

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: P385667

Luminaire Tested: **GWC-SA1B-727-U-T2**

Issue Date: 3/3/2020

#### Test Information

Test Method: LM-79-08  
Report Number: P385667  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-12)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GWC-SA1B-727-U-T2  
Description: GALLEON WALL LUMINAIRE  
(1) 70 CRI, 2700K, 800mA LIGHTSQUARE WITH 16 LEDS AND TYPE II OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

#### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 5007 lumens  
Efficiency: N/A  
Efficacy: 113.8 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - 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



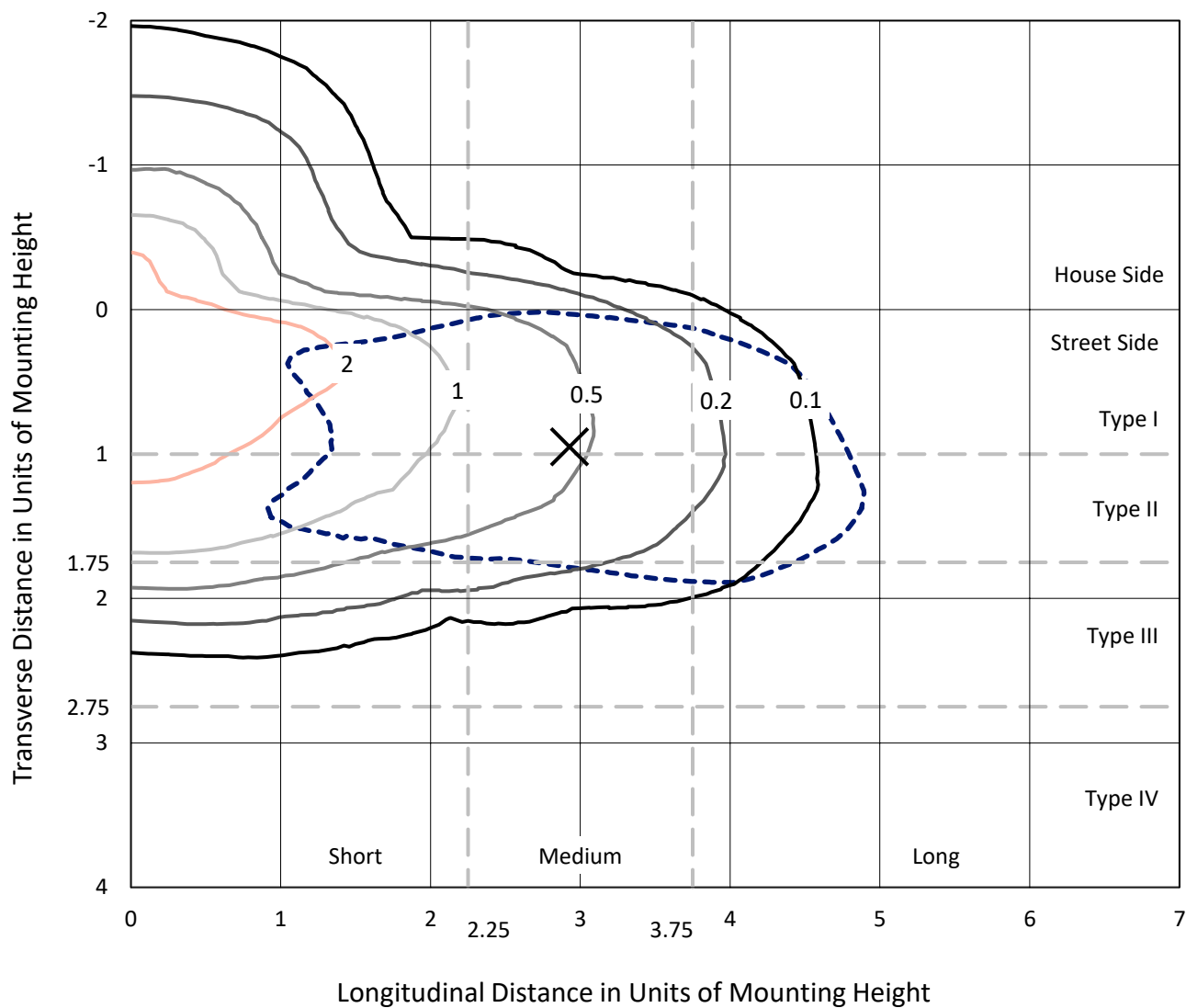
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

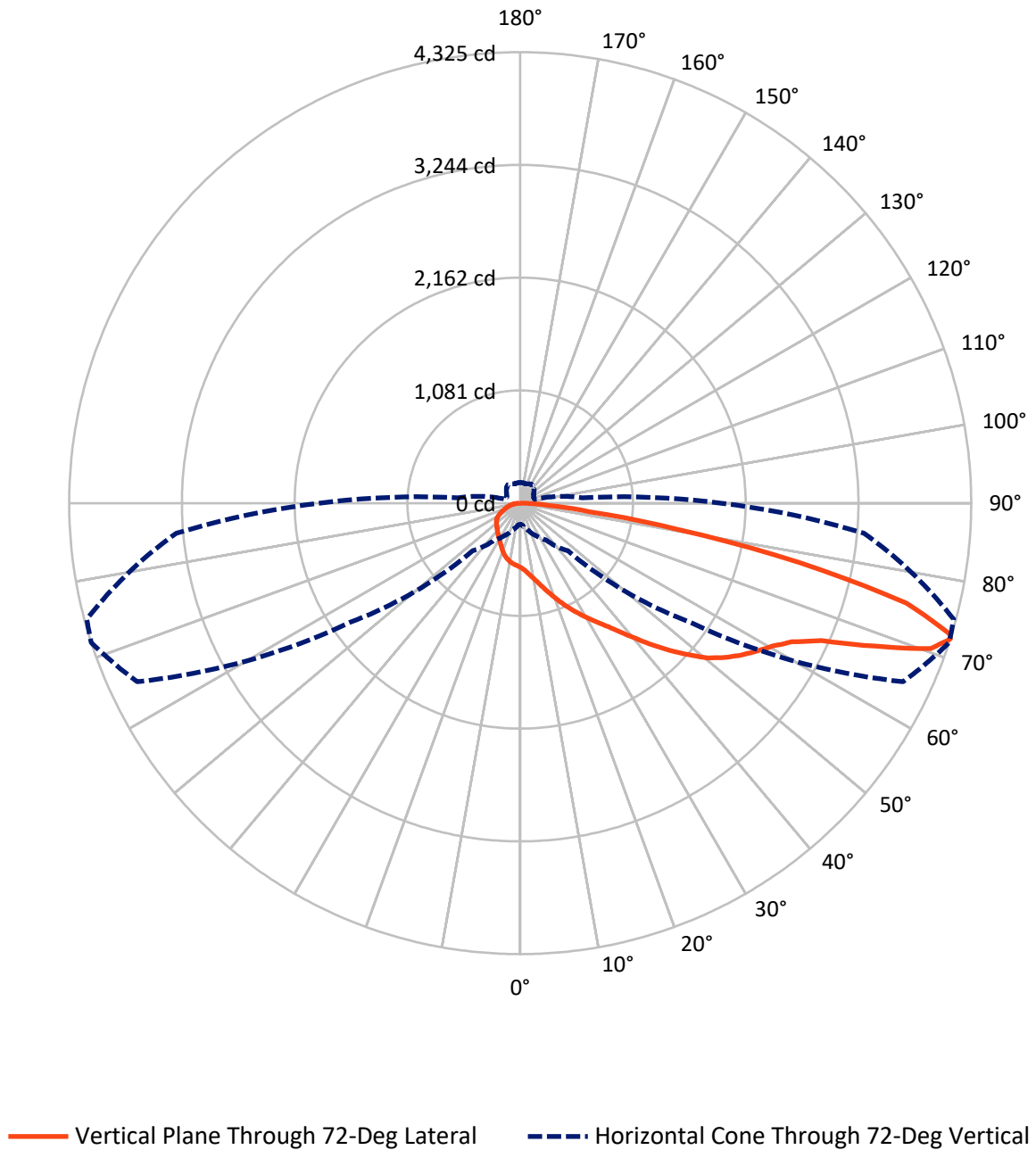
--- 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 3.8 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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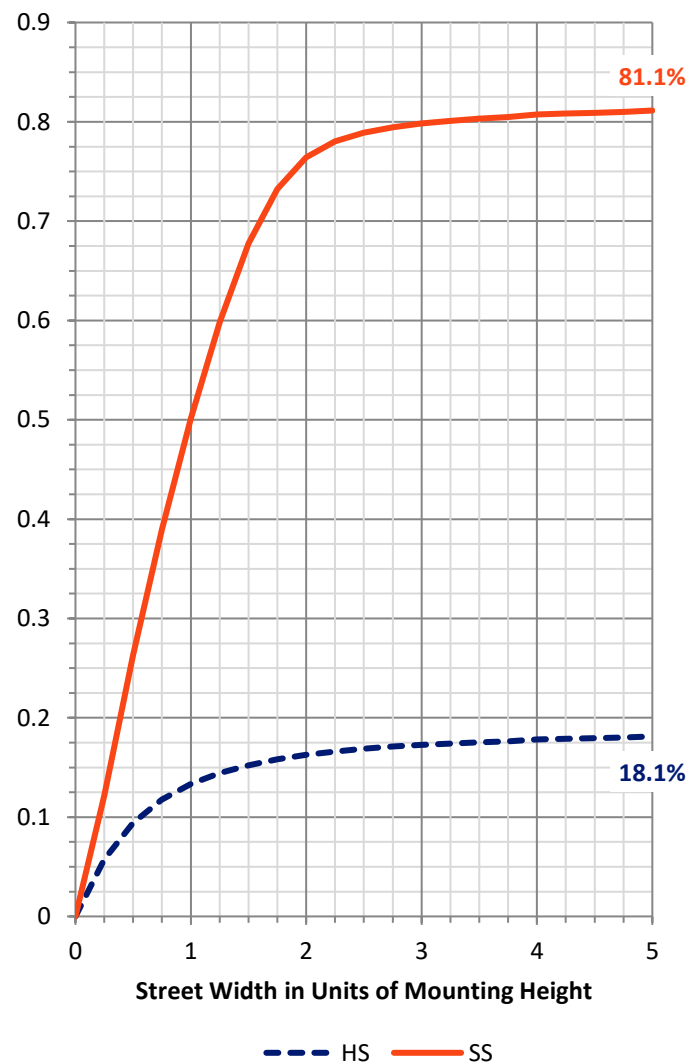
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 928.8    | 0.0    | 928.8  |
|                    | % Fixture | 18.6     | 0.0    | 18.6   |
| <b>Street Side</b> | Lumens    | 4078.2   | 0.0    | 4078.2 |
|                    | % Fixture | 81.4     | 0.0    | 81.4   |
| <b>Total</b>       | Lumens    | 5007.0   | 0.0    | 5007.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 61.7   | 1.2       |
| 10°-20°   | 199.5  | 4.0       |
| 20°-30°   | 349.5  | 7.0       |
| 30°-40°   | 518.2  | 10.4      |
| 40°-50°   | 758.0  | 15.1      |
| 50°-60°   | 1042.9 | 20.8      |
| 60°-70°   | 1161.1 | 23.2      |
| 70°-80°   | 786.8  | 15.7      |
| 80°-90°   | 129.3  | 2.6       |
| 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°    | 5007.0 | 100.0     |
| 0°-180°   | 5007.0 | 100.0     |

**Coefficient of Utilization**



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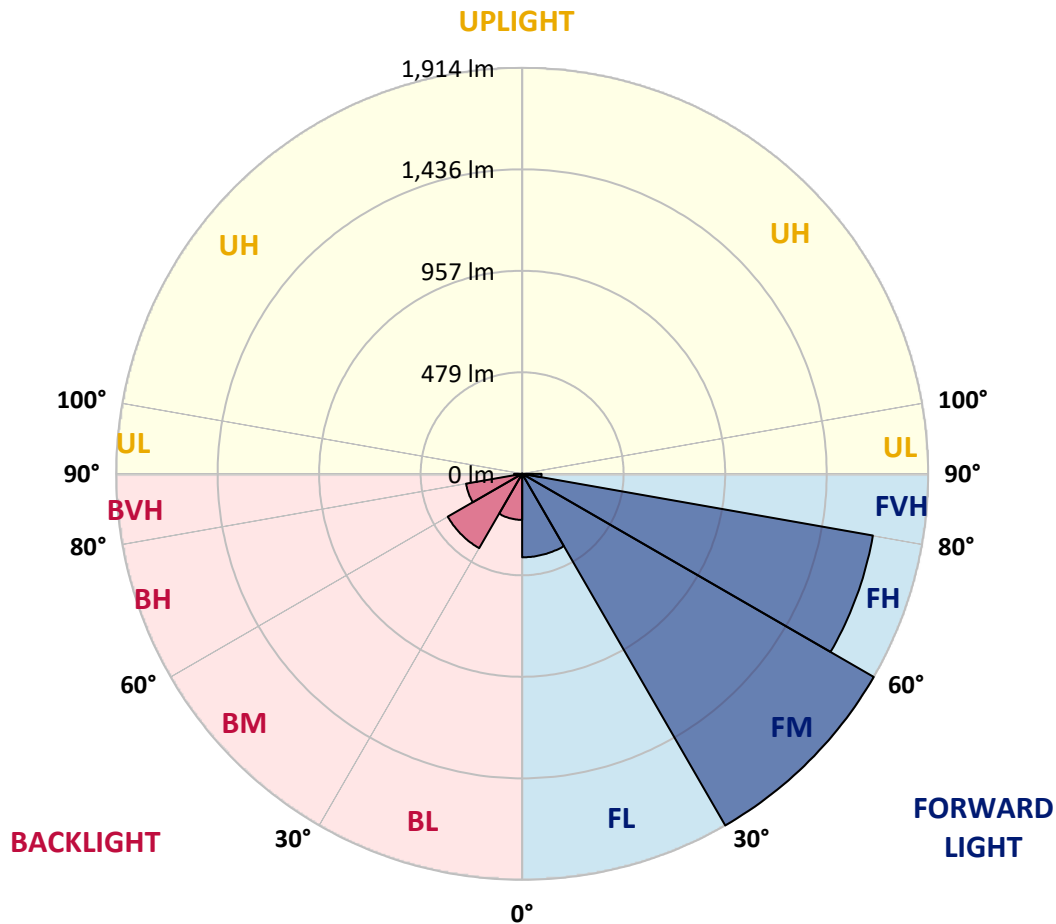
CATALOG NUMBER: GWC-SA1B-727-U-T2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 393.6  | 7.9       |                         |      |         |
| FM   | (30°-60°)   | 1914.2 | 38.2      |                         |      |         |
| FH   | (60°-80°)   | 1679.1 | 33.5      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 91.2   | 1.8       |                         |      | G1/100  |
| BL   | (0°-30°)    | 217.1  | 4.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 404.9  | 8.1       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 268.7  | 5.4       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 38.1   | 0.8       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type III Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 72°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 616.0  | 616.0  | 616.0  | 616.0  | 616.0  | 616.0  | 616.0  | 616.0  | 616.0  | 616.0  | 616.0  |
| 2.5°  | 680.5  | 679.4  | 675.8  | 675.8  | 668.9  | 663.1  | 652.0  | 644.6  | 635.8  | 632.7  | 622.4  |
| 5°    | 746.3  | 746.7  | 742.2  | 739.1  | 728.9  | 716.5  | 697.7  | 680.6  | 663.6  | 656.7  | 635.5  |
| 7.5°  | 801.7  | 801.0  | 799.8  | 797.2  | 787.7  | 774.9  | 749.6  | 724.3  | 699.1  | 688.7  | 652.2  |
| 10°   | 837.2  | 838.7  | 839.8  | 841.0  | 837.0  | 827.9  | 803.9  | 773.0  | 740.1  | 726.0  | 672.2  |
| 12.5° | 855.1  | 857.9  | 862.7  | 871.0  | 877.5  | 876.5  | 859.1  | 826.3  | 787.2  | 769.4  | 697.2  |
| 15°   | 865.6  | 869.2  | 876.8  | 891.7  | 910.1  | 920.6  | 916.0  | 886.3  | 842.7  | 820.8  | 727.7  |
| 17.5° | 872.2  | 875.1  | 886.8  | 906.7  | 934.1  | 962.0  | 974.2  | 949.4  | 905.5  | 880.5  | 762.7  |
| 20°   | 876.7  | 878.9  | 893.6  | 916.8  | 952.3  | 996.8  | 1031.0 | 1024.8 | 974.6  | 942.2  | 799.3  |
| 22.5° | 886.7  | 888.6  | 902.5  | 926.0  | 965.3  | 1022.7 | 1085.6 | 1094.9 | 1047.5 | 1010.8 | 838.4  |
| 25°   | 914.6  | 914.6  | 926.3  | 942.7  | 979.6  | 1045.1 | 1131.8 | 1173.0 | 1122.0 | 1079.2 | 874.6  |
| 27.5° | 967.9  | 967.3  | 971.7  | 977.3  | 1005.3 | 1067.9 | 1173.0 | 1242.0 | 1199.2 | 1152.5 | 909.8  |
| 30°   | 1031.0 | 1034.4 | 1034.9 | 1032.2 | 1045.3 | 1096.3 | 1211.1 | 1314.7 | 1277.0 | 1226.6 | 945.8  |
| 32.5° | 1112.2 | 1114.4 | 1111.8 | 1102.7 | 1100.8 | 1136.6 | 1248.5 | 1390.9 | 1361.1 | 1304.0 | 978.7  |
| 35°   | 1215.3 | 1211.0 | 1202.8 | 1184.2 | 1166.5 | 1190.6 | 1291.3 | 1467.1 | 1455.6 | 1397.7 | 1024.1 |
| 37.5° | 1325.8 | 1325.9 | 1315.9 | 1273.7 | 1249.2 | 1259.6 | 1350.3 | 1553.5 | 1569.9 | 1509.0 | 1082.2 |
| 40°   | 1414.4 | 1419.0 | 1425.2 | 1369.7 | 1338.0 | 1352.3 | 1425.2 | 1653.7 | 1705.1 | 1641.1 | 1157.9 |
| 42.5° | 1476.3 | 1481.6 | 1499.2 | 1464.4 | 1431.5 | 1458.0 | 1513.5 | 1760.6 | 1856.8 | 1793.5 | 1246.5 |
| 45°   | 1541.8 | 1544.7 | 1557.1 | 1542.1 | 1521.1 | 1580.9 | 1613.0 | 1871.2 | 2017.3 | 1955.9 | 1345.6 |
| 47.5° | 1610.8 | 1613.9 | 1626.6 | 1616.6 | 1605.6 | 1695.7 | 1716.8 | 1975.6 | 2171.1 | 2134.3 | 1451.5 |
| 50°   | 1695.9 | 1698.0 | 1710.1 | 1692.0 | 1695.4 | 1782.3 | 1809.5 | 2071.2 | 2332.3 | 2294.7 | 1557.7 |
| 52.5° | 1812.1 | 1812.6 | 1829.4 | 1813.0 | 1796.8 | 1845.7 | 1889.4 | 2161.4 | 2458.6 | 2440.9 | 1663.8 |
| 55°   | 1903.1 | 1908.7 | 1963.5 | 1960.0 | 1950.7 | 1903.3 | 1956.1 | 2247.3 | 2571.4 | 2579.8 | 1776.6 |
| 57.5° | 1845.0 | 1866.6 | 1977.6 | 2055.9 | 2132.1 | 2046.6 | 2046.2 | 2344.0 | 2676.2 | 2716.2 | 1900.6 |
| 60°   | 1615.9 | 1645.2 | 1808.8 | 1982.4 | 2220.9 | 2295.9 | 2233.5 | 2462.1 | 2782.0 | 2851.4 | 2055.9 |
| 62.5° | 1154.1 | 1202.3 | 1424.0 | 1701.3 | 2099.2 | 2461.0 | 2614.5 | 2649.5 | 2926.0 | 3007.9 | 2257.8 |
| 65°   | 583.4  | 620.0  | 805.8  | 1139.7 | 1677.1 | 2353.1 | 3028.6 | 3059.8 | 3176.2 | 3248.9 | 2568.6 |
| 67.5° | 354.5  | 368.3  | 458.9  | 633.9  | 1028.2 | 1833.0 | 3163.7 | 3743.7 | 3660.3 | 3698.9 | 3011.9 |
| 70°   | 261.2  | 271.4  | 327.9  | 421.0  | 591.3  | 1075.6 | 2748.9 | 4231.8 | 4177.0 | 4172.6 | 3339.4 |
| 72°   | 203.4  | 210.8  | 260.8  | 340.1  | 432.4  | 645.3  | 1992.4 | 4051.6 | 4324.9 | 4303.1 | 3309.4 |
| 72.5° | 192.9  | 199.5  | 245.0  | 320.2  | 408.6  | 585.0  | 1791.4 | 3930.1 | 4314.2 | 4304.4 | 3270.6 |
| 75°   | 151.9  | 156.5  | 181.4  | 247.6  | 319.8  | 331.9  | 981.7  | 3045.7 | 3827.1 | 3986.3 | 2941.7 |
| 77.5° | 125.7  | 126.4  | 139.5  | 180.2  | 249.3  | 234.6  | 482.2  | 2113.1 | 2740.5 | 2915.5 | 2083.8 |
| 80°   | 102.4  | 103.3  | 109.5  | 126.4  | 188.6  | 173.6  | 228.9  | 1215.1 | 1534.4 | 1536.3 | 991.0  |
| 82.5° | 81.5   | 81.7   | 88.6   | 92.4   | 135.5  | 124.1  | 131.2  | 570.5  | 670.5  | 645.0  | 356.2  |
| 85°   | 57.4   | 56.2   | 86.5   | 75.9   | 88.6   | 79.6   | 72.4   | 225.8  | 277.2  | 265.2  | 111.5  |
| 87.5° | 19.1   | 19.8   | 38.4   | 49.1   | 51.7   | 45.2   | 32.2   | 86.5   | 104.6  | 103.8  | 35.3   |
| 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: P385667

CATALOG NUMBER: GWC-SA1B-727-U-T2

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 616.0  | 616.0 | 616.0 | 616.0 | 616.0 | 616.0 | 616.0 | 616.0 | 616.0 | 616.0 | 616.0 |
| 2.5°  | 619.1  | 613.6 | 605.5 | 596.5 | 589.4 | 582.2 | 576.9 | 574.1 | 571.0 | 568.4 | 571.5 |
| 5°    | 625.6  | 615.3 | 598.1 | 581.2 | 568.8 | 557.7 | 549.8 | 545.7 | 541.9 | 539.3 | 539.6 |
| 7.5°  | 636.3  | 619.6 | 590.6 | 566.0 | 548.8 | 536.9 | 528.8 | 526.0 | 523.6 | 522.9 | 523.8 |
| 10°   | 647.7  | 623.1 | 580.8 | 548.1 | 528.4 | 518.6 | 515.0 | 516.9 | 518.6 | 520.1 | 521.9 |
| 12.5° | 660.6  | 626.2 | 566.5 | 527.0 | 510.3 | 506.5 | 510.1 | 518.4 | 524.4 | 528.1 | 530.3 |
| 15°   | 677.5  | 628.9 | 550.0 | 506.0 | 494.8 | 499.1 | 511.3 | 525.7 | 536.2 | 542.9 | 543.9 |
| 17.5° | 693.1  | 628.7 | 528.8 | 484.8 | 482.2 | 494.8 | 513.2 | 533.4 | 547.5 | 557.0 | 558.9 |
| 20°   | 709.1  | 624.1 | 504.1 | 464.1 | 469.5 | 490.1 | 514.1 | 538.4 | 555.5 | 566.5 | 569.1 |
| 22.5° | 724.1  | 616.0 | 477.0 | 445.3 | 458.8 | 483.9 | 510.8 | 535.5 | 552.5 | 561.5 | 564.3 |
| 25°   | 734.3  | 601.9 | 449.6 | 429.5 | 449.3 | 476.3 | 500.1 | 520.0 | 532.7 | 537.2 | 537.9 |
| 27.5° | 739.4  | 583.4 | 423.8 | 415.7 | 439.5 | 463.9 | 480.3 | 490.1 | 493.8 | 493.4 | 492.7 |
| 30°   | 740.1  | 559.1 | 401.5 | 404.5 | 428.1 | 445.7 | 453.4 | 451.5 | 446.9 | 438.9 | 439.6 |
| 32.5° | 737.9  | 531.7 | 382.9 | 393.8 | 413.6 | 423.4 | 423.8 | 414.6 | 402.2 | 389.6 | 386.2 |
| 35°   | 738.6  | 504.8 | 366.5 | 381.7 | 396.0 | 400.3 | 396.4 | 382.9 | 366.0 | 349.8 | 346.4 |
| 37.5° | 746.2  | 481.3 | 352.4 | 367.7 | 376.5 | 377.6 | 371.9 | 357.7 | 345.3 | 329.5 | 328.1 |
| 40°   | 764.3  | 464.6 | 338.9 | 352.0 | 357.0 | 357.6 | 349.5 | 339.5 | 340.5 | 332.0 | 331.9 |
| 42.5° | 796.8  | 457.4 | 327.0 | 335.7 | 338.8 | 339.8 | 333.6 | 327.2 | 336.2 | 330.7 | 328.8 |
| 45°   | 838.9  | 459.1 | 317.0 | 319.6 | 325.3 | 330.1 | 326.4 | 318.6 | 322.0 | 298.1 | 290.2 |
| 47.5° | 887.5  | 470.1 | 309.1 | 305.8 | 315.7 | 324.8 | 318.9 | 307.2 | 295.0 | 271.2 | 266.7 |
| 50°   | 944.4  | 487.2 | 301.9 | 292.2 | 305.2 | 317.6 | 311.7 | 295.0 | 276.5 | 265.0 | 263.4 |
| 52.5° | 1003.7 | 508.1 | 294.6 | 277.2 | 291.9 | 312.0 | 309.1 | 292.2 | 269.5 | 258.1 | 256.0 |
| 55°   | 1071.0 | 529.1 | 285.5 | 259.8 | 277.6 | 309.5 | 307.9 | 282.2 | 264.1 | 257.7 | 256.2 |
| 57.5° | 1154.6 | 553.1 | 273.4 | 241.7 | 264.1 | 300.2 | 295.3 | 276.2 | 258.6 | 253.8 | 253.3 |
| 60°   | 1263.5 | 588.4 | 256.0 | 222.4 | 247.7 | 285.8 | 284.8 | 267.4 | 249.8 | 246.4 | 245.7 |
| 62.5° | 1427.0 | 646.9 | 232.1 | 203.1 | 229.5 | 261.5 | 271.0 | 255.5 | 240.5 | 240.3 | 240.7 |
| 65°   | 1680.4 | 734.8 | 206.0 | 186.2 | 211.0 | 241.0 | 255.0 | 243.3 | 231.0 | 234.5 | 235.0 |
| 67.5° | 1974.2 | 807.7 | 180.5 | 169.6 | 192.2 | 221.5 | 240.5 | 231.0 | 218.4 | 227.4 | 227.6 |
| 70°   | 2071.9 | 742.5 | 158.1 | 153.3 | 172.7 | 202.7 | 224.8 | 217.6 | 204.8 | 213.8 | 212.9 |
| 72°   | 1928.1 | 599.4 | 143.6 | 140.9 | 158.1 | 187.2 | 210.8 | 205.0 | 192.4 | 198.4 | 196.2 |
| 72.5° | 1882.8 | 571.5 | 140.0 | 137.7 | 154.1 | 183.3 | 207.2 | 201.9 | 189.3 | 194.5 | 192.4 |
| 75°   | 1679.5 | 496.3 | 120.3 | 120.9 | 134.5 | 164.0 | 186.9 | 185.2 | 172.2 | 172.7 | 172.1 |
| 77.5° | 1218.2 | 363.9 | 101.4 | 104.8 | 114.5 | 144.1 | 166.4 | 165.3 | 151.2 | 148.6 | 148.1 |
| 80°   | 565.3  | 185.7 | 82.6  | 84.1  | 94.1  | 120.5 | 141.9 | 140.5 | 129.1 | 125.9 | 124.0 |
| 82.5° | 193.6  | 88.3  | 62.1  | 63.1  | 72.9  | 97.1  | 123.1 | 122.2 | 112.8 | 106.4 | 102.4 |
| 85°   | 69.1   | 44.0  | 43.4  | 42.4  | 52.1  | 76.4  | 107.2 | 102.6 | 88.6  | 75.5  | 75.2  |
| 87.5° | 22.4   | 18.8  | 22.4  | 22.2  | 30.3  | 51.7  | 77.9  | 66.4  | 64.3  | 53.4  | 52.4  |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

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

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

Test Date: 01/20/2021

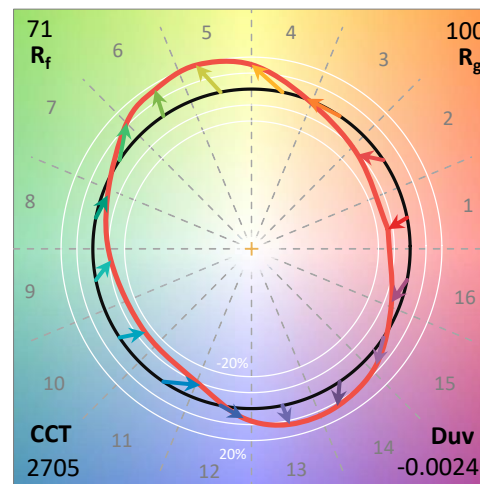
### Test Information

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

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

### Spectral Parameters

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



### Test Conditions

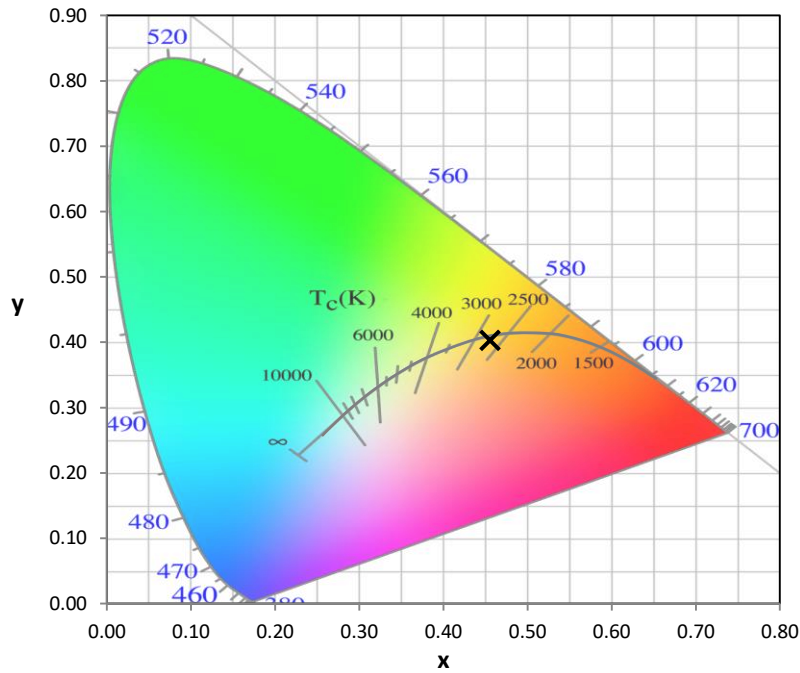
Stabilization Time: 177M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/34%  
 Sphere Temperature (°C): 24.7

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

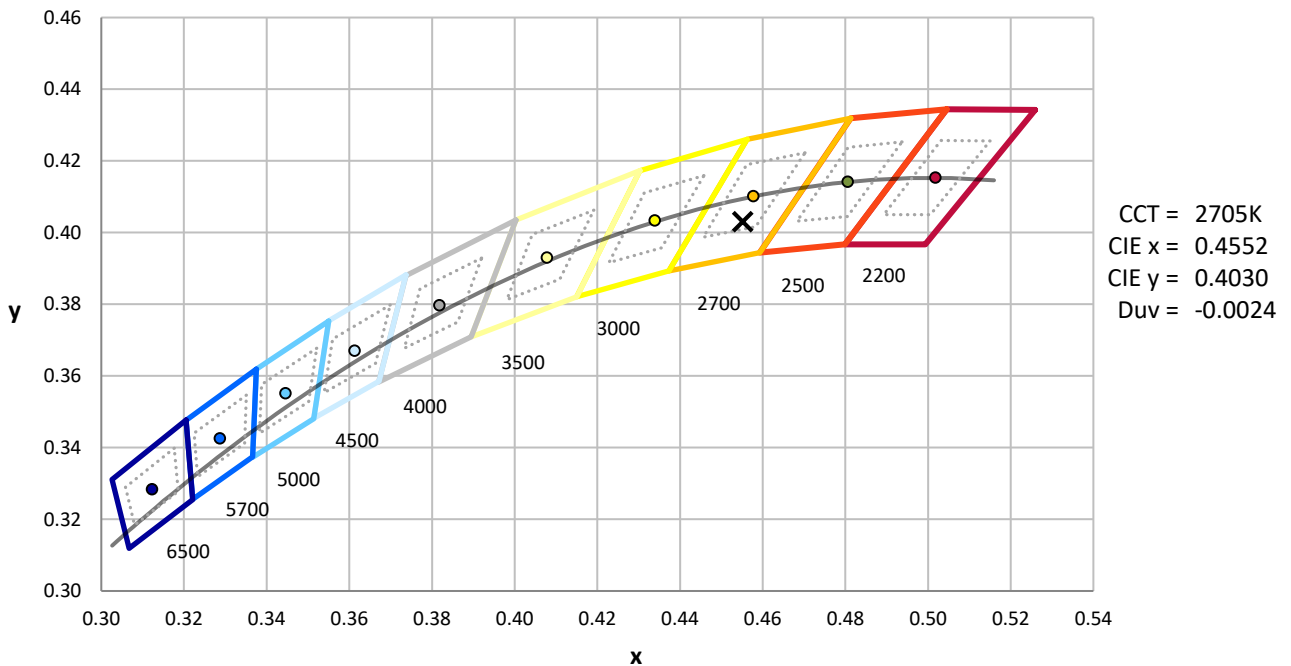
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

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**CIE 1931 Chromaticity Diagram**



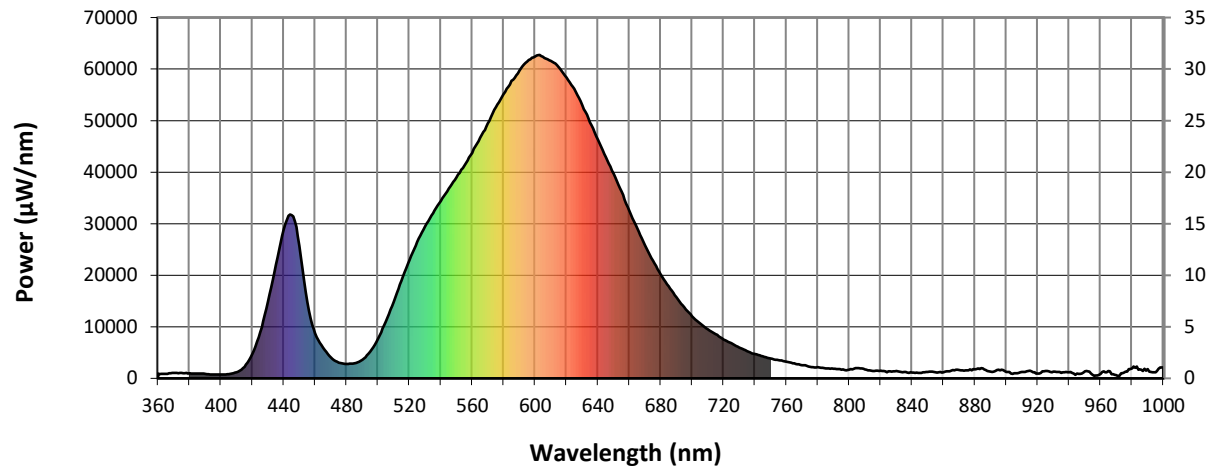
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

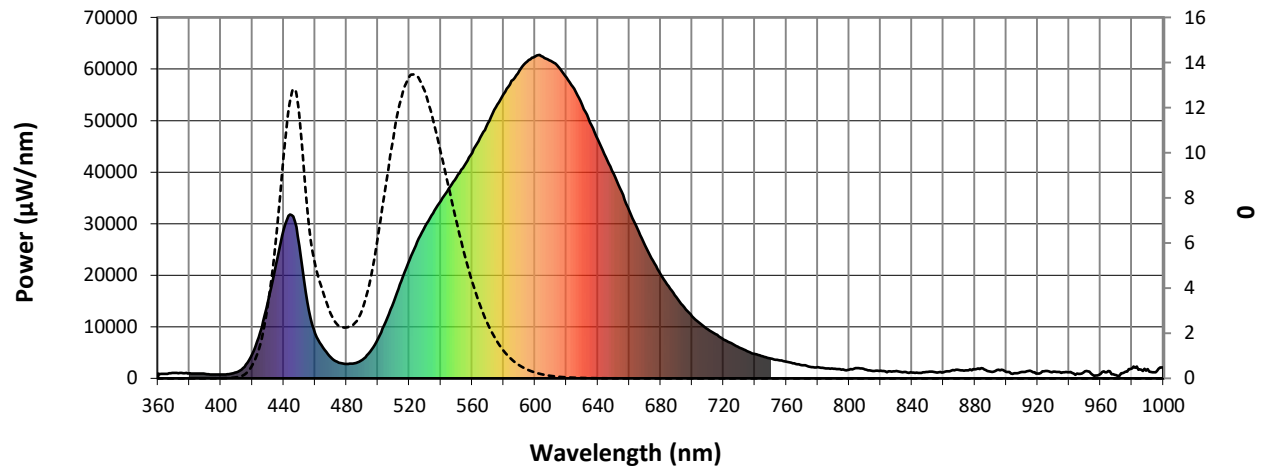


#####

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

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### Scotopic Flux vs. Wavelength



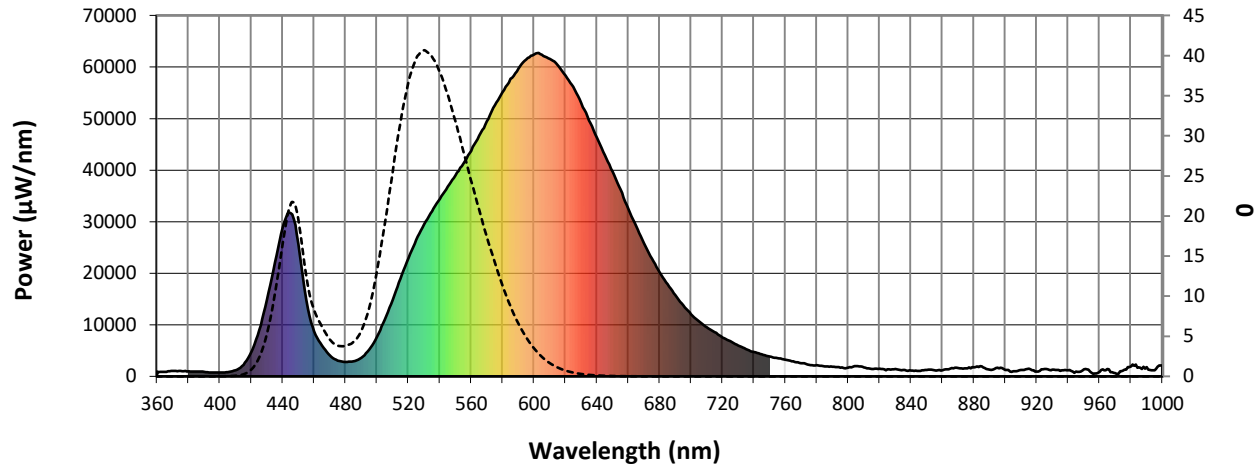
Scotopic Lumens: 1073.3

S/P: 0.36

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 926              | 0.0              | 490       | 3601             | 5.5              | 620       | 58340            | 0.7              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 8.3              | 625       | 56180            | 0.5              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 12.9             | 630       | 53018            | 0.3              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 18.7             | 635       | 49683            | 0.2              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 25.1             | 640       | 46308            | 0.1              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 31.4             | 645       | 42927            | 0.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 36.5             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 39.6             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 40.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 39.9             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.1              | 540       | 34386            | 38.0             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.2              | 545       | 36784            | 35.3             | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.8              | 550       | 39017            | 31.9             | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 2.2              | 555       | 41253            | 28.2             | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 5.1              | 560       | 43733            | 24.4             | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 9.9              | 565       | 46694            | 20.9             | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 16.1             | 570       | 49493            | 17.5             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 21.2             | 575       | 52587            | 14.3             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 19.9             | 580       | 55129            | 11.4             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 12.9             | 585       | 57737            | 8.8              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 8.5              | 590       | 59688            | 6.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 6.3              | 595       | 61458            | 4.9              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 4.7              | 600       | 62443            | 3.5              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 3.8              | 605       | 62403            | 2.5              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 3.8              | 610       | 61581            | 1.7              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 4.2              | 615       | 60386            | 1.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


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

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 926              | 0.0              | 490       | 3601             | 3.0              | 620       | 58340            | 0.0              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 4.2              | 625       | 56180            | 0.0              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 6.2              | 630       | 53018            | 0.0              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 8.5              | 635       | 49683            | 0.0              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 10.6             | 640       | 46308            | 0.0              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 12.4             | 645       | 42927            | 0.0              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 13.4             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 13.4             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 12.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 11.5             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 10.1             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.1              | 545       | 36784            | 8.5              | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.5              | 550       | 39017            | 7.0              | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 1.4              | 555       | 41253            | 5.6              | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 3.1              | 560       | 43733            | 4.3              | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 5.9              | 565       | 46694            | 3.3              | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 9.6              | 570       | 49493            | 2.4              | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 12.5             | 575       | 52587            | 1.8              | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 11.8             | 580       | 55129            | 1.2              | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 7.8              | 585       | 57737            | 0.9              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 5.2              | 590       | 59688            | 0.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 3.9              | 595       | 61458            | 0.4              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 2.9              | 600       | 62443            | 0.3              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 2.3              | 605       | 62403            | 0.2              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 2.3              | 610       | 61581            | 0.1              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 2.4              | 615       | 60386            | 0.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

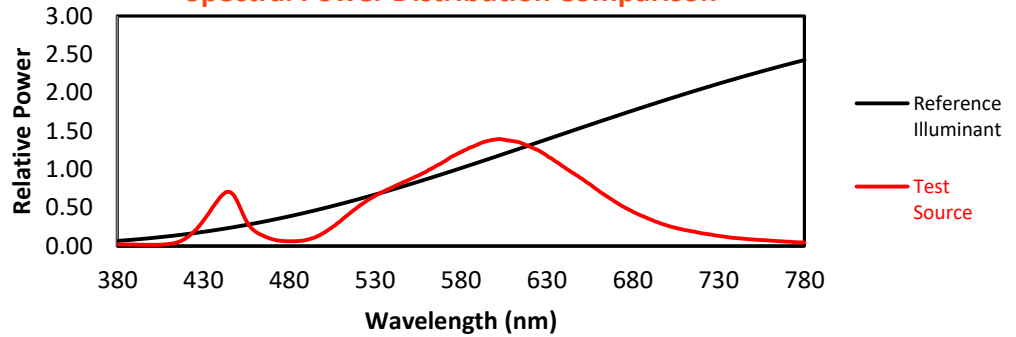
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TM-30-18

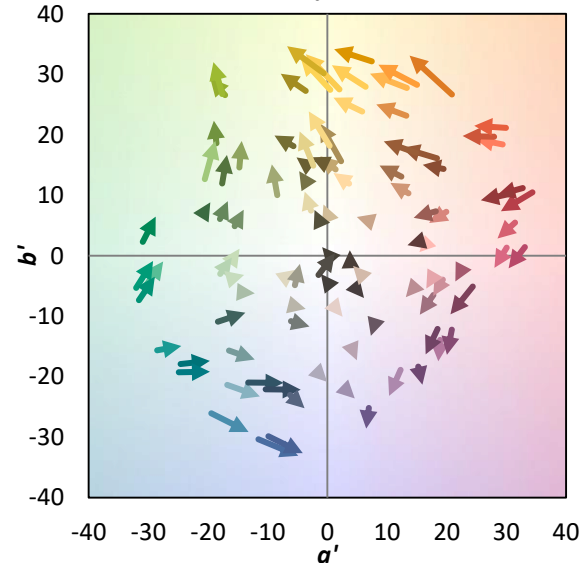
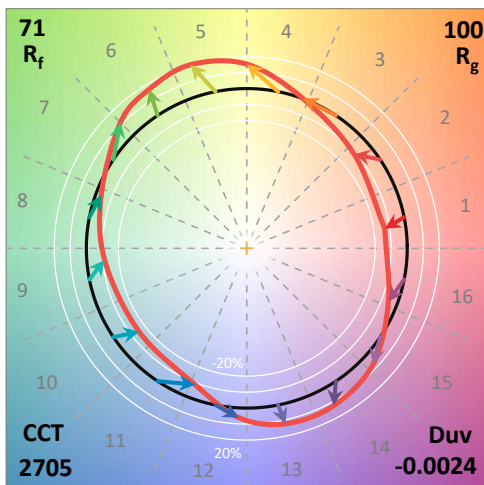
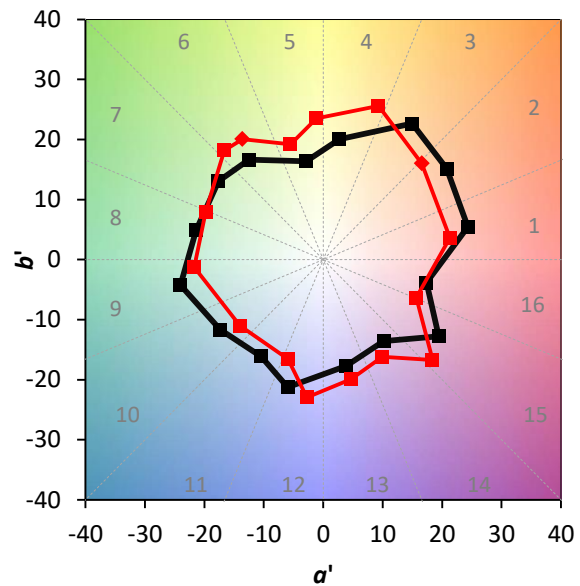
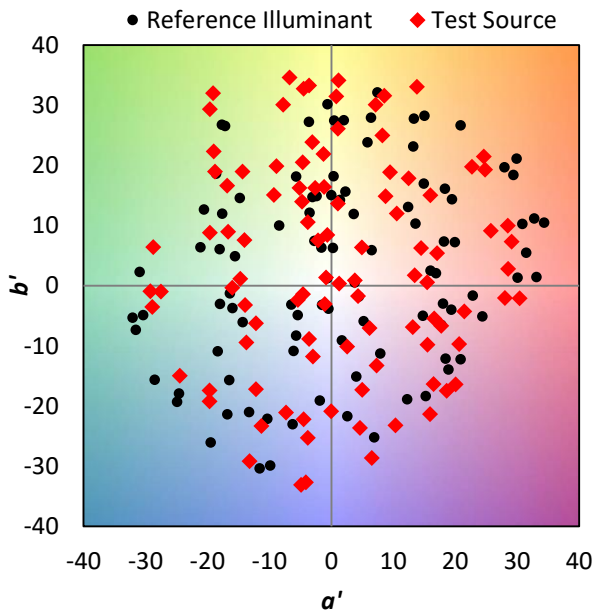
### Summary

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

### Spectral Power Distribution Comparison

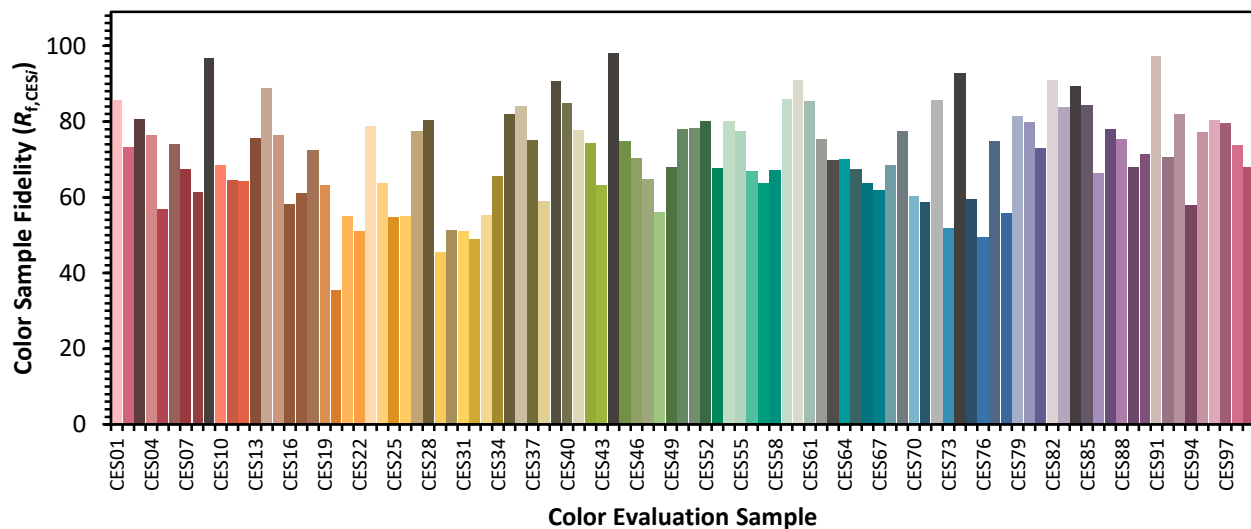


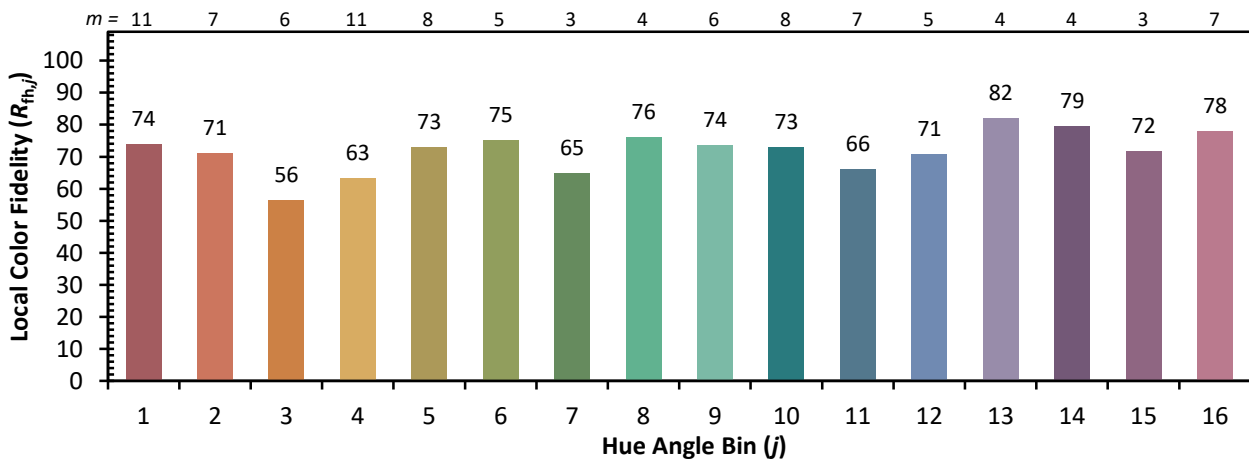
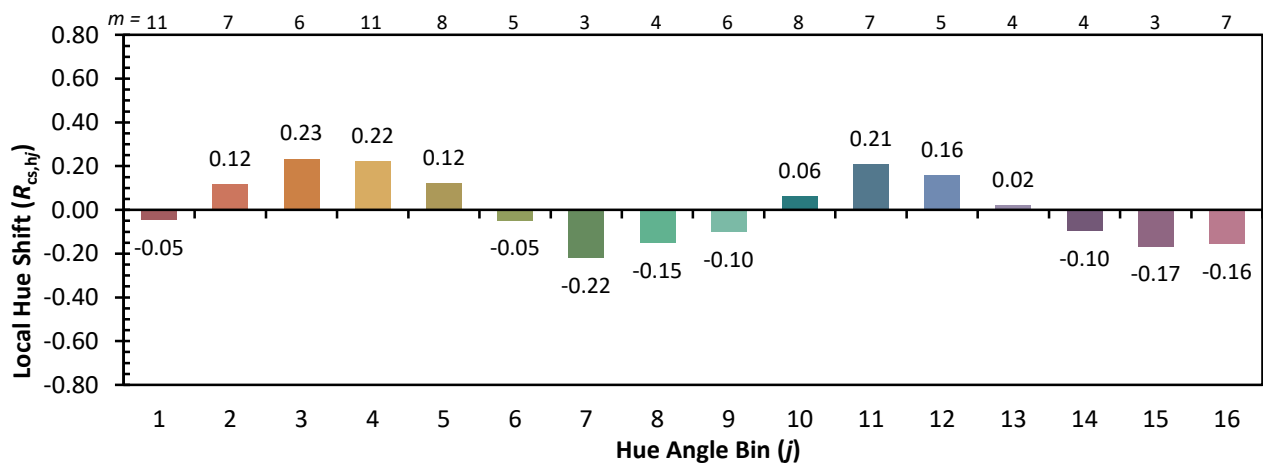
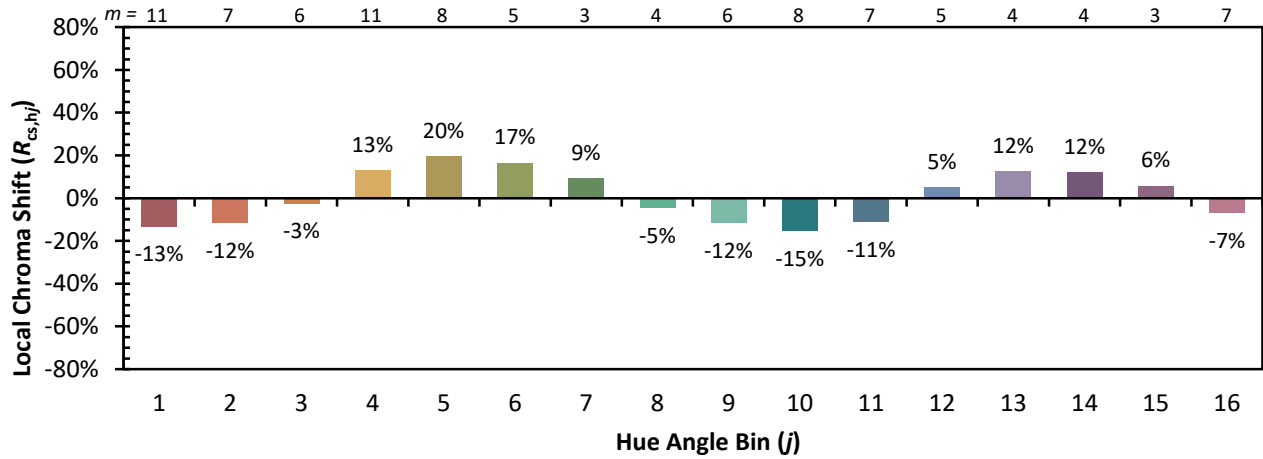
### Color Vector Graphics

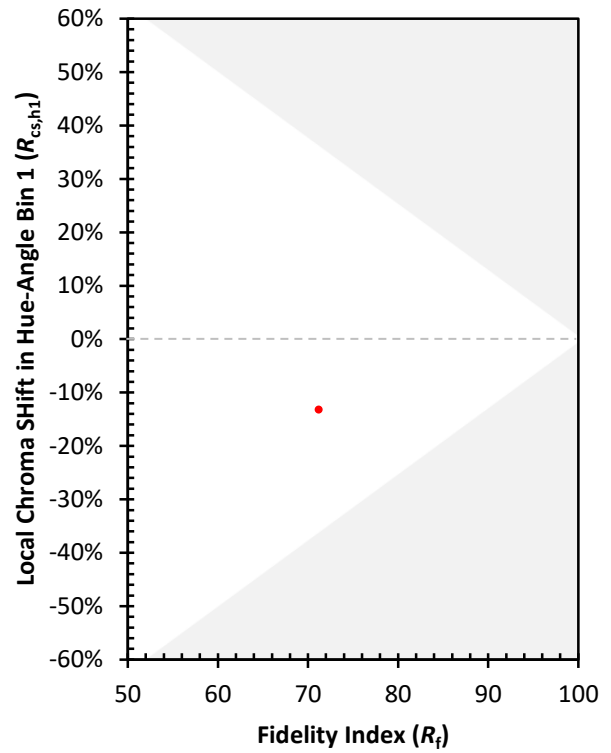
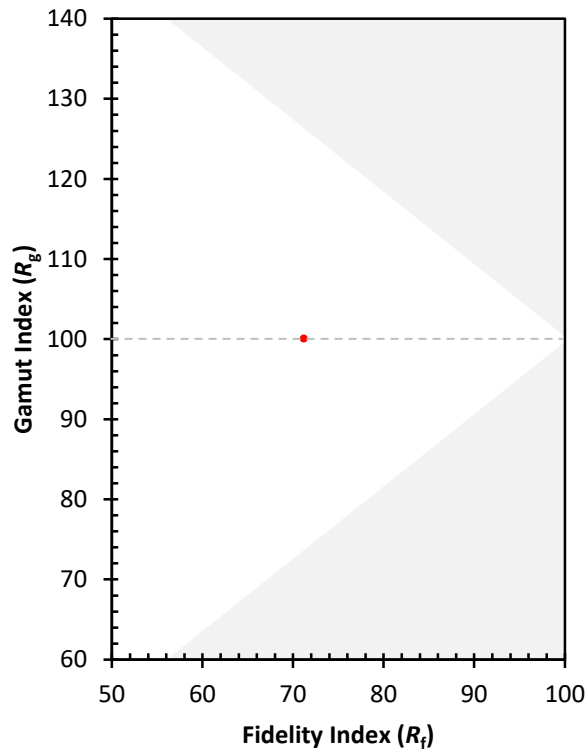


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

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



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**


(END OF REPORT)