

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: P553748

Luminaire Tested: **LXS-VA2-830-U-AST-S**

Issue Date: 7/13/2021

**Test Information**

Test Method: LM-79-08  
Report Number: P553748  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1803-687-17-R2)  
Test Lab: INNOVATION CENTER  
Issue Date: 7/13/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: LXS-VA2-830-U-AST-S  
Description: LUXESCAPE OUTDOOR ARCHITECTURAL LUMINAIRE  
80 CRI, 3000K LEDS AND TYPE IV OPTIC, SPIDER MOUNT  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 3806 lumens  
Efficiency: N/A  
Efficacy: 79.3 lumens/watt  
Luminous Opening: Circular (Dia: 1.62' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 48  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



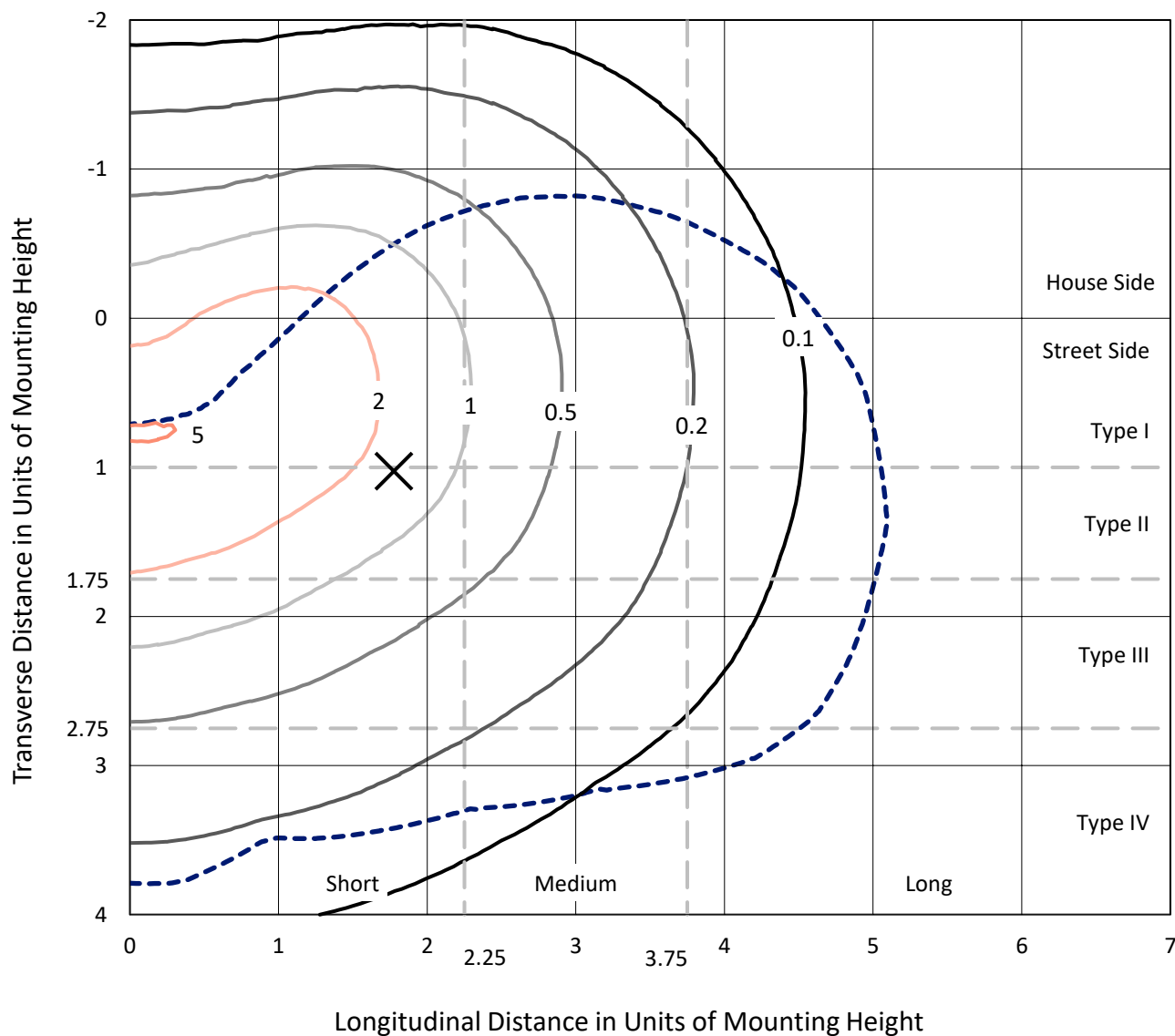
REPORT NUMBER: P553748

CATALOG NUMBER: LXS-VA2-830-U-AST-S

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd



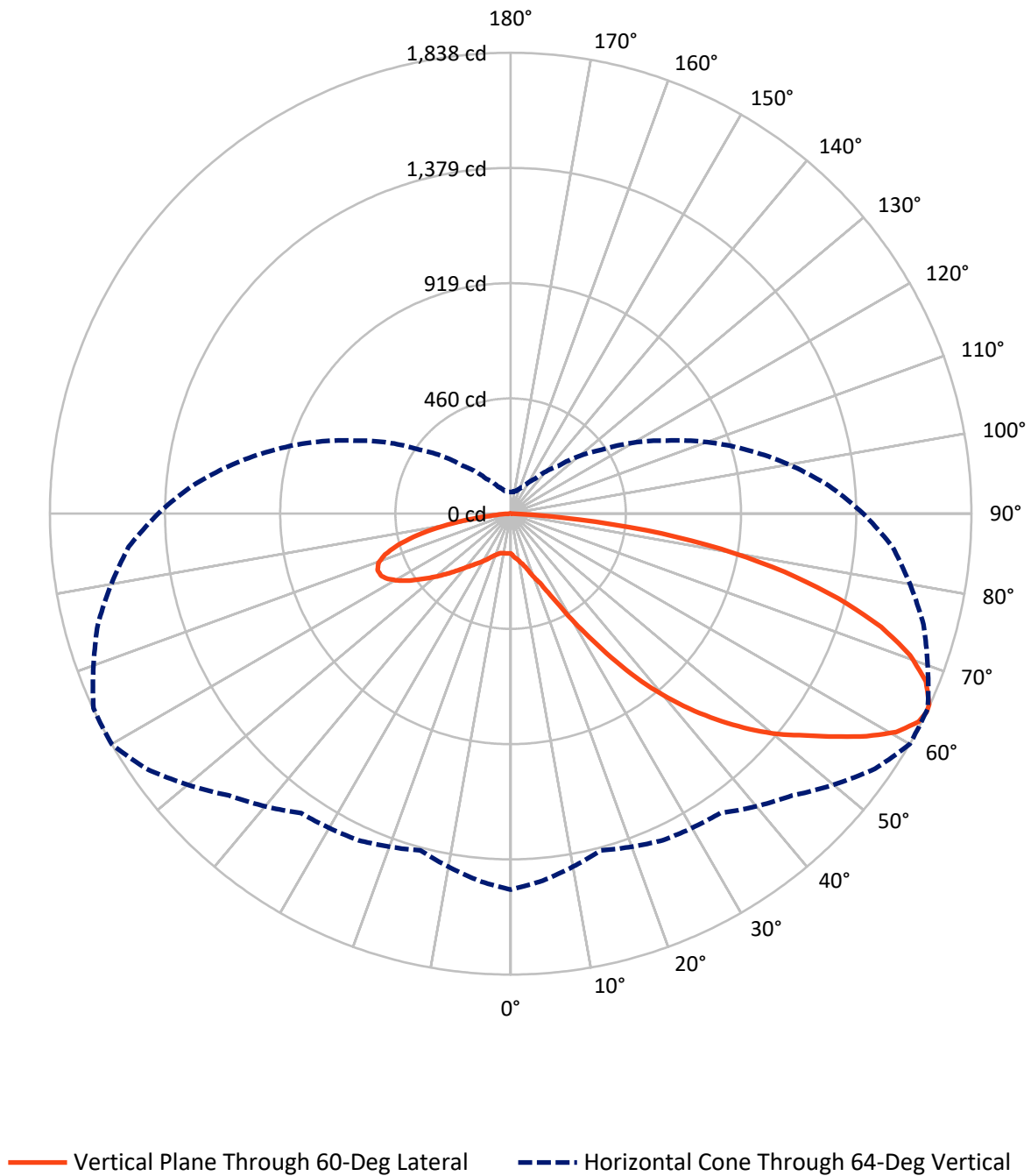
Based on 10 foot mounting height. Maximum calculated value = 5.2 fc

Type IV - Short - N/A

REPORT NUMBER: P553748

CATALOG NUMBER: LXS-VA2-830-U-AST-S

## Luminous Intensity Polar Plot



REPORT NUMBER: P553748

CATALOG NUMBER: LXS-VA2-830-U-AST-S

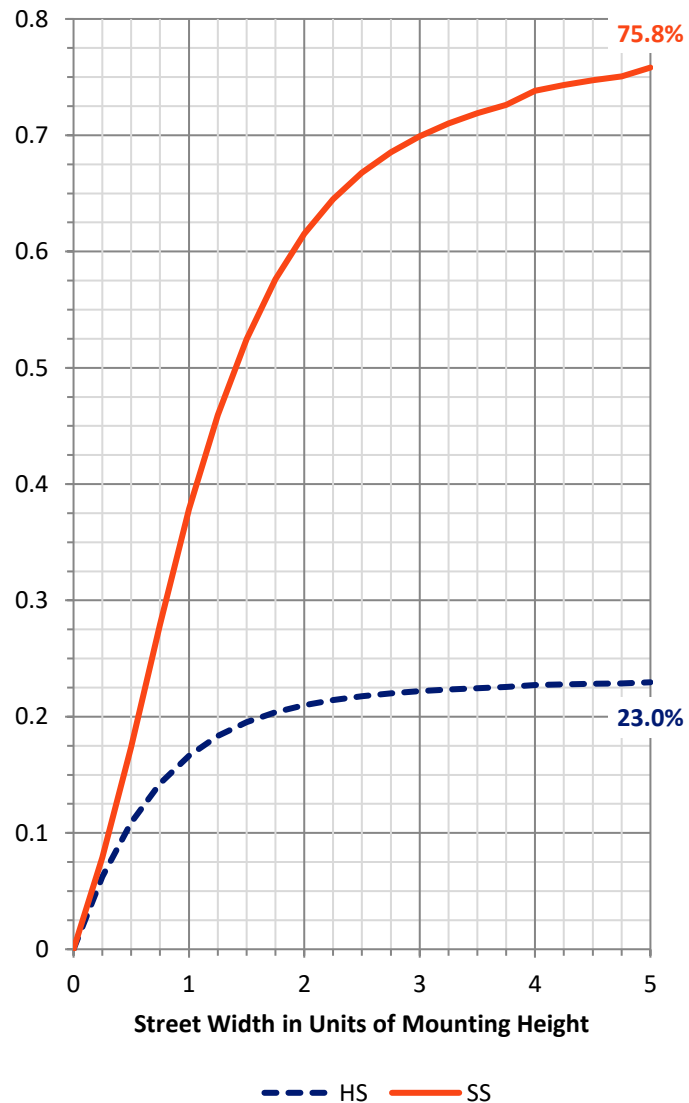
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 880.4    | 0.0    | 880.4  |
|                    | % Fixture | 23.1     | 0.0    | 23.1   |
| <b>Street Side</b> | Lumens    | 2925.6   | 0.0    | 2925.6 |
|                    | % Fixture | 76.9     | 0.0    | 76.9   |
| <b>Total</b>       | Lumens    | 3806.0   | 0.0    | 3806.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 16.1   | 0.4       |
| 10°-20°   | 55.5   | 1.5       |
| 20°-30°   | 130.1  | 3.4       |
| 30°-40°   | 305.0  | 8.0       |
| 40°-50°   | 551.2  | 14.5      |
| 50°-60°   | 813.3  | 21.4      |
| 60°-70°   | 987.5  | 25.9      |
| 70°-80°   | 767.2  | 20.2      |
| 80°-90°   | 180.1  | 4.7       |
| 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°    | 3806.0 | 100.0     |
| 0°-180°   | 3806.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P553748

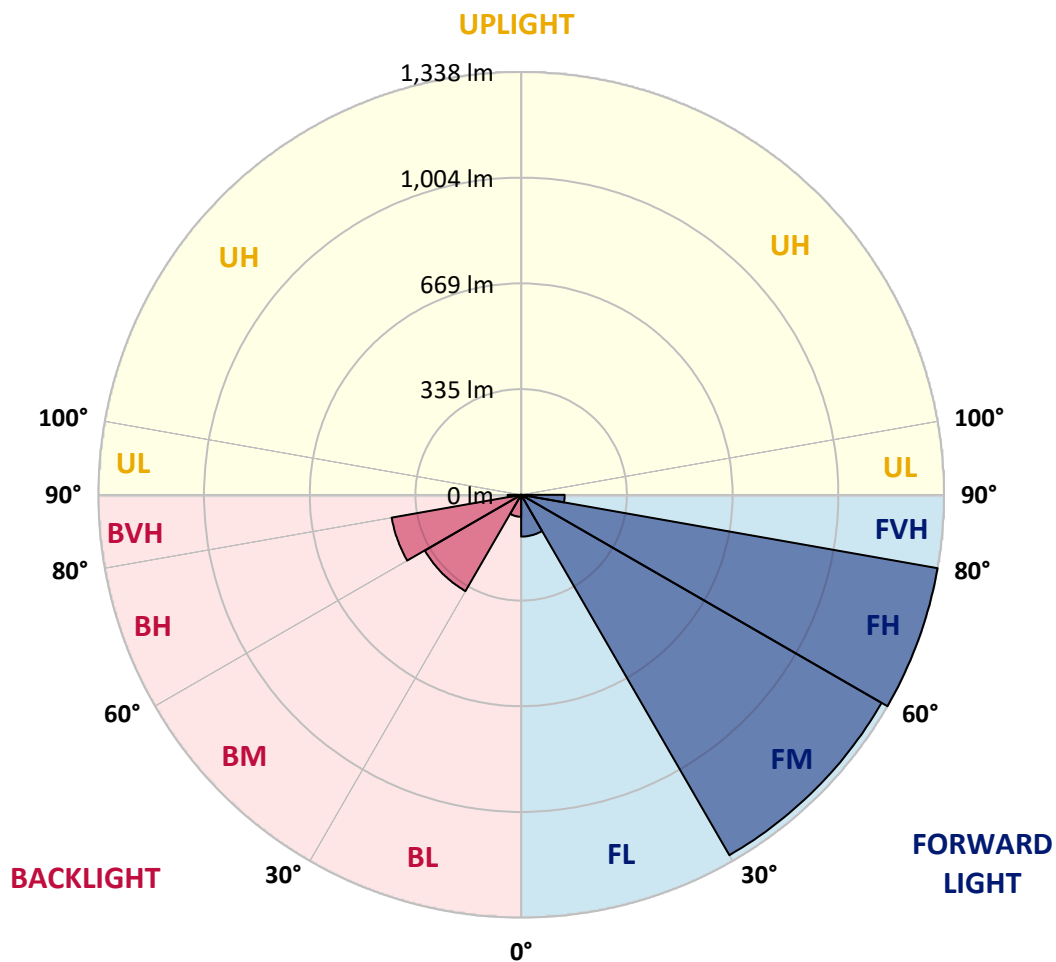
CATALOG NUMBER: LXS-VA2-830-U-AST-S

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 132.2  | 3.5       |                         |      |         |
| FM   | (30°-60°)   | 1317.3 | 34.6      |                         |      |         |
| FH   | (60°-80°)   | 1338.4 | 35.2      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 137.6  | 3.6       |                         |      | G2/225  |
| BL   | (0°-30°)    | 69.6   | 1.8       | B0/110                  |      |         |
| BM   | (30°-60°)   | 352.1  | 9.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 416.2  | 10.9      | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 42.5   | 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



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 60°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 158.9  | 158.9  | 158.9  | 158.9  | 158.9  | 158.9  | 158.9  | 158.9  | 158.9  | 158.9  | 158.9  |
| 2.5°  | 173.4  | 173.4  | 173.4  | 171.8  | 171.8  | 170.2  | 167.0  | 167.0  | 165.4  | 163.8  | 162.2  |
| 5°    | 183.0  | 183.0  | 183.0  | 181.4  | 181.4  | 179.8  | 176.6  | 176.6  | 175.0  | 171.8  | 168.6  |
| 7.5°  | 191.1  | 192.7  | 191.1  | 191.1  | 189.5  | 187.8  | 184.6  | 183.0  | 181.4  | 178.2  | 173.4  |
| 10°   | 208.7  | 207.1  | 205.5  | 203.9  | 200.7  | 197.5  | 194.3  | 192.7  | 191.1  | 186.2  | 179.8  |
| 12.5° | 224.8  | 223.2  | 223.2  | 220.0  | 216.7  | 211.9  | 207.1  | 205.5  | 203.9  | 197.5  | 189.5  |
| 15°   | 242.4  | 242.4  | 240.8  | 239.2  | 236.0  | 231.2  | 223.2  | 220.0  | 218.4  | 210.3  | 197.5  |
| 17.5° | 272.9  | 272.9  | 269.7  | 268.1  | 263.3  | 260.1  | 250.5  | 245.6  | 239.2  | 229.6  | 215.1  |
| 20°   | 309.9  | 309.9  | 309.9  | 309.9  | 300.2  | 287.4  | 277.8  | 272.9  | 264.9  | 250.5  | 234.4  |
| 22.5° | 354.8  | 354.8  | 353.2  | 356.4  | 350.0  | 322.7  | 306.7  | 300.2  | 292.2  | 277.8  | 258.5  |
| 25°   | 428.7  | 430.3  | 425.5  | 420.7  | 404.6  | 380.5  | 353.2  | 348.4  | 342.0  | 316.3  | 292.2  |
| 27.5° | 489.7  | 491.3  | 500.9  | 499.3  | 470.4  | 446.3  | 427.1  | 414.2  | 406.2  | 361.2  | 329.1  |
| 30°   | 579.6  | 579.6  | 590.8  | 590.8  | 566.8  | 533.0  | 520.2  | 504.1  | 480.1  | 419.0  | 369.3  |
| 32.5° | 738.5  | 735.3  | 746.6  | 703.2  | 682.4  | 643.8  | 629.4  | 602.1  | 563.5  | 491.3  | 422.3  |
| 35°   | 937.6  | 932.8  | 932.8  | 860.6  | 802.8  | 780.3  | 741.8  | 724.1  | 675.9  | 579.6  | 486.5  |
| 37.5° | 1042.0 | 1042.0 | 1056.4 | 987.4  | 937.6  | 897.5  | 865.4  | 849.3  | 804.4  | 687.2  | 561.9  |
| 40°   | 1114.2 | 1120.7 | 1136.7 | 1083.7 | 1053.2 | 1000.2 | 990.6  | 964.9  | 926.4  | 801.2  | 651.8  |
| 42.5° | 1167.2 | 1173.6 | 1191.3 | 1157.6 | 1139.9 | 1099.8 | 1099.8 | 1075.7 | 1048.4 | 915.2  | 749.8  |
| 45°   | 1194.5 | 1199.3 | 1210.6 | 1225.0 | 1199.3 | 1188.1 | 1202.5 | 1181.7 | 1159.2 | 1029.1 | 857.4  |
| 47.5° | 1250.7 | 1253.9 | 1228.2 | 1245.9 | 1247.5 | 1266.8 | 1292.5 | 1284.4 | 1265.2 | 1133.5 | 961.7  |
| 50°   | 1260.3 | 1265.2 | 1266.8 | 1268.4 | 1300.5 | 1319.8 | 1367.9 | 1382.4 | 1359.9 | 1231.4 | 1067.7 |
| 52.5° | 1302.1 | 1290.9 | 1266.8 | 1319.8 | 1314.9 | 1358.3 | 1433.7 | 1469.1 | 1445.0 | 1327.8 | 1165.6 |
| 55°   | 1486.7 | 1453.0 | 1390.4 | 1404.8 | 1393.6 | 1461.0 | 1546.1 | 1568.6 | 1539.7 | 1420.9 | 1253.9 |
| 57.5° | 1554.2 | 1522.0 | 1467.5 | 1478.7 | 1483.5 | 1559.0 | 1664.9 | 1674.6 | 1652.1 | 1514.0 | 1340.6 |
| 60°   | 1541.3 | 1507.6 | 1459.4 | 1496.4 | 1514.0 | 1603.9 | 1746.8 | 1767.7 | 1758.1 | 1602.3 | 1430.5 |
| 62.5° | 1534.9 | 1499.6 | 1416.1 | 1475.5 | 1488.3 | 1607.1 | 1777.3 | 1827.1 | 1823.9 | 1674.6 | 1502.8 |
| 64°   | 1499.6 | 1469.1 | 1390.4 | 1437.0 | 1457.8 | 1589.5 | 1774.1 | 1838.3 | 1836.7 | 1705.1 | 1530.1 |
| 65°   | 1453.0 | 1432.1 | 1364.7 | 1403.2 | 1433.7 | 1568.6 | 1762.9 | 1835.1 | 1831.9 | 1714.7 | 1541.3 |
| 67.5° | 1308.5 | 1302.1 | 1273.2 | 1318.1 | 1367.9 | 1504.4 | 1705.1 | 1787.0 | 1793.4 | 1705.1 | 1541.3 |
| 70°   | 1186.5 | 1180.1 | 1151.2 | 1213.8 | 1266.8 | 1403.2 | 1610.4 | 1690.6 | 1698.7 | 1637.6 | 1494.8 |
| 72.5° | 1067.7 | 1066.1 | 1021.1 | 1090.2 | 1136.7 | 1266.8 | 1469.1 | 1546.1 | 1557.4 | 1514.0 | 1395.2 |
| 75°   | 931.2  | 934.4  | 891.1  | 936.0  | 982.6  | 1098.2 | 1276.4 | 1351.9 | 1361.5 | 1335.8 | 1239.5 |
| 77.5° | 775.5  | 777.1  | 740.2  | 773.9  | 820.4  | 908.7  | 1067.7 | 1117.5 | 1135.1 | 1114.2 | 1029.1 |
| 80°   | 602.1  | 606.9  | 571.6  | 594.0  | 626.2  | 696.8  | 817.2  | 850.9  | 852.5  | 836.5  | 769.1  |
| 82.5° | 435.1  | 419.0  | 386.9  | 404.6  | 436.7  | 465.6  | 539.5  | 549.1  | 541.1  | 521.8  | 468.8  |
| 85°   | 199.1  | 183.0  | 184.6  | 203.9  | 205.5  | 189.5  | 210.3  | 200.7  | 197.5  | 178.2  | 163.8  |
| 87.5° | 8.0    | 6.4    | 6.4    | 6.4    | 4.8    | 3.2    | 4.8    | 3.2    | 3.2    | 3.2    | 3.2    |
| 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: P553748

CATALOG NUMBER: LXS-VA2-830-U-AST-S

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 158.9  | 158.9  | 158.9  | 158.9 | 158.9 | 158.9 | 158.9 | 158.9 | 158.9 | 158.9 | 158.9 |
| 2.5°  | 162.2  | 160.6  | 158.9  | 158.9 | 157.3 | 157.3 | 155.7 | 155.7 | 154.1 | 154.1 | 154.1 |
| 5°    | 167.0  | 165.4  | 162.2  | 160.6 | 157.3 | 155.7 | 154.1 | 150.9 | 149.3 | 149.3 | 149.3 |
| 7.5°  | 171.8  | 168.6  | 165.4  | 162.2 | 157.3 | 154.1 | 149.3 | 146.1 | 144.5 | 142.9 | 142.9 |
| 10°   | 176.6  | 175.0  | 168.6  | 162.2 | 157.3 | 150.9 | 146.1 | 142.9 | 141.3 | 139.7 | 139.7 |
| 12.5° | 184.6  | 181.4  | 173.4  | 165.4 | 157.3 | 150.9 | 146.1 | 141.3 | 136.5 | 134.9 | 134.9 |
| 15°   | 192.7  | 187.8  | 178.2  | 167.0 | 157.3 | 150.9 | 142.9 | 136.5 | 131.7 | 128.4 | 128.4 |
| 17.5° | 207.1  | 202.3  | 189.5  | 173.4 | 162.2 | 150.9 | 141.3 | 133.3 | 128.4 | 125.2 | 125.2 |
| 20°   | 226.4  | 218.4  | 200.7  | 181.4 | 167.0 | 152.5 | 141.3 | 131.7 | 123.6 | 120.4 | 118.8 |
| 22.5° | 248.9  | 239.2  | 215.1  | 191.1 | 171.8 | 154.1 | 141.3 | 130.0 | 120.4 | 114.0 | 114.0 |
| 25°   | 276.2  | 263.3  | 231.2  | 203.9 | 178.2 | 157.3 | 142.9 | 128.4 | 118.8 | 112.4 | 112.4 |
| 27.5° | 308.3  | 290.6  | 250.5  | 220.0 | 187.8 | 162.2 | 142.9 | 128.4 | 118.8 | 114.0 | 112.4 |
| 30°   | 343.6  | 322.7  | 272.9  | 234.4 | 197.5 | 165.4 | 144.5 | 126.8 | 117.2 | 114.0 | 114.0 |
| 32.5° | 385.3  | 359.6  | 300.2  | 250.5 | 207.1 | 170.2 | 144.5 | 125.2 | 115.6 | 114.0 | 114.0 |
| 35°   | 438.3  | 403.0  | 329.1  | 268.1 | 216.7 | 175.0 | 144.5 | 125.2 | 115.6 | 110.8 | 110.8 |
| 37.5° | 505.7  | 456.0  | 364.5  | 289.0 | 228.0 | 179.8 | 146.1 | 126.8 | 115.6 | 109.2 | 109.2 |
| 40°   | 584.4  | 518.6  | 406.2  | 313.1 | 240.8 | 186.2 | 149.3 | 126.8 | 115.6 | 109.2 | 107.6 |
| 42.5° | 666.3  | 592.4  | 452.8  | 342.0 | 256.9 | 192.7 | 150.9 | 128.4 | 114.0 | 107.6 | 106.0 |
| 45°   | 761.0  | 675.9  | 507.3  | 375.7 | 274.5 | 200.7 | 154.1 | 130.0 | 112.4 | 106.0 | 104.4 |
| 47.5° | 862.2  | 764.2  | 570.0  | 414.2 | 292.2 | 208.7 | 157.3 | 130.0 | 110.8 | 104.4 | 102.8 |
| 50°   | 961.7  | 857.4  | 642.2  | 456.0 | 313.1 | 218.4 | 160.6 | 130.0 | 110.8 | 102.8 | 101.1 |
| 52.5° | 1053.2 | 945.7  | 711.3  | 497.7 | 335.6 | 228.0 | 163.8 | 130.0 | 109.2 | 101.1 | 99.5  |
| 55°   | 1139.9 | 1027.5 | 780.3  | 542.7 | 362.9 | 239.2 | 167.0 | 128.4 | 107.6 | 99.5  | 97.9  |
| 57.5° | 1221.8 | 1107.8 | 846.1  | 590.8 | 390.1 | 252.1 | 170.2 | 126.8 | 104.4 | 96.3  | 96.3  |
| 60°   | 1303.7 | 1183.3 | 905.5  | 634.2 | 415.8 | 260.1 | 171.8 | 125.2 | 102.8 | 93.1  | 93.1  |
| 62.5° | 1375.9 | 1247.5 | 956.9  | 671.1 | 436.7 | 266.5 | 171.8 | 122.0 | 97.9  | 89.9  | 88.3  |
| 64°   | 1406.5 | 1274.8 | 979.4  | 688.8 | 444.7 | 269.7 | 170.2 | 118.8 | 94.7  | 86.7  | 86.7  |
| 65°   | 1420.9 | 1286.0 | 990.6  | 696.8 | 449.6 | 269.7 | 168.6 | 115.6 | 93.1  | 85.1  | 83.5  |
| 67.5° | 1428.9 | 1292.5 | 1000.2 | 703.2 | 449.6 | 264.9 | 162.2 | 109.2 | 86.7  | 77.1  | 77.1  |
| 70°   | 1388.8 | 1260.3 | 977.8  | 688.8 | 438.3 | 255.3 | 150.9 | 99.5  | 78.7  | 70.6  | 70.6  |
| 72.5° | 1297.3 | 1183.3 | 918.4  | 647.0 | 406.2 | 236.0 | 138.1 | 89.9  | 70.6  | 62.6  | 62.6  |
| 75°   | 1151.2 | 1045.2 | 812.4  | 571.6 | 358.0 | 207.1 | 120.4 | 78.7  | 61.0  | 56.2  | 54.6  |
| 77.5° | 952.1  | 873.4  | 672.7  | 467.2 | 295.4 | 168.6 | 97.9  | 64.2  | 51.4  | 46.6  | 46.6  |
| 80°   | 704.8  | 647.0  | 488.1  | 340.4 | 216.7 | 125.2 | 73.9  | 49.8  | 40.1  | 36.9  | 36.9  |
| 82.5° | 422.3  | 388.5  | 284.2  | 203.9 | 133.3 | 78.7  | 49.8  | 33.7  | 28.9  | 27.3  | 27.3  |
| 85°   | 146.1  | 136.5  | 94.7   | 75.5  | 61.0  | 38.5  | 25.7  | 19.3  | 19.3  | 16.1  | 16.1  |
| 87.5° | 3.2    | 6.4    | 6.4    | 9.6   | 9.6   | 9.6   | 8.0   | 6.4   | 8.0   | 8.0   | 8.0   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2205-670-2

Test Date: 07/01/2022

Luminaire Tested: LXS-VA2-830-U-SYM-C

Data in this report applies to families of products including LXS-VA2-830.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2205-670-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 07/01/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **LXS-VA2-830-U-SYM-C**  
 Description: INVUE LUXESCAPE

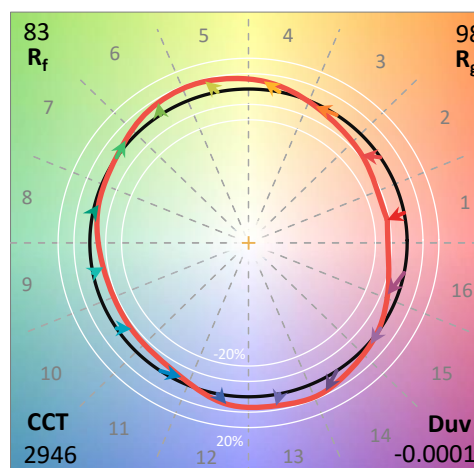
CANTILEVER MOUNT

### Spectral Parameters

CCT (K): 2946  
 CIE  $u'$ : 0.2525  
 CIE  $v'$ : 0.5223  
 Duv: -0.0001  
 CIE x: 0.4406  
 CIE y: 0.4050  
 CIE z: 0.1544  
 Peak Wavelength (nm): 605  
 Dominant Wavelength (nm): 583  
 Purity: 53.9  
 R<sub>f</sub>: 82.5  
 R<sub>g</sub>: 98.2

CRI (Ra): 81.3

|     |      |      |      |
|-----|------|------|------|
| R1: | 79.2 | R9:  | 5.4  |
| R2: | 88.2 | R10: | 73.5 |
| R3: | 96.1 | R11: | 79.6 |
| R4: | 80.2 | R12: | 68.9 |
| R5: | 79.2 | R13: | 80.9 |
| R6: | 85.2 | R14: | 97.9 |
| R7: | 83.2 |      |      |
| R8: | 58.9 |      |      |



### Test Conditions

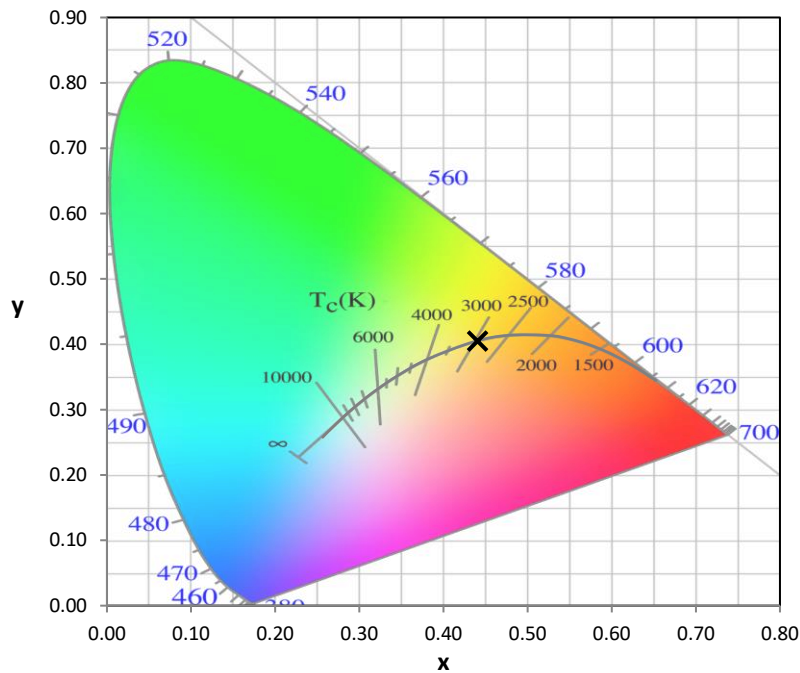
Stabilization Time: 165M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.4/61%  
 Sphere Temperature (°C): 24.8

REPORT NUMBER: SP1-2205-670-2

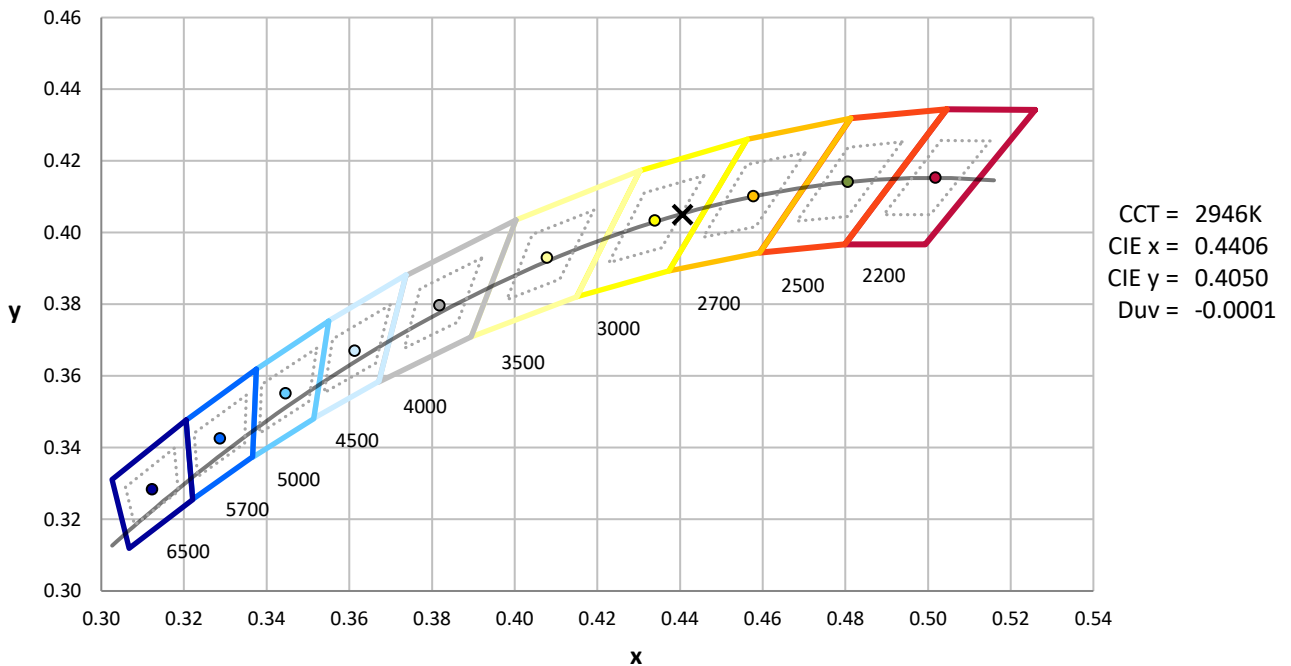
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 2/7/2022         | 8/7/2022             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2021       | 11/29/2022           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/29/2021       | 11/29/2022           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/29/2021       | 11/29/2022           |
| Sphere Thermometer             | ONSET IN0085          | 11/29/2021       | 11/29/2022           |
| Room Thermometer               | ONSET IN0046          | 11/29/2021       | 11/29/2022           |

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**CIE 1931 Chromaticity Diagram**



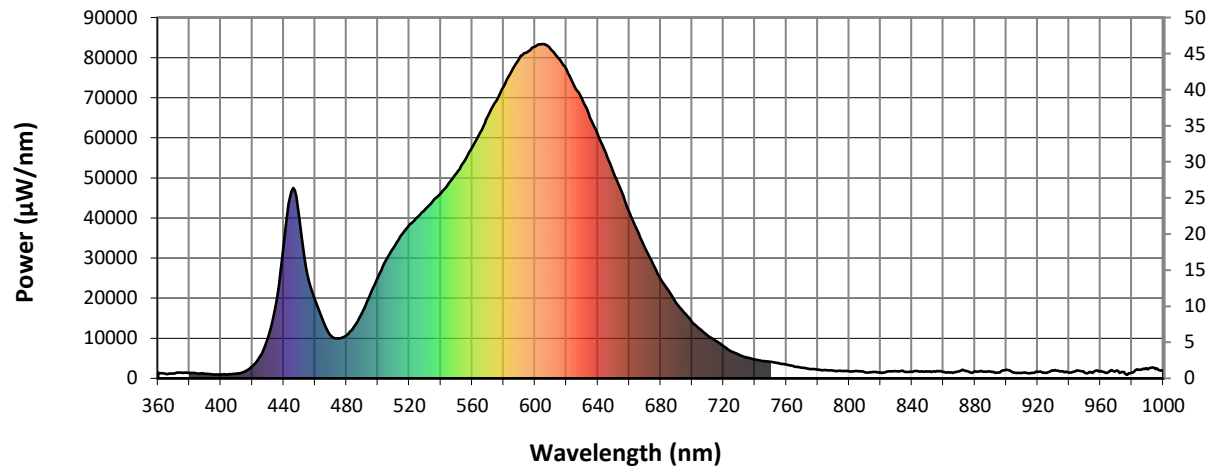
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

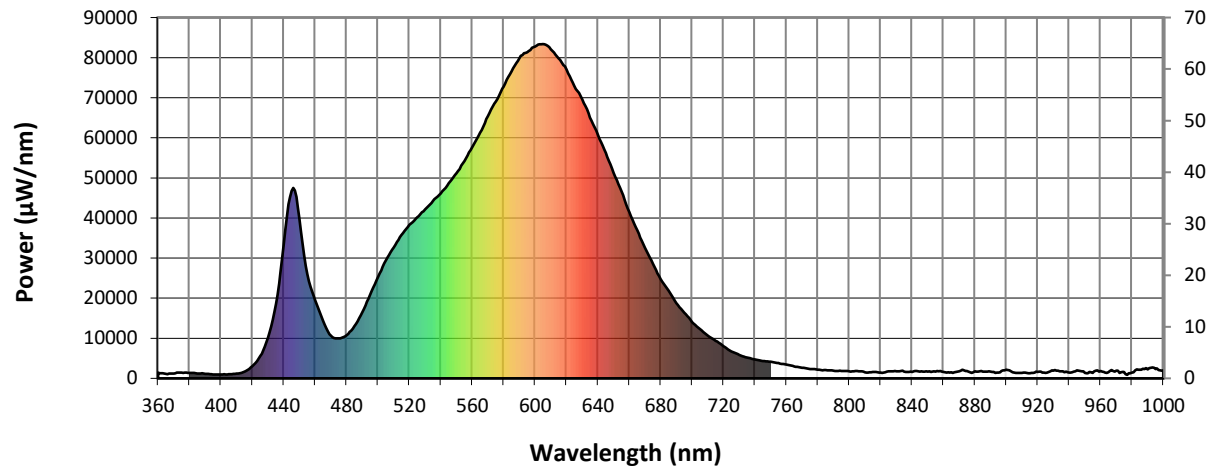


#####

| 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       | 1420             | NR               | 490       | 16514            | NR               | 620       | 77010            | NR               | 750       | 4160             | NR               | 880       | 1762             | NR               |
| 365       | 1119             | NR               | 495       | 20848            | NR               | 625       | 72968            | NR               | 755       | 3799             | NR               | 885       | 1708             | NR               |
| 370       | 1220             | NR               | 500       | 25312            | NR               | 630       | 69621            | NR               | 760       | 3466             | NR               | 890       | 1652             | NR               |
| 375       | 1467             | NR               | 505       | 29412            | NR               | 635       | 65088            | NR               | 765       | 2959             | NR               | 895       | 1448             | NR               |
| 380       | 1377             | NR               | 510       | 32642            | NR               | 640       | 60775            | NR               | 770       | 2669             | NR               | 900       | 2147             | NR               |
| 385       | 1218             | NR               | 515       | 35719            | NR               | 645       | 56160            | NR               | 775       | 2323             | NR               | 905       | 1442             | NR               |
| 390       | 1140             | NR               | 520       | 38312            | NR               | 650       | 51260            | NR               | 780       | 2193             | NR               | 910       | 1354             | NR               |
| 395       | 993              | NR               | 525       | 40145            | NR               | 655       | 46645            | NR               | 785       | 2066             | NR               | 915       | 1289             | NR               |
| 400       | 970              | NR               | 530       | 42169            | NR               | 660       | 41488            | NR               | 790       | 1919             | NR               | 920       | 1620             | NR               |
| 405       | 1007             | NR               | 535       | 44277            | NR               | 665       | 36962            | NR               | 795       | 1855             | NR               | 925       | 1376             | NR               |
| 410       | 1171             | NR               | 540       | 46132            | NR               | 670       | 32536            | NR               | 800       | 1774             | NR               | 930       | 1957             | NR               |
| 415       | 1658             | NR               | 545       | 48654            | NR               | 675       | 28594            | NR               | 805       | 1859             | NR               | 935       | 1749             | NR               |
| 420       | 3022             | NR               | 550       | 51200            | NR               | 680       | 24774            | NR               | 810       | 1499             | NR               | 940       | 1429             | NR               |
| 425       | 5554             | NR               | 555       | 54216            | NR               | 685       | 21857            | NR               | 815       | 1560             | NR               | 945       | 1972             | NR               |
| 430       | 10172            | NR               | 560       | 57652            | NR               | 690       | 18796            | NR               | 820       | 1460             | NR               | 950       | 1386             | NR               |
| 435       | 18521            | NR               | 565       | 61264            | NR               | 695       | 16368            | NR               | 825       | 1779             | NR               | 955       | 1357             | NR               |
| 440       | 33279            | NR               | 570       | 65389            | NR               | 700       | 14086            | NR               | 830       | 1786             | NR               | 960       | 1800             | NR               |
| 445       | 46769            | NR               | 575       | 69020            | NR               | 705       | 12272            | NR               | 835       | 1700             | NR               | 965       | 1500             | NR               |
| 450       | 39883            | NR               | 580       | 72747            | NR               | 710       | 10582            | NR               | 840       | 1604             | NR               | 970       | 1903             | NR               |
| 455       | 25958            | NR               | 585       | 76555            | NR               | 715       | 9375             | NR               | 845       | 1660             | NR               | 975       | 1631             | NR               |
| 460       | 19577            | NR               | 590       | 79922            | NR               | 720       | 7989             | NR               | 850       | 1661             | NR               | 980       | 1405             | NR               |
| 465       | 14390            | NR               | 595       | 81358            | NR               | 725       | 6739             | NR               | 855       | 1690             | NR               | 985       | 2143             | NR               |
| 470       | 10591            | NR               | 600       | 82761            | NR               | 730       | 5847             | NR               | 860       | 1607             | NR               | 990       | 2213             | NR               |
| 475       | 9960             | NR               | 605       | 83375            | NR               | 735       | 5164             | NR               | 865       | 1492             | NR               | 995       | 2325             | NR               |
| 480       | 10779            | NR               | 610       | 82032            | NR               | 740       | 4742             | NR               | 870       | 1768             | NR               | 1000      | 2016             | NR               |
| 485       | 12985            | NR               | 615       | 79853            | NR               | 745       | 4333             | NR               | 875       | 1864             | NR               |           |                  |                  |

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**Scotopic Flux vs. Wavelength**



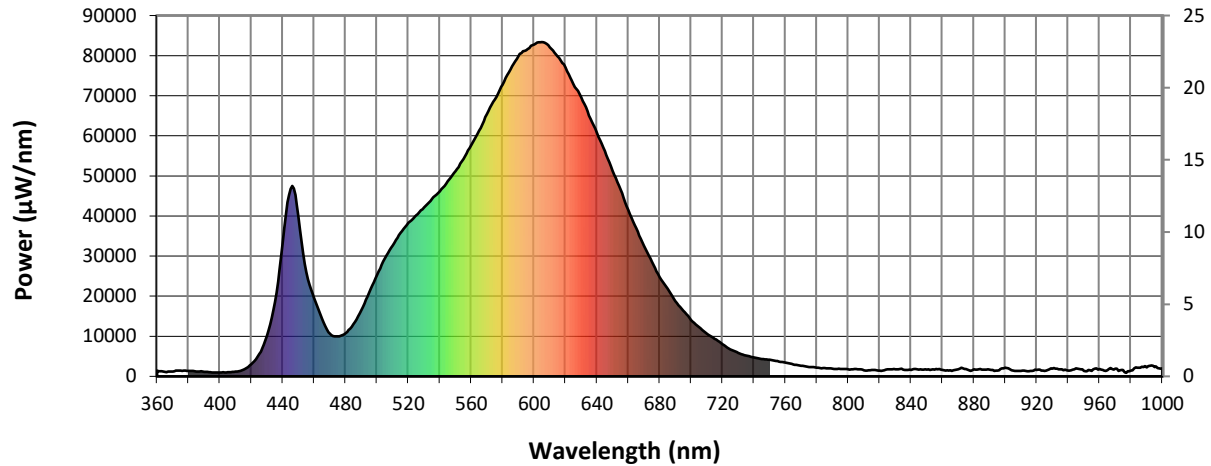
**Scotopic Lumens: 5220.3**

**S/P: 1.28**

| 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       | 1420             | NR               | 490       | 16514            | NR               | 620       | 77010            | NR               | 750       | 4160             | NR               | 880       | 1762             | NR               |
| 365       | 1119             | NR               | 495       | 20848            | NR               | 625       | 72968            | NR               | 755       | 3799             | NR               | 885       | 1708             | NR               |
| 370       | 1220             | NR               | 500       | 25312            | NR               | 630       | 69621            | NR               | 760       | 3466             | NR               | 890       | 1652             | NR               |
| 375       | 1467             | NR               | 505       | 29412            | NR               | 635       | 65088            | NR               | 765       | 2959             | NR               | 895       | 1448             | NR               |
| 380       | 1377             | NR               | 510       | 32642            | NR               | 640       | 60775            | NR               | 770       | 2669             | NR               | 900       | 2147             | NR               |
| 385       | 1218             | NR               | 515       | 35719            | NR               | 645       | 56160            | NR               | 775       | 2323             | NR               | 905       | 1442             | NR               |
| 390       | 1140             | NR               | 520       | 38312            | NR               | 650       | 51260            | NR               | 780       | 2193             | NR               | 910       | 1354             | NR               |
| 395       | 993              | NR               | 525       | 40145            | NR               | 655       | 46645            | NR               | 785       | 2066             | NR               | 915       | 1289             | NR               |
| 400       | 970              | NR               | 530       | 42169            | NR               | 660       | 41488            | NR               | 790       | 1919             | NR               | 920       | 1620             | NR               |
| 405       | 1007             | NR               | 535       | 44277            | NR               | 665       | 36962            | NR               | 795       | 1855             | NR               | 925       | 1376             | NR               |
| 410       | 1171             | NR               | 540       | 46132            | NR               | 670       | 32536            | NR               | 800       | 1774             | NR               | 930       | 1957             | NR               |
| 415       | 1658             | NR               | 545       | 48654            | NR               | 675       | 28594            | NR               | 805       | 1859             | NR               | 935       | 1749             | NR               |
| 420       | 3022             | NR               | 550       | 51200            | NR               | 680       | 24774            | NR               | 810       | 1499             | NR               | 940       | 1429             | NR               |
| 425       | 5554             | NR               | 555       | 54216            | NR               | 685       | 21857            | NR               | 815       | 1560             | NR               | 945       | 1972             | NR               |
| 430       | 10172            | NR               | 560       | 57652            | NR               | 690       | 18796            | NR               | 820       | 1460             | NR               | 950       | 1386             | NR               |
| 435       | 18521            | NR               | 565       | 61264            | NR               | 695       | 16368            | NR               | 825       | 1779             | NR               | 955       | 1357             | NR               |
| 440       | 33279            | NR               | 570       | 65389            | NR               | 700       | 14086            | NR               | 830       | 1786             | NR               | 960       | 1800             | NR               |
| 445       | 46769            | NR               | 575       | 69020            | NR               | 705       | 12272            | NR               | 835       | 1700             | NR               | 965       | 1500             | NR               |
| 450       | 39883            | NR               | 580       | 72747            | NR               | 710       | 10582            | NR               | 840       | 1604             | NR               | 970       | 1903             | NR               |
| 455       | 25958            | NR               | 585       | 76555            | NR               | 715       | 9375             | NR               | 845       | 1660             | NR               | 975       | 1631             | NR               |
| 460       | 19577            | NR               | 590       | 79922            | NR               | 720       | 7989             | NR               | 850       | 1661             | NR               | 980       | 1405             | NR               |
| 465       | 14390            | NR               | 595       | 81358            | NR               | 725       | 6739             | NR               | 855       | 1690             | NR               | 985       | 2143             | NR               |
| 470       | 10591            | NR               | 600       | 82761            | NR               | 730       | 5847             | NR               | 860       | 1607             | NR               | 990       | 2213             | NR               |
| 475       | 9960             | NR               | 605       | 83375            | NR               | 735       | 5164             | NR               | 865       | 1492             | NR               | 995       | 2325             | NR               |
| 480       | 10779            | NR               | 610       | 82032            | NR               | 740       | 4742             | NR               | 870       | 1768             | NR               | 1000      | 2016             | NR               |
| 485       | 12985            | NR               | 615       | 79853            | NR               | 745       | 4333             | NR               | 875       | 1864             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1923.7 S/P: 0.47**

| 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       | 1420             | NR               | 490       | 16514            | NR               | 620       | 77010            | NR               | 750       | 4160             | NR               | 880       | 1762             | NR               |
| 365       | 1119             | NR               | 495       | 20848            | NR               | 625       | 72968            | NR               | 755       | 3799             | NR               | 885       | 1708             | NR               |
| 370       | 1220             | NR               | 500       | 25312            | NR               | 630       | 69621            | NR               | 760       | 3466             | NR               | 890       | 1652             | NR               |
| 375       | 1467             | NR               | 505       | 29412            | NR               | 635       | 65088            | NR               | 765       | 2959             | NR               | 895       | 1448             | NR               |
| 380       | 1377             | NR               | 510       | 32642            | NR               | 640       | 60775            | NR               | 770       | 2669             | NR               | 900       | 2147             | NR               |
| 385       | 1218             | NR               | 515       | 35719            | NR               | 645       | 56160            | NR               | 775       | 2323             | NR               | 905       | 1442             | NR               |
| 390       | 1140             | NR               | 520       | 38312            | NR               | 650       | 51260            | NR               | 780       | 2193             | NR               | 910       | 1354             | NR               |
| 395       | 993              | NR               | 525       | 40145            | NR               | 655       | 46645            | NR               | 785       | 2066             | NR               | 915       | 1289             | NR               |
| 400       | 970              | NR               | 530       | 42169            | NR               | 660       | 41488            | NR               | 790       | 1919             | NR               | 920       | 1620             | NR               |
| 405       | 1007             | NR               | 535       | 44277            | NR               | 665       | 36962            | NR               | 795       | 1855             | NR               | 925       | 1376             | NR               |
| 410       | 1171             | NR               | 540       | 46132            | NR               | 670       | 32536            | NR               | 800       | 1774             | NR               | 930       | 1957             | NR               |
| 415       | 1658             | NR               | 545       | 48654            | NR               | 675       | 28594            | NR               | 805       | 1859             | NR               | 935       | 1749             | NR               |
| 420       | 3022             | NR               | 550       | 51200            | NR               | 680       | 24774            | NR               | 810       | 1499             | NR               | 940       | 1429             | NR               |
| 425       | 5554             | NR               | 555       | 54216            | NR               | 685       | 21857            | NR               | 815       | 1560             | NR               | 945       | 1972             | NR               |
| 430       | 10172            | NR               | 560       | 57652            | NR               | 690       | 18796            | NR               | 820       | 1460             | NR               | 950       | 1386             | NR               |
| 435       | 18521            | NR               | 565       | 61264            | NR               | 695       | 16368            | NR               | 825       | 1779             | NR               | 955       | 1357             | NR               |
| 440       | 33279            | NR               | 570       | 65389            | NR               | 700       | 14086            | NR               | 830       | 1786             | NR               | 960       | 1800             | NR               |
| 445       | 46769            | NR               | 575       | 69020            | NR               | 705       | 12272            | NR               | 835       | 1700             | NR               | 965       | 1500             | NR               |
| 450       | 39883            | NR               | 580       | 72747            | NR               | 710       | 10582            | NR               | 840       | 1604             | NR               | 970       | 1903             | NR               |
| 455       | 25958            | NR               | 585       | 76555            | NR               | 715       | 9375             | NR               | 845       | 1660             | NR               | 975       | 1631             | NR               |
| 460       | 19577            | NR               | 590       | 79922            | NR               | 720       | 7989             | NR               | 850       | 1661             | NR               | 980       | 1405             | NR               |
| 465       | 14390            | NR               | 595       | 81358            | NR               | 725       | 6739             | NR               | 855       | 1690             | NR               | 985       | 2143             | NR               |
| 470       | 10591            | NR               | 600       | 82761            | NR               | 730       | 5847             | NR               | 860       | 1607             | NR               | 990       | 2213             | NR               |
| 475       | 9960             | NR               | 605       | 83375            | NR               | 735       | 5164             | NR               | 865       | 1492             | NR               | 995       | 2325             | NR               |
| 480       | 10779            | NR               | 610       | 82032            | NR               | 740       | 4742             | NR               | 870       | 1768             | NR               | 1000      | 2016             | NR               |
| 485       | 12985            | NR               | 615       | 79853            | NR               | 745       | 4333             | NR               | 875       | 1864             | NR               |           |                  |                  |

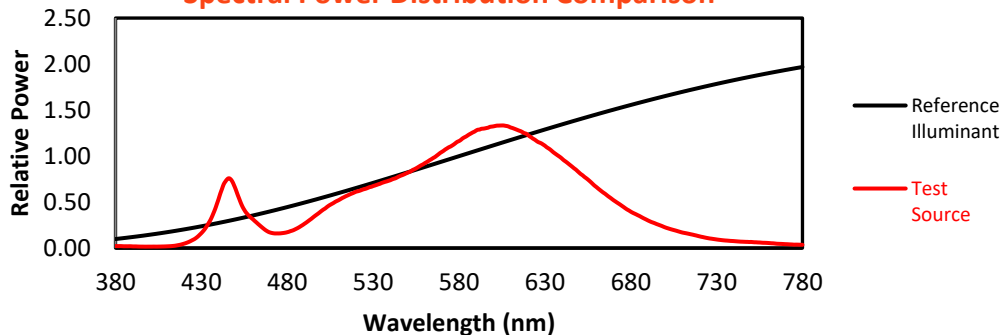
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**TM-30-18**

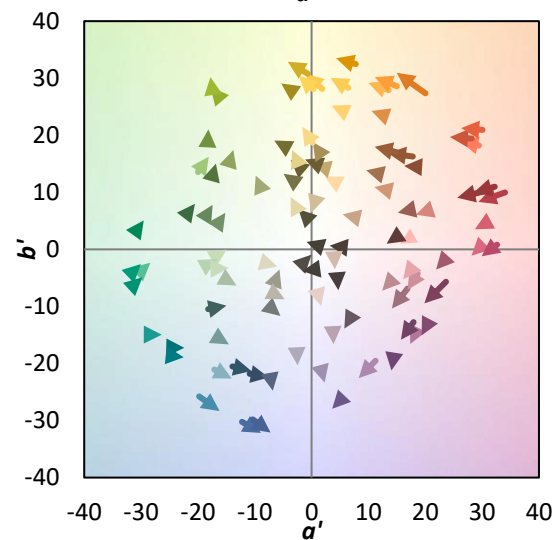
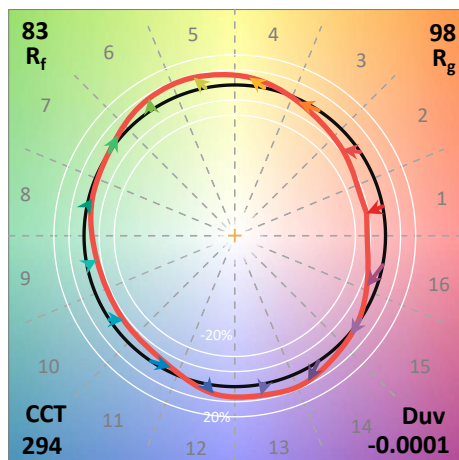
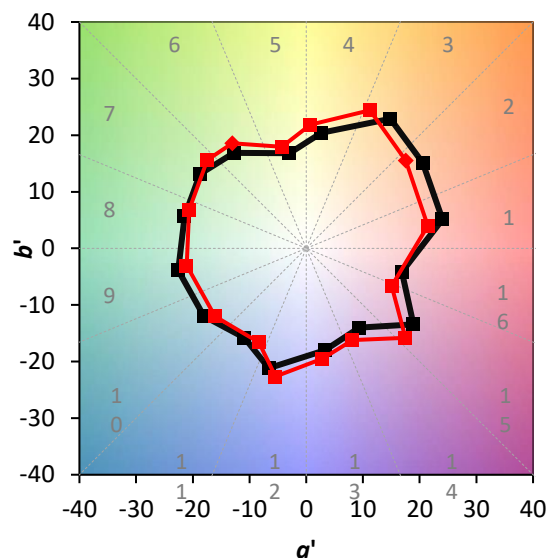
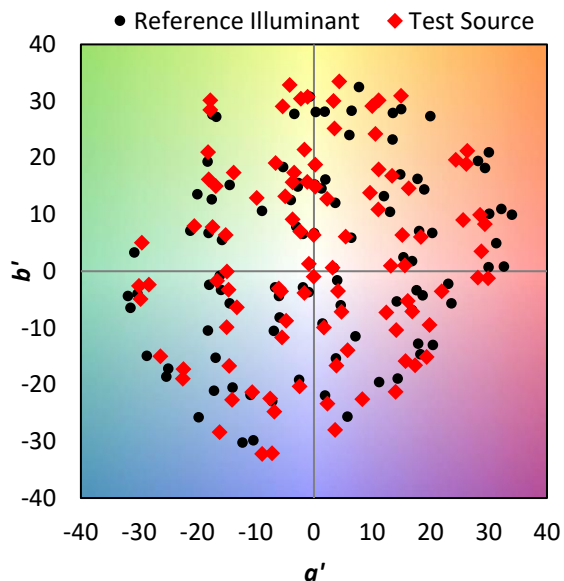
### Summary

$R_f = 82.5$   
 $R_g = 98.2$   
 CIE  $R_a = 81.3$   
 $R_g = 5.4$

### Spectral Power Distribution Comparison



### Color Vector Graphics



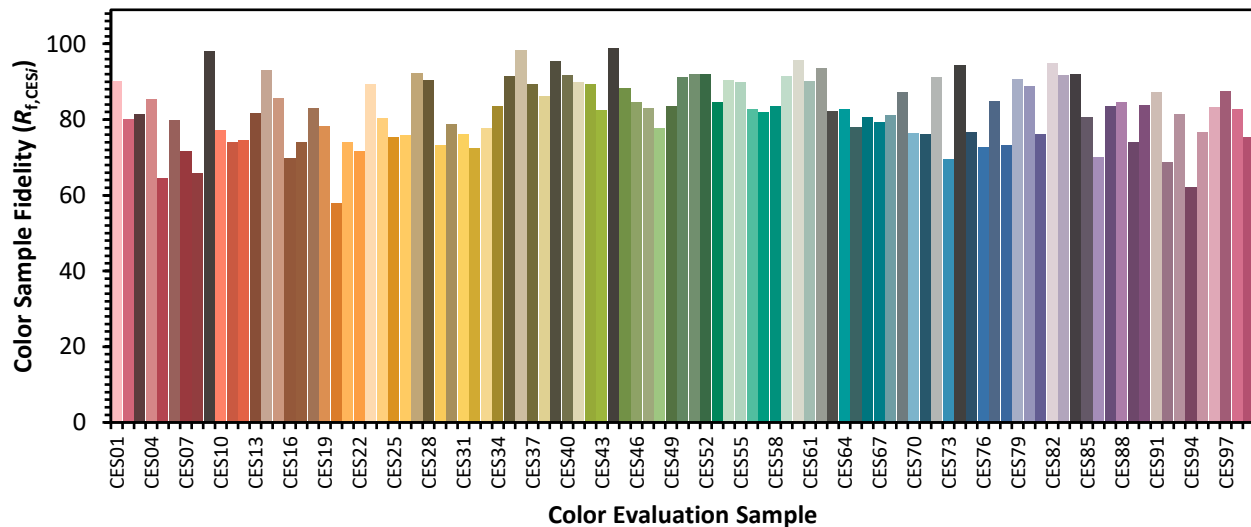


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

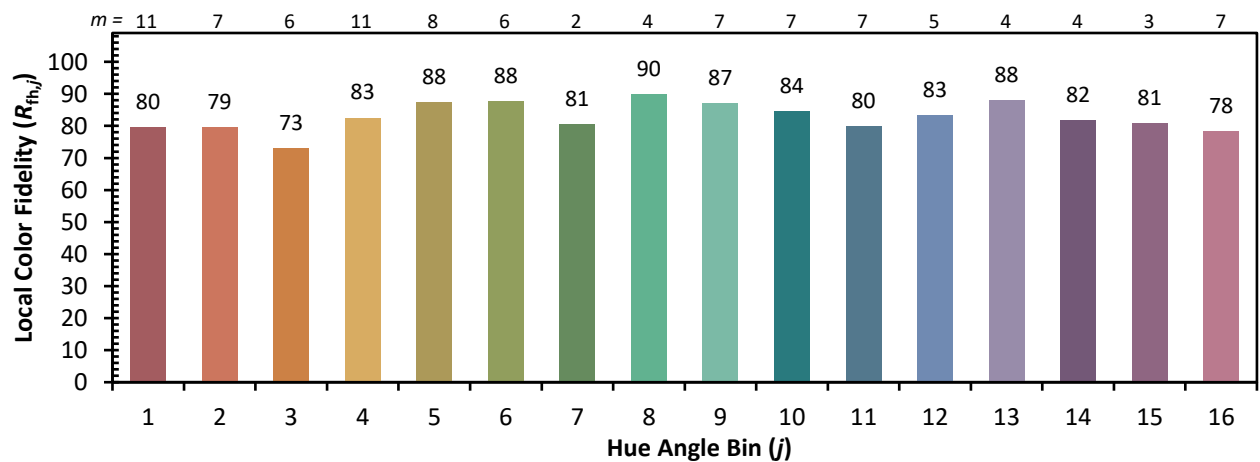
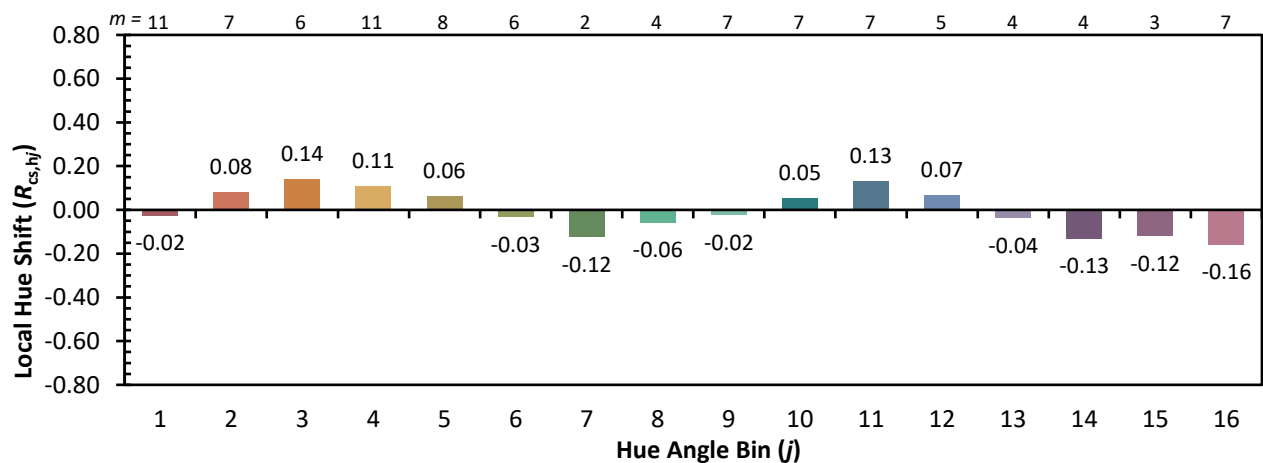
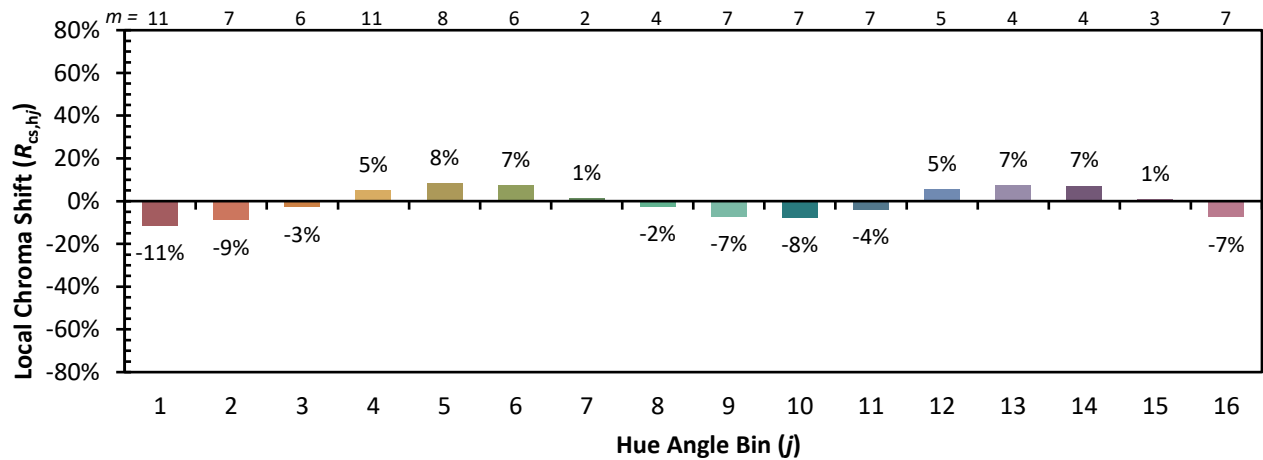
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 76 | CES51 = 92 | CES76 = 73 |
| CES02 = 63 | CES27 = 92 | CES52 = 92 | CES77 = 85 |
| CES03 = 31 | CES28 = 90 | CES53 = 85 | CES78 = 73 |
| CES04 = 71 | CES29 = 73 | CES54 = 90 | CES79 = 91 |
| CES05 = 50 | CES30 = 79 | CES55 = 90 | CES80 = 89 |
| CES06 = 51 | CES31 = 76 | CES56 = 83 | CES81 = 76 |
| CES07 = 42 | CES32 = 73 | CES57 = 82 | CES82 = 95 |
| CES08 = 41 | CES33 = 78 | CES58 = 84 | CES83 = 92 |
| CES09 = 29 | CES34 = 83 | CES59 = 91 | CES84 = 92 |
| CES10 = 76 | CES35 = 92 | CES60 = 96 | CES85 = 81 |
| CES11 = 59 | CES36 = 98 | CES61 = 90 | CES86 = 70 |
| CES12 = 65 | CES37 = 89 | CES62 = 93 | CES87 = 84 |
| CES13 = 44 | CES38 = 86 | CES63 = 82 | CES88 = 85 |
| CES14 = 74 | CES39 = 95 | CES64 = 83 | CES89 = 74 |
| CES15 = 72 | CES40 = 92 | CES65 = 78 | CES90 = 84 |
| CES16 = 48 | CES41 = 90 | CES66 = 81 | CES91 = 87 |
| CES17 = 50 | CES42 = 89 | CES67 = 79 | CES92 = 69 |
| CES18 = 57 | CES43 = 82 | CES68 = 81 | CES93 = 81 |
| CES19 = 72 | CES44 = 99 | CES69 = 87 | CES94 = 62 |
| CES20 = 67 | CES45 = 88 | CES70 = 76 | CES95 = 77 |
| CES21 = 87 | CES46 = 85 | CES71 = 76 | CES96 = 83 |
| CES22 = 79 | CES47 = 83 | CES72 = 91 | CES97 = 88 |
| CES23 = 92 | CES48 = 78 | CES73 = 70 | CES98 = 83 |
| CES24 = 91 | CES49 = 84 | CES74 = 94 | CES99 = 75 |
| CES25 = 72 | CES50 = 91 | CES75 = 77 |            |



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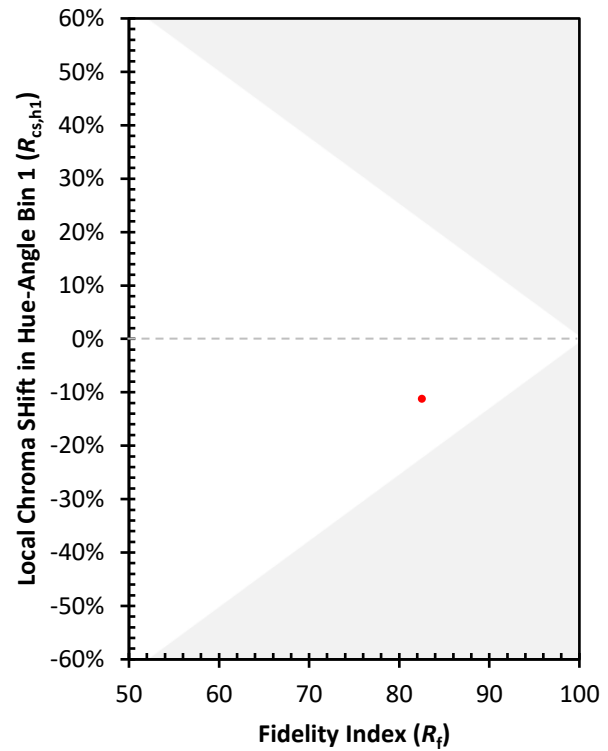
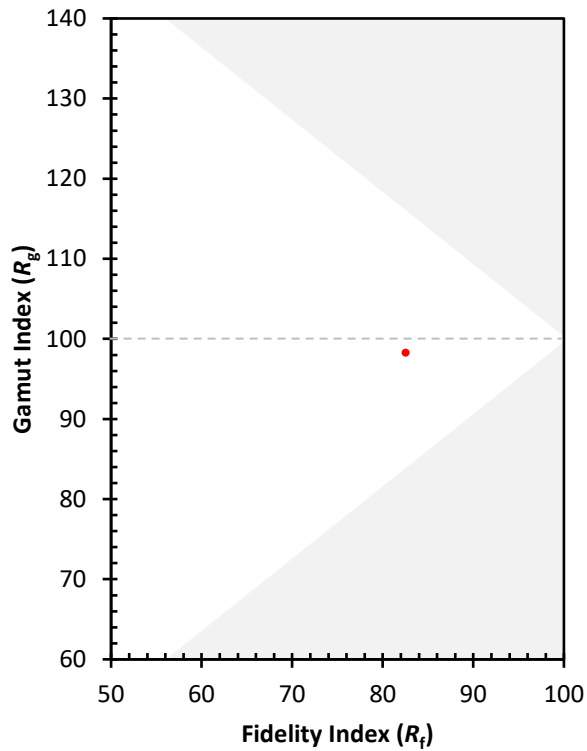
**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)