

Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P320186

Luminaire Tested: **GLEON-SA2A-722-U-SL4**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P320186  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-24)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA2A-722-U-SL4  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(2) 70 CRI, 2200K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV SPILL  
LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6659 lumens  
Efficiency: N/A  
Efficacy: 100.9 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G3

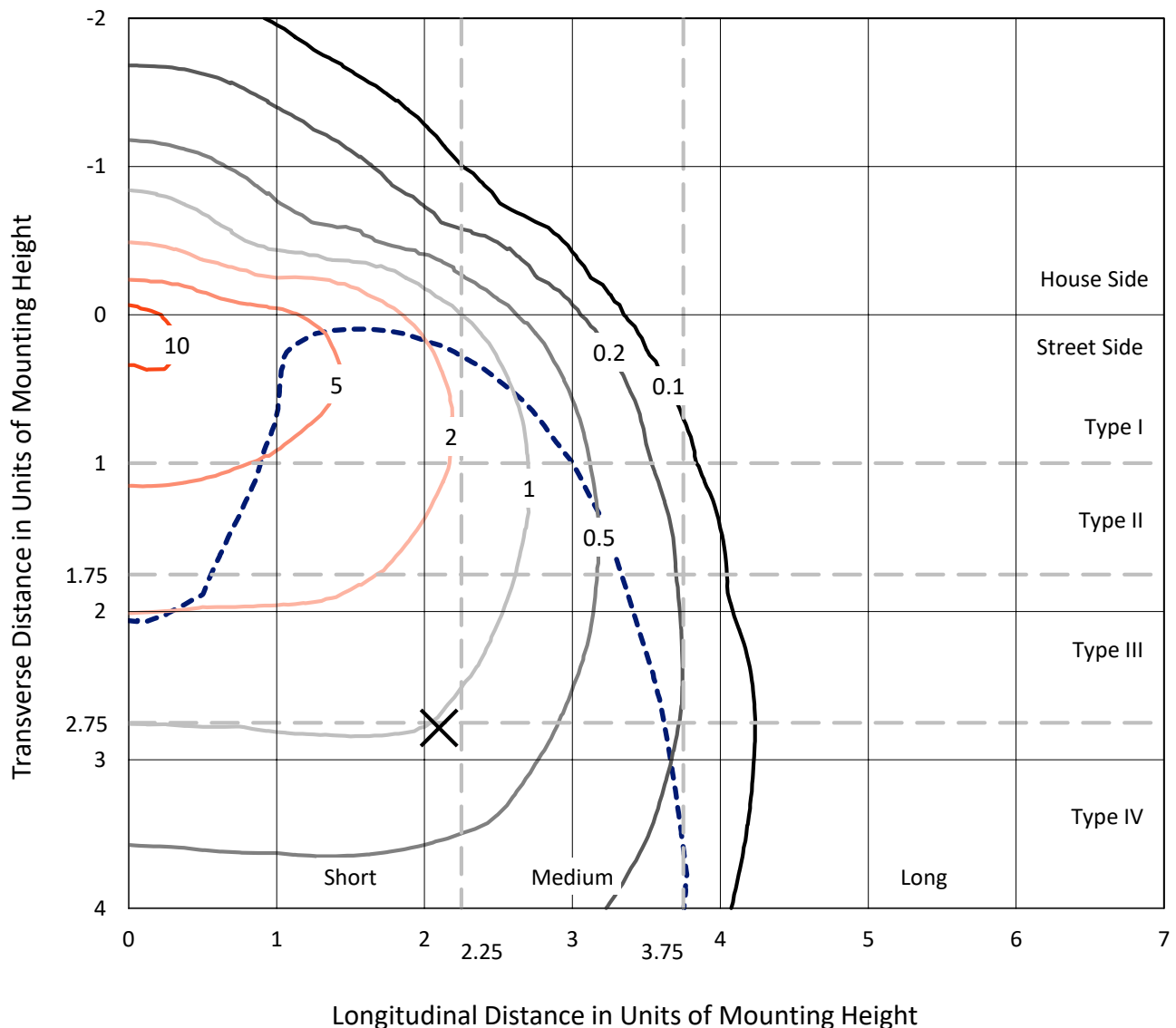
Input Watts (W): 66  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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 CATALOG NUMBER: GLEON-SA2A-722-U-SL4

## Iso-Footcandle Lines of Horizontal Illumination

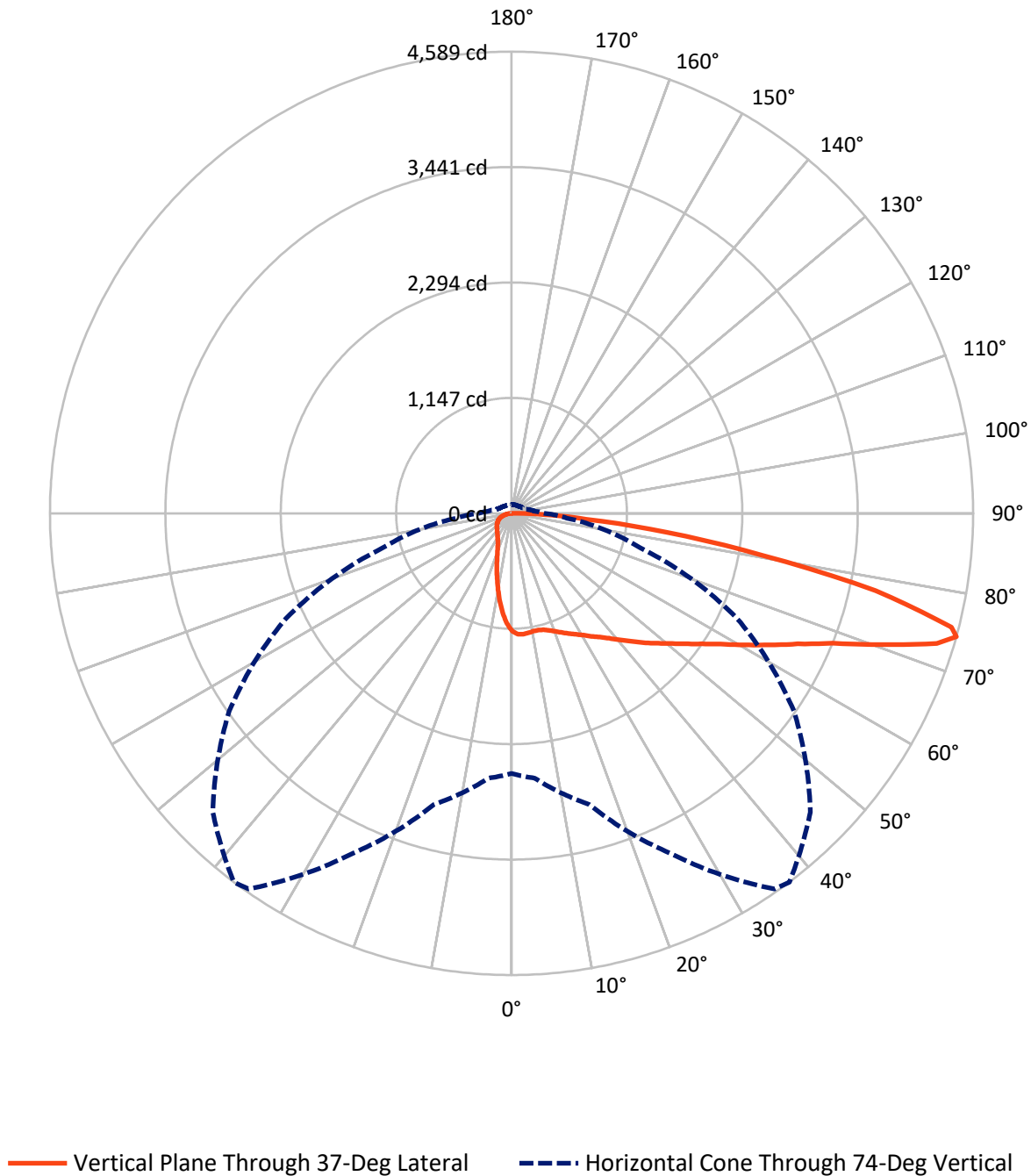
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 11.9 fc  
 Type IV - Short - N/A

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CATALOG NUMBER: GLEON-SA2A-722-U-SL4

## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA2A-722-U-SL4

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 916.2    | 0.0    | 916.2  |
|                    | % Fixture | 13.8     | 0.0    | 13.8   |
| <b>Street Side</b> | Lumens    | 5742.8   | 0.0    | 5742.8 |
|                    | % Fixture | 86.2     | 0.0    | 86.2   |
| <b>Total</b>       | Lumens    | 6659.0   | 0.0    | 6659.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 103.3  | 1.6       |
| 10°-20°   | 264.8  | 4.0       |
| 20°-30°   | 408.1  | 6.1       |
| 30°-40°   | 593.4  | 8.9       |
| 40°-50°   | 873.4  | 13.1      |
| 50°-60°   | 1226.5 | 18.4      |
| 60°-70°   | 1552.4 | 23.3      |
| 70°-80°   | 1366.9 | 20.5      |
| 80°-90°   | 270.3  | 4.1       |
| 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°    | 6659.0 | 100.0     |
| 0°-180°   | 6659.0 | 100.0     |

**Coefficient of Utilization**



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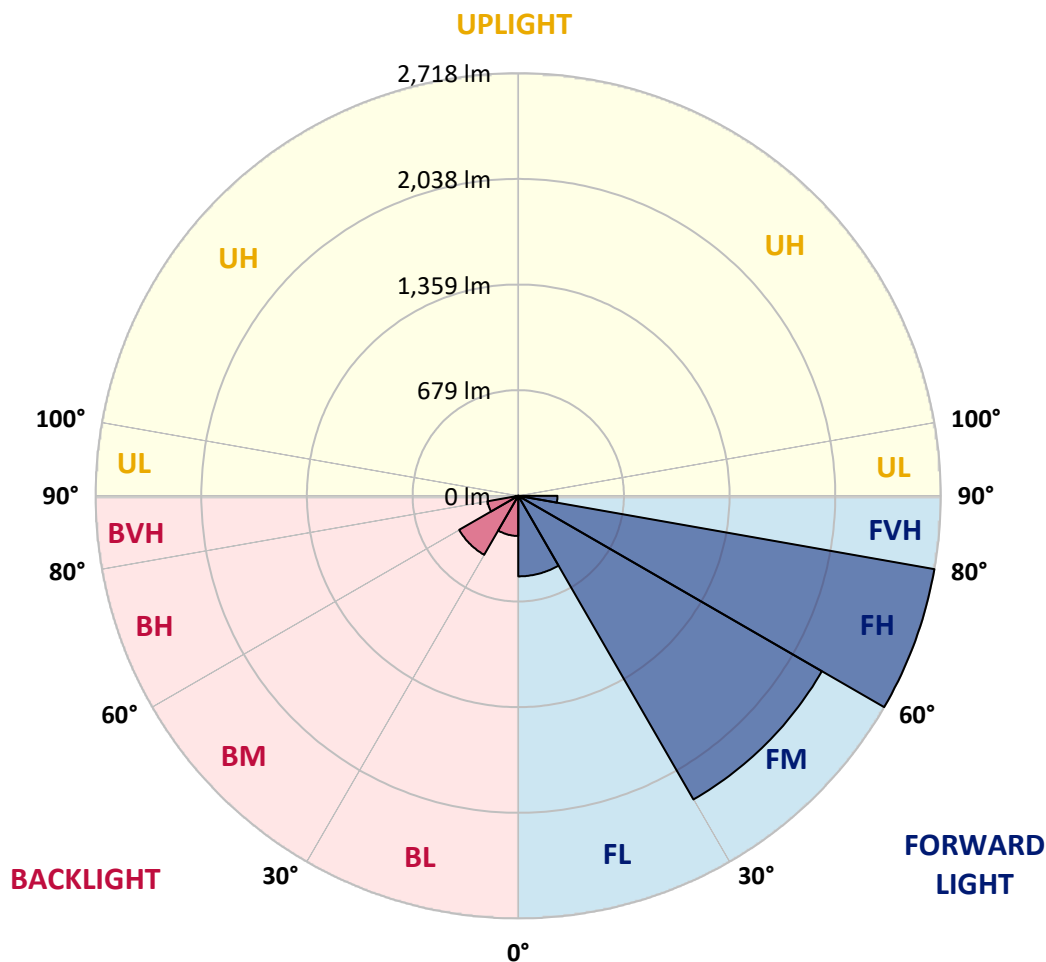
CATALOG NUMBER: GLEON-SA2A-722-U-SL4

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 518.1  | 7.8       |                         |      |         |
| FM   | (30°-60°)   | 2254.8 | 33.9      |                         |      |         |
| FH   | (60°-80°)   | 2717.9 | 40.8      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 252.0  | 3.8       |                         |      | G3/500  |
| BL   | (0°-30°)    | 258.1  | 3.9       | B1/500                  |      |         |
| BM   | (30°-60°)   | 438.5  | 6.6       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 201.4  | 3.0       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 18.3   | 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-G3**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 37°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 |
| 2.5°  | 1213.4 | 1213.6 | 1213.4 | 1211.5 | 1207.1 | 1203.3 | 1200.3 | 1195.8 | 1186.0 | 1178.5 | 1167.2 |
| 5°    | 1224.9 | 1223.5 | 1222.5 | 1219.0 | 1212.0 | 1207.8 | 1201.9 | 1193.5 | 1177.3 | 1162.3 | 1144.0 |
| 7.5°  | 1219.5 | 1217.9 | 1215.7 | 1211.5 | 1203.5 | 1200.0 | 1191.8 | 1180.8 | 1161.3 | 1141.6 | 1115.4 |
| 10°   | 1202.8 | 1202.4 | 1201.4 | 1200.5 | 1193.7 | 1190.9 | 1183.4 | 1171.6 | 1152.4 | 1128.5 | 1097.8 |
| 12.5° | 1184.3 | 1185.5 | 1189.2 | 1194.2 | 1191.1 | 1189.7 | 1185.0 | 1177.0 | 1157.3 | 1131.5 | 1094.5 |
| 15°   | 1172.6 | 1175.9 | 1186.0 | 1198.9 | 1201.4 | 1201.0 | 1199.8 | 1194.6 | 1173.8 | 1145.1 | 1102.0 |
| 17.5° | 1168.6 | 1174.0 | 1193.2 | 1214.6 | 1222.1 | 1223.7 | 1224.2 | 1215.3 | 1192.1 | 1161.8 | 1109.7 |
| 20°   | 1175.9 | 1182.7 | 1210.8 | 1240.1 | 1252.1 | 1253.0 | 1250.9 | 1235.4 | 1209.4 | 1176.1 | 1113.9 |
| 22.5° | 1197.9 | 1204.0 | 1239.2 | 1272.3 | 1285.9 | 1287.3 | 1281.0 | 1257.5 | 1227.7 | 1193.0 | 1119.8 |
| 25°   | 1240.4 | 1247.9 | 1283.1 | 1316.1 | 1323.2 | 1323.4 | 1314.3 | 1285.2 | 1251.6 | 1216.7 | 1132.5 |
| 27.5° | 1295.7 | 1303.2 | 1334.9 | 1367.3 | 1363.5 | 1361.4 | 1349.0 | 1319.9 | 1282.8 | 1249.3 | 1155.0 |
| 30°   | 1357.4 | 1365.6 | 1395.7 | 1418.6 | 1409.7 | 1405.5 | 1395.4 | 1357.9 | 1326.2 | 1293.9 | 1189.5 |
| 32.5° | 1421.2 | 1428.7 | 1455.0 | 1470.7 | 1459.5 | 1457.6 | 1442.3 | 1408.1 | 1382.8 | 1361.9 | 1245.3 |
| 35°   | 1486.7 | 1492.1 | 1517.9 | 1526.8 | 1511.8 | 1511.3 | 1507.1 | 1475.6 | 1459.7 | 1469.5 | 1326.5 |
| 37.5° | 1553.5 | 1554.9 | 1577.0 | 1577.4 | 1573.0 | 1574.9 | 1579.3 | 1559.6 | 1564.1 | 1594.8 | 1432.0 |
| 40°   | 1613.1 | 1616.9 | 1632.8 | 1637.7 | 1645.5 | 1652.0 | 1674.3 | 1661.4 | 1695.9 | 1750.3 | 1563.4 |
| 42.5° | 1657.2 | 1664.5 | 1690.0 | 1702.7 | 1727.8 | 1738.1 | 1769.6 | 1781.5 | 1850.9 | 1932.6 | 1719.6 |
| 45°   | 1694.5 | 1705.8 | 1746.8 | 1772.8 | 1815.3 | 1833.4 | 1878.4 | 1918.5 | 2026.2 | 2130.3 | 1884.0 |
| 47.5° | 1734.8 | 1749.1 | 1800.5 | 1850.2 | 1907.9 | 1928.4 | 2010.2 | 2070.3 | 2213.1 | 2329.2 | 2039.1 |
| 50°   | 1794.2 | 1805.2 | 1855.4 | 1933.5 | 2005.5 | 2031.8 | 2145.1 | 2231.2 | 2403.1 | 2518.8 | 2173.5 |
| 52.5° | 1877.0 | 1872.8 | 1915.2 | 2024.8 | 2121.4 | 2153.8 | 2289.1 | 2402.4 | 2595.7 | 2690.2 | 2287.0 |
| 55°   | 1960.3 | 1953.2 | 1983.0 | 2120.2 | 2256.5 | 2290.5 | 2447.7 | 2574.3 | 2778.9 | 2844.6 | 2374.0 |
| 57.5° | 2052.9 | 2039.5 | 2064.6 | 2227.9 | 2410.4 | 2451.0 | 2625.2 | 2757.1 | 2959.0 | 2969.3 | 2429.4 |
| 60°   | 2148.4 | 2130.3 | 2158.5 | 2361.4 | 2605.8 | 2653.6 | 2833.1 | 2935.3 | 3128.9 | 3069.3 | 2447.2 |
| 62.5° | 2231.9 | 2219.2 | 2262.6 | 2510.3 | 2826.0 | 2878.6 | 3037.1 | 3124.9 | 3296.3 | 3110.8 | 2382.9 |
| 65°   | 2304.8 | 2306.9 | 2382.0 | 2677.8 | 3071.6 | 3127.7 | 3271.2 | 3358.5 | 3428.2 | 3086.2 | 2232.6 |
| 67.5° | 2391.9 | 2403.8 | 2531.9 | 2898.3 | 3380.8 | 3442.2 | 3611.8 | 3613.2 | 3501.8 | 2941.7 | 1936.6 |
| 70°   | 2518.8 | 2543.4 | 2738.1 | 3204.1 | 3820.3 | 3904.8 | 4035.7 | 3762.9 | 3398.4 | 2549.9 | 1523.7 |
| 72.5° | 2631.3 | 2677.3 | 2957.4 | 3554.1 | 4356.1 | 4420.1 | 4283.6 | 3676.6 | 2966.1 | 1911.0 | 949.3  |
| 74°   | 2585.6 | 2642.6 | 2997.3 | 3726.5 | 4557.8 | 4588.5 | 4199.9 | 3424.6 | 2473.0 | 1323.4 | 551.7  |
| 75°   | 2487.1 | 2549.0 | 2939.1 | 3724.9 | 4532.2 | 4515.1 | 3997.7 | 3136.8 | 2036.7 | 902.6  | 367.1  |
| 77.5° | 2007.2 | 2072.6 | 2476.5 | 3192.4 | 3716.2 | 3700.0 | 3070.9 | 2104.3 | 892.0  | 296.0  | 186.5  |
| 80°   | 1167.0 | 1216.9 | 1537.3 | 2027.3 | 2505.8 | 2535.2 | 2019.6 | 1041.2 | 350.9  | 166.3  | 126.4  |
| 82.5° | 518.4  | 552.9  | 742.6  | 1034.9 | 1512.2 | 1550.0 | 1057.6 | 545.6  | 216.7  | 101.1  | 76.0   |
| 85°   | 340.1  | 365.7  | 450.8  | 492.8  | 720.1  | 745.9  | 517.7  | 424.8  | 143.1  | 55.6   | 55.8   |
| 87.5° | 244.7  | 269.3  | 335.0  | 292.5  | 330.5  | 312.9  | 281.7  | 393.1  | 57.5   | 31.7   | 18.8   |
| 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: GLEON-SA2A-722-U-SL4

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 | 1173.3 |
| 2.5°  | 1162.3 | 1158.5 | 1150.1 | 1134.1 | 1125.2 | 1117.7 | 1105.3 | 1098.0 | 1094.7 | 1094.5 | 1095.9 |
| 5°    | 1133.4 | 1124.7 | 1102.9 | 1076.2 | 1054.8 | 1035.4 | 1011.2 | 996.7  | 986.3  | 980.2  | 981.9  |
| 7.5°  | 1099.9 | 1086.3 | 1052.0 | 1009.3 | 975.1  | 937.3  | 900.0  | 877.7  | 860.4  | 847.5  | 849.8  |
| 10°   | 1076.9 | 1058.1 | 1008.2 | 946.7  | 889.7  | 834.8  | 783.4  | 752.7  | 728.3  | 709.6  | 711.0  |
| 12.5° | 1069.1 | 1043.8 | 974.6  | 892.5  | 812.5  | 737.5  | 670.4  | 623.2  | 598.1  | 576.8  | 578.4  |
| 15°   | 1070.3 | 1036.3 | 946.5  | 843.7  | 743.1  | 648.6  | 567.2  | 512.1  | 478.0  | 463.3  | 463.5  |
| 17.5° | 1071.3 | 1027.6 | 916.9  | 791.4  | 674.4  | 565.5  | 477.1  | 421.3  | 389.1  | 375.5  | 375.8  |
| 20°   | 1068.2 | 1013.6 | 880.3  | 731.4  | 602.6  | 489.3  | 403.7  | 356.3  | 331.9  | 321.4  | 321.4  |
| 22.5° | 1064.2 | 996.9  | 839.0  | 671.1  | 531.8  | 423.2  | 351.1  | 315.0  | 300.9  | 293.9  | 293.7  |
| 25°   | 1066.1 | 984.5  | 796.8  | 609.2  | 466.5  | 370.4  | 316.2  | 292.3  | 282.9  | 278.4  | 278.2  |
| 27.5° | 1076.2 | 978.6  | 757.9  | 547.5  | 409.5  | 330.7  | 292.7  | 275.8  | 269.7  | 266.9  | 266.9  |
| 30°   | 1094.5 | 978.6  | 717.3  | 494.9  | 362.2  | 301.4  | 274.7  | 263.2  | 259.0  | 257.1  | 257.1  |
| 32.5° | 1126.4 | 984.0  | 678.1  | 442.9  | 324.4  | 278.4  | 259.7  | 251.9  | 248.6  | 247.7  | 247.7  |
| 35°   | 1181.3 | 1002.3 | 639.9  | 393.6  | 293.9  | 259.7  | 245.4  | 240.9  | 238.6  | 238.3  | 239.0  |
| 37.5° | 1258.4 | 1039.6 | 604.0  | 357.2  | 272.3  | 244.4  | 233.4  | 229.9  | 228.5  | 229.6  | 230.6  |
| 40°   | 1355.5 | 1090.3 | 571.4  | 324.4  | 255.9  | 232.2  | 222.4  | 220.0  | 219.3  | 221.0  | 222.4  |
| 42.5° | 1472.8 | 1158.7 | 544.7  | 300.7  | 243.2  | 221.9  | 213.0  | 210.2  | 209.5  | 211.3  | 213.2  |
| 45°   | 1599.7 | 1232.4 | 525.9  | 283.1  | 233.4  | 214.2  | 204.8  | 201.7  | 200.3  | 201.3  | 203.4  |
| 47.5° | 1715.1 | 1302.1 | 518.4  | 270.7  | 224.0  | 207.6  | 197.5  | 193.8  | 191.4  | 190.9  | 192.6  |
| 50°   | 1812.5 | 1353.9 | 521.9  | 263.2  | 216.5  | 200.3  | 190.5  | 186.2  | 182.7  | 180.6  | 181.8  |
| 52.5° | 1883.3 | 1386.5 | 525.2  | 259.9  | 210.6  | 192.3  | 182.7  | 178.7  | 174.0  | 170.5  | 170.5  |
| 55°   | 1934.7 | 1394.0 | 517.9  | 257.3  | 206.2  | 183.7  | 174.0  | 170.3  | 165.6  | 161.6  | 161.1  |
| 57.5° | 1954.9 | 1372.9 | 490.9  | 253.6  | 203.1  | 175.5  | 164.9  | 162.1  | 158.1  | 153.4  | 153.2  |
| 60°   | 1927.6 | 1307.7 | 438.9  | 245.6  | 199.1  | 168.7  | 155.8  | 153.9  | 152.0  | 147.5  | 147.3  |
| 62.5° | 1818.3 | 1164.6 | 371.5  | 229.4  | 191.2  | 161.4  | 147.3  | 148.2  | 148.5  | 145.4  | 145.0  |
| 65°   | 1620.1 | 968.0  | 305.9  | 208.3  | 179.2  | 152.7  | 138.6  | 143.1  | 145.7  | 145.2  | 144.5  |
| 67.5° | 1332.1 | 753.4  | 259.2  | 186.0  | 163.5  | 140.7  | 129.2  | 134.4  | 136.5  | 138.2  | 137.7  |
| 70°   | 988.7  | 531.3  | 214.4  | 162.6  | 144.5  | 126.7  | 117.0  | 119.6  | 118.2  | 120.1  | 120.8  |
| 72.5° | 551.2  | 318.8  | 174.8  | 139.1  | 124.8  | 110.2  | 103.4  | 103.0  | 99.9   | 99.9   | 99.9   |
| 74°   | 330.7  | 233.9  | 153.6  | 124.6  | 112.8  | 99.5   | 93.6   | 91.5   | 88.7   | 88.9   | 88.7   |
| 75°   | 266.0  | 201.0  | 141.0  | 114.9  | 104.4  | 93.1   | 87.3   | 84.4   | 82.3   | 82.3   | 82.1   |
| 77.5° | 167.9  | 152.7  | 113.5  | 91.5   | 83.5   | 76.7   | 72.7   | 69.0   | 69.0   | 68.7   | 68.5   |
| 80°   | 126.9  | 121.5  | 88.4   | 69.2   | 64.0   | 58.9   | 56.3   | 54.7   | 54.7   | 55.4   | 55.1   |
| 82.5° | 87.0   | 91.5   | 62.2   | 48.3   | 45.7   | 42.0   | 41.5   | 41.8   | 41.0   | 40.1   | 39.9   |
| 85°   | 63.6   | 68.7   | 42.0   | 30.5   | 27.9   | 25.6   | 27.4   | 28.4   | 27.2   | 25.1   | 24.2   |
| 87.5° | 24.4   | 45.0   | 22.5   | 12.7   | 11.7   | 10.1   | 11.7   | 12.2   | 13.1   | 10.3   | 10.6   |
| 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

REPORT NUMBER: SP1-1908-441-10-R4

**Photopic Flux vs. Wavelength**



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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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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)