

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: P385722

Luminaire Tested: **GWC-SA1B-735-U-T2-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P385722  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-13)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GWC-SA1B-735-U-T2-HSS  
Description: GALLEON WALL LUMINAIRE  
(1) 70 CRI, 3500K, 800mA LIGHTSQUARE WITH 16 LEDS AND TYPE II OPTICS WITH  
HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4078.8 lumens  
Efficiency: N/A  
Efficacy: 92.7 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B0 - U0 - G1

Input Watts (W): 44  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

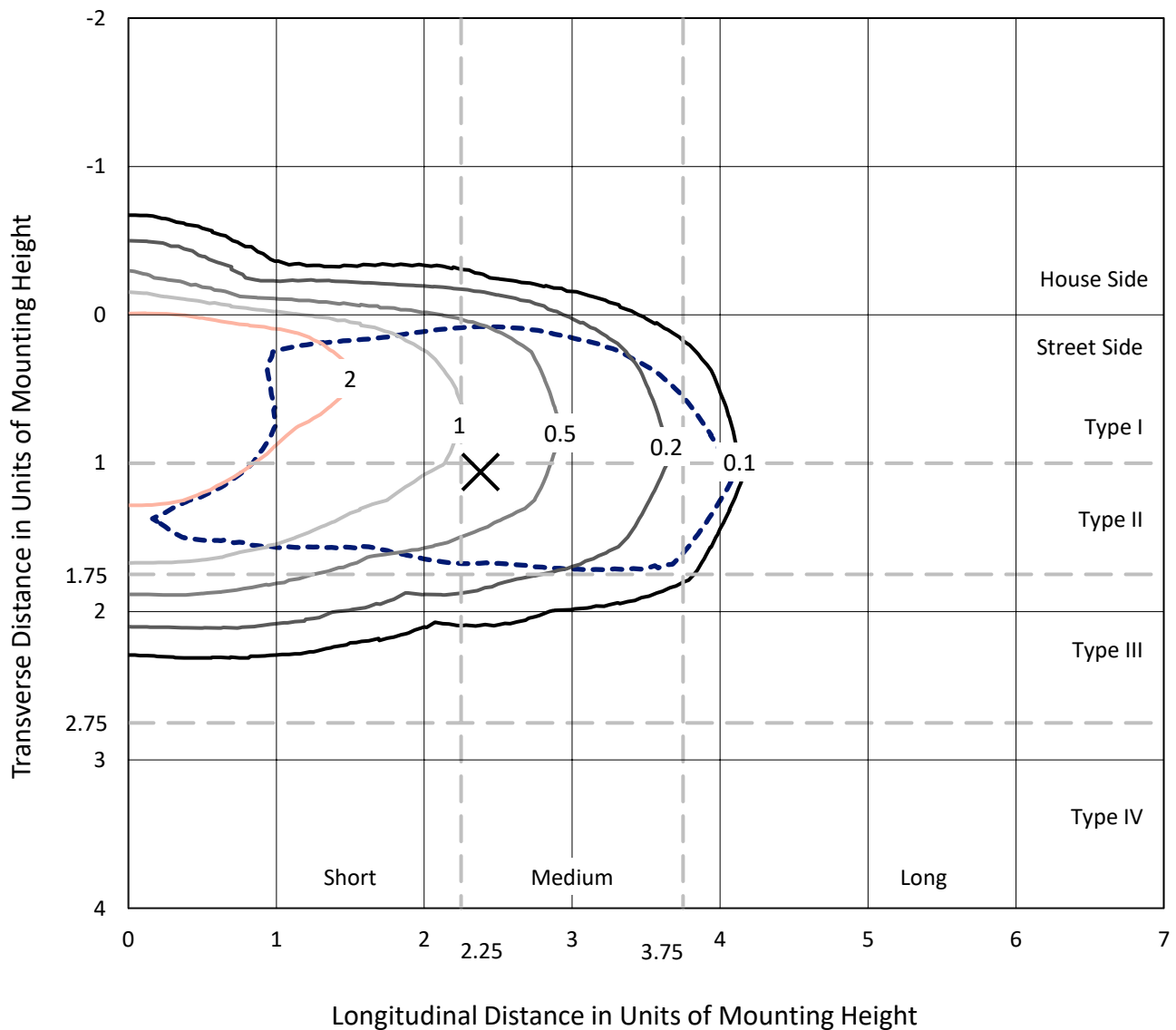


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

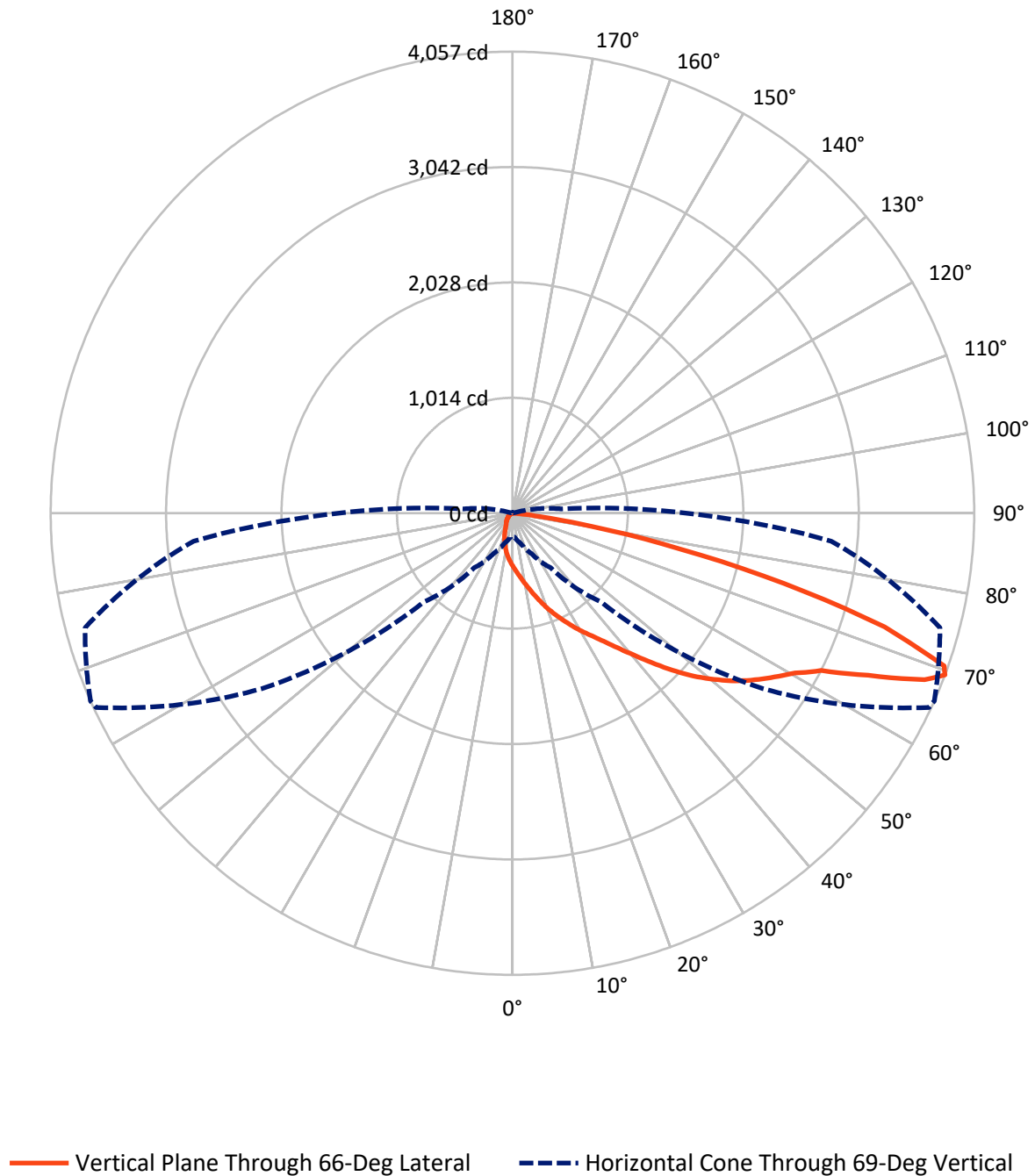


Based on 15 foot mounting height. Maximum calculated value = 3.4 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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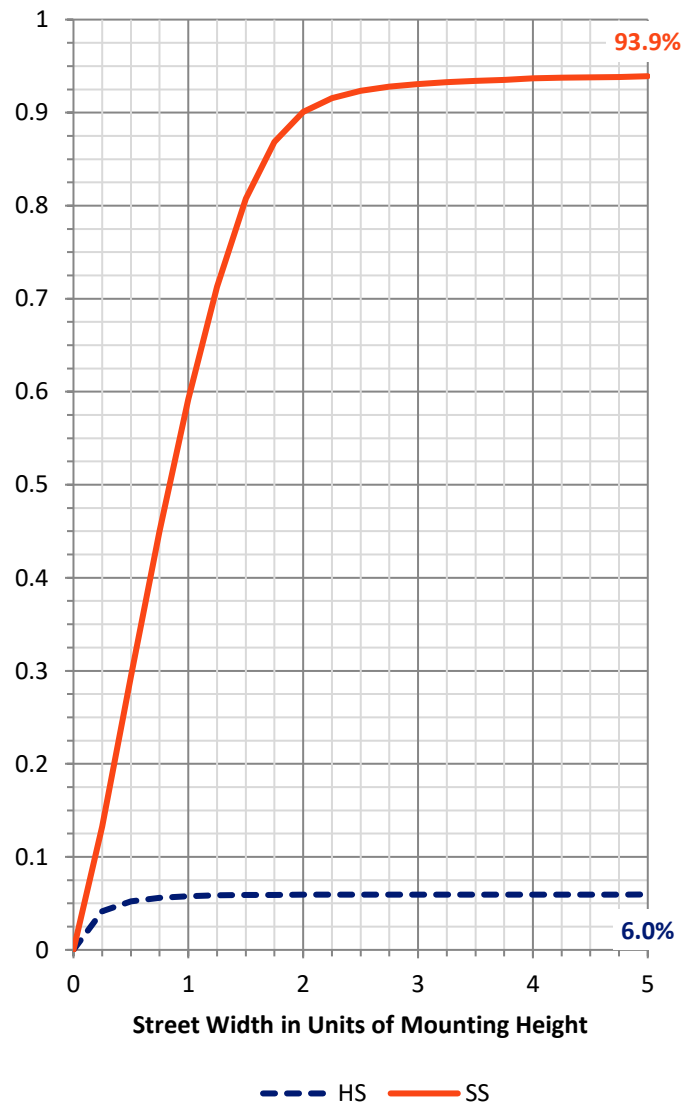
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 244.7    | 0.0    | 244.7  |
|                    | % Fixture | 6.0      | 0.0    | 6.0    |
| <b>Street Side</b> | Lumens    | 3834.2   | 0.0    | 3834.2 |
|                    | % Fixture | 94.0     | 0.0    | 94.0   |
| <b>Total</b>       | Lumens    | 4078.8   | 0.0    | 4078.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 44.9   | 1.1       |
| 10°-20°   | 133.5  | 3.3       |
| 20°-30°   | 232.5  | 5.7       |
| 30°-40°   | 408.0  | 10.0      |
| 40°-50°   | 682.9  | 16.7      |
| 50°-60°   | 1003.8 | 24.6      |
| 60°-70°   | 1030.7 | 25.3      |
| 70°-80°   | 508.8  | 12.5      |
| 80°-90°   | 33.6   | 0.8       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 4078.8 | 100.0     |
| 0°-180°   | 4078.8 | 100.0     |

**Coefficient of Utilization**



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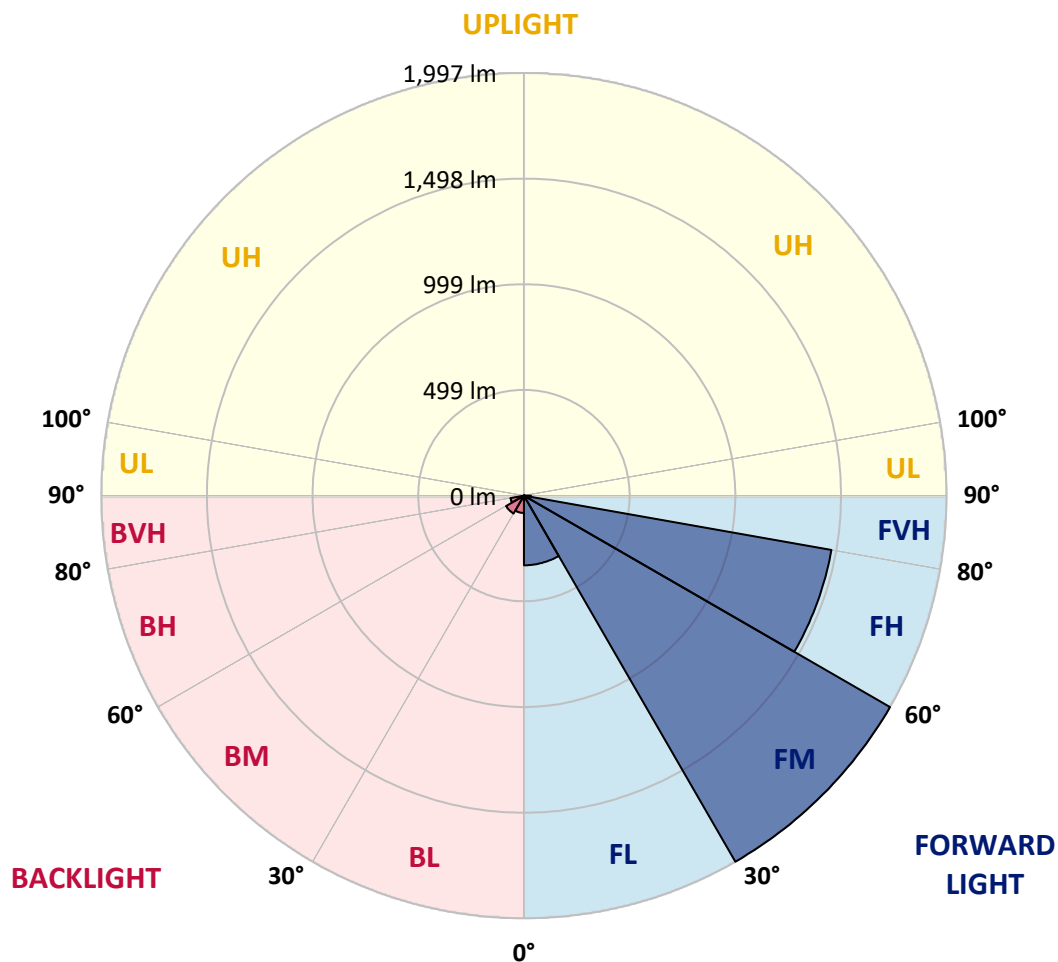
CATALOG NUMBER: GWC-SA1B-735-U-T2-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 329.1  | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 1997.2 | 49.0      |                         |      |         |
| FH   | (60°-80°)   | 1475.0 | 36.2      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 32.8   | 0.8       |                         |      | G1/100  |
| BL   | (0°-30°)    | 81.8   | 2.0       | B0/110                  |      |         |
| BM   | (30°-60°)   | 97.6   | 2.4       | B0/220                  |      |         |
| BH   | (60°-80°)   | 64.5   | 1.6       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.8    | 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 II Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 66°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 464.2  | 464.2  | 464.2  | 464.2  | 464.2  | 464.2  | 464.2  | 464.2  | 464.2  | 464.2  | 464.2  |
| 2.5°  | 546.4  | 544.0  | 543.1  | 538.7  | 531.4  | 525.8  | 515.0  | 502.4  | 500.0  | 487.8  | 472.9  |
| 5°    | 617.3  | 615.3  | 614.0  | 608.0  | 600.4  | 586.3  | 566.5  | 543.1  | 538.6  | 515.4  | 485.5  |
| 7.5°  | 666.6  | 670.2  | 670.2  | 666.2  | 656.7  | 646.1  | 621.9  | 589.9  | 584.3  | 548.7  | 502.4  |
| 10°   | 695.5  | 699.8  | 703.0  | 706.3  | 705.0  | 700.7  | 677.9  | 641.8  | 635.0  | 587.8  | 521.9  |
| 12.5° | 698.3  | 702.5  | 711.8  | 725.5  | 738.9  | 748.6  | 734.2  | 699.4  | 691.7  | 633.2  | 545.1  |
| 15°   | 683.1  | 687.5  | 701.9  | 728.6  | 761.0  | 789.3  | 793.9  | 763.2  | 755.2  | 687.2  | 574.3  |
| 17.5° | 656.7  | 659.6  | 680.2  | 717.2  | 768.0  | 819.9  | 848.0  | 831.6  | 824.1  | 749.0  | 606.6  |
| 20°   | 637.2  | 639.4  | 657.3  | 697.0  | 763.7  | 839.1  | 899.1  | 904.2  | 896.4  | 815.2  | 641.6  |
| 22.5° | 670.7  | 674.6  | 675.1  | 693.9  | 752.1  | 848.6  | 944.1  | 975.7  | 969.8  | 885.6  | 676.2  |
| 25°   | 762.3  | 766.8  | 752.1  | 740.4  | 761.9  | 852.8  | 982.6  | 1048.8 | 1044.2 | 961.3  | 710.8  |
| 27.5° | 883.4  | 888.1  | 869.1  | 834.4  | 813.7  | 868.9  | 1016.9 | 1123.2 | 1123.0 | 1041.5 | 748.2  |
| 30°   | 1002.3 | 1007.0 | 987.7  | 953.0  | 905.3  | 914.4  | 1046.6 | 1201.1 | 1202.3 | 1124.3 | 787.9  |
| 32.5° | 1127.2 | 1132.9 | 1113.0 | 1068.5 | 1018.7 | 993.0  | 1088.2 | 1279.5 | 1286.0 | 1220.2 | 832.7  |
| 35°   | 1268.9 | 1269.7 | 1241.6 | 1194.9 | 1137.6 | 1098.2 | 1155.1 | 1367.2 | 1382.9 | 1338.9 | 889.4  |
| 37.5° | 1408.1 | 1413.7 | 1390.6 | 1317.0 | 1264.3 | 1219.7 | 1254.5 | 1476.8 | 1499.1 | 1484.0 | 963.6  |
| 40°   | 1511.1 | 1522.9 | 1519.7 | 1440.2 | 1390.2 | 1358.5 | 1377.8 | 1607.2 | 1635.5 | 1653.0 | 1057.2 |
| 42.5° | 1575.8 | 1584.8 | 1599.9 | 1552.0 | 1506.7 | 1511.9 | 1523.5 | 1759.1 | 1794.0 | 1845.5 | 1164.8 |
| 45°   | 1650.0 | 1654.3 | 1666.9 | 1645.7 | 1615.2 | 1667.9 | 1678.1 | 1930.2 | 1966.8 | 2052.6 | 1284.1 |
| 47.5° | 1740.7 | 1750.7 | 1754.2 | 1734.9 | 1721.0 | 1805.8 | 1827.1 | 2085.7 | 2137.1 | 2274.5 | 1410.4 |
| 50°   | 1856.1 | 1858.9 | 1864.9 | 1852.3 | 1838.3 | 1924.3 | 1960.8 | 2249.1 | 2295.8 | 2497.0 | 1535.0 |
| 52.5° | 1969.1 | 1978.8 | 1999.7 | 1991.8 | 1986.2 | 2025.3 | 2079.9 | 2396.3 | 2448.4 | 2682.6 | 1659.3 |
| 55°   | 2001.7 | 2010.0 | 2082.3 | 2131.7 | 2177.3 | 2149.7 | 2193.9 | 2528.2 | 2584.6 | 2848.4 | 1779.0 |
| 57.5° | 1871.6 | 1888.6 | 2013.7 | 2142.3 | 2332.0 | 2343.0 | 2350.4 | 2663.7 | 2714.2 | 2975.5 | 1903.6 |
| 60°   | 1543.0 | 1546.3 | 1751.8 | 1972.4 | 2306.4 | 2511.8 | 2579.0 | 2809.2 | 2851.5 | 3093.9 | 2052.8 |
| 62.5° | 981.5  | 1015.0 | 1240.3 | 1551.8 | 2035.9 | 2487.3 | 2855.5 | 3029.3 | 3044.8 | 3235.9 | 2266.7 |
| 65°   | 467.4  | 489.1  | 651.6  | 958.7  | 1474.7 | 2174.9 | 3046.3 | 3427.4 | 3434.3 | 3517.5 | 2552.4 |
| 67.5° | 258.8  | 269.3  | 346.6  | 516.1  | 862.1  | 1538.1 | 2969.1 | 3898.9 | 3905.4 | 3804.9 | 2803.2 |
| 69°   | 202.4  | 211.4  | 272.2  | 389.0  | 584.5  | 1105.5 | 2686.9 | 4037.0 | 4056.6 | 3887.3 | 2812.1 |
| 70°   | 171.8  | 180.6  | 234.4  | 328.6  | 470.0  | 854.2  | 2391.6 | 4002.8 | 4023.4 | 3879.5 | 2745.6 |
| 72.5° | 105.2  | 110.2  | 156.1  | 231.3  | 315.0  | 429.7  | 1474.8 | 3385.1 | 3420.1 | 3558.7 | 2359.7 |
| 75°   | 70.9   | 73.6   | 97.6   | 159.6  | 225.3  | 221.2  | 766.3  | 2386.1 | 2462.0 | 2768.3 | 1742.9 |
| 77.5° | 50.7   | 53.3   | 65.5   | 103.2  | 157.9  | 146.1  | 347.0  | 1482.8 | 1499.1 | 1660.3 | 950.5  |
| 80°   | 28.8   | 31.2   | 46.3   | 61.4   | 107.1  | 97.4   | 137.9  | 708.3  | 716.4  | 712.0  | 317.3  |
| 82.5° | 15.1   | 17.0   | 25.4   | 40.5   | 68.8   | 63.8   | 57.3   | 237.1  | 238.3  | 198.2  | 69.5   |
| 85°   | 2.9    | 3.5    | 12.6   | 27.7   | 35.4   | 27.7   | 23.5   | 55.6   | 56.7   | 50.2   | 17.3   |
| 87.5° | 0.0    | 0.2    | 5.1    | 6.2    | 7.0    | 7.1    | 7.5    | 10.8   | 11.6   | 15.7   | 4.6    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: GWC-SA1B-735-U-T2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 464.2  | 464.2 | 464.2 | 464.2 | 464.2 | 464.2 | 464.2 | 464.2 | 464.2 | 464.2 | 464.2 |
| 2.5°  | 466.3  | 459.4 | 445.9 | 430.4 | 418.5 | 406.7 | 397.4 | 387.7 | 384.2 | 382.4 | 382.2 |
| 5°    | 471.0  | 456.3 | 428.0 | 398.9 | 375.1 | 352.6 | 336.5 | 321.2 | 314.0 | 310.8 | 309.4 |
| 7.5°  | 478.7  | 455.0 | 409.6 | 365.1 | 330.9 | 302.8 | 280.5 | 263.9 | 255.5 | 252.0 | 250.7 |
| 10°   | 487.8  | 453.5 | 388.1 | 329.5 | 285.8 | 256.7 | 234.6 | 218.1 | 209.0 | 205.2 | 203.2 |
| 12.5° | 498.4  | 450.8 | 363.3 | 293.5 | 247.2 | 218.1 | 191.4 | 171.1 | 160.6 | 156.1 | 154.1 |
| 15°   | 511.7  | 448.1 | 337.3 | 259.6 | 213.3 | 177.8 | 148.6 | 134.8 | 132.7 | 131.9 | 132.2 |
| 17.5° | 524.7  | 443.9 | 309.0 | 226.1 | 177.6 | 138.9 | 124.0 | 123.2 | 123.6 | 123.6 | 123.6 |
| 20°   | 536.3  | 434.2 | 278.2 | 197.5 | 143.7 | 117.2 | 114.1 | 112.7 | 111.8 | 111.0 | 110.0 |
| 22.5° | 545.3  | 421.1 | 248.6 | 168.9 | 117.4 | 107.4 | 102.5 | 98.3  | 94.7  | 92.4  | 91.2  |
| 25°   | 551.5  | 403.9 | 221.4 | 141.7 | 105.6 | 97.6  | 89.0  | 81.7  | 76.4  | 73.0  | 71.7  |
| 27.5° | 556.2  | 385.3 | 197.2 | 118.6 | 97.4  | 86.4  | 75.0  | 66.4  | 60.9  | 58.0  | 56.7  |
| 30°   | 559.5  | 364.2 | 175.9 | 104.3 | 88.3  | 74.6  | 62.4  | 54.0  | 50.0  | 48.5  | 47.6  |
| 32.5° | 562.6  | 340.8 | 155.8 | 97.4  | 79.8  | 63.8  | 52.3  | 45.9  | 43.4  | 41.4  | 40.9  |
| 35°   | 570.3  | 319.1 | 136.6 | 90.3  | 71.1  | 54.5  | 44.9  | 40.3  | 37.8  | 36.6  | 36.3  |
| 37.5° | 588.7  | 303.0 | 118.2 | 82.9  | 62.4  | 47.1  | 39.4  | 36.1  | 33.7  | 32.5  | 32.1  |
| 40°   | 618.4  | 294.9 | 102.7 | 75.0  | 53.8  | 41.4  | 35.6  | 32.5  | 30.1  | 28.3  | 27.9  |
| 42.5° | 662.0  | 296.0 | 91.9  | 67.1  | 47.1  | 37.0  | 32.1  | 28.5  | 25.7  | 24.2  | 23.9  |
| 45°   | 714.9  | 304.6 | 84.3  | 59.3  | 41.4  | 33.5  | 28.3  | 24.4  | 21.9  | 20.6  | 20.1  |
| 47.5° | 772.2  | 318.3 | 78.1  | 52.3  | 37.0  | 30.2  | 24.4  | 20.4  | 18.2  | 17.0  | 16.8  |
| 50°   | 832.7  | 331.7 | 71.7  | 45.6  | 33.2  | 27.0  | 20.6  | 16.8  | 15.1  | 14.2  | 13.7  |
| 52.5° | 893.9  | 347.2 | 65.9  | 39.4  | 29.9  | 23.0  | 17.0  | 13.7  | 12.4  | 11.6  | 11.3  |
| 55°   | 959.8  | 358.8 | 60.2  | 34.5  | 26.6  | 19.5  | 14.2  | 11.5  | 10.2  | 9.3   | 9.1   |
| 57.5° | 1037.3 | 376.8 | 54.5  | 29.9  | 22.6  | 16.3  | 11.6  | 9.1   | 8.2   | 7.1   | 7.0   |
| 60°   | 1141.8 | 397.9 | 48.3  | 26.3  | 18.6  | 13.3  | 9.5   | 7.3   | 6.2   | 5.4   | 5.3   |
| 62.5° | 1279.8 | 421.4 | 40.5  | 23.0  | 15.1  | 10.8  | 7.5   | 5.8   | 4.4   | 3.5   | 3.5   |
| 65°   | 1454.7 | 459.6 | 33.2  | 19.4  | 12.4  | 8.9   | 5.8   | 4.2   | 2.5   | 1.5   | 1.5   |
| 67.5° | 1556.9 | 466.1 | 26.8  | 15.9  | 10.1  | 7.5   | 4.9   | 2.9   | 0.8   | 0.2   | 0.0   |
| 69°   | 1524.1 | 428.0 | 22.6  | 13.5  | 8.7   | 7.1   | 4.4   | 2.2   | 0.4   | 0.0   | 0.0   |
| 70°   | 1462.5 | 391.4 | 19.9  | 12.0  | 8.0   | 6.8   | 4.2   | 1.5   | 0.4   | 0.0   | 0.0   |
| 72.5° | 1208.5 | 278.6 | 15.1  | 8.9   | 5.8   | 6.0   | 3.9   | 0.9   | 0.4   | 0.0   | 0.0   |
| 75°   | 880.3  | 169.3 | 10.8  | 6.2   | 3.7   | 4.4   | 2.7   | 0.4   | 0.2   | 0.0   | 0.0   |
| 77.5° | 489.8  | 79.8  | 6.8   | 3.5   | 2.3   | 2.7   | 1.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 159.0  | 21.7  | 3.1   | 2.0   | 1.3   | 1.5   | 0.6   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 29.4   | 6.2   | 1.8   | 0.9   | 0.4   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 6.4    | 2.5   | 0.9   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 2.2    | 0.8   | 0.2   | 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   |



Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-2

Luminaire Tested: CCW-SA-2A-735-U-SL4

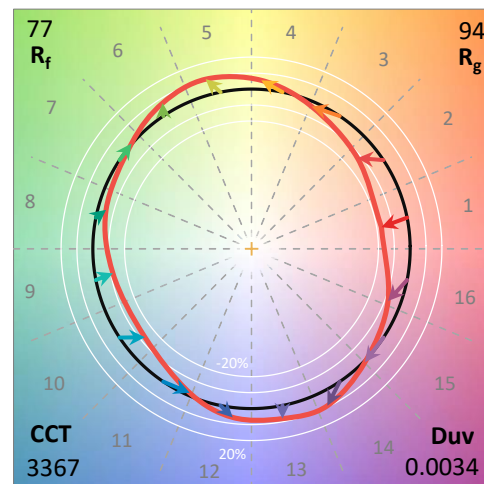
Test Date: 04/26/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/26/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-735-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3367   | CRI (Ra): | 73.3 |      |       |
| CIE u':                   | 0.2376 | R1:       | 69.1 | R9:  | -34.3 |
| CIE v':                   | 0.5184 | R2:       | 81.3 | R10: | 58.3  |
| Duv:                      | 0.0034 | R3:       | 93.4 | R11: | 69.1  |
| CIE x:                    | 0.4168 | R4:       | 71.8 | R12: | 54.2  |
| CIE y:                    | 0.4041 | R5:       | 69.6 | R13: | 71.1  |
| CIE z:                    | 0.1791 | R6:       | 75.4 | R14: | 96.4  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 46.5   |           |      |      |       |
| Rf:                       | 77.2   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

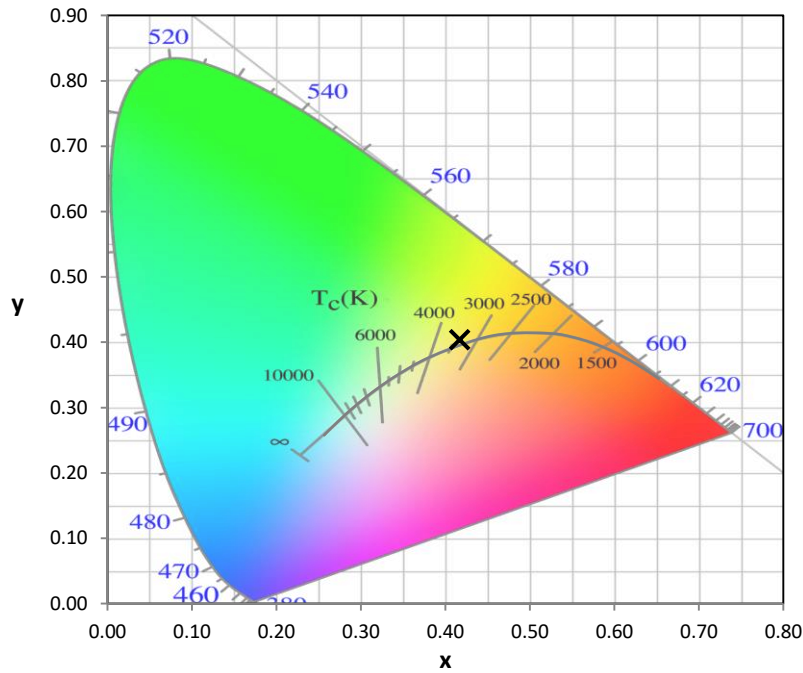
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/38%  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2104-224-2

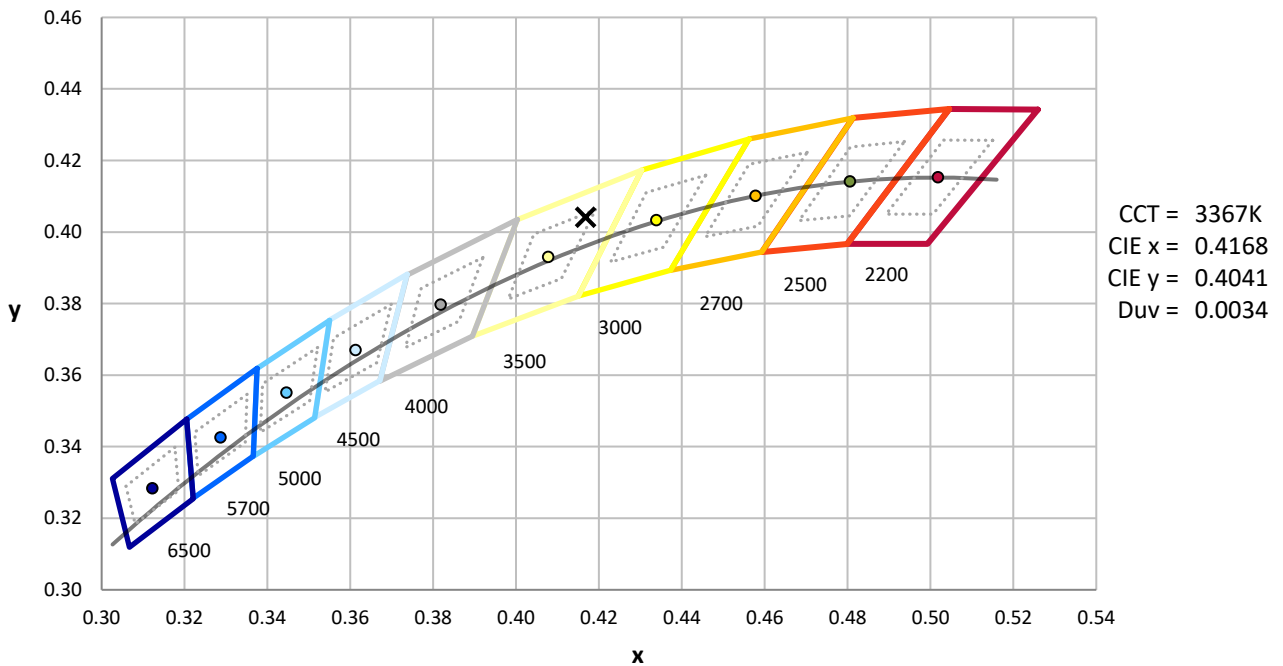
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| 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**



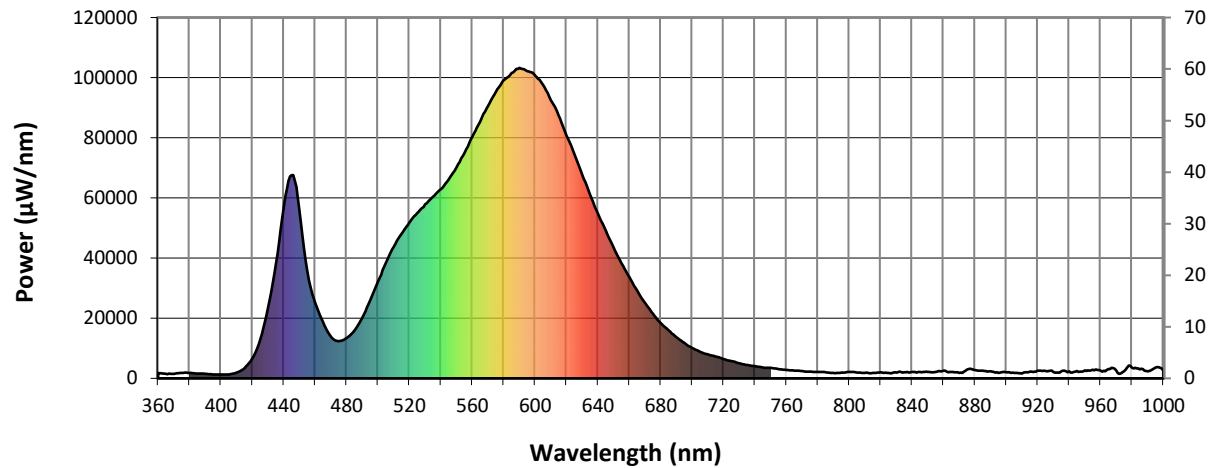
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength

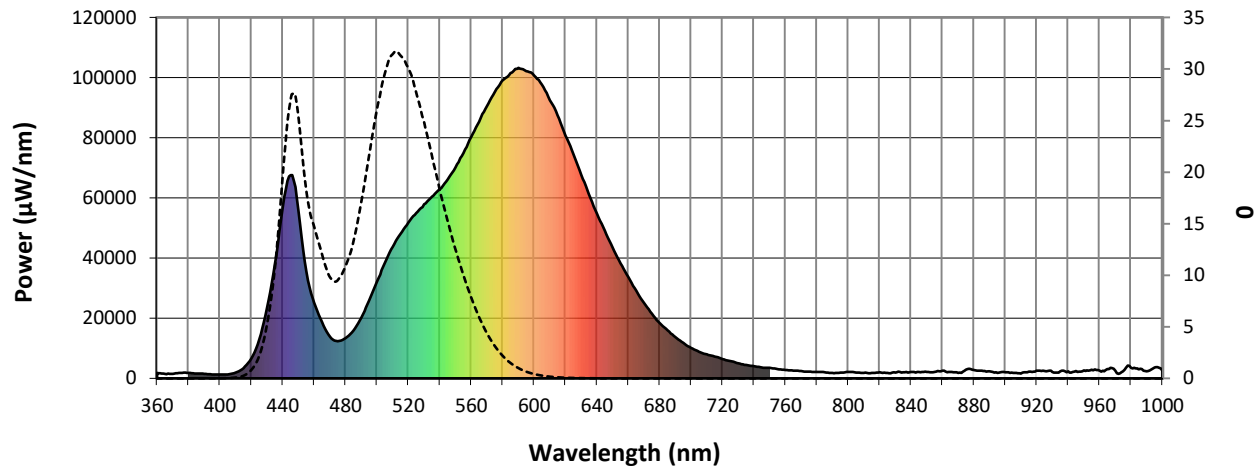


#####

| 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       | 1840             | 0.0              | 490       | 20271            | 2.9              | 620       | 80709            | 21.0             | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 4.7              | 625       | 74695            | 16.5             | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 7.1              | 630       | 67709            | 12.3             | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 10.7             | 635       | 61156            | 9.2              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 15.0             | 640       | 54795            | 6.5              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 19.9             | 645       | 49111            | 4.7              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 25.1             | 650       | 43533            | 3.2              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 29.5             | 655       | 38234            | 2.2              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 34.1             | 660       | 33754            | 1.4              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 37.5             | 665       | 29162            | 0.9              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.0              | 540       | 62857            | 41.0             | 670       | 25117            | 0.5              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.0              | 545       | 66165            | 44.0             | 675       | 21511            | 0.4              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 0.0              | 550       | 70124            | 47.7             | 680       | 18435            | 0.2              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 0.1              | 555       | 74973            | 51.2             | 685       | 16004            | 0.1              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 0.2              | 560       | 80227            | 54.5             | 690       | 13701            | 0.1              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 0.5              | 565       | 85358            | 56.8             | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 0.9              | 570       | 90422            | 58.8             | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 1.4              | 575       | 95259            | 59.3             | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 1.5              | 580       | 99033            | 58.8             | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 1.2              | 585       | 101572           | 56.4             | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 1.0              | 590       | 103264           | 53.4             | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 1.0              | 595       | 102194           | 48.4             | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 0.9              | 600       | 100645           | 43.4             | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 1.0              | 605       | 97644            | 37.8             | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 1.3              | 610       | 92487            | 31.8             | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 1.9              | 615       | 87436            | 26.4             | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



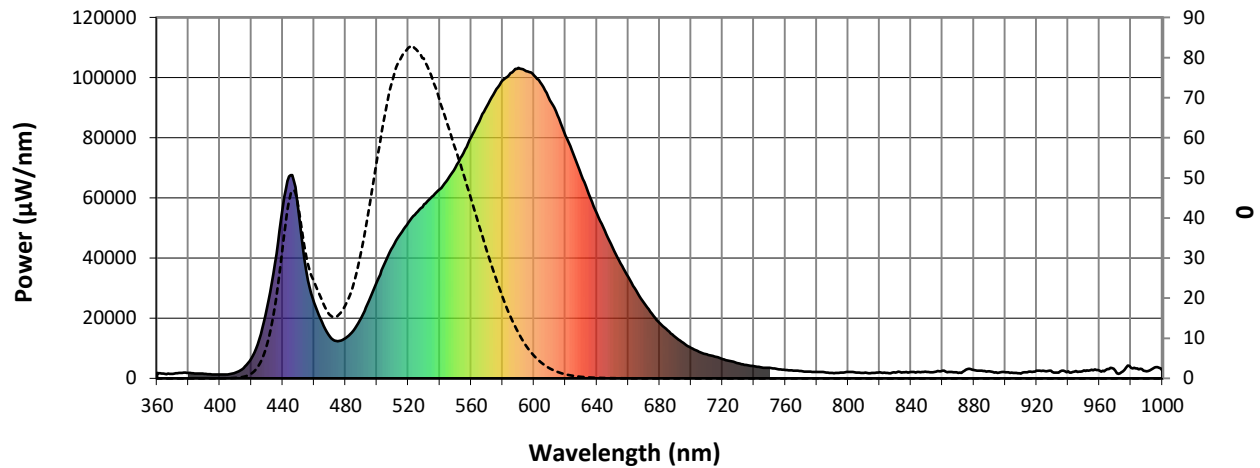
Scotopic Lumens: 7088.7

S/P: 1.35

| 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       | 1840             | 0.0              | 490       | 20271            | 31.2             | 620       | 80709            | 1.0              | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 41.9             | 625       | 74695            | 0.6              | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 53.9             | 630       | 67709            | 0.4              | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 65.2             | 635       | 61156            | 0.2              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 74.1             | 640       | 54795            | 0.1              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 79.5             | 645       | 49111            | 0.1              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 82.4             | 650       | 43533            | 0.1              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 82.1             | 655       | 38234            | 0.0              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 79.8             | 660       | 33754            | 0.0              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 75.3             | 665       | 29162            | 0.0              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.1              | 540       | 62857            | 69.5             | 670       | 25117            | 0.0              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.4              | 545       | 66165            | 63.4             | 675       | 21511            | 0.0              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 1.1              | 550       | 70124            | 57.3             | 680       | 18435            | 0.0              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 3.2              | 555       | 74973            | 51.2             | 685       | 16004            | 0.0              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 8.0              | 560       | 80227            | 44.8             | 690       | 13701            | 0.0              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 17.1             | 565       | 85358            | 38.3             | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 31.7             | 570       | 90422            | 31.9             | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 45.3             | 575       | 95259            | 25.9             | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 43.4             | 580       | 99033            | 20.4             | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 31.1             | 585       | 101572           | 15.5             | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 24.4             | 590       | 103264           | 11.5             | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 19.8             | 595       | 102194           | 8.1              | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 15.9             | 600       | 100645           | 5.7              | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 15.5             | 605       | 97644            | 3.8              | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 18.1             | 610       | 92487            | 2.5              | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 23.0             | 615       | 87436            | 1.6              | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 2621

M/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       | 1840             | 0.0              | 490       | 20271            | 16.9             | 620       | 80709            | 0.1              | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 21.4             | 625       | 74695            | 0.0              | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 25.9             | 630       | 67709            | 0.0              | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 29.4             | 635       | 61156            | 0.0              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 31.4             | 640       | 54795            | 0.0              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 31.3             | 645       | 49111            | 0.0              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 30.2             | 650       | 43533            | 0.0              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 27.8             | 655       | 38234            | 0.0              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 25.0             | 660       | 33754            | 0.0              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 21.7             | 665       | 29162            | 0.0              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.1              | 540       | 62857            | 18.4             | 670       | 25117            | 0.0              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.2              | 545       | 66165            | 15.4             | 675       | 21511            | 0.0              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 0.8              | 550       | 70124            | 12.6             | 680       | 18435            | 0.0              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 2.0              | 555       | 74973            | 10.1             | 685       | 16004            | 0.0              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 4.9              | 560       | 80227            | 7.9              | 690       | 13701            | 0.0              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 10.2             | 565       | 85358            | 6.0              | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 18.9             | 570       | 90422            | 4.4              | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 26.7             | 575       | 95259            | 3.2              | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 25.8             | 580       | 99033            | 2.2              | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 18.6             | 585       | 101572           | 1.5              | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 14.9             | 590       | 103264           | 1.0              | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 12.2             | 595       | 102194           | 0.7              | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 9.9              | 600       | 100645           | 0.4              | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 9.5              | 605       | 97644            | 0.3              | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 10.8             | 610       | 92487            | 0.2              | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 13.1             | 615       | 87436            | 0.1              | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

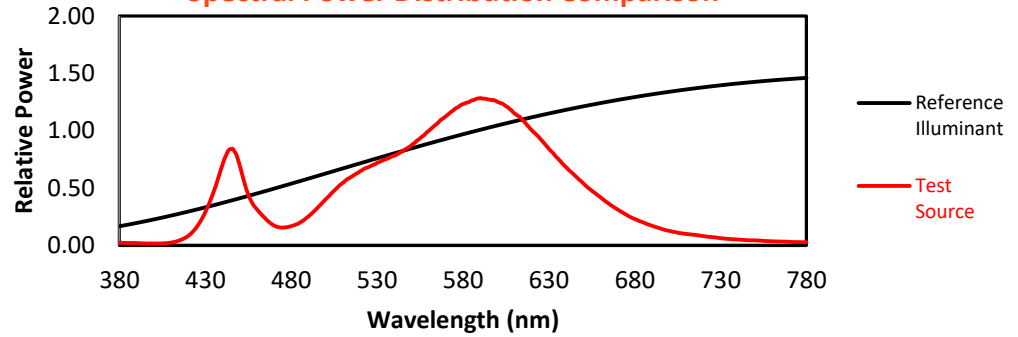
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TM-30-18

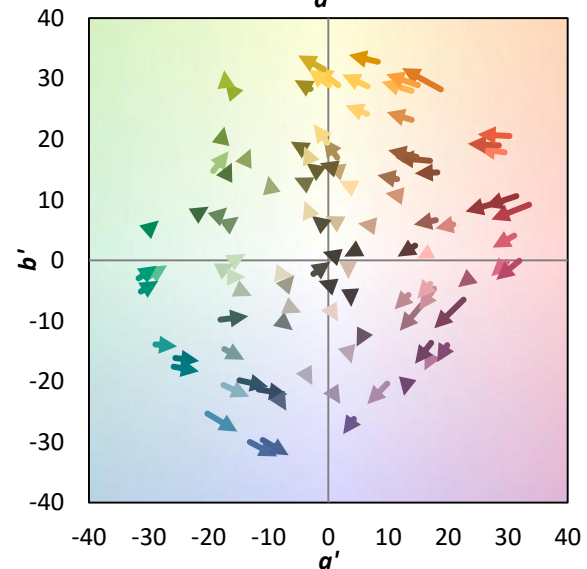
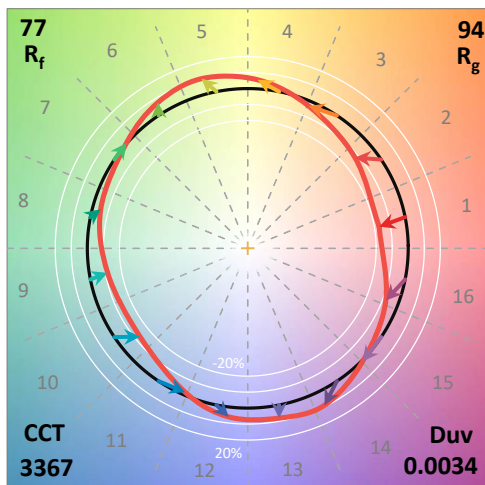
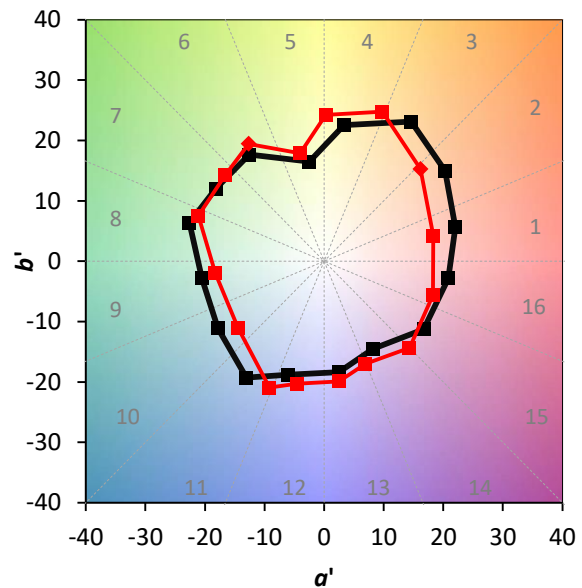
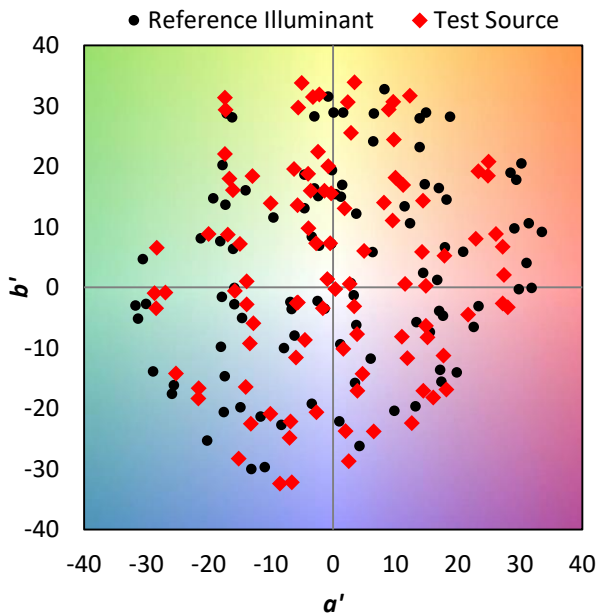
### Summary

$R_f = 77.2$   
 $R_g = 94.4$   
 CIE  $R_a = 73.3$   
 $R_g = -34.3$

### Spectral Power Distribution Comparison



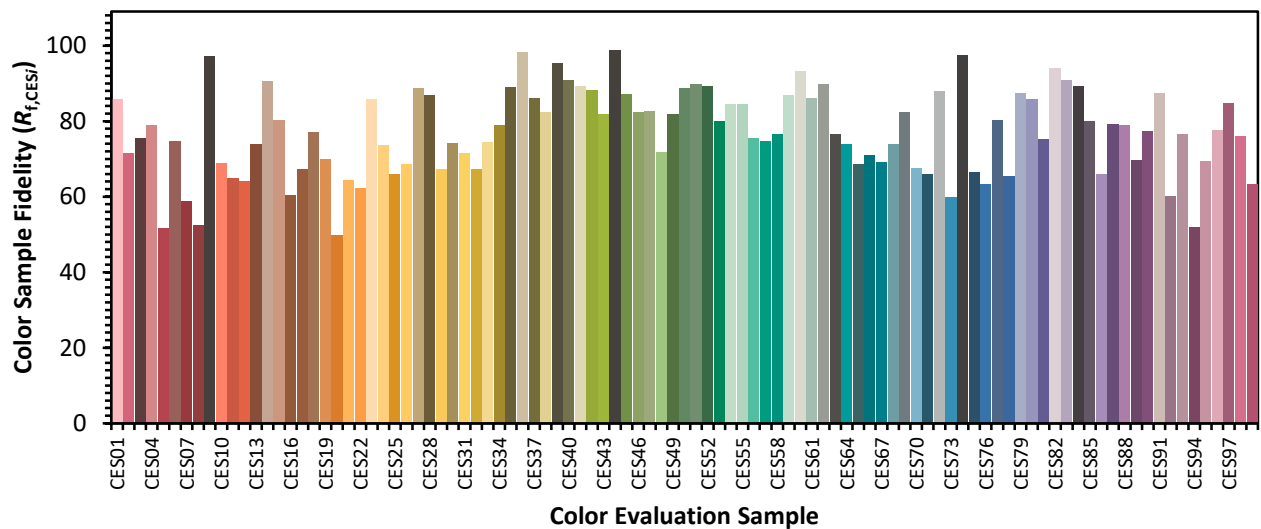
### Color Vector Graphics



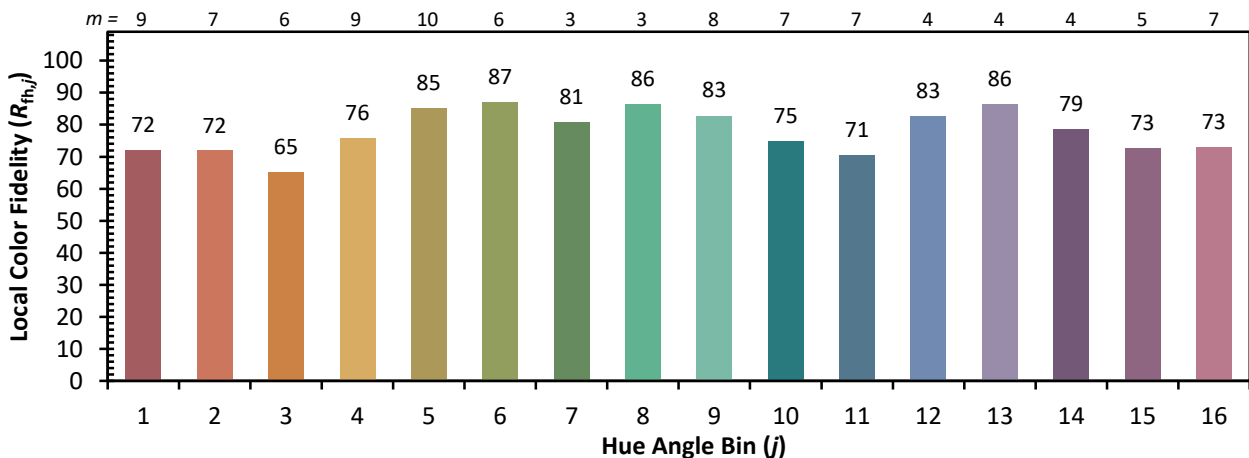
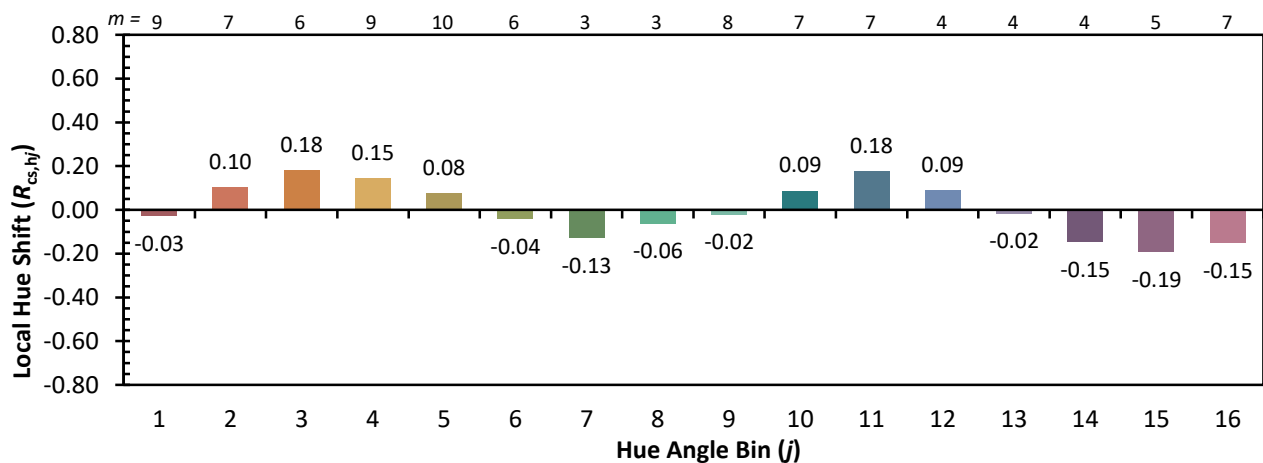
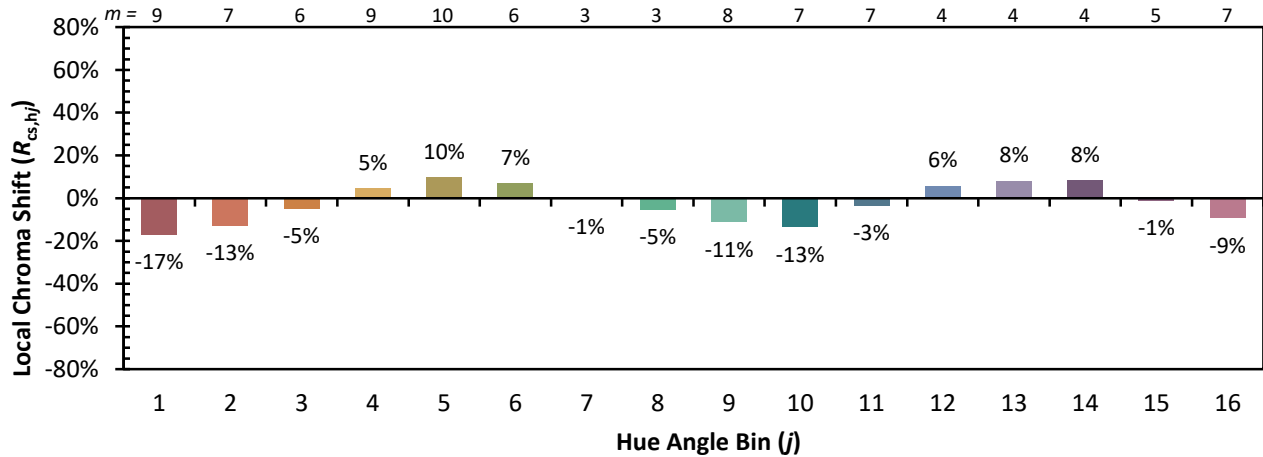


Individual Sample Fidelity Index ( $R_{f,i}$ )

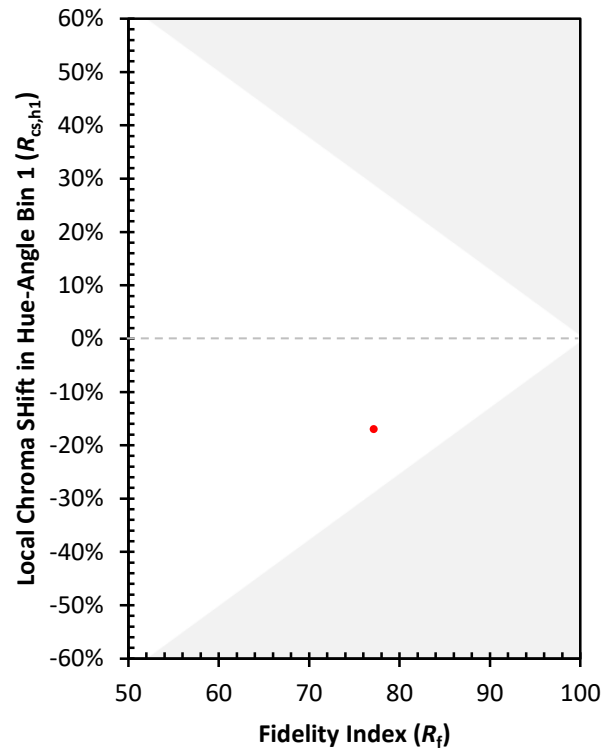
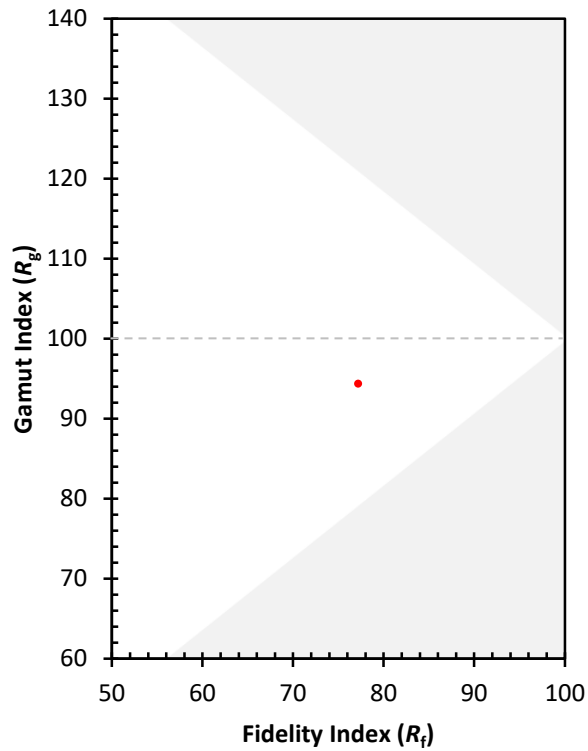
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 69 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 89 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 85 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 76 | CES81 = 75 |
| CES07 = 41 | CES32 = 67 | CES57 = 75 | CES82 = 94 |
| CES08 = 39 | CES33 = 75 | CES58 = 77 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 90 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 69 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 87 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 76 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 83 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 60 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 89 | CES75 = 67 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)