

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: P382801

Luminaire Tested: **GLEON-SA1D-735-U-SL2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P382801  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-20)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA1D-735-U-SL2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(1) 70 CRI, 3500K, 1200mA LIGHTSQUARE WITH 16 LEDS AND TYPE II SPILL  
LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 7413.3 lumens  
Efficiency: N/A  
Efficacy: 110.6 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G2

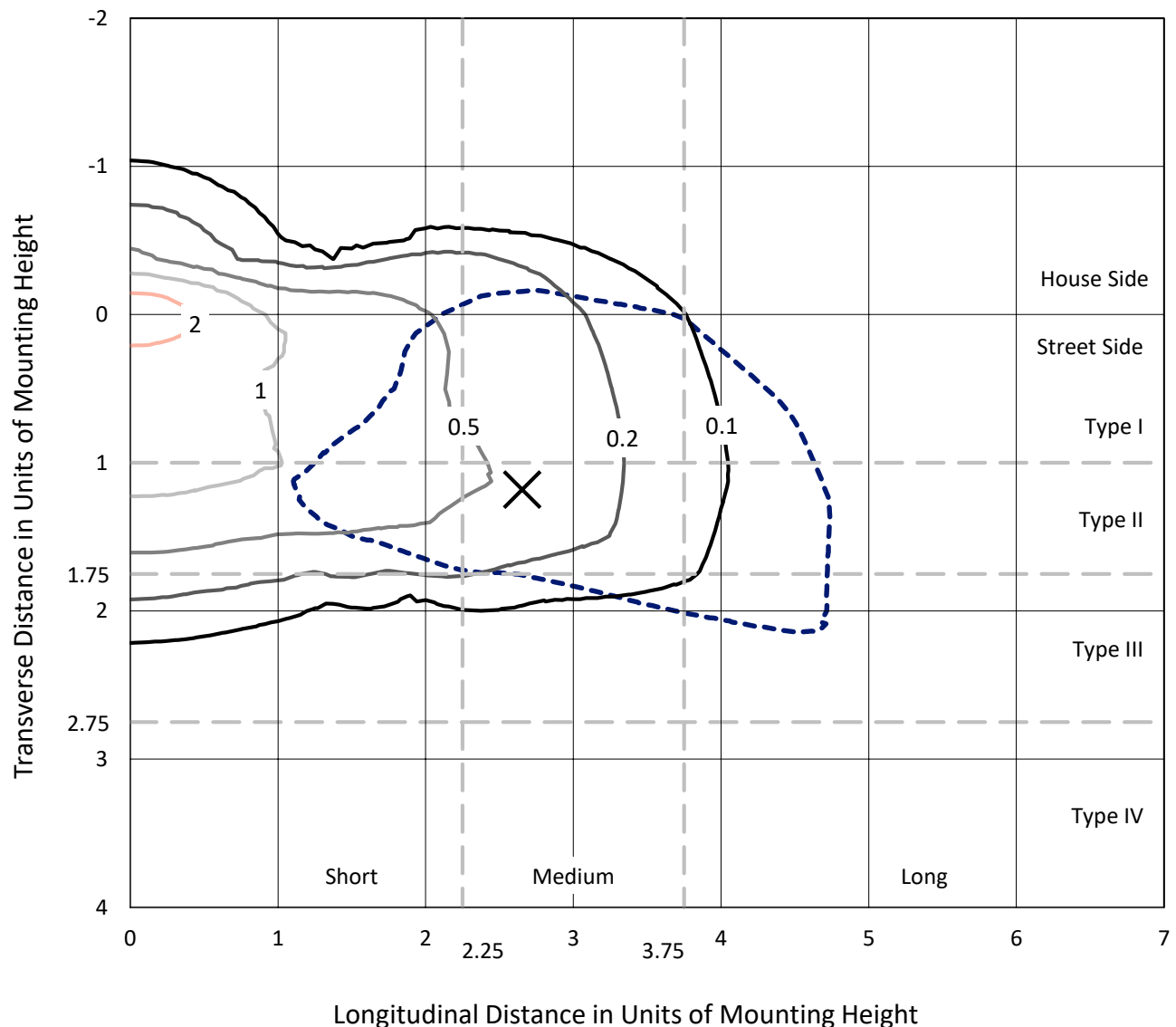
Input Watts (W): 67  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P382801  
 CATALOG NUMBER: GLEON-SA1D-735-U-SL2

## Iso-Footcandle Lines of Horizontal Illumination

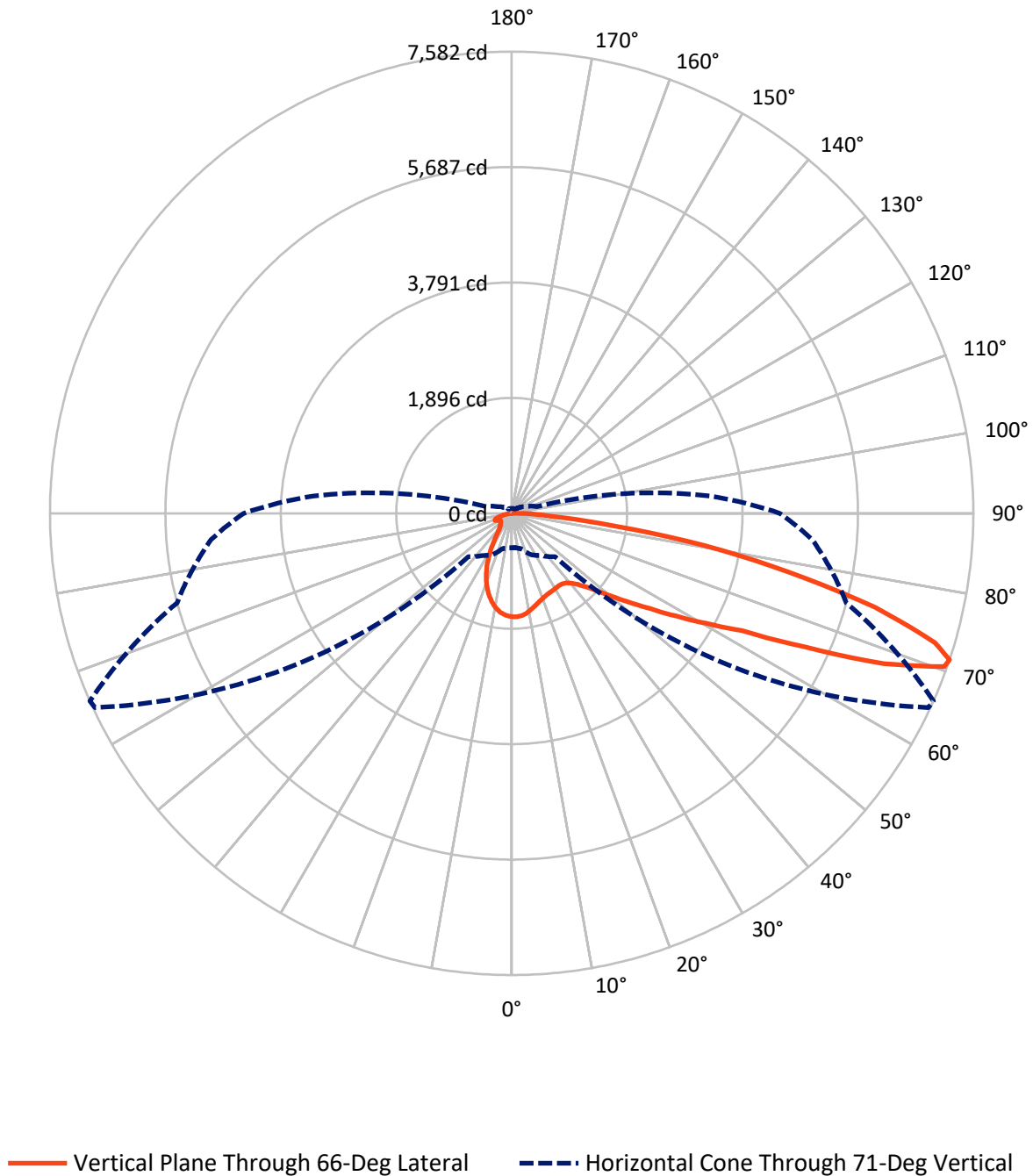
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 2.7 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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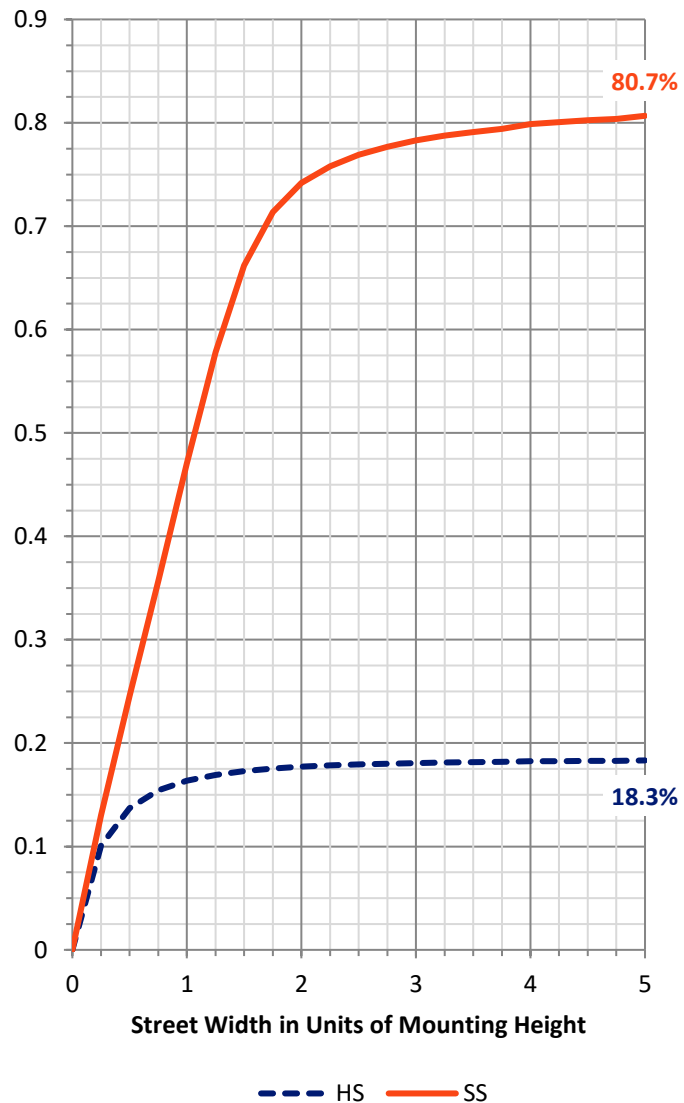
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1373.9   | 0.0    | 1373.9 |
|                    | % Fixture | 18.5     | 0.0    | 18.5   |
| <b>Street Side</b> | Lumens    | 6039.4   | 0.0    | 6039.4 |
|                    | % Fixture | 81.5     | 0.0    | 81.5   |
| <b>Total</b>       | Lumens    | 7413.3   | 0.0    | 7413.3 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 149.5  | 2.0       |
| 10°-20°   | 358.5  | 4.8       |
| 20°-30°   | 481.6  | 6.5       |
| 30°-40°   | 633.5  | 8.5       |
| 40°-50°   | 921.6  | 12.4      |
| 50°-60°   | 1439.7 | 19.4      |
| 60°-70°   | 1803.4 | 24.3      |
| 70°-80°   | 1375.6 | 18.6      |
| 80°-90°   | 249.8  | 3.4       |
| 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°    | 7413.3 | 100.0     |
| 0°-180°   | 7413.3 | 100.0     |

**Coefficient of Utilization**



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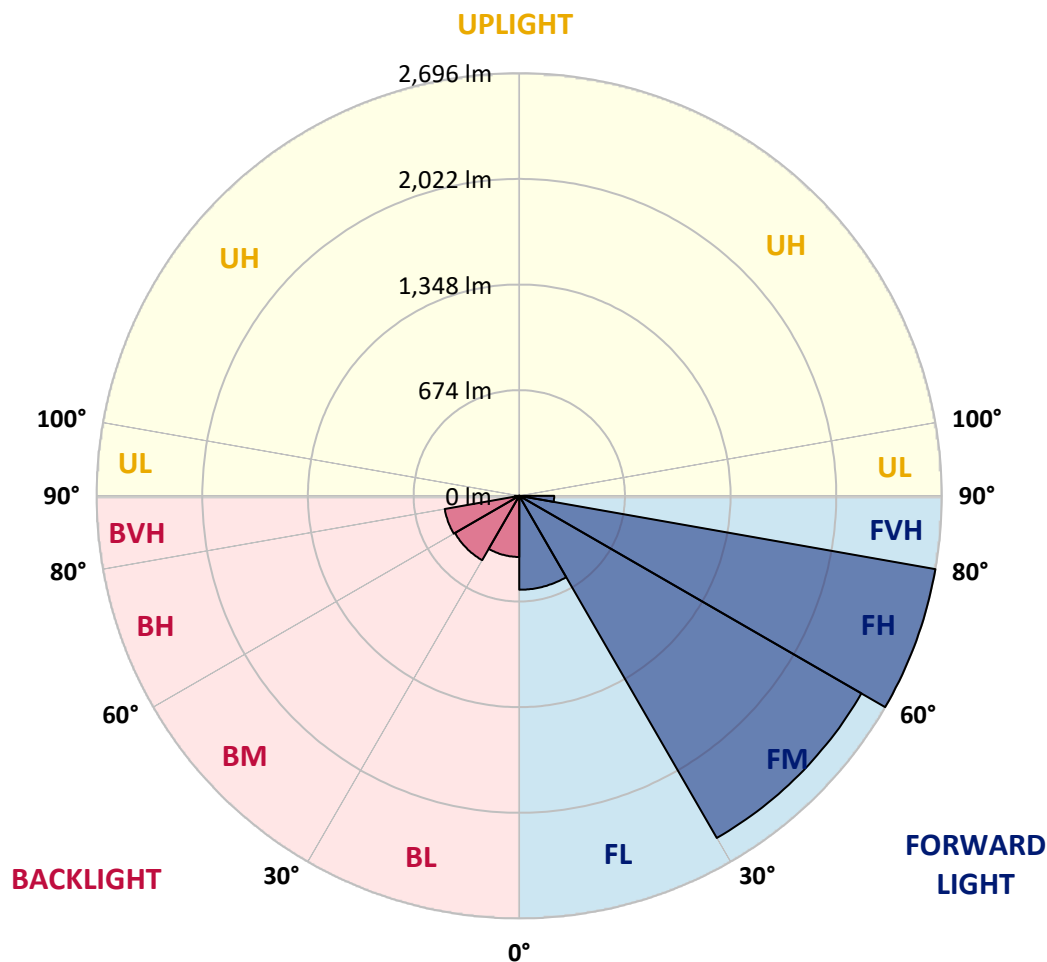
CATALOG NUMBER: GLEON-SA1D-735-U-SL2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 599.5  | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 2520.9 | 34.0      |                         |      |         |
| FH   | (60°-80°)   | 2696.3 | 36.4      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 222.8  | 3.0       |                         |      | G2/225  |
| BL   | (0°-30°)    | 390.1  | 5.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 473.9  | 6.4       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 482.8  | 6.5       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 27.0   | 0.4       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 66°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 |
| 2.5°  | 1666.7 | 1664.2 | 1671.8 | 1679.8 | 1682.8 | 1688.0 | 1695.7 | 1700.0 | 1699.8 | 1700.5 | 1697.9 |
| 5°    | 1556.2 | 1552.9 | 1568.2 | 1580.7 | 1604.8 | 1632.0 | 1665.0 | 1688.5 | 1689.0 | 1702.3 | 1705.9 |
| 7.5°  | 1451.5 | 1449.2 | 1466.8 | 1487.0 | 1515.0 | 1556.4 | 1609.9 | 1660.6 | 1663.7 | 1699.8 | 1712.3 |
| 10°   | 1367.5 | 1367.0 | 1384.2 | 1406.2 | 1438.7 | 1485.0 | 1546.5 | 1620.7 | 1625.3 | 1687.5 | 1713.3 |
| 12.5° | 1302.0 | 1303.0 | 1317.9 | 1343.0 | 1377.3 | 1425.6 | 1492.2 | 1575.9 | 1583.4 | 1668.0 | 1707.4 |
| 15°   | 1253.7 | 1257.8 | 1269.8 | 1295.1 | 1328.9 | 1378.0 | 1446.4 | 1534.4 | 1545.7 | 1646.2 | 1704.1 |
| 17.5° | 1226.0 | 1230.6 | 1239.1 | 1260.0 | 1291.8 | 1339.1 | 1403.9 | 1500.4 | 1510.6 | 1629.6 | 1704.4 |
| 20°   | 1217.8 | 1221.6 | 1226.5 | 1239.3 | 1266.2 | 1309.2 | 1370.4 | 1469.7 | 1480.7 | 1616.3 | 1707.0 |
| 22.5° | 1233.9 | 1236.7 | 1237.3 | 1236.3 | 1252.7 | 1287.7 | 1346.1 | 1447.2 | 1458.9 | 1607.7 | 1708.7 |
| 25°   | 1268.5 | 1272.3 | 1269.5 | 1260.0 | 1254.7 | 1276.1 | 1333.5 | 1432.3 | 1444.1 | 1601.2 | 1705.1 |
| 27.5° | 1320.5 | 1320.9 | 1318.7 | 1306.4 | 1281.1 | 1277.4 | 1329.7 | 1423.6 | 1434.9 | 1593.8 | 1697.7 |
| 30°   | 1391.1 | 1394.4 | 1390.3 | 1373.7 | 1332.2 | 1297.9 | 1334.3 | 1415.1 | 1425.4 | 1584.4 | 1685.7 |
| 32.5° | 1473.8 | 1482.0 | 1481.7 | 1464.3 | 1405.0 | 1343.8 | 1353.2 | 1410.0 | 1418.0 | 1574.3 | 1671.1 |
| 35°   | 1559.5 | 1570.8 | 1591.7 | 1584.4 | 1510.9 | 1416.1 | 1389.6 | 1418.2 | 1423.6 | 1573.1 | 1660.9 |
| 37.5° | 1648.6 | 1659.8 | 1703.1 | 1723.1 | 1637.1 | 1519.8 | 1446.9 | 1447.2 | 1449.7 | 1588.7 | 1660.1 |
| 40°   | 1741.7 | 1753.7 | 1818.8 | 1870.7 | 1800.6 | 1651.2 | 1539.3 | 1507.5 | 1504.7 | 1627.0 | 1675.2 |
| 42.5° | 1872.3 | 1883.0 | 1961.1 | 2027.4 | 1982.1 | 1819.3 | 1667.0 | 1600.7 | 1594.8 | 1702.3 | 1723.5 |
| 45°   | 2037.4 | 2046.6 | 2129.5 | 2200.4 | 2177.1 | 2011.3 | 1827.5 | 1729.0 | 1727.9 | 1827.8 | 1821.6 |
| 47.5° | 2233.7 | 2240.8 | 2315.4 | 2383.9 | 2392.4 | 2232.2 | 2029.2 | 1926.8 | 1910.1 | 1999.8 | 1973.4 |
| 50°   | 2438.2 | 2446.2 | 2496.8 | 2570.5 | 2633.2 | 2527.8 | 2288.7 | 2169.2 | 2146.9 | 2226.8 | 2188.4 |
| 52.5° | 2573.6 | 2584.1 | 2628.1 | 2721.5 | 2904.0 | 2851.8 | 2595.6 | 2463.0 | 2429.2 | 2502.0 | 2472.5 |
| 55°   | 2513.2 | 2536.7 | 2604.0 | 2753.7 | 3120.6 | 3346.8 | 2974.2 | 2805.7 | 2767.6 | 2828.0 | 2810.6 |
| 57.5° | 2238.5 | 2270.8 | 2362.7 | 2593.8 | 3151.1 | 3782.9 | 3546.5 | 3209.4 | 3182.4 | 3165.1 | 3173.0 |
| 60°   | 1736.6 | 1767.6 | 1881.5 | 2182.7 | 2938.8 | 4101.3 | 4407.7 | 3706.9 | 3668.1 | 3503.5 | 3510.6 |
| 62.5° | 1229.1 | 1213.4 | 1291.5 | 1511.9 | 2388.0 | 4138.7 | 5387.8 | 4372.4 | 4244.4 | 3860.8 | 3829.3 |
| 65°   | 937.3  | 933.7  | 968.8  | 1038.9 | 1446.4 | 3691.5 | 5971.6 | 5490.9 | 5291.0 | 4281.0 | 4206.8 |
| 67.5° | 770.1  | 763.8  | 798.3  | 900.4  | 931.4  | 2381.6 | 5984.4 | 6788.6 | 6592.3 | 4804.2 | 4643.5 |
| 70°   | 633.3  | 626.1  | 658.3  | 790.1  | 860.7  | 1207.8 | 5036.6 | 7548.5 | 7538.0 | 5466.6 | 4973.2 |
| 71°   | 567.7  | 562.6  | 601.2  | 747.7  | 845.7  | 1006.6 | 4348.6 | 7550.6 | 7582.1 | 5690.8 | 4953.7 |
| 72.5° | 462.2  | 464.0  | 505.0  | 665.5  | 834.4  | 888.9  | 3196.0 | 7198.6 | 7265.1 | 5904.5 | 4776.8 |
| 75°   | 307.1  | 308.7  | 362.5  | 511.9  | 809.0  | 869.7  | 1756.6 | 6040.4 | 6162.7 | 5776.5 | 4358.8 |
| 77.5° | 206.3  | 205.8  | 242.4  | 351.2  | 704.9  | 869.7  | 1029.9 | 4517.8 | 4652.1 | 4596.3 | 3360.4 |
| 80°   | 142.1  | 141.0  | 166.8  | 242.4  | 533.7  | 880.2  | 796.3  | 3166.1 | 3206.9 | 2482.2 | 1365.7 |
| 82.5° | 87.0   | 87.8   | 109.0  | 171.2  | 363.2  | 792.2  | 751.8  | 1726.3 | 1682.1 | 696.1  | 341.2  |
| 85°   | 49.9   | 49.7   | 69.6   | 116.0  | 233.2  | 668.6  | 733.0  | 743.0  | 681.6  | 209.6  | 123.3  |
| 87.5° | 17.9   | 19.2   | 37.4   | 64.3   | 133.6  | 465.6  | 622.0  | 386.5  | 348.3  | 94.7   | 55.8   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: GLEON-SA1D-735-U-SL2

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 | 1698.2 |
| 2.5°  | 1696.2 | 1697.7 | 1696.0 | 1685.7 | 1677.0 | 1662.9 | 1655.0 | 1644.0 | 1640.6 | 1639.2 | 1643.2 |
| 5°    | 1702.6 | 1703.1 | 1688.0 | 1661.1 | 1631.0 | 1595.4 | 1569.8 | 1538.3 | 1523.5 | 1517.0 | 1521.1 |
| 7.5°  | 1708.5 | 1706.1 | 1673.2 | 1621.7 | 1565.9 | 1504.0 | 1448.9 | 1398.5 | 1369.1 | 1357.1 | 1358.1 |
| 10°   | 1709.2 | 1699.5 | 1646.5 | 1567.0 | 1480.4 | 1389.6 | 1305.1 | 1227.3 | 1178.1 | 1146.2 | 1155.9 |
| 12.5° | 1701.3 | 1684.9 | 1607.4 | 1496.1 | 1376.0 | 1252.1 | 1138.0 | 1021.3 | 951.1  | 918.6  | 919.6  |
| 15°   | 1695.1 | 1665.5 | 1559.2 | 1412.6 | 1251.3 | 1087.3 | 931.4  | 794.2  | 719.4  | 686.2  | 670.6  |
| 17.5° | 1690.0 | 1644.5 | 1503.4 | 1318.7 | 1104.2 | 896.1  | 708.7  | 586.4  | 545.4  | 535.7  | 531.6  |
| 20°   | 1682.8 | 1622.2 | 1441.3 | 1209.9 | 936.5  | 682.1  | 517.6  | 457.1  | 457.4  | 468.7  | 470.2  |
| 22.5° | 1672.9 | 1596.9 | 1375.0 | 1087.8 | 756.6  | 496.8  | 405.7  | 388.3  | 406.0  | 427.4  | 431.3  |
| 25°   | 1658.1 | 1567.0 | 1301.3 | 952.9  | 576.9  | 381.8  | 346.5  | 345.8  | 367.3  | 389.9  | 393.1  |
| 27.5° | 1637.1 | 1527.7 | 1219.4 | 808.0  | 425.2  | 324.6  | 310.5  | 315.9  | 331.7  | 348.1  | 349.3  |
| 30°   | 1608.9 | 1482.2 | 1129.0 | 655.3  | 333.2  | 289.0  | 287.5  | 292.3  | 302.0  | 313.6  | 314.6  |
| 32.5° | 1577.9 | 1435.9 | 1032.5 | 507.3  | 285.4  | 269.8  | 271.3  | 273.6  | 278.3  | 282.8  | 283.8  |
| 35°   | 1549.8 | 1388.6 | 933.7  | 385.5  | 262.6  | 257.2  | 256.2  | 255.7  | 256.2  | 254.7  | 255.0  |
| 37.5° | 1531.7 | 1349.3 | 830.8  | 306.9  | 249.6  | 246.2  | 243.1  | 239.3  | 234.9  | 232.4  | 232.9  |
| 40°   | 1524.9 | 1320.2 | 726.6  | 265.1  | 238.8  | 236.5  | 230.7  | 222.5  | 217.3  | 215.7  | 215.7  |
| 42.5° | 1542.8 | 1305.1 | 626.1  | 244.2  | 229.8  | 226.0  | 216.3  | 206.8  | 203.0  | 202.7  | 202.4  |
| 45°   | 1597.6 | 1311.2 | 530.3  | 232.7  | 221.6  | 214.3  | 201.4  | 193.5  | 191.0  | 191.4  | 191.2  |
| 47.5° | 1696.0 | 1349.9 | 448.4  | 225.0  | 213.4  | 203.7  | 189.4  | 183.0  | 180.0  | 180.0  | 180.2  |
| 50°   | 1863.1 | 1440.3 | 383.1  | 218.5  | 206.5  | 194.0  | 180.7  | 172.8  | 168.7  | 168.4  | 168.4  |
| 52.5° | 2106.5 | 1602.0 | 342.4  | 213.2  | 198.9  | 185.3  | 172.0  | 162.0  | 157.2  | 156.1  | 155.7  |
| 55°   | 2411.6 | 1833.8 | 331.2  | 209.6  | 188.6  | 175.9  | 161.5  | 151.6  | 146.2  | 143.8  | 143.6  |
| 57.5° | 2752.7 | 2115.9 | 353.4  | 205.3  | 178.1  | 164.6  | 150.0  | 140.5  | 134.9  | 132.1  | 131.8  |
| 60°   | 3098.0 | 2423.9 | 444.3  | 199.2  | 169.4  | 152.3  | 138.2  | 129.5  | 123.9  | 120.8  | 120.3  |
| 62.5° | 3443.8 | 2748.4 | 629.9  | 198.6  | 163.3  | 140.5  | 126.2  | 118.8  | 113.4  | 110.0  | 109.3  |
| 65°   | 3833.9 | 3103.6 | 840.8  | 212.2  | 161.3  | 129.8  | 113.9  | 108.0  | 103.4  | 100.3  | 100.0  |
| 67.5° | 4281.8 | 3504.8 | 820.6  | 240.1  | 168.1  | 120.1  | 102.4  | 97.8   | 94.5   | 91.9   | 91.7   |
| 70°   | 4491.9 | 3442.1 | 510.1  | 259.8  | 177.9  | 110.6  | 91.4   | 88.0   | 85.5   | 83.7   | 82.9   |
| 71°   | 4403.9 | 3268.2 | 427.7  | 257.5  | 176.9  | 106.5  | 87.0   | 84.5   | 81.9   | 80.4   | 79.6   |
| 72.5° | 4163.8 | 2980.6 | 356.8  | 239.6  | 165.3  | 99.0   | 81.4   | 78.8   | 76.6   | 74.7   | 74.2   |
| 75°   | 3736.3 | 2661.9 | 285.6  | 191.4  | 131.8  | 83.7   | 71.4   | 68.6   | 66.8   | 65.8   | 64.7   |
| 77.5° | 2746.6 | 1899.7 | 220.9  | 151.3  | 97.0   | 68.4   | 60.9   | 58.9   | 57.1   | 55.5   | 54.8   |
| 80°   | 1052.2 | 735.8  | 148.7  | 112.9  | 71.2   | 54.0   | 49.2   | 48.2   | 46.3   | 45.3   | 45.3   |
| 82.5° | 283.4  | 219.8  | 79.4   | 68.4   | 47.6   | 39.4   | 37.6   | 37.1   | 35.6   | 33.5   | 33.8   |
| 85°   | 114.7  | 97.0   | 44.5   | 37.6   | 29.2   | 23.3   | 25.3   | 25.6   | 23.8   | 21.2   | 21.5   |
| 87.5° | 50.4   | 41.2   | 24.9   | 16.7   | 12.8   | 8.9    | 11.6   | 11.6   | 10.5   | 8.7    | 7.9    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

All Brands

Data applicable to all product families using SA light engines

Report Number: SP1-2101-121-7

Luminaire Tested: IFLD-S-SA2A-735-U-T2

Test Date: 03/04/2021

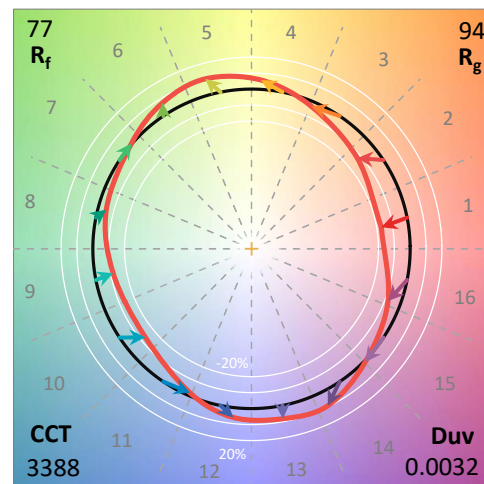
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-735-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3388   | CRI (Ra): | 73.1 |      |       |
| CIE u':                   | 0.2371 | R1:       | 68.9 | R9:  | -34.6 |
| CIE v':                   | 0.5177 | R2:       | 81.1 | R10: | 57.8  |
| Duv:                      | 0.0032 | R3:       | 93.1 | R11: | 68.6  |
| CIE x:                    | 0.4153 | R4:       | 71.6 | R12: | 53.9  |
| CIE y:                    | 0.4030 | R5:       | 69.4 | R13: | 70.9  |
| CIE z:                    | 0.1817 | R6:       | 75.0 | R14: | 96.2  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 45.7   |           |      |      |       |
| Rf:                       | 76.9   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

Stabilization Time: 81M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/30%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2101-121-7

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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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 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength



#####

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 2672                          | 0.0                            | 490               | 34553                         | 4.9                            | 620               | 136720                        | 35.6                           | 750               | 5870                          | 0.0                            | 880               | 4216                          | 0.0                            |
| 365               | 2252                          | 0.0                            | 495               | 44336                         | 8.0                            | 625               | 126308                        | 27.9                           | 755               | 5421                          | 0.0                            | 885               | 4132                          | 0.0                            |
| 370               | 2217                          | 0.0                            | 500               | 54643                         | 12.1                           | 630               | 114625                        | 20.7                           | 760               | 5097                          | 0.0                            | 890               | 3992                          | 0.0                            |
| 375               | 2697                          | 0.0                            | 505               | 64676                         | 18.1                           | 635               | 103216                        | 15.5                           | 765               | 4626                          | 0.0                            | 895               | 3214                          | 0.0                            |
| 380               | 3039                          | 0.0                            | 510               | 73825                         | 25.4                           | 640               | 92605                         | 11.1                           | 770               | 3782                          | 0.0                            | 900               | 2580                          | 0.0                            |
| 385               | 2655                          | 0.0                            | 515               | 81872                         | 33.9                           | 645               | 83234                         | 8.0                            | 775               | 3506                          | 0.0                            | 905               | 1776                          | 0.0                            |
| 390               | 2357                          | 0.0                            | 520               | 88574                         | 43.0                           | 650               | 73263                         | 5.4                            | 780               | 3507                          | 0.0                            | 910               | 3995                          | 0.0                            |
| 395               | 2186                          | 0.0                            | 525               | 93289                         | 50.1                           | 655               | 64627                         | 3.7                            | 785               | 3267                          | 0.0                            | 915               | 4288                          | 0.0                            |
| 400               | 2015                          | 0.0                            | 530               | 98393                         | 57.9                           | 660               | 56614                         | 2.4                            | 790               | 2849                          | 0.0                            | 920               | 2446                          | 0.0                            |
| 405               | 2234                          | 0.0                            | 535               | 103269                        | 64.0                           | 665               | 49537                         | 1.6                            | 795               | 3037                          | 0.0                            | 925               | 3009                          | 0.0                            |
| 410               | 3412                          | 0.0                            | 540               | 107316                        | 69.9                           | 670               | 42866                         | 0.9                            | 800               | 2716                          | 0.0                            | 930               | 3026                          | 0.0                            |
| 415               | 6135                          | 0.0                            | 545               | 113101                        | 75.3                           | 675               | 36708                         | 0.6                            | 805               | 2648                          | 0.0                            | 935               | 4734                          | 0.0                            |
| 420               | 12146                         | 0.0                            | 550               | 120690                        | 82.0                           | 680               | 31814                         | 0.4                            | 810               | 3187                          | 0.0                            | 940               | 3719                          | 0.0                            |
| 425               | 23983                         | 0.1                            | 555               | 128583                        | 87.8                           | 685               | 27485                         | 0.2                            | 815               | 2931                          | 0.0                            | 945               | 1480                          | 0.0                            |
| 430               | 42142                         | 0.3                            | 560               | 137796                        | 93.6                           | 690               | 23698                         | 0.1                            | 820               | 2717                          | 0.0                            | 950               | 3450                          | 0.0                            |
| 435               | 68228                         | 0.8                            | 565               | 146577                        | 97.5                           | 695               | 20309                         | 0.1                            | 825               | 2236                          | 0.0                            | 955               | 5051                          | 0.0                            |
| 440               | 99323                         | 1.6                            | 570               | 154581                        | 100.5                          | 700               | 17890                         | 0.1                            | 830               | 2628                          | 0.0                            | 960               | 3176                          | 0.0                            |
| 445               | 115584                        | 2.4                            | 575               | 162633                        | 101.2                          | 705               | 15500                         | 0.0                            | 835               | 3140                          | 0.0                            | 965               | 5178                          | 0.0                            |
| 450               | 94997                         | 2.5                            | 580               | 168101                        | 99.9                           | 710               | 13699                         | 0.0                            | 840               | 3675                          | 0.0                            | 970               | 6385                          | 0.0                            |
| 455               | 61433                         | 2.1                            | 585               | 173145                        | 96.2                           | 715               | 12398                         | 0.0                            | 845               | 3283                          | 0.0                            | 975               | 3810                          | 0.0                            |
| 460               | 43373                         | 1.8                            | 590               | 174675                        | 90.3                           | 720               | 11147                         | 0.0                            | 850               | 3055                          | 0.0                            | 980               | 4322                          | 0.0                            |
| 465               | 32472                         | 1.7                            | 595               | 173724                        | 82.3                           | 725               | 9761                          | 0.0                            | 855               | 2932                          | 0.0                            | 985               | 4200                          | 0.0                            |
| 470               | 24257                         | 1.5                            | 600               | 171241                        | 73.8                           | 730               | 8651                          | 0.0                            | 860               | 3382                          | 0.0                            | 990               | 4661                          | 0.0                            |
| 475               | 21690                         | 1.7                            | 605               | 165134                        | 64.0                           | 735               | 7730                          | 0.0                            | 865               | 2605                          | 0.0                            | 995               | 6746                          | 0.0                            |
| 480               | 23173                         | 2.2                            | 610               | 156652                        | 53.8                           | 740               | 6847                          | 0.0                            | 870               | 3325                          | 0.0                            | 1000              | 4150                          | 0.0                            |
| 485               | 27564                         | 3.3                            | 615               | 147879                        | 44.6                           | 745               | 6124                          | 0.0                            | 875               | 3325                          | 0.0                            |                   |                               |                                |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 12126

S/P: 1.36

| 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       | 2672             | 0.0              | 490       | 34553            | 53.2             | 620       | 136720           | 1.7              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 71.7             | 625       | 126308           | 1.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 91.4             | 630       | 114625           | 0.6              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 110.0            | 635       | 103216           | 0.4              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 125.1            | 640       | 92605            | 0.2              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 135.7            | 645       | 83234            | 0.1              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 140.8            | 650       | 73263            | 0.1              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 139.6            | 655       | 64627            | 0.1              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 135.7            | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.1              | 535       | 103269           | 128.7            | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.2              | 540       | 107316           | 118.6            | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.6              | 545       | 113101           | 108.4            | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 2.0              | 550       | 120690           | 98.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 5.9              | 555       | 128583           | 87.9             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 14.3             | 560       | 137796           | 77.0             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 30.5             | 565       | 146577           | 65.8             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 55.5             | 570       | 154581           | 54.6             | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 77.4             | 575       | 162633           | 44.3             | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 73.6             | 580       | 168101           | 34.6             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 53.7             | 585       | 173145           | 26.5             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 41.9             | 590       | 174675           | 19.5             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 34.3             | 595       | 173724           | 13.9             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 27.9             | 600       | 171241           | 9.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 27.1             | 605       | 165134           | 6.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 31.3             | 610       | 156652           | 4.2              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 40.0             | 615       | 147879           | 2.7              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 4490.7**

**M/P: 0.5**

| 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       | 2672             | 0.0              | 490       | 34553            | 28.8             | 620       | 136720           | 0.1              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 36.6             | 625       | 126308           | 0.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 43.9             | 630       | 114625           | 0.0              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 49.6             | 635       | 103216           | 0.0              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 53.0             | 640       | 92605            | 0.0              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 53.5             | 645       | 83234            | 0.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 51.6             | 650       | 73263            | 0.0              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 47.3             | 655       | 64627            | 0.0              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 42.5             | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 37.2             | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.1              | 540       | 107316           | 31.4             | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.4              | 545       | 113101           | 26.3             | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 1.4              | 550       | 120690           | 21.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 3.7              | 555       | 128583           | 17.3             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 8.9              | 560       | 137796           | 13.6             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 18.2             | 565       | 146577           | 10.3             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 33.2             | 570       | 154581           | 7.6              | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 45.6             | 575       | 162633           | 5.4              | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 43.8             | 580       | 168101           | 3.8              | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 32.2             | 585       | 173145           | 2.6              | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 25.6             | 590       | 174675           | 1.7              | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 21.2             | 595       | 173724           | 1.1              | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 17.4             | 600       | 171241           | 0.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 16.6             | 605       | 165134           | 0.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 18.6             | 610       | 156652           | 0.3              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 22.7             | 615       | 147879           | 0.2              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 76.9$   
 $R_g = 94.4$   
 $CIE R_a = 73.1$   
 $R_g = -34.6$

### Spectral Power Distribution Comparison



### Color Vector Graphics





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 88 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 84 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 75 | CES81 = 75 |
| CES07 = 40 | CES32 = 67 | CES57 = 74 | CES82 = 94 |
| CES08 = 39 | CES33 = 74 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 78 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 89 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 68 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 88 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 59 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 88 | CES75 = 66 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)