

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: P359180

Luminaire Tested: NVN-SA4C-730-U-T3R

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P359180  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-10)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA4C-730-U-T3R  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(4) 70 CRI, 3000K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 26853 lumens  
Efficiency: N/A  
Efficacy: 119.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type IV - Medium  
BUG Rating: B3 - U0 - G4

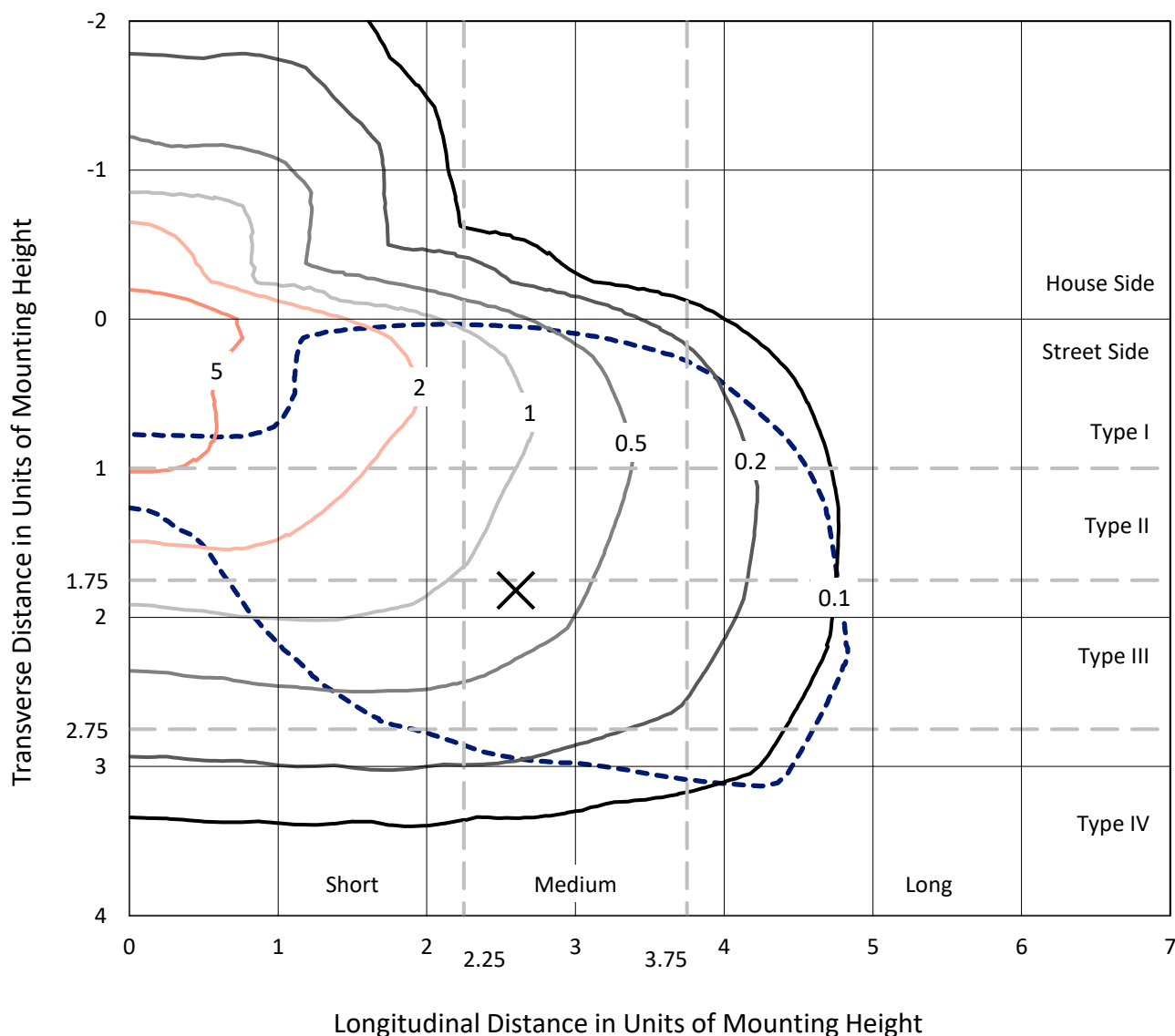
Input Watts (W): 225  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

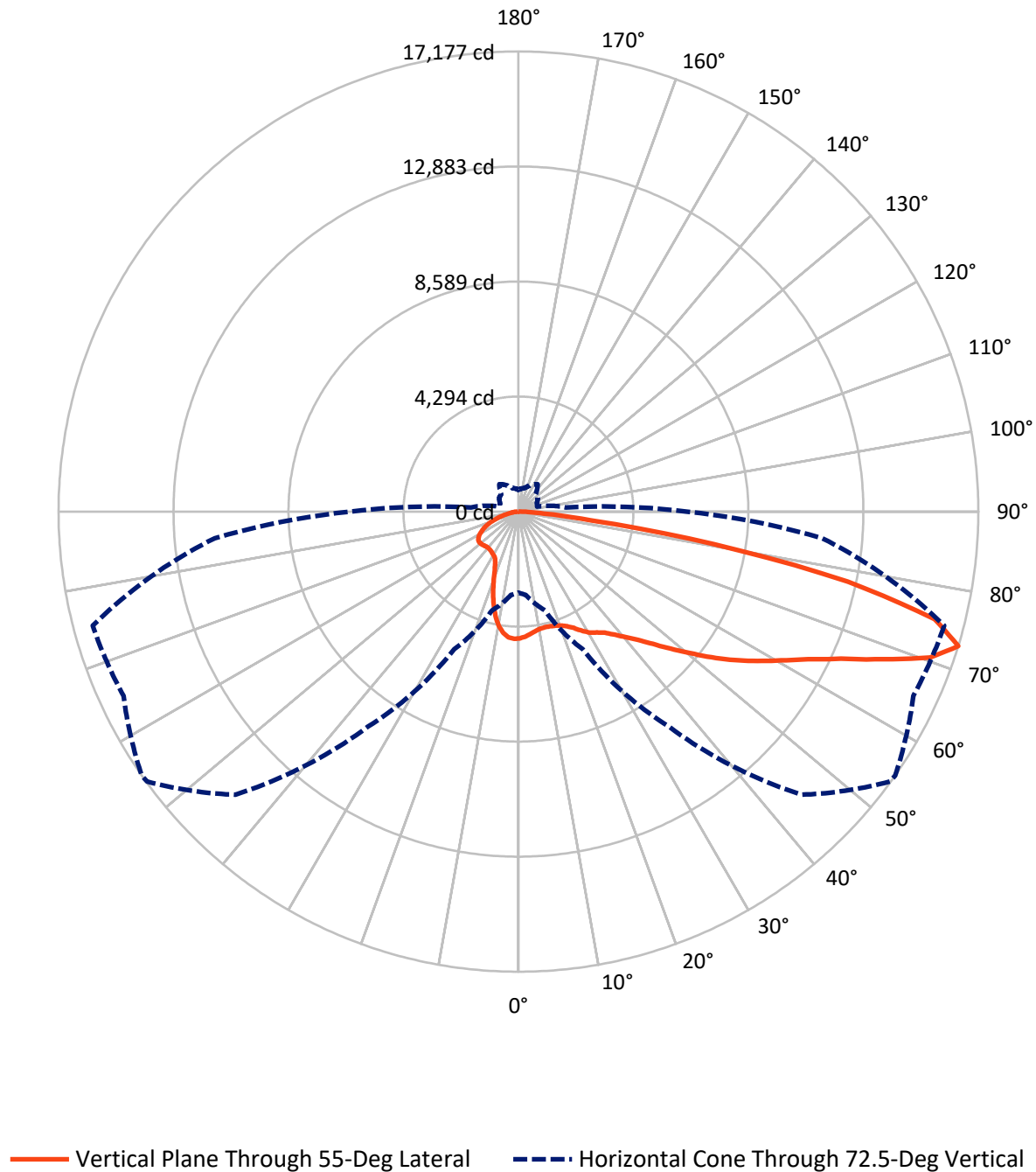
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7.6 fc  
 Type IV - Medium - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: NVN-SA4C-730-U-T3R

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4991.1   | 0.0    | 4991.1  |
|                    | % Fixture | 18.6     | 0.0    | 18.6    |
| <b>Street Side</b> | Lumens    | 21861.9  | 0.0    | 21861.9 |
|                    | % Fixture | 81.4     | 0.0    | 81.4    |
| <b>Total</b>       | Lumens    | 26853.0  | 0.0    | 26853.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 428.6   | 1.6       |
| 10°-20°   | 1141.0  | 4.2       |
| 20°-30°   | 1881.3  | 7.0       |
| 30°-40°   | 2782.9  | 10.4      |
| 40°-50°   | 3884.3  | 14.5      |
| 50°-60°   | 5057.5  | 18.8      |
| 60°-70°   | 6215.5  | 23.1      |
| 70°-80°   | 4872.2  | 18.1      |
| 80°-90°   | 589.6   | 2.2       |
| 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°    | 26853.0 | 100.0     |
| 0°-180°   | 26853.0 | 100.0     |

**Coefficient of Utilization**



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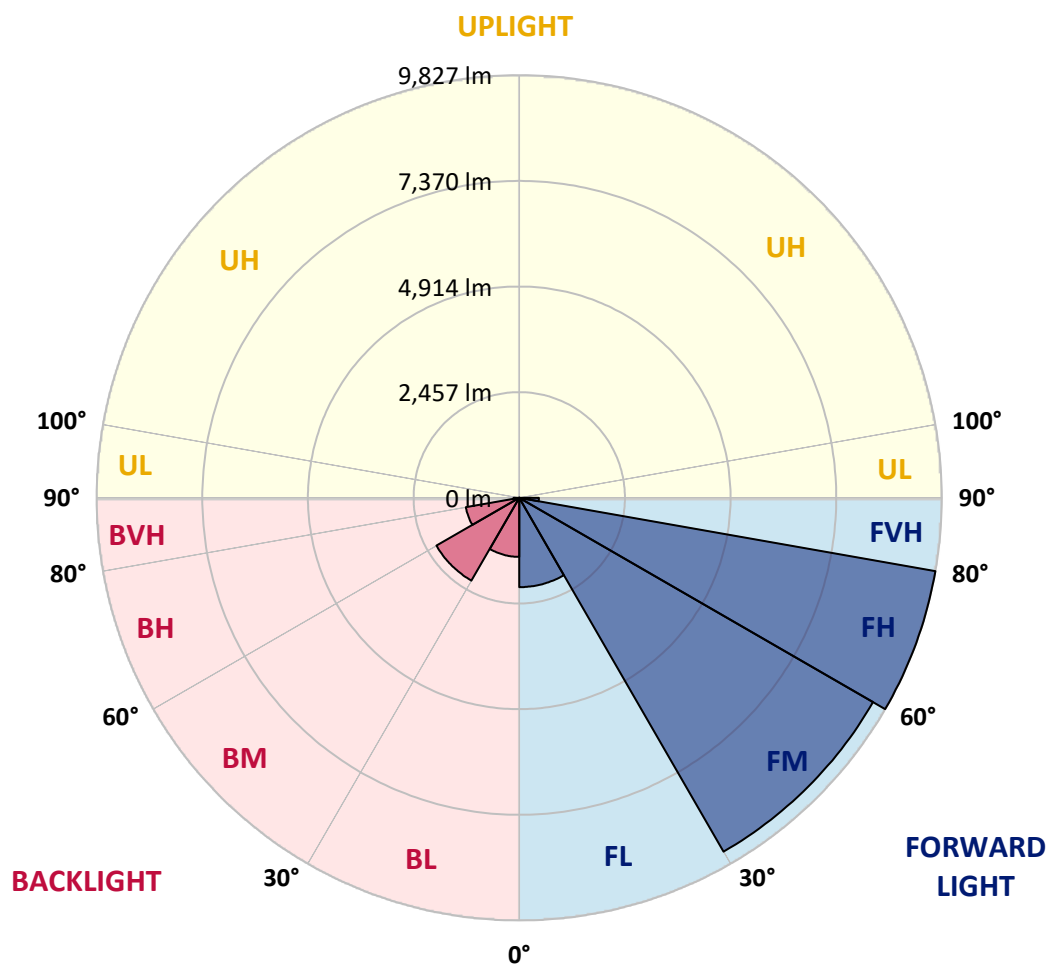
CATALOG NUMBER: NVN-SA4C-730-U-T3R

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2077.6 | 7.7       |                         |      |          |
| FM   | (30°-60°)   | 9501.1 | 35.4      |                         |      |          |
| FH   | (60°-80°)   | 9827.3 | 36.6      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 455.9  | 1.7       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1373.3 | 5.1       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2223.6 | 8.3       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1260.5 | 4.7       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 133.8  | 0.5       |                         |      | G2/225   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G4**

Type IV Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°     | 45°     | 54°     | 55°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 4736.3 | 4736.3 | 4736.3 | 4736.3 | 4736.3  | 4736.3  | 4736.3  | 4736.3  | 4736.3  | 4736.3  | 4736.3  |
| 2.5°  | 4582.1 | 4571.2 | 4584.8 | 4603.9 | 4624.7  | 4652.8  | 4669.2  | 4676.4  | 4704.5  | 4715.4  | 4739.0  |
| 5°    | 4369.9 | 4364.4 | 4387.1 | 4419.8 | 4466.0  | 4531.3  | 4583.9  | 4593.9  | 4668.3  | 4720.9  | 4768.9  |
| 7.5°  | 4215.7 | 4215.7 | 4242.0 | 4281.0 | 4332.7  | 4420.7  | 4495.0  | 4508.6  | 4634.7  | 4748.1  | 4837.0  |
| 10°   | 4093.2 | 4097.8 | 4128.6 | 4174.9 | 4235.6  | 4329.1  | 4427.9  | 4443.3  | 4625.6  | 4811.6  | 4953.1  |
| 12.5° | 4011.6 | 4022.5 | 4050.6 | 4092.3 | 4167.6  | 4281.0  | 4406.1  | 4427.0  | 4644.7  | 4902.3  | 5092.7  |
| 15°   | 4063.3 | 4081.4 | 4084.2 | 4101.4 | 4143.1  | 4266.5  | 4418.8  | 4440.6  | 4685.5  | 4994.8  | 5251.5  |
| 17.5° | 4290.1 | 4296.4 | 4268.3 | 4232.0 | 4212.1  | 4291.0  | 4456.9  | 4479.6  | 4734.5  | 5086.4  | 5403.8  |
| 20°   | 4634.7 | 4631.1 | 4570.3 | 4472.4 | 4370.8  | 4383.5  | 4519.5  | 4543.1  | 4800.7  | 5167.1  | 5556.2  |
| 22.5° | 5070.1 | 5057.4 | 4963.9 | 4783.5 | 4610.2  | 4537.7  | 4629.3  | 4649.2  | 4900.5  | 5282.3  | 5719.5  |
| 25°   | 5597.9 | 5569.8 | 5446.5 | 5204.3 | 4949.4  | 4762.6  | 4794.3  | 4813.4  | 5045.6  | 5411.1  | 5869.1  |
| 27.5° | 6154.8 | 6126.7 | 5969.8 | 5676.8 | 5337.6  | 5046.5  | 5022.0  | 5038.3  | 5210.6  | 5506.3  | 5979.8  |
| 30°   | 6737.1 | 6707.2 | 6563.9 | 6235.5 | 5749.4  | 5340.3  | 5234.2  | 5240.6  | 5326.7  | 5558.0  | 6070.5  |
| 32.5° | 7322.1 | 7294.0 | 7133.5 | 6752.5 | 6196.5  | 5656.0  | 5387.5  | 5379.3  | 5396.6  | 5611.5  | 6173.0  |
| 35°   | 7915.3 | 7926.2 | 7738.4 | 7316.7 | 6691.8  | 6007.0  | 5568.9  | 5551.7  | 5513.6  | 5721.3  | 6318.1  |
| 37.5° | 8550.2 | 8542.9 | 8299.8 | 7859.1 | 7209.6  | 6387.9  | 5829.2  | 5826.5  | 5695.0  | 5929.0  | 6545.7  |
| 40°   | 8974.6 | 8979.2 | 8831.3 | 8414.1 | 7733.0  | 6809.7  | 6163.0  | 6156.6  | 5984.3  | 6240.1  | 6844.1  |
| 42.5° | 9140.6 | 9170.6 | 9208.6 | 8943.8 | 8280.8  | 7298.5  | 6561.2  | 6552.1  | 6387.9  | 6686.3  | 7195.1  |
| 45°   | 9152.4 | 9212.3 | 9448.1 | 9414.5 | 8835.9  | 7858.1  | 7070.0  | 7044.6  | 6926.7  | 7279.5  | 7614.2  |
| 47.5° | 9050.8 | 9112.5 | 9504.3 | 9694.8 | 9332.0  | 8448.6  | 7665.0  | 7645.0  | 7543.4  | 8021.4  | 8067.7  |
| 50°   | 8828.6 | 8887.6 | 9388.2 | 9831.8 | 9740.1  | 9016.4  | 8350.6  | 8298.0  | 8243.6  | 8878.5  | 8586.5  |
| 52.5° | 8412.3 | 8525.7 | 9233.1 | 9864.4 | 9984.1  | 9520.7  | 9071.7  | 9037.2  | 9067.2  | 9782.8  | 9106.2  |
| 55°   | 7426.4 | 7553.4 | 8833.2 | 9837.2 | 10164.6 | 9944.2  | 9792.7  | 9790.9  | 9946.0  | 10731.5 | 9664.0  |
| 57.5° | 6874.1 | 6963.9 | 8018.7 | 9790.9 | 10378.7 | 10365.1 | 10506.5 | 10523.8 | 10825.8 | 11764.5 | 10248.1 |
| 60°   | 6562.1 | 6656.4 | 7606.0 | 9619.5 | 10710.6 | 10909.3 | 11234.9 | 11269.3 | 11720.1 | 12908.3 | 10951.0 |
| 62.5° | 6278.2 | 6381.6 | 7350.2 | 9270.3 | 11101.5 | 11687.4 | 12107.4 | 12138.2 | 12667.0 | 14083.7 | 11630.3 |
| 65°   | 5792.9 | 5909.9 | 6975.6 | 9040.9 | 11457.1 | 12702.4 | 13216.6 | 13237.5 | 13754.5 | 15315.4 | 12150.0 |
| 67.5° | 5107.2 | 5214.3 | 6269.1 | 8533.9 | 11720.1 | 13935.0 | 14691.4 | 14703.2 | 14832.9 | 16185.2 | 12415.8 |
| 70°   | 4306.4 | 4347.2 | 5262.3 | 7487.2 | 11409.0 | 15087.7 | 16307.6 | 16310.4 | 15816.1 | 16742.1 | 12372.2 |
| 72.5° | 3025.7 | 3121.9 | 3820.2 | 5667.8 | 9804.5  | 14947.2 | 17146.6 | 17177.4 | 16273.2 | 16460.9 | 11383.6 |
| 75°   | 1855.7 | 1957.3 | 2396.3 | 3434.8 | 6220.1  | 11755.5 | 15842.4 | 16056.4 | 15416.1 | 14676.9 | 9299.3  |
| 77.5° | 1240.8 | 1278.9 | 1563.6 | 2002.6 | 2818.0  | 6763.4  | 12179.9 | 12582.6 | 12806.7 | 10703.4 | 5947.1  |
| 80°   | 692.0  | 764.6  | 1036.7 | 1244.4 | 1253.5  | 2687.4  | 7303.1  | 7397.4  | 7125.3  | 4261.9  | 1834.8  |
| 82.5° | 366.4  | 406.3  | 692.0  | 731.0  | 683.9   | 899.7   | 2721.9  | 2724.6  | 2276.5  | 1142.8  | 545.1   |
| 85°   | 283.9  | 317.4  | 474.4  | 446.2  | 349.2   | 399.1   | 897.9   | 946.9   | 774.6   | 468.0   | 177.8   |
| 87.5° | 141.5  | 176.0  | 322.0  | 283.0  | 137.0   | 114.3   | 321.1   | 342.8   | 305.7   | 183.2   | 64.4    |
| 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: P359180

CATALOG NUMBER: NVN-SA4C-730-U-T3R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4736.3 | 4736.3 | 4736.3 | 4736.3 | 4736.3 | 4736.3 | 4736.3 | 4736.3 | 4736.3 | 4736.3 | 4736.3 |
| 2.5°  | 4748.1 | 4756.2 | 4766.2 | 4755.3 | 4751.7 | 4737.2 | 4712.7 | 4707.3 | 4694.6 | 4695.5 | 4702.7 |
| 5°    | 4789.8 | 4803.4 | 4798.0 | 4756.2 | 4706.4 | 4636.5 | 4564.0 | 4502.3 | 4461.5 | 4458.8 | 4456.0 |
| 7.5°  | 4869.6 | 4878.7 | 4836.1 | 4717.2 | 4577.6 | 4416.1 | 4263.8 | 4130.4 | 4049.7 | 4029.7 | 4025.2 |
| 10°   | 4994.8 | 4993.0 | 4876.0 | 4636.5 | 4358.1 | 4069.7 | 3824.8 | 3639.7 | 3531.8 | 3500.1 | 3491.9 |
| 12.5° | 5134.5 | 5113.6 | 4889.6 | 4489.6 | 4047.9 | 3647.9 | 3337.7 | 3131.8 | 3019.4 | 2983.1 | 2974.0 |
| 15°   | 5278.7 | 5227.0 | 4856.0 | 4270.1 | 3667.0 | 3193.5 | 2867.9 | 2677.4 | 2616.7 | 2596.7 | 2593.1 |
| 17.5° | 5412.9 | 5313.1 | 4759.9 | 3972.6 | 3232.5 | 2740.9 | 2487.0 | 2410.8 | 2425.3 | 2451.6 | 2452.5 |
| 20°   | 5544.4 | 5371.2 | 4605.7 | 3597.1 | 2774.5 | 2368.1 | 2282.0 | 2338.2 | 2407.1 | 2460.7 | 2467.9 |
| 22.5° | 5674.1 | 5412.0 | 4407.1 | 3163.6 | 2364.5 | 2158.6 | 2219.4 | 2321.9 | 2400.8 | 2458.8 | 2468.8 |
| 25°   | 5783.0 | 5422.0 | 4133.1 | 2701.0 | 2079.7 | 2079.7 | 2189.5 | 2286.5 | 2364.5 | 2421.7 | 2431.6 |
| 27.5° | 5822.9 | 5354.9 | 3746.8 | 2272.9 | 1936.4 | 2043.4 | 2147.7 | 2228.5 | 2294.7 | 2355.4 | 2366.3 |
| 30°   | 5838.3 | 5230.6 | 3300.5 | 1929.2 | 1877.5 | 2004.4 | 2091.5 | 2160.4 | 2223.0 | 2280.2 | 2290.1 |
| 32.5° | 5841.0 | 5080.9 | 2827.1 | 1734.2 | 1836.7 | 1963.6 | 2021.7 | 2082.4 | 2149.6 | 2172.2 | 2175.9 |
| 35°   | 5858.2 | 4904.1 | 2328.2 | 1634.4 | 1798.6 | 1925.5 | 1971.8 | 2015.3 | 1906.5 | 1914.7 | 1921.9 |
| 37.5° | 5908.1 | 4729.0 | 1911.0 | 1578.2 | 1774.1 | 1905.6 | 1960.9 | 1803.1 | 1717.8 | 1697.9 | 1695.2 |
| 40°   | 6001.5 | 4542.2 | 1601.7 | 1532.8 | 1765.0 | 1915.6 | 1891.1 | 1683.4 | 1536.4 | 1426.7 | 1410.4 |
| 42.5° | 6131.2 | 4340.8 | 1404.0 | 1502.9 | 1771.3 | 1963.6 | 1794.0 | 1568.2 | 1324.2 | 1253.5 | 1244.4 |
| 45°   | 6277.3 | 4129.5 | 1297.0 | 1482.0 | 1793.1 | 2000.8 | 1774.1 | 1414.9 | 1225.3 | 1171.8 | 1167.3 |
| 47.5° | 6418.8 | 3871.0 | 1241.7 | 1472.9 | 1823.0 | 1970.9 | 1689.7 | 1367.7 | 1178.2 | 1150.1 | 1152.8 |
| 50°   | 6581.1 | 3637.9 | 1208.1 | 1463.0 | 1849.3 | 1951.8 | 1594.5 | 1343.2 | 1160.0 | 1194.5 | 1230.8 |
| 52.5° | 6718.1 | 3396.7 | 1178.2 | 1443.0 | 1859.3 | 1918.3 | 1570.0 | 1347.8 | 1160.0 | 1226.2 | 1260.7 |
| 55°   | 6880.4 | 3214.4 | 1143.7 | 1401.3 | 1840.3 | 1823.0 | 1552.8 | 1375.0 | 1173.6 | 1131.9 | 1135.5 |
| 57.5° | 7089.9 | 3154.5 | 1105.6 | 1336.0 | 1776.8 | 1684.3 | 1544.6 | 1401.3 | 1165.5 | 1139.2 | 1148.2 |
| 60°   | 7380.2 | 3218.0 | 1090.2 | 1250.7 | 1677.9 | 1575.4 | 1545.5 | 1387.7 | 1108.3 | 1063.0 | 1063.9 |
| 62.5° | 7656.8 | 3288.7 | 1089.3 | 1197.2 | 1556.4 | 1478.4 | 1524.6 | 1343.2 | 1079.3 | 1053.0 | 1063.0 |
| 65°   | 7747.5 | 3217.1 | 1045.8 | 1137.4 | 1419.4 | 1362.3 | 1486.6 | 1296.1 | 1057.5 | 1017.6 | 1015.8 |
| 67.5° | 7626.0 | 2994.9 | 957.8  | 1040.3 | 1262.5 | 1227.2 | 1436.7 | 1239.9 | 1023.1 | 990.4  | 985.0  |
| 70°   | 7265.0 | 2498.8 | 848.9  | 912.4  | 1083.9 | 1074.8 | 1357.8 | 1174.5 | 976.8  | 948.7  | 925.1  |
| 72.5° | 6293.6 | 1780.4 | 715.6  | 759.1  | 882.5  | 911.5  | 1248.9 | 1089.3 | 911.5  | 850.8  | 814.5  |
| 75°   | 5168.9 | 1317.9 | 587.7  | 596.8  | 670.3  | 749.2  | 1099.3 | 989.5  | 834.4  | 731.0  | 702.9  |
| 77.5° | 3165.4 | 806.3  | 468.0  | 471.6  | 480.7  | 597.7  | 905.2  | 878.0  | 736.5  | 609.5  | 589.5  |
| 80°   | 1024.9 | 439.9  | 338.3  | 355.5  | 328.3  | 438.1  | 700.2  | 747.4  | 632.2  | 509.7  | 488.0  |
| 82.5° | 390.0  | 256.7  | 228.6  | 240.4  | 227.7  | 293.9  | 510.6  | 598.6  | 517.9  | 419.0  | 341.0  |
| 85°   | 188.7  | 145.1  | 135.1  | 151.5  | 140.6  | 150.6  | 326.5  | 440.8  | 392.7  | 273.0  | 254.0  |
| 87.5° | 67.1   | 64.4   | 51.7   | 69.8   | 59.9   | 53.5   | 99.8   | 222.2  | 259.4  | 187.7  | 167.8  |
| 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: SP1-1908-441-2-R4

Test Date: 10/03/2019

Luminaire Tested: SA1C-730-U-5WQ

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

### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-2-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-730-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

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

### Spectral Parameters

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



### Test Conditions

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

REPORT NUMBER: SP1-1908-441-2-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: SP1-1908-441-2-R4

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

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

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 8494.8**

**S/P: 1.23**

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

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**Melanopic Flux vs. Wavelength**



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

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

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**Summary**

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



**Color Vector Graphics**



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

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



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**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)