

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: P672745

Luminaire Tested: **CCP-SA-1E-835-U-5NQ**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P672745  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA-1E-835-U-5NQ  
Description: INVUE CLEAR CURVE POLE MOUNT LIGHT SQUARE LUMINAIRE @1050mA w/ 5NQ  
distribution lens  
Light Source: (16) 3500K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5862.5 lumens  
Efficiency: N/A  
Efficacy: 104.5 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B2 - U0 - G1

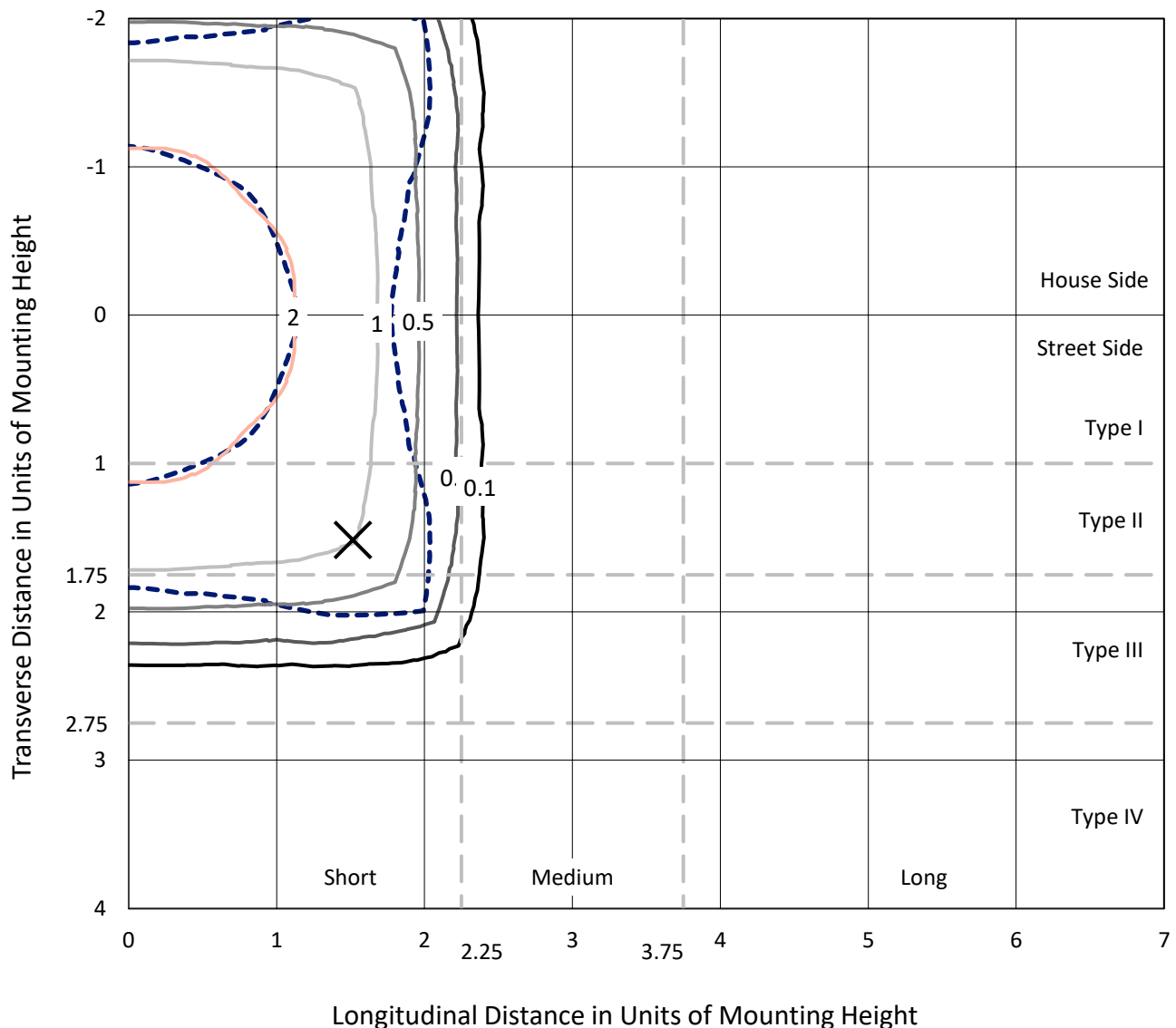
Input Watts (W): 56.1  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P672745

CATALOG NUMBER: CCP-SA-1E-835-U-5NQ

## Iso-Footcandle Lines of Horizontal Illumination

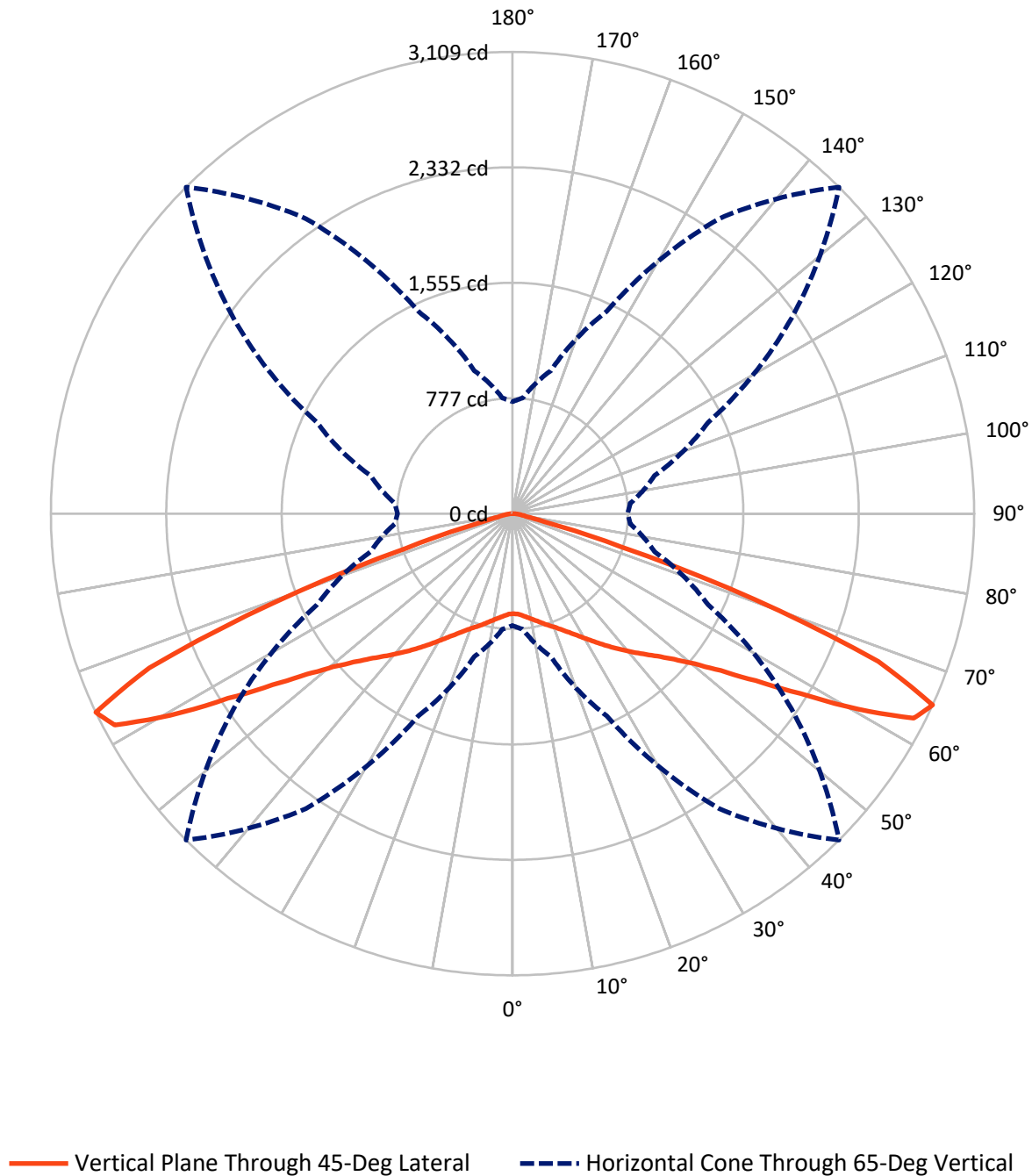
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 3.1 fc  
 Type V - Short - N/A

REPORT NUMBER: P672745  
CATALOG NUMBER: CCP-SA-1E-835-U-5NQ

## Luminous Intensity Polar Plot



REPORT NUMBER: P672745

CATALOG NUMBER: CCP-SA-1E-835-U-5NQ

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 2931.3   | 0.0    | 2931.3 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 2931.3   | 0.0    | 2931.3 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 5862.5   | 0.0    | 5862.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 66.8   | 1.1       |
| 10°-20°   | 217.9  | 3.7       |
| 20°-30°   | 413.4  | 7.1       |
| 30°-40°   | 693.2  | 11.8      |
| 40°-50°   | 1097.0 | 18.7      |
| 50°-60°   | 1723.4 | 29.4      |
| 60°-70°   | 1456.1 | 24.8      |
| 70°-80°   | 169.5  | 2.9       |
| 80°-90°   | 25.2   | 0.4       |
| 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°    | 5862.5 | 100.0     |
| 0°-180°   | 5862.5 | 100.0     |



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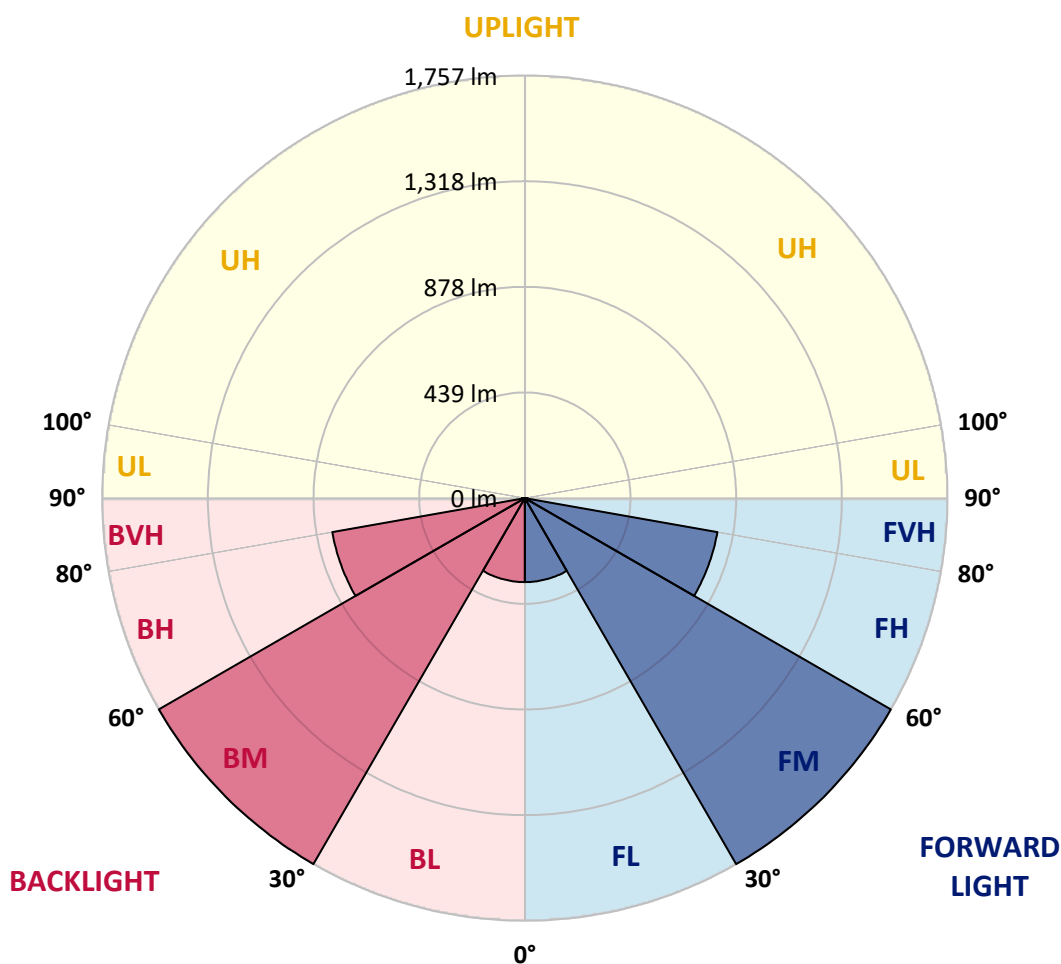
CATALOG NUMBER: CCP-SA-1E-835-U-5NQ

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 349.0  | 6.0       |                         |      |         |
| FM   | (30°-60°)   | 1756.8 | 30.0      |                         |      |         |
| FH   | (60°-80°)   | 812.8  | 13.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 12.6   | 0.2       |                         |      | G1/100  |
| BL   | (0°-30°)    | 349.0  | 6.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 1756.8 | 30.0      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 812.8  | 13.9      | B2/1000                 |      | G1/1800 |
| BVH  | (80°-90°)   | 12.6   | 0.2       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G1**

Type V Short



REPORT NUMBER: P672745

CATALOG NUMBER: CCP-SA-1E-835-U-5NQ

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 674.1  | 674.1  | 674.1  | 674.1  | 674.1  | 674.1  | 674.1  | 674.1  | 674.1  | 674.1  | 674.1  |
| 2.5°  | 677.8  | 675.7  | 677.8  | 677.8  | 676.6  | 677.0  | 675.3  | 674.9  | 677.0  | 675.3  | 674.9  |
| 5°    | 691.8  | 690.2  | 691.8  | 690.6  | 688.5  | 688.9  | 686.5  | 685.6  | 688.1  | 685.6  | 686.0  |
| 7.5°  | 707.9  | 705.0  | 705.8  | 707.1  | 705.0  | 705.0  | 702.9  | 701.7  | 702.9  | 700.5  | 702.1  |
| 10°   | 721.5  | 719.0  | 720.2  | 721.9  | 721.5  | 722.7  | 720.7  | 719.8  | 718.6  | 715.7  | 718.2  |
| 12.5° | 739.2  | 738.4  | 740.0  | 742.1  | 741.3  | 742.9  | 738.4  | 737.1  | 736.7  | 733.4  | 736.3  |
| 15°   | 762.3  | 760.2  | 763.1  | 765.6  | 764.3  | 767.2  | 763.5  | 761.9  | 759.8  | 755.7  | 758.1  |
| 17.5° | 785.3  | 783.7  | 787.8  | 789.0  | 789.5  | 791.9  | 789.0  | 786.6  | 785.8  | 782.9  | 781.2  |
| 20°   | 812.9  | 810.9  | 814.2  | 816.7  | 814.6  | 817.5  | 816.2  | 814.6  | 813.8  | 809.2  | 808.8  |
| 22.5° | 843.9  | 841.0  | 845.9  | 848.8  | 845.9  | 848.8  | 846.3  | 845.9  | 846.3  | 839.7  | 840.6  |
| 25°   | 878.5  | 878.9  | 883.8  | 885.9  | 884.2  | 885.9  | 882.2  | 884.6  | 883.4  | 876.4  | 873.9  |
| 27.5° | 923.0  | 921.3  | 926.7  | 932.8  | 928.7  | 928.7  | 927.1  | 929.6  | 929.1  | 922.5  | 920.9  |
| 30°   | 974.9  | 974.5  | 982.3  | 986.0  | 980.2  | 977.8  | 977.3  | 983.5  | 983.9  | 976.9  | 974.1  |
| 32.5° | 1029.3 | 1029.3 | 1038.7 | 1043.3 | 1035.0 | 1033.4 | 1031.7 | 1040.0 | 1038.7 | 1029.3 | 1023.1 |
| 35°   | 1089.0 | 1086.5 | 1099.3 | 1105.9 | 1097.7 | 1092.7 | 1091.9 | 1099.3 | 1097.7 | 1084.5 | 1077.1 |
| 37.5° | 1147.9 | 1149.6 | 1164.4 | 1171.8 | 1161.9 | 1155.8 | 1157.8 | 1162.8 | 1163.2 | 1148.8 | 1140.9 |
| 40°   | 1220.0 | 1220.5 | 1239.0 | 1244.8 | 1232.0 | 1222.5 | 1225.4 | 1236.5 | 1235.7 | 1218.0 | 1208.1 |
| 42.5° | 1300.8 | 1299.1 | 1322.2 | 1327.2 | 1309.9 | 1291.7 | 1300.4 | 1317.7 | 1321.8 | 1302.0 | 1291.7 |
| 45°   | 1387.3 | 1389.8 | 1413.7 | 1419.1 | 1391.9 | 1368.8 | 1387.3 | 1413.3 | 1418.6 | 1397.2 | 1384.4 |
| 47.5° | 1492.4 | 1495.3 | 1524.1 | 1526.2 | 1495.3 | 1465.2 | 1489.9 | 1523.7 | 1525.8 | 1496.1 | 1481.3 |
| 50°   | 1612.3 | 1622.2 | 1654.3 | 1658.4 | 1628.0 | 1589.2 | 1624.7 | 1654.7 | 1646.9 | 1607.4 | 1593.8 |
| 52.5° | 1748.3 | 1756.1 | 1806.4 | 1823.7 | 1796.9 | 1755.3 | 1783.7 | 1802.2 | 1777.1 | 1725.2 | 1704.2 |
| 55°   | 1864.1 | 1877.2 | 1944.0 | 1996.7 | 2016.9 | 1985.6 | 1982.3 | 1955.1 | 1885.1 | 1806.0 | 1784.1 |
| 57.5° | 1896.6 | 1909.4 | 2012.8 | 2148.8 | 2268.7 | 2284.3 | 2211.8 | 2075.4 | 1924.6 | 1802.7 | 1780.4 |
| 60°   | 1764.3 | 1781.6 | 1932.9 | 2190.4 | 2534.4 | 2676.2 | 2414.1 | 2085.7 | 1822.0 | 1658.4 | 1630.4 |
| 62.5° | 1385.7 | 1417.8 | 1613.1 | 2016.9 | 2641.6 | 3033.0 | 2497.4 | 1908.1 | 1512.6 | 1319.3 | 1282.3 |
| 65°   | 753.6  | 781.2  | 996.7  | 1503.1 | 2424.4 | 3109.2 | 2293.4 | 1452.8 | 989.3  | 795.2  | 775.0  |
| 67.5° | 282.7  | 302.8  | 401.7  | 742.9  | 1714.1 | 2658.0 | 1740.9 | 831.9  | 449.1  | 322.2  | 293.8  |
| 70°   | 120.3  | 122.8  | 145.4  | 258.8  | 779.2  | 1729.3 | 891.2  | 282.7  | 150.0  | 121.1  | 117.8  |
| 72.5° | 86.5   | 86.9   | 93.1   | 114.5  | 237.3  | 758.6  | 269.5  | 118.7  | 91.5   | 82.4   | 82.4   |
| 75°   | 69.2   | 69.6   | 73.3   | 82.8   | 112.1  | 223.3  | 116.2  | 83.2   | 70.9   | 64.7   | 63.9   |
| 77.5° | 54.4   | 55.2   | 58.9   | 64.7   | 75.0   | 102.2  | 78.7   | 65.5   | 56.9   | 51.1   | 50.3   |
| 80°   | 40.4   | 41.6   | 46.6   | 49.4   | 52.7   | 68.0   | 57.3   | 51.1   | 45.3   | 39.1   | 37.9   |
| 82.5° | 26.8   | 28.0   | 34.6   | 36.7   | 36.3   | 42.9   | 39.6   | 39.1   | 34.6   | 26.0   | 24.7   |
| 85°   | 16.1   | 16.9   | 22.2   | 23.9   | 22.2   | 21.0   | 25.1   | 27.2   | 24.3   | 16.9   | 15.7   |
| 87.5° | 7.0    | 7.0    | 9.9    | 10.3   | 9.9    | 7.8    | 11.9   | 14.0   | 14.4   | 8.7    | 7.8    |
| 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

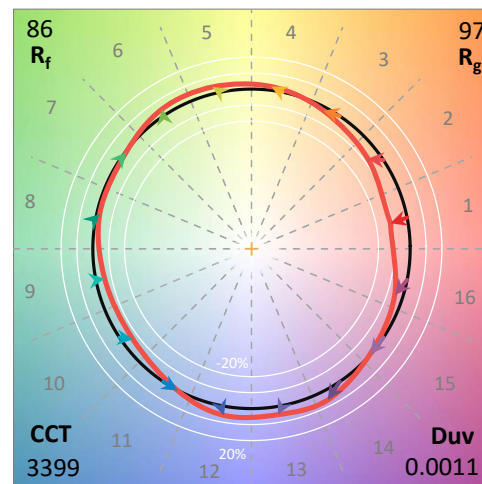
Test Date: 04/27/2021

### 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            |

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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 3500K 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       | 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                            |                   |                               |                                |

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### 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              |           |                  |                  |

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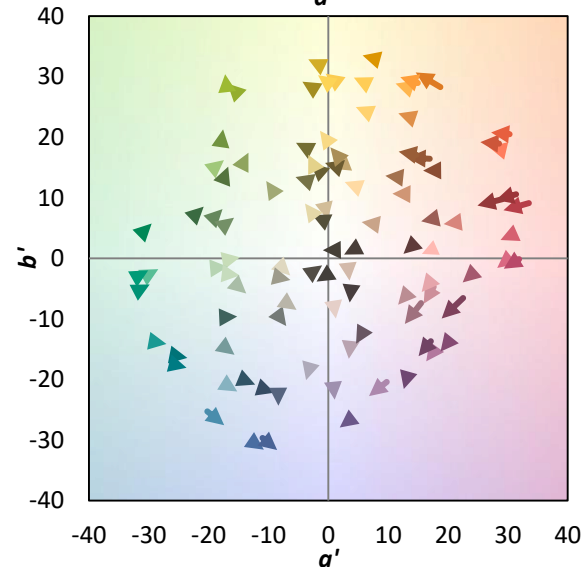
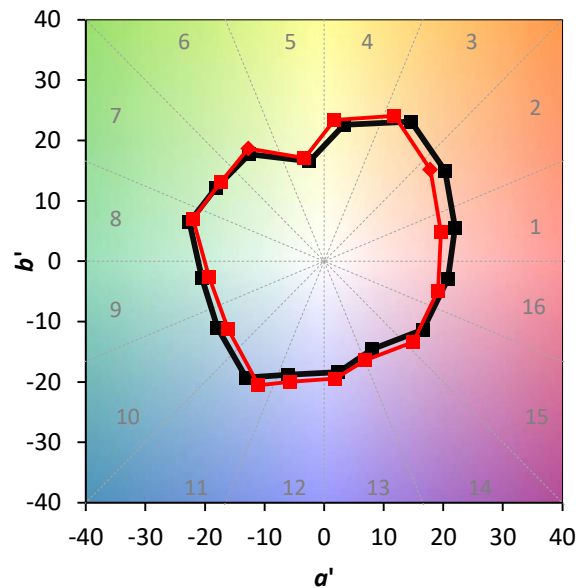
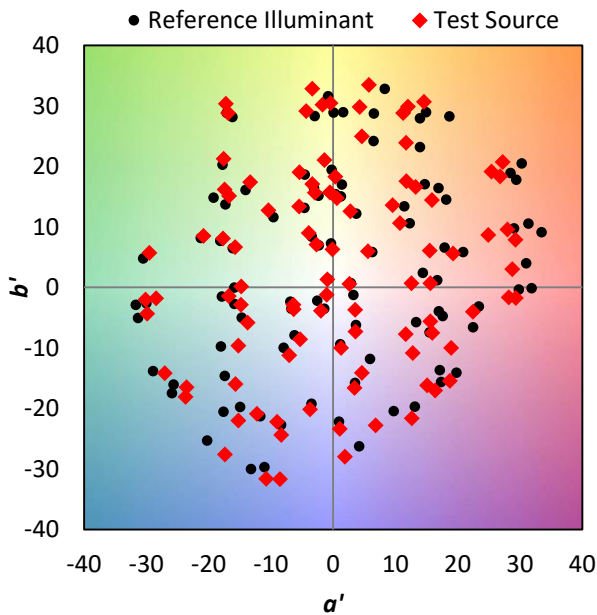
TM-30-18

### Summary

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

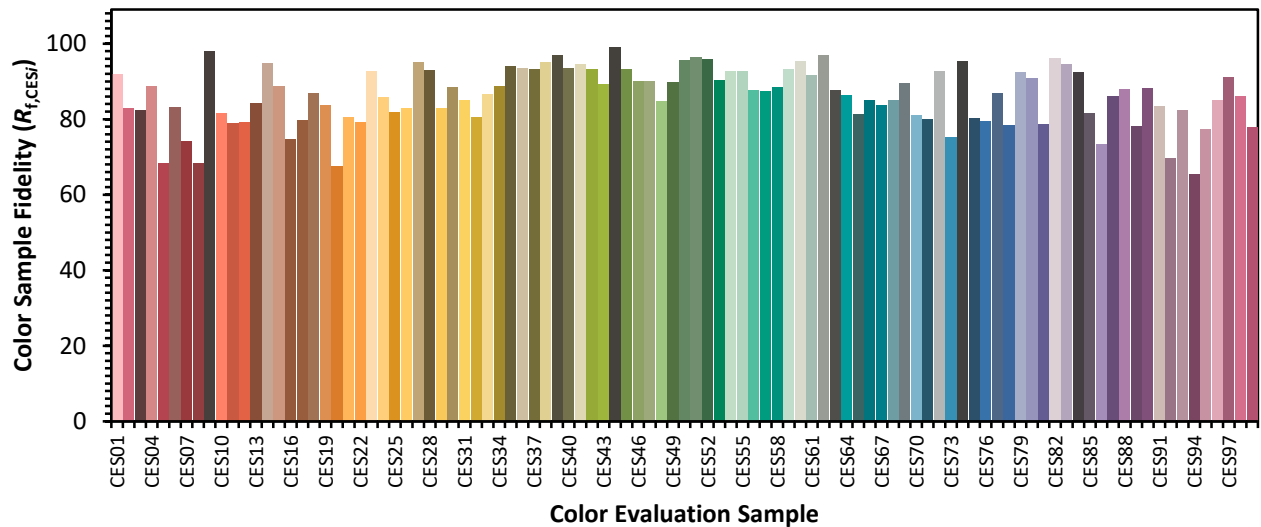


### Color Vector Graphics

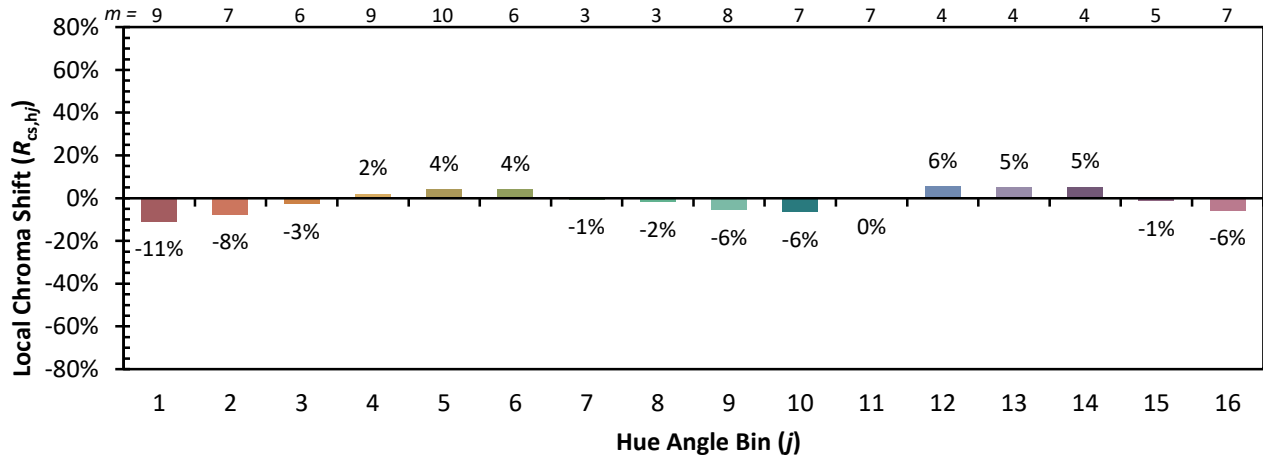


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)