

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: P630607

Luminaire Tested: GWS-SA1E-722-U-SL2-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P630607  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-27)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1E-722-U-SL2-W  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II SPILL LIGHT ELIMINATOR OPTICS  
Light Source: (16) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5485 lumens  
Efficiency: N/A  
Efficacy: 93.9 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 58.4  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



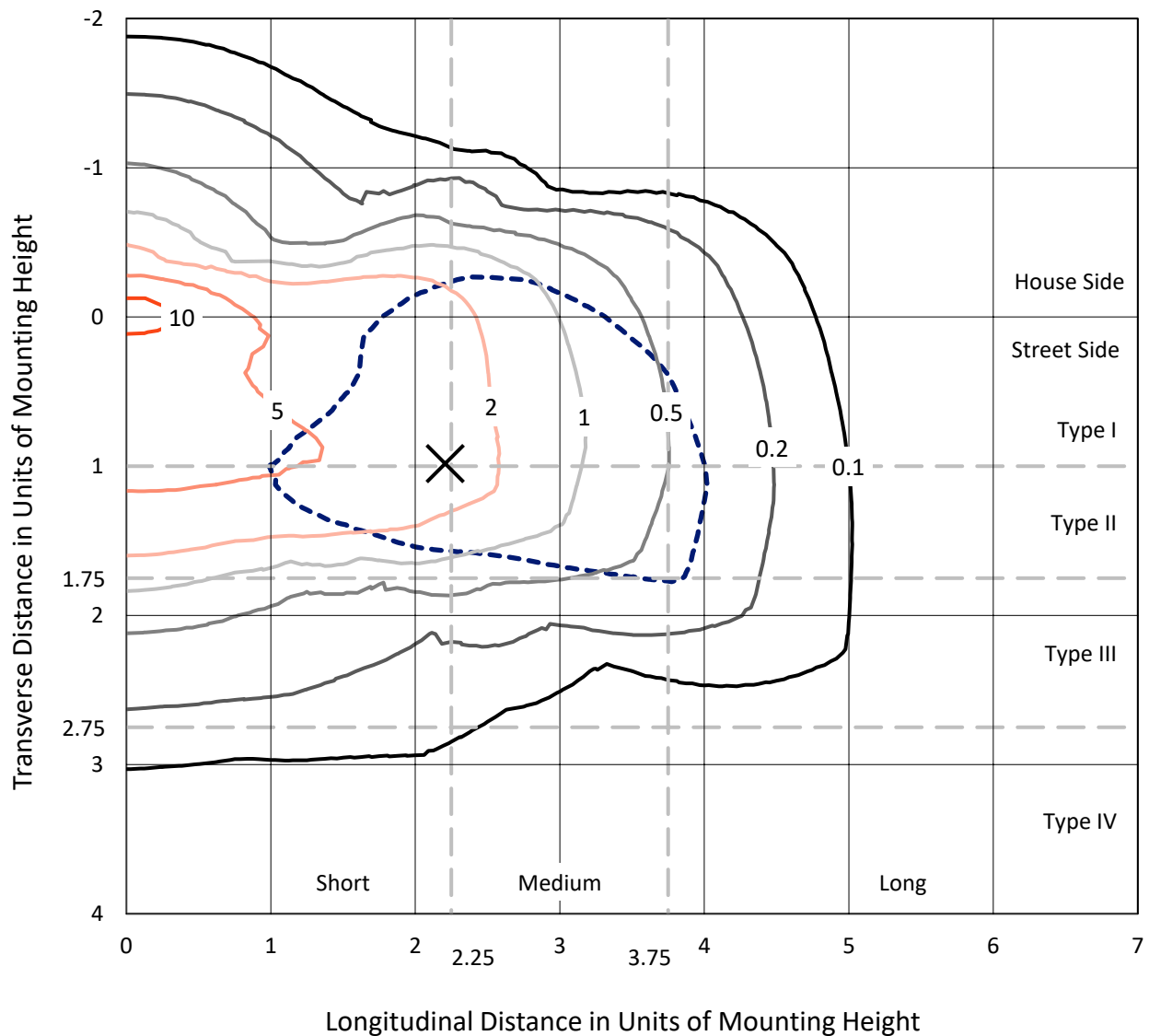
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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

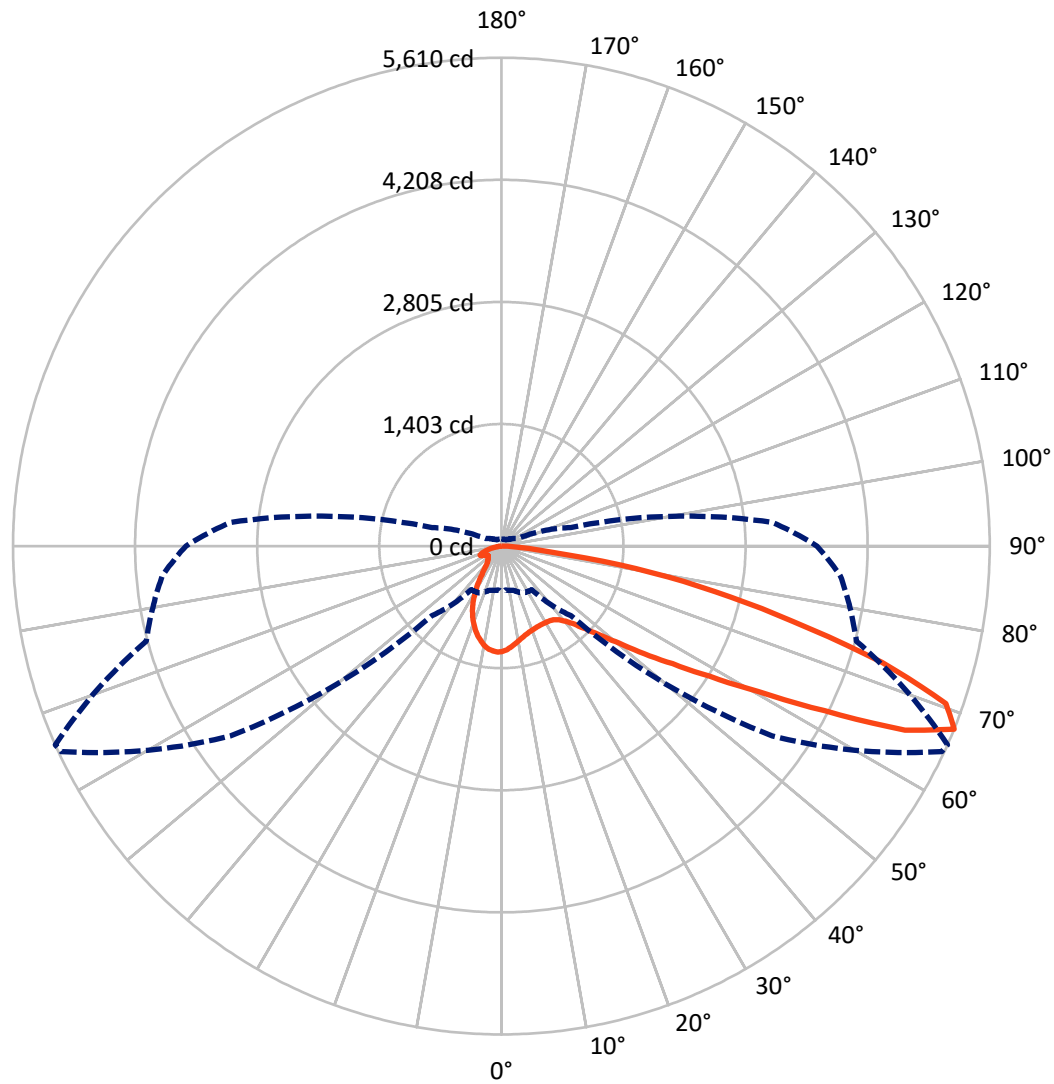


Based on 10 foot mounting height. Maximum calculated value = 12.1 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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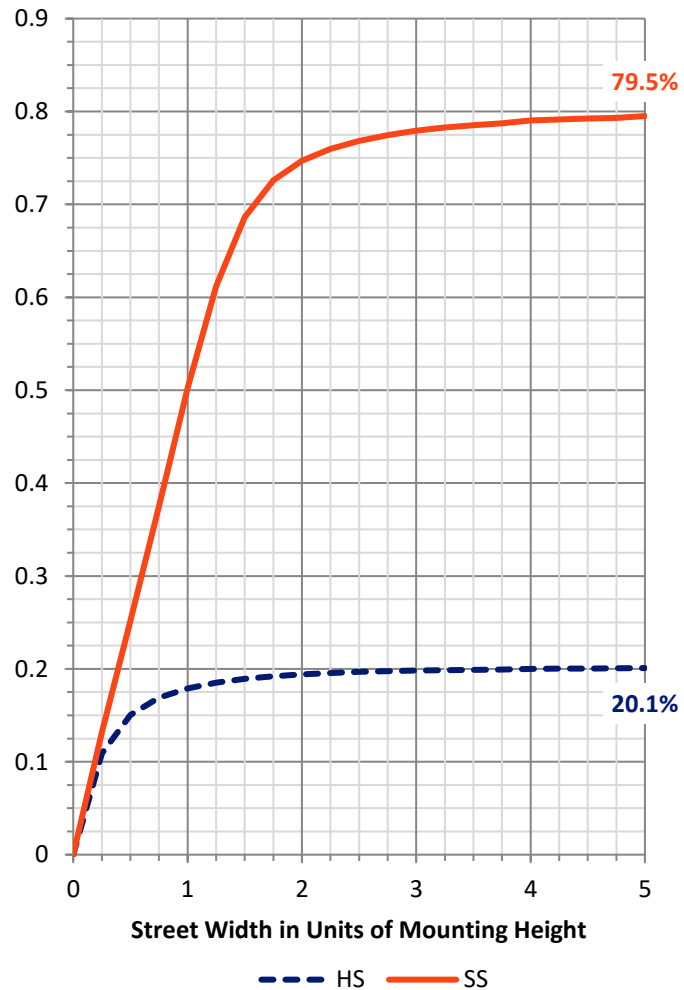
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1113.0   | 0.0    | 1113.0 |
|                    | % Fixture | 20.3     | 0.0    | 20.3   |
| <b>Street Side</b> | Lumens    | 4372.0   | 0.0    | 4372.0 |
|                    | % Fixture | 79.7     | 0.0    | 79.7   |
| <b>Total</b>       | Lumens    | 5485.0   | 0.0    | 5485.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 106.4  | 1.9       |
| 10°-20°   | 261.4  | 4.8       |
| 20°-30°   | 359.3  | 6.6       |
| 30°-40°   | 491.3  | 9.0       |
| 40°-50°   | 744.4  | 13.6      |
| 50°-60°   | 1157.2 | 21.1      |
| 60°-70°   | 1408.8 | 25.7      |
| 70°-80°   | 858.2  | 15.6      |
| 80°-90°   | 98.0   | 1.8       |
| 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°    | 5485.0 | 100.0     |
| 0°-180°   | 5485.0 | 100.0     |

**Coefficient of Utilization**



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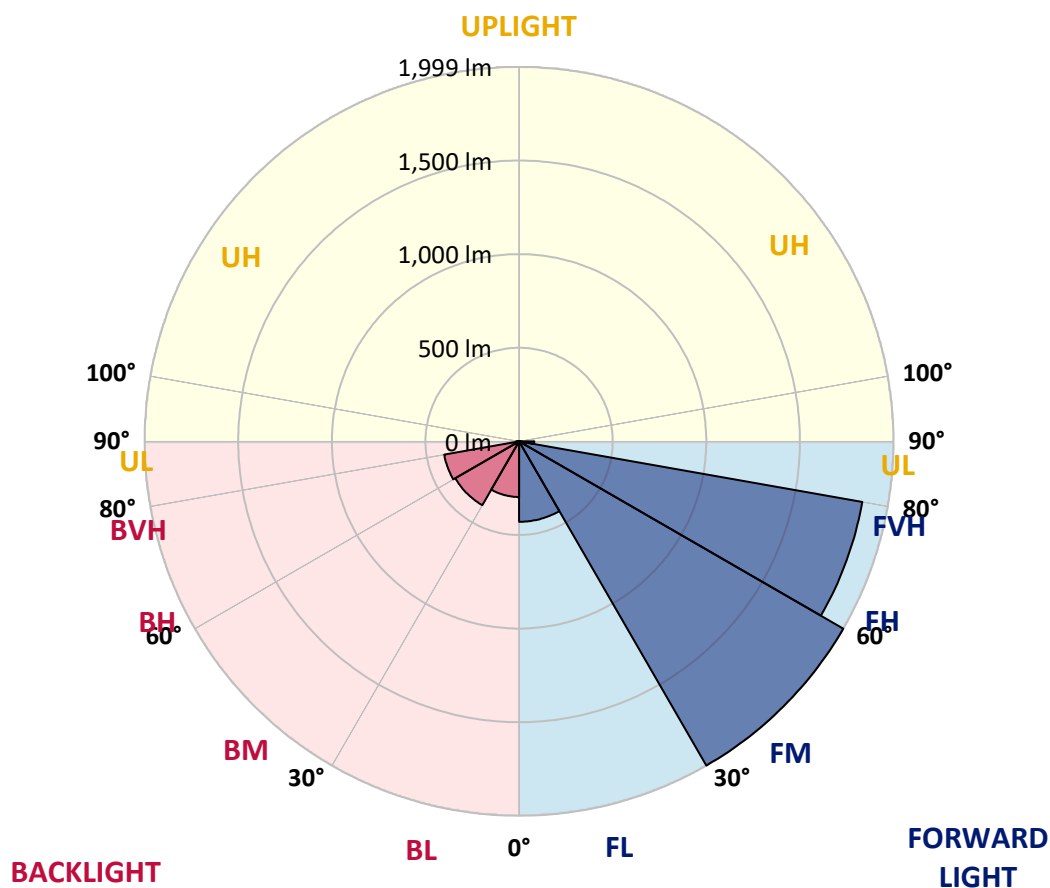
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 429.8  | 7.8       |                         |      |         |
| FM   | (30°-60°)   | 1999.5 | 36.5      |                         |      |         |
| FH   | (60°-80°)   | 1861.2 | 33.9      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 81.5   | 1.5       |                         |      | G1/100  |
| BL   | (0°-30°)    | 297.3  | 5.4       | B1/500                  |      |         |
| BM   | (30°-60°)   | 393.3  | 7.2       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 405.8  | 7.4       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 16.5   | 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 II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 66°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 |
| 2.5°  | 1135.2 | 1139.2 | 1136.8 | 1152.0 | 1152.8 | 1172.0 | 1182.8 | 1192.0 | 1192.8 | 1204.8 | 1212.8 |
| 5°    | 1057.6 | 1060.0 | 1060.0 | 1074.4 | 1084.0 | 1109.6 | 1134.4 | 1160.8 | 1162.8 | 1191.6 | 1213.6 |
| 7.5°  | 994.8  | 997.2  | 995.6  | 1014.8 | 1027.2 | 1055.6 | 1087.2 | 1127.6 | 1131.6 | 1178.0 | 1216.4 |
| 10°   | 945.5  | 944.7  | 948.7  | 966.3  | 982.3  | 1016.4 | 1051.6 | 1097.6 | 1103.6 | 1162.4 | 1219.6 |
| 12.5° | 911.9  | 912.7  | 915.1  | 933.5  | 950.7  | 984.3  | 1020.8 | 1070.8 | 1077.2 | 1144.4 | 1218.0 |
| 15°   | 895.9  | 894.3  | 896.3  | 913.1  | 929.5  | 959.1  | 996.8  | 1048.4 | 1054.8 | 1128.4 | 1218.4 |
| 17.5° | 892.3  | 891.1  | 890.7  | 902.7  | 915.1  | 942.7  | 978.7  | 1031.2 | 1038.0 | 1118.0 | 1220.8 |
| 20°   | 903.5  | 901.9  | 897.5  | 902.7  | 907.9  | 931.1  | 965.9  | 1018.8 | 1026.4 | 1111.2 | 1225.6 |
| 22.5° | 934.3  | 931.5  | 924.7  | 918.3  | 911.5  | 925.5  | 957.9  | 1009.6 | 1017.2 | 1106.8 | 1230.4 |
| 25°   | 981.1  | 978.7  | 971.5  | 957.1  | 932.3  | 929.9  | 956.3  | 1005.6 | 1013.2 | 1103.6 | 1232.4 |
| 27.5° | 1045.6 | 1042.0 | 1034.8 | 1014.0 | 973.5  | 946.3  | 962.3  | 1005.2 | 1012.4 | 1100.0 | 1230.4 |
| 30°   | 1122.0 | 1119.6 | 1115.6 | 1090.4 | 1036.4 | 981.1  | 975.9  | 1008.4 | 1014.0 | 1098.0 | 1226.4 |
| 32.5° | 1199.6 | 1197.2 | 1200.4 | 1188.4 | 1122.0 | 1038.8 | 1005.6 | 1017.2 | 1021.2 | 1097.6 | 1222.8 |
| 35°   | 1268.0 | 1270.9 | 1294.1 | 1296.1 | 1230.8 | 1116.8 | 1052.4 | 1037.6 | 1038.4 | 1105.6 | 1224.4 |
| 37.5° | 1339.7 | 1350.5 | 1380.9 | 1406.9 | 1352.5 | 1220.0 | 1122.0 | 1076.0 | 1075.2 | 1126.0 | 1234.4 |
| 40°   | 1434.5 | 1439.3 | 1478.1 | 1526.9 | 1492.9 | 1361.7 | 1220.8 | 1138.8 | 1133.2 | 1167.6 | 1261.2 |
| 42.5° | 1526.9 | 1538.5 | 1600.6 | 1656.6 | 1645.4 | 1521.3 | 1345.3 | 1232.8 | 1222.8 | 1241.2 | 1316.5 |
| 45°   | 1644.6 | 1655.8 | 1725.4 | 1797.4 | 1817.8 | 1701.8 | 1504.5 | 1366.5 | 1356.5 | 1352.1 | 1417.7 |
| 47.5° | 1762.2 | 1773.8 | 1836.3 | 1940.3 | 2011.9 | 1927.5 | 1711.8 | 1542.9 | 1526.5 | 1509.3 | 1570.6 |
| 50°   | 1841.5 | 1855.1 | 1914.7 | 2039.5 | 2207.6 | 2209.2 | 1957.5 | 1774.2 | 1753.4 | 1726.2 | 1785.8 |
| 52.5° | 1838.7 | 1847.5 | 1904.3 | 2048.3 | 2348.4 | 2532.9 | 2286.4 | 2068.7 | 2051.9 | 1992.7 | 2044.7 |
| 55°   | 1694.2 | 1707.4 | 1764.6 | 1944.7 | 2363.6 | 2839.8 | 2769.8 | 2416.1 | 2386.0 | 2280.0 | 2337.2 |
| 57.5° | 1404.1 | 1415.3 | 1472.9 | 1695.0 | 2228.8 | 2997.1 | 3383.6 | 2858.6 | 2817.4 | 2592.9 | 2658.9 |
| 60°   | 1060.0 | 1046.4 | 1073.6 | 1268.0 | 1906.3 | 3001.1 | 3925.4 | 3458.8 | 3390.0 | 2927.4 | 2982.7 |
| 62.5° | 795.5  | 781.9  | 787.9  | 842.7  | 1292.5 | 2758.6 | 4234.3 | 4279.9 | 4166.3 | 3305.2 | 3294.4 |
| 65°   | 628.6  | 621.0  | 638.2  | 675.8  | 753.5  | 2100.7 | 4236.7 | 5167.8 | 5096.2 | 3742.9 | 3614.1 |
| 67.5° | 512.2  | 507.4  | 525.0  | 594.6  | 611.0  | 1128.8 | 3798.9 | 5582.4 | 5610.4 | 4222.3 | 3910.6 |
| 70°   | 412.5  | 405.3  | 433.0  | 524.6  | 568.2  | 683.0  | 2721.4 | 5371.1 | 5416.3 | 4508.0 | 3827.0 |
| 72.5° | 284.9  | 285.3  | 299.3  | 425.0  | 548.6  | 589.8  | 1539.3 | 4472.4 | 4570.4 | 4249.1 | 3364.4 |
| 75°   | 192.1  | 193.7  | 197.7  | 280.5  | 505.4  | 572.2  | 820.3  | 3386.0 | 3455.2 | 3512.0 | 2781.0 |
| 77.5° | 116.0  | 116.8  | 126.0  | 169.7  | 348.5  | 534.2  | 555.8  | 2454.5 | 2508.9 | 2315.2 | 1723.8 |
| 80°   | 67.2   | 70.0   | 78.4   | 113.6  | 235.3  | 401.3  | 430.2  | 1504.9 | 1566.6 | 1029.2 | 547.8  |
| 82.5° | 29.6   | 31.6   | 42.8   | 66.0   | 137.2  | 341.3  | 335.7  | 594.6  | 585.8  | 286.9  | 190.1  |
| 85°   | 5.2    | 6.4    | 9.2    | 20.8   | 50.4   | 180.1  | 260.5  | 262.5  | 246.9  | 108.8  | 78.8   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 1.2    | 39.2   | 70.4   | 70.0   | 30.8   | 27.2   |
| 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-SA1E-722-U-SL2-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 | 1212.0 |
| 2.5°  | 1218.0 | 1207.2 | 1216.8 | 1218.0 | 1216.0 | 1214.4 | 1202.4 | 1192.0 | 1190.8 | 1179.6 | 1179.6 |
| 5°    | 1222.4 | 1212.4 | 1217.2 | 1208.0 | 1193.6 | 1178.8 | 1153.2 | 1135.6 | 1127.6 | 1113.2 | 1113.2 |
| 7.5°  | 1228.4 | 1218.0 | 1212.4 | 1189.6 | 1156.0 | 1123.6 | 1082.4 | 1048.0 | 1034.0 | 1013.6 | 1012.8 |
| 10°   | 1234.0 | 1220.8 | 1201.6 | 1157.2 | 1103.6 | 1052.0 | 992.0  | 943.1  | 909.9  | 885.5  | 885.5  |
| 12.5° | 1233.6 | 1216.4 | 1178.4 | 1112.8 | 1038.8 | 963.9  | 883.9  | 810.3  | 766.3  | 728.3  | 725.9  |
| 15°   | 1232.8 | 1209.2 | 1148.8 | 1061.2 | 963.1  | 859.5  | 750.7  | 654.6  | 589.4  | 552.2  | 549.0  |
| 17.5° | 1232.0 | 1200.0 | 1115.6 | 1002.4 | 871.1  | 729.9  | 586.2  | 482.2  | 427.8  | 404.9  | 405.7  |
| 20°   | 1232.0 | 1189.6 | 1080.0 | 934.7  | 765.1  | 574.6  | 430.2  | 354.5  | 340.9  | 342.1  | 343.3  |
| 22.5° | 1228.4 | 1176.8 | 1040.4 | 861.1  | 647.0  | 422.5  | 317.3  | 291.7  | 298.9  | 310.1  | 311.7  |
| 25°   | 1220.0 | 1155.6 | 994.4  | 779.5  | 506.6  | 307.7  | 258.9  | 254.1  | 267.3  | 281.3  | 285.3  |
| 27.5° | 1206.8 | 1131.2 | 942.7  | 683.8  | 372.9  | 247.3  | 227.7  | 227.3  | 237.7  | 248.1  | 251.7  |
| 30°   | 1192.8 | 1104.0 | 888.3  | 577.4  | 270.1  | 215.3  | 207.7  | 207.7  | 212.9  | 219.3  | 218.5  |
| 32.5° | 1176.4 | 1076.4 | 829.9  | 466.6  | 220.1  | 197.3  | 194.9  | 193.7  | 194.5  | 196.9  | 196.9  |
| 35°   | 1162.4 | 1052.0 | 769.9  | 349.3  | 197.3  | 187.3  | 184.9  | 182.1  | 180.9  | 179.3  | 180.1  |
| 37.5° | 1157.2 | 1032.8 | 707.9  | 263.3  | 186.1  | 180.1  | 176.1  | 172.1  | 169.3  | 168.5  | 168.1  |
| 40°   | 1165.6 | 1024.8 | 645.8  | 216.9  | 178.1  | 172.5  | 168.1  | 162.9  | 160.5  | 160.5  | 160.5  |
| 42.5° | 1198.4 | 1030.8 | 582.6  | 196.1  | 172.5  | 166.1  | 159.7  | 154.9  | 154.1  | 154.9  | 155.3  |
| 45°   | 1258.4 | 1054.0 | 517.0  | 185.7  | 167.7  | 159.7  | 152.1  | 148.5  | 148.5  | 149.3  | 149.3  |
| 47.5° | 1365.7 | 1114.8 | 452.2  | 179.3  | 162.9  | 154.5  | 146.5  | 142.9  | 142.5  | 143.3  | 143.3  |
| 50°   | 1551.3 | 1224.4 | 393.7  | 174.9  | 159.3  | 150.5  | 142.5  | 137.6  | 136.4  | 136.0  | 136.0  |
| 52.5° | 1785.4 | 1414.5 | 356.5  | 171.7  | 154.9  | 146.1  | 138.0  | 131.6  | 129.2  | 128.0  | 128.0  |
| 55°   | 2068.3 | 1667.8 | 356.5  | 169.3  | 149.3  | 140.8  | 131.6  | 125.2  | 121.6  | 120.0  | 120.0  |
| 57.5° | 2388.8 | 1962.7 | 418.1  | 167.3  | 144.9  | 134.8  | 124.8  | 118.4  | 114.4  | 112.0  | 112.0  |
| 60°   | 2715.0 | 2274.4 | 570.6  | 164.5  | 140.8  | 127.2  | 117.2  | 111.2  | 106.0  | 103.2  | 102.8  |
| 62.5° | 3053.1 | 2617.7 | 771.5  | 166.1  | 138.0  | 120.0  | 109.2  | 102.4  | 98.0   | 95.2   | 94.8   |
| 65°   | 3362.8 | 2944.6 | 947.1  | 178.5  | 138.4  | 113.6  | 100.0  | 94.0   | 90.4   | 86.8   | 86.4   |
| 67.5° | 3625.7 | 3125.1 | 823.9  | 203.7  | 146.9  | 106.0  | 90.8   | 84.8   | 81.6   | 79.2   | 78.8   |
| 70°   | 3441.6 | 2849.8 | 467.4  | 219.3  | 158.5  | 98.0   | 80.4   | 76.4   | 73.2   | 71.6   | 71.2   |
| 72.5° | 2943.0 | 2412.9 | 312.5  | 193.7  | 144.5  | 87.6   | 70.8   | 67.6   | 65.2   | 63.2   | 62.8   |
| 75°   | 2384.0 | 1913.5 | 238.9  | 158.9  | 112.4  | 71.2   | 60.8   | 58.4   | 56.0   | 54.0   | 53.6   |
| 77.5° | 1410.5 | 1105.6 | 176.1  | 125.6  | 79.2   | 55.6   | 50.4   | 48.4   | 46.0   | 44.4   | 44.0   |
| 80°   | 450.2  | 384.1  | 111.6  | 86.4   | 52.4   | 42.8   | 38.8   | 37.2   | 34.8   | 32.8   | 32.4   |
| 82.5° | 171.7  | 148.5  | 59.2   | 44.0   | 34.8   | 29.2   | 26.0   | 24.4   | 22.8   | 20.8   | 20.4   |
| 85°   | 76.0   | 71.2   | 32.8   | 23.6   | 18.8   | 14.4   | 12.8   | 12.0   | 10.0   | 8.4    | 8.0    |
| 87.5° | 26.8   | 26.8   | 14.0   | 6.8    | 4.0    | 2.0    | 1.2    | 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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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)