

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



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P386794

Luminaire Tested: **GWC-SA2C-727-U-T4FT-HSS**

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-08  
Report Number: P386794  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-17)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GWC-SA2C-727-U-T4FT-HSS  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 2700K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 8766 lumens  
Efficiency: N/A  
Efficacy: 77.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 113  
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: 28.75 FT

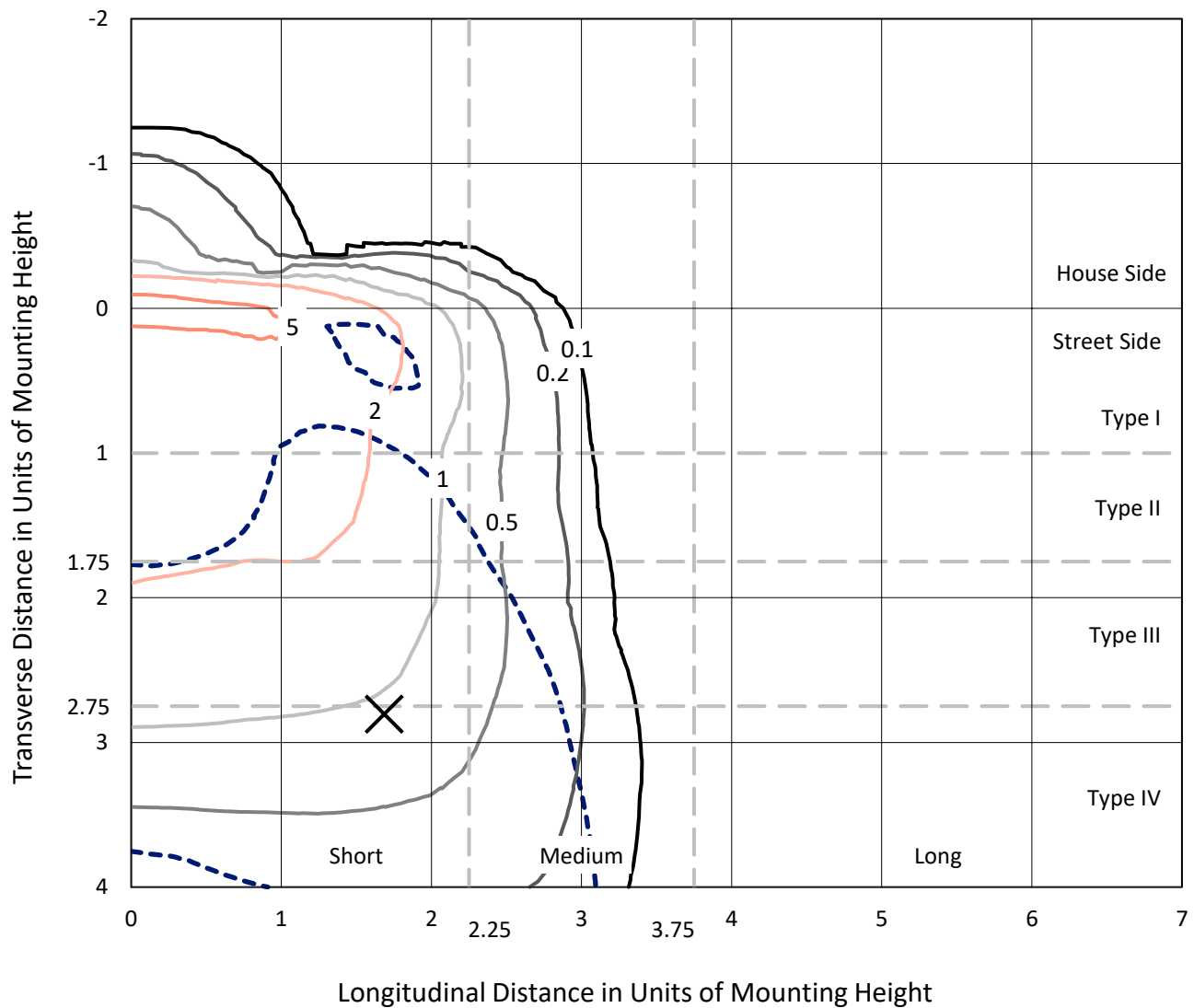


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

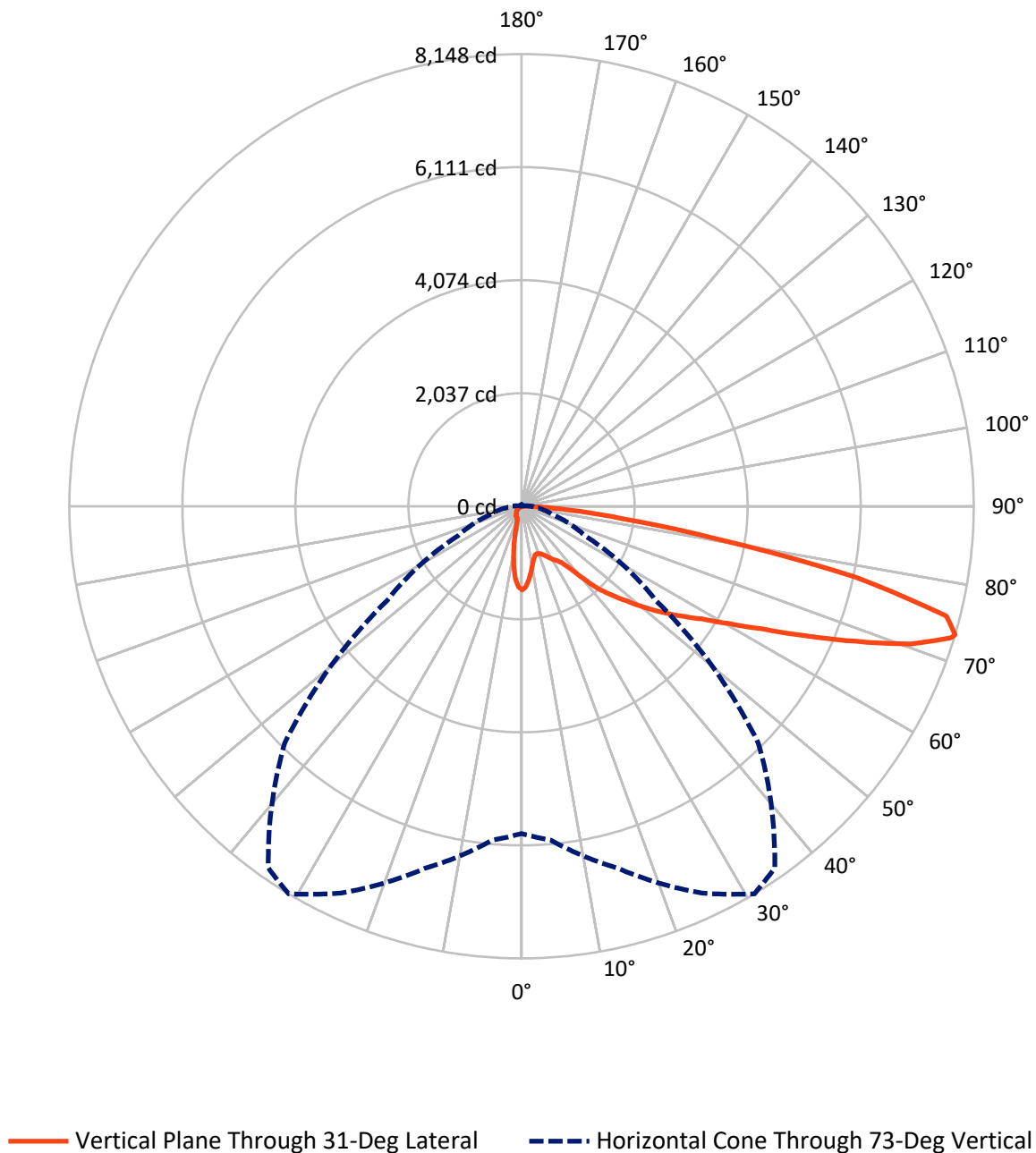


Based on 15 foot mounting height. Maximum calculated value = 6.7 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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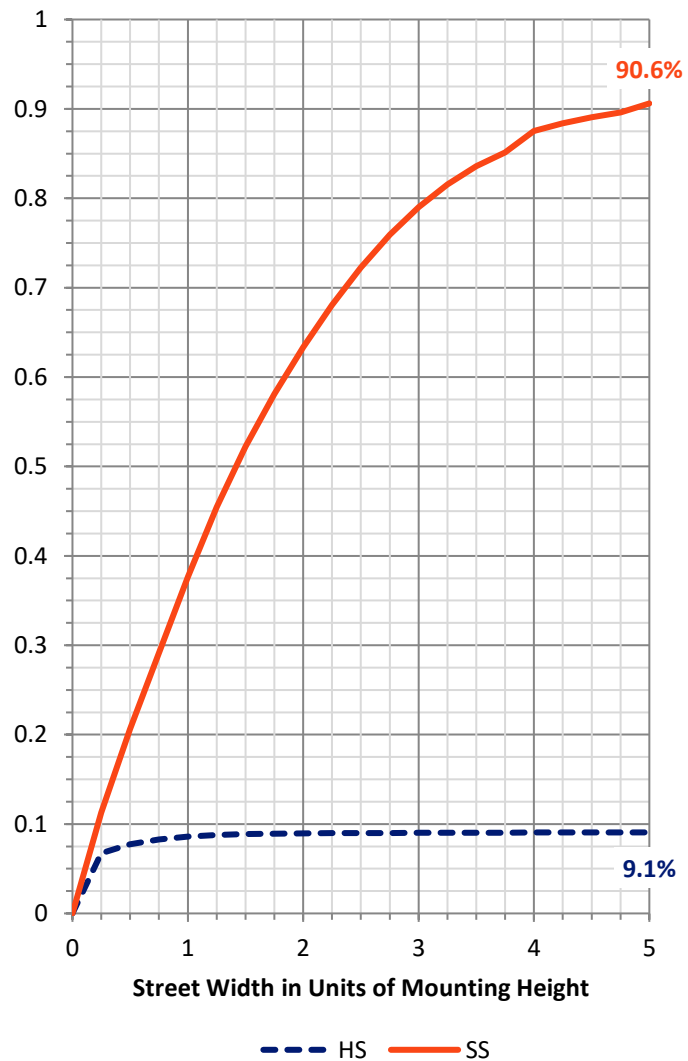
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 799.1    | 0.0    | 799.1  |
|                    | % Fixture | 9.1      | 0.0    | 9.1    |
| <b>Street Side</b> | Lumens    | 7966.9   | 0.0    | 7966.9 |
|                    | % Fixture | 90.9     | 0.0    | 90.9   |
| <b>Total</b>       | Lumens    | 8766.0   | 0.0    | 8766.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 125.1  | 1.4       |
| 10°-20°   | 271.5  | 3.1       |
| 20°-30°   | 406.8  | 4.6       |
| 30°-40°   | 647.3  | 7.4       |
| 40°-50°   | 1155.8 | 13.2      |
| 50°-60°   | 1793.5 | 20.5      |
| 60°-70°   | 2384.2 | 27.2      |
| 70°-80°   | 1793.4 | 20.5      |
| 80°-90°   | 188.4  | 2.1       |
| 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°    | 8766.0 | 100.0     |
| 0°-180°   | 8766.0 | 100.0     |

**Coefficient of Utilization**



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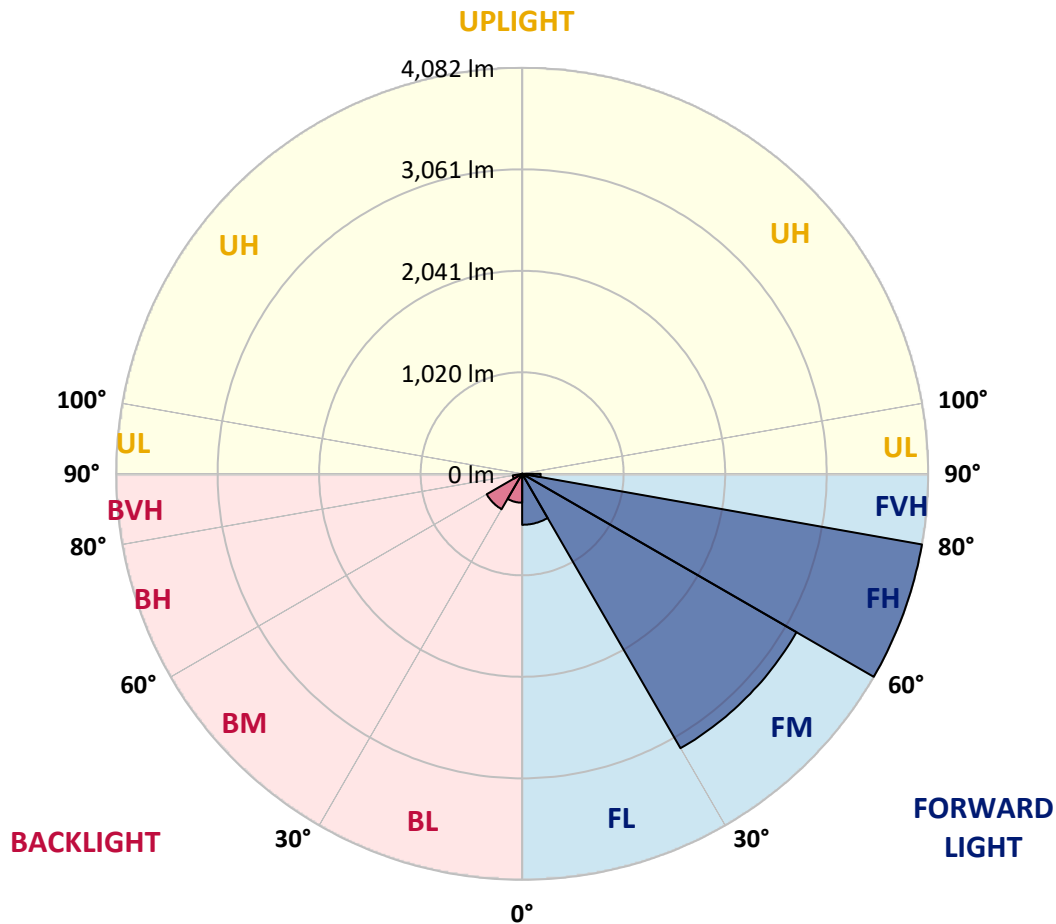
CATALOG NUMBER: GWC-SA2C-727-U-T4FT-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 512.8  | 5.9       |                         |      |         |
| FM   | (30°-60°)   | 3185.3 | 36.3      |                         |      |         |
| FH   | (60°-80°)   | 4082.0 | 46.6      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 186.9  | 2.1       |                         |      | G2/225  |
| BL   | (0°-30°)    | 290.6  | 3.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 411.3  | 4.7       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 95.6   | 1.1       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 1.6    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 31°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 |
| 2.5°  | 1429.3 | 1435.3 | 1441.7 | 1443.0 | 1453.7 | 1454.2 | 1469.6 | 1481.2 | 1492.8 | 1503.9 | 1507.8 |
| 5°    | 1282.6 | 1292.4 | 1304.0 | 1315.6 | 1338.3 | 1347.3 | 1385.1 | 1423.7 | 1460.6 | 1495.8 | 1512.9 |
| 7.5°  | 1126.0 | 1137.2 | 1153.5 | 1182.2 | 1207.5 | 1225.1 | 1284.7 | 1353.4 | 1422.0 | 1486.8 | 1524.1 |
| 10°   | 983.2  | 993.5  | 1010.6 | 1041.1 | 1080.1 | 1104.1 | 1184.3 | 1279.6 | 1380.4 | 1478.6 | 1540.8 |
| 12.5° | 892.2  | 897.8  | 907.2  | 939.8  | 975.0  | 1002.0 | 1096.4 | 1214.4 | 1346.1 | 1478.2 | 1567.8 |
| 15°   | 875.5  | 877.2  | 869.5  | 884.1  | 911.5  | 937.7  | 1033.4 | 1161.6 | 1319.9 | 1485.0 | 1603.0 |
| 17.5° | 902.1  | 901.2  | 875.5  | 873.8  | 895.7  | 917.1  | 1002.5 | 1125.2 | 1301.5 | 1500.9 | 1648.5 |
| 20°   | 942.4  | 939.4  | 894.8  | 886.7  | 909.8  | 930.0  | 1000.3 | 1111.4 | 1294.6 | 1527.5 | 1703.8 |
| 22.5° | 996.0  | 990.9  | 921.0  | 912.4  | 937.3  | 958.3  | 1026.9 | 1124.7 | 1300.6 | 1563.1 | 1768.2 |
| 25°   | 1062.5 | 1054.8 | 966.0  | 956.6  | 981.9  | 1002.9 | 1074.5 | 1162.9 | 1318.6 | 1606.4 | 1849.7 |
| 27.5° | 1137.6 | 1126.4 | 1038.1 | 1013.6 | 1042.4 | 1064.2 | 1138.0 | 1221.2 | 1346.9 | 1652.3 | 1949.6 |
| 30°   | 1208.4 | 1193.8 | 1114.0 | 1073.7 | 1108.9 | 1133.3 | 1206.7 | 1290.7 | 1392.4 | 1723.1 | 2086.4 |
| 32.5° | 1279.6 | 1263.3 | 1181.8 | 1133.7 | 1165.5 | 1192.1 | 1277.4 | 1386.4 | 1477.8 | 1831.2 | 2268.3 |
| 35°   | 1443.4 | 1426.3 | 1326.3 | 1247.0 | 1246.5 | 1261.6 | 1376.5 | 1517.2 | 1590.6 | 1981.8 | 2485.4 |
| 37.5° | 1719.3 | 1709.4 | 1614.2 | 1463.6 | 1423.3 | 1406.5 | 1511.6 | 1673.4 | 1752.7 | 2189.0 | 2730.3 |
| 40°   | 2021.2 | 2012.7 | 1905.9 | 1769.4 | 1708.1 | 1666.9 | 1705.5 | 1890.8 | 1981.8 | 2442.0 | 2980.4 |
| 42.5° | 2362.3 | 2321.5 | 2131.1 | 2090.3 | 2035.4 | 2004.1 | 1969.3 | 2158.9 | 2263.2 | 2717.4 | 3228.3 |
| 45°   | 2672.0 | 2603.3 | 2356.3 | 2294.5 | 2282.0 | 2289.8 | 2309.1 | 2519.3 | 2579.7 | 3044.7 | 3475.4 |
| 47.5° | 2856.4 | 2802.4 | 2612.8 | 2553.6 | 2550.1 | 2601.2 | 2747.0 | 2926.3 | 2895.0 | 3330.0 | 3692.9 |
| 50°   | 3031.9 | 2983.0 | 2825.5 | 2840.1 | 2856.0 | 2925.5 | 3244.2 | 3345.0 | 3182.9 | 3588.6 | 3892.3 |
| 52.5° | 3173.8 | 3099.2 | 3016.8 | 3098.8 | 3176.8 | 3288.8 | 3757.2 | 3720.8 | 3387.0 | 3794.5 | 4063.1 |
| 55°   | 3255.8 | 3221.9 | 3261.8 | 3344.1 | 3490.8 | 3672.7 | 4241.5 | 4033.5 | 3536.3 | 3982.4 | 4176.7 |
| 57.5° | 3556.0 | 3489.6 | 3568.9 | 3640.1 | 3831.4 | 4085.8 | 4656.3 | 4266.4 | 3644.0 | 4098.7 | 4202.9 |
| 60°   | 3919.4 | 3865.7 | 3912.5 | 4030.9 | 4289.1 | 4588.1 | 5044.1 | 4456.4 | 3700.2 | 4173.3 | 4135.1 |
| 62.5° | 4497.6 | 4426.8 | 4397.7 | 4530.2 | 4872.5 | 5198.9 | 5338.4 | 4588.1 | 3687.7 | 4140.3 | 3902.6 |
| 65°   | 5272.3 | 5198.9 | 5068.5 | 5188.6 | 5624.0 | 5854.4 | 5667.4 | 4616.0 | 3601.9 | 3873.0 | 3315.0 |
| 67.5° | 6065.9 | 6012.7 | 5901.1 | 6103.6 | 6496.5 | 6570.7 | 6015.2 | 4548.2 | 3325.7 | 3140.4 | 2342.1 |
| 70°   | 6590.0 | 6567.3 | 6639.8 | 7087.6 | 7438.1 | 7416.6 | 6334.4 | 4184.0 | 2592.2 | 1931.2 | 1158.6 |
| 72.5° | 6212.1 | 6321.1 | 6856.4 | 7668.4 | 8096.5 | 7921.5 | 6170.5 | 3212.9 | 1481.6 | 743.0  | 335.0  |
| 73°   | 5899.0 | 6038.4 | 6759.1 | 7690.3 | 8148.4 | 7956.7 | 6032.8 | 2949.1 | 1262.8 | 586.4  | 253.9  |
| 75°   | 4103.8 | 4275.0 | 5595.7 | 7162.3 | 7905.7 | 7580.9 | 5028.6 | 1805.0 | 585.1  | 259.9  | 102.5  |
| 77.5° | 1992.5 | 2119.0 | 3081.2 | 5174.9 | 6148.2 | 5923.0 | 3130.5 | 672.6  | 264.2  | 162.6  | 47.2   |
| 80°   | 743.8  | 827.0  | 1337.5 | 2633.8 | 3553.0 | 3646.1 | 1376.9 | 254.4  | 175.9  | 130.8  | 24.0   |
| 82.5° | 194.7  | 217.1  | 493.3  | 1174.5 | 1820.9 | 1905.9 | 434.1  | 128.3  | 128.7  | 107.7  | 14.6   |
| 85°   | 62.2   | 71.2   | 154.0  | 527.2  | 857.9  | 753.2  | 113.2  | 62.2   | 93.5   | 80.2   | 8.2    |
| 87.5° | 7.7    | 9.9    | 48.9   | 124.0  | 189.2  | 105.1  | 17.6   | 18.4   | 39.9   | 44.6   | 4.7    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

REPORT NUMBER: P386794

CATALOG NUMBER: GWC-SA2C-727-U-T4FT-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 | 1508.2 |
| 2.5°  | 1511.6 | 1509.5 | 1509.9 | 1498.8 | 1491.5 | 1476.9 | 1461.9 | 1455.0 | 1447.7 | 1444.7 | 1447.7 |
| 5°    | 1519.4 | 1515.5 | 1504.3 | 1470.0 | 1433.6 | 1386.4 | 1342.2 | 1308.7 | 1266.7 | 1255.1 | 1267.1 |
| 7.5°  | 1531.4 | 1523.7 | 1491.1 | 1421.1 | 1340.1 | 1250.0 | 1148.7 | 1075.0 | 1014.5 | 975.4  | 989.6  |
| 10°   | 1549.0 | 1534.4 | 1468.7 | 1349.9 | 1204.9 | 1045.4 | 901.7  | 789.7  | 710.4  | 677.8  | 676.5  |
| 12.5° | 1578.6 | 1551.1 | 1441.3 | 1257.3 | 1039.8 | 827.0  | 638.7  | 517.3  | 453.0  | 411.4  | 410.5  |
| 15°   | 1611.2 | 1570.8 | 1406.5 | 1146.2 | 847.6  | 592.4  | 411.4  | 319.1  | 277.5  | 264.2  | 262.5  |
| 17.5° | 1651.1 | 1593.6 | 1361.5 | 1009.3 | 646.4  | 392.5  | 268.5  | 241.9  | 240.2  | 238.9  | 238.9  |
| 20°   | 1701.2 | 1620.6 | 1303.6 | 852.8  | 458.6  | 262.1  | 228.2  | 229.9  | 230.8  | 229.1  | 229.5  |
| 22.5° | 1759.6 | 1648.0 | 1234.5 | 684.6  | 310.1  | 219.2  | 218.3  | 220.5  | 221.3  | 220.5  | 220.9  |
| 25°   | 1827.4 | 1679.8 | 1150.5 | 508.3  | 223.9  | 208.0  | 210.2  | 213.2  | 215.3  | 215.3  | 215.3  |
| 27.5° | 1911.4 | 1718.4 | 1049.2 | 354.7  | 193.5  | 196.5  | 202.5  | 208.0  | 211.0  | 211.9  | 211.9  |
| 30°   | 2020.8 | 1766.4 | 927.8  | 243.2  | 175.9  | 181.0  | 192.2  | 202.9  | 208.5  | 209.3  | 209.8  |
| 32.5° | 2158.9 | 1820.5 | 787.1  | 179.7  | 160.9  | 164.7  | 176.7  | 194.7  | 205.5  | 207.2  | 207.2  |
| 35°   | 2317.2 | 1883.1 | 635.7  | 156.6  | 150.1  | 151.4  | 160.9  | 181.4  | 200.3  | 205.0  | 205.5  |
| 37.5° | 2490.5 | 1944.9 | 483.4  | 146.3  | 141.1  | 141.1  | 148.0  | 165.6  | 187.9  | 202.5  | 204.2  |
| 40°   | 2652.2 | 1982.2 | 338.9  | 138.1  | 133.0  | 133.0  | 139.0  | 151.9  | 172.9  | 194.7  | 199.5  |
| 42.5° | 2801.5 | 1995.1 | 235.9  | 130.4  | 125.3  | 126.5  | 131.7  | 142.0  | 157.9  | 179.7  | 184.0  |
| 45°   | 2955.1 | 1992.9 | 172.0  | 121.4  | 117.5  | 121.4  | 125.3  | 133.0  | 144.6  | 157.0  | 157.9  |
| 47.5° | 3070.9 | 1974.9 | 136.4  | 112.8  | 110.2  | 115.4  | 118.8  | 124.0  | 130.4  | 129.5  | 129.5  |
| 50°   | 3179.4 | 1931.2 | 109.8  | 101.2  | 102.9  | 109.0  | 110.7  | 112.4  | 112.8  | 104.7  | 103.8  |
| 52.5° | 3261.8 | 1863.0 | 87.9   | 88.8   | 95.7   | 101.7  | 99.9   | 97.4   | 93.1   | 83.2   | 81.5   |
| 55°   | 3289.2 | 1731.7 | 69.1   | 73.4   | 84.9   | 92.7   | 86.2   | 80.6   | 72.5   | 64.3   | 62.6   |
| 57.5° | 3239.5 | 1562.3 | 56.2   | 57.1   | 71.6   | 78.1   | 70.8   | 64.3   | 55.3   | 48.5   | 47.2   |
| 60°   | 3134.0 | 1373.9 | 46.3   | 42.9   | 55.3   | 60.9   | 56.2   | 49.8   | 41.6   | 36.5   | 36.0   |
| 62.5° | 2924.6 | 1173.2 | 38.2   | 33.5   | 42.0   | 46.8   | 43.8   | 39.0   | 32.2   | 28.7   | 28.3   |
| 65°   | 2484.5 | 938.6  | 30.9   | 27.0   | 32.6   | 36.5   | 33.9   | 30.5   | 25.3   | 22.7   | 22.3   |
| 67.5° | 1734.3 | 634.4  | 25.3   | 22.3   | 25.7   | 28.7   | 26.6   | 24.9   | 20.2   | 19.7   | 20.2   |
| 70°   | 836.5  | 305.8  | 21.0   | 18.0   | 20.2   | 22.3   | 21.4   | 20.2   | 19.3   | 22.3   | 25.7   |
| 72.5° | 239.8  | 102.5  | 16.7   | 15.0   | 16.3   | 17.6   | 18.4   | 18.0   | 21.0   | 27.0   | 31.3   |
| 73°   | 184.5  | 82.8   | 15.9   | 14.2   | 15.4   | 17.2   | 18.0   | 17.6   | 21.4   | 27.5   | 31.3   |
| 75°   | 78.9   | 39.9   | 12.0   | 11.6   | 12.9   | 15.0   | 15.9   | 15.9   | 21.4   | 27.9   | 30.0   |
| 77.5° | 35.6   | 21.4   | 7.7    | 9.0    | 11.2   | 12.0   | 13.3   | 13.3   | 17.2   | 21.4   | 21.4   |
| 80°   | 20.2   | 11.6   | 6.0    | 6.9    | 8.2    | 8.2    | 8.2    | 7.3    | 7.7    | 8.6    | 9.4    |
| 82.5° | 12.9   | 7.7    | 4.7    | 5.6    | 5.1    | 4.3    | 3.4    | 3.4    | 3.0    | 3.4    | 4.3    |
| 85°   | 7.3    | 4.3    | 4.3    | 3.4    | 2.1    | 1.7    | 2.1    | 1.7    | 0.4    | 0.0    | 0.4    |
| 87.5° | 4.3    | 2.6    | 1.3    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2012-088-8-R2

Luminaire Tested: CCW-SA1B-727-U-SL4

Test Date: 01/20/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-8-R2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/20/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA1B-727-U-SL4**  
 Description: INVUE WALL PACK

\*\*\*THIS IS A REVISION OF SP1-2012-088-8. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED  
 IN SITU. INVUE WALL PACK LIGHT SQUARE SL4 OPTICS 1-SQUARE

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 2705    | CRI (Ra): | 73.8 |      |      |
| CIE u':                   | 0.2629  | R1:       | 72.2 | R9:  | -7.6 |
| CIE v':                   | 0.5237  | R2:       | 81.9 | R10: | 56.9 |
| Duv:                      | -0.0024 | R3:       | 89.3 | R11: | 66.0 |
| CIE x:                    | 0.4552  | R4:       | 71.3 | R12: | 47.9 |
| CIE y:                    | 0.4030  | R5:       | 69.5 | R13: | 73.4 |
| CIE z:                    | 0.1418  | R6:       | 73.6 | R14: | 93.2 |
| Peak Wavelength (nm):     | 603     | R7:       | 80.1 |      |      |
| Dominant Wavelength (nm): | 585     | R8:       | 52.8 |      |      |
| Purity:                   | 57.7    |           |      |      |      |
| Rf:                       | 71.2    |           |      |      |      |
| Rg:                       | 100.1   |           |      |      |      |



### Test Conditions

Stabilization Time: 177M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/34%  
 Sphere Temperature (°C): 24.7

REPORT NUMBER: SP1-2012-088-8-R2

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 7/29/2020        | 1/29/2021            |
| 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 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 926              | 0.0              | 490       | 3601             | 0.5              | 620       | 58340            | 15.2             | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 0.9              | 625       | 56180            | 12.4             | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 1.7              | 630       | 53018            | 9.6              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 3.1              | 635       | 49683            | 7.5              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 5.1              | 640       | 46308            | 5.5              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 7.9              | 645       | 42927            | 4.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 11.1             | 650       | 39728            | 2.9              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 14.2             | 655       | 36260            | 2.1              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 17.4             | 660       | 32543            | 1.4              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 19.9             | 665       | 29105            | 0.9              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 22.4             | 670       | 25817            | 0.6              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.0              | 545       | 36784            | 24.5             | 675       | 22832            | 0.4              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.0              | 550       | 39017            | 26.5             | 680       | 20201            | 0.2              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 0.0              | 555       | 41253            | 28.2             | 685       | 17863            | 0.2              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 0.1              | 560       | 43733            | 29.7             | 690       | 15761            | 0.1              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 0.3              | 565       | 46694            | 31.0             | 695       | 13762            | 0.1              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 0.5              | 570       | 49493            | 32.2             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 0.7              | 575       | 52587            | 32.7             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 0.7              | 580       | 55129            | 32.8             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 0.5              | 585       | 57737            | 32.1             | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 0.4              | 590       | 59688            | 30.9             | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 0.3              | 595       | 61458            | 29.1             | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 0.3              | 600       | 62443            | 26.9             | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 0.2              | 605       | 62403            | 24.2             | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 0.3              | 610       | 61581            | 21.2             | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 0.3              | 615       | 60386            | 18.2             | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 1073.3

S/P: 0.36

| 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       | 926              | 0.0              | 490       | 3601             | 5.5              | 620       | 58340            | 0.7              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 8.3              | 625       | 56180            | 0.5              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 12.9             | 630       | 53018            | 0.3              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 18.7             | 635       | 49683            | 0.2              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 25.1             | 640       | 46308            | 0.1              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 31.4             | 645       | 42927            | 0.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 36.5             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 39.6             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 40.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 39.9             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.1              | 540       | 34386            | 38.0             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.2              | 545       | 36784            | 35.3             | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.8              | 550       | 39017            | 31.9             | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 2.2              | 555       | 41253            | 28.2             | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 5.1              | 560       | 43733            | 24.4             | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 9.9              | 565       | 46694            | 20.9             | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 16.1             | 570       | 49493            | 17.5             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 21.2             | 575       | 52587            | 14.3             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 19.9             | 580       | 55129            | 11.4             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 12.9             | 585       | 57737            | 8.8              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 8.5              | 590       | 59688            | 6.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 6.3              | 595       | 61458            | 4.9              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 4.7              | 600       | 62443            | 3.5              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 3.8              | 605       | 62403            | 2.5              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 3.8              | 610       | 61581            | 1.7              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 4.2              | 615       | 60386            | 1.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 3157.6      S/P: 1.07**

| 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       | 926              | 0.0              | 490       | 3601             | 3.0              | 620       | 58340            | 0.0              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 4.2              | 625       | 56180            | 0.0              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 6.2              | 630       | 53018            | 0.0              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 8.5              | 635       | 49683            | 0.0              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 10.6             | 640       | 46308            | 0.0              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 12.4             | 645       | 42927            | 0.0              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 13.4             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 13.4             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 12.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 11.5             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 10.1             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.1              | 545       | 36784            | 8.5              | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.5              | 550       | 39017            | 7.0              | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 1.4              | 555       | 41253            | 5.6              | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 3.1              | 560       | 43733            | 4.3              | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 5.9              | 565       | 46694            | 3.3              | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 9.6              | 570       | 49493            | 2.4              | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 12.5             | 575       | 52587            | 1.8              | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 11.8             | 580       | 55129            | 1.2              | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 7.8              | 585       | 57737            | 0.9              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 5.2              | 590       | 59688            | 0.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 3.9              | 595       | 61458            | 0.4              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 2.9              | 600       | 62443            | 0.3              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 2.3              | 605       | 62403            | 0.2              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 2.3              | 610       | 61581            | 0.1              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 2.4              | 615       | 60386            | 0.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

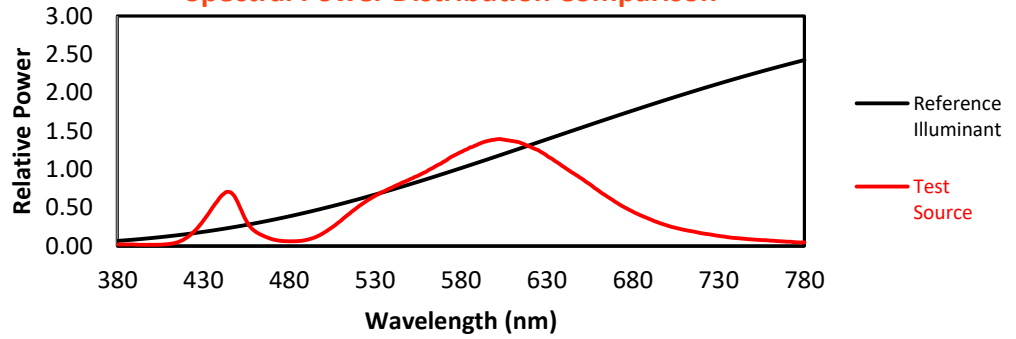
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TM-30-18

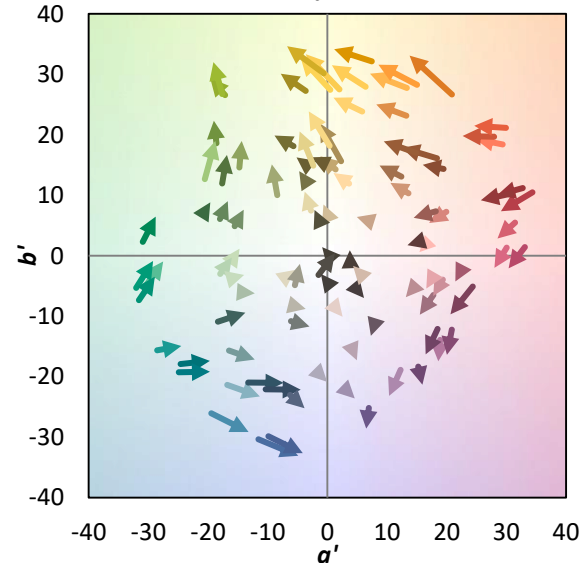
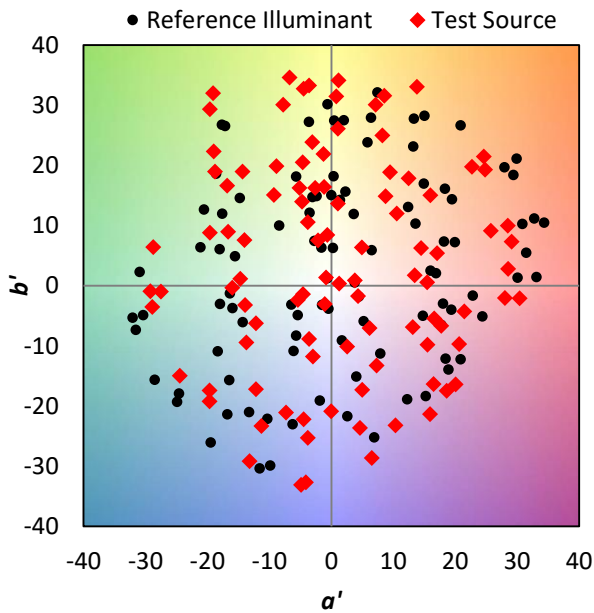
### Summary

$R_f = 71.2$   
 $R_g = 100.1$   
 CIE  $R_a = 73.8$   
 $R_g = -7.6$

### Spectral Power Distribution Comparison



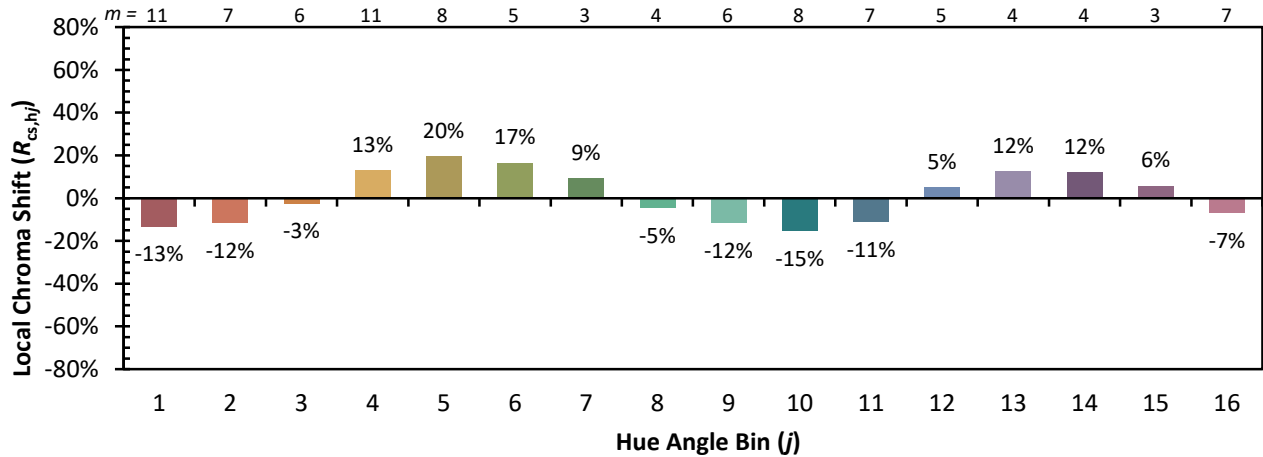
### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 55 | CES51 = 78 | CES76 = 50 |
| CES02 = 63 | CES27 = 77 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 68 | CES78 = 56 |
| CES04 = 71 | CES29 = 46 | CES54 = 80 | CES79 = 81 |
| CES05 = 50 | CES30 = 51 | CES55 = 78 | CES80 = 80 |
| CES06 = 52 | CES31 = 51 | CES56 = 67 | CES81 = 73 |
| CES07 = 43 | CES32 = 49 | CES57 = 64 | CES82 = 91 |
| CES08 = 41 | CES33 = 55 | CES58 = 67 | CES83 = 84 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 89 |
| CES10 = 77 | CES35 = 82 | CES60 = 91 | CES85 = 84 |
| CES11 = 60 | CES36 = 84 | CES61 = 85 | CES86 = 66 |
| CES12 = 66 | CES37 = 75 | CES62 = 75 | CES87 = 78 |
| CES13 = 44 | CES38 = 59 | CES63 = 70 | CES88 = 75 |
| CES14 = 74 | CES39 = 91 | CES64 = 70 | CES89 = 68 |
| CES15 = 72 | CES40 = 85 | CES65 = 67 | CES90 = 71 |
| CES16 = 48 | CES41 = 78 | CES66 = 64 | CES91 = 97 |
| CES17 = 51 | CES42 = 74 | CES67 = 62 | CES92 = 71 |
| CES18 = 57 | CES43 = 63 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 58 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 77 |
| CES21 = 88 | CES46 = 70 | CES71 = 59 | CES96 = 80 |
| CES22 = 80 | CES47 = 65 | CES72 = 86 | CES97 = 80 |
| CES23 = 92 | CES48 = 56 | CES73 = 52 | CES98 = 74 |
| CES24 = 91 | CES49 = 68 | CES74 = 93 | CES99 = 68 |
| CES25 = 73 | CES50 = 78 | CES75 = 59 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**


(END OF REPORT)