

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



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P634457

Luminaire Tested: GWS-SA3B-827-U-SL2-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P634457  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-27)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA3B-827-U-SL2-W  
Description: GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II SPILL LIGHT ELIMINATOR OPTICS  
Light Source: (48) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 7513.9 lumens  
Efficiency: N/A  
Efficacy: 110.0 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G2  
  
Input Watts (W): 68.3  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

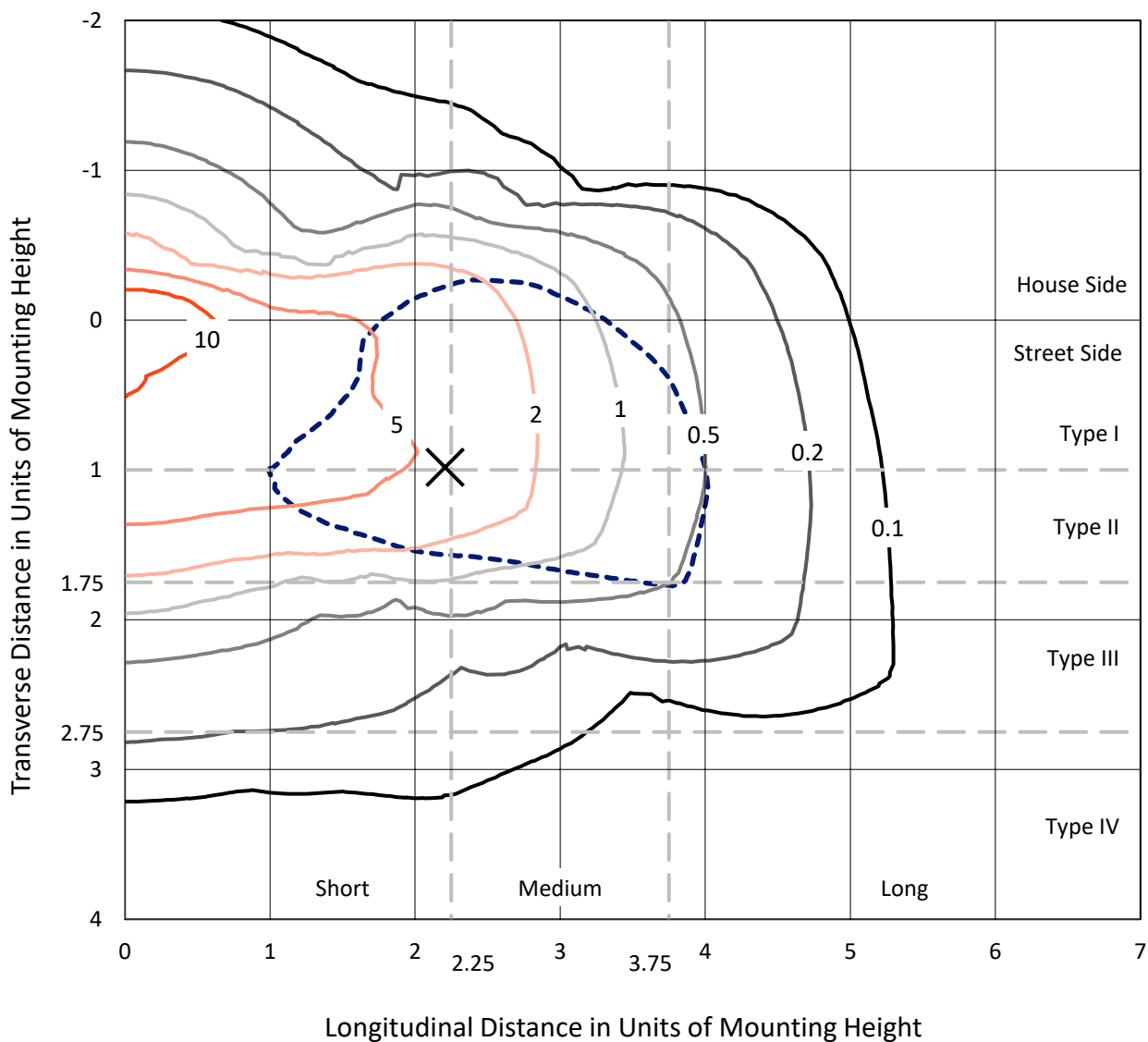


REPORT NUMBER: P634457

CATALOG NUMBER: GWS-SA3B-827-U-SL2-W

### Iso-Footcandle Lines of Horizontal Illumination

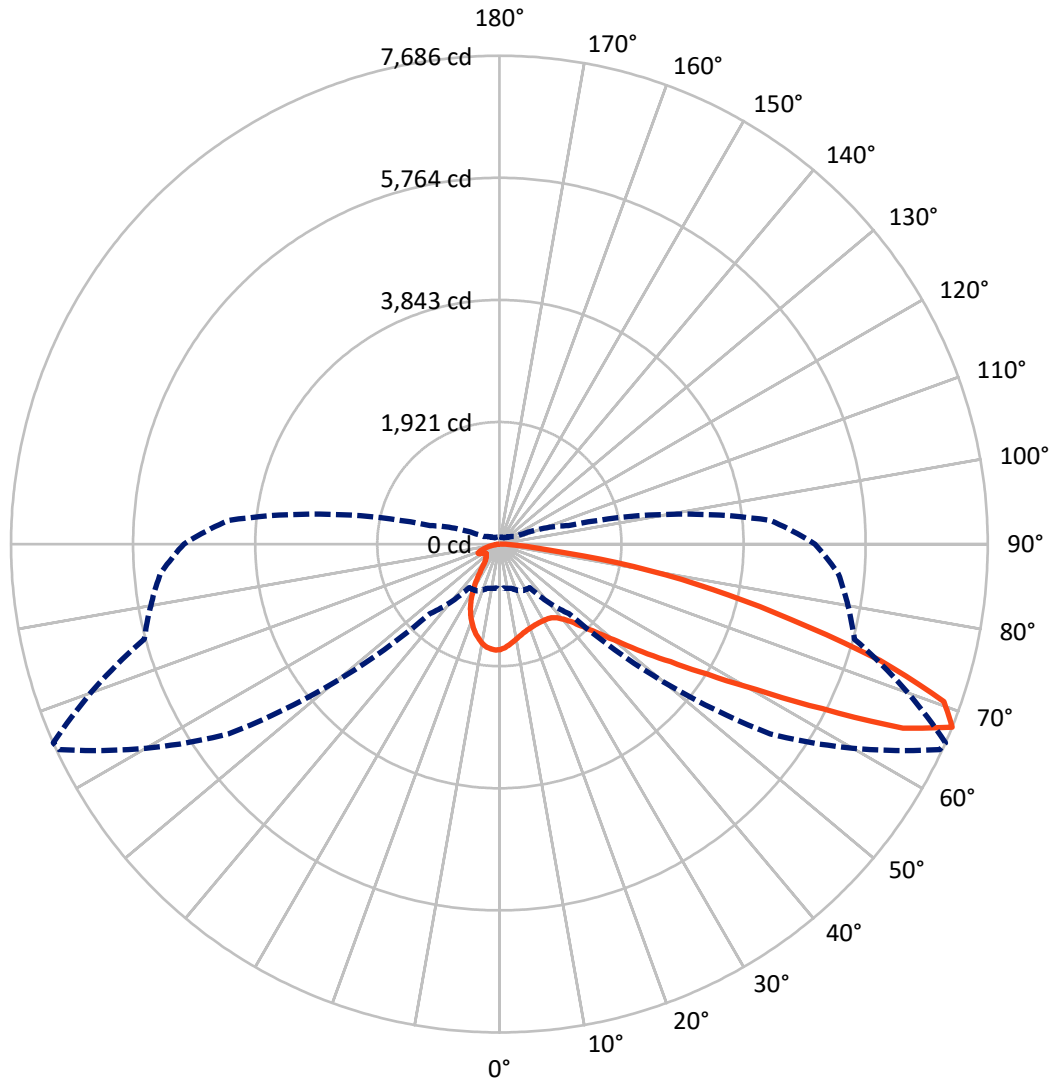
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 16.6 fc  
 Type II - Short - N/A

REPORT NUMBER: P634457  
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### Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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CATALOG NUMBER: GWS-SA3B-827-U-SL2-W

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1524.7   | 0.0    | 1524.7 |
|                    | % Fixture | 20.3     | 0.0    | 20.3   |
| <b>Street Side</b> | Lumens    | 5989.2   | 0.0    | 5989.2 |
|                    | % Fixture | 79.7     | 0.0    | 79.7   |
| <b>Total</b>       | Lumens    | 7513.9   | 0.0    | 7513.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 145.7  | 1.9       |
| 10°-20°   | 358.1  | 4.8       |
| 20°-30°   | 492.2  | 6.6       |
| 30°-40°   | 673.0  | 9.0       |
| 40°-50°   | 1019.7 | 13.6      |
| 50°-60°   | 1585.2 | 21.1      |
| 60°-70°   | 1930.0 | 25.7      |
| 70°-80°   | 1175.6 | 15.6      |
| 80°-90°   | 134.3  | 1.8       |
| 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°    | 7513.9 | 100.0     |
| 0°-180°   | 7513.9 | 100.0     |

**Coefficient of Utilization**



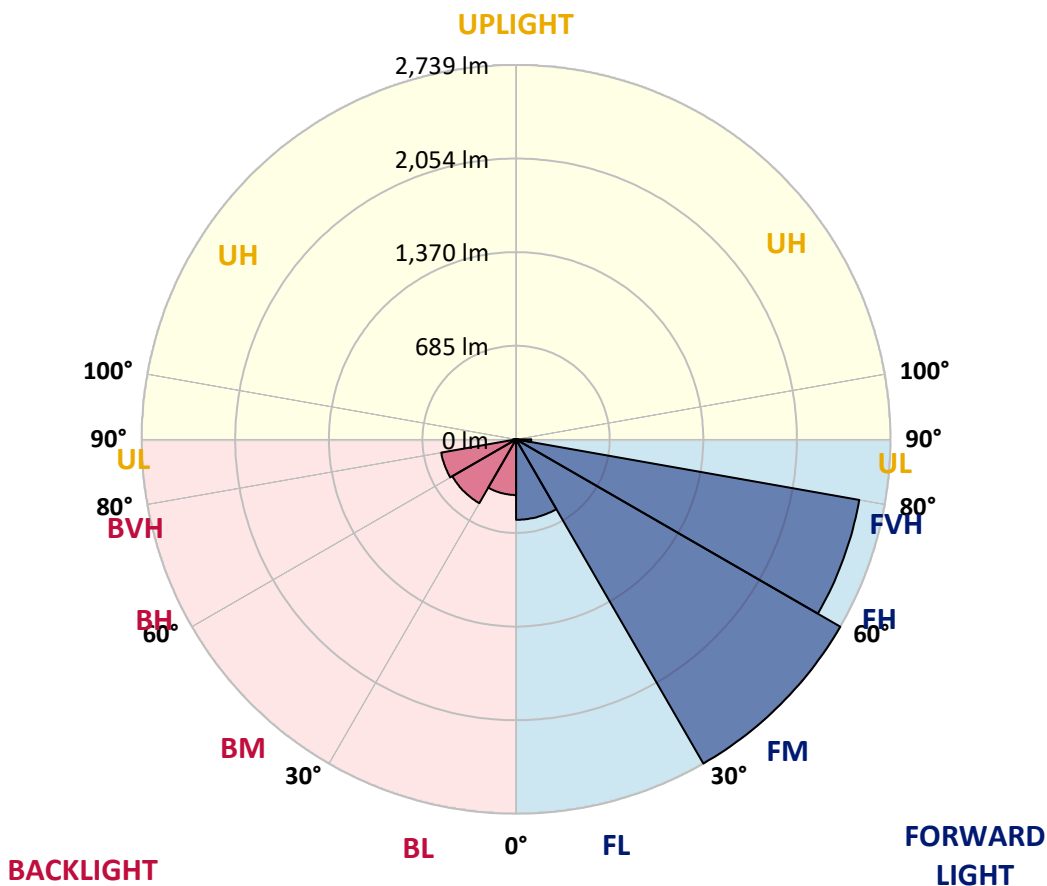
REPORT NUMBER: P634457

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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°)    | 588.7  | 7.8       |                         |      |         |
| FM (30°-60°)   | 2739.1 | 36.5      |                         |      |         |
| FH (60°-80°)   | 2549.7 | 33.9      |                         |      | G2/5000 |
| FVH (80°-90°)  | 111.6  | 1.5       |                         |      | G2/225  |
| BL (0°-30°)    | 407.3  | 5.4       | B1/500                  |      |         |
| BM (30°-60°)   | 538.8  | 7.2       | B1/1000                 |      |         |
| BH (60°-80°)   | 555.9  | 7.4       | B2/1000                 |      | G2/1000 |
| BVH (80°-90°)  | 22.6   | 0.3       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**  
 Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 66°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 |
| 2.5°  | 1555.1 | 1560.6 | 1557.3 | 1578.1 | 1579.2 | 1605.5 | 1620.3 | 1633.0 | 1634.0 | 1650.5 | 1661.5 |
| 5°    | 1448.8 | 1452.1 | 1452.1 | 1471.8 | 1484.9 | 1520.0 | 1554.0 | 1590.2 | 1592.9 | 1632.4 | 1662.6 |
| 7.5°  | 1362.7 | 1366.0 | 1363.8 | 1390.1 | 1407.1 | 1446.0 | 1489.3 | 1544.7 | 1550.2 | 1613.8 | 1666.4 |
| 10°   | 1295.3 | 1294.2 | 1299.7 | 1323.8 | 1345.7 | 1392.3 | 1440.5 | 1503.6 | 1511.8 | 1592.4 | 1670.8 |
| 12.5° | 1249.2 | 1250.3 | 1253.6 | 1278.8 | 1302.4 | 1348.5 | 1398.3 | 1466.9 | 1475.6 | 1567.7 | 1668.6 |
| 15°   | 1227.3 | 1225.1 | 1227.9 | 1250.9 | 1273.4 | 1313.9 | 1365.5 | 1436.2 | 1444.9 | 1545.8 | 1669.1 |
| 17.5° | 1222.4 | 1220.7 | 1220.2 | 1236.6 | 1253.6 | 1291.5 | 1340.8 | 1412.6 | 1421.9 | 1531.5 | 1672.4 |
| 20°   | 1237.7 | 1235.5 | 1229.5 | 1236.6 | 1243.8 | 1275.6 | 1323.2 | 1395.6 | 1406.0 | 1522.2 | 1679.0 |
| 22.5° | 1279.9 | 1276.1 | 1266.8 | 1258.0 | 1248.7 | 1267.9 | 1312.3 | 1383.0 | 1393.4 | 1516.2 | 1685.6 |
| 25°   | 1344.1 | 1340.8 | 1330.9 | 1311.2 | 1277.2 | 1273.9 | 1310.1 | 1377.5 | 1387.9 | 1511.8 | 1688.3 |
| 27.5° | 1432.3 | 1427.4 | 1417.5 | 1389.0 | 1333.7 | 1296.4 | 1318.3 | 1377.0 | 1386.8 | 1506.9 | 1685.6 |
| 30°   | 1537.0 | 1533.7 | 1528.3 | 1493.7 | 1419.7 | 1344.1 | 1336.9 | 1381.3 | 1389.0 | 1504.1 | 1680.1 |
| 32.5° | 1643.4 | 1640.1 | 1644.5 | 1628.0 | 1537.0 | 1423.0 | 1377.5 | 1393.4 | 1398.9 | 1503.6 | 1675.2 |
| 35°   | 1737.1 | 1740.9 | 1772.7 | 1775.5 | 1686.1 | 1529.9 | 1441.6 | 1421.4 | 1422.5 | 1514.5 | 1677.4 |
| 37.5° | 1835.2 | 1850.0 | 1891.7 | 1927.3 | 1852.8 | 1671.3 | 1537.0 | 1474.0 | 1472.9 | 1542.5 | 1691.1 |
| 40°   | 1965.1 | 1971.7 | 2024.9 | 2091.8 | 2045.2 | 1865.4 | 1672.4 | 1560.0 | 1552.4 | 1599.5 | 1727.8 |
| 42.5° | 2091.8 | 2107.7 | 2192.6 | 2269.4 | 2254.0 | 2084.1 | 1842.9 | 1688.9 | 1675.2 | 1700.4 | 1803.4 |
| 45°   | 2252.9 | 2268.3 | 2363.6 | 2462.3 | 2490.3 | 2331.3 | 2061.1 | 1871.9 | 1858.2 | 1852.2 | 1942.1 |
| 47.5° | 2414.1 | 2430.0 | 2515.5 | 2658.0 | 2756.1 | 2640.5 | 2345.0 | 2113.7 | 2091.2 | 2067.6 | 2151.5 |
| 50°   | 2522.6 | 2541.2 | 2622.9 | 2793.9 | 3024.2 | 3026.4 | 2681.6 | 2430.5 | 2402.0 | 2364.7 | 2446.4 |
| 52.5° | 2518.8 | 2530.8 | 2608.7 | 2806.0 | 3217.1 | 3469.8 | 3132.2 | 2834.0 | 2810.9 | 2729.8 | 2801.1 |
| 55°   | 2320.9 | 2339.0 | 2417.4 | 2664.0 | 3237.9 | 3890.2 | 3794.3 | 3309.8 | 3268.6 | 3123.4 | 3201.8 |
| 57.5° | 1923.5 | 1938.8 | 2017.8 | 2322.0 | 3053.2 | 4105.7 | 4635.2 | 3916.0 | 3859.6 | 3552.0 | 3642.5 |
| 60°   | 1452.1 | 1433.4 | 1470.7 | 1737.1 | 2611.4 | 4111.2 | 5377.4 | 4738.2 | 4644.0 | 4010.3 | 4085.9 |
| 62.5° | 1089.7 | 1071.1 | 1079.3 | 1154.4 | 1770.5 | 3779.0 | 5800.6 | 5863.1 | 5707.4 | 4527.8 | 4513.0 |
| 65°   | 861.1  | 850.7  | 874.3  | 925.8  | 1032.2 | 2877.8 | 5803.9 | 7079.4 | 6981.3 | 5127.4 | 4950.9 |
| 67.5° | 701.6  | 695.1  | 719.2  | 814.6  | 837.0  | 1546.3 | 5204.2 | 7647.3 | 7685.7 | 5784.1 | 5357.1 |
| 70°   | 565.1  | 555.3  | 593.1  | 718.6  | 778.4  | 935.7  | 3728.0 | 7357.9 | 7419.8 | 6175.5 | 5242.5 |
| 72.5° | 390.3  | 390.8  | 410.0  | 582.1  | 751.5  | 808.0  | 2108.7 | 6126.7 | 6261.0 | 5820.8 | 4608.9 |
| 75°   | 263.1  | 265.3  | 270.8  | 384.3  | 692.3  | 783.9  | 1123.7 | 4638.5 | 4733.3 | 4811.1 | 3809.7 |
| 77.5° | 159.0  | 160.1  | 172.7  | 232.4  | 477.4  | 731.8  | 761.4  | 3362.4 | 3436.9 | 3171.6 | 2361.4 |
| 80°   | 92.1   | 95.9   | 107.4  | 155.7  | 322.3  | 549.8  | 589.3  | 2061.6 | 2146.0 | 1409.9 | 750.4  |
| 82.5° | 40.6   | 43.3   | 58.7   | 90.4   | 188.0  | 467.6  | 459.9  | 814.6  | 802.5  | 393.0  | 260.4  |
| 85°   | 7.1    | 8.8    | 12.6   | 28.5   | 69.1   | 246.7  | 356.8  | 359.6  | 338.2  | 149.1  | 108.0  |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 1.6    | 53.7   | 96.5   | 95.9   | 42.2   | 37.3   |
| 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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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 | 1660.4 |
| 2.5°  | 1668.6 | 1653.8 | 1666.9 | 1668.6 | 1665.8 | 1663.6 | 1647.2 | 1633.0 | 1631.3 | 1616.0 | 1616.0 |
| 5°    | 1674.6 | 1660.9 | 1667.5 | 1654.9 | 1635.1 | 1614.9 | 1579.8 | 1555.7 | 1544.7 | 1525.0 | 1525.0 |
| 7.5°  | 1682.8 | 1668.6 | 1660.9 | 1629.7 | 1583.6 | 1539.2 | 1482.8 | 1435.6 | 1416.4 | 1388.5 | 1387.4 |
| 10°   | 1690.5 | 1672.4 | 1646.1 | 1585.3 | 1511.8 | 1441.1 | 1358.9 | 1292.0 | 1246.5 | 1213.1 | 1213.1 |
| 12.5° | 1690.0 | 1666.4 | 1614.3 | 1524.4 | 1423.0 | 1320.5 | 1210.9 | 1110.0 | 1049.7 | 997.6  | 994.4  |
| 15°   | 1688.9 | 1656.5 | 1573.8 | 1453.7 | 1319.4 | 1177.4 | 1028.3 | 896.8  | 807.4  | 756.5  | 752.1  |
| 17.5° | 1687.8 | 1643.9 | 1528.3 | 1373.1 | 1193.3 | 999.8  | 803.0  | 660.5  | 586.0  | 554.7  | 555.8  |
| 20°   | 1687.8 | 1629.7 | 1479.5 | 1280.5 | 1048.1 | 787.1  | 589.3  | 485.7  | 467.0  | 468.7  | 470.3  |
| 22.5° | 1682.8 | 1612.1 | 1425.2 | 1179.6 | 886.4  | 578.9  | 434.7  | 399.6  | 409.5  | 424.8  | 427.0  |
| 25°   | 1671.3 | 1583.1 | 1362.2 | 1067.8 | 694.0  | 421.5  | 354.7  | 348.1  | 366.2  | 385.4  | 390.8  |
| 27.5° | 1653.2 | 1549.6 | 1291.5 | 936.8  | 510.9  | 338.8  | 311.9  | 311.4  | 325.6  | 339.9  | 344.8  |
| 30°   | 1634.0 | 1512.4 | 1216.9 | 791.0  | 370.0  | 294.9  | 284.5  | 284.5  | 291.6  | 300.4  | 299.3  |
| 32.5° | 1611.6 | 1474.5 | 1136.9 | 639.1  | 301.5  | 270.2  | 267.0  | 265.3  | 266.4  | 269.7  | 269.7  |
| 35°   | 1592.4 | 1441.1 | 1054.6 | 478.5  | 270.2  | 256.5  | 253.2  | 249.4  | 247.8  | 245.6  | 246.7  |
| 37.5° | 1585.3 | 1414.8 | 969.7  | 360.7  | 254.9  | 246.7  | 241.2  | 235.7  | 231.9  | 230.8  | 230.2  |
| 40°   | 1596.8 | 1403.8 | 884.7  | 297.1  | 243.9  | 236.3  | 230.2  | 223.1  | 219.8  | 219.8  | 219.8  |
| 42.5° | 1641.7 | 1412.0 | 798.1  | 268.6  | 236.3  | 227.5  | 218.7  | 212.1  | 211.0  | 212.1  | 212.7  |
| 45°   | 1723.9 | 1443.8 | 708.2  | 254.3  | 229.7  | 218.7  | 208.3  | 203.4  | 203.4  | 204.5  | 204.5  |
| 47.5° | 1870.8 | 1527.2 | 619.4  | 245.6  | 223.1  | 211.6  | 200.6  | 195.7  | 195.1  | 196.2  | 196.2  |
| 50°   | 2125.2 | 1677.4 | 539.4  | 239.5  | 218.2  | 206.1  | 195.1  | 188.6  | 186.9  | 186.4  | 186.4  |
| 52.5° | 2445.9 | 1937.7 | 488.4  | 235.2  | 212.1  | 200.1  | 189.1  | 180.3  | 177.1  | 175.4  | 175.4  |
| 55°   | 2833.4 | 2284.7 | 488.4  | 231.9  | 204.5  | 193.0  | 180.3  | 171.6  | 166.6  | 164.4  | 164.4  |
| 57.5° | 3272.5 | 2688.7 | 572.8  | 229.1  | 198.4  | 184.7  | 171.0  | 162.3  | 156.8  | 153.5  | 153.5  |
| 60°   | 3719.2 | 3115.7 | 781.7  | 225.3  | 193.0  | 174.3  | 160.6  | 152.4  | 145.3  | 141.4  | 140.9  |
| 62.5° | 4182.4 | 3586.0 | 1056.8 | 227.5  | 189.1  | 164.4  | 149.6  | 140.3  | 134.3  | 130.5  | 129.9  |
| 65°   | 4606.7 | 4033.9 | 1297.5 | 244.5  | 189.7  | 155.7  | 137.0  | 128.8  | 123.9  | 118.9  | 118.4  |
| 67.5° | 4966.8 | 4281.1 | 1128.6 | 279.0  | 201.2  | 145.3  | 124.4  | 116.2  | 111.8  | 108.5  | 108.0  |
| 70°   | 4714.7 | 3904.0 | 640.2  | 300.4  | 217.1  | 134.3  | 110.2  | 104.7  | 100.3  | 98.1   | 97.6   |
| 72.5° | 4031.7 | 3305.4 | 428.1  | 265.3  | 197.9  | 120.0  | 97.0   | 92.6   | 89.3   | 86.6   | 86.1   |
| 75°   | 3265.9 | 2621.3 | 327.2  | 217.6  | 154.0  | 97.6   | 83.3   | 80.0   | 76.7   | 74.0   | 73.5   |
| 77.5° | 1932.2 | 1514.5 | 241.2  | 172.1  | 108.5  | 76.2   | 69.1   | 66.3   | 63.0   | 60.8   | 60.3   |
| 80°   | 616.7  | 526.2  | 152.9  | 118.4  | 71.8   | 58.7   | 53.2   | 51.0   | 47.7   | 44.9   | 44.4   |
| 82.5° | 235.2  | 203.4  | 81.1   | 60.3   | 47.7   | 40.0   | 35.6   | 33.4   | 31.2   | 28.5   | 28.0   |
| 85°   | 104.1  | 97.6   | 44.9   | 32.3   | 25.8   | 19.7   | 17.5   | 16.4   | 13.7   | 11.5   | 11.0   |
| 87.5° | 36.7   | 36.7   | 19.2   | 9.3    | 5.5    | 2.7    | 1.6    | 0.5    | 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    |



Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

Luminaire Tested: EMM2-HTN-SA1A-827-U-5WQ

Data applicable to all product families utilizing light square engine

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/03/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Invue  
 Catalog Number: **EMM2-HTN-SA1A-827-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

**Spectral Parameters**

CCT (K): 2764  
 CIE u': 0.2591  
 CIE v': 0.5290  
 Duv: 0.0020  
 CIE x: 0.4581  
 CIE y: 0.4156  
 CIE z: 0.1263  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 583  
 Purity: 62.2537  
 Rf: 84.7  
 Rg: 94.6

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 80.9 |      |      |
| R1:       | 78.8 | R9:  | -1.5 |
| R2:       | 89.9 | R10: | 77.9 |
| R3:       | 96.2 | R11: | 78.9 |
| R4:       | 79.1 | R12: | 71.6 |
| R5:       | 79.1 | R13: | 81.2 |
| R6:       | 88.8 | R14: | 98.5 |
| R7:       | 81.3 | R15: | 69.9 |
| R8:       | 54.3 |      |      |



**Test Conditions**

Stabilization Time: 81M  
 Operation Time: 2H 21M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-157-9

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

REPORT NUMBER: SP1-2407-157-9

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

REPORT NUMBER: SP1-2407-157-9

**Photopic Flux vs. Wavelength**



**Photopic Lumens: 4337.9**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 2.6                            | 620               | 87426                                | 22.8                           | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 3.9                            | 625               | 83013                                | 18.2                           | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 5.8                            | 630               | 78077                                | 14.1                           | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 8.5                            | 635               | 72080                                | 10.7                           | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 11.5                           | 640               | 66249                                | 7.9                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 15.2                           | 645               | 59973                                | 5.7                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 18.7                           | 650               | 53972                                | 3.9                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 21.9                           | 655               | 48369                                | 2.7                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 24.9                           | 660               | 42641                                | 1.8                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 27.6                           | 665               | 37602                                | 1.1                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.0                            | 540               | 46032                                | 30.0                           | 670               | 32798                                | 0.7                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.0                            | 545               | 48553                                | 32.5                           | 675               | 28558                                | 0.5                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 0.0                            | 550               | 51408                                | 34.9                           | 680               | 24782                                | 0.3                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 0.0                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.2                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 0.0                            | 560               | 58847                                | 40.0                           | 690               | 18413                                | 0.1                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 0.1                            | 565               | 63386                                | 42.4                           | 695               | 15721                                | 0.1                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 0.2                            | 570               | 68196                                | 44.3                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 0.6                            | 575               | 73613                                | 46.0                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 0.9                            | 580               | 79207                                | 47.1                           | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 0.9                            | 585               | 84248                                | 47.0                           | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 0.9                            | 590               | 88397                                | 45.7                           | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 1.0                            | 595               | 91428                                | 43.4                           | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 0.9                            | 600               | 93452                                | 40.3                           | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 1.0                            | 605               | 93959                                | 36.4                           | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 1.3                            | 610               | 93079                                | 32.0                           | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 1.8                            | 615               | 90707                                | 27.3                           | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 5286.7**

**S/P: 1.22**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 75.9                           | 620               | 87426                                | 0.4                            | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 93.2                           | 625               | 83013                                | 0.2                            | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 107.8                          | 630               | 78077                                | 0.1                            | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 118.7                          | 635               | 72080                                | 0.1                            | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 122.2                          | 640               | 66249                                | 0.1                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 120.8                          | 645               | 59973                                | 0.0                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 113.9                          | 650               | 53972                                | 0.0                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 104.1                          | 655               | 48369                                | 0.0                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 92.4                           | 660               | 42641                                | 0.0                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 80.5                           | 665               | 37602                                | 0.0                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.1                            | 540               | 46032                                | 68.2                           | 670               | 32798                                | 0.0                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.3                            | 545               | 48553                                | 57.1                           | 675               | 28558                                | 0.0                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 1.1                            | 550               | 51408                                | 46.7                           | 680               | 24782                                | 0.0                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 2.5                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.0                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 5.9                            | 560               | 58847                                | 29.4                           | 690               | 18413                                | 0.0                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 12.5                           | 565               | 63386                                | 22.5                           | 695               | 15721                                | 0.0                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 26.3                           | 570               | 68196                                | 16.9                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 55.2                           | 575               | 73613                                | 12.4                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 85.4                           | 580               | 79207                                | 9.0                            | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 75.1                           | 585               | 84248                                | 6.3                            | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 63.2                           | 590               | 88397                                | 4.4                            | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 63.2                           | 595               | 91428                                | 3.0                            | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 54.2                           | 600               | 93452                                | 2.0                            | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 48.8                           | 605               | 93959                                | 1.3                            | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 54.2                           | 610               | 93079                                | 0.9                            | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 63.3                           | 615               | 90707                                | 0.5                            | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 9797**

**M/P: 2.26**

| 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    | 0             | 0.0           | 490    | 18018         | 27.7          | 620    | 87426         | 1.1           | 750    | 2680          | 0.0           | 880    | 58            | 0.0           |
| 365    | 0             | 0.0           | 495    | 22295         | 36.0          | 625    | 83013         | 0.7           | 755    | 2287          | 0.0           | 885    | 46            | 0.0           |
| 370    | 0             | 0.0           | 500    | 26478         | 44.2          | 630    | 78077         | 0.4           | 760    | 1944          | 0.0           | 890    | 45            | 0.0           |
| 375    | 0             | 0.0           | 505    | 30524         | 51.8          | 635    | 72080         | 0.3           | 765    | 1653          | 0.0           | 895    | 41            | 0.0           |
| 380    | 0             | 0.0           | 510    | 33611         | 57.0          | 640    | 66249         | 0.2           | 770    | 1413          | 0.0           | 900    | 38            | 0.0           |
| 385    | 0             | 0.0           | 515    | 36490         | 60.5          | 645    | 59973         | 0.1           | 775    | 1198          | 0.0           | 905    | 33            | 0.0           |
| 390    | 0             | 0.0           | 520    | 38610         | 61.4          | 650    | 53972         | 0.1           | 780    | 1025          | 0.0           | 910    | 30            | 0.0           |
| 395    | 0             | 0.0           | 525    | 40511         | 60.6          | 655    | 48369         | 0.0           | 785    | 874           | 0.0           | 915    | 23            | 0.0           |
| 400    | 48            | 0.0           | 530    | 42223         | 58.2          | 660    | 42641         | 0.0           | 790    | 747           | 0.0           | 920    | 24            | 0.0           |
| 405    | 201           | 0.0           | 535    | 44137         | 55.0          | 665    | 37602         | 0.0           | 795    | 639           | 0.0           | 925    | 22            | 0.0           |
| 410    | 457           | 0.0           | 540    | 46032         | 50.9          | 670    | 32798         | 0.0           | 800    | 547           | 0.0           | 930    | 22            | 0.0           |
| 415    | 925           | 0.1           | 545    | 48553         | 46.6          | 675    | 28558         | 0.0           | 805    | 473           | 0.0           | 935    | 17            | 0.0           |
| 420    | 1816          | 0.3           | 550    | 51408         | 42.0          | 680    | 24782         | 0.0           | 810    | 401           | 0.0           | 940    | 13            | 0.0           |
| 425    | 3217          | 0.8           | 555    | 54711         | 37.4          | 685    | 21386         | 0.0           | 815    | 351           | 0.0           | 945    | 6             | 0.0           |
| 430    | 5520          | 1.9           | 560    | 58847         | 32.9          | 690    | 18413         | 0.0           | 820    | 307           | 0.0           | 950    | 10            | 0.0           |
| 435    | 9225          | 4.1           | 565    | 63386         | 28.4          | 695    | 15721         | 0.0           | 825    | 261           | 0.0           | 955    | 11            | 0.0           |
| 440    | 15522         | 8.7           | 570    | 68196         | 24.1          | 700    | 13432         | 0.0           | 830    | 228           | 0.0           | 960    | 8             | 0.0           |
| 445    | 27642         | 18.5          | 575    | 73613         | 20.0          | 705    | 11513         | 0.0           | 835    | 193           | 0.0           | 965    | 12            | 0.0           |
| 450    | 36602         | 28.3          | 580    | 79207         | 16.3          | 710    | 9780          | 0.0           | 840    | 174           | 0.0           | 970    | 3             | 0.0           |
| 455    | 28292         | 24.7          | 585    | 84248         | 12.9          | 715    | 8356          | 0.0           | 845    | 151           | 0.0           | 975    | 8             | 0.0           |
| 460    | 21166         | 20.4          | 590    | 88397         | 9.8           | 720    | 7161          | 0.0           | 850    | 123           | 0.0           | 980    | 2             | 0.0           |
| 465    | 19092         | 20.1          | 595    | 91428         | 7.3           | 725    | 6067          | 0.0           | 855    | 106           | 0.0           | 985    | 13            | 0.0           |
| 470    | 14951         | 17.2          | 600    | 93452         | 5.3           | 730    | 5164          | 0.0           | 860    | 95            | 0.0           | 990    | 16            | 0.0           |
| 475    | 12606         | 15.7          | 605    | 93959         | 3.7           | 735    | 4393          | 0.0           | 865    | 82            | 0.0           | 995    | 20            | 0.0           |
| 480    | 13323         | 18.0          | 610    | 93079         | 2.5           | 740    | 3694          | 0.0           | 870    | 77            | 0.0           | 1000   | 0             | 0.0           |
| 485    | 15164         | 21.9          | 615    | 90707         | 1.7           | 745    | 3157          | 0.0           | 875    | 65            | 0.0           |        |               |               |

**Summary**

$R_f = 84.7$   
 $R_g = 94.6$   
 CIE  $R_a = 80.9$   
 $R_g = -1.5$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)