

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: P629639

Luminaire Tested: GWS-SA1C-722-U-T2R-W-GRSBK

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P629639  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-12)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1C-722-U-T2R-W-GRSBK  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II ROADWAY 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: 2373.4 lumens  
Efficiency: N/A  
Efficacy: 69.6 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G0

Input Watts (W): 34.1  
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



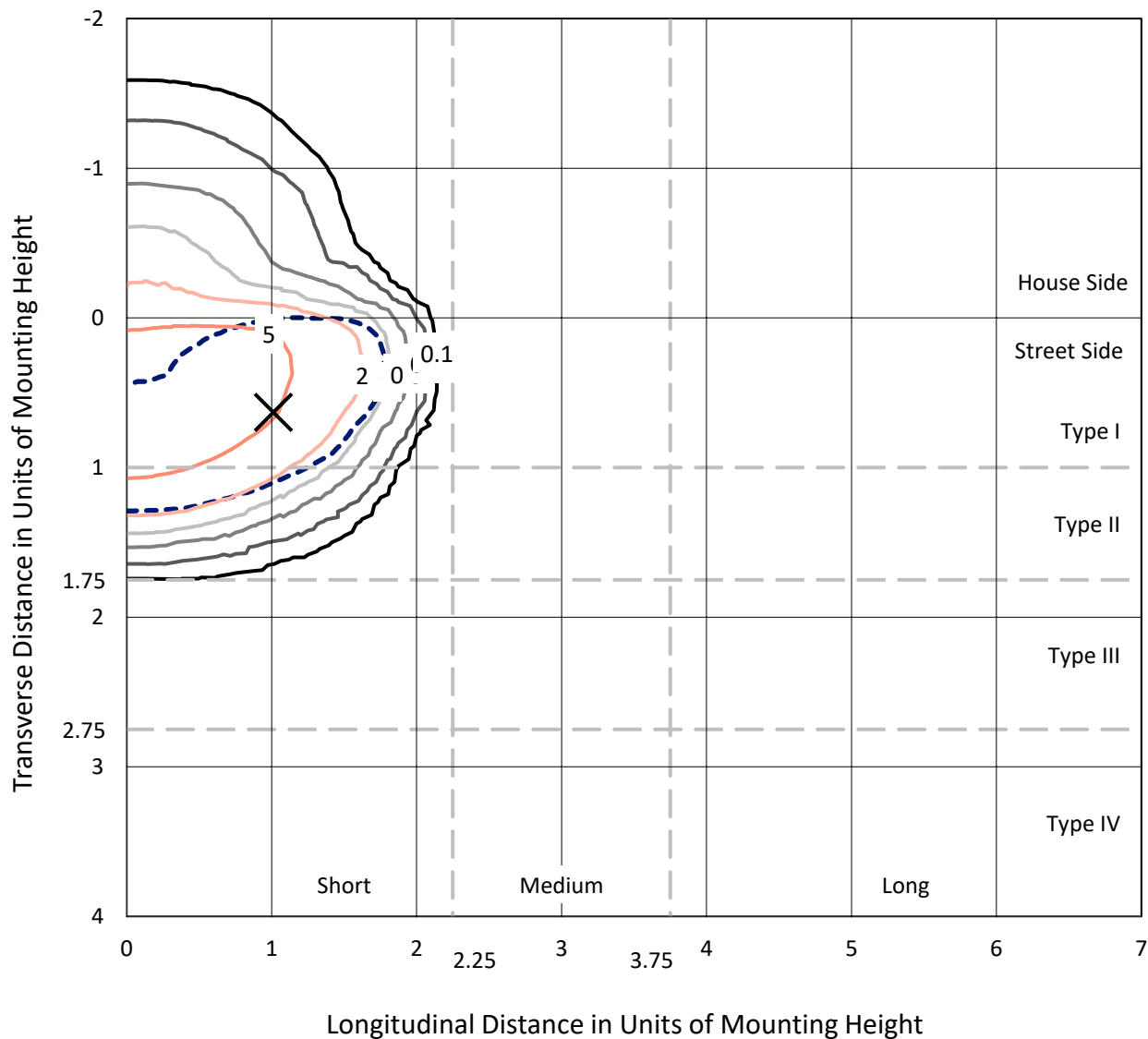
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

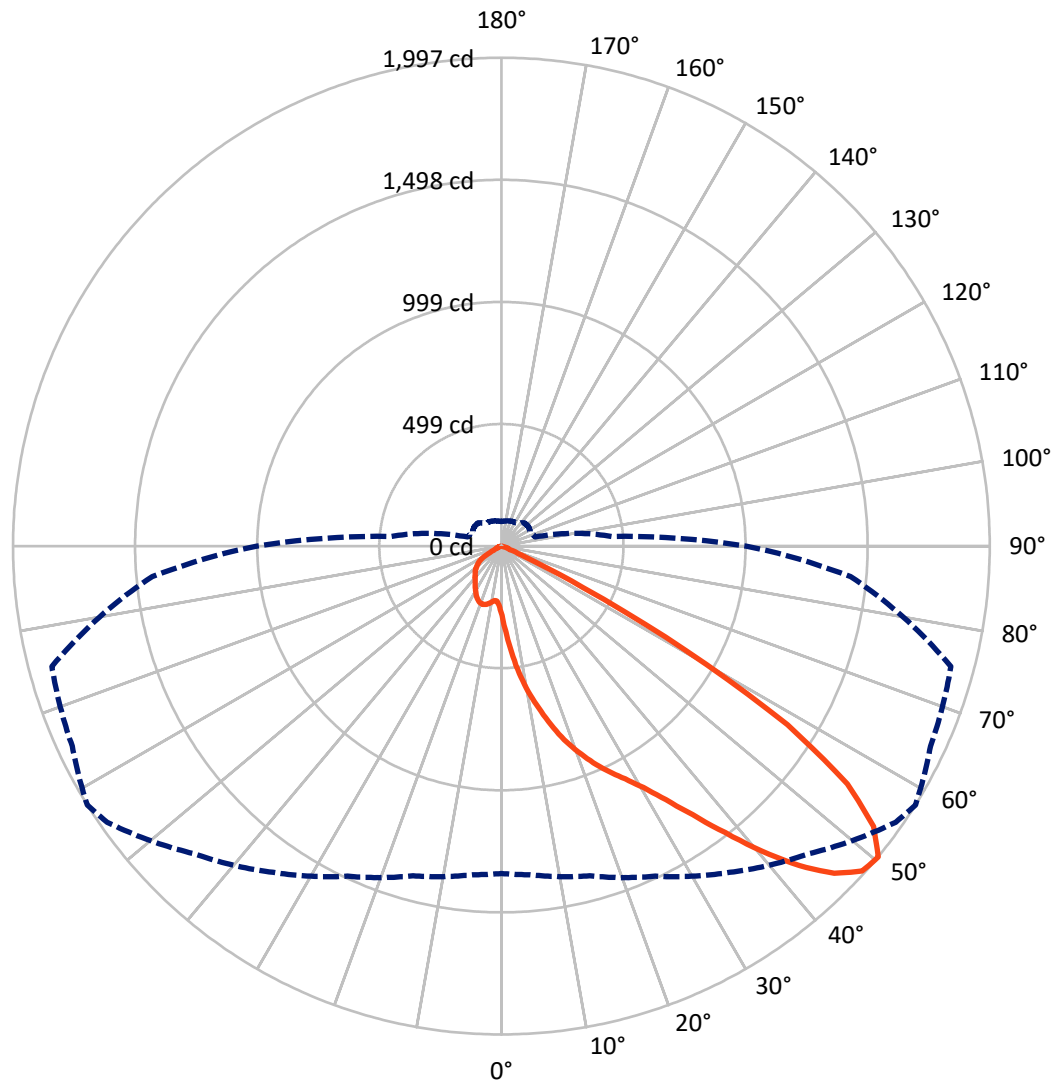


Based on 10 foot mounting height. Maximum calculated value = 8.7 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 58-Deg Lateral    - - - Horizontal Cone Through 50-Deg Vertical

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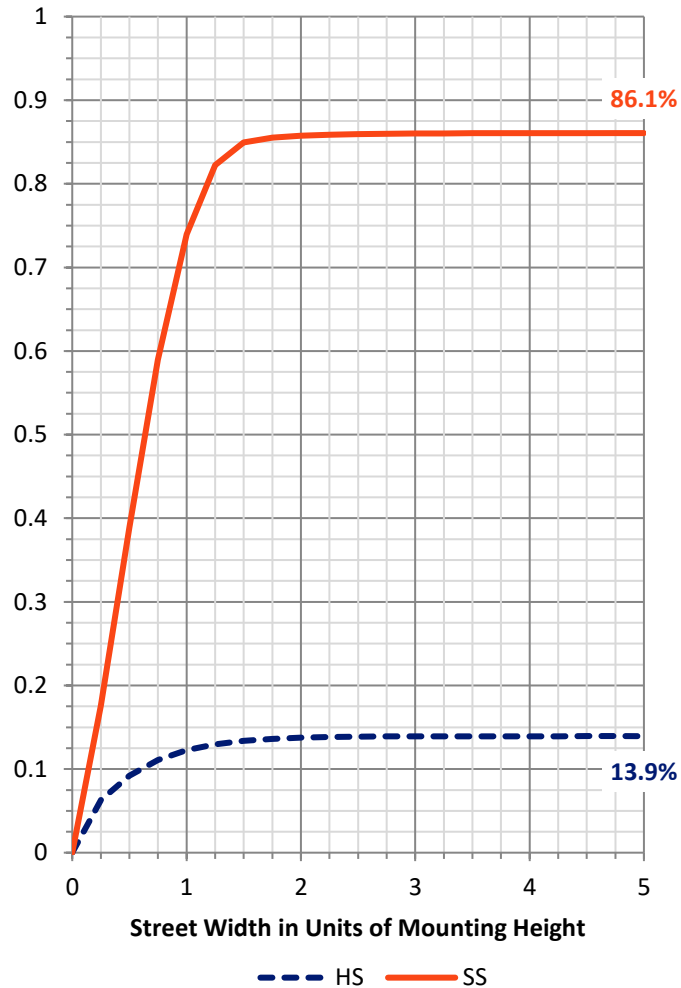
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 332.4    | 0.0    | 332.4  |
|                    | % Fixture | 14.0     | 0.0    | 14.0   |
| <b>Street Side</b> | Lumens    | 2041.0   | 0.0    | 2041.0 |
|                    | % Fixture | 86.0     | 0.0    | 86.0   |
| <b>Total</b>       | Lumens    | 2373.4   | 0.0    | 2373.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 35.1   | 1.5       |
| 10°-20°   | 139.0  | 5.9       |
| 20°-30°   | 281.3  | 11.9      |
| 30°-40°   | 497.7  | 21.0      |
| 40°-50°   | 725.6  | 30.6      |
| 50°-60°   | 581.6  | 24.5      |
| 60°-70°   | 104.8  | 4.4       |
| 70°-80°   | 8.3    | 0.3       |
| 80°-90°   | 0.0    | 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°    | 2373.4 | 100.0     |
| 0°-180°   | 2373.4 | 100.0     |

**Coefficient of Utilization**



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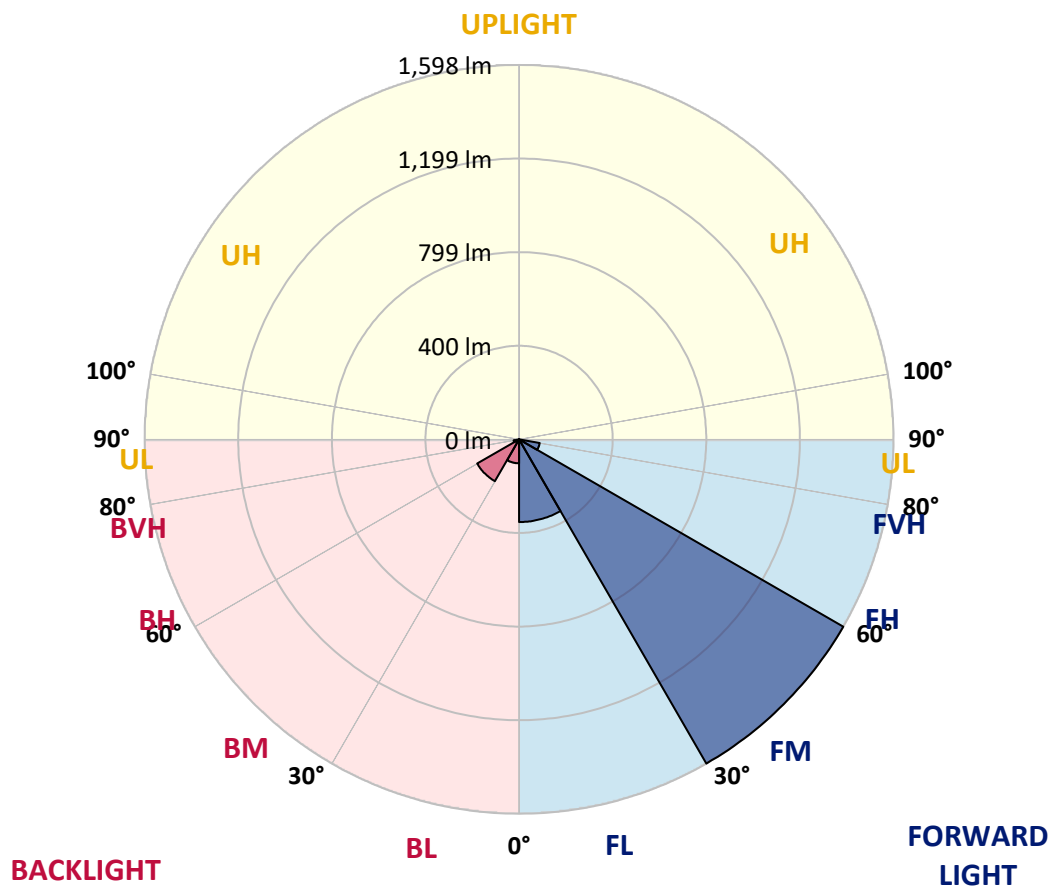
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 353.2  | 14.9      |                         |      |        |
| FM   | (30°-60°)   | 1598.4 | 67.3      |                         |      |        |
| FH   | (60°-80°)   | 89.4   | 3.8       |                         |      | G0/660 |
| FVH  | (80°-90°)   | 0.0    | 0.0       |                         |      | G0/10  |
| BL   | (0°-30°)    | 102.3  | 4.3       | B0/110                  |      |        |
| BM   | (30°-60°)   | 206.5  | 8.7       | B0/220                  |      |        |
| BH   | (60°-80°)   | 23.6   | 1.0       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 0.0    | 0.0       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B0-U0-G0**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 283.5  | 283.5  | 283.5  | 283.5  | 283.5  | 283.5  | 283.5  | 283.5  | 283.5  | 283.5  | 283.5  |
| 2.5°  | 419.5  | 412.9  | 409.1  | 406.1  | 392.6  | 371.3  | 357.4  | 350.0  | 337.8  | 317.3  | 299.5  |
| 5°    | 547.5  | 542.6  | 533.7  | 527.7  | 510.4  | 480.2  | 449.0  | 436.5  | 408.9  | 362.4  | 320.8  |
| 7.5°  | 632.2  | 628.7  | 625.4  | 617.3  | 601.0  | 573.6  | 539.1  | 526.1  | 483.5  | 417.5  | 349.2  |
| 10°   | 697.5  | 694.7  | 690.9  | 690.6  | 677.9  | 653.3  | 619.5  | 606.1  | 559.9  | 477.4  | 382.7  |
| 12.5° | 754.8  | 752.5  | 751.8  | 758.9  | 750.8  | 732.5  | 695.9  | 679.2  | 630.2  | 538.6  | 419.8  |
| 15°   | 794.2  | 793.6  | 796.9  | 810.9  | 815.5  | 807.1  | 776.4  | 758.4  | 702.0  | 600.0  | 460.7  |
| 17.5° | 812.2  | 813.7  | 820.0  | 844.2  | 864.5  | 871.6  | 848.0  | 832.7  | 773.3  | 662.2  | 504.3  |
| 20°   | 842.9  | 842.4  | 846.2  | 869.0  | 893.9  | 919.3  | 912.2  | 899.2  | 845.4  | 727.9  | 552.8  |
| 22.5° | 929.4  | 922.1  | 913.9  | 917.5  | 926.4  | 956.1  | 969.3  | 962.7  | 919.8  | 795.4  | 602.8  |
| 25°   | 1062.4 | 1054.8 | 1028.7 | 1003.3 | 986.5  | 1000.0 | 1018.0 | 1021.3 | 993.6  | 864.7  | 655.1  |
| 27.5° | 1203.5 | 1196.7 | 1167.2 | 1129.2 | 1081.2 | 1057.9 | 1071.3 | 1077.9 | 1066.2 | 947.2  | 710.6  |
| 30°   | 1335.8 | 1326.6 | 1294.4 | 1247.2 | 1191.6 | 1155.8 | 1140.6 | 1145.2 | 1152.0 | 1044.9 | 775.9  |
| 32.5° | 1450.5 | 1443.6 | 1405.1 | 1355.3 | 1301.8 | 1264.4 | 1228.9 | 1236.5 | 1253.3 | 1164.5 | 859.4  |
| 35°   | 1547.7 | 1544.1 | 1503.3 | 1453.8 | 1397.2 | 1378.2 | 1347.7 | 1349.2 | 1366.0 | 1308.9 | 961.2  |
| 37.5° | 1632.2 | 1626.1 | 1589.1 | 1543.1 | 1498.2 | 1495.2 | 1486.8 | 1487.5 | 1496.2 | 1477.1 | 1078.2 |
| 40°   | 1685.5 | 1679.9 | 1653.5 | 1625.1 | 1593.1 | 1593.6 | 1637.0 | 1640.3 | 1630.4 | 1642.4 | 1201.8 |
| 42.5° | 1705.6 | 1701.5 | 1687.3 | 1687.5 | 1684.2 | 1699.2 | 1780.7 | 1786.8 | 1751.2 | 1772.1 | 1307.3 |
| 45°   | 1670.8 | 1669.0 | 1670.0 | 1706.6 | 1746.2 | 1792.4 | 1898.2 | 1908.9 | 1858.6 | 1858.1 | 1389.8 |
| 47.5° | 1558.6 | 1555.1 | 1584.7 | 1646.9 | 1738.6 | 1828.4 | 1969.3 | 1985.8 | 1933.7 | 1907.3 | 1441.6 |
| 50°   | 1338.8 | 1349.0 | 1395.9 | 1489.3 | 1628.7 | 1778.9 | 1968.5 | 1997.2 | 1936.5 | 1903.0 | 1433.0 |
| 52.5° | 969.8  | 967.8  | 1070.5 | 1199.0 | 1368.5 | 1620.5 | 1863.9 | 1905.8 | 1868.8 | 1860.6 | 1413.7 |
| 55°   | 527.7  | 546.2  | 615.5  | 785.5  | 997.2  | 1320.8 | 1625.1 | 1716.5 | 1759.4 | 1845.2 | 1448.5 |
| 57.5° | 193.9  | 202.0  | 245.4  | 365.7  | 527.9  | 821.3  | 1241.4 | 1379.2 | 1511.7 | 1802.0 | 1442.6 |
| 60°   | 78.2   | 79.7   | 97.0   | 134.5  | 221.8  | 418.0  | 744.7  | 867.0  | 991.9  | 1379.4 | 1107.1 |
| 62.5° | 56.9   | 58.9   | 65.7   | 78.7   | 112.2  | 182.7  | 321.1  | 373.3  | 408.1  | 683.2  | 545.4  |
| 65°   | 45.9   | 47.5   | 53.0   | 58.9   | 74.1   | 98.2   | 103.6  | 99.7   | 99.2   | 176.6  | 125.1  |
| 67.5° | 38.1   | 39.6   | 43.7   | 47.7   | 53.3   | 49.0   | 35.5   | 37.3   | 30.5   | 30.2   | 24.6   |
| 70°   | 27.9   | 29.7   | 33.8   | 38.1   | 32.0   | 13.2   | 20.6   | 30.5   | 23.1   | 19.3   | 18.8   |
| 72.5° | 21.1   | 22.3   | 26.1   | 24.9   | 9.4    | 5.1    | 13.7   | 22.1   | 17.8   | 14.2   | 14.0   |
| 75°   | 15.7   | 16.5   | 13.2   | 4.1    | 1.0    | 1.3    | 5.1    | 9.1    | 9.9    | 8.1    | 8.1    |
| 77.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.5    | 0.8    | 1.0    | 1.3    | 1.5    |
| 80°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 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    |

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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 283.5  | 283.5 | 283.5 | 283.5 | 283.5 | 283.5 | 283.5 | 283.5 | 283.5 | 283.5 | 283.5 |
| 2.5°  | 289.3  | 278.7 | 263.4 | 250.8 | 241.1 | 231.7 | 224.6 | 217.5 | 217.3 | 213.7 | 212.9 |
| 5°    | 301.5  | 282.2 | 254.3 | 234.3 | 222.1 | 214.7 | 209.6 | 207.1 | 205.8 | 204.6 | 204.1 |
| 7.5°  | 319.0  | 291.4 | 252.8 | 231.5 | 221.3 | 216.5 | 212.9 | 211.4 | 210.7 | 209.6 | 209.4 |
| 10°   | 340.6  | 304.6 | 258.4 | 236.8 | 227.9 | 223.3 | 219.5 | 217.3 | 216.0 | 214.2 | 213.7 |
| 12.5° | 366.5  | 320.8 | 267.3 | 245.7 | 236.3 | 230.2 | 225.1 | 221.8 | 220.0 | 217.8 | 217.3 |
| 15°   | 394.4  | 338.3 | 277.2 | 253.8 | 242.6 | 234.8 | 228.4 | 223.3 | 220.0 | 217.3 | 216.5 |
| 17.5° | 423.3  | 356.1 | 286.0 | 259.4 | 245.7 | 236.3 | 227.2 | 220.3 | 216.2 | 212.7 | 211.7 |
| 20°   | 455.8  | 374.4 | 291.9 | 260.4 | 244.7 | 232.2 | 221.6 | 212.9 | 208.9 | 204.1 | 203.0 |
| 22.5° | 489.8  | 391.4 | 294.4 | 258.1 | 239.1 | 224.6 | 213.2 | 204.3 | 198.5 | 193.4 | 191.9 |
| 25°   | 522.8  | 406.6 | 293.1 | 251.8 | 230.7 | 214.0 | 202.3 | 193.1 | 186.8 | 181.7 | 180.5 |
| 27.5° | 557.9  | 419.3 | 288.6 | 242.4 | 219.3 | 202.3 | 191.1 | 183.2 | 177.4 | 171.8 | 170.6 |
| 30°   | 597.2  | 431.0 | 281.2 | 231.0 | 205.8 | 190.4 | 181.7 | 176.4 | 170.0 | 164.2 | 162.4 |
| 32.5° | 644.7  | 441.4 | 270.6 | 217.3 | 193.9 | 179.9 | 175.1 | 171.1 | 163.7 | 157.6 | 156.3 |
| 35°   | 699.0  | 450.0 | 257.1 | 203.0 | 182.2 | 173.3 | 172.3 | 167.0 | 157.4 | 150.3 | 148.7 |
| 37.5° | 761.9  | 458.4 | 241.1 | 189.1 | 173.6 | 170.3 | 170.6 | 161.4 | 149.7 | 141.1 | 140.1 |
| 40°   | 829.7  | 466.7 | 223.3 | 176.9 | 165.7 | 168.5 | 166.2 | 153.3 | 134.3 | 125.9 | 124.9 |
| 42.5° | 900.2  | 475.9 | 205.3 | 165.5 | 159.1 | 161.7 | 158.4 | 137.1 | 123.3 | 119.0 | 118.5 |
| 45°   | 963.9  | 486.8 | 185.8 | 154.1 | 152.5 | 151.8 | 146.2 | 124.1 | 118.3 | 115.2 | 115.0 |
| 47.5° | 1009.9 | 485.0 | 165.0 | 143.1 | 145.4 | 142.9 | 125.9 | 118.0 | 113.2 | 109.1 | 108.1 |
| 50°   | 1001.5 | 454.1 | 143.4 | 131.0 | 136.3 | 134.0 | 113.2 | 110.9 | 106.6 | 102.3 | 100.8 |
| 52.5° | 980.2  | 411.9 | 124.6 | 118.0 | 126.4 | 121.1 | 104.6 | 102.3 | 98.5  | 92.9  | 91.1  |
| 55°   | 991.6  | 372.3 | 109.9 | 107.6 | 116.2 | 100.3 | 94.9  | 91.4  | 87.3  | 81.2  | 80.5  |
| 57.5° | 954.8  | 303.8 | 88.3  | 89.8  | 102.8 | 85.5  | 83.2  | 77.7  | 70.8  | 66.8  | 66.2  |
| 60°   | 660.9  | 163.2 | 55.3  | 57.1  | 74.4  | 71.8  | 74.6  | 69.5  | 61.2  | 57.4  | 56.6  |
| 62.5° | 303.5  | 65.5  | 30.2  | 28.9  | 39.1  | 48.7  | 64.0  | 63.5  | 53.0  | 47.0  | 46.4  |
| 65°   | 73.6   | 29.9  | 21.6  | 20.3  | 22.1  | 29.2  | 41.6  | 50.0  | 42.9  | 35.8  | 35.0  |
| 67.5° | 23.9   | 24.4  | 19.8  | 18.5  | 19.5  | 21.8  | 24.9  | 27.7  | 27.4  | 25.1  | 24.6  |
| 70°   | 19.0   | 22.1  | 18.3  | 16.8  | 16.8  | 17.5  | 16.8  | 13.5  | 11.7  | 12.7  | 13.2  |
| 72.5° | 14.2   | 16.8  | 14.5  | 12.9  | 12.4  | 12.2  | 10.4  | 7.6   | 5.3   | 4.8   | 4.6   |
| 75°   | 8.4    | 9.4   | 8.9   | 7.6   | 7.1   | 6.3   | 5.1   | 3.3   | 1.8   | 1.3   | 0.8   |
| 77.5° | 1.5    | 1.8   | 2.0   | 1.5   | 1.3   | 1.0   | 0.8   | 0.3   | 0.0   | 0.0   | 0.0   |
| 80°   | 0.0    | 0.3   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 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

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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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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

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**Photopic Flux vs. Wavelength**



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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 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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### 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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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)