

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: P630631

Luminaire Tested: GWS-SA1E-722-U-T3-W-GRSBK

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P630631  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-24)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1E-722-U-T3-W-GRSBK  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE III OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK  
Light Source: (16) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 3446.7 lumens  
Efficiency: N/A  
Efficacy: 59.0 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G0

Input Watts (W): 58.4  
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



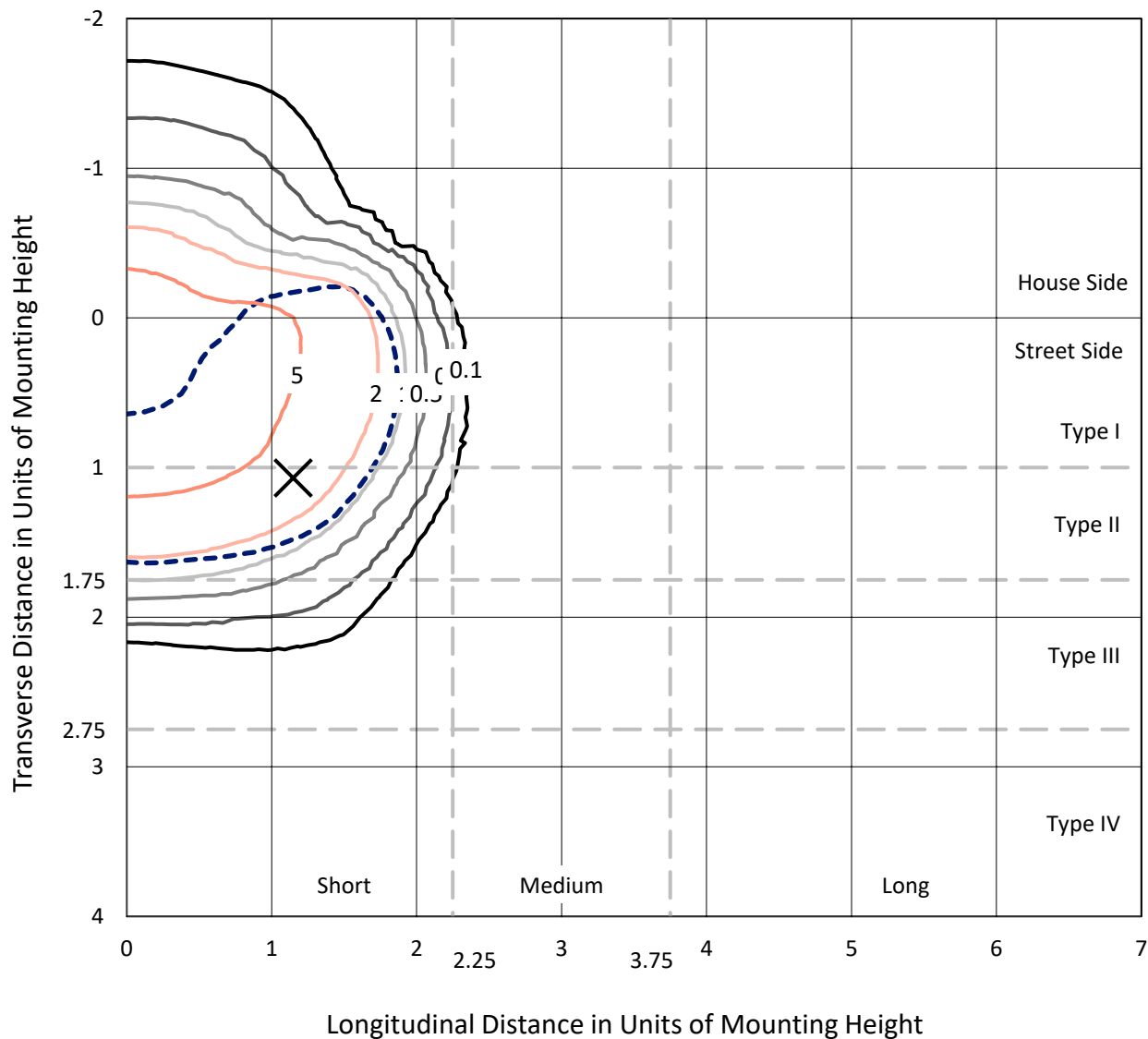
REPORT NUMBER: P630631

CATALOG NUMBER: GWS-SA1E-722-U-T3-W-GRSBK

## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

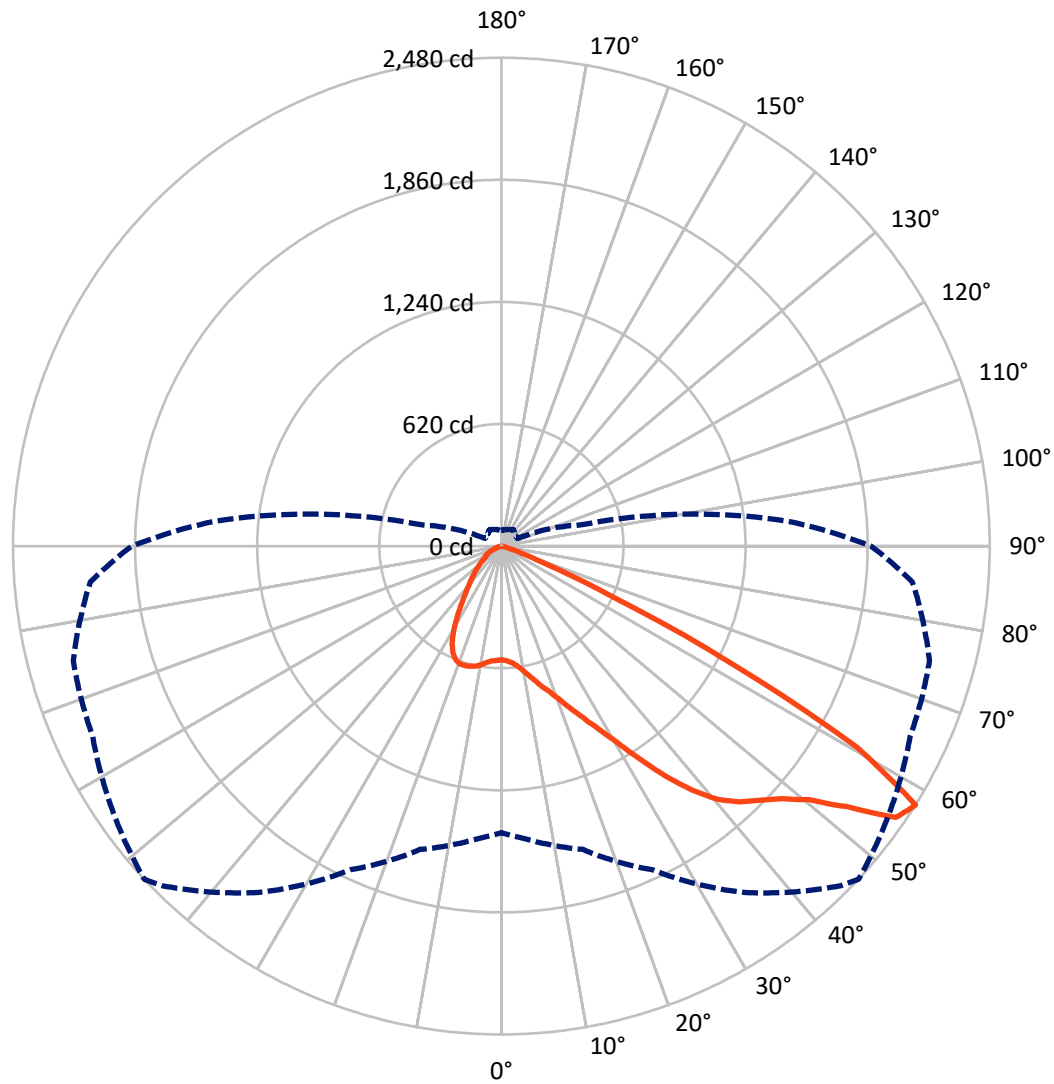


Based on 10 foot mounting height. Maximum calculated value = 8.2 fc  
 Type II - Short - N/A

REPORT NUMBER: P630631

CATALOG NUMBER: GWS-SA1E-722-U-T3-W-GRSBK

## Luminous Intensity Polar Plot



— Vertical Plane Through 47-Deg Lateral    - - - Horizontal Cone Through 57.5-Deg Vertical

REPORT NUMBER: P630631

CATALOG NUMBER: GWS-SA1E-722-U-T3-W-GRSBK

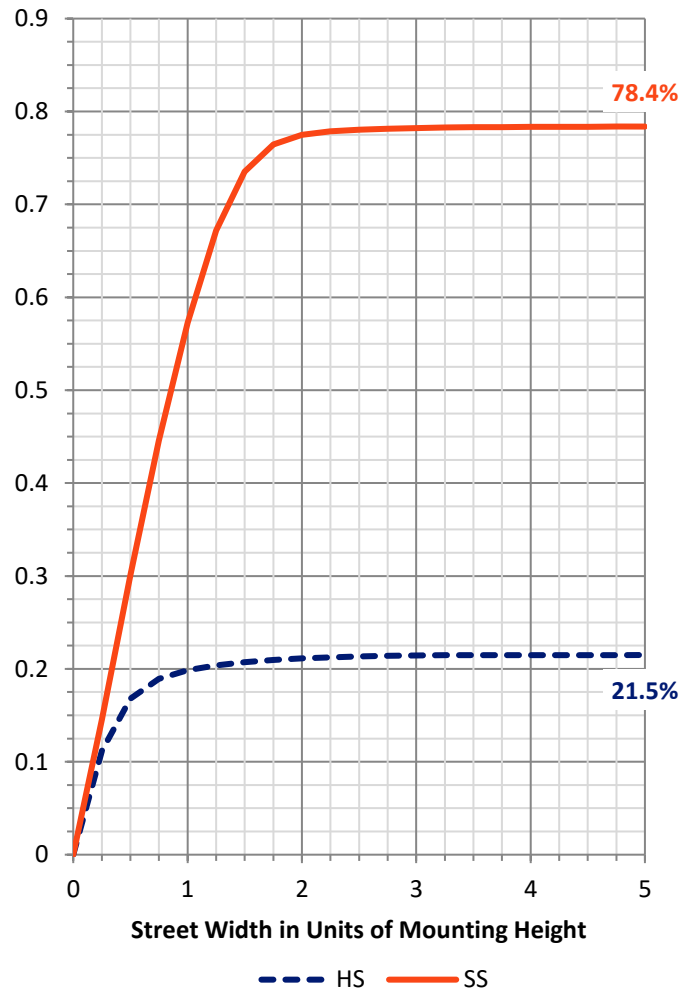
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 747.7    | 0.0    | 747.7  |
|                    | % Fixture | 21.7     | 0.0    | 21.7   |
| <b>Street Side</b> | Lumens    | 2698.9   | 0.0    | 2698.9 |
|                    | % Fixture | 78.3     | 0.0    | 78.3   |
| <b>Total</b>       | Lumens    | 3446.7   | 0.0    | 3446.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 57.4   | 1.7       |
| 10°-20°   | 193.7  | 5.6       |
| 20°-30°   | 359.6  | 10.4      |
| 30°-40°   | 575.7  | 16.7      |
| 40°-50°   | 841.6  | 24.4      |
| 50°-60°   | 1038.6 | 30.1      |
| 60°-70°   | 347.0  | 10.1      |
| 70°-80°   | 32.3   | 0.9       |
| 80°-90°   | 0.7    | 0.0       |
| 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°    | 3446.7 | 100.0     |
| 0°-180°   | 3446.7 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P630631

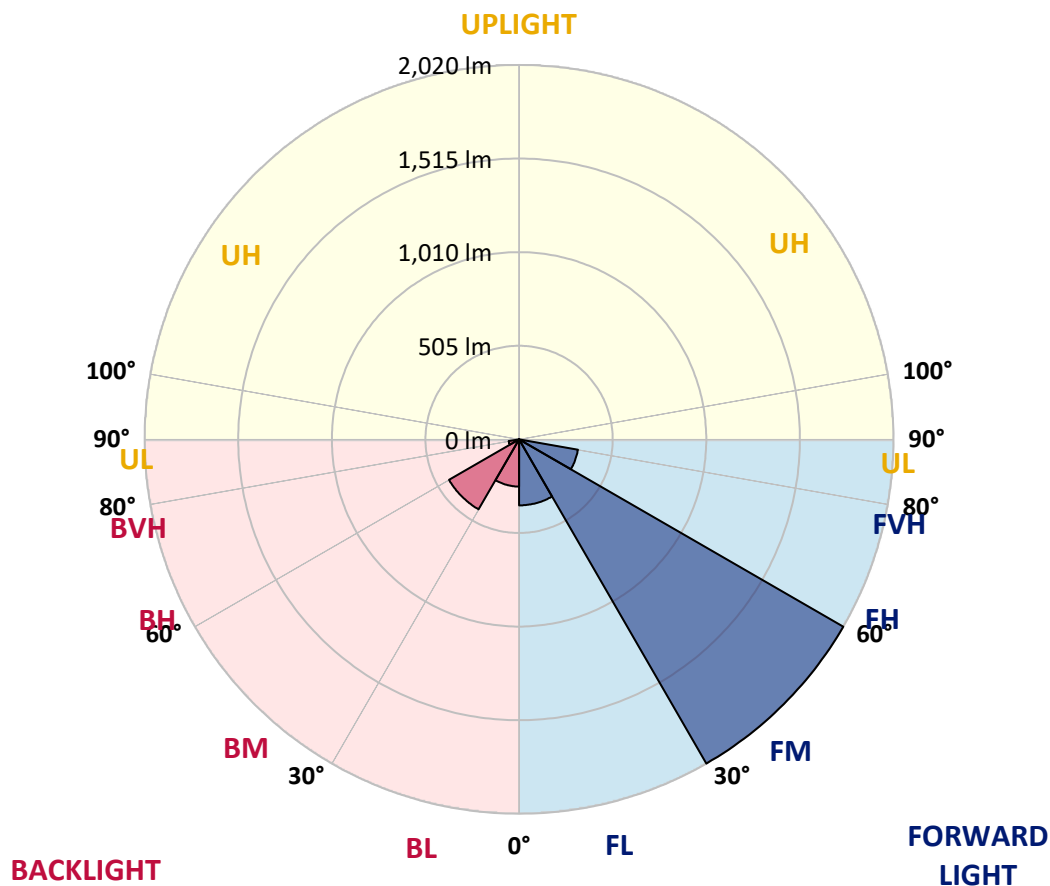
CATALOG NUMBER: GWS-SA1E-722-U-T3-W-GRSBK

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 356.2  | 10.3      |                         |      |        |
| FM   | (30°-60°)   | 2019.7 | 58.6      |                         |      |        |
| FH   | (60°-80°)   | 322.5  | 9.4       |                         |      | G0/660 |
| FVH  | (80°-90°)   | 0.5    | 0.0       |                         |      | G0/10  |
| BL   | (0°-30°)    | 254.5  | 7.4       | B1/500                  |      |        |
| BM   | (30°-60°)   | 436.2  | 12.7      | B1/1000                 |      |        |
| BH   | (60°-80°)   | 56.8   | 1.6       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 0.2    | 0.0       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B1-U0-G0**

Type II Short





REPORT NUMBER: P630631

CATALOG NUMBER: GWS-SA1E-722-U-T3-W-GRSBK

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 47°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 577.0  | 577.0  | 577.0  | 577.0  | 577.0  | 577.0  | 577.0  | 577.0  | 577.0  | 577.0  | 577.0  |
| 2.5°  | 583.0  | 582.6  | 582.2  | 584.6  | 583.8  | 583.4  | 584.2  | 584.2  | 584.2  | 581.8  | 577.0  |
| 5°    | 597.0  | 597.0  | 596.6  | 599.0  | 597.0  | 595.8  | 596.2  | 596.2  | 594.6  | 590.2  | 584.2  |
| 7.5°  | 619.0  | 618.2  | 617.4  | 619.8  | 617.8  | 617.4  | 618.2  | 615.8  | 613.0  | 605.8  | 597.4  |
| 10°   | 650.6  | 650.6  | 649.4  | 651.8  | 650.2  | 649.4  | 649.4  | 647.8  | 642.6  | 631.4  | 619.0  |
| 12.5° | 694.2  | 692.2  | 689.4  | 687.4  | 686.6  | 686.2  | 686.6  | 684.2  | 678.6  | 664.2  | 647.0  |
| 15°   | 741.8  | 740.2  | 735.8  | 732.6  | 728.2  | 727.4  | 729.8  | 727.8  | 722.2  | 702.6  | 678.2  |
| 17.5° | 801.9  | 803.9  | 792.6  | 785.8  | 773.0  | 772.2  | 773.0  | 776.2  | 772.2  | 747.0  | 711.4  |
| 20°   | 853.1  | 854.7  | 846.3  | 841.5  | 829.9  | 824.7  | 826.3  | 831.5  | 827.1  | 797.5  | 747.8  |
| 22.5° | 907.9  | 909.9  | 901.1  | 891.1  | 885.9  | 885.9  | 891.9  | 899.1  | 893.1  | 854.3  | 789.4  |
| 25°   | 973.5  | 975.1  | 967.9  | 954.7  | 945.5  | 957.1  | 965.9  | 985.1  | 975.1  | 922.3  | 838.7  |
| 27.5° | 1048.7 | 1049.1 | 1038.7 | 1025.1 | 1020.3 | 1041.9 | 1050.7 | 1080.3 | 1076.3 | 998.7  | 890.7  |
| 30°   | 1129.2 | 1129.6 | 1127.2 | 1118.0 | 1113.5 | 1142.0 | 1154.0 | 1196.8 | 1194.0 | 1093.5 | 961.5  |
| 32.5° | 1212.8 | 1212.8 | 1217.2 | 1216.4 | 1221.6 | 1268.0 | 1287.2 | 1336.0 | 1333.2 | 1209.6 | 1049.5 |
| 35°   | 1296.8 | 1297.2 | 1304.8 | 1324.0 | 1345.6 | 1407.2 | 1432.5 | 1491.7 | 1485.3 | 1348.4 | 1162.0 |
| 37.5° | 1392.4 | 1388.4 | 1398.8 | 1427.6 | 1475.7 | 1546.9 | 1570.9 | 1627.3 | 1620.1 | 1490.5 | 1308.8 |
| 40°   | 1507.7 | 1500.5 | 1500.5 | 1534.1 | 1588.5 | 1670.5 | 1690.9 | 1718.9 | 1694.5 | 1605.3 | 1452.9 |
| 42.5° | 1634.9 | 1628.1 | 1619.3 | 1648.9 | 1694.5 | 1758.6 | 1775.4 | 1767.8 | 1747.7 | 1713.7 | 1616.9 |
| 45°   | 1763.8 | 1753.4 | 1759.4 | 1777.4 | 1803.8 | 1834.2 | 1840.6 | 1805.4 | 1796.2 | 1805.8 | 1752.6 |
| 47.5° | 1861.8 | 1854.6 | 1869.4 | 1894.6 | 1916.2 | 1920.6 | 1916.2 | 1867.4 | 1866.6 | 1900.6 | 1846.6 |
| 50°   | 1894.6 | 1895.4 | 1936.2 | 1991.4 | 2026.2 | 2029.8 | 2023.8 | 1967.8 | 1960.2 | 1970.2 | 1897.4 |
| 52.5° | 1897.8 | 1901.0 | 1960.6 | 2065.8 | 2160.7 | 2203.9 | 2199.1 | 2138.7 | 2064.2 | 2053.4 | 1974.2 |
| 55°   | 1820.6 | 1839.4 | 1922.6 | 2076.3 | 2277.9 | 2416.0 | 2432.0 | 2316.3 | 2205.9 | 2196.7 | 2139.5 |
| 57.5° | 1455.3 | 1493.7 | 1594.1 | 1813.0 | 2147.1 | 2438.0 | 2479.6 | 2396.4 | 2289.5 | 2250.3 | 2095.1 |
| 60°   | 869.9  | 917.5  | 1013.9 | 1282.4 | 1634.1 | 2003.8 | 2075.5 | 2087.1 | 2037.8 | 1924.6 | 1607.3 |
| 62.5° | 373.3  | 369.3  | 488.2  | 693.8  | 971.9  | 1273.6 | 1306.0 | 1356.4 | 1399.2 | 1280.8 | 975.5  |
| 65°   | 128.0  | 139.2  | 193.7  | 312.9  | 486.6  | 591.4  | 620.2  | 665.4  | 726.2  | 599.4  | 357.3  |
| 67.5° | 79.2   | 84.0   | 111.6  | 184.9  | 262.5  | 258.5  | 245.7  | 238.5  | 232.1  | 158.8  | 98.0   |
| 70°   | 57.6   | 61.6   | 78.4   | 127.2  | 176.5  | 124.0  | 107.6  | 87.2   | 96.8   | 89.2   | 69.6   |
| 72.5° | 38.8   | 42.0   | 54.0   | 77.2   | 90.4   | 60.4   | 56.0   | 63.6   | 76.8   | 73.2   | 56.8   |
| 75°   | 23.2   | 25.2   | 30.8   | 37.6   | 36.8   | 31.2   | 31.6   | 44.8   | 58.8   | 54.8   | 40.4   |
| 77.5° | 16.0   | 16.8   | 20.4   | 24.4   | 18.0   | 9.6    | 8.8    | 12.4   | 20.0   | 20.0   | 13.6   |
| 80°   | 4.0    | 5.2    | 5.2    | 3.2    | 2.8    | 2.4    | 2.4    | 3.6    | 5.6    | 4.0    | 2.0    |
| 82.5° | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.8    | 0.8    | 0.8    | 0.8    |
| 85°   | 0.0    | 0.0    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.8    | 0.8    | 0.8    |
| 87.5° | 0.0    | 0.0    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.8    | 0.8    |
| 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: P630631

CATALOG NUMBER: GWS-SA1E-722-U-T3-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 577.0  | 577.0  | 577.0 | 577.0 | 577.0 | 577.0 | 577.0 | 577.0 | 577.0 | 577.0 | 577.0 |
| 2.5°  | 579.8  | 575.0  | 578.2 | 577.4 | 579.8 | 580.6 | 577.0 | 576.2 | 576.6 | 571.8 | 570.2 |
| 5°    | 585.4  | 579.8  | 581.4 | 579.8 | 582.6 | 585.0 | 583.8 | 585.4 | 587.4 | 583.8 | 582.2 |
| 7.5°  | 597.4  | 591.8  | 591.4 | 589.0 | 593.0 | 594.6 | 594.2 | 598.6 | 602.6 | 600.2 | 597.8 |
| 10°   | 618.2  | 610.6  | 609.8 | 607.8 | 609.0 | 610.2 | 605.8 | 606.6 | 610.2 | 607.4 | 606.2 |
| 12.5° | 643.8  | 634.6  | 632.6 | 627.8 | 627.8 | 621.8 | 612.2 | 610.2 | 613.0 | 611.0 | 609.0 |
| 15°   | 671.4  | 659.0  | 655.8 | 647.4 | 639.4 | 628.2 | 618.2 | 615.8 | 617.8 | 615.4 | 613.8 |
| 17.5° | 702.2  | 688.2  | 677.8 | 663.0 | 645.4 | 632.2 | 621.0 | 615.8 | 612.6 | 607.8 | 607.4 |
| 20°   | 732.6  | 714.2  | 696.6 | 673.0 | 649.8 | 629.8 | 611.4 | 597.8 | 586.2 | 579.0 | 576.2 |
| 22.5° | 767.8  | 740.6  | 712.2 | 679.0 | 645.8 | 615.4 | 583.0 | 559.8 | 539.8 | 533.0 | 529.8 |
| 25°   | 805.5  | 770.2  | 727.8 | 684.6 | 632.2 | 583.4 | 539.4 | 505.0 | 478.6 | 469.7 | 466.1 |
| 27.5° | 847.1  | 798.7  | 743.8 | 683.4 | 604.2 | 537.8 | 479.4 | 436.5 | 410.5 | 402.5 | 405.3 |
| 30°   | 899.9  | 835.5  | 763.8 | 671.0 | 562.2 | 473.7 | 405.3 | 369.3 | 349.7 | 342.1 | 342.5 |
| 32.5° | 970.3  | 888.3  | 793.0 | 644.6 | 508.2 | 400.9 | 340.9 | 314.5 | 301.3 | 291.3 | 290.5 |
| 35°   | 1071.1 | 968.7  | 820.3 | 602.2 | 442.5 | 336.1 | 292.5 | 271.7 | 253.3 | 241.7 | 243.7 |
| 37.5° | 1192.0 | 1069.9 | 835.1 | 545.0 | 368.9 | 285.7 | 256.1 | 234.9 | 214.1 | 196.9 | 198.9 |
| 40°   | 1335.2 | 1202.4 | 833.9 | 469.7 | 301.7 | 251.3 | 225.7 | 200.9 | 174.9 | 159.3 | 160.9 |
| 42.5° | 1494.9 | 1327.6 | 807.9 | 390.1 | 250.1 | 223.3 | 196.5 | 165.3 | 140.0 | 130.4 | 130.8 |
| 45°   | 1633.3 | 1429.2 | 762.2 | 307.7 | 210.5 | 196.1 | 166.1 | 134.0 | 122.8 | 116.0 | 115.6 |
| 47.5° | 1735.7 | 1503.7 | 697.0 | 242.1 | 178.5 | 171.3 | 136.4 | 120.0 | 111.2 | 105.6 | 104.8 |
| 50°   | 1793.0 | 1529.7 | 625.0 | 189.7 | 150.8 | 145.2 | 122.0 | 108.8 | 102.8 | 99.2  | 98.4  |
| 52.5° | 1869.8 | 1560.9 | 573.4 | 149.6 | 126.4 | 118.8 | 112.4 | 101.2 | 97.2  | 94.4  | 93.2  |
| 55°   | 1991.4 | 1621.3 | 528.6 | 118.8 | 105.2 | 103.6 | 106.0 | 96.8  | 94.4  | 90.0  | 88.4  |
| 57.5° | 1877.0 | 1456.5 | 410.5 | 92.0  | 88.8  | 94.8  | 102.4 | 92.4  | 86.4  | 82.4  | 80.8  |
| 60°   | 1320.8 | 968.3  | 206.5 | 74.0  | 79.2  | 88.8  | 96.4  | 83.6  | 77.6  | 78.4  | 77.6  |
| 62.5° | 728.2  | 484.6  | 92.8  | 62.0  | 68.8  | 78.4  | 82.4  | 72.4  | 68.4  | 75.2  | 76.4  |
| 65°   | 238.1  | 164.9  | 53.6  | 48.0  | 54.4  | 64.0  | 71.2  | 68.8  | 68.0  | 76.0  | 78.4  |
| 67.5° | 73.2   | 54.4   | 36.4  | 34.4  | 37.6  | 47.2  | 60.0  | 74.4  | 80.0  | 82.4  | 83.6  |
| 70°   | 54.8   | 42.8   | 31.2  | 29.2  | 30.8  | 36.0  | 50.8  | 62.0  | 58.4  | 58.8  | 58.0  |
| 72.5° | 44.0   | 34.0   | 26.8  | 25.6  | 25.6  | 24.8  | 26.8  | 33.6  | 38.0  | 40.0  | 40.0  |
| 75°   | 30.8   | 24.0   | 20.4  | 18.8  | 14.8  | 12.0  | 10.8  | 10.8  | 9.6   | 9.2   | 8.8   |
| 77.5° | 10.4   | 8.8    | 8.0   | 6.4   | 4.4   | 3.6   | 3.2   | 2.8   | 2.0   | 1.2   | 0.8   |
| 80°   | 1.6    | 1.2    | 0.8   | 0.8   | 0.8   | 0.4   | 0.4   | 0.4   | 0.0   | 0.0   | 0.0   |
| 82.5° | 0.8    | 0.8    | 0.8   | 0.8   | 0.8   | 0.4   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 0.8    | 0.8    | 0.8   | 0.8   | 0.8   | 0.4   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 0.8    | 0.8    | 0.8   | 0.8   | 0.4   | 0.4   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-10-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**



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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       | 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)