

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P631435

Luminaire Tested: GWS-SA1F-760-U-SL3-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P631435  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-34)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1F-760-U-SL3-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (16) 5700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

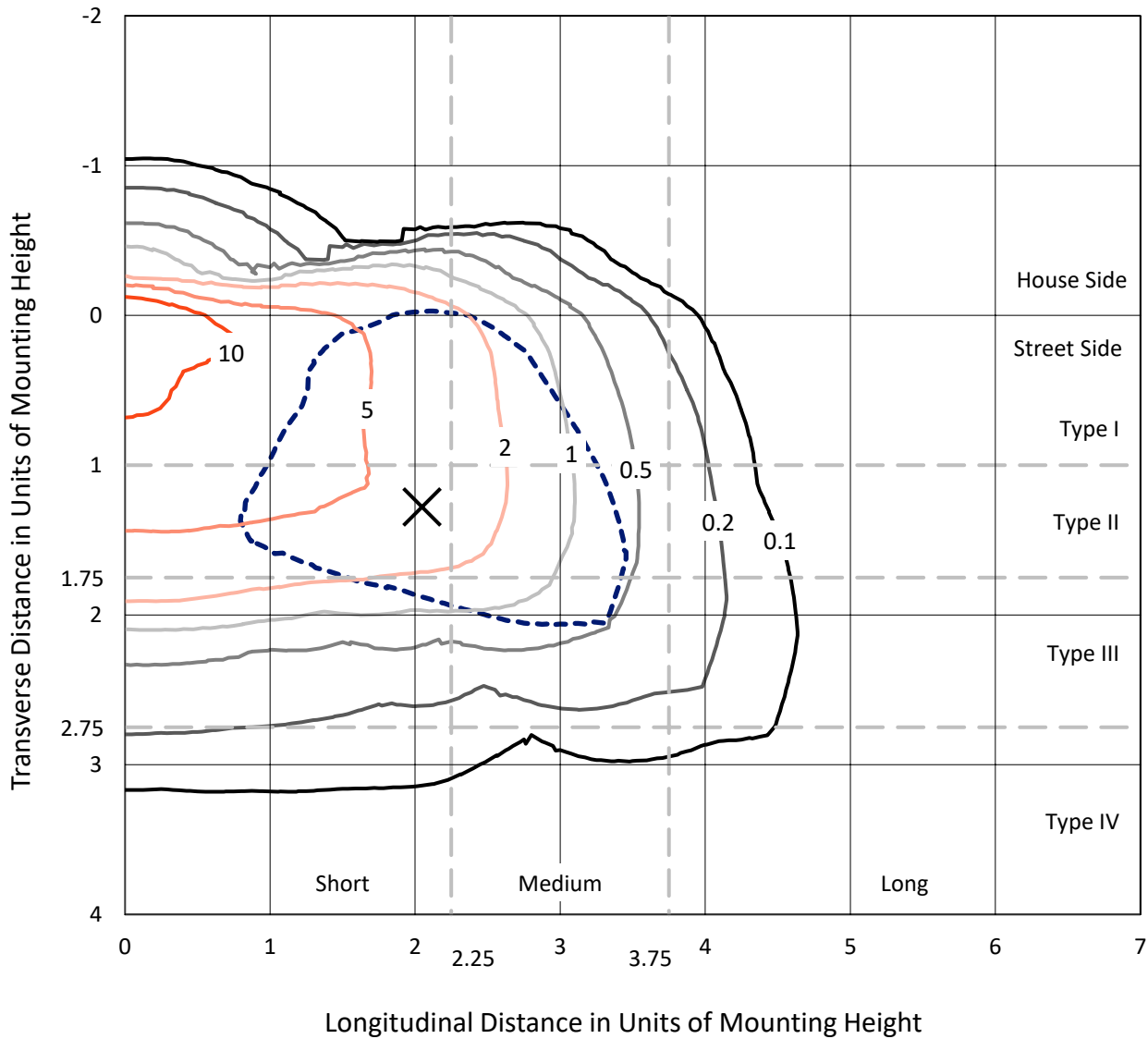
Lumens per Lamp: N/A  
Luminaire Lumens: 6884.2 lumens  
Efficiency: N/A  
Efficacy: 102.4 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G2  
  
Input Watts (W): 67.2  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P631435  
 CATALOG NUMBER: GWS-SA1F-760-U-SL3-W-HSS

### Iso-Footcandle Lines of Horizontal Illumination

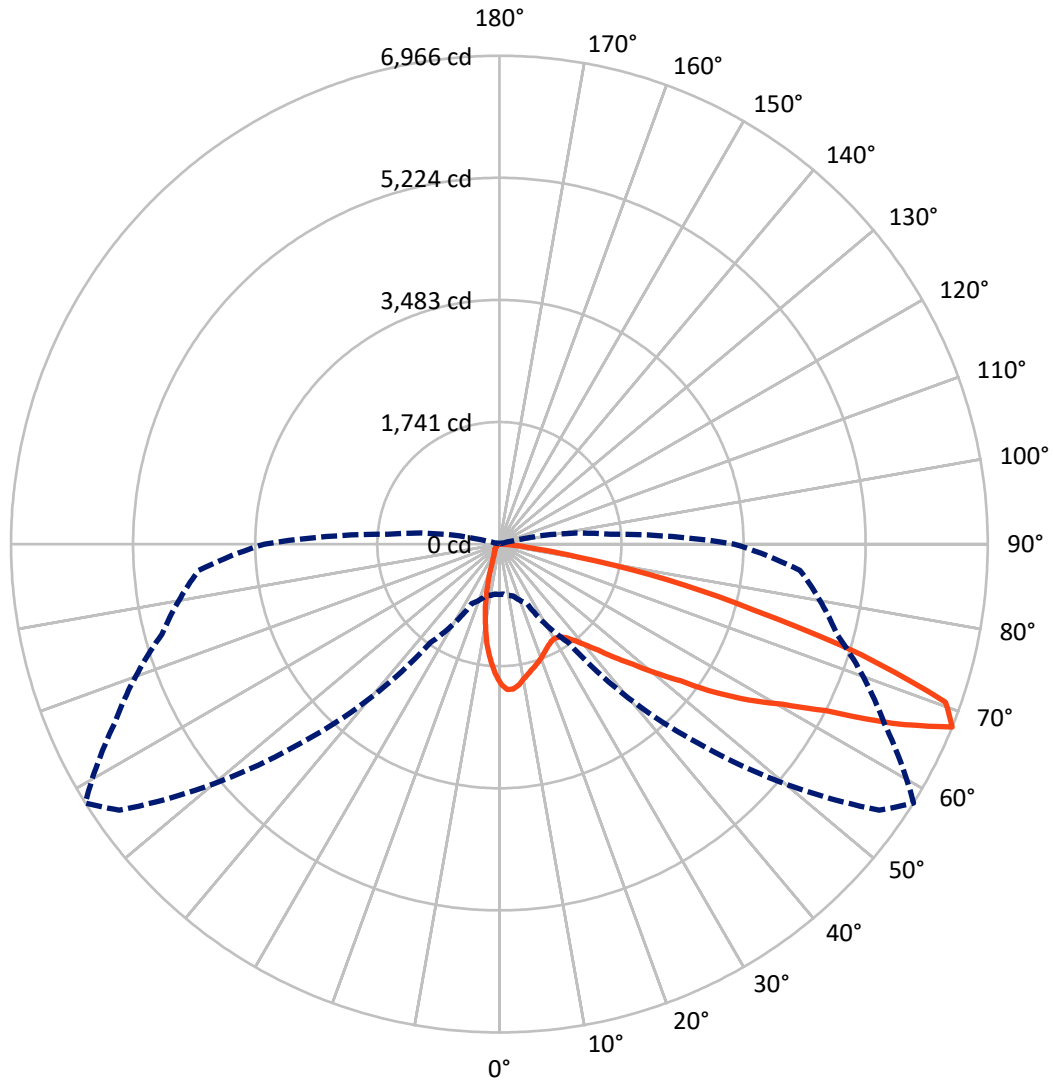
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 19.9 fc  
 Type III - Short - N/A

REPORT NUMBER: P631435  
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### Luminous Intensity Polar Plot



— Vertical Plane Through 58-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 672.6    | 0.0    | 672.6  |
|                    | % Fixture | 9.8      | 0.0    | 9.8    |
| <b>Street Side</b> | Lumens    | 6211.6   | 0.0    | 6211.6 |
|                    | % Fixture | 90.2     | 0.0    | 90.2   |
| <b>Total</b>       | Lumens    | 6884.2   | 0.0    | 6884.2 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 161.4  | 2.3       |
| 10°-20°   | 335.9  | 4.9       |
| 20°-30°   | 453.0  | 6.6       |
| 30°-40°   | 636.5  | 9.2       |
| 40°-50°   | 983.0  | 14.3      |
| 50°-60°   | 1572.0 | 22.8      |
| 60°-70°   | 1861.4 | 27.0      |
| 70°-80°   | 823.4  | 12.0      |
| 80°-90°   | 57.6   | 0.8       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 6884.2 | 100.0     |
| 0°-180°   | 6884.2 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P631435

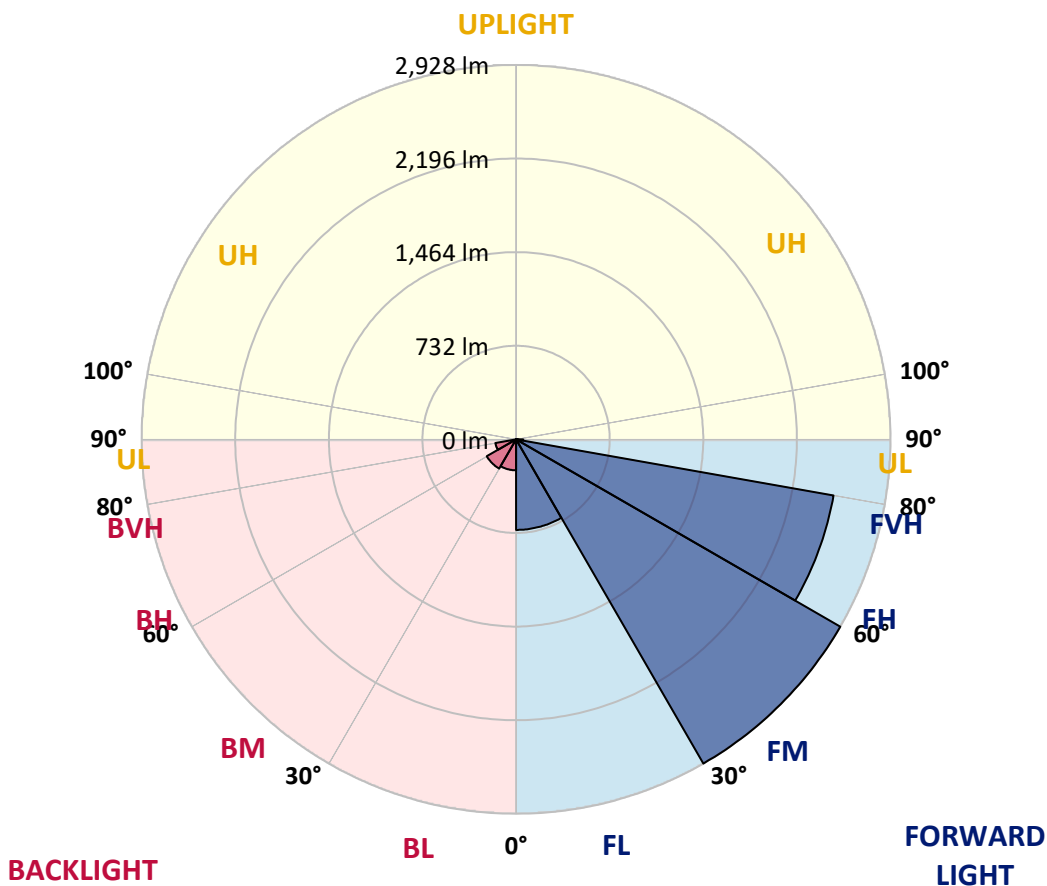
CATALOG NUMBER: GWS-SA1F-760-U-SL3-W-HSS

**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 708.2  | 10.3      |                         |      |         |
| FM (30°-60°)   | 2927.7 | 42.5      |                         |      |         |
| FH (60°-80°)   | 2520.6 | 36.6      |                         |      | G2/5000 |
| FVH (80°-90°)  | 55.1   | 0.8       |                         |      | G1/100  |
| BL (0°-30°)    | 242.0  | 3.5       | B1/500                  |      |         |
| BM (30°-60°)   | 263.9  | 3.8       | B1/1000                 |      |         |
| BH (60°-80°)   | 164.2  | 2.4       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 2.5    | 0.0       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type III Short





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CATALOG NUMBER: GWS-SA1F-760-U-SL3-W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 |
| 2.5°  | 2088.7 | 2092.4 | 2097.2 | 2103.3 | 2102.1 | 2096.6 | 2089.9 | 2074.7 | 2064.9 | 2034.5 | 1997.3 |
| 5°    | 2021.7 | 2021.1 | 2033.3 | 2044.8 | 2065.5 | 2076.5 | 2091.7 | 2077.7 | 2072.9 | 2036.3 | 1976.0 |
| 7.5°  | 1890.7 | 1897.4 | 1911.4 | 1929.7 | 1959.5 | 1991.8 | 2028.4 | 2024.1 | 2038.7 | 2014.4 | 1939.4 |
| 10°   | 1762.1 | 1758.5 | 1780.4 | 1807.8 | 1853.5 | 1894.9 | 1947.9 | 1947.3 | 1985.7 | 1983.3 | 1898.0 |
| 12.5° | 1649.4 | 1648.8 | 1665.8 | 1696.9 | 1750.5 | 1808.4 | 1880.3 | 1882.1 | 1929.7 | 1949.2 | 1862.6 |
| 15°   | 1554.3 | 1555.6 | 1572.0 | 1604.3 | 1659.7 | 1730.4 | 1813.9 | 1829.1 | 1882.8 | 1922.4 | 1827.9 |
| 17.5° | 1486.7 | 1487.3 | 1497.1 | 1525.1 | 1579.3 | 1654.9 | 1755.4 | 1776.1 | 1845.0 | 1902.3 | 1799.9 |
| 20°   | 1455.6 | 1453.2 | 1455.0 | 1469.0 | 1511.1 | 1579.9 | 1695.7 | 1722.5 | 1810.2 | 1888.2 | 1774.3 |
| 22.5° | 1459.9 | 1456.2 | 1447.7 | 1445.9 | 1464.8 | 1517.2 | 1632.3 | 1665.2 | 1772.5 | 1879.7 | 1751.1 |
| 25°   | 1497.7 | 1489.8 | 1477.6 | 1459.3 | 1452.0 | 1478.2 | 1576.9 | 1611.0 | 1737.1 | 1880.3 | 1733.5 |
| 27.5° | 1555.6 | 1547.0 | 1531.8 | 1507.4 | 1478.8 | 1467.8 | 1539.1 | 1571.4 | 1712.1 | 1894.3 | 1724.9 |
| 30°   | 1629.3 | 1622.6 | 1608.0 | 1578.7 | 1540.3 | 1495.2 | 1531.2 | 1558.0 | 1700.0 | 1923.0 | 1728.6 |
| 32.5° | 1716.4 | 1711.5 | 1699.4 | 1672.5 | 1628.7 | 1559.8 | 1558.0 | 1578.7 | 1709.7 | 1964.4 | 1742.6 |
| 35°   | 1800.5 | 1802.3 | 1802.9 | 1788.3 | 1741.4 | 1657.9 | 1631.7 | 1639.0 | 1749.9 | 2026.5 | 1774.3 |
| 37.5° | 1891.3 | 1887.0 | 1909.0 | 1919.3 | 1874.2 | 1785.3 | 1745.7 | 1746.3 | 1826.7 | 2118.6 | 1834.0 |
| 40°   | 1960.1 | 1961.4 | 2008.9 | 2051.5 | 2032.6 | 1946.7 | 1890.1 | 1889.5 | 1944.9 | 2244.7 | 1930.3 |
| 42.5° | 2024.7 | 2032.6 | 2102.7 | 2175.8 | 2202.0 | 2125.9 | 2085.0 | 2069.8 | 2110.6 | 2415.3 | 2074.7 |
| 45°   | 2093.6 | 2105.2 | 2203.2 | 2307.4 | 2376.3 | 2331.2 | 2298.9 | 2305.0 | 2309.9 | 2613.9 | 2269.1 |
| 47.5° | 2174.0 | 2181.3 | 2302.6 | 2449.4 | 2578.0 | 2566.4 | 2568.2 | 2560.9 | 2558.5 | 2864.3 | 2526.2 |
| 50°   | 2271.5 | 2288.6 | 2428.1 | 2603.6 | 2779.0 | 2855.8 | 2881.4 | 2884.5 | 2844.8 | 3137.3 | 2792.4 |
| 52.5° | 2478.7 | 2499.4 | 2618.8 | 2772.3 | 2998.4 | 3159.9 | 3264.0 | 3243.3 | 3182.4 | 3401.8 | 3084.3 |
| 55°   | 2723.0 | 2738.8 | 2854.0 | 3013.0 | 3266.5 | 3493.1 | 3740.5 | 3732.0 | 3582.7 | 3680.2 | 3324.4 |
| 57.5° | 2746.1 | 2763.8 | 2942.3 | 3186.1 | 3610.7 | 3905.0 | 4165.2 | 4192.6 | 3973.9 | 3877.6 | 3538.8 |
| 60°   | 2486.0 | 2521.9 | 2765.6 | 3093.4 | 3742.4 | 4458.9 | 4630.7 | 4636.2 | 4260.9 | 4078.1 | 3800.8 |
| 62.5° | 1992.4 | 2009.5 | 2255.0 | 2682.8 | 3539.5 | 4781.8 | 5341.8 | 5226.0 | 4629.5 | 4388.2 | 4215.8 |
| 65°   | 1044.3 | 1113.8 | 1327.7 | 1801.1 | 2870.4 | 4669.1 | 6197.2 | 6165.6 | 5292.4 | 4832.4 | 4538.7 |
| 67.5° | 716.5  | 715.9  | 766.5  | 938.9  | 1711.5 | 4020.2 | 6617.1 | 6965.6 | 6058.9 | 4984.7 | 4304.7 |
| 70°   | 545.3  | 547.2  | 592.2  | 704.4  | 886.5  | 2676.1 | 6156.4 | 6752.3 | 6201.5 | 4525.9 | 3481.6 |
| 72.5° | 361.9  | 365.6  | 440.5  | 569.1  | 708.0  | 1311.8 | 4784.3 | 5402.7 | 5218.1 | 3635.1 | 2450.6 |
| 75°   | 216.3  | 219.3  | 273.0  | 413.7  | 629.4  | 734.2  | 3039.8 | 3735.0 | 3591.9 | 2505.5 | 1313.7 |
| 77.5° | 89.0   | 91.4   | 140.1  | 257.7  | 460.6  | 570.3  | 1681.1 | 2443.9 | 2151.5 | 996.2  | 358.9  |
| 80°   | 37.2   | 38.4   | 67.6   | 180.4  | 332.1  | 357.7  | 778.7  | 1148.5 | 881.7  | 214.5  | 109.7  |
| 82.5° | 13.4   | 14.0   | 25.0   | 99.3   | 206.6  | 269.3  | 393.0  | 453.9  | 248.6  | 70.1   | 59.1   |
| 85°   | 0.6    | 0.6    | 6.1    | 33.5   | 78.6   | 76.2   | 224.8  | 217.5  | 82.3   | 29.2   | 35.3   |
| 87.5° | 0.0    | 0.0    | 0.6    | 0.6    | 1.2    | 3.0    | 21.3   | 37.8   | 17.7   | 7.3    | 15.2   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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CATALOG NUMBER: GWS-SA1F-760-U-SL3-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 | 1985.7 |
| 2.5°  | 1972.9 | 1940.6 | 1905.3 | 1872.4 | 1820.0 | 1788.9 | 1750.5 | 1733.5 | 1709.1 | 1703.0 | 1706.7 |
| 5°    | 1932.7 | 1877.3 | 1792.6 | 1715.8 | 1616.5 | 1536.7 | 1456.2 | 1422.1 | 1378.2 | 1349.0 | 1336.8 |
| 7.5°  | 1876.1 | 1803.5 | 1671.3 | 1531.8 | 1395.3 | 1249.7 | 1138.8 | 1065.7 | 999.3  | 962.7  | 955.4  |
| 10°   | 1818.8 | 1724.3 | 1534.8 | 1335.0 | 1123.6 | 949.3  | 799.4  | 688.5  | 598.3  | 557.5  | 525.8  |
| 12.5° | 1759.7 | 1642.1 | 1395.9 | 1135.1 | 889.6  | 652.0  | 466.7  | 358.9  | 294.3  | 268.7  | 273.0  |
| 15°   | 1705.4 | 1562.9 | 1258.2 | 935.3  | 626.4  | 393.6  | 257.7  | 217.5  | 202.3  | 197.4  | 196.8  |
| 17.5° | 1653.7 | 1487.9 | 1121.1 | 740.9  | 413.1  | 241.3  | 197.4  | 187.7  | 183.4  | 181.0  | 181.0  |
| 20°   | 1606.7 | 1416.0 | 987.1  | 558.1  | 266.9  | 191.3  | 178.5  | 173.7  | 170.0  | 168.2  | 168.2  |
| 22.5° | 1562.9 | 1346.6 | 856.1  | 394.8  | 196.8  | 171.8  | 163.9  | 159.0  | 154.8  | 152.3  | 152.3  |
| 25°   | 1523.3 | 1283.8 | 731.2  | 271.8  | 169.4  | 157.2  | 148.7  | 143.2  | 135.9  | 131.6  | 131.6  |
| 27.5° | 1494.6 | 1227.8 | 611.1  | 198.0  | 152.9  | 141.4  | 131.6  | 124.3  | 116.4  | 111.5  | 110.3  |
| 30°   | 1477.6 | 1180.2 | 489.9  | 162.7  | 137.7  | 126.1  | 115.2  | 106.0  | 96.9   | 92.0   | 91.4   |
| 32.5° | 1467.8 | 1136.4 | 379.0  | 142.0  | 124.9  | 111.5  | 99.3   | 89.6   | 80.4   | 74.9   | 74.3   |
| 35°   | 1471.5 | 1102.2 | 283.9  | 128.0  | 112.7  | 98.7   | 85.3   | 75.6   | 67.6   | 62.8   | 61.5   |
| 37.5° | 1503.2 | 1087.0 | 213.3  | 117.0  | 102.4  | 87.7   | 73.7   | 64.6   | 57.3   | 53.6   | 53.0   |
| 40°   | 1564.7 | 1090.0 | 167.6  | 108.5  | 93.8   | 76.8   | 63.4   | 54.8   | 49.4   | 46.3   | 45.7   |
| 42.5° | 1660.4 | 1115.6 | 138.3  | 101.1  | 84.7   | 67.0   | 54.8   | 48.1   | 42.7   | 39.6   | 39.0   |
| 45°   | 1802.9 | 1168.6 | 120.6  | 92.6   | 74.9   | 57.9   | 47.5   | 41.4   | 36.6   | 32.9   | 32.3   |
| 47.5° | 2009.5 | 1260.7 | 109.1  | 84.7   | 66.4   | 50.0   | 40.8   | 34.7   | 30.5   | 27.4   | 26.8   |
| 50°   | 2229.4 | 1370.9 | 99.3   | 76.8   | 59.1   | 43.3   | 34.7   | 28.6   | 25.0   | 21.9   | 21.3   |
| 52.5° | 2464.0 | 1489.8 | 92.0   | 69.5   | 52.4   | 37.2   | 29.2   | 23.8   | 20.1   | 17.1   | 16.5   |
| 55°   | 2689.5 | 1609.2 | 83.5   | 64.6   | 44.5   | 31.7   | 24.4   | 19.5   | 15.8   | 13.4   | 13.4   |
| 57.5° | 2908.8 | 1718.9 | 74.3   | 56.7   | 36.6   | 26.8   | 20.1   | 15.8   | 12.8   | 11.0   | 10.4   |
| 60°   | 3170.8 | 1870.6 | 64.0   | 48.1   | 30.5   | 22.5   | 16.5   | 12.8   | 10.4   | 8.5    | 8.5    |
| 62.5° | 3560.2 | 2028.4 | 54.8   | 40.2   | 25.6   | 18.9   | 13.4   | 10.4   | 8.5    | 7.3    | 6.7    |
| 65°   | 3687.5 | 1943.1 | 46.3   | 32.9   | 20.7   | 15.2   | 11.0   | 9.1    | 7.3    | 6.7    | 6.1    |
| 67.5° | 3347.5 | 1592.7 | 38.4   | 26.8   | 17.1   | 12.8   | 9.7    | 7.9    | 6.7    | 6.1    | 5.5    |
| 70°   | 2612.1 | 1130.3 | 29.9   | 20.1   | 14.0   | 10.4   | 8.5    | 7.3    | 6.1    | 5.5    | 5.5    |
| 72.5° | 1776.7 | 668.4  | 23.8   | 15.2   | 11.6   | 9.1    | 7.3    | 6.7    | 6.1    | 5.5    | 4.9    |
| 75°   | 875.0  | 237.6  | 18.3   | 11.6   | 9.1    | 7.9    | 6.7    | 6.1    | 5.5    | 4.9    | 4.9    |
| 77.5° | 235.8  | 65.8   | 14.0   | 9.1    | 7.3    | 6.1    | 6.1    | 6.1    | 5.5    | 4.3    | 4.3    |
| 80°   | 79.8   | 27.4   | 10.4   | 6.7    | 6.1    | 4.9    | 4.3    | 5.5    | 4.9    | 4.3    | 3.7    |
| 82.5° | 43.9   | 13.4   | 7.3    | 5.5    | 4.3    | 3.7    | 3.7    | 3.7    | 3.7    | 3.0    | 3.0    |
| 85°   | 28.0   | 7.3    | 4.9    | 4.3    | 4.3    | 3.0    | 2.4    | 2.4    | 1.8    | 1.8    | 1.8    |
| 87.5° | 12.8   | 4.3    | 4.3    | 3.7    | 3.7    | 3.0    | 1.8    | 1.2    | 0.6    | 0.6    | 0.6    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

Data in this report applies to families of products SA1C-760-U-5WQ .

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-760-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 5474   | CRI (Ra): | 71.7 | R9:  | -27.1 |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R10: | 40.8  |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R11: | 74.6  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R12: | 50.4  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R13: | 70.0  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R14: | 87.8  |
| CIE z:                    | 0.3204 | R6:       | 67.5 |      |       |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| Rf:                       | 72.1   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



**Test Conditions**

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

REPORT NUMBER: SP1-1908-441-9-R4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

REPORT NUMBER: SP1-1908-441-9-R4

CIE 1931 Chromaticity Diagram



CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 5700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



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| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 3540                                 | NR                             | 490               | 33363                                | NR                             | 620               | 80193                                | NR                             | 750               | 4663                                 | NR                             | 880               | 4678                                 | NR                             |
| 365               | 2862                                 | NR                             | 495               | 44177                                | NR                             | 625               | 73091                                | NR                             | 755               | 4147                                 | NR                             | 885               | 4128                                 | NR                             |
| 370               | 2865                                 | NR                             | 500               | 57019                                | NR                             | 630               | 66269                                | NR                             | 760               | 4040                                 | NR                             | 890               | 4504                                 | NR                             |
| 375               | 3254                                 | NR                             | 505               | 70030                                | NR                             | 635               | 60012                                | NR                             | 765               | 3474                                 | NR                             | 895               | 4371                                 | NR                             |
| 380               | 3076                                 | NR                             | 510               | 81972                                | NR                             | 640               | 53914                                | NR                             | 770               | 3469                                 | NR                             | 900               | 4082                                 | NR                             |
| 385               | 2904                                 | NR                             | 515               | 92590                                | NR                             | 645               | 48385                                | NR                             | 775               | 3181                                 | NR                             | 905               | 2982                                 | NR                             |
| 390               | 2689                                 | NR                             | 520               | 100305                               | NR                             | 650               | 43219                                | NR                             | 780               | 2969                                 | NR                             | 910               | 4351                                 | NR                             |
| 395               | 2619                                 | NR                             | 525               | 107452                               | NR                             | 655               | 38562                                | NR                             | 785               | 3132                                 | NR                             | 915               | 3365                                 | NR                             |
| 400               | 2679                                 | NR                             | 530               | 111373                               | NR                             | 660               | 34110                                | NR                             | 790               | 2507                                 | NR                             | 920               | 3430                                 | NR                             |
| 405               | 3515                                 | NR                             | 535               | 114505                               | NR                             | 665               | 30085                                | NR                             | 795               | 2968                                 | NR                             | 925               | 4264                                 | NR                             |
| 410               | 6934                                 | NR                             | 540               | 116408                               | NR                             | 670               | 26205                                | NR                             | 800               | 2758                                 | NR                             | 930               | 4095                                 | NR                             |
| 415               | 14943                                | NR                             | 545               | 118700                               | NR                             | 675               | 22906                                | NR                             | 805               | 2872                                 | NR                             | 935               | 5048                                 | NR                             |
| 420               | 31939                                | NR                             | 550               | 119209                               | NR                             | 680               | 20058                                | NR                             | 810               | 3094                                 | NR                             | 940               | 4074                                 | NR                             |
| 425               | 64701                                | NR                             | 555               | 120742                               | NR                             | 685               | 17413                                | NR                             | 815               | 3222                                 | NR                             | 945               | 4949                                 | NR                             |
| 430               | 110939                               | NR                             | 560               | 121594                               | NR                             | 690               | 15447                                | NR                             | 820               | 3238                                 | NR                             | 950               | 4387                                 | NR                             |
| 435               | 164597                               | NR                             | 565               | 121913                               | NR                             | 695               | 13398                                | NR                             | 825               | 3524                                 | NR                             | 955               | 4978                                 | NR                             |
| 440               | 207696                               | NR                             | 570               | 122147                               | NR                             | 700               | 11777                                | NR                             | 830               | 2921                                 | NR                             | 960               | 4706                                 | NR                             |
| 445               | 201830                               | NR                             | 575               | 121605                               | NR                             | 705               | 10412                                | NR                             | 835               | 3595                                 | NR                             | 965               | 5083                                 | NR                             |
| 450               | 145410                               | NR                             | 580               | 120248                               | NR                             | 710               | 9544                                 | NR                             | 840               | 3016                                 | NR                             | 970               | 4522                                 | NR                             |
| 455               | 89594                                | NR                             | 585               | 117717                               | NR                             | 715               | 8940                                 | NR                             | 845               | 4032                                 | NR                             | 975               | 4740                                 | NR                             |
| 460               | 58321                                | NR                             | 590               | 114359                               | NR                             | 720               | 7897                                 | NR                             | 850               | 3579                                 | NR                             | 980               | 6122                                 | NR                             |
| 465               | 39318                                | NR                             | 595               | 109974                               | NR                             | 725               | 7045                                 | NR                             | 855               | 4571                                 | NR                             | 985               | 6450                                 | NR                             |
| 470               | 27693                                | NR                             | 600               | 105269                               | NR                             | 730               | 6483                                 | NR                             | 860               | 4485                                 | NR                             | 990               | 4875                                 | NR                             |
| 475               | 23081                                | NR                             | 605               | 99453                                | NR                             | 735               | 5838                                 | NR                             | 865               | 3978                                 | NR                             | 995               | 4764                                 | NR                             |
| 480               | 23002                                | NR                             | 610               | 92921                                | NR                             | 740               | 5261                                 | NR                             | 870               | 4298                                 | NR                             | 1000              | 3640                                 | NR                             |
| 485               | 26201                                | NR                             | 615               | 86989                                | NR                             | 745               | 4760                                 | NR                             | 875               | 4356                                 | NR                             |                   |                                      |                                |

REPORT NUMBER: SP1-1908-441-9-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 13759.3 S/P: 1.85

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

REPORT NUMBER: SP1-1908-441-9-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5527.6 M/P: 0.74**

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

REPORT NUMBER: SP1-1908-441-9-R4

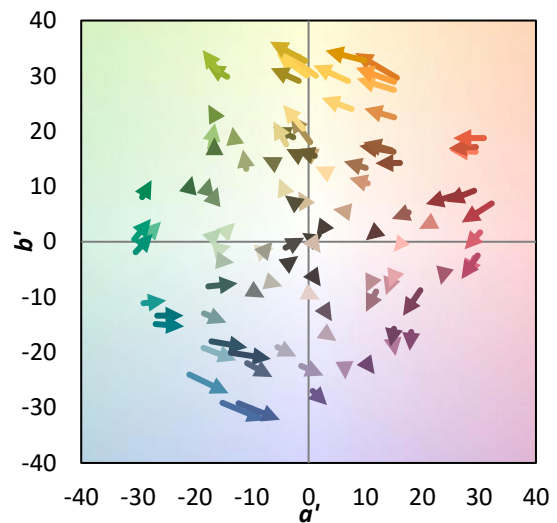
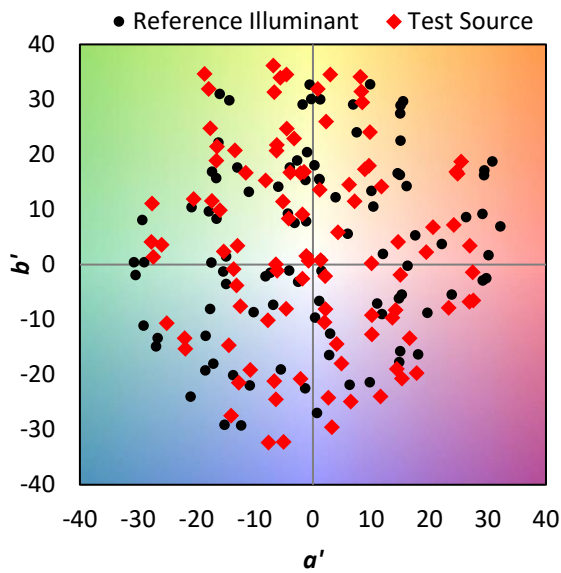
TM-30-18

**Summary**

$R_f = 72.1$   
 $R_g = 97.2$   
 CIE  $R_a = 71.7$   
 $R_g = -27.1$



**Color Vector Graphics**





REPORT NUMBER: SP1-1908-441-9-R4

TM-30-18

**Individual Sample Fidelity Index ( $R_{f,i}$ )**

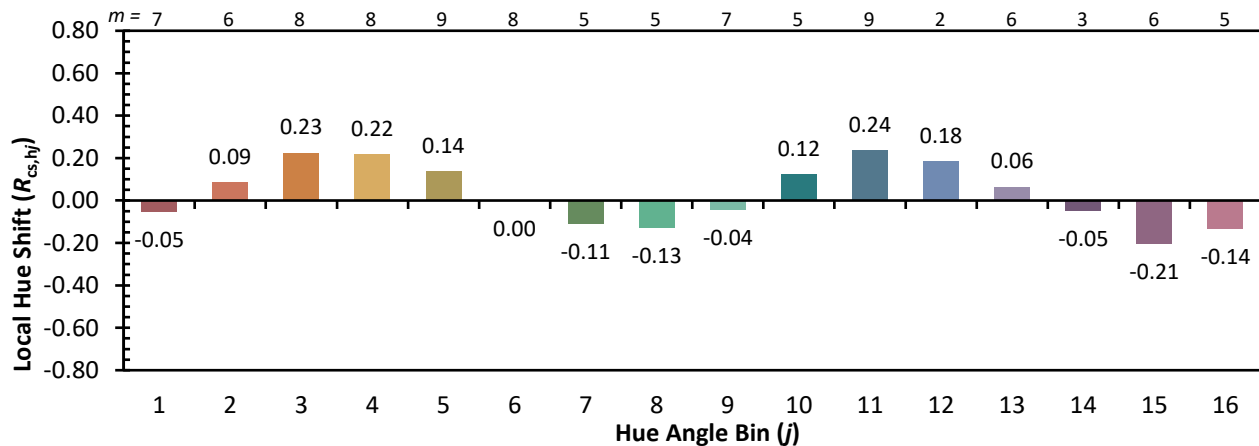
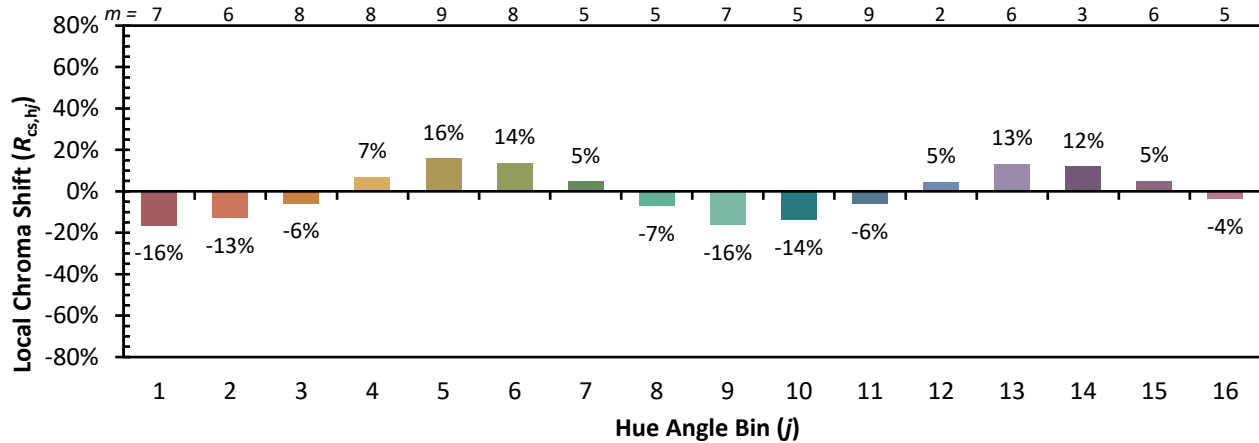
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
| CES05 = 46 | CES30 = 59 | CES55 = 80 | CES80 = 70 |
| CES06 = 50 | CES31 = 55 | CES56 = 70 | CES81 = 71 |
| CES07 = 38 | CES32 = 52 | CES57 = 68 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 82 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 84 |
| CES11 = 55 | CES36 = 90 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 72 | CES62 = 81 | CES87 = 75 |
| CES13 = 41 | CES38 = 68 | CES63 = 75 | CES88 = 77 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 84 | CES66 = 66 | CES91 = 92 |
| CES17 = 48 | CES42 = 70 | CES67 = 64 | CES92 = 70 |
| CES18 = 55 | CES43 = 69 | CES68 = 71 | CES93 = 83 |
| CES19 = 70 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 73 |
| CES21 = 85 | CES46 = 78 | CES71 = 55 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 68 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



REPORT NUMBER: SP1-1908-441-9-R4

TM-30-18

Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-1908-441-9-R4

TM-30-18

Measure Comparisons



(END OF REPORT)