

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: P319872

Luminaire Tested: **GLEON-SA8A-722-U-SL3**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319872  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-22)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA8A-722-U-SL3  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(8) 70 CRI, 2200K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 27457 lumens  
Efficiency: N/A  
Efficacy: 106.8 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G5

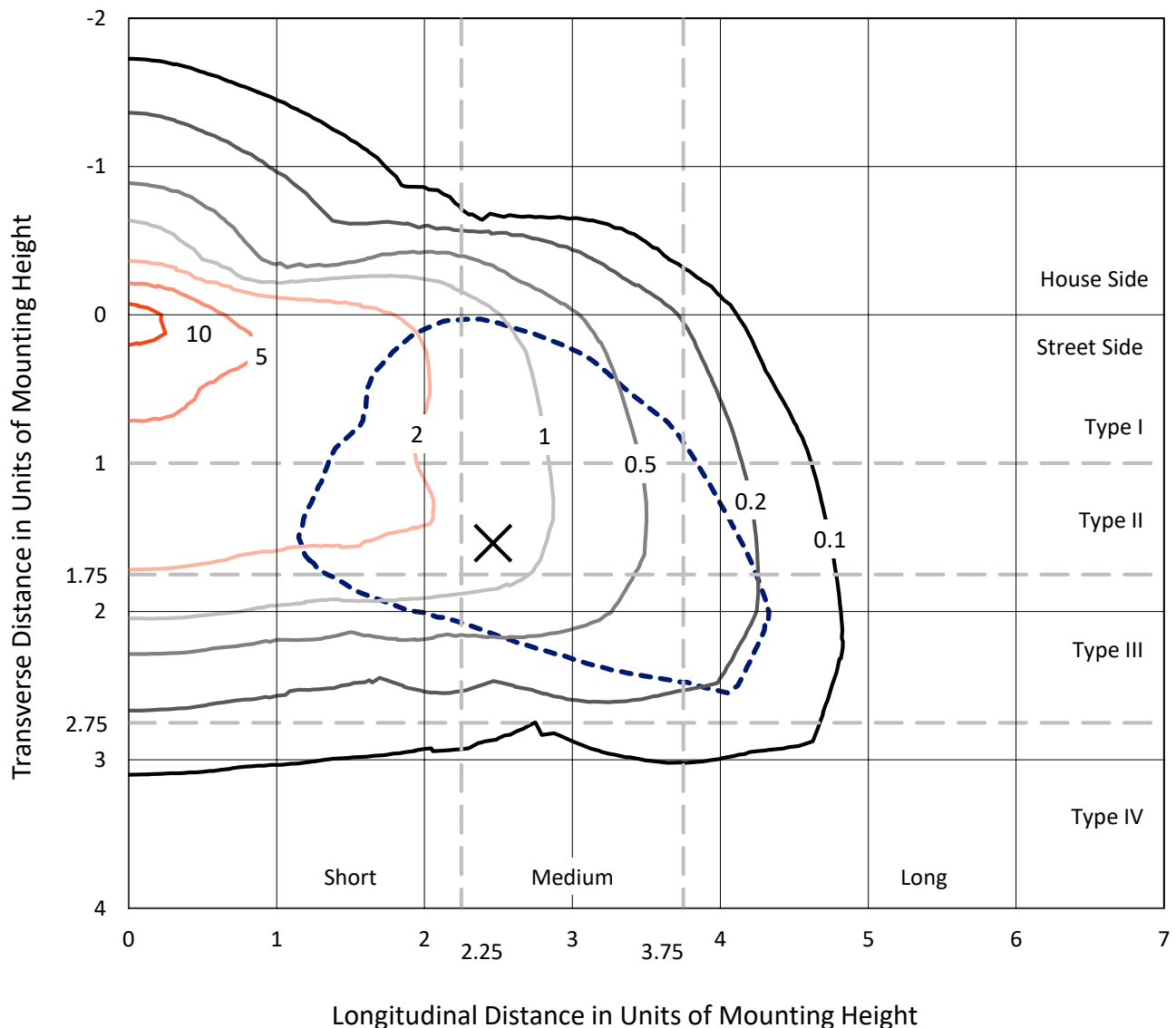
Input Watts (W): 257  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

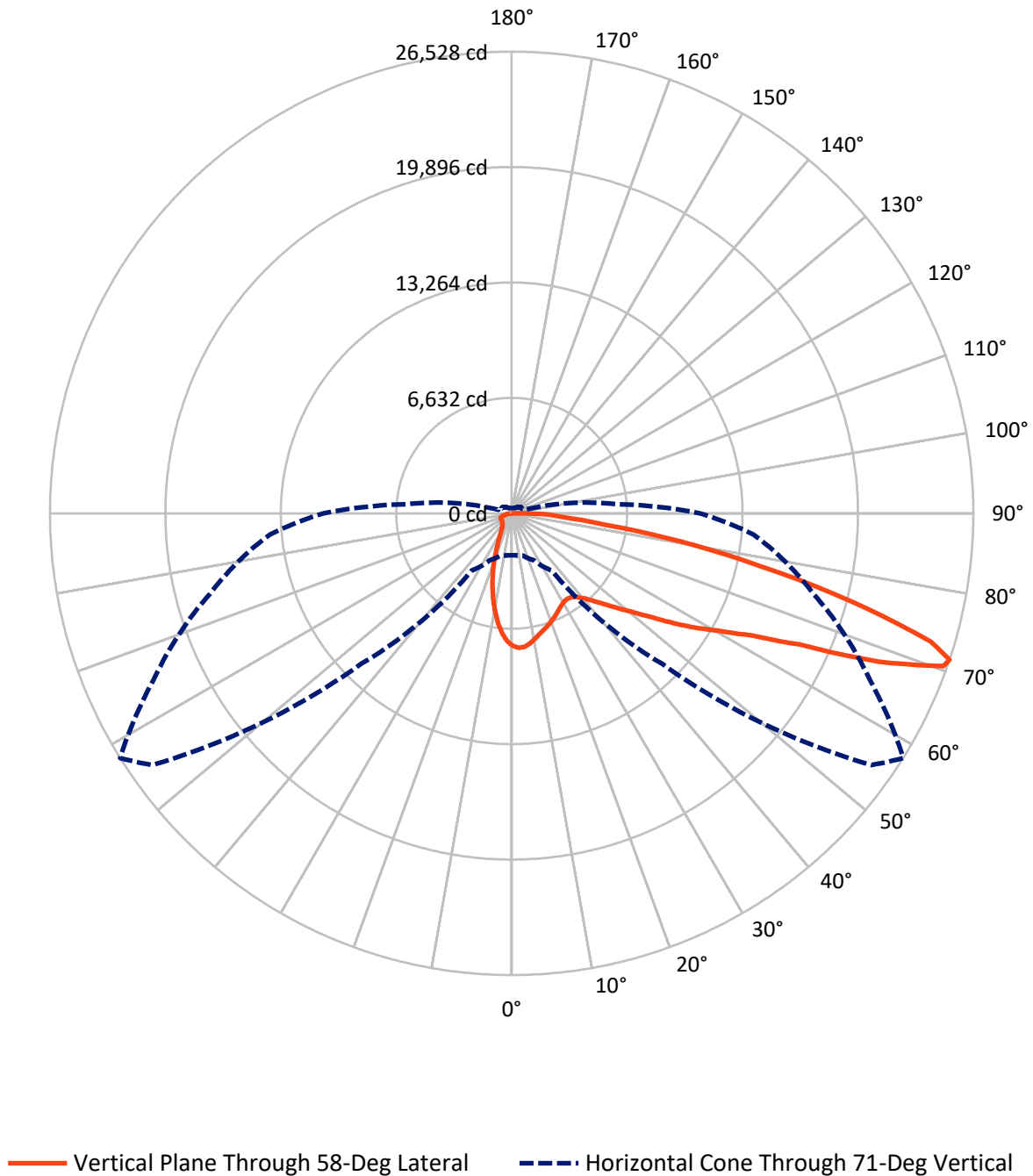
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 12.2 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4105.0   | 0.0    | 4105.0  |
|                    | % Fixture | 15.0     | 0.0    | 15.0    |
| <b>Street Side</b> | Lumens    | 23352.0  | 0.0    | 23352.0 |
|                    | % Fixture | 85.0     | 0.0    | 85.0    |
| <b>Total</b>       | Lumens    | 27457.0  | 0.0    | 27457.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 656.3   | 2.4       |
| 10°-20°   | 1459.3  | 5.3       |
| 20°-30°   | 1854.7  | 6.8       |
| 30°-40°   | 2362.5  | 8.6       |
| 40°-50°   | 3350.1  | 12.2      |
| 50°-60°   | 5184.4  | 18.9      |
| 60°-70°   | 7058.0  | 25.7      |
| 70°-80°   | 4708.5  | 17.1      |
| 80°-90°   | 823.2   | 3.0       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 27457.0 | 100.0     |
| 0°-180°   | 27457.0 | 100.0     |

**Coefficient of Utilization**



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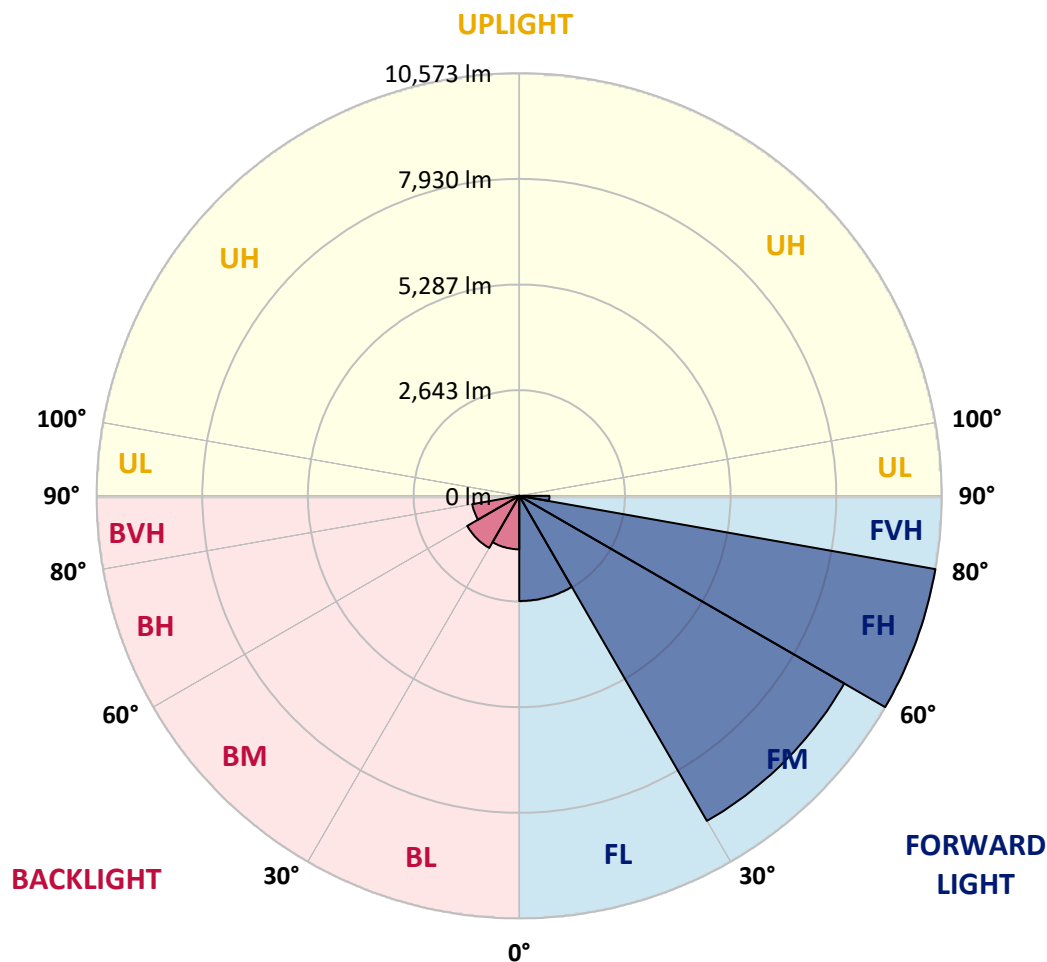
CATALOG NUMBER: GLEON-SA8A-722-U-SL3

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2632.2  | 9.6       |                         |      |          |
| FM   | (30°-60°)   | 9391.6  | 34.2      |                         |      |          |
| FH   | (60°-80°)   | 10573.4 | 38.5      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 754.8   | 2.7       |                         |      | G5       |
| BL   | (0°-30°)    | 1338.1  | 4.9       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 1505.4  | 5.5       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1193.1  | 4.3       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 68.4    | 0.2       |                         |      | G1/100   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G5**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°     | 25°     | 35°     | 45°     | 55°     | 58°     | 65°     | 75°     | 85°     |
|-------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 7607.4 | 7607.4 | 7607.4  | 7607.4  | 7607.4  | 7607.4  | 7607.4  | 7607.4  | 7607.4  | 7607.4  | 7607.4  |
| 2.5°  | 7809.2 | 7798.7 | 7802.5  | 7794.9  | 7776.7  | 7758.5  | 7731.8  | 7736.5  | 7699.2  | 7643.8  | 7574.9  |
| 5°    | 7661.9 | 7658.1 | 7686.8  | 7703.1  | 7716.5  | 7705.9  | 7698.3  | 7707.8  | 7653.3  | 7576.8  | 7457.3  |
| 7.5°  | 7353.0 | 7310.9 | 7347.3  | 7401.8  | 7453.4  | 7492.7  | 7544.3  | 7551.0  | 7516.6  | 7436.2  | 7279.4  |
| 10°   | 6914.0 | 6873.8 | 6927.4  | 7012.5  | 7115.8  | 7209.6  | 7313.8  | 7332.9  | 7339.6  | 7266.9  | 7076.6  |
| 12.5° | 6458.8 | 6428.1 | 6481.7  | 6601.3  | 6772.5  | 6916.9  | 7083.3  | 7112.0  | 7171.3  | 7122.5  | 6889.1  |
| 15°   | 6051.3 | 6039.8 | 6104.9  | 6222.5  | 6419.5  | 6640.5  | 6880.5  | 6933.1  | 7033.6  | 7017.3  | 6742.8  |
| 17.5° | 5699.4 | 5696.5 | 5746.2  | 5869.6  | 6087.7  | 6366.9  | 6678.7  | 6767.7  | 6916.9  | 6936.0  | 6622.3  |
| 20°   | 5437.3 | 5431.6 | 5466.0  | 5556.8  | 5781.6  | 6098.2  | 6460.7  | 6583.1  | 6798.3  | 6865.2  | 6498.0  |
| 22.5° | 5296.7 | 5295.7 | 5296.7  | 5339.7  | 5523.4  | 5817.9  | 6248.3  | 6397.5  | 6682.6  | 6808.8  | 6360.2  |
| 25°   | 5272.8 | 5269.9 | 5248.9  | 5244.1  | 5348.3  | 5583.6  | 6037.9  | 6202.4  | 6572.6  | 6769.6  | 6229.2  |
| 27.5° | 5335.0 | 5338.8 | 5311.0  | 5266.1  | 5287.1  | 5429.6  | 5855.2  | 6031.2  | 6484.6  | 6761.9  | 6138.4  |
| 30°   | 5464.1 | 5462.2 | 5438.2  | 5391.4  | 5350.3  | 5372.3  | 5725.2  | 5901.2  | 6425.3  | 6795.4  | 6076.2  |
| 32.5° | 5606.6 | 5617.1 | 5612.3  | 5586.5  | 5525.3  | 5437.3  | 5686.0  | 5858.1  | 6408.1  | 6875.8  | 6049.4  |
| 35°   | 5777.8 | 5789.3 | 5823.7  | 5843.8  | 5772.0  | 5630.5  | 5770.1  | 5919.3  | 6457.8  | 7026.9  | 6092.4  |
| 37.5° | 5940.4 | 5970.0 | 6066.6  | 6151.7  | 6090.5  | 5932.7  | 5993.9  | 6100.1  | 6611.8  | 7265.0  | 6208.2  |
| 40°   | 6127.8 | 6153.7 | 6311.5  | 6492.2  | 6482.7  | 6319.1  | 6354.5  | 6425.3  | 6883.4  | 7606.5  | 6417.6  |
| 42.5° | 6312.4 | 6364.1 | 6592.7  | 6849.0  | 6922.6  | 6778.2  | 6834.6  | 6871.9  | 7266.0  | 8058.9  | 6783.0  |
| 45°   | 6558.2 | 6613.7 | 6931.2  | 7240.2  | 7412.3  | 7331.0  | 7420.9  | 7435.3  | 7747.1  | 8674.8  | 7313.8  |
| 47.5° | 6930.3 | 6993.4 | 7363.5  | 7687.8  | 7950.8  | 7959.4  | 8107.6  | 8101.9  | 8347.7  | 9379.7  | 7982.3  |
| 50°   | 7509.9 | 7600.7 | 7903.9  | 8207.1  | 8526.6  | 8704.4  | 8902.4  | 8874.7  | 9067.9  | 10130.5 | 8752.3  |
| 52.5° | 8269.3 | 8311.4 | 8536.1  | 8759.9  | 9156.8  | 9555.7  | 9839.7  | 9814.9  | 9884.7  | 10902.3 | 9626.4  |
| 55°   | 9056.4 | 9088.0 | 9180.7  | 9303.2  | 9836.9  | 10487.2 | 11087.9 | 11048.7 | 10871.7 | 11703.8 | 10490.1 |
| 57.5° | 9764.2 | 9828.2 | 9892.3  | 9943.0  | 10521.7 | 11460.9 | 12364.7 | 12367.6 | 11942.9 | 12568.4 | 11382.4 |
| 60°   | 9874.2 | 9930.6 | 10354.3 | 10754.1 | 11693.3 | 12759.7 | 13731.4 | 13702.7 | 13051.4 | 13506.7 | 12377.1 |
| 62.5° | 8728.4 | 8855.6 | 9563.3  | 10626.9 | 12821.9 | 15135.5 | 15475.0 | 15439.6 | 14377.0 | 14663.0 | 13535.4 |
| 65°   | 6255.0 | 6399.5 | 7253.5  | 8851.7  | 12274.8 | 17753.2 | 18621.6 | 18145.3 | 16184.7 | 16085.2 | 14891.6 |
| 67.5° | 3608.6 | 3643.0 | 4013.2  | 5296.7  | 9346.2  | 17890.0 | 23422.0 | 22755.3 | 18991.8 | 17698.7 | 15555.3 |
| 70°   | 2668.4 | 2667.5 | 2755.5  | 3259.5  | 5057.6  | 14600.8 | 25704.9 | 26302.7 | 21947.1 | 18229.5 | 14617.1 |
| 71°   | 2413.1 | 2415.9 | 2514.4  | 2966.8  | 4005.5  | 12221.2 | 25220.0 | 26528.4 | 22725.7 | 17967.4 | 13938.0 |
| 72.5° | 2064.0 | 2073.5 | 2210.3  | 2660.8  | 3369.5  | 8428.0  | 23131.2 | 25174.1 | 23094.9 | 17320.9 | 12875.4 |
| 75°   | 1565.7 | 1587.7 | 1777.0  | 2242.8  | 3079.7  | 4274.3  | 16976.6 | 20102.2 | 20516.3 | 15283.7 | 9567.1  |
| 77.5° | 1117.1 | 1142.0 | 1356.2  | 1886.1  | 2927.6  | 3221.2  | 11369.1 | 14663.0 | 15098.2 | 9794.8  | 4315.4  |
| 80°   | 705.8  | 735.5  | 897.1   | 1500.6  | 2750.7  | 3058.7  | 7144.5  | 9856.0  | 8232.9  | 3134.2  | 1098.0  |
| 82.5° | 414.1  | 437.1  | 556.6   | 980.3   | 2246.6  | 2945.8  | 4203.5  | 5463.1  | 3204.0  | 946.9   | 499.3   |
| 85°   | 240.1  | 250.6  | 347.2   | 624.5   | 1631.7  | 2780.3  | 3088.3  | 3053.9  | 1390.6  | 462.9   | 236.2   |
| 87.5° | 111.9  | 124.3  | 205.6   | 326.1   | 905.7   | 2015.2  | 2440.8  | 2108.9  | 864.6   | 217.1   | 110.9   |
| 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: P319872

CATALOG NUMBER: GLEON-SA8A-722-U-SL3

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 7607.4  | 7607.4 | 7607.4 | 7607.4 | 7607.4 | 7607.4 | 7607.4 | 7607.4 | 7607.4 | 7607.4 | 7607.4 |
| 2.5°  | 7541.4  | 7525.2 | 7457.3 | 7397.0 | 7333.9 | 7251.6 | 7160.8 | 7149.3 | 7093.8 | 7104.3 | 7085.2 |
| 5°    | 7392.2  | 7351.1 | 7187.6 | 7039.3 | 6864.3 | 6707.4 | 6537.2 | 6458.8 | 6345.9 | 6338.2 | 6309.6 |
| 7.5°  | 7178.9  | 7102.4 | 6849.0 | 6567.8 | 6286.6 | 6018.8 | 5753.9 | 5579.8 | 5401.9 | 5326.3 | 5319.6 |
| 10°   | 6938.9  | 6808.8 | 6435.8 | 6019.8 | 5614.2 | 5223.1 | 4844.3 | 4564.1 | 4311.6 | 4192.0 | 4187.2 |
| 12.5° | 6711.3  | 6519.0 | 6007.3 | 5441.1 | 4886.4 | 4379.5 | 3860.1 | 3491.9 | 3175.3 | 3069.2 | 3024.2 |
| 15°   | 6518.1  | 6247.4 | 5590.3 | 4866.3 | 4193.0 | 3489.0 | 2898.0 | 2510.6 | 2218.0 | 2116.6 | 2097.4 |
| 17.5° | 6330.6  | 5982.5 | 5162.8 | 4285.8 | 3471.8 | 2698.1 | 2106.1 | 1818.2 | 1662.3 | 1621.1 | 1620.2 |
| 20°   | 6144.1  | 5709.9 | 4716.1 | 3691.8 | 2774.6 | 2018.1 | 1619.2 | 1490.1 | 1437.5 | 1432.7 | 1425.1 |
| 22.5° | 5932.7  | 5421.0 | 4246.5 | 3096.0 | 2165.4 | 1586.7 | 1376.3 | 1324.7 | 1318.0 | 1335.2 | 1335.2 |
| 25°   | 5734.7  | 5134.1 | 3770.2 | 2512.5 | 1684.3 | 1323.7 | 1229.0 | 1218.5 | 1236.7 | 1267.3 | 1270.1 |
| 27.5° | 5550.1  | 4857.7 | 3305.4 | 1994.2 | 1349.5 | 1165.9 | 1126.7 | 1139.1 | 1171.6 | 1207.0 | 1208.0 |
| 30°   | 5398.1  | 4596.6 | 2854.0 | 1571.4 | 1140.1 | 1048.2 | 1041.5 | 1066.4 | 1101.8 | 1129.5 | 1136.2 |
| 32.5° | 5280.4  | 4373.7 | 2417.8 | 1263.4 | 1003.3 | 960.3  | 966.0  | 987.0  | 1009.0 | 1024.3 | 1034.9 |
| 35°   | 5225.9  | 4182.5 | 2015.2 | 1065.5 | 916.3  | 892.3  | 900.0  | 911.5  | 921.0  | 932.5  | 941.1  |
| 37.5° | 5235.5  | 4034.2 | 1655.6 | 942.1  | 857.9  | 845.5  | 845.5  | 845.5  | 845.5  | 851.2  | 852.2  |
| 40°   | 5324.4  | 3949.1 | 1362.9 | 863.7  | 818.7  | 805.3  | 794.8  | 785.2  | 777.6  | 781.4  | 779.5  |
| 42.5° | 5552.1  | 3941.4 | 1148.7 | 813.9  | 787.1  | 765.1  | 744.1  | 730.7  | 721.1  | 725.0  | 726.9  |
| 45°   | 5938.5  | 4037.1 | 1004.2 | 778.5  | 757.5  | 724.0  | 697.2  | 682.9  | 676.2  | 688.6  | 690.5  |
| 47.5° | 6438.7  | 4245.6 | 916.3  | 752.7  | 729.8  | 685.8  | 657.1  | 643.7  | 645.6  | 663.8  | 668.5  |
| 50°   | 7083.3  | 4584.2 | 874.2  | 736.4  | 710.6  | 653.2  | 623.6  | 612.1  | 617.9  | 643.7  | 649.4  |
| 52.5° | 7791.1  | 5071.9 | 879.0  | 731.7  | 698.2  | 629.3  | 597.8  | 584.4  | 593.9  | 617.9  | 622.6  |
| 55°   | 8607.8  | 5658.2 | 958.3  | 738.4  | 680.0  | 614.0  | 576.7  | 553.8  | 561.4  | 583.4  | 587.2  |
| 57.5° | 9515.5  | 6329.6 | 1118.1 | 736.4  | 657.1  | 599.7  | 554.7  | 520.3  | 526.0  | 539.4  | 543.3  |
| 60°   | 10460.4 | 7140.7 | 1365.8 | 742.2  | 646.5  | 582.5  | 525.1  | 482.0  | 480.1  | 491.6  | 493.5  |
| 62.5° | 11594.8 | 8078.9 | 1648.9 | 746.0  | 653.2  | 560.5  | 485.9  | 443.8  | 438.0  | 440.9  | 442.8  |
| 65°   | 12763.5 | 8758.0 | 1542.7 | 730.7  | 674.3  | 542.3  | 451.4  | 406.5  | 396.0  | 394.0  | 395.0  |
| 67.5° | 12799.9 | 8030.2 | 1081.7 | 700.1  | 682.9  | 532.7  | 425.6  | 374.9  | 357.7  | 351.0  | 350.1  |
| 70°   | 11479.0 | 6523.8 | 842.6  | 667.6  | 648.5  | 517.4  | 401.7  | 349.1  | 323.3  | 312.8  | 311.8  |
| 71°   | 10834.4 | 6005.4 | 798.6  | 651.3  | 622.6  | 502.1  | 391.2  | 337.6  | 310.8  | 299.4  | 297.4  |
| 72.5° | 9823.5  | 5383.7 | 745.1  | 625.5  | 572.9  | 462.9  | 371.1  | 321.4  | 293.6  | 280.2  | 277.4  |
| 75°   | 7049.8  | 3520.6 | 639.9  | 557.6  | 474.4  | 369.2  | 325.2  | 288.8  | 264.9  | 248.7  | 246.8  |
| 77.5° | 2716.3  | 1401.2 | 484.0  | 463.9  | 363.4  | 288.8  | 267.8  | 249.6  | 232.4  | 216.2  | 215.2  |
| 80°   | 839.7   | 626.5  | 352.9  | 349.1  | 263.0  | 215.2  | 208.5  | 203.7  | 197.0  | 179.8  | 176.0  |
| 82.5° | 448.6   | 359.6  | 242.9  | 225.7  | 172.2  | 143.5  | 151.1  | 153.0  | 154.0  | 135.8  | 133.9  |
| 85°   | 214.2   | 190.3  | 136.8  | 128.2  | 100.4  | 80.3   | 92.8   | 100.4  | 101.4  | 83.2   | 77.5   |
| 87.5° | 102.3   | 99.5   | 64.1   | 48.8   | 37.3   | 26.8   | 32.5   | 40.2   | 44.0   | 31.6   | 27.7   |
| 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)