

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: P631106

Luminaire Tested: GWS-SA1F-722-U-SL3-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P631106  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-31)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1F-722-U-SL3-W  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE III SPILL LIGHT ELIMINATOR OPTICS  
Light Source: (16) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6080.5 lumens  
Efficiency: N/A  
Efficacy: 90.5 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G2

Input Watts (W): 67.2  
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



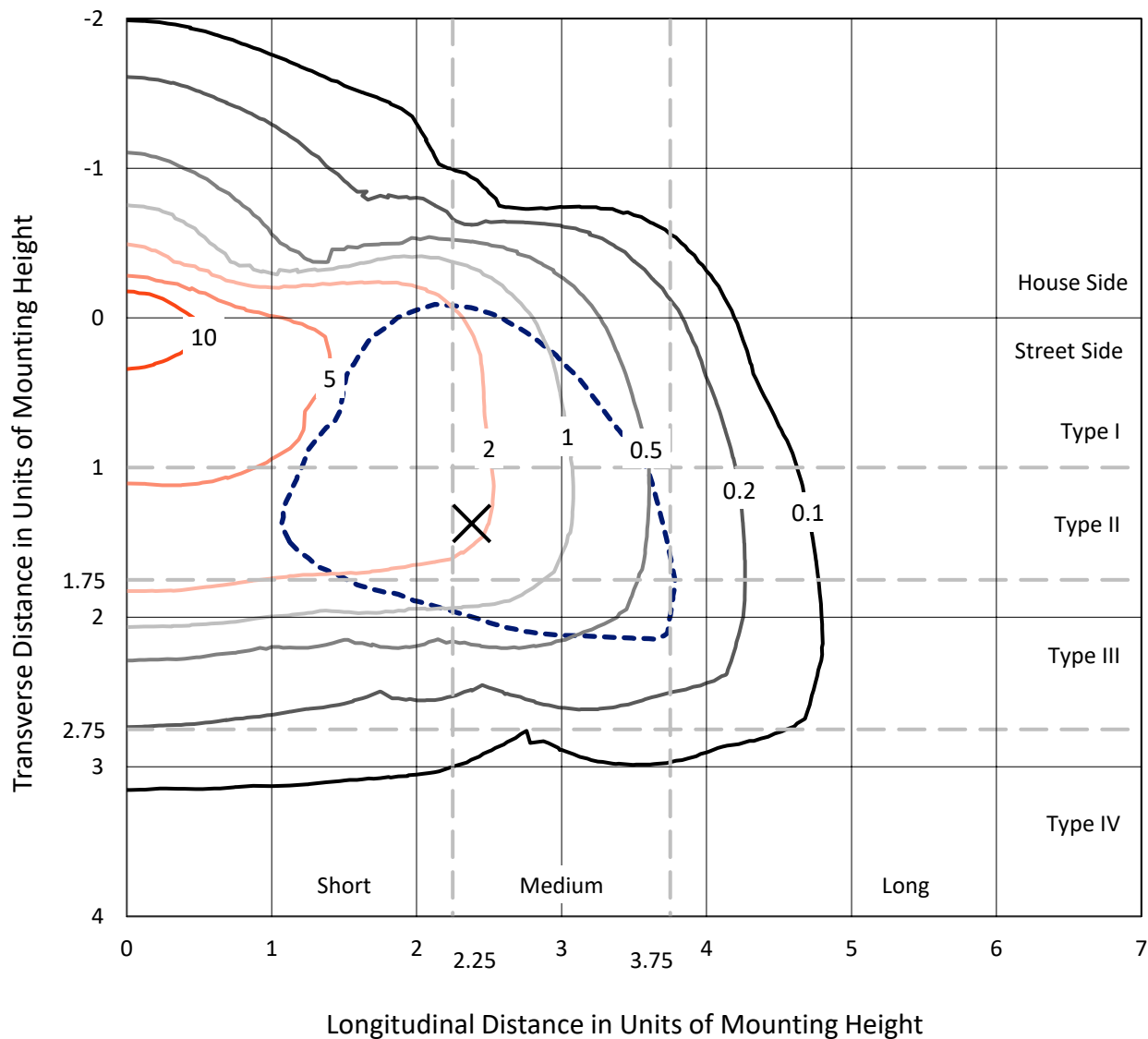
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

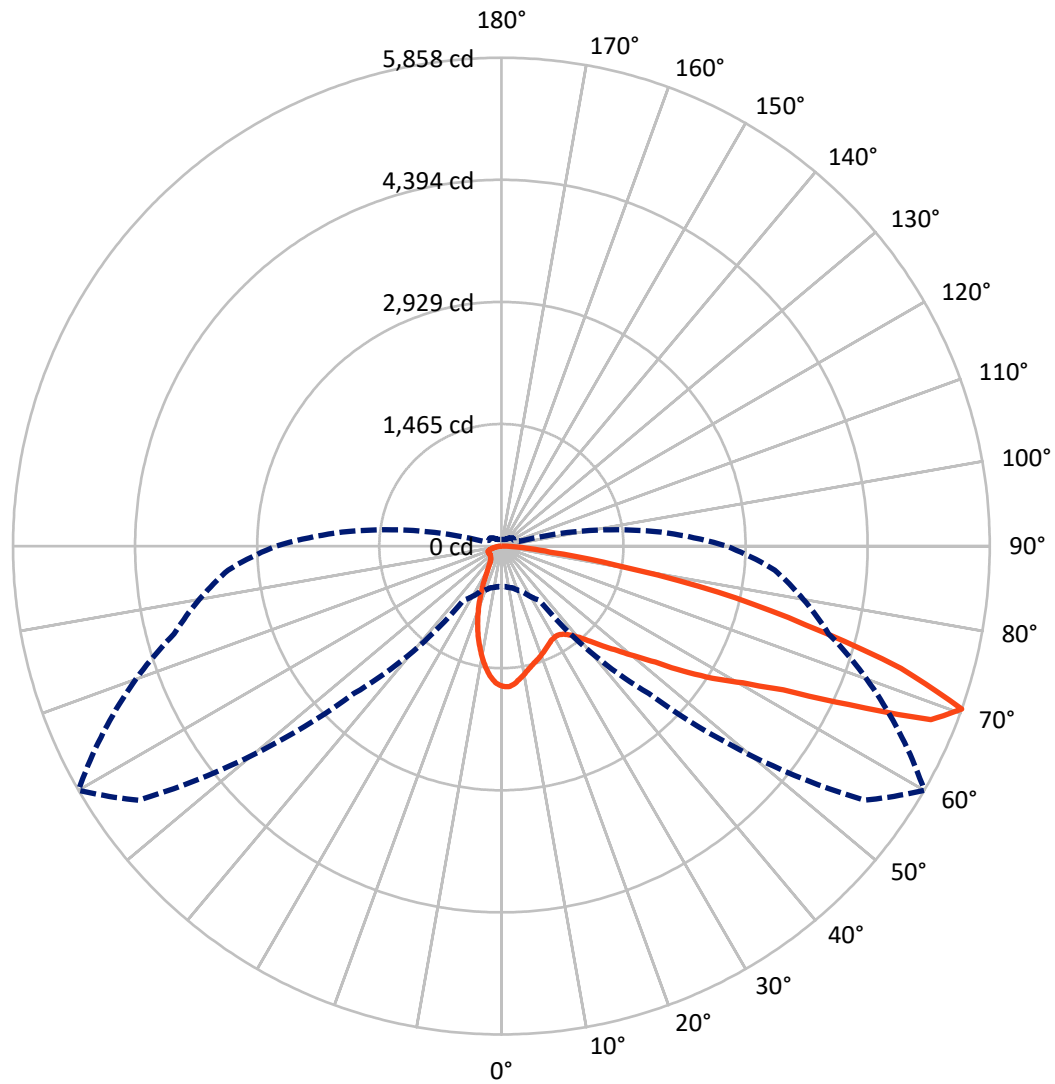


Based on 10 foot mounting height. Maximum calculated value = 16.8 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 60-Deg Lateral    - - - Horizontal Cone Through 70-Deg Vertical

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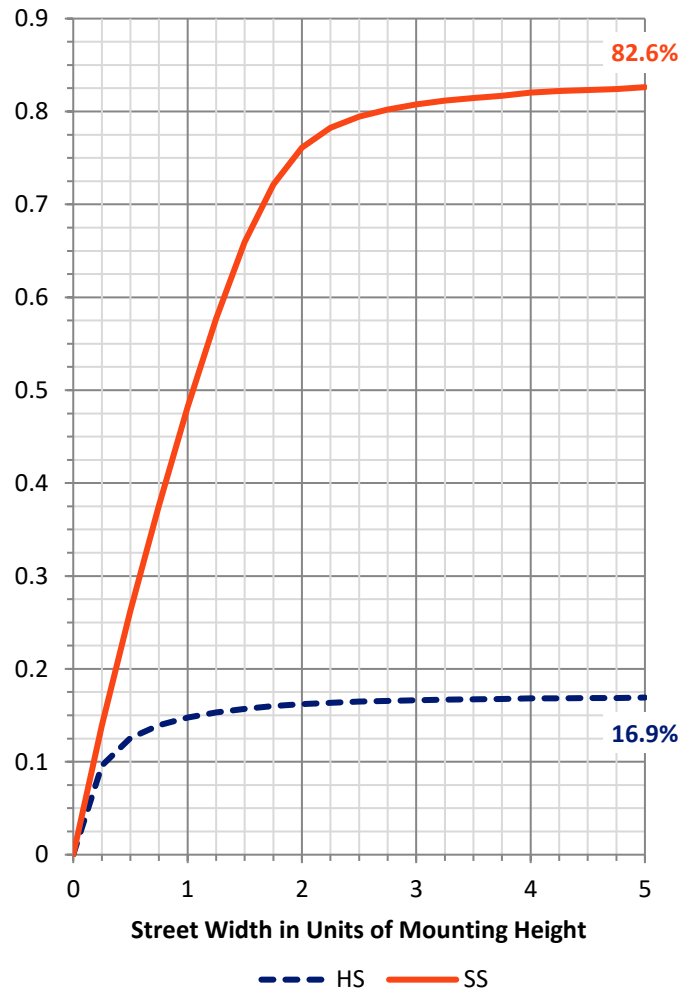
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1039.9   | 0.0    | 1039.9 |
|                    | % Fixture | 17.1     | 0.0    | 17.1   |
| <b>Street Side</b> | Lumens    | 5040.6   | 0.0    | 5040.6 |
|                    | % Fixture | 82.9     | 0.0    | 82.9   |
| <b>Total</b>       | Lumens    | 6080.5   | 0.0    | 6080.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 145.0  | 2.4       |
| 10°-20°   | 324.9  | 5.3       |
| 20°-30°   | 416.1  | 6.8       |
| 30°-40°   | 546.9  | 9.0       |
| 40°-50°   | 793.4  | 13.0      |
| 50°-60°   | 1237.9 | 20.4      |
| 60°-70°   | 1620.7 | 26.7      |
| 70°-80°   | 896.2  | 14.7      |
| 80°-90°   | 99.5   | 1.6       |
| 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°    | 6080.5 | 100.0     |
| 0°-180°   | 6080.5 | 100.0     |

**Coefficient of Utilization**



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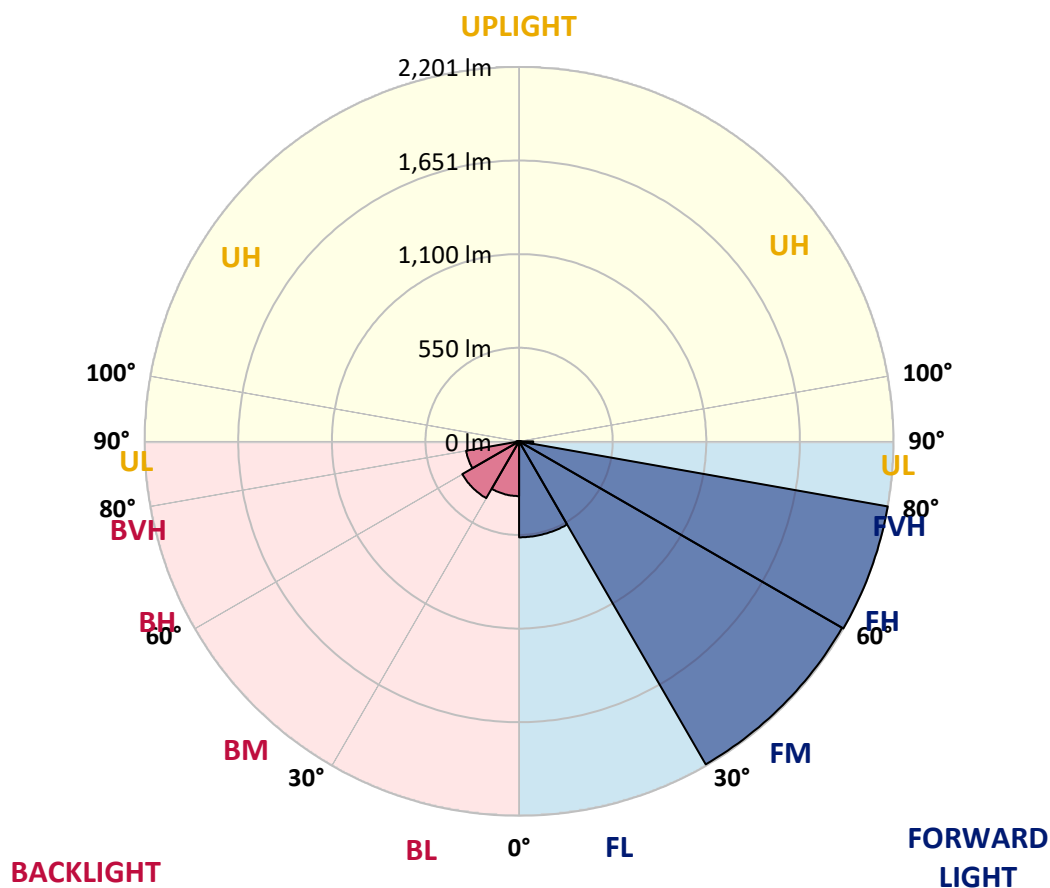
CATALOG NUMBER: GWS-SA1F-722-U-SL3-W

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 564.3  | 9.3       |                         |      |         |
| FM   | (30°-60°)   | 2192.6 | 36.1      |                         |      |         |
| FH   | (60°-80°)   | 2200.8 | 36.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 82.9   | 1.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 321.7  | 5.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 385.6  | 6.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 316.0  | 5.2       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 16.6   | 0.3       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 60°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 |
| 2.5°  | 1659.0 | 1660.8 | 1665.6 | 1672.8 | 1679.9 | 1683.4 | 1692.3 | 1689.7 | 1687.9 | 1684.3 | 1679.9 |
| 5°    | 1585.6 | 1589.1 | 1593.6 | 1607.4 | 1622.9 | 1635.4 | 1655.4 | 1657.6 | 1658.5 | 1660.3 | 1653.2 |
| 7.5°  | 1492.1 | 1493.0 | 1503.7 | 1521.9 | 1542.4 | 1563.8 | 1597.1 | 1606.5 | 1614.5 | 1623.4 | 1617.6 |
| 10°   | 1388.9 | 1391.2 | 1399.2 | 1425.4 | 1460.6 | 1492.1 | 1537.1 | 1552.6 | 1569.6 | 1589.1 | 1581.1 |
| 12.5° | 1304.4 | 1304.8 | 1317.7 | 1345.8 | 1384.0 | 1426.7 | 1482.8 | 1501.5 | 1523.7 | 1554.4 | 1547.3 |
| 15°   | 1237.2 | 1237.2 | 1249.2 | 1273.3 | 1317.3 | 1367.6 | 1434.3 | 1458.3 | 1488.6 | 1530.0 | 1517.5 |
| 17.5° | 1183.8 | 1184.3 | 1191.8 | 1217.2 | 1256.4 | 1312.0 | 1391.2 | 1423.6 | 1457.0 | 1511.7 | 1493.0 |
| 20°   | 1155.8 | 1153.6 | 1154.9 | 1170.5 | 1203.9 | 1257.7 | 1348.0 | 1385.8 | 1430.7 | 1499.3 | 1470.8 |
| 22.5° | 1154.5 | 1150.5 | 1144.7 | 1146.0 | 1165.6 | 1210.1 | 1301.7 | 1347.6 | 1404.1 | 1489.0 | 1448.1 |
| 25°   | 1177.2 | 1172.7 | 1162.5 | 1150.9 | 1149.1 | 1175.8 | 1258.1 | 1310.2 | 1376.5 | 1484.6 | 1426.3 |
| 27.5° | 1215.4 | 1212.3 | 1199.0 | 1181.6 | 1163.4 | 1162.5 | 1225.2 | 1279.5 | 1356.5 | 1489.0 | 1410.7 |
| 30°   | 1266.1 | 1260.8 | 1252.3 | 1230.1 | 1202.5 | 1174.1 | 1212.3 | 1263.0 | 1343.1 | 1503.3 | 1404.1 |
| 32.5° | 1323.5 | 1320.4 | 1312.4 | 1290.2 | 1260.8 | 1215.4 | 1222.5 | 1266.6 | 1343.1 | 1528.2 | 1405.4 |
| 35°   | 1384.5 | 1384.0 | 1384.0 | 1369.4 | 1336.9 | 1280.4 | 1263.0 | 1296.8 | 1363.6 | 1568.2 | 1419.6 |
| 37.5° | 1443.7 | 1443.2 | 1457.4 | 1462.8 | 1425.9 | 1364.9 | 1332.0 | 1357.3 | 1408.5 | 1627.4 | 1454.8 |
| 40°   | 1491.7 | 1493.5 | 1524.6 | 1551.3 | 1530.8 | 1474.3 | 1428.1 | 1441.0 | 1481.5 | 1711.5 | 1516.2 |
| 42.5° | 1540.2 | 1545.1 | 1591.8 | 1639.0 | 1647.0 | 1598.0 | 1551.3 | 1558.9 | 1586.0 | 1822.7 | 1607.8 |
| 45°   | 1593.1 | 1595.4 | 1660.8 | 1726.6 | 1765.3 | 1736.4 | 1698.1 | 1708.4 | 1714.6 | 1960.2 | 1744.4 |
| 47.5° | 1644.3 | 1650.1 | 1734.6 | 1824.9 | 1898.3 | 1895.7 | 1874.3 | 1871.2 | 1872.5 | 2127.4 | 1905.9 |
| 50°   | 1714.1 | 1722.6 | 1821.8 | 1930.8 | 2038.5 | 2087.8 | 2094.1 | 2070.5 | 2060.7 | 2313.4 | 2107.0 |
| 52.5° | 1846.7 | 1846.7 | 1935.7 | 2042.9 | 2187.5 | 2309.8 | 2351.7 | 2313.0 | 2281.8 | 2510.0 | 2320.5 |
| 55°   | 2012.7 | 2019.8 | 2090.5 | 2177.3 | 2360.6 | 2543.4 | 2684.9 | 2642.2 | 2554.1 | 2724.0 | 2544.3 |
| 57.5° | 2086.5 | 2095.4 | 2207.5 | 2342.3 | 2587.0 | 2809.0 | 3005.2 | 2990.1 | 2861.5 | 2946.5 | 2776.5 |
| 60°   | 1953.0 | 1971.7 | 2126.1 | 2352.1 | 2792.1 | 3237.4 | 3375.8 | 3331.7 | 3148.0 | 3180.0 | 3028.3 |
| 62.5° | 1629.2 | 1649.6 | 1820.9 | 2136.3 | 2763.6 | 3700.5 | 3959.9 | 3797.5 | 3505.7 | 3475.0 | 3363.8 |
| 65°   | 972.1  | 971.2  | 1177.2 | 1595.4 | 2412.6 | 3829.1 | 4884.4 | 4581.4 | 4058.2 | 3879.8 | 3709.0 |
| 67.5° | 617.9  | 616.6  | 659.8  | 845.3  | 1605.6 | 3514.1 | 5478.8 | 5557.5 | 4808.8 | 4177.5 | 3737.5 |
| 70°   | 487.6  | 487.1  | 518.3  | 602.8  | 794.1  | 2500.7 | 5313.3 | 5858.2 | 5262.1 | 4064.0 | 3290.8 |
| 72.5° | 355.5  | 356.4  | 404.4  | 504.9  | 612.6  | 1255.5 | 4302.5 | 5012.5 | 4839.9 | 3587.5 | 2671.5 |
| 75°   | 255.4  | 256.7  | 285.6  | 386.6  | 565.0  | 686.5  | 2861.1 | 3769.1 | 3682.3 | 2875.7 | 1837.8 |
| 77.5° | 162.4  | 164.2  | 189.5  | 270.9  | 456.5  | 554.3  | 1734.6 | 2660.9 | 2450.0 | 1620.3 | 653.5  |
| 80°   | 99.2   | 105.0  | 126.3  | 202.0  | 364.8  | 416.0  | 867.1  | 1401.8 | 1227.0 | 444.4  | 219.8  |
| 82.5° | 51.2   | 55.6   | 76.1   | 125.0  | 251.4  | 365.3  | 490.7  | 589.0  | 379.9  | 186.0  | 117.0  |
| 85°   | 16.0   | 18.7   | 26.7   | 50.7   | 119.7  | 226.4  | 324.8  | 292.7  | 174.4  | 87.6   | 54.3   |
| 87.5° | 4.0    | 4.0    | 4.4    | 4.4    | 4.9    | 10.2   | 62.7   | 66.3   | 46.3   | 27.6   | 22.2   |
| 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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CATALOG NUMBER: GWS-SA1F-722-U-SL3-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 | 1682.6 |
| 2.5°  | 1671.0 | 1660.3 | 1655.9 | 1655.4 | 1644.3 | 1628.3 | 1617.6 | 1610.0 | 1605.6 | 1604.7 | 1604.7 |
| 5°    | 1641.2 | 1627.4 | 1609.1 | 1595.4 | 1565.5 | 1535.3 | 1509.9 | 1495.7 | 1479.2 | 1477.0 | 1476.6 |
| 7.5°  | 1601.6 | 1581.6 | 1546.9 | 1508.2 | 1456.1 | 1405.8 | 1363.1 | 1334.2 | 1305.3 | 1300.0 | 1298.2 |
| 10°   | 1558.9 | 1531.7 | 1472.6 | 1404.5 | 1326.6 | 1251.5 | 1186.1 | 1134.9 | 1101.1 | 1077.1 | 1072.6 |
| 12.5° | 1516.6 | 1480.6 | 1393.8 | 1292.4 | 1185.6 | 1082.8 | 984.5  | 900.9  | 840.4  | 805.2  | 799.0  |
| 15°   | 1477.0 | 1426.7 | 1308.0 | 1178.5 | 1039.7 | 899.1  | 759.9  | 651.3  | 566.3  | 536.1  | 529.0  |
| 17.5° | 1441.0 | 1378.3 | 1224.8 | 1060.6 | 887.5  | 703.8  | 545.4  | 448.9  | 399.1  | 383.9  | 380.4  |
| 20°   | 1404.9 | 1328.4 | 1140.2 | 936.5  | 726.1  | 520.1  | 398.6  | 353.2  | 334.6  | 328.8  | 327.0  |
| 22.5° | 1366.2 | 1273.7 | 1048.1 | 814.1  | 562.8  | 389.3  | 326.1  | 306.1  | 300.3  | 300.7  | 300.3  |
| 25°   | 1327.5 | 1218.1 | 951.6  | 681.1  | 419.1  | 315.9  | 284.7  | 277.2  | 278.5  | 282.5  | 283.4  |
| 27.5° | 1295.5 | 1168.7 | 856.8  | 535.2  | 327.4  | 271.8  | 257.1  | 256.7  | 261.6  | 266.9  | 267.8  |
| 30°   | 1272.4 | 1124.7 | 763.4  | 411.5  | 269.6  | 241.6  | 235.8  | 238.5  | 244.2  | 248.2  | 249.6  |
| 32.5° | 1255.9 | 1086.9 | 663.8  | 323.4  | 236.2  | 220.2  | 217.5  | 220.2  | 223.8  | 227.8  | 228.7  |
| 35°   | 1250.1 | 1059.3 | 565.9  | 263.8  | 213.5  | 204.6  | 202.9  | 204.2  | 206.0  | 208.2  | 209.1  |
| 37.5° | 1263.0 | 1045.5 | 463.6  | 229.6  | 199.8  | 194.4  | 191.7  | 190.9  | 191.3  | 192.2  | 192.6  |
| 40°   | 1301.3 | 1051.7 | 379.9  | 209.5  | 190.9  | 186.0  | 181.5  | 179.7  | 179.3  | 180.2  | 179.7  |
| 42.5° | 1367.1 | 1078.0 | 319.4  | 198.0  | 183.7  | 176.6  | 171.7  | 169.9  | 169.9  | 172.2  | 172.2  |
| 45°   | 1463.7 | 1129.6 | 275.8  | 189.5  | 177.5  | 168.6  | 163.3  | 162.4  | 164.2  | 167.7  | 168.2  |
| 47.5° | 1605.1 | 1205.2 | 249.6  | 183.3  | 171.7  | 161.5  | 156.2  | 155.7  | 159.3  | 165.1  | 165.5  |
| 50°   | 1772.9 | 1314.2 | 235.3  | 178.8  | 167.7  | 155.7  | 150.4  | 150.8  | 154.8  | 161.0  | 162.4  |
| 52.5° | 1974.8 | 1462.8 | 236.2  | 177.1  | 165.5  | 152.2  | 146.8  | 145.9  | 149.9  | 156.2  | 157.5  |
| 55°   | 2183.5 | 1643.4 | 253.6  | 177.5  | 162.4  | 150.4  | 143.3  | 140.1  | 143.7  | 148.1  | 148.6  |
| 57.5° | 2413.1 | 1847.2 | 296.7  | 176.6  | 158.4  | 148.6  | 140.1  | 133.0  | 135.2  | 137.9  | 139.2  |
| 60°   | 2672.0 | 2087.0 | 389.7  | 178.4  | 156.6  | 144.6  | 133.9  | 124.6  | 124.1  | 125.9  | 126.3  |
| 62.5° | 3018.1 | 2413.1 | 494.3  | 181.5  | 160.6  | 139.7  | 124.6  | 114.8  | 113.0  | 113.9  | 114.3  |
| 65°   | 3282.8 | 2568.8 | 461.3  | 178.8  | 169.1  | 136.1  | 115.7  | 105.4  | 101.9  | 101.0  | 101.0  |
| 67.5° | 3175.1 | 2362.8 | 321.2  | 171.7  | 173.1  | 136.6  | 108.6  | 95.7   | 91.2   | 89.0   | 88.5   |
| 70°   | 2701.8 | 1919.2 | 223.3  | 164.6  | 168.6  | 135.7  | 101.0  | 87.6   | 81.9   | 78.7   | 78.3   |
| 72.5° | 2134.6 | 1465.4 | 180.6  | 150.4  | 153.0  | 122.3  | 89.9   | 78.7   | 73.9   | 69.8   | 69.8   |
| 75°   | 1373.8 | 894.2  | 150.8  | 133.9  | 125.0  | 95.2   | 77.9   | 70.3   | 65.4   | 61.4   | 61.4   |
| 77.5° | 462.2  | 331.9  | 117.0  | 113.4  | 93.4   | 71.6   | 65.4   | 60.5   | 56.5   | 52.9   | 52.5   |
| 80°   | 187.7  | 157.5  | 85.9   | 85.9   | 65.4   | 54.7   | 51.2   | 48.9   | 46.3   | 41.8   | 41.8   |
| 82.5° | 109.0  | 95.7   | 60.1   | 52.1   | 43.6   | 37.8   | 35.6   | 33.4   | 33.4   | 30.3   | 30.3   |
| 85°   | 52.5   | 52.9   | 36.0   | 32.0   | 24.9   | 21.8   | 20.9   | 19.6   | 19.1   | 17.4   | 16.9   |
| 87.5° | 28.5   | 28.9   | 18.2   | 14.2   | 9.8    | 8.5    | 7.1    | 6.7    | 6.2    | 5.8    | 5.8    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

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

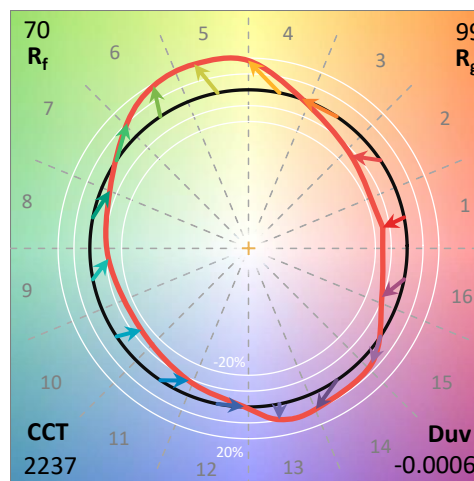
### Test Information

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**



#####

| 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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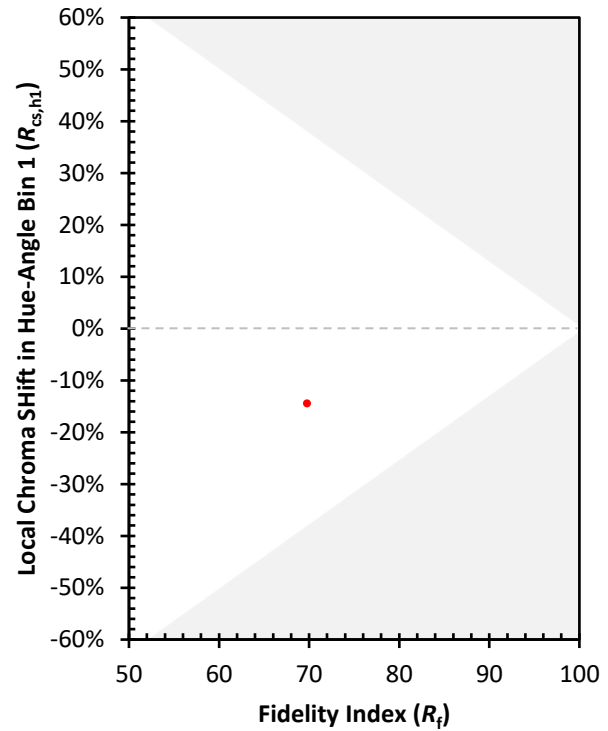
Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)