

Report Number: PL17112-001A
Model: C-TR-D-FP24-S62L-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

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Prepared By:



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Approved By:



Jonathan Vollers, Technical Manager

Product Information

Manufacturer	Cree Lighting
Model Number (SKU)	C-TR-D-FP24-S62L-SCCT-UC-xx-xx (HIGH 4000K)
Serial Number	17112
LED Type	SAMSUNG SPMWHR22

Product Description

2'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"	23.81"	1.8"

Sample

The following sample was submitted for evaluation



Key Photometric Data	Sphere Output	Goniophotometer	
Luminous Flux	7216.1	7103	lm
Efficacy	152.61	151.35	lm/W
Correlated Color Temperature (CCT)	4095	K	
Color Rendering Index (CRI)	85		
R ₉	17		
Duv	-0.0006		
S/P Ratio*	1.74		
CIE Type	Direct		

Electrical Measurements	Sphere		Goniophotometer		
	120V	347V	120V	347V	
Input Wattage	47.29	-	46.93	47.08	W
Input Current	0.396	-	0.392	0.145	A
Input Voltage	120.06	-	120.25	347.13	V
Power Factor	0.996	-	0.996	0.932	
Off-State Power	0	-	0	0	W
Total Harmonic Distortion (Voltage)	0.10	-	0.04	0.50	%
Total Harmonic Distortion (Amperage)	7.35	-	7.58	19.69	%

Note: All photometric measurements taken at 120VAC.

Key Test Parameters	Sphere Output	Goniophotometer	
Stabilization Time	56	36	min
Total Operating Time (Stabilization + Test)	66	56	min
Ambient Temperature	24.44	24.9	°C

Spacing Criteria

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

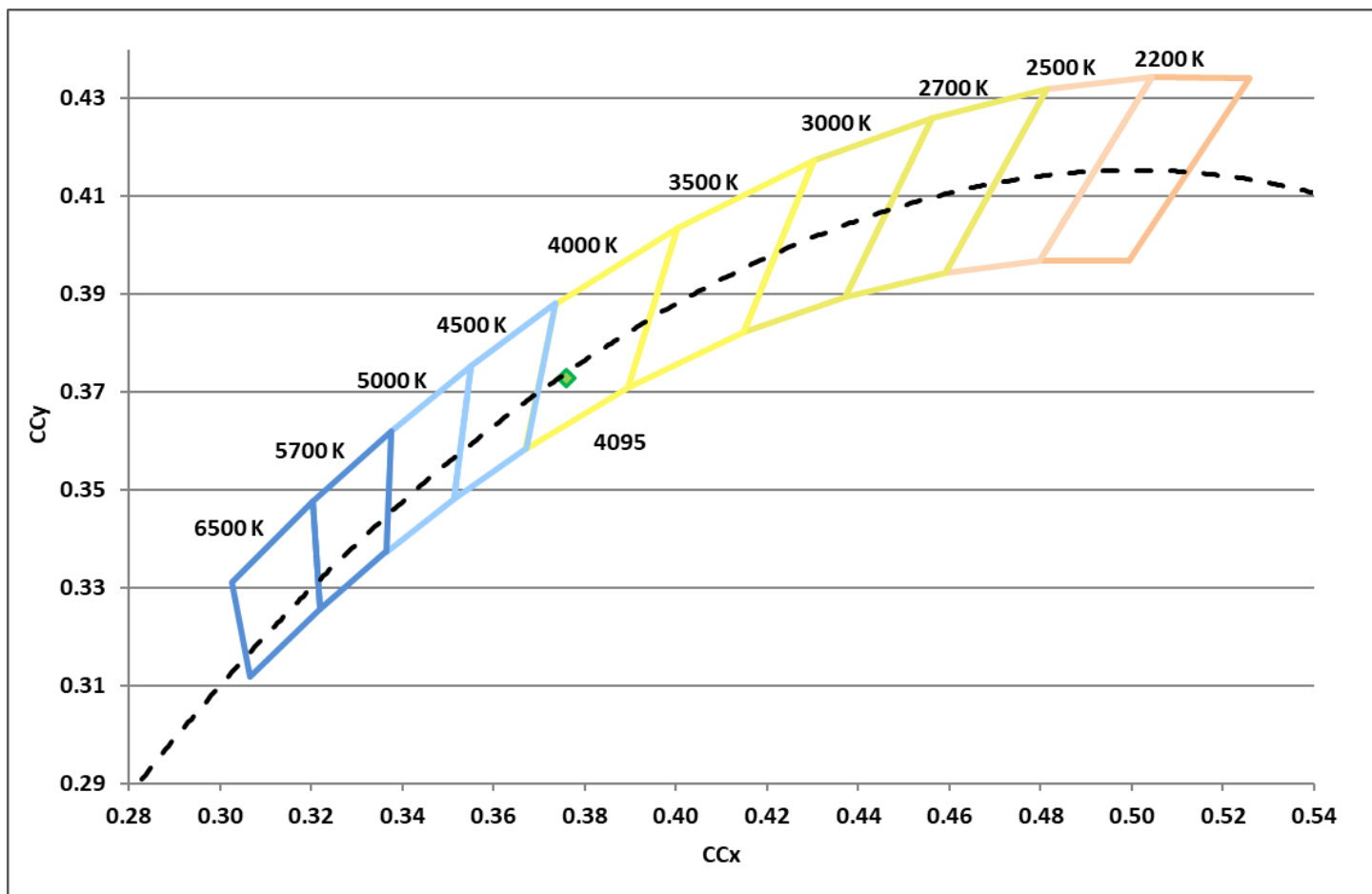
Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.3760	0.3728	0.2238	0.3328	0.2238	0.4991	-0.0006

Color Rendering Index Details

Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
85	84	91	95	84	84	87	87	68	17	78	83	61	86	98

Chromaticity Diagram



Spectral Distribution

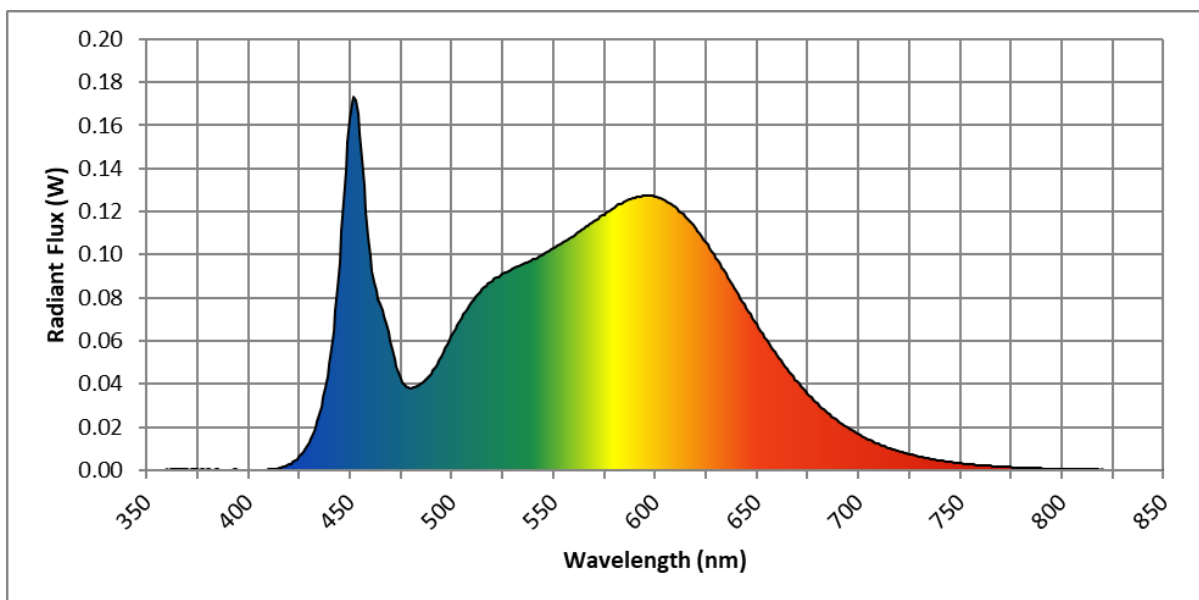
λ (nm)	W/nm
360	0.000418
370	0.000265
380	0.000466
390	0.000215
400	0.000087
410	0.000310
420	0.002625
430	0.012898
440	0.049392
450	0.162998
460	0.099254
470	0.059926
480	0.038102
490	0.044964
500	0.062139
510	0.077831
520	0.087913

λ (nm)	W/nm
530	0.093584
540	0.097751
550	0.102898
560	0.108765
570	0.115630
580	0.121887
590	0.126427
600	0.126853
610	0.122228
620	0.112306
630	0.098521
640	0.083078
650	0.067761
660	0.053518
670	0.041038
680	0.030865
690	0.022951

λ (nm)	W/nm
700	0.016867
710	0.012306
720	0.008946
730	0.006402
740	0.004568
750	0.003291
760	0.002357
770	0.001672
780	0.001203
790	0.000861
800	0.000599
810	0.000399
820	0.000274
830	0.000211

Dominant Wavelength	579	nm
Peak Wavelength	452	nm

Spectral Power Distribution (W/nm)



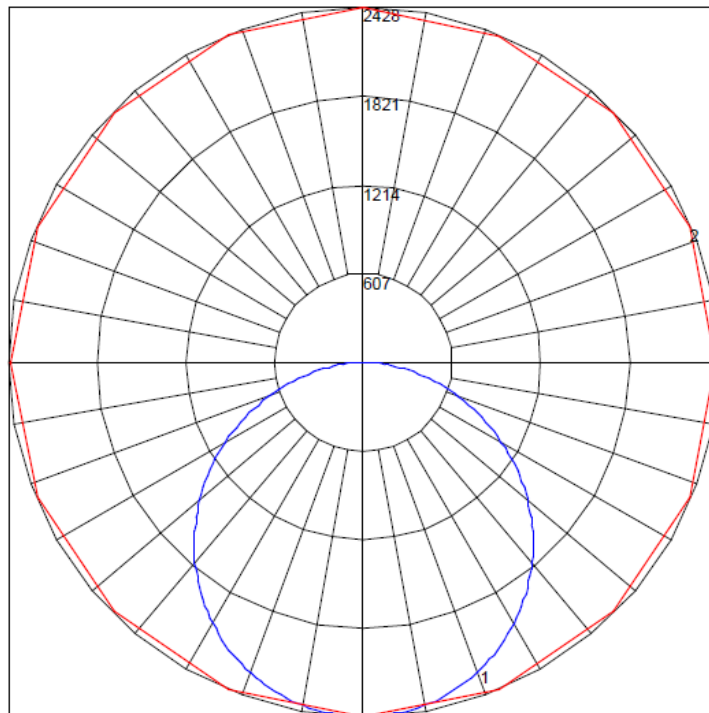
Zonal Lumen Summary

Zone	Lumens	% of Total	Zone	Lumens
0-20	887.2	12.5	0-10	229.3
0-30	1887.7	26.6	10-20	657.9
0-40	3098.5	43.6	20-30	1000.5
0-60	5511.9	77.6	30-40	1210.8
0-80	6938.5	97.7	40-50	1262.8
0-90	7103.4	100.0	50-60	1150.6
10-90	6874.1	96.8	60-70	890.6
20-40	2211.3	31.1	70-80	535.9
20-50	3474.1	48.9	80-90	164.9
40-70	3304.1	46.5	90-100	0
60-80	1426.6	20.1	100-110	0
70-80	535.9	7.5	110-120	0
80-90	164.9	2.3	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	7103.4	100		

Luminance Data (Cd./Sq.M)

Average in Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	3682	3646	3659
55	3583	3536	3542
65	3436	3346	3346
75	3190	3070	3054
85	2892	2650	2620

Candela Plots



Maximum Candela = 2427.96 Located At Horizontal Angle = 90, Vertical Angle = 2
1 - Vertical Plane Through Horizontal Angles (90 - 270) (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	103	99	95	106	101	97	93	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	70	64	87	77	69	63	74	67	62	71	66	61	69	64	60	58
4	82	70	61	54	80	68	60	53	66	58	53	63	57	52	61	56	51	49
5	75	62	53	46	73	61	52	46	59	51	45	57	50	45	55	49	44	42
6	69	56	47	40	67	55	46	40	53	45	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	45	37	32	44	37	31	43	36	31	42	36	31	29
9	56	42	34	28	54	42	34	28	41	33	28	40	33	28	38	32	28	26
10	52	39	31	26	51	39	31	26	38	30	26	37	30	25	36	30	25	24

Candela Tabulations

	0	22.5	45	67.5	90	112.5	135	157.5	180
0	2422.0	2422.0	2422.0	2422.0	2422.0	2422.0	2422.0	2422.0	2422.0
1	2415.9	2418.8	2420.3	2425.8	2427.2	2425.0	2421.3	2419.2	2415.2
2	2412.7	2417.3	2419.5	2423.8	2428.0	2424.2	2419.9	2418.4	2413.6
3	2411.1	2414.4	2415.4	2420.6	2425.6	2423.2	2418.5	2416.0	2410.1
4	2410.6	2411.5	2414.0	2417.5	2421.4	2419.8	2414.7	2414.7	2408.9
5	2405.8	2409.4	2410.7	2414.6	2417.3	2414.9	2412.4	2410.4	2404.3
6	2401.0	2403.1	2404.4	2411.9	2414.6	2410.7	2407.2	2406.2	2401.0
7	2395.3	2397.2	2400.1	2404.3	2409.0	2407.1	2402.6	2401.8	2394.7
8	2390.3	2392.3	2393.3	2398.0	2402.6	2401.2	2397.9	2397.2	2389.2
9	2383.1	2385.4	2387.3	2391.6	2394.6	2394.1	2390.3	2389.4	2383.8
10	2376.2	2377.2	2379.8	2384.3	2387.2	2384.9	2383.0	2382.2	2374.1
11	2367.8	2367.8	2368.8	2375.7	2380.1	2378.4	2375.3	2374.3	2364.5
12	2357.9	2358.5	2360.0	2364.9	2370.8	2369.2	2367.5	2366.6	2356.3
13	2350.1	2348.7	2349.4	2355.1	2359.1	2358.6	2356.2	2356.3	2347.5
14	2338.1	2337.4	2339.7	2344.2	2347.1	2347.0	2344.9	2345.1	2337.0
15	2325.8	2325.4	2326.6	2331.8	2336.4	2335.2	2332.7	2332.7	2323.5
16	2313.0	2311.5	2314.1	2318.6	2324.3	2323.1	2320.7	2321.7	2310.4
17	2300.7	2298.3	2299.6	2305.2	2310.0	2310.6	2309.8	2310.1	2297.8
18	2288.8	2284.5	2285.6	2290.9	2293.9	2295.2	2294.8	2294.3	2283.8
19	2273.6	2269.1	2271.4	2275.4	2280.1	2280.7	2278.7	2279.9	2267.6
20	2258.7	2253.1	2254.5	2259.0	2265.0	2265.0	2264.5	2265.3	2250.5
21	2242.8	2236.3	2238.4	2242.8	2247.4	2248.5	2248.4	2248.7	2236.8
22	2226.8	2220.6	2220.8	2224.3	2229.3	2230.8	2231.1	2232.8	2220.1
23	2208.3	2202.9	2202.8	2207.5	2212.1	2212.7	2213.7	2215.5	2202.5
24	2189.2	2183.9	2185.8	2188.5	2194.2	2194.1	2194.5	2197.5	2182.9
25	2170.7	2163.7	2164.2	2169.3	2174.6	2175.4	2175.8	2177.5	2162.8
26	2152.3	2143.7	2144.3	2148.8	2152.7	2155.8	2156.5	2159.0	2144.6
27	2130.4	2122.8	2123.4	2126.8	2131.6	2134.0	2134.2	2138.7	2123.0
28	2108.4	2100.6	2102.2	2104.8	2109.6	2112.3	2112.3	2114.7	2102.4
29	2085.4	2077.6	2078.8	2082.3	2086.8	2090.2	2089.9	2092.8	2079.8
30	2061.7	2054.9	2053.6	2059.0	2062.7	2066.5	2067.9	2070.3	2056.9
31	2038.9	2031.0	2030.5	2033.6	2037.8	2041.8	2043.0	2046.0	2031.9
32	2013.2	2006.9	2005.6	2008.6	2013.4	2016.0	2018.5	2022.0	2007.3
33	1989.7	1980.3	1980.5	1983.5	1987.8	1991.4	1993.4	1995.7	1983.1
34	1964.7	1954.2	1954.5	1957.4	1961.1	1965.0	1968.4	1971.7	1956.6
35	1940.9	1929.5	1928.2	1929.8	1934.4	1937.8	1942.5	1946.3	1930.5
36	1913.4	1901.4	1901.8	1903.7	1907.3	1910.2	1914.1	1920.0	1906.7

Candela Tabulations (Continued)

	0	22.5	45	67.5	90	112.5	135	157.5	180
37	1885.7	1875.6	1874.1	1875.8	1879.9	1882.5	1887.4	1892.0	1877.0
38	1858.8	1845.9	1845.0	1848.4	1851.4	1855.2	1859.4	1863.2	1848.6
39	1830.7	1818.0	1816.9	1817.9	1822.0	1826.5	1831.3	1836.0	1820.3
40	1802.5	1789.1	1787.3	1788.7	1792.8	1796.5	1801.5	1806.1	1793.3
41	1769.1	1759.0	1757.3	1759.0	1761.7	1766.6	1769.3	1775.4	1763.1
42	1738.0	1727.9	1725.6	1727.4	1731.5	1736.0	1739.5	1744.7	1732.5
43	1706.5	1695.8	1693.1	1695.7	1699.2	1704.8	1708.7	1713.5	1700.9
44	1676.5	1664.4	1661.5	1661.8	1666.7	1671.8	1676.0	1682.3	1669.1
45	1645.2	1632.0	1629.2	1630.1	1634.9	1638.2	1643.4	1648.8	1636.0
46	1612.7	1599.4	1596.5	1596.8	1601.0	1605.2	1609.7	1616.4	1603.1
47	1581.5	1565.0	1562.7	1562.7	1567.8	1571.6	1578.1	1582.8	1569.2
48	1549.5	1531.3	1528.9	1528.6	1533.1	1538.2	1545.0	1549.9	1534.5
49	1515.3	1498.1	1496.1	1494.5	1498.8	1503.3	1510.0	1516.7	1501.9
50	1479.3	1464.1	1460.7	1461.2	1464.1	1469.3	1475.8	1481.5	1466.4
51	1445.6	1429.0	1426.5	1426.5	1429.5	1434.1	1440.1	1446.6	1430.0
52	1409.6	1393.2	1390.0	1390.3	1393.2	1399.3	1404.8	1411.7	1394.0
53	1373.6	1357.5	1355.5	1354.8	1357.0	1363.3	1369.1	1375.3	1359.2
54	1336.1	1321.8	1319.0	1317.9	1319.7	1326.3	1332.1	1338.1	1324.2
55	1298.5	1284.5	1281.5	1281.0	1283.8	1289.6	1294.0	1300.5	1286.8
56	1260.5	1246.5	1242.9	1242.4	1246.3	1251.4	1255.6	1262.4	1249.9
57	1222.4	1209.2	1204.7	1203.6	1208.0	1212.7	1218.1	1224.4	1213.1
58	1185.6	1171.0	1167.1	1165.0	1169.6	1173.5	1178.9	1185.9	1175.4
59	1147.6	1132.1	1128.6	1126.2	1131.3	1133.6	1139.9	1147.5	1135.6
60	1109.7	1093.4	1088.8	1087.5	1092.0	1094.9	1100.8	1108.4	1096.3
61	1073.0	1054.6	1049.9	1048.7	1052.2	1056.6	1062.3	1070.1	1057.5
62	1034.9	1016.0	1012.0	1010.1	1013.2	1016.4	1023.7	1031.5	1017.4
63	996.5	978.0	973.5	971.7	974.1	977.1	984.8	992.3	978.3
64	956.9	938.7	934.6	933.5	935.3	938.4	946.0	953.2	938.2
65	917.5	898.5	893.6	892.0	893.5	898.3	906.4	913.0	894.7
66	875.9	858.6	853.9	852.0	853.2	857.6	865.7	871.7	856.4
67	835.4	820.3	815.7	813.0	813.9	818.3	826.4	831.7	818.0
68	795.2	780.5	776.3	773.2	774.6	779.0	786.2	791.5	778.6
69	755.0	741.5	737.0	733.5	735.2	739.9	746.6	751.8	739.0
70	715.2	702.1	697.5	693.4	695.9	699.8	706.8	711.6	701.0
71	674.6	662.5	657.8	653.6	656.0	659.6	666.8	672.3	661.4
72	635.8	623.1	618.3	614.3	616.8	619.6	626.7	632.4	622.1
73	596.8	584.0	579.3	575.5	577.4	580.4	587.2	593.1	582.5

Candela Tabulations (Continued)

	0	22.5	45	67.5	90	112.5	135	157.5	180
74	559.0	545.3	540.2	536.8	538.4	541.3	548.5	554.4	543.6
75	521.7	507.3	502.0	498.6	499.4	502.2	509.3	516.0	504.4
76	484.6	469.7	464.6	461.5	461.4	464.0	471.3	478.5	466.5
77	448.0	432.6	427.3	424.6	424.0	426.5	433.5	440.7	428.4
78	410.8	395.4	390.5	388.0	386.8	389.5	396.3	403.4	390.5
79	374.3	359.5	354.5	351.6	350.5	353.6	360.0	366.4	354.3
80	337.5	323.2	318.6	315.8	314.9	318.0	323.7	329.8	318.2
81	301.3	287.4	283.1	280.3	279.6	282.7	287.6	292.9	281.8
82	264.4	251.8	248.0	245.2	245.1	247.9	252.2	256.5	246.8
83	228.8	216.7	213.5	210.6	210.9	213.3	217.2	221.2	212.4
84	193.3	181.9	179.4	176.4	177.3	178.6	182.4	185.7	177.3
85	159.3	147.6	145.9	143.1	144.3	145.0	148.4	151.0	143.7
86	126.1	114.4	113.2	110.9	111.8	112.1	115.2	117.6	110.5
87	93.7	81.9	81.2	79.8	80.2	80.1	82.8	84.9	78.3
88	62.5	51.0	51.0	50.5	50.6	50.3	52.2	54.0	47.5
89	34.2	25.0	26.2	27.6	27.6	27.0	27.0	27.4	21.0
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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*Items marked with a single asterisk are not covered by the NVLAP accreditation.

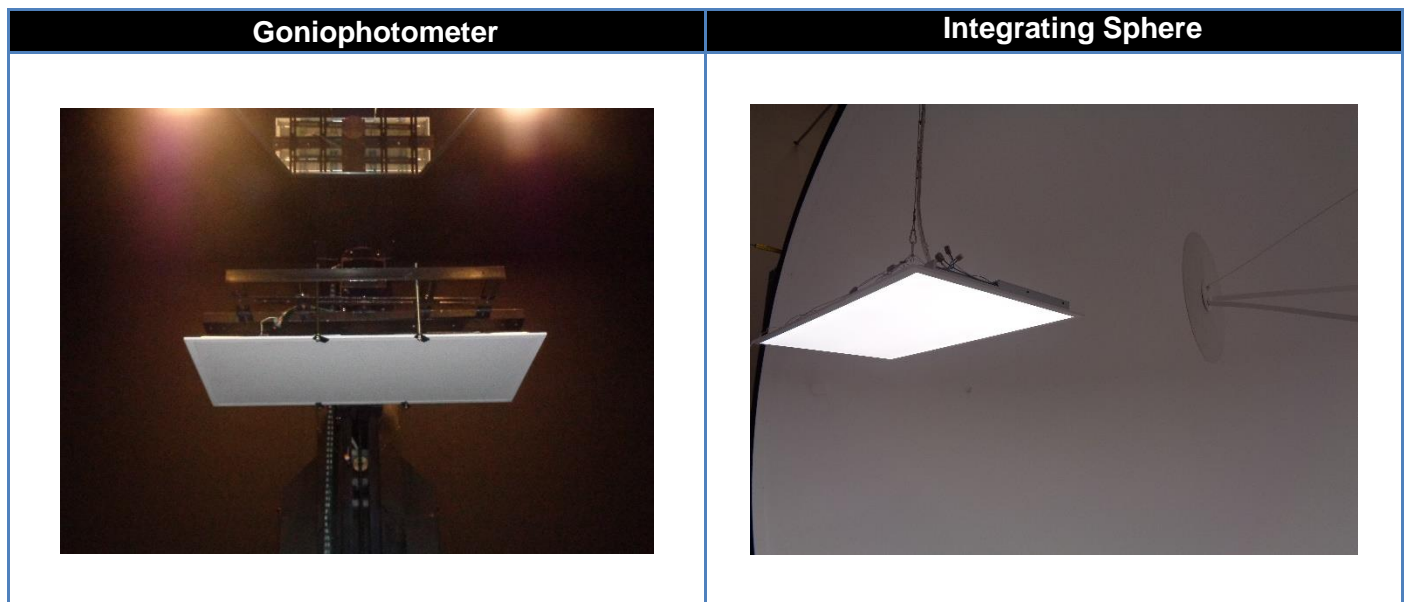
In the event that the recorded temperature is outside of $25 \pm 1^{\circ}\text{C}$, this is considered a non-standard condition.

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