

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: P360227

Luminaire Tested: NVN-SA1B-730-U-AFL-HSS

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P360227  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-30)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA1B-730-U-AFL-HSS  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(1) 70 CRI, 3000K, 800mA LIGHTSQUARE WITH 16 LEDS AND AUTOMOTIVE  
FRONTLINE OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4483 lumens  
Efficiency: N/A  
Efficacy: 101.9 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G1

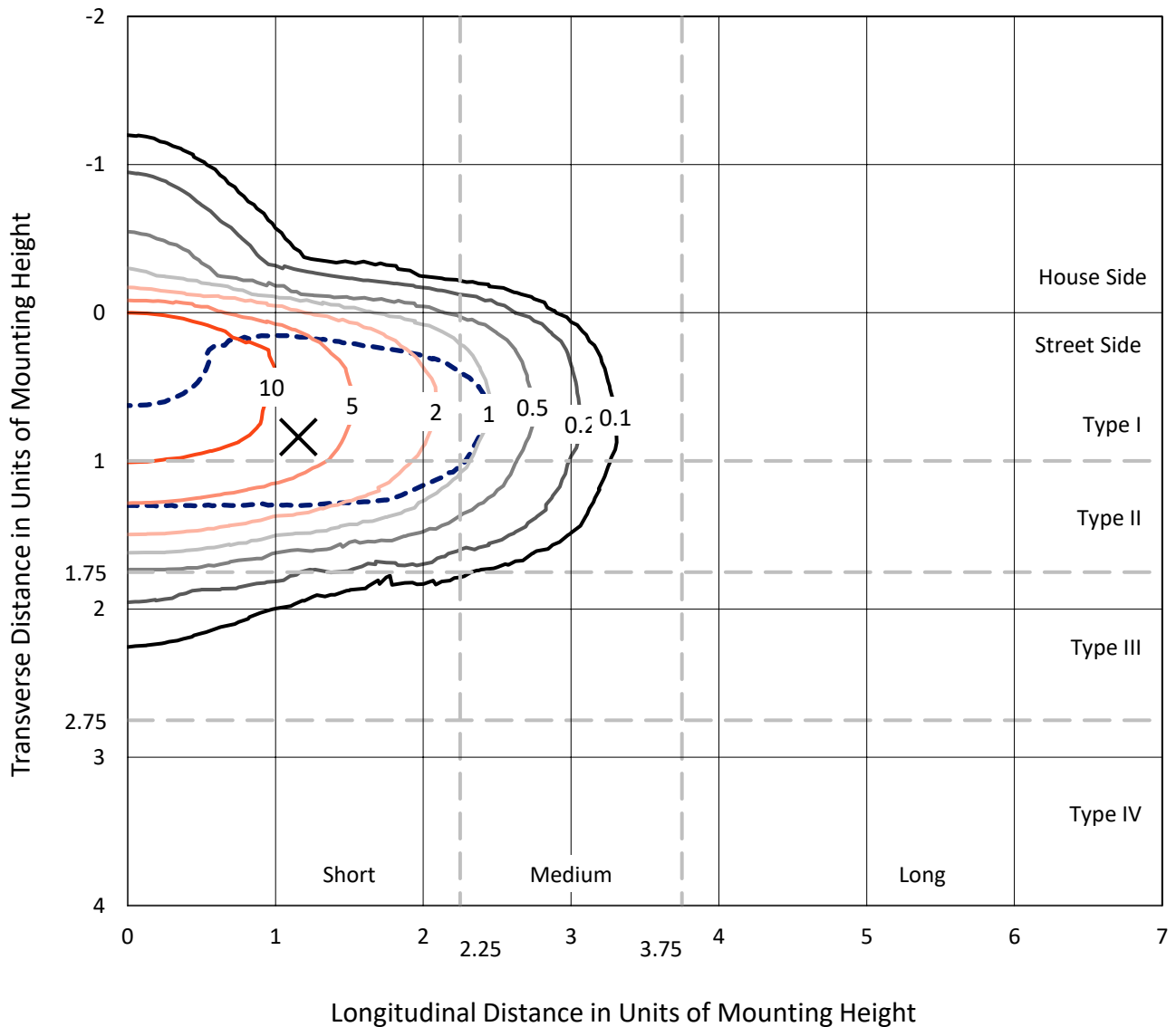
Input Watts (W): 44  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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### Iso-Footcandle Lines of Horizontal Illumination

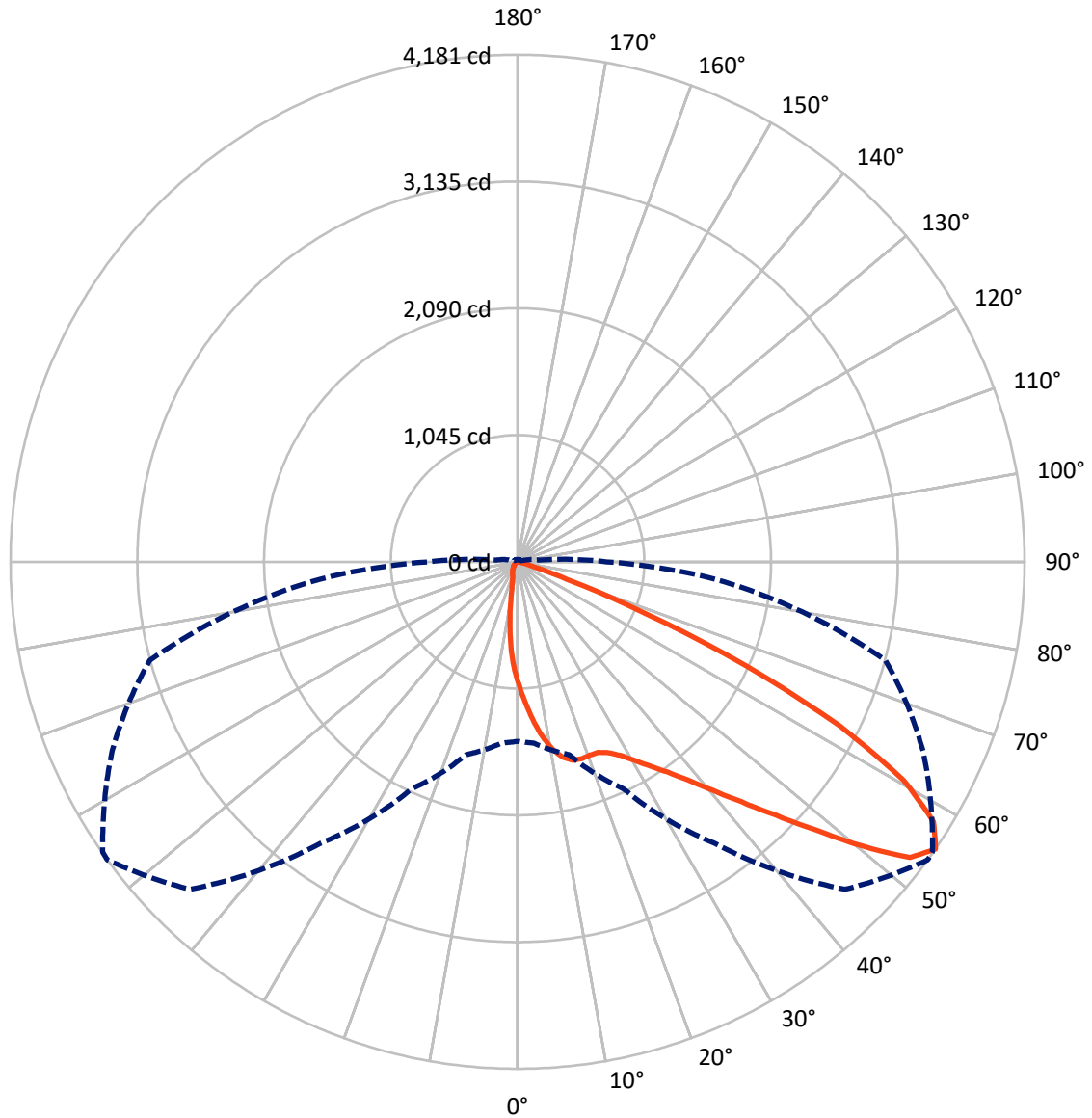
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 15.4 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 54-Deg Lateral      - - - Horizontal Cone Through 55-Deg Vertical

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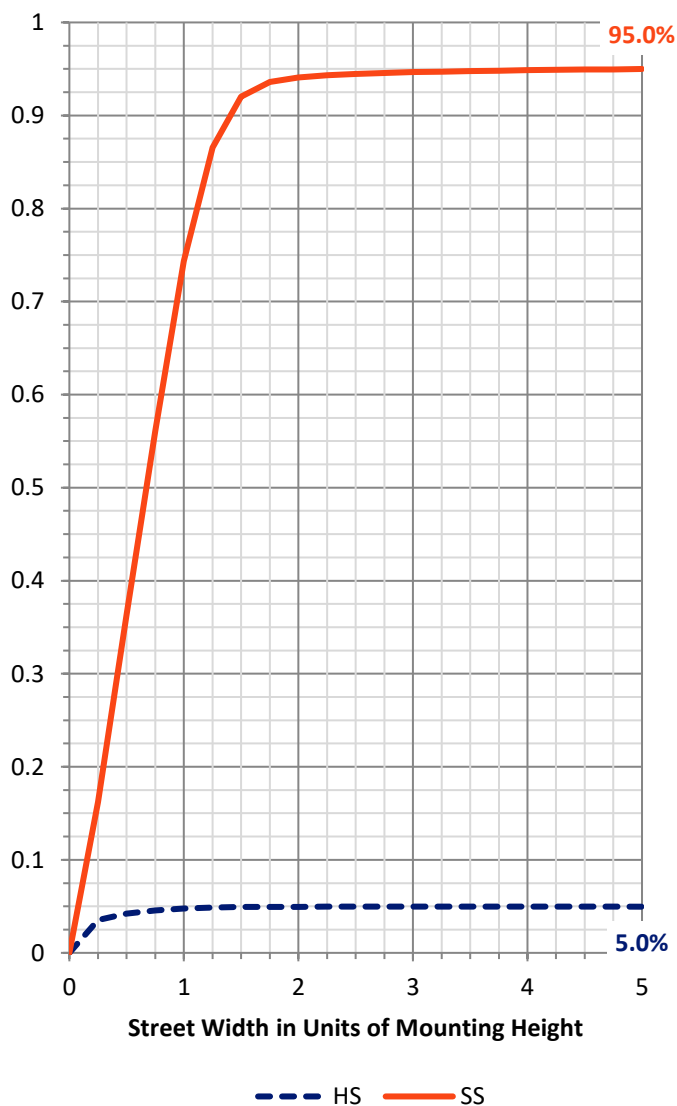
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 223.7    | 0.0    | 223.7  |
|                    | % Fixture | 5.0      | 0.0    | 5.0    |
| <b>Street Side</b> | Lumens    | 4259.3   | 0.0    | 4259.3 |
|                    | % Fixture | 95.0     | 0.0    | 95.0   |
| <b>Total</b>       | Lumens    | 4483.0   | 0.0    | 4483.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 92.5   | 2.1       |
| 10°-20°   | 253.6  | 5.7       |
| 20°-30°   | 432.9  | 9.7       |
| 30°-40°   | 694.8  | 15.5      |
| 40°-50°   | 1110.3 | 24.8      |
| 50°-60°   | 1189.7 | 26.5      |
| 60°-70°   | 610.8  | 13.6      |
| 70°-80°   | 92.5   | 2.1       |
| 80°-90°   | 6.0    | 0.1       |
| 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°    | 4483.0 | 100.0     |
| 0°-180°   | 4483.0 | 100.0     |

**Coefficient of Utilization**

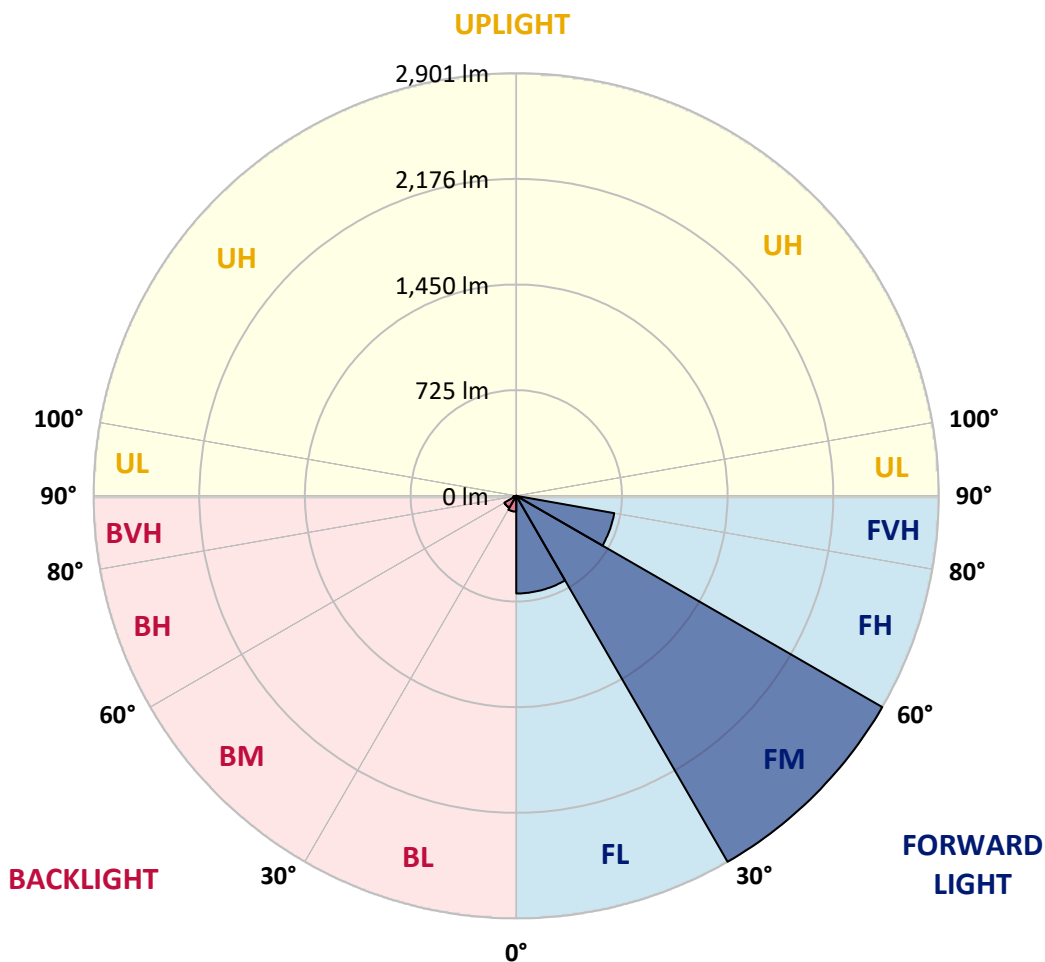


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 670.1  | 14.9      |                         |      |         |
| FM (30°-60°)   | 2900.7 | 64.7      |                         |      |         |
| FH (60°-80°)   | 682.7  | 15.2      |                         |      | G1/1800 |
| FVH (80°-90°)  | 5.8    | 0.1       |                         |      | G0/10   |
| BL (0°-30°)    | 108.8  | 2.4       | B0/110                  |      |         |
| BM (30°-60°)   | 94.0   | 2.1       | B0/220                  |      |         |
| BH (60°-80°)   | 20.6   | 0.5       | B0/110                  |      | G0/110  |
| BVH (80°-90°)  | 0.2    | 0.0       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B0-U0-G1**  
 Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 54°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 |
| 2.5°  | 1260.0 | 1241.2 | 1241.8 | 1233.2 | 1202.1 | 1177.7 | 1152.3 | 1146.3 | 1106.8 | 1065.4 | 1025.5 |
| 5°    | 1477.8 | 1464.0 | 1460.7 | 1444.3 | 1400.9 | 1355.0 | 1305.8 | 1294.4 | 1217.2 | 1132.4 | 1048.9 |
| 7.5°  | 1589.7 | 1589.8 | 1587.1 | 1581.1 | 1554.0 | 1509.5 | 1449.5 | 1437.5 | 1332.4 | 1205.2 | 1073.3 |
| 10°   | 1557.1 | 1564.5 | 1579.6 | 1599.5 | 1620.2 | 1614.6 | 1569.5 | 1558.7 | 1444.5 | 1282.2 | 1100.4 |
| 12.5° | 1481.2 | 1482.2 | 1499.0 | 1531.8 | 1591.4 | 1652.6 | 1653.3 | 1649.7 | 1551.5 | 1362.8 | 1130.2 |
| 15°   | 1443.5 | 1447.2 | 1453.4 | 1474.5 | 1531.0 | 1629.0 | 1699.0 | 1704.3 | 1649.7 | 1448.3 | 1162.0 |
| 17.5° | 1468.3 | 1473.5 | 1468.3 | 1470.8 | 1503.5 | 1591.6 | 1707.0 | 1720.3 | 1735.4 | 1532.9 | 1192.0 |
| 20°   | 1535.4 | 1540.3 | 1531.0 | 1520.7 | 1527.1 | 1580.7 | 1701.4 | 1719.4 | 1802.6 | 1608.0 | 1217.2 |
| 22.5° | 1626.1 | 1628.0 | 1613.9 | 1597.0 | 1592.4 | 1617.5 | 1706.0 | 1724.6 | 1856.4 | 1676.0 | 1233.0 |
| 25°   | 1725.8 | 1727.5 | 1709.9 | 1690.5 | 1679.5 | 1689.7 | 1744.1 | 1758.1 | 1903.9 | 1740.9 | 1242.1 |
| 27.5° | 1834.4 | 1835.9 | 1813.8 | 1790.0 | 1777.3 | 1777.6 | 1807.1 | 1822.0 | 1954.4 | 1814.8 | 1249.5 |
| 30°   | 1949.2 | 1948.4 | 1928.1 | 1895.0 | 1878.7 | 1878.3 | 1897.7 | 1912.8 | 2027.6 | 1909.7 | 1259.6 |
| 32.5° | 2078.1 | 2076.6 | 2047.7 | 2006.7 | 1988.3 | 1991.0 | 2008.2 | 2016.9 | 2118.4 | 2010.7 | 1277.6 |
| 35°   | 2247.9 | 2243.4 | 2199.9 | 2149.0 | 2115.1 | 2114.1 | 2128.6 | 2135.6 | 2234.1 | 2133.1 | 1307.6 |
| 37.5° | 2468.2 | 2464.1 | 2405.1 | 2331.1 | 2283.5 | 2265.7 | 2282.9 | 2291.8 | 2399.3 | 2290.1 | 1355.8 |
| 40°   | 2685.4 | 2681.4 | 2646.3 | 2578.6 | 2505.2 | 2462.4 | 2476.0 | 2485.4 | 2605.5 | 2480.6 | 1416.6 |
| 42.5° | 2835.3 | 2838.8 | 2851.0 | 2856.6 | 2787.8 | 2698.0 | 2704.2 | 2714.1 | 2822.1 | 2684.3 | 1486.1 |
| 45°   | 2874.8 | 2882.3 | 2951.2 | 3086.6 | 3112.3 | 3042.2 | 2977.4 | 2982.8 | 3042.2 | 2887.9 | 1555.6 |
| 47.5° | 2756.1 | 2770.0 | 2903.0 | 3154.7 | 3372.7 | 3422.3 | 3299.5 | 3292.4 | 3253.5 | 3052.7 | 1604.9 |
| 50°   | 2486.4 | 2499.2 | 2671.5 | 3043.8 | 3451.7 | 3785.1 | 3685.6 | 3664.5 | 3438.7 | 3151.2 | 1622.4 |
| 52.5° | 2096.1 | 2111.6 | 2251.6 | 2694.5 | 3302.8 | 3946.9 | 4051.1 | 4033.5 | 3574.6 | 3159.0 | 1625.3 |
| 55°   | 1480.3 | 1499.0 | 1647.2 | 2065.1 | 2831.0 | 3818.2 | 4180.6 | 4175.4 | 3687.5 | 3138.5 | 1631.5 |
| 57.5° | 831.9  | 845.5  | 1005.2 | 1323.8 | 2073.5 | 3325.7 | 4045.3 | 4079.9 | 3755.7 | 3102.8 | 1640.8 |
| 60°   | 369.4  | 373.1  | 455.7  | 659.0  | 1213.9 | 2541.6 | 3657.9 | 3716.4 | 3697.2 | 3055.2 | 1656.4 |
| 62.5° | 204.8  | 201.7  | 201.7  | 273.9  | 527.6  | 1573.4 | 2982.8 | 3079.4 | 3447.6 | 2998.9 | 1657.2 |
| 65°   | 160.5  | 157.6  | 149.3  | 150.4  | 201.0  | 698.3  | 2065.5 | 2237.2 | 2973.7 | 2833.7 | 1601.5 |
| 67.5° | 136.1  | 133.6  | 125.3  | 122.0  | 124.9  | 230.4  | 1134.9 | 1313.2 | 2256.4 | 2404.5 | 1387.1 |
| 70°   | 115.0  | 113.3  | 109.0  | 104.9  | 97.6   | 113.8  | 434.2  | 555.4  | 1390.4 | 1599.5 | 946.9  |
| 72.5° | 92.5   | 91.8   | 93.3   | 89.8   | 80.9   | 75.9   | 148.5  | 179.9  | 624.6  | 713.8  | 390.1  |
| 75°   | 79.8   | 79.4   | 80.2   | 76.7   | 66.6   | 52.9   | 75.5   | 82.5   | 176.2  | 174.6  | 79.0   |
| 77.5° | 51.9   | 52.5   | 66.4   | 64.9   | 57.3   | 35.2   | 39.1   | 42.2   | 53.4   | 40.1   | 24.0   |
| 80°   | 33.1   | 32.7   | 33.7   | 53.8   | 51.5   | 26.9   | 19.6   | 20.5   | 25.7   | 19.7   | 11.6   |
| 82.5° | 20.1   | 19.7   | 22.1   | 25.2   | 25.9   | 18.8   | 12.0   | 12.2   | 16.1   | 12.8   | 6.2    |
| 85°   | 1.7    | 2.3    | 13.4   | 12.4   | 8.9    | 5.8    | 5.8    | 6.2    | 8.5    | 7.6    | 3.5    |
| 87.5° | 0.0    | 0.0    | 2.3    | 3.5    | 1.9    | 2.1    | 2.1    | 2.3    | 3.3    | 3.3    | 1.7    |
| 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-730-U-AFL-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 | 1004.0 |
| 2.5°  | 1004.8 | 984.7  | 944.0  | 904.9  | 871.8  | 839.8  | 803.4  | 767.4  | 750.6  | 743.8  | 736.8  |
| 5°    | 1006.5 | 965.1  | 881.3  | 796.9  | 709.4  | 630.6  | 563.4  | 494.5  | 460.0  | 444.9  | 437.9  |
| 7.5°  | 1008.9 | 945.7  | 810.2  | 668.5  | 527.6  | 420.7  | 327.4  | 267.4  | 241.4  | 237.4  | 227.3  |
| 10°   | 1009.2 | 922.3  | 727.7  | 526.8  | 353.7  | 253.6  | 195.1  | 164.2  | 152.8  | 150.8  | 147.5  |
| 12.5° | 1010.0 | 894.6  | 636.2  | 390.1  | 235.8  | 169.6  | 141.1  | 130.9  | 127.8  | 127.6  | 127.6  |
| 15°   | 1012.3 | 865.6  | 541.1  | 281.1  | 169.4  | 134.4  | 123.9  | 119.8  | 118.7  | 119.3  | 119.1  |
| 17.5° | 1012.3 | 831.3  | 447.8  | 209.5  | 136.9  | 120.8  | 115.0  | 112.3  | 111.9  | 112.5  | 112.7  |
| 20°   | 1005.0 | 789.7  | 362.2  | 163.0  | 121.4  | 112.1  | 106.9  | 104.4  | 103.4  | 103.8  | 104.0  |
| 22.5° | 987.4  | 738.6  | 292.5  | 134.9  | 111.1  | 104.2  | 98.5   | 94.7   | 93.1   | 93.3   | 93.3   |
| 25°   | 959.9  | 678.0  | 228.8  | 116.7  | 102.8  | 95.6   | 89.1   | 84.6   | 83.6   | 83.4   | 83.8   |
| 27.5° | 924.6  | 611.0  | 182.2  | 102.8  | 92.9   | 86.2   | 79.6   | 75.9   | 75.1   | 75.3   | 75.5   |
| 30°   | 890.0  | 541.5  | 143.7  | 91.0   | 81.9   | 75.5   | 70.5   | 68.7   | 68.7   | 69.3   | 69.5   |
| 32.5° | 858.2  | 474.7  | 113.6  | 80.7   | 72.0   | 66.2   | 63.3   | 63.1   | 64.1   | 64.5   | 64.7   |
| 35°   | 830.9  | 412.9  | 94.1   | 72.8   | 64.3   | 59.2   | 58.3   | 59.0   | 60.2   | 61.0   | 61.2   |
| 37.5° | 811.6  | 357.8  | 82.3   | 66.2   | 58.3   | 54.2   | 54.0   | 55.6   | 57.1   | 58.9   | 59.2   |
| 40°   | 803.4  | 311.1  | 74.1   | 60.4   | 53.4   | 50.3   | 49.8   | 51.9   | 54.8   | 57.3   | 57.7   |
| 42.5° | 796.7  | 273.0  | 67.2   | 54.8   | 49.6   | 45.1   | 44.9   | 47.6   | 51.1   | 53.6   | 54.2   |
| 45°   | 790.9  | 242.4  | 60.8   | 48.8   | 44.5   | 38.7   | 39.3   | 42.8   | 45.5   | 48.2   | 48.8   |
| 47.5° | 778.9  | 217.2  | 53.8   | 42.4   | 36.8   | 33.1   | 34.3   | 37.4   | 39.5   | 43.6   | 44.1   |
| 50°   | 757.4  | 196.7  | 46.7   | 34.7   | 30.0   | 28.7   | 30.4   | 32.5   | 35.2   | 38.7   | 39.1   |
| 52.5° | 742.8  | 181.2  | 40.5   | 29.0   | 24.8   | 25.2   | 26.9   | 27.7   | 29.2   | 30.6   | 30.2   |
| 55°   | 734.5  | 172.7  | 35.4   | 25.2   | 21.1   | 22.3   | 22.7   | 21.7   | 20.9   | 19.6   | 19.0   |
| 57.5° | 733.6  | 164.9  | 31.6   | 21.9   | 18.6   | 19.2   | 17.8   | 14.5   | 11.8   | 10.3   | 9.9    |
| 60°   | 732.0  | 155.5  | 28.5   | 18.4   | 16.5   | 15.7   | 12.8   | 7.9    | 5.6    | 5.2    | 5.2    |
| 62.5° | 715.2  | 140.7  | 26.1   | 15.5   | 13.9   | 11.8   | 7.4    | 3.7    | 3.1    | 3.3    | 3.3    |
| 65°   | 661.5  | 120.2  | 23.8   | 12.6   | 11.0   | 8.5    | 3.7    | 2.1    | 1.2    | 1.4    | 1.4    |
| 67.5° | 562.4  | 95.8   | 21.3   | 9.7    | 8.3    | 5.4    | 2.1    | 1.0    | 0.0    | 0.0    | 0.0    |
| 70°   | 376.6  | 59.4   | 18.0   | 6.8    | 5.4    | 3.3    | 1.5    | 0.2    | 0.0    | 0.0    | 0.0    |
| 72.5° | 144.4  | 32.1   | 14.5   | 4.1    | 3.5    | 2.3    | 1.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 75°   | 32.5   | 21.1   | 10.1   | 2.9    | 2.5    | 1.5    | 0.4    | 0.0    | 0.0    | 0.0    | 0.0    |
| 77.5° | 12.4   | 15.3   | 5.8    | 1.9    | 1.7    | 1.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 6.0    | 9.1    | 2.7    | 1.2    | 1.0    | 0.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 3.1    | 3.5    | 1.2    | 0.6    | 0.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 1.7    | 1.7    | 0.6    | 0.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 1.0    | 0.6    | 0.2    | 0.2    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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: SP1-1908-441-2-R4

Test Date: 10/03/2019

Luminaire Tested: SA1C-730-U-5WQ

Data in this report applies to families of products SA1C-730-U-5WQ .

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-2-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-730-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-2-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. (1) 70 CRI, 3000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2993   | CRI (Ra): | 71.8 | R9:  | -38.3 |
| CIE u':                   | 0.2508 | R1:       | 67.5 | R10: | 62.5  |
| CIE v':                   | 0.5215 | R2:       | 82.9 | R11: | 63.7  |
| Duv:                      | 0.0000 | R3:       | 94.7 | R12: | 57.8  |
| CIE x:                    | 0.4374 | R4:       | 67.7 | R13: | 70.4  |
| CIE y:                    | 0.4043 | R5:       | 67.9 | R14: | 97.3  |
| CIE z:                    | 0.1583 | R6:       | 77.6 |      |       |
| Peak Wavelength (nm):     | 593    | R7:       | 76.0 |      |       |
| Dominant Wavelength (nm): | 582    | R8:       | 40.5 |      |       |
| Purity:                   | 53     |           |      |      |       |
| Rf:                       | 75.7   |           |      |      |       |
| Rg:                       | 93.9   |           |      |      |       |



**Test Conditions**

Stabilization Time: 53M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0./44%  
 Sphere Temperature (°C): 25.7

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| 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 3000K 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    | 2397          | NR            | 490    | 24908         | NR            | 620    | 118784        | NR            | 750    | 5037          | NR            | 880    | 2677          | NR            |
| 365    | 2084          | NR            | 495    | 30998         | NR            | 625    | 108951        | NR            | 755    | 4413          | NR            | 885    | 2940          | NR            |
| 370    | 2143          | NR            | 500    | 37103         | NR            | 630    | 99573         | NR            | 760    | 4189          | NR            | 890    | 3116          | NR            |
| 375    | 2413          | NR            | 505    | 42987         | NR            | 635    | 90444         | NR            | 765    | 3677          | NR            | 895    | 3345          | NR            |
| 380    | 2172          | NR            | 510    | 48702         | NR            | 640    | 80749         | NR            | 770    | 3366          | NR            | 900    | 2312          | NR            |
| 385    | 1997          | NR            | 515    | 53741         | NR            | 645    | 71664         | NR            | 775    | 3211          | NR            | 905    | 2829          | NR            |
| 390    | 1830          | NR            | 520    | 57283         | NR            | 650    | 63936         | NR            | 780    | 2682          | NR            | 910    | 2783          | NR            |
| 395    | 1861          | NR            | 525    | 61876         | NR            | 655    | 56611         | NR            | 785    | 2804          | NR            | 915    | 2662          | NR            |
| 400    | 1717          | NR            | 530    | 65398         | NR            | 660    | 49763         | NR            | 790    | 2581          | NR            | 920    | 3047          | NR            |
| 405    | 1761          | NR            | 535    | 69597         | NR            | 665    | 42891         | NR            | 795    | 2711          | NR            | 925    | 2256          | NR            |
| 410    | 2680          | NR            | 540    | 74214         | NR            | 670    | 36939         | NR            | 800    | 2609          | NR            | 930    | 2976          | NR            |
| 415    | 4374          | NR            | 545    | 79911         | NR            | 675    | 31946         | NR            | 805    | 2581          | NR            | 935    | 3503          | NR            |
| 420    | 8071          | NR            | 550    | 86153         | NR            | 680    | 27385         | NR            | 810    | 2404          | NR            | 940    | 4226          | NR            |
| 425    | 15169         | NR            | 555    | 93952         | NR            | 685    | 23504         | NR            | 815    | 2556          | NR            | 945    | 2930          | NR            |
| 430    | 26038         | NR            | 560    | 102904        | NR            | 690    | 20210         | NR            | 820    | 2742          | NR            | 950    | 2115          | NR            |
| 435    | 41316         | NR            | 565    | 112009        | NR            | 695    | 17459         | NR            | 825    | 2014          | NR            | 955    | 2634          | NR            |
| 440    | 59674         | NR            | 570    | 121662        | NR            | 700    | 15207         | NR            | 830    | 2488          | NR            | 960    | 4200          | NR            |
| 445    | 72751         | NR            | 575    | 130476        | NR            | 705    | 13322         | NR            | 835    | 2625          | NR            | 965    | 1982          | NR            |
| 450    | 65091         | NR            | 580    | 137926        | NR            | 710    | 11676         | NR            | 840    | 2754          | NR            | 970    | 3613          | NR            |
| 455    | 44894         | NR            | 585    | 143406        | NR            | 715    | 10626         | NR            | 845    | 2708          | NR            | 975    | 4034          | NR            |
| 460    | 32712         | NR            | 590    | 147039        | NR            | 720    | 9416          | NR            | 850    | 2608          | NR            | 980    | 3922          | NR            |
| 465    | 25296         | NR            | 595    | 147365        | NR            | 725    | 8333          | NR            | 855    | 2605          | NR            | 985    | 1909          | NR            |
| 470    | 19318         | NR            | 600    | 145800        | NR            | 730    | 7134          | NR            | 860    | 1765          | NR            | 990    | 3617          | NR            |
| 475    | 17265         | NR            | 605    | 141363        | NR            | 735    | 6437          | NR            | 865    | 2581          | NR            | 995    | 4767          | NR            |
| 480    | 18260         | NR            | 610    | 134199        | NR            | 740    | 5834          | NR            | 870    | 3016          | NR            | 1000   | 2528          | NR            |
| 485    | 20845         | NR            | 615    | 127683        | NR            | 745    | 5500          | NR            | 875    | 3952          | NR            |        |               |               |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 8494.8

S/P: 1.23

| 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    | 2397          | NR            | 490    | 24908         | NR            | 620    | 118784        | NR            | 750    | 5037          | NR            | 880    | 2677          | NR            |
| 365    | 2084          | NR            | 495    | 30998         | NR            | 625    | 108951        | NR            | 755    | 4413          | NR            | 885    | 2940          | NR            |
| 370    | 2143          | NR            | 500    | 37103         | NR            | 630    | 99573         | NR            | 760    | 4189          | NR            | 890    | 3116          | NR            |
| 375    | 2413          | NR            | 505    | 42987         | NR            | 635    | 90444         | NR            | 765    | 3677          | NR            | 895    | 3345          | NR            |
| 380    | 2172          | NR            | 510    | 48702         | NR            | 640    | 80749         | NR            | 770    | 3366          | NR            | 900    | 2312          | NR            |
| 385    | 1997          | NR            | 515    | 53741         | NR            | 645    | 71664         | NR            | 775    | 3211          | NR            | 905    | 2829          | NR            |
| 390    | 1830          | NR            | 520    | 57283         | NR            | 650    | 63936         | NR            | 780    | 2682          | NR            | 910    | 2783          | NR            |
| 395    | 1861          | NR            | 525    | 61876         | NR            | 655    | 56611         | NR            | 785    | 2804          | NR            | 915    | 2662          | NR            |
| 400    | 1717          | NR            | 530    | 65398         | NR            | 660    | 49763         | NR            | 790    | 2581          | NR            | 920    | 3047          | NR            |
| 405    | 1761          | NR            | 535    | 69597         | NR            | 665    | 42891         | NR            | 795    | 2711          | NR            | 925    | 2256          | NR            |
| 410    | 2680          | NR            | 540    | 74214         | NR            | 670    | 36939         | NR            | 800    | 2609          | NR            | 930    | 2976          | NR            |
| 415    | 4374          | NR            | 545    | 79911         | NR            | 675    | 31946         | NR            | 805    | 2581          | NR            | 935    | 3503          | NR            |
| 420    | 8071          | NR            | 550    | 86153         | NR            | 680    | 27385         | NR            | 810    | 2404          | NR            | 940    | 4226          | NR            |
| 425    | 15169         | NR            | 555    | 93952         | NR            | 685    | 23504         | NR            | 815    | 2556          | NR            | 945    | 2930          | NR            |
| 430    | 26038         | NR            | 560    | 102904        | NR            | 690    | 20210         | NR            | 820    | 2742          | NR            | 950    | 2115          | NR            |
| 435    | 41316         | NR            | 565    | 112009        | NR            | 695    | 17459         | NR            | 825    | 2014          | NR            | 955    | 2634          | NR            |
| 440    | 59674         | NR            | 570    | 121662        | NR            | 700    | 15207         | NR            | 830    | 2488          | NR            | 960    | 4200          | NR            |
| 445    | 72751         | NR            | 575    | 130476        | NR            | 705    | 13322         | NR            | 835    | 2625          | NR            | 965    | 1982          | NR            |
| 450    | 65091         | NR            | 580    | 137926        | NR            | 710    | 11676         | NR            | 840    | 2754          | NR            | 970    | 3613          | NR            |
| 455    | 44894         | NR            | 585    | 143406        | NR            | 715    | 10626         | NR            | 845    | 2708          | NR            | 975    | 4034          | NR            |
| 460    | 32712         | NR            | 590    | 147039        | NR            | 720    | 9416          | NR            | 850    | 2608          | NR            | 980    | 3922          | NR            |
| 465    | 25296         | NR            | 595    | 147365        | NR            | 725    | 8333          | NR            | 855    | 2605          | NR            | 985    | 1909          | NR            |
| 470    | 19318         | NR            | 600    | 145800        | NR            | 730    | 7134          | NR            | 860    | 1765          | NR            | 990    | 3617          | NR            |
| 475    | 17265         | NR            | 605    | 141363        | NR            | 735    | 6437          | NR            | 865    | 2581          | NR            | 995    | 4767          | NR            |
| 480    | 18260         | NR            | 610    | 134199        | NR            | 740    | 5834          | NR            | 870    | 3016          | NR            | 1000   | 2528          | NR            |
| 485    | 20845         | NR            | 615    | 127683        | NR            | 745    | 5500          | NR            | 875    | 3952          | NR            |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 3101.5 M/P: 0.45**

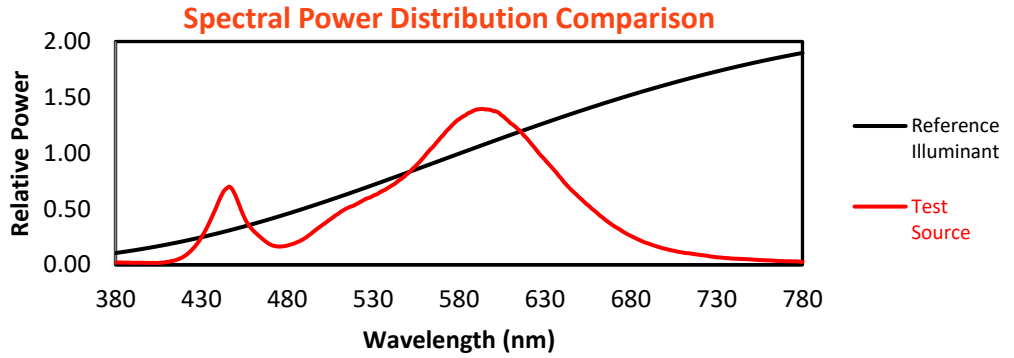
| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2397          | NR            | 490    | 24908         | NR            | 620    | 118784        | NR            | 750    | 5037          | NR            | 880    | 2677          | NR            |
| 365    | 2084          | NR            | 495    | 30998         | NR            | 625    | 108951        | NR            | 755    | 4413          | NR            | 885    | 2940          | NR            |
| 370    | 2143          | NR            | 500    | 37103         | NR            | 630    | 99573         | NR            | 760    | 4189          | NR            | 890    | 3116          | NR            |
| 375    | 2413          | NR            | 505    | 42987         | NR            | 635    | 90444         | NR            | 765    | 3677          | NR            | 895    | 3345          | NR            |
| 380    | 2172          | NR            | 510    | 48702         | NR            | 640    | 80749         | NR            | 770    | 3366          | NR            | 900    | 2312          | NR            |
| 385    | 1997          | NR            | 515    | 53741         | NR            | 645    | 71664         | NR            | 775    | 3211          | NR            | 905    | 2829          | NR            |
| 390    | 1830          | NR            | 520    | 57283         | NR            | 650    | 63936         | NR            | 780    | 2682          | NR            | 910    | 2783          | NR            |
| 395    | 1861          | NR            | 525    | 61876         | NR            | 655    | 56611         | NR            | 785    | 2804          | NR            | 915    | 2662          | NR            |
| 400    | 1717          | NR            | 530    | 65398         | NR            | 660    | 49763         | NR            | 790    | 2581          | NR            | 920    | 3047          | NR            |
| 405    | 1761          | NR            | 535    | 69597         | NR            | 665    | 42891         | NR            | 795    | 2711          | NR            | 925    | 2256          | NR            |
| 410    | 2680          | NR            | 540    | 74214         | NR            | 670    | 36939         | NR            | 800    | 2609          | NR            | 930    | 2976          | NR            |
| 415    | 4374          | NR            | 545    | 79911         | NR            | 675    | 31946         | NR            | 805    | 2581          | NR            | 935    | 3503          | NR            |
| 420    | 8071          | NR            | 550    | 86153         | NR            | 680    | 27385         | NR            | 810    | 2404          | NR            | 940    | 4226          | NR            |
| 425    | 15169         | NR            | 555    | 93952         | NR            | 685    | 23504         | NR            | 815    | 2556          | NR            | 945    | 2930          | NR            |
| 430    | 26038         | NR            | 560    | 102904        | NR            | 690    | 20210         | NR            | 820    | 2742          | NR            | 950    | 2115          | NR            |
| 435    | 41316         | NR            | 565    | 112009        | NR            | 695    | 17459         | NR            | 825    | 2014          | NR            | 955    | 2634          | NR            |
| 440    | 59674         | NR            | 570    | 121662        | NR            | 700    | 15207         | NR            | 830    | 2488          | NR            | 960    | 4200          | NR            |
| 445    | 72751         | NR            | 575    | 130476        | NR            | 705    | 13322         | NR            | 835    | 2625          | NR            | 965    | 1982          | NR            |
| 450    | 65091         | NR            | 580    | 137926        | NR            | 710    | 11676         | NR            | 840    | 2754          | NR            | 970    | 3613          | NR            |
| 455    | 44894         | NR            | 585    | 143406        | NR            | 715    | 10626         | NR            | 845    | 2708          | NR            | 975    | 4034          | NR            |
| 460    | 32712         | NR            | 590    | 147039        | NR            | 720    | 9416          | NR            | 850    | 2608          | NR            | 980    | 3922          | NR            |
| 465    | 25296         | NR            | 595    | 147365        | NR            | 725    | 8333          | NR            | 855    | 2605          | NR            | 985    | 1909          | NR            |
| 470    | 19318         | NR            | 600    | 145800        | NR            | 730    | 7134          | NR            | 860    | 1765          | NR            | 990    | 3617          | NR            |
| 475    | 17265         | NR            | 605    | 141363        | NR            | 735    | 6437          | NR            | 865    | 2581          | NR            | 995    | 4767          | NR            |
| 480    | 18260         | NR            | 610    | 134199        | NR            | 740    | 5834          | NR            | 870    | 3016          | NR            | 1000   | 2528          | NR            |
| 485    | 20845         | NR            | 615    | 127683        | NR            | 745    | 5500          | NR            | 875    | 3952          | NR            |        |               |               |

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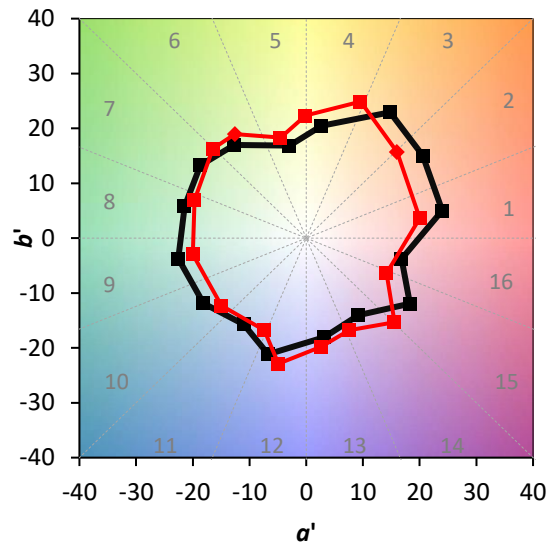
TM-30-18

**Summary**

$R_f = 75.7$   
 $R_g = 93.9$   
 CIE  $R_a = 71.8$   
 $R_9 = -38.3$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 67 | CES51 = 87 | CES76 = 63 |
| CES02 = 63 | CES27 = 88 | CES52 = 86 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 67 |
| CES04 = 71 | CES29 = 66 | CES54 = 84 | CES79 = 87 |
| CES05 = 49 | CES30 = 73 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 70 | CES56 = 75 | CES81 = 71 |
| CES07 = 41 | CES32 = 65 | CES57 = 74 | CES82 = 94 |
| CES08 = 40 | CES33 = 73 | CES58 = 76 | CES83 = 90 |
| CES09 = 29 | CES34 = 79 | CES59 = 85 | CES84 = 89 |
| CES10 = 76 | CES35 = 89 | CES60 = 93 | CES85 = 77 |
| CES11 = 59 | CES36 = 97 | CES61 = 84 | CES86 = 61 |
| CES12 = 65 | CES37 = 87 | CES62 = 91 | CES87 = 78 |
| CES13 = 43 | CES38 = 81 | CES63 = 77 | CES88 = 77 |
| CES14 = 74 | CES39 = 95 | CES64 = 72 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 68 | CES90 = 76 |
| CES16 = 47 | CES41 = 88 | CES66 = 69 | CES91 = 89 |
| CES17 = 50 | CES42 = 89 | CES67 = 67 | CES92 = 58 |
| CES18 = 56 | CES43 = 79 | CES68 = 72 | CES93 = 74 |
| CES19 = 73 | CES44 = 99 | CES69 = 81 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 66 | CES95 = 68 |
| CES21 = 87 | CES46 = 80 | CES71 = 67 | CES96 = 76 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 82 |
| CES23 = 92 | CES48 = 69 | CES73 = 59 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 95 | CES99 = 62 |
| CES25 = 73 | CES50 = 87 | CES75 = 69 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)