

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: P362130

Luminaire Tested: NVN-SA2C-722-U-SL4

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P362130  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-24)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA2C-722-U-SL4  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(2) 70 CRI, 2200K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 10151 lumens  
Efficiency: N/A  
Efficacy: 89.8 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G3

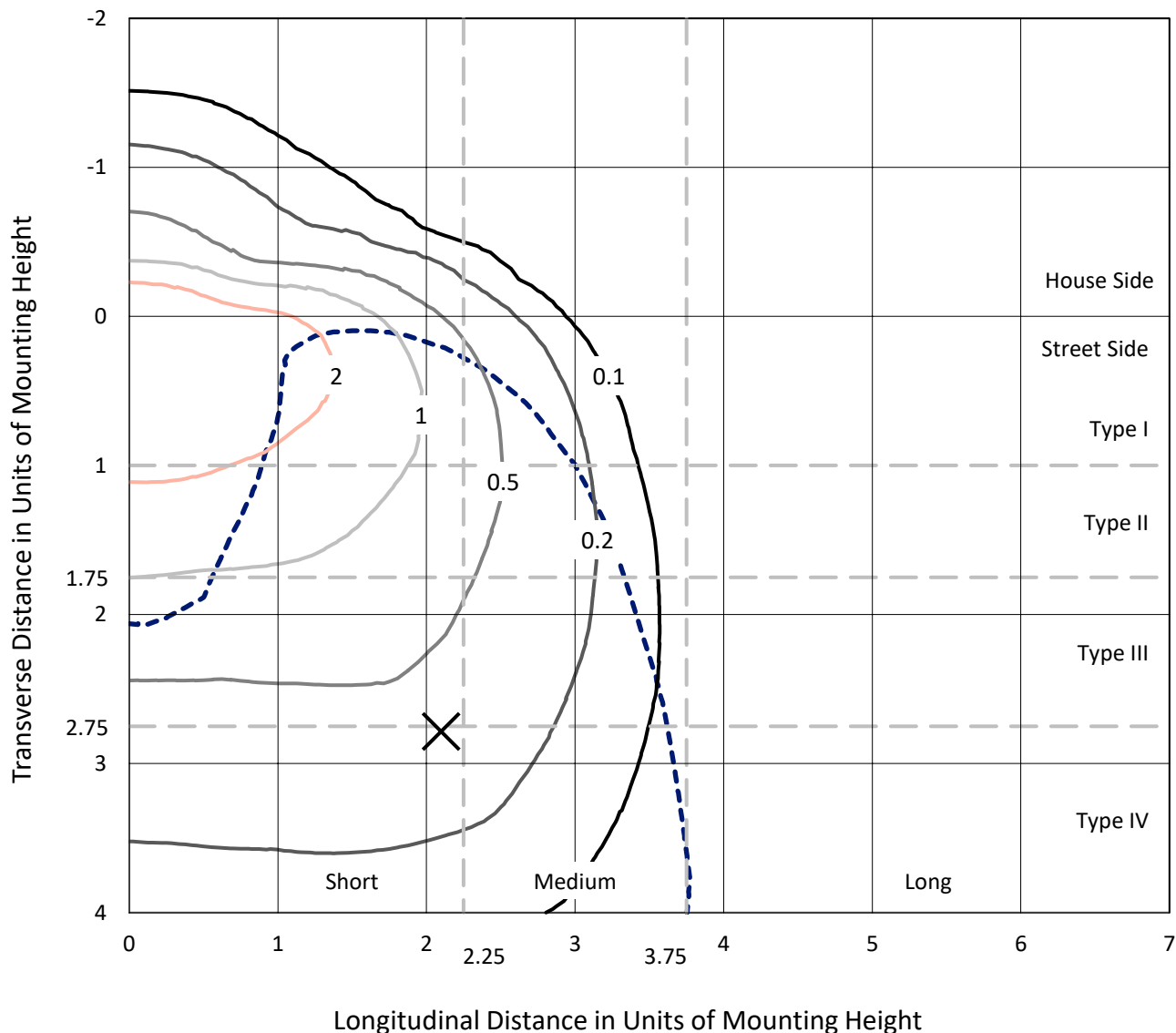
Input Watts (W): 113  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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### Iso-Footcandle Lines of Horizontal Illumination

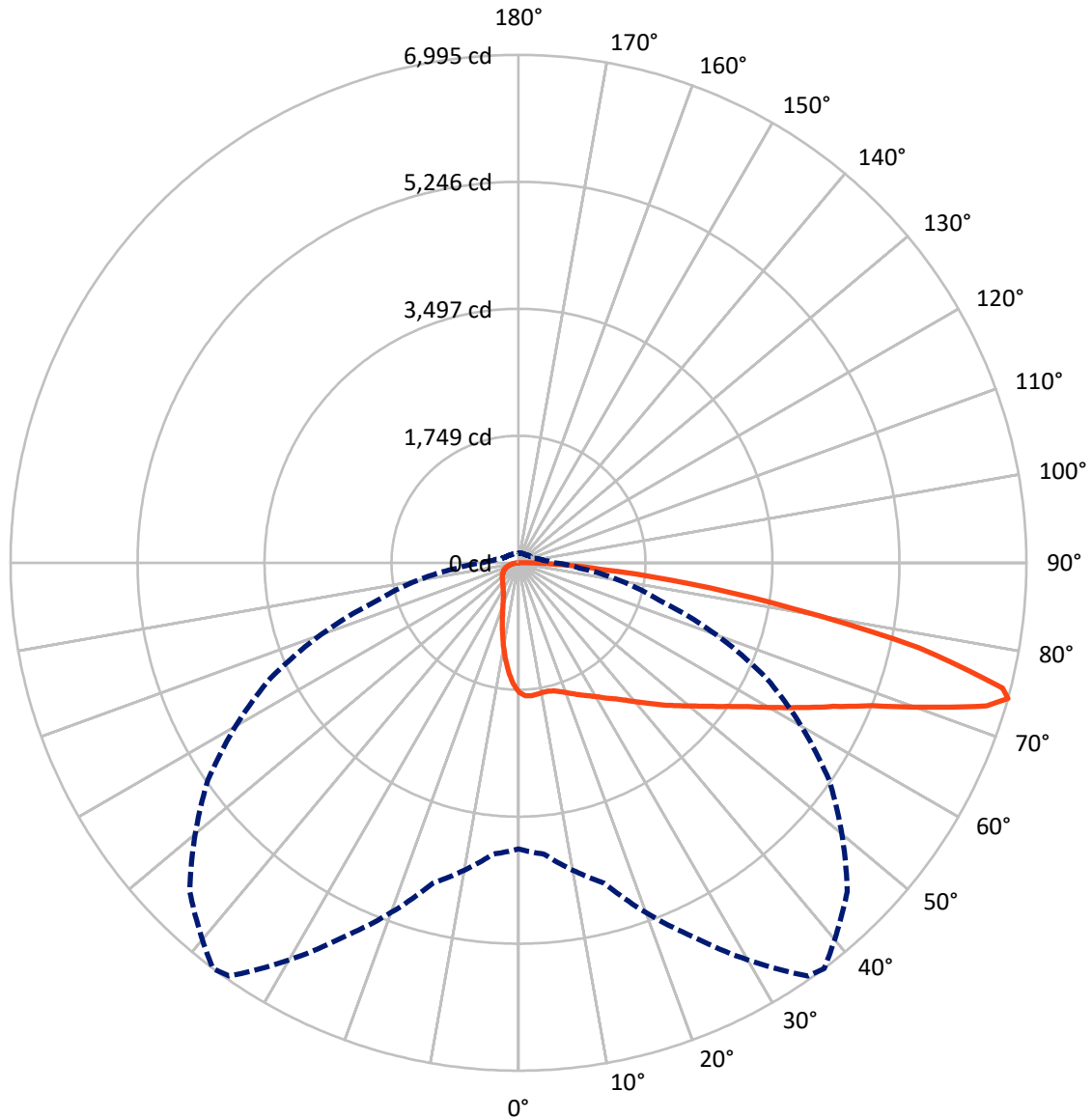
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 4.5 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 37-Deg Lateral      - - - Horizontal Cone Through 74-Deg Vertical

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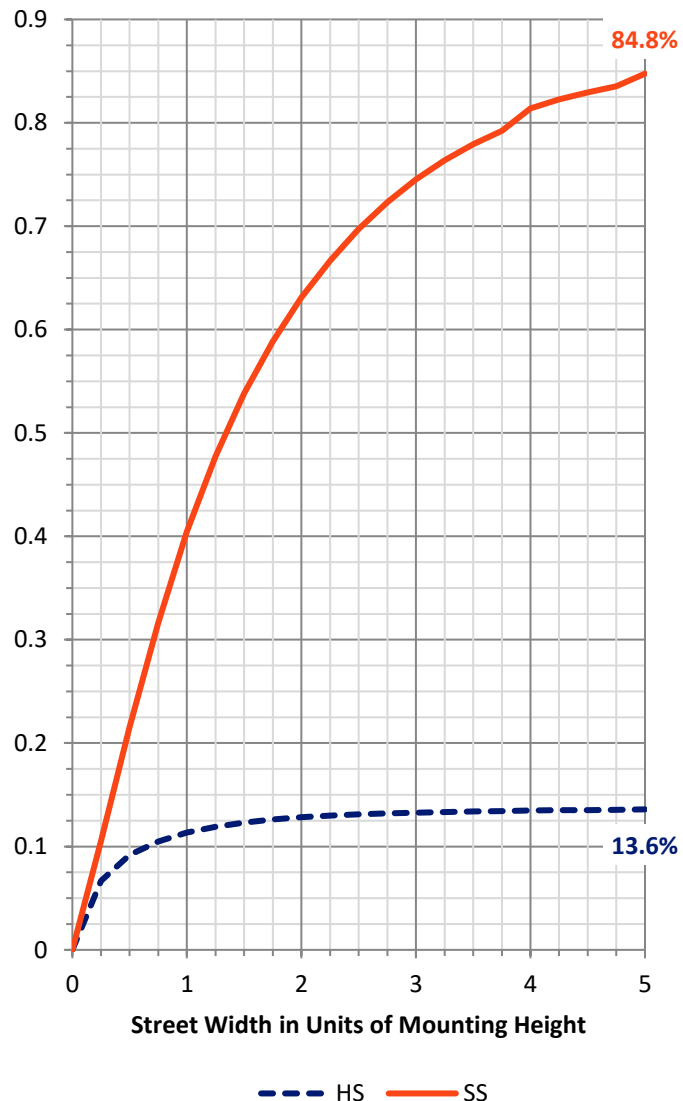
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1396.7   | 0.0    | 1396.7  |
|                    | % Fixture | 13.8     | 0.0    | 13.8    |
| <b>Street Side</b> | Lumens    | 8754.3   | 0.0    | 8754.3  |
|                    | % Fixture | 86.2     | 0.0    | 86.2    |
| <b>Total</b>       | Lumens    | 10151.0  | 0.0    | 10151.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 157.5   | 1.6       |
| 10°-20°   | 403.7   | 4.0       |
| 20°-30°   | 622.1   | 6.1       |
| 30°-40°   | 904.6   | 8.9       |
| 40°-50°   | 1331.4  | 13.1      |
| 50°-60°   | 1869.7  | 18.4      |
| 60°-70°   | 2366.4  | 23.3      |
| 70°-80°   | 2083.7  | 20.5      |
| 80°-90°   | 412.0   | 4.1       |
| 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°    | 10151.0 | 100.0     |
| 0°-180°   | 10151.0 | 100.0     |

**Coefficient of Utilization**

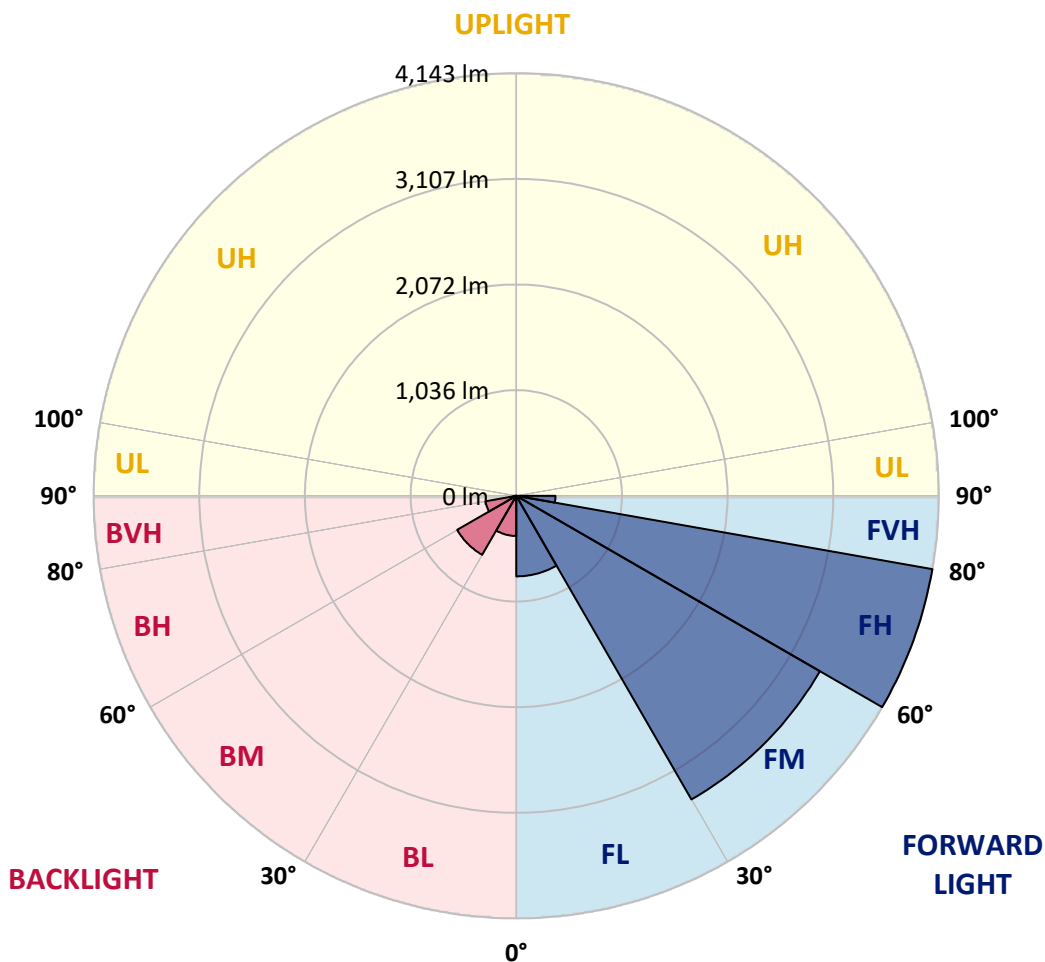


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 789.9  | 7.8       |                         |      |         |
| FM (30°-60°)   | 3437.2 | 33.9      |                         |      |         |
| FH (60°-80°)   | 4143.1 | 40.8      |                         |      | G2/5000 |
| FVH (80°-90°)  | 384.1  | 3.8       |                         |      | G3/500  |
| BL (0°-30°)    | 393.4  | 3.9       | B1/500                  |      |         |
| BM (30°-60°)   | 668.4  | 6.6       | B1/1000                 |      |         |
| BH (60°-80°)   | 307.0  | 3.0       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 27.9   | 0.3       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G3**  
 Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 37°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 |
| 2.5°  | 1849.7 | 1850.1 | 1849.7 | 1846.9 | 1840.1 | 1834.3 | 1829.7 | 1822.9 | 1807.9 | 1796.4 | 1779.3 |
| 5°    | 1867.2 | 1865.1 | 1863.7 | 1858.3 | 1847.6 | 1841.1 | 1832.2 | 1819.3 | 1794.6 | 1771.8 | 1743.9 |
| 7.5°  | 1859.0 | 1856.5 | 1853.3 | 1846.9 | 1834.7 | 1829.3 | 1816.8 | 1800.0 | 1770.3 | 1740.3 | 1700.2 |
| 10°   | 1833.6 | 1832.9 | 1831.5 | 1830.0 | 1819.7 | 1815.4 | 1803.9 | 1786.1 | 1756.7 | 1720.3 | 1673.4 |
| 12.5° | 1805.4 | 1807.2 | 1812.9 | 1820.4 | 1815.7 | 1813.6 | 1806.4 | 1794.3 | 1764.3 | 1724.9 | 1668.4 |
| 15°   | 1787.5 | 1792.5 | 1807.9 | 1827.5 | 1831.5 | 1830.8 | 1829.0 | 1821.1 | 1789.3 | 1745.7 | 1679.9 |
| 17.5° | 1781.4 | 1789.6 | 1819.0 | 1851.5 | 1862.9 | 1865.4 | 1866.2 | 1852.6 | 1817.2 | 1771.0 | 1691.7 |
| 20°   | 1792.5 | 1802.9 | 1845.8 | 1890.5 | 1908.7 | 1910.1 | 1906.9 | 1883.3 | 1843.6 | 1792.9 | 1698.1 |
| 22.5° | 1826.1 | 1835.4 | 1889.0 | 1939.5 | 1960.2 | 1962.3 | 1952.7 | 1916.9 | 1871.5 | 1818.6 | 1707.0 |
| 25°   | 1890.8 | 1902.3 | 1955.9 | 2006.3 | 2017.1 | 2017.4 | 2003.5 | 1959.1 | 1908.0 | 1854.7 | 1726.3 |
| 27.5° | 1975.2 | 1986.7 | 2034.9 | 2084.3 | 2078.6 | 2075.3 | 2056.4 | 2012.0 | 1955.6 | 1904.4 | 1760.7 |
| 30°   | 2069.3 | 2081.8 | 2127.5 | 2162.6 | 2149.0 | 2142.6 | 2127.2 | 2070.0 | 2021.7 | 1972.4 | 1813.2 |
| 32.5° | 2166.5 | 2178.0 | 2218.0 | 2242.0 | 2224.8 | 2221.9 | 2198.7 | 2146.5 | 2107.9 | 2076.1 | 1898.3 |
| 35°   | 2266.3 | 2274.5 | 2313.8 | 2327.4 | 2304.5 | 2303.8 | 2297.4 | 2249.5 | 2225.2 | 2240.2 | 2022.1 |
| 37.5° | 2368.2 | 2370.3 | 2403.9 | 2404.7 | 2397.9 | 2400.7 | 2407.5 | 2377.5 | 2384.3 | 2431.1 | 2183.0 |
| 40°   | 2459.0 | 2464.7 | 2489.0 | 2496.6 | 2508.4 | 2518.4 | 2552.3 | 2532.7 | 2585.2 | 2668.2 | 2383.2 |
| 42.5° | 2526.2 | 2537.3 | 2576.3 | 2595.6 | 2633.9 | 2649.6 | 2697.5 | 2715.7 | 2821.6 | 2946.0 | 2621.3 |
| 45°   | 2583.1 | 2600.3 | 2662.8 | 2702.5 | 2767.2 | 2794.8 | 2863.4 | 2924.6 | 3088.7 | 3247.5 | 2872.0 |
| 47.5° | 2644.6 | 2666.4 | 2744.7 | 2820.5 | 2908.5 | 2939.6 | 3064.4 | 3155.9 | 3373.7 | 3550.7 | 3108.4 |
| 50°   | 2735.1 | 2751.9 | 2828.4 | 2947.5 | 3057.2 | 3097.3 | 3270.0 | 3401.2 | 3663.3 | 3839.6 | 3313.2 |
| 52.5° | 2861.3 | 2854.8 | 2919.6 | 3086.5 | 3233.9 | 3283.2 | 3489.5 | 3662.2 | 3956.9 | 4101.0 | 3486.3 |
| 55°   | 2988.2 | 2977.5 | 3022.9 | 3232.1 | 3439.8 | 3491.7 | 3731.2 | 3924.3 | 4236.1 | 4336.3 | 3619.0 |
| 57.5° | 3129.5 | 3109.1 | 3147.3 | 3396.2 | 3674.4 | 3736.3 | 4001.9 | 4202.9 | 4510.7 | 4526.5 | 3703.4 |
| 60°   | 3275.0 | 3247.5 | 3290.4 | 3599.7 | 3972.2 | 4045.2 | 4318.7 | 4474.6 | 4769.6 | 4678.8 | 3730.5 |
| 62.5° | 3402.3 | 3383.0 | 3449.1 | 3826.7 | 4308.0 | 4388.1 | 4629.8 | 4763.6 | 5024.9 | 4742.1 | 3632.6 |
| 65°   | 3513.5 | 3516.7 | 3631.1 | 4082.0 | 4682.4 | 4767.8 | 4986.7 | 5119.7 | 5225.9 | 4704.6 | 3403.4 |
| 67.5° | 3646.1 | 3664.4 | 3859.6 | 4418.1 | 5153.7 | 5247.3 | 5505.9 | 5508.0 | 5338.2 | 4484.3 | 2952.1 |
| 70°   | 3839.6 | 3877.1 | 4173.9 | 4884.4 | 5823.7 | 5952.5 | 6152.0 | 5736.1 | 5180.5 | 3887.1 | 2322.8 |
| 72.5° | 4011.2 | 4081.3 | 4508.2 | 5417.9 | 6640.4 | 6738.1 | 6529.9 | 5604.6 | 4521.5 | 2913.1 | 1447.1 |
| 74°   | 3941.5 | 4028.4 | 4569.0 | 5680.7 | 6947.9 | 6994.8 | 6402.3 | 5220.5 | 3769.9 | 2017.4 | 841.0  |
| 75°   | 3791.3 | 3885.7 | 4480.4 | 5678.2 | 6909.0 | 6882.9 | 6094.1 | 4781.8 | 3104.8 | 1375.9 | 559.6  |
| 77.5° | 3059.7 | 3159.5 | 3775.2 | 4866.5 | 5665.0 | 5640.3 | 4681.3 | 3207.8 | 1359.8 | 451.3  | 284.3  |
| 80°   | 1778.9 | 1855.1 | 2343.5 | 3090.5 | 3819.9 | 3864.6 | 3078.7 | 1587.3 | 534.9  | 253.5  | 192.7  |
| 82.5° | 790.2  | 842.8  | 1132.1 | 1577.6 | 2305.3 | 2362.8 | 1612.3 | 831.7  | 330.4  | 154.1  | 115.9  |
| 85°   | 518.5  | 557.5  | 687.3  | 751.3  | 1097.7 | 1137.1 | 789.2  | 647.6  | 218.1  | 84.7   | 85.1   |
| 87.5° | 372.9  | 410.5  | 510.6  | 445.9  | 503.8  | 477.0  | 429.4  | 599.3  | 87.6   | 48.3   | 28.6   |
| 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: P362130  
 CATALOG NUMBER: NVN-SA2C-722-U-SL4

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 | 1788.6 |
| 2.5°  | 1771.8 | 1766.0 | 1753.2 | 1728.9 | 1715.3 | 1703.8 | 1684.9 | 1673.8 | 1668.8 | 1668.4 | 1670.6 |
| 5°    | 1727.8 | 1714.5 | 1681.3 | 1640.5 | 1608.0 | 1578.3 | 1541.5 | 1519.3 | 1503.6 | 1494.3 | 1496.8 |
| 7.5°  | 1676.6 | 1655.9 | 1603.7 | 1538.6 | 1486.4 | 1428.9 | 1372.0 | 1338.0 | 1311.6 | 1291.9 | 1295.5 |
| 10°   | 1641.6 | 1613.0 | 1536.8 | 1443.2 | 1356.3 | 1272.6 | 1194.3 | 1147.4 | 1110.3 | 1081.7 | 1083.8 |
| 12.5° | 1629.8 | 1591.2 | 1485.7 | 1360.6 | 1238.6 | 1124.2 | 1021.9 | 950.1  | 911.8  | 879.3  | 881.8  |
| 15°   | 1631.6 | 1579.7 | 1442.8 | 1286.2 | 1132.8 | 988.7  | 864.6  | 780.6  | 728.7  | 706.2  | 706.6  |
| 17.5° | 1633.0 | 1566.5 | 1397.7 | 1206.4 | 1028.0 | 862.1  | 727.3  | 642.2  | 593.2  | 572.5  | 572.8  |
| 20°   | 1628.4 | 1545.1 | 1342.0 | 1114.9 | 918.6  | 745.9  | 615.4  | 543.1  | 506.0  | 489.9  | 489.9  |
| 22.5° | 1622.3 | 1519.7 | 1279.0 | 1023.0 | 810.6  | 645.1  | 535.3  | 480.2  | 458.8  | 448.0  | 447.7  |
| 25°   | 1625.2 | 1500.7 | 1214.7 | 928.6  | 711.2  | 564.6  | 482.0  | 445.5  | 431.2  | 424.4  | 424.1  |
| 27.5° | 1640.5 | 1491.8 | 1155.3 | 834.6  | 624.3  | 504.2  | 446.2  | 420.5  | 411.2  | 406.9  | 406.9  |
| 30°   | 1668.4 | 1491.8 | 1093.5 | 754.5  | 552.1  | 459.5  | 418.7  | 401.2  | 394.8  | 391.9  | 391.9  |
| 32.5° | 1717.1 | 1500.0 | 1033.7 | 675.1  | 494.5  | 424.4  | 395.8  | 384.0  | 379.0  | 377.6  | 377.6  |
| 35°   | 1800.7 | 1527.9 | 975.5  | 600.0  | 448.0  | 395.8  | 374.0  | 367.2  | 363.6  | 363.3  | 364.4  |
| 37.5° | 1918.4 | 1584.8 | 920.7  | 544.6  | 415.1  | 372.6  | 355.8  | 350.4  | 348.3  | 350.1  | 351.5  |
| 40°   | 2066.4 | 1662.0 | 871.0  | 494.5  | 390.1  | 354.0  | 339.0  | 335.4  | 334.3  | 336.8  | 339.0  |
| 42.5° | 2245.2 | 1766.4 | 830.3  | 458.4  | 370.8  | 338.3  | 324.7  | 320.4  | 319.3  | 322.2  | 325.0  |
| 45°   | 2438.6 | 1878.7 | 801.7  | 431.6  | 355.8  | 326.5  | 312.2  | 307.5  | 305.4  | 306.8  | 310.0  |
| 47.5° | 2614.6 | 1984.9 | 790.2  | 412.6  | 341.5  | 316.4  | 301.1  | 295.4  | 291.8  | 291.1  | 293.6  |
| 50°   | 2762.9 | 2063.9 | 795.6  | 401.2  | 330.0  | 305.4  | 290.3  | 283.9  | 278.5  | 275.3  | 277.1  |
| 52.5° | 2870.9 | 2113.6 | 800.6  | 396.2  | 321.1  | 293.2  | 278.5  | 272.5  | 265.3  | 260.0  | 260.0  |
| 55°   | 2949.2 | 2125.0 | 789.5  | 392.3  | 314.3  | 280.0  | 265.3  | 259.6  | 252.4  | 246.4  | 245.7  |
| 57.5° | 2980.0 | 2092.9 | 748.4  | 386.5  | 309.7  | 267.5  | 251.4  | 247.1  | 241.0  | 233.9  | 233.5  |
| 60°   | 2938.5 | 1993.5 | 669.0  | 374.4  | 303.6  | 257.1  | 237.4  | 234.6  | 231.7  | 224.9  | 224.6  |
| 62.5° | 2771.9 | 1775.3 | 566.4  | 349.7  | 291.4  | 246.0  | 224.6  | 226.0  | 226.3  | 221.7  | 221.0  |
| 65°   | 2469.7 | 1475.7 | 466.3  | 317.5  | 273.2  | 232.8  | 211.3  | 218.1  | 222.1  | 221.3  | 220.3  |
| 67.5° | 2030.6 | 1148.5 | 395.1  | 283.6  | 249.2  | 214.5  | 197.0  | 204.9  | 208.1  | 210.6  | 209.9  |
| 70°   | 1507.2 | 809.9  | 326.8  | 247.8  | 220.3  | 193.1  | 178.4  | 182.4  | 180.2  | 183.1  | 184.1  |
| 72.5° | 840.3  | 485.9  | 266.4  | 212.0  | 190.2  | 168.1  | 157.7  | 157.0  | 152.3  | 152.3  | 152.3  |
| 74°   | 504.2  | 356.5  | 234.2  | 189.9  | 172.0  | 151.6  | 142.7  | 139.5  | 135.2  | 135.5  | 135.2  |
| 75°   | 405.5  | 306.4  | 214.9  | 175.2  | 159.1  | 142.0  | 133.0  | 128.7  | 125.5  | 125.5  | 125.1  |
| 77.5° | 256.0  | 232.8  | 173.1  | 139.5  | 127.3  | 116.9  | 110.8  | 105.1  | 105.1  | 104.8  | 104.4  |
| 80°   | 193.4  | 185.2  | 134.8  | 105.5  | 97.6   | 89.8   | 85.8   | 83.3   | 83.3   | 84.4   | 84.0   |
| 82.5° | 132.7  | 139.5  | 94.8   | 73.7   | 69.7   | 64.0   | 63.3   | 63.6   | 62.6   | 61.1   | 60.8   |
| 85°   | 96.9   | 104.8  | 64.0   | 46.5   | 42.6   | 39.0   | 41.8   | 43.3   | 41.5   | 38.3   | 36.8   |
| 87.5° | 37.2   | 68.7   | 34.3   | 19.3   | 17.9   | 15.4   | 17.9   | 18.6   | 20.0   | 15.7   | 16.1   |
| 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  
Cooper Lighting Solutions Photometric Lab  
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: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

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

**Test Information**

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **SA1C-722-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

CCT (K): 2237  
 CIE u': 0.2876  
 CIE v': 0.5346  
 Duv: -0.0006  
 CIE x: 0.5005  
 CIE y: 0.4134  
 CIE z: 0.0860  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 587  
 Purity: 74.5  
 Rf: 69.8  
 Rg: 99.2

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 72.0 |      |       |
| R1:       | 68.9 | R9:  | -17.4 |
| R2:       | 83.0 | R10: | 61.3  |
| R3:       | 95.2 | R11: | 59.8  |
| R4:       | 66.2 | R12: | 50.5  |
| R5:       | 65.9 | R13: | 71.1  |
| R6:       | 76.3 | R14: | 96.9  |
| R7:       | 76.7 |      |       |
| R8:       | 43.8 |      |       |



**Test Conditions**

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

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

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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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 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

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

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

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

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**Melanopic Flux vs. Wavelength**



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

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

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**Summary**

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



**Color Vector Graphics**





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

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



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)