

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: P436822

Luminaire Tested: **TT-D3-830-U-5WQ-PM-HSS**

Issue Date: 12/2/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P436822  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2010-017-2)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/2/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: TT-D3-830-U-5WQ-PM-HSS  
Description: TOPTIER LED SITE LUMINAIRE  
3000K, 80 CRI LEDS AND WIDE DISTRIBUTION WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4561 lumens  
Efficiency: N/A  
Efficacy: 96.6 lumens/watt  
Luminous Opening: Circular (Dia: 1.12' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U2 - G2

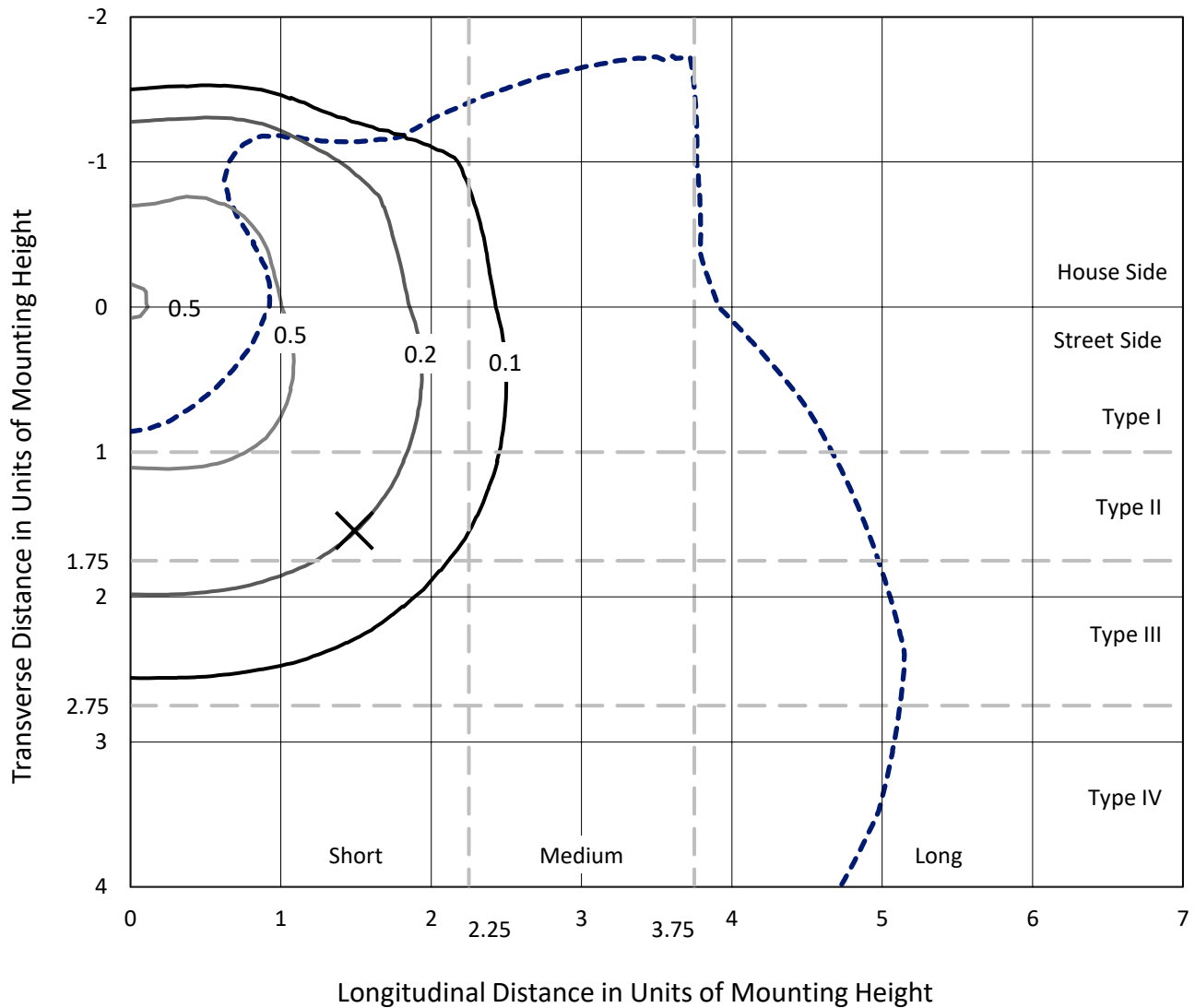
Input Watts (W): 47.2  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

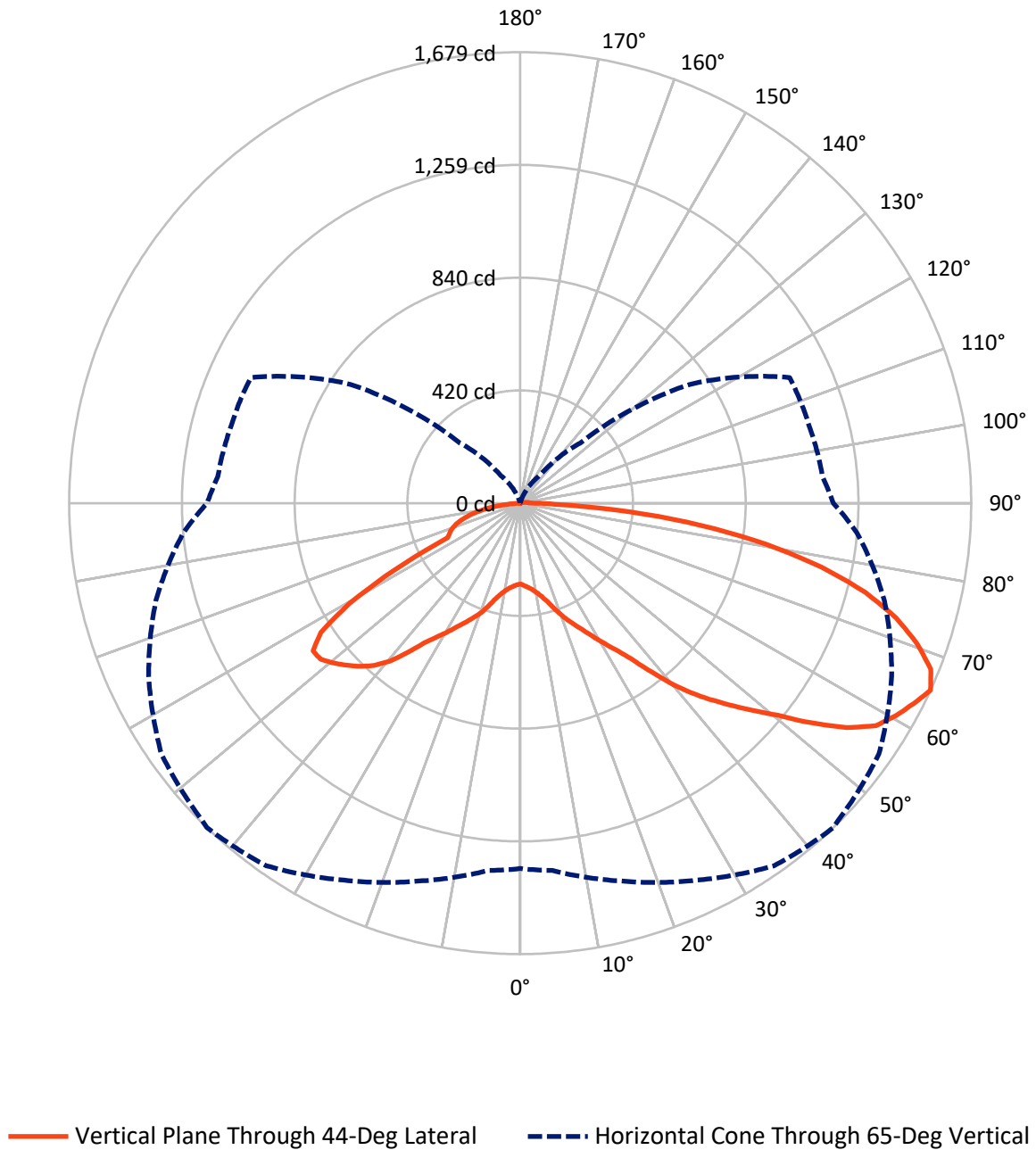
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 0.6 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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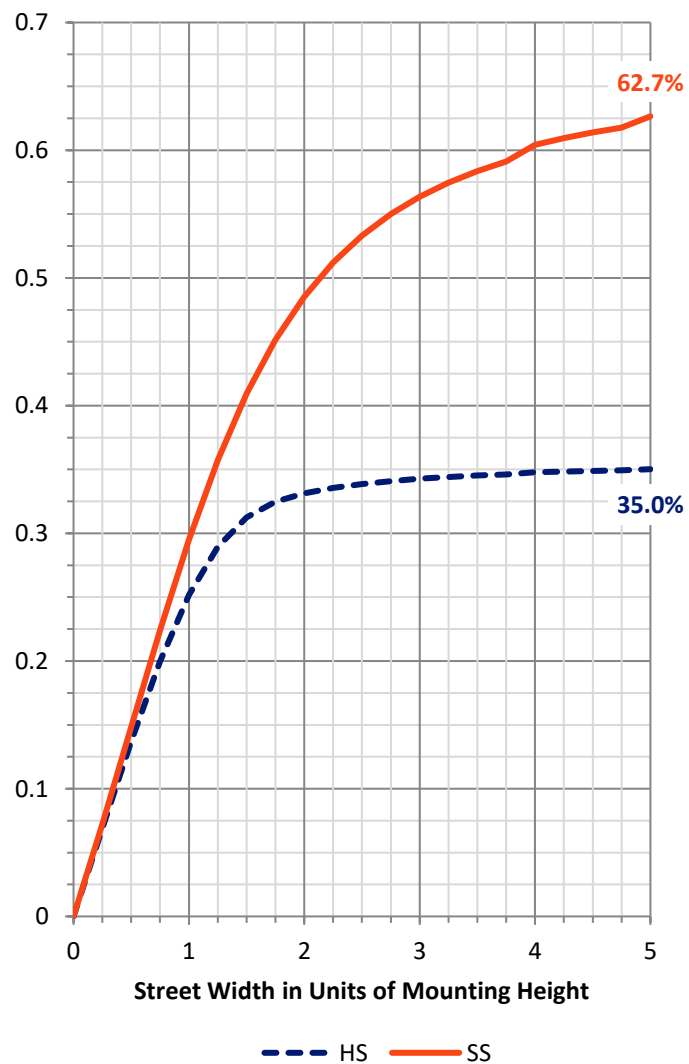
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1606.5   | 1.1    | 1607.6 |
|                    | % Fixture | 35.2     | 0.0    | 35.2   |
| <b>Street Side</b> | Lumens    | 2935.0   | 18.5   | 2953.5 |
|                    | % Fixture | 64.3     | 0.4    | 64.8   |
| <b>Total</b>       | Lumens    | 4541.5   | 19.6   | 4561.0 |
|                    | % Fixture | 99.6     | 0.4    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 30.5   | 0.7       |
| 10°-20°   | 108.3  | 2.4       |
| 20°-30°   | 232.1  | 5.1       |
| 30°-40°   | 420.4  | 9.2       |
| 40°-50°   | 701.6  | 15.4      |
| 50°-60°   | 971.7  | 21.3      |
| 60°-70°   | 1007.0 | 22.1      |
| 70°-80°   | 810.5  | 17.8      |
| 80°-90°   | 259.2  | 5.7       |
| 90°-100°  | 13.1   | 0.3       |
| 100°-110° | 4.2    | 0.1       |
| 110°-120° | 0.8    | 0.0       |
| 120°-130° | 0.5    | 0.0       |
| 130°-140° | 0.3    | 0.0       |
| 140°-150° | 0.3    | 0.0       |
| 150°-160° | 0.1    | 0.0       |
| 160°-170° | 0.1    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 4541.5 | 99.6      |
| 0°-180°   | 4561.0 | 100.0     |

**Coefficient of Utilization**



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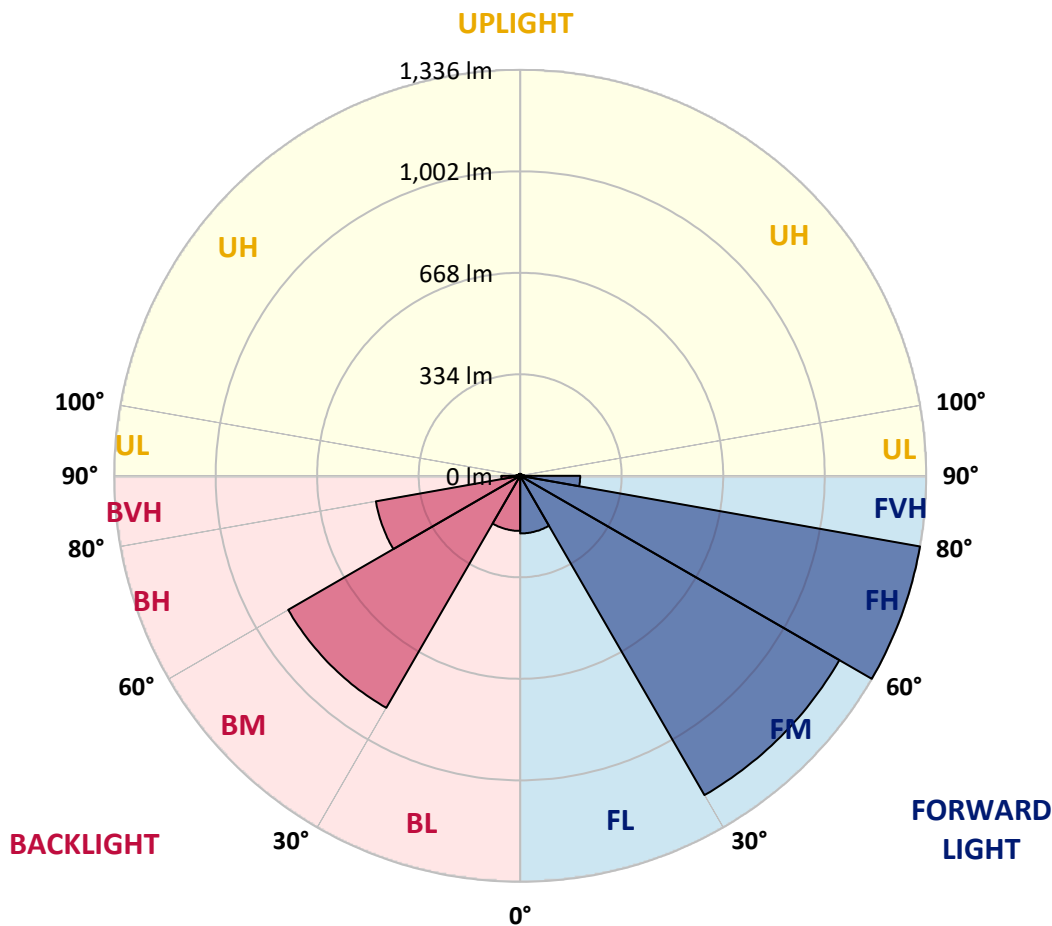
CATALOG NUMBER: TT-D3-830-U-5WQ-PM-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |       |         |
|------|-------------|--------|-----------|-------------------------|-------|---------|
|      |             |        |           | B                       | U     | G       |
| FL   | (0°-30°)    | 189.7  | 4.2       |                         |       |         |
| FM   | (30°-60°)   | 1212.6 | 26.6      |                         |       |         |
| FH   | (60°-80°)   | 1335.5 | 29.3      |                         |       | G1/1800 |
| FVH  | (80°-90°)   | 197.2  | 4.3       |                         |       | G2/225  |
| BL   | (0°-30°)    | 181.3  | 4.0       | B1/500                  |       |         |
| BM   | (30°-60°)   | 881.2  | 19.3      | B1/1000                 |       |         |
| BH   | (60°-80°)   | 482.0  | 10.6      | B1/500                  |       | G1/500  |
| BVH  | (80°-90°)   | 62.0   | 1.4       |                         |       | G1/100  |
| UL   | (90°-100°)  | 13.1   | 0.3       |                         | U2/50 |         |
| UH   | (100°-180°) | 6.4    | 0.1       |                         | U1/10 |         |

**BUG Rating: B1-U2-G2**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 5°     | 15°    | 25°    | 35°    | 44°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°     | 301.0  | 301.0  | 301.0  | 301.0  | 301.0  | 301.0  | 301.0  | 301.0  | 301.0  | 301.0  | 301.0  |
| 2.5°   | 309.9  | 309.0  | 309.0  | 308.1  | 308.1  | 308.1  | 308.1  | 308.1  | 307.2  | 306.3  | 305.4  |
| 5°     | 317.9  | 317.9  | 317.0  | 317.0  | 316.1  | 315.2  | 316.1  | 315.2  | 314.3  | 313.4  | 312.5  |
| 7.5°   | 328.6  | 327.7  | 327.7  | 325.9  | 325.9  | 325.0  | 325.0  | 325.0  | 324.1  | 322.3  | 321.4  |
| 10°    | 343.7  | 341.9  | 341.9  | 340.1  | 339.3  | 338.4  | 338.4  | 336.6  | 336.6  | 335.7  | 334.8  |
| 12.5°  | 360.6  | 358.8  | 360.6  | 359.7  | 358.0  | 356.2  | 356.2  | 354.4  | 353.5  | 352.6  | 349.0  |
| 15°    | 382.9  | 380.2  | 382.0  | 382.0  | 381.1  | 380.2  | 380.2  | 376.7  | 374.9  | 373.1  | 369.5  |
| 17.5°  | 409.6  | 407.8  | 408.7  | 409.6  | 412.3  | 412.3  | 413.2  | 408.7  | 405.1  | 398.9  | 396.2  |
| 20°    | 443.4  | 442.5  | 445.2  | 445.2  | 447.9  | 447.9  | 448.8  | 444.3  | 438.1  | 433.6  | 428.3  |
| 22.5°  | 476.4  | 476.4  | 479.9  | 479.9  | 482.6  | 480.8  | 480.8  | 479.0  | 471.9  | 466.6  | 461.2  |
| 25°    | 510.2  | 509.3  | 512.9  | 515.6  | 519.1  | 514.7  | 516.4  | 513.8  | 506.7  | 499.5  | 492.4  |
| 27.5°  | 547.6  | 545.8  | 547.6  | 551.2  | 557.4  | 553.8  | 555.6  | 551.2  | 544.1  | 534.3  | 528.0  |
| 30°    | 588.6  | 585.9  | 588.6  | 593.9  | 598.4  | 600.1  | 599.3  | 593.0  | 586.8  | 572.5  | 568.1  |
| 32.5°  | 628.6  | 628.6  | 634.9  | 644.7  | 650.0  | 649.1  | 650.0  | 644.7  | 635.8  | 618.0  | 607.3  |
| 35°    | 677.6  | 681.2  | 689.2  | 703.4  | 715.0  | 710.6  | 710.6  | 708.8  | 693.6  | 672.3  | 658.0  |
| 37.5°  | 742.6  | 746.2  | 762.2  | 779.1  | 800.5  | 798.7  | 799.6  | 794.3  | 764.9  | 742.6  | 722.1  |
| 40°    | 818.3  | 821.9  | 845.9  | 869.9  | 890.4  | 896.7  | 897.6  | 886.0  | 853.9  | 821.9  | 789.8  |
| 42.5°  | 887.8  | 892.2  | 917.1  | 951.0  | 973.2  | 983.0  | 984.8  | 966.1  | 932.3  | 895.8  | 855.7  |
| 45°    | 957.2  | 962.6  | 991.0  | 1026.7 | 1058.7 | 1063.2 | 1064.1 | 1048.0 | 1010.6 | 968.8  | 917.1  |
| 47.5°  | 1028.4 | 1032.9 | 1062.3 | 1105.0 | 1139.7 | 1148.7 | 1149.5 | 1134.4 | 1089.0 | 1038.2 | 977.7  |
| 50°    | 1093.4 | 1102.3 | 1142.4 | 1187.8 | 1234.1 | 1241.3 | 1242.1 | 1225.2 | 1171.8 | 1114.8 | 1034.7 |
| 52.5°  | 1170.0 | 1174.5 | 1217.2 | 1292.9 | 1332.1 | 1359.7 | 1360.6 | 1327.6 | 1270.6 | 1194.1 | 1090.8 |
| 55°    | 1259.1 | 1267.1 | 1310.7 | 1386.4 | 1456.7 | 1475.4 | 1480.8 | 1441.6 | 1365.9 | 1283.1 | 1162.0 |
| 57.5°  | 1310.7 | 1325.8 | 1390.0 | 1462.1 | 1550.2 | 1562.7 | 1565.4 | 1524.4 | 1440.7 | 1349.9 | 1215.4 |
| 60°    | 1338.3 | 1347.2 | 1414.9 | 1527.1 | 1595.6 | 1607.2 | 1606.3 | 1575.2 | 1491.5 | 1381.1 | 1240.4 |
| 62.5°  | 1369.5 | 1384.6 | 1441.6 | 1555.6 | 1615.2 | 1643.7 | 1639.3 | 1607.2 | 1521.7 | 1400.6 | 1264.4 |
| 65°    | 1360.6 | 1373.0 | 1456.7 | 1549.3 | 1648.2 | 1679.3 | 1673.1 | 1630.4 | 1526.2 | 1404.2 | 1258.2 |
| 67.5°  | 1325.0 | 1334.8 | 1417.6 | 1532.4 | 1626.8 | 1649.1 | 1659.8 | 1617.9 | 1501.3 | 1365.9 | 1219.0 |
| 70°    | 1251.9 | 1267.1 | 1347.2 | 1464.8 | 1551.1 | 1567.2 | 1568.9 | 1543.1 | 1438.0 | 1295.6 | 1154.0 |
| 72.5°  | 1151.3 | 1163.8 | 1251.0 | 1370.4 | 1445.2 | 1463.9 | 1465.6 | 1426.5 | 1347.2 | 1199.4 | 1060.5 |
| 75°    | 1031.1 | 1042.7 | 1110.4 | 1235.0 | 1308.9 | 1327.6 | 1325.8 | 1289.3 | 1205.6 | 1065.8 | 936.7  |
| 77.5°  | 882.4  | 903.8  | 963.4  | 1065.8 | 1138.0 | 1147.8 | 1149.5 | 1109.5 | 1041.8 | 920.7  | 795.2  |
| 80°    | 696.3  | 716.8  | 784.5  | 861.0  | 921.6  | 929.6  | 932.3  | 898.4  | 837.0  | 730.2  | 623.3  |
| 82.5°  | 495.1  | 512.9  | 566.3  | 628.6  | 679.4  | 679.4  | 681.2  | 653.6  | 606.4  | 514.7  | 431.0  |
| 85°    | 282.3  | 295.6  | 331.2  | 375.8  | 412.3  | 407.8  | 408.7  | 383.8  | 352.6  | 281.4  | 227.9  |
| 87.5°  | 92.6   | 98.8   | 106.9  | 123.8  | 140.7  | 130.0  | 135.3  | 112.2  | 101.5  | 75.7   | 58.8   |
| 90°    | 49.0   | 49.0   | 47.2   | 45.4   | 41.9   | 36.5   | 36.5   | 29.4   | 22.3   | 14.2   | 5.3    |
| 92.5°  | 44.5   | 44.5   | 42.7   | 41.0   | 37.4   | 32.9   | 32.9   | 26.7   | 19.6   | 12.5   | 4.5    |
| 95°    | 36.5   | 36.5   | 35.6   | 33.8   | 31.2   | 27.6   | 26.7   | 22.3   | 16.9   | 9.8    | 3.6    |
| 97.5°  | 28.5   | 28.5   | 27.6   | 26.7   | 24.0   | 21.4   | 21.4   | 16.9   | 12.5   | 8.0    | 2.7    |
| 100°   | 21.4   | 21.4   | 21.4   | 19.6   | 18.7   | 16.0   | 16.0   | 13.4   | 9.8    | 6.2    | 1.8    |
| 102.5° | 15.1   | 16.0   | 15.1   | 14.2   | 13.4   | 11.6   | 11.6   | 9.8    | 7.1    | 4.5    | 1.8    |
| 105°   | 10.7   | 10.7   | 9.8    | 9.8    | 8.9    | 8.0    | 8.0    | 6.2    | 4.5    | 2.7    | 0.9    |
| 107.5° | 6.2    | 6.2    | 6.2    | 6.2    | 5.3    | 5.3    | 5.3    | 4.5    | 2.7    | 1.8    | 0.9    |
| 110°   | 3.6    | 3.6    | 3.6    | 3.6    | 2.7    | 2.7    | 2.7    | 1.8    | 1.8    | 0.9    | 0.9    |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°  | 5°  | 15° | 25° | 35° | 44° | 45° | 55° | 65° | 75° | 85° |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 112.5° | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 0.9 | 0.9 | 0.9 | 0.9 |
| 115°   | 0.9 | 0.9 | 0.9 | 1.8 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 117.5° | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 120°   | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 122.5° | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 125°   | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 127.5° | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 130°   | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 132.5° | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 135°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 137.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 140°   | 0.9 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 142.5° | 0.9 | 0.9 | 0.9 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 145°   | 0.9 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 |
| 147.5° | 0.9 | 0.9 | 0.9 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 150°   | 0.9 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 152.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 |
| 155°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 |
| 157.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 |
| 160°   | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 |
| 162.5° | 0.9 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 |
| 165°   | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 167.5° | 0.9 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 170°   | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 |
| 172.5° | 0.9 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 175°   | 0.9 | 0.9 | 0.9 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 177.5° | 0.0 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 |
| 180°   | 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°     | 301.0  | 301.0  | 301.0  | 301.0  | 301.0  | 301.0 | 301.0 | 301.0 | 301.0 | 301.0 | 301.0 |
| 2.5°   | 305.4  | 305.4  | 304.5  | 303.6  | 303.6  | 303.6 | 302.7 | 302.7 | 302.7 | 301.9 | 301.9 |
| 5°     | 312.5  | 311.6  | 311.6  | 310.8  | 310.8  | 309.9 | 309.9 | 309.0 | 308.1 | 308.1 | 307.2 |
| 7.5°   | 322.3  | 321.4  | 319.7  | 320.6  | 318.8  | 317.9 | 317.0 | 317.0 | 317.0 | 316.1 | 316.1 |
| 10°    | 333.9  | 333.9  | 332.1  | 332.1  | 330.3  | 329.5 | 328.6 | 328.6 | 329.5 | 329.5 | 328.6 |
| 12.5°  | 349.0  | 348.2  | 348.2  | 347.3  | 346.4  | 345.5 | 346.4 | 346.4 | 345.5 | 344.6 | 343.7 |
| 15°    | 367.7  | 367.7  | 367.7  | 368.6  | 367.7  | 367.7 | 367.7 | 366.9 | 365.1 | 363.3 | 363.3 |
| 17.5°  | 396.2  | 395.3  | 393.6  | 394.5  | 396.2  | 398.9 | 396.2 | 393.6 | 390.9 | 390.9 | 390.0 |
| 20°    | 425.6  | 426.5  | 426.5  | 427.4  | 430.1  | 432.7 | 429.2 | 427.4 | 425.6 | 423.8 | 422.1 |
| 22.5°  | 457.7  | 458.6  | 458.6  | 457.7  | 459.5  | 458.6 | 456.8 | 455.0 | 453.2 | 450.6 | 448.8 |
| 25°    | 488.8  | 489.7  | 488.8  | 488.0  | 488.8  | 486.2 | 483.5 | 480.8 | 476.4 | 471.9 | 471.9 |
| 27.5°  | 523.6  | 522.7  | 519.1  | 520.0  | 518.2  | 516.4 | 511.1 | 504.9 | 498.6 | 494.2 | 494.2 |
| 30°    | 560.1  | 560.1  | 553.0  | 556.5  | 553.0  | 552.1 | 540.5 | 532.5 | 523.6 | 517.3 | 516.4 |
| 32.5°  | 600.1  | 598.4  | 593.0  | 596.6  | 593.0  | 589.5 | 575.2 | 564.5 | 549.4 | 540.5 | 539.6 |
| 35°    | 648.2  | 643.8  | 639.3  | 642.9  | 642.9  | 633.1 | 618.8 | 599.3 | 577.9 | 567.2 | 566.3 |
| 37.5°  | 707.0  | 704.3  | 699.0  | 703.4  | 707.0  | 697.2 | 675.8 | 647.3 | 617.1 | 601.0 | 600.1 |
| 40°    | 772.0  | 768.4  | 765.8  | 772.0  | 774.7  | 764.9 | 736.4 | 696.3 | 655.4 | 632.2 | 628.6 |
| 42.5°  | 833.4  | 825.4  | 821.0  | 829.9  | 827.2  | 816.5 | 777.3 | 731.0 | 674.9 | 648.2 | 643.8 |
| 45°    | 888.6  | 879.7  | 873.5  | 881.5  | 878.0  | 856.6 | 813.0 | 750.6 | 683.0 | 650.0 | 644.7 |
| 47.5°  | 943.0  | 929.6  | 919.8  | 930.5  | 923.4  | 890.4 | 837.0 | 760.4 | 674.1 | 634.9 | 626.0 |
| 50°    | 989.3  | 973.2  | 967.0  | 979.5  | 968.8  | 922.5 | 853.9 | 756.0 | 651.8 | 594.8 | 580.6 |
| 52.5°  | 1044.5 | 1020.4 | 1014.2 | 1038.2 | 1014.2 | 952.8 | 857.5 | 745.3 | 601.0 | 532.5 | 519.1 |
| 55°    | 1100.6 | 1073.9 | 1064.1 | 1086.3 | 1049.8 | 959.0 | 839.7 | 683.8 | 524.5 | 451.4 | 431.9 |
| 57.5°  | 1130.0 | 1105.0 | 1096.1 | 1112.1 | 1044.5 | 898.4 | 760.4 | 569.9 | 409.6 | 327.7 | 306.3 |
| 60°    | 1156.7 | 1113.0 | 1101.5 | 1122.8 | 989.3  | 757.8 | 588.6 | 408.7 | 247.5 | 186.1 | 170.1 |
| 62.5°  | 1175.4 | 1133.5 | 1109.5 | 1119.3 | 887.8  | 551.2 | 338.4 | 196.8 | 93.5  | 65.0  | 64.1  |
| 65°    | 1165.6 | 1130.0 | 1113.9 | 1106.8 | 771.1  | 317.0 | 124.7 | 49.9  | 2.7   | 2.7   | 1.8   |
| 67.5°  | 1135.3 | 1096.1 | 1091.7 | 1097.9 | 763.1  | 304.5 | 115.8 | 45.4  | 0.0   | 0.0   | 0.0   |
| 70°    | 1068.5 | 1040.9 | 1040.9 | 1062.3 | 728.4  | 288.5 | 107.7 | 41.9  | 0.0   | 0.0   | 0.0   |
| 72.5°  | 978.6  | 957.2  | 969.7  | 1001.7 | 676.7  | 266.2 | 97.1  | 37.4  | 0.0   | 0.0   | 0.0   |
| 75°    | 870.8  | 848.6  | 864.6  | 900.2  | 612.6  | 237.7 | 84.6  | 32.1  | 0.0   | 0.0   | 0.0   |
| 77.5°  | 733.7  | 718.6  | 743.5  | 776.5  | 527.1  | 200.3 | 69.5  | 25.8  | 0.0   | 0.0   | 0.0   |
| 80°    | 571.7  | 563.6  | 596.6  | 626.0  | 425.6  | 157.6 | 52.5  | 18.7  | 0.0   | 0.0   | 0.0   |
| 82.5°  | 394.5  | 390.9  | 423.0  | 453.2  | 304.5  | 110.4 | 35.6  | 12.5  | 0.0   | 0.0   | 0.0   |
| 85°    | 206.6  | 206.6  | 231.5  | 259.1  | 170.1  | 59.7  | 17.8  | 5.3   | 0.0   | 0.0   | 0.0   |
| 87.5°  | 45.4   | 43.6   | 47.2   | 60.5   | 33.8   | 11.6  | 2.7   | 0.9   | 0.0   | 0.0   | 0.0   |
| 90°    | 0.9    | 0.9    | 0.9    | 0.9    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 92.5°  | 0.9    | 0.9    | 0.9    | 0.9    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 95°    | 0.9    | 0.9    | 0.9    | 0.9    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 97.5°  | 0.9    | 0.9    | 0.9    | 0.9    | 0.9    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 100°   | 0.9    | 0.9    | 0.9    | 0.9    | 0.9    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 102.5° | 0.9    | 0.9    | 0.9    | 0.9    | 0.9    | 0.9   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 105°   | 0.9    | 0.9    | 0.9    | 0.9    | 0.9    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 107.5° | 0.9    | 0.9    | 0.9    | 0.9    | 0.9    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 110°   | 0.9    | 0.9    | 0.9    | 0.9    | 0.9    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

REPORT NUMBER: P436822

CATALOG NUMBER: TT-D3-830-U-5WQ-PM-HSS

**CANDELA DISTRIBUTION (continued):**

|        | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|--------|-----|-----|------|------|------|------|------|------|------|------|------|
| 112.5° | 0.9 | 0.9 | 0.9  | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 115°   | 0.9 | 0.9 | 0.9  | 0.9  | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 117.5° | 0.9 | 0.9 | 0.9  | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 120°   | 0.9 | 0.9 | 0.9  | 0.9  | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 122.5° | 0.9 | 0.9 | 0.9  | 0.9  | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 125°   | 0.9 | 0.9 | 0.9  | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 127.5° | 0.9 | 0.9 | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 130°   | 0.9 | 0.9 | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 132.5° | 0.9 | 0.9 | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 135°   | 0.9 | 0.9 | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 137.5° | 0.9 | 0.9 | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 140°   | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 142.5° | 0.9 | 0.9 | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 145°   | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 147.5° | 0.9 | 0.9 | 0.9  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 150°   | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 152.5° | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 155°   | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 157.5° | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 160°   | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 162.5° | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 165°   | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 167.5° | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 170°   | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 172.5° | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 175°   | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 177.5° | 0.9 | 0.9 | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 180°   | 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)

McGRAW-EDISON

Report Number: SP1-2006-844-5

Luminaire Tested: TT-D5-830-U-MQ

Data valid for TT-D\* family of products

Test Date: 09/30/2020

### Test Information

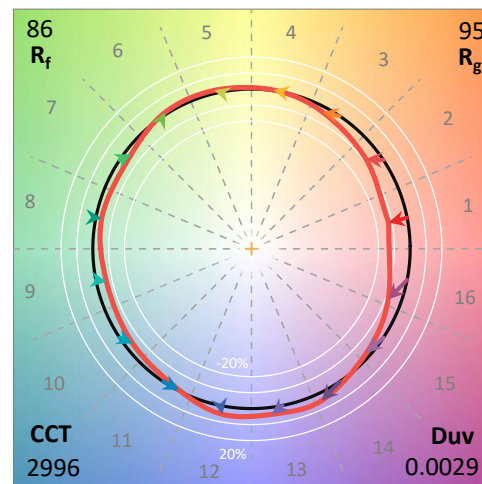
Test Method: LM-79-08  
 Report Number: SP1-2006-844-5  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 09/30/2020  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **TT-D5-830-U-MQ**  
 Description: MCGRAW EDISON

### DISTRIBUTION

### Spectral Parameters

CCT (K): 2996  
 CIE  $u'$ : 0.2496  
 CIE  $v'$ : 0.5255  
 Duv: 0.0029  
 CIE x: 0.4414  
 CIE y: 0.4130  
 CIE z: 0.1455  
 Peak Wavelength (nm): 601  
 Dominant Wavelength (nm): 581  
 Purity: 56.8  
 Rf: 85.7  
 Rg: 94.5

CRI (Ra): 81.6  
 R1: 79.1  
 R2: 89.7  
 R3: 96.7  
 R4: 80.2  
 R5: 79.8  
 R6: 88.4  
 R7: 82.6  
 R8: 56.3  
 R9: -0.6  
 R10: 77.8  
 R11: 80.1  
 R12: 72.7  
 R13: 81.5  
 R14: 98.5



### Test Conditions

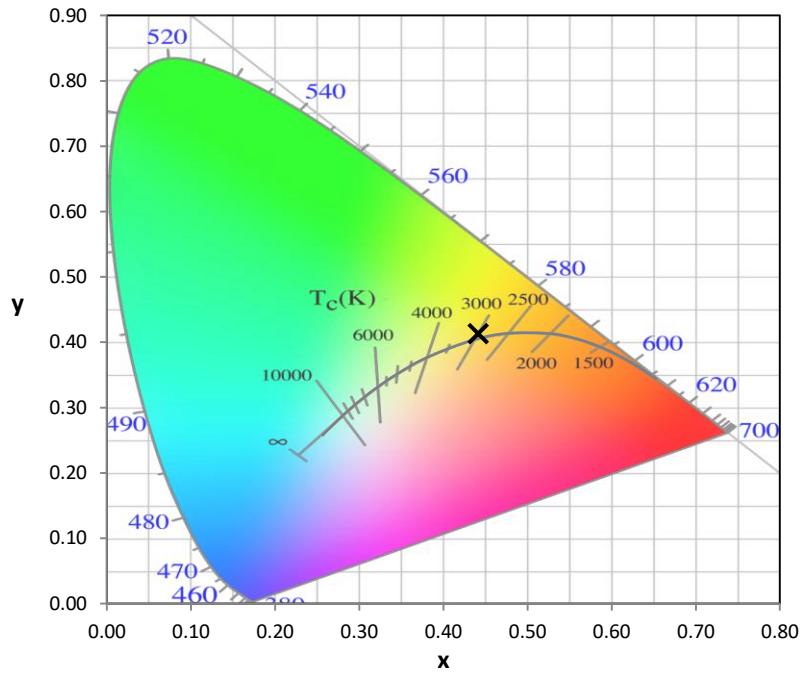
Stabilization Time: 55M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.5/43%  
 Sphere Temperature (°C): 25.9

REPORT NUMBER: SP1-2006-844-5

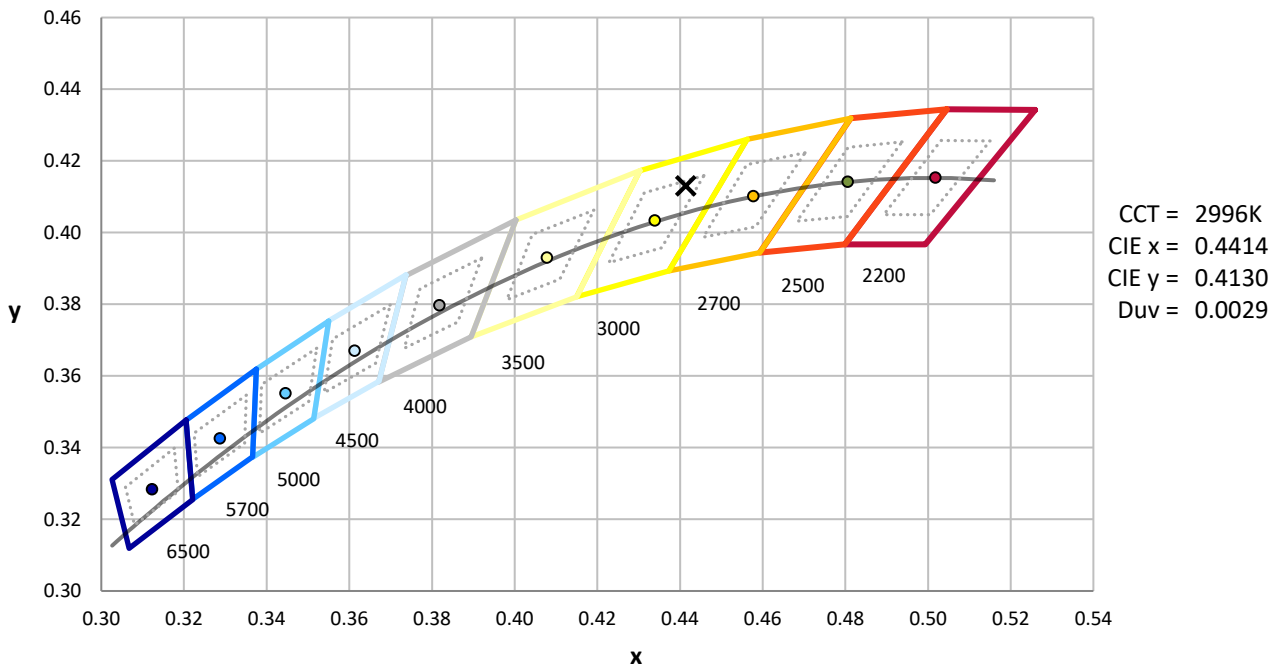
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 7/29/2020        | 1/29/2021            |
| Power Meter                    | IN0071                | 12/3/2019        | 12/3/2020            |
| AC Power Source                | IN0063                | 12/3/2019        | 12/3/2020            |
| DC Power Source                | IN0208                | 12/3/2019        | 12/3/2020            |
| Sphere Thermometer             | IN0085                | 12/3/2019        | 12/3/2020            |
| Room Thermometer               | IN0046                | 12/3/2019        | 12/3/2020            |

REPORT NUMBER: SP1-2006-844-5

**CIE 1931 Chromaticity Diagram**



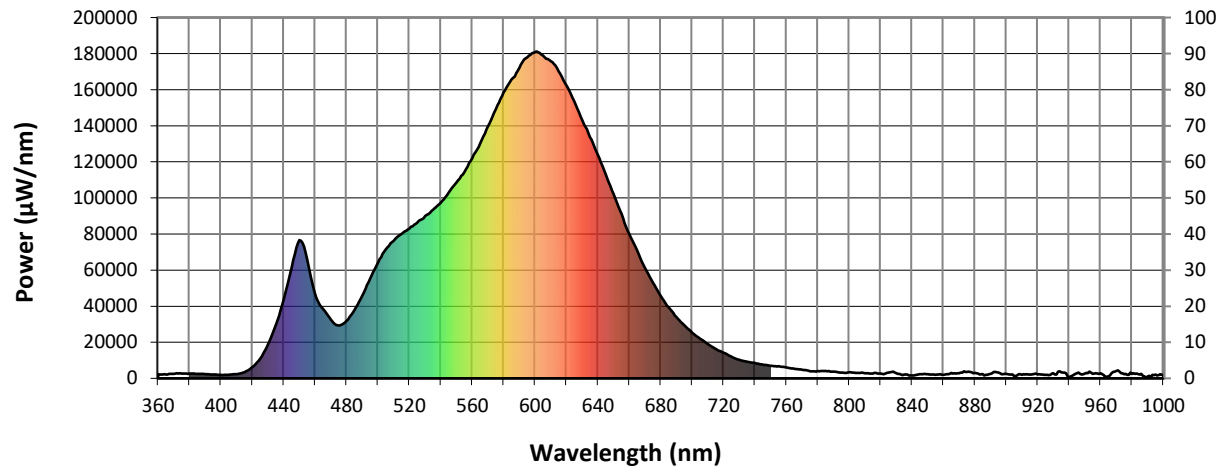
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2006-844-5

### Photopic Flux vs. Wavelength

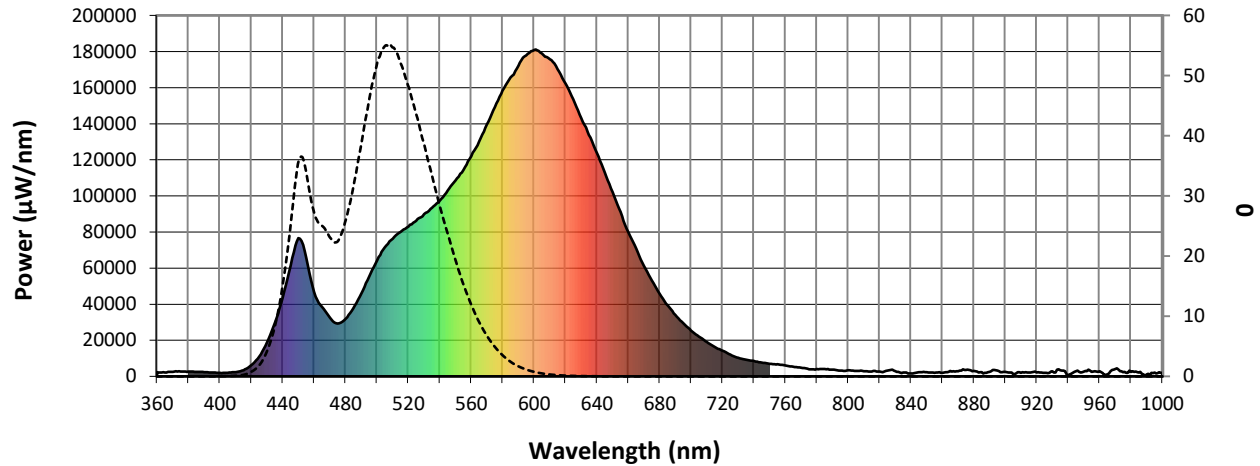


#####

| 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       | 2265             | 0.0              | 490       | 45874            | 6.5              | 620       | 162337           | 42.2             | 750       | 6976             | 0.0              | 880       | 2976             | 0.0              |
| 365       | 2167             | 0.0              | 495       | 55189            | 10.0             | 625       | 153641           | 33.9             | 755       | 6666             | 0.0              | 885       | 2283             | 0.0              |
| 370       | 2505             | 0.0              | 500       | 64204            | 14.2             | 630       | 143151           | 25.9             | 760       | 5969             | 0.0              | 890       | 2506             | 0.0              |
| 375       | 2720             | 0.0              | 505       | 71441            | 20.0             | 635       | 133763           | 20.1             | 765       | 5281             | 0.0              | 895       | 3132             | 0.0              |
| 380       | 2601             | 0.0              | 510       | 76219            | 26.2             | 640       | 123759           | 14.8             | 770       | 4732             | 0.0              | 900       | 2539             | 0.0              |
| 385       | 2461             | 0.0              | 515       | 79949            | 33.1             | 645       | 112859           | 10.9             | 775       | 3998             | 0.0              | 905       | 1252             | 0.0              |
| 390       | 2308             | 0.0              | 520       | 83077            | 40.3             | 650       | 102080           | 7.5              | 780       | 4027             | 0.0              | 910       | 1938             | 0.0              |
| 395       | 2104             | 0.0              | 525       | 86267            | 46.3             | 655       | 91102            | 5.2              | 785       | 4088             | 0.0              | 915       | 2171             | 0.0              |
| 400       | 1900             | 0.0              | 530       | 89871            | 52.9             | 660       | 79928            | 3.3              | 790       | 3700             | 0.0              | 920       | 2123             | 0.0              |
| 405       | 1945             | 0.0              | 535       | 93544            | 58.0             | 665       | 70694            | 2.2              | 795       | 3213             | 0.0              | 925       | 1954             | 0.0              |
| 410       | 2378             | 0.0              | 540       | 97371            | 63.4             | 670       | 61201            | 1.3              | 800       | 3403             | 0.0              | 930       | 2800             | 0.0              |
| 415       | 3437             | 0.0              | 545       | 103011           | 68.6             | 675       | 53092            | 0.9              | 805       | 3079             | 0.0              | 935       | 3314             | 0.0              |
| 420       | 6173             | 0.0              | 550       | 108560           | 73.8             | 680       | 45718            | 0.5              | 810       | 2921             | 0.0              | 940       | 553              | 0.0              |
| 425       | 11052            | 0.1              | 555       | 114473           | 78.2             | 685       | 39372            | 0.3              | 815       | 2705             | 0.0              | 945       | 2793             | 0.0              |
| 430       | 18756            | 0.1              | 560       | 121896           | 82.8             | 690       | 34120            | 0.2              | 820       | 2685             | 0.0              | 950       | 2629             | 0.0              |
| 435       | 29750            | 0.4              | 565       | 130192           | 86.6             | 695       | 29427            | 0.1              | 825       | 3246             | 0.0              | 955       | 2418             | 0.0              |
| 440       | 43697            | 0.7              | 570       | 139595           | 90.8             | 700       | 25380            | 0.1              | 830       | 2813             | 0.0              | 960       | 2857             | 0.0              |
| 445       | 61462            | 1.3              | 575       | 149225           | 92.8             | 705       | 22079            | 0.0              | 835       | 2097             | 0.0              | 965       | 1052             | 0.0              |
| 450       | 76648            | 2.0              | 580       | 158344           | 94.1             | 710       | 18938            | 0.0              | 840       | 1606             | 0.0              | 970       | 4009             | 0.0              |
| 455       | 65529            | 2.2              | 585       | 165704           | 92.1             | 715       | 16322            | 0.0              | 845       | 2347             | 0.0              | 975       | 2341             | 0.0              |
| 460       | 46753            | 1.9              | 590       | 172269           | 89.1             | 720       | 14132            | 0.0              | 850       | 2273             | 0.0              | 980       | 2439             | 0.0              |
| 465       | 38422            | 2.0              | 595       | 177895           | 84.3             | 725       | 12072            | 0.0              | 855       | 1971             | 0.0              | 985       | 2098             | 0.0              |
| 470       | 32450            | 2.0              | 600       | 180887           | 78.0             | 730       | 10271            | 0.0              | 860       | 1962             | 0.0              | 990       | 1159             | 0.0              |
| 475       | 29284            | 2.3              | 605       | 178880           | 69.3             | 735       | 9202             | 0.0              | 865       | 2989             | 0.0              | 995       | 2146             | 0.0              |
| 480       | 31922            | 3.0              | 610       | 175843           | 60.4             | 740       | 8451             | 0.0              | 870       | 2921             | 0.0              | 1000      | 1904             | 0.0              |
| 485       | 37800            | 4.5              | 615       | 170321           | 51.4             | 745       | 7632             | 0.0              | 875       | 3581             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2006-844-5

### Scotopic Flux vs. Wavelength



Scotopic Lumens: 4357.3

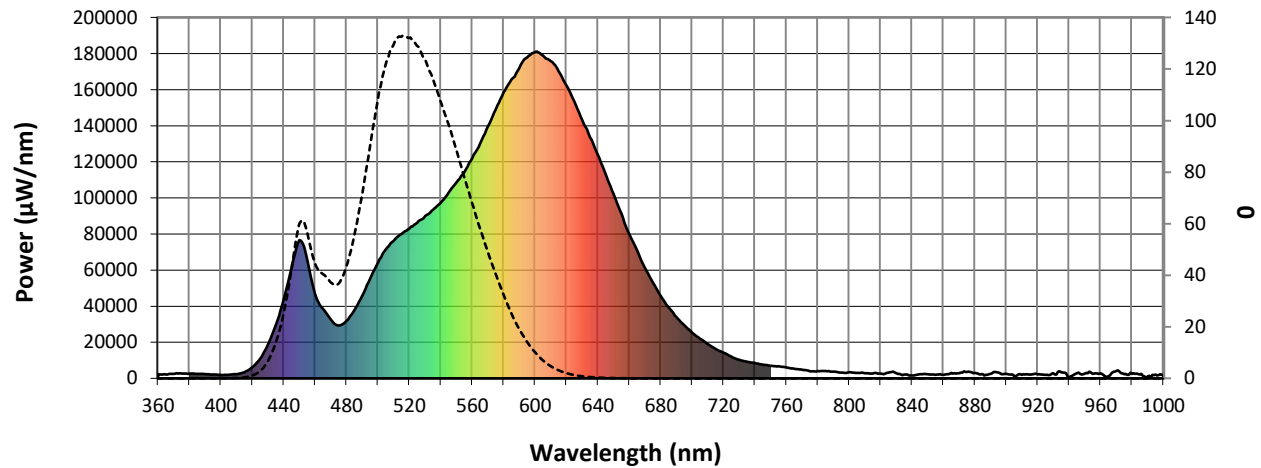
S/P: 0.5

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2265             | 0.0              | 490       | 45874            | 70.6             | 620       | 162337           | 2.0              | 750       | 6976             | 0.0              | 880       | 2976             | 0.0              |
| 365       | 2167             | 0.0              | 495       | 55189            | 89.2             | 625       | 153641           | 1.3              | 755       | 6666             | 0.0              | 885       | 2283             | 0.0              |
| 370       | 2505             | 0.0              | 500       | 64204            | 107.4            | 630       | 143151           | 0.8              | 760       | 5969             | 0.0              | 890       | 2506             | 0.0              |
| 375       | 2720             | 0.0              | 505       | 71441            | 121.4            | 635       | 133763           | 0.5              | 765       | 5281             | 0.0              | 895       | 3132             | 0.0              |
| 380       | 2601             | 0.0              | 510       | 76219            | 129.2            | 640       | 123759           | 0.3              | 770       | 4732             | 0.0              | 900       | 2539             | 0.0              |
| 385       | 2461             | 0.0              | 515       | 79949            | 132.5            | 645       | 112859           | 0.2              | 775       | 3998             | 0.0              | 905       | 1252             | 0.0              |
| 390       | 2308             | 0.0              | 520       | 83077            | 132.1            | 650       | 102080           | 0.1              | 780       | 4027             | 0.0              | 910       | 1938             | 0.0              |
| 395       | 2104             | 0.0              | 525       | 86267            | 129.1            | 655       | 91102            | 0.1              | 785       | 4088             | 0.0              | 915       | 2171             | 0.0              |
| 400       | 1900             | 0.0              | 530       | 89871            | 123.9            | 660       | 79928            | 0.0              | 790       | 3700             | 0.0              | 920       | 2123             | 0.0              |
| 405       | 1945             | 0.1              | 535       | 93544            | 116.6            | 665       | 70694            | 0.0              | 795       | 3213             | 0.0              | 925       | 1954             | 0.0              |
| 410       | 2378             | 0.1              | 540       | 97371            | 107.6            | 670       | 61201            | 0.0              | 800       | 3403             | 0.0              | 930       | 2800             | 0.0              |
| 415       | 3437             | 0.4              | 545       | 103011           | 98.8             | 675       | 53092            | 0.0              | 805       | 3079             | 0.0              | 935       | 3314             | 0.0              |
| 420       | 6173             | 1.0              | 550       | 108560           | 88.8             | 680       | 45718            | 0.0              | 810       | 2921             | 0.0              | 940       | 553              | 0.0              |
| 425       | 11052            | 2.7              | 555       | 114473           | 78.2             | 685       | 39372            | 0.0              | 815       | 2705             | 0.0              | 945       | 2793             | 0.0              |
| 430       | 18756            | 6.4              | 560       | 121896           | 68.1             | 690       | 34120            | 0.0              | 820       | 2685             | 0.0              | 950       | 2629             | 0.0              |
| 435       | 29750            | 13.3             | 565       | 130192           | 58.4             | 695       | 29427            | 0.0              | 825       | 3246             | 0.0              | 955       | 2418             | 0.0              |
| 440       | 43697            | 24.4             | 570       | 139595           | 49.3             | 700       | 25380            | 0.0              | 830       | 2813             | 0.0              | 960       | 2857             | 0.0              |
| 445       | 61462            | 41.2             | 575       | 149225           | 40.6             | 705       | 22079            | 0.0              | 835       | 2097             | 0.0              | 965       | 1052             | 0.0              |
| 450       | 76648            | 59.4             | 580       | 158344           | 32.6             | 710       | 18938            | 0.0              | 840       | 1606             | 0.0              | 970       | 4009             | 0.0              |
| 455       | 65529            | 57.3             | 585       | 165704           | 25.3             | 715       | 16322            | 0.0              | 845       | 2347             | 0.0              | 975       | 2341             | 0.0              |
| 460       | 46753            | 45.2             | 590       | 172269           | 19.2             | 720       | 14132            | 0.0              | 850       | 2273             | 0.0              | 980       | 2439             | 0.0              |
| 465       | 38422            | 40.6             | 595       | 177895           | 14.2             | 725       | 12072            | 0.0              | 855       | 1971             | 0.0              | 985       | 2098             | 0.0              |
| 470       | 32450            | 37.4             | 600       | 180887           | 10.2             | 730       | 10271            | 0.0              | 860       | 1962             | 0.0              | 990       | 1159             | 0.0              |
| 475       | 29284            | 36.6             | 605       | 178880           | 7.0              | 735       | 9202             | 0.0              | 865       | 2989             | 0.0              | 995       | 2146             | 0.0              |
| 480       | 31922            | 43.1             | 610       | 175843           | 4.8              | 740       | 8451             | 0.0              | 870       | 2921             | 0.0              | 1000      | 1904             | 0.0              |
| 485       | 37800            | 54.8             | 615       | 170321           | 3.2              | 745       | 7632             | 0.0              | 875       | 3581             | 0.0              |           |                  |                  |



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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 11640.4 S/P: 1.33**

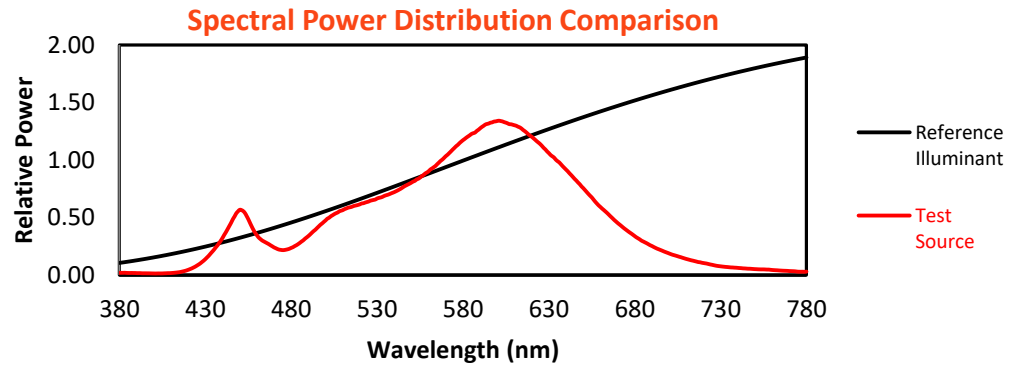
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2265             | 0.0              | 490       | 45874            | 38.2             | 620       | 162337           | 0.1              | 750       | 6976             | 0.0              | 880       | 2976             | 0.0              |
| 365       | 2167             | 0.0              | 495       | 55189            | 45.6             | 625       | 153641           | 0.1              | 755       | 6666             | 0.0              | 885       | 2283             | 0.0              |
| 370       | 2505             | 0.0              | 500       | 64204            | 51.6             | 630       | 143151           | 0.0              | 760       | 5969             | 0.0              | 890       | 2506             | 0.0              |
| 375       | 2720             | 0.0              | 505       | 71441            | 54.8             | 635       | 133763           | 0.0              | 765       | 5281             | 0.0              | 895       | 3132             | 0.0              |
| 380       | 2601             | 0.0              | 510       | 76219            | 54.7             | 640       | 123759           | 0.0              | 770       | 4732             | 0.0              | 900       | 2539             | 0.0              |
| 385       | 2461             | 0.0              | 515       | 79949            | 52.2             | 645       | 112859           | 0.0              | 775       | 3998             | 0.0              | 905       | 1252             | 0.0              |
| 390       | 2308             | 0.0              | 520       | 83077            | 48.4             | 650       | 102080           | 0.0              | 780       | 4027             | 0.0              | 910       | 1938             | 0.0              |
| 395       | 2104             | 0.0              | 525       | 86267            | 43.7             | 655       | 91102            | 0.0              | 785       | 4088             | 0.0              | 915       | 2171             | 0.0              |
| 400       | 1900             | 0.0              | 530       | 89871            | 38.8             | 660       | 79928            | 0.0              | 790       | 3700             | 0.0              | 920       | 2123             | 0.0              |
| 405       | 1945             | 0.0              | 535       | 93544            | 33.7             | 665       | 70694            | 0.0              | 795       | 3213             | 0.0              | 925       | 1954             | 0.0              |
| 410       | 2378             | 0.1              | 540       | 97371            | 28.5             | 670       | 61201            | 0.0              | 800       | 3403             | 0.0              | 930       | 2800             | 0.0              |
| 415       | 3437             | 0.2              | 545       | 103011           | 23.9             | 675       | 53092            | 0.0              | 805       | 3079             | 0.0              | 935       | 3314             | 0.0              |
| 420       | 6173             | 0.7              | 550       | 108560           | 19.5             | 680       | 45718            | 0.0              | 810       | 2921             | 0.0              | 940       | 553              | 0.0              |
| 425       | 11052            | 1.7              | 555       | 114473           | 15.4             | 685       | 39372            | 0.0              | 815       | 2705             | 0.0              | 945       | 2793             | 0.0              |
| 430       | 18756            | 4.0              | 560       | 121896           | 12.0             | 690       | 34120            | 0.0              | 820       | 2685             | 0.0              | 950       | 2629             | 0.0              |
| 435       | 29750            | 7.9              | 565       | 130192           | 9.1              | 695       | 29427            | 0.0              | 825       | 3246             | 0.0              | 955       | 2418             | 0.0              |
| 440       | 43697            | 14.6             | 570       | 139595           | 6.8              | 700       | 25380            | 0.0              | 830       | 2813             | 0.0              | 960       | 2857             | 0.0              |
| 445       | 61462            | 24.2             | 575       | 149225           | 5.0              | 705       | 22079            | 0.0              | 835       | 2097             | 0.0              | 965       | 1052             | 0.0              |
| 450       | 76648            | 35.3             | 580       | 158344           | 3.5              | 710       | 18938            | 0.0              | 840       | 1606             | 0.0              | 970       | 4009             | 0.0              |
| 455       | 65529            | 34.3             | 585       | 165704           | 2.5              | 715       | 16322            | 0.0              | 845       | 2347             | 0.0              | 975       | 2341             | 0.0              |
| 460       | 46753            | 27.5             | 590       | 172269           | 1.7              | 720       | 14132            | 0.0              | 850       | 2273             | 0.0              | 980       | 2439             | 0.0              |
| 465       | 38422            | 25.1             | 595       | 177895           | 1.1              | 725       | 12072            | 0.0              | 855       | 1971             | 0.0              | 985       | 2098             | 0.0              |
| 470       | 32450            | 23.2             | 600       | 180887           | 0.8              | 730       | 10271            | 0.0              | 860       | 1962             | 0.0              | 990       | 1159             | 0.0              |
| 475       | 29284            | 22.4             | 605       | 178880           | 0.5              | 735       | 9202             | 0.0              | 865       | 2989             | 0.0              | 995       | 2146             | 0.0              |
| 480       | 31922            | 25.6             | 610       | 175843           | 0.3              | 740       | 8451             | 0.0              | 870       | 2921             | 0.0              | 1000      | 1904             | 0.0              |
| 485       | 37800            | 31.2             | 615       | 170321           | 0.2              | 745       | 7632             | 0.0              | 875       | 3581             | 0.0              |           |                  |                  |

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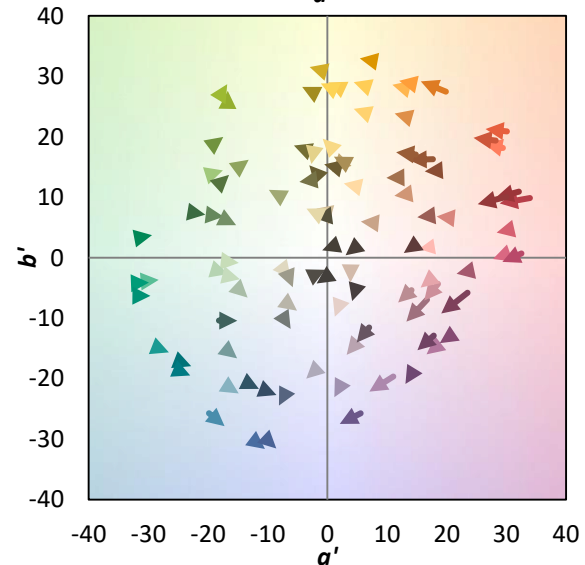
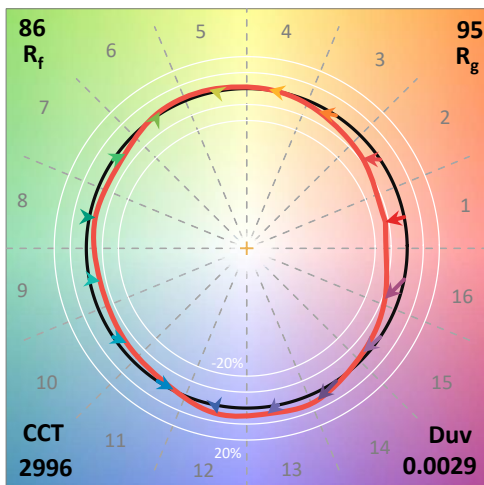
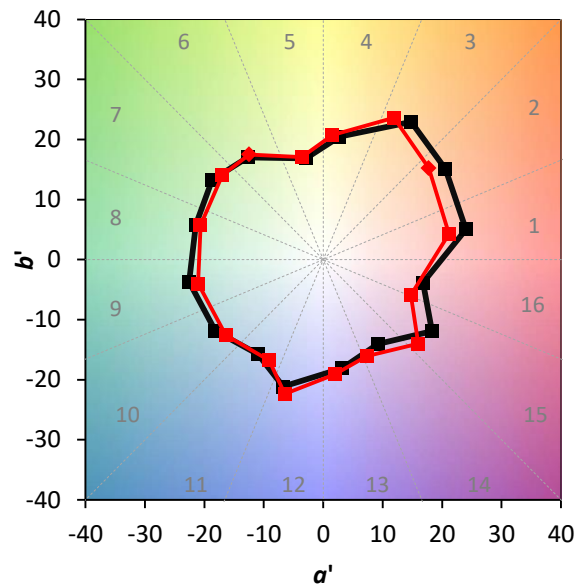
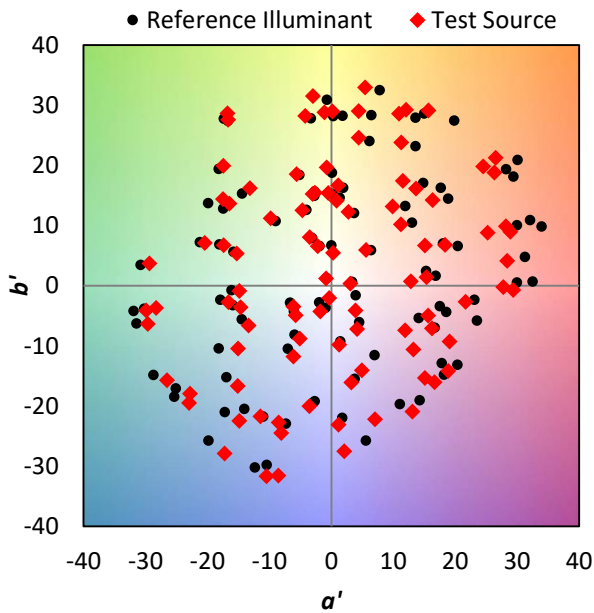
TM-30-18

### Summary

$R_f = 85.7$   
 $R_g = 94.5$   
 CIE  $R_a = 81.6$   
 $R_g = -0.6$

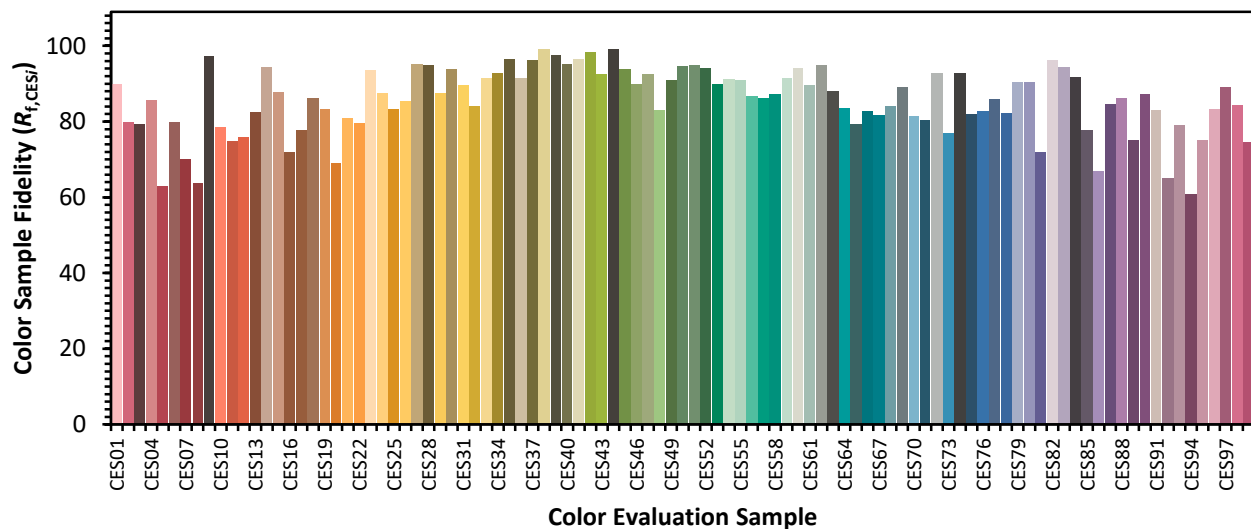


### Color Vector Graphics

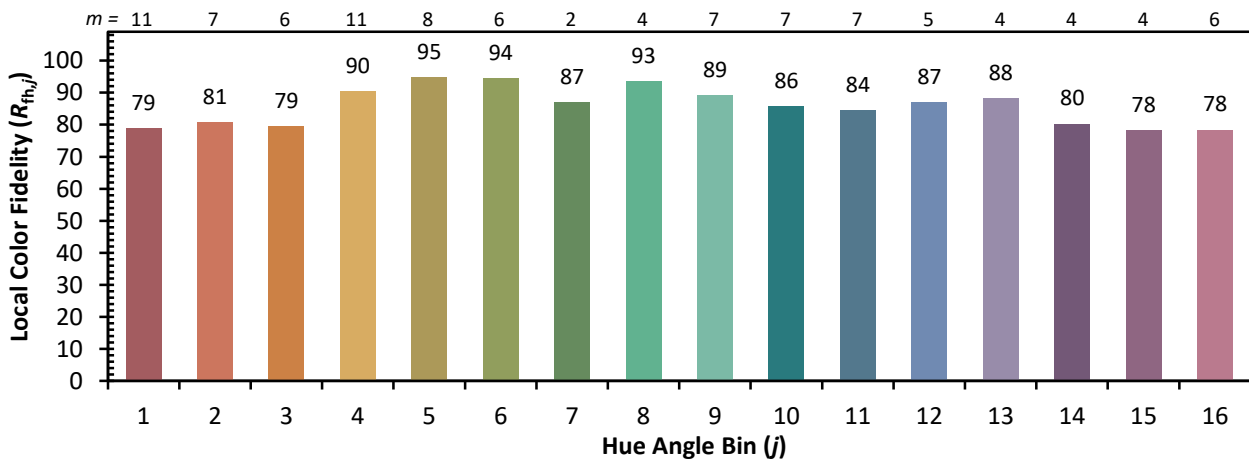
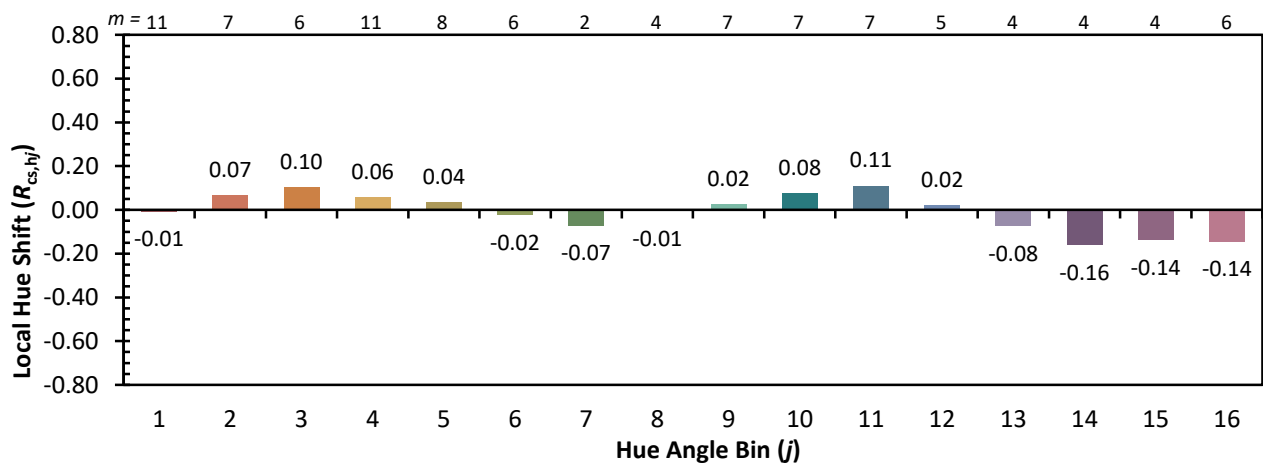
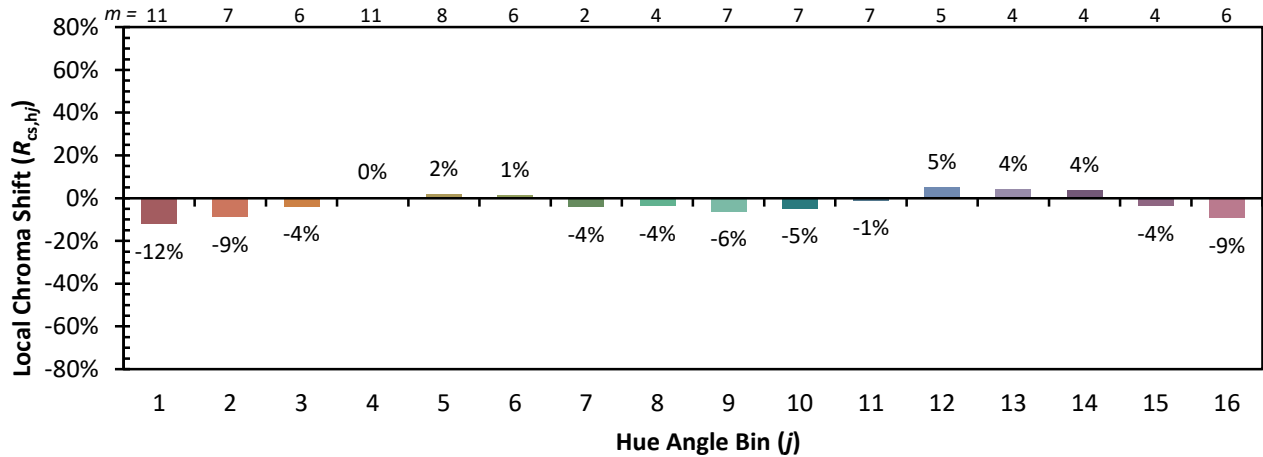


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

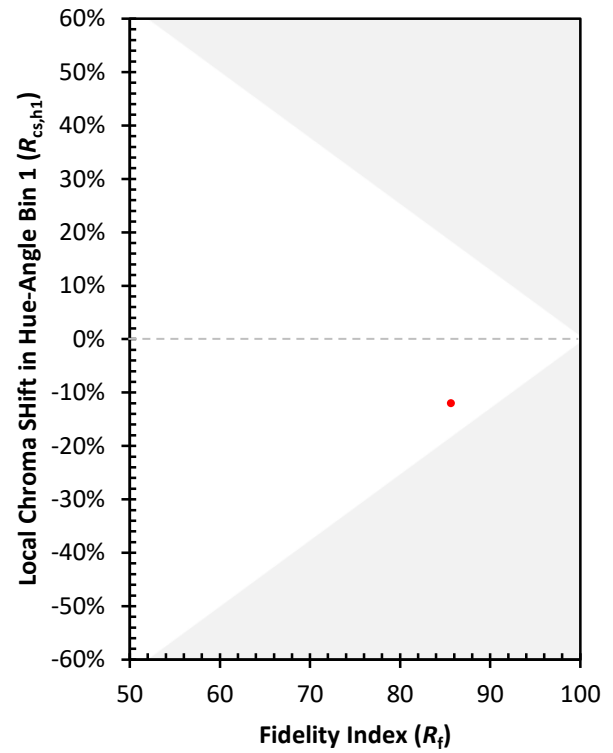
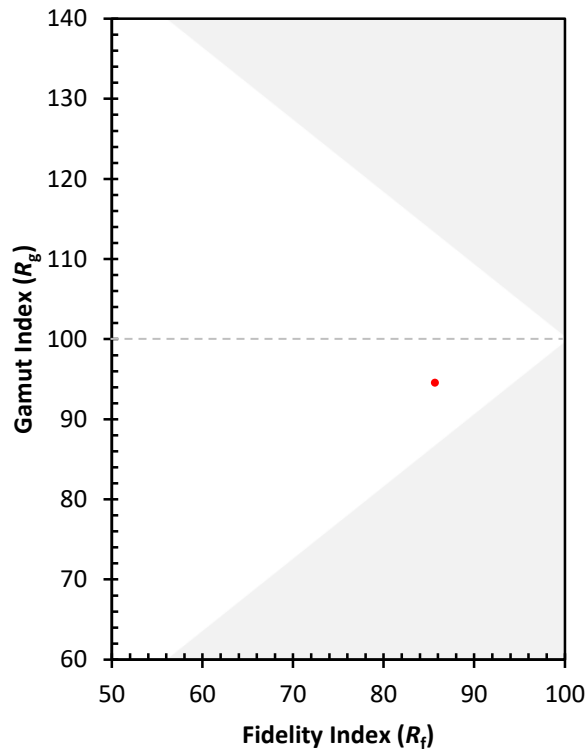
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 85 | CES51 = 95 | CES76 = 83 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 86 |
| CES03 = 31 | CES28 = 95 | CES53 = 90 | CES78 = 82 |
| CES04 = 70 | CES29 = 88 | CES54 = 91 | CES79 = 91 |
| CES05 = 50 | CES30 = 94 | CES55 = 91 | CES80 = 90 |
| CES06 = 51 | CES31 = 90 | CES56 = 87 | CES81 = 72 |
| CES07 = 42 | CES32 = 84 | CES57 = 86 | CES82 = 96 |
| CES08 = 41 | CES33 = 92 | CES58 = 87 | CES83 = 94 |
| CES09 = 29 | CES34 = 93 | CES59 = 91 | CES84 = 92 |
| CES10 = 76 | CES35 = 96 | CES60 = 94 | CES85 = 78 |
| CES11 = 59 | CES36 = 91 | CES61 = 90 | CES86 = 67 |
| CES12 = 65 | CES37 = 96 | CES62 = 95 | CES87 = 85 |
| CES13 = 43 | CES38 = 99 | CES63 = 88 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 84 | CES89 = 75 |
| CES15 = 72 | CES40 = 95 | CES65 = 79 | CES90 = 87 |
| CES16 = 47 | CES41 = 97 | CES66 = 83 | CES91 = 83 |
| CES17 = 50 | CES42 = 98 | CES67 = 82 | CES92 = 65 |
| CES18 = 56 | CES43 = 93 | CES68 = 84 | CES93 = 79 |
| CES19 = 72 | CES44 = 99 | CES69 = 89 | CES94 = 61 |
| CES20 = 67 | CES45 = 94 | CES70 = 81 | CES95 = 75 |
| CES21 = 87 | CES46 = 90 | CES71 = 80 | CES96 = 83 |
| CES22 = 79 | CES47 = 93 | CES72 = 93 | CES97 = 89 |
| CES23 = 92 | CES48 = 83 | CES73 = 77 | CES98 = 84 |
| CES24 = 91 | CES49 = 91 | CES74 = 93 | CES99 = 75 |
| CES25 = 72 | CES50 = 95 | CES75 = 82 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)