

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: P317648

Luminaire Tested: **GLEON-SA4C-722-U-T2R**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P317648  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-8)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA4C-722-U-T2R  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(4) 70 CRI, 2200K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 21851 lumens  
Efficiency: N/A  
Efficacy: 97.1 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G3

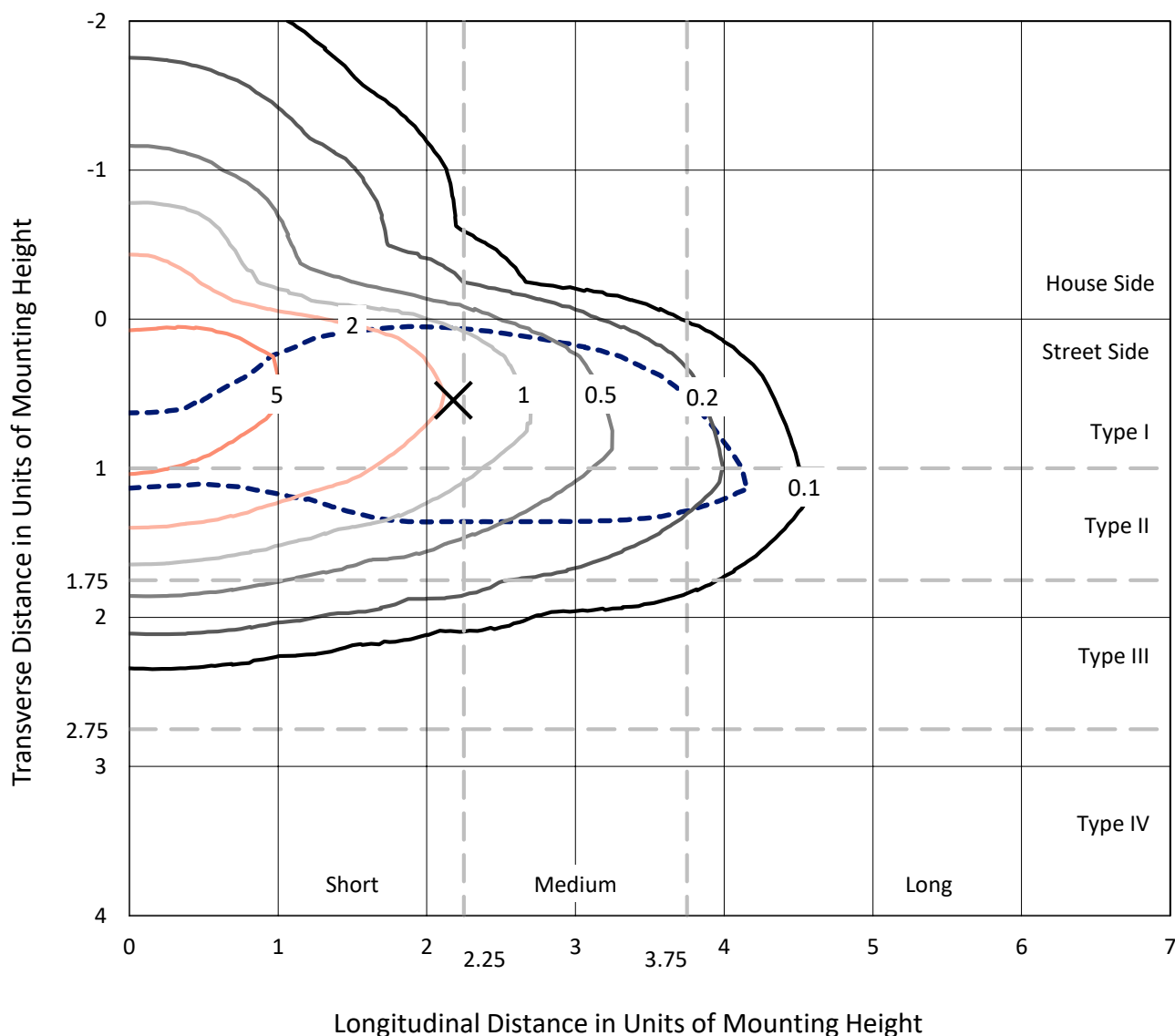
Input Watts (W): 225  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P317648  
 CATALOG NUMBER: GLEON-SA4C-722-U-T2R

## Iso-Footcandle Lines of Horizontal Illumination

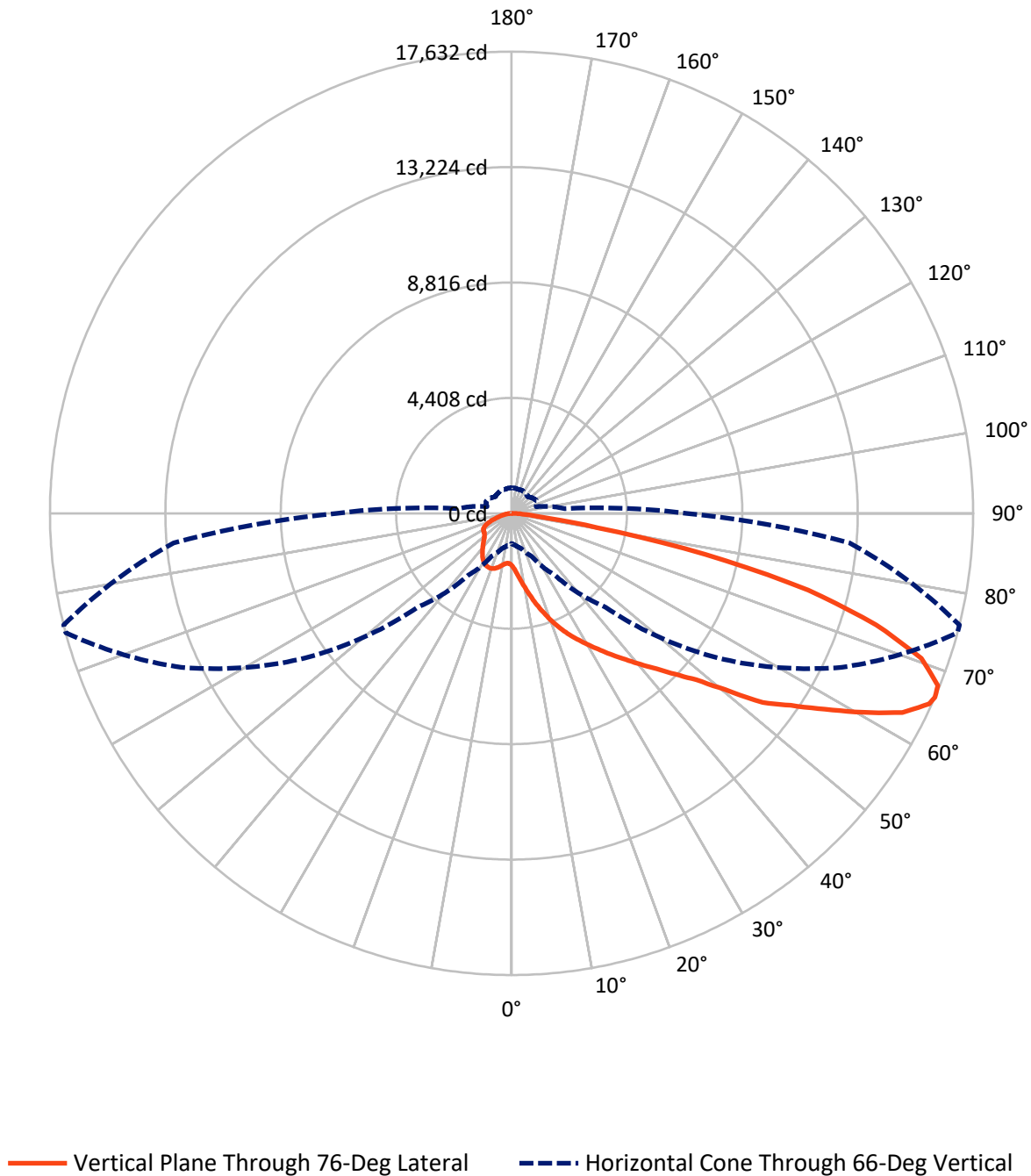
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 8.5 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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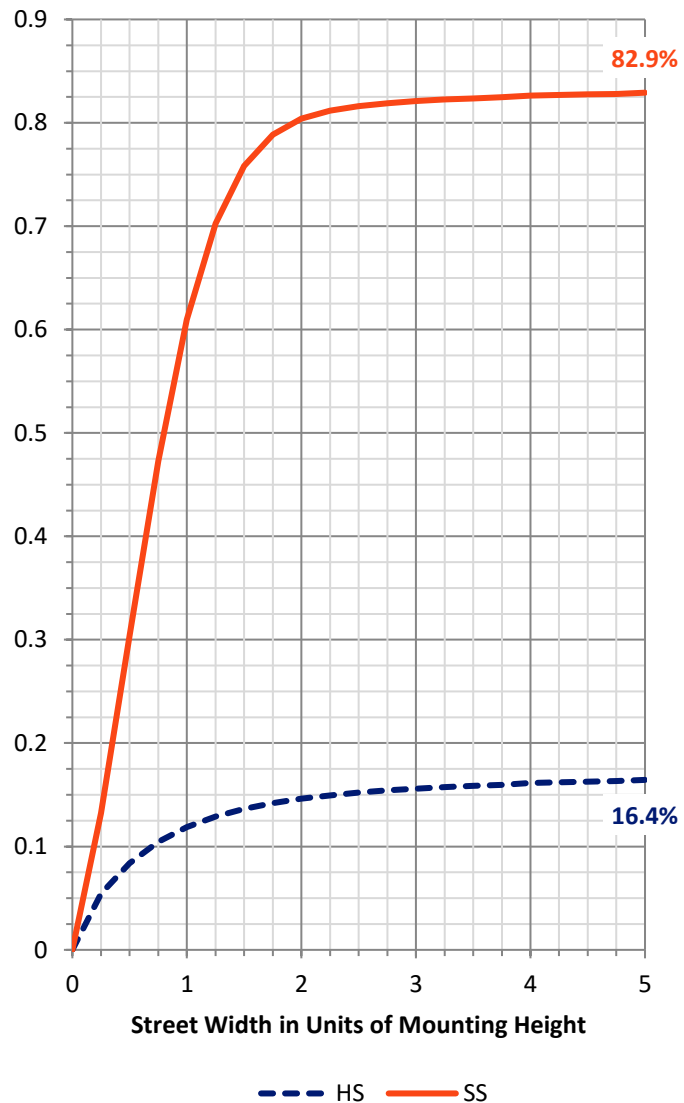
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3676.8   | 0.0    | 3676.8  |
|                    | % Fixture | 16.8     | 0.0    | 16.8    |
| <b>Street Side</b> | Lumens    | 18174.2  | 0.0    | 18174.2 |
|                    | % Fixture | 83.2     | 0.0    | 83.2    |
| <b>Total</b>       | Lumens    | 21851.0  | 0.0    | 21851.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 241.3   | 1.1       |
| 10°-20°   | 952.9   | 4.4       |
| 20°-30°   | 1851.7  | 8.5       |
| 30°-40°   | 3022.4  | 13.8      |
| 40°-50°   | 4129.4  | 18.9      |
| 50°-60°   | 4809.9  | 22.0      |
| 60°-70°   | 4312.2  | 19.7      |
| 70°-80°   | 2179.2  | 10.0      |
| 80°-90°   | 351.9   | 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°    | 21851.0 | 100.0     |
| 0°-180°   | 21851.0 | 100.0     |

**Coefficient of Utilization**



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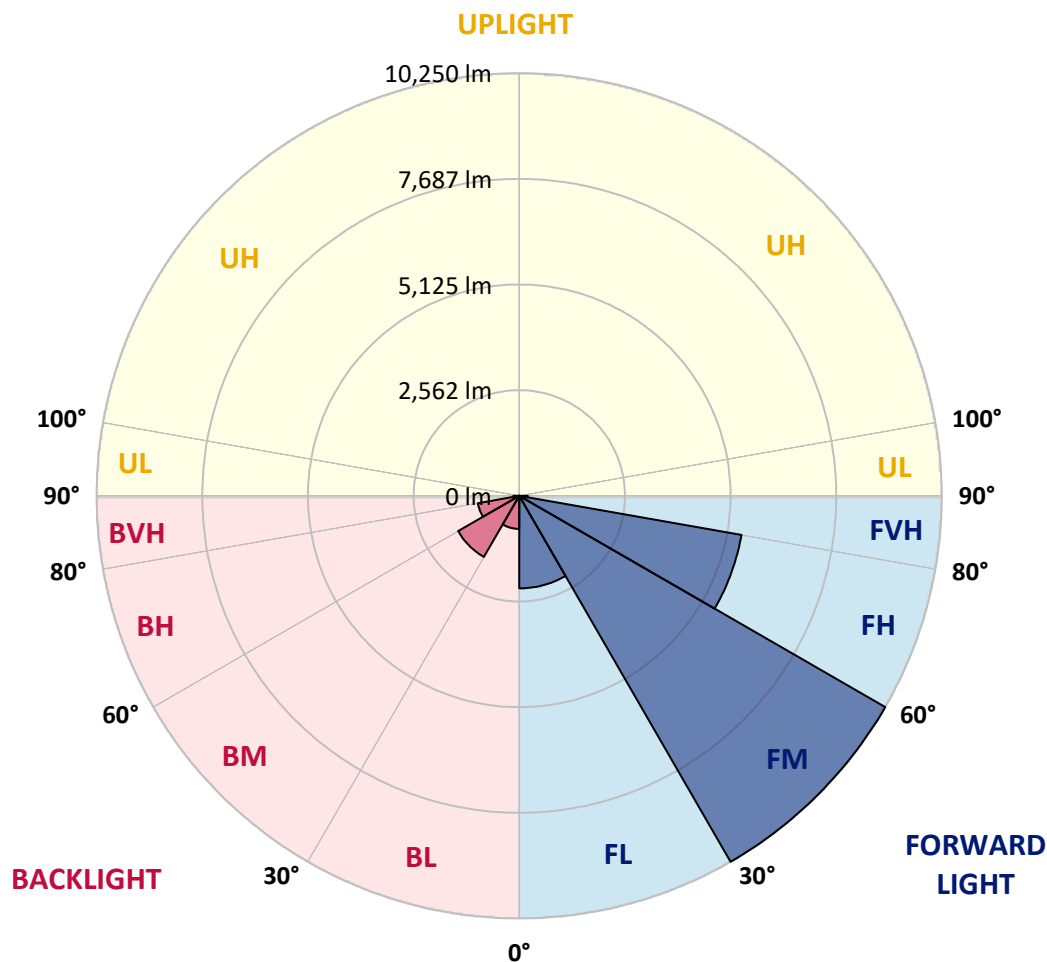
CATALOG NUMBER: GLEON-SA4C-722-U-T2R

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2244.0  | 10.3      |                         |      |         |
| FM   | (30°-60°)   | 10249.6 | 46.9      |                         |      |         |
| FH   | (60°-80°)   | 5472.7  | 25.0      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 207.8   | 1.0       |                         |      | G2/225  |
| BL   | (0°-30°)    | 801.9   | 3.7       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1712.1  | 7.8       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1018.6  | 4.7       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 144.1   | 0.7       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°     | 55°     | 65°     | 75°     | 76°     | 85°     |
|-------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| 0°    | 1995.5 | 1995.5 | 1995.5 | 1995.5 | 1995.5 | 1995.5  | 1995.5  | 1995.5  | 1995.5  | 1995.5  | 1995.5  |
| 2.5°  | 2649.0 | 2609.0 | 2605.3 | 2546.7 | 2533.3 | 2421.3  | 2339.0  | 2252.9  | 2155.0  | 2135.7  | 2058.5  |
| 5°    | 3402.7 | 3399.0 | 3347.8 | 3252.1 | 3177.2 | 2985.8  | 2796.7  | 2596.4  | 2376.8  | 2341.2  | 2167.6  |
| 7.5°  | 4080.7 | 4074.8 | 4035.5 | 3932.4 | 3824.1 | 3588.9  | 3318.9  | 3011.8  | 2655.7  | 2603.0  | 2315.2  |
| 10°   | 4595.6 | 4593.3 | 4580.0 | 4504.3 | 4412.3 | 4186.8  | 3888.6  | 3469.5  | 2979.9  | 2907.9  | 2499.9  |
| 12.5° | 4993.2 | 4997.6 | 5006.5 | 4979.8 | 4936.1 | 4743.9  | 4438.3  | 3954.6  | 3325.6  | 3254.4  | 2705.4  |
| 15°   | 5262.5 | 5275.8 | 5321.8 | 5359.6 | 5382.6 | 5264.7  | 4968.7  | 4450.9  | 3712.8  | 3627.5  | 2933.1  |
| 17.5° | 5398.2 | 5413.0 | 5492.4 | 5606.7 | 5712.0 | 5700.1  | 5465.0  | 4924.2  | 4084.4  | 4002.1  | 3177.9  |
| 20°   | 5515.4 | 5526.5 | 5615.6 | 5752.8 | 5939.0 | 6021.3  | 5889.3  | 5379.7  | 4491.7  | 4393.8  | 3437.6  |
| 22.5° | 5855.2 | 5869.3 | 5896.0 | 5973.9 | 6138.5 | 6289.9  | 6226.1  | 5810.7  | 4864.8  | 4773.6  | 3683.9  |
| 25°   | 6510.9 | 6528.0 | 6470.1 | 6404.1 | 6435.3 | 6540.6  | 6552.5  | 6203.8  | 5243.2  | 5140.1  | 3948.7  |
| 27.5° | 7301.0 | 7325.4 | 7226.8 | 7056.9 | 6908.5 | 6867.7  | 6853.7  | 6525.8  | 5604.4  | 5485.0  | 4210.6  |
| 30°   | 8074.7 | 8117.0 | 7988.6 | 7768.3 | 7496.1 | 7304.7  | 7163.0  | 6841.0  | 5960.5  | 5846.3  | 4457.6  |
| 32.5° | 8830.6 | 8813.5 | 8627.3 | 8412.2 | 8093.2 | 7853.6  | 7510.9  | 7179.3  | 6361.1  | 6229.8  | 4703.1  |
| 35°   | 9348.4 | 9354.3 | 9181.5 | 8926.3 | 8622.1 | 8438.2  | 7976.8  | 7544.3  | 6769.8  | 6648.9  | 4982.0  |
| 37.5° | 9789.0 | 9761.6 | 9565.7 | 9327.6 | 9065.8 | 8987.1  | 8522.0  | 7946.3  | 7212.7  | 7080.6  | 5278.8  |
| 40°   | 9935.9 | 9904.0 | 9775.7 | 9604.3 | 9394.4 | 9387.7  | 9123.6  | 8401.8  | 7713.4  | 7582.9  | 5613.3  |
| 42.5° | 9846.9 | 9806.1 | 9753.4 | 9706.7 | 9642.1 | 9671.8  | 9688.9  | 8935.9  | 8263.8  | 8117.7  | 6000.6  |
| 45°   | 9518.3 | 9456.7 | 9493.8 | 9595.4 | 9735.6 | 9903.3  | 10199.2 | 9527.2  | 8880.3  | 8757.9  | 6455.3  |
| 47.5° | 9013.1 | 8957.4 | 9073.2 | 9290.5 | 9671.8 | 10096.1 | 10682.2 | 10180.0 | 9616.2  | 9494.5  | 7102.9  |
| 50°   | 8302.4 | 8318.7 | 8484.2 | 8879.6 | 9455.9 | 10185.2 | 11277.1 | 11044.2 | 10685.9 | 10572.4 | 7986.4  |
| 52.5° | 7136.3 | 7139.3 | 7605.1 | 8254.2 | 9073.2 | 10139.2 | 11607.2 | 12148.7 | 12146.5 | 12009.3 | 8827.6  |
| 55°   | 6053.2 | 6119.3 | 6487.9 | 7350.7 | 8453.0 | 9955.2  | 11837.9 | 12685.8 | 13105.7 | 12944.7 | 9611.7  |
| 57.5° | 4995.4 | 5034.0 | 5383.4 | 6249.8 | 7568.0 | 9464.8  | 12074.6 | 13330.5 | 14211.0 | 14109.4 | 10586.5 |
| 60°   | 3792.2 | 3851.5 | 4212.8 | 5013.2 | 6436.0 | 8594.7  | 12096.8 | 14003.3 | 15532.2 | 15429.8 | 11674.7 |
| 62.5° | 2461.4 | 2563.7 | 2902.0 | 3652.0 | 5066.6 | 7343.3  | 11580.5 | 14443.2 | 16784.4 | 16748.0 | 12640.6 |
| 65°   | 1414.6 | 1491.8 | 1727.0 | 2305.6 | 3495.4 | 5772.1  | 10352.8 | 14274.1 | 17555.1 | 17534.3 | 13001.8 |
| 66°   | 1155.8 | 1204.0 | 1384.2 | 1801.9 | 2884.2 | 5068.8  | 9639.2  | 13917.2 | 17631.5 | 17632.3 | 12960.3 |
| 67.5° | 924.3  | 945.8  | 1026.7 | 1290.0 | 2128.3 | 4017.7  | 8364.0  | 13130.2 | 17536.6 | 17562.5 | 12692.5 |
| 70°   | 764.8  | 775.9  | 801.2  | 865.0  | 1161.7 | 2422.8  | 5936.8  | 11085.0 | 16583.3 | 16603.4 | 11647.3 |
| 72.5° | 686.2  | 692.9  | 702.5  | 711.4  | 819.7  | 1353.8  | 3626.0  | 8867.7  | 14539.6 | 14565.6 | 10054.6 |
| 75°   | 621.6  | 625.4  | 623.9  | 624.6  | 687.7  | 862.7   | 1873.8  | 6620.7  | 11756.3 | 11704.4 | 7702.3  |
| 77.5° | 546.0  | 549.7  | 542.3  | 543.8  | 608.3  | 663.2   | 932.5   | 4634.9  | 7933.7  | 7567.3  | 4339.6  |
| 80°   | 461.4  | 464.4  | 461.4  | 466.6  | 529.7  | 500.7   | 542.3   | 2607.5  | 3508.1  | 3318.1  | 1543.0  |
| 82.5° | 348.7  | 361.3  | 370.2  | 390.9  | 436.2  | 356.1   | 362.7   | 1015.5  | 1068.2  | 1017.0  | 473.3   |
| 85°   | 152.8  | 186.2  | 278.9  | 299.0  | 327.9  | 213.6   | 238.1   | 413.9   | 434.7   | 421.4   | 172.1   |
| 87.5° | 40.1   | 43.8   | 138.0  | 173.6  | 181.7  | 96.4    | 123.9   | 188.4   | 198.8   | 188.4   | 57.1    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



REPORT NUMBER: P317648

CATALOG NUMBER: GLEON-SA4C-722-U-T2R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1995.5 | 1995.5 | 1995.5 | 1995.5 | 1995.5 | 1995.5 | 1995.5 | 1995.5 | 1995.5 | 1995.5 | 1995.5 |
| 2.5°  | 2017.7 | 1981.4 | 1916.1 | 1858.3 | 1814.5 | 1784.8 | 1755.1 | 1740.3 | 1731.4 | 1722.5 | 1724.0 |
| 5°    | 2082.3 | 2008.8 | 1896.8 | 1817.5 | 1772.9 | 1744.8 | 1729.9 | 1724.0 | 1720.3 | 1711.4 | 1711.4 |
| 7.5°  | 2179.5 | 2075.6 | 1921.3 | 1839.7 | 1804.8 | 1783.3 | 1774.4 | 1771.5 | 1767.0 | 1756.6 | 1758.1 |
| 10°   | 2301.9 | 2156.5 | 1972.5 | 1893.1 | 1861.2 | 1837.5 | 1824.9 | 1820.4 | 1812.3 | 1800.4 | 1801.9 |
| 12.5° | 2445.8 | 2256.6 | 2040.0 | 1956.9 | 1918.3 | 1886.4 | 1865.7 | 1853.1 | 1839.0 | 1823.4 | 1824.1 |
| 15°   | 2603.0 | 2365.7 | 2112.7 | 2014.0 | 1961.4 | 1916.9 | 1883.5 | 1862.0 | 1839.7 | 1820.4 | 1819.7 |
| 17.5° | 2762.5 | 2471.0 | 2168.3 | 2045.2 | 1974.0 | 1915.4 | 1870.1 | 1836.7 | 1809.3 | 1785.6 | 1783.3 |
| 20°   | 2934.6 | 2565.9 | 2199.5 | 2042.2 | 1950.2 | 1880.5 | 1820.4 | 1778.9 | 1748.5 | 1724.7 | 1721.0 |
| 22.5° | 3109.7 | 2655.0 | 2204.7 | 2011.8 | 1897.6 | 1812.3 | 1749.2 | 1703.2 | 1672.1 | 1647.6 | 1638.7 |
| 25°   | 3269.9 | 2724.0 | 2183.2 | 1953.2 | 1824.1 | 1732.1 | 1670.6 | 1623.8 | 1598.6 | 1569.7 | 1560.8 |
| 27.5° | 3416.1 | 2772.2 | 2140.1 | 1878.3 | 1741.8 | 1651.3 | 1593.4 | 1553.4 | 1525.9 | 1503.7 | 1496.2 |
| 30°   | 3547.4 | 2798.1 | 2069.7 | 1789.3 | 1657.2 | 1574.9 | 1525.9 | 1498.5 | 1474.7 | 1446.5 | 1441.4 |
| 32.5° | 3672.0 | 2798.1 | 1979.2 | 1692.1 | 1573.4 | 1507.4 | 1478.4 | 1461.4 | 1434.7 | 1407.2 | 1399.8 |
| 35°   | 3796.6 | 2781.1 | 1872.3 | 1590.5 | 1496.2 | 1459.2 | 1457.7 | 1437.6 | 1396.8 | 1359.8 | 1350.1 |
| 37.5° | 3927.9 | 2746.2 | 1752.2 | 1495.5 | 1433.2 | 1437.6 | 1450.3 | 1405.7 | 1347.9 | 1295.2 | 1281.1 |
| 40°   | 4076.3 | 2698.0 | 1627.5 | 1413.2 | 1380.5 | 1428.0 | 1430.2 | 1359.8 | 1247.0 | 1198.8 | 1186.2 |
| 42.5° | 4250.6 | 2649.8 | 1511.8 | 1340.5 | 1339.0 | 1399.1 | 1392.4 | 1260.3 | 1192.8 | 1168.4 | 1161.7 |
| 45°   | 4479.8 | 2622.3 | 1402.0 | 1271.5 | 1306.3 | 1352.3 | 1327.9 | 1205.5 | 1177.3 | 1163.2 | 1157.2 |
| 47.5° | 4841.1 | 2636.4 | 1301.1 | 1216.6 | 1273.7 | 1305.6 | 1207.7 | 1183.2 | 1163.2 | 1146.1 | 1140.2 |
| 50°   | 5293.6 | 2628.3 | 1219.5 | 1178.7 | 1236.6 | 1256.6 | 1153.5 | 1154.3 | 1143.9 | 1124.6 | 1115.7 |
| 52.5° | 5634.1 | 2564.5 | 1166.9 | 1157.2 | 1204.0 | 1169.8 | 1119.4 | 1126.1 | 1120.9 | 1092.7 | 1083.1 |
| 55°   | 5962.7 | 2509.6 | 1140.2 | 1149.1 | 1180.2 | 1061.5 | 1079.3 | 1095.7 | 1090.5 | 1063.0 | 1058.6 |
| 57.5° | 6371.5 | 2499.2 | 1123.9 | 1151.3 | 1160.2 | 1007.4 | 1040.8 | 1062.3 | 1058.6 | 1046.7 | 1044.5 |
| 60°   | 6872.2 | 2502.2 | 1109.0 | 1155.0 | 1137.9 | 967.3  | 1004.4 | 1031.9 | 1034.1 | 1031.9 | 1030.4 |
| 62.5° | 7147.4 | 2421.3 | 1071.9 | 1144.6 | 1098.6 | 932.5  | 966.6  | 1006.6 | 1007.4 | 1011.8 | 1011.1 |
| 65°   | 6913.7 | 2179.5 | 1002.9 | 1108.3 | 1032.6 | 903.5  | 933.9  | 977.7  | 966.6  | 986.6  | 986.6  |
| 66°   | 6686.7 | 2040.0 | 968.8  | 1084.5 | 1004.4 | 892.4  | 923.6  | 962.9  | 948.8  | 976.2  | 976.2  |
| 67.5° | 6223.1 | 1804.8 | 907.2  | 1034.1 | 964.4  | 876.8  | 911.7  | 938.4  | 919.1  | 959.9  | 956.9  |
| 70°   | 5376.0 | 1396.1 | 783.4  | 919.9  | 898.3  | 853.8  | 895.4  | 889.4  | 861.3  | 923.6  | 911.7  |
| 72.5° | 4532.5 | 1060.8 | 629.1  | 770.0  | 798.2  | 824.9  | 872.4  | 827.1  | 791.5  | 835.3  | 809.3  |
| 75°   | 3517.0 | 797.5  | 497.0  | 598.6  | 674.3  | 779.7  | 844.9  | 755.2  | 704.0  | 699.5  | 685.4  |
| 77.5° | 1901.3 | 547.5  | 393.9  | 457.0  | 535.6  | 723.3  | 826.4  | 678.0  | 600.9  | 583.1  | 571.9  |
| 80°   | 752.9  | 356.1  | 286.3  | 346.4  | 374.6  | 641.7  | 781.9  | 588.3  | 495.5  | 477.7  | 460.7  |
| 82.5° | 310.8  | 210.7  | 184.7  | 232.2  | 244.1  | 548.9  | 701.8  | 482.2  | 382.8  | 529.7  | 562.3  |
| 85°   | 133.5  | 115.7  | 109.8  | 120.2  | 138.0  | 385.0  | 558.6  | 367.9  | 413.2  | 368.7  | 293.0  |
| 87.5° | 40.1   | 49.0   | 46.7   | 46.0   | 50.4   | 92.0   | 297.5  | 204.7  | 303.4  | 115.0  | 86.1   |
| 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

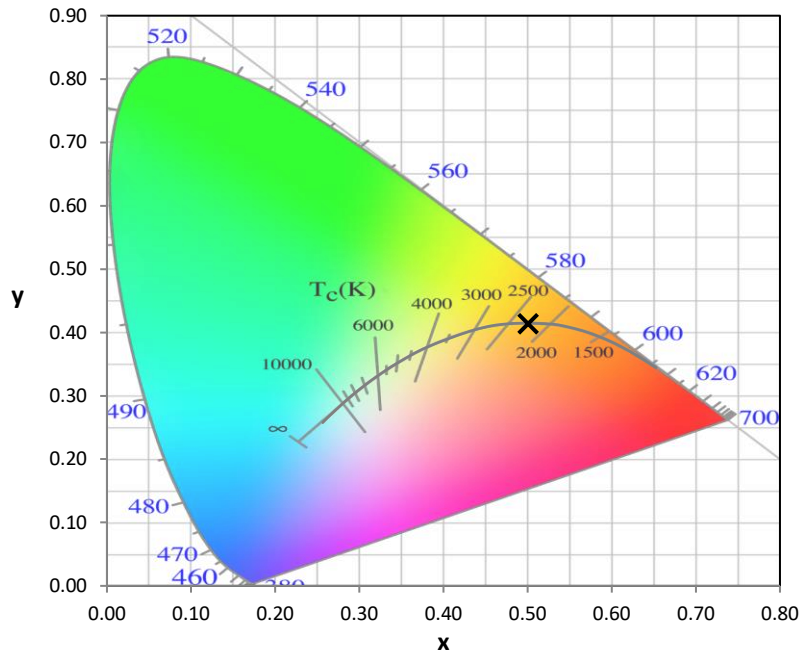
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

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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 ( $R_{f,i}$ )**

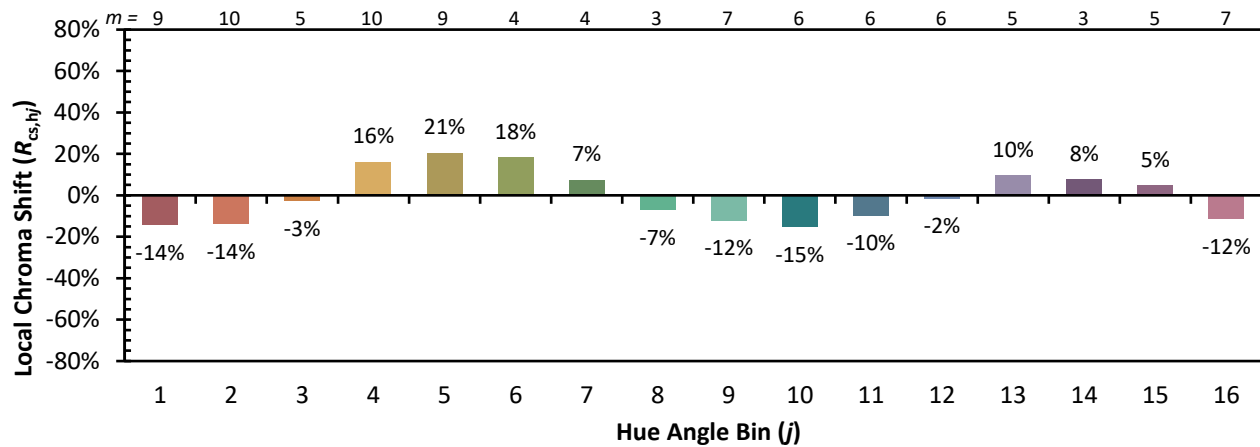
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 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)