

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: STREETWORKS

Report Number: P361626

Luminaire Tested: NVN-SA2C-760-U-T4W

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-2019  
Report Number: P361626  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-18)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA2C-760-U-T4W  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(2) 70 CRI, 5700K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 14302 lumens  
Efficiency: N/A  
Efficacy: 126.6 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G3

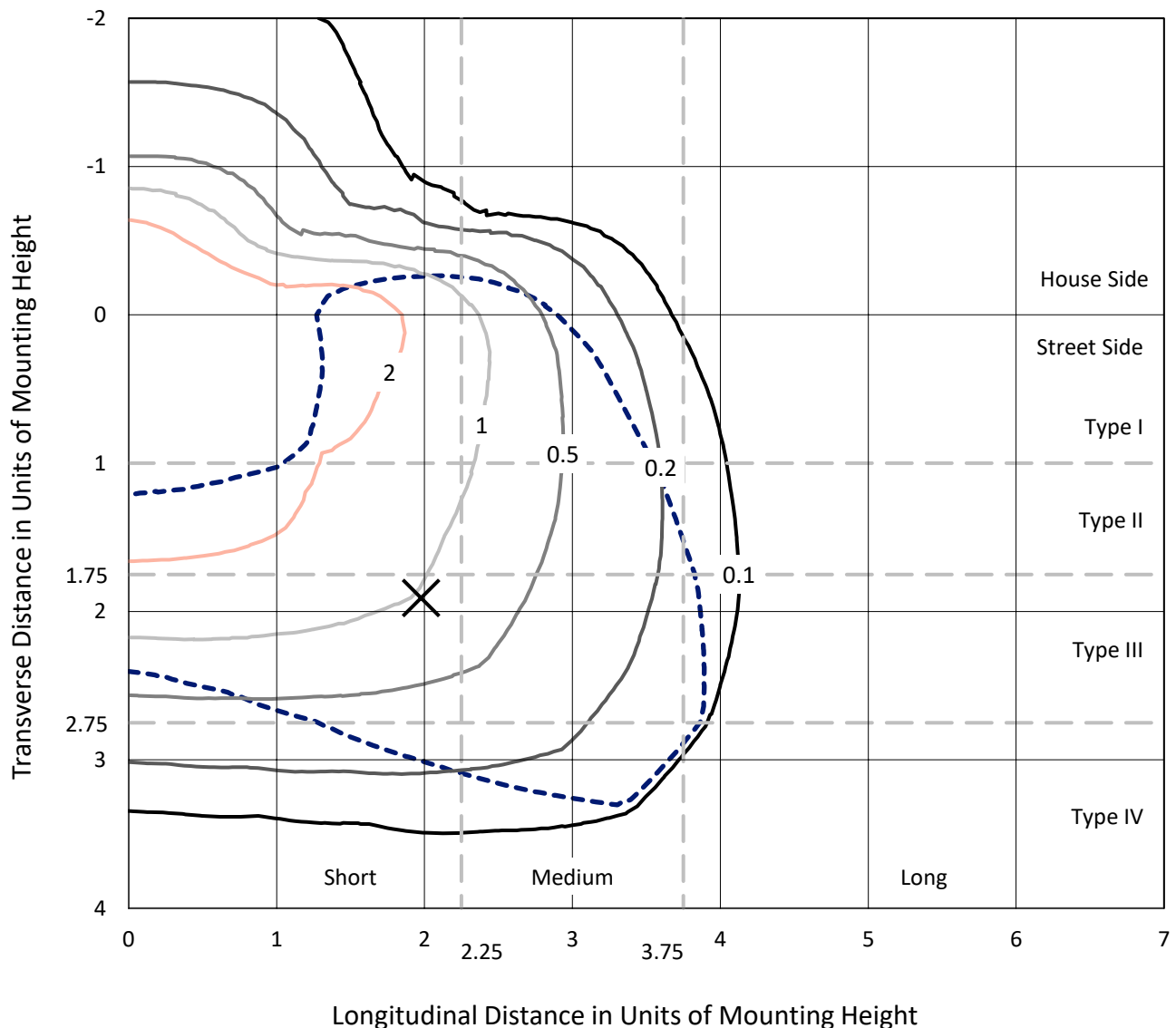
Input Watts (W): 113  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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 CATALOG NUMBER: NVN-SA2C-760-U-T4W

## Iso-Footcandle Lines of Horizontal Illumination

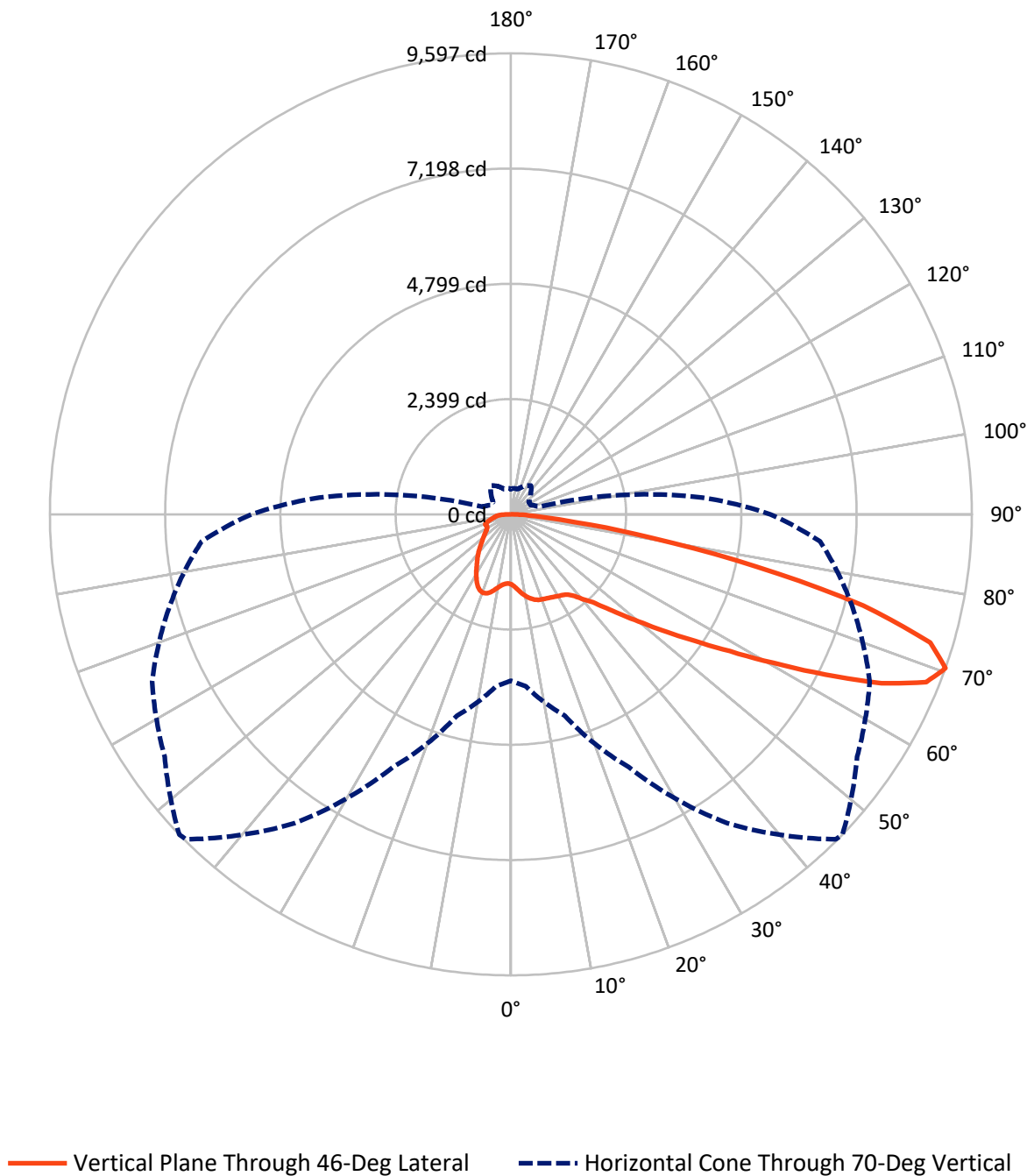
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 4.6 fc  
 Type IV - Short - N/A

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CATALOG NUMBER: NVN-SA2C-760-U-T4W

## Luminous Intensity Polar Plot



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CATALOG NUMBER: NVN-SA2C-760-U-T4W

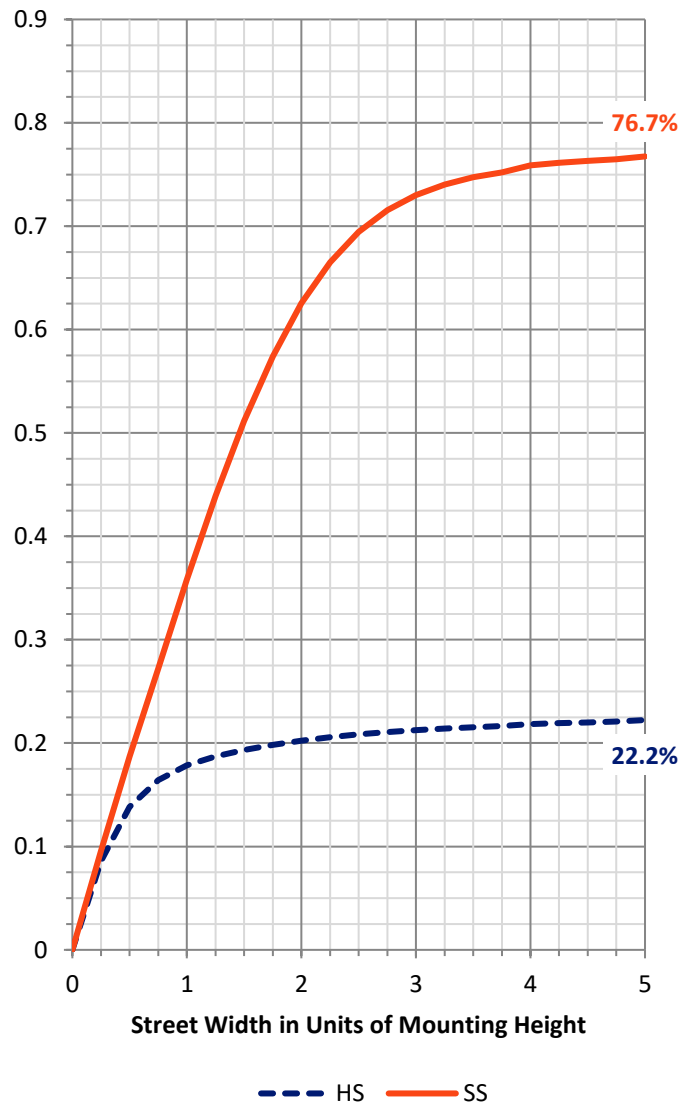
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3278.0   | 0.0    | 3278.0  |
|                    | % Fixture | 22.9     | 0.0    | 22.9    |
| <b>Street Side</b> | Lumens    | 11024.0  | 0.0    | 11024.0 |
|                    | % Fixture | 77.1     | 0.0    | 77.1    |
| <b>Total</b>       | Lumens    | 14302.0  | 0.0    | 14302.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 148.5   | 1.0       |
| 10°-20°   | 494.9   | 3.5       |
| 20°-30°   | 825.2   | 5.8       |
| 30°-40°   | 1171.0  | 8.2       |
| 40°-50°   | 1722.4  | 12.0      |
| 50°-60°   | 2916.9  | 20.4      |
| 60°-70°   | 4140.5  | 29.0      |
| 70°-80°   | 2515.4  | 17.6      |
| 80°-90°   | 367.1   | 2.6       |
| 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°    | 14302.0 | 100.0     |
| 0°-180°   | 14302.0 | 100.0     |

**Coefficient of Utilization**



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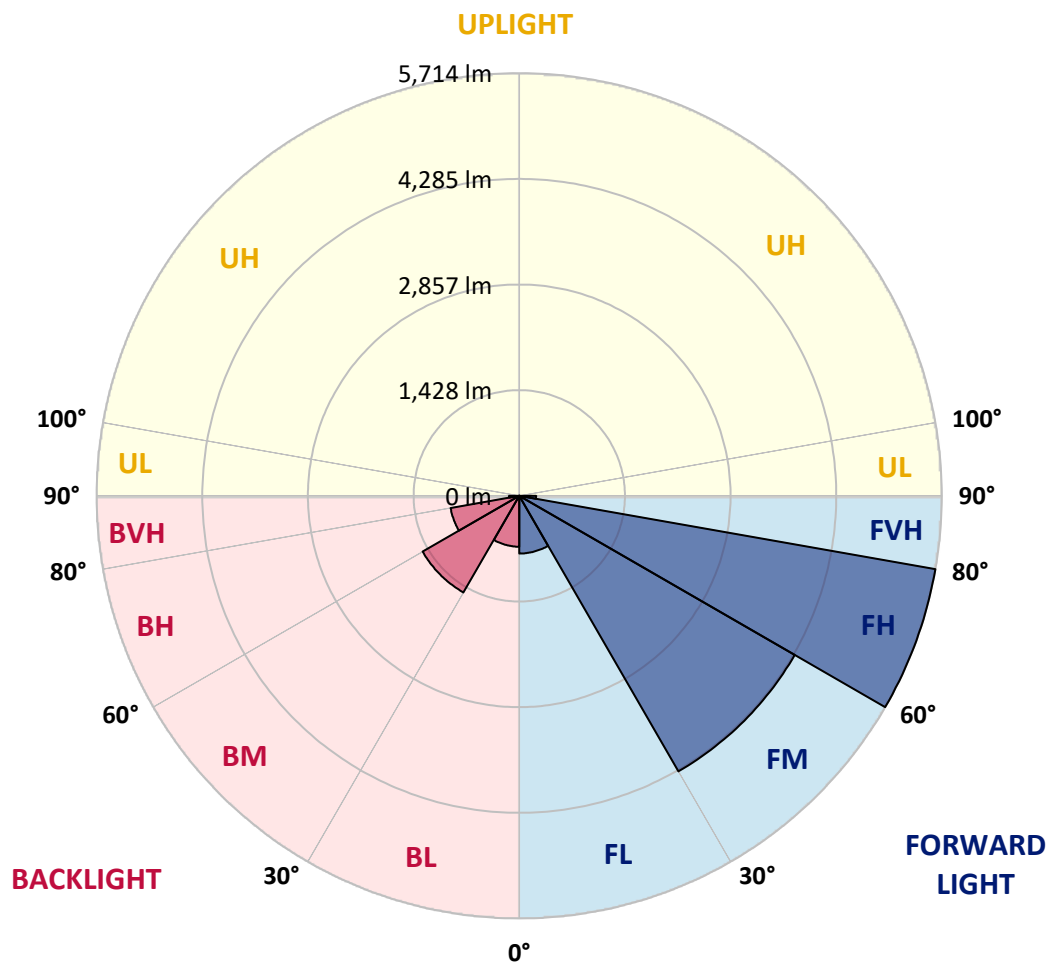
CATALOG NUMBER: NVN-SA2C-760-U-T4W

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 780.4  | 5.5       |                         |      |         |
| FM   | (30°-60°)   | 4301.4 | 30.1      |                         |      |         |
| FH   | (60°-80°)   | 5713.6 | 39.9      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 228.7  | 1.6       |                         |      | G3/500  |
| BL   | (0°-30°)    | 688.2  | 4.8       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1508.9 | 10.6      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 942.4  | 6.6       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 138.4  | 1.0       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type IV Short





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CATALOG NUMBER: NVN-SA2C-760-U-T4W

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 46°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 |
| 2.5°  | 1530.0 | 1531.0 | 1533.0 | 1528.1 | 1514.4 | 1510.4 | 1509.0 | 1494.8 | 1485.5 | 1471.8 | 1460.0 |
| 5°    | 1652.4 | 1653.4 | 1650.4 | 1636.7 | 1606.4 | 1583.9 | 1581.9 | 1549.6 | 1520.2 | 1488.9 | 1465.4 |
| 7.5°  | 1780.1 | 1781.6 | 1772.3 | 1746.4 | 1703.8 | 1664.6 | 1662.2 | 1618.1 | 1573.6 | 1526.1 | 1490.9 |
| 10°   | 1893.2 | 1887.3 | 1872.1 | 1835.9 | 1785.5 | 1737.5 | 1735.6 | 1689.6 | 1638.2 | 1580.9 | 1533.9 |
| 12.5° | 1968.6 | 1963.7 | 1944.1 | 1900.0 | 1844.7 | 1800.7 | 1796.8 | 1754.2 | 1704.3 | 1641.6 | 1585.3 |
| 15°   | 2010.2 | 2013.6 | 1987.2 | 1937.2 | 1883.4 | 1846.2 | 1842.8 | 1812.4 | 1767.9 | 1704.8 | 1640.1 |
| 17.5° | 2015.6 | 2018.5 | 1993.0 | 1943.6 | 1899.6 | 1874.1 | 1872.6 | 1852.6 | 1820.3 | 1759.6 | 1692.0 |
| 20°   | 1984.2 | 1986.2 | 1965.1 | 1924.5 | 1895.6 | 1887.8 | 1887.3 | 1878.5 | 1854.5 | 1800.7 | 1735.1 |
| 22.5° | 1938.7 | 1940.2 | 1925.0 | 1895.6 | 1885.9 | 1898.1 | 1901.5 | 1898.1 | 1881.0 | 1830.5 | 1768.9 |
| 25°   | 1927.5 | 1926.5 | 1910.8 | 1881.0 | 1889.3 | 1915.2 | 1919.6 | 1921.1 | 1909.3 | 1865.3 | 1811.9 |
| 27.5° | 1981.8 | 1978.4 | 1948.5 | 1900.5 | 1905.9 | 1937.2 | 1943.1 | 1957.3 | 1950.0 | 1911.3 | 1860.9 |
| 30°   | 2138.9 | 2133.0 | 2071.8 | 1974.9 | 1948.5 | 1964.7 | 1972.0 | 1994.5 | 1996.0 | 1963.7 | 1926.0 |
| 32.5° | 2404.2 | 2396.8 | 2287.2 | 2113.9 | 2020.5 | 1992.6 | 1999.4 | 2033.2 | 2051.3 | 2026.3 | 1985.7 |
| 35°   | 2739.5 | 2731.1 | 2587.2 | 2350.3 | 2140.9 | 2045.9 | 2050.8 | 2077.7 | 2113.9 | 2078.7 | 2024.9 |
| 37.5° | 3088.9 | 3068.9 | 2930.3 | 2628.3 | 2332.2 | 2159.9 | 2159.9 | 2163.4 | 2180.5 | 2107.1 | 2070.9 |
| 40°   | 3436.4 | 3416.4 | 3291.1 | 2955.3 | 2579.9 | 2339.6 | 2328.3 | 2252.5 | 2238.7 | 2175.6 | 2163.4 |
| 42.5° | 3759.5 | 3753.6 | 3679.7 | 3324.8 | 2870.6 | 2516.3 | 2500.6 | 2371.9 | 2374.8 | 2335.7 | 2336.1 |
| 45°   | 4103.1 | 4103.1 | 4042.9 | 3697.8 | 3209.3 | 2800.1 | 2784.5 | 2595.1 | 2624.4 | 2606.3 | 2649.9 |
| 47.5° | 4383.5 | 4392.3 | 4384.0 | 4086.4 | 3603.3 | 3160.9 | 3132.5 | 2904.4 | 2986.6 | 3048.8 | 3175.6 |
| 50°   | 4669.8 | 4683.6 | 4685.0 | 4512.7 | 4079.6 | 3589.6 | 3557.3 | 3315.0 | 3498.6 | 3676.8 | 3925.9 |
| 52.5° | 5085.4 | 5116.2 | 4993.4 | 4938.1 | 4663.0 | 4098.7 | 4066.8 | 3843.2 | 4149.6 | 4399.7 | 4828.9 |
| 55°   | 5470.6 | 5443.7 | 5356.1 | 5390.3 | 5287.5 | 4678.2 | 4654.2 | 4457.9 | 4874.9 | 5199.9 | 5757.4 |
| 57.5° | 5679.1 | 5677.1 | 5765.2 | 5912.1 | 5961.0 | 5392.8 | 5372.7 | 5181.8 | 5692.8 | 5937.0 | 6629.1 |
| 60°   | 5923.8 | 5927.2 | 6145.5 | 6478.9 | 6680.5 | 6282.6 | 6273.8 | 6128.9 | 6487.2 | 6625.2 | 7312.9 |
| 62.5° | 5958.1 | 6019.8 | 6395.6 | 6969.3 | 7354.0 | 7322.2 | 7341.8 | 6982.0 | 7197.9 | 7174.4 | 7823.4 |
| 65°   | 5564.1 | 5645.3 | 6325.7 | 7117.6 | 8023.6 | 8459.2 | 8477.3 | 7840.0 | 7758.3 | 7643.7 | 8005.9 |
| 67.5° | 4756.5 | 4876.9 | 5616.0 | 6795.0 | 8244.3 | 9299.6 | 9325.0 | 8505.2 | 8223.3 | 7802.8 | 7566.4 |
| 70°   | 3461.4 | 3595.0 | 4339.0 | 5803.4 | 7850.8 | 9568.3 | 9597.1 | 8799.3 | 8240.9 | 7350.1 | 6459.3 |
| 72.5° | 2090.9 | 2195.7 | 2809.0 | 4272.4 | 6626.2 | 9078.8 | 9130.2 | 8426.4 | 7523.8 | 6225.8 | 4769.7 |
| 75°   | 918.2  | 986.7  | 1358.2 | 2461.9 | 4743.8 | 7511.6 | 7575.7 | 7212.5 | 6113.2 | 4524.5 | 2819.2 |
| 77.5° | 391.1  | 410.6  | 557.0  | 1069.4 | 2681.7 | 5132.9 | 5221.0 | 5269.9 | 4147.6 | 2461.9 | 1191.3 |
| 80°   | 243.7  | 251.6  | 315.2  | 484.1  | 1255.0 | 2882.9 | 2977.8 | 3100.7 | 2059.6 | 905.0  | 416.0  |
| 82.5° | 148.3  | 157.1  | 209.5  | 292.7  | 653.4  | 1306.8 | 1352.4 | 1439.0 | 799.3  | 391.1  | 215.4  |
| 85°   | 89.1   | 95.4   | 128.2  | 185.0  | 372.0  | 513.9  | 513.4  | 567.8  | 376.4  | 251.6  | 113.6  |
| 87.5° | 42.6   | 47.5   | 68.5   | 95.9   | 187.5  | 192.8  | 180.6  | 204.6  | 228.6  | 164.9  | 57.3   |
| 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: P361626

CATALOG NUMBER: NVN-SA2C-760-U-T4W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 | 1457.1 |
| 2.5°  | 1456.1 | 1454.2 | 1447.8 | 1442.9 | 1441.9 | 1439.0 | 1436.5 | 1438.0 | 1440.0 | 1440.5 | 1440.5 |
| 5°    | 1455.6 | 1450.2 | 1441.9 | 1438.5 | 1442.9 | 1448.8 | 1456.1 | 1465.9 | 1471.8 | 1476.2 | 1479.1 |
| 7.5°  | 1479.1 | 1468.8 | 1459.5 | 1457.6 | 1466.4 | 1482.1 | 1498.7 | 1519.3 | 1533.4 | 1543.2 | 1545.2 |
| 10°   | 1518.3 | 1505.5 | 1496.2 | 1498.2 | 1513.9 | 1536.4 | 1559.9 | 1586.3 | 1607.8 | 1621.1 | 1622.0 |
| 12.5° | 1563.3 | 1551.1 | 1542.3 | 1550.6 | 1576.5 | 1603.9 | 1628.4 | 1651.4 | 1671.0 | 1684.2 | 1684.2 |
| 15°   | 1615.2 | 1606.4 | 1596.1 | 1615.2 | 1650.4 | 1674.9 | 1685.2 | 1696.4 | 1707.2 | 1717.0 | 1715.0 |
| 17.5° | 1665.1 | 1656.8 | 1651.4 | 1673.9 | 1710.6 | 1721.9 | 1715.0 | 1706.7 | 1706.7 | 1712.1 | 1713.1 |
| 20°   | 1708.2 | 1700.8 | 1704.3 | 1726.3 | 1745.4 | 1733.6 | 1708.2 | 1681.8 | 1671.0 | 1673.9 | 1676.9 |
| 22.5° | 1745.9 | 1742.4 | 1752.7 | 1763.0 | 1749.3 | 1708.2 | 1661.2 | 1625.5 | 1612.2 | 1611.3 | 1612.2 |
| 25°   | 1789.9 | 1789.4 | 1802.2 | 1783.6 | 1722.9 | 1647.0 | 1583.9 | 1549.1 | 1541.8 | 1547.6 | 1557.4 |
| 27.5° | 1844.7 | 1850.1 | 1856.5 | 1788.5 | 1669.0 | 1554.5 | 1490.4 | 1466.4 | 1473.7 | 1487.9 | 1497.2 |
| 30°   | 1914.7 | 1929.4 | 1915.7 | 1776.2 | 1591.7 | 1448.8 | 1387.6 | 1380.7 | 1400.8 | 1420.9 | 1430.7 |
| 32.5° | 1982.8 | 2005.8 | 1972.5 | 1744.4 | 1491.8 | 1336.7 | 1289.2 | 1287.3 | 1311.7 | 1331.3 | 1345.0 |
| 35°   | 2037.6 | 2083.1 | 2015.1 | 1681.3 | 1376.3 | 1233.4 | 1198.7 | 1185.4 | 1194.3 | 1217.3 | 1232.9 |
| 37.5° | 2109.0 | 2184.9 | 2044.4 | 1584.8 | 1251.0 | 1148.3 | 1107.6 | 1077.3 | 1069.4 | 1078.7 | 1086.6 |
| 40°   | 2239.7 | 2340.1 | 2058.1 | 1450.2 | 1128.7 | 1063.1 | 1022.0 | 977.4  | 946.6  | 924.1  | 924.6  |
| 42.5° | 2453.1 | 2542.2 | 2049.3 | 1286.8 | 1015.6 | 979.9  | 933.4  | 882.0  | 832.1  | 781.2  | 777.2  |
| 45°   | 2799.7 | 2842.7 | 2022.9 | 1113.5 | 916.3  | 892.8  | 849.2  | 797.8  | 731.2  | 673.5  | 668.1  |
| 47.5° | 3354.2 | 3258.8 | 1981.8 | 962.3  | 828.6  | 818.9  | 778.7  | 719.5  | 649.0  | 602.5  | 598.6  |
| 50°   | 4110.4 | 3859.3 | 1961.7 | 841.9  | 751.3  | 754.2  | 721.4  | 658.8  | 592.2  | 558.0  | 554.1  |
| 52.5° | 5014.9 | 4558.7 | 2000.4 | 748.9  | 689.1  | 699.4  | 675.0  | 616.2  | 560.4  | 533.5  | 529.6  |
| 55°   | 5953.2 | 5283.1 | 2042.0 | 681.3  | 630.4  | 650.5  | 642.2  | 593.7  | 543.3  | 518.3  | 514.9  |
| 57.5° | 6756.4 | 5824.0 | 1958.8 | 626.5  | 578.0  | 609.4  | 616.7  | 579.5  | 534.5  | 512.0  | 508.0  |
| 60°   | 7262.0 | 6041.8 | 1740.5 | 575.1  | 536.4  | 576.6  | 602.0  | 575.6  | 537.9  | 535.9  | 533.0  |
| 62.5° | 7501.8 | 6022.7 | 1413.0 | 534.5  | 510.5  | 562.4  | 612.8  | 597.6  | 577.1  | 594.7  | 596.2  |
| 65°   | 7394.1 | 5734.9 | 1052.3 | 507.6  | 491.9  | 567.8  | 645.1  | 639.2  | 588.3  | 605.9  | 608.4  |
| 67.5° | 6685.4 | 5048.2 | 779.2  | 484.1  | 471.3  | 582.9  | 703.8  | 652.9  | 566.3  | 579.0  | 571.2  |
| 70°   | 5403.5 | 4002.2 | 601.0  | 457.6  | 450.3  | 581.0  | 730.3  | 644.6  | 542.3  | 545.2  | 524.2  |
| 72.5° | 3726.2 | 2729.2 | 489.0  | 433.2  | 419.9  | 529.6  | 711.7  | 624.0  | 522.2  | 499.7  | 471.8  |
| 75°   | 2026.3 | 1464.9 | 415.5  | 407.7  | 366.6  | 465.0  | 677.4  | 609.4  | 504.1  | 474.3  | 458.6  |
| 77.5° | 797.3  | 607.9  | 360.7  | 373.0  | 320.6  | 410.6  | 639.2  | 581.5  | 479.2  | 440.0  | 432.2  |
| 80°   | 325.5  | 310.3  | 299.1  | 322.5  | 275.6  | 359.3  | 593.2  | 548.7  | 449.3  | 408.2  | 392.5  |
| 82.5° | 184.5  | 192.8  | 232.5  | 254.5  | 223.7  | 330.9  | 571.2  | 522.2  | 413.6  | 365.6  | 347.0  |
| 85°   | 94.5   | 113.1  | 162.0  | 182.6  | 164.5  | 281.4  | 526.2  | 457.1  | 331.8  | 280.0  | 281.4  |
| 87.5° | 45.5   | 63.1   | 102.3  | 114.5  | 106.7  | 203.6  | 393.0  | 331.4  | 258.4  | 204.6  | 198.2  |
| 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: SP1-1908-441-9-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:  $4\pi$   
 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 |      |       |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R9:  | -27.1 |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R10: | 40.8  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R11: | 74.6  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R12: | 50.4  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R13: | 70.0  |
| CIE z:                    | 0.3204 | R6:       | 67.5 | R14: | 87.8  |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| Rf:                       | 72.1   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



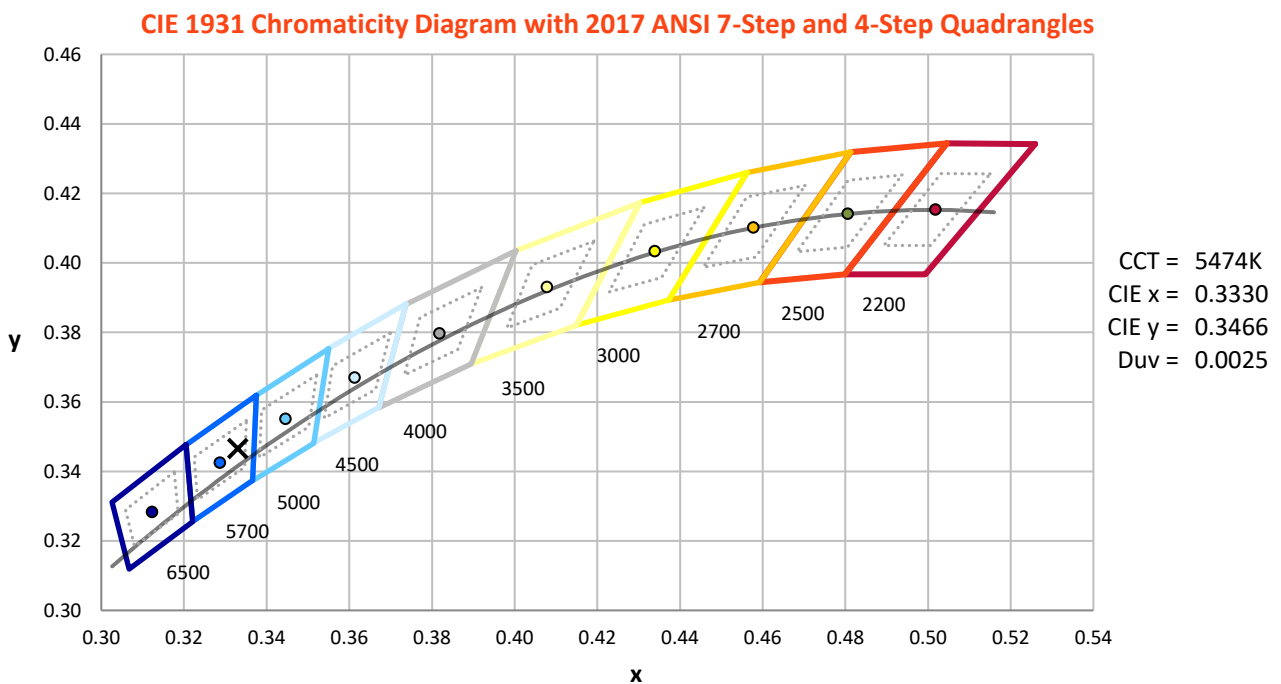
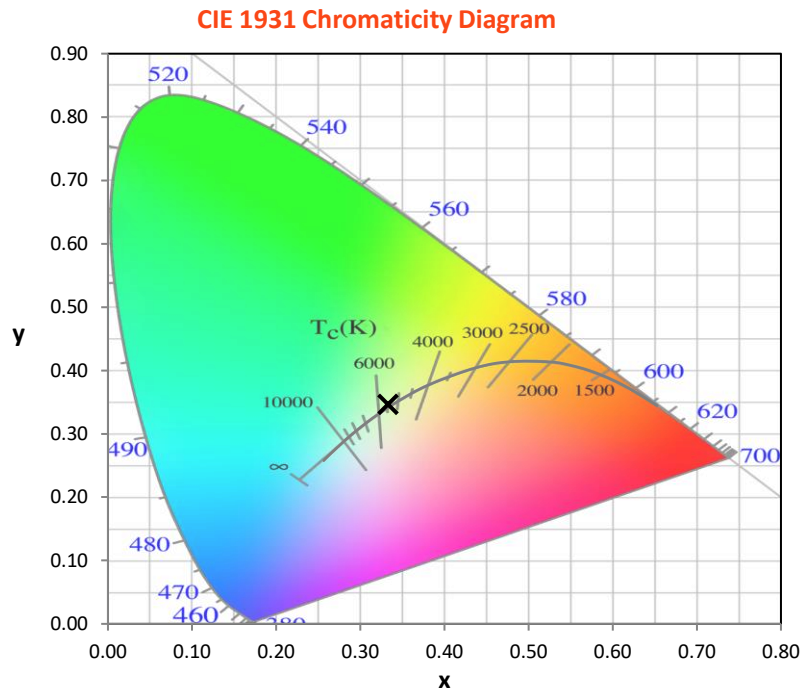
### Test Conditions

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            |

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Point lies inside the ANSI 5700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



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| 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       | 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               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 13759.3

S/P: 1.85

| 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       | 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               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



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

| 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       | 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               |           |                  |                  |

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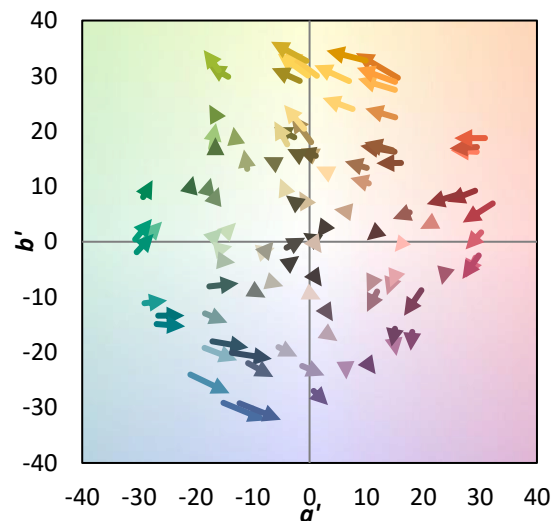
**TM-30-18**

### Summary

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



### Color Vector Graphics





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

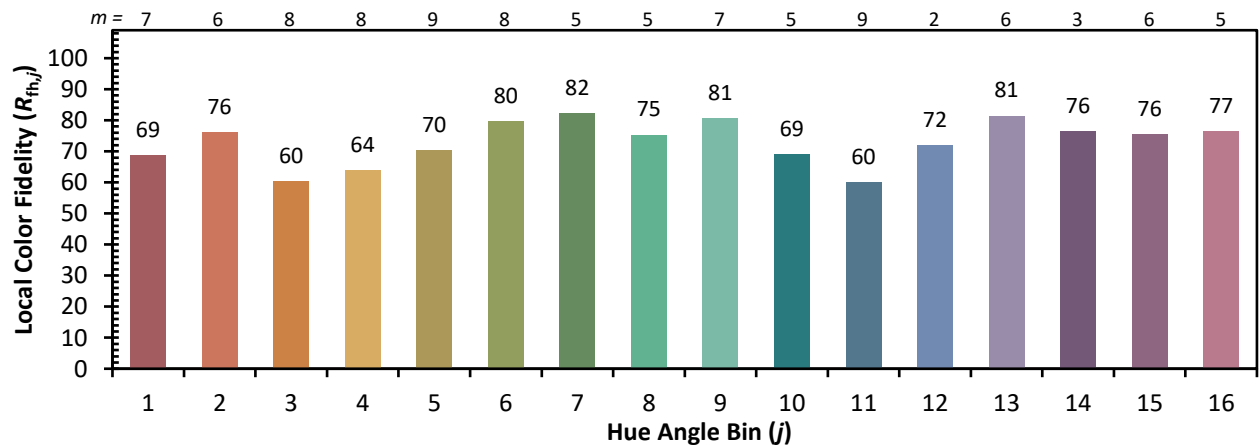
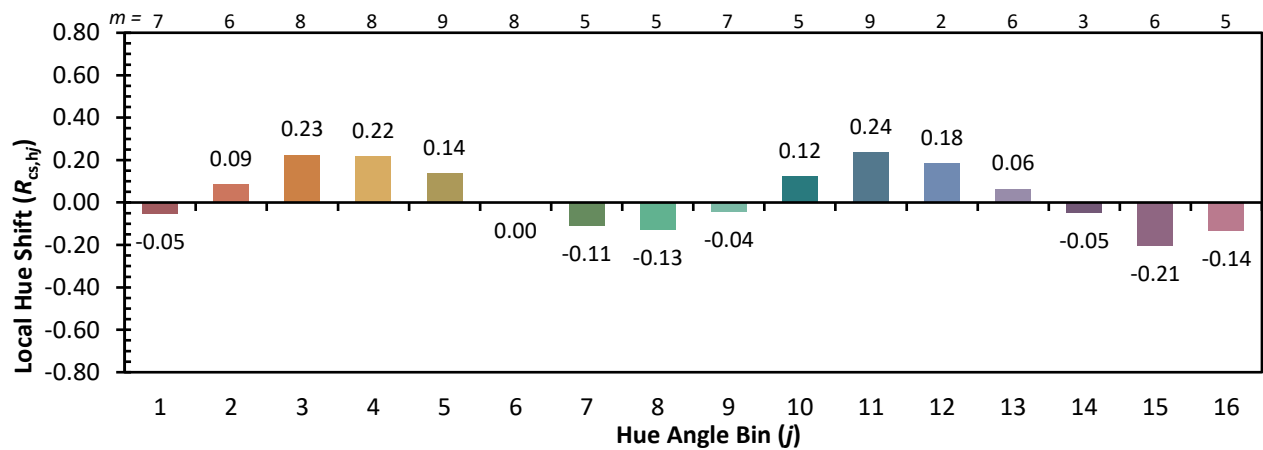
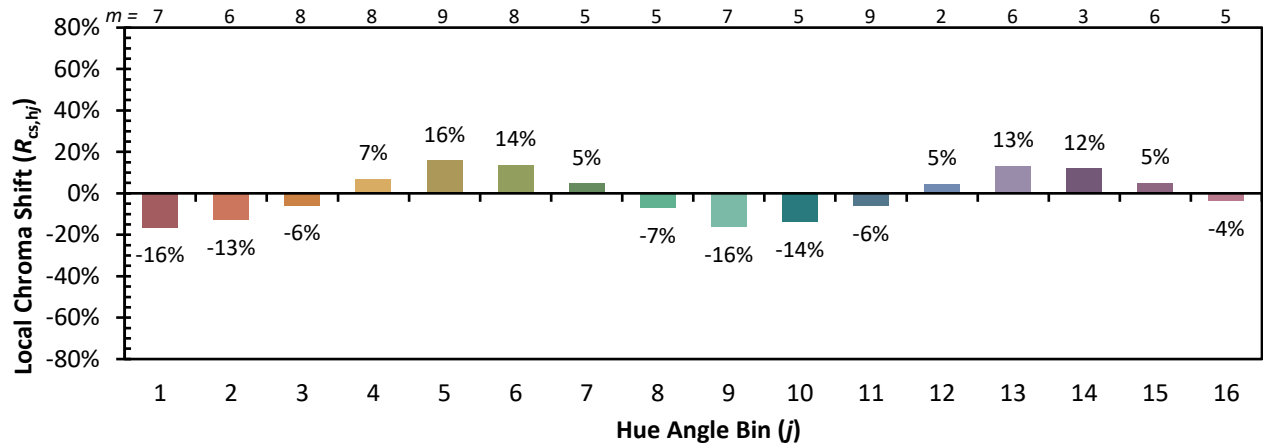
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 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 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)