

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: P385450

Luminaire Tested: **GWC-SA1A-727-U-T4FT-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P385450  
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-SA1A-727-U-T4FT-HSS  
Description: GALLEON WALL LUMINAIRE  
(1) 70 CRI, 2700K, 615mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV FORWARD  
THROW OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2956 lumens  
Efficiency: N/A  
Efficacy: 86.9 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B0 - U0 - G1

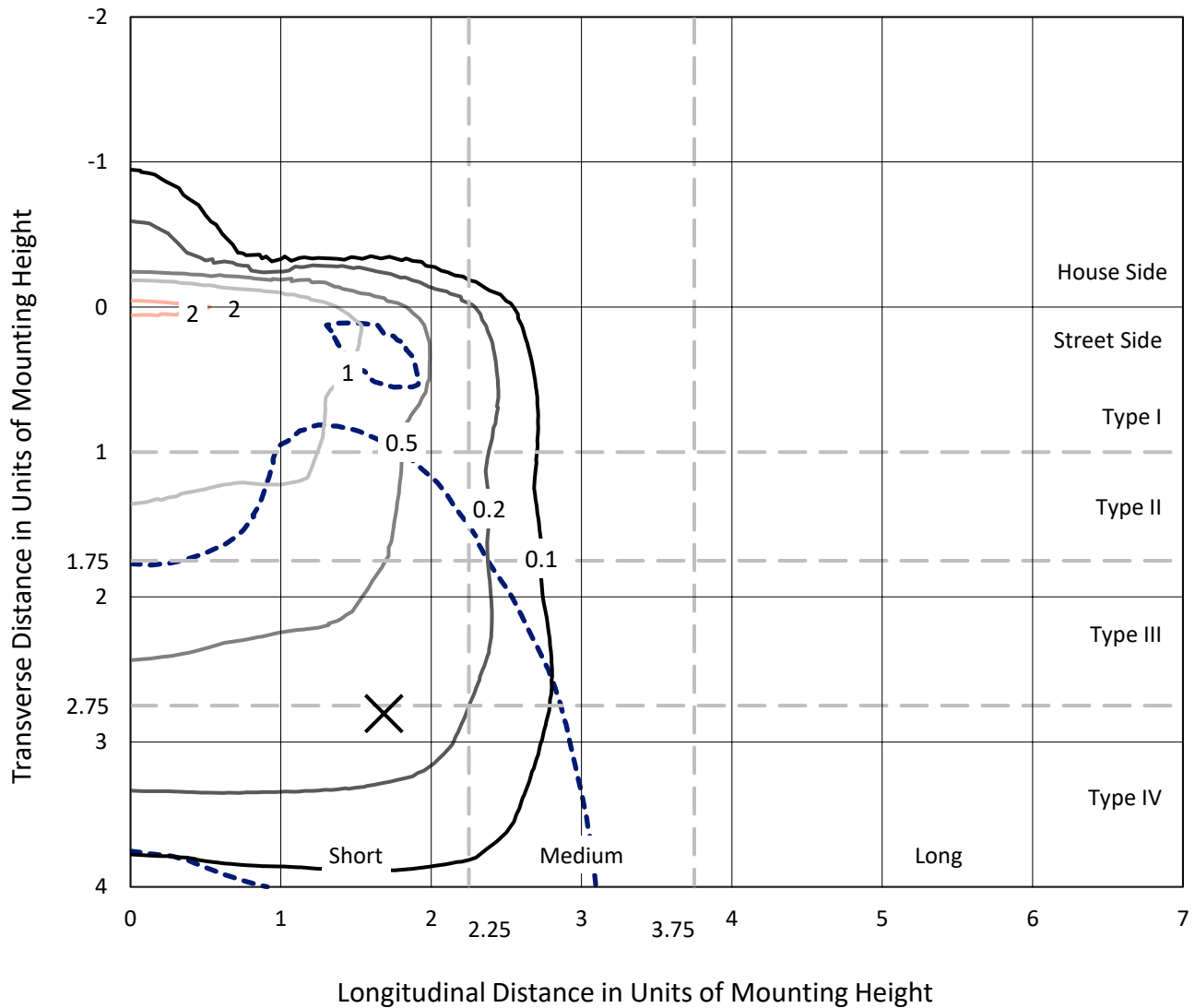
Input Watts (W): 34  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P385450  
 CATALOG NUMBER: GWC-SA1A-727-U-T4FT-HSS

## Iso-Footcandle Lines of Horizontal Illumination

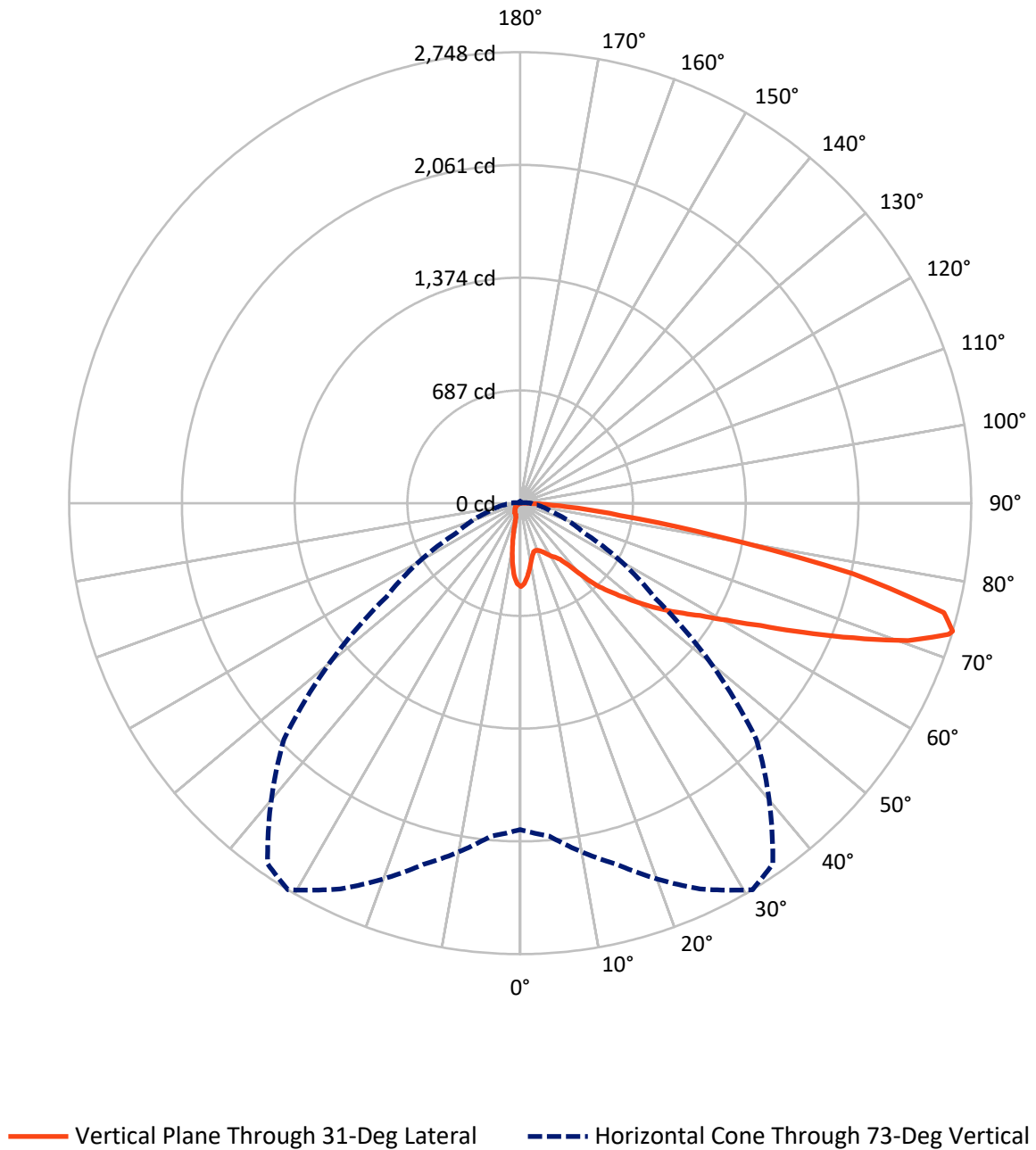
× Max cd  
 --- 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 2.3 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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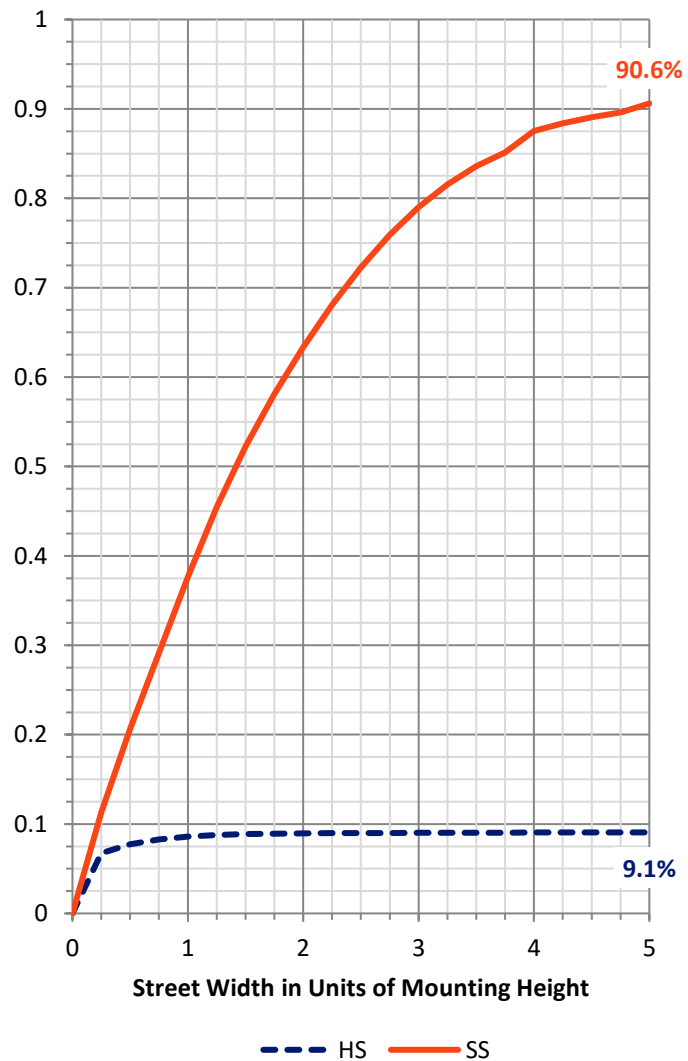
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 269.4    | 0.0    | 269.4  |
|                    | % Fixture | 9.1      | 0.0    | 9.1    |
| <b>Street Side</b> | Lumens    | 2686.5   | 0.0    | 2686.5 |
|                    | % Fixture | 90.9     | 0.0    | 90.9   |
| <b>Total</b>       | Lumens    | 2956.0   | 0.0    | 2956.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 42.2   | 1.4       |
| 10°-20°   | 91.6   | 3.1       |
| 20°-30°   | 137.2  | 4.6       |
| 30°-40°   | 218.3  | 7.4       |
| 40°-50°   | 389.8  | 13.2      |
| 50°-60°   | 604.8  | 20.5      |
| 60°-70°   | 804.0  | 27.2      |
| 70°-80°   | 604.8  | 20.5      |
| 80°-90°   | 63.5   | 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°    | 2956.0 | 100.0     |
| 0°-180°   | 2956.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P385450

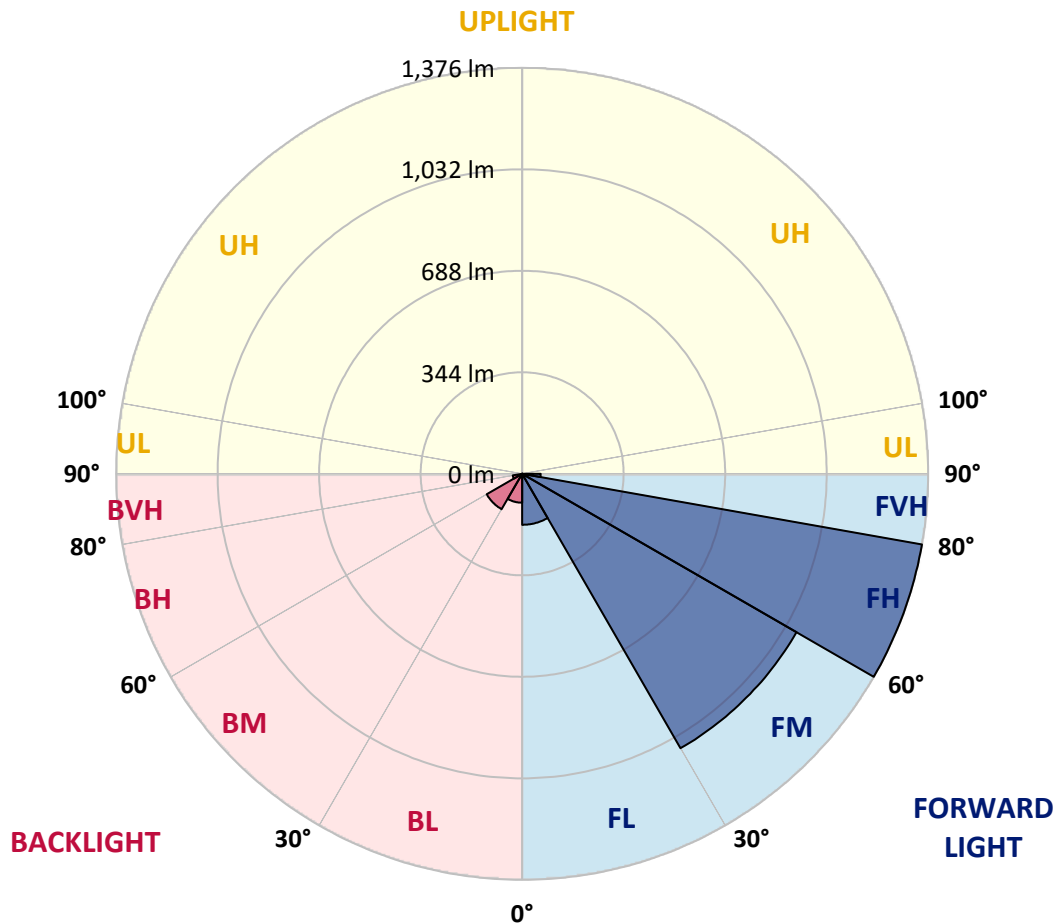
CATALOG NUMBER: GWC-SA1A-727-U-T4FT-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 172.9  | 5.9       |                         |      |         |
| FM   | (30°-60°)   | 1074.1 | 36.3      |                         |      |         |
| FH   | (60°-80°)   | 1376.5 | 46.6      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 63.0   | 2.1       |                         |      | G1/100  |
| BL   | (0°-30°)    | 98.0   | 3.3       | B0/110                  |      |         |
| BM   | (30°-60°)   | 138.7  | 4.7       | B0/220                  |      |         |
| BH   | (60°-80°)   | 32.2   | 1.1       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.5    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B0-U0-G1**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 31°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 508.6  | 508.6  | 508.6  | 508.6  | 508.6  | 508.6  | 508.6  | 508.6  | 508.6  | 508.6  | 508.6  |
| 2.5°  | 482.0  | 484.0  | 486.2  | 486.6  | 490.2  | 490.4  | 495.6  | 499.5  | 503.4  | 507.1  | 508.4  |
| 5°    | 432.5  | 435.8  | 439.7  | 443.6  | 451.3  | 454.3  | 467.1  | 480.1  | 492.5  | 504.4  | 510.2  |
| 7.5°  | 379.7  | 383.5  | 389.0  | 398.7  | 407.2  | 413.1  | 433.2  | 456.4  | 479.5  | 501.4  | 513.9  |
| 10°   | 331.5  | 335.0  | 340.8  | 351.1  | 364.2  | 372.3  | 399.4  | 431.5  | 465.5  | 498.6  | 519.6  |
| 12.5° | 300.9  | 302.8  | 305.9  | 316.9  | 328.8  | 337.9  | 369.7  | 409.5  | 453.9  | 498.5  | 528.7  |
| 15°   | 295.2  | 295.8  | 293.2  | 298.1  | 307.4  | 316.2  | 348.5  | 391.7  | 445.1  | 500.8  | 540.6  |
| 17.5° | 304.2  | 303.9  | 295.2  | 294.6  | 302.0  | 309.3  | 338.0  | 379.4  | 438.9  | 506.1  | 555.9  |
| 20°   | 317.8  | 316.8  | 301.7  | 299.0  | 306.8  | 313.6  | 337.3  | 374.8  | 436.6  | 515.1  | 574.5  |
| 22.5° | 335.9  | 334.1  | 310.6  | 307.7  | 316.1  | 323.1  | 346.3  | 379.3  | 438.6  | 527.1  | 596.2  |
| 25°   | 358.3  | 355.7  | 325.7  | 322.6  | 331.1  | 338.2  | 362.3  | 392.1  | 444.7  | 541.7  | 623.7  |
| 27.5° | 383.6  | 379.8  | 350.1  | 341.8  | 351.5  | 358.9  | 383.8  | 411.8  | 454.2  | 557.2  | 657.4  |
| 30°   | 407.5  | 402.6  | 375.7  | 362.1  | 373.9  | 382.2  | 406.9  | 435.2  | 469.5  | 581.1  | 703.6  |
| 32.5° | 431.5  | 426.0  | 398.5  | 382.3  | 393.0  | 402.0  | 430.8  | 467.5  | 498.3  | 617.5  | 764.9  |
| 35°   | 486.7  | 481.0  | 447.3  | 420.5  | 420.3  | 425.4  | 464.2  | 511.6  | 536.4  | 668.3  | 838.1  |
| 37.5° | 579.8  | 576.4  | 544.3  | 493.5  | 479.9  | 474.3  | 509.7  | 564.3  | 591.0  | 738.1  | 920.7  |
| 40°   | 681.6  | 678.7  | 642.7  | 596.7  | 576.0  | 562.1  | 575.1  | 637.6  | 668.3  | 823.5  | 1005.0 |
| 42.5° | 796.6  | 782.8  | 718.6  | 704.9  | 686.4  | 675.8  | 664.1  | 728.0  | 763.2  | 916.4  | 1088.6 |
| 45°   | 901.0  | 877.9  | 794.6  | 773.7  | 769.5  | 772.1  | 778.6  | 849.5  | 869.9  | 1026.7 | 1171.9 |
| 47.5° | 963.2  | 945.0  | 881.1  | 861.1  | 859.9  | 877.2  | 926.3  | 986.8  | 976.2  | 1122.9 | 1245.3 |
| 50°   | 1022.4 | 1005.9 | 952.8  | 957.7  | 963.1  | 986.5  | 1094.0 | 1128.0 | 1073.3 | 1210.1 | 1312.5 |
| 52.5° | 1070.3 | 1045.1 | 1017.3 | 1044.9 | 1071.3 | 1109.0 | 1267.0 | 1254.7 | 1142.1 | 1279.6 | 1370.1 |
| 55°   | 1097.9 | 1086.5 | 1099.9 | 1127.7 | 1177.2 | 1238.5 | 1430.3 | 1360.1 | 1192.5 | 1342.9 | 1408.4 |
| 57.5° | 1199.1 | 1176.7 | 1203.5 | 1227.5 | 1292.0 | 1377.8 | 1570.2 | 1438.7 | 1228.8 | 1382.1 | 1417.3 |
| 60°   | 1321.7 | 1303.6 | 1319.3 | 1359.3 | 1446.3 | 1547.2 | 1700.9 | 1502.8 | 1247.7 | 1407.3 | 1394.4 |
| 62.5° | 1516.6 | 1492.8 | 1482.9 | 1527.6 | 1643.1 | 1753.1 | 1800.2 | 1547.2 | 1243.5 | 1396.2 | 1316.0 |
| 65°   | 1777.9 | 1753.1 | 1709.2 | 1749.7 | 1896.5 | 1974.2 | 1911.1 | 1556.6 | 1214.6 | 1306.0 | 1117.8 |
| 67.5° | 2045.5 | 2027.5 | 1989.9 | 2058.2 | 2190.7 | 2215.7 | 2028.4 | 1533.7 | 1121.5 | 1059.0 | 789.8  |
| 70°   | 2222.2 | 2214.6 | 2239.0 | 2390.0 | 2508.2 | 2501.0 | 2136.0 | 1410.9 | 874.1  | 651.2  | 390.7  |
| 72.5° | 2094.8 | 2131.5 | 2312.1 | 2585.9 | 2730.2 | 2671.2 | 2080.8 | 1083.4 | 499.6  | 250.5  | 113.0  |
| 73°   | 1989.2 | 2036.2 | 2279.2 | 2593.3 | 2747.8 | 2683.1 | 2034.3 | 994.5  | 425.8  | 197.7  | 85.6   |
| 75°   | 1383.9 | 1441.6 | 1886.9 | 2415.2 | 2665.9 | 2556.4 | 1695.7 | 608.7  | 197.3  | 87.7   | 34.6   |
| 77.5° | 671.9  | 714.6  | 1039.0 | 1745.0 | 2073.3 | 1997.3 | 1055.6 | 226.8  | 89.1   | 54.8   | 15.9   |
| 80°   | 250.8  | 278.9  | 451.0  | 888.1  | 1198.1 | 1229.5 | 464.3  | 85.8   | 59.3   | 44.1   | 8.1    |
| 82.5° | 65.7   | 73.2   | 166.3  | 396.0  | 614.0  | 642.7  | 146.4  | 43.3   | 43.4   | 36.3   | 4.9    |
| 85°   | 21.0   | 24.0   | 51.9   | 177.8  | 289.3  | 254.0  | 38.2   | 21.0   | 31.5   | 27.0   | 2.7    |
| 87.5° | 2.6    | 3.3    | 16.5   | 41.8   | 63.8   | 35.4   | 5.9    | 6.2    | 13.5   | 15.0   | 1.6    |
| 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: P385450

CATALOG NUMBER: GWC-SA1A-727-U-T4FT-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 508.6  | 508.6 | 508.6 | 508.6 | 508.6 | 508.6 | 508.6 | 508.6 | 508.6 | 508.6 | 508.6 |
| 2.5°  | 509.7  | 509.0 | 509.2 | 505.4 | 502.9 | 498.0 | 493.0 | 490.6 | 488.2 | 487.2 | 488.2 |
| 5°    | 512.3  | 511.0 | 507.3 | 495.7 | 483.4 | 467.5 | 452.6 | 441.3 | 427.1 | 423.2 | 427.3 |
| 7.5°  | 516.4  | 513.8 | 502.8 | 479.2 | 451.9 | 421.5 | 387.4 | 362.5 | 342.1 | 328.9 | 333.7 |
| 10°   | 522.3  | 517.4 | 495.3 | 455.2 | 406.3 | 352.5 | 304.1 | 266.3 | 239.5 | 228.5 | 228.1 |
| 12.5° | 532.3  | 523.1 | 486.0 | 424.0 | 350.6 | 278.9 | 215.4 | 174.4 | 152.7 | 138.7 | 138.4 |
| 15°   | 543.3  | 529.7 | 474.3 | 386.5 | 285.8 | 199.8 | 138.7 | 107.6 | 93.6  | 89.1  | 88.5  |
| 17.5° | 556.8  | 537.4 | 459.1 | 340.4 | 218.0 | 132.4 | 90.6  | 81.6  | 81.0  | 80.6  | 80.6  |
| 20°   | 573.7  | 546.5 | 439.6 | 287.6 | 154.6 | 88.4  | 77.0  | 77.5  | 77.8  | 77.2  | 77.4  |
| 22.5° | 593.4  | 555.7 | 416.3 | 230.9 | 104.6 | 73.9  | 73.6  | 74.3  | 74.6  | 74.3  | 74.5  |
| 25°   | 616.2  | 566.4 | 387.9 | 171.4 | 75.5  | 70.2  | 70.9  | 71.9  | 72.6  | 72.6  | 72.6  |
| 27.5° | 644.6  | 579.5 | 353.8 | 119.6 | 65.2  | 66.2  | 68.3  | 70.2  | 71.2  | 71.5  | 71.5  |
| 30°   | 681.4  | 595.7 | 312.9 | 82.0  | 59.3  | 61.0  | 64.8  | 68.4  | 70.3  | 70.6  | 70.7  |
| 32.5° | 728.0  | 613.9 | 265.4 | 60.6  | 54.2  | 55.5  | 59.6  | 65.7  | 69.3  | 69.9  | 69.9  |
| 35°   | 781.4  | 635.0 | 214.4 | 52.8  | 50.6  | 51.1  | 54.2  | 61.2  | 67.6  | 69.1  | 69.3  |
| 37.5° | 839.8  | 655.8 | 163.0 | 49.3  | 47.6  | 47.6  | 49.9  | 55.8  | 63.4  | 68.3  | 68.9  |
| 40°   | 894.4  | 668.4 | 114.3 | 46.6  | 44.8  | 44.8  | 46.9  | 51.2  | 58.3  | 65.7  | 67.3  |
| 42.5° | 944.7  | 672.8 | 79.6  | 44.0  | 42.2  | 42.7  | 44.4  | 47.9  | 53.2  | 60.6  | 62.1  |
| 45°   | 996.5  | 672.0 | 58.0  | 40.9  | 39.6  | 40.9  | 42.2  | 44.8  | 48.7  | 52.9  | 53.2  |
| 47.5° | 1035.5 | 666.0 | 46.0  | 38.0  | 37.2  | 38.9  | 40.1  | 41.8  | 44.0  | 43.7  | 43.7  |
| 50°   | 1072.1 | 651.2 | 37.0  | 34.1  | 34.7  | 36.7  | 37.3  | 37.9  | 38.0  | 35.3  | 35.0  |
| 52.5° | 1099.9 | 628.2 | 29.7  | 29.9  | 32.3  | 34.3  | 33.7  | 32.8  | 31.4  | 28.1  | 27.5  |
| 55°   | 1109.2 | 583.9 | 23.3  | 24.7  | 28.6  | 31.2  | 29.1  | 27.2  | 24.4  | 21.7  | 21.1  |
| 57.5° | 1092.4 | 526.8 | 18.9  | 19.2  | 24.2  | 26.3  | 23.9  | 21.7  | 18.7  | 16.3  | 15.9  |
| 60°   | 1056.8 | 463.3 | 15.6  | 14.5  | 18.7  | 20.5  | 18.9  | 16.8  | 14.0  | 12.3  | 12.2  |
| 62.5° | 986.2  | 395.6 | 12.9  | 11.3  | 14.2  | 15.8  | 14.8  | 13.2  | 10.8  | 9.7   | 9.5   |
| 65°   | 837.8  | 316.5 | 10.4  | 9.1   | 11.0  | 12.3  | 11.4  | 10.3  | 8.5   | 7.7   | 7.5   |
| 67.5° | 584.8  | 213.9 | 8.5   | 7.5   | 8.7   | 9.7   | 9.0   | 8.4   | 6.8   | 6.7   | 6.8   |
| 70°   | 282.1  | 103.1 | 7.1   | 6.1   | 6.8   | 7.5   | 7.2   | 6.8   | 6.5   | 7.5   | 8.7   |
| 72.5° | 80.9   | 34.6  | 5.6   | 5.1   | 5.5   | 5.9   | 6.2   | 6.1   | 7.1   | 9.1   | 10.6  |
| 73°   | 62.2   | 27.9  | 5.4   | 4.8   | 5.2   | 5.8   | 6.1   | 5.9   | 7.2   | 9.3   | 10.6  |
| 75°   | 26.6   | 13.5  | 4.1   | 3.9   | 4.3   | 5.1   | 5.4   | 5.4   | 7.2   | 9.4   | 10.1  |
| 77.5° | 12.0   | 7.2   | 2.6   | 3.0   | 3.8   | 4.1   | 4.5   | 4.5   | 5.8   | 7.2   | 7.2   |
| 80°   | 6.8    | 3.9   | 2.0   | 2.3   | 2.7   | 2.7   | 2.7   | 2.5   | 2.6   | 2.9   | 3.2   |
| 82.5° | 4.3    | 2.6   | 1.6   | 1.9   | 1.7   | 1.4   | 1.2   | 1.2   | 1.0   | 1.2   | 1.4   |
| 85°   | 2.5    | 1.4   | 1.4   | 1.2   | 0.7   | 0.6   | 0.7   | 0.6   | 0.1   | 0.0   | 0.1   |
| 87.5° | 1.4    | 0.9   | 0.4   | 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

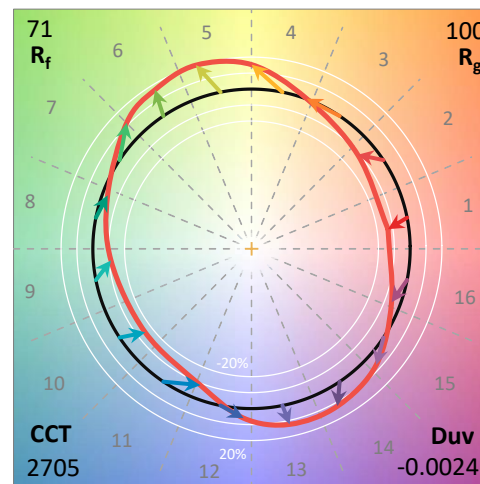
### Test Information

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

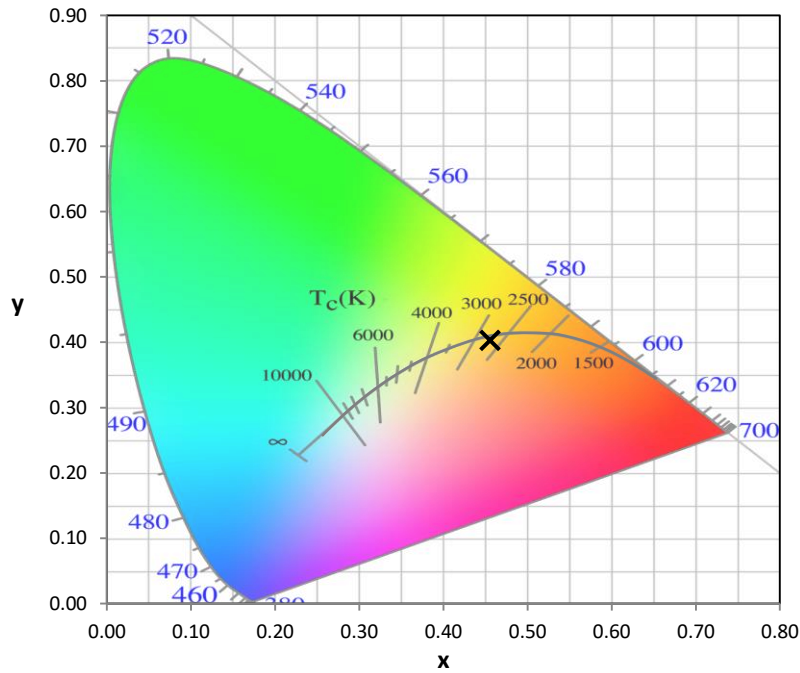
Stabilization Time: 177M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/34%  
 Sphere Temperature (°C): 24.7

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

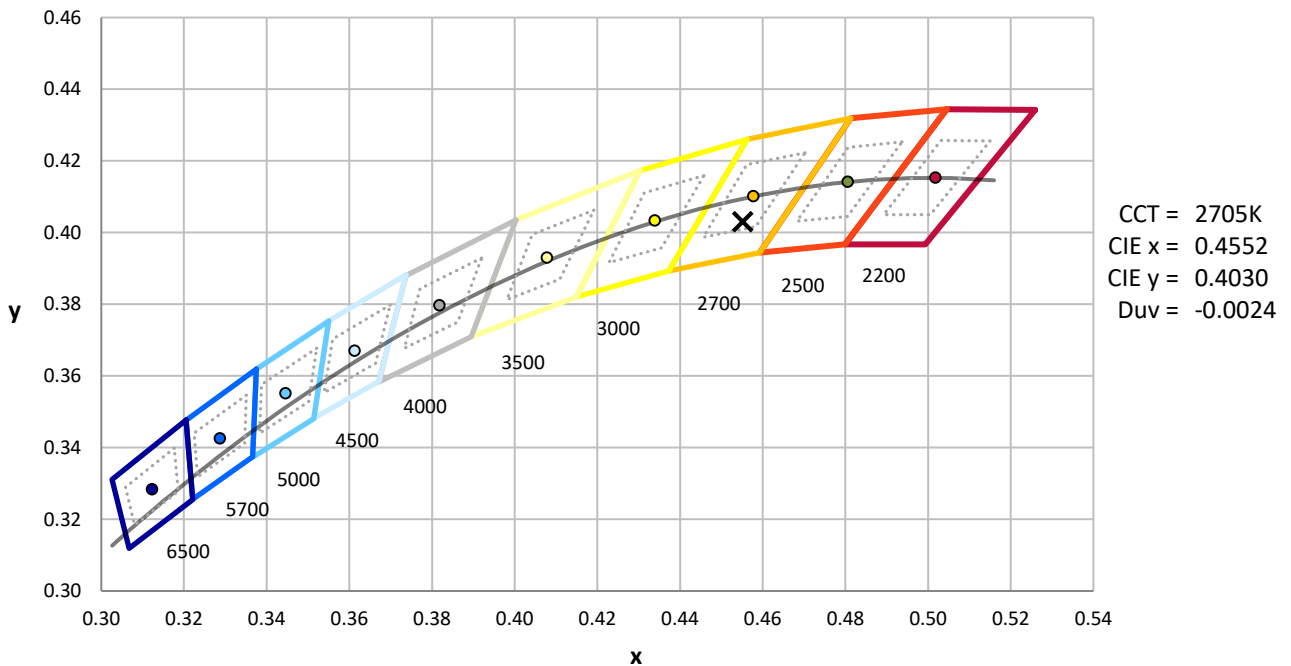
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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**



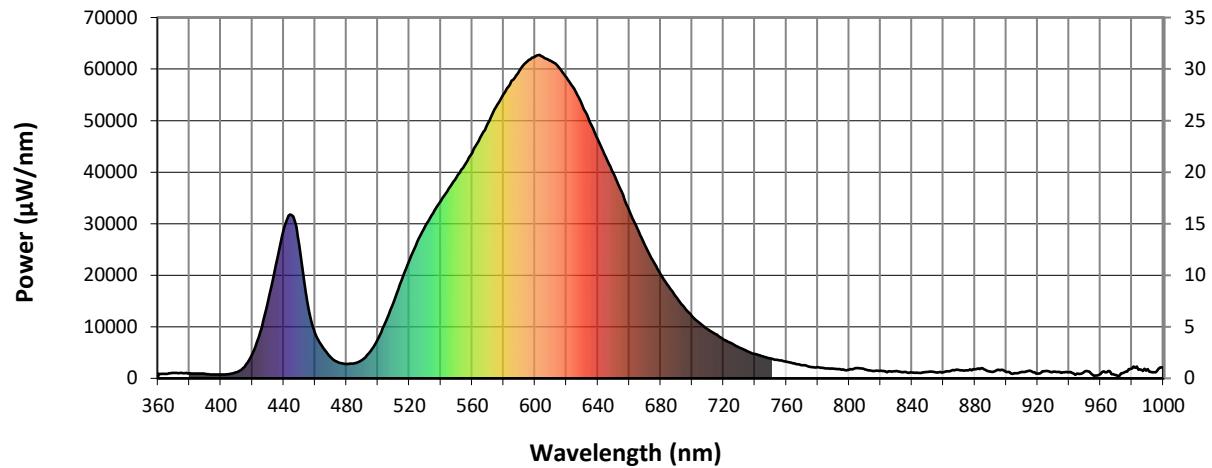
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

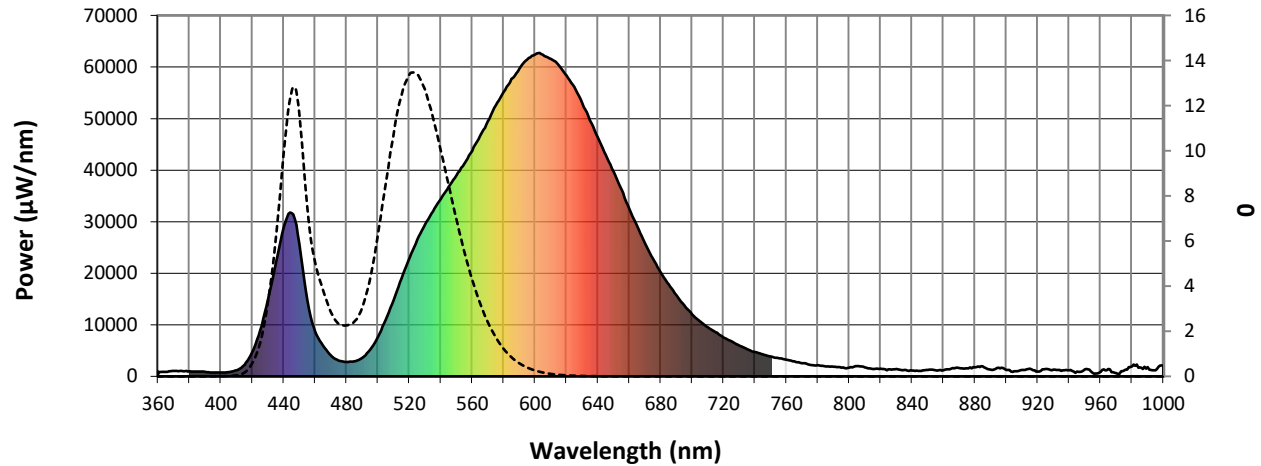


#####

| 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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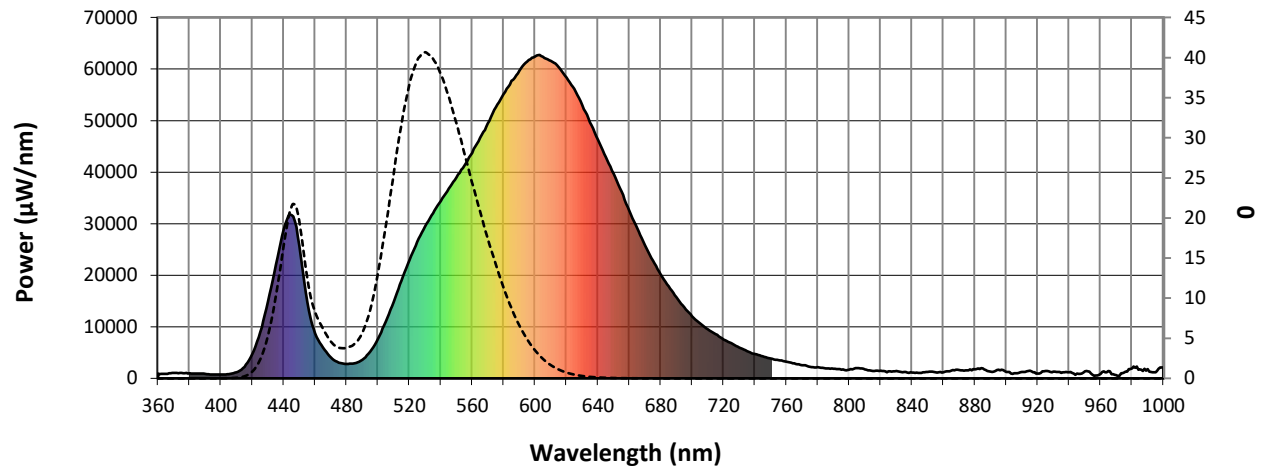
### Scotopic Flux vs. Wavelength


**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

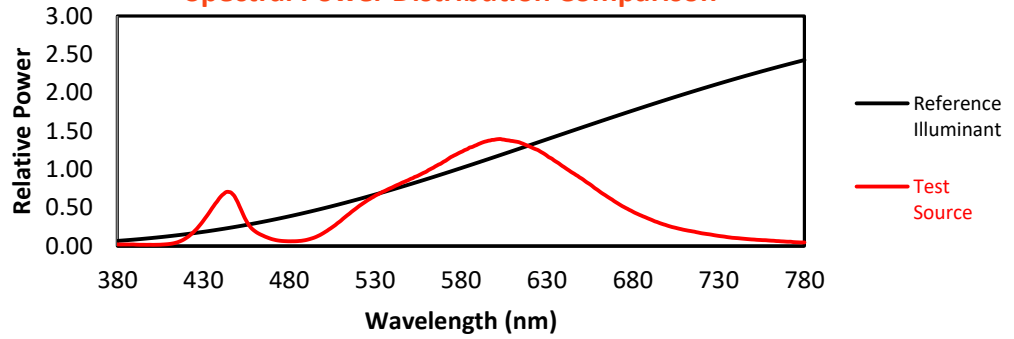
S/P: 1.07

| 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              |           |                  |                  |

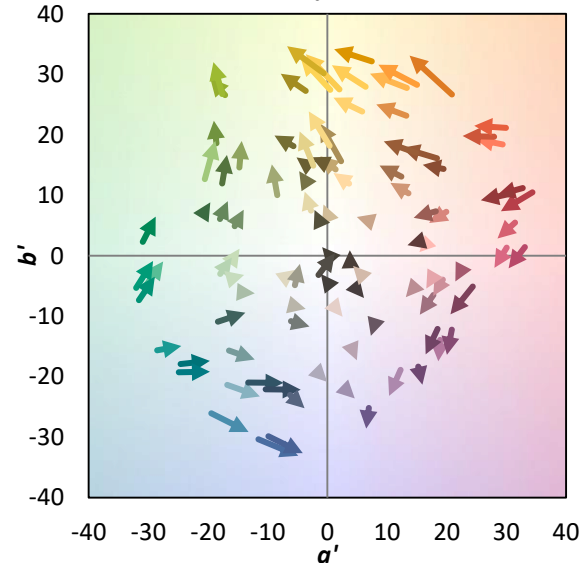
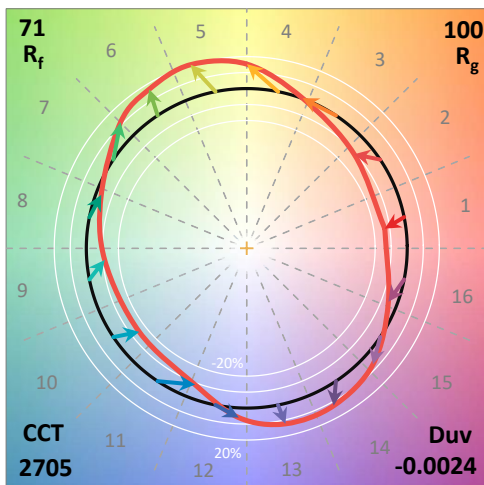
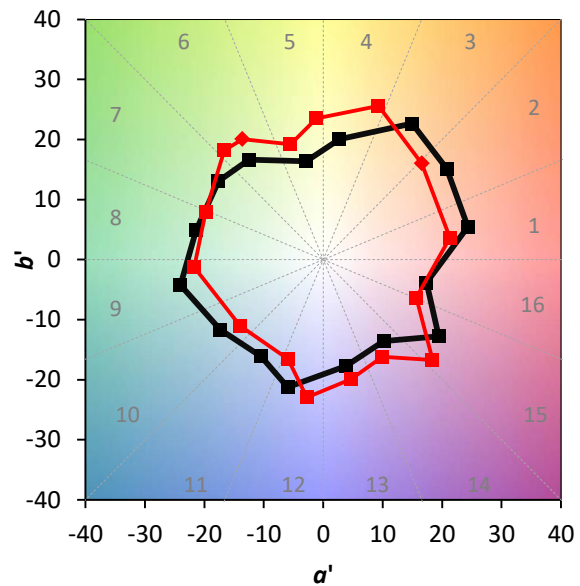
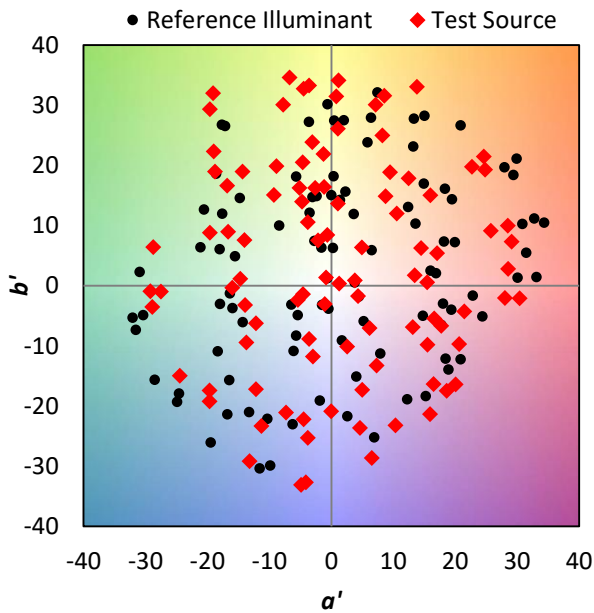
### Summary

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

### Spectral Power Distribution Comparison



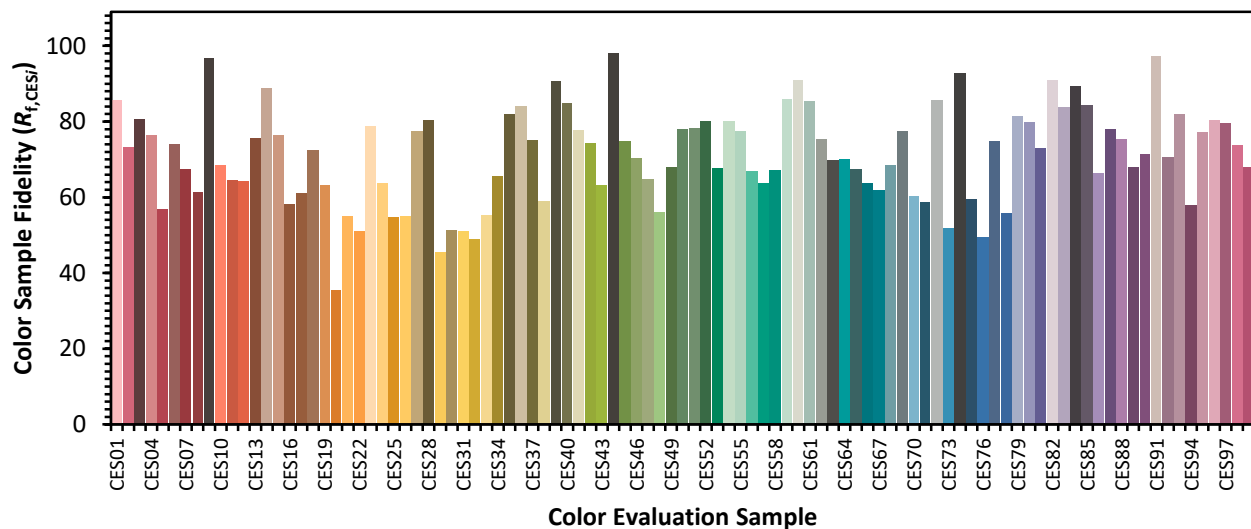
### Color Vector Graphics

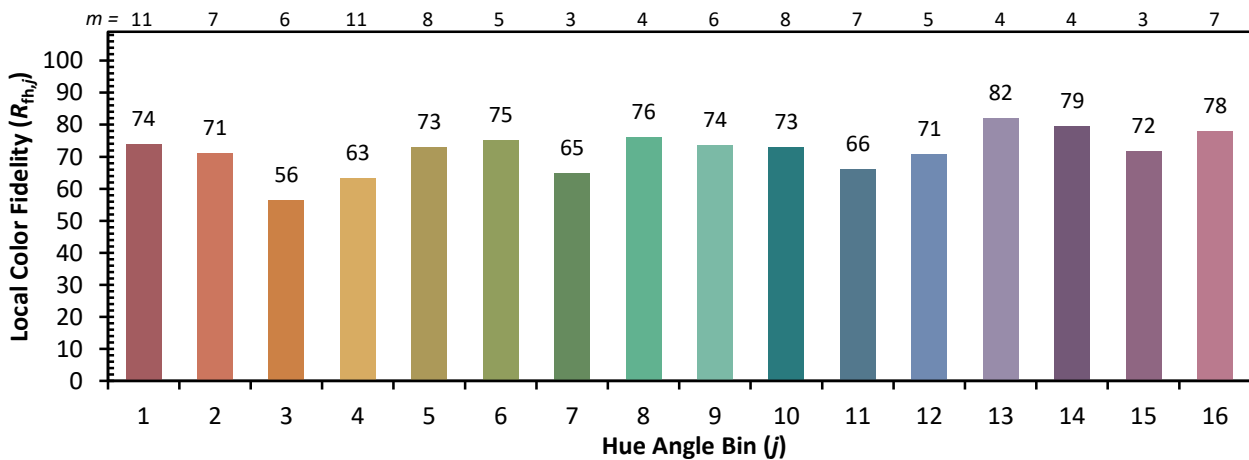
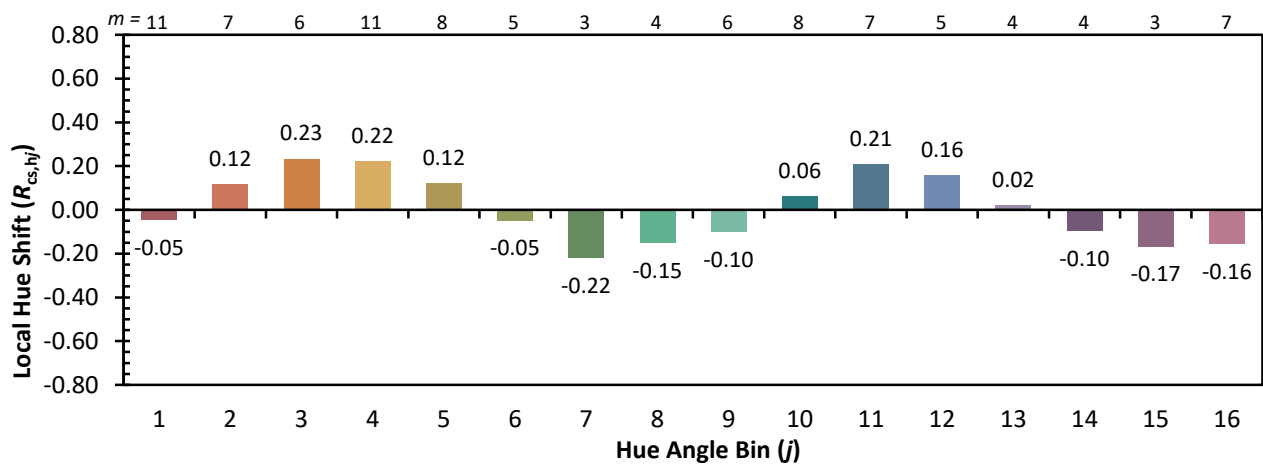
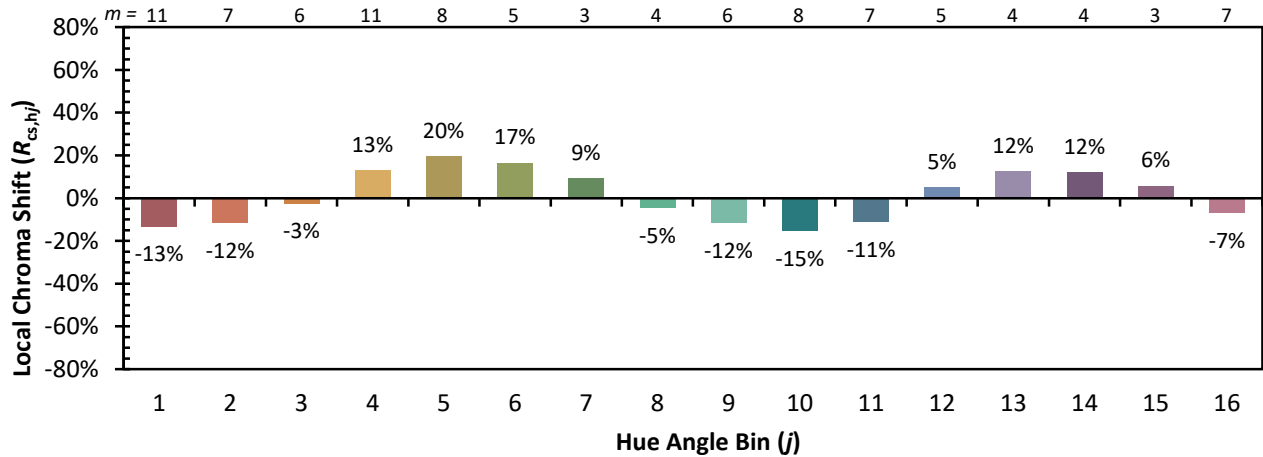


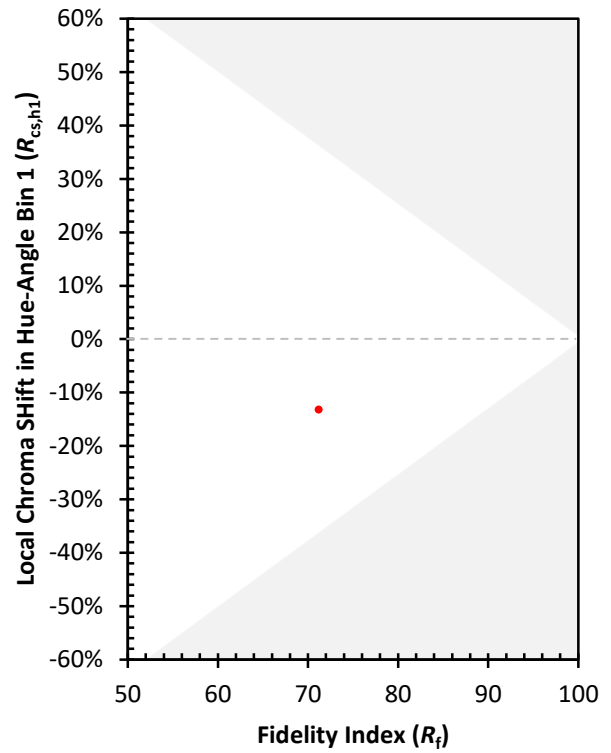
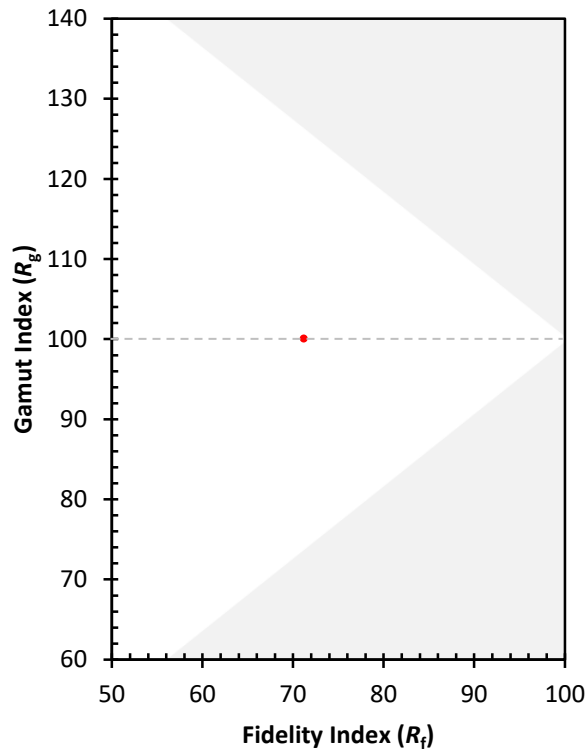


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)