

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: P672559

Luminaire Tested: **CCP-SA-2A-750-U-5MQ**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P672559  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA-2A-750-U-5MQ  
Description: INVUE CLEAR CURVE POLE MOUNT LIGHT SQUARE LUMINAIRE @350mA w/ 5MQ  
distribution lens  
Light Source: (32) 5000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5777.4 lumens  
Efficiency: N/A  
Efficacy: 159.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B3 - U0 - G1

Input Watts (W): 36.2  
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

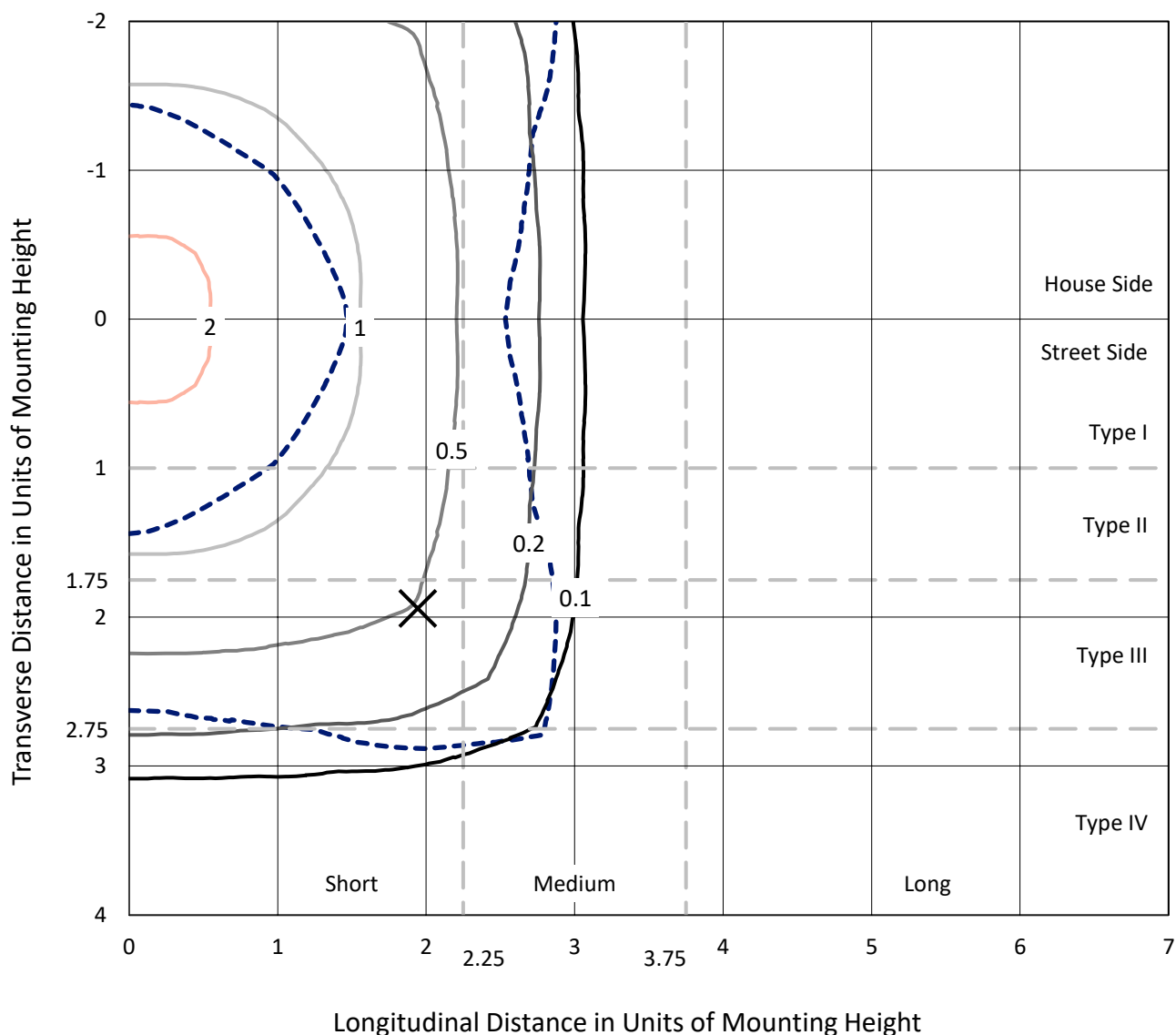
REPORT NUMBER: P672559

CATALOG NUMBER: CCP-SA-2A-750-U-5MQ

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd



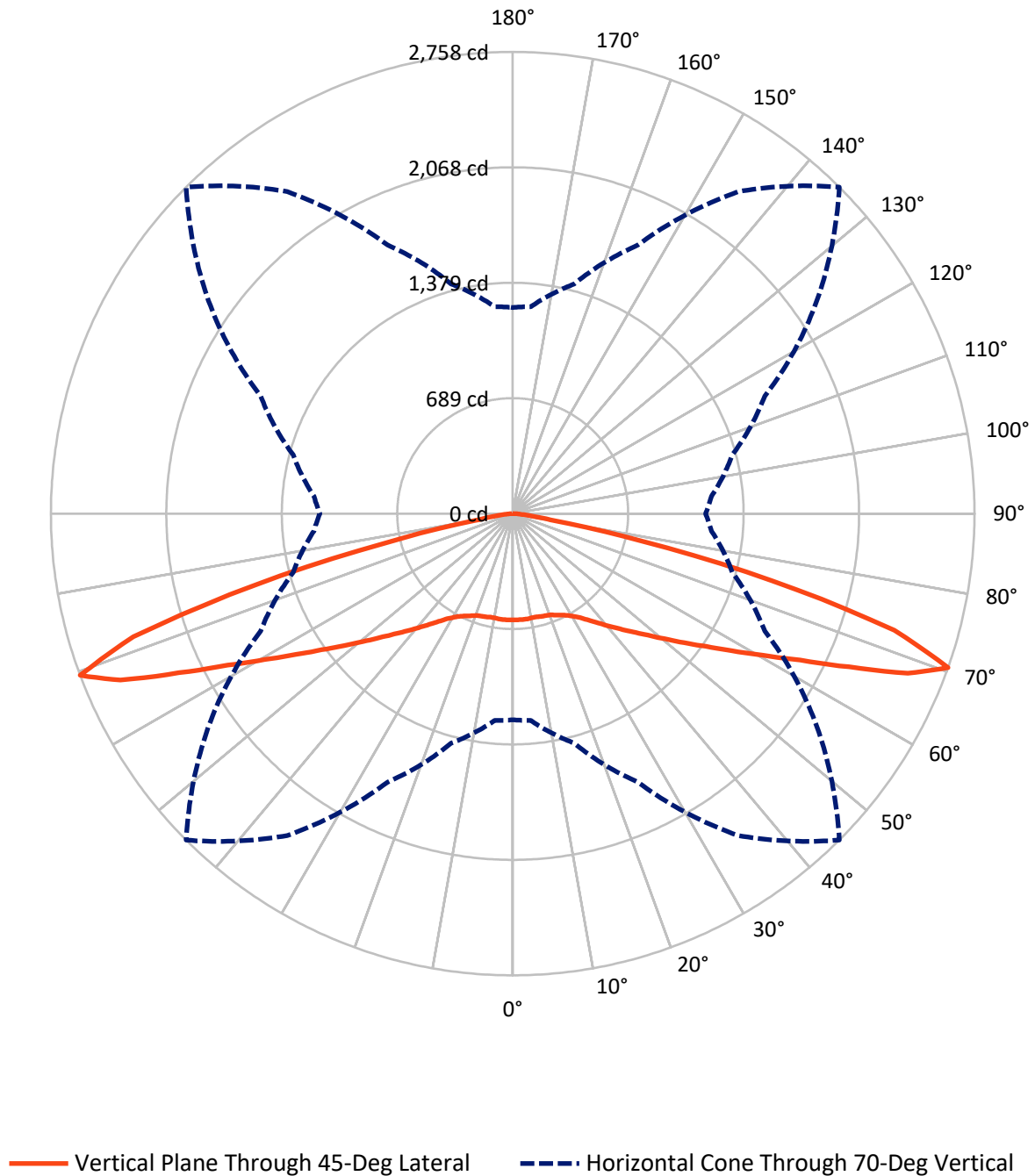
Based on 15 foot mounting height. Maximum calculated value = 2.8 fc

Type V - Short - N/A

REPORT NUMBER: P672559

CATALOG NUMBER: CCP-SA-2A-750-U-5MQ

## Luminous Intensity Polar Plot



REPORT NUMBER: P672559

CATALOG NUMBER: CCP-SA-2A-750-U-5MQ

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 2888.7   | 0.0    | 2888.7 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 2888.7   | 0.0    | 2888.7 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 5777.4   | 0.0    | 5777.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 60.4   | 1.0       |
| 10°-20°   | 178.9  | 3.1       |
| 20°-30°   | 305.4  | 5.3       |
| 30°-40°   | 487.4  | 8.4       |
| 40°-50°   | 786.6  | 13.6      |
| 50°-60°   | 1259.5 | 21.8      |
| 60°-70°   | 1843.8 | 31.9      |
| 70°-80°   | 810.9  | 14.0      |
| 80°-90°   | 44.4   | 0.8       |
| 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°    | 5777.4 | 100.0     |
| 0°-180°   | 5777.4 | 100.0     |



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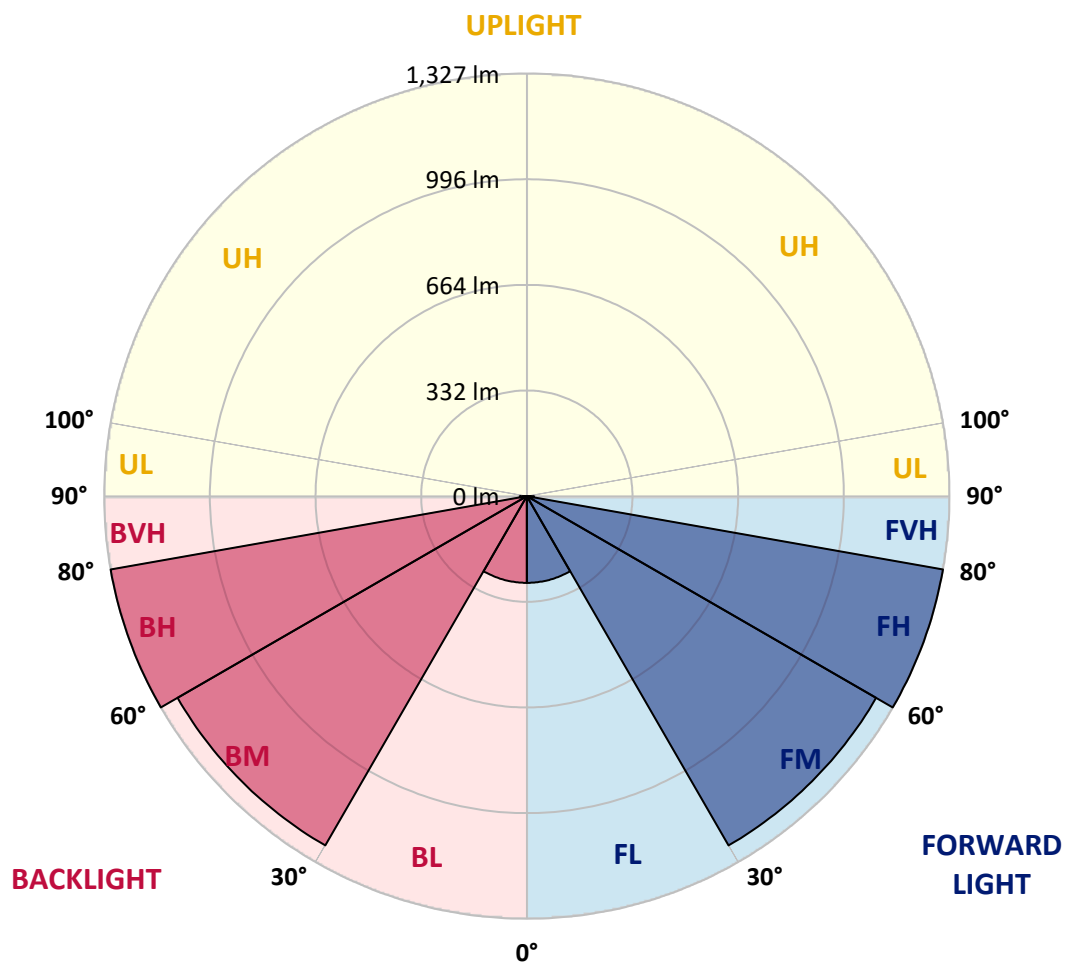
CATALOG NUMBER: CCP-SA-2A-750-U-5MQ

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 272.4  | 4.7       |                         |      |         |
| FM   | (30°-60°)   | 1266.7 | 21.9      |                         |      |         |
| FH   | (60°-80°)   | 1327.4 | 23.0      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 22.2   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 272.4  | 4.7       | B1/500                  |      |         |
| BM   | (30°-60°)   | 1266.7 | 21.9      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1327.4 | 23.0      | B3/2500                 |      | G1/1800 |
| BVH  | (80°-90°)   | 22.2   | 0.4       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G1**

Type V Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 635.3  | 635.3  | 635.3  | 635.3  | 635.3  | 635.3  | 635.3  | 635.3  | 635.3  | 635.3  | 635.3  |
| 2.5°  | 634.5  | 634.1  | 634.9  | 635.3  | 634.5  | 634.9  | 632.5  | 632.5  | 633.7  | 632.5  | 634.1  |
| 5°    | 637.4  | 636.6  | 637.4  | 637.4  | 635.3  | 635.3  | 632.5  | 631.6  | 632.5  | 630.4  | 632.0  |
| 7.5°  | 637.8  | 636.1  | 637.4  | 637.0  | 635.3  | 635.3  | 631.2  | 629.6  | 630.0  | 628.0  | 629.2  |
| 10°   | 633.7  | 632.9  | 634.5  | 633.7  | 632.5  | 632.5  | 629.2  | 626.7  | 626.7  | 624.7  | 625.9  |
| 12.5° | 631.2  | 630.4  | 632.5  | 632.9  | 632.0  | 632.5  | 628.4  | 625.1  | 623.9  | 621.4  | 622.2  |
| 15°   | 631.2  | 629.6  | 632.9  | 633.7  | 634.5  | 637.4  | 631.2  | 625.5  | 623.0  | 619.8  | 620.6  |
| 17.5° | 630.8  | 630.0  | 633.7  | 636.6  | 637.4  | 640.6  | 633.7  | 627.5  | 624.7  | 619.8  | 620.6  |
| 20°   | 630.8  | 630.4  | 634.9  | 640.2  | 642.7  | 645.6  | 638.2  | 632.5  | 627.5  | 622.2  | 622.2  |
| 22.5° | 632.9  | 632.5  | 638.6  | 646.4  | 653.3  | 658.2  | 649.7  | 640.2  | 633.7  | 626.7  | 625.9  |
| 25°   | 641.5  | 640.6  | 648.0  | 657.4  | 666.8  | 671.8  | 663.2  | 653.7  | 644.3  | 636.6  | 635.7  |
| 27.5° | 659.1  | 658.7  | 666.0  | 677.5  | 684.0  | 687.7  | 680.4  | 672.2  | 662.8  | 653.7  | 653.3  |
| 30°   | 682.8  | 682.8  | 692.2  | 704.1  | 707.8  | 710.6  | 703.3  | 697.5  | 687.7  | 677.9  | 677.1  |
| 32.5° | 711.5  | 713.1  | 724.2  | 737.3  | 739.7  | 741.3  | 733.6  | 729.9  | 719.2  | 708.6  | 707.0  |
| 35°   | 749.1  | 749.5  | 763.0  | 776.1  | 779.4  | 781.1  | 772.1  | 768.8  | 759.0  | 747.5  | 745.0  |
| 37.5° | 797.0  | 795.8  | 808.5  | 823.2  | 826.5  | 828.5  | 821.2  | 818.7  | 806.4  | 795.0  | 791.3  |
| 40°   | 850.6  | 851.5  | 865.8  | 879.7  | 881.8  | 882.6  | 878.9  | 875.2  | 863.7  | 850.6  | 846.1  |
| 42.5° | 912.9  | 912.9  | 929.7  | 946.0  | 946.0  | 941.9  | 940.3  | 939.5  | 928.4  | 913.7  | 908.8  |
| 45°   | 984.1  | 984.9  | 1005.8 | 1018.1 | 1018.9 | 1007.8 | 1009.5 | 1014.4 | 1003.7 | 984.9  | 978.4  |
| 47.5° | 1062.3 | 1063.5 | 1088.1 | 1101.6 | 1099.1 | 1084.8 | 1093.8 | 1096.3 | 1084.0 | 1059.8 | 1051.2 |
| 50°   | 1144.6 | 1148.3 | 1175.7 | 1199.4 | 1196.1 | 1175.3 | 1187.1 | 1188.0 | 1167.9 | 1140.1 | 1128.2 |
| 52.5° | 1233.4 | 1242.0 | 1278.4 | 1303.8 | 1307.1 | 1280.9 | 1291.1 | 1290.3 | 1264.5 | 1226.4 | 1218.7 |
| 55°   | 1343.5 | 1348.4 | 1384.5 | 1420.5 | 1432.8 | 1400.4 | 1411.9 | 1406.1 | 1371.4 | 1328.0 | 1314.9 |
| 57.5° | 1453.6 | 1461.0 | 1507.3 | 1547.8 | 1572.3 | 1544.9 | 1547.4 | 1532.6 | 1488.8 | 1436.4 | 1429.9 |
| 60°   | 1584.2 | 1587.5 | 1638.7 | 1691.5 | 1734.0 | 1717.7 | 1706.2 | 1675.5 | 1623.9 | 1571.5 | 1562.1 |
| 62.5° | 1691.1 | 1697.6 | 1773.8 | 1851.5 | 1923.6 | 1926.4 | 1891.6 | 1845.8 | 1763.5 | 1675.9 | 1657.1 |
| 65°   | 1720.5 | 1731.2 | 1838.0 | 1991.5 | 2141.4 | 2208.1 | 2112.7 | 1972.7 | 1788.9 | 1656.7 | 1628.4 |
| 67.5° | 1583.4 | 1603.9 | 1756.6 | 2011.6 | 2344.0 | 2544.2 | 2288.7 | 1912.5 | 1655.9 | 1501.5 | 1474.5 |
| 70°   | 1231.4 | 1240.4 | 1419.7 | 1769.7 | 2347.3 | 2757.8 | 2217.9 | 1660.8 | 1357.4 | 1191.6 | 1151.9 |
| 72.5° | 654.2  | 658.7  | 820.4  | 1191.6 | 1910.1 | 2382.5 | 1832.7 | 1162.2 | 799.1  | 648.4  | 603.0  |
| 75°   | 211.2  | 217.0  | 282.5  | 488.0  | 1053.7 | 1601.0 | 1080.7 | 483.5  | 275.5  | 222.3  | 210.4  |
| 77.5° | 107.7  | 107.3  | 119.1  | 157.2  | 354.5  | 784.7  | 375.0  | 169.5  | 119.1  | 106.8  | 103.6  |
| 80°   | 67.1   | 65.9   | 74.9   | 86.0   | 124.0  | 229.2  | 134.7  | 95.0   | 75.3   | 64.7   | 64.3   |
| 82.5° | 38.1   | 38.1   | 50.4   | 55.3   | 70.0   | 94.6   | 78.6   | 65.1   | 51.6   | 38.5   | 37.3   |
| 85°   | 21.3   | 18.8   | 31.5   | 34.8   | 40.1   | 46.7   | 47.9   | 42.2   | 34.8   | 21.3   | 22.1   |
| 87.5° | 7.8    | 8.6    | 14.7   | 13.9   | 16.0   | 11.1   | 19.6   | 22.1   | 19.6   | 10.2   | 8.6    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-4

Luminaire Tested: CCW-SA-2A-750-U-SL4

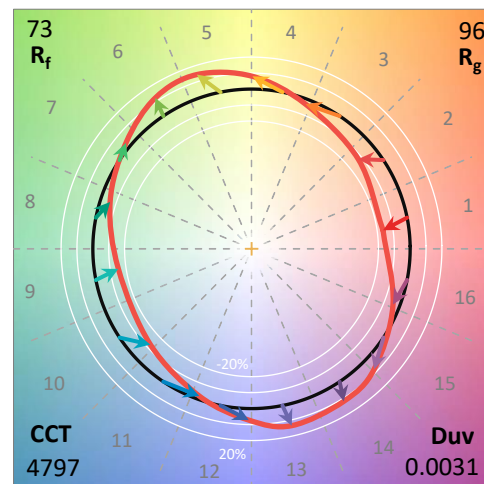
Test Date: 05/04/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 05/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-750-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 4797   | CRI (Ra): | 71.8 |      |       |
| CIE u':                   | 0.2115 | R1:       | 69.5 | R9:  | -28.1 |
| CIE v':                   | 0.4912 | R2:       | 75.8 | R10: | 43.3  |
| Duv:                      | 0.0031 | R3:       | 81.2 | R11: | 71.1  |
| CIE x:                    | 0.3518 | R4:       | 73.2 | R12: | 43.8  |
| CIE y:                    | 0.3631 | R5:       | 70.2 | R13: | 69.8  |
| CIE z:                    | 0.2851 | R6:       | 67.5 | R14: | 89.4  |
| Peak Wavelength (nm):     | 445    | R7:       | 80.3 |      |       |
| Dominant Wavelength (nm): | 572    | R8:       | 57.0 |      |       |
| Purity:                   | 14.6   |           |      |      |       |
| Rf:                       | 72.7   |           |      |      |       |
| Rg:                       | 96.4   |           |      |      |       |



### Test Conditions

Stabilization Time: 91M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/44%  
 Sphere Temperature (°C): 24.5

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| 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 5000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

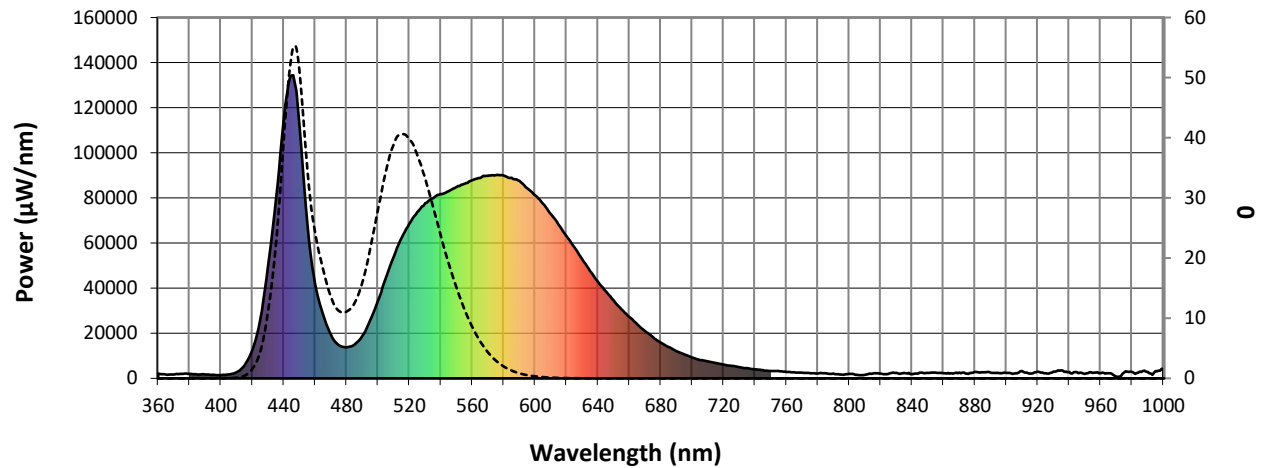


#####

| 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       | 2166             | 0.0              | 490       | 18819            | 2.7              | 620       | 63002            | 16.4             | 750       | 3328             | 0.0              | 880       | 2830             | 0.0              |
| 365       | 1672             | 0.0              | 495       | 25621            | 4.6              | 625       | 58119            | 12.8             | 755       | 3244             | 0.0              | 885       | 2751             | 0.0              |
| 370       | 1688             | 0.0              | 500       | 34501            | 7.6              | 630       | 52745            | 9.5              | 760       | 2856             | 0.0              | 890       | 2579             | 0.0              |
| 375       | 2041             | 0.0              | 505       | 44365            | 12.4             | 635       | 47707            | 7.2              | 765       | 2696             | 0.0              | 895       | 2461             | 0.0              |
| 380       | 1996             | 0.0              | 510       | 53923            | 18.5             | 640       | 42815            | 5.1              | 770       | 2495             | 0.0              | 900       | 2372             | 0.0              |
| 385       | 1720             | 0.0              | 515       | 62101            | 25.7             | 645       | 38643            | 3.7              | 775       | 2247             | 0.0              | 905       | 2190             | 0.0              |
| 390       | 1706             | 0.0              | 520       | 68661            | 33.3             | 650       | 34557            | 2.5              | 780       | 2133             | 0.0              | 910       | 3204             | 0.0              |
| 395       | 1550             | 0.0              | 525       | 73606            | 39.5             | 655       | 30447            | 1.7              | 785       | 2276             | 0.0              | 915       | 2069             | 0.0              |
| 400       | 1444             | 0.0              | 530       | 77628            | 45.7             | 660       | 27287            | 1.1              | 790       | 2093             | 0.0              | 920       | 2977             | 0.0              |
| 405       | 1761             | 0.0              | 535       | 79955            | 49.6             | 665       | 24046            | 0.8              | 795       | 1681             | 0.0              | 925       | 2332             | 0.0              |
| 410       | 2694             | 0.0              | 540       | 81715            | 53.2             | 670       | 20995            | 0.5              | 800       | 2044             | 0.0              | 930       | 2929             | 0.0              |
| 415       | 5767             | 0.0              | 545       | 83067            | 55.3             | 675       | 18242            | 0.3              | 805       | 1519             | 0.0              | 935       | 3495             | 0.0              |
| 420       | 12476            | 0.0              | 550       | 84799            | 57.6             | 680       | 15871            | 0.2              | 810       | 1549             | 0.0              | 940       | 2810             | 0.0              |
| 425       | 26189            | 0.1              | 555       | 86279            | 58.9             | 685       | 13910            | 0.1              | 815       | 2097             | 0.0              | 945       | 2657             | 0.0              |
| 430       | 49608            | 0.4              | 560       | 87792            | 59.7             | 690       | 12111            | 0.1              | 820       | 2098             | 0.0              | 950       | 1935             | 0.0              |
| 435       | 79442            | 0.9              | 565       | 88893            | 59.1             | 695       | 10644            | 0.0              | 825       | 2049             | 0.0              | 955       | 2408             | 0.0              |
| 440       | 114477           | 1.8              | 570       | 89760            | 58.4             | 700       | 9267             | 0.0              | 830       | 2352             | 0.0              | 960       | 2331             | 0.0              |
| 445       | 134358           | 2.8              | 575       | 90097            | 56.1             | 705       | 8161             | 0.0              | 835       | 2358             | 0.0              | 965       | 2231             | 0.0              |
| 450       | 112862           | 2.9              | 580       | 90008            | 53.5             | 710       | 7567             | 0.0              | 840       | 1853             | 0.0              | 970       | 688              | 0.0              |
| 455       | 68630            | 2.3              | 585       | 88925            | 49.4             | 715       | 6794             | 0.0              | 845       | 2553             | 0.0              | 975       | 2537             | 0.0              |
| 460       | 41987            | 1.7              | 590       | 87580            | 45.3             | 720       | 6069             | 0.0              | 850       | 2413             | 0.0              | 980       | 2826             | 0.0              |
| 465       | 28353            | 1.5              | 595       | 84246            | 39.9             | 725       | 5588             | 0.0              | 855       | 2597             | 0.0              | 985       | 3000             | 0.0              |
| 470       | 19290            | 1.2              | 600       | 81176            | 35.0             | 730       | 4999             | 0.0              | 860       | 2269             | 0.0              | 990       | 2880             | 0.0              |
| 475       | 14790            | 1.2              | 605       | 77529            | 30.0             | 735       | 4495             | 0.0              | 865       | 2210             | 0.0              | 995       | 3332             | 0.0              |
| 480       | 13767            | 1.3              | 610       | 72750            | 25.0             | 740       | 4033             | 0.0              | 870       | 2564             | 0.0              | 1000      | 4187             | 0.0              |
| 485       | 14964            | 1.8              | 615       | 68174            | 20.6             | 745       | 3625             | 0.0              | 875       | 2169             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 9214.6

S/P: 1.71

| 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       | 2166             | 0.0              | 490       | 18819            | 29.0             | 620       | 63002            | 0.8              | 750       | 3328             | 0.0              | 880       | 2830             | 0.0              |
| 365       | 1672             | 0.0              | 495       | 25621            | 41.4             | 625       | 58119            | 0.5              | 755       | 3244             | 0.0              | 885       | 2751             | 0.0              |
| 370       | 1688             | 0.0              | 500       | 34501            | 57.7             | 630       | 52745            | 0.3              | 760       | 2856             | 0.0              | 890       | 2579             | 0.0              |
| 375       | 2041             | 0.0              | 505       | 44365            | 75.4             | 635       | 47707            | 0.2              | 765       | 2696             | 0.0              | 895       | 2461             | 0.0              |
| 380       | 1996             | 0.0              | 510       | 53923            | 91.4             | 640       | 42815            | 0.1              | 770       | 2495             | 0.0              | 900       | 2372             | 0.0              |
| 385       | 1720             | 0.0              | 515       | 62101            | 102.9            | 645       | 38643            | 0.1              | 775       | 2247             | 0.0              | 905       | 2190             | 0.0              |
| 390       | 1706             | 0.0              | 520       | 68661            | 109.1            | 650       | 34557            | 0.0              | 780       | 2133             | 0.0              | 910       | 3204             | 0.0              |
| 395       | 1550             | 0.0              | 525       | 73606            | 110.1            | 655       | 30447            | 0.0              | 785       | 2276             | 0.0              | 915       | 2069             | 0.0              |
| 400       | 1444             | 0.0              | 530       | 77628            | 107.0            | 660       | 27287            | 0.0              | 790       | 2093             | 0.0              | 920       | 2977             | 0.0              |
| 405       | 1761             | 0.1              | 535       | 79955            | 99.6             | 665       | 24046            | 0.0              | 795       | 1681             | 0.0              | 925       | 2332             | 0.0              |
| 410       | 2694             | 0.2              | 540       | 81715            | 90.3             | 670       | 20995            | 0.0              | 800       | 2044             | 0.0              | 930       | 2929             | 0.0              |
| 415       | 5767             | 0.6              | 545       | 83067            | 79.6             | 675       | 18242            | 0.0              | 805       | 1519             | 0.0              | 935       | 3495             | 0.0              |
| 420       | 12476            | 2.1              | 550       | 84799            | 69.3             | 680       | 15871            | 0.0              | 810       | 1549             | 0.0              | 940       | 2810             | 0.0              |
| 425       | 26189            | 6.4              | 555       | 86279            | 59.0             | 685       | 13910            | 0.0              | 815       | 2097             | 0.0              | 945       | 2657             | 0.0              |
| 430       | 49608            | 16.9             | 560       | 87792            | 49.1             | 690       | 12111            | 0.0              | 820       | 2098             | 0.0              | 950       | 1935             | 0.0              |
| 435       | 79442            | 35.5             | 565       | 88893            | 39.9             | 695       | 10644            | 0.0              | 825       | 2049             | 0.0              | 955       | 2408             | 0.0              |
| 440       | 114477           | 64.0             | 570       | 89760            | 31.7             | 700       | 9267             | 0.0              | 830       | 2352             | 0.0              | 960       | 2331             | 0.0              |
| 445       | 134358           | 90.0             | 575       | 90097            | 24.5             | 705       | 8161             | 0.0              | 835       | 2358             | 0.0              | 965       | 2231             | 0.0              |
| 450       | 112862           | 87.5             | 580       | 90008            | 18.5             | 710       | 7567             | 0.0              | 840       | 1853             | 0.0              | 970       | 688              | 0.0              |
| 455       | 68630            | 60.0             | 585       | 88925            | 13.6             | 715       | 6794             | 0.0              | 845       | 2553             | 0.0              | 975       | 2537             | 0.0              |
| 460       | 41987            | 40.6             | 590       | 87580            | 9.8              | 720       | 6069             | 0.0              | 850       | 2413             | 0.0              | 980       | 2826             | 0.0              |
| 465       | 28353            | 29.9             | 595       | 84246            | 6.7              | 725       | 5588             | 0.0              | 855       | 2597             | 0.0              | 985       | 3000             | 0.0              |
| 470       | 19290            | 22.2             | 600       | 81176            | 4.6              | 730       | 4999             | 0.0              | 860       | 2269             | 0.0              | 990       | 2880             | 0.0              |
| 475       | 14790            | 18.5             | 605       | 77529            | 3.0              | 735       | 4495             | 0.0              | 865       | 2210             | 0.0              | 995       | 3332             | 0.0              |
| 480       | 13767            | 18.6             | 610       | 72750            | 2.0              | 740       | 4033             | 0.0              | 870       | 2564             | 0.0              | 1000      | 4187             | 0.0              |
| 485       | 14964            | 21.7             | 615       | 68174            | 1.3              | 745       | 3625             | 0.0              | 875       | 2169             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3619.9**

**M/P: 0.67**

| 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       | 2166             | 0.0              | 490       | 18819            | 15.7             | 620       | 63002            | 0.0              | 750       | 3328             | 0.0              | 880       | 2830             | 0.0              |
| 365       | 1672             | 0.0              | 495       | 25621            | 21.2             | 625       | 58119            | 0.0              | 755       | 3244             | 0.0              | 885       | 2751             | 0.0              |
| 370       | 1688             | 0.0              | 500       | 34501            | 27.7             | 630       | 52745            | 0.0              | 760       | 2856             | 0.0              | 890       | 2579             | 0.0              |
| 375       | 2041             | 0.0              | 505       | 44365            | 34.0             | 635       | 47707            | 0.0              | 765       | 2696             | 0.0              | 895       | 2461             | 0.0              |
| 380       | 1996             | 0.0              | 510       | 53923            | 38.7             | 640       | 42815            | 0.0              | 770       | 2495             | 0.0              | 900       | 2372             | 0.0              |
| 385       | 1720             | 0.0              | 515       | 62101            | 40.6             | 645       | 38643            | 0.0              | 775       | 2247             | 0.0              | 905       | 2190             | 0.0              |
| 390       | 1706             | 0.0              | 520       | 68661            | 40.0             | 650       | 34557            | 0.0              | 780       | 2133             | 0.0              | 910       | 3204             | 0.0              |
| 395       | 1550             | 0.0              | 525       | 73606            | 37.3             | 655       | 30447            | 0.0              | 785       | 2276             | 0.0              | 915       | 2069             | 0.0              |
| 400       | 1444             | 0.0              | 530       | 77628            | 33.5             | 660       | 27287            | 0.0              | 790       | 2093             | 0.0              | 920       | 2977             | 0.0              |
| 405       | 1761             | 0.0              | 535       | 79955            | 28.8             | 665       | 24046            | 0.0              | 795       | 1681             | 0.0              | 925       | 2332             | 0.0              |
| 410       | 2694             | 0.1              | 540       | 81715            | 23.9             | 670       | 20995            | 0.0              | 800       | 2044             | 0.0              | 930       | 2929             | 0.0              |
| 415       | 5767             | 0.4              | 545       | 83067            | 19.3             | 675       | 18242            | 0.0              | 805       | 1519             | 0.0              | 935       | 3495             | 0.0              |
| 420       | 12476            | 1.4              | 550       | 84799            | 15.2             | 680       | 15871            | 0.0              | 810       | 1549             | 0.0              | 940       | 2810             | 0.0              |
| 425       | 26189            | 4.1              | 555       | 86279            | 11.6             | 685       | 13910            | 0.0              | 815       | 2097             | 0.0              | 945       | 2657             | 0.0              |
| 430       | 49608            | 10.5             | 560       | 87792            | 8.7              | 690       | 12111            | 0.0              | 820       | 2098             | 0.0              | 950       | 1935             | 0.0              |
| 435       | 79442            | 21.2             | 565       | 88893            | 6.2              | 695       | 10644            | 0.0              | 825       | 2049             | 0.0              | 955       | 2408             | 0.0              |
| 440       | 114477           | 38.3             | 570       | 89760            | 4.4              | 700       | 9267             | 0.0              | 830       | 2352             | 0.0              | 960       | 2331             | 0.0              |
| 445       | 134358           | 53.0             | 575       | 90097            | 3.0              | 705       | 8161             | 0.0              | 835       | 2358             | 0.0              | 965       | 2231             | 0.0              |
| 450       | 112862           | 52.0             | 580       | 90008            | 2.0              | 710       | 7567             | 0.0              | 840       | 1853             | 0.0              | 970       | 688              | 0.0              |
| 455       | 68630            | 36.0             | 585       | 88925            | 1.3              | 715       | 6794             | 0.0              | 845       | 2553             | 0.0              | 975       | 2537             | 0.0              |
| 460       | 41987            | 24.7             | 590       | 87580            | 0.9              | 720       | 6069             | 0.0              | 850       | 2413             | 0.0              | 980       | 2826             | 0.0              |
| 465       | 28353            | 18.5             | 595       | 84246            | 0.5              | 725       | 5588             | 0.0              | 855       | 2597             | 0.0              | 985       | 3000             | 0.0              |
| 470       | 19290            | 13.8             | 600       | 81176            | 0.3              | 730       | 4999             | 0.0              | 860       | 2269             | 0.0              | 990       | 2880             | 0.0              |
| 475       | 14790            | 11.3             | 605       | 77529            | 0.2              | 735       | 4495             | 0.0              | 865       | 2210             | 0.0              | 995       | 3332             | 0.0              |
| 480       | 13767            | 11.1             | 610       | 72750            | 0.1              | 740       | 4033             | 0.0              | 870       | 2564             | 0.0              | 1000      | 4187             | 0.0              |
| 485       | 14964            | 12.3             | 615       | 68174            | 0.1              | 745       | 3625             | 0.0              | 875       | 2169             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 72.7$   
 $R_g = 96.4$   
 $CIE R_a = 71.8$   
 $R_g = -28.1$

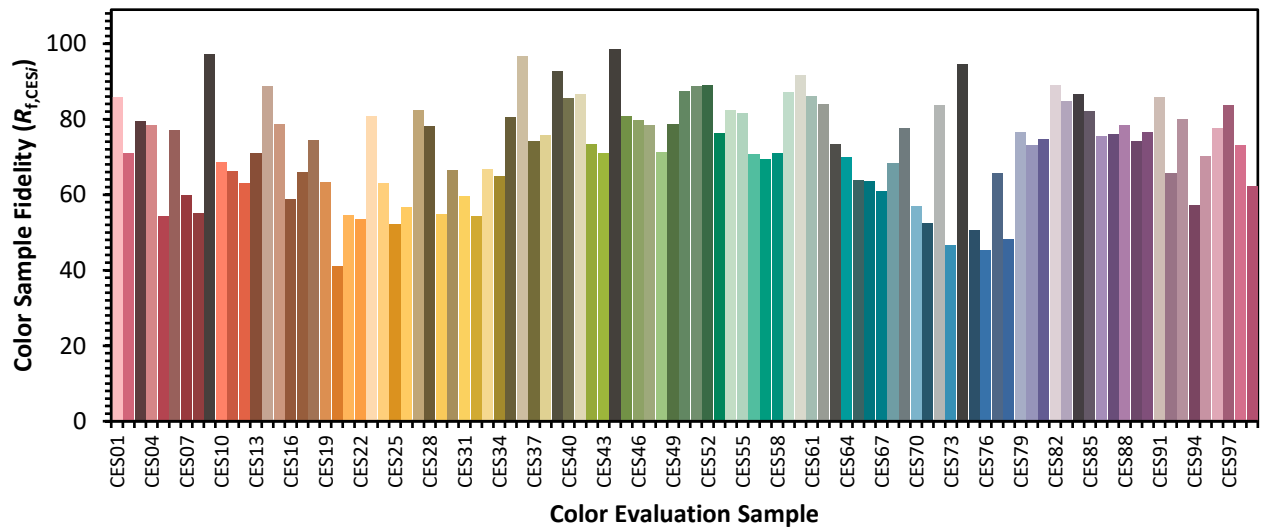


### Color Vector Graphics

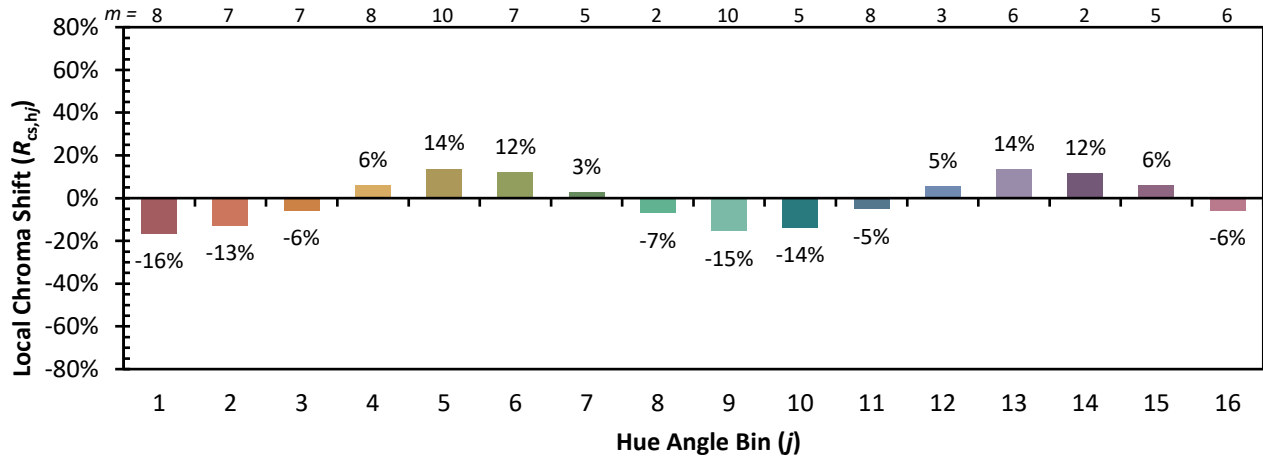


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 57 | CES51 = 89 | CES76 = 45 |
| CES02 = 60 | CES27 = 82 | CES52 = 89 | CES77 = 66 |
| CES03 = 30 | CES28 = 78 | CES53 = 76 | CES78 = 48 |
| CES04 = 69 | CES29 = 55 | CES54 = 82 | CES79 = 76 |
| CES05 = 46 | CES30 = 66 | CES55 = 82 | CES80 = 73 |
| CES06 = 50 | CES31 = 60 | CES56 = 71 | CES81 = 75 |
| CES07 = 39 | CES32 = 54 | CES57 = 69 | CES82 = 89 |
| CES08 = 38 | CES33 = 67 | CES58 = 71 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 87 | CES84 = 87 |
| CES10 = 73 | CES35 = 80 | CES60 = 92 | CES85 = 82 |
| CES11 = 56 | CES36 = 97 | CES61 = 86 | CES86 = 75 |
| CES12 = 62 | CES37 = 74 | CES62 = 84 | CES87 = 76 |
| CES13 = 42 | CES38 = 76 | CES63 = 73 | CES88 = 78 |
| CES14 = 74 | CES39 = 93 | CES64 = 70 | CES89 = 74 |
| CES15 = 70 | CES40 = 86 | CES65 = 64 | CES90 = 76 |
| CES16 = 46 | CES41 = 87 | CES66 = 64 | CES91 = 86 |
| CES17 = 49 | CES42 = 73 | CES67 = 61 | CES92 = 66 |
| CES18 = 55 | CES43 = 71 | CES68 = 68 | CES93 = 80 |
| CES19 = 71 | CES44 = 98 | CES69 = 78 | CES94 = 57 |
| CES20 = 64 | CES45 = 81 | CES70 = 57 | CES95 = 70 |
| CES21 = 85 | CES46 = 80 | CES71 = 53 | CES96 = 78 |
| CES22 = 77 | CES47 = 78 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 71 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 79 | CES74 = 95 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)