

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: STREETWORKS

Report Number: P349019

Luminaire Tested: **ARCH-N-PA1-30-830-24VDC-T2U-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P349019  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1908-474-2)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-N-PA1-30-830-24VDC-T2U-HSS  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 80 CRI, 3000K, 560mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2496 lumens  
Efficiency: N/A  
Efficacy: 89.1 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G1

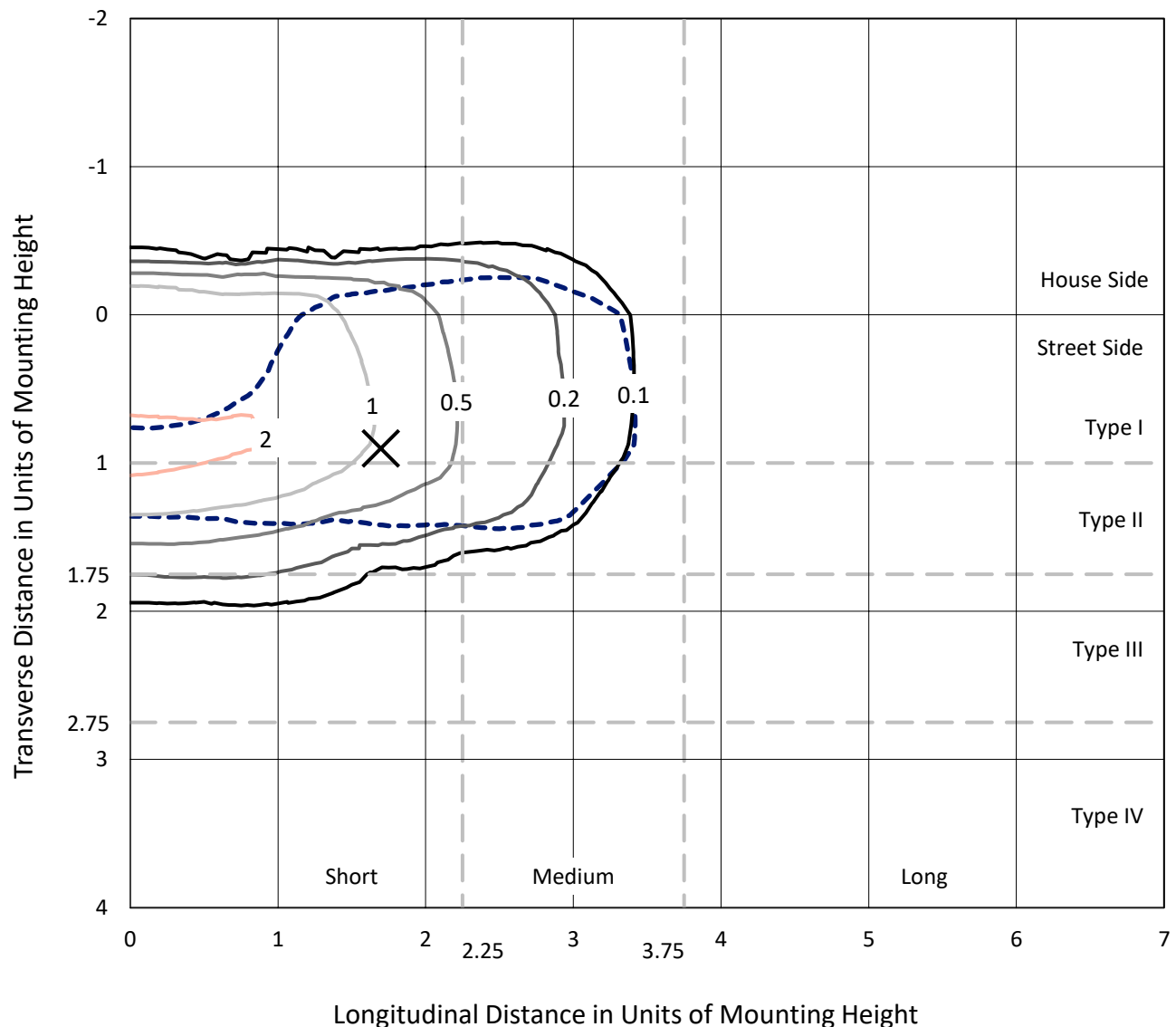
Input Watts (W): 28  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P349019

CATALOG NUMBER: ARCH-N-PA1-30-830-24VDC-T2U-HSS

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

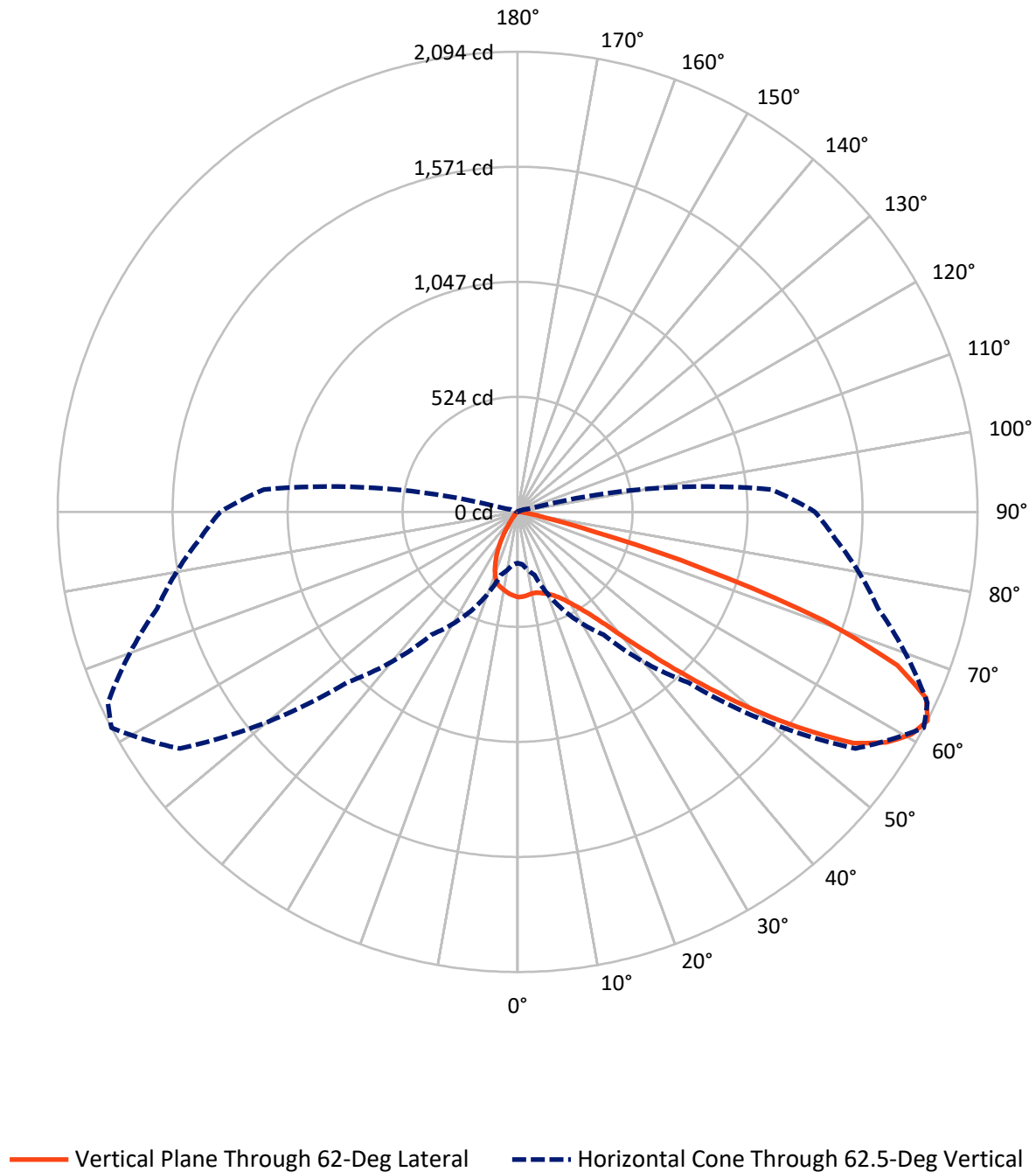


Based on 15 foot mounting height. Maximum calculated value = 2.5 fc  
 Type II - Short - N/A

REPORT NUMBER: P349019

CATALOG NUMBER: ARCH-N-PA1-30-830-24VDC-T2U-HSS

## Luminous Intensity Polar Plot



REPORT NUMBER: P349019

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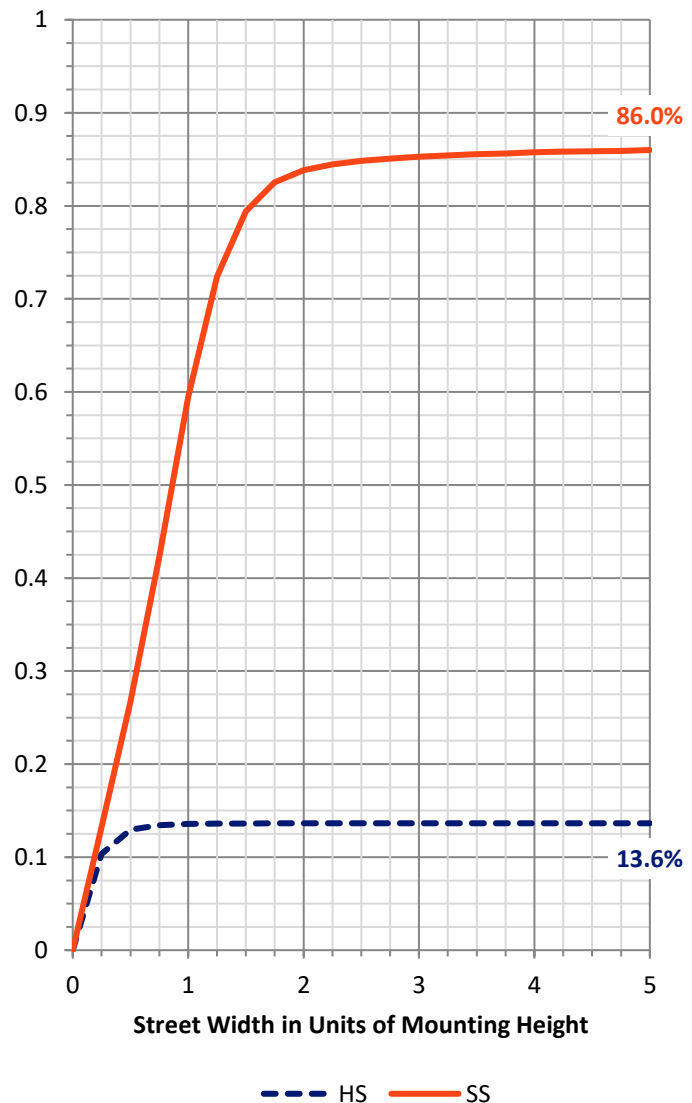
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 344.6    | 0.0    | 344.6  |
|                    | % Fixture | 13.8     | 0.0    | 13.8   |
| <b>Street Side</b> | Lumens    | 2151.4   | 0.0    | 2151.4 |
|                    | % Fixture | 86.2     | 0.0    | 86.2   |
| <b>Total</b>       | Lumens    | 2496.0   | 0.0    | 2496.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 35.3   | 1.4       |
| 10°-20°   | 88.7   | 3.6       |
| 20°-30°   | 132.4  | 5.3       |
| 30°-40°   | 252.2  | 10.1      |
| 40°-50°   | 525.9  | 21.1      |
| 50°-60°   | 698.7  | 28.0      |
| 60°-70°   | 544.7  | 21.8      |
| 70°-80°   | 205.9  | 8.2       |
| 80°-90°   | 12.3   | 0.5       |
| 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°    | 2496.0 | 100.0     |
| 0°-180°   | 2496.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P349019

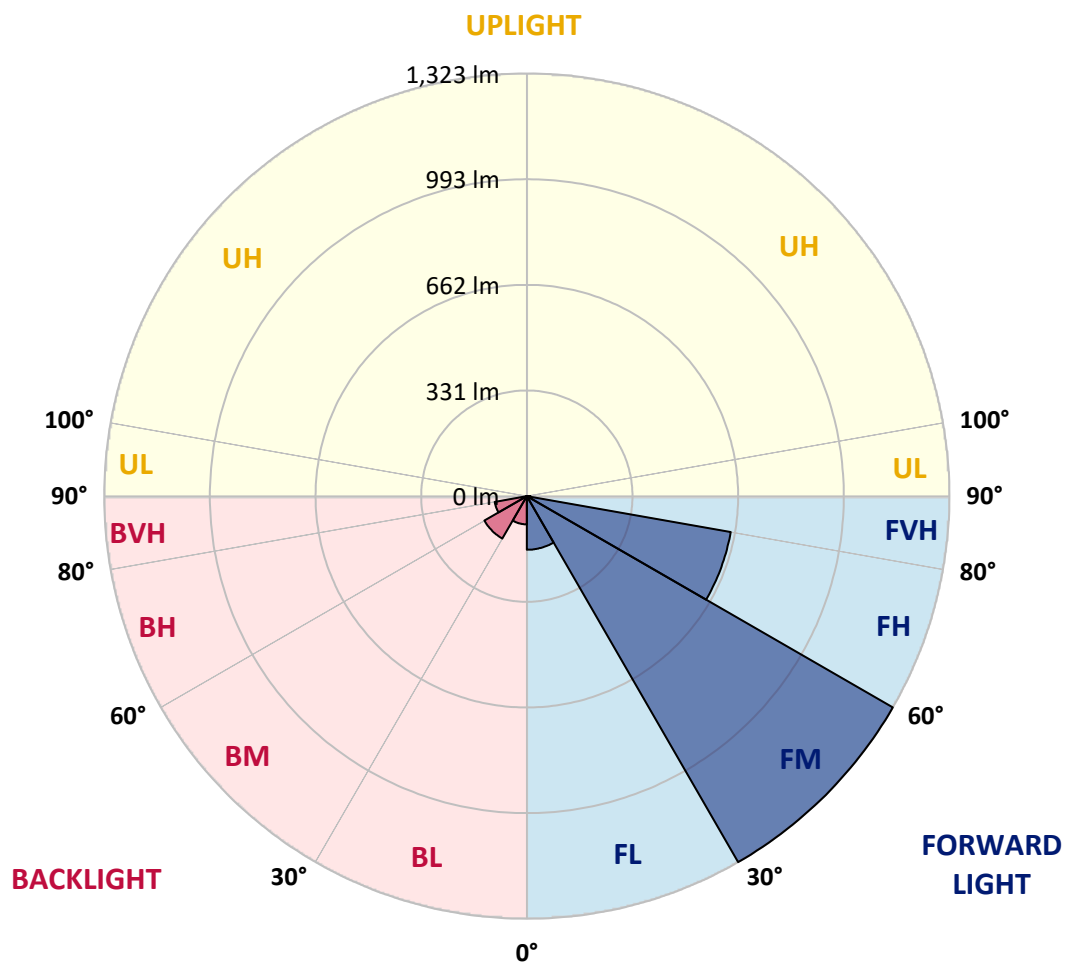
CATALOG NUMBER: ARCH-N-PA1-30-830-24VDC-T2U-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 168.0  | 6.7       |                         |      |        |
| FM   | (30°-60°)   | 1323.4 | 53.0      |                         |      |        |
| FH   | (60°-80°)   | 648.3  | 26.0      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 11.7   | 0.5       |                         |      | G1/100 |
| BL   | (0°-30°)    | 88.4   | 3.5       | B0/110                  |      |        |
| BM   | (30°-60°)   | 153.4  | 6.1       | B0/220                  |      |        |
| BH   | (60°-80°)   | 102.2  | 4.1       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 0.6    | 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-G1**

Type II Short



REPORT NUMBER: P349019

CATALOG NUMBER: ARCH-N-PA1-30-830-24VDC-T2U-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 62°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 387.8  | 387.8  | 387.8  | 387.8  | 387.8  | 387.8  | 387.8  | 387.8  | 387.8  | 387.8  | 387.8  |
| 2.5°  | 386.5  | 385.8  | 387.4  | 387.4  | 387.1  | 387.8  | 387.1  | 386.8  | 386.5  | 385.8  | 385.2  |
| 5°    | 376.4  | 376.4  | 378.6  | 379.6  | 380.6  | 382.6  | 383.2  | 383.9  | 383.5  | 384.2  | 384.5  |
| 7.5°  | 364.6  | 365.3  | 367.9  | 369.2  | 370.8  | 374.7  | 377.0  | 379.6  | 379.9  | 382.2  | 383.5  |
| 10°   | 354.8  | 355.5  | 358.1  | 359.7  | 362.0  | 367.2  | 372.1  | 376.7  | 377.3  | 381.6  | 382.6  |
| 12.5° | 348.3  | 349.0  | 351.6  | 353.9  | 358.7  | 365.3  | 372.1  | 377.3  | 379.0  | 384.2  | 384.2  |
| 15°   | 345.7  | 346.4  | 349.6  | 353.5  | 360.1  | 368.5  | 377.0  | 382.6  | 385.8  | 390.1  | 388.1  |
| 17.5° | 344.7  | 346.0  | 351.6  | 357.4  | 364.6  | 373.7  | 384.2  | 390.1  | 393.3  | 397.9  | 393.6  |
| 20°   | 347.7  | 349.3  | 356.5  | 364.6  | 372.1  | 381.6  | 393.0  | 399.5  | 402.8  | 405.7  | 397.6  |
| 22.5° | 358.1  | 360.7  | 366.9  | 376.0  | 381.9  | 393.3  | 404.7  | 412.2  | 415.8  | 415.5  | 404.7  |
| 25°   | 383.2  | 386.5  | 389.4  | 394.3  | 396.9  | 410.6  | 422.7  | 430.2  | 432.8  | 431.8  | 419.4  |
| 27.5° | 442.6  | 446.8  | 436.4  | 425.6  | 419.7  | 432.5  | 445.8  | 453.7  | 455.9  | 454.0  | 435.1  |
| 30°   | 542.7  | 543.0  | 519.2  | 485.3  | 460.2  | 458.9  | 475.2  | 485.6  | 485.6  | 481.7  | 457.2  |
| 32.5° | 688.5  | 678.0  | 648.0  | 588.0  | 531.3  | 501.6  | 514.0  | 524.1  | 524.1  | 519.2  | 491.2  |
| 35°   | 871.8  | 863.9  | 814.4  | 742.3  | 641.2  | 570.1  | 567.5  | 577.3  | 577.6  | 576.3  | 544.3  |
| 37.5° | 1058.3 | 1039.1 | 997.6  | 911.2  | 792.5  | 675.4  | 644.1  | 651.0  | 655.9  | 655.2  | 615.4  |
| 40°   | 1231.8 | 1212.6 | 1177.7 | 1094.5 | 978.4  | 830.7  | 755.7  | 755.7  | 756.0  | 752.7  | 704.8  |
| 42.5° | 1368.1 | 1359.3 | 1333.2 | 1275.5 | 1185.8 | 1074.9 | 906.0  | 881.2  | 876.0  | 872.7  | 809.8  |
| 45°   | 1456.5 | 1447.4 | 1433.4 | 1421.3 | 1392.3 | 1352.5 | 1107.9 | 1043.0 | 1034.5 | 1002.5 | 925.9  |
| 47.5° | 1461.4 | 1447.4 | 1456.8 | 1502.5 | 1568.1 | 1588.6 | 1357.0 | 1231.5 | 1209.0 | 1151.3 | 1042.3 |
| 50°   | 1352.5 | 1353.8 | 1390.6 | 1501.5 | 1678.6 | 1795.7 | 1621.2 | 1438.9 | 1403.4 | 1287.9 | 1145.1 |
| 52.5° | 1152.2 | 1165.3 | 1222.4 | 1392.9 | 1683.8 | 1928.1 | 1851.1 | 1652.8 | 1582.4 | 1410.5 | 1217.5 |
| 55°   | 902.1  | 913.8  | 1007.1 | 1191.7 | 1557.0 | 1947.0 | 2018.4 | 1857.7 | 1764.4 | 1496.0 | 1282.4 |
| 57.5° | 637.9  | 660.1  | 775.9  | 945.5  | 1315.0 | 1802.5 | 2064.1 | 1980.3 | 1889.9 | 1579.1 | 1343.3 |
| 60°   | 387.8  | 398.9  | 519.2  | 716.5  | 991.1  | 1500.2 | 2010.6 | 2058.6 | 1985.5 | 1651.2 | 1400.4 |
| 62.5° | 233.2  | 239.7  | 297.4  | 493.4  | 681.9  | 1098.4 | 1878.2 | 2094.4 | 2058.6 | 1699.2 | 1455.2 |
| 65°   | 138.0  | 142.2  | 169.3  | 298.1  | 454.3  | 673.8  | 1592.2 | 2045.2 | 2074.2 | 1740.6 | 1487.2 |
| 67.5° | 99.5   | 100.8  | 110.6  | 160.5  | 304.9  | 361.0  | 1107.2 | 1865.8 | 1974.4 | 1754.3 | 1468.3 |
| 70°   | 85.8   | 87.4   | 96.9   | 112.8  | 215.9  | 213.0  | 576.3  | 1476.7 | 1673.7 | 1682.9 | 1388.4 |
| 72.5° | 64.9   | 67.8   | 83.5   | 106.0  | 154.9  | 151.3  | 217.2  | 880.6  | 1136.3 | 1381.5 | 1196.9 |
| 75°   | 44.0   | 45.7   | 62.0   | 90.0   | 121.0  | 112.8  | 113.8  | 353.5  | 555.7  | 866.2  | 822.5  |
| 77.5° | 27.7   | 29.0   | 37.8   | 64.6   | 103.7  | 79.6   | 80.6   | 125.6  | 200.6  | 367.2  | 352.6  |
| 80°   | 18.9   | 19.6   | 22.8   | 41.7   | 70.1   | 69.1   | 51.9   | 65.6   | 74.7   | 113.2  | 76.0   |
| 82.5° | 11.4   | 11.4   | 15.0   | 24.8   | 42.4   | 54.8   | 32.6   | 36.2   | 39.8   | 42.1   | 17.3   |
| 85°   | 3.9    | 4.2    | 9.1    | 15.3   | 26.1   | 27.4   | 18.6   | 21.5   | 22.5   | 24.5   | 8.2    |
| 87.5° | 1.6    | 1.3    | 4.9    | 8.5    | 11.1   | 12.7   | 10.8   | 9.8    | 10.8   | 14.3   | 3.6    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

REPORT NUMBER: P349019

CATALOG NUMBER: ARCH-N-PA1-30-830-24VDC-T2U-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 387.8  | 387.8  | 387.8 | 387.8 | 387.8 | 387.8 | 387.8 | 387.8 | 387.8 | 387.8 | 387.8 |
| 2.5°  | 385.5  | 384.2  | 384.2 | 383.9 | 381.9 | 380.9 | 379.9 | 377.3 | 379.0 | 377.0 | 375.7 |
| 5°    | 383.5  | 382.6  | 380.9 | 379.3 | 374.7 | 370.8 | 369.2 | 365.9 | 365.6 | 363.0 | 361.7 |
| 7.5°  | 383.2  | 380.9  | 378.3 | 372.8 | 365.9 | 359.7 | 354.2 | 348.6 | 346.4 | 343.4 | 341.8 |
| 10°   | 381.6  | 378.6  | 373.7 | 364.9 | 354.8 | 345.0 | 332.7 | 317.3 | 305.9 | 299.4 | 298.4 |
| 12.5° | 381.9  | 378.6  | 371.1 | 358.1 | 344.7 | 323.2 | 289.9 | 255.0 | 226.3 | 214.3 | 212.3 |
| 15°   | 384.5  | 380.9  | 369.5 | 351.9 | 329.1 | 281.8 | 220.8 | 167.3 | 130.1 | 116.8 | 113.8 |
| 17.5° | 387.8  | 381.6  | 365.9 | 343.1 | 299.1 | 218.5 | 138.9 | 87.7  | 66.9  | 59.4  | 58.1  |
| 20°   | 389.7  | 381.3  | 360.1 | 329.7 | 253.4 | 146.1 | 75.7  | 51.5  | 45.3  | 43.7  | 43.0  |
| 22.5° | 394.6  | 382.2  | 355.2 | 308.8 | 196.0 | 88.1  | 47.9  | 40.1  | 36.5  | 34.6  | 34.2  |
| 25°   | 404.7  | 388.8  | 355.5 | 281.8 | 137.3 | 53.2  | 38.8  | 32.6  | 29.4  | 27.4  | 26.7  |
| 27.5° | 419.4  | 400.5  | 361.7 | 248.2 | 84.8  | 40.1  | 32.3  | 26.4  | 22.8  | 21.2  | 20.9  |
| 30°   | 438.0  | 414.8  | 368.9 | 204.5 | 52.8  | 33.6  | 26.1  | 20.5  | 17.9  | 17.0  | 16.6  |
| 32.5° | 467.4  | 439.6  | 375.1 | 153.0 | 36.5  | 27.7  | 20.5  | 16.3  | 14.7  | 13.7  | 13.7  |
| 35°   | 515.9  | 482.4  | 385.2 | 102.4 | 29.0  | 22.2  | 16.6  | 13.4  | 12.1  | 11.4  | 11.4  |
| 37.5° | 584.4  | 543.3  | 390.1 | 63.6  | 23.8  | 17.3  | 13.4  | 11.1  | 10.1  | 9.5   | 9.5   |
| 40°   | 667.9  | 617.4  | 383.2 | 39.5  | 19.9  | 14.0  | 11.1  | 9.5   | 8.5   | 8.2   | 8.2   |
| 42.5° | 764.1  | 702.5  | 361.7 | 28.0  | 16.6  | 11.4  | 9.5   | 8.2   | 7.5   | 7.2   | 7.2   |
| 45°   | 871.8  | 795.8  | 322.9 | 23.5  | 14.0  | 9.8   | 8.2   | 6.8   | 6.5   | 6.2   | 6.2   |
| 47.5° | 979.1  | 890.3  | 272.6 | 20.2  | 11.7  | 8.2   | 6.8   | 5.9   | 5.5   | 5.2   | 5.2   |
| 50°   | 1072.7 | 973.2  | 219.5 | 17.6  | 9.8   | 7.2   | 5.9   | 4.9   | 4.6   | 4.2   | 4.2   |
| 52.5° | 1126.1 | 1022.4 | 169.9 | 14.7  | 8.5   | 6.2   | 4.6   | 3.9   | 3.6   | 3.3   | 3.3   |
| 55°   | 1183.9 | 1063.5 | 126.9 | 12.4  | 6.8   | 5.2   | 3.6   | 2.9   | 2.6   | 2.3   | 2.3   |
| 57.5° | 1237.7 | 1100.4 | 94.3  | 10.1  | 5.9   | 3.9   | 2.9   | 2.3   | 2.0   | 1.6   | 1.6   |
| 60°   | 1289.9 | 1131.7 | 69.8  | 8.2   | 4.9   | 3.3   | 2.3   | 1.6   | 1.3   | 1.0   | 1.0   |
| 62.5° | 1353.5 | 1160.4 | 51.2  | 6.5   | 4.2   | 2.3   | 1.6   | 1.0   | 0.7   | 0.3   | 0.3   |
| 65°   | 1400.7 | 1175.1 | 38.5  | 4.9   | 3.6   | 1.6   | 1.0   | 0.7   | 0.0   | 0.0   | 0.0   |
| 67.5° | 1400.4 | 1146.7 | 28.0  | 3.6   | 2.6   | 1.3   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   |
| 70°   | 1334.9 | 1060.6 | 19.6  | 2.9   | 2.0   | 1.0   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 1144.7 | 838.8  | 12.7  | 2.0   | 1.6   | 0.7   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 772.6  | 425.9  | 7.5   | 1.6   | 1.3   | 0.7   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 330.4  | 167.3  | 3.9   | 1.0   | 1.0   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 69.1   | 40.4   | 1.6   | 0.7   | 0.7   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 11.7   | 5.9    | 0.7   | 0.7   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 2.9    | 1.6    | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 1.3    | 0.7    | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-6

Luminaire Tested: CCW-SA-2A-830-U-SL4

Test Date: 04/27/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-6  
 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-830-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 2979   | CRI (Ra): | 83.1 |      |      |
| CIE u':                   | 0.2511 | R1:       | 81.3 | R9:  | 7.1  |
| CIE v':                   | 0.5225 | R2:       | 91.2 | R10: | 80.8 |
| Duv:                      | 0.0005 | R3:       | 96.2 | R11: | 82.0 |
| CIE x:                    | 0.4390 | R4:       | 81.7 | R12: | 76.3 |
| CIE y:                    | 0.4060 | R5:       | 82.0 | R13: | 83.6 |
| CIE z:                    | 0.1550 | R6:       | 90.2 | R14: | 98.4 |
| Peak Wavelength (nm):     | 603    | R7:       | 82.8 |      |      |
| Dominant Wavelength (nm): | 582    | R8:       | 58.9 |      |      |
| Purity:                   | 54     |           |      |      |      |
| Rf:                       | 86     |           |      |      |      |
| Rg:                       | 96.1   |           |      |      |      |



### Test Conditions

Stabilization Time: 78M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/47%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2104-224-6

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

REPORT NUMBER: SP1-2104-224-6

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2104-224-6

### 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       | 1540             | 0.0              | 490       | 23715            | 3.4              | 620       | 85792            | 22.3             | 750       | 4198             | 0.0              | 880       | 1529             | 0.0              |
| 365       | 1274             | 0.0              | 495       | 27763            | 5.0              | 625       | 82163            | 18.1             | 755       | 3846             | 0.0              | 885       | 1863             | 0.0              |
| 370       | 1307             | 0.0              | 500       | 32023            | 7.1              | 630       | 76960            | 13.9             | 760       | 3380             | 0.0              | 890       | 2114             | 0.0              |
| 375       | 1612             | 0.0              | 505       | 35605            | 10.0             | 635       | 71512            | 10.7             | 765       | 3174             | 0.0              | 895       | 1695             | 0.0              |
| 380       | 1536             | 0.0              | 510       | 38842            | 13.3             | 640       | 65929            | 7.9              | 770       | 2898             | 0.0              | 900       | 1843             | 0.0              |
| 385       | 1342             | 0.0              | 515       | 41267            | 17.1             | 645       | 60362            | 5.8              | 775       | 2539             | 0.0              | 905       | 1730             | 0.0              |
| 390       | 1278             | 0.0              | 520       | 43140            | 20.9             | 650       | 55010            | 4.0              | 780       | 2473             | 0.0              | 910       | 1325             | 0.0              |
| 395       | 1204             | 0.0              | 525       | 44884            | 24.1             | 655       | 49154            | 2.8              | 785       | 2349             | 0.0              | 915       | 1786             | 0.0              |
| 400       | 1038             | 0.0              | 530       | 46722            | 27.5             | 660       | 44162            | 1.8              | 790       | 1939             | 0.0              | 920       | 2044             | 0.0              |
| 405       | 1061             | 0.0              | 535       | 48254            | 29.9             | 665       | 38916            | 1.2              | 795       | 1859             | 0.0              | 925       | 1947             | 0.0              |
| 410       | 1327             | 0.0              | 540       | 50064            | 32.6             | 670       | 33949            | 0.7              | 800       | 2145             | 0.0              | 930       | 1610             | 0.0              |
| 415       | 1996             | 0.0              | 545       | 52217            | 34.8             | 675       | 29528            | 0.5              | 805       | 1833             | 0.0              | 935       | 2111             | 0.0              |
| 420       | 3268             | 0.0              | 550       | 55198            | 37.5             | 680       | 25626            | 0.3              | 810       | 2023             | 0.0              | 940       | 2657             | 0.0              |
| 425       | 5667             | 0.0              | 555       | 58564            | 40.0             | 685       | 22299            | 0.2              | 815       | 1752             | 0.0              | 945       | 2238             | 0.0              |
| 430       | 9713             | 0.1              | 560       | 62385            | 42.4             | 690       | 19299            | 0.1              | 820       | 1756             | 0.0              | 950       | 2401             | 0.0              |
| 435       | 16063            | 0.2              | 565       | 66522            | 44.2             | 695       | 16488            | 0.1              | 825       | 1713             | 0.0              | 955       | 2656             | 0.0              |
| 440       | 26124            | 0.4              | 570       | 71254            | 46.3             | 700       | 14392            | 0.0              | 830       | 1766             | 0.0              | 960       | 2228             | 0.0              |
| 445       | 38102            | 0.8              | 575       | 75923            | 47.2             | 705       | 12426            | 0.0              | 835       | 1901             | 0.0              | 965       | 2517             | 0.0              |
| 450       | 42175            | 1.1              | 580       | 80516            | 47.8             | 710       | 10953            | 0.0              | 840       | 1722             | 0.0              | 970       | 2476             | 0.0              |
| 455       | 34315            | 1.1              | 585       | 84772            | 47.1             | 715       | 9724             | 0.0              | 845       | 1694             | 0.0              | 975       | 2085             | 0.0              |
| 460       | 26966            | 1.1              | 590       | 88815            | 45.9             | 720       | 8614             | 0.0              | 850       | 1717             | 0.0              | 980       | 1509             | 0.0              |
| 465       | 22504            | 1.2              | 595       | 90846            | 43.1             | 725       | 7544             | 0.0              | 855       | 1853             | 0.0              | 985       | 2241             | 0.0              |
| 470       | 18776            | 1.2              | 600       | 92683            | 39.9             | 730       | 6583             | 0.0              | 860       | 1827             | 0.0              | 990       | 1651             | 0.0              |
| 475       | 16954            | 1.3              | 605       | 93294            | 36.1             | 735       | 5796             | 0.0              | 865       | 1745             | 0.0              | 995       | 1035             | 0.0              |
| 480       | 17815            | 1.7              | 610       | 91814            | 31.5             | 740       | 5170             | 0.0              | 870       | 1690             | 0.0              | 1000      | 2009             | 0.0              |
| 485       | 20300            | 2.4              | 615       | 89370            | 27.0             | 745       | 4593             | 0.0              | 875       | 1834             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-6

### Scotopic Flux vs. Wavelength



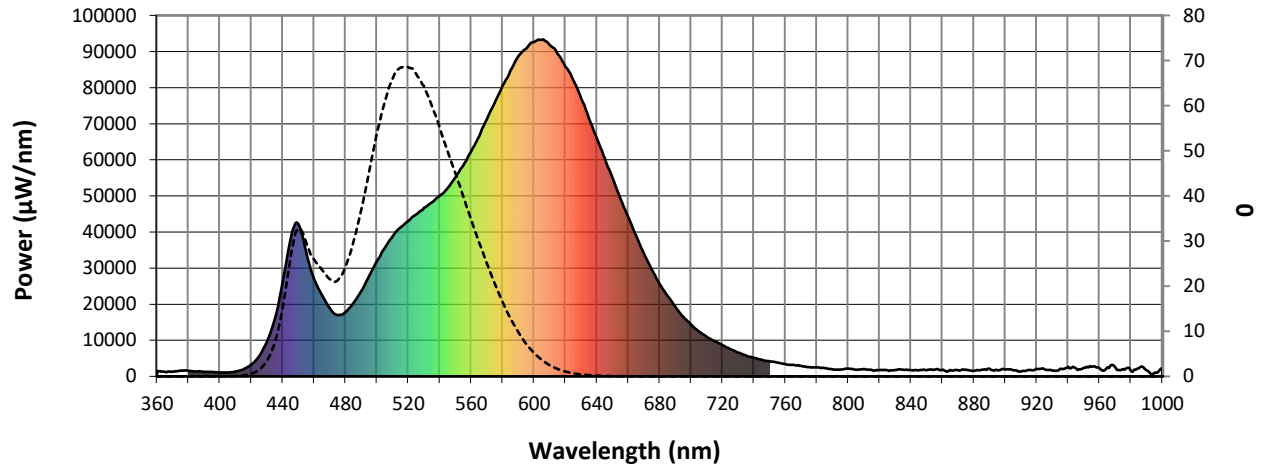
Scotopic Lumens: 6076.4

S/P: 1.34

| 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       | 1540             | 0.0              | 490       | 23715            | 36.5             | 620       | 85792            | 1.1              | 750       | 4198             | 0.0              | 880       | 1529             | 0.0              |
| 365       | 1274             | 0.0              | 495       | 27763            | 44.9             | 625       | 82163            | 0.7              | 755       | 3846             | 0.0              | 885       | 1863             | 0.0              |
| 370       | 1307             | 0.0              | 500       | 32023            | 53.6             | 630       | 76960            | 0.4              | 760       | 3380             | 0.0              | 890       | 2114             | 0.0              |
| 375       | 1612             | 0.0              | 505       | 35605            | 60.5             | 635       | 71512            | 0.3              | 765       | 3174             | 0.0              | 895       | 1695             | 0.0              |
| 380       | 1536             | 0.0              | 510       | 38842            | 65.8             | 640       | 65929            | 0.2              | 770       | 2898             | 0.0              | 900       | 1843             | 0.0              |
| 385       | 1342             | 0.0              | 515       | 41267            | 68.4             | 645       | 60362            | 0.1              | 775       | 2539             | 0.0              | 905       | 1730             | 0.0              |
| 390       | 1278             | 0.0              | 520       | 43140            | 68.6             | 650       | 55010            | 0.1              | 780       | 2473             | 0.0              | 910       | 1325             | 0.0              |
| 395       | 1204             | 0.0              | 525       | 44884            | 67.1             | 655       | 49154            | 0.0              | 785       | 2349             | 0.0              | 915       | 1786             | 0.0              |
| 400       | 1038             | 0.0              | 530       | 46722            | 64.4             | 660       | 44162            | 0.0              | 790       | 1939             | 0.0              | 920       | 2044             | 0.0              |
| 405       | 1061             | 0.0              | 535       | 48254            | 60.1             | 665       | 38916            | 0.0              | 795       | 1859             | 0.0              | 925       | 1947             | 0.0              |
| 410       | 1327             | 0.1              | 540       | 50064            | 55.3             | 670       | 33949            | 0.0              | 800       | 2145             | 0.0              | 930       | 1610             | 0.0              |
| 415       | 1996             | 0.2              | 545       | 52217            | 50.1             | 675       | 29528            | 0.0              | 805       | 1833             | 0.0              | 935       | 2111             | 0.0              |
| 420       | 3268             | 0.5              | 550       | 55198            | 45.1             | 680       | 25626            | 0.0              | 810       | 2023             | 0.0              | 940       | 2657             | 0.0              |
| 425       | 5667             | 1.4              | 555       | 58564            | 40.0             | 685       | 22299            | 0.0              | 815       | 1752             | 0.0              | 945       | 2238             | 0.0              |
| 430       | 9713             | 3.3              | 560       | 62385            | 34.9             | 690       | 19299            | 0.0              | 820       | 1756             | 0.0              | 950       | 2401             | 0.0              |
| 435       | 16063            | 7.2              | 565       | 66522            | 29.8             | 695       | 16488            | 0.0              | 825       | 1713             | 0.0              | 955       | 2656             | 0.0              |
| 440       | 26124            | 14.6             | 570       | 71254            | 25.1             | 700       | 14392            | 0.0              | 830       | 1766             | 0.0              | 960       | 2228             | 0.0              |
| 445       | 38102            | 25.5             | 575       | 75923            | 20.7             | 705       | 12426            | 0.0              | 835       | 1901             | 0.0              | 965       | 2517             | 0.0              |
| 450       | 42175            | 32.7             | 580       | 80516            | 16.6             | 710       | 10953            | 0.0              | 840       | 1722             | 0.0              | 970       | 2476             | 0.0              |
| 455       | 34315            | 30.0             | 585       | 84772            | 13.0             | 715       | 9724             | 0.0              | 845       | 1694             | 0.0              | 975       | 2085             | 0.0              |
| 460       | 26966            | 26.0             | 590       | 88815            | 9.9              | 720       | 8614             | 0.0              | 850       | 1717             | 0.0              | 980       | 1509             | 0.0              |
| 465       | 22504            | 23.8             | 595       | 90846            | 7.2              | 725       | 7544             | 0.0              | 855       | 1853             | 0.0              | 985       | 2241             | 0.0              |
| 470       | 18776            | 21.6             | 600       | 92683            | 5.2              | 730       | 6583             | 0.0              | 860       | 1827             | 0.0              | 990       | 1651             | 0.0              |
| 475       | 16954            | 21.2             | 605       | 93294            | 3.7              | 735       | 5796             | 0.0              | 865       | 1745             | 0.0              | 995       | 1035             | 0.0              |
| 480       | 17815            | 24.1             | 610       | 91814            | 2.5              | 740       | 5170             | 0.0              | 870       | 1690             | 0.0              | 1000      | 2009             | 0.0              |
| 485       | 20300            | 29.4             | 615       | 89370            | 1.7              | 745       | 4593             | 0.0              | 875       | 1834             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-6

### Melanopic Flux vs. Wavelength



Melanopic Lumens: 2300.1

M/P: 0.51

| 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       | 1540             | 0.0              | 490       | 23715            | 19.7             | 620       | 85792            | 0.1              | 750       | 4198             | 0.0              | 880       | 1529             | 0.0              |
| 365       | 1274             | 0.0              | 495       | 27763            | 22.9             | 625       | 82163            | 0.0              | 755       | 3846             | 0.0              | 885       | 1863             | 0.0              |
| 370       | 1307             | 0.0              | 500       | 32023            | 25.7             | 630       | 76960            | 0.0              | 760       | 3380             | 0.0              | 890       | 2114             | 0.0              |
| 375       | 1612             | 0.0              | 505       | 35605            | 27.3             | 635       | 71512            | 0.0              | 765       | 3174             | 0.0              | 895       | 1695             | 0.0              |
| 380       | 1536             | 0.0              | 510       | 38842            | 27.9             | 640       | 65929            | 0.0              | 770       | 2898             | 0.0              | 900       | 1843             | 0.0              |
| 385       | 1342             | 0.0              | 515       | 41267            | 27.0             | 645       | 60362            | 0.0              | 775       | 2539             | 0.0              | 905       | 1730             | 0.0              |
| 390       | 1278             | 0.0              | 520       | 43140            | 25.1             | 650       | 55010            | 0.0              | 780       | 2473             | 0.0              | 910       | 1325             | 0.0              |
| 395       | 1204             | 0.0              | 525       | 44884            | 22.8             | 655       | 49154            | 0.0              | 785       | 2349             | 0.0              | 915       | 1786             | 0.0              |
| 400       | 1038             | 0.0              | 530       | 46722            | 20.2             | 660       | 44162            | 0.0              | 790       | 1939             | 0.0              | 920       | 2044             | 0.0              |
| 405       | 1061             | 0.0              | 535       | 48254            | 17.4             | 665       | 38916            | 0.0              | 795       | 1859             | 0.0              | 925       | 1947             | 0.0              |
| 410       | 1327             | 0.1              | 540       | 50064            | 14.7             | 670       | 33949            | 0.0              | 800       | 2145             | 0.0              | 930       | 1610             | 0.0              |
| 415       | 1996             | 0.1              | 545       | 52217            | 12.1             | 675       | 29528            | 0.0              | 805       | 1833             | 0.0              | 935       | 2111             | 0.0              |
| 420       | 3268             | 0.4              | 550       | 55198            | 9.9              | 680       | 25626            | 0.0              | 810       | 2023             | 0.0              | 940       | 2657             | 0.0              |
| 425       | 5667             | 0.9              | 555       | 58564            | 7.9              | 685       | 22299            | 0.0              | 815       | 1752             | 0.0              | 945       | 2238             | 0.0              |
| 430       | 9713             | 2.1              | 560       | 62385            | 6.2              | 690       | 19299            | 0.0              | 820       | 1756             | 0.0              | 950       | 2401             | 0.0              |
| 435       | 16063            | 4.3              | 565       | 66522            | 4.7              | 695       | 16488            | 0.0              | 825       | 1713             | 0.0              | 955       | 2656             | 0.0              |
| 440       | 26124            | 8.7              | 570       | 71254            | 3.5              | 700       | 14392            | 0.0              | 830       | 1766             | 0.0              | 960       | 2228             | 0.0              |
| 445       | 38102            | 15.0             | 575       | 75923            | 2.5              | 705       | 12426            | 0.0              | 835       | 1901             | 0.0              | 965       | 2517             | 0.0              |
| 450       | 42175            | 19.4             | 580       | 80516            | 1.8              | 710       | 10953            | 0.0              | 840       | 1722             | 0.0              | 970       | 2476             | 0.0              |
| 455       | 34315            | 18.0             | 585       | 84772            | 1.3              | 715       | 9724             | 0.0              | 845       | 1694             | 0.0              | 975       | 2085             | 0.0              |
| 460       | 26966            | 15.9             | 590       | 88815            | 0.9              | 720       | 8614             | 0.0              | 850       | 1717             | 0.0              | 980       | 1509             | 0.0              |
| 465       | 22504            | 14.7             | 595       | 90846            | 0.6              | 725       | 7544             | 0.0              | 855       | 1853             | 0.0              | 985       | 2241             | 0.0              |
| 470       | 18776            | 13.4             | 600       | 92683            | 0.4              | 730       | 6583             | 0.0              | 860       | 1827             | 0.0              | 990       | 1651             | 0.0              |
| 475       | 16954            | 12.9             | 605       | 93294            | 0.3              | 735       | 5796             | 0.0              | 865       | 1745             | 0.0              | 995       | 1035             | 0.0              |
| 480       | 17815            | 14.3             | 610       | 91814            | 0.2              | 740       | 5170             | 0.0              | 870       | 1690             | 0.0              | 1000      | 2009             | 0.0              |
| 485       | 20300            | 16.7             | 615       | 89370            | 0.1              | 745       | 4593             | 0.0              | 875       | 1834             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-224-6

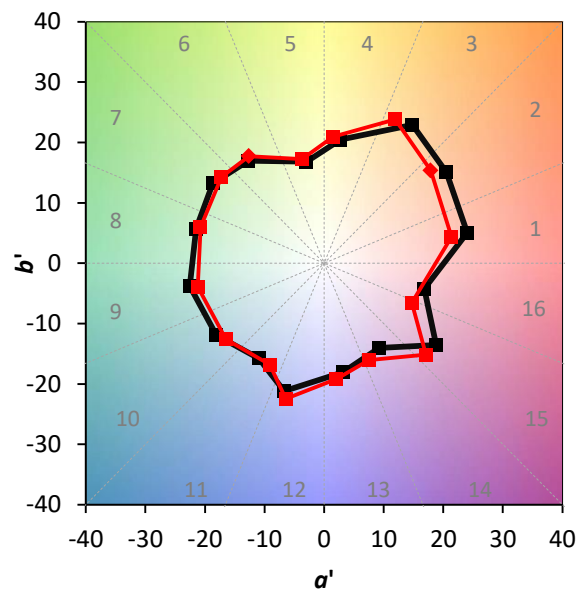
TM-30-18

### Summary

$R_f = 86$   
 $R_g = 96.1$   
 CIE  $R_a = 83.1$   
 $R_9 = 7.1$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 96 | CES76 = 82 |
| CES02 = 63 | CES27 = 96 | CES52 = 95 | CES77 = 86 |
| CES03 = 31 | CES28 = 94 | CES53 = 90 | CES78 = 82 |
| CES04 = 70 | CES29 = 86 | CES54 = 92 | CES79 = 91 |
| CES05 = 50 | CES30 = 92 | CES55 = 92 | CES80 = 90 |
| CES06 = 51 | CES31 = 88 | CES56 = 88 | CES81 = 73 |
| CES07 = 42 | CES32 = 82 | CES57 = 88 | CES82 = 96 |
| CES08 = 41 | CES33 = 90 | CES58 = 89 | CES83 = 94 |
| CES09 = 29 | CES34 = 91 | CES59 = 92 | CES84 = 92 |
| CES10 = 76 | CES35 = 95 | CES60 = 95 | CES85 = 78 |
| CES11 = 59 | CES36 = 92 | CES61 = 90 | CES86 = 68 |
| CES12 = 65 | CES37 = 95 | CES62 = 96 | CES87 = 85 |
| CES13 = 44 | CES38 = 99 | CES63 = 88 | CES88 = 87 |
| CES14 = 74 | CES39 = 98 | CES64 = 85 | CES89 = 76 |
| CES15 = 72 | CES40 = 95 | CES65 = 81 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 84 | CES91 = 83 |
| CES17 = 50 | CES42 = 96 | CES67 = 83 | CES92 = 67 |
| CES18 = 57 | CES43 = 90 | CES68 = 84 | CES93 = 80 |
| CES19 = 72 | CES44 = 99 | CES69 = 89 | CES94 = 63 |
| CES20 = 67 | CES45 = 93 | CES70 = 82 | CES95 = 76 |
| CES21 = 87 | CES46 = 90 | CES71 = 81 | CES96 = 84 |
| CES22 = 79 | CES47 = 91 | CES72 = 93 | CES97 = 90 |
| CES23 = 92 | CES48 = 84 | CES73 = 77 | CES98 = 85 |
| CES24 = 91 | CES49 = 90 | CES74 = 93 | CES99 = 77 |
| CES25 = 72 | CES50 = 95 | CES75 = 82 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)