

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: P472270

Luminaire Tested: **CCP-VA-2-735-U-T4FT**

Issue Date: 01/27/2021



**Test Information**

Test Method: LM-79-08  
Report Number: P472270  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 01/27/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-VA-2-735-U-T4FT  
Description: INVUE CLEARCURVE POLE MOUNT Wave Stream LUMINAIRE WITH T4FT  
DISTRIBUTION LENS  
Light Source: 3500K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4372.5 lumens  
Efficiency: N/A  
Efficacy: 107.4 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 40.7  
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

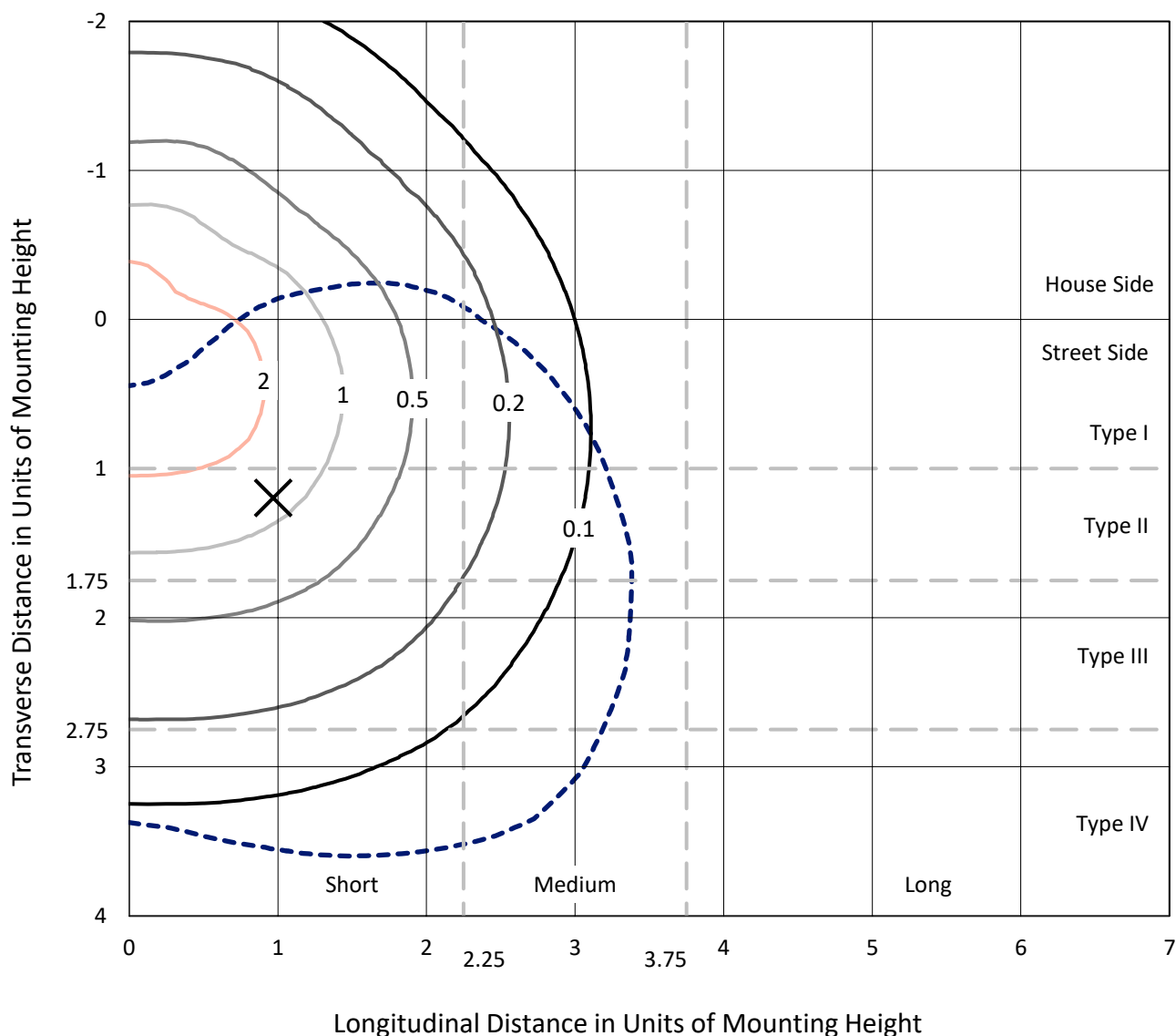
REPORT NUMBER: P472270

CATALOG NUMBER: CCP-VA-2-735-U-T4FT

## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

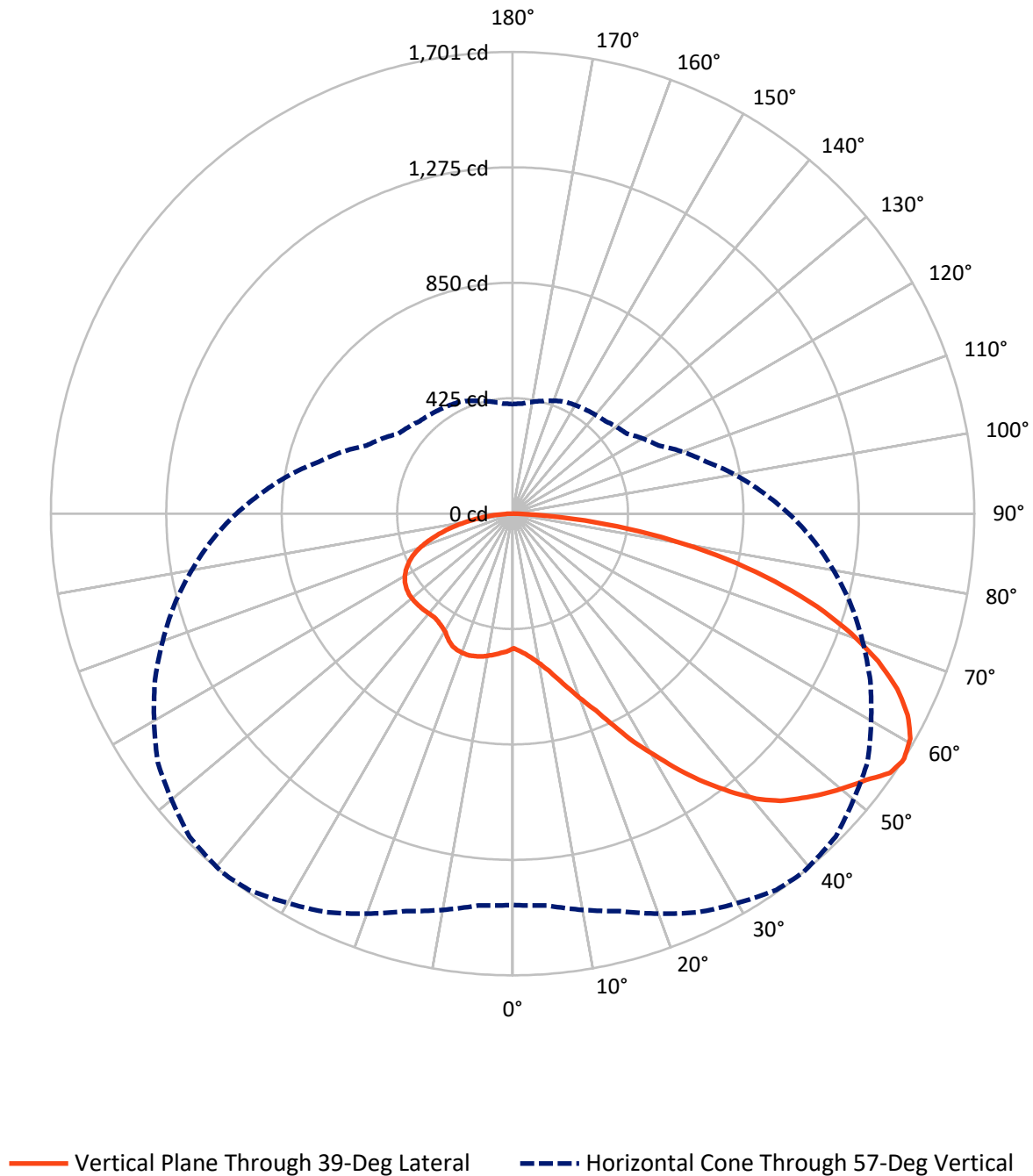


Based on 15 foot mounting height. Maximum calculated value = 3 fc

Type IV - Short - N/A

REPORT NUMBER: P472270  
CATALOG NUMBER: CCP-VA-2-735-U-T4FT

## Luminous Intensity Polar Plot



REPORT NUMBER: P472270

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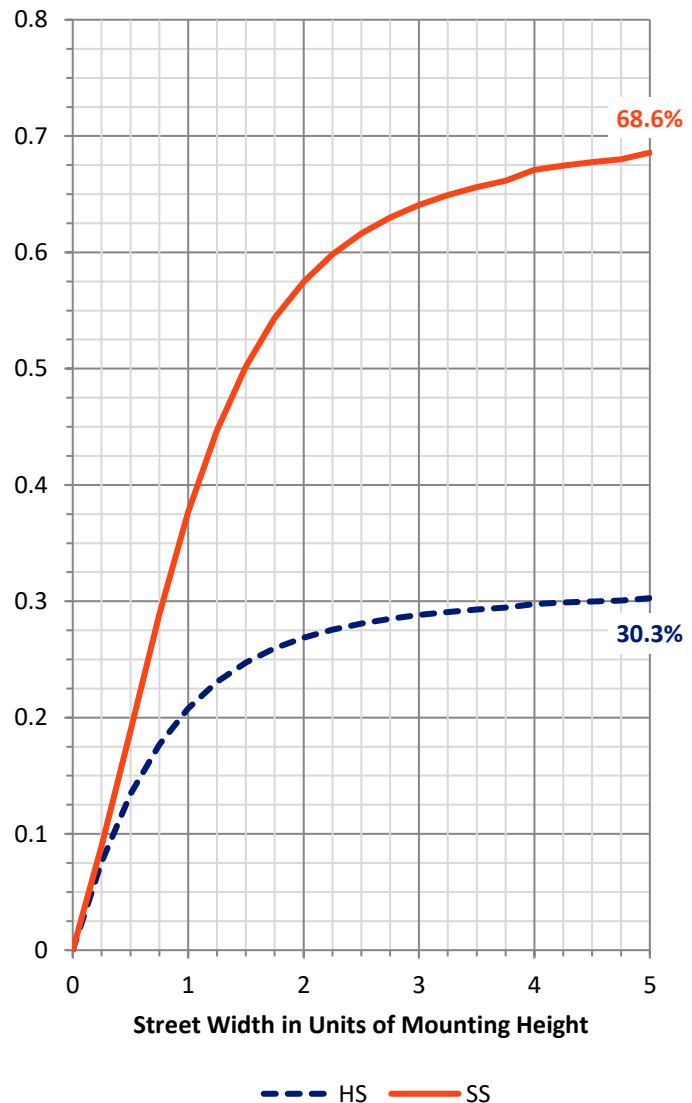
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1341.6   | 0.0    | 1341.6 |
|                    | % Fixture | 30.7     | 0.0    | 30.7   |
| <b>Street Side</b> | Lumens    | 3030.8   | 0.0    | 3030.8 |
|                    | % Fixture | 69.3     | 0.0    | 69.3   |
| <b>Total</b>       | Lumens    | 4372.5   | 0.0    | 4372.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 50.2   | 1.1       |
| 10°-20°   | 167.4  | 3.8       |
| 20°-30°   | 323.4  | 7.4       |
| 30°-40°   | 523.1  | 12.0      |
| 40°-50°   | 735.0  | 16.8      |
| 50°-60°   | 907.9  | 20.8      |
| 60°-70°   | 902.4  | 20.6      |
| 70°-80°   | 610.6  | 14.0      |
| 80°-90°   | 152.4  | 3.5       |
| 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°    | 4372.5 | 100.0     |
| 0°-180°   | 4372.5 | 100.0     |



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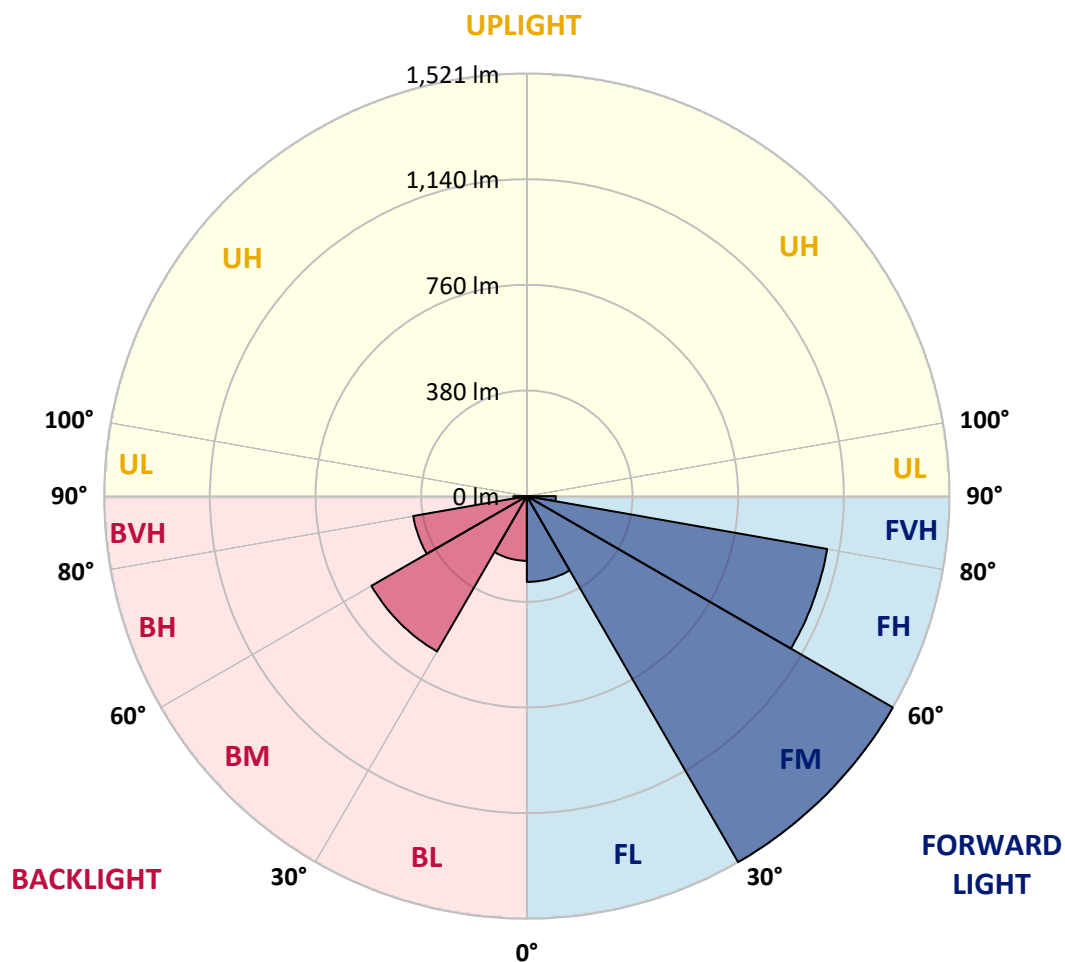
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 308.5  | 7.1       |                         |      |         |
| FM   | (30°-60°)   | 1520.5 | 34.8      |                         |      |         |
| FH   | (60°-80°)   | 1097.5 | 25.1      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 104.3  | 2.4       |                         |      | G2/225  |
| BL   | (0°-30°)    | 232.5  | 5.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 645.5  | 14.8      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 415.5  | 9.5       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 48.1   | 1.1       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type IV Short





REPORT NUMBER: P472270

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 39°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 495.8  | 495.8  | 495.8  | 495.8  | 495.8  | 495.8  | 495.8  | 495.8  | 495.8  | 495.8  | 495.8  |
| 2.5°  | 510.6  | 509.9  | 509.2  | 509.2  | 507.9  | 506.5  | 505.9  | 504.5  | 505.2  | 506.5  | 507.2  |
| 5°    | 525.3  | 524.0  | 524.0  | 522.6  | 520.6  | 520.6  | 518.6  | 515.9  | 515.2  | 514.6  | 514.6  |
| 7.5°  | 548.1  | 546.1  | 546.7  | 544.7  | 542.7  | 540.0  | 536.7  | 533.3  | 532.0  | 527.3  | 523.3  |
| 10°   | 574.2  | 573.5  | 571.5  | 568.2  | 566.2  | 563.5  | 560.1  | 554.1  | 549.4  | 544.1  | 540.7  |
| 12.5° | 605.0  | 603.7  | 604.4  | 601.7  | 598.3  | 593.6  | 588.3  | 582.2  | 573.5  | 563.5  | 556.8  |
| 15°   | 645.2  | 642.5  | 642.5  | 641.9  | 635.2  | 633.8  | 628.5  | 615.1  | 603.0  | 589.6  | 574.2  |
| 17.5° | 694.1  | 693.5  | 690.8  | 688.1  | 684.1  | 679.4  | 674.0  | 659.3  | 641.2  | 620.4  | 599.7  |
| 20°   | 746.4  | 745.1  | 747.1  | 743.1  | 735.0  | 733.0  | 724.3  | 707.5  | 685.4  | 661.3  | 629.8  |
| 22.5° | 803.4  | 804.7  | 804.7  | 803.4  | 796.7  | 788.6  | 781.2  | 759.1  | 733.7  | 704.2  | 667.3  |
| 25°   | 872.4  | 873.0  | 877.1  | 881.1  | 877.1  | 864.3  | 854.3  | 820.1  | 785.9  | 748.4  | 704.9  |
| 27.5° | 950.1  | 945.4  | 956.8  | 964.2  | 956.8  | 953.4  | 931.3  | 893.8  | 846.9  | 800.0  | 745.7  |
| 30°   | 1025.1 | 1025.1 | 1034.5 | 1045.2 | 1040.5 | 1032.5 | 1014.4 | 966.2  | 912.6  | 852.9  | 787.3  |
| 32.5° | 1094.8 | 1102.9 | 1106.9 | 1131.7 | 1129.0 | 1125.0 | 1104.2 | 1040.5 | 973.5  | 905.9  | 827.5  |
| 35°   | 1177.2 | 1174.5 | 1191.3 | 1206.7 | 1218.8 | 1213.4 | 1198.0 | 1133.7 | 1045.9 | 961.5  | 871.7  |
| 37.5° | 1239.5 | 1244.9 | 1259.6 | 1287.1 | 1295.8 | 1298.5 | 1279.1 | 1212.7 | 1112.9 | 1021.1 | 920.6  |
| 40°   | 1287.1 | 1291.1 | 1319.3 | 1354.1 | 1372.2 | 1381.6 | 1362.2 | 1281.7 | 1175.9 | 1068.7 | 958.8  |
| 42.5° | 1325.3 | 1328.0 | 1357.5 | 1407.0 | 1437.2 | 1446.6 | 1429.2 | 1344.1 | 1229.5 | 1106.9 | 990.3  |
| 45°   | 1350.8 | 1355.5 | 1390.3 | 1441.2 | 1488.1 | 1494.8 | 1486.1 | 1399.0 | 1277.1 | 1143.1 | 1013.1 |
| 47.5° | 1372.9 | 1378.2 | 1417.1 | 1481.4 | 1533.7 | 1542.4 | 1534.3 | 1447.2 | 1322.6 | 1175.9 | 1032.5 |
| 50°   | 1402.4 | 1408.4 | 1447.2 | 1518.9 | 1576.6 | 1586.6 | 1583.9 | 1498.2 | 1365.5 | 1212.7 | 1052.6 |
| 52.5° | 1430.5 | 1435.2 | 1481.4 | 1561.1 | 1623.5 | 1630.2 | 1628.1 | 1545.7 | 1409.1 | 1252.3 | 1078.1 |
| 55°   | 1452.6 | 1458.0 | 1512.9 | 1611.4 | 1678.4 | 1685.8 | 1671.7 | 1582.6 | 1443.2 | 1281.1 | 1102.2 |
| 57°   | 1441.2 | 1448.6 | 1515.6 | 1620.1 | 1692.5 | 1700.5 | 1682.4 | 1596.0 | 1453.3 | 1289.1 | 1110.9 |
| 57.5° | 1437.9 | 1443.2 | 1512.9 | 1619.4 | 1693.1 | 1700.5 | 1682.4 | 1595.3 | 1452.6 | 1288.4 | 1110.9 |
| 60°   | 1389.0 | 1401.7 | 1480.1 | 1595.3 | 1673.7 | 1683.1 | 1665.7 | 1568.5 | 1435.9 | 1269.7 | 1092.8 |
| 62.5° | 1323.3 | 1340.7 | 1423.1 | 1538.4 | 1626.8 | 1633.5 | 1616.1 | 1523.6 | 1398.3 | 1230.2 | 1055.3 |
| 65°   | 1228.8 | 1255.6 | 1342.1 | 1453.3 | 1549.1 | 1557.1 | 1539.7 | 1448.6 | 1336.0 | 1169.9 | 999.0  |
| 67.5° | 1136.4 | 1152.4 | 1244.9 | 1350.8 | 1439.9 | 1451.9 | 1437.2 | 1356.1 | 1250.3 | 1089.5 | 924.0  |
| 70°   | 1031.2 | 1042.6 | 1118.9 | 1222.8 | 1312.6 | 1322.6 | 1309.9 | 1234.2 | 1134.3 | 989.6  | 836.2  |
| 72.5° | 904.5  | 916.6  | 981.6  | 1077.4 | 1157.1 | 1173.2 | 1164.5 | 1086.1 | 995.7  | 870.4  | 738.4  |
| 75°   | 761.8  | 775.2  | 833.5  | 909.9  | 987.6  | 997.0  | 986.9  | 929.3  | 847.6  | 734.3  | 619.1  |
| 77.5° | 617.8  | 626.5  | 668.7  | 726.3  | 786.6  | 806.7  | 804.0  | 763.2  | 680.7  | 591.0  | 497.2  |
| 80°   | 462.3  | 463.7  | 485.8  | 533.3  | 581.6  | 596.3  | 599.7  | 562.8  | 508.5  | 440.9  | 372.5  |
| 82.5° | 292.1  | 296.8  | 308.9  | 344.4  | 367.8  | 387.9  | 392.6  | 371.2  | 337.0  | 294.8  | 252.6  |
| 85°   | 136.0  | 132.0  | 141.4  | 153.4  | 186.9  | 186.9  | 193.0  | 181.6  | 171.5  | 157.5  | 130.7  |
| 87.5° | 11.4   | 10.7   | 10.7   | 11.4   | 18.1   | 19.4   | 30.8   | 34.2   | 36.9   | 36.9   | 38.9   |
| 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: P472270

CATALOG NUMBER: CCP-VA-2-735-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 495.8  | 495.8 | 495.8 | 495.8 | 495.8 | 495.8 | 495.8 | 495.8 | 495.8 | 495.8 | 495.8 |
| 2.5°  | 505.9  | 505.2 | 503.2 | 503.2 | 504.5 | 506.5 | 507.2 | 507.9 | 508.5 | 509.2 | 509.2 |
| 5°    | 513.9  | 513.2 | 511.9 | 510.6 | 511.9 | 512.6 | 514.6 | 515.9 | 515.9 | 517.3 | 516.6 |
| 7.5°  | 521.3  | 521.9 | 520.6 | 519.9 | 519.9 | 521.3 | 524.0 | 526.0 | 527.3 | 528.0 | 529.3 |
| 10°   | 538.0  | 534.0 | 528.6 | 526.0 | 526.0 | 528.6 | 531.3 | 534.0 | 536.7 | 538.0 | 538.0 |
| 12.5° | 552.8  | 548.1 | 538.0 | 534.0 | 533.3 | 536.0 | 539.4 | 543.4 | 545.4 | 547.4 | 547.4 |
| 15°   | 566.2  | 562.1 | 550.1 | 540.7 | 538.0 | 540.0 | 544.1 | 548.7 | 552.1 | 554.1 | 554.1 |
| 17.5° | 591.6  | 579.6 | 563.5 | 548.1 | 542.7 | 543.4 | 548.1 | 552.8 | 556.8 | 558.1 | 557.5 |
| 20°   | 615.7  | 600.3 | 576.2 | 554.1 | 545.4 | 542.7 | 547.4 | 553.4 | 556.8 | 558.8 | 558.8 |
| 22.5° | 643.2  | 626.5 | 588.9 | 560.1 | 544.1 | 540.0 | 544.1 | 549.4 | 553.4 | 554.8 | 556.1 |
| 25°   | 682.1  | 652.6 | 603.0 | 564.8 | 542.0 | 534.0 | 536.7 | 542.0 | 546.7 | 547.4 | 546.7 |
| 27.5° | 716.9  | 683.4 | 621.8 | 569.5 | 537.4 | 522.6 | 519.9 | 524.0 | 531.3 | 536.0 | 537.4 |
| 30°   | 747.1  | 716.3 | 641.2 | 573.5 | 528.6 | 503.9 | 500.5 | 501.8 | 506.5 | 519.3 | 519.9 |
| 32.5° | 792.0  | 744.4 | 660.6 | 576.9 | 518.6 | 493.8 | 489.1 | 487.8 | 489.1 | 495.8 | 495.8 |
| 35°   | 822.8  | 775.9 | 680.1 | 582.9 | 511.2 | 485.8 | 481.1 | 479.1 | 477.7 | 471.0 | 469.0 |
| 37.5° | 863.0  | 810.7 | 698.8 | 588.3 | 507.9 | 482.4 | 475.7 | 477.1 | 470.4 | 451.6 | 446.2 |
| 40°   | 907.2  | 842.2 | 717.6 | 593.6 | 509.2 | 483.1 | 477.1 | 476.4 | 465.0 | 438.9 | 433.5 |
| 42.5° | 928.6  | 869.0 | 737.0 | 601.0 | 514.6 | 485.1 | 479.7 | 477.7 | 463.7 | 434.2 | 426.8 |
| 45°   | 949.4  | 888.4 | 751.1 | 607.0 | 519.9 | 487.8 | 481.1 | 479.1 | 463.0 | 430.2 | 424.8 |
| 47.5° | 968.2  | 900.5 | 757.8 | 610.4 | 524.0 | 489.8 | 481.7 | 478.4 | 459.6 | 428.1 | 422.8 |
| 50°   | 976.9  | 907.2 | 757.8 | 610.4 | 525.3 | 491.8 | 480.4 | 475.7 | 454.3 | 424.8 | 420.1 |
| 52.5° | 990.3  | 911.2 | 751.8 | 606.4 | 523.3 | 491.8 | 477.7 | 470.4 | 447.6 | 420.1 | 416.1 |
| 55°   | 1010.4 | 918.6 | 743.7 | 600.3 | 518.6 | 487.8 | 473.0 | 463.0 | 438.2 | 413.4 | 410.1 |
| 57°   | 1017.1 | 921.3 | 738.4 | 593.0 | 513.2 | 482.4 | 467.7 | 454.9 | 429.5 | 406.7 | 403.4 |
| 57.5° | 1015.8 | 919.9 | 736.4 | 591.0 | 511.2 | 480.4 | 466.3 | 452.9 | 427.5 | 405.4 | 402.0 |
| 60°   | 997.7  | 907.2 | 723.6 | 578.2 | 500.5 | 469.7 | 454.3 | 439.5 | 413.4 | 394.0 | 391.3 |
| 62.5° | 968.2  | 878.4 | 700.8 | 561.5 | 485.8 | 454.9 | 438.9 | 422.1 | 396.0 | 379.2 | 377.9 |
| 65°   | 917.9  | 830.2 | 668.0 | 537.4 | 467.0 | 435.5 | 418.1 | 400.0 | 377.2 | 362.5 | 358.5 |
| 67.5° | 834.2  | 765.8 | 621.8 | 503.9 | 438.2 | 411.4 | 392.6 | 373.9 | 353.1 | 340.4 | 337.7 |
| 70°   | 764.5  | 695.5 | 562.8 | 461.6 | 403.4 | 377.9 | 360.5 | 342.4 | 324.3 | 312.9 | 312.2 |
| 72.5° | 676.1  | 609.7 | 489.1 | 409.4 | 359.1 | 334.3 | 320.9 | 304.9 | 290.8 | 280.7 | 280.7 |
| 75°   | 568.8  | 516.6 | 412.7 | 347.1 | 306.2 | 288.1 | 276.7 | 264.0 | 251.9 | 245.2 | 246.6 |
| 77.5° | 452.3  | 412.7 | 337.0 | 280.7 | 250.6 | 238.5 | 227.8 | 220.4 | 213.1 | 207.0 | 207.7 |
| 80°   | 333.7  | 304.2 | 247.9 | 206.4 | 191.6 | 180.9 | 178.9 | 174.2 | 170.2 | 168.2 | 164.8 |
| 82.5° | 228.5  | 202.3 | 164.8 | 141.4 | 130.7 | 127.3 | 128.0 | 128.0 | 128.6 | 128.6 | 127.3 |
| 85°   | 118.6  | 108.5 | 83.8  | 75.7  | 74.4  | 77.7  | 81.7  | 84.4  | 83.8  | 83.8  | 81.7  |
| 87.5° | 34.2   | 30.8  | 26.8  | 24.1  | 25.5  | 27.5  | 24.1  | 23.5  | 22.8  | 22.1  | 22.1  |
| 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

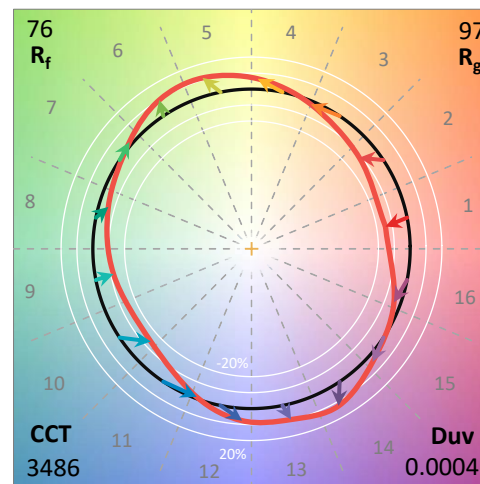
Test Date: 09/08/2020

### 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

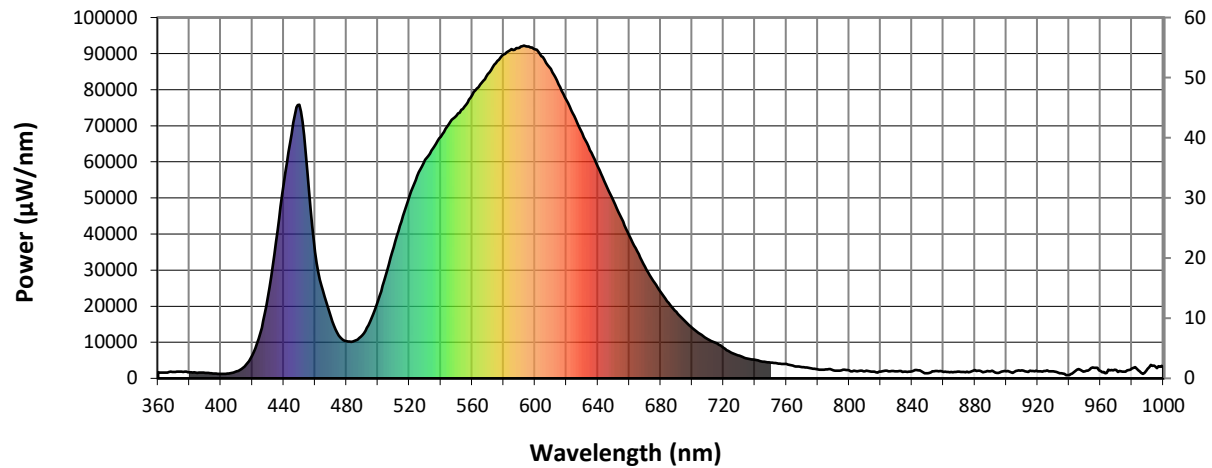
REPORT NUMBER: SP1-2005-785-21

| 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            |



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### Photopic Flux vs. Wavelength

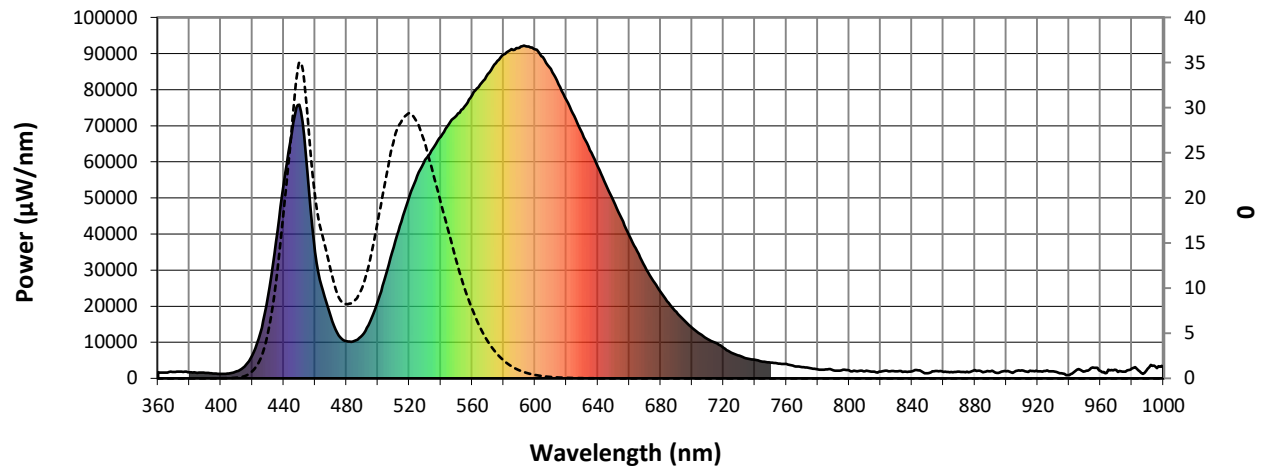


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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 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              |           |                  |                  |

REPORT NUMBER: SP1-2005-785-21

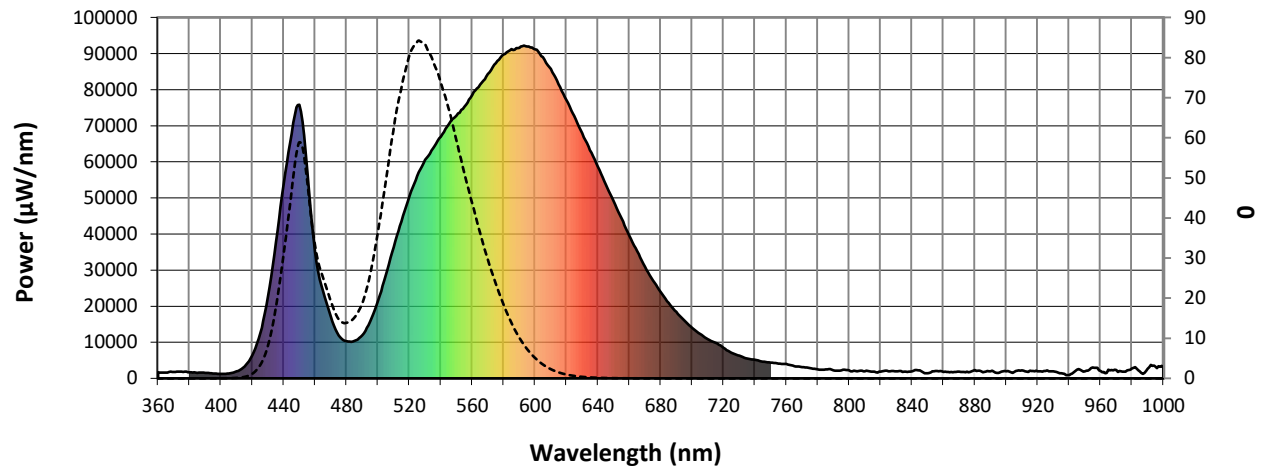
### Scotopic Flux vs. Wavelength


**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              |           |                  |                  |

REPORT NUMBER: SP1-2005-785-21

### 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              |           |                  |                  |

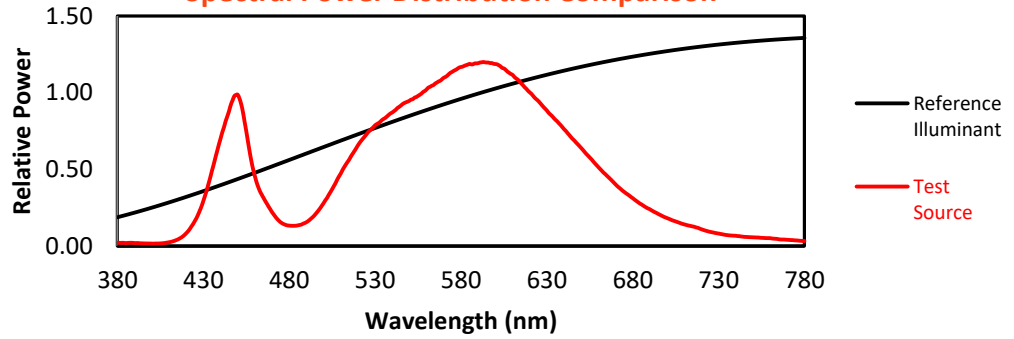
REPORT NUMBER: SP1-2005-785-21

TM-30-18

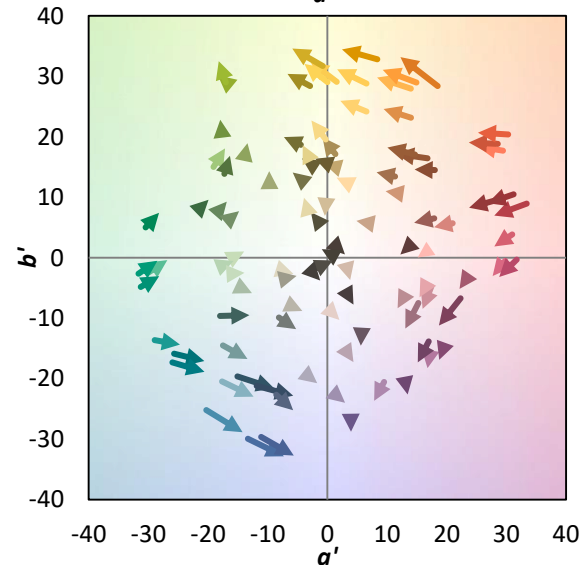
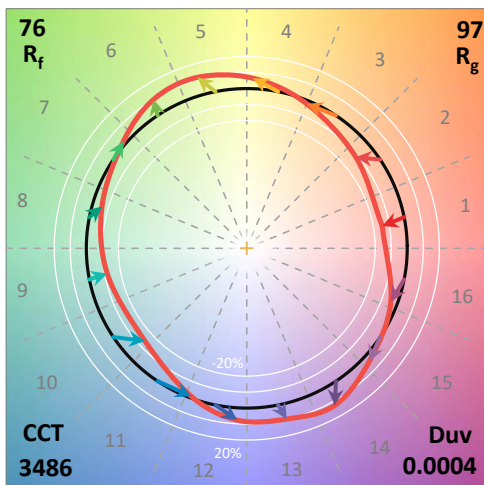
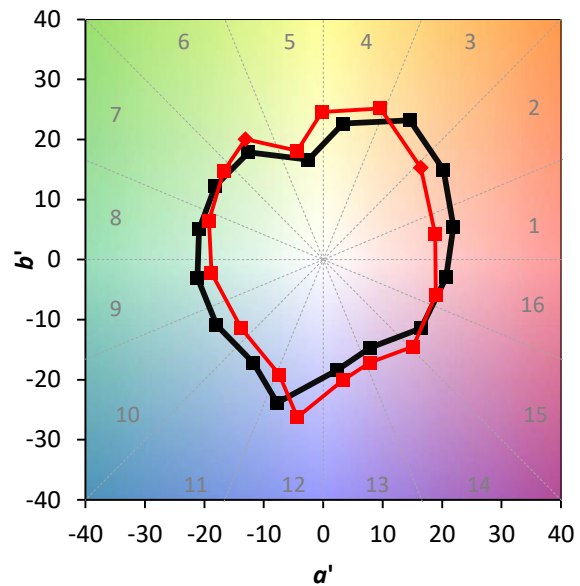
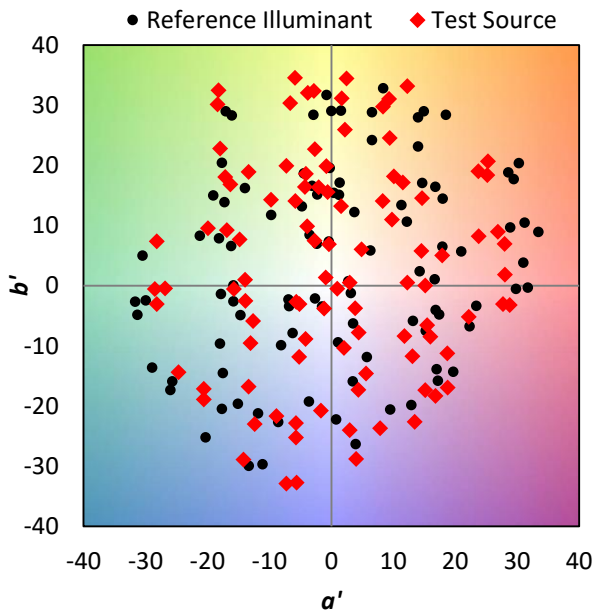
### Summary

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

### Spectral Power Distribution Comparison

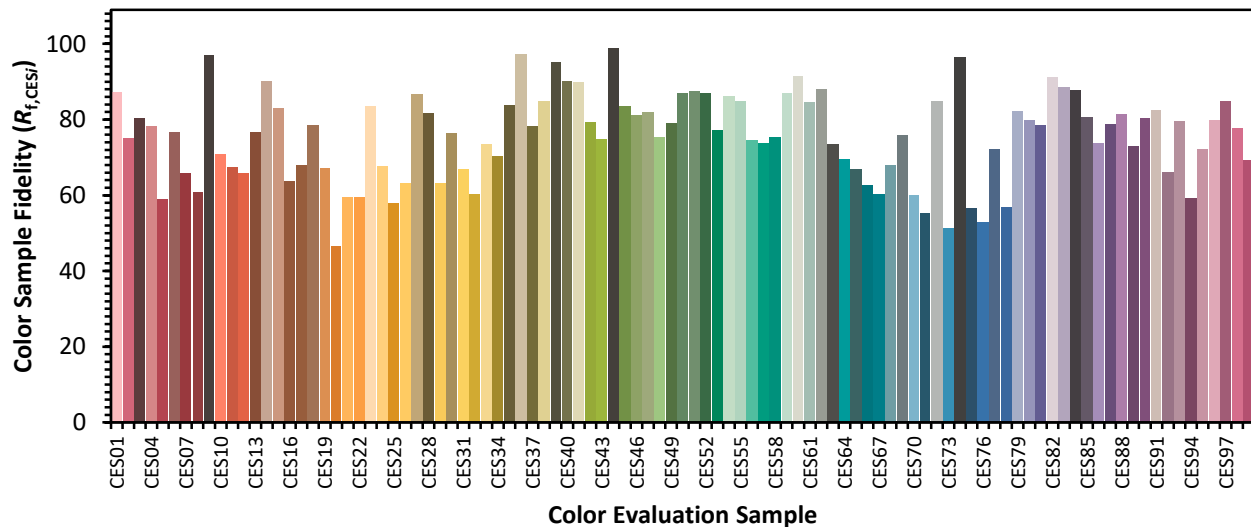


### Color Vector Graphics

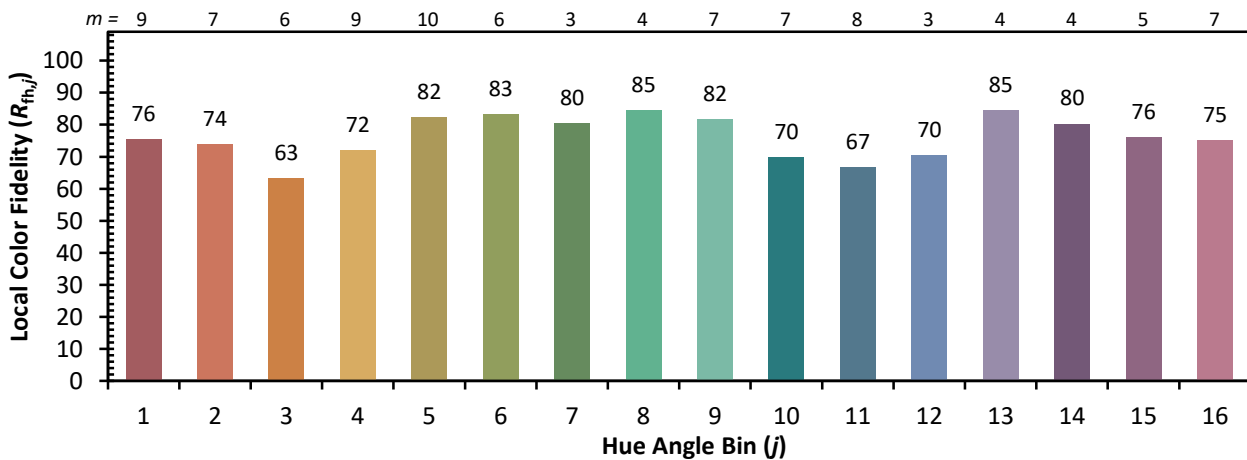
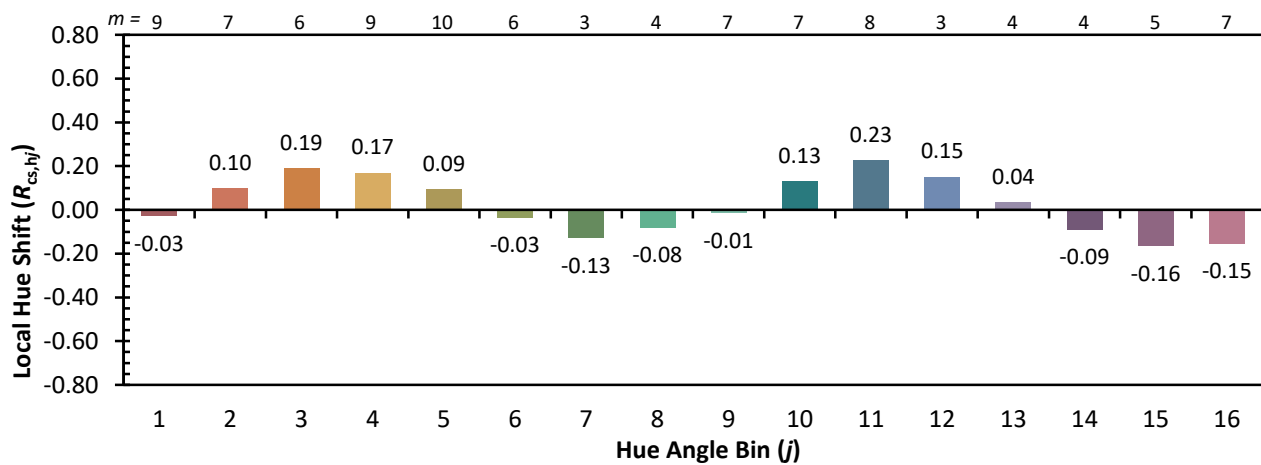
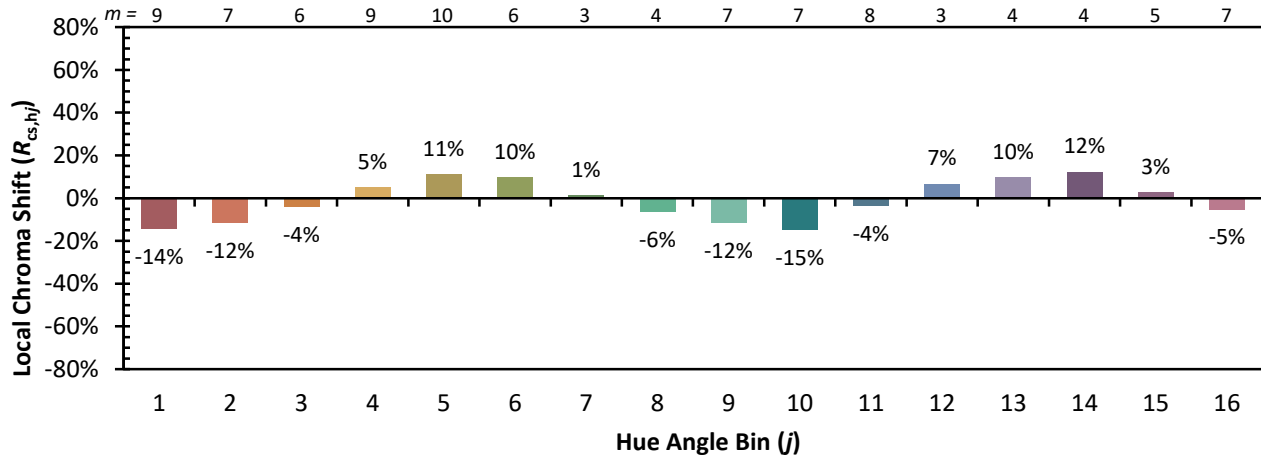


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

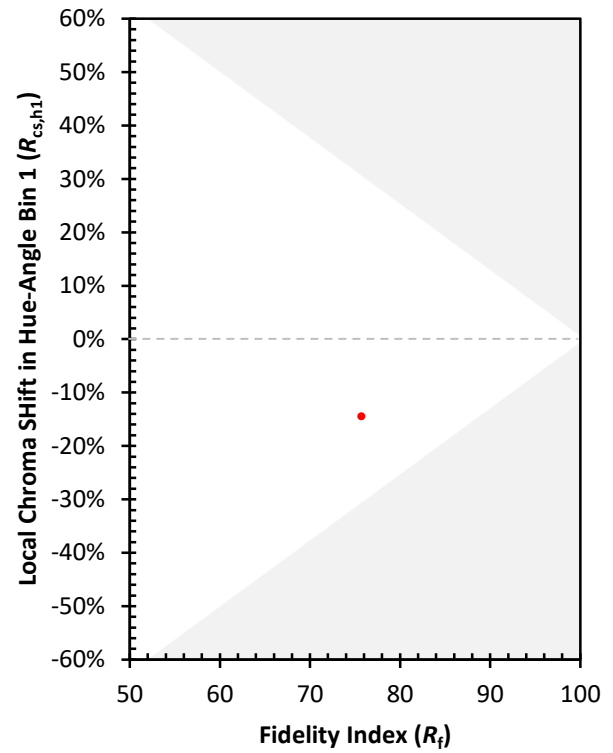
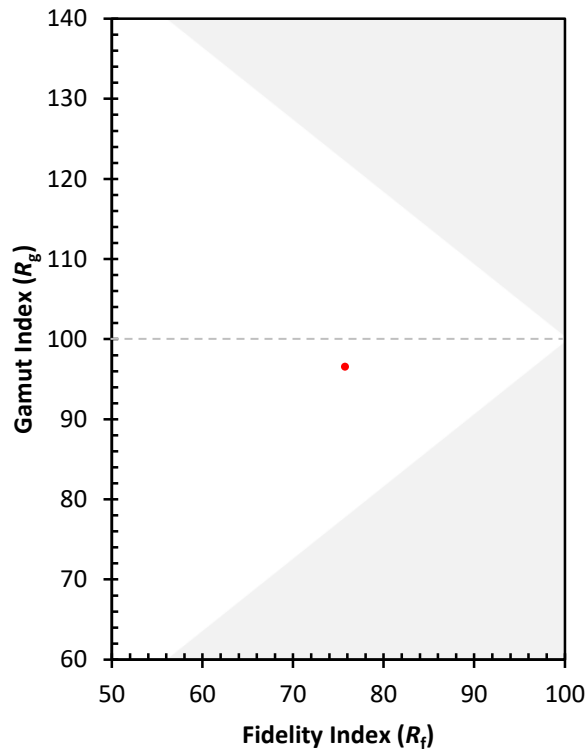
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 63 | CES51 = 88 | CES76 = 53 |
| CES02 = 62 | CES27 = 87 | CES52 = 87 | CES77 = 72 |
| CES03 = 31 | CES28 = 82 | CES53 = 77 | CES78 = 57 |
| CES04 = 70 | CES29 = 63 | CES54 = 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)