

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: P672463

Luminaire Tested: **CCP-SA-2E-835-U-5WQ**

Issue Date: 04/16/2023



**Test Information**

Test Method: LM-79-08  
Report Number: P672463  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA-2E-835-U-5WQ  
Description: INVUE CLEAR CURVE POLE MOUNT LIGHT SQUARE LUMINAIRE @1050mA w/ 5WQ  
distribution lens  
Light Source: (32) 3500K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 11808.6 lumens  
Efficiency: N/A  
Efficacy: 110.8 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B4 - U0 - G2

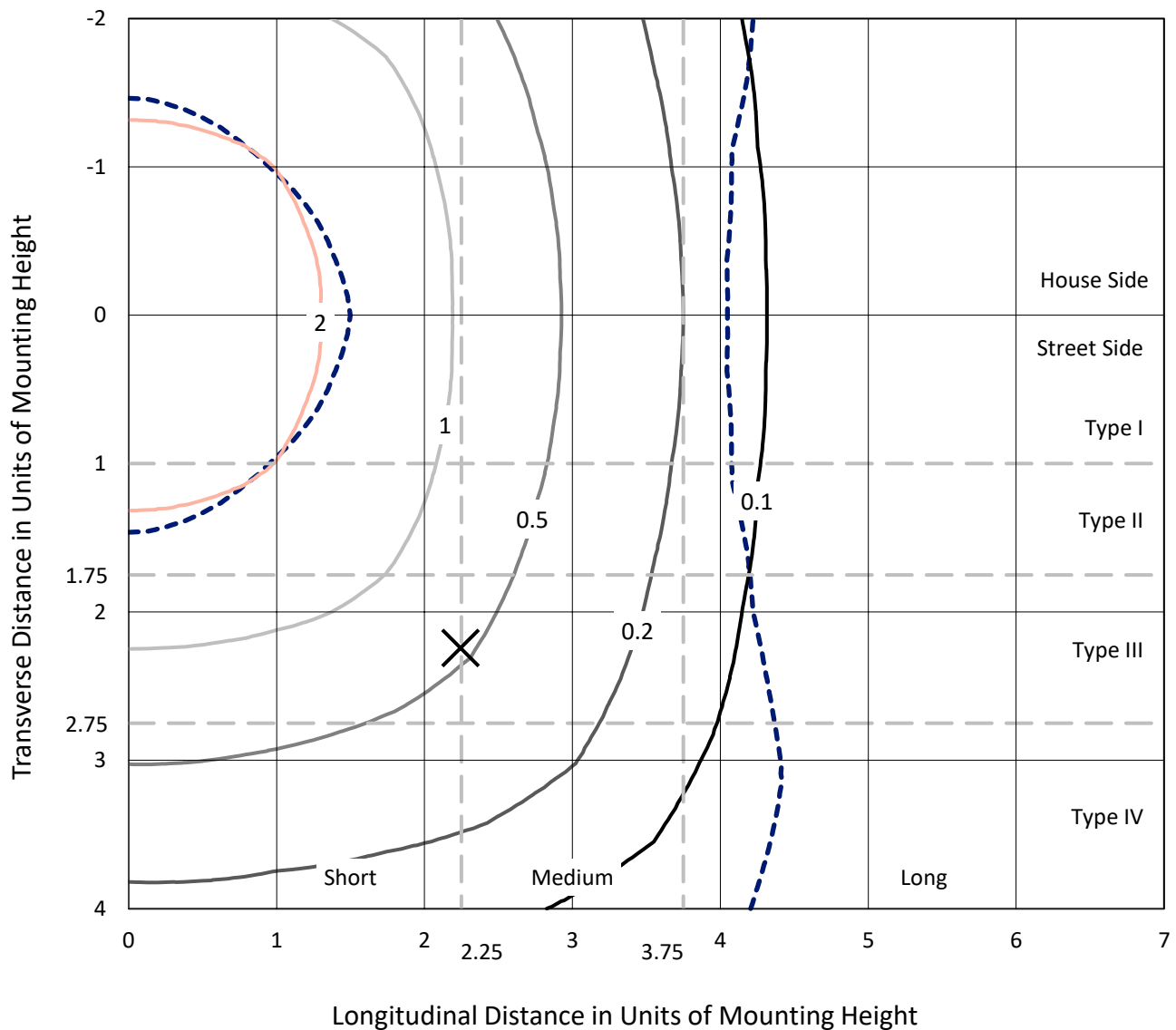
Input Watts (W): 106.6  
Input Voltage (V): 120  
Input Current (A<sub>in</sub>): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P672463

CATALOG NUMBER: CCP-SA-2E-835-U-5WQ

## Iso-Footcandle Lines of Horizontal Illumination

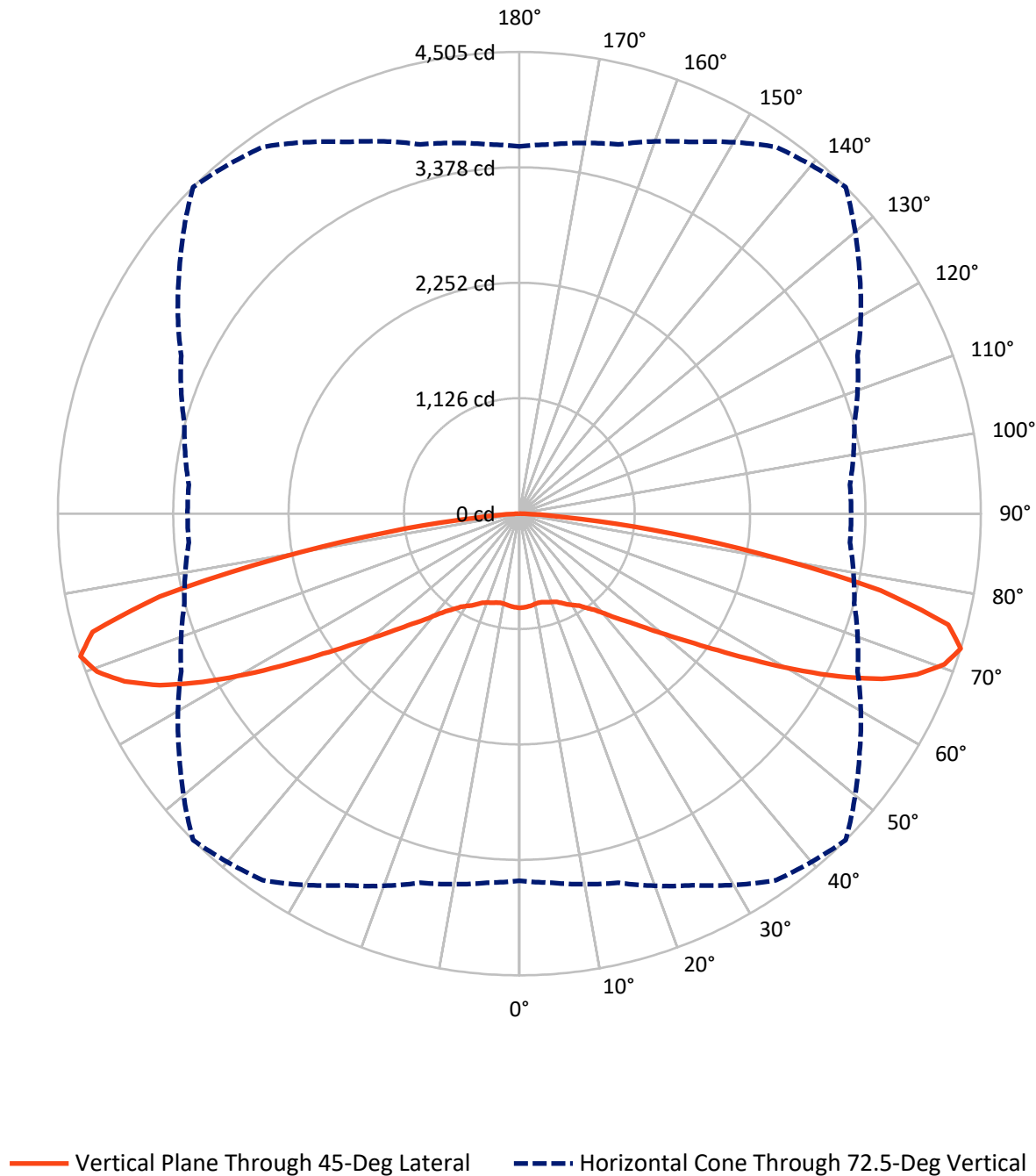
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 4.1 fc  
 Type V - Short - N/A

REPORT NUMBER: P672463  
CATALOG NUMBER: CCP-SA-2E-835-U-5WQ

## Luminous Intensity Polar Plot



REPORT NUMBER: P672463

CATALOG NUMBER: CCP-SA-2E-835-U-5WQ

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 5904.3   | 0.0    | 5904.3  |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Street Side</b> | Lumens    | 5904.3   | 0.0    | 5904.3  |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Total</b>       | Lumens    | 11808.6  | 0.0    | 11808.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 86.4    | 0.7       |
| 10°-20°   | 256.5   | 2.2       |
| 20°-30°   | 450.5   | 3.8       |
| 30°-40°   | 718.8   | 6.1       |
| 40°-50°   | 1201.9  | 10.2      |
| 50°-60°   | 2056.7  | 17.4      |
| 60°-70°   | 3395.4  | 28.8      |
| 70°-80°   | 3254.3  | 27.6      |
| 80°-90°   | 388.1   | 3.3       |
| 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°    | 11808.6 | 100.0     |
| 0°-180°   | 11808.6 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P672463

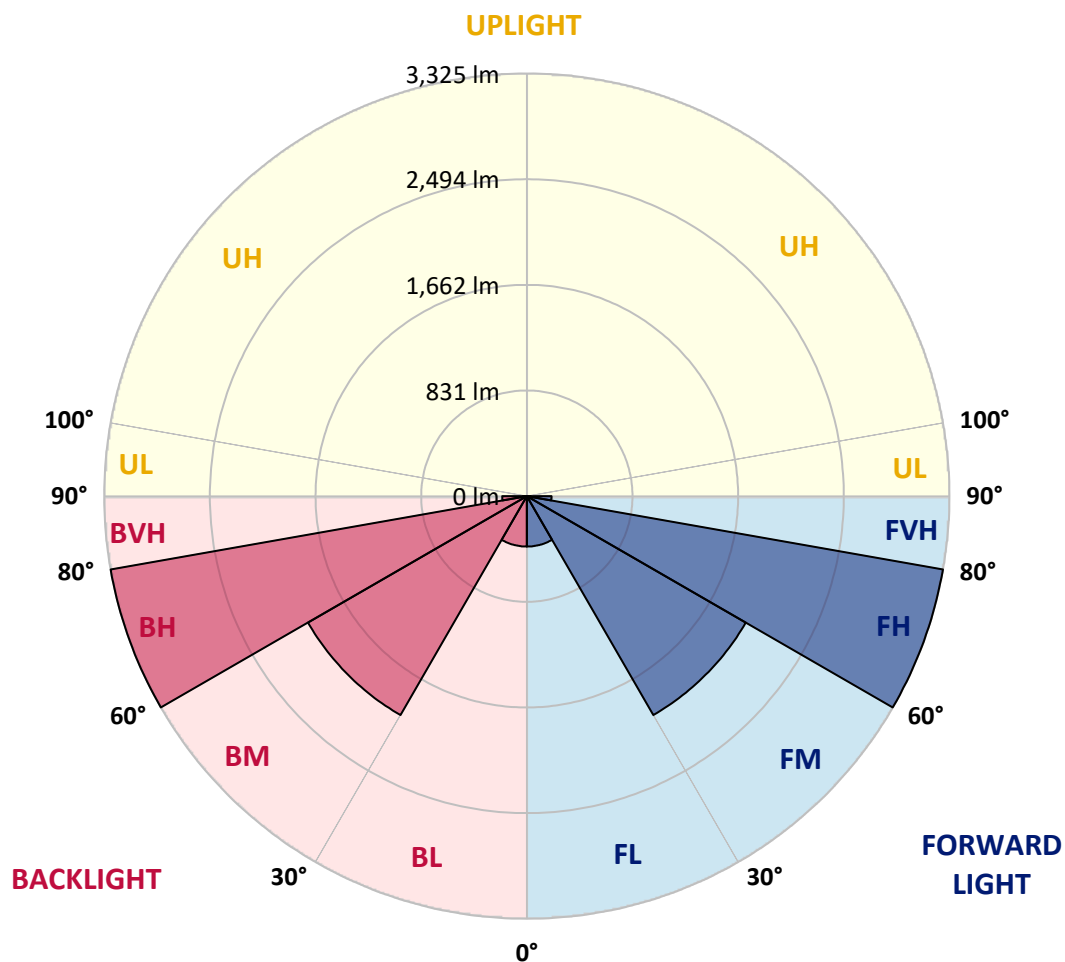
CATALOG NUMBER: CCP-SA-2E-835-U-5WQ

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 396.7  | 3.4       |                         |      |         |
| FM   | (30°-60°)   | 1988.7 | 16.8      |                         |      |         |
| FH   | (60°-80°)   | 3324.8 | 28.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 194.0  | 1.6       |                         |      | G2/225  |
| BL   | (0°-30°)    | 396.7  | 3.4       | B1/500                  |      |         |
| BM   | (30°-60°)   | 1988.7 | 16.8      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 3324.8 | 28.2      | B4/5000                 |      | G2/5000 |
| BVH  | (80°-90°)   | 194.0  | 1.6       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B4-U0-G2**

Type V Short



REPORT NUMBER: P672463

CATALOG NUMBER: CCP-SA-2E-835-U-5WQ

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 919.6  | 919.6  | 919.6  | 919.6  | 919.6  | 919.6  | 919.6  | 919.6  | 919.6  | 919.6  | 919.6  |
| 2.5°  | 913.8  | 913.8  | 916.3  | 917.1  | 916.3  | 915.4  | 914.6  | 913.8  | 916.3  | 915.4  | 916.3  |
| 5°    | 911.3  | 911.3  | 912.1  | 913.0  | 911.3  | 910.5  | 908.8  | 908.0  | 909.7  | 909.7  | 911.3  |
| 7.5°  | 904.7  | 903.9  | 904.7  | 905.5  | 903.1  | 902.2  | 899.8  | 899.8  | 899.8  | 899.0  | 900.6  |
| 10°   | 899.0  | 897.3  | 897.3  | 895.7  | 891.5  | 892.4  | 889.1  | 891.5  | 895.7  | 896.5  | 897.3  |
| 12.5° | 901.4  | 899.8  | 898.1  | 894.0  | 888.2  | 889.1  | 888.2  | 890.7  | 896.5  | 899.8  | 902.2  |
| 15°   | 913.0  | 911.3  | 907.2  | 899.8  | 896.5  | 896.5  | 894.8  | 895.7  | 903.9  | 908.8  | 911.3  |
| 17.5° | 925.3  | 922.0  | 914.6  | 909.7  | 906.4  | 908.8  | 903.1  | 902.2  | 908.8  | 916.3  | 918.7  |
| 20°   | 935.2  | 932.7  | 923.7  | 917.9  | 917.9  | 920.4  | 914.6  | 911.3  | 918.7  | 927.8  | 930.3  |
| 22.5° | 952.5  | 950.9  | 941.8  | 936.0  | 936.0  | 936.9  | 933.6  | 931.1  | 939.3  | 948.4  | 950.9  |
| 25°   | 977.2  | 977.2  | 968.2  | 965.7  | 964.9  | 966.5  | 962.4  | 959.9  | 967.3  | 973.9  | 976.4  |
| 27.5° | 1006.1 | 1003.6 | 996.2  | 994.5  | 997.8  | 1003.6 | 996.2  | 989.6  | 995.4  | 1001.1 | 1001.9 |
| 30°   | 1036.6 | 1036.6 | 1030.0 | 1030.0 | 1032.4 | 1034.9 | 1028.3 | 1021.7 | 1027.5 | 1034.1 | 1034.9 |
| 32.5° | 1079.4 | 1076.9 | 1074.5 | 1075.3 | 1074.5 | 1071.2 | 1067.9 | 1067.0 | 1072.0 | 1076.1 | 1077.8 |
| 35°   | 1132.1 | 1131.3 | 1128.0 | 1129.7 | 1129.7 | 1129.7 | 1119.8 | 1116.5 | 1124.7 | 1128.0 | 1126.4 |
| 37.5° | 1213.7 | 1212.9 | 1204.6 | 1199.7 | 1193.9 | 1191.5 | 1179.1 | 1178.3 | 1198.1 | 1207.9 | 1206.3 |
| 40°   | 1313.4 | 1310.1 | 1302.7 | 1294.5 | 1287.0 | 1282.1 | 1269.7 | 1278.8 | 1299.4 | 1306.8 | 1306.8 |
| 42.5° | 1422.2 | 1418.1 | 1409.8 | 1405.7 | 1400.8 | 1395.8 | 1379.3 | 1383.4 | 1408.2 | 1415.6 | 1407.3 |
| 45°   | 1555.7 | 1549.9 | 1540.8 | 1531.8 | 1524.3 | 1514.5 | 1506.2 | 1510.3 | 1536.7 | 1545.8 | 1539.2 |
| 47.5° | 1697.4 | 1695.7 | 1688.3 | 1680.9 | 1674.3 | 1667.7 | 1657.0 | 1664.4 | 1687.5 | 1685.8 | 1672.7 |
| 50°   | 1847.3 | 1850.6 | 1851.5 | 1858.9 | 1853.9 | 1854.8 | 1835.0 | 1830.9 | 1849.0 | 1838.3 | 1821.8 |
| 52.5° | 2008.8 | 2013.8 | 2031.1 | 2045.9 | 2073.1 | 2076.4 | 2051.7 | 2025.3 | 2022.0 | 1994.0 | 1976.7 |
| 55°   | 2195.9 | 2195.1 | 2233.0 | 2274.2 | 2334.3 | 2353.3 | 2298.1 | 2248.6 | 2221.4 | 2167.0 | 2148.9 |
| 57.5° | 2407.6 | 2405.2 | 2462.8 | 2535.4 | 2644.1 | 2691.1 | 2589.7 | 2495.8 | 2429.9 | 2364.8 | 2345.8 |
| 60°   | 2637.5 | 2643.3 | 2713.3 | 2831.2 | 3019.0 | 3084.1 | 2930.9 | 2775.1 | 2674.6 | 2589.7 | 2582.3 |
| 62.5° | 2906.1 | 2907.0 | 2989.4 | 3149.2 | 3393.1 | 3497.8 | 3286.8 | 3075.9 | 2948.2 | 2855.1 | 2835.3 |
| 65°   | 3223.4 | 3229.1 | 3317.3 | 3478.8 | 3759.0 | 3888.3 | 3645.2 | 3388.2 | 3237.4 | 3111.3 | 3108.8 |
| 67.5° | 3548.8 | 3545.5 | 3626.3 | 3797.7 | 4067.9 | 4187.4 | 3932.8 | 3646.1 | 3450.0 | 3292.6 | 3272.0 |
| 70°   | 3757.3 | 3775.4 | 3862.8 | 4026.7 | 4285.5 | 4401.7 | 4091.8 | 3745.8 | 3540.6 | 3396.4 | 3386.5 |
| 72.5° | 3581.8 | 3615.6 | 3728.5 | 4000.4 | 4367.0 | 4504.6 | 4053.9 | 3642.8 | 3384.0 | 3239.0 | 3239.0 |
| 75°   | 2907.8 | 2963.8 | 3121.2 | 3539.8 | 4085.2 | 4323.4 | 3753.2 | 3187.9 | 2811.4 | 2656.5 | 2656.5 |
| 77.5° | 1771.5 | 1825.1 | 2037.7 | 2548.5 | 3299.2 | 3604.0 | 3059.4 | 2401.1 | 1965.2 | 1775.7 | 1750.9 |
| 80°   | 589.1  | 623.7  | 832.2  | 1295.3 | 2025.3 | 2398.6 | 2050.0 | 1363.7 | 880.0  | 670.7  | 667.4  |
| 82.5° | 156.6  | 170.6  | 237.3  | 375.7  | 879.2  | 1299.4 | 937.7  | 449.9  | 257.9  | 200.2  | 184.6  |
| 85°   | 54.4   | 58.5   | 100.5  | 125.2  | 223.3  | 430.1  | 261.2  | 163.1  | 125.2  | 75.8   | 70.9   |
| 87.5° | 15.7   | 17.3   | 40.4   | 43.7   | 64.3   | 50.3   | 70.9   | 65.1   | 59.3   | 24.7   | 22.2   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-7

Luminaire Tested: CCW-SA-2A-835-U-SL4

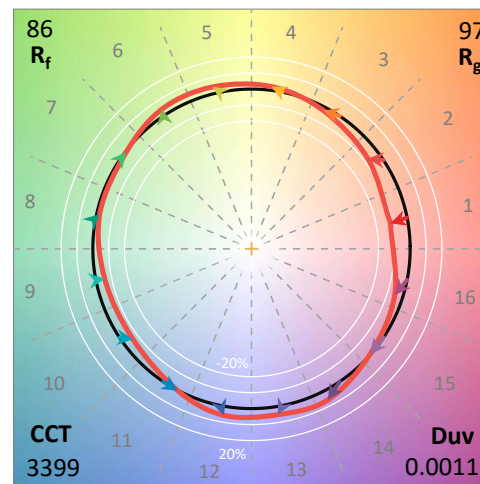
Test Date: 04/27/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/27/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-835-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 3399   | CRI (Ra): | 84.3 |      |      |
| CIE u':                   | 0.2378 | R1:       | 82.5 | R9:  | 12.4 |
| CIE v':                   | 0.5147 | R2:       | 90.0 | R10: | 77.8 |
| Duv:                      | 0.0011 | R3:       | 96.9 | R11: | 84.8 |
| CIE x:                    | 0.4123 | R4:       | 84.3 | R12: | 74.0 |
| CIE y:                    | 0.3967 | R5:       | 83.2 | R13: | 84.1 |
| CIE z:                    | 0.1911 | R6:       | 88.1 | R14: | 98.4 |
| Peak Wavelength (nm):     | 603    | R7:       | 85.7 |      |      |
| Dominant Wavelength (nm): | 580    | R8:       | 64.0 |      |      |
| Purity:                   | 43     |           |      |      |      |
| Rf:                       | 86.3   |           |      |      |      |
| Rg:                       | 97.5   |           |      |      |      |



### Test Conditions

Stabilization Time: 68M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/42%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2104-224-7

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| 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            |

REPORT NUMBER: SP1-2104-224-7

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2104-224-7

### 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       | 1575             | 0.0              | 490       | 27129            | 3.9              | 620       | 76816            | 20.0             | 750       | 3769             | 0.0              | 880       | 1764             | 0.0              |
| 365       | 1304             | 0.0              | 495       | 32004            | 5.8              | 625       | 73341            | 16.2             | 755       | 3612             | 0.0              | 885       | 1716             | 0.0              |
| 370       | 1308             | 0.0              | 500       | 36855            | 8.1              | 630       | 68822            | 12.5             | 760       | 3033             | 0.0              | 890       | 1765             | 0.0              |
| 375       | 1543             | 0.0              | 505       | 41002            | 11.5             | 635       | 63685            | 9.6              | 765       | 2817             | 0.0              | 895       | 1149             | 0.0              |
| 380       | 1553             | 0.0              | 510       | 44391            | 15.3             | 640       | 58596            | 7.0              | 770       | 2655             | 0.0              | 900       | 1818             | 0.0              |
| 385       | 1347             | 0.0              | 515       | 46931            | 19.4             | 645       | 53894            | 5.2              | 775       | 2370             | 0.0              | 905       | 2116             | 0.0              |
| 390       | 1323             | 0.0              | 520       | 48839            | 23.7             | 650       | 48923            | 3.6              | 780       | 2197             | 0.0              | 910       | 1996             | 0.0              |
| 395       | 1205             | 0.0              | 525       | 50192            | 26.9             | 655       | 44036            | 2.5              | 785       | 1941             | 0.0              | 915       | 1915             | 0.0              |
| 400       | 1081             | 0.0              | 530       | 51686            | 30.4             | 660       | 39548            | 1.6              | 790       | 1871             | 0.0              | 920       | 1905             | 0.0              |
| 405       | 1217             | 0.0              | 535       | 53075            | 32.9             | 665       | 34921            | 1.1              | 795       | 1876             | 0.0              | 925       | 1870             | 0.0              |
| 410       | 1655             | 0.0              | 540       | 54402            | 35.4             | 670       | 30451            | 0.7              | 800       | 1957             | 0.0              | 930       | 1721             | 0.0              |
| 415       | 2743             | 0.0              | 545       | 56230            | 37.4             | 675       | 26614            | 0.4              | 805       | 1683             | 0.0              | 935       | 1335             | 0.0              |
| 420       | 4829             | 0.0              | 550       | 58553            | 39.8             | 680       | 23255            | 0.3              | 810       | 1724             | 0.0              | 940       | 1902             | 0.0              |
| 425       | 8795             | 0.0              | 555       | 61171            | 41.8             | 685       | 20234            | 0.2              | 815       | 1771             | 0.0              | 945       | 2151             | 0.0              |
| 430       | 15648            | 0.1              | 560       | 64140            | 43.6             | 690       | 17243            | 0.1              | 820       | 1778             | 0.0              | 950       | 2420             | 0.0              |
| 435       | 26272            | 0.3              | 565       | 67312            | 44.8             | 695       | 14870            | 0.1              | 825       | 1813             | 0.0              | 955       | 2342             | 0.0              |
| 440       | 42276            | 0.7              | 570       | 70494            | 45.8             | 700       | 13016            | 0.0              | 830       | 1600             | 0.0              | 960       | 2115             | 0.0              |
| 445       | 56219            | 1.2              | 575       | 73960            | 46.0             | 705       | 11173            | 0.0              | 835       | 1819             | 0.0              | 965       | 2478             | 0.0              |
| 450       | 52457            | 1.4              | 580       | 77110            | 45.8             | 710       | 9898             | 0.0              | 840       | 1712             | 0.0              | 970       | 1720             | 0.0              |
| 455       | 37508            | 1.3              | 585       | 80213            | 44.6             | 715       | 8850             | 0.0              | 845       | 1465             | 0.0              | 975       | 2086             | 0.0              |
| 460       | 29408            | 1.2              | 590       | 82780            | 42.8             | 720       | 7769             | 0.0              | 850       | 1667             | 0.0              | 980       | 2378             | 0.0              |
| 465       | 23421            | 1.2              | 595       | 83727            | 39.7             | 725       | 6837             | 0.0              | 855       | 1951             | 0.0              | 985       | 2216             | 0.0              |
| 470       | 18707            | 1.2              | 600       | 84514            | 36.4             | 730       | 6108             | 0.0              | 860       | 1783             | 0.0              | 990       | 1516             | 0.0              |
| 475       | 17733            | 1.4              | 605       | 84686            | 32.8             | 735       | 5272             | 0.0              | 865       | 1505             | 0.0              | 995       | 2048             | 0.0              |
| 480       | 19502            | 1.9              | 610       | 82842            | 28.5             | 740       | 4593             | 0.0              | 870       | 1414             | 0.0              | 1000      | 2071             | 0.0              |
| 485       | 22724            | 2.7              | 615       | 80383            | 24.3             | 745       | 4077             | 0.0              | 875       | 1968             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-7

### Scotopic Flux vs. Wavelength



Scotopic Lumens: 6763.3

S/P: 1.5

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 1575                          | 0.0                            | 490               | 27129                         | 41.8                           | 620               | 76816                         | 1.0                            | 750               | 3769                          | 0.0                            | 880               | 1764                          | 0.0                            |
| 365               | 1304                          | 0.0                            | 495               | 32004                         | 51.7                           | 625               | 73341                         | 0.6                            | 755               | 3612                          | 0.0                            | 885               | 1716                          | 0.0                            |
| 370               | 1308                          | 0.0                            | 500               | 36855                         | 61.6                           | 630               | 68822                         | 0.4                            | 760               | 3033                          | 0.0                            | 890               | 1765                          | 0.0                            |
| 375               | 1543                          | 0.0                            | 505               | 41002                         | 69.7                           | 635               | 63685                         | 0.2                            | 765               | 2817                          | 0.0                            | 895               | 1149                          | 0.0                            |
| 380               | 1553                          | 0.0                            | 510               | 44391                         | 75.2                           | 640               | 58596                         | 0.1                            | 770               | 2655                          | 0.0                            | 900               | 1818                          | 0.0                            |
| 385               | 1347                          | 0.0                            | 515               | 46931                         | 77.8                           | 645               | 53894                         | 0.1                            | 775               | 2370                          | 0.0                            | 905               | 2116                          | 0.0                            |
| 390               | 1323                          | 0.0                            | 520               | 48839                         | 77.6                           | 650               | 48923                         | 0.1                            | 780               | 2197                          | 0.0                            | 910               | 1996                          | 0.0                            |
| 395               | 1205                          | 0.0                            | 525               | 50192                         | 75.1                           | 655               | 44036                         | 0.0                            | 785               | 1941                          | 0.0                            | 915               | 1915                          | 0.0                            |
| 400               | 1081                          | 0.0                            | 530               | 51686                         | 71.3                           | 660               | 39548                         | 0.0                            | 790               | 1871                          | 0.0                            | 920               | 1905                          | 0.0                            |
| 405               | 1217                          | 0.0                            | 535               | 53075                         | 66.1                           | 665               | 34921                         | 0.0                            | 795               | 1876                          | 0.0                            | 925               | 1870                          | 0.0                            |
| 410               | 1655                          | 0.1                            | 540               | 54402                         | 60.1                           | 670               | 30451                         | 0.0                            | 800               | 1957                          | 0.0                            | 930               | 1721                          | 0.0                            |
| 415               | 2743                          | 0.3                            | 545               | 56230                         | 53.9                           | 675               | 26614                         | 0.0                            | 805               | 1683                          | 0.0                            | 935               | 1335                          | 0.0                            |
| 420               | 4829                          | 0.8                            | 550               | 58553                         | 47.9                           | 680               | 23255                         | 0.0                            | 810               | 1724                          | 0.0                            | 940               | 1902                          | 0.0                            |
| 425               | 8795                          | 2.2                            | 555               | 61171                         | 41.8                           | 685               | 20234                         | 0.0                            | 815               | 1771                          | 0.0                            | 945               | 2151                          | 0.0                            |
| 430               | 15648                         | 5.3                            | 560               | 64140                         | 35.9                           | 690               | 17243                         | 0.0                            | 820               | 1778                          | 0.0                            | 950               | 2420                          | 0.0                            |
| 435               | 26272                         | 11.7                           | 565               | 67312                         | 30.2                           | 695               | 14870                         | 0.0                            | 825               | 1813                          | 0.0                            | 955               | 2342                          | 0.0                            |
| 440               | 42276                         | 23.6                           | 570               | 70494                         | 24.9                           | 700               | 13016                         | 0.0                            | 830               | 1600                          | 0.0                            | 960               | 2115                          | 0.0                            |
| 445               | 56219                         | 37.6                           | 575               | 73960                         | 20.1                           | 705               | 11173                         | 0.0                            | 835               | 1819                          | 0.0                            | 965               | 2478                          | 0.0                            |
| 450               | 52457                         | 40.7                           | 580               | 77110                         | 15.9                           | 710               | 9898                          | 0.0                            | 840               | 1712                          | 0.0                            | 970               | 1720                          | 0.0                            |
| 455               | 37508                         | 32.8                           | 585               | 80213                         | 12.3                           | 715               | 8850                          | 0.0                            | 845               | 1465                          | 0.0                            | 975               | 2086                          | 0.0                            |
| 460               | 29408                         | 28.4                           | 590               | 82780                         | 9.2                            | 720               | 7769                          | 0.0                            | 850               | 1667                          | 0.0                            | 980               | 2378                          | 0.0                            |
| 465               | 23421                         | 24.7                           | 595               | 83727                         | 6.7                            | 725               | 6837                          | 0.0                            | 855               | 1951                          | 0.0                            | 985               | 2216                          | 0.0                            |
| 470               | 18707                         | 21.5                           | 600               | 84514                         | 4.8                            | 730               | 6108                          | 0.0                            | 860               | 1783                          | 0.0                            | 990               | 1516                          | 0.0                            |
| 475               | 17733                         | 22.2                           | 605               | 84686                         | 3.3                            | 735               | 5272                          | 0.0                            | 865               | 1505                          | 0.0                            | 995               | 2048                          | 0.0                            |
| 480               | 19502                         | 26.3                           | 610               | 82842                         | 2.2                            | 740               | 4593                          | 0.0                            | 870               | 1414                          | 0.0                            | 1000              | 2071                          | 0.0                            |
| 485               | 22724                         | 32.9                           | 615               | 80383                         | 1.5                            | 745               | 4077                          | 0.0                            | 875               | 1968                          | 0.0                            |                   |                               |                                |

REPORT NUMBER: SP1-2104-224-7

### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 2622.7**

**M/P: 0.58**

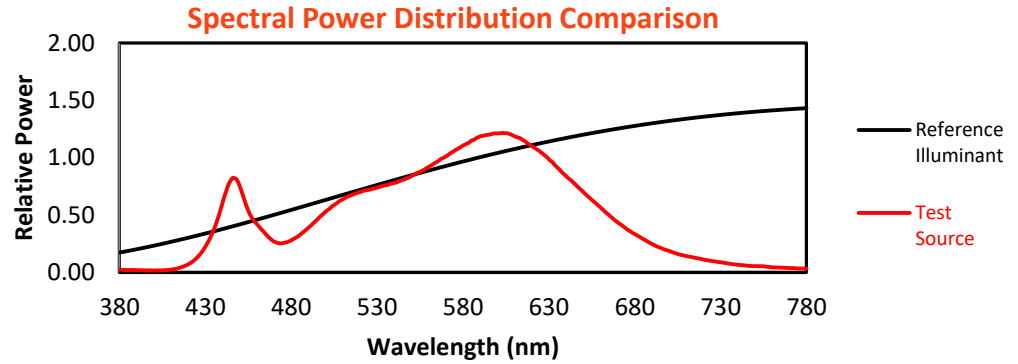
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1575             | 0.0              | 490       | 27129            | 22.6             | 620       | 76816            | 0.1              | 750       | 3769             | 0.0              | 880       | 1764             | 0.0              |
| 365       | 1304             | 0.0              | 495       | 32004            | 26.4             | 625       | 73341            | 0.0              | 755       | 3612             | 0.0              | 885       | 1716             | 0.0              |
| 370       | 1308             | 0.0              | 500       | 36855            | 29.6             | 630       | 68822            | 0.0              | 760       | 3033             | 0.0              | 890       | 1765             | 0.0              |
| 375       | 1543             | 0.0              | 505       | 41002            | 31.5             | 635       | 63685            | 0.0              | 765       | 2817             | 0.0              | 895       | 1149             | 0.0              |
| 380       | 1553             | 0.0              | 510       | 44391            | 31.9             | 640       | 58596            | 0.0              | 770       | 2655             | 0.0              | 900       | 1818             | 0.0              |
| 385       | 1347             | 0.0              | 515       | 46931            | 30.7             | 645       | 53894            | 0.0              | 775       | 2370             | 0.0              | 905       | 2116             | 0.0              |
| 390       | 1323             | 0.0              | 520       | 48839            | 28.4             | 650       | 48923            | 0.0              | 780       | 2197             | 0.0              | 910       | 1996             | 0.0              |
| 395       | 1205             | 0.0              | 525       | 50192            | 25.5             | 655       | 44036            | 0.0              | 785       | 1941             | 0.0              | 915       | 1915             | 0.0              |
| 400       | 1081             | 0.0              | 530       | 51686            | 22.3             | 660       | 39548            | 0.0              | 790       | 1871             | 0.0              | 920       | 1905             | 0.0              |
| 405       | 1217             | 0.0              | 535       | 53075            | 19.1             | 665       | 34921            | 0.0              | 795       | 1876             | 0.0              | 925       | 1870             | 0.0              |
| 410       | 1655             | 0.1              | 540       | 54402            | 15.9             | 670       | 30451            | 0.0              | 800       | 1957             | 0.0              | 930       | 1721             | 0.0              |
| 415       | 2743             | 0.2              | 545       | 56230            | 13.1             | 675       | 26614            | 0.0              | 805       | 1683             | 0.0              | 935       | 1335             | 0.0              |
| 420       | 4829             | 0.6              | 550       | 58553            | 10.5             | 680       | 23255            | 0.0              | 810       | 1724             | 0.0              | 940       | 1902             | 0.0              |
| 425       | 8795             | 1.4              | 555       | 61171            | 8.2              | 685       | 20234            | 0.0              | 815       | 1771             | 0.0              | 945       | 2151             | 0.0              |
| 430       | 15648            | 3.3              | 560       | 64140            | 6.3              | 690       | 17243            | 0.0              | 820       | 1778             | 0.0              | 950       | 2420             | 0.0              |
| 435       | 26272            | 7.0              | 565       | 67312            | 4.7              | 695       | 14870            | 0.0              | 825       | 1813             | 0.0              | 955       | 2342             | 0.0              |
| 440       | 42276            | 14.1             | 570       | 70494            | 3.4              | 700       | 13016            | 0.0              | 830       | 1600             | 0.0              | 960       | 2115             | 0.0              |
| 445       | 56219            | 22.2             | 575       | 73960            | 2.5              | 705       | 11173            | 0.0              | 835       | 1819             | 0.0              | 965       | 2478             | 0.0              |
| 450       | 52457            | 24.2             | 580       | 77110            | 1.7              | 710       | 9898             | 0.0              | 840       | 1712             | 0.0              | 970       | 1720             | 0.0              |
| 455       | 37508            | 19.7             | 585       | 80213            | 1.2              | 715       | 8850             | 0.0              | 845       | 1465             | 0.0              | 975       | 2086             | 0.0              |
| 460       | 29408            | 17.3             | 590       | 82780            | 0.8              | 720       | 7769             | 0.0              | 850       | 1667             | 0.0              | 980       | 2378             | 0.0              |
| 465       | 23421            | 15.3             | 595       | 83727            | 0.5              | 725       | 6837             | 0.0              | 855       | 1951             | 0.0              | 985       | 2216             | 0.0              |
| 470       | 18707            | 13.4             | 600       | 84514            | 0.4              | 730       | 6108             | 0.0              | 860       | 1783             | 0.0              | 990       | 1516             | 0.0              |
| 475       | 17733            | 13.5             | 605       | 84686            | 0.2              | 735       | 5272             | 0.0              | 865       | 1505             | 0.0              | 995       | 2048             | 0.0              |
| 480       | 19502            | 15.7             | 610       | 82842            | 0.2              | 740       | 4593             | 0.0              | 870       | 1414             | 0.0              | 1000      | 2071             | 0.0              |
| 485       | 22724            | 18.7             | 615       | 80383            | 0.1              | 745       | 4077             | 0.0              | 875       | 1968             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-7

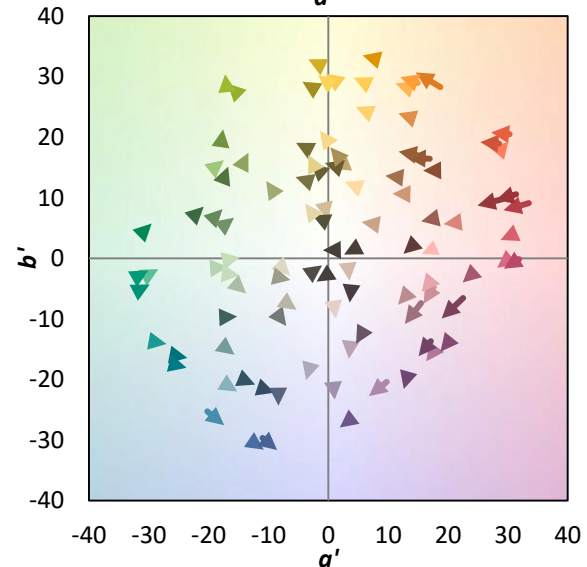
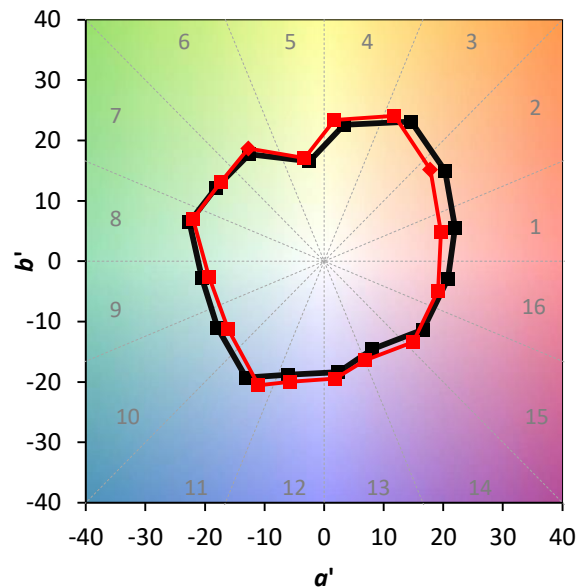
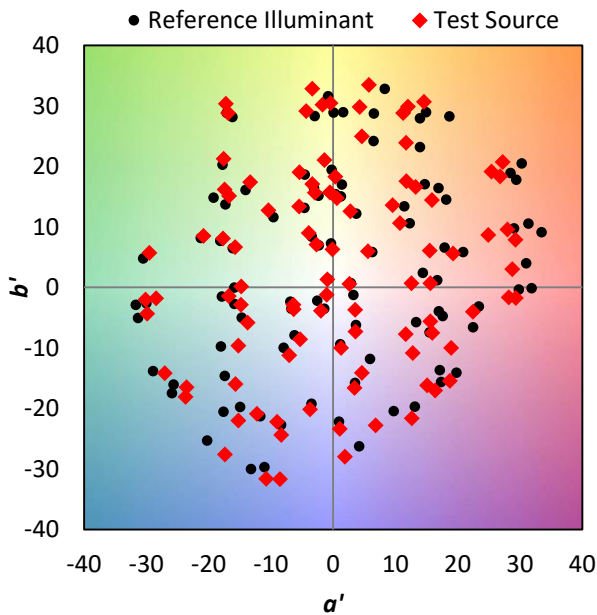
TM-30-18

### Summary

$R_f = 86.3$   
 $R_g = 97.5$   
 CIE  $R_a = 84.3$   
 $R_9 = 12.4$

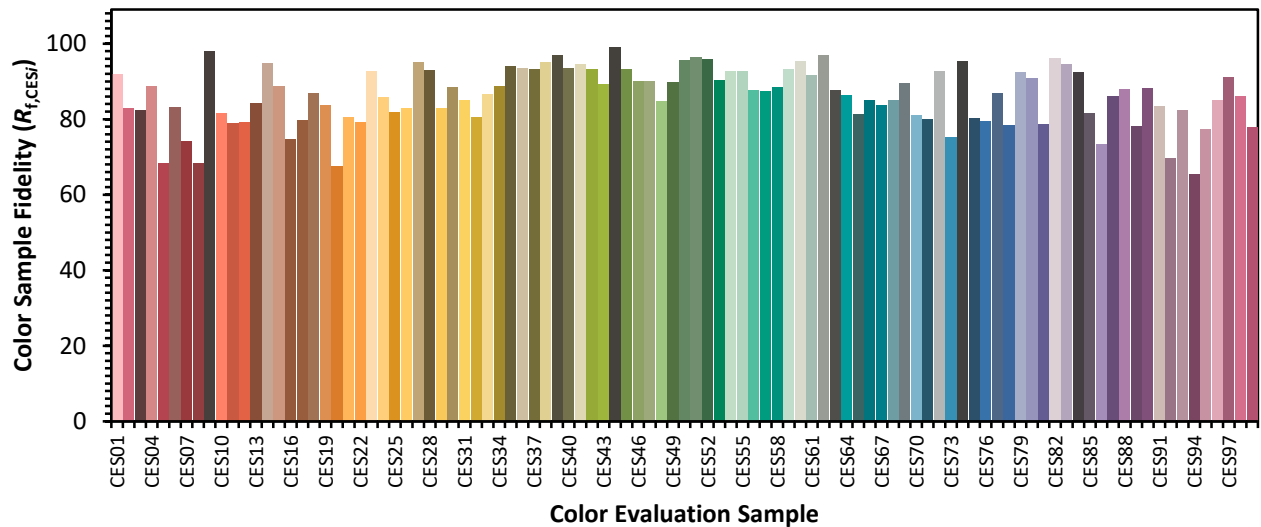


### Color Vector Graphics

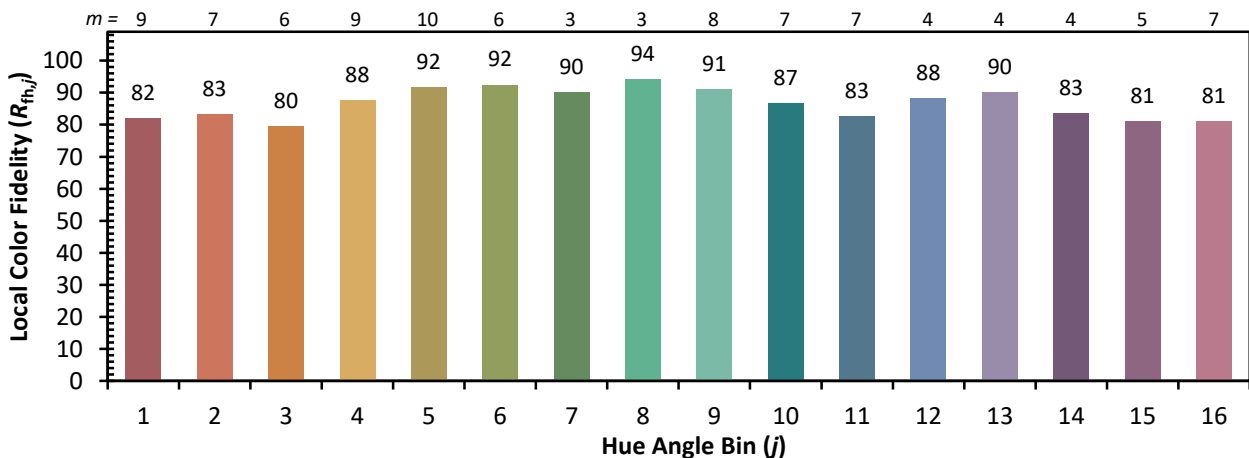
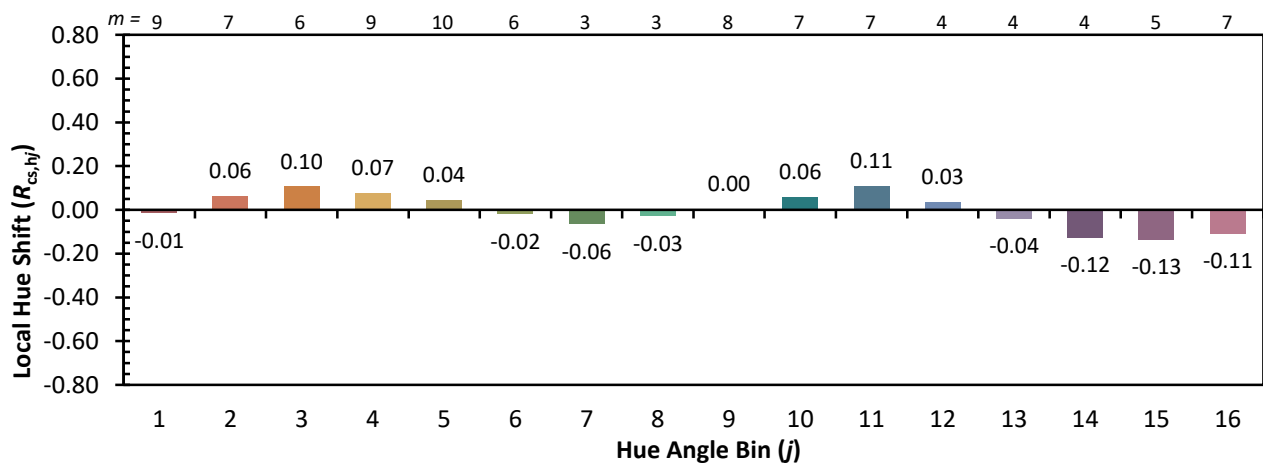
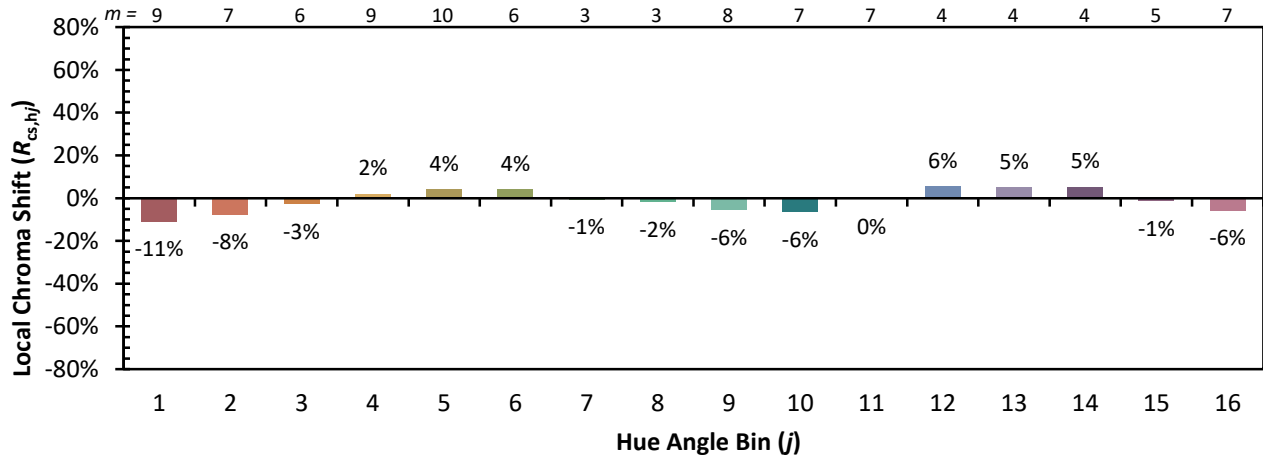


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 83 | CES51 = 96 | CES76 = 80 |
| CES02 = 62 | CES27 = 95 | CES52 = 96 | CES77 = 87 |
| CES03 = 31 | CES28 = 93 | CES53 = 90 | CES78 = 78 |
| CES04 = 70 | CES29 = 83 | CES54 = 93 | CES79 = 92 |
| CES05 = 49 | CES30 = 89 | CES55 = 93 | CES80 = 91 |
| CES06 = 51 | CES31 = 85 | CES56 = 88 | CES81 = 79 |
| CES07 = 42 | CES32 = 81 | CES57 = 87 | CES82 = 96 |
| CES08 = 40 | CES33 = 87 | CES58 = 88 | CES83 = 94 |
| CES09 = 29 | CES34 = 89 | CES59 = 93 | CES84 = 92 |
| CES10 = 75 | CES35 = 94 | CES60 = 95 | CES85 = 82 |
| CES11 = 58 | CES36 = 94 | CES61 = 92 | CES86 = 73 |
| CES12 = 64 | CES37 = 93 | CES62 = 97 | CES87 = 86 |
| CES13 = 43 | CES38 = 95 | CES63 = 88 | CES88 = 88 |
| CES14 = 74 | CES39 = 97 | CES64 = 86 | CES89 = 78 |
| CES15 = 71 | CES40 = 94 | CES65 = 81 | CES90 = 88 |
| CES16 = 47 | CES41 = 95 | CES66 = 85 | CES91 = 83 |
| CES17 = 50 | CES42 = 93 | CES67 = 84 | CES92 = 70 |
| CES18 = 56 | CES43 = 89 | CES68 = 85 | CES93 = 82 |
| CES19 = 72 | CES44 = 99 | CES69 = 89 | CES94 = 65 |
| CES20 = 66 | CES45 = 93 | CES70 = 81 | CES95 = 77 |
| CES21 = 86 | CES46 = 90 | CES71 = 80 | CES96 = 85 |
| CES22 = 78 | CES47 = 90 | CES72 = 93 | CES97 = 91 |
| CES23 = 92 | CES48 = 85 | CES73 = 75 | CES98 = 86 |
| CES24 = 90 | CES49 = 90 | CES74 = 95 | CES99 = 78 |
| CES25 = 72 | CES50 = 96 | CES75 = 80 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)