

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: P362642

Luminaire Tested: NVN-SA4D-760-U-T2R-HSS

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P362642  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-9)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA4D-760-U-T2R-HSS  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(4) 70 CRI, 5700K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
ROADWAY OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 25821 lumens  
Efficiency: N/A  
Efficacy: 100.1 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B1 - U0 - G3

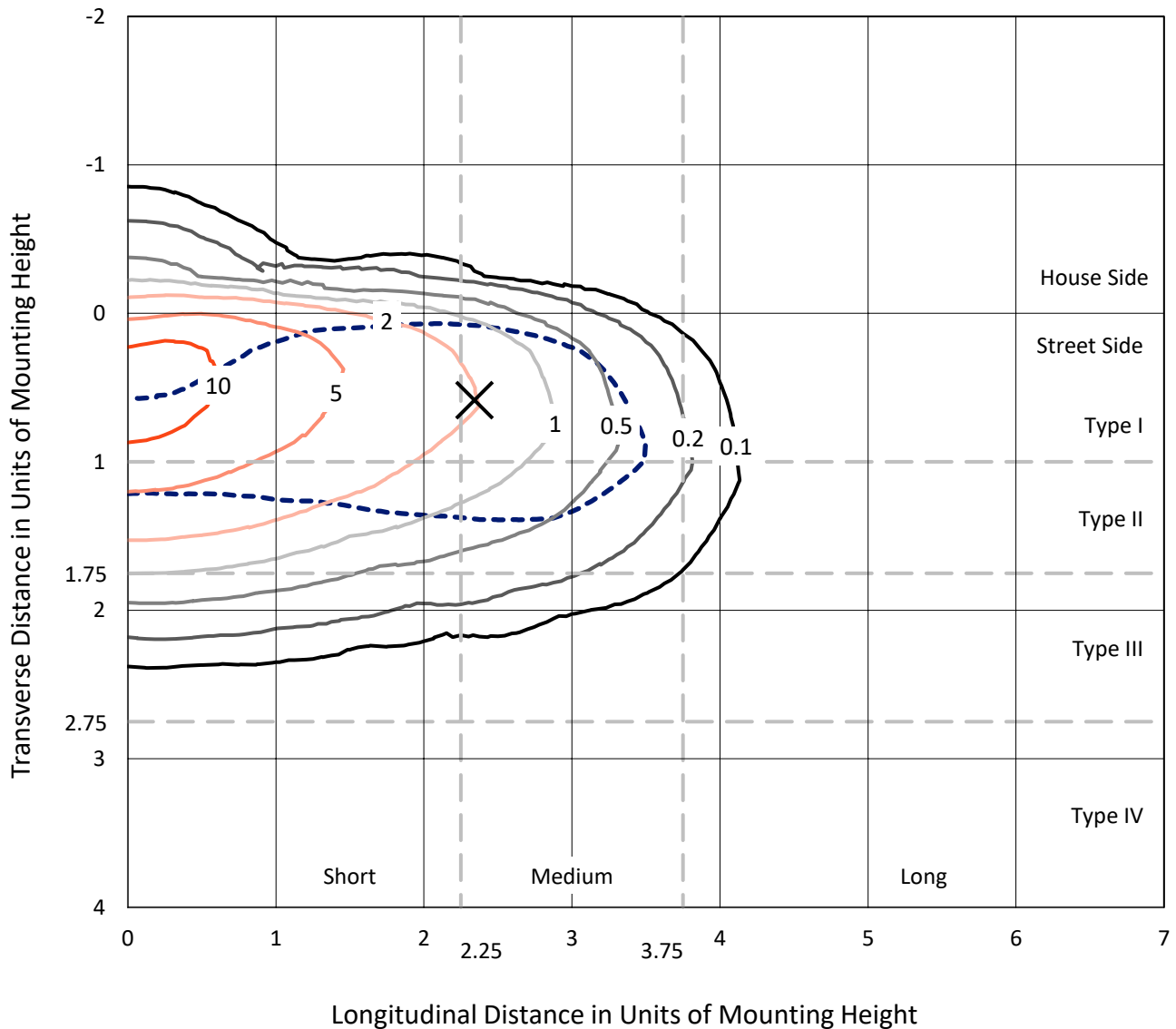
Input Watts (W): 258  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P362642  
CATALOG NUMBER: NVN-SA4D-760-U-T2R-HSS

## Iso-Footcandle Lines of Horizontal Illumination

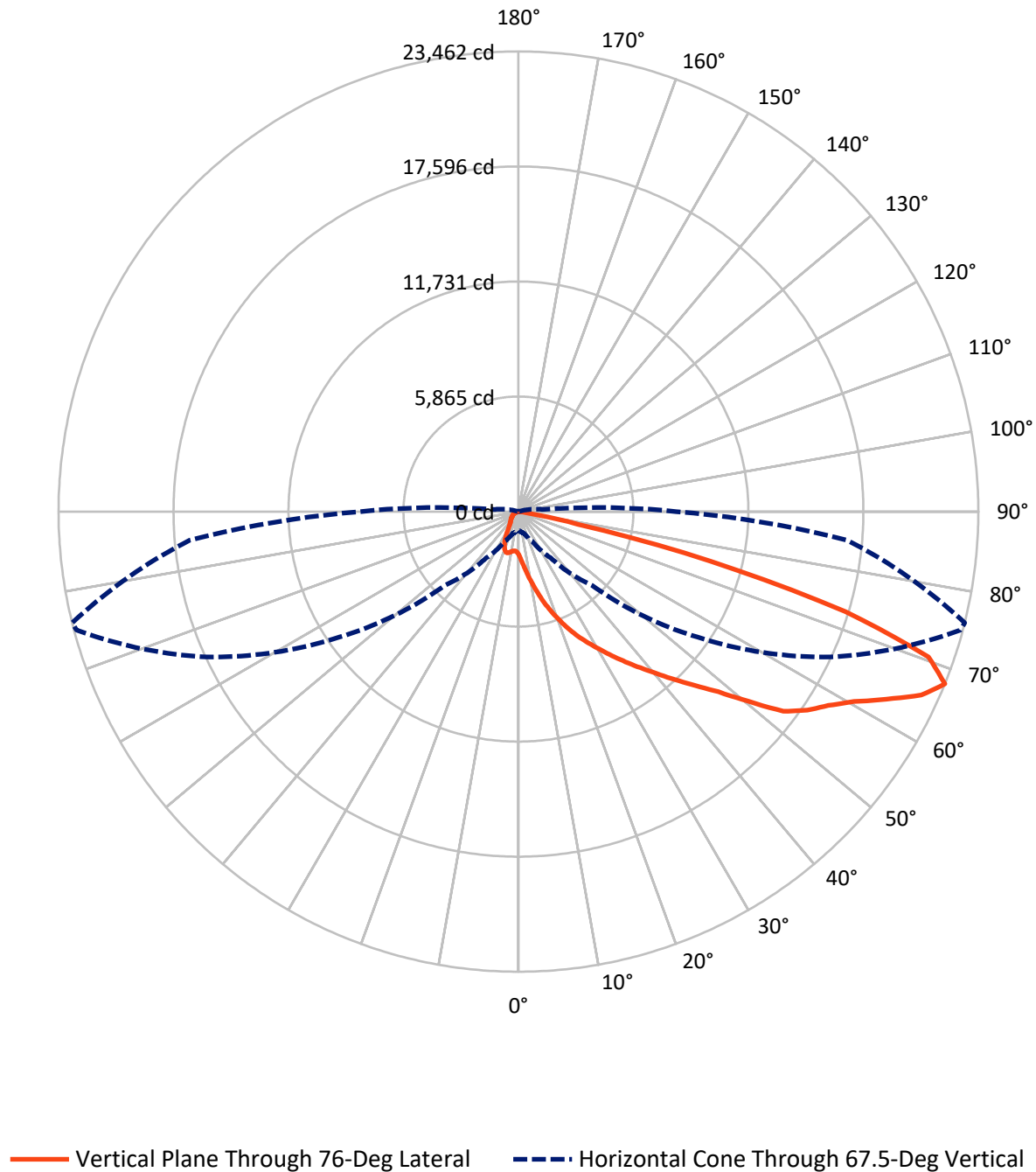
× Max cd  
- - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 12.3 fc  
Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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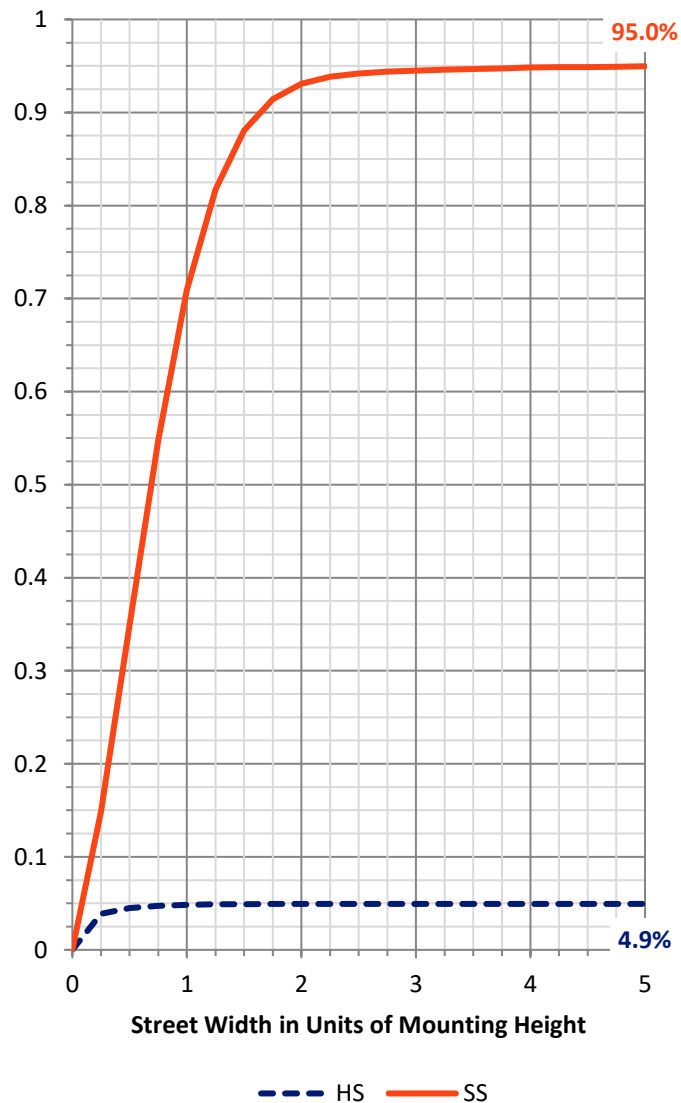
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1282.2   | 0.0    | 1282.2  |
|                    | % Fixture | 5.0      | 0.0    | 5.0     |
| <b>Street Side</b> | Lumens    | 24538.8  | 0.0    | 24538.8 |
|                    | % Fixture | 95.0     | 0.0    | 95.0    |
| <b>Total</b>       | Lumens    | 25821.0  | 0.0    | 25821.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 272.4   | 1.1       |
| 10°-20°   | 1079.7  | 4.2       |
| 20°-30°   | 2196.9  | 8.5       |
| 30°-40°   | 3813.0  | 14.8      |
| 40°-50°   | 5387.3  | 20.9      |
| 50°-60°   | 6109.5  | 23.7      |
| 60°-70°   | 5067.2  | 19.6      |
| 70°-80°   | 1835.5  | 7.1       |
| 80°-90°   | 59.5    | 0.2       |
| 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°    | 25821.0 | 100.0     |
| 0°-180°   | 25821.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P362642

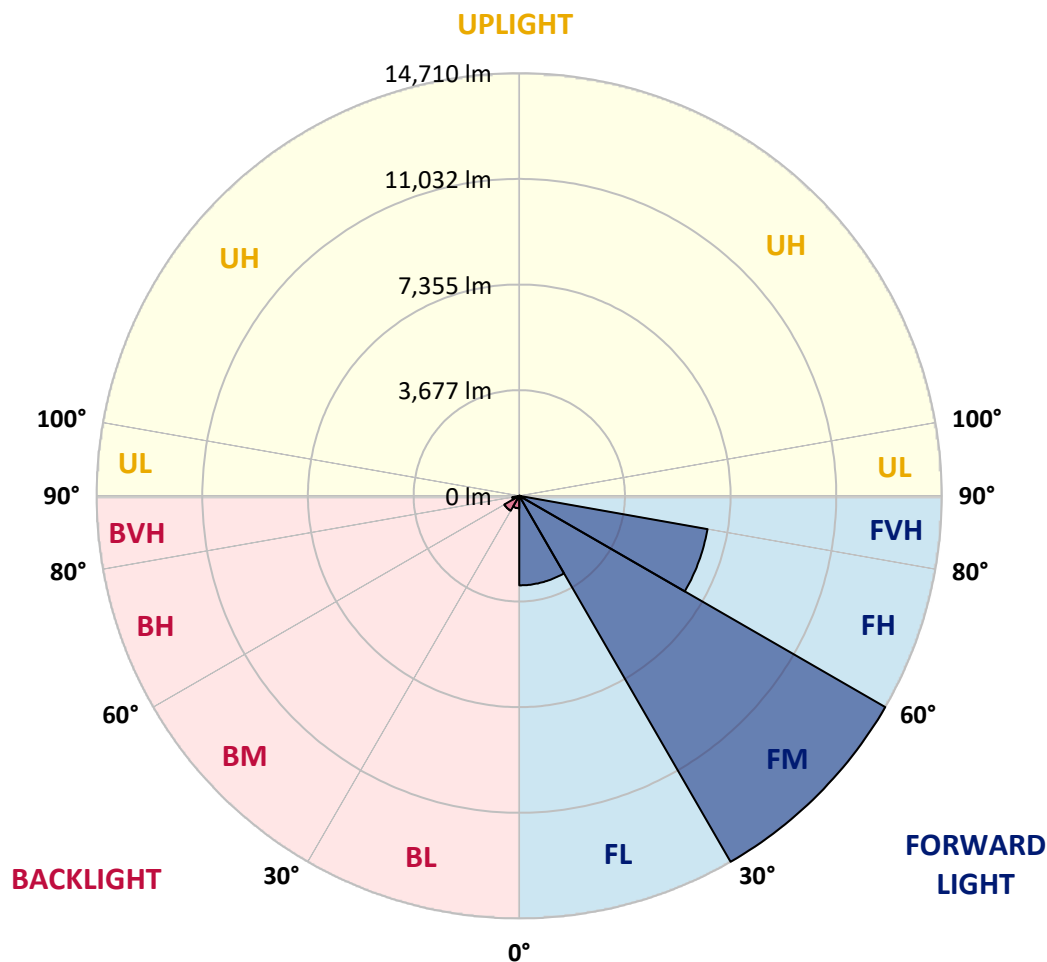
CATALOG NUMBER: NVN-SA4D-760-U-T2R-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 3116.5  | 12.1      |                         |      |         |
| FM   | (30°-60°)   | 14709.7 | 57.0      |                         |      |         |
| FH   | (60°-80°)   | 6654.9  | 25.8      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 57.6    | 0.2       |                         |      | G1/100  |
| BL   | (0°-30°)    | 432.4   | 1.7       | B1/500                  |      |         |
| BM   | (30°-60°)   | 600.1   | 2.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 247.8   | 1.0       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 1.9     | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G3**

Type II Medium



REPORT NUMBER: P362642

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 75°     | 76°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 2190.4  | 2190.4  | 2190.4  | 2190.4  | 2190.4  | 2190.4  | 2190.4  | 2190.4  | 2190.4  | 2190.4  | 2190.4  |
| 2.5°  | 3269.7  | 3196.2  | 3213.1  | 3165.6  | 3079.6  | 2903.1  | 2752.7  | 2610.1  | 2443.8  | 2438.1  | 2301.2  |
| 5°    | 4409.0  | 4346.8  | 4338.9  | 4242.7  | 4086.6  | 3786.8  | 3494.9  | 3162.2  | 2791.1  | 2764.0  | 2473.2  |
| 7.5°  | 5443.1  | 5393.3  | 5375.2  | 5261.0  | 4970.2  | 4678.3  | 4298.1  | 3809.4  | 3229.0  | 3179.2  | 2705.2  |
| 10°   | 6237.3  | 6213.6  | 6218.1  | 6136.7  | 5887.7  | 5616.2  | 5117.3  | 4493.9  | 3725.7  | 3648.7  | 2983.5  |
| 12.5° | 6839.2  | 6844.9  | 6885.6  | 6835.9  | 6696.7  | 6495.3  | 5962.4  | 5223.6  | 4275.5  | 4170.3  | 3301.4  |
| 15°   | 7281.6  | 7309.9  | 7384.6  | 7446.8  | 7436.6  | 7262.4  | 6773.6  | 5964.7  | 4859.3  | 4742.8  | 3655.5  |
| 17.5° | 7567.9  | 7599.5  | 7708.2  | 7846.2  | 7972.9  | 7932.2  | 7556.5  | 6679.7  | 5449.9  | 5315.3  | 4034.5  |
| 20°   | 7819.0  | 7856.4  | 7972.9  | 8155.1  | 8391.5  | 8442.4  | 8195.8  | 7373.3  | 6039.4  | 5875.3  | 4426.0  |
| 22.5° | 8363.2  | 8362.1  | 8433.4  | 8539.7  | 8764.9  | 8896.1  | 8740.0  | 8017.0  | 6622.0  | 6451.2  | 4825.4  |
| 25°   | 9347.5  | 9310.2  | 9285.3  | 9201.6  | 9251.4  | 9332.8  | 9245.7  | 8618.9  | 7208.1  | 7035.0  | 5230.4  |
| 27.5° | 10517.4 | 10540.0 | 10338.6 | 10113.5 | 9939.3  | 9855.5  | 9713.0  | 9176.7  | 7771.5  | 7581.4  | 5626.4  |
| 30°   | 11751.7 | 11758.5 | 11520.9 | 11233.6 | 10850.0 | 10532.1 | 10285.5 | 9709.6  | 8350.8  | 8143.7  | 6011.1  |
| 32.5° | 12865.0 | 12820.9 | 12585.6 | 12194.1 | 11709.9 | 11352.4 | 10839.8 | 10304.7 | 8964.0  | 8763.7  | 6438.7  |
| 35°   | 13747.5 | 13695.5 | 13409.2 | 13052.8 | 12550.5 | 12190.7 | 11574.1 | 10898.7 | 9608.9  | 9413.2  | 6867.5  |
| 37.5° | 14392.4 | 14331.3 | 14037.1 | 13670.6 | 13237.2 | 13027.9 | 12426.0 | 11544.7 | 10312.6 | 10102.2 | 7319.0  |
| 40°   | 14616.4 | 14563.2 | 14378.8 | 14110.7 | 13762.2 | 13714.7 | 13330.0 | 12288.0 | 11078.6 | 10854.5 | 7830.3  |
| 42.5° | 14482.9 | 14430.9 | 14365.2 | 14274.7 | 14129.9 | 14175.2 | 14183.1 | 13135.4 | 11929.4 | 11708.7 | 8394.9  |
| 45°   | 13953.4 | 13907.0 | 13974.9 | 14107.3 | 14287.2 | 14511.2 | 14961.5 | 14046.2 | 12879.7 | 12644.4 | 9047.7  |
| 47.5° | 13173.9 | 13139.9 | 13327.8 | 13658.1 | 14184.2 | 14802.0 | 15673.1 | 15003.3 | 13946.6 | 13728.3 | 9862.3  |
| 50°   | 12065.1 | 12059.5 | 12435.1 | 13038.1 | 13847.1 | 14942.3 | 16408.5 | 16091.7 | 15428.7 | 15199.1 | 10994.8 |
| 52.5° | 10338.6 | 10349.9 | 11088.7 | 12053.8 | 13255.4 | 14847.2 | 16881.5 | 17490.1 | 17153.0 | 16914.3 | 11975.8 |
| 55°   | 8694.7  | 8762.6  | 9286.4  | 10678.0 | 12348.0 | 14494.2 | 17044.4 | 18143.0 | 18104.5 | 17878.2 | 12521.1 |
| 57.5° | 7084.8  | 7208.1  | 7712.7  | 9012.6  | 11023.1 | 13680.8 | 16955.0 | 18425.8 | 18812.7 | 18639.6 | 13240.6 |
| 60°   | 5340.2  | 5396.7  | 5978.3  | 7193.4  | 9322.6  | 12196.4 | 16306.7 | 18579.7 | 19781.2 | 19661.3 | 14284.9 |
| 62.5° | 3397.6  | 3539.0  | 4054.9  | 5227.0  | 7259.0  | 10135.0 | 15213.8 | 18577.4 | 20992.9 | 21058.5 | 15632.4 |
| 65°   | 1789.9  | 1955.0  | 2228.8  | 3239.2  | 4988.3  | 7832.6  | 13569.9 | 18403.2 | 22479.6 | 22571.2 | 16685.7 |
| 67.5° | 965.1   | 1012.6  | 1157.4  | 1681.2  | 2893.0  | 5306.2  | 11154.4 | 17543.3 | 23340.6 | 23461.6 | 16832.8 |
| 70°   | 706.0   | 732.0   | 786.3   | 930.0   | 1456.1  | 3081.9  | 8139.2  | 15593.9 | 22230.7 | 22185.4 | 14955.8 |
| 72.5° | 541.9   | 582.7   | 623.4   | 681.1   | 837.2   | 1645.0  | 5067.5  | 12211.1 | 17737.9 | 17439.2 | 11179.3 |
| 75°   | 427.7   | 434.5   | 492.2   | 544.2   | 627.9   | 936.8   | 2250.3  | 7111.9  | 10826.3 | 10119.1 | 5797.2  |
| 77.5° | 341.7   | 346.2   | 380.1   | 425.4   | 504.6   | 615.5   | 696.9   | 2797.9  | 3456.4  | 3084.2  | 1258.1  |
| 80°   | 202.5   | 213.8   | 282.8   | 328.1   | 418.6   | 388.1   | 254.6   | 607.6   | 539.7   | 488.8   | 211.6   |
| 82.5° | 113.1   | 122.2   | 159.5   | 259.1   | 291.9   | 185.5   | 126.7   | 164.1   | 126.7   | 123.3   | 60.0    |
| 85°   | 0.0     | 5.7     | 103.0   | 160.7   | 118.8   | 40.7    | 53.2    | 54.3    | 37.3    | 35.1    | 23.8    |
| 87.5° | 0.0     | 0.0     | 31.7    | 30.5    | 4.5     | 6.8     | 12.4    | 18.1    | 14.7    | 14.7    | 12.4    |
| 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: P362642

CATALOG NUMBER: NVN-SA4D-760-U-T2R-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2190.4 | 2190.4 | 2190.4 | 2190.4 | 2190.4 | 2190.4 | 2190.4 | 2190.4 | 2190.4 | 2190.4 | 2190.4 |
| 2.5°  | 2233.4 | 2172.3 | 2056.9 | 1943.7 | 1848.7 | 1770.6 | 1700.5 | 1672.2 | 1649.6 | 1646.2 | 1628.1 |
| 5°    | 2332.9 | 2209.6 | 1989.0 | 1808.0 | 1686.9 | 1600.9 | 1527.4 | 1482.1 | 1447.0 | 1433.5 | 1421.0 |
| 7.5°  | 2483.4 | 2296.7 | 1979.9 | 1771.8 | 1626.9 | 1482.1 | 1346.4 | 1199.3 | 1107.6 | 1072.6 | 1052.2 |
| 10°   | 2666.7 | 2412.1 | 2013.9 | 1761.6 | 1508.1 | 1202.7 | 977.5  | 790.8  | 715.0  | 690.1  | 683.4  |
| 12.5° | 2880.5 | 2555.8 | 2072.7 | 1698.2 | 1254.7 | 854.2  | 674.3  | 610.9  | 594.0  | 586.1  | 586.1  |
| 15°   | 3126.0 | 2713.1 | 2114.6 | 1514.9 | 927.7  | 646.0  | 583.8  | 554.4  | 536.3  | 526.1  | 527.2  |
| 17.5° | 3377.2 | 2866.9 | 2094.2 | 1249.1 | 684.5  | 574.7  | 528.4  | 496.7  | 471.8  | 461.6  | 459.3  |
| 20°   | 3630.6 | 3009.5 | 1981.1 | 930.0  | 579.3  | 521.6  | 469.5  | 434.5  | 409.6  | 399.4  | 397.1  |
| 22.5° | 3893.1 | 3130.6 | 1781.9 | 682.2  | 520.4  | 462.7  | 411.8  | 376.8  | 353.0  | 343.9  | 339.4  |
| 25°   | 4148.8 | 3229.0 | 1503.6 | 552.1  | 465.0  | 407.3  | 358.7  | 325.8  | 304.3  | 295.3  | 294.2  |
| 27.5° | 4387.5 | 3291.2 | 1181.2 | 487.6  | 416.4  | 357.5  | 313.4  | 284.0  | 265.9  | 259.1  | 258.0  |
| 30°   | 4602.5 | 3296.9 | 873.4  | 440.1  | 373.4  | 314.5  | 273.8  | 247.8  | 231.9  | 225.1  | 222.9  |
| 32.5° | 4819.7 | 3249.3 | 635.8  | 397.1  | 333.8  | 277.2  | 237.6  | 217.2  | 205.9  | 200.3  | 200.3  |
| 35°   | 5024.5 | 3139.6 | 495.5  | 359.8  | 295.3  | 241.0  | 209.3  | 194.6  | 187.8  | 182.2  | 182.2  |
| 37.5° | 5224.8 | 2982.3 | 420.9  | 327.0  | 259.1  | 210.4  | 184.4  | 175.4  | 169.7  | 164.1  | 164.1  |
| 40°   | 5428.4 | 2784.3 | 382.4  | 296.4  | 229.7  | 186.7  | 164.1  | 156.1  | 150.5  | 145.9  | 144.8  |
| 42.5° | 5678.4 | 2555.8 | 357.5  | 268.1  | 203.6  | 165.2  | 144.8  | 135.8  | 131.2  | 126.7  | 124.5  |
| 45°   | 5968.1 | 2358.9 | 337.2  | 239.9  | 182.2  | 147.1  | 125.6  | 116.5  | 109.7  | 104.1  | 103.0  |
| 47.5° | 6385.6 | 2216.4 | 310.0  | 209.3  | 161.8  | 127.8  | 108.6  | 98.4   | 88.2   | 82.6   | 81.5   |
| 50°   | 6918.4 | 2098.7 | 274.9  | 182.2  | 141.4  | 108.6  | 90.5   | 78.1   | 69.0   | 63.4   | 63.4   |
| 52.5° | 7183.2 | 1944.9 | 243.2  | 158.4  | 118.8  | 91.6   | 73.5   | 58.8   | 54.3   | 48.6   | 48.6   |
| 55°   | 7289.5 | 1827.2 | 211.6  | 134.6  | 98.4   | 75.8   | 57.7   | 45.3   | 41.9   | 38.5   | 37.3   |
| 57.5° | 7588.2 | 1793.3 | 184.4  | 114.3  | 81.5   | 60.0   | 44.1   | 33.9   | 31.7   | 27.2   | 27.2   |
| 60°   | 8069.1 | 1810.2 | 159.5  | 97.3   | 65.6   | 46.4   | 32.8   | 26.0   | 23.8   | 19.2   | 19.2   |
| 62.5° | 8588.4 | 1788.7 | 134.6  | 83.7   | 50.9   | 33.9   | 22.6   | 19.2   | 19.2   | 11.3   | 10.2   |
| 65°   | 8687.9 | 1593.0 | 115.4  | 69.0   | 39.6   | 24.9   | 14.7   | 12.4   | 17.0   | 2.3    | 0.0    |
| 67.5° | 8063.4 | 1235.5 | 99.6   | 53.2   | 29.4   | 19.2   | 11.3   | 5.7    | 14.7   | 0.0    | 0.0    |
| 70°   | 6447.8 | 785.2  | 80.3   | 38.5   | 22.6   | 15.8   | 9.1    | 2.3    | 11.3   | 0.0    | 0.0    |
| 72.5° | 4559.5 | 455.9  | 63.4   | 27.2   | 19.2   | 12.4   | 6.8    | 0.0    | 6.8    | 0.0    | 0.0    |
| 75°   | 2305.8 | 243.2  | 39.6   | 20.4   | 14.7   | 9.1    | 4.5    | 0.0    | 1.1    | 0.0    | 0.0    |
| 77.5° | 498.9  | 113.1  | 24.9   | 14.7   | 10.2   | 5.7    | 2.3    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 108.6  | 49.8   | 15.8   | 9.1    | 5.7    | 3.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 39.6   | 26.0   | 7.9    | 4.5    | 2.3    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 21.5   | 13.6   | 4.5    | 2.3    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 11.3   | 4.5    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

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

### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-760-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):                  | 5474   | CRI (Ra): | 71.7 |      |       |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R9:  | -27.1 |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R10: | 40.8  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R11: | 74.6  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R12: | 50.4  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R13: | 70.0  |
| CIE z:                    | 0.3204 | R6:       | 67.5 | R14: | 87.8  |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| Rf:                       | 72.1   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



### Test Conditions

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

REPORT NUMBER: SP1-1908-441-9-R4

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

REPORT NUMBER: SP1-1908-441-9-R4

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 5700K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-9-R4

**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-9-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 13759.3

S/P: 1.85

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-9-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5527.6 M/P: 0.74**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-9-R4

**TM-30-18**

**Summary**

$R_f = 72.1$   
 $R_g = 97.2$   
 CIE  $R_a = 71.7$   
 $R_g = -27.1$



**Color Vector Graphics**



REPORT NUMBER: SP1-1908-441-9-R4

**TM-30-18**

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

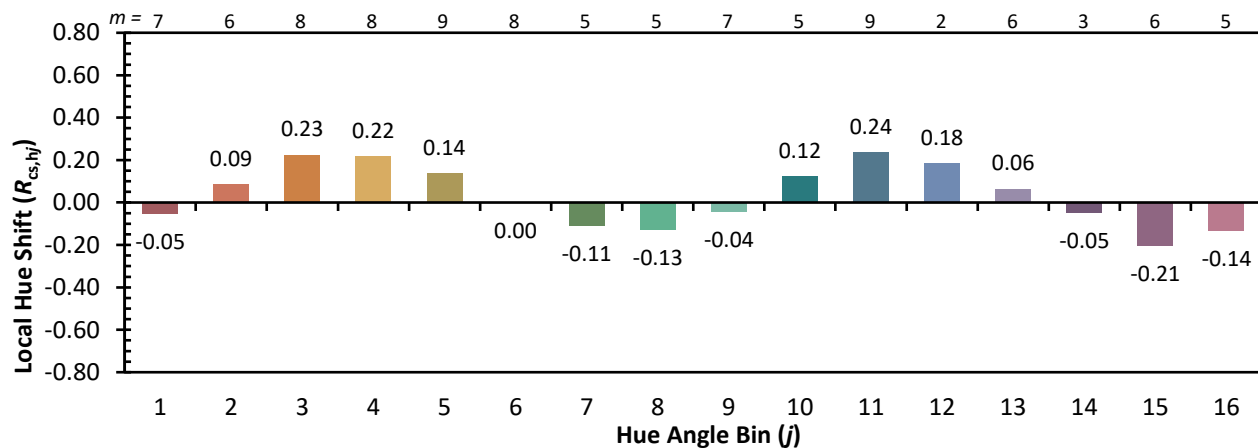
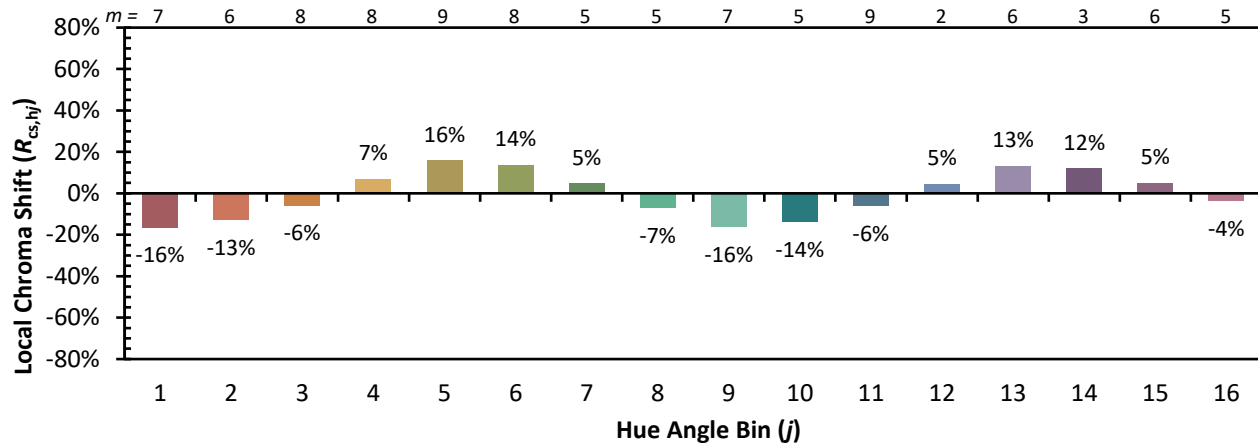
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
| CES05 = 46 | CES30 = 59 | CES55 = 80 | CES80 = 70 |
| CES06 = 50 | CES31 = 55 | CES56 = 70 | CES81 = 71 |
| CES07 = 38 | CES32 = 52 | CES57 = 68 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 82 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 84 |
| CES11 = 55 | CES36 = 90 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 72 | CES62 = 81 | CES87 = 75 |
| CES13 = 41 | CES38 = 68 | CES63 = 75 | CES88 = 77 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 84 | CES66 = 66 | CES91 = 92 |
| CES17 = 48 | CES42 = 70 | CES67 = 64 | CES92 = 70 |
| CES18 = 55 | CES43 = 69 | CES68 = 71 | CES93 = 83 |
| CES19 = 70 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 73 |
| CES21 = 85 | CES46 = 78 | CES71 = 55 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 68 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



REPORT NUMBER: SP1-1908-441-9-R4

**TM-30-18**

**Color Rendition by Hue-Angle Bin**



REPORT NUMBER: SP1-1908-441-9-R4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)