

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: P363186

Luminaire Tested: NVN-SA2C-750-U-T4FT-HSS

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-2019  
Report Number: P363186  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-17)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA2C-750-U-T4FT-HSS  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(2) 70 CRI, 5000K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 10297 lumens  
Efficiency: N/A  
Efficacy: 91.1 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

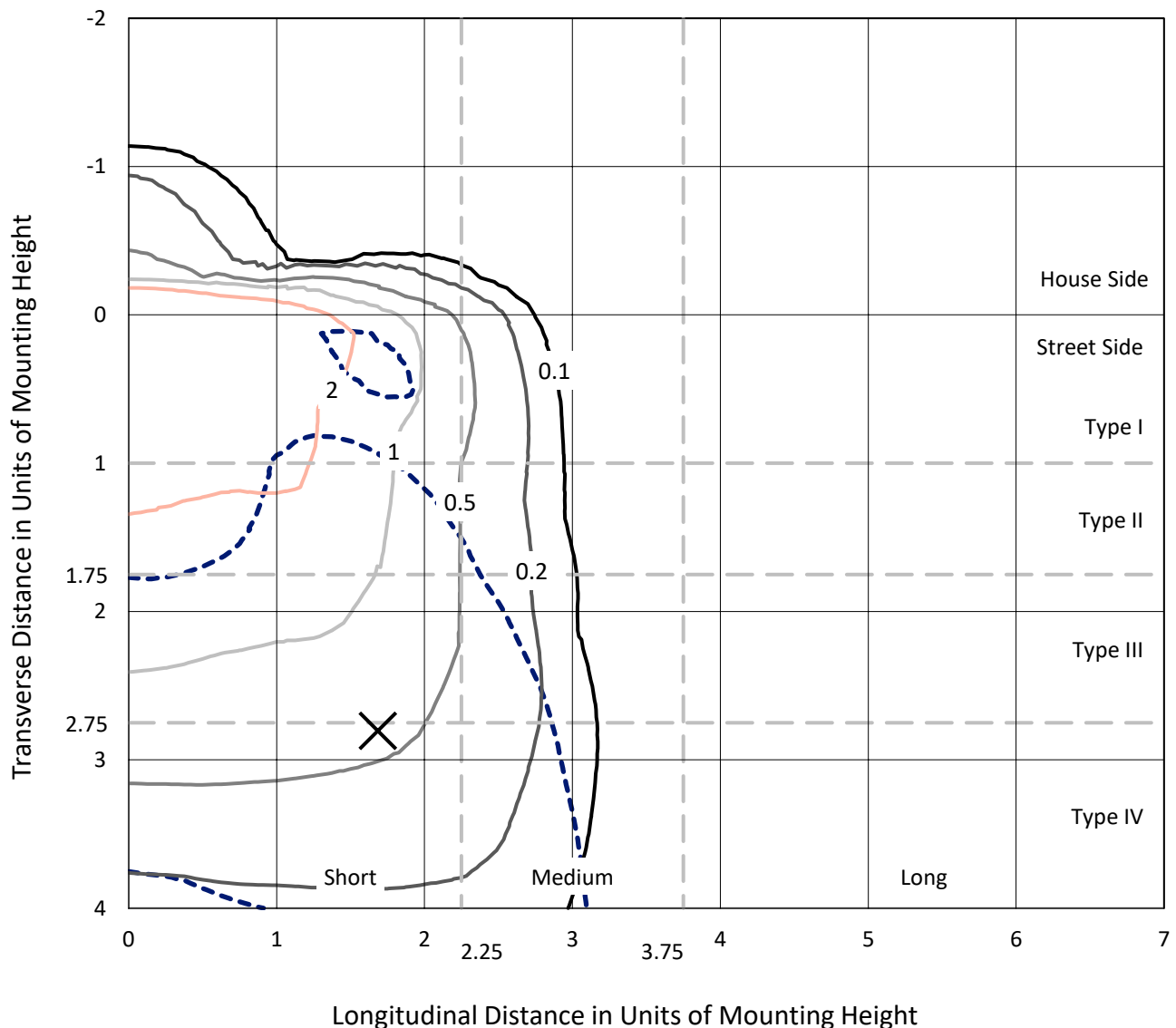
Input Watts (W): 113  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P363186  
 CATALOG NUMBER: NVN-SA2C-750-U-T4FT-HSS

## Iso-Footcandle Lines of Horizontal Illumination

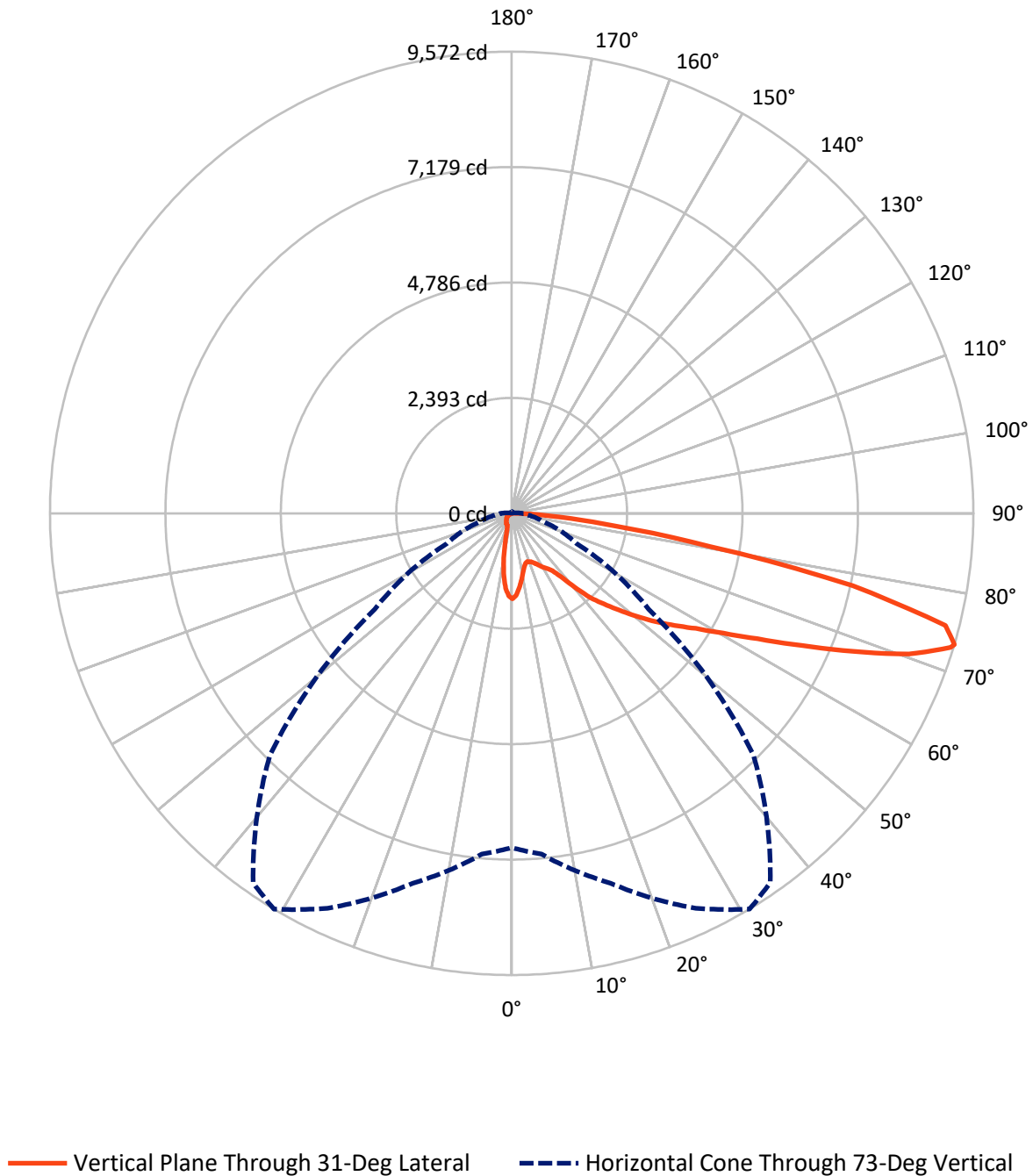
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 4.4 fc  
 Type IV - Short - N/A

REPORT NUMBER: P363186  
CATALOG NUMBER: NVN-SA2C-750-U-T4FT-HSS

## Luminous Intensity Polar Plot



REPORT NUMBER: P363186

CATALOG NUMBER: NVN-SA2C-750-U-T4FT-HSS

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 938.6    | 0.0    | 938.6   |
|                    | % Fixture | 9.1      | 0.0    | 9.1     |
| <b>Street Side</b> | Lumens    | 9358.4   | 0.0    | 9358.4  |
|                    | % Fixture | 90.9     | 0.0    | 90.9    |
| <b>Total</b>       | Lumens    | 10297.0  | 0.0    | 10297.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 146.9   | 1.4       |
| 10°-20°   | 318.9   | 3.1       |
| 20°-30°   | 477.9   | 4.6       |
| 30°-40°   | 760.3   | 7.4       |
| 40°-50°   | 1357.7  | 13.2      |
| 50°-60°   | 2106.7  | 20.5      |
| 60°-70°   | 2800.6  | 27.2      |
| 70°-80°   | 2106.6  | 20.5      |
| 80°-90°   | 221.4   | 2.1       |
| 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°    | 10297.0 | 100.0     |
| 0°-180°   | 10297.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P363186

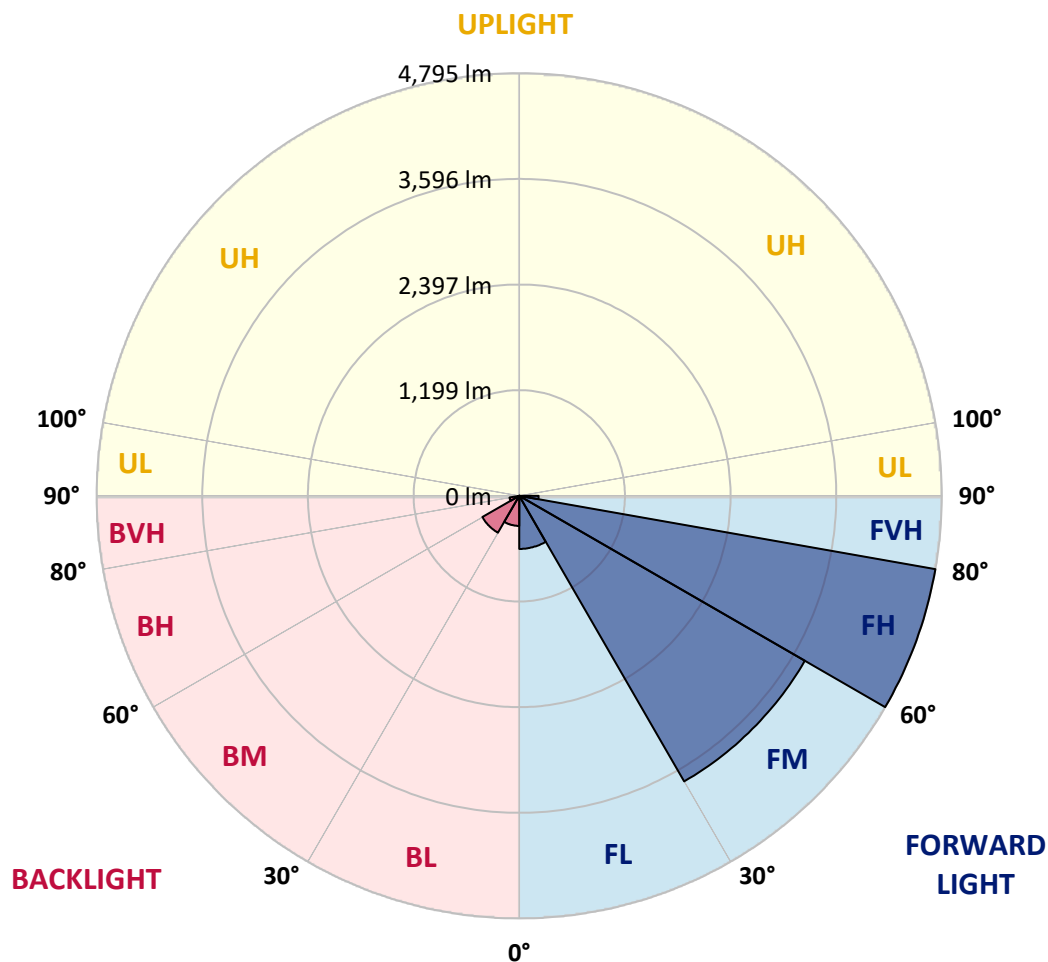
CATALOG NUMBER: NVN-SA2C-750-U-T4FT-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 602.4  | 5.9       |                         |      |         |
| FM   | (30°-60°)   | 3741.6 | 36.3      |                         |      |         |
| FH   | (60°-80°)   | 4794.9 | 46.6      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 219.5  | 2.1       |                         |      | G2/225  |
| BL   | (0°-30°)    | 341.3  | 3.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 483.1  | 4.7       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 112.3  | 1.1       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 1.9    | 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 IV Short





REPORT NUMBER: P363186

CATALOG NUMBER: NVN-SA2C-750-U-T4FT-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 31°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 |
| 2.5°  | 1678.9 | 1686.0 | 1693.5 | 1695.0 | 1707.6 | 1708.1 | 1726.3 | 1739.9 | 1753.5 | 1766.6 | 1771.1 |
| 5°    | 1506.6 | 1518.2 | 1531.8 | 1545.4 | 1572.1 | 1582.7 | 1627.0 | 1672.4 | 1715.7 | 1757.0 | 1777.2 |
| 7.5°  | 1322.7 | 1335.8 | 1354.9 | 1388.7 | 1418.4 | 1439.1 | 1509.1 | 1589.7 | 1670.3 | 1746.4 | 1790.3 |
| 10°   | 1154.9 | 1167.0 | 1187.1 | 1222.9 | 1268.8 | 1297.0 | 1391.2 | 1503.1 | 1621.5 | 1736.9 | 1809.9 |
| 12.5° | 1048.1 | 1054.6 | 1065.7 | 1104.0 | 1145.3 | 1177.0 | 1287.9 | 1426.5 | 1581.2 | 1736.3 | 1841.7 |
| 15°   | 1028.4 | 1030.4 | 1021.4 | 1038.5 | 1070.7 | 1101.5 | 1213.8 | 1364.5 | 1550.4 | 1744.4 | 1883.0 |
| 17.5° | 1059.6 | 1058.6 | 1028.4 | 1026.4 | 1052.1 | 1077.3 | 1177.6 | 1321.7 | 1528.8 | 1763.1 | 1936.4 |
| 20°   | 1107.0 | 1103.5 | 1051.1 | 1041.5 | 1068.7 | 1092.4 | 1175.0 | 1305.5 | 1520.7 | 1794.3 | 2001.4 |
| 22.5° | 1170.0 | 1163.9 | 1081.8 | 1071.7 | 1101.0 | 1125.7 | 1206.3 | 1321.2 | 1527.7 | 1836.1 | 2077.0 |
| 25°   | 1248.1 | 1239.0 | 1134.7 | 1123.6 | 1153.4 | 1178.1 | 1262.2 | 1366.0 | 1548.9 | 1887.0 | 2172.7 |
| 27.5° | 1336.3 | 1323.2 | 1219.4 | 1190.7 | 1224.4 | 1250.1 | 1336.8 | 1434.5 | 1582.2 | 1940.9 | 2290.1 |
| 30°   | 1419.4 | 1402.3 | 1308.6 | 1261.2 | 1302.5 | 1331.2 | 1417.4 | 1516.2 | 1635.6 | 2024.1 | 2450.8 |
| 32.5° | 1503.1 | 1483.9 | 1388.2 | 1331.7 | 1369.0 | 1400.3 | 1500.5 | 1628.5 | 1735.8 | 2151.0 | 2664.5 |
| 35°   | 1695.5 | 1675.4 | 1558.0 | 1464.8 | 1464.3 | 1481.9 | 1616.9 | 1782.2 | 1868.4 | 2327.9 | 2919.4 |
| 37.5° | 2019.5 | 2007.9 | 1896.1 | 1719.2 | 1671.9 | 1652.2 | 1775.7 | 1965.6 | 2058.8 | 2571.3 | 3207.2 |
| 40°   | 2374.3 | 2364.2 | 2238.7 | 2078.5 | 2006.4 | 1958.1 | 2003.4 | 2221.1 | 2327.9 | 2868.6 | 3500.9 |
| 42.5° | 2774.8 | 2727.0 | 2503.2 | 2455.4 | 2390.9 | 2354.1 | 2313.3 | 2536.0 | 2658.4 | 3192.0 | 3792.2 |
| 45°   | 3138.6 | 3058.0 | 2767.8 | 2695.2 | 2680.6 | 2689.7 | 2712.4 | 2959.3 | 3030.3 | 3576.5 | 4082.4 |
| 47.5° | 3355.3 | 3291.8 | 3069.1 | 2999.6 | 2995.5 | 3055.5 | 3226.8 | 3437.4 | 3400.6 | 3911.6 | 4337.8 |
| 50°   | 3561.4 | 3503.9 | 3319.0 | 3336.1 | 3354.8 | 3436.4 | 3810.8 | 3929.2 | 3738.7 | 4215.4 | 4572.2 |
| 52.5° | 3728.2 | 3640.5 | 3543.7 | 3640.0 | 3731.7 | 3863.2 | 4413.4 | 4370.6 | 3978.6 | 4457.3 | 4772.7 |
| 55°   | 3824.4 | 3784.6 | 3831.5 | 3928.2 | 4100.5 | 4314.2 | 4982.3 | 4737.9 | 4153.9 | 4678.0 | 4906.2 |
| 57.5° | 4177.1 | 4099.0 | 4192.2 | 4275.9 | 4500.6 | 4799.4 | 5469.5 | 5011.5 | 4280.4 | 4814.5 | 4937.0 |
| 60°   | 4603.9 | 4540.9 | 4595.8 | 4734.9 | 5038.2 | 5389.4 | 5925.1 | 5234.7 | 4346.4 | 4902.2 | 4857.3 |
| 62.5° | 5283.1 | 5200.0 | 5165.7 | 5321.4 | 5723.5 | 6106.9 | 6270.7 | 5389.4 | 4331.8 | 4863.4 | 4584.2 |
| 65°   | 6193.1 | 6106.9 | 5953.8 | 6094.9 | 6606.3 | 6876.9 | 6657.2 | 5422.2 | 4231.0 | 4549.5 | 3893.9 |
| 67.5° | 7125.3 | 7062.8 | 6931.8 | 7169.6 | 7631.2 | 7718.3 | 7065.8 | 5342.6 | 3906.5 | 3688.9 | 2751.2 |
| 70°   | 7741.0 | 7714.3 | 7799.5 | 8325.5 | 8737.2 | 8712.0 | 7440.7 | 4914.8 | 3044.9 | 2268.4 | 1361.0 |
| 72.5° | 7297.1 | 7425.1 | 8053.9 | 9007.8 | 9510.6 | 9305.0 | 7248.2 | 3774.0 | 1740.4 | 872.7  | 393.5  |
| 73°   | 6929.3 | 7093.0 | 7939.5 | 9033.4 | 9571.6 | 9346.4 | 7086.5 | 3464.1 | 1483.4 | 688.8  | 298.3  |
| 75°   | 4820.6 | 5021.6 | 6573.0 | 8413.2 | 9286.4 | 8905.0 | 5906.9 | 2120.3 | 687.3  | 305.3  | 120.4  |
| 77.5° | 2340.5 | 2489.1 | 3619.3 | 6078.7 | 7222.0 | 6957.5 | 3677.3 | 790.1  | 310.4  | 191.0  | 55.4   |
| 80°   | 873.7  | 971.5  | 1571.1 | 3093.8 | 4173.6 | 4282.9 | 1617.4 | 298.8  | 206.6  | 153.7  | 28.2   |
| 82.5° | 228.8  | 255.0  | 579.5  | 1379.6 | 2138.9 | 2238.7 | 509.9  | 150.7  | 151.2  | 126.5  | 17.1   |
| 85°   | 73.1   | 83.6   | 180.9  | 619.3  | 1007.7 | 884.8  | 133.0  | 73.1   | 109.8  | 94.2   | 9.6    |
| 87.5° | 9.1    | 11.6   | 57.4   | 145.6  | 222.2  | 123.4  | 20.7   | 21.7   | 46.9   | 52.4   | 5.5    |
| 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: P363186

CATALOG NUMBER: NVN-SA2C-750-U-T4FT-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 | 1771.6 |
| 2.5°  | 1775.7 | 1773.1 | 1773.6 | 1760.5 | 1752.0 | 1734.8 | 1717.2 | 1709.1 | 1700.6 | 1697.0 | 1700.6 |
| 5°    | 1784.7 | 1780.2 | 1767.1 | 1726.8 | 1683.9 | 1628.5 | 1576.6 | 1537.3 | 1487.9 | 1474.3 | 1488.4 |
| 7.5°  | 1798.8 | 1789.8 | 1751.5 | 1669.3 | 1574.1 | 1468.3 | 1349.4 | 1262.7 | 1191.7 | 1145.8 | 1162.4 |
| 10°   | 1819.5 | 1802.4 | 1725.3 | 1585.7 | 1415.4 | 1227.9 | 1059.1 | 927.6  | 834.4  | 796.1  | 794.6  |
| 12.5° | 1854.3 | 1822.0 | 1693.0 | 1476.9 | 1221.4 | 971.5  | 750.3  | 607.7  | 532.1  | 483.2  | 482.2  |
| 15°   | 1892.5 | 1845.2 | 1652.2 | 1346.4 | 995.7  | 695.8  | 483.2  | 374.9  | 326.0  | 310.4  | 308.4  |
| 17.5° | 1939.4 | 1871.9 | 1599.3 | 1185.6 | 759.3  | 461.0  | 315.4  | 284.2  | 282.2  | 280.7  | 280.7  |
| 20°   | 1998.4 | 1903.6 | 1531.3 | 1001.7 | 538.6  | 307.9  | 268.1  | 270.1  | 271.1  | 269.1  | 269.6  |
| 22.5° | 2066.9 | 1935.9 | 1450.1 | 804.2  | 364.3  | 257.5  | 256.5  | 259.0  | 260.0  | 259.0  | 259.5  |
| 25°   | 2146.5 | 1973.2 | 1351.4 | 597.1  | 263.0  | 244.4  | 246.9  | 250.4  | 252.9  | 252.9  | 252.9  |
| 27.5° | 2245.3 | 2018.5 | 1232.5 | 416.7  | 227.2  | 230.8  | 237.8  | 244.4  | 247.9  | 248.9  | 248.9  |
| 30°   | 2373.7 | 2075.0 | 1089.9 | 285.7  | 206.6  | 212.6  | 225.7  | 238.3  | 244.9  | 245.9  | 246.4  |
| 32.5° | 2536.0 | 2138.4 | 924.6  | 211.1  | 189.0  | 193.5  | 207.6  | 228.8  | 241.4  | 243.4  | 243.4  |
| 35°   | 2721.9 | 2212.0 | 746.7  | 183.9  | 176.4  | 177.9  | 189.0  | 213.1  | 235.3  | 240.9  | 241.4  |
| 37.5° | 2925.5 | 2284.6 | 567.9  | 171.8  | 165.8  | 165.8  | 173.8  | 194.5  | 220.7  | 237.8  | 239.8  |
| 40°   | 3115.5 | 2328.4 | 398.1  | 162.2  | 156.2  | 156.2  | 163.3  | 178.4  | 203.1  | 228.8  | 234.3  |
| 42.5° | 3290.8 | 2343.5 | 277.1  | 153.2  | 147.1  | 148.6  | 154.7  | 166.8  | 185.4  | 211.1  | 216.2  |
| 45°   | 3471.2 | 2341.0 | 202.1  | 142.6  | 138.1  | 142.6  | 147.1  | 156.2  | 169.8  | 184.4  | 185.4  |
| 47.5° | 3607.2 | 2319.8 | 160.2  | 132.5  | 129.5  | 135.5  | 139.6  | 145.6  | 153.2  | 152.2  | 152.2  |
| 50°   | 3734.7 | 2268.4 | 129.0  | 118.9  | 120.9  | 128.0  | 130.0  | 132.0  | 132.5  | 122.9  | 121.9  |
| 52.5° | 3831.5 | 2188.3 | 103.3  | 104.3  | 112.4  | 119.4  | 117.4  | 114.4  | 109.3  | 97.8   | 95.7   |
| 55°   | 3863.7 | 2034.1 | 81.1   | 86.2   | 99.8   | 108.8  | 101.3  | 94.7   | 85.2   | 75.6   | 73.6   |
| 57.5° | 3805.3 | 1835.1 | 66.0   | 67.0   | 84.1   | 91.7   | 83.1   | 75.6   | 65.0   | 56.9   | 55.4   |
| 60°   | 3681.3 | 1613.9 | 54.4   | 50.4   | 65.0   | 71.6   | 66.0   | 58.4   | 48.9   | 42.8   | 42.3   |
| 62.5° | 3435.4 | 1378.1 | 44.8   | 39.3   | 49.4   | 54.9   | 51.4   | 45.9   | 37.8   | 33.8   | 33.3   |
| 65°   | 2918.4 | 1102.5 | 36.3   | 31.7   | 38.3   | 42.8   | 39.8   | 35.8   | 29.7   | 26.7   | 26.2   |
| 67.5° | 2037.2 | 745.2  | 29.7   | 26.2   | 30.2   | 33.8   | 31.2   | 29.2   | 23.7   | 23.2   | 23.7   |
| 70°   | 982.6  | 359.3  | 24.7   | 21.2   | 23.7   | 26.2   | 25.2   | 23.7   | 22.7   | 26.2   | 30.2   |
| 72.5° | 281.7  | 120.4  | 19.7   | 17.6   | 19.1   | 20.7   | 21.7   | 21.2   | 24.7   | 31.7   | 36.8   |
| 73°   | 216.7  | 97.2   | 18.6   | 16.6   | 18.1   | 20.2   | 21.2   | 20.7   | 25.2   | 32.2   | 36.8   |
| 75°   | 92.7   | 46.9   | 14.1   | 13.6   | 15.1   | 17.6   | 18.6   | 18.6   | 25.2   | 32.8   | 35.3   |
| 77.5° | 41.8   | 25.2   | 9.1    | 10.6   | 13.1   | 14.1   | 15.6   | 15.6   | 20.2   | 25.2   | 25.2   |
| 80°   | 23.7   | 13.6   | 7.1    | 8.1    | 9.6    | 9.6    | 9.6    | 8.6    | 9.1    | 10.1   | 11.1   |
| 82.5° | 15.1   | 9.1    | 5.5    | 6.6    | 6.0    | 5.0    | 4.0    | 4.0    | 3.5    | 4.0    | 5.0    |
| 85°   | 8.6    | 5.0    | 5.0    | 4.0    | 2.5    | 2.0    | 2.5    | 2.0    | 0.5    | 0.0    | 0.5    |
| 87.5° | 5.0    | 3.0    | 1.5    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 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: SP1-1908-441-4-R4

Test Date: 10/02/2019

Luminaire Tested: SA1C-750-U-5WQ

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

### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-4-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-750-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):                  | 4884   | CRI (Ra): | 73.5 |      |       |
| CIE u':                   | 0.2101 | R1:       | 70.5 | R9:  | -28.4 |
| CIE v':                   | 0.4904 | R2:       | 77.7 | R10: | 48.6  |
| Duv:                      | 0.0037 | R3:       | 84.6 | R11: | 73.2  |
| CIE x:                    | 0.3493 | R4:       | 74.7 | R12: | 50.7  |
| CIE y:                    | 0.3624 | R5:       | 71.9 | R13: | 71.2  |
| CIE z:                    | 0.2884 | R6:       | 70.7 | R14: | 91.4  |
| Peak Wavelength (nm):     | 444    | R7:       | 81.2 |      |       |
| Dominant Wavelength (nm): | 571    | R8:       | 56.9 |      |       |
| Purity:                   | 13.7   |           |      |      |       |
| Rf:                       | 74.9   |           |      |      |       |
| Rg:                       | 96.3   |           |      |      |       |



REPORT NUMBER: SP1-1908-441-4-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: SP1-1908-441-4-R4

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 5000K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-4-R4

**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       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-4-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 13493.5

S/P: 1.77

| 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       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-4-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5378.9 M/P: 0.71**

| 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       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-4-R4

**TM-30-18**

### Summary

$R_f = 74.9$   
 $R_g = 96.3$   
 CIE  $R_a = 73.5$   
 $R_g = -28.4$

### Spectral Power Distribution Comparison



### Color Vector Graphics



REPORT NUMBER: SP1-1908-441-4-R4

TM-30-18

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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 61 | CES51 = 90 | CES76 = 52 |
| CES02 = 60 | CES27 = 84 | CES52 = 91 | CES77 = 71 |
| CES03 = 30 | CES28 = 81 | CES53 = 79 | CES78 = 54 |
| CES04 = 69 | CES29 = 58 | CES54 = 83 | CES79 = 80 |
| CES05 = 46 | CES30 = 67 | CES55 = 83 | CES80 = 77 |
| CES06 = 50 | CES31 = 63 | CES56 = 73 | CES81 = 77 |
| CES07 = 39 | CES32 = 59 | CES57 = 72 | CES82 = 90 |
| CES08 = 38 | CES33 = 69 | CES58 = 73 | CES83 = 86 |
| CES09 = 29 | CES34 = 69 | CES59 = 88 | CES84 = 88 |
| CES10 = 73 | CES35 = 83 | CES60 = 93 | CES85 = 84 |
| CES11 = 56 | CES36 = 95 | CES61 = 88 | CES86 = 75 |
| CES12 = 61 | CES37 = 78 | CES62 = 85 | CES87 = 78 |
| CES13 = 41 | CES38 = 76 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 93 | CES64 = 74 | CES89 = 75 |
| CES15 = 70 | CES40 = 86 | CES65 = 67 | CES90 = 77 |
| CES16 = 46 | CES41 = 87 | CES66 = 69 | CES91 = 89 |
| CES17 = 49 | CES42 = 78 | CES67 = 67 | CES92 = 66 |
| CES18 = 55 | CES43 = 75 | CES68 = 73 | CES93 = 80 |
| CES19 = 71 | CES44 = 99 | CES69 = 81 | CES94 = 57 |
| CES20 = 64 | CES45 = 83 | CES70 = 63 | CES95 = 71 |
| CES21 = 85 | CES46 = 81 | CES71 = 60 | CES96 = 78 |
| CES22 = 77 | CES47 = 80 | CES72 = 86 | CES97 = 85 |
| CES23 = 91 | CES48 = 72 | CES73 = 53 | CES98 = 75 |
| CES24 = 90 | CES49 = 81 | CES74 = 96 | CES99 = 62 |
| CES25 = 71 | CES50 = 89 | CES75 = 58 |            |



REPORT NUMBER: SP1-1908-441-4-R4

**TM-30-18**

**Color Rendition by Hue-Angle Bin**



REPORT NUMBER: SP1-1908-441-4-R4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)