

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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: P321505

Luminaire Tested: **GLEON-SA1A-727-U-T3R-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P321505  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-11)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA1A-727-U-T3R-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(1) 70 CRI, 2700K, 615mA LIGHTSQUARE WITH 16 LEDS AND TYPE III ROADWAY OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 3137 lumens  
Efficiency: N/A  
Efficacy: 92.3 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G1

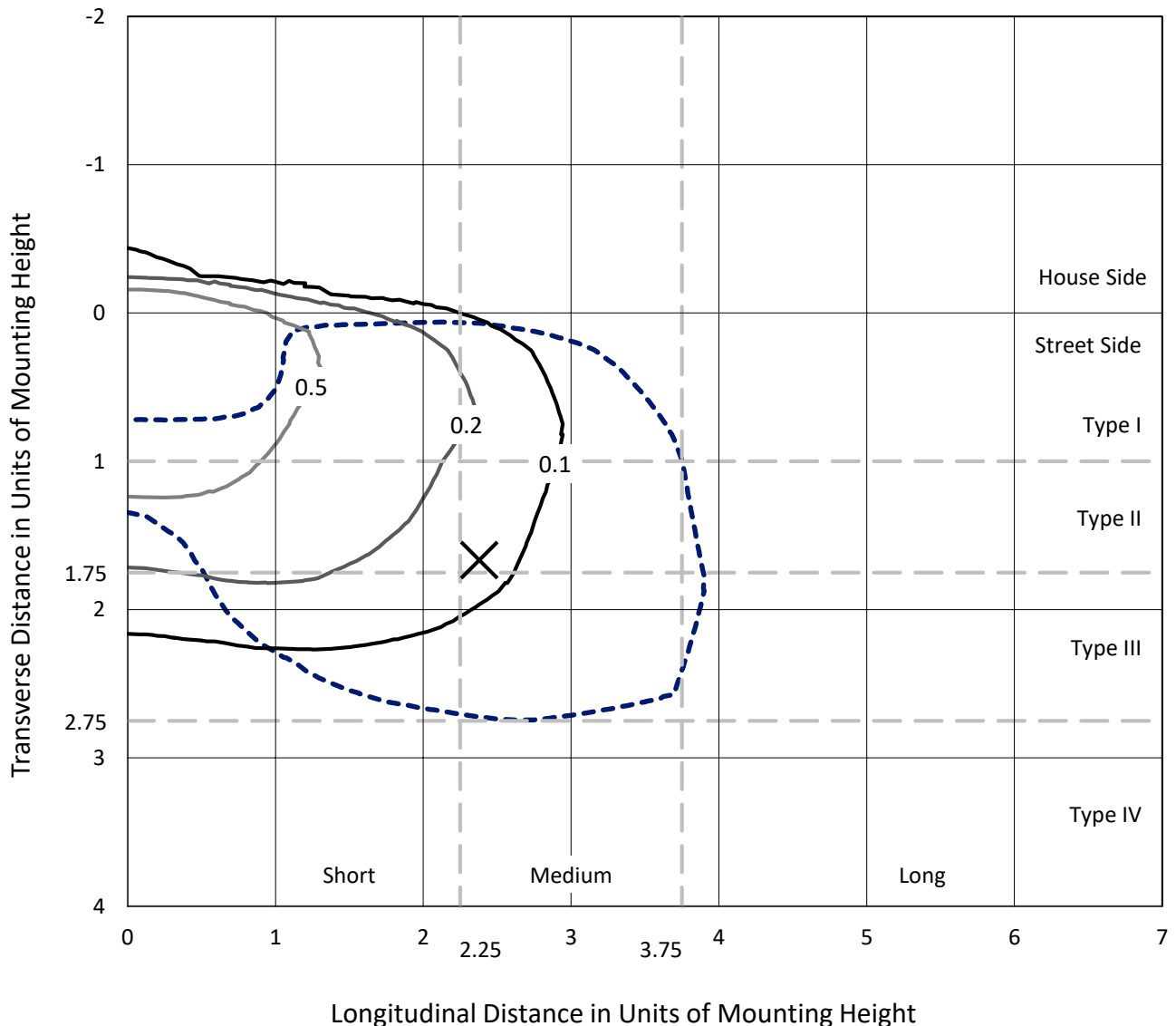
Input Watts (W): 34  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P321505  
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### Iso-Footcandle Lines of Horizontal Illumination

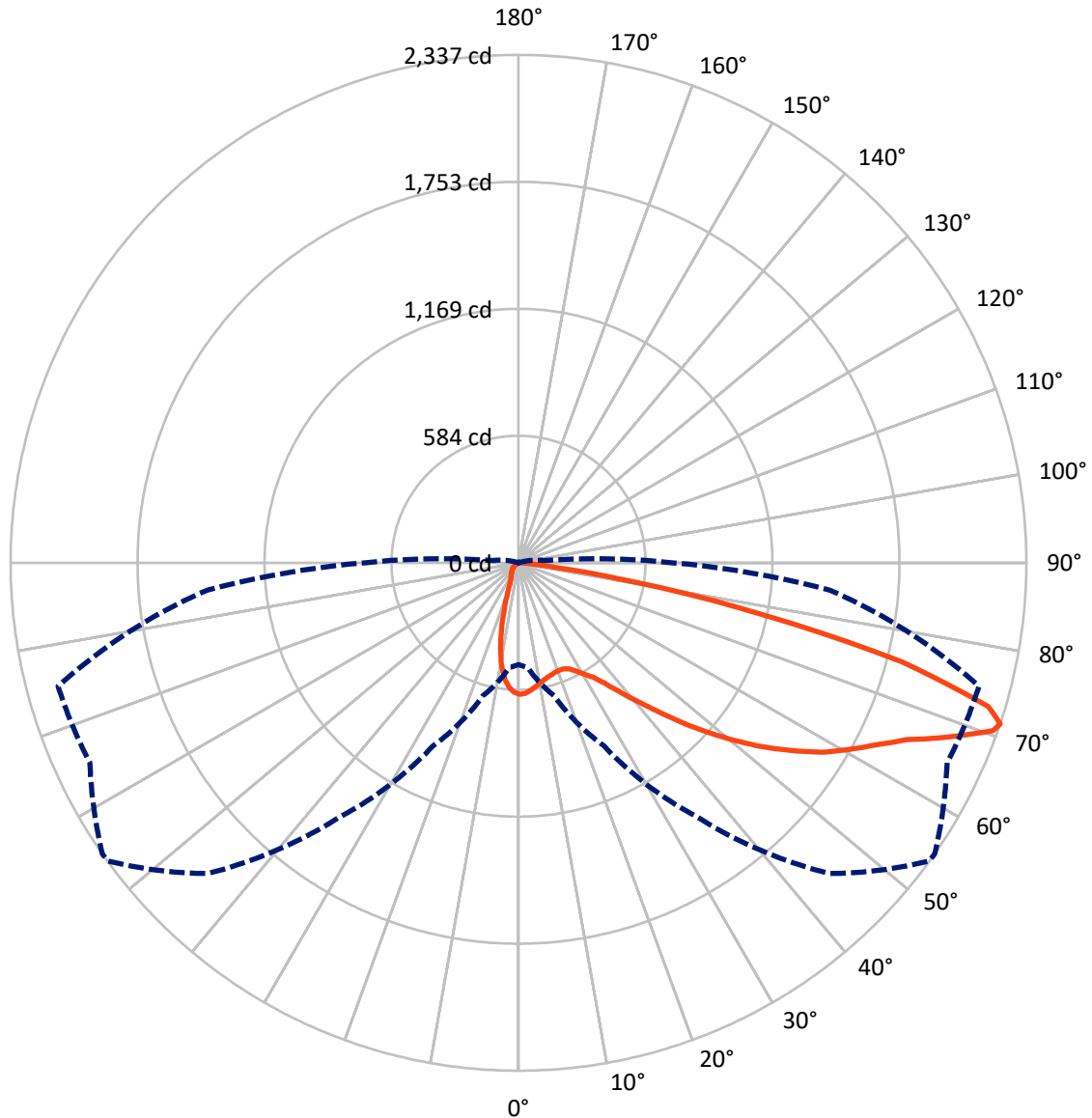
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 55-Deg Lateral      - - - Horizontal Cone Through 71-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 248.4    | 0.0    | 248.4  |
|                    | % Fixture | 7.9      | 0.0    | 7.9    |
| <b>Street Side</b> | Lumens    | 2888.6   | 0.0    | 2888.6 |
|                    | % Fixture | 92.1     | 0.0    | 92.1   |
| <b>Total</b>       | Lumens    | 3137.0   | 0.0    | 3137.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 51.6   | 1.6       |
| 10°-20°   | 116.5  | 3.7       |
| 20°-30°   | 187.1  | 6.0       |
| 30°-40°   | 318.0  | 10.1      |
| 40°-50°   | 493.5  | 15.7      |
| 50°-60°   | 663.5  | 21.2      |
| 60°-70°   | 811.7  | 25.9      |
| 70°-80°   | 474.6  | 15.1      |
| 80°-90°   | 20.5   | 0.7       |
| 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°    | 3137.0 | 100.0     |
| 0°-180°   | 3137.0 | 100.0     |

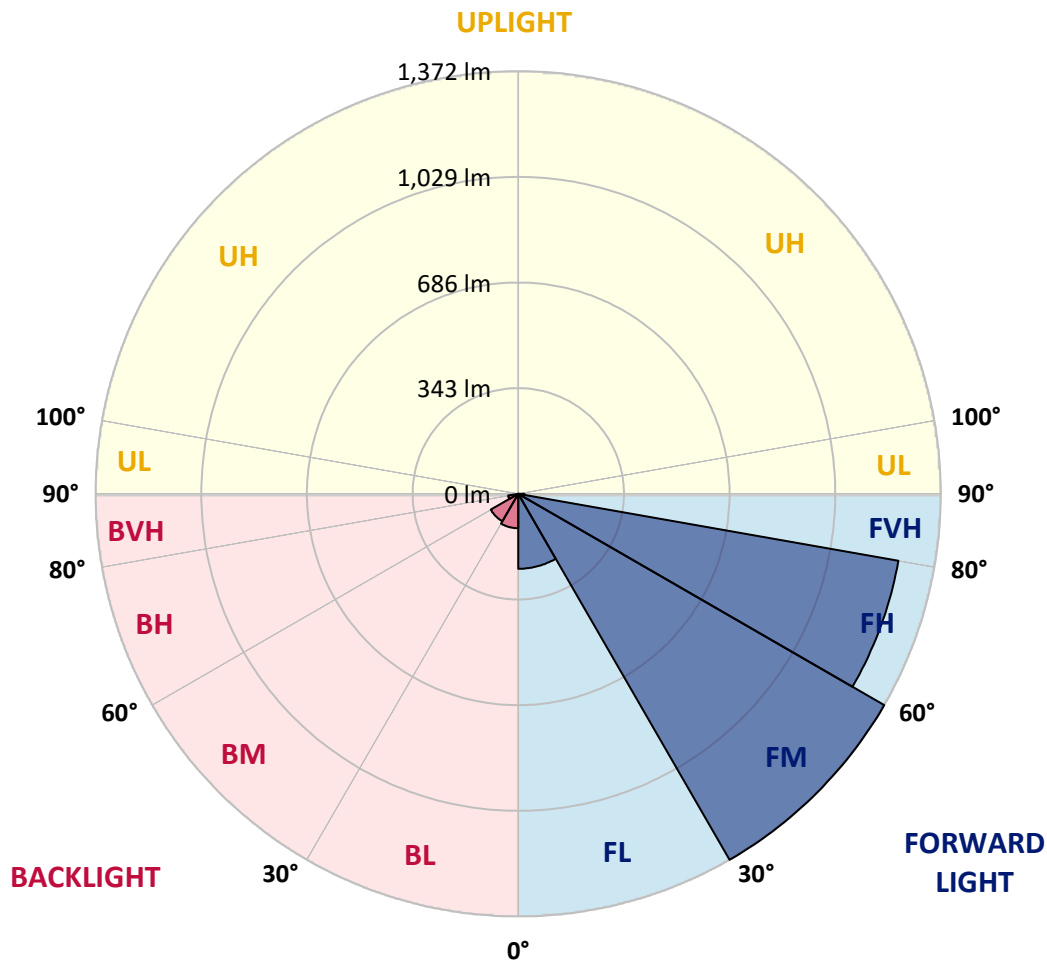


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 243.4  | 7.8       |                         |      |         |
| FM (30°-60°)   | 1372.0 | 43.7      |                         |      |         |
| FH (60°-80°)   | 1253.0 | 39.9      |                         |      | G1/1800 |
| FVH (80°-90°)  | 20.2   | 0.6       |                         |      | G1/100  |
| BL (0°-30°)    | 111.8  | 3.6       | B1/500                  |      |         |
| BM (30°-60°)   | 103.0  | 3.3       | B0/220                  |      |         |
| BH (60°-80°)   | 33.3   | 1.1       | B0/110                  |      | G0/110  |
| BVH (80°-90°)  | 0.3    | 0.0       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**  
 Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 54°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 605.0  | 605.0  | 605.0  | 605.0  | 605.0  | 605.0  | 605.0  | 605.0  | 605.0  | 605.0  | 605.0  |
| 2.5°  | 587.2  | 587.9  | 590.5  | 591.6  | 594.3  | 598.8  | 601.0  | 601.2  | 604.8  | 606.2  | 607.4  |
| 5°    | 545.7  | 549.9  | 554.1  | 558.6  | 566.8  | 577.7  | 588.4  | 589.3  | 601.2  | 609.9  | 614.6  |
| 7.5°  | 509.9  | 513.7  | 518.8  | 526.0  | 537.5  | 554.6  | 572.4  | 574.6  | 597.0  | 616.8  | 627.2  |
| 10°   | 473.1  | 476.2  | 483.6  | 494.1  | 510.0  | 532.9  | 556.9  | 560.5  | 593.1  | 626.1  | 644.4  |
| 12.5° | 433.8  | 435.7  | 444.5  | 459.8  | 483.1  | 512.2  | 543.8  | 548.5  | 590.8  | 636.8  | 664.7  |
| 15°   | 404.0  | 404.8  | 413.3  | 429.1  | 455.8  | 493.6  | 533.7  | 539.3  | 591.3  | 649.6  | 686.8  |
| 17.5° | 396.4  | 396.8  | 401.3  | 412.1  | 435.8  | 476.9  | 525.7  | 532.6  | 593.0  | 662.2  | 709.1  |
| 20°   | 427.2  | 424.3  | 419.6  | 417.9  | 428.1  | 466.9  | 520.9  | 528.6  | 595.3  | 673.3  | 729.1  |
| 22.5° | 511.9  | 503.1  | 483.8  | 458.1  | 442.4  | 467.6  | 522.2  | 529.9  | 602.4  | 687.0  | 752.2  |
| 25°   | 637.5  | 625.4  | 592.6  | 541.9  | 493.1  | 487.9  | 532.7  | 540.6  | 616.4  | 703.3  | 774.3  |
| 27.5° | 780.5  | 768.5  | 728.4  | 656.0  | 572.9  | 528.1  | 556.9  | 564.3  | 637.1  | 717.8  | 791.2  |
| 30°   | 917.4  | 914.0  | 866.7  | 784.4  | 673.2  | 593.1  | 588.2  | 594.4  | 652.5  | 726.5  | 804.6  |
| 32.5° | 1033.5 | 1028.1 | 990.1  | 910.1  | 788.0  | 671.3  | 625.0  | 626.8  | 664.0  | 737.8  | 822.0  |
| 35°   | 1141.1 | 1134.5 | 1101.1 | 1025.4 | 905.7  | 766.8  | 681.6  | 678.9  | 689.2  | 760.5  | 847.4  |
| 37.5° | 1235.0 | 1241.1 | 1204.0 | 1132.1 | 1011.4 | 866.1  | 758.0  | 749.9  | 728.7  | 797.4  | 884.2  |
| 40°   | 1313.6 | 1313.6 | 1294.3 | 1234.3 | 1125.4 | 968.8  | 844.3  | 833.7  | 788.0  | 854.3  | 930.8  |
| 42.5° | 1341.9 | 1348.0 | 1355.2 | 1321.2 | 1227.6 | 1075.6 | 940.5  | 929.5  | 871.5  | 935.0  | 989.7  |
| 45°   | 1343.6 | 1353.2 | 1390.0 | 1389.8 | 1319.8 | 1181.7 | 1049.0 | 1043.8 | 978.5  | 1038.7 | 1062.6 |
| 47.5° | 1319.8 | 1331.8 | 1392.4 | 1426.7 | 1392.9 | 1280.4 | 1167.6 | 1161.1 | 1104.3 | 1165.7 | 1139.0 |
| 50°   | 1283.1 | 1296.3 | 1366.7 | 1441.3 | 1442.7 | 1366.3 | 1292.5 | 1282.8 | 1242.8 | 1311.0 | 1217.9 |
| 52.5° | 1217.3 | 1242.9 | 1343.8 | 1444.6 | 1475.3 | 1440.5 | 1411.4 | 1407.2 | 1397.7 | 1450.8 | 1280.7 |
| 55°   | 1076.6 | 1105.0 | 1286.2 | 1445.8 | 1505.6 | 1506.3 | 1522.8 | 1523.9 | 1542.9 | 1581.5 | 1327.4 |
| 57.5° | 1010.1 | 1026.1 | 1185.6 | 1451.1 | 1550.6 | 1581.0 | 1636.3 | 1645.1 | 1674.5 | 1705.6 | 1380.8 |
| 60°   | 968.3  | 987.3  | 1136.0 | 1443.8 | 1621.1 | 1678.9 | 1741.6 | 1744.5 | 1776.1 | 1833.7 | 1453.1 |
| 62.5° | 934.9  | 953.6  | 1104.7 | 1415.6 | 1700.4 | 1796.6 | 1844.4 | 1844.7 | 1868.3 | 1986.2 | 1535.2 |
| 65°   | 852.5  | 868.2  | 1041.5 | 1383.9 | 1752.8 | 1913.1 | 1963.8 | 1962.0 | 1981.3 | 2147.1 | 1630.6 |
| 67.5° | 733.3  | 745.4  | 912.3  | 1263.8 | 1733.1 | 2019.0 | 2144.1 | 2138.1 | 2114.7 | 2286.1 | 1668.0 |
| 70°   | 567.0  | 571.3  | 719.1  | 1053.2 | 1548.3 | 2059.8 | 2318.4 | 2315.3 | 2196.5 | 2261.2 | 1530.7 |
| 71°   | 468.6  | 483.0  | 633.7  | 929.5  | 1424.5 | 2022.1 | 2335.3 | 2337.1 | 2176.0 | 2193.3 | 1436.2 |
| 72.5° | 272.1  | 284.4  | 459.3  | 713.9  | 1209.4 | 1865.2 | 2247.7 | 2260.9 | 2079.9 | 1995.0 | 1226.7 |
| 75°   | 58.3   | 62.4   | 170.3  | 345.5  | 665.3  | 1307.3 | 1774.1 | 1821.3 | 1695.2 | 1357.2 | 739.4  |
| 77.5° | 40.6   | 43.8   | 73.0   | 156.8  | 219.9  | 646.0  | 1102.1 | 1155.3 | 1012.8 | 510.0  | 236.6  |
| 80°   | 32.1   | 35.8   | 56.9   | 77.5   | 59.4   | 208.3  | 516.2  | 548.8  | 337.8  | 113.8  | 39.9   |
| 82.5° | 17.9   | 21.3   | 44.4   | 41.8   | 22.8   | 39.6   | 144.5  | 163.4  | 67.6   | 23.0   | 9.4    |
| 85°   | 5.2    | 6.3    | 28.6   | 30.4   | 9.7    | 7.6    | 24.7   | 30.6   | 12.8   | 6.1    | 4.2    |
| 87.5° | 0.0    | 0.0    | 13.8   | 11.7   | 2.8    | 1.1    | 2.3    | 2.5    | 2.5    | 2.5    | 2.8    |
| 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: P321505

CATALOG NUMBER: GLEON-SA1A-727-U-T3R-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 605.0 | 605.0 | 605.0 | 605.0 | 605.0 | 605.0 | 605.0 | 605.0 | 605.0 | 605.0 | 605.0 |
| 2.5°  | 607.4 | 608.4 | 604.8 | 600.2 | 595.3 | 589.2 | 582.9 | 577.9 | 577.8 | 575.4 | 573.0 |
| 5°    | 614.8 | 614.3 | 604.6 | 589.8 | 572.3 | 554.1 | 536.8 | 517.2 | 510.7 | 502.7 | 500.0 |
| 7.5°  | 628.6 | 624.7 | 604.1 | 571.7 | 533.4 | 495.4 | 456.1 | 416.5 | 399.6 | 384.4 | 381.7 |
| 10°   | 646.0 | 638.5 | 601.5 | 544.7 | 474.4 | 404.3 | 345.0 | 291.2 | 267.5 | 249.3 | 248.5 |
| 12.5° | 664.0 | 652.6 | 594.0 | 503.8 | 397.1 | 298.5 | 230.2 | 177.2 | 157.5 | 144.8 | 145.9 |
| 15°   | 682.9 | 665.8 | 577.9 | 448.8 | 309.0 | 202.6 | 141.4 | 110.3 | 102.4 | 99.2  | 100.0 |
| 17.5° | 702.2 | 675.0 | 555.5 | 382.4 | 222.1 | 130.7 | 97.9  | 89.2  | 89.2  | 89.9  | 90.1  |
| 20°   | 718.9 | 679.9 | 522.6 | 308.1 | 150.6 | 95.2  | 85.6  | 84.4  | 85.1  | 86.2  | 86.3  |
| 22.5° | 735.6 | 680.2 | 479.6 | 232.7 | 105.4 | 83.4  | 81.6  | 81.0  | 81.4  | 82.7  | 82.8  |
| 25°   | 749.1 | 676.8 | 425.8 | 165.5 | 84.1  | 78.6  | 77.8  | 77.5  | 77.8  | 79.3  | 79.3  |
| 27.5° | 754.6 | 664.6 | 360.2 | 116.3 | 75.4  | 73.2  | 73.0  | 73.2  | 73.7  | 74.8  | 74.9  |
| 30°   | 755.1 | 643.2 | 288.6 | 84.2  | 68.3  | 66.1  | 66.6  | 67.6  | 67.2  | 66.9  | 67.2  |
| 32.5° | 756.5 | 618.4 | 218.9 | 69.3  | 62.4  | 58.9  | 58.2  | 58.2  | 56.5  | 55.5  | 54.9  |
| 35°   | 761.2 | 589.2 | 158.7 | 62.3  | 56.3  | 52.3  | 49.6  | 46.5  | 43.2  | 41.6  | 41.1  |
| 37.5° | 768.5 | 558.6 | 113.7 | 57.6  | 51.0  | 46.3  | 41.3  | 35.8  | 31.1  | 29.9  | 29.9  |
| 40°   | 781.9 | 527.1 | 84.1  | 53.9  | 46.8  | 41.0  | 33.4  | 26.2  | 22.0  | 21.3  | 21.3  |
| 42.5° | 803.0 | 493.8 | 67.0  | 50.7  | 43.1  | 35.5  | 25.5  | 19.0  | 15.9  | 15.5  | 15.4  |
| 45°   | 825.0 | 457.2 | 58.6  | 47.6  | 39.2  | 29.2  | 18.9  | 14.1  | 12.3  | 11.8  | 11.8  |
| 47.5° | 847.0 | 418.2 | 54.5  | 44.7  | 35.4  | 22.7  | 14.1  | 11.1  | 10.3  | 10.3  | 10.4  |
| 50°   | 865.6 | 377.5 | 51.6  | 41.4  | 30.4  | 17.2  | 11.1  | 9.4   | 9.2   | 9.7   | 9.9   |
| 52.5° | 870.2 | 337.5 | 47.9  | 37.3  | 24.4  | 13.1  | 9.2   | 8.3   | 8.3   | 8.3   | 8.3   |
| 55°   | 867.4 | 306.5 | 43.1  | 32.3  | 18.0  | 10.4  | 7.9   | 7.3   | 7.2   | 7.2   | 7.2   |
| 57.5° | 877.0 | 288.2 | 34.5  | 25.1  | 13.0  | 8.5   | 6.9   | 6.5   | 6.2   | 6.1   | 6.1   |
| 60°   | 896.3 | 276.2 | 24.7  | 18.0  | 9.7   | 7.0   | 5.9   | 5.5   | 5.1   | 4.8   | 4.8   |
| 62.5° | 921.9 | 265.8 | 18.3  | 13.4  | 7.5   | 5.6   | 4.9   | 4.5   | 3.9   | 3.7   | 3.7   |
| 65°   | 941.6 | 247.2 | 13.9  | 10.0  | 5.6   | 4.5   | 3.8   | 3.7   | 2.8   | 2.5   | 2.4   |
| 67.5° | 911.5 | 206.4 | 11.3  | 7.3   | 4.2   | 3.5   | 3.0   | 2.8   | 1.7   | 1.4   | 1.4   |
| 70°   | 781.8 | 143.7 | 9.0   | 5.4   | 3.1   | 2.8   | 2.4   | 1.8   | 1.3   | 1.1   | 1.1   |
| 71°   | 708.9 | 120.0 | 8.2   | 4.5   | 2.7   | 2.7   | 2.3   | 1.5   | 1.1   | 1.0   | 1.0   |
| 72.5° | 588.9 | 85.2  | 6.9   | 3.5   | 2.4   | 2.8   | 2.4   | 1.4   | 1.1   | 1.0   | 0.8   |
| 75°   | 341.9 | 35.6  | 4.8   | 2.4   | 1.8   | 3.4   | 3.1   | 1.3   | 0.8   | 0.7   | 0.7   |
| 77.5° | 102.8 | 13.1  | 2.7   | 1.5   | 1.4   | 3.0   | 3.5   | 1.1   | 0.4   | 0.1   | 0.1   |
| 80°   | 18.7  | 5.6   | 1.7   | 1.0   | 1.0   | 1.8   | 2.7   | 0.6   | 0.0   | 0.0   | 0.0   |
| 82.5° | 6.6   | 2.8   | 1.0   | 0.6   | 0.4   | 0.8   | 1.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 3.8   | 2.0   | 0.6   | 0.3   | 0.0   | 0.1   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 2.5   | 0.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
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LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-1-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **SA1C-727-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.\*\*\*TESTED IN  
 SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

CCT (K): 2741  
 CIE u': 0.2605  
 CIE v': 0.5272  
 Duv: 0.0005  
 CIE x: 0.4573  
 CIE y: 0.4113  
 CIE z: 0.1313  
 Peak Wavelength (nm): 602  
 Dominant Wavelength (nm): 583  
 Purity: 61.2

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.5 |      |       |
| R1:       | 69.2 | R9:  | -16.1 |
| R2:       | 79.4 | R10: | 51.4  |
| R3:       | 87.8 | R11: | 63.1  |
| R4:       | 69.4 | R12: | 42.0  |
| R5:       | 66.4 | R13: | 70.2  |
| R6:       | 69.8 | R14: | 92.4  |
| R7:       | 79.8 |      |       |
| R8:       | 50.1 |      |       |

Rf: 69.9  
 Rg: 98.3



**Test Conditions**

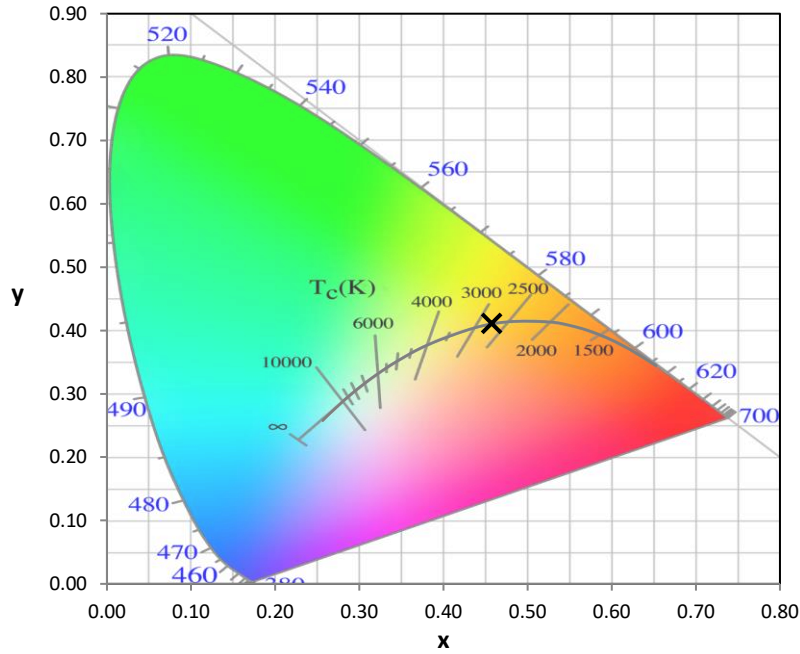
Stabilization Time: 56M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3./42%  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-1-R4

| 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 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2044          | 0.0           | 490    | 7179          | 1.0           | 620    | 118034        | 30.7          | 750    | 8362          | 0.0           | 880    | 3128          | 0.0           |
| 365    | 2016          | 0.0           | 495    | 10476         | 1.9           | 625    | 111884        | 24.7          | 755    | 7635          | 0.0           | 885    | 3110          | 0.0           |
| 370    | 2020          | 0.0           | 500    | 15549         | 3.4           | 630    | 106119        | 19.2          | 760    | 6582          | 0.0           | 890    | 2632          | 0.0           |
| 375    | 2137          | 0.0           | 505    | 22477         | 6.3           | 635    | 99706         | 15.0          | 765    | 5777          | 0.0           | 895    | 2709          | 0.0           |
| 380    | 2046          | 0.0           | 510    | 30417         | 10.4          | 640    | 92142         | 11.0          | 770    | 5474          | 0.0           | 900    | 2016          | 0.0           |
| 385    | 1925          | 0.0           | 515    | 39274         | 16.3          | 645    | 84987         | 8.2           | 775    | 4977          | 0.0           | 905    | 1748          | 0.0           |
| 390    | 1893          | 0.0           | 520    | 47282         | 22.9          | 650    | 78016         | 5.7           | 780    | 4723          | 0.0           | 910    | 2046          | 0.0           |
| 395    | 1695          | 0.0           | 525    | 55413         | 29.7          | 655    | 71541         | 4.1           | 785    | 4219          | 0.0           | 915    | 1844          | 0.0           |
| 400    | 1633          | 0.0           | 530    | 62377         | 36.7          | 660    | 64863         | 2.7           | 790    | 3969          | 0.0           | 920    | 2734          | 0.0           |
| 405    | 2065          | 0.0           | 535    | 68520         | 42.5          | 665    | 58485         | 1.9           | 795    | 4122          | 0.0           | 925    | 2307          | 0.0           |
| 410    | 3449          | 0.0           | 540    | 73435         | 47.8          | 670    | 51641         | 1.1           | 800    | 2864          | 0.0           | 930    | 2039          | 0.0           |
| 415    | 7117          | 0.0           | 545    | 78677         | 52.4          | 675    | 46030         | 0.8           | 805    | 3151          | 0.0           | 935    | 1784          | 0.0           |
| 420    | 13992         | 0.0           | 550    | 83331         | 56.6          | 680    | 40590         | 0.5           | 810    | 3022          | 0.0           | 940    | 2464          | 0.0           |
| 425    | 25176         | 0.1           | 555    | 89120         | 60.9          | 685    | 35691         | 0.3           | 815    | 3471          | 0.0           | 945    | 2794          | 0.0           |
| 430    | 38151         | 0.3           | 560    | 94613         | 64.3          | 690    | 31631         | 0.2           | 820    | 2749          | 0.0           | 950    | 3090          | 0.0           |
| 435    | 49673         | 0.6           | 565    | 99818         | 66.4          | 695    | 27437         | 0.1           | 825    | 2729          | 0.0           | 955    | 1866          | 0.0           |
| 440    | 57273         | 0.9           | 570    | 106526        | 69.3          | 700    | 24589         | 0.1           | 830    | 2282          | 0.0           | 960    | 3110          | 0.0           |
| 445    | 54802         | 1.1           | 575    | 111610        | 69.4          | 705    | 21832         | 0.0           | 835    | 3140          | 0.0           | 965    | 3880          | 0.0           |
| 450    | 39184         | 1.0           | 580    | 117163        | 69.6          | 710    | 19500         | 0.0           | 840    | 2365          | 0.0           | 970    | 3243          | 0.0           |
| 455    | 22506         | 0.8           | 585    | 122201        | 67.9          | 715    | 17870         | 0.0           | 845    | 3024          | 0.0           | 975    | 2014          | 0.0           |
| 460    | 13692         | 0.6           | 590    | 125662        | 65.0          | 720    | 15924         | 0.0           | 850    | 2510          | 0.0           | 980    | 1688          | 0.0           |
| 465    | 9446          | 0.5           | 595    | 127415        | 60.4          | 725    | 14268         | 0.0           | 855    | 2739          | 0.0           | 985    | 2827          | 0.0           |
| 470    | 6698          | 0.4           | 600    | 129155        | 55.7          | 730    | 12438         | 0.0           | 860    | 3515          | 0.0           | 990    | 4172          | 0.0           |
| 475    | 5328          | 0.4           | 605    | 128057        | 49.6          | 735    | 11255         | 0.0           | 865    | 3600          | 0.0           | 995    | 3177          | 0.0           |
| 480    | 5081          | 0.5           | 610    | 126031        | 43.3          | 740    | 9951          | 0.0           | 870    | 3609          | 0.0           | 1000   | 3241          | 0.0           |
| 485    | 5579          | 0.7           | 615    | 123059        | 37.1          | 745    | 8870          | 0.0           | 875    | 3208          | 0.0           |        |               |               |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3

S/P: 1.04

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2044          | 0.0           | 490    | 7179          | 6.0           | 620    | 118034        | 0.1           | 750    | 8362          | 0.0           | 880    | 3128          | 0.0           |
| 365    | 2016          | 0.0           | 495    | 10476         | 8.6           | 625    | 111884        | 0.1           | 755    | 7635          | 0.0           | 885    | 3110          | 0.0           |
| 370    | 2020          | 0.0           | 500    | 15549         | 12.5          | 630    | 106119        | 0.0           | 760    | 6582          | 0.0           | 890    | 2632          | 0.0           |
| 375    | 2137          | 0.0           | 505    | 22477         | 17.3          | 635    | 99706         | 0.0           | 765    | 5777          | 0.0           | 895    | 2709          | 0.0           |
| 380    | 2046          | 0.0           | 510    | 30417         | 21.8          | 640    | 92142         | 0.0           | 770    | 5474          | 0.0           | 900    | 2016          | 0.0           |
| 385    | 1925          | 0.0           | 515    | 39274         | 25.7          | 645    | 84987         | 0.0           | 775    | 4977          | 0.0           | 905    | 1748          | 0.0           |
| 390    | 1893          | 0.0           | 520    | 47282         | 27.5          | 650    | 78016         | 0.0           | 780    | 4723          | 0.0           | 910    | 2046          | 0.0           |
| 395    | 1695          | 0.0           | 525    | 55413         | 28.1          | 655    | 71541         | 0.0           | 785    | 4219          | 0.0           | 915    | 1844          | 0.0           |
| 400    | 1633          | 0.0           | 530    | 62377         | 27.0          | 660    | 64863         | 0.0           | 790    | 3969          | 0.0           | 920    | 2734          | 0.0           |
| 405    | 2065          | 0.0           | 535    | 68520         | 24.7          | 665    | 58485         | 0.0           | 795    | 4122          | 0.0           | 925    | 2307          | 0.0           |
| 410    | 3449          | 0.1           | 540    | 73435         | 21.5          | 670    | 51641         | 0.0           | 800    | 2864          | 0.0           | 930    | 2039          | 0.0           |
| 415    | 7117          | 0.5           | 545    | 78677         | 18.3          | 675    | 46030         | 0.0           | 805    | 3151          | 0.0           | 935    | 1784          | 0.0           |
| 420    | 13992         | 1.6           | 550    | 83331         | 15.0          | 680    | 40590         | 0.0           | 810    | 3022          | 0.0           | 940    | 2464          | 0.0           |
| 425    | 25176         | 3.9           | 555    | 89120         | 12.0          | 685    | 35691         | 0.0           | 815    | 3471          | 0.0           | 945    | 2794          | 0.0           |
| 430    | 38151         | 8.1           | 560    | 94613         | 9.3           | 690    | 31631         | 0.0           | 820    | 2749          | 0.0           | 950    | 3090          | 0.0           |
| 435    | 49673         | 13.3          | 565    | 99818         | 7.0           | 695    | 27437         | 0.0           | 825    | 2729          | 0.0           | 955    | 1866          | 0.0           |
| 440    | 57273         | 19.1          | 570    | 106526        | 5.2           | 700    | 24589         | 0.0           | 830    | 2282          | 0.0           | 960    | 3110          | 0.0           |
| 445    | 54802         | 21.6          | 575    | 111610        | 3.7           | 705    | 21832         | 0.0           | 835    | 3140          | 0.0           | 965    | 3880          | 0.0           |
| 450    | 39184         | 18.1          | 580    | 117163        | 2.6           | 710    | 19500         | 0.0           | 840    | 2365          | 0.0           | 970    | 3243          | 0.0           |
| 455    | 22506         | 11.8          | 585    | 122201        | 1.8           | 715    | 17870         | 0.0           | 845    | 3024          | 0.0           | 975    | 2014          | 0.0           |
| 460    | 13692         | 8.1           | 590    | 125662        | 1.2           | 720    | 15924         | 0.0           | 850    | 2510          | 0.0           | 980    | 1688          | 0.0           |
| 465    | 9446          | 6.2           | 595    | 127415        | 0.8           | 725    | 14268         | 0.0           | 855    | 2739          | 0.0           | 985    | 2827          | 0.0           |
| 470    | 6698          | 4.8           | 600    | 129155        | 0.5           | 730    | 12438         | 0.0           | 860    | 3515          | 0.0           | 990    | 4172          | 0.0           |
| 475    | 5328          | 4.1           | 605    | 128057        | 0.4           | 735    | 11255         | 0.0           | 865    | 3600          | 0.0           | 995    | 3177          | 0.0           |
| 480    | 5081          | 4.1           | 610    | 126031        | 0.2           | 740    | 9951          | 0.0           | 870    | 3609          | 0.0           | 1000   | 3241          | 0.0           |
| 485    | 5579          | 4.6           | 615    | 123059        | 0.1           | 745    | 8870          | 0.0           | 875    | 3208          | 0.0           |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 2145.7 M/P: 0.35**

| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360            | 2044                              | 0.0                         | 490            | 7179                              | 11.1                        | 620            | 118034                            | 1.5                         | 750            | 8362                              | 0.0                         | 880            | 3128                              | 0.0                         |
| 365            | 2016                              | 0.0                         | 495            | 10476                             | 16.9                        | 625            | 111884                            | 0.9                         | 755            | 7635                              | 0.0                         | 885            | 3110                              | 0.0                         |
| 370            | 2020                              | 0.0                         | 500            | 15549                             | 26.0                        | 630            | 106119                            | 0.6                         | 760            | 6582                              | 0.0                         | 890            | 2632                              | 0.0                         |
| 375            | 2137                              | 0.0                         | 505            | 22477                             | 38.2                        | 635            | 99706                             | 0.4                         | 765            | 5777                              | 0.0                         | 895            | 2709                              | 0.0                         |
| 380            | 2046                              | 0.0                         | 510            | 30417                             | 51.6                        | 640            | 92142                             | 0.2                         | 770            | 5474                              | 0.0                         | 900            | 2016                              | 0.0                         |
| 385            | 1925                              | 0.0                         | 515            | 39274                             | 65.1                        | 645            | 84987                             | 0.1                         | 775            | 4977                              | 0.0                         | 905            | 1748                              | 0.0                         |
| 390            | 1893                              | 0.0                         | 520            | 47282                             | 75.2                        | 650            | 78016                             | 0.1                         | 780            | 4723                              | 0.0                         | 910            | 2046                              | 0.0                         |
| 395            | 1695                              | 0.0                         | 525            | 55413                             | 82.9                        | 655            | 71541                             | 0.1                         | 785            | 4219                              | 0.0                         | 915            | 1844                              | 0.0                         |
| 400            | 1633                              | 0.0                         | 530            | 62377                             | 86.0                        | 660            | 64863                             | 0.0                         | 790            | 3969                              | 0.0                         | 920            | 2734                              | 0.0                         |
| 405            | 2065                              | 0.1                         | 535            | 68520                             | 85.4                        | 665            | 58485                             | 0.0                         | 795            | 4122                              | 0.0                         | 925            | 2307                              | 0.0                         |
| 410            | 3449                              | 0.2                         | 540            | 73435                             | 81.1                        | 670            | 51641                             | 0.0                         | 800            | 2864                              | 0.0                         | 930            | 2039                              | 0.0                         |
| 415            | 7117                              | 0.7                         | 545            | 78677                             | 75.4                        | 675            | 46030                             | 0.0                         | 805            | 3151                              | 0.0                         | 935            | 1784                              | 0.0                         |
| 420            | 13992                             | 2.3                         | 550            | 83331                             | 68.1                        | 680            | 40590                             | 0.0                         | 810            | 3022                              | 0.0                         | 940            | 2464                              | 0.0                         |
| 425            | 25176                             | 6.2                         | 555            | 89120                             | 60.9                        | 685            | 35691                             | 0.0                         | 815            | 3471                              | 0.0                         | 945            | 2794                              | 0.0                         |
| 430            | 38151                             | 13.0                        | 560            | 94613                             | 52.9                        | 690            | 31631                             | 0.0                         | 820            | 2749                              | 0.0                         | 950            | 3090                              | 0.0                         |
| 435            | 49673                             | 22.2                        | 565            | 99818                             | 44.8                        | 695            | 27437                             | 0.0                         | 825            | 2729                              | 0.0                         | 955            | 1866                              | 0.0                         |
| 440            | 57273                             | 32.0                        | 570            | 106526                            | 37.6                        | 700            | 24589                             | 0.0                         | 830            | 2282                              | 0.0                         | 960            | 3110                              | 0.0                         |
| 445            | 54802                             | 36.7                        | 575            | 111610                            | 30.4                        | 705            | 21832                             | 0.0                         | 835            | 3140                              | 0.0                         | 965            | 3880                              | 0.0                         |
| 450            | 39184                             | 30.4                        | 580            | 117163                            | 24.1                        | 710            | 19500                             | 0.0                         | 840            | 2365                              | 0.0                         | 970            | 3243                              | 0.0                         |
| 455            | 22506                             | 19.7                        | 585            | 122201                            | 18.7                        | 715            | 17870                             | 0.0                         | 845            | 3024                              | 0.0                         | 975            | 2014                              | 0.0                         |
| 460            | 13692                             | 13.2                        | 590            | 125662                            | 14.0                        | 720            | 15924                             | 0.0                         | 850            | 2510                              | 0.0                         | 980            | 1688                              | 0.0                         |
| 465            | 9446                              | 10.0                        | 595            | 127415                            | 10.2                        | 725            | 14268                             | 0.0                         | 855            | 2739                              | 0.0                         | 985            | 2827                              | 0.0                         |
| 470            | 6698                              | 7.7                         | 600            | 129155                            | 7.3                         | 730            | 12438                             | 0.0                         | 860            | 3515                              | 0.0                         | 990            | 4172                              | 0.0                         |
| 475            | 5328                              | 6.7                         | 605            | 128057                            | 5.0                         | 735            | 11255                             | 0.0                         | 865            | 3600                              | 0.0                         | 995            | 3177                              | 0.0                         |
| 480            | 5081                              | 6.9                         | 610            | 126031                            | 3.4                         | 740            | 9951                              | 0.0                         | 870            | 3609                              | 0.0                         | 1000           | 3241                              | 0.0                         |
| 485            | 5579                              | 8.1                         | 615            | 123059                            | 2.3                         | 745            | 8870                              | 0.0                         | 875            | 3208                              | 0.0                         |                |                                   |                             |

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**Summary**

$R_f = 69.9$   
 $R_g = 98.3$   
 $CIE R_a = 71.5$   
 $R_9 = -16.1$



**Color Vector Graphics**





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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)