

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: P386276

Luminaire Tested: **GWC-SA1D-830-U-SL4-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386276  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-25)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GWC-SA1D-830-U-SL4-HSS  
Description: GALLEON WALL LUMINAIRE  
(1) 80 CRI, 3000K, 1200mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV SPILL  
LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5345 lumens  
Efficiency: N/A  
Efficacy: 81.0 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 66  
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

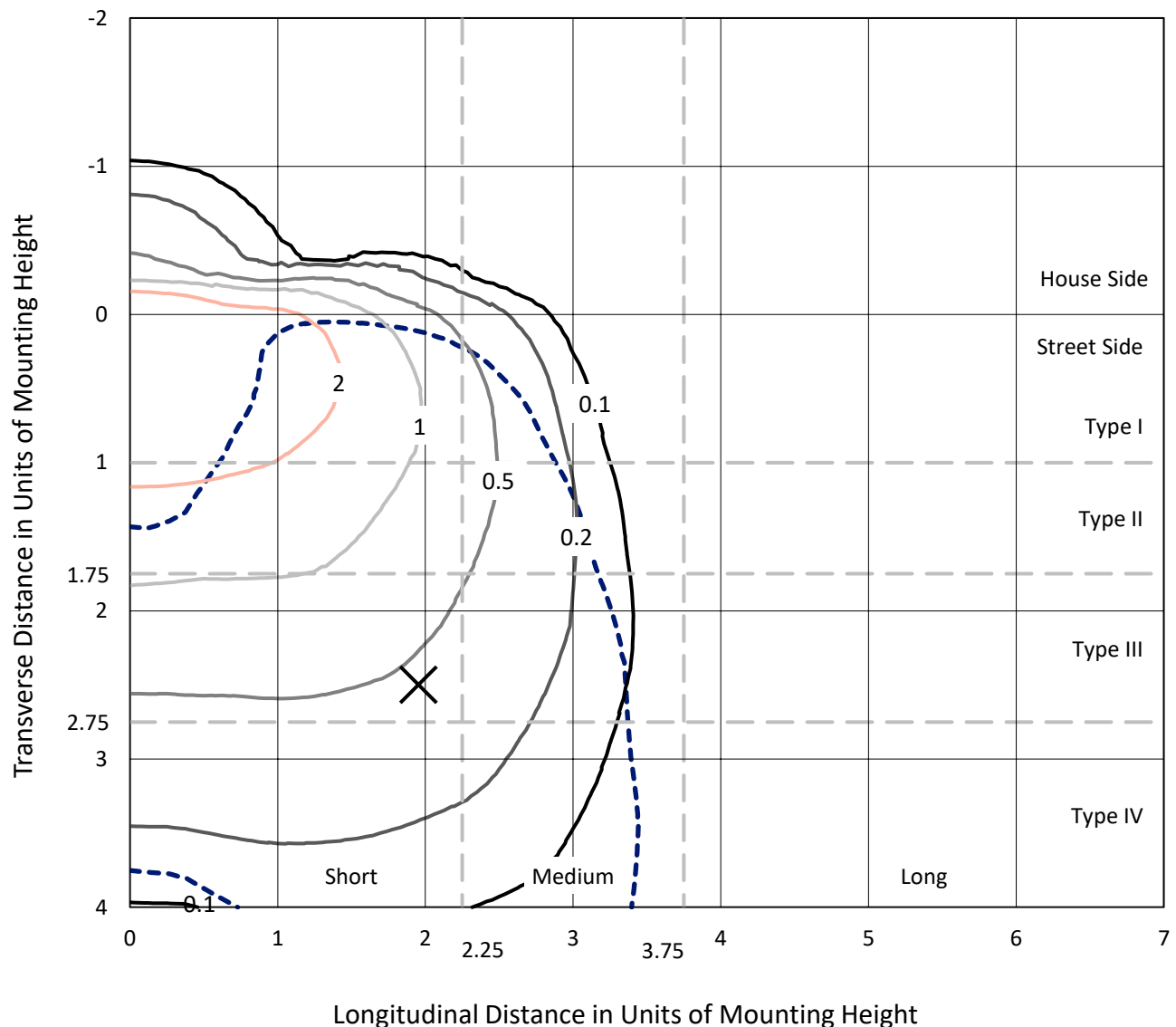


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

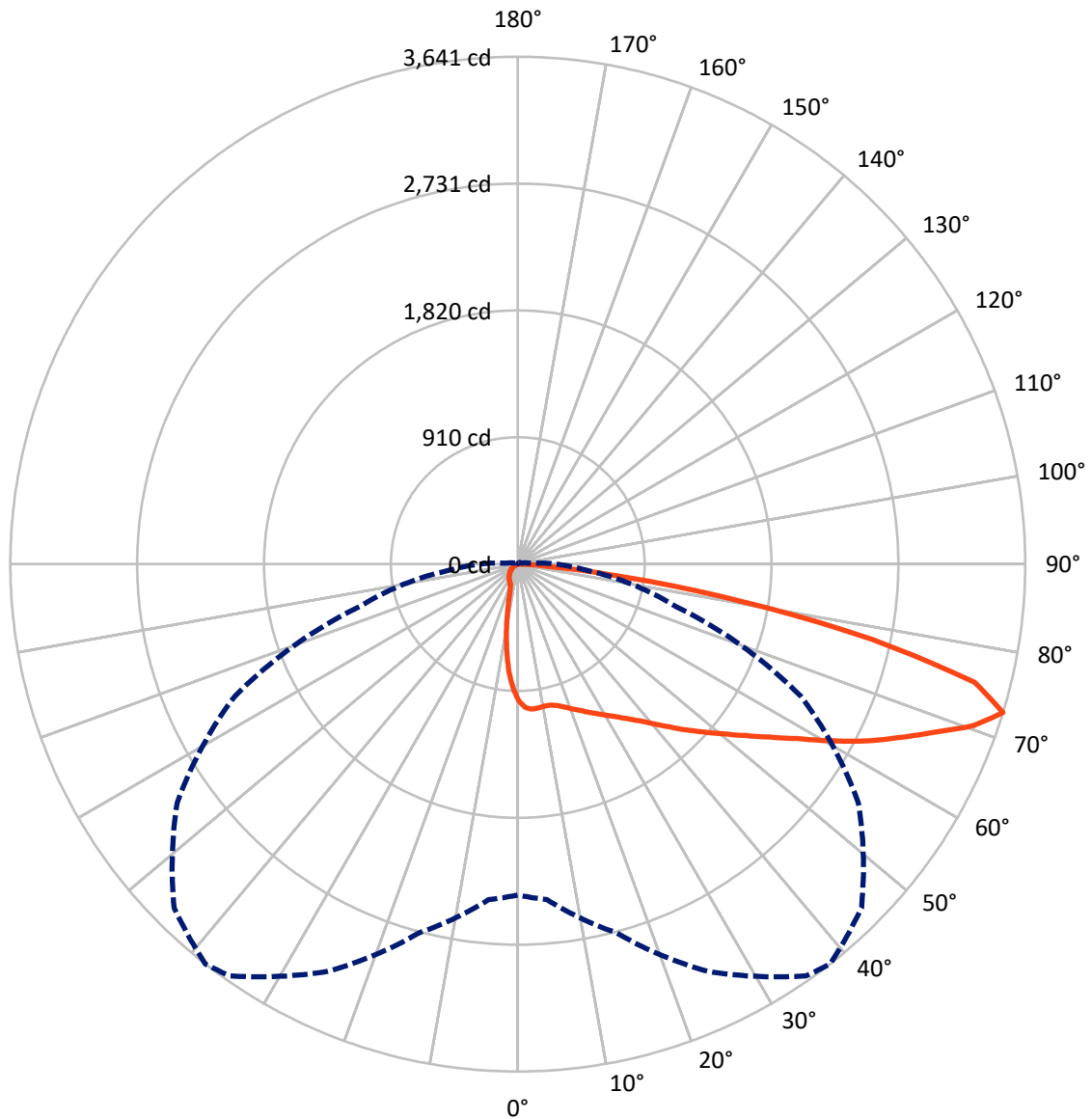


Based on 15 foot mounting height. Maximum calculated value = 4.6 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 38-Deg Lateral      - - - Horizontal Cone Through 72.5-Deg Vertical

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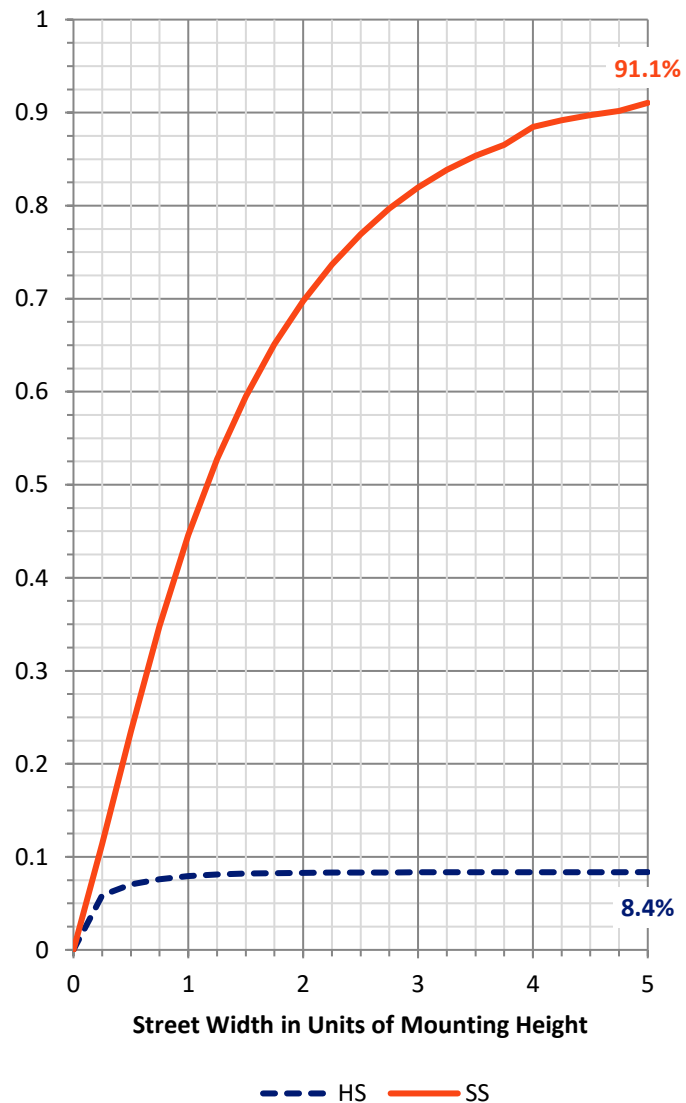
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 449.8    | 0.0    | 449.8  |
|                    | % Fixture | 8.4      | 0.0    | 8.4    |
| <b>Street Side</b> | Lumens    | 4895.2   | 0.0    | 4895.2 |
|                    | % Fixture | 91.6     | 0.0    | 91.6   |
| <b>Total</b>       | Lumens    | 5345.0   | 0.0    | 5345.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 83.8   | 1.6       |
| 10°-20°   | 204.8  | 3.8       |
| 20°-30°   | 325.8  | 6.1       |
| 30°-40°   | 489.8  | 9.2       |
| 40°-50°   | 747.2  | 14.0      |
| 50°-60°   | 1056.0 | 19.8      |
| 60°-70°   | 1324.6 | 24.8      |
| 70°-80°   | 990.4  | 18.5      |
| 80°-90°   | 122.8  | 2.3       |
| 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°    | 5345.0 | 100.0     |
| 0°-180°   | 5345.0 | 100.0     |

**Coefficient of Utilization**



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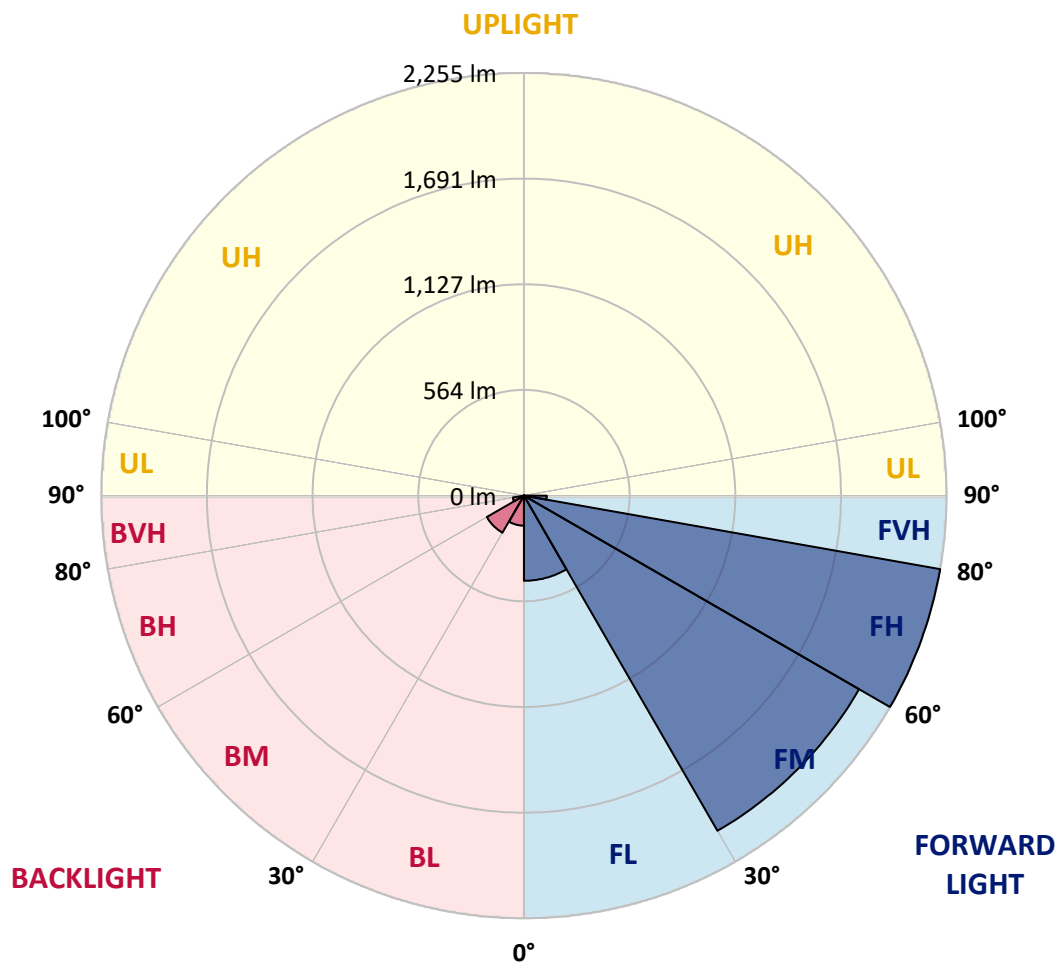
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 454.2  | 8.5       |                         |      |         |
| FM   | (30°-60°)   | 2064.5 | 38.6      |                         |      |         |
| FH   | (60°-80°)   | 2254.9 | 42.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 121.7  | 2.3       |                         |      | G2/225  |
| BL   | (0°-30°)    | 160.2  | 3.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 228.4  | 4.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 60.1   | 1.1       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 1.1    | 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°    | 35°    | 38°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 982.9  | 982.9  | 982.9  | 982.9  | 982.9  | 982.9  | 982.9  | 982.9  | 982.9  | 982.9  | 982.9  |
| 2.5°  | 1043.3 | 1043.5 | 1041.1 | 1037.1 | 1032.0 | 1029.3 | 1024.9 | 1017.8 | 1010.2 | 996.7  | 982.0  |
| 5°    | 1064.6 | 1064.6 | 1061.5 | 1056.2 | 1048.0 | 1045.5 | 1037.1 | 1025.8 | 1010.2 | 988.3  | 963.6  |
| 7.5°  | 1062.4 | 1062.8 | 1058.6 | 1053.1 | 1044.9 | 1042.6 | 1032.4 | 1019.8 | 1000.5 | 973.8  | 942.3  |
| 10°   | 1050.9 | 1052.0 | 1048.6 | 1046.0 | 1038.4 | 1036.0 | 1026.4 | 1013.8 | 994.5  | 966.1  | 929.9  |
| 12.5° | 1039.1 | 1040.2 | 1041.3 | 1043.8 | 1039.1 | 1038.2 | 1030.7 | 1020.0 | 1001.6 | 972.1  | 931.2  |
| 15°   | 1031.5 | 1033.8 | 1041.8 | 1051.3 | 1052.4 | 1051.5 | 1046.6 | 1036.6 | 1018.0 | 987.4  | 940.8  |
| 17.5° | 1031.5 | 1035.1 | 1051.7 | 1069.9 | 1076.4 | 1077.0 | 1072.8 | 1058.8 | 1036.6 | 1003.8 | 949.6  |
| 20°   | 1040.2 | 1045.1 | 1071.1 | 1096.8 | 1107.5 | 1107.5 | 1099.2 | 1079.7 | 1053.7 | 1018.7 | 955.6  |
| 22.5° | 1062.4 | 1068.8 | 1101.5 | 1131.2 | 1142.5 | 1140.1 | 1129.0 | 1100.6 | 1071.5 | 1035.5 | 963.2  |
| 25°   | 1106.1 | 1111.0 | 1145.0 | 1174.9 | 1181.8 | 1176.3 | 1162.3 | 1125.9 | 1094.1 | 1058.4 | 976.9  |
| 27.5° | 1162.5 | 1163.2 | 1198.2 | 1223.6 | 1219.3 | 1215.6 | 1198.0 | 1157.6 | 1126.8 | 1091.0 | 1000.7 |
| 30°   | 1224.4 | 1224.4 | 1255.3 | 1274.6 | 1261.7 | 1258.6 | 1241.1 | 1196.0 | 1168.5 | 1135.4 | 1034.4 |
| 32.5° | 1284.4 | 1287.0 | 1312.1 | 1324.3 | 1309.9 | 1306.8 | 1289.7 | 1244.6 | 1224.0 | 1203.1 | 1087.0 |
| 35°   | 1342.3 | 1344.3 | 1368.1 | 1374.7 | 1361.0 | 1361.8 | 1349.6 | 1311.5 | 1303.7 | 1301.0 | 1166.3 |
| 37.5° | 1398.5 | 1398.9 | 1423.1 | 1427.3 | 1420.5 | 1428.0 | 1429.1 | 1395.4 | 1409.8 | 1431.3 | 1277.9 |
| 40°   | 1449.8 | 1450.2 | 1474.2 | 1485.0 | 1496.8 | 1506.6 | 1515.2 | 1497.3 | 1545.0 | 1594.9 | 1410.9 |
| 42.5° | 1490.8 | 1495.5 | 1525.9 | 1546.5 | 1577.6 | 1596.3 | 1619.8 | 1618.9 | 1705.9 | 1780.9 | 1571.6 |
| 45°   | 1527.0 | 1535.0 | 1577.4 | 1613.6 | 1666.8 | 1696.6 | 1733.4 | 1762.3 | 1887.1 | 1988.1 | 1734.3 |
| 47.5° | 1574.7 | 1582.3 | 1630.7 | 1689.9 | 1761.0 | 1800.0 | 1861.1 | 1923.5 | 2086.2 | 2191.4 | 1893.3 |
| 50°   | 1642.0 | 1638.7 | 1686.4 | 1771.4 | 1862.6 | 1913.9 | 2000.9 | 2094.4 | 2283.7 | 2368.5 | 1986.7 |
| 52.5° | 1713.7 | 1712.4 | 1747.6 | 1860.0 | 1982.5 | 2042.4 | 2157.4 | 2271.1 | 2472.6 | 2490.6 | 2029.6 |
| 55°   | 1802.5 | 1792.9 | 1822.7 | 1961.0 | 2124.8 | 2189.2 | 2324.6 | 2446.0 | 2623.1 | 2559.4 | 2051.1 |
| 57.5° | 1895.5 | 1879.7 | 1908.1 | 2073.5 | 2285.3 | 2361.4 | 2509.7 | 2616.5 | 2723.3 | 2606.5 | 2050.9 |
| 60°   | 1991.6 | 1973.0 | 2006.7 | 2214.3 | 2484.6 | 2572.7 | 2710.4 | 2731.7 | 2816.7 | 2630.2 | 2035.8 |
| 62.5° | 2072.0 | 2060.9 | 2111.0 | 2364.8 | 2707.3 | 2793.8 | 2862.0 | 2836.5 | 2895.5 | 2648.7 | 2000.5 |
| 65°   | 2157.0 | 2157.6 | 2238.7 | 2540.3 | 2943.9 | 3002.3 | 3008.1 | 2972.3 | 2961.4 | 2644.9 | 1881.1 |
| 67.5° | 2272.0 | 2282.6 | 2417.8 | 2778.7 | 3174.1 | 3219.2 | 3218.7 | 3119.5 | 3009.6 | 2494.8 | 1616.2 |
| 70°   | 2393.6 | 2418.7 | 2624.2 | 3051.6 | 3425.4 | 3471.1 | 3447.6 | 3213.2 | 2833.8 | 2017.4 | 1143.9 |
| 72.5° | 2373.2 | 2416.7 | 2739.0 | 3223.6 | 3605.8 | 3640.7 | 3487.8 | 2983.0 | 2239.8 | 1172.5 | 487.0  |
| 75°   | 1830.9 | 1881.3 | 2511.5 | 3053.1 | 3416.5 | 3385.2 | 2996.7 | 2321.2 | 1224.0 | 327.2  | 109.7  |
| 77.5° | 967.2  | 994.0  | 1659.1 | 2325.9 | 2664.0 | 2598.5 | 2111.0 | 1287.7 | 373.1  | 81.0   | 49.3   |
| 80°   | 506.6  | 512.8  | 723.0  | 1319.7 | 1644.2 | 1644.7 | 1251.1 | 565.6  | 153.8  | 41.5   | 33.1   |
| 82.5° | 271.3  | 276.6  | 382.0  | 609.8  | 861.5  | 780.9  | 479.0  | 311.2  | 89.5   | 23.5   | 31.7   |
| 85°   | 65.3   | 66.4   | 216.7  | 278.6  | 338.7  | 242.0  | 142.3  | 261.3  | 24.2   | 13.8   | 25.7   |
| 87.5° | 25.1   | 25.5   | 80.4   | 120.5  | 86.4   | 55.9   | 66.6   | 97.4   | 3.1    | 5.3    | 4.0    |
| 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°    | 982.9  | 982.9  | 982.9 | 982.9 | 982.9 | 982.9 | 982.9 | 982.9 | 982.9 | 982.9 | 982.9 |
| 2.5°  | 973.2  | 967.4  | 953.2 | 935.2 | 919.2 | 907.7 | 890.4 | 879.0 | 871.5 | 871.3 | 868.4 |
| 5°    | 948.5  | 936.8  | 906.1 | 869.7 | 836.6 | 806.9 | 771.8 | 744.1 | 723.4 | 720.1 | 713.0 |
| 7.5°  | 922.1  | 902.8  | 855.7 | 798.9 | 743.4 | 687.0 | 621.5 | 580.9 | 546.1 | 529.4 | 527.6 |
| 10°   | 905.9  | 878.8  | 812.0 | 729.9 | 642.9 | 551.2 | 465.5 | 406.2 | 363.4 | 351.2 | 342.1 |
| 12.5° | 902.6  | 866.8  | 778.3 | 665.1 | 540.7 | 419.5 | 324.8 | 261.7 | 227.5 | 216.7 | 213.8 |
| 15°   | 905.9  | 861.3  | 749.8 | 600.9 | 437.3 | 297.7 | 218.0 | 181.4 | 168.5 | 165.4 | 165.2 |
| 17.5° | 907.9  | 854.6  | 717.7 | 529.6 | 337.0 | 212.7 | 166.9 | 156.3 | 154.3 | 154.1 | 154.5 |
| 20°   | 907.7  | 844.4  | 679.3 | 450.2 | 250.6 | 167.2 | 150.9 | 148.7 | 148.3 | 148.5 | 148.3 |
| 22.5° | 906.1  | 832.4  | 637.1 | 368.3 | 189.3 | 149.4 | 144.1 | 142.7 | 142.5 | 142.5 | 142.5 |
| 25°   | 909.0  | 822.9  | 590.7 | 289.9 | 156.1 | 141.2 | 137.8 | 136.7 | 136.5 | 136.5 | 136.1 |
| 27.5° | 919.4  | 817.6  | 539.9 | 223.1 | 141.0 | 133.9 | 131.2 | 131.0 | 130.3 | 130.1 | 130.5 |
| 30°   | 936.3  | 817.6  | 484.1 | 173.6 | 131.9 | 126.3 | 124.3 | 123.9 | 123.6 | 123.4 | 123.6 |
| 32.5° | 966.1  | 823.8  | 423.3 | 144.3 | 123.2 | 117.9 | 116.5 | 117.2 | 116.5 | 116.5 | 116.5 |
| 35°   | 1019.8 | 842.4  | 359.6 | 125.9 | 114.1 | 109.7 | 108.3 | 109.2 | 108.8 | 108.8 | 108.5 |
| 37.5° | 1098.1 | 877.0  | 295.5 | 114.8 | 106.1 | 101.4 | 99.7  | 101.0 | 100.6 | 100.6 | 100.3 |
| 40°   | 1193.6 | 927.4  | 234.4 | 106.3 | 98.3  | 93.5  | 91.9  | 92.6  | 91.5  | 91.5  | 91.9  |
| 42.5° | 1311.5 | 991.4  | 181.1 | 98.1  | 90.6  | 85.9  | 85.0  | 84.4  | 82.4  | 81.2  | 81.5  |
| 45°   | 1442.4 | 1058.0 | 141.2 | 90.1  | 83.2  | 79.5  | 78.1  | 76.4  | 73.0  | 70.8  | 71.0  |
| 47.5° | 1559.4 | 1109.2 | 114.8 | 82.4  | 76.6  | 73.7  | 71.7  | 68.4  | 63.5  | 60.8  | 61.0  |
| 50°   | 1620.9 | 1117.0 | 97.7  | 74.6  | 70.4  | 67.5  | 64.6  | 59.5  | 53.7  | 50.8  | 50.6  |
| 52.5° | 1636.7 | 1080.6 | 85.0  | 67.5  | 64.2  | 60.8  | 57.0  | 50.2  | 43.7  | 40.6  | 40.2  |
| 55°   | 1642.4 | 1025.1 | 73.7  | 60.8  | 57.5  | 53.7  | 48.8  | 41.1  | 35.1  | 32.0  | 31.7  |
| 57.5° | 1623.3 | 942.3  | 64.8  | 54.8  | 50.8  | 46.2  | 40.2  | 32.9  | 27.1  | 24.6  | 24.6  |
| 60°   | 1580.9 | 830.2  | 57.9  | 48.4  | 44.0  | 38.6  | 32.4  | 25.5  | 20.2  | 18.2  | 18.2  |
| 62.5° | 1496.4 | 685.0  | 51.5  | 41.7  | 37.5  | 32.0  | 26.2  | 19.3  | 14.2  | 13.1  | 13.3  |
| 65°   | 1336.8 | 519.7  | 45.1  | 35.7  | 32.0  | 26.4  | 20.4  | 13.8  | 9.5   | 9.5   | 10.0  |
| 67.5° | 1090.1 | 360.9  | 38.4  | 30.4  | 27.5  | 21.5  | 15.5  | 9.5   | 6.7   | 7.5   | 8.4   |
| 70°   | 721.7  | 202.4  | 32.9  | 25.1  | 23.5  | 17.1  | 11.5  | 6.4   | 5.3   | 7.1   | 8.7   |
| 72.5° | 272.4  | 78.8   | 27.5  | 20.2  | 20.4  | 13.1  | 8.2   | 4.9   | 4.9   | 7.8   | 10.2  |
| 75°   | 75.9   | 38.6   | 19.8  | 14.9  | 16.0  | 9.5   | 6.0   | 4.2   | 4.7   | 8.9   | 12.0  |
| 77.5° | 44.6   | 28.4   | 12.9  | 8.7   | 10.9  | 6.7   | 4.0   | 3.3   | 4.0   | 7.5   | 11.5  |
| 80°   | 36.0   | 15.1   | 7.5   | 4.4   | 6.0   | 3.8   | 2.7   | 2.0   | 1.1   | 2.9   | 6.0   |
| 82.5° | 36.0   | 9.1    | 3.6   | 3.1   | 3.1   | 2.0   | 1.3   | 0.9   | 0.2   | 0.0   | 1.6   |
| 85°   | 24.2   | 3.8    | 2.2   | 2.0   | 1.6   | 0.7   | 0.4   | 0.2   | 0.0   | 0.0   | 0.0   |
| 87.5° | 4.0    | 1.6    | 0.9   | 0.4   | 0.2   | 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: SP1-2012-088-3

Luminaire Tested: WIS-SA-830-2D-U-SL4

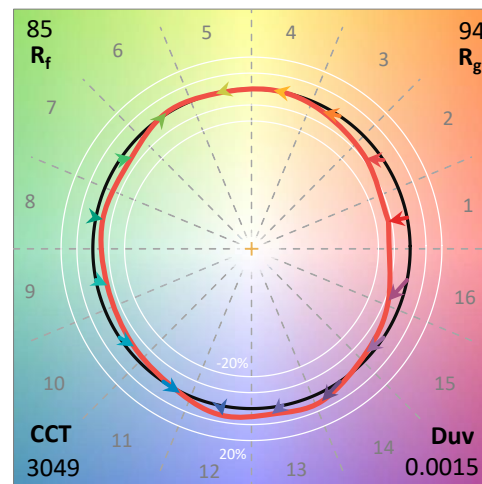
Test Date: 01/11/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/11/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **WIS-SA-830-2D-U-SL4**  
 Description: INVUE. WALL PACK LIGHT SQUARE SL4 OPTICS 2-SQUARE.

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 3049   | CRI (Ra): | 81.7 |      |      |
| CIE u':                   | 0.2482 | R1:       | 79.6 | R9:  | 1.9  |
| CIE v':                   | 0.5224 | R2:       | 90.6 | R10: | 79.3 |
| Duv:                      | 0.0015 | R3:       | 95.7 | R11: | 78.7 |
| CIE x:                    | 0.4354 | R4:       | 79.4 | R12: | 72.2 |
| CIE y:                    | 0.4072 | R5:       | 80.2 | R13: | 82.2 |
| CIE z:                    | 0.1574 | R6:       | 89.0 | R14: | 98.1 |
| Peak Wavelength (nm):     | 601    | R7:       | 82.2 |      |      |
| Dominant Wavelength (nm): | 582    | R8:       | 57.0 |      |      |
| Purity:                   | 53     |           |      |      |      |
| Rf:                       | 85.1   |           |      |      |      |
| Rg:                       | 94.3   |           |      |      |      |



### Test Conditions

Stabilization Time: 83M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/29%  
 Sphere Temperature (°C): 25.6

REPORT NUMBER: SP1-2012-088-3

| 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 3000K 4-step quadrangle

REPORT NUMBER: SP1-2012-088-3

### Photopic Flux vs. Wavelength

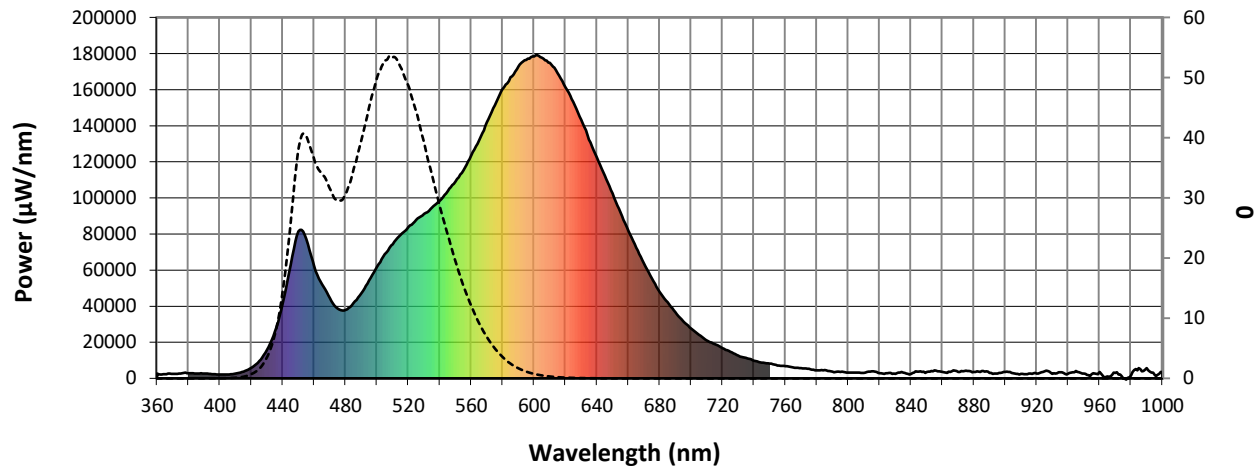


#####

| 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       | 2750             | 0.0              | 490       | 47173            | 6.7              | 620       | 161309           | 42.0             | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 9.8              | 625       | 153301           | 33.8             | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 13.6             | 630       | 143292           | 25.9             | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 19.3             | 635       | 132368           | 19.9             | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 25.5             | 640       | 122334           | 14.6             | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 32.9             | 645       | 112200           | 10.8             | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 40.6             | 650       | 102448           | 7.5              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 47.1             | 655       | 91886            | 5.3              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 53.7             | 660       | 81865            | 3.4              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.0              | 535       | 94694            | 58.7             | 665       | 72448            | 2.3              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.0              | 540       | 98431            | 64.1             | 670       | 63654            | 1.4              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.0              | 545       | 103765           | 69.1             | 675       | 55284            | 0.9              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 0.0              | 550       | 109130           | 74.2             | 680       | 47949            | 0.6              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 0.1              | 555       | 115271           | 78.7             | 685       | 42173            | 0.4              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 0.1              | 560       | 123390           | 83.9             | 690       | 36755            | 0.2              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 0.3              | 565       | 131926           | 87.7             | 695       | 31630            | 0.1              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 0.7              | 570       | 141815           | 92.2             | 700       | 27642            | 0.1              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 1.3              | 575       | 151359           | 94.2             | 705       | 24213            | 0.1              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 2.1              | 580       | 160364           | 95.3             | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 2.6              | 585       | 166836           | 92.7             | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 2.6              | 590       | 172885           | 89.4             | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 2.7              | 595       | 176548           | 83.7             | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 2.8              | 600       | 178427           | 76.9             | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 3.0              | 605       | 177729           | 68.8             | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 3.6              | 610       | 174846           | 60.1             | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 4.9              | 615       | 169274           | 51.1             | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 4584.8**
**S/P: 0.52**

| 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       | 2750             | 0.0              | 490       | 47173            | 72.6             | 620       | 161309           | 2.0              | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 87.7             | 625       | 153301           | 1.3              | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 103.4            | 630       | 143292           | 0.8              | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 117.0            | 635       | 132368           | 0.5              | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 126.0            | 640       | 122334           | 0.3              | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 131.6            | 645       | 112200           | 0.2              | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 133.2            | 650       | 102448           | 0.1              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 131.3            | 655       | 91886            | 0.1              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 125.8            | 660       | 81865            | 0.0              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.1              | 535       | 94694            | 118.0            | 665       | 72448            | 0.0              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.2              | 540       | 98431            | 108.8            | 670       | 63654            | 0.0              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.4              | 545       | 103765           | 99.5             | 675       | 55284            | 0.0              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 1.0              | 550       | 109130           | 89.2             | 680       | 47949            | 0.0              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 2.3              | 555       | 115271           | 78.8             | 685       | 42173            | 0.0              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 5.4              | 560       | 123390           | 69.0             | 690       | 36755            | 0.0              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 11.6             | 565       | 131926           | 59.2             | 695       | 31630            | 0.0              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 23.2             | 570       | 141815           | 50.0             | 700       | 27642            | 0.0              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 42.1             | 575       | 151359           | 41.2             | 705       | 24213            | 0.0              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 63.1             | 580       | 160364           | 33.0             | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 67.4             | 585       | 166836           | 25.5             | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 60.3             | 590       | 172885           | 19.3             | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 55.1             | 595       | 176548           | 14.1             | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 51.0             | 600       | 178427           | 10.1             | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 48.4             | 605       | 177729           | 7.0              | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 51.4             | 610       | 174846           | 4.7              | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 60.4             | 615       | 169274           | 3.1              | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 12033.4**    **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       | 2750             | 0.0              | 490       | 47173            | 39.3             | 620       | 161309           | 0.1              | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 44.8             | 625       | 153301           | 0.1              | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 49.7             | 630       | 143292           | 0.0              | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 52.8             | 635       | 132368           | 0.0              | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 53.4             | 640       | 122334           | 0.0              | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 51.9             | 645       | 112200           | 0.0              | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 48.8             | 650       | 102448           | 0.0              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 44.5             | 655       | 91886            | 0.0              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 39.4             | 660       | 81865            | 0.0              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.0              | 535       | 94694            | 34.1             | 665       | 72448            | 0.0              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.1              | 540       | 98431            | 28.8             | 670       | 63654            | 0.0              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.2              | 545       | 103765           | 24.1             | 675       | 55284            | 0.0              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 0.7              | 550       | 109130           | 19.6             | 680       | 47949            | 0.0              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 1.5              | 555       | 115271           | 15.5             | 685       | 42173            | 0.0              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 3.3              | 560       | 123390           | 12.2             | 690       | 36755            | 0.0              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 6.9              | 565       | 131926           | 9.3              | 695       | 31630            | 0.0              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 13.9             | 570       | 141815           | 6.9              | 700       | 27642            | 0.0              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 24.8             | 575       | 151359           | 5.0              | 705       | 24213            | 0.0              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 37.5             | 580       | 160364           | 3.6              | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 40.4             | 585       | 166836           | 2.5              | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 36.8             | 590       | 172885           | 1.7              | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 34.1             | 595       | 176548           | 1.1              | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 31.7             | 600       | 178427           | 0.8              | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 29.5             | 605       | 177729           | 0.5              | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 30.6             | 610       | 174846           | 0.3              | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 34.3             | 615       | 169274           | 0.2              | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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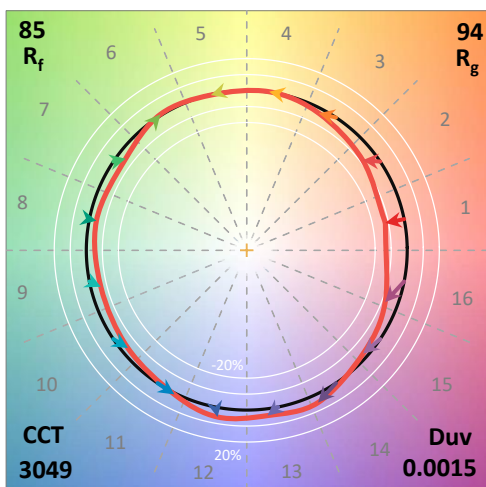
TM-30-18

### Summary

$R_f = 85.1$   
 $R_g = 94.3$   
 CIE  $R_a = 81.7$   
 $R_g = 1.9$



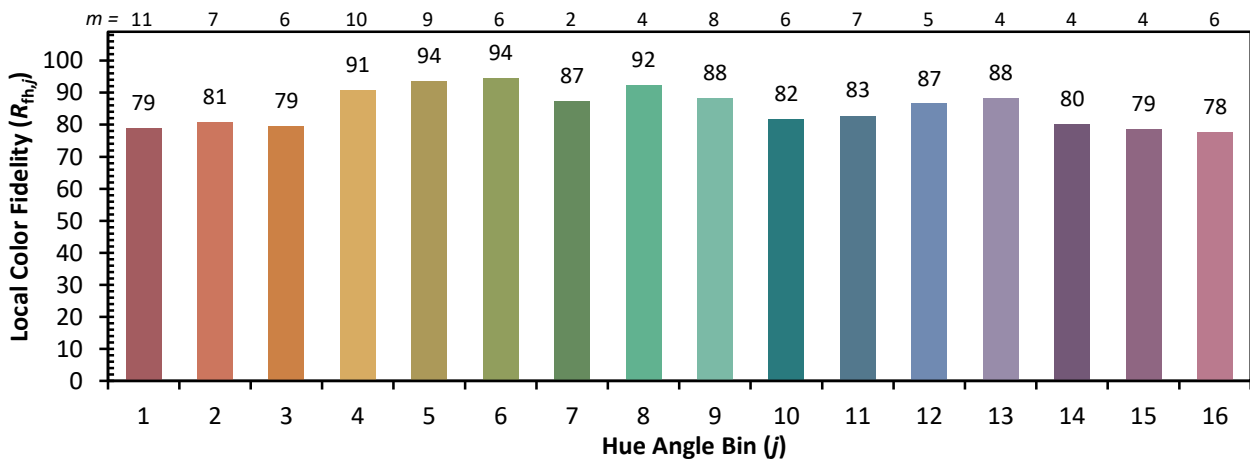
### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 85 | CES51 = 93 | CES76 = 82 |
| CES02 = 63 | CES27 = 94 | CES52 = 93 | CES77 = 85 |
| CES03 = 31 | CES28 = 95 | CES53 = 89 | CES78 = 82 |
| CES04 = 70 | CES29 = 90 | CES54 = 90 | CES79 = 91 |
| CES05 = 49 | CES30 = 96 | CES55 = 89 | CES80 = 90 |
| CES06 = 51 | CES31 = 91 | CES56 = 86 | CES81 = 72 |
| CES07 = 42 | CES32 = 85 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 95 | CES58 = 86 | CES83 = 95 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 76 | CES35 = 96 | CES60 = 92 | CES85 = 77 |
| CES11 = 59 | CES36 = 87 | CES61 = 88 | CES86 = 68 |
| CES12 = 65 | CES37 = 96 | CES62 = 90 | CES87 = 84 |
| CES13 = 43 | CES38 = 94 | CES63 = 88 | CES88 = 87 |
| CES14 = 74 | CES39 = 98 | CES64 = 81 | CES89 = 75 |
| CES15 = 71 | CES40 = 96 | CES65 = 79 | CES90 = 88 |
| CES16 = 47 | CES41 = 97 | CES66 = 80 | CES91 = 79 |
| CES17 = 50 | CES42 = 98 | CES67 = 78 | CES92 = 65 |
| CES18 = 56 | CES43 = 92 | CES68 = 82 | CES93 = 78 |
| CES19 = 72 | CES44 = 99 | CES69 = 87 | CES94 = 61 |
| CES20 = 66 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 90 | CES71 = 77 | CES96 = 83 |
| CES22 = 79 | CES47 = 95 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 84 | CES73 = 75 | CES98 = 84 |
| CES24 = 91 | CES49 = 91 | CES74 = 92 | CES99 = 75 |
| CES25 = 72 | CES50 = 94 | CES75 = 80 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)