

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: P674399

Luminaire Tested: **CCP-SA2B-730-U-AFL-HSS**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P674399  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA2B-730-U-AFL-HSS  
Description: INVUE CLEAR CURVE POLE MOUNT Light Square Luminaire @450mA w/ AFL  
distribution lens and House Side Shield  
Light Source: (32) 3000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5215 lumens  
Efficiency: N/A  
Efficacy: 113.4 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

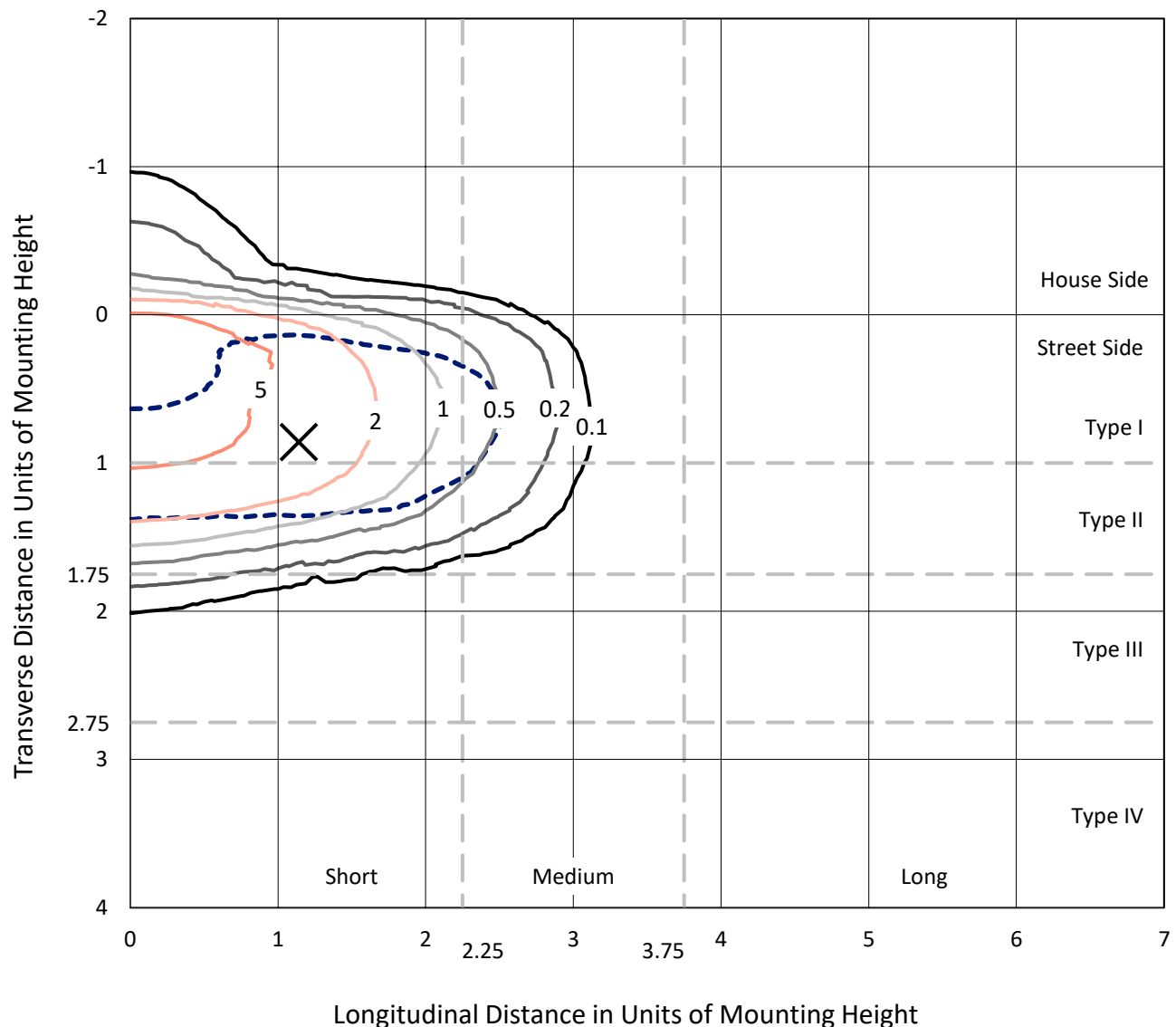
Input Watts (W): 46  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
- - - 1/2 Max cd

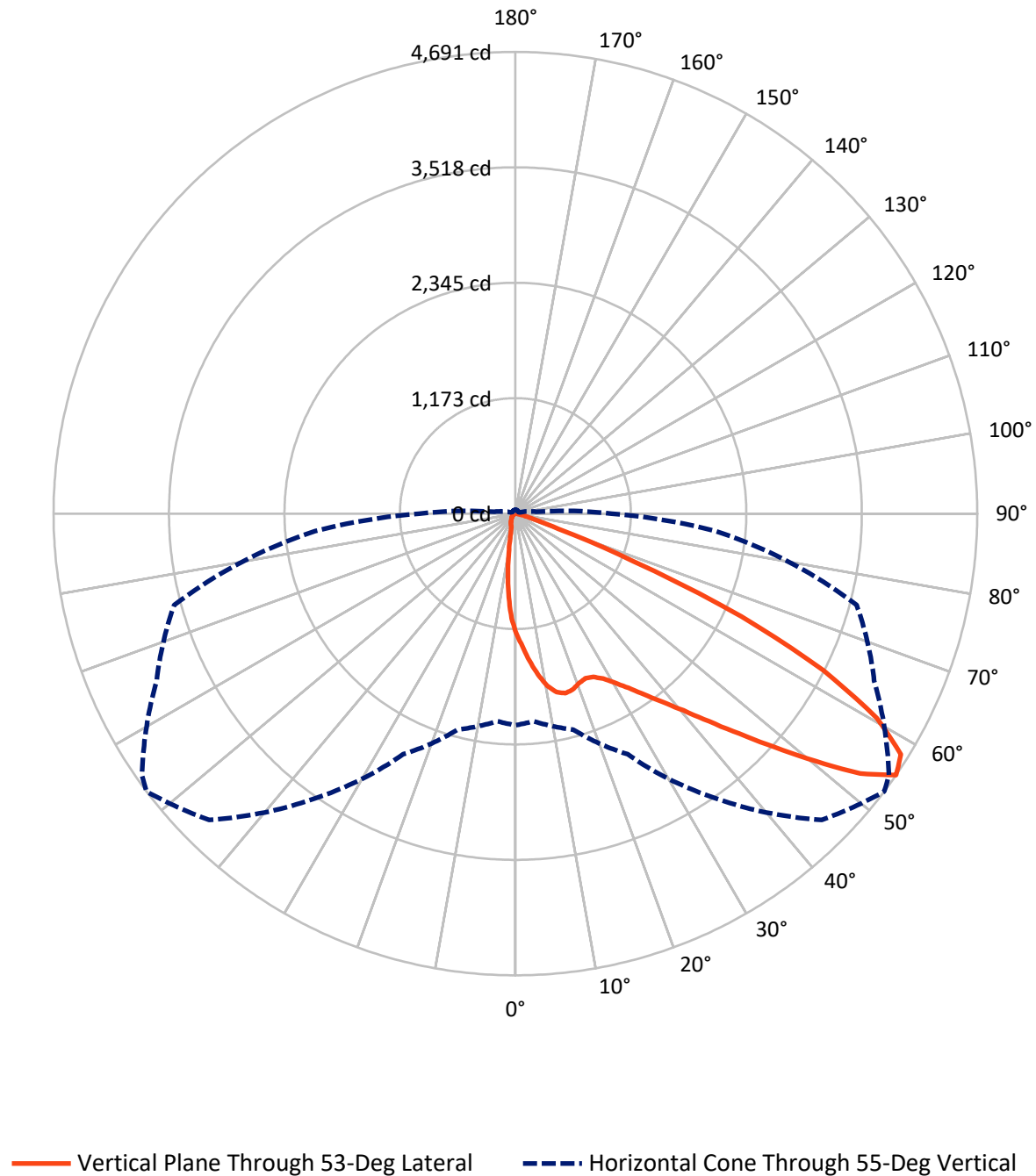


Based on 15 foot mounting height. Maximum calculated value = 7.9 fc  
Type II - Short - N/A

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CATALOG NUMBER: CCP-SA2B-730-U-AFL-HSS

## Luminous Intensity Polar Plot



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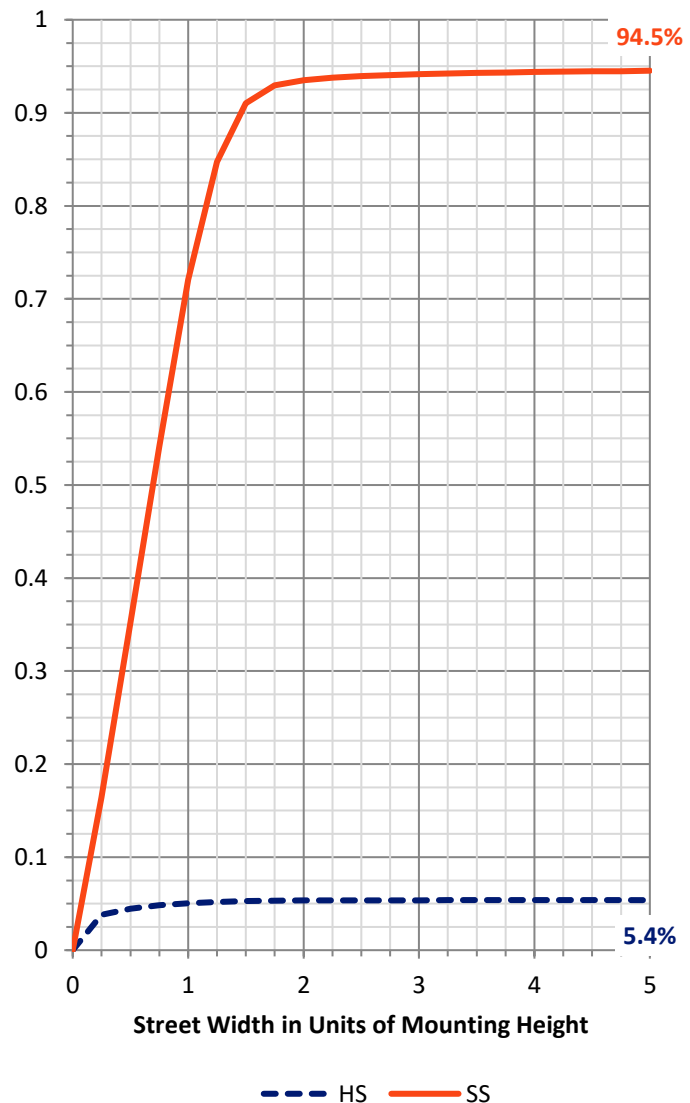
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 281.9    | 0.0    | 281.9  |
|                    | % Fixture | 5.4      | 0.0    | 5.4    |
| <b>Street Side</b> | Lumens    | 4933.1   | 0.0    | 4933.1 |
|                    | % Fixture | 94.6     | 0.0    | 94.6   |
| <b>Total</b>       | Lumens    | 5215.0   | 0.0    | 5215.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 109.1  | 2.1       |
| 10°-20°   | 285.1  | 5.5       |
| 20°-30°   | 477.2  | 9.2       |
| 30°-40°   | 780.7  | 15.0      |
| 40°-50°   | 1254.9 | 24.1      |
| 50°-60°   | 1416.9 | 27.2      |
| 60°-70°   | 755.8  | 14.5      |
| 70°-80°   | 124.2  | 2.4       |
| 80°-90°   | 11.1   | 0.2       |
| 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°    | 5215.0 | 100.0     |
| 0°-180°   | 5215.0 | 100.0     |

**Coefficient of Utilization**



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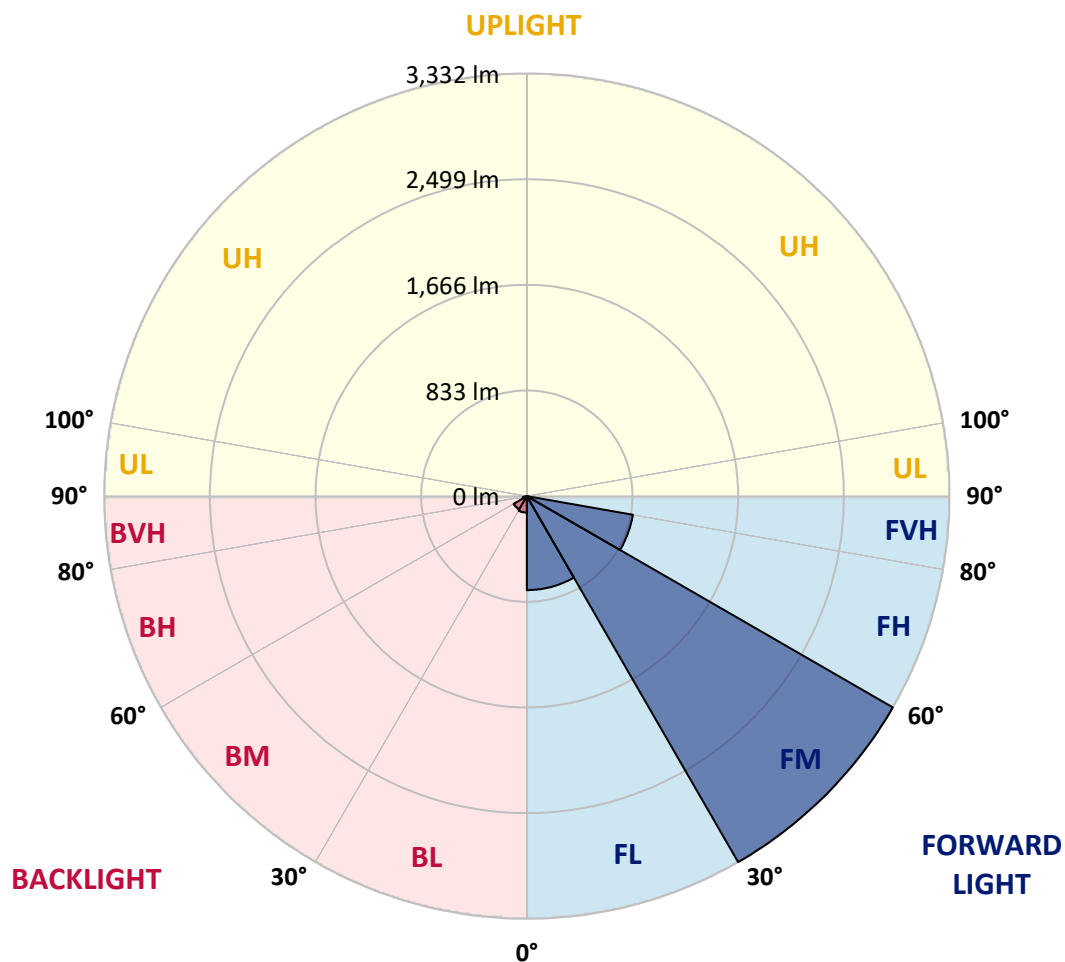
CATALOG NUMBER: CCP-SA2B-730-U-AFL-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 741.3  | 14.2      |                         |      |         |
| FM   | (30°-60°)   | 3332.4 | 63.9      |                         |      |         |
| FH   | (60°-80°)   | 849.1  | 16.3      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 10.2   | 0.2       |                         |      | G1/100  |
| BL   | (0°-30°)    | 130.1  | 2.5       | B1/500                  |      |         |
| BM   | (30°-60°)   | 120.1  | 2.3       | B0/220                  |      |         |
| BH   | (60°-80°)   | 30.8   | 0.6       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.9    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 53°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 |
| 2.5°  | 1463.5 | 1454.8 | 1459.9 | 1446.6 | 1422.4 | 1392.2 | 1347.0 | 1349.3 | 1313.6 | 1282.6 | 1239.6 |
| 5°    | 1705.2 | 1696.1 | 1693.4 | 1659.5 | 1625.7 | 1571.4 | 1504.2 | 1493.2 | 1427.9 | 1348.8 | 1258.8 |
| 7.5°  | 1832.7 | 1824.9 | 1830.9 | 1818.5 | 1785.2 | 1735.8 | 1650.9 | 1642.6 | 1541.7 | 1421.9 | 1289.4 |
| 10°   | 1774.2 | 1771.5 | 1796.6 | 1825.9 | 1852.8 | 1846.9 | 1778.8 | 1766.0 | 1652.7 | 1502.4 | 1321.0 |
| 12.5° | 1617.0 | 1625.7 | 1657.7 | 1711.6 | 1794.8 | 1872.9 | 1862.0 | 1864.2 | 1766.0 | 1589.6 | 1355.7 |
| 15°   | 1524.7 | 1535.3 | 1553.5 | 1581.4 | 1683.8 | 1822.7 | 1893.5 | 1916.3 | 1874.7 | 1687.0 | 1396.8 |
| 17.5° | 1517.0 | 1525.7 | 1528.4 | 1538.9 | 1598.8 | 1741.8 | 1880.7 | 1924.1 | 1971.6 | 1778.8 | 1443.0 |
| 20°   | 1576.8 | 1580.5 | 1578.2 | 1570.4 | 1591.9 | 1697.9 | 1840.5 | 1902.6 | 2051.6 | 1876.6 | 1483.6 |
| 22.5° | 1689.7 | 1684.2 | 1677.4 | 1648.6 | 1647.2 | 1710.3 | 1818.5 | 1883.4 | 2099.1 | 1957.5 | 1510.6 |
| 25°   | 1829.5 | 1818.1 | 1808.5 | 1767.8 | 1748.6 | 1774.7 | 1838.2 | 1890.3 | 2142.0 | 2036.0 | 1529.8 |
| 27.5° | 1982.1 | 1985.8 | 1962.0 | 1907.2 | 1877.0 | 1871.6 | 1899.0 | 1937.8 | 2183.6 | 2106.4 | 1540.3 |
| 30°   | 2145.2 | 2147.1 | 2116.0 | 2059.3 | 2031.9 | 1996.7 | 1994.9 | 2018.2 | 2228.4 | 2187.3 | 1550.3 |
| 32.5° | 2331.2 | 2336.2 | 2285.5 | 2226.6 | 2178.6 | 2132.9 | 2110.5 | 2130.2 | 2308.8 | 2292.8 | 1570.9 |
| 35°   | 2599.9 | 2578.0 | 2509.4 | 2420.3 | 2352.2 | 2292.4 | 2258.1 | 2270.9 | 2415.7 | 2419.4 | 1612.0 |
| 37.5° | 2876.8 | 2874.5 | 2798.6 | 2670.3 | 2558.8 | 2484.3 | 2425.8 | 2446.8 | 2566.1 | 2588.9 | 1677.8 |
| 40°   | 3134.9 | 3140.9 | 3075.1 | 2963.1 | 2819.7 | 2691.7 | 2629.1 | 2643.3 | 2765.7 | 2794.5 | 1757.8 |
| 42.5° | 3303.5 | 3300.3 | 3305.4 | 3273.4 | 3129.5 | 2978.7 | 2884.5 | 2892.3 | 2997.9 | 3012.9 | 1857.8 |
| 45°   | 3381.2 | 3368.9 | 3411.8 | 3513.3 | 3456.2 | 3297.6 | 3190.2 | 3180.6 | 3238.7 | 3234.5 | 1948.8 |
| 47.5° | 3314.1 | 3291.2 | 3389.9 | 3634.4 | 3744.9 | 3697.0 | 3543.4 | 3526.1 | 3476.7 | 3443.8 | 2043.4 |
| 50°   | 2980.0 | 2970.0 | 3181.1 | 3576.8 | 3926.3 | 4066.1 | 3953.3 | 3888.9 | 3689.2 | 3598.3 | 2093.2 |
| 52.5° | 2662.5 | 2634.6 | 2777.2 | 3283.0 | 3845.5 | 4363.1 | 4386.4 | 4271.8 | 3865.6 | 3642.6 | 2076.3 |
| 55°   | 2150.7 | 2116.5 | 2271.8 | 2697.2 | 3525.2 | 4401.1 | 4690.8 | 4630.9 | 4020.0 | 3587.7 | 2042.0 |
| 57.5° | 1306.3 | 1272.5 | 1501.0 | 1931.9 | 2819.2 | 4085.8 | 4615.8 | 4676.6 | 4138.8 | 3527.4 | 2019.6 |
| 60°   | 549.2  | 527.7  | 617.3  | 922.1  | 1800.3 | 3357.9 | 4218.3 | 4370.0 | 4161.2 | 3444.7 | 2028.7 |
| 62.5° | 285.6  | 276.0  | 281.0  | 369.2  | 727.9  | 2211.0 | 3511.0 | 3775.1 | 3935.5 | 3408.2 | 2037.9 |
| 65°   | 214.3  | 207.0  | 191.0  | 202.9  | 282.8  | 955.9  | 2523.1 | 2876.8 | 3446.1 | 3315.4 | 1976.2 |
| 67.5° | 175.9  | 169.1  | 157.6  | 154.0  | 166.8  | 331.7  | 1288.1 | 1747.7 | 2700.4 | 2920.2 | 1755.0 |
| 70°   | 140.3  | 138.0  | 134.3  | 127.5  | 125.2  | 160.8  | 461.9  | 712.3  | 1785.7 | 2059.3 | 1272.1 |
| 72.5° | 117.0  | 117.4  | 113.3  | 107.4  | 99.2   | 103.7  | 184.1  | 243.5  | 864.0  | 987.4  | 532.8  |
| 75°   | 97.8   | 97.8   | 99.2   | 90.9   | 82.7   | 71.3   | 102.4  | 118.8  | 277.4  | 228.0  | 113.8  |
| 77.5° | 76.8   | 77.7   | 83.6   | 76.8   | 66.3   | 44.8   | 55.7   | 63.5   | 82.2   | 65.8   | 41.6   |
| 80°   | 61.2   | 60.3   | 58.0   | 69.0   | 59.4   | 31.5   | 26.5   | 29.2   | 38.4   | 31.5   | 20.6   |
| 82.5° | 43.0   | 42.5   | 40.7   | 46.6   | 46.1   | 23.3   | 17.4   | 17.8   | 23.3   | 20.1   | 12.8   |
| 85°   | 10.5   | 12.3   | 26.0   | 21.9   | 19.2   | 13.7   | 10.5   | 11.4   | 15.1   | 13.3   | 6.9    |
| 87.5° | 4.6    | 4.6    | 11.9   | 14.2   | 9.1    | 5.9    | 4.6    | 5.0    | 7.8    | 7.8    | 4.1    |
| 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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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 | 1220.4 |
| 2.5°  | 1224.6 | 1194.9 | 1157.4 | 1117.6 | 1077.0 | 1028.1 | 997.0  | 971.4  | 951.3  | 935.8  | 930.3  |
| 5°    | 1229.1 | 1172.0 | 1087.0 | 981.5  | 874.1  | 773.6  | 695.9  | 638.3  | 590.8  | 564.8  | 553.3  |
| 7.5°  | 1228.7 | 1152.8 | 999.3  | 822.5  | 647.9  | 503.1  | 400.3  | 336.8  | 294.3  | 276.9  | 266.4  |
| 10°   | 1228.2 | 1127.7 | 899.2  | 646.1  | 433.2  | 291.5  | 214.8  | 179.1  | 163.6  | 157.6  | 156.7  |
| 12.5° | 1241.5 | 1098.9 | 787.3  | 475.7  | 271.9  | 181.4  | 149.4  | 141.2  | 137.5  | 135.7  | 135.2  |
| 15°   | 1248.8 | 1072.4 | 669.4  | 335.8  | 183.2  | 143.5  | 133.4  | 129.8  | 128.4  | 127.5  | 127.0  |
| 17.5° | 1256.5 | 1031.3 | 557.4  | 243.1  | 146.7  | 130.2  | 124.3  | 122.0  | 121.1  | 121.1  | 121.1  |
| 20°   | 1257.9 | 987.0  | 446.4  | 179.1  | 130.2  | 121.5  | 115.6  | 113.3  | 111.9  | 111.0  | 111.0  |
| 22.5° | 1247.9 | 934.4  | 350.9  | 145.3  | 120.6  | 113.3  | 106.9  | 103.3  | 101.0  | 100.5  | 100.5  |
| 25°   | 1222.7 | 859.9  | 269.1  | 127.5  | 112.9  | 105.1  | 97.3   | 93.2   | 91.4   | 91.4   | 91.4   |
| 27.5° | 1186.6 | 772.2  | 207.9  | 113.3  | 102.8  | 95.0   | 88.2   | 84.5   | 84.1   | 83.6   | 84.1   |
| 30°   | 1145.5 | 687.7  | 159.0  | 100.5  | 90.9   | 84.5   | 79.0   | 77.2   | 78.1   | 78.1   | 78.6   |
| 32.5° | 1104.4 | 603.1  | 124.3  | 90.5   | 80.4   | 74.9   | 72.2   | 72.2   | 73.6   | 73.6   | 73.6   |
| 35°   | 1069.2 | 520.4  | 104.2  | 82.2   | 73.1   | 68.5   | 67.2   | 68.5   | 69.5   | 69.9   | 69.9   |
| 37.5° | 1049.5 | 449.2  | 91.8   | 74.9   | 67.2   | 63.5   | 63.1   | 64.4   | 66.3   | 67.6   | 68.1   |
| 40°   | 1042.2 | 394.3  | 84.5   | 69.5   | 61.7   | 59.4   | 58.9   | 60.8   | 64.0   | 66.3   | 66.7   |
| 42.5° | 1042.7 | 345.9  | 78.1   | 64.0   | 58.0   | 54.8   | 54.8   | 57.6   | 60.8   | 63.1   | 63.1   |
| 45°   | 1045.9 | 304.3  | 71.7   | 58.5   | 54.8   | 49.3   | 49.8   | 53.5   | 55.7   | 58.0   | 58.0   |
| 47.5° | 1048.6 | 271.0  | 64.9   | 52.5   | 47.5   | 44.8   | 45.7   | 48.4   | 51.6   | 55.3   | 55.3   |
| 50°   | 1032.6 | 247.2  | 58.0   | 46.1   | 41.6   | 40.7   | 42.5   | 44.8   | 49.3   | 53.0   | 53.5   |
| 52.5° | 994.3  | 225.7  | 52.1   | 41.1   | 37.5   | 37.9   | 40.2   | 41.6   | 45.2   | 45.7   | 46.1   |
| 55°   | 977.4  | 214.8  | 47.5   | 37.5   | 34.3   | 35.6   | 37.0   | 37.5   | 36.6   | 34.3   | 34.3   |
| 57.5° | 973.7  | 207.4  | 43.0   | 33.8   | 31.5   | 33.4   | 32.9   | 30.2   | 27.4   | 24.7   | 24.2   |
| 60°   | 977.4  | 197.4  | 39.3   | 29.2   | 28.8   | 29.2   | 27.9   | 22.8   | 19.2   | 17.4   | 16.4   |
| 62.5° | 956.3  | 182.8  | 36.1   | 25.1   | 25.1   | 24.7   | 21.0   | 15.5   | 12.3   | 11.0   | 10.5   |
| 65°   | 886.9  | 154.0  | 32.9   | 21.0   | 20.6   | 19.6   | 14.2   | 10.5   | 8.2    | 6.9    | 6.4    |
| 67.5° | 750.3  | 119.3  | 29.7   | 17.4   | 16.4   | 13.7   | 9.1    | 6.9    | 4.6    | 4.1    | 3.7    |
| 70°   | 511.8  | 74.0   | 25.1   | 13.7   | 12.3   | 8.7    | 5.5    | 4.1    | 2.7    | 2.3    | 1.8    |
| 72.5° | 185.5  | 43.0   | 21.0   | 10.5   | 8.2    | 5.5    | 3.2    | 1.8    | 1.4    | 1.4    | 0.9    |
| 75°   | 43.9   | 30.2   | 16.0   | 7.8    | 5.5    | 3.2    | 1.8    | 1.4    | 0.9    | 0.9    | 0.5    |
| 77.5° | 20.1   | 23.3   | 10.5   | 4.6    | 3.7    | 2.3    | 1.4    | 0.9    | 0.5    | 0.5    | 0.0    |
| 80°   | 11.4   | 16.4   | 5.0    | 3.2    | 2.7    | 1.8    | 0.9    | 0.5    | 0.5    | 0.0    | 0.0    |
| 82.5° | 5.9    | 9.1    | 3.7    | 2.7    | 2.3    | 1.4    | 0.9    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 4.1    | 4.6    | 2.7    | 2.3    | 1.8    | 1.4    | 0.9    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 3.2    | 3.2    | 2.7    | 2.3    | 1.8    | 1.4    | 0.5    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2012-088-7

Luminaire Tested: WIS-SA730-2A-U-SL3-HSS

Test Date: 01/20/2021

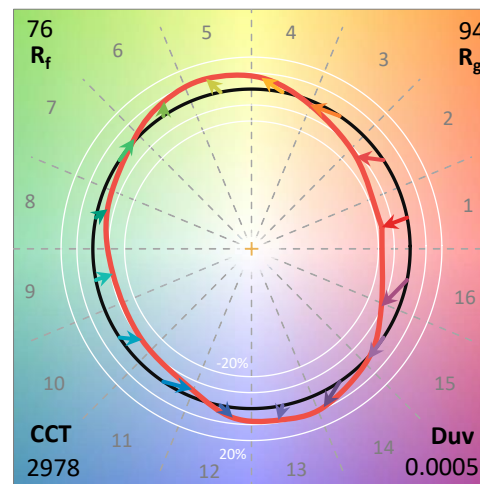
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/20/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **WIS-SA-730-2A-U-SL3-HSS**  
 Description: INVUE WALL PACK

SHIELD

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2978   | CRI (Ra): | 72.4 |      |       |
| CIE u':                   | 0.2511 | R1:       | 68.2 | R9:  | -36.8 |
| CIE v':                   | 0.5225 | R2:       | 83.1 | R10: | 63.2  |
| Duv:                      | 0.0005 | R3:       | 94.9 | R11: | 65.5  |
| CIE x:                    | 0.4391 | R4:       | 68.7 | R12: | 58.5  |
| CIE y:                    | 0.4060 | R5:       | 68.6 | R13: | 71.0  |
| CIE z:                    | 0.1549 | R6:       | 78.2 | R14: | 97.4  |
| Peak Wavelength (nm):     | 596    | R7:       | 76.3 |      |       |
| Dominant Wavelength (nm): | 582    | R8:       | 41.2 |      |       |
| Purity:                   | 54     |           |      |      |       |
|                           |        |           |      |      |       |
| Rf:                       | 76.2   |           |      |      |       |
| Rg:                       | 94.2   |           |      |      |       |



### Test Conditions

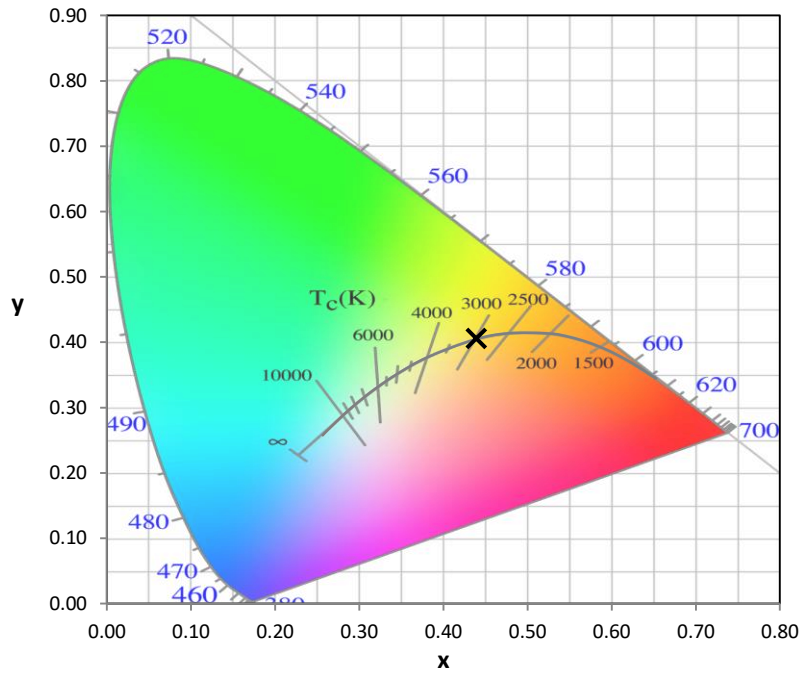
Stabilization Time: 82M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/28%  
 Sphere Temperature (°C): 25.5

REPORT NUMBER: SP1-2012-088-7

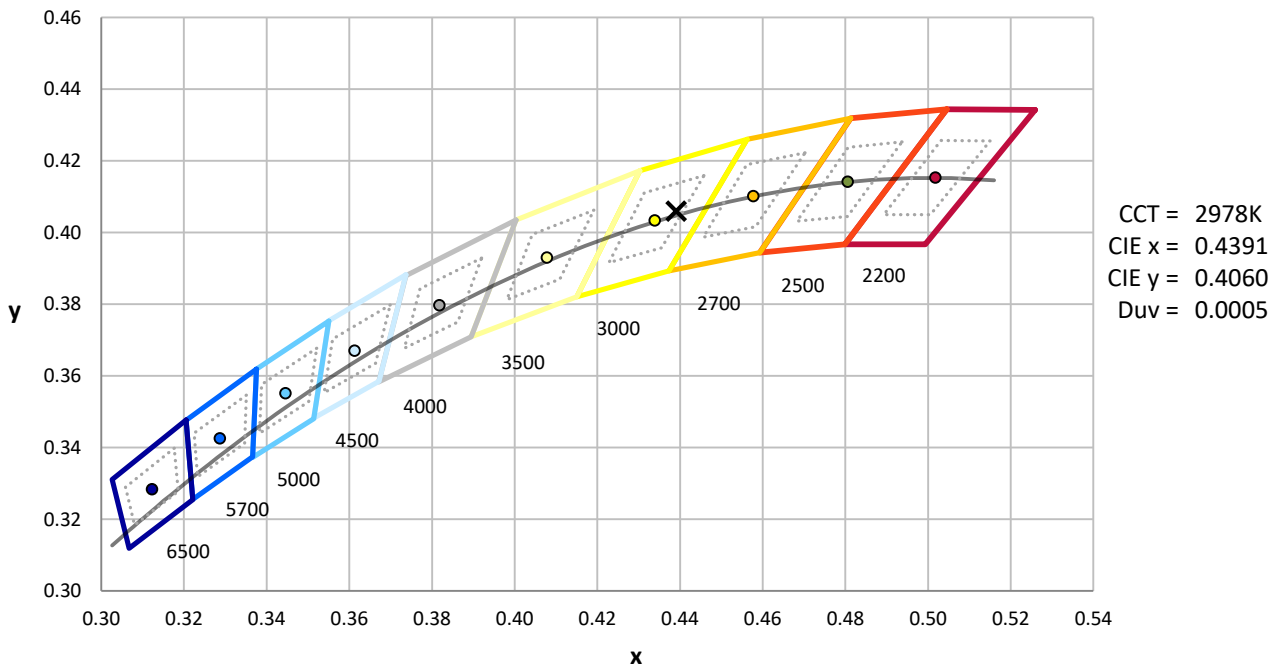
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

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**CIE 1931 Chromaticity Diagram**



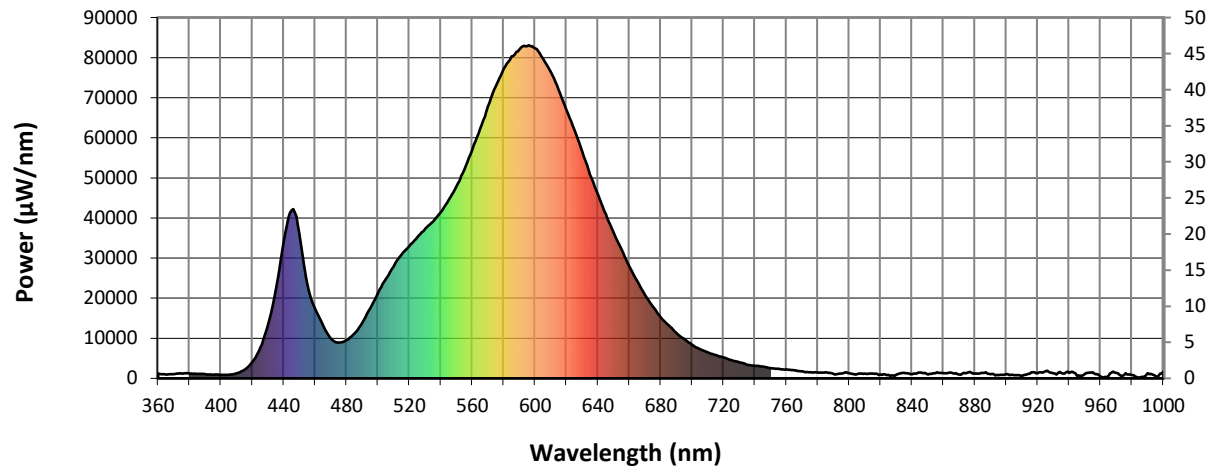
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2012-088-7

### Photopic Flux vs. Wavelength

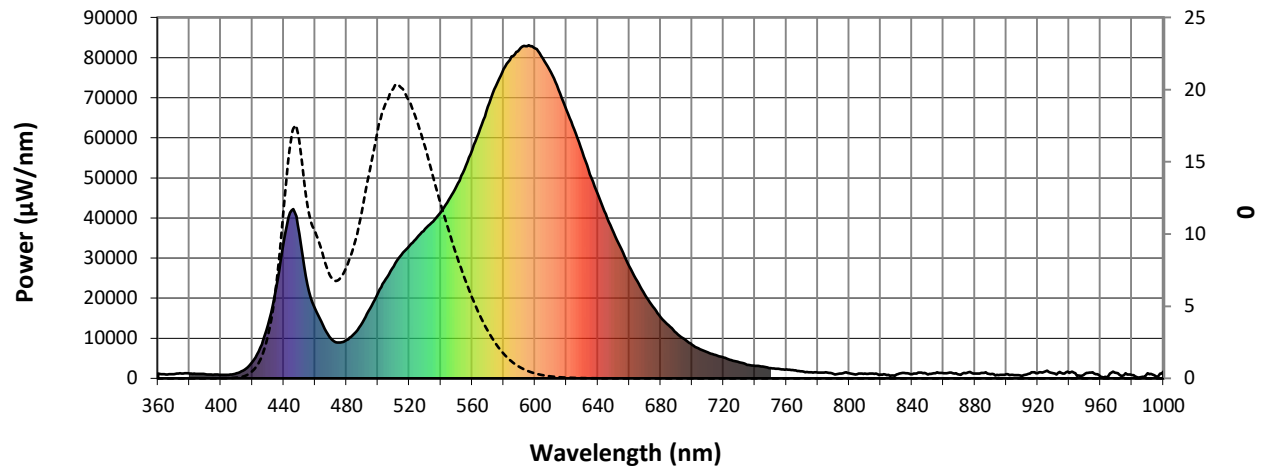


#####

| 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       | 1195             | 0.0              | 490       | 13880            | 2.0              | 620       | 66879            | 17.4             | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 3.2              | 625       | 62111            | 13.7             | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 4.7              | 630       | 56551            | 10.2             | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 6.9              | 635       | 50866            | 7.6              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 9.6              | 640       | 45859            | 5.5              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 12.8             | 645       | 40924            | 3.9              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 16.0             | 650       | 36434            | 2.7              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 18.9             | 655       | 32132            | 1.8              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 22.0             | 660       | 27953            | 1.2              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 24.3             | 665       | 24284            | 0.8              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.0              | 540       | 41391            | 27.0             | 670       | 20822            | 0.5              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.0              | 545       | 44515            | 29.6             | 675       | 17848            | 0.3              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.0              | 550       | 47864            | 32.5             | 680       | 15278            | 0.2              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 0.0              | 555       | 52101            | 35.6             | 685       | 13213            | 0.1              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 0.1              | 560       | 56892            | 38.7             | 690       | 11304            | 0.1              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 0.3              | 565       | 62242            | 41.4             | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 0.5              | 570       | 67731            | 44.0             | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 0.9              | 575       | 72883            | 45.3             | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 0.9              | 580       | 77104            | 45.8             | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 0.8              | 585       | 80305            | 44.6             | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 0.7              | 590       | 82039            | 42.4             | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 0.7              | 595       | 82883            | 39.3             | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 0.6              | 600       | 82307            | 35.5             | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 0.7              | 605       | 79818            | 30.9             | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 0.9              | 610       | 76405            | 26.2             | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 1.3              | 615       | 71967            | 21.7             | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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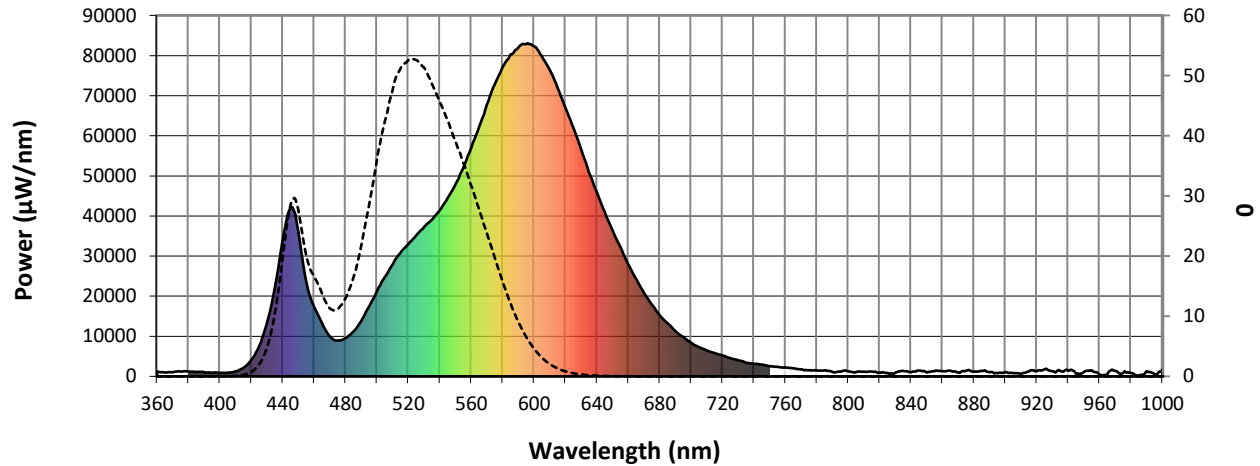
### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 1728.4**
**S/P: 0.45**

| 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       | 1195             | 0.0              | 490       | 13880            | 21.4             | 620       | 66879            | 0.8              | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 28.1             | 625       | 62111            | 0.5              | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 35.6             | 630       | 56551            | 0.3              | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 42.1             | 635       | 50866            | 0.2              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 47.4             | 640       | 45859            | 0.1              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 51.1             | 645       | 40924            | 0.1              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 52.5             | 650       | 36434            | 0.0              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 52.6             | 655       | 32132            | 0.0              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 51.4             | 660       | 27953            | 0.0              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 48.8             | 665       | 24284            | 0.0              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.1              | 540       | 41391            | 45.7             | 670       | 20822            | 0.0              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.2              | 545       | 44515            | 42.7             | 675       | 17848            | 0.0              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.7              | 550       | 47864            | 39.1             | 680       | 15278            | 0.0              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 1.9              | 555       | 52101            | 35.6             | 685       | 13213            | 0.0              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 4.5              | 560       | 56892            | 31.8             | 690       | 11304            | 0.0              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 10.0             | 565       | 62242            | 27.9             | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 19.0             | 570       | 67731            | 23.9             | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 28.0             | 575       | 72883            | 19.8             | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 28.0             | 580       | 77104            | 15.9             | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 20.5             | 585       | 80305            | 12.3             | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 16.8             | 590       | 82039            | 9.1              | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 14.0             | 595       | 82883            | 6.6              | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 11.4             | 600       | 82307            | 4.6              | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 11.1             | 605       | 79818            | 3.1              | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 12.9             | 610       | 76405            | 2.1              | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 16.2             | 615       | 71967            | 1.3              | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 4752**
**S/P: 1.23**

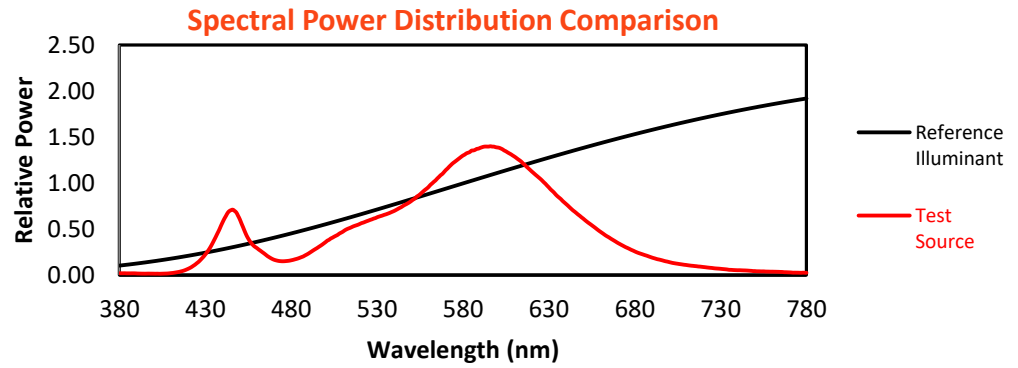
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1195             | 0.0              | 490       | 13880            | 11.5             | 620       | 66879            | 0.1              | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 14.4             | 625       | 62111            | 0.0              | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 17.1             | 630       | 56551            | 0.0              | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 19.0             | 635       | 50866            | 0.0              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 20.1             | 640       | 45859            | 0.0              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 20.1             | 645       | 40924            | 0.0              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 19.2             | 650       | 36434            | 0.0              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 17.8             | 655       | 32132            | 0.0              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 16.1             | 660       | 27953            | 0.0              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 14.1             | 665       | 24284            | 0.0              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.0              | 540       | 41391            | 12.1             | 670       | 20822            | 0.0              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.1              | 545       | 44515            | 10.3             | 675       | 17848            | 0.0              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.5              | 550       | 47864            | 8.6              | 680       | 15278            | 0.0              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 1.2              | 555       | 52101            | 7.0              | 685       | 13213            | 0.0              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 2.8              | 560       | 56892            | 5.6              | 690       | 11304            | 0.0              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 6.0              | 565       | 62242            | 4.4              | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 11.4             | 570       | 67731            | 3.3              | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 16.5             | 575       | 72883            | 2.4              | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 16.6             | 580       | 77104            | 1.7              | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 12.3             | 585       | 80305            | 1.2              | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 10.3             | 590       | 82039            | 0.8              | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 8.7              | 595       | 82883            | 0.5              | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 7.1              | 600       | 82307            | 0.3              | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 6.8              | 605       | 79818            | 0.2              | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 7.7              | 610       | 76405            | 0.1              | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 9.2              | 615       | 71967            | 0.1              | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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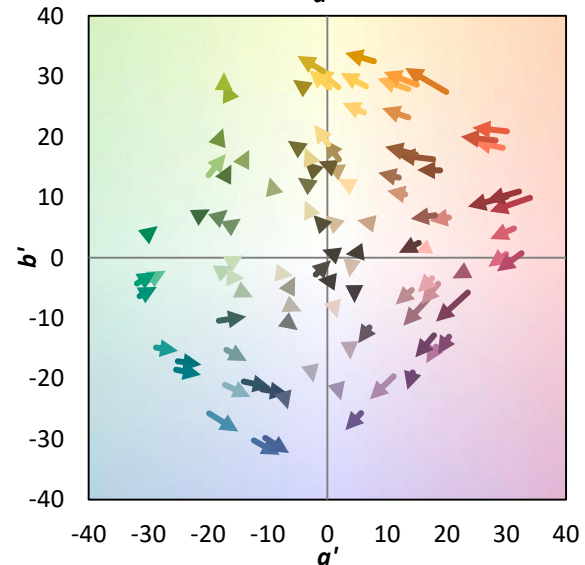
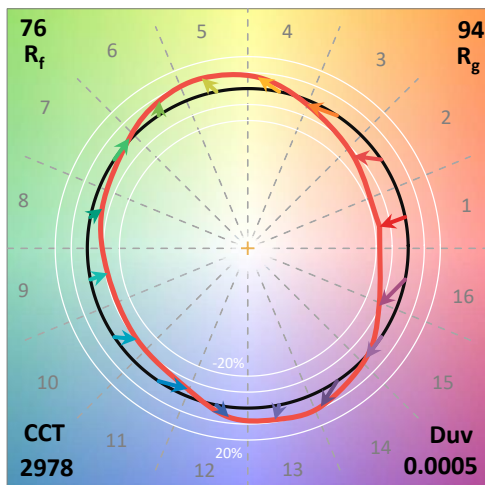
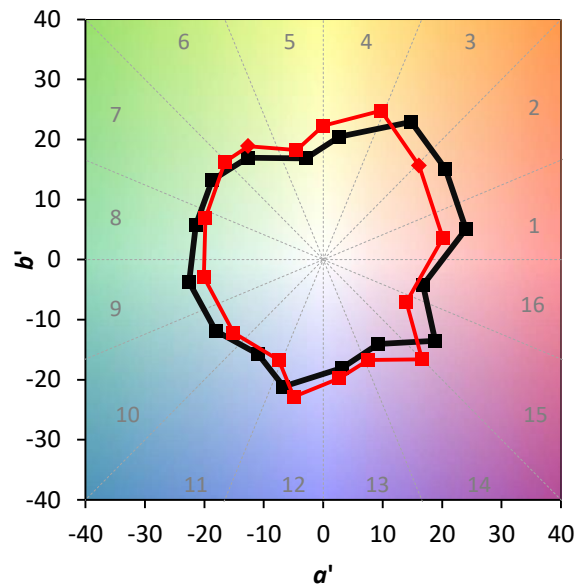
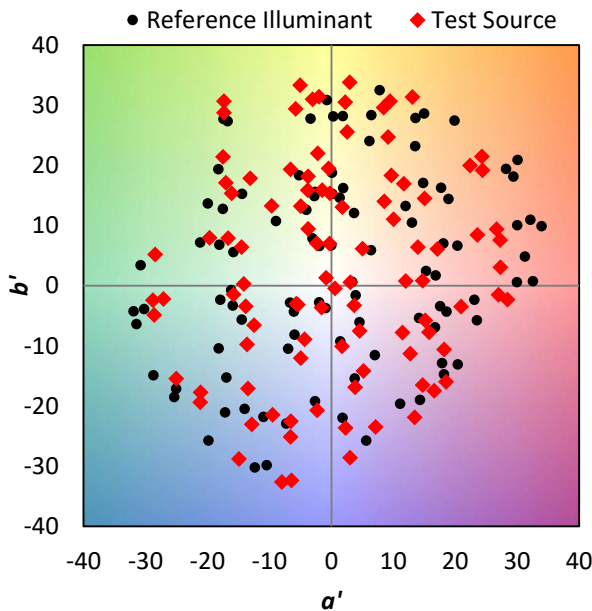
TM-30-18

### Summary

$R_f = 76.2$   
 $R_g = 94.2$   
 CIE  $R_a = 72.4$   
 $R_g = -36.8$



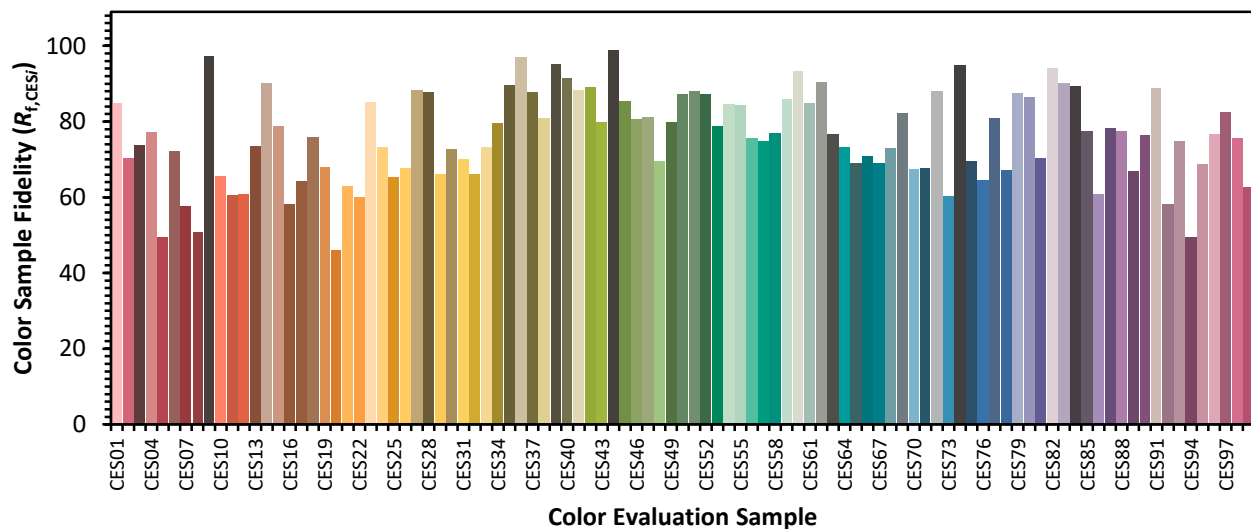
### Color Vector Graphics



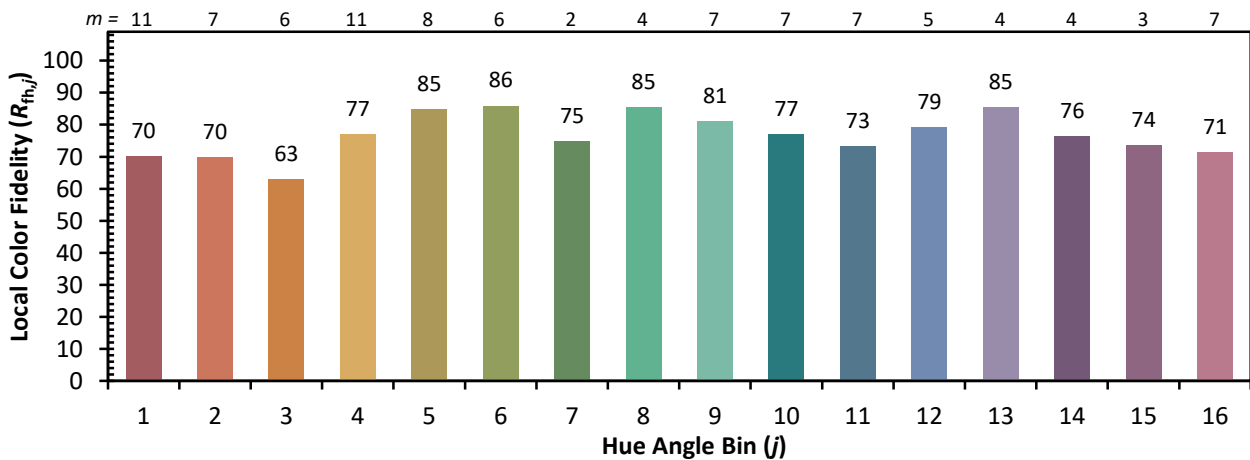
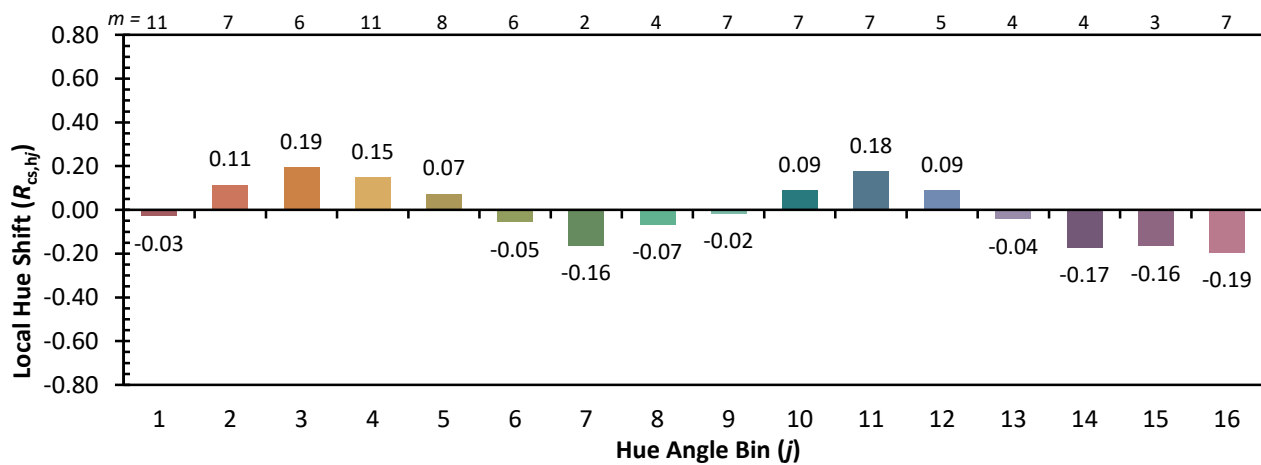
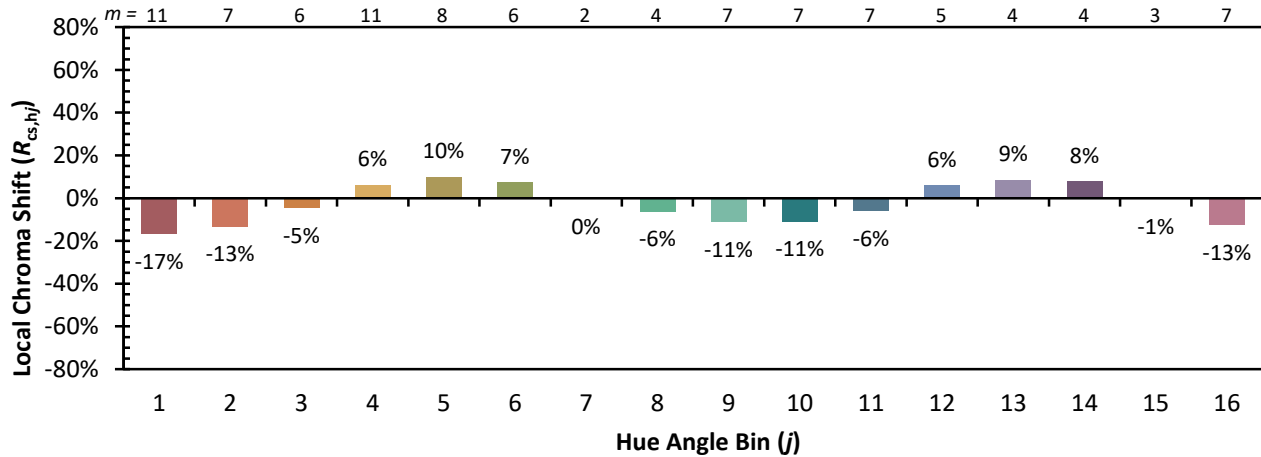


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

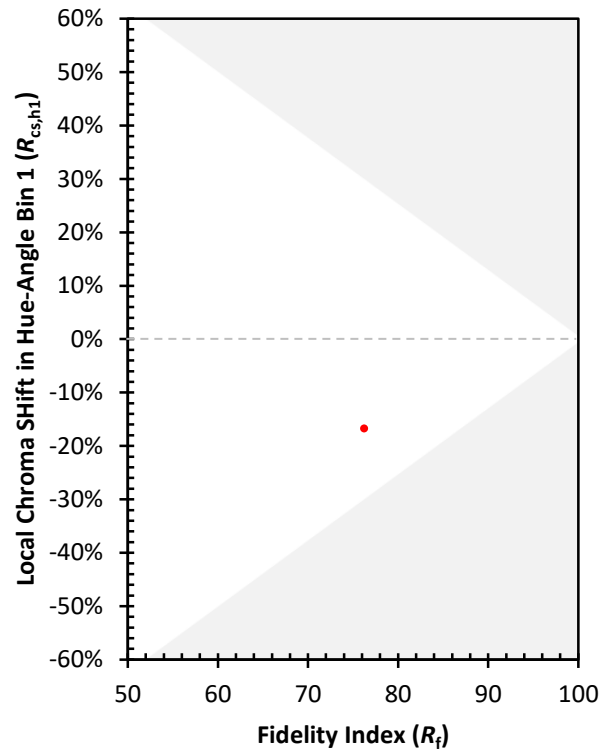
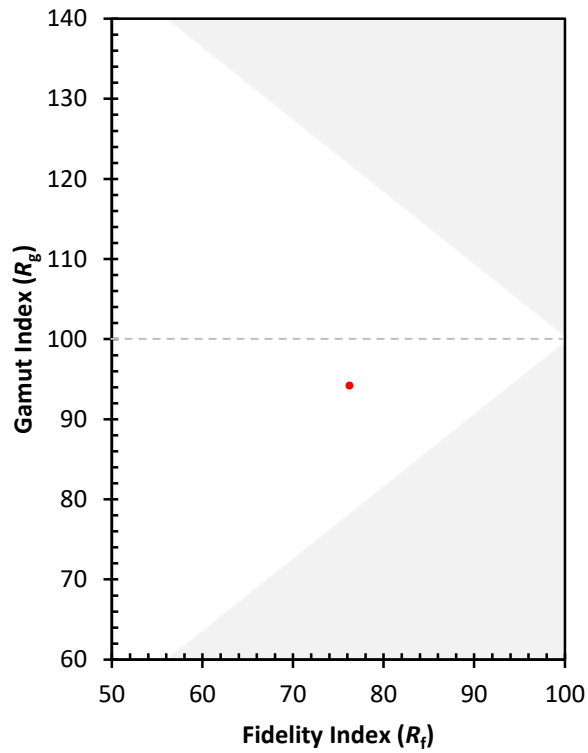
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 88 | CES76 = 65 |
| CES02 = 63 | CES27 = 88 | CES52 = 87 | CES77 = 81 |
| CES03 = 31 | CES28 = 88 | CES53 = 79 | CES78 = 67 |
| CES04 = 71 | CES29 = 66 | CES54 = 85 | CES79 = 87 |
| CES05 = 49 | CES30 = 73 | CES55 = 84 | CES80 = 87 |
| CES06 = 51 | CES31 = 70 | CES56 = 76 | CES81 = 70 |
| CES07 = 41 | CES32 = 66 | CES57 = 75 | CES82 = 94 |
| CES08 = 40 | CES33 = 73 | CES58 = 77 | CES83 = 90 |
| CES09 = 29 | CES34 = 80 | CES59 = 86 | CES84 = 89 |
| CES10 = 76 | CES35 = 90 | CES60 = 93 | CES85 = 77 |
| CES11 = 59 | CES36 = 97 | CES61 = 85 | CES86 = 61 |
| CES12 = 65 | CES37 = 88 | CES62 = 90 | CES87 = 78 |
| CES13 = 43 | CES38 = 81 | CES63 = 77 | CES88 = 78 |
| CES14 = 74 | CES39 = 95 | CES64 = 73 | CES89 = 67 |
| CES15 = 71 | CES40 = 91 | CES65 = 69 | CES90 = 76 |
| CES16 = 47 | CES41 = 88 | CES66 = 71 | CES91 = 89 |
| CES17 = 50 | CES42 = 89 | CES67 = 69 | CES92 = 58 |
| CES18 = 56 | CES43 = 80 | CES68 = 73 | CES93 = 75 |
| CES19 = 73 | CES44 = 99 | CES69 = 82 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 67 | CES95 = 69 |
| CES21 = 87 | CES46 = 81 | CES71 = 68 | CES96 = 77 |
| CES22 = 79 | CES47 = 81 | CES72 = 88 | CES97 = 83 |
| CES23 = 92 | CES48 = 69 | CES73 = 60 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 95 | CES99 = 63 |
| CES25 = 73 | CES50 = 87 | CES75 = 69 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)