

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



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

Test Report Prepared for  
Cooper Lighting Solutions

Brand: STREETWORKS

Report Number: P363473

Luminaire Tested: NVN-SA1C-750-U-SL2-HSS

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P363473  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-21)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA1C-750-U-SL2-HSS  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(1) 70 CRI, 5000K, 1050mA LIGHTSQUARE WITH 16 LEDS AND TYPE II SPILL  
LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5921 lumens  
Efficiency: N/A  
Efficacy: 100.4 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

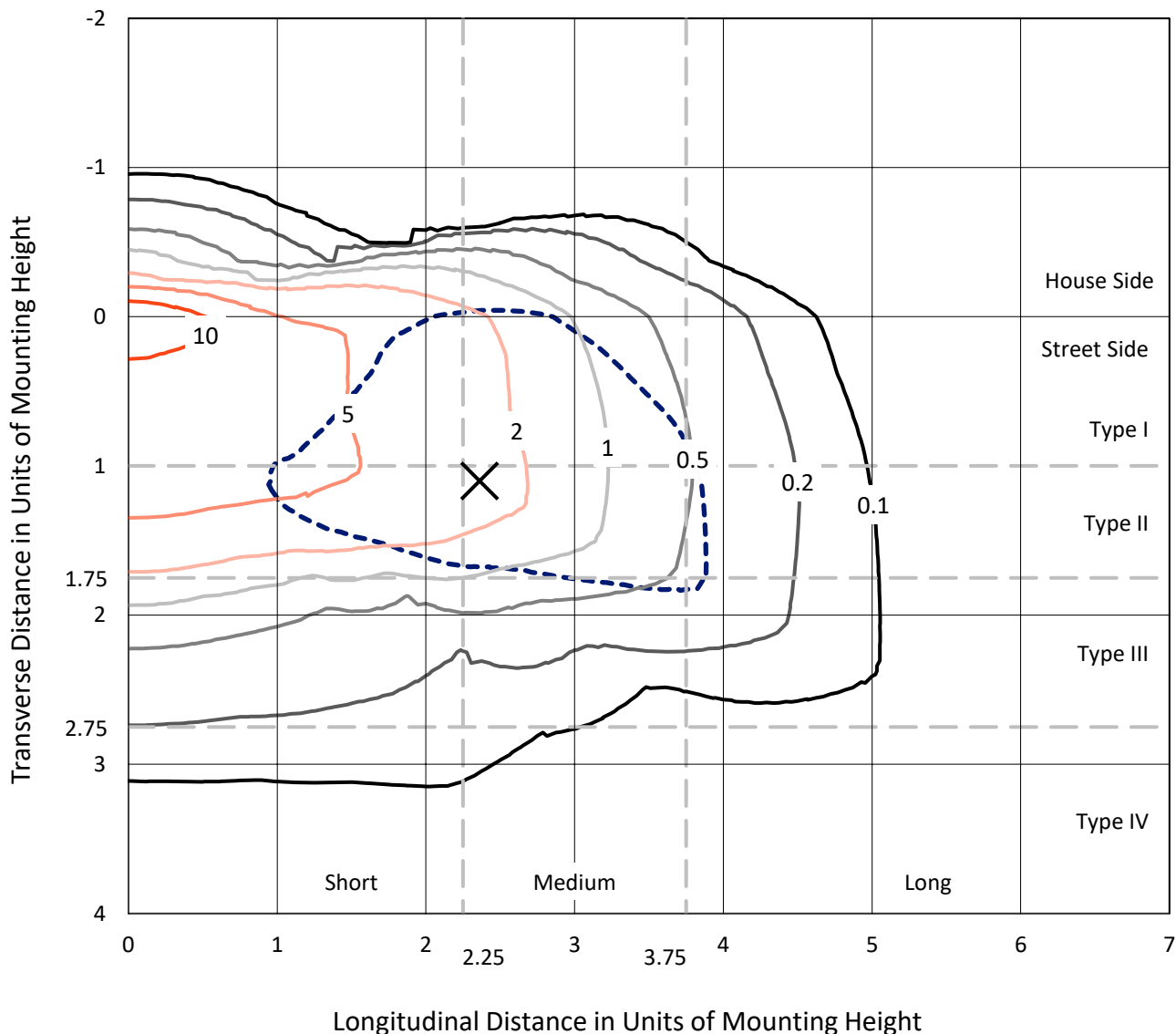
Input Watts (W): 59  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P363473  
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### Iso-Footcandle Lines of Horizontal Illumination

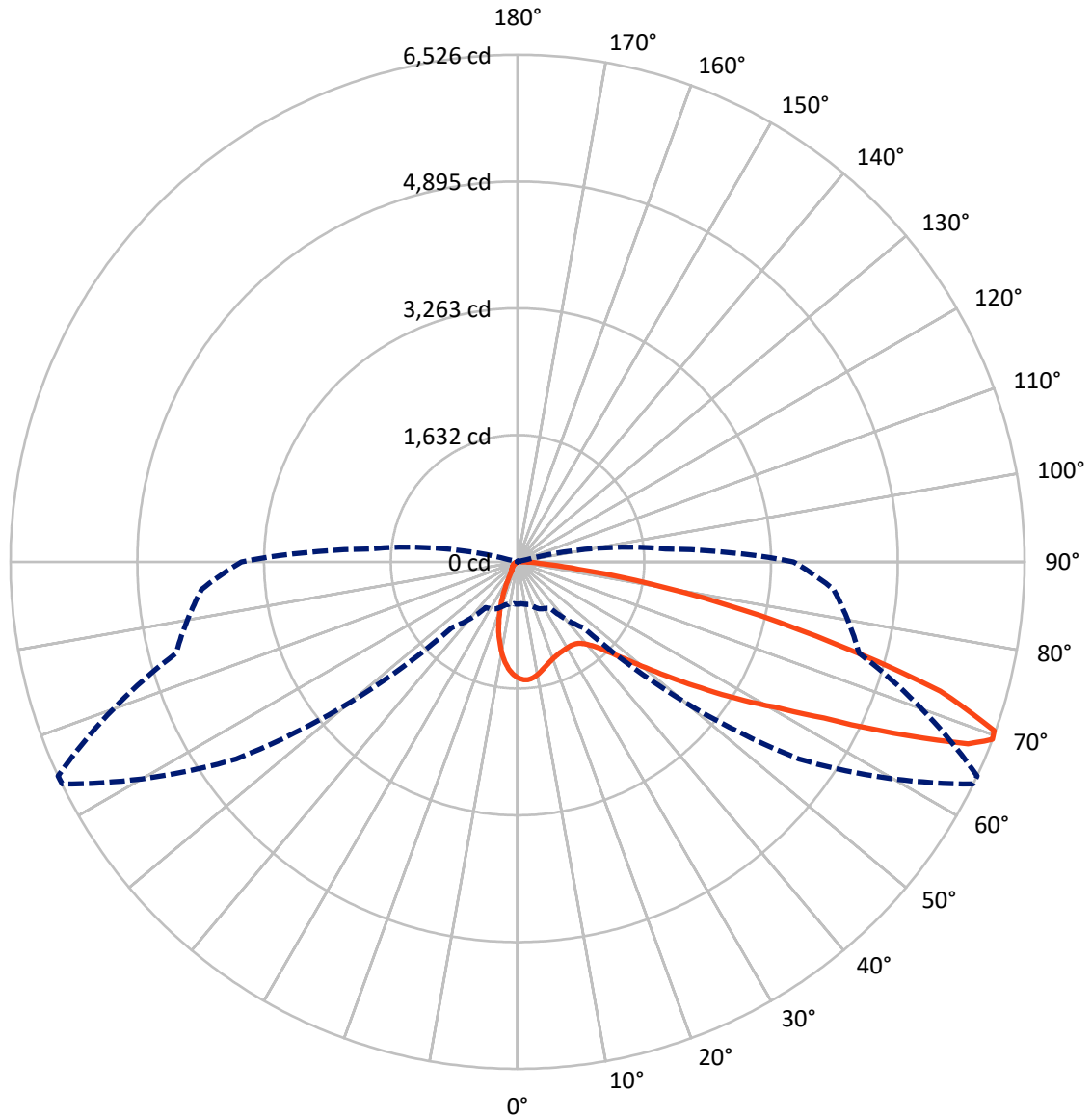
× Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 15 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 65-Deg Lateral      - - - Horizontal Cone Through 69-Deg Vertical

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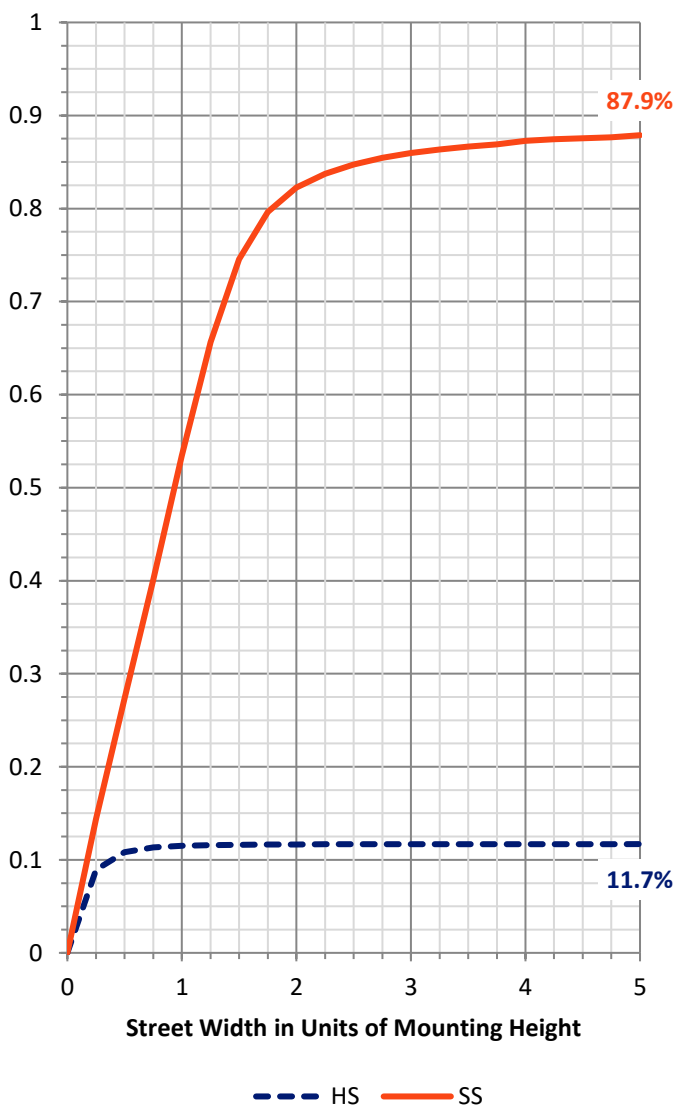
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 698.0    | 0.0    | 698.0  |
|                    | % Fixture | 11.8     | 0.0    | 11.8   |
| <b>Street Side</b> | Lumens    | 5223.1   | 0.0    | 5223.1 |
|                    | % Fixture | 88.2     | 0.0    | 88.2   |
| <b>Total</b>       | Lumens    | 5921.0   | 0.0    | 5921.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 125.1  | 2.1       |
| 10°-20°   | 273.9  | 4.6       |
| 20°-30°   | 379.3  | 6.4       |
| 30°-40°   | 528.9  | 8.9       |
| 40°-50°   | 822.1  | 13.9      |
| 50°-60°   | 1319.8 | 22.3      |
| 60°-70°   | 1493.0 | 25.2      |
| 70°-80°   | 876.8  | 14.8      |
| 80°-90°   | 102.0  | 1.7       |
| 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°    | 5921.0 | 100.0     |
| 0°-180°   | 5921.0 | 100.0     |

**Coefficient of Utilization**

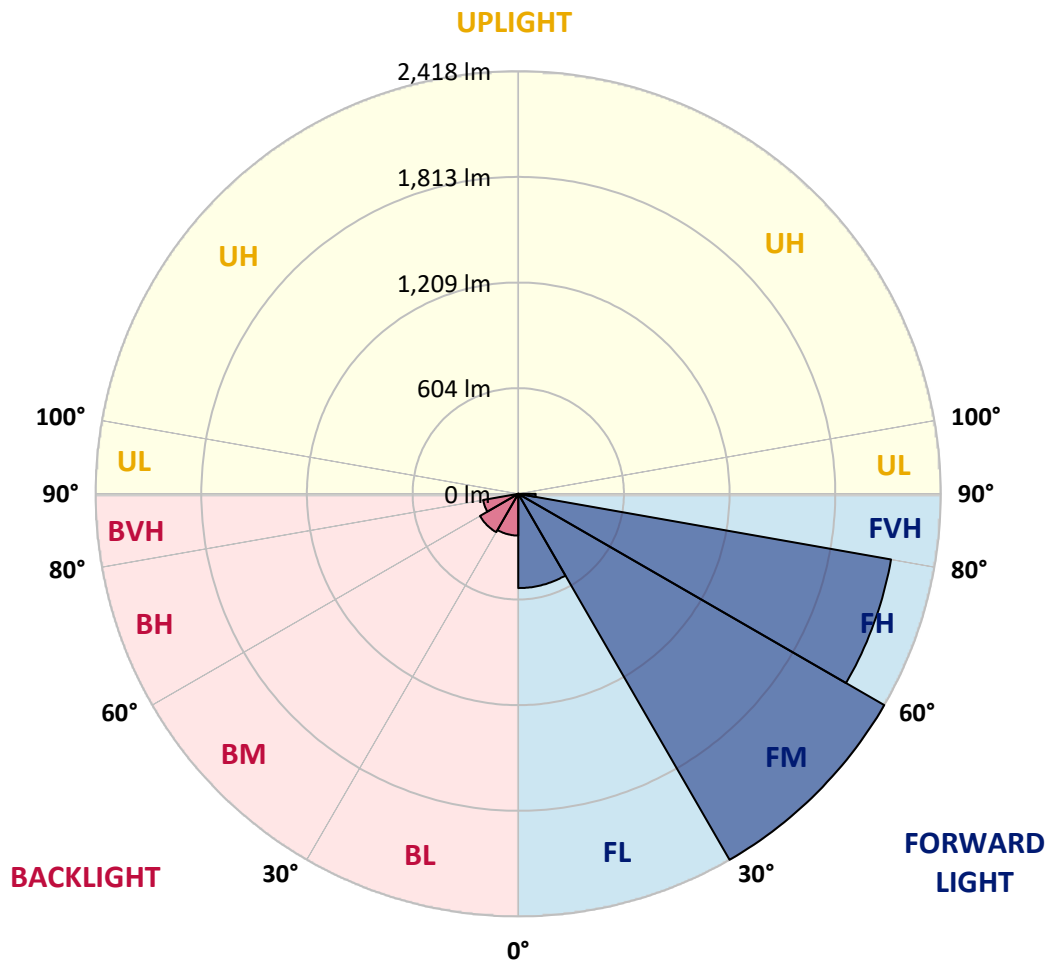


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 539.5  | 9.1       |                         |      |         |
| FM (30°-60°)   | 2418.0 | 40.8      |                         |      |         |
| FH (60°-80°)   | 2165.8 | 36.6      |                         |      | G2/5000 |
| FVH (80°-90°)  | 99.7   | 1.7       |                         |      | G1/100  |
| BL (0°-30°)    | 238.8  | 4.0       | B1/500                  |      |         |
| BM (30°-60°)   | 252.9  | 4.3       | B1/1000                 |      |         |
| BH (60°-80°)   | 203.9  | 3.4       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 2.3    | 0.0       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**  
 Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 64°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 |
| 2.5°  | 1509.5 | 1505.8 | 1508.8 | 1515.3 | 1518.5 | 1518.5 | 1521.1 | 1518.0 | 1519.0 | 1511.8 | 1501.3 |
| 5°    | 1415.1 | 1409.3 | 1417.6 | 1435.9 | 1458.4 | 1477.7 | 1506.3 | 1521.3 | 1522.8 | 1523.1 | 1510.8 |
| 7.5°  | 1313.4 | 1308.1 | 1320.4 | 1341.9 | 1371.0 | 1406.8 | 1456.7 | 1500.3 | 1502.8 | 1526.3 | 1517.3 |
| 10°   | 1230.7 | 1226.9 | 1241.2 | 1264.2 | 1298.3 | 1338.4 | 1399.5 | 1460.2 | 1467.4 | 1519.5 | 1516.3 |
| 12.5° | 1165.0 | 1162.0 | 1175.6 | 1202.1 | 1236.9 | 1281.3 | 1345.2 | 1415.6 | 1425.3 | 1504.3 | 1511.3 |
| 15°   | 1117.2 | 1116.7 | 1127.9 | 1153.5 | 1192.1 | 1233.4 | 1298.8 | 1374.2 | 1385.5 | 1487.7 | 1510.5 |
| 17.5° | 1092.1 | 1092.9 | 1101.1 | 1122.9 | 1156.0 | 1197.1 | 1259.7 | 1339.4 | 1351.7 | 1472.9 | 1514.3 |
| 20°   | 1089.6 | 1090.4 | 1094.9 | 1107.2 | 1134.0 | 1170.3 | 1227.9 | 1310.1 | 1322.9 | 1461.9 | 1520.3 |
| 22.5° | 1111.7 | 1111.2 | 1112.4 | 1111.2 | 1126.2 | 1153.8 | 1206.9 | 1287.5 | 1302.3 | 1454.7 | 1525.1 |
| 25°   | 1154.0 | 1153.3 | 1152.8 | 1143.5 | 1133.5 | 1148.2 | 1198.1 | 1274.8 | 1288.8 | 1449.4 | 1527.8 |
| 27.5° | 1212.9 | 1212.4 | 1211.6 | 1196.3 | 1166.3 | 1157.0 | 1199.1 | 1270.0 | 1281.8 | 1445.1 | 1527.3 |
| 30°   | 1290.3 | 1293.8 | 1292.8 | 1271.5 | 1224.7 | 1183.8 | 1209.6 | 1267.5 | 1277.8 | 1436.9 | 1522.1 |
| 32.5° | 1381.2 | 1388.3 | 1393.8 | 1371.0 | 1312.3 | 1236.9 | 1233.9 | 1270.3 | 1277.8 | 1430.6 | 1512.5 |
| 35°   | 1475.7 | 1484.7 | 1505.0 | 1497.0 | 1419.8 | 1316.9 | 1275.8 | 1286.8 | 1293.1 | 1434.1 | 1508.0 |
| 37.5° | 1568.7 | 1579.4 | 1623.5 | 1646.8 | 1560.6 | 1422.6 | 1340.9 | 1327.6 | 1330.9 | 1455.4 | 1513.0 |
| 40°   | 1676.6 | 1692.9 | 1759.8 | 1797.4 | 1728.8 | 1564.1 | 1438.4 | 1397.8 | 1399.0 | 1502.3 | 1536.3 |
| 42.5° | 1818.4 | 1835.2 | 1907.6 | 1966.5 | 1918.2 | 1743.0 | 1570.7 | 1505.0 | 1503.8 | 1590.0 | 1591.2 |
| 45°   | 1991.3 | 2008.9 | 2083.8 | 2149.2 | 2127.4 | 1955.0 | 1740.0 | 1661.6 | 1660.1 | 1728.3 | 1695.2 |
| 47.5° | 2187.2 | 2204.5 | 2271.4 | 2338.8 | 2362.4 | 2202.5 | 1955.7 | 1875.3 | 1871.8 | 1920.4 | 1855.8 |
| 50°   | 2355.4 | 2366.6 | 2428.3 | 2519.0 | 2625.2 | 2506.7 | 2224.1 | 2146.7 | 2142.9 | 2175.7 | 2091.5 |
| 52.5° | 2416.5 | 2423.0 | 2485.6 | 2612.7 | 2877.7 | 2918.6 | 2576.6 | 2476.9 | 2474.1 | 2488.4 | 2405.5 |
| 55°   | 2292.7 | 2304.5 | 2381.4 | 2569.8 | 3014.5 | 3384.1 | 3021.6 | 2885.8 | 2865.0 | 2834.2 | 2733.7 |
| 57.5° | 1955.5 | 1974.3 | 2057.0 | 2307.5 | 2950.7 | 3753.4 | 3675.5 | 3348.3 | 3317.7 | 3129.3 | 3000.5 |
| 60°   | 1465.2 | 1488.2 | 1556.9 | 1827.2 | 2609.7 | 3884.9 | 4390.0 | 3863.6 | 3794.7 | 3364.3 | 3245.8 |
| 62.5° | 1005.4 | 1017.0 | 1063.6 | 1239.7 | 1921.9 | 3669.5 | 4987.8 | 4553.9 | 4428.1 | 3619.9 | 3511.1 |
| 65°   | 767.9  | 771.9  | 791.0  | 851.6  | 1144.5 | 2980.7 | 5225.6 | 5464.6 | 5312.5 | 3925.5 | 3786.5 |
| 67.5° | 618.8  | 615.6  | 641.9  | 728.6  | 766.4  | 1818.4 | 4948.2 | 6326.2 | 6255.1 | 4334.2 | 4063.6 |
| 69°   | 545.7  | 541.2  | 568.0  | 668.7  | 719.8  | 1202.1 | 4423.6 | 6521.9 | 6526.4 | 4549.9 | 4082.6 |
| 70°   | 491.1  | 494.1  | 520.6  | 633.1  | 704.0  | 943.5  | 3922.5 | 6472.0 | 6507.6 | 4630.5 | 3968.4 |
| 72.5° | 328.0  | 336.0  | 389.3  | 525.6  | 677.0  | 714.0  | 2368.4 | 5553.8 | 5690.6 | 4448.9 | 3404.6 |
| 75°   | 184.9  | 190.9  | 254.3  | 396.4  | 637.9  | 680.0  | 1251.0 | 4091.6 | 4223.9 | 3720.3 | 2625.4 |
| 77.5° | 90.7   | 94.0   | 143.8  | 255.8  | 533.4  | 647.9  | 709.5  | 2779.3 | 2930.4 | 2428.3 | 1485.0 |
| 80°   | 38.3   | 40.1   | 71.9   | 157.8  | 381.3  | 618.3  | 526.9  | 1710.5 | 1729.3 | 951.3  | 395.6  |
| 82.5° | 14.8   | 15.3   | 30.3   | 98.5   | 242.3  | 482.0  | 440.7  | 811.0  | 791.5  | 179.1  | 90.2   |
| 85°   | 1.8    | 2.0    | 11.0   | 59.1   | 134.8  | 248.0  | 358.0  | 349.5  | 323.5  | 35.6   | 46.4   |
| 87.5° | 0.0    | 0.0    | 0.8    | 18.0   | 40.1   | 116.3  | 186.2  | 145.1  | 130.8  | 11.5   | 24.1   |
| 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-SA1C-750-U-SL2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 | 1496.2 |
| 2.5°  | 1492.5 | 1490.0 | 1476.5 | 1456.9 | 1438.4 | 1415.3 | 1393.3 | 1380.0 | 1369.5 | 1362.5 | 1370.7 |
| 5°    | 1496.5 | 1485.5 | 1444.4 | 1391.8 | 1340.2 | 1282.0 | 1227.9 | 1182.1 | 1164.0 | 1144.0 | 1153.0 |
| 7.5°  | 1495.2 | 1474.4 | 1400.5 | 1306.8 | 1212.1 | 1114.2 | 1021.5 | 950.1  | 913.0  | 876.7  | 885.9  |
| 10°   | 1489.0 | 1453.9 | 1341.9 | 1203.1 | 1061.3 | 920.5  | 789.0  | 689.0  | 633.1  | 582.5  | 589.8  |
| 12.5° | 1475.2 | 1426.3 | 1272.8 | 1084.4 | 894.7  | 709.0  | 555.0  | 426.9  | 358.3  | 328.0  | 331.7  |
| 15°   | 1466.9 | 1399.5 | 1199.6 | 964.1  | 716.8  | 493.8  | 339.2  | 252.3  | 221.0  | 211.0  | 212.2  |
| 17.5° | 1462.9 | 1373.7 | 1123.9 | 826.5  | 534.9  | 314.4  | 219.2  | 193.4  | 186.7  | 184.9  | 185.4  |
| 20°   | 1458.9 | 1347.7 | 1046.0 | 690.5  | 368.5  | 211.5  | 180.1  | 172.6  | 170.1  | 167.9  | 168.4  |
| 22.5° | 1452.2 | 1322.6 | 962.3  | 552.7  | 248.5  | 171.6  | 162.4  | 155.1  | 149.8  | 147.1  | 147.6  |
| 25°   | 1443.9 | 1296.3 | 876.9  | 411.6  | 181.4  | 153.1  | 144.3  | 134.0  | 127.8  | 122.8  | 123.0  |
| 27.5° | 1430.6 | 1264.0 | 788.7  | 299.7  | 152.3  | 137.0  | 125.3  | 114.0  | 103.5  | 97.7   | 97.7   |
| 30°   | 1412.1 | 1227.4 | 690.7  | 214.5  | 136.5  | 121.3  | 107.0  | 93.0   | 81.7   | 76.4   | 75.9   |
| 32.5° | 1391.5 | 1189.3 | 591.8  | 162.6  | 124.0  | 106.5  | 90.2   | 75.4   | 65.4   | 61.1   | 60.9   |
| 35°   | 1374.0 | 1148.2 | 493.1  | 136.3  | 111.5  | 92.2   | 74.4   | 61.9   | 53.9   | 50.4   | 50.1   |
| 37.5° | 1362.7 | 1107.2 | 396.9  | 121.8  | 100.2  | 78.9   | 62.4   | 51.1   | 45.3   | 42.6   | 42.3   |
| 40°   | 1361.0 | 1076.6 | 308.9  | 110.7  | 89.7   | 67.1   | 52.1   | 43.3   | 38.1   | 35.1   | 34.8   |
| 42.5° | 1383.8 | 1059.0 | 237.0  | 101.5  | 78.9   | 56.9   | 44.3   | 37.1   | 31.6   | 28.6   | 28.3   |
| 45°   | 1443.6 | 1064.6 | 182.4  | 93.2   | 68.1   | 48.1   | 37.6   | 30.8   | 25.8   | 23.6   | 23.1   |
| 47.5° | 1552.9 | 1102.6 | 145.1  | 84.9   | 57.9   | 40.8   | 32.1   | 25.6   | 21.3   | 19.0   | 18.8   |
| 50°   | 1747.3 | 1192.1 | 121.3  | 75.9   | 48.4   | 34.8   | 26.6   | 20.8   | 17.3   | 15.3   | 15.0   |
| 52.5° | 2005.4 | 1351.4 | 108.2  | 67.1   | 40.1   | 29.6   | 21.8   | 16.5   | 13.5   | 12.0   | 11.8   |
| 55°   | 2290.0 | 1544.4 | 99.7   | 57.6   | 32.8   | 24.6   | 17.3   | 13.0   | 10.5   | 9.3    | 8.8    |
| 57.5° | 2567.8 | 1711.5 | 91.7   | 48.4   | 27.3   | 20.0   | 13.8   | 10.3   | 8.3    | 7.0    | 6.8    |
| 60°   | 2823.1 | 1865.0 | 82.4   | 38.8   | 22.3   | 15.8   | 10.8   | 8.0    | 6.5    | 5.3    | 5.3    |
| 62.5° | 3096.5 | 1983.8 | 69.7   | 30.3   | 18.3   | 12.0   | 8.8    | 7.3    | 5.3    | 4.5    | 4.3    |
| 65°   | 3386.1 | 2072.0 | 54.6   | 23.6   | 14.3   | 9.0    | 7.3    | 7.5    | 4.3    | 3.3    | 3.0    |
| 67.5° | 3600.1 | 2054.5 | 40.3   | 18.5   | 11.0   | 7.0    | 7.0    | 8.0    | 3.8    | 2.5    | 2.3    |
| 69°   | 3553.0 | 1911.9 | 33.8   | 16.0   | 9.5    | 6.0    | 6.5    | 8.0    | 3.5    | 2.3    | 2.0    |
| 70°   | 3416.4 | 1754.1 | 29.8   | 14.3   | 8.5    | 5.5    | 6.3    | 7.8    | 3.3    | 2.3    | 2.0    |
| 72.5° | 2845.2 | 1321.1 | 23.3   | 10.8   | 6.8    | 4.5    | 5.3    | 6.8    | 3.3    | 2.3    | 1.8    |
| 75°   | 2140.1 | 845.6  | 17.8   | 7.8    | 5.0    | 3.5    | 4.0    | 5.0    | 3.3    | 2.0    | 1.8    |
| 77.5° | 1164.5 | 304.9  | 12.8   | 5.3    | 3.5    | 2.8    | 2.8    | 3.8    | 3.0    | 1.5    | 1.0    |
| 80°   | 299.4  | 76.7   | 8.0    | 3.5    | 2.8    | 2.0    | 1.8    | 2.5    | 1.8    | 0.3    | 0.0    |
| 82.5° | 73.9   | 17.3   | 4.3    | 2.5    | 2.0    | 0.8    | 0.8    | 1.3    | 0.8    | 0.0    | 0.0    |
| 85°   | 40.6   | 8.5    | 2.8    | 1.8    | 1.0    | 0.0    | 0.0    | 0.3    | 0.0    | 0.0    | 0.0    |
| 87.5° | 20.8   | 2.5    | 0.8    | 0.5    | 0.3    | 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    |



Signify Classified - Internal  
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1121 Highway 74 South  
Peachtree City, GA 30269



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-4-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: 4π  
 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 | R9:  | -28.4 |
| CIE u':                   | 0.2101 | R1:       | 70.5 | R10: | 48.6  |
| CIE v':                   | 0.4904 | R2:       | 77.7 | R11: | 73.2  |
| Duv:                      | 0.0037 | R3:       | 84.6 | R12: | 50.7  |
| CIE x:                    | 0.3493 | R4:       | 74.7 | R13: | 71.2  |
| CIE y:                    | 0.3624 | R5:       | 71.9 | R14: | 91.4  |
| CIE z:                    | 0.2884 | R6:       | 70.7 |      |       |
| 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**



#####

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 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 (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 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 (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 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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**Summary**

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



**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)