

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: P362049

Luminaire Tested: NVN-SA5A-760-U-SL4

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P362049  
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-SA5A-760-U-SL4  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(5) 70 CRI, 5700K, 615mA 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: 22458 lumens  
Efficiency: N/A  
Efficacy: 138.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G5

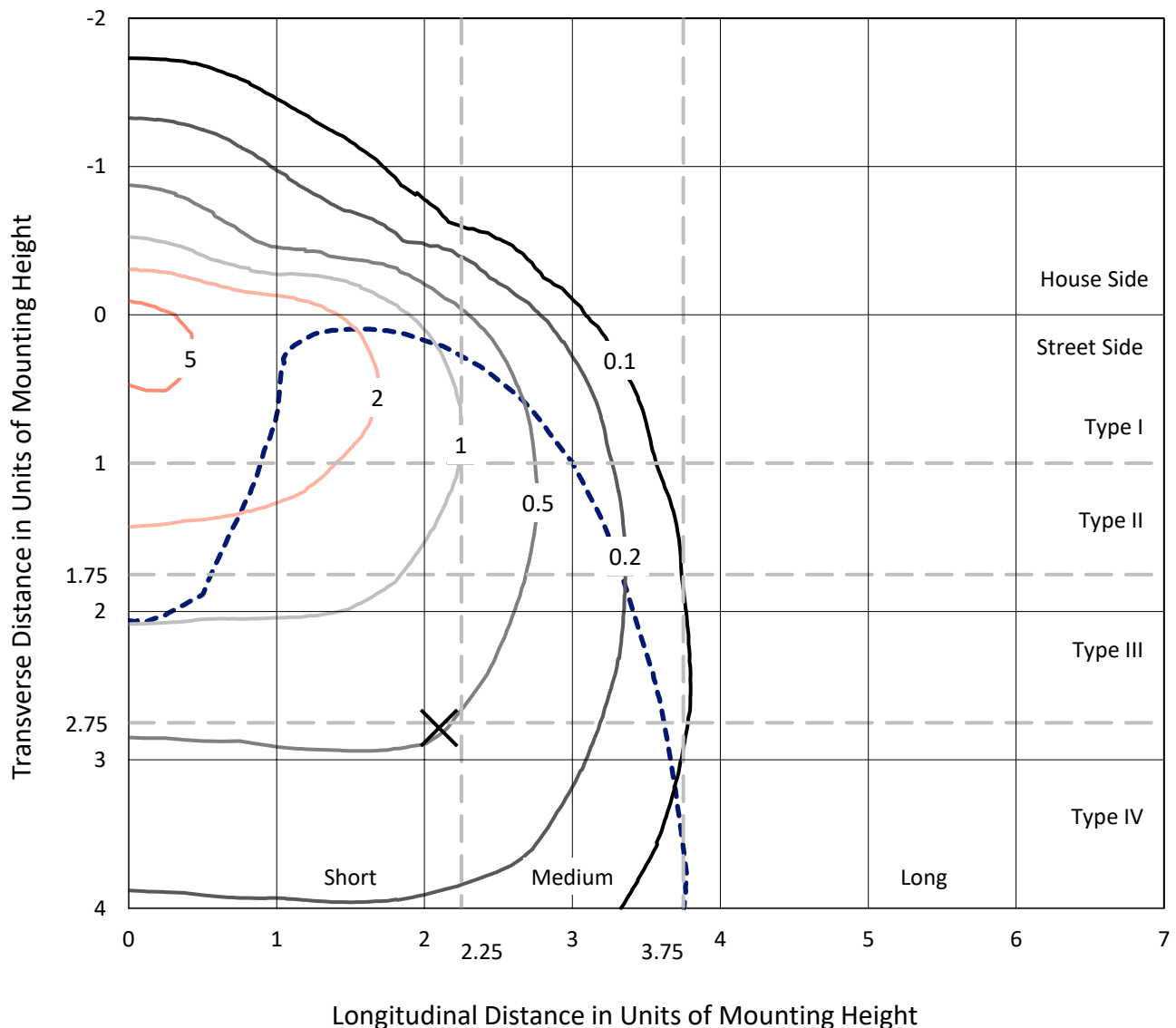
Input Watts (W): 162  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

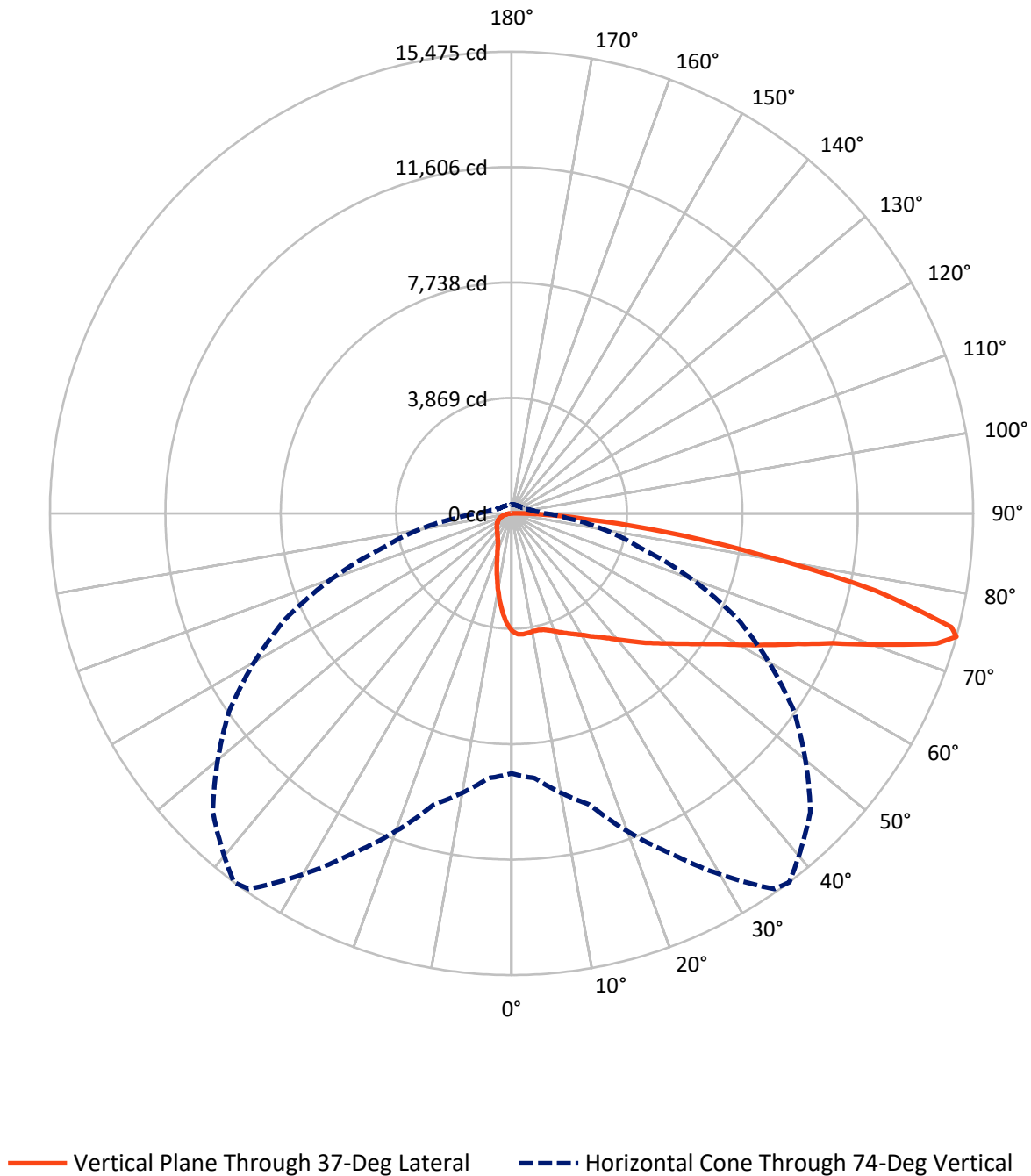
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6.4 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3090.1   | 0.0    | 3090.1  |
|                    | % Fixture | 13.8     | 0.0    | 13.8    |
| <b>Street Side</b> | Lumens    | 19367.9  | 0.0    | 19367.9 |
|                    | % Fixture | 86.2     | 0.0    | 86.2    |
| <b>Total</b>       | Lumens    | 22458.0  | 0.0    | 22458.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 348.5   | 1.6       |
| 10°-20°   | 893.2   | 4.0       |
| 20°-30°   | 1376.2  | 6.1       |
| 30°-40°   | 2001.2  | 8.9       |
| 40°-50°   | 2945.5  | 13.1      |
| 50°-60°   | 4136.4  | 18.4      |
| 60°-70°   | 5235.4  | 23.3      |
| 70°-80°   | 4610.0  | 20.5      |
| 80°-90°   | 911.5   | 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°    | 22458.0 | 100.0     |
| 0°-180°   | 22458.0 | 100.0     |

**Coefficient of Utilization**



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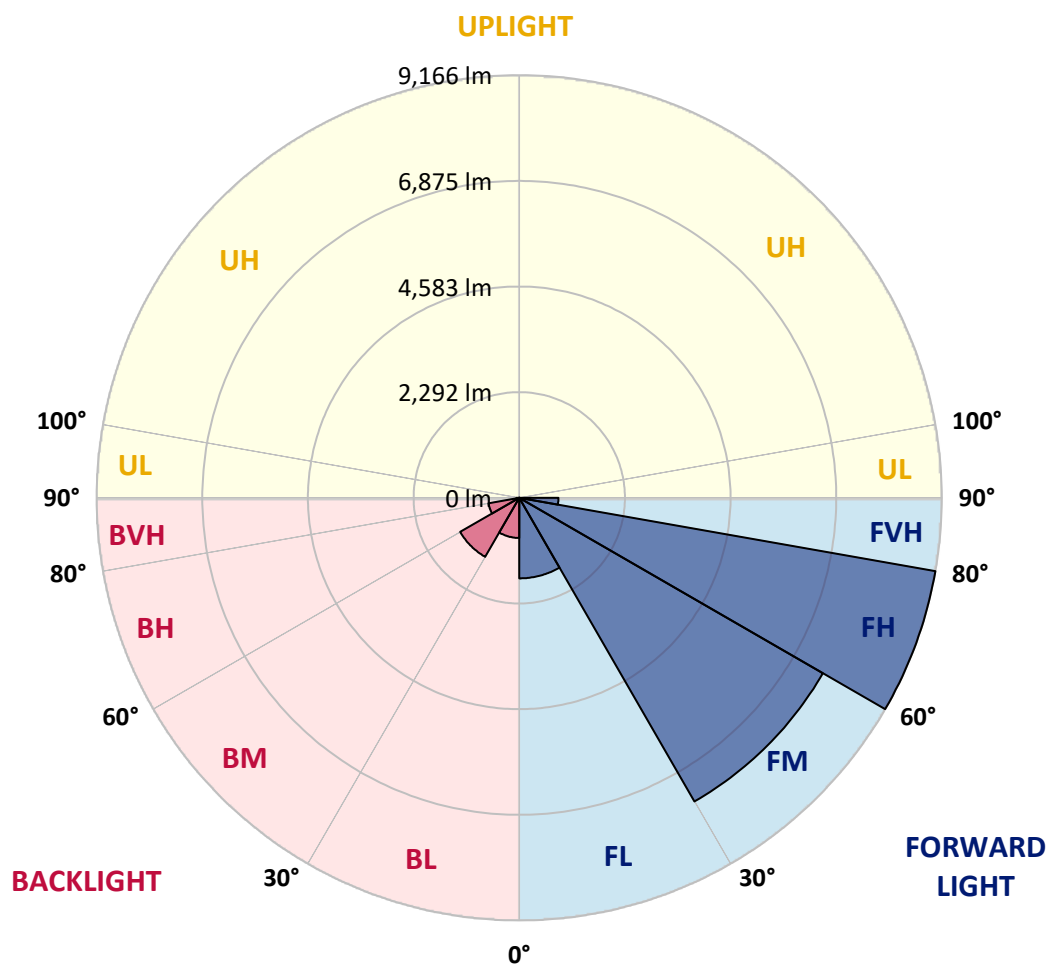
CATALOG NUMBER: NVN-SA5A-760-U-SL4

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1747.5 | 7.8       |                         |      |          |
| FM   | (30°-60°)   | 7604.5 | 33.9      |                         |      |          |
| FH   | (60°-80°)   | 9166.2 | 40.8      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 849.8  | 3.8       |                         |      | G5       |
| BL   | (0°-30°)    | 870.4  | 3.9       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 1478.7 | 6.6       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 679.2  | 3.0       | B2/1000                 |      | G2/1000  |
| BVH  | (80°-90°)   | 61.7   | 0.3       |                         |      | G1/100   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |          |

**BUG Rating: B2-U0-G5**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°     | 25°     | 35°     | 37°     | 45°     | 55°     | 65°     | 75°     | 85°    |
|-------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 3957.0 | 3957.0 | 3957.0  | 3957.0  | 3957.0  | 3957.0  | 3957.0  | 3957.0  | 3957.0  | 3957.0  | 3957.0 |
| 2.5°  | 4092.3 | 4093.1 | 4092.3  | 4086.0  | 4070.9  | 4058.3  | 4048.0  | 4033.0  | 3999.7  | 3974.4  | 3936.4 |
| 5°    | 4131.1 | 4126.3 | 4123.1  | 4111.3  | 4087.5  | 4073.3  | 4053.5  | 4025.0  | 3970.5  | 3919.8  | 3858.1 |
| 7.5°  | 4112.9 | 4107.3 | 4100.2  | 4086.0  | 4059.1  | 4047.2  | 4019.5  | 3982.3  | 3916.7  | 3850.2  | 3761.6 |
| 10°   | 4056.7 | 4055.1 | 4051.9  | 4048.8  | 4025.8  | 4016.3  | 3991.0  | 3951.5  | 3886.6  | 3805.9  | 3702.3 |
| 12.5° | 3994.2 | 3998.1 | 4010.8  | 4027.4  | 4017.1  | 4012.4  | 3996.6  | 3969.7  | 3903.2  | 3816.2  | 3691.2 |
| 15°   | 3954.6 | 3965.7 | 3999.7  | 4043.2  | 4051.9  | 4050.4  | 4046.4  | 4029.0  | 3958.6  | 3862.1  | 3716.5 |
| 17.5° | 3941.2 | 3959.4 | 4024.3  | 4096.2  | 4121.6  | 4127.1  | 4128.7  | 4098.6  | 4020.3  | 3918.2  | 3742.6 |
| 20°   | 3965.7 | 3988.7 | 4083.6  | 4182.5  | 4222.8  | 4226.0  | 4218.9  | 4166.7  | 4078.8  | 3966.5  | 3756.9 |
| 22.5° | 4040.1 | 4060.6 | 4179.3  | 4290.9  | 4336.7  | 4341.5  | 4320.1  | 4241.0  | 4140.5  | 4023.5  | 3776.6 |
| 25°   | 4183.3 | 4208.6 | 4327.2  | 4438.8  | 4462.5  | 4463.3  | 4432.5  | 4334.4  | 4221.2  | 4103.4  | 3819.4 |
| 27.5° | 4370.0 | 4395.3 | 4502.1  | 4611.2  | 4598.6  | 4591.5  | 4549.5  | 4451.4  | 4326.4  | 4213.3  | 3895.3 |
| 30°   | 4578.0 | 4605.7 | 4707.0  | 4784.5  | 4754.4  | 4740.2  | 4706.2  | 4579.6  | 4472.8  | 4363.6  | 4011.6 |
| 32.5° | 4793.2 | 4818.5 | 4907.1  | 4960.1  | 4922.1  | 4915.8  | 4864.4  | 4748.9  | 4663.5  | 4593.0  | 4199.9 |
| 35°   | 5013.9 | 5032.1 | 5119.1  | 5149.2  | 5098.5  | 5097.0  | 5082.7  | 4976.7  | 4922.9  | 4956.2  | 4473.6 |
| 37.5° | 5239.4 | 5244.1 | 5318.5  | 5320.1  | 5305.0  | 5311.4  | 5326.4  | 5259.9  | 5275.0  | 5378.6  | 4829.6 |
| 40°   | 5440.3 | 5453.0 | 5506.8  | 5523.4  | 5549.5  | 5571.6  | 5646.8  | 5603.3  | 5719.6  | 5903.1  | 5272.6 |
| 42.5° | 5589.0 | 5613.5 | 5699.8  | 5742.5  | 5827.1  | 5861.9  | 5968.0  | 6008.3  | 6242.5  | 6517.8  | 5799.5 |
| 45°   | 5714.8 | 5752.8 | 5891.2  | 5979.0  | 6122.2  | 6183.1  | 6335.0  | 6470.3  | 6833.4  | 7184.6  | 6354.0 |
| 47.5° | 5850.9 | 5899.1 | 6072.4  | 6240.1  | 6434.7  | 6503.5  | 6779.6  | 6982.1  | 7463.9  | 7855.5  | 6876.9 |
| 50°   | 6051.0 | 6088.2 | 6257.5  | 6520.9  | 6763.8  | 6852.4  | 7234.5  | 7524.8  | 8104.7  | 8494.7  | 7330.2 |
| 52.5° | 6330.3 | 6316.0 | 6459.2  | 6828.7  | 7154.6  | 7263.8  | 7720.2  | 8102.3  | 8754.2  | 9073.0  | 7713.1 |
| 55°   | 6611.1 | 6587.4 | 6687.8  | 7150.6  | 7610.2  | 7725.0  | 8255.0  | 8682.2  | 9372.0  | 9593.5  | 8006.6 |
| 57.5° | 6923.6 | 6878.5 | 6963.1  | 7513.7  | 8129.2  | 8266.1  | 8853.8  | 9298.4  | 9979.6  | 10014.4 | 8193.3 |
| 60°   | 7245.6 | 7184.6 | 7279.6  | 7963.9  | 8788.2  | 8949.6  | 9554.7  | 9899.7  | 10552.3 | 10351.4 | 8253.4 |
| 62.5° | 7527.2 | 7484.5 | 7630.8  | 8466.2  | 9531.0  | 9708.2  | 10243.0 | 10538.8 | 11117.1 | 10491.4 | 8036.6 |
| 65°   | 7773.2 | 7780.3 | 8033.5  | 9031.0  | 10359.3 | 10548.3 | 11032.5 | 11326.8 | 11561.7 | 10408.3 | 7529.6 |
| 67.5° | 8066.7 | 8107.1 | 8539.0  | 9774.7  | 11401.9 | 11609.2 | 12181.1 | 12185.9 | 11810.1 | 9921.0  | 6531.2 |
| 70°   | 8494.7 | 8577.7 | 9234.3  | 10806.2 | 12884.4 | 13169.2 | 13610.6 | 12690.6 | 11461.3 | 8599.9  | 5138.9 |
| 72.5° | 8874.4 | 9029.5 | 9974.0  | 11986.5 | 14691.3 | 14907.2 | 14446.8 | 12399.5 | 10003.3 | 6445.0  | 3201.5 |
| 74°   | 8720.1 | 8912.4 | 10108.5 | 12568.0 | 15371.6 | 15475.2 | 14164.4 | 11549.9 | 8340.4  | 4463.3  | 1860.6 |
| 75°   | 8387.9 | 8596.7 | 9912.3  | 12562.4 | 15285.4 | 15227.6 | 13482.5 | 10579.2 | 6869.0  | 3044.1  | 1238.0 |
| 77.5° | 6769.3 | 6990.0 | 8352.3  | 10766.7 | 12533.2 | 12478.6 | 10356.9 | 7096.8  | 3008.5  | 998.4   | 628.9  |
| 80°   | 3935.7 | 4104.2 | 5184.8  | 6837.4  | 8451.2  | 8550.1  | 6811.3  | 3511.6  | 1183.5  | 560.9   | 426.4  |
| 82.5° | 1748.3 | 1864.6 | 2504.6  | 3490.3  | 5100.1  | 5227.5  | 3567.0  | 1840.1  | 731.0   | 341.0   | 256.3  |
| 85°   | 1147.1 | 1233.3 | 1520.5  | 1662.1  | 2428.6  | 2515.7  | 1745.9  | 1432.7  | 482.6   | 187.5   | 188.3  |
| 87.5° | 825.1  | 908.2  | 1129.7  | 986.5   | 1114.6  | 1055.3  | 950.1   | 1325.9  | 193.8   | 106.8   | 63.3   |
| 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: P362049

CATALOG NUMBER: NVN-SA5A-760-U-SL4

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3957.0 | 3957.0 | 3957.0 | 3957.0 | 3957.0 | 3957.0 | 3957.0 | 3957.0 | 3957.0 | 3957.0 | 3957.0 |
| 2.5°  | 3919.8 | 3907.2 | 3878.7 | 3824.9 | 3794.8 | 3769.5 | 3727.6 | 3703.1 | 3692.0 | 3691.2 | 3696.0 |
| 5°    | 3822.5 | 3793.3 | 3719.7 | 3629.5 | 3557.5 | 3491.9 | 3410.4 | 3361.3 | 3326.5 | 3305.9 | 3311.5 |
| 7.5°  | 3709.4 | 3663.5 | 3548.0 | 3404.0 | 3288.5 | 3161.2 | 3035.4 | 2960.2 | 2901.7 | 2858.2 | 2866.1 |
| 10°   | 3631.9 | 3568.6 | 3400.1 | 3192.8 | 3000.6 | 2815.5 | 2642.2 | 2538.6 | 2456.3 | 2393.0 | 2397.8 |
| 12.5° | 3605.8 | 3520.3 | 3287.0 | 3010.1 | 2740.3 | 2487.2 | 2260.9 | 2101.9 | 2017.3 | 1945.3 | 1950.8 |
| 15°   | 3609.7 | 3495.0 | 3192.0 | 2845.5 | 2506.2 | 2187.4 | 1912.8 | 1726.9 | 1612.2 | 1562.4 | 1563.2 |
| 17.5° | 3612.9 | 3465.7 | 3092.4 | 2669.1 | 2274.4 | 1907.3 | 1609.1 | 1420.8 | 1312.4 | 1266.5 | 1267.3 |
| 20°   | 3602.6 | 3418.3 | 2968.9 | 2466.6 | 2032.3 | 1650.2 | 1361.5 | 1201.7 | 1119.4 | 1083.8 | 1083.8 |
| 22.5° | 3589.2 | 3362.1 | 2829.7 | 2263.3 | 1793.4 | 1427.1 | 1184.3 | 1062.4 | 1015.0 | 991.2  | 990.4  |
| 25°   | 3595.5 | 3320.2 | 2687.3 | 2054.5 | 1573.5 | 1249.1 | 1066.4 | 985.7  | 954.0  | 939.0  | 938.2  |
| 27.5° | 3629.5 | 3300.4 | 2556.0 | 1846.4 | 1381.2 | 1115.4 | 987.3  | 930.3  | 909.7  | 900.3  | 900.3  |
| 30°   | 3691.2 | 3300.4 | 2419.1 | 1669.2 | 1221.4 | 1016.5 | 926.4  | 887.6  | 873.4  | 867.0  | 867.0  |
| 32.5° | 3798.8 | 3318.6 | 2287.0 | 1493.6 | 1094.1 | 939.0  | 875.7  | 849.6  | 838.6  | 835.4  | 835.4  |
| 35°   | 3983.9 | 3380.3 | 2158.1 | 1327.4 | 991.2  | 875.7  | 827.5  | 812.4  | 804.5  | 803.7  | 806.1  |
| 37.5° | 4244.2 | 3506.1 | 2037.0 | 1204.8 | 918.5  | 824.3  | 787.1  | 775.3  | 770.5  | 774.5  | 777.6  |
| 40°   | 4571.7 | 3677.0 | 1927.1 | 1094.1 | 863.1  | 783.2  | 749.9  | 742.0  | 739.7  | 745.2  | 749.9  |
| 42.5° | 4967.2 | 3908.0 | 1836.9 | 1014.2 | 820.4  | 748.4  | 718.3  | 708.8  | 706.4  | 712.8  | 719.1  |
| 45°   | 5395.2 | 4156.4 | 1773.6 | 954.8  | 787.1  | 722.3  | 690.6  | 680.3  | 675.6  | 678.8  | 685.9  |
| 47.5° | 5784.4 | 4391.3 | 1748.3 | 912.9  | 755.5  | 700.1  | 666.1  | 653.4  | 645.5  | 643.9  | 649.5  |
| 50°   | 6112.7 | 4566.1 | 1760.2 | 887.6  | 730.2  | 675.6  | 642.4  | 628.1  | 616.3  | 609.1  | 613.1  |
| 52.5° | 6351.6 | 4676.1 | 1771.2 | 876.5  | 710.4  | 648.7  | 616.3  | 602.8  | 587.0  | 575.1  | 575.1  |
| 55°   | 6524.9 | 4701.4 | 1746.7 | 867.8  | 695.4  | 619.4  | 587.0  | 574.3  | 558.5  | 545.1  | 543.5  |
| 57.5° | 6592.9 | 4630.2 | 1655.7 | 855.2  | 685.1  | 591.7  | 556.1  | 546.6  | 533.2  | 517.4  | 516.6  |
| 60°   | 6501.1 | 4410.3 | 1480.1 | 828.3  | 671.6  | 568.8  | 525.3  | 519.0  | 512.6  | 497.6  | 496.8  |
| 62.5° | 6132.5 | 3927.7 | 1253.1 | 773.7  | 644.7  | 544.3  | 496.8  | 500.0  | 500.8  | 490.5  | 488.9  |
| 65°   | 5464.0 | 3264.8 | 1031.6 | 702.5  | 604.4  | 515.0  | 467.5  | 482.6  | 491.3  | 489.7  | 487.3  |
| 67.5° | 4492.6 | 2541.0 | 874.2  | 627.3  | 551.4  | 474.7  | 435.9  | 453.3  | 460.4  | 465.9  | 464.4  |
| 70°   | 3334.4 | 1791.8 | 723.1  | 548.2  | 487.3  | 427.2  | 394.8  | 403.5  | 398.7  | 405.0  | 407.4  |
| 72.5° | 1859.1 | 1075.1 | 589.4  | 469.1  | 420.9  | 371.8  | 348.9  | 347.3  | 337.0  | 337.0  | 337.0  |
| 74°   | 1115.4 | 788.7  | 518.2  | 420.1  | 380.5  | 335.4  | 315.6  | 308.5  | 299.0  | 299.8  | 299.0  |
| 75°   | 897.1  | 678.0  | 475.4  | 387.6  | 352.0  | 314.1  | 294.3  | 284.8  | 277.7  | 277.7  | 276.9  |
| 77.5° | 566.4  | 515.0  | 382.9  | 308.5  | 281.6  | 258.7  | 245.2  | 232.6  | 232.6  | 231.8  | 231.0  |
| 80°   | 428.0  | 409.8  | 298.2  | 233.4  | 216.0  | 198.6  | 189.9  | 184.3  | 184.3  | 186.7  | 185.9  |
| 82.5° | 293.5  | 308.5  | 209.6  | 163.0  | 154.3  | 141.6  | 140.0  | 140.8  | 138.4  | 135.3  | 134.5  |
| 85°   | 214.4  | 231.8  | 141.6  | 102.8  | 94.1   | 86.2   | 92.6   | 95.7   | 91.8   | 84.6   | 81.5   |
| 87.5° | 82.3   | 151.9  | 75.9   | 42.7   | 39.6   | 34.0   | 39.6   | 41.1   | 44.3   | 34.8   | 35.6   |
| 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

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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 5700K 4-step quadrangle

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**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               |           |                  |                  |

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**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               |           |                  |                  |

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**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               |           |                  |                  |

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**Summary**

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



**Color Vector Graphics**



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**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 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)