

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: P674381

Luminaire Tested: **CCP-SA-1A-727-U-AFL-HSS**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P674381  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA-1A-727-U-AFL-HSS  
Description: INVUE CLEAR CURVE POLE MOUNT Light Square Luminaire @350mA w/ AFL  
distribution lens and House Side Shield  
Light Source: (16) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

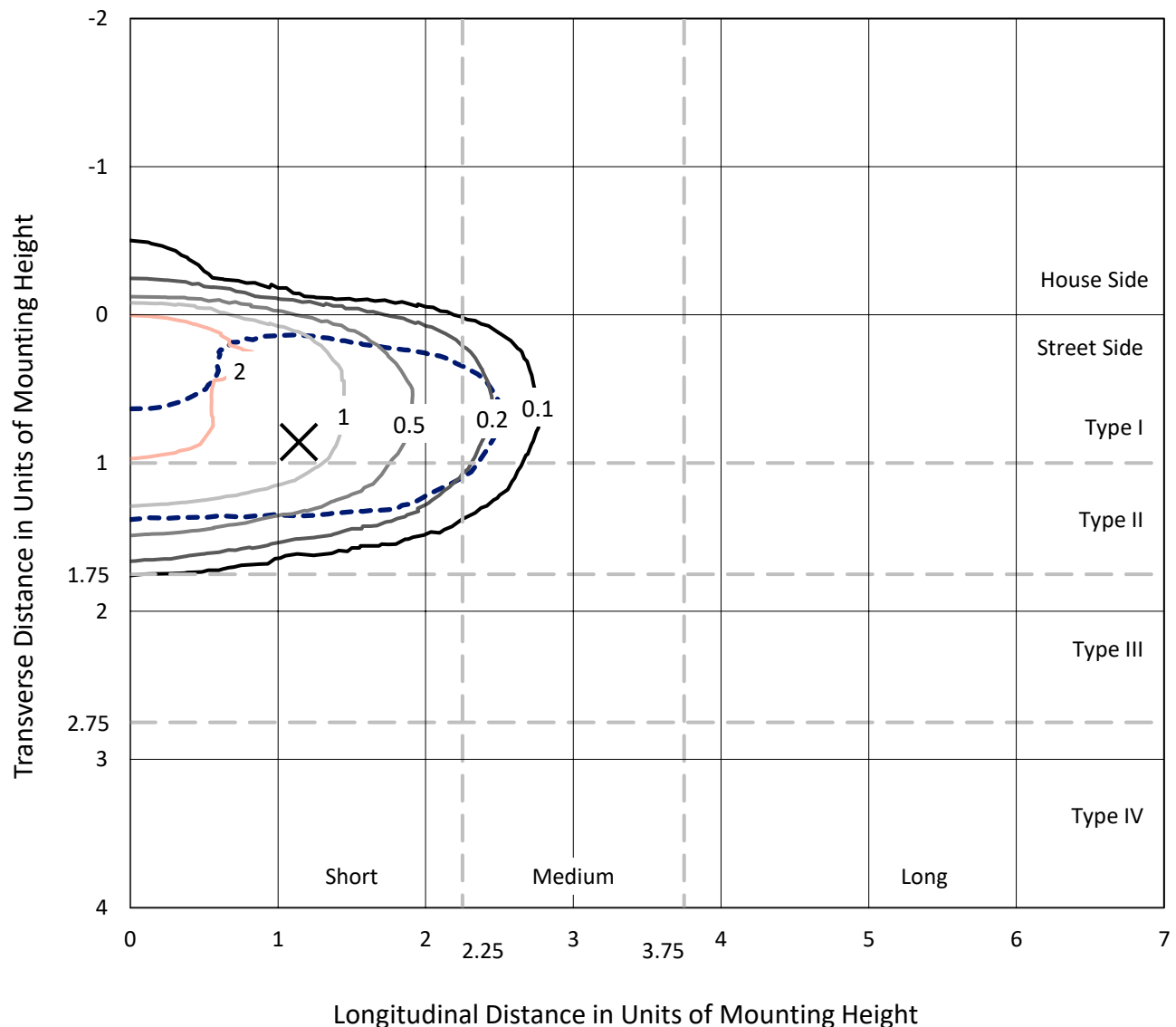
Lumens per Lamp: N/A  
Luminaire Lumens: 1897.3 lumens  
Efficiency: N/A  
Efficacy: 105.4 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G0

Input Watts (W): 18  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

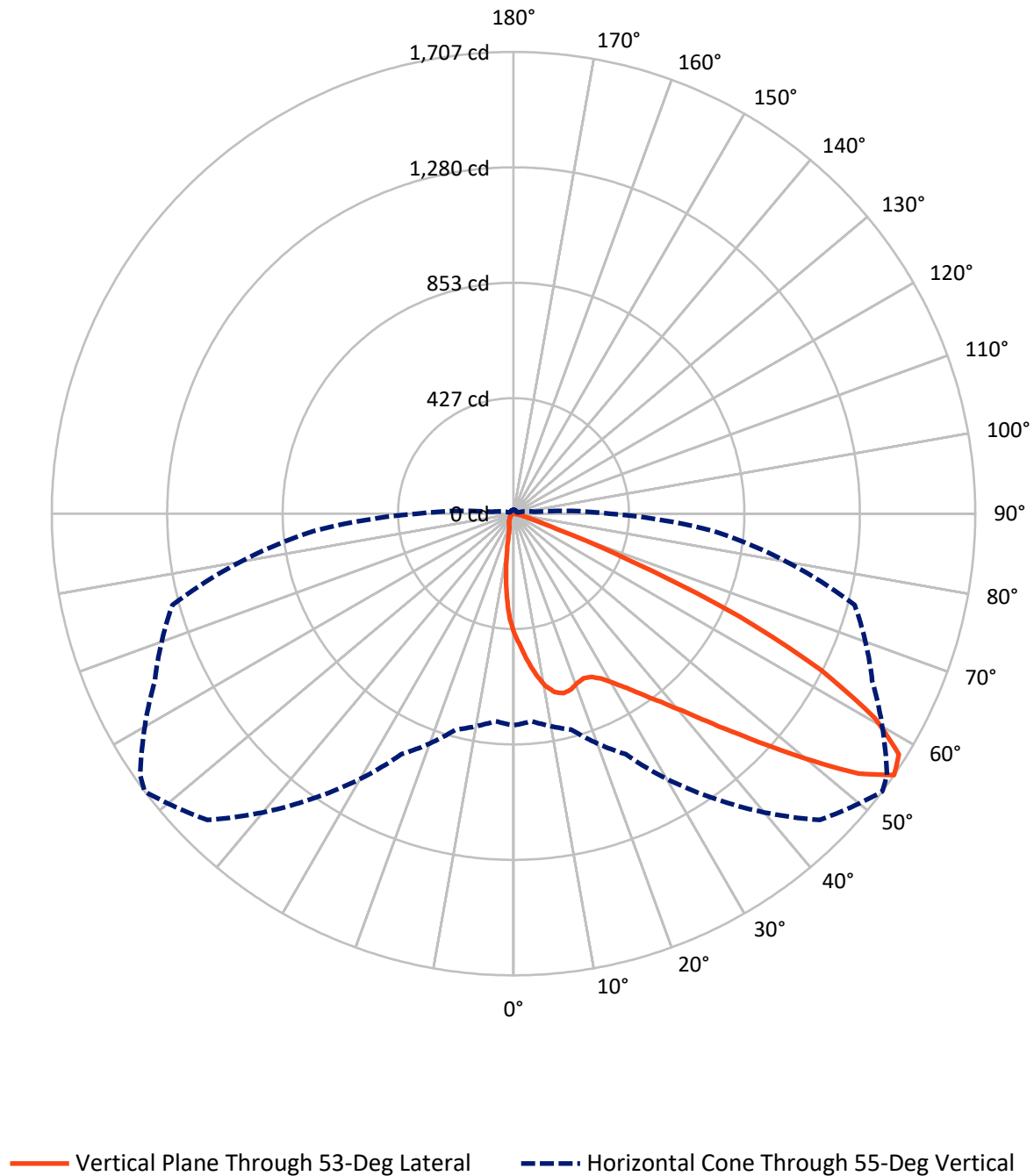
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 2.9 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 102.6    | 0.0    | 102.6  |
|                    | % Fixture | 5.4      | 0.0    | 5.4    |
| <b>Street Side</b> | Lumens    | 1794.8   | 0.0    | 1794.8 |
|                    | % Fixture | 94.6     | 0.0    | 94.6   |
| <b>Total</b>       | Lumens    | 1897.3   | 0.0    | 1897.3 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 39.7   | 2.1       |
| 10°-20°   | 103.7  | 5.5       |
| 20°-30°   | 173.6  | 9.2       |
| 30°-40°   | 284.0  | 15.0      |
| 40°-50°   | 456.6  | 24.1      |
| 50°-60°   | 515.5  | 27.2      |
| 60°-70°   | 275.0  | 14.5      |
| 70°-80°   | 45.2   | 2.4       |
| 80°-90°   | 4.0    | 0.2       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 1897.3 | 100.0     |
| 0°-180°   | 1897.3 | 100.0     |

**Coefficient of Utilization**



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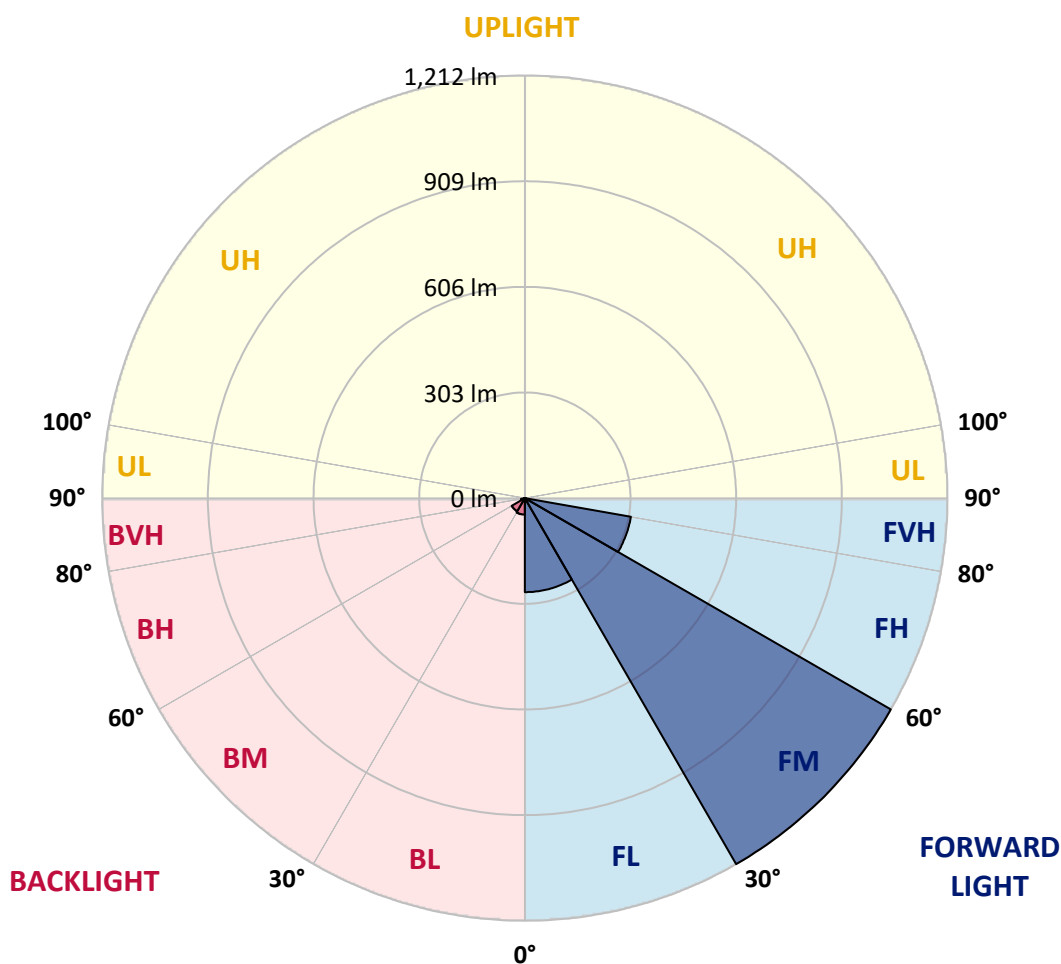
CATALOG NUMBER: CCP-SA-1A-727-U-AFL-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 269.7  | 14.2      |                         |      |        |
| FM   | (30°-60°)   | 1212.4 | 63.9      |                         |      |        |
| FH   | (60°-80°)   | 308.9  | 16.3      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 3.7    | 0.2       |                         |      | G0/10  |
| BL   | (0°-30°)    | 47.3   | 2.5       | B0/110                  |      |        |
| BM   | (30°-60°)   | 43.7   | 2.3       | B0/220                  |      |        |
| BH   | (60°-80°)   | 11.2   | 0.6       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 0.3    | 0.0       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B0-U0-G0**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 53°    | 55°    | 65°    | 75°    | 85°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 0°    | 444.0  | 444.0  | 444.0  | 444.0  | 444.0  | 444.0  | 444.0  | 444.0  | 444.0  | 444.0  | 444.0 |
| 2.5°  | 532.5  | 529.3  | 531.1  | 526.3  | 517.5  | 506.5  | 490.1  | 490.9  | 477.9  | 466.6  | 451.0 |
| 5°    | 620.4  | 617.1  | 616.1  | 603.8  | 591.5  | 571.7  | 547.2  | 543.3  | 519.5  | 490.7  | 458.0 |
| 7.5°  | 666.8  | 663.9  | 666.1  | 661.6  | 649.5  | 631.5  | 600.6  | 597.6  | 560.9  | 517.3  | 469.1 |
| 10°   | 645.5  | 644.5  | 653.6  | 664.3  | 674.1  | 671.9  | 647.2  | 642.5  | 601.3  | 546.6  | 480.6 |
| 12.5° | 588.3  | 591.5  | 603.1  | 622.7  | 653.0  | 681.4  | 677.4  | 678.2  | 642.5  | 578.3  | 493.2 |
| 15°   | 554.7  | 558.6  | 565.2  | 575.3  | 612.6  | 663.1  | 688.9  | 697.2  | 682.1  | 613.7  | 508.2 |
| 17.5° | 551.9  | 555.1  | 556.1  | 559.9  | 581.7  | 633.7  | 684.2  | 700.0  | 717.3  | 647.2  | 525.0 |
| 20°   | 573.7  | 575.0  | 574.2  | 571.4  | 579.2  | 617.7  | 669.6  | 692.2  | 746.4  | 682.7  | 539.8 |
| 22.5° | 614.7  | 612.7  | 610.3  | 599.8  | 599.3  | 622.2  | 661.6  | 685.2  | 763.7  | 712.2  | 549.6 |
| 25°   | 665.6  | 661.5  | 658.0  | 643.2  | 636.2  | 645.7  | 668.8  | 687.7  | 779.3  | 740.7  | 556.6 |
| 27.5° | 721.1  | 722.5  | 713.8  | 693.9  | 682.9  | 680.9  | 690.9  | 705.0  | 794.4  | 766.3  | 560.4 |
| 30°   | 780.5  | 781.1  | 769.8  | 749.2  | 739.2  | 726.4  | 725.8  | 734.3  | 810.7  | 795.8  | 564.0 |
| 32.5° | 848.1  | 850.0  | 831.5  | 810.1  | 792.6  | 776.0  | 767.8  | 775.0  | 840.0  | 834.2  | 571.5 |
| 35°   | 945.9  | 937.9  | 913.0  | 880.5  | 855.8  | 834.0  | 821.5  | 826.2  | 878.9  | 880.2  | 586.5 |
| 37.5° | 1046.6 | 1045.8 | 1018.2 | 971.5  | 930.9  | 903.8  | 882.5  | 890.2  | 933.6  | 941.9  | 610.4 |
| 40°   | 1140.5 | 1142.7 | 1118.8 | 1078.0 | 1025.8 | 979.3  | 956.5  | 961.7  | 1006.2 | 1016.7 | 639.5 |
| 42.5° | 1201.9 | 1200.7 | 1202.5 | 1190.9 | 1138.5 | 1083.7 | 1049.4 | 1052.3 | 1090.7 | 1096.2 | 675.9 |
| 45°   | 1230.1 | 1225.7 | 1241.3 | 1278.2 | 1257.4 | 1199.7 | 1160.7 | 1157.2 | 1178.3 | 1176.8 | 709.0 |
| 47.5° | 1205.7 | 1197.4 | 1233.3 | 1322.2 | 1362.5 | 1345.0 | 1289.2 | 1282.8 | 1264.9 | 1252.9 | 743.4 |
| 50°   | 1084.2 | 1080.5 | 1157.3 | 1301.3 | 1428.5 | 1479.3 | 1438.3 | 1414.8 | 1342.2 | 1309.1 | 761.5 |
| 52.5° | 968.7  | 958.5  | 1010.4 | 1194.4 | 1399.0 | 1587.4 | 1595.9 | 1554.1 | 1406.4 | 1325.2 | 755.4 |
| 55°   | 782.5  | 770.0  | 826.5  | 981.3  | 1282.5 | 1601.2 | 1706.6 | 1684.8 | 1462.5 | 1305.3 | 742.9 |
| 57.5° | 475.3  | 463.0  | 546.1  | 702.8  | 1025.7 | 1486.5 | 1679.3 | 1701.4 | 1505.8 | 1283.3 | 734.8 |
| 60°   | 199.8  | 192.0  | 224.6  | 335.5  | 655.0  | 1221.7 | 1534.7 | 1589.9 | 1513.9 | 1253.2 | 738.1 |
| 62.5° | 103.9  | 100.4  | 102.2  | 134.3  | 264.8  | 804.4  | 1277.4 | 1373.4 | 1431.8 | 1240.0 | 741.4 |
| 65°   | 78.0   | 75.3   | 69.5   | 73.8   | 102.9  | 347.8  | 918.0  | 1046.6 | 1253.7 | 1206.2 | 719.0 |
| 67.5° | 64.0   | 61.5   | 57.4   | 56.0   | 60.7   | 120.7  | 468.6  | 635.9  | 982.5  | 1062.4 | 638.5 |
| 70°   | 51.0   | 50.2   | 48.9   | 46.4   | 45.5   | 58.5   | 168.1  | 259.2  | 649.6  | 749.2  | 462.8 |
| 72.5° | 42.6   | 42.7   | 41.2   | 39.1   | 36.1   | 37.7   | 67.0   | 88.6   | 314.4  | 359.2  | 193.8 |
| 75°   | 35.6   | 35.6   | 36.1   | 33.1   | 30.1   | 25.9   | 37.2   | 43.2   | 100.9  | 83.0   | 41.4  |
| 77.5° | 27.9   | 28.3   | 30.4   | 27.9   | 24.1   | 16.3   | 20.3   | 23.1   | 29.9   | 23.9   | 15.1  |
| 80°   | 22.3   | 21.9   | 21.1   | 25.1   | 21.6   | 11.5   | 9.6    | 10.6   | 14.0   | 11.5   | 7.5   |
| 82.5° | 15.6   | 15.5   | 14.8   | 17.0   | 16.8   | 8.5    | 6.3    | 6.5    | 8.5    | 7.3    | 4.7   |
| 85°   | 3.8    | 4.5    | 9.5    | 8.0    | 7.0    | 5.0    | 3.8    | 4.2    | 5.5    | 4.8    | 2.5   |
| 87.5° | 1.7    | 1.7    | 4.3    | 5.2    | 3.3    | 2.2    | 1.7    | 1.8    | 2.8    | 2.8    | 1.5   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   |



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**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 444.0 | 444.0 | 444.0 | 444.0 | 444.0 | 444.0 | 444.0 | 444.0 | 444.0 | 444.0 | 444.0 |
| 2.5°  | 445.5 | 434.7 | 421.1 | 406.6 | 391.8 | 374.0 | 362.7 | 353.4 | 346.1 | 340.5 | 338.5 |
| 5°    | 447.2 | 426.4 | 395.5 | 357.1 | 318.0 | 281.4 | 253.2 | 232.2 | 214.9 | 205.5 | 201.3 |
| 7.5°  | 447.0 | 419.4 | 363.6 | 299.2 | 235.7 | 183.0 | 145.6 | 122.5 | 107.1 | 100.7 | 96.9  |
| 10°   | 446.8 | 410.3 | 327.2 | 235.1 | 157.6 | 106.1 | 78.1  | 65.2  | 59.5  | 57.4  | 57.0  |
| 12.5° | 451.7 | 399.8 | 286.4 | 173.1 | 98.9  | 66.0  | 54.4  | 51.4  | 50.0  | 49.4  | 49.2  |
| 15°   | 454.3 | 390.2 | 243.5 | 122.2 | 66.7  | 52.2  | 48.5  | 47.2  | 46.7  | 46.4  | 46.2  |
| 17.5° | 457.1 | 375.2 | 202.8 | 88.4  | 53.4  | 47.4  | 45.2  | 44.4  | 44.1  | 44.1  | 44.1  |
| 20°   | 457.6 | 359.1 | 162.4 | 65.2  | 47.4  | 44.2  | 42.1  | 41.2  | 40.7  | 40.4  | 40.4  |
| 22.5° | 454.0 | 340.0 | 127.7 | 52.9  | 43.9  | 41.2  | 38.9  | 37.6  | 36.7  | 36.6  | 36.6  |
| 25°   | 444.8 | 312.9 | 97.9  | 46.4  | 41.1  | 38.2  | 35.4  | 33.9  | 33.2  | 33.2  | 33.2  |
| 27.5° | 431.7 | 280.9 | 75.6  | 41.2  | 37.4  | 34.6  | 32.1  | 30.8  | 30.6  | 30.4  | 30.6  |
| 30°   | 416.8 | 250.2 | 57.8  | 36.6  | 33.1  | 30.8  | 28.8  | 28.1  | 28.4  | 28.4  | 28.6  |
| 32.5° | 401.8 | 219.4 | 45.2  | 32.9  | 29.3  | 27.3  | 26.3  | 26.3  | 26.8  | 26.8  | 26.8  |
| 35°   | 389.0 | 189.3 | 37.9  | 29.9  | 26.6  | 24.9  | 24.4  | 24.9  | 25.3  | 25.4  | 25.4  |
| 37.5° | 381.8 | 163.4 | 33.4  | 27.3  | 24.4  | 23.1  | 22.9  | 23.4  | 24.1  | 24.6  | 24.8  |
| 40°   | 379.2 | 143.5 | 30.8  | 25.3  | 22.4  | 21.6  | 21.4  | 22.1  | 23.3  | 24.1  | 24.3  |
| 42.5° | 379.3 | 125.8 | 28.4  | 23.3  | 21.1  | 19.9  | 19.9  | 20.9  | 22.1  | 22.9  | 22.9  |
| 45°   | 380.5 | 110.7 | 26.1  | 21.3  | 19.9  | 18.0  | 18.1  | 19.4  | 20.3  | 21.1  | 21.1  |
| 47.5° | 381.5 | 98.6  | 23.6  | 19.1  | 17.3  | 16.3  | 16.6  | 17.6  | 18.8  | 20.1  | 20.1  |
| 50°   | 375.7 | 89.9  | 21.1  | 16.8  | 15.1  | 14.8  | 15.5  | 16.3  | 18.0  | 19.3  | 19.4  |
| 52.5° | 361.7 | 82.1  | 19.0  | 15.0  | 13.6  | 13.8  | 14.6  | 15.1  | 16.5  | 16.6  | 16.8  |
| 55°   | 355.6 | 78.1  | 17.3  | 13.6  | 12.5  | 13.0  | 13.5  | 13.6  | 13.3  | 12.5  | 12.5  |
| 57.5° | 354.2 | 75.5  | 15.6  | 12.3  | 11.5  | 12.1  | 12.0  | 11.0  | 10.0  | 9.0   | 8.8   |
| 60°   | 355.6 | 71.8  | 14.3  | 10.6  | 10.5  | 10.6  | 10.1  | 8.3   | 7.0   | 6.3   | 6.0   |
| 62.5° | 347.9 | 66.5  | 13.1  | 9.1   | 9.1   | 9.0   | 7.6   | 5.7   | 4.5   | 4.0   | 3.8   |
| 65°   | 322.7 | 56.0  | 12.0  | 7.6   | 7.5   | 7.1   | 5.2   | 3.8   | 3.0   | 2.5   | 2.3   |
| 67.5° | 273.0 | 43.4  | 10.8  | 6.3   | 6.0   | 5.0   | 3.3   | 2.5   | 1.7   | 1.5   | 1.3   |
| 70°   | 186.2 | 26.9  | 9.1   | 5.0   | 4.5   | 3.2   | 2.0   | 1.5   | 1.0   | 0.8   | 0.7   |
| 72.5° | 67.5  | 15.6  | 7.6   | 3.8   | 3.0   | 2.0   | 1.2   | 0.7   | 0.5   | 0.5   | 0.3   |
| 75°   | 16.0  | 11.0  | 5.8   | 2.8   | 2.0   | 1.2   | 0.7   | 0.5   | 0.3   | 0.3   | 0.2   |
| 77.5° | 7.3   | 8.5   | 3.8   | 1.7   | 1.3   | 0.8   | 0.5   | 0.3   | 0.2   | 0.2   | 0.0   |
| 80°   | 4.2   | 6.0   | 1.8   | 1.2   | 1.0   | 0.7   | 0.3   | 0.2   | 0.2   | 0.0   | 0.0   |
| 82.5° | 2.2   | 3.3   | 1.3   | 1.0   | 0.8   | 0.5   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 1.5   | 1.7   | 1.0   | 0.8   | 0.7   | 0.5   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 1.2   | 1.2   | 1.0   | 0.8   | 0.7   | 0.5   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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: SP1-2012-088-8-R2

Luminaire Tested: CCW-SA1B-727-U-SL4

Test Date: 01/20/2021

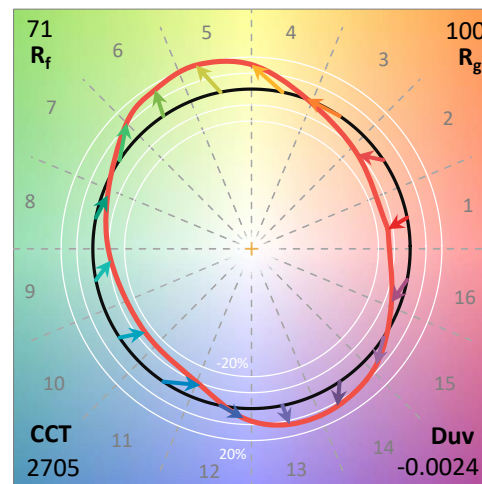
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-8-R2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/20/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA1B-727-U-SL4**  
 Description: INVUE WALL PACK

\*\*\*THIS IS A REVISION OF SP1-2012-088-8. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. INVUE WALL PACK LIGHT SQUARE SL4 OPTICS 1-SQUARE

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 2705    | CRI (Ra): | 73.8 |      |      |
| CIE u':                   | 0.2629  | R1:       | 72.2 | R9:  | -7.6 |
| CIE v':                   | 0.5237  | R2:       | 81.9 | R10: | 56.9 |
| Duv:                      | -0.0024 | R3:       | 89.3 | R11: | 66.0 |
| CIE x:                    | 0.4552  | R4:       | 71.3 | R12: | 47.9 |
| CIE y:                    | 0.4030  | R5:       | 69.5 | R13: | 73.4 |
| CIE z:                    | 0.1418  | R6:       | 73.6 | R14: | 93.2 |
| Peak Wavelength (nm):     | 603     | R7:       | 80.1 |      |      |
| Dominant Wavelength (nm): | 585     | R8:       | 52.8 |      |      |
| Purity:                   | 57.7    |           |      |      |      |
| Rf:                       | 71.2    |           |      |      |      |
| Rg:                       | 100.1   |           |      |      |      |



### Test Conditions

Stabilization Time: 177M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/34%  
 Sphere Temperature (°C): 24.7

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

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**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

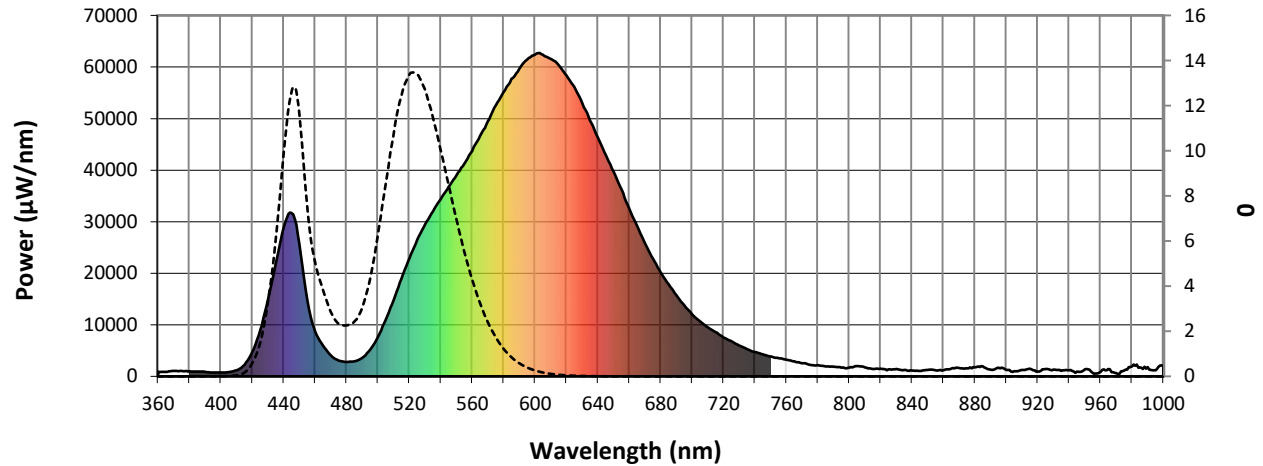


#####

| 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       | 926              | 0.0              | 490       | 3601             | 0.5              | 620       | 58340            | 15.2             | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 0.9              | 625       | 56180            | 12.4             | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 1.7              | 630       | 53018            | 9.6              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 3.1              | 635       | 49683            | 7.5              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 5.1              | 640       | 46308            | 5.5              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 7.9              | 645       | 42927            | 4.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 11.1             | 650       | 39728            | 2.9              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 14.2             | 655       | 36260            | 2.1              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 17.4             | 660       | 32543            | 1.4              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 19.9             | 665       | 29105            | 0.9              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 22.4             | 670       | 25817            | 0.6              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.0              | 545       | 36784            | 24.5             | 675       | 22832            | 0.4              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.0              | 550       | 39017            | 26.5             | 680       | 20201            | 0.2              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 0.0              | 555       | 41253            | 28.2             | 685       | 17863            | 0.2              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 0.1              | 560       | 43733            | 29.7             | 690       | 15761            | 0.1              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 0.3              | 565       | 46694            | 31.0             | 695       | 13762            | 0.1              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 0.5              | 570       | 49493            | 32.2             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 0.7              | 575       | 52587            | 32.7             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 0.7              | 580       | 55129            | 32.8             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 0.5              | 585       | 57737            | 32.1             | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 0.4              | 590       | 59688            | 30.9             | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 0.3              | 595       | 61458            | 29.1             | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 0.3              | 600       | 62443            | 26.9             | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 0.2              | 605       | 62403            | 24.2             | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 0.3              | 610       | 61581            | 21.2             | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 0.3              | 615       | 60386            | 18.2             | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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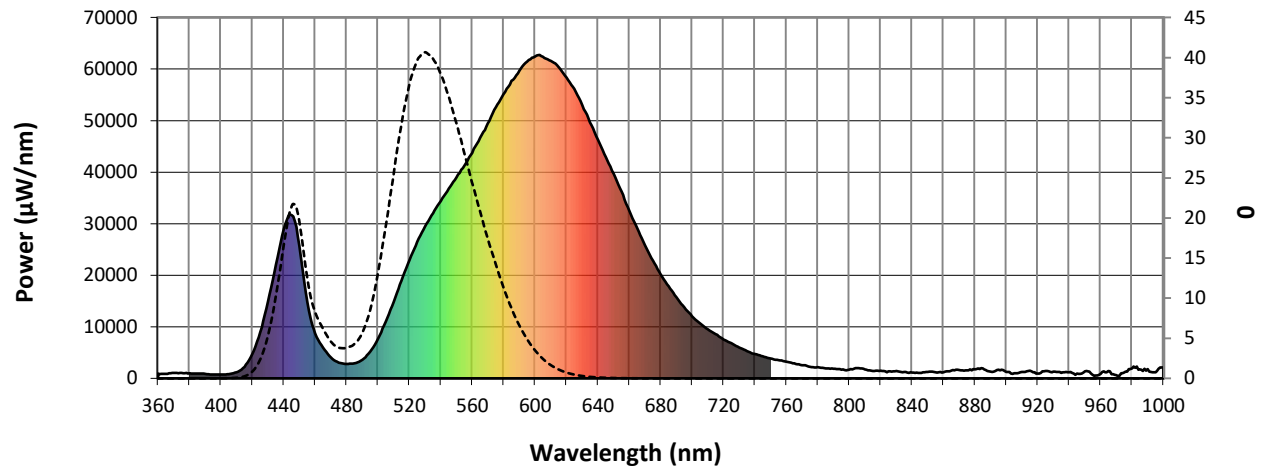
### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 1073.3**
**S/P: 0.36**

| 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       | 926              | 0.0              | 490       | 3601             | 5.5              | 620       | 58340            | 0.7              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 8.3              | 625       | 56180            | 0.5              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 12.9             | 630       | 53018            | 0.3              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 18.7             | 635       | 49683            | 0.2              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 25.1             | 640       | 46308            | 0.1              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 31.4             | 645       | 42927            | 0.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 36.5             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 39.6             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 40.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 39.9             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.1              | 540       | 34386            | 38.0             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.2              | 545       | 36784            | 35.3             | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.8              | 550       | 39017            | 31.9             | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 2.2              | 555       | 41253            | 28.2             | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 5.1              | 560       | 43733            | 24.4             | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 9.9              | 565       | 46694            | 20.9             | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 16.1             | 570       | 49493            | 17.5             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 21.2             | 575       | 52587            | 14.3             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 19.9             | 580       | 55129            | 11.4             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 12.9             | 585       | 57737            | 8.8              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 8.5              | 590       | 59688            | 6.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 6.3              | 595       | 61458            | 4.9              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 4.7              | 600       | 62443            | 3.5              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 3.8              | 605       | 62403            | 2.5              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 3.8              | 610       | 61581            | 1.7              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 4.2              | 615       | 60386            | 1.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 3157.6      S/P: 1.07**

| 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       | 926              | 0.0              | 490       | 3601             | 3.0              | 620       | 58340            | 0.0              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 4.2              | 625       | 56180            | 0.0              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 6.2              | 630       | 53018            | 0.0              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 8.5              | 635       | 49683            | 0.0              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 10.6             | 640       | 46308            | 0.0              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 12.4             | 645       | 42927            | 0.0              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 13.4             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 13.4             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 12.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 11.5             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 10.1             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.1              | 545       | 36784            | 8.5              | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.5              | 550       | 39017            | 7.0              | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 1.4              | 555       | 41253            | 5.6              | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 3.1              | 560       | 43733            | 4.3              | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 5.9              | 565       | 46694            | 3.3              | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 9.6              | 570       | 49493            | 2.4              | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 12.5             | 575       | 52587            | 1.8              | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 11.8             | 580       | 55129            | 1.2              | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 7.8              | 585       | 57737            | 0.9              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 5.2              | 590       | 59688            | 0.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 3.9              | 595       | 61458            | 0.4              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 2.9              | 600       | 62443            | 0.3              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 2.3              | 605       | 62403            | 0.2              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 2.3              | 610       | 61581            | 0.1              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 2.4              | 615       | 60386            | 0.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

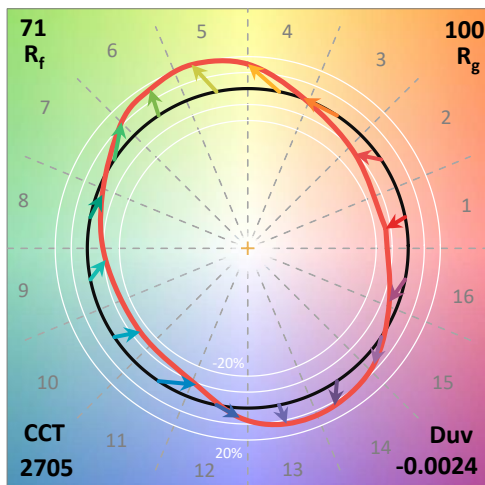
### Summary

$R_f = 71.2$   
 $R_g = 100.1$   
 CIE  $R_a = 73.8$   
 $R_g = -7.6$

### Spectral Power Distribution Comparison

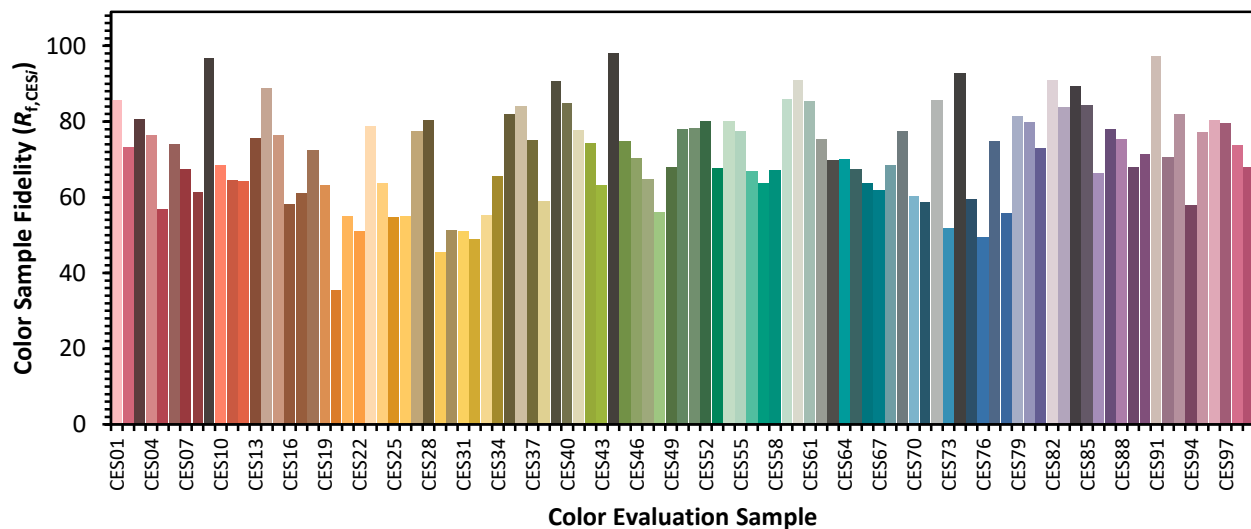


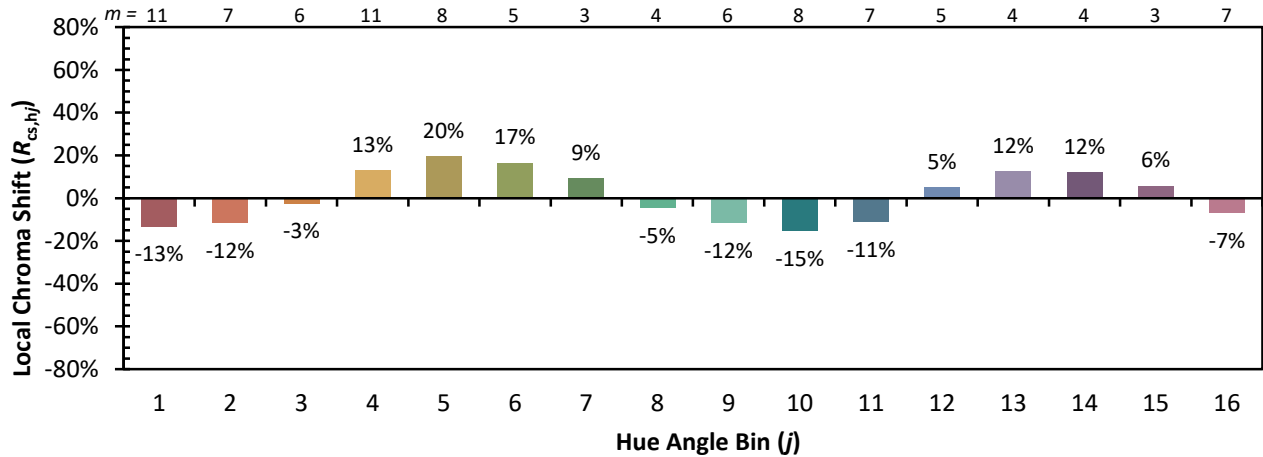
### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 55 | CES51 = 78 | CES76 = 50 |
| CES02 = 63 | CES27 = 77 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 68 | CES78 = 56 |
| CES04 = 71 | CES29 = 46 | CES54 = 80 | CES79 = 81 |
| CES05 = 50 | CES30 = 51 | CES55 = 78 | CES80 = 80 |
| CES06 = 52 | CES31 = 51 | CES56 = 67 | CES81 = 73 |
| CES07 = 43 | CES32 = 49 | CES57 = 64 | CES82 = 91 |
| CES08 = 41 | CES33 = 55 | CES58 = 67 | CES83 = 84 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 89 |
| CES10 = 77 | CES35 = 82 | CES60 = 91 | CES85 = 84 |
| CES11 = 60 | CES36 = 84 | CES61 = 85 | CES86 = 66 |
| CES12 = 66 | CES37 = 75 | CES62 = 75 | CES87 = 78 |
| CES13 = 44 | CES38 = 59 | CES63 = 70 | CES88 = 75 |
| CES14 = 74 | CES39 = 91 | CES64 = 70 | CES89 = 68 |
| CES15 = 72 | CES40 = 85 | CES65 = 67 | CES90 = 71 |
| CES16 = 48 | CES41 = 78 | CES66 = 64 | CES91 = 97 |
| CES17 = 51 | CES42 = 74 | CES67 = 62 | CES92 = 71 |
| CES18 = 57 | CES43 = 63 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 58 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 77 |
| CES21 = 88 | CES46 = 70 | CES71 = 59 | CES96 = 80 |
| CES22 = 80 | CES47 = 65 | CES72 = 86 | CES97 = 80 |
| CES23 = 92 | CES48 = 56 | CES73 = 52 | CES98 = 74 |
| CES24 = 91 | CES49 = 68 | CES74 = 93 | CES99 = 68 |
| CES25 = 73 | CES50 = 78 | CES75 = 59 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)