

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: P361163

Luminaire Tested: NVN-SA1B-750-U-T2

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P361163  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-12)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA1B-750-U-T2  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(1) 70 CRI, 5000K, 800mA LIGHTSQUARE WITH 16 LEDS AND TYPE II OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5740 lumens  
Efficiency: N/A  
Efficacy: 130.5 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G2

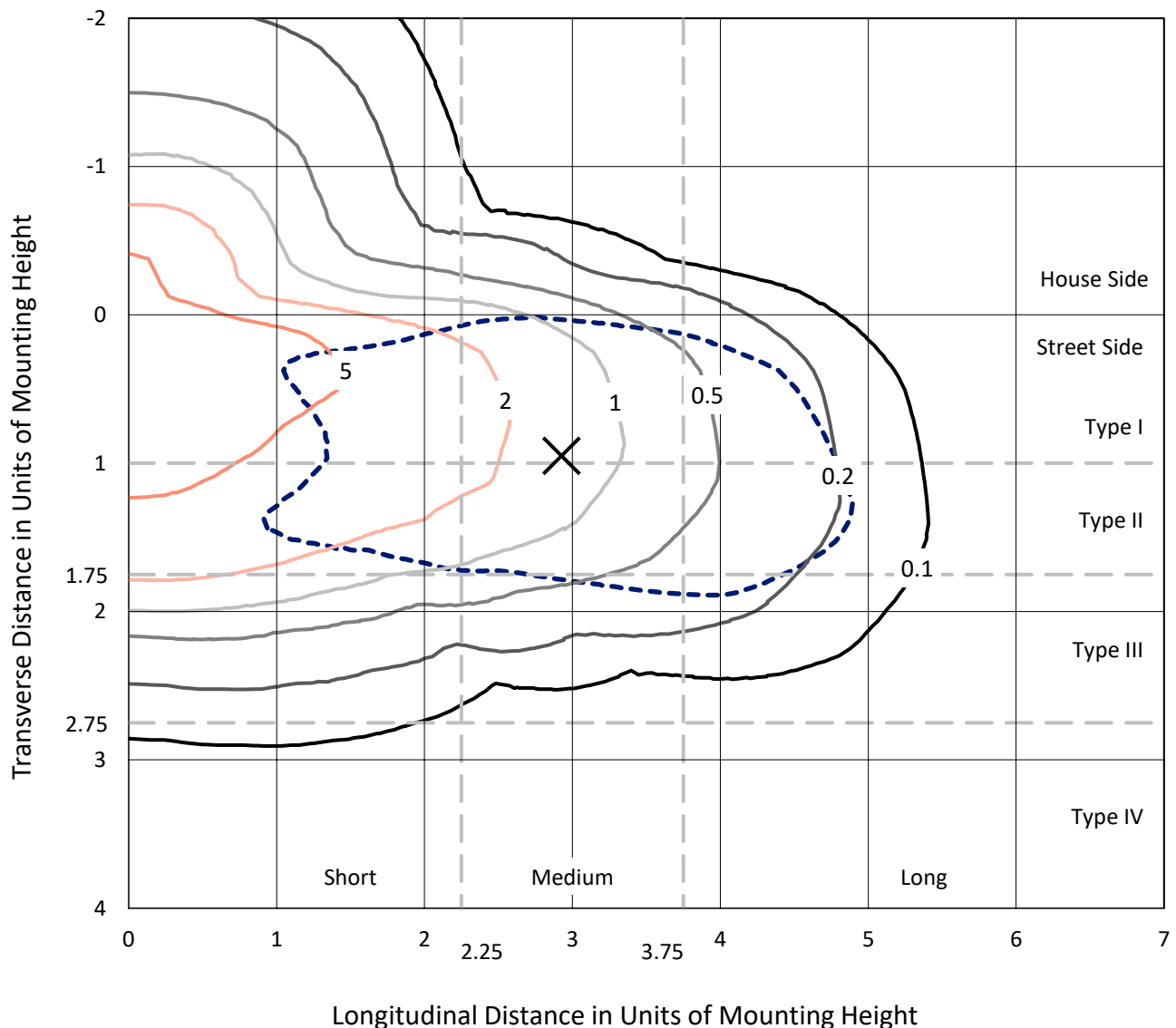
Input Watts (W): 44  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

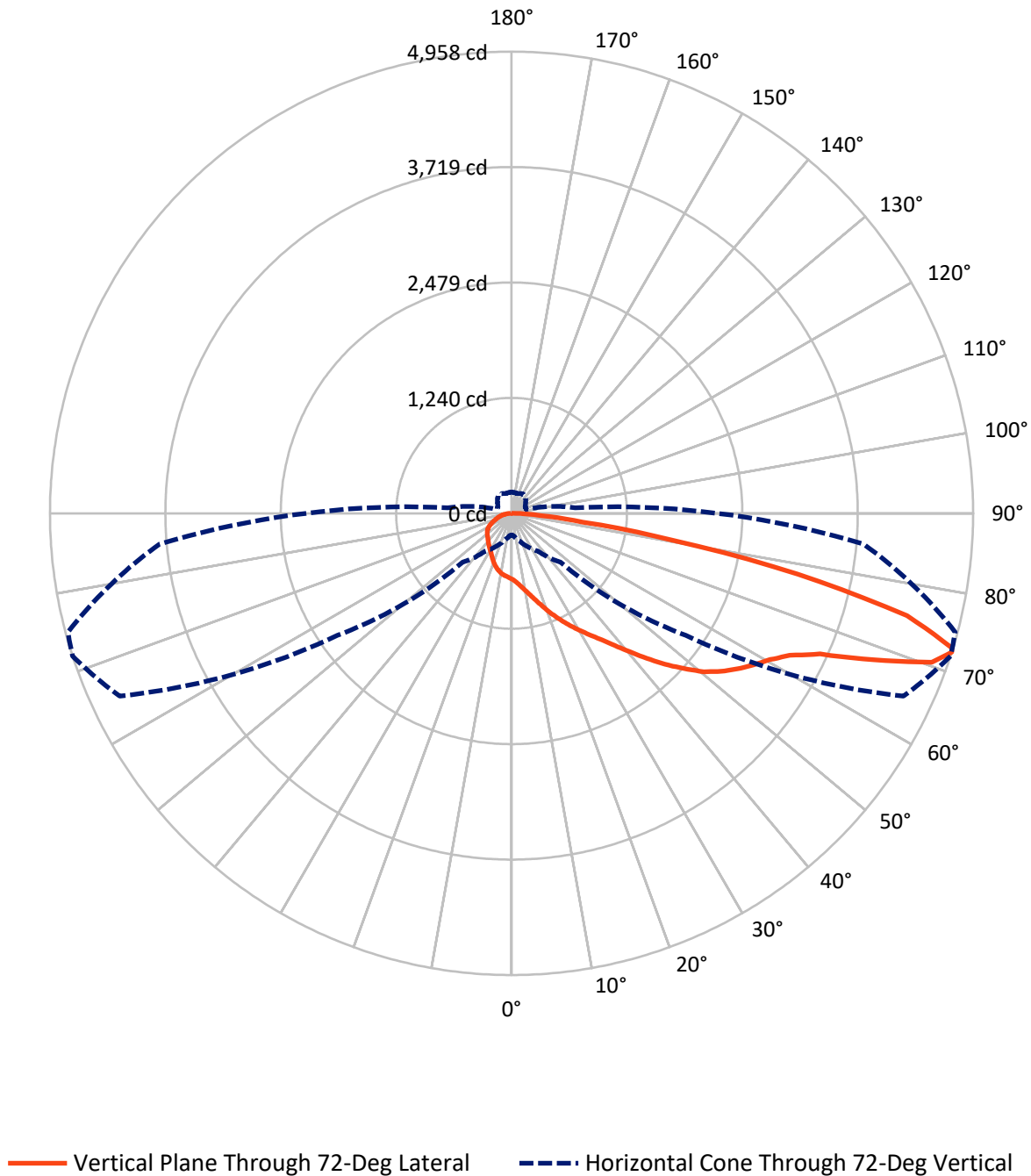
× Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 9.7 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: NVN-SA1B-750-U-T2

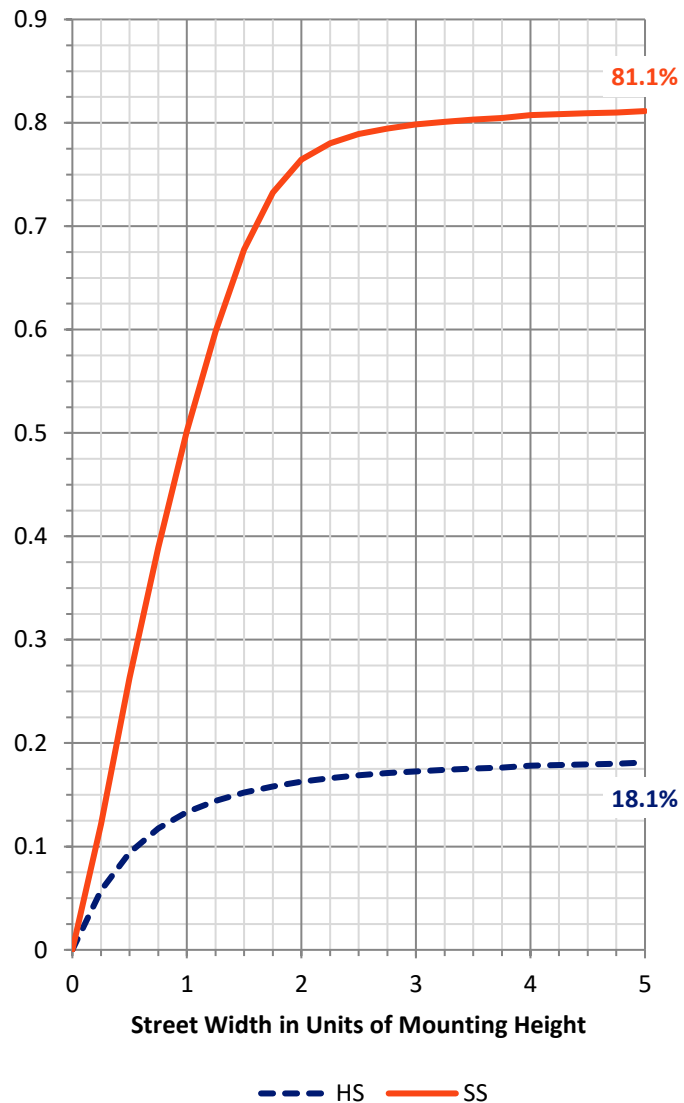
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1064.8   | 0.0    | 1064.8 |
|                    | % Fixture | 18.6     | 0.0    | 18.6   |
| <b>Street Side</b> | Lumens    | 4675.2   | 0.0    | 4675.2 |
|                    | % Fixture | 81.4     | 0.0    | 81.4   |
| <b>Total</b>       | Lumens    | 5740.0   | 0.0    | 5740.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 70.8   | 1.2       |
| 10°-20°   | 228.7  | 4.0       |
| 20°-30°   | 400.7  | 7.0       |
| 30°-40°   | 594.1  | 10.4      |
| 40°-50°   | 868.9  | 15.1      |
| 50°-60°   | 1195.6 | 20.8      |
| 60°-70°   | 1331.1 | 23.2      |
| 70°-80°   | 901.9  | 15.7      |
| 80°-90°   | 148.2  | 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°    | 5740.0 | 100.0     |
| 0°-180°   | 5740.0 | 100.0     |

**Coefficient of Utilization**



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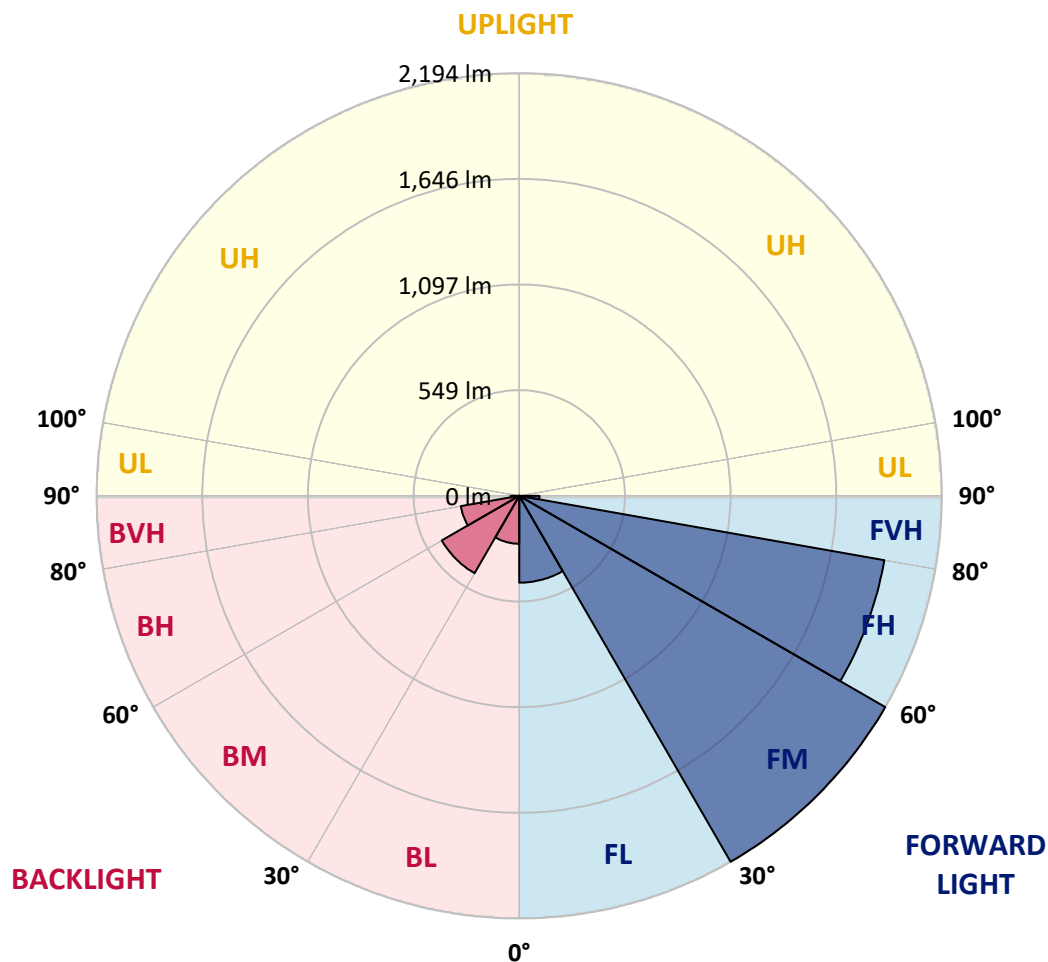
CATALOG NUMBER: NVN-SA1B-750-U-T2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 451.2  | 7.9       |                         |      |         |
| FM   | (30°-60°)   | 2194.5 | 38.2      |                         |      |         |
| FH   | (60°-80°)   | 1925.0 | 33.5      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 104.6  | 1.8       |                         |      | G2/225  |
| BL   | (0°-30°)    | 248.9  | 4.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 464.2  | 8.1       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 308.1  | 5.4       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 43.7   | 0.8       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type III Medium



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CATALOG NUMBER: NVN-SA1B-750-U-T2

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 72°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 706.2  | 706.2  | 706.2  | 706.2  | 706.2  | 706.2  | 706.2  | 706.2  | 706.2  | 706.2  | 706.2  |
| 2.5°  | 780.1  | 778.9  | 774.8  | 774.8  | 766.8  | 760.1  | 747.5  | 739.0  | 728.9  | 725.3  | 713.5  |
| 5°    | 855.6  | 856.0  | 850.8  | 847.3  | 835.6  | 821.4  | 799.9  | 780.3  | 760.7  | 752.8  | 728.5  |
| 7.5°  | 919.0  | 918.2  | 916.9  | 913.9  | 903.0  | 888.4  | 859.3  | 830.3  | 801.4  | 789.6  | 747.7  |
| 10°   | 959.7  | 961.5  | 962.7  | 964.1  | 959.5  | 949.1  | 921.6  | 886.2  | 848.5  | 832.3  | 770.6  |
| 12.5° | 980.3  | 983.5  | 989.0  | 998.5  | 1006.0 | 1004.8 | 984.8  | 947.3  | 902.4  | 882.1  | 799.3  |
| 15°   | 992.4  | 996.5  | 1005.2 | 1022.2 | 1043.3 | 1055.4 | 1050.1 | 1016.1 | 966.1  | 941.0  | 834.2  |
| 17.5° | 999.9  | 1003.2 | 1016.7 | 1039.4 | 1070.8 | 1102.8 | 1116.9 | 1088.4 | 1038.0 | 1009.4 | 874.4  |
| 20°   | 1005.0 | 1007.6 | 1024.4 | 1051.1 | 1091.8 | 1142.8 | 1181.9 | 1174.8 | 1117.3 | 1080.1 | 916.3  |
| 22.5° | 1016.5 | 1018.6 | 1034.6 | 1061.5 | 1106.6 | 1172.4 | 1244.5 | 1255.2 | 1200.9 | 1158.8 | 961.1  |
| 25°   | 1048.5 | 1048.5 | 1061.9 | 1080.7 | 1123.0 | 1198.1 | 1297.5 | 1344.7 | 1286.2 | 1237.2 | 1002.6 |
| 27.5° | 1109.6 | 1109.0 | 1113.9 | 1120.4 | 1152.4 | 1224.2 | 1344.7 | 1423.8 | 1374.8 | 1321.2 | 1042.9 |
| 30°   | 1181.9 | 1185.8 | 1186.4 | 1183.3 | 1198.3 | 1256.8 | 1388.4 | 1507.2 | 1463.9 | 1406.2 | 1084.3 |
| 32.5° | 1275.0 | 1277.5 | 1274.6 | 1264.1 | 1261.9 | 1303.0 | 1431.3 | 1594.6 | 1560.4 | 1495.0 | 1122.0 |
| 35°   | 1393.2 | 1388.2 | 1378.9 | 1357.6 | 1337.2 | 1364.9 | 1480.3 | 1681.9 | 1668.7 | 1602.3 | 1174.0 |
| 37.5° | 1519.9 | 1520.1 | 1508.6 | 1460.2 | 1432.1 | 1444.0 | 1547.9 | 1780.9 | 1799.7 | 1729.9 | 1240.6 |
| 40°   | 1621.4 | 1626.8 | 1633.9 | 1570.3 | 1533.9 | 1550.3 | 1633.9 | 1895.8 | 1954.7 | 1881.3 | 1327.4 |
| 42.5° | 1692.4 | 1698.5 | 1718.7 | 1678.8 | 1641.0 | 1671.4 | 1735.1 | 2018.3 | 2128.6 | 2056.1 | 1428.9 |
| 45°   | 1767.5 | 1770.9 | 1785.1 | 1767.9 | 1743.8 | 1812.4 | 1849.1 | 2145.2 | 2312.6 | 2242.2 | 1542.6 |
| 47.5° | 1846.6 | 1850.1 | 1864.7 | 1853.3 | 1840.6 | 1944.0 | 1968.1 | 2264.8 | 2488.9 | 2446.8 | 1663.9 |
| 50°   | 1944.2 | 1946.6 | 1960.4 | 1939.6 | 1943.6 | 2043.2 | 2074.4 | 2374.5 | 2673.7 | 2630.6 | 1785.7 |
| 52.5° | 2077.4 | 2078.0 | 2097.2 | 2078.4 | 2059.8 | 2115.9 | 2165.9 | 2477.8 | 2818.6 | 2798.2 | 1907.4 |
| 55°   | 2181.8 | 2188.1 | 2250.9 | 2247.0 | 2236.3 | 2182.0 | 2242.4 | 2576.2 | 2947.8 | 2957.5 | 2036.7 |
| 57.5° | 2115.1 | 2139.9 | 2267.1 | 2356.9 | 2444.2 | 2346.2 | 2345.8 | 2687.1 | 3068.0 | 3113.8 | 2178.8 |
| 60°   | 1852.5 | 1886.1 | 2073.6 | 2272.7 | 2546.0 | 2632.0 | 2560.4 | 2822.5 | 3189.3 | 3268.8 | 2356.9 |
| 62.5° | 1323.0 | 1378.3 | 1632.5 | 1950.3 | 2406.5 | 2821.3 | 2997.2 | 3037.3 | 3354.4 | 3448.2 | 2588.3 |
| 65°   | 668.8  | 710.7  | 923.8  | 1306.6 | 1922.6 | 2697.6 | 3472.0 | 3507.7 | 3641.1 | 3724.5 | 2944.6 |
| 67.5° | 406.3  | 422.2  | 526.1  | 726.7  | 1178.7 | 2101.3 | 3626.9 | 4291.8 | 4196.1 | 4240.4 | 3452.8 |
| 70°   | 299.4  | 311.1  | 375.9  | 482.6  | 677.9  | 1233.1 | 3151.4 | 4851.3 | 4788.4 | 4783.5 | 3828.3 |
| 72°   | 233.2  | 241.7  | 299.0  | 389.9  | 495.7  | 739.8  | 2284.1 | 4644.8 | 4958.0 | 4933.1 | 3793.9 |
| 72.5° | 221.2  | 228.7  | 280.8  | 367.0  | 468.4  | 670.6  | 2053.7 | 4505.4 | 4945.8 | 4934.5 | 3749.4 |
| 75°   | 174.1  | 179.5  | 207.9  | 283.8  | 366.6  | 380.5  | 1125.4 | 3491.5 | 4387.4 | 4569.8 | 3372.3 |
| 77.5° | 144.1  | 144.9  | 159.9  | 206.5  | 285.8  | 269.0  | 552.8  | 2422.5 | 3141.7 | 3342.3 | 2388.9 |
| 80°   | 117.4  | 118.4  | 125.5  | 144.9  | 216.2  | 199.0  | 262.5  | 1393.0 | 1759.0 | 1761.2 | 1136.0 |
| 82.5° | 93.5   | 93.7   | 101.6  | 105.9  | 155.3  | 142.3  | 150.4  | 654.0  | 768.6  | 739.4  | 408.3  |
| 85°   | 65.8   | 64.4   | 99.2   | 87.0   | 101.6  | 91.3   | 83.0   | 258.9  | 317.8  | 304.0  | 127.9  |
| 87.5° | 21.9   | 22.7   | 44.1   | 56.3   | 59.3   | 51.8   | 37.0   | 99.2   | 120.0  | 119.0  | 40.5   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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CATALOG NUMBER: NVN-SA1B-750-U-T2

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 706.2  | 706.2 | 706.2 | 706.2 | 706.2 | 706.2 | 706.2 | 706.2 | 706.2 | 706.2 | 706.2 |
| 2.5°  | 709.7  | 703.4 | 694.1 | 683.8 | 675.7 | 667.4 | 661.3 | 658.1 | 654.6 | 651.6 | 655.2 |
| 5°    | 717.2  | 705.4 | 685.6 | 666.2 | 652.0 | 639.4 | 630.3 | 625.5 | 621.2 | 618.2 | 618.6 |
| 7.5°  | 729.5  | 710.3 | 677.1 | 648.9 | 629.1 | 615.5 | 606.2 | 603.0 | 600.2 | 599.4 | 600.4 |
| 10°   | 742.5  | 714.3 | 665.9 | 628.3 | 605.8 | 594.5 | 590.4 | 592.5 | 594.5 | 596.3 | 598.3 |
| 12.5° | 757.4  | 717.8 | 649.4 | 604.2 | 585.0 | 580.7 | 584.8 | 594.3 | 601.2 | 605.4 | 607.9 |
| 15°   | 776.7  | 721.0 | 630.5 | 580.1 | 567.2 | 572.2 | 586.2 | 602.6 | 614.7 | 622.4 | 623.6 |
| 17.5° | 794.5  | 720.8 | 606.2 | 555.8 | 552.8 | 567.2 | 588.4 | 611.5 | 627.7 | 638.6 | 640.8 |
| 20°   | 812.9  | 715.5 | 577.9 | 532.0 | 538.2 | 561.9 | 589.4 | 617.2 | 636.8 | 649.4 | 652.4 |
| 22.5° | 830.1  | 706.2 | 546.9 | 510.5 | 525.9 | 554.8 | 585.6 | 613.9 | 633.4 | 643.7 | 646.9 |
| 25°   | 841.8  | 690.0 | 515.4 | 492.3 | 515.1 | 546.1 | 573.4 | 596.1 | 610.7 | 615.8 | 616.6 |
| 27.5° | 847.7  | 668.8 | 485.8 | 476.5 | 503.8 | 531.9 | 550.6 | 561.9 | 566.0 | 565.6 | 564.9 |
| 30°   | 848.5  | 640.9 | 460.3 | 463.7 | 490.7 | 510.9 | 519.8 | 517.6 | 512.3 | 503.2 | 504.0 |
| 32.5° | 845.9  | 609.5 | 439.0 | 451.4 | 474.1 | 485.4 | 485.8 | 475.3 | 461.1 | 446.7 | 442.7 |
| 35°   | 846.7  | 578.7 | 420.2 | 437.6 | 454.0 | 458.9 | 454.4 | 439.0 | 419.6 | 401.0 | 397.1 |
| 37.5° | 855.4  | 551.8 | 404.0 | 421.6 | 431.6 | 432.8 | 426.3 | 410.1 | 395.9 | 377.7 | 376.1 |
| 40°   | 876.1  | 532.6 | 388.6 | 403.6 | 409.3 | 409.9 | 400.6 | 389.2 | 390.3 | 380.7 | 380.5 |
| 42.5° | 913.5  | 524.3 | 374.9 | 384.8 | 388.4 | 389.5 | 382.4 | 375.1 | 385.4 | 379.1 | 376.9 |
| 45°   | 961.7  | 526.3 | 363.5 | 366.4 | 372.9 | 378.5 | 374.1 | 365.2 | 369.2 | 341.7 | 332.6 |
| 47.5° | 1017.5 | 539.0 | 354.4 | 350.6 | 361.9 | 372.4 | 365.6 | 352.2 | 338.2 | 310.9 | 305.7 |
| 50°   | 1082.7 | 558.5 | 346.1 | 335.0 | 349.8 | 364.1 | 357.3 | 338.2 | 317.0 | 303.8 | 302.0 |
| 52.5° | 1150.7 | 582.4 | 337.8 | 317.8 | 334.6 | 357.7 | 354.4 | 335.0 | 308.9 | 295.9 | 293.5 |
| 55°   | 1227.7 | 606.6 | 327.3 | 297.8 | 318.2 | 354.8 | 353.0 | 323.5 | 302.8 | 295.5 | 293.7 |
| 57.5° | 1323.6 | 634.0 | 313.5 | 277.1 | 302.8 | 344.1 | 338.6 | 316.6 | 296.5 | 290.9 | 290.3 |
| 60°   | 1448.5 | 674.5 | 293.5 | 255.0 | 284.0 | 327.7 | 326.5 | 306.5 | 286.4 | 282.4 | 281.6 |
| 62.5° | 1635.9 | 741.5 | 266.0 | 232.8 | 263.1 | 299.8 | 310.7 | 292.9 | 275.7 | 275.5 | 275.9 |
| 65°   | 1926.4 | 842.3 | 236.2 | 213.5 | 241.9 | 276.3 | 292.3 | 278.9 | 264.8 | 268.8 | 269.4 |
| 67.5° | 2263.2 | 925.9 | 206.9 | 194.5 | 220.4 | 254.0 | 275.7 | 264.8 | 250.4 | 260.7 | 260.9 |
| 70°   | 2375.2 | 851.2 | 181.2 | 175.7 | 198.0 | 232.4 | 257.7 | 249.4 | 234.8 | 245.1 | 244.1 |
| 72°   | 2210.4 | 687.2 | 164.6 | 161.5 | 181.2 | 214.6 | 241.7 | 235.0 | 220.6 | 227.5 | 224.9 |
| 72.5° | 2158.4 | 655.2 | 160.5 | 157.9 | 176.7 | 210.1 | 237.6 | 231.4 | 217.0 | 222.9 | 220.6 |
| 75°   | 1925.4 | 569.0 | 138.0 | 138.5 | 154.2 | 188.0 | 214.2 | 212.3 | 197.4 | 198.0 | 197.2 |
| 77.5° | 1396.5 | 417.2 | 116.2 | 120.2 | 131.2 | 165.2 | 190.7 | 189.5 | 173.3 | 170.4 | 169.8 |
| 80°   | 648.1  | 212.9 | 94.7  | 96.4  | 107.9 | 138.2 | 162.7 | 161.1 | 148.0 | 144.3 | 142.1 |
| 82.5° | 222.0  | 101.2 | 71.2  | 72.3  | 83.6  | 111.3 | 141.1 | 140.1 | 129.3 | 121.9 | 117.4 |
| 85°   | 79.3   | 50.4  | 49.8  | 48.6  | 59.7  | 87.6  | 122.9 | 117.6 | 101.6 | 86.6  | 86.2  |
| 87.5° | 25.7   | 21.5  | 25.7  | 25.5  | 34.8  | 59.3  | 89.3  | 76.1  | 73.7  | 61.3  | 60.1  |
| 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   |           |      |      |       |



### Test Conditions

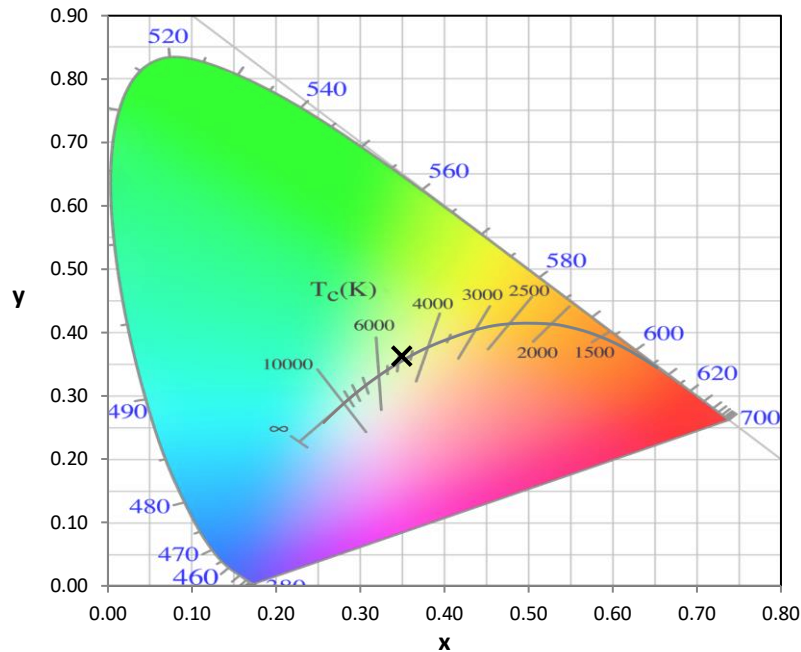
Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0./44%  
 Sphere Temperature (°C): 25.7

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            |

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**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

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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       | 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               |           |                  |                  |

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Scotopic Flux vs. Wavelength



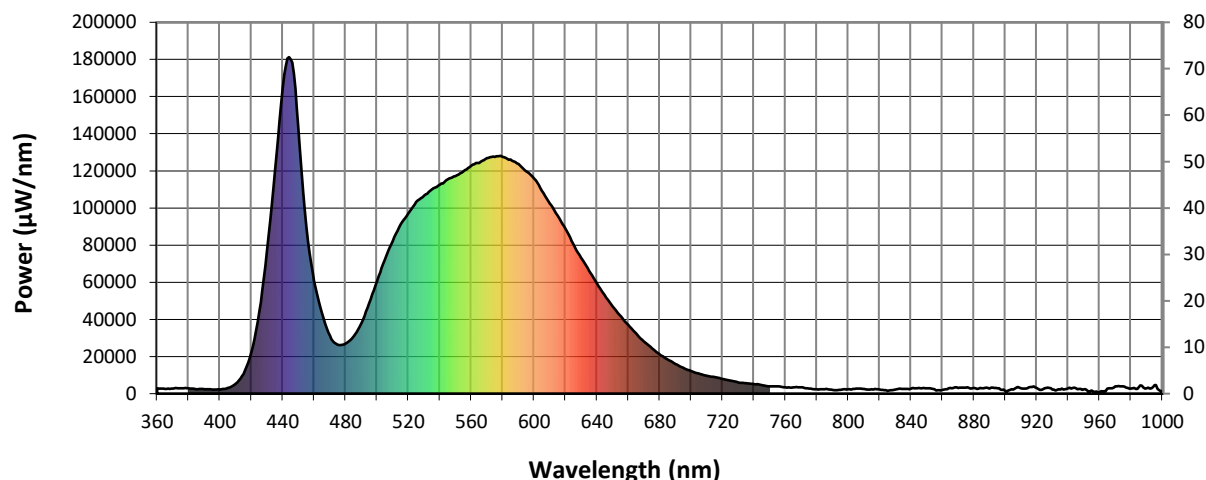
Scotopic Lumens: 13493.5

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               |           |                  |                  |

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**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               |           |                  |                  |

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**TM-30-18**

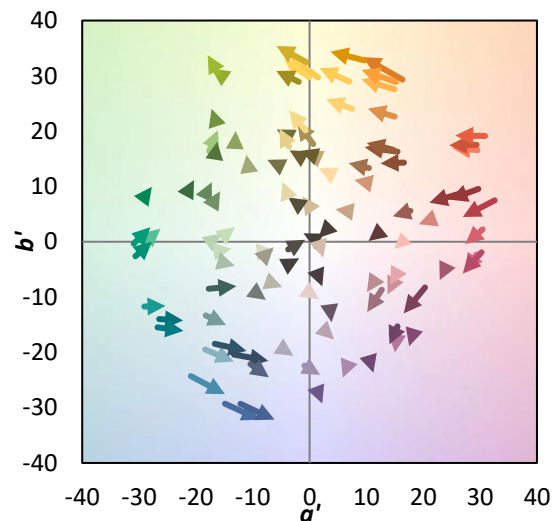
**Summary**

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

**Spectral Power Distribution Comparison**



**Color Vector Graphics**



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

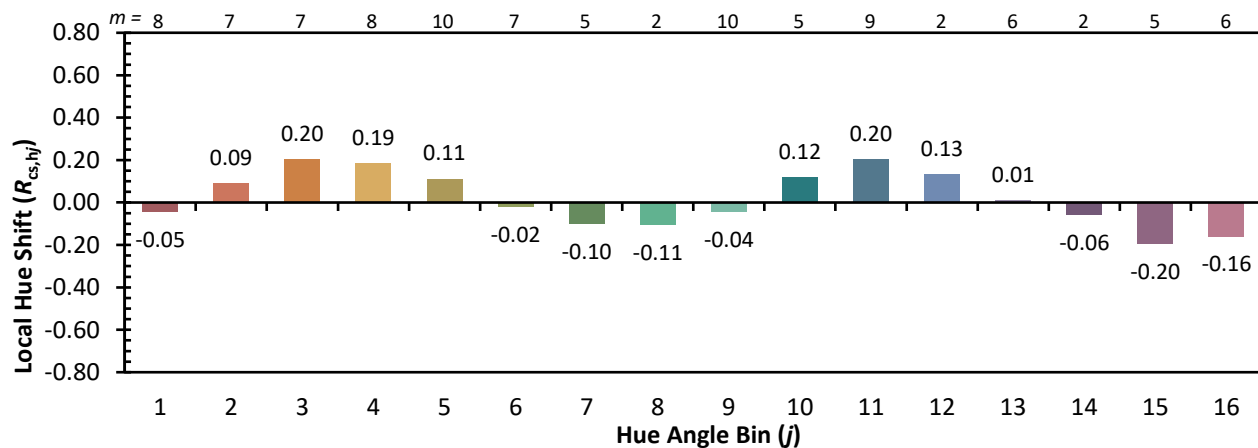
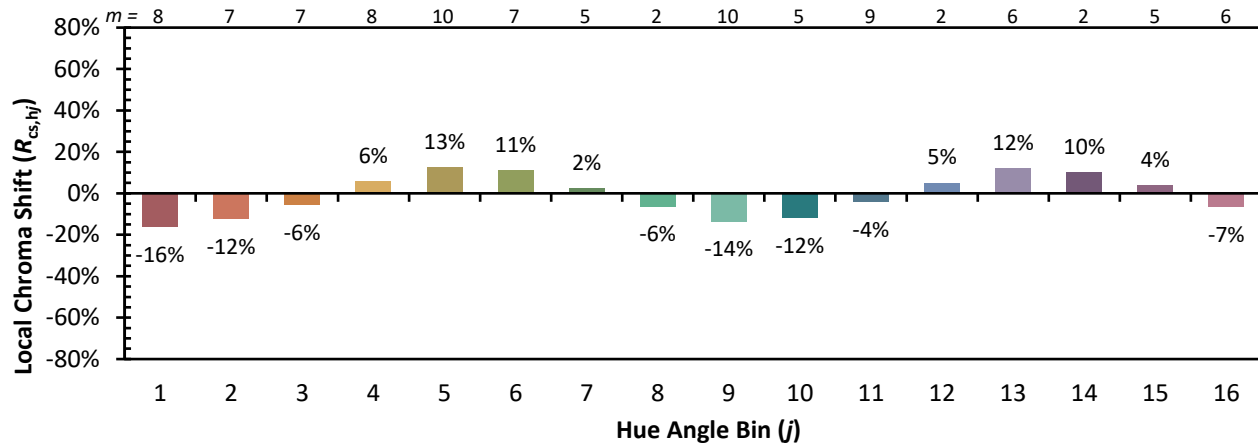
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 61 | CES51 = 90 | CES76 = 52 |
| CES02 = 60 | CES27 = 84 | CES52 = 91 | CES77 = 71 |
| CES03 = 30 | CES28 = 81 | CES53 = 79 | CES78 = 54 |
| CES04 = 69 | CES29 = 58 | CES54 = 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 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)