

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: McGRAW-EDISON

Report Number: P642518

Luminaire Tested: GWS-SA6D-722-U-T3R-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P642518  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-15)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA6D-722-U-T3R-W  
Description: GALLEON WALL SLIM LUMINAIRE. (6) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE III ROADWAY OPTICS  
Light Source: (96) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

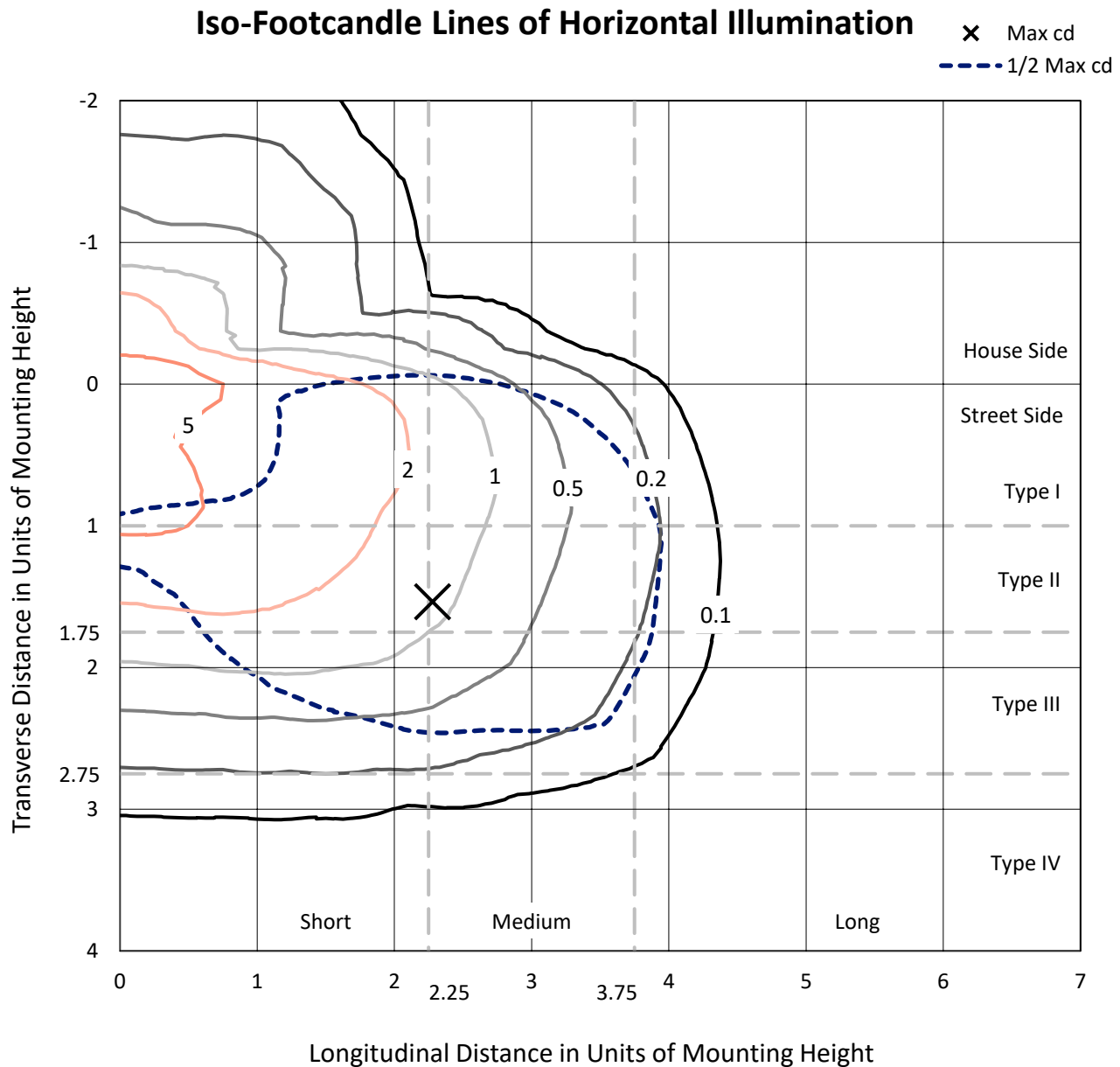
Lumens per Lamp: N/A  
Luminaire Lumens: 26824 lumens  
Efficiency: N/A  
Efficacy: 109.2 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G4

Input Watts (W): 245.7  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P642518

CATALOG NUMBER: GWS-SA6D-722-U-T3R-W

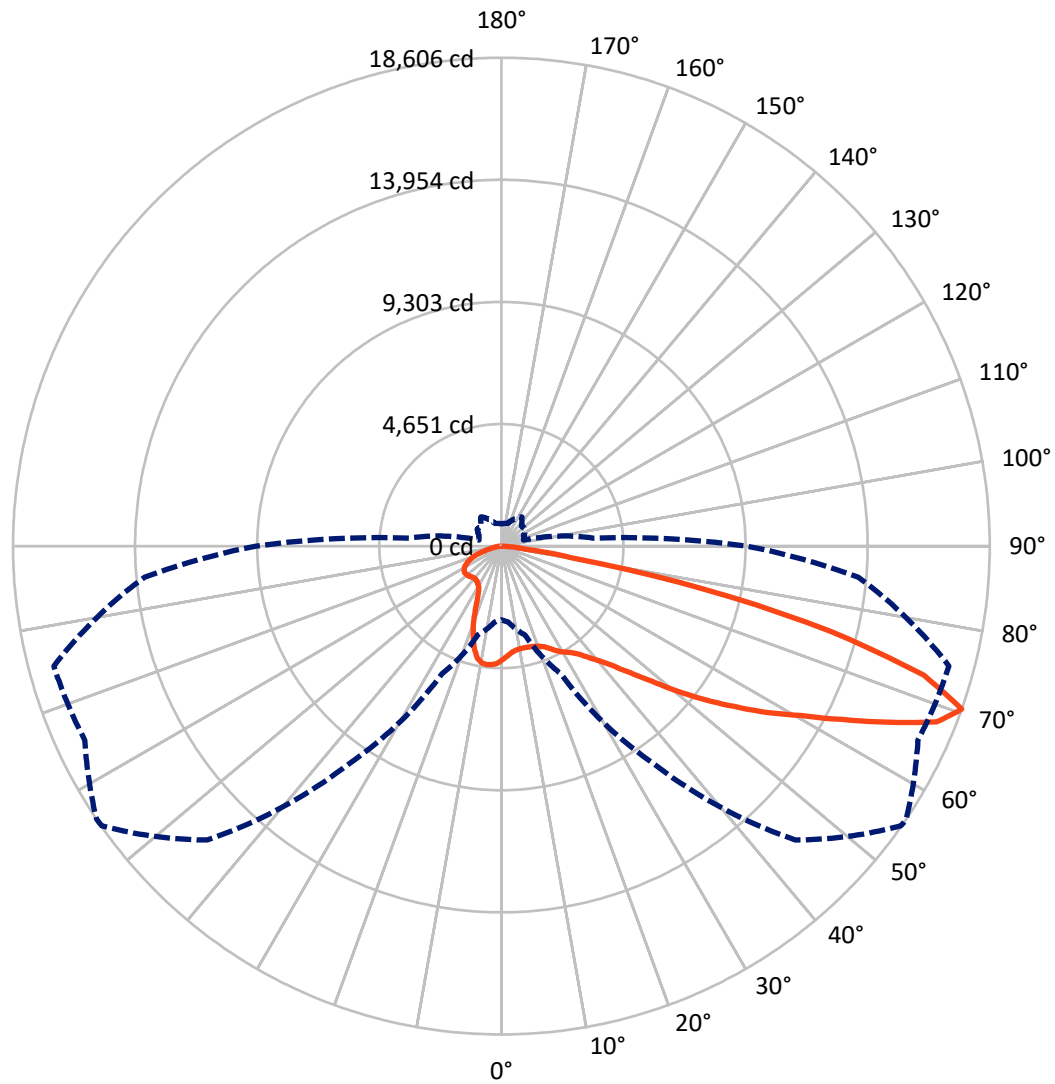


Based on 25 foot mounting height. Maximum calculated value = 7.2 fc  
 Type III - Medium - N/A

REPORT NUMBER: P642518

CATALOG NUMBER: GWS-SA6D-722-U-T3R-W

## Luminous Intensity Polar Plot



— Vertical Plane Through 56-Deg Lateral    - - - Horizontal Cone Through 70-Deg Vertical

REPORT NUMBER: P642518

CATALOG NUMBER: GWS-SA6D-722-U-T3R-W

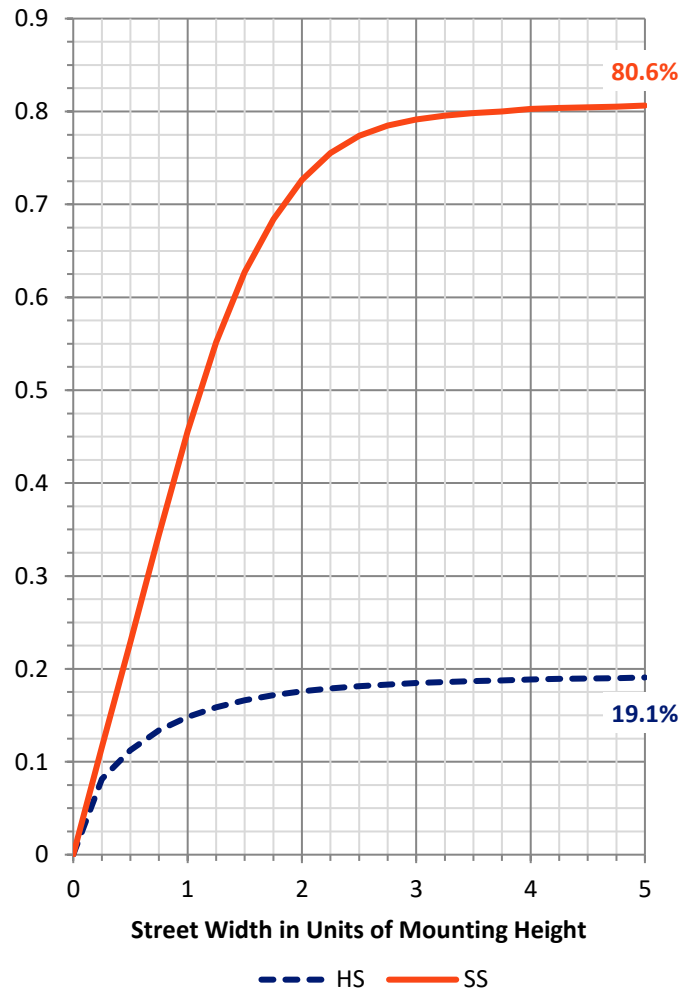
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 5157.0   | 0.0    | 5157.0  |
|                    | % Fixture | 19.2     | 0.0    | 19.2    |
| <b>Street Side</b> | Lumens    | 21667.0  | 0.0    | 21667.0 |
|                    | % Fixture | 80.8     | 0.0    | 80.8    |
| <b>Total</b>       | Lumens    | 26824.0  | 0.0    | 26824.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 400.7   | 1.5       |
| 10°-20°   | 1085.6  | 4.0       |
| 20°-30°   | 1794.9  | 6.7       |
| 30°-40°   | 2683.6  | 10.0      |
| 40°-50°   | 3993.5  | 14.9      |
| 50°-60°   | 5677.6  | 21.2      |
| 60°-70°   | 7031.9  | 26.2      |
| 70°-80°   | 3882.8  | 14.5      |
| 80°-90°   | 273.5   | 1.0       |
| 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°    | 26824.0 | 100.0     |
| 0°-180°   | 26824.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P642518

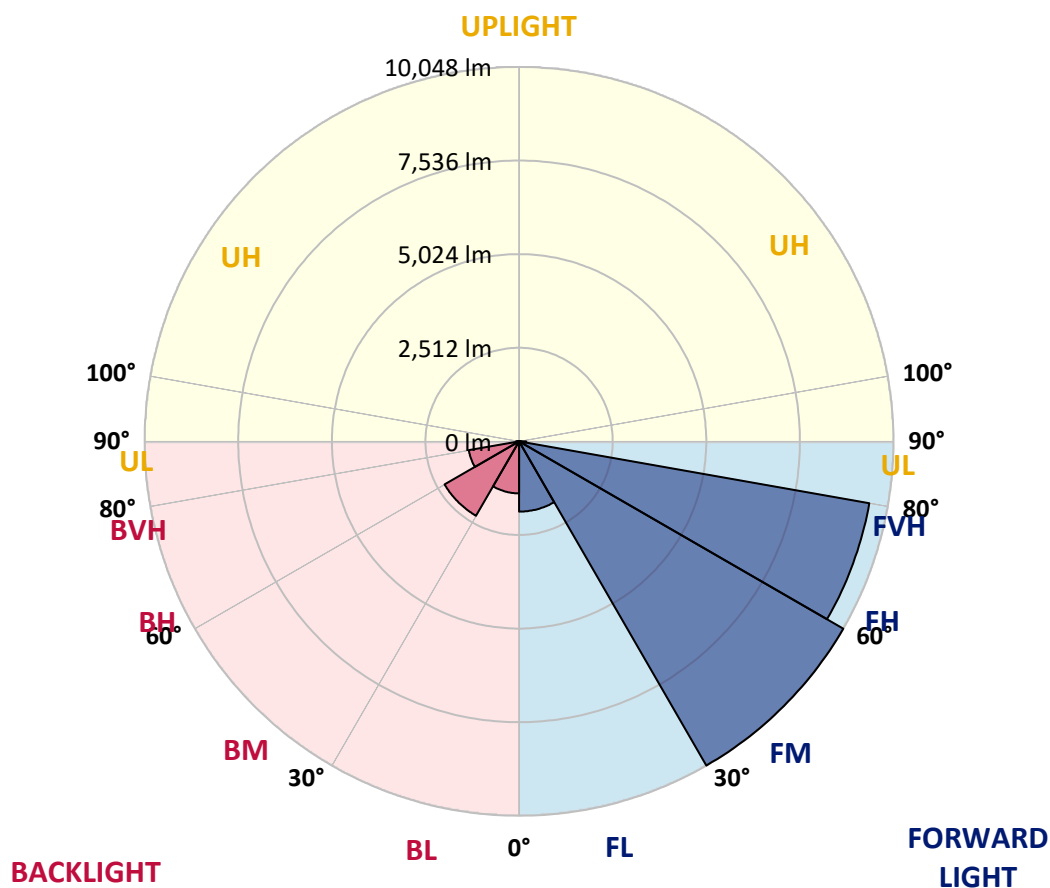
CATALOG NUMBER: GWS-SA6D-722-U-T3R-W

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1885.2  | 7.0       |                         |      |          |
| FM   | (30°-60°)   | 10047.9 | 37.5      |                         |      |          |
| FH   | (60°-80°)   | 9544.0  | 35.6      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 190.0   | 0.7       |                         |      | G2/225   |
| BL   | (0°-30°)    | 1396.0  | 5.2       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2306.8  | 8.6       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1370.7  | 5.1       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 83.4    | 0.3       |                         |      | G1/100   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

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

Type III Medium





REPORT NUMBER: P642518

CATALOG NUMBER: GWS-SA6D-722-U-T3R-W

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°     | 25°     | 35°     | 45°     | 55°     | 56°     | 65°     | 75°     | 85°     |
|-------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 4329.8 | 4329.8 | 4329.8  | 4329.8  | 4329.8  | 4329.8  | 4329.8  | 4329.8  | 4329.8  | 4329.8  | 4329.8  |
| 2.5°  | 4051.7 | 4029.0 | 4055.5  | 4068.8  | 4102.8  | 4152.0  | 4195.5  | 4197.4  | 4220.1  | 4275.0  | 4327.9  |
| 5°    | 3868.3 | 3856.9 | 3864.5  | 3904.2  | 3940.1  | 4002.6  | 4068.8  | 4074.4  | 4138.8  | 4246.6  | 4352.5  |
| 7.5°  | 3726.4 | 3711.3 | 3739.6  | 3790.7  | 3836.1  | 3906.1  | 3993.1  | 4000.7  | 4091.5  | 4254.1  | 4416.8  |
| 10°   | 3522.1 | 3510.8 | 3563.7  | 3631.8  | 3730.2  | 3845.6  | 3960.9  | 3970.4  | 4089.6  | 4303.3  | 4530.3  |
| 12.5° | 3433.2 | 3433.2 | 3455.9  | 3520.2  | 3628.0  | 3781.3  | 3955.3  | 3970.4  | 4119.8  | 4379.0  | 4676.0  |
| 15°   | 3571.3 | 3580.7 | 3561.8  | 3558.0  | 3601.6  | 3747.2  | 3962.8  | 3985.5  | 4176.6  | 4456.5  | 4819.7  |
| 17.5° | 3849.3 | 3858.8 | 3809.6  | 3732.1  | 3688.6  | 3779.4  | 3991.2  | 4015.8  | 4237.1  | 4541.7  | 4974.8  |
| 20°   | 4239.0 | 4250.4 | 4142.5  | 4023.4  | 3873.9  | 3872.0  | 4046.1  | 4068.8  | 4314.7  | 4634.3  | 5139.4  |
| 22.5° | 4694.9 | 4702.4 | 4566.3  | 4377.1  | 4148.2  | 4044.2  | 4140.6  | 4163.3  | 4414.9  | 4763.0  | 5317.2  |
| 25°   | 5222.6 | 5245.3 | 5080.8  | 4806.5  | 4496.3  | 4280.6  | 4297.6  | 4324.1  | 4594.6  | 4935.1  | 5527.2  |
| 27.5° | 5786.3 | 5814.7 | 5625.5  | 5322.9  | 4895.4  | 4541.7  | 4500.0  | 4522.7  | 4785.7  | 5041.0  | 5638.8  |
| 30°   | 6363.2 | 6384.1 | 6194.9  | 5848.7  | 5324.8  | 4836.7  | 4670.3  | 4683.5  | 4868.9  | 5092.1  | 5752.3  |
| 32.5° | 7004.5 | 6987.5 | 6805.9  | 6406.8  | 5820.4  | 5190.5  | 4829.2  | 4825.4  | 4961.6  | 5194.3  | 5914.9  |
| 35°   | 7606.0 | 7630.6 | 7437.7  | 6996.9  | 6365.1  | 5627.4  | 5067.5  | 5052.4  | 5158.3  | 5360.7  | 6143.8  |
| 37.5° | 8334.3 | 8326.7 | 8095.9  | 7619.2  | 6911.8  | 6045.5  | 5402.3  | 5375.8  | 5413.7  | 5619.9  | 6463.5  |
| 40°   | 8854.4 | 8907.4 | 8758.0  | 8313.5  | 7551.2  | 6560.0  | 5793.9  | 5735.2  | 5744.7  | 5939.5  | 6891.0  |
| 42.5° | 9280.0 | 9329.2 | 9344.4  | 9060.6  | 8283.2  | 7195.5  | 6281.9  | 6223.3  | 6228.9  | 6505.1  | 7416.9  |
| 45°   | 9607.3 | 9673.5 | 9887.2  | 9804.0  | 9107.9  | 7929.5  | 6942.1  | 6881.5  | 6885.3  | 7191.8  | 8052.4  |
| 47.5° | 9741.6 | 9813.5 | 10246.6 | 10445.3 | 9983.7  | 8807.2  | 7763.0  | 7674.1  | 7687.3  | 8025.9  | 8778.8  |
| 50°   | 9698.1 | 9794.6 | 10380.9 | 10939.0 | 10717.6 | 9700.0  | 8744.7  | 8682.3  | 8631.2  | 9123.0  | 9567.6  |
| 52.5° | 9323.6 | 9429.5 | 10367.7 | 11253.0 | 11317.3 | 10543.6 | 9758.6  | 9722.7  | 9711.3  | 10288.3 | 10449.0 |
| 55°   | 8220.8 | 8398.6 | 9911.8  | 11336.2 | 11786.4 | 11338.1 | 10857.6 | 10797.1 | 10855.7 | 11536.7 | 11340.0 |
| 57.5° | 7609.8 | 7742.2 | 9019.0  | 11243.5 | 12170.4 | 12094.7 | 11954.7 | 11960.4 | 12026.6 | 12892.9 | 12420.1 |
| 60°   | 7261.7 | 7416.9 | 8523.4  | 10990.0 | 12539.2 | 13014.0 | 13102.9 | 13102.9 | 13222.1 | 14355.1 | 13517.2 |
| 62.5° | 6800.2 | 6957.2 | 8060.0  | 10502.0 | 12879.7 | 14096.0 | 14546.2 | 14540.5 | 14587.8 | 15923.2 | 14589.7 |
| 65°   | 5863.9 | 6009.5 | 7129.3  | 9732.1  | 13046.2 | 15287.7 | 16186.2 | 16169.1 | 16074.6 | 17319.2 | 15299.0 |
| 67.5° | 4257.9 | 4396.0 | 5461.0  | 8268.1  | 12446.5 | 16248.6 | 17875.3 | 17882.9 | 17317.3 | 18198.8 | 15336.9 |
| 70°   | 2807.1 | 2901.7 | 3510.8  | 5370.2  | 10121.8 | 15834.3 | 18582.8 | 18605.5 | 17508.4 | 17650.2 | 13649.6 |
| 72.5° | 1751.6 | 1817.8 | 2192.3  | 3202.4  | 5981.1  | 12533.5 | 16766.9 | 16829.3 | 15751.1 | 15510.9 | 11215.1 |
| 75°   | 1163.3 | 1208.7 | 1458.4  | 1867.0  | 2767.4  | 6783.2  | 12745.4 | 12945.9 | 12624.3 | 12159.0 | 7814.1  |
| 77.5° | 699.9  | 737.7  | 928.8   | 1186.0  | 1225.7  | 2650.1  | 7439.5  | 7957.8  | 8003.2  | 6348.1  | 3272.4  |
| 80°   | 319.7  | 363.2  | 512.6   | 677.2   | 652.6   | 923.1   | 2623.6  | 2744.7  | 3238.4  | 2016.4  | 1032.8  |
| 82.5° | 189.2  | 208.1  | 340.5   | 336.7   | 278.1   | 448.3   | 943.9   | 968.5   | 822.8   | 737.7   | 440.7   |
| 85°   | 75.7   | 88.9   | 143.8   | 126.7   | 102.1   | 145.7   | 355.6   | 372.6   | 357.5   | 321.6   | 162.7   |
| 87.5° | 0.0    | 0.0    | 0.0     | 0.0     | 1.9     | 3.8     | 32.2    | 34.0    | 49.2    | 88.9    | 49.2    |
| 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: P642518

CATALOG NUMBER: GWS-SA6D-722-U-T3R-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4329.8  | 4329.8 | 4329.8 | 4329.8 | 4329.8 | 4329.8 | 4329.8 | 4329.8 | 4329.8 | 4329.8 | 4329.8 |
| 2.5°  | 4362.0  | 4350.6 | 4407.4 | 4450.9 | 4469.8 | 4488.7 | 4471.7 | 4466.0 | 4466.0 | 4428.2 | 4409.3 |
| 5°    | 4409.3  | 4414.9 | 4492.5 | 4528.4 | 4528.4 | 4513.3 | 4467.9 | 4435.7 | 4424.4 | 4375.2 | 4362.0 |
| 7.5°  | 4498.2  | 4522.7 | 4594.6 | 4592.7 | 4539.8 | 4456.5 | 4343.0 | 4256.0 | 4176.6 | 4142.5 | 4121.7 |
| 10°   | 4643.8  | 4676.0 | 4725.1 | 4645.7 | 4498.2 | 4278.7 | 4038.5 | 3849.3 | 3735.9 | 3645.1 | 3645.1 |
| 12.5° | 4810.3  | 4840.5 | 4831.1 | 4647.6 | 4343.0 | 3932.6 | 3586.4 | 3368.9 | 3210.0 | 3126.8 | 3126.8 |
| 15°   | 4976.7  | 5001.3 | 4899.2 | 4560.6 | 4019.6 | 3472.9 | 3094.6 | 2833.6 | 2695.5 | 2617.9 | 2617.9 |
| 17.5° | 5145.1  | 5143.2 | 4927.5 | 4360.1 | 3597.8 | 2964.1 | 2593.3 | 2390.9 | 2343.7 | 2330.4 | 2328.5 |
| 20°   | 5307.7  | 5264.2 | 4891.6 | 4025.3 | 3107.9 | 2451.5 | 2216.9 | 2230.2 | 2300.2 | 2330.4 | 2334.2 |
| 22.5° | 5491.2  | 5383.4 | 4785.7 | 3597.8 | 2551.7 | 2095.9 | 2111.0 | 2220.7 | 2322.8 | 2368.2 | 2373.9 |
| 25°   | 5678.5  | 5485.6 | 4607.9 | 3096.5 | 2086.4 | 1965.3 | 2082.6 | 2205.6 | 2321.0 | 2379.6 | 2385.3 |
| 27.5° | 5754.2  | 5485.6 | 4305.2 | 2515.8 | 1838.6 | 1910.5 | 2039.1 | 2158.3 | 2279.3 | 2347.4 | 2360.7 |
| 30°   | 5816.6  | 5438.3 | 3881.5 | 1991.8 | 1736.5 | 1857.5 | 1969.1 | 2078.8 | 2198.0 | 2281.2 | 2296.4 |
| 32.5° | 5903.6  | 5396.7 | 3368.9 | 1674.0 | 1689.2 | 1806.5 | 1884.0 | 1976.7 | 2084.5 | 2139.4 | 2133.7 |
| 35°   | 6005.7  | 5332.3 | 2750.3 | 1522.7 | 1649.4 | 1762.9 | 1817.8 | 1872.7 | 1823.5 | 1821.6 | 1827.3 |
| 37.5° | 6151.4  | 5275.6 | 2211.2 | 1454.6 | 1623.0 | 1732.7 | 1778.1 | 1660.8 | 1592.7 | 1564.3 | 1553.0 |
| 40°   | 6361.4  | 5252.9 | 1744.0 | 1414.9 | 1619.2 | 1730.8 | 1698.6 | 1517.0 | 1424.4 | 1326.0 | 1324.1 |
| 42.5° | 6626.2  | 5235.9 | 1441.4 | 1396.0 | 1632.4 | 1774.3 | 1588.9 | 1422.5 | 1231.4 | 1187.9 | 1184.1 |
| 45°   | 6966.7  | 5209.4 | 1290.1 | 1392.2 | 1664.6 | 1808.3 | 1577.6 | 1291.9 | 1161.4 | 1142.5 | 1142.5 |
| 47.5° | 7377.1  | 5167.8 | 1222.0 | 1392.2 | 1700.5 | 1793.2 | 1543.5 | 1263.6 | 1129.3 | 1150.1 | 1163.3 |
| 50°   | 7848.1  | 5114.8 | 1186.0 | 1388.4 | 1736.5 | 1793.2 | 1471.6 | 1257.9 | 1121.7 | 1229.5 | 1273.0 |
| 52.5° | 8351.3  | 5054.3 | 1161.4 | 1373.3 | 1761.1 | 1795.1 | 1475.4 | 1276.8 | 1129.3 | 1248.4 | 1284.4 |
| 55°   | 8907.4  | 5044.8 | 1127.4 | 1341.1 | 1768.6 | 1745.9 | 1484.9 | 1318.4 | 1140.6 | 1131.2 | 1133.1 |
| 57.5° | 9609.2  | 5158.3 | 1102.8 | 1293.8 | 1738.4 | 1645.7 | 1503.8 | 1348.7 | 1127.4 | 1129.3 | 1142.5 |
| 60°   | 10343.1 | 5372.1 | 1123.6 | 1248.4 | 1675.9 | 1551.1 | 1517.0 | 1333.6 | 1063.1 | 1032.8 | 1036.6 |
| 62.5° | 10967.3 | 5534.7 | 1140.6 | 1227.6 | 1585.1 | 1467.9 | 1503.8 | 1299.5 | 1027.1 | 1019.6 | 1036.6 |
| 65°   | 11228.4 | 5400.4 | 1099.0 | 1184.1 | 1452.7 | 1365.7 | 1475.4 | 1256.0 | 996.9  | 968.5  | 970.4  |
| 67.5° | 10939.0 | 4770.5 | 1017.7 | 1087.7 | 1303.3 | 1235.2 | 1430.0 | 1199.3 | 955.2  | 921.2  | 913.6  |
| 70°   | 9344.4  | 3505.1 | 877.7  | 934.4  | 1121.7 | 1082.0 | 1360.0 | 1125.5 | 889.0  | 864.4  | 847.4  |
| 72.5° | 7530.3  | 2481.7 | 728.3  | 743.4  | 879.6  | 911.7  | 1239.0 | 1032.8 | 813.4  | 743.4  | 718.8  |
| 75°   | 5241.5  | 1558.7 | 607.2  | 592.1  | 635.6  | 696.1  | 966.6  | 856.9  | 701.8  | 628.0  | 605.3  |
| 77.5° | 2254.8  | 800.1  | 474.8  | 467.2  | 423.7  | 482.4  | 741.5  | 715.0  | 588.3  | 503.2  | 489.9  |
| 80°   | 754.7   | 463.4  | 342.4  | 329.1  | 281.8  | 338.6  | 522.1  | 571.3  | 461.5  | 372.6  | 349.9  |
| 82.5° | 378.3   | 268.6  | 217.5  | 196.7  | 189.2  | 213.7  | 308.3  | 355.6  | 319.7  | 257.3  | 217.5  |
| 85°   | 185.4   | 153.2  | 119.2  | 117.3  | 98.4   | 92.7   | 128.6  | 151.3  | 143.8  | 105.9  | 100.3  |
| 87.5° | 68.1    | 60.5   | 37.8   | 30.3   | 18.9   | 13.2   | 7.6    | 7.6    | 5.7    | 5.7    | 5.7    |
| 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: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-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-722-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):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

REPORT NUMBER: SP1-1908-441-10-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: SP1-1908-441-10-R4

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2200K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-10-R4

**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

### Summary

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_g = -17.4$



### Color Vector Graphics



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)