

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: INVUE

Report Number: P472156

Luminaire Tested: **CCP-VA-4-735-U-T4W**

Issue Date: 01/27/2021



**Test Information**

Test Method: LM-79-08  
Report Number: P472156  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 01/27/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-VA-4-735-U-T4W  
Description: INVUE CLEARCURVE POLE MOUNT Wave Stream LUMINAIRE WITH T4W  
DISTRIBUTION LENS  
Light Source: 3500K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6145.6 lumens  
Efficiency: N/A  
Efficacy: 106.7 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.54' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G2

Input Watts (W): 57.6  
Input Voltage (V): 120  
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: 25 FT

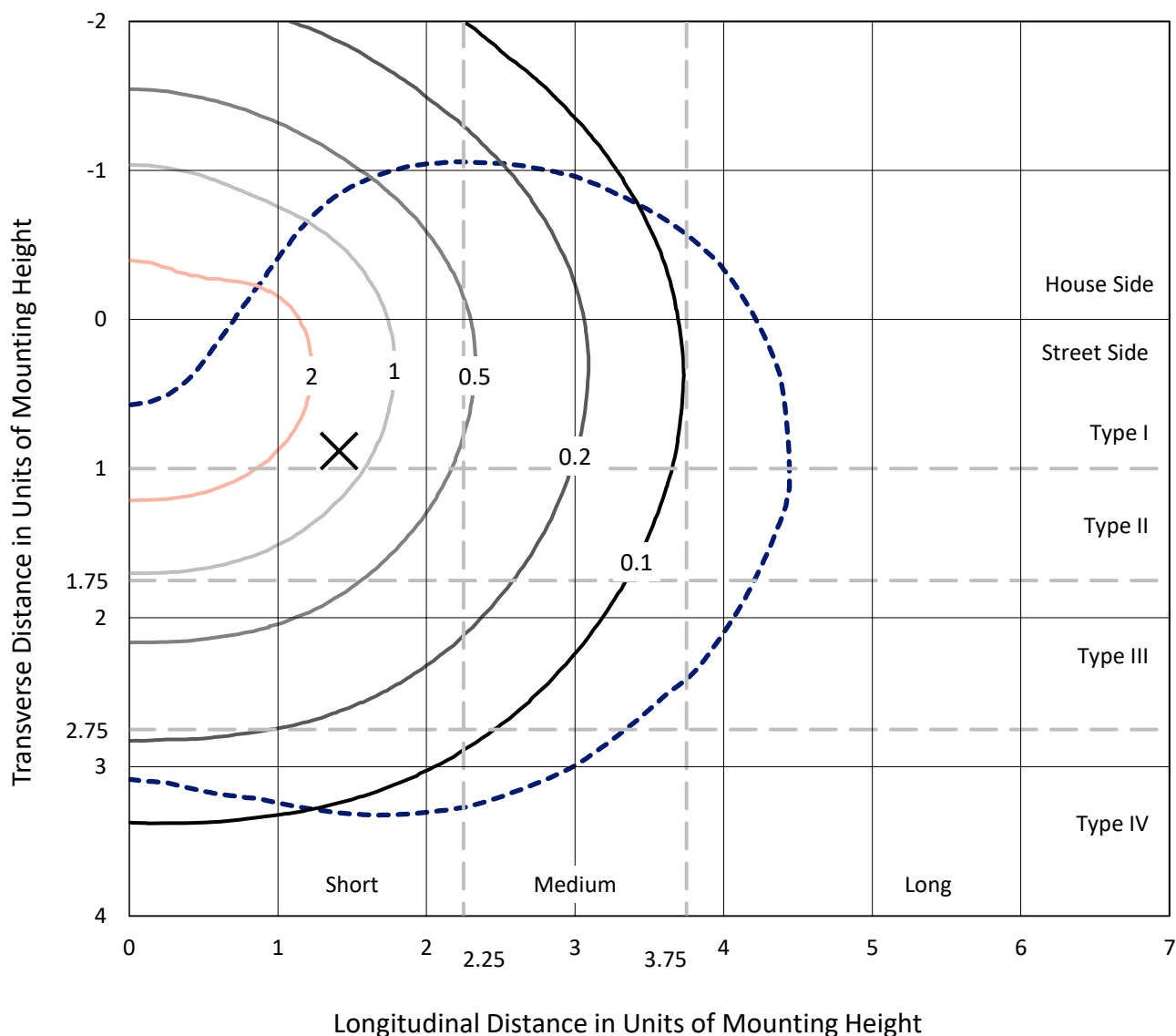
REPORT NUMBER: P472156

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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

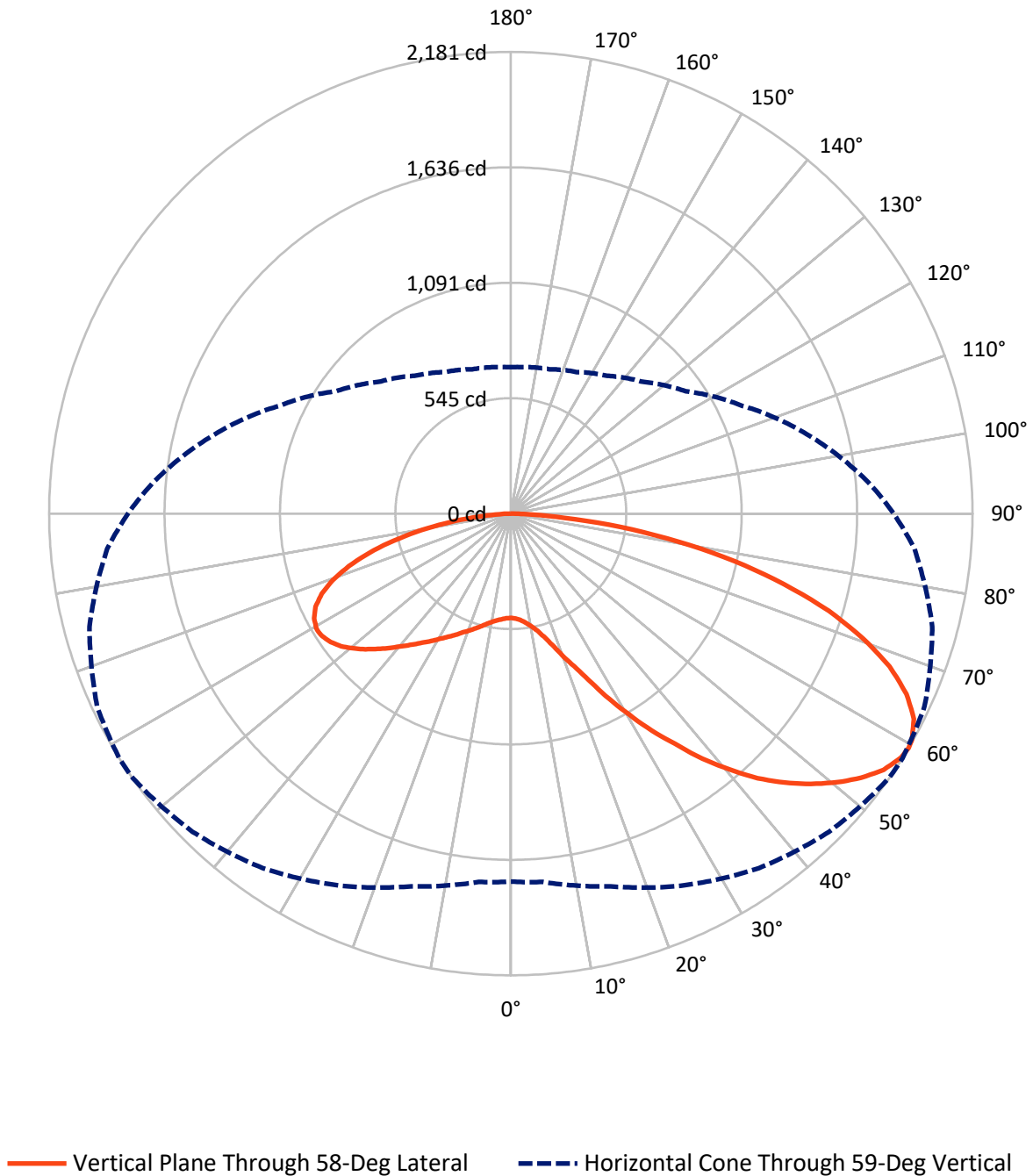


Based on 15 foot mounting height. Maximum calculated value = 3.3 fc

Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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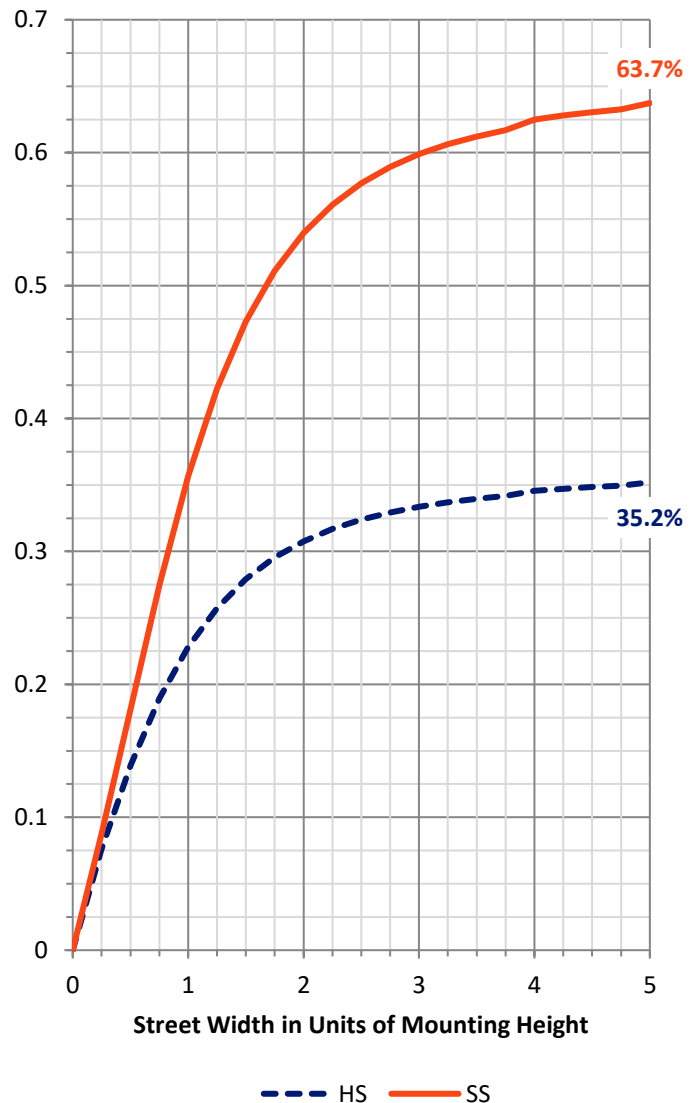
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 2191.7   | 0.0    | 2191.7 |
|                    | % Fixture | 35.7     | 0.0    | 35.7   |
| <b>Street Side</b> | Lumens    | 3953.8   | 0.0    | 3953.8 |
|                    | % Fixture | 64.3     | 0.0    | 64.3   |
| <b>Total</b>       | Lumens    | 6145.6   | 0.0    | 6145.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 48.9   | 0.8       |
| 10°-20°   | 166.7  | 2.7       |
| 20°-30°   | 351.8  | 5.7       |
| 30°-40°   | 647.5  | 10.5      |
| 40°-50°   | 1009.3 | 16.4      |
| 50°-60°   | 1326.2 | 21.6      |
| 60°-70°   | 1389.7 | 22.6      |
| 70°-80°   | 963.5  | 15.7      |
| 80°-90°   | 241.9  | 3.9       |
| 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°    | 6145.6 | 100.0     |
| 0°-180°   | 6145.6 | 100.0     |

**Coefficient of Utilization**



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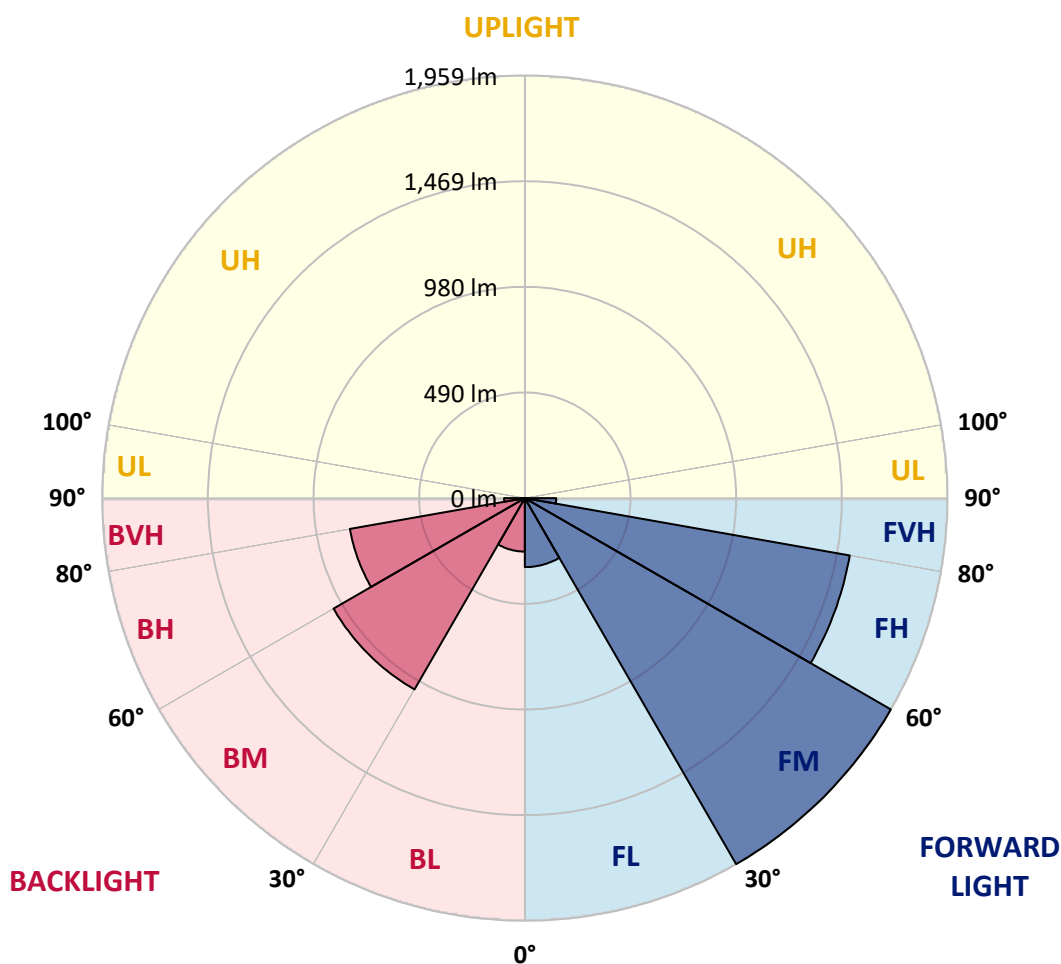
CATALOG NUMBER: CCP-VA-4-735-U-T4W

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 319.7  | 5.2       |                         |      |         |
| FM   | (30°-60°)   | 1959.1 | 31.9      |                         |      |         |
| FH   | (60°-80°)   | 1529.7 | 24.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 145.4  | 2.4       |                         |      | G2/225  |
| BL   | (0°-30°)    | 247.7  | 4.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 1024.0 | 16.7      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 823.5  | 13.4      | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 96.6   | 1.6       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 492.7  | 492.7  | 492.7  | 492.7  | 492.7  | 492.7  | 492.7  | 492.7  | 492.7  | 492.7  | 492.7  |
| 2.5°  | 499.6  | 499.6  | 499.6  | 498.2  | 498.2  | 498.2  | 496.8  | 496.8  | 496.8  | 495.4  | 494.0  |
| 5°    | 510.7  | 510.7  | 509.3  | 510.7  | 509.3  | 507.9  | 506.5  | 506.5  | 506.5  | 505.1  | 503.7  |
| 7.5°  | 525.9  | 527.3  | 525.9  | 527.3  | 525.9  | 524.5  | 521.7  | 521.7  | 520.3  | 517.6  | 514.8  |
| 10°   | 549.4  | 549.4  | 549.4  | 548.0  | 546.6  | 545.3  | 543.9  | 542.5  | 541.1  | 536.9  | 532.8  |
| 12.5° | 578.5  | 578.5  | 578.5  | 575.7  | 575.7  | 572.9  | 571.5  | 570.2  | 567.4  | 561.9  | 556.3  |
| 15°   | 614.4  | 613.1  | 617.2  | 617.2  | 615.8  | 615.8  | 611.7  | 608.9  | 606.1  | 597.8  | 585.4  |
| 17.5° | 662.9  | 661.5  | 665.6  | 668.4  | 668.4  | 669.8  | 662.9  | 660.1  | 650.4  | 639.4  | 622.7  |
| 20°   | 727.9  | 725.2  | 729.3  | 732.1  | 729.3  | 732.1  | 725.2  | 726.5  | 712.7  | 693.3  | 667.0  |
| 22.5° | 798.5  | 798.5  | 802.7  | 802.7  | 804.0  | 806.8  | 798.5  | 794.4  | 783.3  | 755.6  | 722.4  |
| 25°   | 885.7  | 892.6  | 892.6  | 892.6  | 898.1  | 899.5  | 891.2  | 884.3  | 869.1  | 831.7  | 786.0  |
| 27.5° | 992.2  | 990.9  | 989.5  | 997.8  | 997.8  | 1000.5 | 995.0  | 992.2  | 974.3  | 928.6  | 859.4  |
| 30°   | 1105.7 | 1097.4 | 1103.0 | 1105.7 | 1111.3 | 1115.4 | 1109.9 | 1101.6 | 1079.4 | 1029.6 | 943.8  |
| 32.5° | 1209.5 | 1215.1 | 1223.4 | 1226.1 | 1234.4 | 1235.8 | 1222.0 | 1222.0 | 1199.8 | 1136.2 | 1047.6 |
| 35°   | 1327.1 | 1327.1 | 1349.3 | 1359.0 | 1359.0 | 1367.3 | 1346.5 | 1335.5 | 1320.2 | 1253.8 | 1141.7 |
| 37.5° | 1429.6 | 1432.3 | 1450.3 | 1472.5 | 1475.2 | 1487.7 | 1472.5 | 1468.3 | 1440.6 | 1372.8 | 1248.3 |
| 40°   | 1525.0 | 1527.8 | 1550.0 | 1576.2 | 1591.5 | 1610.8 | 1595.6 | 1588.7 | 1559.6 | 1482.1 | 1354.8 |
| 42.5° | 1599.8 | 1605.3 | 1633.0 | 1671.7 | 1696.6 | 1720.2 | 1713.3 | 1709.1 | 1669.0 | 1587.3 | 1453.1 |
| 45°   | 1656.5 | 1666.2 | 1704.9 | 1750.6 | 1785.2 | 1819.8 | 1821.2 | 1812.9 | 1775.5 | 1684.2 | 1548.6 |
| 47.5° | 1702.2 | 1713.3 | 1756.2 | 1814.3 | 1866.9 | 1909.8 | 1918.1 | 1908.4 | 1873.8 | 1778.3 | 1634.4 |
| 50°   | 1739.5 | 1745.1 | 1793.5 | 1868.2 | 1933.3 | 1987.3 | 2003.9 | 1995.6 | 1965.1 | 1857.2 | 1709.1 |
| 52.5° | 1758.9 | 1767.2 | 1822.6 | 1908.4 | 1987.3 | 2052.3 | 2077.2 | 2073.1 | 2037.1 | 1929.1 | 1775.5 |
| 55°   | 1768.6 | 1776.9 | 1842.0 | 1940.2 | 2028.8 | 2104.9 | 2135.3 | 2136.7 | 2102.1 | 1994.2 | 1837.8 |
| 57.5° | 1757.5 | 1768.6 | 1839.2 | 1948.5 | 2046.8 | 2128.4 | 2175.5 | 2174.1 | 2146.4 | 2044.0 | 1890.4 |
| 59°   | 1738.2 | 1746.5 | 1822.6 | 1937.4 | 2044.0 | 2125.6 | 2179.6 | 2181.0 | 2156.1 | 2060.6 | 1913.9 |
| 60°   | 1716.0 | 1725.7 | 1803.2 | 1923.6 | 2032.9 | 2116.0 | 2172.7 | 2175.5 | 2154.7 | 2064.8 | 1923.6 |
| 62.5° | 1639.9 | 1652.4 | 1738.2 | 1866.9 | 1985.9 | 2064.8 | 2132.6 | 2136.7 | 2125.6 | 2053.7 | 1930.5 |
| 65°   | 1533.3 | 1544.4 | 1637.1 | 1774.1 | 1898.7 | 1980.3 | 2044.0 | 2053.7 | 2052.3 | 2003.9 | 1902.8 |
| 67.5° | 1403.3 | 1404.6 | 1491.8 | 1641.3 | 1771.4 | 1851.6 | 1912.5 | 1929.1 | 1941.6 | 1909.8 | 1821.2 |
| 70°   | 1246.9 | 1245.5 | 1329.9 | 1478.0 | 1608.1 | 1692.5 | 1753.4 | 1764.5 | 1796.3 | 1771.4 | 1699.4 |
| 72.5° | 1053.1 | 1069.7 | 1148.6 | 1273.2 | 1401.9 | 1496.0 | 1550.0 | 1570.7 | 1588.7 | 1594.2 | 1534.7 |
| 75°   | 870.5  | 888.5  | 950.7  | 1067.0 | 1177.7 | 1264.9 | 1323.0 | 1332.7 | 1365.9 | 1374.2 | 1318.8 |
| 77.5° | 696.1  | 697.5  | 743.1  | 835.9  | 936.9  | 1008.9 | 1055.9 | 1080.8 | 1098.8 | 1115.4 | 1057.3 |
| 80°   | 488.5  | 495.4  | 527.3  | 593.7  | 672.6  | 748.7  | 787.4  | 804.0  | 816.5  | 827.6  | 808.2  |
| 82.5° | 305.8  | 308.6  | 329.4  | 369.5  | 423.5  | 466.4  | 506.5  | 520.3  | 523.1  | 548.0  | 545.3  |
| 85°   | 145.3  | 146.7  | 160.5  | 179.9  | 203.4  | 238.0  | 253.3  | 253.3  | 272.6  | 290.6  | 290.6  |
| 87.5° | 19.4   | 19.4   | 23.5   | 26.3   | 33.2   | 42.9   | 59.5   | 60.9   | 72.0   | 80.3   | 87.2   |
| 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: CCP-VA-4-735-U-T4W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|
| 0°    | 492.7  | 492.7  | 492.7  | 492.7  | 492.7  | 492.7 | 492.7 | 492.7 | 492.7 | 492.7 | 492.7 |
| 2.5°  | 494.0  | 494.0  | 494.0  | 494.0  | 494.0  | 492.7 | 494.0 | 494.0 | 494.0 | 494.0 | 494.0 |
| 5°    | 503.7  | 502.4  | 501.0  | 499.6  | 499.6  | 498.2 | 498.2 | 498.2 | 498.2 | 498.2 | 498.2 |
| 7.5°  | 513.4  | 512.0  | 510.7  | 507.9  | 506.5  | 505.1 | 505.1 | 503.7 | 503.7 | 503.7 | 503.7 |
| 10°   | 530.0  | 528.6  | 523.1  | 519.0  | 516.2  | 514.8 | 513.4 | 512.0 | 510.7 | 510.7 | 510.7 |
| 12.5° | 552.2  | 549.4  | 539.7  | 534.2  | 530.0  | 527.3 | 524.5 | 523.1 | 521.7 | 520.3 | 520.3 |
| 15°   | 579.8  | 572.9  | 560.5  | 552.2  | 546.6  | 542.5 | 538.3 | 535.6 | 534.2 | 532.8 | 532.8 |
| 17.5° | 613.1  | 604.8  | 588.2  | 572.9  | 563.2  | 556.3 | 550.8 | 546.6 | 545.3 | 545.3 | 545.3 |
| 20°   | 654.6  | 640.7  | 617.2  | 596.5  | 581.2  | 571.5 | 563.2 | 559.1 | 557.7 | 556.3 | 554.9 |
| 22.5° | 703.0  | 685.0  | 650.4  | 618.6  | 599.2  | 585.4 | 575.7 | 570.2 | 566.0 | 564.6 | 564.6 |
| 25°   | 758.4  | 732.1  | 686.4  | 647.7  | 621.4  | 602.0 | 589.5 | 582.6 | 575.7 | 572.9 | 572.9 |
| 27.5° | 824.8  | 790.2  | 729.3  | 678.1  | 642.1  | 618.6 | 604.8 | 595.1 | 588.2 | 582.6 | 579.8 |
| 30°   | 896.8  | 858.0  | 776.4  | 711.3  | 665.6  | 639.4 | 622.7 | 611.7 | 602.0 | 592.3 | 590.9 |
| 32.5° | 988.1  | 932.7  | 833.1  | 748.7  | 693.3  | 660.1 | 640.7 | 626.9 | 614.4 | 604.8 | 602.0 |
| 35°   | 1080.8 | 1014.4 | 892.6  | 787.4  | 719.6  | 679.5 | 656.0 | 640.7 | 628.3 | 617.2 | 615.8 |
| 37.5° | 1176.3 | 1105.7 | 957.6  | 833.1  | 750.1  | 701.6 | 672.6 | 656.0 | 640.7 | 629.7 | 628.3 |
| 40°   | 1275.9 | 1192.9 | 1024.1 | 880.2  | 781.9  | 723.8 | 690.6 | 669.8 | 653.2 | 643.5 | 642.1 |
| 42.5° | 1370.0 | 1280.1 | 1096.0 | 935.5  | 819.3  | 747.3 | 708.5 | 686.4 | 665.6 | 656.0 | 654.6 |
| 45°   | 1460.0 | 1363.1 | 1168.0 | 986.7  | 856.6  | 772.2 | 726.5 | 700.2 | 678.1 | 668.4 | 667.0 |
| 47.5° | 1541.6 | 1444.8 | 1234.4 | 1042.1 | 895.4  | 799.9 | 745.9 | 714.1 | 689.2 | 679.5 | 679.5 |
| 50°   | 1615.0 | 1514.0 | 1299.5 | 1093.3 | 931.4  | 827.6 | 762.5 | 726.5 | 701.6 | 691.9 | 690.6 |
| 52.5° | 1684.2 | 1574.9 | 1356.2 | 1137.6 | 966.0  | 852.5 | 779.1 | 736.2 | 709.9 | 698.9 | 697.5 |
| 55°   | 1739.5 | 1630.2 | 1403.3 | 1173.5 | 989.5  | 869.1 | 790.2 | 741.8 | 712.7 | 703.0 | 701.6 |
| 57.5° | 1788.0 | 1675.9 | 1436.5 | 1198.4 | 1004.7 | 878.8 | 795.7 | 741.8 | 711.3 | 700.2 | 698.9 |
| 59°   | 1808.7 | 1695.3 | 1447.5 | 1205.4 | 1007.5 | 880.2 | 794.4 | 737.6 | 705.8 | 694.7 | 691.9 |
| 60°   | 1819.8 | 1703.6 | 1451.7 | 1206.7 | 1006.1 | 877.4 | 793.0 | 733.5 | 700.2 | 687.8 | 687.8 |
| 62.5° | 1830.9 | 1710.5 | 1446.2 | 1195.7 | 990.9  | 862.2 | 779.1 | 716.9 | 679.5 | 665.6 | 665.6 |
| 65°   | 1807.4 | 1685.6 | 1414.3 | 1165.2 | 960.4  | 835.9 | 752.8 | 689.2 | 647.7 | 633.8 | 633.8 |
| 67.5° | 1738.2 | 1624.7 | 1356.2 | 1108.5 | 910.6  | 790.2 | 709.9 | 644.9 | 606.1 | 590.9 | 586.8 |
| 70°   | 1620.5 | 1525.0 | 1264.9 | 1026.8 | 842.8  | 732.1 | 656.0 | 593.7 | 553.6 | 538.3 | 532.8 |
| 72.5° | 1462.8 | 1368.7 | 1143.1 | 927.2  | 752.8  | 656.0 | 589.5 | 530.0 | 485.7 | 470.5 | 471.9 |
| 75°   | 1245.5 | 1179.1 | 985.3  | 801.3  | 649.0  | 559.1 | 503.7 | 453.9 | 416.5 | 404.1 | 405.5 |
| 77.5° | 1010.2 | 954.9  | 798.5  | 653.2  | 530.0  | 460.8 | 413.8 | 373.6 | 348.7 | 341.8 | 337.7 |
| 80°   | 773.6  | 719.6  | 599.2  | 487.1  | 402.7  | 354.3 | 322.4 | 294.8 | 275.4 | 265.7 | 268.5 |
| 82.5° | 519.0  | 485.7  | 397.2  | 322.4  | 274.0  | 239.4 | 228.3 | 210.4 | 203.4 | 197.9 | 202.0 |
| 85°   | 279.5  | 250.5  | 207.6  | 173.0  | 150.8  | 141.2 | 143.9 | 142.5 | 137.0 | 135.6 | 139.8 |
| 87.5° | 91.3   | 78.9   | 60.9   | 51.2   | 52.6   | 47.1  | 47.1  | 44.3  | 40.1  | 38.7  | 41.5  |
| 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: SP1-2005-785-21

Luminaire Tested: WIS-VA-3-735-U-T4FT

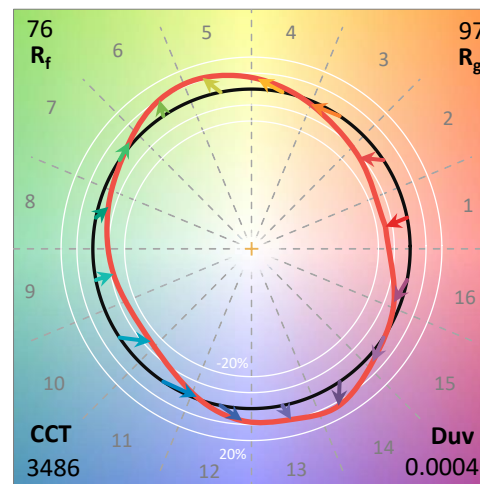
Test Date: 09/08/2020

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2005-785-21  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 09/08/2020  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **WIS-VA-3-735-U-T4FT**  
 Description: INVUE WALL PACK VA

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3486   | CRI (Ra): | 74.4 |      |       |
| CIE u':                   | 0.2358 | R1:       | 72.3 | R9:  | -12.4 |
| CIE v':                   | 0.5120 | R2:       | 80.7 | R10: | 53.8  |
| Duv:                      | 0.0004 | R3:       | 87.0 | R11: | 69.3  |
| CIE x:                    | 0.4064 | R4:       | 73.6 | R12: | 46.2  |
| CIE y:                    | 0.3921 | R5:       | 71.0 | R13: | 73.4  |
| CIE z:                    | 0.2015 | R6:       | 72.2 | R14: | 92.2  |
| Peak Wavelength (nm):     | 593    | R7:       | 82.3 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 56.3 |      |       |
| Purity:                   | 39.9   |           |      |      |       |
| Rf:                       | 75.7   |           |      |      |       |
| Rg:                       | 96.5   |           |      |      |       |



### Test Conditions

Stabilization Time: 82M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.0/46%  
 Sphere Temperature (°C): 25.7

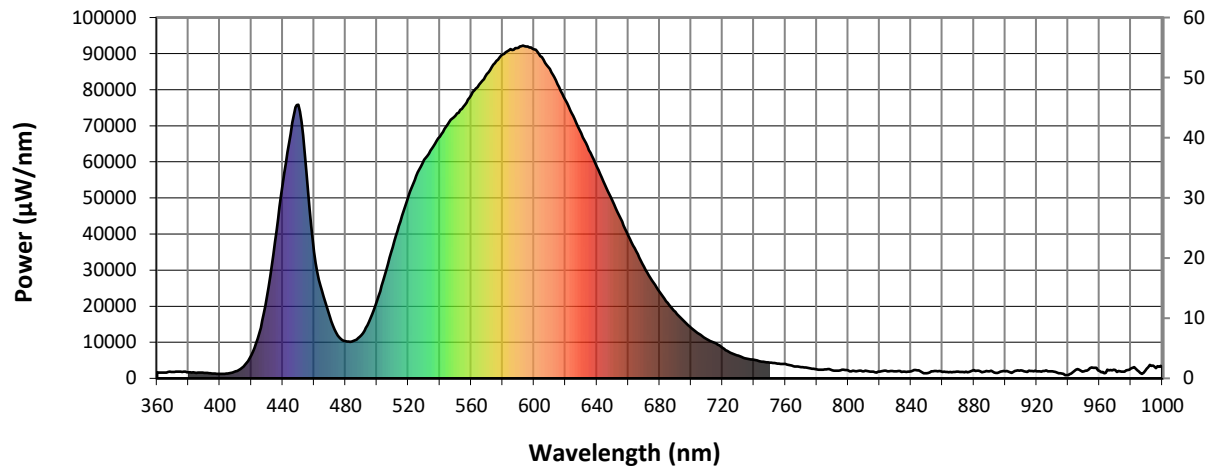
REPORT NUMBER: SP1-2005-785-21

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



REPORT NUMBER: SP1-2005-785-21

### Photopic Flux vs. Wavelength

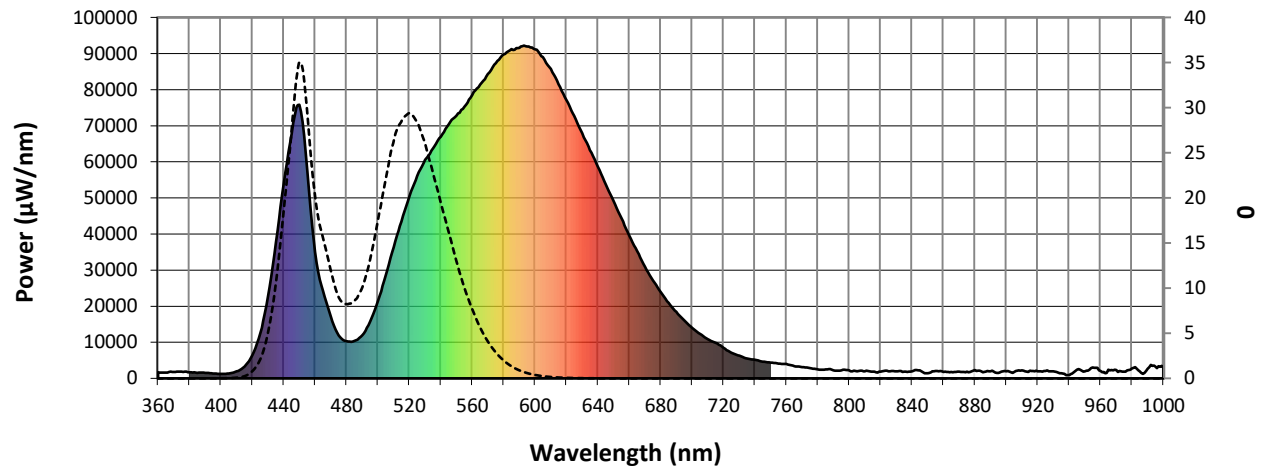


#####

| 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       | 1694             | 0.0              | 490       | 11961            | 1.7              | 620       | 77036            | 20.0             | 750       | 4377             | 0.0              | 880       | 2271             | 0.0              |
| 365       | 1591             | 0.0              | 495       | 15721            | 2.9              | 625       | 72716            | 16.0             | 755       | 4117             | 0.0              | 885       | 1711             | 0.0              |
| 370       | 1770             | 0.0              | 500       | 21514            | 4.7              | 630       | 67928            | 12.3             | 760       | 3969             | 0.0              | 890       | 1986             | 0.0              |
| 375       | 1835             | 0.0              | 505       | 28551            | 8.0              | 635       | 63273            | 9.5              | 765       | 3416             | 0.0              | 895       | 1480             | 0.0              |
| 380       | 1657             | 0.0              | 510       | 36348            | 12.5             | 640       | 58591            | 7.0              | 770       | 3118             | 0.0              | 900       | 1982             | 0.0              |
| 385       | 1511             | 0.0              | 515       | 43490            | 18.0             | 645       | 53669            | 5.2              | 775       | 2846             | 0.0              | 905       | 1794             | 0.0              |
| 390       | 1503             | 0.0              | 520       | 50496            | 24.5             | 650       | 49111            | 3.6              | 780       | 2519             | 0.0              | 910       | 2237             | 0.0              |
| 395       | 1343             | 0.0              | 525       | 56037            | 30.1             | 655       | 44337            | 2.5              | 785       | 2487             | 0.0              | 915       | 2093             | 0.0              |
| 400       | 1254             | 0.0              | 530       | 60528            | 35.6             | 660       | 39548            | 1.6              | 790       | 2260             | 0.0              | 920       | 1980             | 0.0              |
| 405       | 1336             | 0.0              | 535       | 63727            | 39.5             | 665       | 35203            | 1.1              | 795       | 2240             | 0.0              | 925       | 2079             | 0.0              |
| 410       | 1922             | 0.0              | 540       | 66952            | 43.6             | 670       | 30911            | 0.7              | 800       | 2233             | 0.0              | 930       | 1991             | 0.0              |
| 415       | 3268             | 0.0              | 545       | 70402            | 46.9             | 675       | 27162            | 0.5              | 805       | 1992             | 0.0              | 935       | 1439             | 0.0              |
| 420       | 6421             | 0.0              | 550       | 72833            | 49.5             | 680       | 23988            | 0.3              | 810       | 1999             | 0.0              | 940       | 919              | 0.0              |
| 425       | 12531            | 0.1              | 555       | 75261            | 51.4             | 685       | 20923            | 0.2              | 815       | 1886             | 0.0              | 945       | 2356             | 0.0              |
| 430       | 22703            | 0.2              | 560       | 78503            | 53.3             | 690       | 18421            | 0.1              | 820       | 1871             | 0.0              | 950       | 1926             | 0.0              |
| 435       | 37769            | 0.4              | 565       | 81450            | 54.2             | 695       | 16019            | 0.1              | 825       | 1948             | 0.0              | 955       | 3062             | 0.0              |
| 440       | 53851            | 0.8              | 570       | 84341            | 54.8             | 700       | 14014            | 0.0              | 830       | 1931             | 0.0              | 960       | 2083             | 0.0              |
| 445       | 67798            | 1.4              | 575       | 87351            | 54.4             | 705       | 12348            | 0.0              | 835       | 1891             | 0.0              | 965       | 2372             | 0.0              |
| 450       | 75835            | 2.0              | 580       | 89722            | 53.3             | 710       | 10862            | 0.0              | 840       | 1993             | 0.0              | 970       | 2341             | 0.0              |
| 455       | 57420            | 1.9              | 585       | 91274            | 50.7             | 715       | 9815             | 0.0              | 845       | 2230             | 0.0              | 975       | 1835             | 0.0              |
| 460       | 34998            | 1.4              | 590       | 91636            | 47.4             | 720       | 8417             | 0.0              | 850       | 1466             | 0.0              | 980       | 2784             | 0.0              |
| 465       | 24175            | 1.2              | 595       | 91960            | 43.6             | 725       | 7131             | 0.0              | 855       | 2043             | 0.0              | 985       | 1945             | 0.0              |
| 470       | 16967            | 1.1              | 600       | 91208            | 39.3             | 730       | 6277             | 0.0              | 860       | 1799             | 0.0              | 990       | 2689             | 0.0              |
| 475       | 11915            | 0.9              | 605       | 88999            | 34.5             | 735       | 5498             | 0.0              | 865       | 1810             | 0.0              | 995       | 3194             | 0.0              |
| 480       | 10261            | 1.0              | 610       | 85799            | 29.5             | 740       | 5155             | 0.0              | 870       | 1854             | 0.0              | 1000      | 3112             | 0.0              |
| 485       | 10367            | 1.2              | 615       | 81543            | 24.6             | 745       | 4609             | 0.0              | 875       | 1868             | 0.0              |           |                  |                  |

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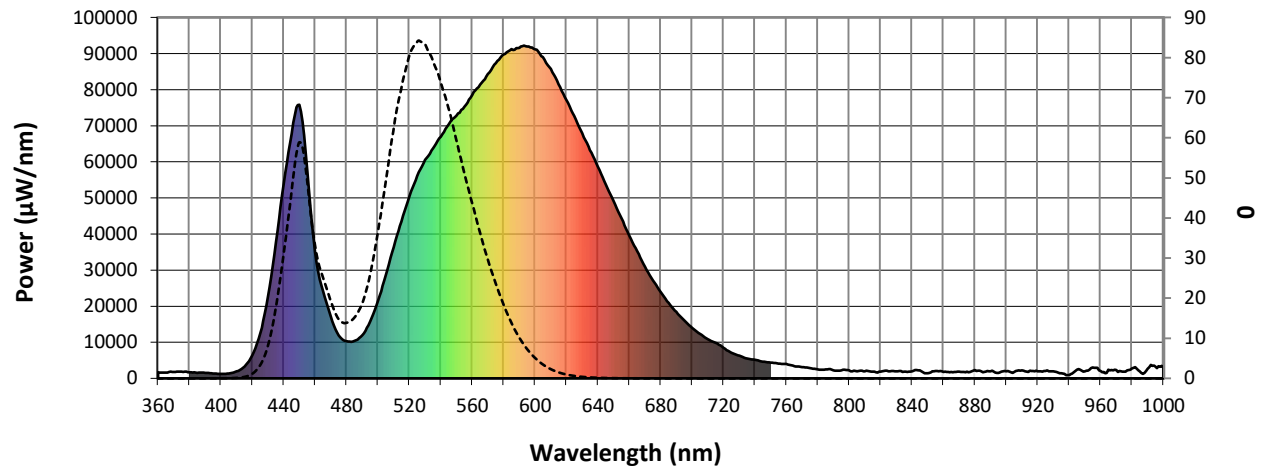
### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 2555.9**
**S/P: 0.51**

| 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       | 1694             | 0.0              | 490       | 11961            | 18.4             | 620       | 77036            | 1.0              | 750       | 4377             | 0.0              | 880       | 2271             | 0.0              |
| 365       | 1591             | 0.0              | 495       | 15721            | 25.4             | 625       | 72716            | 0.6              | 755       | 4117             | 0.0              | 885       | 1711             | 0.0              |
| 370       | 1770             | 0.0              | 500       | 21514            | 36.0             | 630       | 67928            | 0.4              | 760       | 3969             | 0.0              | 890       | 1986             | 0.0              |
| 375       | 1835             | 0.0              | 505       | 28551            | 48.5             | 635       | 63273            | 0.2              | 765       | 3416             | 0.0              | 895       | 1480             | 0.0              |
| 380       | 1657             | 0.0              | 510       | 36348            | 61.6             | 640       | 58591            | 0.1              | 770       | 3118             | 0.0              | 900       | 1982             | 0.0              |
| 385       | 1511             | 0.0              | 515       | 43490            | 72.1             | 645       | 53669            | 0.1              | 775       | 2846             | 0.0              | 905       | 1794             | 0.0              |
| 390       | 1503             | 0.0              | 520       | 50496            | 80.3             | 650       | 49111            | 0.1              | 780       | 2519             | 0.0              | 910       | 2237             | 0.0              |
| 395       | 1343             | 0.0              | 525       | 56037            | 83.8             | 655       | 44337            | 0.0              | 785       | 2487             | 0.0              | 915       | 2093             | 0.0              |
| 400       | 1254             | 0.0              | 530       | 60528            | 83.4             | 660       | 39548            | 0.0              | 790       | 2260             | 0.0              | 920       | 1980             | 0.0              |
| 405       | 1336             | 0.0              | 535       | 63727            | 79.4             | 665       | 35203            | 0.0              | 795       | 2240             | 0.0              | 925       | 2079             | 0.0              |
| 410       | 1922             | 0.1              | 540       | 66952            | 74.0             | 670       | 30911            | 0.0              | 800       | 2233             | 0.0              | 930       | 1991             | 0.0              |
| 415       | 3268             | 0.3              | 545       | 70402            | 67.5             | 675       | 27162            | 0.0              | 805       | 1992             | 0.0              | 935       | 1439             | 0.0              |
| 420       | 6421             | 1.1              | 550       | 72833            | 59.6             | 680       | 23988            | 0.0              | 810       | 1999             | 0.0              | 940       | 919              | 0.0              |
| 425       | 12531            | 3.1              | 555       | 75261            | 51.4             | 685       | 20923            | 0.0              | 815       | 1886             | 0.0              | 945       | 2356             | 0.0              |
| 430       | 22703            | 7.7              | 560       | 78503            | 43.9             | 690       | 18421            | 0.0              | 820       | 1871             | 0.0              | 950       | 1926             | 0.0              |
| 435       | 37769            | 16.9             | 565       | 81450            | 36.5             | 695       | 16019            | 0.0              | 825       | 1948             | 0.0              | 955       | 3062             | 0.0              |
| 440       | 53851            | 30.1             | 570       | 84341            | 29.8             | 700       | 14014            | 0.0              | 830       | 1931             | 0.0              | 960       | 2083             | 0.0              |
| 445       | 67798            | 45.4             | 575       | 87351            | 23.8             | 705       | 12348            | 0.0              | 835       | 1891             | 0.0              | 965       | 2372             | 0.0              |
| 450       | 75835            | 58.8             | 580       | 89722            | 18.5             | 710       | 10862            | 0.0              | 840       | 1993             | 0.0              | 970       | 2341             | 0.0              |
| 455       | 57420            | 50.2             | 585       | 91274            | 13.9             | 715       | 9815             | 0.0              | 845       | 2230             | 0.0              | 975       | 1835             | 0.0              |
| 460       | 34998            | 33.8             | 590       | 91636            | 10.2             | 720       | 8417             | 0.0              | 850       | 1466             | 0.0              | 980       | 2784             | 0.0              |
| 465       | 24175            | 25.5             | 595       | 91960            | 7.3              | 725       | 7131             | 0.0              | 855       | 2043             | 0.0              | 985       | 1945             | 0.0              |
| 470       | 16967            | 19.5             | 600       | 91208            | 5.1              | 730       | 6277             | 0.0              | 860       | 1799             | 0.0              | 990       | 2689             | 0.0              |
| 475       | 11915            | 14.9             | 605       | 88999            | 3.5              | 735       | 5498             | 0.0              | 865       | 1810             | 0.0              | 995       | 3194             | 0.0              |
| 480       | 10261            | 13.9             | 610       | 85799            | 2.3              | 740       | 5155             | 0.0              | 870       | 1854             | 0.0              | 1000      | 3112             | 0.0              |
| 485       | 10367            | 15.0             | 615       | 81543            | 1.5              | 745       | 4609             | 0.0              | 875       | 1868             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 6884**
**S/P: 1.37**

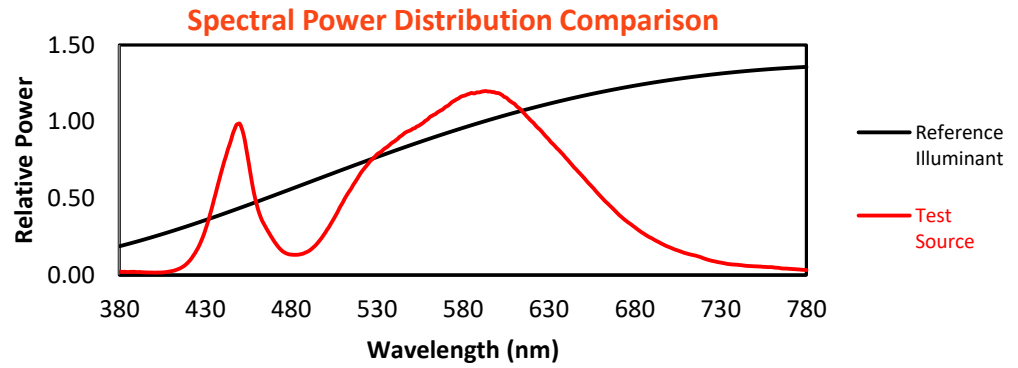
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1694             | 0.0              | 490       | 11961            | 10.0             | 620       | 77036            | 0.1              | 750       | 4377             | 0.0              | 880       | 2271             | 0.0              |
| 365       | 1591             | 0.0              | 495       | 15721            | 13.0             | 625       | 72716            | 0.0              | 755       | 4117             | 0.0              | 885       | 1711             | 0.0              |
| 370       | 1770             | 0.0              | 500       | 21514            | 17.3             | 630       | 67928            | 0.0              | 760       | 3969             | 0.0              | 890       | 1986             | 0.0              |
| 375       | 1835             | 0.0              | 505       | 28551            | 21.9             | 635       | 63273            | 0.0              | 765       | 3416             | 0.0              | 895       | 1480             | 0.0              |
| 380       | 1657             | 0.0              | 510       | 36348            | 26.1             | 640       | 58591            | 0.0              | 770       | 3118             | 0.0              | 900       | 1982             | 0.0              |
| 385       | 1511             | 0.0              | 515       | 43490            | 28.4             | 645       | 53669            | 0.0              | 775       | 2846             | 0.0              | 905       | 1794             | 0.0              |
| 390       | 1503             | 0.0              | 520       | 50496            | 29.4             | 650       | 49111            | 0.0              | 780       | 2519             | 0.0              | 910       | 2237             | 0.0              |
| 395       | 1343             | 0.0              | 525       | 56037            | 28.4             | 655       | 44337            | 0.0              | 785       | 2487             | 0.0              | 915       | 2093             | 0.0              |
| 400       | 1254             | 0.0              | 530       | 60528            | 26.2             | 660       | 39548            | 0.0              | 790       | 2260             | 0.0              | 920       | 1980             | 0.0              |
| 405       | 1336             | 0.0              | 535       | 63727            | 22.9             | 665       | 35203            | 0.0              | 795       | 2240             | 0.0              | 925       | 2079             | 0.0              |
| 410       | 1922             | 0.1              | 540       | 66952            | 19.6             | 670       | 30911            | 0.0              | 800       | 2233             | 0.0              | 930       | 1991             | 0.0              |
| 415       | 3268             | 0.2              | 545       | 70402            | 16.4             | 675       | 27162            | 0.0              | 805       | 1992             | 0.0              | 935       | 1439             | 0.0              |
| 420       | 6421             | 0.7              | 550       | 72833            | 13.1             | 680       | 23988            | 0.0              | 810       | 1999             | 0.0              | 940       | 919              | 0.0              |
| 425       | 12531            | 2.0              | 555       | 75261            | 10.1             | 685       | 20923            | 0.0              | 815       | 1886             | 0.0              | 945       | 2356             | 0.0              |
| 430       | 22703            | 4.8              | 560       | 78503            | 7.7              | 690       | 18421            | 0.0              | 820       | 1871             | 0.0              | 950       | 1926             | 0.0              |
| 435       | 37769            | 10.1             | 565       | 81450            | 5.7              | 695       | 16019            | 0.0              | 825       | 1948             | 0.0              | 955       | 3062             | 0.0              |
| 440       | 53851            | 18.0             | 570       | 84341            | 4.1              | 700       | 14014            | 0.0              | 830       | 1931             | 0.0              | 960       | 2083             | 0.0              |
| 445       | 67798            | 26.7             | 575       | 87351            | 2.9              | 705       | 12348            | 0.0              | 835       | 1891             | 0.0              | 965       | 2372             | 0.0              |
| 450       | 75835            | 34.9             | 580       | 89722            | 2.0              | 710       | 10862            | 0.0              | 840       | 1993             | 0.0              | 970       | 2341             | 0.0              |
| 455       | 57420            | 30.1             | 585       | 91274            | 1.4              | 715       | 9815             | 0.0              | 845       | 2230             | 0.0              | 975       | 1835             | 0.0              |
| 460       | 34998            | 20.6             | 590       | 91636            | 0.9              | 720       | 8417             | 0.0              | 850       | 1466             | 0.0              | 980       | 2784             | 0.0              |
| 465       | 24175            | 15.8             | 595       | 91960            | 0.6              | 725       | 7131             | 0.0              | 855       | 2043             | 0.0              | 985       | 1945             | 0.0              |
| 470       | 16967            | 12.1             | 600       | 91208            | 0.4              | 730       | 6277             | 0.0              | 860       | 1799             | 0.0              | 990       | 2689             | 0.0              |
| 475       | 11915            | 9.1              | 605       | 88999            | 0.2              | 735       | 5498             | 0.0              | 865       | 1810             | 0.0              | 995       | 3194             | 0.0              |
| 480       | 10261            | 8.2              | 610       | 85799            | 0.2              | 740       | 5155             | 0.0              | 870       | 1854             | 0.0              | 1000      | 3112             | 0.0              |
| 485       | 10367            | 8.5              | 615       | 81543            | 0.1              | 745       | 4609             | 0.0              | 875       | 1868             | 0.0              |           |                  |                  |

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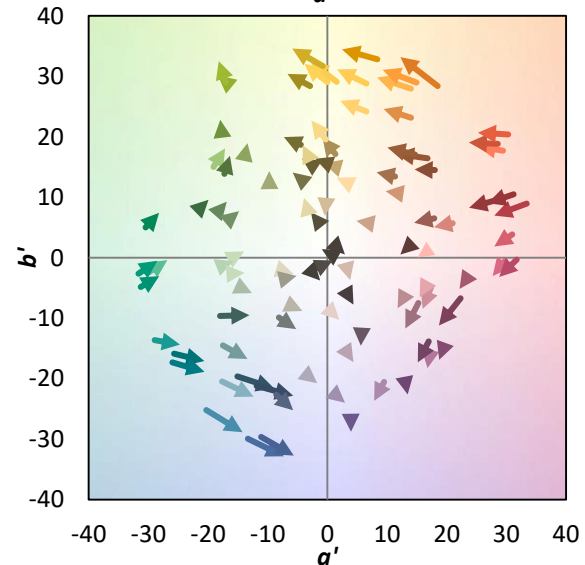
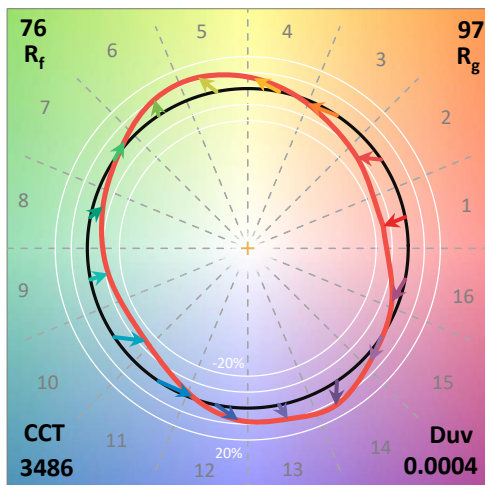
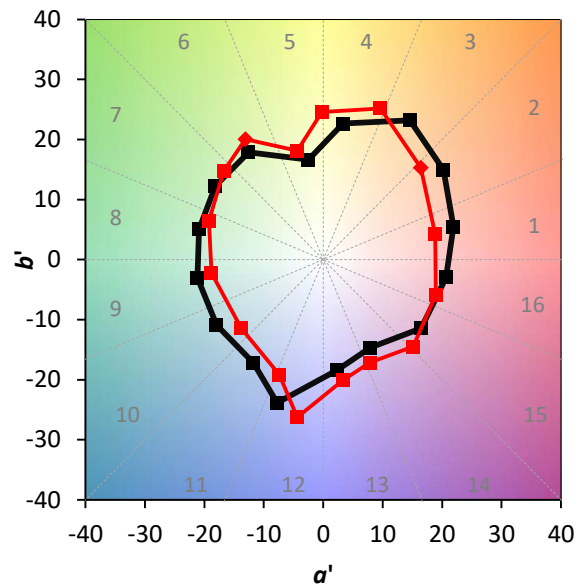
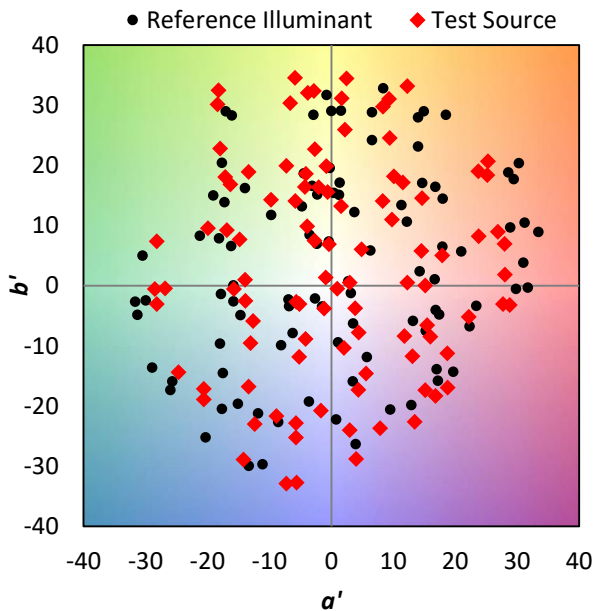
TM-30-18

### Summary

$R_f = 75.7$   
 $R_g = 96.5$   
 CIE  $R_a = 74.4$   
 $R_g = -12.4$



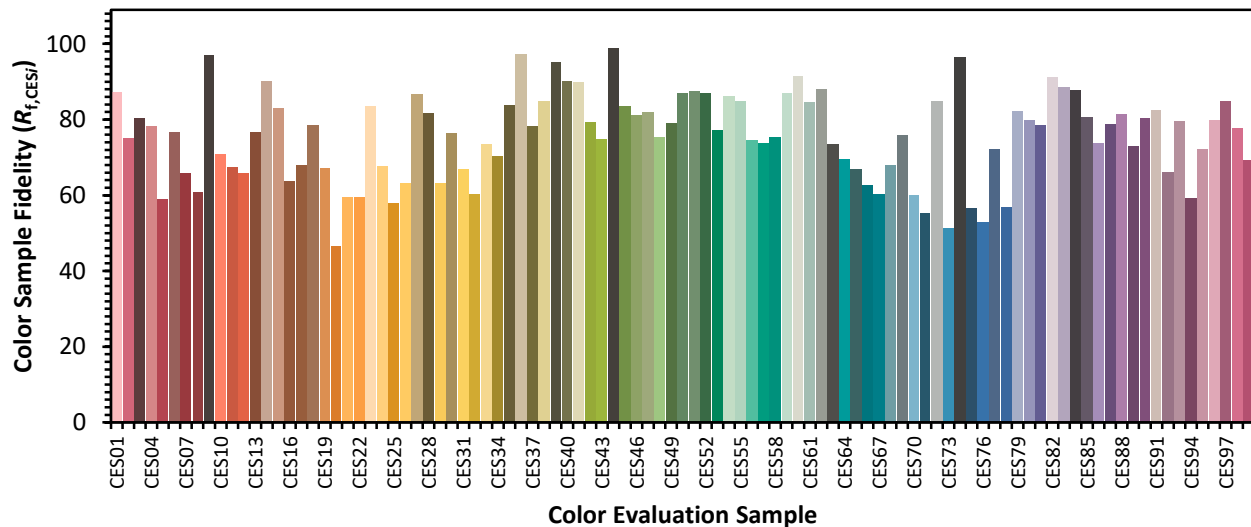
### Color Vector Graphics

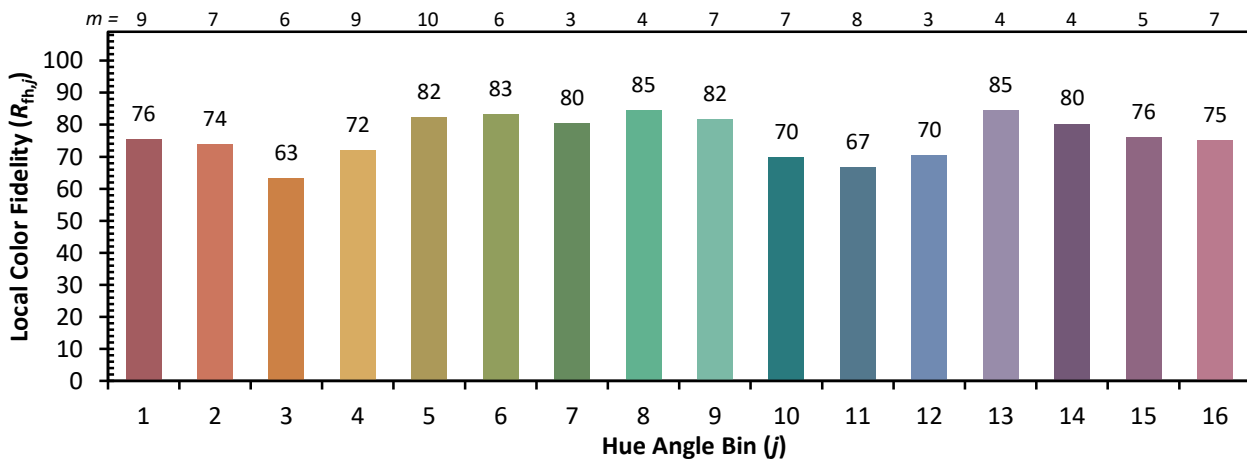
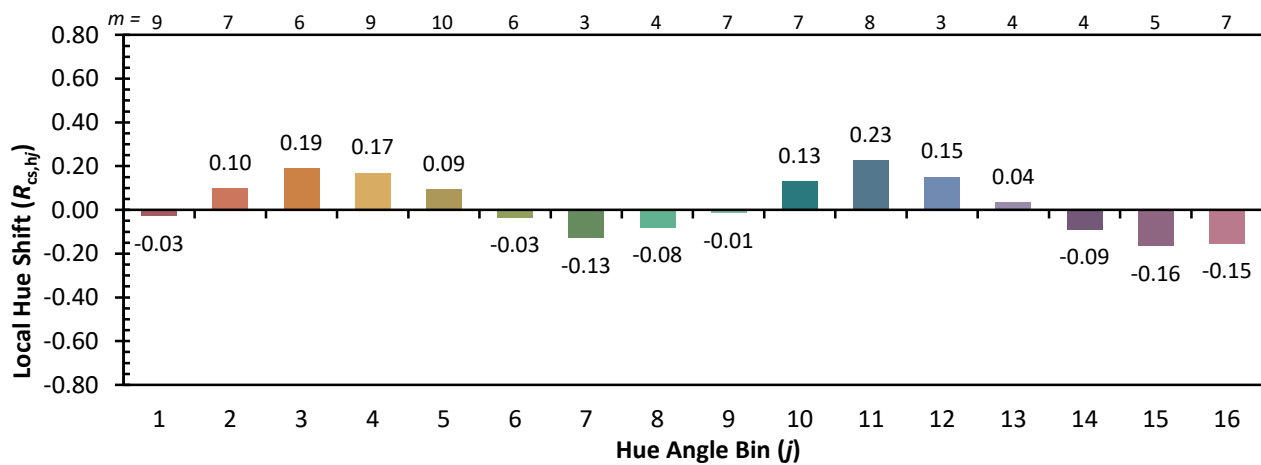
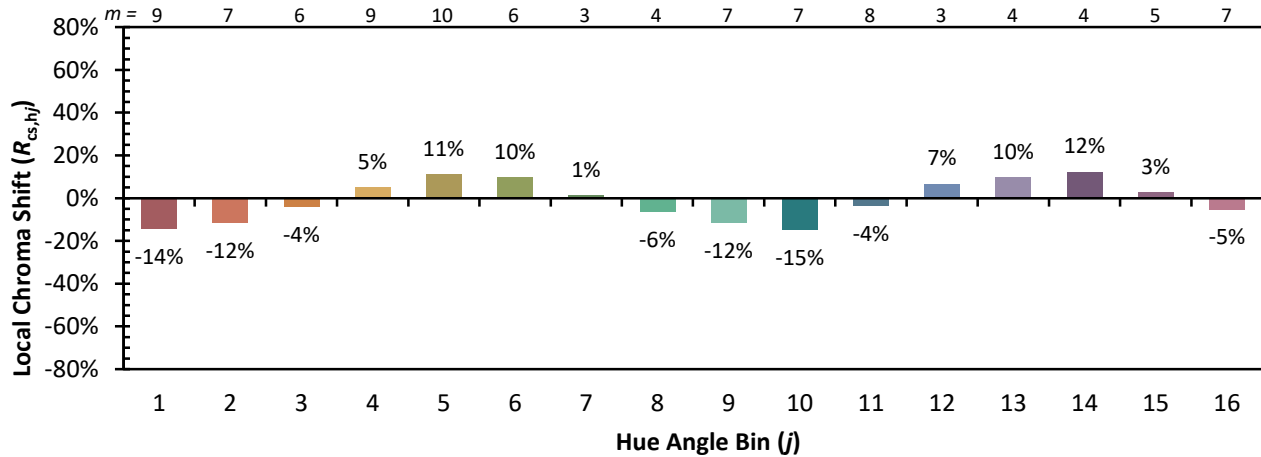




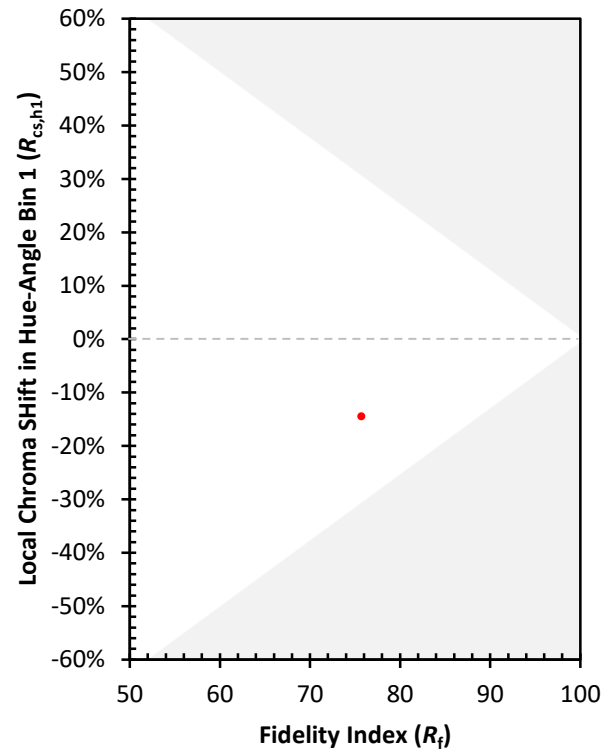
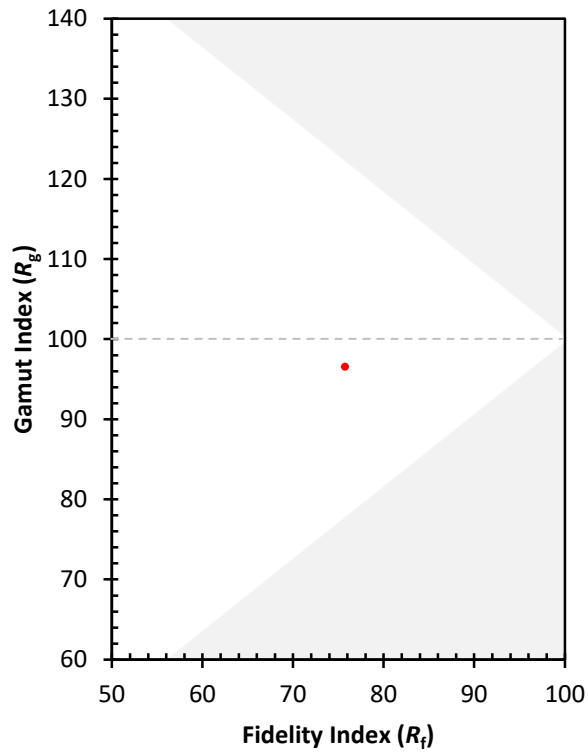
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 63 | CES51 = 88 | CES76 = 53 |
| CES02 = 62 | CES27 = 87 | CES52 = 87 | CES77 = 72 |
| CES03 = 31 | CES28 = 82 | CES53 = 77 | CES78 = 57 |
| CES04 = 70 | CES29 = 63 | CES54 = 86 | CES79 = 82 |
| CES05 = 48 | CES30 = 76 | CES55 = 85 | CES80 = 80 |
| CES06 = 51 | CES31 = 67 | CES56 = 75 | CES81 = 79 |
| CES07 = 41 | CES32 = 60 | CES57 = 74 | CES82 = 91 |
| CES08 = 40 | CES33 = 73 | CES58 = 75 | CES83 = 89 |
| CES09 = 29 | CES34 = 70 | CES59 = 87 | CES84 = 88 |
| CES10 = 75 | CES35 = 84 | CES60 = 91 | CES85 = 81 |
| CES11 = 58 | CES36 = 97 | CES61 = 85 | CES86 = 74 |
| CES12 = 64 | CES37 = 78 | CES62 = 88 | CES87 = 79 |
| CES13 = 43 | CES38 = 85 | CES63 = 73 | CES88 = 82 |
| CES14 = 74 | CES39 = 95 | CES64 = 70 | CES89 = 73 |
| CES15 = 71 | CES40 = 90 | CES65 = 67 | CES90 = 80 |
| CES16 = 47 | CES41 = 90 | CES66 = 63 | CES91 = 82 |
| CES17 = 50 | CES42 = 79 | CES67 = 60 | CES92 = 66 |
| CES18 = 56 | CES43 = 75 | CES68 = 68 | CES93 = 80 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 59 |
| CES20 = 65 | CES45 = 84 | CES70 = 60 | CES95 = 72 |
| CES21 = 86 | CES46 = 81 | CES71 = 55 | CES96 = 80 |
| CES22 = 79 | CES47 = 82 | CES72 = 85 | CES97 = 85 |
| CES23 = 92 | CES48 = 75 | CES73 = 51 | CES98 = 78 |
| CES24 = 91 | CES49 = 79 | CES74 = 97 | CES99 = 69 |
| CES25 = 72 | CES50 = 87 | CES75 = 57 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)