

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: P361629

Luminaire Tested: NVN-SA5C-760-U-T4W

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P361629  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-18)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA5C-760-U-T4W  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(5) 70 CRI, 5700K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 35309 lumens  
Efficiency: N/A  
Efficacy: 126.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

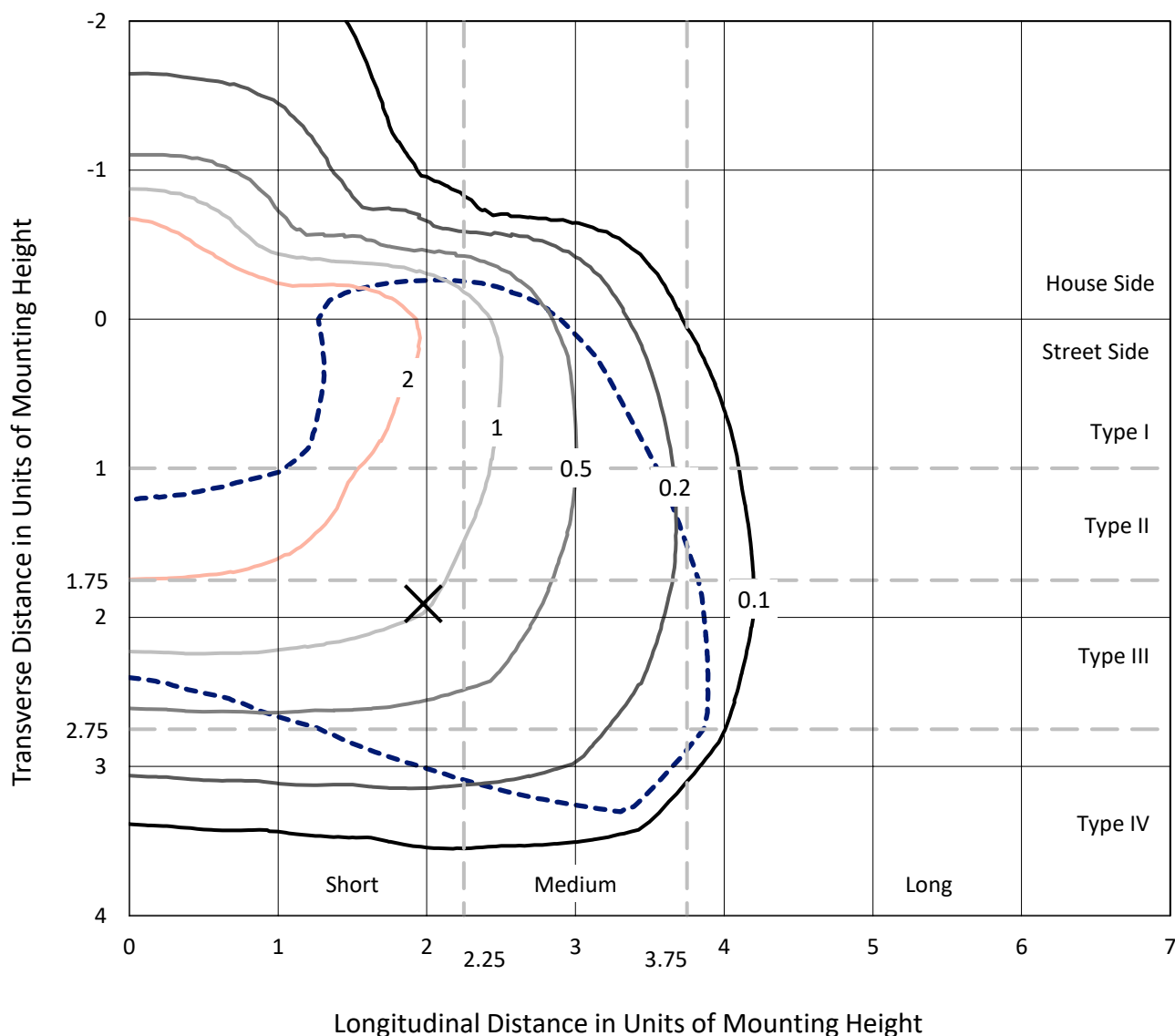
Input Watts (W): 279  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

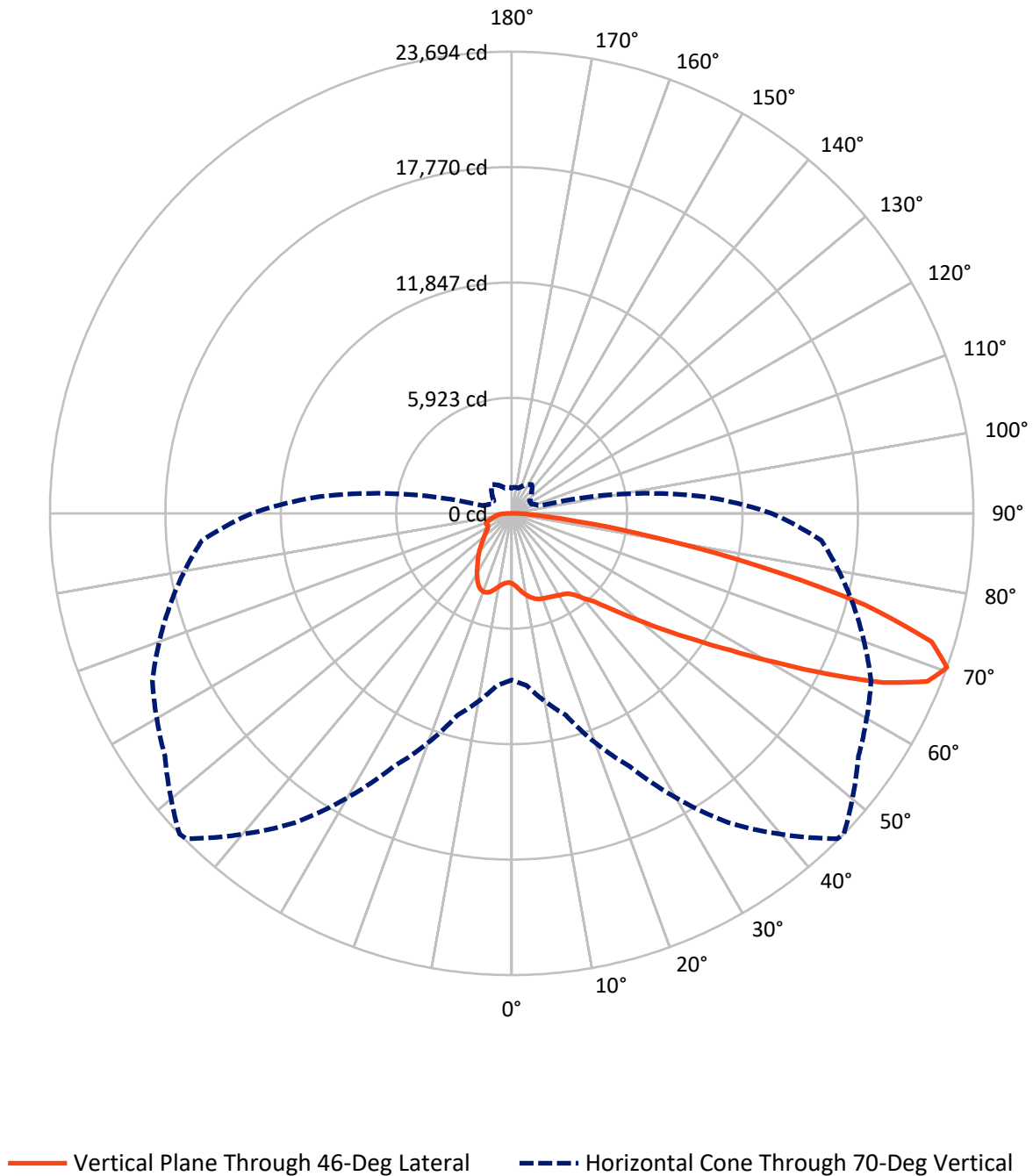
✕ Max cd  
 - - - 1/2 Max cd



Based on 30 foot mounting height. Maximum calculated value = 5 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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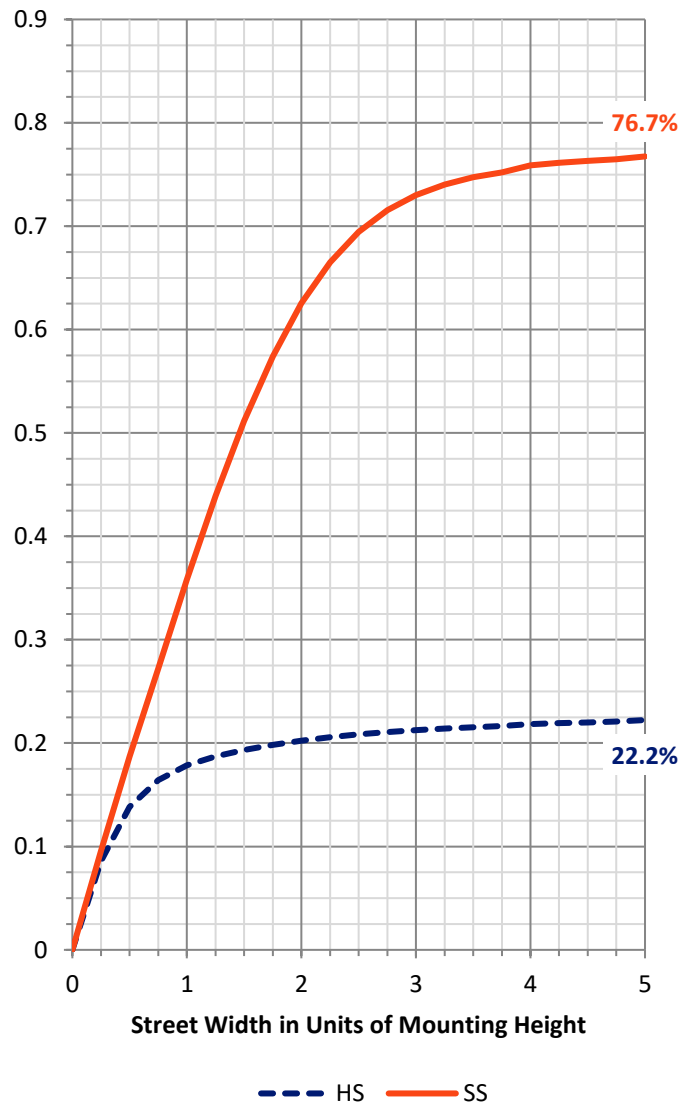
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 8092.7   | 0.0    | 8092.7  |
|                    | % Fixture | 22.9     | 0.0    | 22.9    |
| <b>Street Side</b> | Lumens    | 27216.3  | 0.0    | 27216.3 |
|                    | % Fixture | 77.1     | 0.0    | 77.1    |
| <b>Total</b>       | Lumens    | 35309.0  | 0.0    | 35309.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 366.7   | 1.0       |
| 10°-20°   | 1221.8  | 3.5       |
| 20°-30°   | 2037.2  | 5.8       |
| 30°-40°   | 2890.9  | 8.2       |
| 40°-50°   | 4252.4  | 12.0      |
| 50°-60°   | 7201.4  | 20.4      |
| 60°-70°   | 10222.2 | 29.0      |
| 70°-80°   | 6210.1  | 17.6      |
| 80°-90°   | 906.3   | 2.6       |
| 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°    | 35309.0 | 100.0     |
| 0°-180°   | 35309.0 | 100.0     |

**Coefficient of Utilization**



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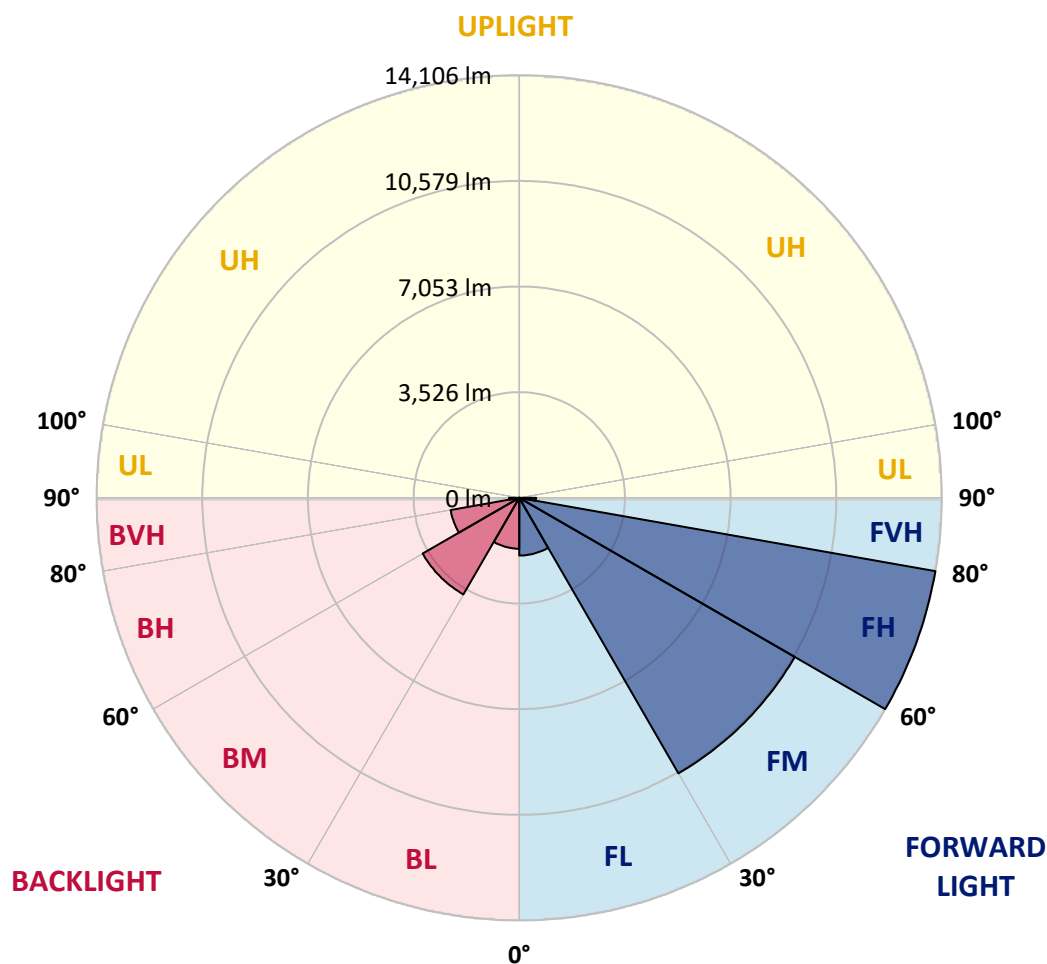
CATALOG NUMBER: NVN-SA5C-760-U-T4W

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1926.6  | 5.5       |                         |      |         |
| FM   | (30°-60°)   | 10619.4 | 30.1      |                         |      |         |
| FH   | (60°-80°)   | 14105.8 | 39.9      |                         |      | G5      |
| FVH  | (80°-90°)   | 564.5   | 1.6       |                         |      | G4/750  |
| BL   | (0°-30°)    | 1699.1  | 4.8       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 3725.3  | 10.6      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 2326.6  | 6.6       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 341.7   | 1.0       |                         |      | G3/500  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G5**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 46°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3597.3  | 3597.3  | 3597.3  | 3597.3  | 3597.3  | 3597.3  | 3597.3  | 3597.3  | 3597.3  | 3597.3  | 3597.3  |
| 2.5°  | 3777.3  | 3779.8  | 3784.6  | 3772.5  | 3738.7  | 3729.0  | 3725.4  | 3690.3  | 3667.4  | 3633.5  | 3604.5  |
| 5°    | 4079.4  | 4081.8  | 4074.6  | 4040.8  | 3965.8  | 3910.3  | 3905.4  | 3825.7  | 3753.2  | 3675.8  | 3617.8  |
| 7.5°  | 4394.8  | 4398.4  | 4375.5  | 4311.4  | 4206.3  | 4109.6  | 4103.6  | 3994.8  | 3884.9  | 3767.7  | 3680.7  |
| 10°   | 4673.9  | 4659.4  | 4622.0  | 4532.6  | 4408.1  | 4289.7  | 4284.9  | 4171.3  | 4044.4  | 3903.0  | 3787.0  |
| 12.5° | 4860.0  | 4848.0  | 4799.6  | 4690.9  | 4554.3  | 4445.6  | 4435.9  | 4330.8  | 4207.5  | 4052.8  | 3913.9  |
| 15°   | 4962.7  | 4971.2  | 4906.0  | 4782.7  | 4649.8  | 4557.9  | 4549.5  | 4474.6  | 4364.6  | 4208.7  | 4049.2  |
| 17.5° | 4976.0  | 4983.3  | 4920.5  | 4798.4  | 4689.7  | 4626.8  | 4623.2  | 4573.7  | 4493.9  | 4344.1  | 4177.3  |
| 20°   | 4898.7  | 4903.5  | 4851.6  | 4751.3  | 4680.0  | 4660.7  | 4659.4  | 4637.7  | 4578.5  | 4445.6  | 4283.6  |
| 22.5° | 4786.3  | 4790.0  | 4752.5  | 4680.0  | 4655.8  | 4686.0  | 4694.5  | 4686.0  | 4643.7  | 4519.3  | 4367.0  |
| 25°   | 4758.5  | 4756.1  | 4717.4  | 4643.7  | 4664.3  | 4728.3  | 4739.2  | 4742.8  | 4713.8  | 4605.1  | 4473.4  |
| 27.5° | 4892.7  | 4884.2  | 4810.5  | 4692.1  | 4705.4  | 4782.7  | 4797.2  | 4832.2  | 4814.1  | 4718.7  | 4594.2  |
| 30°   | 5280.5  | 5266.0  | 5115.0  | 4875.7  | 4810.5  | 4850.4  | 4868.5  | 4924.1  | 4927.7  | 4848.0  | 4754.9  |
| 32.5° | 5935.5  | 5917.4  | 5646.7  | 5218.9  | 4988.1  | 4919.2  | 4936.2  | 5019.5  | 5064.2  | 5002.6  | 4902.3  |
| 35°   | 6763.2  | 6742.7  | 6387.4  | 5802.6  | 5285.4  | 5051.0  | 5063.0  | 5129.5  | 5218.9  | 5131.9  | 4999.0  |
| 37.5° | 7626.0  | 7576.4  | 7234.5  | 6488.9  | 5757.8  | 5332.5  | 5332.5  | 5341.0  | 5383.3  | 5202.0  | 5112.6  |
| 40°   | 8483.9  | 8434.4  | 8125.0  | 7296.1  | 6369.3  | 5776.0  | 5748.2  | 5560.9  | 5527.1  | 5371.2  | 5341.0  |
| 42.5° | 9281.4  | 9266.9  | 9084.5  | 8208.4  | 7087.0  | 6212.2  | 6173.5  | 5855.7  | 5863.0  | 5766.3  | 5767.5  |
| 45°   | 10129.7 | 10129.7 | 9981.1  | 9129.2  | 7923.2  | 6913.0  | 6874.4  | 6406.7  | 6479.2  | 6434.5  | 6542.1  |
| 47.5° | 10822.1 | 10843.8 | 10823.3 | 10088.6 | 8896.0  | 7803.6  | 7733.5  | 7170.4  | 7373.4  | 7526.9  | 7839.9  |
| 50°   | 11529.0 | 11562.8 | 11566.4 | 11141.1 | 10071.7 | 8862.1  | 8782.4  | 8184.2  | 8637.4  | 9077.2  | 9692.3  |
| 52.5° | 12554.9 | 12631.0 | 12327.7 | 12191.2 | 11512.1 | 10118.8 | 10040.3 | 9488.1  | 10244.5 | 10862.0 | 11921.7 |
| 55°   | 13505.9 | 13439.4 | 13223.1 | 13307.7 | 13053.9 | 11549.5 | 11490.3 | 11005.8 | 12035.3 | 12837.6 | 14214.0 |
| 57.5° | 14020.6 | 14015.8 | 14233.3 | 14595.8 | 14716.7 | 13313.7 | 13264.2 | 12792.9 | 14054.5 | 14657.4 | 16366.1 |
| 60°   | 14624.8 | 14633.3 | 15172.2 | 15995.1 | 16492.9 | 15510.5 | 15488.8 | 15131.1 | 16015.6 | 16356.4 | 18054.1 |
| 62.5° | 14709.4 | 14861.7 | 15789.7 | 17205.9 | 18155.7 | 18077.1 | 18125.4 | 17237.3 | 17770.2 | 17712.2 | 19314.5 |
| 65°   | 13736.7 | 13937.3 | 15616.9 | 17572.0 | 19808.7 | 20884.1 | 20928.8 | 19355.6 | 19153.8 | 18871.0 | 19765.2 |
| 67.5° | 11742.9 | 12040.1 | 13864.8 | 16775.7 | 20353.7 | 22958.9 | 23021.7 | 20997.7 | 20301.7 | 19263.7 | 18680.1 |
| 70°   | 8545.5  | 8875.4  | 10712.1 | 14327.6 | 19382.1 | 23622.3 | 23693.6 | 21723.9 | 20345.2 | 18146.0 | 15946.8 |
| 72.5° | 5162.1  | 5420.7  | 6934.8  | 10547.8 | 16358.8 | 22413.9 | 22540.8 | 20803.2 | 18575.0 | 15370.4 | 11775.5 |
| 75°   | 2266.9  | 2436.1  | 3353.2  | 6078.1  | 11711.5 | 18544.7 | 18703.0 | 17806.4 | 15092.5 | 11170.1 | 6960.2  |
| 77.5° | 965.5   | 1013.8  | 1375.1  | 2640.3  | 6620.6  | 12672.1 | 12889.6 | 13010.4 | 10239.7 | 6078.1  | 2941.2  |
| 80°   | 601.8   | 621.1   | 778.2   | 1195.1  | 3098.2  | 7117.3  | 7351.7  | 7655.0  | 5084.8  | 2234.3  | 1027.1  |
| 82.5° | 366.1   | 387.9   | 517.2   | 722.6   | 1613.2  | 3226.3  | 3338.7  | 3552.6  | 1973.3  | 965.5   | 531.7   |
| 85°   | 219.9   | 235.6   | 316.6   | 456.8   | 918.4   | 1268.8  | 1267.6  | 1401.7  | 929.2   | 621.1   | 280.3   |
| 87.5° | 105.1   | 117.2   | 169.2   | 236.8   | 462.8   | 476.1   | 445.9   | 505.1   | 564.3   | 407.2   | 141.4   |
| 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: P361629

CATALOG NUMBER: NVN-SA5C-760-U-T4W

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3597.3  | 3597.3  | 3597.3 | 3597.3 | 3597.3 | 3597.3 | 3597.3 | 3597.3 | 3597.3 | 3597.3 | 3597.3 |
| 2.5°  | 3594.9  | 3590.0  | 3574.3 | 3562.3 | 3559.8 | 3552.6 | 3546.5 | 3550.2 | 3555.0 | 3556.2 | 3556.2 |
| 5°    | 3593.7  | 3580.4  | 3559.8 | 3551.4 | 3562.3 | 3576.8 | 3594.9 | 3619.0 | 3633.5 | 3644.4 | 3651.7 |
| 7.5°  | 3651.7  | 3626.3  | 3603.3 | 3598.5 | 3620.3 | 3658.9 | 3700.0 | 3750.8 | 3785.8 | 3810.0 | 3814.8 |
| 10°   | 3748.3  | 3716.9  | 3694.0 | 3698.8 | 3737.5 | 3793.1 | 3851.1 | 3916.3 | 3969.5 | 4002.1 | 4004.5 |
| 12.5° | 3859.5  | 3829.3  | 3807.6 | 3828.1 | 3892.1 | 3959.8 | 4020.2 | 4077.0 | 4125.4 | 4158.0 | 4158.0 |
| 15°   | 3987.6  | 3965.8  | 3940.5 | 3987.6 | 4074.6 | 4135.0 | 4160.4 | 4188.2 | 4214.8 | 4238.9 | 4234.1 |
| 17.5° | 4110.9  | 4090.3  | 4077.0 | 4132.6 | 4223.2 | 4251.0 | 4234.1 | 4213.6 | 4213.6 | 4226.9 | 4229.3 |
| 20°   | 4217.2  | 4199.1  | 4207.5 | 4261.9 | 4309.0 | 4280.0 | 4217.2 | 4151.9 | 4125.4 | 4132.6 | 4139.9 |
| 22.5° | 4310.2  | 4301.8  | 4327.1 | 4352.5 | 4318.7 | 4217.2 | 4101.2 | 4013.0 | 3980.3 | 3977.9 | 3980.3 |
| 25°   | 4419.0  | 4417.8  | 4449.2 | 4403.3 | 4253.4 | 4066.1 | 3910.3 | 3824.5 | 3806.3 | 3820.8 | 3845.0 |
| 27.5° | 4554.3  | 4567.6  | 4583.3 | 4415.4 | 4120.5 | 3837.8 | 3679.5 | 3620.3 | 3638.4 | 3673.4 | 3696.4 |
| 30°   | 4727.1  | 4763.4  | 4729.5 | 4385.1 | 3929.6 | 3576.8 | 3425.7 | 3408.8 | 3458.3 | 3507.9 | 3532.0 |
| 32.5° | 4895.1  | 4951.9  | 4869.7 | 4306.6 | 3683.1 | 3300.0 | 3182.8 | 3178.0 | 3238.4 | 3286.7 | 3320.6 |
| 35°   | 5030.4  | 5142.8  | 4974.8 | 4150.7 | 3397.9 | 3045.1 | 2959.3 | 2926.7 | 2948.4 | 3005.2 | 3043.9 |
| 37.5° | 5206.8  | 5394.1  | 5047.3 | 3912.7 | 3088.6 | 2834.8 | 2734.5 | 2659.6 | 2640.3 | 2663.2 | 2682.6 |
| 40°   | 5529.5  | 5777.2  | 5081.2 | 3580.4 | 2786.5 | 2624.6 | 2523.1 | 2413.1 | 2337.0 | 2281.4 | 2282.6 |
| 42.5° | 6056.3  | 6276.2  | 5059.4 | 3176.8 | 2507.4 | 2419.1 | 2304.3 | 2177.5 | 2054.2 | 1928.5 | 1918.9 |
| 45°   | 6911.8  | 7018.2  | 4994.2 | 2749.0 | 2262.1 | 2204.1 | 2096.5 | 1969.6 | 1805.3 | 1662.7 | 1649.4 |
| 47.5° | 8280.9  | 8045.3  | 4892.7 | 2375.6 | 2045.8 | 2021.6 | 1922.5 | 1776.3 | 1602.3 | 1487.5 | 1477.8 |
| 50°   | 10147.8 | 9527.9  | 4843.1 | 2078.4 | 1854.8 | 1862.1 | 1781.1 | 1626.5 | 1462.1 | 1377.5 | 1367.9 |
| 52.5° | 12380.9 | 11254.7 | 4938.6 | 1848.8 | 1701.4 | 1726.8 | 1666.3 | 1521.3 | 1383.6 | 1317.1 | 1307.4 |
| 55°   | 14697.3 | 13043.1 | 5041.3 | 1682.0 | 1556.4 | 1605.9 | 1585.4 | 1465.7 | 1341.3 | 1279.7 | 1271.2 |
| 57.5° | 16680.2 | 14378.3 | 4835.9 | 1546.7 | 1427.1 | 1504.4 | 1522.5 | 1430.7 | 1319.5 | 1263.9 | 1254.3 |
| 60°   | 17928.5 | 14916.0 | 4296.9 | 1419.8 | 1324.4 | 1423.5 | 1486.3 | 1421.0 | 1328.0 | 1323.2 | 1315.9 |
| 62.5° | 18520.6 | 14868.9 | 3488.5 | 1319.5 | 1260.3 | 1388.4 | 1512.9 | 1475.4 | 1424.7 | 1468.2 | 1471.8 |
| 65°   | 18254.7 | 14158.4 | 2598.0 | 1253.1 | 1214.4 | 1401.7 | 1592.6 | 1578.1 | 1452.5 | 1496.0 | 1502.0 |
| 67.5° | 16505.0 | 12463.1 | 1923.7 | 1195.1 | 1163.7 | 1439.2 | 1737.6 | 1612.0 | 1398.1 | 1429.5 | 1410.2 |
| 70°   | 13340.3 | 9880.8  | 1483.9 | 1129.8 | 1111.7 | 1434.3 | 1802.9 | 1591.4 | 1338.9 | 1346.1 | 1294.2 |
| 72.5° | 9199.3  | 6737.8  | 1207.2 | 1069.4 | 1036.8 | 1307.4 | 1757.0 | 1540.7 | 1289.3 | 1233.7 | 1164.9 |
| 75°   | 5002.6  | 3616.6  | 1025.9 | 1006.6 | 905.1  | 1147.9 | 1672.4 | 1504.4 | 1244.6 | 1170.9 | 1132.2 |
| 77.5° | 1968.4  | 1500.8  | 890.6  | 920.8  | 791.5  | 1013.8 | 1578.1 | 1435.5 | 1183.0 | 1086.3 | 1067.0 |
| 80°   | 803.6   | 766.1   | 738.3  | 796.3  | 680.3  | 886.9  | 1464.5 | 1354.6 | 1109.3 | 1007.8 | 969.1  |
| 82.5° | 455.6   | 476.1   | 574.0  | 628.3  | 552.2  | 816.9  | 1410.2 | 1289.3 | 1021.1 | 902.6  | 856.7  |
| 85°   | 233.2   | 279.1   | 400.0  | 450.7  | 406.0  | 694.8  | 1299.0 | 1128.6 | 819.3  | 691.2  | 694.8  |
| 87.5° | 112.4   | 155.9   | 252.5  | 282.8  | 263.4  | 502.7  | 970.3  | 818.1  | 638.0  | 505.1  | 489.4  |
| 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            |



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**Photopic Flux vs. Wavelength**



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| 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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**TM-30-18**

**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)