.000222
370	0.000144
380	0.000144
390	0.000149
400	0.000043
410	0.000344
420	0.002084
430	0.010066
440	0.038109
450	0.127747
460	0.077424
470	0.047182
480	0.030472
490	0.035974
500	0.049328
510	0.061251
520	0.068812

λ (nm)	W/nm
530	0.072970
540	0.076091
550	0.080214
560	0.084980
570	0.090758
580	0.096105
590	0.100321
600	0.100866
610	0.097048
620	0.089130
630	0.077950
640	0.065252
650	0.052664
660	0.041237
670	0.031267
680	0.023211
690	0.017071

λ (nm)	W/nm
700	0.012430
710	0.008945
720	0.006422
730	0.004569
740	0.003241
750	0.002281
760	0.001622
770	0.001171
780	0.000798
790	0.000598
800	0.000400
810	0.000288
820	0.000171
830	0.000112

Dominant Wavelength

579

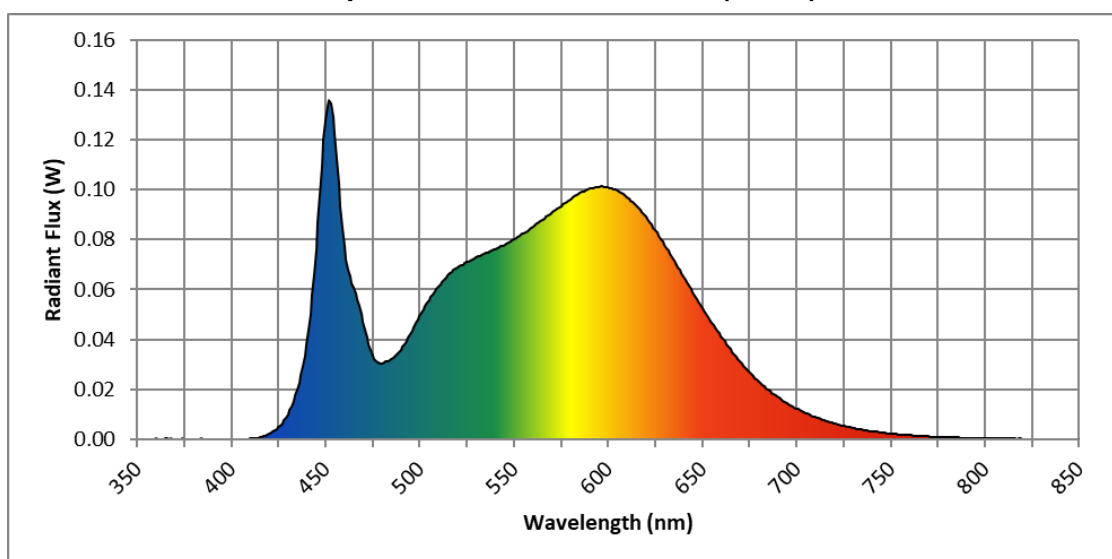
nm

Peak Wavelength

452

nm

Spectral Power Distribution (W/nm)



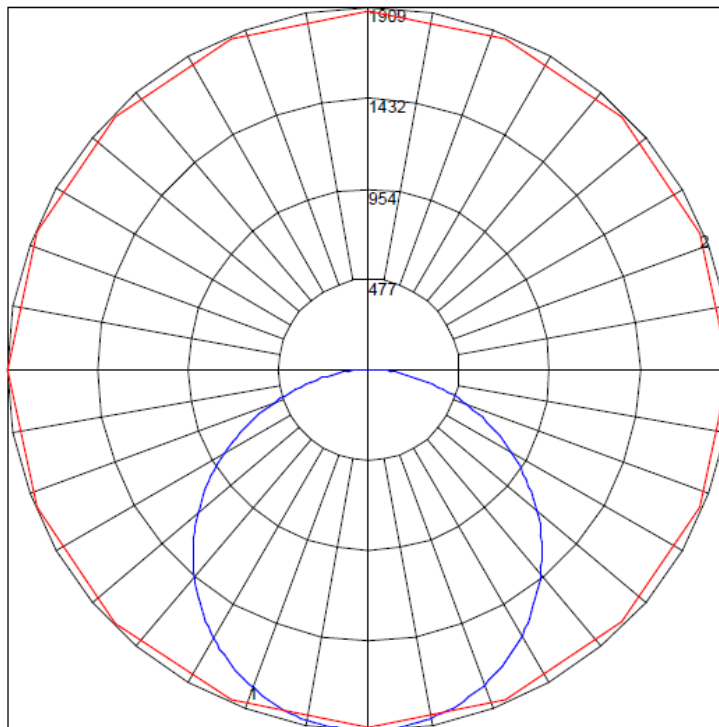
Zonal Lumen Summary

Zone	Lumens	% of Total	Zone	Lumens
0-20	694.0	12.5	0-10	179.3
0-30	1476.7	26.6	10-20	514.6
0-40	2424.8	43.7	20-30	782.7
0-60	4314.2	77.8	30-40	948.1
0-80	5422.0	97.8	40-50	989.2
0-90	5544.9	100.0	50-60	900.3
10-90	5365.6	96.8	60-70	694.0
20-40	1730.8	31.2	70-80	413.9
20-50	2720.0	49.1	80-90	122.8
40-70	2583.4	46.6	90-100	0
60-80	1107.9	20.0	100-110	0
70-80	413.9	7.5	110-120	0
80-90	122.8	2.2	120-130	0
90-110	0	0	130-140	0
90-120	0	0	140-150	0
90-130	0	0	150-160	0
90-150	0	0	160-170	0
90-180	0	0	170-180	0
110-180	0	0		
Total	5544.9	100		

Luminance Data (Cd./Sq.M)

Average in Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	6513	6382	6463
55	6328	6173	6249
65	6033	5812	5880
75	5584	5261	5291
85	4910	4247	4301

Candela Plots



Maximum Candela = 1908.93 Located At Horizontal Angle = 180, Vertical Angle = 2
1 - Vertical Plane Through Horizontal Angles (180 - 0) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (2) (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	108	104	99	95	106	101	97	94	97	94	91	93	90	88	89	87	85	83
2	98	90	83	77	96	88	82	76	84	79	74	81	77	73	78	74	71	69
3	90	79	71	64	87	77	70	63	74	68	62	71	66	61	69	64	60	58
4	82	70	61	54	80	68	60	54	66	59	53	64	57	52	61	56	51	49
5	75	62	53	46	73	61	53	46	59	51	46	57	50	45	55	49	45	42
6	69	56	47	40	68	55	46	40	53	46	40	51	45	39	50	44	39	37
7	64	51	42	36	63	50	41	35	48	41	35	47	40	35	45	39	35	33
8	60	46	38	32	58	46	37	32	44	37	31	43	36	31	42	36	31	29
9	56	42	34	29	55	42	34	28	41	33	28	40	33	28	39	32	28	26
10	52	39	31	26	51	39	31	26	38	31	26	37	30	26	36	30	25	24

Candela Tabulations

	0	22.5	45	67.5	90	112.5	135	157.5	180
0	1894.7	1894.7	1894.7	1894.7	1894.7	1894.7	1894.7	1894.7	1894.7
1	1906.8	1894.3	1888.0	1891.4	1894.8	1892.0	1889.4	1895.7	1908.0
2	1905.9	1892.8	1886.0	1890.1	1893.9	1891.2	1889.8	1896.3	1908.9
3	1903.7	1889.9	1883.4	1887.7	1892.3	1889.3	1888.0	1895.3	1907.6
4	1900.7	1887.3	1880.9	1885.4	1889.1	1887.3	1885.9	1893.7	1905.0
5	1897.4	1884.9	1878.4	1882.3	1886.6	1884.8	1883.1	1890.2	1900.4
6	1895.3	1880.6	1874.5	1878.8	1883.4	1882.5	1880.6	1887.8	1899.6
7	1890.0	1874.5	1869.8	1874.2	1879.9	1879.0	1878.4	1885.0	1896.2
8	1884.0	1868.9	1863.9	1869.4	1874.8	1875.0	1873.9	1880.9	1892.7
9	1877.0	1863.6	1857.7	1862.8	1868.5	1869.2	1868.4	1876.9	1886.7
10	1871.2	1857.1	1852.3	1856.3	1862.7	1862.6	1862.5	1870.3	1880.8
11	1865.0	1850.1	1845.0	1850.1	1857.6	1857.4	1857.2	1865.0	1875.9
12	1857.7	1842.0	1837.2	1843.0	1850.2	1850.3	1850.7	1857.7	1868.3
13	1848.1	1833.1	1828.3	1835.2	1841.8	1842.8	1843.1	1850.6	1860.6
14	1840.0	1823.7	1819.6	1825.3	1833.3	1834.4	1834.8	1843.3	1851.5
15	1829.9	1814.6	1809.9	1816.1	1824.9	1826.1	1826.5	1835.4	1843.9
16	1819.2	1802.8	1798.3	1805.0	1814.0	1816.4	1817.2	1826.9	1835.3
17	1808.5	1792.0	1787.6	1792.8	1802.9	1805.0	1806.7	1816.6	1824.5
18	1797.9	1781.0	1775.9	1782.4	1790.4	1794.9	1795.4	1806.3	1812.7
19	1787.0	1769.7	1763.6	1770.6	1779.0	1782.7	1784.2	1795.3	1800.7
20	1774.6	1756.2	1751.1	1758.5	1768.1	1770.3	1774.1	1784.6	1790.2
21	1760.9	1742.3	1737.1	1745.6	1754.4	1758.2	1761.5	1773.5	1777.9
22	1747.3	1727.6	1723.8	1730.7	1741.2	1744.3	1749.5	1760.5	1764.7
23	1732.7	1714.1	1709.9	1716.2	1726.5	1730.6	1736.2	1746.9	1752.1
24	1718.9	1699.1	1695.1	1702.2	1712.4	1716.0	1721.3	1732.9	1737.9
25	1704.6	1683.3	1680.2	1686.8	1697.4	1701.1	1707.0	1718.7	1723.0
26	1688.0	1667.2	1664.4	1670.9	1681.5	1684.3	1690.7	1703.3	1707.6
27	1670.6	1651.0	1648.2	1655.1	1665.1	1669.1	1674.8	1687.0	1691.5
28	1654.2	1632.8	1630.1	1637.7	1647.7	1652.7	1658.3	1671.6	1675.9
29	1635.1	1615.5	1612.6	1620.0	1629.6	1636.0	1640.7	1654.8	1658.4
30	1617.3	1598.0	1593.5	1600.9	1611.3	1618.6	1622.6	1636.9	1642.2
31	1598.8	1579.4	1573.9	1581.6	1591.5	1598.1	1603.5	1618.0	1622.2
32	1579.8	1561.4	1555.3	1561.5	1572.8	1578.9	1584.3	1598.2	1602.7
33	1560.5	1542.0	1535.7	1542.2	1553.3	1559.8	1565.6	1579.5	1584.2
34	1539.5	1520.9	1514.8	1522.5	1533.6	1540.3	1546.0	1560.7	1564.5
35	1518.7	1500.9	1494.1	1500.7	1512.3	1518.8	1526.5	1540.4	1543.5
36	1498.4	1479.4	1473.3	1479.6	1490.5	1497.3	1505.2	1519.8	1522.9

Candela Tabulations (Continued)

	0	22.5	45	67.5	90	112.5	135	157.5	180
37	1477.4	1457.4	1452.3	1458.1	1468.8	1475.1	1484.8	1498.8	1501.8
38	1455.3	1434.6	1430.6	1435.9	1447.1	1453.9	1463.2	1477.2	1480.0
39	1433.3	1412.2	1407.7	1413.1	1423.2	1430.8	1440.4	1454.6	1457.7
40	1410.3	1389.3	1384.2	1389.4	1400.3	1407.6	1416.8	1431.6	1433.9
41	1385.0	1365.2	1360.7	1366.8	1376.8	1384.8	1393.3	1408.6	1411.3
42	1359.9	1341.3	1336.8	1342.0	1353.0	1360.3	1369.7	1384.7	1386.7
43	1335.2	1316.4	1311.0	1317.7	1327.2	1336.7	1344.9	1360.6	1364.5
44	1309.7	1291.0	1285.5	1292.1	1301.1	1310.7	1319.4	1335.7	1337.4
45	1286.2	1266.1	1260.4	1266.5	1276.3	1285.7	1293.6	1309.7	1311.2
46	1262.3	1240.6	1234.3	1240.9	1251.0	1259.8	1267.7	1283.8	1284.9
47	1236.6	1214.7	1209.0	1215.6	1225.3	1234.3	1242.4	1257.4	1259.0
48	1210.6	1188.5	1182.4	1188.5	1199.1	1208.3	1216.7	1231.6	1231.8
49	1184.3	1161.5	1155.3	1161.4	1171.7	1181.2	1190.2	1205.2	1203.7
50	1157.9	1134.5	1128.8	1134.8	1144.5	1154.3	1163.2	1177.6	1176.6
51	1128.9	1106.9	1102.0	1107.4	1116.4	1127.5	1136.1	1150.5	1149.2
52	1101.3	1079.4	1073.9	1079.1	1088.4	1098.7	1107.4	1122.2	1120.3
53	1072.1	1051.8	1046.5	1051.2	1059.1	1070.1	1078.6	1093.5	1091.0
54	1043.2	1023.2	1018.1	1023.0	1030.9	1040.8	1049.4	1064.5	1062.9
55	1013.7	994.6	988.8	994.0	1000.9	1011.9	1019.8	1034.8	1034.2
56	983.7	964.3	959.2	964.6	970.9	981.7	990.4	1005.5	1004.6
57	953.6	934.5	929.2	934.4	941.1	951.4	959.5	974.8	975.5
58	925.5	903.1	897.4	902.5	909.0	920.6	928.9	943.9	943.7
59	893.0	871.8	865.7	870.8	876.8	887.6	896.0	912.6	911.9
60	864.2	842.0	835.9	840.4	846.9	856.3	865.1	878.7	878.9
61	834.2	812.0	806.1	810.0	816.7	825.8	835.2	848.3	847.6
62	804.4	781.5	775.9	779.7	786.0	794.9	804.7	816.9	815.7
63	774.0	751.3	746.3	749.2	755.2	764.6	774.0	786.3	784.3
64	743.5	721.3	716.4	718.8	724.7	733.7	743.6	755.2	753.6
65	712.0	690.7	686.0	688.5	694.0	703.0	712.1	724.1	721.8
66	680.6	660.3	656.0	657.5	662.3	672.0	680.9	692.4	690.3
67	649.2	630.1	625.9	626.5	631.1	640.8	649.1	661.0	658.2
68	617.8	599.6	595.0	595.7	599.6	609.3	617.2	628.8	626.5
69	586.3	568.5	564.1	564.6	568.3	577.7	585.7	597.1	594.6
70	554.7	537.3	533.0	533.0	536.7	546.0	553.8	565.2	562.9
71	523.6	506.8	501.6	501.9	505.3	514.1	521.8	532.7	530.9
72	493.0	475.8	470.9	470.7	473.6	482.1	490.1	500.8	498.7
73	463.2	445.6	440.5	440.0	443.1	450.7	458.8	469.3	467.5

Candela Tabulations (Continued)

	0	22.5	45	67.5	90	112.5	135	157.5	180
74	433.1	415.7	410.2	409.8	412.5	419.6	427.7	438.0	435.8
75	403.6	385.8	380.3	379.7	382.4	388.9	396.9	407.0	404.6
76	374.1	356.4	351.2	350.1	353.2	359.0	366.9	376.6	373.9
77	345.1	327.5	322.2	321.3	324.1	329.6	337.2	346.5	343.7
78	316.3	298.4	293.4	292.5	295.3	300.4	307.4	316.9	313.7
79	287.5	270.4	265.3	264.1	267.0	271.9	278.3	287.3	283.6
80	258.5	242.8	237.5	236.3	238.9	243.4	249.3	258.1	254.4
81	230.2	215.0	209.7	208.9	211.0	215.3	220.4	229.1	224.8
82	201.9	187.4	182.5	181.7	183.8	187.6	192.2	199.9	196.1
83	173.9	160.5	155.4	155.1	157.0	160.5	164.2	171.4	167.7
84	146.2	133.4	129.0	128.9	130.2	133.6	137.0	142.9	139.9
85	119.5	107.2	103.4	103.6	104.7	107.4	110.4	115.3	112.7
86	93.7	81.8	78.6	79.0	80.0	82.2	84.6	88.6	86.4
87	68.6	57.1	54.8	55.8	56.6	58.4	60.1	63.0	61.0
88	45.0	34.1	33.1	34.3	35.4	36.5	37.2	39.0	36.8
89	22.8	14.6	14.9	15.7	16.3	17.5	17.9	18.0	14.5
90	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
3M Sphere	Labsphere	ILLUMIA PLUS 3020-300 4PI	1115184557
CCD Array Spectrometer	Labsphere	MC-9801:3683L	98010844
Programmable AC Source	Chroma	61602	62012PF01504
Power Analyzer	Xitron	XT2640	2641AD2006002

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	12415189
Spectrometer	Inphora, Inc	PDET 31	130627
Power Meter	Xitron	XT2640	M20140823

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 35W Calibration Lamp, Serial Number E4
Type C Goniophotometer and Spectrometer	Tungsten Halogen Omni-Directional 500W Calibration Lamp, Serial Numbers 16C293, 16C294, 16C295. For color calibration of spectrometer, 13C074.

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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.

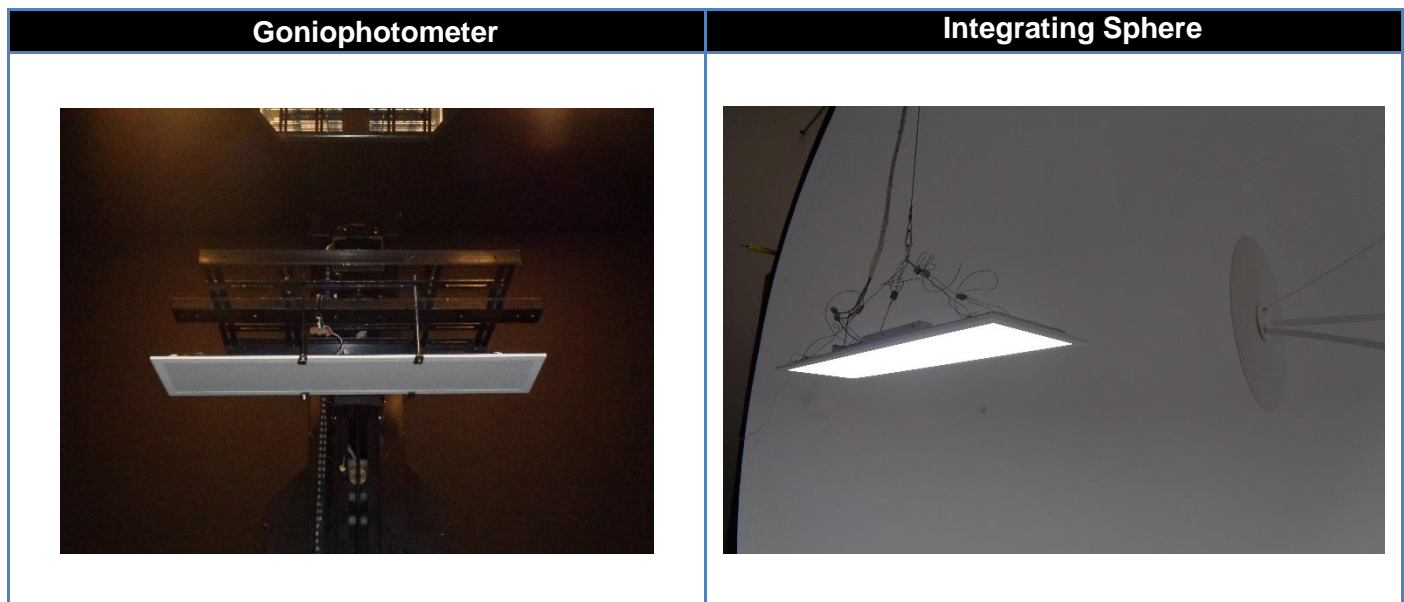
In the event that the recorded temperature is outside of $25 \pm 1^{\circ}\text{C}$, this is considered a non-standard condition.

This report may contain data not covered by the NVLAP accreditation, and are identified with **.

In the event that testing is subcontracted, or subcontracted equipment was used, test results in this report marked with the symbol *, or noted as "Sphere" or "Integrating Sphere" or "Goniophotometer," were performed by the subcontracted laboratory identified in the equipment list of this report.

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
11/29/2022	A	DMS	Origination	M. Hubbard	J. Vollers