

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: P631618

Luminaire Tested: GWS-SA2B-722-U-T2R-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P631618  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-13)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA2B-722-U-T2R-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (2) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II ROADWAY OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (32) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4473.9 lumens  
Efficiency: N/A  
Efficacy: 96.4 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

Input Watts (W): 46.4  
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



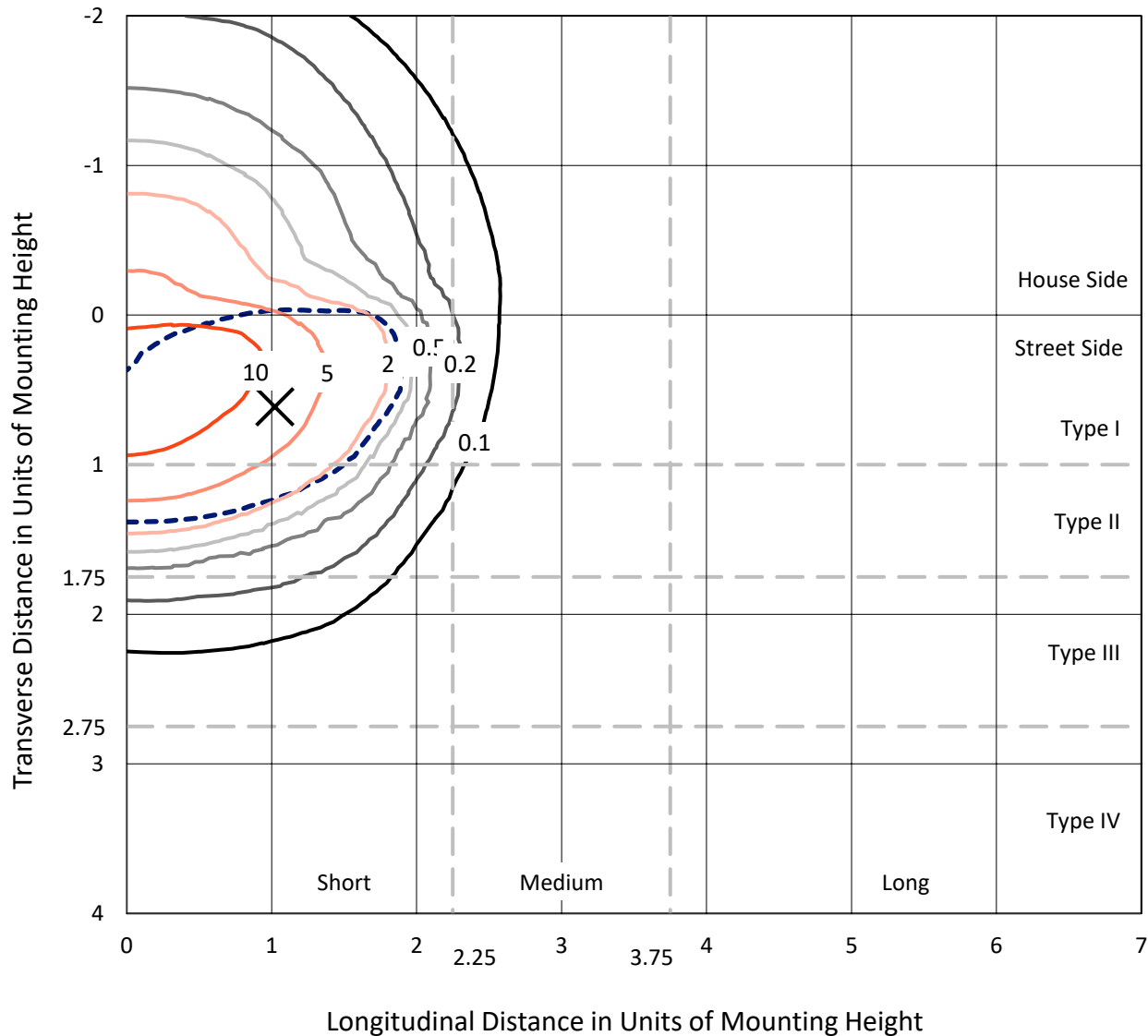
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

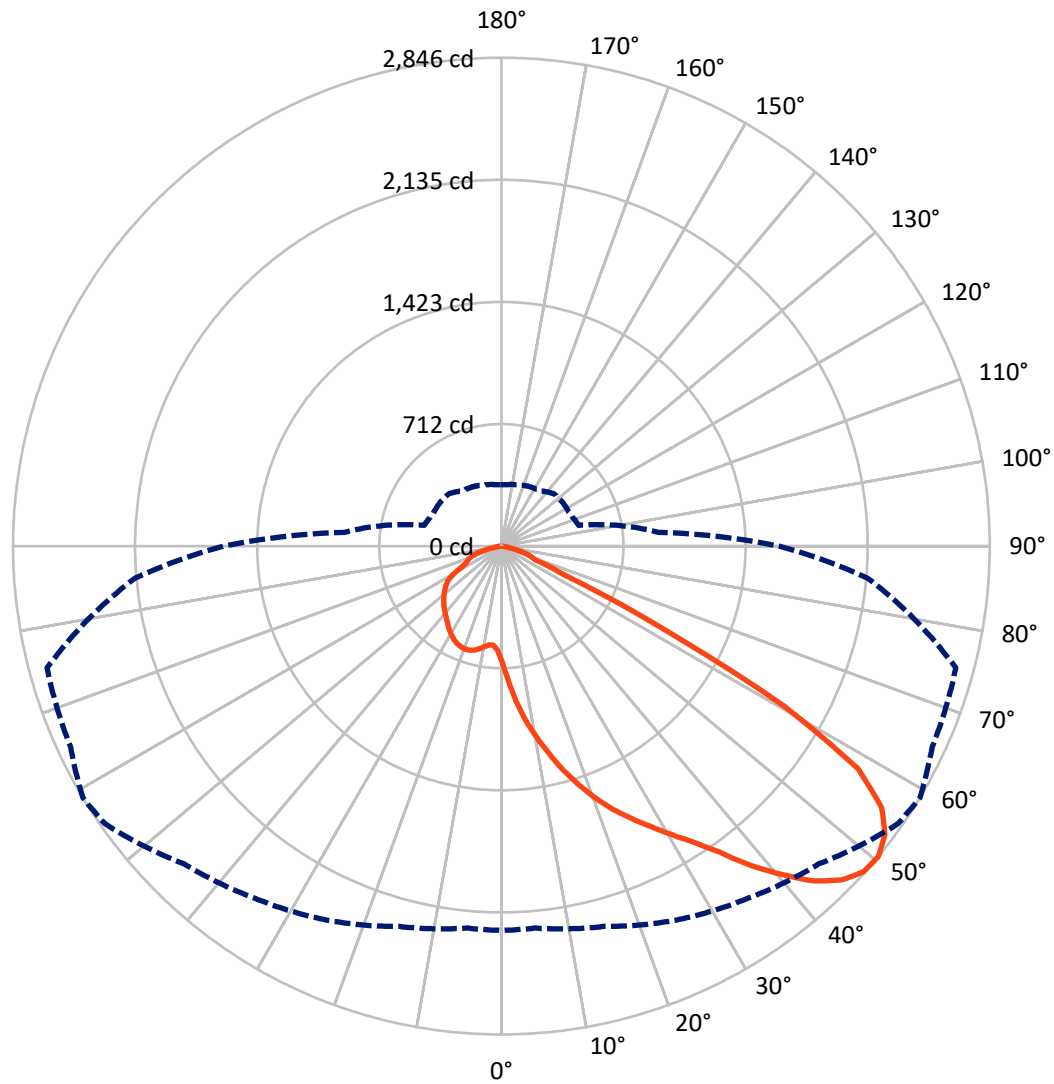


Based on 10 foot mounting height. Maximum calculated value = 13.4 fc  
Type II - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 59-Deg Lateral    - - - Horizontal Cone Through 50-Deg Vertical

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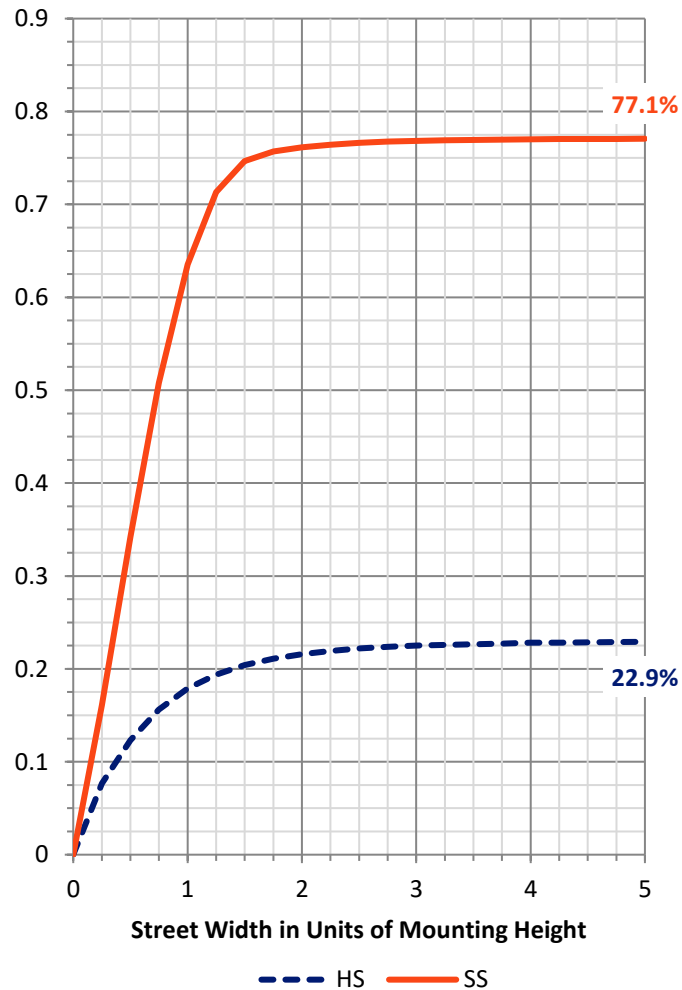
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1029.1   | 0.0    | 1029.1 |
|                    | % Fixture | 23.0     | 0.0    | 23.0   |
| <b>Street Side</b> | Lumens    | 3444.8   | 0.0    | 3444.8 |
|                    | % Fixture | 77.0     | 0.0    | 77.0   |
| <b>Total</b>       | Lumens    | 4473.9   | 0.0    | 4473.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 76.0   | 1.7       |
| 10°-20°   | 276.0  | 6.2       |
| 20°-30°   | 522.7  | 11.7      |
| 30°-40°   | 866.8  | 19.4      |
| 40°-50°   | 1184.1 | 26.5      |
| 50°-60°   | 1074.9 | 24.0      |
| 60°-70°   | 357.9  | 8.0       |
| 70°-80°   | 104.4  | 2.3       |
| 80°-90°   | 11.0   | 0.2       |
| 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°    | 4473.9 | 100.0     |
| 0°-180°   | 4473.9 | 100.0     |

**Coefficient of Utilization**



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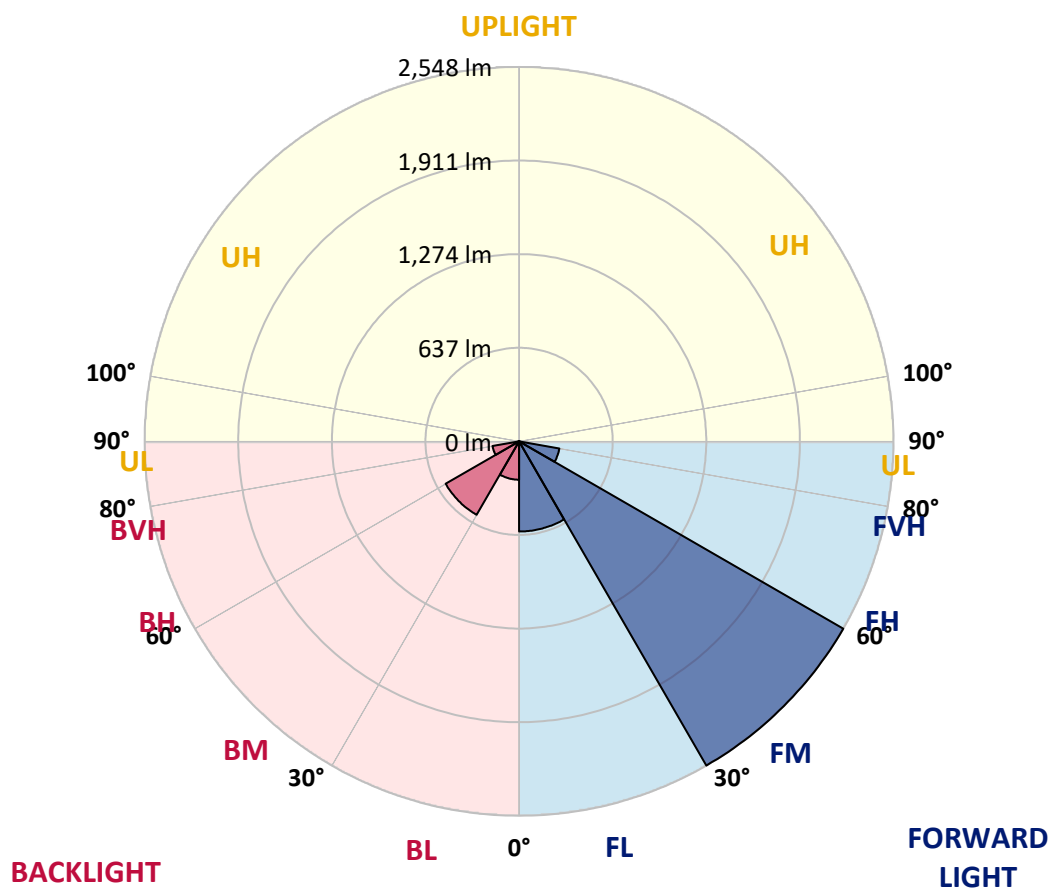
CATALOG NUMBER: GWS-SA2B-722-U-T2R-W-GRSWH

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 613.5  | 13.7      |                         |      |        |
| FM   | (30°-60°)   | 2548.4 | 57.0      |                         |      |        |
| FH   | (60°-80°)   | 278.7  | 6.2       |                         |      | G0/660 |
| FVH  | (80°-90°)   | 4.3    | 0.1       |                         |      | G0/10  |
| BL   | (0°-30°)    | 261.3  | 5.8       | B1/500                  |      |        |
| BM   | (30°-60°)   | 577.4  | 12.9      | B1/1000                 |      |        |
| BH   | (60°-80°)   | 183.7  | 4.1       | B1/500                  |      | G1/500 |
| BVH  | (80°-90°)   | 6.7    | 0.1       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B1-U0-G1**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 59°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 677.8  | 677.8  | 677.8  | 677.8  | 677.8  | 677.8  | 677.8  | 677.8  | 677.8  | 677.8  | 677.8  |
| 2.5°  | 878.3  | 884.8  | 874.6  | 875.3  | 849.8  | 838.2  | 805.4  | 786.1  | 773.3  | 737.6  | 705.2  |
| 5°    | 1055.4 | 1047.7 | 1039.7 | 1035.0 | 1012.7 | 981.4  | 940.6  | 908.1  | 878.3  | 808.3  | 740.9  |
| 7.5°  | 1164.0 | 1160.0 | 1154.5 | 1151.6 | 1129.7 | 1096.9 | 1056.1 | 1028.4 | 985.0  | 890.3  | 784.2  |
| 10°   | 1256.2 | 1251.4 | 1248.2 | 1250.3 | 1232.5 | 1211.3 | 1166.9 | 1135.2 | 1086.3 | 977.0  | 836.7  |
| 12.5° | 1327.6 | 1330.1 | 1331.2 | 1342.9 | 1335.2 | 1322.5 | 1276.6 | 1243.0 | 1188.7 | 1068.5 | 898.3  |
| 15°   | 1384.1 | 1383.4 | 1396.1 | 1418.3 | 1430.7 | 1422.7 | 1385.9 | 1357.8 | 1291.5 | 1158.5 | 964.6  |
| 17.5° | 1397.2 | 1397.9 | 1418.0 | 1457.0 | 1497.4 | 1517.1 | 1496.3 | 1462.8 | 1397.2 | 1247.4 | 1033.5 |
| 20°   | 1407.8 | 1409.2 | 1430.0 | 1474.5 | 1533.5 | 1588.5 | 1591.8 | 1567.7 | 1511.3 | 1343.6 | 1103.5 |
| 22.5° | 1474.5 | 1477.7 | 1483.2 | 1511.3 | 1564.5 | 1634.1 | 1672.3 | 1667.2 | 1619.9 | 1444.6 | 1178.9 |
| 25°   | 1649.7 | 1639.9 | 1613.3 | 1605.3 | 1625.7 | 1682.2 | 1747.4 | 1757.2 | 1733.9 | 1555.7 | 1260.2 |
| 27.5° | 1866.2 | 1855.6 | 1816.3 | 1774.7 | 1730.6 | 1750.3 | 1819.9 | 1849.4 | 1849.8 | 1678.2 | 1341.8 |
| 30°   | 2062.6 | 2054.3 | 2022.2 | 1962.8 | 1886.6 | 1858.2 | 1909.6 | 1949.3 | 1973.0 | 1819.6 | 1434.7 |
| 32.5° | 2230.6 | 2223.0 | 2179.6 | 2131.1 | 2056.8 | 1999.6 | 2018.2 | 2056.4 | 2111.8 | 2002.5 | 1550.3 |
| 35°   | 2372.0 | 2364.4 | 2322.8 | 2274.0 | 2205.1 | 2170.9 | 2164.3 | 2190.5 | 2262.3 | 2193.5 | 1682.9 |
| 37.5° | 2486.8 | 2479.2 | 2435.8 | 2389.9 | 2337.4 | 2339.6 | 2349.4 | 2362.2 | 2403.4 | 2397.9 | 1824.7 |
| 40°   | 2561.2 | 2553.2 | 2522.2 | 2489.4 | 2456.2 | 2482.5 | 2531.3 | 2516.0 | 2537.8 | 2563.0 | 1955.1 |
| 42.5° | 2594.3 | 2584.1 | 2566.3 | 2559.0 | 2548.8 | 2589.6 | 2683.6 | 2668.3 | 2642.1 | 2673.0 | 2052.1 |
| 45°   | 2561.2 | 2552.4 | 2552.1 | 2574.3 | 2598.0 | 2650.5 | 2788.9 | 2776.5 | 2710.2 | 2726.3 | 2110.0 |
| 47.5° | 2459.5 | 2451.8 | 2472.6 | 2530.9 | 2589.2 | 2665.8 | 2835.9 | 2838.1 | 2758.7 | 2748.5 | 2147.5 |
| 50°   | 2239.7 | 2234.6 | 2294.8 | 2405.2 | 2505.8 | 2618.0 | 2821.0 | 2846.1 | 2770.3 | 2741.6 | 2142.8 |
| 52.5° | 1793.0 | 1816.7 | 1947.5 | 2131.9 | 2327.2 | 2534.2 | 2765.6 | 2798.4 | 2714.2 | 2696.0 | 2117.3 |
| 55°   | 1227.4 | 1238.3 | 1369.1 | 1638.4 | 1948.2 | 2352.7 | 2638.4 | 2689.1 | 2647.9 | 2688.4 | 2143.9 |
| 57.5° | 635.6  | 644.3  | 747.4  | 986.5  | 1321.4 | 1859.3 | 2285.3 | 2451.5 | 2514.2 | 2727.0 | 2226.6 |
| 60°   | 260.9  | 268.2  | 310.9  | 426.4  | 666.5  | 1082.7 | 1644.6 | 1891.0 | 2038.2 | 2490.5 | 1977.4 |
| 62.5° | 189.5  | 193.1  | 213.6  | 254.4  | 349.1  | 530.6  | 930.7  | 1021.5 | 1125.0 | 1560.8 | 1255.4 |
| 65°   | 159.6  | 163.6  | 180.0  | 204.8  | 254.7  | 325.4  | 397.6  | 399.8  | 440.6  | 635.9  | 465.4  |
| 67.5° | 133.7  | 137.4  | 152.0  | 173.1  | 205.9  | 231.0  | 213.6  | 213.9  | 213.2  | 230.7  | 223.0  |
| 70°   | 104.2  | 107.1  | 121.7  | 144.3  | 161.4  | 148.3  | 166.9  | 184.8  | 177.1  | 184.0  | 194.6  |
| 72.5° | 76.2   | 79.4   | 92.2   | 109.3  | 105.0  | 105.7  | 135.2  | 153.4  | 149.0  | 156.7  | 166.5  |
| 75°   | 55.0   | 57.2   | 63.8   | 54.7   | 57.6   | 69.6   | 95.1   | 105.0  | 109.3  | 115.9  | 124.6  |
| 77.5° | 17.9   | 17.9   | 20.0   | 25.1   | 31.3   | 38.6   | 48.5   | 52.5   | 59.0   | 66.3   | 72.5   |
| 80°   | 9.1    | 9.5    | 11.3   | 13.8   | 17.5   | 22.2   | 28.4   | 30.2   | 33.5   | 37.5   | 40.1   |
| 82.5° | 4.4    | 4.7    | 5.5    | 6.9    | 9.1    | 11.7   | 15.7   | 17.5   | 19.7   | 22.2   | 24.1   |
| 85°   | 1.1    | 1.1    | 1.5    | 2.2    | 2.9    | 4.4    | 5.8    | 6.9    | 8.7    | 10.6   | 11.7   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.4    | 1.1    | 1.5    | 1.8    | 2.2    | 2.9    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 677.8  | 677.8 | 677.8 | 677.8 | 677.8 | 677.8 | 677.8 | 677.8 | 677.8 | 677.8 | 677.8 |
| 2.5°  | 690.6  | 670.2 | 643.9 | 621.7 | 601.3 | 585.6 | 572.1 | 565.6 | 559.4 | 555.0 | 556.5 |
| 5°    | 709.5  | 674.5 | 625.7 | 591.8 | 571.1 | 560.5 | 553.2 | 549.6 | 548.8 | 545.9 | 544.8 |
| 7.5°  | 737.2  | 687.3 | 622.1 | 587.8 | 574.0 | 568.5 | 564.5 | 562.3 | 563.4 | 560.5 | 559.4 |
| 10°   | 771.5  | 708.4 | 631.2 | 600.9 | 588.9 | 584.9 | 580.5 | 577.6 | 576.2 | 571.8 | 571.1 |
| 12.5° | 814.1  | 734.7 | 647.6 | 617.7 | 605.7 | 598.7 | 592.9 | 587.8 | 584.5 | 579.1 | 577.6 |
| 15°   | 860.0  | 763.8 | 666.9 | 634.1 | 619.9 | 609.7 | 600.2 | 592.6 | 586.7 | 579.4 | 578.3 |
| 17.5° | 910.0  | 794.4 | 682.9 | 645.4 | 627.2 | 613.7 | 599.8 | 588.5 | 580.5 | 571.1 | 570.0 |
| 20°   | 962.1  | 825.4 | 695.0 | 650.9 | 627.5 | 609.3 | 590.7 | 575.8 | 565.6 | 556.1 | 555.4 |
| 22.5° | 1016.0 | 853.8 | 702.2 | 649.4 | 621.7 | 599.1 | 576.9 | 560.1 | 548.1 | 536.8 | 536.1 |
| 25°   | 1070.3 | 881.2 | 704.1 | 643.6 | 610.0 | 583.8 | 561.6 | 541.9 | 528.4 | 515.7 | 514.2 |
| 27.5° | 1125.3 | 904.1 | 699.7 | 631.9 | 594.4 | 565.9 | 543.7 | 524.4 | 510.6 | 497.8 | 495.6 |
| 30°   | 1184.0 | 923.8 | 690.2 | 616.6 | 576.2 | 547.0 | 525.1 | 510.6 | 497.4 | 484.7 | 482.5 |
| 32.5° | 1246.7 | 940.9 | 676.7 | 598.0 | 555.0 | 528.0 | 512.0 | 498.9 | 485.8 | 474.5 | 472.3 |
| 35°   | 1321.4 | 952.2 | 656.7 | 574.0 | 535.3 | 514.2 | 503.3 | 488.0 | 471.9 | 459.5 | 458.4 |
| 37.5° | 1398.7 | 961.0 | 632.6 | 551.0 | 518.2 | 506.2 | 497.1 | 476.3 | 456.3 | 441.3 | 439.5 |
| 40°   | 1473.4 | 968.3 | 602.8 | 529.5 | 502.5 | 500.4 | 488.0 | 462.1 | 427.5 | 410.7 | 409.2 |
| 42.5° | 1543.0 | 970.5 | 571.4 | 506.5 | 488.3 | 487.2 | 473.4 | 433.3 | 406.7 | 396.1 | 394.7 |
| 45°   | 1590.7 | 968.6 | 539.0 | 485.0 | 474.1 | 468.3 | 453.7 | 412.5 | 396.1 | 386.7 | 384.8 |
| 47.5° | 1626.1 | 959.2 | 502.5 | 462.5 | 458.1 | 450.1 | 418.7 | 399.4 | 384.1 | 374.6 | 372.8 |
| 50°   | 1619.9 | 919.8 | 465.7 | 440.6 | 438.8 | 431.8 | 393.2 | 383.0 | 369.5 | 359.3 | 357.9 |
| 52.5° | 1587.8 | 845.1 | 428.2 | 416.5 | 420.2 | 406.7 | 375.0 | 363.3 | 351.7 | 340.0 | 337.5 |
| 55°   | 1595.8 | 791.2 | 399.8 | 393.2 | 399.8 | 369.2 | 354.6 | 342.2 | 331.3 | 320.0 | 317.8 |
| 57.5° | 1630.8 | 738.0 | 369.5 | 368.1 | 375.0 | 340.4 | 328.3 | 312.7 | 297.0 | 287.9 | 287.9 |
| 60°   | 1369.5 | 537.9 | 316.3 | 320.0 | 335.6 | 317.0 | 306.5 | 290.4 | 273.3 | 265.3 | 265.3 |
| 62.5° | 809.7  | 337.5 | 262.4 | 258.4 | 268.2 | 279.9 | 285.7 | 272.6 | 252.2 | 241.6 | 242.0 |
| 65°   | 356.8  | 245.6 | 231.4 | 228.1 | 225.2 | 233.2 | 249.3 | 250.4 | 228.9 | 216.5 | 216.8 |
| 67.5° | 219.7  | 222.3 | 216.5 | 213.9 | 211.4 | 209.9 | 208.5 | 209.2 | 203.3 | 192.1 | 191.7 |
| 70°   | 198.2  | 205.2 | 201.2 | 199.0 | 195.7 | 193.1 | 184.4 | 170.2 | 160.3 | 157.4 | 160.7 |
| 72.5° | 170.6  | 180.0 | 177.8 | 176.7 | 172.7 | 166.5 | 154.9 | 141.0 | 129.4 | 122.1 | 123.5 |
| 75°   | 128.6  | 136.3 | 137.4 | 137.8 | 133.4 | 127.5 | 115.5 | 103.9 | 93.7  | 86.0  | 87.8  |
| 77.5° | 74.0   | 78.4  | 79.4  | 80.5  | 77.3  | 75.1  | 67.1  | 58.7  | 53.2  | 45.2  | 47.4  |
| 80°   | 41.2   | 43.0  | 43.0  | 43.4  | 41.5  | 39.0  | 33.5  | 28.8  | 26.2  | 22.6  | 23.0  |
| 82.5° | 24.8   | 25.5  | 25.9  | 26.2  | 25.1  | 22.6  | 18.6  | 15.3  | 13.8  | 12.0  | 11.7  |
| 85°   | 12.0   | 12.8  | 12.8  | 13.1  | 11.3  | 9.8   | 7.7   | 5.8   | 5.1   | 3.6   | 4.0   |
| 87.5° | 2.9    | 3.3   | 3.3   | 2.9   | 2.6   | 1.8   | 1.1   | 0.4   | 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

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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Point lies inside the ANSI 2200K 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       | 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               |           |                  |                  |

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**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               |           |                  |                  |

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**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               |           |                  |                  |

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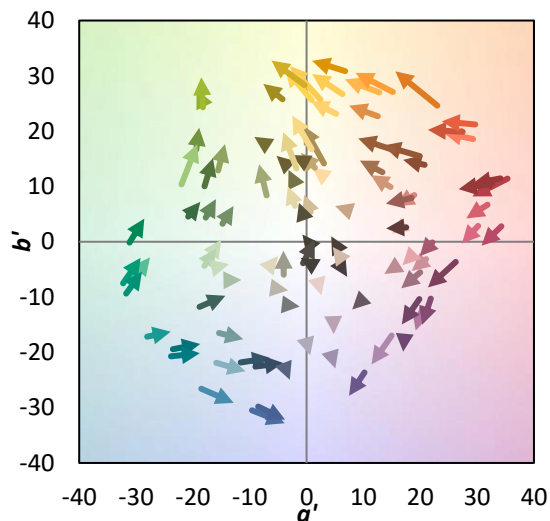
**TM-30-18**

### Summary

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



### Color Vector Graphics



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**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 |            |



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**TM-30-18**

Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)