

Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P319556

Luminaire Tested: **GLEON-SA2B-722-U-SL2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319556  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-20)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA2B-722-U-SL2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(2) 70 CRI, 2200K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II SPILL  
LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 8420 lumens  
Efficiency: N/A  
Efficacy: 99.1 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B2 - U0 - G3

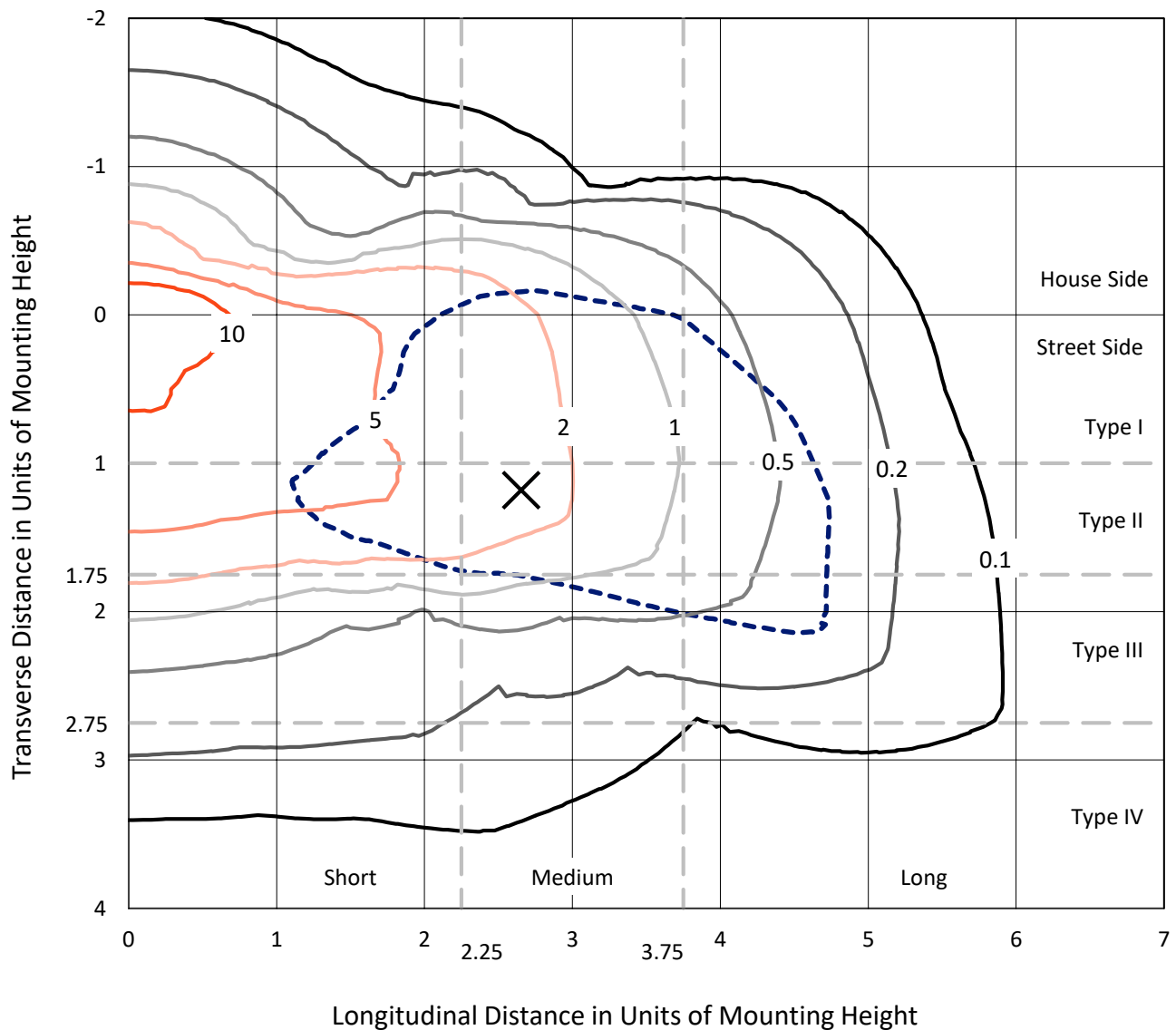
Input Watts (W): 85  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P319556  
 CATALOG NUMBER: GLEON-SA2B-722-U-SL2

## Iso-Footcandle Lines of Horizontal Illumination

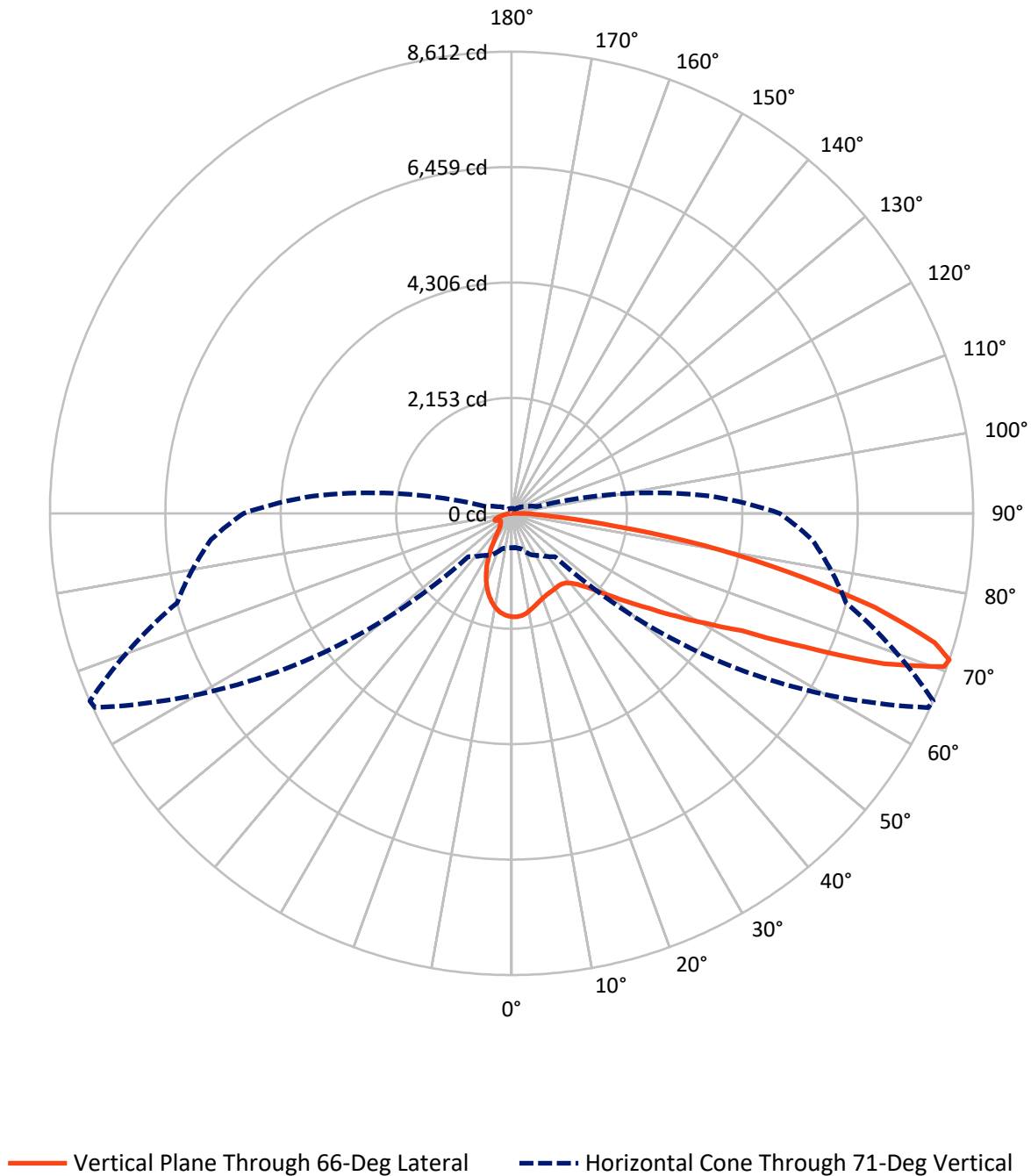
× Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 19.3 fc  
 Type III - Medium - N/A

REPORT NUMBER: P319556  
CATALOG NUMBER: GLEON-SA2B-722-U-SL2

## Luminous Intensity Polar Plot



REPORT NUMBER: P319556

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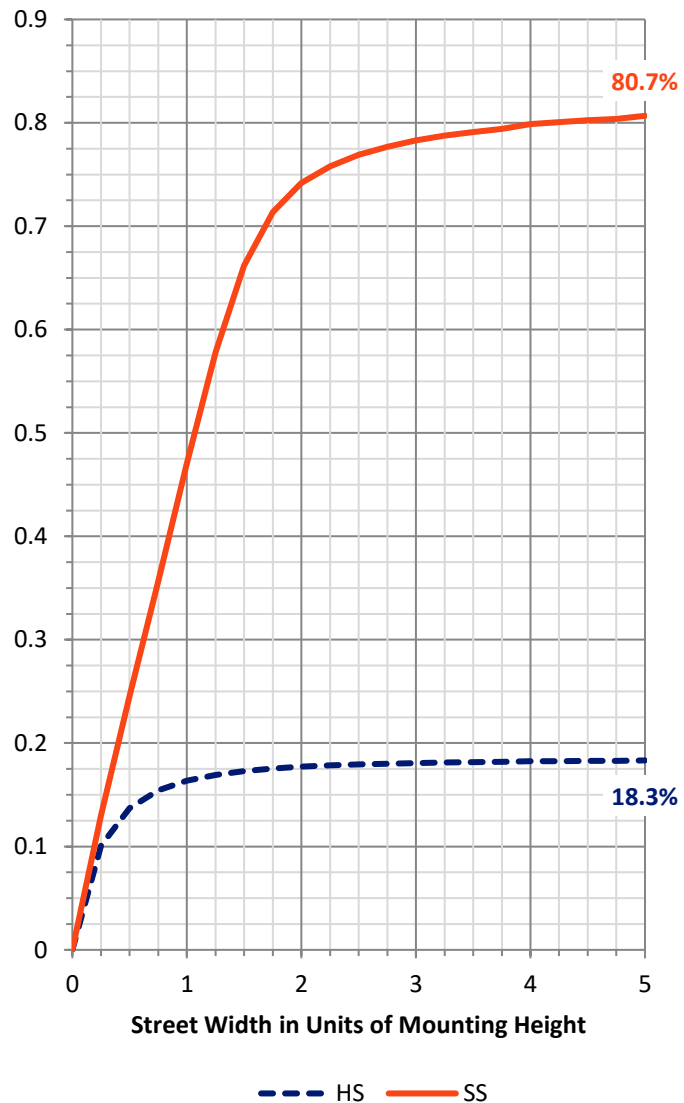
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1560.5   | 0.0    | 1560.5 |
|                    | % Fixture | 18.5     | 0.0    | 18.5   |
| <b>Street Side</b> | Lumens    | 6859.5   | 0.0    | 6859.5 |
|                    | % Fixture | 81.5     | 0.0    | 81.5   |
| <b>Total</b>       | Lumens    | 8420.0   | 0.0    | 8420.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 169.8  | 2.0       |
| 10°-20°   | 407.2  | 4.8       |
| 20°-30°   | 547.0  | 6.5       |
| 30°-40°   | 719.6  | 8.5       |
| 40°-50°   | 1046.8 | 12.4      |
| 50°-60°   | 1635.2 | 19.4      |
| 60°-70°   | 2048.3 | 24.3      |
| 70°-80°   | 1562.4 | 18.6      |
| 80°-90°   | 283.7  | 3.4       |
| 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°    | 8420.0 | 100.0     |
| 0°-180°   | 8420.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P319556

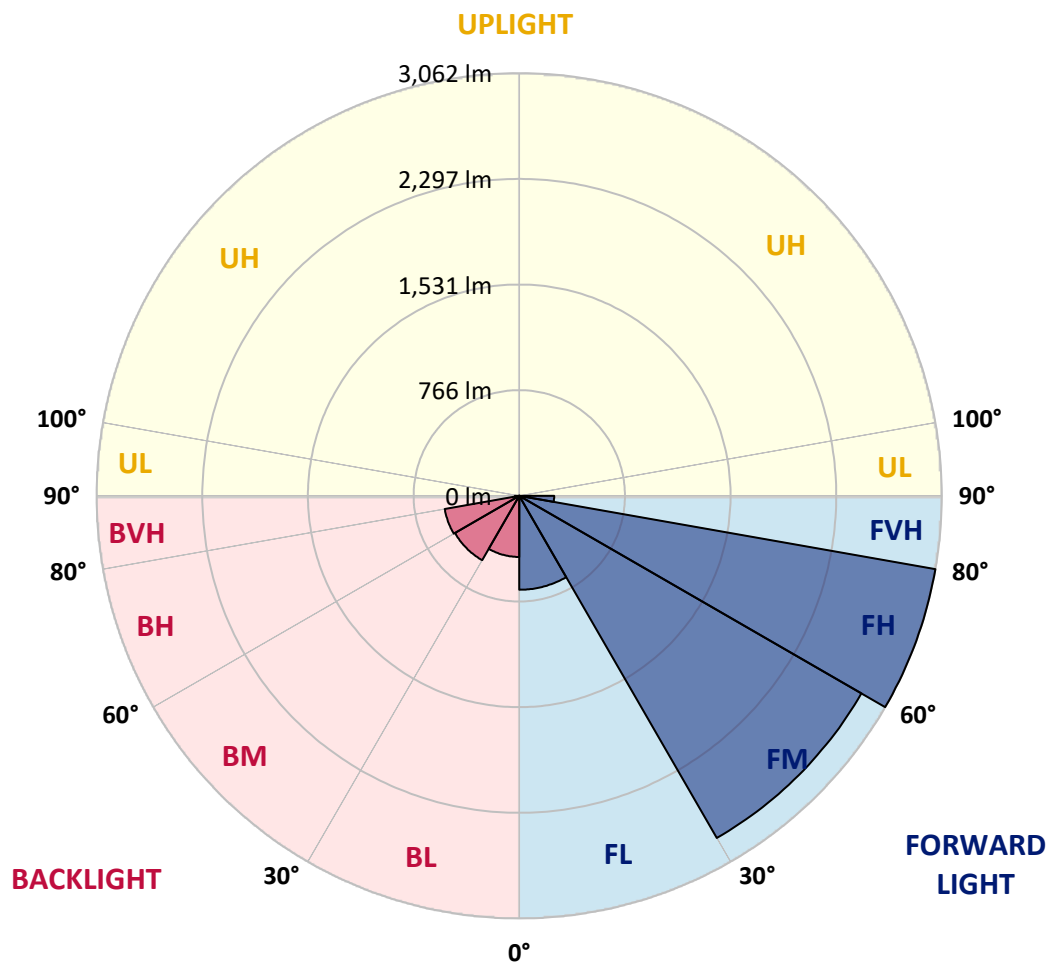
CATALOG NUMBER: GLEON-SA2B-722-U-SL2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 680.9  | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 2863.2 | 34.0      |                         |      |         |
| FH   | (60°-80°)   | 3062.4 | 36.4      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 253.0  | 3.0       |                         |      | G3/500  |
| BL   | (0°-30°)    | 443.1  | 5.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 538.3  | 6.4       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 548.3  | 6.5       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 30.7   | 0.4       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G3**

Type III Medium



REPORT NUMBER: P319556

CATALOG NUMBER: GLEON-SA2B-722-U-SL2

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 66°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 |
| 2.5°  | 1893.1 | 1890.2 | 1898.9 | 1907.9 | 1911.4 | 1917.2 | 1926.0 | 1930.9 | 1930.6 | 1931.5 | 1928.6 |
| 5°    | 1767.5 | 1763.7 | 1781.2 | 1795.4 | 1822.7 | 1853.6 | 1891.1 | 1917.8 | 1918.4 | 1933.5 | 1937.6 |
| 7.5°  | 1648.6 | 1646.0 | 1666.1 | 1689.0 | 1720.7 | 1767.8 | 1828.6 | 1886.1 | 1889.6 | 1930.6 | 1944.8 |
| 10°   | 1553.3 | 1552.7 | 1572.2 | 1597.2 | 1634.1 | 1686.7 | 1756.5 | 1840.8 | 1846.0 | 1916.6 | 1946.0 |
| 12.5° | 1478.8 | 1480.0 | 1496.9 | 1525.4 | 1564.3 | 1619.3 | 1694.8 | 1789.9 | 1798.3 | 1894.6 | 1939.3 |
| 15°   | 1423.9 | 1428.5 | 1442.2 | 1471.0 | 1509.4 | 1565.2 | 1642.8 | 1742.8 | 1755.6 | 1869.8 | 1935.5 |
| 17.5° | 1392.5 | 1397.7 | 1407.3 | 1431.2 | 1467.2 | 1521.0 | 1594.5 | 1704.1 | 1715.8 | 1850.9 | 1935.8 |
| 20°   | 1383.2 | 1387.6 | 1393.1 | 1407.6 | 1438.1 | 1487.0 | 1556.5 | 1669.3 | 1681.8 | 1835.8 | 1938.7 |
| 22.5° | 1401.5 | 1404.7 | 1405.3 | 1404.1 | 1422.7 | 1462.6 | 1528.8 | 1643.7 | 1657.0 | 1825.9 | 1940.8 |
| 25°   | 1440.8 | 1445.1 | 1441.9 | 1431.2 | 1425.1 | 1449.5 | 1514.6 | 1626.8 | 1640.2 | 1818.7 | 1936.7 |
| 27.5° | 1499.8 | 1500.4 | 1497.7 | 1483.8 | 1455.0 | 1450.9 | 1510.2 | 1616.9 | 1629.7 | 1810.2 | 1928.3 |
| 30°   | 1580.0 | 1583.8 | 1579.1 | 1560.2 | 1513.1 | 1474.2 | 1515.5 | 1607.3 | 1619.0 | 1799.5 | 1914.6 |
| 32.5° | 1673.9 | 1683.2 | 1682.9 | 1663.2 | 1595.7 | 1526.2 | 1537.0 | 1601.5 | 1610.5 | 1788.2 | 1898.0 |
| 35°   | 1771.3 | 1784.1 | 1807.9 | 1799.5 | 1716.1 | 1608.5 | 1578.3 | 1610.8 | 1616.9 | 1786.7 | 1886.4 |
| 37.5° | 1872.5 | 1885.3 | 1934.4 | 1957.1 | 1859.4 | 1726.2 | 1643.4 | 1643.7 | 1646.6 | 1804.4 | 1885.5 |
| 40°   | 1978.3 | 1991.9 | 2065.8 | 2124.8 | 2045.1 | 1875.4 | 1748.3 | 1712.3 | 1709.1 | 1848.0 | 1902.7 |
| 42.5° | 2126.5 | 2138.8 | 2227.4 | 2302.7 | 2251.3 | 2066.4 | 1893.4 | 1818.1 | 1811.4 | 1933.5 | 1957.6 |
| 45°   | 2314.0 | 2324.5 | 2418.7 | 2499.2 | 2472.8 | 2284.4 | 2075.7 | 1963.7 | 1962.6 | 2076.0 | 2069.0 |
| 47.5° | 2537.0 | 2545.2 | 2629.8 | 2707.7 | 2717.3 | 2535.3 | 2304.7 | 2188.5 | 2169.6 | 2271.3 | 2241.4 |
| 50°   | 2769.3 | 2778.3 | 2835.9 | 2919.6 | 2990.8 | 2871.0 | 2599.5 | 2463.8 | 2438.5 | 2529.2 | 2485.6 |
| 52.5° | 2923.1 | 2935.0 | 2985.0 | 3091.1 | 3298.4 | 3239.1 | 2948.1 | 2797.5 | 2759.1 | 2841.7 | 2808.3 |
| 55°   | 2854.5 | 2881.2 | 2957.7 | 3127.7 | 3544.3 | 3801.3 | 3378.0 | 3186.8 | 3143.4 | 3212.1 | 3192.3 |
| 57.5° | 2542.5 | 2579.2 | 2683.5 | 2946.1 | 3578.9 | 4296.7 | 4028.1 | 3645.2 | 3614.7 | 3594.9 | 3603.9 |
| 60°   | 1972.5 | 2007.6 | 2137.0 | 2479.2 | 3337.9 | 4658.3 | 5006.3 | 4210.3 | 4166.2 | 3979.2 | 3987.4 |
| 62.5° | 1396.0 | 1378.3 | 1466.9 | 1717.2 | 2712.3 | 4700.8 | 6119.4 | 4966.2 | 4820.8 | 4385.1 | 4349.3 |
| 65°   | 1064.6 | 1060.5 | 1100.3 | 1180.0 | 1642.8 | 4192.9 | 6782.5 | 6236.6 | 6009.6 | 4862.4 | 4778.1 |
| 67.5° | 874.7  | 867.5  | 906.7  | 1022.7 | 1057.9 | 2705.1 | 6797.1 | 7710.5 | 7487.5 | 5456.6 | 5274.1 |
| 70°   | 719.2  | 711.1  | 747.7  | 897.4  | 977.7  | 1371.9 | 5720.6 | 8573.6 | 8561.7 | 6209.0 | 5648.5 |
| 71°   | 644.8  | 639.0  | 682.9  | 849.2  | 960.5  | 1143.4 | 4939.2 | 8575.9 | 8611.7 | 6463.6 | 5626.4 |
| 72.5° | 525.0  | 527.1  | 573.6  | 755.8  | 947.7  | 1009.6 | 3630.1 | 8176.2 | 8251.8 | 6706.4 | 5425.5 |
| 75°   | 348.9  | 350.6  | 411.6  | 581.4  | 918.9  | 987.8  | 1995.1 | 6860.7 | 6999.7 | 6561.0 | 4950.8 |
| 77.5° | 234.3  | 233.7  | 275.3  | 398.9  | 800.6  | 987.8  | 1169.8 | 5131.3 | 5283.9 | 5220.6 | 3816.7 |
| 80°   | 161.3  | 160.2  | 189.5  | 275.3  | 606.1  | 999.8  | 904.4  | 3596.1 | 3642.3 | 2819.3 | 1551.2 |
| 82.5° | 98.8   | 99.7   | 123.8  | 194.5  | 412.5  | 899.7  | 853.8  | 1960.8 | 1910.5 | 790.7  | 387.5  |
| 85°   | 56.7   | 56.4   | 79.1   | 131.7  | 264.8  | 759.3  | 832.6  | 843.9  | 774.2  | 238.1  | 140.1  |
| 87.5° | 20.3   | 21.8   | 42.4   | 73.0   | 151.8  | 528.8  | 706.4  | 439.0  | 395.7  | 107.6  | 63.4   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P319556

CATALOG NUMBER: GLEON-SA2B-722-U-SL2

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 | 1928.9 |
| 2.5°  | 1926.5 | 1928.3 | 1926.2 | 1914.6 | 1904.7 | 1888.7 | 1879.7 | 1867.2 | 1863.4 | 1861.7 | 1866.4 |
| 5°    | 1933.8 | 1934.4 | 1917.2 | 1886.7 | 1852.4 | 1812.0 | 1782.9 | 1747.2 | 1730.3 | 1723.0 | 1727.7 |
| 7.5°  | 1940.5 | 1937.9 | 1900.4 | 1841.9 | 1778.6 | 1708.2 | 1645.7 | 1588.4 | 1555.0 | 1541.3 | 1542.5 |
| 10°   | 1941.4 | 1930.3 | 1870.1 | 1779.7 | 1681.5 | 1578.3 | 1482.3 | 1394.0 | 1338.1 | 1301.8 | 1312.8 |
| 12.5° | 1932.3 | 1913.7 | 1825.7 | 1699.2 | 1562.9 | 1422.2 | 1292.5 | 1159.9 | 1080.3 | 1043.4 | 1044.5 |
| 15°   | 1925.4 | 1891.6 | 1771.0 | 1604.4 | 1421.3 | 1234.9 | 1057.9 | 902.1  | 817.2  | 779.4  | 761.7  |
| 17.5° | 1919.6 | 1867.8 | 1707.6 | 1497.7 | 1254.1 | 1017.8 | 805.0  | 666.0  | 619.5  | 608.5  | 603.8  |
| 20°   | 1911.4 | 1842.5 | 1637.0 | 1374.2 | 1063.7 | 774.7  | 587.8  | 519.2  | 519.5  | 532.3  | 534.0  |
| 22.5° | 1900.1 | 1813.7 | 1561.7 | 1235.5 | 859.3  | 564.3  | 460.8  | 441.0  | 461.1  | 485.5  | 489.8  |
| 25°   | 1883.2 | 1779.7 | 1478.0 | 1082.3 | 655.3  | 433.7  | 393.6  | 392.7  | 417.2  | 442.8  | 446.5  |
| 27.5° | 1859.4 | 1735.2 | 1384.9 | 917.8  | 482.9  | 368.6  | 352.6  | 358.7  | 376.8  | 395.4  | 396.8  |
| 30°   | 1827.4 | 1683.5 | 1282.3 | 744.2  | 378.5  | 328.2  | 326.5  | 332.0  | 343.0  | 356.1  | 357.3  |
| 32.5° | 1792.2 | 1630.9 | 1172.7 | 576.2  | 324.1  | 306.4  | 308.2  | 310.8  | 316.0  | 321.2  | 322.4  |
| 35°   | 1760.2 | 1577.1 | 1060.5 | 437.8  | 298.3  | 292.2  | 291.0  | 290.4  | 291.0  | 289.3  | 289.5  |
| 37.5° | 1739.6 | 1532.6 | 943.6  | 348.6  | 283.4  | 279.7  | 276.2  | 271.8  | 266.9  | 264.0  | 264.5  |
| 40°   | 1732.0 | 1499.5 | 825.3  | 301.2  | 271.2  | 268.6  | 261.9  | 252.6  | 246.8  | 245.1  | 245.1  |
| 42.5° | 1752.4 | 1482.3 | 711.1  | 277.3  | 261.1  | 256.7  | 245.6  | 234.9  | 230.5  | 230.2  | 230.0  |
| 45°   | 1814.6 | 1489.3 | 602.4  | 264.3  | 251.8  | 243.3  | 228.8  | 219.8  | 216.9  | 217.5  | 217.2  |
| 47.5° | 1926.2 | 1533.2 | 509.3  | 255.5  | 242.5  | 231.4  | 215.1  | 207.9  | 204.4  | 204.4  | 204.7  |
| 50°   | 2116.1 | 1635.8 | 435.2  | 248.3  | 234.6  | 220.4  | 205.2  | 196.2  | 191.6  | 191.3  | 191.3  |
| 52.5° | 2392.5 | 1819.6 | 389.0  | 242.2  | 225.9  | 210.5  | 195.4  | 184.0  | 178.5  | 177.3  | 176.8  |
| 55°   | 2739.1 | 2082.9 | 376.2  | 238.1  | 214.3  | 199.7  | 183.4  | 172.1  | 166.0  | 163.4  | 163.1  |
| 57.5° | 3126.6 | 2403.3 | 401.5  | 233.1  | 202.3  | 186.9  | 170.4  | 159.6  | 153.2  | 150.0  | 149.7  |
| 60°   | 3518.8 | 2753.0 | 504.7  | 226.2  | 192.4  | 173.0  | 157.0  | 147.1  | 140.7  | 137.2  | 136.6  |
| 62.5° | 3911.5 | 3121.6 | 715.4  | 225.6  | 185.5  | 159.6  | 143.3  | 134.9  | 128.8  | 125.0  | 124.1  |
| 65°   | 4354.5 | 3525.1 | 955.0  | 241.0  | 183.1  | 147.4  | 129.4  | 122.7  | 117.4  | 114.0  | 113.7  |
| 67.5° | 4863.3 | 3980.7 | 932.0  | 272.7  | 191.0  | 136.3  | 116.3  | 111.1  | 107.3  | 104.4  | 104.1  |
| 70°   | 5102.0 | 3909.5 | 579.4  | 295.1  | 202.0  | 125.6  | 103.8  | 100.0  | 97.1   | 95.1   | 94.2   |
| 71°   | 5002.0 | 3712.1 | 485.8  | 292.5  | 200.9  | 120.9  | 98.8   | 95.9   | 93.0   | 91.3   | 90.4   |
| 72.5° | 4729.3 | 3385.3 | 405.2  | 272.1  | 187.8  | 112.5  | 92.4   | 89.5   | 86.9   | 84.9   | 84.3   |
| 75°   | 4243.8 | 3023.4 | 324.4  | 217.5  | 149.7  | 95.1   | 81.1   | 77.9   | 75.9   | 74.7   | 73.5   |
| 77.5° | 3119.6 | 2157.6 | 250.9  | 171.8  | 110.2  | 77.6   | 69.2   | 66.9   | 64.8   | 63.1   | 62.2   |
| 80°   | 1195.1 | 835.8  | 168.9  | 128.2  | 80.8   | 61.3   | 55.8   | 54.7   | 52.6   | 51.5   | 51.5   |
| 82.5° | 321.8  | 249.7  | 90.1   | 77.6   | 54.1   | 44.8   | 42.7   | 42.2   | 40.4   | 38.1   | 38.4   |
| 85°   | 130.2  | 110.2  | 50.6   | 42.7   | 33.1   | 26.5   | 28.8   | 29.1   | 27.0   | 24.1   | 24.4   |
| 87.5° | 57.3   | 46.8   | 28.2   | 18.9   | 14.5   | 10.2   | 13.1   | 13.1   | 11.9   | 9.9    | 9.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-722-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):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

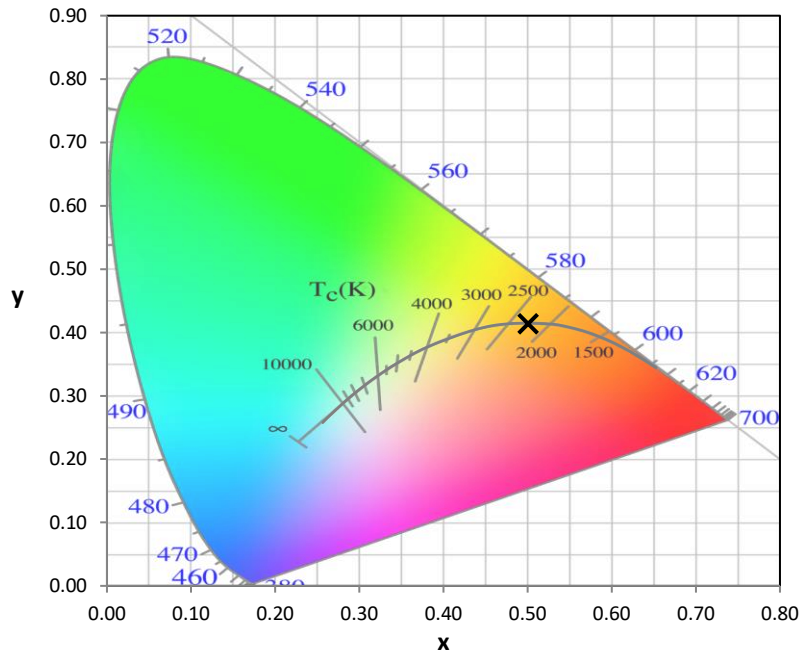
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

REPORT NUMBER: SP1-1908-441-10-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: SP1-1908-441-10-R4

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 2200K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-10-R4

**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

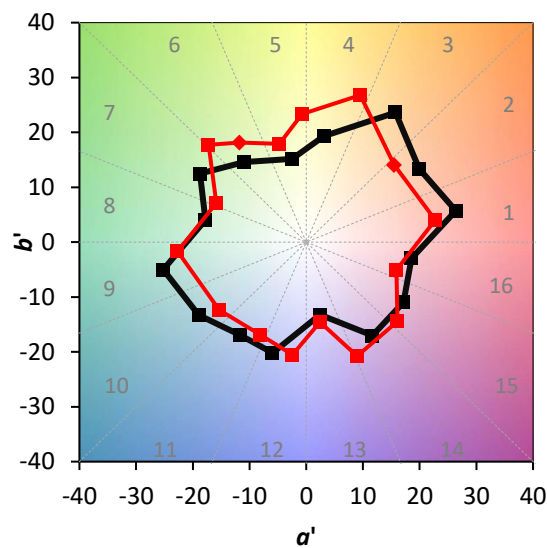
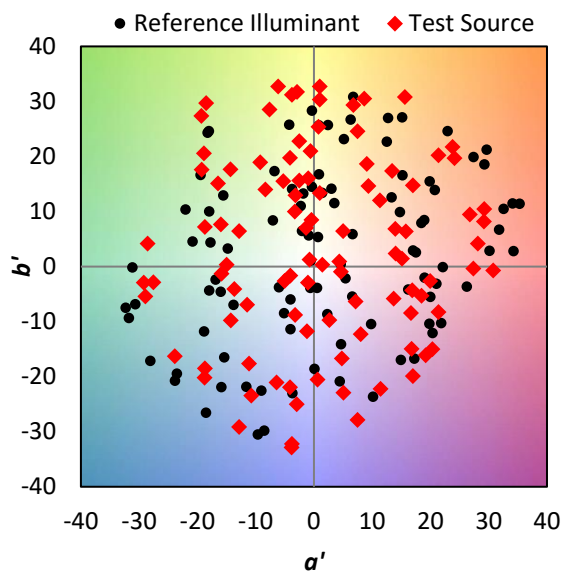
**TM-30-18**

**Summary**

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_g = -17.4$



**Color Vector Graphics**





REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

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

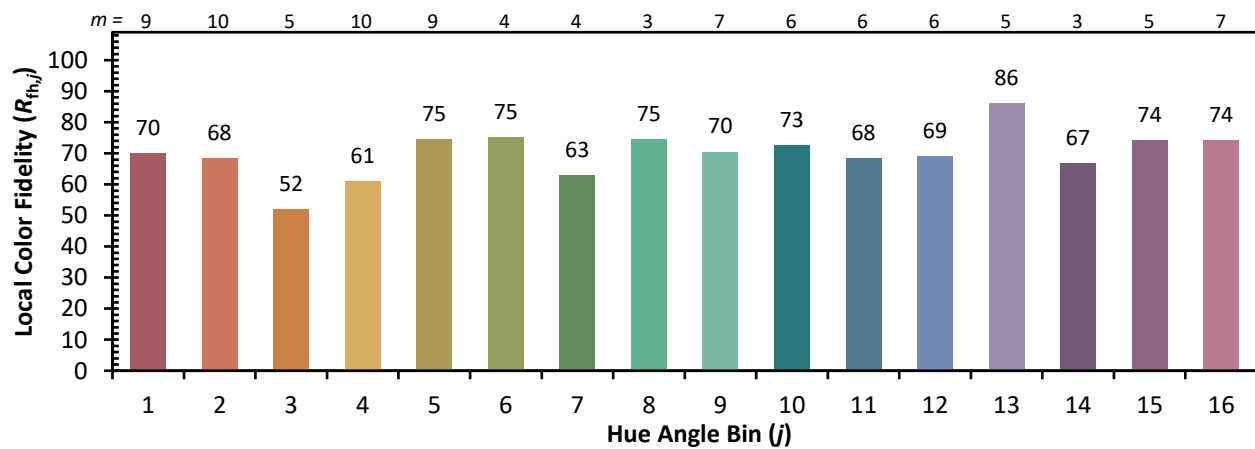
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)